Impetus4Change (I4C): Improving near-term climate predictions for societal transformation

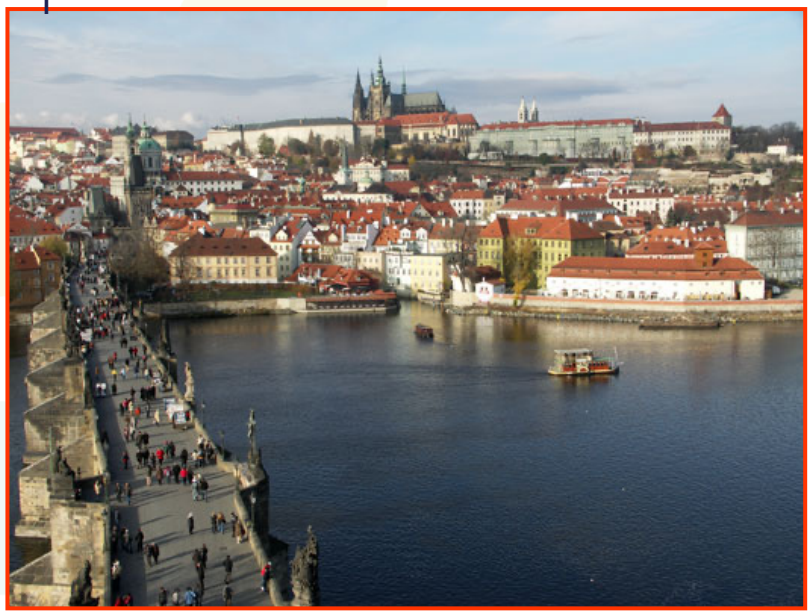
Disaster preparedness in Prague

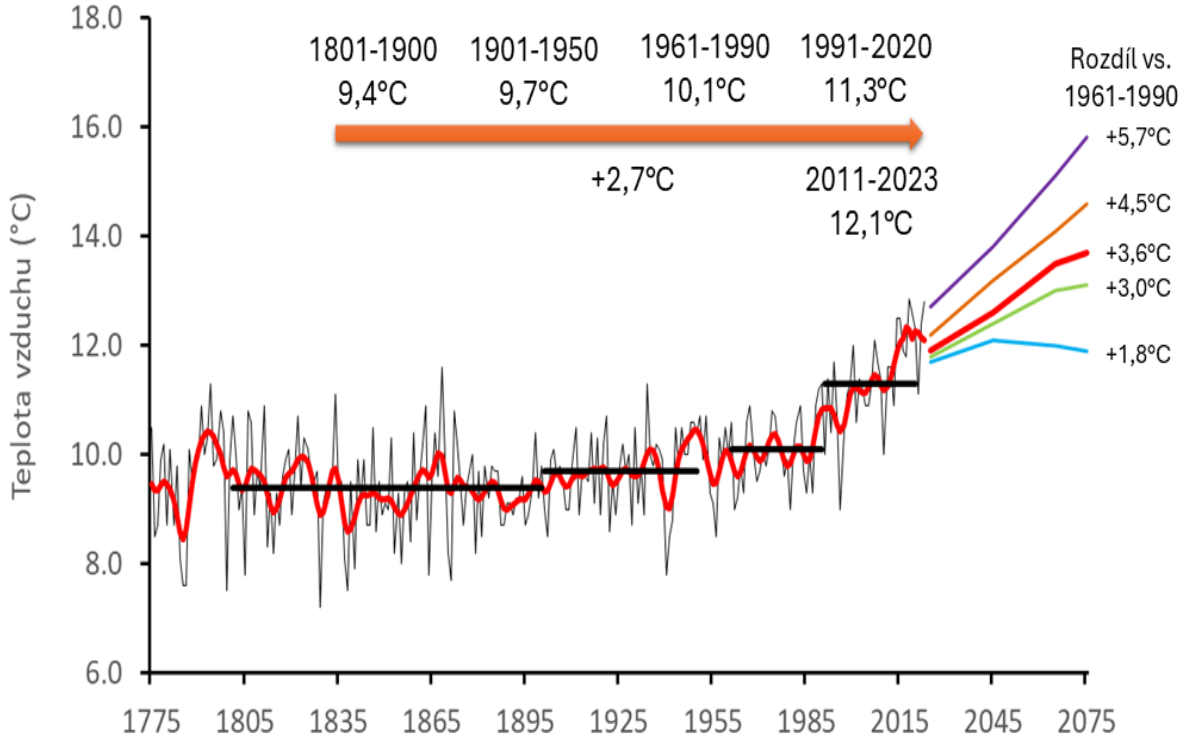
Štěpán Kyjovský
Department of Environment, Prague City Hall

