

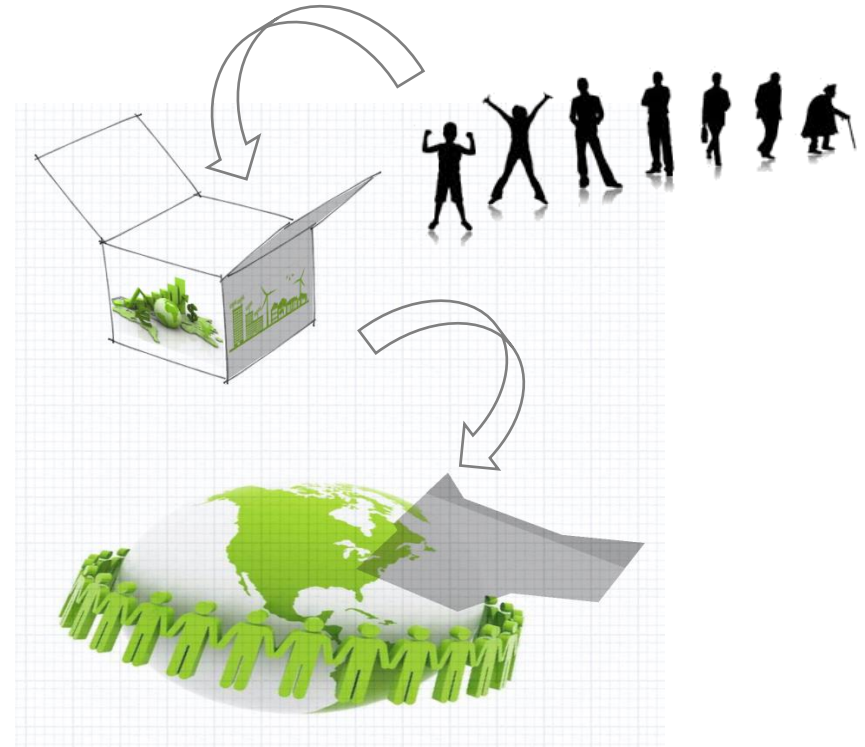


Flexibility Activated Zero Energy Districts

*A project co-funded by the European Commission in the H2020 Programme*

## Transition in the construction industry

- *High performance demands*
- *Long term performance guarantees*
- *Energy Transition*
- *Technology Development*
  
- *Digital Construction*
- *(connected)Building as a service*
- *Cyclical construction*



## De Stroomversnelling

### Large scale renovation of houses

- Industrialized approach, net-zero-energy, comfort, lifetime extension

### Long term performance guarantee

- Energy performance, maintenance and operation for 40 years

### Communicate with devices

- User feedback, commissioning, performance optimization



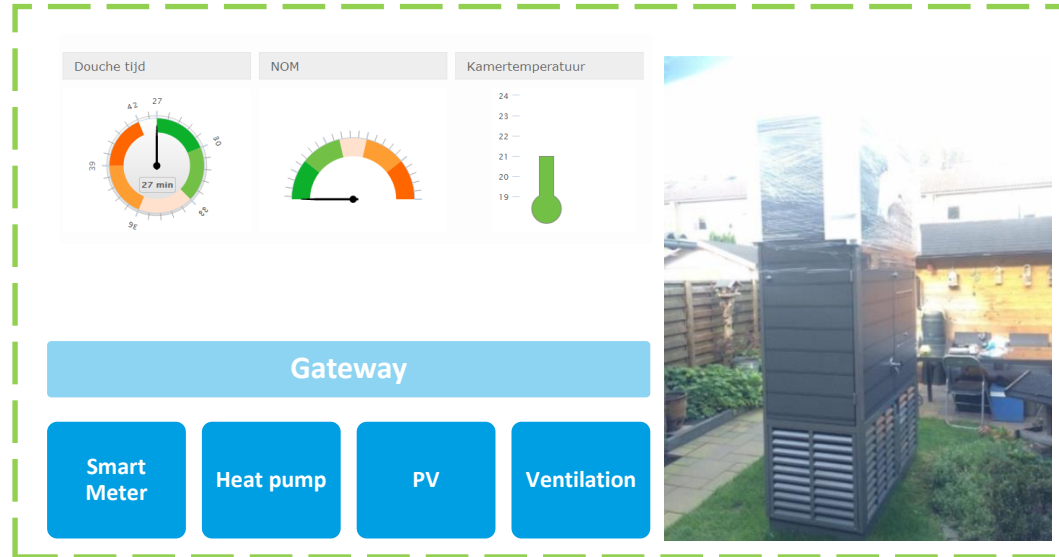
Integrates all installations into one unit

