

# 4 Years of Energy Management with openHAB

A personal story about smart homes, PV systems and EVs.



## FOSDEM

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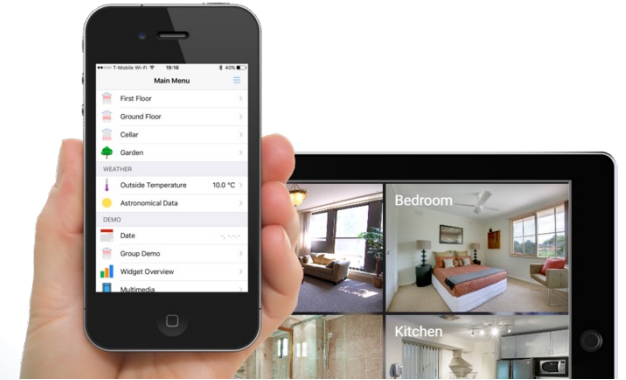
**openHAB**  
empowering the smart home

## Electrical Cabinet

- Light
- Heating
- Warm Water
- PV (6,6 kWp)

# openHAB

- Founded 2010
- Open Source
- Overarching Rules & UI
- Local Control

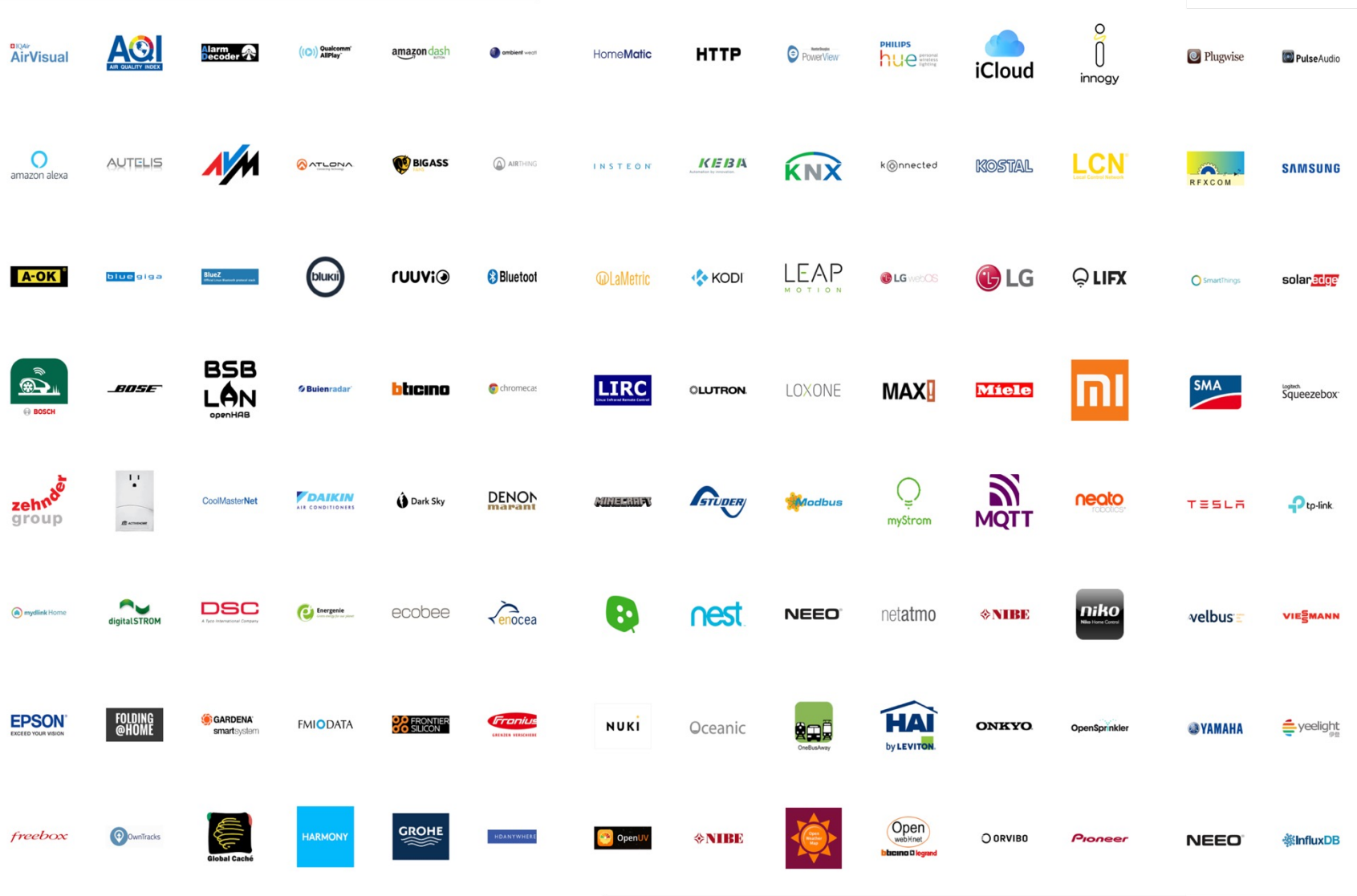


## INTRANET OF THINGS



# openHAB

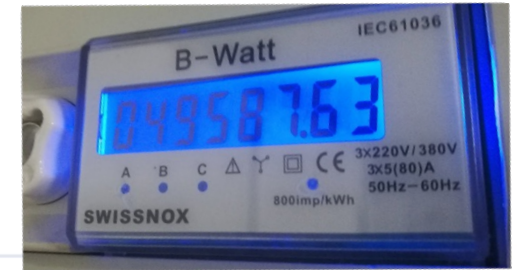
400+ supported protocols / systems / technologies



