

## 34c3 meta fields:

Track:

- Hardware / making 60%
- Ethics / Society 40%

Email: [johannes.valbjorn@gmail.com](mailto:johannes.valbjorn@gmail.com)

Speaker: Emmerik

Questions: Johannes and Kristoffer

Nationality: Denmark

Length: 20 minutes plus 10 minutes of questions

Language: English

## “Nabovarme” - Freetown Christiania´s digitally controlled/surveyed heating system. 350 users

Project “Nabovarme” (meaning “neighbour heating”) has transformed private heating necessity into a social experiment build on OpenSource software/hardware and social empowerment by transforming heat consumers into Nabovarme Users and letting them take ownership to infrastructure and consumption.

Christiania - a child of hippie thinking and direct democracy, est. 1971

900 inhabitants, 210 houses, 24 hectares land, 1 km from the danish parliament and the royal palace

Local common ownership to ALL infrastructure:

houses, roads, electricity, water, sewers, fiber LAN, park and lakes

Nabovarme (started 2001) has connected more than half of Christiania

Previously heating was based on private wood burning stoves, coal burning stoves and oilheaters, Nabovarme has created a transition towards common heating systems based on burning wood pellets.

Nabovarme has transformed the heating infrastructure into a social experiment built on OpenSource software/hardware and social empowerment and is transforming passive heat consumers into active Nabovarme Users -making everyone take ownership of the infrastructure and a goal of optimizing usage for economic and climate reasons.

Current technologies for heating systems are proprietary and full of protocols hidden behind NDA's.

Our project has unlocked a broad range of devices so data and control now is in the hands of the users - and not sent out of the community.

The project is a cross competence endeavor where equal amounts of plumbing, infrastructure building and digging, electronics and software has been needed to fulfill the task.

The project tells the story about:

- A society embracing OpenSource before the term was declared
- Communities going together and creating a common heating solution to lower the environmental impact and risk of fire and increase the level of autonomy.
- The creation of a custom fitted, self administered payment model.

We have liberated devices controlling the production of heat (NBE Pellet system, Kamstrup meter systems) and made devices (MeterLogger) used for metering heat and electricity consumption using open source. We are in the process of bringing easy readable consumption data to the focus of christiania citizens - **for all of us to take climate action**

Stoffer, Johannes and Emmerik

Thanks to Alfred, TB, Mælkevejen, Byggekontoret and Christiania

## Appendix

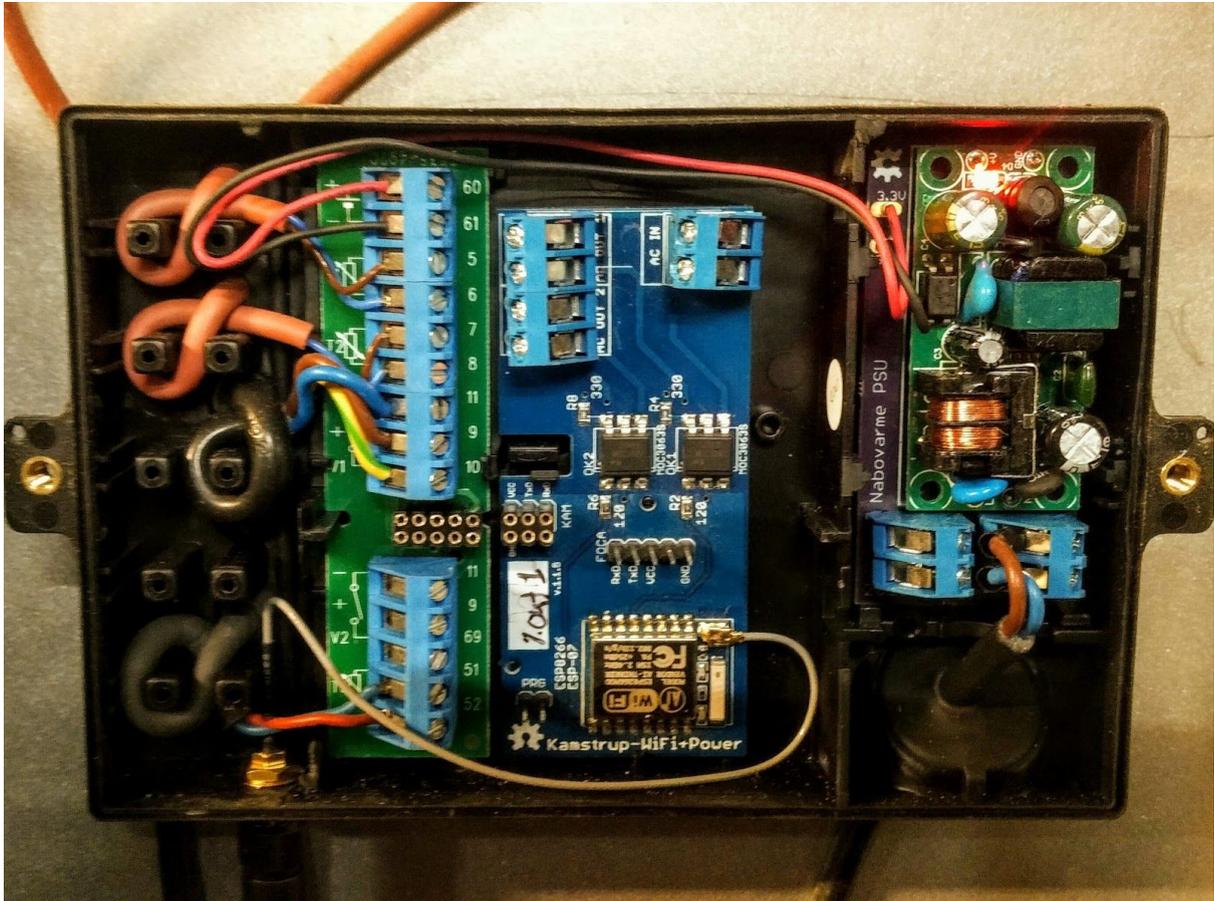
1. Github link to all sources hardware/software

