CleanEnergy4CE

Collection and Analysis of Territorial Evidence on Coverage and Status Quo of Energy Transition

ESPON

Co-funded by
the European Union

Interreg

Inspire Policy with Territorial Evidence

ABOUT THE PROJECT

The primary goal of the "Putting Clean Energy Transition Policies into Practice in Central Europe" (CleanEnergy4CE) analysis is to **provide high-quality research on the practical implementation of clean energy transition policies**. This study examines how energy policies at various governance levels can effectively accelerate the clean energy transition in Central Europe.

It aims to **identify both opportunities and challenges in implementing these policies across the region**. Additionally, the research will **assess the impact of transnational cooperation and adapted governance mechanisms**. The findings will offer new insights and data on the readiness and capacity of local and regional authorities to achieve climate neutrality.
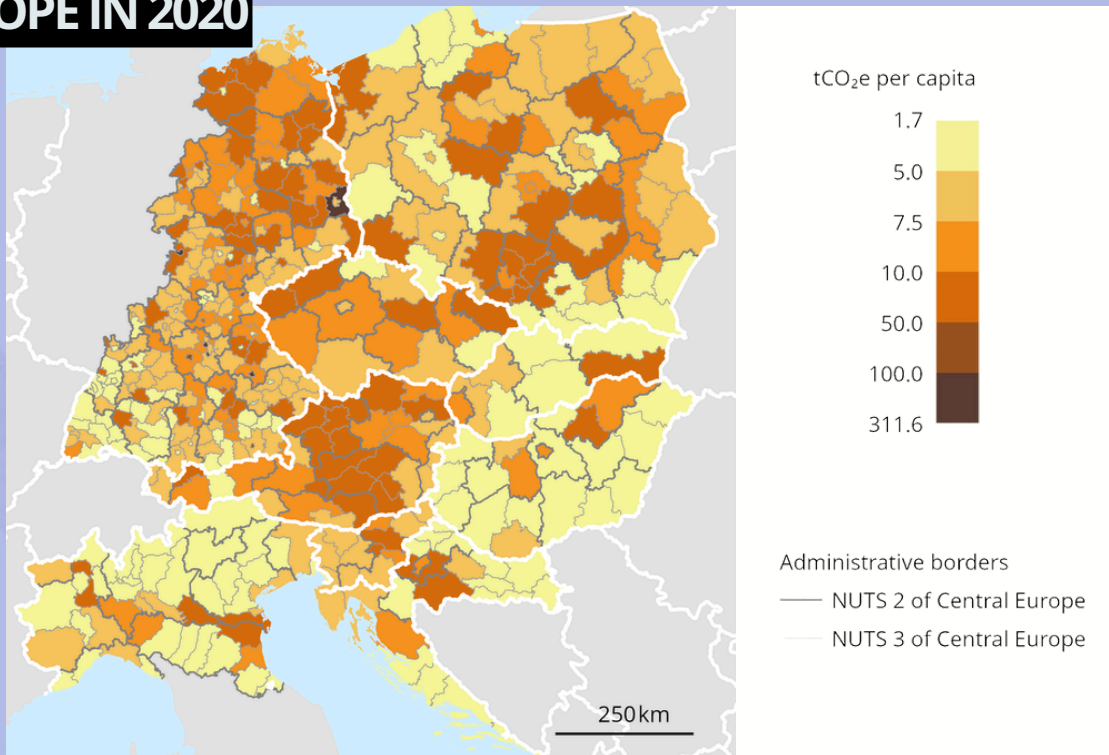
The project, set to run for 13 months, began in April 2024. **The lead project stakeholder is City of Vienna**, MA 27 – Municipal Department for European Affairs, Managing Authority (MA) and Monitoring Committee (MC) Member of the Interreg CENTRAL EUROPE Programme, supported by the Joint Secretariat. Representatives from relevant ministries and public organizations across nine Central European countries are engaged as other stakeholders.
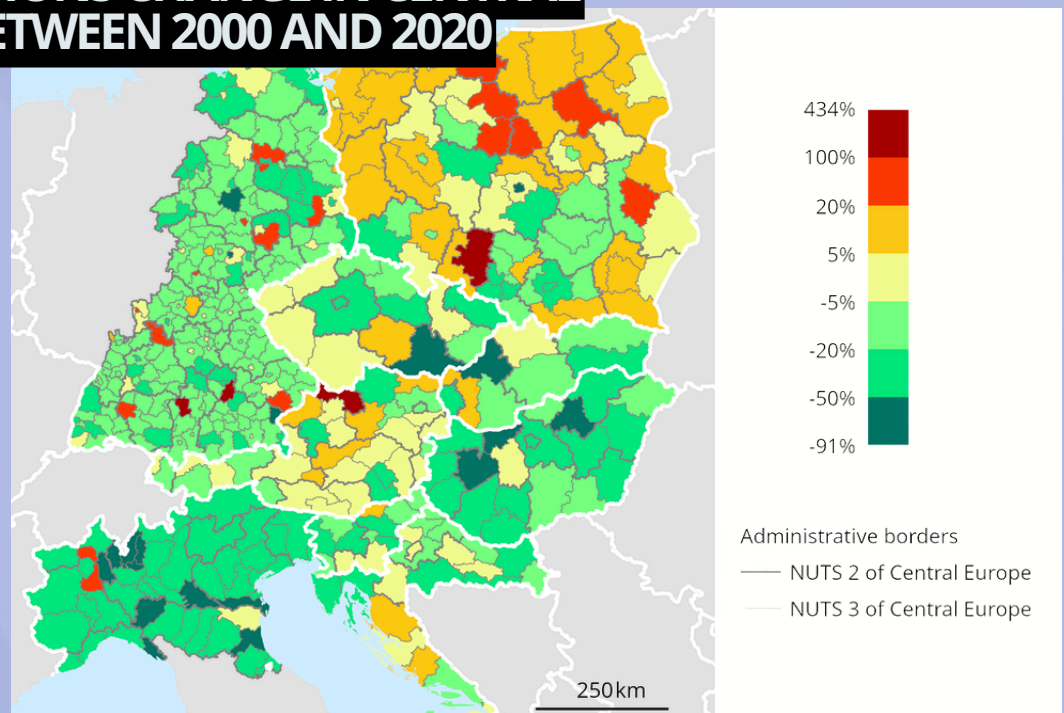
Project Consortium

