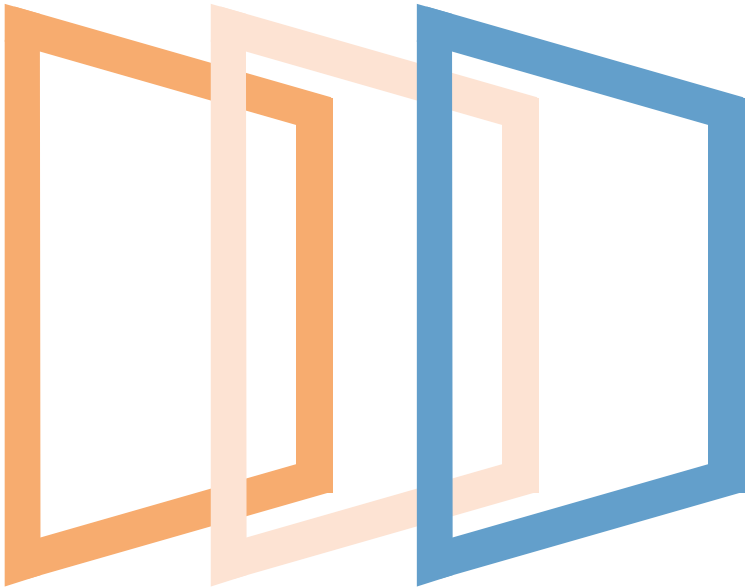
New models facing Energy Transition

onesait prosumers

March, 2020



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Responding to Energy Transition Challenges & Opportunities

01


Because together
we can build a better world

Sustainability awareness, and renewable generation competitive improvements, are transforming the traditional electric value chain.

Sustainability Goals

EU data (2030 Goals)

From 22%[1] to 45%[1] CO2 emissions reduction vs 1990

From 17,5%[1] to 32%[1] Share of energy consumption from renewable sources

32,5%[1] Energy Efficiency improvements

Competitive Improvements

Global data (LCOE Utility Scale)

Eolic ≈ 43$ /MWh [2] ≈70% cost reduction in 10 years

Solar ≈ 43$ /MWh [2] ≈90% cost reduction in 10 years

Storage ≈ 176$ /MWh[3] ≈85% cost reduction in 10 years

Today, mobility and Grid Services

Key technology for reaching ≈0% CO_2 Emissions

Local Drivers

Energy Dependencies

Grid Extension

Grid Congestion

1. CE
2. Lazard
3. BNEF

The traditional vertical setup evolves in to a much more efficient distributed model as generation gets cleaner and closer to consumption points…

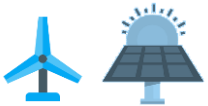
522 M€ from CO_2[1] emission rights, and 1.640 M€ from energy losses[1], rise consumers energy bill

Inefficiencies

Spain data 2018

Generation

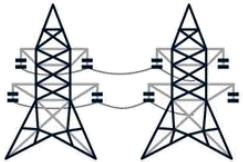
≈ 55 Mt CO_2 emissions from traditional Generación[2]



3-36kV

Transport

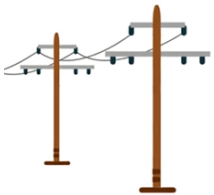
≈ 2% technical losses[3]



110-380kV

HV Distribution

≈ 4% technical losses[3]



AT 132-25kV

LV/MV Consumption

> 15% technical and non-technical losses[3]

…

MT 3-30kV / BT 125-220V

1. 2018 National Electric Demand : 268 TWh, with 10,7% of average losses (data from CNMC, boletín de indicadores eléctricos de Enero 2019), with an average Price of electricity of 57,3 €/MWh (data from REE). 2018 Emissions of 55 Mt CO_2 from generation, with an average dispatched Price of 9,5€/EUA (data REE)

2. Spain data 2018. REE (Red Eléctrica de España).

3. Spanish System data. CNMC (Comisión Nacional de Mercados y Competencia). Monthly average registered losses between last 12 months. May 2018

...where prosumers take an active role and, in the appropriate regulatory context, gets integrated with the distribution grid

←Global Efficiency

557B US $ /year Global Investment until 2050

Energy Efficiency

Monitors electric consumption for saving purposes. Shifts its own demand program depending on energy prices

214B US $ /year Global Investment until 2050

Selfconsumption

Aware of its own consumption needs, Installs PV generation for their total or partial coverage

451B US $ /year Global Investment until 2050

Vehículo eléctrico

Changes its combustion vehicles by electric ones and integrates its batteries in its overall energy management together with consumption and generation assets

Responds to grid needs shifting its own demand program

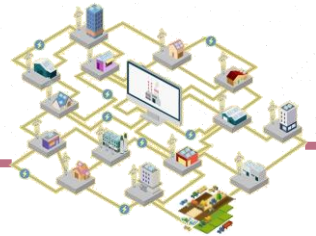
Manages its energy surplus taking into account grid needs

