

FLOODS, WATER SCARCITY AND EXTREME EVENTS 2023

Setting the scene for the LNEC Lisbon conference 2023

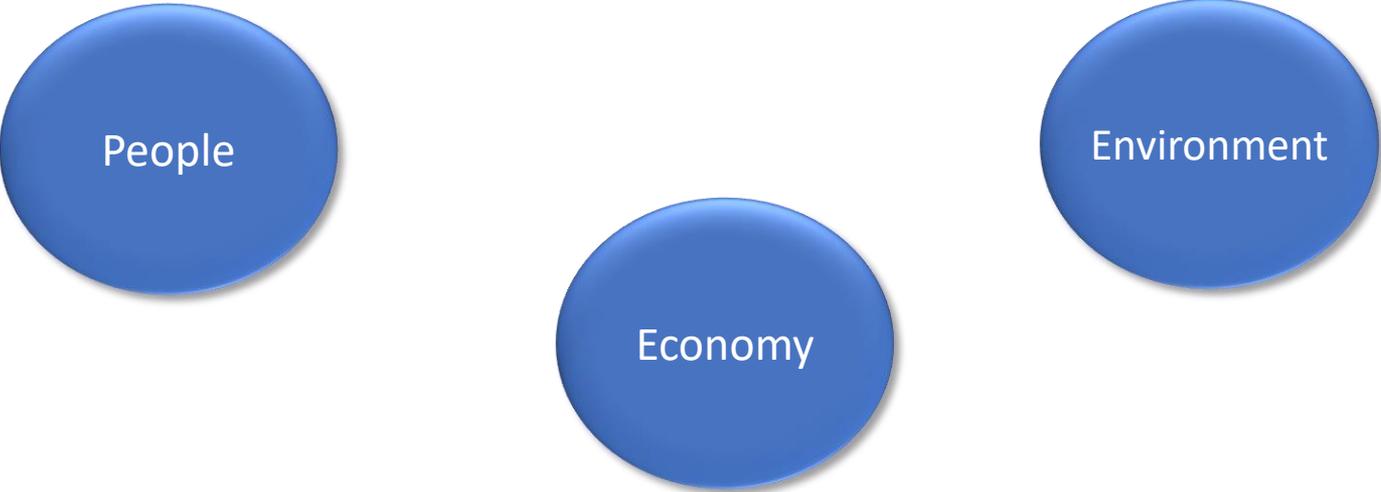
Helena Alegre
Conference chair
Head of the Hydraulics and Environment Department, LNEC



**LNEC
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CONFERENCE**



- **Extreme hydrometeorological events have high adverse impacts**
- **These impacts can be exacerbated by climate change**



People

Economy

Environment

- **Extreme hydrometeorological events have high adverse impacts**
- **These impacts can be exacerbated by climate change**



Cities



River
basins



Estuaries
& coastal
areas

- Extreme hydrometeorological events have high adverse impacts
- These impacts can be exacerbated by climate change



