

Supplementary materials: Results at NUTS 2 level

Wind power potential in low environmental sensitivity areas of Spain: a regional assessment*

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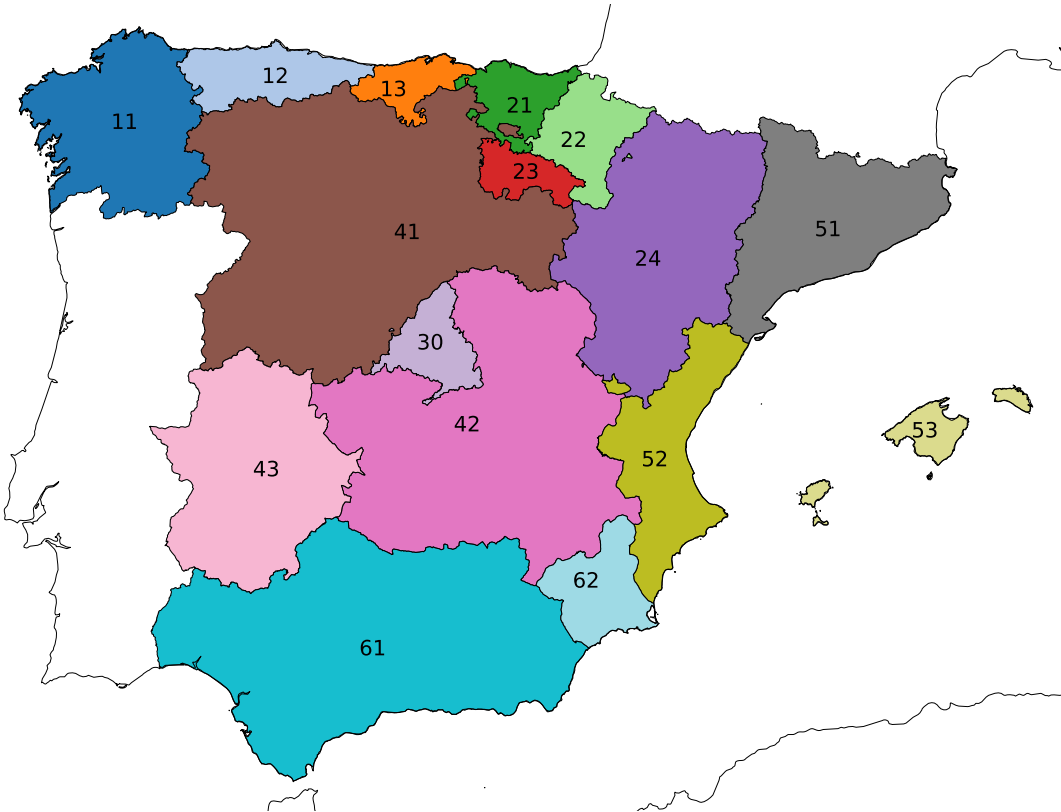
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Summary of main hypotheses:

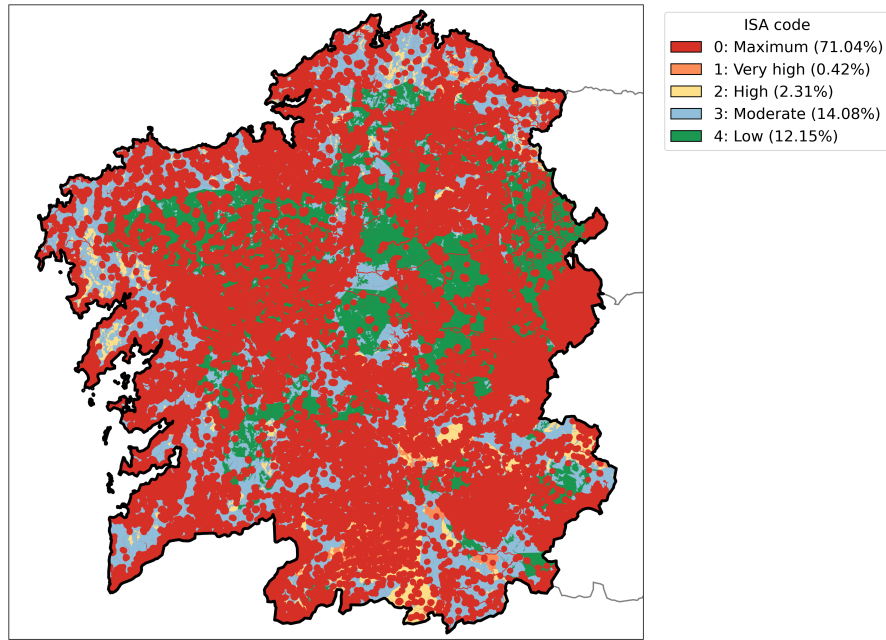
- The environmental sensitivity assessment is based on the ISA index performed by MITECO ([link](#)). Here, the potential in “Low sensitivity” areas, corresponding to the lowest of the five defined ISA classes, is estimated. However, low sensitivity does not imply that an environmental impact assessment is unnecessary for wind farm development. Wind farms may also be located in other ISA classes following a preliminary environmental impact assessment.
- Wind resource from New European Wind Atlas (NEWA), wind speed at 100 m height, year 2013.
- Software: [atlite](#)
- Wind power density: 10 MW/km²
- Power curve from wind turbine model: Vestas V112 3MW h100.
- Correction factor to account for wind farm losses: 0.93
- Capacity factor threshold: 0.285 (~2500 equiv. hours)



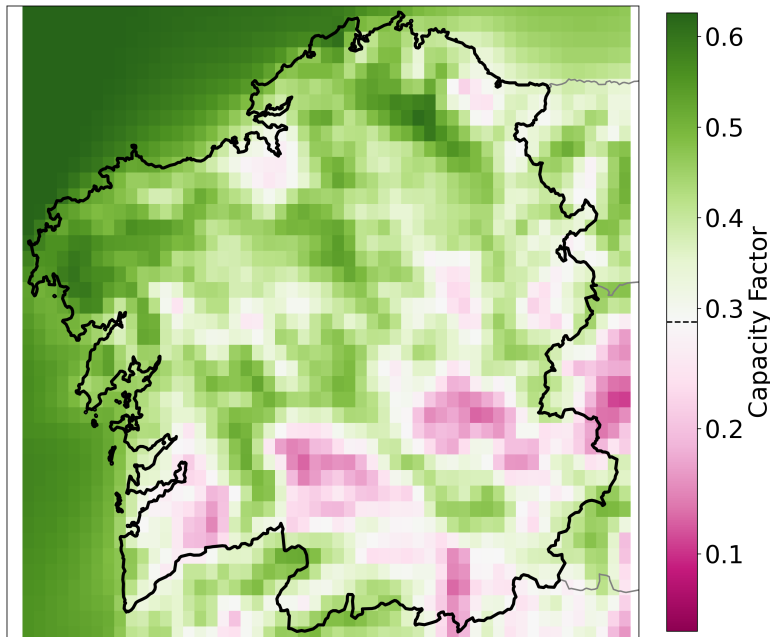
NUTS 2 regions			
ES11 (Galicia)		ES41 (Castilla y León)	
ES12 (Principado de Asturias)		ES42 (Castilla-La Mancha)	
ES13 (Cantabria)		ES43 (Extremadura)	
ES21 (País Vasco)		ES51 (Cataluña)	
ES22 (Comunidad Foral de Navarra)		ES52 (Comunitat Valenciana)	
ES23 (La Rioja)		ES53 (Illes Balears)	
ES24 (Aragón)		ES61 (Andalucía)	
ES30 (Comunidad de Madrid)		ES62 (Región de Murcia)	

Galicia (ES11)

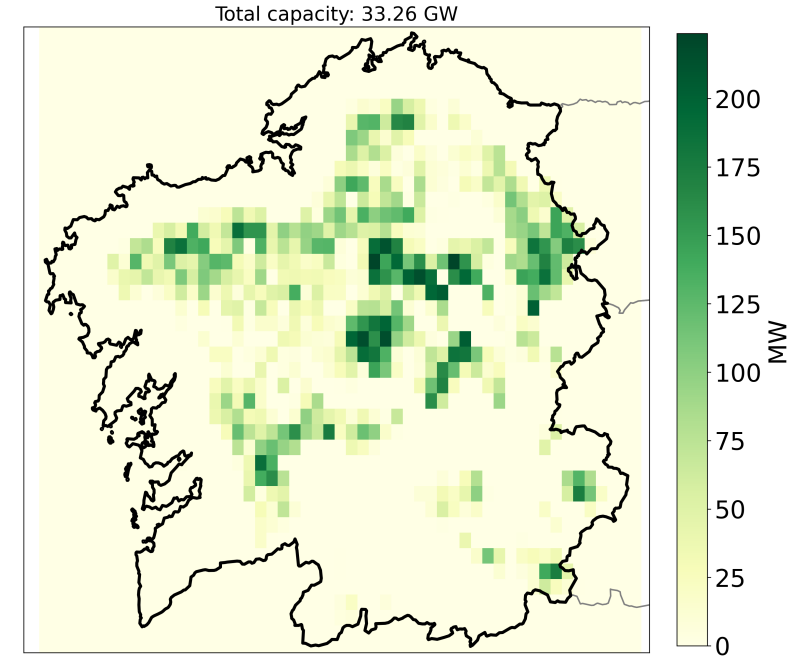
Environmental sensitivity to wind farms



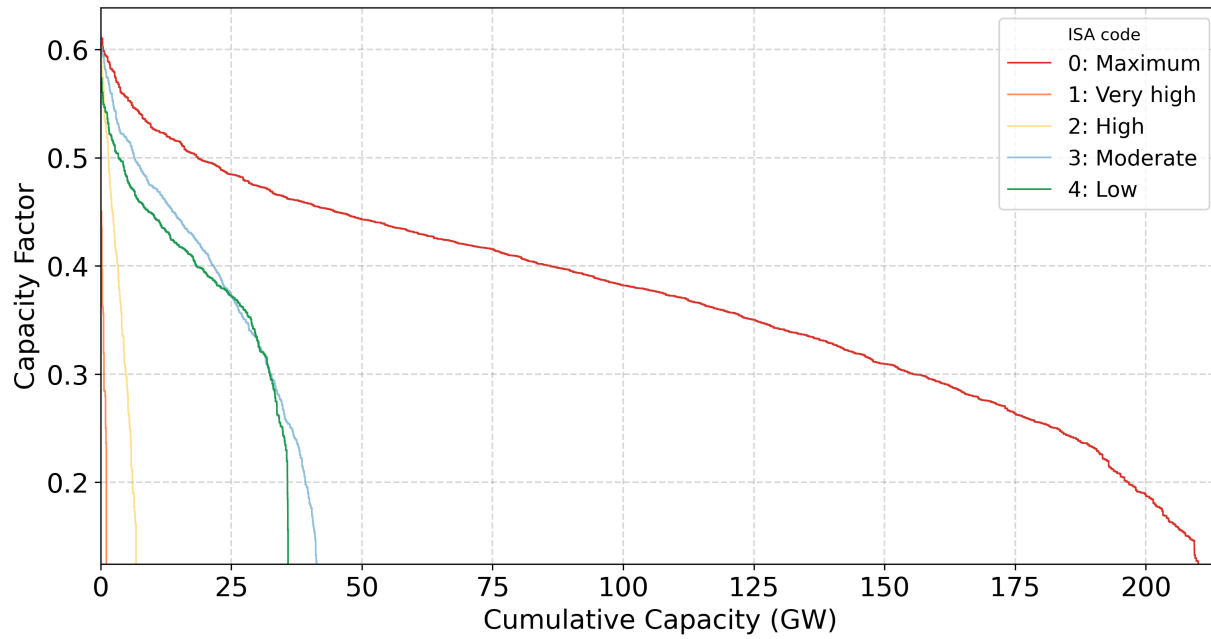
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



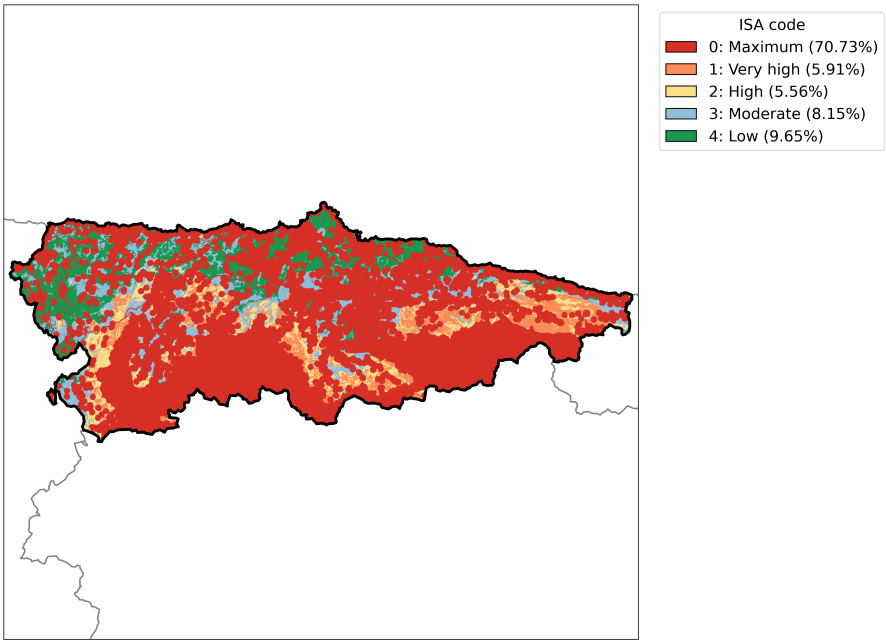
Wind power potential vs. capacity factor



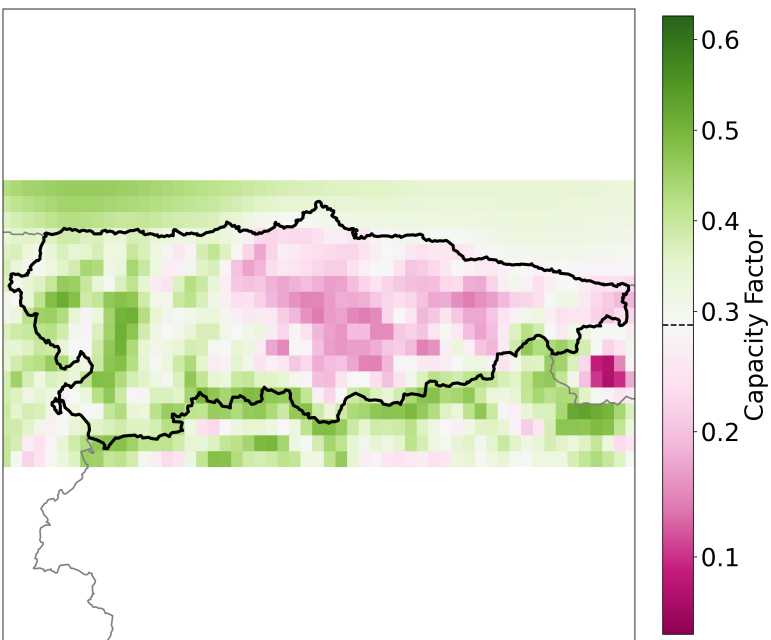
- **LAND:** 11.27% of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** 33.26 GW could be installed in these areas. Installed wind power capacity in Galicia in 2025 was 4.03 GW.
- **ENERGY:** 120.90 TWh could be generated with this potential capacity. This represents around 856% of the actual electricity demand in the region (14.12 TWh).

