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## EU4 Energy Transition: Covenant of Mayors in the Western Balkans and Turkey

**2<sup>nd</sup> Information Session on the Competition:**  
*Small-scale project implementation in the fields of  
Energy, Climate Protection and Transport for  
municipalities and cities in the Western Balkans.*

**Wednesday 8<sup>th</sup> June 2022, 10:00AM**

Implemented by

**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

## Agenda

Time	Agenda item	Presenter
10:00 - 10:05	<b>Welcome address</b> <ul style="list-style-type: none"><li>• Presentation of the agenda for session 2</li></ul>	Dukagjin Bakija
10:05 - 10:15	<b>Short recap of Session 1</b>	Quentin Bayart
10:15 - 11:00	<b>- EU energy &amp; climate framework</b> <b>- Examples of eligible projects</b>	Vesna Kolega (INTEGRATION Environment & Energy)
11:00 - 11:30	<b>Q&amp;A</b>	All participants

*Moderation: Dukagjin Bakija*



# EU4 Energy Transition Covenant of Mayors in the Western Balkans and Turkey

*Short recap of the first information session*

*Quentin Bayart, Regional Advisor Climate Change & Energy*





## Competition for small-scale projects implementation in energy, climate, transport for municipalities and cities in the Western Balkans

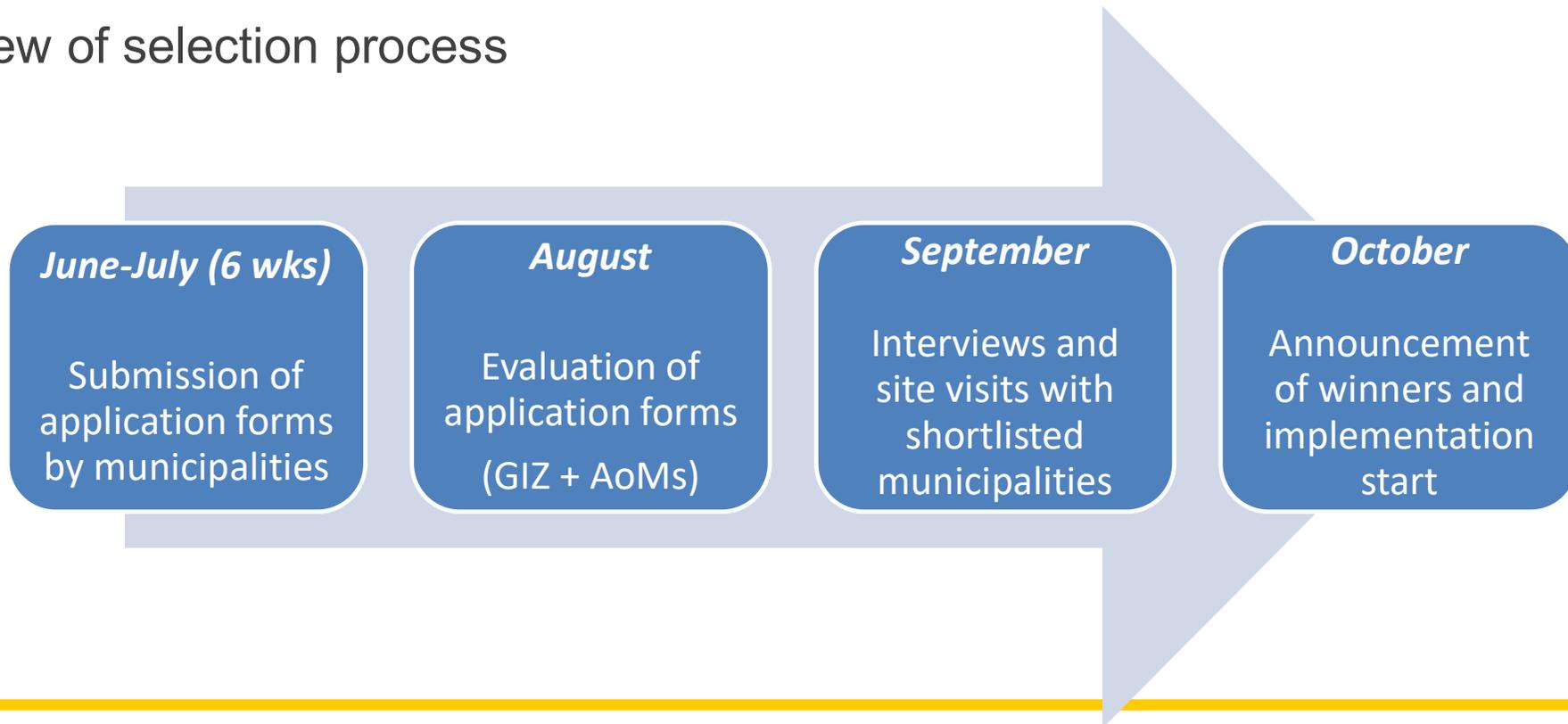
- All municipalities and cities in the Western Balkans are eligible to apply
- The project will support 8 to 10 projects in the whole Western Balkans
- Selected projects will receive up to 50,000 Euros each (10-40% of total costs shall come from municipality)
- Technical support for project development, monitoring, communication & regional exchange
- Projects should be related to climate mitigation (energy, transport...) or adaptation



## Competition for small-scale projects implementation in energy, climate, transport for municipalities and cities in the Western Balkans and Turkey

- Projects should be innovative, replicable, realistic, tackle energy poverty, and be aligned with local policy framework
- Projects must not have started yet, and be completed by end 2023
- Projects must derive from an approved strategic document (i.e. SECAP, SEAP, SUMP or equivalent) and have complete backing of decision-makers (City Council and Mayor).
- Only construction/rehabilitation of infrastructure/equipment. “Soft” measures not eligible.
- Obtention of permits and authorizations is the municipality’s responsibility

## Overview of selection process





# EU4 Energy Transition Covenant of Mayors in the Western Balkans and Turkey

*Examples of small-scale climate mitigation and adaptation projects in EU and the Western Balkans cities and municipalities*

*MSc. Vesna Kolega, INTEGRATION Environment & Energy*





## Content

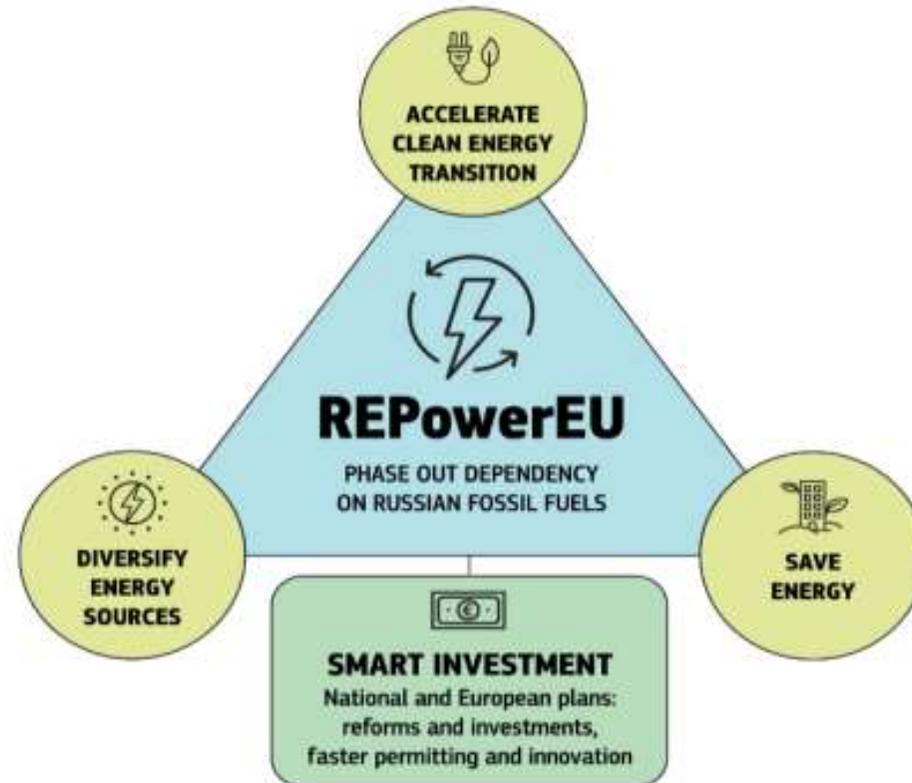
- A brief overview on current EU energy situation
- Ways to tackle energy poverty
- Flagship projects addressing energy poverty
- Introduction to Smart city concept
- A brief overview on EU solar energy strategy
- Innovative climate mitigation small-scale projects
- Conventional climate mitigation small-scale projects
- Climate adaptation small-scale projects

