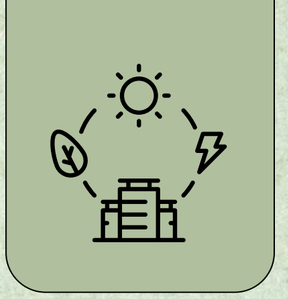
Funded by
the European Union



I.C.E. Informal Civic Education
KA2 Erasmus n. 2021-1-IT02-KA220-ADU-000033716
Open Educational Resource Project Result
by: ARCI

Towards an energy community

arci

Erasmus+

ICE

OER INDEX

I) Contents

- What is ICE?
- What is meant by sustainable energy models?
- How can efficiency and savings be ensured? Some good practices to follow
- What is a renewable energy community?
- Are there any energy communities in Italy?

II) Test

III) Resources

WHAT IS ICE?

INFORMAL CIVIC EDUCATION

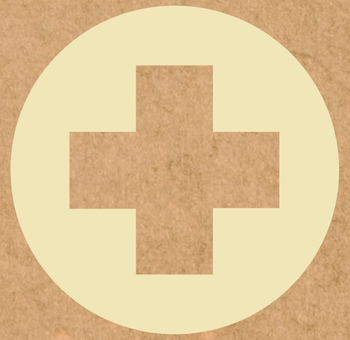
The ICE project is born from the need to for new “educating communities for adults” regarding civic practices and topics. Grossroots associations, people’s home and adult cultural centres are classic places for adult learning and awareness raising on issues such as legality, social inclusion and democratic growth.

THE PROJECT AIMS TO:

- Develop a working method with/on adults on issues of civic education
- Use informal and interactive learning methodologies for the community
- Create audio-video training modules, in multiple languages and accessible online on basic skills related to the macro themes of:

GIUSTIZIA

AMBIENTE



SALUTE

ECONOMIA

MENÙ:

What is meant by sustainable energy models?

How can efficiency and savings be ensured? Some good practices to follow

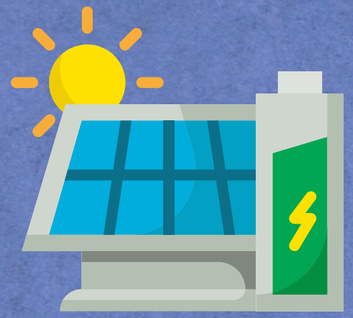
What is a renewable energy community?

Are there renewable energy communities in Italy?

WHAT IS MEANT BY SUSTAINABLE ENERGY MODELS?

It refers to a set of viable options for creating sustainable energy both in its production process and its usage. To enable the reduction of greenhouse gas emissions, optimal utilization of resources, lower economic impact of energy systems, and increased supply security, it is necessary to study new energy models that are environmentally sustainable.

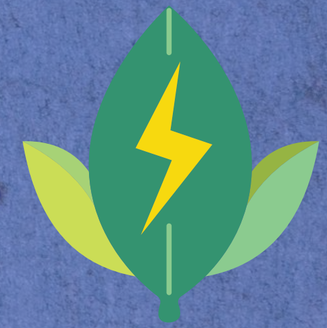
WHICH ARE THE SUSTAINABLE ENERGY MODELS?