Adaptalab #2, Barcelona, Spain, March 11–13, 2025

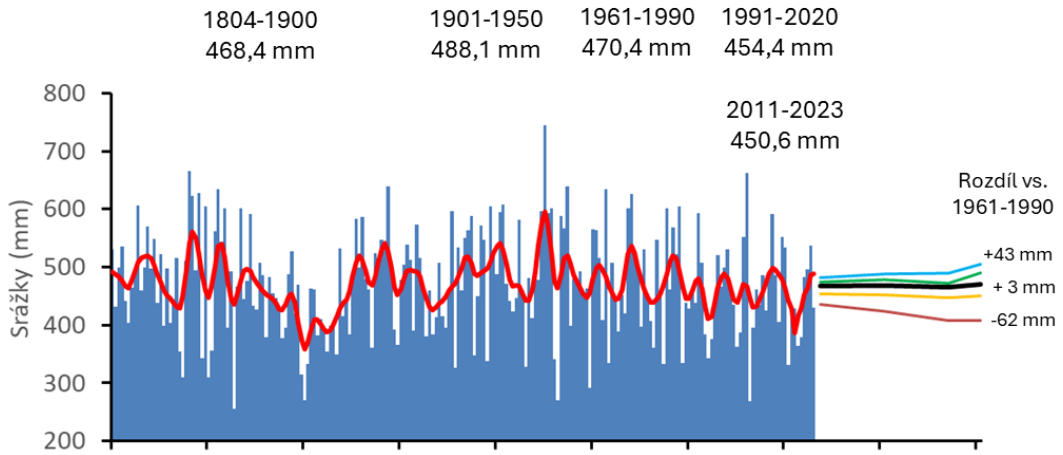
Prague Climate : Air Temperature

Population: 1.4 M
Metropolitan area: 2.7 M

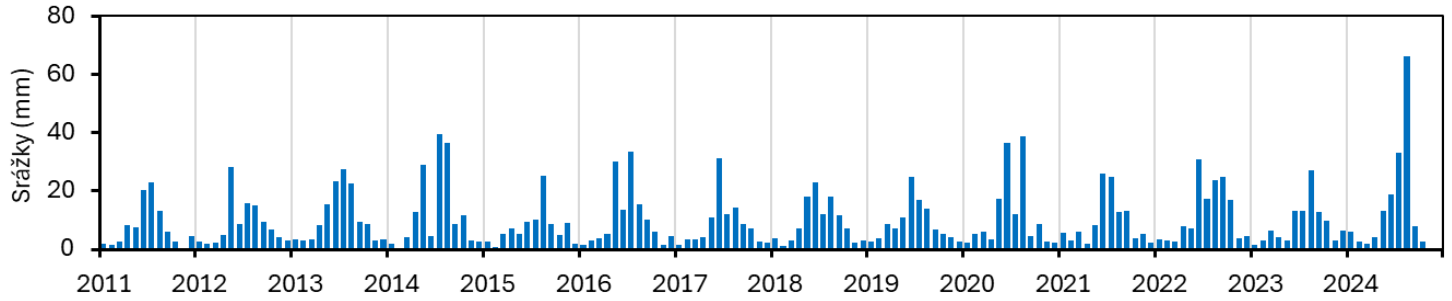




Percipitation in Prague



Maximální hodinový úhrn srážek v Praze



Major Climate Related Hazards

- Flooding
- Heat waves
- Drought
- Late spring frosts
- ….

