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First policy brief

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EXECUTIVE SUMMARY

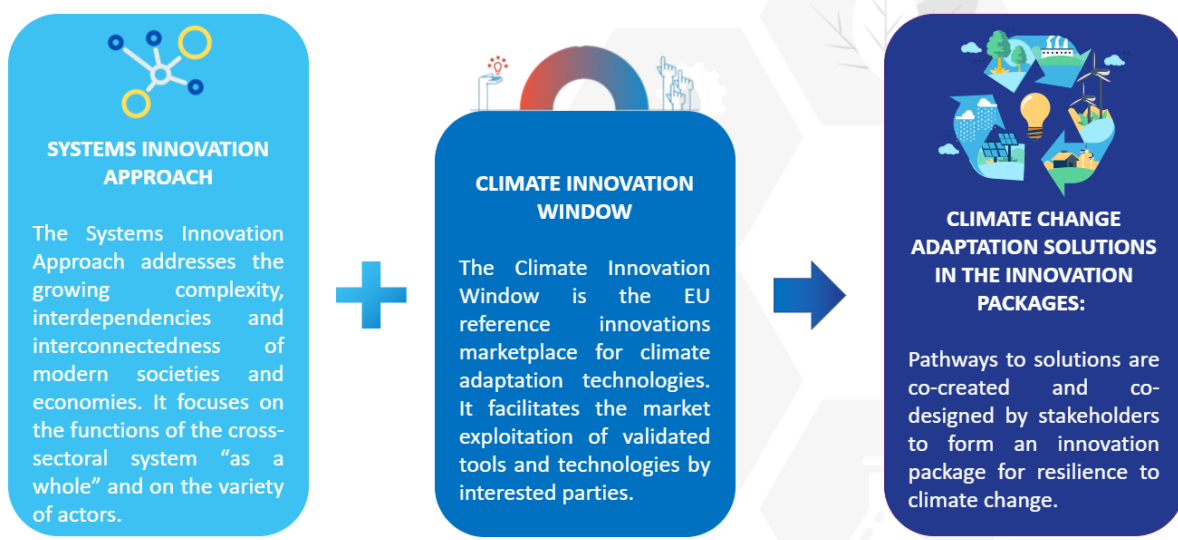
ARSINOE is an EU funded innovation action that brings together 41 partners from 15 countries and intends to be a game-changer for shaping pathways to resilience by delivering regional innovation packages that build an ecosystem to develop and implement innovative climate change adaptation measures and solutions across Europe. This project was developed in line with several priorities and strategies of the European Institutions and will test solutions in nine case studies across Europe. Each of them is deploying the methodology in their specific context. However, all of them will draw conclusions about how EU legislation can be effectively deployed in diverse environments across Europe and will therefore reinforce our knowledge on the most suitable governance that the relevant stakeholders need to develop. In keeping with the main opportunity to demonstrate how systemic thinking and systemic approaches can significantly boost transformation processes towards climate resilience while simultaneously adding to the attainment of other EU goals, the conclusions of the project will particularly be relevant for the implementation of the strategies, action plans and legislation related to the EU Green Deal.

1.0 INTRODUCTION

The aim of the policy brief is to raise awareness about the nine case-studies of ARSINOE to the relevant stakeholders and its potential benefits for mitigating climate change. This is a first policy brief in a project running from 2021 to 2025. It is a living document that will be reviewed on a regular basis to reflect the progress of the project. After a short presentation of the nine case studies, this policy brief will focus on the expected benefits in the European context.

