

SCORE – Smart Control of the Climate Resilience in European Coastal Cities

Summary

The SCORE project (Smart Control of the Climate Resilience in European Coastal Cities), funded by the European Union with a substantial budget of 10 million euros, stands as a monumental effort to address and enhance climate resilience in European coastal cities. Embarking on a four-year journey from July 1, 2021, to June 30, 2025, SCORE strategically tackles the pressing challenges posed by sea-level rise, coastal erosion, and extreme weather events. At its core, the project amalgamates smart technologies and nature-based solutions (NBS) into an integrated framework, setting out to bolster the adaptive capabilities of coastal cities.

Coastal City Living Labs (CCLLs):

An innovative concept central to SCORE is the establishment of Coastal City Living Labs (CCLLs). This groundbreaking approach diverges from traditional methods by actively involving citizens and stakeholders in the co-creation of solutions. The intention is clear: to ensure that the proposed solutions are not only scientifically sound but are also sustainable and socially acceptable. The vision encompasses a network of 10 CCLLs, each serving as a dynamic platform for the development of prototype coastal city early-warning systems.

Ecosystem-Based Approach (EBA) and Smart Technologies:

In addressing climate-related hazards, SCORE employs an Ecosystem-Based Approach (EBA), leveraging the richness of biodiversity and ecosystem services. This approach goes beyond the conventional focus on environmental benefits and extends to encompass social and economic gains. The project integrates these EBA principles with smart technologies and hybrid Nature-Based Solutions (NBS), creating a comprehensive strategy to fortify coastal cities against the impacts of climate change.

Tools and Platforms Driving Innovation:

SCORE provides an impressive array of tools and platforms to support its multifaceted objectives. The EBA catalogue serves as a guide for exploring measures to address climate hazards. The Co-Creation toolkit facilitates stakeholder engagement, a critical aspect of developing sustainable living labs. The SCORE ICT Platform acts as a central marketplace for data exchange among project partners, showcasing results to stakeholders, scientists, and citizens alike. Additionally, the Low-cost sensors catalogue assists CCLLs in planning and deploying sensing technologies tailored to local needs.

Portugal's Role – Oeiras Municipality:

The Oeiras Coastal City Living Lab (CCLL) stands as a pivotal component within the SCORE project, spearheading climate resilience initiatives with the robust technical support provided by IST-ID (Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento). This collaborative endeavor, situated in the Lisbon District of Portugal, has not only emerged as a frontrunner in the SCORE project but has also become a testament to the synergies between scientific expertise and community driven solutions.

Geographical Context and Demographics:

Oeiras Municipality, the focal point of the Oeiras CCLL, is strategically located between the Municipalities of Lisbon and Cascais, near the mouth of the Tagus River. Encompassing an area of 45.88 km², Oeiras is home to a diverse population of 177,408 inhabitants (INE, 2019). The municipality boasts a unique blend of multinational companies, scientific research units, and higher education institutes, contributing to its dynamic and vibrant character.

IST-ID's Technical Leadership:

As the lead organization, IST-ID brings its technical prowess to the forefront, steering the Oeiras CCLL towards innovative and effective climate resilience solutions. The technical support provided by IST-ID has been instrumental in implementing SCORE's overarching goals.

Challenges and Mitigation Strategies:

Oeiras faces a set of challenges encompassing sea level rise, alterations in the characteristics of extreme events, and the malfunctioning of drainage systems. IST-ID, in collaboration with local authorities and stakeholders, is actively engaged in assessing some of the EBAs that already implemented in the area to address these challenges. Some of these EBAs include natural retention ponds, increased underground recharge areas, and the rezoning of flooded areas for alternative uses such as leisure spaces and gardens.

