

Descentralização e Flexibilidade: a emergência dos mercados locais de energia

13/04/2023

Painel II - Mercados Locais de Energia: Relacionamento entre pares e soluções de flexibilidade

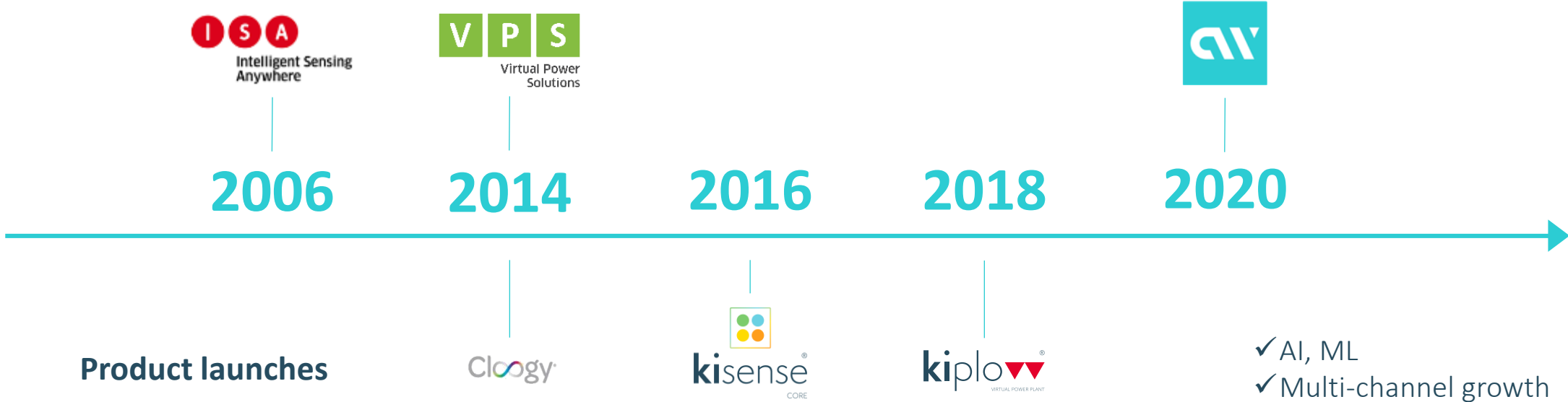
José Basilio Simões | [Vice Chairman and Co-Founder](#)



Clean energy. Decentralized, digitized and democratized.



Our journey



We are a **climate tech leader** committed to simplifying, amplifying, and accelerating the global energy transition for local communities around the world.