Manages its batteries taking into account grid needs

470B US $ /year Global Investment until 2050

Grid Integration

Virtual Power Plant



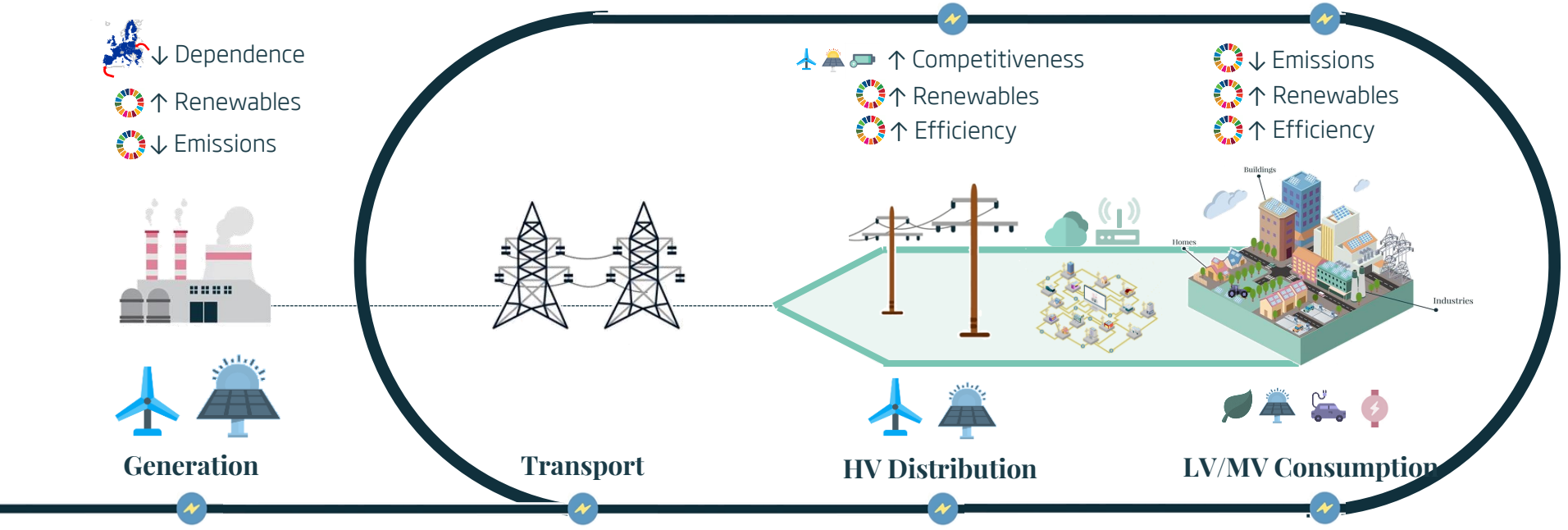
Aggregator

Retailers or existing stakeholders that currently aggregates existing services

New Business Models

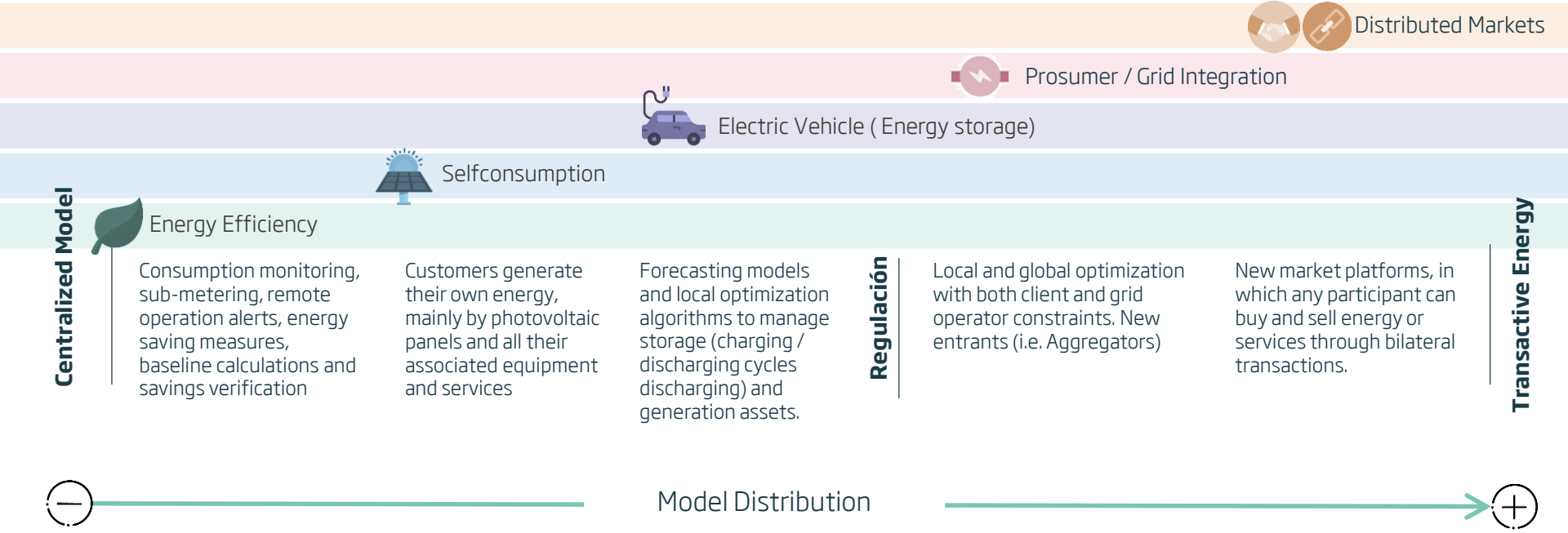
Nota 1. Minsait Analysis from: IEA & IRENA. Perspectives for the Energy Transition. Investment needs for a low-carbon energy system; BNEF. Global trends in renewable energy investment 2016 & BNEF. New Energy Outlook 2017; IEA. World Energy Investment 2017 & World Energy Outlook 2017

