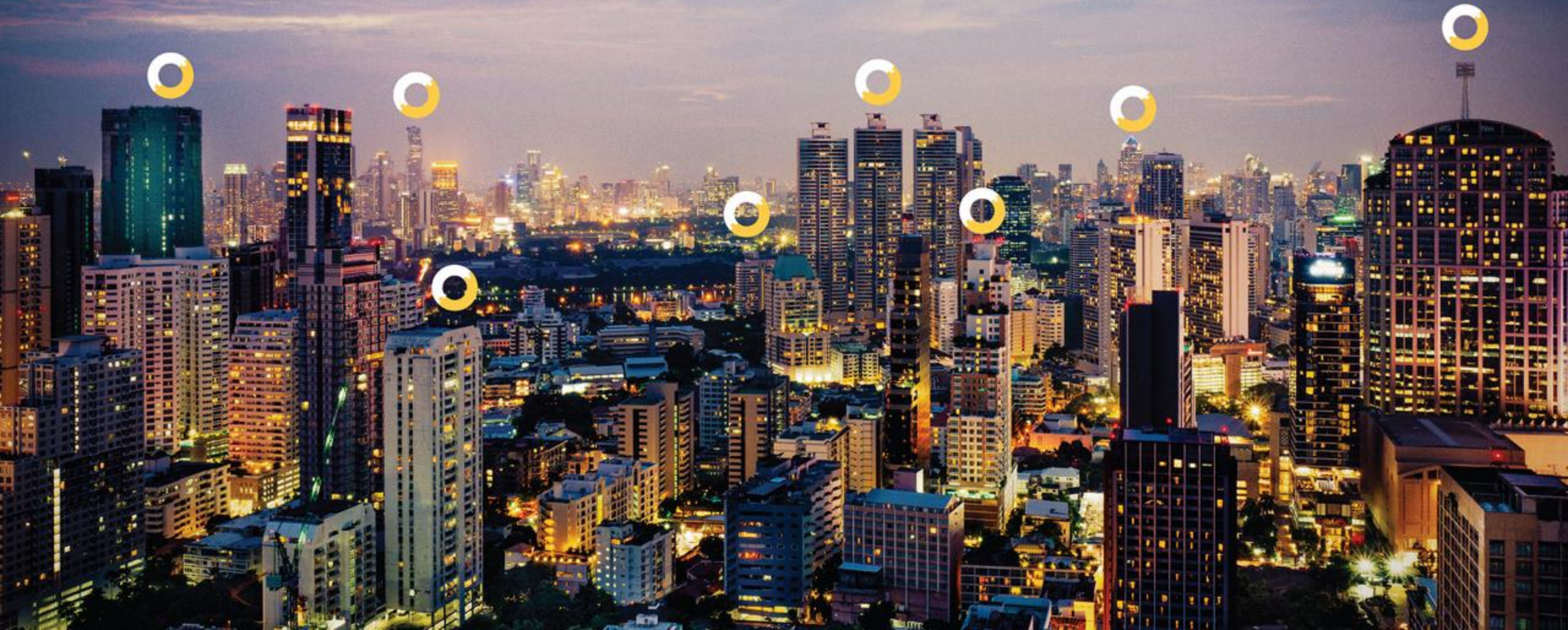


interconnect

interoperable solutions
connecting smart homes,
buildings and grids



InterConnect (*Interoperable Solutions Connecting Smart Homes, Buildings and Grids*) is the name of the **project** that **gathers 50 European entities** to **develop and demonstrate advanced solutions for connecting and converging digital homes and buildings with the electricity sector.**

The main goal? **Bringing efficient energy management within reach of the end-users by interoperable Solutions Connecting Smart Homes, Buildings and Grids.**

The project places the foundation for the future of smart energy management solutions by **seven connected large-scale test-sites in, Belgium, France, Germany, Greece, Italy, Portugal, and The Netherlands.**

Eleven European countries are involved – Austria, Belgium, France, Germany, Greece, Italy, Poland, Portugal, Serbia, Slovenia and the Netherlands - in this **36 M€ project that started in October 2019 and ends in October 2023.**

interconnect





Belgium



The pilot values ...

We provide borderless configuration of services from and to community members aiming at maximizing the value of flexibility for the society without compromising community values.

Distinctive FEATURES:

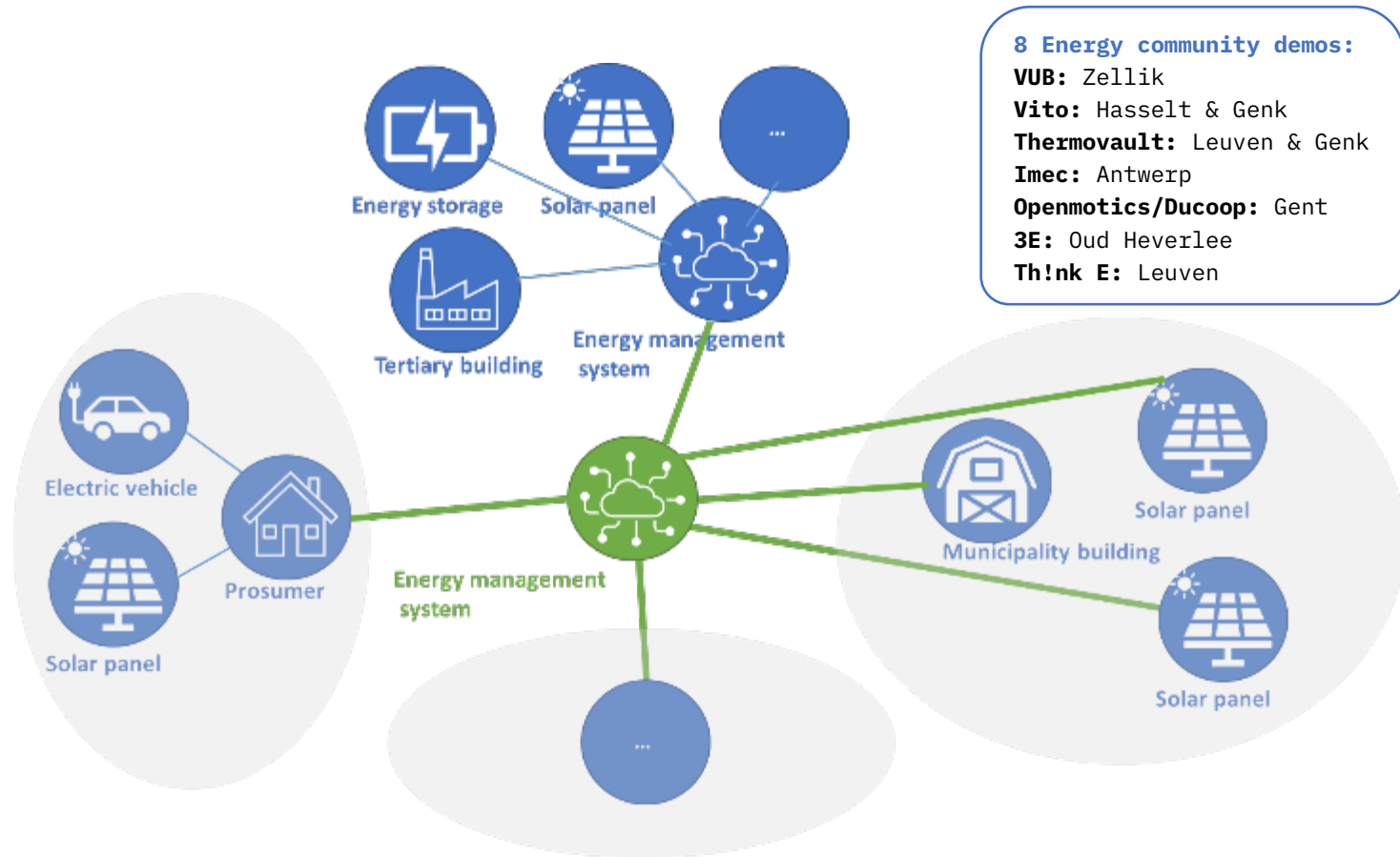
- Participative innovation
- Borderless innovation
- Seaming less configuration
- Dynamic contribution to environment without compromising community values and targets