## EU energy situation - from European Green Deal to REPowerEU plan



## REPowerEU – 18 May 2022

- A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition





### SAVING

Every citizen, business, and organisation can save energy. Small behavioural changes, if we all commit to them, can make a significant difference. Contingency measures for supply interruptions will also be needed.



### DIVERSIFYING

The EU is working with international partners to find alternative energy supplies. In the short-term, we need alternative supplies of gas, oil and coal as quickly as possible, and looking to the future we will need renewable hydrogen too.



### ACCELERATING CLEAN ENERGY

Renewables are the cheapest and cleanest energy available, and can be produced domestically, reducing our need for energy imports. **REPowerEU** will speed up the green transition and spur massive investment in renewable energy. We also need to enable industry and transport to substitute fossil fuel use faster to bring down emissions and dependencies.



### INVESTMENT AND REFORM

Additional investments of €210 billion are needed between now and 2027 to achieve our independence from Russian fossil fuel imports, currently costing European taxpayers nearly €100 billion per year. The Commission proposes that Member States develop national **REPowerEU** plans to implement these new priorities.

## SHORT TERM MEASURES



- **Common purchases of gas, LNG and hydrogen via the EU Energy Platform** for all Member States who want to participate as well as Ukraine, Moldova, Georgia and the Western Balkans
- **New energy partnerships** with reliable suppliers, including future cooperation on renewables and low carbon gases
- **Rapid roll out of solar and wind energy projects** combined with renewable hydrogen deployment to save around 50 bcm of gas imports
- **Increase the production of biomethane** to save 17 bcm of gas imports

- Approval of first **EU-wide hydrogen projects** by the summer
- An **EU Save Energy Communication** with recommendations for how citizens and businesses can save around 13 bcm of gas imports
- **Fill gas storage** to 80% of capacity by 1 November 2022
- **EU-coordinated demand reduction plans** in case of gas supply disruption



## MEDIUM-TERM MEASURES TO BE COMPLETED BEFORE 2027



- **New national REPowerEU Plans under the modified Recovery and Resilience Fund** – to support investment and reforms worth €300 billion
- **Boosting industrial decarbonisation** with around €3 billion of frontloaded projects under the Innovation Fund
- **New legislation and recommendations for faster permitting of renewables** especially in dedicated 'go-to areas' with low environmental risk
- **Investments in an integrated and adapted gas and electricity infrastructure network**
- Increased ambition on **energy savings by raising the EU-wide target on efficiency for 2030 from 9% to 13%**

- **Increase the European renewables target for 2030 from 40% to 45%**
- **New EU proposals** to ensure industry has access to critical raw materials
- Regulatory measures to **increase energy efficiency in the transport sector**
- **A hydrogen accelerator** to build 17.5 GW by 2025 of electrolyzers to fuel EU industry with homegrown production of 10 million tonnes renewable hydrogen
- **A modern regulatory framework for hydrogen**





## Study on addressing Energy Poverty in the Energy Community Contracting Parties - DOOR, EIHP, November 2021

- An energy poor consumer is a consumer who cannot secure adequate warmth, cooling, lighting, and energy to power appliances necessary for essential services that underpin a decent standard of living and health.

Country	% of households living in energy poverty
EU level	5
Albania	37
Bosnia and Herzegovina	35
Kosovo	40
North Macedonia	33
Montenegro	15
Serbia	22



## Residential Energy Efficiency for Low Income Households - (REELIH)

Project duration: **2012-2022**

- **Partners:** Habitat for Humanity North Macedonia, Habitat for Humanity Armenia, (NGOs) ENOVA (private company), USAID
- Implementation areas: Yerevan, Vanadzor – **Armenia**; Banovici, Zivinice, Tuzla, Sarajevo - **Bosnia and Herzegovina**; Skopje, Veles - **North Macedonia**
- set to tackle the effects of climate change and energy poverty and improve the health and quality of life of low-income homeowners living in multi-apartment buildings
- helps establish and develop an **investment market** for retrofitting to secure the financial and political support of governments and to place increased focus on improving existing buildings by working with the local communities
- **Results** - 100 buildings and over 3,500 apartments fully or partially renovated, improving the quality of life for 12,000 residents
- **Budget** - 1 million €, cofinanced by USAID



## The House of Sustainable Housing (HSH): a tool in the struggle against energy poverty, City of Lille, France





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## HSH project components and characteristics

1. A city that is made more sustainable and inclusive through a policy of fighting energy poverty – City fund to cover energy bills and renovations (crowdfunding)
2. A one-stop shop for all of the aspects of sustainable housing – 10.000 visitors/year
3. An exemplary building that demonstrates good practices and innovation in renovation
4. Residents are involved and empowered using the "Do it yourself" principle



## Flagship projects addressing energy poverty

- **EmpowerMed** – Empowering Women to Take Action Against Energy Poverty – Barcelona, Marseille, Padova, **Vlora**, Zadar and Koper
- **EnergyMeasures** – Tailored measures supporting energy vulnerable households - Turnhout, **Skopje**, Burgas and Gabrovo, Isles, Cork and Dublin, Eindhoven, Biała and Bielsko
- **ENPOR** – Actions to mitigate energy poverty in the private rental sector – Austria, Greece, Croatia, the Netherlands, Estonia, Belgium, Germany and UK
- Audits and interventions in homes experiencing energy poverty – Barcelona, Spain
- Energia su Misura – Milan, Italy
- Energy Advise Points (PAEs) – Barcelona, Spain
- Green Doctors – numerous cities in UK
- Barrio Solar – Sharing renewable energy and solidarity in the community - Zaragoza, Spain



