



CLIMATE CHANGE IMPACT AND ADAPTATION IN CROATIAN TRANSPORT SECTOR

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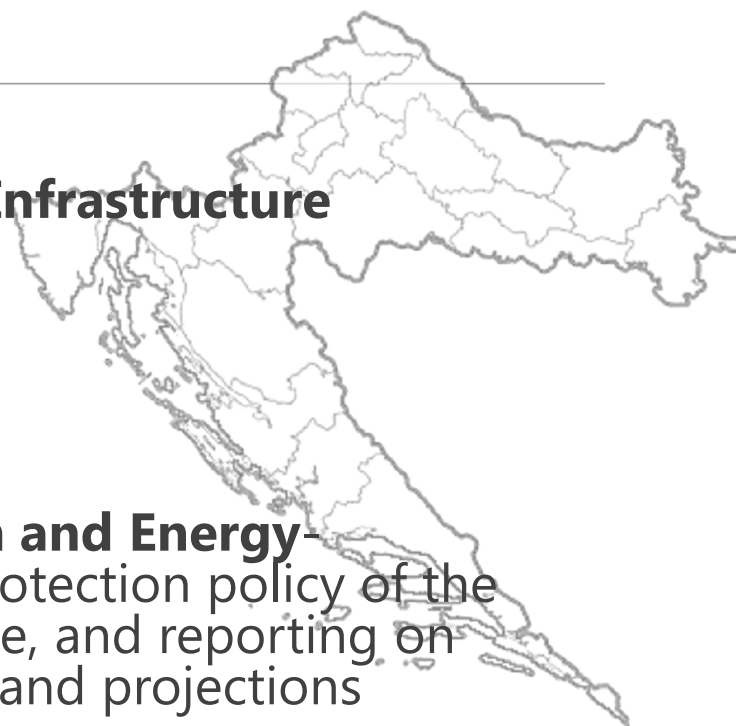
COMPETENT AUTHORITIES

TRANSPORT:

- **Ministry of the Sea, Transport and Infrastructure**

ENVIRONMENT (Clima):

- **Ministry of Environment protection and Energy** - responsible for the overall national protection policy of the environment, including climate change, and reporting on policy and measures implementation and projections emission
- **The Croatian Environment and Nature Agency** - responsible for organizing the Inventory of greenhouse gas emissions, data collection, quality assurance planning and quality control



LEGAL FRAMEWORK


- **Air Protection Act** (Official Gazette, No.130/2011, 47/2014, 61/2017)
- **Regulation on the Monitoring of Greenhouse Gas Emissions, Policies and Mitigation measures in the Republic of Croatia** (Official Gazette, No. 87/2017)
 - Guidelines for low-carbon development by 2020
 - Strategic Framework for Development 2006 - 2013
 - Strategy Compliance Framework 2007-2013
 - National Strategic Reference Framework