Innovative Tools and Platforms:

The collaborative efforts between IST-ID and Oeiras CCLL have led to the development of innovative tools and platforms within the SCORE project:

- EBA Catalogue: This invites exploration of EBA measures tailored to address climate change hazards in urban and natural coastal areas. The Case Study Map Tour facilitates an in-depth understanding of



Project Reference

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Leading Institution

ATU – Atlantic Technological University (Ireland)

Partners

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal), IHS – Institute for Housing and Urban Development Studies (Netherlands), Università di Pisa (Italy), UCC – University College Cork National University of Ireland (Ireland), Universidad de Alicante (Spain), LaMMA – Laboratorio di Monitoraggio e Modellistica Ambientale per lo Sviluppo Sostenibile (Italy), Sligo County Council (Ireland), Naider Analisis y Accion Socioeconomica SI (Spain), UG – University of Gdańsk (Poland), MBI Srl (Italy), Oarsoaldea SA (Spain), Câmara Municipal de Oeiras (Portugal), University College Dublin (Ireland), NUI Galway – National University of Ireland (Ireland), RED SpA (Italy), Samsun University (Turkey), Diputacion Provincial de Barcelona (Spain), Dún Laoghaire Rathdown County Council (Ireland), Euronovia (France), Znanstveno-raziskovalno središče Koper (Slovenia), ENT – Serveis de Suport a la Gestió (Spain), TERO Consulting (Greece), Technical University Kosice (Slovakia), Pro Ge Com Srl (Italy), ERINN Innovation Limited (Ireland), City Council of Vilanova i la Geltru (Spain), European Network of Living Labs IVZW (Belgium), Consiglio Nazionale delle Ricerche (Italy)

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different EBA options, providing valuable insights for stakeholders.

- **Co-creation Toolkit:** Grounded in the principles of co-creation, this toolkit serves as a comprehensive resource for engaging stakeholders in the development of sustainable living labs. It incorporates a diverse collection of tools designed to foster interactive and engaging co-creation activities.
- **SCORE ICT Platform (SIP):** As a marketplace for data exchange, the SIP showcases project results to stakeholders, scientists, and citizens. IST-ID's technical contributions enhance the functionality of the platform, ensuring it serves as a hub for collaborative efforts in co-creating and co-designing EBA solutions.
- **Low-cost Sensors Catalogue:** Designed to assist CCLLs in selecting and deploying sensing technologies, this online platform streamlines the process for community members. Citizens and stakeholders can actively contribute to the selection of sensors based on various criteria, aligning with the local needs of each community.

practical implementation of solutions. These institutions have significantly enriched the scientific landscape through their contributions to peer-reviewed publications, indicating their commitment to advancing our understanding of climate change impacts:

Publication 1: Addressing the Spatiotemporal Patterns of Heatwaves in Portugal (1980–2021)
<https://doi.org/10.3390/w15173102>

Publication 2: Climate Change Trends in a European Coastal Metropolitan Area: Rainfall, Temperature, and Extreme Events (1864–2021)
<https://doi.org/10.3390/atmos13121995>

Grid-Point Rainfall Trends, Teleconnection Patterns, and Regionalised Droughts in Portugal (1919–2019)
<https://doi.org/10.3390/w14121863>

These publications exemplify the collaborative and interdisciplinary nature of the SCORE project, where scientific inquiry aligns with on-the-ground solutions. Through their role as first authors in these publications, IST-ID and CERIS position themselves at the forefront of climate research, leveraging their expertise to inform and guide the ongoing discourse on climate change adaptation and resilience.

Conclusion:

The SCORE project represents a transformative initiative at the intersection of climate science, technology, and community engagement. Through Coastal City Living Labs (CCLLs) and innovative tools, SCORE pioneers Nature-Based Solutions and Ecosystem-Based Approaches, exemplified in the technical leadership of IST-ID. This collaborative endeavor, spanning 10 coastal cities, not only addresses immediate challenges but also lays the foundation for sustainable climate resilience, leaving an indelible impact on European coastal cities.

The Oeiras Coastal City Living Lab, with the technical support provided by IST-ID, exemplifies the fusion of scientific expertise and community engagement in the pursuit of climate resilience. This collaborative model, embedded within the SCORE project, serves as a blueprint for addressing climate challenges in coastal cities, with Oeiras emerging as a beacon of innovative solutions guided by the technical leadership of IST-ID.

Contributions to Climate Science – Publications by IST-ID and CERIS:

The active participation of IST-ID and CERIS within the SCORE project extends beyond the

Funding

EU Horizon 2020 Framework Programme

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2021-2025

Total

9 980 831.00€

CERIS

336 181.25€

Project Website

score-eu-project.eu