DISASTROUS FLOOD IN PRAGUE AUG/2002

DISASTROUS FLOOD IN AUG/2002 PRAGUE SUMMARY

Culmination Flow Rate:	**5 .160 $m^3.s^{-1}$**
Evacuated citizens:	**50.000**
Collapsed buildings (total costs):	**€ 29 million**
Victims (CZ total):	**17**
Metro stations flooded by water:	**18**
Flooded ZOO, agricultural land, damaged buildings, factories, cars, infrastructure, Sewage treatment plant, parks, roads, etc.	
Total damage costs:	**€1,04 billion**

CONCEPTION OF FLOOD PROTECTION

TOTAL LENGTH OF LINEAR FLOOD PROTECTION 19,225 km

System consists of:

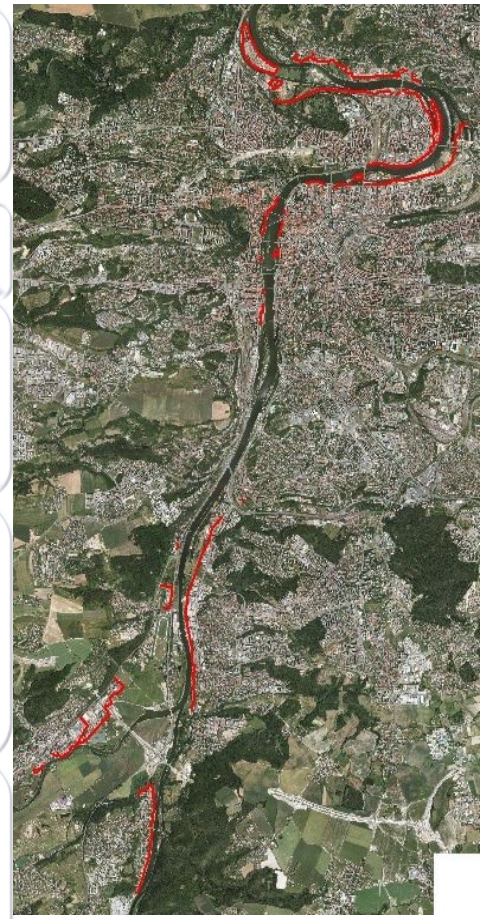
Flood protection fixed barriers

(concrete walls, soil dams and embankments)

Flood protection mobile barriers

(underground sealing and mobile support pillars and segment fillings)

Other measures: Sewage stoppers, sewage and creek pump stations, flood water gates, sandbags, evacuation plans, etc.



CONCEPTION OF FLOOD PROTECTION

Central storage of flood protection mobile parts Praha - Dubeč:

1.100 tons

119 containers

2013 FLOOD EVENT

FLOOD PROTECTION OF PRAGUE

2013 FLOOD EVENT

	JUNE 2013	AUGUST 2002
Culmination Flow Rate:	3.210 $m^3.s^{-1}$	5.160 $m^3.s^{-1}$
Evacuated citizens:	1.279	50.000
Victims (CZ total):	7	17
Metro stations flooded by water:	0	18
Flooded ZOO, damaged buildings, infrastructure, parks, roads, cars, etc.		€1090 million
Total damage costs:	€153 million	

FLOOD RISK AND PROTECTION OF PRAGUE

Total costs of the complete flood protection system:

€ 126 million

Support from European funds:

€ 22 million

INVESTMENT EFFICIENCY
after completion of Flood Protection System

Total area endangered by floods 57,2 sq. km

Citizens endangered by floods 70.000

Revitalizations in the territory of Prague

- There are a total of 100 streams in Prague
- Total length 357 km
- In the administration of the city of Prague is 312 km
- 88 ponds with an area of 134 ha and a volume of retained water of 2,19 mil. m^3
- 3 dam reservoirs with an area of 56,9 ha and a volume of retained water of 1,75 mil. m^3
- 33 retention reservoirs with an area of 30,2 ha and a volume of retained water of 362 512 m^3
- 8 dry polders with an area of 46,9 ha and a retention volume of 875 340 m^3

