Heat Network Technical Assurance Scheme – Technical Specification – Energy Centre

Overview

HNTAS-TS-EC-P0

Version History

Revision	Notes	Date
V0.4	Draft issue alongside consultation	10/04/25

Disclaimer

The following technical document has been prepared for issue ahead of the Heat Networks Technical Standards consultation and is published in a draft format. This document is intended to provide background context to the structure, style and contents of HNTAS draft Code documents, as they currently exist. The information in this document has been developed to facilitate understanding of the scheme.

DESNZ is not currently seeking views on specific individual technical requirements in the draft Code documents due to their large number and technical complexity.

Draft Code documents, including Technical Specifications and Assessment Procedures, have been reviewed and consulted on through a series of technical workshops with participation from a range of experts from across the heat network industry. We are seeking views on individual requirements through further, facilitated workshops with sector technical experts and through our pilot programme. The content of this document is therefore still in development and is subject to change. Requirements should not be considered as fixed at this stage.

You can sign up to receive updates and provide views on future detailed draft technical documents as they are published by contacting: heatnetworks@energysecurity.gov.uk.

Please be advised that this document references other HNTAS draft Code documents which have not yet been published. These referenced documents will be published at a later date. References to the Heat Networks Code of Practice (CP1) 2020 found within this document will also be subject to change following the publication of updated standards.

Contents

Foreword

This technical specification forms part of the UK Government's Heat Network Technical Assurance Scheme (HNTAS, the Scheme) delivered by the Department of Energy Security and Net Zero, in partnership with the Scottish Government and Ofgem. The Department of Energy Security and Net Zero appointed FairHeat as technical author for this document.

The Scheme has been designed and developed in consultation with a range of experts across the heat network industry, culminating in a series of technical specifications and Assessment Procedures to facilitate the validation and verification of performance outcomes of elements within a heat network.

This document provides an overview of the series of technical specifications for the Energy Centre element.

This document sits within a series of technical specifications and supplementary specifications for the Energy Centre as outlined in Table 1 and Table 2 below.

This Technical Specification - Energy Centre: Overview is current and valid as of [XX/XX/XX].

For further information on the Heat Network Technical Assurance Scheme please refer to Heat Network Technical Assurance Scheme – Scheme Rules – New Build Heat Networks: Assessment Regime (HNTAS-SR-NB-AS).

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Normative document structure

Technical Specifications

Document type	Element	Part/phase					
		Overview	Phase 1: Feasibility	Phase 2: Design	Phase 3: Construction	Phase 4: Operation (initial)	Phase 5: Operation (ongoing)
		P0	P1	P2	P3	P4	P5
Technical Specifications (TS)	Energy Centre (EC)	HNTAS-TS-EC-P0	HNTAS-TS-EC-P1	HNTAS-TS-EC-P2	HNTAS-TS-EC-P3	HNTAS-TS-EC-P4	HNTAS-TS-EC-P5
	District Distribution Network (DD)	HNTAS-TS-DD-P0	HNTAS-TS-DD-P1	HNTAS-TS-DD-P2	HNTAS-TS-DD-P3	HNTAS-TS-DD-P4	HNTAS-TS-DD-P5
	Substation (SS)	HNTAS-TS-SS-P0	HNTAS-TS-SS-P1	HNTAS-TS-SS-P2	HNTAS-TS-SS-P3	HNTAS-TS-SS-P4	HNTAS-TS-SS-P5
	Communal Distribution Network (CD)	HNTAS-TS-CD-P0	HNTAS-TS-CD-P1	HNTAS-TS-CD-P2	HNTAS-TS-CD-P3	HNTAS-TS-CD-P4	HNTAS-TS-CD-P5
	Consumer Connection (CC)	HNTAS-TS-CC-P0	HNTAS-TS-CC-P1	HNTAS-TS-CC-P2	HNTAS-TS-CC-P3	HNTAS-TS-CC-P4	HNTAS-TS-CC-P5
	Consumer Heat System (CH)	HNTAS-TS-CH-P0	HNTAS-TS-CH-P1	HNTAS-TS-CH-P2	HNTAS-TS-CH-P3		

Table 1: Technical Specification structure

Supplementary specifications

Document type	Element		Reference
Acceptance Testing specification (AT)	Energy Centre	EC	HNTAS-AT-EC
	District Distribution Network	DD	HNTAS-AT-DD
	Substation	SS	HNTAS-AT-SS
	Communal Distribution Network	CD	HNTAS-AT-CD
	Consumer Systems - Consumer Connection and Consumer Heat System	CS	HNTAS-AT-CS

Table 2: Supplementary specifications structure

Introduction

HNTAS is a performance-based assurance scheme, which contains impartial assessment and independent certification, to ensure that heat network performance outcomes are achieved, and maintained.

An impartial assessment is to be made with regards to claims made by a Responsible Party as to whether Technical Standards have been fulfilled, and Key Performance Indicators (KPIs) will be achieved (validation) or have been achieved (verification), for identifiable elements of a heat network.

The Technical Standards to be fulfilled are contained within technical specifications.

The Technical Standards consist of the following technical obligations:

- The Technical Requirements to be met
- The Performance Monitoring Requirements to be met
- The Key Failures to be avoided at each stage
- The Evidence Requirements to be provided, to demonstrate conformity with the Technical Standards and avoidance of Key Failures

The Technical Standards also contain the KPIs for each element, to be achieved and maintained in operation. The fundamental principle of the Scheme it to ensure throughout all the HNTAS Stages, that the KPIs will be achieved (design, installation) or have been achieved (commissioning, operation), to ensure performance outcomes.

There are separate technical specifications for each heat network element, at each phase of a heat network development and operation.

This document specifically provides an overview of the series of technical specifications for the Energy Centre element. It contains the following:

- A description of the scope of the Energy Centre
- An outline of the structure of the series of technical specification and of each individual technical specification document
- A description of the KPIs specific to the Energy Centre, including the minimum monitoring points required to measure and calculate KPIs

More information on HNTAS assessment can be found within Heat Network Technical Assurance Scheme – Scheme Rules – New Build Heat Networks: Assessment Regime (HNTAS-SR-NB-AS).

1. Scope

This document, and all documents part of the Energy Centre Technical Specification series, specifies Technical Standards for an Energy Centre.

It is applicable to an Energy Centre, which is defined as a dedicated area that contains heat generation equipment; and/or equipment connecting to an energy source; or a Substation which contains heat generation equipment (for example, building connection with heat pumps or top-up boilers). This area could be internal and/or external depending on the heat generation equipment. An Energy Centre typically contains (but is not limited to) heat generation equipment (for example, heat pumps, CHPs, chillers), top-up generation equipment (for example, boilers), plate heat exchangers, pumps, expansion and pressurisation units, thermal storage, water quality equipment, BMS/control equipment, strainers, control valves and heat meters.