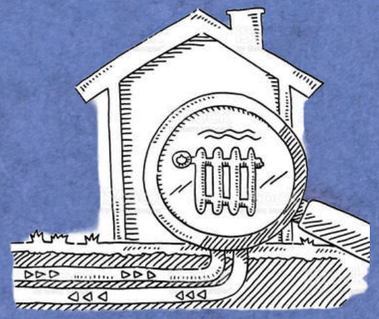
THERMAL AND PHOTOVOLTAIC SOLAR PANELS

WIND ENERGY

HYDROELECTRIC



BIOENERGY

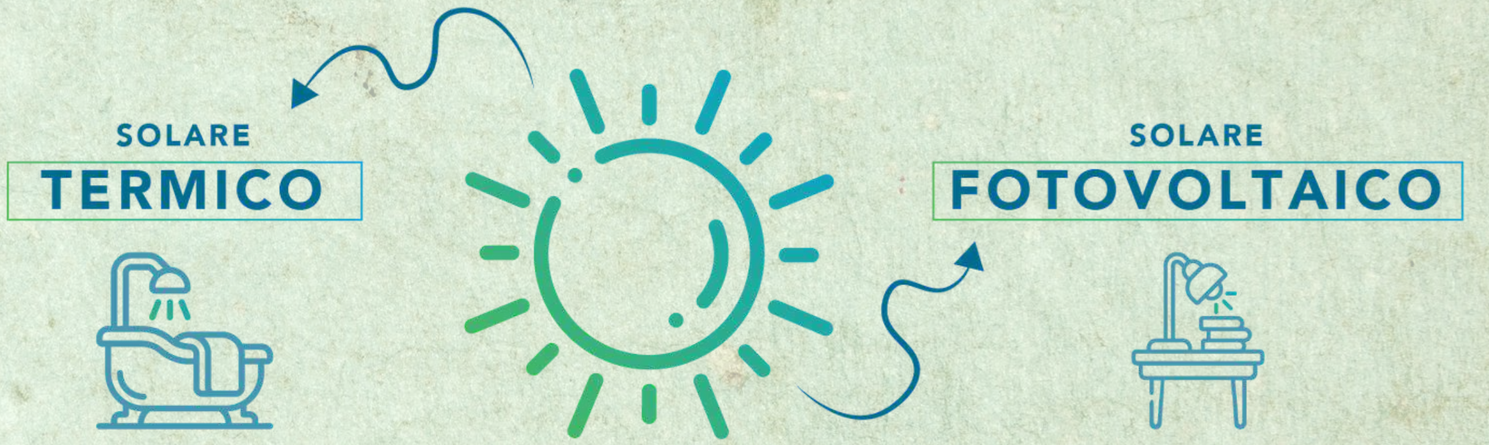


DISTRICT HEATING

GEOTHERMAL ENERGY

THERMAL AND PHOTOVOLTAIC SOLAR PANELS

Thermal solar panels harness solar rays to heat water for domestic use and heating systems. With a modest economic investment and limited space, thermal solar panels can significantly provide for the hot water needs of an average family (1 m² of solar panel can heat between 40 and 300 liters of water to 45-60 °C in a day, depending on efficiency).



Photovoltaic panels convert solar radiation into electrical energy without the use of any fuel, thus producing no carbon dioxide emissions. For photovoltaics, the initial economic investment is higher, and the occupied surface area is larger, but the benefits in terms of savings (and environmental impact) are extremely significant.

WIND ENERGY

To produce wind energy, it's necessary to harness the force of the wind using a wind turbine, a modern version of the ancient windmills.

When the wind blows with sufficient intensity, its force activates the blades, whose movement triggers a rotor enclosed within a frame called a nacelle. The motion of the rotor is transmitted to a gear multiplier. This accelerates its rotation and transfers it to the generator, which is responsible for converting mechanical energy into electrical energy.

Throughout the process, a control system monitors the operation of the entire nacelle, ensuring that everything occurs with maximum efficiency. Once generated, the electricity is transferred through a cable to a transformer, which gathers all the electricity generated by the numerous blades in the wind farm and makes it available on the grid.

HYDROELECTRIC

The hydropower plant transforms the hydraulic energy of a natural or artificial watercourse into renewable electrical energy.

Hydropower plants can be classified into three types: run-of-the-river, reservoir, or pumped storage.

Through intake structures, channels, and diversion tunnels, water is channeled from the dam to hydraulic turbines via penstocks. The turbines, as they rotate, generate mechanical energy, which is then converted into electrical energy by the rotating electric generator.

GEOTHERMAL ENERGY

Geothermal energy is the form of energy resulting from the heat contained within the Earth's interior. This heat manifests as a progressive increase in rock temperature with depth, following a geothermal gradient.

