D5.2 – Catalogue of sources and instruments and adaptation finance process

WP5 – Task 5.2

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Summary

The objective of Deliverable 5.2 is to create a catalogue of finance mechanisms, sources and best practices and develop a process for building adaptation finance strategies and resource mobilisation plans. In doing so, it provides the core content in Pathways2Resilience (P2R) to support regions to bridge the gap between their adaptation needs and current flows. It sets out:

- **A catalogue of sources of finance** - that is targeted to regions, with examples of best practice in Key Community Systems (KCS) of the Adaptation Mission. It also explores emerging innovative practices for increasing the diversity of sources for financing adaptation and their volumes of finance.
- **A catalogue of instruments** – that can be used to finance adaptation for or within regions, with a series of best practice examples in KCS. This also explores innovations in instruments to support adaptation financing.
- **An evaluation of adaptation finance approaches** - a review and evaluation of adaptation finance processes and their potential applicability to regions and to P2R.
- **An adaptation finance process** – a proposed process for mobilising adaptation finance in regions for the P2R project, known as the Adaptation Investment Cycle.

The deliverable presents the review and synthesis undertaken, informed by academic and grey literature. This has included an assessment of existing catalogues and processes, as well as labs and accelerator programmes to identify innovations and best practice examples.

Sources of finance for adaptation

To date, regions have mainly relied on public resources for adaptation, employing their own resources, or leveraging national or EU funds (primarily grants) to support them. There is greater use of Cohesion Policy and the LIFE programme than of finance (loans) from development banks such as the EIB, or Council of Europe Development Bank. This, combined with evidence of limited private finance flows, suggests there is significant scope to boost the scale and diversity of sources for adaptation, involving financial entities, households, businesses, third sector and the private sector.

The P2R study identified ten catalogues of sources. There are fewer catalogues focusing on sources than instruments and none are directly relevant to the purpose of supporting the European Misson on Climate Change Adaptation (EMCCA). Source catalogues also tend to focus more on public sources than private or third sector. Many are less applied and instead provide taxonomies for the purposes of finance tracking or high-level policy development. There is also a trade-off between granularity and usability - in principle a comprehensive range of individual sources is useful, but to make them accessible, effective catalogues use categories to help users navigate the wide variation of sources across Europe.

Many catalogues conflate sources and instruments or combine them under terms such as ‘funding opportunities’. Whilst useful for regions getting started for financing adaptation, in the long term, regions are likely to be better served by building capabilities to identify, appraise and select sources, including from the private sector. In this regard the best catalogues focus on the practicalities of working with different sources, such as the actors and instruments they offer, their motivations, and the advantages and drawbacks, and provide case studies.

Based on the review, P2R has developed a catalogue that contains a nested taxonomy of 55 sources across the public, private and third sectors, along with detailed practice-oriented information such as the scalability and amount of resources needed to deploy, in a way that

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complements the wider capacity building and support activities planned through P2R and the Mission process. This includes consideration of innovative sources, including private investment, with discussion of how to address some of the barriers to accessing these.

It also discusses some of the enabling conditions around mobilising sources. This includes new methods of project design and business case development, the new regulations under the EU Sustainable Finance package, the use of platforms and investment portfolios / pipelines to raise visibility of opportunities, and new instruments like crowdfunding which offer the potential to connect citizens in directly to opportunities.

Financing Instruments for Adaptation

There are a wide variety of financial instruments that can be used to finance adaptation in regions. These include grants, debt, equity, fees and user charges, risk mitigation, taxation, results-based finance, land value capture and blended finance. There are also non-financial instruments that can support these, such as subsidies, regulations and incentives. Regions can also work with others to combine different funding sources into blended arrangements, which combine public and private finance.

The P2R study identified and reviewed 16 instrument catalogues. The review found that none were suitable for use by regions (off-the-shelf), and while they had a variety of strengths they also had weaknesses. Many of the most effective catalogues of instruments were anchored within wider guidance on financing of adaptation projects, and included applied information needed.

Building on the review, the P2R instruments catalogue developed a flexible taxonomy of 61 instruments for regions, with supporting information on their advantages and drawbacks, their relevance to Key Community Systems and potential for different financing strategies. This will be expanded over the project to accommodate new and innovative instruments.

This includes innovative instruments, for example: modifying insurance to incentivise city- or household-level investments in adaptation, providing dedicated climate proofing grants to supplement standard expenditures, project aggregation, results-based finance and many more.

Adaptation Finance Processes

The next step in the task was focused on adaptation finance processes. The review identified thirteen processes for mobilising resources and delivering adaptation finance. It evaluated the objectives and outcomes these processes were seeking to achieve as well as the type of processes they used. The review found these processes cover a diverse range of scope and ambition ranging from project level investments, to aggregate budgetary decisions. There were also a wide range of audiences for these processes, including national governments and project developers, as well as local and regional governments. The approach adopted in these processes also varied, with some more focused on existing contexts, whilst others explicitly address key barriers or challenges. There is no ex-post data to assess which of these approaches have been most successful, however, the literature indicates that those that focused on creating value might lead to greater success, as they quantify the financial and economic value of adaptation and avoided damages alongside wider economic and social benefits. Surprisingly, there was a limited focus on justice and equity in the processes, though this may reflect the fact that the concept of just resilience is more recent.

The processes varied widely in terms of the methods and activities they involved. Some focused on linear step by step approaches, some introduced general frameworks, and some used

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capability-maturity matrices. Nonetheless, there were some common elements, such as the use flexible, iterative processes.

Finally, many of the processes reviewed focus on one aspect of financing (e.g., green budgeting, or project development or pipeline development), instead of seeking to provide a single, end to end process. This means none of them are directly applicable to the P2R context of strategic process for mobilising adaptation finance across regions.

Pathways2Resilience Adaptation Investment Cycle

Drawing on the review and learning, the task has developed a model Adaptation Finance Process for regions for P2R, called the Adaptation Investment Cycle (CRIC). The aim is to provide regions with a process which mobilises the necessary resources to deliver their Climate Resilience Strategies and Innovation Agendas in a way that links to the focus on adaptation pathways in other tasks in P2R. This is organised around a six-step process, which is aligned to the Regional Resilience Journey and can also support the Mission Implementation Platform's Regional Adaptation Support Tool. Each step is supported by detailed activities, outputs and guidance to support implementation. The process is shown below in Figure 1.

Conclusion

This deliverable sets out a catalogue of sources and instruments, and an adaptation finance process (the Adaptation Investment Cycle). The catalogues and process will be used in the next step of the Work Package to develop and roll-out the Adaptation Finance capacity package for regions.

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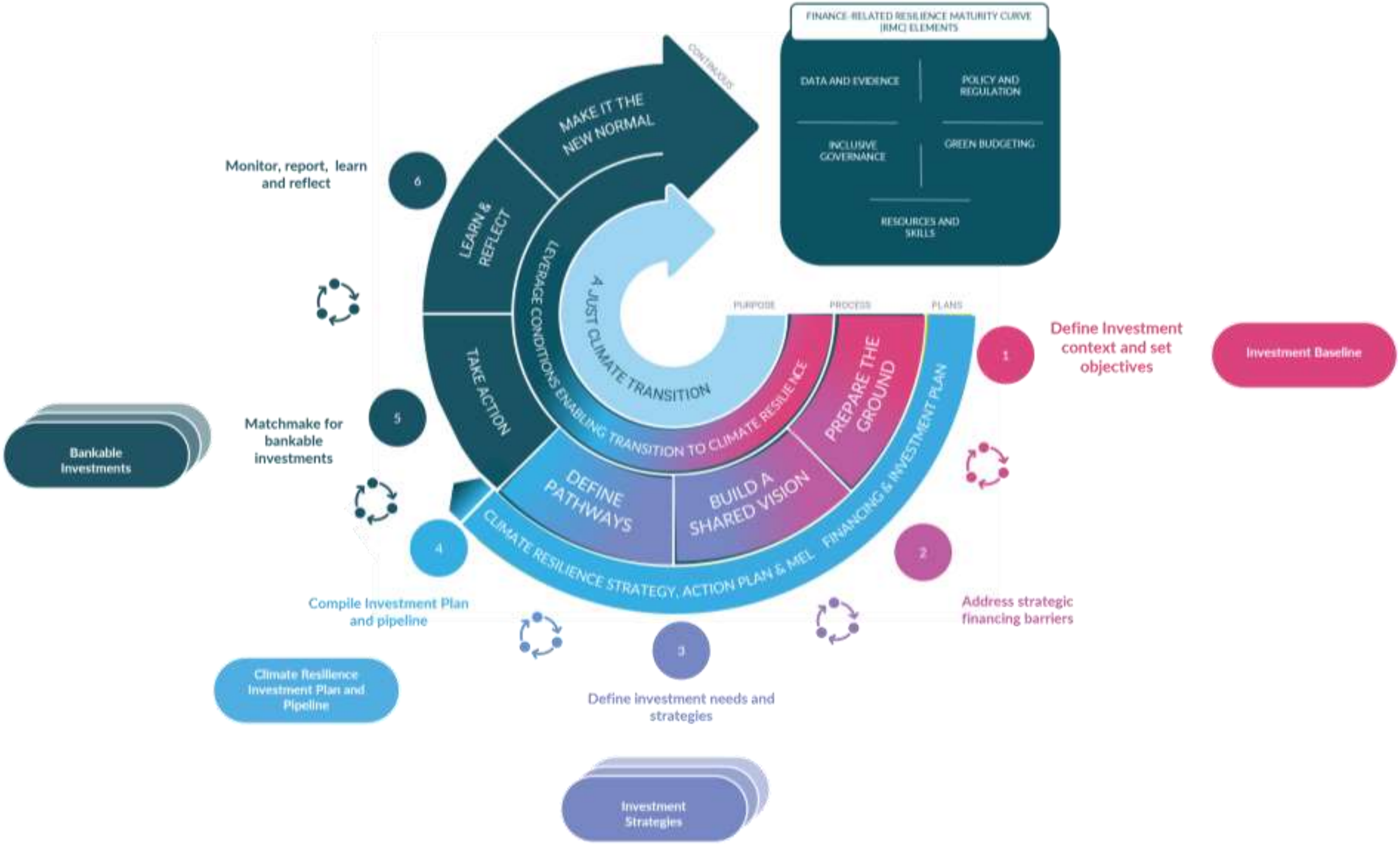

Figure 1: The P2R Adaptation Investment Cycle within the Regional Resilience Journey. Source: Authors.

Keywords

Adaptation, finance, funding, resource mobilisation, Climate Investment, Adaptation Investment Plan, funding sources, financing instruments, structuring, Adaptation Finance Process,

Abbreviations and acronyms

Term	Definition
AFP	Adaptation Finance Process
AIC	Adaptation Investment Cycle
AIP	Adaptation Investment Plan
AST	Adaptation Support Tool
CSRD	Corporate Sustainability Reporting Directive
EIB	European Investment Bank
ESRS	European Sustainability Reporting Standards
EMCCA	European Mission on Climate Change Adaptation
ICMA	International Capital Markets Association
KCS	Key Community Systems
MAFF	Multi-Annual Financial Framework
NGO	Non-Governmental Organisation
PFM	Public Financial Management
PIM	Public Investment Management
RAST	Regional Adaptation Support Tool
RMC	Resilience Maturity Curve
RRJ	Regional Resilience Journey
SME	Small and Medium-Sized Enterprise

1 Introduction

Pathways2Resilience is an innovative project funded under Horizon Europe's Adaptation Mission which is aiming to support 100 regions to co-develop pathways towards climate resilient regions in Europe. This work involves supporting regions to create Climate Resilience Strategies and Innovation Agendas, as well as Resource Mobilisation Plans (Adaptation Investment Plans (AIPs))[1].

Work Package 5 (WP5) of the project provides support services to bridge the Adaptation Finance Gap for regions. It aims to:

- Map systemic barriers to financing, synthesis lessons and identify solutions against the regional needs for adaptation finance.
- Create a data-based catalogue of finance mechanisms, sources and best practices (Development and National Banks at macro level, national public and private investment and insurance organizations at meso level) and develop a process for building adaptation finance strategies and resource mobilisation plans.
- Develop an Adaptation Finance capacity package that is a region-tailored set of material (as an input to WP7 in the form of action-orientated online tools and catalogues, training material).
- Support the activities in WP7 on adaptation finance strategies and resource mobilisation plans, and to provide tailored one-to-one support with several regions.
- Develop an Adaptation Finance Innovation Lab to design and conceptualise innovative finance mechanisms tailored to regions as well as propose and advise regions on adaptation finance and innovation policy.

Pathways2Resilience is developing an adaptation finance process for regions to help mobilise the funding and financing required to develop and implement transformative adaptation strategies, programmes and projects that are required to meet the goals of the EU's adaptation mission.

The described tasks within Task 5.2, and the focus of this deliverable, are to:

- Cross-map, catalogue and synthesize existing, new and innovative sources of sustainable finance against regional finance needs, identified in Task 5.1. Including, a review of finance best practice examples for the KCS
- Review, cross-map and synthesize financing approaches and financial instruments for adaptation for regions, including private sector and blended finance, and b= opportunities for sustainable finance aligned to the EU Taxonomy and the European proposal on the Corporate Sustainability Directive.
- Map these to the RMC and develop an inventory of good practice examples. This mapping will be validated by the Practitioner Finance Expert Group (T5.1) and in the Adaptation Finance Innovation Lab (T5.5).
- Develop a process for regional adaptation finance strategies, to provide framework to the regions for funding their pathways and innovation agendas. This will be codesigned with a representative sample of finance stakeholders that will support the project, via the Practitioner Finance Expert Group.

[1] Note. The original Pathways2Resilience proposal proposed the creation of adaptation finance strategies and Resource Mobilisation Plans. However, for consistency with the wider literature, and to align with the wider Horizon Europe proposals on adaptation finance, we refer to these terms as 'Adaptation Investment Plans'. Fuller definitions are provided in section 1.3.

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- Develop the steps and activities involved in resource mobilisation plans, to provide concrete steps for regions on how to access finance.

This deliverable (D5.2) reports on these task activities. It has undertaken an extensive review to bring together state-of-the-art knowledge in adaptation financing. It has reviewed the sources of finance and potential instruments and has identified good practice examples. It has then reviewed the processes for adaptation financing and developed a flexible, replicable process and associated actions which can be used by the 100 regions participating in Pathways2Resilience to support regions participating in the project, as well as wider European regions participating in the Adaptation Mission.

Chapter 2 describes the method used to review the literature, produce the catalogues and best practice examples as well as the development of the Adaptation Investment Cycle. Chapter 3 reviews the existing sources catalogues, and sets out the P2R sources catalogue, including sources available to regions for adaptation finance, and the challenges to accessing them. It also sets out innovative examples to increase and diversify the mix of sources. Chapter 4 reviews existing catalogues of instruments and sets out a bespoke set of instruments available to regions. It also includes innovative instruments to enhance adaptation financing. Chapter 5 undertakes a review of adaptation finance processes, evaluating their strengths and weaknesses. These are then used to inform criteria for an Adaptation Finance Process for regions. Chapter 6 sets out an Adaptation Investment Cycle with the steps and activities involved in developing Adaptation Investment Plans, to provide concrete steps for regions on how to access finance. This includes a series of enabling conditions for regions that support the mobilisation of adaptation finance, for use in both the overall Regional Resilience Journey framework and evaluation of regions' capabilities through the Resilience Maturity Curve. Chapter 7 concludes with a reflection on what has been provided and the limitations or further work.

1.1 Context

Whilst global mitigation efforts will reduce future impacts, the climate will continue to change towards the 2050s, and therefore Europe will need to scale-up adaptation (COACCH, 2021).

Adaptation will have large benefits in reducing the costs of climate change in Europe but it will have a cost. The costs of adaptation can be defined as the costs of planning, preparing for, facilitating, and implementing adaptation measures, including transition costs (IPCC, 2007).There will also be a series of economic opportunities associated with providing the goods and services, sometimes termed the 'adaptation economy'. However, the anticipated adaptation costs (or finance needs) are much higher than current adaptation finance flows, and thus there is a global adaptation finance gap. (UNEP, 2022, 2023). The same analysis can be considered for Europe.

Early estimates of potential adaptation finance needs for Europe have begun to be developed in Horizon Europe. These estimate the financial needs for adaptation finance for Europe as being an additional €18bn-€41bn a year this decade for Europe, or about 1.5-3% of the EU's total €1.7tn 7-year budget, and are shown in Figure 2 below (ACCRUE, forthcoming). Whilst such numbers vary based on assumptions around the levels of adaptation, estimations of costs, and effectiveness, they still provide a sense of the scale of resources required and indicate that it is very likely an increased supply of private sector finance will be needed to meet adaptation goals.

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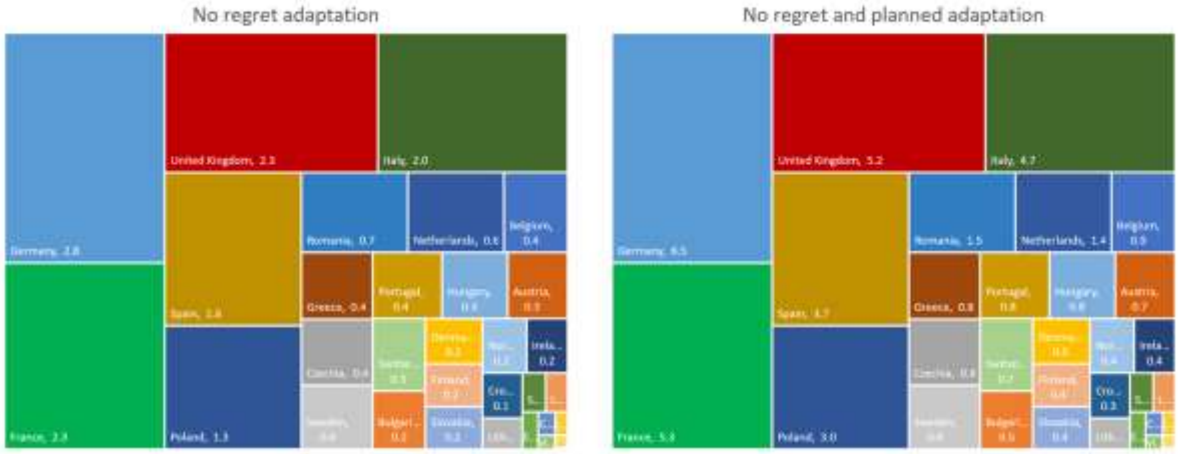

Figure 2: Cost estimates of no-regret adaptation (left) and no-regret and planned adaptation (right) for the EU27, UK and EFTA. Source: Watkiss, P. (2023) Forthcoming. Note: estimates are extrapolated from IC4E's estimates for France (Depoues et al., 2021) and (Watkiss, 2022) for the UK.

These needs can be compared to adaptation finance flows. While global adaptation finance flows rose to USD $63bn in 2021/22, these flows are much smaller than for mitigation (which constitutes 95% of total climate finance flows), and adaptation finance is dominated (98%) by public finance (Buchner et al., 2023). The financing of adaptation remains a major challenge for most regional authorities, with multiple pressures from the financial crisis, reduced taxes, COVID-19 on budgets. (EEA, 2017; Richmond, Choi, Rosane, et al., 2021)

There has been limited work to quantify these flows in Europe. (Buchner et al., 2023) estimate USD 4.2bn of adaptation flows to Western Europe, and USD 2.1bn for Central Asia and Eastern Europe for 2021/22. As part of efforts to define the context for an adaptation finance process, the analysis for this work package evaluated the self-reported finance flows of European Cities provided to CDP (CDP, 2022). Expenditure was standardised to Euros, and categorised by action type, with sources classified across public and private sectors. The results are shown in Figure 3 below:

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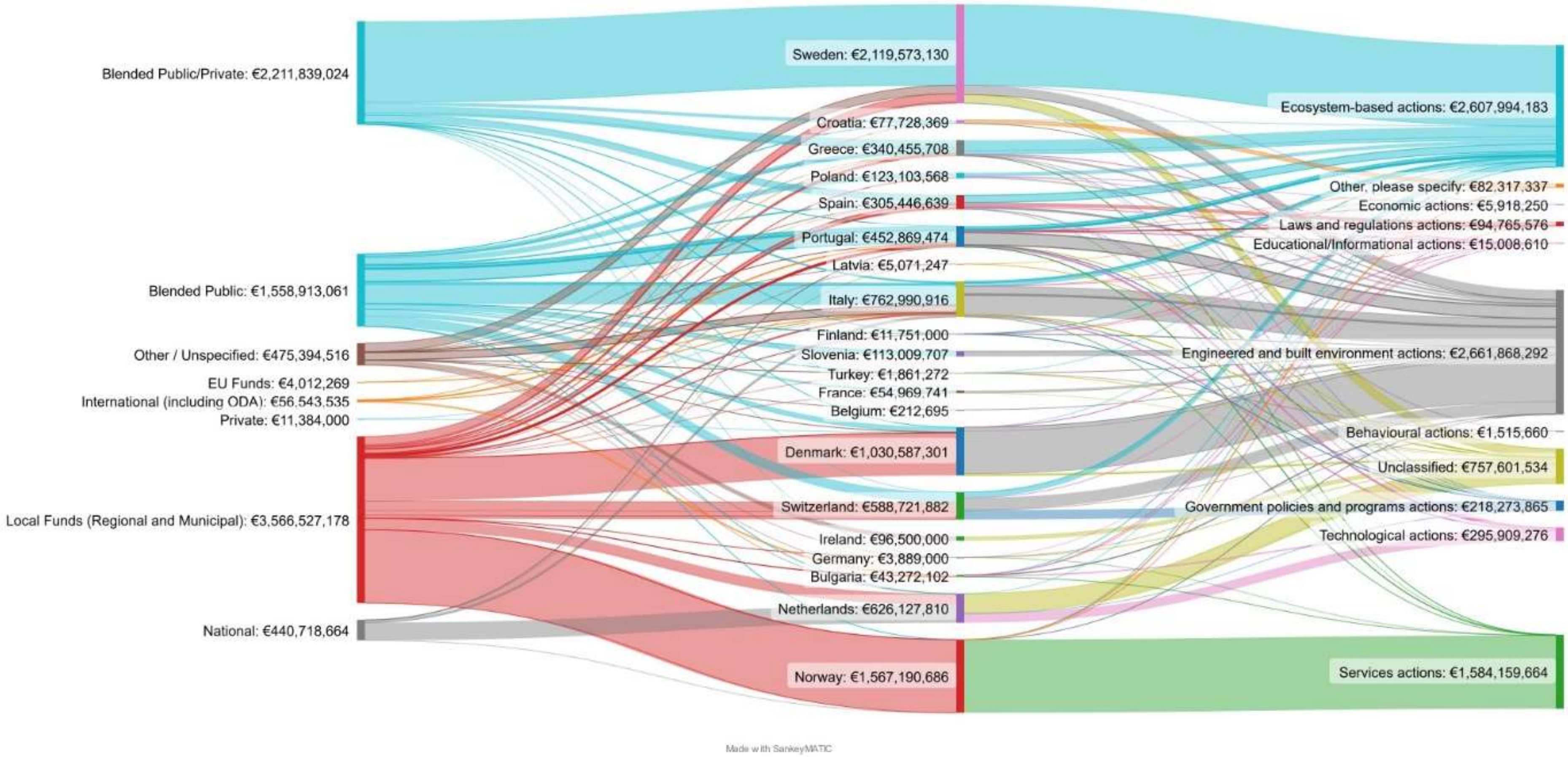

Figure 3: Self-reported adaptation finance of EU27 cities in 2022. The diagram shows sources (left), receiving countries (middle) and action groups (right). Source: Authors based on (CDP, 2022).

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These numbers suggest around €8.3bn of adaptation finance flows at the city level within the EU27 in 2022. This was predominantly driven by public finance. Whilst €2.2bn of blended public/private finance was included, pure private finance was a small component of reporting at only €11m. Many flows were spent on ecosystem-based solutions, engineering and built environment actions, and services.

However, it is likely that these numbers are a significant over-estimate. Whilst these numbers indicate flows are already high and on the way to meeting finance needs, a deeper review of a sample of actions showed this is unlikely to be the case due to particular issues with data submissions, including:

- Some actions predominantly related to mitigation, but where there was aspiration to include adaptation.
- Many of the highest reported expenditures related to total needs for implementing Adaptation Plans or Project needs, but not to actual in-year expenditure (e.g. City of Gothenburg, Gladsaxe)
- Some reporting covered multi-year projects, with some covering very long (e.g. 30-year) time periods.

These challenges are in addition to general limitations of finance tracking (such as context dependency, confidentiality, lack of standards, disaggregating adaptation components and allocation vs. defraying – see Richmond & Hallmeyer, 2019, EBRD).

The local level is the bedrock for European adaptation and the EU Adaptation Strategy seeks to provide local support and close the finance gaps, through a focus on Faster, Smarter and More Systemic adaptation, as well as through international support (European Commission, 2021b). This is important since a bottom-up approach actively involving businesses and stakeholders on the ground could help adaptation finance flows as local companies and communities are directly affected by climate change. (Restle-Steinert & Hausotter, 2019). The EU Strategy includes a range of objectives to increase investment including:

- Reframing adaptation from a cost towards an investment.
- Integrating climate resilience in national fiscal frameworks.
- Enhancing public / private sector collaboration.
- Increasing investments in nature-based solutions
- Increasing the diversity of funding and financing sources.
- Using the EU Taxonomy to channel private finance towards adaptation.
- Increasing use of insurance as risk-transfer and reduction mechanism
- Scaling up international finance through innovation and collaboration

A key delivery mechanism of the EU Adaptation Strategy is the new Research and Innovation Mission, Adaptation to Climate Change, including societal transformation. The Mission sets out three specific objectives and associated targets (European Commission, 2021a):

Specific objective 1: Preparing and planning for climate resilience

- provide general support to European regions and communities to better understand, prepare for and manage climate risks and opportunities

Specific objective 2: Accelerating transformations to climate resilience

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- work with at least 150 regions and communities to accelerate their transformation to a climate resilient future, supporting them in the co-creation of innovation pathways and the testing of solutions

Specific objective 3: Demonstrating systemic transformations to climate resilience

- Deliver at least 75 large-scale demonstrations of systemic transformations to climate resilience across European regions and communities.

Increasingly, it is understood that ensuring public and private finance flows towards adaptation is predicated on shaping the direction of the economy through the use of good policy, regulation, innovation, and investment. (Fankhauser et al., 2023; Ranger et al., 2023). The strategy of the mission is to use Mission-specific Horizon Europe funds across all three objectives to crowd in further funding, as shown in Figure 4:

Figure 4: Stylised representation of the adaptation mission budget and other potential sources of funding. Source: (European Commission, 2021a)

This aligns with broader international consensus that closing the adaptation finance gap relies on both increasing domestic expenditure, mobilising private finance, and reforming the financial architecture. (UNEP, 2023)

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Box 1: Mobilising private sector adaptation finance

The private sector can play three roles in adaptation: adapting to climate change; financing the adaptation of others (in both public and private sectors); and supporting the development of new products and services for adaptation (Cochu et al., 2019):

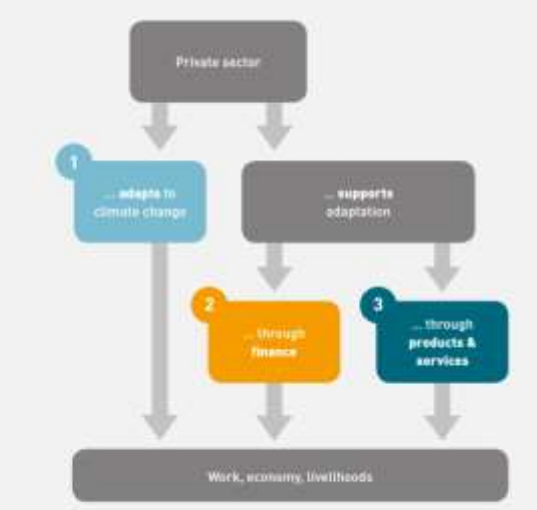

Figure 5: Three key functions of the private sector. Source: (Cochu et al., 2019), adapted from Byiers and Reosngren, 2012

Private sector actors may take one or more of these roles, but all three collectively underpin efforts to build supply and demand which underpins a climate-resilient economy and a well-functioning market in adaptation goods and services. For example, insurance companies can help drive vulnerability reduction as well as appropriate social protection but will also need to adapt their own premises and operations to impacts.

Function 1) Private sector adapts to climate change.

The private sector may invest directly to adapt to climate change. This could be in defensive assets, to protect revenues, or to reduce costs. This can be encouraged by regions through awareness raising, as well as use of incentives, subsidies, or regulations.

Function 2) Private sector financing adaptation of others.

The private sector, particularly financial actors are able to provide finance for others to act. In this context, private finance can be defined as "private finance invested as a result of adaptation-related public interventions, which can typically take the form of finance or policies". (Brown et al., 2015). This can either be through mainstreaming consideration of climate risk into their general lending activities, or by providing new or dedicated products and services. There is emerging evidence that investments in adaptation solutions are likely to yield improved results over time (Goolgasian, 2021; Ranger et al., 2023).

Function 3) Private sector goods and services

There are a wide range of opportunities for the private sector to create new products and services in response to new business opportunities, such as in agriculture, education, energy health, infrastructure, transport, urban. resilience and water (Tall et al., 2021). Independent analytics firms indications it A being a significant growth sector for Europe (Howard, 2023).

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A novel area of the Adaptation Mission is the inclusion of a focus on Key Community Systems, shown in Figure 6. These are systems that meets important basic societal needs but that is increasingly impacted by climate change. A key community system is an area of innovation and transformation for the Mission, part of a larger interdependent system. (European Commission, 2021a).

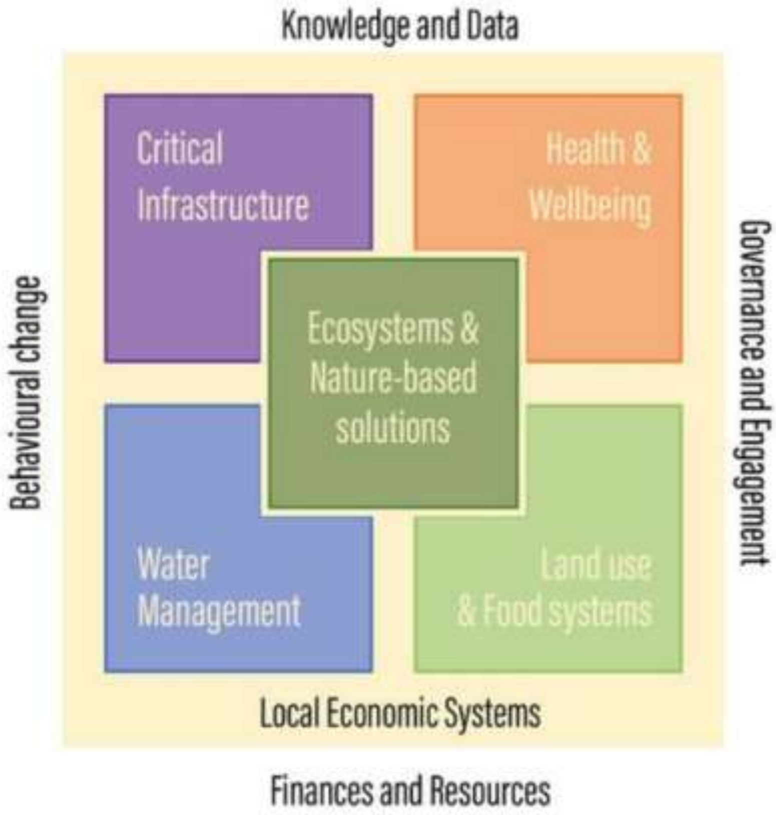

Figure 6: Key Community Systems and Enabling Conditions of the Adaptation Mission. Source: (European Commission, 2021a)

1.2 Barriers to adaptation financing

(Paul Watkiss Associates & Frontier Economics, 2022)The mission is seeking to use core funding to leverage a much greater volume of finance. However, there are a range of barriers which prevent funding and financing flowing into adaptation (Paul Watkiss Associates & Frontier Economics, 2022). These include information barriers, market failures, financial barriers, policy and governance and behavioural barriers. A summary which maps the relative strength and importance of these barriers, using expert opinion, based on their prevalence in the literature is shown in Figure 7 below:

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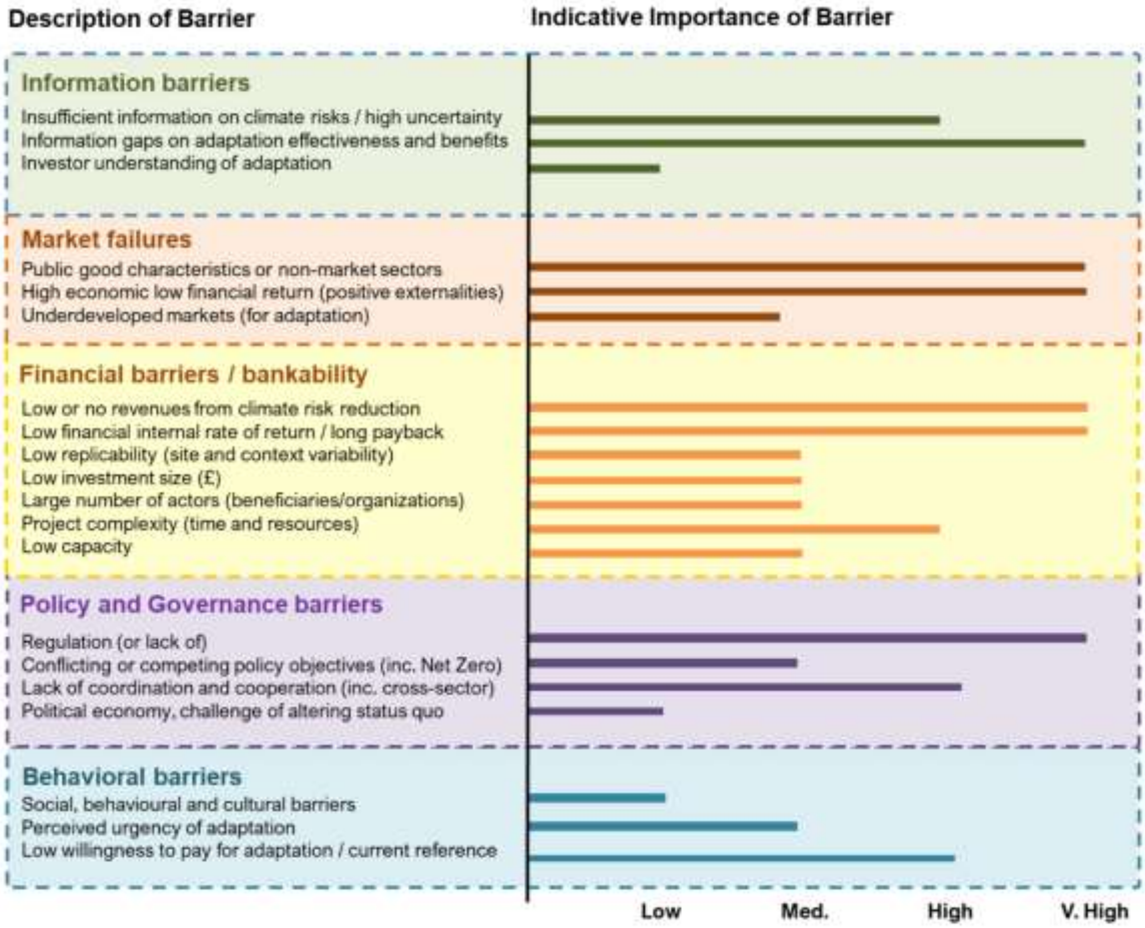

Figure 7: Barriers to adaptation finance and indicative importance. Source: (Paul Watkiss Associates & Frontier Economics, 2022)

It is also understood that strength of barriers varies based on type of adaptation, timing of the risk, and the financing sources envisaged, and are more challenging as the ambition around adaptation increases from incremental to transformational.

The understanding of these barriers is being considered in deliverable 5.1, including the extent to which barriers are prevalent across Key Community Systems, and the public and private sectors. An indicative mapping is shown in Figure 8 below:

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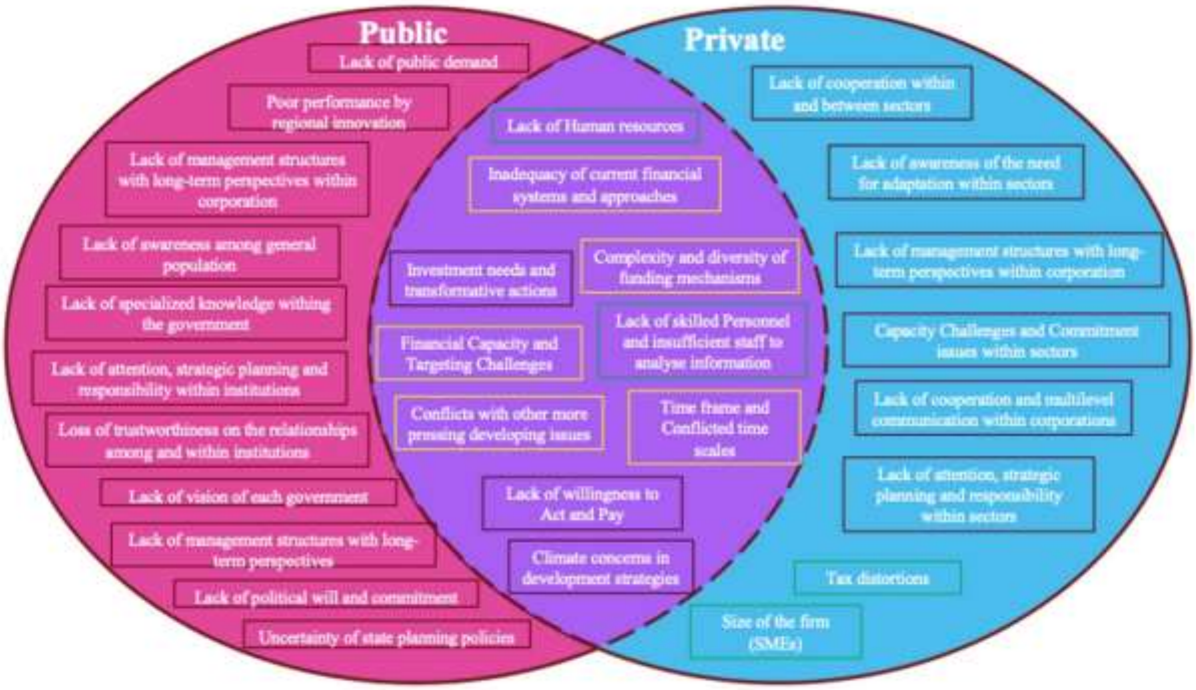

Figure 8: Indicative mapping of public and private barriers to adaptation. Boxes with green borders relate to incremental projects, yellow to intermediate projects and brown to transformational projects Source: Pathways2Resilience (forthcoming).

There are also practical barriers faced by cities and regions. Challenges in accessing financing prominently feature for regions. 93% of signatories to the adaptation mission cited financial resources as one of the main challenges, whilst 61% identified a need for financial advice. (European Commission, 2023a). However, the information did not collect further detail, such as whether the challenges related to accessing sources, or the issues with instruments. There is some relevant information on this (Moser et al., 2019). Figure 9 identifies the more practical barriers facing local government officials, and those working with them (in California) in acquiring adaptation funds:

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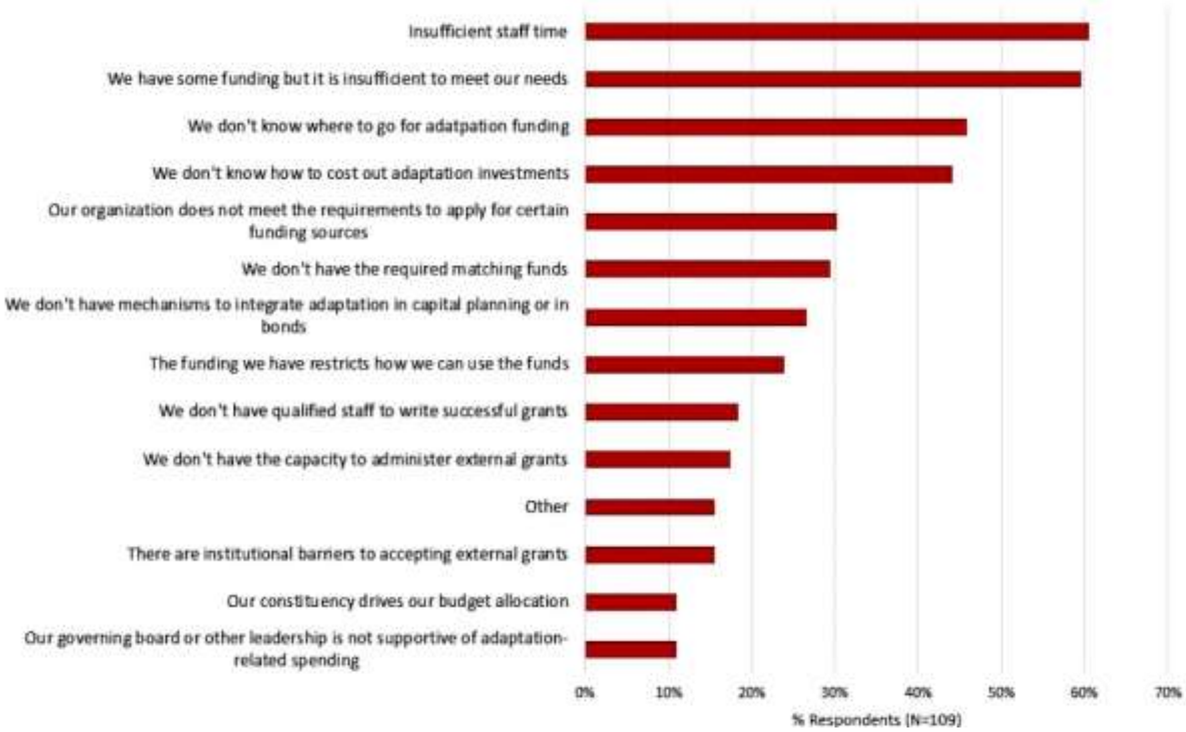

Figure 9: Barriers related to acquiring adaptation funds. Source: (Moser et al., 2019)

Their work identifies archetypes of financing challenges - "building blocks". Each archetype consists of four dimensions: an observed phenomenon occurring (or anchored) at a key stage in the funding process, caused by a characteristic set of underlying and interacting drivers, resulting in defining outcomes. The study also identifies a range of practical solutions that can be adopted by regions and entities to support them to fund or finance adaptation. These are extremely useful in deciding how best to present information to maximise its relevance for regions, and has been developed further in Table 1 below.

Table 1: Focal points, archetypes and solutions to adaptation finance for regions. Source: Authors, based on Moser et al.

Focal point	Archetype	Solutions
1. Establishing climate change risks and adaptation as a matter of concern	Low Priority	• Education and trainings for local government staff and elected officials. • Help with framing, communication, and engagement, particularly of sceptical audiences. • Top-level mandates that adaptation planning be undertaken.
	Lack of Leadership	• Include local and state mandates to provide cover for local politicians neighbouring community leaders serving as "ambassadors" to those not yet taking action.
	Conflict of Interest	• Strong and persistent leadership, backed by a populace demanding change, • Education and training in how to link adaptation to local agencies' core missions
	Disproportionate Burden (e.g., by more vulnerable communities)	• Systematic and sustained interventions through broad policy and smaller targeted approaches (such as through providing more capacity grants, grant writing services to the disadvantaged), or charging fees for nonparticipation in adaptation planning
2. Establishing adaptation funding need, costs, and benefits	Inappropriate funding scale	• Funded mandates, • Block grants, • Assuming that there will not be any state/federal funding assistance, thus spurring radical rethinking of solutions
	Disjointed Risk Structure	• Policy interventions to de-incentivise living in risky places. • Foster development of funds to address these risks through adaptation.

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		• Incentives to mitigate hazards on an ongoing basis. • Creating "benefit districts" to generate adaptation funding from the most capable property owners
	Inability to Make the Economic Case	• More research on adaptation costs and benefits. • advances in establishing common sets of metrics of success and performance; and staff trainings in the most useful economic tools.
3. Proving the fiscal standing of the adaptation funding seeker	Chronic Underfunding	• Profound rethinking of Local government funding and taxation policy, • reframing adaptation as redevelopment • making creative use of carrot and stick approaches
	Siloed Government Syndrome	• Informal learning and collaborative networks. • Leadership demanding cross-sector/ agency accounting of costs and benefits of projects within the local budget framework. • Funding for coordinating entities; and shifts in narratives to "shared opportunities."
	Lack of Capacity	• Reducing onerous grant-writing requirements. • scaling up internship programs particularly in low-capacity communities. • providing more capacity or block grants
4. Identifying and accessing adaptation funding providers	Discontinuous funding	• Set up "life-long funding sources" that could cover all aspects of adaptation-related work. • Block grants. • Establishing a "climate resilience authority" that pools risk insurance premiums for larger projects. • State assistance in establishing relationships to private sector funders.
5. Accessing different types of funding or financing	Funding Biases	• Establishing life-cycle funding requirements that include funding for the "soft" aspects of adaptation. • Investments in research to help illustrate cost-effectiveness and success of different adaptation measures.
	Lack of Knowledge About Funding Sources or Happenstance	• Establishing an easily navigable and regularly updated clearinghouse of funding opportunities. • A summit of region-focused foundations to help them see why they should include adaptation in their missions /portfolios. • Creation of a region-wide adaptation fund.
6. Navigating adaptation funding mechanisms	Eligibility	• Adding adaptation criteria to existing funding streams; establishing a pool of matching funds that smaller communities could draw on; integrating different local planning processes and documents to create efficiencies; and updating local codes and standards so that certain funding sources can be used for adaptation.
7. Having or building capacity to use and administer adaptation funds	Lack of Capacity	• Establishing or working with capable lead organizations, trainings in grant administration, or building up staff capacity through capacity and block grants

This list highlights some of the more applied issues that are important in designing an adaptation catalogue and finance process to support regions in the European context, as well as wider opportunities for regions and the entities which support them (such as the EEA, ERRIN, Covenant of Mayors, the Mission Implementation platform etc), to develop their approaches to boost the volume of finance and diversity of sources.

1.3 Adaptation Investment Planning in the P2R Regional Resilience Journey

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Pathways2Resilience uses a process and series of steps to support regions to develop transformative Climate Resilience Strategies and Innovation Agendas. The steps, known as the '**Regional Resilience Journey'** set out a new adaptation planning logic, which seeks to support regions to deliver transformative and transformational adaptation, complemented by Adaptation Investment Plans. An early version of this logic is shown in Figure 10 below:

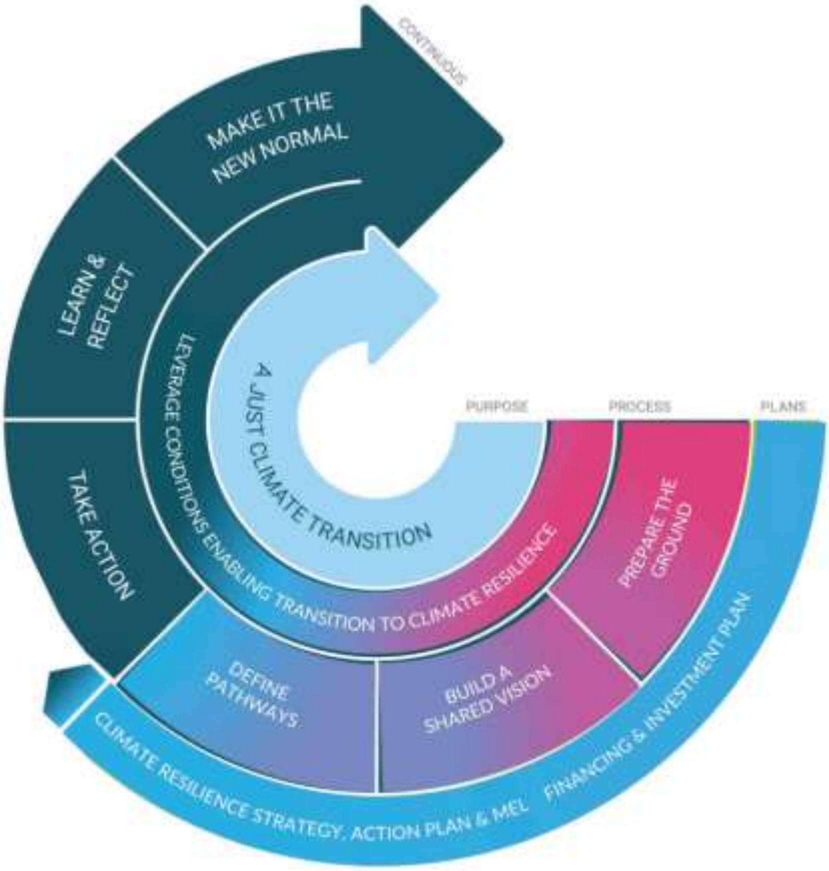

Figure 10: The emerging Pathways2Resilience Regional Resilience Journey. Source: Koetz, T. et al. (forthcoming)

Within this cycle, financing is identified as one of the key enabling conditions for the journey, and envisages a process to mobilise investment. This deliverable can help to address the barriers to both public and private investment in the Climate Resilience Strategies developed by regions. These potential contributions are shown in Table 2 below:

Table 2: Opportunities for the P2R Adaptation investment Cycle and Catalogue to addressing structural barriers to financing adaptation. Source: Authors

Deliverable Component	Barrier Types	How the deliverable can address them
Adaptation Investment Cycle and Plans	Information	• Involving private sector and investors development and delivery can build awareness knowledge and understanding. • A cycle can help Identify and fills knowledge gaps for investable propositions
	Market failures	• Directs regions to consider the rationale for private or public intervention, helping allocate resources efficiently across public and private sectors. • Supports development of a market of goods and services through allocations of risks

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	Financial Barriers / bankability	• Standardised process lowers overall cost of Investment Planning process to regions. • Increases diversity of sources by co-creating value propositions with all relevant stakeholders, • Enhances revenues and paybacks based on all revenue streams created through adaptation and wider co-benefits. • Includes resources, guides and examples to build stakeholder capacity.
	Policy and Governance	• Provides a coordinated cross-sector approach, which bridges adaptation and financial planning processes of regions.
	Behavioural	• Estimating totality of financing need increases willingness to pay for • Practical limits of fiscal space emphasise need to prioritise and sequence adaptation investments based on urgency. • Process can allocate financial responsibility to adapt and manage risk across public and private sectors
Catalogue of sources, instruments and best practice examples	Information	• Bridges finance-related information gaps for adaptation planning • Helps develop investor understanding of adaptation
	Market failures	• Catalogue can help regions identify appropriate sources for different sectors, adaptation actions and systems
	Financial Barriers / bankability	• Catalogue can help regions select appropriate instruments or strategies, increasing likelihood of bankability
	Policy and Governance	• Can enhance coordination by highlighting the various roles of different sources in paying for adaptation.
	Behavioural	• Best practice examples can challenge the convention of adaptation as only a public sector activity.

Pathways2Resilience will offer a range of capacity building and training activities through WP7, as well as dedicated enabling resource through the subgrants in WP3, which are designed to work alongside the wider Mission projects and the Mission Platform MIP4Adapt, to address the more practical barriers facing regions.

1.4 Definitions

Throughout this deliverable we use a number of key terms, and associated definitions. These include:

Adaptation - the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. (IPCC, 2022)

Adaptation Finance Process - A framework, series of steps, process or description of activities which can be used to increase the overall deployment of adaptation finance, both directly through development of bankable projects, or indirectly through area-based investment planning or boosting of enabling conditions. (P2R project definition).

Adaptation Investment Cycle – The specific, 6-stage cycle designed for Pathways2Resilience to support the creation of a region's Adaptation Investment Plan. (P2R project definition).

Adaptation Investment Plan - Document which outlines how the region intends to finance its Climate Resilience Strategy, along with a pipeline of bankable adaptation investments. (P2R project definition).

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Bankable – The project or investment in question meets the requirements of the financier in order for them to provide the financing for the project. (UNECE et al., 2020)

Catalogue - a complete list of items, typically one in alphabetical or other systematic order. (P2R team definition)

Enabling Conditions - The institutional, technical, and financial aspects that characterize the framework under which urban climate action can happen. (CCFLA, 2023)

Finance - all sources of funding and financing for adaptation from the public, private and third sector, and all financial instruments including grant, debt, equity and other. This follows the convention in the adaptation finance literature (see (Negreiros et al., 2021)) and uses 'finance' as a broad term to represent all investment in adaptation. However, it is noted that financing and funding are sometimes defined differently. Funding is sometime defined as money (especially grants) that is provided by government / public sector. Finance is often defined as capital raised from financial institutions or other lenders (such as debt) which requires repayment. However, these definitions might be confusing here, for example, public funding of adaptation can be through debt that has to be repaid. We use the generic term 'finance' for all investment in adaptation but note the differences between public and private sources and various instruments.

Financial instrument - the mechanism which enables the provision of finance from one actor to another, or to a dedicated project which delivers adaptation. (P2R Project definition).

Incremental adaptation. Adaptation that maintains the essence and integrity of a system or process at a given scale. (IPCC, 2022)

Investment Concepts - Document that translates an investment project idea into the financial language to mobilise financing for its realisation. The purpose is to provide investors and financial institutions with the information necessary to assess an investment project in a simple and fast manner. The owner of this document is the territory proposing the investment project. (P2R Project definition).

Investment Strategies – A shortlist of possible approaches to raising, deploying and (if appropriate), repaying capital associated with meeting investment needs for particular sectors or risks, including indicative mixes of public and private investment, and sources, instruments and mechanisms for achieving them. (P2R Project definition).

Key Community System - systems that meets important basic societal needs but that are increasingly impacted by climate change. A key community system is an area of innovation and transformation for the Mission, part of a larger interdependent system. (European Commission, 2021a)

Pipeline - specific, upcoming investment opportunities in adaptation within regions (OECD)

Sources of finance – A source or sources of finance, refers to the entity providing the money to fund the adaptation activities. Finance can be gained from either **internal** or **external** sources. (P2R Project definition).

