

Smartenergi ApS

Intelligent Energy Management

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Agenda

- Background and ideas (*Smartenergi ApS*)
- PV and wind in our grid. (*synergy*)
- Smartenergi products. (*what do we sell?*)
- Data harvested from our PV customers.
- Smartenergi HEM system.
- Project AAU testlab.
- Project "Næsseskoven". (*layout*)



Background

- ▶ +1.000 photovoltaic systems in Denmark since 2012 (Solarflex A/S).
- ▶ Founder of Smartenergi ApS april 2019.
- ▶ Knowledge in heatpumps, battery systems og Home Energy Management Systems (HEM).
- ▶ Corporation with a large Danish utility company (HEM system).
- ▶ Funded research project ETI CLEAN HEM system (prof of concept high tier lvl).
- ▶ Co-owner E4 Energy ApS (PV Power purchase agreement for commercial buildings).



The need for Smartenergi?

- ▶ Often changing laws and regulations for solar in Denmark since 2012. ("start-stop" policy).
- ▶ Today there is no real subsidizing programs for solar.
- ▶ Average synergy between PV production and consumption in residential houses (25-40% of yearly pv production).
- ▶ Need to raise the level of own consumption of pv production to enhance the business case for customers.



Smartenergi ApS sell these 5 products and connect them.

1

SOLCELLER
Solcelleanlæg



2

BATTERI
Solcelleanlæg



3

VARMEPUMPER
Luft-vand & Luft-luft



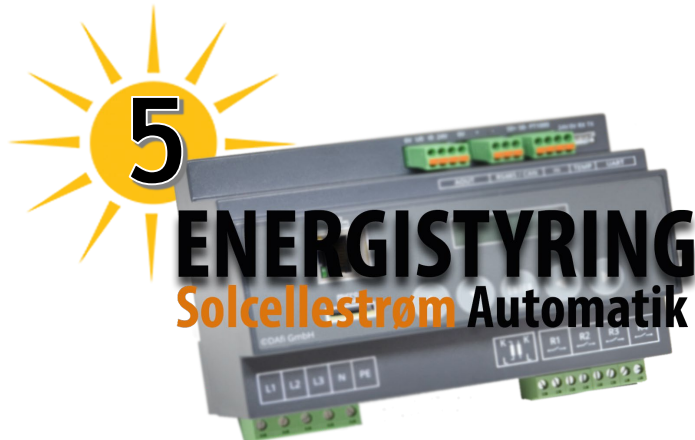
4

EL-BIL
Ladestationer



5

ENERGISTYRING
Solcellestrøm Automatik



The need for Smartenergi?

