ENERGIE INSTITUT
an der Johannes Kepler Universität Li

eCREW | eSTABLISHING COMMUNITY RENEWABLE ENERGY WEBS

A business model to aim for

Individual motivation and collective actions

H2020 Project# 890362

June 2020 – June 2023

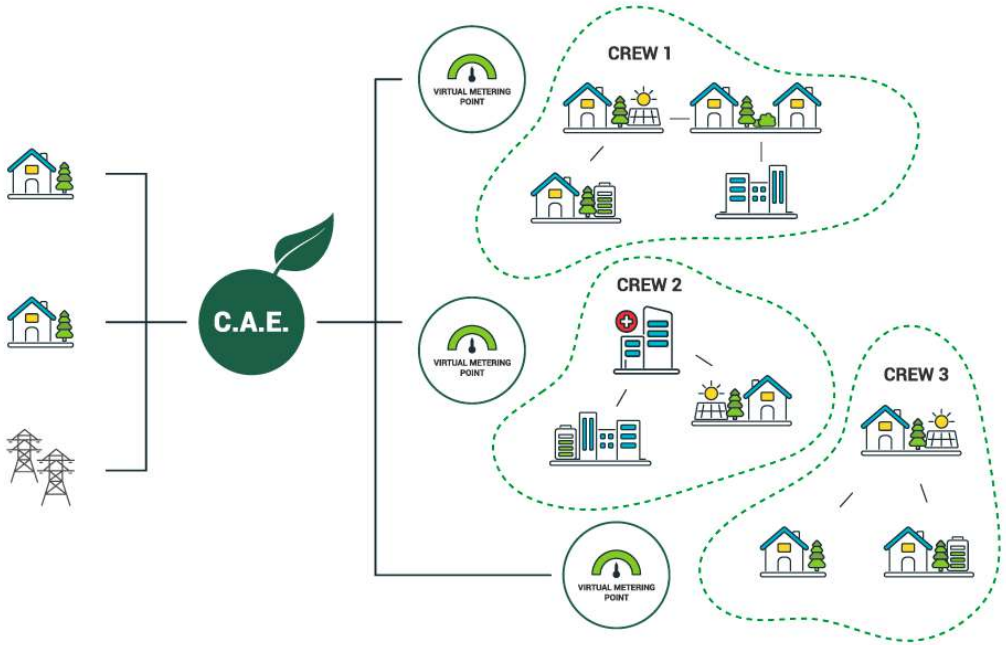
Dr. Johannes Slacik
Energy Institute at the JKU Linz, Austria

Sustainable Places 2022, Nice, FR

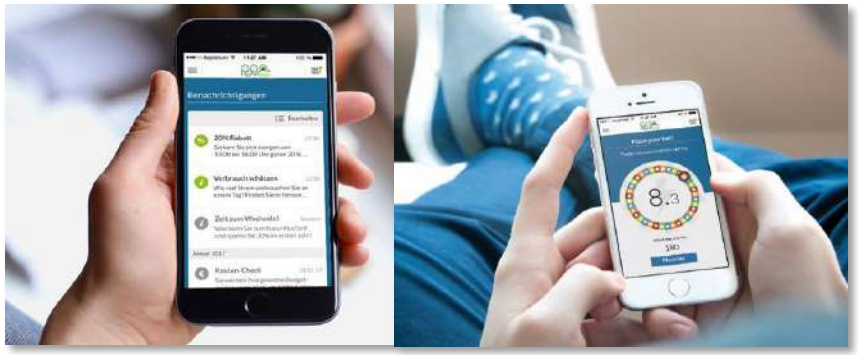
The eCREW Model

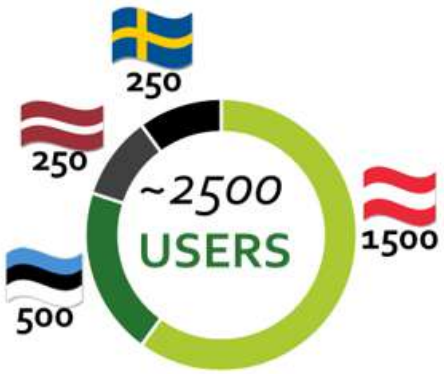
- Virtually connecting consumers and prosumers for energy efficiency
- Small energy communities
- Energy utility management & service partner

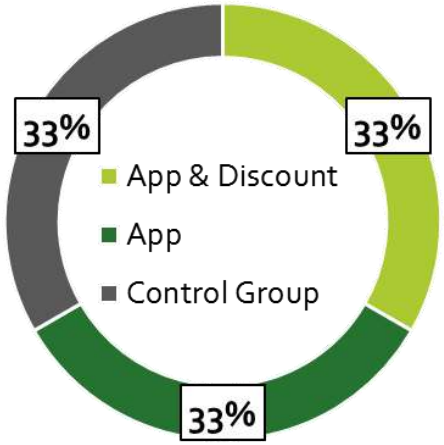
- Digital platform
- Nudging & push-up messages change the consumption behavior
- Shared incentive systems
- **Individual and collective actions**
- Win-win-win Situation