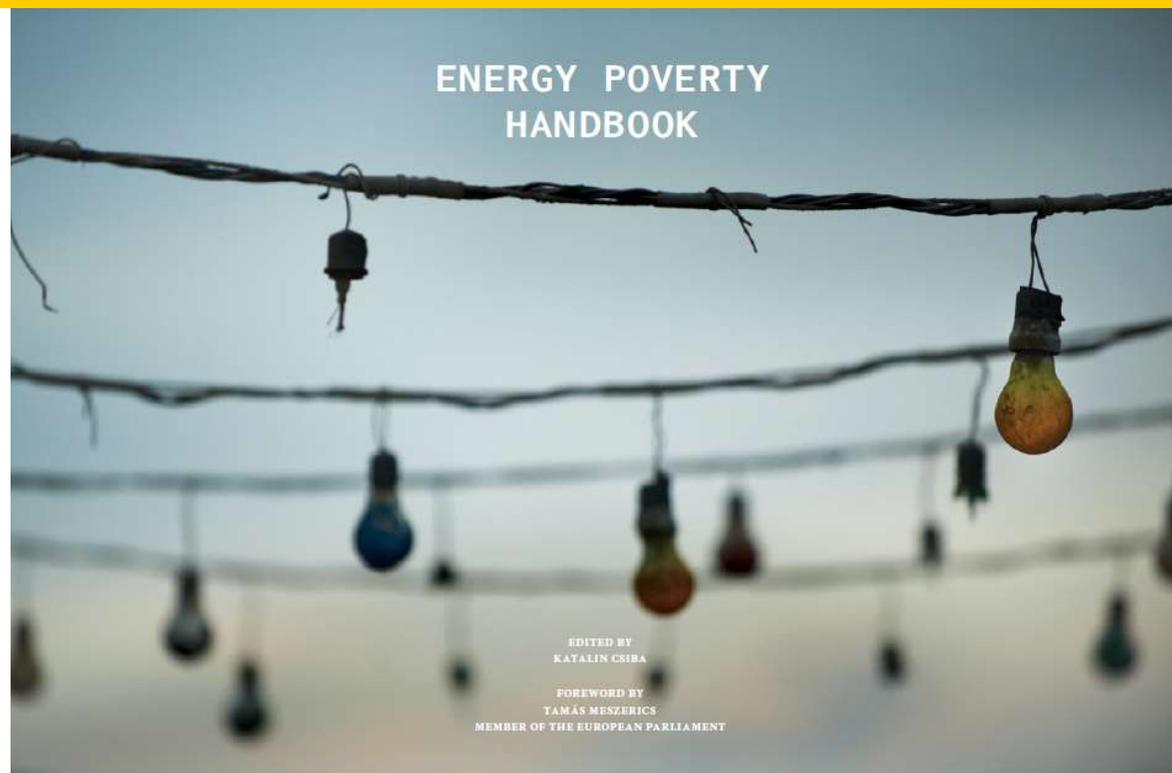
The image shows the cover of a report. At the top center is the European Commission logo. Below it, the title 'Tackling energy poverty through local actions – Inspiring cases from across Europe' is written in bold, dark blue text. Underneath the title, 'Energy Poverty Advisory Hub 2021' is written in a smaller, grey font. At the bottom of the cover, there is a grayscale illustration of a hand holding a compact fluorescent light bulb (CFL) over a network of white lines on a dark background, with a small green arrow pointing upwards from the bulb.



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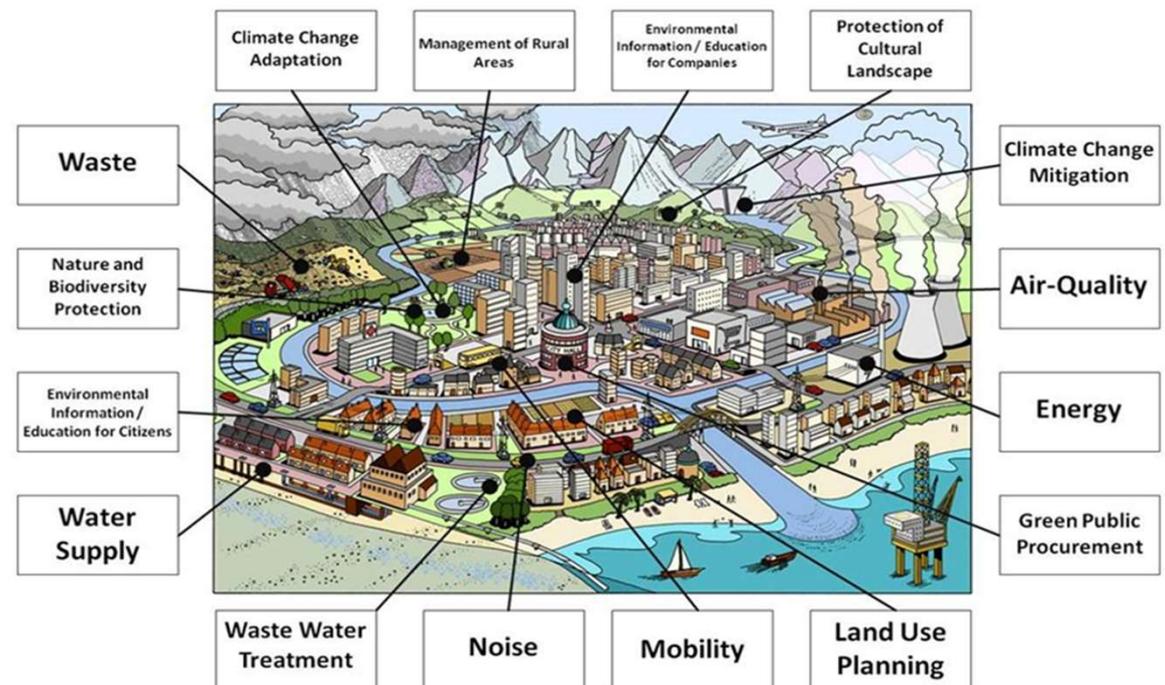
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- **Smart City concept** - an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects

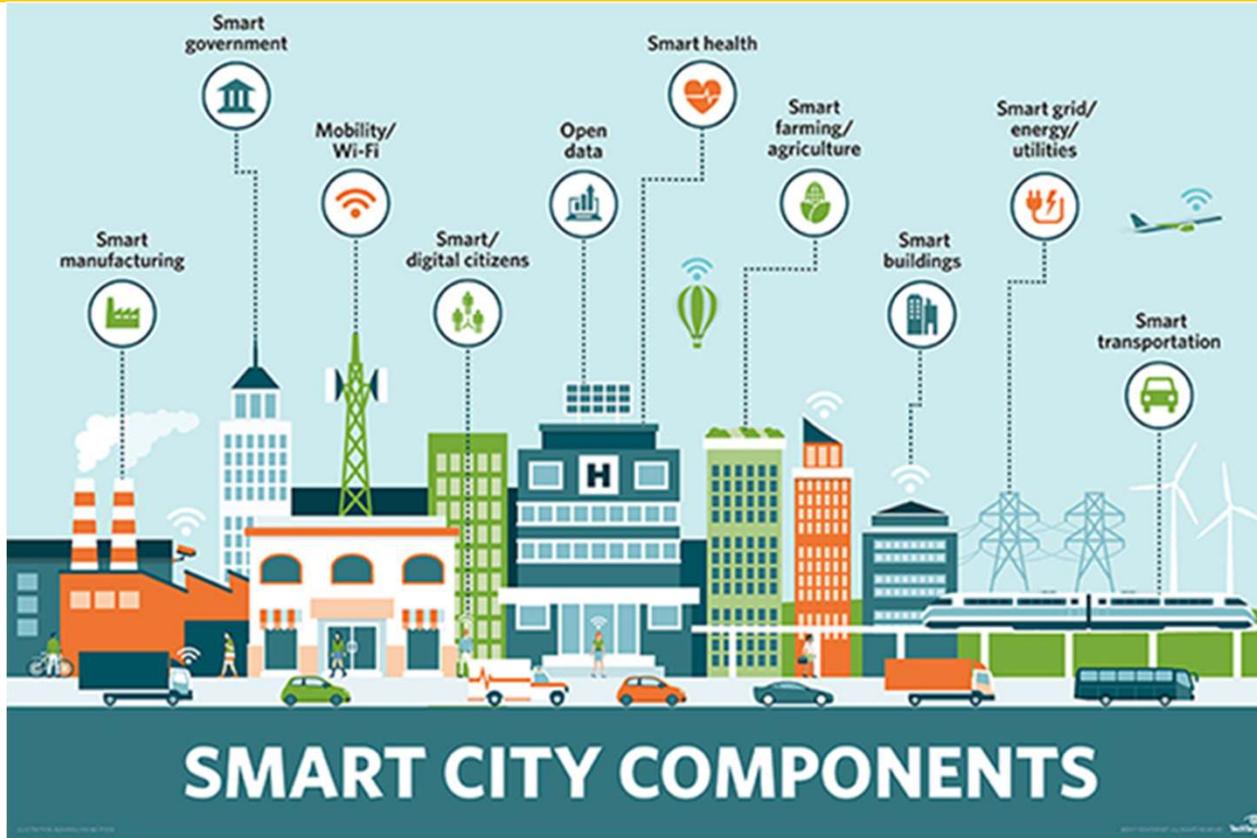




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### GOVERNMENT

- Digital public administration
- Participatory governance
- E-services

### BUILDINGS

- Connected facility management
- Smart home
- Smart construction

### HEALTH

- Telemedicine
- Integrated health information systems
- Ambient assisted living

### MOBILITY

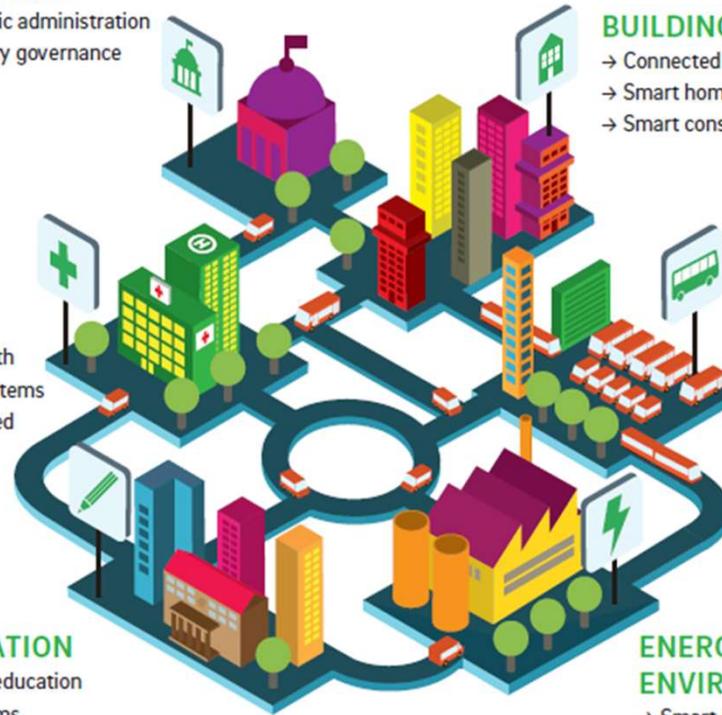
- Intelligent traffic management systems
- Smart services for public transport
- Smart urban logistics

### EDUCATION

- Urban education platforms
- Digital learning formats
- Digital skills

### ENERGY AND ENVIRONMENT

- Smart energy
- Smart water management
- Smart waste management





## EU solar energy strategy – 18 May 2022

- An essential part of the REPowerEU plan – rapid PV increase - 320 GW of PV by 2025 and almost 600 GW by 2030 - displace the consumption of 9 bcm of natural gas annually by 2027
- By the end of 2020 - 136 GW of PV - 5% of total EU electricity generation
- **European Solar Rooftops Initiative** - limit the length of permitting for rooftop solar installations, including large ones, to a maximum of 3 months

The installation of rooftop solar energy compulsory for:

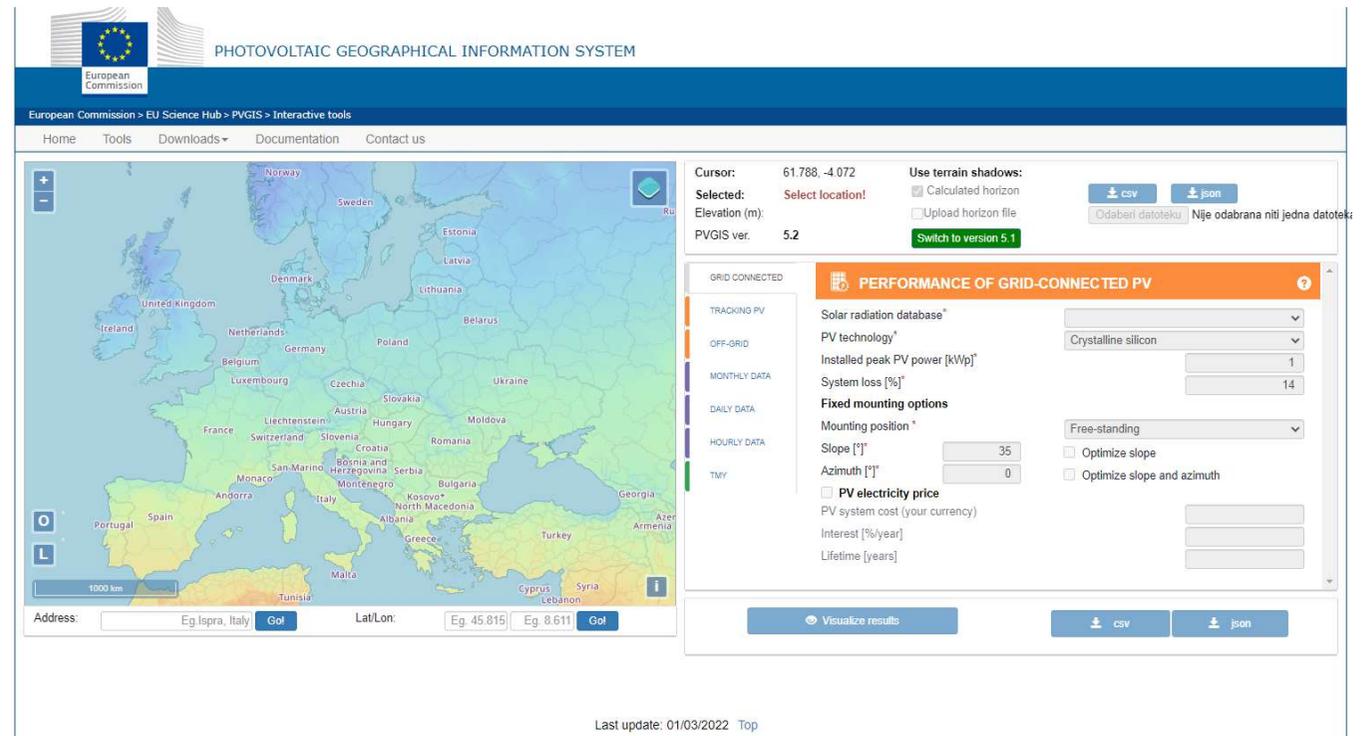
- all new public and commercial buildings with useful floor area larger than 250 m<sup>2</sup> by 2026;
- all existing public and commercial buildings with useful floor area larger than 250 m<sup>2</sup> by 2027;
- all new residential buildings by 2029

**Expected results:** 58 TWh of additional electricity generated

- 19 billion € to accelerate the roll-out of renewables

## PVGIS – JRC tool for citizens to evaluate their roof's PV potential

- [https://joint-research-centre.ec.europa.eu/pvgis-photovoltaic-geographical-information-system\\_en](https://joint-research-centre.ec.europa.eu/pvgis-photovoltaic-geographical-information-system_en)



The screenshot shows the PVGIS (Photovoltaic Geographical Information System) web application. The interface includes a map of Europe with a location marker, a sidebar with navigation options (Home, Tools, Downloads, Documentation, Contact us), and a main panel for configuring and visualizing PV system performance. The main panel is titled "PERFORMANCE OF GRID-CONNECTED PV" and contains several input fields and checkboxes. The "Use terrain shadows" section includes "Calculated horizon" and "Upload horizon file" options. The "Fixed mounting options" section includes "Mounting position" (Free-standing), "Slope" (35 degrees), and "Azimuth" (0 degrees). The "PV electricity price" section includes "PV system cost", "Interest", and "Lifetime" fields. The interface also features download buttons for CSV and JSON data, and a "Visualize results" button. The bottom of the page indicates the last update date as 01/03/2022.