 Where we are



✓ Europe ✓ U.S.A. ✓ Brazil ✓ Japan

 Who we are

130+

Team members

2000+

Active clients

 Efficiency & management through Cleanwatts™ OS

2+ TWh

Energy managed

10+ tCO₂

Emissions reduced

23000+

Metering points

 Cleanwatts Energy Communities

100+

Number of REC managed

1500+

Community members

50+ MWp

Total capacity

30%

Average abatement of energy cost

Our belief

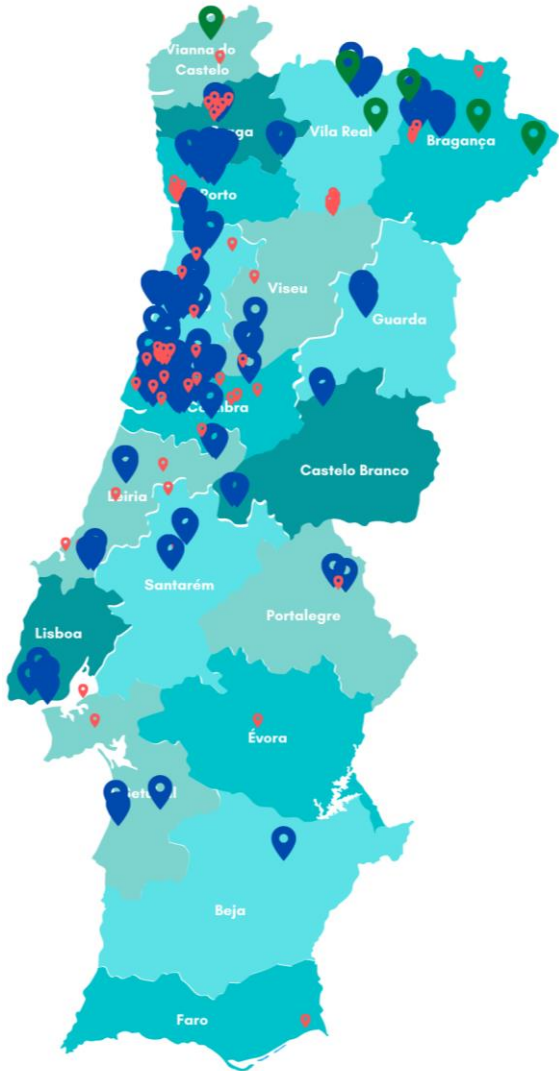


Energy communities have the potential to accelerate energy transition, provide affordable energy, democratize access to energy markets and support security of supply

Join us as we reframe society's relationship with energy.

- 1 NO POVERTY
- 7 AFFORDABLE AND CLEAN ENERGY
- 8 DECENT WORK AND ECONOMIC GROWTH
- 11 SUSTAINABLE CITIES AND COMMUNITIES
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
- 13 CLIMATE ACTION