# Measurement

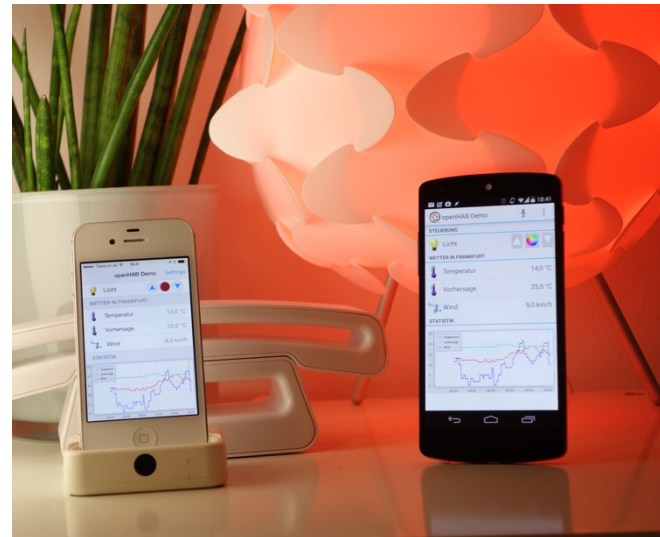
- Meters with S0-interface
- KNX binary input
- openHAB rule calculating power

○ Heating    ○ PV    ○ Household



# Energy Monitoring

```
rule Energieampel
when
    Item Haushalt_Leistung changed
then
    if(Nightmode.state!=ON) {
        val power = Haushalt_Leistung.state as DecimalType
        var hue = 140.0 - ((power - 0.2) * 140.0)
        if(hue < 0) hue = 0.0
        if(hue > 120) hue = 120.0
        Light_GF_Living_Energy.sendCommand(hue + ",100,100")
    }
end
```

