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WP1 Workshop no. 6

Meeting in Paris
4-5 May 2017

"Final design, monitoring and mobility"

COWI

Ringgaarden afd. 20, Trigeparken
Heating installations

- Objectives
  1. Demonstration of low temperature DH housing installations 55/25°C
  2. Reduce heat loss from piping installations (50% reduction compared with standard)
  3. Test solution with "flatstations" vs solution with central domestic hot water tank
  4. Test waste water heat recovery
  5. Test PVT panels used as heat absorbers for heat pumps
  6. Possible improved PVT on one block

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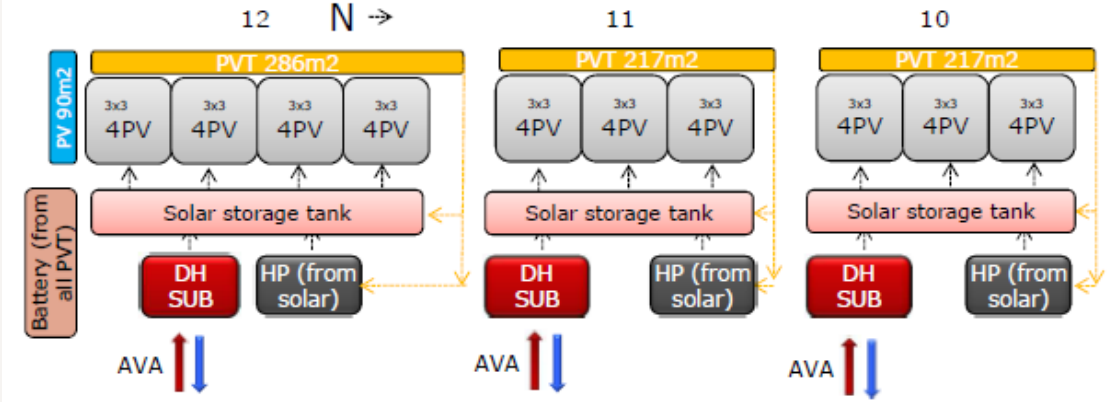
Afdeling 20, Trige, (DK2)

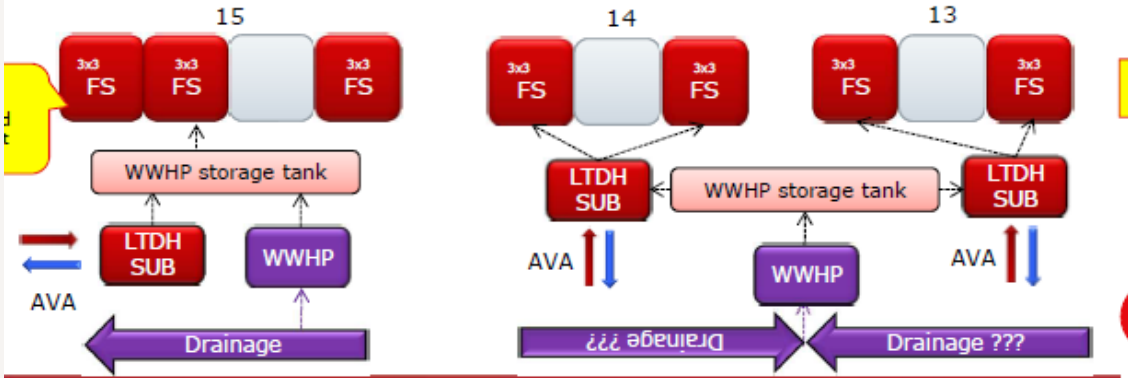
http://8380.dk/ny-afdeling-20-trige-parkvej/

Danfoss solutions

Version 4
7-6-2016

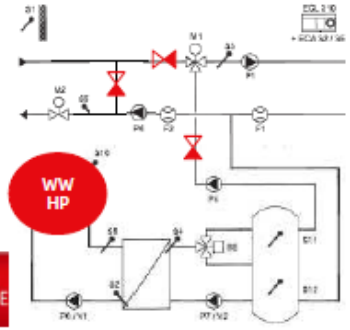
	requirement	T_{DHWmin}	FS F1, F2 DH	FS F1, F2 RES	4P TH1, TH2 DH	4P TH1, TH2 RES	TH3 inner coil DH	TH3 inner coil RES
1	60°C at DHW production place	60	67	72	67	72	72	77
2	50°C at any place of DHW system	50	57	62	60	65	65	70
3	45°C at kitchen tap	45	52	57	60	65	65	70





- One basement substation for each block
- 4PV = four pipes vertical system
- FS = flat stations
- 10-12: 3x basement unit, DH + solar thermal (incl. HP part)
- 13-15: 3 basement units = mixing loop, one WWHP integration
- Rest of 12 basement units and 156-42 FS available for afd. 21 (but there is nothing agreed yet)