## Energy Module

- Pre-fabricated, modular element providing comfortable, healthy and sustainable home

## Communicate with devices

- User feedback, commissioning, performance optimization

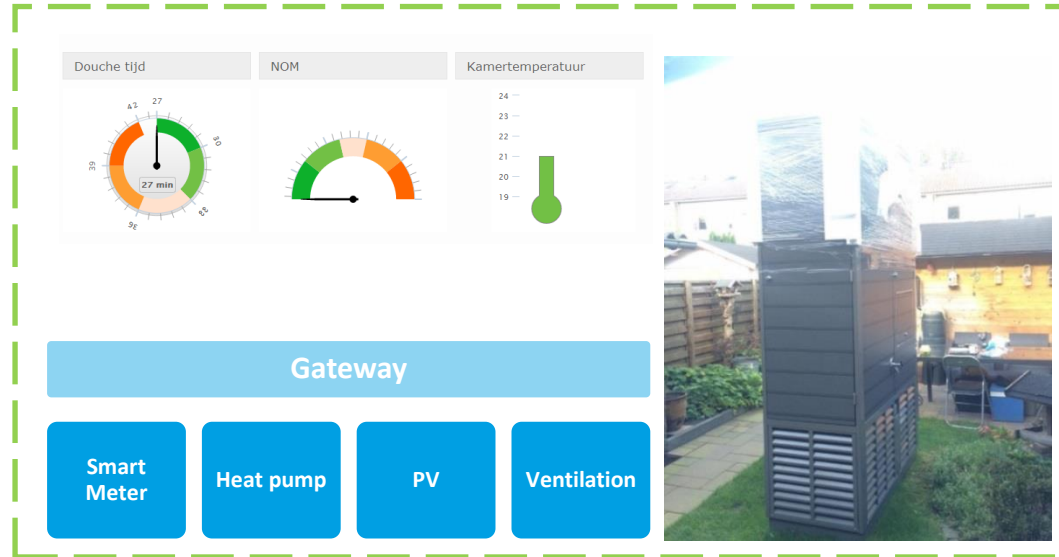


Integrates all energy related devices into one unit

Challenge:

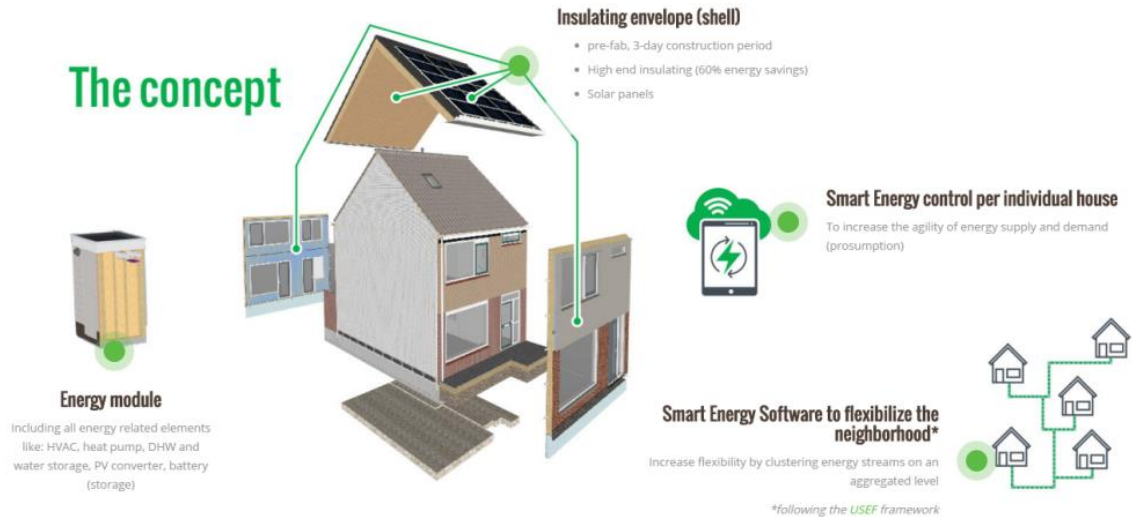
- How to avoid a **lock-in** to a specific manufacturer or technology
- How to assure device compatibility for necessary **functionalities** – without reoccurring complicated integration efforts