IT/OT Technologies will orchestrate a global more efficient model, in which stakeholders will exchange energy and services in Real-Time



We globally move along towards this new model following each country regulatory framework

Model distribution will be progressive, from Energy Efficiency to Transactive Energy



New roles and opportunities will arise for new entrants, **challenging Utilities Business-as-Usual**

New opportunities: Aggregation Services for the System

02

As conventional generation migrates to renewable, a wide range of new energy services are tackling instability issues by integrating flexibility from the demand side

UK electricity system price spikes as outages, low renewables combine to trigger volatility

Renewables' variability sends wary utilities from traditional DR to DER and load flexibility

Flexibility response triggered by drop in grid frequency to 49.59Hz

National Grid electricity blackout report points to failure at wind farm

UK power prices turn negative for nine hours, balancing costs spike during 'extraordinary' weekend

RES battery prevented complete blackout in the UK

Energy regulations worldwide are implementing new rules to foster the participation of Distributed Energy Resources in electric markets…

USA

Since 2011, FERC and DOE submitted the National Action Plan on Demand Response.

California and New York are the most advanced states.

In 2017:

- demand resource participation in all the ISO's reached **27,5 GW** (5% YoY growth).
- nearly **10 million customers** are enrolled in demand response programs.[1]

EU

EU has recently (2019) adopted new regulations (all members must comply) for the Europe's electricity market:

- Enabling more **flexibility** through new and more standardized markets and products
- Allowing **consumers participation** in all markets

UK and **France** regulators have been until now more reactive, launching new markets to stimulate the participation of flexible technologies.

AUS

ARENA (govt. renewable energy agency) and AEMO (market operator) are pushing to implement new rules promoting the participation of demand in the electricity markets.

ARENA and AEMO are also funding pilot projects and trials throughout the country. Since 2017, **171 MAUD** have been invested in **32 projects** (Indra+Monash Univ. included)[3].

JP

In 2017, the METI (Ministry of Economy, Trade and Industry) opened a new DR market called the "NegaWatt Market" in which electricity utilities utilize *negawatt* **aggregators** to pay for the amount of electricity saved by consumers.

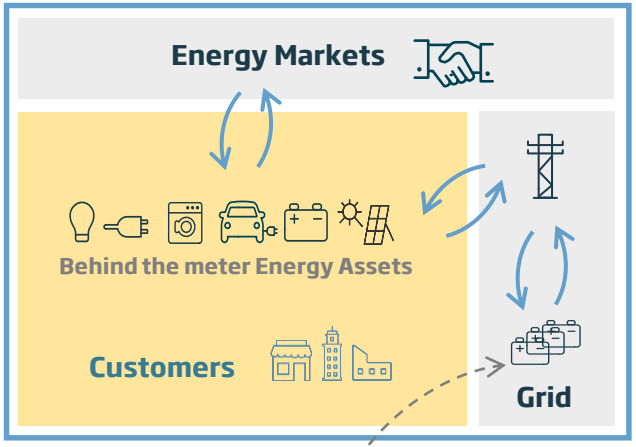
The 16 companies that took part in the Negawatt project established the Demand Response Promotion Council (DRC) to boost new regulations.

…through a new player that will make relevant the addition of high , but atomized, amount of flexible load from the demand side: **The Aggregator**

Source 1: Assessment of Demand Response and Advanced Metering – Federal Energy Regulatory Commission (FERC) 2018
Source 2: Regulation (EU) 2019/943 on the internal market for electricity
Source 3: ARENA funded projects (in www.arena.gov.au/projects)

Flexibility of customer energy assets (shifting up/down consumption, generation and/or storage), when aggregated, has a yet untapped value for the System

To provide Services...	...to the System,...	...relying in customer assets...
Flexitricity: 13 MW of power for **Peak shaving, Demand turn-up and Capacity market**	**UK National Grid** markets	Cutting power to **fridges, freezers** and **air conditioning** in **300 ASDA** (Uks 2nd largest **supermarket** chain) stores and **18 distribution depots**
OATI: Direct Load Control of 1600 MW for Dispatch **Voltage Regulation**	**USA Tennessee Valley Authority** 37 GW of power, 26k km of transmission lines for 154 local utilities and industrial consumers	**Small commercial and Industrial consumer Loads** from 154 Local utilities and Aggregators



...and other front-of-the-meter grid energy asserts

Players that firstly combine a **high level of behind-the-meter clients**, with a **SW able to draw on their Energy Resources flexibility,** will play a key role **providing energy and price optimization** services for the **System**