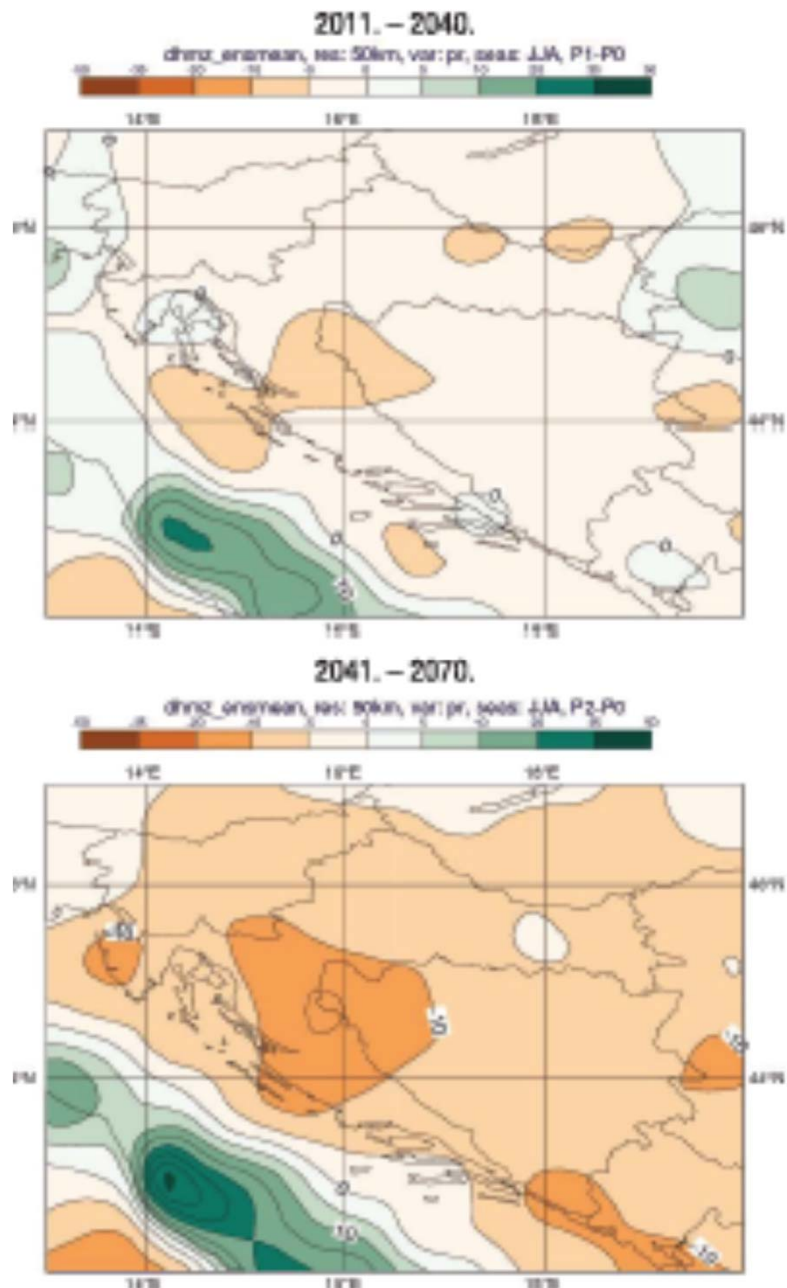
CLIMATE MODELING - CROATIA

- - reference climate period (1971-2009)
- - RegCM regional climate model for the European area at a resolution of 50 km.
- - 4 climatic scenarios RCP4.5 and RCP8.5, the four global climate models from IPCC AR5
- - Calculations were made on supercomputers VELEBIT



BASIC FACTS –CLIMA in Croatia

- temperature in Croatia is increasing, bigger changes are expected in the continental part of the country than on the coast
- the amount of rainfall decreases in winter season
- more extreme weather events are expected - especially drought and heat strikes especially during the summer 
- In the future, it is expected that the climate in Croatia will become warmer and drought - especially during the summer.
- Climate models predict that, if greenhouse gas emissions increase, the period from 2040 to 2070 could be warmer for 3 to 3.5 ° C throughout Croatia, during the summer. By the end of the century, increasing temperature and reducing rainfall will be even more pronounced.
- Projections of changing the Adriatic Sea level by the end of the 21st century provide a steady increase in the range between 32 and 65 cm
- change in spatial distribution of forest vegetation; higher risk of waterborne fires (on the coast, but also parts of Slavonia)



