

# DETERMINANTS OF RENEWABLE ENERGY INVESTMENT IN THE EU: A PANEL DATA ANALYSIS USING EVIEWS

## 1. Overview

### Client:

A European sustainability research firm advising on climate finance, ESG investment, and clean energy transitions

### Objective:

To examine the economic and regulatory drivers of renewable energy investment across the EU using fixed effects panel regression in EViews. The analysis aimed to quantify which macro variables most significantly influence capital allocation toward renewables.

## 2. Background

As EU nations scale their green transition agendas, policy analysts and investors need empirical insight into what truly drives renewable energy investment. While commitments vary, the economic conditions and incentive mechanisms behind actual investment behavior require robust statistical investigation. EViews was selected for its reliable panel data modeling capabilities.

## 3. Data Summary

### Time Period:

2005–2021 (17 years)

### Sample:

EU-27 countries (n = 459 observations, unbalanced panel due to some missing data)

### Variables Used:

Variable	Type	Source
Renew_Inv (log, EUR millions)	Dependent	Eurostat, IEA
GDP_per_capita (log)	Independent	World Bank
Elec_Demand_Growth (%)	Independent	Eurostat

Carbon_Tax_Exist (Dummy)	Independent	OECD
Feed_in_Tariff (Dummy)	Independent	EU Energy Regulatory Reports
Energy_Import_Dependency (%)	Independent	Eurostat
Country Fixed Effects	Included	Country dummies (27 countries)
Year Fixed Effects	Included	Time dummies for all 17 years

## 4. Methodology

### Software Used:

EViews 13

### Model Type:

Panel Fixed Effects (Least Squares Dummy Variable - LSDV)

### Steps in EViews:

#### 1. Data Import and Restructuring:

- Wide-format Excel sheet imported
- Converted to panel structure using *Workfile Structure > Panel*
- Set cross-section as country, time as year

#### 2. Model Estimation:

- *Quick > Estimate Equation > Panel Least Squares*
- Included fixed effects for country and year (dummies auto-generated)

#### 3. Diagnostics and Robustness:

- Hausman test: Fixed effects preferred ( $p < 0.01$ )
- Serial correlation: Wooldridge test passed
- Heteroskedasticity: Robust standard errors (White cross-section) used
- Multicollinearity: VIFs  $< 3$  for all regressors

## 5. Key Results

Variable	Coefficient ( $\beta$ )	p-value	Interpretation
GDP_per_capita (log)	+0.684	0.000	Higher income levels positively influence renewables investment
Elec_Demand_Growth	+0.219	0.012	Growing electricity demand stimulates renewable expansion
Carbon_Tax_Exist	+0.153	0.017	Carbon tax presence correlates with greater investment
Feed_in_Tariff	+0.271	0.001	Feed-in tariffs strongly drive investor activity
Energy_Import_Dependency	+0.007	0.063	Marginally significant—energy security may influence investment

### Model Fit:

- $R^2$  (within) = 0.71
- F-statistic = 26.4 ( $p < 0.001$ )
- No multicollinearity or omitted variable bias detected

## 6. Visual Outputs (from EViews)

- Coefficient summary chart with confidence intervals
- Time trend overlay: actual vs. predicted investment (by region)
- VIF heatmap for multicollinearity check
- Hausman test result box (fixed vs. random effects decision)

## 7. Deliverables

- EViews .wfl file with dataset, model output, and panel setup
- Econometric report (19 pages) including:
  - Research design and theory
  - Panel regression results and interpretation

- Policy relevance and ESG integration
- Technical appendix with diagnostics
- Policy brief (3 pages) with:
  - Key drivers summary
  - Recommendations for boosting clean energy investment
  - Visuals for board-level discussion

## 8. Client Use and Outcome

- Used in preparing investment criteria for an ESG-aligned energy transition fund
- Informed EU-level whitepaper on incentivizing private sector clean energy financing
- Presented in COP side event to highlight data-backed ESG policy design

## 9. Strategic Value Delivered

- Quantified the **role of income, regulation, and incentives** in driving renewable investment
- Delivered a **replicable and transparent panel model** that aligns with ESG disclosure norms
- Enabled data-driven **policy and fund strategy formation** across the EU energy sector