What is Onesait Prosumers

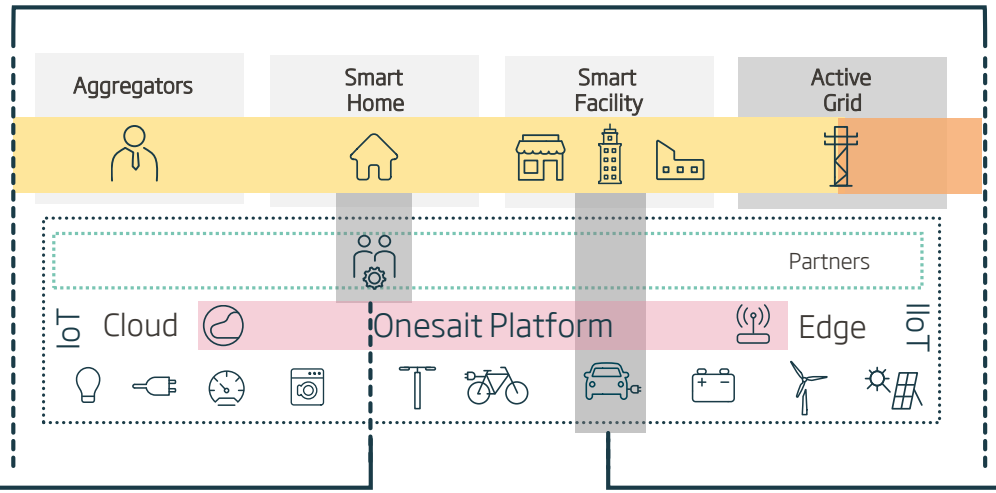
03

Onesait Prosumers: Manage behind-the-meter energy asset portfolios and unleash their aggregated value.

Customer Energy Management **Unified** Solution to reach Grid Services

Our solutions are open to third parties

To improve our use cases, we promote the use of third party algorithmia whenever its better, faster or cheaper, because nobody can make the best energy management solution alone.

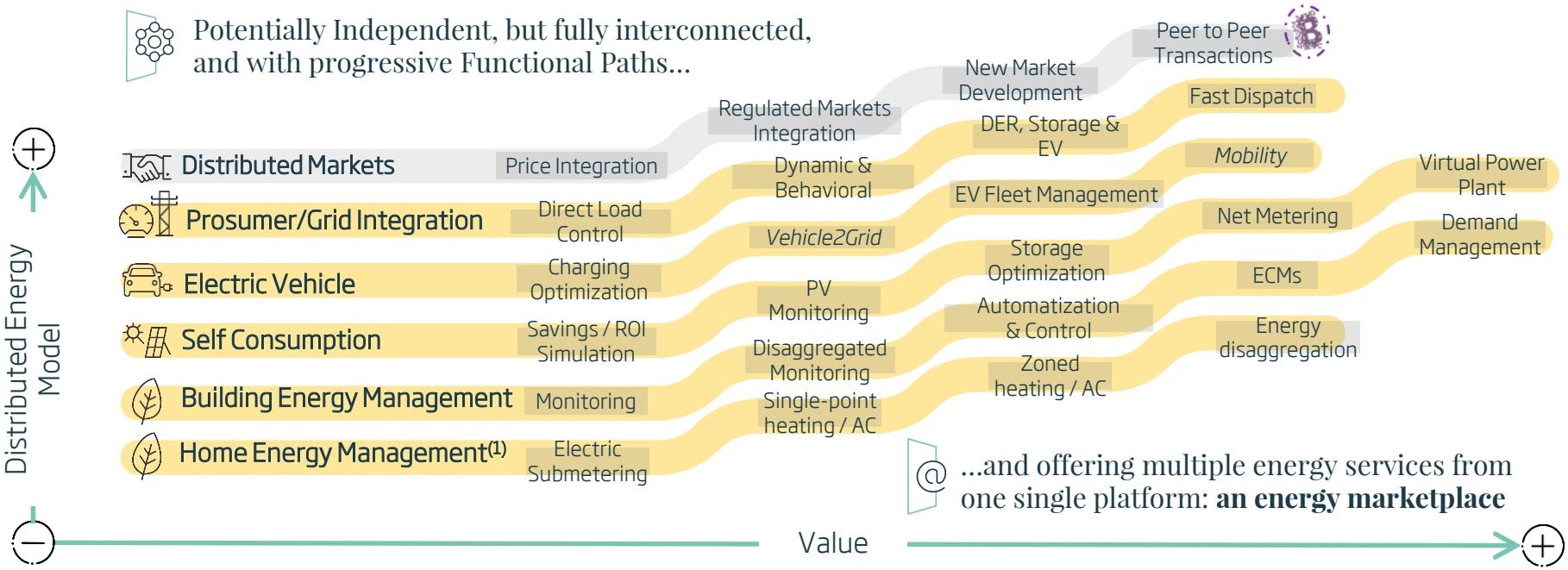


Our ecosystem comprises high value added HW

We expand our device ecosystem through integrations and partnerships with specialized HW manufacturers, vertically incorporating new use cases in a much faster way

Standardization and **specialization** reduce costs and **accelerate** the development of **new value propositions**

Onesait Prosumers: Scalable product that facilitates progressive onboarding into the new energy Paradigm



This modular scheme allows our **partners** to **migrate to new distributed energy models, following those functional paths** that are **more aligned with their strategy**

1. Complementary Customer Engagement through additional domotic functionalities (security sensors, cameras, lighting, scenes...)

