

Monitoring your home, with IoT and DevOps observability tools

Nick Burch

Community Over Code, NA 2024

Nick Burch

Director of Engineering



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Slides, Code, Config, Scripts

[github.com/Gagravarr/BBuzz2024-
HomeMonitoring](https://github.com/Gagravarr/BBuzz2024-HomeMonitoring)

All code+config mentioned in slides is
available from here

Links, build instructions, screenshots etc too



PV Generation



Battery %



**Any Berlin Buzzwords fans in
the room?**

And/or anyone seen this?

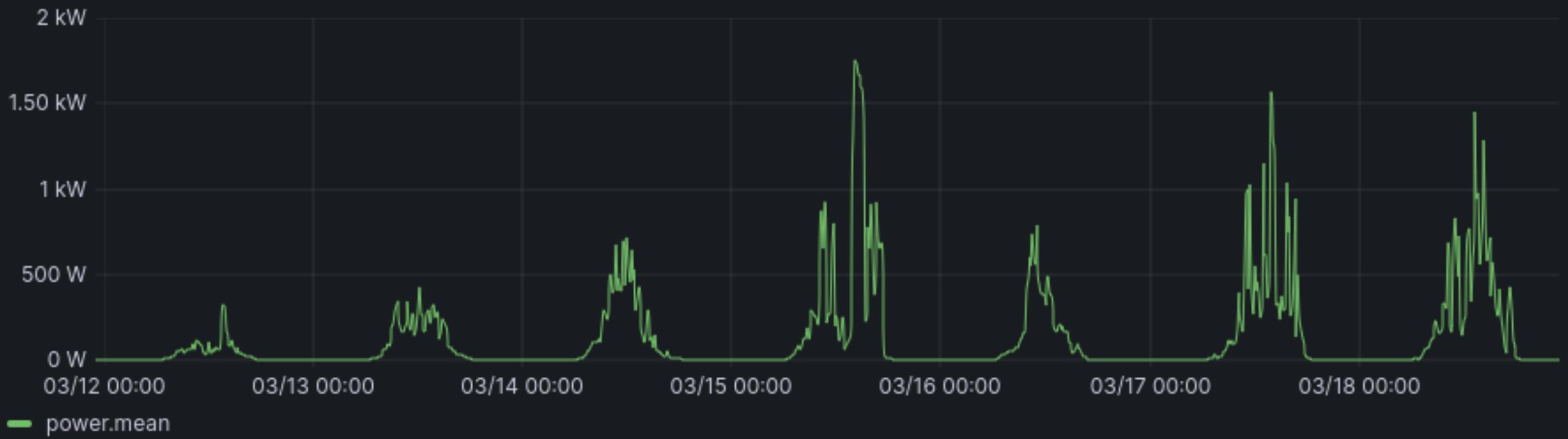
Steve L's BBuzz 2023 talk

Alexa, is The Smart Home vision
failing?



**Good news - no terrible
proprietary systems needed!**

PV Generation



Battery %



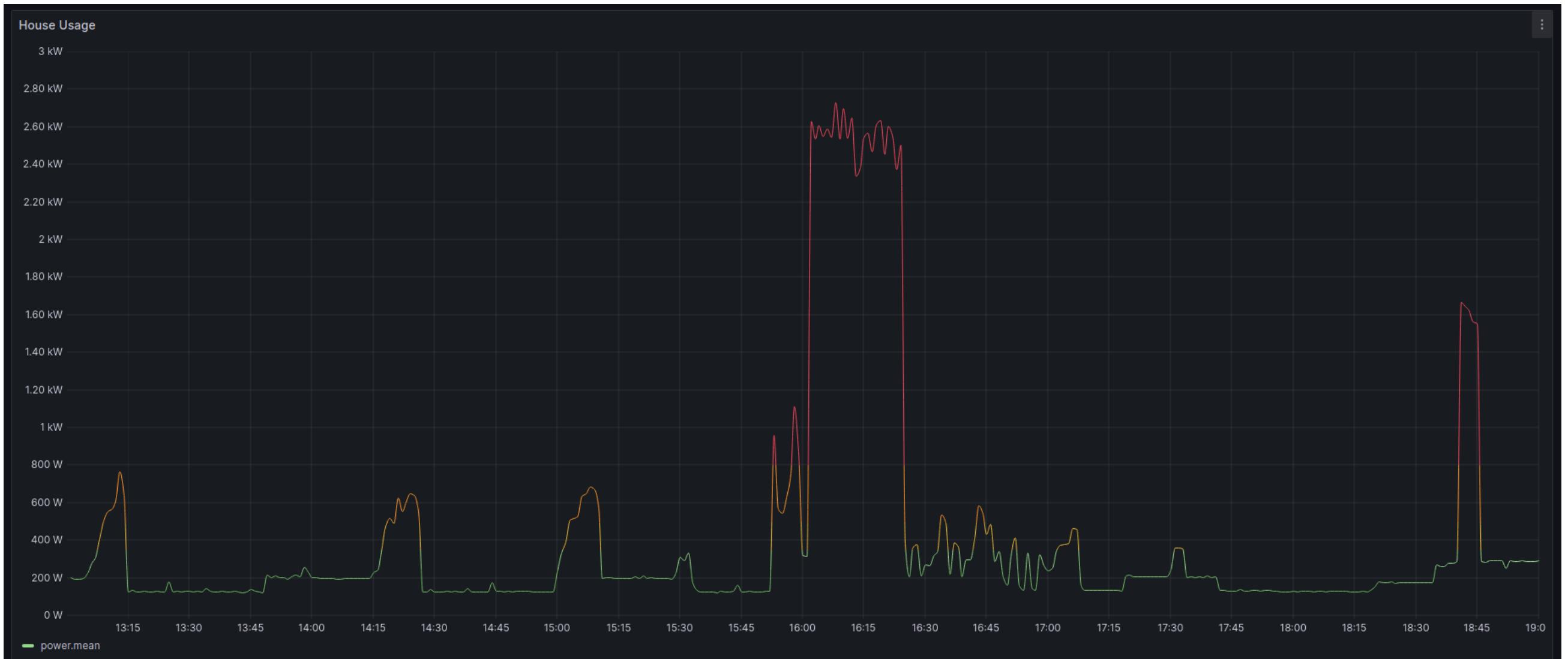
If you want fancy, open source
home automation

If you want fancy, open source
home automation

Home Assistant

<https://www.home-assistant.io/>





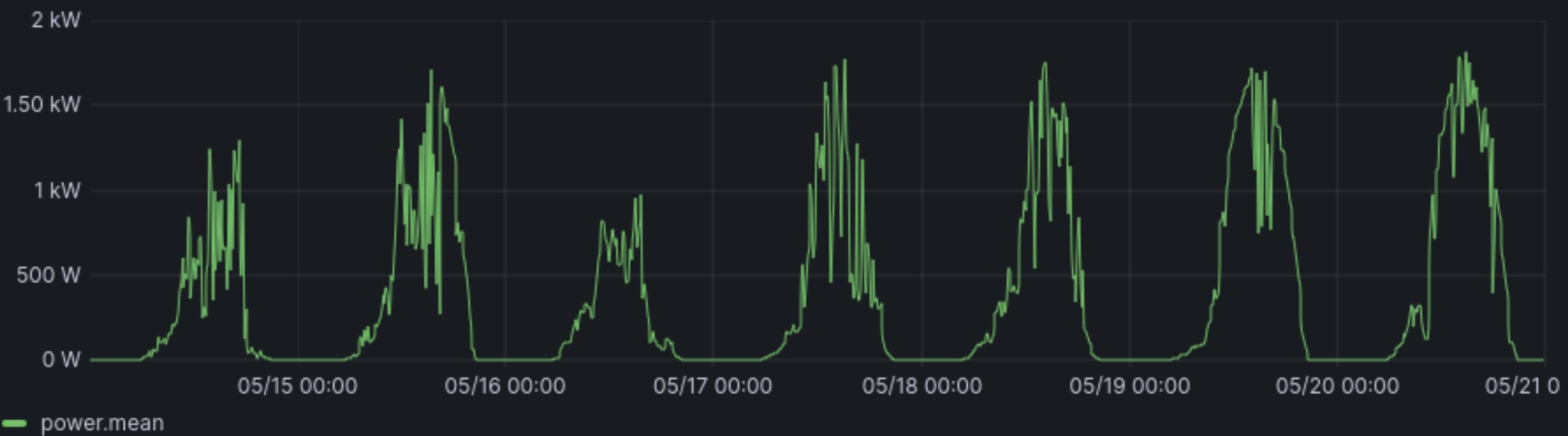
But if you're not sure yet...

But if you're not sure yet...

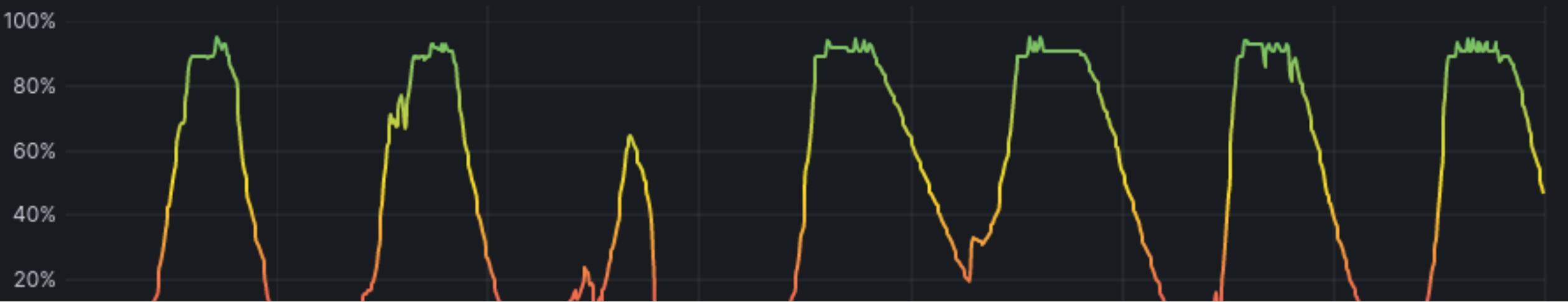
What about just collecting some data?

Gather a baseline, make changes later!

PV Generation



Battery %



What data?

What data?

- How much power am I using?
- How much power is that using?
- How does my power use vary? And when?
- How much solar energy am I generating?
- How full is my battery?
- What is the temperature?
- How has the temperature changed recently?
- What is the humidity?