Structuring – the allocation of responsibilities and risks to the parties, and the determination of a financing structure for a Climate Resilience Strategy or bankable investment. (P2R Definition)

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Transformational adaptation - Adaptation that changes the fundamental attributes of a social-ecological system in anticipation of climate change and its impacts. (IPCC, 2022)

Transformative change. A system-wide change that requires more than technological change through consideration of social and economic factors that, with technology, can bring about rapid change at scale. (IPCC, 2022)

2 Methodology

The deliverable employed a bespoke research method to inform the four component parts for a catalogue and adaptation finance process:

- Identifying existing, new and innovative sources of finance against regional finance needs
- Identifying and synthesising of financial instruments for adaptation for regions (including private sector and blended finance).
- Identifying and reviewing financing approaches for adaptation for regions (including private sector and blended finance).
- Developing an adaptation finance process – Development of an overarching adaptation finance process for regions to use to develop Adaptation Investment Plans.

The research approach consisted of 6 stages:

1. First, the deliverable undertook an initial high-level scan of adaptation finance literature to gain a broad overview of the topic area. The scan provided an initial literature set, including the grey and academic literature, the key expert institutions, and how relevant knowledge was structured.
2. The deliverable used a narrative review process (see next section) to identify a body of literature which identified or included existing (catalogues of) sources and instruments, case studies, and adaptation finance processes, and which outlined key innovations, relevant knowledge gaps, broad challenges, and solutions.
3. The identified literature was reviewed and grouped into core topics relating to catalogue development, financial innovation and strategies which address barriers, and adaptation finance process as well as case studies for best practice.
4. The catalogues of sources and instruments were evaluated for the range and depth of content as well as the approaches used to classify and structure them, and the information provided. The adaptation finance processes were reviewed for strengths and weaknesses to identify lessons for the P2R catalogues and adaptation finance process and criteria.
5. The deliverable reviewed a series of adaptation finance accelerator programmes to gain an overview of innovative financial approaches to adaptation and best practice examples.
6. The study then developed the adaptation finance process and the catalogue for the deliverable in parallel. The detailed approach to their development is outlined in the respective chapters.

The overall approach is shown in Figure 11 below:

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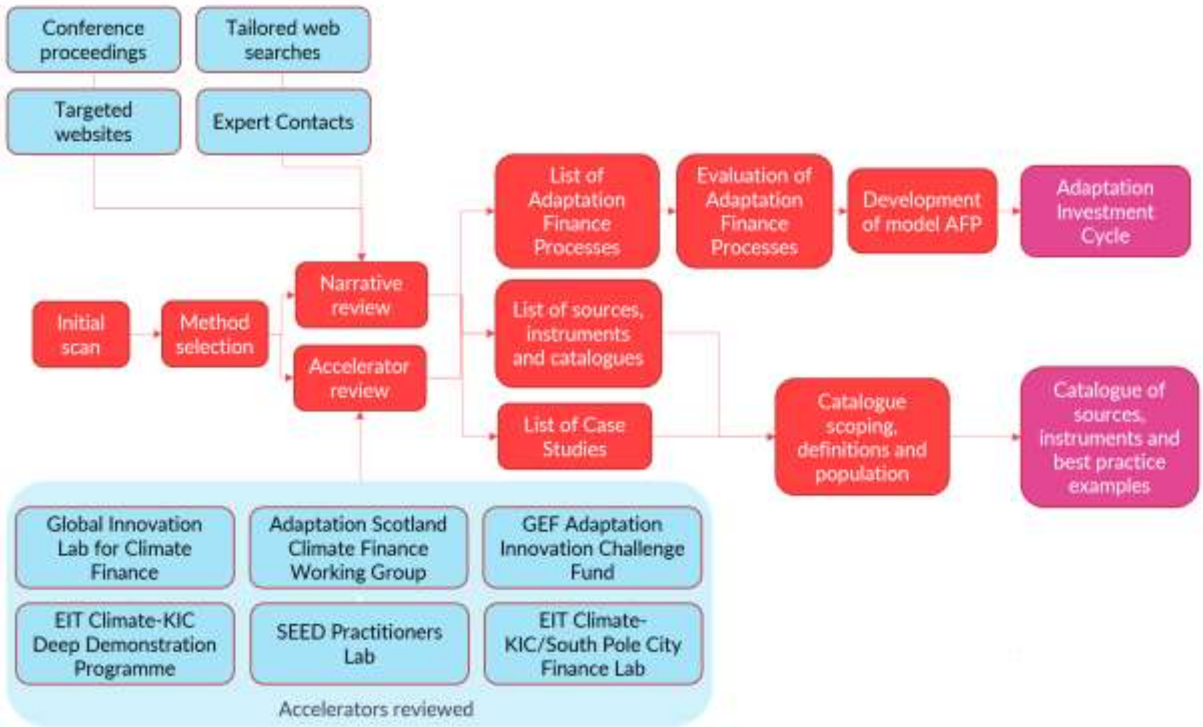

Figure 11: Deliverable development process. Source: Authors.

More detail on the overall research approach and the individual stages is outlined below.

2.1 Research approach

A wide range of review approaches are available to researchers looking to review the literature on a particular topic, but these exist on a spectrum between narrative reviews and systemic reviews. Broadly, they fall into three areas:

- **Narrative review** - A narrative review, also referred to as a traditional review, summarises and presents the available research on a topic.
- **Scoping Review** - Scoping reviews provide a useful alternative to literature reviews when clarification around a concept or theory is required.
- **Systematic Review** - A systematic review is a high-level overview of primary research on a particular research question that tries to identify, select, synthesize and appraise all high-quality research evidence relevant to that question in order to answer it. (Smith, n.d.)

Table 3 shows that these are generally used for a number of different purposes:

Table 3: Purpose of different literature review methods. Source: Authors, adapted from (Munn et al., 2018)

Type	Narrative Review	Scoping Review	Systematic Review
Purpose	Providing an overview of a topic or issue	1. Identify the types of available evidence in a given field. 2. Clarify key concepts/ definitions in the literature.	1. Uncover the international evidence 2. Confirm current practice/ address any variation/ identify new practices 3. Identify and inform areas for future

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		3. Examine how research is conducted on a certain topic or field. 4. Identify key characteristics or factors related to a concept. 5. As a precursor to a systematic review 6. To identify and analyse knowledge gaps	research 4. Identify and investigate conflicting results 5. Produce statements to guide decision-making.

There are a number of defining characteristics of systematic reviews which have been designed to increase the confidence in the evidence. These are illustrated in Table 4 below:

Table 4: Defining characteristics of traditional literature reviews, scoping reviews and systematic reviews. Source: (Munn et al., 2018)

Criteria	Traditional Literature Reviews	Scoping Review	Systematic Review
A priori review protocol	No	Yes (some)	Yes
PROSPERO registration of the review protocol	No	No	Yes
Explicit, transparent, peer reviewed search strategy	No	Yes	Yes
Standardized data extraction forms	No	Yes	Yes
Mandatory Critical Appraisal (Risk of Bias Assessment)	No	No	Yes
Synthesis of findings from individual studies and the generation of 'summary' findings	No	No	Yes

However, in reality, these categories are more of a continuum. The challenge for and research is to adopt elements of scoping or systematic reviews which increase the confidence of the reader that the foundation of the data has been obtained following a robust set of procedures, whilst maintaining a manageable process. (Turnbull et al., 2023).

Following an initial scan of the literature, the authors chose to adopt a narrative review approach to identify literature which was likely to include adaptation finance processes, catalogues, or best practice examples. To increase its robustness, the authors borrowed elements of a tightly bounded scoping review in line with the process set out in the JBI Manual for Evidence Synthesis (Aromataris & Munn, 2020). This included developing a research question and search strategy, searching relevant databases, and screening literature. These choices of method were based on the following reasons.

- **Appropriateness of the methods** –In the case of adaptation finance, the context specific nature of adaptation financing, as well as the varying range of solutions and approaches make mapping the literature more appropriate.
- **Solution-oriented focus** - The solution-oriented nature and ambition of the Adaptation Mission suggested a focus on the ground solutions rather than the academic literature.
- **Emerging nature of adaptation finance** - The literature in adaptation finance is an emerging space, making it more suited to a scoping review. Author's expert opinion, discussion with other adaptation experts, and initial review of the literature indicated that much of the literature on adaptation finance was in the grey literature.

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- **Presence of relevant content in the literature** – Several of the documents in the literature combined elements required in the deliverable (for example processes which included a short list of sources and/or instruments,
- **Available time** – The relatively short window afforded for the deliverable need for development of the RMJ and the catalogue meant that the use of screening criteria could be used to identify a small but significant component of the literature.

However, due to criteria outlined above, rather than adopting a full screening approach, authors performed a simplified approach, rapidly screening documentation using the scoping criteria as guides to select a final set of literature to form the basis of a thematic review which informed the development of the catalogues and the adaptation finance process. The criteria used for the selection are set out in Appendix 1.

2.1.1 Research question

To guide the review, the deliverable sought to answer the following primary research question:

> *What current processes, guidance, tools, catalogues, strategies, activities, or actions can help local government, cities and regions in Europe to mobilise finance for equitable incremental, and transformational adaptation to climate change?*

2.1.2 Search strategy, sources and inclusion / exclusion criteria

To identify the literature the deliverable adopted a four-pronged approach to selecting sources, which combined (1) conference proceedings, (2) tailored searches, (3) targeted websites and (4) consultations with key experts. In addition, where relevant, the reviewers identified further literature through snowballing from initial articles.

Detail of each element of the search strategy is outlined below:

2.1.2.1 Conference proceedings

The conference proceedings reviewed related to two key conferences:

- Adaptation Futures
- European Conference on Climate Adaptation

2.1.2.2 Tailored web searches

The search strategy sought to be as comprehensive as possible within the time constraints of the approach. The primary sources of information was Google for grey literature and Google Scholar for academic literature. To search the databases, we used a series of keywords per theme in combination to identify a long list of potential literature.

We combine adaptation keywords with (a) planning keywords and (b) finance-related keywords. For example, we searched for 'adaptation financ* AND green budgeting'. Since the aim was to include both conceptual literature and case study literature, we used high level search terms (such as adaptation finance), and more specific case-based examples. These are outlined in Table 5 below:

Table 5: Illustrative themes and keywords used in the literature review. Source: Authors.

Theme	Keyword longlist (to be combined in searches)
Regional Adaptation Finance	Adaptation finance, Incremental, transformational, justice, equity, public, public-private, blended, leveraging, crowding in, funding, resilience, process, framework; regions; investment; bankable

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Regional Adaptation Planning	Process, implementation, equity, finance, resilience, roadmap,
Enabling conditions to mobilise finance	Costs, benefits, capacity, green budgeting, Monitoring, Evaluation, Learning, increasing,

We added keywords as we became more familiar with the literature relevant to our research question.

2.1.2.3 Targeted websites

The deliverable reviewed the literature, research and publications from key sources and institutions working in the field. These included:

- World Bank Open Knowledge Repository
- OECD
- Global Centre on Adaptation (and associated Global Commission on Adaptation)
- Development banks (EIB, EBRD, ADB)
- UNEP-FI
- UNDP
- C40 Cities Finance Facility
- Climate Policy Initiative
- NDC Climate Toolbox
- CPI
- IISD

Literature was searched using the website's own functions and leaving topics to 'most relevant'. Any documents not providing guidance (e.g., conference remarks, speeches, business plans), were not included in the screening searches.

For each of these approaches, searches were limited to the first 50 results. Search strategies were limited to within the last eight years (2015 onwards) but were limited to English language versions due to the author's own limitations. Where relevant literature was cited in reports, a second round of additional literature was screened and included to ensure as comprehensive a mapping as possible.

2.1.2.4 Expert contacts

A final, small set of literature and examples was identified through a series of informal conversations with expert contacts working in the space of adaptation finance. The list of those approached, those that participated are included in Appendix 2.

2.1.3 Use of grey literature

Grey literature is recognised as a valuable source in systematic approaches (Paez, 2017), but there has been more limited application of systematic approaches. However, methodical approaches have been adopted which have helped minimise individual bias and improve effectiveness of research approaches (Godin et al., 2015).

The use of grey literature can also offer other benefits. For example, it can ensure proper representation of challenges (negative / null results), as well as access to data and information which has yet to make its way into academic literature.

For this review, we have adopted the Luxembourg definition, which defines grey literature as "that which is produced on all levels of government, academics, business and industry in print

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and electronic formats, but which is not controlled by commercial publishers, i.e., where publishing is not the primary activity of the producing body”. (Farace DJ & Frantzen J, 2005) Whilst the review focused on the grey literature, academic literature was not explicitly excluded, and was considered using traditional search engines and the expert reviews.

2.1.4 Presentation of information

To assemble a core set of information for further analysis, the literature was screened and collated into an overall list of the existing processes, tools and approaches being used to overcome barriers. Table 6 sets out the data collected:

Table 6: Initial data collated from literature review. Source: Authors

Variable	Description
Name	Name of the publication
Publisher	The publisher or institution affiliated with the publication
Author	The author of the institution
Year	The year it was published
Rationale for inclusion	The rationale in line with the Literature Review protocol in Appendix 1.
Developed / developing country context	Whether the study focuses on a developed/developing country context
Geographical focus (Global, EU/US/Asia, Regional)	The geographical focus of the publication
Focus on project, programme or strategy.	Whether the publication focused on adaptation strategies, programmes or projects.
Focus on wider enabling conditions	Whether the publication included reference to the wider enabling conditions for adaptation finance.
Focus on Justice and Equity?	Whether the publication included a focus on adaptation justice and equity
Coverage of synergies with mitigation planning	Whether the publication included discussion of the synergies or trade-offs with mitigation planning
Includes a process for financing adaptation?	Whether the publication included a process for financing adaptation, whether strategically or at the project level
Includes sources of finance	Whether the publication included a list / catalogue of the types of sources available for adaptation finance
Types of instruments	Whether the publication included a list / catalogue of the types of sources available for adaptation finance
Inclusion of best practice examples	Whether the publication included a list / catalogue of the types of sources available for adaptation finance
References to systemic / transformational approaches	Whether the publication focused on systemic or transformational adaptation finance approaches.
Key findings that relate to the research questions - current processes, guidance, strategies, activities and insights	A summary of the key findings from the article that relate to the research question

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Key strategies / frameworks or actions that could be included in the Adaptation Finance process	Key approaches, strategies or activities that could be used as part of the Adaptation Finance Processes
Key issues for systemic / transformative finance	Any relevant issues related to systemic or transformative finance.

This information was used to structure further spreadsheets of Adaptation Finance catalogues and processes, with detailed criteria on each. Table 7 below sets out the information collated for catalogues:

Table 7: Data collated on sources and instruments catalogues. Source: Authors.

Theme	Variable	Description
Content	Name	The name of the catalogue
	Publisher	The author or institution publishing the catalogue
	Year	The year it was published
	Financial scope	Whether the catalogue covered public and/or private sectors
	Sources	Whether the catalogue covered sources.
	Sources Included	The sources included by the catalogue
	Scope Instruments – Existing/Mature	Whether the catalogue covered existing / mature instruments.
	Instruments – Emerging/ pilot, new and innovative	Whether the catalogue covered emerging, pilot, new and/or innovative instruments
	Instruments included	The instruments included in the catalogue
	Business Models	Whether the catalogue covered business models
	Barriers / Challenges	Whether the catalogue covered barriers and challenges of using sources/instruments
	Strengths/Weaknesses	Whether the catalogue covered strengths and weaknesses of using sources/instruments
	How to access / contacts	Whether the catalogue how to access or contacts for sources/instruments
	Eligibility Criteria	Whether the catalogue covered eligibility costs
	Indicative costs of deployment / size of finance mobilised	Whether the catalogue covered barriers and challenges of using sources/instruments
	Use cases	Whether the catalogue contains use cases for instruments.
	Thematic/ sector relevance	If the catalogue had a particular thematic / sector relevance (e.g., Nature-based solutions or innovation)
	Case Studies	If the catalogue included case studies
	Typical revenue streams	If the catalogue assumed particular revenue streams or sizes

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	Synergies / Co-benefits	If it considered synergies or co-benefits
Look and Feel	Filters and Tags	Whether the catalogue could be filtered or tagged for navigations
	Solutions driven	Whether the catalogue was aimed at helping users solve particular challenges – e.g., generating new revenue streams for adaptation
	Use of a Taxonomy	Whether the catalogue includes use of a taxonomy for organisational purposes
	Format	The format of the catalogue (e.g., PDF, website, interactive tool)
	Identified Audience	If there was an identified audience for the catalogue
Summary reflections	Strengths	The particular strengths of each catalogue
	Weaknesses	The particular weaknesses of each catalogue

This review identified material directly relating to Europe, as well as relevant global insights and innovation that could be applicable to a European context. In addition to adaptation finance, the scan of literature included elements of wider topics of non-adaptation specific climate finance, sauch as mitigation finance, nature finance, biodiversity finance, and green finance. The review also drew upon practices emerging in the developing country context, where the greater need and more mature practices are driving Investment Planning processes (IISD, 2022b). More detail on the particular methods employed for each section of the deliverable is included in the relevant chapter below.

2.1.4.1 Catalogue information

The development of the sources and instruments catalogues begun with a review of the existing catalogues for adaptation finance. The review was conducted from two perspectives:

1) To understand the existing state of the literature on source and instruments – this covered both adaptation as a topic; and

2) To identify the content traditionally contained within a catalogue and possible structures and presentation approaches.

These findings from this catalogue of catalogues were used to inform a specification for the P2R sources and instruments catalogues, which was then populated by the project team. The final cataloguing criteria for sources and instruments of adaptation finance are shown in Tables 8 and 9 below:

Table 8: Fields for the Adaptation Sources catalogue. Source: Authors.

Characteristic	Description
Name	Name of the source of finance.
Actor Type	Whether the source is public, private or third sector in nature.
Category	The category for that particular type of source (e.g., European Institutions, National government entities, banks etc). Note this

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	included a number of nested categories (e.g., breaking down the types of banks).
Description	A short narrative description of the funding or finance source.
What matters to these sources?	The key motivations to these particular sources (i.e., that regions are going to have to pay attention to when considering mobilising)
Eligible Entities	The entities that can be funded by this source
Advantages	The strengths of using this particular source
Drawbacks	The drawbacks of using this particular source
Funding Instrument(s)	The type of funding instruments typically provided (e.g., grants, loans)
Typical Finance Size	Typical Finance Size provided by the entity
Relevant KCS	Whether the source is particularly suited for a particular KCS
Current or potential adaptation-relevant activities;	Whether the source has a particular focus on types of adaptation actions (e.g., research and evidence, capacity building, risk reduction)
Additional insights	Space for anything not covered elsewhere
Inspiring Examples	List of examples being used for each finance source
Further information / Contact details	Where to go / who to speak to for more information on options from particular sources.

Table 9: Fields for the Adaptation Instruments Catalogue. Source: Authors.

Characteristic	Description
Name	Name of the finance instrument
Category	The category for that particular type of instrument (e.g., debt, equity etc).
Description	A short narrative description of the funding or finance instrument.
Typical size/volume of finance	Range of finance normally provided by this instrument
Advantages	The particular advantages of using this type of instrument
Drawbacks	The drawbacks associated with the use of this type of instrument
Scalability	To what extent does the instrument have the ability to scale finance, through for example replication, aggregation, bundling
Time, resources, and expertise to access / deploy	The nominal amount of time, resources and expertise needed to either access or deploy the finance.
Setup costs	TBC
Concessionality	The approximate costs associated with setting up this kind of instrument.

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Considerations for accessing [Finance Instrument]	The degree to which the source is concessional and /or typical range of financial returns expected from each of the sources.
Current or potentially relevant sector(s) /KCS;	Particular considerations needed for accessing instrument [X]
Additional insights;	The current or potential sector(s) or KCS the instruments are particularly relevant to (if any)
Good practice examples	Any further insights for the use of this instrument
Further Information	Relevant examples of where the instrument has been used.

2.1.4.2 Adaptation Finance Process information

The Adaptation Finance Process was developed in two stages. Firstly, the literature review identified 14 adaptation finance processes for inclusion in the scope of the review. For each of the processes the study captured a range of information. The information collected is set out in Table 10 below. These criteria were developed and selected following the initial review of the processes.

The outcomes sought ranged from supporting individual investments through to holistic planning approaches, whilst the range of processes identified ranged from incremental, step by step approaches focused on individual investments, to more transformational, systemic processes designed to increase consideration of climate change in public financing across entire countries or places. For both the outcomes sought and the processes used, these were categorised as follows:

Table 10: Information collected on adaptation finance processes. Source: Authors.

Criteria	Description
Name	The name of the process
Year	The year in which the criteria was produced
Author	The Institution or author who produced the process
Audience	Who the primary audience for the process is.
Outcome categories	**Whether the process is primarily focused on** **Developing Investable Projects** – the main objective of the framework is to advance development of individual projects or a pipeline of investable projects. **Investment plan** – These target the financing needs of the municipal entity, and/or the wider actors in the area, with a primary focus on the entire region. **Improving Enabling Conditions** – the objective is to improve the institutional, technical, and financial aspects that characterize the framework under which adaptation action can happen.
Process employed	**Step by step processes** – these are designed to be followed in a linear way or through a cyclical process (e.g., for bankable projects) **Flexible framework** – A framework which describes the desired activities or outcomes, but which do not have to be followed specifically in order. (e.g., that describe the 'hallmarks' of good projects or processes) **Capability-Maturity Matrix** – programme which has a number of dimensions which mature and progress over time. – Presumes that all elements are needed, which have specific stages which mature over time.
Thematic focus	The thematic focus of the process, whether it is on: • Dedicated adaptation planning and implementation – The process provides finance-related support for adaptation plans, strategies, and projects.

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	• Green budgeting and mainstreaming climate in budgetary processes – Considering climate change in financing processes. • Integrated – i.e., considering the two categories above in an integrated way (e.g., both using green budgeting and broader adaptation planning processes)
Process overview	A narrative description of the process, including its aim and objectives and particular novel features
Strengths and Weaknesses	A summary of the relative strengths and weaknesses of each process, as relates to a process that regions can follow.

In some cases, processes contributed to more than one of the categories. In these cases, the primary outcome or process was selected. The deliverable then evaluated the strengths and weaknesses of these approaches and used them to define criteria and activities to frame an Adaptation Finance Process.

The P2R Adaptation Finance Process was then developed by using the insights from the process review to frame the context and ambition. The deliverable then iteratively mapped key activities from the process reviews and wider financing literature to the different stages of the Regional Adaptation Support Tool and the RRJ to provide an initial framework of activities. These were then supplemented by good practice guidance and tools identified in the literature as well as suggested by consortium partners.

2.2 Best practice examples in Key Community Systems

A requirement for the deliverable was to present case studies and best practice examples throughout the key community systems.

Therefore, the study includes a range of leading innovative sources, instruments and business models that could be further developed, or replicated in regions. These are provided as a separate worksheet of summary examples, linked to sources and instruments in the catalogues to highlight best practice examples,

To inform the selection and development of good practice case studies, the study started by cataloguing the case studies identified in the literature to develop a long list of examples. The case studies were reviewed by the authors for their relevance, and a subset were chosen for inclusion based on whether there was significant possibility for the case studies to be leveraged, replicated, or adopted by European Regions. Table 11 shows the final set of sources and number of identified case studies from each:

Table 11: Final set of literature used to populate case studies in the best practice examples catalogue. Source: Authors. Note final number does not match individual sources due to duplication in some literature.

Source	Number
EEA (2017)	11
IISD (2022)	42
CPI/GCA (2021)	27
Fankhauser et al, (2022)	5
Watkiss and Frontier Economics, (2022)	11
Ranger et al. (2023)	7
CCFLA, (2021)	12
WWF (2020)	6
GrowGreen (2019)	44

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Resilient Futures Investment Roundtable, (2023)	4
Ready to Fund Resilience Toolkit (2022)	9
Total	**169**

Examples were also cross-referenced across publications to ensure no overlap or duplication. For each case study, a short description was produced, along with the relevant key community systems, a location, the relevant sources, and instruments used, and further information. This approach was designed to be compatible with existing work undertaken with the sister Mission project ClimateFIT, with a view to developing a single inventory of finance-related case studies for regions in 2024.

This was complemented by a review of the major Financial Innovation labs and programmes to develop a long list of emerging financial instruments. The accelerators reviewed were:

- The Global Innovation Lab for Climate Finance – Established by CPI in 2014, the lab is an investor-led, public-private initiative that accelerates early-stage climate finance solutions and instruments. It crowdsources, selects, develops, and launches financial solutions to drive funding and financing into mitigation and adaptation action in developing countries. The lab seeks ideas that are actionable, catalytic, innovative, add value, and have the potential to be financially sustainable.

- SEED Practitioner Labs for Climate Finance - SEED is a multi-donor programme and network for action on sustainable development and the green economy, founded by UN Environment, UNDP, and IUCN, that works in eight developing countries. SEED runs a practitioner lab for climate finance (PLCF) included a specific adaptation finance stream targeted at small- and medium-sized eco-inclusive businesses & enterprises. The adaptation stream brings together organisations, businesses, and stakeholders to jointly develop prototype solutions and financial instruments that mobilise finance for adaptation measures and increasing climate change resilience. The programme has developed solutions in South Africa, Indonesia, Ghana, Uganda, Thailand, and India.

- Adaptation Scotland Climate Finance Working Group – The Adaptation Scotland programme is Scotland's national programme of support for public sector, communities, and businesses to support to climate change. The programme has established a Climate Finance Working Group, which has produced a finance guide, as well as undertaken a series of case studies evaluating adaptation financing options.

- GEF Adaptation Innovation Challenge Fund – The GEF Challenge Program for Adaptation Innovation supports scalable, bankable solutions that can help industries and communities cope with the adverse impacts of climate change and build economies that are resilient to changing weather and water patterns. Half of the funding will be used to support initiatives in least developed countries. The first round of funding supported nine new proposals.

- Climate-KIC / South Pole City Finance Lab - The City Finance Lab was an incubator of innovative, replicable, and scalable financing solutions that increase investment in climate-resilient, low-carbon and green urban projects for sustainable cities. The lab supported development of Innovative financing instruments and mechanisms tailored

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to cities and aimed to leverage USD 500 million in additional finance for climate action in cities by 2025 by mobilising private finance, leveraging expertise on climate finance and channelling efforts into innovative financing mechanisms.

- **EIT Climate-KIC Deep Demonstration Programme** – the EIT Climate-KIC Deep Demonstration programme developed a number of financial models through its Forging Resilient Regions programme, particularly focused in Glasgow.

The review of labs highlighted a strong focus in a number of key community systems – namely Land Use and Food, Ecosystems and Nature-based Solutions and Local Economic Systems. There were significant gaps in Health and Wellbeing and Behavioural Change as shown below:

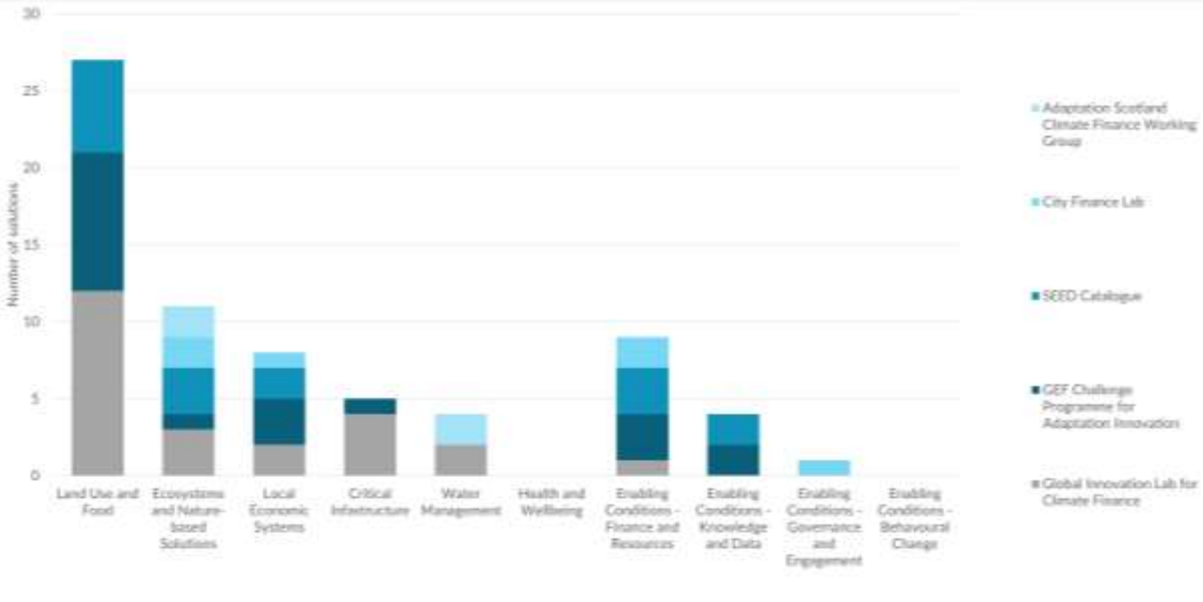

Figure 12: Emerging adaptation finance instruments by Key Community Systems and Enabling Conditions. Source: Authors

Whilst the case studies and best practice examples are intended to inspire regions and identify possible options that could be transferrable or replicated, it is important to note that their suitability is highly context-specific, depending on regional hazards, the characteristics of the system/sector, as well as local, national and EU policy. For example, in agriculture, weather indexing insurance payments and payouts, or aligning loan repayments with agricultural cycles have helped mobilise finance, along with the use of mobile technology to overcome issues of rurality, but depend on the availability of technology, financial regulations, and are currently only suitable for drought. **Therefore, whilst the business models provide illustrations for each of the key community systems, they cannot be comprehensive, and regions should use them as a starting point to explore their own financing models for regional adaptation needs.** In addition, it is important to note that the role of a region in each situation could differ. For example, in land use and food systems, the regional authority could facilitate the development of such a product, connecting insurers with potential purchasers, or supporting early-stage product development, whilst in supporting SMEs in climate risk reduction, Regional or local municipalities could provide direct delivery of the programme, as well as some of the adaptation options in partnership with the target beneficiaries.

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3 Existing, new, and innovative sources of adaptation finance

This chapter maps, catalogues and synthesises existing, new, and innovative sources of finance against regional finance needs. To do this, it starts with source definitions, before defining the objectives of a combined catalogue of sources and instruments. It then evaluates the strengths and weaknesses of existing catalogues of sources of adaptation finance and the implications for a P2R catalogue. It then presents a P2R catalogue of sources and outlines some of the key innovations underway. It concludes by reflecting on the state of the art and the potential impact of the catalogue for boosting the number and diversity of adaptation sources in regions.

3.1 Introduction

An early step in the process of mobilising finance for adaptation is for regions to identify, and engage with relevant sources of finance, and explore their suitability. By a source of finance, we mean:

"the entity able to provide the money to fund adaptation activities within a region." (Source: Authors)

The suitability of sources and instruments varies by actor (DeBoer, 2018). Therefore, regions will have to assess whether they are willing to accept such terms. Key considerations when assessing sources for their suitability include:

- **Ability to offer instruments** – Different sources are also able to offer different instruments. Some sources (for example National government) can offer grants and loans, whilst Venture Capital firms are more likely to take an equity stake.
- **Motivations for providing finance** - Each source will also have different motivations and values that make them suited for different activities. For example, a public institution with a health mandate would be more likely to support activities for deliver early warning systems. Banks may also provide finance for such activities but would still expect a commercial return in line with the terms of a lending agreement.
- **Regional capabilities -** Different actors have different powers and capabilities which modify their ability to reach certain sources. For example, regional governments may have the potential capacity to issue a green bond that a municipality does not have,
- **National, regional, and local political context –** for example some regions may be opposed to too significant involvement of private equity firms, or of citizen engagement via crowdfunding or local climate bonds.
- **Terms of finance** – Each source will offer different terms for providing finance. For example, public institutions may offer more favourable terms, but projects may have to align with specific policy criteria or include monitoring and evaluation reporting.
- **Economic and financial context –** The wider economic and financial context of a region may influence the choice of sources – for example depending on the ability of the region to borrow funding or finance.

Each of these issues will be context specific. Once suitable sources are identified, regions will then need to work with them to unlock finance, using their standard methods for approving, deploying and repaying capital. The process varies from source to source. For example, for Grants provided by the European Commission there is an application process. Development

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banks will assess the creditworthiness of an entity and the ability to repay lending. Investors will assess whether a project or entity can provide returns that meet its investment criteria.

Identifying and accessing sources is a particular challenge for regions. Figure 13 shows that 92% of those completing the P2R EOI said they had limited awareness of financial resources and mechanisms, whilst 95% said they had limited availability of financial resources and instruments, and 96% that they had limited ability to access financial resources and instruments (P2R Internal information):

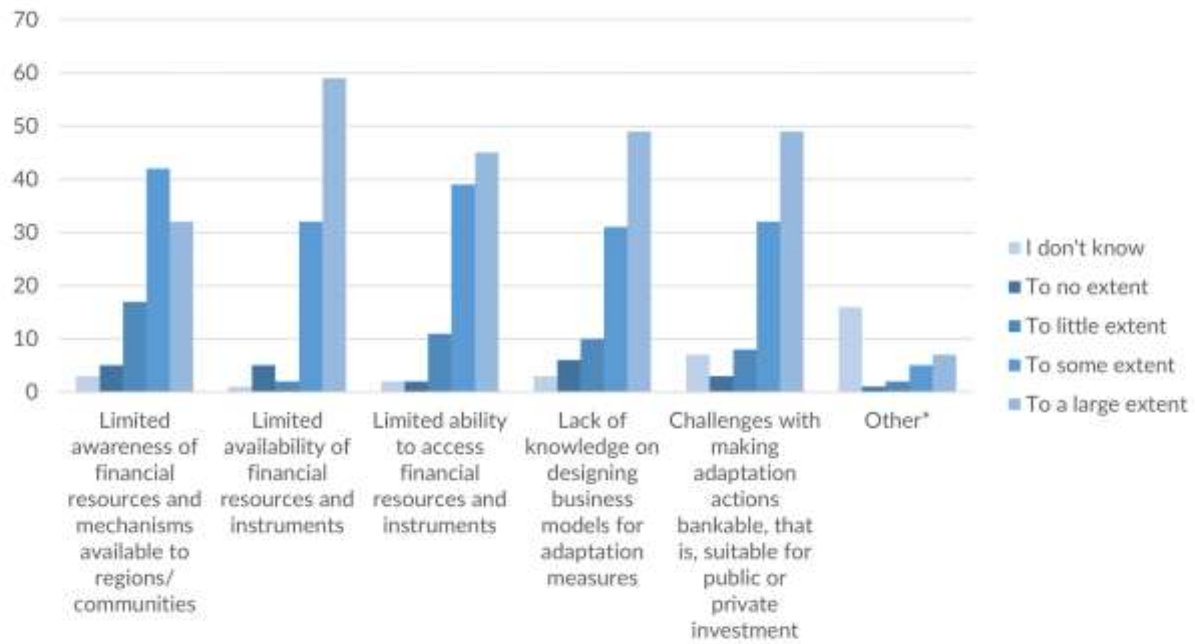

Figure 13: Regional challenges to financing adaptation. Source: P2R Expressions of Interest.

These challenges seem to be reflected in the choice of sources currently accessed by regions. The EU Adaptation Mission secretariat recently surveyed regions in the EU Adaptation Mission about the extent to which they access a range of sources and instruments. The results are shown in Table 12 below:

Table 12: Sources and programmes for adaptation finance from regions in the Adaptation Mission. Source: Authors, based on (European Commission, 2023a). N=301.

Source	Programme(s)	Type	I have used	I intend to use	I know	I don't know.
European Commission	Cohesion Policy Funds (EDRF, Interreg)	Public	48%	26%	14%	11%
	LIFE Programme	Public	31%	31%	24%	14%
	European Rural Development Funds	Public	22%	21%	30%	28%
	Horizon Europe	Public	25%	44%	20%	11%
	Other EU funds	Public	27%	26%	18%	29%
EIB	European Investment Bank Financing	Public	9%	12%	32%	47%
Private sector	Private/commercial banking financing	Private	8%	10%	31%	50%

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Member States	National funds	Public	62%	19%	11%	8%
Subnational Institutions	Regional funds	Public	52%	17%	12%	19%
Own source	Own local funds	Public	56%	14%	10%	20%
Unknown	Other	Public/private	7%	12%	12%	69%

The results in Table 12 show that to date, regions have predominantly used national, regional, and local sources, as well as some European Commission programmes. There is low use of sources which require repayment or require a return– i.e., from loans (e.g., EIB) or the private sector,. Interestingly, there is also a very low level of intention to use EIB or private sector, with limited knowledge on the awareness of these sources.

To support regions in increasing the number and diversity of sources in adaptation finance, P2R is developing a catalogue of sources which support regions in the design, funding, and implementation of Climate Resilience Strategies. There is no widely accepted definition of a catalogue – they can vary in topic, scale, depth, and focus, depending on proposed use and context. For the purposes of this study, we define a catalogue as:

"a complete list of items, typically one in alphabetical or other systematic order." (Source: Authors).

Catalogues can provide a broad overview of the options available to the user on a particular topic, as well as provide more detailed information. Table 13 highlights that by streamlining the process of data discovery and access to relevant sources, they provide a number of benefits.

Table 13: Selected benefits of catalogues. Source: Authors, adapted from Paperflite (2023) and (Kuttapa, 2022) .

Benefit	Description
Improves knowledge and information	A catalogue can raise awareness of sources the topic in question.
Speed, efficiency, and cost reduction	Catalogues make the process of achieving objectives shorter and more efficient and cheaper by reducing the amount of research and development required and reducing the reliance upon external consultants.
Improves uptake of solutions	By showcasing the range of solutions available, catalogues help focus efforts on uptake and replication, rather than on gathering information on possibilities
Supporting a shift to action	Catalogues help shift the focus to action, by allowing users to have contextual conversations instead of spending time on problem discovery and solution.
Comprehensive search and access to relevant data	Catalogues can provide a clear 'go-to' resource on a particular topic.
Enhance reputation	Catalogues can enhance reputation of those developing them, increasing their attractiveness to engage with.
Enhancing user experiences	Catalogues can enhance user experience – making it easier and more desirable to access the information.
Enabling local progress	Catalogues can enable users to make progress on their activities without reliance on others.
Improved trust and confidence	A catalogue provides a reliable set of information, improve trust and the confidence of regions that they will be using

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Supports training and capacity building efforts	Catalogues can act as a resource to support wider efforts by others in helping train and upskill others.

3.2 P2R catalogue aim, objectives, and audience

In light of this, the aim of the P2R catalogue is to support regions to explore, appraise and select relevant sources and instruments to support financing and implementation of their Climate Resilience Strategies and projects. The objectives are to:

- **Raise awareness of financial sources and instruments for adaptation in regions** – The catalogue should aim to raise awareness of the full potential range of sources of adaptation finance available to regions.
- **Support a shift to financing action** - Catalogues help shift the focus to action, allowing P2R and regions to have contextual conversations instead of spending time on problem discovery and solution. When regions have all the data that they need, they can seek approvals, make decisions, and develop Adaptation Investment Plans more efficiently.
- **Increase the speed and efficiency of development of adaptation projects and reduce costs –** The P2R catalogue will make it easier and quicker for regions to select sources of finance and instruments for adaptation projects, reducing the costs of project development.
- **Support training and capacity building efforts across the Adaptation Mission** – Provide a resource to support wider efforts by others in helping train and upskill others – for example through the planned training in WP5 and WP7 of Pathways2Resilience and other Adaptation Mission Projects (e.g., ClimateFIT, PIISA or REGILIENCE)
- **Extending progress beyond P2R –** The catalogues will enable regions to make decisions in their own region without relying on P2R staff. It will also support impact beyond the funded activity of P2R.

The audience is primarily regional entities themselves, but with a secondary audience of those interested in financing adaptation projects across a mission region.

3.3 Development approach

To develop the catalogue, the study identified 16 catalogues and evaluated the strengths and weaknesses, before identifying a series of implications for a P2R catalogue. This analysis was used, alongside the wider literature identified, as the basis to develop the P2R sources catalogue, with detailed supporting information. The supporting information was populated from wider desk-based searches related to the source in question. This review also identified and explored approaches that are being used to mobilise new sources of finance that the authors felt were innovative.

3.4 Existing catalogues of adaptation finance sources

The aim of the catalogue review was to:

- Explore the extent to which suitable catalogues of sources and instruments of adaptation finance already existing and could be leveraged for P2R,
- Evaluate the catalogues with a view to identifying key learnings and insights to inform the preparation of the P2R catalogues.
- Identify a long list of sources and instruments that could provide the basis for a taxonomy to structure and inform a catalogue.

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The catalogues identified are set out in Table 14 below:

Table 14: Identified list of catalogues of sources and/or instruments for climate adaptation. Source: Authors.

#	Name	Publisher	Year	Format	Sources	Instruments
1	Global Landscape of Climate Finance	CPI	2021	Report	Y	Y
2	Toolkit to Enhance Adaptation Finance	OECD	2015	Report	Y	Y
3	Climate Ready Clyde Resource Mobilisation Plan	Sniffer	2021	Report	Y	Y
4	A guide to Climate Adaptation Finance	Sniffer	2021	Report	N	Y
5	Financing Urban Adaptation to Climate Change	EEA	2017	Report	Y	Y
6	Ready to Fund Resilience Toolkit	American Society of Adaptation Professionals	2022	Tool	Y	Y
7	Funding Strategies for Flood Mitigation - Where do you get the money?	Headwater Economics		Report	Y	Y
8	Paying for Climate Adaptation in California: A Primer for Practitioners	Resources Legacy Fund	2018	Report	Y	Y
9	Implementing the Green New Deal	Offices of Senator Ed Markey & Congresswoman Alexandria Ocasio-Cortez	2023	Report	N	Y
10	REGILIENCE Toolkit	Fedarene	2023	Tool	Y	Y
11	Net Zero Cities Funding tool	Climate-KIC	2023	Tool	N	Y
12	Covenant of Mayors Funding Guide	European Commission	Ongoing	Tool	N	Y
13	GrowGreen - Approaches to financing nature-based solutions in cities	GrowGreen	2019	Report	N	Y
14	Innovative Financial Instruments for Climate Adaptation	IISD	2022	Report and Tool	N	Y
15	Financial Innovation for Climate Adaptation in Africa	CPI/GCA	2021	Report and Tool	Y	Y
16	An analysis of Urban Climate Finance	CCFLA	2021	Report	Y	Y

The review identified ten catalogues which included some consideration of sources, whilst all sixteen included some consideration of instruments. The NetZeroCities funding tool was included as whilst focusing on mitigation, it was primarily targeted at regions, and focused on implementation, which made it highly relevant to the review. Similarly, Glasgow City Region's Transformational Adaptation Strategy included a dedicated resource mobilisation plan which included a mapping of sources and instruments. Whilst not a catalogue in a traditional sense, it is included here because of its use in a mission-based approach and because it provides an example of the 'end use' output that a more general catalogue for regions in P2R could inform.

The catalogues were reviewed separately for their content on sources and instruments. For each we provide a general overview, the sources included and assessed the catalogue's strengths and weaknesses in relation to both the content *and* the accessibility for the end user.

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For example, a number of the catalogues are presented in dense literature, whilst others are more traditionally positions as a 'catalogue' and presented in interactive forms online as a living basis.

Each catalogue was scored by the study twice – once for sources and once for instruments - using the following criteria:

- Relevance to EUMCCA context – How relevant overall the catalogue is to supporting the EU Mission on Climate Change Adaptation (1-5, Very Low – Very High)
- Coverage – How broad the coverage of sources/instruments were. Note: this is broadly relative score across the range of catalogues reviewed (1-5, Very Low – Very High)
- Case studies – Whether the catalogue included case studies related to different sources/instruments of finance (0 – No, 1 – Yes)
- Practice-oriented – The extent to which the catalogue is oriented towards implementing solutions as opposed to providing high level information relevant to policy development (1-5, Very Low – Very High).
- Depth of content – The overall depth of information provided on the source/instrument, such as detail on the source, motivations, or links to further information. (1-5, Very Low – Very High).

These give a range of scores from 4 to 21.

An overview of each catalogue, along with the lists of sources and instruments included in set out in Appendix 3.

3.4.1 Evaluation of existing catalogues

1. **Global Landscape of Climate Finance, CPI.**

Strengths and Weaknesses: The categories of sources used for the CPI work are fairly broad classifications that support the main objective of the report – i.e., to track the current state of finance and make headline recommendations for where attention needs to focus on scaling finance to meet the Paris Agreement. However, it is unlikely to be granular enough for the purposes of developing and delivering bankable investments or regional investment strategies – for example 'Corporations' fails to acknowledge the different capacities and capabilities and interests between large private Organisations and SMEs. Similarly, there is distinction between corporates that focus on enabling/delivering adaptation, and those that are primarily focused on other activities but for whom adaptation will be needed to continue to achieve those goals. This is likely a product to an extent of the availability of data at the global level (e.g., from the OECD DAC database and Rio Markers approach). Despite this, its standardized approach, and consistently improving methodology since the work started in 2011 has contributed to it being a widely understood and referenced approach in the field. This suggests that there is the potential for exploring a more nested approach to a catalogue, whereby sources are structured into different categories for the purposes of providing strategic perspectives of finance tracking.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	4	0	1	1	9

2. **Climate Ready Clyde Resource Mobilisation Plan, Sniffer**

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Strengths and Weaknesses: The catalogue's strength is that whilst it includes a rather broad categorisation of 'sources', it includes a more detailed extension to 'actors' – the particular organisations within those general sources operating in Glasgow City Region that may be able to provide funding or financing instruments for adaptation interventions. In doing so, it provides a real-world example of how a region could draw upon a more general catalogue to develop tailored list of potential sources for a Mission region.

It is also helpful in that it situates both the sources and instruments within a wider 'finance taxonomy' - recognising that both sources and instruments can be 'conventional' or 'transformational'. This recognises that new instruments or financing models to can be used to scale-up incremental adaptation, or to catalyse more transformational adaptation. This is shown in Figure 14:

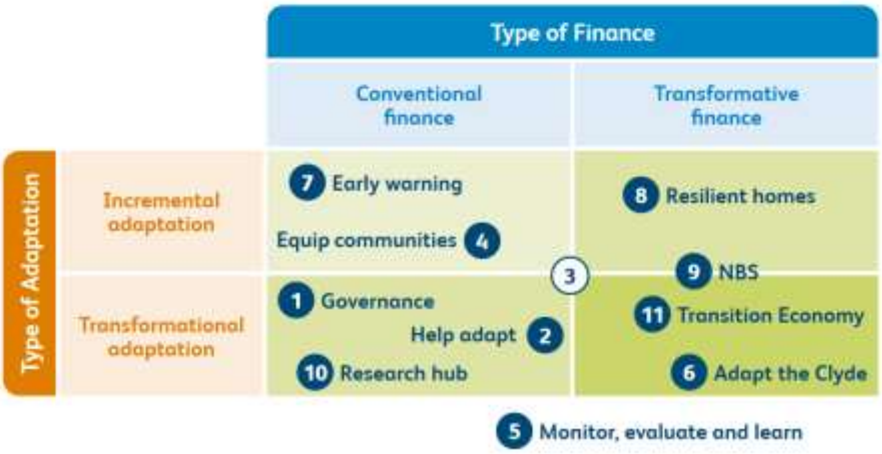

Figure 14: Mapping the Interventions of the Adaptation Strategy to the finance typology. Source: Climate Ready Clyde, (2021).

Finally, the strategy outlines delivery arrangements for finance (figure 15) – outlining how different sources become matched to the Adaptation Strategy and Innovation Portfolio, and flow to the Adaptation Interventions:

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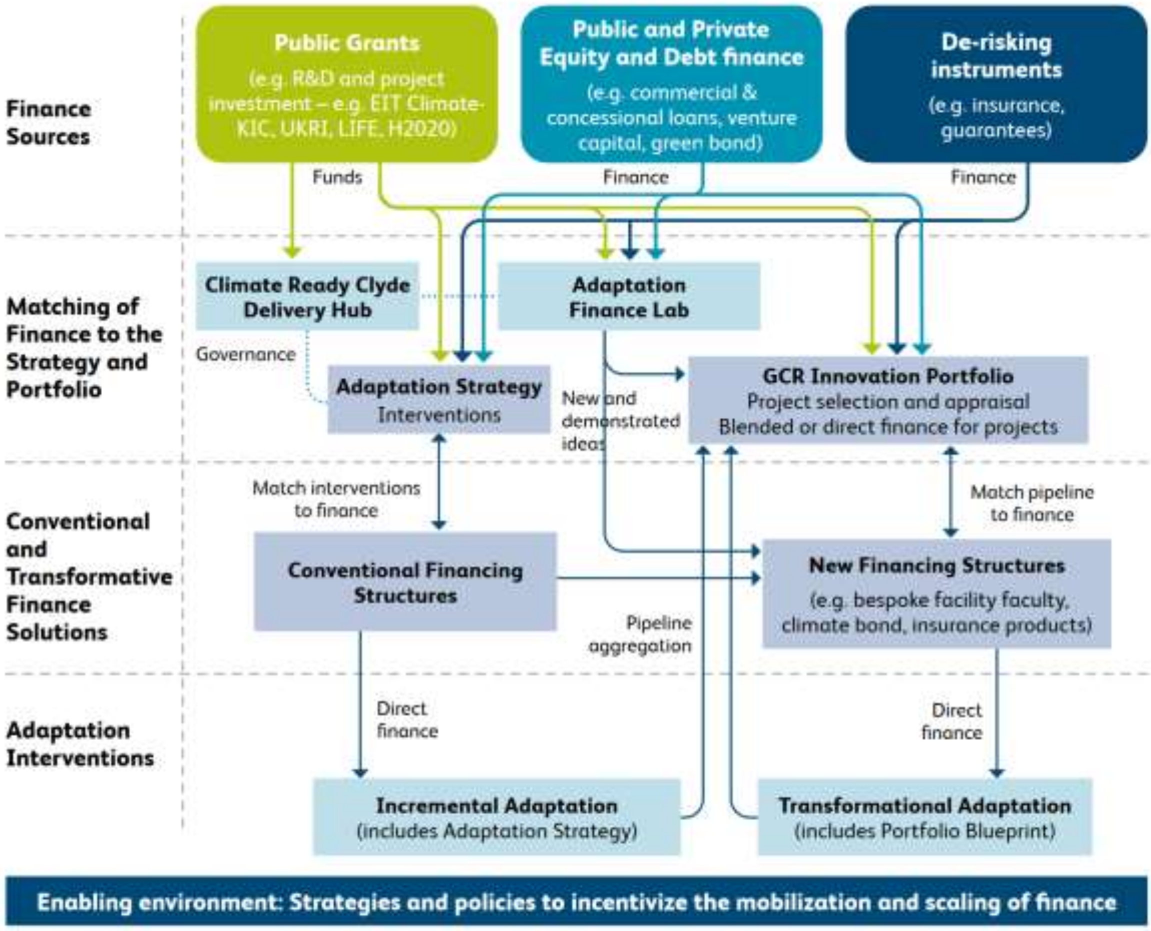

Figure 15: Delivery structure for transformative finance. Source: Climate Ready Clyde, (2021).

However, whilst it provides a strong, delivery-oriented approach for stakeholders in Glasgow City Region, the Resource Mobilisation Plan it is too tailored to be widely relevant for Mission Regions. Instead, it provides an illustration of the types of activity that ultimately regions should undertake and could be used as a guiding star to help inform the steps and outputs of the Adaptation Investment Cycle, as well as informing the types of content/categories for the P2R Catalogue.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
5	4	0	4	3	16

3. Toolkit to Enhance Adaptation Finance, OECD.

Strengths and Weaknesses: The OECD catalogue provides a strong set of practical information useful for practitioners to access and deliver adaptation projects, with detailed information on eligibility criteria, programme priorities, key policies, the processes for application and contacts for further discussion. However, the catalogue itself acknowledges that the sources included represent a fraction of the overall amount of adaptation finance available, and in fact runs the risk of promoting further dependence on UNFCCC funds. Confused instruments and sources in the sense of who provides the finance.

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Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	1	0	4	4	10

4. **Financing Urban Adaptation to Climate Change, EEA**

Strengths and Weaknesses: The EEA report provides a much looser taxonomy than many of the other catalogues, structured based around four key categories. Whilst this provides a helpful sense of the institutions involved, it makes it hard to identify exactly which stakeholder to involve in a particular situation, and limited information on the actors and their motivations or suitability is provided. Again, the document suffers by conflating sources and instruments. However, one of the interesting elements is the use of free or low-cost actions to widen the availability of sources – for example the use of mainstreaming into policy or using regulation to drive new action.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
4	2	1	2	3	12

5. **Ready to Fund Resilience Toolkit, American Society of Adaptation Professionals**

Strengths and Weaknesses: The strength of the Ready to Fund resilience toolkit is its efforts to build upon the work of others (including AECOM in California, as well as partners such as Climate Finance Advisors LLP and ASAP), to build a practice-oriented toolkit. It modifies the work to remove a number of sources and expands the more limited work on private sector actors to cover Institutional Investors and Insurance. Whilst the work by AECOM identifies the advantages and drawbacks of working with each potential source, this is given added value by being placed in wider context of financing resilience. In doing so, it provides a helpful example of how a catalogue can be anchored into wider capacity building efforts, in a way which complements and builds upon the ecosystem of actors in the US.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	5	1	4	4	16

6. **Funding Strategies for Flood Mitigation - Where do you get the money?, Headwater Economics**

Strengths and Weaknesses: The catalogue strikes a good balance between granularity and accessibility, outlining general categories of source where there are multiple actors with many different institutions, but then being specific on the public sector where there are a more limited number of actors which are likely to have a long-term stake in adaptation. It helpfully includes case study examples, as well as the benefits and challenges. Interestingly, it focuses heavily on the practical challenges of implementation by including a section on focused on stakeholder influence, prompting users to consider who they need to convince and the evidence that can be used to do so (see the example in Figure 16).

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This approach helps generate some of the wider evidence needed for bankable investments. One drawback common across multiple catalogues is that it conflates sources and instruments. It also has a limited number of potential sources – whilst foundations and business owners are identified as actors that may need to be convinced, the majority of sources with detail on possible financing are predominantly state or national public sector.