Where the heat generation is contained in a separate location to the main plant room, both areas are classed as the Energy Centre, despite there being a physical separation. Examples of this include rooftop heat generation plant with a separate plant room containing all other items of equipment (pumps, thermal stores, pressurisation unit etc.). The pipework connecting these areas shall fulfil the applicable distribution network requirements. For example, where there is external pipework connecting these two areas, District Distribution Network Technical Requirements shall be fulfilled. Where the pipework is contained within the building, Communal Distribution Network Technical Requirements shall be fulfilled.

Where the Energy Centre is connecting to an external energy source (for example, a waste heat source), the external energy source is not within scope of this technical specification. The scope of this technical specification starts from the equipment connecting the plant room to the energy source, e.g. a plate heat exchanger.

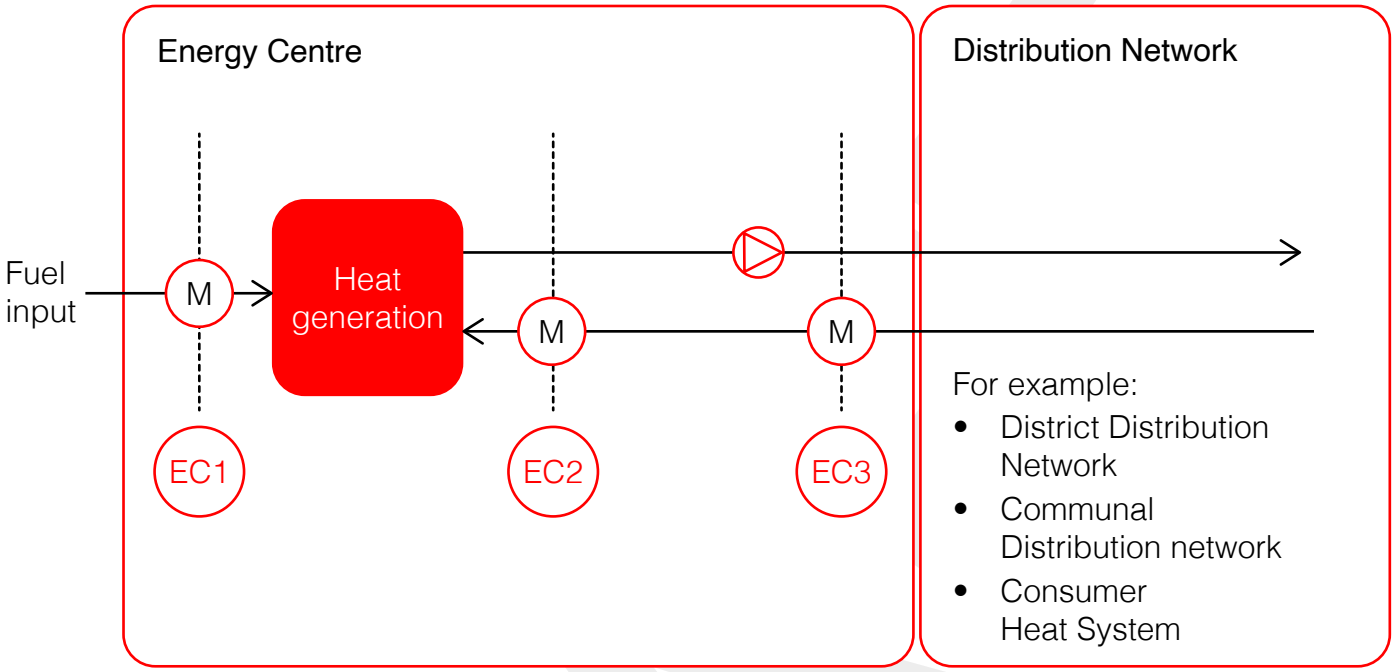
Where there is a connection between Distribution Networks which contains heat generation equipment (for example, top-up boiler), this would be defined as an Energy Centre rather than a Substation.

The Energy Centre boundary for the purpose of measuring performance, via Key Performance Indicators, is determined by the overall Energy Centre monitoring point (EC3), as outlined in Figure 1.

The physical boundary of the Energy Centre, for where the Technical Requirements in this technical specification apply, may not be the same as the performance boundary defined above. The physical boundary may be determined by physical barriers (for example, walls) or contractual relationships. It is expected that the physical boundary and performance boundary are similar. Pipework downstream of the boundary will fall under the specific distribution network (either District Distribution Network or Communal Distribution Network) or Consumer Heat System (where the Energy Centre is a Building Connection containing heat generation).

For clarity, all other heat network elements are not in the scope of this technical specification.

Figure 1: Illustrative drawing of Energy Centre boundary



1.1 Equipment in scope of element

The following equipment is within scope of the Energy Centre element:

- Heat generation equipment (boilers, heat pumps etc.)
- Heat exchange equipment (plate heat exchangers)
- Pressurisation and expansion equipment (pressurisation unit, expansion vessel)
- Water quality equipment
  - Air and dirt separators
  - Vacuum degassers
  - Dosing pots
  - Side stream filtration units
  - Online water quality monitoring equipment
  - Corrosion prevention equipment (for example, coupons)
  - Strainers
  - Water softeners
- Pumps
  - Network distribution pumps
  - Shunt pumps

- Thermal storage and buffer vessels
- Pipework
- Pipework expansion provision
- Insulation
- Control and field equipment (valves and actuators, sensors, switches)
- Ancillary equipment
  - Valves, test points, drain points, air vents, orifice plates
- BMS panel
- Metering and Monitoring Systems
  - Monitoring points (meters and sensors)
  - Automatic and remote monitoring systems

1.2 Example typologies

There are many different typologies of an Energy Centre. Within the evidence requirements sections of the technical specifications, common typologies are referred to, to demonstrate differences in the expected evidence items.

A description of each example typology is outlined in Table 3.

ID	Example typology	Description
A	Network-led District Heat Network	An Energy Centre which is being developed as part of a network-led District Heating Network. A network-led District Heating Network is a heat network which supplies two or more buildings, and that is developed independently of the boundaries of any particular development, with third parties connecting to that heat network. This would cover both District Heating Networks which are connecting to existing buildings and/or pre-existing heat networks (such as city-wide district heating networks constructed with Heat Networks Investment Project (HNIP) or Green Heat Network Fund (GHNF) funding connecting to public buildings, campus networks, etc.), and those which serve new building developments developed by plot developers (but developed and constructed independently of new buildings). An example is shown in Figure 2.