PV Generation



Battery %

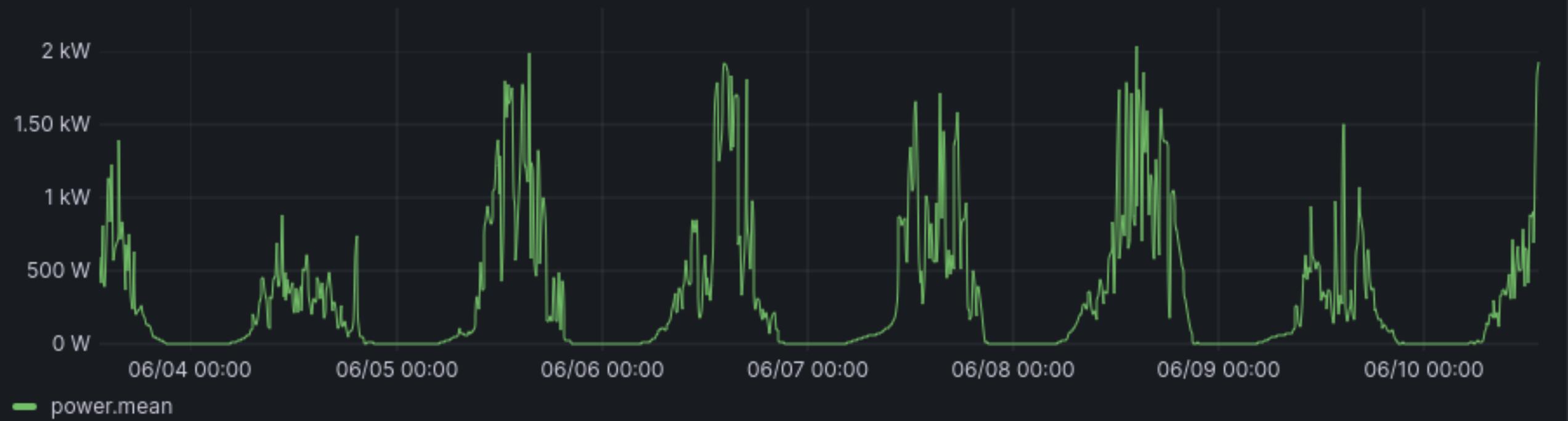


These are...

Interesting eco-home questions

Common DevOps questions (ish)

PV Generation



Battery %



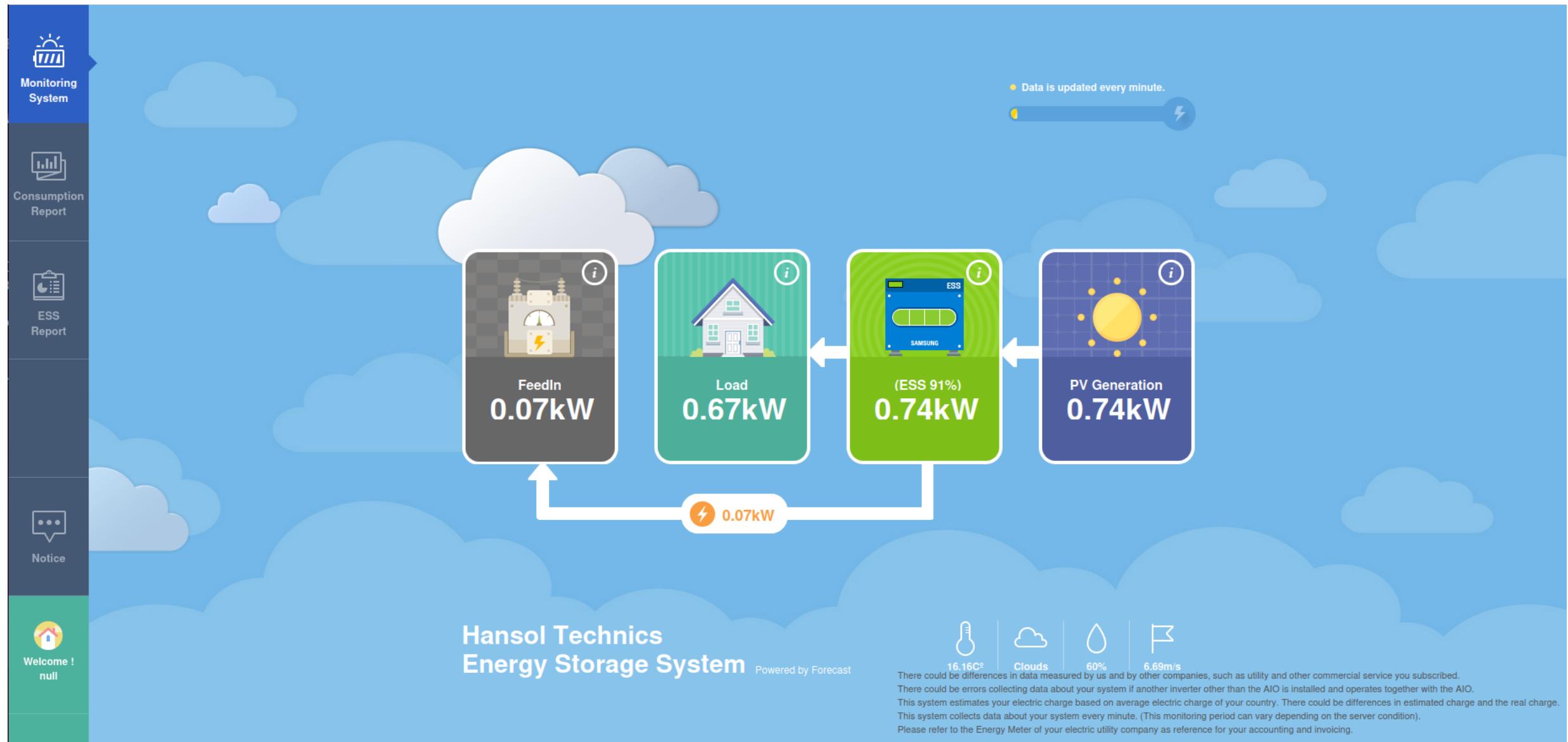
A lot of green-tech / eco-home
stuff is half-abandoned, or
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A lot of green-tech / eco-home stuff is half-abandoned, or worse....

See Steve L's talk BBuzz 23
talk for more!

Also we need a "right to repair" and the right to replace firmware when cloud services are shut down, but that's a different talk...

Welcome! null

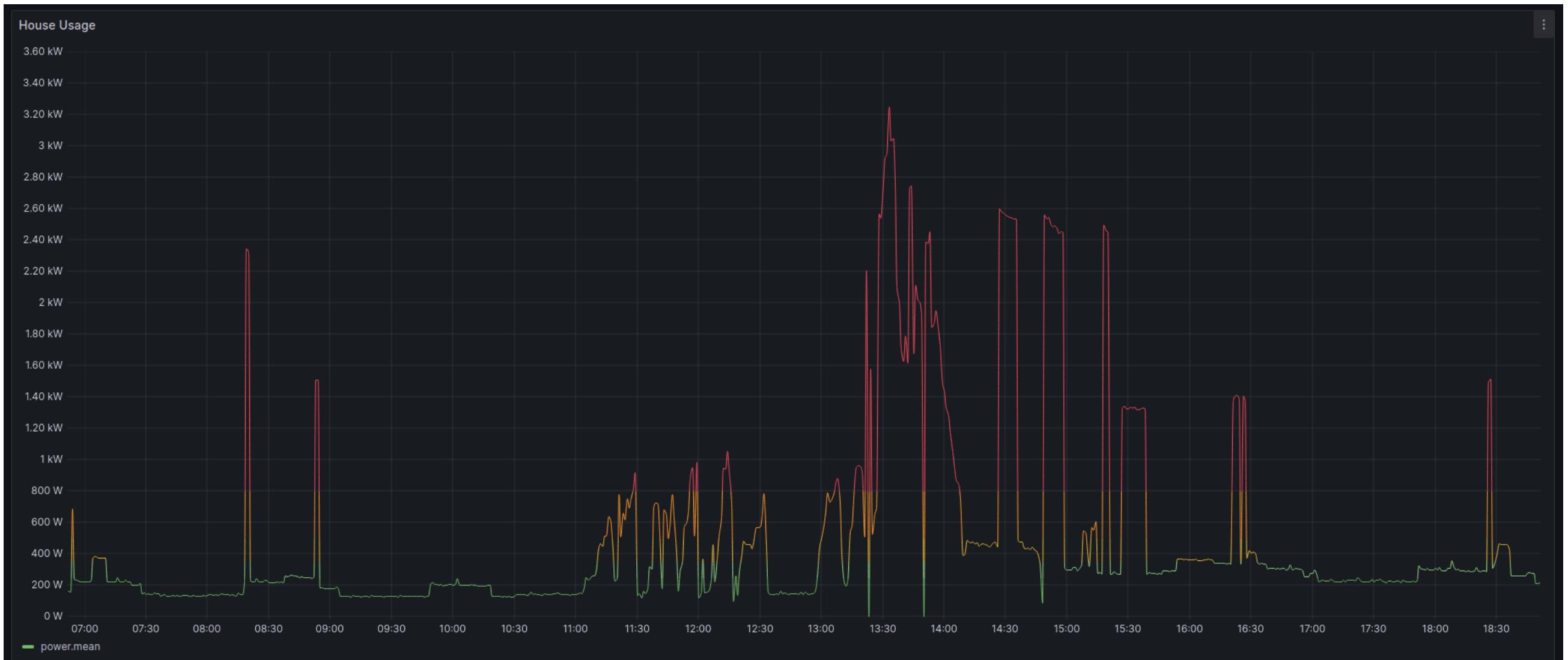


Modern, maintained code

MENU LIST																																																																																																																																																																																																																																																																													
ELM (Manual Control) ELA (Local-Auto) Monitor Overall -- >> Monitor EMS data -- >>	<p>(2024-5-27, 16:05:01) --- EMS Monitoring data Refresh [More data]</p> <table border="1"> <thead> <tr> <th colspan="2">EMS Control MODE</th> <th colspan="2">Version Information</th> <th colspan="2">More Information</th> </tr> </thead> <tbody> <tr> <td>EMS(8)</td> <td>ELA: Local Auto</td> <td>EMS Version</td> <td>V01.10 ,ENG, Nov 28 2016</td> <td>AIO serial number</td> <td>AR00460036Z115304033A</td> </tr> <tr> <td>EMS-ELA:CMD</td> <td>P (W)</td> <td>DSP-1 Version</td> <td>(U) = 0x09 , (I) = 0x11</td> <td>Nominal Voltage</td> <td>230</td> </tr> <tr> <td>EMS-ELS:CMD</td> <td>A (S)</td> <td>DSP-2 Version</td> <td>(U) = 0x09 , (I) = 0x11</td> <td>Under Voltage</td> <td>stage 1 200.1</td> </tr> <tr> <td>EMS-Send CMD</td> <td>P (0)</td> <td>EMS-Model Name</td> <td>ELSR362-00002</td> <td>stage 2</td> <td>184</td> </tr> <tr> <td>PCS:Running</td> <td>P (W)</td> <td>PCS-Model Name</td> <td>ELSR362-00002</td> <td>Over Voltage</td> <td>stage 1 262.2</td> </tr> <tr> <td>CMD</td> <td>2596</td> <td>Mode Mismatch Diag.</td> <td>= 0</td> <td>stage 2</td> <td>273.7</td> </tr> <tr> <td>GRID_P</td> <td>-83.00</td> <td colspan="4">PCS Status</td> </tr> <tr> <td>PV_P</td> <td>770.87</td> <td>READY</td> <td>1</td> <td>FAULT:</td> <td>0</td> </tr> <tr> <td>BT_P</td> <td>0.00</td> <td>DIS_Ava.</td> <td>1</td> <td>PV Limited</td> <td>0</td> </tr> <tr> <td>BT_SOC</td> <td>91.00</td> <td>Derating</td> <td>0</td> <td>PV_Av.(1), PV_Auto_Ava.(1)</td> <td></td> </tr> <tr> <td>GRID_P(30s)</td> <td>-87</td> <td>PV_Start_Grad.</td> <td>0</td> <td>G_Relay_OK</td> <td>1</td> </tr> <tr> <td>PV_P(30s)</td> <td>762</td> <td>PV1_Install</td> <td>2000</td> <td>PV_Insul_End</td> <td>1</td> </tr> <tr> <td>Temp</td> <td>28.1</td> <td>FAN Warning</td> <td>0</td> <td>INV max</td> <td>3600</td> </tr> <tr> <td></td> <td></td> <td>Grid_Relay</td> <td>363</td> <td>BAT CONN Warning</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6">EMS Control [FLAG 0]</td> </tr> <tr> <td>SYS_READY</td> <td>1</td> <td>SYS FAULT</td> <td>0</td> <td>PV[W]:</td> <td>770.6</td> </tr> <tr> <td>PV_run</td> <td>1</td> <td>BT_CH_run</td> <td>0</td> <td>PV[V]:</td> <td>4.1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>BDC[V]:</td> <td>0.0</td> </tr> <tr> <td colspan="6">EMS Control [FLAG 1-STATUS]</td> </tr> <tr> <td>PV</td> <td>1</td> <td>BT_CH</td> <td>1</td> <td>INV[FHz]:</td> <td>49.9</td> </tr> <tr> <td>GRID</td> <td>1</td> <td>S-Meter</td> <td>1</td> <td>Temp. 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This is my house!

