# OPTIMISING NZEB DWELLING ENERGY SYSTEMS

Research Group Energy in Transition

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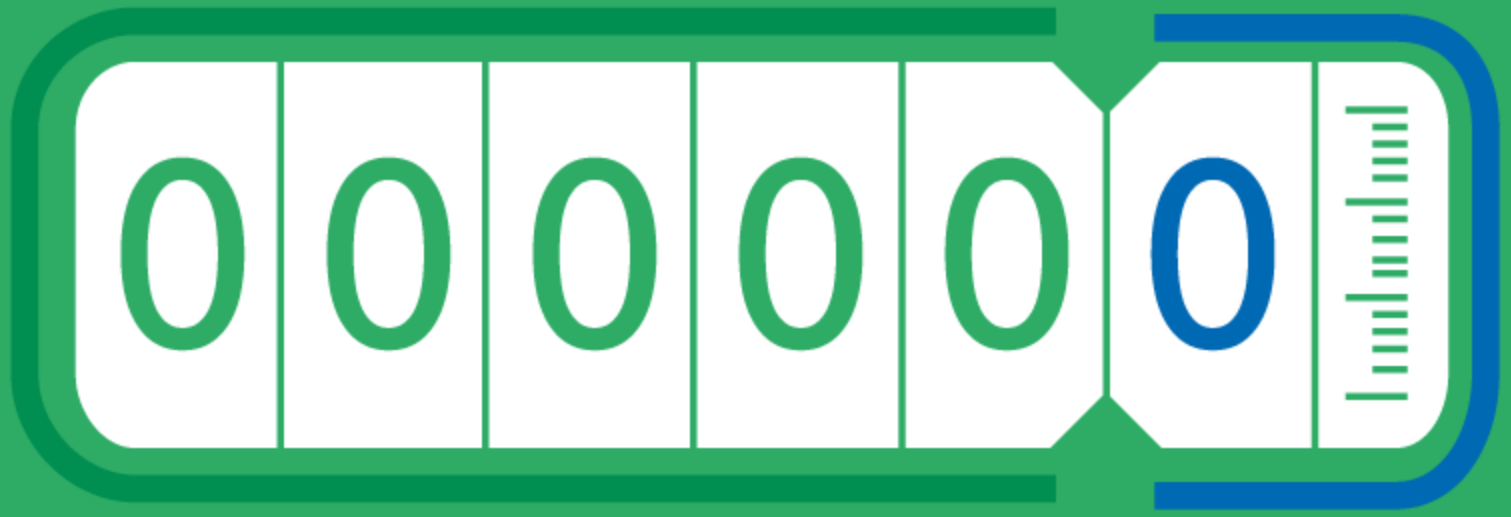
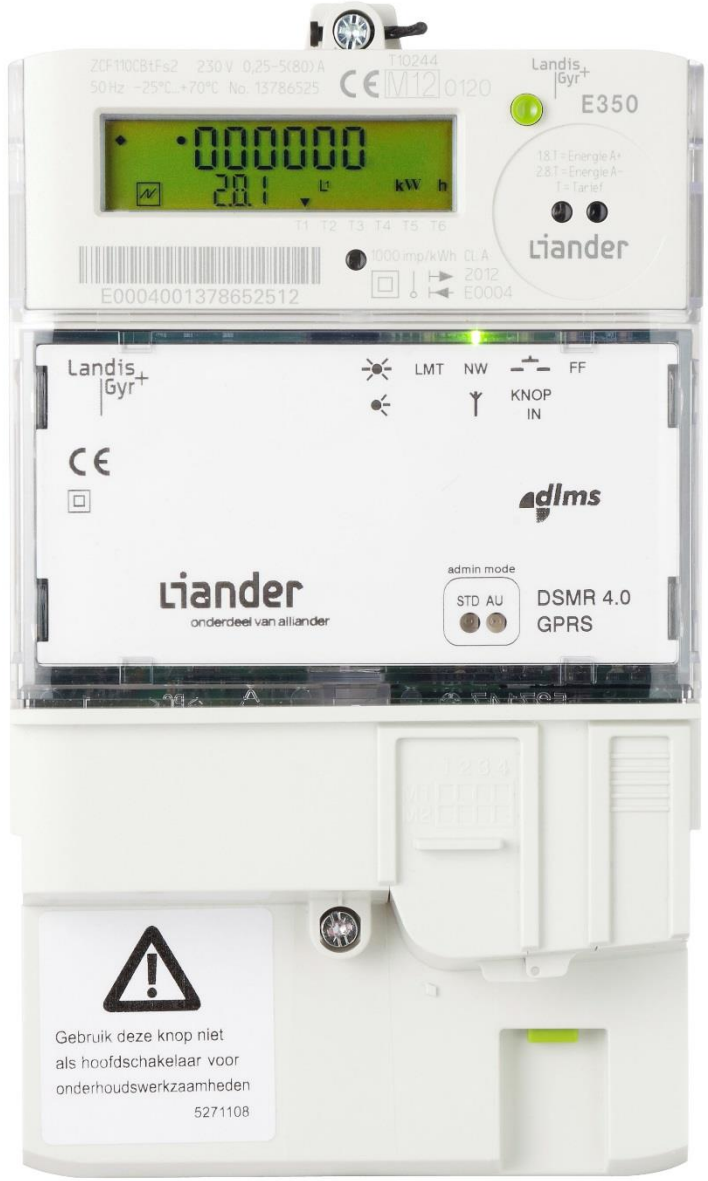



