ASECAP DAYS
ISTANBUL 2023

Celebrating 50 YEARS OF Successful TOLL ROAD PROJECTS

RESILIENCE OF MOTORWAY INFRASTRUCTURE IN RELATION TO CLIMATE CHANGE PHENOMENON

Valerio Molinari

Majority Shareholder – Ecogest SpA and Founder of the CCSC

Antonio Stornello

CEO of Kassandra

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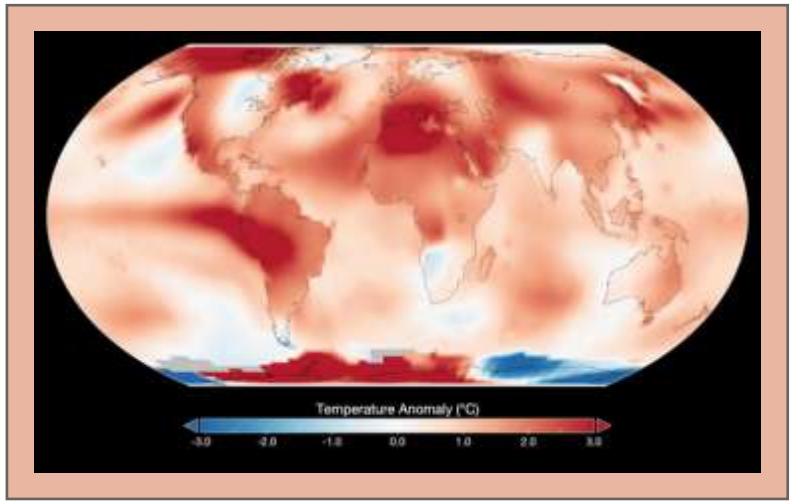
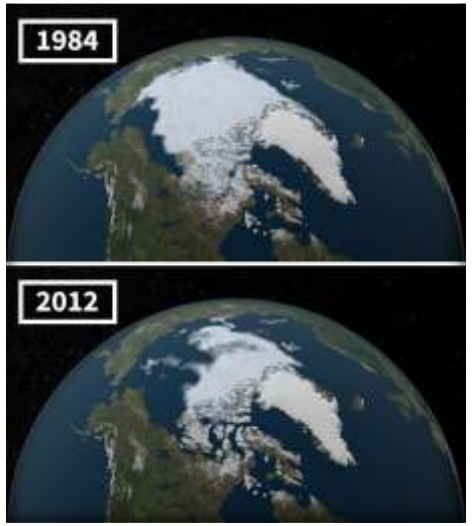
ICA
YAVUZ SULTAN SELIM BRIDGE AND NORTHERN RING MOTORWAY

Resilience of Motorway Infrastructure in Relation to Climate Change Phenomenon

NASA considers July 2023 the hottest month on record since 1880





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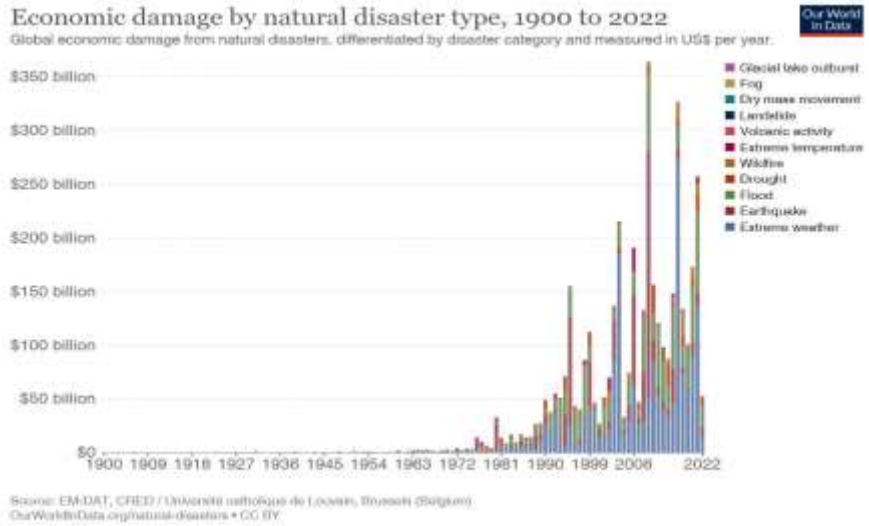
Resilience of Motorway Infrastructure in Relation to Climate Change Phenomenon

