

# Nabovarme

## DIY Central Heating Infrastructure



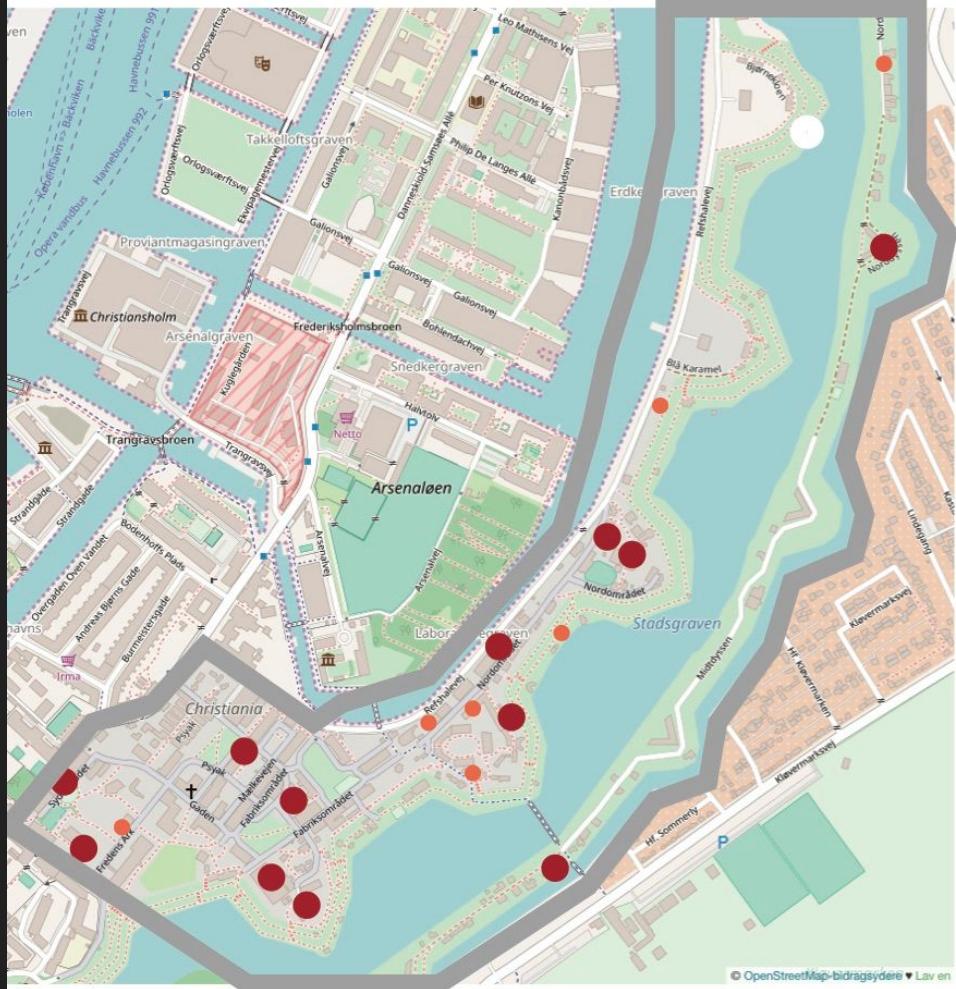
# Nabovarme is a word for community heating