Principado de Asturias (ES12)

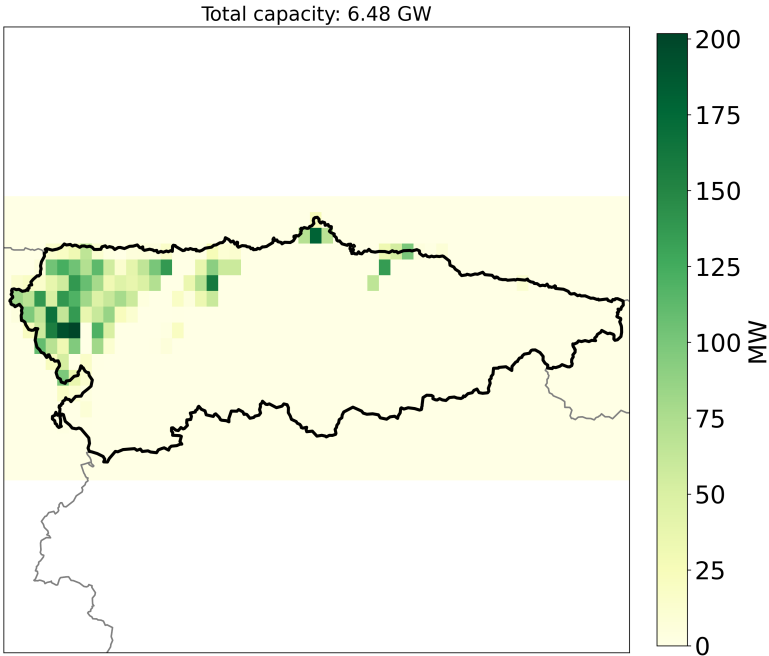
Environmental sensitivity to wind farms



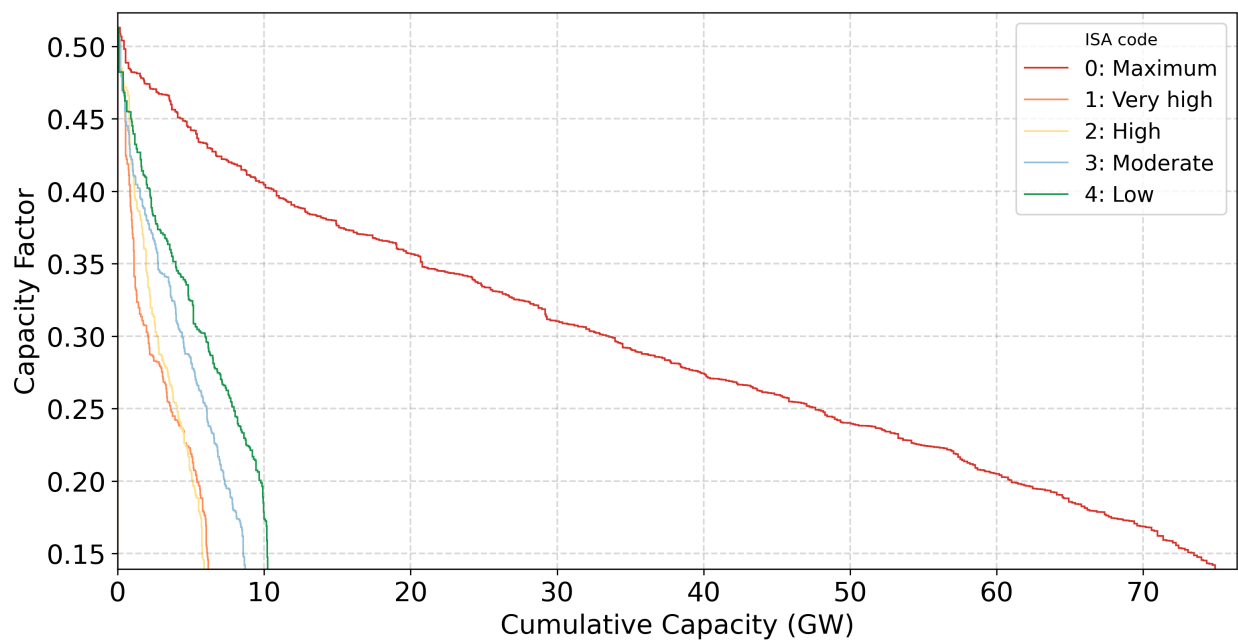
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



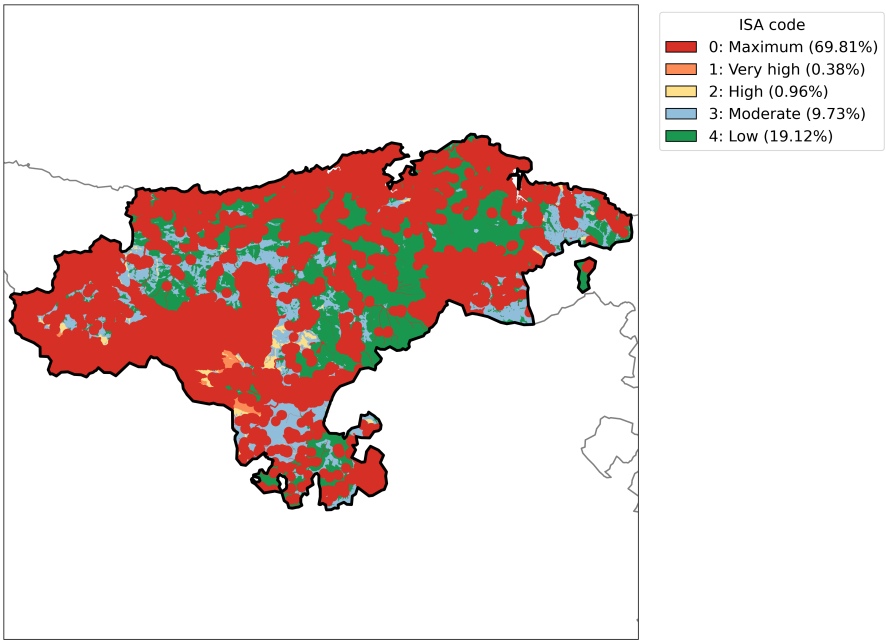
Wind power potential vs. capacity factor



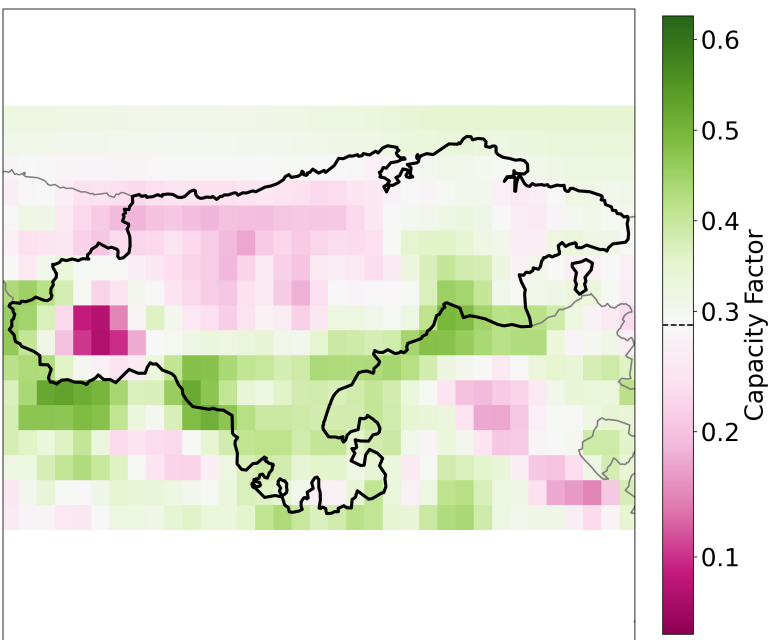
- **LAND:** 6.11% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 6.48 GW could be installed in these areas. Installed wind power capacity in Principado de Asturias in 2025 was 0.70 GW.
- **ENERGY:** 21.23 TWh could be generated with this potential capacity. This represents around 250% of the actual electricity demand in the region (8.51 TWh).

Cantabria (ES13)

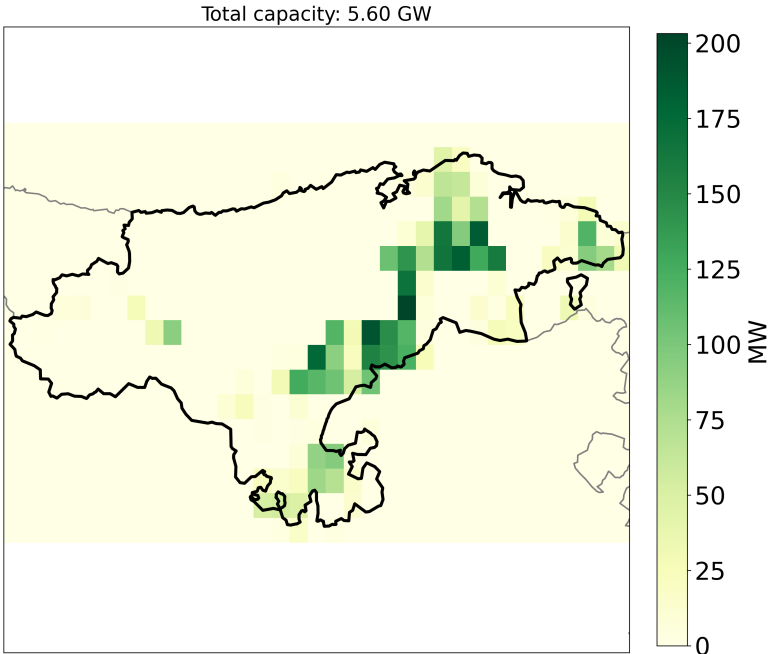
Environmental sensitivity to wind farms



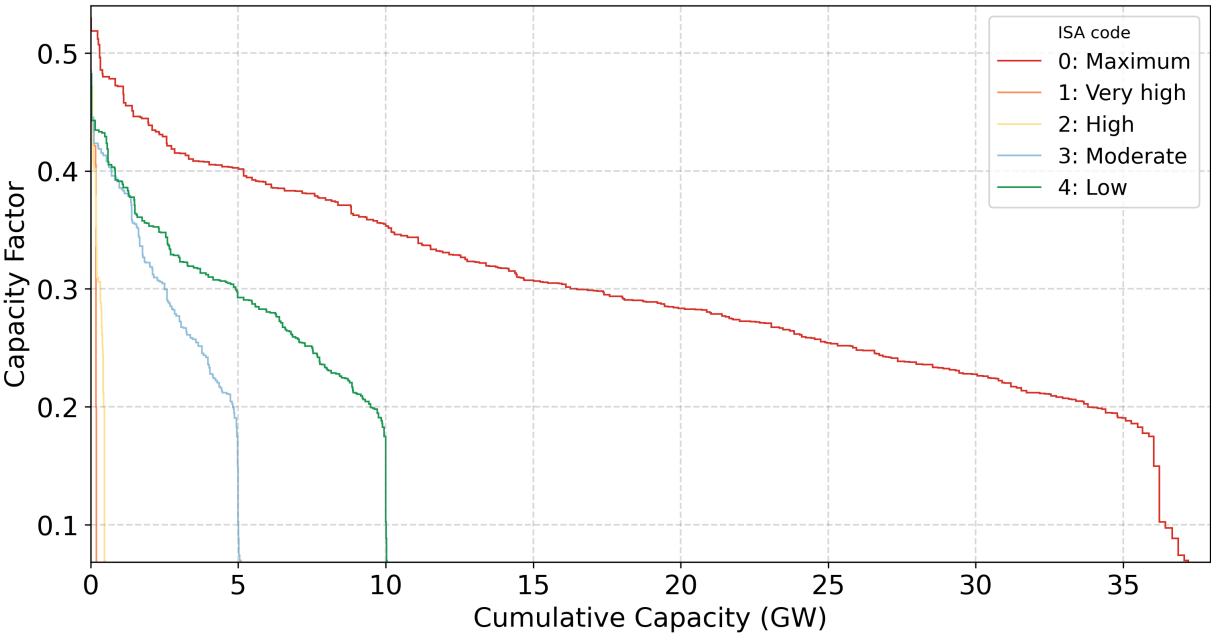
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



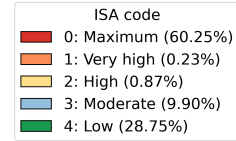
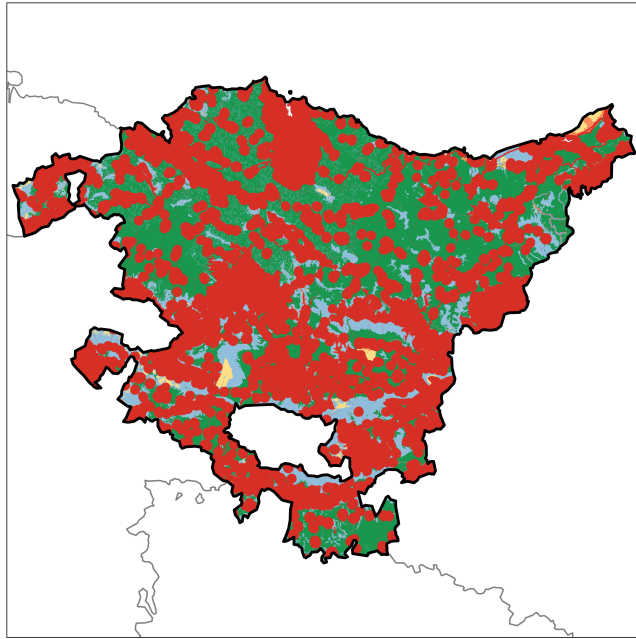
Wind power potential vs. capacity factor



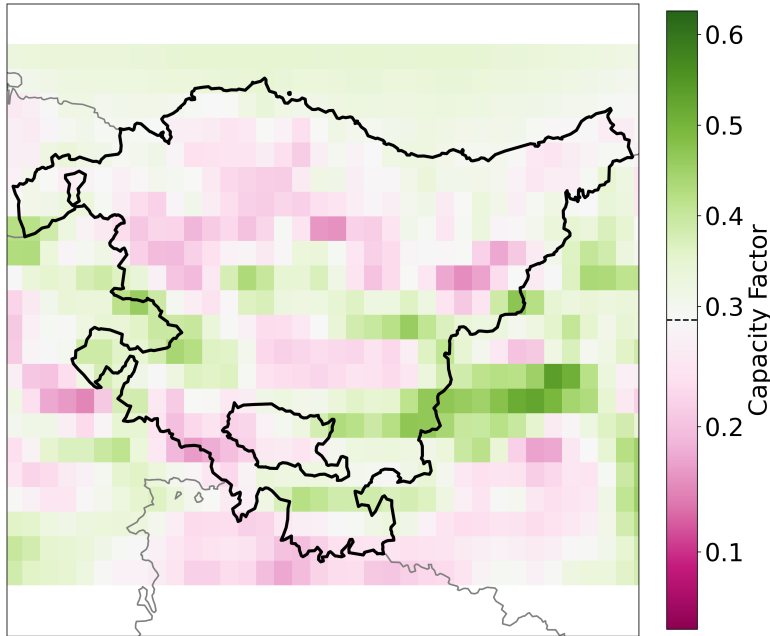
- **LAND:** 10.56% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 5.60 GW could be installed in these areas. Installed wind power capacity in Cantabria in 2025 was 0.04 GW.
- **ENERGY:** 16.92 TWh could be generated with this potential capacity. This represents around 434% of the actual electricity demand in the region (3.90 TWh).

