



SUSTAINABLE ISLANDS

observatory on smaller Italian islands

ENERGY, WATER, MOBILITY, CIRCULAR ECONOMY, SUSTAINABLE TOURISM



Challenges for smaller islands and
best practices from the world.

Issue 2022



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**ISOLE
SOSTENIBILI**
osservatorio sulle isole minori

ENERGY, WATER, MOBILITY, CIRCULAR ECONOMY, SUSTAINABLE TOURISM



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Foreword

The current period is characterized by a great focus on **insular** settings, increasingly seen as an **essential innovation lab on the road to ecological transition**. In fact, many communities decided to accelerate the implementation of ambitious decarbonization activities, as well as projects fostering circular economy and the protection and promotion of the special biodiversity of these unique, charming and fragile settings. In Italy, during the pandemic summers, the number of tourists has increased considerably and their stays throughout the year extended - this is the "de-seasonalization" which is discussed from a long time - with some critical moments as regards hospitality and services management. 2021 was also the year of the National Recovery and Resilience Plan (PNRR), which drew attention on and investments in the islands, and gave rise to projects and activities which deserve to be carefully observed and studied.

The **Sustainable Islands Observatory**, promoted by the **Atmospheric Pollution Institute of the National Research Council (CNR-IIA) and Legambiente** wishes to contribute to illustrate the ongoing processes and to understand a very complex situation, as well as to make up for delays and support the push for change, to play a role in the transformation of these islands into a real environmental innovation lab. The work is carried out with a view to the international challenges, by means of partnerships with network and associations committed in these areas, as well as involved in European and national projects. The aim is to highlight the good practices implemented in the islands around the world in terms of energy, water, waste, mobility, sustainable tourism, through the portal **isolesostenibili.it**.

Italian smaller islands are wonderful places, where extraordinary environmental, historical, cultural and landscape resources coexist. But they are also **fragile, isolated** and particularly **vulnerable systems**, which have to face specific issues and barriers. Several indicators already show how they are affected by the negative effects of atmosphere and water temperature increase, as well as by human activities connected to the high tourist presence in the summer season. Worldwide, islands have become a place for innovative interventions in the field of energy, water and waste cycles. In Italy, these challenges are particularly relevant during the peak of the tourist season, resulting in a great imbalance in comparison with other periods of the year. The elements that in the next few years will have to characterize our smaller islands in order to preserve their great natural, historical, cultural and artistic heritage include: environmental protection, sustainable tourism, the reduction of human pressures, the adoption of sustainable practices through energy efficiency, the recovery and reuse of the building stock, the production of energy from RES, the management of tourist flows and its de-seasonalization, the protection of priority habitats and threatened species, the environmental certification of services and the competitiveness of island enterprises.

The **27 inhabited Italian smaller islands** are the core of the report, that every year describes the state of the art and the current stage on the road to sustainability. However, the observatory also works with an international outlook, since the challenges and opportunities are similar all over the world, and there are many contexts where sustainability targets were made increasingly ambitious. The associations working with the observatory include Dafni Network (Greece), Island Movement (Croatia), Smilo (France) and the company Any Solution (Spain).

The monitoring of the most interesting data and project is the starting point, but the aim is to make the observatory an **accelerator for the interventions in the islands**, through the exchange of experiences and knowledge, the organization of workshops and events, and the dissemination of periodic documents and reports to inform about the potential and the urgency of a positive and widespread change.

A greater awareness on environmental issues is spreading across the local community. However, to ensure the implementation of sustainable development projects, more human resources are needed.

Salvatore Compagno, Deputy Mayor of the Municipality of Ustica

In the recent years, a great deal of national **funds** for climate mitigation actions (renewable sources, energy efficiency, sustainable mobility) and for an agricultural and forest heritage's climate adaptation were approved. Several projects are being launched, but as this report shows, significant delays must be recovered and change is still too slow.

The main problems refer to: purification (the majority of the islands has not any system, or the existing ones are inappropriate); the transition from an energy production driven by fossil sources (currently, electricity is produced by old and polluting diesel oil systems) to renewable sources (the islands show the lowest data in Italy in terms of their dissemination and the growth is very low); waste management (many islands have not yet activated the door to door collection and no organic waste treatment plants exist); mobility towards the islands (which is hampered by winter weather conditions) and inside the islands (with non-sustainable modes of transport). In all these areas, results are mixed and change occurs at a variable rate.

From an energy point of view, the installation of solar photovoltaic systems is growing, especially in those islands that are not interconnected with the mainland, thanks to the incentives introduced by the Ministry of economic development. An overall amount of 531 kW has been installed in 20 Italian small islands since 2018 thanks to the fund, that add to the existing 2,700 kW. Unfortunately, the delays in the issue of the implementing measures did not allow to achieve the objectives set at 31st December 2020, which aimed to reach a total

installation of 11,820 kW and 13,850 MW of solar thermal systems.

Among the non-interconnected islands, except Capraia, the highest value of coverage of electricity requirements from renewable energy sources is recorded in Ustica, reaching 12% (compared to < 2% in 2019), followed by the Pelagie islands with 6.22% (compared to < 1% in 2019) and Ventotene, 5%.

Today, photovoltaic systems are widespread across all the islands, although in some cases with very low numbers, as shown by the data of Tremiti (18.4 kW) and the Giglio island (34.7 kW). The larger installations of photovoltaic systems are concentrated in the interconnected islands, i.e., Ischia, Elba Island and Sant'Antioco (4,000, 3,7000 and 2,000 kW, respectively). The other source is micro-wind generation, which is only present in Pantelleria, Sant'Antioco and Ventotene, with 32 kW, 55 kW and 3.16 kW installed respectively (no variation compared to 2020).

From 2019 to 2022 waste sorting increased in all the islands, including compared to the increase recorded in 2019. The overall waste sorting average achieved by the islands amounts to 47.33%. However, some islands fail to reach 15%. The most substantial deterioration is recorded by the Pelagie Islands, falling from 38% to 11%.

The island of Sant'Antioco (composed of the namesake municipality and the municipality of Calasetta) is still the most virtuous island, with 82% of WS, followed by the Aegadian Islands, that achieved 75% of WS. Also Pantelleria (73 %) and San Pietro (72.6%) show excellent data. Despite the growth trend, the level of waste sorting is still low in some islands: Ustica, Aeolian Islands (excluding Salina), Ventotene, Pelagie Islands and Ponza do not go beyond 30%



On the other hand, sustainability of mobility in the islands was not subject to substantial changes: private vehicles are still the main mobility solutions and in many islands the vehicles on the road are very old. There are a few buses fueled by alternative sources and technologies and the change of the fleet with more eco-friendly vehicles is slow, although some islands joined public tenders for funding the renewal of the local public transport fleet. Shared transports struggle to take off, especially in the smaller islands.

The water sector is essentially static since years. Desalination systems, only existing in 33% of the islands, are often insufficient and outdated and water supply is provided by tankers coming from mainland. New projects are often halted by appeals to TAR (Regional Administrative Court) or mutual oppositions between different administrative levels. Water network leaks are in line with the national average, but in some islands they exceed 60%. As already pointed out, the low number of purification systems is one of the main problems of the Italian smaller islands.

Funding for islands are very relevant in this period: the PNRR, for example, allocated two hundred million of Euro for 140 sustainable development projects submitted by 13 municipalities of the 19 smaller islands, joining the PNRR tender "Green Islands". The municipalities of Giglio Island, Capraia, Ponza, Ventotene, Tremiti Islands, Ustica and Pantelleria, the three municipalities of the island of Salina, Favignana, Lampedusa and Lipari applied for fundings for interventions related to renewable energies, construction of desalinators, improvement of the efficiency of the water network, sustainable mobility, energy efficiency and the management of the urban waste cycle, showing that there is a lot of work to do.





There are many barriers to overcome in order to give a steer towards ecological transition, including:

1. the lack of a shared point of view on the issues and priorities, as well as of a coordination of the smaller islands at a national level. This entails the risk of a fragmentation of the interventions on the islands at a local level, which may limit the transition expected and requested by the PNRR [National Recovery and Resilience Plan].
2. the time-consuming authorization procedures for the renewable sources' projects, which are substantially hindered by the existing environmental constraints for landscape protection, due to the lack of an organic view focused on sustainability and the respect of the territorial natural features, that may also include interventions aimed at simplifying the path to ecological transition.
3. the slowness of the processes at a local level, despite the existing opportunities, due to the lack of information, of support by the public bodies and in access to credit.
4. a lack of awareness on the vulnerability of the islands, the importance of reducing consumptions, of energy and water efficiency (particularly urgent as regards purification) and of the sustainable exploitation of the territorial resources.
5. the lack of technical expertise in Local Administrations, arising from years of economic rigidity by the Central Government.

Today, all the expertise, technologies and resources are available to create, also in these particular settings, a fossil-free future, with innovative waste management and water treatment systems to approach a circular economy, with a balanced tourist flow that is not only limited to the summer but extended all year long, also by re-discovering traditions and typical activities such as food and wine or local crafts.

The European decarbonization goals and policies represent the bearings to deal with the present issues and to orient the relevant responses. Since there are many opportunities available, new tools and resources should be introduced, in order to develop sustainability projects and enhance the technical structures of Local Bodies. A further key element is communication, cohesion and cooperation between territorial and national bodies, as well as the involvement of citizens in the decision-making process. These are all essential elements to move forward clearly and transparently.

Legambiente and the CNR-IIA proposed the following solutions in order to accelerate towards a virtuous scenario for the Italian smaller islands and to implement ambitious environmental and climate interventions therein:

1. **Establish at the Ministry of Ecological Transition a steering committee for climate and environmental transition in the smaller islands**, in charge of defining the actions and the energy, water, mobility, sustainable tourism goals, while supporting the activities of the municipalities. Now it is essential to define a strategy involving the different national and local players, since the projects started are just as many as the difficulties hindering change. One of the central issues concerns the installation of new renewable sources and waste treatment plants in relation to the superintendencies of cultural, historical, archaeological and landscape heritage, which is called to give its binding opinion on any type of intervention, regardless of its scope. The Ministry of Culture and the Superintendencies must be involved in the steering committee, to overcome these problems, by defining regulations to simplify interventions and the relevant guidelines. In this perspective, it is possible to achieve an effective coordination among the Italian islands and to avoid missing the opportunities arising at a European level with programs and resources.
2. **Develop a climate and environmental sustainability plan for each island, with clear goals for 2030, outlining the solutions for an energy model focused on renewable sources and to address the challenges and simplify penetration, complete purification, improve waste sorting and recycling, set the sights on sustainable mobility.** The Ministry of Ecological Transition should finance these plans and be involved in their development, in order to identify solutions consistent with the National Energy and Climate Plan, and to help the Local Bodies of the islands to find national, European and regional funds suitable for achieving the goals and carrying out the interventions set out in the general innovation and modernization plan and strategy referred to above.

List of the 27 Italian smaller islands analyzed in the report

Island	Municipality	Province	Archipelago	Total area [km ²]	Population
Capri	Capri	Naples	Campanian	10,4	13877
	Anacapri				
Ischia	Ischia	Naples	Phlegraean	46,3	62323
	Barano d'Ischia				
	Forio				
	Casamicciola Terme				
	Lacco Ameno				
	Serrara Fontana				
Procida	Procida	Naples	Phlegraean	4,26	10183
Capraia	Capraia Isola	Livorno	Tuscan	19,26	391
Isola del Giglio	Isola del Giglio	Grosseto	Tuscan	21,5	1345
Gorgona	Livorno	Livorno	Tuscan	2,22	105
Isola d'Elba	Portoferraio	Livorno	Tuscan	224	31477
	Porto Azzurro				
	Capoliveri				
	Marciana				
	Marciana Marina				
	Rio				
	Campo nell'Elba				
Pantelleria	Pantelleria	Trapani	Pelagie	84,5	7366
Lampedusa	Lampedusa e Linosa	Agrigento	Pelagie	20,2	6337
Linosa				5,4	
Favignana	Favignana	Trapani	Aegadian	19,3	4270
Marettimo				12,4	
Levanzo				5,8	
Ponza	Ponza	Latina	Pontine	7,6	3301
Ventotene	Ventotene	Latina	Pontine	1,75	736
Ustica	Ustica	Palermo		8,65	1271
Isole Tremiti	Isole Tremiti	Foggia	Tremiti	3,18	451

Island	Municipality	Province	Archipelago	Total area [km ²]	Population
Lipari	Lipari	Messina	Aeolian Islands	37,6	12266
Vulcano				21	
Stromboli				12,6	
Panarea				3,4	
Filicudi				9,3	
Alicudi				5,1	
Salina	Leni	Messina	Aeolian Islands	26,2	2522
	Malfa				
	Santa Marina Salina				
Sant'Antioco	Sant'Antioco	South Sardinia	Sulcis	108,9	13570
	Calasetta				
San Pietro	Carloforte	South Sardinia	Sulcis	51	5960
Maddalena	La Maddalena	Sassari		20,1	10722

Sustainable Islands Report 2022 Source: data from Municipalities and ISTAT (2022).

Smaller islands just became part of the internal areas, that is all those territories far from essential and necessary services, affected by territorial discontinuity. Many problems were identified in several areas: health care, school, maritime transport, understaffing of municipalities and environmental criticalities.

It is difficult to protect the islands, since there's a system of constraints constantly limiting the transition actions and the change of the intended use.

Sergio Ortelli, Mayor of the Municipality of the Giglio Island



Sustainable islands 2022 - The data.

Island	Energy: coverage of electricity demand from RES [%]	Energy: electricity production plants from RES [kWe]		Waste: incidence of waste sorting [%]	Water: water supply methods	Purification status
		Photovoltaic	Wind			
Capri	interconnected	206,3	0	61%	Submarine pipes of the Sorrento Peninsula	partial
Ischia	interconnected	3960,4	0	41%	Submarine pipes	partial
Procida	interconnected	339,8	0	69%	Submarine pipes	partial and out of order
Sant'Antioco	interconnected	1934,6	55	82%	Submarine pipe coming from the Bau Pressiu dam, wells/springs	partial
San Pietro	interconnected	1547,2	0	73%	Submarine pipe coming from Sant'Antioco	partial
Maddalena	interconnected	990,5	0	68%	Submarine pipe from the dam of "Liscia"	partial
Isola d'Elba	interconnected	3623,8	0	63%	Submarine pipe from the Cornia Valley, wells/springs	partial
Capraia	*	35,5	0	40%	Desalinator	partial
Isola del Giglio	0,45%	34,7	0	31%	Desalinator	partial
Pantelleria	3,02%	840,3	32	73%	Desalinators	partial
Lampedusa	6,22%	605,1	0	11%	Desalinator	partial and out of order
Linosa					Desalinator	partial

*Capraia is still the only non-interconnected island which has completely ceased the production from fossil sources, fully replacing it with renewable sources, by means of a 2.4 MW station, powered by imported biodiesel resulting from the processing of soybean, sunflower and rapeseed oil. However, the plant uses imported biomasses; therefore, this may not be considered as environmentally sustainable.

Island	Energy: coverage of electricity demand from RES [%]	Energy: electricity production plants from RES [kWe]		Waste: incidence of waste sorting [%]	Water: water supply methods	Purification status
		Photovoltaic	Wind			
Favignana	3,01%	404,1	0	75%	Submarine pipes from Trapani (EAS), desalinator (Sicilacque), private wells, storage tanks and tankers	absent
Marettimo					Karstic water sources under restoration, sub-marine pipes from Trapani and tankers	absent
Levanzo					Tankers and submarine pipes from Favignana	absent
Ponza	3,40%	289,3	0	11%	Tankers	absent
Ventotene	5,77%	112,2	3,2	24%	Desalinator	partial
Ustica	11,99%	432,6	0	13%	Desalinator	partial
Isole Tremiti	0,64%	18,4	0	55%	Tankers from Manfredonia	partial
Lipari	1,35%	508,9	0	22%	Reverse osmosis desalinator	partial
Vulcano					Desalinator and tankers from Naples or Palermo	partial
Stromboli					Tankers	partial
Panarea					Tankers	partial
Filicudi					Tankers	partial
Alicudi					Tankers	partial
Salina	1,53%	103,5	0	40%	Tankers	partial
Gorgona	-	-	-	-	Desalinator, wells	partial
Media	3,74%			47,33%		





ENERGY

One of the main challenges of the Italian smaller islands concerns **energy supply**. Although some islands have the highest potential for solar and wind energy in Italy, the actual number of renewable sources plants are among the lowest nationwide. The coverage of electricity demand in the islands not interconnected with the national electricity grid is still ensured by diesel oil-powered thermoelectric plants, with companies that - thanks to a regulatory exception allowed by the European directives - control both its production and distribution (in 12 islands they are private companies, whereas Enel Produzione operates on 8 islands).

Among the 27 inhabited islands in the scope of this report, 20 are still not interconnected to the national electricity grid (Pelagie Islands, Aegadian Islands, Tremiti Islands, Aeolian Islands, Ponza, Ventotene, Ustica, Capraia, Giglio Island, Gorgona).

The table below shows the current situation of the Italian smaller islands with regard to the dissemination of the renewable sources installed and the coverage of consumption.



Electricity in the inhabited Italian smaller islands analyzed in the report.

Island	Plants for the production of electricity from renewable sources at 31/12/2021 Power (kWe)	Target RES power [kWe] (Min. Decree on Smaller Islands of February 14th, 2017 - Sect. 2, par. 1, point b) ¹	Energy demand covered by RES ²
Capri	206,3	-	Interconnected ³
Ischia	3960,4	-	Interconnected
Procida	339,8	-	Interconnected
Isola d'Elba	3623,8	-	Interconnected
Sant'Antioco	1989,6	-	Interconnected
San Pietro	1547,2	-	Interconnected
Maddalena	990,5	-	Interconnected
Capraia	35,52++2391 ⁴	180	*5
Isola del Giglio	34,7	700	0,45%
Pantelleria	872,3	2720	3,02%
Isole Pelagie (Lampedusa e Linosa)	605,1	2310	6,22%

¹ The types of systems that contribute to the objective are not defined (technological neutrality applies). The calculation includes new installations, including electric charging stations, plants already operating, upgrades of existing systems, systems integrated in new buildings or major renovations (sect. 11, Leg. Decree no. 28/2011) and the reactivation of existing plants.

² The coverage of electricity demand from RES was calculated by comparing the theoretical production of RES electricity with the annual production from fossil source, as extracted from Annex 1 of the Decree of the Ministry of Economic Development of February 14th, 2014. The biodiesel plant of Capraia is not included in the calculation of the RES coverage since the fuel is imported. The RES data are provided by Municipality: for islands belonging to the same municipality, the data refer to the whole Municipality. For islands with many municipalities, data were aggregated.