Our action



Cleanwatts™ OS

One platform: modular, interoperable and localizable



Behind the meter

- ✓ Optimization for community members

Front of the meter

- ✓ Flexibility aggregation, and transaction management for local energy markets

App

- ✓ App for end users

Our Business Model

WHAT


Zero upfront investment

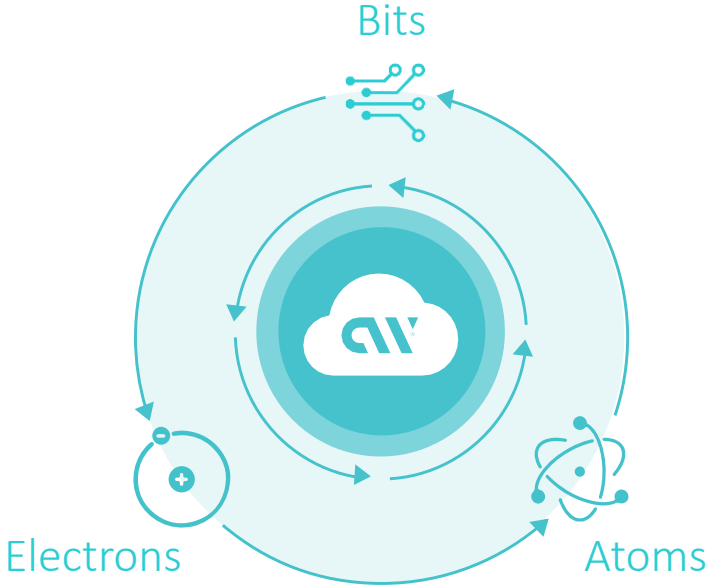

Design


Implementation


Management


Optimization

HOW



OUTCOMES

Grid Stability

Energy Security

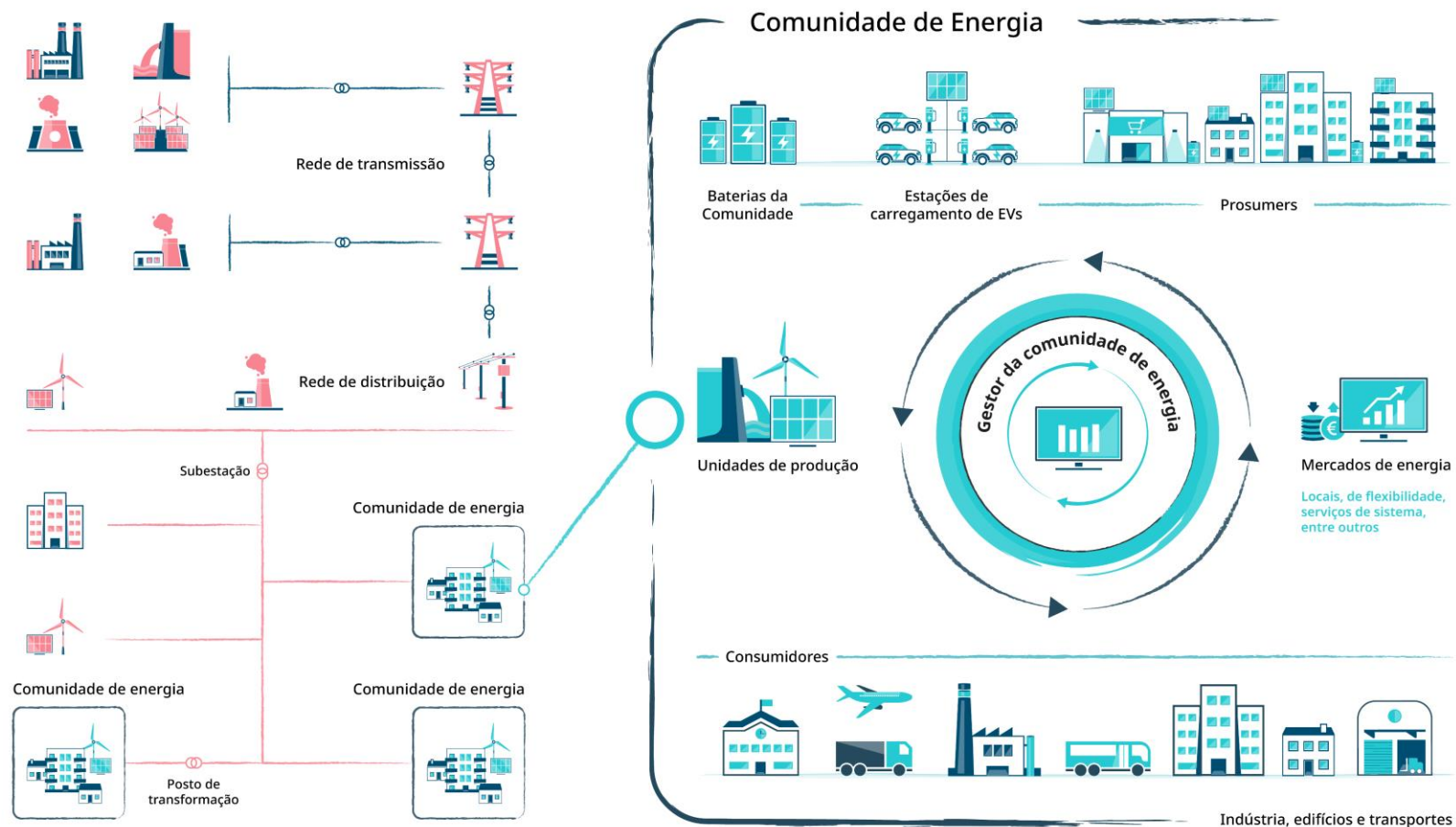
Decarbonization

Flexibility

Savings



Energy Communities – our way to tackle the energy transition



Renewable Energy Communities (RECs) are joint initiatives of companies, private citizens and public administration joining together towards a common idea: tackle the energy transition, democratize and make accessible the energy market.

Cleanwatts™ OS

One platform: modular, interoperable and localizable

Front of the meter

Virtual Power Plant:

- ✓ Flexibility services
- ✓ Energy markets (buy/sell)

Community management:

- ✓ Management of all assets (generation, consumption, storage)
- ✓ Inter/intra community settlements