Peter + Bjarne P501 – atypical modification



DHS - Application & Technology READY project

9 | c:\Users\U268384\Dropbox___Danfoss_DOC\READY\READY_FS_multi-apartment.pptx ENGINEE

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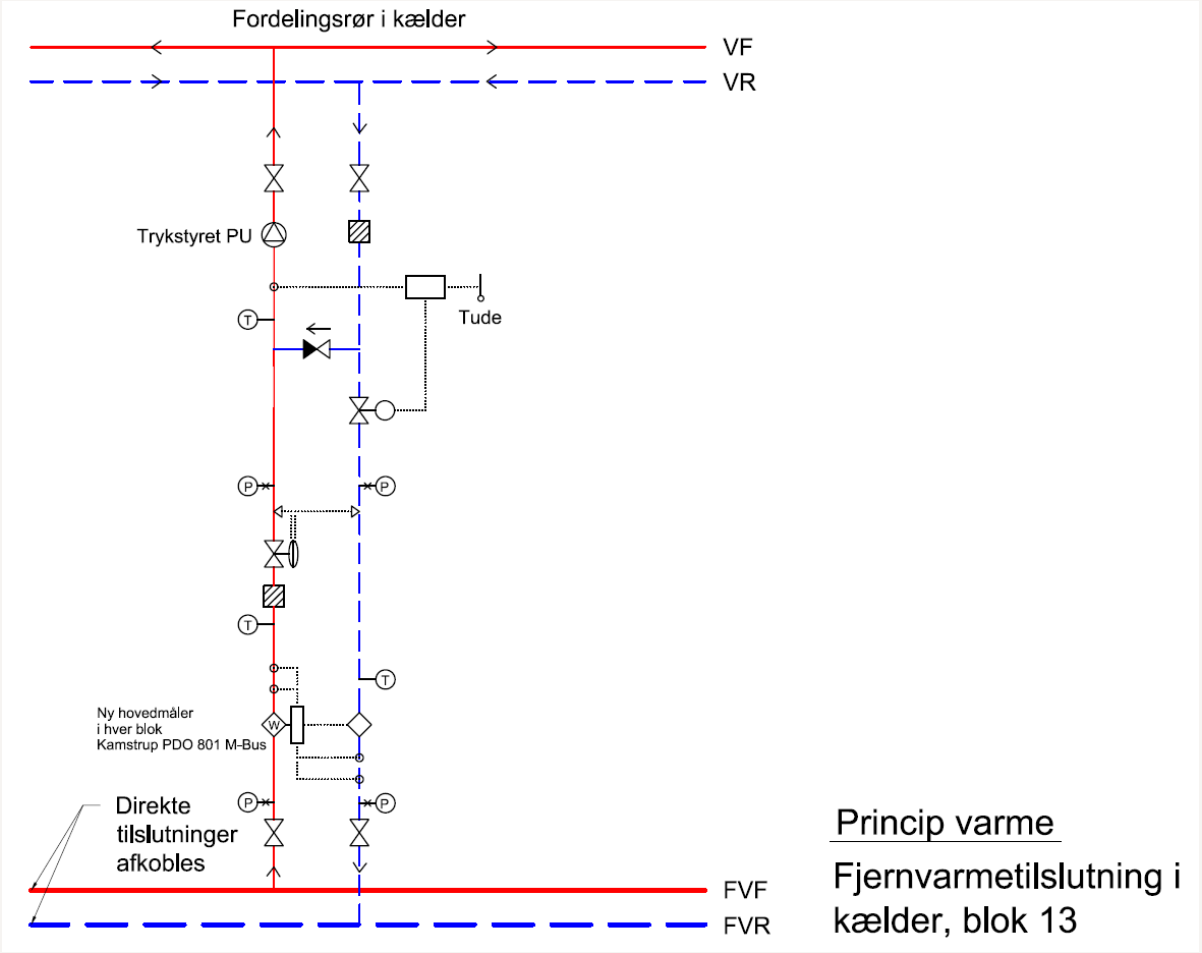
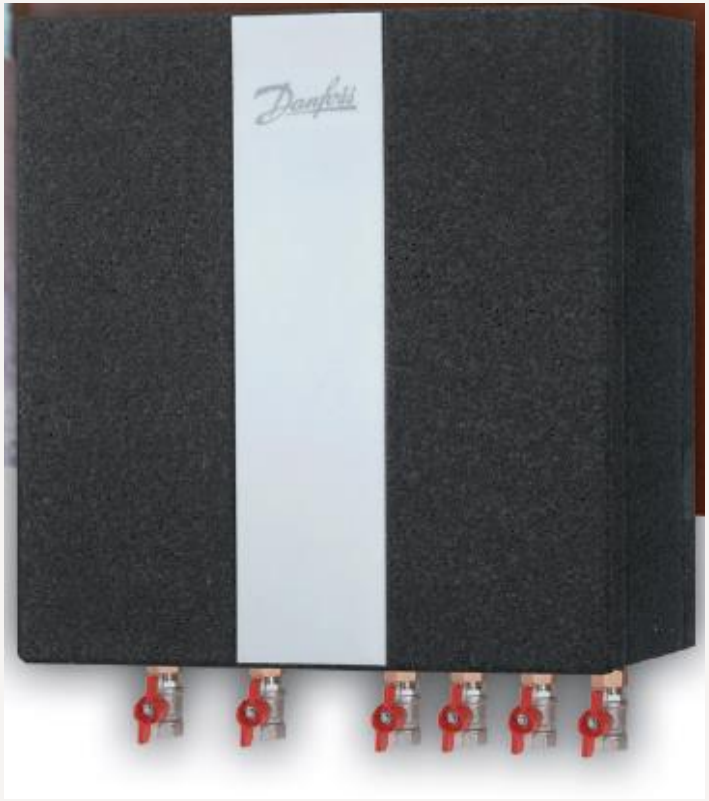
DH Heating Shunt – direct connection