The thermal energy accumulated underground is made available through fluid carriers (water or steam), whether natural or injected, which flow from the geothermal reservoir to the surface spontaneously (geysers, fumaroles, hot springs) or are artificially extracted through mechanical drilling (geothermal well).

There are three main types of geothermal power plants:

- Dry steam: The oldest geothermal technology that extracts steam from fractures in the ground and uses it directly to drive a turbine.
- Flash: These plants transform deep, high-pressure boiling water into cooler, low-pressure water.
- Binary: In these plants, the boiling water is passed alongside a second fluid with a much lower boiling point than water. This causes the second fluid to turn into steam, which then powers a turbine.

BIOENERGY

Bioenergies represent a clean and renewable source of energy. This category includes all forms of energy produced from biomass, bioliquids, and biogas.

Biomass is the biodegradable portion of products, waste, and residues of biological origin.

Biogas, on the other hand, primarily consists of methane and carbon dioxide, and it forms through the anaerobic fermentation of organic material.

Bioliquids are liquid fuels obtained from biomass and can be of either plant or animal origin.

DISTRICT HEATING

District heating refers to a remote heating system. Through a network of pipelines, it transports heat generated by large combined heat and power plants to individual residential structures.

District heating reduces energy wastage and has a lower environmental impact compared to individual boilers. In fact, various types of fuel can be used in these central plants depending on local availability and market conditions.

Additionally, transportation and maintenance costs are reduced compared to individual apartment boilers. Properly designed combined heat and power plants ensure extremely low pollution levels.

How can efficiency and savings be ensured? Some good practices to follow

HOW TO ACT

SAVING

GOOD PRACTICES

EFFICIENCY

SOME THINGS ARE BENEFICIAL FOR BOTH THE WALLET AND THE ENVIRONMENT.

Saving and reducing one's consumption/needs.

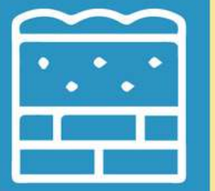
Producing the energy we need sustainably - yes to renewable energy, no to gas/petroleum.

From a consumption perspective, the best energy is the one not used.

GOOD PRACTICES

01

Utilizzare lampadine a risparmio energetico

02

Migliorare la coibentazione dell'abitazione

03

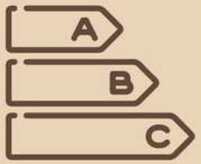
Isolare tetto e soffitto

04

Utilizzare serramenti a doppi vetri

05

Ridurre l'utilizzo dell'acqua

06


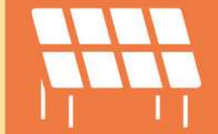
Preferire apparecchi elettronici di classe superiore

07

Utilizzare le ciabatte multipresa

08

Non lasciare la luce accesa inutilmente

09

Realizzare impianti di generazione di energia rinnovabile

10

Effettuare la manutenzione degli impianti

11

Controllare la temperatura degli ambienti

12

Fare attenzione alle ore di accensione

13

Schermare le finestre durante la notte

14

Evitate ostacoli davanti e sopra i termosifoni e non lasciare le finestre aperte a lungo