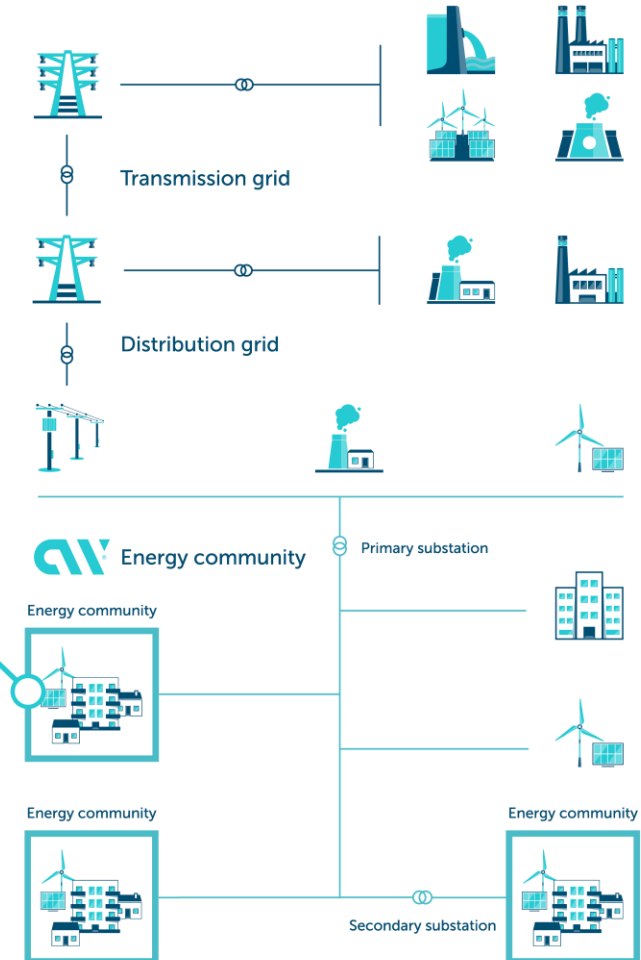
Behind the meter

UI for C&I members

- ✓ Behind the meter energy management & efficiency

UI for residential members

- ✓ Behind the meter energy management & efficiency for consumers/prosumers



Flexibility

How has it been traditionally viewed?

- Flexibility has been operated in 2 main ways:
 - Implicit flexibility – For individual premises – To reduce costs and carbon emissions
 - Explicit flexibility – Aggregated premises and assets
 - For wholesale market optimization
 - For flexibility markets – system/TSO or DSO
- Energy Communities bring a 3rd type of flexibility:
 - Implicit flexibility – For Energy Communities member premises – Also to reduce costs and carbon
 - Controlling this flexibility enables deployment of larger generating systems
 - Larger generating systems enable:
 - For the producers in the community – Sell more of their excess into the community
 - For the consumers in the community – Buy more of the community generated energy

Flexunity case study



Challenge

WHAT

Validate new business models for flexible energy communities responding to:



Energy optimization, efficiency & savings



Aggregation of different loads and need for grid stability & energy security



Flexibility end energy community tariff scheme



Scale-up VPP with AI and Blockchain



FleXunity project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 870146

Solution

HOW



Pilot sites recruited in the UK, in Corby, Northamptonshire



20

Homes with PV

10

Homes without PV

04

Non-residential sites



UK pilot community at a glance:

7.8 GWh

Total annual consumption

216 kW

Total flexibility

191 kW

Total PV power



180

IoT devices installed

Iberian Pilot

0.5 GWh

Total annual consumption

333 kW

Total flexibility

101 kW

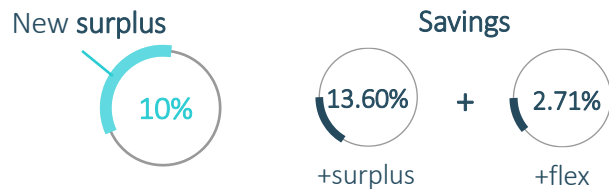
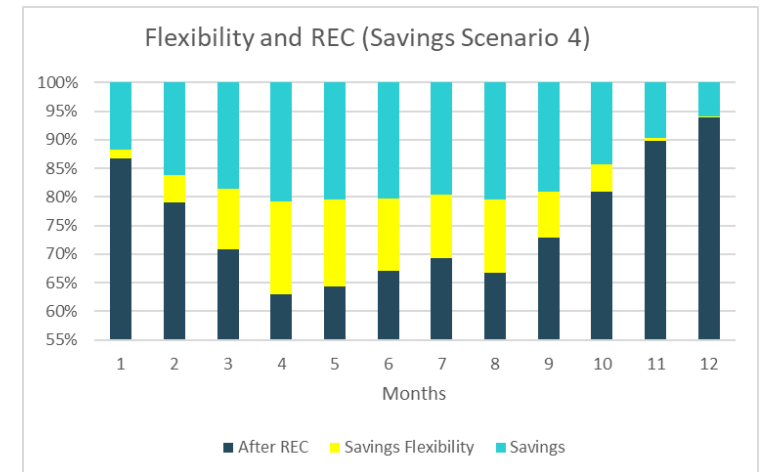
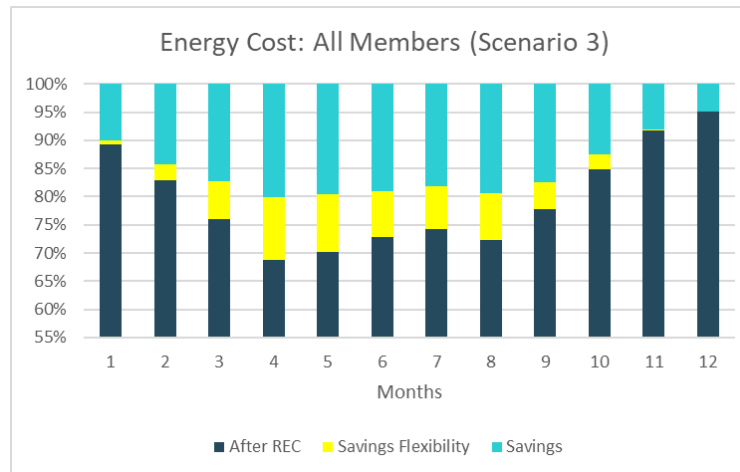
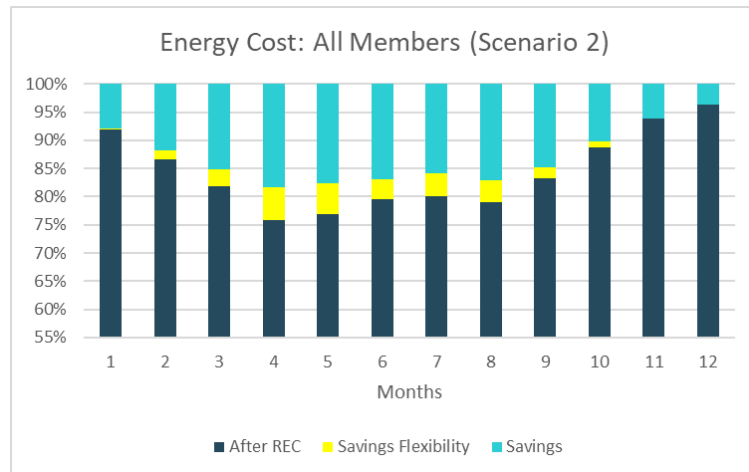
Total PV power



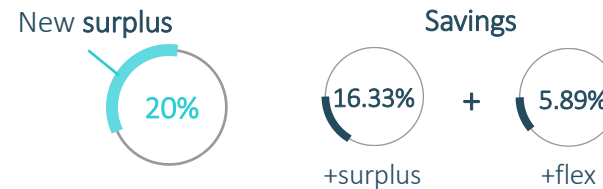
FleXunity pilot case with P2P energy sharing with flexibility for DER optimization with centralized ownership

Organizing the consumers as a REC drives energy savings.

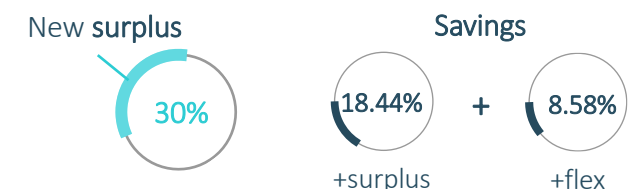
Additional generation -> more surplus to share -> additional flexibility potential -> additional savings!



