The future of Heat Networks:

Future-Proofing Performance and the latest guidance

Neil Parry

CIBSE Accredited Heat Network Consultant

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ABOUT ALTECNIC

- Altecnic is one of the UK's leading supplier of hydronic solutions for commercial and domestic markets throughout the UK & Ireland.
- We employ 98 staff based out of our 70,000 Sq Ft HQ facilities in Stafford, UK
- Altecnic is part of the Caleffi Group – a leading European manufacturer of high quality hydronic solutions.
- We have industry leading expertise and new product development capabilities
- We have dedicated sales, technical and customer service support teams.
- Altecnic is committed to providing superior quality and service and is proud to be ISO 9001:2015, ISO 14001:2015 and 18001:2007 certified, as well as being the only Carbon Neutral company in the industry.

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CALEFFI PARTNERSHIP

- Established in 1961, Caleffi is a manufacturer of high-quality components for heating, plumbing, air conditioning and renewable energy, for residential and industrial systems, whilst also providing state of the art components for metering applications.

- The Group has over 1,270 employees worldwide and distributes to over 90 countries, generating a recorded turnover of over 400 million euros in 2018.

- Caleffi has 3 production plants located in Fotaneto d'Agogna, north of Milan. Altecnic has been a partner of Caleffi S.p.a since 2002.

- Working jointly with Caleffi allows Altecnic to continuously anticipate new regulations and market trends, with regards to new product introduction and continuous professional development.

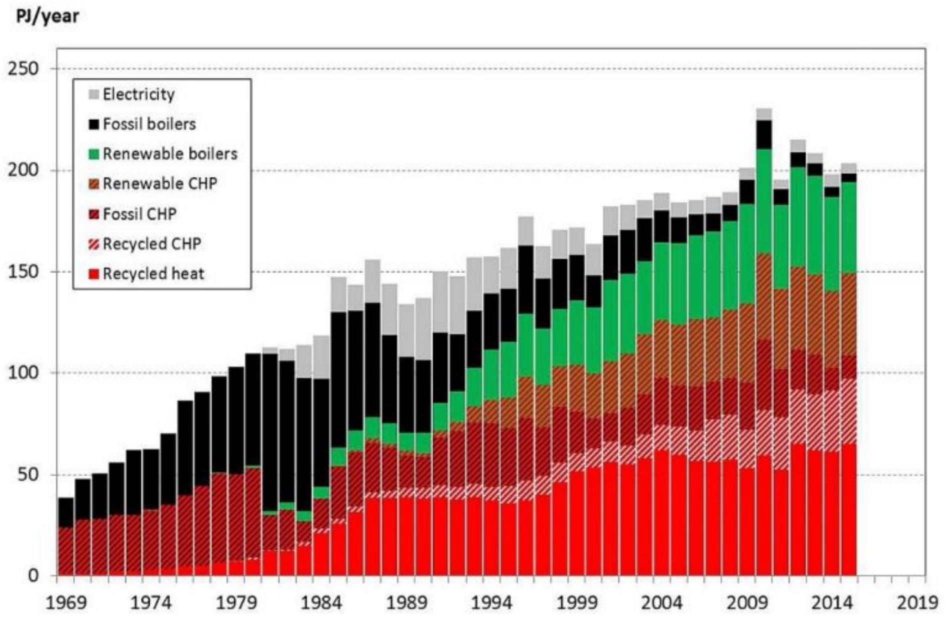
POINTS TO BE COVERED:

- Development of Swedish DH
- Why Instantaneous HIU's?
- What are, and can we meet, the loads?
- The design process: where to start and where to finish?
- Approach Temperatures – Why are they important?
- How important is ΔT- How do we maximise it?
- Integrating heat pumps and central plant design
- CIBSE CP1 2020
- Remote HIU Connection and continuous automated commissioning

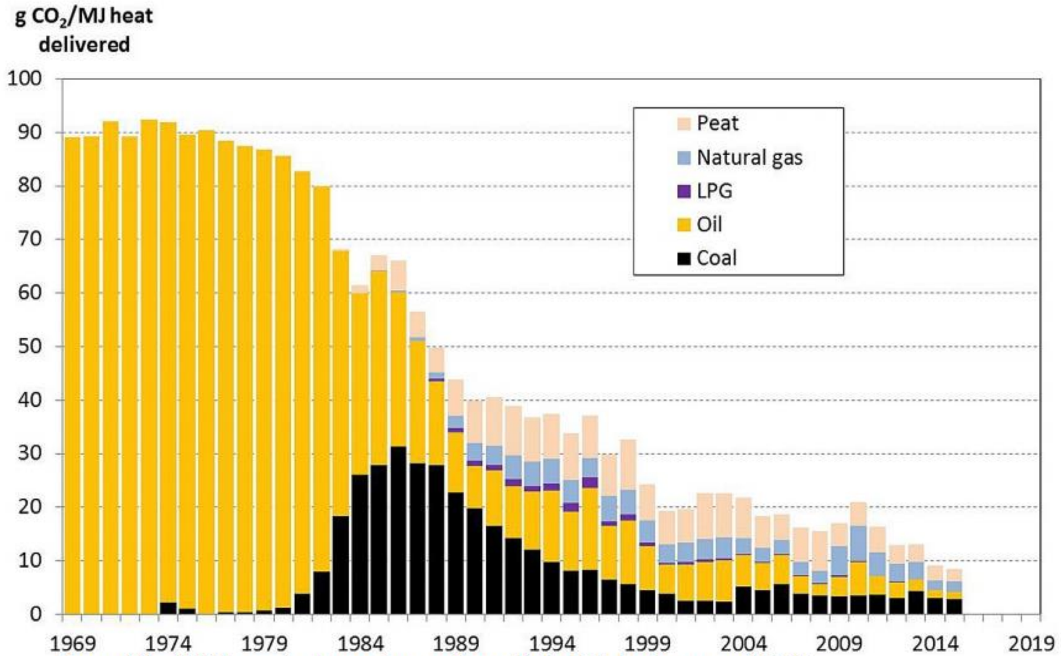
Swedish Heat Networks

- Continuous increase in heat supply
- Diversification increase in heat sources
- Dramatic reduction in carbon emissions

Heat networks are a *proven* method to reduce carbon emissions



Heat supply to Swedish DH systems between 1969 and 2015 by heat source.



Specific CO2 emissions from Swedish DH between 1969 and 2015 by input fuel.

Why Instantaneous HIU’s?

Why move away from domestic hot water storage?

Instantaneous DHW production

- DHW produced only when required
- High Diversity.
- Wide network ΔT: Low network return temperature.
- Reduced network losses.
- Maximised network efficiency.
- Reduced legionella risk
- No need to overheat the DHW
- DHW always available.
- Retrofit is viable when stored water is used on a heat network.
- Space!
- No fixed requirement to service.

Stored DHW

- Lower Diversity (programming cycles/cylinder re-heat times).
- Reduced ΔT and high network return temperatures for long periods
- Greater chance of overheating the building
- Higher network losses.
- legionella risk: We must heat DHW >60°C
- No DHW while cylinder is reheating.
- Must heat the entire cylinder even if it's not required.
- Bulky domestic hot water cylinders consume habitable space.
- Unvented cylinders must be serviced (safety concern).

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Myth: Pipe-work and energy centers are larger with instantaneous HIU’s

Example calculation – 100 apartments, typical DHW loads.

(55C primary flow, 50C DHW, SATK32107)

Instantaneous:

- 35kW (DHW demand) x 100 (no. of apps) x 0.07 (Diversity DS439) = 245kW
- 245kW / (4.2 x 37 DT) = 1.576 l/s

Stored:

- 12kW (Cylinder coil) x 100 (no. of Apps) x 0.25 (Diversity BS8558) = 300kW
- 300kW / (4.2 x 30 DT) = 2.38 l/s

Can we meet the DHW demand requirement?

Examples using the SATK32107

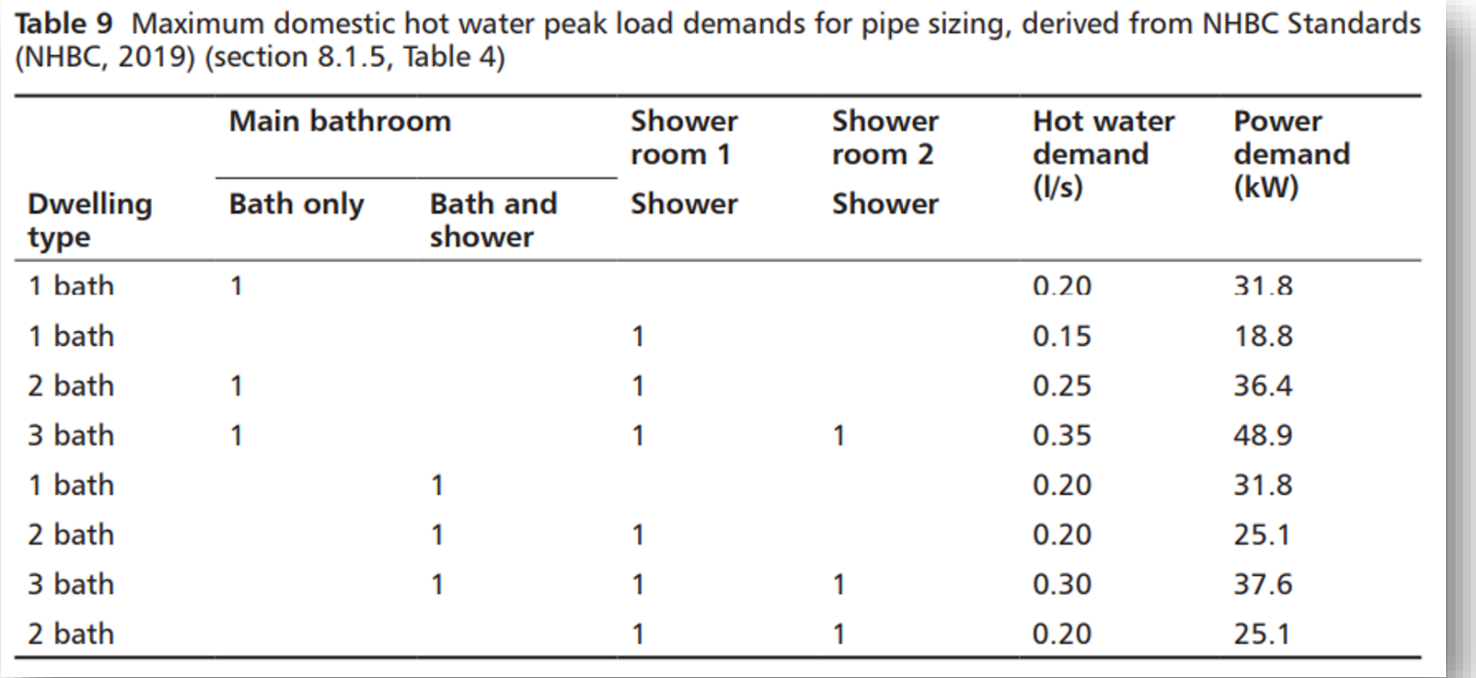
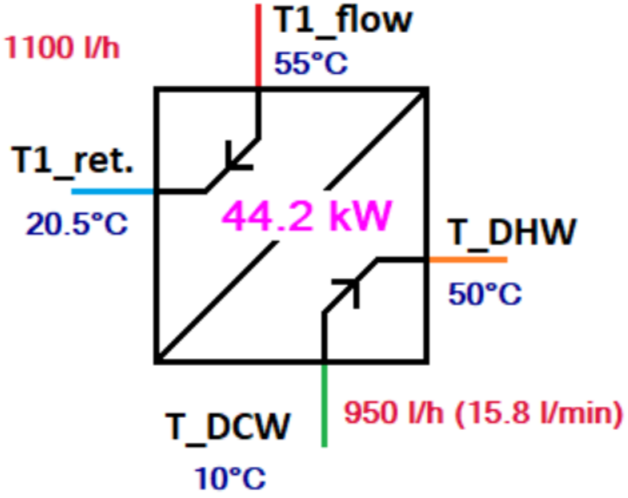
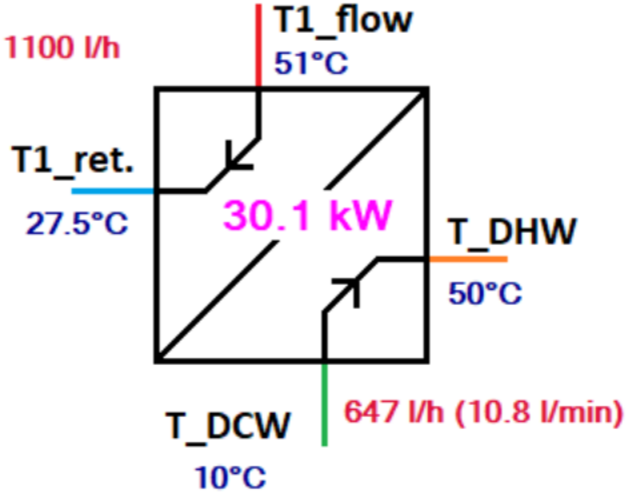