CLIMATE CHANGE is a risk driver that is increasing the intensity and frequency of *DISASTERS* and endangering the life of our *ROAD INFRASTRUCTURE NETWORK.*



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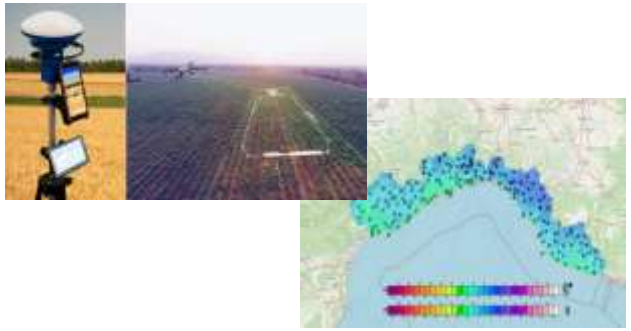
Climate-resilient infrastructure

Risk assessment in the medium and long term →

No-regret actions and technology →



Planning or specific adaptation interventions →

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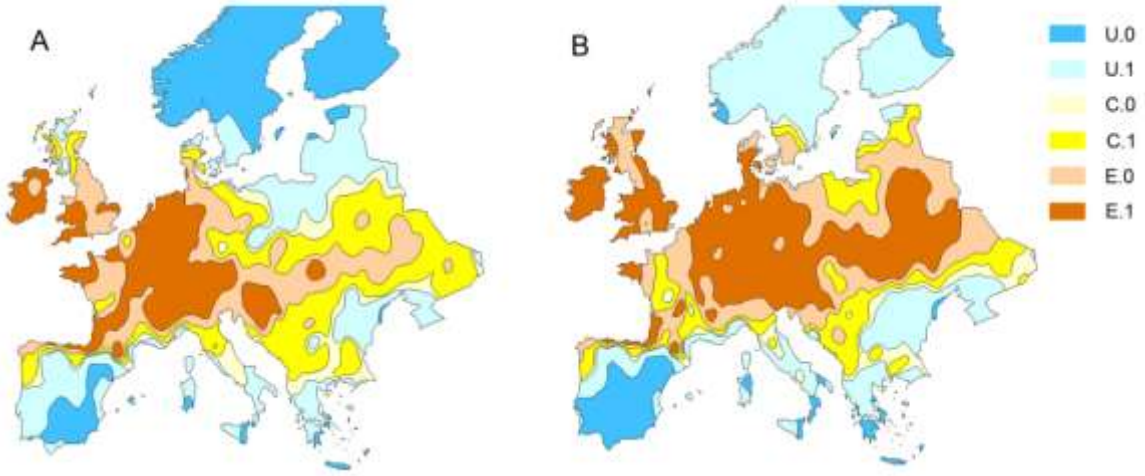
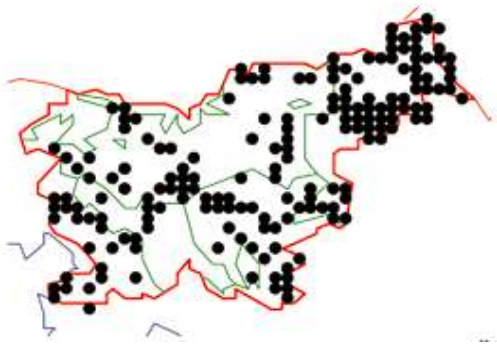
Distribution of Ambrosia artemisiifolia (common ragweed) in Europe under climate change

2010-2030



2050-2070

Distribution map for Common ragweed (Ambrosia artemisiifolia L.) in Slovenia



Common ragweed (Ambrosia artemisiifolia L.)

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Climate change affects the weeds, their management, and cost of their control.

The invasive and penetrating capacity of the plants, and of the entire green system, is in a position to compromise not only the safety of the roadway, but also the tightness of the works of art.