15

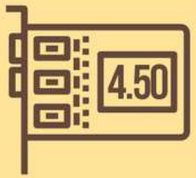
Fare il check-up dell'immobile

16


Dotare il proprio impianto di una centralina di regolazione della temperatura

17

Utilizzare valvole termostatiche

18


Utilizzare un sistema di contabilizzazione del calore

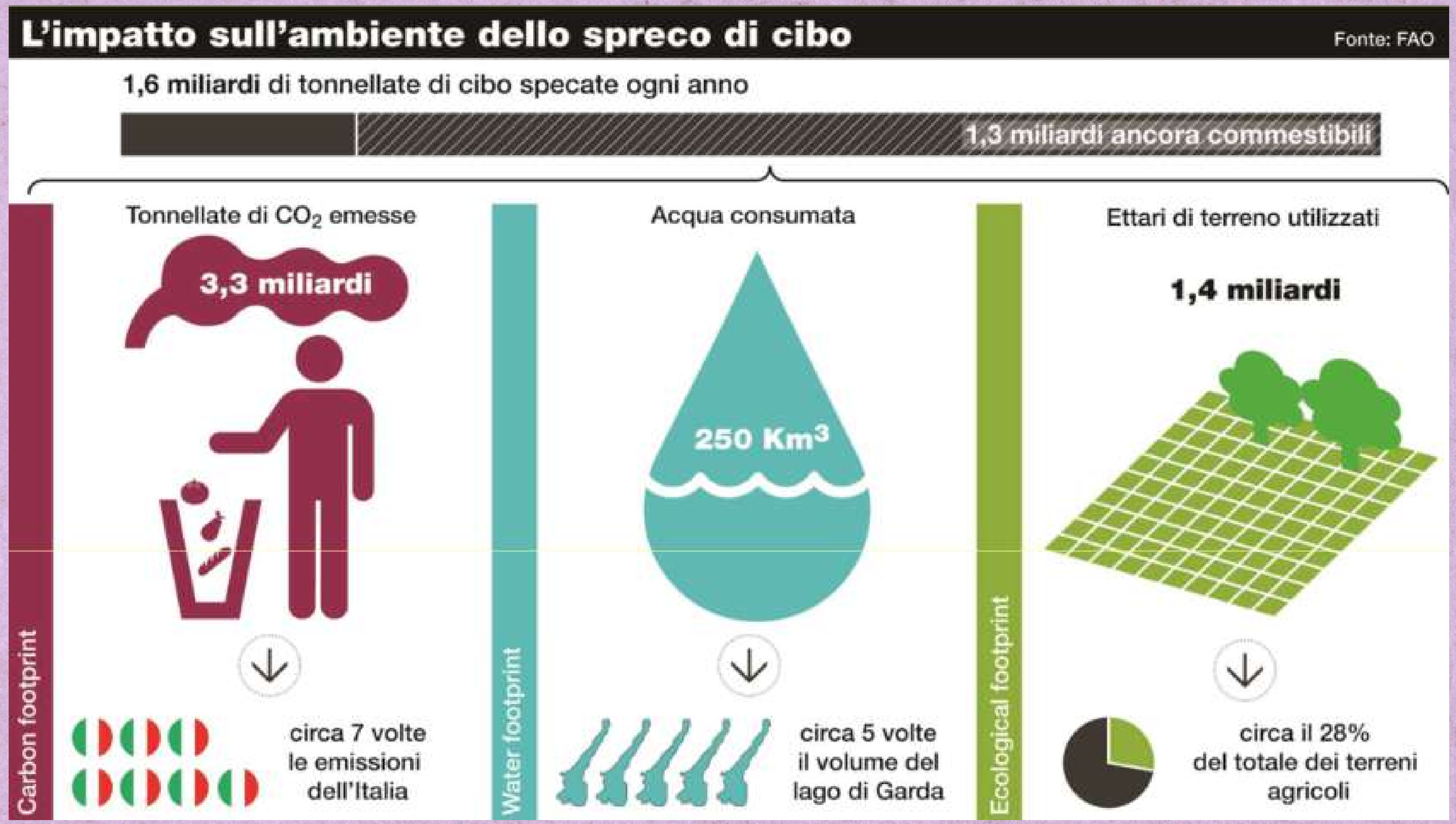
19

Sostituire la caldaia esistente con una caldaia a condensazione

20

Sbrinare regolarmente frigoriferi e congelatori

EFFICIENCY



FINISH WHAT'S ON YOUR PLATE, AND DON'T BUY TOO MUCH FOOD.
AROUND THE WORLD, ABOUT ONE-THIRD OF FOOD ENDS UP IN THE TRASH.
In Italy, it's about 150kg/year/person.

What is a renewable energy community?