Min 50°C flow temp

Optimised flatstation from Danfoss

- Advantages
  - designed for low temperature DH
  - insulated to lowest heat loss in market
  - superefficient heat exchanger HEX
  - cold HEX under idle load e_{save}^{TM}
  - integrated differential pressure control
  - no circulation of hot water max 4 l vol.in pipes
  - stainless steel
  - no limestone fouling
  - no legionella
  - 32,3 kW DHW



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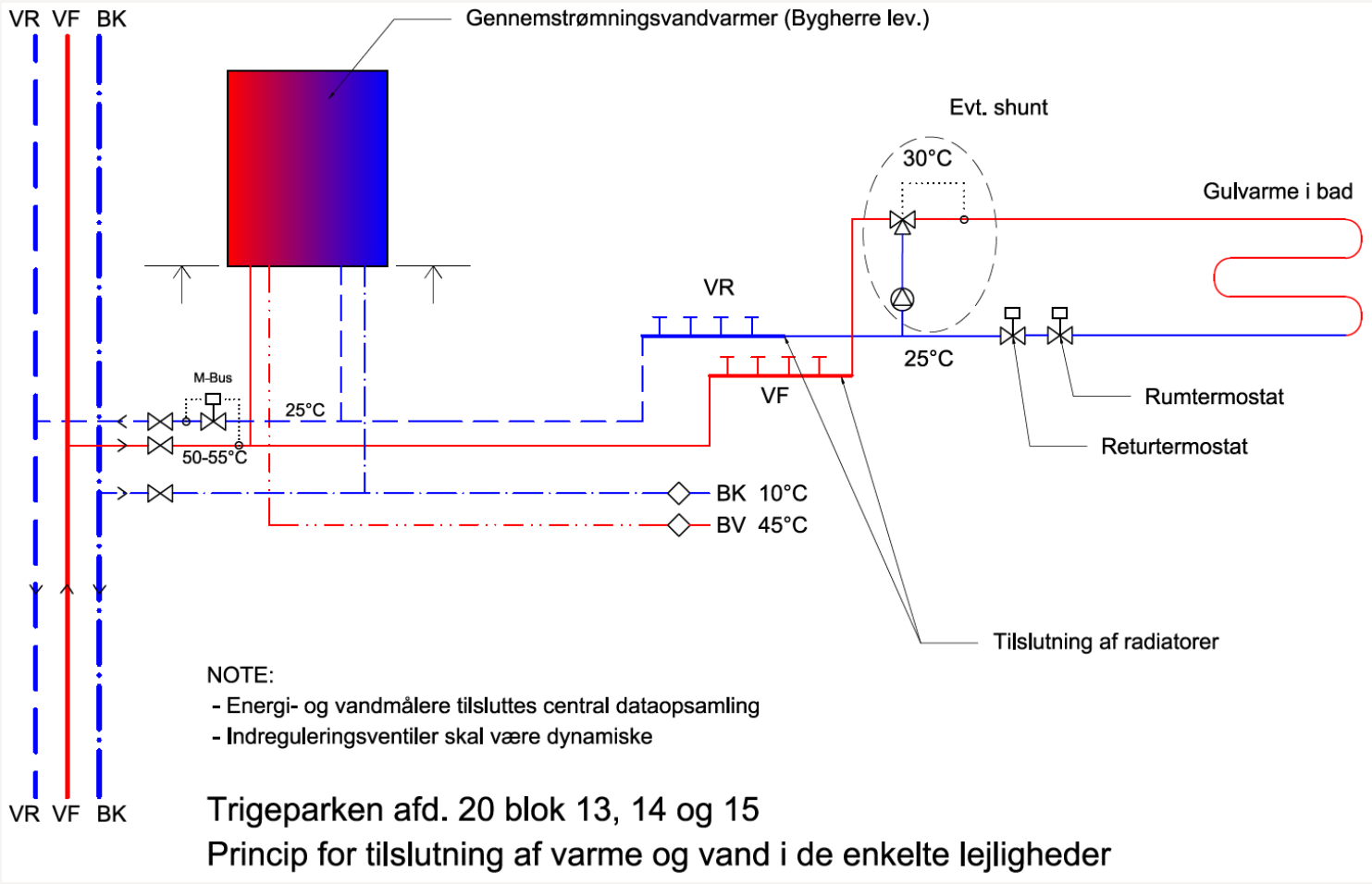
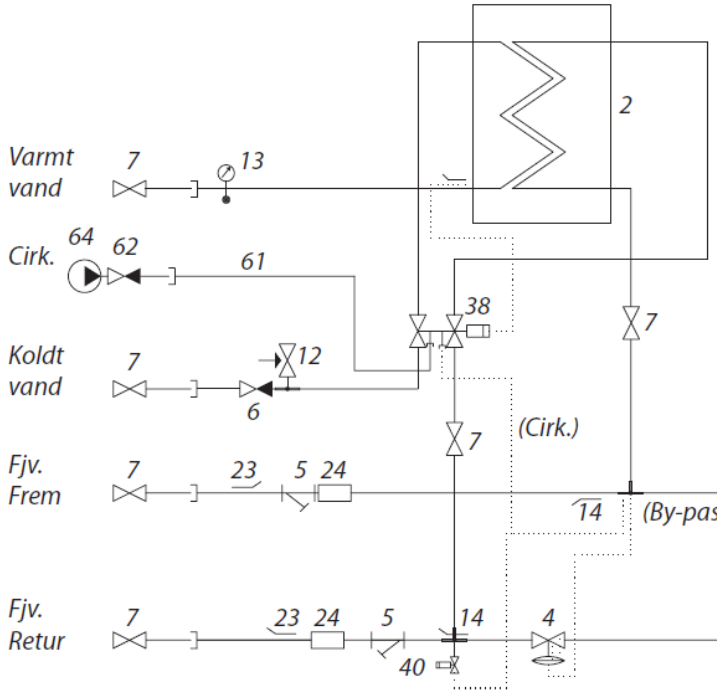
Flat-station installation for DHW



