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# The impact of climate change on the economy of the Republic of Belarus and priorities for sectoral adaptation

## Summary for decision makers

"There is no question that human activity has warmed the atmosphere, land, and ocean... The rate of warming is unprecedented for the past two thousand years, and the temperatures reached are unprecedented for more than a hundred thousand years. Much of this temperature change is irreversible on a lifetime scale of at least a few generations."

*Interstate Panel on Climate Change, 2021*



Historical borders (Shklyar A. Kh. 1973)



Average for 1989–2015



Projection for 2011–2030 (RCP 4.5)



Projection for 2041–2060 (RCP 4.5)

0 100 km

### Changing the boundaries of climatic zones on the territory of Belarus

Colors correspond to different values of the sum of active temperatures above 10°C

The maps are produced by Zoi Environment Network from cartographic originals prepared by expert team led by Victor I. Melnik at the Republican Centre for Hydrometeorology, Radioactive Contamination and Environment Monitoring of the Ministry of Natural Resources and Environment Protection of the Republic of Belarus in the framework of EU Klima East expert facility project CEEF2016-071-BL (March 2017).

In Belarus, the average annual air **temperature** grows **3.5 times faster** than on the Earth as a whole and two times faster than on land in the northern hemisphere. At the same time the number of **hot days** is increasing, the duration of **seasons** and distribution of **precipitation** is changing. These trends will intensify during the 21st century. The climate in **Gomel** and **Brest** regions will become the hottest and driest, while the climate in **Vitebsk** region will remain more humid than in the country as a whole.

Future climatic changes will affect the life and activities of nature, society and economy. An analysis of four of all the **sectors classified** as “weather-dependent” in Belarus, carried out with the participation of sectoral organizations and specialists, showed that in all cases, climate change will affect sectoral processes, systems and results to a greater or lesser extent.





## Climate change trends in Belarus

## and their impact on individual sectors of the economy

↗ Increase / strengthen

↘ Decrease / weaken

### SLOW CHANGE

					
Temperature	↗	●	●	●	●
"Hot days" / "waves of heat"	↗	●	●	●	●
Summer duration	↗	●	●	●	●
Duration of winter	↘	●	●	●	●
Cold days	↘	●	●	●	●
Precipitation	↗	●	●	●	●
Droughts	↗	●	●	●	●

Expected impacts under the specified climate trends:

● strong

● moderate

Direction of influence:


● negative


● mixed

● positive

 Energy

 Transportation

 Construction

 Housing and utilities (water supply and sewage)

### HAZARDOUS EVENTS

Heavy rains	↘	●	●	●	●
The intense heat	↘	●	●	●	●
Severe frost	↗	●	●	●	●
Strong winds	↗	●	●	●	●

## Examples of sectoral impacts of future climate change in Belarus



**Energy** conversion: reduced power output and efficiency of heat and power generation, changes in the availability of cooling water, and reduced efficiency of cooling systems for thermal power plants, nuclear power plants, and refineries.



**Railway transport:** deformation and loss of track strength, malfunction of signaling systems and automated control, deterioration of passenger comfort and working conditions for personnel, flooding of tracks, structures and territories..



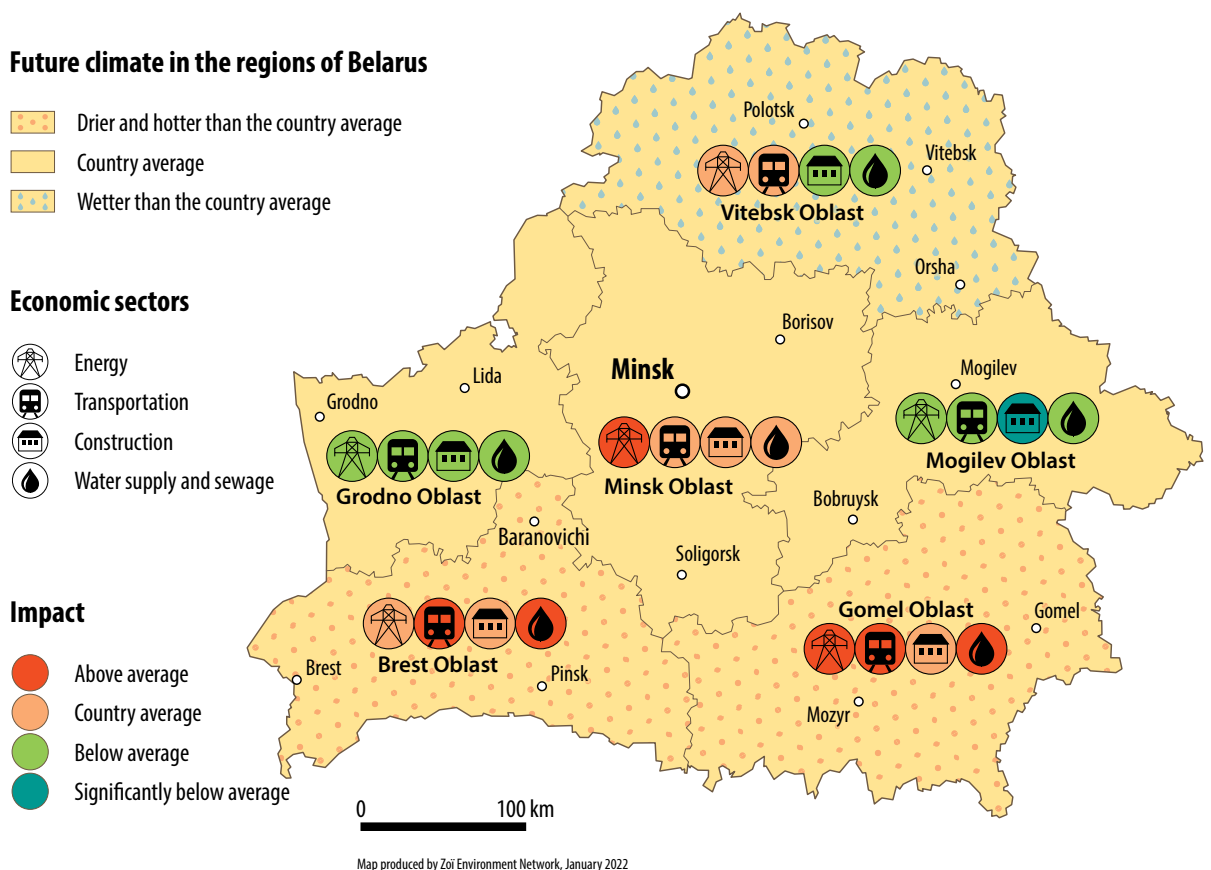
Physical assets in **construction:** reduced ground frost penetration, reduced durability of structures, changes in the service life of finishing layers, increased snow load, changes in the designed capacity of heating and cooling systems.



