How next generation smartgrid software can enable the mass-role out of net-zero social houses
Some relevant EU nrs ...

40% energy consumption = buildings

75% building floor space = residential

Residential = 56.17 % EU building energy consumption (1.600 TWh/y)

40% residential built before 1960

12% EU27 residential = social = 25M units
Setting the new energy scene ...

Old-style (pro)sumption

Opportunity Gap (100’s B EUR)

Smart-grid adopting prosumers

Electricity prices

Time

Evolution
To date
Germany as an interesting example ...

GROSS POWER GENERATION MIX GERMANY 2016
Share of energy sources in German power production

648 TWh [bn kWh]

1. Natural gas 78.5 TWh
2. Nuclear 64.9 TWh
3. Lignite 150 TWh
4. Hard coal 110 TWh
5. Wind power 79.8 TWh
6. Biomass 51.7 TWh
7. Solar 38.3 TWh
8. Hydropower 21.5 TWh

Other 5.2 TWh

Source: AGEB, 2016

ELECTRICITY CONSUMPTION IN GERMANY 2014
Electric energy consumption by source and sector [in percent]

576 billion kWh

1. Industry 47%
2. RE 27.3%
3. FF 22.7%
4. Private households 2.5%
5. Agriculture 1.5%
6. Public sector 1.2%
7. Trade and commerce 0.9%

Load duration 2010 in Germany

Load duration 2030 in Germany

RE contribution lowers full load hours of the residual system, which will lead to an increase in cost
(RE share in power generation 2030: 65%)
So ...

Buildings = key

Social housing = big impact opportunity

Smart Green = must
Passive consumers (incl HPs, Evs, Batteries, etc)

Enervalis creates the evolution towards

Active part of the energy system

Network congestion will occur in the future

Flexibility will be needed by the Electricity markets

Enervalis enables the “internet of energy” to support next generation mass-market Energy Service As a Service
And NL example: drivers for a smart green microgrid

100’s M EUR/y DSO OPEX (inc gas)

2,6M social houses => 100% green
=>> 13TWh/y & > 5Mton CO2/y (grey displace)

BUT >15GWp!! (worst case)
UK typical residential energy profile

Figure 1: Heating and hot water as a proportion of total energy usage in homes heated by natural gas
Energy modules

The cost-effective way to a sustainable all-electric future
What does it look like in reality?
Smart Energy model ("ZOM+"): roles

**Construction company**

- Service and guarantee to **Housing association**
- Renovation + Service Fee to **Housing association**

**Housing association**

- Rent to **Tenant**

**Tenant**

- Service from **Energy Supplier**

**Energy Supplier**

- Energy Performance Fee

**DSO: Distribution Service Operator**

**ESA: Energy Service Aggregator**
Smart Energy model ("ZOM+"): key values

**Save** energy through insulating the building using a modular, pre-fabricated system (50% save)

Minimize consumption by using **efficient** installations in the pre-fabricated Energy Module (25% save) and add local generation

**Optimize local** energy consumption and production and enable flexibility in value cases (5+ % saving)

**Orchestrate** neighbourhood interaction to support the infrastructure and community (+3-5% income)

*Increase comfort, health, sustainability and cohesion*

>5% ROI for housing associations
A snapshot of a day in June from a smart microgrid project.
Smart energy value: congestion management

e.g. summer: 1-2kW // 1-2hrs
Alternative congestion management example
Smart Energy value: self-consumption

+75%
Smart energy value: Energy efficiency

20% savings - 250-300kWh/y
To conclude

Community based smart energy management

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Key to cost-effective net-zero social housing in EU

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150+TWh/y green // 25++MTon CO2/y!

Without network cost impact