

# Wind Energy Investment & Rentability Analysis Report

## User Inputs Summary

**Region:** Europe  
**Grid Resolution:** 10 points per side  
**Turbine Swept Area (m²):** 12400.0  
**Base Efficiency:** 0.4  
**Electricity Price (€/kWh):** 0.12  
**CAPEX (€):** 1500000  
**O&M; Cost (€):** 65000  
**Discount Rate (%):** 7.0000000000000001  
**Project Lifetime (years):** 20  
**Top Countries Analyzed:** 3  
**Max API Requests:** 500

**Ukraine:** Estimated Annual Revenue: €435,461.63  
**Romania:** Estimated Annual Revenue: €422,730.03  
**Lithuania:** Estimated Annual Revenue: €409,216.11  
**Russia:** Estimated Annual Revenue: €233,001.78  
**Poland:** Estimated Annual Revenue: €163,892.51  
**Estonia:** Estimated Annual Revenue: €158,989.70  
**Finland:** Estimated Annual Revenue: €145,584.84  
**United Kingdom:** Estimated Annual Revenue: €144,840.26  
**Sweden:** Estimated Annual Revenue: €142,197.99  
**France:** Estimated Annual Revenue: €104,436.48  
**Hungary:** Estimated Annual Revenue: €101,997.98  
**Portugal:** Estimated Annual Revenue: €71,697.03  
**Germany:** Estimated Annual Revenue: €57,783.32  
**Bulgaria:** Estimated Annual Revenue: €51,891.21  
**Norway:** Estimated Annual Revenue: €23,399.31  
**Switzerland:** Estimated Annual Revenue: €15,279.93  
**Italy:** Estimated Annual Revenue: €13,622.76  
**Spain:** Estimated Annual Revenue: €8,090.89

## Financial Computations Summary

Country	Avg Wind Speed (m/s)	NPV (€)	IRR (%)	Payback (years)	Rentability
Ukraine	5.15	2424675.82	24.38	5	1.62
Romania	5.10	2289797.01	23.50	5	1.53
Lithuania	5.04	2146630.34	22.55	5	1.43
Russia	4.18	279813.26	9.31	9	0.19
Poland	3.72	-452331.39	2.79	16	-0.30

Estonia	3.68	-504271.80	2.25	16	-0.34
Finland	3.57	-646283.08	0.69	19	-0.43
United Kingdom	3.57	-654171.11	0.60	19	-0.44
Sweden	3.54	-682163.39	0.28	20	-0.45
France	3.20	-1082209.35	-5.47	N/A	-0.72
Hungary	3.17	-1108042.84	-5.96	N/A	-0.74
Portugal	2.82	-1429051.58	-16.67	N/A	-0.95
Germany	2.63	-1576453.65	nan	N/A	-1.05
Bulgaria	2.53	-1638874.70	nan	N/A	-1.09
Norway	1.94	-1940718.30	nan	N/A	-1.29
Switzerland	1.69	-2026735.08	nan	N/A	-1.35
Italy	1.62	-2044291.24	nan	N/A	-1.36
Spain	1.36	-2102895.90	nan	N/A	-1.40

## Detailed Financial Modeling Report

### Executive Summary:

This report evaluates the financial viability of the wind energy project based on the estimated wind resource, turbine performance, and financial assumptions. The analysis covers estimated annual energy production, revenue, and cash flow projections over the project lifetime. Key financial metrics, including Net Present Value (NPV), Internal Rate of Return (IRR), payback period, and project rentability (NPV/CAPEX), are computed for each country.

### Technical Overview:

The project utilizes wind turbines with a swept area of 12400.0 m<sup>2</sup> and an efficiency of 0.4. Annual energy production is estimated using the formula:

$$\text{Energy (MWh)} = 0.5 \times \text{Air Density} \times (\text{Wind Speed}^3) \times \text{Turbine Area} \times \text{Efficiency} \times \text{Hours per Year} \div 1,000,000.$$

### Financial Analysis:

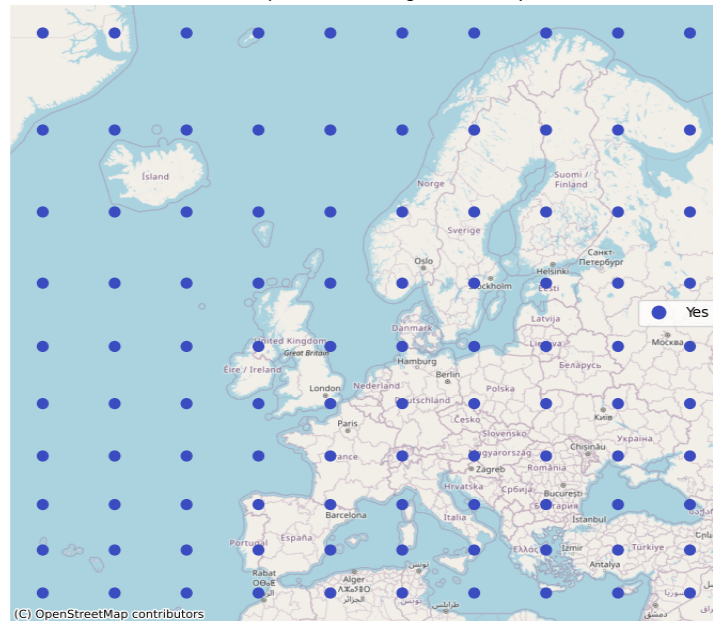
The initial CAPEX is €1500000, and the annual O&M; cost is €65000. Electricity is assumed to be sold at €0.12 per kWh. Future cash flows are discounted at a rate of 7.000000000000001% over a period of 20 years. The resulting NPV, IRR, and payback period provide insights into the project's viability. Sensitivity analysis indicates that small variations in wind speed, CAPEX, and O&M; costs can significantly impact financial outcomes.