(It's terrible, but it's real...)



**DevOps monitoring tools are
miles better!**



**DevOps monitoring tools are
also supported**

grafana / grafana

Type to search | + ⚙️ 🔍 🌐 📁

Code Issues 3.9k Pull requests 277 Discussions Actions Projects 6 Security 28 Insights

Releases

Tags

Find a release

last week

 GitHub Oct 1, 2024, 8:37 PM GMT+1

↳ v11.1.7 
-o dec1389

Compare ▾

11.1.7

[Download page](#)

[What's new highlights](#)

Features and enhancements

- **Chore:** Bump Go to 1.22.7 [#93355](#), [@hairyhenderson](#)
- **Chore:** Bump Go to 1.22.7 (Enterprise)

PV Generation



Battery %



**But how do I get that data for
my house?**

But how do I get that data for my house?

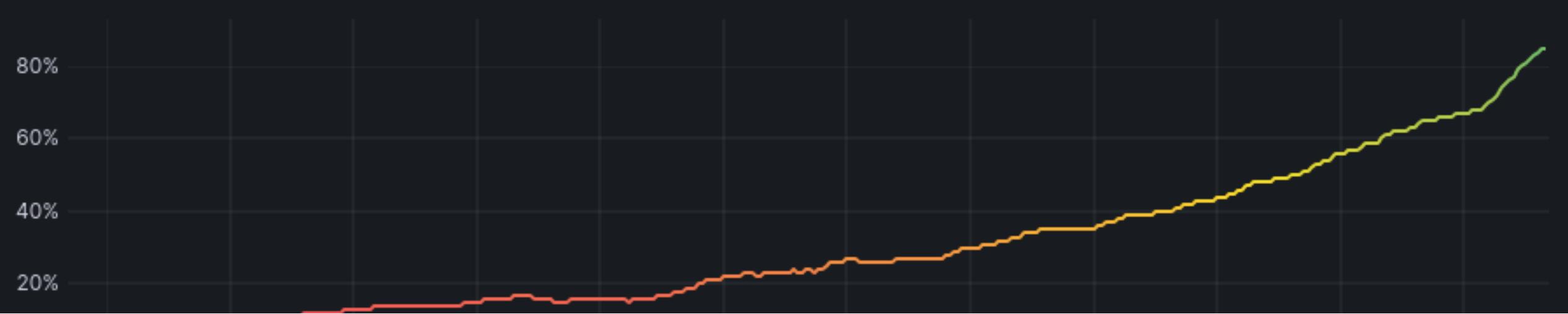
Won't it be hard?

Won't it be expensive?

PV Generation



Battery %



You might already have it!

You might already have it!
Especially if you have solar
panels

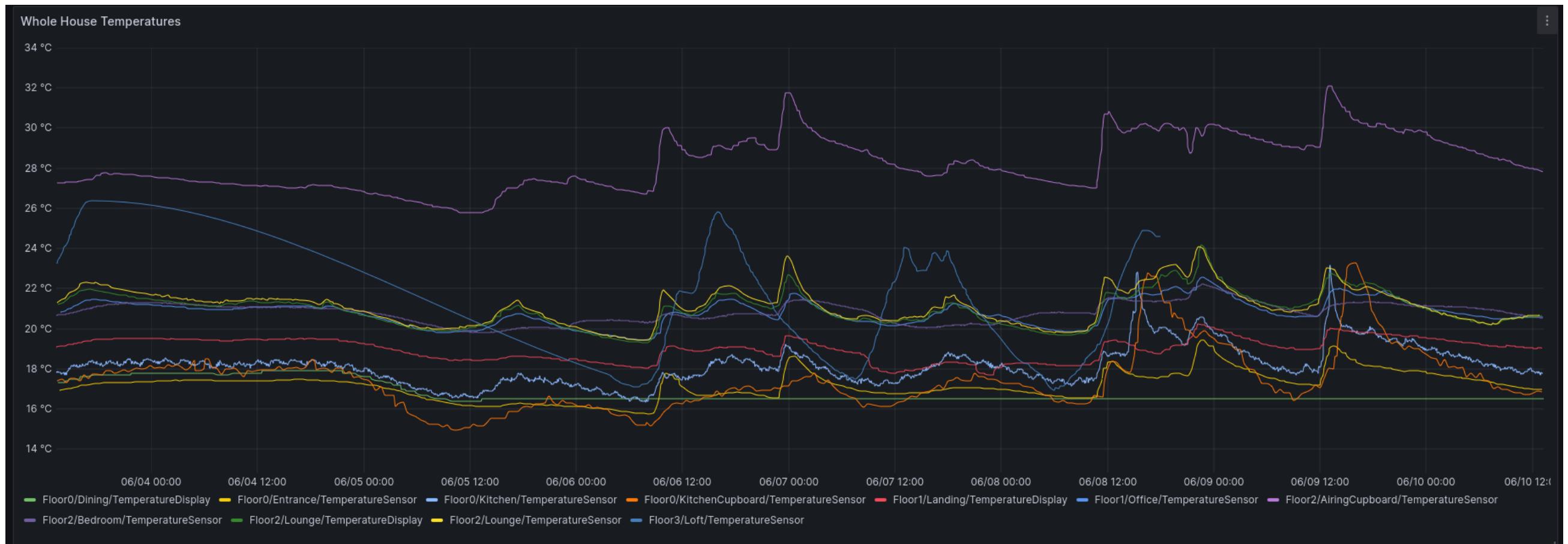
You might already have it!

From your Smart Meter

(But that's very country-specific)

You might already have it!
From your Energy Supplier's
website

(But that's very country + supplier specific)



For my house, I have a lot of the energy stuff

MENU LIST

- ELM (Manual Control)**
- ELA (Local-Auto)**
- [Monitor Overall -->](#)
- [Monitor EMS data -->](#)

- EMS S/W : V01.10
(Nov 28 2016) - ENG

- EMS H/W : V6

(2024-5-27, 16:05:01) --- EMS Monitoring data [Refresh](#) [[More data](#)]

EMS Control MODE		Version Information		More Information	
EMS(8)	ELA: Local Auto	EMS Version	V01.10 ,ENG, Nov 28 2016	AIO serial number	AR00460036Z115304033A
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EMS:Send CMD	P (0)	EMS-Model Name	ELSR362-00002	stage 2	184
PCS:Running	P (W)	PCS-Model Name	ELSR362-00002	Over Voltage	stage 1 262.2
CMD	PCS Target Power	Mode Mismatch Diag.	= 0	stage 2	273.7
GRID_P	-83.00	PCs Status		Nominal Frequency	50
PV_P	770.87	READY	1 FAULT: 0 PV Limited 0	Under Frequency	stage 1 47.5
BT_P	0.00	DIS_Ava.	1 PV_Av.(1), PV_Auto_Ava.(1)	stage 2	47
BT_SOC	91.00	Derating	0 G_Relay_OK 1 PV_Insul_End 1	Over Frequency	stage 1 51.5
GRID_P(30s)	-87	PV_Start_Grad.	0 Factory Mode 0 INV max 3600	stage 2	52
PV_P(30s)	762	PV1_Install	2000 PV2_Install 0 Feed-In Limit 100 %	Loss of Mains (Vector Shift)	12 degree
Temp	28.1 (ADC)	FAN Warning	:0 BAT CONN Warning :0	Loss of Mains (RoCoF)	0.2 Hz per second
		Grid_Relay	363 Bat_Relay 150231	Algorithm - PV Coeff. Update	
		PCS Sensing Data			
		PV-1	V[V]: 279.2 I[A]: 2.8 P[W]: 770.6	Coeff. Value	96 / 100
		PV-2	V[V]: 4.1 I[A]: 0.0 P[W]: 0.0	Weight Count	19
		BDC	V[V]: 0.0 I[A]: 0.0 P[W]: 0.0		
		INV	V[V]: 248.0 I[A]: 3.5 P[W]: 789.24		
			F[Hz]: 49.9		
		Temp.	INV: 2214.0 BDC: 2241.0 PV: 2231.0		
		Etc.	Temp.Hex: 0x00 Hansol 50Hz PV2: 2221.0		
		DATE	2024-05-27 , 16:05:01 DCL[V] 405.3		
		PCS OPMode and Diag.			
		Status	0x1B mode0 0x02 mode1 0x20 mode2 0x80		
		mode3	0x00 mode4 0x0B		
		diag0	0x02 diag1 0x06 diag2 0x00 diag3 0x00		
		diag4	0x00 diag5 0x00 diag6 0x00 diag7 0x00		
		diag8	0x00 diag9 0x00 diag10 0x00 diag11 0x00		
		diag12	0x00 diag13 0x00 diag14 0x00		
		Single Fault			
		[1]2023-06-30,14:26	Data_H 0x00 Data_L 0x01		
		[2]2023-06-30,14:29	Data_H 0x04 Data_L 0x00		
		[3]2023-06-30,14:59	Data_H 0x04 Data_L 0x00		
		[4]2023-04-29,10:52	Data_H 0x00 Data_L 0x01		
		[5]2023-06-04,20:01	Data_H 0x00 Data_L 0x01		
		PCS Fault Data			
		INV_Grid_V	0.0 INV_DCL_V 0.0 INV_MCon_V 4.1		
		INV_MCon_V2	232.7 BDC_Grid_V 0.0 INV_MCon_I 0		
		INV_MCon_I2	0 BDC_Fault 0x00 BDC_V 0		
		BDC_I	0 DSP_mode 0x00 GRID DC I 0.0		
		PVC_LeakI	11 PV1 R I 0.066 PV2 R I 0.136		
		BMS data			
		Status	Ready: 1 Fault: 0 Charge Ava.: 1 DisCharge Ava.: 1		
		SOC(%):	91.0 SOH(%): 73.0	WARN	0
		Rack_V(V):	65.1 Rack_I(I): 0.0		
		Cell.1	14.067 Cell.2	14.070 Cell.3	14.072 Cell.4

But more on that later!

Otherwise - pre-built
hardware is very cheap

Otherwise - pre-built hardware is very cheap

To ship

Order date: Apr 22, 2024

Order ID: 3034537996305256 [Copy](#)

[Order details >](#)

✓Choice | IHSENO Store > [...](#)



1Pcs Tuya Smart Zigbee Temperature And Humidity Sensor Indoor The...

