DAFNI
Network of Sustainable Greek Islands

Renewable heating and cooling practices in the Greek islands

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DAFNI

Network of Sustainable Greek Islands

DAFNI – Network of Sustainable Greek Islands is a public interest non-profit organization of the island local and regional authorities in Greece.

It promotes **sustainable development** in Greek islands through the delivery of integrated actions in the fields of energy, water, waste and transport / mobility enabling the transition to a circular and sector-coupled local economy boosted by touristic activities.

52
Island municipalities

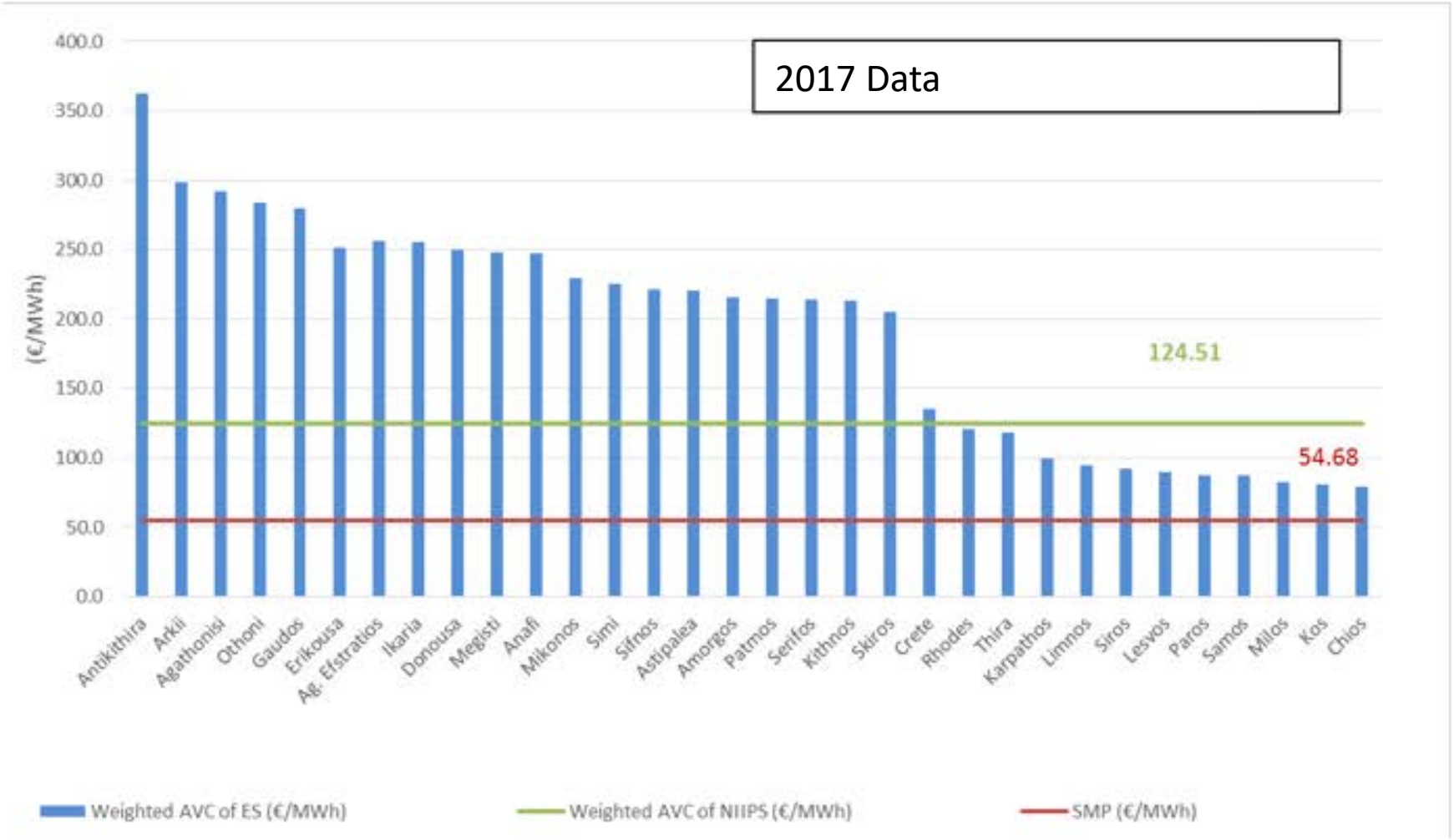
4
Regional authorities

Insularity challenges

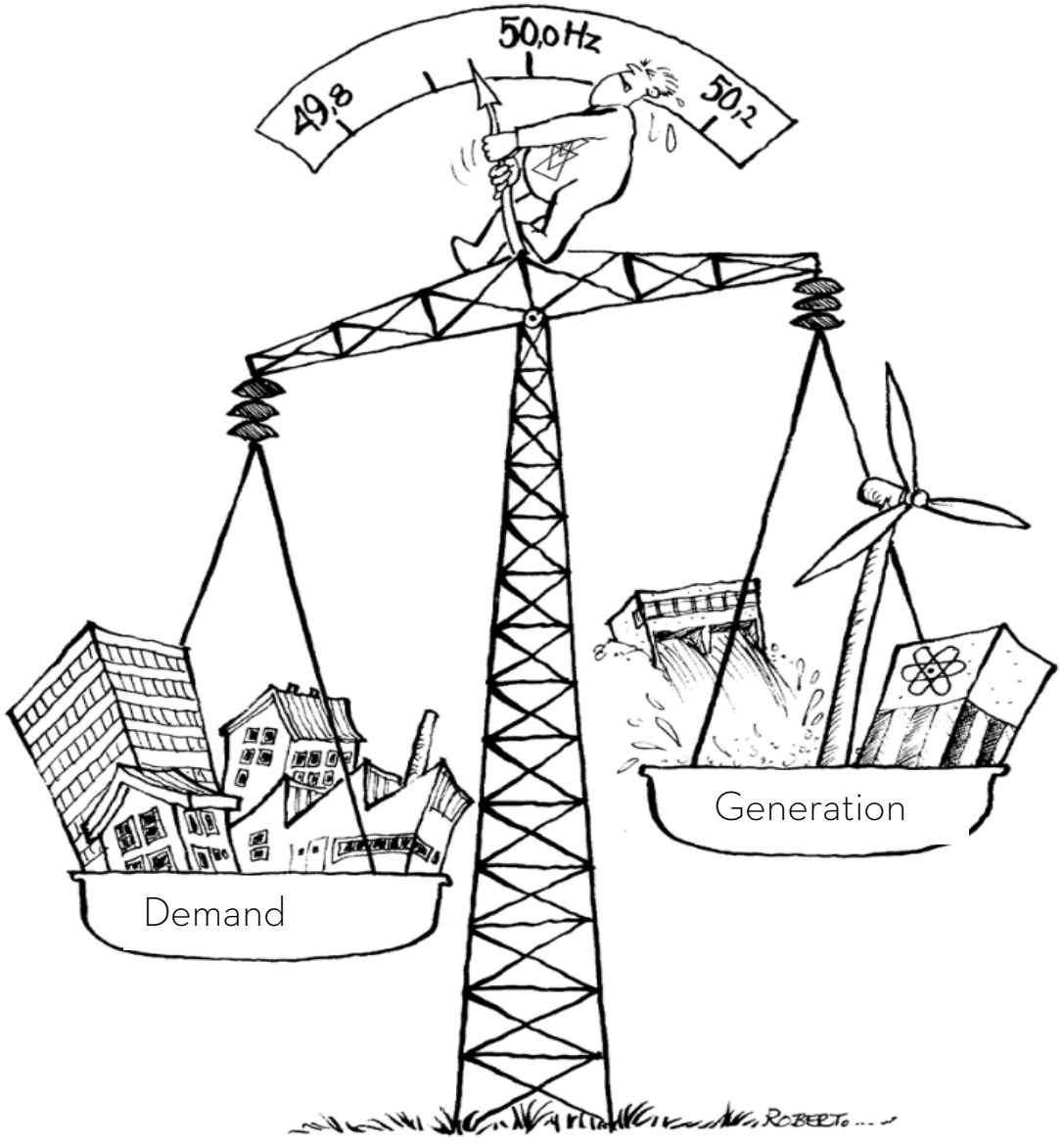
1. **Population seasonality** due to the dependence of the local economies on tourism
   → High operation cost for local infrastructures
2. **Limited human resources** to operate the infrastructures
   → Dependence on off-island support
3. **High dependency on fossil fuel** for energy production and transportation
   → High cost, energy insecurity, environmental and climate impacts
4. **Sensitive and unique ecosystems** (Natura, archaeology, traditional architecture)
   → Limited available space, competitive land uses