ID	Example typology	Description
B	Developer-led District Heat Network (medium-large)	An Energy Centre which is being developed as part of a new build medium-large developer-led District Heating Network. A developer-led District Heating Network refers to a heat network that is built to service a single development, which contains two or more buildings. Normally the heat network would be constructed simultaneously with the wider building works, but this can also include heat networks retrofitted to a single building or estate. A medium-large heat network would be a self-contained District Heating Network, which contains multiple (>4) new build apartment blocks or other Consumer Connection, with large amounts of buried pipework serving the connection. The construction of the heat network is linked to the build out of a new development. An example is shown in Figure 3.
C	Developer-led District Heat Network (small)	An Energy Centre which is being developed as part of a new build developer-led District Heating Network. This example is the same as above, however, this would be applicable where there are only a small number of new build apartment blocks or other Consumer Connections, with small amounts of District Distribution Network pipework. For example, a District Heating System where there are only two buildings, with one small length of buried pipework connecting them together. An example is shown in Figure 4.
D	Communal Heat Network	An Energy Centre which is being developed as part of a new build Communal Heat Network. A Communal Heat Network is a heat network which serves a single building divided into separate premises or persons in those premises (for example, habitable dwellings). This will most likely be a developer-led heat network, where the heat network is built to serve a single development. For example, an Energy Centre serving a heat network in a single building containing multiple apartments and a small number of commercial connections. The Energy Centre (and rest of the heat network) is constructed simultaneously to the rest of the building. An example is shown in Figure 5.

Table 3: Descriptions of example typologies used within the Energy Centre technical specification

Figure 2: Example typology A: network-led district heat network schematic

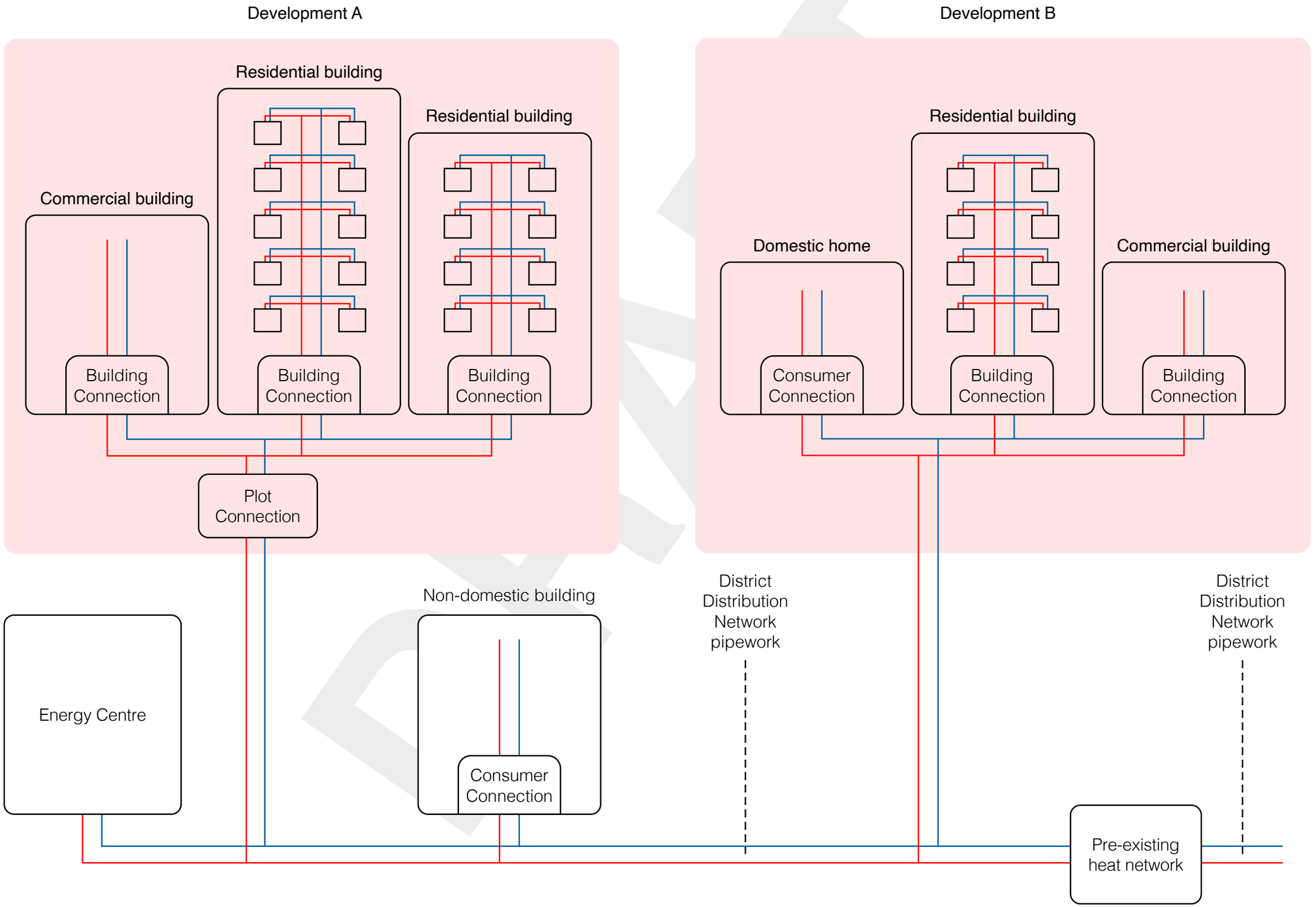


Figure 3: Example typology B: developer-led district heat network (medium-large) schematic