## Innovative climate mitigation small-scale projects

- Solar energy utilisation
  - Solar smart benches for charging mobile phones
  - PV roofs
  - Photovoltaic LED public lighting
  - Solar education centres
  - Solar autonomous charging stations
- Digital based sustainable urban mobility projects



## Solar smart benches for charging mobile phones, Island Ugljan, Croatia

- Innovative project of the Croatian student Ivan Mrvos from the Faculty of electrical engineering and computing
- Price: 2000€-5000€





## Technical performances, investments and results

- Project - “Adventure island – Insula ager visitatio”
- 8 solar smart benches on the promenade by the sea
- Solar panels generate up to 110W electricity per hour
- The smart bench is equipped with self-developed devices for charging smartphones and watches of the new generation
- Two USB ports with 10 W of output power
- Public lighting during nights due to accumulated solar energy
- Estimated investment – 24.000€



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## Photovoltaic roof on the municipal building, Island Murter, Croatia

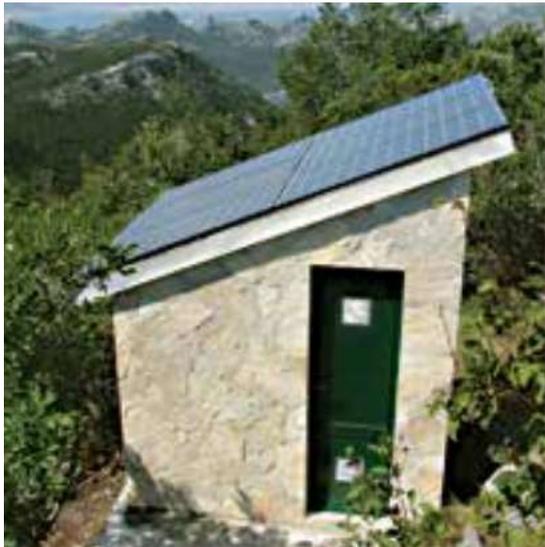




## Technical characteristics, investments and results

- Island Murter – high insolation, 280 sunny days per year
- Photovoltaic roof - installed capacity 9,62 kW
- 44 PV moduls type JINKO Solar 225W/24V
- Feed-in tariff – 47 € cent/kWh
- Agreement with HROTE for 12 years
- Project duration – 10 months
- Time consuming and complicated procedures to become eligible electricity producer – 20 months
- Total investment – **26.989,3 €** (54% co-financed by the Fund for environment protection and energy efficiency)
- Pay back period – 2 years
- CO2 reduction – 3,84 t/year

## Photovoltaic power system for the reception of the national park, National park Paklenica, Croatia





## Technical performances and investments

- National park Paklenica – inaccessible terrain, without the possibility of connection to the electricity grid
- **Photovoltaic power system consists of:**
  1. Entrance reception Mala Paklenica - installed capacity 600 W, investment – **5.333,33€**
  2. Lugar house - installed capacity 1500 W, investment – **12.000€**
  3. Cave Manita peć – 2kW PV panels + modernisation of interior lighting, total investment – **26.666,67€**



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## Photovoltaic power plant on the technical school, City of Sibenik, Croatia





## Technical performances, investments and results

- City of Sibenik – high insolation, 277 sunny days per year
- Photovoltaic roof - installed capacity 10 kW
- 46 PV moduls type JINKO Solar 225W/24V
- Feed-in tariff – 47 € cent/kWh
- Agreement with HROTE for 12 years
- Total investment – **30.666,7 €**
- Pay back period – 5,7 years
- CO2 reduction – 3,97 t/year

## Solar Education Center of Zadar County, City of Zadar, Croatia





## Technical performances, investments and results

- Solar Education Center – cofinanced by UNDP
- Photovoltaic roof - installed capacity 2 kW for charging electric vehicles
- Biomass boiler room
- Solar collectors
- Total investment – **48.000 €**



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## Solar collectors for hot water preparation in the market, City of Osijek, Croatia





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## Technical performances, investments and results

- 48 solar collectors for heating 6000 l of sanitar water
- Total investment – 98.000 €
- Energy savings – 246.000 kWh/year
- Cost savings – 17.333,3€/year
- Pay back period – 5,6 years

## Residential PV power plant – Family house Lepojevic, Prokuplje municipality, Serbia

- Built for 2 days in 2015, installed capacity of 17kW, Yinglisolar
- Feed-in tariff system for 12 years - 14.6 € cent/kWh for roof-mounted PV plants up to 30 kW
- Estimated investment – 24.000€ (1.350 €/kW)
- Pay back period – 7,3 years



## Residential PV power plant – Villa Palladio, City of Durres, Albania

- Built for 2 days in January 2018, installed capacity of 20,8kW, 32 panels with installed invertors 2x18kW, Jaha solar, average annual production of electricity is around 52 MWh
- Feed-in tariff system for 15 years - 10 € cent /kWh
- Estimated investment – 52.000 € (1.500 €/kW)
- Pay back period – 8,6 years





## Residential PV power plant – Family house Hristov, City of Skopje, North Macedonia

- Built for 15 days in 2010, installed capacity of 49,5 kW, 80 panels with installed invertors 2x40kW, Photowatt, average annual production of electricity is around 82 MWh
- Feed-in tariff system for 15 years - 16 € cent/kWh
- Estimated investment – 90.000 € (1.800 €/kW)
- Pay back period – 11,4 years





## Commercial PV plant – Company Elektrovat Ltd, City of Cacak, Serbia

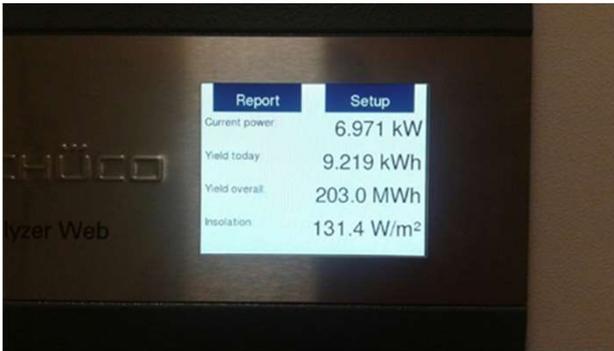
- Built for less than 10 days in September 2012, installed capacity of 54,72 kW
- Feed-in tariff system for duration of 12 years - 12.4 €cent/kWh
- 228 panels produced by German manufacturer SCHÜCO, with installed invertors 2x25kW
- Estimated investment – 65.000 € (1.150 €/kW)
- Pay back period – 7,3 years
- 200 MWh electricity delivered to distribution network first 3 years
- Almost ten years in operation without any failures