Why...

- **Convenience and cost savings** while allowing community to support participants to provide services (energy and non-energy)
- **Energy efficiency** by optimizing consumption profiles
- **Reduce environmental footprint** by maximizing utilization of locally generated energy

What...

- **Technical:** Centralized control and monitoring, combination of different services, manage flexible resources to avoid peaks
- **Business:** Reduce invoice, promote additional RES investments, add new sources of income (utilization of spaces)
- **Environmental:** CO2 reduction/contribution to combat global warming, better forecasting of RES
- **Privacy** Private data used for community-related services with respect to values and GDPR



USER Features

- Cost reduction for neighborhood as a whole
- Increased renewable energy sources in local energy mix
- Different demonstration sites have different goals and features for the users

GRID Features

- Combining neighbourhood buildings to offer flexibility
- Peak shaving
- Different demonstration sites have different goals towards the grid

Business Modell

- Pilot focuses on Energy communities. By maximizing the usage of locally produced energy sources the electricity bill of community members will be reduced. Neighborhoods can also offer flexibility to support the national grid. These grid services can also be monetized.
- Favorable legislation:
- Enable peer to peer exchange
- Time of use tariff

KPI Definition

KPI 1.1: Fraction of self consumption in neighborhood increase (%produced energy that is consumed in the same neighborhood). Objective: 15% increase.

KPI 1.2: Peak shaving (maximum power measured on the grid during a timeframe of 1 month) Objective: peak reduced by 10%.

KPI 1.3: Customer energy awareness (% measuring the rise in customer energy awareness by measuring the increase of an energy awareness index (survey)). Objective: 75% on the total of the participating final users

KPI 1.4: Reduction of estimated greenhouse gas emission. Objective: 10%

KPI 1.5: Customer economical impact (% , ratio of the difference between the average electricity bills before the project and after project to the average electricity bill before the project). Objective: 2%.



France

Interconnect



You are empowered to protect
the environment...

... JOIN THE ENERGY COMMUNITIES

Living in InterConnect communities, management of the devices at home are simpler, the electricity bill is reduced, and the new energy challenges are understood by all.

September 2023

The pilot values ...

Become an actor by contributing to an efficient and eco-friendly energy management

Distinctive FEATURES:

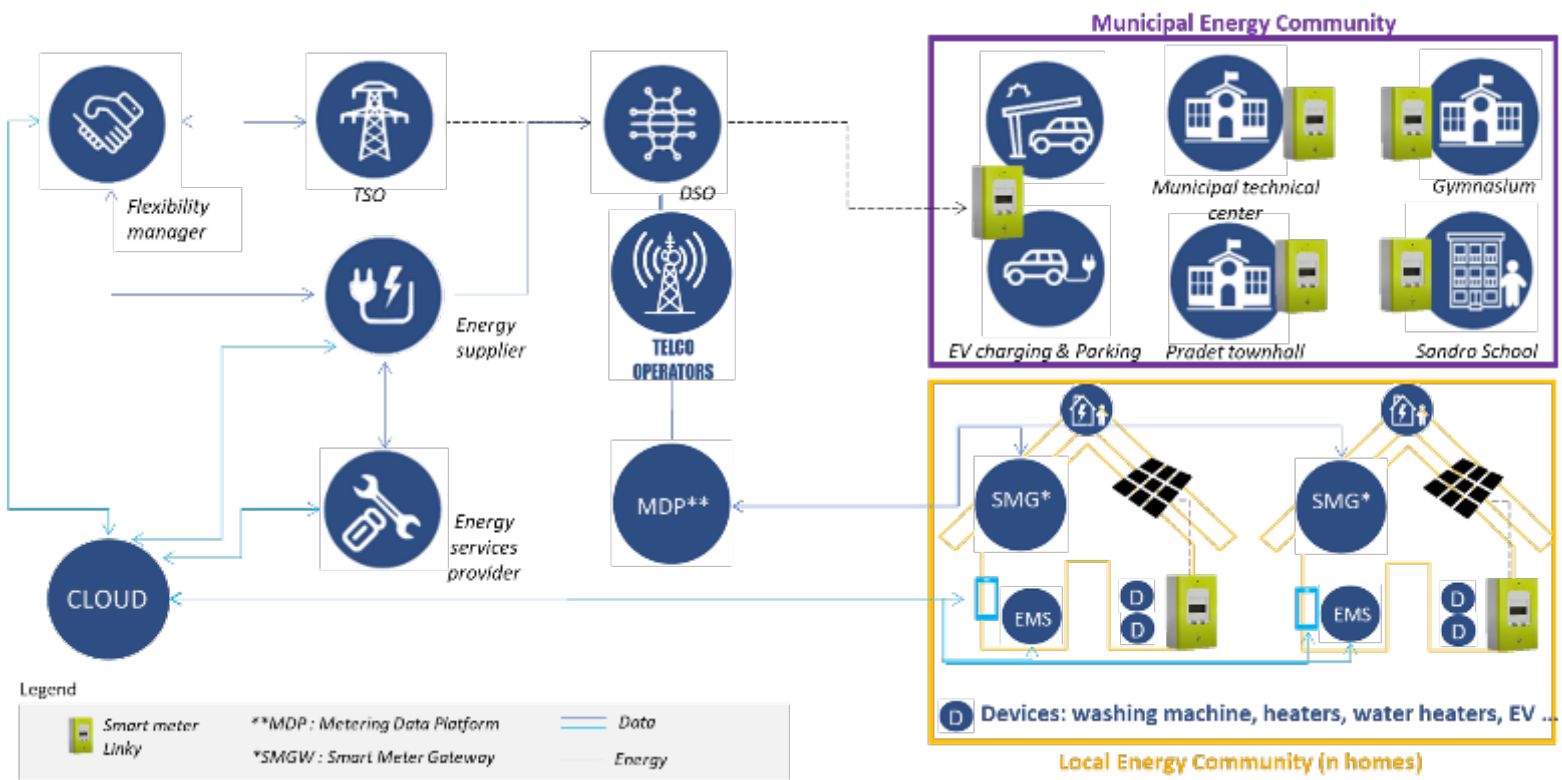
- Optimize the client's energy system
- Use flexibility
- Reduce bill
- Optimize the management of local renewable energy for maximizing the collective self-consumption

Why...