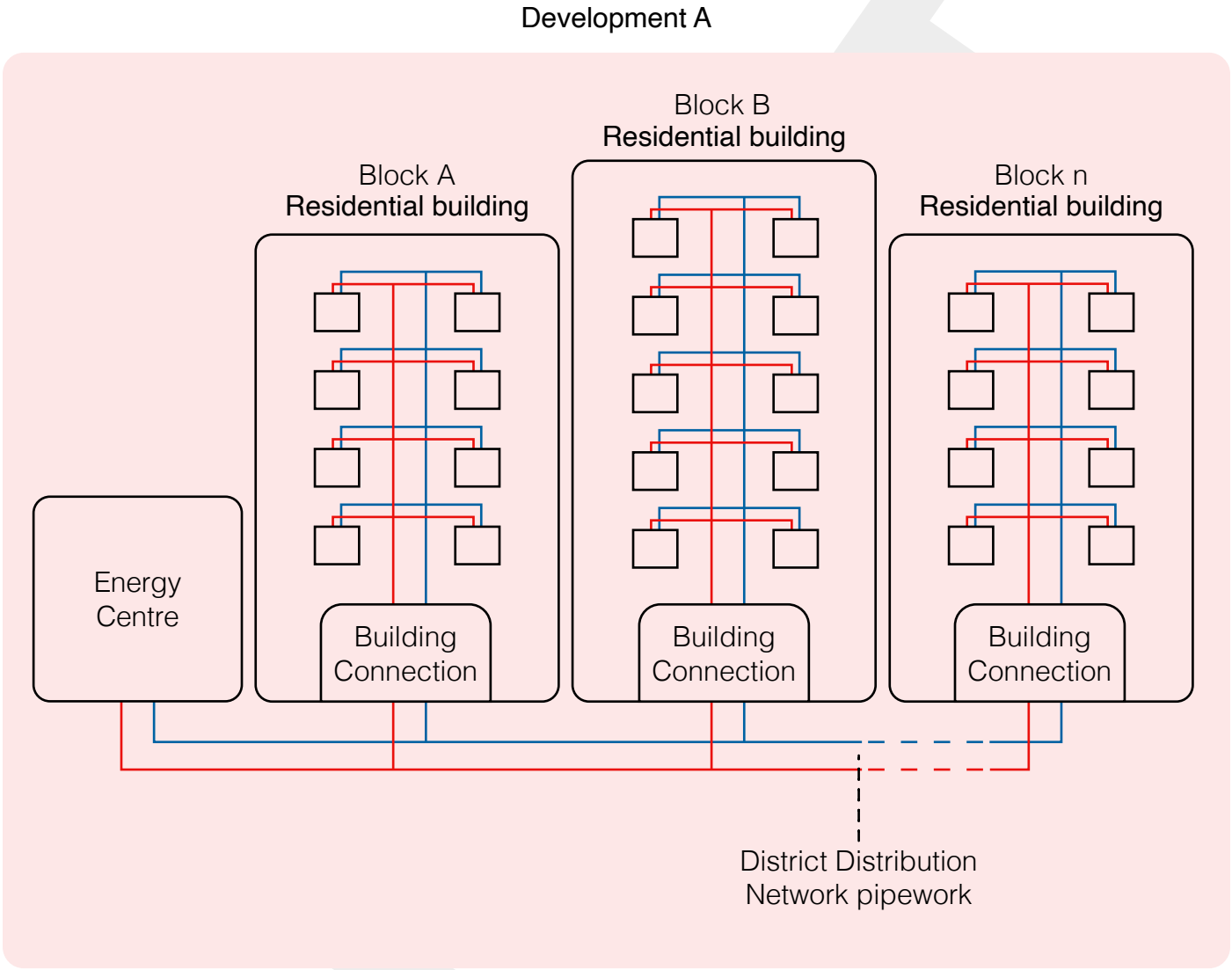


Figure 4: Example typology C: developer-led district heat network (small) schematic

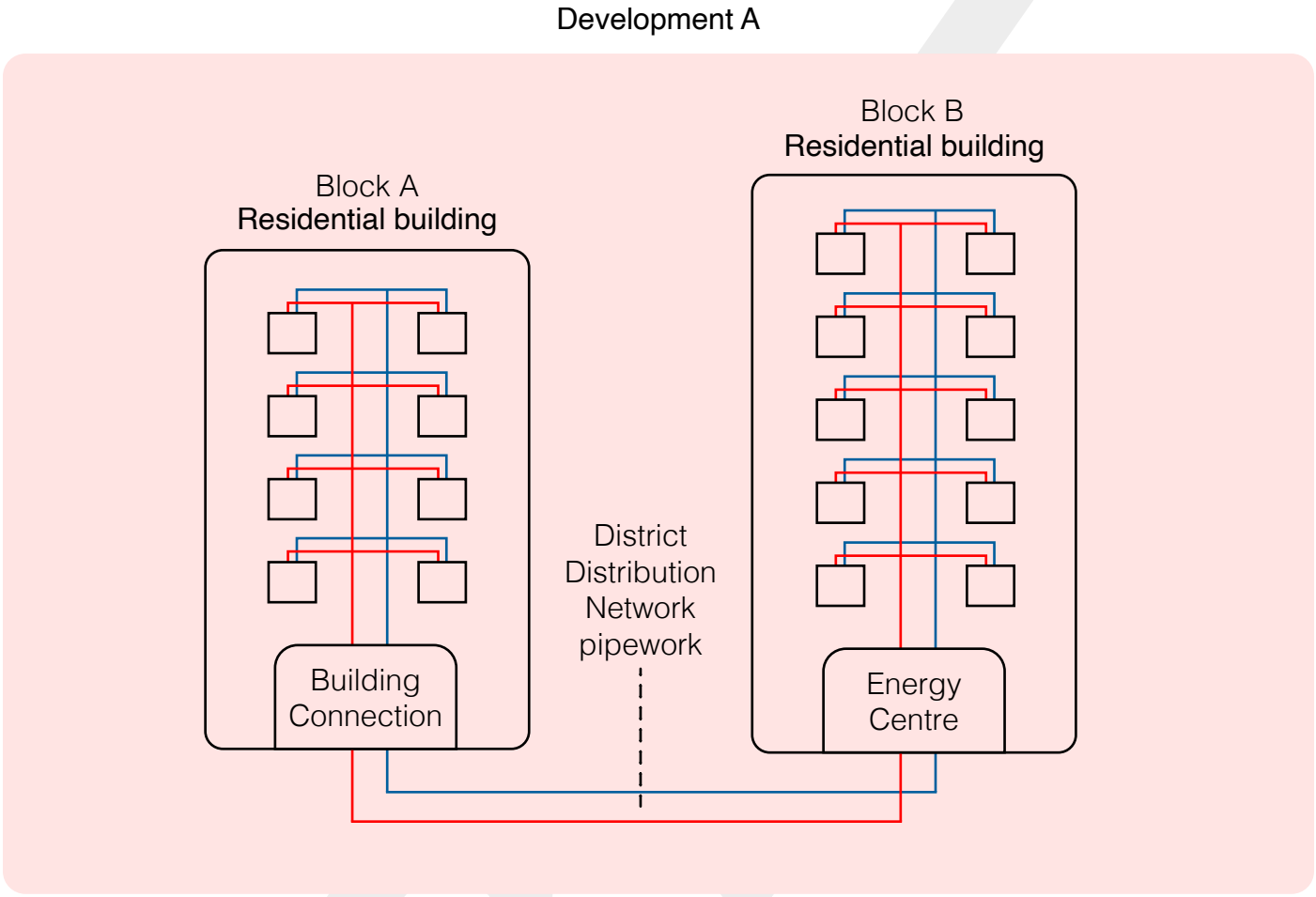
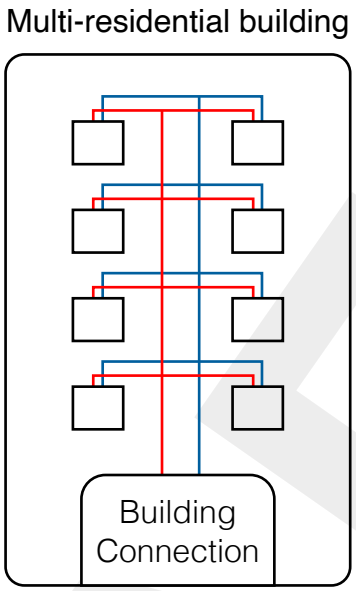


