

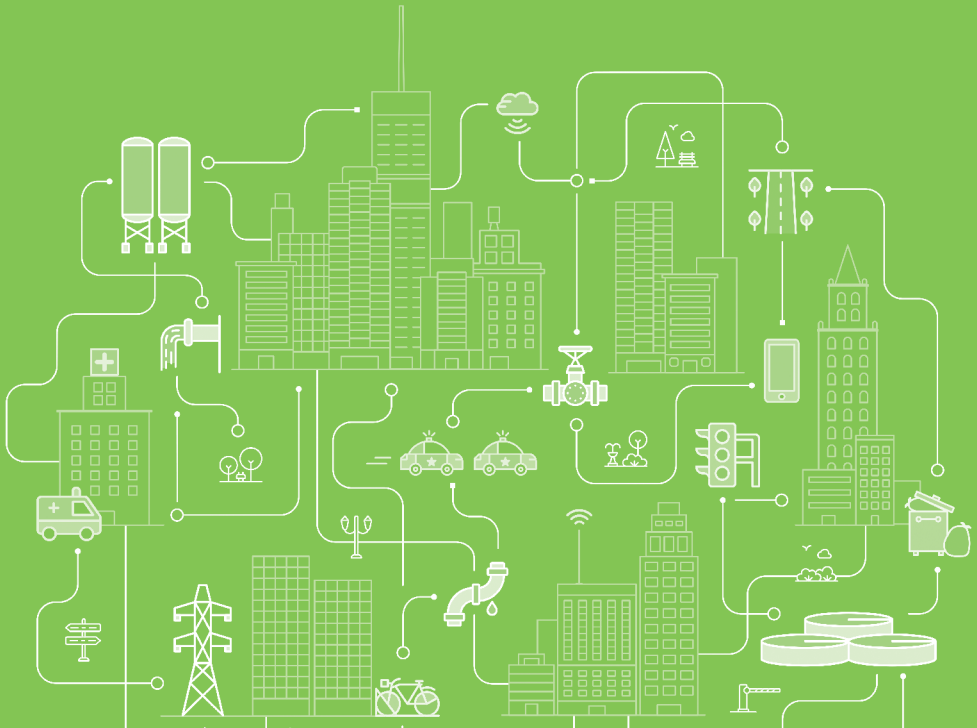


**RESILIENT CITIES FACING
CLIMATE CHANGE**



HOW TO...

**analyse the behaviour
of critical urban services
under climate pressures**

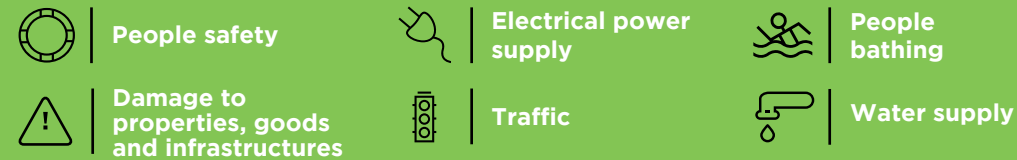


WHAT IS YOUR CONCERN?

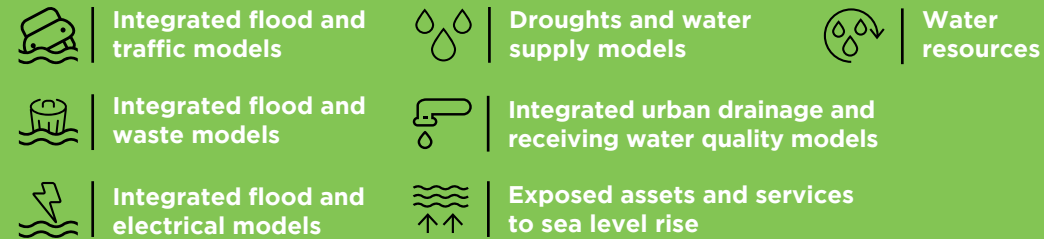
What hazard affects your area?