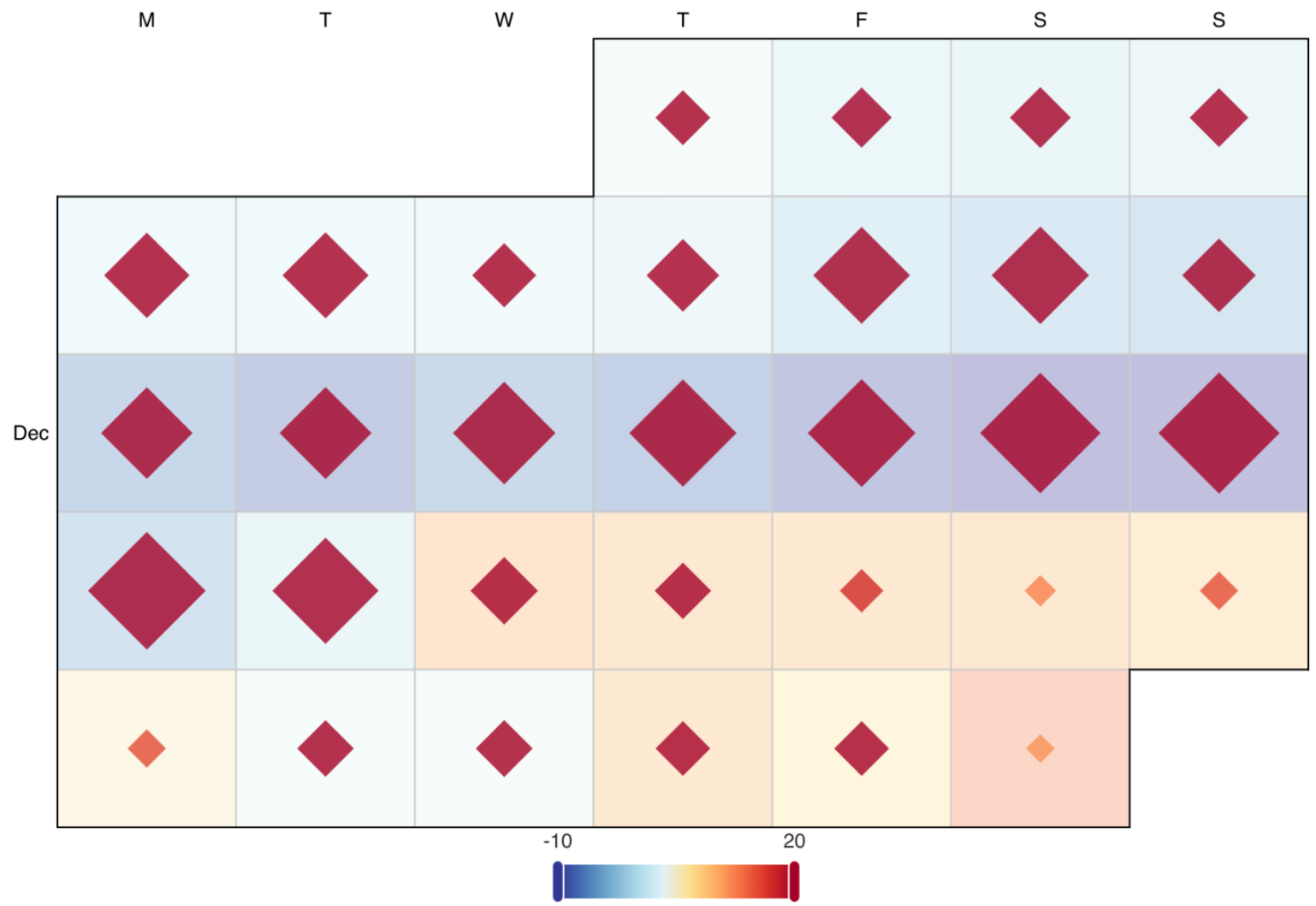


# Heating Monitoring

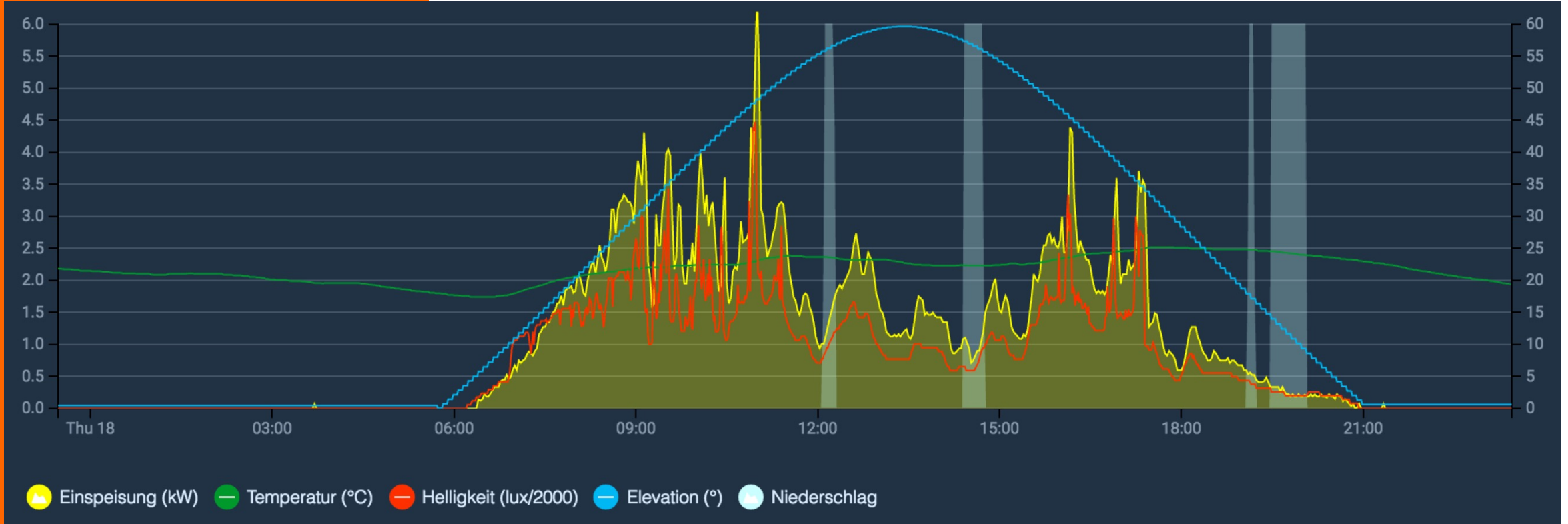
## Heating Energy Consumption

Minimal Temperature Heating

< Dec 2022 >



# PV Monitoring



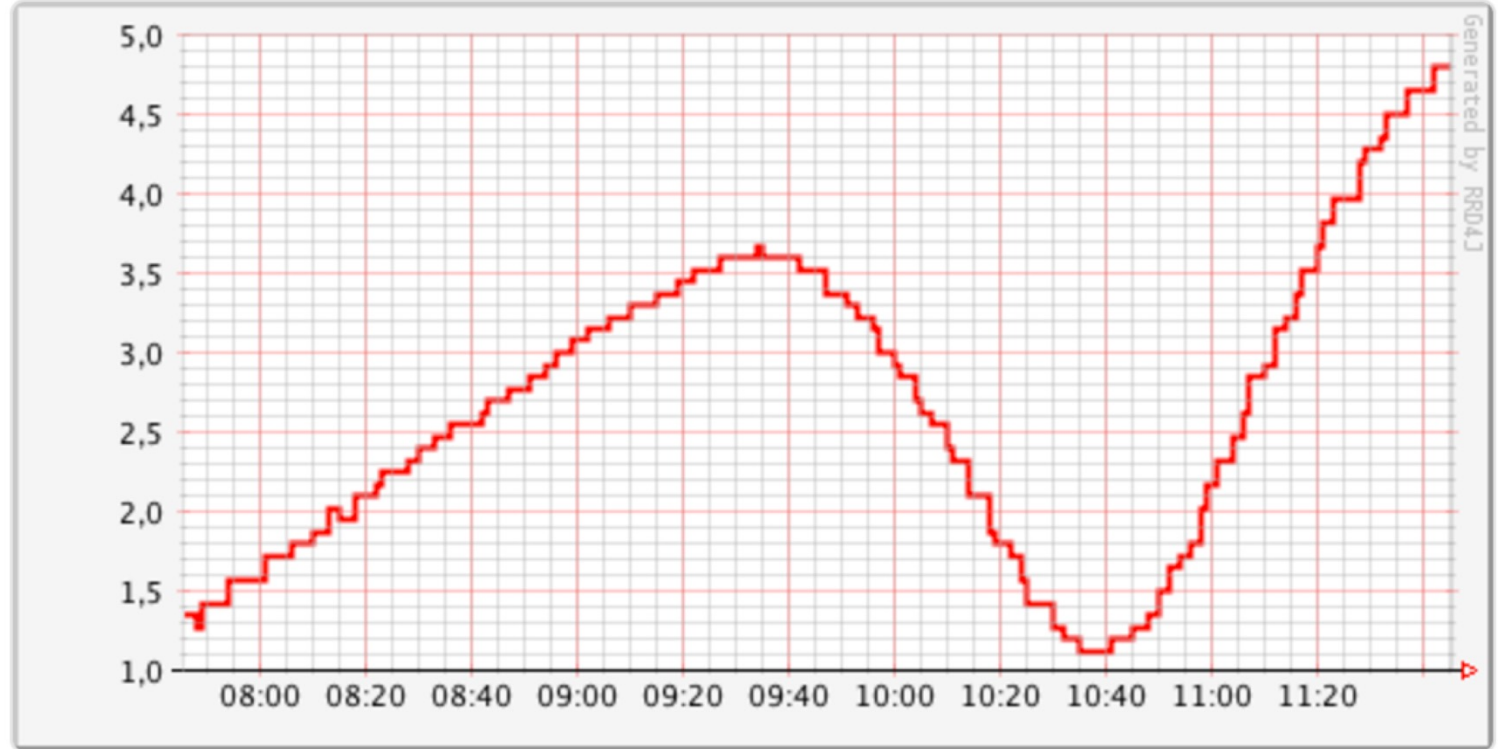


# PV Monitoring



**Kai Kreuzer** @kaikreuzer · 20. März 2015

Tracked the [#SolarEclipse](#) through my photovoltaics and [@openHAB](#)!



6

30



40



# Washing Machine



SmartStart: ~ 300 EUR

Smart Tarif: ~100 EUR / a