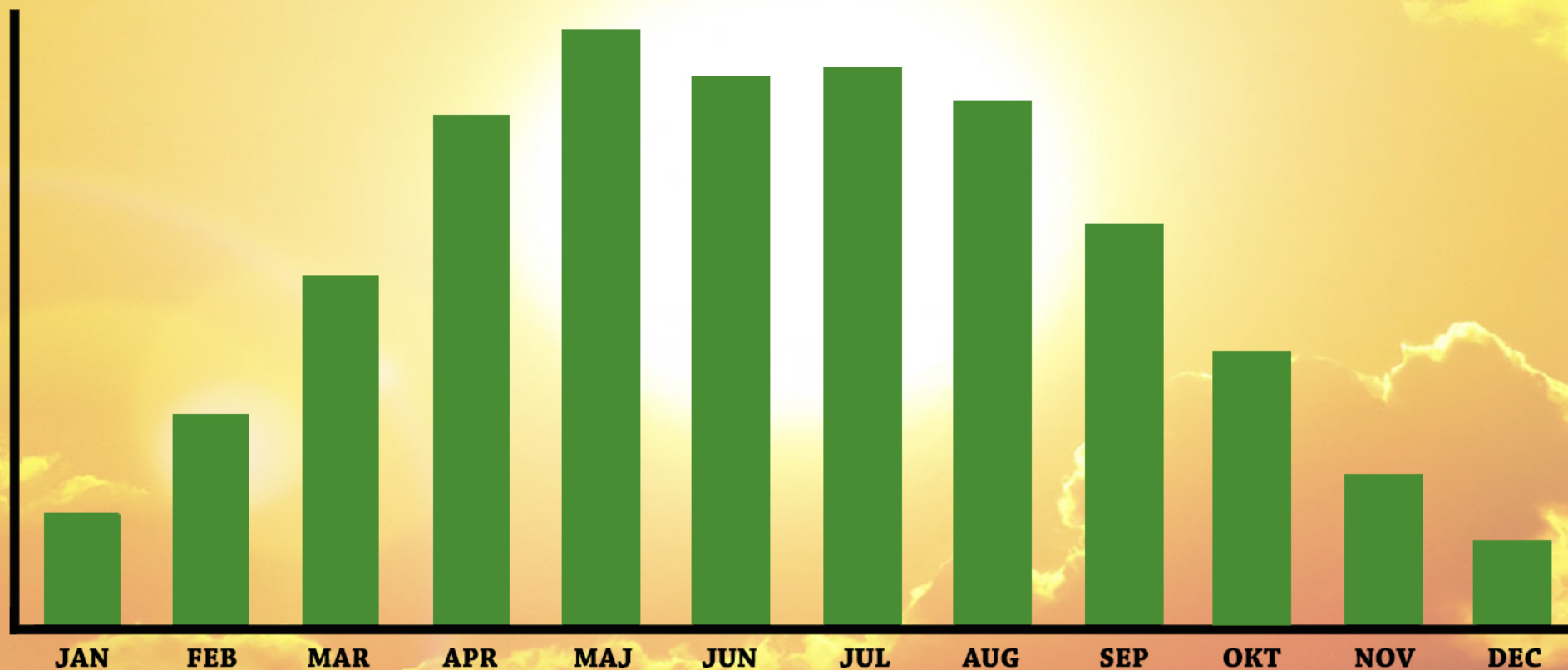




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INTELLIGENT ENERGY MANAGEMENT