Scenario 2: original generation was multiplied by 1.5, resulting in a surplus of 10%



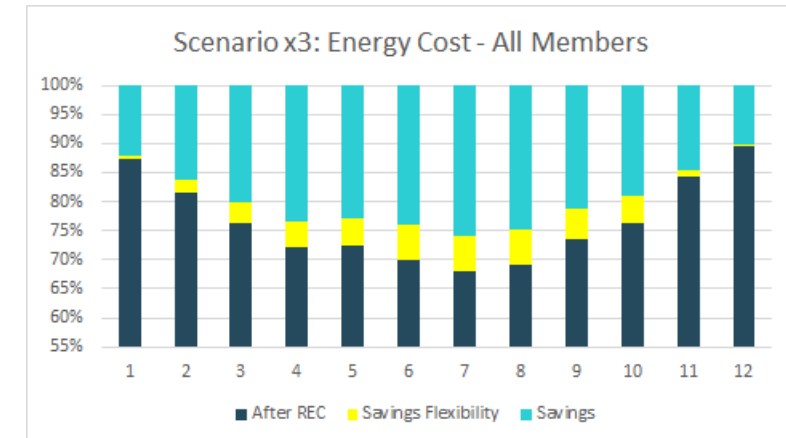
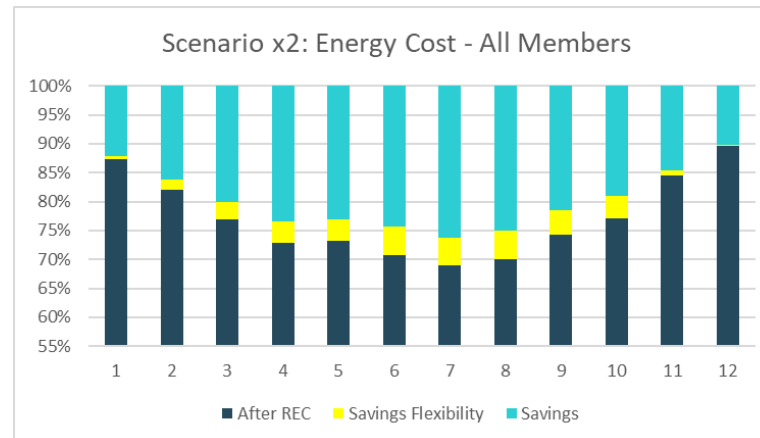
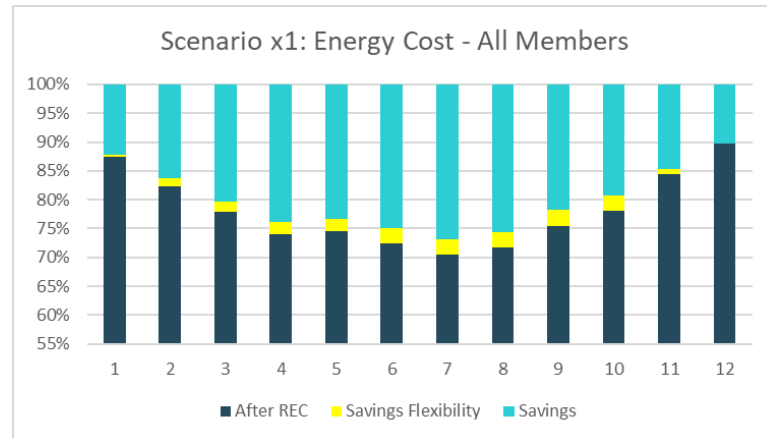
Scenario 3: original generation was multiplied by 2, resulting in a surplus of 20%



Scenario 4: original generation was multiplied by 2.5, resulting in a surplus of 30%

FleXunity pilot case with P2P energy sharing with flexibility for DER optimization with centralized ownership

Increasing the flexible loads -> additional flexibility -> additional savings!