<https://github.com/nabovarme>

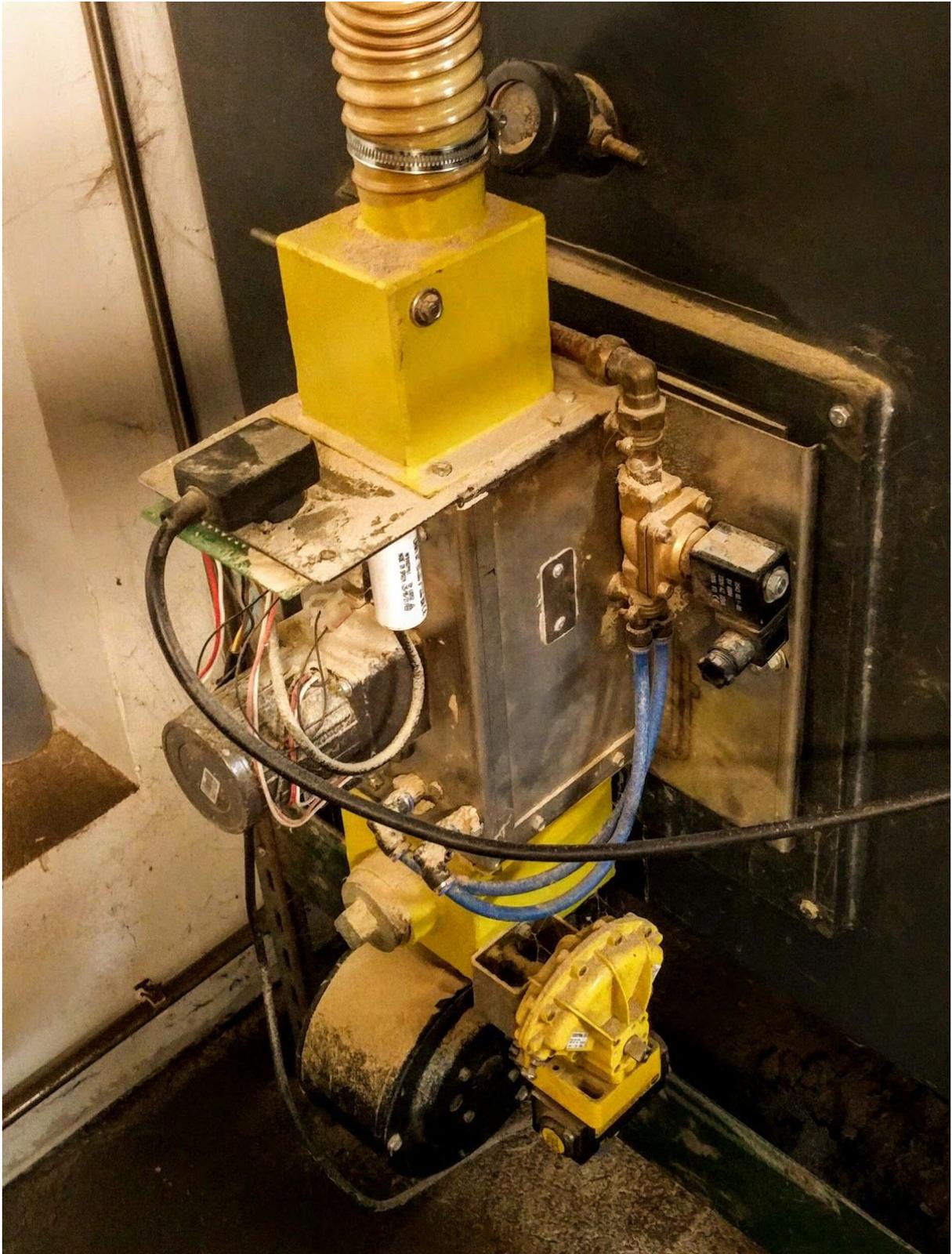
2. Wooden pellets



### 3. Our custom made MeterLogger pcb in Kamstrup meter



4. Custom made wooden pellet feeding mechanism



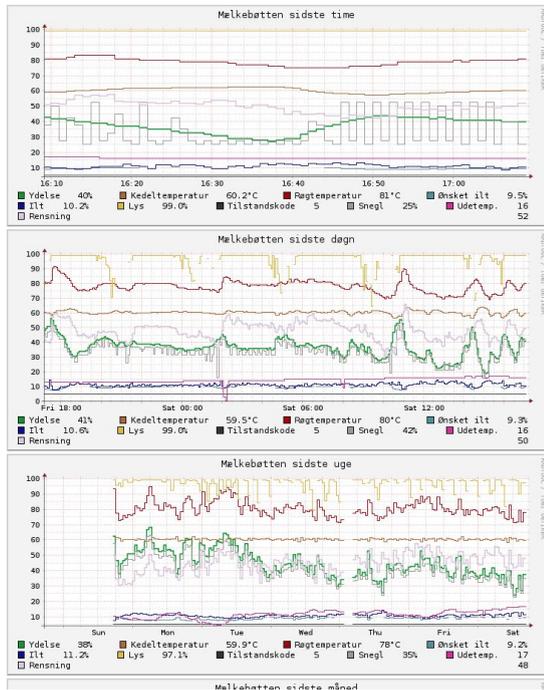
5. Burner controller and MeterLogger device. Note the angled Wifi Antenna protruding under Kamstrup meter



6. "Fredens Ark", 80 people residence added recently

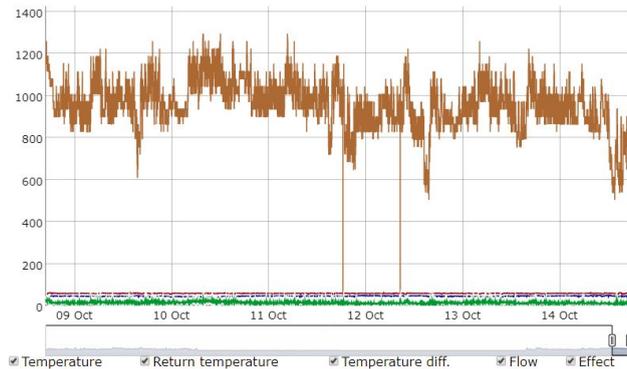


## 7. Production chart of Nabovarme stove “Mælkebøtten”



## 8. Consumption chart of collective “Mælkebøtten” - 5 days

**Mælkebøtten, hovedmåler**  
 serial 4063116  
 1560610 kWh  
 55959,6 m<sup>3</sup>  
 104628 hours



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## 9. Old (Elprog) and new (CAforbrug) custom made account systems for entering/reading consumption



**ElProg V 3.02**

LogindUser: emmerik VandMåler: 777

**CAforbrug v 0.993**

https://caforbrug.christiania.org/readmaaler.php?Path=..55050505data55050505Transformer-CAE000C55050505Solvogn\_Tav