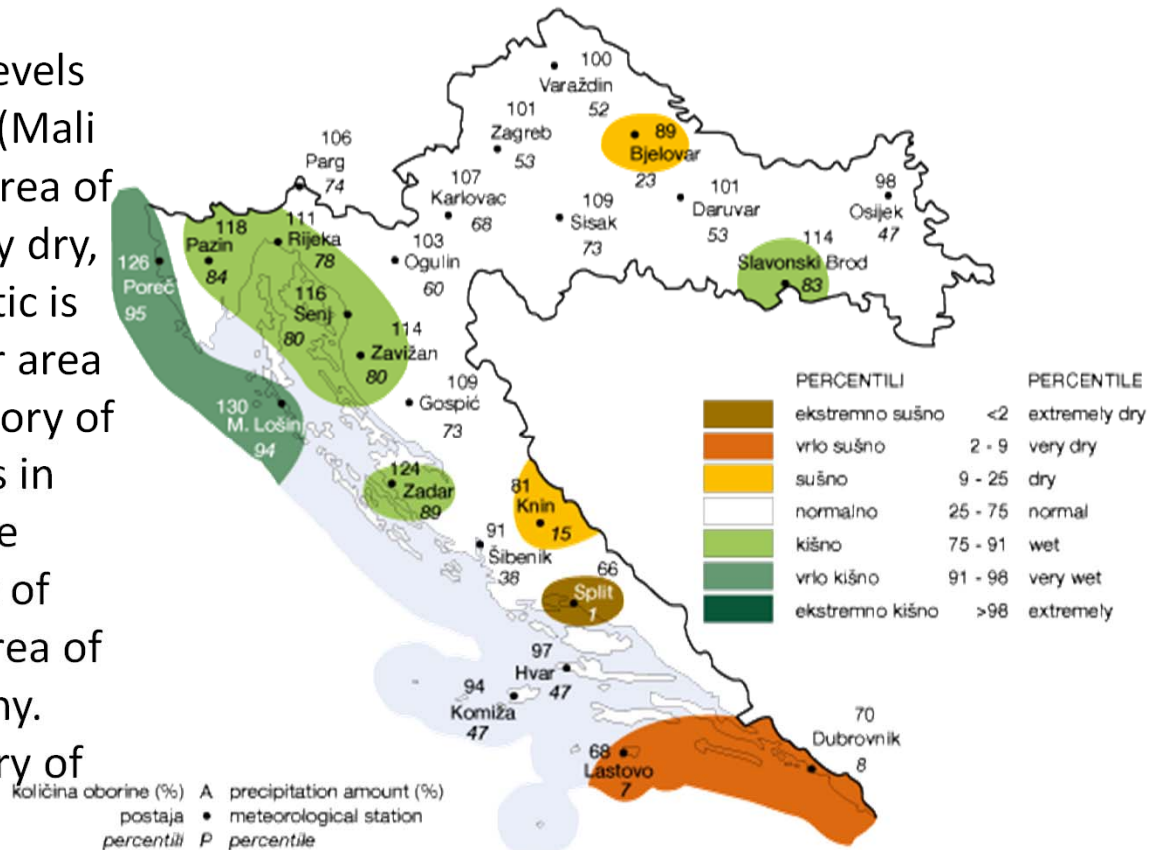
PRECIPITATION

Expected changes in the total amount of summer precipitation in the period 2011-2040 and in the period 2041-2070, relative to the reference climate 1971-2000 according to the RPC 4.5 scenario generally shows a decrease in precipitation.

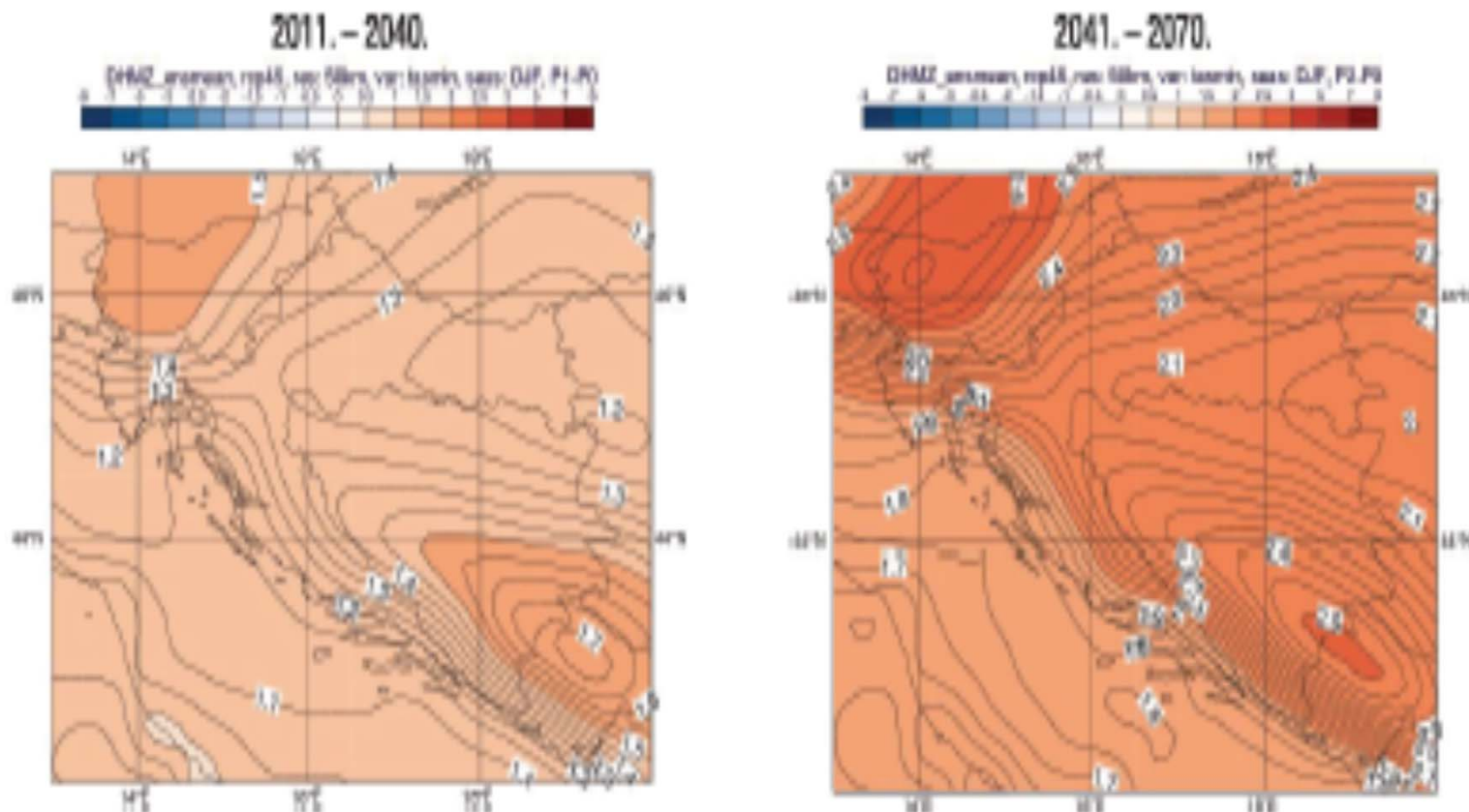
In 2017, in Croatia, the number of precipitation was higher than the average (1961. - 1990.) in most analyzed stations in Croatia.