### Recommendations:

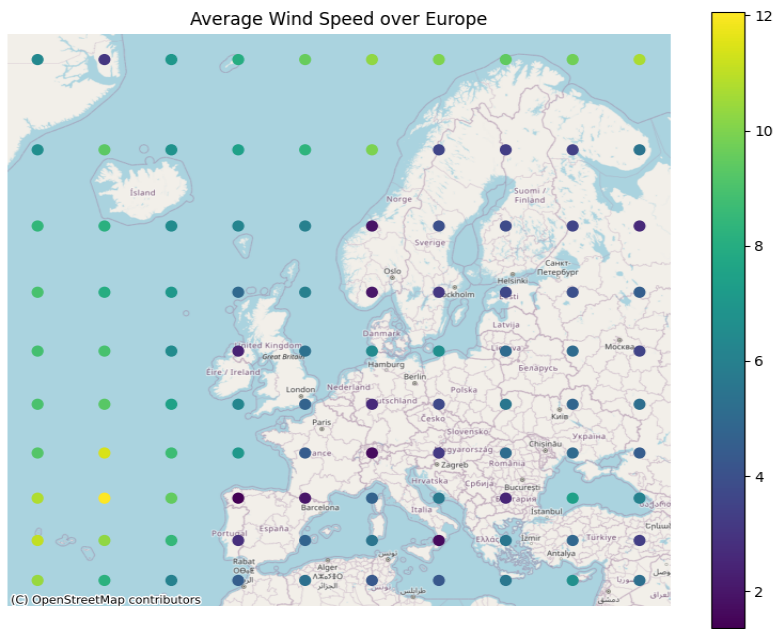
To improve project viability, consider selecting sites with higher average wind speeds, optimizing CAPEX through economies of scale, or negotiating higher electricity prices via long-term PPAs.

## Data Coverage Map

Data Acquisition Coverage over Europe

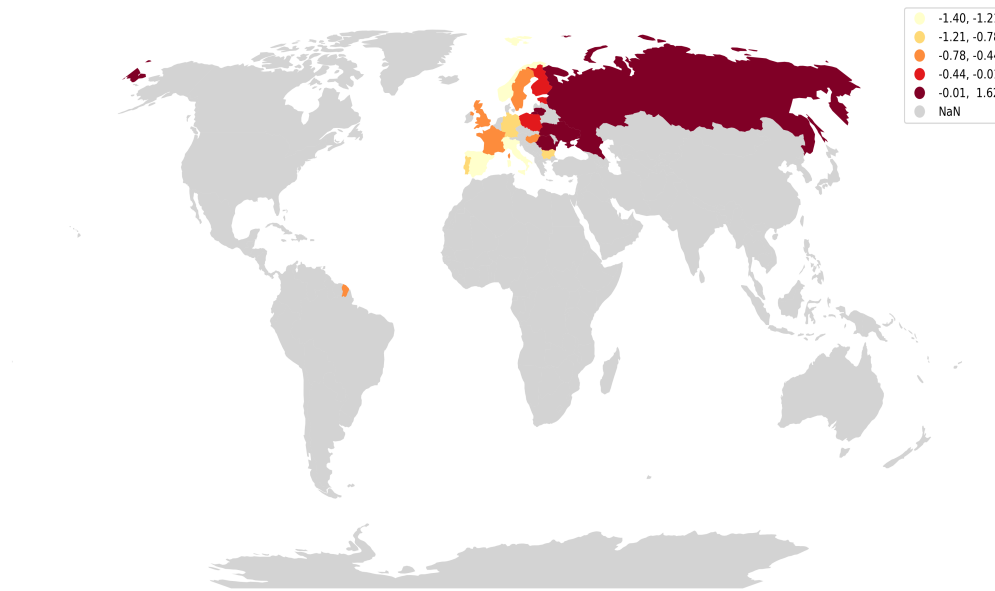


## Geographic Heatmap



## Choropleth Map

World Map of Project Rentability (Quantiles)



### ***Combined Cash Flow Chart***