Who do you need to convince?	What matters to these folks? Example pitches.	What evidence can you use? $ (least expensive) – $$$ (most expensive)
Local elected officials	**Community health, safety, and welfare; budgets; competing demands and priorities; electability** • Project creates jobs and brings new funding to the area • Protecting our community is worth the cost • Project is a win-win; • Project complements other municipal plans and departmental strategies • Project reduces impacts of climate change on underserved neighborhoods	$ Show impact on city department budgets and planning processes. $-$$ Use neighborhood-level data and data from familiar peer municipalities. $$$ Estimate money saved from having project in place (cost avoidance study).
Local taxpayers	**Fees; taxes; quality of life; community stability** • A small investment now will avoid tragedies with enormous future costs • Your neighbors are participating • Project will provide safe and reliable infrastructure • Project will improve neighborhood safety	$ Show that similar projects have increased property values in other communities. $-$$ Point out savings from decreased flood risk and lowered insurance premiums. $$-$$$ Share data from questionnaires, surveys, and comments from public meetings.
Local business owners	**Regulatory predictability; economic impacts and efficiency; debt avoidance** • Project creates jobs • Good return on investment • Local economic drivers will be sustained • Project will bring new people to the area	$ Get data showing trends in population and employment so that you can explain how your project can contribute to economic development. For growing communities, your project can help sustain growth. Otherwise, your project can help retain and attract residents. $$ Estimate jobs and income that can be protected or created as a result of the project (economic income analysis).
State and federal agency partners	**Quantifiable costs and benefits; reliable data; logical procedures** • Protecting our community is worth the cost • Doing Y will most likely result in Z • Avoidance of damage and expenses from natural hazards • Project increases safety of people and infrastructure	$ Get letters of support to demonstrate community buy-in. $$ Compare costs of different actions to achieve a specific goal. $$-$$$ Estimate cost-effectiveness through a benefit cost analysis by comparing project costs (construction, administration, etc.) and project benefits (avoided costs, community improvements, etc.). $$-$$$ Estimate positive impacts on amenities that people value even though they do not pay for them, such as health, clean air, and recreational opportunities.
Foundations, philanthropists, impact investors	**Climate change impacts on people and the environment; obligations to future generations; equitable outcomes; environmental stewardship** • Climate change is threatening the world as we know it – we must act • Project improves racial and environmental justice • Project improves clean air and water, abundant wildlife • Project provides green infrastructure, alternative energy • Project is the right thing to do for future generations • Project supports neighborhood decision-making	$ Show how the project will benefit underserved individuals and neighborhoods. $ Take compelling photos, organize site visits, get quotes from community members who will benefit from the project. $ Show how the philanthropic investment will serve as a catalyst and be leveraged to secure additional funding. $$ Explain who will bear the costs and who will receive the benefits.

Figure 16: Extract of Funding Strategies for Flood Mitigation on sources. Source: Headwater Economics.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	1	4	3	11

7. Paying for Climate Adaptation in California, Resources Legacy Fund

Strengths and Weaknesses: Rather than potential sources of finance, the catalogue provides this as 'lead institutions', shows the funding or financing tools they have, when to involve and the strengths and drawbacks of involving different actors. This places a more subtle framing, recognising that sources are active participants in the financing processes, rather than merely being available to draw down finance from. Whilst framing the funding sources as lead institutions can be helpful to help with project preparation, and engagement it may also lead to confusion as a source and lead institutions can be different, and many projects will involve multiple sources to develop bankable investments.

It also benefits from the more detailed guidance provided on the local enabling environment such as policy and regulations. However, it includes very limited information on the practical aspects of how these sources might be engaged. It also has limited coverage of the private sector sources available.

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Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	3	0	3	3	10

8. Funding Opportunities, REGILIIENCE

Strengths and Weaknesses: The catalogue is highly relevant to the EUMCCA context as it is funded through the Mission. It also brings together the range of EC funding options. However, whilst the information provided in a central location, much of it is already publicly available – raising questions on the added value of the catalogue beyond an initial introductory resource. Similarly, it doesn't distinguish between sources and instruments, instead classifying them as a single set of funding opportunities, and mainly focuses on public, European sources. Whilst this helps provide a summary of near-term options for regions, it does little to encourage the more robust investment planning needed to move beyond the existing range of public sources on offer.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
4	2	0	3	4	13

9. Financial Innovation for Climate Adaptation in Africa, CPI/GCA

Strengths and Weaknesses: Whilst the African context is less relevant to the European Mission on Climate Adaptation. A particularly novel approach to the catalogue is that it rates the Risk appetite, climate mandate, and ability to raise funds and flexibility to deploy funds of each actor, on a scale of 0 - 4. In addition, the tagging features which allow users to navigate freely between sources, instruments and case studies helps overall accessibility. However, the online catalogue is more limited in information than the written report, which takes a sector-by-sector approach to linking actors to different instruments and programmes for finance.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	1	3	3	10

10. An analysis of Urban Climate Finance, CCFLA

Strengths and Weaknesses: The catalogue provides a helpful classification of sources which is more detailed than many other catalogues. It is particularly useful as the Taxonomy illustrates the links between the sources and instruments available to them. However, the international focus means that some of the classifications of the taxonomy are less relevant to the European context (e.g., the inclusion of Climate Funds).

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	4	1	1	2	10

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3.4.2 Results

The review of sources catalogues showed a wide range of catalogues available to support access to sources of finance. The scoring of the instruments is show in Table 15 below:

Table 15: Aggregate scoring of sources catalogues for P2R relevance. Source: Authors.

Catalogue	Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
Climate Ready Clyde Resource Mobilisation Plan	5	4	0	4	3	16
Ready to Fund Resilience Toolkit	2	5	1	4	4	16
REGILIENCE	4	2	0	3	4	13
Financing Urban Adaptation to Climate Change	4	2	1	2	3	12
Funding Strategies for Flood Mitigation – Where do you get the money?	1	2	1	4	3	11
Toolkit to Enhance Adaptation Finance	1	1	0	4	4	10
Paying for Adaptation in California	1	3	0	3	3	10
Financial Innovation for Climate Adaptation in Africa	1	2	1	3	3	10
An analysis of Urban Climate Finance, CCFLA	2	4	1	1	2	10
Global Landscape of Climate Finance	2	4	0	1	1	9

The review highlighted there is not an existing catalogue of sources that is suitable to the context of building a region's knowledge and awareness within the Adaptation Mission. The majority of catalogues' content and were determined by their final intended use – e.g., to support policymaking, delivery of adaptation investment or for the tracking of finance flows.

There were varying levels of depths of typologies, highlighting the trade-off between granularity and usability. For example, whilst the work by Climate Ready Clyde is highly useful for the local context in Scotland, it is beyond the practical scope of a catalogue to list every financial entity interested in every member state. Therefore, the catalogue should seek to provide a granular set of sources, whilst not naming them individually. The Headwater Economics, AECOM and Ready to Fund Resilience Toolkits work strikes a helpful balance in this regard by creating category classes for large groups of multiple actors (e.g., Institutional Investors), but list out those public sources which will have a significant, long-term, sustained interest in financing adaptation in regions.

The catalogues used a wide range of taxonomies of sources– whilst most used some mix of public and private sector, many had a public sector focus or on more limited funding opportunities.

A number of the catalogues conflate sources and instruments – with a number of them citing actors and instruments interchangeably (e.g., EIB vs Loans or Technical Assistance, or European Commission vs. ERDF). This suggests that the work in this space is relatively immature, and value could be added by a degree of robustness.

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A number of the more innovative elements focused on the characteristics of the different sources – for example what matters to them, the advantages or drawbacks of working with them (Ready to Fund), or their risk appetite (CPI/GCA). This speaks to a more strategic approach to financing, helping users conduct early diligence to help avoid wasted effort to engaging them, and boosting likelihood of success.

The review also highlighted that catalogues could add further value by being used alongside other content rather than in a standalone effort, such as in the Ready to Fund Resilience Toolkit. Despite this, there have been limited efforts to build a comprehensive catalogue of sources of adaptation finance that are relevant to European regions.

Many of the toolkits link sources to instruments, actors and/or case studies. Whilst good, the sheer geographical size, number of different sources and policy and regulatory contexts suggests this will be impractical for a European catalogue. Whilst it can be a useful in the early stages to help illustrate potential approaches, it eventually becomes limiting in that it potentially constrains the ability of users to go beyond what is included in the catalogues.

3.4.3 Discussion

The assessment of catalogues shows there is a unique opportunity to comprehensively define a catalogue of sources of finance for subnational adaptation and clarify terminology to support wider efforts to mobilise adaptation finance. However, the review highlighted a range of issues that will need to be considered.

- **Objectives and links to the Adaptation Investment Cycle -** There will be a need to set an overarching objective for the catalogue of sources. It is suggested that this should be to support diversification of sources and increase the volume of adaptation finance, as part of the wider Adaptation Investment Cycle. This suggests that a step in the development of Adaptation investment Plans should be to map the sources and instruments available to regions to help inform development of financing options.
- **Trade-offs between granularity and usability -** The catalogue will need to strike an appropriate balance between granularity and usability –it is not practical to list every financial entity interested in every member state. However, the catalogue ought to be granular enough to allow for regions to select their sources for real-world applications. This would allow the catalogue to underpin wider applications in future such as analysis of finance flows and policy development to boost particular sources of adaptation finance. Therefore, the catalog should seek to provide a granular set of sources, whilst not naming them individually. A compromise, as in the work by Headwater Economics, could be to create category classes for large groups of multiple actors (e.g., Institutional Investors), but list out those public sources which will have a significant, long-term, sustained interest in financing adaptation in regions (e.g., European Investment Bank or Council of Europe Development Bank). Similarly, the catalogue could also use 'nested' classifications – i.e., breaking down sources into public, private and third sector, before then using sub-categories such as EU institutions, banks, households, etc. This would allow the catalogue to reflect the nuance of different sources (e.g., a university or a think-tank)
- **Considering the motivations of sources and advantages and drawbacks** – The catalogue should move beyond a taxonomy to have a consideration of what matters to these sources, as well as the advantages and drawbacks of working with them, and some kind of indication as to the types of adaptation they would be interested in funding.

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- **Linkages of catalogue elements -** Where possible, the catalogues should link together specific instruments and case studies to each source, whilst being clear that such examples are not exhaustive and encouraging regions to be creative in their approaches to identifying and engaging potential sources.

3.5 Pathways2Resilience Sources Catalogue

Having reviewed the range of catalogues, the study then drew on them and further developed them into a bespoke catalogue for Pathways2Resilience. To do this, the authors longlisted the sources included in each of the catalogues and used expert judgement to combine them into an overall typology for use by regions in a European Context.

The review of catalogues resulted in the selection of 57 sources for adaptation, including a mix of 18 public, 35 private, and 4 third sector sources. The final taxonomy is presented in Figure 17 below:

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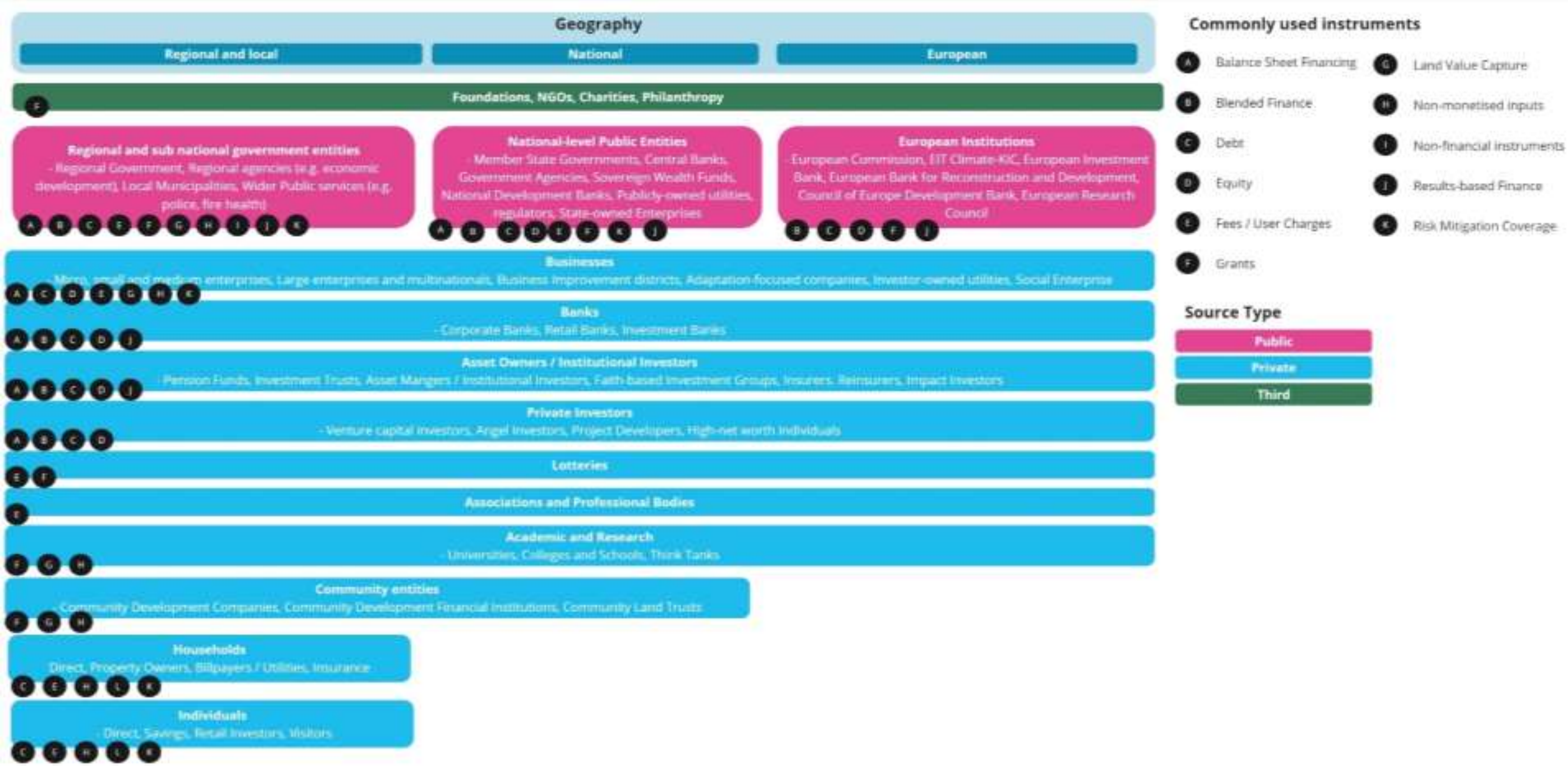

Figure 17: The P2R sources catalogue by geography, sector and commonly used instruments. Source: Authors

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For each source, the study then populated the criteria as set out in Chapter 2. These were then included as part of the combined catalogue of sources, instruments, and best practice examples in Appendix 4.

3.6 Innovative approaches to boost regional access to sources of finance.

In addition to the above, over the past few years, a number of innovations have emerged to diversify and scale the range of sources available to fund regional adaptation. These range from the reconceptualization of the value of resilience and its incorporation into new methodologies for project development, through to regulation and investment planning approaches. Key innovations include:

- **Advances in quantification and assessment of the value of climate resilience –** the Global Commission on adaptation outlined the potential for a triple dividend of adaptation; avoiding costs; driving economic benefits and social and environmental benefits. (Global Commission on Adaptation, 2019). Since then, there have been a series of theoretical and academic advances made in being able to demonstrate how investments in adaptation contribute to wider value creation both at the project level. This body of knowledge has contributed to increasing the bankability of finance solutions which involve new actors. For example, (Barrett & Chaitanya,2023) outline the underpinning process by which such value creation occurs in Figure 18 below:

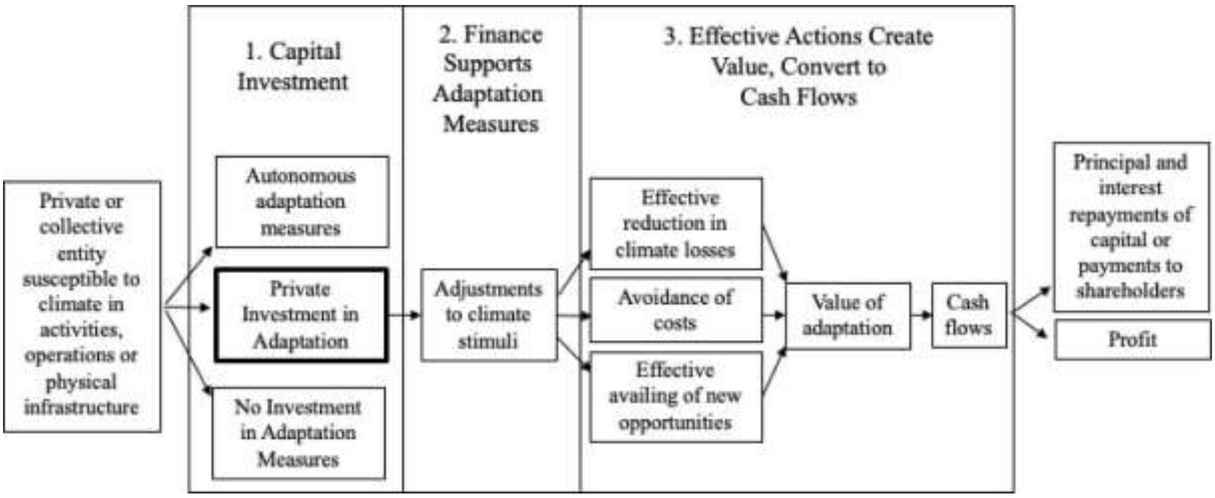

Figure 18: Private investment in adaptation, supported actions, value of adaptation and cash flows. Source: (Barrett & Chaitanya, 2023)

This in turn provides the theoretical underpinning for others to articulate additional value of adaptation. For example efforts at the more systematic level such as those by the ADB (Ward & Watkiss, 2021 and the Coalition for Climate Resilient Investment (Coalition for Climate Resilient Investment, 2021) have focused on quantifying the costs associated with climate impacts across the cashflows of projects. In doing so, project development and design are better able to address climate impacts and provide a truer picture of the costs and benefits of resilience. An illustrative diagram on this is shown in Figure 19 below:

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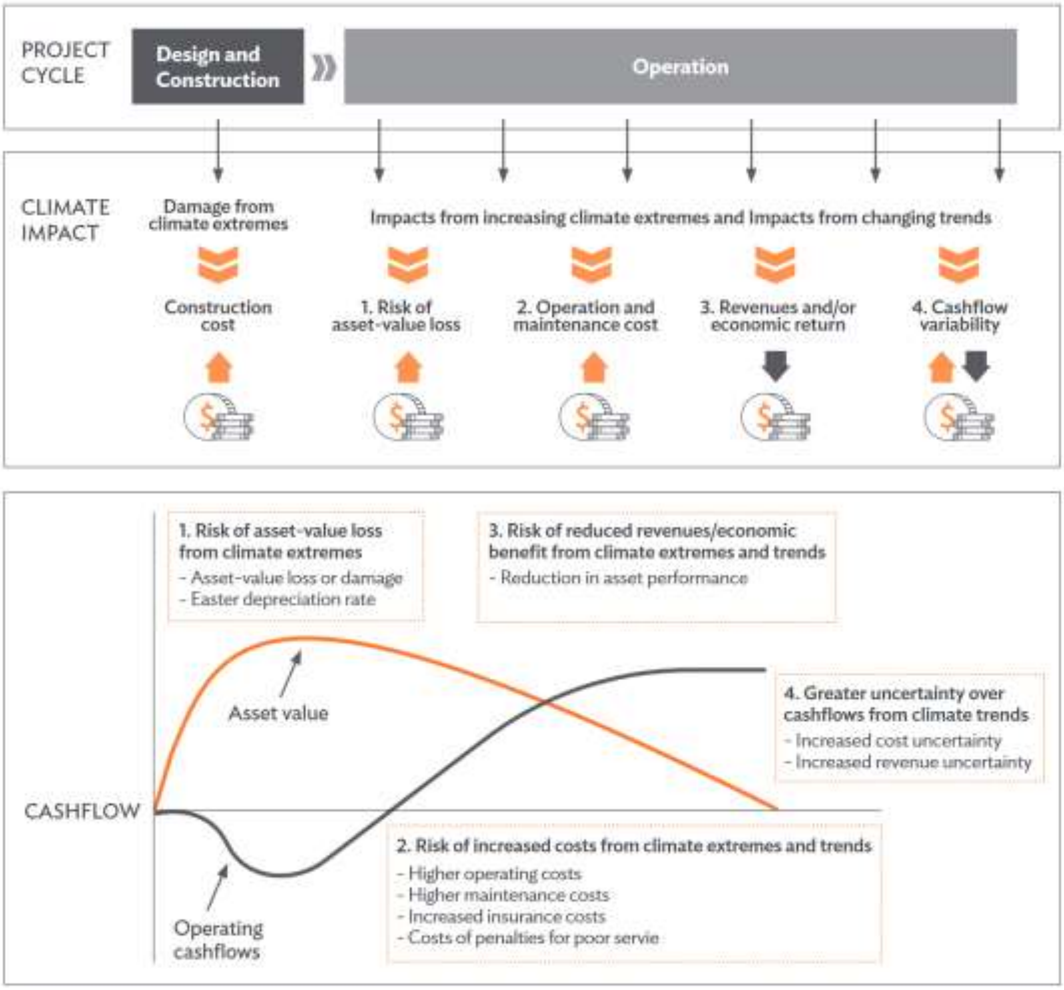

Figure 19: Impacts of climate change in Infrastructure Asset Financial Performance. Source: (Ward & Watkiss, 2021)

There have also been a series of innovations in assessment methodologies which have helped demonstrate the avoided costs of climate change. For example, a number of studies in Australia have focused on 'betterment' - these show the avoided costs from an investment. For example, At the Gayndah Water Supply Intake Station it is estimated that a $1.3 million investment in betterment in 2013 has so far avoided losses of over $10million. Whilst adaptation projects remain place and context specific, these methodologies allow project developers to demonstrate the value provided to a much wider range of potential sources, strengthening the rationale for their investment in adaptation.

- **Development of shared value propositions and realisation of co-benefits which crowd in new sources** – Building on this new understanding, new project approaches are emerging which seek to involve a wide variety of actors from the outset to maximise funding opportunities (for example (England et al., 2023; Porter et al., 2023; Wise et al., 2022). The potential approaches here start by identifying a wide range of potential adaptation benefits and wider economic, social, and environmental co benefits that could potentially be delivered through the project, as well as who they accrue to. An example is shown in Figure 20 below:

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Figure 20: How Resilience provides value (left) and how co-beneficiaries can help pay (right). Source: (Porter et al., 2023)

If quantified at an early stage, these benefits can then be used to inform the technical design of a project and the financial case for investment, as well as the economic and strategic rationale of public sector actors. Figure 21 shows how this has been used in Scotland, where recent work by the Adaptation Scotland programme mapped the benefits and beneficiaries from a nature-based solutions project in Edinburgh:

Category	Benefit type	Nature of good	Beneficiary	Revenue streams
Adaptation benefits	Moderation of extreme events – Drainage Infrastructure	Public	Scottish Water	Avoided infrastructure investment costs, Avoided running costs
	Moderation of extreme events – Surface water	Public and Private	City of Edinburgh Council, Tenants, Nuveen	Avoided infrastructure investment costs, Avoided running costs.
	Moderation of extreme events – Insurance claims	Private	Tenants, Insurance industry	Reduced insurance premiums
	Wastewater treatment	Public and Private	Scottish Water, Tenants	Avoided infrastructure investment costs, Reduced wastewater charges
Co-benefits, environment (Regulating services)	Local climate and air quality regulation	Public	City of Edinburgh Council, Nuveen, Tenants	Grant finance
	Carbon sequestration and storage	Public / private	Edinburgh City Council, NatureScot, high emitting companies	Government net zero / carbon credits (note private Carbon Credit markets would have lower values)
Wider Amenity benefits	Economic growth and property value uplift	Private	Nuveen Real Estate	Increased rental fees

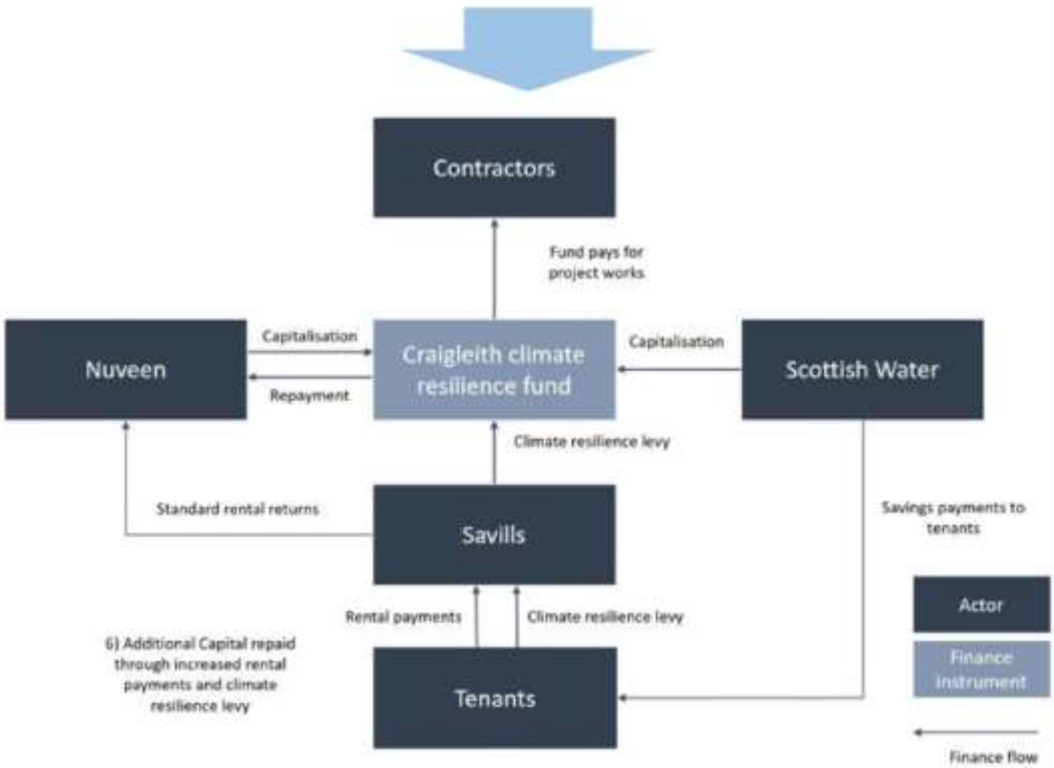

Figure 21: From beneficiaries to business model. Source: Authors, based on England, K., Hunt, A., and Watkiss. P. 2023.

There are also numbers of tools and template to which support this approach. Connecting Nature's Business Model Canvas and Guidebook, provides a dedicated section on stakeholders as part of its structured process for building a value proposition and business model (Connecting Nature, 2019). Similarly, CSIRO's guidance advocates the development of a value proposition which delivers adaptation alongside wider economic, social, and environmental co-benefits. (Wise et al., 2022).

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- **Coordinating and brokering public and private sector interactions** –. In the context of facilitating private sector adaptation, public coordination in developing, financing, and executing priority adaptation investments is important as private sector actors look to public institutions to set out what is needed (Tall et al., 2021). In this context, intermediaries such as development finance institutions or development banks can play a strong role in identifying opportunities. (WWF, 2020). In the UK, the 3Ci initiative has been holding regional investor roundtables, bringing together local municipalities with private investors to highlight and shape investment opportunities as part of a broader programme of capacity building and support (3Ci, 2022). This work has improved the visibility of investments to the private sector, improved the ability of public sector actors to design projects in line with private sector requirements, and strengthened private sector confidence in opportunities. Whilst the scope of the initiative has mainly focused on mitigation, projects include nature-based solutions and could in theory be easily expanded to cover adaptation.

- **Finance labs which coordinate investment opportunities** – whilst the provision of technical assistance or funding or finance lab is common for adaptation, a new wave of approaches have sought to move beyond traditional technical assistance by increasing the focus of matchmaking – i.e., building pipelines of projects and involving new actors such as financiers to help increase the robustness and bankability of solutions as well improving coordination of actors. Examples include South Pole City Finance Lab, and Adaptation Scotland's Climate Finance Working Group, as well as Brigaid Connect.

- **Dedicated instruments for investments from individuals** – There have been a number of efforts which directly connect citizens with local municipal action on adaptation, recognising the dual roles citizens and households can play since they have a stake in their area, and can also act as retail investors. For example, crowdfunding platforms have been used successfully in Ghent to support neighbourhood level actions (ClimateADAPT, 2016). In the UK the most prominent efforts have been through the financial company Abundance. Their platform enables citizens to invest in public or private projects and receive a return under Green Finance frameworks. Whilst projects have yet to focus on adaptation, some nature-based solutions offer adaptation co-benefits Such approaches are financially attractive in the current context; many believe investments are lower risk than company investments and the rising interest rates make low risk municipal investments a valuable part of a balanced portfolio, although few believe municipalities will deliver on their climate plans (Abundance, 2023).

- (Swann & Miller, 2019).**EU Sustainable Finance Package** – Sustainable finance reforms spearheaded by the EC have also aimed to boosting the availability of finance for adaptation, and to encourage private sector actors to adapt to climate change. The EC's actions are in line with wider recommendations around adapting the financial architecture to consider adaptation in private decisions, e.g., (Swann & Miller, 2019). The package comprises three complementary strands – the EU Taxonomy, Sustainable Finance Disclosure Regulation, and the EU Corporate Sustainability Reporting Directive. Together, these provide a framework for companies to enhance sustainability across the economy, including on adaptation. An overview is shown in Figure 22 below:

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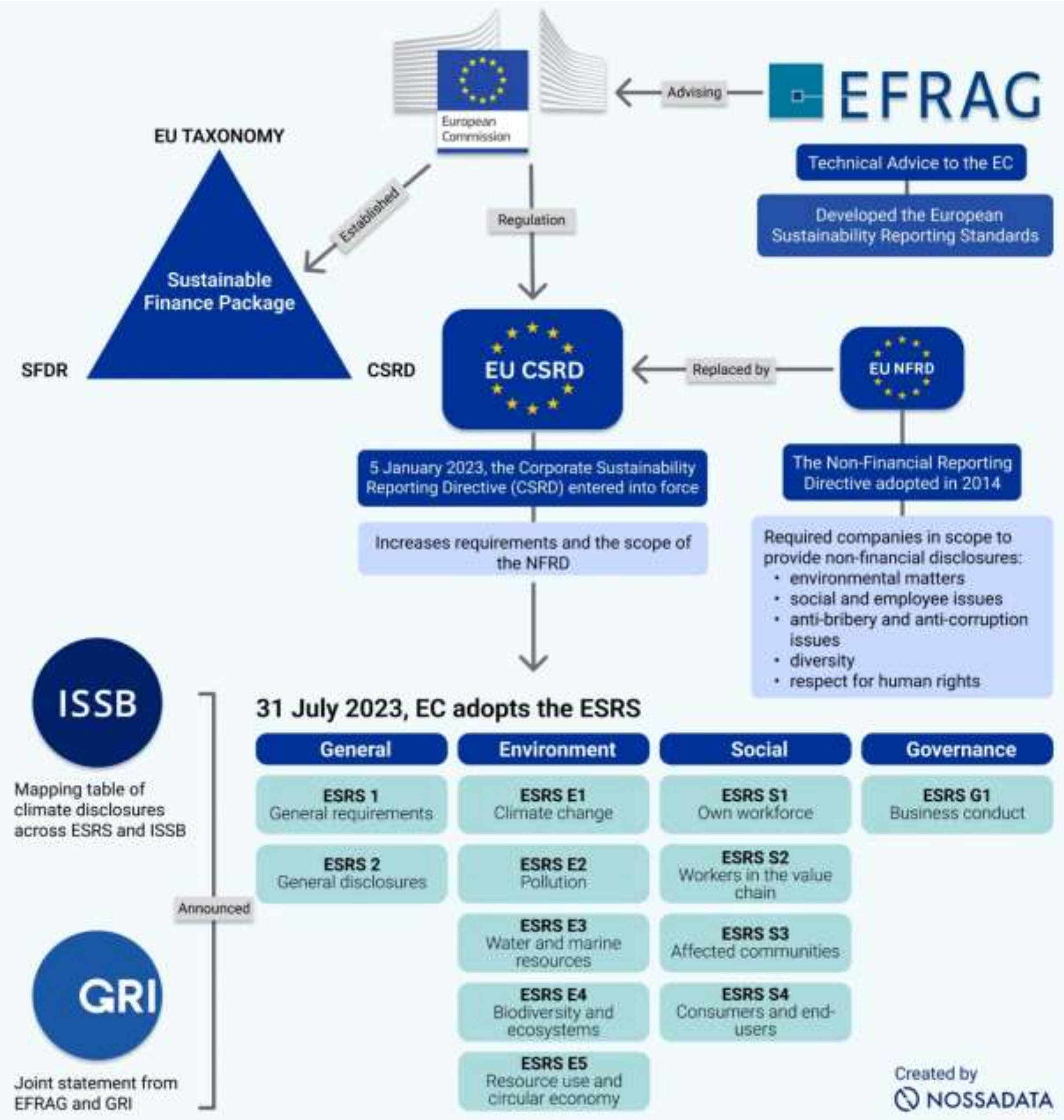

Figure 22: Overview of the EU's Sustainable Finance Agenda. Source: (SustainableViews, 2023., based on Nossadata)

The Corporate Sustainability Reporting Directive sets out requirements for all large companies and all listed companies (except listed micro-enterprises) to disclose information on what they see as the risks and opportunities arising from social and environmental issues, and on the impact of their activities on people and the environment. This helps investors, civil society organisations, consumers, and other stakeholders to evaluate the sustainability performance of companies, as part of the European Green Deal (European Commission, 2023b). Around 50,000 companies within the EU are in scope of the regulations_(European Parliament, 2022), along with an additional 10,300 outside of Europe (Refinitiv, 2023). Disclosure is supported by a common set of European Sustainability Reporting Standards (ESRS) which provide detail on the standards. The Sustainable Finance Disclosure Regulation requires similar disclosures for financial market participants. Finally, the EU taxonomy for Sustainable

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Activities outlines a set of criteria to determine if an economic activity is sustainable. The taxonomy covers six categories (Including adaptation). Together, these aim to significantly drive forward adaptation action by increasing visibility of adaptation investments, but given the early nature of the analysis, it remains to be seen if the package will have the desired effect of significantly scaling adaptation finance.

To complement the existing package, there is ongoing work to make companies set out transition plans under the green deal, with work underway to incorporate a requirement to produce them under the Corporate Sustainability Due Diligence Directive. Although subject to negotiation, if the requirement is contained within the final Directive, companies will have to design climate transition plans as a part of their long-term strategies and ensure they do not contribute to adverse environmental and human rights impacts across their value chain, with the responsibility being enforced through companies' civil liability, links to remuneration of directors, and the public authorities' capacity to impose sanctions (E3G, 2023). The final scope remains to be seen, but internationally, Transition Plans have been widening from a focus on mitigation to accounting for actions to address the risks of climate change, and to explicitly include adaptation. Examples include the recent ISSB standards and Transition Plan Disclosure Framework. (IFRS, 2023; Transition Plan Taskforce, 2023).

- **Investment Planning** – There is an emerging body of activity focused on the merits of Investment Planning for Adaptation, recognising that doing so, can better allocate risks, helping quantify and sequence public investment needs, highlight private sector investment needs and opportunities, and help the private sector play a better role in financing adaptation goals. (Ranger et al., 2023). Investment Planning translates high level adaptation aspirations in a National Adaptation Programme into bankable investments, with a clear financing strategy. This approach has emerged in developing countries thanks in part due to the support of the UNFCCC, with at least 23 strategies including dedicated adaptation financing approaches or a broader approach in climate action (IISD, 2022b). The OECD is now undertaking preparation of a Climate Adaptation Investment Framework and has received strong interest from 12 countries (England, K., Personal Communication, 10 November 2023). This has the potential to boost the range of sources for financing adaptation by providing clearer signals on risk allocation to entities and the strategies for delivering them (e.g., regulation, public finance etc).

- **Digital platforms** –There have been a number of initiatives aimed at brokering investors and solutions, Example include Abundance's Crowdfunding platform, allowing regions to access savings from residents and pay a return, circumventing the need for additional taxes, and enhancing project ownership and boosting incomes of local citizens.

- **Citizens assemblies and public dialogues** – Engagement with citizens on adaptation also have the potential to boost the set of sources of finance, by increasing the political mandate and acceptability to allocate public finance to adaptation as well as for implementation of new regulations or taxes which scale existing sources of finance and increase the likelihood of new ones. As part of the development of the UK's Third National Adaptation Programme, a public dialogue with 112 participants on priorities and responsibility for climate adaptation action and what a well-adapted England should look like. The work found a recognition that increased funding was to be needed in the years ahead. Some participants noted a need to start ring-fencing funds for the coming decades – by taxing those on higher incomes more and involving NGOs in adaptation responses. Some others also suggested government subsidies to facilitate individual adaptation actions. (Brisley et al., 2023).

- **Investment Prospectuses** – Some regions have begun to launch Investment Prospectuses to showcase public and private investment opportunities in their regions. Whilst Economic Development teams have historically undertaken such work, these are increasingly focused on delivery of thematic priorities such as mitigation and biodiversity. However, a number of these in recent years have included projects which are mainstreaming adaptation – such as in housing retrofit in the West Midlands, or through nature-based solutions projects like the Clyde Climate Forest, Glasgow City Region Metro, or the Climate Neutral Innovation District in Glasgow City Region. An example is shown in Figure 23 below. First hand involvement in this work by the authors have shown these prospectuses help attract new actors, such as Institutional Investors and Private Equity into projects.

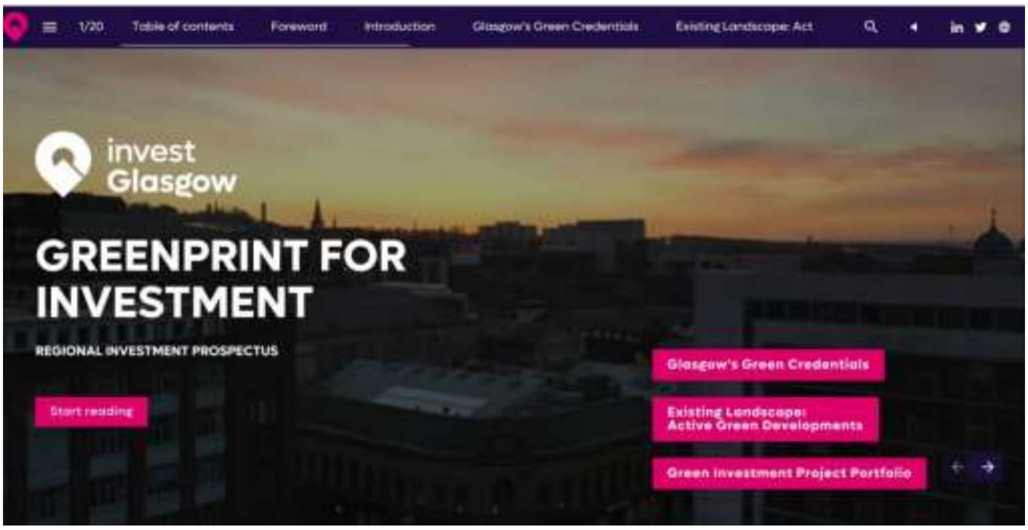

Figure 23: Glasgow City Region Green Investment Prospectus. Source: (InvestGlasgow, 2021).

3.7 Conclusion

Whilst regions currently rely on public sources for adaptation, employing their own resources, or leveraging national or EU funds, there is significant scope to boost the scale and diversity of sources for adaptation, involving financial entities, households, businesses, third sector and private sector.

The review of literature and catalogues has shown there are a wide variety of sources available to support adaptation, across the public, private, and third sectors. However, none of the catalogues identified by this review were specifically relevant to the European context or for the Adaptation Mission.

To address this gap, the study has developed a comprehensive catalogue of sources, as well as contextual information to help regions identify the most relevant sources and boost the likelihood of successfully engaging them.

As part of the development process, the review identified a range of innovations which can increase the willingness of sources to engage in adaptation finance. These included methodological innovations relating to the quantification of adaptation value, new processes for project design which systematically attempt to realise this value, enhanced coordination and

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brokering efforts, regulations for disclosures and taxonomies; adaptation investment planning; investment prospectuses, and new instruments to access citizens' resources.

In conclusion, the review suggests that when considered alongside wider training and capacity building, the P2R sources catalogue has the potential to lay the groundwork to significantly diversify and scale the sources available to regions.

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4 Financial instruments for regions

This chapter is maps, catalogues and synthesises financing approaches and instruments for adaptation, including private sector and blended finance, and opportunities for sustainable finance aligned to the EU Taxonomy and Corporate Sustainability Directive.

Building on the definitions of catalogues and the objective of a P2R catalogue, set out in the previous chapter, it evaluates the strengths and weaknesses of existing catalogues of instruments of adaptation finance. It then develops a P2R catalogue of instruments and outlines some of the key innovations underway to boost adaptation finance. The chapter concludes by reflecting on the state of the art and the potential impact of the catalogue for boosting the range of instruments used in regions.

4.1 Introduction

In deciding how to mobilise finance, regions will need to longlist a range of instruments which can support their adaptation priorities and evaluate their suitability. By instrument we mean:

> "the mechanism which enables the provision of finance from one actor to another, or to a dedicated project which delivers adaptation". Source: Authors.

In deciding whether instruments are suitable for use in a particular region, there are a number of conditions to consider.

Factors that influence financial instrument suitability, according to (Richmond, Choi, Rosane, et al., 2021) may include:

- speed of implementation required - Instruments that are simple with fewer actors may be swifter in project financing.
- the maturity of the private investment environment for the sector.
- monitoring and evaluation capacity which may be needed if financing involves outcome-based payments.

However, we also identify a series of further considerations:

- **Financing objectives** – The financial objectives that the region is seeking to achieve in relation to adaptation. This can include:
    1. Leveraging debt to grow funding and finance,
    2. Generating new revenue for adaptation,
    3. Crowding in / incentivizing private sector finance
    4. To manage climate risks directly
    5. To de-risk project investment
    6. To strengthen citizen's ownership with adaptation

  Such finance can be *conventional* (using traditional or existing sources), or *transformative* – using innovation to develop new models that scale up adaptation and which support systemic responses (see Box 2). below.
- **Envisaged use** – Given their unique role, regions may be having a number of uses for an instrument. For example:
    1. Using an instrument to implement their activity – e.g., regions may access a grant to fund direct delivery of an adaptation project.

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2. Considering deploying an instrument for access by others – e.g., setting up a grant fund or blended finance fund to invest in adaptation.
3. Stewarding regional finance flows – the region may be acting to shape the enabling conditions for adaptation finance in the region, connecting sources to new actors in a region which may benefit from different instruments.

- (*Climate Explainer: Concessional Finance*, n.d.)**Concessionality** - For those instruments that require capital to be repaid, a return is also normally expected. This return can either be *concessional*, or *commercial*. Concessional funds are provided at below market rates, typically by development institutions such as development banks. It is usually provided in recognition of the need to achieve societal goals, as a flexible mix of loans, grants, and equity. (*Climate Explainer: Concessional Finance*, n.d.). It can also help crowd in wider financiers by boosting rates of returns or through providing a first loss guarantee (i.e., the concessional finance bears losses should they occur). In contrast, commercial finance is provided at market rates. Market rates vary by geography, instrument, and sector., as well as the financial health of an entity and the risk of an investment. A broad overview of entity types and the expectations of their returns is outlined in Figure 24 below:

Entity Type		Returns Spectrum
Real sector (corporations, private companies of all sizes)		**Market-rate returns**
Commercial banks		
Institutional investors (e.g. pension funds, insurance companies, sovereign wealth funds, other asset managers)		
Bilateral, multilateral, national development banks (private sector arms)		**Quasi- or blended returns**
Impact Investors	**Impact investors** (seeking impacts & return)	
	Impact investors (not seeking market returns)	**Below market returns by design**
Family offices/Philanthropies/ NGOs		
Bilateral, multilateral, national development banks (public sector arms)		
Governments		

Figure 24: Types of Private Sector Investors in Adaptation and Return Expectation. Source:(Tall et al., 2021)

- **Ability to raise funds to repay investments –** Linked to the above, if a region is borrowing funds or issuing debt to fund its investment, it will need to consider their ability to afford repayments This could be from the project itself, or from wider regional funds.

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- **Local context** - Instruments are normally used as a component of broader business models or financing strategies, to allow the flow and repayment of finance, to deliver adaptation outcomes. However, not all instruments will be suitable in each context, based on policy objectives, financial context, stakeholder objectives and attitudes.

There are also a series of underpinning practical challenges facing regions (Moser et al., 2019). These include:

- **Skills and capabilities –** The use of particular instruments will require pre-requisite skills and capabilities, and knowledge.
- **Access factors –** These types of factors relate to practical considerations associated with accessing sources. For example, can a region assemble a team of staff with the required time to write a funding application, or are they able to secure political approval for such actions.
- **Implementation concerns –** Instruments have different requirements around implementation. For example, some instruments may provide more favourable financial returns, but instead required comprehensive M+E efforts which require ongoing revenue to satisfy. Similarly, instruments which can help raise capital may need administration or require preliminary actions such as obtaining credit ratings.

An effective catalogue will help regions navigate these concerns and select the correct instruments for the particular circumstances.

Box 2: Defining 'conventional' or 'transformative finance.

In addition to traditional considerations of financial instruments, an emerging distinction across instruments is whether they are *conventional*, or *transformative*. Bridging the adaptation finance gap is likely to require significant innovation which both scales financing and transforms the financial system to support adaptation.

- **Conventional finance** refers to the use of existing sources and instruments to support adaptation (e.g. that can be deployed in service of adaptation).
- **Transformative finance** can be defined as finance for "an area where there is a systemic challenge and financial innovation is needed.".

Both types of finance can be used to support both incremental and transformational adaptation. Transformative finance can be used to develop new instruments or finance models which support incremental adaptation, as well as to develop new instruments and/or financing models for more innovative and systemic approaches. The typology is shown in Figure 25:

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Type of Adaptation		Type of Finance	
		Conventional finance	Transformative finance
Type of Adaptation	Incremental adaptation	Public sector funds using grants, i.e. business as usual	New instruments or financing models to scale-up adaptation
	Transformational adaptation	Public sector funds for new innovative adaptation delivering at scale	New instruments or financing models for innovative and systemic transformation

Figure 25: The Adaptation Finance Matrix (typology). Source: (Climate Ready Clyde, 2021)

In developing Climate Resilience Strategies, regions will need to employ both conventional and transformative finance approaches, with the most ambitious regions needing to dedicate time and effort to developing new instruments and approaches which unlock a step change in adaptation finance and action. Examples of the typology are shown in Figure 26 below:

Type of adaptation		Type of finance	
		Conventional finance	Transformative finance
Type of adaptation	Incremental adaptation	• Public funded flood defences • Grant and/or concessional debt for nature-based solutions projects • Early warning systems	• Blended project finance (public and private) for green infrastructure • Crowdfunding or insurance-linked investment in flood defences
	Transformational adaptation	• New Shared Adaptation Planning Uni using shared public finance (governance) • Grant for innovation and demonstration of solutions • Major resilience bond for a region (scale)	• System (regional) green densification strategy using blended finance • Green bond and public private partnership for long term river corridor adaptation pathway investment.

Figure 26: Examples of the adaptation finance matrix typology. Source: Authors based on (Climate Ready Clyde, 2021)

4.2 Catalogue objectives and audience

As stated above, the catalogue of instruments used the same definition of a catalogue and drew on the same objectives and audience as for the catalogue on sources. For completeness these are to:

- **Raise awareness of financial sources and instruments for adaptation in regions** – The catalogue should aim to raise awareness of the full potential range of sources of adaptation finance available to regions.
- **Support a shift to financing action** - Catalogues help shift the focus to action, allowing P2R and regions to have contextual conversations instead of spending time on problem discovery and solution. When regions have all the data that they need, they can seek approvals, make decisions, and develop Adaptation Investment Plans more efficiently.

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- **Increase the speed and efficiency of development of adaptation projects and reduce costs –** The P2R catalogue will make it easier and quicker for regions to select sources of finance and instruments for adaptation projects, reducing the costs of project development.
- **Support training and capacity building efforts across the Adaptation Mission** – Provide a resource to support wider efforts by others in helping train and upskill others – for example through the planned training in WP5 and WP7 of Pathways2Resilience and other Adaptation Mission Projects (e.g., ClimateFIT, PIISA or REGILIENCE)
- **Extending progress beyond P2R –** The catalogues will enable regions to make decisions in their own region without relying on P2R staff. It will also support impact beyond the funded activity of P2R, supporting further replication if Pathways2Resilience Investment Plans are considered as best practice.

The audience is primarily regional entities themselves, but with a secondary audience of those interested in financing adaptation projects across a mission region.

4.3 Development approach

To develop the catalogue, the study drew on the 16 catalogues identified and evaluated the strengths and weaknesses of those which included instrument include sources, before identifying a series of implications for a P2R catalogue. This analysis was used, alongside the wider literature identified, as the basis to develop the P2R sources catalogue - a taxonomy of sources available to regions, with detailed supporting information. The supporting information was populated from wider desk-based searches related to the instrument in question. This review also identified and explore approaches that are being used to mobilise new sources of finance that the authors felt were innovative.

4.4 Existing catalogues of adaptation finance instruments

4.4.1 Evaluation of existing catalogues

4.4.1.1 Global Landscape of Climate Finance, CPI

Strengths and Weaknesses: Similar to the analysis of sources, the categories of instruments used for the CPI work are broad classifications that are unlikely to be granular enough for the purposes of developing and delivering bankable investments or regional investment strategies – for example ‘Corporations’ fails to acknowledge the different capacities and capabilities and interests between large private Organisations and SMEs. Similarly, there is no distinction between corporates that focus on enabling/delivering adaptation, and those that are primarily focused on other activities but for whom adaptation will be needed to continue to achieve those goals. This is likely a product to an extent of the availability of data at the global level (e.g., from the OECD DAC database and Rio Markers approach). Despite this, its standardized approach and consistently improving methodology has contributed to it being a widely understood and referenced approach in the field.

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Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	0	2	2	7

4.4.1.2 Toolkit to Enhance Adaptation Finance, OECD

Strengths and Weaknesses: The OECD catalogue provides a variable amount of information on the instruments provided by each financing channel. However, it is not consistent throughout, making it challenging to compare the relative advantages and drawbacks of different channels. Combined with the fact that very little detail is provided on the financial instruments used by each approach, it is best suited to providing a high-level overview of financing options.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	0	2	2	7

4.4.1.3 Climate Ready Clyde Resource Mobilisation Plan, Sniffer

Strengths and Weaknesses: Similar to the work on sources, the key value in this work is the identification of particular types of instruments that could be used to deliver the interventions and actions contained within the Glasgow City Region Adaptation Strategy and Action Plan in the in the wider context facing the region. This mapping is shown in Table 16 below. The work makes it too detailed for the purposes of Pathways2Resilience, but again illustrates how regions can work to map the suitability of different funding or financing instruments in support of their adaptation action.

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Table 16: Mapping public finance sources to Glasgow City Region's Adaptation Strategy Interventions. Source: (Climate Ready Clyde, 2021)

Sources of public finance (indicative)	Government Capital Grants	Scottish Enterprise Innovation Grants	Clyde Mission Funding (capital funding – Grants)	Early Stage Growth Challenge Fund (grants, debt, equity)	The Climate Challenge Fund (grants and concessional debt)	Glasgow City Region City Deal (grants, debt and equity)	PWLB (concessional debt loans for capital expenditure)	Scottish Investment Bank (debt and equity)	Scottish National Investment Bank (debt and equity)	User charges (Scottish Water)	Tax Incremental Financing (TIF)	Non-Profit Distributing (NPD)
Funding/Finance instrument												
Grants	✓	✓	✓	✓	✓	✓						
Debt				✓	✓	✓	✓	✓	✓			
Equity								✓	✓			
Tax to raise debt (including user charges)										✓	✓	✓
Draft Adaptation Strategy Interventions												
1 Reform, reshape and expand governance mechanisms			✓			✓						
2 Develop the ability of organisations, businesses and communities to adapt		✓		✓	✓	✓						
3 Increase adaptation finance through leverage and innovation		✓	✓	✓	✓	✓		✓				
4 Enable and equip communities to participate in adaptation			✓			✓						
5 Embed reflection, monitoring, evaluation and learning into adaptation action						✓						
6 Adopt the Clyde Corridor for the twenty-second century	✓		✓			✓	✓	✓	✓			
7 Enhance early warning and preparedness for floods and heatwaves	✓	✓	✓									✓
8 Ensure our homes, offices, buildings and infrastructure are climate resilient	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
9 Deliver nature-based solutions for resilient, blue-green landscapes and neighbourhoods		✓	✓			✓	✓	✓	✓			
10 Establish Glasgow City Region as a global research and knowledge hub for adaptation		✓										
11 Begin the transition to a climate-resilient economy	✓	✓	✓	✓	✓	✓		✓	✓	✓		

The strategy also categorises the types of instruments that could be used for transformational adaptation priorities, adding a further level of depth. This is shown in Table 17:

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Table 17: Examples for the Clyde Rebuilt adaptation finance typology (Source: Climate Ready Clyde, 2021).