ARSINOE is an EU funded innovation action that brings together 41 partners from 15 countries and intends to be a game-changer for shaping pathways to resilience by delivering regional innovation packages to develop and implement innovative climate change adaptation measures and solutions in nine different case studies. It aims to leverage innovation for climate adaptation across a series of key systems – from biodiversity to flooding and sea level rise and from droughts and water scarcity to heatwaves and deforestation. The four-year ARSINOE project will develop a methodological framework transferable to other cases thanks to the combination of three approaches:

The ARSINOE Concept – Three Tier Approach



The objectives of the project can be described at such:

- Facilitate a fundamental transformation of economic, social and financial systems that will trigger exponential change in decarbonisation rates and strengthen climate resilience through a Systems Innovation Approach;
- Support recovery from the COVID-19 crisis and climate resilience through the implementation of the EU Next Generation Fund Recovery and Resilience Plans (RRP’s) in a co-integrated way;
- Support communities and scientists in efficiently evaluating environmental and economic effects of climate change and understanding the impact of possible interventions by citizens and multidisciplinary scientists;
- Offer advanced Environmental Intelligence services and tools, through an interactive platform allowing multiple stakeholders to collaborate;
- Quantify, model and manage climate risk in a systematic way through resilience;
- Facilitate knowledge transfer and exploitation for start-ups and SMEs.

From these objectives, several results are expected to support the Green Deal implementation:

- Using the Systems Innovation Approach to address the growing complexity, interdependencies and interconnectedness of modern societies and economies;
- Developing vulnerability indices that quantify risks resulting from the interactions of climatic hazards; vulnerabilities and exposures of humans, ecosystems, economic, social or cultural assets;
- Introducing a set of Machine Learning-driven approaches to tackle and predict challenges;
- Delivering regional resilience innovation packages through the [Climate Innovation Window](#);
- Promoting a robust out scaling strategy allowing for the expansion of the ARSINOE innovation packages;
- Developing VR experiences to elicit citizens' preferences on interventions towards a resilient adaptation to climate change

2.0 ARSINOE CASE STUDIES: TESTING METHOD IN A DIVERSIFIED CONTEXTS

ARSINOE entails nine case studies. They serve as test cases where it is being demonstrated how implementing ARSINOE's approach for systemic change can foster climate-resilience. This is how ARSINOE offers evidence for how transformation processes which are in line with the goals of the EU Green Deal can be organised.

The regions where case studies are located will be strongly affected by climate change in the near future and are in need of comprehensive transformation strategies and systemic change. Nevertheless, the selection of case studies is diverse and covers a wide array of challenges and European regions. Consequently, the ARSINOE approach is being tested in a variety of contexts. The solutions and innovations developed in the single cases can be transferred to other contexts. Other regions can draw from the case studies in their own transformation process.

The results of ARSINOE will offer insight into how regional transition in line with the goals of the EU Green Deal could be organised as well into which challenges are connected with such transformation processes. This includes but is not limited to governance and legislative challenges.

In the following the nine case studies will be introduced briefly and it will be pointed out which main water-related law could be evaluated using the case studies.

CASE STUDY 1 Greening the Athens metropolitan area

The Athens Metropolitan Area (AMA) focus on enhancing green infrastructure, supporting urban biodiversity as well as public well-being. By assessing the effect of Nature Based Solutions (NBSs) in alleviating the Urban Heat Island (UHI) effect in the area, the AMA aims to best shield itself from, adapt to, and build resilience to Climate Change challenges (as extreme heat and flash floods), in line with the Athens Resilience Strategy for 2030. Public awareness and active participation will be enhanced by adopting three means: citizen science, youth assemblies to simulate local Green Deal processes and curation of green practices, and innovation and science into educational curricula.

CASE STUDY 2 Mediterranean Ports

The ports of Piraeus (Greece), Limassol (Cyprus), and Valencia (Spain) are leading European seaports in terms of coastal shipping, cruise, containerized cargo, commercial traffic, and activities. Sea level rise and weather phenomena (floods, intense winds, coastal erosion) sharpened by climate change can

cause extensive damage to the port and coastal infrastructure and are a menace for seaports, their adjacent infrastructure, and waterways globally. ARSINOE aims to improve their resilience, health and well-being by avoiding cascading effects of climate change on human communities, including the risk of mortality and relocation.