THE DEFINITION OF CER

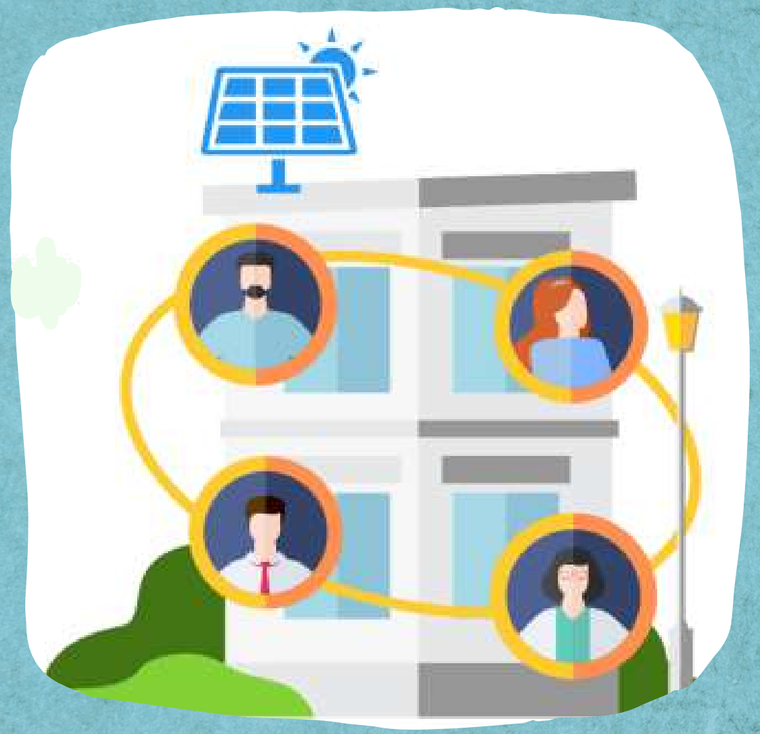
A RENEWABLE ENERGY COMMUNITY is a group of AT LEAST TWO SELF-CONSUMERS of electrical energy and AT LEAST ONE RENEWABLE ENERGY SOURCE INSTALLATION connected to the low-voltage grid portion served by the same medium-to-low voltage transformer substation.

THE ENTITIES PARTICIPATING IN CER SHARE THE ENERGY PRODUCED BY USING THE EXISTING PRODUCTION NETWORK.

THE SHARING OF ENERGY IS VIRTUAL.

IT IS INDEED DEFINED AS SHARED ELECTRICITY AS "THE MINIMUM, ON AN HOURLY BASIS, BETWEEN THE ELECTRICITY ACTUALLY INJECTED INTO THE GRID AND THAT WITHDRAWN."

WHAT IS THE DIFFERENCE COMPARED TO SELF-CONSUMPTION GROUPS?



A COLLECTIVE SELF-CONSUMPTION GROUP is a group of AT LEAST TWO ELECTRICITY SELF-CONSUMERS and AT LEAST ONE RENEWABLE ENERGY INSTALLATION who are located in the SAME BUILDING OR CONDOMINIUM and act collectively.

It is necessary that those who are part of a group of self-consumers do not engage in the production and exchange of electricity as their main commercial or professional activity.

The concept of 'condominium' also applies in the commercial or industrial context, for example, in the case of logistics hubs, interports, shopping centers, or industrial districts, as well as super-condominiums (e.g., also managed by consortia).

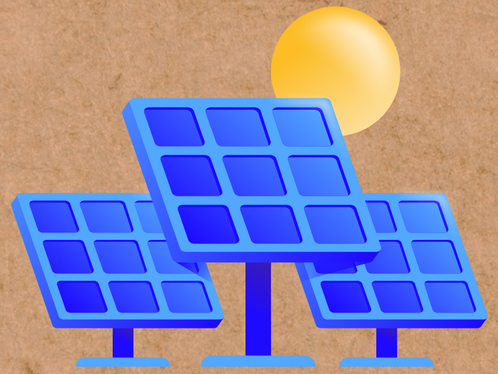
WHO IS PART OF IT?