Requirement of tailor-made approach based on the specificities of islands that can support the coupling of the island's rural with tourism economy

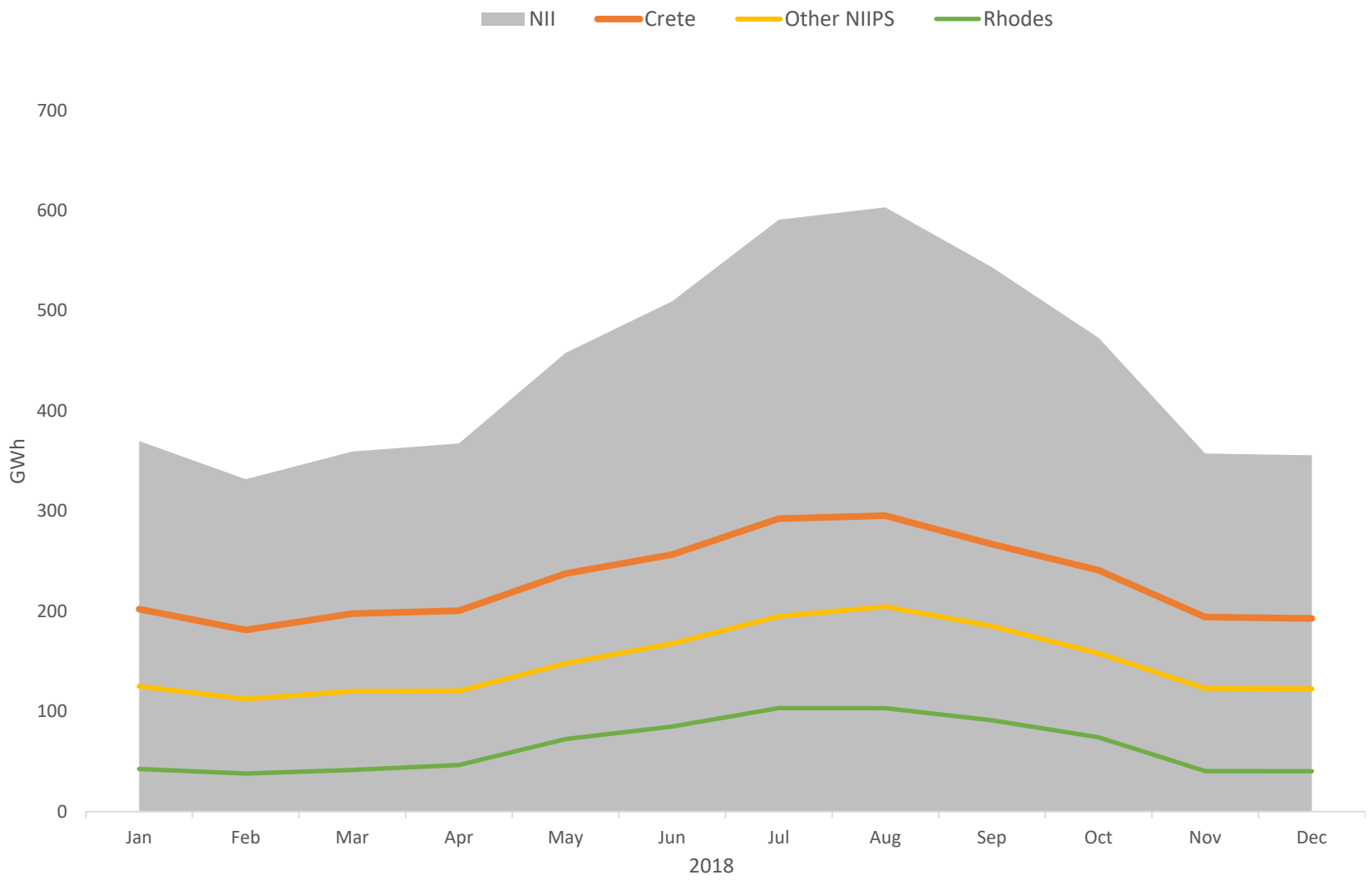
Energy production cost



Power systems' reliability



Demand seasonality



Other challenges

- Land use conflicts
- Limited resources
- Sensitive ecosystems
- Lack of economies of scale
- Higher costs due to transportation
- Vulnerable to climate change
- Lack of water – Need for desalination
- All infrastructure on the island
- Need for innovation

Clean energy transition
&
Local energy planning
in islands

The Path towards the Clean Energy for EU Islands Initiative

ISLENET
European Islands Network on Energy & Environment

PACT OF ISLANDS

smilegov
Multilevel Governance

SMART ISLANDS INITIATIVE

CLEAN ENERGY FOR EU ISLANDS

New Energy Solutions Optimised for Islands
NESOI
EUROPEAN ISLANDS FACILITY

1993
ISLENET
EU Islands Network on Energy & Environment

2011