**Utility** wastewater treatment and discharge: increased costs and reduced efficiency (but reduced costs for thermal treatment), increased fermentation in the sludge (odors), deterioration of biological treatment efficiency, utility failures.

Due to the differences in the future climate between **the regions of Belarus**, the sectoral effects of climate change will also manifest themselves differently in different parts of the country. The southern regions will be most affected. However, in the Minsk and Mogilev regions there will also be noticeable effects on some industries due to the specific location of their infrastructure and the nature of climate change.

## Expected impact of climate change on economic sectors



It is quite difficult to fully assess **the financial and economic consequences** of climate change for specific sectors of the economy. However, calculations for individual climatic factors show that already in 2022-2030 direct and indirect losses in the energy sector due to increased temperature and increased frequency of adverse weather events can amount to one and a half to two million rubles, or up to **0.2% of GDP**.

The economic consequences of worsening access to drinking water for households not connected to centralized water supply can be indirectly estimated at **0.1–0.4% of GDP** in urban areas and **0.2–0.5% of GDP** in rural areas in the whole country.

These losses can be prevented or reduced by timely **adaptation** to climate change, which will also allow us to take advantage of some of the positive effects of change.

## Approaches to Climate Adaptation and groups of measures

**Reactive:** respond to existing threats, eliminate the consequences

**Active:** preparation for expected threats, vulnerability reduction, rapid response

**Transformational:** reducing vulnerability to climate change by fundamentally reshaping systems and strategic planning

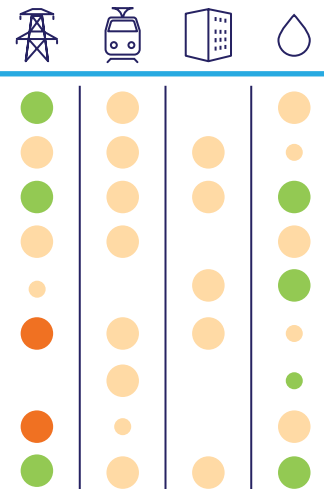
**“Gray”** adaptation measures: technological solutions, infrastructure development

**“Green”** adaptation measures: harnessing the power of natural ecosystems

**“Soft,” “institutional,” or “horizontal”** adaptation measures: policy, planning, finance, information

## Preliminarily proposed measures of adaptation of industries and their availability of resources

Monitoring and modeling climate change processes  
 Climate change impact study and sectoral monitoring  
 Improvement of the legislative and regulatory framework  
 Industry planning for climate change  
 Maintaining and reducing wear and tear on existing infrastructure  
 Technical re-equipment of infrastructure facilities  
 Improving the quality of services, regulating demand  
 Territorial planning, regulation, asset allocation  
 Informing and engaging stakeholders



Measures for most or some of the industry impacts of climate change.

Resources and capacity to develop and implement measures are sufficient limited insufficient.

Energy Transportation Construction Housing and utilities (water supply and sewage)

The outlined areas of adaptation for Belarus' industries are the first step towards a national climate change adaptation **strategy and plan**. The integration of specific measures into existing and future **state and sectoral** strategies and programs provides great opportunities for their implementation.

**Business**, which has significant intellectual and material resources, has a significant role to play. Finally, as the experience of the European Union countries shows, an important and necessary condition for success is full participation of **citizens** and civil society.

## Success Factors in the Adaptation Process in the EU Countries

Planning and implementing adaptation measures under the auspices of interdepartmental working groups and in close cooperation with key industry agencies and organizations

Integration of adaptation measures into existing state programs and mechanisms

A wide variety of ways to engage stakeholders

Effective dissemination of information and professional development of participants

Treating strategies as “living” documents