kWh

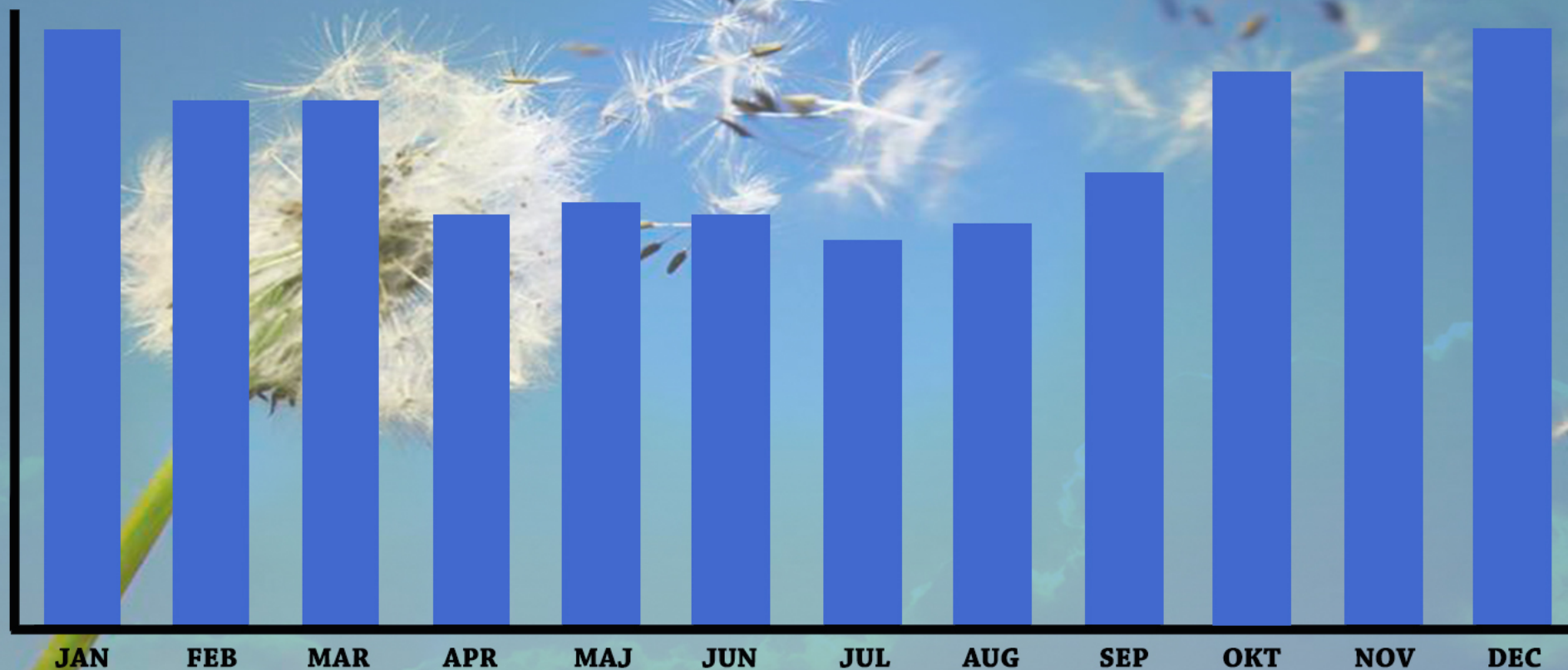




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INTELLIGENT ENERGY MANAGEMENT