	Type of finance	
Type of adaptation	Conventional finance	Transformative finance
Incremental adaptation	• Public funded flood defence • Grant and/or concessional debt for nature-based solutions project	• Blended project finance (public and private) for green infrastructure • Crowdfunding or new insurance for investment in flood defence
Transformational adaptation	• New Shared Adaptation Planning Unit using shared public finance (governance) • Grant for innovation and demonstration of solutions • Major resilience bond for the region (scale)	• System (regional) green densification strategy using blended finance • Green bond and public private partnerships for long-term Clyde corridor investment

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
3	4	0	5	4	16

4.4.1.4 Financing Urban Adaptation to Climate Change, EEA

Strengths and Weaknesses: Rather than instruments the case studies consider financing mechanisms, which combine the instruments with process used to implement them (e.g., business case and EIB Loan Process). This is helpful as it anchors the use of an instrument in a wider process but poses challenges for scaling to a catalogue since it is difficult to cover the wide range of combinations of development process and instruments. By its nature of a case study approach, it only provides a limited example of the possible instruments, albeit an inspiring set.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
5	3	1	4	4	17

4.4.1.5 Ready to Fund Resilience Toolkit, ASAP

Strengths and Weaknesses: The Ready to Fund Resilience Toolkit outlines a wide range of instruments that regions can use to support investment in adaptation, covering policy incentives, risk management and financing. Helpfully for financing mechanisms, it categorises them into four strategies: Leverage debt to grow funding and finance, Generate revenue specifically for resilience, Explore and incentivise private investment and Incentivise action and mitigation risk. This is particularly useful since it provides a potential entry point for regions to access a catalogue.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	4	1	4	3	14

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4.4.1.6 Funding Strategies for Flood Mitigation - Where do you get the money? Headwater Economics

Strengths and Weaknesses: The work by Headwater Economics provides a very targeted list of instruments provided by institutions for a particular challenge. Whilst useful for the project, this approach would be challenging and time consuming to scale when considering the geographical coverage of the EU, as well as the diversity of climate hazards. However, it helpfully provides the indicative amounts provided by such instruments, as well as the benefits and challenges associated with managing them.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	1	3	2	9

4.4.1.7 Paying for Climate Adaptation in California: A Primer for Practitioners, Resources Legacy Fund

Strengths and Weaknesses: The catalogue provides a much deeper and broader overview of funding and financing options compared to its work on sources. Helpfully, for each source it outlines who pays and the key benefits and drawbacks – showing that each instrument has its relative strengths and weaknesses. The information is also combined as pat of a wider financing process, with strategies to overcome a range of challenges associated with funding and financing.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	4	0	4	5	14

4.4.1.8 Implementing the Green New Deal, Offices of Senator Ed Markey & Congresswoman Alexandria Ocasio-Cortez

Strengths and Weaknesses: The sheer scale of the funding available under the American Acts, as well as the immediacy of the programs is such that a catalogue is helpful to be able to a range of actors navigate the programs. However, the focus on the acts has the potential to crowd out focus on wider sources or instruments of investment, such as private or third sector. Similarly, its preparation by the offices of Senator Markey and Congresswoman Ocasio-Cortez, rather than a formal Government institution may mean that it is updated less frequently than if prepared by a contractually obliged entity.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	2	0	3	3	9

4.4.1.9 Funding Opportunities, REGILIENCE

Strengths and Weaknesses: Similar to the evaluation of the catalogue for sources, the catalogue is highly relevant to the EUMCCA context as It also brings together the range of EC funding options. Although it collates the information in a central location, much of it is already publicly available – raising questions on the added value of the catalogue. Similarly, it doesn't distinguish

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between sources and instruments, instead classifying them as a single set of funding opportunities, and mainly focuses on public, European sources. Whilst this helps provide a summary of near-term options for regions for those getting underway it does little to encourage the more robust investment planning needed to move beyond the existing range of public sources on offer. However, the catalogue is an important resource for those regions beginning their adaptation journey and not knowing what is available to them to begin to get started.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
5	2	0	4	4	14

4.4.1.10Finance Guidance Tool, Net Zero Cities

Strengths and Weaknesses: Whilst focused on mitigation, the Net Zero Cities funding tool includes a number of general instruments, describing their strengths and weaknesses and linking to further detail. It also provides added value through the use of a series of questions to users to constrain the range of instruments recommended to users. This has a specific advantage of helping target users navigate a broader range of information. By being anchored on the wider NetZeroCities mission platform, it benefits from the ongoing set of resources and case studies being added as part of the mitigation Mission. Given its specific target audience. However, whilst publicly accessible, registration to the NetZeroCities platform is required to access it, adding a further barrier to regions, and making it less visible through general search engines.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
3	4	1	4	4	16

4.4.1.11Covenant of Mayors Funding Opportunities, European Commission

Strengths and Weaknesses: The platform provides a comprehensive overview of the range of funding opportunities provided or facilitated by the European Commission. However, whilst the platform includes a range of useful filters to help search the information, it doesn't distinguish between adaptation and mitigation sources This is challenging since whilst the Covenant of Mayors ostensibly covers both mitigation and adaptation, due to the historical emphasis of mitigation over adaptation the catalogue is more tailored to the mitigation funding streams. However, the use of filters is helpful to aid navigation, whilst the inclusion of support services which aid with project development is also a helpful addition.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
4	4	1	4	4	17

4.4.1.12GrowGreen - Approaches to financing nature-based solutions in cities

Strengths and Weaknesses: The catalogue provides a comprehensive overview of the types of instruments that have been used to finance nature-based solutions, with information targeted at practitioners. It provides pre-requisites and limiting factors for the use of such instruments, as well as specific case studies. However, while it is designed for a European context, its focus on nature-based solutions it is less holistic than required for a comprehensive adaptation response.

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Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
4	2	1	4	3	14

4.4.1.13Innovative Financial Instruments for Climate Adaptation, IISD

Strengths and Weaknesses: The IISD catalogue concentrates a significant body of innovative knowledge on innovative instruments into one place, adding significant value. However, the catalogue doesn't define what is. meant by innovation, nor the criteria by which the instruments were selected. In addition, by focusing on innovative instruments, it crowds out many traditional instruments that can also be used to support adaptation funding and financing in developing and developed countries.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
1	3	1	4	4	13

4.4.1.14Financial Innovation for Climate Adaptation in Africa, CPI/GCA

Strengths and Weaknesses: The catalogue outlines a range of innovative adaptation instruments, and usefully links them to case studies. It also provides some overview of the varying concessionality of instruments. However, similar to the work by IISD, by focusing on innovative approaches, it assumes a certain degree of knowledge of the user and ignores the potential use of traditional instruments that may come from a budgetary reallocation of others (e.g., grants, loans, blended finance etc). Whilst not explicitly stated, this suggests the resources are targeted to those already working in development and deployment of adaptation finance, rather than supporting a spectrum of users from those just getting started to more mature entities.

By nature of being both a report and an online catalogue, it suffers from some of the information is being provided in on that would be useful to the other. For example, Figure 27 shows how the instruments are helpfully arranged by phase of adaptation, purpose and sector in the report but which are not in the online tool.

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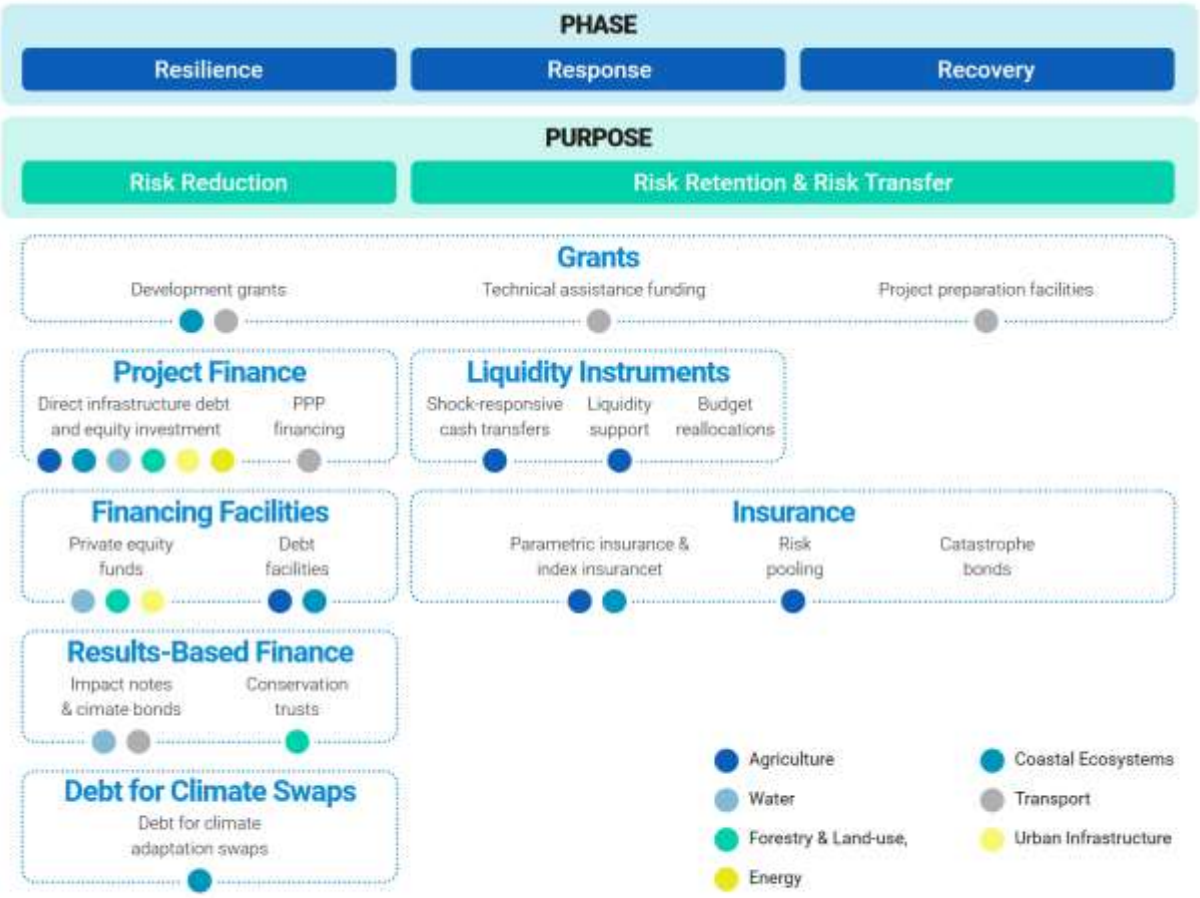

Figure 27: Instrument Typology by Phase and Purpose. Source: (Richmond, Choi, Padmanabhi, et al., 2021)

Similarly, the main report summarises the detailed instruments across different sectors, phases of adaptation, and how they address strategic barriers. This helps to make the catalogue content manageable, but accessibility could be improved by being more explicit about the relationship between the different products developed and informing regions about the benefits of using each resource.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	3	1	4	3	13

4.4.1.15An analysis of Urban Climate Finance, CCFLA

Strengths and Weaknesses: The CCFLA taxonomy of instruments is helpful as whilst it is particularly urban focused, it explicitly focuses on the breath of instruments and sources available to subnational governments and inks the instruments to the range of sources available to cities. It is more comprehensive taxonomy than the global landscape because it includes risk management instruments like guarantees and insurance and includes a range of sample 'sub-instruments', supported by summary case studies. It benefits from being much broader than just focusing on near-term 'opportunities', instead helping to illustrate that subnational government has a wide range of options available to support the financing of adaptation. However, because the report's purpose is to explore tracking and analysis, there is limited information on how such instruments can be practically applied.

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Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
2	3	1	2	3	11

4.4.1.16 A guide to Climate Finance, Sniffer

Strengths and Weaknesses: The Sniffer guide is a strong catalogue which strikes an appropriate balance between granularity and usability. The set of Instruments outlined benefit from being included as part of wider capacity building efforts and guidance and structured by their relevance to the three 'use cases' – of public, blended or place-based use cases, which set out high level adaptation financing processes. This makes it more straightforward for regions to select from the wide range of instruments – especially when thinking about place, which is a strong feature in the Scottish policy landscape. Although not focused on the EU context, its relevance is boosted due to its developed country context. It also includes a range of resources to help the development of funding proposals.

If there is a weakness, it suffers a little from navigation – but this is predominantly because of the challenge of condensing such a breadth of information into a short document. It would also benefit more from more depth of content around the advantages and drawbacks of different instruments and advice on how to select them.

Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
4	3	1	5	3	16

4.4.2 Results

From the review of catalogues on instruments, the content is considerably richer and more diverse than on sources. The overall results of the scoring are provided in Table 18 below:

Table 18: Ranked scoring of instruments catalogues. Source: Authors.

Catalogue	Relevance to EUMCCA context	Coverage	Case studies	Practice-oriented	Depth of content	Total
Covenant of Mayors Funding Opportunities	4	4	1	4	4	17
Financing Urban Adaptation to Climate Change	5	3	1	4	4	17
Climate Ready Clyde Resource Mobilisation Plan	3	4	0	5	4	16
Finance Guidance Tool, NetZeroCities	3	4	1	4	4	16
GrowGreen	4	2	1	4	3	16
A guide to adaptation climate finance.	4	3	1	5	3	16
Ready to Fund Resilience Toolkit	2	4	1	4	3	14
Paying for Adaptation in California	1	4	0	4	5	14
Global Landscape of Climate Finance	1	2	0	2	2	7

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REGILIENCE Funding Opportunities Repository	5	2	0	4	4	14
Innovative Financial Instruments for Climate Adaptation	1	3	1	4	4	13
Financial Innovation for Climate Adaptation in Africa	2	3	1	4	3	13
An analysis of Urban Climate Finance	2	3	1	2	3	11
Funding Strategies for Flood Mitigation – Where do you get the money?	1	2	1	3	2	9
Implementing the Green New Deal	1	2	0	3	3	9
Toolkit to Enhance Adaptation Finance	1	2	0	2	2	7

4.4.3 Discussion

The review has highlighted a number of considerations for the design of a catalogue of instruments.

Some of the catalogues (Covenant of Mayors, REGILIENCE) present existing opportunities available to boost regional governments' initial sources, rather than acting as a mechanism to empower regions. This can be useful as an initial introduction to those regions who are getting started on adaptation and want to explore near-term financing options. However, given the longer term needs of closing the adaptation finance gap, there may be a greater long-term value in using the catalogue as part of a wider set of resources that support regions to build a deeper knowledge on the range of instruments and how they can be best applied to the region.

The most comprehensive catalogues just don't focus on the most innovative instruments, but instead situate these in the broader landscape of instruments available to regions, and accommodate new examples as they emerge, such as in results-based finance, which includes Work for Taxes or Debt for Climate Swaps. In thinking about this, it is also important that catalogues consider the use of non-financial instruments, such as technical assistance which help support project development, or volunteering time or expertise to reduce overall project costs.

However, this comes with challenges of organisation and accessibility. The catalogues employ a range of options to manage this complexity, categorizing instruments for accessibility and/or implementation purposes, such as thinking about the type of adaptation (e.g. anticipatory or reactive), sectorally, for the purposes of risk management (e.g. risk reduction, risk transfer), for particular 'use cases', the degree of maturity of instruments, or for their uses (e.g. to generate revenues, de-risk, crowd in private sector finance, or use debt to grow resources). This can be supported by strong visualisations which help intuitively help their accessibility.

As well as challenges in the breadth of taxonomy, a number of the catalogues consider the instruments as part of broader efforts of practical implementation. The Ready to Fund Resilience Toolkit and Headwater Economics cover different aspects such as convincing actors to fund them, advantages and drawbacks of instruments, whilst Sniffer's guide anchors them in high level adaptation finance processes.

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Implications for a catalogue

Whilst none of the catalogues reviewed provide an 'off-the-shelf catalogue', suitable for boosting adaptation financing in Europe as part of P2R, the range of insights from their evaluation yield a number of helpful implications.

Given that both the Covenant of Mayors catalogue and the REGILIENCE toolkit already provide an overview of the basic funding opportunities, the P2R catalogue could complement the landscape by focus more deeply on aspects which broaden and deepen regions' abilities to appraise and select the most appropriate sources and instruments for use in their Climate Resilience Strategies.

The taxonomy developed by P2R should be comprehensive with the aim of familiarising regions with the wide range of instruments, and used should be flexible enough to be expanded over time to accommodate more innovative variations of 'results-based financing' to include a range of the more innovative instruments, and findings from other mission projects, such as ClimateFIT, and supported by an overarching visualisation which makes it accessible and engaging to users.

The catalogue should also include a focus on implementation – for example including information on advantages and drawbacks, suitability for different funding strategies or Key Community Systems, or phases of adaptation.

4.5 Pathways2Resilience Instruments catalogue

To develop P2R's catalogue of instruments for adaptation, the deliverable reviewed the existing catalogues identified, as well as the accelerators to identify a long list of 78 instruments that were deemed to be relevant to the EU context. These were then organised into a common taxonomy with a series of categories. and populated with supporting information. The Taxonomy is shown in Figure 28 below. The summary of instruments catalogued shown below, categorised by phase of adaptation and purpose. It also identifies financing strategies for relevant instruments.

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Figure 28: The P2R Financial Instrument catalogue and respective financing strategies. Source: Authors.

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In the following section, we categorise and outline the common instruments used for adaptation, along with variations, and their advantages and drawbacks, and tailor them to the European Context. Given the range of combinations of different features and characteristics, it is not within the scope of this review to catalogue the entire range of instruments that are being deployed in service of adaptation. Instead, we focus on instruments which are commonly transferrable or applicable in multiple contexts, citing particular examples from the literature and practice. We also include a section on more innovative instruments that are being developed for sustainability objectives, as well as specific innovations in service of adaptation.

4.6 Adaptation-related innovations in financial instruments

In addition to the use of these traditional sets of instruments, a number of innovations have been used in the space of adaptation financing. These innovations have tended to build on or modify traditional instruments to account for the unique characteristics of climate risk, or overcome particular barriers and challenges, or diversify the range of sources and increase the total availability of adaptation finance. Key innovations include:

- **Climate and weather-linkages –** A number of instruments are exploring linking financing of adaptation, or payouts of disasters to local conditions. For example, in sectors where revenues vary over a year (e.g., in agriculture), it is possible to profile lease payments for climate-smart agriculture equipment in a way which matches (SEED, 2018a). Similarly, the use of weather monitoring and mobile technology can be leveraged to support the payout of insurance premiums. (SEED, 2018b). This has also been the case in insurance, where parametric insurance is being used in Mexico's Quintana Roo reef, where work by The Nature Conservancy and Swiss Re has resulted in the setup of a dedicated trust fund which has purchased an insurance scheme which provides provide payouts based on the size of a windstorm event. An overview is shown in Figure 29 below:

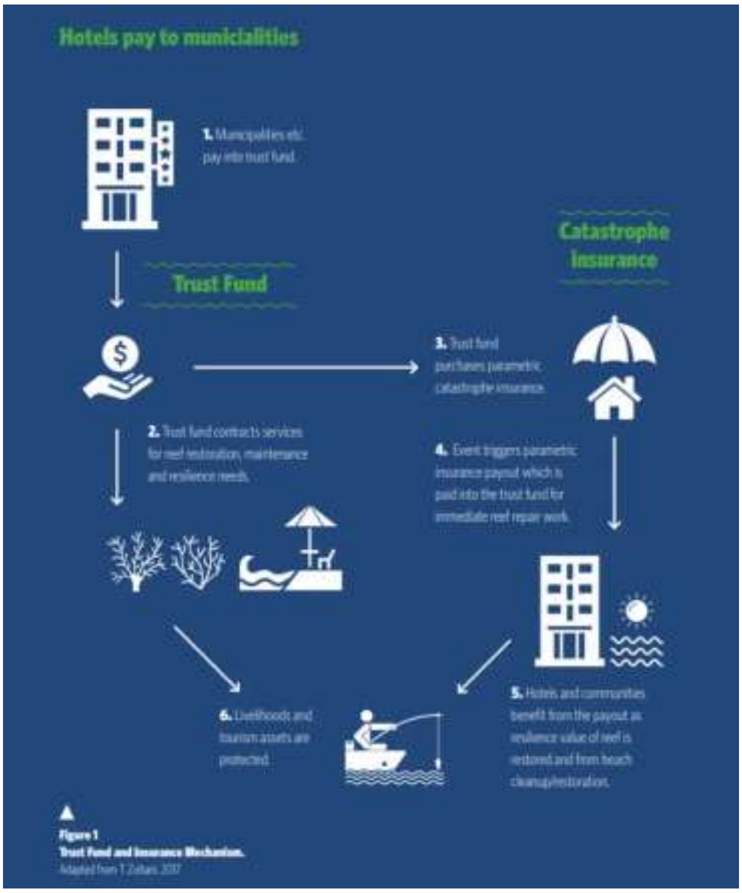

Figure 29: Quintana Roo Parametric Insurance Scheme. Source: (Green Finance Institute, n.d.)

- **Use of mobile technology and Artificial Intelligence** – this can be used in rural areas to overcome challenges, such as lack of local infrastructure or people. Similarly, new advances in AI and mobile technology have been used to significantly reduce timescales of emergency payments following disasters – in some cases, those affected by hurricane damage received funds received emergency payments in less than a day. (GiveDirectly, 2023)
- **Resilience-linked incentives in insurance** – A number of instruments have begun including incentives to enhance adaptation and resilience. This has particularly been the case in the insurance sector, where future premiums for insurance of households or city infrastructure have been adjusted to reflect investments in resilience, or insurance payouts have been increased to cover investments in property flood resilience. (Flood Re, n.d.; Global Innovation Lab for Climate Finance, 2022). Similarly, the PIISA project is piloting the extension of incentivisation approaches of adaptation in five key areas: green roof insurance, subsidence risks, agriculture, biotic and abiotic risks in forestry, and wildfire insurance.
- **Performance Based Resilience Grants** – Performance-based climate resilience grants provide a **financial top-up** to local governments to cover the additional costs of making investments climate resilient and are channelled through existing government fiscal transfer systems (rather than parallel or ad hoc structures). Further allocations are dependent on performance of the incorporated of adaptation, This creates an incentive for local government to mainstream adaptation into new investments over time. Figure 30 below sets out the overall mechanism. The mechanism has been turned into an international standard, ISO14093(*ISO 14093:2022 - Mechanism for Financing Local*

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Adaptation to Climate Change — Performance-Based Climate Resilience Grants — Requirements and Guidelines, n.d.).

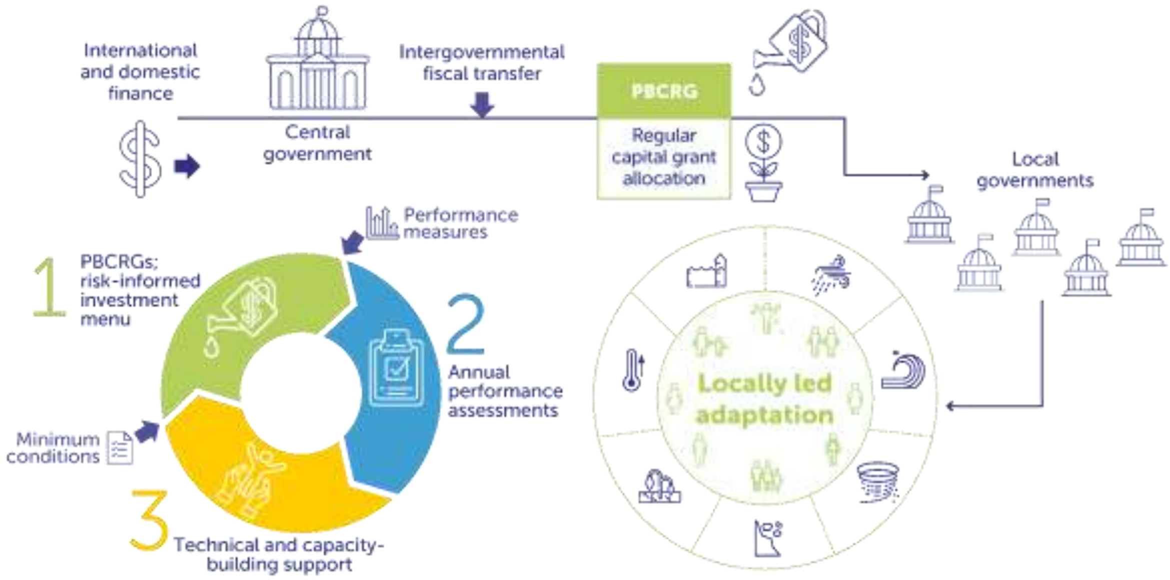

Figure 30: Overview of Performance-based Climate Resilience Grants. Source:(*Performance-Based Climate Resilience Grants - UN Capital Development Fund (UNCDF)*, n.d.)

- **Pre-agreed lines of credit for disasters** – in some cases the World Bank, Asian Development Bank and Inter-American Bank have provided lines of credit that become available upon the impact of an extreme weather event or disaster, accelerating the pace of disbursement to help limit the impacts (IISD, 2022a).
- **Project aggregation and bundling** – Aggregation or bundling involves compiling projects together (either similar ones or a portfolio of different projects), with the aim of making the entirety of the programme fundable. Whilst the context and site-specific nature of adaptation projects makes aggregation more challenging than in mitigation, some initiatives have been seeking to do this in different ways. Examples include TreesAI (see Figure 31 below), as well as 3Ci and academic studies (3Ci, 2022; Bockarjova et al., 2022)..

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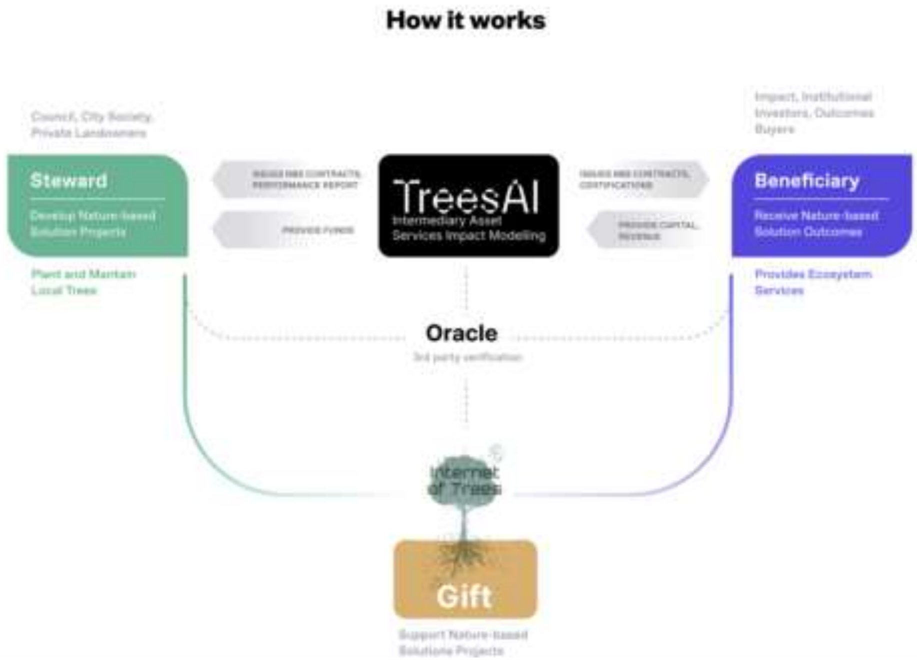

Figure 31:Bundling mechanism for nature-based solutions in Trees as Infrastructure. Source: (Trees as Infrastructure, 2023)

Aggregation or bundling can have several advantages, including reducing transaction costs, cross-subsidisation (e.g., using mitigation benefits to subsidise adaptation projects), or helping reach new classes of investors by reaching the size of investment they are typically used to (Covenant of Mayors for Climate and Energy, 2023).

- **Results-based finance –** A number of new instruments are emerging under the broad umbrella of 'results-based finance' – these are programmes which inks disbursements to achievement of results that are tangible, transparent, and verifiable, across a broad range of countries, sectors, and programmes. (World Bank, 2011). Three particularly relevant examples include:
    - **Debt for adaptation swaps** – An emerging idea is to build on debt-for-nature swaps since the 1980s, with the idea that countries with high climate risk and high levels of sovereign debt, could have that debt forgiven in return for investments made for resilience. Such approaches also have the additional benefit of reducing wider sovereign credit risks associated with climate risks and freeing up domestic fiscal space for development and adaptation priorities. The approach has been explored at the national / international level to address the high debt burdens of developing countries from international finance institutions, and the large financing commitments of developed countries under the Paris Agreement and Glasgow Climate Pact (Brookings Institute, 2023). However, some kind of similar model could be explored for relevance at the sub national/national level or between member states and the ECB.
    - **Payments for Ecosystem Services (PES) –** As highlighted in chapter 3, new approaches around the payment of ecosystem services such as water availability or regulation are crowding in a range of new sources, but in themselves represent a series of growing instruments for adaptation.
    - **Work For Taxes –** Pilot schemes in Peru and Cambodia have explored the use of private companies to undertake public works such as the construction and maintenance of infrastructure in lieu of taxes. (IISD, 2022a) Such approaches

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could be used to replace or supplement regional or local taxes to support delivery of adaptation. This approach provides flexibility for politicians by avoiding the imposition of new taxes which could be subject to local widespread opposition.

4.7 Conclusion

This study has evaluated a wide range of catalogues of Instruments that can be used for adaptation. There are a broad range of catalogues for adaptation financing, designed for different purposes, such as finance tracking, policy development or capacity building, and many have innovative and useful elements that could be adopted for use in P2R.

Some of these have been as well innovations that are being used to modify instruments to increase their suitability or effectiveness for adaptation. However, rather than instruments being universally suitable, each carries advantages and drawbacks and regions will need to interpret and tailor the use of such instruments to maximise effectiveness.

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5 Adaptation financing approaches for regions

(Barrett & Chaitanya, 2023)Whilst the increasing prevalence and proliferation of sources and instruments for regional adaptation is helpful, their effects will be limited unless they are used as part of a strategic approach to raising, deploying and sometimes, repaying, capital. However, many processes have focused at the project level and for public sector actors, and they have failed to articulate the logic of adaptation investment and its value proposition (particularly in the private sector), instead focusing on standard equity, debt or loan investments in climate vulnerable contexts, or poorly specified adaptation and resilience solutions. (Barrett & Chaitanya, 2023).

(Climate Resilience Consulting & American Society of Adaptation Professionals, 2022)Over the last few years, there has been a shift from development of plans and strategies towards implementation, and the financing of adaptation to support it (IISD, 2022b). Intentional processes to raise, deploy and direct sources of finance, regions need a systematic, common process and set of activities or process for regions to follow in order to successfully take forward these roles. (Climate Resilience Consulting & American Society of Adaptation Professionals, 2022).

In this context, the mobilisation of finance has also become an increased focus of knowledge brokers and capacity building. These efforts have resulted in an increasing number of *processes* by which actors undertake more structured and strategic approaches to the consideration of funding and financing needs. These processes have taken many shapes and forms, and each have associated strengths and weaknesses.

However, there is a diverse array of entry points to financing adaptation, as well as a myriad of guidance. Couple with varying skills, knowledge, and capabilities across regions, it is challenging for them to know where to begin financing, or the relative merits of different approaches.

To address this, the study has reviewed the different processes available to public institutions on adaptation financing, with the objective of assessing their overall relevance to the development of an Adaptation Finance Process for regions. It considers each processes' strengths and weaknesses and uses them to inform a series of framing criteria to structure the development of a standardised adaptation finance process,

5.1 Review of processes for mobilising adaptation finance

To inform the development of the P2R Adaptation Finance Process, the study identified and reviewed 14 adaptation finance processes designed to increase the demand and supply of adaptation finance at the subnational level. For the purpose of this review, we define an adaptation finance process as:

> "A framework, series of steps, process or description of activities which can be used to increase the overall deployment of adaptation finance, both directly through development of bankable projects, or indirectly through area-based investment planning or boosting of enabling conditions." Source: Authors.

The processes identified were broadly representative of the different domains of finance planning – focusing on individual adaptation investments as well as broader area-based planning and enabling conditions. Given the global nature of the challenge, the scope was global, but also covered innovative practices in cities and regions.

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As well as adaptation finance processes, two additional processes were reviewed. The first was the investment planning process in the EU Climate Neutral and Smart Cities mission (NetZeroCities, 2022a) , and the second was Glasgow City Region's Resource Mobilisation Strategy (Climate Ready Clyde, 2021). The Climate Neutrality Mission work was included because it was assumed that a similar process would lower the barriers to action on both mitigation and adaptation investment planning, and that many of the challenges of sub-national investment planning would have been considered as part of the development. The Glasgow City Region work was included due to it being one of the only examples of a City Region explicitly seeking to fund, finance and deliver transformational adaptation and the depth of work, which developed new outputs and thinking which could inform the development of finance-related process (since it was funded through EIT Climate-KIC's Deep Demonstration programme, a forerunner to P2R and the Adaptation Mission). This is included in Box 3 below:

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Box 3: Innovative approaches to regional adaptation finance in Glasgow City Region

As part of EIT Climate-KIC's Deep Demonstration programme, Forging Resilient Regions, the Glasgow City Region partnership on adapting to climate change, Climate Ready Clyde, was funded to develop a transformational adaptation strategy and action plan and innovation portfolio. In support of the Strategy and Action Plan, the consortium produced a dedicated Resource Mobilisation Plan, with the aim of enhancing the deliverability of the Adaptation Strategy. The Resource Mobilisation Plan included a number of novel aspects:

- **Finance mapping** – the work undertook high level mapping of available sources and instruments that would be suitable for each of the strategy's interventions to help prepare for implementation.
- **Finance delivery arrangements** – The plan provided stylized delivery arrangements for the financial mobilization, highlighting the need for an Adaptation Innovation Lab, as well as strong enabling conditions.
- **Transformative financial instruments and value propositions** – The work involved developing a number of new value propositions in mission KCS of a transformative, systemic nature. The work supported an early assessment of economic recovery priorities from COVID-19, proposing a portfolio of recovery measures that supported economic recovery, mitigation, and broader resilience building alongside adaptation.

The work significantly advanced the thinking on the need and value provided by development of a Regional Adaptation Investment Plan, but also highlighted the additional resource and support needed to regions to replicate and undertake the process. Key outputs are shown in Figure 32 below.

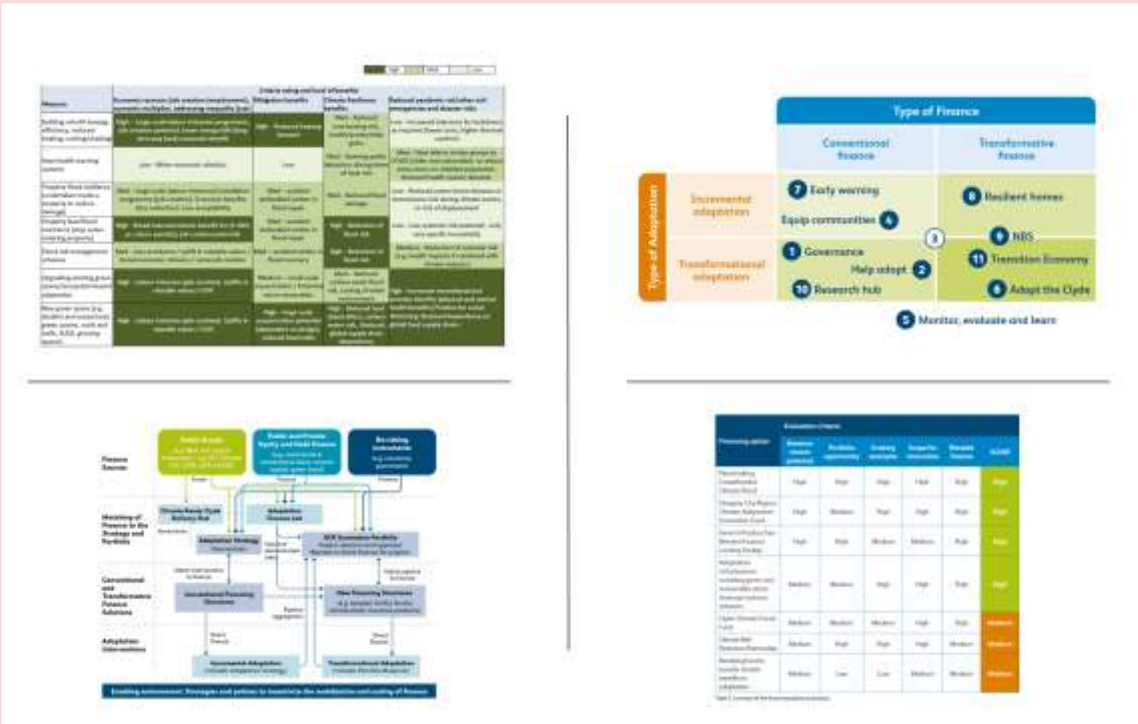

Figure 32: Key outputs from the Climate Ready Clyde Resource Mobilisation Plan: portfolio approaches with wider value creation as COVID-19 recovery (top left) Incremental/Transformative Finance mapping (top right), delivery

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The list of processes reviewed, as well as the desired outcome they are seeking, the type of process, and the audience, are set out in Table 19 below.

Table 19: List of adaptation finance processes reviewed. Source: Authors

#	Framework	Year	Author	Desired outcome	Type of process	Audience
1	EEA Adaptation Support Tool	2020	EEA	Subnational plan	Step by step process	Local municipalities and regions
2	CDKN NDC – Planning for NDC implementation: A Quick-Start Guide Implementation	2016	CDKN and Ricardo AEA	Plan and Pipeline of Investable Projects	Step by step process	National Governments
3	Enabling Private Investment in Climate Adaptation and Resilience: Current Status, Barriers to Investment and Blueprint for Action	2021	World Bank	Pipeline of Investable projects	Step by Step process	Private Sector, Government
4	Adaptation Scotland Public sector capability framework, financing guidance.	2021-2023	Sniffer	Adaptation Projects, Enabling Conditions	Maturity Matrix	Public Institutions Government
5	Enabling Resilience Investment Guidance	2022	CSIRO	Investable projects	Flexible Framework	Public Institutions
6	Hard Choices, Integrated Approaches: A Guidance Note on Climate Change Financing Frameworks	2019	UNDP	Improving enabling Conditions	Capability-Maturity Matrix	National Government
7	Mainstreaming, accessing and institutionalising finance for climate change adaptation	2017	Act on Climate Today / OPM	Improving enabling conditions	Flexible Framework	Not specified
8	State of Cities Climate Finance Part 2: Enabling conditions for mobilising urban climate finance	2021	CPI	Enabling Conditions	Flexible framework	Local Government
9	European Resilience Management Guideline (Smart Mature Resilience)	2018	ICLEI	Improving enabling conditions	Step by Step, Capability-Maturity Matrix	Local Government
10	IEMA Climate Change Adaptation Practitioner Guide	2022	IEMA	Improving enabling conditions	Capability-Maturity Matrix	Public and private institutions
11	NetZeroCities 2030 Climate Neutrality Investment Plan	2022	NetZeroCities	Subnational plan, bankable projects	Step by Step process	Local Government
12	Ready to Fund Resilience Toolkit	2022	ASAP	Bankable adaptation projects	Hallmarks/Characteristics	Local Government
13	Mobilising private sector finance for climate change adaptation	2019	GIZ	Investable projects	Step by step process	Private Sector
14	EC Guidelines for Member States' adaptation strategies and plans	2023	European Commission	National Plan	Step by step process	National Government

For each of the processes reviewed the study evaluates its relevance to regions and respective strengths and weaknesses as a process which supports sinvestment mobilisation. A summary description of the overall approach is included in Appendix 5.

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5.1.1 EEA Adaptation Support Tool

Relevance to an Adaptation Finance Process for regions: The EEA support tools are included in the consideration of adaptation finance processes for regions due to their position as the de-facto standard for adaptation planning in Europe. Whilst the adaptation cycle and tailored versions of the tool provide a useful entry point into the planning process, the limited direct emphasis on addressing financing needs and barriers, suggests its role is limited to stimulating demand for finance, rather than actively creating the conditions to mobilise all finance required.

In addition, the planning process is limited to helping regions address their own risks and vulnerabilities. Whilst this is important it misses the wider economic opportunity afforded by adaptation through the development of new goods and services, and therefore potentially ignores the importance of regions investing in R&D and innovation with a view to serving the broader European and global markets, These limitations suggest that a much wider array of tools, frameworks and processes are needed to maximise the supply of adaptation finance and tends to minimise the wider leadership role of municipalities and regions to support and enable the adaptation of wider public entities in the region and the private sector.

5.1.2 CKDN Planning for Implementation: A quick start guide.

Relevance to an Adaptation Finance Process for regions: Whilst the guide is targeted towards developing countries in many ways, they face similar challenges as regions, in that local resources will not be sufficient to address adaptation needs and need to mobilise a broader array of sources. The guide is helpful in that it brings together element of financial and adaptation planning in a clear and comprehensive way, acknowledging the need for both adaptation planning and finance processes to be integrated. The steps of the guide and short, clear, and concise, making it easy to understand as an approach, but also making it likely that users will also need further guidance and support to implement such a process.

5.1.3 World Bank Enabling Private Investment in Climate Adaptation and Resilience: Current Status, Barriers to Investment and Blueprint for Action

Relevance to an Adaptation Finance Process for regions: The approach provides a comprehensive framework for national Governments to work with the private sector on mobilising finance into adaptation. It is holistic recognising each step as an 'entry point' into an overall approach. The framework helpfully distinguishes between enabling environment activities and direct activities. It also has a very clear set of practically-oriented activities - for each stage sets out the inputs required, and outputs provided, as well as the key partners and success factors. This is helpful as it acknowledges that different sets of stakeholders are required for different aspects of adaptation finance. The inclusion of success factors is also positive, since it draws out some of the reality of working in the space, and practical issues for users to consider when undertaking the process.

One of the limitations is that it is targeted at the international space and in developing countries, and so is tailored to national government ministries and development finance institutions, and finance streams (e.g., GEF/GCF or Technical Assistance) that are not necessarily as relevant/accessible in the European Context. The framework also doesn't propose solutions to some of the more fundamental barriers to adaptation financing such as lack of returns, or technical / knowledge barriers.

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5.1.4 Adaptation Scotland Public Sector Capability Framework, Financing Guidance and Case studies, and Policy Note

Relevance to an Adaptation Finance Process for regions: The Adaptation Scotland Programme work provides a range of learning and insights. The public sector capability framework highlights the need to recognises the role of finance as an enabling condition to undertake adaptation planning overall. The lessons from the case studies include the valuation of co-benefits to support the development of revenue streams, the need for partnership working and inclusive governance, the need for earlier finance development to consider at the project stage. Finally, the strategic review recognises the need for more systemic reform alongside project development. It identifies that projects sit in a wider ecosystem and need a range of enabling conditions, some of which can be supported by regions, but others of which need to be enabled by higher tiers of Government.

5.1.5 CSIRO Enabling Resilience Investment Framework

Relevance to an Adaptation Finance Process for regions: The process from CSIRO represents one of the most mature and comprehensive and detailed processes evaluated as part of the review. The key strength of the process is it's focus on a wide conception of value, going beyond merely adaptation, to that of framing adaptation and resilience as part of value creation. It also emphasises the need to start by visioning future change, creating adaptive space and pathways, and expanding resilience options whilst scoping value creation activities, so as to not developed confined or fixed adaptation options too early, before then moving into the detailed financial appraisal and structuring required for a successful instrument. The underlying theory (shown in Figure 33 below) is to support a shift a focus away from incremental, asset by asset approaches to system level, integrated, place-based approaches. In doing so it directly identifies and addresses a number of the key barriers to adaptation financing identified in the literature, such as the lack of returns or market failures, or public good characteristics.

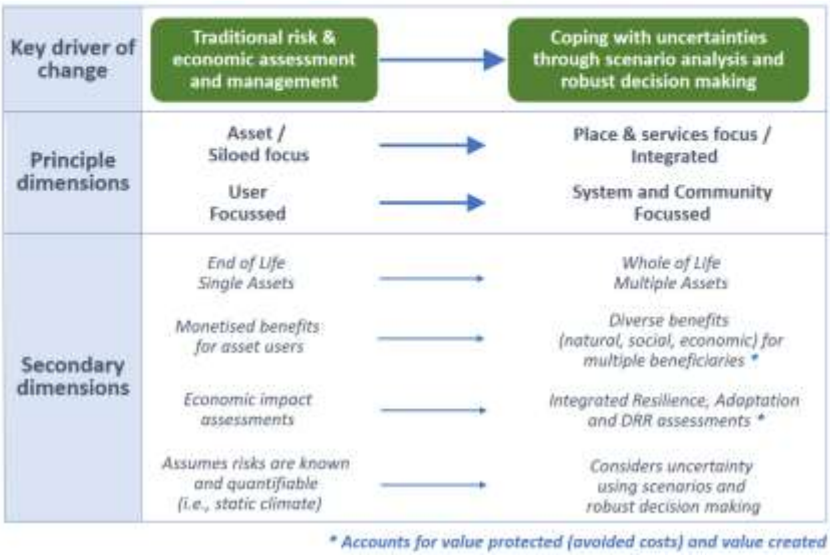

Figure 33: Mapping desired shifts in risk and economic assessment and decision making (management, investment, planning) from a narrow focus on asset criticality towards resilient communities in place. Source: (Wise et al., 2022)

It also advocates for new, inclusive approaches to governance to address policy and coordination barriers, with decision makers authorised, equipped, and supported to diagnose and overcome the structural constraints of their decision contexts to address the uncertainties and ambiguities of the problems.

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The user-oriented design (such as the inclusion of questions such as 'why use this module'?) make it extremely relevant, whilst questions such as 'why is it different' help users understand the differences in approach and reasons, and communicate this to others, and clearly sets out evidence requirements for each of the steps.

Finally, it is very clear how the framework can be used, highlighting that they can 'enter and leave' the process at any point, and not necessarily run the whole process, providing 'scaffolding' for users to meet them where they are and pull together the relevant tools and processes for where they want to go next. It highlights that it can be used in depth or in summary, and at strategic through to project levels. It's also very helpful to include a section on 'why it's different from traditional approaches' and key questions that are addressed as part of this process' includes some very different and helpful modules, including imagining change, a systems and scenarios analysis. Highlights that some of this will need to be adopted into steps in the overall P2R resilience journey to ensure a strong financing approach on transformation, and into pathways, and sequencing of options.

Whilst the approach is overwhelmingly positive, it still includes a number of limitations. Firstly, the comprehensiveness and robustness of the process, whilst helpful, is likely to require significant resources to complete, especially for the more specialist areas, such as systems analysis. Secondly, the approach is focused on the individual investment level, rather than at a broad, regional approach, meaning it is still challenging for regions to build comprehensive pipelines, and is likely only to be more applicable or suitable for new, area-based development and investment. It could also lead to regions focusing on investments where value creation opportunities are more possible, rather than where investment is needed the most to protect against climate hazards. There is also limited focus on equity and justice as part of the process.

5.1.6 UNDP Hard Choices, Integrated Approaches: A Guidance Note on Climate Change Financing Frameworks

Relevance to an Adaptation Finance Process for regions: The UNDP framework recognises that the budgetary process is often a powerful lever and driver to prioritise the identification, selection and implementation of actions and projects. Secondly, it recognises that the mobilisation of public finance more broadly involves the buy in of public finance professionals, and satisfaction to allow the allocation of resources. It also has the added advantage of layering on top of well-established existing processes, likely reducing the barriers to uptake. These suggest that an adaptation finance process for P2R is likely to need to be linked / integrated with a broader green budgeting approach which helps create a more strategic shift in finance to support the implementation of adaptation objectives.

The drawbacks include the need to build the climate-related expertise of finance experts, as well as the need for significant buy in from financial institutions, given the need to introduce additional procedures into the budgeting and financial management. The framework is also harder to replicate since it provides limited sets of templates and information to allow users to apply the process themselves, or case studies of steps in the process.

5.1.7 OPM Mainstreaming, accessing and institutionalising finance for climate change adaptation.

Relevance to an Adaptation Finance Process for regions: The ACT process is one of the only projects which clearly sets out the relevant adaptation and budgetary and financing components and brings them together into a comprehensive framework. Whilst a developing country focused approach, it also starts from a common European assumption, which is that donor funding or grants will not be sufficient for adaptation and will involve the mobilisation of domestic resources.

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As a consequence, a key strength of the ACT framework is that it recognises that both budgetary processes and dedicated investment planning processes for adaptation will be needed for success – bridging two traditionally separate domains. It also acknowledges the need for enhanced =capacity to undertake the approach, but that entities may have different objectives or entry points in building this capacity.

As well as proposing a dedicated cycle, it also helpfully shares lessons from real world approaches, and proposes a range of solutions to overcome common challenge in mobilising finance, including linking adaptation objectives with broader development objectives, flexible approaches, the importance of institutional leadership, and the use of climate change champions. Finally, it provides a helpful detailed overview of the strengths and weaknesses of different green budgeting approaches (e.g., objectives or benefits-based approaches to public expenditure tracking) and associated methods and analysis. It is also helpful as it attaches nominal costs to some of the activities (e.g., $150,000 for a Climate Public Expenditure and Investment Review), also covers the set-up of institutional arrangements to support the processes such as climate finance units – institutional support.

Whilst outlining a broad approach, the framework doesn't provide detailed descriptions, guidance, or templates, limiting its potential replicability and application by others.

5.1.8 CPI State of Cities Climate Finance Framework

Relevance to an Adaptation Finance Process for regions: Whilst the framework does not provide a step-by-step guide to the development of climate investments, it helpfully acknowledges and points to, the key regional/local components, plans and strategies needed, through the use of an 'outcome' diagram/delivery arrangements. It is also helpful to acknowledge that regions have multiple roles as providers and stewards, showing a range of levers to help mobilise adaptation finance, beyond direct delivery. Finally, the set of additional narratives on key enabling conditions such as spatial planning or sources and instruments provides a comprehensive overview. The key limitation is the lack of any real guidance on how to implement such approaches, including limited case studies, or detailed guidance on application of tools and techniques to enable these, although some elements have been the focus of further outputs from the Cities Climate Finance Leadership Alliance (CCFLA).

5.1.9 SMR European Resilience Management Guideline (Smart Mature Resilience)

Relevance to an Adaptation Finance Process for regions: The SMR European Resilience Management guideline provides a range of helpful activities. Whilst finance only receives limited acknowledgement in the overall reparation of a resilience strategy, the inclusion of a finance workstream within the resilience maturity model provides a degree of recognition that financial competence and capability will be needed. The workstream focuses both on financing outcomes (e.g., provision of insurance), as well as the enabling conditions (e.g., allowing for a resilience action plan in the local government budget, the potential of innovation) However, it stops short of translating these goals into the finance sections of a resilience strategy. Another novel feature of the process is that it acknowledges the different actors involved in the resilience process, and the tool can tailor the resilience-maturity model based on this.

A novel aspect of the framework was the use of CEN Workshop Agreements (CWA) to create voluntary European Standards on City Resilience. Such approaches are used to enhance uptake of processes (for example through being able to refer to them in procurement briefs) and scope the need for formal ISO / CEN standards, but this was not taken forward after the creation of the

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CWA, limiting the effectiveness of the project. This issue highlights a broader challenge, which is that Horizon projects are often time-limited or not partnered with end-users / industry bodies that can help accelerate and mainstream uptake.

5.1.10 IEMA Climate Change Adaptation Practitioner Guide

Relevance to an Adaptation Finance Process for regions: The IEMA guidance is a good example of an approach which caters to all audiences, including those who have never worked on adaptation. In doing so, it provides a strong clear, narrative on the economic and financial benefits of adaptation for businesses. It also seeks to meet people where they are, explicitly recognising adaptation can be strategic or planned, or autonomous/responsive to extreme weather events or disruption. The way it embeds finance as a consideration alongside other business functions is helpful, structuring it as a consideration alongside other elements of delivery and operations for adaptation.

Whilst the guide is likely to build general understanding of adaptation finance for newcomers and some working in adaptation, it suffers from many of the limitations from introductory guides, which is that the need for simplification and accessibility is traded off against the need for detail and specifics. The three-stage maturity/capability matrix approach limits the nuance but does make it feel more accessible to newcomers. However, in doing so, it conflates the stages of an adaptation planning process, failing to acknowledge that implementation can happen even when an organisation has limited maturity in multiple domains. In addition, the guide fails to acknowledge or address the more fundamental barriers to financing of individual projects or investments. Finally, many of the tools and techniques recommended require specialist knowledge for application but the practicalities or process for undertaking these are not expanded, and no further resources are provided (e.g., sample Terms of Reference for consultants).

5.1.11 NetZeroCities 2030 Climate Investment Planning

Relevance to an Adaptation Finance Process for regions: The NetZeroCities' work provides a strong, clear process for cities to follow, supported by relevant templates and guidance, as well as a targeted funding tool. Of all the tools produced, it is the only one to intentionally produce an investment plan focused across an entire city geography, on a timeframe aligned with the mission goals (2030). It also benefits from having a clear, defined end product (the Investment Plan) which has a degree of standardisation, allowing for aggregation and comparability of investment opportunities across cities. The Investment Plan is holistic, starting from current financing arrangements before moving to future needs. It is also integrated with the wider Mission process, acknowledging that regions will need to draw on wider support from the mission platform to create the Investment Plan and undertake relevant stages.

In terms of limitations, the template and process include limited information on developing individual bankable investments, (though this may reflect the reduced complexity of mitigation financing) – though this is covered in the wider innovation process, as well as the finance guidance tool. Given the complexity and maturity of the template, a number of regions may struggle to generate the information required by the plan. The guidance also fails to contain any examples or best practice case studies for each of the stages or recommend tools and approaches to help generate the required information.

5.1.12 Ready to Fund Resilience Toolkit

Relevance to an Adaptation Finance Process for regions: Despite stating that it seeks to help practitioners operate in the existing landscape, the Ready to Fund resilience toolkit includes a

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strong focus on tackling more systemic factors and key barriers to adaptation financing through approaches such as a refined value proposition, an inclusive stakeholder approach, leveraging existing power structures and governance mechanisms, co-design, holistic financing approaches i.e. across the project cycle). It also highlights how multiple characteristics can be used together to overcome particular challenges.

It is extremely solutions focused – offering practical activities and approaches for practitioners who may otherwise feel frustrated. The quick refences section also includes strategies to help overcome problems with discounting (e.g., the use of time-declining discount rates, or social discount rates), though some of these may be limited in their success since their approaches are dictated by other organisations (e.g., national guidance on public financial management and economic appraisal).

The key limitation with the approach comes from the lack of a standardised process. This makes it challenging to know how to apply to an early-stage project idea and assumes a degree of familiarity already with project development and adaptation appraisal techniques.

5.1.13 GIZ Private sector project financing framework

Relevance to an Adaptation Finance Process for regions: The GIZ process provides a clear, step by step process that users can follow to develop actions. It also provides clear descriptions of actions. A particular strength is the specific stage on project financing – including identifying sources and appropriate structuring.

Finally, it helpfully acknowledges that projects sit on a development-adaptation continuum (shown in Figure 34), highlighting that the value created from an investment can sit anywhere across this spectrum, as well as highlighting the roles that public finance can play in crowding in private sector finance.

Figure 34: The development-adaptation continuum. Source: (GIZ, 2019)

The inclusion of an overview of sources and instruments is useful; however, these are provided at quite a high level, with more limited examples of how they can be put into practice.

