



Heat Network Quality Assurance

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Heat Network Quality Assurance

Why do we need QA?



NO
FISHING



Heat Network Quality Assurance

Is it possible to create effective quality assurance measures [for heat networks] without introducing the need for a 100% external inspections,

and the training of a workforce to perform those inspections?

What do we know that works ?

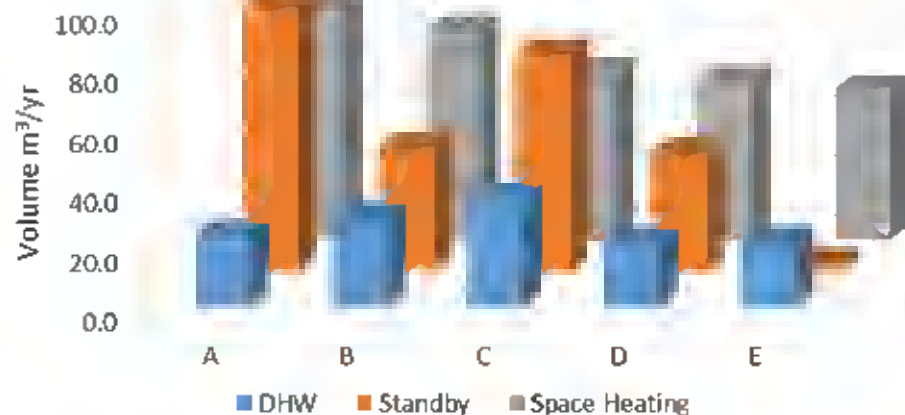
A single KPI, when on public display, motivates all stakeholders to improve quality themselves.

The BESA HIU Test Regime

“The [BESA] testing clearly shows performance differences between substations. The simplicity of the VWARD as a benchmark of substation performance is having an impact – with manufacturers starting to publicise the VWARD figure for their substations. Most of the manufacturers have made or brought forward planned substation improvements as a result of the testing.”

Martin Crane, Carbon Alternatives

**Substation E:
The DATA HIU**



VWARD with keep warm inactive *		
Period	VWARD (°C)	% Time
No heating	13.9	93%
Heating	39.4	7%
Overall	15.8	

* HIU has ability to deactivate keep warm function

VWARD calculation prepared by Freddie Valletta of FairHeat Ltd on 26 July 2017

Heat Network Quality Assurance

How do we shine a light on
poor efficiency in real-world
heat networks ?

Q1: Do the lights work?



Service KPIs (from HNTAS)

KPI Data Points	Days In Period	Devices Reporting (24h)	Points Operational (24h)	ARMS Connectivity (24h)
174	1	100%	100%	100%

Energy Centre Flow Temperatures		Avg Return Temp... ↗	Current Differential Pr...	
Current Value	71.1 °C	Network	62.4 °C	block3 4.05 bar
Volume Weighted Average	71.1 °C	Boilers	71.6 °C	block8and9 270 mbar
Time Weighted Average	71.1 °C	Difference	9.12 °C	block4and5 180 mbar
Minimum	69.8 °C			
Variance	2.81 °C			