Table 9 Maximum domestic hot water peak load demands for pipe sizing, derived from NHBC Standards (NHBC, 2019) (section 8.1.5, Table 4)

	Main bathroom		Shower room 1	Shower room 2	Hot water demand (l/s)	Power demand (kW)
Dwelling type	Bath only	Bath and shower	Shower	Shower		
1 bath	1				0.20	31.8
1 bath			1		0.15	18.8
2 bath	1		1		0.25	36.4
3 bath	1		1	1	0.35	48.9
1 bath		1			0.20	31.8
2 bath		1	1		0.20	25.1
3 bath		1	1	1	0.30	37.6
2 bath			1	1	0.20	25.1





Heat networks:
Code of Practice for the UK

Raising standards for heat supply

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CP1
2020

CIBSE: Heat Network Code Of Practice 2020 Apartment Loads

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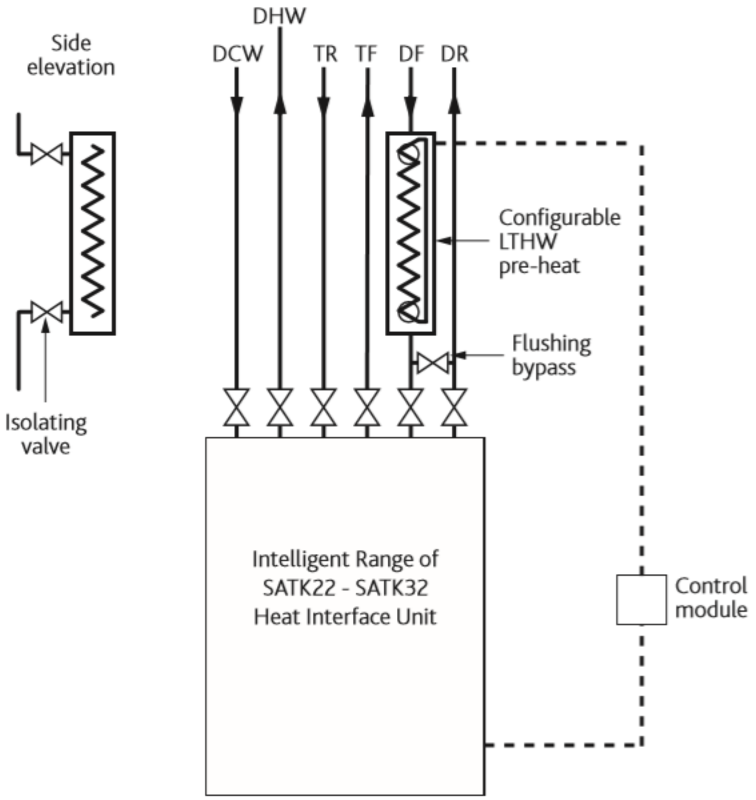
Need a little boost?

If the heat pump(s) can't supply a high enough temperature to meet the apartments DHW demands we have a solution in the way of a LTHW pre-heat.

This gives us the ability to "boost" the LTHW supply by up to 10°C.

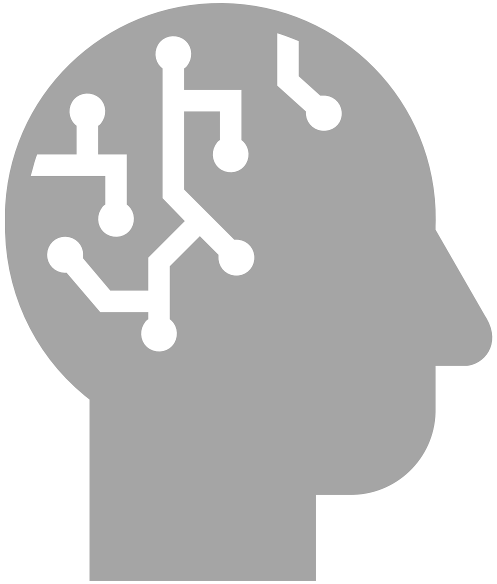
This inline heating element is sized dependant on requirement, and only used when the HIU is providing DHW.

The element is energised by the HIU, only when DHW is required. High diversity (DS439) is therefore applied to the overall building load



The design process: where to start and where to finish?

Design considerations.



Network Flow temperatures

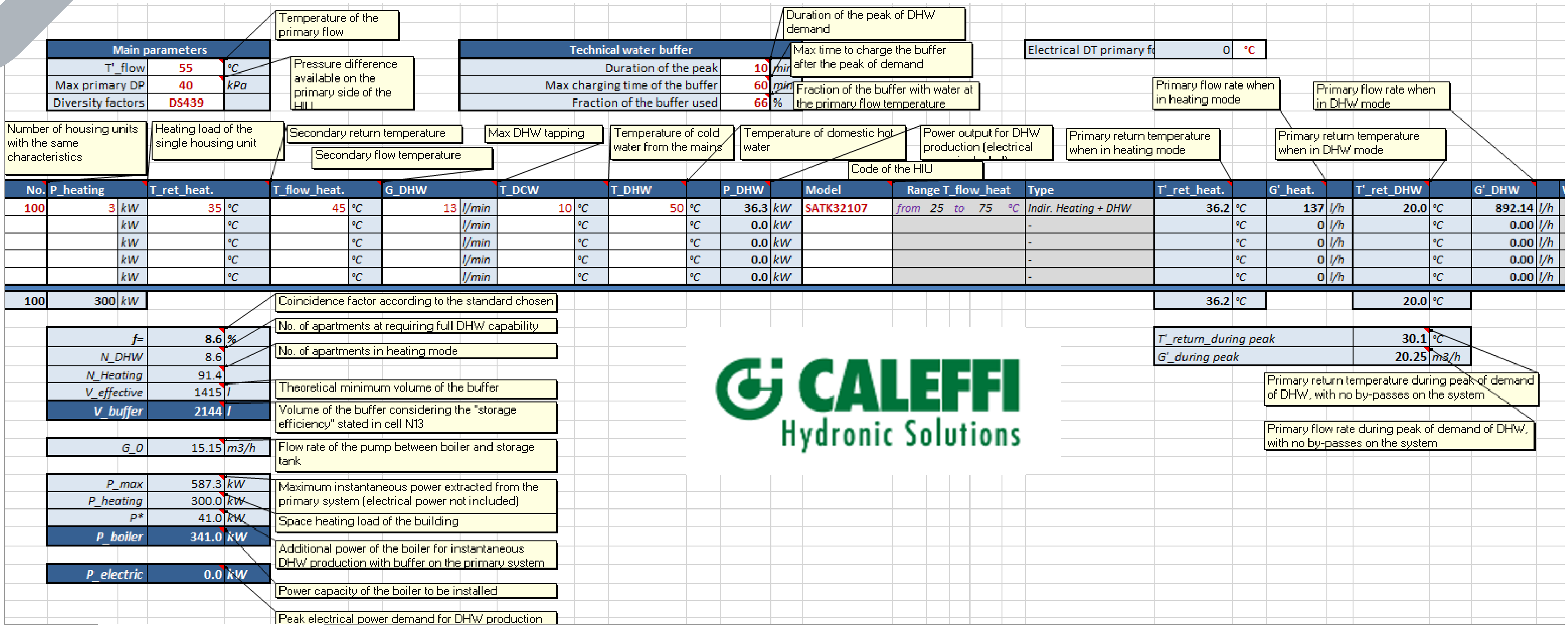
Apartment demand calculations:
- UFH/Radiators
- Approach temperatures
- Realistic DHW output
- Realistic DHW temperatures

HIU Selection to meet demand

Δ T Calculations

Heat network sizing:
- Pipework (correct velocities/pressure drop)
- Pumps
- Thermal store/(s)
- Energy source input

Sizing software:



Main parameters		
T'_flow	55	°C
Max primary DP	40	kPa
Diversity factors	DS439	

Technical water buffer		
Duration of the peak	10	min
Max charging time of the buffer	60	min
Fraction of the buffer used	66	%

Electrical DT primary fo	0	°C

No.	P_heating		T_ret_heat.		T_flow_heat.		G_DHW		T_DCW		T_DHW		P_DHW		Model	Range T_flow_heat	Type	T'_ret_heat.		G'_heat.		T'_ret_DHW		G'_DHW	
100	3	kW	35	°C	45	°C	13	l/min	10	°C	50	°C	36.3	kW	SATK32107	from 25 to 75 °C	Indir. Heating + DHW	36.2	°C	137	l/h	20.0	°C	892.14	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
100	300	kW																36.2	°C			20.0	°C		

f=	8.6	%
N_DHW	8.6	
N_Heating	91.4	
V_effective	1415	l
V_buffer	**2144**	**l**
G_0	15.15	m3/h
P_max	587.3	kW
P_heating	300.0	kW
P*	41.0	kW
P_boiler	**341.0**	**kW**
P_electric	**0.0**	**kW**

T'_return_during peak	30.1	°C
G'_during peak	20.25	m3/h

Temperature of the primary flow

Pressure difference available on the primary side of the HIU

Duration of the peak of DHW demand

Max time to charge the buffer after the peak of demand

Fraction of the buffer with water at the primary flow temperature

Primary flow rate when in heating mode

Primary flow rate when in DHW mode

Number of housing units with the same characteristics

Heating load of the single housing unit

Secondary return temperature

Secondary flow temperature

Max DHW tapping

Temperature of cold water from the mains

Temperature of domestic hot water

Power output for DHW production (electrical

Code of the HIU

Primary return temperature when in heating mode

Primary return temperature when in DHW mode

Coincidence factor according to the standard chosen

No. of apartments at requiring full DHW capability

No. of apartments in heating mode

Theoretical minimum volume of the buffer

Volume of the buffer considering the "storage efficiency" stated in cell N13

Flow rate of the pump between boiler and storage tank

Maximum instantaneous power extracted from the primary system (electrical power not included)

Space heating load of the building

Additional power of the boiler for instantaneous DHW production with buffer on the primary system

Power capacity of the boiler to be installed

Peak electrical power demand for DHW production

Primary return temperature during peak of demand of DHW, with no by-passes on the system

Primary flow rate during peak of demand of DHW, with no by-passes on the system

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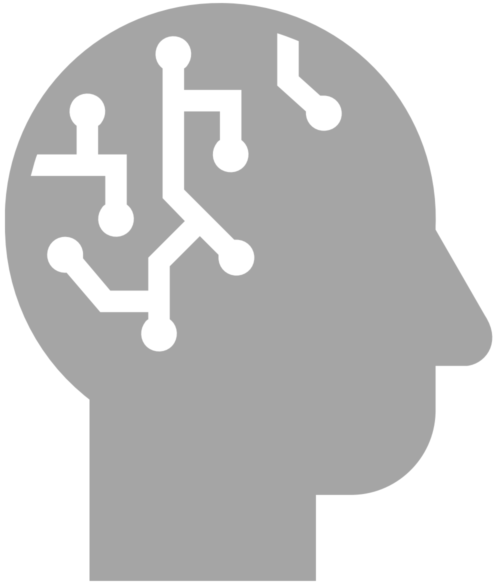
More design considerations.