Solution:



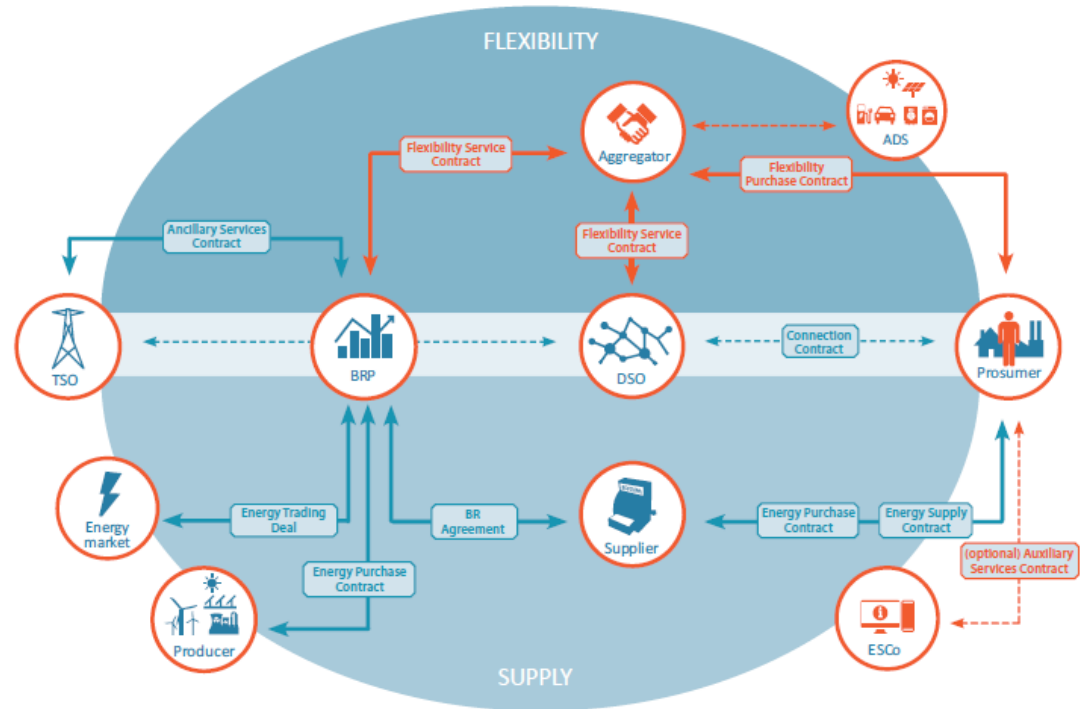
## Integrated approach to retrofitting buildings

- Deep renovation of houses towards net-zero-energy **and integration of houses into smart neighborhoods**
- Industrial approach necessary: prefabrication, modularity, digital construction
- For holistic energy management, **standardized device communication is essential**



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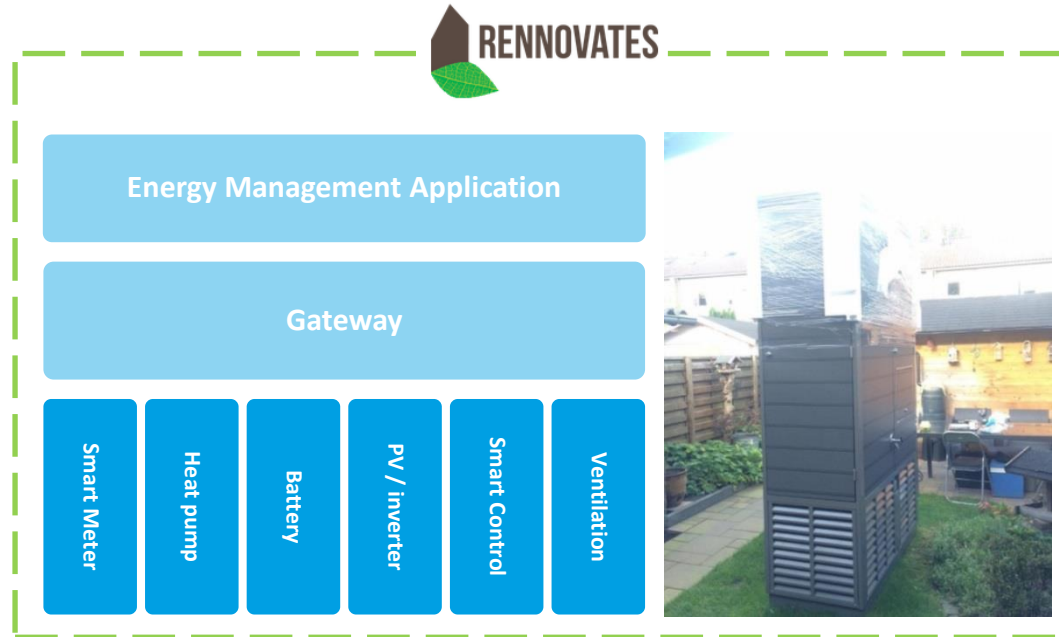