While celebrating our 75th anniversary, let us look back
before looking ahead



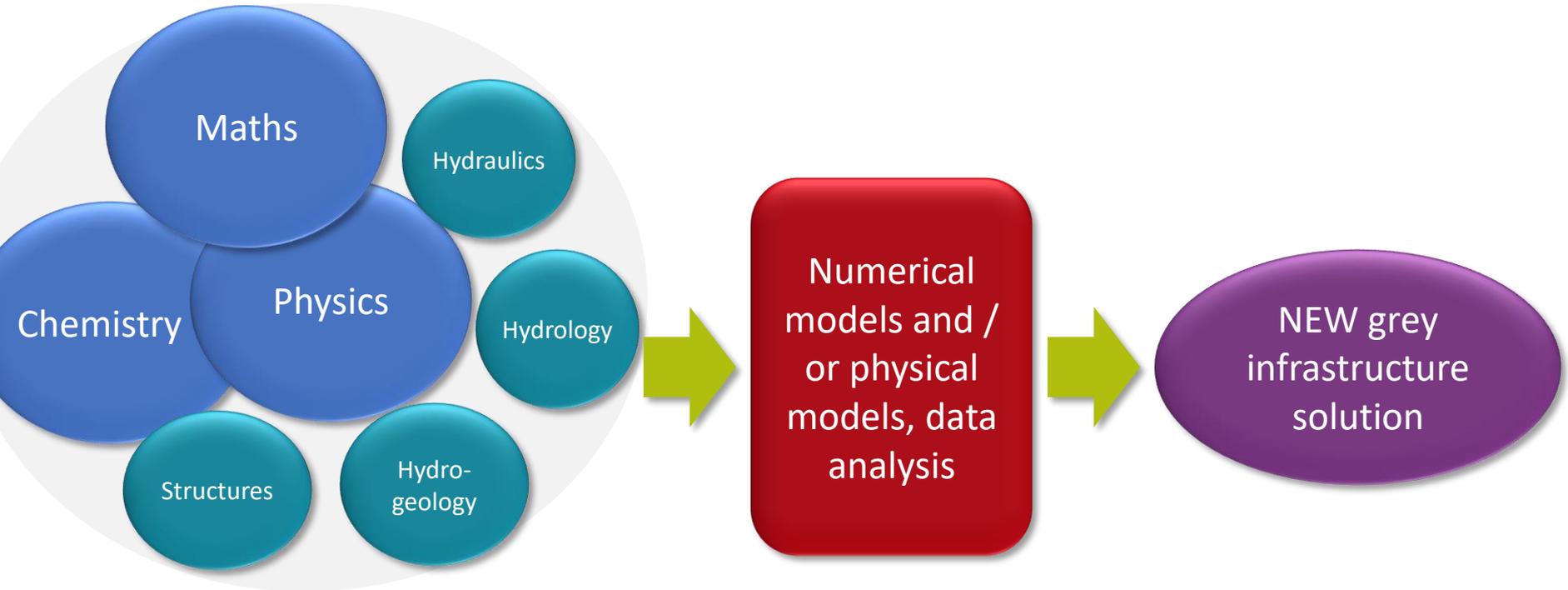
Role of engineering over time

Not long ago...



- Linear economies
- Stable time series for hydrometeorological phenomena
- Clear boundaries between public services
- Design from scratch new (water)works for design horizon
- “Safety factors”

Traditional competences and methods



Role of engineering over time

Nowadays...

Societal
objective
1

Societal
objective
2

Societal
objective
3

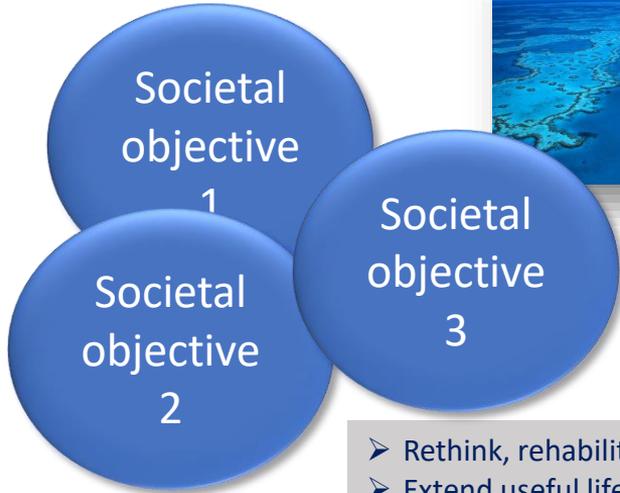


=

NEW grey
infrastructure
solution

Role of engineering over time

Nowadays...



+

=

Rebuilt from existing infrastructure

Collaborative, multidisciplinary, new interventions

Grey

Green

Blue

- Rethink, rehabilitate existing infrastructure
- Extend useful life of existing assets (physical, functional)
- Manage efficiently, build with nature, through collaborative strategies
- Implement circular economies

- Unstable time series for hydrometeorological phenomena
- Fuzzy boundaries between public services

Research and innovation on floods, water scarcity and extreme events

We have

- New problems and drivers, new objectives to achieve
- New generation of technologies evolving at a short pace
- **Increased** uncertainty about the future is the most certain fact!

- But:
 - the **waterworks are expensive and long-lasting assets!**
 - Interventions are even more necessary to protect people, economy and the environment from multi-source hazards



This conference aims at looking ahead in terms of research and innovation

- What are the main **issues we need to address**? What are the most **critical needs in terms of innovation**?
- What **challenges and strategies** are our research peers adopting?
- How can we **jointly** contribute to **build a better future**?
- How can the new generation of tools and approaches be useful in the context of the floods, water scarcity and extreme events?



We would recommend to...