Our product roadmap aligns with our vision and is at different stages of development. The key for success: Unified open energy services platform

Energy Efficiency | Self-Consumption | EV | Prosumer Grid Integration | Active Grid Management

2020






Home and Building energy management are the entry point to the residential and commercial customers

While making homes and facilities efficient, these solutions prepare consumers to become active players of the energy system

EV and **flexibility** value propositions fully exploit the potential of homes and businesses towards the **grid**

After establishing a touchpoint with the consumer, these solutions grow with new core energy assets to incorporate them into the grid and open up new revenue streams for them

Active grid management integrates DERs into a new grid operation paradigm

Commercially available | Designed & Prototyped | Under development

Commercially Available

03a

Building Energy Management

Home Energy Management

Building Energy Management System

BEMS

Building Energy Management System

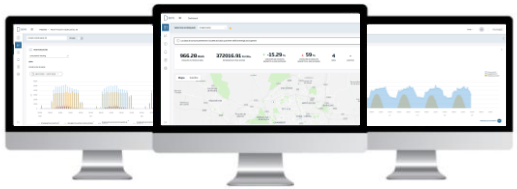
Available

Focused in **energy savings** and **new energy asset** integration, such as **PVs & EVs**

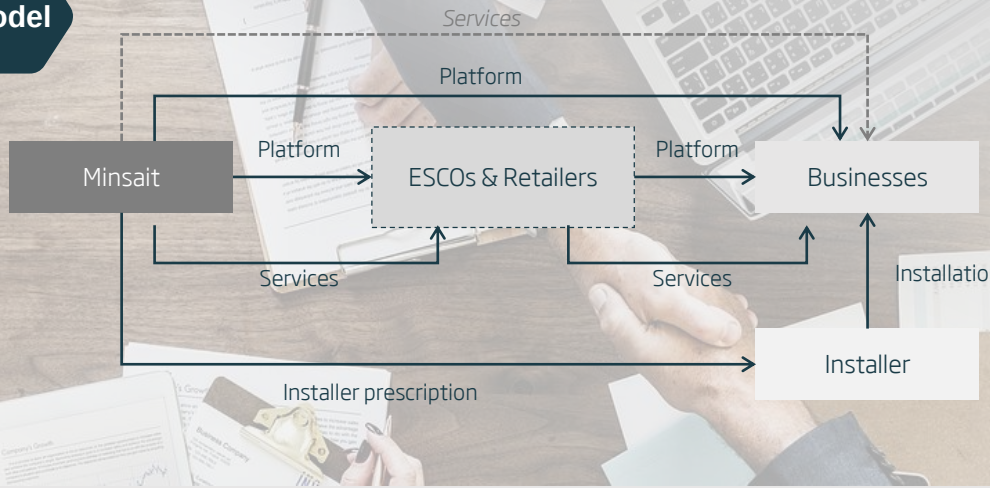
- Multi-site Real-time **monitoring** of disaggregated **consumptions** and asset conditions.
- Integrated **PV generation** and consumption **monitoring**
- **EV charging state monitoring** for use optimization
- **Global KPI** visualization and **customized** analytic **dashboards**.
- Remote Real-time **control**, assuring savings through **automatized procedures**.
- Traceability and verification of **customized ECM's** impact.
- **Energy certification support** as ISO-50001.
- Up to **8-20% energy savings**.

Help Businesses to save energy and Money, and give them valuable operational information

BEMS



Model



Beyond 'state-of-the-art' **efficiency** functionalities, **locates consumptions at substation** level to seamlessly **integrate with DSO use cases**, turning **facilities into DERs**

Building Energy Management System

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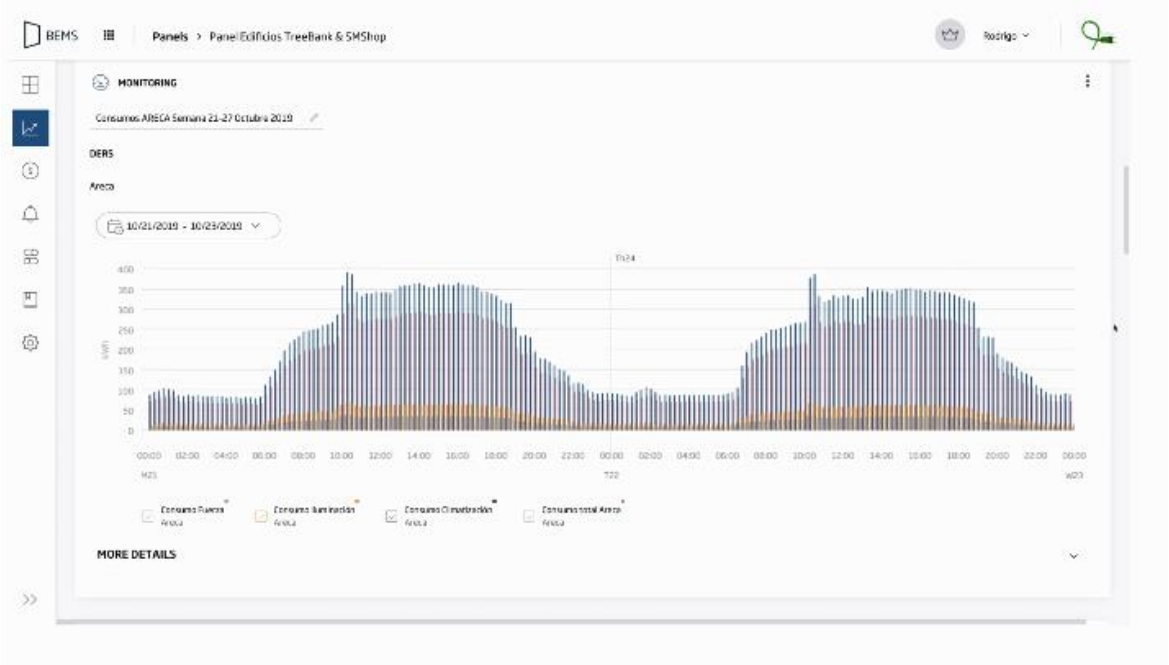