PRECIPITATION

The comparison with multi-annual average shows that precipitation levels for 2017 range from 66% to 130% (Mali Lošinj) of the average. The wider area of Split is in the category of extremely dry, while a part of the southern Adriatic is in the category very dry. The wider area of Bjelovar and Knin is in the category of dry. Part of the northern Adriatic is in the category of very rainy while the wider area of Zadar, Zavižana, part of Istria and Kvarner and the wider area of Slavonski Brod are classified as rainy. The rest of Croatia is in the category of normal

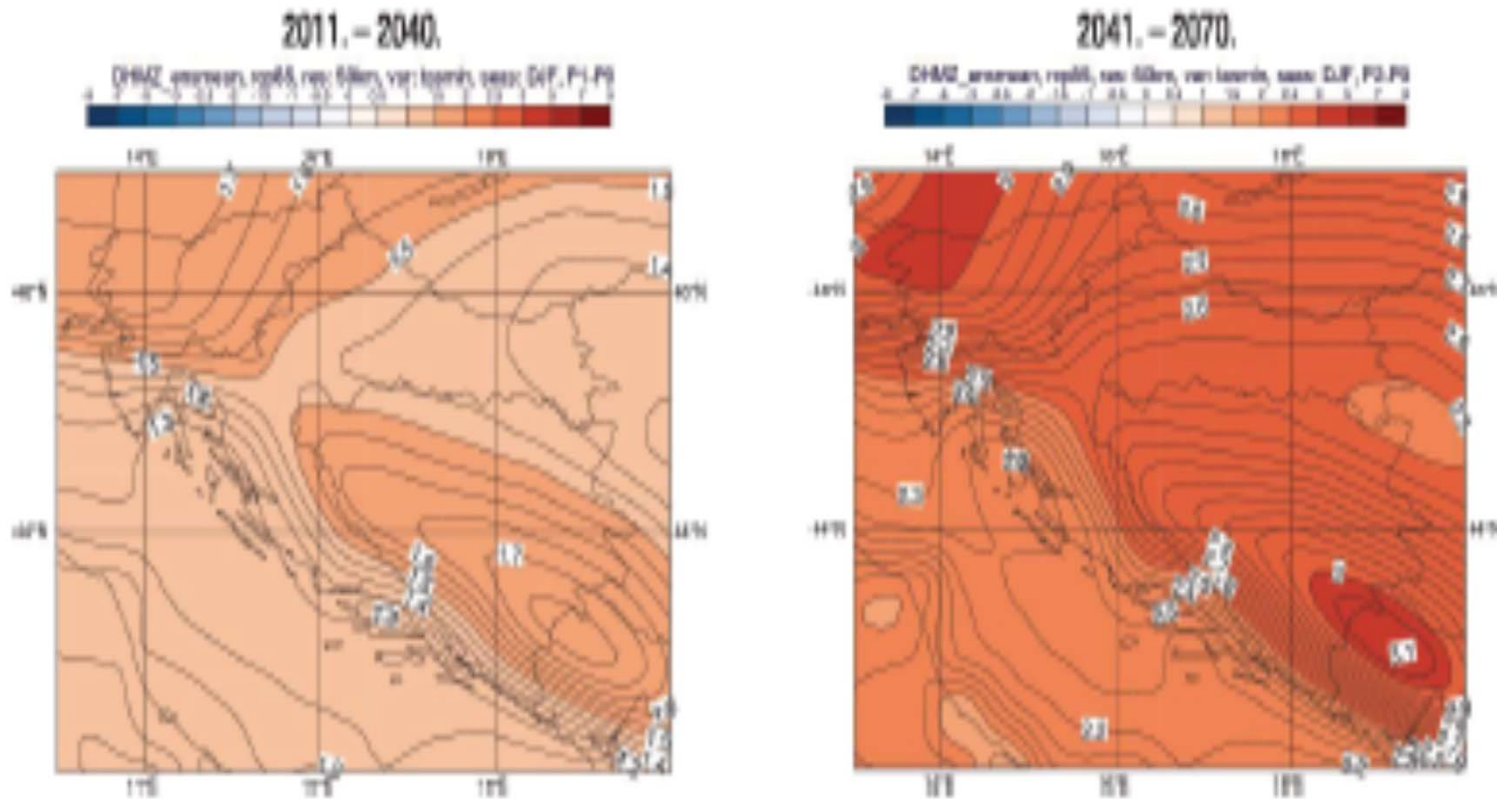


TEMPERATURE



Expected average minimum air temperature rise in the period 2011-2040 and 2041-2070 relative to the reference climate 1971-2000 according to RPC 4.5 scenario

