

Air quality and health impacts of co-created climate change mitigation and adaptation strategies



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Developing STratEgies by integrating mitigatioN, aDaptation and participation to climate changE Risks

https://distender.eu/

Aims to:

- develop actionable strategies for climate change mitigation and adaptation, based on the integration of climate change adaptation and mitigation actions with participatory approaches, as a holistic, multi-scale cross-sectoral framework (agriculture, health and well-being, energy, water, biodiversity, forestry, transport and urban planning)
- develop a Decision Support System to help policy makers to take the most out of the knowledge, tools and recommendations generated by DISTENDER

5 Core Case Studies:



Austria



Dehesa-Montado (EURAF)



North-east of The Netherlands (HUAS)



Metropolitan City of Turin (CMTo)



Guimarães city, Portugal



DISTENDER Framework

Developing SSP depicting possible socio-economic futures

in each CCS CO-CREATION

Developing climate adaptation and mitigation strategies



to gather all DISTENDER outputs and make a final classification of the different proposed robust strategies.

Evaluating Adaptation and Mitigation Strategies (Round 2b)

Synthesised lists of adaptation and mitigation strategies

- Strategies across strategy types, sub-types and sectors
- Strategies represent priorities for CCS and suitability for robust strategy evaluation
- Strategies evaluated for 26 indicators, each related to a component of robustness

	2 indicators on health impacts:
Indicator 0	Reduction of air quality impacts on human health
Indicator 1	Reduction of excess mortality due to heat

Case Study	Nr of Strat
Austria	75
EURAF	64
HUAS	64
Guimarães	55
Turin	75

How were these indicators assessed?



Evaluation methodology

Scoring Impact

from 1 (high negative impact)to 5 (high positive impact)(3 means no effect)



- 1. First screening of strategies based on their potential effects on emissions, air quality and health, or no effect, and also on whether they could be modelled or not.
- 2. Literature review to support the assessment of strategies that could not be modelled and scoring them accordingly.
- 3. For the strategies to be **modelled**,
 - translated to an emission reduction potential, assuming a high implementation rate
 - air quality and health impacts were estimated to inform the scoring of the respective strategies and populate a decision matrix of each case study including all evaluated strategies



Posters on site

Wed, 30 Apr, 14:00-15:45 Hall X4

Sílvia Coelho **X4.58** | EGU25-10811| ECS

Evaluation methodology

for the modellable strategies



Modelling approach applied to each strategy to be modelled in Round 2b (as well as in the 2 previous Rounds of DISTENDER)



• Morbidity Nr of cases Years of Life Disability

Evaluation results



Austria

• Half of the co-created strategies have no impact on health

Reduce passenger transport per person by creating '15 min cities'

Reduce parking spaces in cities

Reduce passenger transport per person by implementing traffic calming and banning/restricting entry into certain areas

Electrification of modes of transport including cars, buses, and rail

Implement measures to make transport infrastructure climate adaptive, such as by removing impervious surfaces and increasing green space

Implement dedicated funding mechanisms to promote green infrastructure and nature-based solutions

Strategies on transports and mobility can greatly reduce impacts on air quality and health



NBS can not only greatly reduce health impacts from heat but also from air quality

Evaluation results

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C M Turin

- More than half of the co-created strategies (45 in 75) have no impact on health
- Strategies to prevent/reduce the impact of heatwaves can be effective on **reduction of deaths** due to heat!
- Combined with strategies on mobility that can be effective on **reducing emissions and deaths** due to air pollution!

Increase quantity and accessibility of refuge areas from urban heat

Increase urban greenery on roofs, in parks and in gardens

Increase green areas and ecological connections between them

Provide an efficient and integrated network of public services

Reduce demand in the transport sector by promoting campaigns and nudging policies towards sustainable mobility

Premature deaths (PM2.5)

Premature deaths (NO₂)



in 2050, compared to 2018

Targeting the DSS

Decision Matrix







Decision matrix

High certainty

Strategy title	Indicator0	Indicator1	Indicator2	Indicator3	Indicator4	Indicator5	Indicator6	Indicator7	Indicator8	Indicator9	Indicator10	Indicator11	Indicator12	Indicator13	Indicator14	Indicato
Strategy0	-1.0+0	-3.0+0	-3.0+0	-3.0+0	-3.0+0	- 3.0+	-3.0+0	- 3.0 + 0	-3.0+0	- 3.0+	-3.0+0	- 3.0 + 0	-3.0+0	-3.0+0	-3.0+0	- 3.0 +
Strategy1	- 3.0 + 0	-3.0+0	-3.0+0	-3.0+0	- 3.0 + 0	-3.0+	-3.0+	-3.0+	-3.0+	-3.0+0	-3.0+	-3.0+	- 3.0 + 0	-3.0+0	- 3.0 + 0	- 3.0+
Strategy2	- 5.0 + 0	-3.0+0	-3.0+0	-3.0+0	- 3.0 + 0	-3.0+	-3.0+	-3.0+	-3.0+	-3.0+0	-3.0+	-3.0+	- 3.0 + 0	-3.0+0	- 3.0 + 0	- 3.0+
Strategy3	- 3.0 + 0	-3.0+0	-3.0+0	-3.0+0	- 3.0 + 0	-3.0+	-3.0+	-3.0+	-3.0+	-3.0+0	-3.0+	-3.0+	- 3.0 + 0	-3.0+0	- 3.0 + 0	- 3.0+
Strategy4	-2.0+	-3.0+0	-3.0+0	- 3.0+	- 3.0+	-3.0+0	-3.0+0	- 3.0 + 0	- 3.0 + 0	-3.0+0	-3.0+0	- 3.0 + 0	- 3.0 + 0	-3.0+0	- 3.0+	- 3.0 +
Strategy5	- 3.0+	-3.0+0	-3.0+0	- 3.5 + 0	-3.0+0	-3.0+0	-3.0+0	-3.0+0	-3.0+	-3.0+0	-3.0+0	-3.0+0	- 3.0 + 0	- 3.0 + 0	-3.0+0	- 3.0+
Strategy6	- 3.0+	-3.0+0	-5.0+0	- 5.0 + 0	-3.0+0	-3.0+0	-3.0+	-3.0+0	-3.0+	-3.0+	-3.0+0	-3.0+0	- 3.0+	- 3.0 + 0	-3.0+0	- 3.0+
Strategy7	-3.0+	-3.0+0	-4.9+	-4.0+0	-3.0+0	-3.0+0	-3.0+	-3.0+0	-3.0+	-3.0+0	-3.0+	-3.0+0	- 3.0+	-3.0+0	-3.0+0	- 3.0+
Strategy8	-3.0+0	-3.0+0	-4.3+	-4.0+	- 3.0+	-3.0+0	-3.0+	-3.0+0	-3.0+0	-3.0+0	-3.0+0	-3.0+0	-3.0+	-3.0+0	-3.0+	- 3.0+
Ctratage																
Legend of a dec	ision matrix:															
1. Strong negative effect.																
2. Negative effect.																
3. No effect.																
4. Positive effect.	ositive effect.															
5. Strong positive effect.																
Low certainty.																

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Thank You!





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How different SSPs will affect air quality and human health: the DISTENDER project

framework

Silvia Coelho, Vera Rodrigues, and Joana Ferreira