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## PV plant – Albanian Ministry of Energy, Transport and Infrastructure, City of Tirana, Albania

- Built for 12 days in June 2017, installed capacity of 27 kW, 102 polycrystalline panels produced by SCHÜCO, average annual production of electricity - 61 MWh
- Feed-in tariff system for duration of 15 years - 10 € cent /kWh
- Estimated investment – 72.000 € (1.400 €/kW)
- Pay back period – 7,8 years





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## Photovoltaic power plant on the building of the City Administration, City of Rijeka, Croatia





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## Technical performances, investments and results

- PV system - 9,9 kW installed capacity – located on the 219,13 m<sup>2</sup> terrace on the fifth floor
- 44 PV moduls – type IBC 225 TE Polycrystalline solar cells (dim:1.660x990x42 mm, 22 kg)
- Total investment – **38.933,33 €**
- Pay back period – 9 years

## Photovoltaic LED public lighting on the promenade by the sea, Murter island, Croatia





## Public lighting characteristics

- Before: public lighting system without automatic on and off control system, 800 W installed capacity, 3.600 working hours/year, 2.880 kWh/year electricity consumption
- After: public lighting system with automatic on and off control system based on intensity of natural light, 580 kWh/year electricity consumption
- 8 25 W LED lamps + 1000 W PV panel, 200 W installed capacity





## Investments and results

- Total investment – **21.502,53 €** (53,59% co-financed by the Fund for environment protection and energy efficiency)
- Energy savings – 2.300 kWh/year, 580 kWh produced from by PV
- CO2 reduction – 0,663 t/year
- High reduction of light pollution
- Independence from the electricity grid

## Solar charging station for electric cars, City of Utrecht, Netherlands

### Haarrijn



- Fast charging point for EVs along the A2.
- The configuration consists of a solar PV system, a charging station for 4 EVs and a battery system.
- The power consumption from the grid is lower due to storing of solar energy in the battery.
- This allows the grid operator to avoid investments (grid upgrade).

## Solar autonomous charging station “SUNČICA”

- Sunčica – Croatian fast charging station with solar panels with a peak power of 50 kW and battery energy storage of 500 kWh (enough to quickly charge ten vehicles at once) – still in pilot phase
- Estimated investment – 300,000€



## High penetration of electric vehicles & infrastructure in Netherlands and Croatia

- Netherlands

- over 115.000 EVs
- 11.768 public charging stations
- 14.320 semi-public chargers
- 600+ fast chargers
- + 72.000 private charging stations



- Croatia

- 1500 EVs
- 1.233 charging stations on 556 locations
- Goal – 2000 charging stations





## Mobike project, City of Tirana, Albania

- Bicycle Lanes on urban roads inside Tirana City (21.55 km)
- Bicycle Lanes on Tirana Lake Park (5.5 km)
- Bicycle Lanes connecting City center to Tirana Lakes/Parks (30.6 km)
- 1200 new stationless bikes (Mobikes) for renting



[www.tiranasmart.city](http://www.tiranasmart.city)



**BETTER  
MOBILITY**



## Tirana on a Bicycle





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## MOL Bubi - Public Bikesharing, City of Budapest, Hungary





## Project characteristics

- MOL BUBI consists of 126 docking stations and 1.526 bicycles
- BKK- Budapest Centre for Transport
- 24/7 availability
- On public space, easily accessible for everybody
- Online, real-time information system
- Hiring options: card, app (QR code), pin code
- The 4th generation features - smart bikes with board computer, various access channels, GPS, electronic lock/extra stand, solar panel, surveillance system and paypass



# 4 YEARS IN NUMBERS

September 2014 – September 2018

TOTAL NUMBER OF TRIPS

## 2,5 MILLION



DAILY TRIPS  
**1 700**



TYPICAL TRIP  
**1 KM**



NUMBER OF DOCKING STATIONS  
**127**



SERVICE AREA  
(km<sup>2</sup>)



MOST POPULAR DOCKING STATIONS



SOCIAL AND ENVIRONMENTAL BENEFITS\*

SOCIAL BENEFITS (EUR)  
**2,3 MILLION**

SAVED ENERGY CONSUMPTION (kcal)  
**88 MILLION**

SAVED CO<sub>2</sub> EMISSION (kg)  
**0,8 MILLION**

\*Source: [integracsiomunkaba.hu](http://integracsiomunkaba.hu)  
Social benefits include health and environmental benefits, savings of travel time and energy consumption.



TOTAL DISTANCE CYCLED

some **5 MILLION KILOMETRES**





## Conventional climate mitigation small-scale projects

- Public and infrastructure lighting
- Energy efficiency in buildings
- Biomass energy utilization
- Sustainable urban mobility



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## Public lighting reconstruction, City of Dubrovnik, Croatia



## Public lighting characteristics

- Before: 86 300 W lamps and 103 150 W lamps, „feral” type – installed capacity 41,3 kW
- After: 189 75 W fluorescent integrated energy saving lamps, „feral” type – installed capacity 14,2 kW





## Investments and results

- Total investment (VAT included) – **20.266,7€**
- Change of old with new lumps and transport
- Project duration – **2 months**
- Electricity savings – **113.860 kWh (66%)**
- Cost savings – **11.674,7€/year**
- Pay back period = **1,7 year**
- GHG emissions reduction/year: **34,39 t CO2 , 0,12 t SOx and 0,73 t Nox**
- Life expectancy of fluorescent integrated lamps is 40% shorter than of LED lamps but they are around 50% less expensive (cca 120€/lams) with easier installation and maintenance.



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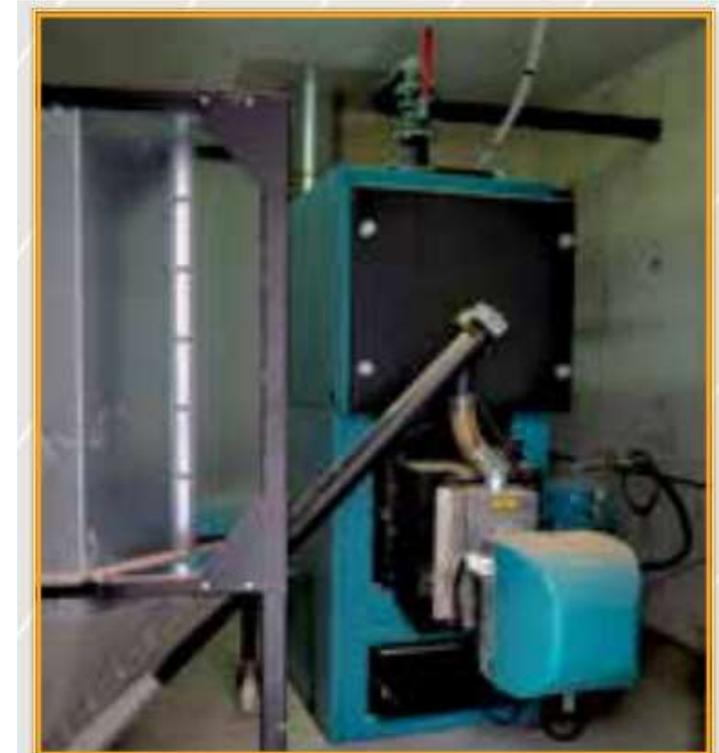
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## Energy efficient reconstruction of the building of the City administration, City of Slunj, Croatia