# Pellet heating systems in Christiania

Large red dots:  
major systems

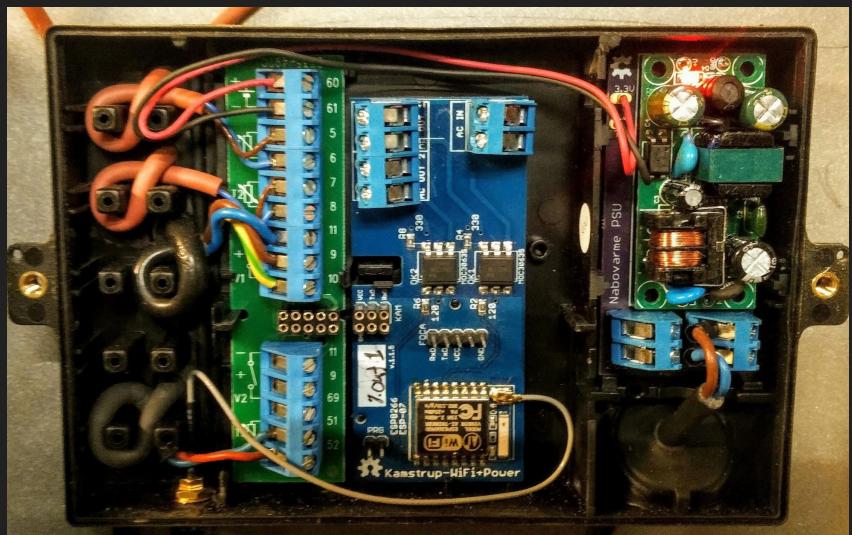
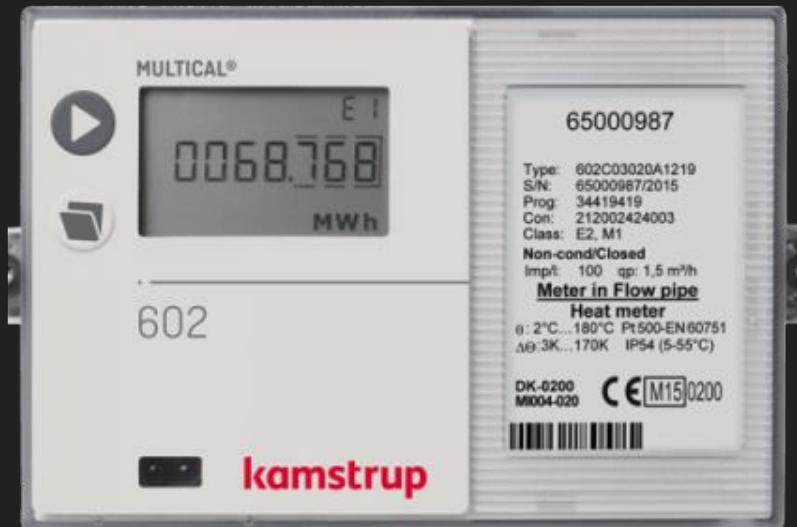
Small orange dots:  
some of many independent units



# History of heaters



# Kamstrup Multical 602 - first to be reverse engineered



# Communities with Communities inside



# Christiania - an old army base



# Christiania today

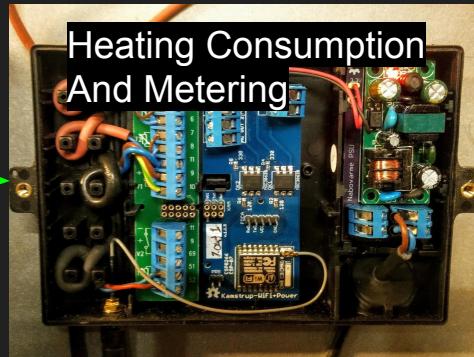
- 46 year old squatted area
- 900 inhabitants
- 265 houses
- 24 hectares land
- 1 km from Danish parliament