Substation KPIs

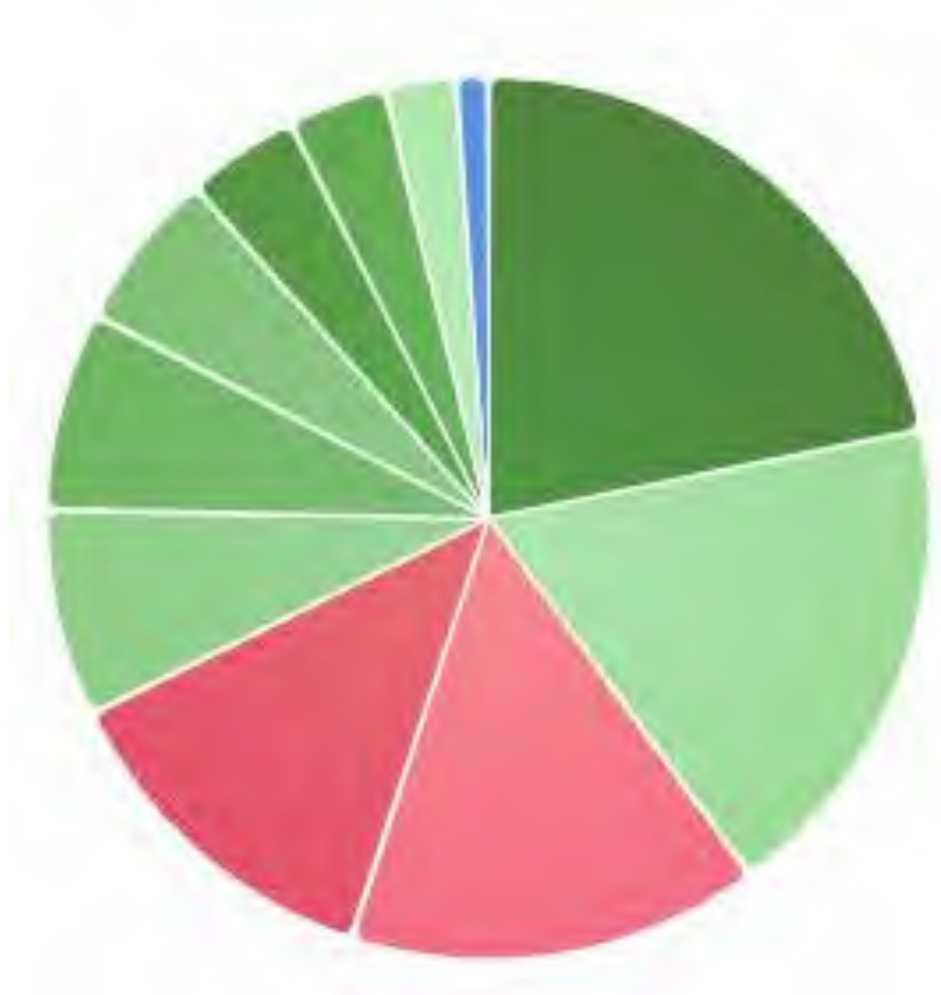
Substation Blocks 1 & 2 Tem... ↗	Substation Block 3	Substation Blocks 4 & 5 Te... ↗	Substation Blocks 8 & 9 Te... ↗
Current Value 70.3 °C	Current Value 69.6 °C	Current Value 72.4 °C	Current Value 76 °C
Volume Weighted Average 1 69.7 °C	Volume Weighted Average 1 70.1 °C	Volume Weighted Average 1 72.0 °C	Volume Weighted Average 1 70.0 °C
Volume Weighted Average 2 69.9 °C	Volume Weighted Return Temperature 1 69.2 °C	Volume Weighted Average 2 0 °C	Volume Weighted Average 2 74.4 °C
Avg Primary Return Temperature 1 45.1 °C	Avg Secondary Return Temperature 58.2 °C	Avg Primary Return Temperature 1 71.5 °C	Avg Primary Return Temperature 1 66.8 °C
Avg Primary Return Temperature 2 51.9 °C	PHE Efficiency 34.2%	Avg Primary Return Temperature 2 0 °C	Avg Primary Return Temperature 2 71.6 °C
Avg Secondary Return Temperature 43.9 °C		Avg Secondary Return Temperature 66.2 °C	Avg Secondary Return Temperature 67.5 °C
PHE 1 Efficiency 98.5%		PHE 1 Efficiency 20.7%	PHE 1 Efficiency 95.1%
PHE 2 Efficiency 71.0%		PHE 2 Efficiency 0%	PHE 2 Efficiency 54.5%

Block B Low Returns			Block B High Returns			Block C Returns			Block D Returns			Block E Returns		
phex1 57.4 °C	phex2 45.2 °C	meter 57.4 °C	phex1 69.6 °C	phex2 49.1 °C	meter 69.8 °C	phex1 59.3 °C	phex2 59.0 °C	meter 59.6 °C	phex1 58.9 °C	phex2 53.5 °C	meter 59.1 °C	phex1 56.9 °C	phex2 57.9 °C	meter 61.2 °C

Energy & Bypass KPIs

Primary Network Loss...	Primary Bypass Volume	Energy Delivered
2.1 MWh	87.2 m ³	11.6 MWh
15.2%	11.9%	EC Electrical Energy 182 kWh

- blockd 22%
- blockc 18%
- Plantroom Losses 15%
- Primary Distribution Losses 13%
- blockblow 8%
- blockalow 7%
- blockahigh 6%
- blockbhigh 4%
- blockahotel 4%
- blocke 3%