Akva Les II TD

Diagram – Eksempel



2. Pladeveksler varmt vand
4. Danfoss TD-regulator AVPL
5. Snavssamler indbygget i T-stk.
6. Kontraventil
7. Kugleventil
12. Sikkerhedsventil, 10 bar
13. Termometer
14. Trykudtag ½"
23. Følerlomme til føler f. måler ½"
24. Passtykke for måler ¾" x 110-165[1] mm
38. Brugsvandsregulator Danfoss type PTC2+P
40. Danfoss FJVR for by-pass/cirkulation

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61. Cirkulationsrør[2] (medleveres ikke)
62. Kontraventil (medleveres ikke)
64. Pumpe v.v. cirk. (medleveres ikke)

1) Ved måler med 1" gevind bestilles særskilt fittingsæt, se skema nedenfor.

2) Cirkulationsrørsæt (61) skal tilkøbes som ekstraudstyr, se skema nedenfor.

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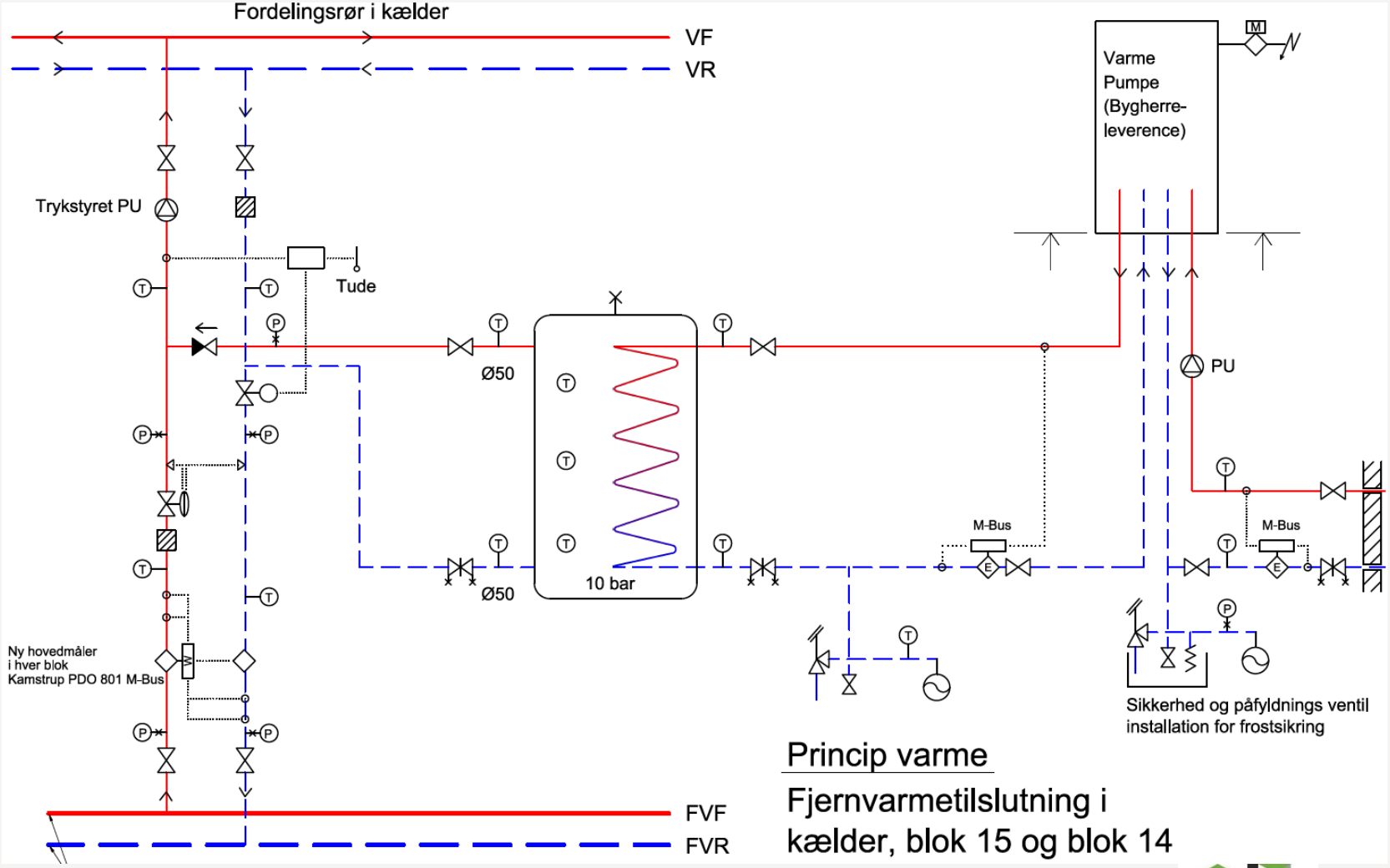
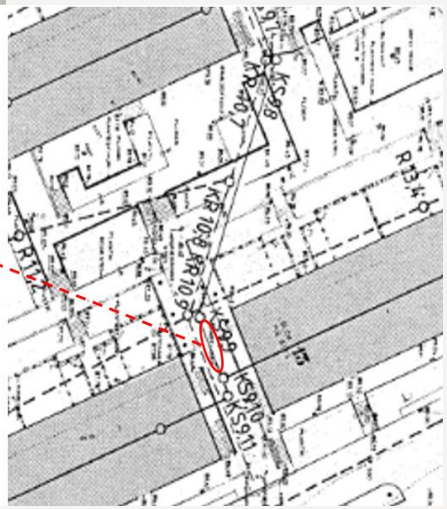
Connection of heat pump for waste water heat recovery



Location of waste water heat exchangers

Spildevandsbrønd nr. 1 tilhørende varmepumpe nr. 1 monteres på spildevandledning fra blok 13 og 14. Spildevandsbrønd placeres mellem brøndene KS9.9 og KS9.10



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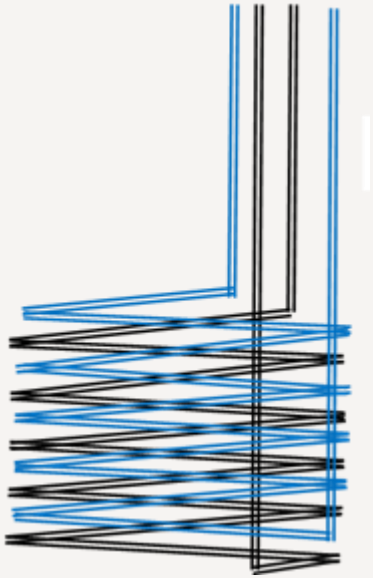
Waste water heat exchanger