- **Empower** the users to be part of an interconnected world
- **Simplify** the energy management, for a carefree life
- **Reduce** cost of the electricity bill. Maintain comfort
- **Consume** and exchange your own energy production.

What...

- **Technical:** Single and community are able to control energy consumption through an ecosystem of interoperable products
- **Business:** Demonstrate the feasibility of business cases focused on dynamic tariff/flexibility and self consumption
- **Environmental:** Reduce the energy consumption and maximize the potential of renewable energy
- **Social:** Involves the end-user in energy problems so that he understands them and adapts his behavior. Understand mechanisms and stimuli that may induce end-users to change their behaviors in order to fulfill specific requests by grid actors.



Business Modell

- Enable customers to reduce their bill by providing a dynamic tariff, an automatic system to optimize their behavior to the tariff, and monitoring/information support
- Service provider enables customers to maximize the use of the local RES by synchronizing automatically consumption with periods of renewable energy production
- Market: residential/municipality energy consumers/prosumers
- European and French legislation driven

KPI Definition

- **KPI1.1** :Fraction of households participating to the pilot (% of enrolled households compared to the total contacted household).Objective: 12%.
- **KPI 1.2**: Fraction of implicated households pursuing energy management with the App from the beginning to the end of the project. Objective: 65%.
- **KPI 1.3**: Customer energy awareness (% measuring the rise in customer energy awareness by measuring the increase of an energy awareness index (survey)). Objective: 75% on the total of the participating final users.
- **KPI 1.4**: Customer Satisfaction index: measuring customer experience, on no loss of comfort and easiness of setting up the IoT equipment .Objective: 70%.
- **KPI 1.5**: Customer/municipality economical impact (% ,ratio of the difference between the average electricity bills before the project and after project to the average electricity bill after the project). Objective: 2%.

USER Features

- Pilot the different devices remotely/locally using interoperable interfaces
- Remain the master of the service control
- Control of the devices according to renewable energy period/dynamic tariff period

GRID Features

- Flexibility manager for primary, secondary and tertiary reserve R1,R2, R3



Germany

interconnect



Living as a Service

An automated approach for carefree home energy management through DSO-consumer collaboration

EXCLUSIVE

Being environmentally friendly has never been so easy!

Automation, transparency and security are just a few of the ingredients for this new independent way of life

September 2023

The pilot values ...

Living as a Service

Distinctive FEATURES:

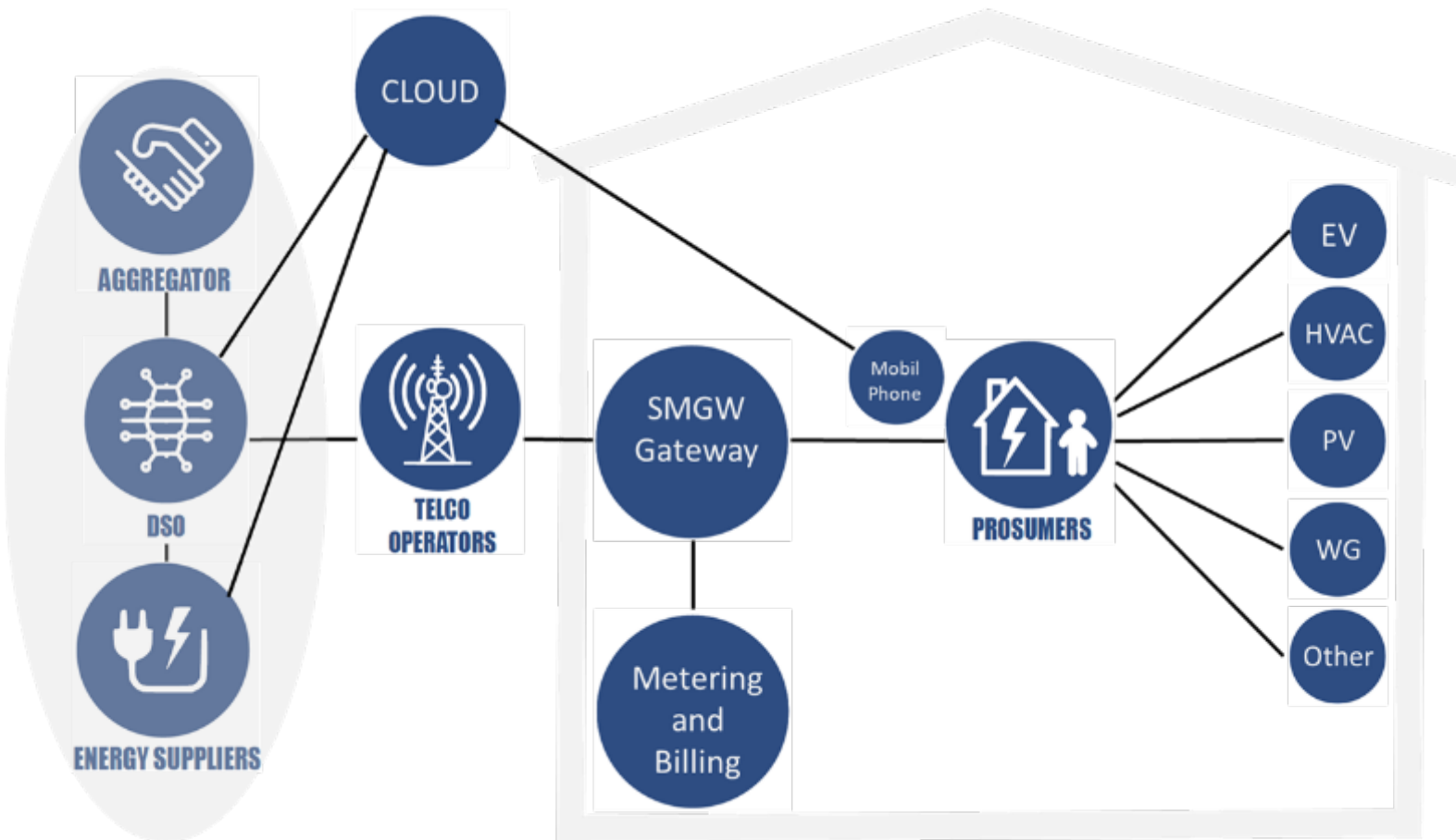
- Carefree energy supply with novel services
- Self-sustainable
- Awareness of impact (prices...)