Savings per kWh: 3 ct



# Washing Machine

Hersteller	Modellbez.	60 °C Vollbeladung	Jahresverbrauch	Stromkosten
Electrolux	WASL3T201	0,62 kWh	129 kWh	34,83 €
Gorenje	WA6440P	0,70 kWh	146 kWh	39,42 €
Gorenje	W6443/S	0,79 kWh	149 kWh	40,23 €
Miele	W 668 F WCS	0,85 kWh	150 kWh	40,50 €
Miele	W 668 F WPM	0,85 kWh	150 kWh	40,50 €
Miele	W 695 F WPM	0,85 kWh	150 kWh	40,50 €
KOENIC	KWF 61417	0,70 kWh	152 kWh	41,04 €
Miele	W 194 WCS	0,85 kWh	152 kWh	41,04 €
KOENIC	KWF 61427	0,70 kWh	153 kWh	41,31 €
KOENIC	KWF 61217	0,78 kWh	153 kWh	41,31 €
Electrolux	WAGL6S200	0,76 kWh	156 kWh	42,12 €
AEG	L60460FL	0,89 kWh	159 kWh	42,93 €
AEG	L60468FL	0,89 kWh	159 kWh	42,93 €
AEG	L60466FL	0,89 kWh	159 kWh	42,93 €



# Washing Machine



SmartStart: ~ 300 EUR

Smart Tariff: ~100 EUR / a

Savings per kWh: 3 ct

Max. Savings / annum:

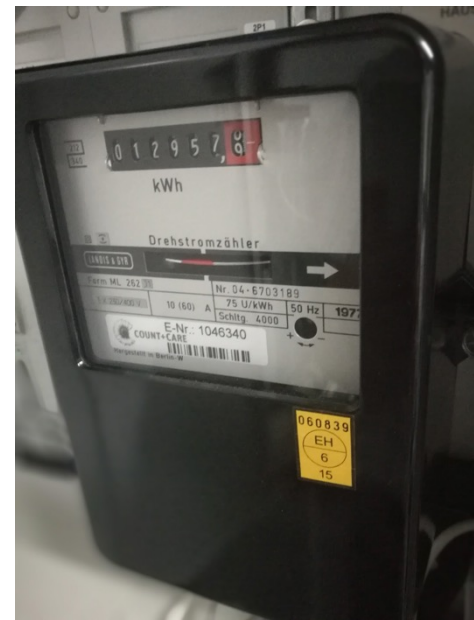
**4,50 EUR!**



# Measurement



2016



# Electric Vehicles –

78 kWh Battery!