País Vasco (ES21)

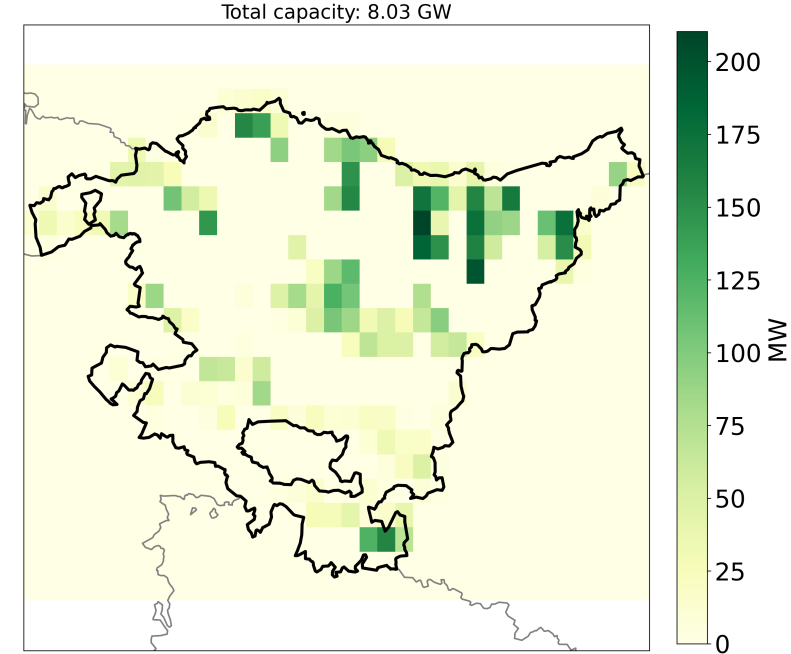
Environmental sensitivity to wind farms



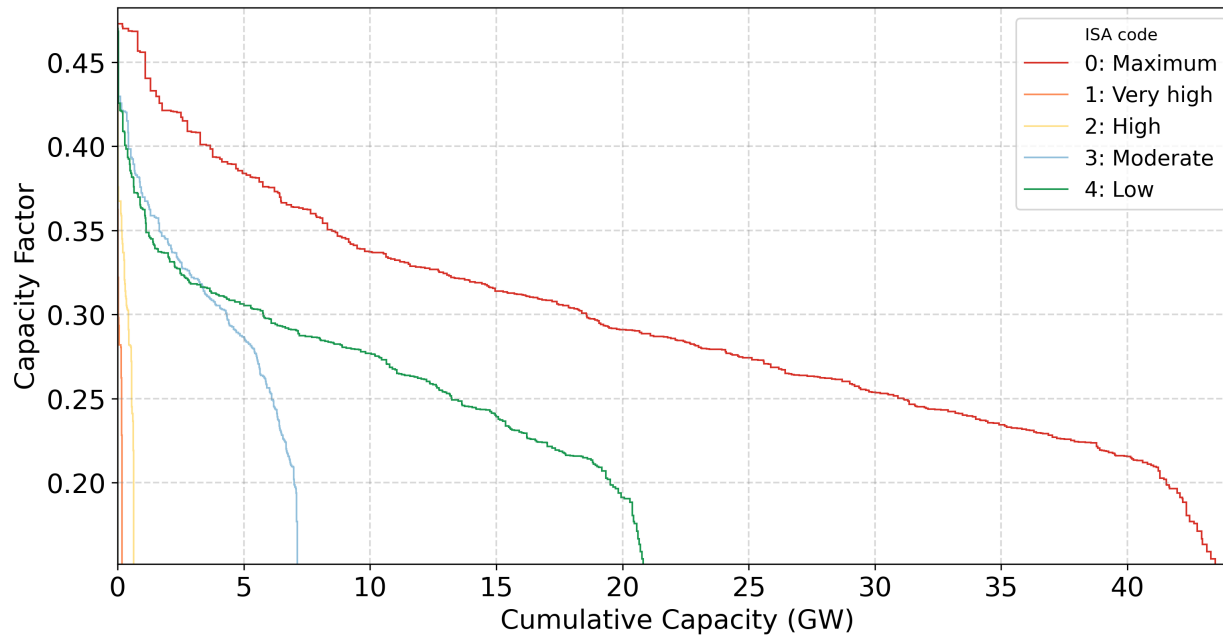
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



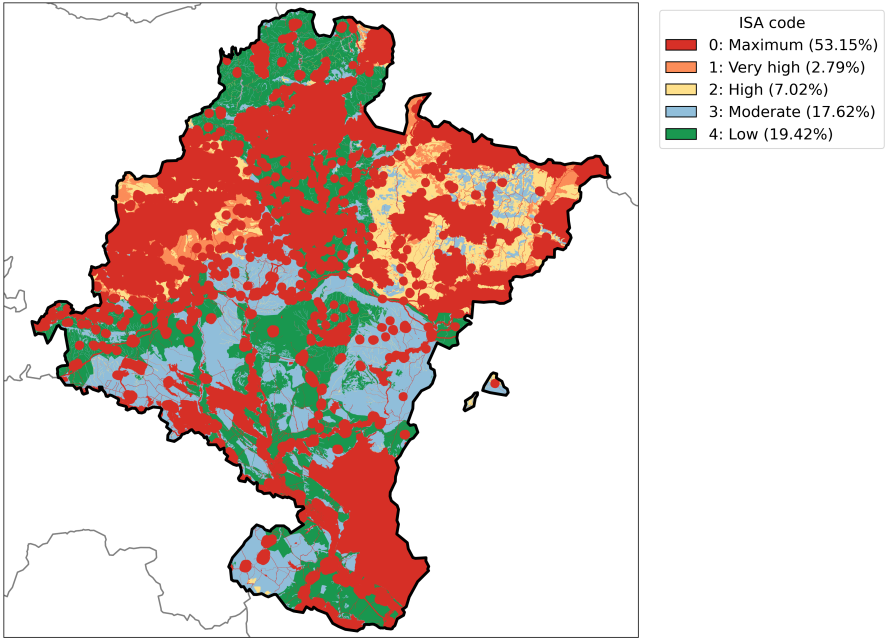
Wind power potential vs. capacity factor



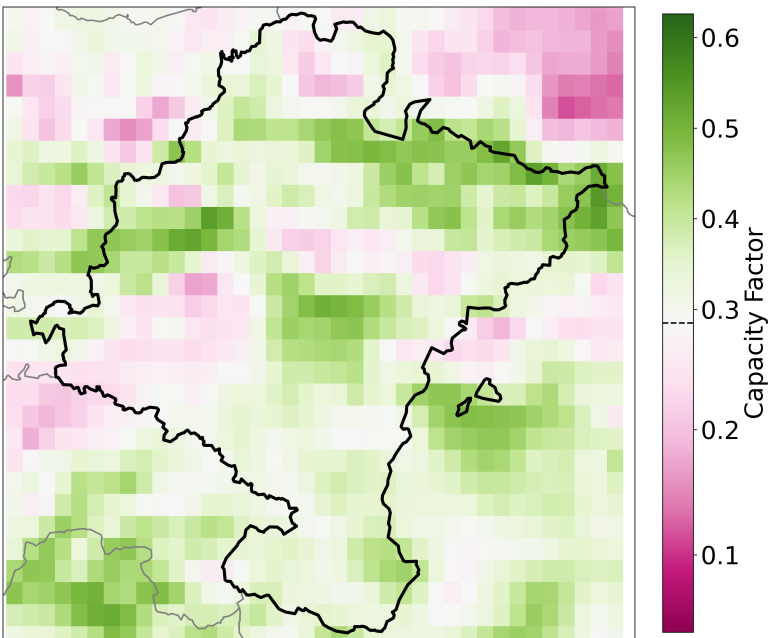
- **LAND:** **11.12%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **8.03 GW** could be installed in these areas. Installed wind power capacity in País Vasco in 2025 was **0.16 GW**.
- **ENERGY:** **22.58 TWh** could be generated with this potential capacity. This represents around **150%** of the actual electricity demand in the region (15.04 TWh).

Comunidad Foral de Navarra (ES22)

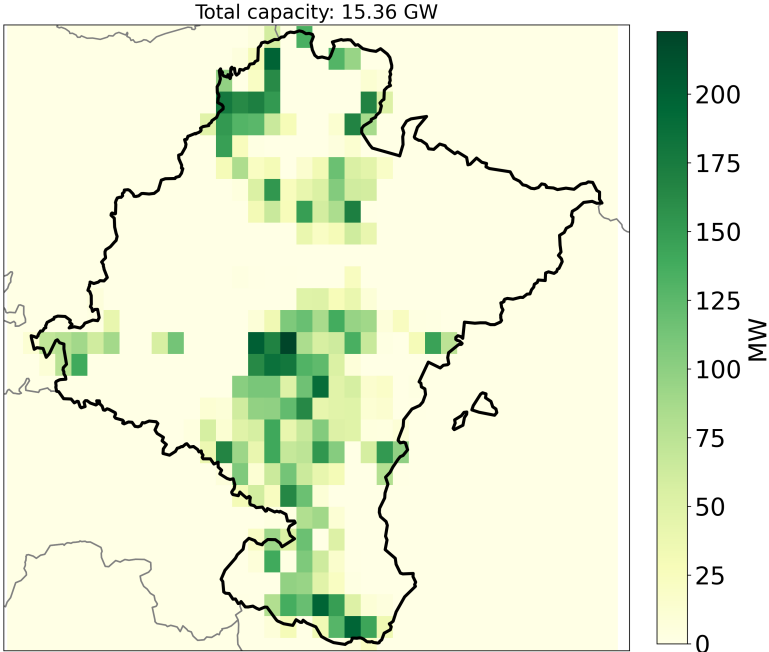
Environmental sensitivity to wind farms



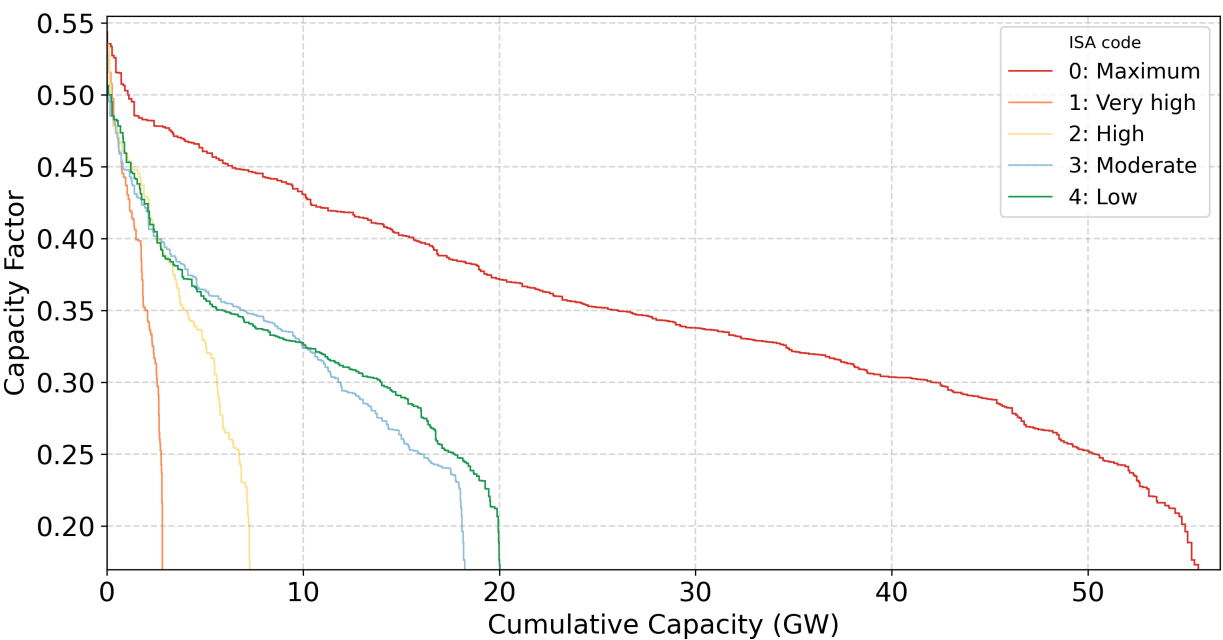
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



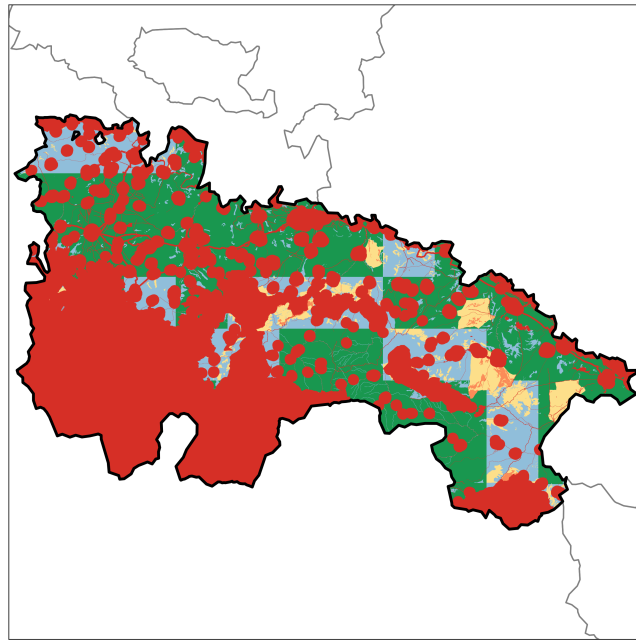
Wind power potential vs. capacity factor



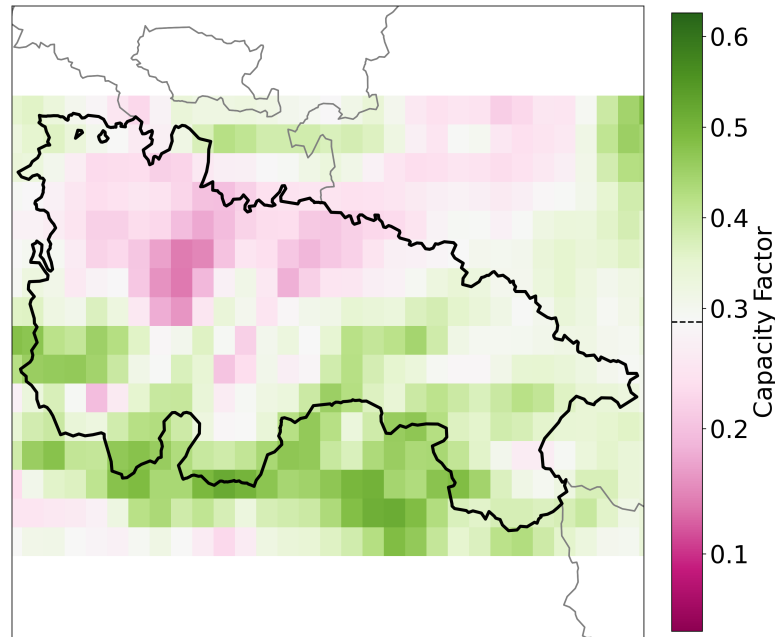
- **LAND:** 14.77% of the region combines low environmental sensitivity (ISA-4) and high wind resource (CF $>$ 0.285).
- **WIND POWER CAPACITY:** 15.36 GW could be installed in these areas. Installed wind power capacity in Comunidad Foral de Navarra in 2025 was 1.63 GW.
- **ENERGY:** 47.48 TWh could be generated with this potential capacity. This represents around 974% of the actual electricity demand in the region (4.87 TWh).