kWh

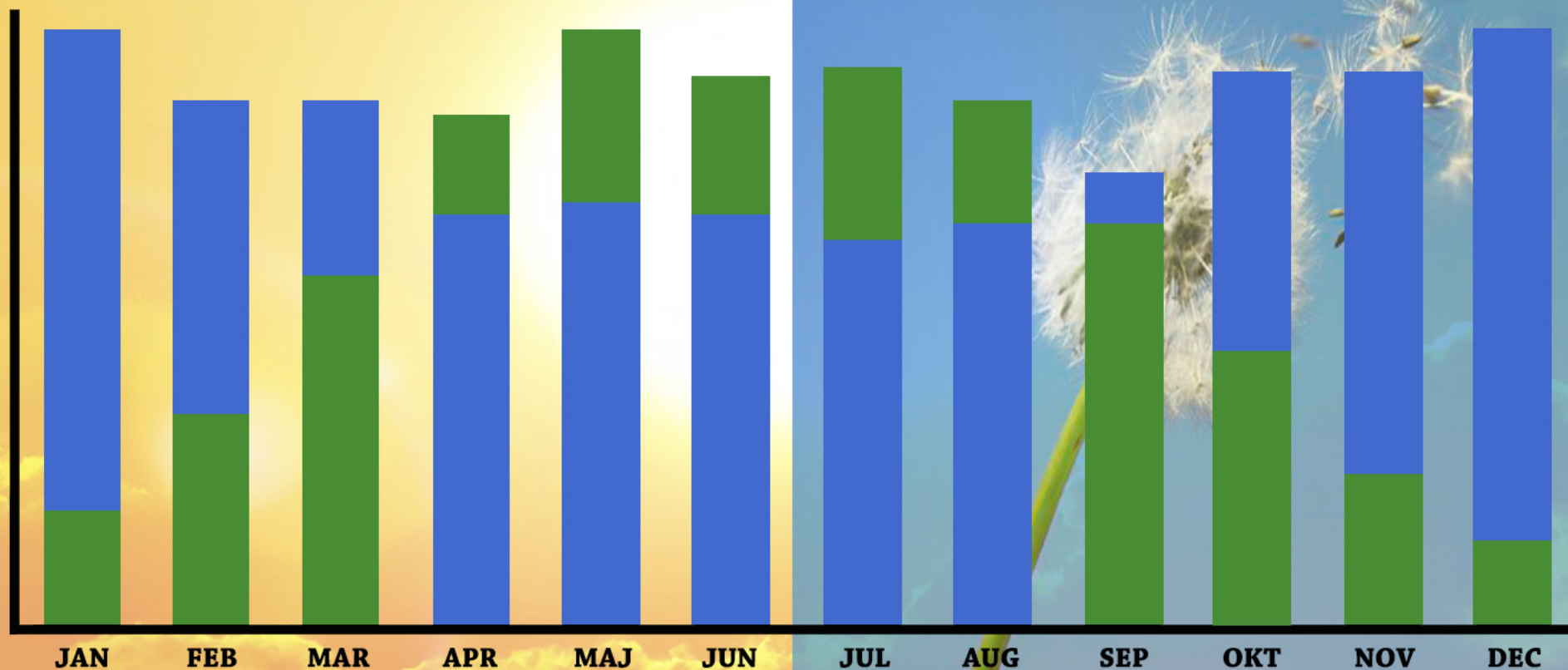




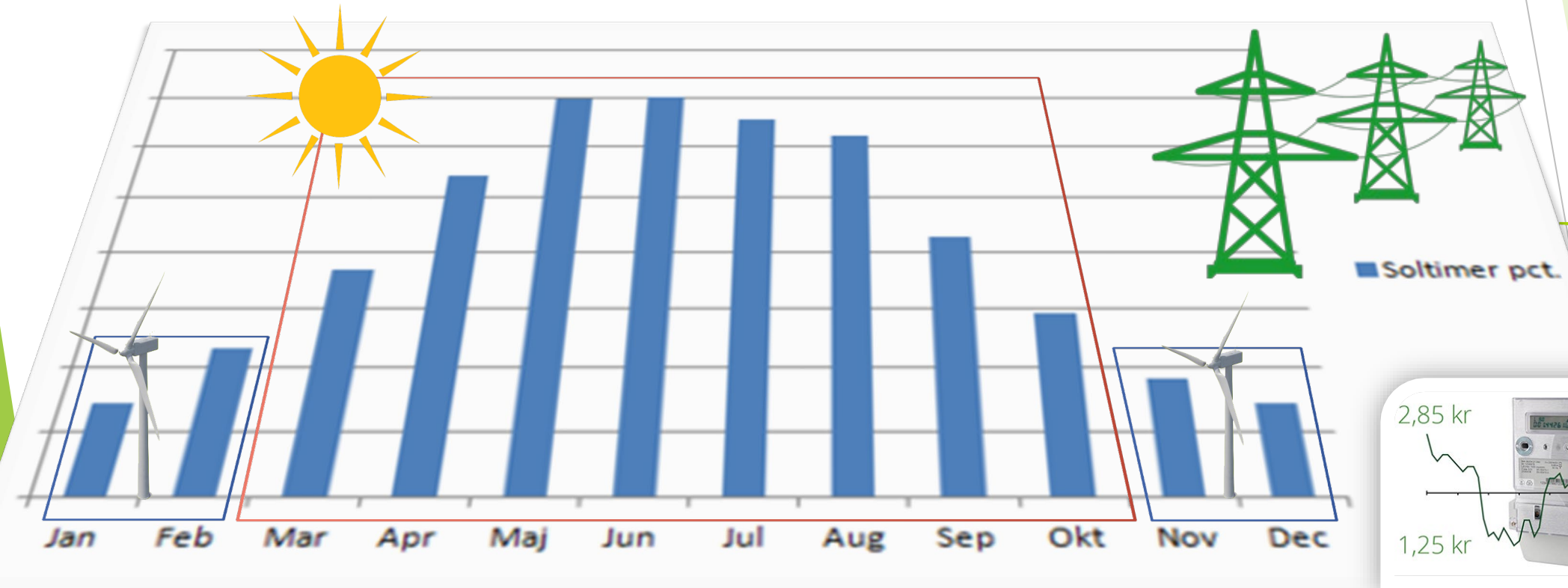
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INTELLIGENT ENERGY MANAGEMENT

