

Energy Transition of cities

... or how we would like our cities to be in future

Wolfram Sparber – Head of Institute for Renewable Energy

Green City Forum, Brasov, Romania, September 2023

Eurac Research – Institute for Renewable Energy

It is an applied research Institute working since 20 years in the field of energy transition and electric mobility.



Credits: NOI Spa/I. Corrà - Our offices and labs at the NOI Techpark in Bolzano

The Institute's team



Credits: Eurac Research - Institute's collaborators with the Scientific Council, November 2022

Accredited laboratories in several energy fields



Credits: Eurac Research/F. Giraldi - Indoor facilities at Eurac Research, NOI Techpark Bolzano

EUREC – The EU association of renewable energy research centres

The Association of European Renewable Energy Research Centers

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Source: <https://eurec.be/>

Alperia – a leading Italian renewable energy utility



Credits: Alperia. Hydropowerplant in Lasa/Laas, South Tyrol

Energy transition of cities ...

What means “Energy transition” in this context?

In our understanding it includes

... all relevant sectors: **Electricity, Heating&Cooling, Transport, Industry**

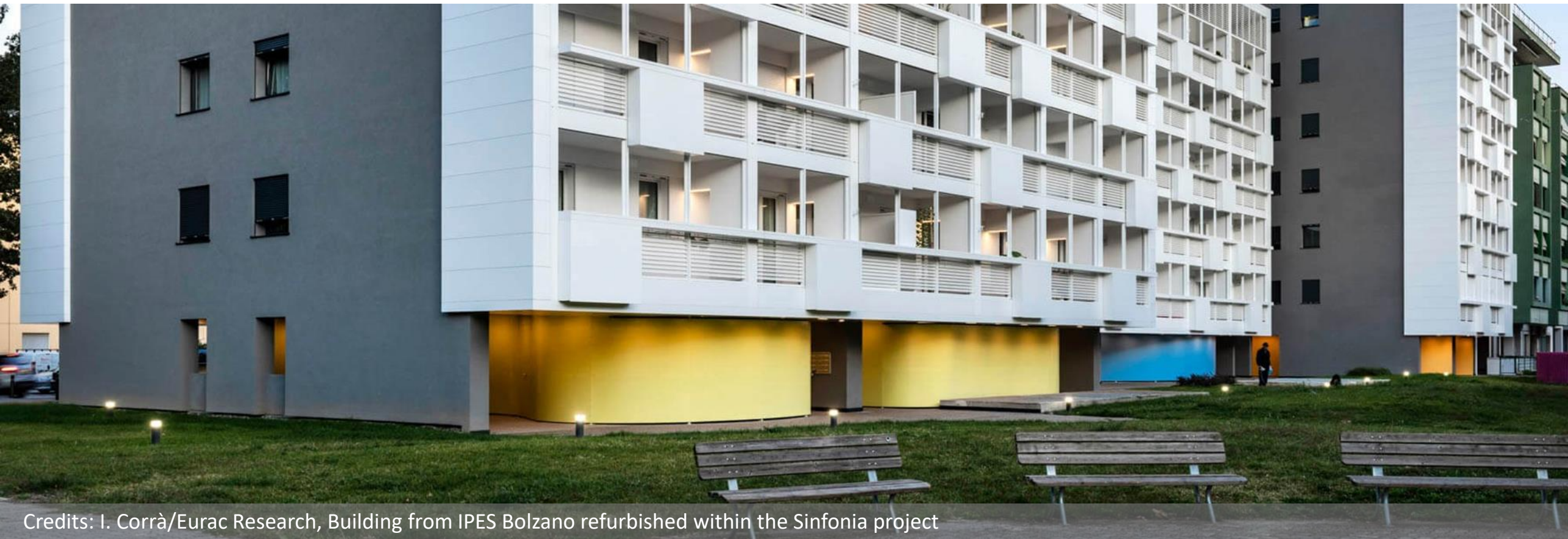
... utilization of as little energy as necessary (*efficiency*)

... utilization of **local energy sources** (local *renewables* and local otherwise *wasted resources*)

Some examples based on **EU projects** (which are an opportunity for concrete implementation) and local **practical experiences** ...