³ Capri was interconnected to the national electricity grid on June 27th, 2019 due to the commissioning of the 150 kV Nova SE Capri - CP Torre Annunziata connection and therefore after approval of Min. Decree of February 14th, 2017 on non-interconnected smaller islands.

⁴ The electricity production from RES plants in Capraia are made up of photovoltaic systems (35.5 kW) and the power plant powered by imported biodiesel resulting from the processing of soybean, sunflower, and rapeseed oil (2,391 kW).

⁵ Capraia is still the only non-interconnected island which has completely ceased the production from fossil sources, fully replacing it with renewable sources, by means of a 2.4 MW station, powered by imported biodiesel resulting from the processing of soybean, sunflower and rapeseed oil. However, the plant uses imported biomasses; therefore, this may not be considered as environmentally sustainable.

Island	Plants for the production of electricity from renewable sources at 31/12/2021 Power (kWe)	Target RES power [kWe] (Min. Decree on Smaller Islands of February 14th, 2017 - Sect. 2, par. 1, point b)	Energy demand covered by RES
Isole Egadi (Favignana, Levanzo, Marettimo)	404,1	1060	3,01%
Ponza	289,3	720	3,40%
Ventotene	115,4	170	5,77%
Ustica	432,6	280	11,99%
Isole Tremiti	18,4	240	0,64%
Isole Eolie (Lipari, Vulcano, Stromboli, Panarea, Filicudi, Alicudi)	508,9	2860	1,35%
Salina	103,5	580	1,53%
Gorgona	-	ND	-

Sustainable Islands Report 2022 Source: processing of GSE and Terna data.

As at December 31st, a total of 16,077 kWe of power are available from plants for electricity production from renewable sources - including photovoltaic and wind generation. These figures are still too low, especially compared to the minimum development goals with regard to the use of renewable energy sources to be achieved by December 31st, 2020, according to Min. Decree of February 14th, 2017, Decree of the Ministry of Economic Development to promote renewable sources in the smaller islands, approved in February 2017 ⁶ (see table - Target RES power). The islands far below the targets include: the Aeolian islands, that in 2021 has 509 kW of RES installation, compared to a target of 2,860 kW, Pantelleria with only 872 kW, compared to 2,720 kW expected and the Pelagie islands, with 605 kW, compared to

⁶ Con la Deliberazione del 6 novembre 2018 n.558/2018/R/EFER dell'ARERA, si è completato il quadro regolatorio relativo a tale D.M., che ha definito gli obiettivi di evoluzione energetica delle isole minori, mediante lo sviluppo di fonti rinnovabili elettriche e termiche. Il 7 agosto 2019 il GSE ha pubblicato sul proprio sito le "Modalità Operative per il riconoscimento della remunerazione prevista dal D.M. 14 febbraio 2017 e dalla Deliberazione 558/2018/R/EFER" e le "Condizioni Generali del servizio di remunerazione dell'energia elettrica e termica prodotta da fonti rinnovabili nelle isole minori non interconnesse di cui al D.M. 14 febbraio 2017".

the planned 2,310 kW. The only positive signals come from Ustica, that exceeded the target, achieving 432 kW of RES installed, and Capraia that has completely removed the use of fossil fuels for the production of electricity (although the number of photovoltaic systems installed are still far from the target).

The larger installations of photovoltaic systems are concentrated in the interconnected islands, i.e., Ischia, Elba Island and Sant'Antioco (4,000, 3,7000 and 2,000 kW, respectively). Among the non-interconnected islands, Pantelleria is the island with more photovoltaic installations (840 kW), followed by Lampedusa and Linosa (605 kW), the Aeolian Islands (municipality of Lipari), 509 kW, and Ustica, 433 kW. Good results were achieved by the island of Salina, that shows the highest percentage increase in photovoltaic installations from 2020 to 2021 (from 22 to 104 kW).

Today, photovoltaic systems are widespread across all the islands, although in some cases with very low numbers, as shown by the data of the Tremiti (18.4 kW) and the Giglio island (34.7 kW). The other source is micro-wind generation, which is only present in Pantelleria, Sant'Antioco and Ventotene, with 32 kW, 55 kW and 3.16 kW installed respectively (no variation compared to 2020).

Among the non-interconnected islands, except Capraia, the highest value of coverage of electricity demand from renewable energy sources is recorded in Ustica, reaching 12% (compared to < 2% in 2019), followed by Pelagie islands with 6.22% (compared to < 1 % in 2019) and Ventotene, 5%. The other islands do not reach 5 % and the lowest values are recorded in the Giglio Island and the Tremiti Islands (< 1 %).

There are different **problems** underlying this slow development of renewable energy sources in the smaller islands, mainly referred to photovoltaic and wind energy. Very strict landscape constraints, complex connection applications, complicated and outdated authorization procedures: these are only a few of the technological barriers preventing the implementation of a suitable energy transition in these areas.

The position of the Superintendency isn't always clear. They don't carry out an active monitoring and the bureaucratic machine isn't appropriate to the times and the local needs. There's a need for a national strategy taking into account of the real needs of the islands and their context.

Arch. **Onofrio Marco Scarpinato**, technical office manager, Municipality of Favignana



For example, in Sicily the authorizations for the cable ducts for the power lines are still bound by an old Royal Decree-Law of 1943, requiring the approval of 23 different bodies, including if they are not present in the area where the authorization is requested. This is due to the fact that Sicily, which is a Special Statute Region, never approved a regulation to simplify the authorization procedures for cable ducts, as other ordinary statute Regions did in specific cases. The Sicilian smaller islands are also affected by another problem which prevents the development of wind energy. In fact, in 2016, the then Regional government also included among the areas unsuitable for wind power plants the IBAs (Important Bird Areas) defined as such by the LIPU (Italian Bird Protection Association) since they are important for the birds nesting and migration. However, these areas should be intended as potentially important, i.e., for each of them it should be specified if a real restriction is required and on which of their portions this should apply. The Government, by declaring these areas as unsuitable, created a restriction and prevented the construction of any type of wind power plant in all the Sicilian islands, which are IBAs throughout their maritime and land area. The hope is that the situation evolves as a result of the transposition of Directive EU 2018/2001, RED II, of the European Parliament and of the Council on the promotion of the use of energy from renewable sources. This directive provides for the identification of the suitable, rather than the unsuitable, areas, requiring a case-by-case assessment for the remaining areas.

There is still a lot to do in terms of energy in the Italian smaller islands, but some good policies, projects and practices are available both from Italy and the rest of the world.

Good practices in Italy and in the world

In recent years, the European Commission and some supranational organizations promoted several initiatives to support **energy transition for islands** or to enhance the good practices in this field. This is also the reason why there are different operations for decarbonization running in different countries.

In the last years, the **Croatian islands** developed different energy transition programs and focused their development on the “quadruple helix model”, i.e., a model entailing a close cooperation among four key players: public authorities, entrepreneurs, educational institutions and citizens. Although the European Commission stresses the importance of the energy communities, as well as the cooperation between private & public bodies and citizens, as the key for energy transition, they are not yet anchored in the thinking and everyday lives of the Croatian islanders. Despite the first energy cooperatives were established in the islands, people gradually left behind the benefits arising from the aggregation and development of community projects. And this is just one of the points increasingly motivating the experts of the **Island Movement**, the Croatian partner of the Clean Energy for EU Islands Secretariat, to raise public awareness and attract a greater number of people interested in developing innovative business models starting from the construction of solar fields on the islands.



In this regard, **the archipelago of Cres and Lošinj and the island of Korčula**, drew together and joined the NESOI (New Energy Solutions Optimized for Islands) program for the development of the islands, filing an application for the "SOLAR ISLANDS" investment study, with the aim to start the installation of a joint solar power plant on each archipelago through a crowd-investment model. This project may support the objective of the archipelago of Cres and Lošinj to decarbonize its energy system by 2040. On the other hand, the island of Korčula works towards carbon neutrality by 2050.

Again in Croatia, the **island of Brač** aspires to become energy independent by 2040, by increasing energy efficiency, installing renewable energy sources and developing the infrastructures required to fully exploit the solar potential of the island. In addition to a strategic paper for the progressive elimination of fossils, the island of Brač and the Split-Dalmatia County are developing for the whole island a joint PAESC, the first action plan for sustainable development of energy and climate in this area. Thanks to the synergy of these two documents, the island of Brač may easily access the funds required to implement projects in the short term.

The island of Hvar expects to be energy independent by 2035 and this transition should ensure the active involvement of the islanders and the energy communities. The current framework shows that the majority of the islanders consumes energy, but a small number of them produces electricity - only 6 %. Hvar, the sunniest Croatian island, has a population of 11,077 and the aim is to develop plants for the production of energy from the sun, which would lead to a significant energy saving for everyone.

Good news also come from the neighboring **Greece** that, again through the NESOI tender, ran many energy projects. The municipality of **Halki**, in the namesake Greek island, set as its priority the conversion of the current energy system into a new system powered by fully renewable sources. To this purpose, an in-depth analysis of the potential of the energy coming from waves breaking on the coast of the island will be carried out, in order to identify the most suitable location for a wave power plant, while ensuring the protection of the environment and of the local ecosystem.

The "JEDI" (Just clean Energy transition of Diapontia Islands) project aims to meet the electricity demand of **Othonoi and Ereikoussa**, making them the first Greek islands to be 100 % powered by renewable sources. The projects also provides for the transformation of the harbor of the island of **Mathraki** into a smart tourist port, with the creation of an energy community.

Again in Greece, the project ZEN "Zero emissions Nisyros" provides for the development of renewable energy systems (small-scale photovoltaic and wind systems) to make different villages of the island of **Nisyros** energy independent.



In **Spain**, the project “ARINDEC-GRANCANARIA” aims to create a favorable environment for the realization of an industrial energy community in the industrial park of Arinaga, island of **Gran Canaria**.

Again in Spain, but this time in **La Palma**, the project “CEL-EBRe - Comunidad energética locale Energía Bonita y Renovable” aims to develop a pilot project composed of photovoltaic systems for a shared self-consumption, to show the potential of energy communities in assisting the energy transition and supporting people affected by energy poverty.

The island of **Tenerife, Canary Islands**, is engaged in sustainable development and respect of the environment. The Technology and Renewable Energies Institute (ITER), located in Granadilla de Abona, deals with wind farms, photovoltaic systems and bioclimatic houses. In the **city of Adeje**, Energy Research & Intelligence Solutions S.L.U. promoted, within the framework of the NESOI program, the project SoFIA, providing for the development of a feasibility study for the establishment of energy communities around photovoltaic systems. The study will analyze different ways to increase the self-consumption level: electrification of water heating and of cooking solutions, electric mobility, technologies for the production of energy other than photovoltaic systems. For the collective self-consumption, the members of the community will receive an economic benefit (reduction of the network fee).

El Hierro, in the **Canary Islands**, aims to become the first 100 % sustainable island in the world. The city was awarded the second place at the RESponsible Island Prize 2021 thanks to its project “El Hierro 100 RES - El Hierro: Towards a 100% Renewable Energy Island”. This award is due to the amount of renewable energy generated by different energy technologies. In fact, with the commissioning of the joint hydroelectric power plant of El Hierro, the levels of renewable energy progressively increased, reaching an average rate of 60 % of electricity from renewable sources. Furthermore, the island reached the record of 100 % renewable energy supply for 25 consecutive days, with significant economic and environmental benefits resulting therefrom. A groundbreaking result for an off-grid energy system, disconnected from the European power grid. These innovations enable the island of El Hierro to save an average of 7,000 tons of diesel oil and to emit into the atmosphere 18,700 tons of CO₂ per year.



In Italy, **Pantelleria**, pilot island for full decarbonization by 2030 within the framework of the strategy of the Clean Energy for EU Islands Secretariat, already made great strides in energy transition. As regards the public sector, the city hall has already been made energy efficient and now it is equipped with insulation systems, latest-generation window frames, 30 kW photovoltaic system and LED lighting. Two elementary schools were equipped with two 15 kW photovoltaic systems and, thanks to municipal funds, the energy efficiency of a nursery school was achieved (static and energy renovation and 40 kW of photovoltaic energy). Furthermore, the Municipality of Pantelleria joined a tender of the Ministry of Economic Development, azione 4.1.1, aimed at achieving energy efficiency for the buildings and systems of smaller islands, while applying to increase the efficiency of five more public buildings, thus completing all the public building stock (one elementary school, one nursery school, the baby parking, the media library, the municipal dog shelter). The relevant works should be awarded in the following months; after their completion, the Municipality will have a photovoltaic stock of approx. 350 kW. As regards public lighting,

90 % of the island urban lighting is being replaced with remote control LED equipped with flow regulators and people detectors in the less popular areas. This system is supposed to provide an energy saving of approx. 80 %.

Again in Pantelleria, within the framework of the NESOI program, the National Park of the Island of Pantelleria promoted the project "RENEWDAMMUSI" aimed at analyzing the best solutions for energy efficiency and independence of Dammusi, the traditional houses of Pantelleria.

We were lucky, since no problems were raised about the development of photovoltaic systems in Pantelleria by the Superintendency of Trapani, that, instead, supports the installation of these systems on the flat roofs in accordance with the applicable law.

Angelo Parisi, Councilor for Environment and Energy, Municipality of Pantelleria

In **Lipari**, the Green Consulting Group S.r.l. (TGCG) promoted the project “FESOL”, aimed at developing a feasibility study for the replacement of the existing and deteriorated photovoltaic system, with a new photovoltaic solar power plant including both a storage system and a control management and modulation system. The goal of the project is to reach a high level of energy independence from fossil fuels for the whole island, thanks to the supply of green energy for the desalination of water, the public lighting and the energy consumption of buildings. Furthermore, Lipari is included among the islands that, together with Vulcano, Filicudi, Alicudi, Ustica and Favignana and with the support of the CNR-IIA, are carrying out substantial energy efficiency activities, within the framework of the tender of the Ministry of Ecological Transition “energy efficiency and sustainable mobility activities and adaptation to the impacts of climate change in smaller islands” of 2017.

The project “Hydroelectric Pumping Storage” entails a feasibility study for the integration of a micro-hydroelectric pumping system in the **Island of San Pietro** (municipality of Carloforte). Since in the island an energy community, including approx. 30 houses with photovoltaic panels installed on the roof, already exists, the aim is to use the excess energy to power the pumps and store the sea water into an upper tank (already built).

The city of Capri promoted the project “CIET” – Capri Island Energy Transition, aimed at developing a feasibility study for the realization of the works provided for by the Action plan for sustainable energy of the Municipality of Capri, relating to energy efficiency of public buildings and public lighting systems, as well as to the electrification of small vessels.

Photovoltaic panels don't work on an industrial scale, since the roof pitches, both inward and outward the historic center, should be used.

Focus must be put on domestic photovoltaic panels.

The population of the Giglio Island is disappointed by the great effort required to obtain authorizations, but they would be willing to do so.

Sergio Ortelli, Mayor of the Municipality of the Giglio Island



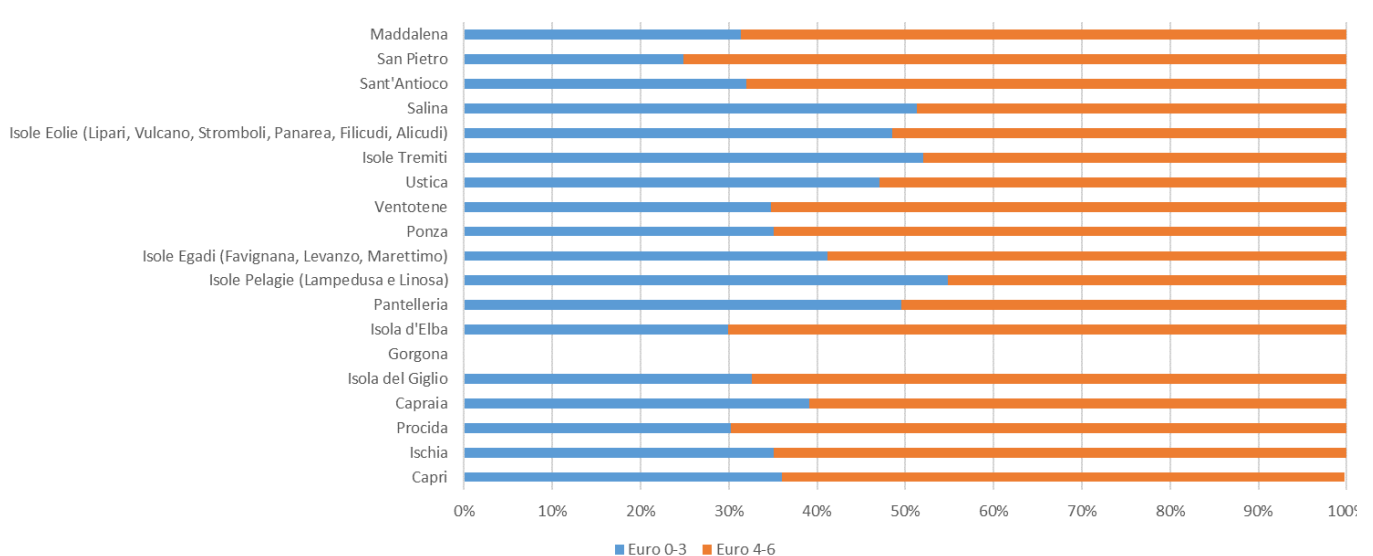


MOBILITY

One of the topics most closely related to energy is mobility in the islands with a view to sustainable and zero impact development. The first step requires a change entailing the use of renewable energy sources, but it is also important to encourage the use of shared services and the local public transport, as well as awareness campaigns on this topic which may support a zero-impact development.

The road infrastructures of the islands are often dispersed through the territory and this makes it difficult to connect the more remote areas. Private vehicles are still the main solution for moving and this is confirmed by the very high motorization rates in some municipalities, where this reaches almost one car per inhabitant, e.g., in Lampedusa and Linosa (0.9 cars/inhabitant) and in Pantelleria (0.9 c/i), which is increased compared to the previous year. The most eco-friendly island in this regard is Capri, where the motorization rate is of 0.3 c/i, substantially lower than the other islands.

Distribution of cars in the different environmental classes.



Sustainable Islands Report 2022 Source: data from ACI (2020).



The freshest car fleet in 2021 is confirmed in the Island of San Pietro, with 75% of vehicles with environmental classes euro 4, 5, 6 and the Elba Island and Procida, both 70%. The oldest car fleet is confirmed in the Pelagie Islands (55%) and Tremiti Islands (52%), although it decreased by some percentage points compared to the 2021 report.