ISLEPACT
Pact of Islands

2013
SMILEGOV
Smart Islands Strategy

2016
SMART ISLANDS INITIATIVE
Smart Islands Declaration

2017
Clean Energy for EU Islands
CE4EUI Declaration

2019
European Islands Facility
NESOI H2020 project

NESOI projects supported by DAFNI

1. JEDI: Just clean energy transition of Diapontia Islands

2. TESLA: Transport electrification on sea and land in Antiparos

3. SCGM NaKou: Smart, clean and green marinas in Naxos and Koufonisi

4. DGReS-Aegean: Decarbonization of Generation and Resilience of Security of Power Supply in an autonomous North-Aegean Archipelago

5. WiRe-K: Wind turbine repowering in Kythnos

6. B-IOS: Promoting green and circular economy through biomass exploitation in Ios

7. BIOG-LEMNOS: Promoting green and circular economy through Biogas exploitation in Lemnos

8. GHEKO: Green Hydrogen Ecosystem on Kos Island

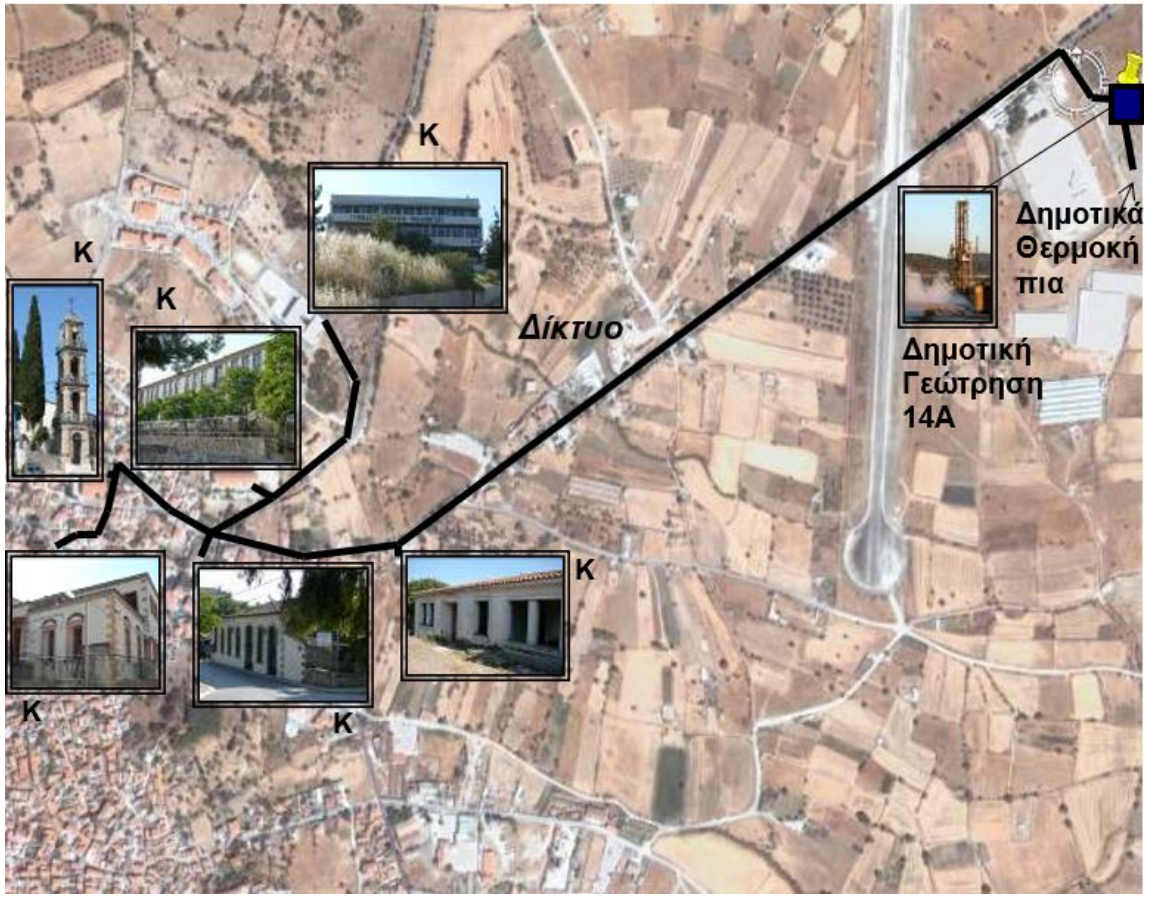
9. ENERSIK: Energy planning for clean energy transition for Ikaria

