



# **CIVITAS** indicators

Public charging stations per inhabitant by charging speed (ENV\_ES\_EA2)

### **DOMAIN**



**Transport** 



Environment



Energy



Society



**Economy** 

**TOPIC** 

**Energy supply** 

**IMPACT** 

Availability of alternative energy supply

Increasing the number of public charging stations for electric vehicles

**ENV\_ES** 

## Category

Key indicator Supplementary indicator	State indicator
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#### **CONTEXT AND RELEVANCE**

As cities shift towards decarbonized transport systems, electric mobility has emerged as a key component of sustainable urban mobility strategies. Electric vehicles contribute to environmental goals by reducing tailpipe emissions of greenhouse gases and air pollutants such as nitrogen oxides (NOx) and particulate matter.

The widespread adoption of electric vehicles (EVs) hinges, among other factors, on the availability of a reliable and extensive public charging infrastructure. This indicator measures the number of electric charging stations within the pilot area, allowing to evaluate policy actions aimed at expanding charging infrastructure. A successful intervention is reflected in a <a href="HIGHER">HIGHER</a> value of this indicator.

#### **DESCRIPTION**

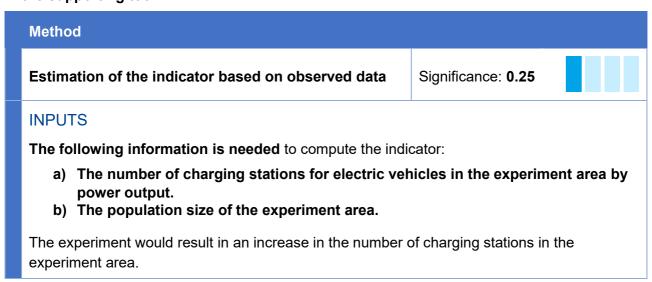
The indicator measures the number of electric charging stations per inhabitant in the experiment area **by charging speed**. It consists of a **vector** of five values, each representing the number of stations within a specific power output range in kilowatts:

- Slow (≤7.5 kW): Typically requires 10 hours or more to fully charge an EV with an average battery capacity of 80 kWh.
- Quick (7.6–22 kW): Charging time is approximately 4 to 7 hours.
- Fast (22.1–50 kW): Charging takes around 90 minutes.
- **Ultra-fast (50.1–150 kW):** Charging time ranges between 30 and 60 minutes.
- High Power Charging (HPC, ≥150 kW): Enables charging in approximately 15 to 30 minutes.

The unit of measurement is **charging stations per inhabitant**.

#### METHOD OF CALCULATION AND INPUTS

The indicator should be calculated exogenously based on direct observation and then coded in the supporting tool.



#### METHOD OF CALCULATION

The indicator is computed exogenously according to the following steps:

- Retrieval of the number of charging stations for electric vehicles in the experiment area by power output. This information can be obtained from municipal records or by inquiring with charging station operators in the experiment area. Once collected, the data should be classified into the following five categories according to power output:
  - o Group 1: Slow charging, ≤7.5 kW
  - o Group 2: Quick charging, 7.6-22 kW
  - o Group 3: Fast charging, 22.1-50 kW
  - Group 4: Ultra-fast charging, 50.1–150 kW
  - o Group 5: High Power Charging, ≥150 kW
- Retrieval of the number of inhabitants within the experiment area. This value can be obtained from census data.
- **Estimation of the indicator** by computing the ratios between the number of charging stations by power output obtained in the first step and the number of inhabitants obtained in the second step.

#### **EQUATIONS**

The equation computing the indicator (last step of the method of calculation) is the following:

$$ChrgStPerInh_p = \frac{ChrgSt_p}{Pop}$$

Where:

 $ChrgSt_p$  = Number of electric charging stations in the experiment area belonging to power output group p

Pop = Population in the experiment area

#### ALTERNATIVE INDICATORS

This indicator measures the number of electric charging stations per inhabitant in the experiment area. It distinguishes charging stations based on their power output and, therefore, charging speed.

Alternative indicator **ENV\_ES\_EA1** does not distinguish charging stations by power output. This alternative can be used for higher-level evaluations where less detail is needed. It can also be employed when data on station specifications is unavailable or inconsistent.