# NZEB Net Zero Energy Building

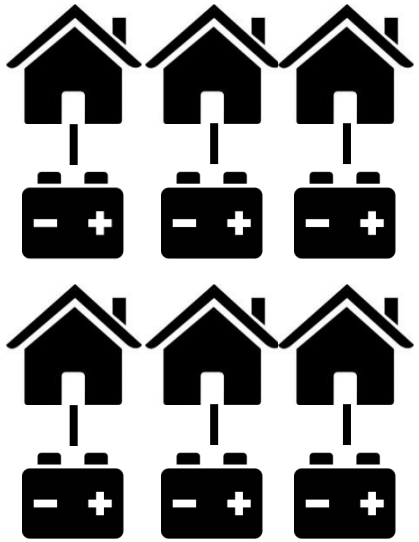
# NOM Nul Op de Meter


FACTORY ZERO

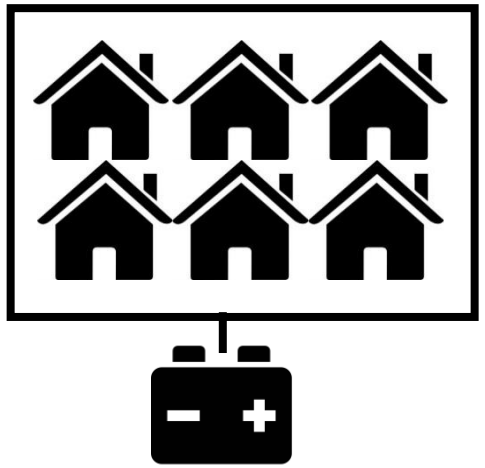
# Groene Mient


Landis+Gyr
E350
Liander
LMT
NW
FF
KNOP
IN
dlms
admin mode
STD AU
DSMR 4.0
GPRS
onderdeel van alliander
Gebruik deze knop niet
als hoofdschakelaar voor
onderhoudswerkzaamheden
5271108