Keep warm / Bypass strategy

Layout:
- Energy centre configuration
- LTHW pipework

Consumer control and expectation

Billing and energy usage

Ongoing monitoring, adjustment (energy centre/HIU) and optimisation

Remote access and control through Modbus

Approach Temperatures – Why are they important?

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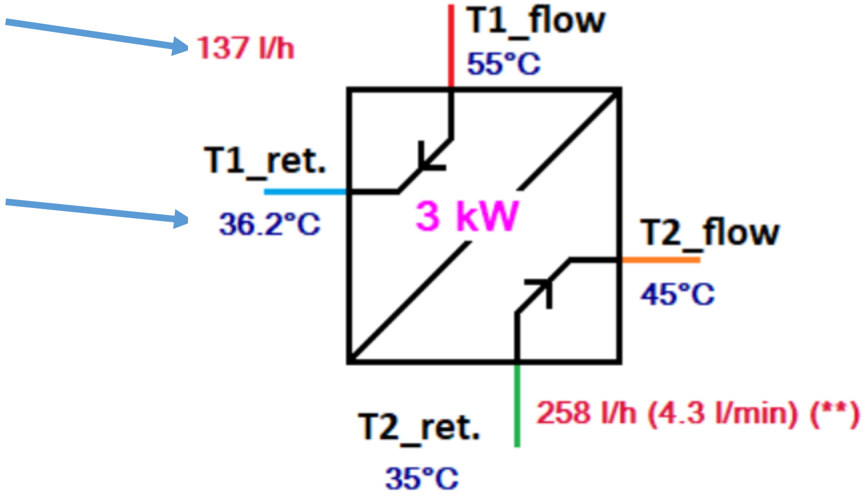
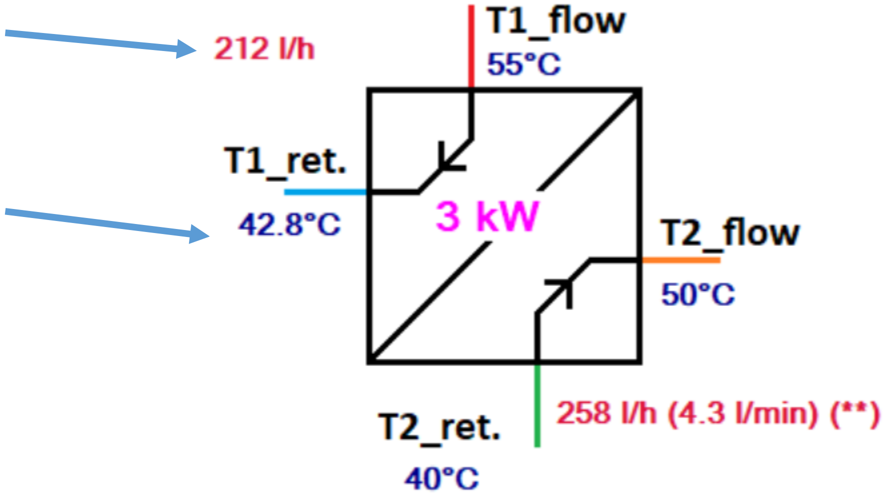
How does approach temperature change performance?

- Approach temperature – The difference between primary flow temperature and secondary flow temperature (DHW and Heating)
- Maintain 'reasonable' approach temperatures
- The smaller the approach temperature, the higher primary flow rate and the higher the network return temperature (for a given output).



3kW heating with 10°C approach



3kW heating with 5°C approach

Space heating example

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How important is delta T? How do we maximise it?

The importance of maximizing delta T

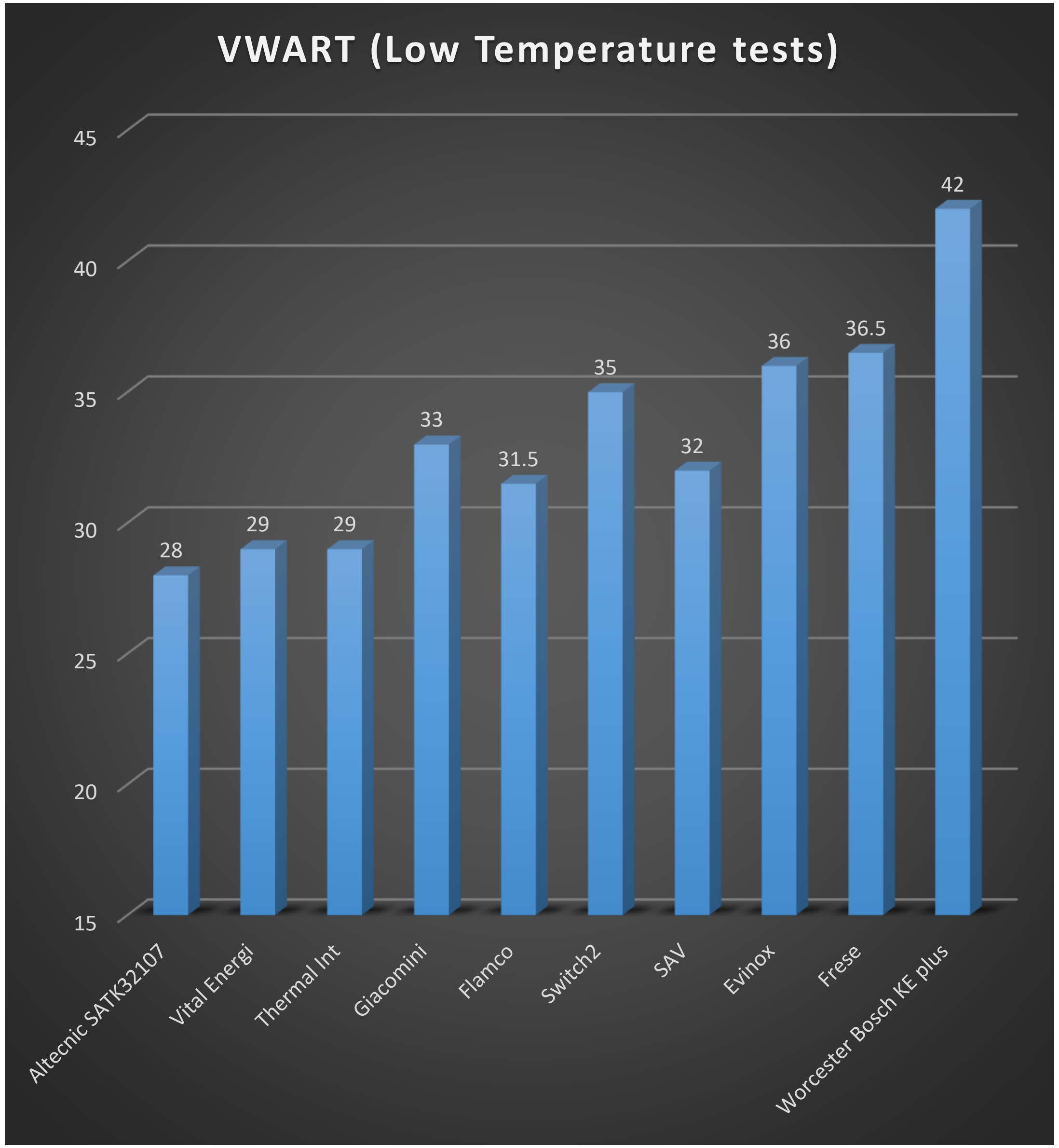
- Low losses on the network
- Lowest possible flow rates required to achieve demand
- Smaller diameter pipework required
- Better response times
- Reduced pump sizing

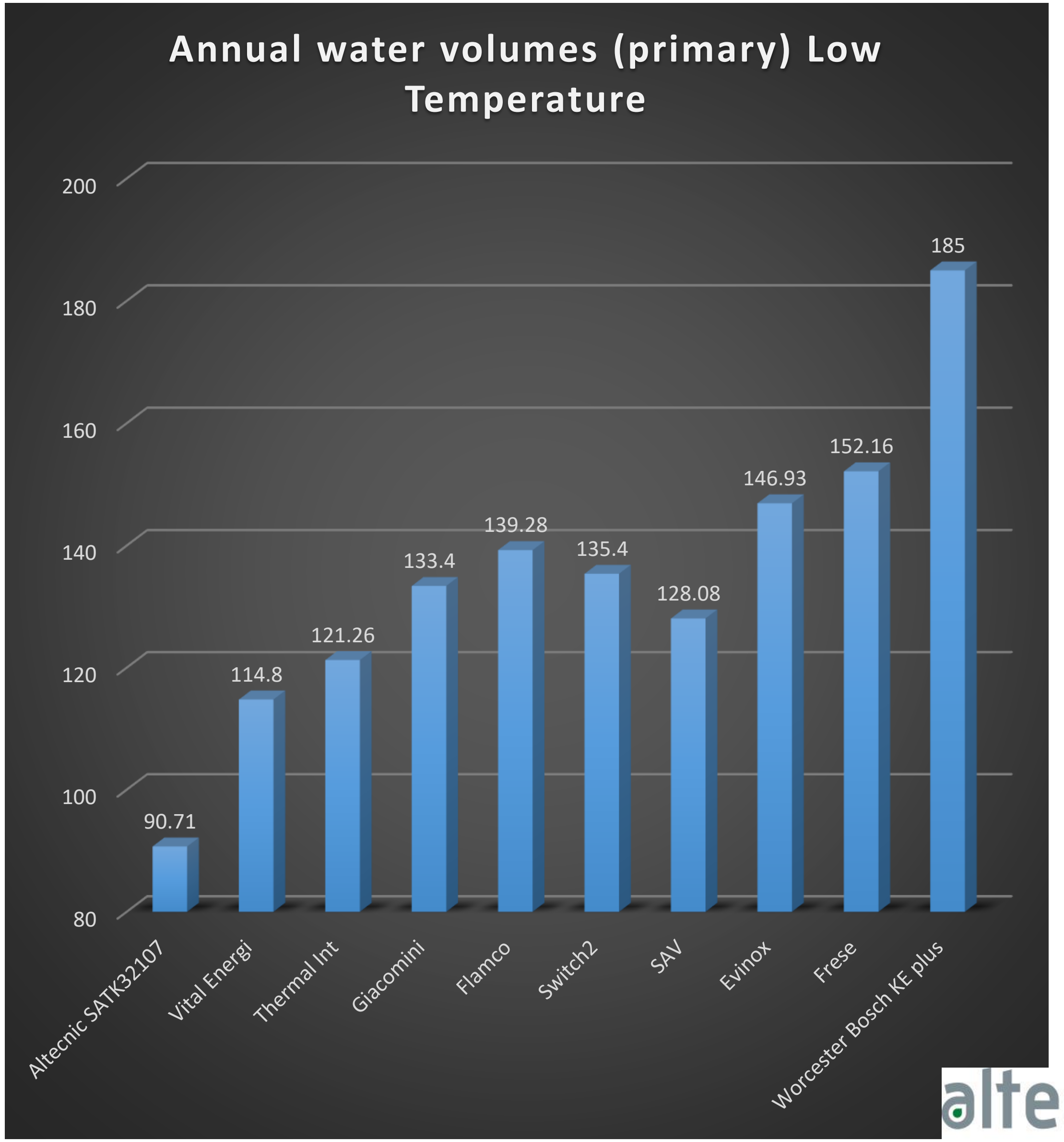
Maintaining a good ΔT across the **HEAT NETWORK (not the HP)** is crucial!