kWh

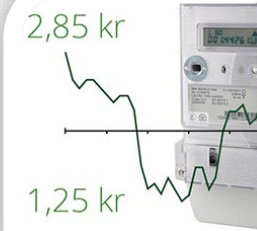


Energy companies, flexible power tariffs and Home Energy Management systems are the keys for a very low level *CO2 pr. kWh in a household.*



EUR/MWh

14-09-2020	DK1	DK2
00 - 01	17,98	17,98
01 - 02	18,51	18,51
02 - 03	32,90	21,87
03 - 04	32,35	22,05
04 - 05	32,32	25,60
05 - 06	36,07	36,07
06 - 07	50,00	50,00
07 - 08	58,34	58,34
08 - 09	62,05	62,05
09 - 10	55,93	55,93
10 - 11	50,49	50,49
11 - 12	46,04	47,18
12 - 13	40,46	44,29
13 - 14	42,28	44,23
14 - 15	40,15	40,15
15 - 16	45,23	45,23
16 - 17	51,69	51,69
17 - 18	66,40	66,40
18 - 19	80,98	80,98
19 - 20	120,62	120,62
20 - 21	96,43	96,43
21 - 22	66,32	66,32
22 - 23	54,01	54,01
23 - 00	44,15	44,15
Min	17,98	17,98
Max	120,62	120,62
Average	51,74	50,86
Peak	58,53	59,10
Off-peak 1	34,81	31,30
Off-peak 2	65,23	65,23