Total: £ 3.64

[Edit address](#)

1Pcs Zigbee

£ 3.03 x1

7 day delivery · Free returns · Delivery guarantee

To ship

Order date: Apr 22, 2024

Order ID: 3034537996345256 [Copy](#)

[Order details >](#)

✓Choice | SONOFF TECH Store > [...](#)



Sonoff Zigbee CC2531 USB Dongle Bare Board Packet Protocol ...

Total: £ 4.65

[Edit address](#)

Zigbee CC2531

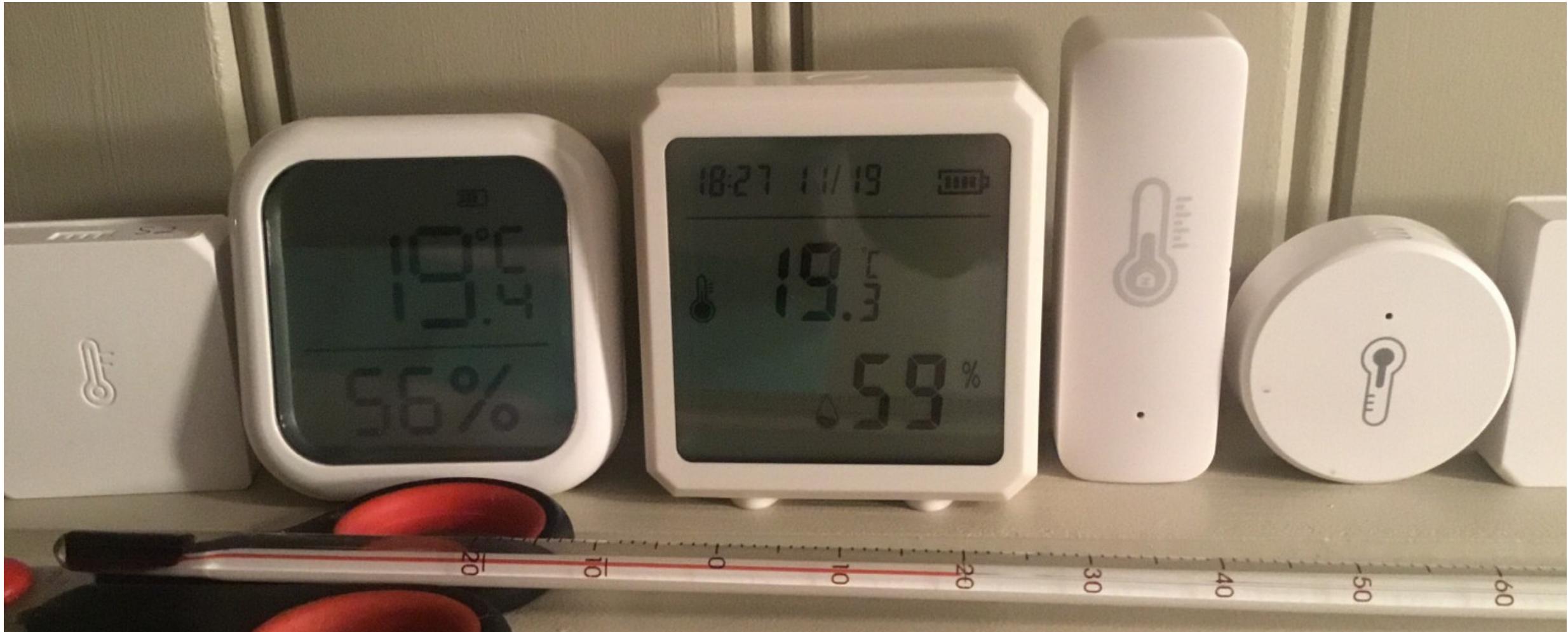
£ 3.96 x1

7 day delivery · Free returns · Delivery guarantee

They come in a variety of shapes and sizes



They are pretty well calibrated out-of-the-box



Demo in a little bit!

**Otherwise - DIY Hardware is
also very cheap**

Otherwise - DIY Hardware is also very cheap

Completed

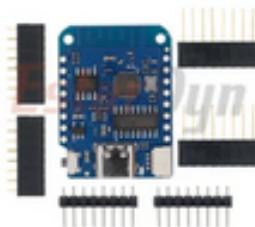
Order date: Nov 15, 2023

Order ID: 8179833644995256 [Copy](#)

[Order details >](#)

Estardyn Official Store > [💬](#)

EstarDyn



D1 Mini ESP8266 ESP-12F CH340G V2 USB WeMos D1 Mini WIFI ...

Total: £ 5.08

D1 MINI V4.0.0

£ 1.15 x3

[Fast Delivery · Free returns](#)

[Add to cart](#)

[Remove](#)

Completed

Order date: Nov 15, 2023

Order ID: 8179833645015256 [Copy](#)

[Order details >](#)

Simple Robot Store > [💬](#)



HDC1080 module Low Power, GY-213V-HDC1080 High Accuracy Digital ...

Total: £ 4.12

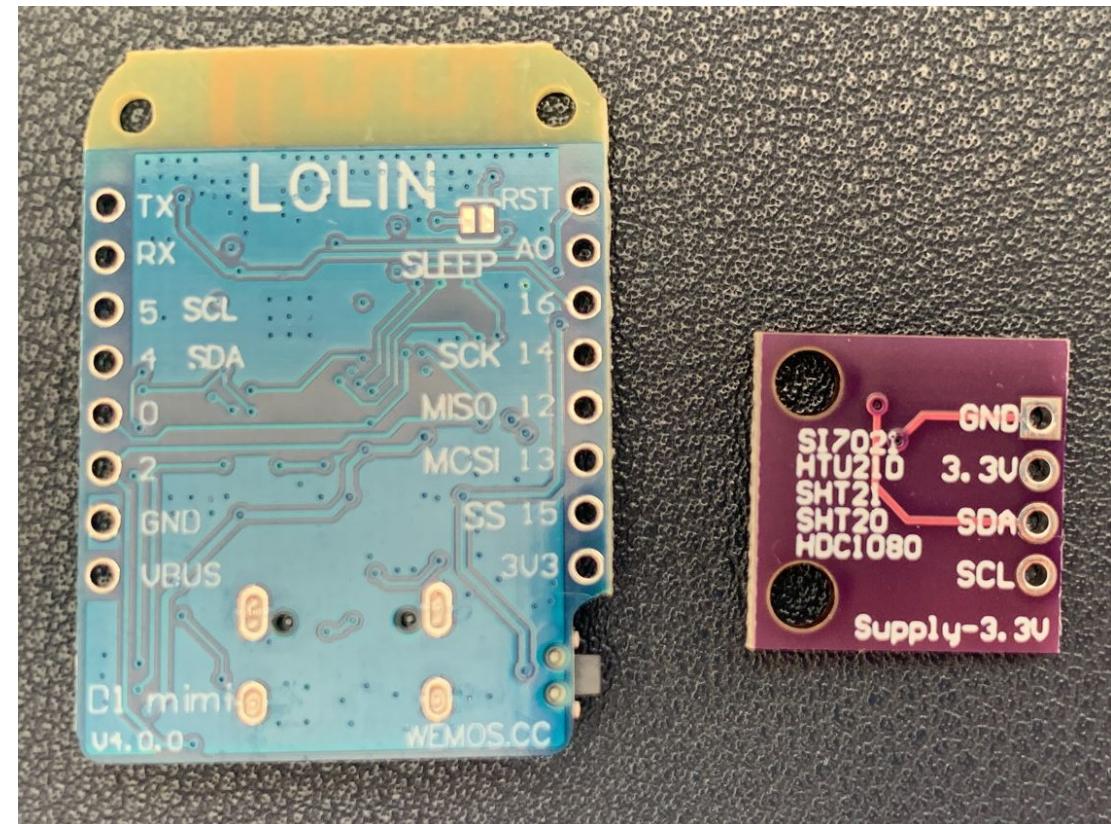
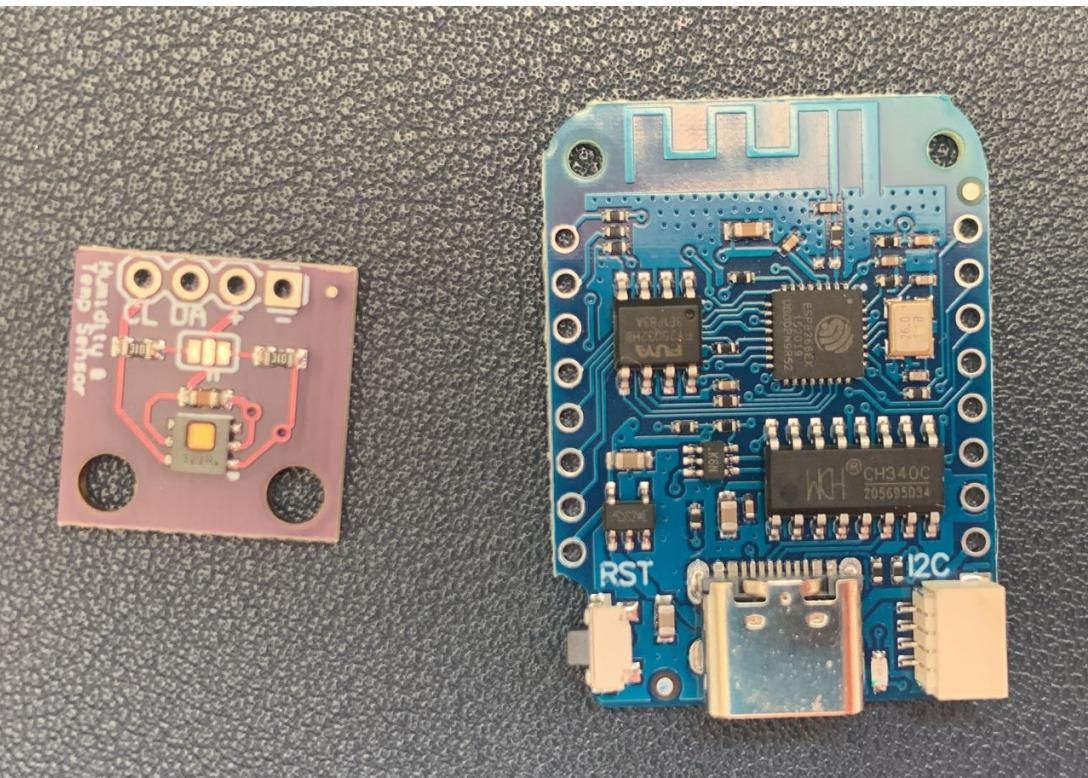
£ 1.44 x2

[Fast Delivery · Free returns](#)

[Add to cart](#)

[Remove](#)

Otherwise - DIY Hardware is also very cheap



Otherwise - DIY Hardware is also very cheap
It's also a lot easier to work
with than it used to be!

USB-C connectors, Wifi built-in
MicroPython
ESPHome (HomeAssistant)

Otherwise - DIY Hardware is
also very cheap

But not all temperature sensors are made
equally

An extra €0.20 can get you a big improvement!

Demo in a little bit!