The vehicle fleet in all the islands is mainly composed of cars, but, for example, in the Aegadian Islands, Procida and Capri a fair percentage, up to 40%, is composed of motorcycles. The highest numbers of vehicles for goods transport are recorded in Pantelleria and the Tremiti Islands. Private buses or shuttles, i.e., any vehicle for the carriage of persons equipped with more than nine seats, including the driver, are particularly widespread in Ischia and the Elba Island, followed by Pantelleria, the Aeolian Islands, Sant'Antioco and La Maddalena. Local public transport buses are substantially less and only few of them are fueled with technologies other than fossil sources. Some islands, like Favignana and Pantelleria, joined public tenders for funding low environmental impact buses, but this is not enough to ensure a zero emissions fleet in all the islands. However, investments on low emissions local public transport are inadequate.

Some interviews made to the islands administrators pointed out how **difficult** it is to provide sharing services, mainly in the smaller islands, due to a lack of skills and resources for the management of such services by the local administrations. Currently, some private operators make available these services, that however rarely include fleets with electric vehicles.

The municipality didn't provide sharing services because its management by the administration would be complex. Therefore, we preferred to delegate the service to the economic operators of this sector.

Salvatore Compagno, Deputy Mayor of the Municipality of Ustica

The installation of photovoltaic systems in the parking lot would be required, in order to make mobility really sustainable.

Arch. **Onofrio Marco Scarpinato**, technical office manager, Municipality of Favignana

Many topics on smaller islands mobility are still to be dealt with, in order to reduce the number of cars per inhabitants during the year and to avoid an additional inflow of vehicles in the summer. The first is the guarantee of an efficient public transport system, which enables to leave the private vehicles for local movements throughout the year, including by means of innovative ways (e.g., on-call service). Sharing mobility solutions may enable to combine the environmental and economic sustainability of the services. Another solution is the use of more efficient means of transport, fueled by non-fossil sources, including for private providers of a collective service (e.g., hotel shuttles). Therefore, it is essential to equip the islands with the required infrastructures, such as shelters with photovoltaic panels in parking lots or private charging stations, in order to allow access to the island only to electric vehicles.

The islands are ecosystems very vulnerable to climate changes, but in spite of this, little progress has been made in terms of mobility. It is clear that in order to achieve the decarbonization goals, a strong acceleration of interventions is required, including with the support of central administrations.



Good practices in Italy and in the world

The project LIFE SILVER COAST, involving also the **Giglio Island** as a pilot site, provided for the realization of an e-bike sharing service, one electric boat and three bike charging stations already installed. However, the project goes slowly, due to several difficulties in obtaining the authorizations.

The projects funded in 2022 by the fund for investment in Smaller Islands include the sustainable mobility project “Mare&Shopping”, funded by the Municipality of Campo nell’Elba, **Elba Island**. This project will lead to the realization of an integrated system of e-minibuses, connecting all the districts of the area with the administrative center of Marina di Campo and the seaside resorts.



Rathlin Island, in Northern Ireland, with a population of 75, will enjoy the first shared e-transport program: new electric cars and a pool of 20 e-bikes will be available to the community and the visitors working on the island.

One of the 29 projects selected in the first NESOI tender is focused on mobility. The “CARING” project is a collective initiative to enable six small islands to work together and simultaneously on innovative solutions for their local contexts: Ile aux Moines (France), Inishbofin (Ireland), Nagu (Finland), Fur and Venø (Denmark) and Ulva (United Kingdom). Each island chose to focus the transition process to clean energy on a different technology and, among these, **Ile aux Moines** in Brittany (France) will explore the opportunities to extend electric mobility to the entire island.

In the **Greek island of Chalki**, an agreement was concluded with Citroën for a complete development plan for a smart and climate neutral mobility. Citroën will provide the opportunity to purchase zero emissions electric vehicles at affordable prices, through a wide range of green and smart solutions, from quadricycles to passenger and commercial vehicles, with the free use of all the new technologies and the relevant connected applications that will be developed. This will begin with the provisions of a fleet of six full-electric vehicles to the public authorities of Chalki, i.e., two cars shared by the Police and the Coast Guard and the other three e-cars to the Municipality of Chalki. Finally, an additional electric car will be delivered to the Energy Community of the island.





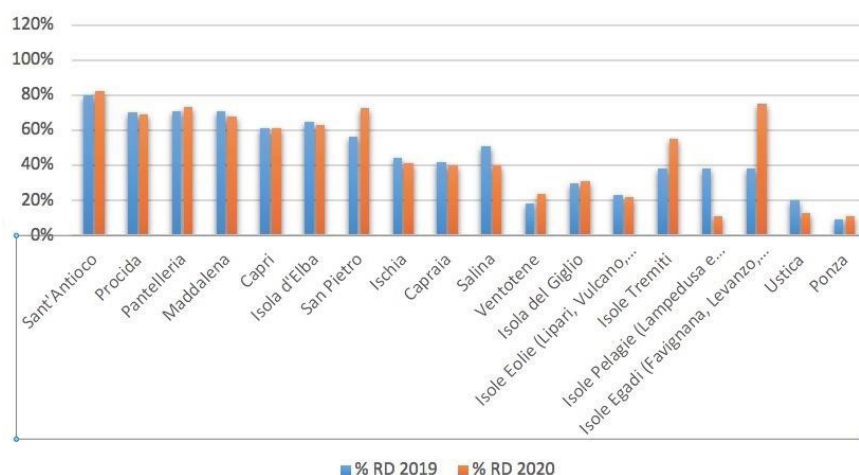


WASTE

The integrated management of waste cycle is one of the main challenges smaller islands have to deal with. In fact, during the summer season, also due to the high number of tourists, there is an increase up to five times of the average presences in the territory and the relevant impact on waste accumulation may become unsustainable, both as regards environment and health care, if not managed properly.

Overall, from 2019 to 2020 waste sorting increased in all the islands, including compared to the increase recorded in 2019. The Aegadian Islands increased from 38% to 75%, San Pietro from 56% to 72.6%, Ventotene from 18% to 24%, the Giglio Island from 24% to 31%, the Tremiti Islands from 38% to 55%. The most substantial deterioration is recorded in the Pelagie Islands, falling from 38% to 11%.

Waste sorting 2019-2020



Sustainable Islands Report 2021 Processing of National Waste Registry, ISPRA data (2019-2020).

Waste sorting is pretty easy to do, but the main problem of the islands regards the management costs, especially in the summer, which can be substantially reduced by investing in the appropriate equipment.

Sergio Ortelli, Mayor of the Municipality of Giglio Island

The current administration of Pantelleria moved towards the realization of a plant suitable to treat organic waste by anaerobic digestion. Thus far, they prepared a project, achieved a favorable resolution by the Region and are currently waiting to received funds. This plant will enable to reduce the price of the waste bill, since dump contributions would be zeroed, leaving only the management costs to be paid.

Angelo Parisi, Councilor for Environment and Energy, Municipality of Pantelleria

The waste sorting average achieved by the island amounts to 47.33%. The island of Sant'Antioco is still the most virtuous island, with 82% of WS, followed by the Aegadian Islands, that achieved 75% of WS. Also Pantelleria (73%) and San Pietro (72.6%) show excellent data. Despite the growth trend, the level of waste sorting is still low in some islands: Ustica, Aeolian Islands (excluding Salina), Ventotene, Pelagie Islands and Ponza do not go beyond 30%.

Waste sorting in the inhabited Italian smaller islands analyzed in the report.

Island	2020
Sant'Antioco	82%
Procida	69%
Pantelleria	73%
Maddalena	68%
Capri	61%
Isola d'Elba	63%
San Pietro	73%
Ischia	41%
Capraia	40%
Salina	40%
Ventotene	24%
Isola del Giglio	31%
Isole Eolie (Lipari, Vulcano, Stromboli, Panarea, Filicudi, Alicudi)	22%
Isole Tremiti	55%
Isole Pelagie (Lampedusa e Linosa)	11%
Isole Egadi (Favignana, Levanzo, Marettimo)	75%
Ustica	13%
Ponza	11%

Processing of National Waste Registry, ISPRA data (2020).

One of the highest costs in the budget of local administrations is the sea shipping of waste to mainland plants, adding to the pre-existing disposal costs. Therefore, in the periods when sea links are interrupted due to adverse weather conditions, waste may accumulate and be held up to 10 days, thus creating huge management **problems**. It is therefore fundamental for local authorities to launch prevention policies to reduce waste production at the source, by implementing information, awareness raising and containment measures, as well as to speed up waste sorting.

Many islands are still not equipped with the **door-to-door** waste collection service, which may substantially contribute to increase waste sorting, create employment and promote home or community composting, if possible. However, it is not always easy to implement this service, especially in some remote districts or during the summer, when the number of people on the islands is substantially increased and personnel is subject to work overloads.

In this case, the installation of mini-recycling points in the remote districts, as well as in those areas where people are more likely to welcome new infrastructures, may be a good solution. The realization of organic waste treatment plants in the islands, which are currently missing, would enable to significantly reduce the number of shipping to the mainland, leading both to transport and energy savings through the resulting compost and biogas/biomethane. An **increase in waste sorting** would enable substantial economic savings and benefits.

However, virtuous actions in the waste sector are not lacking in the Italian smaller islands: 18 out of the 21 islands analyzed already implemented plastic-free policies.

One of the main problems in waste management for Pantelleria is the distance from Sicily of over 100 km. This means that all waste must be transported to Trapani and then by road to other plants, which can be very far. Most of the time, the organic waste of Pantelleria is shipped to the area of Catania (almost 10 hours away), but there are periods when maritime links don't work and waste is held up to 8/10 days, creating huge management problems.

Angelo Parisi, Councilor for Environment and Energy, Municipality of Pantelleria

Good practices in Italy and in the world

Maldives approved the elimination of the import of disposable plastic by 2023. This is a structured plan to respect and protect the environment, divided into multiple stages. At the end of 2020, the President announced the list of disposable items that would be banned from 2021, such as: straws, plates, cutlery, cups, bottles, cotton buds, plastic bags smaller than 30×30, lunch boxes, shampoo bottles and other cleaning products under 50 ml, and disposable snack packs.

El Hierro, Canary Islands, embraced the philosophy of waste reuse. Organic waste are composted to fertilize fields or revitalize plants. Disused items come to new life thanks to local creativity.

Plastic Free Ibiza & Formentera is a NGO covenant started in 2018 to fight disposable plastic pollution in the **Balearic islands**. The initiative is led and funded by the Ibiza Preservation foundation and the aim is to provide solutions for the reduction and elimination of disposable plastic in houses, companies and public institutions, through awareness and environmental education actions and campaigns. From 2021 the covenant promotes and implements the Plastic Free Balearics certificate, an environmental seal of warranty for the reduction of plastic waste in all the Balearic Islands. At the present date, 67 businesses were certified as Plastic Free Guardians, as a result of their implementation of alternative solutions in lieu of disposable plastic products.





A similar initiative was implemented in **Lipari and Panarea**, Aeolian Islands, to support the tourist companies in the elimination of disposable plastic and in the implementation of sustainable practices: the campaign “The Oceanic Standard (The Blue Standard): Plastic Free Solutions for the hospitality sector” implemented by Oceanic Global and Marevivo and supported by the Aeolian Preservation Foundation, involved the first commercial activities that will display the certificate attesting their real commitment against disposable plastic.

The project **Tremi** Plastic Free Islands, carried out by Blu Marine Service within the framework of the MedPAN Regular Call for Small Projects and co-funded by the French Facility for Global Environment and the Alber II, Prince of Monaco Foundation, aimed to improve waste management and reduction in the islands, by promoting the use of new solutions. The project fostered the use of a new biodegradable and compostable packaging (Biofoam) to transport fish on the islands, that may be integrated in the normal organic waste disposal cycle and then moved to industrial composting. Another activity entailed the recovery of maritime waste; by using abandoned and/or disused buoys from the mussel-farming fields, domestic composters were created, that may be used by the citizens to create compost from their food waste. Furthermore, a new composter, capable of composting all the organic domestic waste throughout the year and of biodegrading also bioplastics, was installed. These actions were also aimed at raising awareness on the real possibility to implement biodegradation and composting for bioplastic (plates, cups and Biofoam boxes) directly in the island, reducing the organic waste to be dumped





WATER

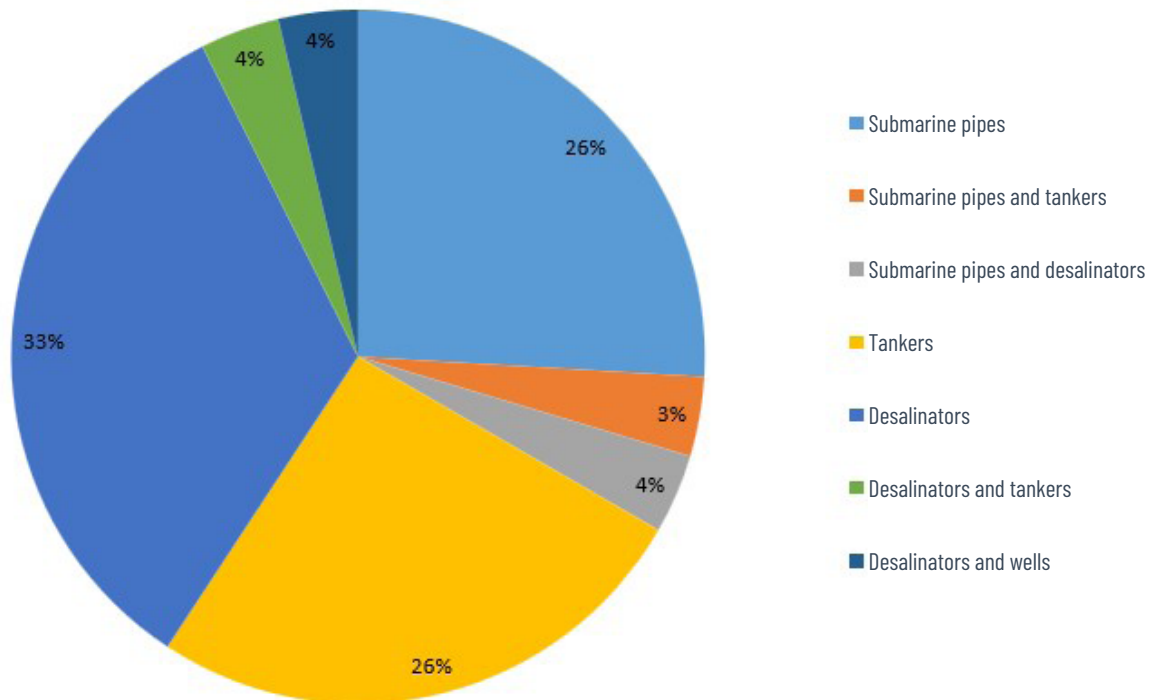
In the Italian smaller islands, water is a critical issue, since it is a basic commodity. In the small islands, drinking water is limited and the solutions to get it entail a substantial environmental impact, considering the energy required to transport it or the potential negative externalities resulting from desalination systems. For many small islands water shortage is an endemic problem, far from being resolved.

Italian islands require a great deal of innovation, interventions and maintenance, both as regards water supply and purification of wastewater. Water supply is affected both by the difficulty to have drinking water (by tankers, desalination systems or, in very few cases, by submarine pipes) and by the criticality related to network maintenance, which has an average leak equal to 34%, even reaching 86% in the Aegadian islands.

In terms of water supply, only 9 of the Italian smaller islands are equipped with submarine pipes, from the mainland or other neighboring islands. Tankers represent the only drinking water supply method for seven smaller islands, but they are essential to meet the demand also on other islands during the summer, when, due to the increase of population, water rationing is applied.



Water supply methods by type in the Italian smaller islands.



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Tankers are very expensive (their cost is three times a desalination system) and not very sustainable in terms of climate-changing emissions, taking into account the energy required to handle tankers.

Only 11 out of the 27 islands analyzed are equipped with desalination systems (that sometimes do not meet the demands of the island), entailing a considerable energy consumption and giving rise to complaints due to the discharge of sewage into the sea, although the projects often provides for discharge in open sea. The desalinators of Lipari is equipped with photovoltaic systems for the energy required for its operation, but it does not work at full capacity due to the obsolescence of the pipe that cannot collect from the sea all the water required, and the photovoltaic system has never been commissioned.

In 2021 a project for a "desalination ship" capable of desalinating approx. 5,000 tons of water and to transport it where required, was published. The discharge would be carried out in open sea, to avoid any negative effect on the coastal environment, and the low-speed sailing would enable to discharge the brine in deep waters, with the resulting rapid dispersion, with a safety plan of water to ensure higher levels of system security.

Water supply methods in the Italian smaller islands.

Island	Water supply method
Capri	Submarine pipes of the Sorrento Peninsula
Ischia	Submarine pipes
Procida	Submarine pipes
Sant'Antioco	Submarine pipe coming from the Bau Pressiu dam, wells/springs
San Pietro	Submarine pipe coming from Sant'Antioco
Maddalena	Submarine pipe from the dam of "Liscia"
Isola d'Elba	Submarine pipe from the Cornia Valley, wells/springs
Capraia	Desalinator
Isola del Giglio	Desalinator
Pantelleria	Desalinators
Lampedusa	Desalinator
Linosa	Desalinator
Favignana	Submarine pipes from Trapani (EAS), desalinator (Sicilacque), private wells, storage tanks and tankers.
Marettimo	Karstic water sources under restoration, submarine pipes from Trapani and tankers
Levanzo	Tankers and submarine pipes from Favignana
Ponza	Tankers
Ventotene	Desalinator
Ustica	Desalinator
Isole Tremiti	Tankers from Manfredonia.
Lipari	Reverse osmosis desalinator
Vulcano	Desalinator and tankers from Naples or Palermo
Stromboli	Tankers
Panarea	Tankers
Filicudi	Tankers
Alicudi	Tankers
Salina	Tankers
Gorgona	Desalinator, wells

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Among the project for desalination plants, those of Ponza and the Tremiti Islands are aimed at decreasing reliance on tankers. In Ponza there are vessels departing from Naples, Terracina and Formia supplying water to the island. However, already in 2019, the Optimal Territory Environment agency (ATO) and the Lazio Region authorized Acqualatina to realize the desalination plant in Cala dell'Acqua, in Le Forna. Following two appeals to the TAR, both rejected, the plant will be built on a municipal land, including also an abandoned vineyard, a disused building and an old quarry. According to the project, the desalinator under construction should make Ponza self-sufficient as regards water supply, especially during the tourist-holiday season.

Also the Tremiti Islands are preparing for equipping themselves with their own desalinator. With an investment of 3.6 million of Euro, this will be the first modern drinking water desalinator in Apulia. The plant, running completely underground, will be built in Colle dell'Eremita, nearby the current tank used by the islands. After receiving the approval by the preliminary Conference of the Services, the integrative surveys are currently under way for the realization of the project by 2026.

The difficulties related to drinking water supply also include the issue of riddled pipes. The leaks in the water supply network on the smaller islands are in line with the national average and amount to 42 % of the water supplied to the network. However, this data tends to fluctuate: it ranges from 9 % in the Tremiti Islands to the network of the Aegadian Islands, with a leak of 86 % of the network water.