Figure 5: Example typology D: communal heat network schematic



2. Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

i. Heat Network Technical Assurance Scheme – Scheme Rules – New Build Heat Networks: Assessment Regime (HNTAS-SR-NB-AS).

3. Terms and definitions

For the purposes of this document, the terms and definitions given in Heat Network Technical Assurance Scheme – Terms and Definitions (HNTAS-TD) and the following table apply.

Term	Definition
Communal Heat Network	A heat network by means of which heating, cooling or hot water is supplied only to a single building divided into separate premises or persons in those premises.
Construction Phase	The third phase of a heat network development. This phase covers the construction of a heat network. This phase contains Construction Design (Stage 4), Installation (Stage 5) and Commissioning (Stage 6) Stages.
Developer-led heat network	A heat network that is built to service a single development. Normally the heat network would be constructed simultaneously with the wider building works, but this can also include networks retrofitted to a single building or estate. Examples would typically be communal heating systems or a self-contained district heating system where the construction of the heat network is linked to the build out of a new development.
District Heat network	A heat network by means of which heating, cooling or hot water is supplied to two or more buildings or persons in those buildings.
Energy Centre	Plant room that contains heat generation equipment; and/or equipment connecting to an energy source; or a substation which contains heat generation equipment (for example, building connection with heat pumps or top-up boilers). Typically contains heat generation equipment (for example, heat pumps, CHPs, chillers), top-up generation equipment (for example, boilers), plate heat exchangers (PHE), pumps, expansion and pressurisation units, thermal storage, water quality equipment, BMS/control equipment, strainers, control valves and heat meters.
Evidence Requirements	Lists of evidence items, with descriptions and requirements, expected to be provided to demonstrate conformity with the Technical Requirements, Performance Monitoring Requirements and avoidance of Key Failures.
Heat Network	A network that, by distributing a liquid or a gas, enables the transfer of thermal energy for the purpose of supplying heating, cooling or hot water to a building or persons in that building (and includes any appliance the main purpose of which is to heat or cool the liquid or gas).

Term	Definition
Key Failures	Key Failures are identified failures which occur frequently within the industry and lead to poor performance outcomes.
Key Performance Indicators (KPIs)	A quantifiable metric used to measure the performance of a heat network. Key Performance Indicator values and thresholds are to be defined during the design stages, and the heat network shall be designed to ensure KPIs can be achieved in operation.
Network-led heat network	A heat network that is developed independently of the boundaries of any particular development, with third parties connecting to that heat network. This would cover both district heating networks that serve new building developments developed by plot developers, and those connecting to existing buildings and/or pre-existing heat networks (such as district heating networks constructed with HNIP or GHNF funding connecting to public buildings, campus networks, etc.).
Performance Monitoring Requirements	Requirements of a technical nature which relate to the performance monitoring of the heat network, using KPIs, and the Metering and Monitoring systems that facilitate performance monitoring.
Stage 1: Concept Design	Stage 1 is the first HNTAS Stage. This stage corresponds to RIBA Stage 2. This will likely align with pre-planning applications and will be prior to the progression of design, with potential handover of design to additional parties.
Stage 2: Developed Design	Stage 2 is the second HNTAS Stage. This stage corresponds to RIBA Stage 3 design. Assessment at this stage is optional. This stage occurs prior to progression of design in RIBA Stage 4. This will likely align with submission of planning applications and may have potential handover of design to additional parties.
Stage 3: Technical Design	Stage 3 is the third HNTAS Stage. This stage corresponds to pre-construction activities at RIBA Stage 4 design, prior to design sign off and procurement and construction commencing.
Stage 4: Construction Design	Stage 4 is the fourth HNTAS Stage. This stage corresponds to RIBA Stage 4/5 design items that occur within the Construction Phase.
Stage 5: Installation	Stage 5 is the fifth HNTAS Stage. This stage corresponds to the installation activities of a heat network.

Term	Definition
Stage 6: Commissioning	Stage 6 is the sixth HNTAS Stage. This stage corresponds to the commissioning activities of a heat network, prior to commissioning sign off, practical completion and handover to the heat network operator.
Stage 7: Operation and Maintenance (initial 2 years)	Stage 7 is the seventh HNTAS Stage. This stage corresponds to the operation and maintenance activities of a heat network during the first two years of operation.
Stage 8: Ongoing Monitoring	Stage 8 is the eighth HNTAS Stage. This stage corresponds to the ongoing operation and maintenance of a heat network during operation.
Technical Requirements	Requirements of a technical nature which relate to the generation and delivery of heat, specific to an element and stage, which are to be fulfilled. The Technical Requirements are predominantly based on existing industry requirements (from codes, guidance and other standards). Where existing industry requirements could not be identified, these have been developed.
Technical Standards	Technical Standards consist of all the types of technical obligations under HNTAS. These include: • Conformity with the Technical Requirement • Conformity with Performance Monitoring Requirements • Avoidance of Key Failures • Submission of evidence