10. RACETRACE: Energy planning for clean energy transition for Samothrace

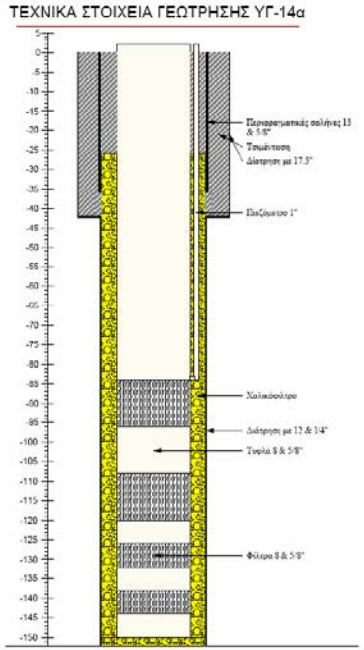
11. ENERRAS: Energy planning for clean energy transition for Astypalea

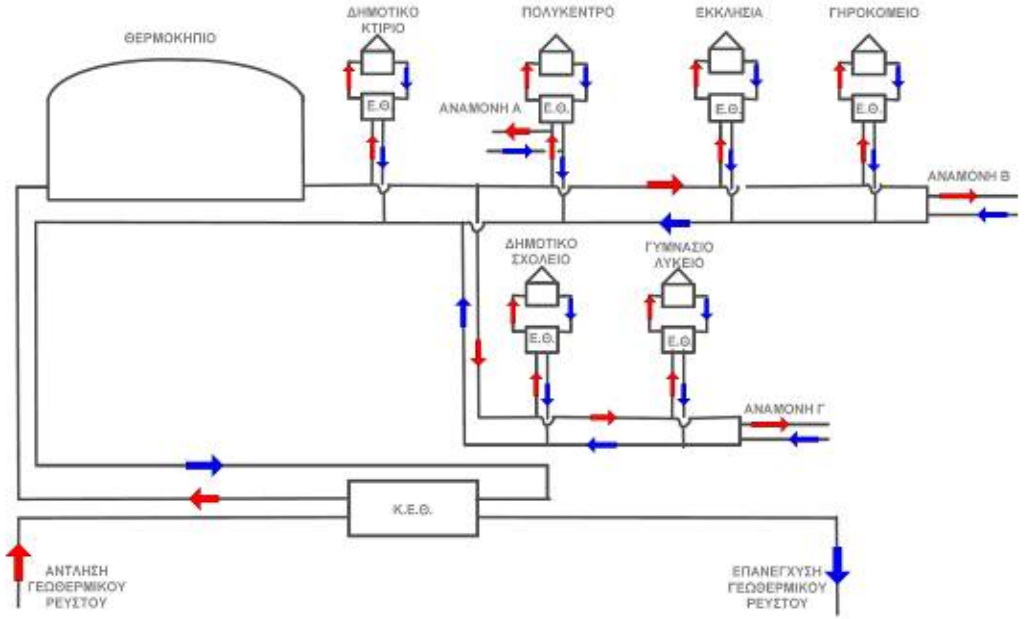
Clean energy transition of West Lesvos through the exploitation of the rich geothermal potential of the island