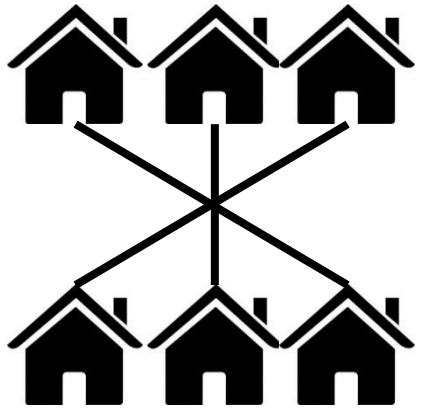
# Alternatives to net metering analysed



One battery per house



One battery for all houses



Peer-to-peer

# Alternatives to net metering analysed

| | Percentage used energy surplus |
|---|---|
| **Net metering (current situation)** | 100% |
| **Alternative 1. One battery per house** | 53% |
| **Alternative 2. One battery for all** | 58% |
| **Alternative 3. Peer 2 Peer** | 16% |

Peer to peer does hardly not reduce energy costs because the 33 houses have a really similar energy use and generation pattern.

# Maximum current

| | Use | Delivery |
|---|---|---|
| **Maximum current 1 house** | 50 A | 16,5 A |
| **Maximum current 33 houses** | 313 A | 367,8 A |

There is more current required per house for use but all houses deliver their maximum current at the same moment in time, when the sun shines and no one is at home. So for the total of 33 houses, there is higher amperage needed for delivery than for use.