TEMPERATURE



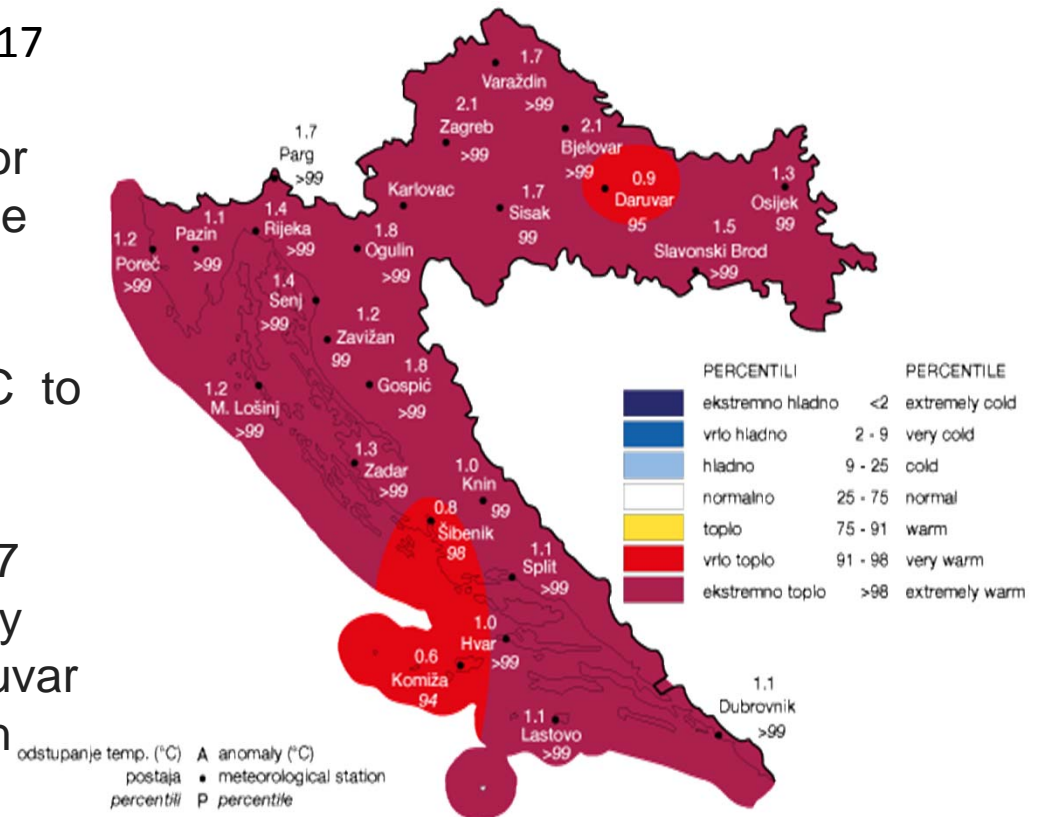
Expected average minimum air temperature rise in the period 2011-2040 and 2041-2070 relative to the reference climate 1971-2000 according to RPC 8.5 scenario