Leak of drinking water from the water network in the smaller islands.

Island	Municipality	Aqueduct leaks
Capri	Capri	40%
	Anacapri	
Ischia	Ischia	26%
	Barano d'Ischia	
	Forio	
	Casamicciola Terme	
	Lacco Ameno	
	Serrara Fontana	
Procida	Procida	22%
Capraia	Capraia Isola	59%
Giglio Island	Giglio Island	25%
Gorgona	Livorno	
Isola d'Elba	Portoferraio	54%
	Porto Azzurro	
	Capoliveri	
	Marciana	
	Marciana Marina	
	Rio	
	Campo nell'Elba	
Pantelleria	Pantelleria	40%
Pelagie Islands (Lampedusa e Linosa)	Lampedusa e Linosa	17%
Aegadian Islands (Favignana, Levanzo, Marettimo)	Favignana	86%
Ponza	Ponza	68%

Island	Municipality	Aqueduct leaks
Ventotene	Ventotene	40%
Ustica	Ustica	20%
Tremi Islands	Tremi Islands	9%
Aeolian Islands (Lipari, Vulcano, Stromboli, Panarea, Filicudi, Alicudi)	Lipari	33%
Salina	Leni	41%
	Malfa	
	Santa Marina Salina	
Sant'Antioco	Sant'Antioco	58%
	Calasetta	
San Pietro	Carloforte	51%
Maddalena	La Maddalena	62%
average of the islands		40%

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Drinking water is a very salient issue for the citizens of smaller islands and their representatives. Almost all the municipalities submitting projects within the framework of the tender "Green Islands" funded by the PNRR, included some improvements to the water distribution network or the desalination systems.



The **purification of wastewater** is another sore topic for Italian smaller islands, which need an operating system also to attract tourists and support their economies. All the smaller islands in the scope of this report, **are equipped with inappropriate or no purification systems**. No significant variations in this field were recorded compared to the previous years and the municipalities have no funds to deal with this issue. The PNRR should make available 600,000,000.00 Euro for Mission 2, Part 4, Investment 4.4 “Drainage and purification systems investments”, aimed at rectifying and preventing deficiencies in the sewer-purification system. However, the resources would be addressed to projects having a greater impact on a large number of people and smaller islands may be hindered by this. **None** of the 27 islands analyzed **is equipped with a purification system capable of meeting the demand of the inhabitants**. In the Aegadian Islands, in Ponza and in Salina there is not a single system or plant. In Ischia, after ten years of inactivity, a new plant for the purification of wastewater of the municipality of Ischia and the neighboring Barano, is completed only for 60 %. In the summer of 2020, the procedures on hold since 2015 were resumed, but actually also this new purifier would not be appropriate to treat the water of the smaller island with the highest population density. Procida, with its candidacy as Capital of Culture, accelerated the realization of the purification system, funded by the Campania Region, whose works were already started in 2009. The maximum capacity expected is of 15,000 equivalent-users in high-load periods (the population of the island is of approx. 10,000 inhabitants), therefore it may be capable of bearing the stress also during the maximum peak of tourism in the island, in the summer; however, there is no information available about the commissioning of the purifier.



Purification status in the Italian smaller islands.

Island or archipelago	Purification status
Capri	incomplete
Ischia	incomplete
Procida	under construction
Capraia	incomplete
Giglio Island	incomplete
Gorgona	incomplete
Elba Island	incomplete
Pantelleria	incomplete
Pelagie Islands (Lampedusa and Linosa)	incomplete
Aegadian Islands (Favignana, Levanzo, Marettimo)	absent
Ponza	absent
Ventotene	incomplete
Ustica	incomplete
Tremiti Islands	incomplete
Aeolian Islands (Lipari, Vulcano, Stromboli, Panarea, Filicudi, Alicudi)	incomplete
Salina	absent
Sant'Antioco	incomplete
San Pietro	incomplete
Maddalena	incomplete

European Commission Urban Waste Water Website.

Within a framework of production and distribution of water and of collection and treatment of wastewater, the energy demand for water services is an important factor. Therefore, taking also into account the existing technologies, the ideal innovations in the field of water management in the smaller islands must entail a joint management of water-energy or the realization of systems with a circular approach.



Good practices in Italy and in the world

The HYDROUSA project, funded by the Horizon 2020 program of the European Union aims to offer a solution to one of the most binding issues of the smaller islands through a non-conventional approach. In the **island of Tino (Greece)** a low-cost desalination system, inspired by the operation of plants and based on the principles of evaporation and condensation, was realized to produce fresh water and salt from seawater, as well as from the brine resulting from the existing desalination system. The water treated is carried to a 200 m² dike irrigating the tropical plants. Fresh water is produced in the dike for evaporation of saltwater, where moisture is generated and converted into freshwater that may be used after condensation. To improve this process, mangroves and halophytes are planted.

Within the framework of the same project, the island of **Lesbos** is testing a wastewater treatment system in rural areas, characterized by high seasonal tourism peaks. The demonstrative site treats the domestic wastewater of the village of Antissa and combines anaerobic processes in specific humid areas, with a sanitization treatment. This is a fully circular solution, where the water, nutrients and sewage sludge produced are reused. Furthermore, the anaerobic process recovers energy in the form of biogas, which is then enhanced to produce high-purity methane, used to fuel local vehicles.

The HYDROUSA project revolutionizes the water supply chain in the Mediterranean sea, providing nature-based solutions for water and wastewater treatment and management. The solutions realized in the six demonstrative sites of the three islands of **Lesbos, Tino and Mykonos (Greece)**, will be tested in other Mediterranean areas, including the **Elba Island**.



Environmental innovation opportunities for Italian smaller islands

Italian smaller islands are potential beneficiaries of different national programs as well as reserved fundings for their development and transition to sustainability. The most important news, in addition to the resources of the PNRR, is that the smaller islands from 2022 entered the **"73rd Ultraperipheral Interior Area"** specifically created by the Interior Areas Committee, with the support of the ANCIM (National Association of the Municipalities of the Smaller Islands). These areas are characterized by a significant process of depopulation and criticalities, in particular as regards health and school services.

Their integration is particularly relevant since this entailed the joint involvement of all the 35 municipalities of the smaller islands for the creation of a consistent development system. There are many benefits for the municipalities involved in the "interior areas", especially if coordinated with the acknowledgment of all the municipalities, including Central-Northern areas, among the Southern areas. As a first step, 11.4 million Euro were allocated for the 73rd Interior Area and the municipalities included therein may take part in any tender currently active for the Interior Areas in general. This integration also led to the extension to the smaller islands of Central and Northern Italy of the incentives **"Resto al Sud"**, for businesses and professionals, already available in the Southern regions and in some central areas of Italy affected by the earthquakes in 2016 and 2017.

In **Favignana, Pantelleria and Vulcano** three projects granted under the public tender **"Integrated projects for non-interconnected smaller islands"** will be funded, implementing section 6 (Innovative integrated projects) of Ministerial Decree of February 14th, 2017, allocating 10 million Euro for the realization of innovative and integrated investment projects aimed at reducing the annual conventional production of electricity, in compliance with the safety and continuity of service provisions requirements.

Pantelleria is one of the pilot islands of the Clean Energy for the EU Islands Secretariat for the full decarbonization by 2030. To achieve this goal, different initiatives have already been implemented to speed up the ecological transition of the island. The projects submitted for the PNRR tender "Green Islands" are aimed at completing the actions requiring resources.

Angelo Parisi, Councilor for Environment and Energy, Municipality of Pantelleria

Meanwhile, the **“Energy and Territorial Development Program 2014-2020”** of the Ministry of Economic Development (MiSE) is still running with a total budget of 120.4 million Euro for islands of the less developed regions under the thematic goal 4 (Supporting the transition to a low-carbon economy) of the European Union’s Cohesion Policy. Under this Program, the Ministry of Economic Development and the Municipalities of the smaller islands of Southern Italy, whether interconnected or not with the national electricity grid, signed seven Protocols to promote energy efficiency interventions in public buildings and infrastructures under Action 4.1.1 - Promotion of eco-efficiency and reduction of primary energy consumption in public buildings and facilities. More specifically, 15 projects were selected to be carried out on the islands of **Tremi, Capri, Pantelleria, Ustica, Lampedusa and Salina**, for interventions on schools, town halls and other buildings of public interest, as well as for the modernization of the street lighting systems.

The implementation of these projects will be financed with more than 12 million Euro available for the territory. The Ministry of Economic Development is already working on a second edition of the measure, and its modalities will be announced in the near future.

In accordance with the Program Action 4.3.1 - Implementation of smart energy distribution grids (smart grids) and interventions on transmission networks”, under the public tender of December 20th, 2019 of the Ministry of Economic Development DGA-ECE (now under the Ministry of Ecologic Transition, Department for Energy and Climate - DGA-ECE) “for the financing of interventions for the implementation of smart grids in the territories of the less developed regions”, projects were financed for a total amount of 119,997,324.62 Euro, including three projects carried out in non-interconnected smaller islands, **Ustica, Capri and Favignana**, which received a funding for their projects of 2,956,051.82 Euro, 1,207,446.14 Euro and 8,484,000.00 Euro, respectively.



The Ministry of the Environment (now Ministry of Ecological Transition), published in 2017 the tender **“energy efficiency interventions, sustainable mobility and adaptation to climate change in smaller islands”**, allocating 15 million Euro for financing public works for improving the use of water, energy and for adaptation to climate change. Projects were submitted by 13 municipalities of the smaller islands, for actions in 21 different islands. The Director’s Decision no. 201/CLE dated 23/07/2018 approved the project rankings; 15 projects were selected as eligible for funding, in **Ventotene, Capri, Salina, Tremiti Islands, Capraia, Lipari, Filicudi, Favignana, Alicudi, Vulcano, Ustica, Ponza, Pantelleria**. Works will start soon, after the approval of the executive projects.



Again with regard to the environment and the field of interest of the island including Protected Marine Areas (PMA) and National Parks, the Ministry of Ecological Transition allocated 4.5 million Euro for financing “interventions aimed to mitigate and adapt to climate change in the Italian protected marine areas”. The third edition of the tender **“Protected marine areas for climate”**, provides fundings for energy efficiency actions on the property assets available to the PMAs and for the provision and realization of land and maritime sustainable mobility services and infrastructures. Similarly, the third edition of the Program **“Parks for Climate”** will finance projects to be carried out in the areas of the National Parks for an amount of over 98 million Euro, aimed in particular at: interventions to adapt to climate change; interventions for energy efficiency of public properties available to the Park Authority as well as to local authorities, within the park areas or in adjacent areas, and construction of small-scale plants for the production of energy from renewable sources; interventions for the creation of services and infrastructures for sustainable mobility; interventions for sustainable forest management; technological innovation interventions to support the prevention and management of forest fires.

Another initiative of the Ministry of Ecologic Transition is the **“Program of interventions for adaptation to climate change addressed to the municipalities of UNESCO sites and places of naturalistic interest and in national parks”**, with the allocation of 75 million Euro for the 2021-2023 period. In detail, 15 million Euro will be available in the FY 2021, 37.5 million Euro in the fiscal year 2022 and 22.5 million Euro in the fiscal year 2023. The program will finance three-year plans aimed at reducing emissions. The resources are addressed to energy efficiency measures in the public properties of local authorities included in the UNESCO areas, the construction of small-scale plants to produce energy from renewable sources, sustainable mobility services and infrastructures, means and structures for monitoring, controlling and fighting pollution, as well as measures to support sustainable forest management. **The islands eligible for these funds are Pantelleria, Ponza, the Aeolian Islands and the Islands of the Tuscan Archipelago.** The applications submitted and the measures eligible for funding are currently under assessment.

As regards the **Fund for Investment in Smaller Islands**, managed by the Department for Regional Affairs and Autonomies, budgeted in 2020 and addressed to 56 smaller islands, corresponding to 40 municipalities, 66,868,091.59 Euro was allocated for: decarbonization projects in the energy field; renovation of buildings; reduction of energy bills and consumption; supporting the industry to innovate for green economy purposes; introducing means of transport to reduce consumption and polluting emissions; waste recovery and management; water management; mobility and recovery and reuse of the existing buildings and infrastructures; restrictions to tourist flows and to de-seasonalization; priority habitats and protected species protection; environmental certification of services.

Other innovation opportunities in the smaller islands are indirectly provided by the **PNRR funds for digitalization**, managed by the Ministry of Economic Development: in fact, Next generation EU allocates 45 million to connect by ultra-wide band the small Italian islands. After the first tender of January, where there were no bidders, the 45-million tender was successful and was awarded to the company Elettra Tlc. The plan to connect the smaller islands of Sicily, Sardinia, Tuscany, Lazio, Campania and Apulia by the ultra-wide band has been under study for years, but it materialized only now. The aim is to fill the digital gap with mainland, providing the smaller and more remote islands with fast, resistant and cutting-edge connections. The beneficiary islands of the project include **Favignana, Lipari, Lampedusa, Pantelleria, Ustica, Ponza, Tremiti Islands, Asinara and Ventotene.**

The resources and policies implemented to deal with the challenges of the smaller islands represent a huge innovation opportunity and a step forward in achieving the goals set at national and European level. To do so, additional and more targeted funds will be required, in order to enhance perspectives and support the decarbonization process, so as to make these islands more and more sustainable and independent of the mainland.

PNRR

It is quite clear that the **PNRR – National Recovery and Resilience Plan** was the most interesting opportunity for the Italian smaller islands in the last year, thanks to the **“Green Islands” Program** (investment 3.1, M2. C1) allocating 200 million Euro to fund integrated actions to make them more independent and greener.

The program is aimed at promoting improvement and strengthening, both environmentally and energetically, the municipalities of the 19 non-interconnected smaller islands, overcoming the problems related to their disconnection from mainland, through the realization of integrated energy and water efficiency projects, as well as plans for sustainable mobility, waste cycle management, circular economy, production of renewable energy and different applications for end uses.

The municipalities involved in this program are the Giglio Island, Capraia, Ponza, Ventotene, Tremiti Islands, Ustica and Pantelleria, the three municipalities of the Island of Salina (Leni, Malfa and Santa Marina Salina), Favignana, Lampedusa and Lipari. **140 projects were submitted within the deadlines of April 22nd, 2022, relating to all the fields of intervention included in the tender.** In fact, the Italian smaller islands welcomed the tender as an important chance for innovation in those areas where they are underdeveloped and often deal with significant barriers.

For example, **Lampedusa** and **Linosa** submitted projects continuing the drive towards the European NESOI program. The Pelagian islands applied for interventions for a total amount of 41.3 million of Euro, equal to the whole sum allocated thereto. The interventions relate to the purchase of electric buses, incentives for the purchase of environmentally friendly vehicles and scooters, recharging stations to be installed in the island, drinking water dispensers to reduce the use of PET bottles, new desalinators, incentives for photovoltaic systems, modernization and upgrade of the energy distribution grid, realization of a wind power plant. The goals include the achievement of 26 % of electricity from renewable sources in Lampedusa and of more than 37 % in Linosa.

The PNRR was very disappointing, since it doesn't deal with water purification. Of the three districts of the Giglio Island - Giglio Porto, Campese and Castello - only the latter has a properly operating and sized purification system built in the '90s. The other districts only have the sewage discharge system at the depth allowed by the law, but the pipes often break down and their repair is complicated. This is the reason why purifiers should be the utmost priority.

Sergio Ortelli, Mayor of the Municipality of Giglio Island

The **Municipality of Ponza** organized the funds in four project plans for: energy efficiency, management of urban waste cycle, circular economy and production of energy from renewable sources, for a total amount of € 14,503,100.00. An optimization of the waste cycle is expected, by treating the urban solid waste and its recycling directly on the island, so as to reduce the delivery costs. Furthermore, the aim is to use the funds for public lighting, with more than 2,000 lighting points and the renewal of the existing systems, in addition to the streamlining of the consumption of electricity from renewable sources. The fourth project is addressed to the efficiency of the water distribution network, in order to reduce the leaks, that in Ponza reach a rate of 68 %.

Also the **Giglio Island** administration proposed different interventions. As regards **waste**, the project has 4 main goals: the realization of a collection center, a widespread composting of domestic waste, to be carried out by means of small domestic composters to be supplied to the residents, a “prompted” waste sorting with access-controlled bins, and the plastic-free campaign entailing a system of reliefs on the municipal waste tax (TARI) for non-domestic users, governed by plastic free agreements with the municipality. The projects submitted also provide for the installation of three drinking water dispensers, with a UV-lamp purification system, the replacement of 3 out of 4 osmosis modules operating on the existing desalinators with more efficient modules, which may also rely on the installation of photovoltaic panels, thus reducing consumption of approx. 30 %. Finally, the intervention entails the extraordinary maintenance of one of the main water storage centers of the island. In terms of energy efficiency, the proposals concern the energy upgrading of the Rocca Pisana, the replacement of public lighting with new generation systems and the modernization of the power lines, now suffering severe insulation defects and thus high electricity dispersion.



By means of these interventions, an annual energy saving of at least 20 % is expected by the local government. A very innovative measure is represented by the installation of a submarine wave energy recovery system from the jetties of the Port of the Giglio Island. In order to eliminate the impact of the port users' consumption without spoiling the appearance of the port, a submarine system will enable the recovery of wave energy through mechatronics devices on the moorings of the floating jetties, which is invisible from the outside and fully eco-compatible with the surrounding marine environment.

For the **Island of Salina**, the tender allocated more than 8 million Euro and requested a coordination between the three competent municipalities of the island (Leni, Malfa, Santa Maria Salina).

For an amount slightly higher than 3 million Euro, the municipality of Malfa invested in the energy efficiency of the water network, since on the island more than 40% of water fails to reach its destination. A significant share of the investment is addressed to sustainable mobility, through the implementation of electric bike sharing and incentives for the purchase of electric motorcycles. Furthermore, the municipality expects to create four Underground Pocket Recycling Points and to make more efficient the door-to-door waste collection system. Lastly, as regards the development of RES plants, in addition to the installation of photovoltaic panels in some public buildings, three new-generation vertical wind power generators with a low impact on the landscape will be installed.



Also the municipality of Santa Maria Salina allocated the majority of the funds (39.94%) to the efficiency of the drinking water distribution and supply network. On the other hand, 22.70% of the resources, equal to 665,000 Euro, were allocated to the development of photovoltaic systems on nine municipal buildings, that according to the current local government plan will represent the first step toward an energy community in Santa Maria Salina. A similar amount was allocated to the purchase of electric vehicles for the municipality and to incentives for motor scooters or other electric vehicles for citizens and merchants. Furthermore, the projects for waste provide for the restoration of the recycling point and the improvement of the structure, the purchase of the swap bodies for the collection services as well as of the floating systems for the collection of microplastics at the port. The increase of the efficiency as well as the maintenance of the drinking water distribution and supply network is also the main focus of the municipality of Leni (46.92% of funds allocated to this issue). The projects for waste concern the improvement of the collection system and the construction of a recycling point. The majority of the amounts for sustainable mobility are allocated to the purchase of electric vehicles and only to a minor extent to the implementation of shared mobility systems. Lastly, almost one million (903,800.00 Euro) were allocated to fund new municipal renewable sources plants.