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Importance of nature-based solutions

Naturalistic engineering works

Planting and green maintenance

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Final Report Presentation
Pilot Study
March 2021 - March 2023

- Tangenziale di Mestre
  from km 13+700 to km 14+000
- A4 Passante di Mestre
  from km 377+500 to km 377+800
- A4/A57 Venice-Padova
  from km 366+500 to km 366+800

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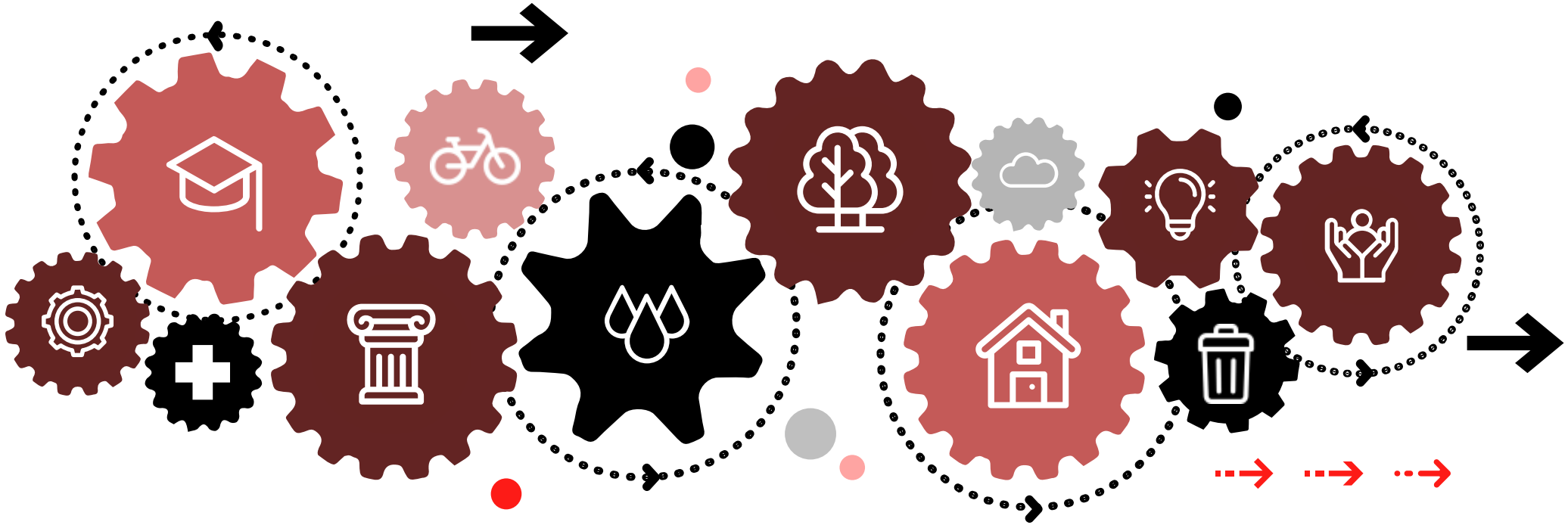
Everything is connected!