There are several factors in play when trying to achieve it but primarily we focus on:

- Tertiary heating circuit: A poorly commissioned tertiary circuit will have a massive impact to the network ΔT. This impact is felt even more if a direct HIU is used. Intelligent HIUs have the ability to limit the return temperature back to the network however this is not a substitute to good commissioning.
- Approach temperatures: As designers we need to maximise the approach temperatures wherever possible. This is even more important when we choose which type of heating is required inside the dwelling. The favourable option being underfloor heating however panel radiators can be used but must be sized to maximise both the approach temperatures and the ΔT
- Bypass methodology: There are several different ways to implement good bypass control, all should be looked at on a design by design basis. The objective however remains the same: minimalize cross over between flow/return while maximising pump efficiency.
- **Remember not all HIUs are created equal!**

Altecnic SATK32107 – BESA Test Results





Integrating heat pumps

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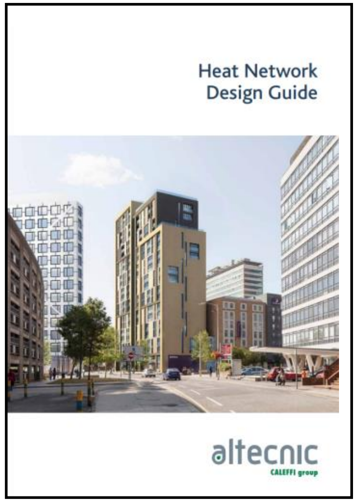
Integrating heat pumps and future proofing design.



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Design Guide

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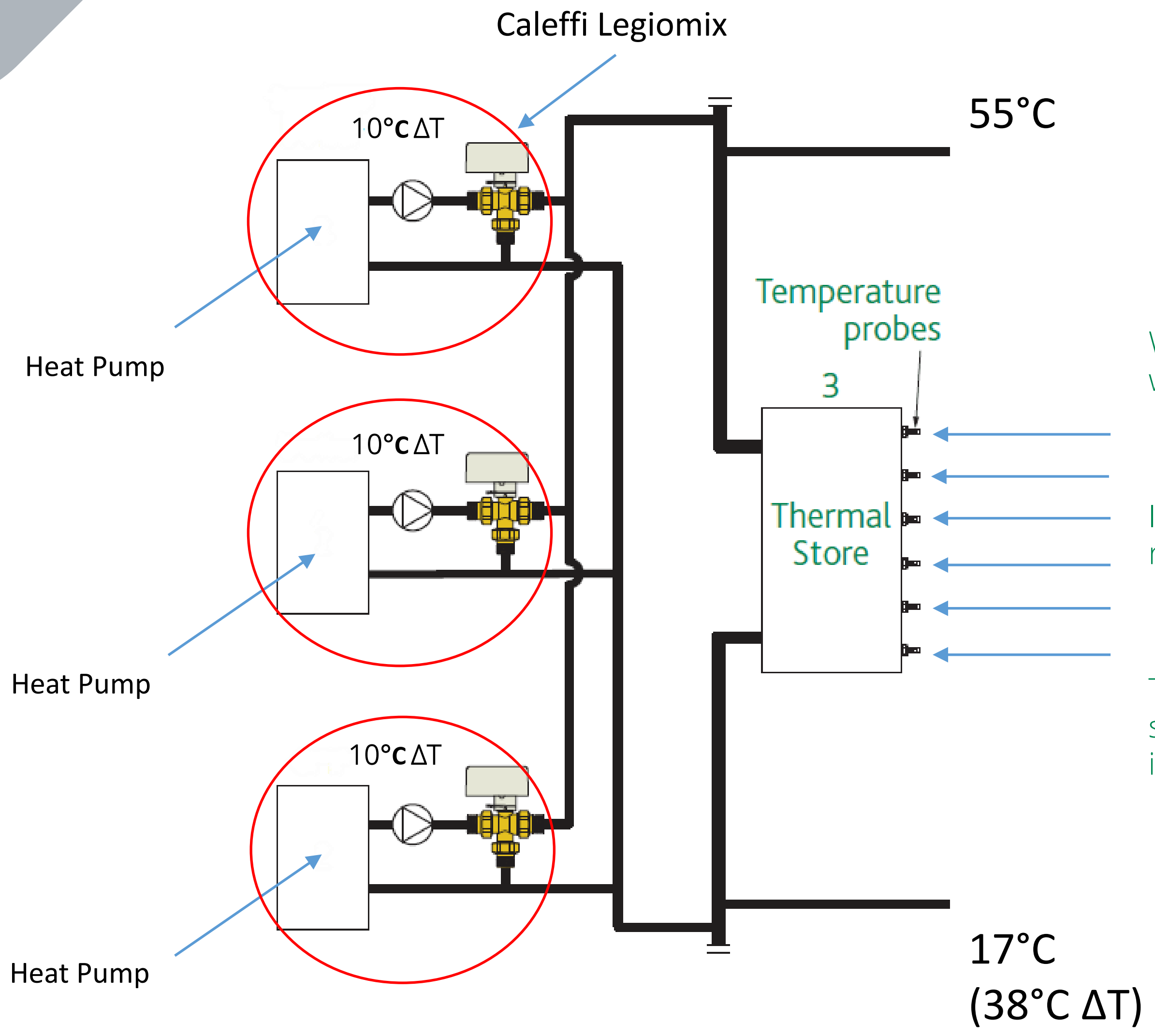

We are at the point of creating a design with a fantastic network ΔT but the HP wants a <10°C ΔT

Incorporate the HP with a thermal mixing valve to ensure the 10°C ΔT is maintained regardless of network return temperature.

The connected HP/s will modulate to the stratification layer within the buffer storage (3 – 1 ratio min.). As the stratification layer rises the HP productions will increase.

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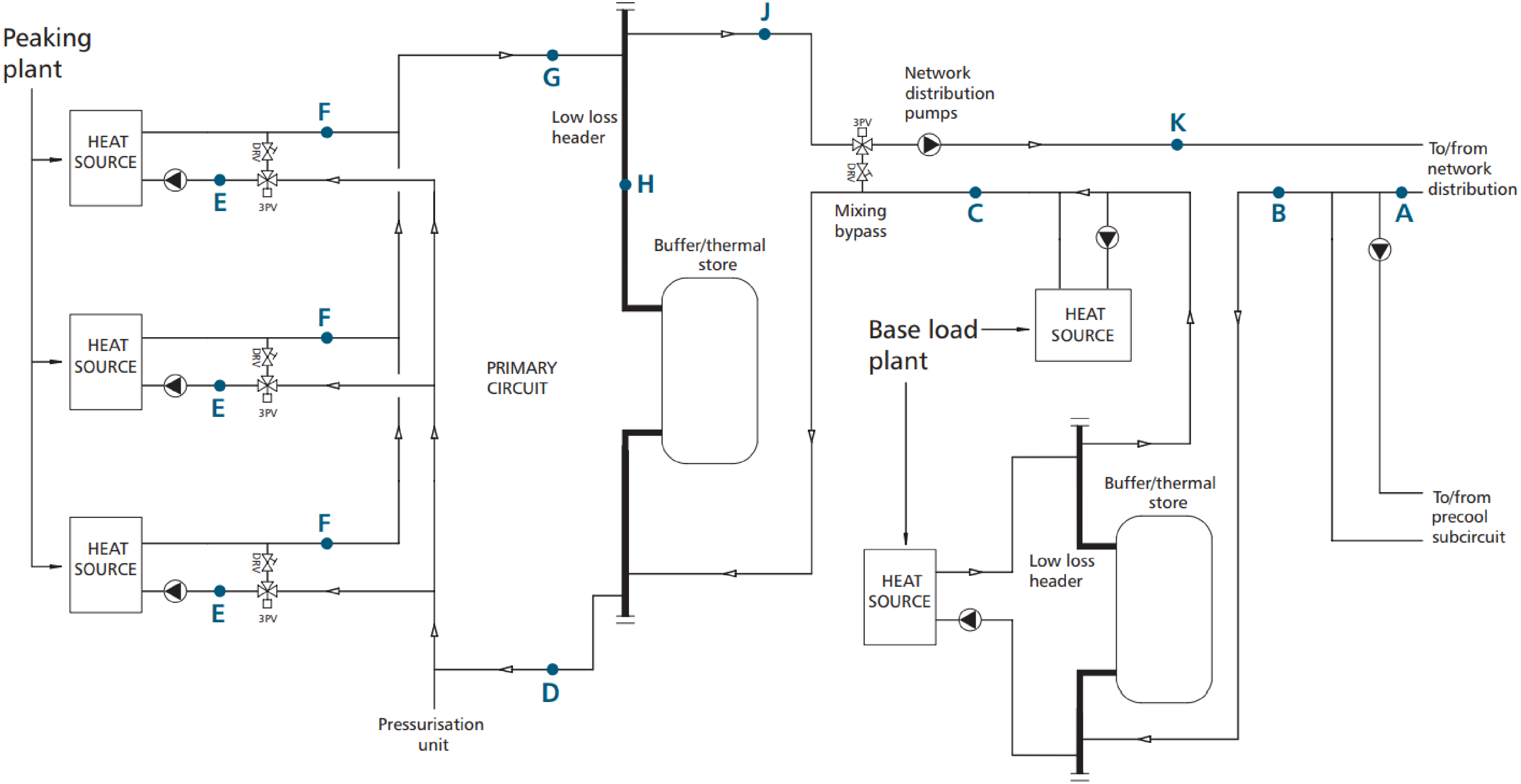

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CIBSE Heat Network Design Guide 2021 – Thermal store sizing and allocation

CIBSE Design Guide

Heat networks

2021

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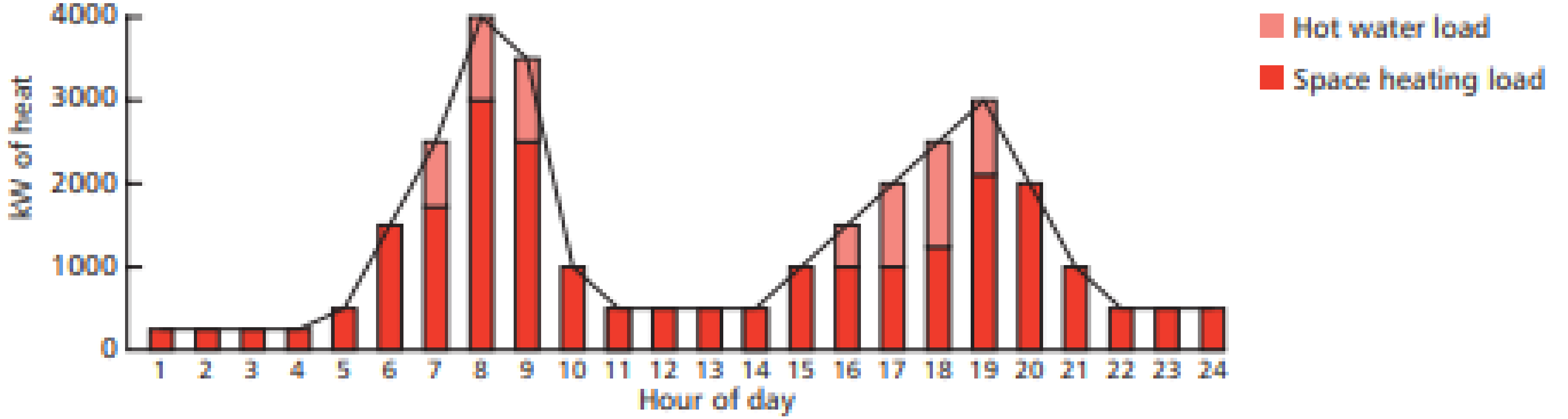

