

***The one in the 100 cities – Cluj-Napoca
challenge
towards a carbon neutral city***

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Energy use





1,5 – 15% energy bill (buildings, street lighting).

Facts and figures

A city with more than 350.000 people

No.	Energy users	Electricity [MWh/yr]	%
1	Industry	66.000	9,7%
2	Private commercial buildings	50.612	7,4%
3	Water company	39.770	5,8%
4	Public universities	18.356	2,7%
5	Public buildings	88.844	13%
6	Public street lighting	10.783	1,6%
7	District Heating company	12.269	1,8%
8	Local public transportation	13.048	1,9%
9	Residential energy users & others.	453.744	54,6%
	Total	682.017	100%

27%

Cluj-Napoca SECAP / EEA evaluation

From 3.365 GWh/year in 2011

**To an energy saving of 263 GWh up to 2021,
meanwhile the highest development and population rate increase in Romania.**

- ✓ **8% energy savings**
- ✓ **30% CO₂ reduction**

Strategies on paper

- Sustainable Energy and Climate Action Plan – **SECAP**;
- Integrated Urban Development Strategy – **IUDS**;
- Sustainable Urban Mobility Plan – **SUMP**;
- European Energy Award – **EEA**;
- District Heating Decarbonation Strategy – **DHDS**;
- Plan to increase the nearly zero buildings – **nZEBP**;
- Attenuation action plan for the energy poverty – **EPAP**;
- Smart City / Digitalization Strategy / Action Plan – **SmartCity**
- Climate Change Adaption and Resilience Action Plan – **CCARAP**

and others to come...

Local and elsewhere challenges

Distributed energy generation

From centralized to distributed generation...

What is the impact in the local energy grids?

The owner of the energy source... is this compatible with the social equality?

Prosumers on large scale

Is it an opportunity for local energy markets?

When shall we have these energy communities?

*How much **R**energy can we harvest locally?*

At this moment a 0,3% RES is covered directly in the public buildings.

nZEB on daily basis

Are we ready?

Have the local public authorities started?

*Energy planning included
in the urban planning?*

Energy poverty

Is it generalized in the present day?

When did the energy poverty occurred after the fossil fuels abundance release?

Can energy transition towards RES eradicate the energy poverty?

From the right to energy access (human dignity, education & health) to electricity as a currency...

District heating with low emission

Do we still believe in the future of district heating?

Energy storage

0,4 kWh/kg VS 11,6 kWh/kg
electricity diesel fuel

How much time do we need to have an equal balance?



3002 MWh/yr. – electricity supplied for the electrical vehicles in Cluj-Napoca in 2021

versus

10.990 MWh/yr. – public street lighting

Electrified mobility

What will be the impact on the power grid?

Professionals

Do we have the required human resources?

Research and innovation

Is it visible in Romania?

Energy Transition Research Center

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Planul Național
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UNIVERSITATEA TEHNICĂ
DIN CLUJ-NAPOCA