CASE STUDY 3 Main River basin, Germany

The Main River is a major European waterway. It is the largest eastern tributary to the Rhine river and connects the North Sea to the Black Sea via the Main-Danube canal, bridging the European water divide. The Main river basin is a densely populated and intensively used area of about 25,000 km² which is already subject to significant challenges and competitions for its water, land and energy. The effects of climate change are expected to lead to a strong increase of summer droughts and heatwaves as well as winter floods. This will have considerable consequences for almost all actors in agriculture, forestry, water, and energy management. A fundamental and forward-looking revision of available resource management measures is essential for ensuring a climate change resilient development of the region. On the basis of an excellent database of authorities and enterprises of the region as well as already existing own simulations with process-based, spatially distributed models, the ARSINOE approach is to be transferred to the region. Relevant innovations arise from a close cooperation and joint method development between science, authorities, municipal companies, actors of agriculture and forestry, or nature and environmental protection associations. The aim is to create a cross-sectoral understanding of the diverse consequences of the dynamic climate development and to provide new services and user-oriented tools for data analysis and modelling.

CASE STUDY 4 Ohrid/ Prespa lakes

The Region of Ohrid and the Prespa Lakes, situated in south-western Europe, are recognized among the most ecologically valuable aquatic regions in Europe. The transboundary area includes six protected areas, three internationally recognized wetlands and a UNESCO Biosphere Reserve. This Case Study aims to improve climate resilience of environmental, economic and social sectors related to water use, by providing an intelligent comprehensive innovation set of long-term planning solutions, allocation and use of sufficient quantity and of adequate quality water for all users. This will improve human health, food production, conservation of natural environmental systems, clean energy production and sustainable growth of all sectors.

CASE STUDY 5 Canary Islands, Spain

The agricultural sector is the largest water user in the Canary Islands. ARSINOE will focus on the ecological transition and vulnerability of aquifers in volcanic islands and will put further efforts into the primary production including agriculture, forestry, fisheries and aquaculture, water management and clean energy infrastructure. ARSINOE will consider the interdependence between water and agriculture. The project foresees to establish the starting point of the Canarian archipelago with respect to the vulnerability produced in the insular aquifer by agriculture and livestock, defining and quantifying the limits that should not be crossed in the islands in this aspect. In addition, the energy impact of this nexus on the Canary Islands will also be established, so that it may also be the starting point for reducing emissions related to agriculture.

CASE STUDY 6 Black Sea

The Black Sea, in Bulgaria, Greece, Romania and Turkey, is a unique marine ecosystem that may face serious climate-induced problems exacerbated by anthropogenic influences. The Case Study focuses on the connection between upstream land uses and the coastal and marine ecosystems of the Black Sea under climate change and brings out innovative, holistic and integrated approaches including nature-based solutions. ARSINOE intends to follow an integrated watershed management approach, from

source to open sea, and provide climate-resilient good practices, that will enhance the adaptive capacity of ecosystems and the local communities involved.

CASE STUDY 7 Southern Denmark

Southern Denmark is a region dominated by low-lying coastal areas, coastal cities and vulnerable natural resources where often extreme sea-level rise, storms and runoff events occur. Due to climate change, multi-hazards and their associated risks to key societal and natural systems are expected to increase. To build sustainable resilience to both direct and cascading impacts of flooding, ARSINOE will pursue and co-design systemic solutions involving different scales and socio-economic sectors that exploit intelligent water management and other innovative technologies, nature-based solutions, governance models, and financing instruments.

CASE STUDY 8 Torbay and Devon County

The area has suffered from flooding over many years from a number of different sources. As the sea level is predicted to rise by over 1 m in Torbay over the next 100 years, resulting in more infrastructure and properties being affected. The case study will assess water by looking at the effects of flooding on the water supply network. Infrastructures, environment, including biodiversity can be assessed as part of the study by investigating the effects of flooding on the local environment.

CASE STUDY 9 Sardinia

Water scarcity has always been a crucial issue in this region and climate change projections forecast an increase of the average temperature, with longer hot and dry periods, alternated by short but intense rainfall events resulting in land degradation. ARSINOE will apply an innovative use of water, for rainfed extensive crops, coupled with a sustainable land, in order to increase yields and stabilize staple food production in local food chains.

