RENEWABLE ENERGY SOURCES - PRESENT & FUTURE

GREEN PARTICAPATION, GREEN EUROPE

Project Number: 2023-2-TR01-KA154-YOU-000168735

A8- The Role of fossil fuels in climate change & sustainable green transportation



TABLE OF CONTENT

The Importance of Renewable Energy in Today's World 1

Why Choose Renewable Energy? 2

Types of Renewable Energy Solutions 3

The Installation Process 4

Long-Term Maintenance and Support 5

Financial Benefits and Incentives 6

The Future of Renewable Energy 7



INTRODUCTION



Why Do We Need Renewable Energy?

- Fossil fuels are running out.
- Climate change is accelerating.
- We need clean, sustainable energy.

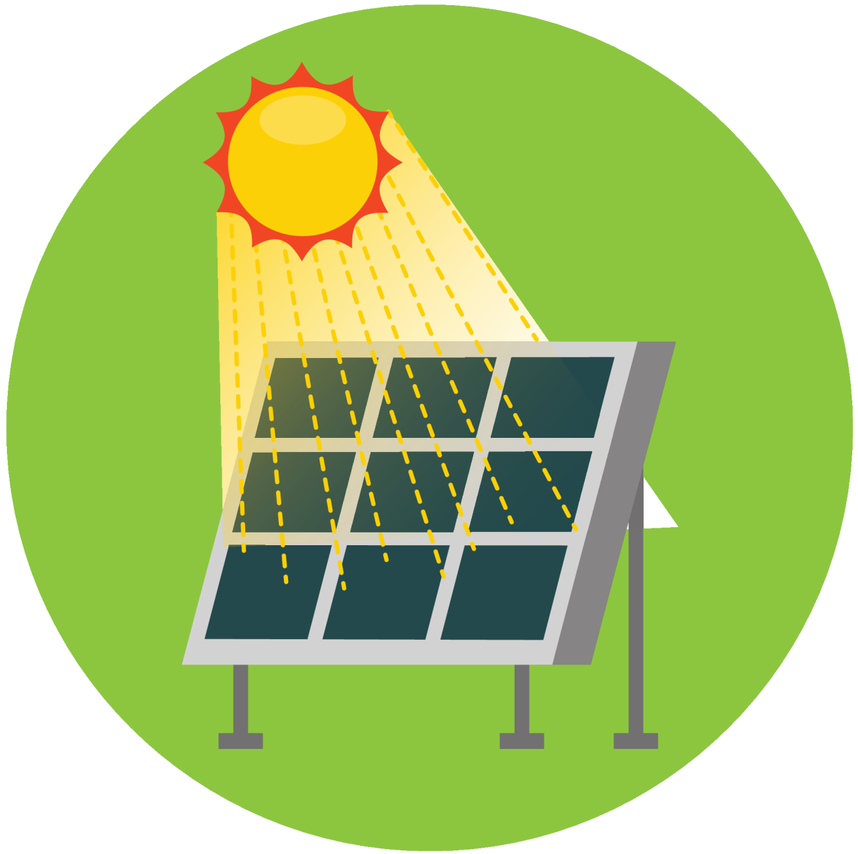


TYPES OF RENEWABLE ENERGY



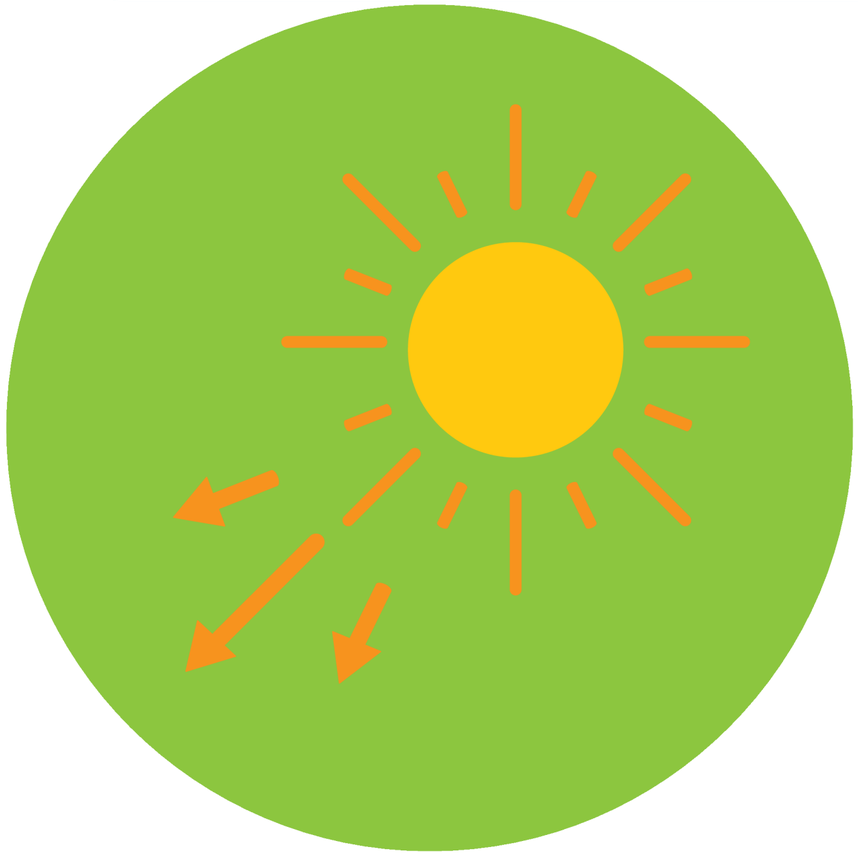
- SOLAR ENERGY
- WIND ENERGY
- HYDROPOWER
- GEOTHERMAL ENERGY
- BIOMASS ENERGY

SOLAR ENERGY



- Direct electricity generation via solar panels (photovoltaic cells)
- Silent, low-maintenance, environmentally friendly systems
- Installation costs are decreasing, government incentives increasing
- Rapidly expanding in both residential and industrial use

SOLAR ENERGY



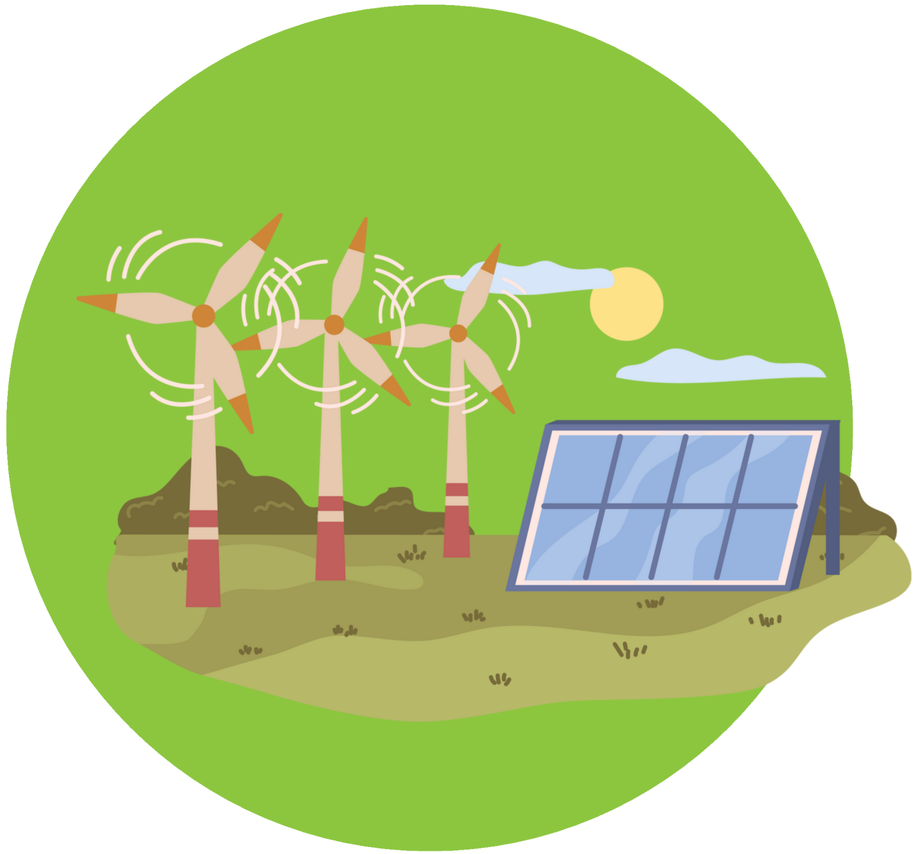
Benefits:

- Clean, silent, and emission-free
- Easy to install, low maintenance cost
- Can be integrated on rooftops