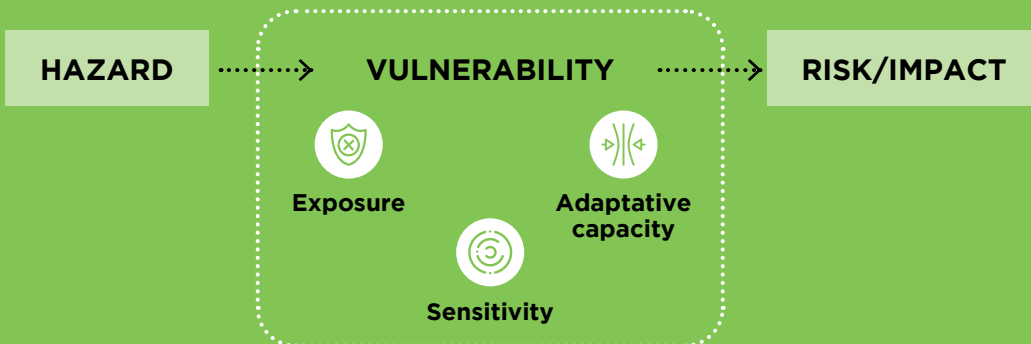
How does it affect?



Hazard assessment

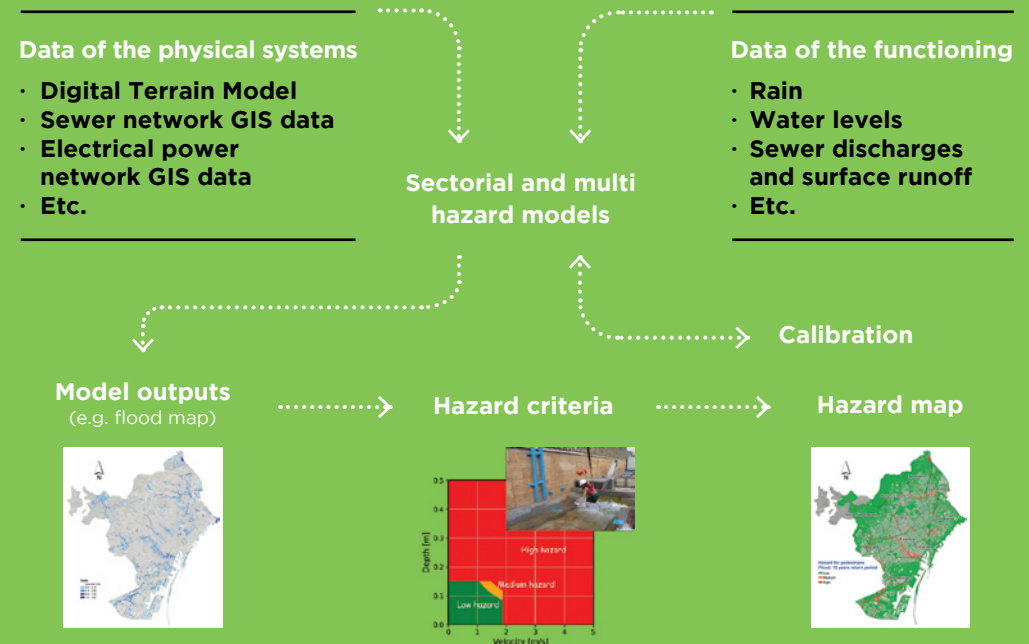


The results can be presented in form of qualitative hazard maps and/or indicators to assess hazard level from low to high. Hazard assessment is fundamental for further risk assessment, urban resilience analysis and for the evaluation of climate change scenarios and adaptation measures.



WHAT BENEFITS WOULD YOU ACHIEVE?

- ✓ **Detailed hazard assessment scenarios**
Urban scale and regional scale scenarios for multiple hazards related to urban services and infrastructures.
- ✓ **Adapted to your local needs**
Simulations of multiple hazards can be tailored to specific requirements. Also, different levels of detail can be used depending on the local needs and the information available.
- ✓ **With high quality**
Computer-based model simulations are a widespread decision support tool, thanks to the potential objectivity and transparency characteristics of the models that are mostly developed using the best available information and tools.



Example of a computer-based simulation of a flood map

RESCCUE SOLVES YOUR PROBLEMS THIS IS HOW!

✓ What is your concern?

Where is the source of your hazard?

- Regional scale
- Local urban scale

How does hazard affect your city?

- It affects on a single urban service
- It has cascade effects on other urban services and infrastructures

How long does it last?

- It is a very short phenomenon
- It lasts several hours/days

When does it occur?

- It is a current problem
- It is a possible future problem

What is your time frame?