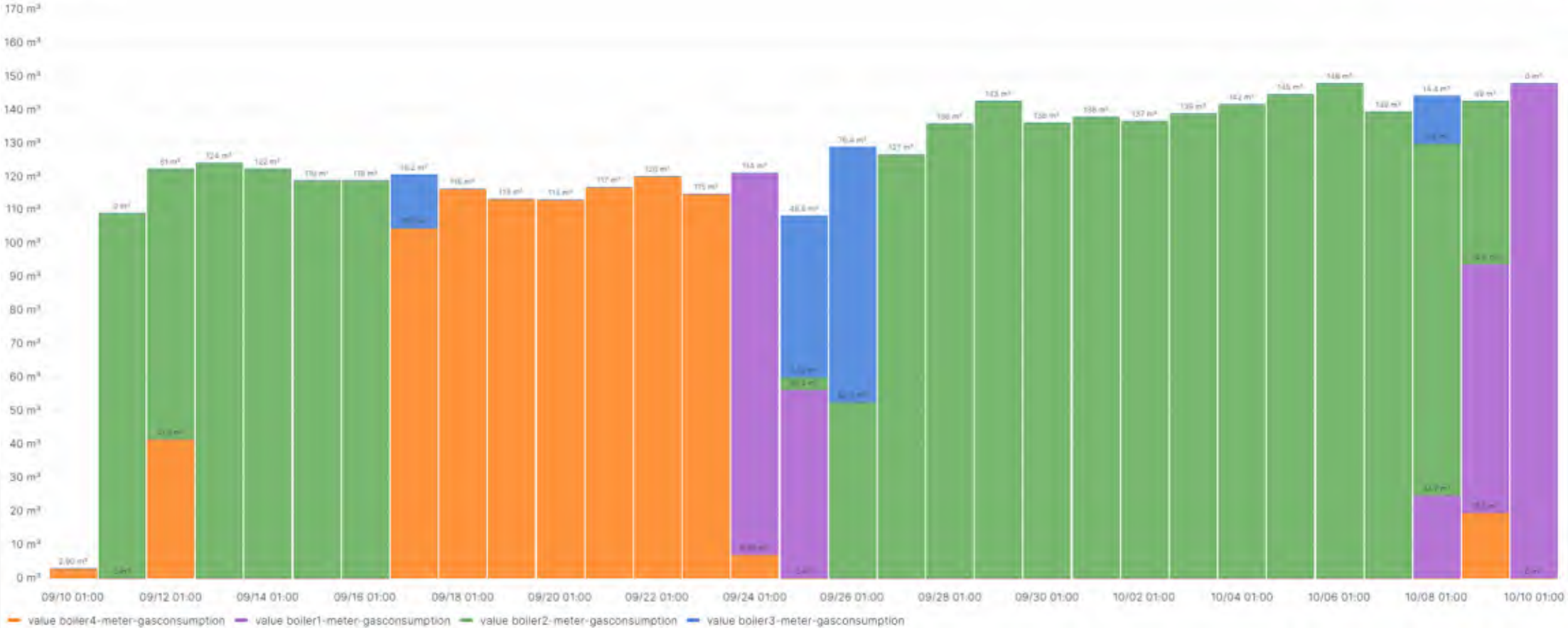


Gas Boiler KPIs

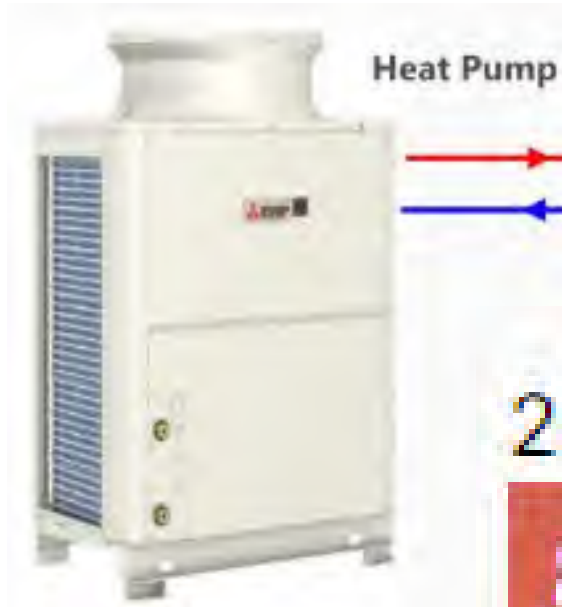
Fuel Conversion Losses

15.3%

Gas Consumption



Heat Pump KPIs



24hr VWA

82.9 °C

23.3 °C

Period COP

2.00

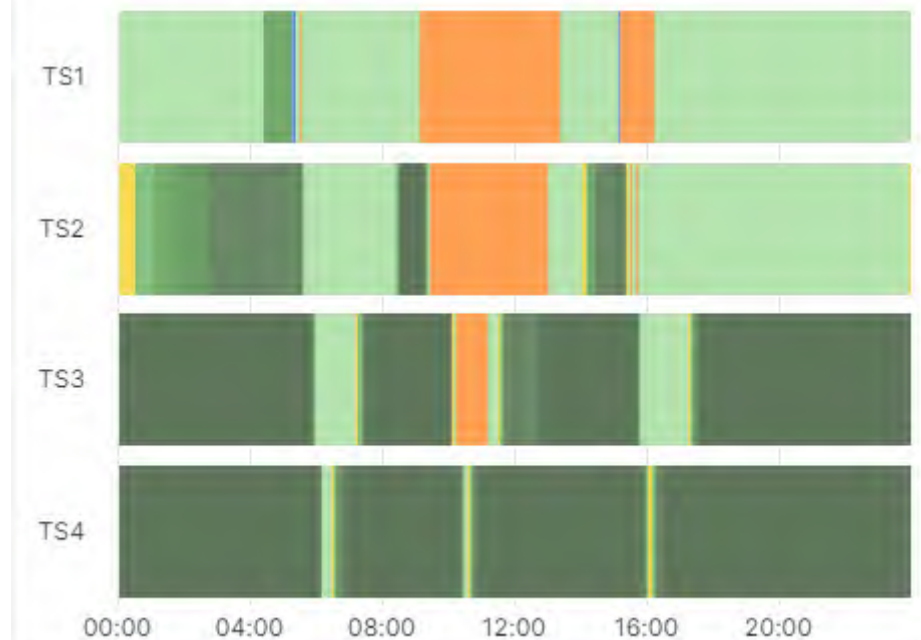
In

44.1 kWh

Out

88.3 kWh

Storage Temperatures



Buffer & Thermal Store KPIs