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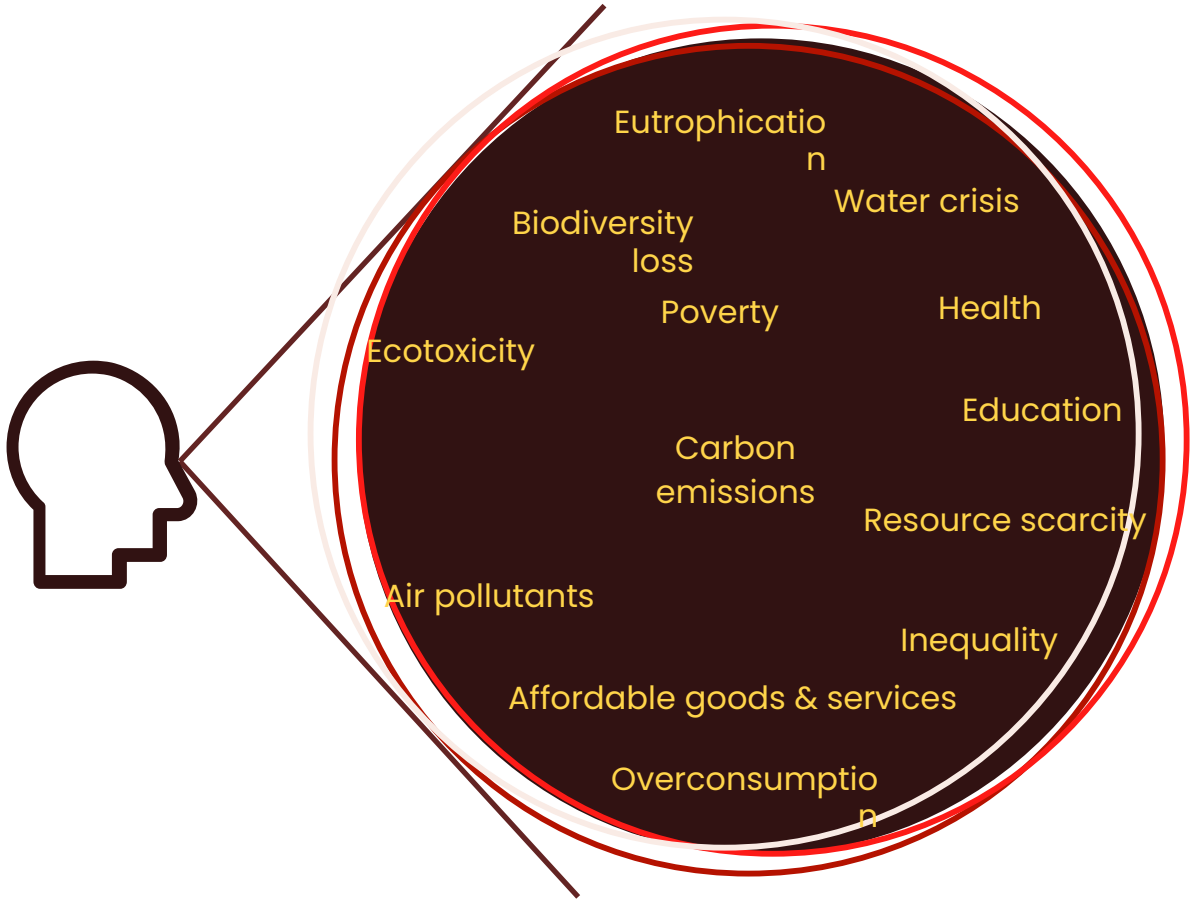
Kassandra's Vision



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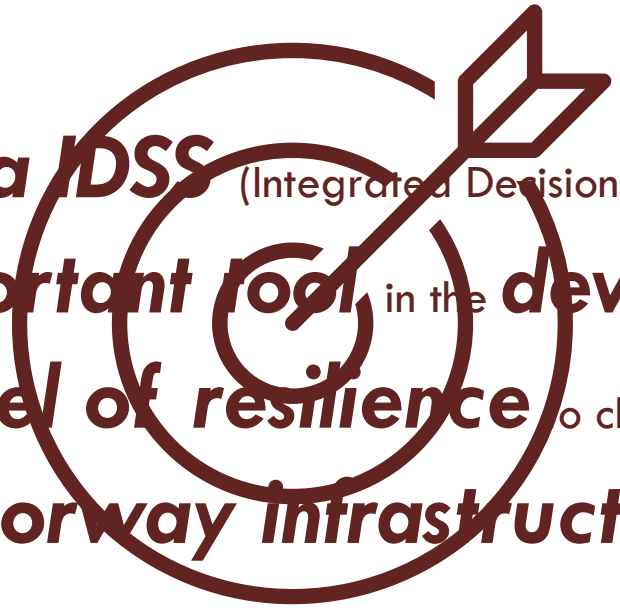
Primary Aims of the Pilot Study



Kassandra IDSS (Integrated Decision Support System)

can be an ***important tool*** in the ***development of a model of resilience*** to climate change for ***motorway infrastructure***