TEMPERATURE

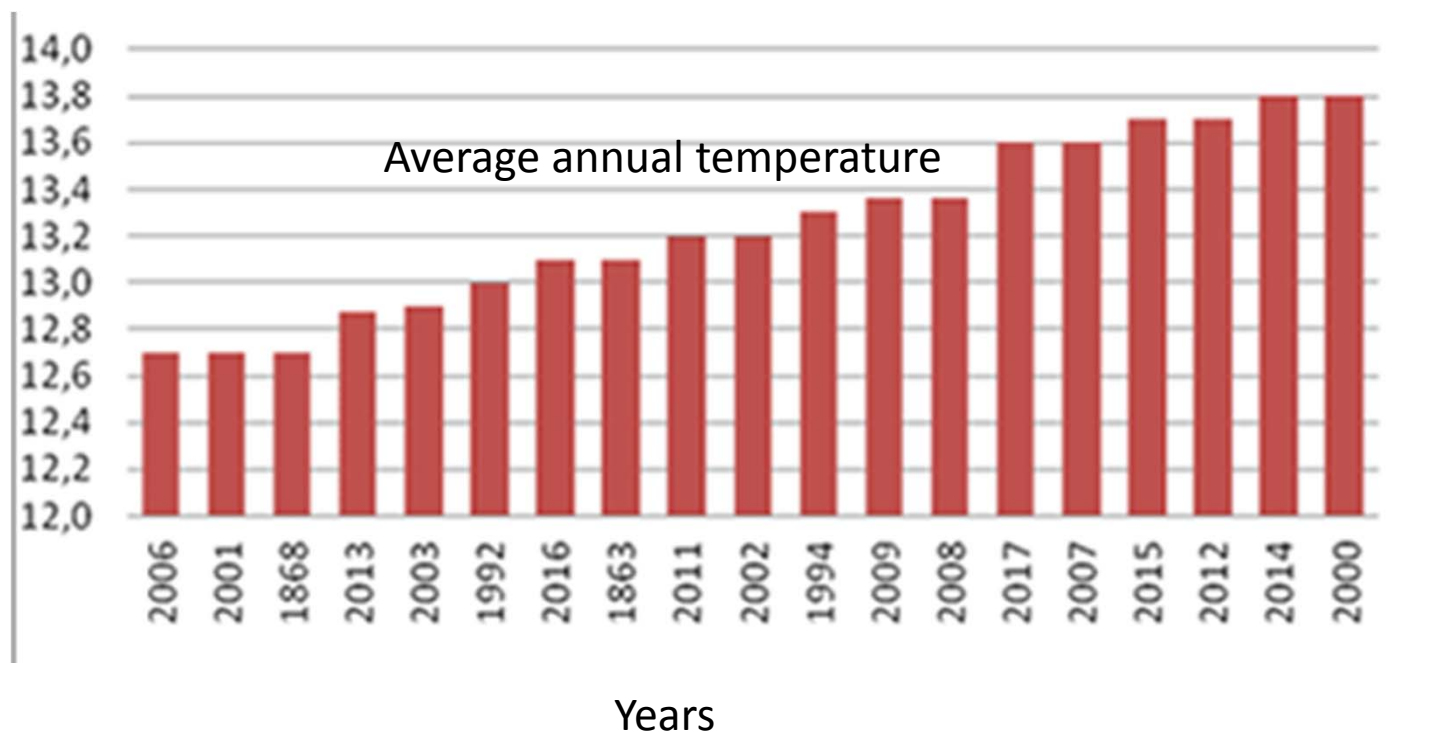
Air temperature anomalies in year 2017

The average annual air temperature for the year 2017 in Croatia was above the perennial average (1961-1990). Anomalies of the mean annual air temperature are in the range of 0.6 ° C to 2.1 ° C.

The heat conditions in Croatia for 2017 are described in the dominant category „extremely warm” while the wider Daruvar area and part of the Central and South Adriatic are classified as very warm



TEMPERATURE



Nineteen hottest years since the beginning of meteorological observations (1862 - 2017), Zagreb-Grič.

TRANSPORT NETWORK

ROADS: 26,958.5 kilometers of total length

○ motorways and semi-motorways 1,416.5 km

RAILWAY-2,722 km of total length of track

SEA PORTS; of state interest:

- 3 mostly freight - Rijeka, Ploče and Šibenik; 3 mostly for passengers: Zadar, Split and Dubrovnik

INLAND WATERWAYS: total length of 804.1 km

INLAND PORTS: 4 Vukovar, Osijek, Sisak, Slavonski Brod

AIRPORTS: 7: Zagreb, Dubrovnik, Split, Zadar, Pula, Rijeka and Osijek

- 2 Airfields: Mali Losinj and Brač



TRANSPORT

Basis of sustainable and regional balanced development of Croatia

Road infrastructure prevail over the other types of transport infrastructure – increase per year.

Stagnation of non-road (more environmentally acceptable forms) transport infrastructure (rail and river) - since 2006 there has not been move in the construction of new railway lines.

The level of transport activities that are a source of pollution of the environment and nature (space occupation, emission of various pollutants, extraordinary events, impact on biodiversity and landscape, the use of significant energy) is increased.