La Rioja (ES23)

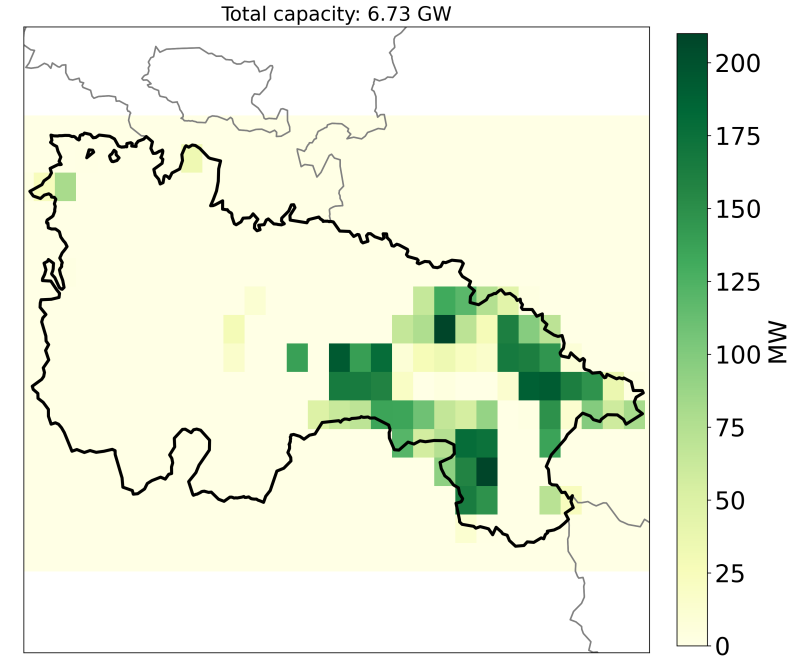
Environmental sensitivity to wind farms



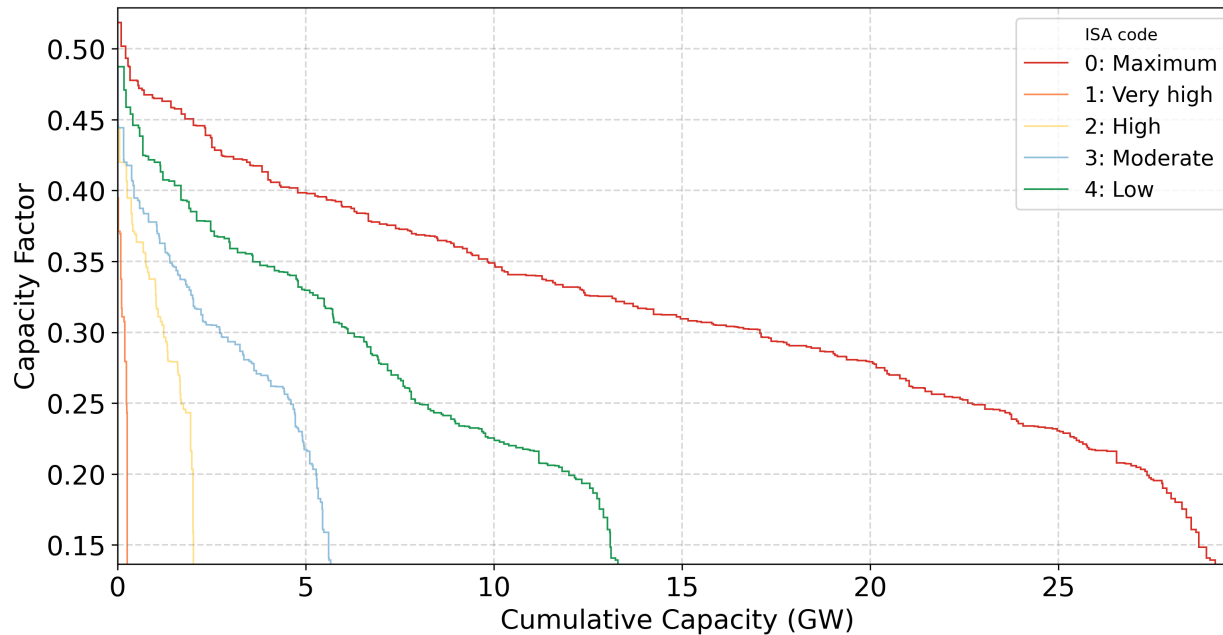
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



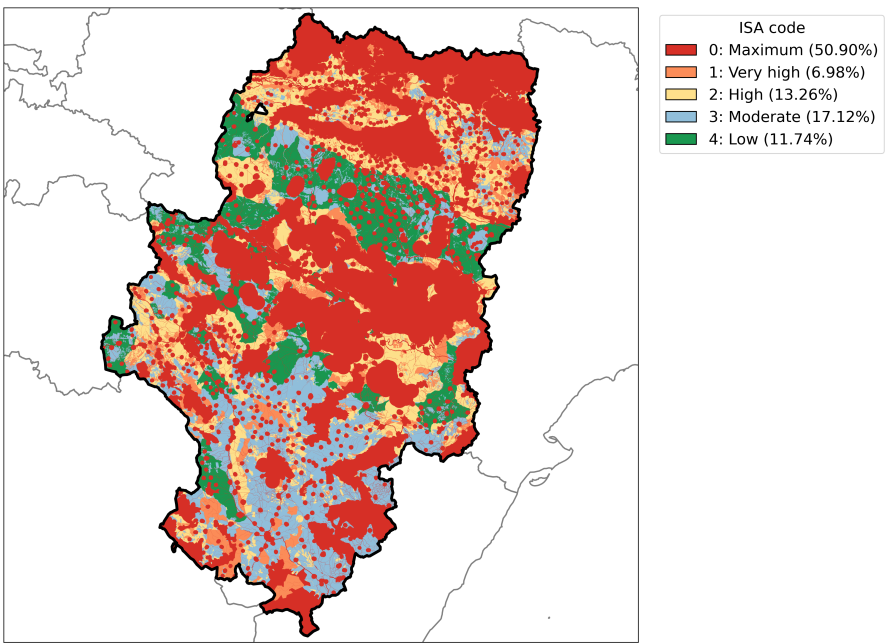
Wind power potential vs. capacity factor



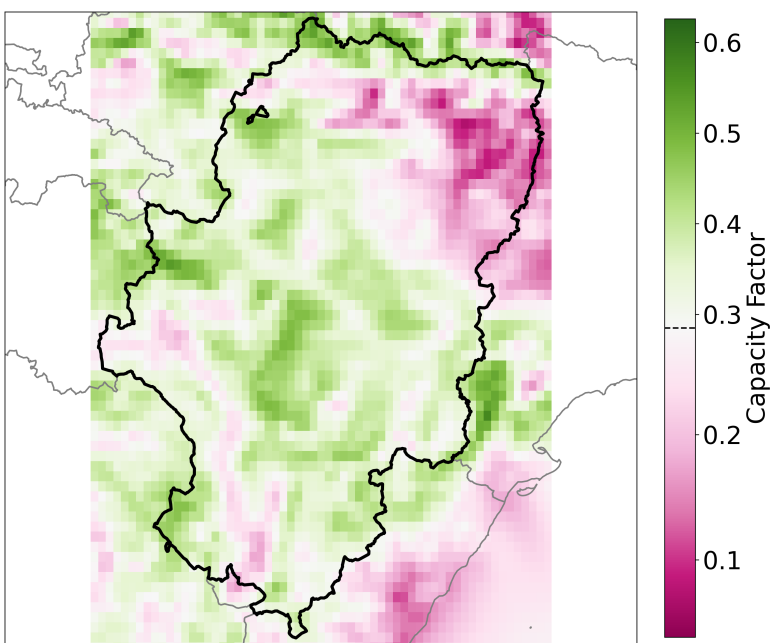
- **LAND:** **13.35%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **6.73 GW** could be installed in these areas. Installed wind power capacity in La Rioja in 2025 was **0.51 GW**.
- **ENERGY:** **21.49 TWh** could be generated with this potential capacity. This represents around **1367%** of the actual electricity demand in the region (1.57 TWh).

Aragón (ES24)

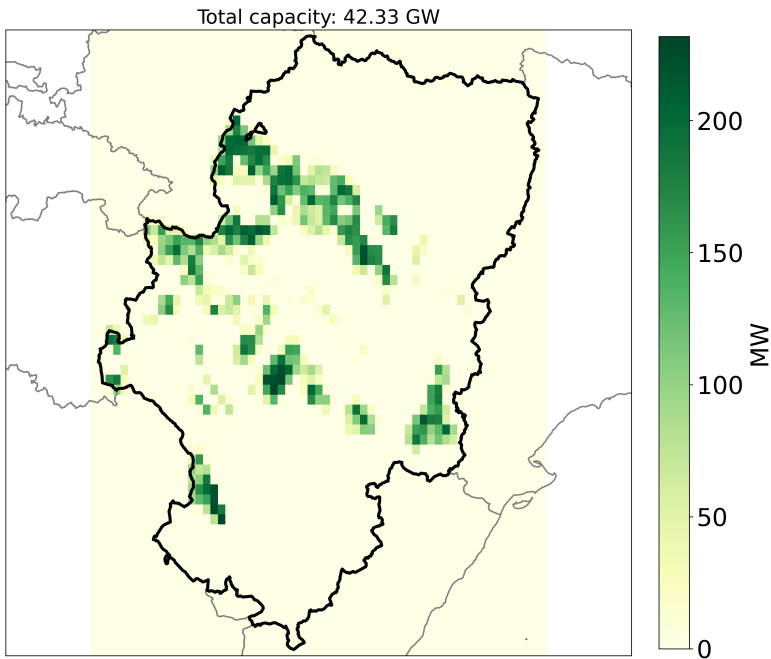
Environmental sensitivity to wind farms



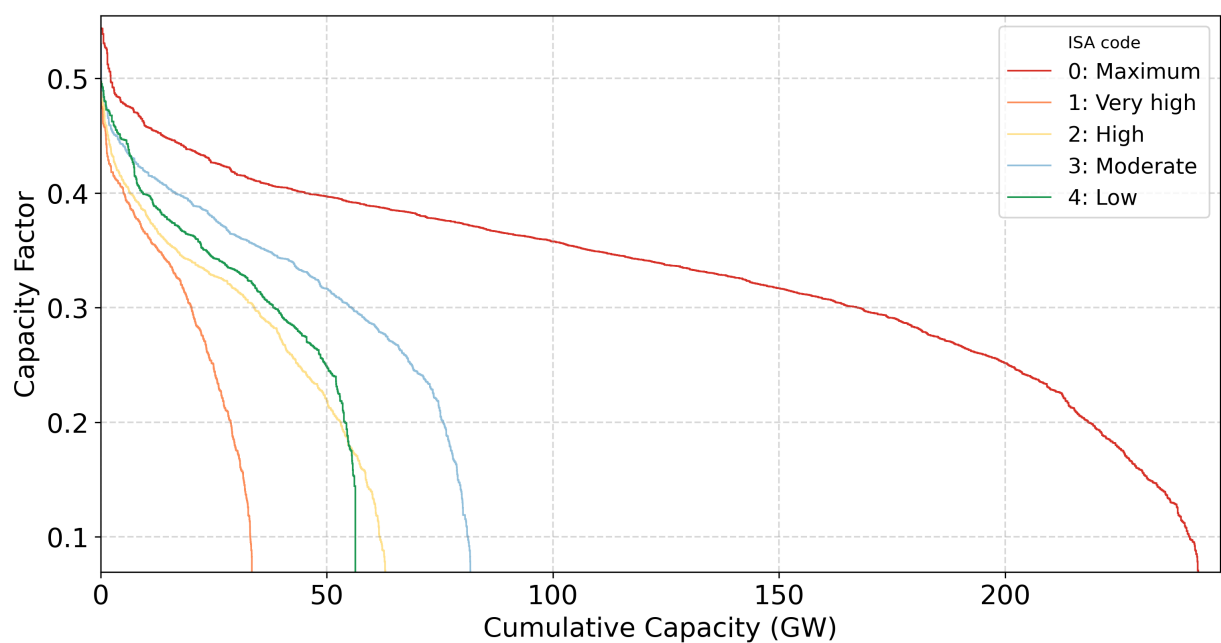
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



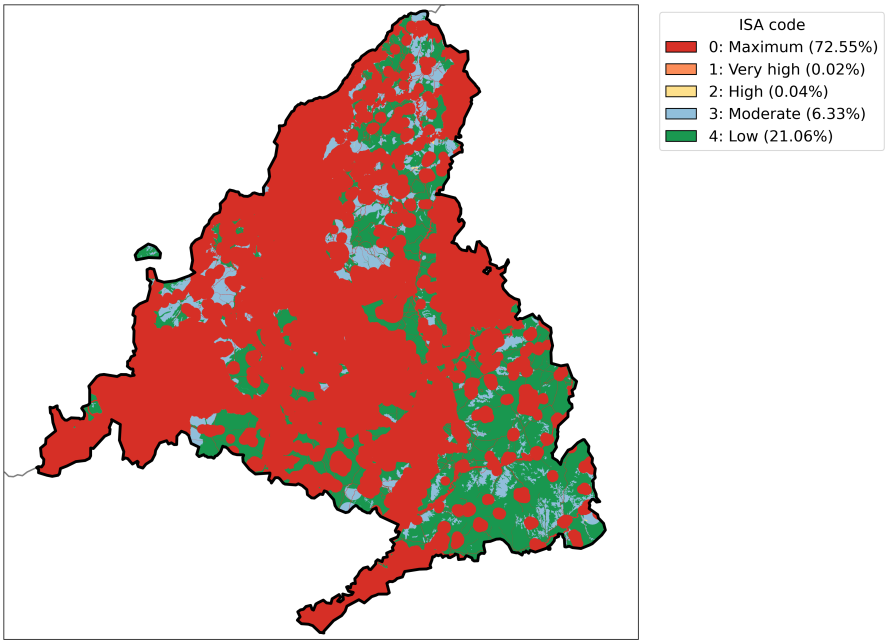
Wind power potential vs. capacity factor



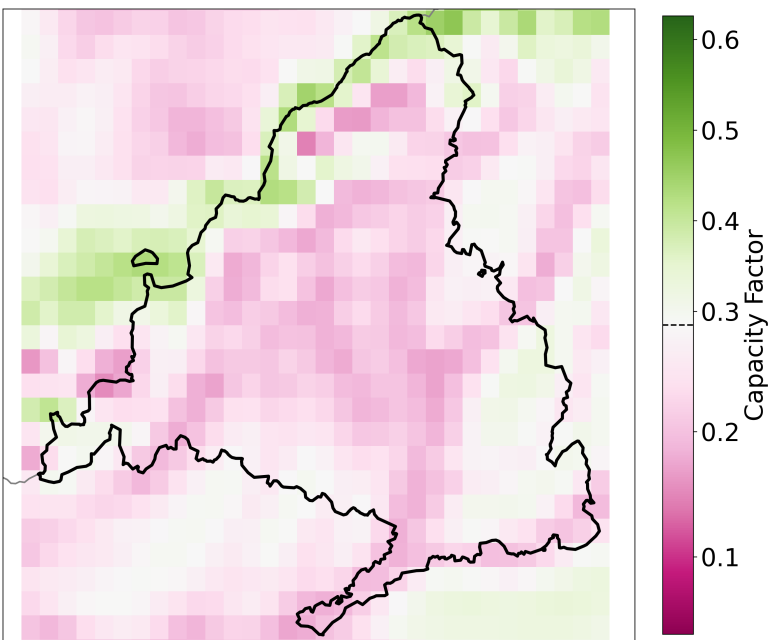
- **LAND:** 8.87% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 42.33 GW could be installed in these areas. Installed wind power capacity in Aragón in 2025 was 6.06 GW.
- **ENERGY:** 135.64 TWh could be generated with this potential capacity. This represents around 1272% of the actual electricity demand in the region (10.66 TWh).

Comunidad de Madrid (ES30)

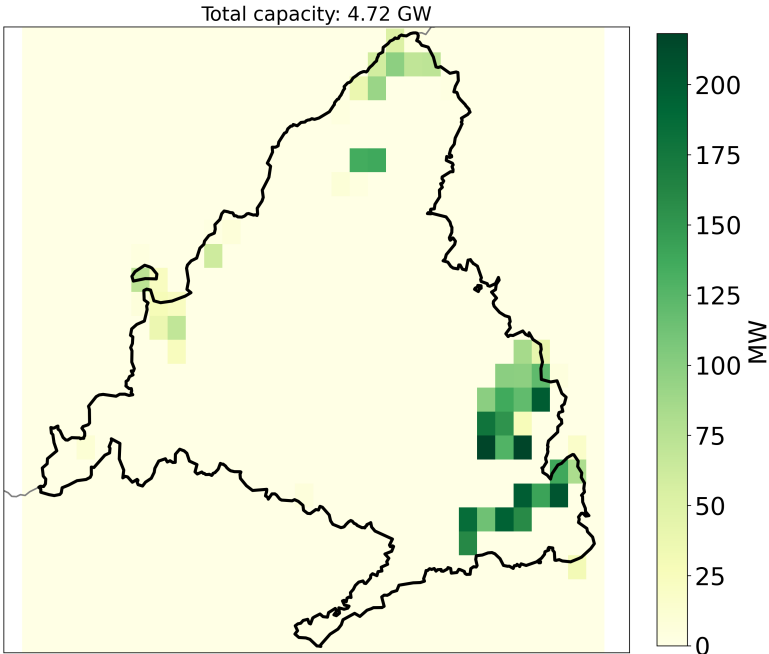
Environmental sensitivity to wind farms



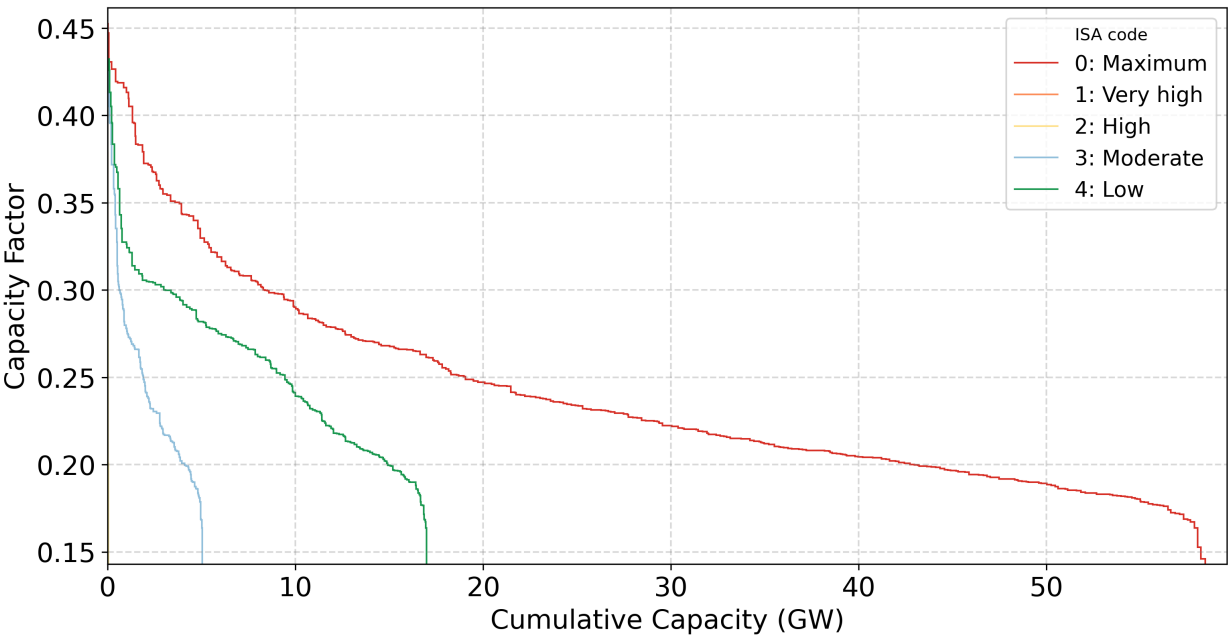
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