Čihadla – new riverbeds and pools

Opening of the arched section of the Šárecký stream

Revitalization under Hořejší pond

Revitalization of the Brusnice stream

Říčanka and its surroundings before revitalization and after completion

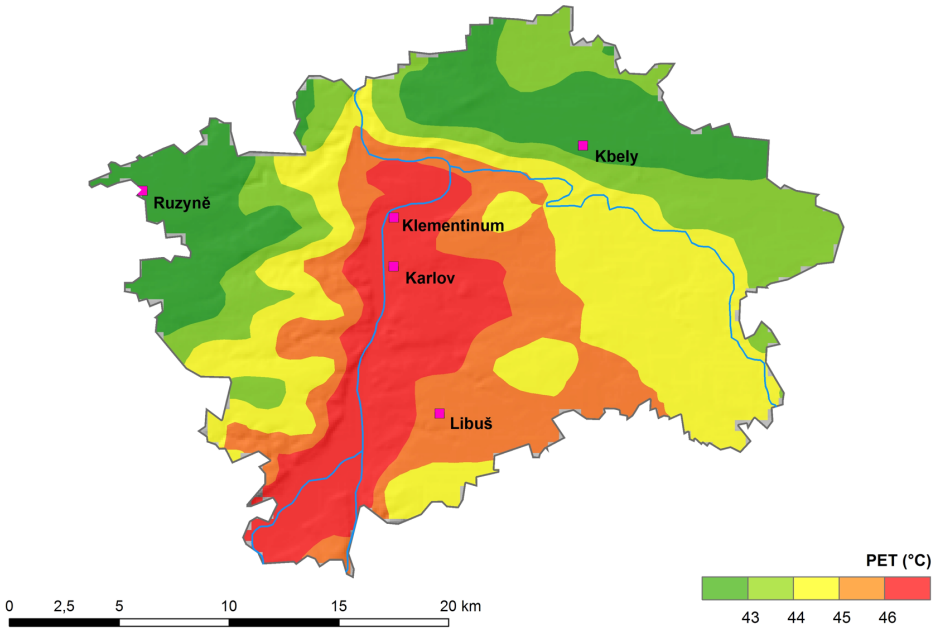
Říčanka – during the June 2022 floods

Revitalization of Rokytka stream 2021-2022

- The stream lengthened by 306 m.
- The new meandering riverbed was supplemented by a system of larger and smaller pools.
- Almost **3 times more water** is retained in the revitalized riverbed than in the original riverbed.