Within the Renewable Energy Community, a member can take on the role of:

CONSUMER

Electricity consumption only

PRODUCER



Electricity production only

"PROSUMER"

Production and consumption of electricity

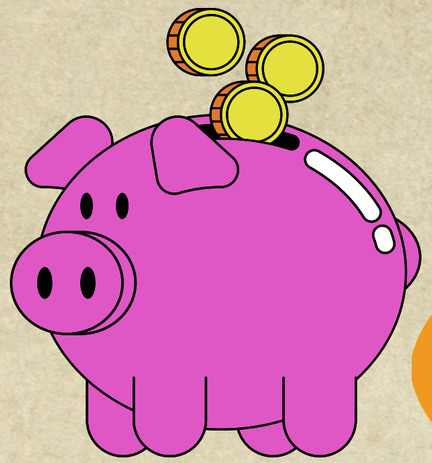
The CER is open to everyone, with control powers held by:

- INDIVIDUALS;

- SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs), whose participation in the renewable energy community does not constitute their primary commercial and/or industrial activity;

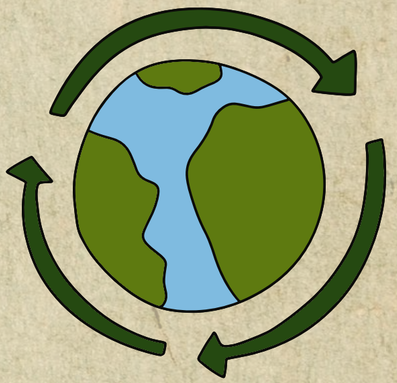
- LOCAL AUTHORITIES AND TERRITORIAL ENTITIES, including municipal administrations, research and training institutions, religious organizations, third-sector and environmental protection entities, as well as local administrations included in the ISTAT list, located in the territories of the same municipalities where the renewable energy community's production facilities are situated.

WHAT ARE THE BENEFITS OF CER'



VECONOMIC BENEFITS:
- Savings on the bill
- Incentives provided by the GSE for shared electricity
- Tax benefits for the construction of plants
- Capital contributions or zero-interest loans from the PNRR measure

ENVIRONMENTAL ADVANTAGES:
The use of renewable sources eliminates climate-altering emissions, net of the CO2 emitted during the construction phase of the plant and its components, and avoids further harmful emissions.



SOCIAL BENEFITS:
Combating energy poverty and more efficient resource management.
Through self-consumption and the use of renewable energy sources, CERs can contribute to the fight against energy disparities within a region.

WHAT ROLE DO LOCAL AUTHORITIES PLAY?

A Local Authority can:

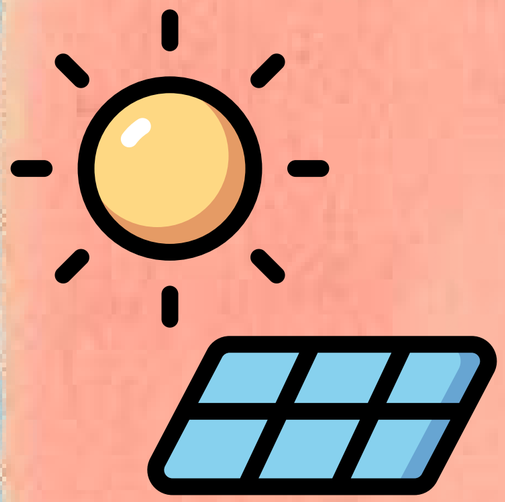
- Highlight opportunities, as it is familiar with the local area
- Incorporate energy sharing into its planning instruments and governance documents
- Remove any obstacles to the implementation of facilities and communities in its territory
- Promote informative campaigns
- Aggregate needs, requests, roles, and expertise within its context
- Provide production facilities, including those funded by its own resources
- Collect memberships
- Administer the CER from an administrative standpoint
- Manage maintenance of the facilities

ARE THERE FINANCIAL INSTRUMENTS FOR THE DEVELOPMENT OF CER?

From a financial perspective, CERs are well-suited to the cooperative and mutualistic forms of organization.

RESPIRA is a project carried out by a group of companies and cooperatives that believe in the potential for the development of CERs. An integrated proposal that provides financial instruments to the market and a dedicated platform for the establishment of RENEWABLE ENERGY COMMUNITIES IN COOPERATIVE FORM.