A particular drawback, however, is that it is particularly rigid in the development approach for adaptation projects, failing to acknowledge the multiple entry points, as well as the ability to use a range of tools and techniques to support project development. It also suffers from seeing finance as a separate step after an adaptation option has been selected, rather than encouraging an explorative approach where financing considerations and the value proposition interact, resulting in a more limited set of financing options for projects.

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5.1.14 EC Guidelines of Member States' adaptation strategies and plans

Relevance to an adaptation finance process for regions: The EC guidelines helpfully acknowledge the need to generate an estimation of investment needs for the adaptation plan or strategies, including both public and private investment, as well as the resources needed to implement the strategy or plan, as well as covering the synergies and trade-offs of both. They also recognise the role of stronger consideration of climate change in fiscal frameworks.

However, the guidelines only consider financial resources at the implementation stage and fails to reflect the reality of Public Investment Management and Public Financial Management processes whereby project appraisal and development is normally undertaken as part of strategy development and budget preparation as financial approval is normally needed as part of signing off a strategy and action plan.

5.2 Discussion

From the review of the frameworks above, it is clear there are a wide range of different approaches, with different steps in the processes that are useful to support the mobilisation of adaptation finance. Whilst they all emerge as a common response to the adaptation finance gap, in reality, they are very different. The frameworks target different decision types – some focus on the development of projects as the entry point, whereas others focus on budgetary processes of financial institutions. Here, we reflect on a number of the key aspects for P2R's adaptation finance process and

- **Scope** – The toolkits vary widely in terms of the scope of their ambitions, with a large number seeking to support individual, project-level investments, whilst others focusing on building capabilities of organisations, or to change public financial management and budgeting processes. Some such as the World Bank identify overall coordinated arrangements, but do not identify the need for a dedicated investment plan. Others talk about the need to build pipelines and the components needed to do so, but these are generally quite high level, without practical steps needed. However, none provide a detailed, regional process for building an overarching adaptation finance approach. Only the CPI and the Net Zero Cities processes identify City Climate Investment Plans, but whilst the NetZeroCities process provides a City with an overall climate investment plan, it ignores the role of the financing and budgetary processes in enabling it.

- **Addressing finance barriers and transformative approaches** – The majority of the processes don't explicitly set out how they address some of the barriers to adaptation finance or seek to use transformative finance approaches supporting the development of new sources and instruments. The exceptions are the CSIRO and Ready to Fund Resilience toolkits, which identify economic and coordination barriers, as well as knowledge and evidence barriers, and provide approaches and solutions which seek to overcome them. These approaches also seek to change the wider context of the system, such as the governance processes, or methodology as to how investment decisions are designed and made.

- **Optimising Public and Private Sector finance** – Several processes are aimed at mobilising more private sector finance into adaptation (CSIRO, GIZ, Ready to Fund Resilience Project). However, whilst such approaches talk about the use of private and public finance at the project level, many fail to consider wider principles for the appropriate roles of public and

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private capital and how to apportion these. Such principles are considered in some of the frameworks which focus on green budgeting (UNDP, ACT), but these are often separated from the wider project development process.

- **Equity and Justice** – Only a small number of processes included a focus on justice and equity – notably the Ready to Fund Resilience Project. On one level this is surprising given the profound implications of designing and financing adaptation, but on another it is not given the complexity and novel nature of both domains. However, this is an area where more work is urgently needed to avoid maladaptation and facilitate a just transition.

- **Type of processes** – The frameworks evaluated also vary on their approach employed for users – some provide step by step approaches (GIZ, SMR), whilst other rely on maturity matrices. For example, the Adaptation Scotland and IEMA capability frameworks takes an approach whereby financing is embedded as part of a wider set of activities for public institutions to lead the development of an adaptation plan. A couple were very broad (Ready to Fund Resilience Toolkit, ACT), relying on regions to identify when different steps were appropriate, or providing broad guidelines to steer local approaches.

Each of the processes evaluated brings insights and learnings that are relevant to help regions develop dedicated Adaptation investment Plans, and P2R will need to leverage the best of these. However, a key limitation for all the processes evaluated (with the exception of ACT) is that they focus on one particular aspect of financing (e.g., green budgeting, or project development or pipeline development), instead of seeking to provide a single, end to end process, which is tailored to regional context. Apart from the climate change financing frameworks, the majority also have bespoke processes that do not align with existing project development or adaptation planning cycles. This is not necessarily an issue but does create challenges when being considered alongside existing capital investment or adaptation approaches such as the RAST.

5.2.1 Implications for P2R adaptation finance processes

From evaluating the strengths and weaknesses of existing adaptation processes, and the extent to which they include finance, there are several key aspects which will be important to inform the adaptation finance process for Pathways2Resilience. These are:

Objectives and Scope

- The overall objective of the Adaptation Finance Process should be to translate the high-level ambitions of a Climate Resilience Strategy into bankable investments which can be delivered across a region by 2030.
- Given that adaptation options and financing are inherently linked, the adaptation finance process should be aligned with the development of the overall Climate Resilience Strategy through the RRJ to enable them to inform one another.
- The finance process should span the entire range of financing approaches from financing individual projects, through to light touch or dedicated adaptation investment planning at the regional scale, as well as supporting relevant enabling conditions to undertake the process and mobilise finance.
- The overall approach should seek to be systemic – seeking to change the way investment decisions are made within and across regions, by focusing on wider value creation through adaptation alongside wider economic, social, and environmental goals.

Content of the adaptation process

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- The process should outline a clear 'core' process for regions to follow but each step should be able to be tailored and undertaken in isolation or independently so regions can apply it in their specific context (e.g., specific climate risks and levels of ambition).
- It should encourage users to be explorative – looking at future options and pathways in their adaptive space to diversify adaptation options, and sources and instruments for adaptation financing, rather than homing in on individual adaptation options too early and closing off financing avenues in the process.
- The main output of should be a dedicated Investment Plan, supported by a series of bankable projects, and an action plan for its implementation.
- The process should seek to set out a strategic economic and financial narrative to frame the investment approach – this could be supported through calculating potential and avoided economic losses and damages at the regional level.
- For fiscal and economic credibility, an AIP should align with the wider public financial management (i.e. budgetary) planning frameworks and public financial management of a region.
- Regions should set out a clear delivery approach (e.g. via a stylised diagram), showing how the desired plans/actions, sources and instruments, governance mechanisms and enabling conditions will mobilise the resources to deliver the pipeline of projects.
- An AIP should ensure the AIP and pipeline have Justice and equity as a core consideration, with the steps in the process identifying key concerns for equity and justice and adjusting investment approaches in response.
- The AFP should be linked to a range of supporting case studies, tools, and resources to illustrate how the process can work and help regions to begin the work – with each such as case studies, tools and resources which can be expanded throughout the P2R project and maintained for much longer.
- It should be possible for regions to evaluate progress / maturity of the adaptation finance process (for example, through P2R's Resilience Maturity Curve being developed in WP1).
- The process should set out a series of use cases, highlighting the broader uses of the AIP
- Each step in the process should articulate the associated inputs, outputs, partners, and success factors required, alongside the key equity and justice considerations.
- The process should acknowledge that region's abilities to raise, deploy and repay finance for adaptation will be influenced by national / EC policy, and should encourage and equip them to engage at national / EC level to provide strong enabling conditions.
- The AFP should clearly describe the outcomes arising from the use of the process relating to adaptation finance, as well as additional benefits from its use (e.g., building skills and competencies, informing Member States/EC of investment needs).

Approach and attributes

- Given the size and nature of the change for developing an AIP, the process should be iterative and adaptive, and therefore should seek to help regions secure high-level authority and strategic oversight to be sustained.
- An adaptation finance process can benefit from, and support national and regional green budgeting processes. Green budgeting can improve understanding of existing spend, whilst adaptation planning can help support tagging of relevant budget lines. Regions should draw on and encourage green budgeting approaches (to the extent they exist or there is appetite to employ them).

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- The approach should seek to mobilise all of the different levers/roles that regions play in facilitating adaptation finance, such as procurement, or direct provision of services as well as place leadership.
- The approach should be empowering – seeking to ensure regions feel they have the skills, authority to lead a process and to know where to look when they need further reading. examples of this could include providing regional narratives, creating an authorising environment through early steps in governance, increasing use of a wide range of types of knowledge and values, as well as encouraging investment in competencies and capabilities, and designing aligned funding programmes.
- It should be solutions focused – offering practical solutions to common challenges encountered at every stage of the process.
- The outputs must have a degree of standardisation to allow comparability and benchmarking, encourage knowledge exchange amongst regions, and reduce barriers to private sector engagement.
- Since successful adaptation financing is likely to involve a much wider array of actors, the process should be inclusive, encouraging widespread engagement and involving a wide variety of potential beneficiaries and actors in the development of the Investment Plan and individual emphasis. There should be a particular emphasis on involving those most vulnerable to climate change. The involvement of financing departments in public administrations will also be crucial to widespread support but increased skills development and support is likely to be needed. However, the range and type of actors involved is not likely to be the same at each stage of a process, suggesting the need to include recommended types of actors to involve at each stage. But such approaches should still be supported by strong leadership and oversight to drive the process and ensure it avoids becoming no-one's responsibility because it's everyone's responsibility.
- The approach to governing the adaptation finance process should include efforts to ensure that decision makers feel authorised, equipped, and supported to diagnose and overcome the structural constraints of their decision contexts to address the uncertainties and ambiguities of the problems. It also needs to ensure coordinated and strategic efforts to develop multi-level governance, supporting facilitating and enabling change across scales at levels above and below individual, local, place-based, or organisational units.
- It is important to highlight the enabling conditions required to undertake the process (e.g., a structured team, sub, teams, working groups, well defined governance and roles and responsibilities and an available budget), as well as the timetable and effort needed to undertake it.
- In addition, this should seek to include a degree of 'realpolitik' – emphasising the practical considerations that are likely to make an adaptation financing process successful, based on real world experiences – examples could include political economy issues, constrained timescales, governance considerations or resource limitations.
- The approach should seek to foster transparency and accountability by increasing the overall amount of information available to politicians, NGOs, and interest groups to allow for better scrutiny.
- The P2R process should seek to engage not just regions in the co-design but a cohort of additional actors that can champion its uptake to support success – this could include financiers and investors, the EIB, European Commission regions, but also the EEA, Mission Implementation Platform, CINEA, ERRIN, the Covenant of Mayors, and consultant.

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Look and Feel

- Whilst an overall process will be useful for a strategic framework, it is likely to need a series of additional modules and components for each stage of the framework to help this.
- It must be user centred, focusing on regions as the end user and designing the process around them.
- The process should be supported by additional components to provide an integrated approach – drawing on the catalogue of sources and instruments, the templates and resources, and the envisaged outputs of the Finance Innovation Lab and to provide a one-stop shop.
- It must be visually appealing, and suitable for deployment in a range of practical situations, such as with a senior management meeting, a stakeholder workshop or event, or in a desk-based environment to support day to day work.
- It should be as simple as possible, and clear to navigate to allow users to clearly understand progress.
- Wherever possible the process should build on existing or emerging tools and processes to minimise the complexity and barriers to uptake.
- It must be able to encourage and record progress on multiple steps at once, reflecting that resource mobilisation is not a linear process but an iterative one over time (for example an early region may be developing a small number of climate proofing projects as well as some finance strands in their adaptation strategy, whilst mature ones may develop an adaptation investment plan and *AND* be mobilising the investment community).

The outcomes of the process (such as Adaptation Investment Plans or actions in the other use cases) should be publicly accessible to allow development banks, investors, and the private sector to identify opportunities to participate in regions' investment planning, and to raise awareness amongst citizens. Options could include a dedicated regional page on the P2R website, a repository, or the outcomes of the tool.

5.3 Conclusion

This chapter has reviewed a range of adaptation finance processes for their potential strengths and weaknesses and has uncovered many insights that can help frame the design of the P2R adaptation finance process. These will be used to inform the design of the P2R Adaptation Investment Cycle, but also have wider value for those seeking to design capacity building tools for finance.

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6 The P2R Adaptation Investment Cycle

6.1 Aim

The Pathways2Resileince Adaptation Investment Planning process aims to ensure regions can mobilise the resources to deliver their Climate Resilience Strategies and Innovation Agendas.

6.2 Objectives

The objective is to develop a Climate Resilience Investment Plan and pipeline of bankable projects by:

- Translating adaptation objectives into investment needs.
- Providing a strategic basis for linking needs to resources and identifying approaches to fill the gap between them.
- Doing so in a way that prioritises equity.

6.3 The Adaptation Investment Cycle

The P2R Adaptation Investment Cycle (show in Figure 36 below) is an iterative, six-step process designed to be undertaken in parallel to the development of a regions' Climate Resilience Strategy through Pathways2Resilience's Regional Resilience Journey, or as a separate standalone process for regions which have already developed Adaptation Strategies. It seeks to change the way regional adaptation financing is undertaken, planned, projects are developed, and investment decisions are made,

It does this by moving from a project-by-project approach to a region-wide investment planning approach which links existing and emerging approaches to adaptation planning, with regional financial and investment planning to create new value for regions, in line with public financial management requirements. The broad theoretical framework underpinning P2R's Adaptation Investment Cycle is shown in Figure 35 below:

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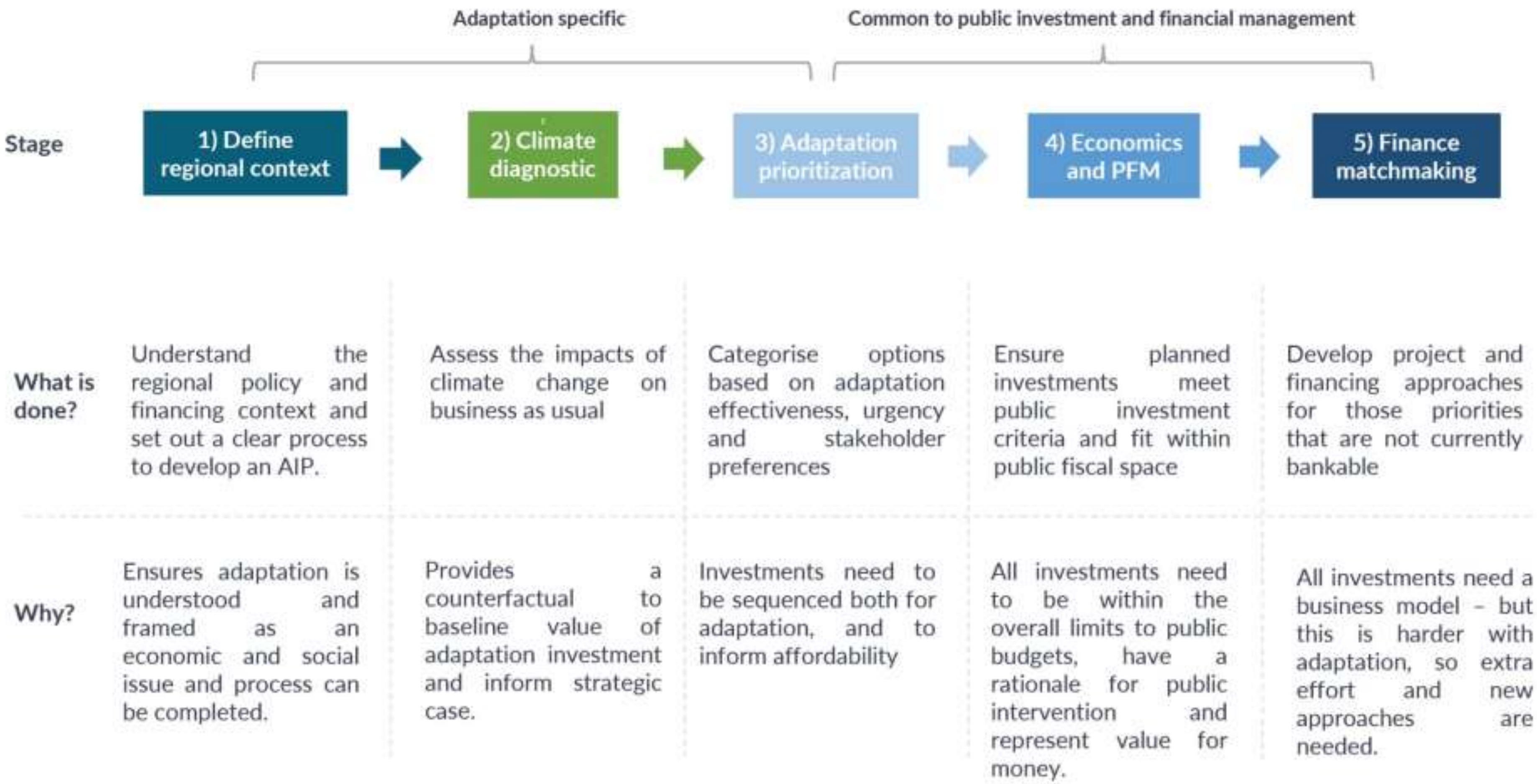

Figure 35: Theoretical diagram of how Adaptation Investment Planning links Adaptation Planning with typical financial/Investment planning. Source: Authors

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The process is comprehensive but flexible, meeting regions where they are and allowing them to identify and use the whole process, or relevant components to address their individual needs. In doing so, it unlocks the creativity and entrepreneurship of *all* regions, leveraging their strengths to mobilise adaptation finance.

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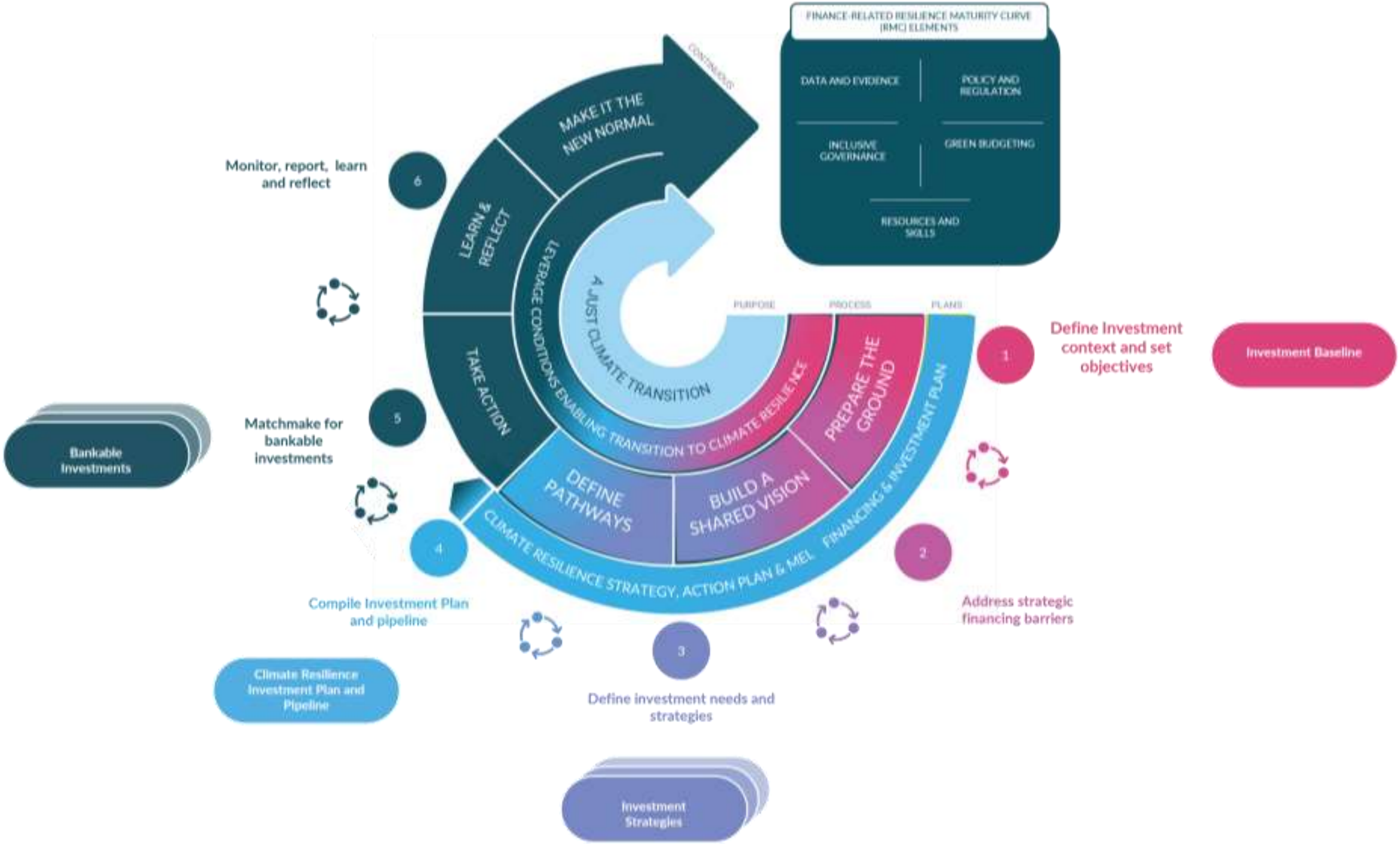

Figure 36: The P2R Adaptation Investment Cycle, within the Regional Resilience Journey. Source: Authors

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The cycle has 6 main steps and each step includes a series of activities. These are shown in Figure 37 below. For each of the steps in the Cycle this deliverable sets out an objective, and series of activities and outputs, as well as supporting guidance, good practice examples and tools needed to achieve them. In addition, to ensure the process remains manageable for regions, each step includes information on what is essential in early iterations of an AIP, and what could be done in future iterations, as well as what information can be drawn from budgetary or adaptation planning to reduce the amount of effort in developing the AIP. The detailed steps and sub-steps are shown in Figure 35 below.

These will be developed further throughout the implementation of P2R. The process also relies on a series of wider enabling conditions, based on the regional financial capabilities of Pathways2Resilience's Resilience Maturity Curve – to develop and implement the Investment Plan. These are addressed in the P2R's wider work on enabling conditions, but they are acknowledged here as they are fundamental to working through the Investment Cycle.

The Cycle also aligns with the existing and emerging landscape of adaptation planning and finance. The steps in the process broadly map to the stages of the adaptation planning cycles of existing EU Adaptation Planning tools (the Regional Adaptation Support Tool, but also the Adaptation Support Tool and Urban Adaptation Support Tool) to allow for integration and use by those beyond the P2R process. The process is also designed to work with regions' existing financial planning arrangements such as budgetary cycles, medium term expenditure frameworks and public investment planning. Finally, the activities and outputs account for wider Horizon Europe projects helping scale adaptation finance, such as PIISA (Piloting Innovative Insurance Solutions for Adaptation) and ClimateFIT (Climate Financing and Investment Taskforces).

Throughout the Cycle, reference is made to these interactions with adaptation planning and financial planning. However, given the wide range of individual processes, it has not been possible to anticipate every possible scenario, and regions will need to tailor the process to meet their own local requirements.

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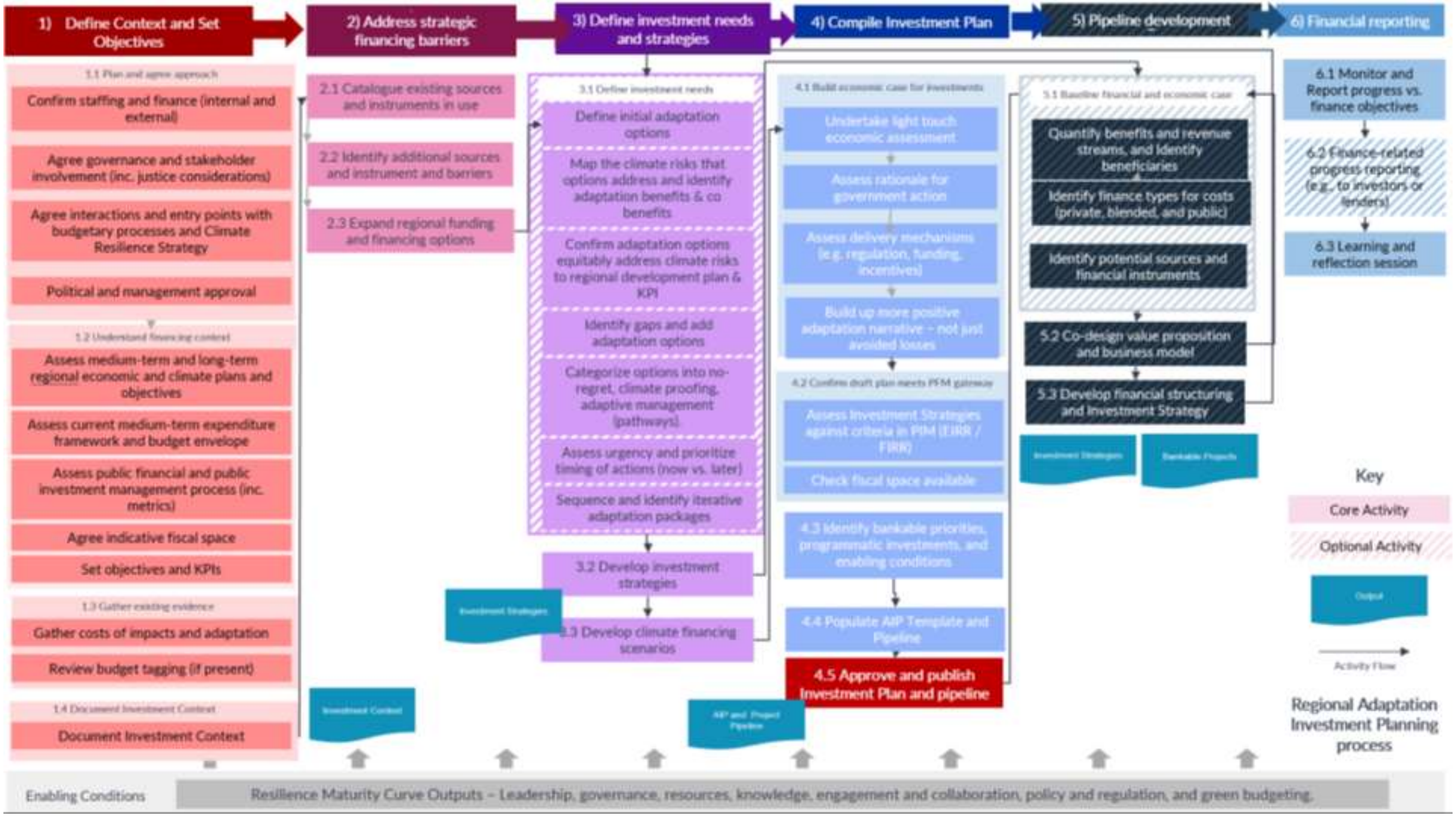

Figure 37: Detailed activities and process of the Pathways2Resilience Adaptation Investment Cycle. Source: Authors

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The Adaptation Investment Cycle supports regions to develop a Climate Resilience Investment Plan in parallel to their Climate Resilience Strategy, helping them undertake the necessary steps at the right time to maximise adaptation finance, and therefore implementation, as they move along the Regional Resilience Journey and/or EEA Adaptation Cycle.

Although the focus of P2R is on preparing regions for implementation adaptation action, in line with the broader RRJ, the Cycle covers both the development of a plan and its implementation, because successfully undertaking developmental stages depends to a degree on how they will be delivered and the associated risks.

Following the process and developing an CRIP will give regions a credible, scalable financing approach for adaptation in their region, involving the public, private and third sectors on adaptation finance, including the development of new instruments and business models.

6.3.1 Benefits to regions

Producing a Climate Resilience Investment Plan will provide a number of benefits for adaptation:

- Increasing attempts to use of public financing to leverage and crowd-in private finance.
- Activating and mobilising stakeholders to help meet the region's finance needs.
- Identifying funding or financing gaps in adaptation strategies and ways to fill them.
- Developing the region's adaptation finance skills, knowledge, and capabilities.
- Helping sequence and phase investments over time to meet budgetary constraints or limitations.
- Directs resources in a way which facilitates a just transition.

Producing the plan also has a number of wider benefits both within the region and more broadly across Europe:

- Shows how adaptation is positively linked to regional development objectives.
- Helps diversify and scale the sources of finance and instruments across the public and private sectors and supports effective allocation of financing responsibilities.
- Increases the visibility of investment opportunities and needs to Governments, investors, and intermediaries.
- Strengthens regional enabling conditions for investment in adaptation (including budgetary processes).
- Develops the wider European adaptation economy and associated local economic benefits.
- Supporting implementation of the EU's overall Adaptation Mission and its charter signatories.

6.3.2 Timescales and resource requirements

Given the deep relationship between adaptation planning and its financing, the Adaptation Investment Cycle has been designed to be undertaken alongside the main Regional Resilience Journey and the subgrant and capacity building provided to P2R's 100 regions. Therefore, it has been designed to be developed over an 18-month period, with a further 6 months for

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beginning implementation. Whilst regions will need to fit the activities based on local context, an illustrative project plan showing the phasing of activities is outlined in Figure 38.

The relative amounts of effort required over this period will vary from region to region, based on local context and the ambitions of the region, as well as whether regions already have an Adaptation Strategy or are developing a Climate Resilience Strategy using the Regional Resilience Journey. However, it will be useful for regions at the outset to have a broad indication of the resource implications of the development of a Climate Resilience Investment Plan.

If a region already has an adaptation strategy in place, a resource of roughly 0.5 FTE over 18 months might be needed to prepare the Adaptation Investment Plan – i.e., 9 months of effort for an FTE. If a region is developing a transformational adaptation strategy using the RRJ, a resource of ~0.75 FTE over 18 months – i.e. 13.5 months of effort for an FTE might be needed. Note in both cases there is a 2-month overlap between steps 3 and 4, which results in a slightly higher resource requirement than a linear approximation.

In Table 20 below we outline the number of months required for each step of the AIC, and the indicative resource requirements based on developing an CRIP alongside the RRJ, using these high-level estimates.

Table 20: Indicative Resource estimates for the Adaptation investment Cycle in parallel to the RRJ. Source; Authors. Note steps 5 and 6 focus on implementation and so are outside the scope of the RRJ process.

AIC Step	Number of months	Total Effort (PM) (0.75 FTE)
1	3	2.25
2	3	2.25
3	7	5.25
4	7	5.25
5	6	4.5
6	3	2.25
	Total	**21.75**

In theory the AIC can also be undertaken independently of an Adaptation Strategy, but this is not advised since many of the steps depend on the availability of underlying adaptation information, and therefore resource requirements are likely to increase significantly to > 1 FTE over 18 months.

Note the AIC extends beyond the scope of Pathways2Resilience project. Since P2R is focused on supporting regions to prepare for implementation, this estimate excludes Step 5 and 6 (bankable projects and monitoring, evaluation, and learning). However, we have also included additional resource estimates to complete these steps, suggesting MEL activities begin alongside developing individual projects.

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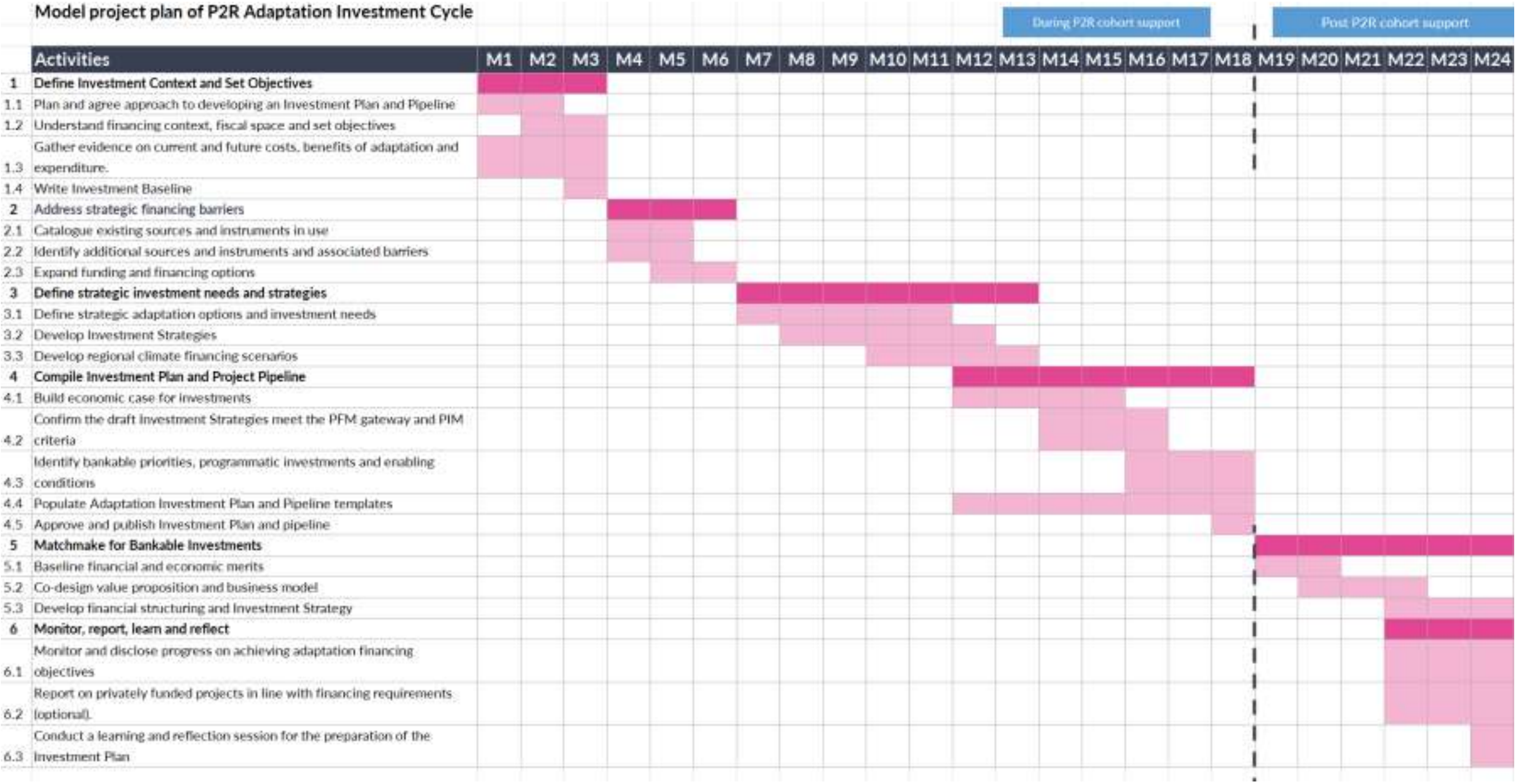

Figure 38: Illustrative project plan for development of a Climate Resilience Investment Plan. Source: Authors.

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6.3.3 Outputs

As part of the Adaptation Investment Cycle, regions create outputs which serve as inputs to an Climate Resilience Investment Plan and create a Regional Adaptation Investment Framework for the region shown below:

Figure 39: The outputs from the P2R Adaptation Investment Cycle. Source. Authors.

The outputs are developed by following the Adaptation Investment Cycle but will also be shaped by the wider Regional Resilience Journey, and regions' Climate Resilience Strategies, Action Plan, and Innovation Agendas, as well as wider economic and financial policies, plans and strategies. The four outputs are summarised as follows:

Investment Baseline – An early position statement outlining overall economic context for the region, including costs to the region without adaptation, current and planned expenditure, further investment need and ambition, Indicative budget envelope, Public Financial Management requirements, supporting economic narrative, and associated delivery approach.

Investment Strategies - A shortlist of possible approaches to raising, deploying and (if appropriate), repaying capital associated with meeting investment needs for particular sectors or risks, including indicative mixes of public and private investment, and sources, instruments and mechanisms for achieving them.

Climate Resilience Investment Plan (CRIPs) - CRIPs are documents which outline how regions intend to finance its Climate Resilience Strategy, along with a pipeline of bankable adaptation investments. (P2R own definition). More detail on CRIPs is included in Box 4.

Bankable Projects – These are projects or investments which meet the requirements of the relevant financier in order for them to provide the financing for the project. These are traditionally gathered together into a 'pipeline' and aim to show how the entirety of the Climate Resilience Strategy will be delivered.

While the Cycle identifies and recommends stages in the process for completing these outputs, regions may also prefer to use them to inform and structure their own bespoke process or build them out throughout the entire Cycle.

Box 4: Climate Resilience Investment Plans

There are a wide range of finance, investment, and resource mobilization plans, strategies, or roadmaps that seek—either wholly or in part—to increase financing for climate adaptation. (IISD, 2022a). For the purposes of this report, we use the term 'Climate Resilience Investment Plan'. Climate Resilience Investment Plans are documents which outline how regions intend to finance

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their Climate Resilience Strategy, along with a pipeline of bankable adaptation investments. (P2R own definition). They build on the global Adaptation Investment Planning approaches employed by developing countries and Development Banks and are closely modelled on the Climate Neutrality Investment Plans of the European Commission's mission to create 100 Climate Neutral and Smart Cities. They have a number of characteristics, summarised below in Figure 40:

Figure 40: Characteristics of a P2R Climate Resilience Investment Plan. Source: Authors.

- **Aligned to Climate Resilience Strategy** – they align to the Climate Resilience Strategies developed through P2R, providing credible detail on how the strategy will be paid for. The process can also inform adaptation plans, helping them become more concrete and achievable.
- **Economic and Financial Planning** – they provide detailed economic and financial information for a region's adaptation investment, within public financial management criteria, to enhance its deliverability, credibility, and scalability.
- **Region-wide place-based approach** – The plan provides a comprehensive statement of investment needs and opportunities across the region, collating information from public, private and third sectors.
- **Covers priority risks and opportunities** – The Investment Plan sets out financing strategies which comprehensively addresses climate risks, realise opportunities and support transformation, rather than a piecemeal approach.
- **Iterative, maturing process** – The first CRIPs will not be complete with all relevant information. Instead, the emphasis is on encouraging regions to complete the process alongside development of their Climate Resilience Strategy, and to develop and mature their approaches through future refreshes or iterations.

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- **Catalyst for capital** – As the focal point for adaptation investment, the document is designed to act as a catalyst, triggering new and additional investment from public and private sectors and financial institutions.
- **Long-term focus, short term action** – the plan takes a long-term approach (i.e., assessing financing needs aligned to the adaptation planning horizon) to support public financial planning and boost private sector confidence, and anchors it in near term timeframes of an action plan for a Climate Resilience Strategy, and budgetary planning to boost supply *and* demand for adaptation projects.
- **Equitably, inclusively governed** – Climate Resilience Investment Plans should be governed in an equitable and inclusive way, involving a wide variety of stakeholders from the public, private and third sectors, particular those most vulnerable to, or affected by climate change. The governance should maximise the potential for value creation whilst ensuring the region's adaptation financing is just and equitable.

6.3.4 The roles of regions in the Adaptation Investment Cycle

The main role of regions in the Adaptation Investment Cycle is to lead and oversee its execution, leading to the development of an Climate Resilience Investment Plan. In doing so it is important for regions to ensure they have the capacity to follow the Cycle, coordinating the process and undertaking the individual activities. The cycle has been designed to be completed in its entirety, but regions may also wish to 'jump in' at any point and complete certain stages. Regions will need to define the scope of their CRIP, review the steps involved, estimate the time and resources requirements, and secure relevant political or administrative approval. In doing so they should take into account external support available, including funding and training from Pathways2Resilience.

In addition to this role, developing a Climate Resilience Investment Plan also entails developing a pipeline of bankable projects. In doing so, regions need to be mindful of the varying roles they have in raising, deploying, and repaying capital. It is generally well understood that local and regional governments play five different, but complementary roles. These fall into two categories – provider' – i.e., 'what a region or subnational government can pay for' and steward - 'how the region can influence'. These are shown below and outlined in more detail in Box 5.

Box 5: The roles of regions in mobilising climate adaptation finance. Source: (Authors, adapted from Boukerche et al., 2021).

Regions as providers of finance for adaptation:

1: Consumer: Regions can act as powerful, demand-side influencers, demand aggregators and green bulk procurers. For example, a regional government can choose to procure from suppliers which assess and adapt for the risks or undertake community benefit activities which build wider local resilience.

2. Provider: To the extent that regional or local services or infrastructure falls within their legal mandate and expenditure assignments, regional governments may deliver goods and services to residents, such as social care, education, or water. Depending on their purview and financing sources, they can ensure that regional investments are climate resilient and deliver adaptation.

Regions as stewards of finance for adaptation:

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3. Fundraiser: To finance their own investment and spending, regional governments can raise revenues through the collection of own source revenue (OSR). In some cases, and under certain enabling conditions, regions can raise funds from debt through municipal bonds or debentures, pension funds, and public private partnerships (PPPs). In such cases a regional government can facilitate or establish green financing instruments that mobilize climate finance.

4. Regulator: Regional governments act as regulators of land use and commerce and are often empowered to regulate specific activities, such as construction in flood plains, or overheating risk in buildings. As well as discouraging actions which increase climate risk, regional governments can also offer incentives through local policies, regulations, standards, and subsidies to households and businesses to encourage climate-smart spending and investment. Incentives include instituting taxes and fees for climate-resilient infrastructure, changing and enforcing building codes, providing regulatory frameworks for nature-based solutions, and providing the regional-level regulatory framework for businesses to build resilience to climate change. These tools can help enable financial transactions for climate-positive investments or transactions that happen outside of region's' direct remit.

5. Convener and champion for systems thinking: Cities and regions are spaces where different jurisdictions and layers of government, sectors, and systems (energy, transport, wastewater, health, biodiversity etc.) converge and interact to serve city dwellers and businesses. The intersection of these layers and systems presents a host of coordination challenges for managing urban growth and integrating climate-smart objectives for impact. In other words, an urban area is a "system of systems", and regional governments can act as critical conveners and champions for systems-level thinking. Regional government leadership, if well-equipped in terms of capacity and aligned with other regional and national stakeholders, can be in a strong position to drive transformational change to achieve net zero carbon and resilient growth pathways.

6.3.5 Use cases for the Adaptation Investment Cycle

The Adaptation investment Cycle has been designed to be used end to end to develop Adaptation Investment Plans for regions as each step builds on the last. However, its use can also support a range of additional use cases - generalized application of adaptation financing in a particular decision-making context – that regions can use to help them address their financing needs. These can be used for adaptation strategies, programmes, or individual projects, and are relevant to different audiences. They are as follows:

Table 21: Use cases for the P2R Adaptation Investment Cycle. Source: Authors

Use case	Description	Relevant to	AFP stage
1. Developing the investment narrative for regions	The AIC helps develop a positive narrative around investment in adaptation for regions	Politicians, finance directors	1
2. Assessing barriers and solutions to financing	The cycle can help regions identify particular challenges to financing regional action or projects, and associated solutions.	Project developers/ proposers	2
3. Identifying sources	The cycle can be used to longlist and prioritise additional sources of funding and finance for use in adaptation.	Project developers/ proposers	3

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4. Identifying instruments	The process can identify and develop instruments and mechanisms to deploy finance for adaptation.	Project developers/ proposers	
5. Finance components in adaptation / climate resilience strategies	For regions that are not ready to undertake AIP development, the Cycle can also be used to strengthen the financial elements of broader adaptation or climate resilience strategies.	Public adaptation professionals	4
6. Adaptation Investment Plans	The development of dedicated Adaptation Investment Plans which translate high level visions and aspirations to concrete, bankable investments	Public adaptation professionals	4
7. Bankable climate-proof projects	The development of projects where adaptation is not the primary purpose, but need to be protected from the impacts of future climate change	Project developers/ proposers	5
8. Bankable adaptation projects	The development of projects where the primary purpose is supporting adaptation to climate change.	Project developers/ proposers	5

In addition, the AIC can also support delivery through performance management, and external scrutiny and accountability by providing information on progress within region as well as against other regions.

It can also support national ambitions such as including building adaptation markets (through their use as a tool to help develop the 'supply' of adaptation projects goods and services, and stimulate demand for new financing and investment), and strengthening uptake of the EU Taxonomy by demonstrating the scale of current or envisaged finance that is taxonomy-aligned or promoting taxonomy-aligned investments.

6.3.6 Financing 'Just Resilience'

The Cycle has also been designed with an explicit focus on supporting 'Just Resilience' in line with the ambitions of the European Climate Adaptation Strategy. Climate change affects people, based on the combination of the hazards, exposure to those hazards and their relative vulnerability (IPCC, 2022), and these differential impacts also arise from historical injustices and unequal power arrangements. Similarly, differential impacts of climate change can also arise from differential and procedural aspects of adaptation policies and responses. (Lager et al., 2023).

Figure 41 below shows the emerging 'Just Resilience' approach from the European Investment Bank, which has begun to identify criteria for investments that qualify as investments into Just Resilience, and covers those unequally affected by adaptation action, or by climate change, as well as those in areas most affected by climate change.

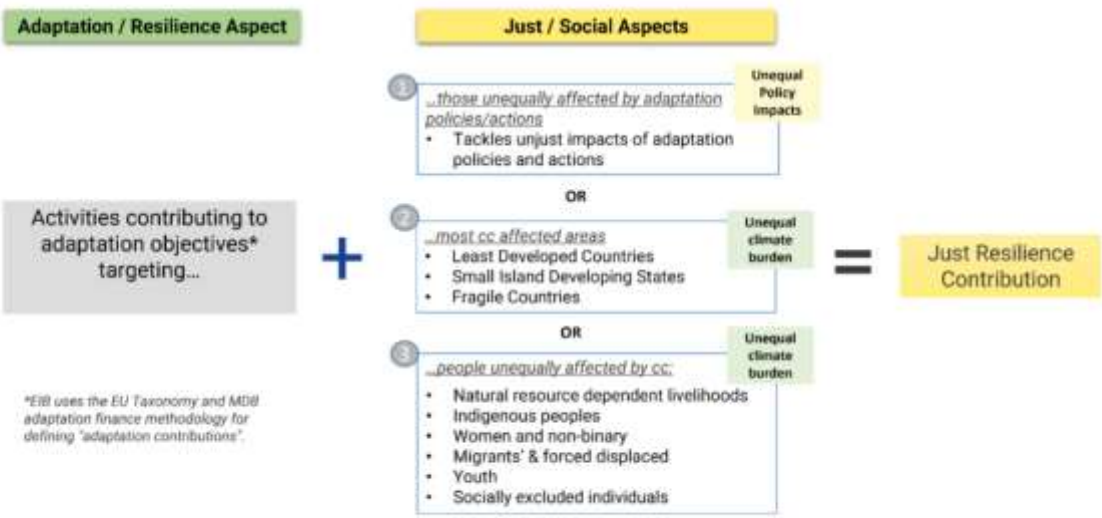

Figure 41: Overview of EIB Global's just resilience approach. Source: (EIB Global, 2023).

In financial terms, the just resilience contribution would be equal to the associated adaptation finance in terms of percentages for investments that meet the defined climate adaptation and social criteria outlined.

Therefore, the P2R cycle and associated guidance and templates encourages:

- The consideration of the baseline current impact of extreme weather on individuals, households, and places, as well as differential impacts of future climate change risks.
- Considering the equity-related implications of different financing approaches (e.g., ethical considerations of different sources, the distribution of costs across the population.)
- The equity-related outcomes from the financing of different adaptation projects
- The involvement of the most vulnerable in the AIP development process and in projects
- Considering the views of those most affected by current extreme weather and future climate impacts in the decisions around which projects and programmes to finance.
- Establishing metrics to help investments and flows which support Just Resilience.

6.3.7 Enabling conditions for the Adaptation Investment Cycle

Successfully following the Adaptation Investment Cycle presupposes the existence of a number of additional 'enabling conditions' that support the process and the mobilisation of adaptation finance. Enabling conditions are commonly defined as "the institutional, technical, and financial aspects that characterize the framework under which urban climate action can happen. (CCFLA, 2023). Whilst this definition is urban focused, it is broadly applicable to a regional context.

In the context of Pathways2Resilience, these are cross-cutting factors that support the development and implementation of an Investment Plan, and cover both the capabilities of a regional entity itself, as well as broader conditions that influence the ability of the region to undertake different activities. Different aspects of enabling conditions include broadly are:

- **Data and Evidence** – Ensuring there is access to the relevant economic and financial-related data and evidence to inform an investment plan, or the means to develop such data and evidence, either through in-house expertise or consultancy. Examples include economic valuation of climate change risks or costs of adaptation options. This also includes learning and knowledge exchange related to adaptation financing with other regions across Europe.

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- **Inclusive Governance** – A process which involves a wide range of relevant stakeholders in the process to ensure a just approach and the widest possible exploration of adaptation solutions and associated financing. In addition, the AFP relies on involving multiple stakeholders at different times, and from diverse backgrounds, including finance, adaptation, and from private public sectors as well as communities.

- **Green Budgeting** – The development of an Adaptation Investment Plan will be greatly enhanced if regional entities adapt wider fiscal policy and processes in the region to support adaptation, such as mainstreaming climate considerations into budget submissions or adopting green budget tagging to help track existing and planned adaptation expenditure.

- **Policy and Regulation** – Mechanisms to ensure that the wider policy and regulatory environment is supporting to achieve the aims of the investment plan - this could include reforms to local or regional policies or regulations and the introduction of regional incentives (e.g., taxes or subsidies).

- **Resources and Skills** – Ensuring that a region has set aside appropriate human and financial resources to develop an Adaptation investment Plan, with appropriate skills and knowledge, as well as the institutional architecture to direct and drive the plan's development.

The Adaptation Investment Cycle focuses on ensuring these enabling conditions in two ways. Firstly, in Step 1, regions are asked to define the governance and delivery arrangements for an Adaptation investment Plan, whilst Step 4 requires the identification of enabling conditions as part of compiling the Adaptation Investment Plan itself.

In addition, elements of these enabling conditions are being incorporated into the RMC diagnostic and capability building activities of the overall Regional Resilience Journey in recognition of the fact that these cross-cutting factors also support the wider elements of Climate Resilience Strategies and Innovation Agendas.

6.3.8 Adaptation Investment Cycle Steps

This section sets out the individual steps involved in developing the Climate Resilience Investment Plan and pipeline. Note, the process includes reference to a range of additional P2R guidance. These templates and guidance will be produced as part of Task 5.3.

6.3.8.1 Step 1. Define Investment Context and set objectives.

Months undertaken: M1 – M3
Indicative effort: 2.25 Person Months

ABOUT [OBJECTIVE]

Description: The aim of this step is to define the approach to developing the Investment Plan, set objective(s) for the plan, understand the financial and economic context, and develop a positive financial and economic narrative for adaptation investment.

HOW [ACTIVITIES & OUTPUTS]

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Step 1.1 Plan and agree approach to developing an Investment Plan and Pipeline

Define the process for developing the Climate Resilience Investment Plan and Project Pipeline. Regions will need to establish a team of people with adaptation and financial expertise and confirm resources to undertake the process. This includes in-house staffing and resources but could also involve external partners, and the Pathways2Reislience consortium.

The team should consider how to coordinate and govern the Investment Plan process. This should include who should be involved (and when, and how), as well as how it will be resourced and governed. It should also consider the entry point for how and when an CRIP interacts with wider financial process such as the budgetary cycle and capital investment programmes, as well as the development of the Climate Resilience Strategy.

In developing governance arrangements, regions should consider how those most vulnerable to climate change will be considered and represented to ensure the CRIP supports just resilience. It should also maximise public, private and third sector engagement opportunities throughout the setting of Investment Objectives, development of Investment Strategies and the Investment Plan and bankable projects to ensure a diverse set of funding and financing options are considered and increase the likelihood of financing.

Finally, regions should secure management and political approval to produce the Investment Plan. High level authority and buy in from the outset will ensure the Adaptation Investment Plan has longevity and becomes a mainstream regional activity over time.

Step 1.2 Understand financing context, fiscal space and set objectives.

Regions should understand and document the broad policy context for financing a Climate Resilience Investment Plan. This involves reviewing national, regional, and local economic and climate policy and plans to anchor the development of the Investment Plan within a sense of the regional priorities.

The region should also review the region's public financial management and public investment management processes to identify the relevant timetable. The key areas to review and document are the:

- Public Financial Management process - the multi-year public expenditure planning exercise that is used to set out the future budget requirements for existing services, and to assess the resource implications of future policy changes and any new programmes), and the annual budgetary cycles.
- Public investment management process - The process and requirements for developing and approving individual investments, including key investment criteria /metrics. These may be set locally or by Member States.

Doing so will ensure the Investment Plan and the individual bankable projects. are grounded in, and align to, the broader budgetary systems and approaches, increasing the likelihood that the final Investment Plan and individual projects will meet the final requirements for authorisation from finance directors and politicians.

Having done this, the region should work with the regional financing department to identify a 'fiscal space' for the Climate Resilience Strategy and Innovation Agenda. Essentially, this is about creating a high-level spending envelope or range for the region's own resources over the period(s) covered by Climate Resilience Strategy to constrain public spending and sequence adaptation options over time. However, it is important to note that this is not the same as the

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totality of the resource the region intends to mobilise for adaptation (e.g., there may be a higher total of finance once private sector finance or spending of other public actors is included).

More information on fiscal space is included Box 6 below. The indicative fiscal space and financing scenarios may change throughout strategy development in light of evidence on economic or financial risks of climate change, wider changes to regional spending priorities, or the ability of certain projects in the Climate Resilience Strategy to generate revenues or savings.

Box 6: What is fiscal space?

Fiscal space is defined as "*room in a government´s budget that allows it to provide resources for a desired purpose without jeopardizing the sustainability of its financial position or the stability of the economy*" (Heller, 2005).

At the regional level, fiscal space will depend heavily upon legal competence and subnational funding arrangements, as well as national fiscal space, (which is in turn contingent on public debt) and the EU approach to assessing the sustainability of public debt. Depending on context, regional government can create fiscal space by raising taxes, securing outside grants, reprioritising expenditure, boosting efficiency, borrowing resources (from citizens or foreign lenders), or borrowing from the banking system (and thereby expanding the money supply). But it must do this without compromising macroeconomic stability and fiscal sustainability—making sure that it has the capacity in the short term and the longer term to finance its desired expenditure programs as well as to service its debt.