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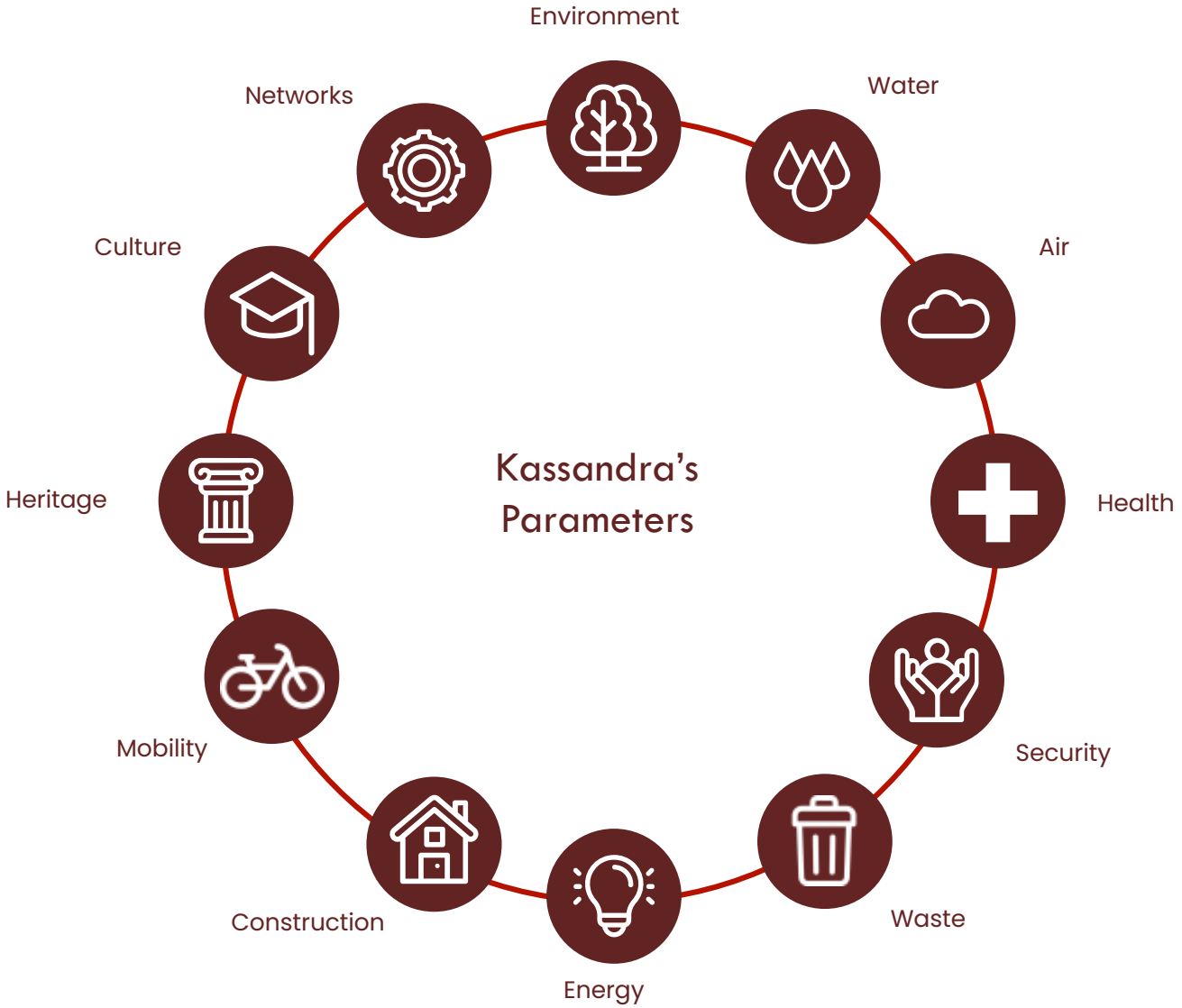