ARE THERE ANY ENERGY COMMUNITIES IN ITALY?



In 2022, there were 7,317 municipalities that witnessed the implementation of new renewable energy installations (only a 14.4% increase compared to 2021), and 3,535 municipalities achieved 100% Renewable Electricity (only 42 more than in 2021). Solar photovoltaic municipalities grew modestly (+14.6% compared to 2021).

The territories of 8 regions played a leading role, with Lombardy, Puglia, and Sicily having the highest installed power on their territory in wind and photovoltaic energy (420 MW, 338 MW, 321 MW respectively).

In Italy in 2022, there were only 3.4 GW of newly installed capacity from renewable sources, for a total of 206,600 installed facilities, including:

206,167 OF PHOTOVOLTAIC SOLAR

73 BIOENERGY

215 WIND ENERGY

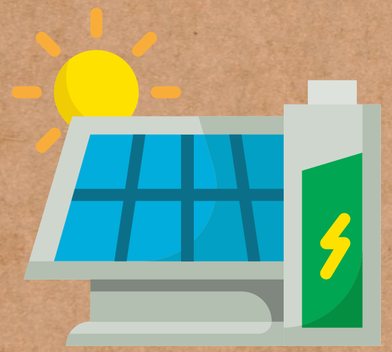
145 HYDROELECTRIC

MAKING A TOTAL OF 1.3 MILLION INSTALLATIONS.

THE KEY REGIONS

Installations have covered the territories of all Italian regions, with 8 regions playing a prominent role:

PHOTOVOLTAIC



LOMBARDIA
VENETO
EMILIA ROMAGNA

WIND ENERGY

PUGLIA
SICILIA
CAMPANIA

BIOENERGY

LOMBARDIA
CAMPANIA
PIEMONTE

HYDROELECTRIC

PIEMONTE
TRENTINO-ALTO ADIGE

THE DISTRIBUTION OF RENEWABLE SOURCES IN 2022 (MW)

Regione	Totale complessivo	Fotovoltaico	Eolico	Idroelettrico	Bioenergie	kW/ab
Lombardia	9.118,80	405,5	0	8,9	5,6	0,92
Puglia	6.425,80	99,8	237,7	0	0,5	1,65
Piemonte	5.182,80	195,6	0	18,5	2,6	1,22
Sicilia	4.120,90	207,8	113	0,1	0,1	0,86
Trentino Alto Adige	4.052,70	50,2	0	12,3	0	3,77
Veneto	4.012,70	257,3	0	0,3	1,6	0,83
Emilia Romagna	3.517,40	225,5	0	1,8	1,5	0,79
Campania	3.460,40	85,9	70,7	0,5	3	0,62
Sardegna	2.837,70	136,6	1,9	0	0,2	1,8
Calabria	2.817,00	43,4	5,1	3,3	0	1,53
Toscana	2.637,80	101,9	0	1,1	2	0,72
Lazio	2.394,60	212,2	1,8	0,1	0,2	0,42
Abruzzo	2.167,80	56,8	0	1,7	0	1,71
Basilicata	2.129,20	36,7	39,8	0,4	0	3,97
Marche	1.525,90	70	0	0	0,1	1,03
Friuli Venezia Giulia	1.317,70	56,8	0	5,2	0,3	1,11
Umbria	1.154,10	40,9	0	0	0	1,35
Valle d'Aosta	1.074,50	10,2	0	5,2	0	8,74
Molise	717,5	8,2	29,8	0,1	0	2,48
Liguria	373,8	17,1	31,2	0,5	0	0,25
Italia	**61.039,10**	**2.318,30**	**530,9**	**60,2**	**17,7**	**1,04**

Elaborazione Legambiente su dati Terna

FINAL TEST

1) What is meant by sustainable energy models?

2) How can efficiency and savings be ensured?

3) What is a renewable energy community?

4) Are there any energy communities in Italy?

RESOURCES

- https://www.arrr.it/
- https://www.legambiente.it/
- https://www.respira.coop/

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