## Flexibility activated zero-energy neighborhoods

- Smart Start/Stop
- Battery Charging
- Inverter control
- Local optimization

### The role of EEBus

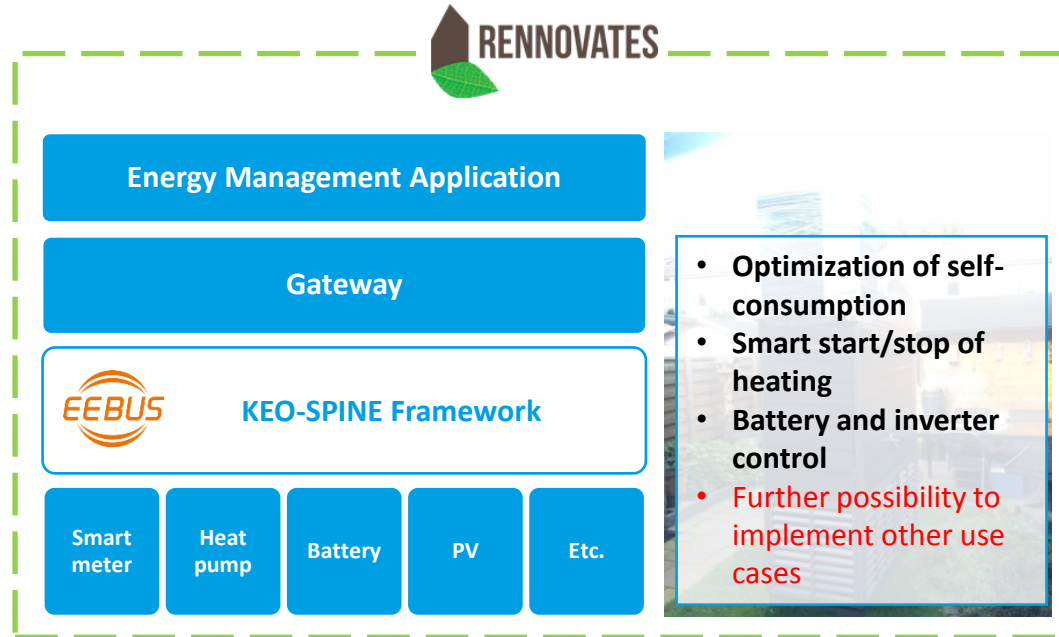
**Solution:**





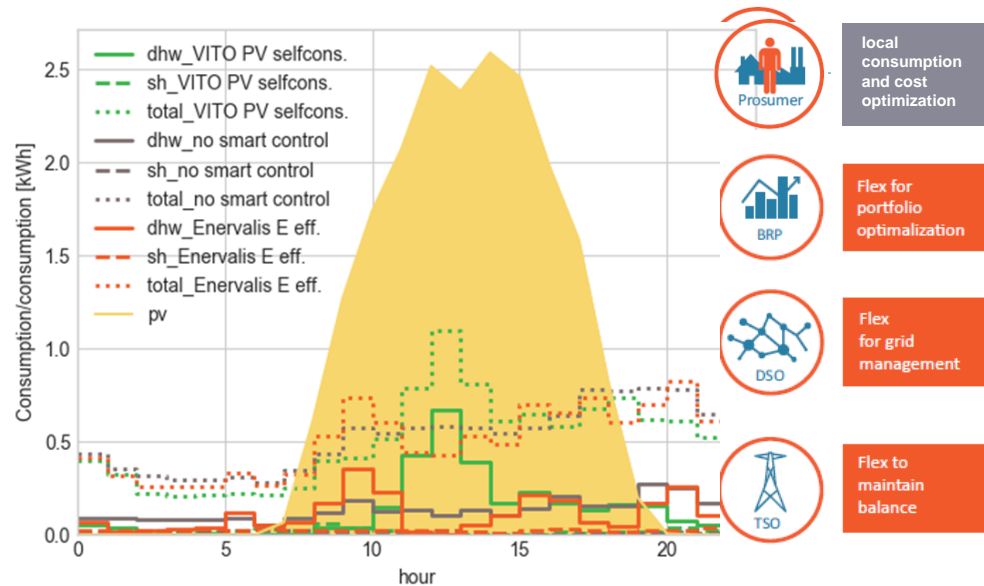
## KEO enabled successful EEBus integration

- Smart Start/Stop
- Battery charging
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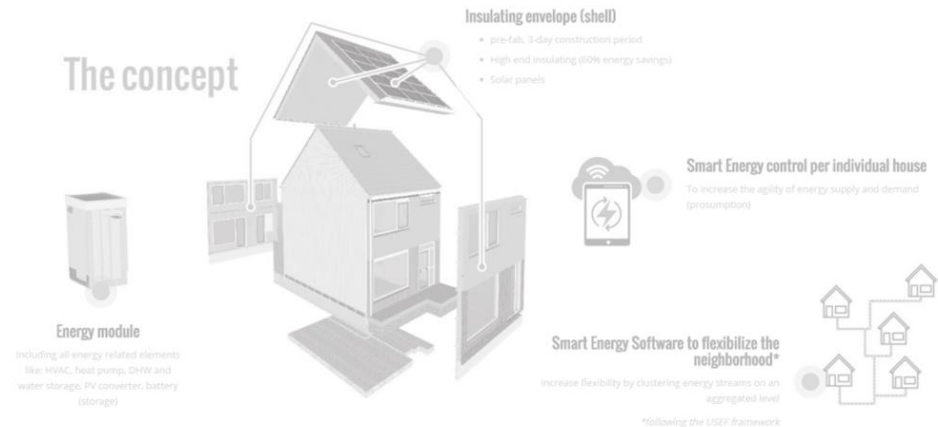
## Smart Control and Flexibility

- Requirements to realize flexibility: local optimization, forecasting, control and orchestration of resources
- Reduction in demand and increase in local self consumption (Smart Control)
- 1kWh/1kW flexibility per house per day, expected to increase
- Flexibility for DSO/BRP
- EEBus implemented, USEF implemented
- Over 240 houses (Q2 2018), local- and district batteries + Spanish and Polish demonstrator.



## Deep retrofit towards smart neighborhoods: opportunities

- Devices provide **demand side flexibility**