Refurbishment of buildings...

Refurbishment of buildings is central aspect in order to keep existing (and historic) buildings attractive and comfortable. Furthermore it is an important step to use heat as efficient as possible ...



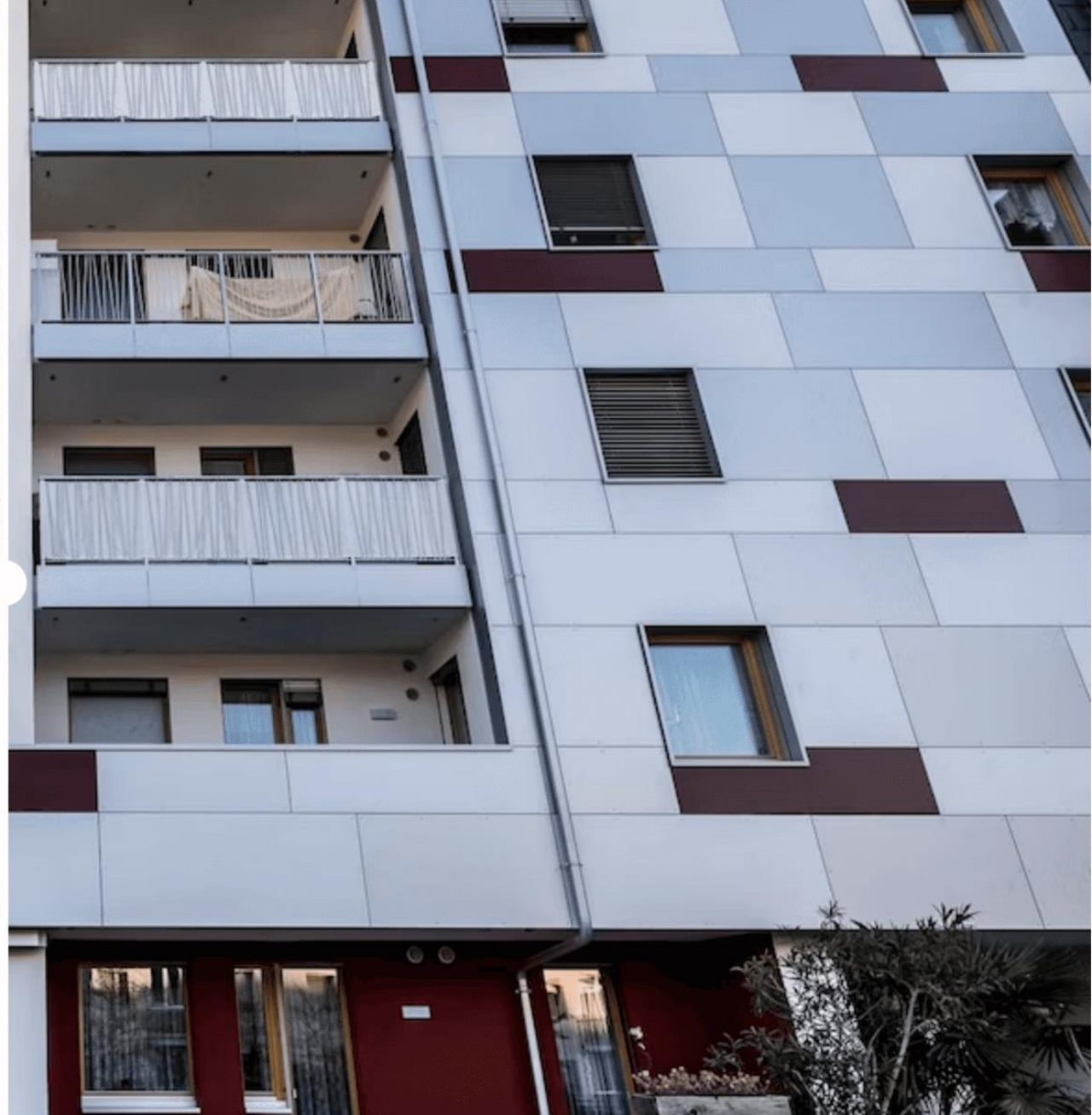
Credits: I. Corrà/Eurac Research, Building from IPES Bolzano refurbished within the Sinfonia project