Limitations:

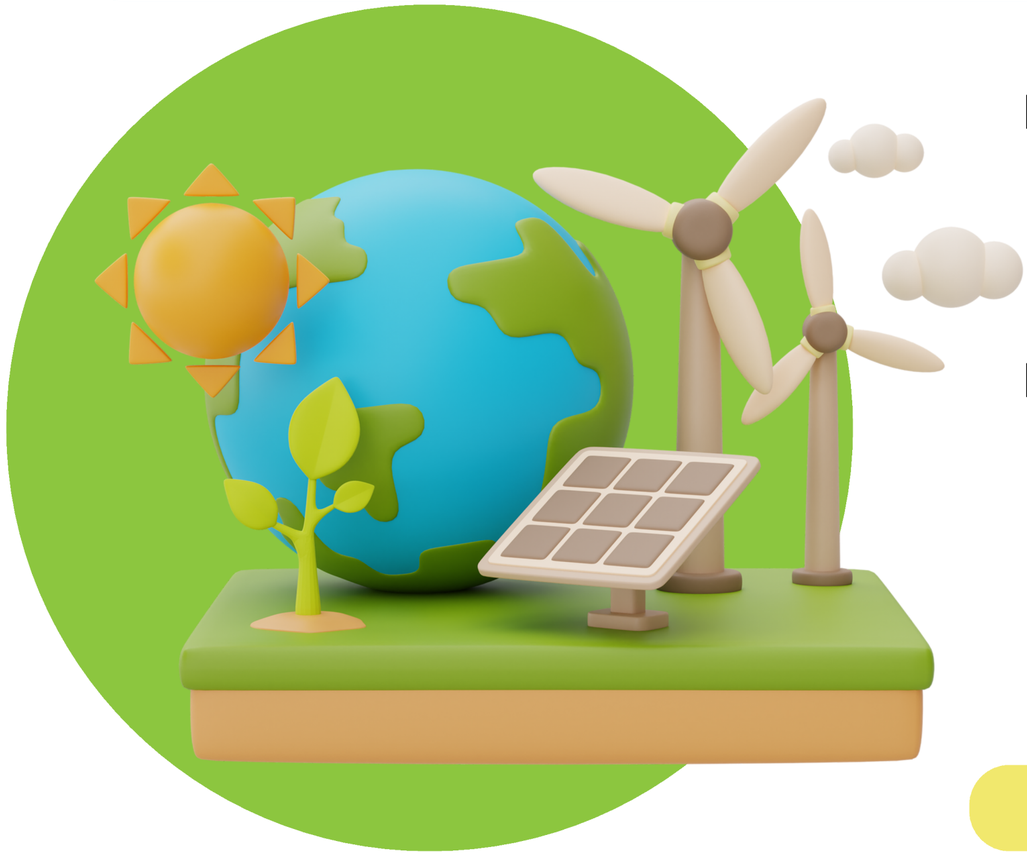
- Reduced output at night and on cloudy days
- Requires energy storage systems
- Initial installation cost can be high

WIND ENERGY



- Wind turbines rotate and generate electricity via generators
- Most efficient in coastal areas and high altitudes
- Turbines can operate both day and night
- Noise and land use are among the challenges