2 x ø 42 mm

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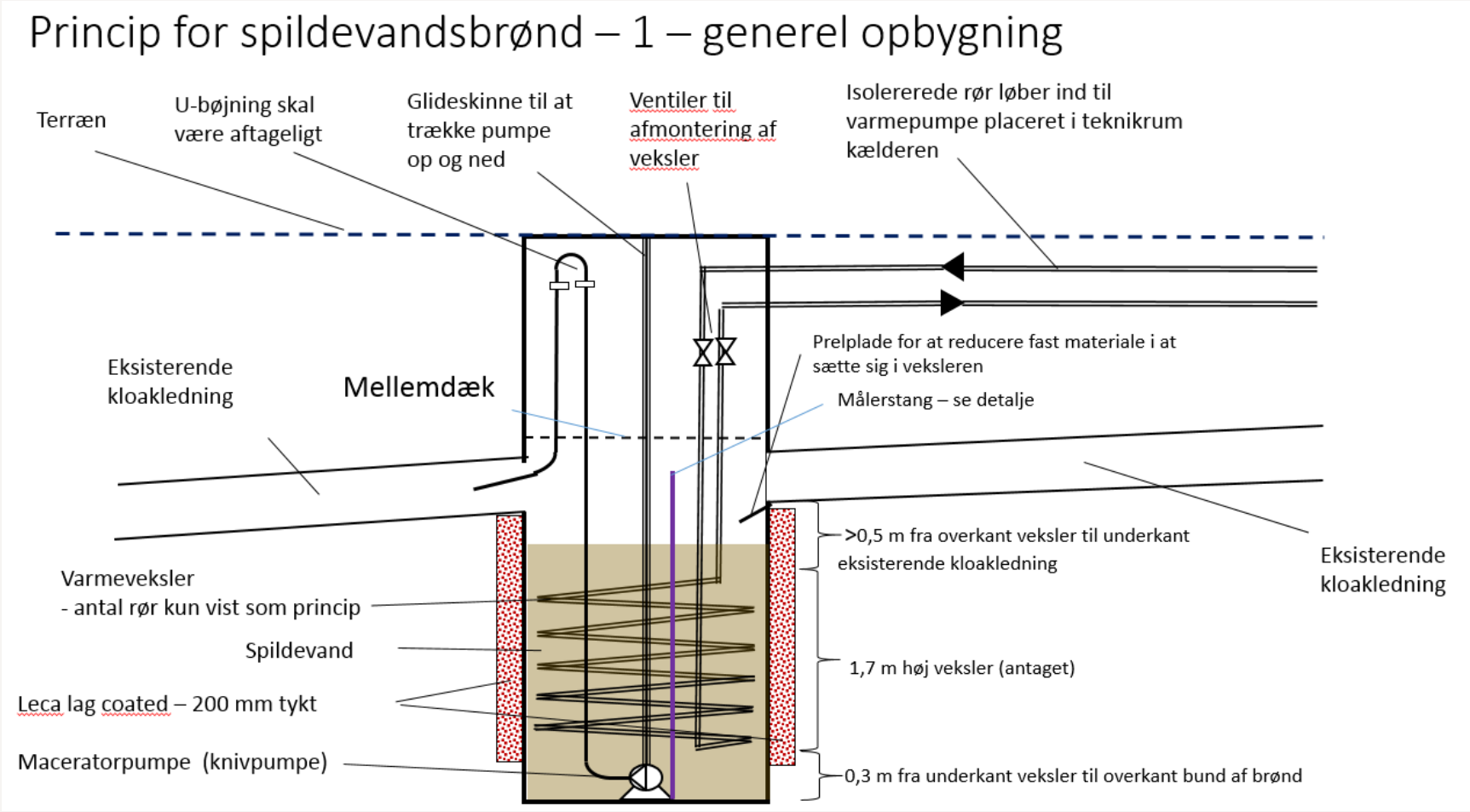
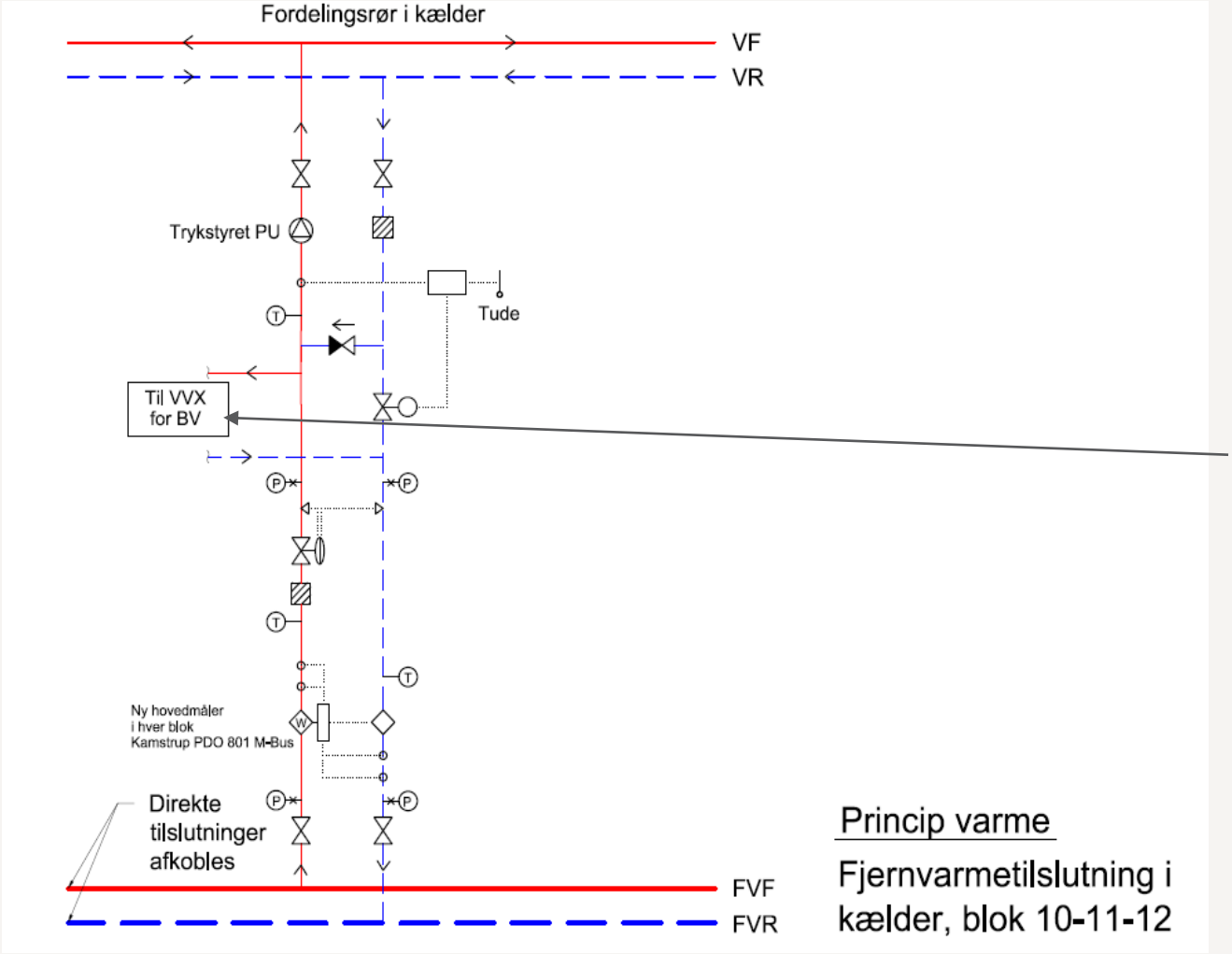
General principle