TRANSPORT SECTOR: TRANSPORT DEVELOPMENT STRATEGY 2017-2030

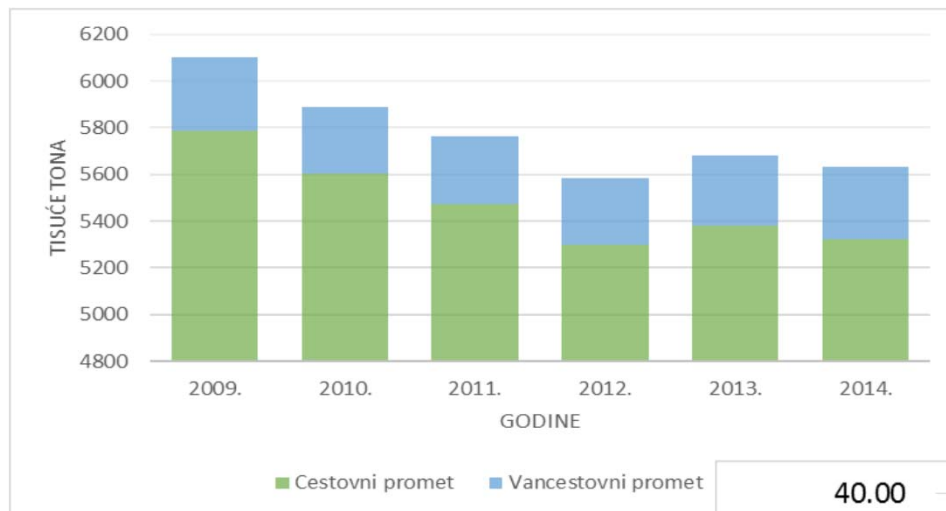
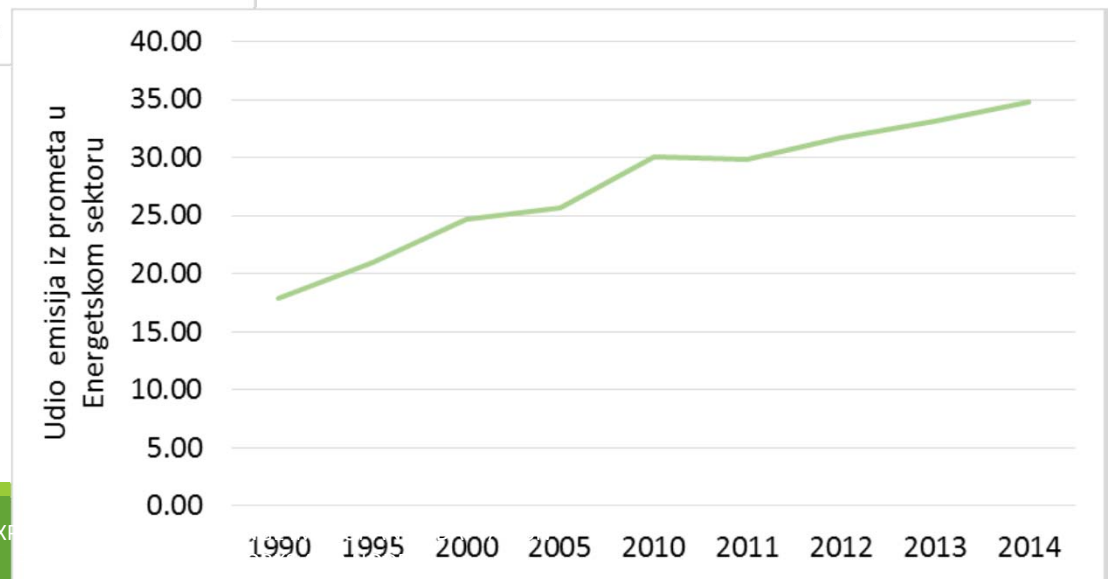


Figure2 : CO2 emissions from transport sector for the period from 2009 to 2014 (Adjusted according to: Energy in Croatia in 2014)

Figure 3: The share of emissions from transport in the Energetics sector (Prepared by: IRES EKOLOGIJA d.o.o.)



TRANSPORT SECTOR: TRANSPORT DEVELOPMENT STRATEGY 2017-2030

Measures to reduce negative impacts from transport sector, for the sustainable use of all resources, are in process of developing and implementing

Based on an analysis of the current state of the country, identifying medium and long term development in the Republic of Croatia

As a result of the policies and strategies of the European Union and the Republic of Croatia, a list of general objectives was established:

- specific objectives derive from the analysis of the Croatian transport system, and are further elaborated by the sectors to which they relate.

TRANSPORT SECTOR: TRANSPORT DEVELOPMENT STRATEGY 2017-2030

C01

- Promote the distribution of passenger traffic in support of public transport (PT) and forms of transport with zero emission of harmful gases.

C02

- Change the distribution of freight traffic in favor of rail and maritime traffic and inland waterway transport.

C03

- Develop a traffic system (management, organization and development of infrastructure and maintenance) according to the principle of economic viability

C04

- Reduce the impact of the traffic system on climate change

C05

- Reduce the impact of the transport system on the environment (environmental sustainability).

C06

- Increase the security of the transport system.

C07

- Increase the interoperability of the transport system (public transport, rail, road, maritime and air traffic and inland waterway transport).

C08

- Improve the integration of transport modes in Croatia (management, intelligent transport systems (hereinafter: ITS, VTMS), park and ride parking lots (hereinafter: P & R) etc.).

C09

- Further develop the Croatian part of the Trans-European Road Network (hereinafter: TEN-T) (basic and comprehensive).