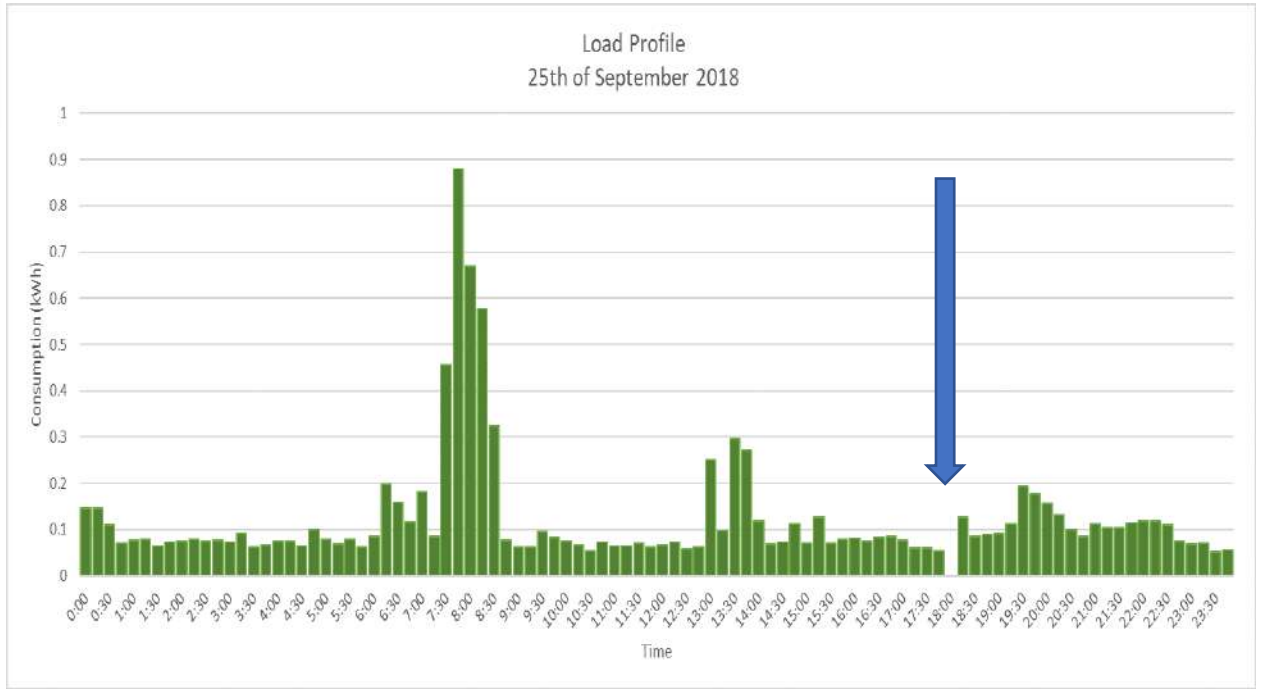


Demand-Side Management - Potential Consumer Roles



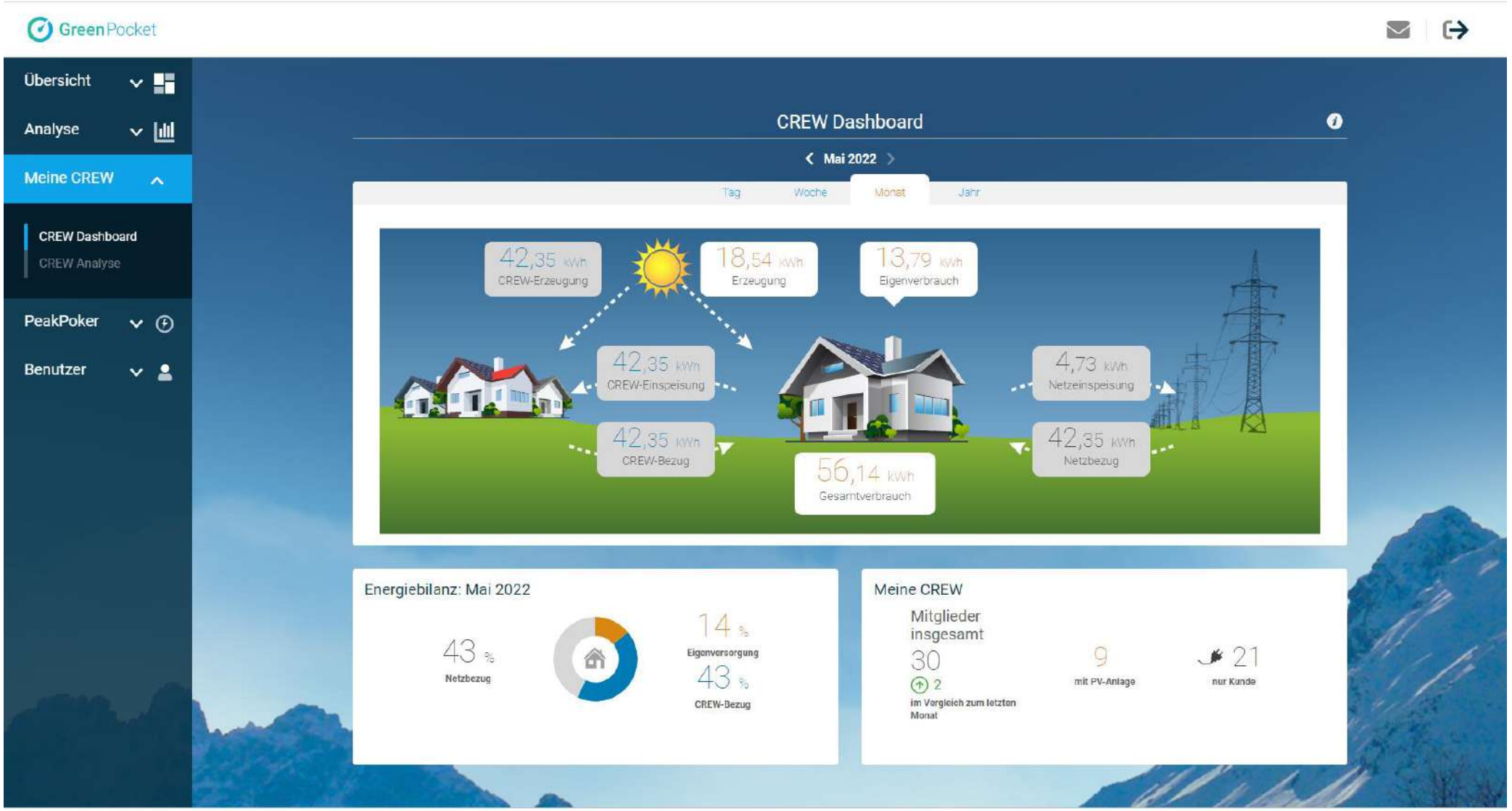




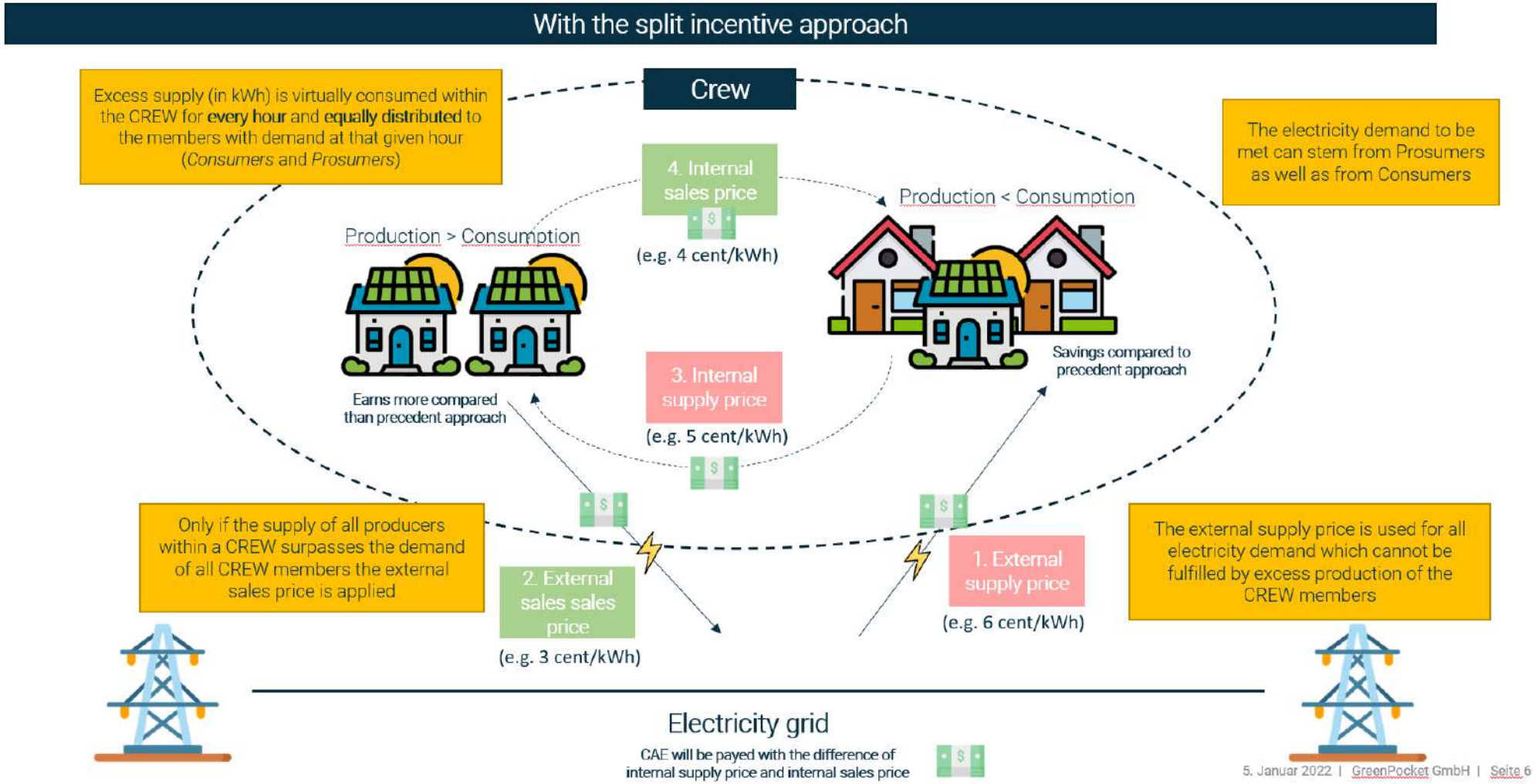


Demand-Side Management - Potential Consumer Roles

- ENERGIE Efficiency through transitory strategic behavioral change


GreenPocket
Übersicht
Analyse
Meine CREW
CREW Dashboard
CREW Analyse
PeakPoker
Benutzer
CREW Dashboard
Mai 2022
Tag
Woche
Monat
Jahr
42,35 kWh
CREW-Erzeugung
18,54 kWh
Erzeugung
13,79 kWh
Eigenverbrauch
42,35 kWh
CREW-Einspeisung
4,73 kWh
Netzeinspeisung
42,35 kWh
CREW-Bezug
42,35 kWh
Netzbezug
56,14 kWh
Gesamtverbrauch
Energiebilanz: Mai 2022
43 %
Netzbezug
14 %
Eigenversorgung
43 %
CREW-Bezug
Meine CREW
Mitglieder insgesamt
30
2
im Vergleich zum letzten Monat
9
mit PV-Anlage
21
nur Kunde
© 2010-2021 GreenPocket GmbH
AGB
Datenschutz
Hilfe
Impressum

Shared Incentive System



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eCrew – establishing community renewable energy webs

A new business model to aim for?

Lighthouse Communities – Pilot-Sites in

SPAIN; TURKEY; GERMANY

The eCREW roll-out

- Three Lighthouse Communities (LCs)

SPANIEN

zero members

TÜRKEI

1823 members

DEUTSCHLAND

102 members

- Different situations, different regulative barriers, different sun/wind exploitation
- eCREW is sucessfully lounged in Turkey, Germany and Spain-(with some issues) – Spain experiences challenges (prices, tariffs, regulations, lack of prosumers)
- Digital platform as interface (required data transfer compatibility), tariff-challenges
- A unified regulatory EU-policy for tariff-settings and market conditions is recommended

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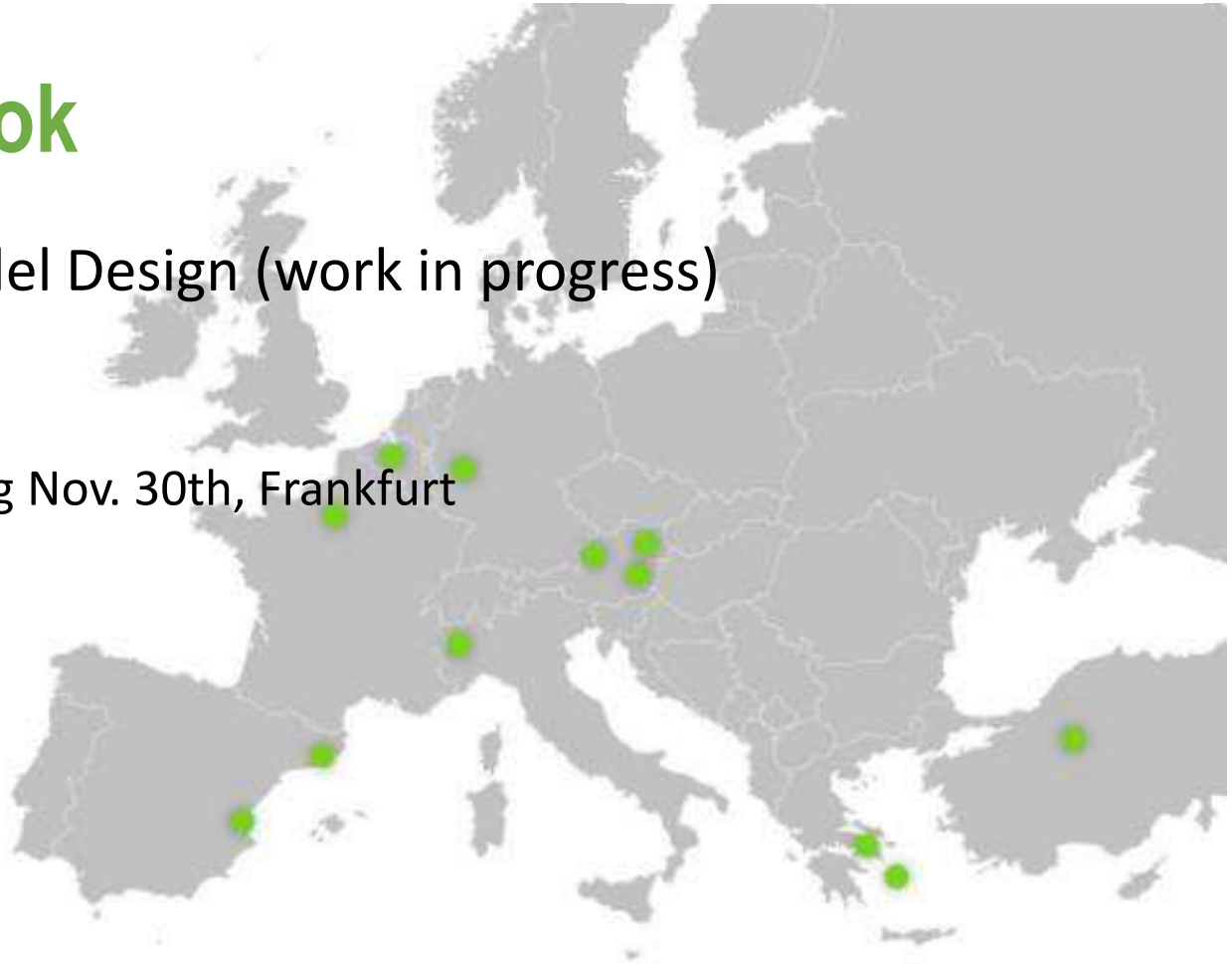
eCREW – Progress and Outlook

- White Book Conpendium – Business Model Design (work in progress)
  - KPIs are collected
  - Enablers and barriers are identified
  - 24 Follower Communities – Kick-OFF Meeting Nov. 30th, Frankfurt



AUSTRIA
- Energie Steiermark AG
- E-Werk Gösting Stromversorgungs GmbH
- Kraftwerk Glatzing-Rüstorf eGen
- Österreichs Energie
- Spotty Smart Energy Partner GmbH

BELGIUM
- Joint Programme on Economic, Environmental and Social Impacts of the Energy Transition

FRANCE
- Électricité de France S.A. (EDF)

GERMANY
- Energieversorgung Mittelrhein AG
- RhönEnergie Fulda GmbH
- SWB AG

GREECE
- Municipality of Kythnos
- Network of Sustainable Greek Islands

ITALY
- Iren S.p.A.

SPAIN
- Federación Coope
- Som Energia SCCL

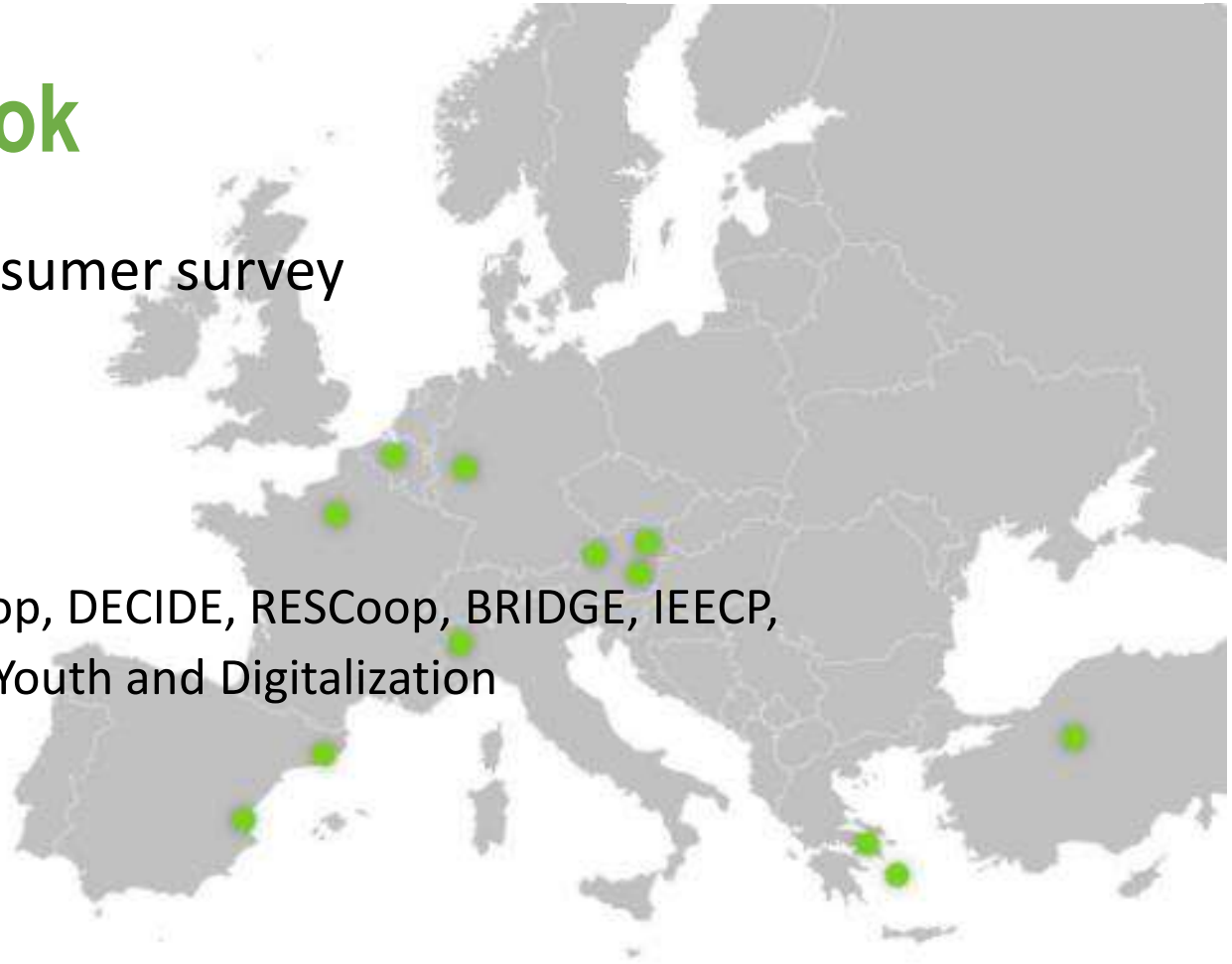
SWEDEN
- Nordiska Elbolage

TURKEY
- Ataseven Enerji Ür
- Petroleum and Nat
- Turkish Pump and Valve Manufacturers Association