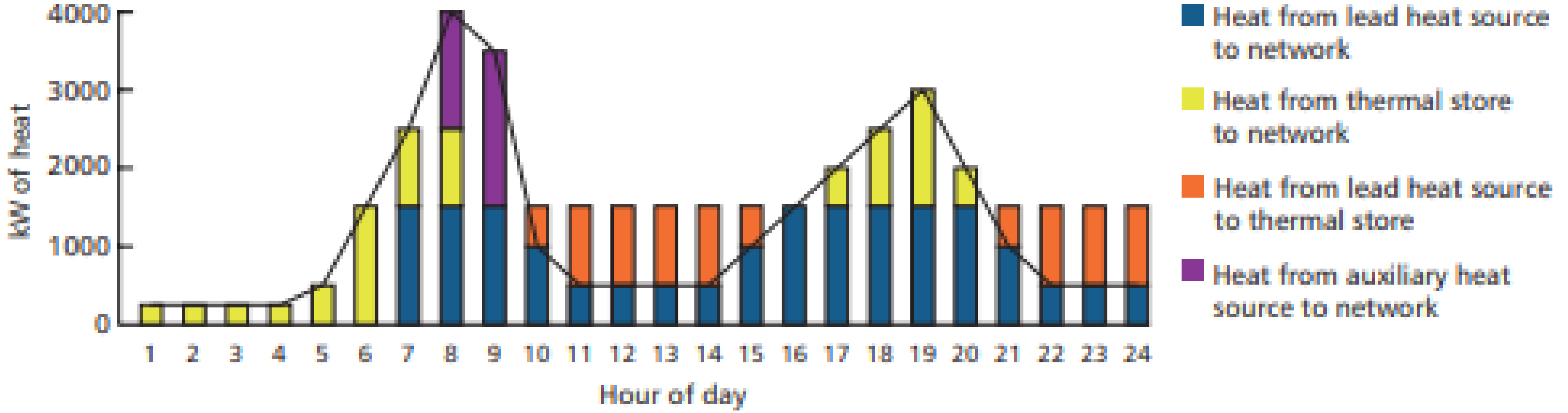

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CIBSE CP1 2020 (released 2021)

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Raising standards for heat supply

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2020

Varying primary flow temperatures

CIBSE CP1 (2020) – **Minimum** Requirements

1.3.4 The intended minimum flow temperature that will be available from the network in the summer period shall be defined, taking into account the use of variable flow temperature control and heat losses from the network.

1.3.5 The peak flow temperature and variations in flow temperature of the network, e.g. seasonally or in relation to the external air temperature, shall be defined in the heat supply contract with the customer. The contract shall include the right for the district heating (DH) operator to vary the network operating temperatures, provided the customer's comfort/service levels are still achieved.

2.4.3 The potential to reduce the flow temperature as demand falls (weather compensation) in order to reduce heat losses under part-load conditions shall be analysed, taking into account pumping energy and impact on return temperatures. This is subject to providing a sufficiently high flow temperature to safely produce domestic hot water for all customers.

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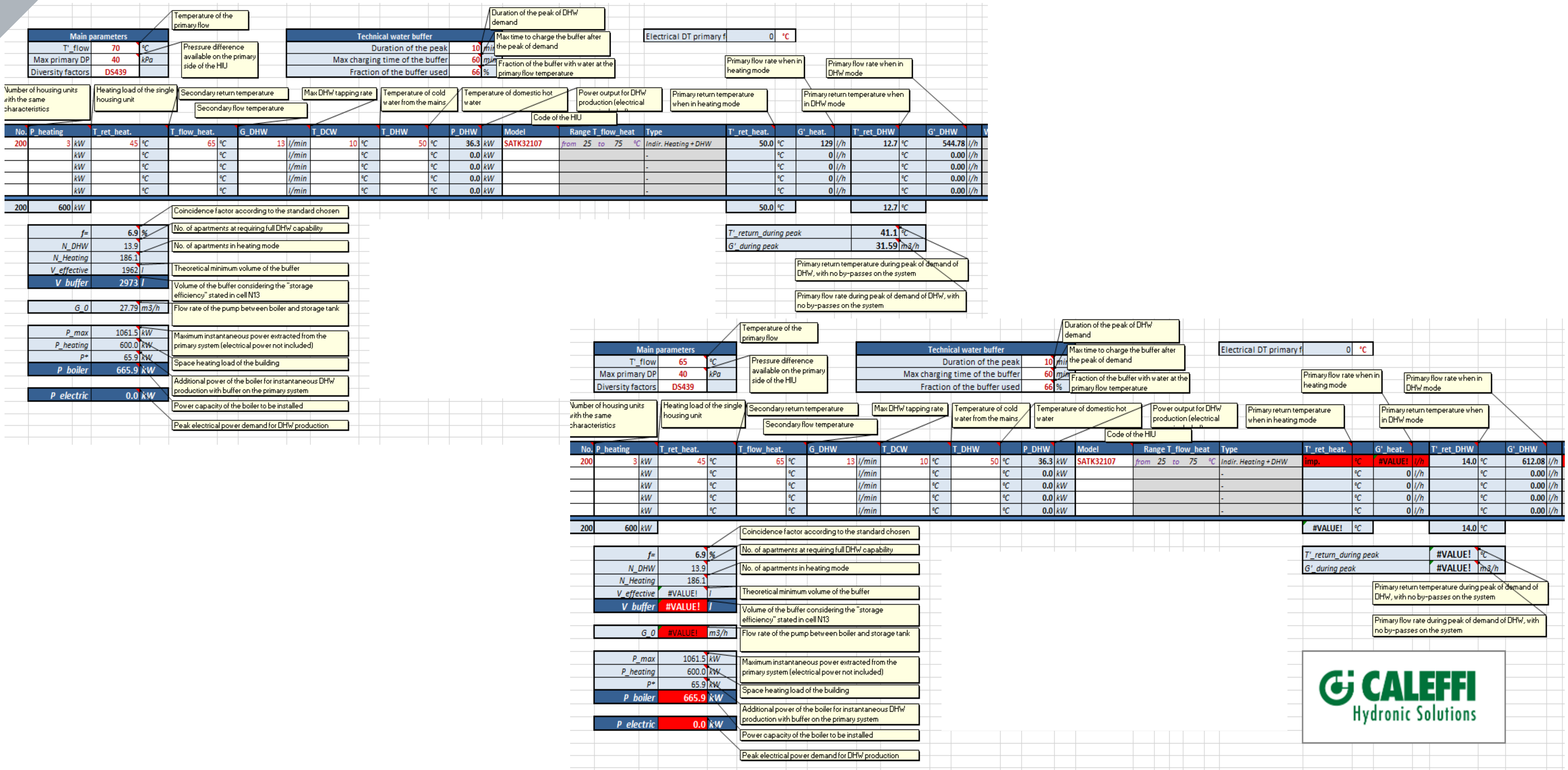
What happens when we reduce primary flow temperatures?



Main parameters		
T'_flow	70	°C
Max primary DP	40	kPa
Diversity factors	DS439	

Technical water buffer		
Duration of the peak	10	min
Max charging time of the buffer	60	min
Fraction of the buffer used	66	%

Electrical DT primary f	0	°C

Temperature of the primary flow

Pressure difference available on the primary side of the HIU

Duration of the peak of DHW demand

Max time to charge the buffer after the peak of demand

Fraction of the buffer with water at the primary flow temperature

Number of housing units with the same characteristics

Heating load of the single housing unit

Secondary return temperature

Secondary flow temperature

Max DHW tapping rate

Temperature of cold water from the mains

Temperature of domestic hot water

Power output for DHW production (electrical

Code of the HIU

Primary return temperature when in heating mode

Primary flow rate when in heating mode

Primary return temperature when in DHW mode

Primary flow rate when in DHW mode

No.	P_heating	T_ret_heat.	T_flow_heat.	G_DHW	T_DCW	T_DHW	P_DHW	Model	Range T_flow_heat	Type	T'_ret_heat.	G'_heat.	T'_ret_DHW	G'_DHW
200	3 kW	45 °C	65 °C	13 l/min	10 °C	50 °C	36.3 kW	SATK32107	from 25 to 75 °C	Indir. Heating + DHW	50.0 °C	129 l/h	12.7 °C	544.78 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
200	600 kW										50.0 °C		12.7 °C	

f=	6.9	%
N_DHW	13.9	
N_Heating	186.1	
V_effective	1962	l
V_buffer	2973	l
G_0	27.79	m3/h
P_max	1061.5	kW
P_heating	600.0	kW
P*	65.9	kW
P_boiler	665.9	kW
P_electric	0.0	kW

Coincidence factor according to the standard chosen

No. of apartments at requiring full DHW capability

No. of apartments in heating mode

Theoretical minimum volume of the buffer

Volume of the buffer considering the "storage efficiency" stated in cell N13

Flow rate of the pump between boiler and storage tank

Maximum instantaneous power extracted from the primary system (electrical power not included)

Space heating load of the building

Additional power of the boiler for instantaneous DHW production with buffer on the primary system

Power capacity of the boiler to be installed

Peak electrical power demand for DHW production

T'_return_during peak	41.1	°C
G'_during peak	31.59	m3/h

Primary return temperature during peak of demand of DHW, with no by-passes on the system

Primary flow rate during peak of demand of DHW, with no by-passes on the system

Main parameters		
T'_flow	65	°C
Max primary DP	40	kPa
Diversity factors	DS439	

Technical water buffer		
Duration of the peak	10	min
Max charging time of the buffer	60	min
Fraction of the buffer used	66	%

Electrical DT primary f	0	°C

Temperature of the primary flow

Pressure difference available on the primary side of the HIU

Duration of the peak of DHW demand

Max time to charge the buffer after the peak of demand

Fraction of the buffer with water at the primary flow temperature

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Max DHW tapping rate

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Primary flow rate when in heating mode

Primary return temperature when in DHW mode

Primary flow rate when in DHW mode

No.	P_heating	T_ret_heat.	T_flow_heat.	G_DHW	T_DCW	T_DHW	P_DHW	Model	Range T_flow_heat	Type	T'_ret_heat.	G'_heat.	T'_ret_DHW	G'_DHW
200	3 kW	45 °C	65 °C	13 l/min	10 °C	50 °C	36.3 kW	SATK32107	from 25 to 75 °C	Indir. Heating + DHW	imp. °C	#VALUE! l/h	14.0 °C	612.08 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
	kW	°C	°C	l/min	°C	°C	0.0 kW			-	°C	0 l/h	°C	0.00 l/h
200	600 kW										#VALUE! °C		14.0 °C	

f=	6.9	%
N_DHW	13.9	
N_Heating	186.1	
V_effective	#VALUE!	l
V_buffer	#VALUE!	l
G_0	#VALUE!	m3/h
P_max	1061.5	kW
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Space heating load of the building

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Power capacity of the boiler to be installed

Peak electrical power demand for DHW production

T'_return_during peak	#VALUE!	°C
G'_during peak	#VALUE!	m3/h

Primary return temperature during peak of demand of DHW, with no by-passes on the system