Otherwise - Screen Scraping

HTML is a thing

- eg Python - Beautiful Soup
- Find the data on your device / the supplier's website
- Write a few lines of selectors and data cleanup
- Then graph it as if they had a proper API!

```
def find_table(soup, heading):
    "Finds the table based on the Heading"
    h = soup.find("td", string=heading)
    if not h:
        raise Exception("Could not find table with heading '%s' in %s" % (heading, url))

    tbl = h.parent.parent
    if tbl.name != "table":
        raise Exception("Table with heading '%s' in the wrong format:\n%s" % (heading, tbl))
    return tbl

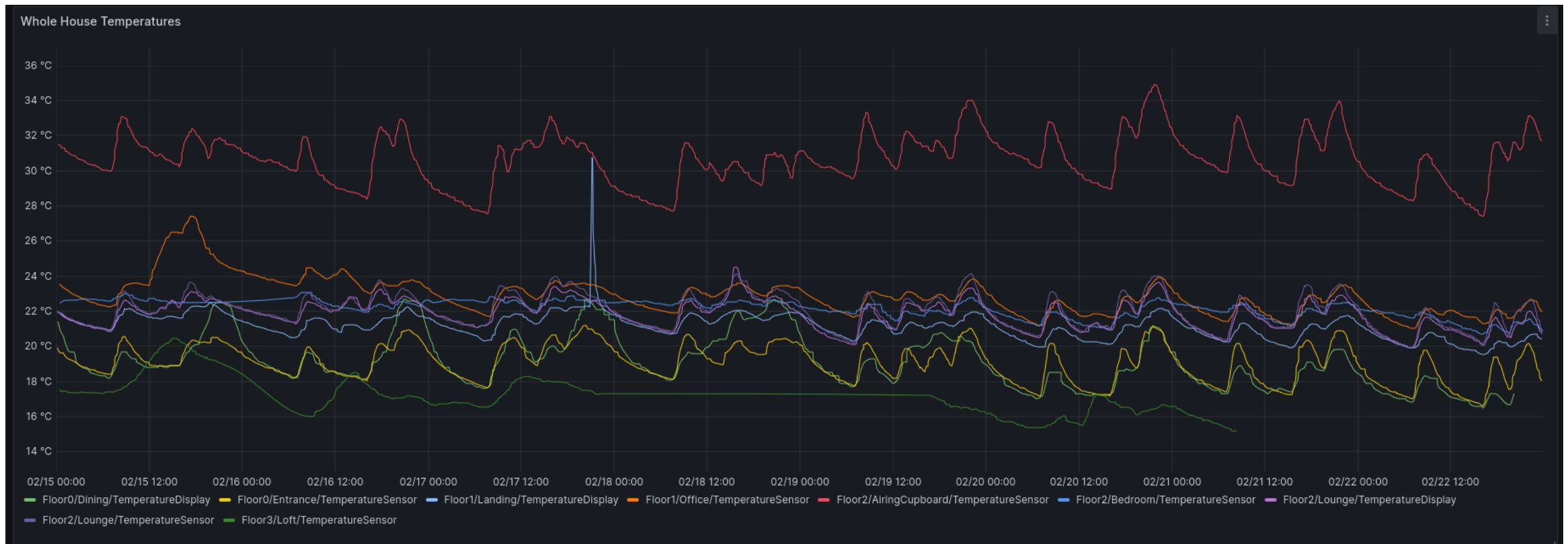
def get_value(cell):
    v = cell.text.strip()
    try:
        num = float(v)
        if num.is_integer():
            return int(num)
        return num
    except ValueError:
        return v
```

```
def extract_paired_columns(table):
    "Get the labels and values from a multi-column table"
    data = {}

    # Skip the header row, then odd-column is label, even-column value
    for row in table.find_all("tr")[1:]:
        cells = iter( row.find_all("td") )
        for d, v in zip(cells,cells):
            if d and v and d.text and v.text:
                data[d.text] = get_value(v)
    return data

def extract_vips(table):
    "Extract Voltage/Current/Power for the different components"
    vips = []
    for row in table.find_all("tr"):
        label = row.find("td").text
        vip = VIP(label)

        cells = iter( row.find_all("td")[1:] )
        for d, v in zip(cells,cells):
            if d.text == "V[V]:":
                vip.voltage = float(v.text.strip())
```



Picking a Radio ecosystem

Picking a Radio ecosystem

- Zigbee
- Thread
- Bluetooth Low Energy
- Wifi
- 433 MHz / 868 MHz etc

Try to pick just one!

Zigbee



Low power

Mesh networking

Dongles are cheap

A lot of smart lights use this, you may already have some

Your smart lights can act as routers, if not switched off!

Thread

THREAD

Low power

Mesh networking

IPv6

IEEE 802.15.4, same as Zigbee

Often deployed with Matter

Not many dongles, but some Zigbee ones can be reflashed

Bluetooth Low Energy



Low power

Keeps changing name(!)

Many Bluetooth "classic" dongles also support LE

Some mesh networking

But lower chance of already having repeaters

WiFi

(Mostly) high power

Aimed at always-powered devices

Much bigger batteries needed otherwise

Higher range, no new routers / APs needed

Potentially can query on demand, if always online



Custom Radio stuff

eg 433 MHz / 868 MHz

Try to avoid this for your own stuff

But you might have devices that use these

RTL-SDR + RTL_433 to the rescue!

Software Defined Radio with cheap USB sticks + decoder



Gathering the data

**Gathering the data - Wifi
Easy!**

Just have the device write to your database

Gathering the data - Zigbee / Bluetooth

Devices will periodically wake up, take a reading
Won't push every time, usually needs change or long time

No control of when new values will appear

Probably want something between gateway and database

Zigbee2mqtt

Handles all the Zigbee radio stuff
eg Pairing, Configuration

Pushes all messages to MQTT

Sends data to devices from MQTT (eg lights)

Zigbee2mqtt

Zigbee2MQTT Devices Dashboard Map Settings Groups OTA Touchlink Logs Extensions  Permit join (All) 								
Enter search criteria 								
#	Pic	Friendly name	IEEE Address	Manufacturer	Model	LQI	Last seen	Power
1		Floor0/Dining/TemperatureDisplay Tuya temperature display on the Ground Floor in the Dining Room		TuYa	TH01Z	80	4 minutes ago	
2		Floor1/Landing/TemperatureDisplay Moes temperature display on the 1st Floor landing		TuYa	TS0201	196	19 minutes ago	 1%
3		Floor0/Kitchen/TemperatureSensor Sonoff square temperature sensor in the kitchen above the doorway		SONOFF	SNZB-02	124	just now	
4		Floor0/Entrance/TemperatureSensor Rectangular temperature sensor in the entrance hall, on top of the coat rack		TuYa	TH02Z	120	26 minutes ago	
5		Floor3/Loft/TemperatureSensor Round temperature sensor in the loft		TuYa	IH-K009	64	6 minutes ago	
6		Floor2/Lounge/TemperatureSensor Rounded-corners temperature + pressure sensor, on the shelves in the lounge		Aqara	WSDCGQ11LM	176	35 minutes ago	
7		Floor2/Bedroom/TemperatureSensor Sonoff square temperature sensor in the main bedroom		SONOFF	SNZB-02	120	19 seconds ago	
8		Floor0/Dining/LightLeft Left hand window lights in the Dining Room		Lonsonho	ZB-RGBCW	120	2 weeks ago	
9		Floor2/AiringCupboard/TemperatureSensor Sonoff square temperature sensor in the airing cupboard		SONOFF	SNZB-02	104	7 minutes ago	

Zigbee2mqtt



Color Xy



2 weeks ago

120 LQI

Color Xy



2 weeks ago

100 LQI

Temperature Alarm

Humidity Alarm

7 minutes ago

upper_alarm

80 LQI

Humidity

64.75 %

29 minutes ago

120 LQI

Floor0/Kitchen/TemperatureSensor

Sonoff square temperature sensor in the kitchen above the doorway

Temperature

17.17 °C

Humidity

59.78 %

2 minutes ago

124 LQI

Floor0/KitchenCupboard/TemperatureSensor

TuYa round temperature sensor in the Kitchen cupboard under the sink

Temperature

15.95 °C

Humidity

66.96 %

20 minutes ago

124 LQI

Floor1/Landing/TemperatureDisplay

Moes temperature display on the 1st Floor landing

Temperature

18.56 °C

Humidity

55.3 %

just now

196 LQI

Floor1/Office/TemperatureSensor

Rectangular temperature sensor in the office, on the shelf by the hifi

Temperature

19.95 °C

Humidity

39.05 %

28 minutes ago

220 LQI

Floor2/AiringCupboard/TemperatureSensor

Sonoff square temperature sensor in the airing cupboard

Temperature

25.91 °C

Humidity

38 %

10 minutes ago

104 LQI

Floor2/Bedroom/TemperatureSensor

Sonoff square temperature sensor in the main bedroom

Temperature

19.66 °C

Humidity

58 %

2 minutes ago

124 LQI

Floor2/Lounge/TemperatureDisplay

Moes temperature display in the 2nd floor lounge

Temperature

20.03 °C

Humidity

52.6 %

7 minutes ago

136 LQI

Floor2/Lounge/TemperatureSensor

Rounded-corners temperature + pressure sensor, on the shelves in the lounge

Temperature

20.07 °C

Humidity

50.65 %

Pressure

1019.3 hPa

37 minutes ago

176 LQI

Floor3/Loft/TemperatureSensor

Round temperature sensor in the loft

Temperature

20.08 °C

Humidity

55.02 %

8 minutes ago

64 LQI

Zigbee2mqtt

Floor2/Lounge/TemperatureDisplay ▾

About Exposes Bind Reporting Settings Settings (specific) State Clusters Scene Dev console

Battery
Remaining battery in %, can take up to 24 hours before reported **26 %**

Temperature
Measured temperature value **20.03 °C**

Humidity
Measured relative humidity **52.6 %**

Voltage
Voltage of the battery in millivolts **2600 mV**

Linkquality
Link quality (signal strength) **136 lqi**

Zigbee2mqtt

Floor2/Lounge/TemperatureSensor ▾

About Exposes Bind Reporting Settings Settings (specific) State Clusters Scene Dev console

Battery
Remaining battery in %, can take up to 24 hours before reported **100 %**

Temperature
Measured temperature value **20.18 °C**

Humidity
Measured relative humidity **50.43 %**

Pressure
The measured atmospheric pressure **1019.4 hPa**

Voltage
Voltage of the battery in millivolts **3005 mV**

Linkquality
Link quality (signal strength) **176 lqi**

Zigbee2mqtt

Floor0/Dining/LightLeft ▾

About Exposes Bind Reporting Settings Settings (specific) State Clusters Scene Dev console