UNITED ARAB EMIRATES
- SA Engineering Consultancy

eCREW – Progress and Outlook

- CEO Handbook to follow a consumer/prosumer survey
- PV-amortization calculator
  - Simplification, average measurement
- Dissemination Process
  - Collaboration with COM RES, WE4RES, BeCoop, DECIDE, RESCoop, BRIDGE, IEECP,
  - Awareness programms, women integration, Youth and Digitalization
  - EU-Sustainability Energy Weeks:
    - Women integration in energy communities
    - Energy communities and digitaliziation for youth



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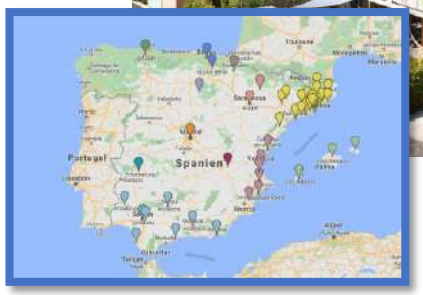
eCREW – Progress and Outlook

Three **CREWs + ACEA (Italian energy utility)**

And more to come



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eCREW | eSTABLISHING COMMUNITY RENEWABLE ENERGY WEBS

a business model to aim for

slacik@energieinstitut-linz.at

The SENSEI project

SENSEI – Smart Energy Services to Improve the Energy Efficiency of the European Building Stock (https://senseih2020.eu/)

Duration: September 2019 – February 2023

omnia energia

GECO GLOBAL

SINERGI Formazione e Innovazione

CIMNE

beegroup

IEECP

Generalitat de Catalunya Departament de Territori i Sostenibilitat

FACTOR 4 BUILDING PERFORMANCE

advanticsys

Hebes Intelligent control as a Service

FONDEN TEKNOLOGI RÅDET DANISH BOARD OF TECHNOLOGY FOUNDATION

RAP

UNIVERSITÀ DELLA CALABRIA

OFFIS

HEBES

sensei

The SENSEI project

The overall goal of the SENSEI project is to propose services that allow energy efficiency to be treated as a **transactable asset**, as well as business models that utilize these services in order to valorize energy efficiency as a **grid resource**.

To this end, the pay-for-performance (P4P) concept has been adopted by SENSEI as a way to enable the aforementioned services and business models.

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The P4P concept

The main premise of the P4P concept is simple: compensate an asset or a service according to its actual impact.

Performance-based agreements for energy efficiency are already part of the ESCO model. SENSEI focuses on designing **public programs** that support energy efficiency by compensating (paying) energy efficiency retrofits based on the energy savings they actually deliver (performance).

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The main arguments of SENSEI

Argument #1: P4P increases the impact of public programs for energy efficiency financing by introducing accountability.

P4P is not meant to completely replace grants and subsidies, since subsidizing the upfront investment costs is a strong driver for energy efficiency upgrades and, in particular, for deep retrofits.

Linking part of the subsidies to ex post results/impact helps increase the cost-effectiveness of public programs (as if imposing an upper bound to the acceptable amount of Euros per MWh saved).

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The main arguments of SENSEI

Argument #1: P4P increases the impact of public programs for energy efficiency financing by introducing accountability.

Do these benefits of P4P outweigh its implementation costs?

Find synergies to increase benefits for same costs.

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The main arguments of SENSEI

Argument #2: P4P can – and should* – be used to offer a premium to energy efficiency projects when their implementation leads to load shape changes that are beneficial for the power grid's operation.

* Adopting P4P is necessary because all other alternatives for ensuring the power grid's reliability – capacity reserves and demand response – are compensated based on their performance.

Treating energy efficiency on equal basis with the alternative options that system operators have at their disposal means that energy efficiency should be rewarded based on actual impacts.

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The main arguments of SENSEI

SENSEI has demonstrated (SENSEI Deliverable D4.2) that:

- Energy efficiency is valuable when its impact is aligned with persistent needs of the power grid that reflect the regularity and seasonality of power demand at the aggregated level.
- The design of a program that compensates energy efficiency for its contribution to the grid does not need a radically new toolset, but can be done using the tools that power system operators already use.

  Open source tool for quantifying energy efficiency value: https://github.com/hebes-io/eevalue

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The main arguments of SENSEI

Argument #3: P4P programs can incentivize the development of the know-how and infrastructure necessary for energy retrofit project aggregation.

P4P programs create a market for aggregation, along with all the **governance structures** and **technical capabilities** to support it.

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The main arguments of SENSEI

Governance structures:

SENSEI introduces the concept of a P4P program facilitator: a third party that is responsible for running a P4P program on behalf of the corresponding program owner (SENSEI Deliverables D6.3 and D6.5).

Technical capabilities:

- Project screening and evaluation methods
- Measurement and verification of impact from retrofit (SENSEI Deliverable D7.1, https://github.com/hebes-io/eensight)

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Conclusions

The energy efficiency services sector is lagging behind renewable energy generation in terms of demand for investments, as well as business models for aggregating projects and attracting investment capital from institutional investors.

While a lot of work has taken place in measuring energy savings and formally covering risks and uncertainties at the individual project level, scaling energy efficiency up to project portfolio level still faces challenges.

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Conclusions

SENSEI argues that the design and roll out of P4P pilots for energy efficiency projects can lay the groundwork for the development of the methods and standards that are necessary for creating large-scale pipelines of projects.

P4P pilots constitute an effective use of public finance to discover best practices for the aggregation of a large number of energy efficiency projects into portfolios, and they can act as a workbench for developing financing tools and risk allocation mechanisms.

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Thank you for your attention

Any questions or comments?

https://senseih2020.eu/

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SmartSPIN

Analysis of an enhanced Energy Efficiency-as-a-Service model for the European commercial rented sector

Luciano De Tommasi

International Energy Research Centre

8-9-2022 (online presentation)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033744.

Outline

- SmartSPIN objectives, concept and work plan
- Definitions of Smart Energy Services (SES)
- The split-incentive issue
- ESCO Business Models to deliver SES to Commercial Rented Sector
- Interviews of Work Package 2
- The SmartSPIN Energy Efficiency as a Service Model
- The SmartSPIN Energy Savings Model
- Recommendations for SmartSPIN Service Definition
- Published deliverables

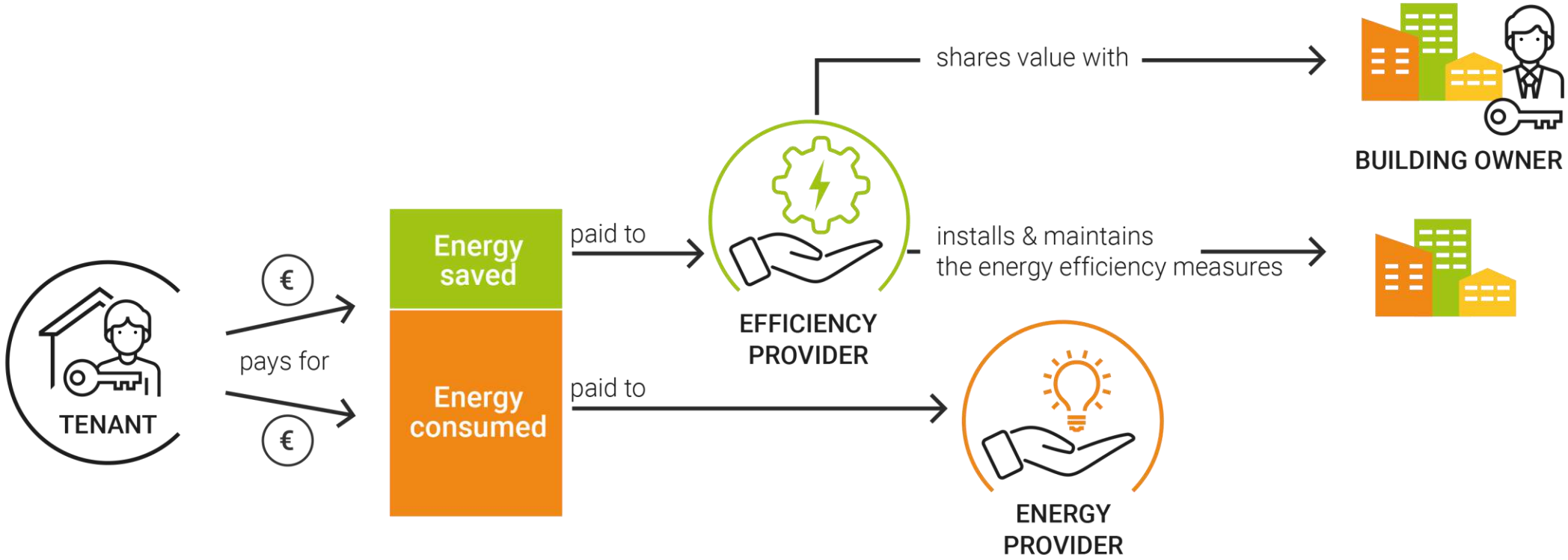
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 10133744.

SmartSPIN Objectives

- Demonstrating the feasibility, effectiveness and advantages of the **SmartSPIN innovative business model** that combines both energy and non-energy benefits in a smart energy services offering for the commercial rented sector.
- **Addressing the barriers** that prevent the commercial rented sector from engaging in energy services, energy efficiency projects and performance-based contracting.
- Showcasing how **big data generated from smart equipment can be used to better control energy consumption** in buildings and more accurately measure and verify energy savings and flexible energy consumption.
- Developing an innovative business model and **new contractual templates** that allow the proposed Smart Energy Services to be deployed in the commercial rented sector.
- **Engaging and training key market stakeholders** (ESCOs, landlords, tenants, industry bodies, measurement and verification practitioners, smart technology manufacturers) in the deployment of the SmartSPIN business model.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 10133744.

The SmartSPIN Concept



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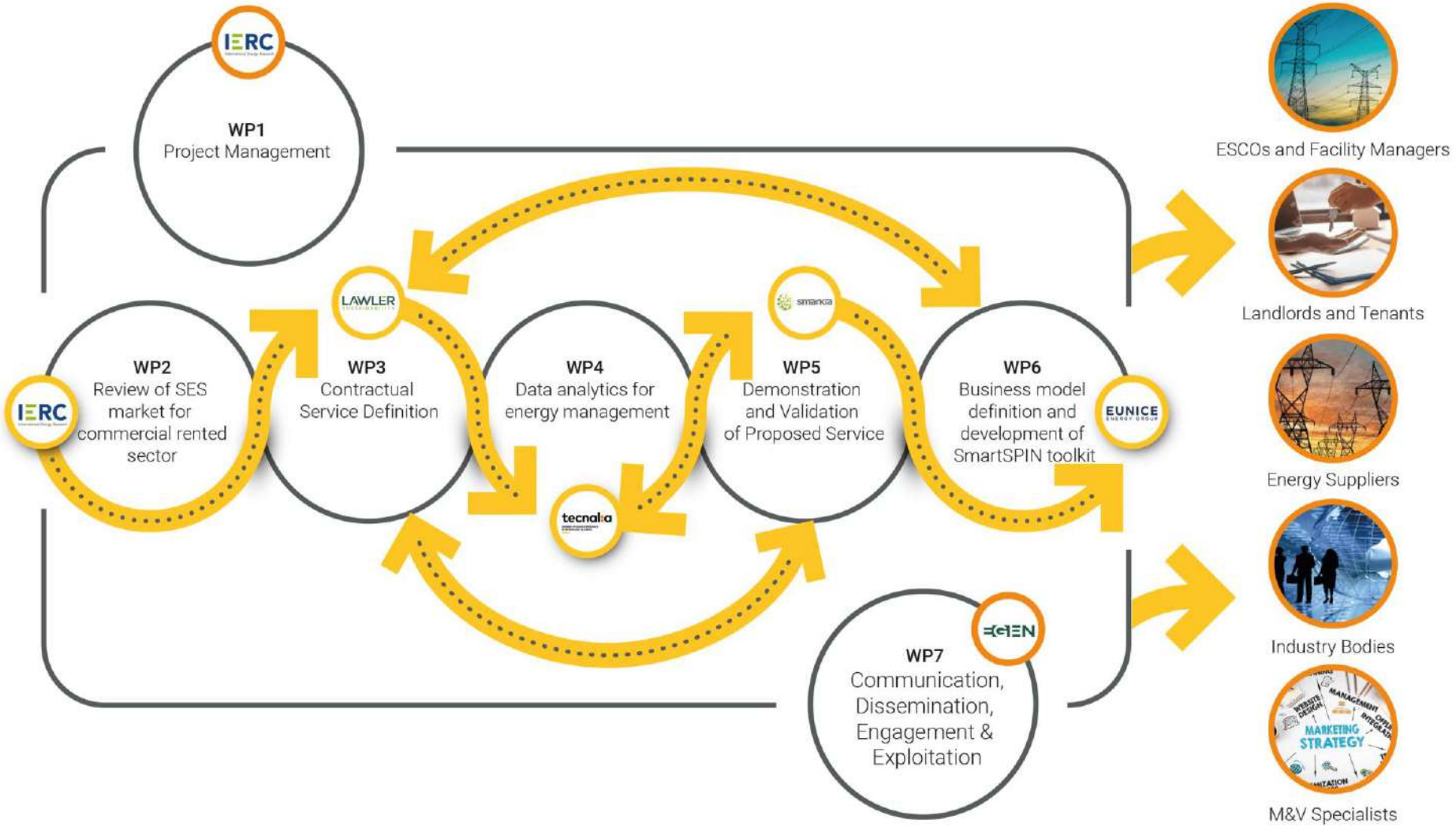
SmartSPIN Work Plan