TRANSPORT SECTOR-PRIORITY MEASURES FOR TRANSITION TOWARDS LOW - CARBON DEVELOPMENT



THE IMPACTS OF CLIMATE CHANGE IDENTIFIED DURING THE IMPLEMENTATION OF SEA FOR TDS



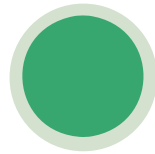
INSTITUTION IN RELATION TO ADAPTATION TO CLIMATE CHANGE-MSTI



CURRENT STATUS

MODERATELY IMPORTANT

Preparation, development and supervision of the implementation of all strategic documents from the Transport sector



FUTURE STATUS

VERY IMPORTANT

- Development of Climate change adjustment measures in the Transport sector.
- proposing and evaluating Climate adjustment measures in cooperation with stakeholders
- Renewal and rehabilitation of Transport infrastructure according to priorities
- Cooperation with scientific institutions in design and analysis for the needs of climate modeling in the transport sector

CLIMATE CHANGE REQUIREMENTS

The process of transition to a low carbon economy is a continuous and long-lasting, affecting the entire society and economy, should be reasoned and adapted to the possibilities and available resources.

THE GOAL:

- limitation of the global temperature increase well below 2°C - changes in lifestyle, behavior and cultural patterns, consumer choices, change in energy structure - the whole economy



capacity building, intersectoral cooperation

LOW-CARBON VISION BY 2050- TRANSPORT SECTOR -MEASURES

- Low carbon and non-urban transport:
 - (hybrid vehicles, developed vehicle refueling infrastructure, environmentally friendly fuels, narrower urban centers, electricity for renewable energy vehicles, new technology, cycling, higher public transport);
- High levels of public awareness of Public transport (cleaner forms of transport)
- Developed railway, river and air traffic (transition from road to rail and river traffic, developed infrastructure);
- Taxes on fossil fuel vehicles (collection of fuel consumption, ecological vignette);
- Public transport is completely low-spirited;
- Increasing Energy Efficiency in Traffic (Aggregated Measure)
- Croatia branded as a country of ecological and sustainable development

POLICY AND MEASURES



- Low-carbon Development Strategy up to 2030 with a view to 2050, with Action Plan for Implementation of the Low-Carbon Development Strategy for a period of 5 years;
- Revision of the Energy strategy with National Energy Action Plan for the period 2017 – 2019;
- Energy efficiency program in public lighting by 2025;
- Integrated Energy-Climate Plan for the period 2021-2030;
- The plan for the use of financial resources from the sale of emission allowances by auction based on the EU ETS for the period 2017 to 2020;
- Climate change adaptation strategy in Croatia for the period up to 2040 with a view to 2070 (currently in process of adoption by Croatian Government).

MEASURES - PROJECTS

- Environmental protection and conservation measures carried out during the planning and construction of the transport infrastructure, in accordance with regulations in the field of environmental protection, spatial planning and construction.
- SEA and EIA procedures are implemented
- when applying for calls of proposal, investors must demonstrate that the projects are planned in accordance with the EIA Directive and that, when designing the project,
 - they take into account the relevant indicators of possible impacts of climate change on the operation;
 - that the risks are assessed
 - and that the materials and processes of construction are adapted to withstand the identified climatic changes.

MEASURES

Measure	Goal	Type of instrument	Status of Implementation
Informing consumers about the fuel economy and CO ₂ emissions of new personal cars	informing consumers of fuel consumption and CO ₂ emissions of new cars	Information	Adopted
Training of road vehicles for eco-driving	reduction of CO ₂ emissions from road vehicles	Education	Adopted
Obligation to use biofuels in transport	increasing the share of biofuels in transport	Regulatory, economic, tax	adopted, partly applied
Special Environmental Fee for Motor Vehicles	reduction of CO ₂ emissions from road vehicles	tax, economic	Adopted
Special Tax on Motor Vehicle	reduction of CO ₂ emissions from road vehicles	tax, economic	Adopted
Development of Alternative Fuels Infrastructure	legislative framework and reduction of CO ₂ emissions from road vehicles	Regulatory, economic	Adopted
Promoting Integrated and Intelligent Transport Systems and Alternative Fuels in urban areas	reduction of CO ₂ emissions from road vehicles	Planning	partially adopted, partially applied
Monitoring, reporting and verification of greenhouse gas emissions in the life cycle of liquid fuels	Monitoring greenhouse gas emissions from liquefied petroleum fuels	Regulatory	Adopted

ALLOCATION ESIF

OPERATIONAL PROGRAM COMPETITIVENESS AND COHESION

Priority Axis	Allocation ESIF (EUR)
Promoting Energy Efficiency and Renewable Energy	531.810.805
Climate Change and Risk Management	245,396,147
Relationship and Mobility	1.260.415.428,00



Extreme wether
condition in Croatia
on Jun 7, 2018.



Sorce: www.24sata.hr,
7.6.2018.





THANK YOU FOR YOUR ATTENTION!

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