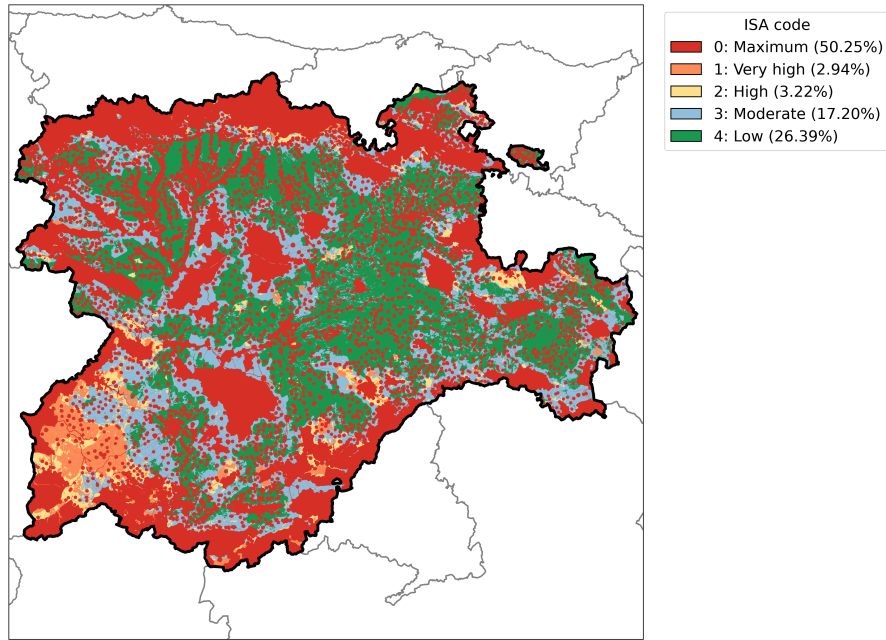
Wind power potential vs. capacity factor



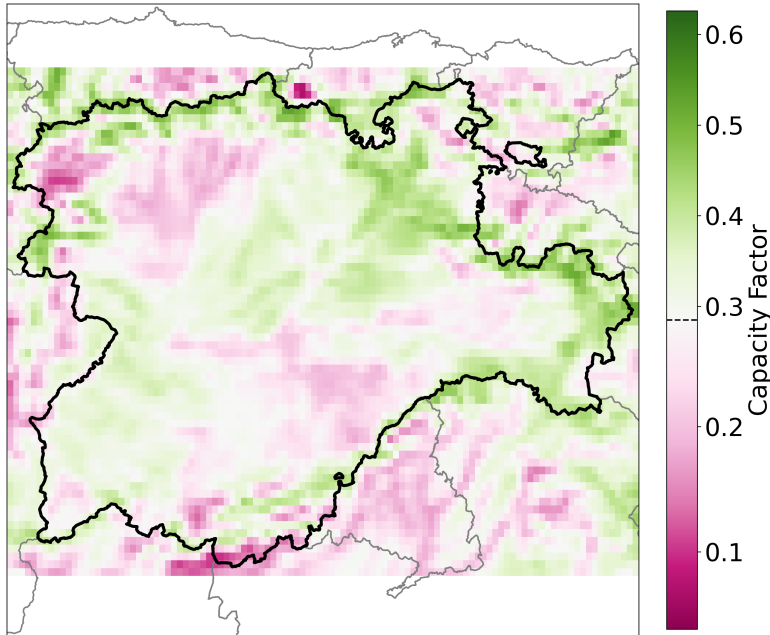
- **LAND:** 5.87% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 4.72 GW could be installed in these areas. Installed wind power capacity in Comunidad de Madrid in 2025 was 0.00 GW.
- **ENERGY:** 13.08 TWh could be generated with this potential capacity. This represents around 45% of the actual electricity demand in the region (28.88 TWh).

Castilla y León (ES41)

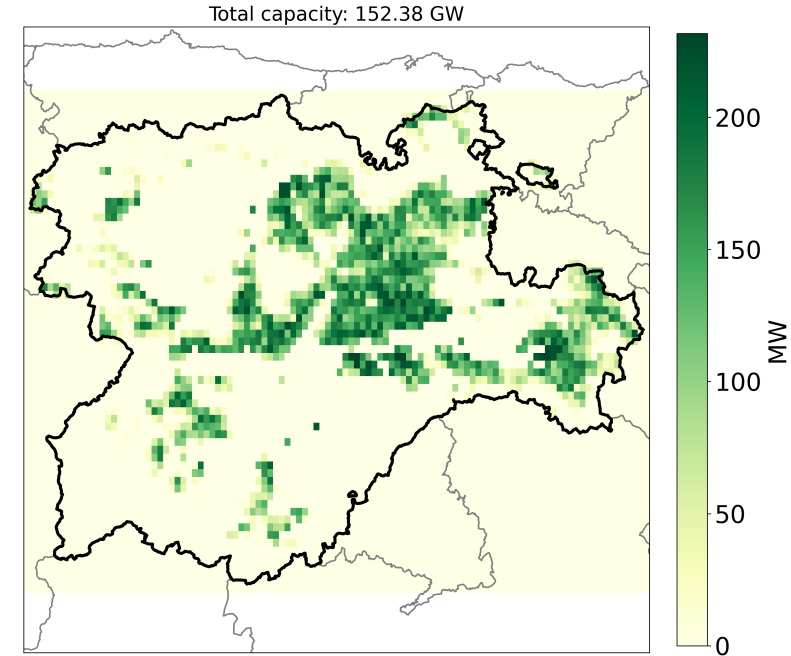
Environmental sensitivity to wind farms



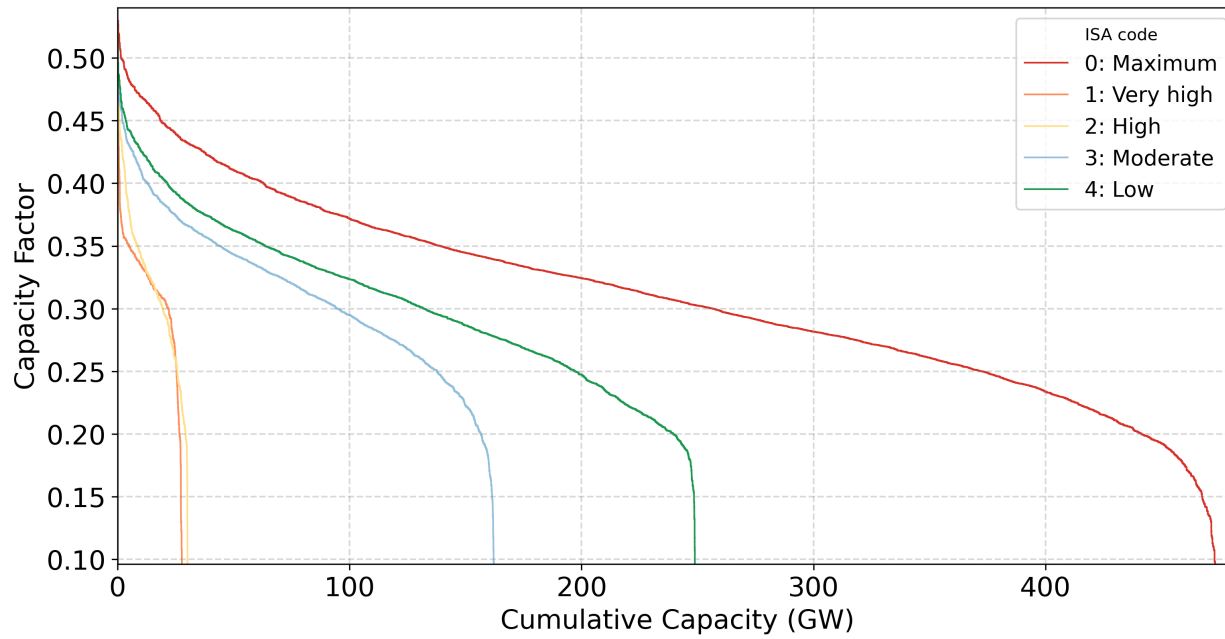
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



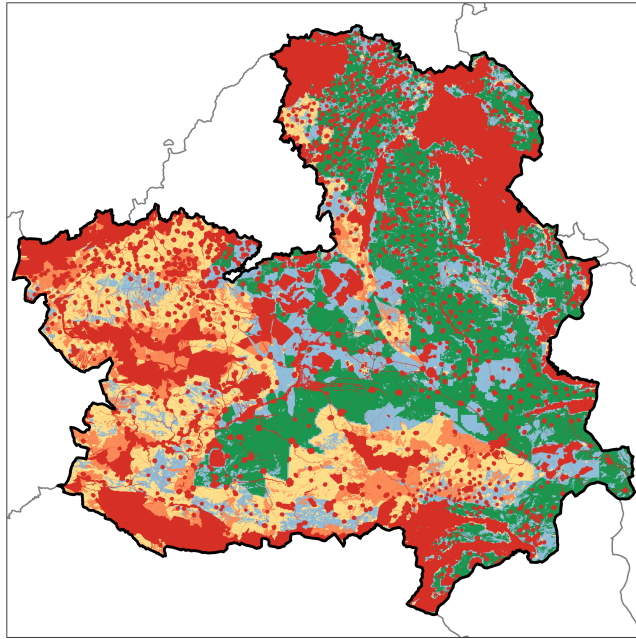
Wind power potential vs. capacity factor



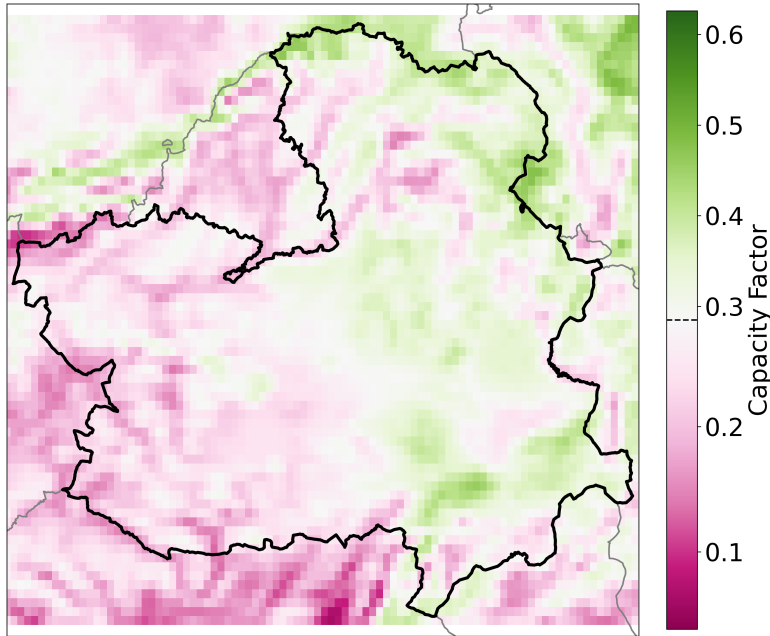
- **LAND:** 16.18% of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** 152.38 GW could be installed in these areas.
Installed wind power capacity in Castilla y León in 2025 was 7.75 GW.
- **ENERGY:** 464.49 TWh could be generated with this potential capacity.
This represents around 3441% of the actual electricity demand in the region (13.50 TWh).

Castilla-La Mancha (ES42)

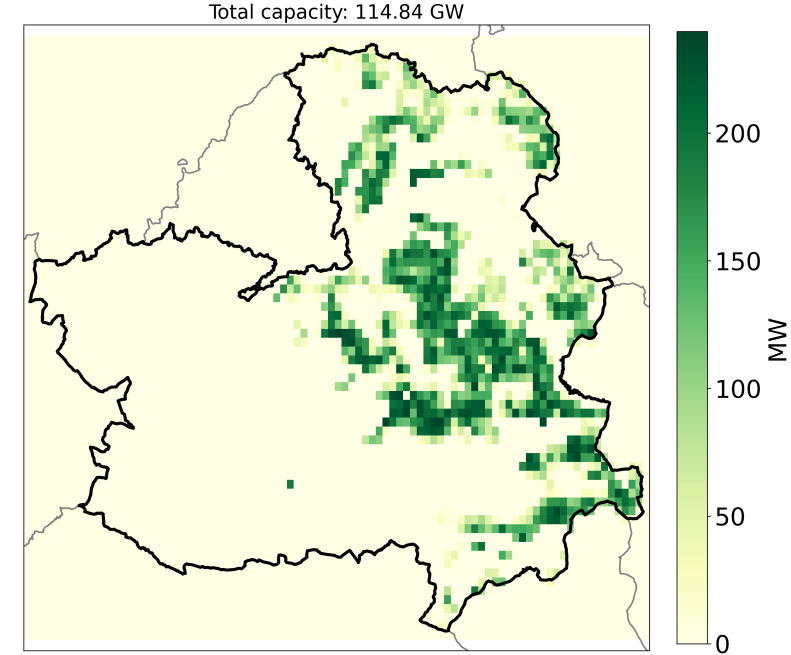
Environmental sensitivity to wind farms



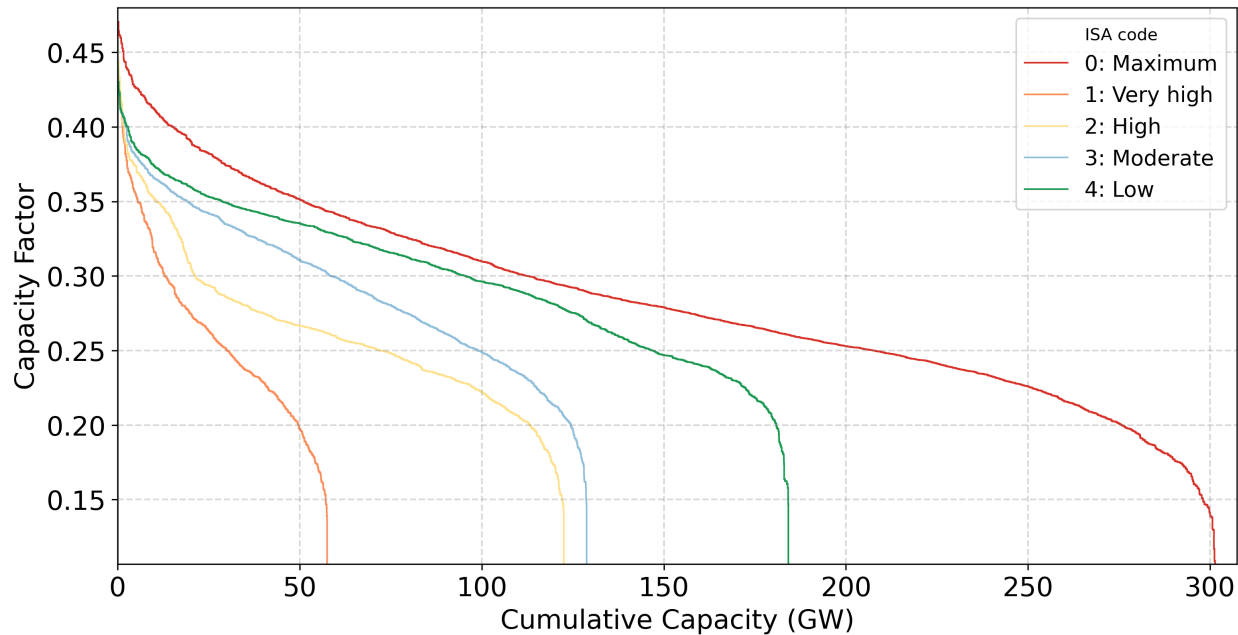
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