# Dwelling Energy Insights

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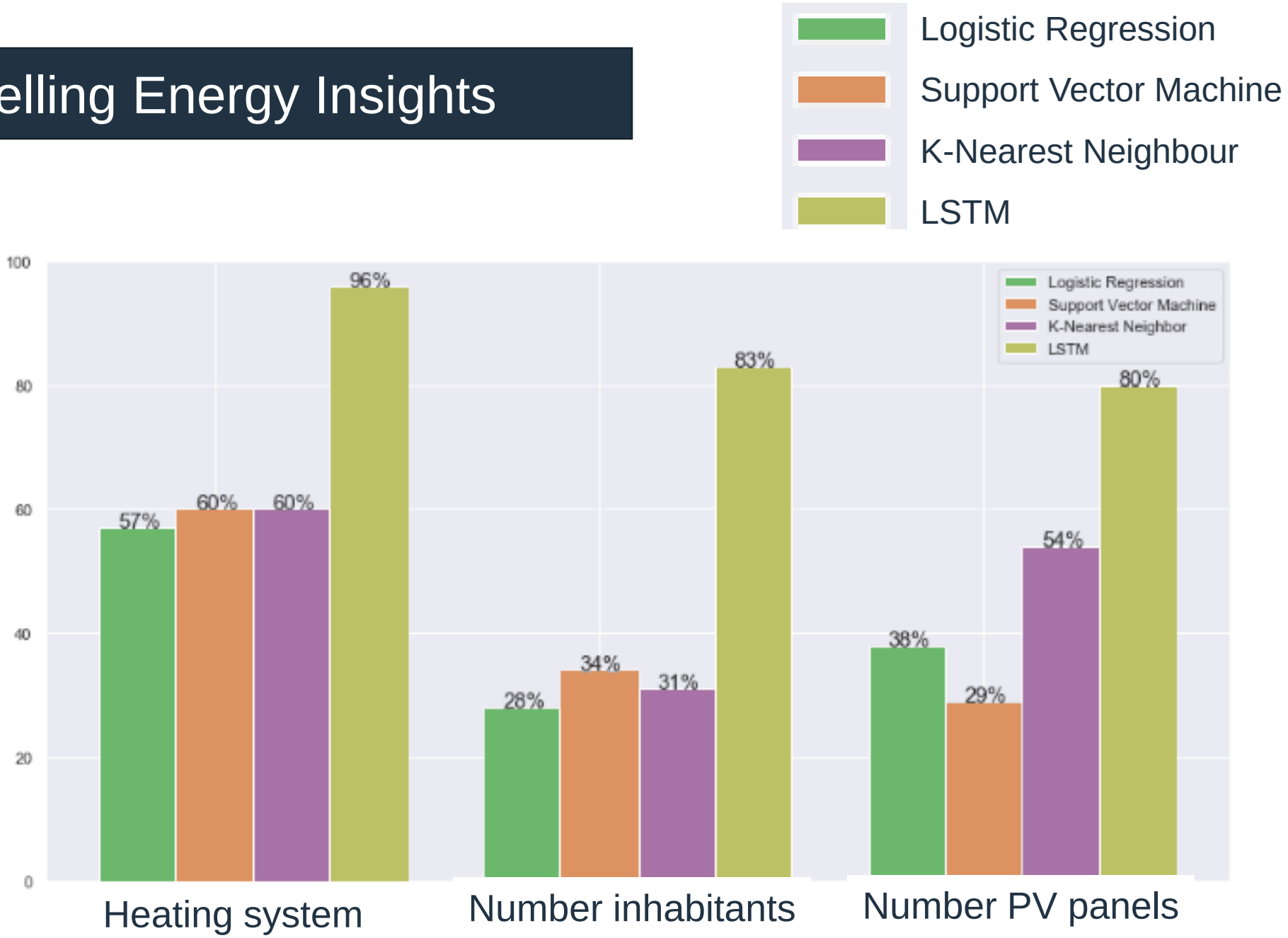
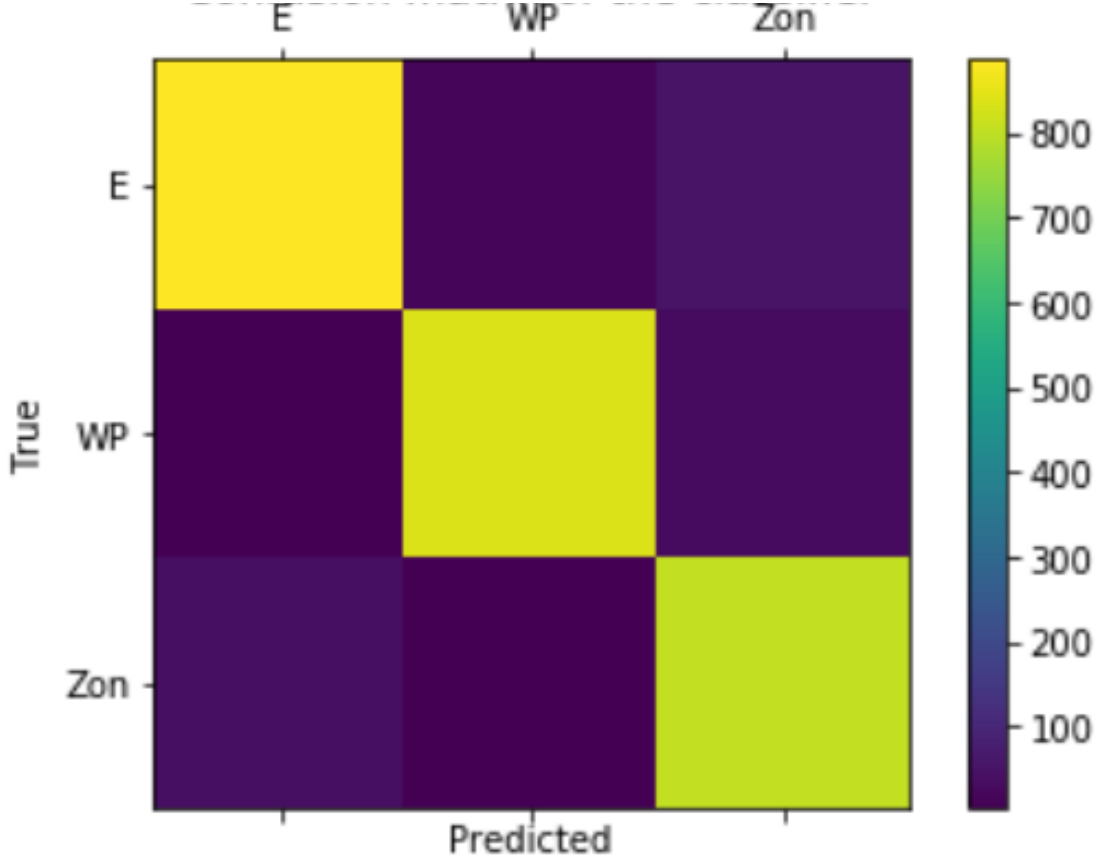


# Long Short Term Memory

Confusion matrix of the heating system classifier




The sequence of data used for the LSTM was 96 data rows, what is one day data (15 minutes data).