Emmerik - MBE025A

Navn: Emmerik  
 Kode: MBE025A  
 Placé: 18øren  
 Område: MB  
 Type: PrivatMåler  
 Målernummer: 17688  
 El/vand type: Elmåler  
 Bemærkninger: Sidder i beboelse  
 Path: ./data/Transformer-CAE000C/Solvogn\_Tavlen-HTE000A/Midt\_syddysse-FOE000D/Mælkebotten\_Øst-MBE000C/Emmerik-MBE025A.txt

Nr	Dato	Aflæsning	Målernummer	Bemærkninger
0001	01-03-2005	0,00	17688	Første aflæsning
0002	01-06-2005	792,00	17688	
0003	07-09-2005	1450,00	17688	
0004	02-03-2006	3182,00	17688	
0005	25-02-2007	6659,00	17688	
0006	07-03-2008	10130,00	17688	
0007	25-02-2009	13461,00	17688	
0008	17-02-2010	17113,00	17688	
0009	27-02-2011	20644,00	17688	
0010	26-02-2012	24292,00	17688	
0011	21-02-2013	28048,00	17688	
0012	12-02-2014	31404,00	17688	
0013	17-02-2015	34777,00	17688	
0014	06-02-2016	38317,00	17688	
0015	20-11-2016	41598,00	17688	

Dato: 14-10-2017 Aflestal Bemærkninger: max 30 tegn Bogter

# 10. Cropped screenshot of Meterlogger Networking topology