# What is Nabovarme?

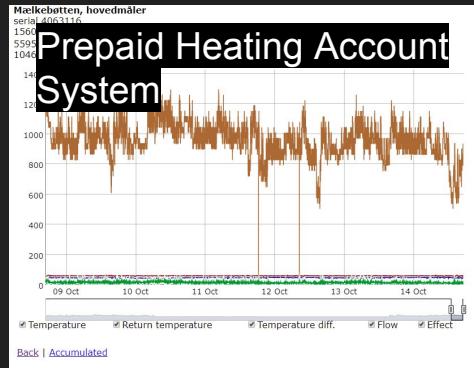


## Heating Production



# Heating Consumption And Metering





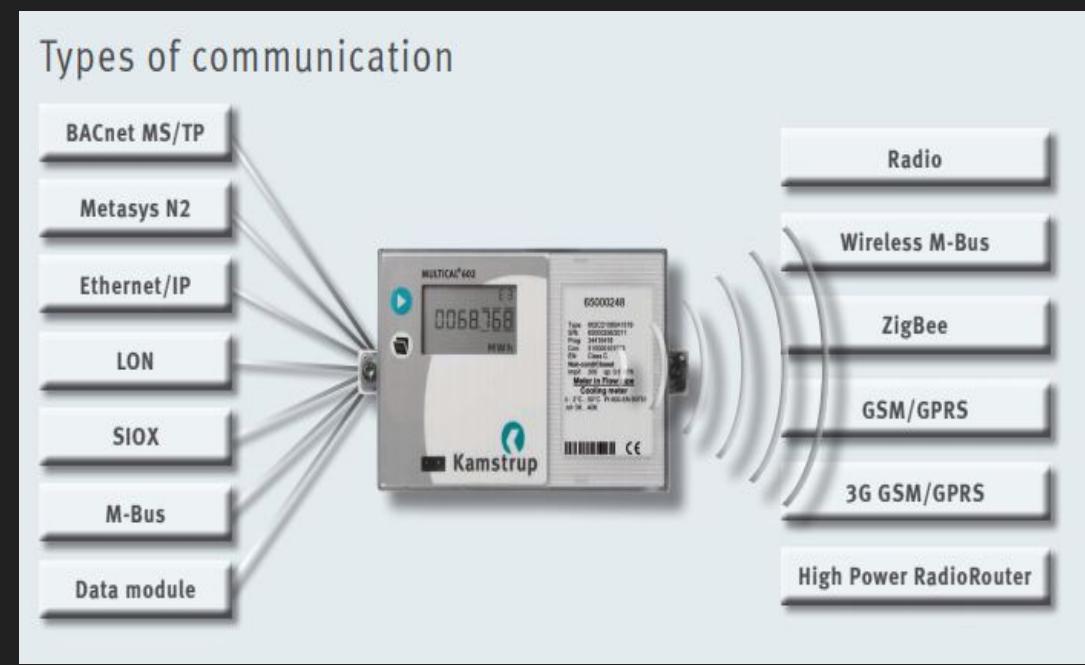
# Prepaid Heating Account System



## WIFI NAT Propagation

# Kamstrup solutions

- No WIFI option - requires additional infrastructure
- No open software to receive data
- Enterprise