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Pilot Study, methodology

- Analyze and give visibility to current critical issues in terms of resilience to climate change
- Analyze and give visibility to current critical issues in terms of impact on the quality of life of those who use the motorway or live near it
- Create the "digital twin"' of the motorway sections considered in this pilot study
- Create a specific database
- Use the "digital twin" to allow the creation and modulation of different scenarios to improve the elements where there are critical issues in the current state
- Create the "best scenario" for each road section
- Gives to the Concessioni Autostradali Venete Managment a Final Report

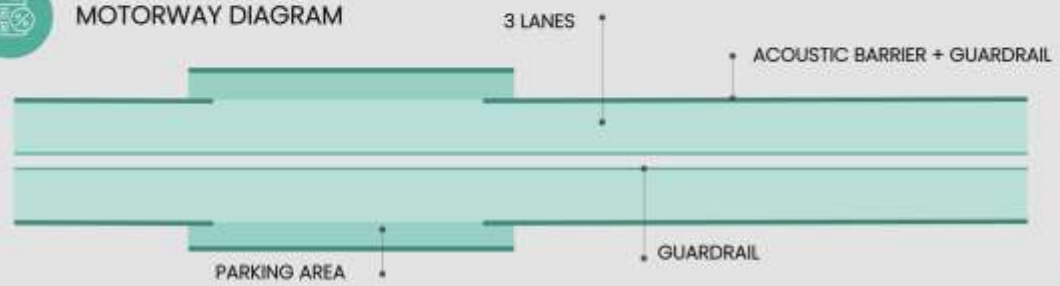
Resilience of Motorway Infrastructure in Relation to Climate Change Phenomenon

MOTORWAY SECTION STUDIED
300 m

DATA POINTS
170

ROAD TYPE
VIADUCT

MOTORWAY DIAGRAM



ACOUSTIC BARRIER

Materiale	METAL
Total length	560 m
Sound absorption	A3
Condition	1 (poor)

TARMAC
SMA WITH AGGREGATES

GUARDRAIL
METAL TYPE: H3-A-W6 (3n28361)

TRAFFIC DATA

LIGHTING TYPE

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DATI STAZIONE VIA TAGLIAMENTO (1,2 km dall'AREA DI STUDIO)[1]

Latitudine (nord)	45° 29' 22"
Longitudine (est)	12° 13' 03"
Altitudine (m)	3
Anno attivazione	2008
Parametri monitorati	NO_x, CO, PM10

MEDIA ANNUALE PM 10 (µg/m3)[1]

GIORNI DI SUPERAMENTO LIMITE (40 µg/m3)[1]

ALTRE FONTI · KASSANDRA · CAV

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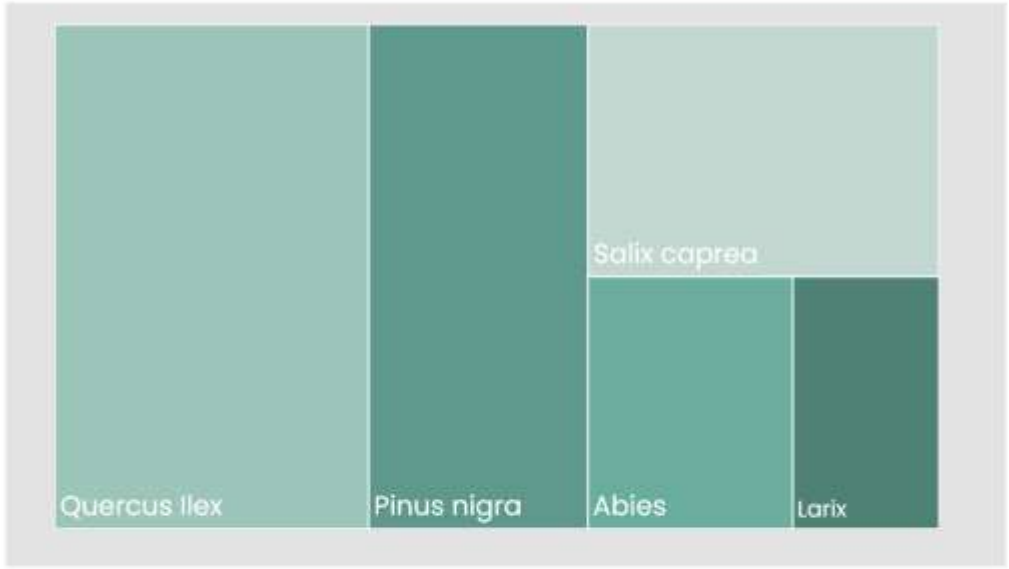