Estimates of fiscal space often use multiple lines of evidence to provide the range, as illustrated in Figure 42 below:

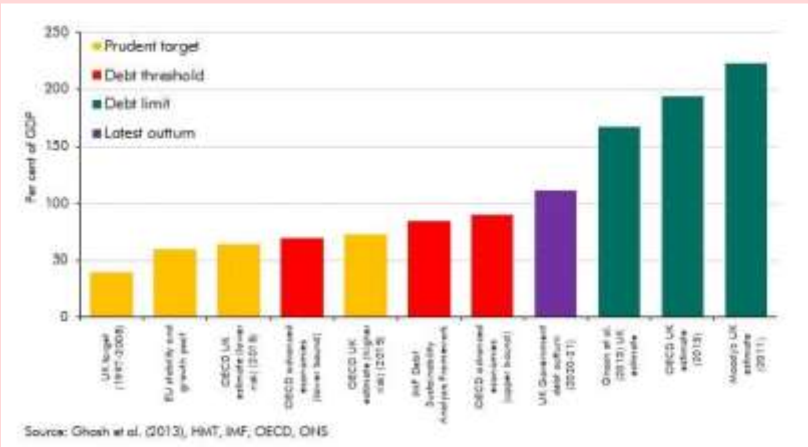

Figure 42: Illustrative Fiscal Space for the UK Government. Source:(Office for Budget Responsibility, 2021)

It is important to highlight that whilst fiscal space is an important component of securing budgetary approval for a region's AIP, in reality an AIP is likely to also include a wider set of resources for adaptation investment – in part mobilised by this direct regional spend.

Finally, regions should set high level objectives and associated KPIs for an Adaptation Investment Plan. Precise goals will vary. Whilst optimising public spend may be goal for the majority of regions, for some regions, mobilisation of private sector finance for public adaptation may also be a key goal, whilst for others, it may be about increasing the allocations of public finance from bodies across the region. Regions may also wish to set objectives which improve the enabling conditions for adaptation finance, or the region's Resilience Maturity Capabilities which support Investment Plan development. Objectives can be set centrally, or through

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discussions or workshops with relevant teams and departments, as well as other key stakeholders such as the Chamber of Commerce, other public services, citizens, or civil society.

Step 1.3 Gather evidence on current and future costs of climate change, benefits of adaptation and existing and planned expenditure.

The next step is to gather the baseline data and information which provides economic and financial context for action. This should cover four categories:

- Current and historic costs of extreme weather to the region, (known as the adaptation deficit),
- Projected future costs from specific risks and in aggregate, and benefits of adaptation – including particular thresholds, equity and distribution.
- Estimates of adaptation investment needs
- Existing and committed revenue and capital expenditure on climate change adaptation.

This can be done through a combination of desk-based review, new evidence guidance or through commissioning dedicated studies. Whilst most approaches consist of modelling changes in hazards, assessing impacts on sectors and then modelling the impact on the economy or GDP growth, there are a wide range of approaches, including rapid assessments, sector specific approaches, or modelling approaches that use both physical and economic components.

Data and estimates should seek to cover both the economic (costs to society) and/or financial costs (i.e., cost to individual organisations such as the regional authority or other public bodies such as health organisations). Wherever possible, this should also include consideration of the differential impacts of individuals and households from varying hazards, exposure, or vulnerability.

Information on current and planned expenditure can be drawn from a range of sources, including capital investment plans, budget lines, and stakeholder dialogue. Regions should document both the source of the finance (who pays) and the instruments used (how it is disbursed), as well as the extent to which it is supporting just or equitable adaptation. This will help build regions' current understanding of the region's finance landscape and identify areas for diversification.

In addition, regions should consider the use of green budgeting and/or budget tagging approaches (which 'tag' lines of expenditure based on their contribution to a range of environmental goals), to systemise this collection to reduce the burden of the exercise, as well as monitor progress (see Box 7 below).

Box 7: Green budgeting and finance tracking approaches to support investment planning

(*OECD Green Budgeting Framework*, 202 C.E.) 'Green Budgeting' is defined as "using the tools of budgetary policymaking to achieve climate and environmental objectives" (OECD, 2020). It can help governments achieve environmental goals by evaluating environmental impacts of budgetary and fiscal policies, assessing their coherence towards the delivery of national and international commitments, and contributing to informed, evidence-based debate and discussion (OECD Green Budgeting Framework, 202 C.E.). The overall approach commonly includes four elements; a strategic framework, tools to generate evidence and policy coherent, reporting, and a budgetary governance framework, as show in Figure 43 below:

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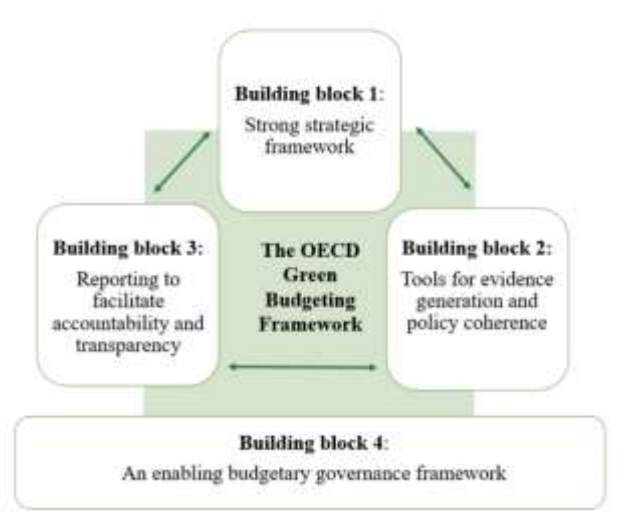

Figure 43: Building blocks of a Green Budgeting Framework. Source: (OECD, 2020)

(Falconer & Furio, 2021; UNDP, 2019)(Ward & Watkiss, 2022)To implement Green Budgeting, regions select different tools and approaches, depending on institutional context, and desired objectives. (Ward & Watkiss, 2022). Green budget tagging, (also known as climate finance tracking) is particularly helpful for mobilising resources (Falconer & Furio, 2021; UNDP, 2019). This involves 'tagging' lines of expenditure as to their relative contributions towards climate or environmental objectives and can be broadened to capture data such as sources and instruments.

(Falconer & Furio, 2021)Tracking investments in adaptation is more challenging since it is often mainstreamed into other projects (EBRD, 2022). Budget tagging helps overcome these by attributing a portion of expenditure or assessing the primary focus of expenditure. Finance tracking can support planning, budgeting and awareness, monitoring, evaluation and reporting, and mobilisation of resources (Falconer & Furio, 2021). It can help local governments measure progress and inform efforts to better coordinate and mobilize climate finance, going beyond their own institutions to account for contributions from all major public and private actors across the region, and identify needs going forward. (Negreiros et al., 2021). Estimates of investment volumes, when compared with investment needs, can be a powerful motivation for stakeholders to address the barriers that hinder climate capital flows in cities, as well as helping identify opportunities and gaps, helping better deploy local, regional, and national resources, policies and incentives (Negreiros et al., 2021). Finance tracking helps direct spending towards environmental projects, increases accountability and trust with citizens, donors, and other stakeholders, provides opportunities to engage stakeholders and start dialogues on new co-financing and can help inform revisions to policies and targets (Negreiros et al., 2021; OECD, 2022a). Such approaches also support national investment planning, since local government is routinely recognised as key institutions for supporting national public expenditure analysis, due to their discretionary powers for spending and revenue collection related to adaptation. (Bird et al., 2012).

Other elements of green budgeting tend to involve mainstreaming consideration of climate into the wider budgetary processes. Two key initiatives have been the Coalition of Finance Ministries for Climate Action, and the use of Climate Change Financing Frameworks (Resch et al., 2017; UNDP, 2017). Whilst most green budgeting is focused on national level, the approaches are also applicable to regions (OECD, 2022a). A range of regions have begun to adopt broader subnational green budgeting approaches, including Brittany in France, Sardinia in Italy,

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Catalonia and Andalusia in Spain, Glasgow in Scotland, and Oslo in Norway, as well as Austria, as well as in the C40 (OECD, 2022b).

Step 1.4 Document Investment Baseline

Regions should draw the information together, into a summary document on the Investment Baseline.

The document should summarise the economic and financial case for investment in adaptation (for example, how climate change could affect the regional economy or broader economic, social, or environmental priorities and the benefits from responding), the broad fiscal space and envelopes, and the approach the region will be taking to develop and govern the plan.

The economic narrative will need to be tailored to regional policy context and political/economic priorities but could include detailing how investment in adaptation supports wider economic, social, or environmental objectives and policies, prevents damages and repair costs to regional assets, co-benefits, as well as supports broader financial benefits such as macroeconomic stability, sustaining revenues, reducing insurance premiums or improving access to borrowing. Detail on these benefits is set out in Box 8 below.

Box 8: Framing adaptation with a positive economic and financial narrative.

Adaptation is traditionally portrayed as an additional cost making it seem unaffordable and pitting it against other spending priorities. Regions can successfully reframe adaptation as having a positive regional economic and financial narrative. The most common economic reframing is known as the triple dividend (Global Commission on Adaptation, 2019):

- **Avoiding future losses** - Adaptation helps minimise economic and financial losses and while context specific, often has very high cost-benefit ratios compared to other investments (Watkiss, 2022).These benefits are either directly provided by adaptation, and by considering these alongside wider co-benefits (Moser et al., 2019). An overview of such benefits, provided by the Global Commission on Adaptation, is outlined in Figure 44 below:

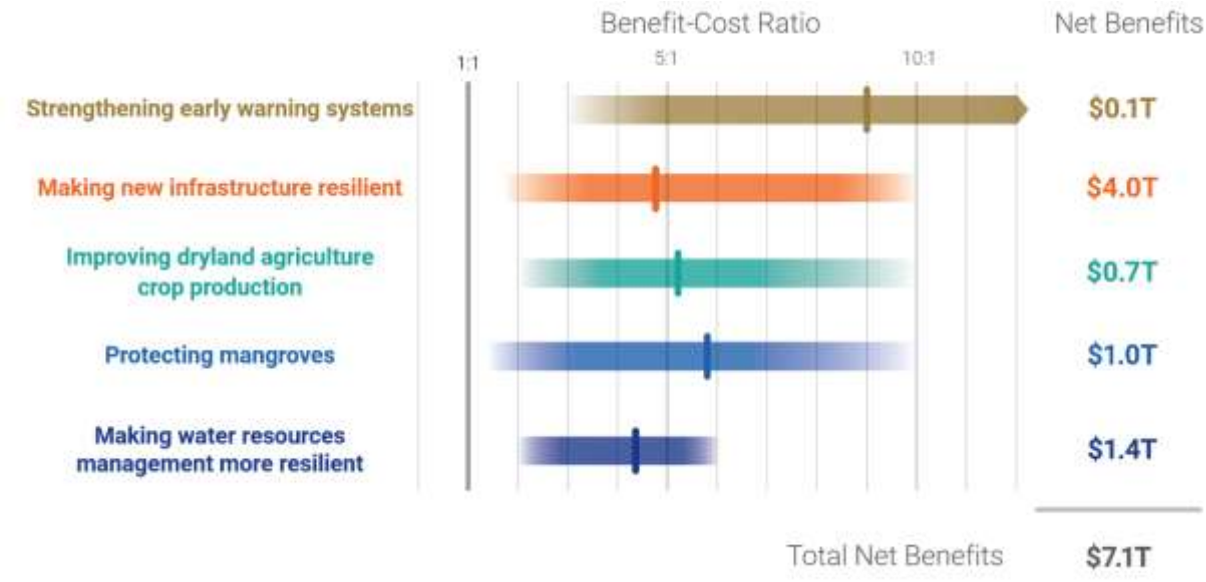

Figure 44: Benefits and costs of illustrative adaptation investments. Source: (Global Commission on Adaptation, 2019)

- **Economic benefits through adaptation activity –** Adaptation, like any other economic activity, generates economic benefits, both directly and indirectly, including through job creation, productivity enhancements and tax revenues.
- **Adaptation delivers a wider range of co-benefits** – Whilst they vary from case to case, adaptation projects deliver a wide range of extra benefits, for example helping increase property values and rental yields, or boosting biodiversity.

The narrative can be further extended to demonstrate that **adaptation helps achieve strategic economic and social priorities, by improving wider effectiveness of such actions.** For example, adaptation improves economic performance by reducing the impacts of heat on labour productivity (Gosling et al., 2018). It also improves the reliability of energy generation, helping reduce the costs of mitigation (International Renewable Energy Agency, 2021). In communicating these issues, it is also important to recognise the existing 'adaptation deficit' (the extent to which societies are adequate adapted to the current climate (Burton, 2004), since these are often excluded from evaluations of costs.

As well as economic benefits of adaptation, an additional under-communicated area is the financial co-benefits it can provide. Examples of these benefits include:

- **Reducing future pressures on municipal finance, and wider public institutions** – climate impacts will result in financial costs to public institutions as a result of extreme weather events, and slow-onset changes (Gilmore et al., 2022). This can occur directly (e.g., through payments for recovery from extreme weather and adaptation measures), as well as indirectly from erosion of the revenue base as a result of reduced output, high public expenditure on social payments, or wider debt sustainability. As one example, summer heatwaves and higher temperatures are estimated to add an additional annual $1bn of cost to healthcare services in the US (Woolf et al., 2023), whilst Sea Level Rise could affect up to 30% of local government revenue in Florida. (Shi et al., 2023) Extreme weather has had a limited effect on national fiscal balances to date, but climate change, or the impact of large natural disasters may increase these significantly (Avgousti et al., 2023). Investing in adaptation helps reduce the likelihood of these issues.
- (S&P Global Ratings, 2015)**Supporting access to finance** - Strong adaptation policies can improve creditworthiness and reduce the potential future risk of downgrades of credit ratings, due to improved economic performance, reduced regulatory risk, and improved sustainability (Rashidi et al., 2019). Climate impact downgrades can be significant – as much as 3 notches (S&P Global Ratings, 2015). Given that better credit ratings lead to lower overall investment costs and can support access to capital markets, early investment in adaptation has the potential to at a minimum reduce future constraints on access to capital, and at best contribute to a more virtuous cycle as climate action makes further rounds more affordable.
- **Protecting revenue streams –** Adaptation also has the potential to protect revenue streams which are used / relied upon for public spending or repayment of debt. (Gilmore et al., 2022; Shi et al., 2023) For example, climate-proof transport systems, or actions which support businesses to adapt increase the ability of the private sector to continue payment of local taxes.
- **Supporting broader macroeconomic stability –** investments in adaptation have the effect of providing a more stable economic environment, which in turn contributes to a positive investment environment. This helps support public and private investment into the region, in turn bolstering the public tax base and reducing the risk of capital flight from existing businesses as they become increasingly exposed to climate risks. They can

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also act as considerations for private sector transition plans, increasing long-term private sector profitability.

- **Lower insurance costs –** Being able to pro-actively demonstrate investments in adaptation can be used to obtain reductions in insurance discounts. Some insurers are going further, developing models and approaches which link cheaper insurance premiums to adaptation investments (Global Innovation Lab for Climate Finance, 2022).

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• A high-level summary of the impacts of climate change on GDP will provide a strong driver for action, ideally with detail on impacts on groups or sectors.	• Historic and current costs can be helpful as they demonstrate the costs of doing nothing, and the benefits of adaptation but they are not essential.
What can be drawn from budgetary planning?	**What can be drawn from the Regional Resilience Journey and RMC?**
• Current and planned expenditure on adaptation can be drawn from capital investment plans, or green budgeting	• Step 1.1.1 of the RRJ requires the collection and review of information which may include financial and economic information. • The framing of the problem in Step 1.1.2, and systems review in step 1.2.1 can help inform the setting of Objectives and context. • The Stakeholder analysis undertaken in 1.2.2 can inform setting of objectives and governance, helping ensure ensuring climate justice and that relevant groups are included to make financing more likely

Outputs

- **P2R Investment Baseline Statement** – A position statement outlining overall economic narrative, including costs to the region without adaptation, current and planned expenditure, further investment need and ambition, Indicative budget envelope, Public Financial Management requirements, supporting economic narrative, and associated delivery approach.

SUPPORT & RESOURCES [TOOLBOX]

Pathways2Resillience resources (to be developed)

- Pathways2Resilience (2024) Illustrative statement of Fiscal Space
- Pathways2Resilience and Climate Ready Clyde (2024) Model Terms of Reference for an Economic Assessment of Climate Risk and Opportunity
- Pathways2Resilience (2023) Resilience Maturity Curve

Wider resources

- World Bank (2019) *PEFA, Public Financial Management, and Good Governance. Chapter 1: Introduction: What Is PFM and Why Is It Important?*
- ICLEI Canada (2022) Cost of Doing Nothing Toolbox
- UKCIP (2007) Costing Guidelines – Guidelines for costing the impacts of extreme weather events
- ACT (2017) Mainstreaming, accessing and institutionalising finance for climate change adaptation.
- OECD (2022) Aligning Regional and Local Budgets with Green Objectives

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- COACCH Climate Change Impact Scenario Explorer – Online tool which allows an assessment of the economic impact of climate change at the NUTS2 regions for a range of climate scenarios.
- CCC (2022) Monetary Valuation of Climate Risks
- Best Practice Examples:
    - Case Study – Investment Ambition Statement for Lower Austria [Under Development].
    - Glasgow City Region Economic Assessment
    - City of Windsor (2022) Cost of Doing Nothing Report.

6.3.8.2 Step 2: Address strategic financing barriers.

Months undertaken: M4 – M6
Indicative effort: 2.25 Person Months

ABOUT [OBJECTIVE]

Description: The aim of this step is to document the existing sources and instruments the region is using to fund and/or finance adaptation action, identify additional possible sources and instruments that could be used, and identify the associated barriers and solutions to facilitate their rollout. This sub-step is strategic, boosting the overall regional capabilities to access and mobilise different sources and instruments of adaptation finance (for example opening up the ability to use crowdfunding, or bonds), rather than focusing on sector, risk or project-specific needs. This is further complemented through deep dives into specific investment needs and strategies.

HOW [ACTIVITIES & OUTPUTS]

Step 2.1. Catalogue existing sources and instruments in use

The region should review and catalogue the current sources and instruments that are currently available, or in use by the region for financing adaptation. The review should capture the type of source/instrument as well as the overall size, the extent to which it provides traditional/transformational finance and should analyse the sufficiency of the sources and instruments to meet current and future investment needs and their size relative to the fiscal space.

Step 2.2 Identify additional sources and instruments and associated barriers.

Regions should identify and prioritise additional instruments and the associated barriers to accessing them. This could include both existing sources and instruments to scale, as well as new sources and instruments. This should be informed by the region's risks and opportunities, emerging or planned adaptation actions as well as the headline financing objectives, and the wider political, economic, and financial context.

For each of the sources or instruments, the region should identify the key barriers to their use, using the five categories of barrier identified in Task 5.1 of Behavioural and capability, Financial and market, Technical and data, Political, Institutional and Governance and knowledge and awareness. They should then identify possible solutions to the range of financing barriers and develop an action plan to address these. This could be done by through expert review, or through a stakeholder workshop to involve wider actors from across the region.

Step 2.3. Expand financing options.

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Following this review the region should identify actions that can be used to scale its existing sources and instruments and unlock new ones for inclusion in the overall Investment Plan. These actions could be undertaken during the preparation of the Climate Resilience Strategy and Investment Plan or included as a set of actions in the Adaptation Investment Plan that will be delivered as part of implementation.

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• This work should start by focusing on ensuring there is enough available finance for the first Climate Resilience Strategy and Climate Resilience Investment Plan	• Further iterations of the work could identify further diversification to reduce the costs of implementation, or improve efficiency, or begin to mobilise more private sector finance.
What can be drawn from budgetary planning?	**What can be drawn from the Regional Resilience Journey and RMC?**
• Previous work by financial teams may have assessed the implications of accessing new financing sources or using new instruments.	• The systems review in step 1.2.1 may identify key systemic financial challenges and barriers to be addressed.

Outputs:

- Summary of existing sources and instruments and ambitions for diversification
- Summary of barriers and solutions to diversification

SUPPORT & RESOURCES [TOOLBOX]

Pathways2Resilience resources (to be developed)

- Pathways2Resilience (2023) D5.1 – Assessment of resources and barriers
- Pathways2Resilience (2023) D5.2 Catalogue of sources and instruments
- Pathways2Resilience (2024) Existing Sources and Instruments checklist and assessment
- Pathways2Resilience (2024) Barriers assessment

Wider resources

- **OECD Climate Adaptation Finance Diagnostic Framework (Forthcoming)** – The OECD are developing a Climate Adaptation Finance Diagnostic which will help identify the barriers of institutions to mobilise finance for infrastructure.

6.3.8.3 Step 3: Define strategic investment needs and strategies.

Months undertaken: M7 – M13
Indicative effort: 5.25 Person Months

ABOUT [OBJECTIVE / 'OUTCOME']

Description: The aim of this step is to gain a broad sense of the emerging cost of the Climate Resilience Strategy and develop outline investments strategies for key areas. This will help regions understand whether the fiscal space available is appropriate, and to prepare the ground for actions needed to raise the appropriate fund.

Developing Investment Strategies will help inform strategic discussions with political leaders and senior finance officials about how the Climate Resilience Strategy can be financed, ensuring needs are considered alongside other long-term strategic priorities. It will also allow for early engagement with key financing partners, including national governments, the EC, and the

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private sector to identify any key requirements / options. The outcome of these discussions can be used to inform the development of more detailed investment plans. Note – there may be packages of investments or projects for which regions decide they are currently unable to advance a business model and financial case far enough to be included in an Investment Plan. These investments should be included in the pipeline but further developed through step 5, for future inclusion in the Investment Plan.

HOW [ACTIVITIES & OUTPUTS]

Step 3.1 Define strategic adaptation options and investment needs.

Regions should identify a list of the broad areas where adaptation finance is likely to be needed (e.g., flood risk management, early warning systems, climate-smart agriculture), and outline options of packages of adaptation options are likely needed. This can be done using existing information on feasibility studies or adaptation plans or developed as part of their Regional Resilience Journey. For each area, regions should obtain an initial list of adaptation options and high-level estimates of the costs of adaptation (covering both Capital Expenditure and ongoing revenue costs) for various broad packages of measures, as well as their benefits. Regions should consider their various mechanisms for delivery of adaptation, such as direct projects, regulation, incentives etc.

The packages of adaptation options should identify the climate risks addressed, the adaptation benefits and associated co-benefits and equity implications and the potential costs, in the context of long term economic, social, and climatic change. The aim should be to ensure the measures equitably address climate risks to regional development as well as supporting the transformative pathways.

Where possible, the investment needs should include key project information such as the period over which investment is likely to be needed, as well as options for how action in each area could be funded or financed (including detailed sources and instruments and actors where known). Information could be taken from early-stage project feasibility studies, from engagement with relevant stakeholders (such as environmental agencies or development banks), or from additional work. Estimates should be confirmed with relevant stakeholders for accuracy or assumptions.

To enable the packages to align with the available fiscal space and total resources available, regions should then prioritise the packages from an adaptation perspective (see Box 9), as well as a broader political and economic perspectives.

Box 9: Prioritisation of adaptation options using a building block approach.

Where regions have been decided that more action is needed to address climate risks, it is important to prioritise actions to allow the most effective adaptation within available resources. This is influenced by the type of decision, noting that for many risks and adaptation responses, there is a need to address the challenge of deep uncertainty, i.e., where the probability of risks is not known (Hallegatte et al., 2012). The approach used is built on a well-established literature and existing frameworks for identifying early adaptation priorities, using a portfolio or 'building block' approach. drawing on (Fankhauser et al., 1999; Ranger et al., 2010; Watkiss & Hunt, 2011). Key to this is identify three main priorities for early adaptation activities, which are to:

- Address any current adaptation gap by implementing 'no-regret' or 'low-regret' actions to reduce risks associated with current climate variability as well as building future climate resilience, or to enhance opportunities.

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- Intervene to ensure that adaptation is considered in near-term decisions that have long lifetimes, such as major infrastructure developments, in order to avoid 'lock-in' (see key terms). This can include the use of decision making under uncertainty (DMUU) concepts (i.e., flexibility, robustness).
- Fast-track early adaptive management activities, especially for decisions that have long lead times or involve major future change, including planning, monitoring, and research. This can enhance learning and allows the use of evidence in forthcoming future decisions, for either risks or opportunities.

These are shown in the adaptation priority framework in Figure 45 below, along with the decision characteristics involved. All three of these adaptation priorities or building blocks (shown in the green boxes) are needed, and this requires portfolios of interventions for each individual risk or opportunity. Indeed, the three activities above can be part of an overall adaptive management process or adaptation roadmap.

The differences between the three 'building blocks' are quite subtle, but important. Each involves a different combination of the timescale of climate risks and the time period of the adaptation decision. On the left of the figure there are some current decisions or actions that can be taken now to address current climate risks. These lead to an immediate benefit. An example is to improve weather and climate services to reduce current weather-related impacts from heatwaves.

Moving to the centre of the figure there are some near-term decisions which will be exposed to future climate change risks, and there is a one-off opportunity to adapt now. For example, to change the design of a major new infrastructure project (e.g., a major bridge or hydroelectric-power plant) to make them more resilient to future climate change, noting later major retrofits could be expensive or impossible.

Finally, on the right of the figure, there are some future decisions that may need to be implemented to address major climate change in the future. Some of these will take time to develop, and some will benefit from improved information and learning. In these cases, it makes sense to start planning now (especially if lead times are long or the potential for learning is large). Sea level rise (is such an example, where early planning and monitoring is put in place now to prepare for the possibility that a new tidal barrier might be needed in the long-term e.g., in (Ranger et al., 2013).

The key point is that all of these involve some actions in the next five years, i.e., in a region's Climate Resilience Strategy and Adaptation Investment Plan.

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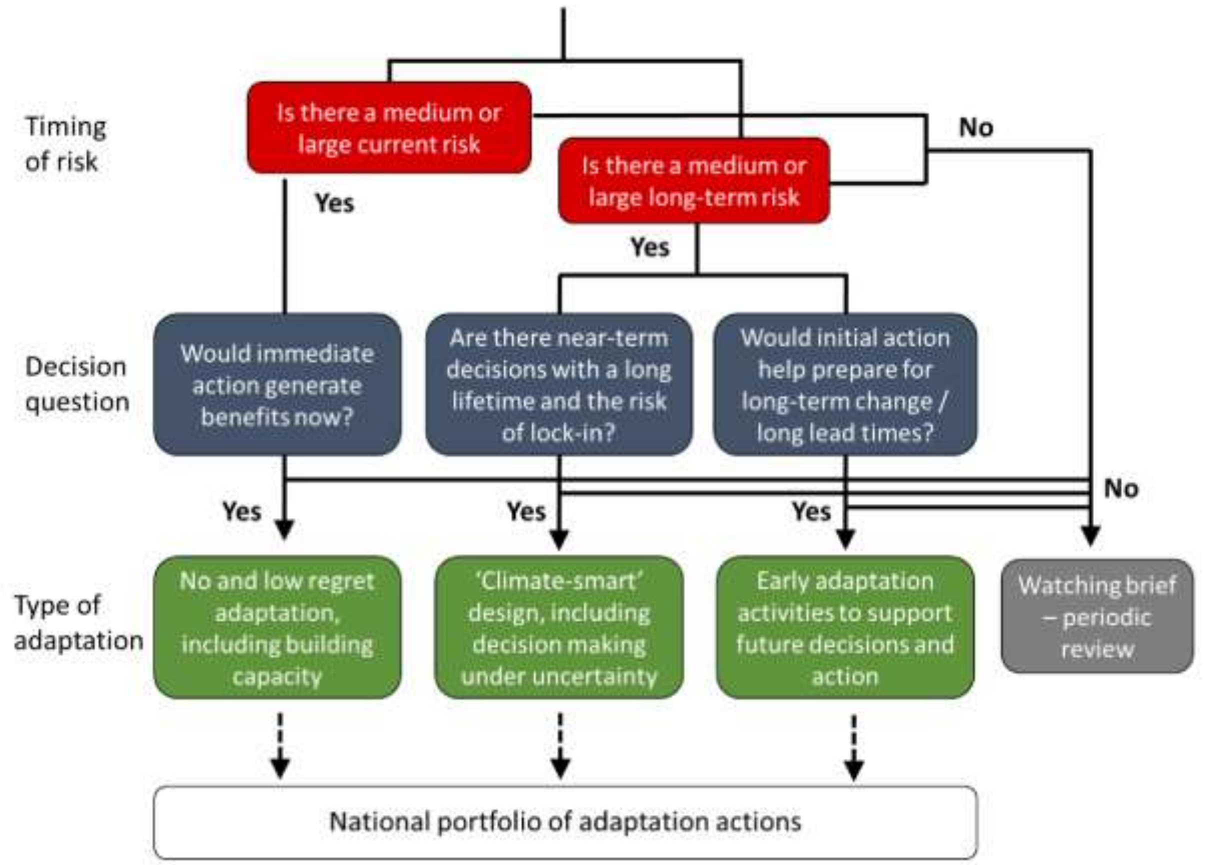

Figure 45: Early adaptation priority framework in CCRA3. Source: (Watkiss & Betts, 2021)

Step 3.2 Develop Investment Strategies

Once there is a clear sense of the priorities for investment over the Strategy timeframe, the region should consider the range of sources and instruments available and develop an Investment Strategy for each of the areas of investment need. An Investment Strategy is the high-level approach by which the region intends to mobilise the funds for packages of adaptation options. This includes defining the broad investment needs, identifying, and prioritising options to mobilise the resource (e.g., through financing directly, but also non-financial mechanisms such as regulation, subsidy etc), as well as practical next steps. This will provide early thinking for input into the project pipeline in step 4.

In doing so, the work should also consider what enabling conditions are needed to be able to develop financing options in each area. The team should draw this information together and produce an overall Investment Strategy template for each area.

Step 3.3 *Develop regional climate financing scenarios.*

This Investment Strategies should then be combined to develop high level climate financing scenarios which illustrate total finance needs over the period of the investment plan and subsequent periods. An example is shown in Figure 46 below:

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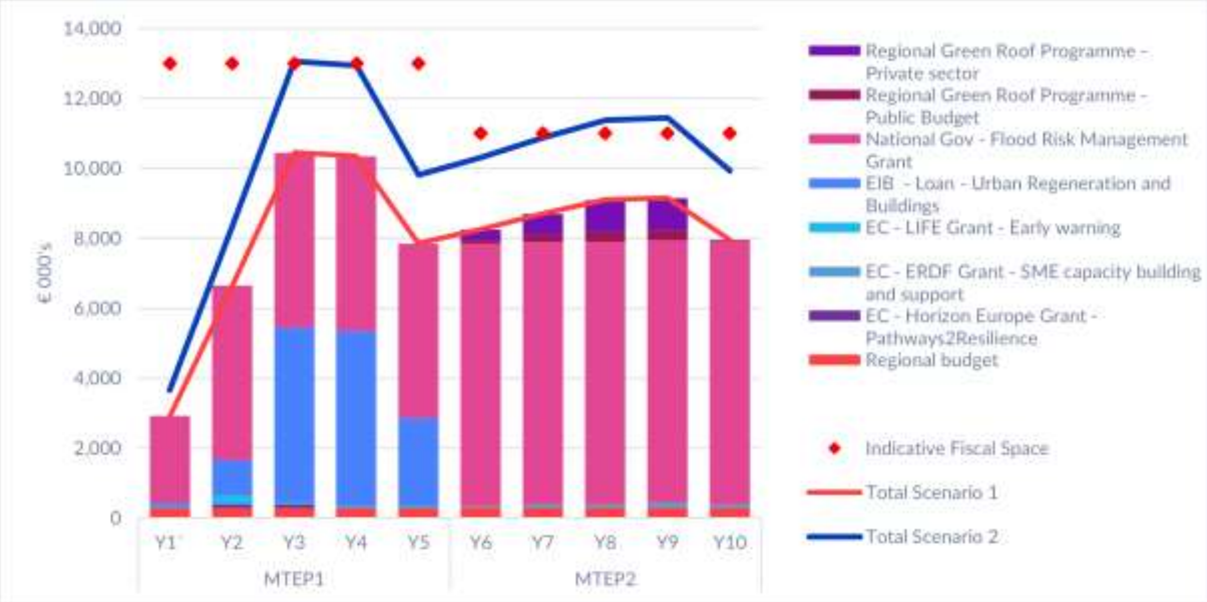

Figure 46: Example climate financing scenarios for an Adaptation Investment Plan. Source: Authors, based on (Resch et al., 2017)

A key aim of this step is to understand whether the public resource requirements identified in the emerging Investment Strategies fit within the indicative fiscal space allocated by the finance department, and where there are flexibilities in expenditure to make this the case.

This exercise can also identify risks in a financing strategy, such as potential overreliance on insecure or hard to access sources and instruments.

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• In first iterations of the AIP, the focus should be on a small number of Investment Strategies that are credible and robust.	• Future AIPs could include investment strategies for a broader range of climate risks
What can be drawn from budgetary planning?	**What can be drawn from the Regional Resilience Journey and RMC?**
•	• The analysis of risks in Step 1.3.1 may include an economic assessment, as well as sequencing and prioritisation approach for adaptation options which could inform the development of investment needs and strategies in Step 3 of the plan, as well as the overall financing scenarios in Step 3.3. • The RRJ has steps which development of the packages of adaptation options in step 3.1 should have been designed to be sequenced and categorise investment needs over time Feasibility studies for adaptation planning may include detailed costs and/or recommended sources and instruments.

Outputs:

- **Investment Strategies for emerging adaptation priorities** – A statement of planned approaches to raising, deploying and (if appropriate), repaying capital associated with meeting investment needs for particular sectors or risks, including the mix of public and private investment, and sources, instruments and mechanisms for achieving them.

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- **Climate Financing scenarios** – High level illustrations of options to meet the collective investment needs of the climate resilience Strategy.

SUPPORT & RESOURCES [TOOLBOX]

Pathways2Resilience resources (to be developed)

- Pathways2Resilience (2024) Investment Strategy Template and Guidance

Wider resources

- Resch et al (2017) Mainstreaming, accessing and institutionalising access to finance for climate adaptation. – Provides a summary of climate financing scenarios.
- REGILIENCE Funding Opportunities Catalogue – The toolkit produced as part of the REGILIENCE toolkit provides an overview of the main 'off the shelf' European funding opportunities for adaptation that could be targeted to support adaptation projects and Climate Resilience Strategies.
- Watkiss, P. and Betts, R.A. (2021) Method. In: The Third UK Climate Change Risk Assessment Technical Report [Betts, R.A., Haward, A.B. and Pearson, K.V. (eds.)]. Prepared for the Climate Change
- Best Practice Examples
    - IC4E (2020) Climate assessment of local authority budgets
    - Green Budgeting in Glasgow City Council

6.3.8.4 Step 4: Compile Investment Plan and Project Pipeline

Months undertaken: M12 – M18
Indicative effort: 5.25 Person Months

ABOUT [OBJECTIVE / 'OUTCOME']

Description: Having developed Investment Strategies and an indicative climate financing scenario, the content can be combined and expanded to allow a region to develop and publish an Adaptation Investment Plan. The plan will be around 35-50 pages in length and will provide the overall economic and financial case for investment over the period of the strategy, including a pipeline of investments, and envisaged sources and instruments to deliver them, as well as the envisaged enabling conditions and performance metrics.

HOW [ACTIVITIES & OUTPUTS]

Step 4.1 – Build economic case for investments.

Regions should build the economic case for each of the Investment Strategies. This consists of:

- **An economic case** - Evidence that the intervention will results in an improvement.
- **A rationale for public sector intervention** - Identifying a market failure or a need to intervene to ensure just and equitable approach to adaptation.

To generate this information, regions should perform a light touch economic assessment of the individual Investment Strategies to understand the costs and benefits being proposed, and whether they are likely high enough to meet the region's financial expenditure requirements – such as a certain cost benefit ratio.

If there is a strong economic case for action, regions should also assess the rationale for government action. This is important to justify that there is a case for the public sector to act.

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Examples of such justifications can be when markets fail to use resources in the most productive way possible, or for equity considerations. Market failures can occur for many reasons, including the presence of, for example, public goods, externalities, imperfect information, or market power (GLA Economics, 2008).

Once it is identified it is important to assess the most appropriate delivery mechanisms – aim to ensure the most efficient use of public funding and delivery approach. For example, building retrofit for overheating could be achieved through a direct funding programme but this is likely to be costly, and costs could be at least partially met from a subsidy programme. In Hamburg, the use of a green roof subsidy mobilised €13.5 million through €1.5m of subsidy. (ClimateADAPT, 2022)

Build up the positive narrative outlined in the Ambition Statement from Step 1 to provide detail on how the investments are contributing to the delivery of the vision identified in the RRJ, as well as the region's wider economic and social objectives.

Step 4.2 Confirm the draft Investment Strategies meet public financing and investment criteria.

Most regions will have some kind of gateway process in place to reject or approve programmes of investments. Having prepared the Investment Strategies, the region should ensure that the proposed set of investments meet the public investment management (PIM) and Public Financial Management requirements (PFM), such as the Economic and Financial Rates of Return, as well as a final estimate of the fiscal space. More detail on these is available in Box 10 below:

Box 10: Public Investment Management (PIM) and Public Financial Management (PFM)

Ensuring good value for money from public investments is not just about having strong appraisal or budgeting systems; it is also about the decisions taken when preparing, selecting and implementing projects, as well as in regard to maintaining and operating the assets once construction has been completed. Public investment management (PIM) refers to processes and systems that governments use to manage investment expenditure, i.e., how they select, construct, and maintain their public assets **(Miller & Mustapha, 2016)**. As such, public investment management has come to be thought of as a system comprising groups of processes linked around an investment management cycle with links to the annual budget cycle at certain key points. This is illustrated in Figure 47 below:

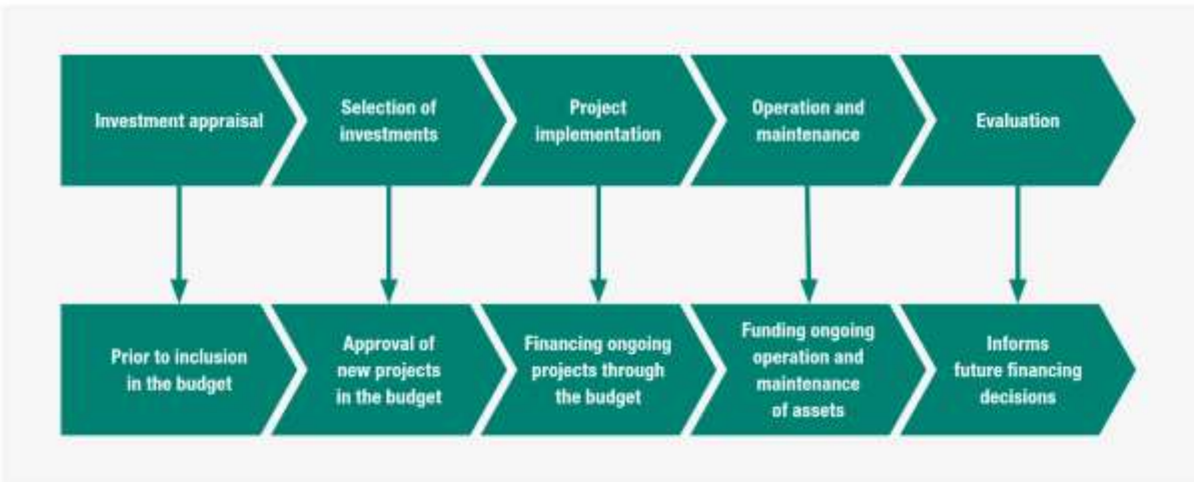

Figure 47: Linking the project cycle and the annual budget cycle. Source: (Miller & Mustapha, 2016)

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Most governments have formal processes for appraising projects for selection. The exact criteria will vary but in practical terms ensuring projects meet PIM criteria is likely to involve evaluation of why the project is needed, an appraisal of the costs and benefits of the project to society, an appraisal of how the project will be implemented and its risks, and an appraisal of how a project would be financed and if necessary, repaid, with an assessment of cashflows. This also covers private investment repaid by citizens (e.g., Public Private Partnerships).

Once a project has been approved as eligible to receive public money, consideration can then be given as to whether to incorporate the project in the annual budget. The broader processes designed to manage public finances are commonly defined as 'Public Financial Management' and are often described in terms of an annual budget cycle, and/or medium-term expenditure programme. It typically involves four key phases, illustrated in Figure 48 below (Kristensen et al., 2019):

- **Budget formulation.** The budget is prepared with due regard to government fiscal policies, strategic plans, and adequate macroeconomic and fiscal projections.
- **Budget execution.** The budget is executed within a system of effective standards, processes, and internal controls, ensuring resources are obtained and used as intended.
- **Accounting and reporting.** Accurate and reliable records are maintained, and information is produced and disseminated at appropriate times to meet decision-making, management, and reporting needs.
- **External security and audit.** Public finances are independently reviewed, with external follow-up on whether the executive has acted on recommendations for improvement.

Figure 48: Annual budget cycle. Source: (Kristensen et al., 2019)

Step 4.3 Identify bankable priorities, programmatic investments and enabling conditions.

The next step is to translate the investment strategies into a series of programmatic investments for the plan period, as well as priorities for further development and inclusion in the project pipeline, which will be further developed in step 5.

In parallel, regions should identify further enabling conditions that would support the plan's implementation. This should include building regional capability informed by the assessments developed through their assessments against P2R's Resilience Maturity Curve.

Step 4.4 Populate Adaptation Investment Plan and Pipeline templates.

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Regions should draw together information from the Investment Ambitions, individual Investment Strategies, and previous steps, along with the information from the Regional Resilience Journey, and the resilience Maturity Curve diagnostic and use it to compile a Regional Adaptation Investment Plan (AIP).

The AIP should set out and document the strategic policy and financial context for adaptation financing, set an overall economic narrative for adaptation, financing objectives, current and envisaged future expenditure (including envisaged sources and instruments).

The AIP should include a portfolio of projects and associated Investment Strategy for the, identifying how the region will mobilise the finance needed, including the envisaged role of public and private sector across these investments, to provide clear signals to the private sector about where they will need to begin to take action and identify their own financing needs.

The plan should highlight the collective rationale for Government action and assess the available delivery mechanisms for this (e.g., regulation, public funding, incentives), with a view to making the most strategic use of public funding (see Box 11 below).

Box 11: Maximising the impact of public finance to maximise private adaptation finance.

Whilst adaptation has the characteristics of public goods, the need for private finance and action to close the gap requires regions to use their finances strategically to maximise private sector innovation to address barriers. At the same time, the challenging situation of public finances increases the need to maximise value for money from public spend and incentivise and crowd in private sector action.

In this context, regions should seek to maximise the impact of public funds in adaptation through leveraging, crowding in, and avoiding crowding out, based on the maturity of markets and views of relevant stakeholders. This ranges from championing early successes, through to de-risking. In cases where private sector investment is unviable, purely public financing is used as a last resort. A decision tree for the approach, outlining the range of different stances the public sector can take is shown in Figure 49 below:

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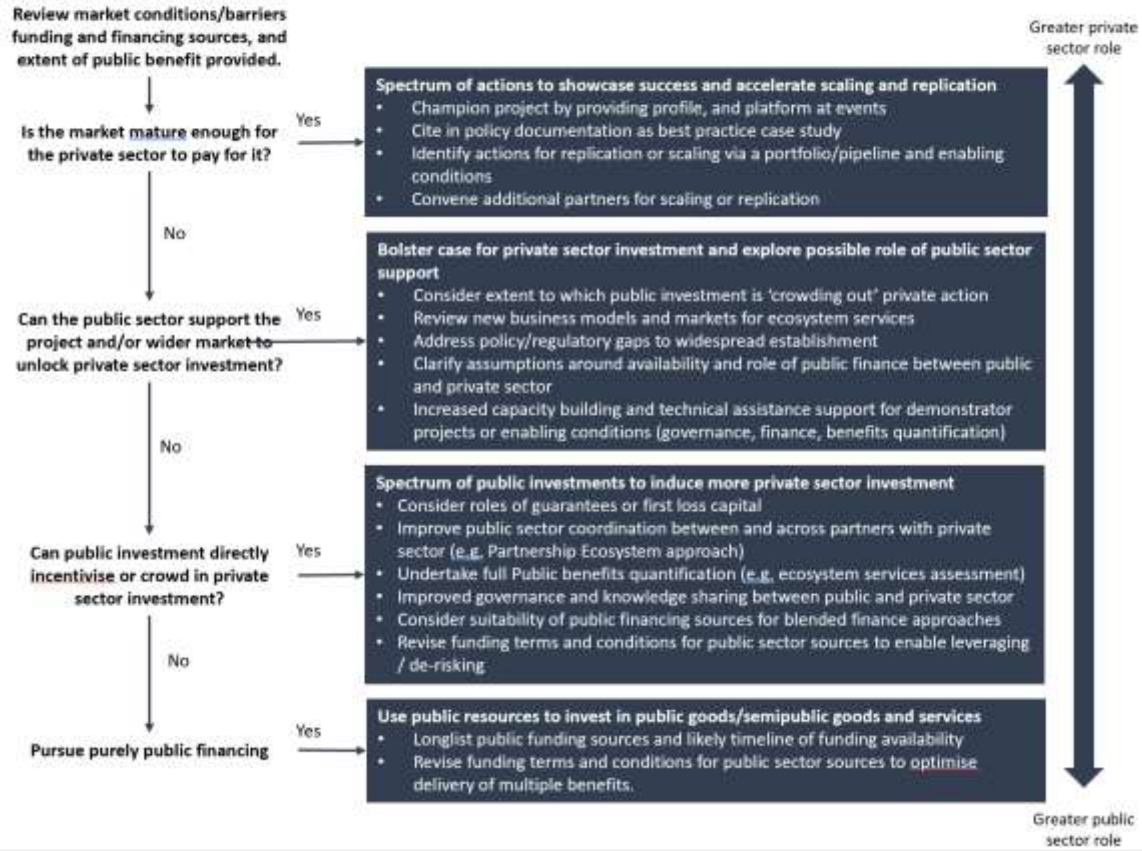

Figure 49: Decision tree for public sector to maximise private sector funding of nature-based solutions in Scotland in the changing private sector context. Source: (England et al., 2023), adapted from (World Bank Group, 2019)

The AIP should include a pipeline – a series of upcoming investment opportunities in adaptation within regions over the investment Plan period.

Each project or programme within a pipeline should be developed to meet the relevant economic and financial criteria set out in the region's Public Investment Management approach (such as Economic or Financial Internal Rates of Return, Net Present Value, or Cost-Benefit Ratios) and should draw on the planned investments and milestones in a programme of capital investment to help identify suitable financing mechanisms and associated timescales (e.g. resilience bonds, where issuance should be linked to milestones, or grants, which should be timed to support particular project stages). Each project or programme should also have its delivery mechanisms assessed (e.g., whether the project could be delivered by regulation, funding, or incentives)

These investments should be framed as part of longer-term investment horizon for climate resilience, showing at a high level how investments will also be sequenced in future periods beyond the timeframe of the AIP.

Along with the pipeline of investments, the Investment Plan should set out the associated actions to mobilise resources, manage the risks of implementation and improve the enabling conditions for the plan to be implemented, informed by the RMC. Finally, the plan should provide an overview of the appropriate governance arrangements and relevant finance-related metrics and targets. It should also outline how the region will be engaging with National Government and the EC to further boost the supply of adaptation finance.

Step 4.5. Approve and publish Investment Plan and project pipeline.

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Once the plan has been developed, the plan and the list of investment opportunities should be approved through the normal management and political approvals, and published online on region's own website, as well as submitted to the Pathways2Resilience website, the Mission Implementation Platform, MIP4ADAPT, and the InvestEU platform (if appropriate). This provides transparency around the region's planned investment approach, setting out the relative roles and responsibilities amongst public and private actors. It will confirm the regions' expectations in respect of financing from national and local governments and other public sector entities, as well as the role envisaged by the different sectors of the economy.

The plan and pipeline also help investors and intermediaries identify inward investment opportunities and begin dialogue with the appropriate institutions around mobilising private sector finance. Where relevant, it can also be used as the basis for adaptation-related elements of the region's broader inward investment approach, helping populate a region's dedicated Inward Investment website or portfolios.

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• A clear economic and financial case for the investment in the plan is essential. • Publication of the Investment Plan online, to create confidence in the process, and help engage private sector investors	• Updates of the plan could include a larger project pipeline. • Wider promotion of the Investment Opportunities could be left until later versions of the AIP, for example the engagement with MIP4Adapt or InvestEU.
What can be drawn from budgetary planning?	**What can be drawn from adaptation planning?**
• Most financial departments document their approval process for spending and investment.	• Individual adaptation options developed in the main RRJ should also have indicative costs and benefits included.

Outputs:

- **Adaptation Investment Plan and pipeline of bankable investments**
- InvestEU submissions (optional)

SUPPORT & RESOURCES [TOOLBOX]

Pathways2Resilience resources (to be developed)

- Pathways2Resilience (2024) Adaptation Investment Plan Template
- Pathways2Resilience (2024) Adaptation investment Plan Guidance
- Pathways2Resilience (2024) Bankable Investment Pipeline Template
- Pathways2Resilience (2024) Sample Adaptation Investment Plan Metrics

Wider resources

- European Commission – InvestEU – How to add your project
- Climate Ready Clyde (2021) Resource Mobilisation Plan – An example adaptation finance plan for Glasgow City Region in Scotland. It includes a set of objectives for financing of adaptation, including the optimisation of public financing, and the use of public finance to leverage private investment.
- GLA Economics (2006 and 2013) The rationale for public sector intervention in the economy. Part I and Part II – An overview of the rationale for when public institutions should seek to intervene in the economy
- UK Government (2022) Treasury Approvals Process for programmes and projects.

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6.3.8.5 Step 5: Matchmake for Bankable Investments (Optional)

Months undertaken: M19 – M24
Indicative effort: 4.5 Person Months

ABOUT [OBJECTIVE / 'OUTCOME']

Having set out an investment approach and set of projects through the Investment Plan, if necessary, regions should undertake additional work on their project pipeline to develop the economic and financial cases and associated business models. This may be necessary for projects and packages of adaptation options that are still under development and therefore were unable to develop Investment Strategies or compliant economic and/or financial cases with investment strategies in the overall Adaptation Investment Plan, with investment strategies in Step 3.

This involves taking the individual investments identified in the Plan and turning them into bankable projects by working with a wide group of stakeholders to develop a shared value proposition and business model. This work can also potentially be supported by the Pathways2Resilience Adaptation Finance Lab.

HOW [ACTIVITIES & OUTPUTS]

Step 5.1 Baseline financial and economic merits

Regions should start by baselining the current financial and economic merits for the proposed adaptation project. To do this, regions should quantify the benefits provided by the adaptation project, identify the revenue streams from the adaptation and map them to beneficiaries (e.g., public and private sector). Where relevant, the work should also focus on measurable risk reduction to allow for calculation of avoided losses. They should also map any economic, social, or environmental co-benefits from the project (such as property value uplift, carbon storage).

Wit this mapping undertaken, regions should seek to understand who would be appropriate to pay for the adaptation and wider co-benefits arising (e.g., local businesses, other public sector entities etc), as well as potential sources of finance and instruments that could be mobilised.

This will provide an initial assessment of the potential financial conditions, as a basis for co-designing a value proposition.

Step 5.2 Co-design value proposition and business model

Regions should bring together project proposers with project-relevant stakeholders and funding and financiers, to raise awareness of the adaptation objectives and explore the potential to combining them with wider value creation in the public and/or private sectors. The aim is to co-design and co-develop a value proposition for an adaptation investment which also delivers wider benefits which other stakeholders may be willing to pay for or contribute to.

A key part of designing value propositions is recognising that whilst early designs of the adaptation investment are needed to provide an initial financial outline for discussion, to make a project bankable, it may need to be modified or combined with wider economic or social benefits. The key point here to manage the interplay between the adaptation options and the financial structuring. That can mean considering different technologies, construction methods, or other design solutions, and enhanced monitoring and evaluation to ensure effective, measurable adaptation outcomes, whilst creating greater financial value. to meet economic, climate, financial and equity objectives of all the stakeholders involved. This differs from traditional project design and is counterintuitive for most designers and engineers who are typically

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presented with a scope of work and/or budget. Therefore, where consultancy support is used, regions should make use innovative or flexible, staged procurement to ensure the focus doesn't move to designing the best solution at the lowest cost.

This could be done on a case-by-case basis, or through regional investor events, which showcase projects at all stages of development, with a view to developing them further with potential public or private financiers and beneficiaries.

Once completed, the approach should move into the detailed financial structuring, business case and risk management approach to allow the sign off and approval of funds.

Step 5.3 Develop financial structuring and Investment Strategy

Once there is a general agreement about the value proposition and the business model to be employed, the region and stakeholders should undertake the detailed financial structuring. This involves considering the optimal mix of financial contributions from the relevant parties and the form that will take, as well as apportion the overall financial and project risk each party is willing to bear. For example, private sector stakeholders may be less willing to take on risk, or may increase borrowing costs to compensate, all of which impact whether the. The aim of this step

The outputs from this work should provide the information required for the project to progress in a number of ways, depending on regional preference:

1) The project could be fed into the wider package of adaptation actions in Step 3, and to underpin development of clear Investment Strategies as part of future iterations of an Adaptation Investment Plan.
2) The project could be taken forward on an ad hoc basis (i.e., outside of an AIP cycle).

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• Regions should focus efforts on developing one or two projects, where it has been possible to deliver in other places, with more focus on identifying stakeholders, benefits and beneficiaries and possible revenue streams, and co-designing solutions. •	• The region should consider developing a long list of areas where it intends to develop future bankable projects or business models. • As the region develops its financing further, it could look at more innovative, experimental, or ambitious approaches, or in harder to finance sectors (e.g., building renovation for overheating).
What can be drawn from budgetary planning?	**What can be drawn from adaptation planning?**
• Regions can see what remaining fiscal space there is for adaptation from the regional budgets and other public sector actors	• Adaptation feasibility studies may contain information needed to help quantify and monetise some benefits or revenue streams (e.g., wider Carbon Storage benefits or amenity value of nature-based solutions)

SUPPORT & RESOURCES [TOOLBOX]

Pathways2Resilience Resources (to be developed)

- Pathways2Resilience (2024) Guide for developing bankable projects.
- Pathways2Resilience (2024) Business model canvas
- Pathways2Resilience (2024) Workshop template for Investor Events
- Pathways2Resilience (2024) Bankable project template

Wider resources

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- ClimateFIT (link TBC) – the ClimateFIT project is a Horizon Europe project working with regions and financing and investment entities (FIE) to develop Investment Strategies, Investment Plans, and bankable projects, with an emphasis on mobilising private sector investment into adaptation.
- ClimateFIT - *Finance and Investment Entities adaptation finance maturity assessment (Forthcoming)* - Climate FIT is developing an assessment tool to help regions identify finance and investment entities with an ambition and capability towards adaptation finance.
- CSIRO (2022) *Enabling Resilience Investment Guidance.* – The guidance from CSIRO outlines a method for co-designing value propositions that support resilience.
- Resilience Futures Investment Roundtable (2023) *Case Study – Queensland Reconstruction Authority Cost-Benefit Analysis* – The work by QRA analyses the avoided damages to show the benefits provided from betterment works.
- Coalition for Climate Resilient Infrastructure (2022) *Physical Climate Risk Assessment Methodology* – This work outlines a conceptual approach to valuing the impacts of climate change in the cashflows of infrastructure projects. It has since been further developed by engineering consultancy Mott Macdonald.
- National Institute of Building Sciences (2023) Resilience Incentivisation Roadmap 2.0 – Report provides a framework that forests alignment of the motivation and interests of the various stakeholders involved to support resilience, Whilst it focuses on pluvial urban flooding, the principles and be adapted to other hazards.
- ADB (2021) *A system-wide approach for Infrastructure Resilience* – Illustrates how climate impacts affect the cashflow of a project and steps that can be taken to improve resilience.
- Barret S. and Chaitanya, R.S.K. (2023) Getting private investment in adaptation to work: Effective adaptation, value, and cash flows.