The project consortium (service provider) consists of **three diverse yet complementary partners**: **Charles University**, the Association of Local Energy Managers (**SEMMO**), and UNICO Analytics (**UNICO**). Each partner contributes distinct expertise, ranging from advanced geospatial data visualization and management, in-depth knowledge of sustainable energy policies, to extensive experience in regional development and technology transfer.

One of the key data points introduced by the project includes **greenhouse gas emissions in nine Central European (CE) countries**, broken down to the NUTS 3 regional level, as illustrated in the maps below. This data **provides a foundational understanding of emission trends** across various regions and countries within the CE area.

GHG EMISSIONS IN CENTRAL EUROPE IN 2020

tCO₂e per capita

| 1.7 |
| 5.0 |
| 7.5 |
| 10.0 |
| 50.0 |
| 100.0 |
| 311.6 |

Administrative borders
—— NUTS 2 of Central Europe
—— NUTS 3 of Central Europe

250km

GHG EMISSIONS CHANGE IN CENTRAL EUROPE BETWEEN 2000 AND 2020

| 434% |
| 100% |
| 20% |
| 5% |
| -5% |
| -20% |
| -50% |
| -91% |

Administrative borders
—— NUTS 2 of Central Europe
—— NUTS 3 of Central Europe

250km

A comparative analysis of the data reveals **significant regional and national disparities in greenhouse gas emission trends**. For example, some regions in Italy and Germany have seen notable reductions in emissions. In contrast, regions in countries such as Slovenia and the Czech Republic have experienced relative stagnation or only minor changes in emissions. More concerning is the observed increase in emissions in selected regions of Poland.

These initial findings will undergo further verification and in-depth analysis as the research progresses. By incorporating additional relevant data and indicators, **the project will aim to draw conclusions about the practical implementation of energy transition policies at multiple governance levels**. The insights gained will inform the development of targeted recommendations designed to enhance the effectiveness and speed of implementing European, national, and regional climate change policies.

Another important indicator in our analysis is the share of renewable energy in final energy consumption. While data at the regional level is still being collected, **national-level trends already show a steady increase in renewable energy use over the last two decades**. However, in some countries, this progress has slowed or even reversed in recent years, largely due to geopolitical events – particularly Russia's aggression against Ukraine.

SHARE OF RENEWABLE ENERGY IN GROSS FINAL ENERGY CONSUMPTION IN CE COUNTRIES 2004–2022

GREEN TECHNOLOGIES AMONG THE MOST VALUED PATENTS (MORE THAN 1M USD) IN CENTRAL EUROPE IN 2023

Proportion of addresses listed for green topic patents to total number of adresses listed to patents (%) per NUTS2

without green patents	0.8
no data	1.0
	2.0
	3.0
	5.0
	10.0
	20.0

NUTS 2 borders of Central Europe

250km

Patent offshoring is a phenomenon that highlights where new technologies are actually being invented. It refers to the proportion of patents that were developed by inventors in one country but are owned by organisations in another. This is particularly significant in Central and Eastern European countries, where substantial foreign direct investment has occurred over the past 30 years. As a result, these countries and their regions can host innovative and groundbreaking investments, but statistics often fail to fully capture this phenomenon, especially for the highest-value technologies.

For Europe's energy transition, new 'green' technologies represent one pathway forward. As shown in the map, the outflow of green patents from their country of origin is particularly notable in the Czech, German, Austrian, and Italian regions. Interestingly, this phenomenon applies to various types of regions in these countries, whether carbon-intensive, industrial, agricultural, or otherwise.

In contrast, there are certain regions with zero patent activity or no green patents, particularly in Poland, Slovakia, Hungary, and Slovenia. These regions appear to be the least attractive for multinational companies in terms of their potential to develop technologies suitable for the green transition.

FURTHER STEPS
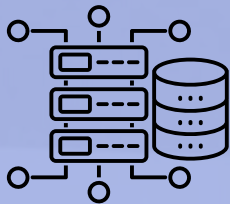
We are continuing **intensive data collection** at the regional level (NUTS2, NUTS3) for over 12 indicators, alongside the **development of a comprehensive thematic database**. As the project advances, all final data used in the analysis will be published on the ESPON data portal.
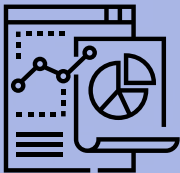
The general public will also have access to this information through illustrative, interactive **maps and dashboards**.

We are also currently developing a follow-up **online survey** and gathering feedback from project stakeholders. Scheduled for distribution to all identified relevant stakeholders in September 2024, the survey aims to reach up to 1,000 participants.

The empirical part of the analysis will finally be completed with **expert interviews** and **case studies**.

In the final phase of the project, we will focus on formulating recommendations and creating a comprehensive **handbook.**