

The complete analysis of the construction, operation and decommissioning phases shows that, at the border line, noise, air quality, water and other environmental components remain permanently below the limit levels allowed by European standards, so that the project does not generate significant risks for the population or ecosystems of the neighboring state.

Environmental factor	Border Impact Summary (Romania / Bulgaria)	Pages in the Republic of Moldova
Water	The undercrossings of the Cerchez and Magura rivers are carried out by horizontal drilling; The risk of sediments or accidental leaks remains local and temporary. No water is captured from the RODL04 and RODL06 transboundary bodies; The chemical quality is not affected across the border.	31-34, 98, 179
Air	ADMS modelling shows that the dust and gases in the construction phase are diluted below the limits before the border; In operation, the turbines do not emit pollutants.	90-92
Ground / Basement	Any oil or fuel leaks can contaminate punctiformly, but it is controlled by absorbent materials; There is no overseas transport vector.	98-99
Natural resources	No aggregates or water from Bulgaria are exploited; The materials come from local chains, so the consumption of resources remains internal.	204 (OM4)
Waste	Only inert waste and packaging appear in the construction, selectively collected and transported to the county landfill; in operation – small quantities of turbine oil, handed over to authorized operators. No flow crosses the border.	117, 128-129
Noise and vibration	SoundPLANnoise modelling indicates ≤ 36 dB in villages and 27 dB in the Natura 2000 area "Kardam", below the WHO thresholds; in operation, the cumulative level remains < 40 dB at the border.	99-100, 138-139, 178-180
Population and health	Calculated noise level at homes < 40 dB; the modeling shows increases of only 0.016 dB compared to the background. Air emissions and vibrations do not reach risk values for Bulgarian communities.	66-68, 178-180
Climate	Wind farm (303 MW) will avoid CO ₂ emissions by replacing fossil fuel-based energy; The positive contribution is common to both states.	118, 180
Cultural heritage and landscape	The archaeological diagnosis required prevents any damage; the visual profiles show landscape continuity, and the objectives in Bulgaria do not enter the visibility cone of the turbines.	116, 140

In order to clarify to what extent the operation, construction and decommissioning of the wind farm can influence the health of the population of the neighboring state, the following paragraphs summarize the results of the noise, air, water and vibration modeling, in relation to the safety thresholds established at international level and European legislation, as well as the possible associated climate benefits.

A. Noise and vibration

Construction / decommissioning. The SoundPLANnoise modeling shows that, at the most exposed point of the Romanian localities, the equivalent continuous level reaches ≈ 36 dB(A) – below the limit of 55 dB(A) day and over 1 km from the border; the area where it could exceed 55 dB(A) is restricted to < 5 ha, directly on the work front and at a maximum of 300 m from it.

Operation. After commissioning, the cumulative noise of the 46 turbines is modeled at < 40 dB(A) in the villages and at 27 dB(A) at the level of the Natura 2000 site BG0000569 "Kardam" in Bulgaria, i.e. +0.2 dB compared to the natural background and well below the WHO guideline of 40 dB(A) at night. The increase calculated in the nearest households is only 0.008-0.016 dB – clinically imperceptible.

Thus, **the potential cumulative impact of the plan with the activities in the area** (agriculture around the plan, transport infrastructure Road II-29 Dobrich – border – 1.5 km and **energy infrastructure – Karnobat wind farm – 5.6 km**) will be **small, insignificant**.

Health implications. The literature cited in the report mentions cardiovascular effects at chronic exposures > 45 dB(A); the frontier value (27 dB(A)) remains ~18 dB below this threshold, resulting in a virtually zero risk to the Bulgarian population.

B. Air quality

Construction activities produce dust and exhaust gases, but ADMS modelling indicates a sub-detectable contribution to the boundary line; locally the PM₁₀ background of the commune is ~12 µg/m³, i.e. below half of the European limit of 40 µg/m³.

In operation, the turbines do not emit pollutants, and the energy produced replaces gas or coal generation, reducing regional emissions.

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Health implications. Additional exposure to particulate matter and NO₂ is virtually nil.

C. Drinking water and surface waters

The construction activities do not include technological discharges; rainwater is collected in the gutters and infiltrates the site. There is no connection with the transboundary water bodies, and the monitoring of the Constanta Public Health Department shows compliant drinking parameters throughout Cerchezu commune.

During the operation phase, maintenance works are carried out on platforms equipped with retention trays sized to fully collect any oil leaks, thus eliminating any discharge of liquid substances into the environment.