demo

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Home Energy Management System

HEMS

Home Energy Management System

Available

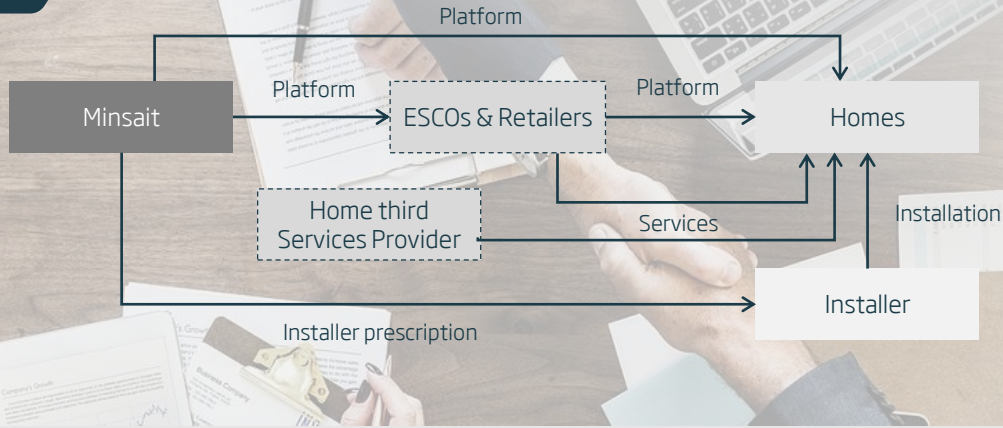
Making homes efficient and **connecting the long tail demand** for aggregated value propositions

- **Consumption and power monitoring** and **control**, through both smart meter integration and submetering devices
- Consumption and power **alerts**. **Goal management**, in energy and budget
- **Energy disaggregation**, through both **submetering** devices and third party **algorithms**
- Multi device **programming and Scene configuration**
- Seamless integration with Self Consumption and Demand Response modules for a **unified Home management experience**

Help Homes to remotely manage their energy assets, and save energy and Money

HEMS

Model



Offer your customer **a unique experience in energy management, comfort and safety,** while opening **a new solution ecosystem for home service providers.**

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demo

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Currently Designed & Prototyped

Self-consumption

Self-consumption

03b

Designed & Prototyped

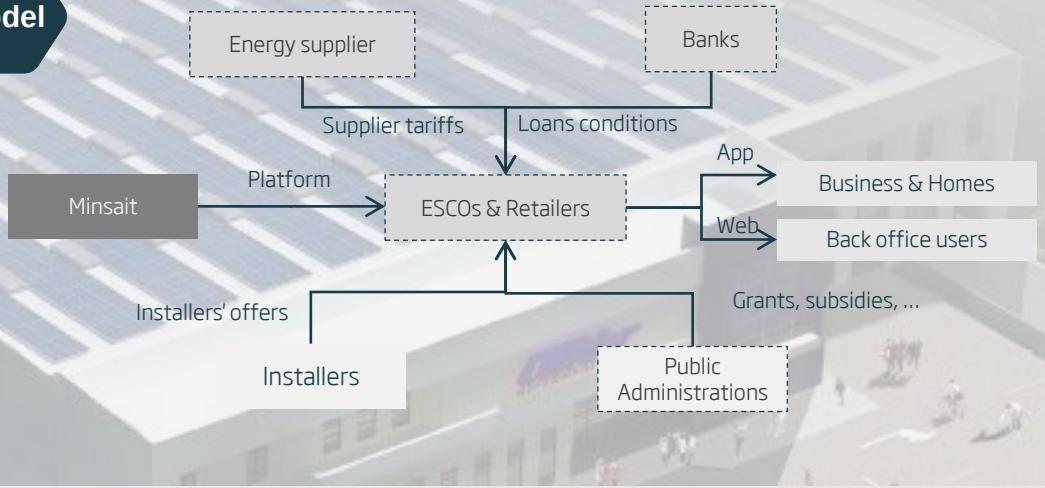
Ease PV adoption through a monetizable marketplace