Primary flow rate during peak of demand of DHW, with no by-passes on the system

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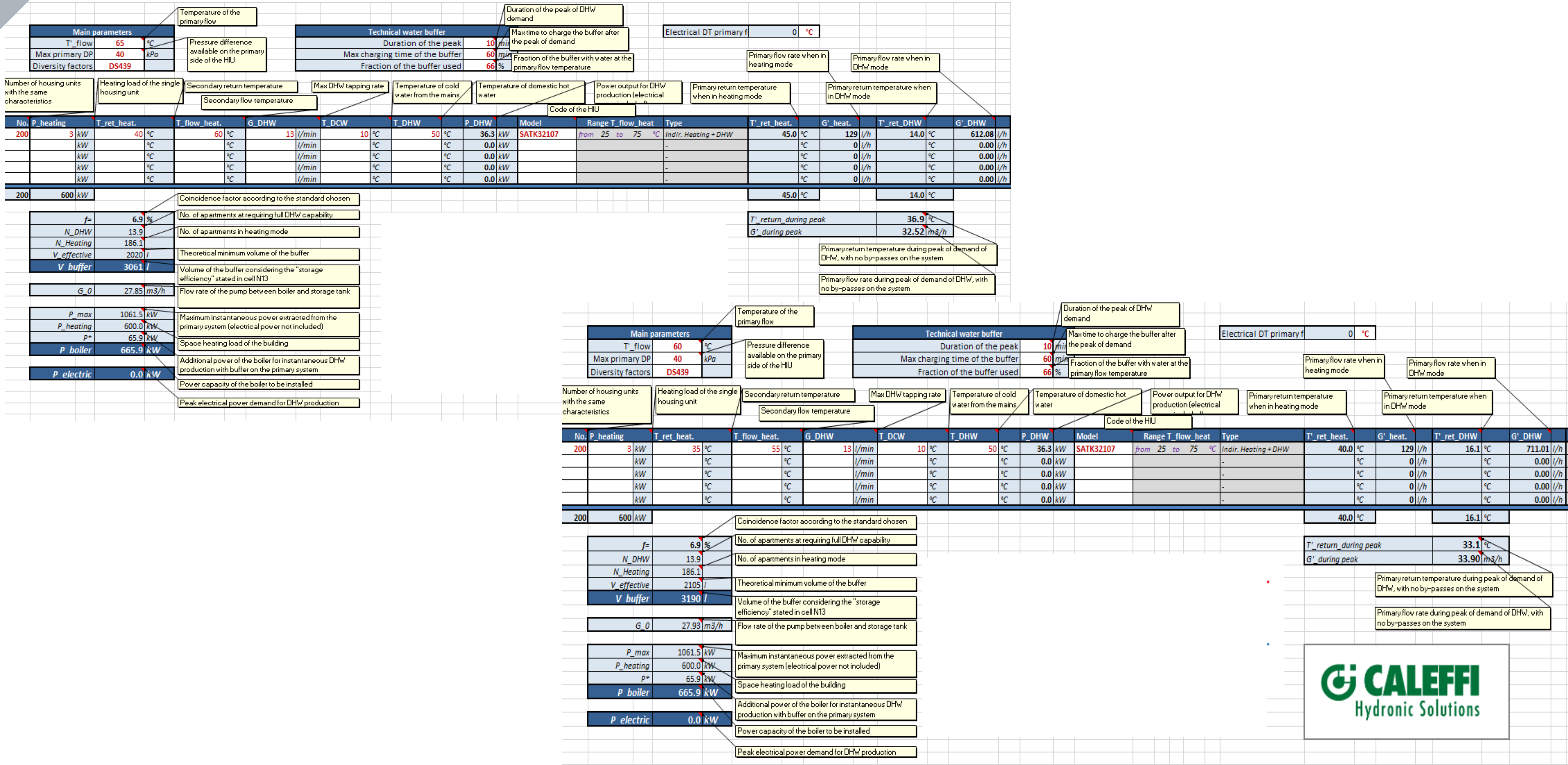
What happens when we reduce primary flow temperatures?



Main parameters		
T'_flow	65	°C
Max primary DP	40	kPa
Diversity factors	DS439	

Technical water buffer		
Duration of the peak	10	min
Max charging time of the buffer	60	min
Fraction of the buffer used	66	%

Electrical DT primary f	0	°C

No.	P_heating		T_ret_heat.		T_flow_heat.		G_DHW		T_DCW		T_DHW		P_DHW		Model	Range T_flow_heat	Type	T'_ret_heat.		G'_heat.		T'_ret_DHW		G'_DHW	
200	3	kW	40	°C	60	°C	13	l/min	10	°C	50	°C	36.3	kW	SATK32107	from 25 to 75 °C	Indir. Heating + DHW	45.0	°C	129	l/h	14.0	°C	612.08	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
200	600	kW																45.0	°C			14.0	°C		

f=	6.9	%
N_DHW	13.9	
N_Heating	186.1	
V_effective	2020	l
V_buffer	3061	l
G_0	27.85	m3/h
P_max	1061.5	kW
P_heating	600.0	kW
P*	65.9	kW
P_boiler	665.9	kW
P_electric	0.0	kW

T'_return_during peak	36.9	°C
G'_during peak	32.52	m3/h

Temperature of the primary flow

Pressure difference available on the primary side of the HIU

Duration of the peak of DHW demand

Max time to charge the buffer after the peak of demand

Fraction of the buffer with water at the primary flow temperature

Primary flow rate when in heating mode

Primary flow rate when in DHW mode

Number of housing units with the same characteristics

Heating load of the single housing unit

Secondary return temperature

Secondary flow temperature

Max DHW tapping rate

Temperature of cold water from the mains

Temperature of domestic hot water

Power output for DHW production (electrical

Code of the HIU

Primary return temperature when in heating mode

Primary return temperature when in DHW mode

Coincidence factor according to the standard chosen

No. of apartments at requiring full DHW capability

No. of apartments in heating mode

Theoretical minimum volume of the buffer

Volume of the buffer considering the "storage efficiency" stated in cell N13

Flow rate of the pump between boiler and storage tank

Maximum instantaneous power extracted from the primary system (electrical power not included)

Space heating load of the building

Additional power of the boiler for instantaneous DHW production with buffer on the primary system

Power capacity of the boiler to be installed

Peak electrical power demand for DHW production

Primary return temperature during peak of demand of DHW, with no by-passes on the system

Primary flow rate during peak of demand of DHW, with no by-passes on the system

Main parameters		
T'_flow	60	°C
Max primary DP	40	kPa
Diversity factors	DS439	

Technical water buffer		
Duration of the peak	10	min
Max charging time of the buffer	60	min
Fraction of the buffer used	66	%

Electrical DT primary f	0	°C

No.	P_heating		T_ret_heat.		T_flow_heat.		G_DHW		T_DCW		T_DHW		P_DHW		Model	Range T_flow_heat	Type	T'_ret_heat.		G'_heat.		T'_ret_DHW		G'_DHW	
200	3	kW	35	°C	55	°C	13	l/min	10	°C	50	°C	36.3	kW	SATK32107	from 25 to 75 °C	Indir. Heating + DHW	40.0	°C	129	l/h	16.1	°C	711.01	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
		kW		°C		°C		l/min		°C		°C	0.0	kW			-		°C	0	l/h		°C	0.00	l/h
200	600	kW																40.0	°C			16.1	°C		

f=	6.9	%
N_DHW	13.9	
N_Heating	186.1	
V_effective	2105	l
V_buffer	3190	l
G_0	27.93	m3/h
P_max	1061.5	kW
P_heating	600.0	kW
P*	65.9	kW
P_boiler	665.9	kW
P_electric	0.0	kW

T'_return_during peak	33.1	°C
G'_during peak	33.90	m3/h

Temperature of the primary flow

Pressure difference available on the primary side of the HIU

Duration of the peak of DHW demand

Max time to charge the buffer after the peak of demand

Fraction of the buffer with water at the primary flow temperature

Primary flow rate when in heating mode

Primary flow rate when in DHW mode

Number of housing units with the same characteristics

Heating load of the single housing unit

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Secondary flow temperature

Max DHW tapping rate

Temperature of cold water from the mains

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CALEFFI Hydronic Solutions

Remote HIU connection and Control

Remote HIU connection and Control

CIBSE CP1 (2020) – **Minimum** and **Best Practice** Requirements

2.6.10 Consideration shall be given to whether the HIUs and/or substations will have a communication system to allow remote interrogation of performance and remote setting of controls. Such a system may be combined with the AMR system. Where hard-wired, the communications cabling shall be installed at the same time as the heat network.

BP3.3d allow remote access into the HIU settings, where possible, so that changes can be made, faults addressed and performance checked without needing to visit the HIU.


Heat networks:
Code of Practice for the UK

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2020

Remote HIU connection and Control

Future-Proofing a building's performance

Guru: "Our Pinpoint® data shows, that whatever the network losses are at handover, on a particular project, they will double, within three years, due to performance drift."

Network and HIU remote interrogation

Utilising the Guru Hub Core III all the data from the HIU energy meter and the HIU's MODBUs output can be interrogated.

For the consultant:

A HIU that guarantees his design parameters are achieved.
A HIU that can be configured to meet the project requirements
Exceptionally low return temperatures

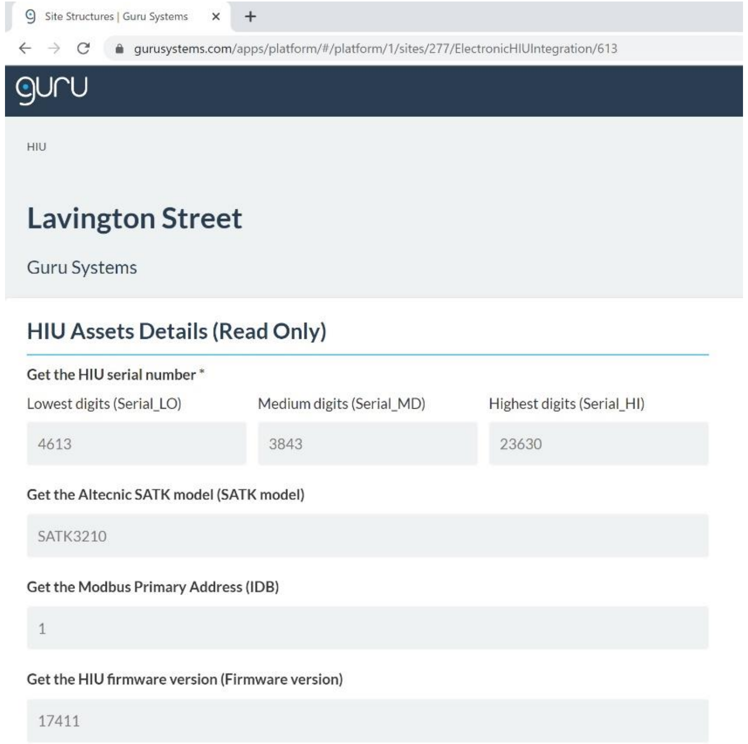
For the installer:

Remote commissioning of the HIU
Remote fault diagnosis (both network and HIU)
Remotely diagnose network issues, bypasses left open, commissioning issues etc.
Remotely diagnose apartment issues: Space heating commissioning, HIU set points etc.
Know what's required *before* the engineer attends

For the ESCo/Client:

Remote network optimisation – maximum performance and efficiency
Detect tenant issues: No DHW use, heating permanently on/off
Remotely 'see' problems even before the tenant does.
Real time network efficiency feedback and HIU diagnostics.