Rokytka – during the June 2022 floods

Prague
Urban Heat Island

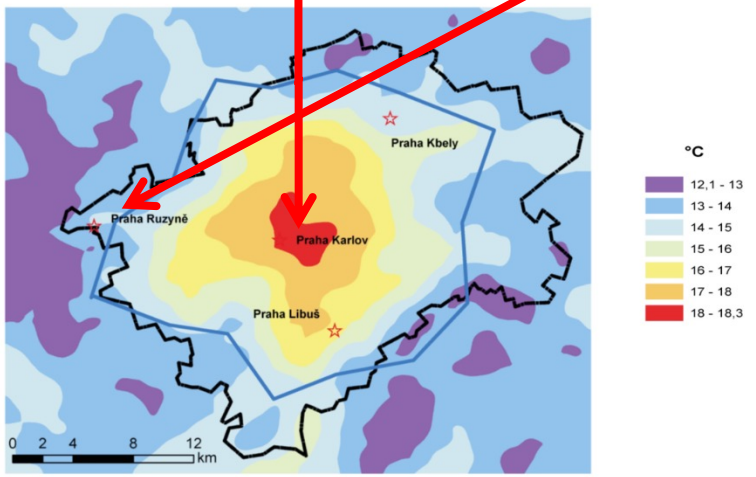


Maximum PET in Prague on 28th July 2013

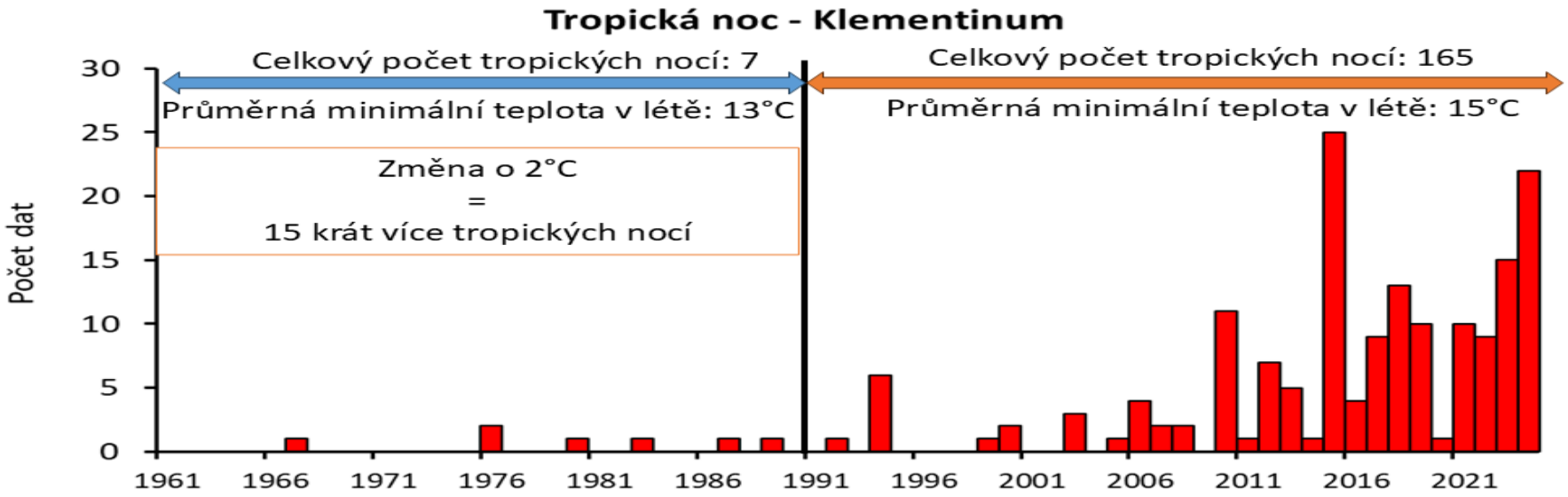
	J	F	M	A	M	J	J	A	S	O	N	D	annual
Tmax [°C]	1,4	3,1	7,7	13,4	18,7	21,2	23,6	23,5	18,6	12,8	5,5	2,1	12,6
Tmin [°C]	−3,6	−3,3	−0,1	3,5	8,4	11,3	13,4	13,0	9,1	4,9	0,3	−2,2	4,6
Precip [mm]	23,6	23,1	28,1	38,2	77,2	72,7	66,2	69,6	40,4	30,5	31,9	25,3	526,8

Zdroj: Ročenka Praha - Životní prostředí 2005 Statistické údaje za roky 1961–1990 ze stanice Praha-Ruzyně

Klementinum vs. Ruzyne



Tropical Nights at Klementinum



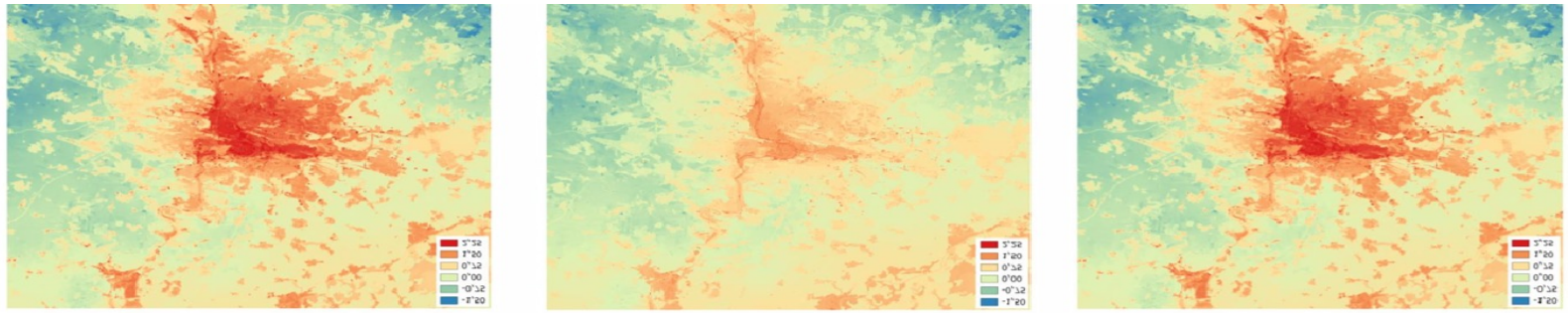
		Teplota vzduchu	Tropické dny	Tropické noci	Mrazové dny
1981-2010		10.7	13.7	2	65
	chladnější	12.4	27.6	11.9	45.4
2031-2060	pravděpodobná	12.6	32.8	14.4	42.3
	teplejší	13.2	38.5	19.9	38