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Energy Services Definitions

Some definitions relevant with SmartSPIN

- Energy services are the benefits that energy carriers produce for human well-being (Modi et al, 2005)
- An energy service is a measure of the service actually provided to ultimate consumers by their own use of energy, quantified, for example, using units of work or of heat at various temperatures (Devine Jr., 1979)
- Energy services refer to the services that are generated from consuming energy combined with appliances (Fouquet, 2016)
- People do not use energy but obtain benefits from the services provided by energy. The term energy services is used to describe these benefits, such as illumination or cooked meals (Pachauri and Spreng, 2003)
- An energy service is the useful work obtained by energy consuming (Sorrell, 2009)
- Energy services are provided through a combination of capital equipment, labour, materials and energy. An essential feature of an energy service is the useful work obtained which may be measured by a variety of way (Sorrell, 2007)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 10133744.

The Split-Incentive Issue

A split incentive **occurs where the benefits of a transaction do not primarily accrue to the person who pays for it**.

The Energy Efficiency Directive (Directive 2012/27/EU) includes a provision in its Article 19(1)(a) recognising the importance of addressing the barrier of split incentives in the building sector.

"*Member States shall evaluate and if necessary take appropriate measures to remove regulatory and non-regulatory barriers to energy efficiency, without prejudice to the basic principles of the property and tenancy law of the Member States, in particular as regards: (a) the split of incentives between the owner and the tenant of a building or among owners, with a view to ensuring that these parties are not deterred from making efficiency- improving investments that they would otherwise have made by the fact that they will not individually obtain the full benefits or by the absence of rules for dividing the costs and benefits between them, including national rules and measures regulating decision- making processes in multi- owner properties*"

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ESCO Business models addressing the split incentive

- Review of Business Models (D2.1)

- Three Business Models for ESCO have been reformulated from the literature (Shang et al, 2017) to deal with the split-incentive issue (D2.2).

- Shang, T., Zhang, K., Liu, P., & Chen, Z. (2017). A review of energy performance contracting business models: Status and recommendation. Sustainable cities and society, 34, 203-210.

- Most promising business models investigated in SmartSPIN are:
  1. **Shared savings business model** addressing the split-incentive issue
  2. **Guaranteed savings business model** addressing the split-incentive issue
  3. **Chaffee business model** addressing the split-incentive issue
  4. **Energy Efficiency as a Service** addressing the split-incentive issue

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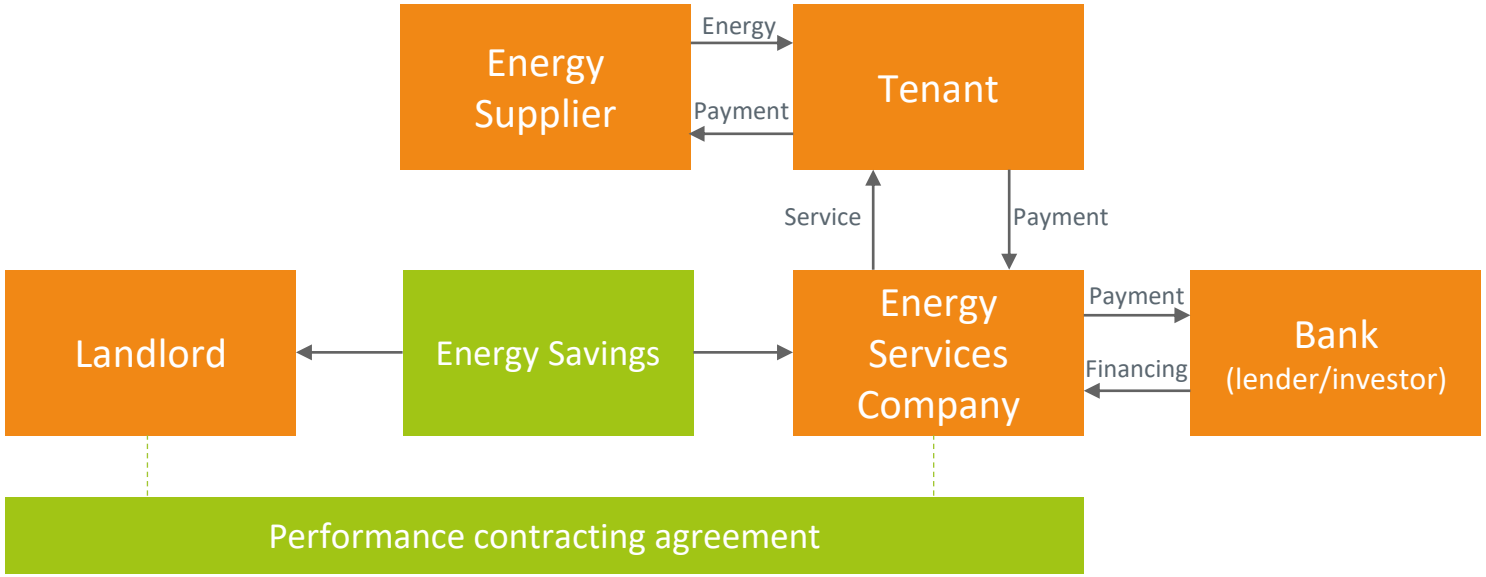
ESCO Business models addressing split incentive – 1

Shared savings business model addressing the split-incentive



- The ESCO is responsible for designing, financing and implementing the project
- The ESCO is responsible to verify the savings during the contract period
- The ESCO gets a fixed portion of the saving over a fixed period *and shares the savings with the landlord*
- The tenant pays the fees for the energy service to the ESCO
- Low risk model for the client

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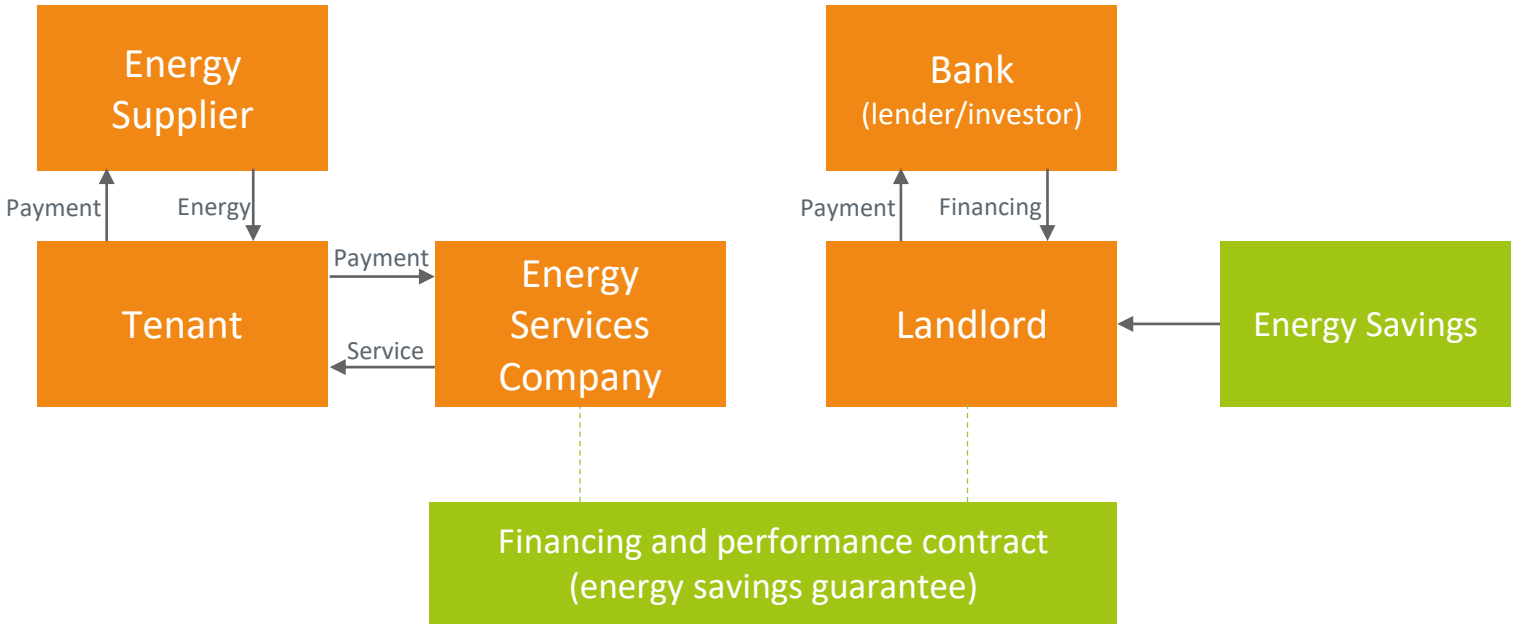
ESCO Business models addressing split incentive – 2

Guaranteed savings business model addressing the split-incentive issue



- The ESCO is responsible for designing and implementing the project but it is not responsible for financing it
- The ESCO guarantees that the savings will be sufficient to pay for the service fees

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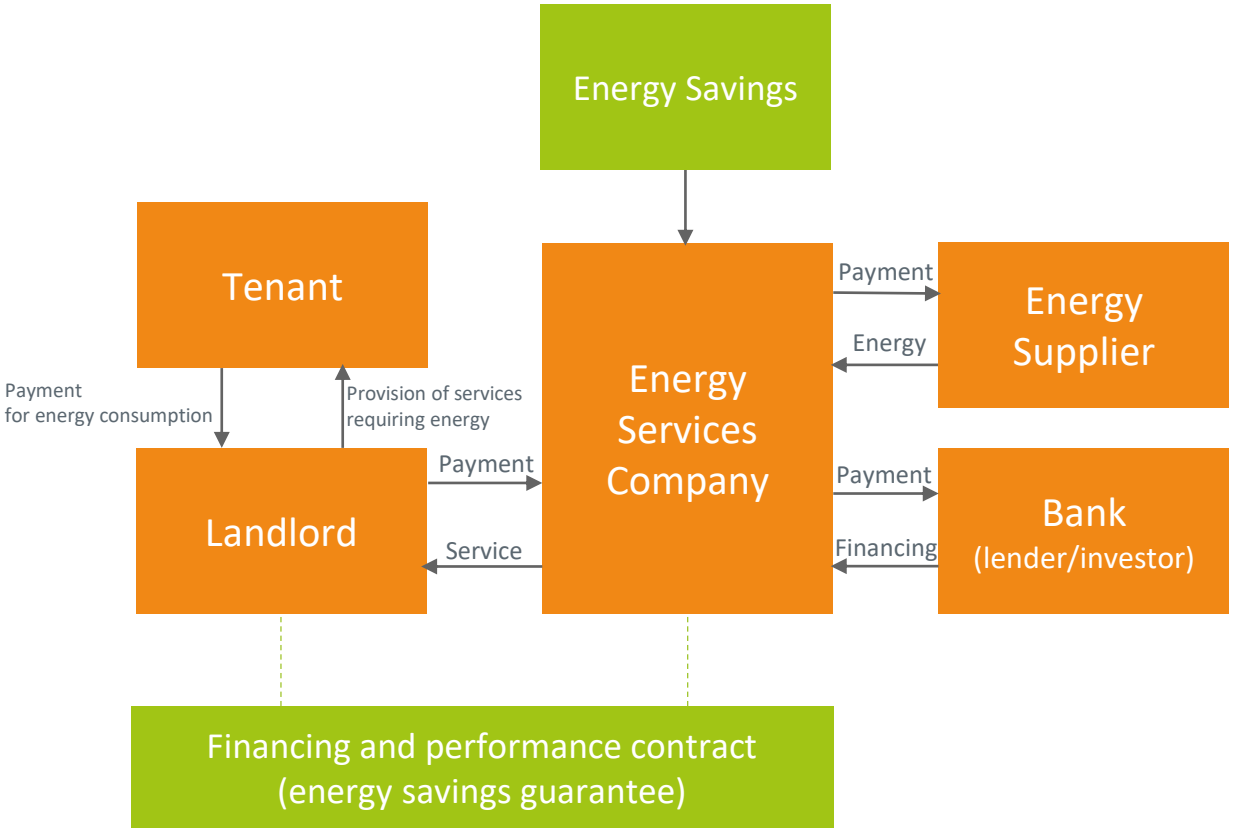
ESCO Business models addressing split incentive – 3