The **municipality of Lipari** submitted projects for an overall amount exceeding 53 million, divided as follows: Lipari 22 M, Alicudi 4.5 M, Filicudi 5.3 M, Panarea 7.5 M, Stromboli 6.7 M, Vulcano 7 M. All the scopes of the tender were covered by various projects on different islands. In Lipari the realization of a composting plant for the organic fraction of solid urban waste (FORSU) as well as of an infrastructure for waste treatment through photovoltaic panels are expected. Lipari, Filicudi and Vulcano will purchase electric or hybrid collective means of transport (urban taxis or shuttles for accommodation facilities). All the islands will receive new sharing mobility systems as well as incentives for citizens and companies (electric bikes and motor scooters). More than 4 million Euro are allocated to the efficiency of the water network on all of the six islands. Furthermore, a desalinator will be installed in the islands of Alicudi, Filicudi, Panarea and Stromboli. The renovation of properties for energy efficiency purposes will be implemented in schools and the municipal buildings, as well as in the lighting system of the docks of the ports of Lipari, Alicudi, Filicudi, Stromboli and Vulcano. As regards renewable energies, the projects provide for the installation of photovoltaic systems in all of the six islands, in addition to a biomass plant in the island on Vulcano and the exploitation of geothermal energy in Panarea. Furthermore, breakwaters producing wave energy will be erected in Alicudi. Lastly, eleven million will be allocated to increase the efficiency of the power grid of all the islands of the municipality of Lipari. Particular attention should be paid to an open procedure promoted by the municipality of Lipari for the definition of the interventions within the framework of the Green Islands program as well as the other interventions included in the scope of the PNRR.



The local government of the Island of **Pantelleria** decided to use the funds to complete some works already planned. The interventions were addressed to the water distribution network to reduce water leaks, the electrification of public (purchase of two electric buses) and school (school bus) transport, the efficiency of the remaining 10 % obsolete urban lighting by investing in the stability and efficiency of the power grid, thanks to storage systems adjusted to the demands of the island.

The island of **Capraia** submitted various projects in the different sectors to be funded with the 3,350,000.00 Euro made available by the tender. As regards waste, a new recycling point will be realized, including a composting plant, with canopies covered by photovoltaic panels and a rainwater recovery system for the irrigation of the surrounding rural areas. In terms of water management, a new, more efficient and less energy-intensive desalinator will be realized and the municipal aqueduct will be equipped with a smart alert system to prevent any hidden leaks. The projects also include incentives for residents, for the purchase of e-bikes, as well as for the purchase by the municipality of an electric bus for local public transport. As regards energy, the municipality intends to create an energy community of approx. 90 kW of photovoltaic panels, with the relevant storage systems installed on roofs and canopies owned or administered by the municipality, managed by an innovative platform that will make the energy community a real smart grid system, capable of managing future RES plants. Furthermore, different power stations for electric vehicles will be installed and the energy efficiency of the town hall, the elementary school and the municipal Hypogeum hall will be increased.

In the **Aegadian Islands** the projects were focused on energy, mobility and water. The municipality of Favignana submitted projects for new public lighting powered by solar energy as well as to power heating and cooling system with photovoltaic panels in the municipal buildings, including schools, in Favignana, Levanzo and Marettimo, in addition to the tune-fishing net facility of Favignana. These municipal buildings will also be subject to energy efficiency works. As regards sustainable mobility, the municipality intends to promote incentives for the conversion to electric motorcycles and the purchase of bikes, for private citizens and the operators of the rental service. Also sea transport will be improved by means of new hybrid boats in the island of Marettimo. Lastly, the projects submitted by the Aegadian islands provide for the realization of desalinators for the procurement of drinking water in all of the three islands and the increase of the water supply in Favignana.

	ELECTRIC MOBILITY	LPT	SHARED MOBILITY	WASTE REDUCTION	WASTE CYCLE MANAGEMENT	NEW RES	ENERGY EFFICIENCY	POWER DISTRIBUTION GRID	DESALINATORS	WATER NETWORK
Giglio Island				X	X	X	X	X	X	X
Capraia	X	X				X	X	X	X	X
Ponza					X	X		X		X
Pantelleria	X	X					X	X		X
Salina										
Municipality of Leni	X		X		X	X				X
Municipality of Malfa	X		X		X	X				X
Municipality of Santa Maria Salina	X				X	X				X
Favignana	X					X	X		X	X
Lampedusa and Linosa	X	X	X	X		X		X	X	
Lipari	X	X	X		X	X	X	X	X	X



THE ISLANDS





CAPRAIA

ARCHIPELAGO: TUSCAN PROVINCE: LIVORNO



POPULATION

391

TOTAL AREA

19,3 Km²

DENSITY

20,3 ab/Km²



TOURISTS/YEAR

13.931

TOURIST FACILITIES

7

DISEMBARKATION FEE

1,50 EURO/PASS

20.896 ANNUAL REVENUES



PROTECTED AREAS

TUSCAN ARCHIPELAGO **17.887** ha
NATIONAL PARK **56.776** ha in SEA

REFUGE FOR MARINE MAMMALS **8.750.000** ha in SEA
NATURAL MARINE AREA OF INTERNATIONAL INTEREST

ISLAND OF CAPRAIA - LAND AND MARINE AREA
SPECIAL PROTECTED AREA **18.403** ha
SPECIAL CONSERVATION AREA **18.753** ha **90** ha in SEA

ISOLE DI TOSCANA **28.929** ha
UNESCO MAB BIOSPHERE RESERVE **1.050.611** ha in SEA

CONTINENTAL SCARP
OF THE TUSCAN ARCHIPELAGO
100 ha **473** ha in SEA
SPECIAL CONSERVATION AREA



ENERGY

RENEWABLE SOURCES


ELECTRICITY PRODUCTION
FROM **BIODIESEL** **2.760** Mwh/Year


INSTALLED CAPACITY

2,4 MW

ELECTRICITY COMPANY
ENEL PRODUZIONE

 **PHOTOVOLTAIC SYSTEMS**
35,52 kW
POWER AT 31/12/2021

 **WIND POWER SYSTEMS**
0 kW
POWER AT 2020

 **THERMAL SOLAR ENERGY**
0 m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ **WASTE WATER TREATMENT**

PURIFICATION STATUS **INCOMPLETE**

RESIDENTS
(non-tourist periods)

383

MUNICIPAL
PLANT

1

PLANNED
CAPACITY (A.E.)

2.000

ACTUAL WATER
TREATED (m³/year)

79.974

EXISTING PURIFICATION
TREATMENTS

 **PRIMARY**



DRINKING WATER

DRINKING WATER INLET IN THE MUNICIPAL NETWORKS

97.000 m³

DRINKING WATER SUPPLIED BY MUNICIPAL NETWORKS

40.000 m³

LEAKS **59%**

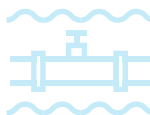
WATER SUPPLIED TO PUBLIC AND PRIVATE USERS **70** m³/day WINTER

WATER SUPPLY METHOD



DESALINATOR

334.548 m³



SUBMARINE PIPES



TANKERS



WELLS AND SPRINGS

500 m³/day SUMMER



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

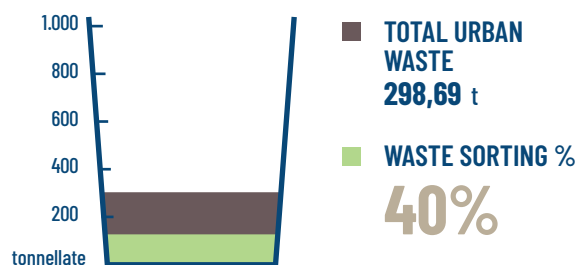
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☒ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING **307,08** kg/ab*year

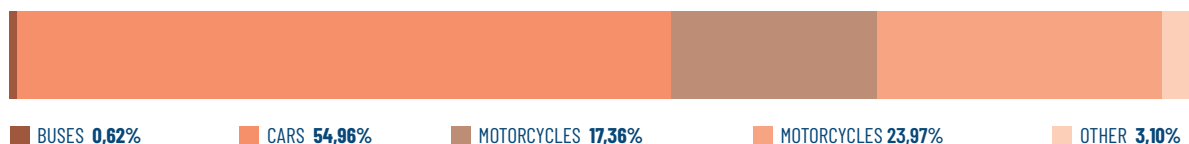
URBAN WASTE **763,92** kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

PARCO VEICOLARE



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,7** av/ab

TOTAL CARS **266**





CAPRI

ARCHIPELAGO: **CAMPANIAN**
PROVINCIA: **NAPLES**



POPULATION

13.877

TOTAL AREA

10,4 Km²

DENSITY

1.334 ab/Km²



TOURISTS/YEAR

603.615

TOURIST FACILITIES

275

DISEMBARKATION FEE

2,50 EURO/PASS

--- ANNUAL



PROTECTED AREAS

MAIN BODY AND WESTERN COASTAL CLIFFS OF THE ISLAND OF CAPRI **388** ha
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

SEABED OF PUNTA CAMPANELLA AND CAPRI **8.491** ha **100** ha in SEA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

WESTERN SECTOR AND COASTAL CLIFFS OF THE ISLAND OF CAPRI **96** ha **1** ha in SEA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

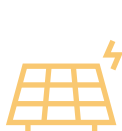
FROM FOSSIL SRC **66.600** Mwe/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

206,26 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020



THERMAL SOLAR ENERGY

118,70 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

INCOMING LOAD (A.E.)

32.683

PHYSICAL CAPACITY OF THE PLANT (A.E.)

25.000

EXISTING PURIFICATION TREATMENTS



PRIMARY



SECONDARY



TERTIARY



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

2.541.000 m³

DRINKING WATER SUPPLIED
FROM THE MUNICIPAL NETWORKS

1.528.000 m³

LEAKS **40%**

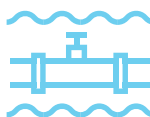
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES
FROM THE SORRENTO
PENINSULA



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

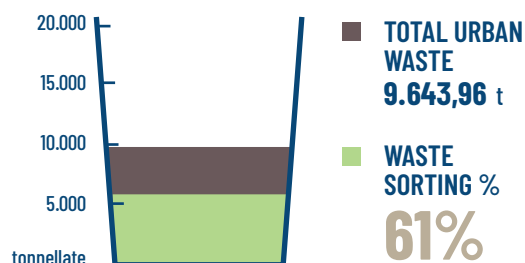
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
421,72 kg/ab*year

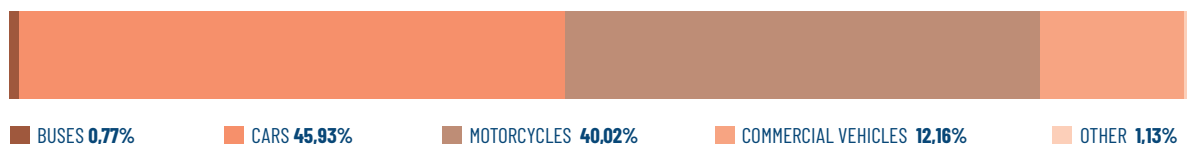
URBAN WASTE
694,96 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,3** av/ab

TOTAL CARS **4.179**



GIGLIO ISLAND

ARCHIPELAGO: TUSCAN PROVINCE: GROSSETO



POPULATION

1.345

TOTAL AREA

21,5 Km²

DENSITY

62,6 ab/Km²



TOURIST FACILITIES

104

DISEMBARKATION FEE

1,50 EURO/PASS



PROTECTED AREAS

TUSCAN ARCHIPELAGO 17.887 ha
NATIONAL PARK 56.776 ha in SEA

ISOLE DI TOSCANA 28.929 ha
UNESCO MAB BIOSPHERE RESERVE 1.050.611 ha in SEA

REFUGE FOR MARINE MAMMALS 8.750.000 ha in SEA
NATURAL MARINE AREA OF INTERNATIONAL INTEREST

GIGLIO ISLAND 2.094 ha
SPECIAL PROTECTED AREA AND SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **10.300** Mwhe/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY

SOCIETÀ IMPIANTI ELETTRICI SRL

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

34,7 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020



THERMAL SOLAR ENERGY

10 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **ABSENT**



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

231.000 m³

DRINKING WATER SUPPLIED
FROM THE MUNICIPAL NETWORKS

173.000 m³

LEAKS **25%**

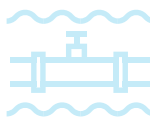
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

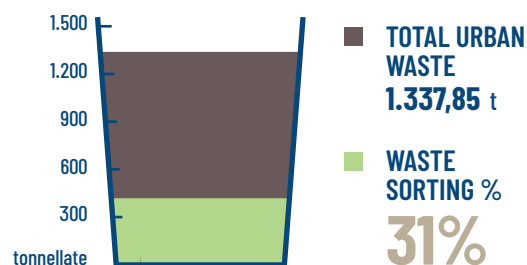
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
310,21 kg/ab*year

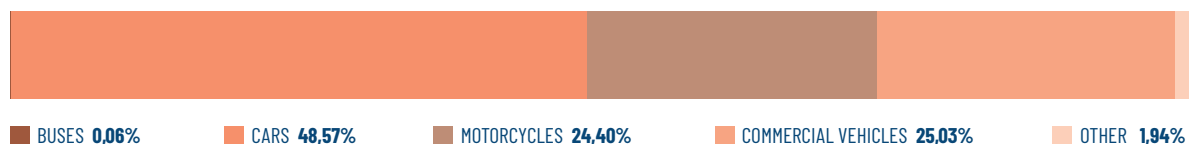
URBAN WASTE
994,69 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **850**





GORGONA

last prison
island in Italy

ARCHIPELAGO: TUSCAN PROVINCIA: LIVORNO



POPULATION

105*

TOTAL AREA

2,2 Km²

DENSITY

47,3 ab/Km²

WOODED AREA

1,7 Km²

*75 inmates, 25 penitentiary police officers and 5 civilians



TOURISTS/YEAR

2.000

TOURIST

1 OF THE PRISON
ADMINISTRATION

DISEMBARKATION FEE

6,00

EURO/PASS IN FAVOR OF THE
TUSCAN ARCHIPELAGO PARK



PROTECTED AREAS

ISLAND OF GORGONA - LAND AND MARINE AREA

SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

14.818 ha

95 ha in SEA

REFUGE FOR MARINE MAMMALS **8.750.000** ha in SEA

NATURAL MARINE AREA OF INTERNATIONAL INTEREST



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR IN DIFFERENT AREAS OF THE ISLAND**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC --- Mwhe/year

INSTALLED CAPACITY

1,265 MW

ELECTRICITY COMPANY

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

0 kW

POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW

POWER AT 2020



THERMAL SOLAR ENERGY

m²
SOLAR AREA



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

PHYSICAL CAPACITY OF THE PLANT (A.E.) **500**

INCOMING LOAD (A.E.) **150**

TYPE OF SEWER **MIXED**

MUNICIPAL PLANTS **2**

EXISTING PURIFICATION TREATMENTS

1 MECHANICAL PURIFIER

1 CONSTRUCTED WETLAND

BOTH MANAGED BY

Prison of Livorno, department of Gorgona



PRIMARY



SECONDARY



NATURAL



DRINKING WATER

DRINKING WATER INLET IN THE MUNICIPAL NETWORKS

--- m³

DRINKING WATER SUPPLIED BY MUNICIPAL NETWORKS

60 m³/day

LEAKS ---

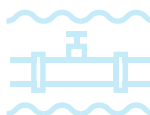
WATER SUPPLY METHOD



DESALINATOR
30 m³/day



TANKERS



**SUBMARINE
PIPES**



**WELLS AND
SPRINGS**
8 wells



WASTE

☒ **PLASTIC FREE POLICIES**

COLLECTION METHODS

☒ **STREET DUMPSTERS**

☐ DELIVERY TO ECOLOGICAL PLATFORM

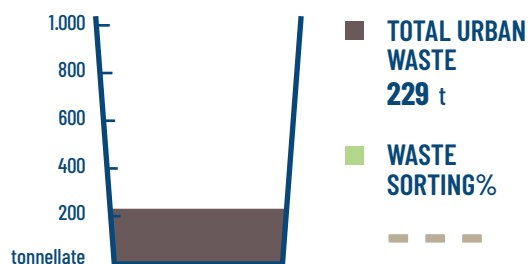
☐ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS

105 INHABITANTS USING THE
DOMESTIC COLLECTION SYSTEM



WASTE SHARE PER PERSON

WASTE SORTING

--- kg/ab*year

URBAN WASTE

--- kg/ab*year



MOBILITY

☒ **CAR SHARING**

TOTAL VEHICLES 10 ALL OWNED BY THE PRISON ADMINISTRATION
AND DIESEL-FUELED



DIESEL VEHICLES 4

DIESEL TRACTORS 6



ISCHIA

ARCHIPELAGO: PHLEGRAEN PROVINCIA: NAPLES



POPULATION

62.323

TOTAL AREA

46,3 Km²

DENSITY

1.346 ab/Km²



TOURISTS/YEAR

TOURIST FACILITIES

371

DISEMBARKATION FEE

NO



PROTECTED AREAS

KINGDOM OF NEPTUNE 11.256 ha in SEA
PROTECTED MARINE AREA

MAIN BODY OF THE ISLAND OF ISCHIA 1.310 ha
SPECIAL CONSERVATION AREA

PINE GROVES OF THE ISLAND OF ISCHIA 66 ha
SPECIAL CONSERVATION AREA

COASTAL CLIFFS OF THE ISLAND OF ISCHIA 685 ha
SPECIAL CONSERVATION AREA

CYPERUS POLYSTACHYUS STATION 14 ha
SPECIAL CONSERVATION AREA

SEABED OF ISCHIA, PROCIDA AND VIVARA 6.116 ha **100** ha in SEA

SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA





ENERGY

☒ INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **3.960,39** kW
POWER AT 31/12/2021

WIND POWER SYSTEMS
 **0** kW
POWER AT 2020

SOLAR THERMAL ENERGY
 **1.504,33** m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**



DRINKING WATER

DRINKING WATER INLET IN THE MUNICIPAL NETWORKS

12.984.000 m³

DRINKING WATER SUPPLIED BY MUNICIPAL NETWORKS

958.000 m³

LEAKS **26%**

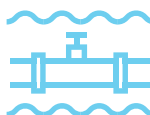
MODALITÀ APPROVVIGIONAMENTO IDRICO



DESALINATOR



TANKERS



SUBMARINE PIPES



WELLS AND SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

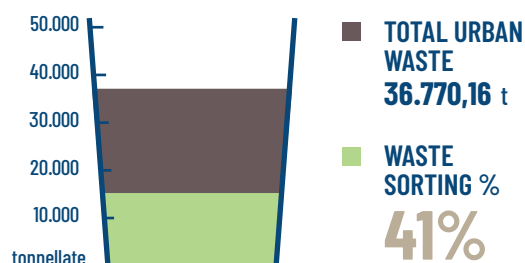
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
239,08 kg/ab*year

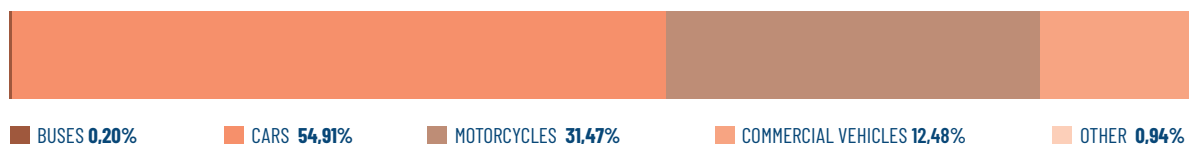
URBAN WASTE
589,99 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **39.046**





ELBA ISLAND

ARCHIPELAGO: TUSCAN PROVINCE: LIVORNO



POPULATION

31.477

TOTAL AREA

224 Km²

DENSITY

140,5 ab/Km²



TOURIST FACILITIES

689

DISEMBARKATION FEE

1,50 EURO/PASS (LOW SEASON)

PIOMBINO-PORTOFERRAIO SECTION

5,00 EURO/PASS (PEAK SEASON)

PIOMBINO-RIO MARINA AND PIOMBINO-CAVO SECTIONS

3,50 EURO/PASS (PEAK SEASON)



PROTECTED AREAS

TUSCAN ARCHIPELAGO

NATIONAL PARK

17.887 ha

56.776 ha in SEA

ISOLE DI TOSCANA

UNESCO MAB BIOSPHERE RESERVE

28.929 ha

1.050.611 ha in SEA

REFUGE FOR MARINE MAMMALS **8.750.000** ha in SEA

NATURAL MARINE AREA OF INTERNATIONAL INTEREST

EASTERN ELBA **4.687** ha **2** ha in SEA

SPECIAL PROTECTED AREA




ENERGY




INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **3.623,81** kW
POWER AT 31/12/2021

WIND POWER SYSTEMS
 **0** kW
POWER AT 2020

THERMAL SOLAR ENERGY
 **264,29** m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

TYPE OF SEWER **MIXED**

MUNICIPAL PLANTS **23**

INCOMING LOAD (A.E.)

43.456

PHYSICAL CAPACITY OF THE PLANT (A.E.)

128.300

ACTUAL WATER TREATED (m³/YEAR)

- - -

TRATTAMENTI DI DEPURAZIONE PRESENTI





DRINKING WATER

DRINKING WATER INLET IN
THE MUNICIPAL NETWORKS

4.959.780 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

2.666.972 m³

LEAKS **46%**

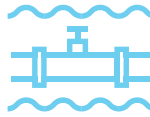
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES

4.057.391 m³



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

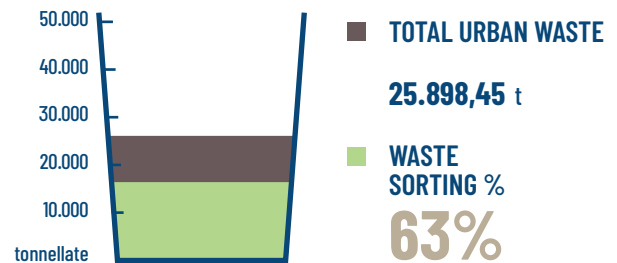
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☒ RECYCLING BANKS



WASTE SHARE PER PERSON

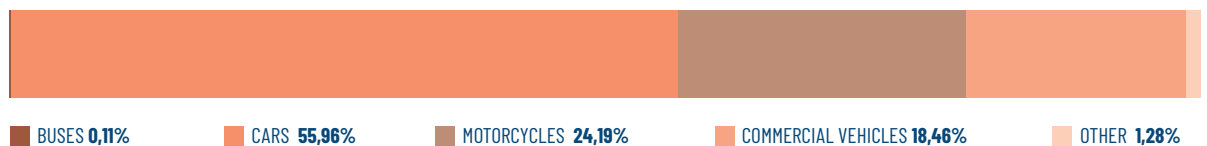
WASTE SORTING
514,53 kg/ab*year

URBAN WASTE
822,77 kg/ab*year



MOBILITY

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,3** av/ab

TOTAL CARS **4.179**





AEGADIAN ISLANDS

ARCHIPELAGO: AEGADIAN PROVINCIA: TRAPANI



POPULATION

4.270

TOTAL AREA

37,7 Km²

DENSITY

113,3 ab/Km²



TOURIST FACILITIES

76T

DISSEMBARKATION FEE

2,50 EURO/PASS FAVIGNANA

1,50 EURO/PASS MARETTIMO

1,50 EURO/PASS LEVANZO



PROTECTED AREAS

AEGADIAN ARCHIPELAGO - MARINE AND LAND AREA **48.291** ha **93** ha A MARE
SPECIAL PROTECTED AREA

AEGADIAN ISLANDS **53.992** ha A MARE
PROTECTED MARINE AREA

ISLAND OF FAVIGNANA **1.832** ha **2** ha A MARE
SPECIAL CONSERVATION AREA

SEABED OF THE ARCHIPELAGO OF THE AEGADIAN ISLANDS **54.281** ha
SPECIAL CONSERVATION AREA

ISLAND OF LEVANZO **552** ha **2** ha A MARE
SPECIAL CONSERVATION AREA

ISLAND OF MARETTIMO **1.111** ha **2** ha A MARE
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR ***

FAVIGNANA



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **15.470** Mwhe/year

INSTALLED CAPACITY

20 MW

ELECTRICITY COMPANY
SOCIETÀ ELETTRICA DI FAVIGNANA SPA

MARETTIMO



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **2.040** Mwhe/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY
S.EL.I.S. MARETTIMO SPA

LEVANZO



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **600** Mwhe/year

INSTALLED CAPACITY

1 MW

ELECTRICITY COMPANY
SI.C.EL. SRL

* Including domestic gas cylinders

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS



404,11 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020

THERMAL SOLAR ENERGY



499,96 m²
SOLAR AREA AT 31/12/2021



PURIFICATION

WASTE WATER TREATMENT

PURIFICATION STATUS **ABSENT**



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

900.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

125.000 m³

LEAKS **86%**

WATER SUPPLY METHOD

FAVIGNANA



DESALINATOR
(SICILACQUE)



SUBMARINE PIPES
FROM TRAPANI (EAS)



TANKERS
INTENSIVE IN THE SUMMER



WELLS, SPRINGS AND
STORAGE TANKS (4.390 m³)

MARETTIMO



DESALINATOR



SUBMARINE PIPES
FROM TRAPANI



TANKERS
INTENSIVE IN THE SUMMER



WELLS AND SPRINGS
KARSTIC WATER SOURCES

LEVANZO



DESALINATOR



SUBMARINE PIPES
FROM FAVIGNANA



TANKERS
INTENSIVE IN THE SUMMER



WELLS AND SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

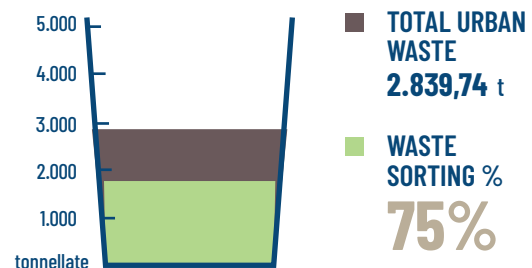
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
501,85 kg/ab*year

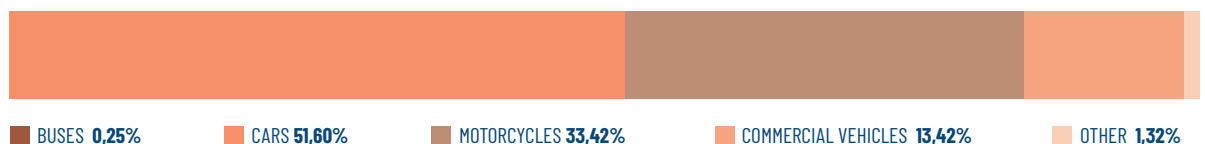
URBAN WASTE
665,04 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET

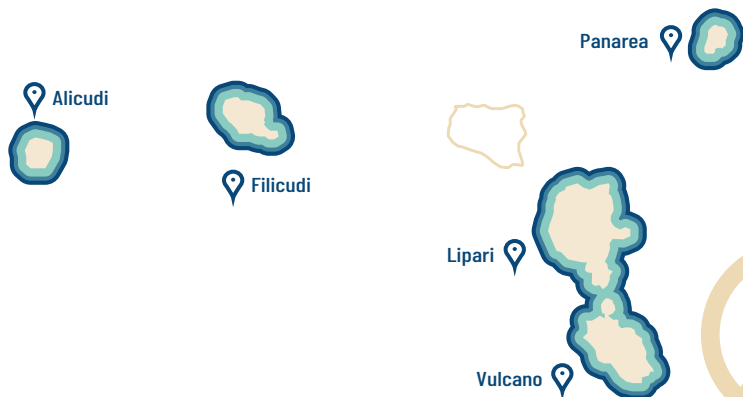


CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **2.707**





AEOLIAN ISLANDS

ARCHIPELAGO: AEOLIANE PROVINCE: MESSINA



POPULATION
12.266

TOTAL AREA
89 Km²

DENSITY
138 ab/Km²



TOURIST FACILITIES

220

DISEMBARKATION FEE

2,50 EURO/PASS
(LOW SEASON)

5,00 EURO/PASS
(PEAK SEASON)

— — — ANNUAL
REVENUE



PROTECTED AREAS

ISLAND OF ALICUDI **371** ha
ORIENTED NATURE RESERVE

ISLAND OF FILICUDI E SCOGLI CANNA E MONTENASSARI **636** ha
ORIENTED NATURE RESERVE

ISLAND OF VULCANO **1.362** ha
ORIENTED NATURE RESERVE

ISLAND OF STROMBOLI E STROMBOLICCHIO **1.053** ha
ORIENTED NATURE RESERVE

ISLAND OF PANAREA AND VICINIORI ROCKS
ORIENTED NATURE RESERVE **283** ha

AEOLIAN ARCHIPELAGO - MARINE AND LAND AREAS
SPECIAL PROTECTED AREA **40.432** ha **79** ha in SEA

ISLAND OF ALICUDI **389** ha
SPECIAL CONSERVATION AREA

ISLAND OF LIPARI **2.476** ha
SPECIAL CONSERVATION AREA

ISLAND OF DI PANAREA AND VICINIORI ROCKS
SPECIAL CONSERVATION AREA **259** ha

ISOLA DI VULCANO **1.608** ha
SPECIAL CONSERVATION AREA

ISLAND OF STROMBOLI AND STROMBOLICCHIO **1.057** ha
SPECIAL CONSERVATION AREA

ISLAND OF FILICUDI **779** ha
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**

INSTALLED CAPACITY* **4** MW

LIPARI ELECTRICITY PROD. FOSSIL SRC
34.800 Mwhe/year
COMPANY: COMPANY ELETTRICA LIPARESE

VULCANO ELECTRICITY PROD. FOSSIL SRC
7.280 Mwhe/year
COMPANY: ENEL PRODUZIONE

PANAREA ELECTRICITY PROD. FOSSIL SRC
3.140 Mwhe/year
COMPANY: ENEL PRODUZIONE

FILICUDI ELECTRICITY PROD. FOSSIL SRC
1.400 Mwhe/year
COMPANY: ENEL PRODUZIONE

ALICUDI ELECTRICITY PROD. FOSSIL SRC
400 Mwhe/year
COMPANY: ENEL PRODUZIONE

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 508,89 kW
POWER AT 31/12/2021

WIND POWER SYSTEM
 0 kW
POWER AT 2020

THERMAL SOLAR ENERGY
 391,12 m²
SOLAR AREA AT 31/12/2021



PURIFICATION

WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE***

*data on the island of Lipari

INCOMING
LOAD (A.E.)

10.075

PHYSICAL CAPACITY
OF THE PLANT (A.E.)

10.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET IN
THE MUNICIPAL NETWORKS

1.129.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

756.000 m³

LEAKS **33%**

WATER SUPPLY METHOD

LIPARI



REVERSE OSMOSIS
DESALINATOR



SUBMARINE
PIPES



TANKERS



WELLS AND
SPRINGS

VULCANO



DESALINATOR



SUBMARINE
PIPES



TANKERS
FROM NAPLES OR PALERMO



WELLS AND
SPRINGS

FILICUDI



DESALINATOR



SUBMARINE
PIPES



TANKERS



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

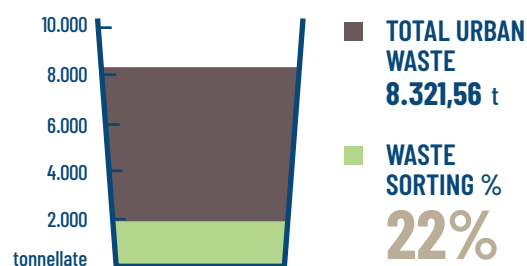
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
151,76 kg/ab*year

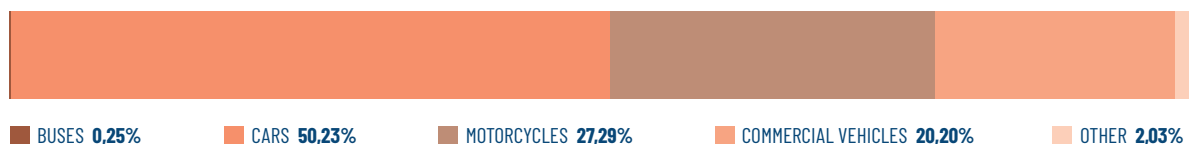
URBAN WASTE
678,42 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

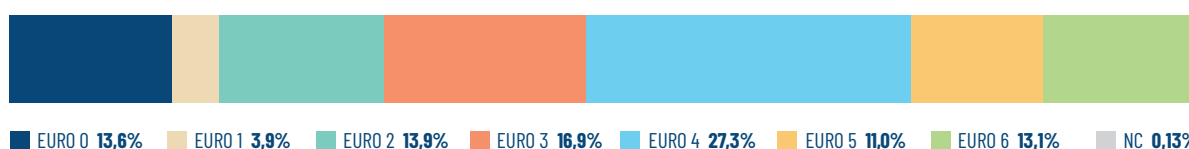
VEHICLE FLEET



ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,3** av/ab

TOTAL CARS **4.179**





SALINA

Municipality of
Santa Marina
Salina, Leni
and Malfa

ARCHIPELAGO: **AEOLIAN** PROVINCIA: **MESSINA**



POPULATION

2.522

TOTAL AREA

26,2 Km²

DENSITY

96,3 ab/
Km²



TOURISTS/YEAR

25.570

TOURIST FACILITIES

52

DISSEMBARKATION FEE*

2,50 EURO/PASS
(LOW SEASON)

5,00

*Malfa and Santa Marina Salina

EURO/PASS
(PEAK SEASON)



PROTECTED AREAS

LE MONTAGNE DELLE FELCI E DEI PORRI **1.079** ha
NATURE RESERVE

ISLAND OF SALINA (STAGNO DI LINGUA) **1.234** ha
SPECIAL CONSERVATION AREA

AEOLIAN ARCHIPELAGO - MARINE AND LAND AREAS **40.432** ha **79** ha in SEA
SPECIAL PROTECTED AREA

ISLAND OF SALINA (MONTE FOSSA DELLE FELCI E DEI PORRI) **665** ha
SPECIAL CONSERVATION AREA

SEABED OF THE ISLAND OF SALINA **1.565** ha **100** ha in SEA
SITE OF COMMUNITY INTEREST



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **9.160** Mwhe/year

INSTALLED CAPACITY

3,9 MW

ELECTRICITY COMPANY

ENEL PRODUZIONE

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

103,50 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020



THERMAL SOLAR ENERGY

72,72 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **ABSENT**



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

449.000 m³

DRINKING WATER SUPPLIED
FROM THE MUNICIPAL NETWORKS

265.000 m³

LEAKS **41%**

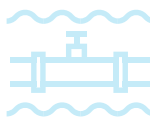
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS

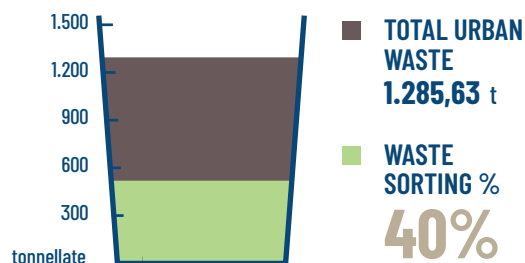


WASTE

☒ **PLASTIC FREE POLICIES***
*only in the municipality of Malfa

COLLECTION METHODS

- ☒ STREET DUMPSTERS
- ☒ DELIVERY TO ECOLOGICAL PLATFORM
- ☐ DOMESTIC COMPOSTING
- ☒ DOOR-TO-DOOR
- ☐ ON-CALL SERVICE
- ☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
202,17 kg/ab*year

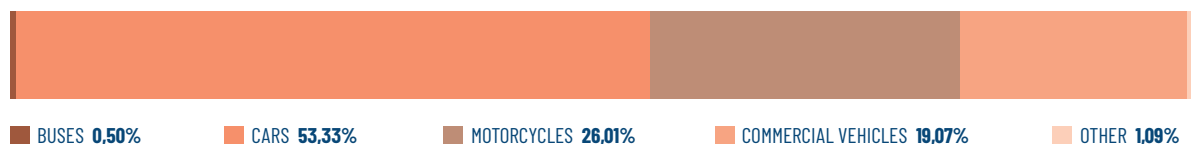
URBAN WASTE
509,77 kg/ab*year



MOBILITY

☒ **SUSTAINABLE MOBILITY POLICIES**

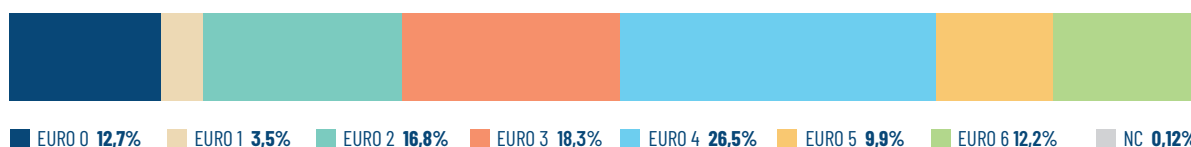
VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,7** av/ab

TOTAL CARS **1.712**



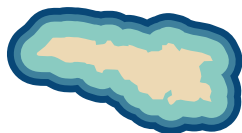


Linosa

PELAGIAN ISLANDS

ARCHIPELAGO: PELAGIAN PROVINCE: AGRIGENTO

Lampedusa



POPULATION

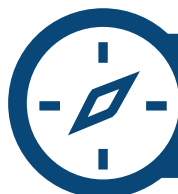
6.337

TOTAL AREA

25,5 Km²

DENSITY

248,2 ab/Km²



TOURIST FACILITIES

96

DISEMBARKATION FEE

2,50 EURO/PASS

ANNUAL REVENUES



PROTECTED AREAS

PELAGIAN ISLANDS 4.136 ha in SEA
PROTECTED MARINE AREA

ISLAND OF LAMPEDUSA - RABBIT ISLAND 370 ha
ORIENTED NATURE RESERVE

ISLAND OF LINOSA E LAMPIONE 267 ha
ORIENTED NATURE RESERVE

SEABED OF THE PELAGIAN ISLANDS 267 ha
SPECIAL CONSERVATION AREA

PELAGIAN ARCHIPELAGO - MARINE AND LAND AREAS 12.729 ha **86** ha in SEA
SPECIAL PROTECTED AREA

ISLAND OF LAMPEDUSA E LAMPIONE 1.406 ha **7** ha in SEA
SPECIAL CONSERVATION AREA

ISLAND OF LINOSA 435 ha **8** ha in SEA
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**

LINOSA



ELECTRICITY PRODUCTION

DA FONTI FOSSILI 2.800 Mwh/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY

S.EL.I.S. LINOSA SPA

LAMPEDUSA



ELECTRICITY PRODUCTION

DA FONTI FOSSILI 10.342 Mwh/year

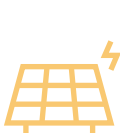
INSTALLED CAPACITY

10 MW

ELECTRICITY COMPANY

S.EL.I.S. LAMPEDUSA SPA

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

605,12 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2019



THERMAL SOLAR ENERGY

526,01 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **OUT OF ORDER**

INCOMING LOAD (A.E.)

7.200

PHYSICAL CAPACITY OF THE PLANT (A.E.)

8.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

876.000 m³

DRINKING WATER SUPPLIED
FROM THE MUNICIPAL NETWORKS

727.000 m³

LEAKS **17%**

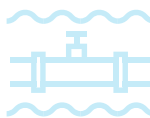
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

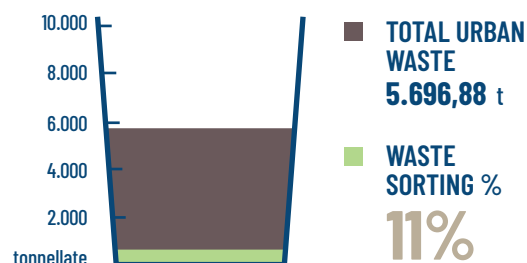
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
96,70 kg/ab*year

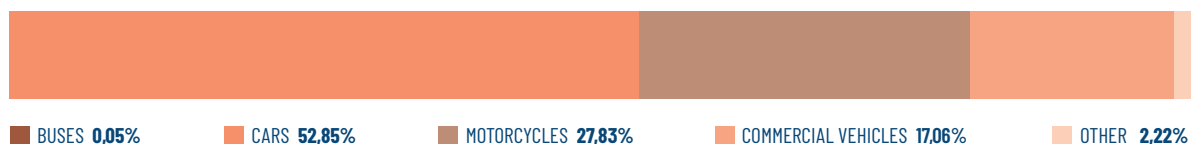
URBAN WASTE
898,99 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

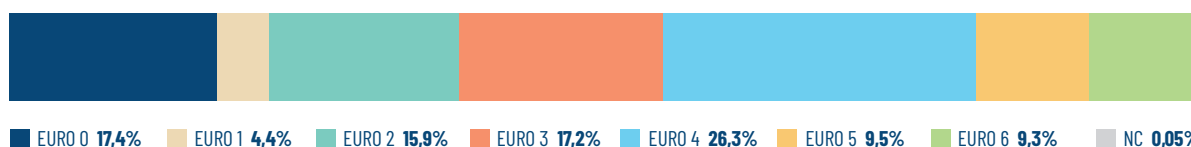
VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,3** av/ab

TOTAL CARS **4.179**





TREMITI ISLANDS

ARCHIPELAGO: TREMITI PROVINCE: FOGGIA



POPULATION

451

TOTAL AREA

3,18 Km²

DENSITY

141,8 ab/Km²



TOURIST FACILITIES

39

DISEMBARKATION FEE

2,50 EURO/PASS

ANNUAL REVENUES

PROTECTED AREAS



GARGANO 121.118 ha
NATIONAL PARK

TREMITI ISLANDS 372 ha
SPECIAL CONSERVATION AREA

TREMITI ISLANDS 1.466 ha IN SEA
PROTECTED MARINE AREA

TREMITI ISLANDS 342 ha
SPECIAL PROTECTED AREA

ENERGY



MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **3.870** Mwhe/year

INSTALLED CAPACITY

5 MW

ELECTRICITY COMPANY

GERMANO INDUSTRIE ELETTRICHE

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

18,40 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020



THERMAL SOLAR ENERGY

16,9 m²
SOLAR AREA AT 31/12/2021

PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

INCOMING LOAD (A.E.)

963

PHYSICAL CAPACITY OF THE PLANT (A.E.)

5.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

193.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

175.000 m³

LEAKS **9%**

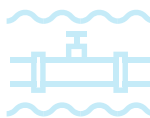
WATER SUPPLY METHOD



DESALINATOR



TANKERS
FROM
MANFREDONIA



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

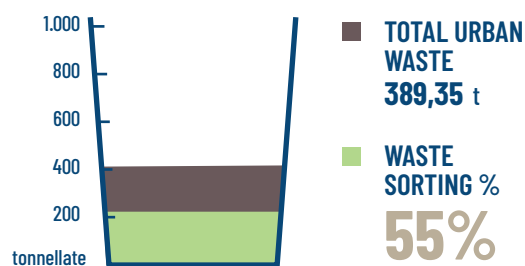
☐ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
473,81 kg/ab*year

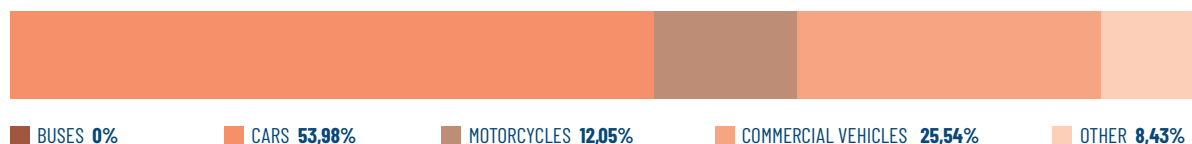
URBAN WASTE
863,30 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

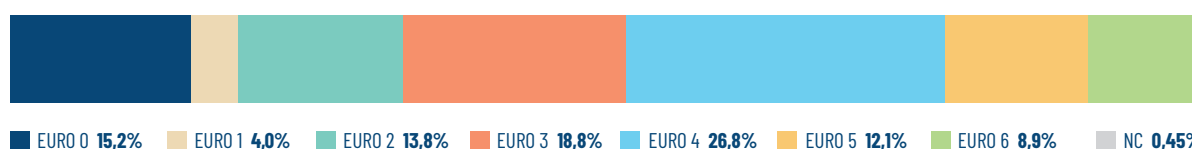
VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,5** av/ab

TOTAL CARS **224**





MADDALENA

ARCHIPELAGO: LA MADDALENA PROVINCIA: SASSARI



POPULATION
10.722

TOTAL AREA
20 Km²

DENSITY
533,4 ab/Km²



TOURIST FACILITIES
87

DISEMBARKATION FEE
0,50 EURO/PASS
(OCT 1ST TO MARCH 31ST)

2,50 EURO/PASS
(APR 1ST TO SEP 30TH)

only for disembarkations in the smaller islands
5,00 EURO/PASS
(FROM JUN 1ST TO AUG 31ST)



PROTECTED AREAS

ARCHIPELAGO OF LA MADDALENA **5.134** ha **15.046** ha in SEA
NATIONAL PARK

REFUGE FOR MARINE MAMMALS **8.750.000** ha in SEA
NATURAL MARINE AREA OF INTERNATIONAL INTEREST

ARCHIPELAGO OF LA MADDALENA **21.004** ha **79** ha in SEA
SITE OF COMMUNITY INTEREST AND SPECIAL PROTECTED AREA





ENERGY

☒ INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **990,50** kW
POWER AT 31/12/2021

WIND POWER SYSTEMS
 **0** kW
POWER AT 2020

THERMAL SOLAR ENERGY
 **51,3** m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

TYPE OF SEWER **MIXED**

MUNICIPAL PLANTS **1** ACTUAL WATER TREATED **2.393.019** m³/year

INCOMING
LOAD (A.E.)
26.883

PHYSICAL CAPACITY
OF THE PLANT (A.E.)
37.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

3.200.000 m³

DRINKING WATER SUPPLIED
FROM THE MUNICIPAL NETWORKS

--- m³

LEAKS --- %

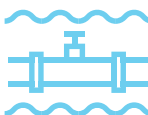
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES
FROM THE DAM OF "LISCIA"
(PROV. SASSARI)



WELLS AND
SPRINGS



WASTE



PLASTIC FREE POLICIES

COLLECTION METHODS



STREET DUMPSTERS



DELIVERY TO ECOLOGICAL PLATFORM



DOMESTIC COMPOSTING



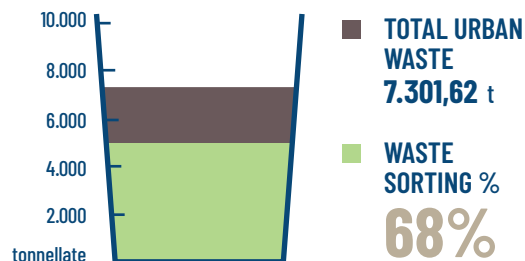
DOOR-TO-DOOR



ON-CALL SERVICE



RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING

462,49 kg/ab*year

URBAN WASTE

680,99 kg/ab*year



MOBILITY

VEHICLE FLEET

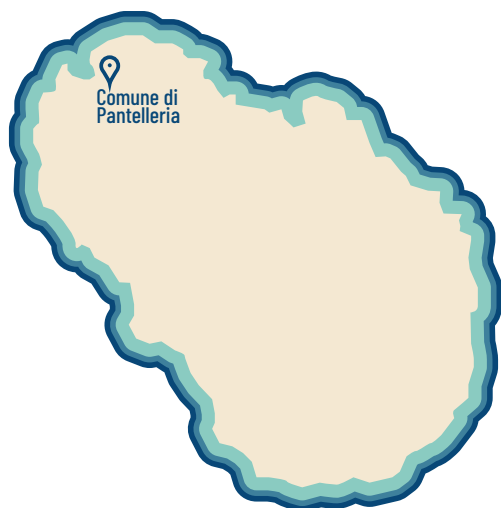


CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,3** av/ab

TOTAL CARS **4.179**





PANTELLERIA

ARCHIPELAGO: PELAGIAN PROVINCE: TRAPANI



POPULATION

7.366

TOTAL AREA

84,5 Km²

DENSITY

87,2 ab/Km²



TOURISTS/YEAR TOURIST FACILITIES

109.318 45

DISEMBARKATION FEE

2,50 EURO/PASS
(01/01 TO 30/06 AND 01/09 TO 31/12)

5,00 EURO/PASS
(01/07 TO 31/08)

REVENUES

€ 269.747

TOTAL REVENUES FROM ITS APPLICATION

€ 807.000



PROTECTED AREAS

ISLAND OF PANTELLERIA AND SURROUNDING MARINE AREA **15.778** ha **59** ha in SEA
SPECIAL PROTECTED AREA

ISLAND OF PANTELLERIA - COASTAL AREA, CLIFFS AND BAGNO DELL'ACQUA LAKE **3.402** ha
SPECIAL CONSERVATION AREA **10** ha in SEA

ISLAND OF PANTELLERIA: MONTAGNA GRANDE AND MOUNT GIBELE **3.099** ha
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **8 DIESEL GENERATORS**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **39.000** Mwhe/year

INSTALLED CAPACITY

23 MW

ELECTRICITY COMPANY

S.MED.E PANTELLERIA SPA

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

840,31 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

32 kW
POWER AT 2020



THERMAL SOLAR ENERGY

547,98 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

TYPE OF SEWER **MIXED**

INCOMING LOAD (A.E)

5.900 (WINTER)
9.900 (SUMMER)

ACTUAL WATER TREATED

550.000 m³/year

MUNICIPAL PLANTS **1**

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET IN THE MUNICIPAL NETWORKS

--- m³

DRINKING WATER SUPPLIED BY MUNICIPAL NETWORKS

--- m³

LEAKS **40%**

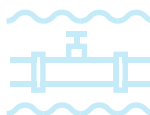
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

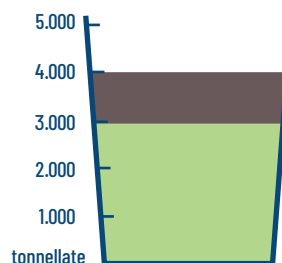
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☐ RECYCLING BANKS



TOTAL URBAN
WASTE
4.009,56 t

WASTE
SORTING %
73%

WASTE SHARE PER PERSON

WASTE SORTING
396,74 kg/ab*year

URBAN WASTE
544,3 kg/ab*year

INHABITANTS USING DOMESTIC COLLECTION SYSTEMS **7.496** ab/year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



BUSES 0,08%

CARS 55,98%

MOTORCYCLES 14,11%

COMMERCIAL VEHICLES 28,52%

OTHER 1,31%

CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,9** av/ab

TOTAL CARS **6.325**



EURO 0 12,8%

EURO 1 3,7%

EURO 2 15,1%

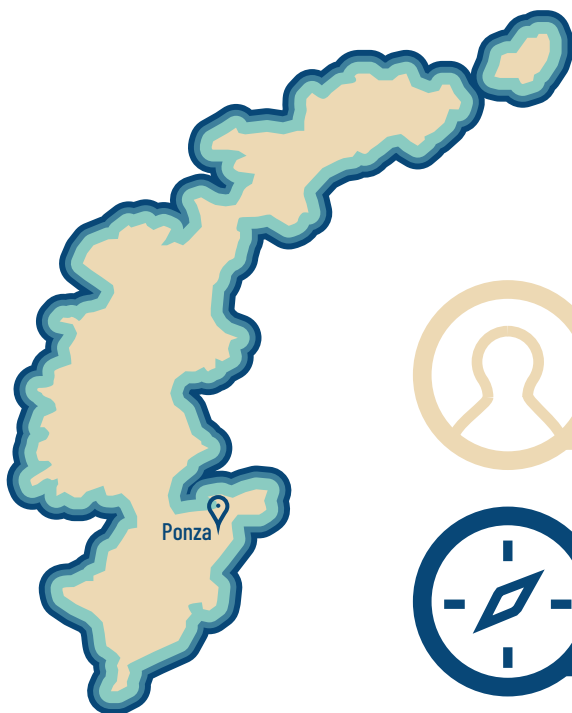
EURO 3 17,9%

EURO 4 28,4%

EURO 5 9,9%

EURO 6 12,0%

NC 0,09%



PONZA

ARCHIPELAGO: PONTINE PROVINCE: LATINA



POPULATION

3.301

TOTAL AREA

7,6 Km²

DENSITY

434,3 ab/Km²



TOURIST FACILITIES

134

DISEMBARKATION FEE

2,50 EURO/PASS



PROTECTED AREAS

CIRCEO 8.484 ha
NATIONAL PARK

ISLANDS OF PONZA, PALMAROLA, ZYEARNE, VENTOTENE AND S. STEFANO 17.168 ha **70** ha in SEA
SPECIAL PROTECTED AREA

SEABED SURROUNDING THE ISLAND OF PONZA 2.207 ha **100** ha in SEA
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **11.500** Mwh/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY

SOCIETÀ ELETTRICA PONZESE

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS

289,29 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

0 kW
POWER AT 2020



THERMAL SOLAR ENERGY

81,11 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

467.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

149.000 m³

LEAKS **68%**

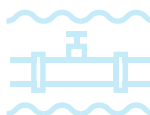
WATER SUPPLY METHOD



DESALINATOR
MOBILE



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☒ STREET DUMPSTERS

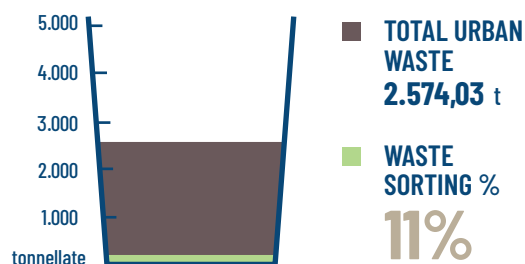
☐ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☐ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
84,84 kg/ab*year

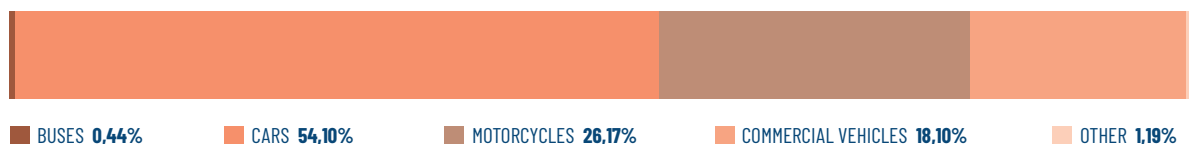
URBAN WASTE
779,77 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES



MOTORIZATION RATE **0,9** av/ab

TOTAL CARS **6.325**



PROCIDA

ARCHIPELAGO: PHLEGRAEAN PROVINCIA: NAPLES



POPULATION

10.183

TOTAL AREA

4,26 Km²

DENSITY

2390,4 ab/Km²



TOURIST FACILITIES

33

DISEMBARKATION FEE

2,00 EURO/PASS



PROTECTED AREAS

KINGDOM OF NEPTUN **11.256** ha IN SEA
PROTECTED MARINE AREA

SEABED OF ISCHIA, PROCIDA AND VIVARA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA


8.491 ha **100** ha IN SEA





ENERGY

☒ INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **339,78** kW
POWER AT 31/12/2021

WIND POWER SYSTEMS
 **0** kW
POWER AT 2020

THERMAL SOLAR ENERGY
 **252** m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

910.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

710.000 m³

LEAKS **22%**

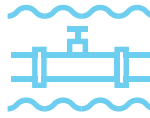
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