State  OFF ON
On/off state of this light

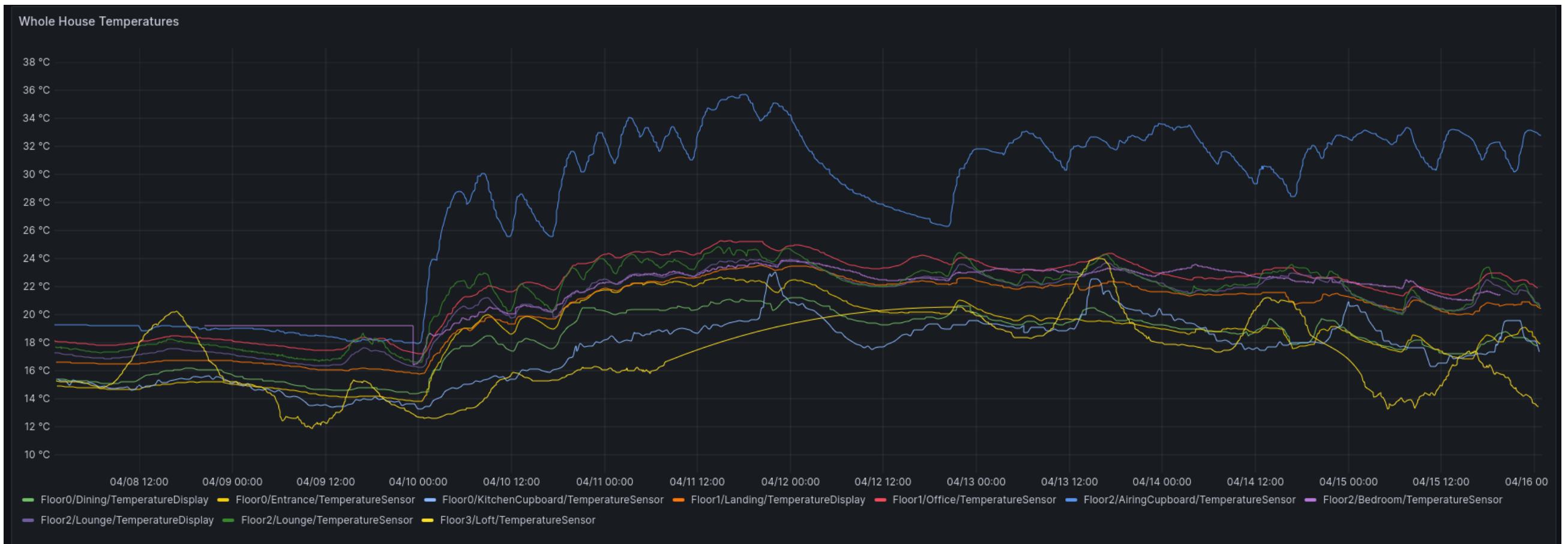
Brightness  20 
Brightness of this light

Color temp  coolest cool neutral warm **warmest** 500  mired
Color temperature of this light

Color (X/Y)    
Color of this light in the CIE 1931 color space (x/y)

Linkquality 120 lqi
Link quality (signal strength)

(Or HomeAssistant can do all
of this for you)



Storing the Data

Storing the Data

Timeseries Data

Long periods of time with no new value
(Largely) can't poll for new values

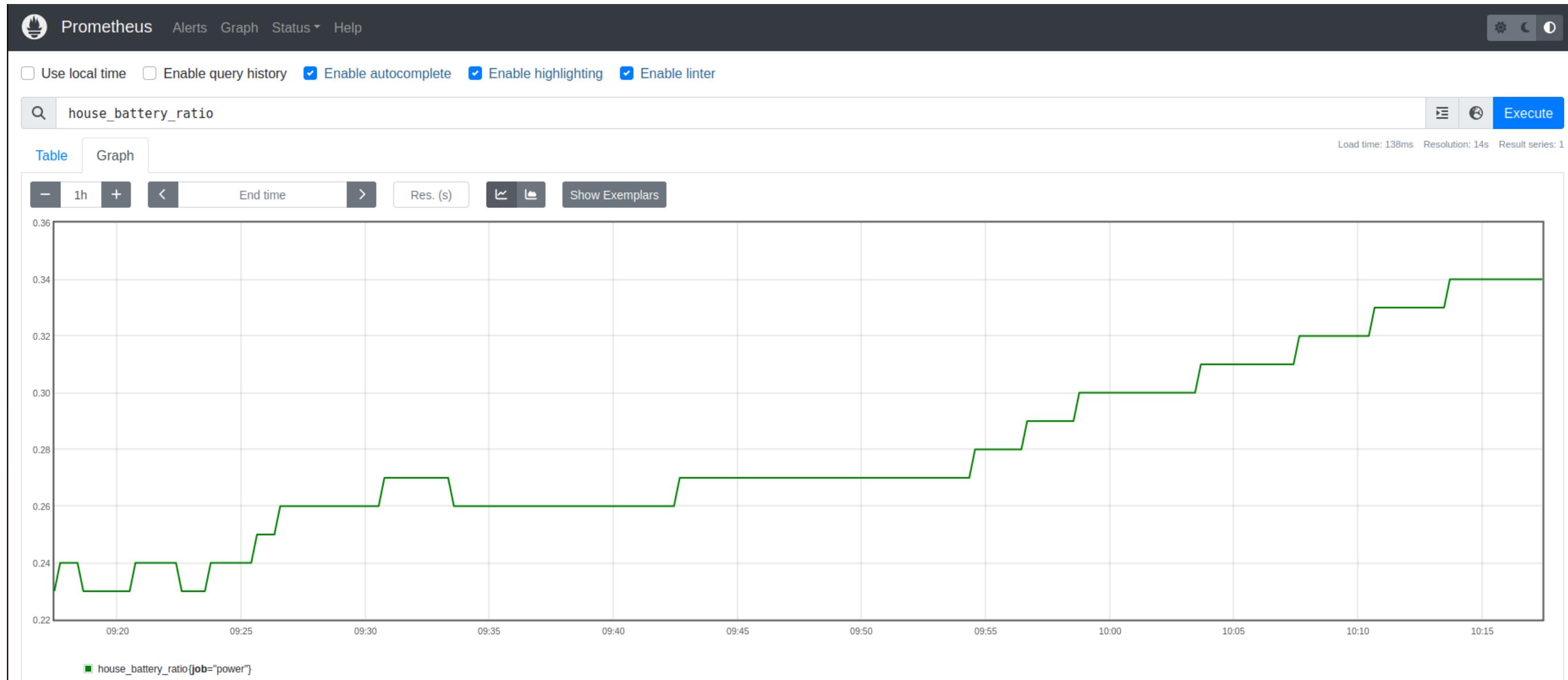
Timeseries Data

Prometheus is popular for DevOps use cases

But it assumes you can always poll the source for new
values

No even always true wtih DevOps (eg short-lived pods)

Prometheus



Timeseries Data

Prometheus Push Gateway lets you stash the lastest value somewhere

Main Prometheus then grabs that
Sending to a Push Gateway much simpler than
implementing a full endpoint

Prometheus Push Gateway

Pushgateway Metrics Status Help

job="power" Delete Group

<input type="checkbox"/> house_battery_ratio Battery Charge GAUGE last pushed: 2024-06-10T10:19:01Z
<input type="checkbox"/> house_electrical_amps Current GAUGE last pushed: 2024-06-10T10:19:01Z
<input type="checkbox"/> house_electrical_volts Voltage GAUGE last pushed: 2024-06-10T10:19:01Z
<input type="checkbox"/> house_electrical_watts Power GAUGE last pushed: 2024-06-10T10:19:01Z
<input type="checkbox"/> house_power_watts Power GAUGE last pushed: 2024-06-10T10:19:01Z

Labels	Value
component="load" instance="" job="power"	226.97
component="pv" instance="" job="power"	417.24
component="inv" instance="" job="power"	225.97
component="bat" instance="" job="power"	175.46
component="grid" instance="" job="power"	1

Timeseries Data

Many other Timeseries databases exist!

See older Buzzwords talks / videos for many

Key part of many IoT solutions

Timeseries Data

InfluxDB seems pretty lightweight, and available in most distros

But most package the older one without a Web UI

```
Connected to http://localhost:8086 version 1.6.7~rc0
```

```
InfluxDB shell version: 1.6.7~rc0
```

```
> show databases
```

```
name: databases
```

```
_internal
```

```
zigbee
```

```
power
```

```
> show series on zigbee
```

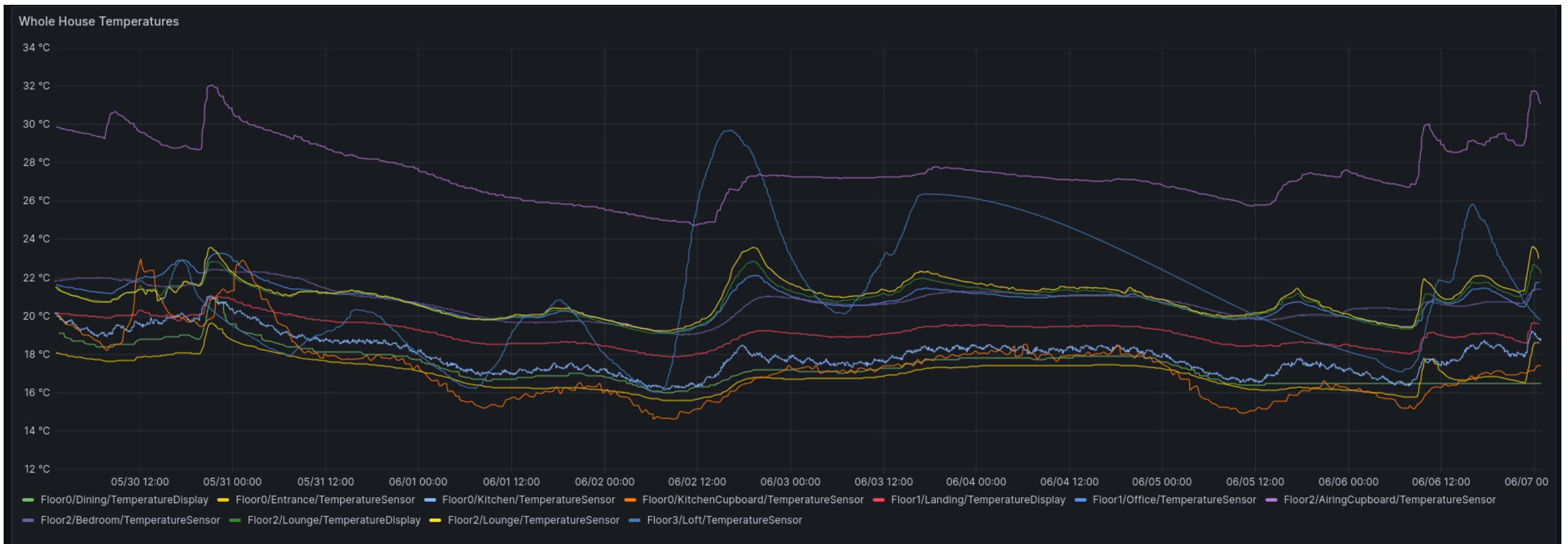
```
key
```

```
zigbee,dev=Floor0/Dining/LightLeft,device=LightLeft,floor=Floor0,host=pattertwig,room=Di
```

```
zigbee,dev=Floor0/Dining/LightRight,device=LightRight,floor=Floor0,host=pattertwig,room=
```

```
zigbee,dev=Floor0/Entrance/TemperatureSensor,device=TemperatureSensor,floor=Floor0,host=
```

```
zigbee,dev=Floor0/Kitchen/TemperatureSensor,device=TemperatureSensor,floor=Floor0,host=p
```



Transform the data

Transform the data

**Generally, graphing tools don't directly talk to eg MQTT
Need to move the data from collection to the time series
database**