6.3.8.6 Step 6: Monitor, report, learn and reflect.

Months undertaken: M22 – M24
Indicative effort: 2.25 Person Months

ABOUT [OBJECTIVE / 'OUTCOME']

Having completed an Investment Plan, including a number of bankable projects, regions should track and report progress on implementing the Investment Plan (Including whether it is mobilising the overall amount of finance needed), report on metrics and progress associated with particular financing instruments, and identify learning for further improvement.

HOW [ACTIVITIES & OUTPUTS]

Step 6.1 Monitor and disclose progress on achieving adaptation financing objectives.

Alongside general reporting on progress delivering the Climate Resilience Strategy, regions should report and disclose on progress related to delivering the Adaptation Investment Plan to the relevant administrative committees and/or politicians.

Reporting should include progress on the overall financing of the investments included in the plan (i.e., total amounts mobilised/secured), and. It should also report on pipeline development, and implementation of wider actions to provide the enabling conditions for implementing, as well as any relevant Key Performance Indicators (KPIs). These will need to be appropriate to the region, but examples could include the totality of finance mobilised for investment (and the

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percentage splits of public and private), the proportion of the Climate Resilience Strategy with agreed financing strategies, the number of sources engaged in the region in financing, or the numbers of instruments being deployed or developed.

Where relevant it should also include reporting on wider adaptation flows, e.g., from green budgeting approaches used by the region or local municipalities. The reports should be made publicly available to ensure appropriate scrutiny and accountability and to identify areas for further action.

Step 6.2 Report on privately funded projects in line with financing requirements (optional).

Where regions have used private finance arrangements such as bonds or loans to take forward projects, it will be important for regions to have a transparent process to disclose the use of proceeds to provide assurance to financiers that their funds are meeting industry standard classifications and that their investments are ‘green or sustainable.

This reporting should align to the relevant frameworks and requirements for the particular instruments For example the ICMA’s Green Bond Principles for purchases of coupons for green bonds, or the EU Taxonomy on Sustainable Finance for those funded directly by institutional investors.

This could be in the form of annual reports on the use of proceeds provided directly to financiers or investors or mainstreamed into broader progress reports on the Adaptation investment Plan or Climate Resilience Strategy.

What is essential for a first AIP?	What could be done in future iterations of the AIP?
• A first version of an AIP may have a lower level of detail on financial reporting. However, setting out how the proceeds will be overseen and reported on, even if at a high level is important. • If the AIP is relying on private financing for some or all of its investments, regions will need to set a clear process on the use of proceeds	• The more detailed information on financial reporting could be included in further iterations of the plan. • Wider reporting on adaptation finance flows across a region which rely on green budgeting processes could be used in a future iteration of the plan.
What can be drawn from budgetary planning?	**What can be drawn from adaptation planning?**
• Information on adaptation spend and resource mobilisation should be able to be drawn from normal budgetary processes	• Information on individual adaptation projects should be able to be leveraged to provide the reporting metrics.

Step 6.3 Conduct a learning and reflection session on the preparation of the Investment Plan

Having completed preparation of the Adaptation Investment Plan and fulfilled a first round of further project development and/or reporting, the team should bring together the key actors involved in the development of the AIP to evaluate the preparation process and identify for lessons for future iterations of an Adaptation Investment Plan, as well as gaps in competencies and capabilities. These recommendations should be documented to ensure knowledge and lessons do not solely remain with those individuals involved in preparation of the AIP.

Outputs:

- Adaptation Finance performance report (setting out progress against investment.
- Instrument-specific financial reporting (e.g., green bonds performance report)
- AIP preparation evaluation report

SUPPORT & RESOURCES [TOOLBOX]

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Pathways2Resilience resources (under development)

- Pathways2Resilience (2024) Adaptation Investment Plan –performance report template and reporting metrics
- Pathways2Resilience (2024) Sample learning and reflection workshop template

Wider resources

- EBRD (2019) *Example use of proceeds report for green finance* – Climate Resilience Bonds often require reporting on the use of proceeds to investors. This report provides an example of the types of reporting required from green bonds.
- City of Paris (2020) *Projects funded by the € 300 million Sustainability Bond issued on November, 2020* – A second example of the type of proceeds report required for investors when using bonds to support adaptation and mitigation projects.
- Dutch State Treasury Agency (2023) *State of the Netherlands Green Bonds report* – This report shows how the Dutch Government is using its green bonds to finance a programme of climate change adaptation amongst other projects in the Netherlands, some of which are cascaded down to regional or local level.

6.4 The supporting and enabling role of Member states and European Institutions

Finally, whilst there is much more that regions can do to mobilise adaptation finance, it is important to acknowledge that they operate in a wider socio-political context, with more limited ability to change macroeconomic conditions or institutional and policy context. (CCFLA, 2023). In many cases, national and EC policies and expenditure priorities affect the sources and size of regional and local government funding for climate investments. This is illustrated in Figure 50 below:

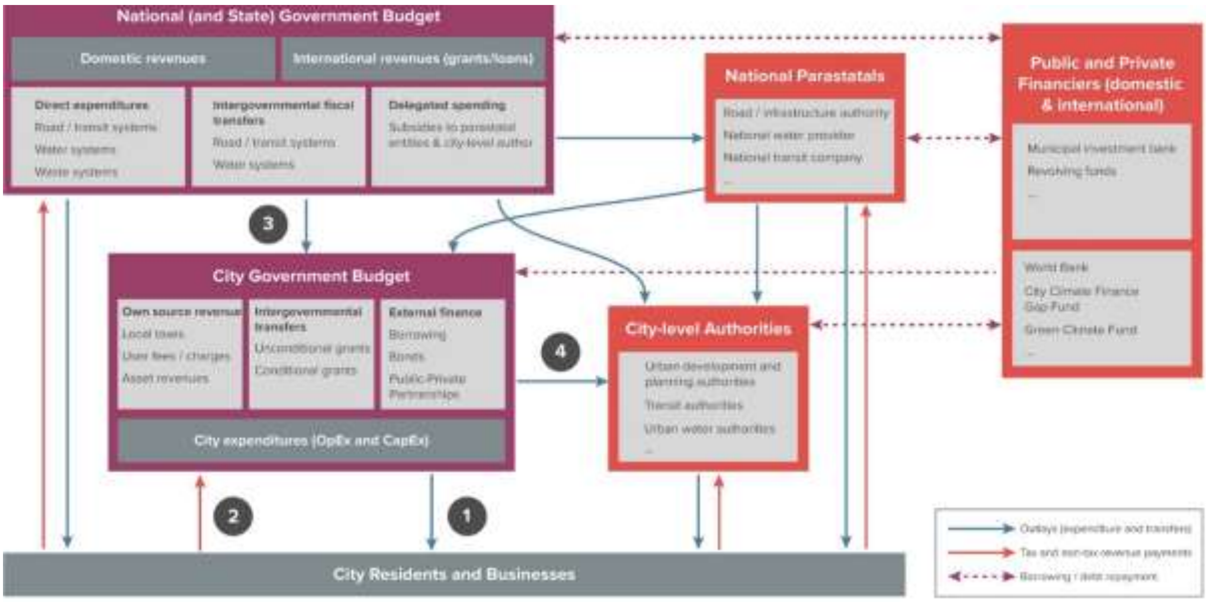

Figure 50: Country-level enabling conditions for regional adaptation finance. Source: Authors, adapted from:(Boukerche et al., 2021)

Therefore, it is important that as part of developing Investment Plans, regions identify the kinds of issues they should be engaging with member state governments, the European Commission, and the private sector on, to further enhance flows of adaptation finance. In many cases further

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reforms may help boost regional supplies of adaptation finance. Key areas where Member States and the EC have a role include:

- **Setting the roles and mandates for national and European Development banks** (Negreiros et al., 2021) – this could include the amount of capital available for lending, the terms on which it is lent (e.g., expected returns), mandates (such as the ability to invest in adaptation). This could also include supporting development banks to act as intermediaries allowing investors to invest in local opportunities, and structure new deals for blended finance, helping to standardize, aggregate and structure complex transactions mandates.

- **Revising limits on regional expenditure** – Central government often limits local and regional expenditure on capital investment, in an effort to protect taxpayers' money. This places a ceiling on borrowing, and places long -term expenditure on adaptation within many other priorities. Given that many of the investments are outside the day-to-day investment, there is a potential case for providing limited exceptions for resilience investments.

- **Making cash transfers contingent on climate change expenditure reporting** – The allocation and transfer of budgets from EC or national governments could be made contingent on climate change expenditure reporting. This would support the introduction of green budgeting at a regional level and help national Governments and the EC better identify the current state of adaptation finance flows to identify areas for improvement.

- **Supporting development of regional adaptation strategies and associated investment plans** – Member states and the EC could provide dedicated financial support or technical assistance to support the preparation of Regional Adaptation Strategies and Investment Plans (e.g., through Covenant of Mayors), with a particular focus on clarifying investment needs over the short, medium, and long terms.

- **Coordinating development of national adaptation project pipelines and Inward Investment opportunities** – similar to the mandates of development banks, Member States and the EC have the ability to stimulate development of regional pipelines by developing mechanisms which raise the profile of regional investment opportunities (e.g., inward investment portfolios) or by providing opportunities to input into national pipelines associated with the National Adaptation Strategies.

- **Providing greater certainty to regions on the expectations around how European and national adaptation action will be funded and financed** – At present, it is not clear at national and member state level how the EC and national governments expect to raise the finance to address their climate risks, whilst the EC prioritises finance, it includes no detail on how the measures of the EU adaptation strategy will be paid for and delivered. This contributes to a greater level of uncertainty for regions. If regions are clear that future approaches will involve a bigger scale (e.g., funded mandates, expanded LIFE scheme), then they will plan accordingly. Equally, being clear that no further national funding will be forthcoming has the potential to spur more radical rethinking and solutions. (Moser et al., 2019).

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- **Providing mandates for adaptation which provide political cover** (Moser et al., 2019) – For example the recent introduction of mandatory local adaptation plans in Germany increases the political capability of cities and regions to allocate resources to adaptation planning and finance.

These examples are not meant to be comprehensive, but merely to illustrate that whilst not a part of a regional adaptation finance process Member States and the EC have a range of levers that can be used to support regions to successfully mobilise or influence their implementation.

7 Conclusion

This deliverable has sought to outline existing adaptation finance sources and instruments for regions, as well as case studies and best practice examples in key community systems. In addition, it has reviewed and evaluated a range of existing adaptation finance processes and drawn together a range of insights.

These activities have informed and underpinned an Adaptation Investment Cycle which will support the development of Adaptation Investment Plans across the cohort of regions in Pathways2Resilience. These will be used as key inputs for Task 5.3, the development of guidance documents and delivery of capacity development modules for adaptation finance, as well as the development of nine Adaptation Investment Plans under Task 5.4 and will also shape the approach to developing an Adaptation Finance Innovation Lab in Task 5.5.

Whilst the research has yielded many insights which have informed the design of state-of-the-art processes, there are limitations. The topic of adaptation investment planning is also a fast-moving field, with many countries and the EU also beginning to explore this topic and pilot tools and approaches. As a consequence, more academic research is also needed into the effectiveness or approaches of public adaptation investment planning, as well as independent evaluations or studies on the merits and challenges of investment planning processes.

There have been internal limitations. Due to the need to clarify engagement with regions as a result of P2R’s sub granting process, there have been limited opportunities for co-designing the catalogue and investment cycle with regions. Whilst the study authors have involved organisations whose role is supporting regions, leveraged their direct experiences of working within a regional context, there will likely be many opportunities. Similarly, the aspiration to develop the AIC as part of a more integrated adaptation planning and capability building approach has relied on the development and engagement of other WPs and progress has not been even in this regard. Therefore, it is likely that the processes and catalogues will need further updates during the remained of Pathways2Resilience to reflect the real-world experiences of application.

Despite these limitations, the deliverable makes a significant new contribution to the field of adaptation planning, and in doing so will support both Pathways2Resilience’ aspiration of creating 100 Climate Resilience Strategies, as well as the European Commission’s aspirations of creating 150 resilient regions by 2030.

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Appendix 1 – Literature Review protocol

The final inclusion and exclusion criteria used for the literature reviews on adaptation finance processes and catalogues are set out in the table below. These were developed and refined after a number of initial searches and review of initial literature:

Research question 1: *What current processes, guidance, strategies, activities, or insights can help local government, cities and regions in Europe to mobilise finance for equitable incremental, and transformational adaptation to climate change?*

Table 22: Inclusion and Exclusion criteria for the literature review. Source: Authors.

Included	Criteria type	Excluded	Criteria type
Local municipalities and regional municipalities within Europe	Population and condition	Adaptation planning guidance which didn't include a substantive finance component	Study design
Documents focusing on either incremental or transformational adaptation	Study design	Developing country studies mainly/solely reliant on global financing sources (e.g., Green Climate Fund, Adaptation Fund).	Population and condition
Documents focused on challenges or solutions to mobilising public and private finance	Study design	Studies focused solely on adaptation outside Europe with limited transferable lessons	Population and condition
Approaches focusing on financing across all stages of maturity	Study design	Studies in languages other than English	Study design
Documents focusing on tools and approaches to mobilise adaptation finance	Population and condition	Studies focusing mainly/wholly on mitigation	Study design
Studies focusing on equity and / or just resilience	Study design	Studies solely focused on adaptation finance as a barrier or constraint	Study design
Studies focused on 'enabling conditions/environments' for mobilising adaptation finance (even if not at regional level)	Study design	Studies outside the Scope of the Mission's Key Community Systems	Population and condition
Studies focused on financing of adaptation projects, programmes, or strategies	Population and condition	Studies focused solely on UNFCCC processes	Population and condition
Studies that include case studies / best practice examples	Study design	Articles in draft or those inaccessible online (paywall, or unobtainable)	Study design
Documents that include sources or instruments for adaptation finance	Study design	Adaptation when not related to climate change	Study design
		Different geographical definition of region (e.g., globally)	
Studies that address barriers identified in D5.1	Study design	Studies older than 7 years (2015 onwards)	

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Appendix 2 – Expert sources for literature review

Table 23 below outlines key individuals that acted as expert sources to supplement the literature review.

Table 23: Individuals and organisations involved as expert sources for papers in the literature review. Source: Authors.

Individual	Organisation
Fernando Diaz Lopez	Climate-KIC
Sam Barrett	IIED Europe
Jonathan Casey	Sniffer
Ben Connor	Sniffer
Michael Mullan	OECD
Roger Street	University of Oxford
Tom Mitchell	IIED Europe
Oscar Higuera Roa	IIASA

Appendix 3 – Descriptions of catalogues of sources and instruments

1. Global Landscape of Climate Finance, CPI.

Overview: The Global Landscape of Climate Finance is one of the major reports tracking the state of climate finance. It identifies and classifies relevant sources and instruments for climate change mitigation and adaptation at the Global Level and develops recommendations. Whilst it is not primarily a catalogue, its status as the predominant publication tracking global finance flows makes it the most widely recognized classifications of sources and instruments.

Sources Identified: Public: (Government, National DFI, Bilateral DFI, Multilateral DFI, Export Credit Agency (ECA), Multilateral Climate Funds, Public Fund, State-owned entities (SOE), State-owned FI). Private: (Commercial Fis, Corporation, Funds, Households/Individuals, Institutional Investors), Other

Instruments Identified: Grants, Low-cost project debt, Project level market rate debt, Project level equity, Debt, Balance sheet financing, Equity.

2. Toolkit to Enhance Adaptation Finance, OECD

Overview: The OECD toolkit to enhance Adaptation Finance outlines a spectrum of "tools" that could help the countries navigate the evolving architecture of climate finance and seize opportunities for accessing finance for adaptation. The tools aim to provide practical and technical solutions, including to: identify and support adaptation as a national priority; design fundable projects and programmes; better link with available funding; and enhance in-country capacities and enabling environments to attract investments from a wide variety of sources. The toolkit was designed for Low Income Developing Countries and Small Island Developing States (SIDS and African states. As part of this, it includes a series of dedicated financing channels. Rather than using classic definitions of 'sources' and 'instruments' the catalogue combines both under the terminology 'financing channels'.

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Sources Identified: Adaptation for Smallholder Agriculture Programme (ASAP); Adaptation Fund; Global Climate Change Alliance; Global Environment Facility; Green Climate Fund; LDC Fund; Pilot Programme for Climate Resilience; Special Climate Change Fund.

Instruments identified: Adaptation for Smallholder Agriculture Programme (ASAP); Adaptation Fund; Global Climate Change Alliance; Global Environment Facility; Green Climate Fund; LDC Fund; Pilot Programme for Climate Resilience; Special Climate Change Fund.

3. **Climate Ready Clyde Resource Mobilisation Plan, Sniffer**

Overview: Glasgow City Region's Transformational Adaptation Strategy included a dedicated Resource Mobilisation Plan which mapped the available sources and instruments for adaptation. Whilst not a catalogue in a traditional sense, it is included as a catalogue of options for a transformational adaptation strategy, because it provides an example of the 'end use' product that a more general catalogue for regions should seek to support. It also identifies a series of constraints to the availability of sources and actions that can address them. A novel addition is the extension from 'sources' to 'actors' – specific entities that may be able to provide funding and finance for actions.

Sources Identified: PUBLIC, GENERAL TAX BASE, REVENUES, (e.g., from subsidy reductions, user charges), PRIVATE (Commercial & Personal Private Capital), SAVINGS, (e.g., from pension payments, insurance policies, deposits), STOCKS & SHARES

Actors:

National and Regional Government: UK Government, Scottish Government. **Local Authorities:** East Dunbartonshire Council, East Renfrewshire Council, Glasgow City Council, Inverclyde Council, North Lanarkshire Council, Renfrewshire Council, South Lanarkshire Council, West Dunbartonshire Council. **Foundations, NGOs, Charities:** Scottish Wildlife Trust, Keep Scotland Beautiful, Esme Fairbairn Foundation, The MacRobert Trust. **Public Financial Institutions:** Scottish National Investment Bank, National Bank of Scotland. **Institutional Investors and Foundations:** Insurance Companies, Asset Management Firms, Pension Funds, Charities, Foundations, Trusts. **Private Investors:** Investment Banks, Venture Capital, Angel and Impact Investors, Project Developers. **Personal:** Households, Local Communities.

Instruments Identified: Grants, Debt, Equity, Tax to raise debt. Government Capital Grants, Scottish Enterprise Innovation Grants, Clyde Mission Funding (capital funding - Grants), Early-Stage Growth Challenge Fund (Grants, Debt, Equity). The Climate Challenge Fund (grans and concessional debt), Glasgow City Region City Deal (grants, debt, and equity), PWLB (concessional debt loans for capital expenditure), Scottish Investment Bank (debt and equity), Scottish National Investment Bank (debt and equity), User charges (Scottish Water), Tax Incremental Financing (TIF), Non-profit distributing

4. **Financing Urban Adaptation to Climate Change, EEA**

Overview: The EEA report on Financing Urban Adaptation to Climate Change provides a broad overview of the challenges and successes. It provides a broad framing of how investment in adaptation can be made positive, mapping both sources and instruments in a delivery diagram (Figure 51 below), as well as including 11 case studies covering both sources and instruments.

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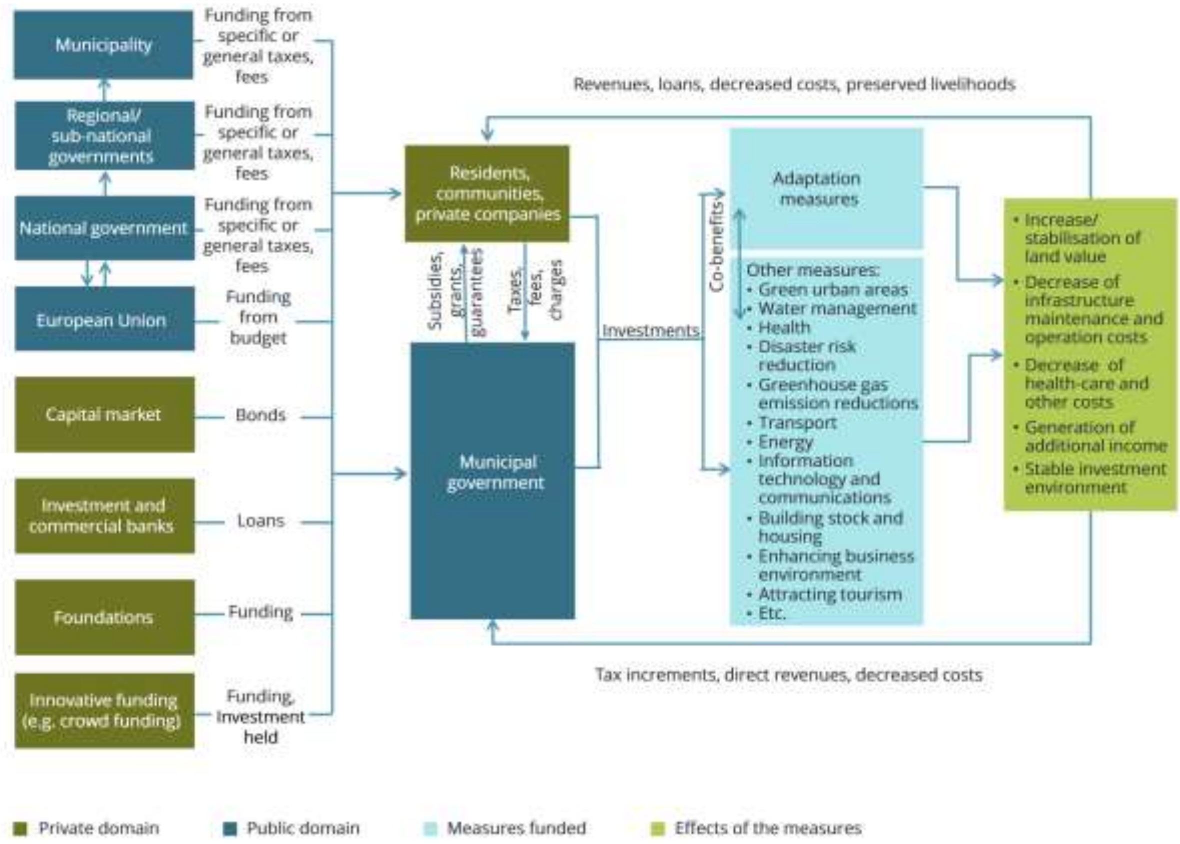

Figure 51: Opportunities for financing climate change adaptation in municipalities, and the interplay between the various stakeholders involved. Source: EEA, 2018.

Sources Identified: Governmental sources (Grants, International and EU funding instruments, National budgets, Regional Budgets, Local/Municipality budgets). **Banks or other financial institutions** (Local retail banks, Investment and Commercial Banks, Capital Markets). **Private stakeholders: (Foundations, Real Estate Developers, Companies). Free/low-cost solutions: (Early integration of adaptation into urban planning and design, Mainstreaming into other municipal areas, Supporting regulation). Innovative Funding:** (e.g., Crowdfunding).

Instruments identified: Specific taxes; General taxes; Fees; Bonds; Loans; Funding; Funding Investments held; Subsidies; Grants; Guarantees.

5. **Ready to Fund Resilience Toolkit, American Society of Adaptation Professionals**

Overview: The Ready to Fund Resilience Toolkit was a project by the American Society of Adaptation Professionals to build capacity and capabilities of state and local Government in the US to mobilise funds for adaptation. It includes a longlist of actors, as well as links to efforts by Climate Finance Advisors, and the Adaptation Society of Adaptation Professional's prior work on mapping sources and instruments. Instruments are contextualized within wider financing and funding strategies. Both elements are anchored within a wider set of guidance, including characteristics of successful projects.

Sources Identified: Non-Profit / Educational: (Academic and Research Institutions, Community Development Corporations, Community Development Financial Institutions, Community Land Trusts, Think Tanks). Public Sector: (Federal, State, TIF District, Publicly Owned Utilities, Special Districts). Private Involvement: (Public Private Partnerships, Investor-Owned Utilities, Insurance, Institutional Investors).

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Instruments Identified: Leverage debt to grow funding and finance: General Obligation Bonds, Revenue Bonds, Green Bonds, Resilience Bonds, Catastrophe Bonds, Tax Incremental Financing. **Generate revenue specifically for resilience:** Utility rates, Insurance surcharges, Carbon Pricing, Dedicated Tax Revenue, Tourism and Recreation Fees, **Explore and Incentivise Private Investment:** Environmental/Social Impact Bonds, Public-Private Partnerships, Trading Schemes, Infrastructure Bank. **Incentivise action and mitigate risk:** Insurance of tax incentives, Insurance Pooling

6. **Funding Strategies for Flood Mitigation - Where do you get the money?, Headwater Economics**

Overview: The Funding Strategies for Flood Mitigation catalogue is cited as an example of funding strategies for local adaptation on the US Climate Resilience Toolkit website. It seeks to provide an overview of the range of sources and instruments available in Minesota for flood mitigation. For each of the sources, It identifies the amount that can be raised, community examples, and benefits and challenges. It also includes a section on who do you need to convince, It was originally produced for a workshop 'Building Blocks for Regional Resilience, in southern Minesota.

Sources Identified: Local Revenue: (Direct User Charges, Local sales taxes, Shared costs and join agreements, Tax Increment financing and special assessment districts). **Private and Philanthropic** (Impact Investing and Environmental Impact Bonds, Public Private Partnerships, Community and Corporate Foundations). **Minnesota State Grants and Loans:** (MN Dept of Natural Resources, MN Pollution Control Agency, MN Homeland Security and Emergency Management, MN Board of Water and Soil Resources, MN Dept. of Employment and Economic Development, MN Department of Transportation, MN Dept. of Agriculture. **Federal Grants and Loans:** (Federal Emergency Management Agency (FEMA), US Dept. of Housing and Urban Development, National Park Service, US Environmental Protection Agency (EPA), US Economic Development Administration (EDA), US Fish and Wildlife Service).

Instruments Identified: State grants and loans; Federal Grants and Loans

7. **Paying for Climate Adaptation in California: A Primer for Practitioners, Resources Legacy Fund**

Overview: The Resources Legacy Fund report was commissioned with the intention in part as a guide for leaders aiming to navigate California's complex funding and financing processes. It is intended to serve as a primer for those wishing to understand how such processes relate to adaptation and resilience projects. As part of this, the guide includes information on both sources and instruments. Sources are classified into lead institutions with a broad summary of the institution, supplemented with detail on the funding and financing tools available to them as well as recommendations on when to involve then, key benefits and drawbacks. A similar approach is taken with instruments, where they identify key issuers/involved parties, along with benefits and drawbacks.

Sources Identified: Non-Profit / Educational: (Academic and Research Institutions, Community Development Corporations, Community Development Financial Institutions, Community Land Trusts, Think Tanks). **Public Sector:** (Federal, State, Counties and Cities, California Infrastructure and Economic Development Bank, Enhanced Infrastructure Financing (EIFD) Districts, Geologic Hazard Abatement Districts, Joint Powers Authorities, Publicly Owned Utilities, Special Districts**). Private Involvement:** (Public Private Partnerships, Investor-Owned Utilities).

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Instruments identified: Bonds, Municipal Bonds (Geneal Obligation, Revenue Bonds), Private Activity Bonds, Pay for Success Financing (Social Impact bonds, Environmental bond), Green Bonds, Insurance-Linked Securities (Catastrophe Bonds, Resilience Bonds), Loans, Federal Loans, Revolving Loan Funds, Program Related Investments.

8. **Implementing the Green New Deal, Offices of Senator Ed Markey & Congresswoman Alexandria Ocasio-Cortez**

Overview: The catalogue provides an overview of the range of funding opportunities opened up by the passage of the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) in the US. The guide lays out the goal of the Green New Deal and compiles resources from the White House and federal agencies to give cities, states, Tribes, nonprofits, and individuals the tools they need to take full advantage of these new programs and create on-the-ground progress toward a Green New Deal. The guide systematically goes through the IRA and IIJA and for each element of the Act outlines the total amounts, mechanisms, eligible recipients, eligible uses, period of availability and signposts to more information.

Sources identified: N/A

Instruments identified: Goal 1: Building resiliency against climate change: Research and Forecasting for Weather and Climate Grants; Tribal Climate Resilience and Adaptation; Tribal Climate Resilience: Fish Hatchery Operations and Maintenance; Native Hawaiian Climate Resilience; Emergency Drought Relief for Tribes; NOAA Habitat Restoration and Community Resilience Grants; Energy Improvement in Rural or Remote Areas Program; PROTECT Formula Program; Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program; USDA-DOI Fire Science Program Partnership; Tribal Climate Resilience: Community Relocation and Adaptation Planning

9. **Funding Opportunities Repository, REGILIENCE**

Overview: The REGILIENCE catalogue outlines a series of funding opportunities for regions to implement adaptation. It has been developed as part of the wider REGILIENCE project – a Horizon Europe Adaptation Mission project which is seeking to foster the adoption of climate resilient development pathways, building capacity in a range of regions, amplifying three wider Innovation Projects of ARSINOE, IMPETUS and TransformAr and replicating them in a further 10 vulnerable and low-capacity regions. As part of this work, it includes a database of funding opportunities. For each of them, it provides an overview of the source/instrument, it's geographical coverage within Europe, relevant sectors, the type of funding, budget ranges and key information and further information. A sample is shown in Figure 52 below.

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Figure 52: Sample funding opportunity extract. Source: REGILIENCE Funding Opportunities repository.

Sources Identified: Connecting Europe Facility; Digital Europe; Erasmus+; Horizon Europe; European Agricultural Fund for Rural Development; ERDF; LIFE+; Union Civil Protection Mechanism; EIB; Cohesion Fund; Innovation Fund; European Social Fund+; European Maritime, Fisheries and Aquaculture Fund; EBRD; Various National Funds

Instruments Identified: Connecting Europe Facility; Digital Europe; Erasmus+; Horizon Europe; European Agricultural Fund for Rural Development; ERDF; LIFE+; Union Civil Protection Mechanism; EIB; Cohesion Fund; Innovation Fund; European Social Fund+; European Maritime, Fisheries and Aquaculture Fund; EBRD; Various National Funds

10. Net Zero Cities Funding tool, NetZeroCities

Overview: The Net Zero Cities Funding tool is an interactive tool produced by EIT Climate-KIC to support the European Commission's mission to create 100 Climate Neutral and Smart Cities by 2030. Whilst focused on mitigation, it includes a wide range of generally transferrable instruments to help cities find the right funding for their projects. It is structured thematically, and asks users a series of questions to help recommend the right instruments, before providing more detailed information and links to case studies and further information.

Sources identified: N/A

Instruments identified: Municipal budget spending, revolving fund; Intracting (Revolving fund - internal contracting); Taxes; Grant; Partial grant plus partial self finance; Blended finance; Concessional Loan; Green Loans; Commercial loan; Guarantee; Municipal bonds; Institutional Investors; Simple private contracting model; Model with forfaiting and waiver of defence; private equity / green equity; Energy efficiency obligation schemes (EEOS), On-bill Financing,

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EPC - Guaranteed Savings; EPC - shared savings; EPC - related payments; EPC - related payments; EPC - immediate savings; EPC - staggered savings; Sell to a private partner and leaseback; concessions to a private partner; project finance (SPV)

11. Covenant of Mayors Funding Guide, European Commission

Overview: The Covenant of Mayors Funding guide is hosted online as part of the European Commission's overall website for the Covenant of Mayors for Climate and Energy. For each instrument, a detailed amount of information is provided, including who is eligible for support, what it can be for, who can apply, the type of funding, project size and co-funding requirements. It also usefully includes wider technical assistance and support instruments.

Instruments identified: Shared Management Funds: Cohesion Fund; EAFRRD - European Agricultural Fund for Rural Development EMFAF - European Maritime Fisheries and Aquaculture Fund, ERDF - European Regional Development Fund, ESF+, Just Transition Fund. **European Funding Programmes:** Connecting Europe Facility, EU renewable energy financing mechanism, Horizon Europe, Innovation Fund, Urbact IV, LIFE, Territorial Cooperation. **Technical Assistance and Advisory Support:** European Energy Efficiency Fund - Technical Assistance Facility (eeef - TAF), Just Transition Platform, LIFE Technical Assistance Projects, InvestEU Advisory Hub. **Financial Institutions Instruments:** EIB Municipal Framework Loans, InvestEU Fund, Public Sector Loan Facility, Alternative Financing Schemes, Citizen Cooperatives, Crowdfunding, Energy Performance Contracting, Green municipal funds, On-bill-financing, Revolving loan funds; Soft loans, guarantees.

12. GrowGreen - Approaches to financing nature-based solutions in cities

Overview: GrowGreen was a five-year Horizon 2020 project aimed at creating climate and water resilient, healthy and livable cities by investing in nature based solutions. As part of the project, a working document was prepared by Trinomics which outlined the financing approaches that can be used to deliver green infrastructure and nature-based solutions.

Sources identified: N/A

Instruments identified: Innovative Uses of Public Budgets; Pooled funding from different departments; Attract funding from the public health budget; Green prescribing; Greening hospital estates; Police budgets; Education budgets. **Grant funding and donations:** ESIF; LIFE; Horizon 2020; Regional and national government grants; Philanthropic contributions; Crowdfunding. **Instruments Generating Revenue:** Land sales/leases; Taxes; User fees; Developer Contributions/Charges; Betterment levies; Voluntary beneficiary contributions; Sale of development rights and leases; Funds linked to offsetting/compensation requirements; Other voluntary schemes. **Green Finance (Debt Instruments):** Loans; Green bonds; Natural capital financing facility; Market**-based instruments:** User charges, taxes; subsidies; tax rebates; credit trading systems; Offsets (biodiversity, habitat banking); Payments for Ecosystem services; **Business Improvement Districts; Endowments; Public Private Partnerships; Revolving Funds; Community Asset Transfer; Regulation and Planning Standards; Leveraging Existing Regulatory Requirements.**

13. Innovative Financial Instruments for Climate Adaptation, IISD

Overview: The IISD catalogue was produced as part of part of the wider IISD research project "Mobilizing Development Finance for Strategic and Scaled-up Investment in Climate Adaptation"**.** It compiles 23 instruments for adaptation across debt instruments, results-based management, and financial risk management. For each it assesses the maturity of each

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instrument, as well as their current or potential sector applications, and considerations for their use. It also includes case studies. The catalogue includes a mapping of the instruments to relevant sectors and case study geographies, shown in Figure 53 below:

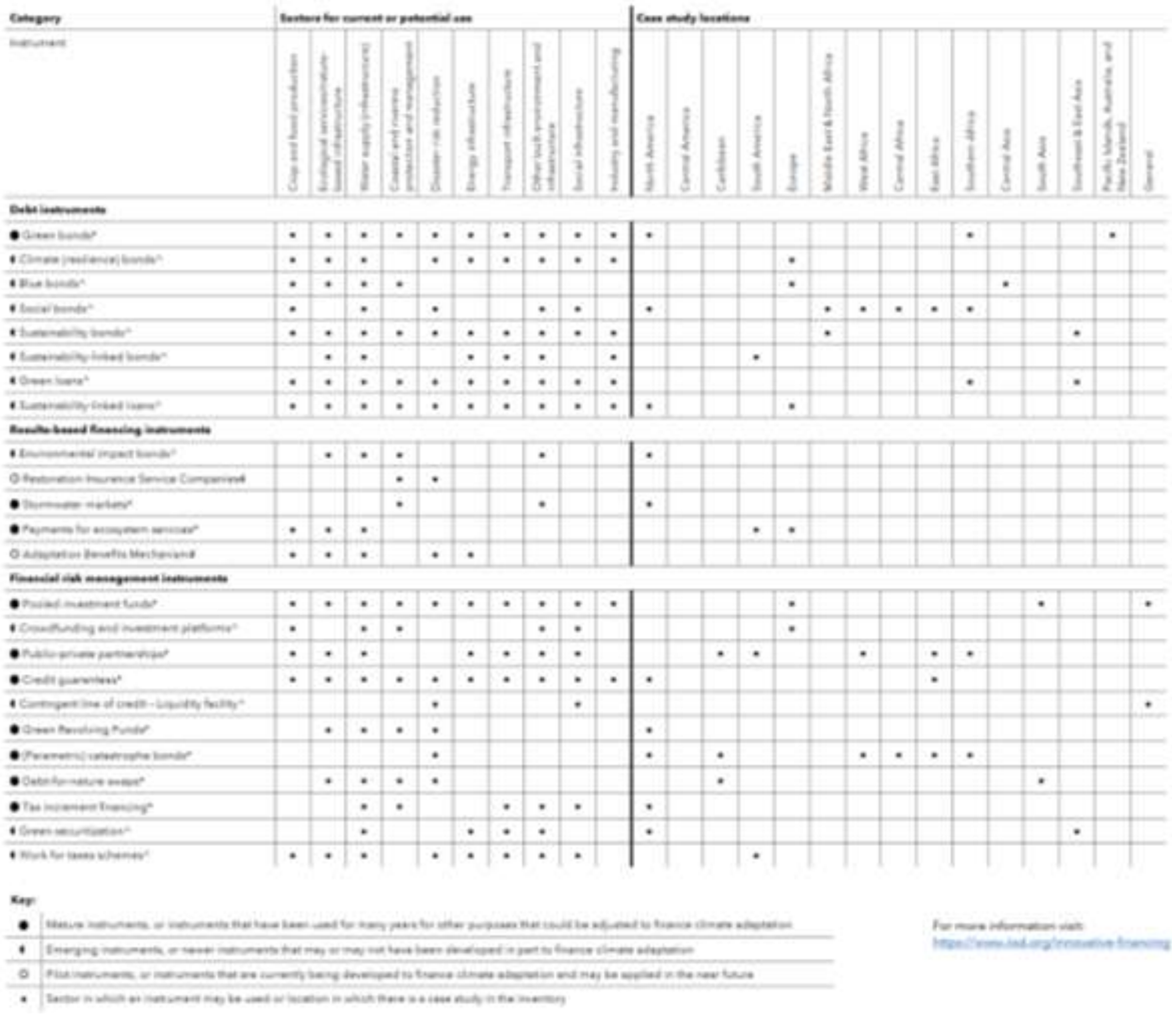

Figure 53: IISD Instruments by Sector and Case Study Location. Source: (IISD, 2022a)

Sources identified: N/A

Instruments identified: Debt Instruments: Green Bonds, Climate (Resilience) Bonds, Blue Bonds, Social Bonds, Sustainability Bonds, Sustainability-Linked Bonds, Green Loans, Sustainability-Linked Loans. **Financial risk management Instruments:** Pooled Investment Funds; Crowdfunding and Investment Funds; Public Private Partnership; Credit Guarantees; Contingent Line of Credit - Liquidity Facility; Green Revolving Fund; (Parametric) Catastrophe Bonds; Debt-for-nature swaps; Tax Increment Financing; Work for Taxes; Green Securitization; **Results-based Finance:** Environmental Impact Bond; Payment for Ecosystem Services; Stormwater markets; Restoration Insurance Service Companies; Adaptation Benefits Mechanisms;

14. Financial Innovation for Climate Adaptation in Africa, CPI/GCA

Overview: The catalogue is framed as an interactive report, based on the work by the CPI and Global Centre on Adaptation. It identifies the key actors providing adaptation financing in Africa, the instruments used to finance adaptation projects and programs, the sectors of adaptation, key barriers to finance, and case studies of successful projects. For each source, it provides a description and rates the Risk appetite, climate mandate, and ability to raise funds and flexibility to deploy funds of each actor, on a scale of 0 - 4. It also links the Actors and Instruments to case studies.

Sources Identified: African Governments, Commercial Financial Institutions, Foreign Government Agencies (Official Development Assistance) Green Banks and National Climate Change Funds; Institutional Investors; Insurance; Large Corporations; Multilateral and Bi-lateral Development Finance Institutions; Multilateral Climate Funds; National Development Banks; Philanthropies, Foundations and Non-profits, Private Equity and Venture Capital (PE/VC); State-owned Financial Institutions (SOE), Sub-Regional Development Banks (SRDBS).

Instruments Identified: Financing Facilities: Debt Facilities, Private Equity Funds. **Grants:** Development Grants, Project Preparation Facilities, Technical Assistance Funding, **Insurance:** Catastrophe Bonds, Parametric and Index Insurance, Risk Pooling. **Liquidity Support:** Budget Reallocations, Liquidity Support, Shock-Responsive Cash Transfers; Project **Finance:** Direct Infrastructure Debt and Equity Investments, PPP Financing. **Results-based Finance:** Conservation Trusts, Debt for Climate Adaptation Swaps, Impact Notes or Climate Bonds

15. An analysis of Urban Climate Finance, CCFLA

Overview: The work builds on CPI's flagship report to with the aim of assessing the state of urban climate adaptation finance and to prototype analysis methods to address current data and methodology limitation. It estimates the overall size of primary financial flows to urban climate adaptation and advances a methodology by proposing a taxonomy with sector specific inclusion roles.

Sources Identified: Municipal government, State/provincial government, National government; National DFIs; Bilateral DFIs, Multilateral DFIs, Climate Funds, Commercial Fis, PE/infrastructure funds, Institutional investors, Private insurance, Corporate actors, Households, Nonprofits, philanthropies, and foundations.

Instruments Identified: Local Revenue Generation: (Utility Fees, Open space funds/land value capture, General obligation bonds, Local Property, Income, and sales taxes). **Grants, Incentives, Technical Assistance Funds:** Insurance, tax advantages, Low-cost project debt, infrastructure investment funds

16. A guide to climate adaptation finance, Sniffer

Overview: The instruments are anchored in a wider capacity building guide for the use of climate finance, structured around the three 'use cases' – of public, blended or place-based projects. For each use case, a number of steps are outlined to develop financing mechanisms (e.g., for public is says 'consider the policy landscape and identify levers, review finance mechanisms and sources, develop the business case). For each of the instruments, a high-level overview is provided. It also includes a list of specific funding opportunities relevant to Scotland in the Appendix.

Sources Identified: N/A

Instruments Identified: Public Use Case: Grants; Bonds; Household or local business charge models; Debt; **Blended Finance Use Case:** Direct Debt or Equity; Guarantees; Collaborate Revenue Bonds; Insurance; Grants and Philanthropic Funding; Value Capture; Public Private Partnership. **Place-based Use Case:** Venture and Impact capital - Impact Investing; Crowdfunding; Bonds; Value capture; Fees; Incentives; Grants; Payment for Ecosystem Services

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Appendix 4 – P2R Catalogue of Sources, Instruments and Best Practice Examples

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Appendix 5 - Descriptions of Adaptation Finance Processes

This Appendix summarises the aims of the Adaptation Finance processes reviewed and provides an overview of the approach.

EEA Adaptation Support Tools

The EEA's Adaptation Support Tools provide the standard adaptation cycle and provide guidance to subnational authorities on the process to adapt to climate change. It outlines a six-step process for Regions and local authorities to prepare strategies, and that these should involve the selection of projects and programmes and projects. A stylised illustration is shown in Figure 54 below. Tailored versions are provided for urban authorities, and regions (through the Mission Implementation Platform)

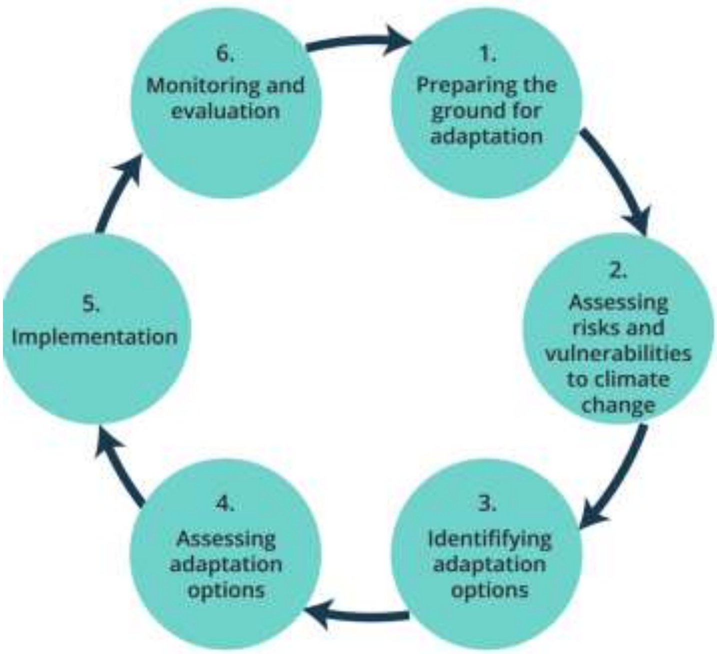

Figure 54: Adaptation Policy Cycle of the Adaptation Support Tool. Source: (Leitner et al., 2020)

Whilst obviously a pre-requisite, the funding and financing of such strategies is not included as an explicit step in the process of the EEA's adaptation support tool, regional support tool, or urban adaptation support tool, nor is it discussed in any great detail in the steps in the journey (Climate ADAPT, 2023). Although the study did not focus on finance specifically, over half of

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Europe's cities have an adaptation plan, plan quality is still low in many cities. (Reckien et al., 2023).

CKDN Planning for Implementation: A quick-start guide.

In line with the broader ambitions of the Paris Agreement and the UN structures, the objective of the CKDN NDC Implementation guide is to support developing countries in implementing their NDCs. It is aimed at policymakers at national and subnational levels, and development partners and practitioners supporting the implementation of NDCs. A summary of its process is shown in Figure 55 below:

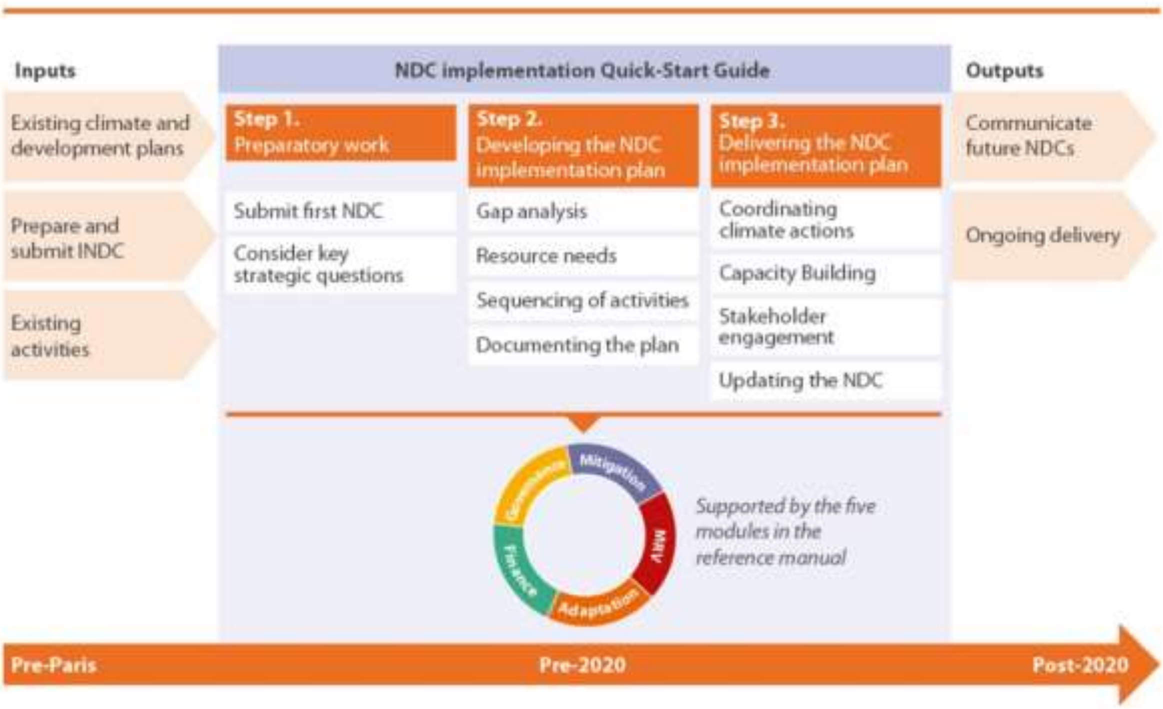

Figure 55: The national NDC process. Source: (CDKN and Ricardo, 2016).

The guide includes a finance workstream. It aims to help countries mobilise additional funds for adaptation beyond global climate funds, including private sector and domestic budgets. The guide includes a dedicated finance process but also includes considerations for financing individual adaptation actions in the relevant adaptation planning section. The key activities are shown in Figure 56 below:

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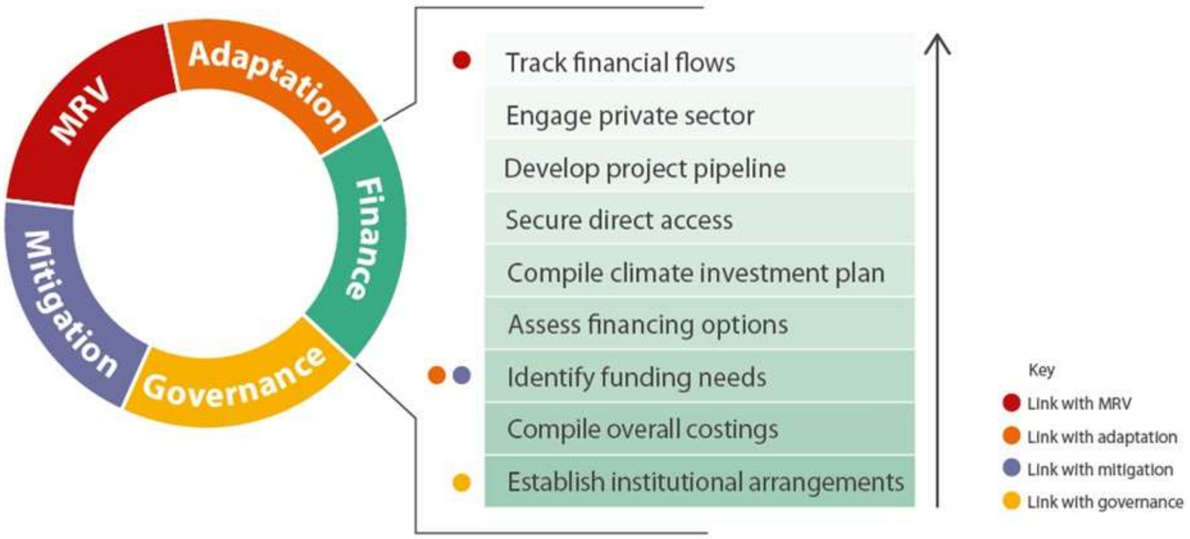

Figure 56: Key activities in the CDKN finance module. Source: (CDKN and Ricardo, 2016)

World Bank Enabling Private Investment in Climate Adaptation and Resilience: Current Status, Barriers to Investment and Blueprint for Action

The World Bank process (shown in Figure 57) sets out an incremental, step by step process designed to work across public stakeholders to allow the private sector to participate in adaptation financing. However, whilst a step-by-step process, it does emphasise flexibility, recognising that it should be implemented "depending on country and sector-level needs, recognizing that not all countries and cases will need to implement all five, and that opportunities where market-ready projects are identified and taken to the private sector should of course still be seized".

Figure 57: Blueprint for Action—Five Steps to Enable Private Sector Engagement in Climate Adaptation. Source:(Tall et al., 2021)

For each stage, the blueprint then details associated entry points, inputs, outputs, partners, and key success factors, as shown in Figure 58 below:

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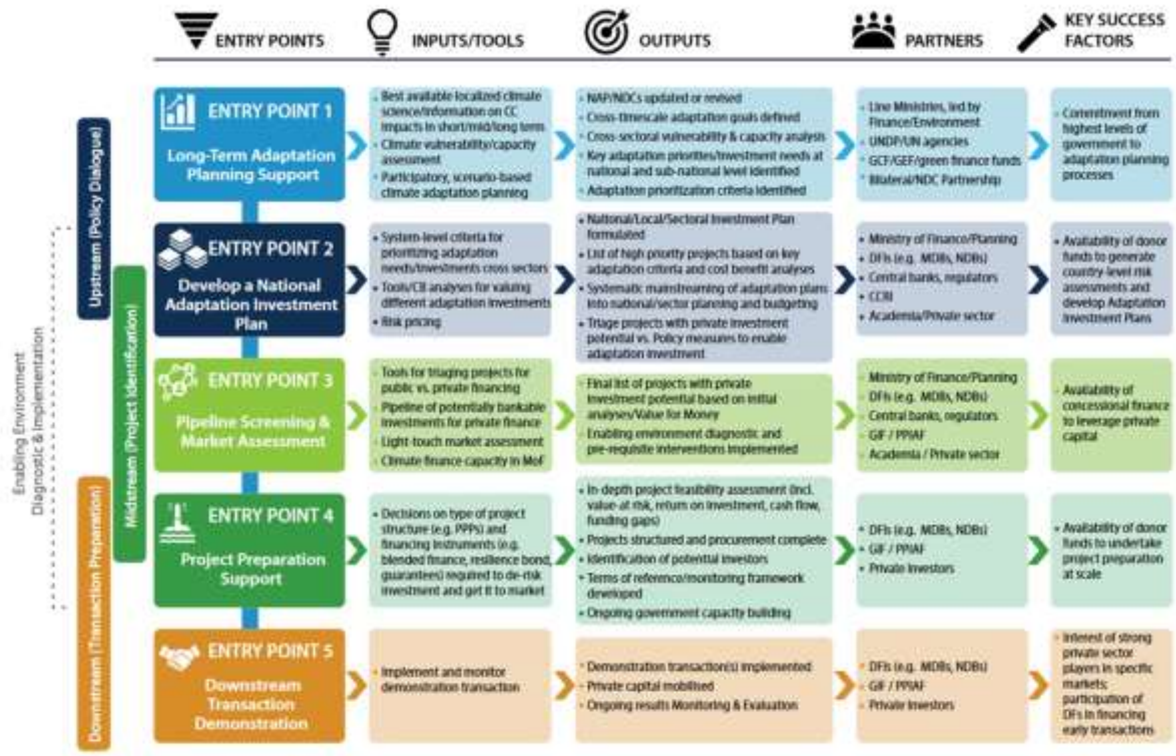

Figure 58: Entry points Inputs, Outputs, Partners, and Key Success Factors for mobilising private sector investment in adaptation. Source: (Tall et al., 2021)

Adaptation Scotland Public Sector Capability Framework, Financing Guidance and Case studies, and Policy Note

Overview and aims of the process: Over the past three or four years, Scotland's programme of support to public private sector and communities, Adaptation Scotland, has increasingly developed a programme of work designed to increase the supply of funding and finance into adaptation. This has included mainstreaming consideration of finance into its public sector capability framework – the guidance provided to public authorities to enable adaptation. This approach uses a capability-maturity matrix but acknowledges that institutions need to identify resources to undertake adaptation planning and implementation.