Credits: I. Corrà/Eurac Research. BEFORE/AFTER building refurbishment within the Sinfonia project



Credits: I. Corrà/Eurac Research. BEFORE/AFTER building refurbishment within the Sinfonia project



Credits: I. Corrà/Eurac Research. BEFORE/AFTER building refurbishment within the Sinfonia project



Programme: H2020

Role: Lead partner

Web: www.4rineu.eu

4RinEU project aims to **provide new technologies and strategies** to encourage **large scale deep renovation** of existing buildings, **fostering the use of renewable energies**, and providing **reliable business models** to support their applications.



Credits: I. Brodey/Oslo Kommune, 4RinEU project

Programme: H2020

Role: Lead partner

Web: www.infinitebuildingrenovation.eu

INFINITE will pave the way for the decarbonisation of the EU building stock by facilitating the market uptake of **all-in-one industrialised envelope technologies**.

INFINITE's approach for deep renovation of buildings will result in cost and timing reduction, with attention to life cycle perspective.



Credits: Unsplash

Programme: Interreg Alpine Space

Role: Lead partner

Web: www.alpine-space.eu/atlas

The **ATLAS** project aimed at (re-) discovering all traditional architecture (buildings and ensembles beyond the level of protection), **capitalizing and optimizing existing best practice solutions** for building refurbishment and regional development.



Credits: M. Girardelli

Local resources for heating – biomass ...

Biomass is the traditional renewable energy source and “low hanging solution” if locally available and sustainably used.



Credits: Alperia. Biomass district heating plant in Sesto/Sexten, South Tyrol

Local resources for heating – waste ...

Waste is only partially renewable and often strongly discussed. But it is a locally available resource and only parts can be recycled. So the energetic use of the non-recyclable waste – if professionally done - can be an efficient on site solution for heat and electricity production



Credits: Eco-center. Waste incinerator plant in Bolzano/Bozen, South Tyrol

Further possible resources...

Every city has its individual best mix of local resources which might include sources such as:

Deep and shallow **geothermal**, **solar thermal**, **waste heat** from power plants and industrial sites, **ambient heat** from lakes, rivers, sea or air

Fundamental to use all this is an **optimized (partially low temperature) district heating system**



Programme: H2020

Role: Lead partner

Web: www.rewardheat.eu

REWARDHeat project will demonstrate **low-temperature district heating and cooling networks**, which will be able to recover low-grade renewable and waste heat available within urban settlements, with the aim to **maximize their replication potential**.



Credits: Eurac Research/I. Corrà



LIFE 4 HEAT
RECOVERY



Co-funded by
the European Union

Programme: LIFE

Role: Lead partner

Web: www.life4heatrecovery.eu

LIFE4HeatRecovery will demonstrate that a new generation of highly efficient district heating and cooling networks and **prefabricated skid solutions** will be able to recover a range of urban waste heat available at low temperature within urban districts.



Credits: Cogeme. Prefabricated skid container

Local renewable electricity sources...

In case of biomass, waste or deep geothermal based district heating electricity production is often connected. Otherwise, the possibilities include solar, hydropower or wind in the surroundings ...



Credits: Adobe Stock

Programme: H2020

Role: Lead partner

Web: www.symbiosyst.eu

Symbiosyst investigates innovative systems to go beyond the idea of solar energy production and agriculture as two separate sectors and **find a new synergy where land & crops and photovoltaics can have a mutually beneficial relationship.**

The project develops different PV solutions and their demonstration in four agricultural scenarios, in three different Countries.