Savings



+total +flex

Scenario 1: original flexible load was used

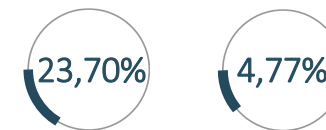
Savings



+total +flex

Scenario 2: flexible load was multiplied by 2

Savings



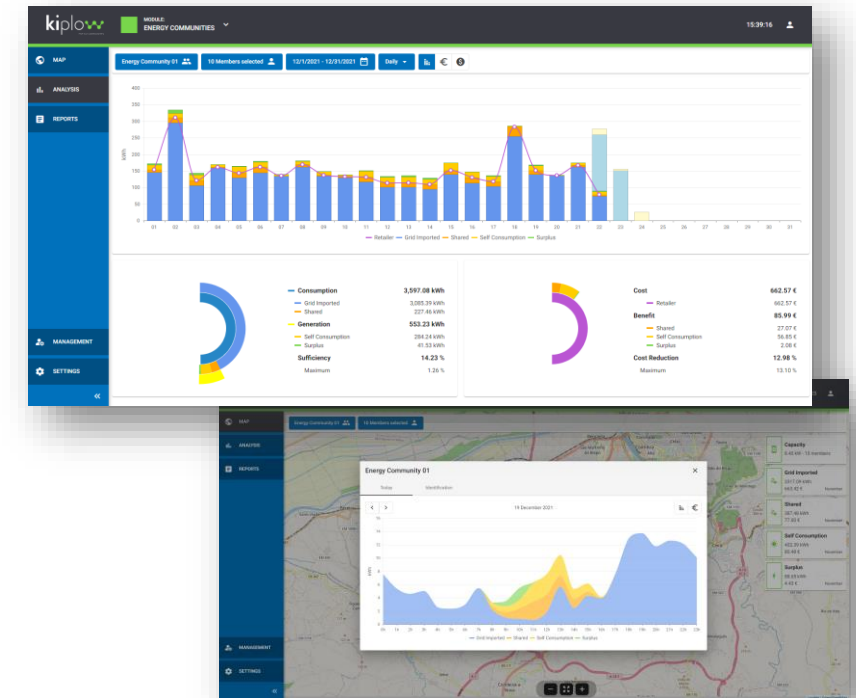
+total +flex

Scenario 3: flexible load was multiplied by 3

Implications for Flexibility

Do Energy Communities change anything?

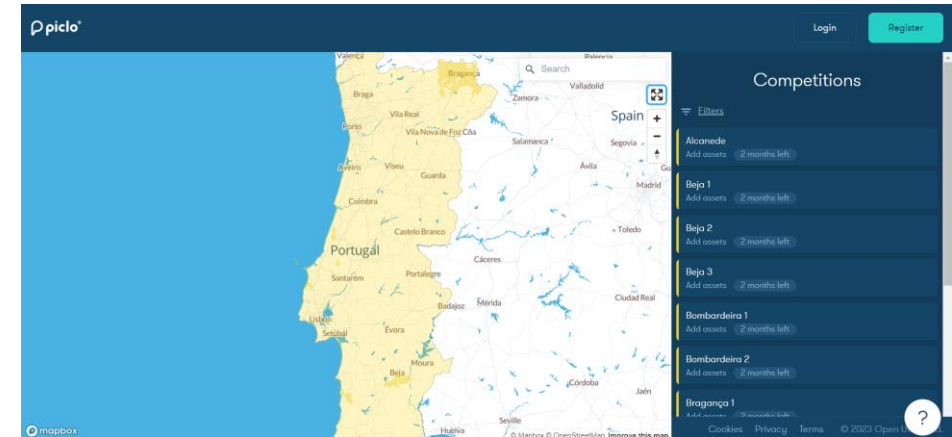
- Energy Communities increase energy assets to use for flexibility:
 - Community-owned flexible assets
 - Member-owned flexible assets
- Flexibility becomes a 3-tier optimization process:
 - Optimize for the individual (+ self-consumption)
 - Optimize for the member (+ collective self-consumption)
 - Optimize for markets – Value must be attractive
- Energy Community operators can extract more value through the management of all flexibility possibilities.



This is exactly what we do with Cleanwatts™ OS

In Portugal... Piclo & E-Redes project

- Providenciar flexibilidade para zonas mais congestionadas da rede
- Através da ferramenta Piclo, será criado um mercado e geridos os respetivos leilões
- Os providers (agregadores ou empresas) irão colocar as suas bids
- Os providers com bid aceite procederão à ativação dos assets
- Os providers serão pagos em função da flexibilidade entregue



Visão da Cleanwatts

- O projeto é excelente porque providencia uma plataforma de mercado
- Permite agregadores de pequenas cargas com bids aceitáveis (mínimo de 100kW)
- Estabelecimento de baseline será muito importante para a rentabilidade dos prestadores de serviço