- Hours
- Days
- Weeks
- Months
- Years
- Decades

High-quality, understandable, useful, usable, valid and reliable information is fundamental for a quality outcome.

✓ What can you use?

Background information

- Physical data for the model setup (from drainage, electrical, water resources network, etc.)
- Observed weather and systems data
- Future climate variables (precipitation, temperature, sea level rise, etc.)
- Local expertise

Multiple Hazards

A large number of multiple hazards and their cascade effects on other critical services and infrastructures can be simulated using loosely coupled models depending on local interests and resource availability.

Models

- Detailed sectorial model
- Integrated model (loosely coupled models)

Usually the outputs of for instance flood models and/or drought models can be coupled to critical infrastructure data/models to simulate multiple and cascade hazards.

Hazard maps and indicators

The achievement of hazard maps and indicators is a common and intermediate fundamental step for further risk assessment and resilience analysis including multiple cascade effects on different services and infrastructures.

✓ What should you do?

Identify hazards

Identify the main hazard/s and consequent cascade effects of interest.

Find historical references

Use high-quality observed data (from weather and systems), articles, photos and videos from operators, press and social media.

Define hazard levels

Define different hazard criteria and qualitative hazard classification (like low, medium, high, etc.) and their acceptance level on the basis of risk owner perception.

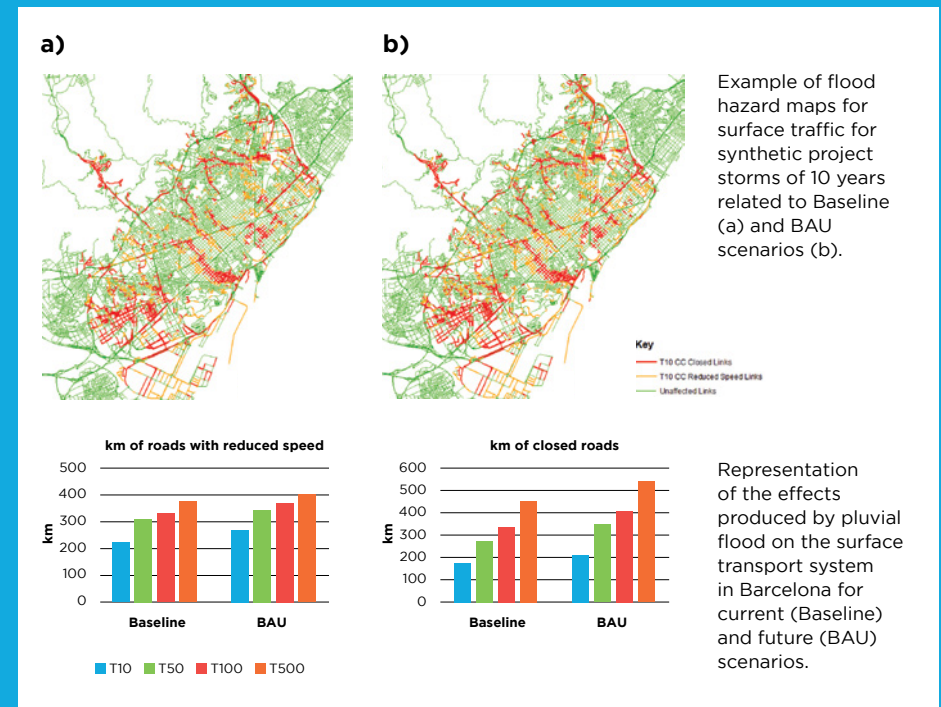
Hazard assessment

Set-up the models to perform detailed hazard assessment in the selected urban services.

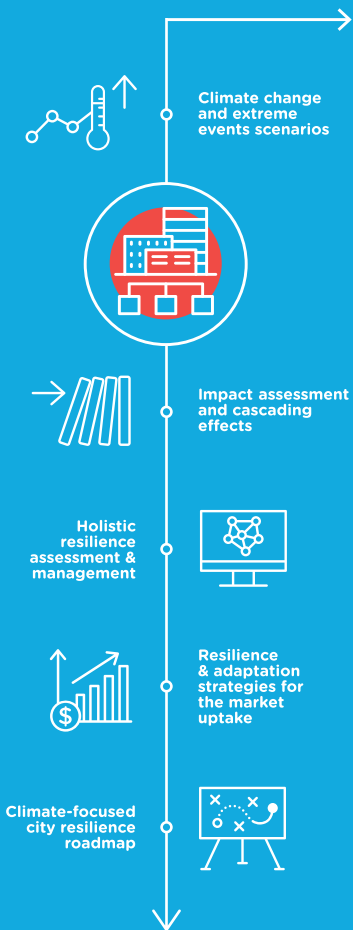
Validate derived hazards

Validate the obtained results against historical references and the data provided by risk owner and local stakeholders.