The work has followed this with a climate finance guide (Murtagh et al., 2022) which outlines the common barriers to adaptation finance, as well as three use cases and associated activities, designed to support the development of 'typical' investments of adaptation by the public sector, on a blended basis, or a place-based approach. The use cases are summarised in Figure 59 below:

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Use Case	Description
Public use case	Governments are often responsible for adaptation planning and public actors therefore play a role in enabling adaptation through policy actions and providing public finance or funding. This use case presents key activities for public sector organisations seeking finance.
Blended use case	Blended finance can take a variety of models but typically involves the public sector using funds to enable or de-risk private sector action. Private actors may implement adaptation-related projects for their own self-interest, but they can also be incentivised to develop new goods and services associated with wider adaptation. Public finance can help support the early development of such goods and services, and/or it can be used to support adaptation, for example, when it may deliver broader societal benefits. This use case supports projects considering the use of blended finance.
Place based use case	This use case explores financing activities relating to specific geographic place and/ or broader place-making projects. It includes public and blended finance relevant across a range of scales.

Figure 59: Summary of use cases presented in guidebook. Source: (Murtagh et al., 2022)

This work has been complemented by the development of a number of case studies which aimed to support the development of four adaptation finance business cases (England et al., 2023; Watkiss & Khosla, 2022). Figure 60 below highlights the range of financing options available and their potential suitability to each of the case studies selected:

No.	Financing option	Inch of Ferryton Managed Realignment	Newcastleton Flood Protection	Uist Community Climate Resilience
1.	Carbon (mitigation) revenue streams	High	High	N/A
2.	Payment for ecosystem services	Low	Low	Low
3.	Tourism revenues	High	High	N/A
4.	Crowdfunding platform	High	Low	Medium
5.	Biodiversity habitat bank/biodiversity credits	Low	Low	Low
6.	Government grant funds	High	High	High
7.	Philanthropic based grant funds	Medium	Medium	Medium
8.	Equity financing	Low/Medium	Low/Medium	Low
9.	Flood insurance based on a risk pool model	N/A	N/A	Low
10.	Parametric insurance	N/A	N/A	N/A
11.	Resilience bonds	N/A	Low	Medium
12.	Land-use development option	Medium	Medium	Medium
13.	Household or local business charges	N/A	Medium	N/A
14.	Renewable energy revenues	Low/Medium	Medium	N/A
15.	Landowner investment	Low/Medium	N/A	N/A

Figure 60: Case study financing options. Source:(Watkiss & Khosla, 2022)

The case studies also included key learnings and recommendations to support further development of business cases.

Finally, the programme has begun reviewing the literature and generating recommendations for Scottish Government based on practical experience in Scotland to generate recommendations to Scottish Government as part of the development and implementation of the third Scottish

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Climate Change Adaptation Programme (Casey & Connor, 2023). This has set out a high-level vision and roadmap, structured around five key priorities, including supply, demand, market rules and the use of place-based approaches, set out in Figure 61 below.

Figure 61: Strategic priority areas for Scotland. Source: (Casey & Connor, 2023)

CSIRO Enabling Resilience Investment Framework

Overview and aims of the process: The ERI is used to generate place-based resilience options for communities in cities, suburbs and rural and regional Australia. It allows users to identify the beneficial outcomes of the options such as jobs, infrastructure, social capital, natural capital, and increased economic activity which supports the case for funding and potentially investment. In doing so, the approach supports communities, regions and economies to recover, transition, and develop towards sustainable, well-adapted and disaster-resilient futures.

The Enabling Resilience Investment Framework comprises "a range of methods, tools, frameworks and processes to support planning and analysis of investments that incorporate value creation and systemic risk mitigation into the inclusive design and delivery of future investments". (*Enabling Resilience Investment Guidance – Enabling Resilience Investment*, 2018). It is summarised in Figure 62 below. The approach is designed to be tailored by users to suit their own needs and context depending on the types of decisions being made, the stage of decision or assessment process and the levels of shared understanding of those involved. As such, the framework is designed for users to pull together their own approach, meeting where they are and helping them to go where they want to go next.

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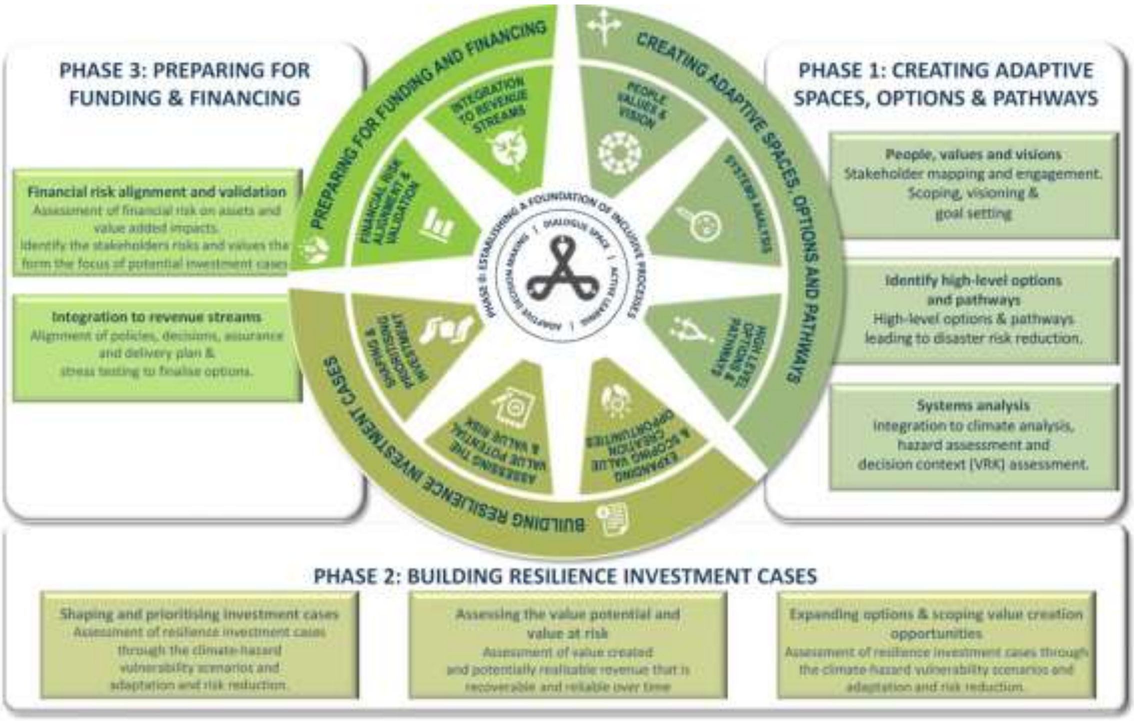

Figure 62: The Enabling Resilience Investment 'Wheel'. Source: (Wise et al., 2022)

The framework builds on previous work by Climate-KIC Australia, which has demonstrated significant challenges in securing investment-ready projects, and work by the Resilient Futures Investment Roundtable which has developing new investable propositions, through a focus on resilience valuation, alongside tools and methods and capabilities. ((Mortimer et al., 2020; Resilience Valuation Initiative et al., 2023; Resilient Futures Investment Roundtable, 2023).

It uses out a three-phase approach, focusing first on creating adaptive spaces, options and pathways, before developing investment cases, and preparing for funding and financing. it also sets out the benefits of undertaking the process.

Each phase is split into a number of modules, which answer the key questions from those seeking to apply the process, such as, ‘Why use this module, why it’s different from traditional approaches, and then the steps and associated outputs and outcomes.

The approach requires inclusive and coordinated governance, deliberation and negotiation at strategy, policy and project delivery levels, both across government portfolios, economic sectors and government, business and community. The framework has been used to generate investment cases in several cases, including Port Adelaide, Enfield.

UNDP Hard Choices, Integrated Approaches: A Guidance Note on Climate Change Financing Frameworks

Overview and aims of the process: The UNDP process sets out an approach for consideration of climate change adaptation and resilience (alongside mitigation), as part of national budget processes. This process maps and links the planning and investment process of public administrations to elements of climate change policymaking, public financial and economic management, sectoral investment and delivery. It then includes an additional set of workflows and processes that map onto these to enhance the flow and uptake of climate change mitigation and adaptation finance. The framework overview is shown in Figure 63 below:

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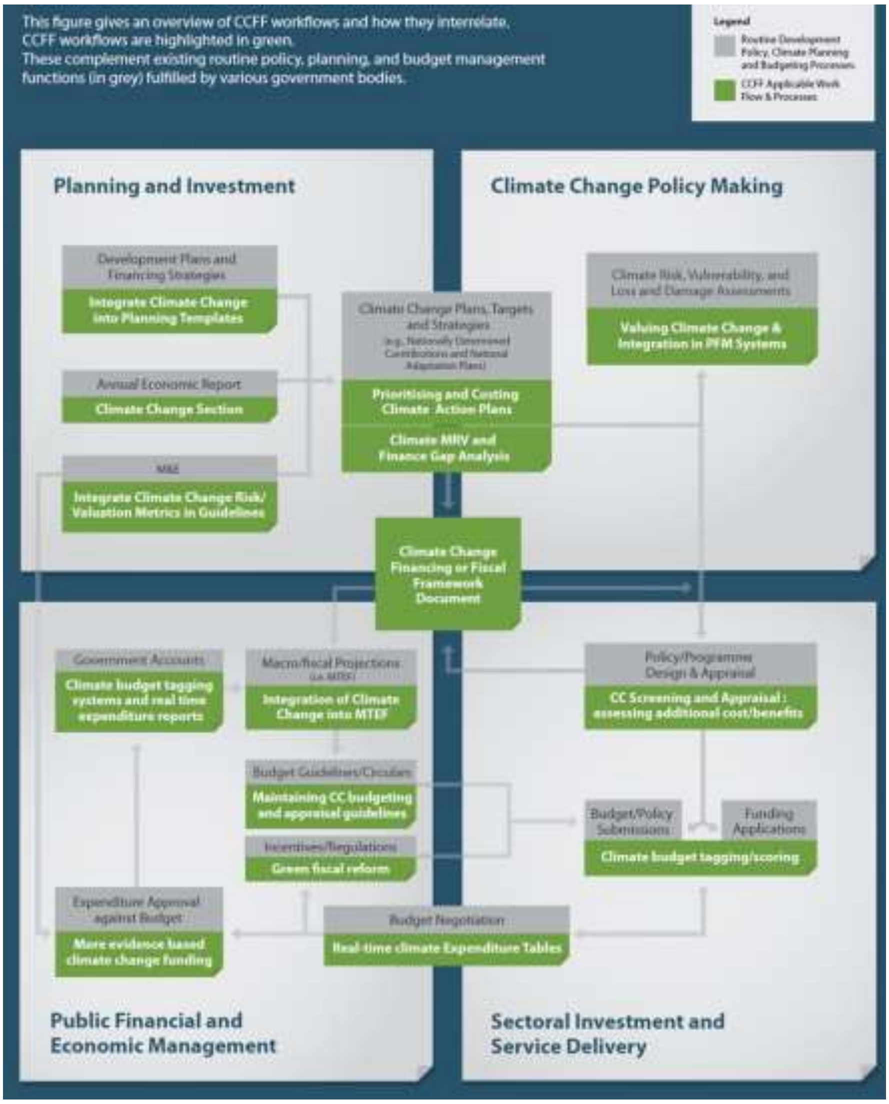

Figure 63: Workflows within a CCFF. Source: (UNDP, 2017)

The framework also sets out how these requirements traditionally map onto the roles and responsibilities for each of the differing Government departments in a budgetary process, and where responsibilities for each of the new elements should sit, shown in Figure 64 below:

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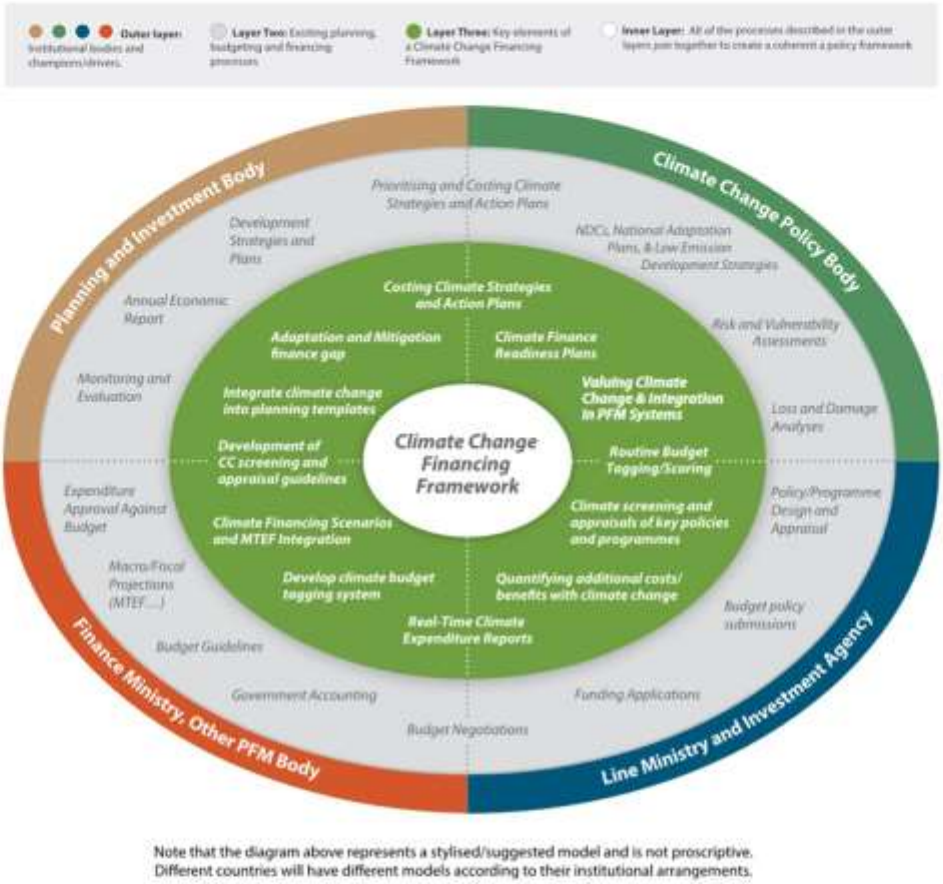

Figure 64: Climate Change Financing Framework. Source:(UNDP, 2017)

Finally, the authors recognise the need for an iterative approach over time, where components can be started and improved over time.

OPM Mainstreaming, accessing and institutionalising finance for climate change adaptation.

Overview and aims of the process: The ACT framework approach was part of a UK Overseas AID programme managed by Oxford Policy Management focusing on climate proofing growth in five South Asian countries., The approach seeks to help developing countries shift away from the reliance on international climate funds by mainstreaming climate change into core development budgets. It provides a mechanism to:

1) raise government awareness of adaptation needs.

2) help governments identify key priority sectors or actions where investment is needed.

3) mobilise finance from development budgets and assessing the adequacy of effort; and

4) report on adaptation-relevant expenditure, thereby adding to accountability and transparency.

The way it does this through the use of Financing frameworks for resilient growth (FFRGs), which include 5 key elements, shown in Figure 65 below:

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Figure 65: Elements of a financing framework for resilient growth: Source: (Resch et al., 2017)

These components are brought together into a three-stage financing framework aimed at baselining, assessing needs and filling the gap, and defining roles for the ACT programme (which was directly supporting countries), and other partners, shown in Figure 66 below:

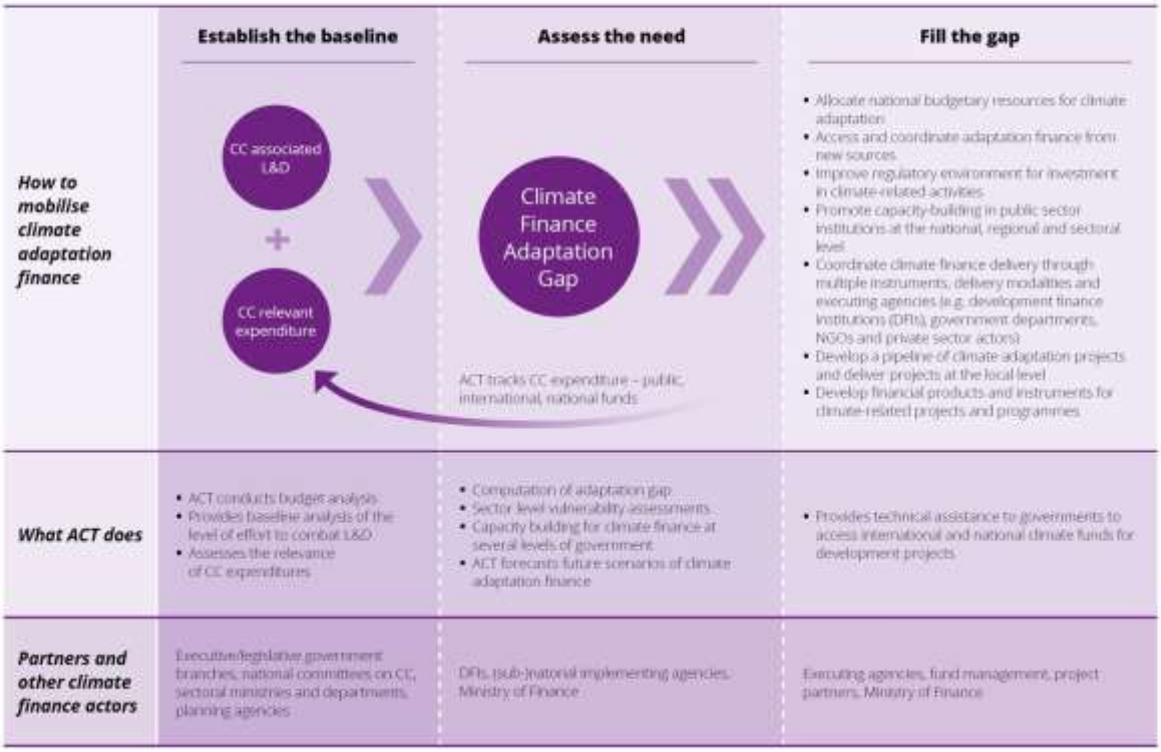

Figure 66: Financing framework for resilient growth. Source: (Resch et al., 2017)

In following the process, a number of outputs are envisaged, including development and delivery of a pipeline of adaptation projects, new products and instruments, an improved enabling environment and capacities/capabilities, and a governance and coordination process.

The report also outlines (as shown in Figure 67 below) how such components can be applied across budgetary cycles:

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Figure 67: FFRGs and budget cycles. Source: (Resch et al., 2017)

For each of the steps, the discusses the advantages and disadvantages of particular methods in undertaking the activities. Finally, the approach includes barriers and enablers to including climate finance in budgetary and planning processes, setting out a financing framework for resilient growth.

CPI State of Cities Climate Finance Framework

Overview and aims of the process: (Boukerche et al., 2021) set out a conceptual framework which highlights the key components of a framework which allows subnational governments to raise, allocate, spend and repay finance for mitigation and adaptation. This framework consists of three elements. The first (shown in Figure 68 below) sets out the various roles of cities in providing or influencing climate finance and investment:

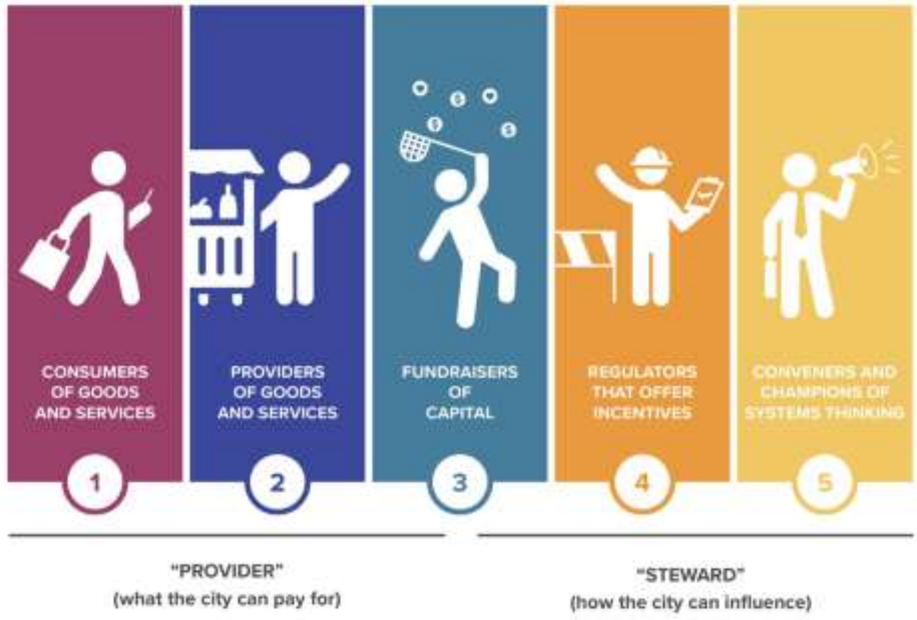

Figure 68: Five roles cities play to provide or influence climate finance and investment. Source: (Boukerche et al., 2021)

The second (shown in Figure 69 below) sets out climate and city-specific elements that are key to be in place, both for the City Government, and for the wider area to both increase the supply and demand of adaptation finance:

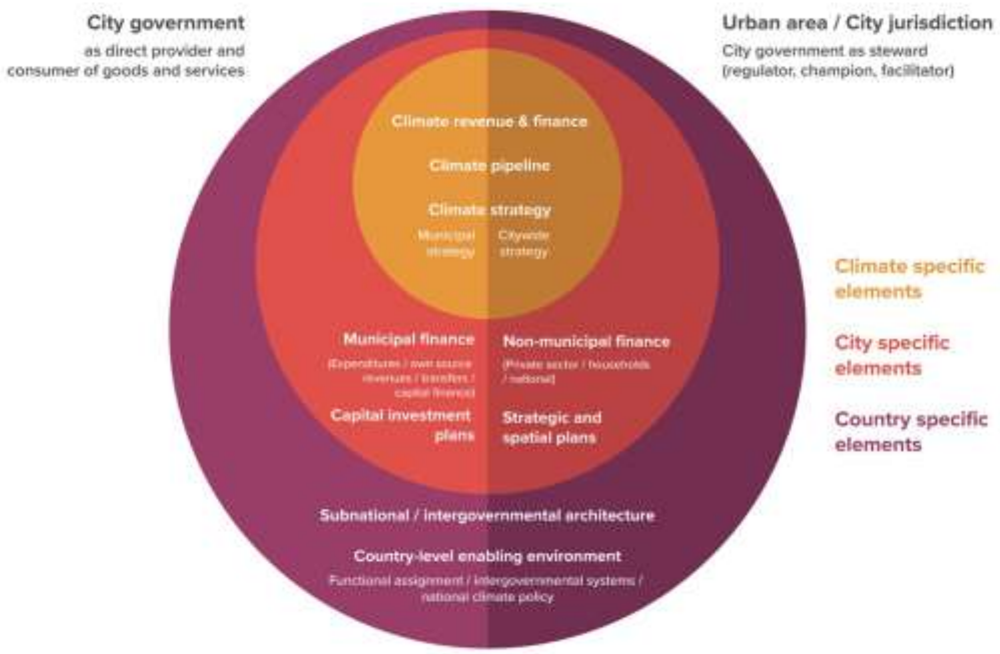

Figure 69: The enabling conditions framework to mobilise urban climate finance: country, city and climate-specific elements. Source: (Boukerche et al., 2021)

Finally, the report also highlights the important of country conditions in detail in setting the broader context for cities and regions in adaptation finance. It also provides significant recommendations on the use of city specific (e.g., strategic and spatial planning, capital investment plans) and climate specific enabling conditions (e.g. project pipelines, various sources and instruments

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SMR European Resilience Management Guideline (Smart Mature Resilience)

Overview and aims of the process: SMR was a Horizon 2020 project to enhance cities' capacity to resist, absorb, adapt to and recover from the hazardous effects of climate change, by developing and implementing a European Resilience Management Guideline (ERMG) (Smart Mature Resilience, 2018). The EMRG sets out an operational framework for cities that provides guidance on local resilience planning and supports their efforts in building resilience. In doing so, the guideline aims to direct available resources towards defined goals, while securing transparency and the democratic principles of decision-making for city resilience development and planning.

The guideline for cities, includes an iterative, five-step process (shown in Figure 70 below), which is regularly repeated according to cities' needs. Whilst finance is recognised as a prerequisite to undertake the process (i.e., an enabling condition), the process itself only has a light touch focus on finance, with a review of sources available in step 3, and allocation resources in step 4.

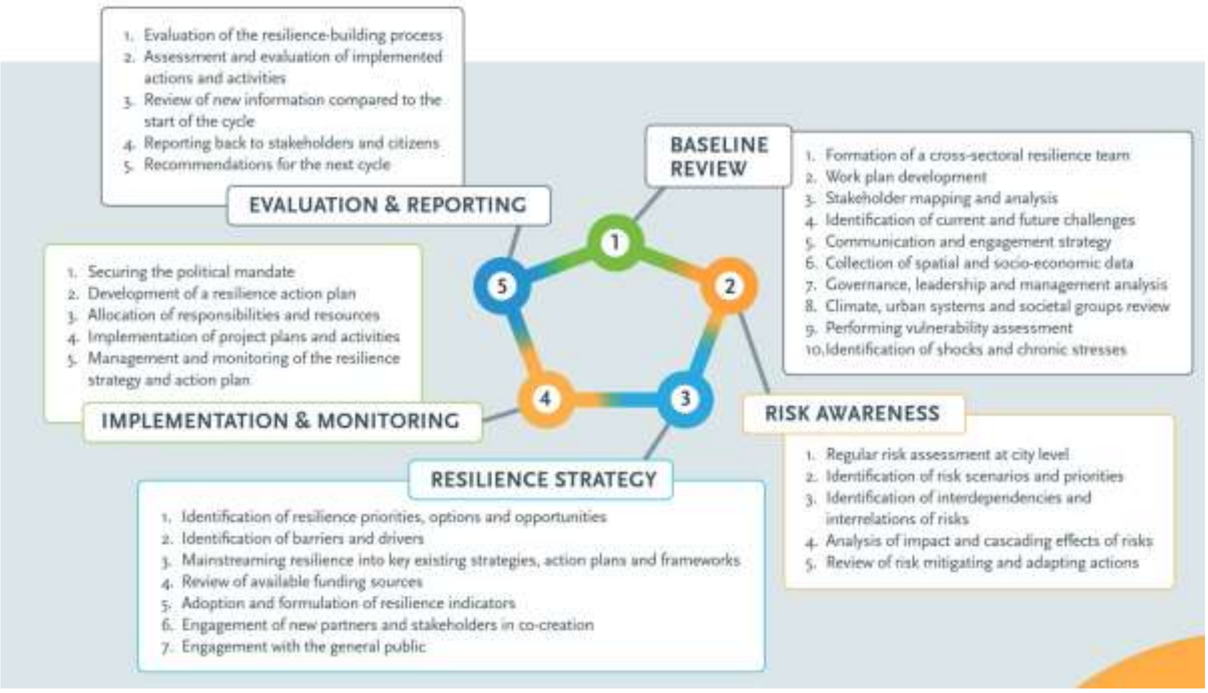

Figure 70: The European Resilience Management Guideline. Source:(Smart Mature Resilience, 2018).

The process is supported by five resilience-building tools, engagement tool, and a resilience maturity model for baselining and measuring progress, a risk systemicity questionnaire to help prioritise risk scenarios, a set of model policies to improve, and a city resilience dynamics model to encourage experimentation (summarised in Figure 71).

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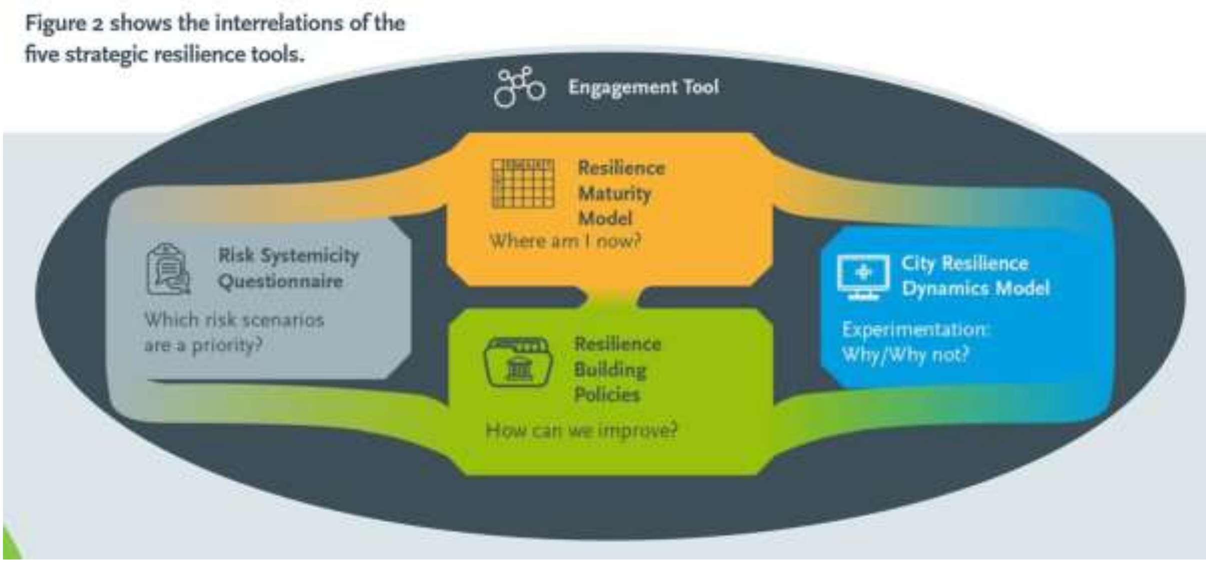

Figure 71: SMR tools and their interrelationship. Source: (Smart Mature Resilience, 2018)

Of particular relevance is the resilience maturity model. This sets out five stages across four dimensions. Helpfully, it also recognises the cross-cutting, area-based nature of resilience by identifying roles and responsibilities to different actors within a City. It also includes a dedicated set of finance actions that support the development of the resilience strategy (shown in Figure 72) – such as allowing for the action plan in the Local Government budget, use of incentives as a mechanism for mobilising investment:

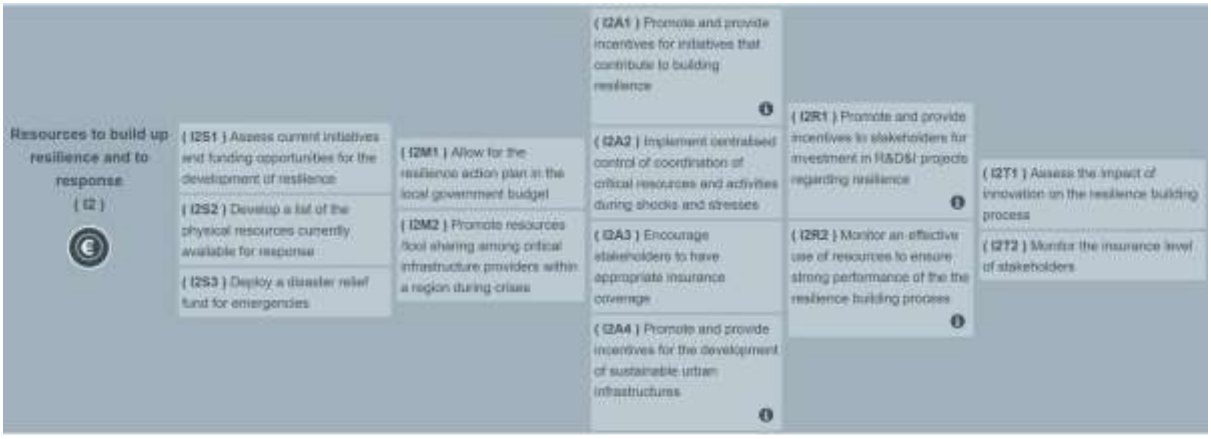

Figure 72: Finance-related extract from the SMR Resilience Maturity Model. Source: (Smart Mature Resilience, 2018)

IEMA Climate Change Adaptation Practitioner Guide

Overview and aims of the process: The IEMA Climate Change Adaptation practitioner guide is a summary document produced by the Institute for Environmental Management and Assessment to support its members in practicing adaptation. IEMA has a diverse set of members that specialise in a wide range of environmental sustainability topics. Therefore, the guide attempts to cater to all audiences, including those who have never worked on adaptation. The guide is split into two sections – the first being a primer on climate risk and adaptation, with a summary of the financial and business benefits of adaptation, definitions of climate risk and adaptation, and an overview of relevant risks to the UK and the legislative framework for adaptation, wider information on adaptation. The second half is a capability-maturity matrix, containing 29 actions across five business functions: sites and operations, strategy, people and skills, finance and

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resources, and supply chains. On finance it sets out a series of tasks, including assessment of costs and benefits, business case development, green budgeting, mainstreaming, and allocating core resources for progressing adaptation financing.

The matrix covers three stages – Initial (Low regrets and assessment of risks and adaptive capacity), Intermediate (detailed adaptation planning and beginning implementation), and Advanced (Implementation, Monitoring and Evaluation), and for each area, identifies a number of tasks, along with relevant case studies and resources. An extract of the finance workstream is shown in Figure 73 below:

Initial STAGE 1 – LOW REGRET ACTIONS AND ASSESSMENT OF RISKS AND ADAPTIVE CAPACITY	Intermediate STAGE 2 – DETAILED ADAPTATION PLANNING AND INITIATING IMPLEMENTATION	Advanced STAGE 3 – IMPLEMENTATION, MONITORING AND EVALUATION
Task 4.1 – Assess the costs and benefits of adapting (and not adapting). Understand the financial implications of climate change on the organisation. Undertake cost-benefit analysis of proposed actions, including the act of doing nothing. Note – full assessments may involve modifying existing tools to properly account for climate change – e.g. lengthening CBA timescales to allow proper pricing in of climate impacts. Useful resources Watkiss, P., Cimato, F. and Hunt, A. (2021). Monetary Valuation of Risks and Opportunities in CCRA3 **Task 4.2** – Allocate funding for core adaptation capabilities. Whilst adaptation options will have specific costs, a core budget is needed to ensure the organisation has the appropriate competencies and capabilities to develop and implement an adaptation response. Therefore, an organisation will need to assign a budget for climate adaptation activities. In addition, it is important to recognise the potential broad capital requirement across the organisation for early-stage adaptation or reaction to extreme weather events. Identify needed resource requirements and demonstrate tangible benefits to decision makers.	**Task 4.3** – Embed climate smart investment into all decision-making. All resourcing decisions, from capital investment to pensions, should consider the implications associated with a changing climate and their effect on planned expenditure and/or profits. This relates to all funding decisions not just climate action. Useful resources Paul Watkiss & Federica Cimato, (2016). The economics of adaptation and climate-resilient development: lessons from projects for key adaptation challenges. **Task 4.4** – Develop business cases for dedicated adaptation options. Develop proposals for dedicated investments in adaptation. Note that these generally take more time and effort to develop than traditional proposals due to the data and evidence needs, and the location-specific context of climate impacts. Capture predicted wider environmental and social benefits that climate adaptation investments also offer. Useful resources Adaptation Scotland (2022). A guide to adaptation climate finance **Task 4.5** – Develop Green Budgeting approaches to track spend on adaptation. The use of green budgeting approaches can help track spend on adaptation-related activity, in turn helping identify the spending gap, and informing disclosure of action to manage climate risks. Useful resources Institut Montaigne (2020). France's green budget: Making our planet great again? OECD (2021). Aligning regional and local budgets with green objectives	**Task 4.5** – Ensure accountability and transparency of financing climate risks. Governance structures and mechanisms are put in place so that the CFO has targets to reduce climate risk. Climate-related costs are included within the organisation's approach to managing financial risks. You should ensure consistent and clear messaging on climate risk and adaptation. This can be achieved via public disclosure of climate-related risks and regular awareness raising of progress. Useful resources Task Force Climate Related Disclosures (TCFD) **Task 4.6** – Achieve long-term, sustainable resourcing and planning. Identify and address both the short- and long-term costs associated with adaptation emerging from a more mature and holistic understanding of the challenges climate change presents. Consider big challenges such as stranded assets and managed retreat. Consider fiscal and non-fiscal costs and benefits (including human and natural capital). If relevant, engage with shareholders, investors or funders on the strategic implications of future investment needs in adaptation options. Useful resources ECCC – Working towards a Climate Resilience Investment Framework **Task 4.7** – Develop and promote innovative approaches for adaptation finance. Support the development of alternative mechanisms for funding and financing adaptation, such as the use of blended or pooled finance or new business models. Be aware of investor interest in climate risk from a financing perspective. Useful resources CASE STUDY: Climate Ready Clyde (2021). Glasgow City Region Climate Adaptation Strategy and Action Plan Annex 3: Resource Mobilisation Plan Adaptation Scotland (2022). Developing adaptation finance business cases

Figure 73: Finance-related maturity matrix. Source:(England & Murtagh, 2022)

NetZeroCities 2030 Climate Investment Planning

Overview and aims of the process: As part of the sister mitigation mission, the Mission Implementation Platform has adopted an approach which involves the participating 112 cities developing a Climate Neutrality Investment Plan alongside their main Climate Neutrality Plan for 2030, with the two documents together forming the basis of the Climate City Contract (NetZeroCities, 2022b). A summary of the NetZeroCities logic is shown in Figure 74 below:

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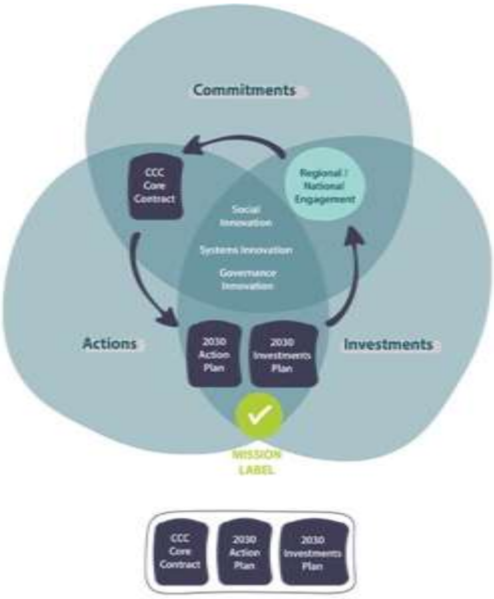

Figure 74: The Climate Neutral Cities Mission framework. Source: (NetZeroCities, 2022b)

To support the process of developing an Investment Plan, the consortium has produced a range of tools and resources. This includes a dedicated set of guidance and template and a checklist for an Investment Plan. The investment plan focuses on documenting three areas:

- **Current states of climate investment,** covering existing funding and financing options for activities by sector, existing strategies for capital deployment, existing regulatory policies and an assessment of the city's capacity and/or capabilities needs.
- **Investment Pathways towards Climate Neutrality by 2030** – including a cost analysis, monetisation of benefits, public and private sources, financial structures and instruments to raise capital and economic and financial indicators, as well as alignment across these elements.
- **Enabling financial conditions for 2030 –** including additional policies to be implemented that enable capital deployment, risks and mitigation strategies, maps of relevant stakeholders and knowledge gaps on developing and delivering the plan.

The guidance for an Investment Plan sets out a number of characteristics, shown in Figure75 below:

Figure 75: Characteristics of a Climate Neutrality Investment Plan. Source: (NetZeroCities, 2022a)

It also includes detailed descriptions and guiding questions for each of the stages.

Alongside the formal guidance for an Investment Plan, the work has also been supported by the broader knowledge platform, which provides a mechanism to allow users to share and access detailed financing information across mission cities. In addition, the platform includes a detailed Finance Guidance tool for specific investments, focusing on five categories –buildings, infrastructure, waste, transportation and energy generation. The tool asks a series of questions to generate a range of suitable financial instruments, setting out their pros and cons, the types of projects that can be financed in the sector, and additional resources related to the specific instrument. An extract is shown in Figure 76 below:

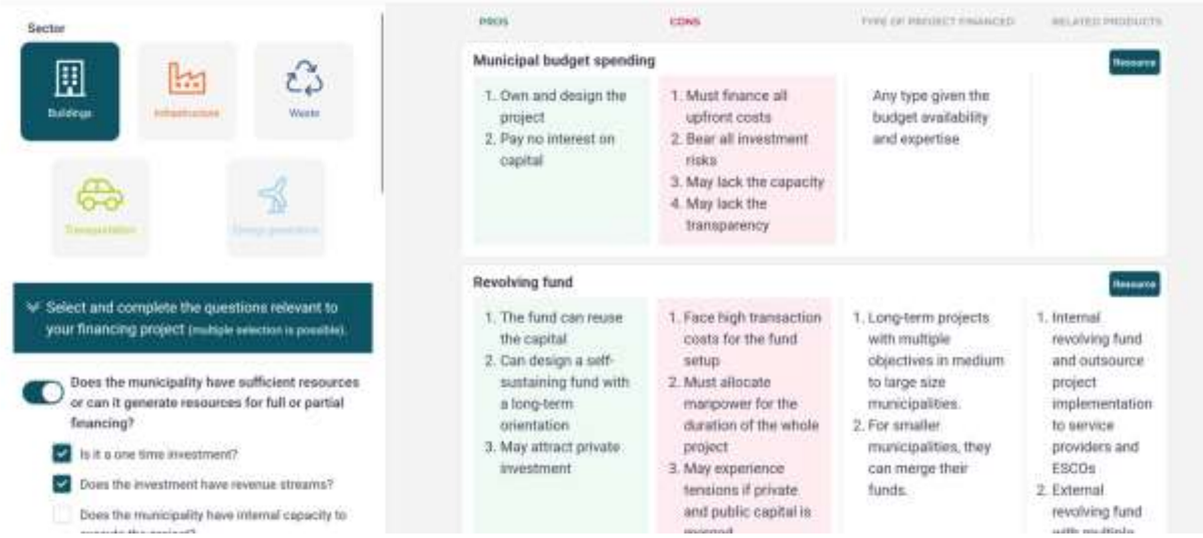

Figure 76: Sample output form the NetZeroCities Funding Guidance Tool. Source: (NetZeroCities, 2023)

Ready to Fund Resilience Toolkit

Overview and aims of the process: The Ready to Fund Resilience toolkit is a set of information and examples designed to apply to a variety of types of resilience projects. It supports practitioners to:

1. More effectively operate within the resilience funding and finance system.
2. Better prepare themselves to receive funding and finance for climate resilience-building.
3. Create equity through resilience funding and finance.

It was developed particularly for small-and-mid-sized local government practitioners working on resilience, or department leads with power over, and a stake in, climate resilience funding and finance, as well as for organizations and government bodies with the capacity and jurisdiction to support local government climate resilience funding and finance through policy, resources, technical assistance, partnerships, or process change.

The toolkit describes "how" local government leads and partners can design more fundable projects by pulling specific policy levers, seeking key partnerships, using innovative accounting practices, inverting power structures, and rethinking and redesigning internal processes. It will help local government leads and partners operate within current finance and policy systems to better prepare themselves and their communities for climate resilience funding and finance.

The toolkit adopts a 'challenge-focused' approach, outlining a series of common practical challenges and barriers to financing and highlights which characteristics can be used to help

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overcome them. The main way this is done is through the identification of 10 characteristics of ready to fund projects, shown in Figure 77 below:

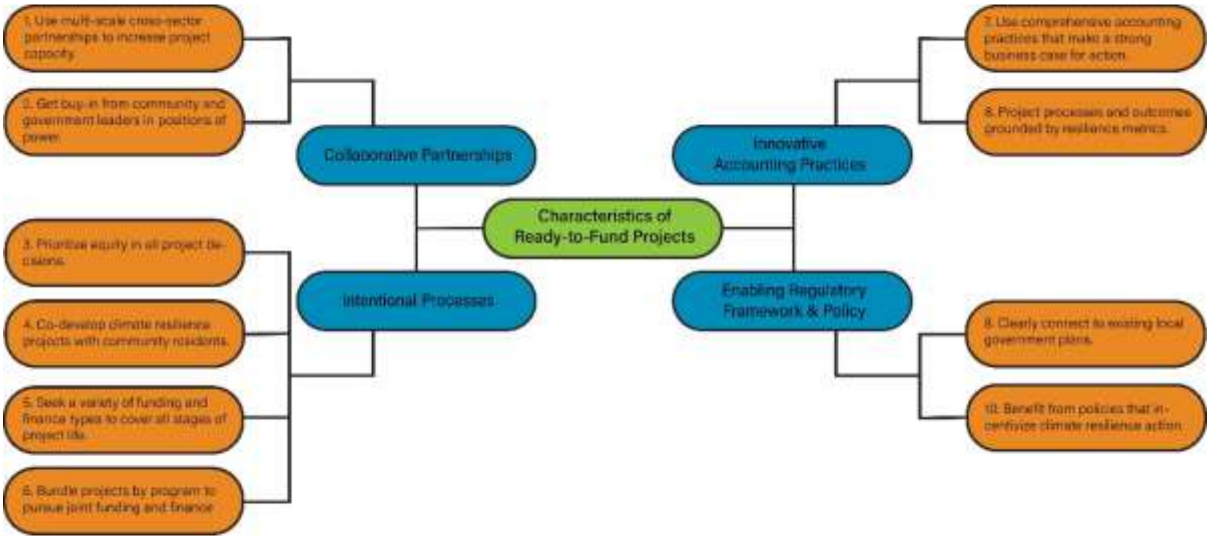

Figure 77: The ten characteristics of Ready to Fund Resilience Projects. Source:(Climate Resilience Consulting & American Society of Adaptation Professionals, 2022)

For each characteristic, the toolkit includes a range of practical categories (what and why, how, think and act, promising practices and innovation, additional resources).

The toolkit also includes a range of wider tools and resources – including financing mechanisms, an overview of characteristics of potential partners, including when to involve them, benefits and drawbacks, taken from (DeBoer, 2018), and risk management mechanisms to help facilitate private sector investment.

GIZ Private sector project financing framework

Overview and aims of the process: The GIZ framework sets out a step-by-step framework designed to help build capacity to design, develop and implement adaptation projects which can mobilise private sector finance. It is set out in Figure 78 below:

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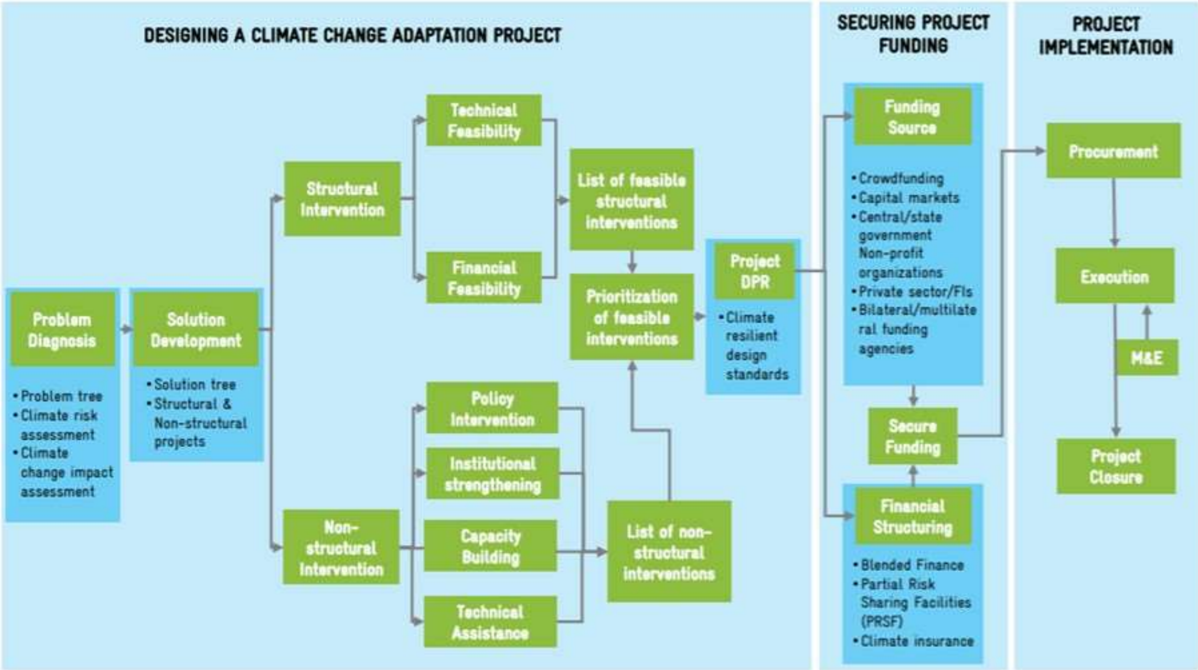

Figure 78: Flowchart of activities from project design to implementation. Source:(GIZ, 2019)

For each step, it sets out a clear description of actions and the potential application of tools and techniques, as well as providing an overview of traditional and innovative financing sources and instruments (such as catastrophe bonds, insurance).

European Commission Guidelines on Member States' adaptation strategies and plans

Overview and aims of the process:

The Guidelines aim to provide guidelines to member states on their National Adaptation strategies or plans. In doing so it sets out four purposes:

- To support EU Member States in revising their adaptation strategies and drafting / revising their adaptation plans
- To highlight the key features that are essential for delivering quality adaptation policy and results.
  To provide an example of a template outlining a structure for the strategy that will make it easier to access and compare these strategies and to ensure a comparable overview of the state of preparedness and planned actions at EU level; and
- To enhance adaptation policy with new areas.

The guidelines also set out the key common features of adaptation policy and a 5-step process to prepare an adaptation strategy and plan, shown in Figure 79 below.

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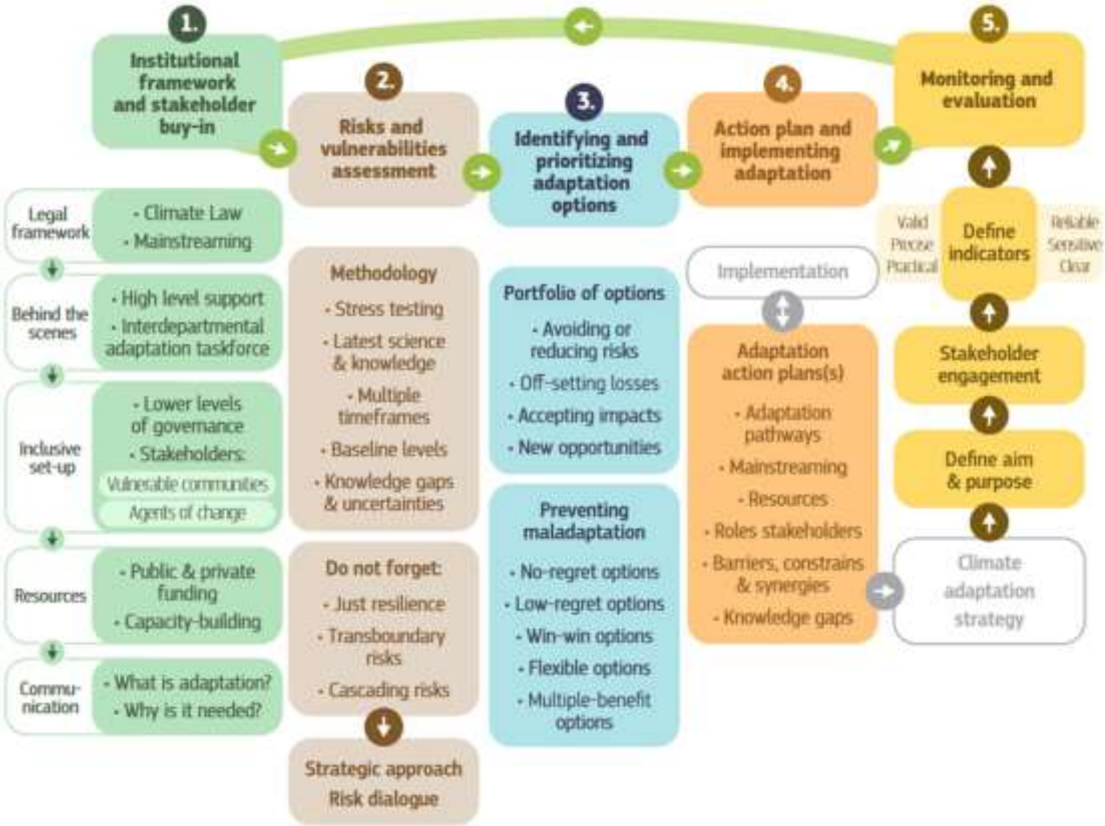

Figure 79: Overview of the preparatory steps in developing or updating adaptation strategy / plan. (European Commission, 2023c)

The guidelines also include a template example, including indicative lengths and importance of key sections as well as more detailed guidance on new areas of adaptation policy – namely Just Resilience, Maladaptation, Nature-based solutions and Climate stress testing.

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