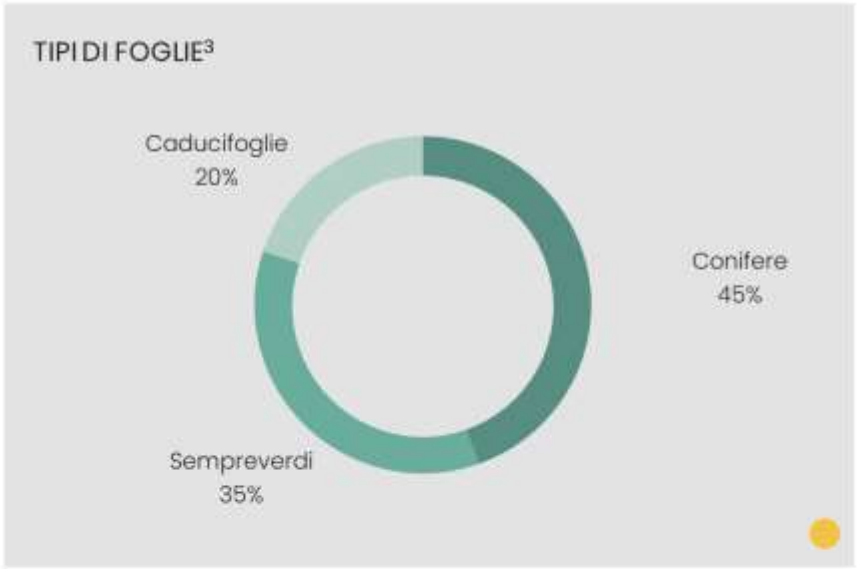

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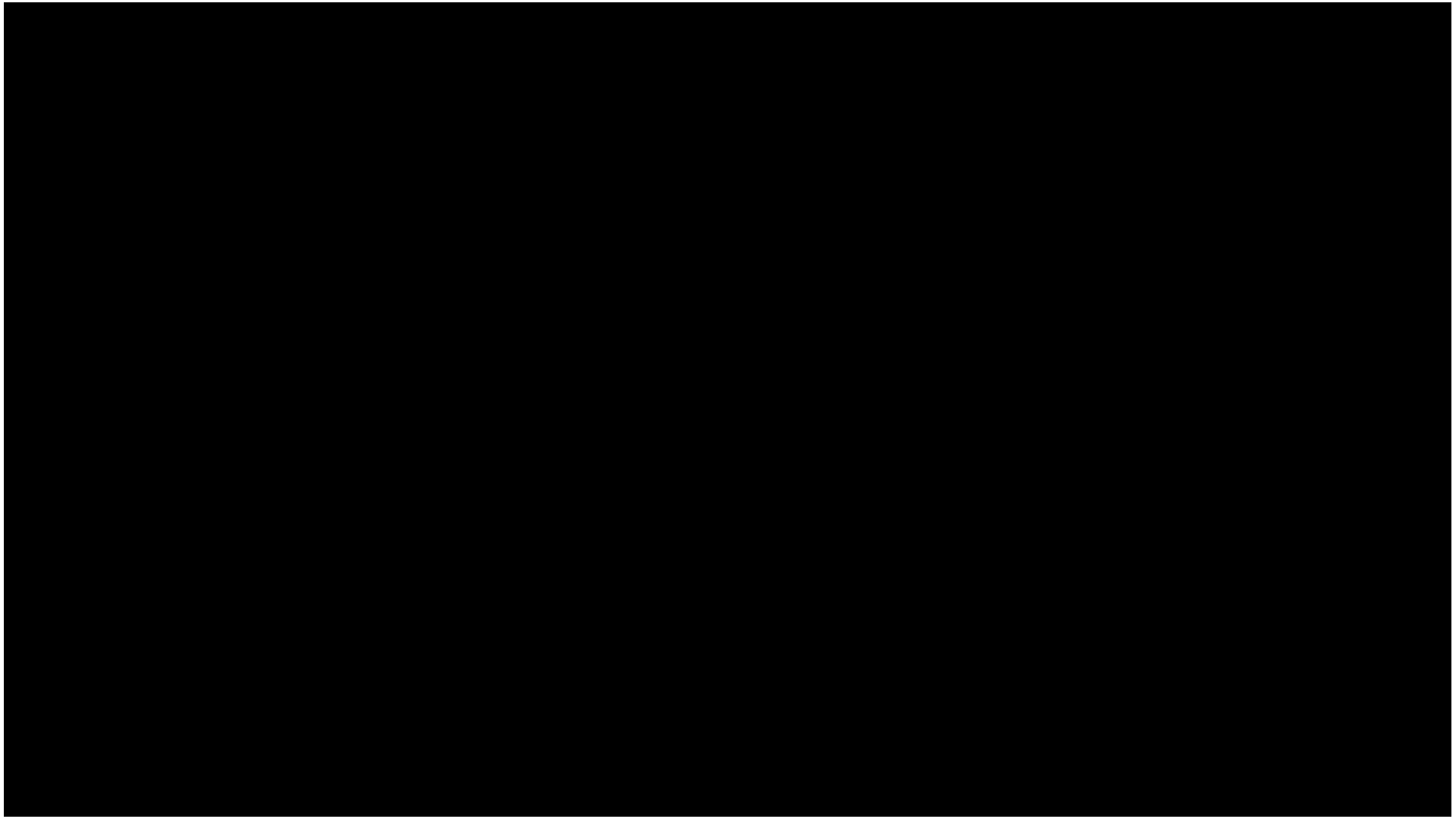