The geothermal energy was and will be used for:
district heating of public buildings, in the settlement of Polichnitos and distribution of het to third parties to cover heating demand of greenhouse facilities, agri-food businesses, tourism facilities



Clean energy transition of West Lesvos through the exploitation of the rich geothermal potential of the island





circulargreece
no time to waste

Agrofood waste valorisation

- **assess** the current agro-food waste management practices,
- identify the related **environmental impacts**
- develop **strategies** and **tools** for the enhanced agro-food waste management through the adoption of a circular economy approach

circulargreece
no time to waste

Strategies & Tools for agrofood waste valorisation

- Prevention
- Raising awareness
- Development of a decision making support tool
- Agrofood Waste collection
- Agrofood Waste treatment and valorisation

HEATING

ANAEROBIC DIGESTION

SOLID FUELS

COMPOSTING

FEED PRODUCTION

KYONOS
SMARTISLAND

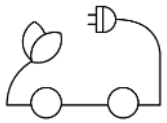
Innovative solutions for the efficient upgrade & smart management of local infrastructures

Kythnos becomes a living lab, not only for clean energy, smart grids and energy efficiency, but also for the coupling of energy with water, waste and mobility management solutions.

KYONOS SMARTISLAND

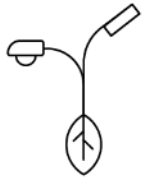
ENERGY & SMART GRIDS

Acceleration of the clean energy transition through multiple applications, such as demand side management, integration of storage in the distribution network, research on a local microgrid and extensive sector coupling.



TRANSPORT & MOBILITY

Decarbonize the island's transport sector through the uptake of electromobility on land and sea transportation.



STREET LIGHTING

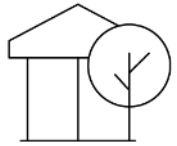
Energy upgrade and smartening of the island's street lighting network, while improving visual comfort and minimizing lighting pollution

WASTE MANAGEMENT

Demonstrate the potential to transform an island into a zero-waste area, while maximizing valorization of waste and minimizing environmental impact

WATER MANAGEMENT

Demonstrate the integrated water resource management at island scale, while reducing the water production cost and water losses at the distribution system.



BUILDING & PUBLIC SPACE RETROFITTING

Energy upgrade of municipal buildings into Nearly Zero Energy Buildings and sustainable regeneration of public space.