Credits: Flickr/Dennis Schroeder-NREL

Programme: Interreg IT-CH

Role: Lead partner

Web: www.bipvmeetshistory.eu

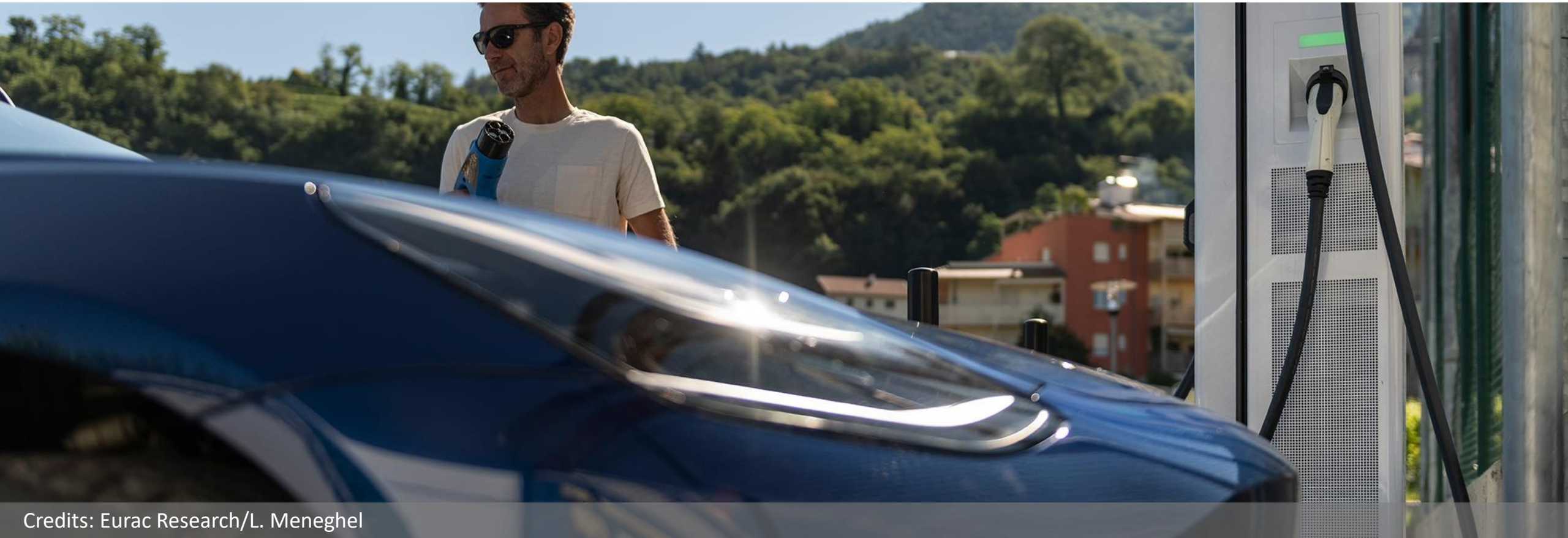
PV technology has made gigantic steps, and today it offers aesthetically pleasing and harmonically integrated solutions in the landscape. The **BIPV meets History** project allows **new business opportunities to all players in the supply chain:** planners, designers, architects, builders through networking and training.



Credits: L. Carugo – Castello di Doragno (CH), Studio deltaZERO

Electrification of transport...

... is a major aspect in order to enhance air quality, reduce noise levels, enhance energy efficiency in transport and have the possibility to use locally produced renewable electricity.



Credits: Eurac Research/L. Meneghel

E-mobility, much more than electric cars



Credits: Unsplash

E-mobility including public transport & logistics

Cities can influence strongly how attractive e-mobility is in comparison to fossil fuel based mobility. By doing so they can impact the speed of transformation in their region. Public transport is often under direct or indirect city control, giving the possibility of direct strategy implementation



Credits: Lukasz Bera/www.lukaszbera.com

Programme: Interreg IT-CH

Role: Lead partner

Web: www.progettomobster.eu

The **MOBSTER** project encourages the spread of **electric mobility** and promotes **sustainable tourism** in cross-border areas of Italy and Switzerland by finding innovative applications of the tools already in use in the field of e-mobility and by upgrading the charging infrastructure in three pilot areas.



Credits: Eurac Research/L. Meneghel



Co-funded by
the European Union

Programme: Interreg IT-CH

Role: Project partner

Web: www.life-alps.eu

The **LIFEalps project** aims to transform **South Tyrol** into a model region for **zero-emission mobility in the Alps**.