Configure the SATK32 remotely



Lavington Street

Guru Systems

HIU Assets Details (Read Only)

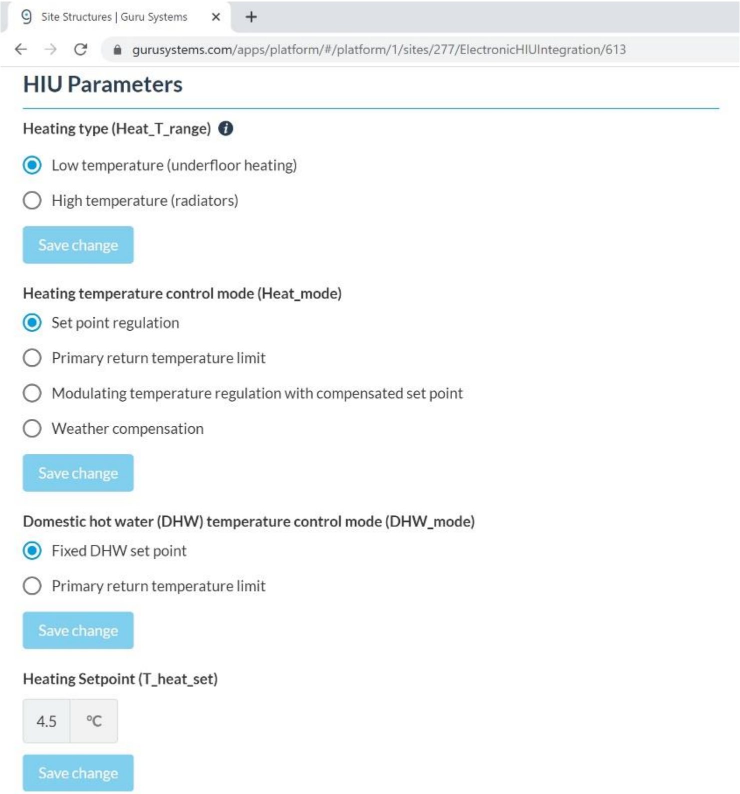
Get the HIU serial number *

Lowest digits (Serial_LO)	Medium digits (Serial_MD)	Highest digits (Serial_HI)
4613	3843	23630

Get the Altecnic SATK model (SATK model)
SATK3210

Get the Modbus Primary Address (IDB)
1

Get the HIU firmware version (Firmware version)
17411



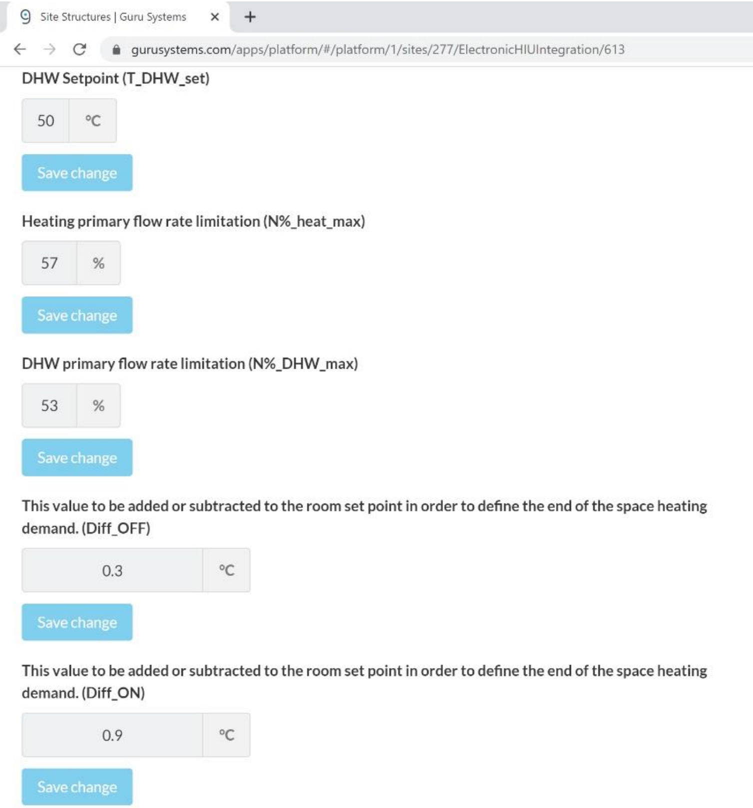
HIU Parameters

Heating type (Heat_T_range)
- ● Low temperature (underfloor heating)
- ○ High temperature (radiators)

Heating temperature control mode (Heat_mode)
- ● Set point regulation
- ○ Primary return temperature limit
- ○ Modulating temperature regulation with compensated set point
- ○ Weather compensation

Domestic hot water (DHW) temperature control mode (DHW_mode)
- ● Fixed DHW set point
- ○ Primary return temperature limit

Heating Setpoint (T_heat_set)
4.5 °C



DHW Setpoint (T_DHW_set)
50 °C

Heating primary flow rate limitation (N%_heat_max)
57 %

DHW primary flow rate limitation (N%_DHW_max)
53 %

This value to be added or subtracted to the room set point in order to define the end of the space heating demand. (Diff_OFF)
0.3 °C

This value to be added or subtracted to the room set point in order to define the end of the space heating demand. (Diff_ON)
0.9 °C

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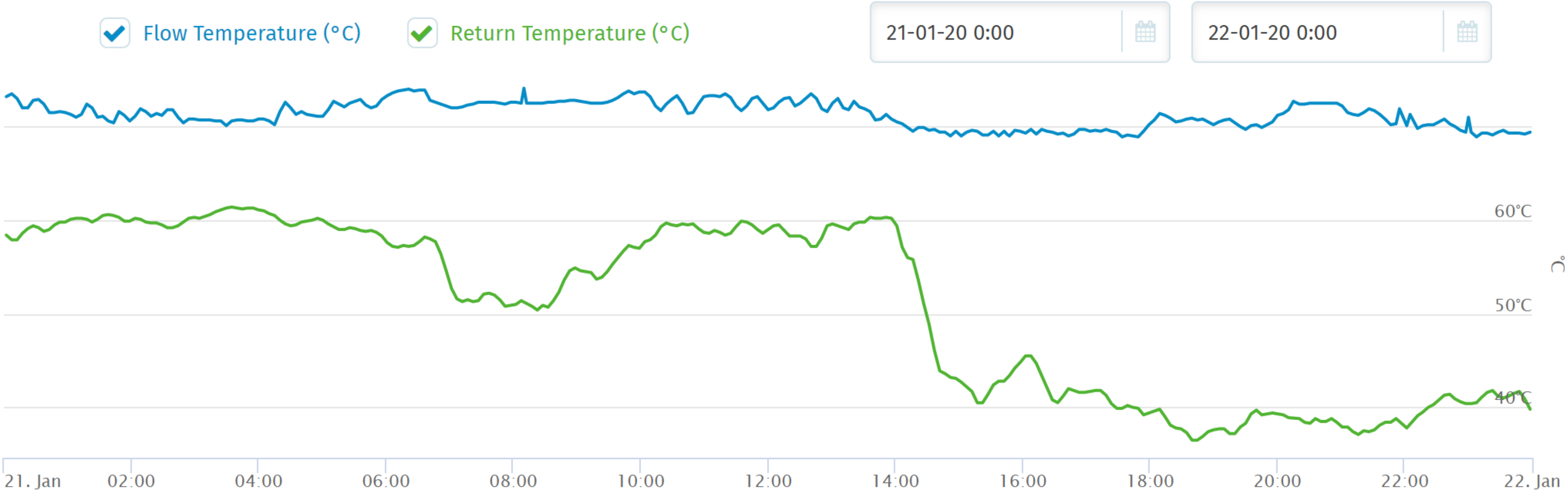
Remote recommissioning improves network efficiency



☑ Flow Temperature (°C) ☑ Return Temperature (°C)

21-01-20 0:00

22-01-20 0:00

Guru Pinpoint shows the impact that one HIU can have on a network.
Note the return temperature drop at the energy centre as just one HIU was replaced and properly commissioned.

Modbus – Remote HIU commissioning, remote control and network evaluation

Simple, clear, real time feedback of network performance

Easy to view, easy to read dial indicators.

Error reporting with automatic configurable alarms

Remote setting of HIU outputs, such as DHW temperature, space heating temperature, pre-heat condition etc.

Real time network efficiency calculations

Historic performance data

Graphable and configurable key performance parameters

Can include bulk meters and remote sensors for pressure/temperature etc.

Pen Name	Current Value	Minimum	Maximum	Average	Axis	Plot	X Trace
energy meter flowrate instantaneous power (kw)	0	0	12.90	4.19	Default	0	0.44
live primary return temperature	45.50	24.70	49	59.02	Default	0	49
live dhw temperature	38.70	37.50	54.60	51.17	Default	0	41.80

Domestic Hot Water Temperature (40C-60C): 50.0 | 0

Heating control mode (Fixed = 0, RTL = 1, Tertiary opt = 2, Weather comp = 3): 0 | 0

Heating temperature range (low 25-45C = 1, high 45-75C = 0):0 | 0

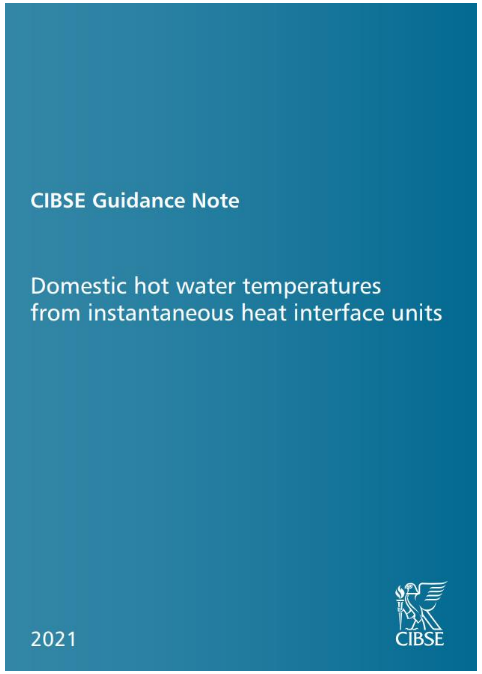
Heating set-point (check correct range first): 50.0 | 0

HIU operation mode (Stand-by = 0, DHW only = 1, DHW/Heating = 2): 2 | 0

Primary return temperature in heating mode (must be active, range low temp 15-42C, high temp 30-70C) : 30.0 | 0

Primary return temperature Thermostat mode (manual = 0, Programmed = 1, Holiday = 2) : 0

CIBSE Guidance Note 2021 – DHW temperatures



CIBSE Guidance Note

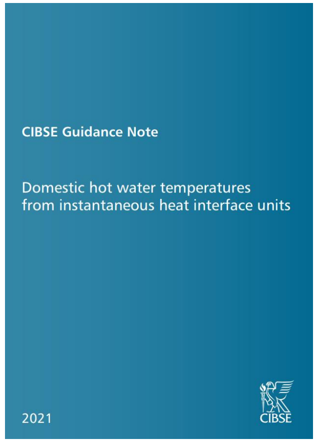
Domestic hot water temperatures
from instantaneous heat interface units

2021

CIBSE

DHW temperatures from instantaneous HIU's – 50C

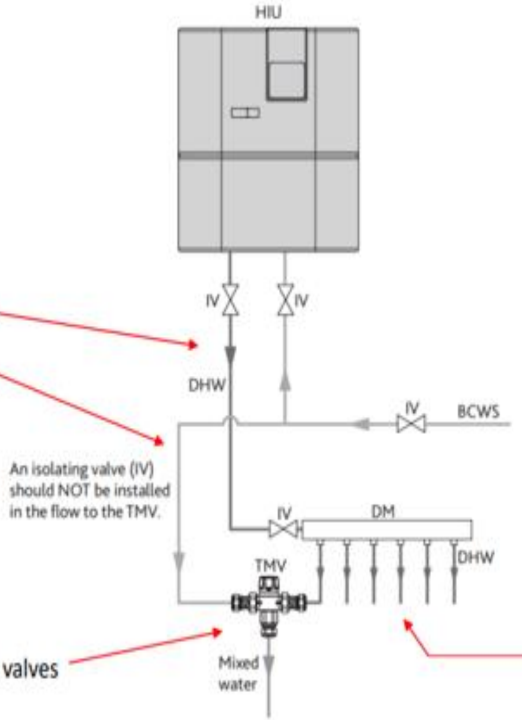
- How do we ensure shut off on failure of DCW?
- Will the outlet temperature form the TMV be stable with circa 2C Delta T?