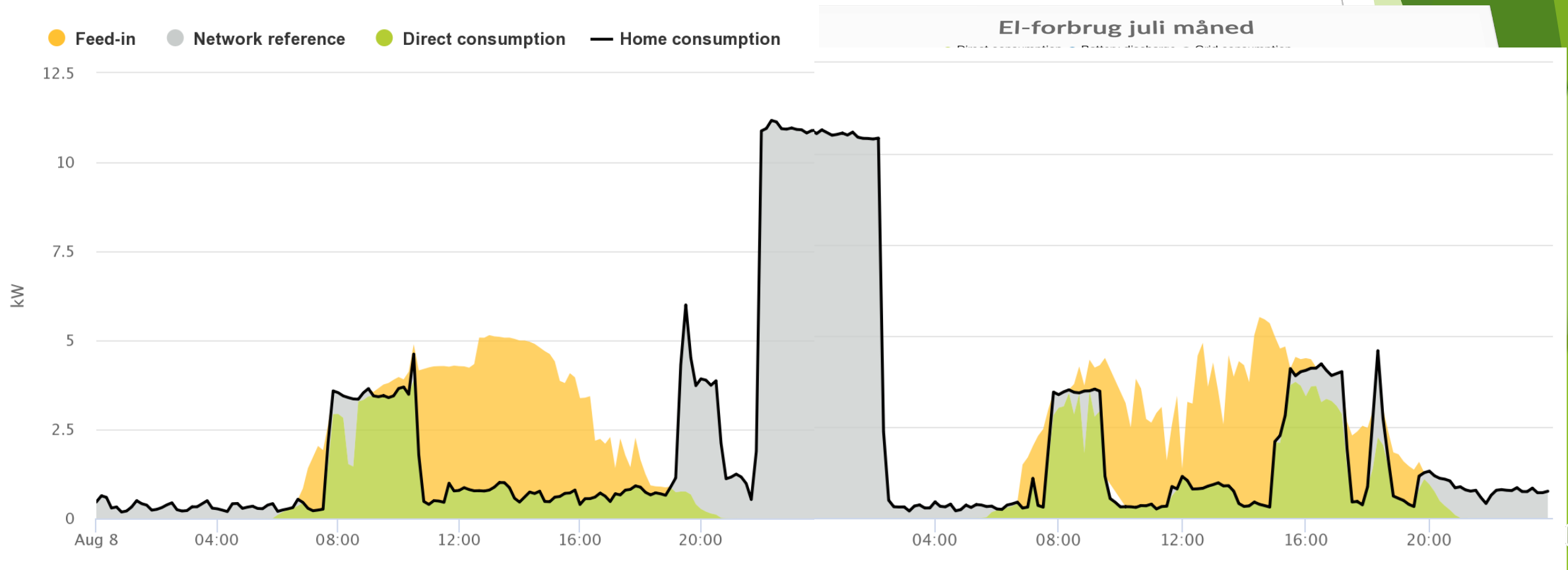


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