20-60°C flow temp

Black box connection to heat pump and PVT system

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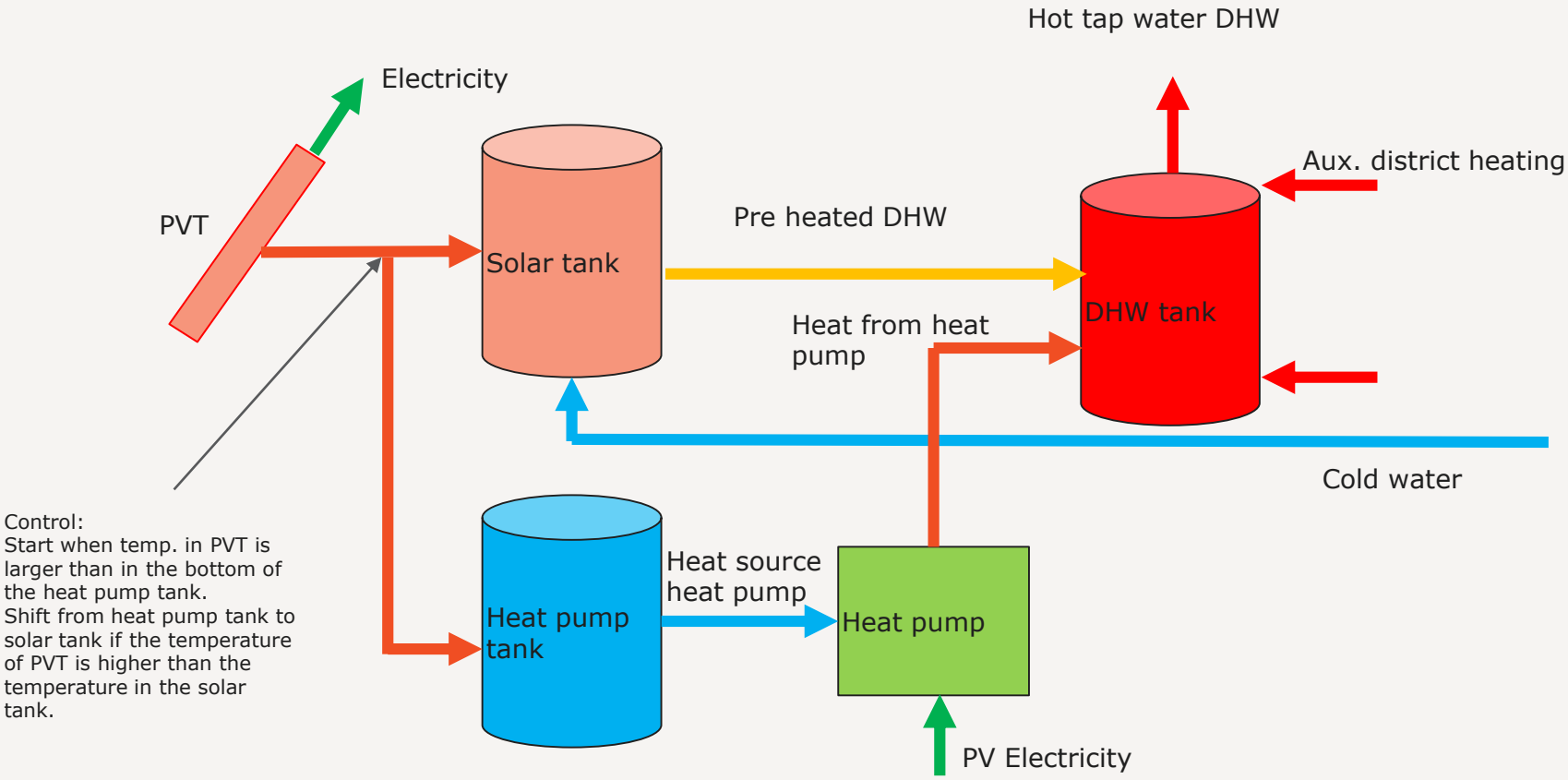
PVT energy absorber



System performance as a function of PVT area Calculated for one block.

PVT modules for heat pump. Performance as a function of the PVT area. Valid for one block.						
PVT area		m²	220	110	55	27
Solar thermal energy to the system		kWh	34.842	33.767	32.348	29.113
Electricity production		kWh	29.863	16.208	8.061	3.785
Thermal production per m² PVT		kWh/m²	158	307	588	1.078
Electricity production per m² PVT		kWh/m²	136	147	147	140
Balance						
Demand for hot tap water		kWh	47.700	47.700	47.700	47.700
Circulation loss		kWh	6.000	6.000	6.000	6.000
Heat from heat pump			36.100	36.600	37.700	37.100
District heating			11.000	12.500	13.200	15.900
COP			4,1	4,0	4,0	3,9

As we install 220m² we can improve the PVT e.g. with transparent insulation on one block

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System performance for various size of storage tanks

Storage tank size. Solar / heat pump / water tank (m³). Valid for one block.					
Storage tanks m^3	3 -2 - 1	1.5 - 2 - 1	1.5 - 1.5 - 1	1.5 - 1 - 1	1 - 1 - 1
PVT area	220	220	220	220	220
Solar thermal energy to the system	34.100	33.200	33.200	33.300	32.800
Electricity production	29.800	29.800	29.800	29.800	29.800
Thermal production per m² PVT	155	151	151	151	149
Electricity production per m² PVT	135	135	135	135	135
Demand for hot tap water	47.700	47.700	47.700	47.700	47.700
Heat from heat pump	35.700	36.500	36.400	36.300	36.900

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Day 2

Agenda: 4th May morning, General and Aarhus

08:30	Registration and coffee
09:00	Advanced training programme (1 hour 30 min.)
	Discussion and feed back
10:30	Break
11:00	Communication: Latest activities (15 min.)
11:15	Behavioural campaign (45 min.) Status of Task 8.9
12:00	Energy Cities Conference - Stuttgart (15 min.) Short report from latest dissemination activity
12:15	Lunch
13:30	Transport with metro
14:30	Site visit at the ECO-neighbourhood "Le Trapèze". Address: Ile Seguin, 92100 Boulogne Billancourt. Guided tour through the neighbourhood which used to be a Renault Factory
16:00	End of site visit and program

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