Therefore, **the cumulative impact with the activities in the area** (agriculture around the plan, transport infrastructure Road II-29 Dobrich–border – 1.5 km and energy infrastructure – Karnobat wind farm – 5.6 km) is **insignificant**, as there is no vector for the transport of contaminants to Bulgaria.

Health implications. The safety of drinking water sources in the neighboring state remains unaffected.

D. Soil and seismic vibrations

In the construction phase, small excavations and isolated foundations are carried out; the excavated earth remains on site, and the vibrations of the machines are temporally limited.

In operation, there is no more ground work, and the vibrations generated by the turbines quickly dissipate in the geological layer, falling below the threshold of human perception up to the border.

Cumulative potential. The sum of all sources does not exceed 0.2 mm/s at the border, so the effect remains insignificant.

E. Shadow-flicker and visual effect

The modelling indicates 0.1–8 h/year of intermittent shadows in the nearest Romanian households; At the border, the duration decreases below the detection limit. The Karnobat wind farm adds an apparent angle of only 0.3–0.4°, insufficient for shadow overlap.

Cumulative potential: even if both parks were to generate shadows simultaneously, the total would remain < 10 h/year, well below the international threshold of 30 h/year, resulting **in insignificant cumulative visual impact.**

F. Traffic and road pollution

The increase in traffic on DJ 391 in **the construction phase** adds < 3 µg/m³ NO₂ and < 2 µg/m³ PM₁₀, values that dissipate before reaching the neighboring country limit.

In operation, the service visits amount to only a few vans per day, and at **decommissioning** the flow of trucks is lower than in construction and limited in time.

Health implications. The concentrations of pollutants remain below the limit values set at European level; Thus, there are no exceedances of the existing values at the level of the Bulgarian communities.

G. The climate benefit, with an indirect effect on health

The installed capacity (≈ 303 MW) will avoid ~0.55 Mt CO₂ regionally over its lifetime, reducing the risk factors associated with fine particulate mortality and heat waves

In construction and decommissioning, CO₂ emissions from machinery diesel are punctual and low compared to the total carbon savings.

Health implications. By contributing to the decarbonization of the regional energy mix, the project reduces the population's exposure to fossil-based air pollutants and limits the intensity of extreme heat episodes; These factors, epidemiologically correlated with the incidence of cardiovascular and respiratory diseases, are attenuating, which supports the increase in life expectancy and the decrease in public health costs on both sides of the border.

The comparative evaluation of the three stages shows that:

- **The construction** brings local-temporary disturbances (dust, noise, inert waste), but these dissipate before the border line; there are no exceedances of international standards for air or noise, and the water works are controlled by horizontal drilling and emergency plans.
- **The operation** has the lowest degree of pressure: the turbines do not emit liquid or gaseous pollutants, the noise calculated at the border is 18 dB below the maximum permissible threshold, and the project generates a net climate gain by avoiding fossil fuels.

- **Decommissioning** reiterates the disruptions in the construction, but in a shorter period and with the possibility of recycling more than 90% of the dismantled materials; the transport and treatment of waste are managed exclusively on the national territory, eliminating the cross-border vector.

Therefore, no combined life-cycle environmental factor exceeds the maximum permissible values at European level. The effects remain local, temporary and of low intensity, and in terms of climate-energy, the balance is positive for both states. Thus, the project sums up an **insignificant cross-border** impact throughout its operational path.