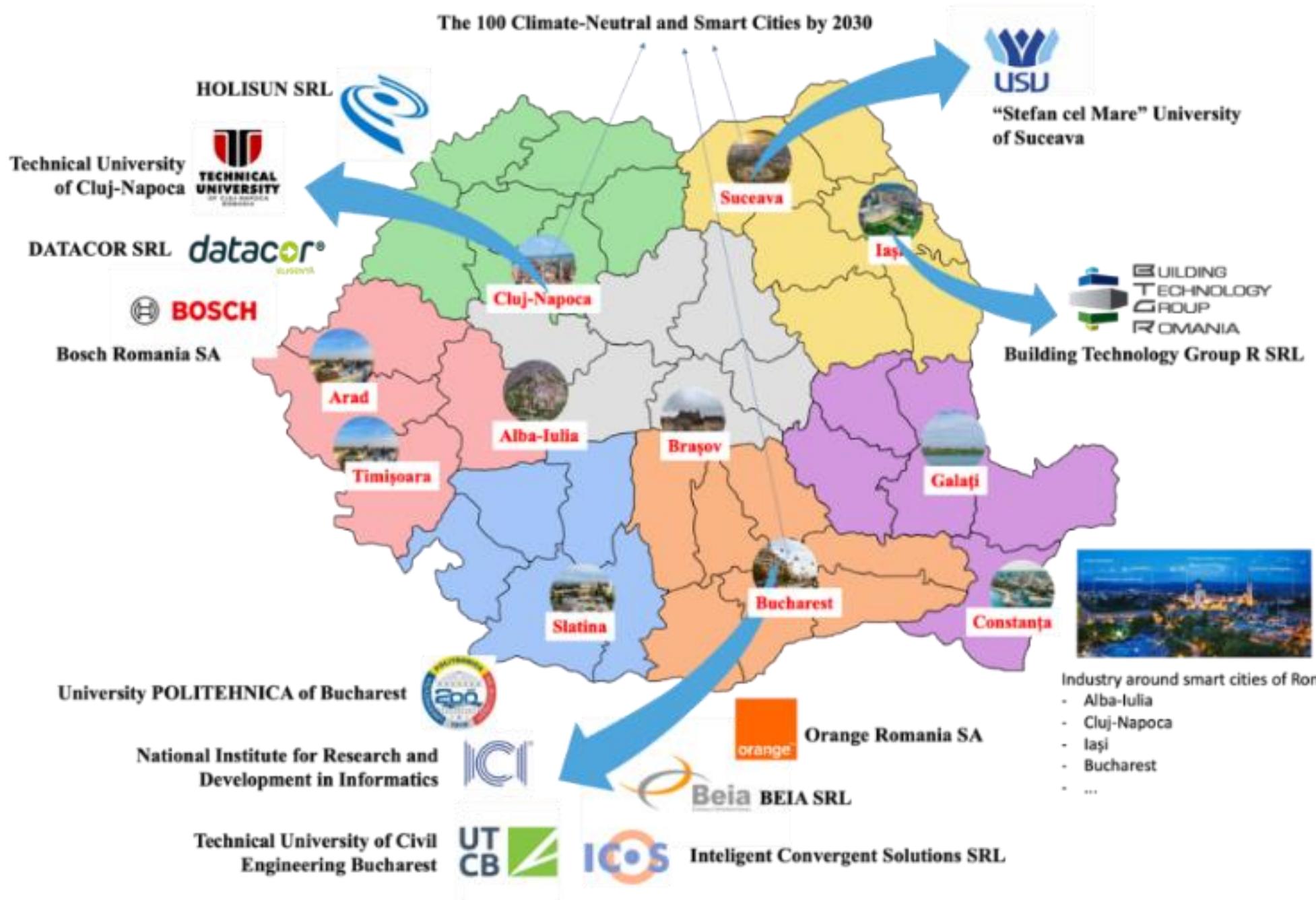


PNRR: Fonduri pentru România modernă și reformată!
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NetZeRoCities

*National Competence Centre and solutions for the development
of Climate Neutral and Smart Cities*

The 100 Climate-Neutral and Smart Cities by 2030



Our mission

EnTReC mission is to significantly contribute through evidenced based research **to the energy transition** in the energy sector, industry, buildings and **local communities**, in a **sustainable approach** focused on development, testing and replication of **innovative instruments, energy and digital technologies.**

Local technology production

How much money will go in China?

What is the impact in the building materials market?

Pumping too much EU funding in deep renovation – from **450** to more than **700** euro/sqm

What is the impact for the local authority?

Energy cost

Internal human resources in the public sector?

EU Funding Office



What is the impact on the local community?

Local economy and the public authority incomes

EU funding 2007 – 2013

Total EU local investments	56.445.795 euro	100%
Out of which with an impact in the energy field	2.424.231 euro	4,3%

EU funding 2014 – 2020

Total EU local investments	95.041.606 euro	100%
Out of which with an impact in the energy field	35.121.531 euro	37%

EU funding 2021 – 2027 yet to come

Total EU local investments	232.953.774 euro	100%
Out of which with an impact in the energy field	115.000.000 euro	49,4%