# Energy Performance Guarantee

# The HVAC system

1: Heat pump (outdoor unit)

2: Heat pump (indoor unit)

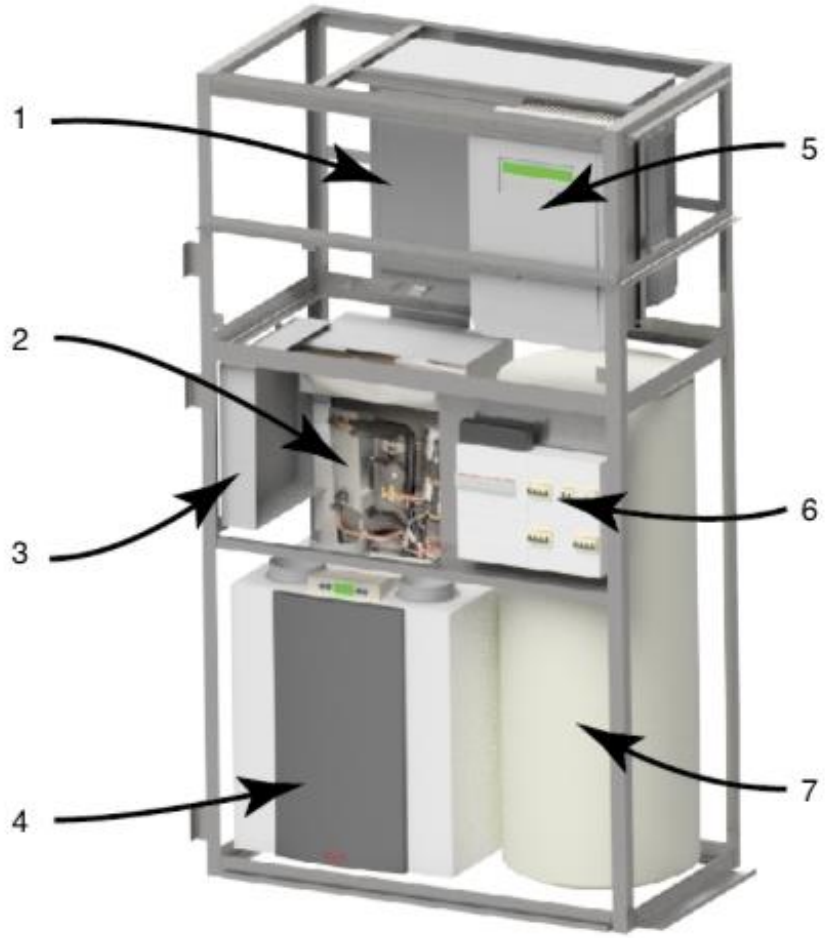
3: Motherboard

4: Heat recovery system

5: Inverter

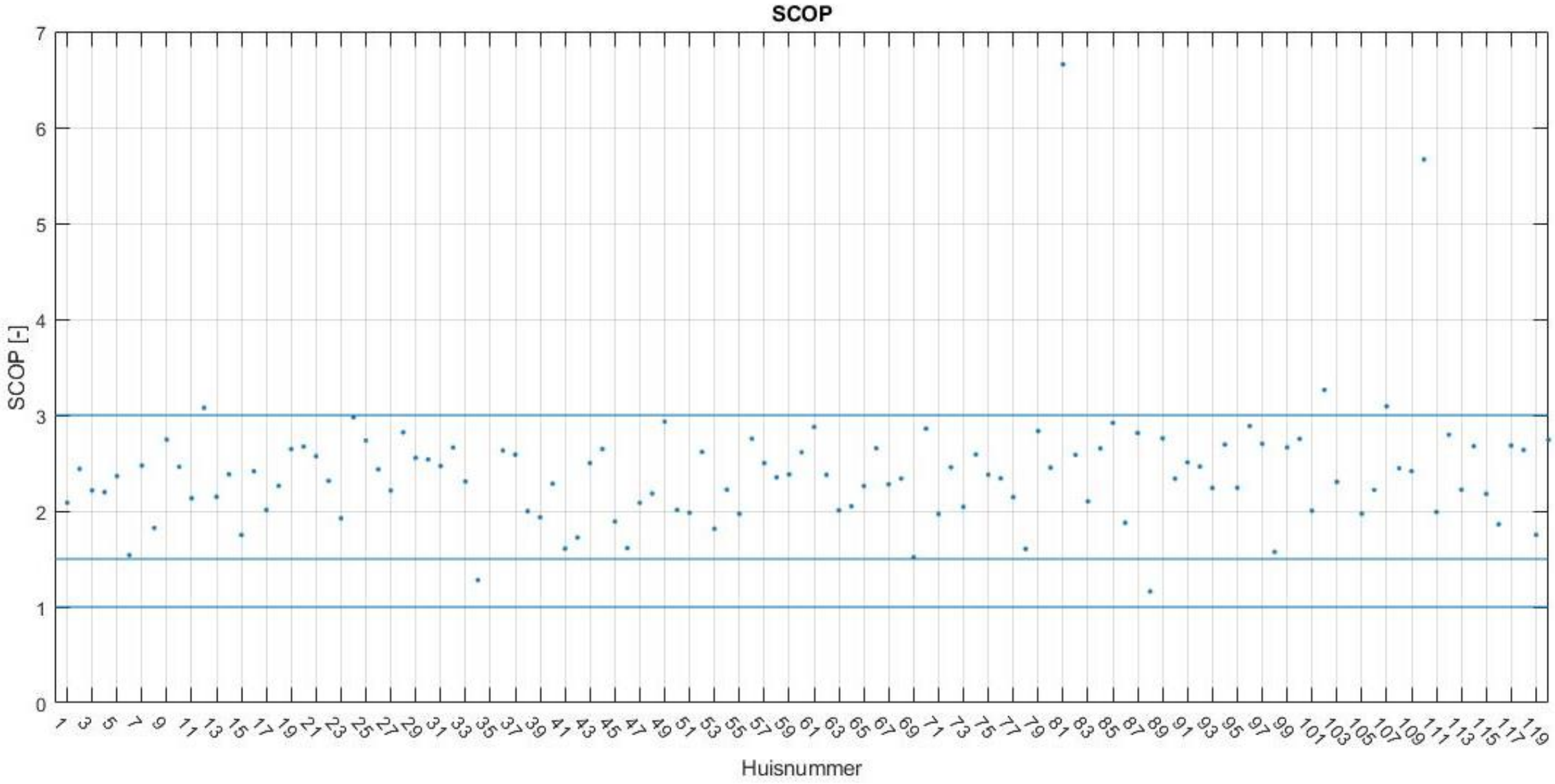
6: Smart box

7: Hot tap water reservoir




FACTORY ZERO

# COP analysis



# COP analysis

- The heat pump manufacturer control system does not calculate the COP
- The higher the use of the heat pump, the higher the COP
- It is needed to correlate 3 different data tables to calculate COP per heat pump working modus.
- As the system is right now designed it is not possible to calculate the COP of the heat recovery system.

# Conclusion

There is more and more data available. We need plenty more professionals able to convert this data into useful information.


let’s change
YOU. US. THE WORLD.