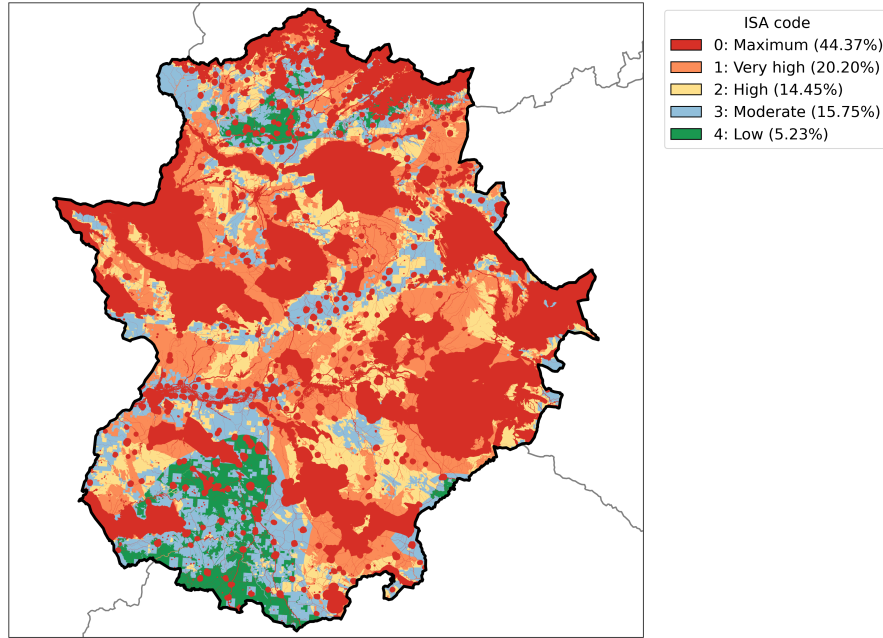
Wind power potential vs. capacity factor



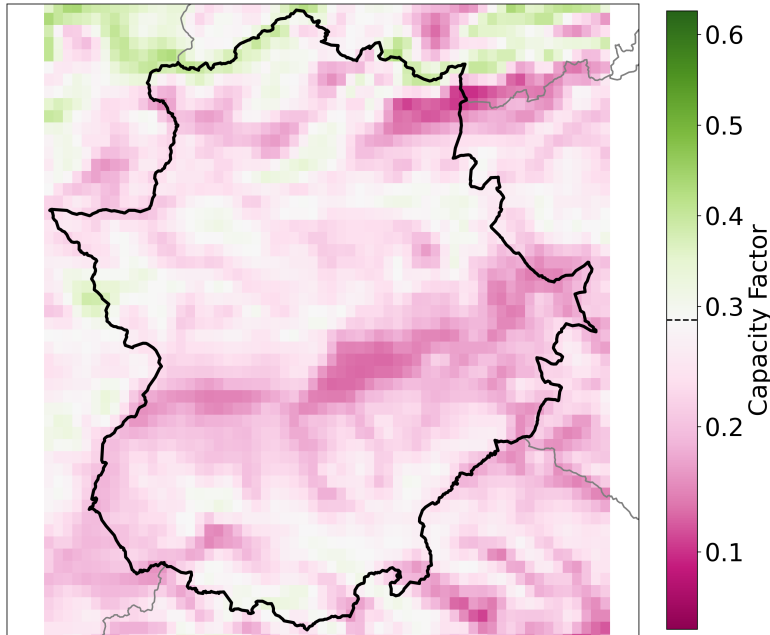
- **LAND:** **14.46%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **114.84 GW** could be installed in these areas.
Installed wind power capacity in Castilla-La Mancha in 2025 was **4.98 GW**.
- **ENERGY:** **333.41 TWh** could be generated with this potential capacity.
This represents around **2662%** of the actual electricity demand in the region (12.52 TWh).

Extremadura (ES43)

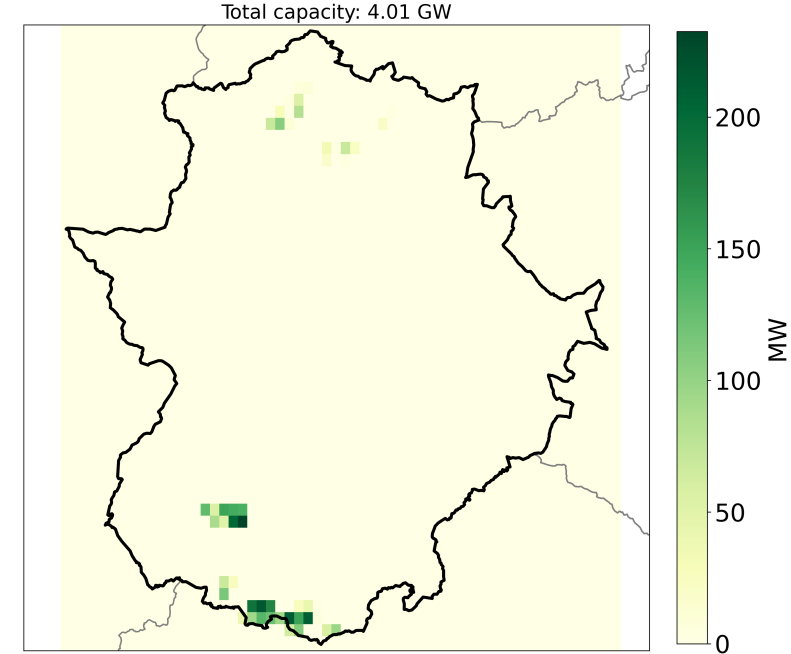
Environmental sensitivity to wind farms



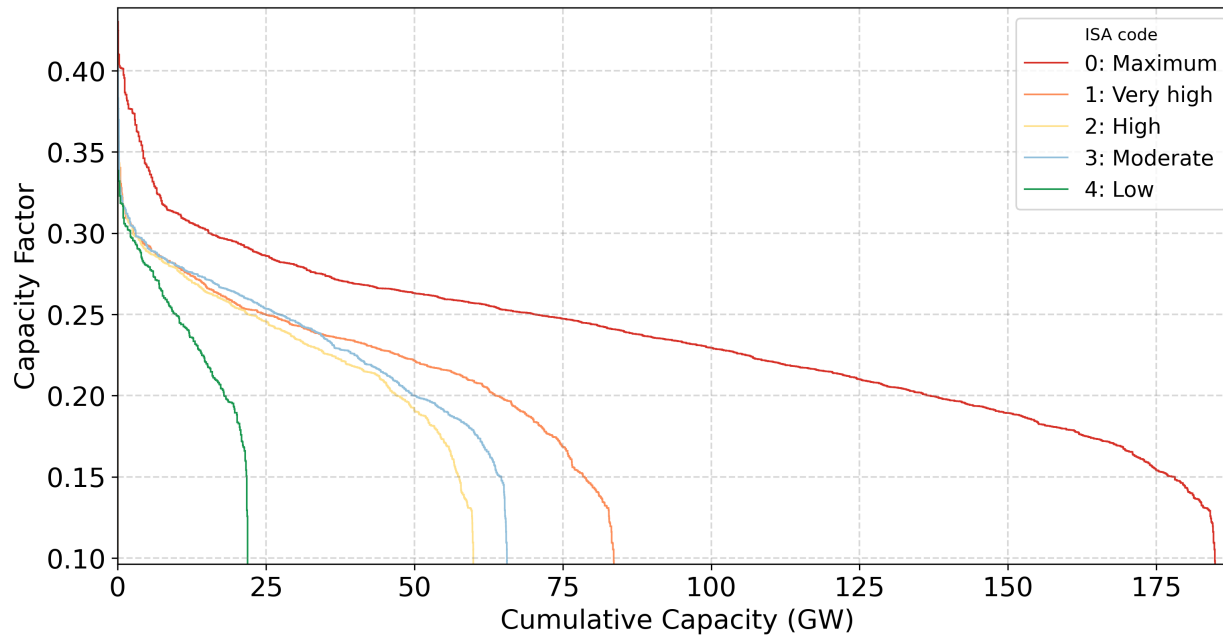
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



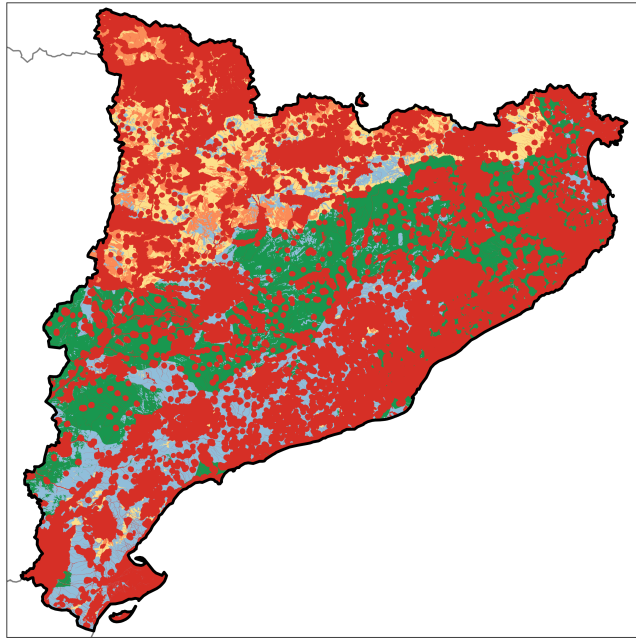
Wind power potential vs. capacity factor



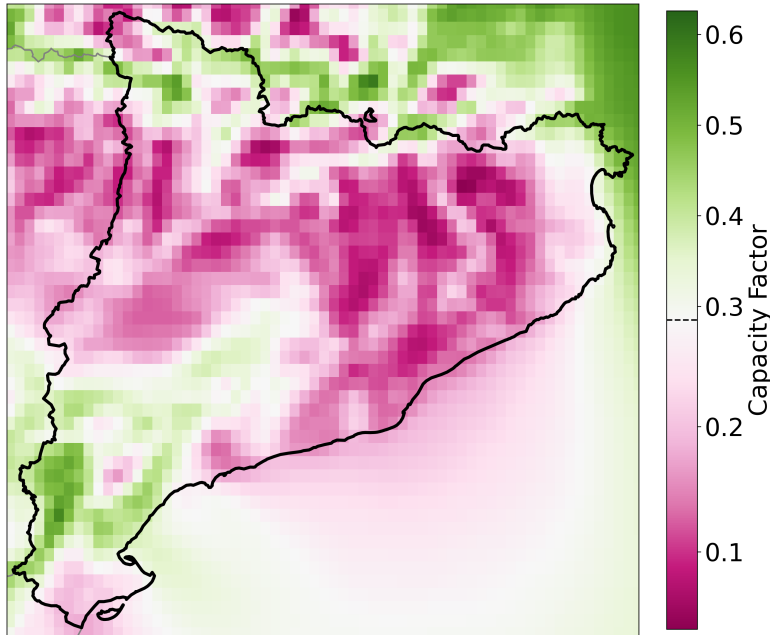
- **LAND:** **0.96%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **4.01 GW** could be installed in these areas. Installed wind power capacity in Extremadura in 2025 was **0.10 GW**.
- **ENERGY:** **10.66 TWh** could be generated with this potential capacity. This represents around **214%** of the actual electricity demand in the region (4.98 TWh).

Cataluña (ES51)

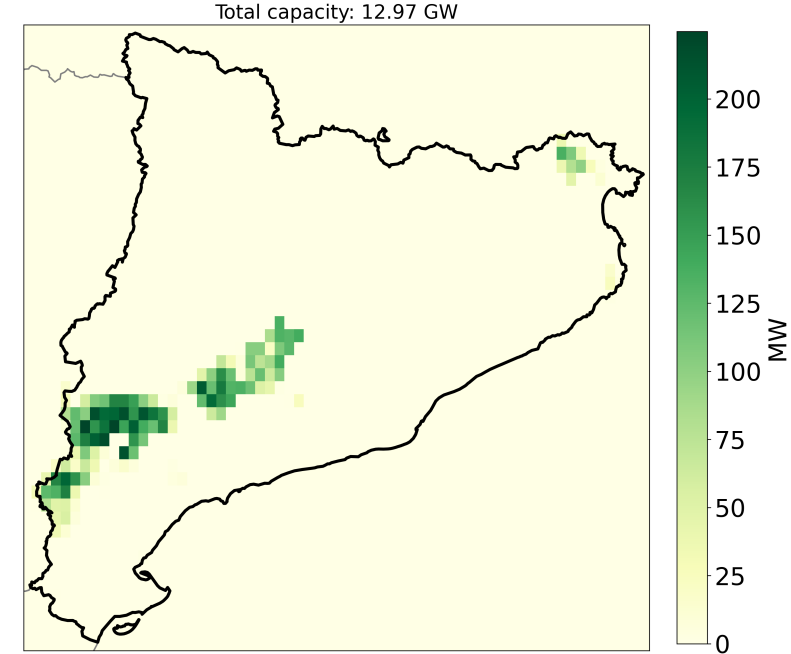
Environmental sensitivity to wind farms



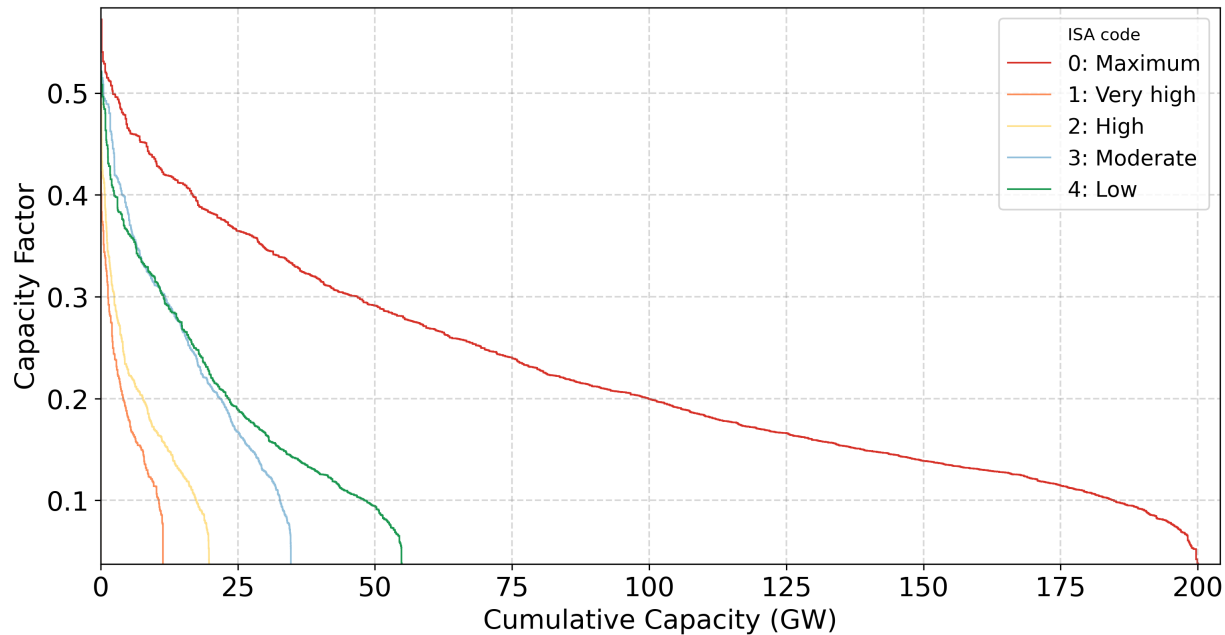
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