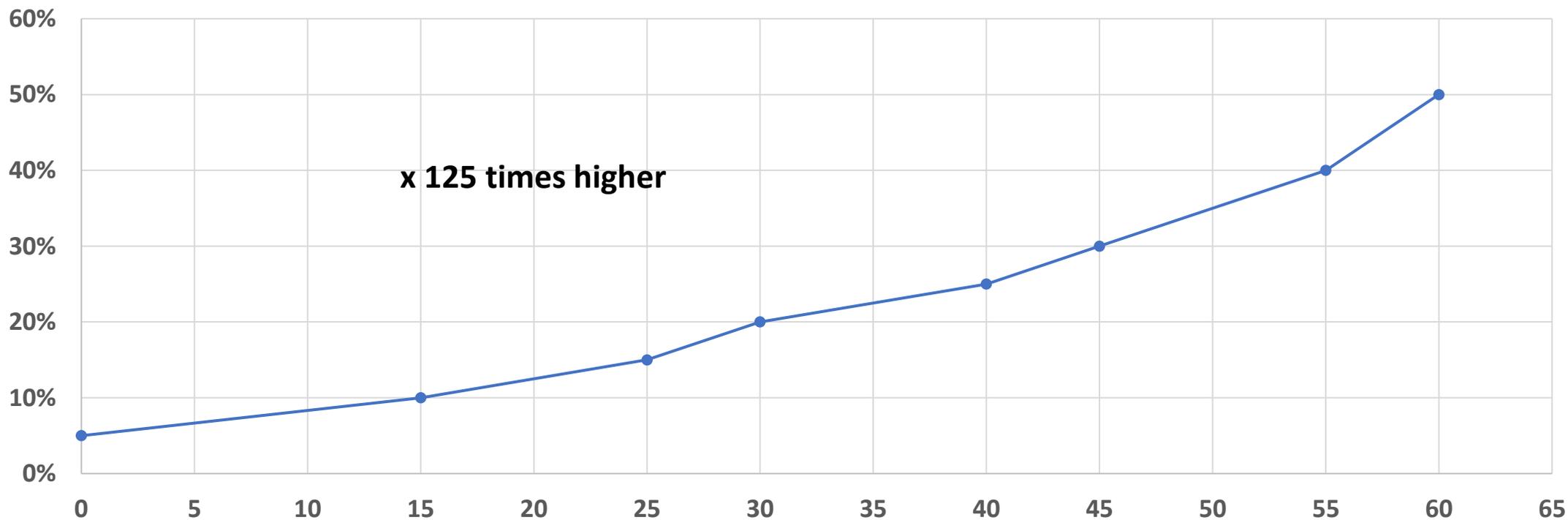
EU ambition

Decarbonation

Decarbonation

Decarbonation

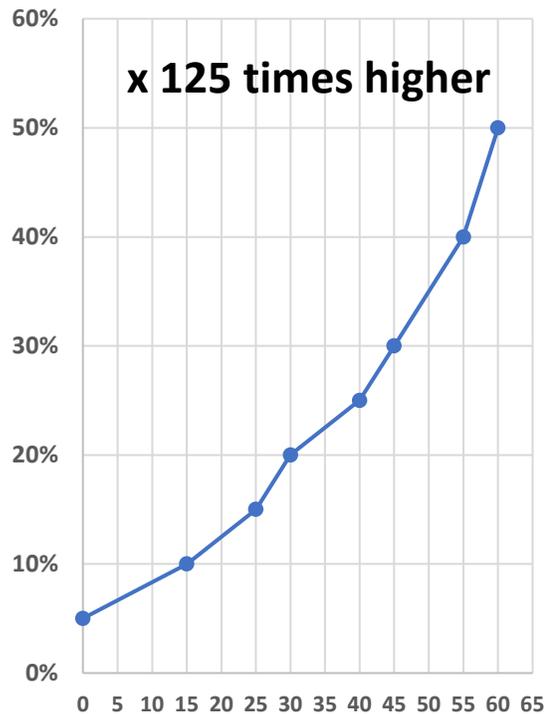
Coal – year 1840 to 2015



x 125 times higher

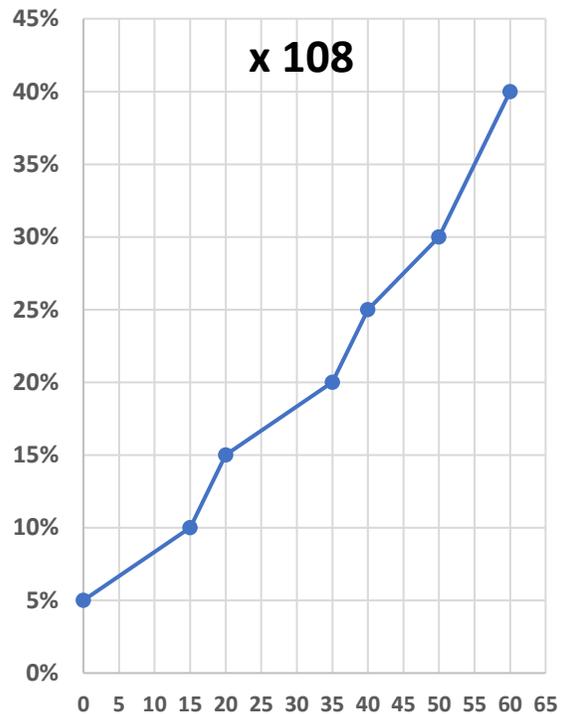
From 1,28 to 159,7 EJ

Coal – year 1840 to 2015



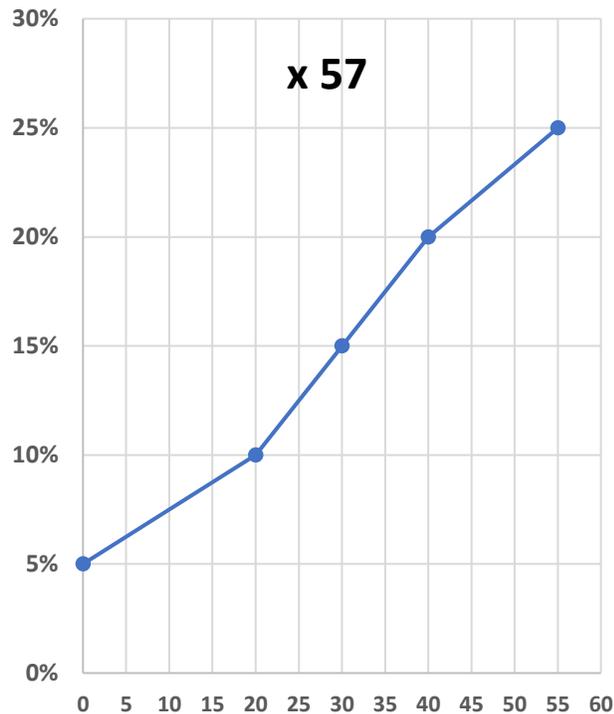
From 1,28 to 159,7 EJ

Crude Oil – year 1910 to 2015



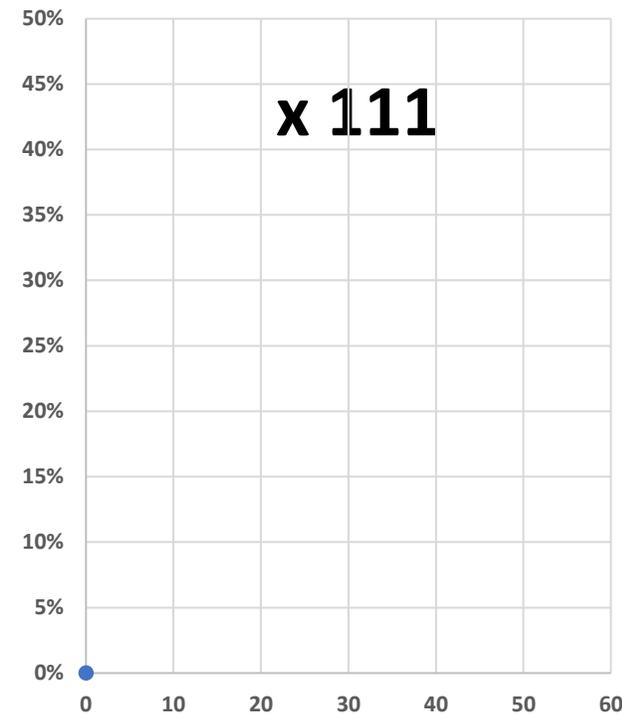
From 1,43 to 154,6 EJ

Natural gas – year 1930 to 2015



From 2,17 to 123,8 EJ

Modern renewables - 2015



From 3,93 to 438,1 EJ

From 0,01 to 3,93 EJ in 25 years

Energy / CO2 emissions transition **triggers**

- Energy price
- Free money to do it
- Technology advancement
- Climate change awareness
- Energy security
- War on the horizon
- Behavior

X 111

Energy security

Reliable, affordable access to all
fuels and energy sources

Energy security main objectives

- 1) Diversification of energy sources;
- 2) Reserve capacities;
- 3) Power / gas grid interconnections;
- 4) Stability in the energy markets.

Decarbonization

What is the price to do it?

Shall we do it with the same ambition everywhere?

The four elements to become three

Fire, Water, Air, Earth

***What is the final frontier
in **RE**powering cities?***

Is there anything left after?

If the third energy transition (fossil fuels) brought the present-day human civilization, what the fourth energy transition (carbon neutral) will bring?

Best European Energy Service Project

granted to

**Technical University of Cluj-Napoca &
Cluj-Napoca City Municipality**

by **EU EESA** in Brussels – February 2019



Institutional Energy Management Award

granted to

Technical University of Cluj-Napoca & Cluj-Napoca City Municipality

by **Association of Energy Engineers (AEE)** on **World Energy Engineering Congress, USA, 2018**





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European Union
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Thank you!

Questions welcome



Project media