Adaptation measures for climate related heat Projekt DESTINATION EARTH : Urban Heat Use Case

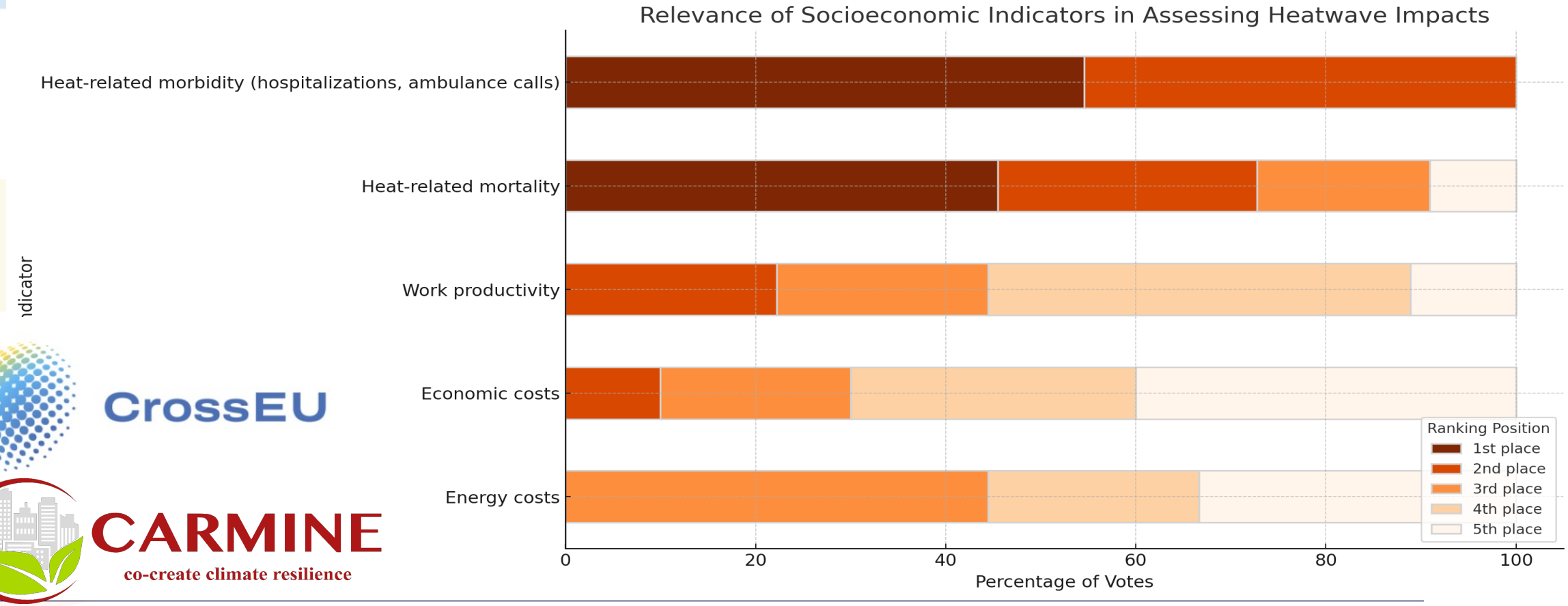
The impact of ambitious climate adaptation scenarios has been calculated for Prague:

1. Light-colored materials: the albedo of all build-up areas is changed to 0.3 (realistic white)
2. Soil unsealing: 50% of all non-building urban areas are unsealed
3. Urban trees: 50% of all non-building urban areas are under tree crown cover
4. Combination of all of these: maximum impact scenario

Previous results have shown that only the wide-spread application of measures is effective to reduce the overall urban heat stress in a city