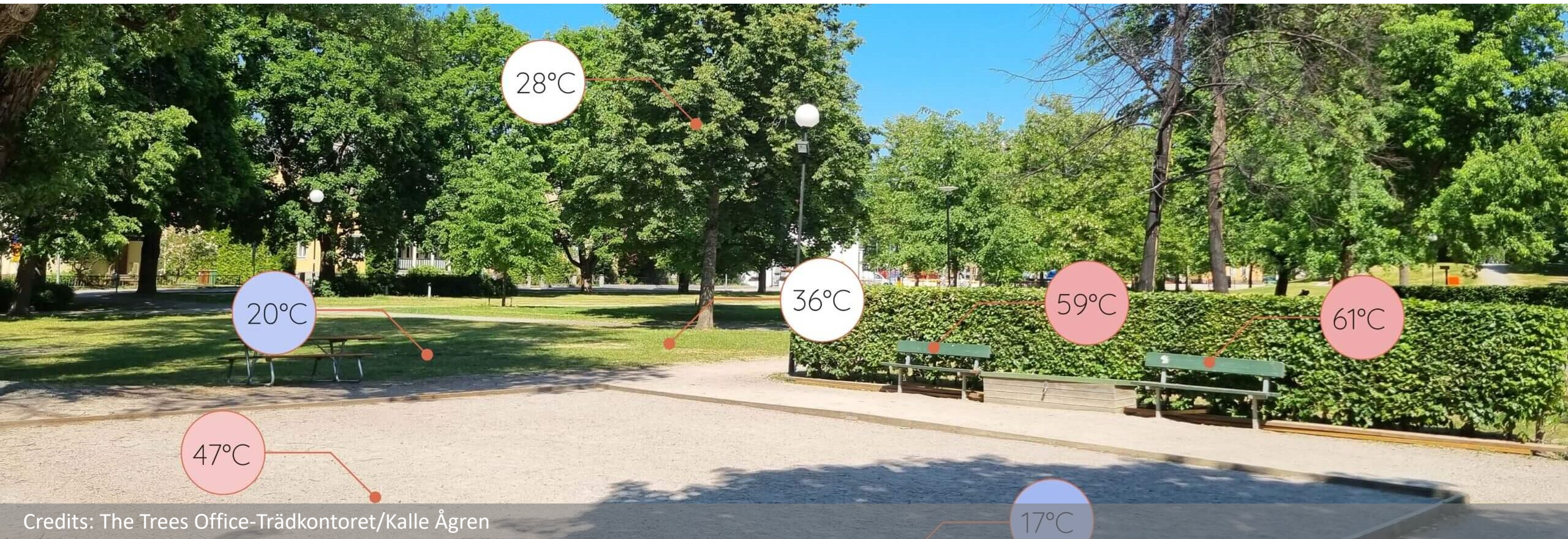
To achieve this goal, zero-emission mobility will be promoted on several fronts, as the expansion of the infrastructure network, the introduction of pilot fleets in various locations and the development of zero-emission services.



Credits: IDM Südtirol-Alto Adige/Manuel Köttersteger

Greening of cities...

Greening is not a direct energy measure. But has many beneficial effects in the energy field (reduction of urban heat islands, reduction of cooling demand of buildings, ...) and in many other fields like air quality, sound spaces, biodiversity and general urban attractiveness ...