WIND ENERGY



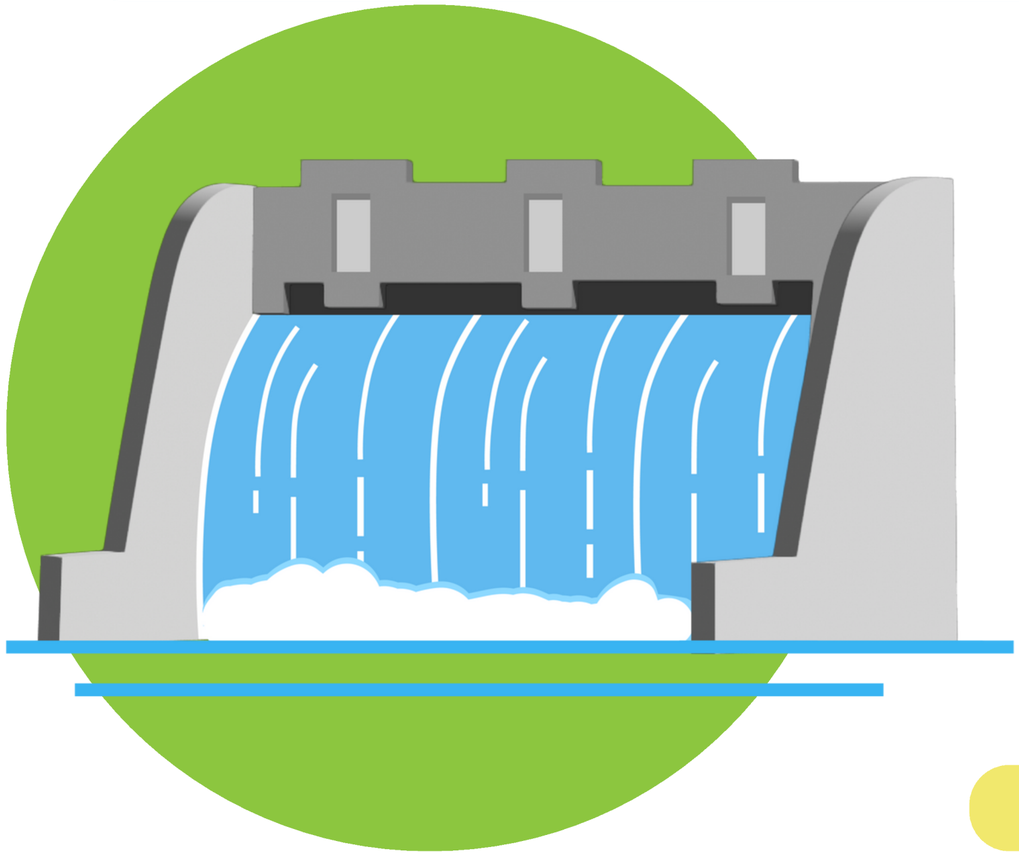
Benefits:

- Clean and continuous power production
- Costs are dropping; effective in wide open areas
- Can generate power day and night

Limitations:

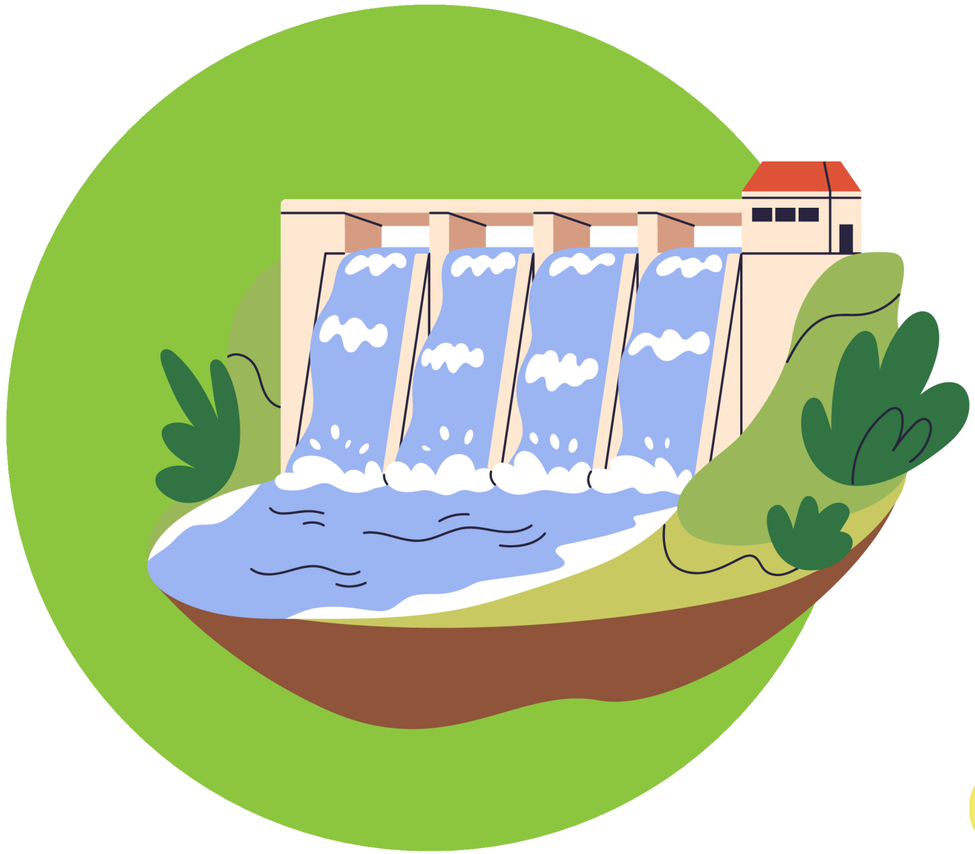
- Can cause noise and visual pollution
- Irregular wind patterns affect efficiency
- May pose a threat to bird migration routes