# Electric Vehicles

→ more PV



# Energy Management

## Surplus-Charging

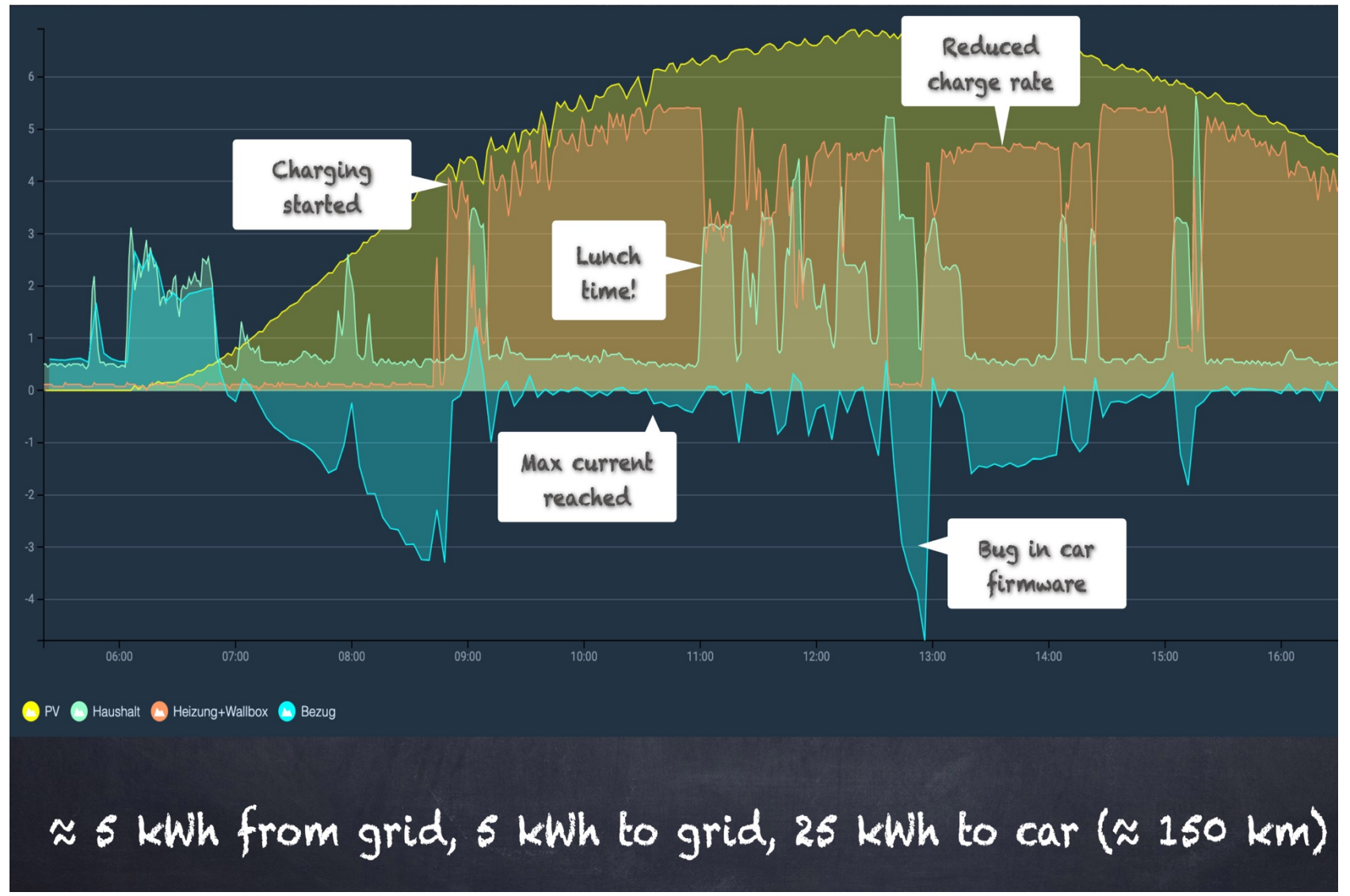
```
rule "Adjust Wallbox current"
when
    Item PV_Leistung changed or
    Item Haushalt_Leistung changed
then
    if(Wallbox_Ready.state==ON) {
        if(Wallbox_Quickcharge.state!=ON) {
            val surplus = PV_Leistung.state as DecimalType - Haushalt_Leistung.state as DecimalType
            logInfo("PV", "Surplus: " + surplus.toString + " kW")
            val deltaI = surplus * 1000 * 1000 / 230
            var currentI = Wallbox_MaxCurrent.state as DecimalType
            var newI = currentI + deltaI
            if(newI > 16000) {
                newI = 16000
            }
            if(newI > 6000 || (Tesla_Charge===OFF && newI > 0)) {
                logInfo("PV", "Adjusting charging current by " + deltaI.toString + "mA")
                Wallbox_Enable.send(ON)
                Wallbox_MaxCurrent.sendCommand(newI)
            } else {
                Wallbox_Enable.send(OFF)
            }
        }
    }
end
```