Why...

- Convenience, comfort: people do not want to be involved more than today (carefree)
- Transparency on how much energy is being used
- Automized environmentally friendly choices
- Security of supply and "protection"
- Independency

What...

- **Technical:** Interoperable connection via Gateways, fully autonomous EMS operation, using a mobile app and automated devices to conveniently manage energy consumption, independent, environmentally friendly; House has an active role in the Network
- **Business:** Marketing Flexibility while retaining planning security, comfortably lower energy bill with little additional effort
- **Environmental:** less CO2 emissions, efficient usage of renewable energy
- **Other** (social, safety, privacy...) transparency through mobile app



Business Modell

- Tariff information: save energy costs for customers, DSO cheap flexibility
- Pay as you go for features/services
- Fees for participating companies (e.g. Media Market) for offering products with which the customer can save money over time

KPI Definition

KPI 1.1: Percentage of households participating in the pilot project. Objective: 75%.

KPI 1.2: Percentage of customers satisfied with the energy behaviour of the house. Objective: 55%.

KPI 1.3: How much CO2 each customer saves over the pilot period Objective: 35%.

KPI 1.4: How customers' energy awareness is improving and they are reducing their bills. Objective: 20%.

KPI 1.5: How forecasts of actual consumption are improving. Objective: 10%.

USER Features

- Price optimized device operation
- Device operation in underload scenario
- Indication to run devices manually if price of energy is low
- Overload protection

GRID Features

- Power limitation
- Flexible tariffs
- Power consumption / energy forecast

interconnect



Smart Charging- safe for you, safe for the grid!

Smart charging infrastructure for grid compatible and price-optimized integration and operation of electric cars in hotels.

EXCLUSIVE

Grid conform EV charging facilities your guests have never seen before!

Connectivity between grid and hotel building operator with new technologies pathing the way for future EV infrastructure.

September 2023

The pilot values ...

Grid compatible EV integration

Distinctive FEATURES:

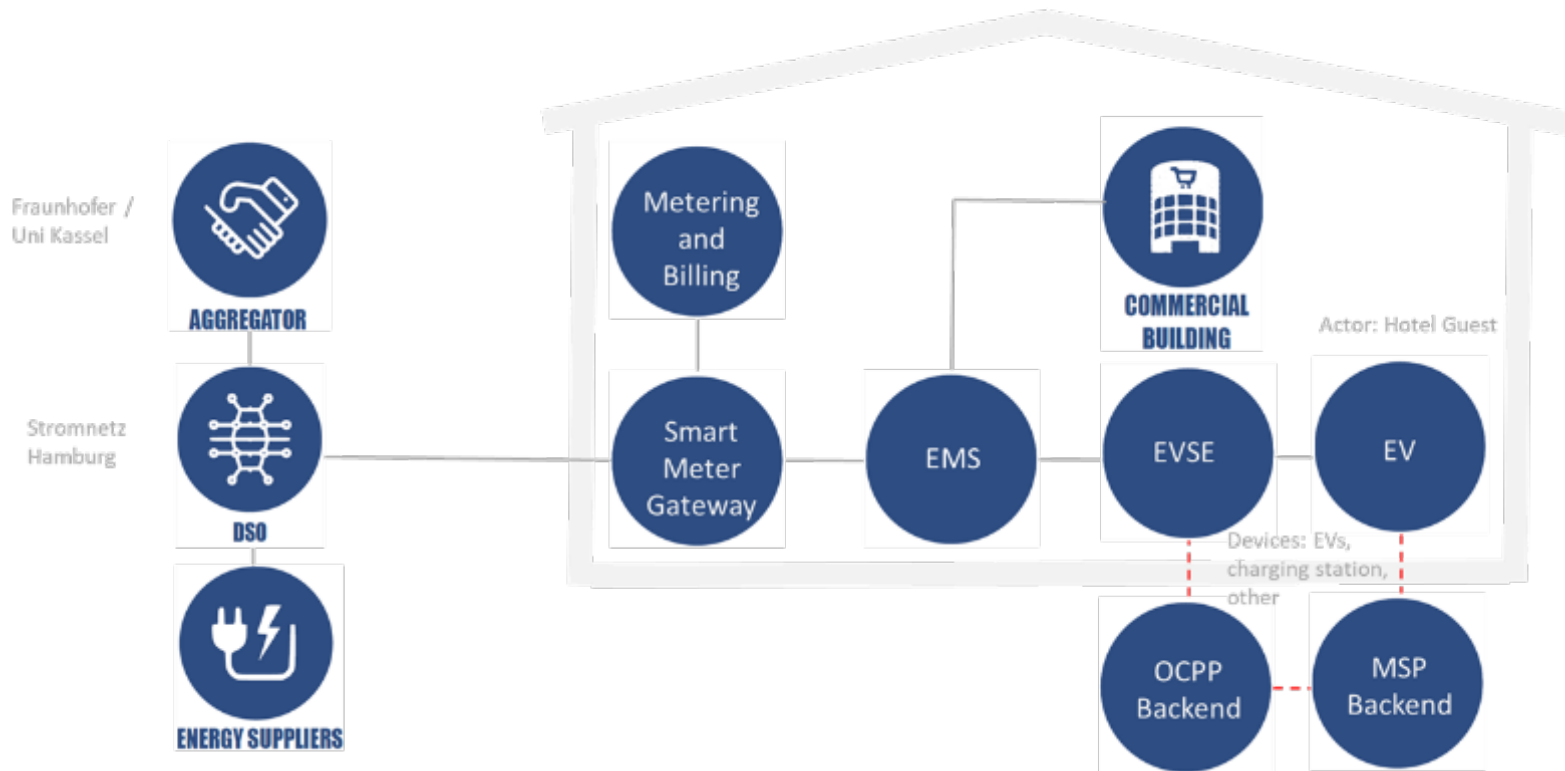
- Blackout prevention
- Price-optimization
- Transparency from building to grid level

Why...

- Convenience, comfort: people do not want to be involved more than today (carefree)
- Transparency on how much energy is being used
- Automized environmentally friendly choices
- Security of supply and "protection"
- Independency

What...