## Technical characteristics

- City administration building – 635 m<sup>2</sup>, 2 floors, 94 m<sup>2</sup> of windows
- Project includes: replacement of worn-out windows with energy efficient and heating system on fuel oil to biomass (pellets)
- Biomass furnace – 230 kW installed power





## Investment and results

- Total investment – **72.637,3 €** (19.657,2 € co-financed by Ministry of regional development and EU funds, 37.617,2 € co-financed by the Fund for environmental protection and energy efficiency and 15.362,8 € City financial means)
- Energy savings – 54%
- Pay back period – 3 years
- CO2 reduction – 45 t/year



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## Energy efficient reconstruction of the primary school, Municipality of Velika Pisanica, Croatia



## Project components – 5 sub-projects

1. Replacement of wooden windows and doors
2. Insulation of external walls
3. Room temperature control – thermostatic valves
4. Modernization of interior lighting
5. Conversion of oil into a gas boiler room





## Replacement of wooden windows and doors – technical performances, investment and results

- Before – 334 m<sup>2</sup> worn-out wooden windows with single glazing and doors
- After - PVC windows with 5 chamber profile filled with gas - heat transfer coefficient  $U=1,5 \text{ W/m}^2\text{K}$
- Total investment – **29.333,33€** (24.000 € co-financed by the Fund for environmental protection and energy efficiency, 5.333,33€ co-financed by the Bjelovar-bilogora county and municipality of Velika Pisanica and 1.333,3 € school financial means)
- Energy savings - 46.990 kWh
- Cost savings – 3.560€/year
- Pay back period – 8,23 year
- CO<sub>2</sub> emission reduction – 12,51 t/year



## Insulation of external walls – technical performances, investment and results

- Before – 340 m<sup>2</sup> walls surface, heat transfer coefficient  $U=1,88$  W/m<sup>2</sup>K (does not meet the prescribed requirements)
- After - 10 cm thick thermal insulation boards of stonewool (facade lamellas, heat transfer coefficient  $U=0,45$  W/m<sup>2</sup>K
- Total investment – **12.406,33€**
- Energy savings - 24.600 kWh
- Cost savings – 1.862,7€/year
- Pay back period – 6,66 year
- CO<sub>2</sub> emission reduction – 6,66 t/year



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## Room temperature control – thermostatic valves \_ technical performances, investment and results

- Installation of 60 thermostatic valves on radiators in classrooms
- Minimal reduction of temperature (1°C) - 21°C to 20°C
- Total investment – **2.000€ (33,3€ thermostatic valves + installation)**
- Energy savings - 11.100 kWh
- Cost savings – 840,7€/year
- Pay back period – 2,38 year
- CO2 emission reduction – 3,01 t/year



## Modernization of interior lighting in classrooms – technical performances, investment and results

- Before – 200 energy inefficient incandescent bulbs, installed capacity - 15.850 W, electricity consumption - 11.506 kWh, cost – 1.085,6€
- After - 200 LED energy efficient bulbs
- Total investment – **1.672€ (8,4€ per bulb)**
- Energy savings – 7.358 kWh
- Cost savings – 695,9€/year
- Pay back period – 2,4 year
- CO2 emission reduction – 1,99 t/year

## Conversion of oil into a gas boiler room – technical performances, investment and results

- Before – worn-out oil boiler with capacity of 19.000 l
- After - 2 Viessmann 80 kW condensing gas boilers with efficiency over 90%
- Total investment – **18.666,7€**
- CO2 emission reduction – 5,42 t/year





## Investments and savings

- Total investment – **64.078,36€**
  1. Replacement of wooden windows and doors - **29.333,33€**
  2. Insulation of external walls - **12.406,33€**
  3. Room temperature control – thermostatic valves – **2.000€**
  4. Modernization of interior lighting - **1.672€**
  5. Conversion of oil into a gas boiler room - **18.666,7€**
- Total energy savings – **90.000 kWh (49% decrease)**
- Total cost savings – **13.333,33€**
- Total CO2 emission reduction – **26t/year (54% decrease)**
- Pay back period – **4,8 years**

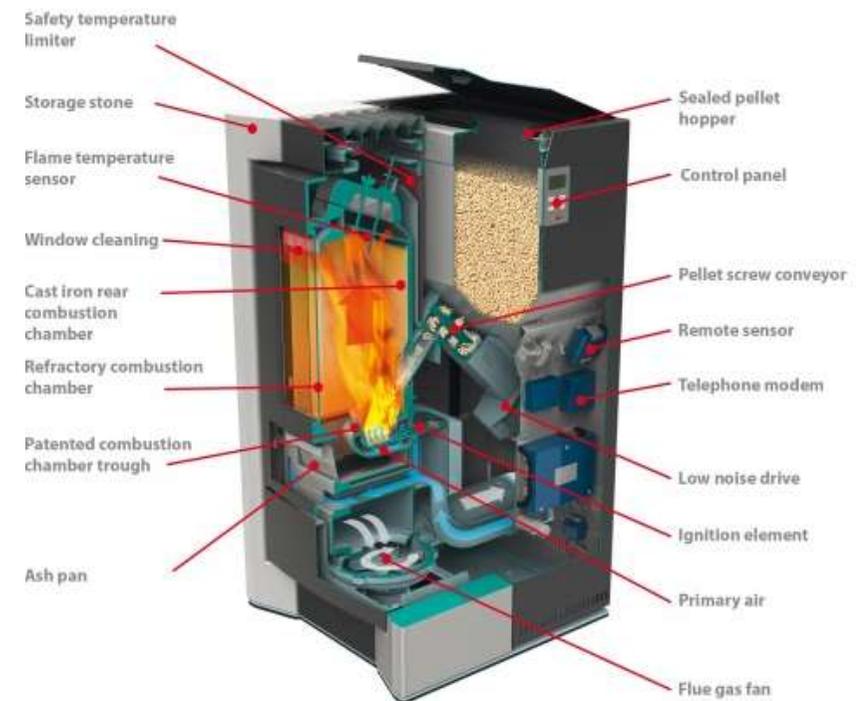
## Biomass heating in primary school Preparimi in Drelaj, Peja municipality, Kosovo

- Before – classical stoves on firewoods for partial heating of 5 classrooms and seven offices
- After - biomass (wood chip) furnace produced by LINDDANA TP (type TP160), 59kW installed capacity, wood chip boiler located behind the school building
- Estimated investment – **42.000 €**



## Biomass heating in primary school in Dvorishte, Berovo municipality, North Macedonia

- Before – classical stoves on firewods for partial heating
- After - biomass (wood chip) furnace, 64 kW installed capacity, efficiency coefficient 95%
- Estimated investment – **47.000 €**





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## Heat pumps in the Saint Maria monastery, Municipality of Luznica, Croatia





## Technical performances, investment and results

- Saint Maria monastery: castle of 1890 m<sup>2</sup> and new building of 2700 m<sup>2</sup>
- Project includes:
  1. 24 solar collectors for hot water preparation
  2. PV roof – installed capacity 30kW
  3. 5 Vaillant air-water 8,5 kW heat pumps – 2 in the castle and 3 in the new buildings
- Total investment – **103.000 €** (41% cofinanced by the Fund for environmental protection and energy efficiency)

## Small-scale climate adaptation projects

- Green roofs
- Green walls
- Tree plantations
- Community gardens
- Urban heat islands measurements





## Green roofs

- 2 typologies: **extensive** (around 140€/m<sup>2</sup>) and **intensive** (around 250€/m<sup>2</sup>)
- **Extensive** - basic, lightweight systems, minimum maintenance and management (automated irrigation, fertilization), not accessible or with very limited access to public
- **Intensive** - more complex and heavier greening systems, a higher installation, maintenance, management effort (regular irrigation and fertilization)