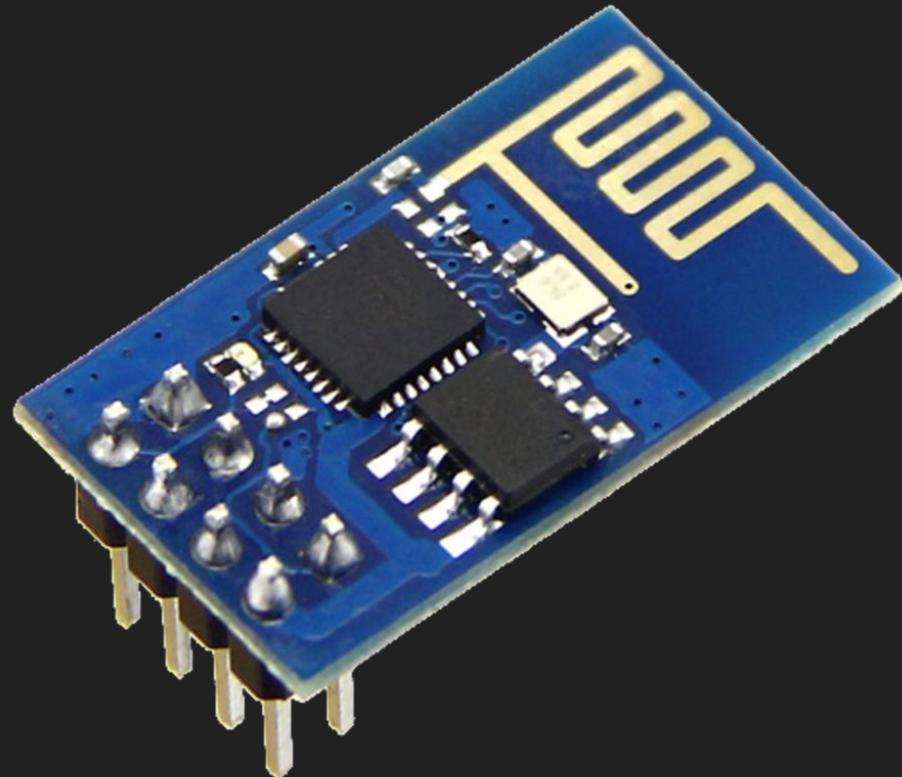


# Nabovarme users are willing to share WIFI to meters

- 350+ users
- 150'000€ worth or wood burned yearly
- Huge diversity in income, social class, heritage etc.
- Low level of interest in heating