- **Technical:** Interoperable connection via Gateways, Energy Management Systems, Smart Load management of EV charging point that reacts to the EMS; Building that interacts/communicates to the grid operator
- **Business:** Enable local EV infrastructure at the hotel buildings
- **Environmental:** less CO2 emissions, efficient usage of renewable energy, less power generation through partly flexible demand
- **Social:** Great reputation for the hotel to offer EV infrastructure and apply new innovative concepts



Business Modell

- Value/Revenues: Save energy costs by making use of cheaper tariffs, by avoiding peaks (i.e. more expensive power tariffs) and costs for expansion of power cable/installed load capacity
- Action/Activity: Hotel operators become charging point operators that offer smart EV charging infrastructure to their guest
- Use Cases (Building): Load/energy management, peak-shaving as well as overload protection
- Use Cases (Grid): Power limitation, Flexible tariffs, Power consumption / energy forecast
- Expenditures: Costs of devices and systems (Smart Meter Gateway, EMS, charging points), costs for installation, operating fee to use the EMS

KPI Definition

- KPI 1.1:** Decrease of local blackouts caused by overload of parallel EV charging processes (100% less than without smart infrastructure) .
- KPI 1.2:** Decrease in overload scenarios in the distribution grid (40% less incidences than without smart infrastructure).
- KPI 1.3:** Improvement of buildings power forecast/load profiles (by 20%)
- KPI 1.4:** Percentage of hotel operators satisfied with the energy performance of EV infrastructure
- KPI 1.5:** Overall reduction of CO2 of each hotels power consumption (at least 35%).
- KPI 1.6:** Increase of social awareness of smart and innovative EV infrastructure (at least 50% of hotel guests using the EV charging points know about the concept/ benefits)

USER Features

- Price optimized device operation
- Device operation in underload scenario
- Indication to run devices manually if price of energy is low
- Overload protection

GRID Features

- Overload protection
- Price optimized device operation



Greece

interconnect



The Energy Changer project

EXCLUSIVE

Play smart with energy to live better and save the environment (... and your pocket)

September 2023

The pilot values ...

Play smart with energy to live better and save the environment (... and your pocket)

Distinctive FEATURES:

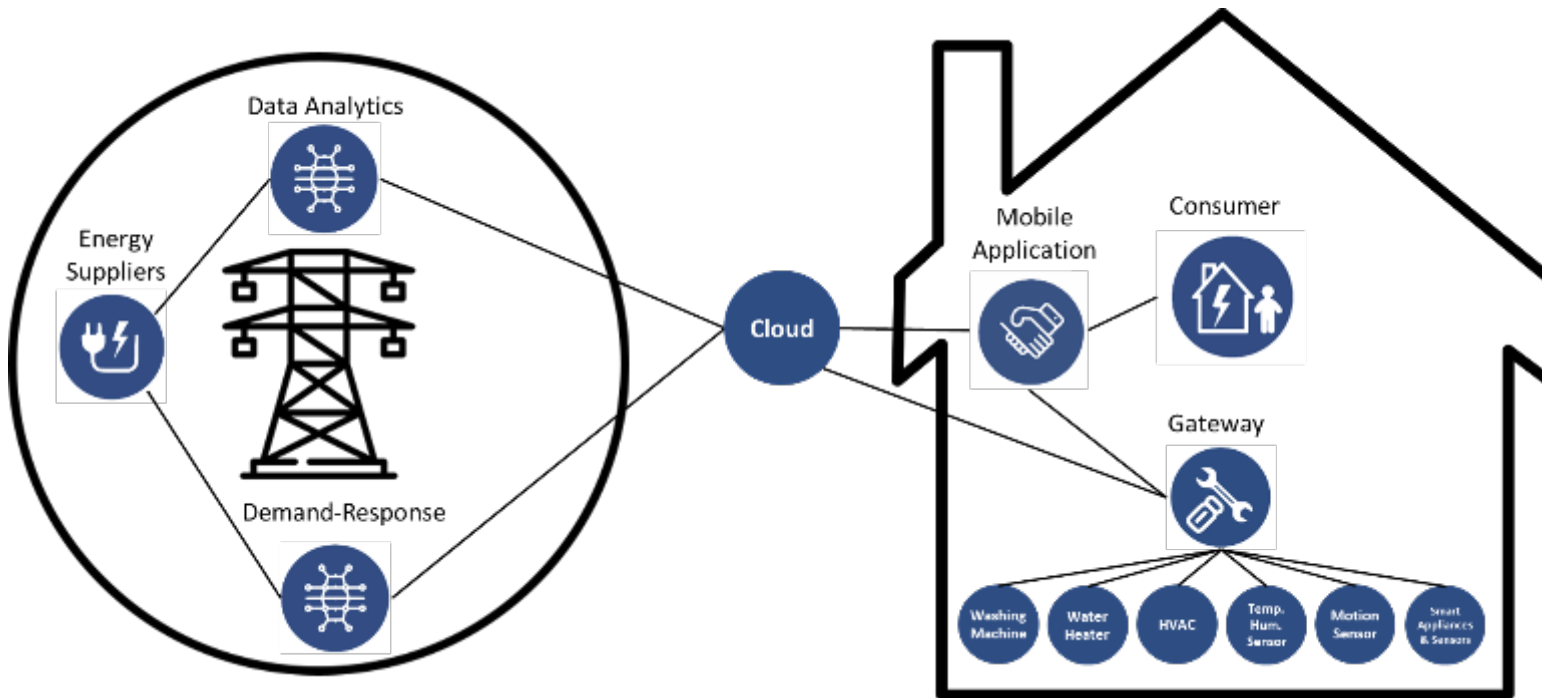
- Unlock energy and cost savings
- Play with energy and get rewards
- Let Grid help you to increase your eco-awareness

Why...

- Learn how to save energy
- Save the environment and reduce your CO2 emissions
- Reduce your electricity living costs by exchanging excess energy
- Be an active Grid player by participating in energy efficiency

What...

- **Technical:**
 - Collection of real-time energy consumption information from residential setups
 - Mobile app for boosting and supporting user engagement
- **Business:**
 - Load shifting of users' energy-costing consumption profiles from peak to off-peak hours
 - Demand response during off-peak hours where low Market Clearing Prices are usually observed
- **Environmental & Social:**
 - Active engagement of residential end-users for continuous, validation of user acceptance and understanding of consumer behavior through mobile app for actively engaging users through incentives (energy cost, social responsibility, etc.) provisioning.



Business Modell

- Technology providers implement the solutions, while energy suppliers rely on new customers acquisition because of innovation

KPI Definition

KPI 1.1: Measurable increase in user acceptance (20% - 30% by 2022), as a result of the user engagement approaches (events, loyalty benefits) and provision of supporting services offered through mobile apps (e.g. incentives, loyalty benefits, gamification approaches, etc.)

KPI 1.2: DR signals acceptance ratio over 25%.

USER Features

- Price optimized device operation
- Device operation in underload scenario
- Indication to run devices manually if price of energy is low
- Overload protection

GRID Features

- Energy/Home Monitoring
- Personalised recommendations
- Push notifications for energy events from Home or Grid (DR)
- Mobile app for monitoring and controlling a smart home



Italy

interconnect



Why do humans love to flock together?

LIVING IN FLOCKS

Living in InterConnect sites humans can enrich and rely on neighbors' behaviors and practices to scale up the individual impact to the larger InterConnect community.

September 2023

The pilot values ...