Project phase	Activities in the vicinity of the plan	Cumulative cross-border impact								
		Water	Air	Ground/Basement	Natural resources	Waste	Noise and vibration	Population and human health	Climate	Cultural heritage
Construction/decommissioning	Agricultural activities – immediate vicinity	<p>Rainwater infiltrates the soil and does not reach the transboundary rivers</p> <p>No wastewater is discharged into surface water bodies crossing the border, and the regional groundwater has no significant transboundary flow.</p>	<p>The relevant emissions are dust and exhaust gases from machinery; dissipates quickly, and the distance to the border (> 1.5 km) and the short duration do not allow the limit concentrations to be exceeded on the territory of the neighboring state</p>	<p>The excavations only produce temporary storage of earth and gravel on site; There is no mechanism for the effect to cross the border.</p>	<p>The materials (ballast, cement, steel) come from the local market of the host country; their extraction/reduction of availability does not affect resources across the border.</p>	<p>Plant and construction debris are collected and disposed of at nearby licensed facilities. No waste is transported or deposited across the border.</p>	<p>Site noise levels (70-75 dB(A) at source) fall below 35-40 dB(A) at 1 km; at the border are below the WHO materiality thresholds, so there is no cross-border health impact.</p>	<p>Direct exposure is limited to nearby rural areas; The population across the border is not exposed to any additional risk factors.</p>	<p>GHG emissions from construction (diesel machinery) are negligible compared to the national inventory and irrelevant on a transboundary scale.</p>	<p>There are no common archaeological sites on the border that are influenced by the works.</p>
	Power generation activities (Karnobat Wind Farm) – 5.6 km	<p><i>Bulgarian turbines do not discharge water; The direction of the underground flow is opposite to the border</i></p>	<p><i>The air is not loaded with pollutants, and there are no odor sources.</i></p>	<p><i>The foundations are stable; no particles are transported to Romania, the cross-border impact being zero</i></p>	<p><i>In the process of operating the park, no natural resources related to the Romanian state are used</i></p>	<p><i>The waste is not transported across borders, so the impact is zero</i></p>	<p><i>Given the distance from the border and the fact that the disturbance caused by the noise produced by a wind farm is felt at a maximum of 500 m, the transboundary impact is zero</i></p>	<p><i>The localities in the immediate vicinity, given the distance from the wind infrastructure, are not affected</i></p>	<p><i>The operation of the park does not bring a GHG contribution to the local level</i></p>	<p><i>Turbines do not influence Romanian historical sites</i></p>
	Transport infrastructure Road II – 29 Dobrich – Border with Romania – 1.5 km	<p>Road gutters prevent cumulative cross-border impacts</p>	<p>Possible temporary impact due to site traffic and construction work</p>	<p>Existing infrastructure has no potential to have a cross-border impact</p>	<p>The existing infrastructure does not use natural resources other than local ones</p>	<p>No cross-border waste is conveyed</p>	<p>Even if the noise level will increase locally, it does not cumulate with the existing infrastructure</p>	<p>The Romanian population will not perceive changes, the exposure remaining unchanged</p>	<p>The climate impact will be insignificant</p>	<p>The existing infrastructure does not affect common cultural areas or historical landscapes</p>
Operation	Agricultural activities – immediate vicinity	<p>Rainwater penetrates the ground and does not reach the border rivers.</p>	<p>The dust produced dissipates quickly and does not increase pollution at the border.</p>	<p>Light tillage does not create erosion that influences transboundary soiling.</p>	<p>Fertilizers and fuel come from the local market; no resources from the neighboring country are used.</p>	<p>The straw remains in the field and is briquetted or incorporated; No waste is transported across the border.</p>	<p>The sound of the machines fades before the border and remains below the level allowed in rural areas.</p>	<p>The distance to the villages in the neighboring country is too long for risks or discomfort to occur.</p>	<p>Emissions from agriculture are very low and do not influence the climate abroad.</p>	<p>The agricultural landscape does not contain common cultural objectives that could be affected.</p>
	Power generation activities (Karnobat Wind Farm) – 5.6 km	<p><i>Turbines do not generate wastewater; Any hydraulic oil is in closed circuits, with retention systems, so the risk of cross-border contamination is non-existent.</i></p>	<p><i>The operation does not produce atmospheric emissions; in fact, it replaces fossil sources and reduces regional pollution.</i></p>	<p><i>Minimal contact with the ground after the completion of the foundations; there are no erosion or contamination processes that cross the border.</i></p>	<p><i>The consumption of resources is limited to spare parts; their extraction is not related to territories in the neighboring state.</i></p>	<p><i>Maintenance waste (filters, oils) is small in volume and is managed by authorized operators in the host country.</i></p>	<p><i>Acoustic modelling for turbines shows < 35 dB(A) at distances > 1 km; The border is far enough, so the reception limits in the neighboring state are not exceeded.</i></p>	<p><i>Possible visual discomfort for the inhabitants of the vicinity (< 2 km), but the settlements across the border are further away; There are no</i></p>	<p><i>The impact is positive (reduction of CO₂ emissions); The benefit is global, so it does not generate negative cross-border "impacts".</i></p>	<p><i>No cross-border sight-line heritage sites were identified that would be affected by the presence of turbines.</i></p>

Project phase	Activities in the vicinity of the plan	Cumulative cross-border impact								
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								<i>proven medical or psychological effects at that distance.</i>		
	Transport infrastructure Road II – 29 Dobrich – Border with Romania – 1.5 km	The water from the road drains into the gutters next to the road and does not cross the border.	The normal level of traffic does not produce an increase in air pollution beyond background values.	The infrastructure does not bring a contribution of dangerous substances to the Romanian soil.	Only local resources are used	The resulting waste is disposed of locally through authorised operators	The existing noise will not be cumulated with the noise produced by the operation of the park	The level of comfort and health for the inhabitants of the immediate vicinity will not change	The operation of the existing infrastructure will not lead to an influence on the transboundary climate balance	Common cultural objectives will not be affected