Help Businesses and Homes to accurately determine their optimal PV installation

Self-consumption

- **Accurate PV simulation tool**, through Smart Meter integration, optimizing installation **for minimum ROI**.
- Customer facilities **simulation repository**, with daily updates triggered by new subsidies or regulation .
- **Market-place** for customers, PV installers and credit institutions.
- Customer management website, providing **willingness-to-adopt ratings**, and **simulation-to-lead tracking.**
- Seamless integration with TEAM's Energy Efficiency module for **integrated Consumption & Generation monitoring.**

Model



Provide a **PV adoption channel** and a market-place to **monetize adoption** along the way

Designed & Prototyped

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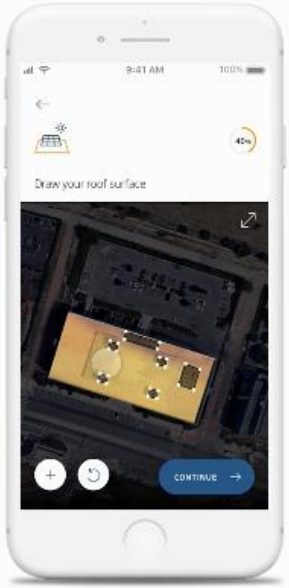


demo

Provide a **PV adoption channel** and a market-place to **monetize adoption** along the way

Currently under development

Flexibility

Flexibility

03c

Under Development

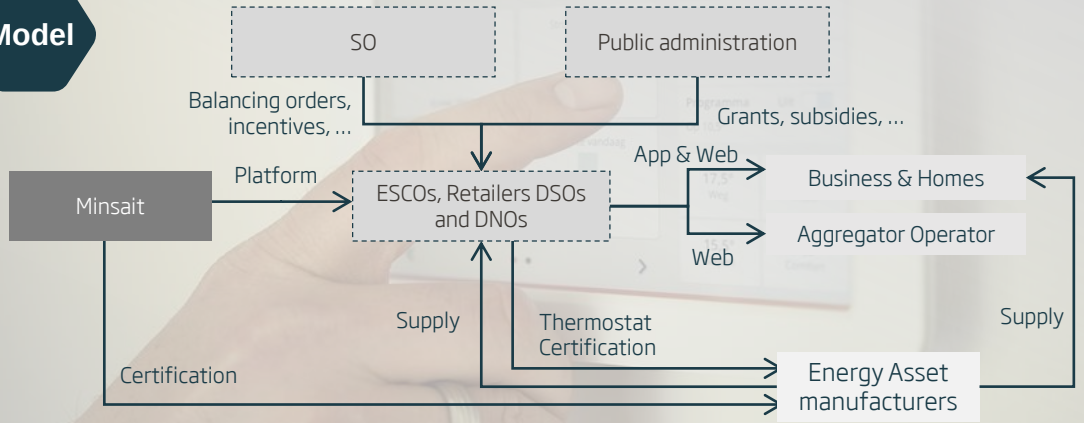
Aggregates **flexible energy** assets for **Demand Response** services

Provide services to the System to balance supply and demand or avoid grid congestions

Flexibility

- **E2E Enrolment** and device management.
- Markets and **Program management**, setting DLC features and economic parameters.
- **Event planning,** through advanced forecasting algorithms based in historical consumption, working with calendar and weather parameters.
- Ranking of **proposed alternatives to meet load reduction**, and Operational tracking of load evolution.
- Audit features to **KPI analysis and post-event data.**
- Charges & fees management, generating a **billing report to support settlement** process.

Model



Beyond enabling **alternatives to distribution investments to system operators**, open **new customer engagement channel** for energy services, such as **HEMS and BEMS**

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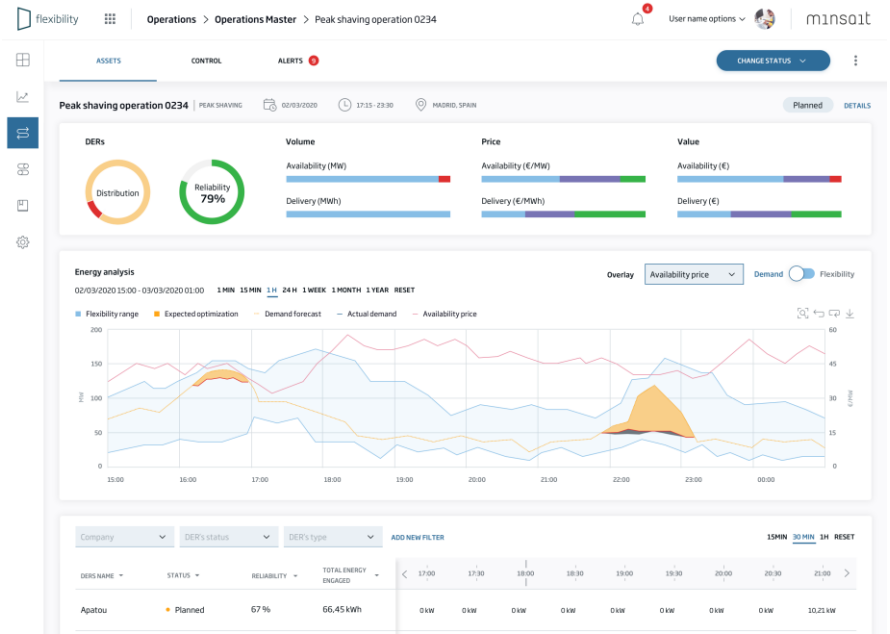

demo

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Onesait Prosumers and Grid shared Use Cases: Microgrids