Contributing to OUR future by acting (energy) smarter today, without compromising MY lifestyles

Distinctive FEATURES:

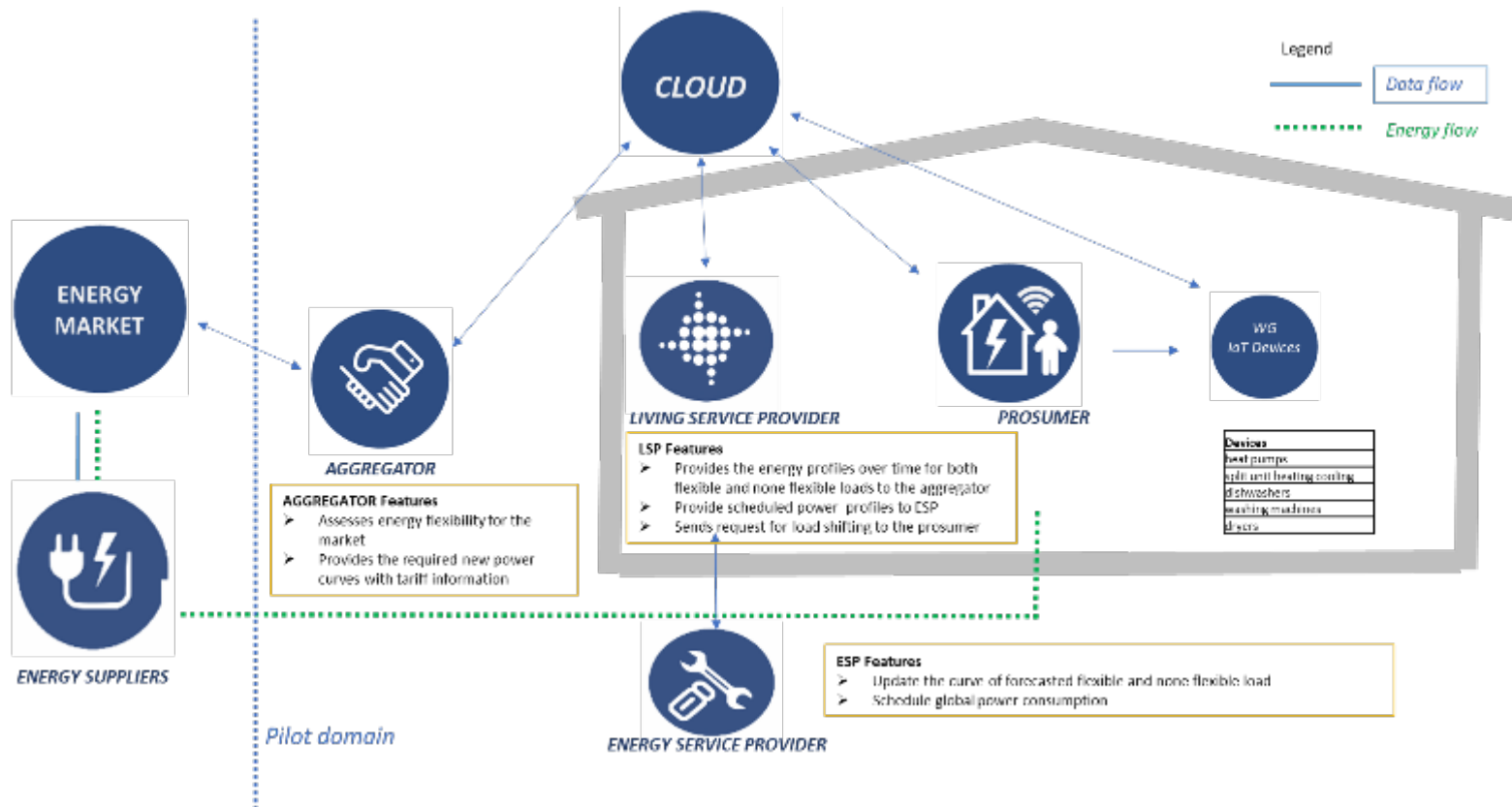
- Automation
- Single AND community awareness
- Impact

Why...

- **Individual:** Willingness to actively change behavior to offer flexibility and benefit from it (through individual challenges)
- **Social housing:** Sense of ownership, how the community overall can have an impact
- **Contribution to sustainability:** Small daily actions, when added overtime and scaled up to the community, make the difference!
- **Community (energy-influencer):** Stimulating activeness at single person level through awareness of community behaviors
- **Social aggregation** as key of social, economic and environmental improvement

What...

- **Technical:** Single and community able to control energy consumption through an ecosystem of interoperable products
- **Business:** Demonstrate, within the foreseen regulatory environment in Italy, that aggregation of residential users can have a positive business case
- **Environmental:** Awareness about the CO2 emissions
- **Social:** Understand mechanisms and stimuli that may induce users to change their behaviours in order to fulfil specific requests by grid actors



Business Modell

- Living Service provider gets revenues from third party companies that want to promote their products through rewards.
- They can pay an initial fee to become part of the program and then a royalty for every product sold to users redeeming rewards

KPI Definition

KPI 1.1: Fraction of households participating to the pilot (% of enrolled households). Objective: 60%

KPI 1.2: Fraction of implicated households pursuing energy management with the App. Objective: 70% (2X)

KPI 1.3: Customer energy awareness (% measuring the rise in customer energy awareness by measuring the increase of an energy awareness index (survey)). Objective: 75% on the total of the participating final users

KPI 1.4: Customer satisfaction index: Net promoter score measuring customer experience (difference in percentage between promoters and detractors). Objective: 70%.

KPI 1.5: Customer economical impact (% ratio of the difference between the average electricity bills before the project and after project to the average electricity bill before the project). Objective: 2%.

USER Features

- Price optimized device operation
- Device operation in underload scenario
- Indication to run devices manually if price of energy is low
- Overload protection

- Select flexible device
- Schedule cycle on App

GRID Features

- Flexible tariffs
- Power consumption/energy forecast



Portugal

Interconnect

Maximizing the value of demand flexibility through services and reliable interoperable technologies



- Consumer as active player in the electrical system
- "Take control of your energy"
- Convenient and valuable services and technologies to allow the exploitation of flexibility of prosumers
- Maximizing energy flexibility for consumer and smart grids
- Maximizing the value of flexibility conveniently and seamlessly
- Convenience and transparency to maximize the value of demand flexibility
- Valorize demand side flexibility seamlessly
- Energy efficiency and flexibility management as a service
- Extract benefits from energy flexibility through innovative services and technologies

September 2023

The pilot values ...