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## Types of green roofs



Guide to living terrace roofs and green roofs



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## IGRA members



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## Green walls in the Three Hills coffee, City of Prelog, Croatia

- Very popular in coffee bars, restaurants, hotels and hostels in Croatia
- A few companies on the turn-key solution principle
- A tree absorbs around 5.5 kg of CO<sub>2</sub> a year, 1m<sup>2</sup> of green wall can absorb up to 2 kg, also improving air quality by eliminating harmful toxins



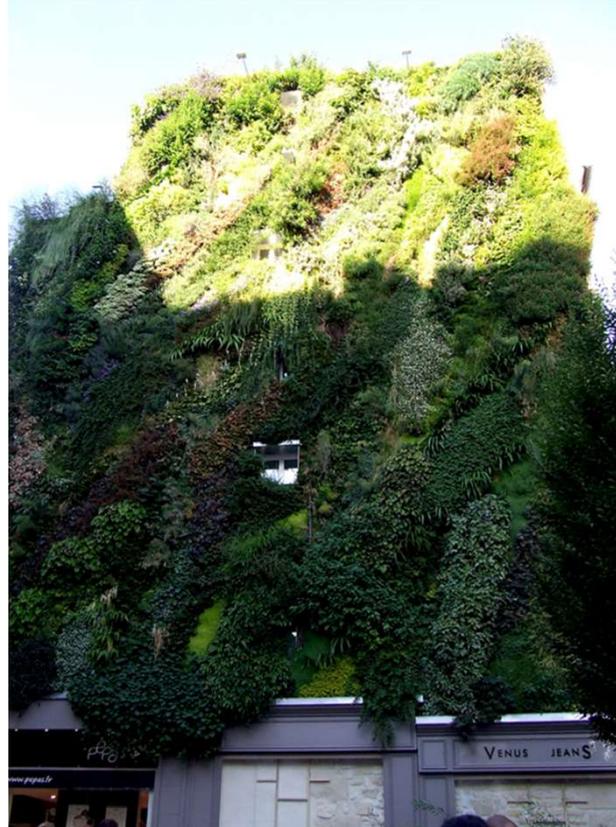


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## Green wall on the building at the corner of Aboukir street and the Petits Carreaux street, City of Paris, France





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### Estimated Budget cost of a 500 Square Foot LIVE Green Wall

Initial Start-up Costs	
Cost Of Moisture Barrier	\$1,250.00
Cost Of The Green Wall System	\$40,000.00
Cost Of Plant Material	\$14,400.00
Cost Of The Irrigation System	\$7,500.00
Professional Installation	\$13,000.00
<b>TOTAL START-UP COSTS</b>	<b>\$76,150.00</b> <b>(\$152.30/ Sq Ft)</b>
On-going Running Costs	
Quarterly Licensed Irrigation Inspector	\$200.00 (est)
Regular Plant Maintenance Service	\$8,700.00/ annually
Plant Replacements	\$2,250.00/ annually
<b>TOTAL ANNUAL COST</b>	<b>\$10,950.00</b>
<b>TOTAL 5 YEAR ESTIMATED COST OF A 500 Square Foot Live Green Wall: \$130,900.00</b>	

## Tree planting campaign, City of Tirana, Albania

- 1000 cypress trees for the Artificial Lake Park donated by Trans Adriatic Pipeline in March 2018 - **50,000€**
- Tirana vowed to add almost one tree per inhabitant
- Goal – 2.00.000 trees by 2030





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# Pledges in Trees in Cities Challenge reach 11 million



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## The measurement of urban heat islands, City of Dijon, France

- Partnerships with a number of research laboratories and Météo France in order to characterize urban heat islands (UHI)
- 60 micro-stations measuring temperature and air humidity installed throughout the City



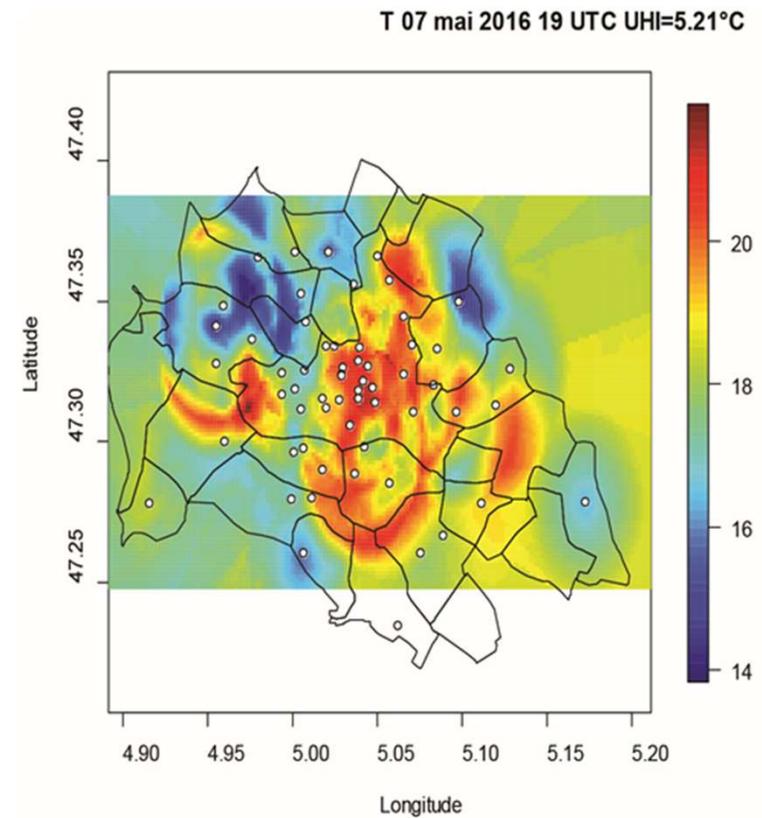


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- The UHIs are modelling with observations of the landscape, planted areas and urban development
- Main goal – [Protection of health](#)





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## Community urban gardens, City of Avignon, France

- Participative planting: “Planting Avignon’s public spaces together” campaign – 40 projects implemented
- Educational gardens – school visits
- Development of a new park - the Jardin des Papes in 2018



## Saving water campaign, City of Avignon, France

- The installation of closed-loop systems on fountains, the identification of leaks and the improved management of green areas (planting species with low water requirements, management of certain parks using integrated watering from an IT platform)





## Conclusions and recommendations

- Facing imminent energy crises change everything
- Fighting it by implementing REPowerEU plan and EU solar energy strategy (18 May 2022)
- Accelerating RES utilization at all levels from municipal to national - first priority
- Energy poverty - essential to tackle it efficiently
- Select your projects according to current energy situation
- Use PVGIS – JRC tool for citizens to evaluate roof's PV potential – user friendly and really helpful
- Include Smart city concept



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# Thanks a lot for your attention!

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## Q&A

- Raise your hand or write your question in the chat
- Questions can also be sent to [ORF-ETC@giz.de](mailto:ORF-ETC@giz.de) and will be answered in the following sessions
- To ensure fairness and transparency, answers will also be shared in written form with all municipalities, through the Associations of Municipalities



# Thank you for your attention!

Open Regional Fund for South East Europe  
Energy, Transport and Climate Protection

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## Next info sessions

***Session 3 (Thursday 16th of June, 10am – 11.30am):***  
Details of selection criteria and final Q&A