- **Recognise the essential role of spatial planning** in increasing resilience to extreme coastal and inland flooding events in a changing climate.
- **Maintain up-to-date flood hazard and risk maps and management plans**, based on scientific evidence and modelling, prioritising areas at highest risk.
- **Develop flood forecasting and early warning systems**, based on reliable data and modelling tools, to strengthen preparedness and support effective disaster response.
- **Improve the resilience of hydraulic infrastructures** through adequate monitoring, review of return periods and upgrading of critical elements.
- **Relocate critical** facilities and, where necessary, make long-term plans to relocate communities exposed to unacceptable risks.
- **Promote water efficiency** through innovative technological and non-technological solutions, including capacity building and certification.
- **Facilitate safe water reuse** and support research into treatment and renewable energy desalination technologies to address growing water scarcity.
- **Reduce the unsustainable use of water**, in particular groundwater, and ensure surface and groundwater quality protection.
- **Increase the use of nature-based solutions** and multiple-benefit solutions through appropriate partnerships with clear lines of responsibility.
- **Develop water-oriented living labs** and engage citizens, local authorities, industry and research institutions in the design of innovative solutions.

At LNEC, our strategic research include topics such as:

- Rehabilitate, assess risk, rethink/ adapt; combine grey/green/blue infrastructures
- Optimally manage/operate the water systems
- Develop the tools for the construction of Water Digital twins, from the river to the ocean
- Address advanced water reclamation technologies but also software tools for smart operation and monitoring, policy & regulation instruments for enabling business models
- Asset management of sewer systems integrating nature-based solutions for urban stormwater management



Extreme events

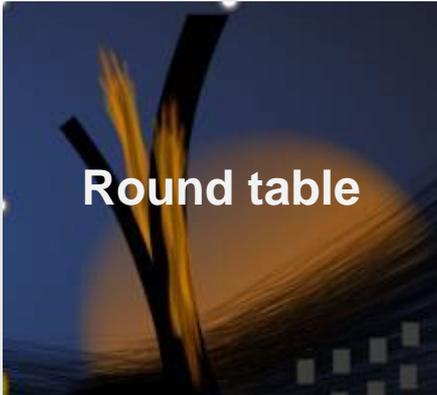
Miguel Miranda



Round table

Water scarcity

Clive Lipchin (on-line)
Valentina Lazarova



Round table

Floods

André Fortunato
José Pedro Matos



Round table

Session 1

- Joint Research Centre (JRC, European Commission)
Jann Martinsohn
- University of Algarve, Faculty of Sciences and Technology (UAlg)
Carla Rolo Antunes
- University of Lisbon, Faculty of Sciences (FCUL)
Ricardo Trigo

Session 2

- Aqua Research Collaboration (ARC)
Kristina Wencki
- Lisbon Municipality – Lisbon Living Laboratory
Catarina Freitas
- National Laboratory for Civil Engineering (LNEC)
Helena Alegre

Session 3

- Instituto Superior Técnico, University of Lisbon (IST/UL)
Dídia Covas
- Swiss Federal Institute of Aquatic Science and Technology (EAWAG, Switzerland)
Christian Stamm
- Zero Pollution and Green Cities, DG Environment, European Commission
Lukas Repa (on-line)

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Concluding remarks



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The good news are:



Water will be increasingly in the core of societies and economies

Floods, water scarcity and extreme events will be at the top of the top

New problems to be addressed by research

Many opportunities for innovation will increasingly exist

In Portugal, in Europe, in the world

Futures Consciousness for hopeful futures

Sanna Ahvenharju
Finland Futures Research Centre
University of Turku

**The future does not
come
- IT IS MADE!**

Today is a day of celebrations and sharing

- Making hopeful futures requires collaboration
- Research institutes need to collaborate and co-produce

LNEC values this a lot. In this conference:

- The rationale of the program
- A presentation on the Aqua Research Collaboration
- Examples of European projects and of Innovation Alliances (video playing at the hall)
- Highlights of the collaboration between LNEC and the 6 water professional associations located at LNEC's campus – a highly successful path not often duly valued.
 - Video produced for this event by APESB, APRH, AEPASA, LisWater, PIANC and PPA.



Thanks!



Helena Alegre

Chair of LNEC Lisbon Conference 2023

Head of the Hydraulics and Environment Department,
LNEC, Portugal

halegre@lneec.pt

Office: +351 218443420

Mobile: + 351 963382390

Linkedin.com: helena-alegre

www.LNEC.pt