# ESP8266 - Microcontroller with wifi for 1\$



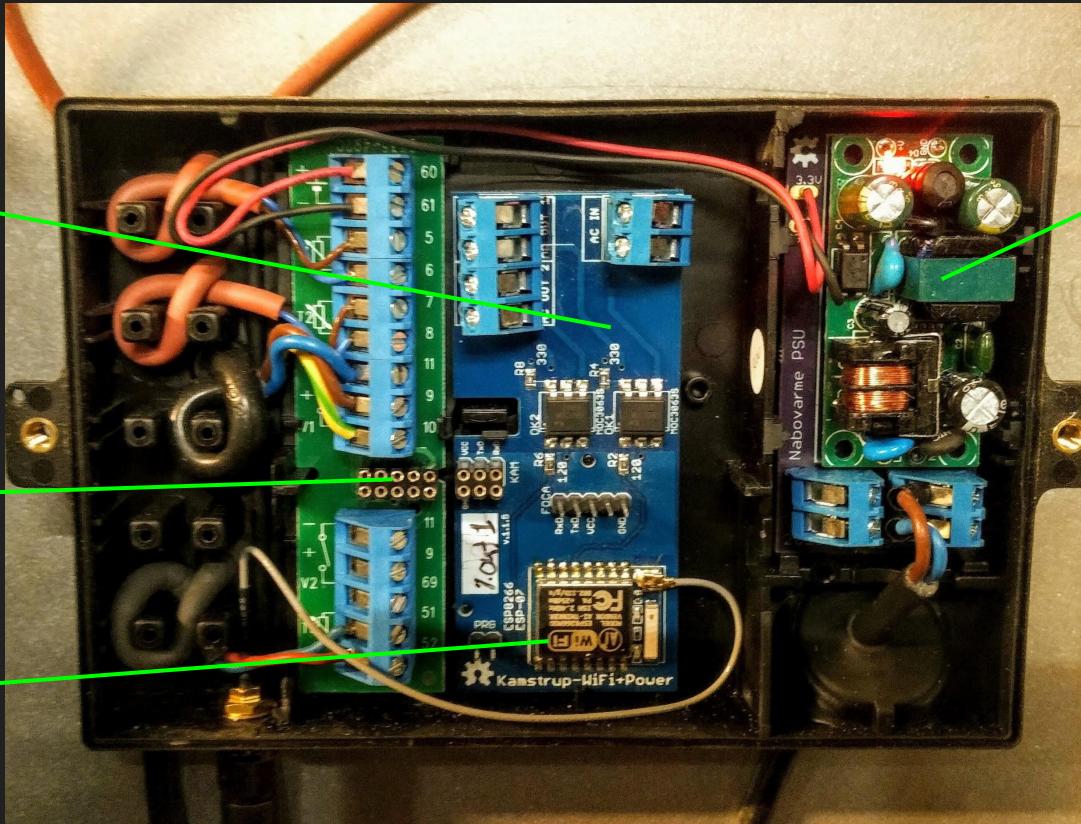
# MeterLogger Hardware

MeterLogger PCB

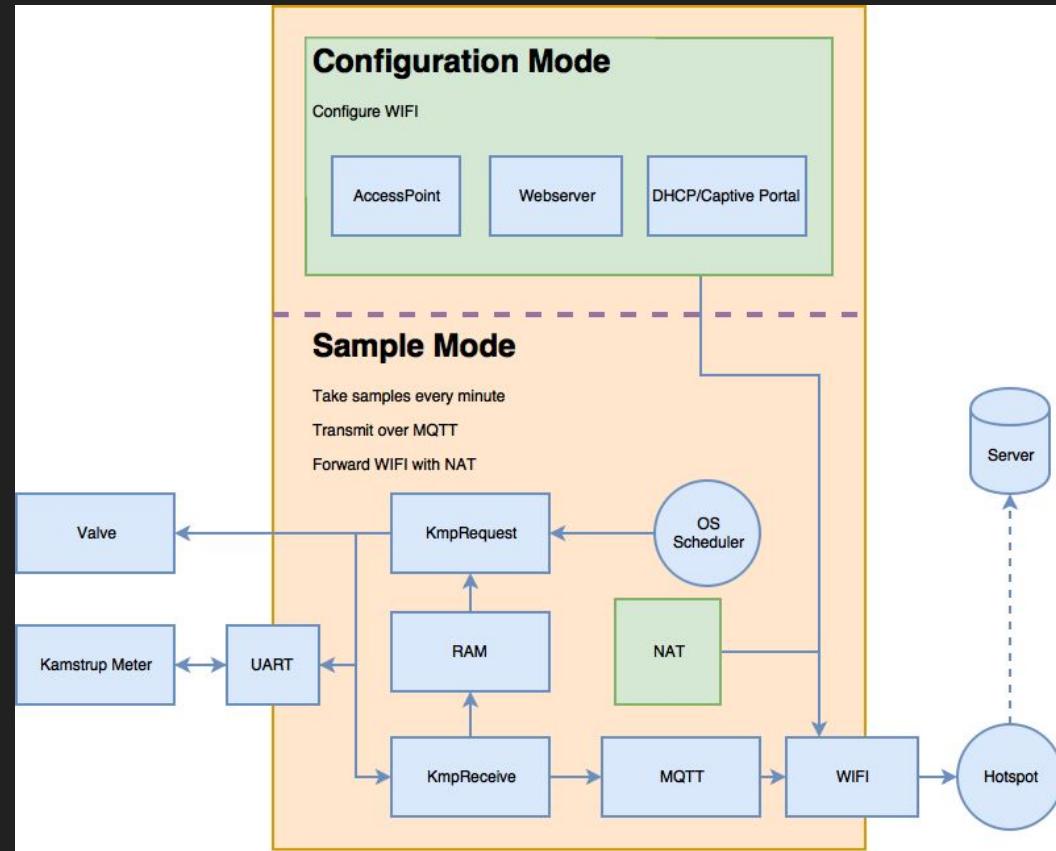
Kamstrup Connector

ESP8266

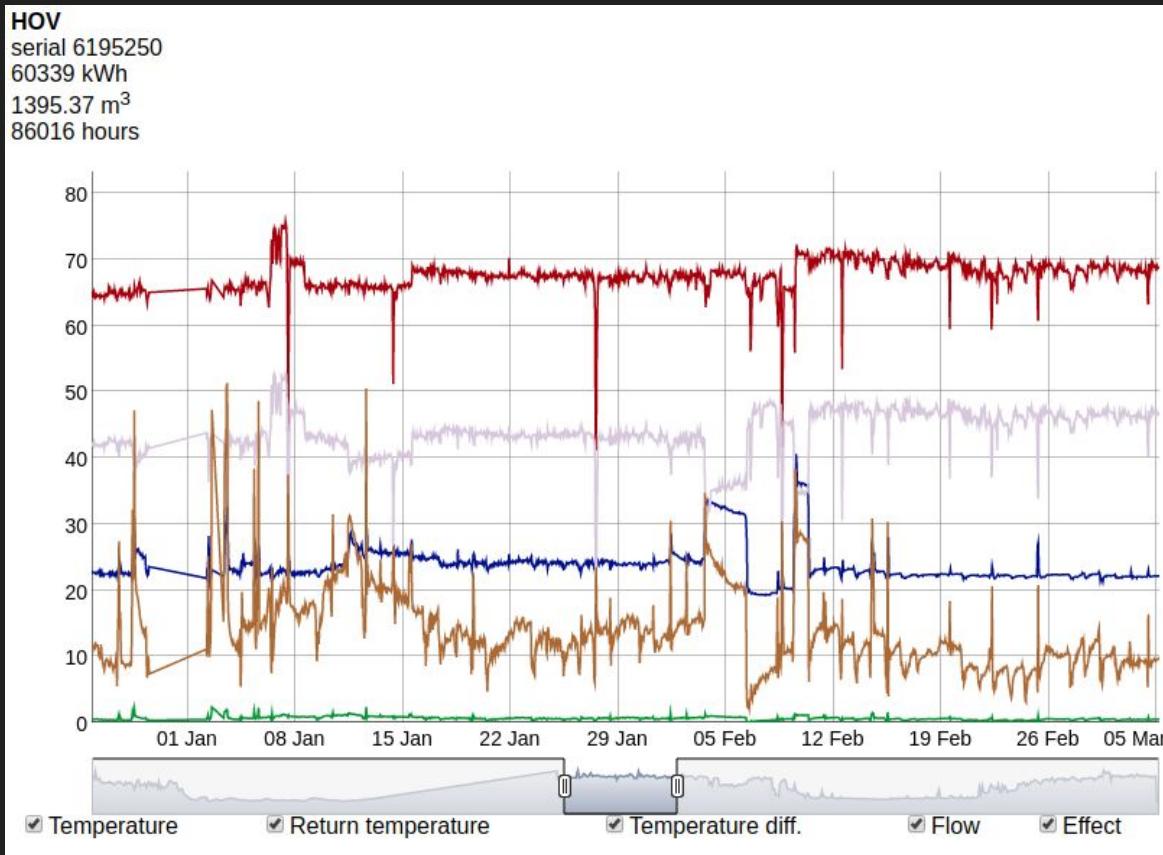
MeterLogger PSU



# Meterlogger Firmware



# Central overview



# Accounting systems

Aircond\_Skurvogn - NDE024A

Tilbage

Navn: Aircond\_Skurvogn  
Kode: XXXXXXXXXX  
Place: aircondition  
Omraade: ND  
Type: PrivatMåler  
Målenummer: 0  
Elvand type: Elmåler  
Bemærkninger: Måler inde i Skurvognen ved Aircondition

Nr	Dato	Aflæsning	Målenummer	Bemærkninger
0011	12-12-2004	1136,00	0	
0012	01-06-2005	1286,00	0	
0013	03-12-2005	1474,00	0	
0014	31-05-2006	1567,00	0	
0015	03-12-2006	1715,00	0	
0016	04-06-2007	1874,00	0	
0017	31-05-2009	2543,00	0	
0018	03-03-2010	3665,30	0	
0019	01-01-2011	5868,20	0	
0020	01-02-2011	6367,00	0	
0021	02-01-2012	7816,90	0	
0022	13-01-2015	13608,00	0	
0023	08-01-2016	15376,70	0	
0024	22-02-2017	17335,40	0	
0025	26-12-2017	18019,30	0	