Chaffee business model addressing the split-incentive issue



- The ESCO is responsible for the operation and maintenance of the entire energy system
- The ESCO burdens the energy costs
- The ESCO manages and transforms the energy system to achieve the targets specified in the contract and self-finances the related projects
- The ESCO gets all the savings if targets are met, otherwise it pays a compensation corresponding to the energy shortage.
- The landlord has a contract with the ESCO and pays for the energy provision and the energy efficiency
- The landlord receives a payment from the tenant for the energy expenses due to the energy consumption of the tenant

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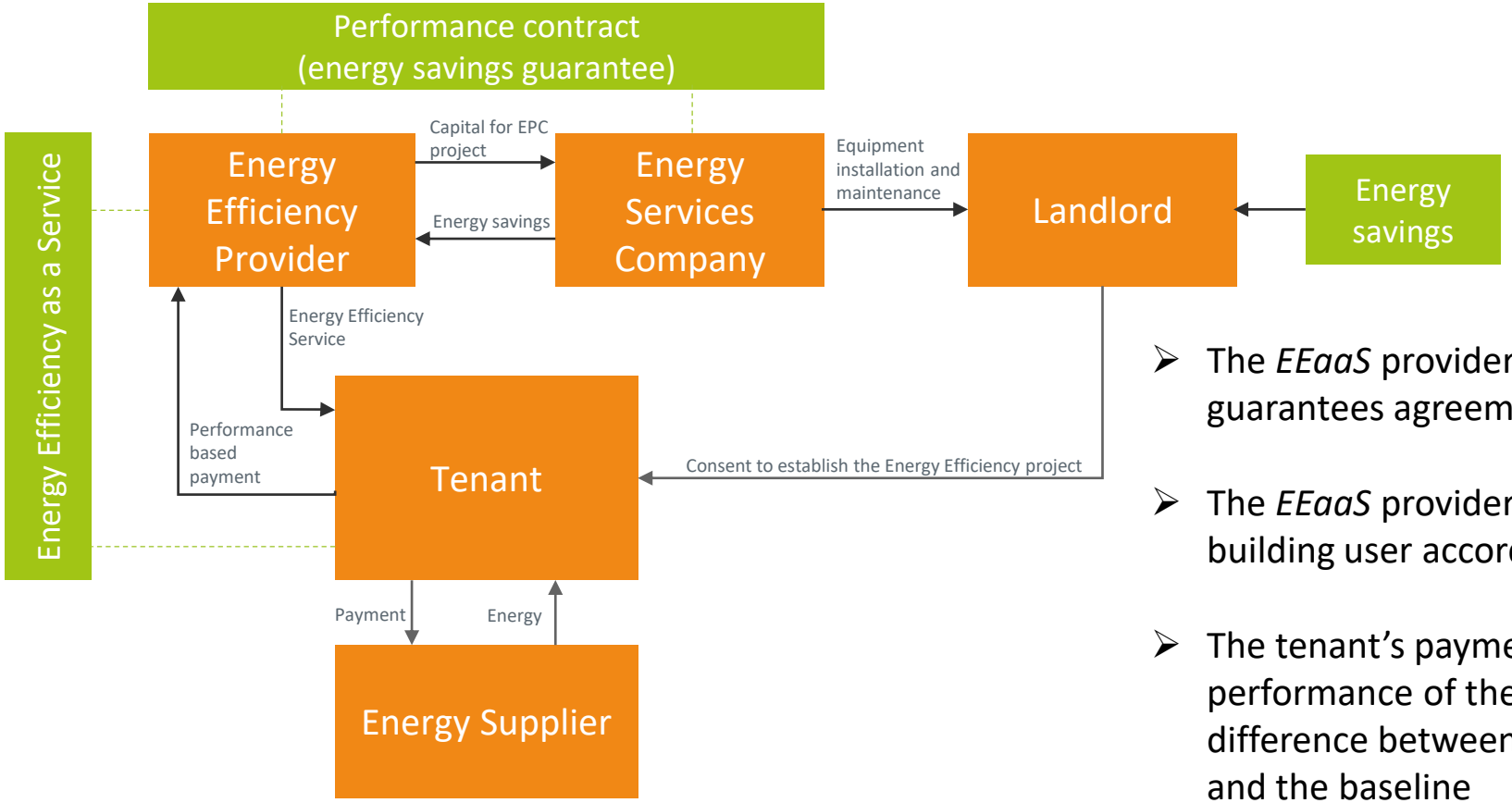
ESCO Business models addressing split incentive – 4

Energy Efficiency as a Service business model addressing the split-incentive issue



- The *EEaaS* provider has an EPC with performance guarantees agreement with an ESCO
- The *EEaaS* provider receives payments from the building user according to the achieved energy savings
- The tenant's payments depend on the overall performance of the service; quantified as the difference between the actual energy consumption and the baseline

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Interviews in Work Package 2

Ten interviews with members of External Advisory Board

1. City of Dublin Energy Management Agency Limited (**CODEMA**) – CODEMA is Dublin's Energy Agency. It aims at accelerating Dublin's low-carbon transition to mitigate the effects of climate change and improve the lives of citizens.
2. FACTOR 4 BVBA (**FACTOR4**) – FACTOR4 is an ESCO and EPC facilitator specialized in realizing comfort, energy efficiency and renewable energy in existing non-residential buildings, industrial plants and apartment buildings.
3. Carbon Minded (**CARBON MINDED**) – CARBON MINDED is an energy and carbon consultancy working with both public and private sector organizations to deliver sustainable solutions.
4. ANESE. **ANESE** is the National Association of ESCOs in Spain and counts more than 120 members specialized in energy services, technologies and investments.
5. Klépierre S.A. (**KLEPIERRE**) – Klépierre is a real estate investment trust focusing on shopping centers assets, which are owned and managed by the company. The headquarters are in France and the company's activity is well established in 16 European countries (Belgium, France, Scandinavian countries, Germany, Netherlands, Poland, Greece, Portugal, and Spain).
6. MEETS Accelerator Coalition (**MEETS AC**) – MEETS AC is an organization that aims at promoting the MEETS model.
7. REGENERA LEVANTE SL (**REGENERA**) – REGENERA is an Energy Service Company established in 2007 that offers services for Engineering and Energy Assistance, Industrial work and installations, Maintenance, Energy Services, and R&D – Regenera Digital.
8. SERCO Limited (**SERCO**) – SERCO established in 1929 as Serco Group Plc's and became Serco Limited on 1987. SERCO provides essential service to the public sectors like defense, transport, justice, immigration, healthcare and other citizen services across their four operating regions UK & Europe, North America, Asia Pacific and Middle East.
9. Smart M Power – **Smart M Power** is a very specialized ESCO in Ireland. It specializes in managing and intelligently automate power-matching transactions on a local level.
10. An anonymous interviewee from the **European Commission**

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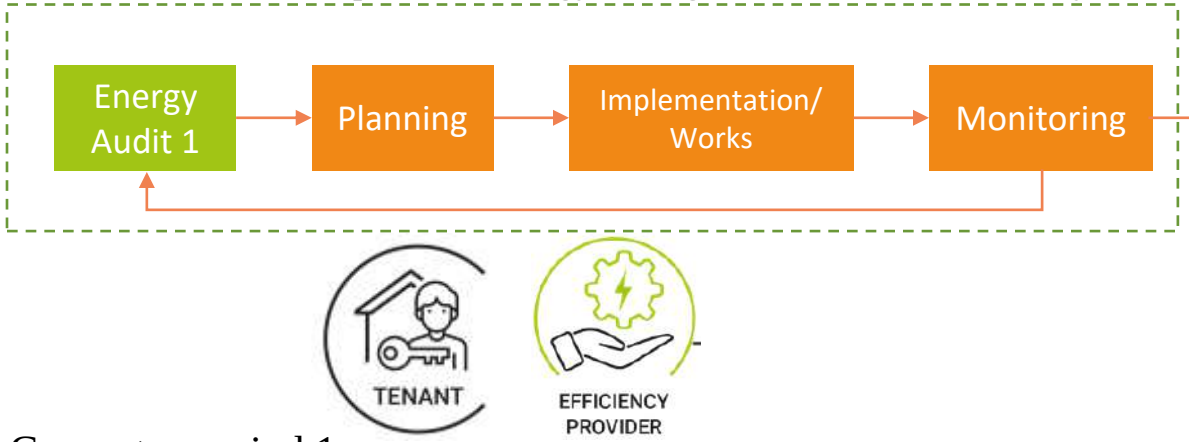
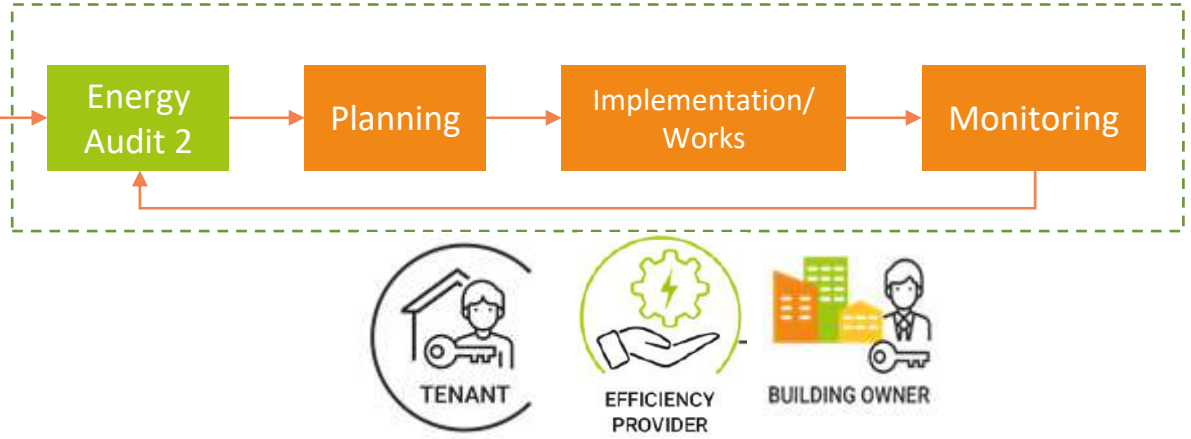
The SmartSPIN Energy Efficiency as a Service Model

Towards a Tripartite Energy Performance Contracting

Guarantee Period 1: optimized energy management & EEMs owned by tenant



Guarantee Period 2: EEMs & upgrades to the building owned by building owner



Guarantee period 1

- The service provides:
  - Optimized energy management and advice to reduce energy consumption.
  - Installation/replacement of energy efficient equipment owned by the tenant (agreed in Energy Audit 1).
- Start / end date of guarantee period 1
- Target energy savings in guarantee period 1
- Penalty for the ESCO if not achieving the target savings
- Service Level Agreement (users' satisfaction / thermal comfort)

Guarantee period 2

- List of approved energy efficiency measures which can be installed in Step 2 (agreed in Energy Audit 2).
- Start / end date of guarantee period 2
- Financing means other than energy savings accumulated in period 1
- End date of ESCO contract
- Target energy savings in period 2
- Penalty for the ESCO if not achieving the target savings
- Service Level Agreement

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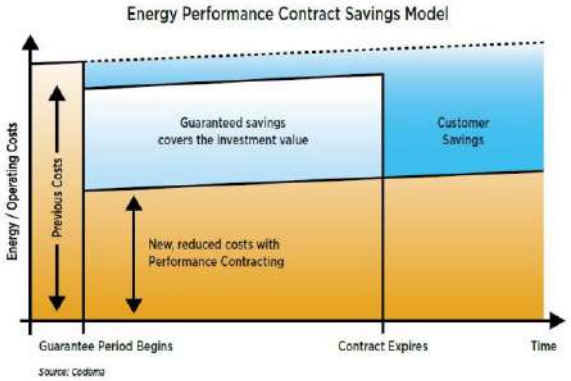
The SmartSPIN energy savings model



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Recommendations for the SmartSPIN Service

- The ***Energy as a Service*** (EaaS) model should cover: Energy Management, Maintenance, Total Guarantee of Equipment, Improvement works, Improvement of energy efficiency
- The SmartSPIN service should comprise: energy management, changing the electricity supplier, equipment/RES installation (e.g. solar PV installations) or replacement and O&M services
- The ***Measurement & Verification*** process should be standardized, ensuring no measurement errors and trusted by stakeholders
- ***Green leases*** should be used to allow engagement of landlords and tenants for improvement of sustainability and energy efficiency in rented commercial buildings.
- Two cases should be considered for service definition: 1. the landlord owns space and equipment and 2. the landlord owns only the space.
- The engagement of both landlord and tenants with an ESCO should be achieved by means of a ***tripartite Energy Performance Contract*** which can deliver *performance guarantee* in the rented scenario (while circumventing the split incentive issue)
- Sub-metering is required for a fair billing of tenants' energy consumption
- The energy tariff for the electricity, gas consumption and water applied to the tenants should be independent of the season, fair and easy to understand.