- Business opportunities for new players and current grid stakeholders (i.e. **Smart Neighborhoods** as product, bundling of demand response with other consumer services)
- **When all devices in the energy network speak EEBUS: households become core components of the Smart Grid**





## RENNOVATES

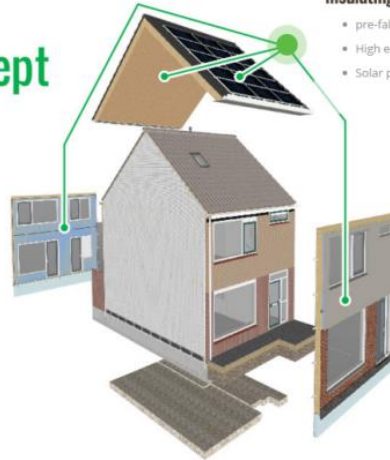
Flexibility Activated Zero Energy Districts

### The concept



#### Energy module

Including all energy related elements like: HVAC, heat pump, DHW and water storage, PV converter, battery (storage)



#### Insulating envelope (shell)

- pre-fab, 3-day construction period
- High end insulating (60% energy savings)
- Solar panels



#### Smart Energy control per individual house

To increase the agility of energy supply and demand (prosumption)

#### Smart Energy Software to flexibilize the neighborhood\*

Increase flexibility by clustering energy streams on an aggregated level



*\*following the USEF framework*