Table 4: Terms and definitions

4. Technical specification Structure

4.1 Structure of technical specification: series

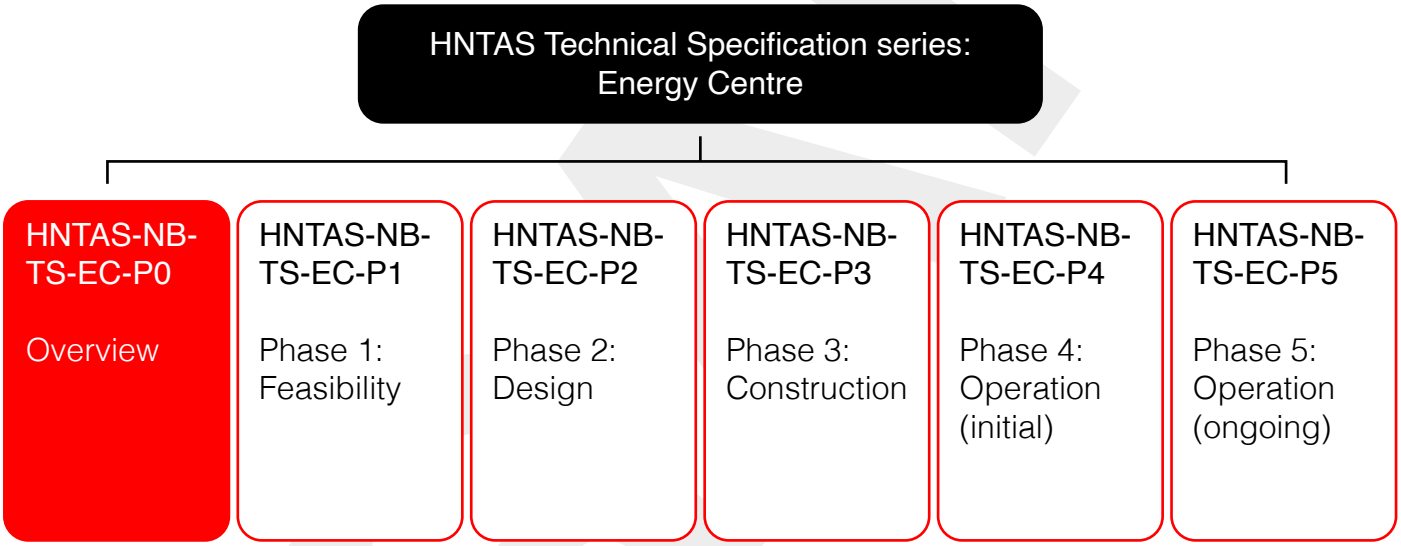
This document provides an overview of the technical specification for the Energy Centre element.

This document sits within a series of technical specifications for the Energy Centre.

The series contains five separate documents for each HNTAS phase, which contains the specific Technical Standards for the Energy Centre at each stage.

Figure 6 illustrates the technical specification series for this element. Table 1 outlines this series of Energy Centre technical specifications alongside the other HNTAS elements.

Figure 6: Illustration of the technical specification series



4.2 Structure of technical specifications: individual phase documents

The technical specifications for each phase are split into sections for each HNTAS Stage.

A description of HNTAS Phases and Stages is provided in Heat Network Technical Assurance Scheme – Scheme Rules – New Build Heat Networks: Assessment Regime (HNTAS-SR-NB-AS).

Each section contains the Technical Standards for each HNTAS Stage. This consists of the following:

- The Technical Requirements to be met
- The Performance Monitoring Requirements
- The Key Failures to be avoided at each stage
- The Evidence Requirements to be provided, to demonstrate conformity with the Technical Standards and avoidance of Key Failures

4.2.1 Technical Requirements section

Within each Technical Requirements section, a table is presented which contains a list of the HNTAS Technical Requirements and any applicable referenceable Technical Standards that must be achieved to meet the requirement. For each HNTAS Technical Requirement a reference to the expected evidence item has been outlined.

All Technical Requirements are based on current industry documentation. The predominant Technical Standard referenced is the Heat Network Technical Standard (HTS1). For topics which were not present in any reference industry documentation, additional Technical Requirements have been added to address these gaps.

4.2.2 Performance Monitoring Requirements section

Within this section, the requirements in relation to Key Performance Indicators and the Metering and Monitoring System are outlined.

It is expected that the Metering and Monitoring System for the Energy Centre will also cover multiple other elements within a heat network. For example, for a communal heat network, it would be likely that the Metering and Monitoring System covers the Energy Centre, Communal Distribution Network, and all Consumer Connections. As a result, the evidence provided for the Metering and Monitoring System will likely contain multiple elements.

Whilst the evidence can be provided which covers multiple elements, all KPIs are to be assessed on an element basis.

4.2.3 Key Failures section

Within each Key Failures section, a table is presented which contains a list of Key Failures, the outcome to avoid, and a reference to the expected evidence item to demonstrate that the key failure is or has been avoided.

4.2.4 Evidence Requirements section

Within each Evidence Requirements section, the expected evidence item, which is referred to within Key Failures and Technical Requirements sections for each stage, is detailed.

A table is presented which contains a description and the requirements of each evidence item to provide clarity as to what evidence is expected to prove fulfilment of the Technical Standards.

The evidence is expected to be appropriate for the scale of heat network and project specifics. The example typologies are outlined in Section 1.1.

It is understood that the evidence items referenced in each table may be presented in different formats or multiple Evidence Requirements may be contained together within larger reports.

It is also expected that evidence items may be applicable to multiple elements across the heat network. Therefore, evidence does not need to be provided on an element-specific basis where it covers multiple elements.

Further evidence may be required by the Assessor to demonstrate fulfilment with the Technical Standards.

5. Note on applicability

The applicability of the Technical Standards within the technical specifications for Energy Centre will depend on the specific heat network characteristics. This includes heat generation technology type, the typology of heat network and the temperature of the heat network.

At each stage a Statement of Applicability shall be produced, which determines the applicable Technical Standards for the specific heat network.

Further requirements on the Statement of Applicability are outlined in Heat Network Technical Assurance Scheme – Scheme Rules – New Build Heat Networks: Assessment Regime (HNTAS-SR-NB-AS).

6. Key Performance Indicators

Table 5 contains the Key Performance Indicators for the Energy Centre.