What can you use to know that?



STRATEGIC URBAN SERVICES MODELLING: MODELLING THE BEHAVIOR OF CRITICAL URBAN SERVICES UNDER CLIMATE PRESSURES



Use these guidelines to:

Analyze the response of our city services in case of extreme events

Urban floods, combined sewer overflows, sea level rise and droughts are among the major climate-related hazards that threaten our cities. Within RESCCUE, these impacts were selected together with the project stakeholders to be assessed in the cities of Barcelona, Bristol and Lisbon for current and future scenarios. These hazards may trigger further impacts, known as cascade effects, on other strategic urban services. For instance, urban floods can generate traffic disruptions or electrical power shortages. Also, sea level rise can compromise the functioning of the urban drainage network.

RESCCUE aimed to provide deep knowledge about the behavior of urban services under extreme climate conditions. Monitoring and modelling can contribute to achieve this goal for current and future scenarios, where, in a context of climate change, the experience of operators may not be enough to understand the potential response of the systems out of usual conditions. RESCCUE also presented and tested different methodologies in order to develop multiple hazard assessment for strategic urban services and infrastructures.

5 steps to your solution:

- ✓ What is your concern?
- ✓ What benefits should you achieve?
- ✓ What do you need to know?
- ✓ What can you use?
- ✓ What should you do?

RESCCUE Project

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Strategic urban services modelling experts:

Several RESCCUE partners worked together under the leadership of Aquatec-SUEZ Advanced Solutions to assess multiple climate related hazards for Barcelona, Lisbon and Bristol:

- Aquatec-SUEZ Advanced Solutions
- FIC (Climate Research Foundation)
- Cetaqua (Water Technology Centre)
- IREC (Institut de Recerca En Energia de Catalunya)
- The University of Exeter
- LNEC (Laboratório Nacional de Engenharia Civil)
- EDP Distribuição (Energias de Portugal)
- Ajuntament de Barcelona
- Câmara Municipal de Lisboa
- Bristol City Council
- Wessex Water
- Hidra
- Águas do Tejo Atlântico



Aquatec-SUEZ Advanced Solutions was responsible for developing the overall methodological framework that was then adapted, tested and applied to all the three cities.

Aquatec-SUEZ Advanced Solutions, with the support of other RESCCUE experts, provided advanced guidances in flood analysis, hazard assessment and multiple model integrations linking flooding models to other strategic urban services model like traffic, waste collection or electricity, linking urban drainage and marine model for water quality assessment and providing accurate outputs for social and economic flood damage assessment.

Aquatec-SUEZ Advanced Solutions continuously participates in different international projects related to climate change adaptation, urban resilience, risk assessment and socio-economic analysis in the field of water management.

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RESCCUE HELPS YOU MAKE YOUR CITY RESILIENT TO CLIMATE CHANGE

The RESCCUE project

RESCCUE (RESilience to cope with Climate Change in Urban arEas—a multisectorial approach focusing on water) is Europe's first large-scale innovation and urban resilience project, aimed to **improve the capability of cities to anticipate, prepare for, respond to, and recover from significant climate-change related threats with minimum damage.**

A multisectorial approach, a key advantage of RESCCUE

The RESCCUE perspective is a holistic one, which focuses rather on the interconnections than on separate city units of the urban infrastructure networks. To interconnect the several sectorial models, the project takes advantage of the **proposed tools and methodologies.**

3 cities, 3 different challenges

The models and tools developed within RESCCUE to analyse urban resilience based on a multisectorial approach have been validated in three different cities, carefully selected by their representativeness of the European diversity in terms of climate type and city characteristics: **Barcelona, Lisbon and Bristol.**

The RESCCUE partners can be your strategic team to help you make your city resilient to climate change:

