

IANOS Project: IntegrAted SolutioNs for the DecarbOnization and Smartification of Islands

Unlocking the great potential of EU islands to act as Lighthouses of pan-European decarbonization

On October 1st the project IANOS officially started and the kick-off meeting of the project was organized virtually on October 7th-8th. IANOS Project aims to demonstrate, under real-life operational conditions, a group of both technological and non-technological solutions adapted to harsh islandic conditions, in two Lighthouse (LH) islands (Ameland in the Netherlands and Terceira Portugal), covering a multitude of energy supply, storage and end-use vectors on different climatic and socio-economic conditions, while taking the appropriate measures for their replication into three Fellow islands (Lampedusa in Italy, Bora Bora in the French Polynesia and Nissyros in Greece).

IANOS was funded by the European Commission in the framework of Horizon 2020 research and innovation program in line with the commitment to decarbonize the energy system of islands and a new wave of projects with such purpose as almost 3.5% of European citizens live in geographical islands, which are more than 2,700 islands on the European Continent.

A great diversification of characteristics can be found within the EU islands ecosystem: the vast majority consists of small/medium sized islands (<600km²) while in total, 500 islands are larger than 20 km² and cover a total area of 700,000 km² or more than 7% of Europe's surface area. Natural resources abundance and applicable energy technologies can also vary significantly, due to different climate or geological conditions, as well as different policy environment.

At the same time, specific energy-related challenges and trends pertain to the majority of EU islands: high dependence on fossil fuels or energy import from mainland; seasonality of demand (tourist arrivals in small islands have increased by >30% during the last decade); continuously increasing non controllable Renewable Energy Sources (RES) penetration that displaces conventional generation, dramatically reducing grid inertia (especially in smaller islands - isolated networks); all of which make for a more burdensome and expensive pathway to ensure energy security and resilience compared to the mainland.

However, opportunities can also arise as, compared to the highly complex mainland energy systems, solutions towards RES integration are easier to deploy and have a significant decarbonization impact on islands' ecosystems. Islands can be also great candidates for maintaining active Local Energy Communities (LECs).

In order to tackle the system resilience challenge, IANOS focuses in the **maximization of flexibility harnessing and provision along with self-consumption capability, through the utilization of distributed RE and storage technologies**. Operational linkage and coordination of the energy vectors (electricity, thermal, fuels) is performed through **multi-source energy storage, demand response (DR) and Powerto-X technologies** (i.e. power-to-gas, power-to-hydrogen, power-to-heat, power-to-mobility),

supported by an **intelligent Virtual Power Plant platform (iVPP)**. The iVPP design aims in optimal modularity and scalability, offering secured monitoring, aggregation and predictive energy management features, complemented by a set of cloud and fog-enabled software and hardware modules, oriented to serve the needs of island energy market stakeholders.

At the planning level, IANOS streamlines the decision-making process towards tailor-made solutions considering islands' specific traits, through the **Island Energy Planning and Transition Suite (IEPT)**.

IANOS adopts a LEC - oriented design, in which the policy/ regulations decision makers, small prosumers, large energy providers are empowered to create synergies, exchange knowledge and lead community-driven RE investments, also reaping the benefits of their active participation in transactive energy programs and services.

In this way, IANOS will demonstrate a rich portfolio of Use-Cases (including numerous RES-based systems) towards a full decarbonization goal, increasing the share of RES in the energy mix and exploiting the assets of each LH, including geothermal, wind, tidal and solar energy.

Project FactSheet

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Project Coordinator: EDP (Energias de Portugal) TROUGH CNET CENTRE FOR NEW ENERGY TECHNOLOGIES SA (Portugal)

Project Partners: UNINOVA-INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS-ASSOCIACAO (Portugal), EFACEC ENERGIA - MAQUINAS E EQUIPAMENTOS ELECTRICOS SA (Portugal), EDA - ELECTRICIDADE DOS ACORES SA (Portugal), EFACEC ELECTRIC MOBILITY, SA (Portugal), SECRETARIA REGIONAL DA ENERGIA AMBIENTE E TURISMO GOVERNO REGIONAL DOS ACORES (Portugal), VIRTUAL POWER SOLUTIONS SA (Portugal), TERALOOP OY (Finland), SUNAMP LIMITED (United Kingdom), BEMICRO LDA (Portugal), GEMEENTE AMELAND (Netherlands), STICHTING NEW ENERGY COALITION (Netherlands), NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO (Netherlands), ALLIANDER NV (Netherlands), AMELANDER ENERGIE COOPERATIE UA (Netherlands), SUWOTEC BV (Netherlands), Stichting Hanzehogeschool Groningen (Netherlands), NEROA BV (Netherlands), REPOWERED BV (Netherlands) SEAQUURRENT HOLDING BV (Netherlands), BAREAU BV (Netherlands), GASTERRA BV (Netherlands), COMUNE DI LAMPEDUSA E LINOSA (Italy), CONSIGLIO NAZIONALE DELLE RICERCHE (Italy), COMMUNE DE BORA BORA (French Polynesia), AKUO ENERGY SAS (France), DIMOS NISUROU (Greece), ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Greece), ETRA INVESTIGACION Y DESARROLLO SA (Spain), ENGINEERING - INGEGNERIA INFORMATICA SPA (Italy), RINA CONSULTING SPA (Italy), EUROPEAN RENEWABLE ENERGIES FEDERATION-FEDERATION EUROPEENNE DES ENERGIES RENOUVELABLES (Belgium), ELLINIKI ETAIREIA ENERGEIAKIS OIKONOMIAS (Greece),UBITECH ENERGY (Belgium)

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