Telegraf

Swiss army knife of data transformation /
plumbing

Might not be suitable for TB of data per day

But works well for small scale data



```
# Read Zigbee sensor data from MQTT
[[inputs.mqtt_consumer]]
  servers = ["tcp://localhost:1883"]
  topics = ["zigbee2mqtt/#"]
  data_format = "json"
  # Use the name of the sensor for the "tag"
  name_override = "zigbee"
  topic_tag = "dev"

# If the topic is in the Floor/Room/Device format, add extra tags
[[inputs.mqtt_consumer.topic_parsing]]
  topic = "zigbee2mqtt/+/*/"
  tags = "_/floor/room/device"

# Strip the base topic (typically "zigbee2mqtt")
# from the dev tag using the regex processor
[[processors.regex]]
  namepass = ["zigbee"]

[[processors.regex.tags]]
  key = "dev"
  pattern = '^zigbee2mqtt/(?P<device>.+)$'
  replacement = "${device}"

# Don't include messages about the Zigbee2MQTT bridge itself
# (also note the single square brackets used for this)
[inputs.mqtt_consumer.tagdrop]
  dev = ["zigbee2mqtt/bridge/*"]
```



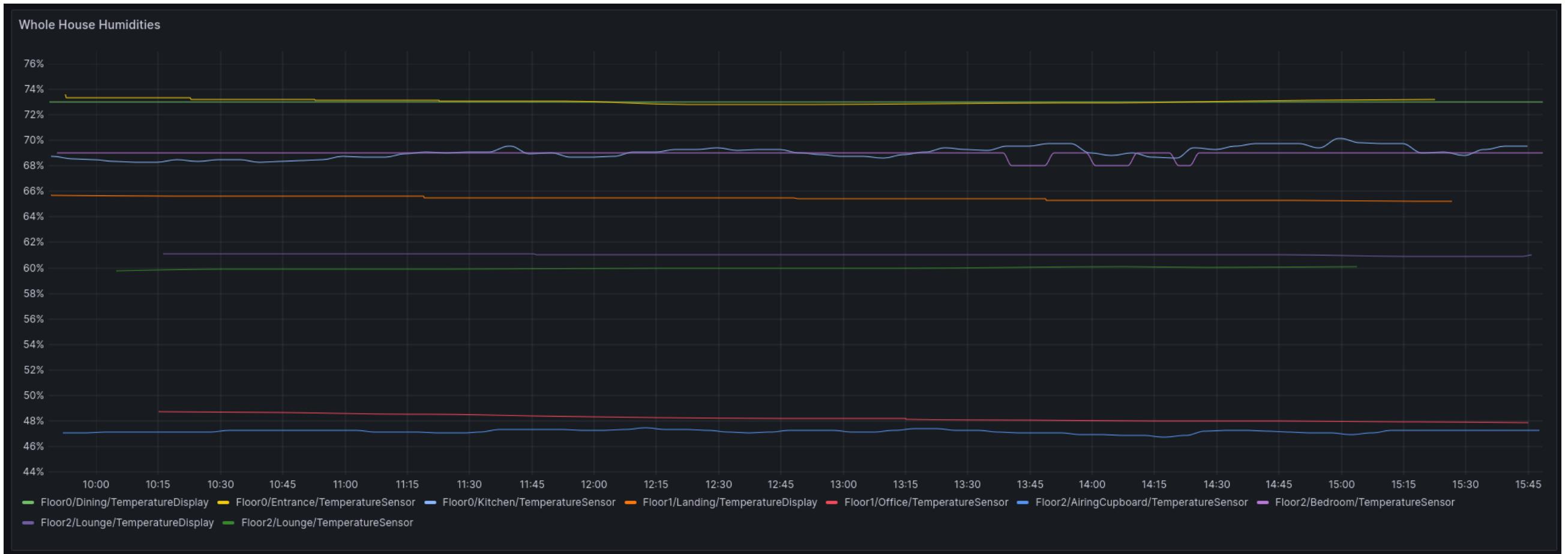
```
# Send to Influx v1
[[outputs.influxdb]]
urls = ["http://127.0.0.1:8086"]
namepass = ["zigbee"]
database = "zigbee"
skip_database_creation = false

# Send to Cloud-hosted Grafana's Prometheus via Influx emulation
[[outputs.influxdb]]
urls = ["https://influx-prod-24-prod-eu-west-2.grafana.net/api/v1/push/influx"]
namepass = ["zigbee"]
database = "telegraf_metrics"
skip_database_creation = true
user_agent = "telegraf"

username = "1282265"

# Print to stdout for debugging
# Disable this once you're happy everything works!
[[outputs.file]]
files = ["stdout"]
data_format = "json"
```


Otherwise write a few lines of
Python!