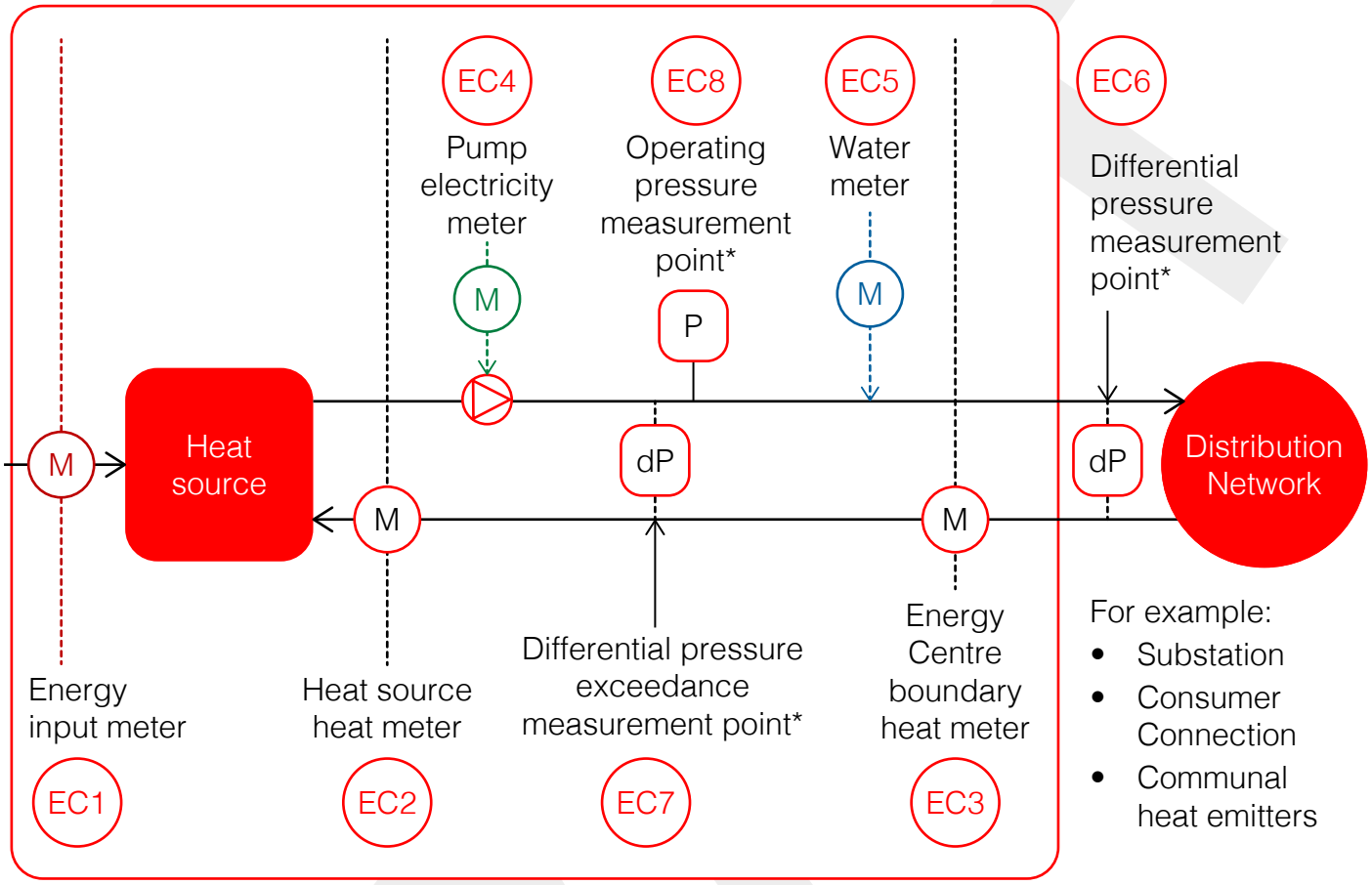
KPIs are split into two types:

- **Assessed KPIs:** These are KPIs which are assessed against pre-determined targets throughout the Operation and Maintenance phase in order to achieve and maintain HNTAS Certification.
- **Reported KPIs:** These are KPIs which are not assessed against a pre-determined target through the Operation and Maintenance phase, but still provide valuable information, so are to be reported in the same format.

The specific requirements for each stage in relation to KPIs are included in the Performance Monitoring Requirement section, including setting KPI targets on a project-specific basis. Where this is required, the target is illustrated in green in Table 5.

Figure 7 illustrates the required monitoring points for measuring Energy Centre KPIs. The monitoring points are also listed in Table 7, along with the data required from each monitoring point and the minimum read frequency. The monitoring points to be used to measure KPIs are illustrated in orange in Table 5.

Figure 7: Diagram indicating required Energy Centre monitoring points



*Location(s) to be identified by the designer

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-01	Automatic Remote Monitoring System (ARMS) connectivity	Total number of days where monitoring points have connected to the ARMS system within 24 hours of last connection.	(Number of monitoring point days) / (total monitoring points * total days in period). Number of monitoring point days = Σ number of days each monitoring point has connected to the ARMS system within 24 hours of last connection.	Assessed KPI	Commissioning stage: 100% O&M stage: ≥ 99%.	Monthly
EC-KPI-02	Energy Centre monitoring point data completeness	Number of total reads received in comparison to the total reads expected within the given [time period] for each monitoring point.	(Total number of reads recorded across [time period] / total reads expected across [time period]) x 100. Total reads expected = Σ (monitoring point x frequency of monitoring point x [time period]).	Assessed KPI	≥ 95%.	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-03	Energy Centre monitoring points operational	Of the monitoring points which are connected to the ARMS system (as per EC-KPI-01) and have complete data (as per EC-KPI-02), the number of which are operating as expected. Monitoring points that are operating as expected will have (dependent on type of monitoring point): • No error codes (meters) • No negative readings (meters) • No signals outside of operating parameters (sensors).	Verification that each monitoring point is operating as expected. Measurement will be dependent on ARMS and may be automated.	Assessed KPI	100% of monitoring points, which are connected to ARMS (as per EC-KPI-01) and have complete data (as per EC-KPI-02)	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-04	Energy Centre unplanned interruptions*	Number of unplanned interruptions reported per annum. An Energy Centre interruption is defined as an event causing: • The flow temperature at the **Energy Centre boundary (EC3)** to be below the minimum required flow temperature for more than 12 hours • The differential pressure at the **specified differential pressure measurement point(s) (EC6)** (note that this location may change during operation) to be below the minimum required differential pressure for more than 12 hours, due to an issue originating in the Energy Centre An unplanned interruption is an interruption as defined above, where the heat network end user has not been provided with at least 48 hours written notice of such interruption.	Number of unplanned interruptions = ∑ (unplanned interruptions for given [time period]).	Assessed KPI	≤ 3 interruptions per annum.	Previous 12 months Measured on monthly rolling basis

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-05	Energy Centre planned interruptions*	Number of planned interruptions reported per annum. An Energy Centre interruption is defined as an event causing: • An Energy Centre interruption is defined as an event causing: The flow temperature at the **Energy Centre boundary (EC3)** to be below the minimum required flow temperature for more than 12 hours • The differential pressure at the **specified differential pressure measurement point(s) (EC6)** (note that this location may change during operation) to be below the minimum required differential pressure for more than 12 hours, due to an issue originating in the Energy Centre A planned interruption is an interruption as defined above where notice has been given to the end user at least 48 hours prior to the interruption occurring.	Number of planned interruptions = ∑ (planned interruptions for given [time period]).	Assessed KPI	≤ 1 interruption per annum.	Previous 12 months Measured on monthly rolling basis