CIBSE Guidance Note

Domestic hot water temperatures from instantaneous heat interface units

2021



15mm pipework

TMV with no isolation valves

Microbore pipework

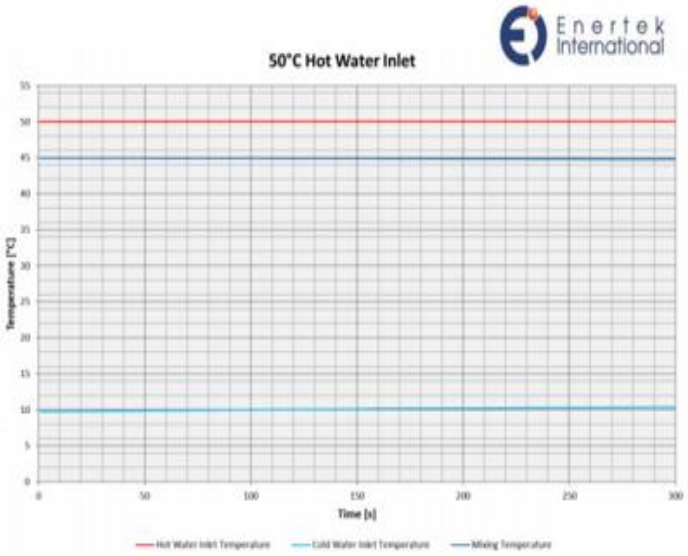
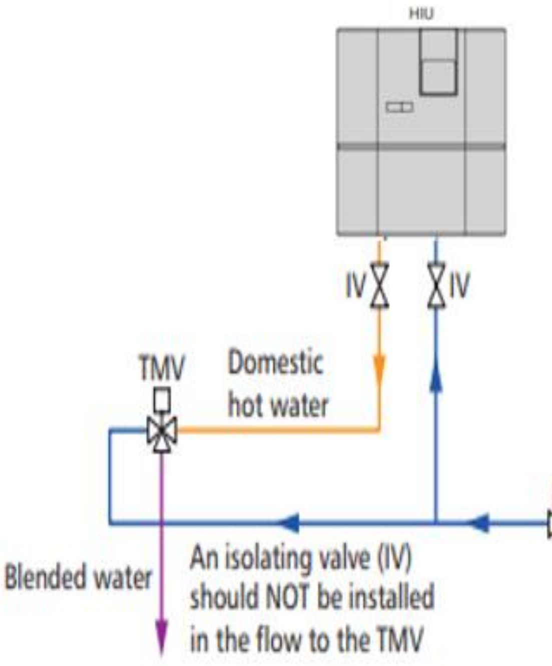


Figure 1.4 - 45 °C Mixed Outlet with 50 °C Hot Water Inlet

port No. 2

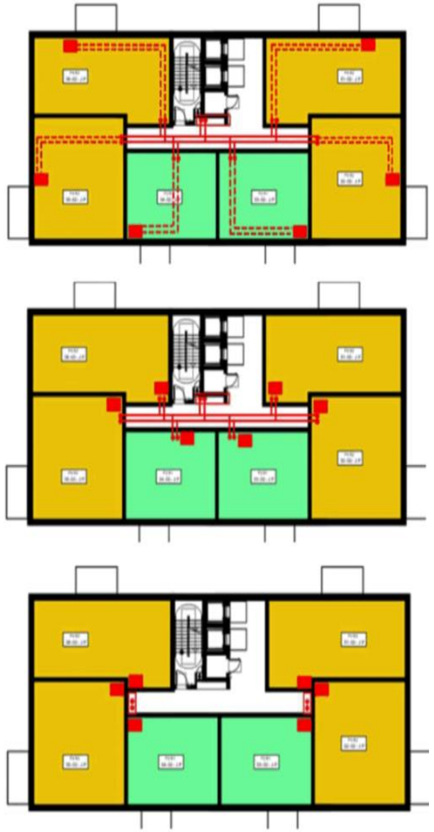
Page | 13 of 16

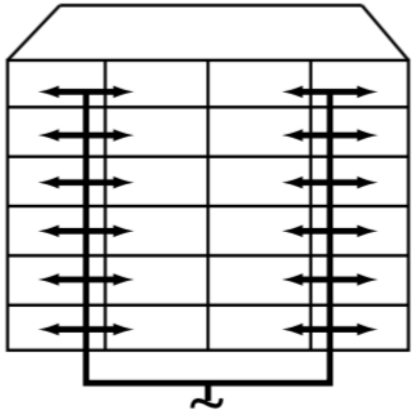


From cold water mains

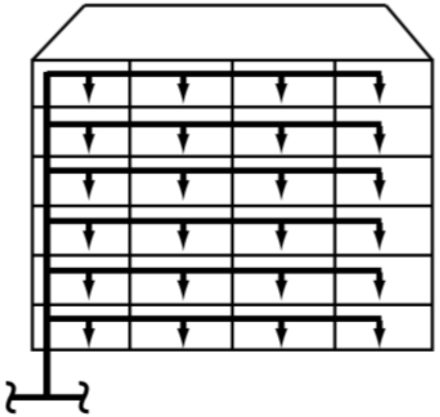
CIBSE CP1 2020 – LTHW Network layout

- **Locate HIU's on corridor walls if possible**
- **Utilise multiple risers if possible**
- **Minimise corridor pipe runs**





(a) Shared risers, minimal horizontal distribution



(b) Single riser, horizontal distribution

Heat networks:
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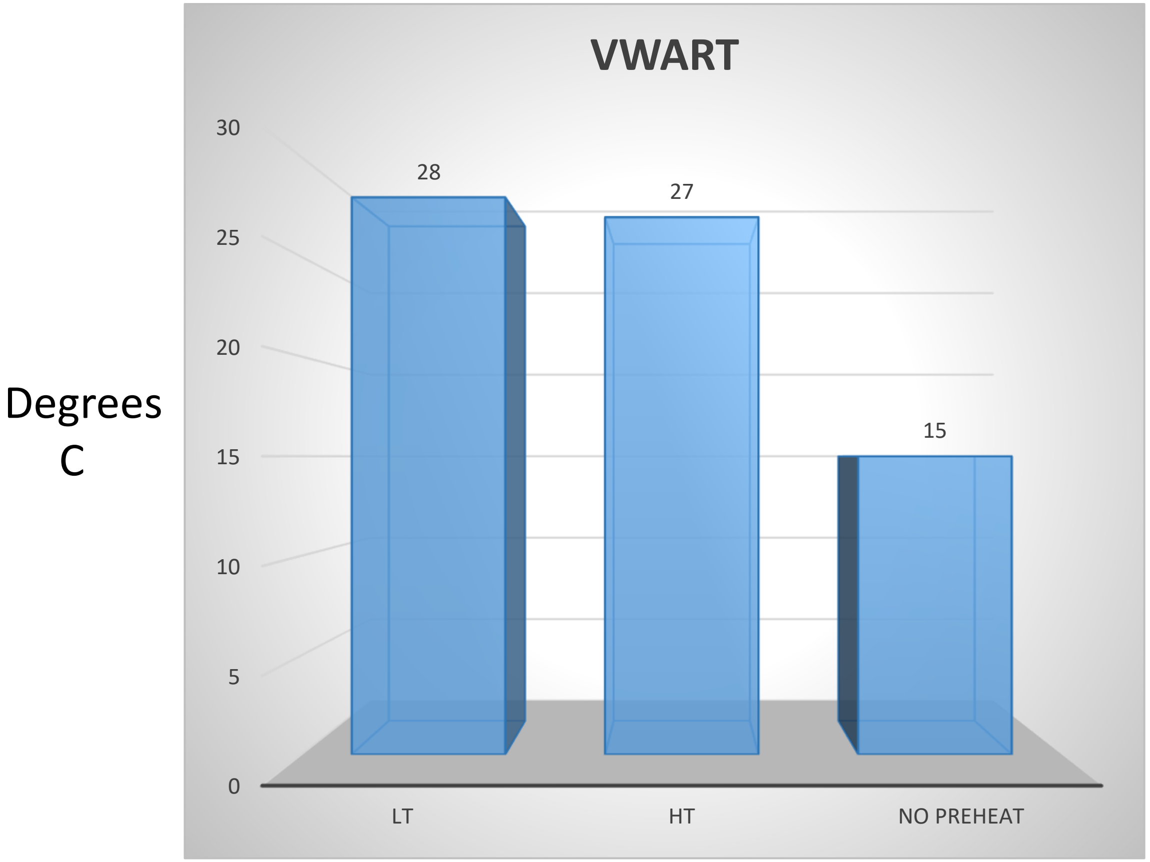
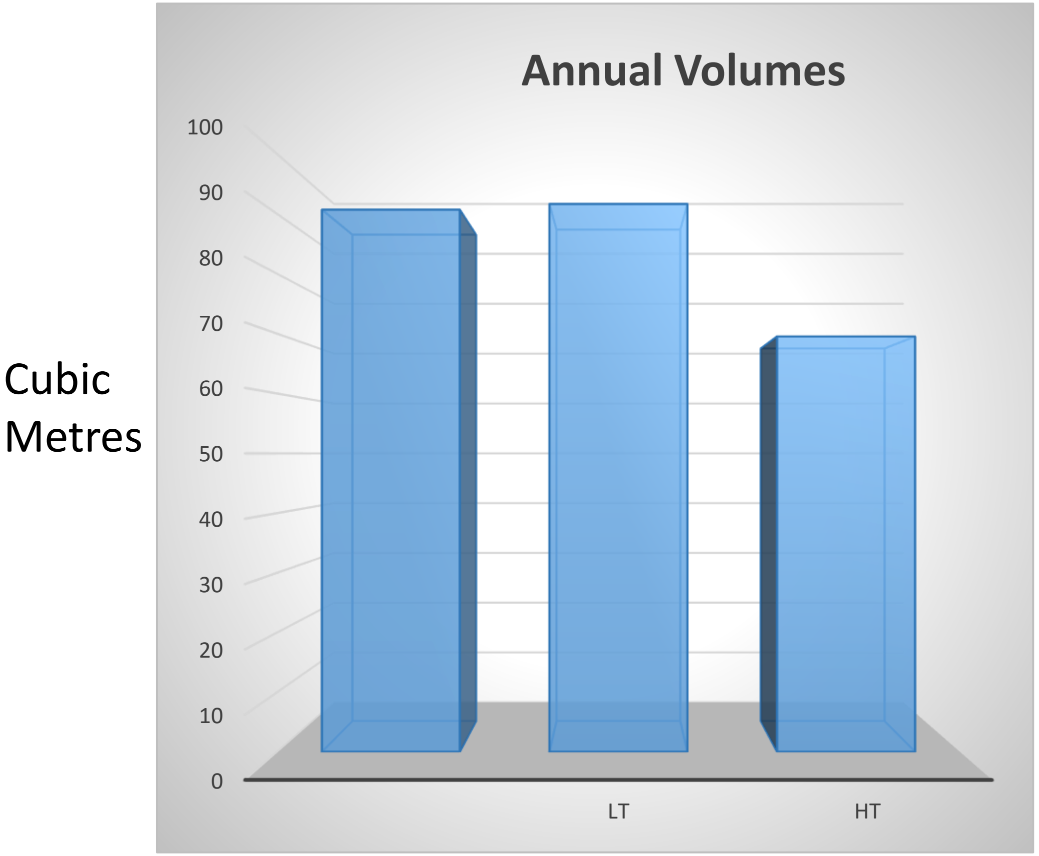
Keep warm: Is it needed?

- A minefield!
- What is a trickle?
    - Is 100 litres/hour a trickle?
- Why is it needed?
    - Slow acting HIU control valves
    - Long and oversized lateral pipe-work
    - Long and oversized DHW pipe-work
- What are the downsides?
    - Increased energy use
    - Decreased network delta T
    - Increased network losses
    - Higher bills to the tenant
    - Can you achieve 15% losses (CIBSE CP1)?
    - Should you be relying on something the tenant owns, with restricted access, to make the system work?

Keep warm affect on return temperature and flow volumes

SATK32107 – Preheat ON – VWART 28.35C
SATK32107 – Preheat OFF – VWART 15.9C





THANK YOU

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