Credits: The Trees Office-Trädkontoret/Kalle Ågren



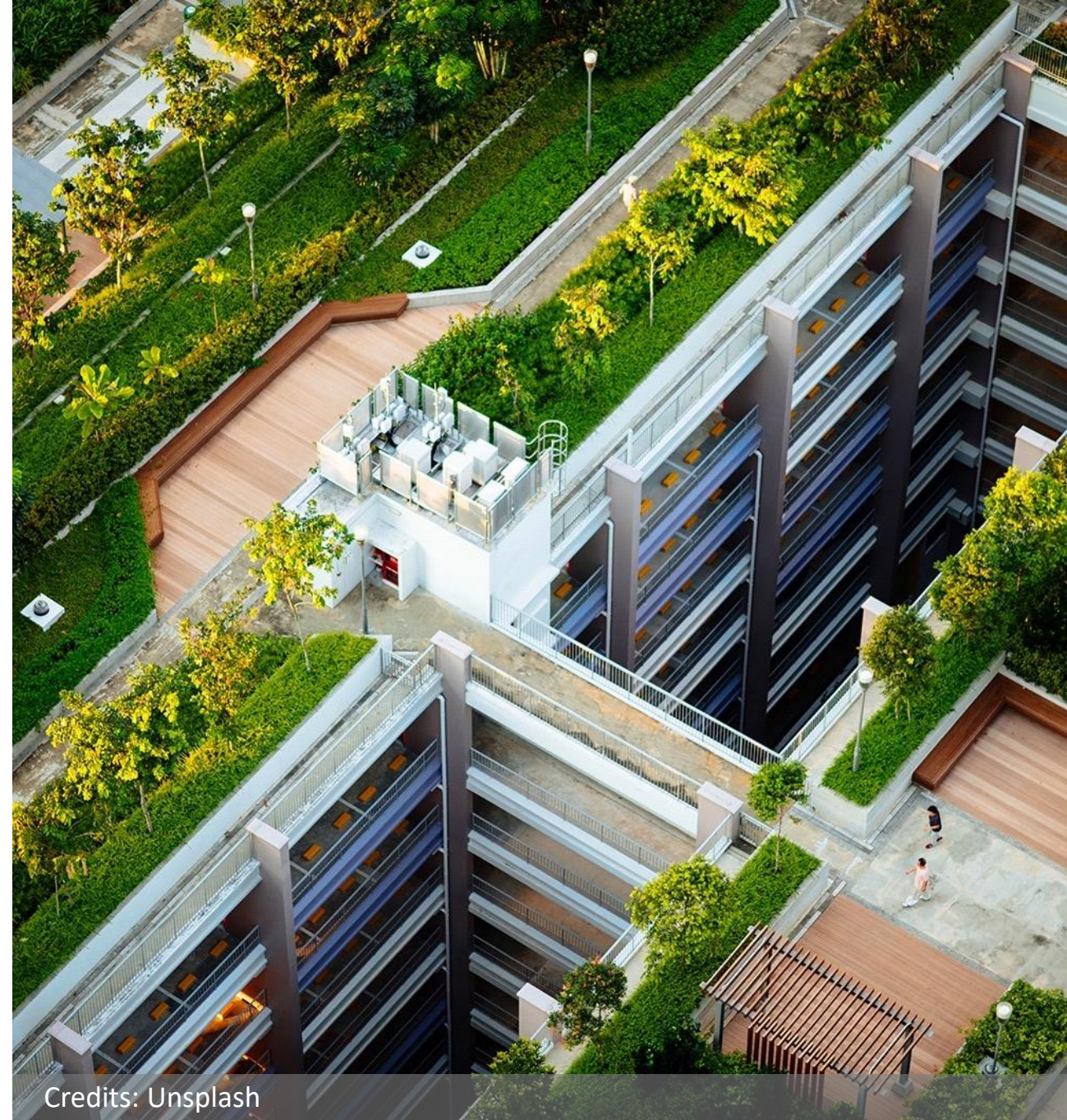
Programme: H2020

Role: Lead partner

Web: www.justnatureproject.eu

The **JUSTNature** project will turn to nature-based solutions to ensure a **just transition to low carbon cities**.

Considering the **right of all citizens to ecological space**, the project will **co-design new systems** which conserve natural ecosystem values and functions and will ultimately provide **numerous benefits** to people.



Credits: Unsplash

Conclusions...

Brasov – city centre



Credits: <https://romaniatourism.com/brasov.html>

Brasov – new city development



<https://earth.google.com/web/search/Bra%c8%99ov,+Romania/>

“Energy transition”...