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Published deliverables

https://www.smartspin.eu/results/

- D2.1 Review of existing business models for Smart Energy Services
- D2.2 Report on market status and revenue stream mapping
- D2.3 Review of policies on SES
- D3.1 Review on legal aspects
- D3.2 Report on smart contract design
- D7.1 Dissemination and communication plans

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 10133744.

Thank you.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033744.

MUSE GRIDS

MULTI UTILITIES SMART ENERGY GRIDS

Multi Utilities Smart Energy Grids and their Contribution to Service Integration

Giorgio Bonvicini - RINA Consulting S.p.A.

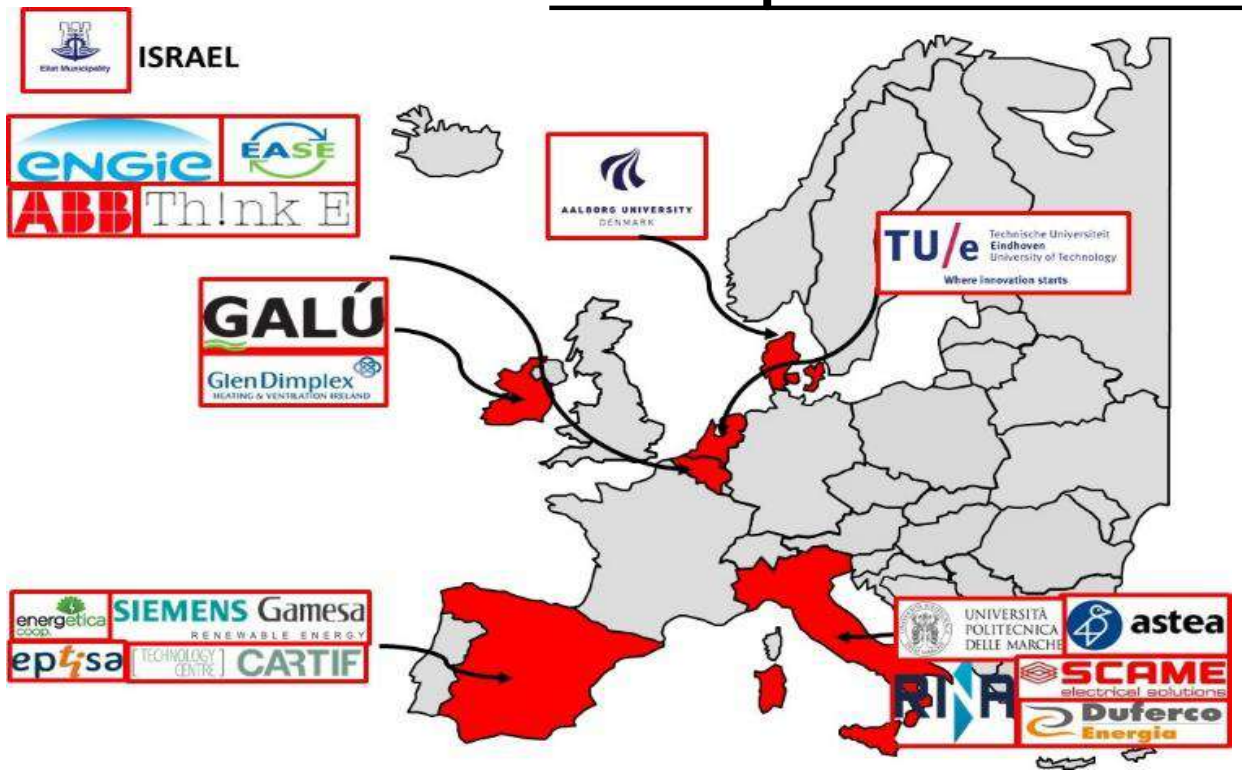
Sustainable Places 2022 Conference, September 8th, 2022

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

MUSE GRIDS Project

MUSE GRIDS – Multi Utilities Smart Energy Grids
Duration: November 2018 – October 2022

A lighthouse project for Europe towards local energy independency via the promotion of Smart Energy Systems



- An industry-driven consortium
- Demo sites in Osimo (Italy) and Oud-Heverlee (Belgium)
- Virtual demo sites in Eilat (Israel), Belen & San Cembrian (Spain), Kolkata (India)
- Replication sites in Riga (Latvia), Porto (Portugal), Constanta (Romania), Pesaro (Italy), Cologne (Germany)

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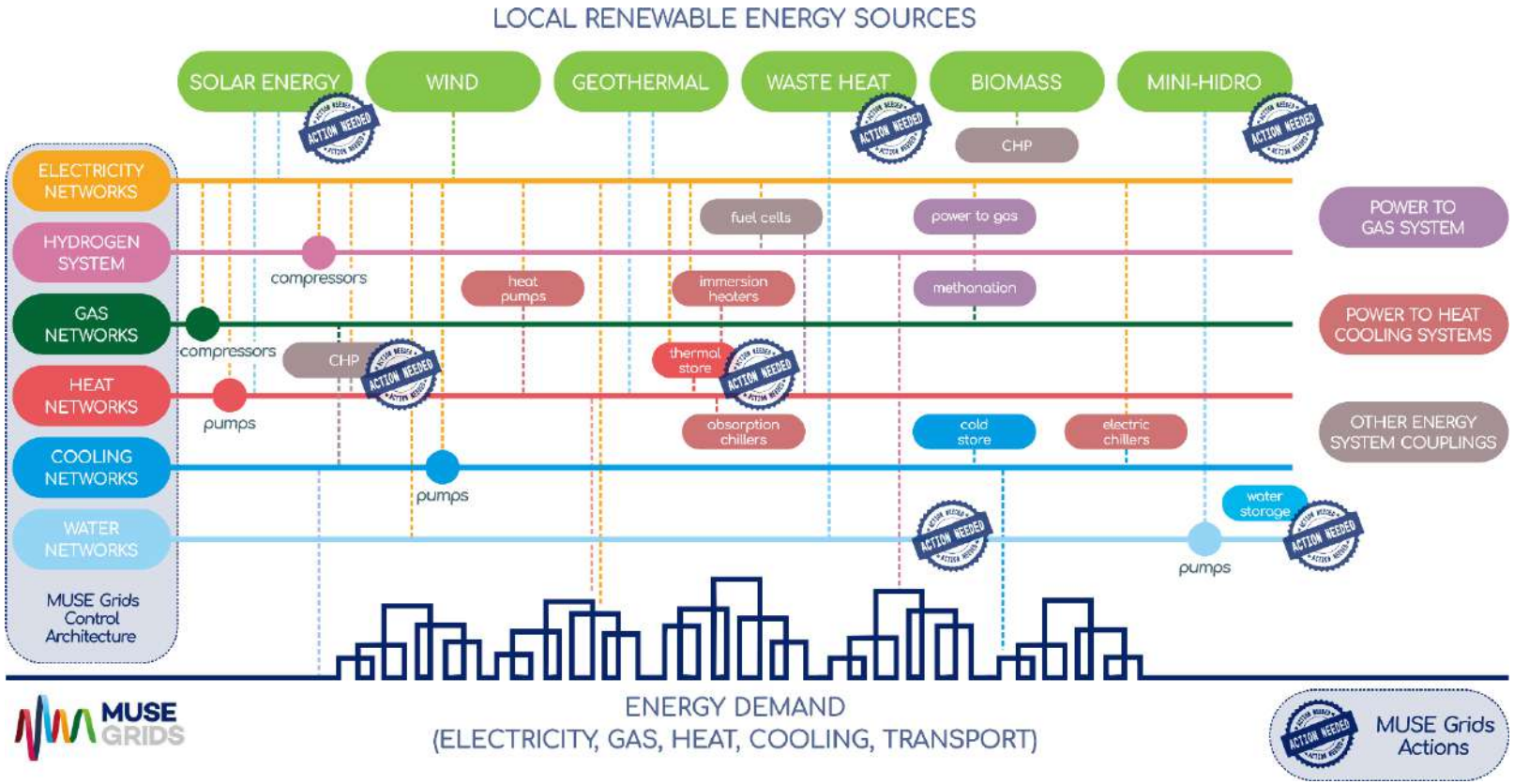
MUSE GRIDS Vision towards Energy Resilience



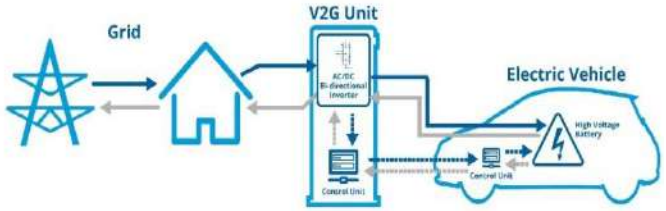
*A **Smart Energy System** is defined as an approach in which smart electricity, thermal, water, gas grids etc. are combined with storage technologies and coordinated to identify synergies between them in order to achieve an optimal solution for each individual sector as well as for the overall energy system."*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

MUSE GRIDS Main Technological Assets

POWER TO HEAT

- Smart Heating
- TES integration at small and large scale
- Neighbourhood battery



ELECTRIC VEHICLES

- V2G/V2B algorithms
- Innovative fast charging station

+ management of existing assets (cogeneration & renewable plants, district heating network, water network)

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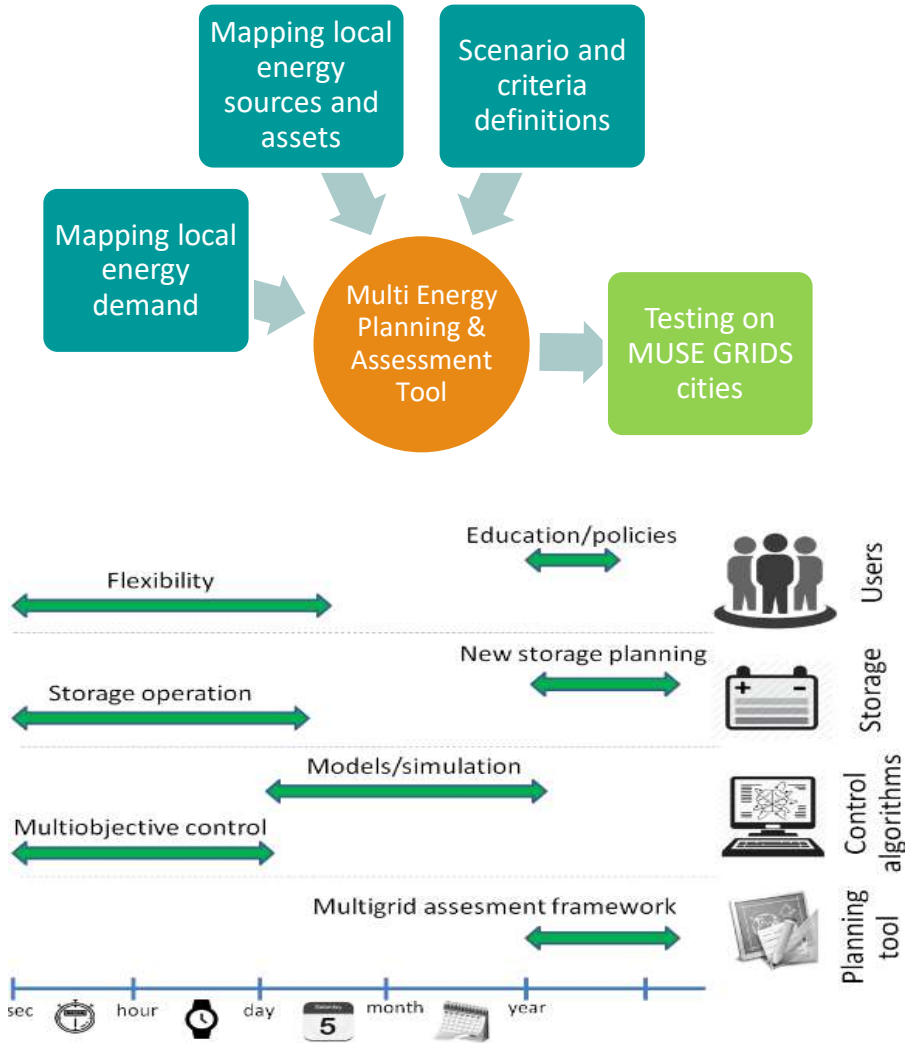
MUSE GRIDS Planning Tool for Cities