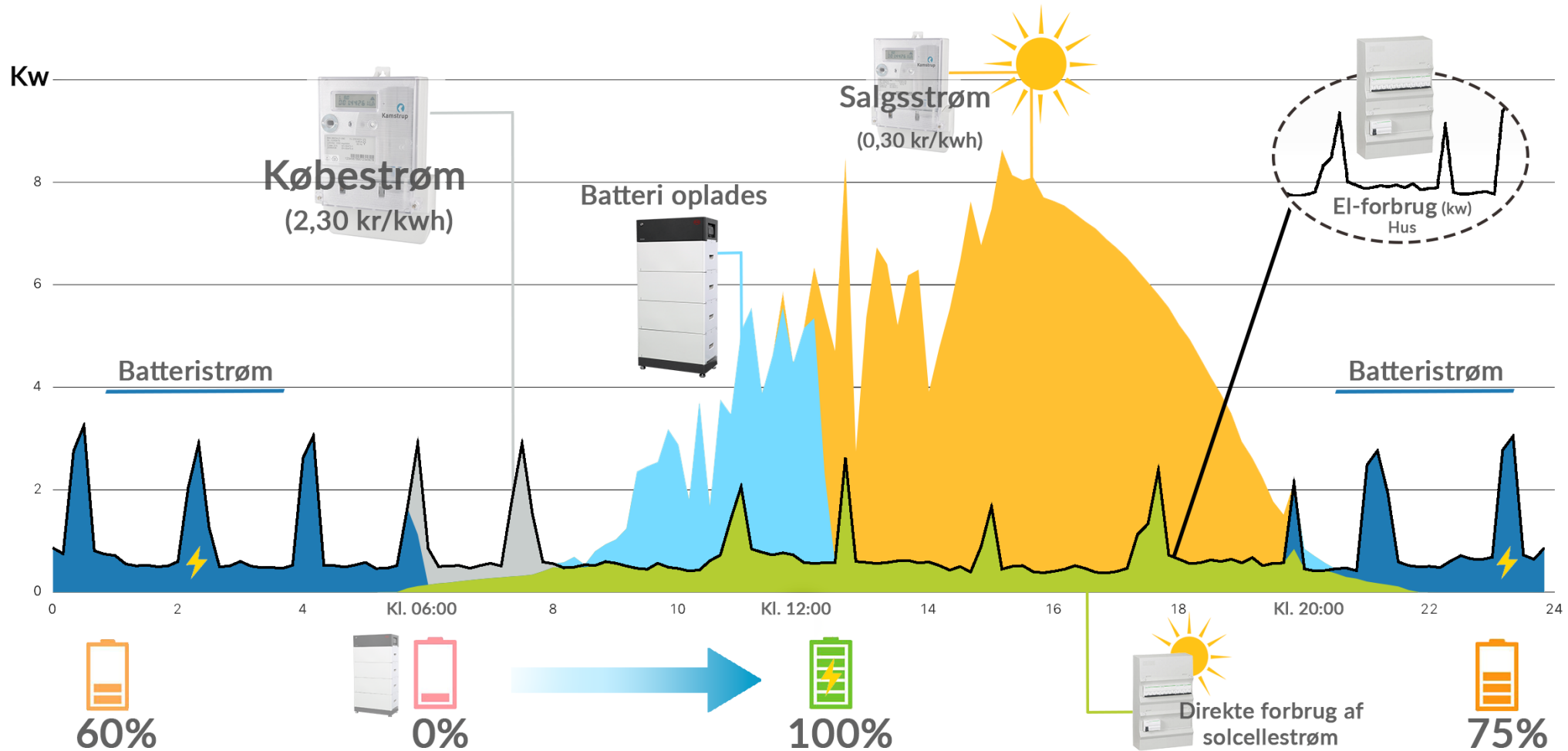
The many data...