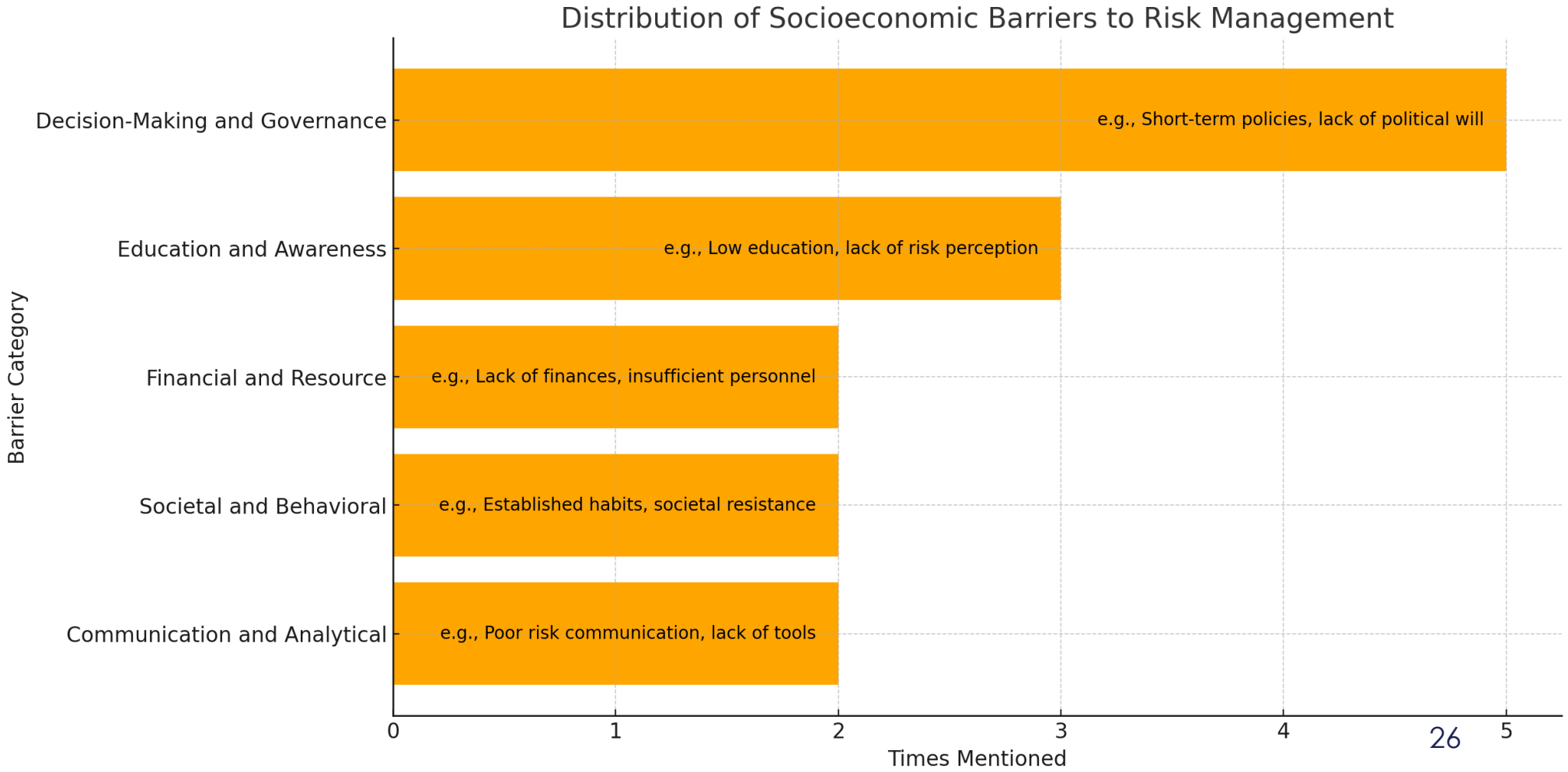
Workshop on Resilience to Urban Heat: Relevant Heat-Related Socio-Economic Risks



CrossEU

CARMINE
co-create climate resilience

Barriers to Efficient Risk Management



Prague Climate Change Adaptation Strategy 2017

Implementation Plans 2017-2019, 2020-2024, 2025-2029

www.adaptacepraha.cz

Prague Climate Plan 2030

many thanks for your attention
Stepan.Kyjovsky@praha.eu