KYONOS SMARTISLAND

Integrated management of municipal bulky waste valorization

KYONOS
SMARTISLAND

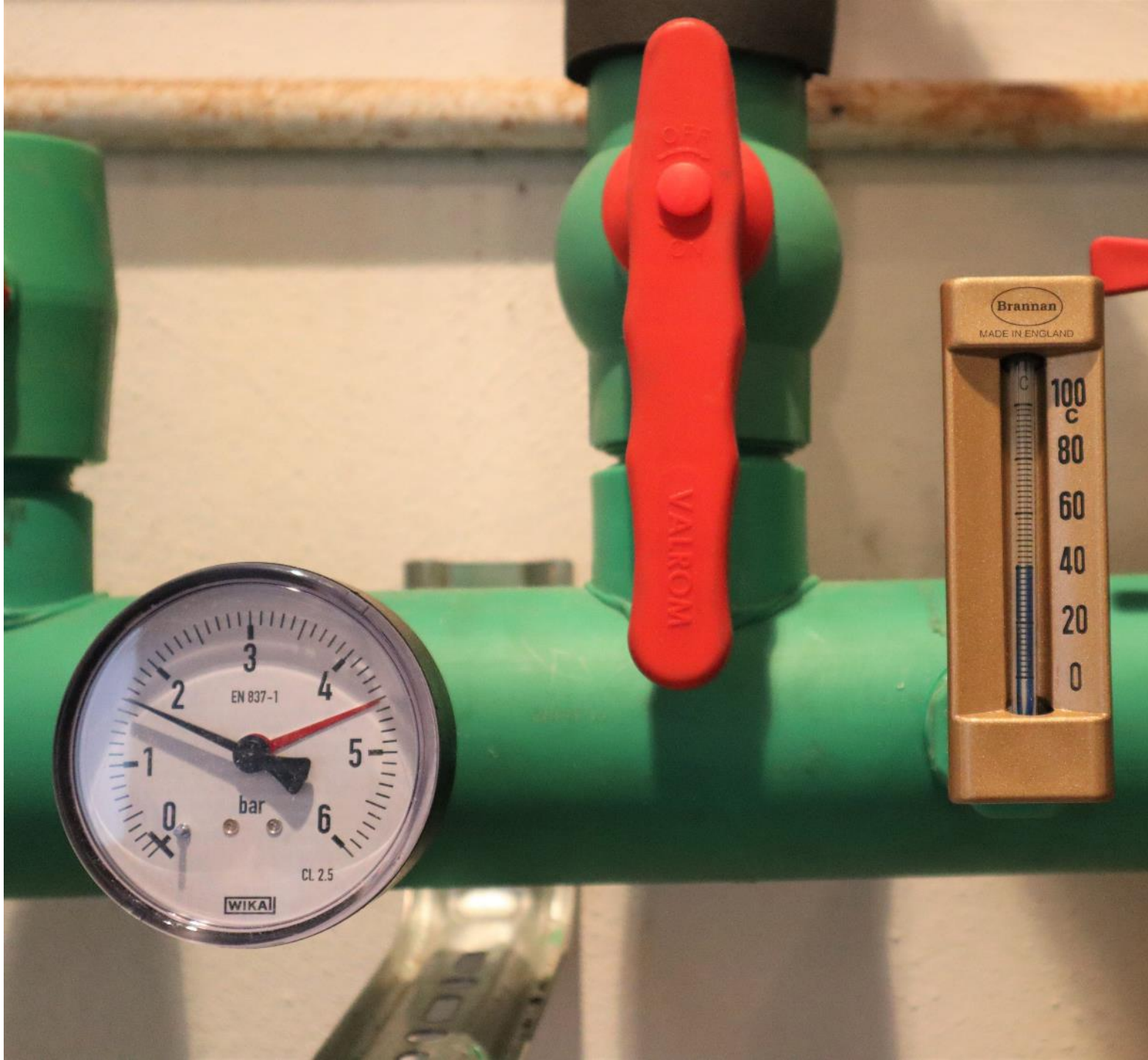
KYONOS SMARTISLAND

Exploitation of bulky wood waste for head production

- Pellet production from painted and impregnated wood waste
- Combustion in solid fuel fired boiler to cover heating demand of a school building
- Capture of emission through a set of filters
  - Class G2 filter
  - Class G4 / F5 synthetic filter
  - Fixed F8 class bag filter
  - Fixed H10/ H12 class bag filter
  - chemical cleaning filter

KYONOS SMARTISLAND

Energy upgrade of school buildings by maximizing the decarbonization of the heating system



KYONOS SMARTISLAND

- Hybrid solution was selected to ensure the reliable yearlong operation
- High temperature heating pump as primary heating system
- Oil fired condensation boiler system as backup heating system
- Buffer tank to collect and distribute hot water that to be preheated before school heating hours
- Inverter circulation pumps
- Connected on the existing distribution system

KYONOS SMARTISLAND

- Building Energy Management System to control the heating load and working hours, monitor the system's efficiency and set warning alarms.
- Potential operation of the heating pump as a flexible load to enhance the electrical system's efficiency

Future interventions:

- Led technology lighting will replace the old fluorescent luminaires
- Envelope renovation to enhance the building's energy efficiency

THANK YOU!

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