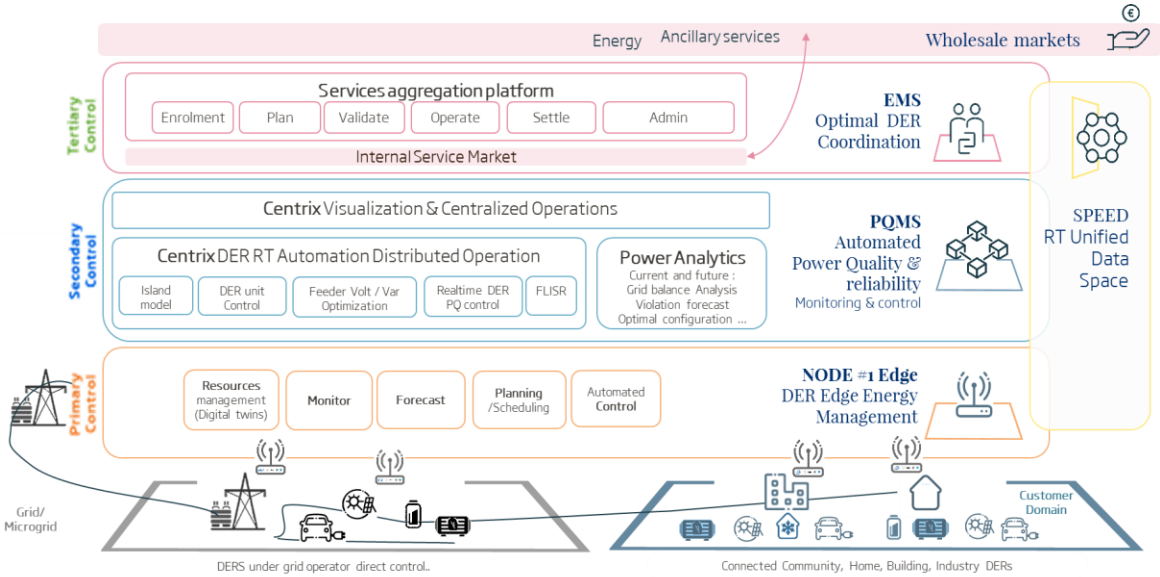
04

Available

Reduce energy **costs**, **increase** grid **reliability** and drive **environmental** benefits

- Provide a **complete visualization** of the Microgrid state and its connected resources
- **Control** all the buses (**nodes**) **meet** the **voltage** criterion
- **Control** current across a grid element does not exceed the maximum capacity
- **Make frequency stable**
- **Exchange power** flow with distribution **grid**
- Energy cost reduction through **Peak Shaving** and **Energy arbitrage**
- Battery **Energy Storage Management** for photovoltaic generation smoothing
- **Grid Services Provision** : Frequency control as a service (FCAS), through load response, Volt/Var service**age Management** for photovoltaic generation smoothing

Microgrid Management system for the reliable and optimal grid management



On top of the same architecture and technical modular components as Onesait Prosumers, sharing platform investments

Microgrids

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Our Global Vision

05

Connecting Prosumers and the Grid

Leveraging existing energy assets, value can be created by applying specific intelligence to each customer segment.

	Energy management	Demand flexibility
Asset characterization	Characterize BTM DERs by setting equipment, address and custom labels	Characterize DERs flexibility by setting time availability and usage constraints
Consumption tracking	Track building and home consumption to find potential savings	Track aggregated consumptions to define portfolio flexibility base line
Specific intelligence	Define intelligence to orchestrate DER consumption, generation and storage	Define intelligence to determine which DERs better fit into a flexibility event
Alert notifications	Be alerted of consumption or demand exceeding set thresholds	Get actionable warnings at each stage of the operation process
Asset control & programming	Act in real time or program time-scheduled routines	Settle multiple aggregated programs under an operation event
Customized visualizations	Create custom dashboards and analytical panels	Have updated visualization of your flexibility portfolios

Boosting business value for Utilities, Retailers and Energy Service Companies

Our value proposition for Energy Management.

BEMS

Businesses receive valuable operational information that drives energy-efficient solutions.

Self - consumption

Accurate determination of the optimal photovoltaic installation for businesses & homes.

HEMS

Homes can manage their energy assets, contributing to a sustainable use of energy.

Opening new paths for Grid Operators and Energy Market stakeholders

Our value proposition for Flexibility.

Flexibility

Homes and Businesses can complete their local optimization with savings and revenue streams.

The whole system can benefit through balancing supply and demand and avoiding grid congestions.

brochure


77°
Successful analysis!
Useful surface
Investment

Thank you !

An Indra company