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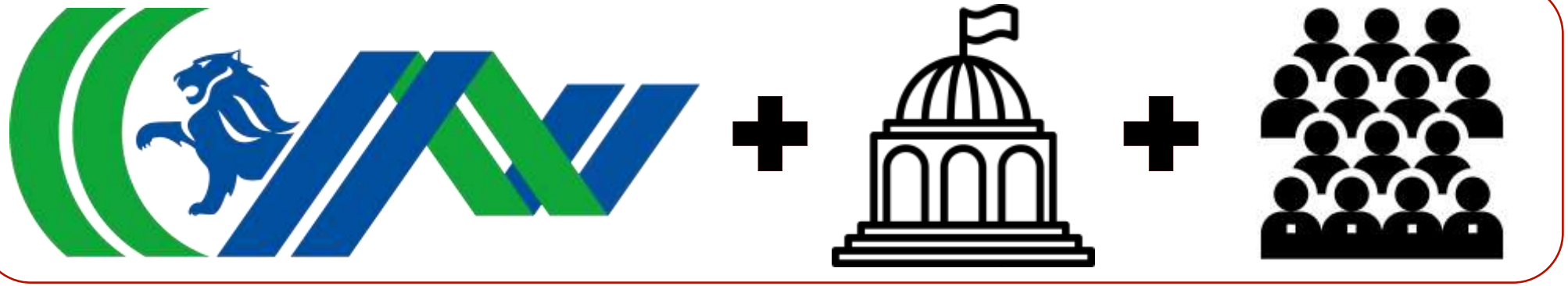
The Actions Approach

Best Solutions



Resilience of Motorway Infrastructure in Relation to Climate Change Phenomenon

Summary of the Pilot Study

- 3 Different Sections
- 900.000 sqm
- 8110 Data points
- 18 Different Scenarios
- 3 Main Public Projects evalueted
- 220 pages of Final Report
- We have raised the Resilience Index by more than 15% on average in each area
- We have given to CAV Management the correct information about the right way to increase the resilience of their Motorways

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THANK YOU FOR YOU ATTENTION

VALERIO MOLINARI

Majority Shareholder – Ecogest SpA and Founder of the CCSC

ANTONIO STORNELLO

CEO of Kassandra

In collaboration with Miriam Olmeda Alarcon – Scientific Researcher at CCSC

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