Interoperable prosumers enabling new flexibility services for smart grids

Distinctive FEATURES:

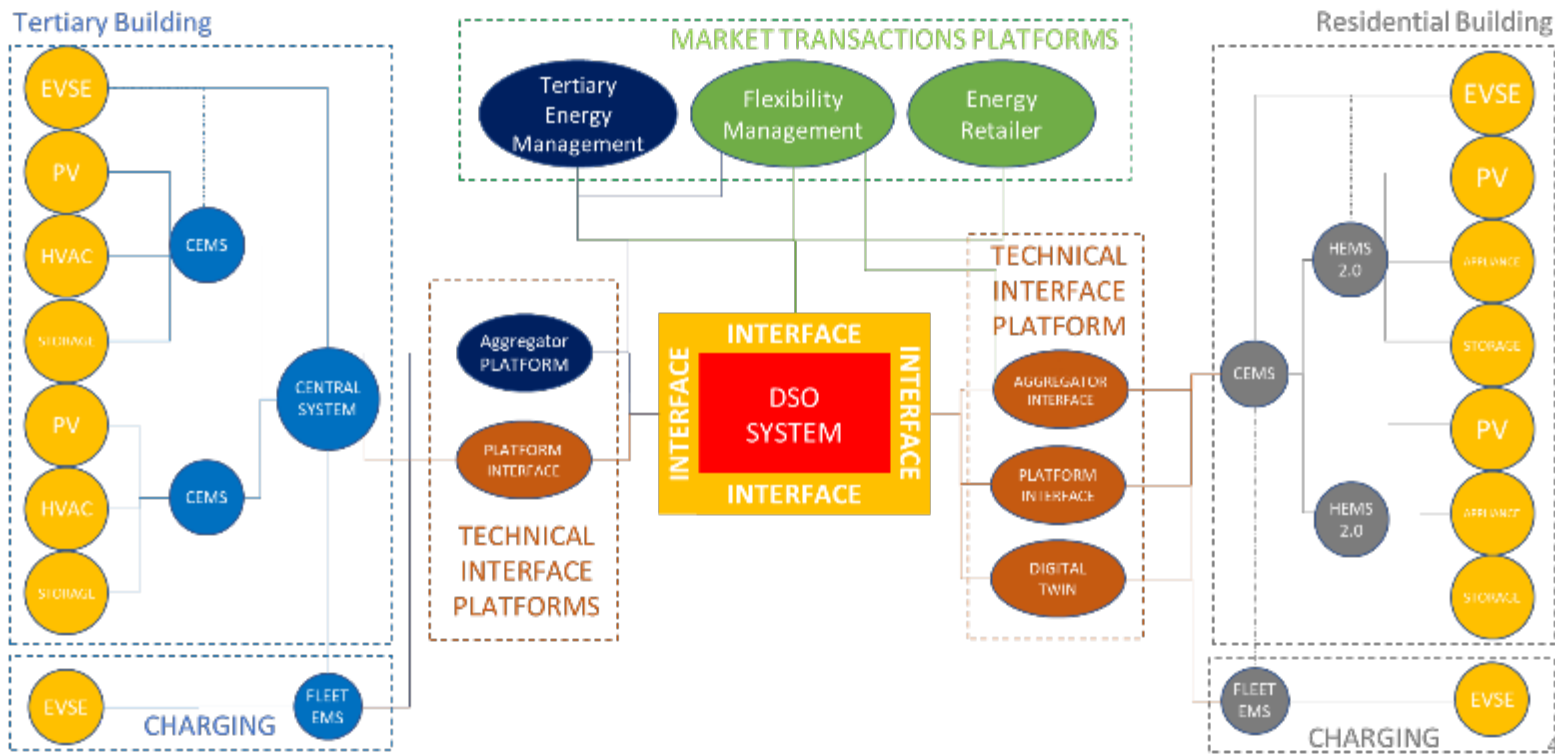
- Interoperable HEMS for residential buildings
- Advanced HEMS scheduling based in consumer load forecasting, preferences and comfort (to be developed)
- Standardized DSO interface for energy and flexibility market facilitation and participation
- Standardized implementation of grid support flexibility services provided by residential consumers
- P2P transactions in an energy community

Why...

- | | |
|---|---|
| <ul style="list-style-type: none"> • Individual: <ul style="list-style-type: none"> • Belongs to a RES Community that cares about energy efficiency • Cares Energy bill • Reduces environmental impact while having fun • Social: <ul style="list-style-type: none"> • Diversity & freedom of choice • Demand for transparency and informed choice | <ul style="list-style-type: none"> • Technological: <ul style="list-style-type: none"> • Interested in new services • Plug & Play • Data access & control • Data privacy • Energy: <ul style="list-style-type: none"> • Unconstrained energy consumption • Efficiency and energy for good |
|---|---|

What...

- **Technical:** Promote interoperability between smart homes, buildings and grids to sustain and empower energy transition
- **Business:** Explore advanced instruments for demand side flexibility, market facilitation and consumer empowerment
- **Environmental:** Interoperability as technical leverage mechanism to increase renewable penetration
- **Social:** Create citizen-centered value by enhancing energy efficiency mechanisms to generate social awareness, increase energy literacy and involve more consumers in the energy transition process



Business Modell

- Main customer for flexibility: DSO; Electricity provider; Energy Community; Energy trading market.
- Flexibility intermediaries: Aggregator; Retailer; P2P Market Platforms.
- Intermediation model: Tariff Based; Market Based; Bilateral Contracts

KPI Definition

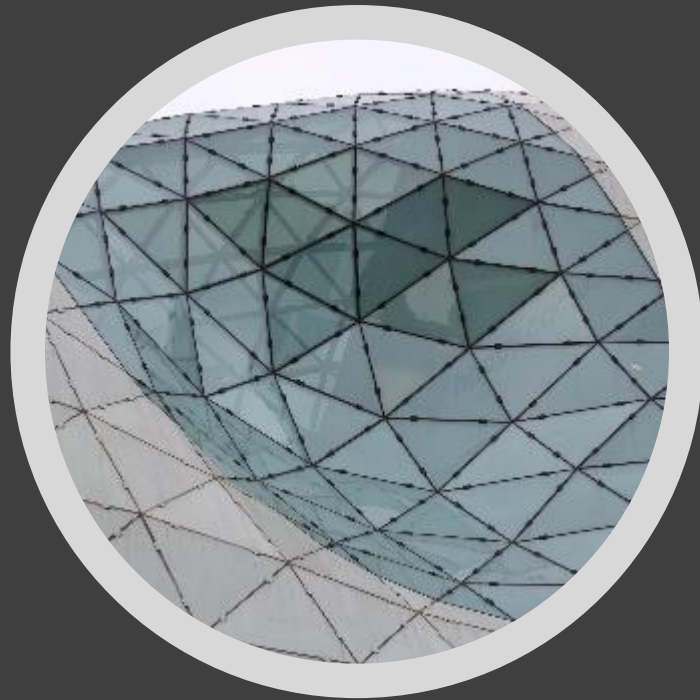
- KPI 1.1:** # of DSF activations
- KPI 1.2:** # Households Devices available for DSF programs
- KPI 1.3:** % of automated household appliances
- KPI 1.4:** % self-consumption (After/Before)
- KPI 1.5:** Flexibility mobilized for grid support (kWh)
- KPI 1.6:** # number of technical constraints solved with flexibility mobilized
- KPI 1.7:** - Number of buildings integrated in CEMS;
- KPI 1.8:** - Number of technologies integrated in CEMS through interoperable solution;
- KPI 1.9:** - Share of energy consumption of the devices integrated in CEMS for data monitoring;
- KPI 1.10:** - Share of energy consumption of the devices integrated in CEMS for actuation;
- KPI 1.11:** - Energy efficiency / savings achieved through CEMS; Energy cost reduction; Eq CO2 emissions saved; Improved renewable penetration achieved through CEMS;
- KPI 1.12:** - Number of restrictions imposed by CEMS to buildings/store/device;
- KPI 1.13:** - Total number of offers for grid flexibility to grid operator, number of offers approved;
- KPI 1.14:** - Duration of DSF service and associated curtailment.