... is a **complex process** involving all sectors and many public and private actors in a city

... it is a **BIG opportunity** for cities, in fact it allows

- To enhance **air quality**
- **Reduce the dependence** of imported fossil fuels
- Creates **local jobs** and supports **local economy**
- Enhances **economic stability and resilience**

- **Enhances quality of life and attractiveness of cities ...**

Thank you for your attention

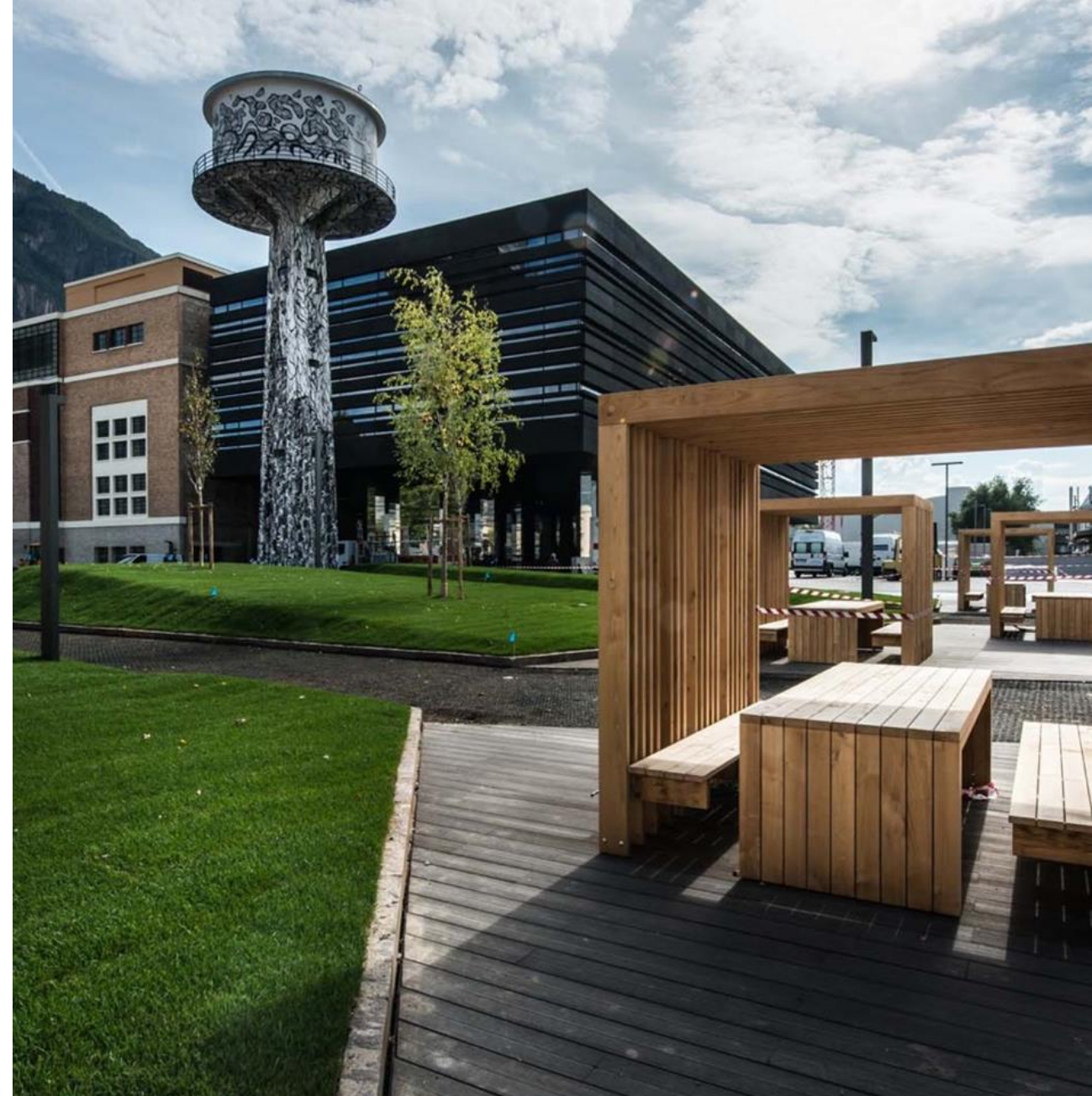
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Credits: NOI Spa - NOI TechPark Bolzano

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