HYDROPOWER ENERGY



- Turbines operate using the potential energy of flowing water
- Includes large dams and small-scale micro systems
- High efficiency, low operational cost
- Environmental impact can be minimized with proper planning

HYDROPOWER ENERGY



Benefits:

- High efficiency and stable energy production
- Long-lasting infrastructure
- Energy flow is easily controllable

Limitations:

- Significant impact on ecosystems
- Dam construction is costly and time-consuming
- Efficiency drops during droughts

GEOTHERMAL ENERGY



- Uses heat from deep within the Earth’s crust
- Applied in electricity production and district heating systems
- Türkiye ranks 1st in Europe – Aydın, Denizli, Manisa are leading
- Continuous energy source with very low CO_2 emissions
- Surface emissions and odor may occur as environmental impacts

GEOTHERMAL ENERGY



Benefits:

- Continuous energy throughout the year
- Very low CO_2 emissions
- Useful for both heating and electricity

Limitations:

- Location-dependent: only possible in specific regions
- Surface gas and odor emissions may occur
- High drilling and infrastructure costs

BIOMASS ENERGY



- Energy from organic waste (plant, animal, and agricultural residues)
- Production of biogas, biodiesel, and biofuels
- Key to circular economy: waste reduction + energy generation
- Farm and municipal waste in Türkiye are potential sources
- Can significantly reduce carbon footprint

BIOMASS ENERGY

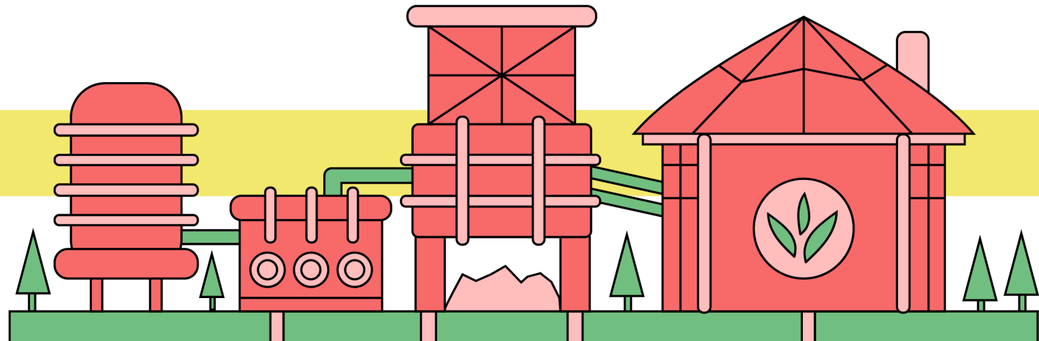


Benefits:

- Converts waste into energy – eco-friendly
- Supports local energy production
- Integrates well with agriculture and livestock

Limitations:

- Can release CO_2 if not burned properly
- Collecting and transporting biomass is challenging
- Facilities may produce unpleasant odors



CURRENT STATUS OF RENEWABLE ENERGY

- Approximately 30% of global energy consumption comes from renewable sources.
- In EU countries, this rate is approaching 45%.
- In Türkiye, the share of renewables in electricity generation reached 42% in 2023.
- Investments in solar and wind energy have increased rapidly over the past 10 years.
- Geothermal and biomass energy sources are also expanding.



THE FUTURE OF RENEWABLE ENERGY



- The EU's 2030 target: at least 42.5% renewable energy.
- 2050 goal: a carbon-neutral continent.
- Emerging technologies: energy storage, green hydrogen, smart grids.
- Solar panels will become three times more efficient.
- Biomass and waste-to-energy systems will become widespread in urban areas.