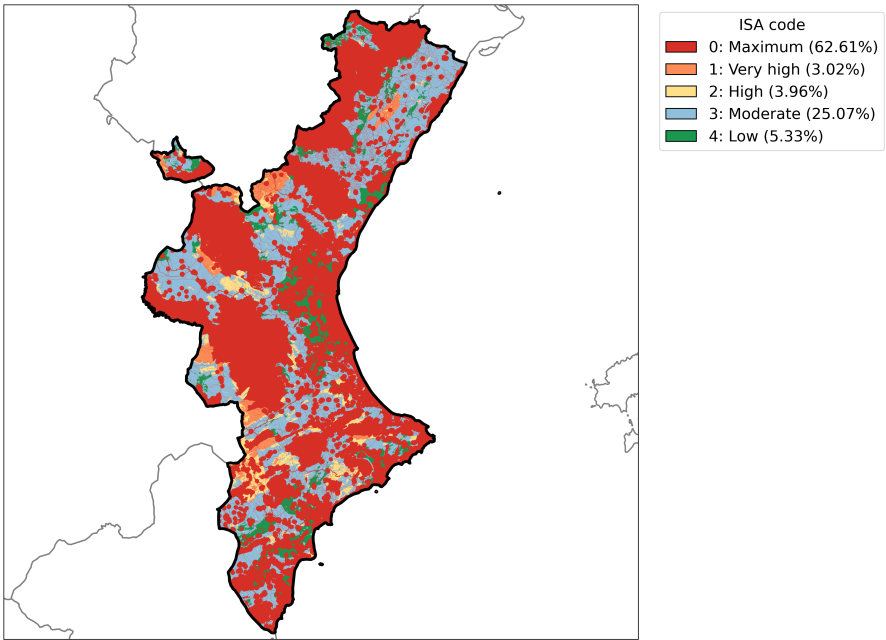
Wind power potential vs. capacity factor



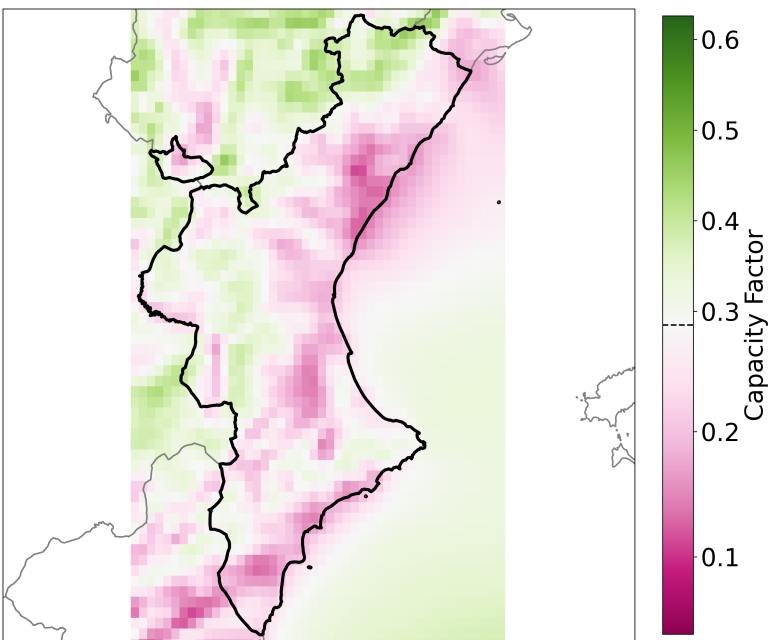
- **LAND:** **4.04%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **12.97 GW** could be installed in these areas. Installed wind power capacity in Cataluña in 2025 was **1.42 GW**.
- **ENERGY:** **40.81 TWh** could be generated with this potential capacity. This represents around **91%** of the actual electricity demand in the region (44.64 TWh).

Comunitat Valenciana (ES52)

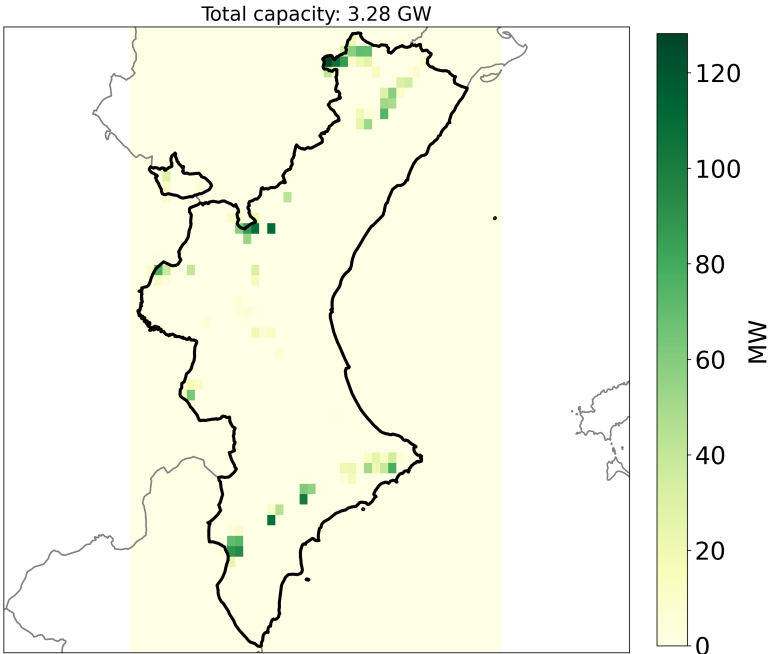
Environmental sensitivity to wind farms



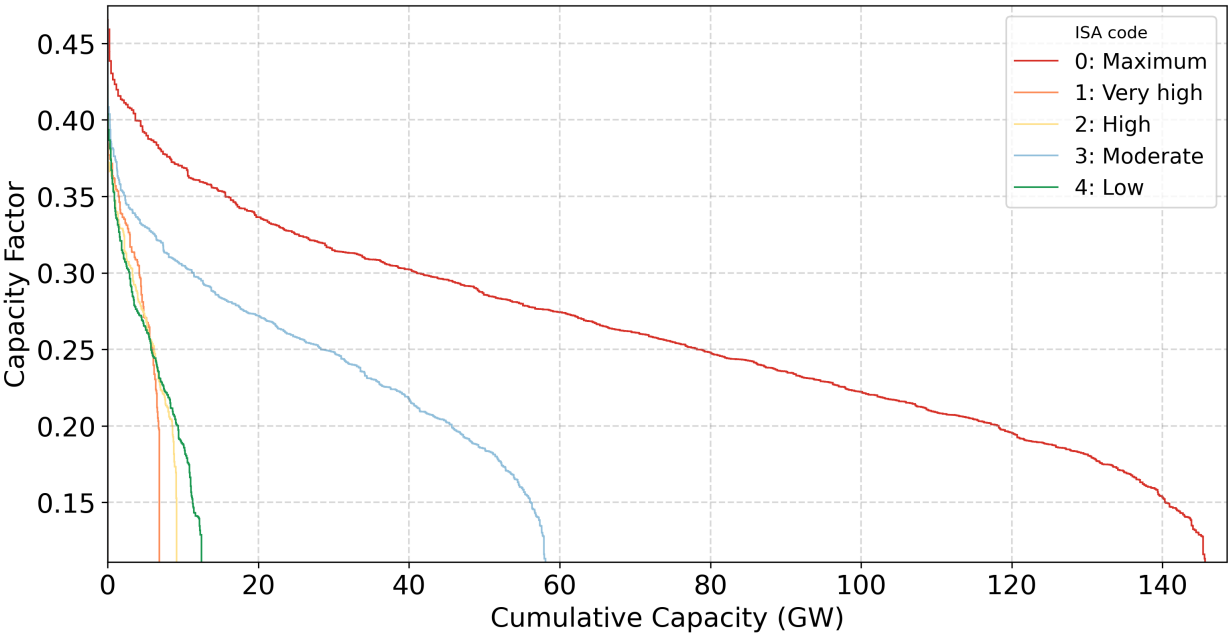
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



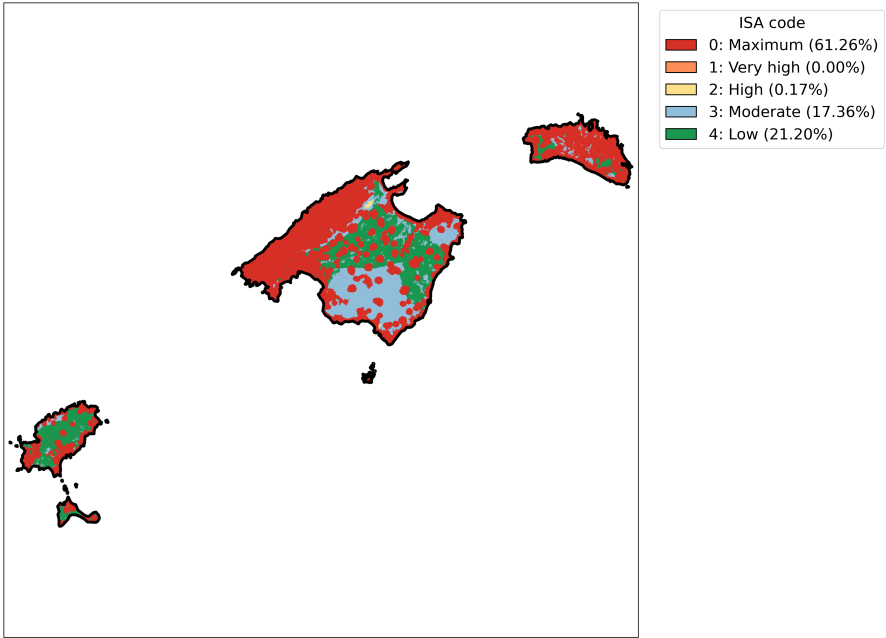
Wind power potential vs. capacity factor



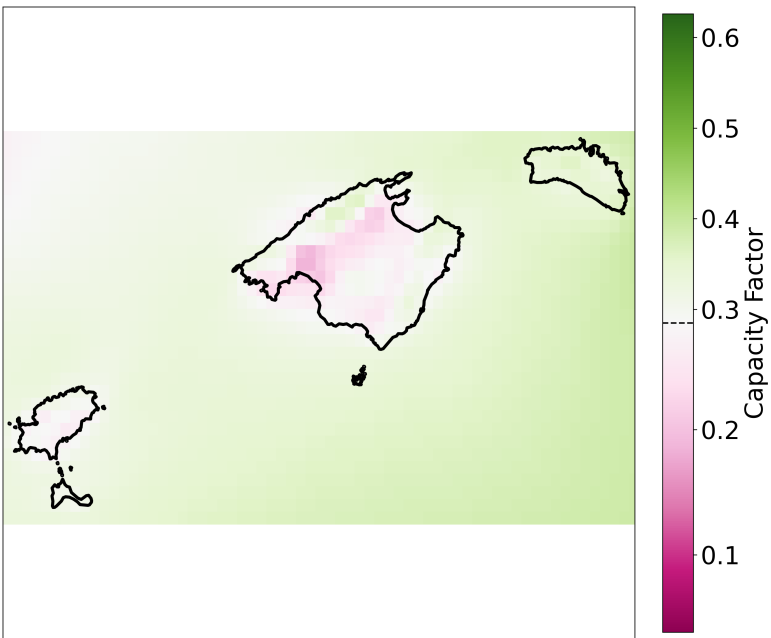
- **LAND:** 1.41% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 3.28 GW could be installed in these areas. Installed wind power capacity in Comunitat Valenciana in 2025 was 1.24 GW.
- **ENERGY:** 9.49 TWh could be generated with this potential capacity. This represents around 34% of the actual electricity demand in the region (27.79 TWh).

Illes Balears (ES53)

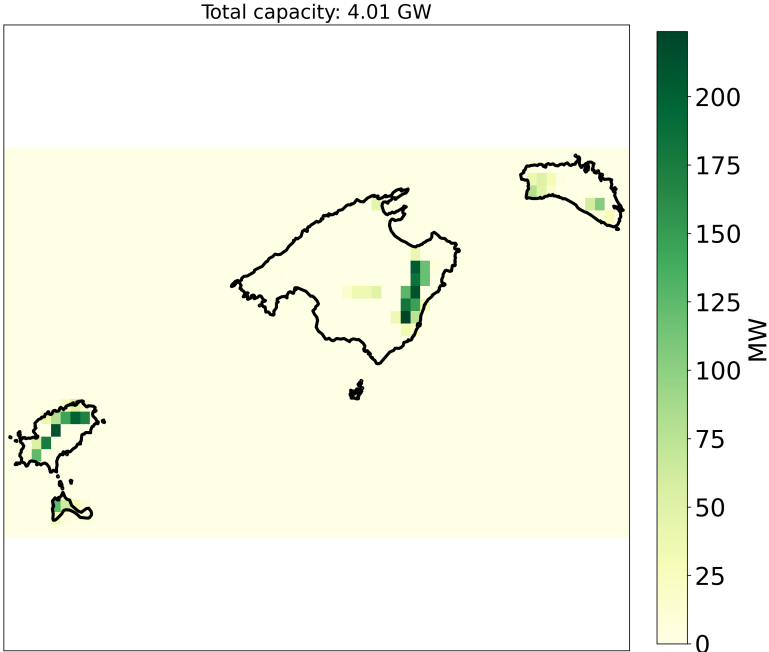
Environmental sensitivity to wind farms



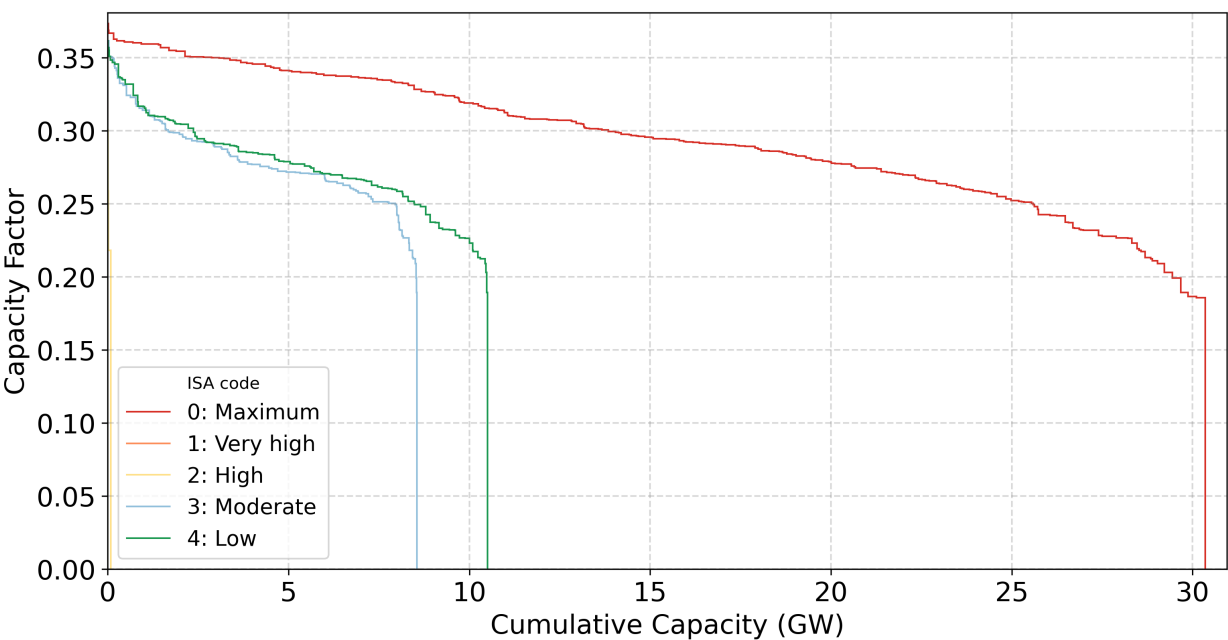
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Wind power capacity at ISA-4 and CF $\geq$ 0.285