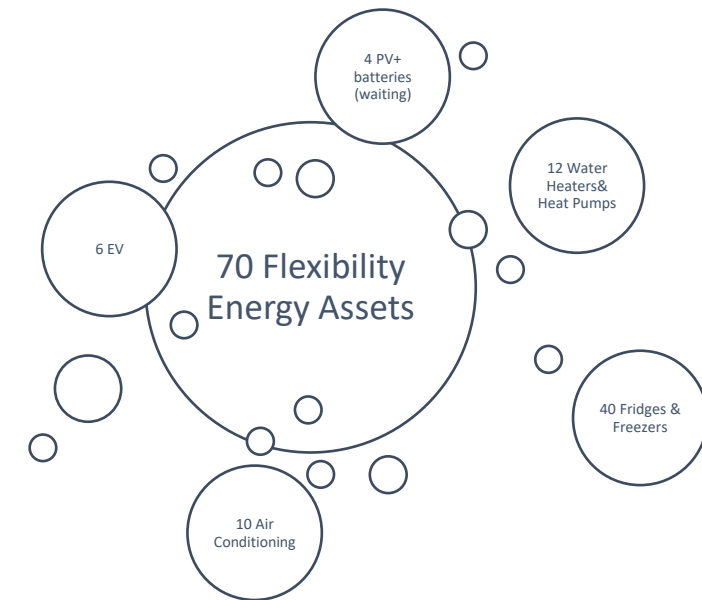
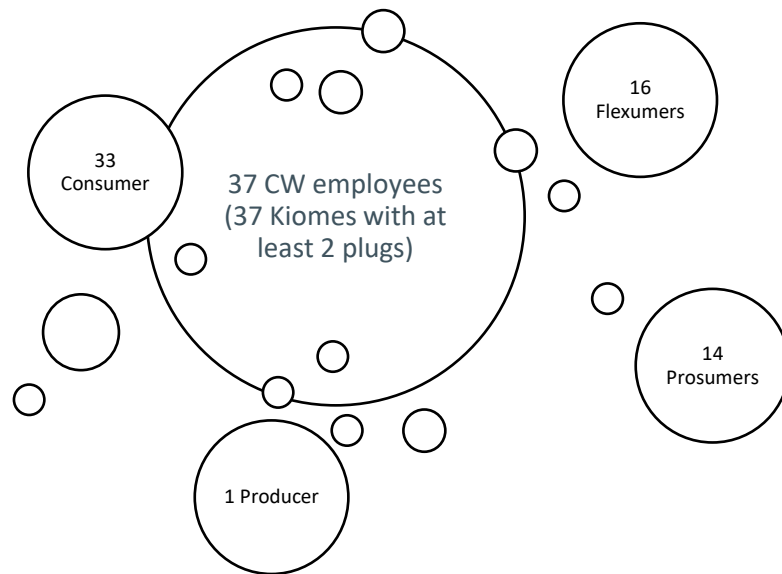
Status:

- Cleanwatts registada como agregador junto da Piclo
- Identificação de consumidores e seus recursos no portfolio de CERs e clientes individuais da Cleanwatts
- Cleanwatts participará nas bids (mais próximo das datas de necessidade)

Energy Community living laboratory of innovation that connects people and technology
Real-world environment, composed by CW employees and CW technology & solutions

Objectives:

1. Create use cases to test the interactions between REC and grid/energy market;
2. Define strategies to develop **local energy markets** and **flexibility energy markets** at the DSO level;
3. Define **restrictions and grid conditions to activate the small load flexibility** ensuring grid stability and lower balancing costs (ie., V2G; H2G; REC2G)
4. Observation and analysis of the results to improve the algorithms;
5. **Validate business models based on incentives for Demand Response/Demand Side Management;**
6. **Interoperability between DSO and CW OS as “*Sistemas específicos de gestão dinâmica*”** according to DL 15/2022 de 14 de janeiro:





Clean energy.
Decentralized, digitalized and democratized.



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Values that drive our culture



Accountability



Empathy



Integrity



Initiative



Resilience



Responsiveness

Join the
energy
transition
today