RECENT REPORTS AND ACADEMIC SOURCES



- IEA (2023): “Renewables will be the largest source of electricity by 2025”
- EU Commission (2023): “Fit for 55” target
- IRENA (2022): Renewable energy employment reached 12.7 million globally

GLOBAL TRENDS IN RENEWABLE ENERGY

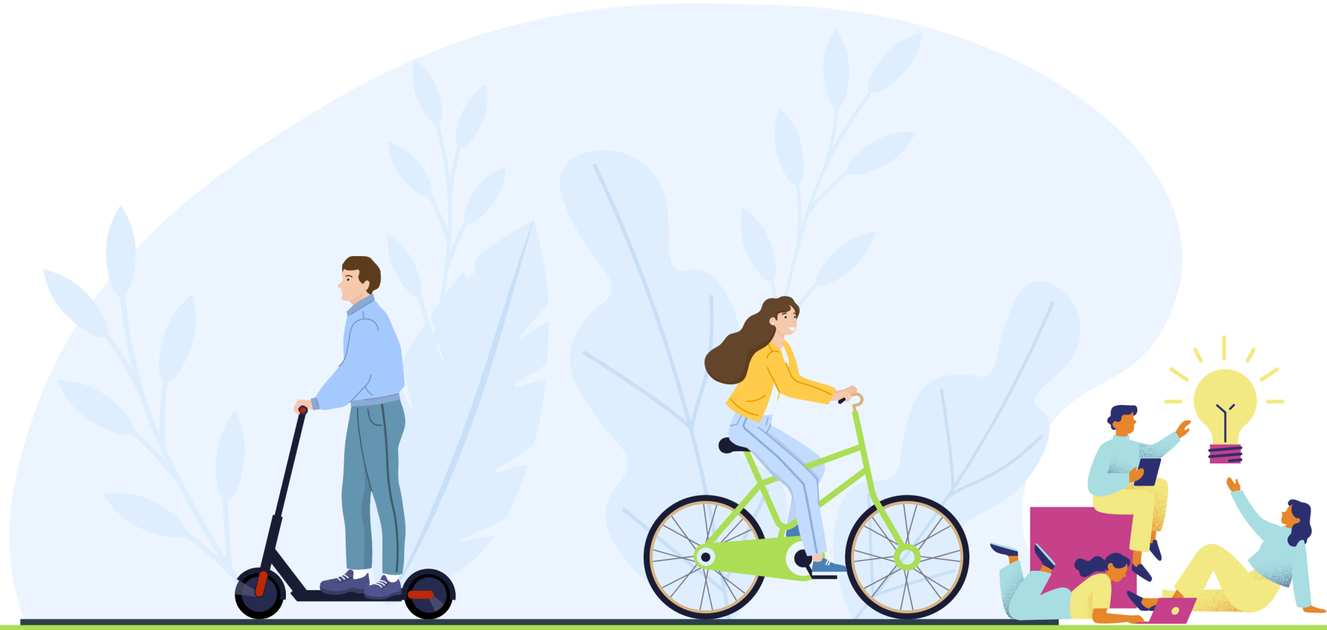


- Renewables will become the main source of electricity by 2025 (IEA, 2023)
- Solar and wind installations are accelerating in developing countries
- 12.7 million people worked in the renewable sector in 2022 (IRENA)
- USA and China are leading investors in the field
- Energy storage and green hydrogen technologies are on the rise



EU RENEWABLE ENERGY TARGETS

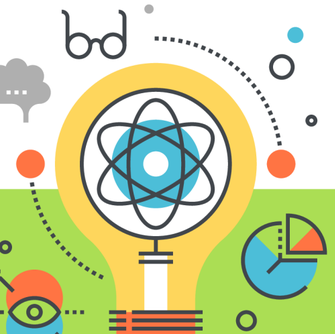
- 2030 target: at least 42.5% renewable energy
- “Fit for 55” package: 55% emissions reduction by 2030
- 2050 goal: first carbon-neutral continent
- Energy efficiency and building renovation programs
- €1 trillion annual investment planned for renewables



INNOVATION AND TECHNOLOGY IN RENEWABLE ENERGY

- Battery storage systems
- Smart grids for efficient energy use
- Green hydrogen technologies
- Energy-efficient cities and infrastructure
- Digital monitoring and AI-supported systems





THANK YOU



WORKSHOP: LOCAL ENERGY SOLUTIONS

Do you think your neighborhood could be fully powered by renewable energy?

What would be the first thing you'd change to make your neighborhood more sustainable?

- 🔹 Where could you install solar panels?
- 🔹 Are there areas suitable for wind turbines?
- 🔹 Where could electric vehicle charging stations be placed?
- 🔹 How can waste be converted into energy?