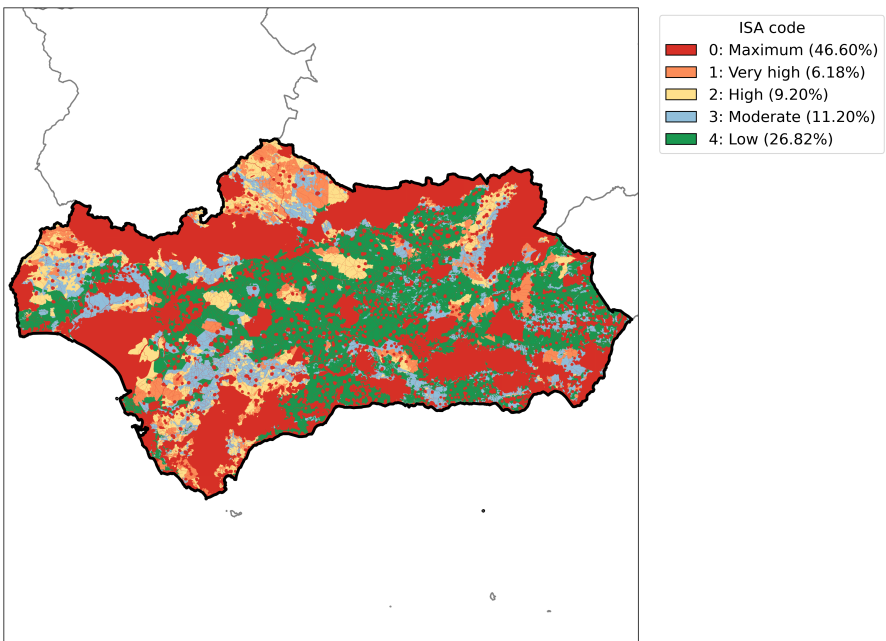
Wind power potential vs. capacity factor



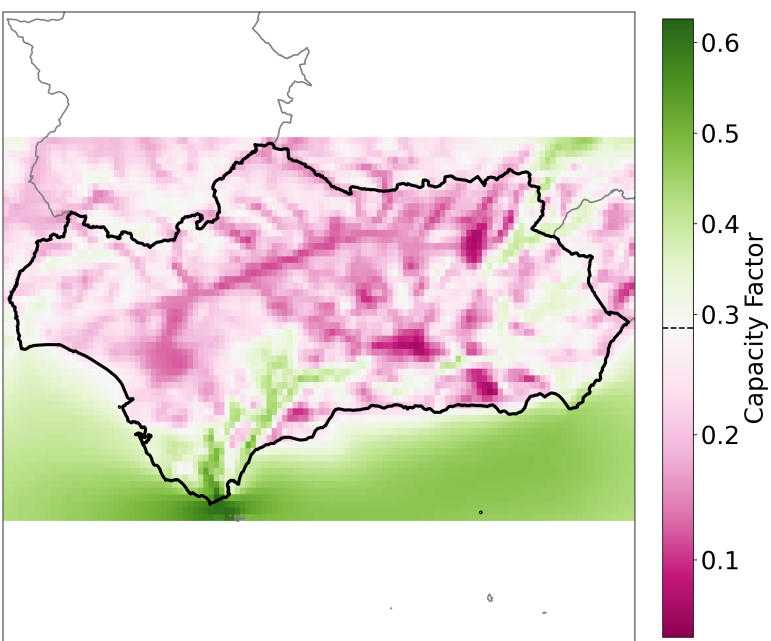
- **LAND:** 8.10% of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** 4.01 GW could be installed in these areas. Installed wind power capacity in Illes Balears in 2025 was 0.00 GW.
- **ENERGY:** 10.79 TWh could be generated with this potential capacity. This represents around 171% of the actual electricity demand in the region (6.31 TWh).

Andalucía (ES61)

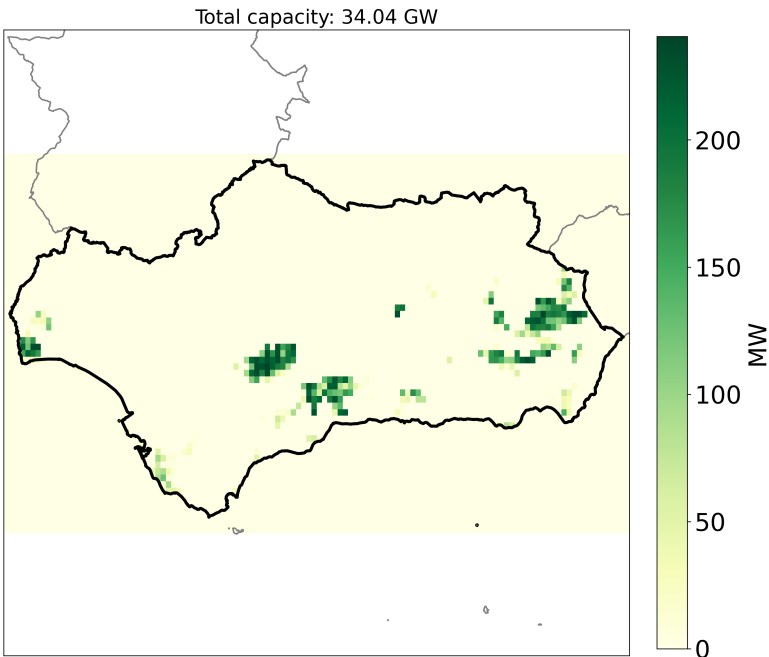
Environmental sensitivity to wind farms



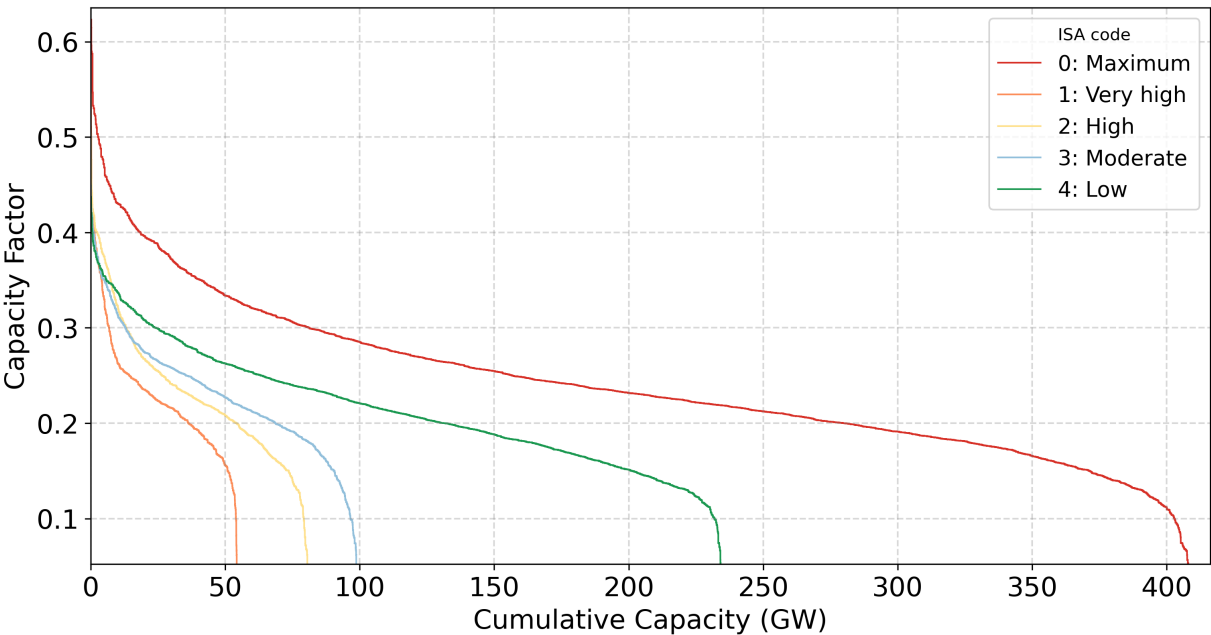
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and CF $\geq$ 0.285



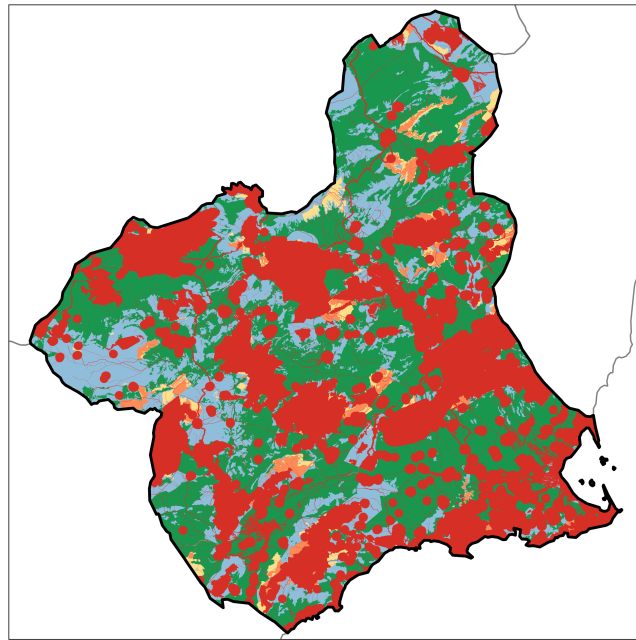
Wind power potential vs. capacity factor



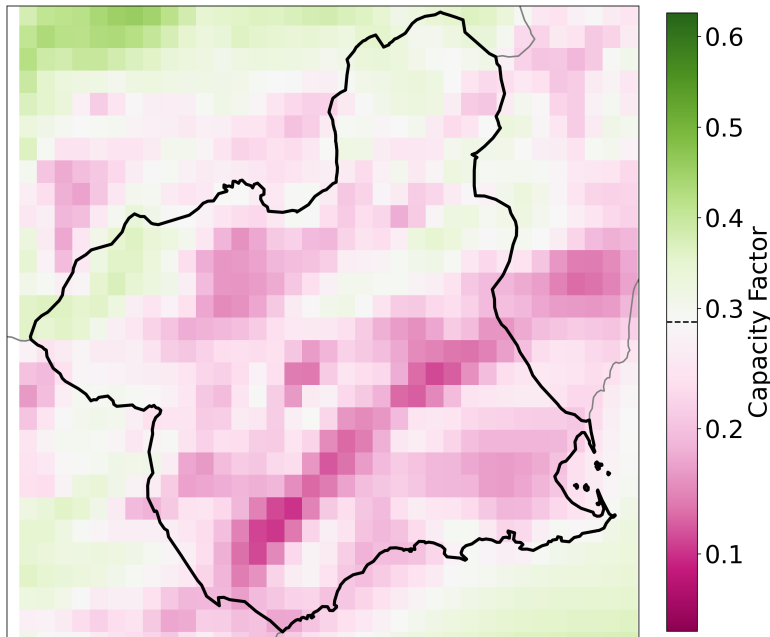
- **LAND:** **3.89%** of the region combines low enviromental sensitivity (ISA-4) and high wind resource (CF>0.285).
- **WIND POWER CAPACITY:** **34.04 GW** could be installed in these areas. Installed wind power capacity in Andalucía in 2025 was **3.71 GW**.
- **ENERGY:** **96.14 TWh** could be generated with this potential capacity. This represents around **242%** of the actual electricity demand in the region (39.79 TWh).

Región de Murcia (ES62)

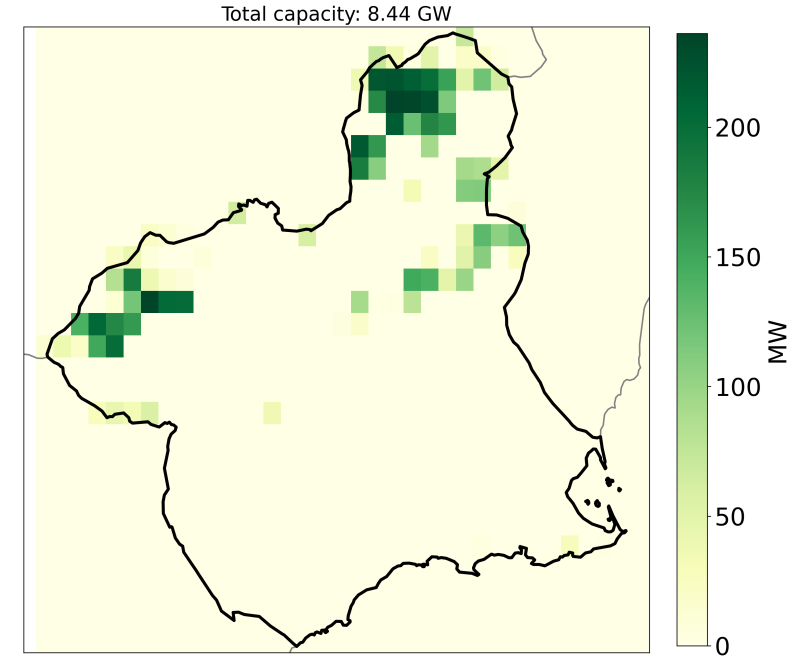
Environmental sensitivity to wind farms



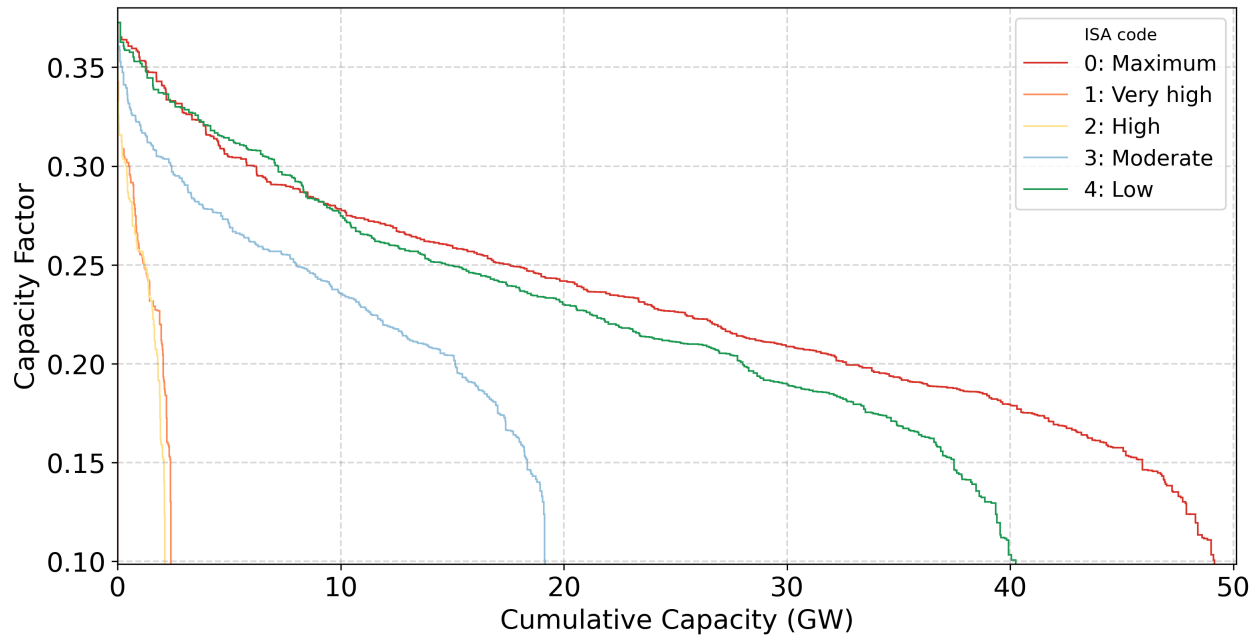
Wind power capacity factor (CF) at 100 m. height



Wind power capacity at ISA-4 and $CF \geq 0.285$



Wind power potential vs. capacity factor



- **LAND:** **7.47%** of the region combines low environmental sensitivity (ISA-4) and high wind resource ($CF > 0.285$).
- **WIND POWER CAPACITY:** **8.44 GW** could be installed in these areas. Installed wind power capacity in Región de Murcia in 2025 was **0.26 GW**.
- **ENERGY:** **23.82 TWh** could be generated with this potential capacity. This represents around **249%** of the actual electricity demand in the region (9.58 TWh).

Venn's diagrams