- From private households with PV systems gave us an insight in where to optimize and save money.



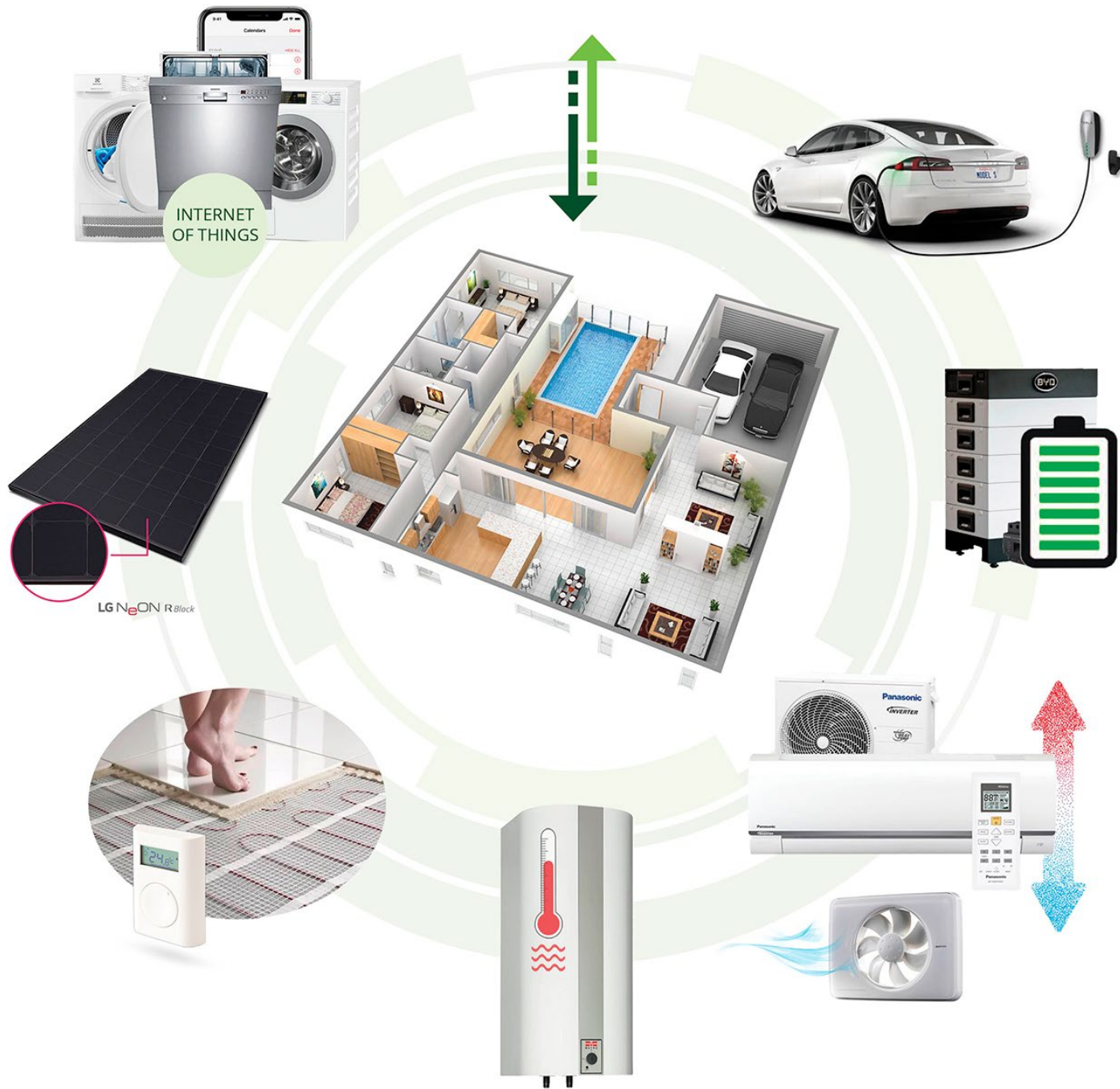
Home consumption - 09. July 2020

● Feed into grid ● Battery charge ● Grid consumption ● Battery discharge ● Direct consumption ● Home consumption



But what is Smartenergi management?







AAU Testlab Energitest



HEATING



COOLING



ENERGY
MANAGEMENT



VENTILATION



Smarthome & Smartenergi

IDM heatpump (heating/cooling)
Terra SW 26 twin



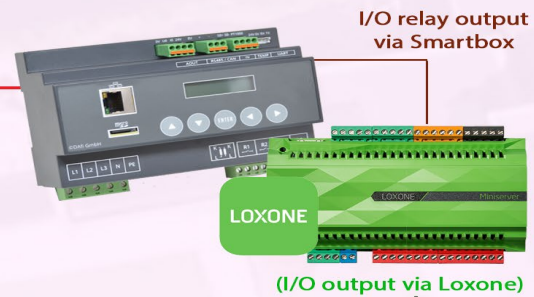
(MODBUS TCP)



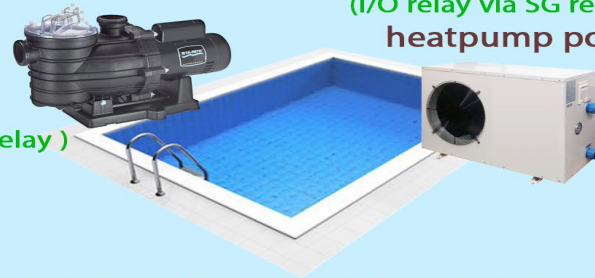
floor cooling specific rooms



Nilan ventilation (speed control)

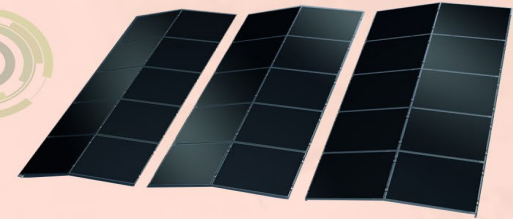


Filter circulation pump



(I/O relay via SG ready)
heatpump pool

30-35 kwp solarpanels LG360 wp prime



Fronius Smart-meter
(1-2 pcs or none?)



3 x 11,5 kwh BYD HV batterier
(MODBUS TCP)



2 x Fronius Symo
24GEN 10 invertere
(MODBUS TCP)



10 kw power
backup 3 ph
(el-tavle)

Mitsubishi-MSZ-LN25 + LN50
2 pcs LN25 and 1 pcs LN50



CTC EcoZenith i550 PRO
Integrated hot water



Analog out
(trinvis kw)

heating rod

(I/O relay via SG ready)
CTC EcoAir varmepumpe



EV charger (prepared)



Smartenergi ApS

Intelligent Energi Styring
Bjarke Henriksen