Slet/Godkend

Dato Aflæst tal Bemærkninger, max 30 tegn

28-12-2017

Bogfør

Hjælp Pris DIV en to Log ud

mb Seg

- Zeren\_HM - MBV057A  
Målenummer: 3406922 Type: PrivatMåler Vandmåler Place: Zeren Omraade: MB Kode: MBV057A Bemærkninger: sidder i opgang på 1.sal ve -
- Anders - MBE026A  
Målenummer: 31788 Type: PrivatMåler Elmåler Place: Udklapperen Omraade: MB Kode: MBE026A Bemærkninger: Sidder i beboelse
- Anders - MBV026A  
Målenummer: 411035264 Type: PrivatMåler Vandmåler Place: Udklapperen Omraade: MB Kode: MBV026A Bemærkninger: I køken, oppe under loft p -
- Anders - MBV026B  
Målenummer: 3406942 Type: PrivatMåler Vandmåler Place: Udklapperen Omraade: MB Kode: MBV026B Bemærkninger: På toilet
- Anders - MBV026C  
Målenummer: 3406442 Type: PrivatMåler Vandmåler Place: Udklapperen Omraade: MB Kode: MBV026C Bemærkninger: Udendørs hane, ved indgang -
- Anders - MBV026D  
Målenummer: 03406443 Type: PrivatMåler Vandmåler Place: Udklapperen Omraade: MB Kode: MBV026D Bemærkninger: Under kækkenvask
- Anemone - MBE077A  
Målenummer: 133600369\_932 Type: PrivatMåler Elmåler Place: Bagsyveren Omraade: MB Kode: MBE077A Bemærkninger: opsat eddie
- Anemone - MBV077A  
Målenummer: 33058245 Type: PrivatMåler Vandmåler Place: Bagsyveren Omraade: MB Kode: MBV077A Bemærkninger: I entréen
- Anett&Jesper - MBV048A  
Målenummer: 3406404 Type: PrivatMåler Vandmåler Place: Parthenon Omraade: MB Kode: MBV048A Bemærkninger: 2.sal i entré ved elmåler, -

- Børnekloen-CAE000G
- Børnekloen-CAV000H
- BlåKaramel-CAE000E
- BlåKaramelSyd-CAV000G
- FredensArk-CAE000B
- FredensArk-CAV000D
- LoppenBrand-CAV000J
- Mælkevejen-CAV000F
- Norddyssen-CAE000D
- Norddyssen-CAV000I
- Adam-NDV001B
- Aftensol-NDV020A**
- AircondSkurvgn-NDV024A
- AircondiNord-NDV023A
- AircondiSyd-NDV023B
- Boi&Karina-NDV021A
- Bombely-NDV013A
- CamillaOkNord-NDV027A
- DorteOkkulte-NDV008A
- Ralf-NDV030A
  - Okkulte\_syd\_fyr-NDV030B
  - Dorte-NDV008B
  - Dorte\_ny-NDV008C
  - Solvej-NDV007B
- HeleneOkkulte-NDV006A
- Himmelhuset-NDV012A
- Himmelhuset-NDV012B
- JelindeOlkeldtIM-NDV029A

# We need your help!

- Stoffer IS our busfactor, run him down and hundreds of people loose their heating
- We need security on our samples
- We need a scalable billing system

COME WORK WITH US ON THIS

You may **APPLY** at Christiania Researcher in Residence and work with us in  
Opensource

# Thanks and come visit us! - Questions?

- [nabovarme.github.io](https://nabovarme.github.io)
- [cirr.net/apply.html](https://cirr.net/apply.html)