A useful tool to plan the energy transition of cities and increase their resilience

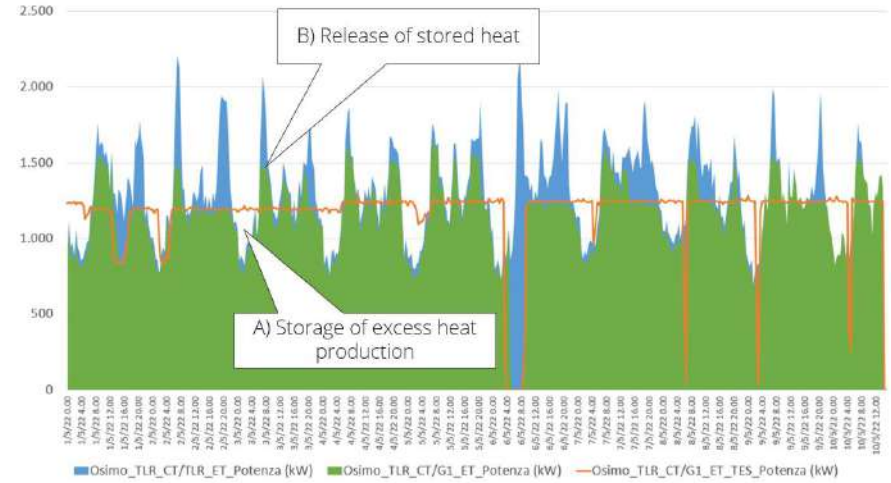
#	Scenarios - heating	District heating	Individual heat production	Storage	RE production
0	**Reference**	No changes	No changes	No changes	No changes
1	**Individual HPs**	No changes	100% HP	No changes	No changes
2	**+20% DH**	DH increased by 20% (3 GWh)	Decreased of 3 GWh	5 MWh of seasonal thermal storage	No changes
3	**50% DH**	DH supplies 50% of total heating demand	50% of total heating Demand	5 MWh of seasonal thermal storage	No changes
4	**90% DH**	DH supplies 90% of total heating demand	90% of total heating demand	No changes	No changes
5	**Reference + RE**	Individual heating	No changes	No changes	PV increased up to 40 MW
6	**Individual HPs + RE**	No changes	100% HP	No changes	PV increased up to 40 MW
7	**+20% DH + RE**	DH increased of 20% (3 GWh)	Decreased of 3 GWh	5 MWh of seasonal thermal storage	PV increased up to 40 MW
8	**50% DH + RE**	DH supplies 50% of total heating demand	50% of total heating demand	5 MWh of seasonal thermal storage	PV increased up to 40 MW
9	**90% DH + RE**	DH supplies 90% of total heating demand	10% of total heating demand	No changes	PV increased up to 40 MW

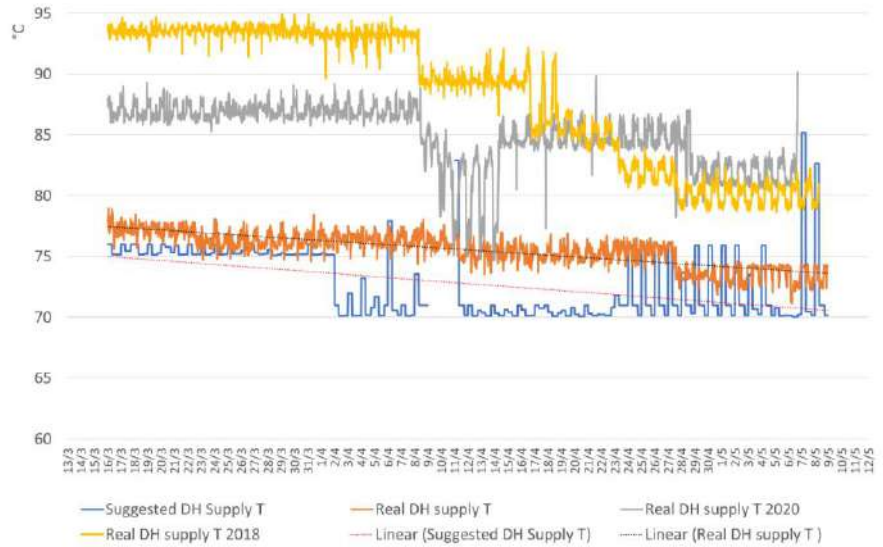
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

Main Project Results - Osimo

- Thermal energy storage and cogeneration used to feed District Heating Network (+900 h/y CHP prod.)
- Reduction of DH supply temperature (5-15°C, 50% of the year)
- Renewable Electricity Production (ASTEA: 80 kWp PV & 110 kW hydro + 33.3 MW private assets)
- Smart Management of Water Network (-41,200 m3/y of water losses, also implying electricity savings)
- Electric Vehicles and Heat Pumps at ASTEA Headquarters (minor impact but interesting tests)

- Total avoided emissions: 128,070 tCO_2e/y
- Preliminary results → final in October





This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

Main Project Results – Oud-Heverlee

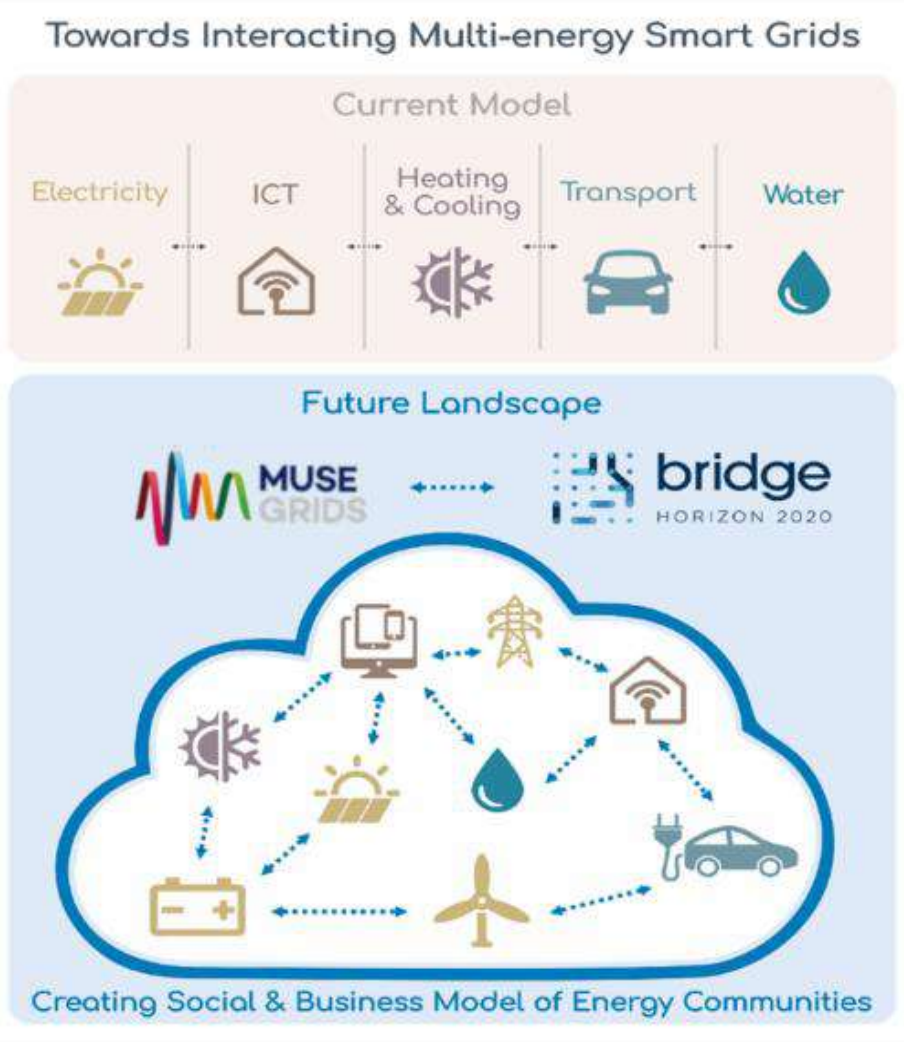
- Photovoltaic Plants with Battery Electric Storage System (11 MWh/y production; increased self-consumption by 38.5%)
- Electric Vehicles and V2G Chargers (benefits on local electric grid, plus 486 MWh/y of fuel savings)
- Smart Heating Systems (10.2 MWh/y NG savings)

- Total avoided emissions: 131.6 tCO_2e/y
- Preliminary results → final in October

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

Conclusions

- Service integration in energy systems can be achieved in many different ways, all leading to an increased flexibility and security of supply
- MUSE GRIDS promotes service integration:
  - increased exploitation of local RES
  - energy storage systems (electric/thermal)
  - smart load management systems
  - power-to-X solutions
- Other benefits are achieved in terms of:
  - increased self-production & security of supply
  - reduction of GHG and pollutant emissions
  - decrease of energy supply costs



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

Thank you for your attention!

giorgio.bonvicini@rina.org

Visit us at EUSEW Energy Fair on September 28-29th and attend our Final Event on October 27th

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824441.

SUSTAINABLE PLACES

Next-Generation Integrated Energy Services fOr Citizen Energy CommuNities

Eneko Olabarrieta - R2M Solution Spain

Sustainable Places 2022 Conference, September 8th, 2022

Introduction

Horizon 2020

Call: H2020-LC-SC3-2018-2019-2020

(BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY)

Topic: LC-SC3-B4E-14-2020

Type of action: CSA

Ecology

Society

What is NEON pursuing?

- Integrated cross-cutting services
- Innovative business models
- Digitalization
- Flexibility
- Facilities
- Validation

¿How do we start?

Identify the services

Engagement

How to integrate?

Is it legal? How is it paid?

- Legal and financial conditions of cross-cutting services
- State of the art of financing mechanisms
- Available tools
- Gaps
- Enabling factors
- Feasibility

Remember!

Ecology

Society

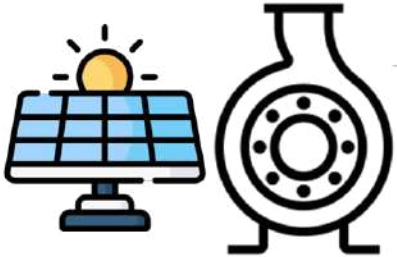
Let's do some math

Terminal Units

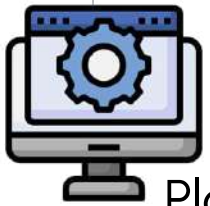
DR
Flexibility
Aggregation
etc.

Predictive data analytics

Optimization



Production and generation



Platform

Quantification

- DLT
- Methodology
- P4P
- Smart Contracts

Impact

Ethics

How do we validate it?

BERCHIDDA

DOMAINE DE LA SOURCE

POLÍGONO INDUSTRIAL LAS CABEZAS

STAINS CITY

SUSTAINABLE PLACES

Thank you!!

SUSTAINABLE PLACES

Local Energy Communities with positive net balance

Julio César Diez - ITE

Sustainable Places 2022 Conference, September 8th, 2022

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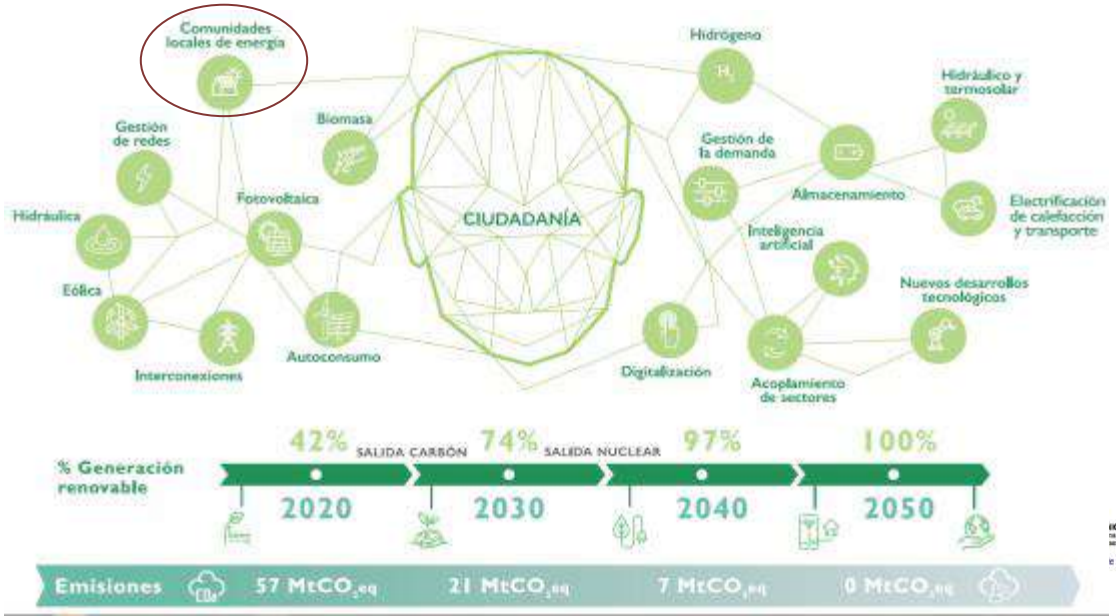
ENERGY COMMUNITIES

An Energy Community reflects the need to find new ways to organize and govern energy systems (Van Der Schoor et al., 2016). It is a social movement that enables more participatory and democratic energy processes. JRC Science for Policy Report. European Commission

A new energy model to lead the green energy transition



Source: Long-term decarbonization strategy 2050. Ministry for Ecological Transition and Demographic Challenge.