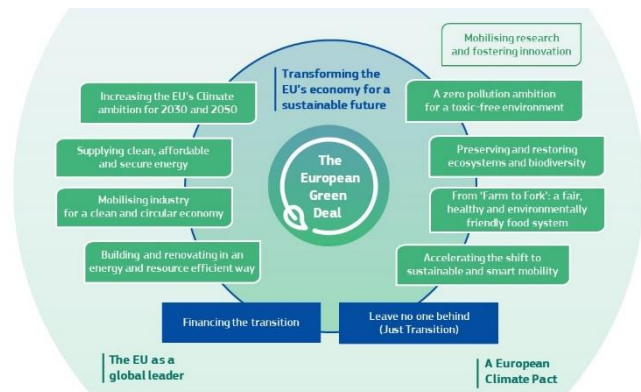
3.0 A PROVEN METHOD FOR BUILDING CLIMATE-RESILIENT REGIONS THROUGH SYSTEMIC SOLUTIONS AND INNOVATIONS

The European Green Deal sets out to transform Europe with the ultimate goal of achieving climate neutrality by 2050. It is designed to transform the EU into a green, fair and prosperous society with a modern and competitive economy. This strategy for systemic transformation is supported by legislation but ultimately must be implemented by communities “on the ground”.

Similarly, ARSINOE takes a systemic approach to transformation with the goal of creating climate resilient regions. ARSINOE applies the system innovation approach to address the growing complexity, interdependencies and interconnections of modern societies and economies. In the case studies living labs are set up where stakeholders from different sectors cooperate to identify challenges to climate resilience and sketch pathways towards a climate-resilient future for their region. This is how diverse actors come into contact and start cooperating on increasing climate-resilience together and realising the ideas behind the EU Green Deal and ARSINOE.

Moreover, ARSINOE supports the EU efforts to reach the Sustainable Development Goals. The SDGs offer a framework for thinking about sustainable development and are used during the formulation of transformation pathways in the case studies. Stakeholders are encouraged to keep them in mind and reflect on what the SDGs could mean for their home region.

In the context of managing climate change, ARSINOE will contribute to the full panel of legislative activities engaged under the different strategies, action plan lead by the Green Deal. This approach will particularly contribute to the implementation of the different Green Deal strategies and Action Plan such as the [Adaptation to Climate Change Strategy](#), the [Biodiversity Strategy](#), the [Zero Pollution Ambition for a Toxic-Free Environment](#) or the [Healthy Soils Strategy](#).



European commission graph

Moreover, the innovation package is developed as a result of the cooperation between a Living Lab and the Climate Innovation Window. Although these Living Labs were not water-oriented by design, their conclusions will be valuable to implement new Water-Oriented Living Labs¹ in Europe and stress the importance of this theme for citizens. The current assessment of the first activities run by the Living Labs will contribute to the next expected policy brief².

Lastly, the project will offer further evidence on the effectiveness of nature-based solutions for tackling climate-related risks.

¹ For more information about the Water-Oriented Living approach: <https://watereurope.eu/publications/>

² D6.5. Implementation of the System Innovation Approach for all CSs (M18) (WP6, task 6.2)

4.0 CONCLUSION

In a nutshell, ARSINOE tests a method for triggering and managing systemic change in line with the objectives of the EU Green Deal. The cases studies and outcomes of the project will touch several legislations. Several of them are under revision due to the priorities of the European Commission which aims to build a green, resilient and digitised Europe.

ARSINOE offers beneficial insights for policy makers on the EU level. It highlights the necessity of systemic thinking and holistic approaches when addressing climate change adaptation. Moreover, case studies can offer insights into the implementation of single EU policies and how they might need to be adapted to support the transformation in line with the goals of the EU Green Deal.

The European Commission and the Member States should consider this method in the implementation of the new legislations and in their path to achieve the different action plans and strategies of the EU Green Deal to maximize the synergies.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system as a whole and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



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