# Energy Management

## Surplus-Charging

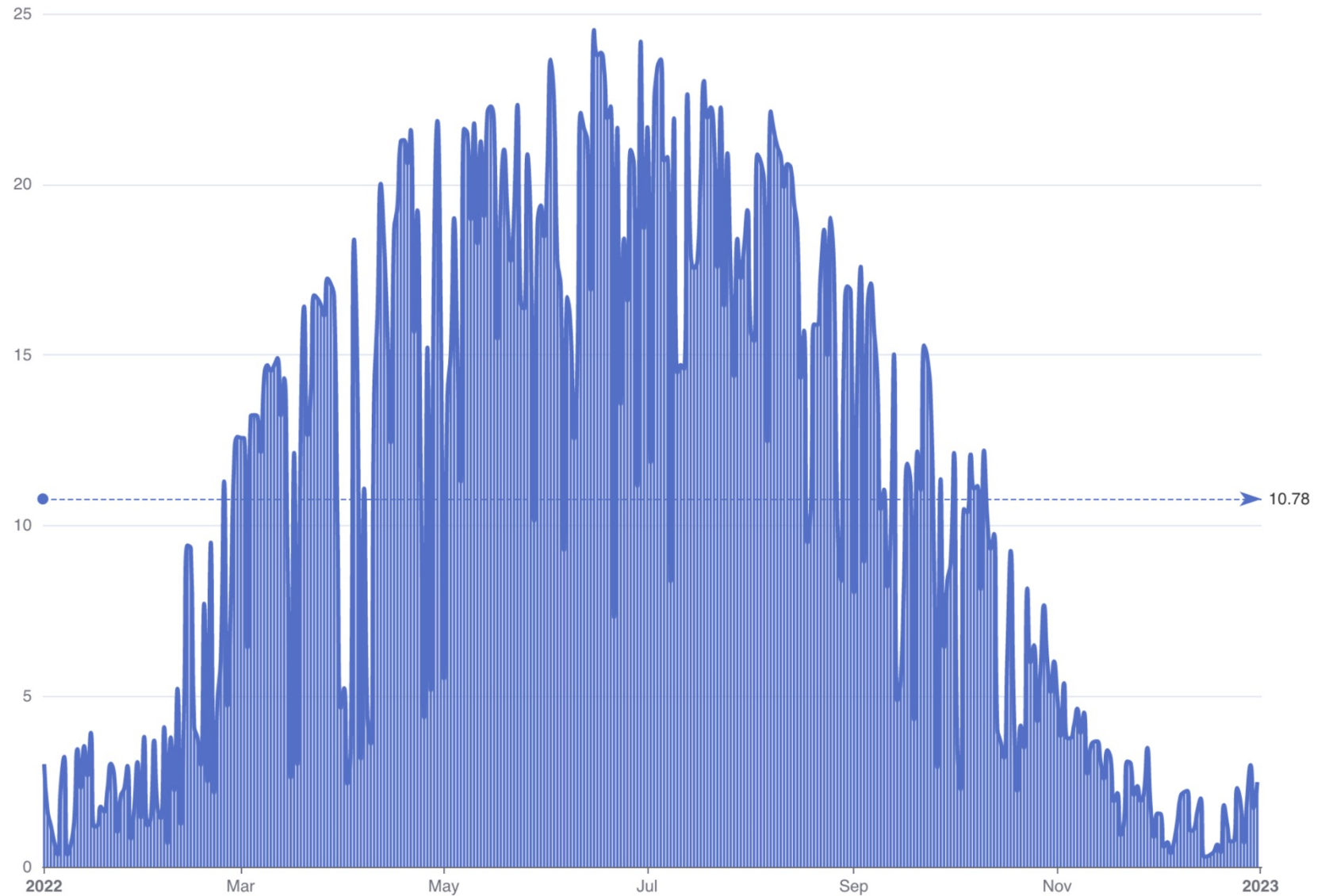


# Energy Management

~ 5 kWh / day

~ 10.000 km / annum

~ 2 t CO<sub>2</sub> saved



THANK YOU!

Questions?