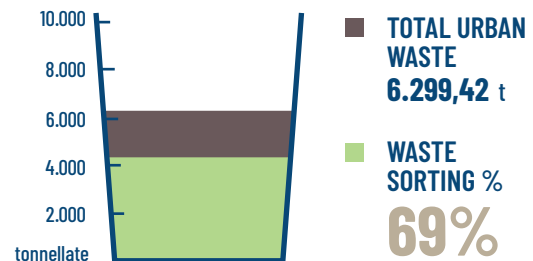
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☐ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
426,83 kg/ab*year

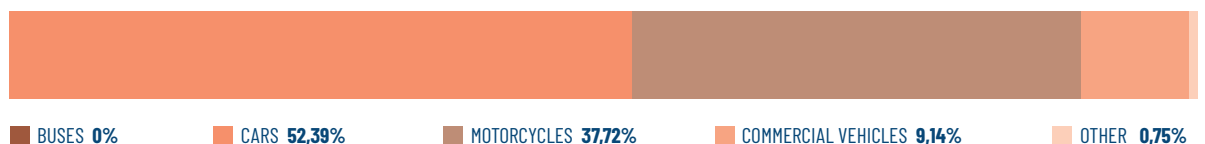
URBAN WASTE
618,62 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,5** av/ab

TOTAL CARS **4.620**





SAN PIETRO

ARCHIPELAGO: **SULCIS** PROVINCE: **SOUTH SARDINIA**



POPULATION

5.960

TOTAL AREA

51 Km²

DENSITY

116,9 ab/Km²



TOURIST FACILITIES

44

DISSEMBARKATION FEE

1,50 EURO/PASS
(JAN, FEB, MAR, NOV, DEC)

2,00 EURO/PASS
(APR, MAY, OCT)

2,50 EURO/PASS
(JUN, JUL, AUG, SEP)



PROTECTED AREAS

COAST AND HINTERLAND, BETWEEN PUNTA CYEARNI AND PUNTA DELLE OCHE **1.911** ha **16** ha IN SEA
SPECIAL PROTECTED AREA

ISLAND OF SAN PIETRO **9.274** ha **26** ha IN SEA
SPECIAL CONSERVATION AREA

**HISTORICAL AND ENVIRONMENTAL
GEOMINERAL PARK OF SARDINIA**
OTHER AREAS

THE COLUMNS **11** ha
NATURAL MONUMENT


(LIPU) OASIS OF CARLOFORTE **284** ha
NATURAL OASIS





ENERGY

☒ INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **1.547,23** kW
kW POWER AT 31/12/2021

WIND POWER SYSTEMS
 **0** kW
kW POWER AT 2020

THERMAL SOLAR ENERGY
 **53,34** m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

INCOMING
LOAD (A.E.)
8.000

PHYSICAL CAPACITY
OF THE PLANT (A.E.)
8.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

717.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

348.000 m³

LEAKS **51%**

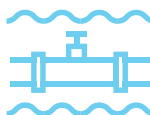
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES
FROM SANT'ANTIOCO



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

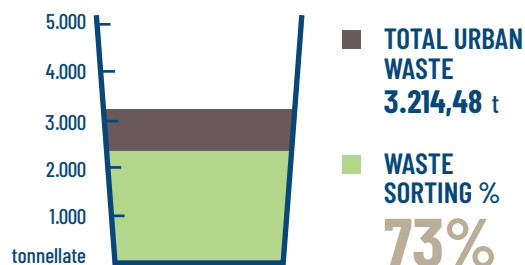
☒ DELIVERY TO ECOLOGICAL PLATFORM

☐ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
391,77 kg/ab*year

URBAN WASTE
539,34 kg/ab*year



MOBILITY

☒ BIKE LANES **1,2** Km

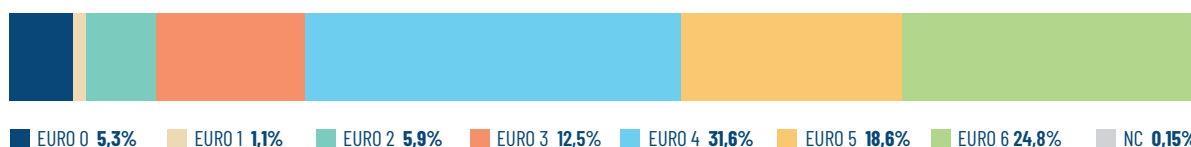
VEHICLE FLEET

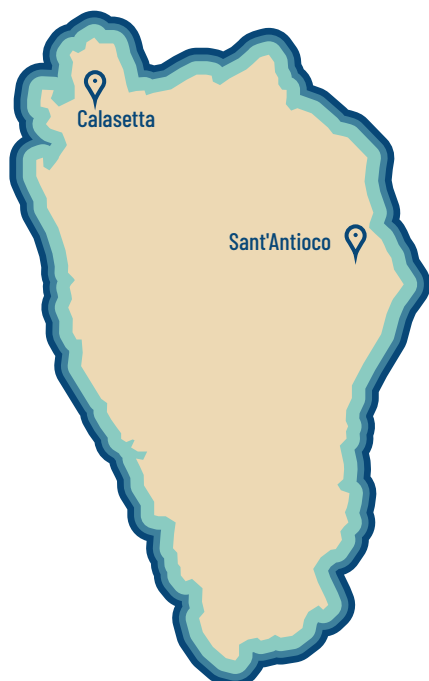


CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **3.326**





SANT'ANTIOCO

ARCHIPELAGO: **SULCIS** PROVINCE: **SOUTH SARDINIA**



POPULATION

13.570

TOTAL AREA

115,6 Km²

DENSITY

117,4 ab/Km²



TOURIST FACILITIES

77

DISEMBARKATION FEE*

NO

*Sant'Antioco applies an environmental accommodation fee



PROTECTED AREAS

ISLAND OF SANT'ANTIOCO, CAPO SPERONE **1.785** ha **20** ha IN SEA
SPECIAL PROTECTED AREA

IS PRUINIS **94** ha **60** ha IN SEA
SPECIAL CONSERVATION AREA

PUNTA GIUNCHERA **54** ha **71** ha IN SEA
SPECIAL CONSERVATION AREA

POND OF SANTA CATERINA **625** ha
SPECIAL CONSERVATION AREA

IS TRES PORTUS GREENHOUSE (SANT'ANTIOCO) **261** ha **25** ha IN SEA
SPECIAL CONSERVATION AREA

BULL ISLAND **63** ha **79** ha IN SEA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

NORTH OF SALINA (CALASETTA) **5** ha
SPECIAL CONSERVATION AREA

COW ISLAND **60** ha **83** ha IN SEA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

BETWEEN POGGIO LA SALINA AND PUNTA MAGGIORE
SPECIAL CONSERVATION AREA **11** ha

HISTORICAL AND ENVIRONMENTAL GEOMINERAL PARK OF SARDINIA
OTHER AREAS





ENERGY

☒ **INTERCONNECTED TO THE NATIONAL ELECTRICITY GRID**

RENEWABLE SOURCES

PHOTOVOLTAIC SYSTEMS
 **1.934,61** kW
POWER AT 1/12/2021

WIND POWER SYSTEMS
 **55** kW
kW POWER AT 2020

THERMAL SOLAR ENERGY
 **193,58** m²
SOLAR AREA AT 31/12/2021



PURIFICATION

☒ **WASTE WATER TREATMENT**

PURIFICATION STATUS **INCOMPLETE**

TYPE OF SEWER **SEPARATE**

INCOMING LOAD (A.E.)

20.129

PHYSICAL CAPACITY OF THE PLANT (A.E.)

15.000

EXISTING PURIFICATION TREATMENTS



MUNICIPAL PLANTS 1



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

2.168.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

918.000 m³

LEAKS **58%**

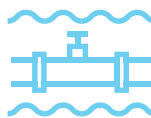
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES
FROM THE DAM
OF BAU PRESSIU



WELLS AND
SPRINGS



WASTE



PLASTIC FREE POLICIES*

*only in the municipality of Sant'Antioco

COLLECTION METHODS



STREET DUMPSTERS



DELIVERY TO ECOLOGICAL PLATFORM



DOMESTIC COMPOSTING



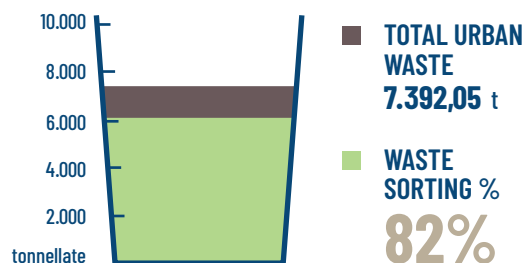
DOOR-TO-DOOR



ON-CALL SERVICE



RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING

447,00 kg/ab*year

URBAN WASTE

544,73 kg/ab*year

INHABITANTS USING DOMESTIC COLLECTION SYSTEMS **10.854** ab/year

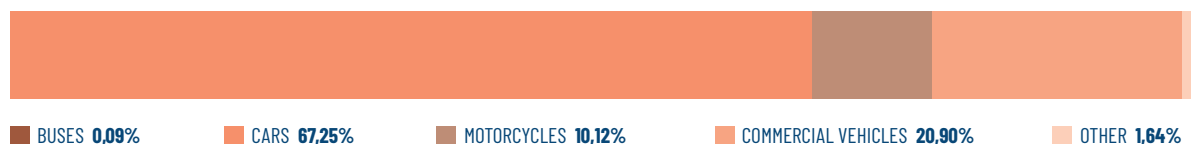


MOBILITY



BIKE LANES **8** linear Km

VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **8.180**





USTICA

PROVINCE: PALERMO



POPULATION
1.271

TOTAL AREA
8,65 Km²

DENSITY
147 ab/Km²



TOURIST FACILITIES
34

DISEMBARKATION FEE
2,50 EURO/PASS

--- ANNUAL REVENUES



PROTECTED AREAS

ISLAND OF USTICA 15.951 ha IN SEA
PROTECTED MARINE AREA

ISLAND OF USTICA 204 ha
ORIENTED NATURE RESERVE

ISLAND OF USTICA 349 ha **5** ha IN SEA
SPECIAL CONSERVATION AREA AND SPECIAL PROTECTED AREA

SEABED OF THE ISLAND OF USTICA 16.214 ha **100** ha IN SEA
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION
FROM FOSSIL SRC **4.870** Mwhe/year

INSTALLED CAPACITY
--- MW

ELECTRICITY COMPANY
IMPRESA ELETTRICA D'ANNA BONACCORSI

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS
432,64 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS
0 kW
POWER AT 2020



THERMAL SOLAR ENERGY
121,09 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

TYPE OF SEWER **SEPARATE**

MUNICIPAL PLANTS **1**

INCOMING LOAD (A.E.)
1.320

PHYSICAL CAPACITY OF THE PLANT (A.E.)
3.500

EXISTING PURIFICATION TREATMENTS



PRIMARY



SECONDARY



TERTIARY



DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

293.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

233.000 m³

LEAKS **20%**

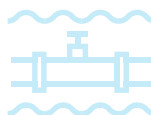
WATER SUPPLY METHOD



1
DESALINATOR
300.000 m³



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

COLLECTION METHODS

☐ STREET DUMPSTERS

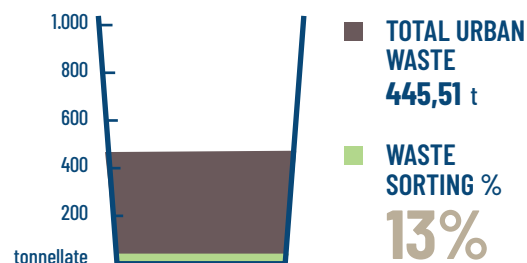
☒ DELIVERY TO ECOLOGICAL PLATFORM

☒ DOMESTIC COMPOSTING

☒ DOOR-TO-DOOR

☒ ON-CALL SERVICE

☐ RECYCLING BANKS



WASTE SHARE PER PERSON

WASTE SORTING
44,40 kg/ab*year

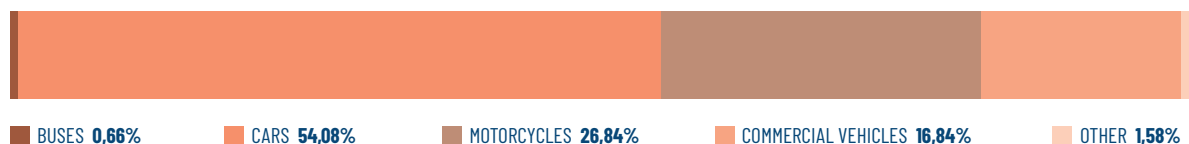
URBAN WASTE
350,52 kg/ab*year



MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

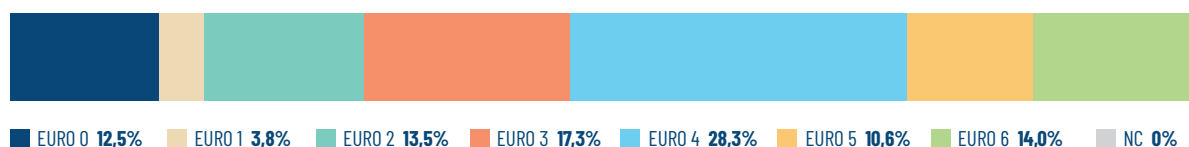
VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,6** av/ab

TOTAL CARS **822**





VENTOTENE

ARCHIPELAGO: PONTINE PROVINCE: LATINA



POPULATION

736

TOTAL AREA

1,75 Km²

DENSITY

420,6 ab/Km²



TOURISTS/YEAR

50.000

TOURIST FACILITIES

20

DISEMBARKATION FEE

2,50 EURO/PASS

70.000 ANNUAL REVENUES



PROTECTED AREAS

ISLANDS OF VENTOTENE AND SANTO STEFANO 2.799 ha IN SEA
PROTECTED MARINE AREA

ISLANDS OF VENTOTENE AND SANTO STEFANO 174 ha
NATIONAL RESERVE

SEABED SURROUNDING THE ISLAND OF VENTOTENE 757 ha
SPECIAL CONSERVATION AREA



ENERGY

MAIN POWER SOURCE **DIESEL ENGINE-GENERATOR**



ELECTRICITY PRODUCTION

FROM FOSSIL SRC **2.700** Mwhe/year

INSTALLED CAPACITY

--- MW

ELECTRICITY COMPANY

ENEL PRODUZIONE

RENEWABLE SOURCES



PHOTOVOLTAIC SYSTEMS T

112,20 kW
POWER AT 31/12/2021



WIND POWER SYSTEMS

3,16 kW
POWER AT 2020



THERMAL SOLAR ENERGY

14,85 m²
SOLAR AREA AT 31/12/2021



PURIFICATION



WASTE WATER TREATMENT

PURIFICATION STATUS **INCOMPLETE**

INCOMING LOAD (A.E.)

5.100

PHYSICAL CAPACITY OF THE PLANT (A.E.)

5.000

EXISTING PURIFICATION TREATMENTS





DRINKING WATER

DRINKING WATER INLET
IN THE MUNICIPAL NETWORKS

166.000 m³

DRINKING WATER SUPPLIED
BY MUNICIPAL NETWORKS

99.000 m³

LEAKS **40%**

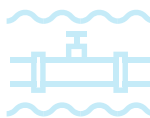
WATER SUPPLY METHOD



DESALINATOR



TANKERS



SUBMARINE
PIPES



WELLS AND
SPRINGS



WASTE

☒ PLASTIC FREE POLICIES

MODALITÀ DI RACCOLTA

☐ CASSONETTI STRADALI

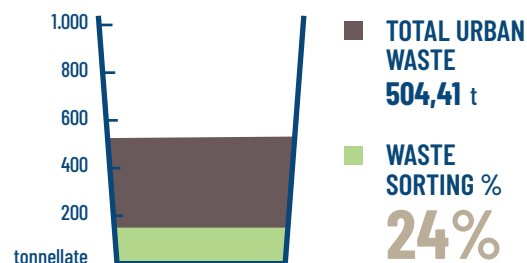
☐ CONFERIMENTO IN PIATTAFORMA ECOLOGICA

☒ COMPOSTAGGIO DOMESTICO

☒ PORTA A PORTA

☒ SERVIZIO SU CHIAMATA

☒ CAMPANE STRADALI



WASTE SHARE PER PERSON

WASTE SORTING
166,51 kg/ab*year

URBAN WASTE
685,34 kg/ab*year

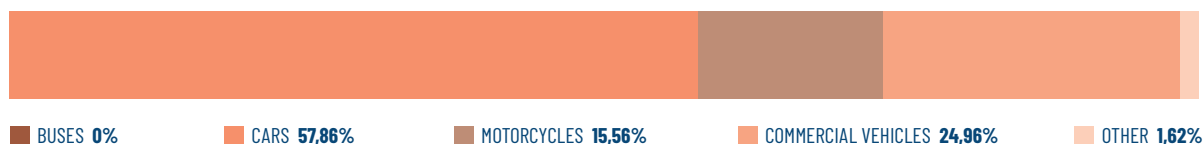


MOBILITY

☒ SUSTAINABLE MOBILITY POLICIES

☒ BIKE LANES **4** Km

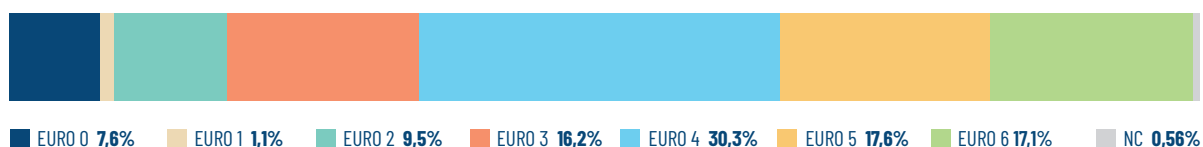
VEHICLE FLEET



CARS ENVIRONMENTAL CLASSES

MOTORIZATION RATE **0,5** av/ab

TOTAL CARS **357**



Data source

ISTAT (National Institute of Statistics)

ASC – Statistical Atlas of Municipalities

Parks.it – The portal of Italian parks

MiTE – Ministry of Ecological Transition

GSE – Energy Services Manager

Terna

Ministry of Economic Development decree 14.02.2017

European Commission Urban Waste Water Website

ISPRA, National Waste Registry

ACI – Italian Automobile Club

Questionnaire submitted to Municipalities

Clean Energy for EU Islands Secretariat

<https://openbilanci.it/> – The financial report of all Italian municipalities

The websites of the Municipalities of the Italian smaller islands

Online sources

The majority of the data included in this report were collected on a municipal basis.

For the islands composed of more municipalities, data were aggregated in order to achieve the overall data of the island (Capri, Ischia, Elba Island). On the other hand, for the islands belonging to the same municipality, the data refer to the relevant municipality (Pelagian Islands, Aegadian Islands, Tremiti Islands, Aeolian Islands).



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