USER Features

- Residential consumers with PV, storage, EV charging and smart appliances
- Intelligent Management system in commercial buildings

GRID Features

- AMI/Smart metering
- Storage
- Indirect Observability
- DSO Interface



The Netherlands



**Feel free to
connect to our
sustainable
network**

Climate goals
achieved via the
Chameleon Homes with
its automated
platform

interconnect

The pilot values ...

No hassle, easy setup, plug & play and contribute to and enable a smart sustainable comfortable environment. I feel connected with others to support our future sustainable and innovative energy network

Distinctive FEATURES:

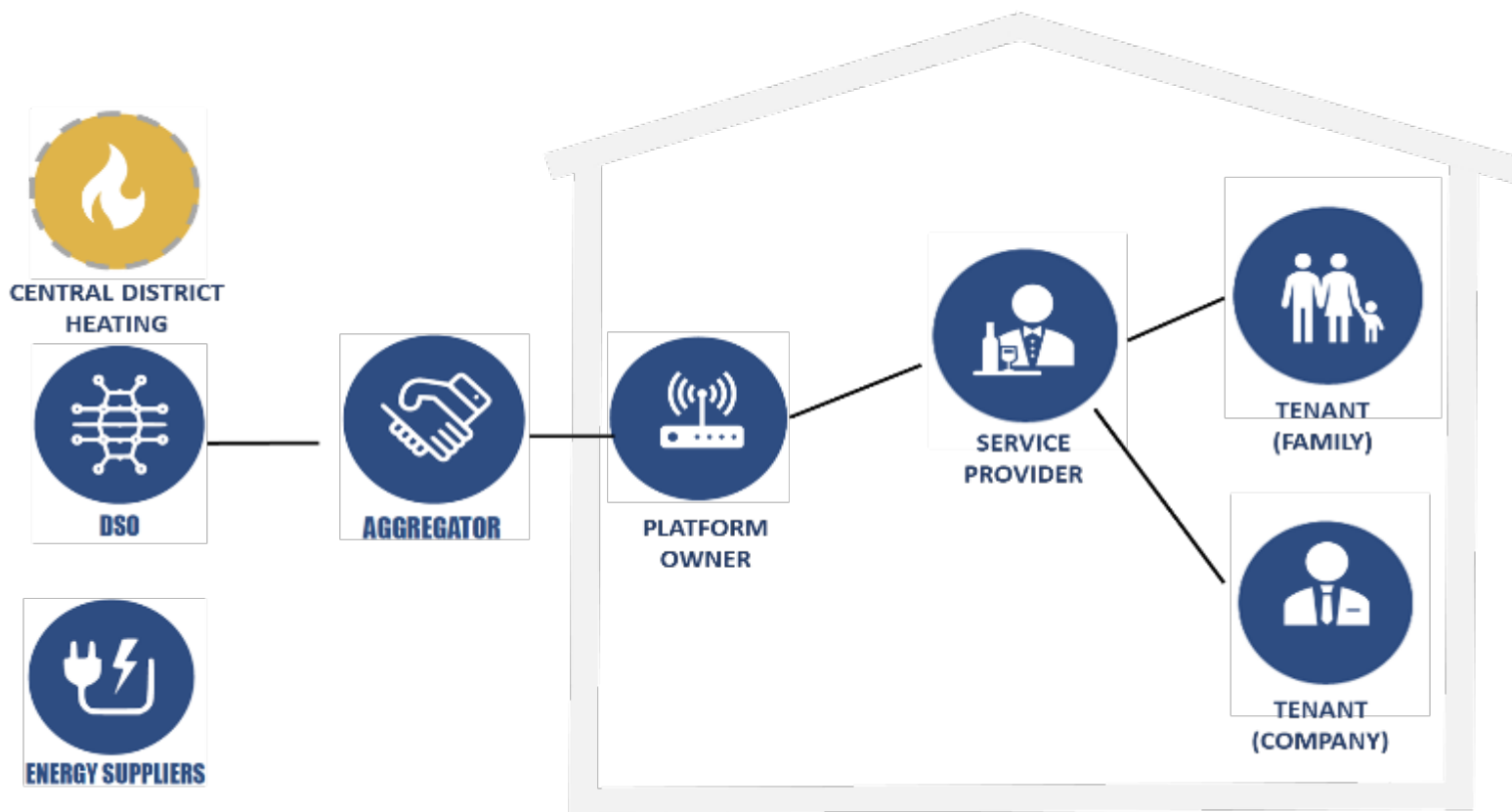
- Interoperable ecosystem that takes care of flexibility without noticing

Why...

- End-user want to contribute to a sustainable society
- End-user wants to benefit from innovative home automation services
- Building owner wants to reduce costs in a sustainable way
- Building owner wants to offer advanced services to enhance their value proposition: quality of life/living comfort

What...

- **Technical:** A interconnected system (hardware and platform) which can connect in-house (smart) appliances (dishwasher, washing machine), devices (locks, lights) and systems (HEMS, HVAC) to external systems (power grid, PV panels, battery, EV charger)
- **Business:** Building owner needs to have a business case, polluter pays principle, and new business model that goes beyond simply offering living space, to offer high quality of life.
- **Environmental:** CO2 reduction by optimizing external systems, peak shaving leads to be able to keep the current power infrastructure, so no additional expansion is needed
- **Other:** Energy poverty is addressed by better use of energy system, privacy addressed by anonymized use of data



Business Modell

- Value driven business model offering higher quality of living. Revenues generated from subscriptions and third-party service providers.
- Focus on market, but communities can play a key role to collect enough or the right flexibility (one user is often less predictable)

KPI Definition

- **KPI 1.1:** # kwh, Amount of shifted energy,
- **KPI 1.2:** %, own generated & consumed energy
- **KPI 1.3:** %, price reduction of energy bill
- **KPI 1.4:** %, reduction of congestion/grid peaks,
- **KPI 1.5:** # kwh, shared energy within community
- **KPI 1.6:** #, types of non-energy data used
- **KPI 1.7:** #, amount of services offered
- **KPI 1.8:** % services that is used by users
- **KPI 1.9:** %, people that experience a higher living quality

USER Features

- Single User interface (i.e. app) for all home devices
- Automate routine tasks
- Select additional services
- Reduce energy consumption

GRID Features

- Flexible tariffs
- Power consumption / energy forecast
- Demand side flexibility

interconnect

interoperable solutions
connecting smart homes,
buildings and grids

FINANCING



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DURATION

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