REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR

Izkušnje z integracijo klimatskih sprememb v presojo planov/programov v Sloveniji

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR

Primer:

STRATEGIJA RAZVOJA PROMETA V REPUBLIKI SLOVENIJI

2. april 2015, predlog

Pripravljavec:

- Nosilec: Ministrstvo za infrastrukturo
- Zunanji sodelavci: PNZ in DRI

Izdelovalec okoljskega poročila:

- Aquarius, d.o.o.

COMMISSION STAFF WORKING DOCUMENT
Adapting infrastructure to climate change
Accompanying the document
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS
An EU Strategy on adaptation to climate change

5.1.2. Environmental Impact Assessment and Strategic Environment Assessment

The Environmental Impact Assessment (EIA) and the Strategic Environmental Assessment (SEA) can be appropriate instruments to mainstream adaptation, helping to improve the climate resilience of infrastructure.

Okoljsko poročilo

Podnebni dejavniki

Merila vrednotenja in metodologija vrednotenja za okoljski cilj 4:
Prilagoditi prometno infrastrukturo podnebnim spremembam in zmanjšati letno količino izpustov toplogrednih plinov pod ciljne vrednosti, ki so za promet določene v Operativnem programu ukrepov zmanjšanja emisij toplogrednih plinov v obdobju do leta 2020.

Kazalnik 1

- prilagajanje prometne infrastrukture podnebnim spremembam

(ukrepi novogradnje ali rekonstrukcije prometne infrastrukture morajo vsebovati tudi ukrepe za zmanjševanje ali preprečevanje posledic podnebnih sprememb, predvsem tistih, ki jih povzročajo poplave, snežne padavine ter pojav žleda)

Kazalnik 2

- letna količina izpustov toplogrednih plinov iz prometa

(*največja količina izpustov toplogrednih plinov iz prometa ne sme presegati ciljnih letnih količin emisije toplogrednih plinov za sektor prometa 5.622 kt CO_2 ekv. v letu 2020 in 5.224 kt CO_2 ekv. v letu 2030;*
kumulativni vplivi vseh ukrepov iz Strategije ne smejo povzročiti, da letna količina vseh izpustov toplogrednih plinov iz prometa preseže ciljne vrednosti, ki so za promet določene v Operativnem programu zmanjšanja emisij toplogrednih plinov v obdobju do leta 2020 s pogledom do leta 2030)

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„……..z veliko gotovostjo do sredine stoletja pričakujemo:
- ob višji temperaturi zraka hudo vročino poleti,
- večjo spremenljivost temperature in padavin poleti,
- več močnih padavinskih dogodkov (na splošno več vodne pare v ozračju) in večje izhlapevanje,
- okrepitev hidrološkega cikla – kroženja vode,
- pogostejše zdajšnje stoletne poplave (krajšanje povratne dobe ekstremnih padavin),
- zelo verjetno znatno povečanje pogostosti poletne suše in
- verjetno povečanje števila dni z ugodnimi razmerami za nastanek poletnih neurij.

Ne glede na dokaj okvirne napovedi podnebnih sprememb v Sloveniji, pa je treba upoštevati tudi rezultate podobnih scenarijskih simulacij za druga območja v EU zaradi dviga temperature za 3,5°C oziroma za 2°C. Zaključki vseh teh scenarijev poudarjajo, da so glavni izzivi podnebnih sprememb poplave in obalna erozija, večje povpraševanje za vodo, energijo in surovine, ter motnje v prometnih omrežjih in komunikacijskih povezavah, ki jih povzročajo ekstremni vremenski dogodki. „

„Ker se na strateškem nivoju razvoja prometne politike ukrepi s področja prilagajanja podnebnim spremembam obravnavajo kot splošni ukrepi, se morajo ukrepi iz skupine splošnih ukrepov razširiti z izdelavo smernic, metodologije in postopkov za ravnanje pri zbiranju informacij o ekstremnih vremenskih pojavih ter pri načrtovanju in izvajanju:

- ukrepov za izboljšanje odpornosti cestnega omrežja na **poplave**,
- ukrepov za izboljšanje odpornosti cestnega omrežja na snežne **padavine** in
- ukrepov za izboljšanje odpornosti železniškega omrežja na **žled**.“