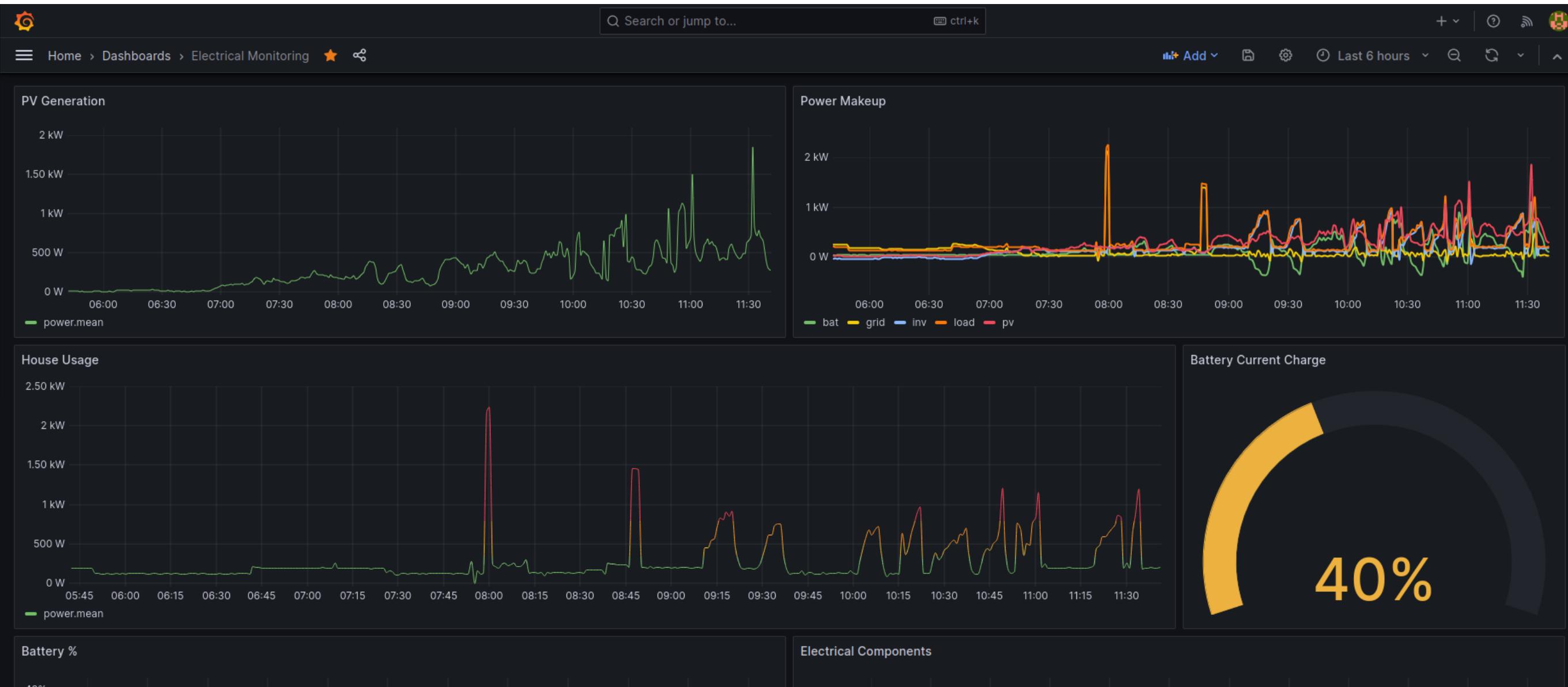


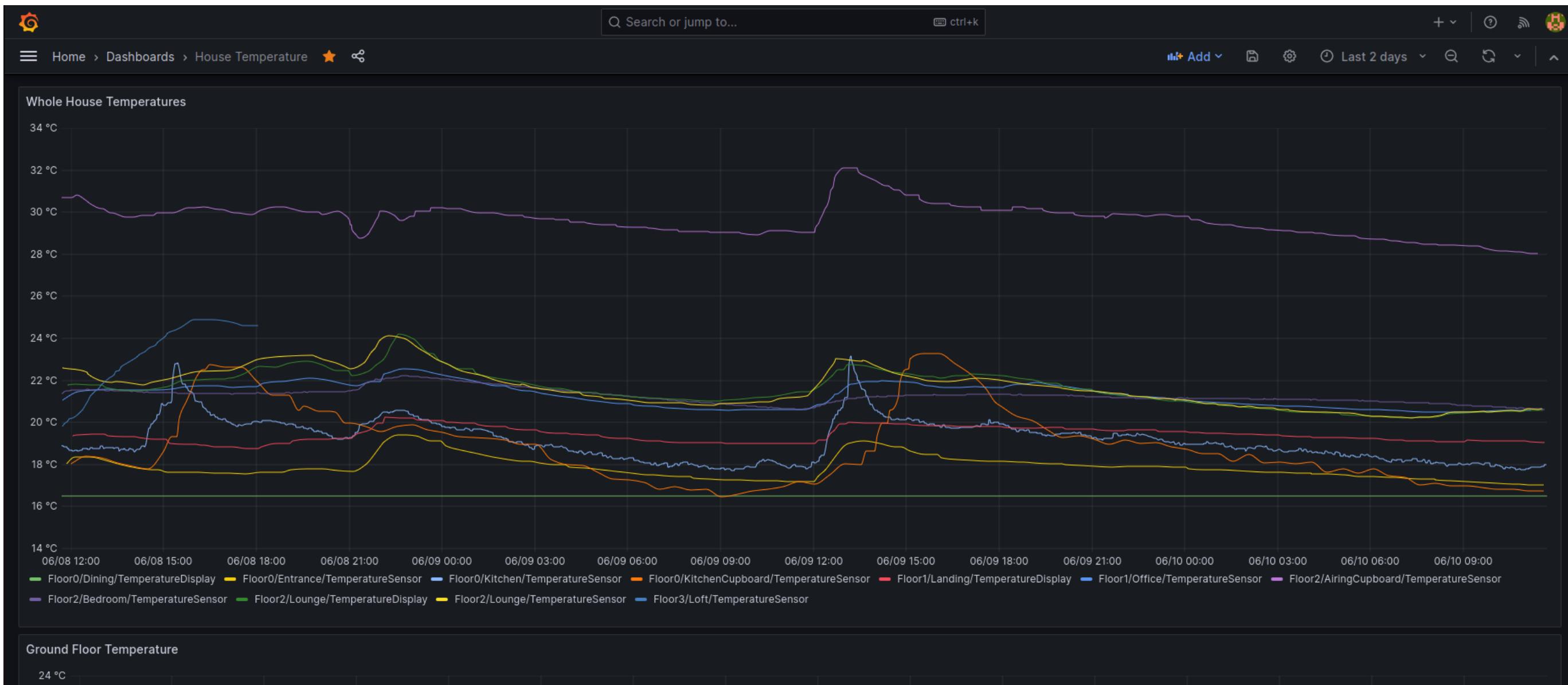
Graphing the data

Graphing the data

Grafana

Kibana







Temperature Monitoring

Temperature Monitoring

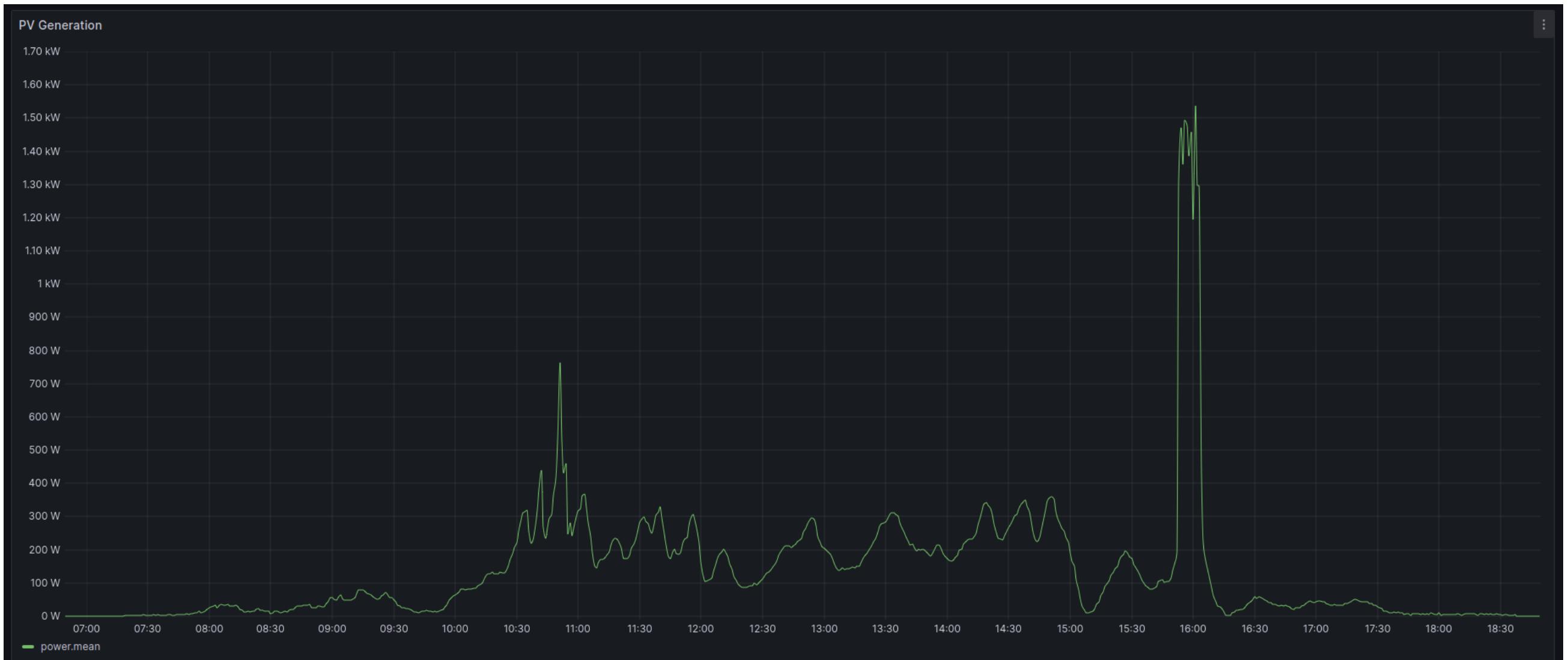
What Works / Doesn't

- In-room - good
- In-cupboard - slow to change due to lack of air circulation
- Entryway etc - devices seem to do some averaging
- Hot water - can't do with cheap devices
- Outside - can't do with cheap devices
- Speed of reporting - mains powered only
- Polling on demand - mains powered only

What next?

Ecological Improvements

- Adjusting when your heating runs
- Adjusting when you have hot water
- Identifying areas with poor insulation
- Identifying radiators that don't work well / aren't big enough
- Home automation - smart radiator controls
- Heat pump before/after



Electrical Monitoring

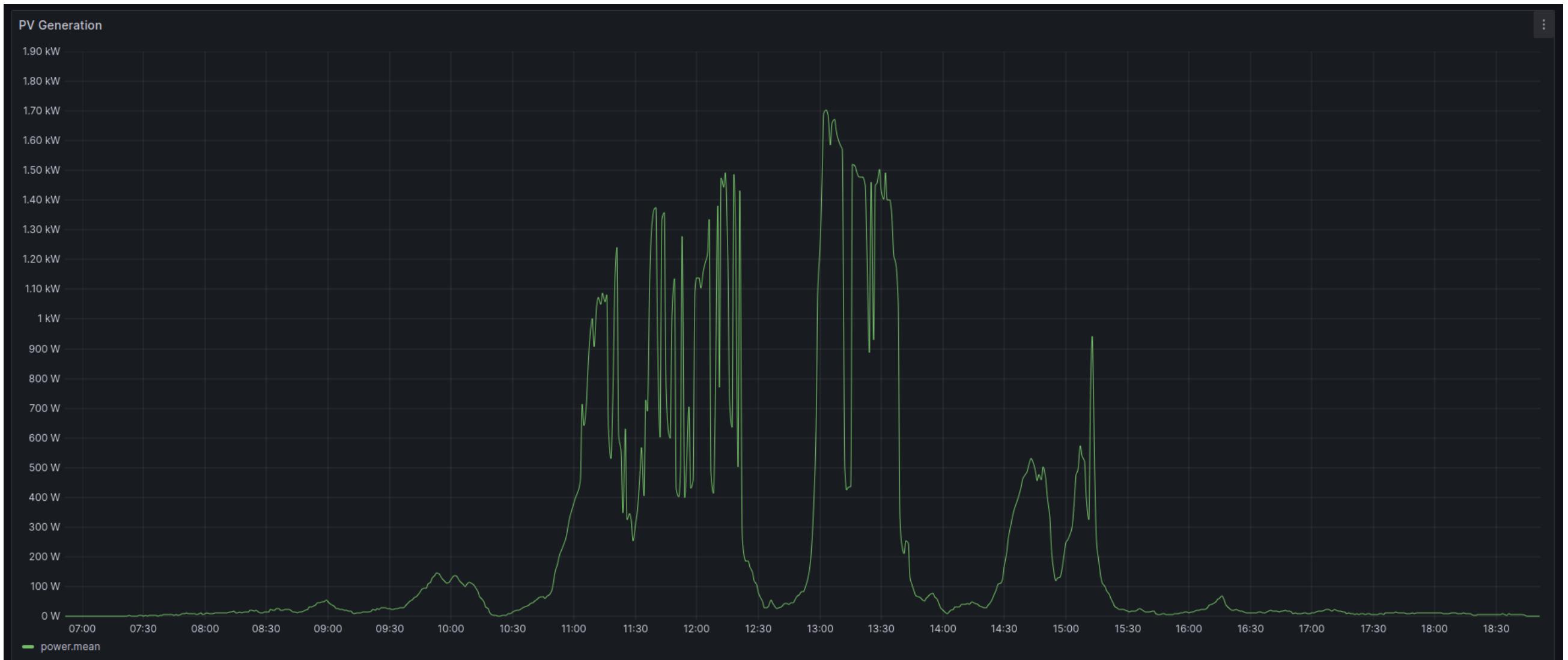
- Smart sockets
- Power clamps
- Smart lights
- LED strips
- Baseline for solar
- Baseline for battery
- Electric car

Doing more with your new radio ecosystem

- Smart bulbs
- LED lighting strips
- Smart heating controls
- Smart switches / buttons
- Smart sockets for control
- Smart sockets for energy monitoring

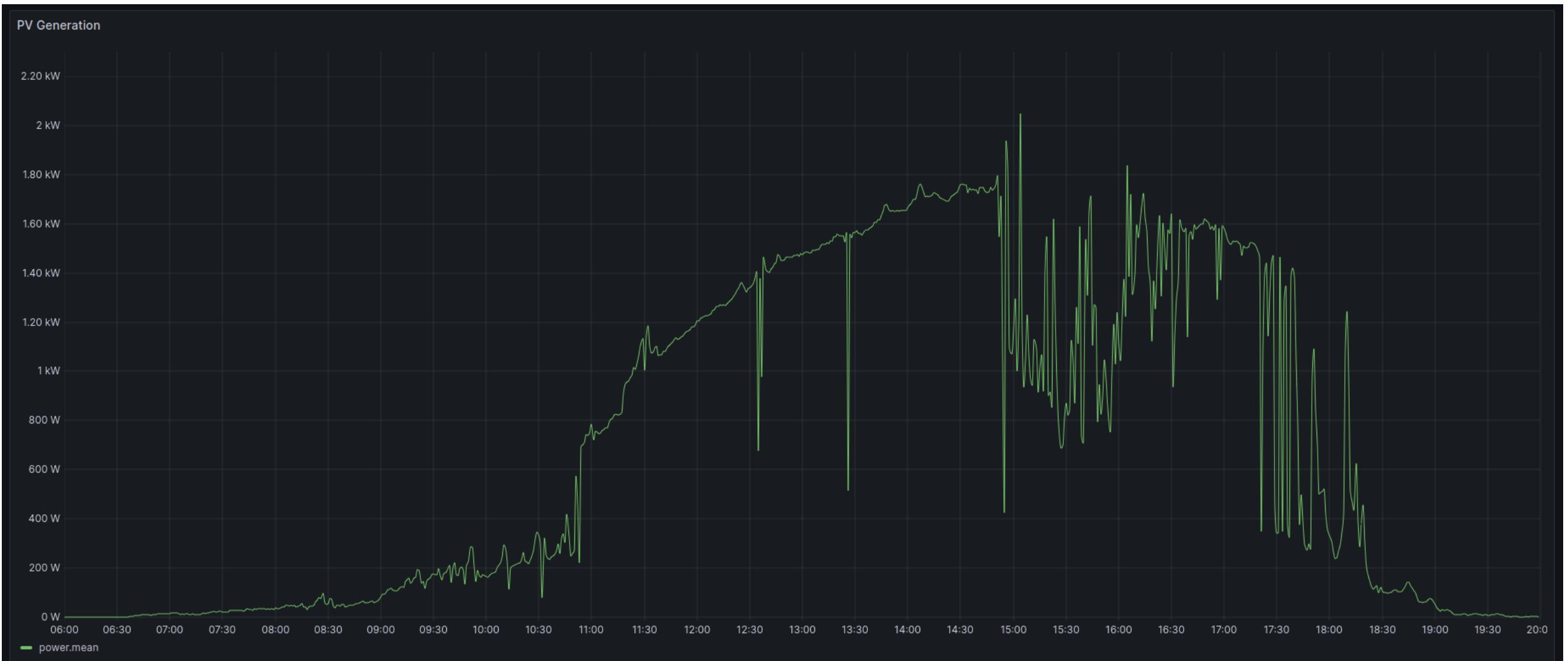
What's next - more Advanced...

- See if any old devices pair with open source stuff
- Reflash old devices to work with open source controllers
- MITM unsupported smart devices
- MITM supported-but-crap smart devices



Next Steps

- See if you already have some data sources in your house
- If you have sensors on a proprietary system, consider making your own open gateway and re-pointing a few of them
- If you have some arduinos, consider buying some temperature sensors for them and starting that way
- Otherwise go on aliexpress / ebay / etc, order a few things, and have a play!



Demos in just a second....

Code / Config / Slides

Github: [@gagravarr](https://github.com/gagravarr)

@nick@social.earth.li



Zigbee temperature monitoring

**ESP8266 + temperature
sensor**