ENERGY COMMUNITIES

Energy communities are a way of organizing an activity, not an activity in itself.

- Generation
- Distribution
- Supply
- Storage
- Energy market
- EV
- Energy Efficiency Services

HySGrid+: Local Energy Communities

…with positive net balance

- Local and intensive generation
- Electrification of transport and thermal demand
- Flexibility management
- Encouraging the active participation of end-users

Key features

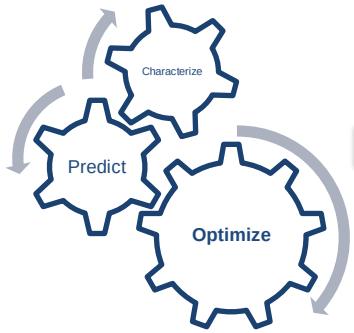
Duration: 3,5 years (2020-2023) **Budget:** 3.738.200 € **Coordinator:** ITE

Funding: Centro para el Desarrollo Tecnológico e Industrial (CDTI) del Ministerio de Ciencia e Innovación de España dentro del Programa Cervera para Centros Tecnológicos.

DESIGN AND PLANNING: Energy Communities

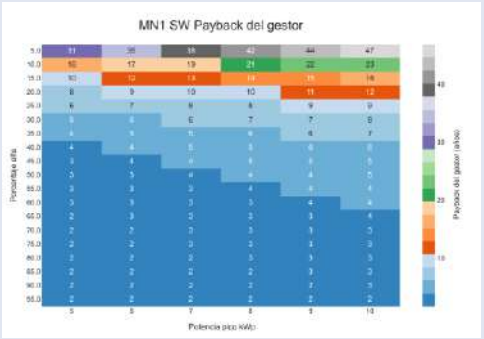
Pre-dimensioning service

- **Individual consumption**
- **Available surfaces**
- **Electricity tariff**
- **Others (self-consumption modality,...)**
- **Type of model**
  - Model: “Energy as a service” (EaS)
  - Model: “Energy as you invest” (EaI)



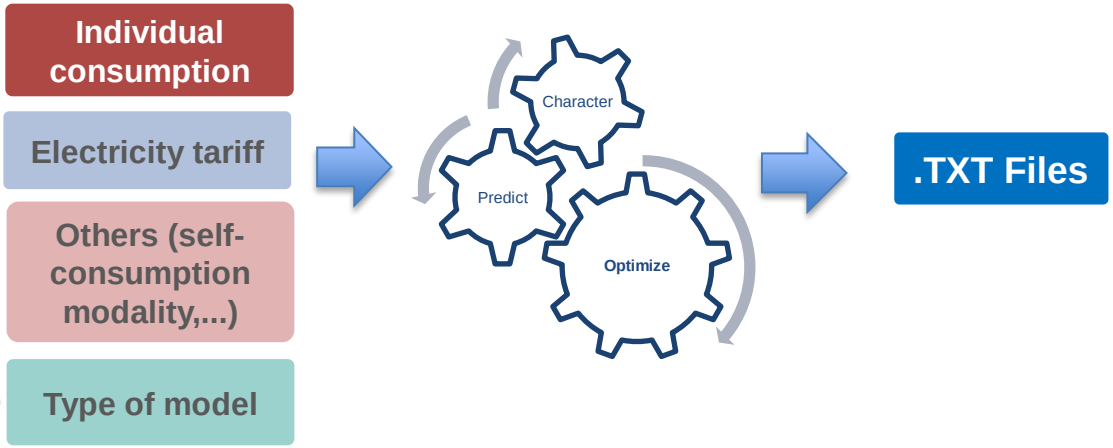
Optimal pre-dimensioning of the installation

- **Peak power to be installed**
- **Energy allocation criteria**
- **Others (depending on model)**
  - Investment ratio (EaI)
  - Generation surplus (EaS)
  - Monthly fee (EaS)
  - ...



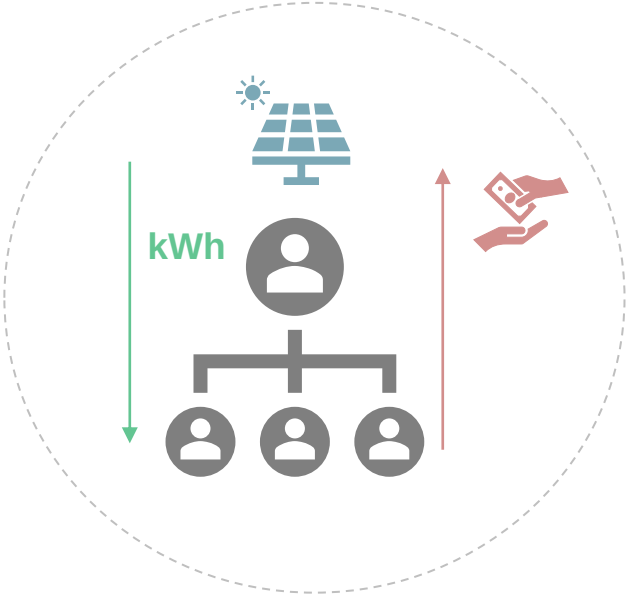
DESIGN AND PLANNING: Energy Communities

Calculation service
distribution coefficients



- Model “Energy as a service” (EaS)
- Model “Energy as you invest” (EaI)

ENERGY AS A SERVICE



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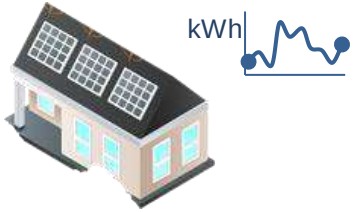
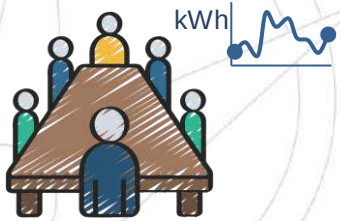
ENERGY AS A SERVICE

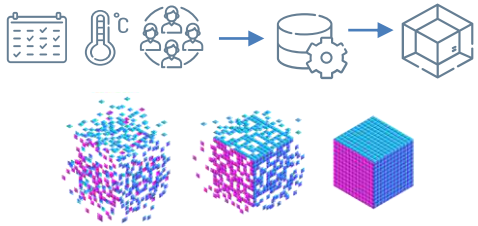


Residential users

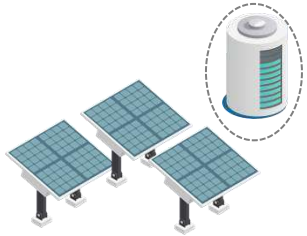
Public entity



Companies



Aggregate demand



- Available surface area
- Peak power

- Available budget
- Scenarios (quotas, peak power...)

- Maximize social benefit
- Maximize individual savings

Optimization criteria

Restrictions

- Peak power to be installed
- Individual fee
- Apportionment coefficients

Prioritize self-consumption

Reduction of energy poverty

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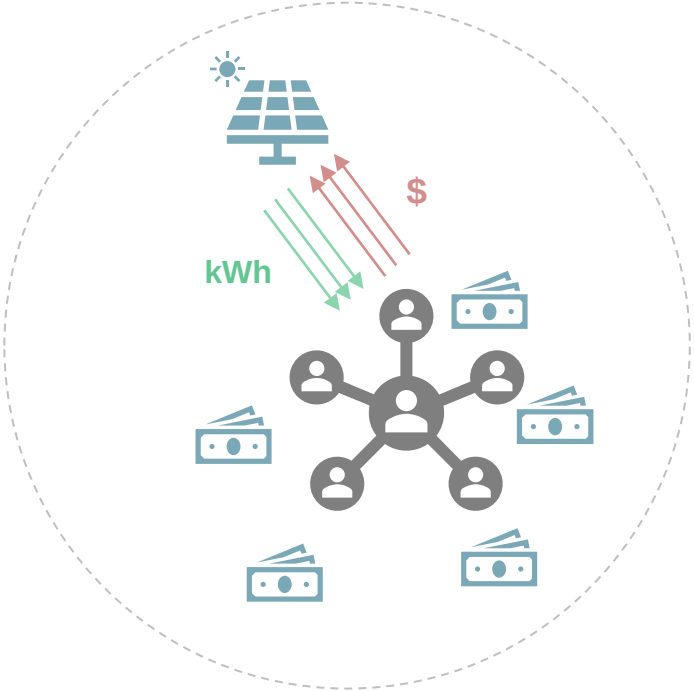
ENERGY AS YOU INVEST



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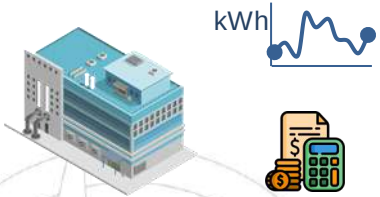
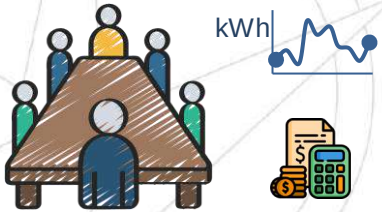
ENERGY AS YOU INVEST

Residential users



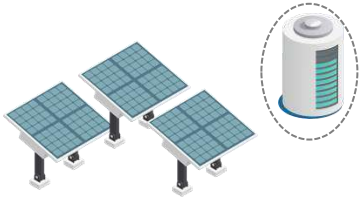
Public entity



Companies

Individual demand profiles

Available budget



- Available surface area
- Peak power

Maximize individual benefit in an equitable manner

Optimization criteria

Restrictions

Peak power to be installed

Investment ratios

Apportionment coefficients

Establishment of investment percentages

Setting generation percentages

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DIGITAL TWIN

REAL ENVIRONMENT

ELECTRIC SYSTEM DIGITAL TWIN

DIGITAL TWIN:

- ***Intelligence:*** Analyzes data and draws conclusions
- ***Sensorization:*** Collects data in real time
- ***Management and Control:*** Solves incidents, proposes optimizations and predicts operations

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ELECTRICAL SYSTEM DIGITAL TWIN

HiL + PHiL

- ***Certification and validation of equipment***
- ***Development testing***

ELECTRICAL SYSTEM DIGITAL TWIN

GAMMA – Real Environment

Wind

3 kW

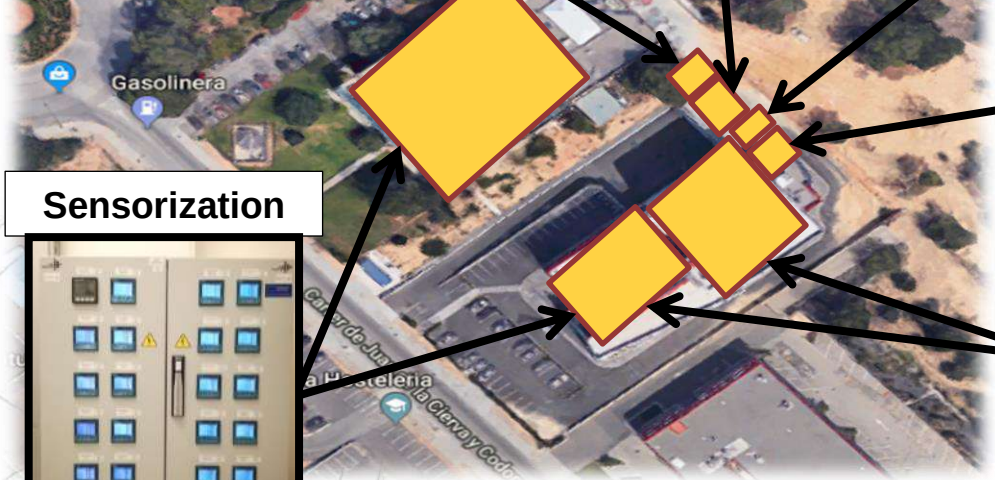
EV

2 VE

120 kWh
60 kW

Batteries

Monitoring and Management Center



Sensorization

PV

25 kWp
+
5 kWp
+
25 kWp

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