6.1. Annex 1: Climate risk and impacts on transport infrastructure

	TYPE	CLIMATIC PRESSURES	RISKS	TIME FRAME of expected impact	REGIONS mainly affected
RAIL infrastructure	Rail	Summer heat	• Rail buckling; • material fatigue; increased • instability of embankments; • overheating of equipment (e.g. engine ventilation, acclimatisation); • increase wildfires can damage infrastructure	Medium negative (2025; 2080) to high negative (2080)	Southern Europe medium negative until 2025 and high negative until 2080; West, East and Central EU medium negative until 2080
		Winter cold/ice	• Ice on trains and catenary	Medium negative (2025; 2080)	Northern Europe, Central Europe
		Extreme precipitation	• Damage on infrastructure due to flooding and/or landslides; • scour to structures; • destabilization of embankment	Medium negative (2025) to high negative (2080)	European wide
		Extreme storms	• Damage on infrastructure such as signals, power cable etc. (e.g. due to falling trees, etc.	No information	No information
		In general:	• Reduced safety; • increased cost for reparation and maintenance; • disruption of "just in time" delivery of goods and passengers		
ROAD infrastructure	Roads (including bridges, tunnels, etc.)	Summer heat	• Pavement deterioration and subsidence; • melting tarmac; • reduced life of asphalt road surfaces (e.g. surface cracks); • increase wildfires can damage infrastructure; expansion/buckling of bridges	Medium negative (2025; 2080) to high negative (2080)	Southern Europe (2025), West, East and Central EU (2080)
		Extreme precipitation/ floods	• Damage on infrastructure (e.g. pavements, road washout); • road submersion; • scour to structures; • underpass flooding; • overstrain drainage systems; • risk of landslides; • instability of embankments	Medium negative (2025) to high negative (2080)	European wide
		Extreme storm events	• Damage on infrastructure; roadside trees/vegetation can block roads	No information	No information
		In general:	• Speed reduction; • road closure or road safety hazards; • disruption of "just in time" delivery of goods; • welfare losses; • higher reparation and maintenance costs		
	Coastal roads	Sea level rise	• Damage infrastructure due to flooding; • coastal erosion; • road closure	Medium negative (2080)	European wide
		Extreme storm events		No information	No information

	TYPE	CLIMATIC PRESSURES	RISKS	TIME FRAME of expected impact	REGIONS mainly affected
		Heavy precipitation events		Medium negative (2025) to high negative (2080)	European wide
	Mountain road	Permafrost degradation	• Decrease of stability; rockfalls; landslides; road closure;	No information	No information
	Sewerage system	Heavy precipitation events	• Overloaded sewerage system can cause road flooding and water pollution	Medium negative (2025) to high negative (2080)	European wide
AVIATION infrastructure	Airports (including runways)	Summer heat	• Greater need for ground cooling; • degradation of runways and runways foundations; • higher density altitudes causing reduced engine combustion efficiency; • decrease airport lift and increased runway lengths	Medium negative (2025; 2080) to high negative (2080)	Southern Europe (2025), West, East and Central EU (2080)
		Heavy precipitation events	• Flood damage to runways and other infrastructure; • water runoff exceeds capacity of drainage system	Medium negative (2025) to high negative (2080)	European wide
		Extreme storms	• Wind damage to terminals, navigation, equipment, signage	No information	No information
		Sea level rise	• Flooding of runways, outbuildings and access roads	Medium negative (2080)	European wide
		In general:	• Interruption and disruption to services supplied and to ground access; • periodic airport closures; • higher maintenance costs		

SHIPPING infrastructure	Inland shipping	High river flow (e.g. extreme precipitation, snow melt)	• Problems for the passage of bridges; • speed limitations because of dike instability; • some restrictions to the height of vessels	Medium negative (2080)	European wide
		Low river flow (e.g. drought)	• Strong restrictions to the loading capacity; • navigation problems, speed reduction	Medium negative (2025) to high negative (2080)	South, East and Central Europe; in 2080 also Western Europe
		Change in ice cover	In general shorter periods of ice cover can be expected; Nevertheless warm and early winters, followed by a rapid decrease in air temperature, may result in thicker or rougher ice cover formation and thus, lead to ice jams, damage to navigation signs and infrastructure (e.g. locks)	No information	No information
		In general:	• Disruption of "just in time" delivery of goods; • stop of inland shipping; • welfare losses		
	Maritime transport	Sea level rise	• Navigability could be affected by changes in sedimentation rates and location of shoals; more frequent closure	Medium negative (2080)	European wide
		Change in sea conditions	• More severe storms and extreme waves might affect ships	No information	No information
		Less days	• Reduce problems with ice		

URBAN TRANSPORT	Urban transport (road infrastructure, bike lanes, walkways, rail infrastructure, waterways, public and private transport)	Temperature increase and heat waves	• Increase of the heat island effect (e.g. melting asphalt, increased asphalt rutting due to material constraints, thermal expansion on bridge expansion joints and paved surfaces, and damage to bridge structure material)	Medium negative to extreme negative	2025: Southern, Eastern EU 2080: Northern, Southern, Eastern, Central EU
		Heavy precipitation events (extreme flash floods)	• Damage to infrastructure due to flooding, property at risk due to location, heavy water runoff	Medium negative (2025;2080) to high negative (2080)	2025: Southern, Western 2080: Eastern, Southern, Northern, Western, Central
		Sea level rise and storm surage flooding	• Risk of inundation of road infrastructure and flooding of underground tunnels, • Degradation of the road surface and base layers from salt penetration	Medium negative to extreme negative	2025: Southern, Western, Northern EU 2080: Southern, Western, Northern EU
		Extreme storms, strong winds	• Damages, increase of maintenance cost	Small to medium impacts	European wide