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-06	Energy Centre average flow temperature.	Average flow temperature for given [time period] measured at the **Energy Centre boundary (EC3)**.	Average flow temperature = ∑ (flow temperature at each time point for given [time period])/ ∑(time points for given [time period]).	Reported KPI	**[expected average flow temperature]**	Monthly
EC-KPI-07	Energy Centre average return temperature	Average return temperature for given [time period] measured at the **Energy Centre boundary (EC3)**.	Average return temperature = ∑ (Return temperature at each time point for given [time period])/ ∑(time points for given [time period]).	Reported KPI	**[expected average return temperature range]**	Monthly
EC-KPI-08	Energy Centre flow temperature variance from set point	Average difference between the actual flow temperature measured at the **Energy Centre boundary (EC3)** and the set point.	Average variance = ∑ (Actual flow temperature - set point at each time point for given [time period])/ ∑(time points for given [time period]).	Assessed KPI	± 2 °C	Monthly
EC-KPI-09A	Energy Centre Volume Weighted Average Flow Temperature (VWAFT)	Energy Centre flow temperature weighted against volumetric flow rate, measured at the **Energy Centre boundary (EC3)**.	$\mathrm{VWART} = \frac{\sum(T_t \times q_t)}{\sum q_t}$ Where T = flow temperature for each time recording (t) for given [time period], and q = flow rate for each time recording (t) for given [time period] or cumulative volume for each time recording (t) for given [time period].	Assessed KPI	**[Energy Centre flow temperature]** ± 3 °C	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-09B	Energy Centre Volume Weighted Average Flow Temperature (VWAFT) *Note: Applicable for heat networks which do not have a fixed flow temperature (for example,. weather compensated heat networks)*	Energy Centre flow temperature difference from its set point weighted against volumetric flow rate, measured at the **Energy Centre boundary (EC3)**.	$\mathrm{VWART} = \frac{\sum(T_t \times q_t)}{\sum q_t}$ Where T = difference between flow temperature and its setpoint for each time recording (t) for given [time period], and q = flow rate for each time recording (t) for given [time period] or cumulative volume for each time recording (t) for given [time period].	Assessed KPI	± 3 °C	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-10A	Energy Centre flow temperature stability	The percentage of time flow temperature, measured at the **Energy Centre boundary (EC3)** is within upper and lower bounds of the design set point. The upper and lower bounds shall not exceed ± 5 °C from the flow temperature set point. The lower bound shall also be equal to or greater than the minimum flow temperature of the network required to deliver >45 °C domestic hot water (DHW) to outlets within Consumer Heat System, or is the minimum required flow temperature required at the Substation to deliver the minimum required flow temperature for the network it is supplying.	Stability = ∑ (time points spent within the upper and lower threshold of the design set point for given [time period]) / ∑(time points for given [time period]).	Assessed KPI	≥ 95 % spent within the thresholds Upper threshold: **[Upper temperature stability threshold (for example, 60 °C)]** Lower threshold: **[Lower temperature stability threshold (for example, 50 °C)]**	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-10B	Energy Centre flow temperature stability *Note: Applicable for networks which do not have a fixed flow temperature (for example,. weather compensated systems)*	The percentage of time the flow temperature differential from its setpoint, measured at the **Energy Centre boundary (EC3)**, is within the upper and lower bounds. The upper and lower bounds shall not exceed ± 5 °C from the flow temperature set point. The lower bound shall also be equal to or greater than the minimum required flow temperature of the network required to deliver >45 °C DHW to outlets within Consumer Heat System, or is the minimum flow temperature required at the Substation to deliver the minimum required flow temperature for the network it is supplying.	Stability = ∑ (time points that the difference between the flow temperature and its setpoint is within the upper and lower threshold for given [time period])/ ∑(time points for given [time period]).	Assessed KPI	≥ 95 % spent within the thresholds Upper threshold: **[Upper temperature stability threshold (for example, + 5 °C)]** Lower threshold: **[Lower temperature stability threshold (for example, -5 °C)]**	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-11	Energy Centre flow temperature uptime	The percentage of time flow temperature, measured at the **Energy Centre boundary (EC3)** is above the Minimum Required Flow Temperature. Minimum required flow temperature will be project specific and shall be set for each Energy Centre. Minimum required flow temperature of the network is the flow temperature required to deliver >45 °C DHW to outlets within Consumer Heat System, or is the minimum flow temperature required at the Substation to deliver the minimum required flow temperature for the network it is supplying.	Uptime = ∑ (time points spent above minimum required flow temperature for given [time period])/ ∑ (time points for given [time period]).	Assessed KPI	≥ 98 % above **[minimum required flow temperature]**	Monthly
EC-KPI-12	Pressure differential uptime	The percentage of time the pressure differential spends above the minimum differential pressure set point at the **specified differential pressure measurement point(s) (EC6)**.	Uptime = ∑ (time points spent above [Setpoint – 10%] for given [time period])/ ∑ (time points for given [time period]).	Assessed KPI	≥ 99 % spent above **[minimum differential pressure]**	Monthly
EC-KPI-13	Maximum allowable differential pressure exceedance	The percentage of time the pressure differential spends below the maximum allowable differential pressure at the **specified differential pressure exceedance measurement point (EC7)**.	Percentage time below maximum = 1 – [∑ (reads above maximum for given [time period]) / ∑ (reads for given [time period])].	Assessed KPI	100% spent below **[maximum allowable differential at the defined measurement point]**	Monthly

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-14	Maximum allowable operating pressure exceedance	The percentage of time the operating pressure spends below the maximum allowable operating pressure at the **specified operating pressure measurement point(s) (EC8)**.	1 – [∑ (operating pressure reads greater than the maximum operating pressure requirement for given [time period]) /∑(operating pressure reads for given [time period])].	Assessed KPI	100% spent below **[maximum allowable operating pressure at the defined measurement point]**	Monthly
EC-KPI-15	Volume of top up water added to the network	Volume of top up water added to the network as percentage of total system pipework volume per [time period], measured at the **Energy Centre water meter (EC5)**. Network may include other elements, such as the Distribution Network pipework served by Energy Centre.	Amount of top-up water = volume added measured in [time period] (m^3) / total system pipework volume (m^3).	Assessed KPI	≤ 1% of total system pipework volume per month. Volume: **[system pipework volume]**	Monthly
EC-KPI-16	Heat fraction	Proportion of total annual heat generation supplied by each heat source, measured at the **Energy Centre heat source(s) (EC2)**. To be calculated for each heat source, where more than one heat source used.	Heat fraction of heat source = Total heat generated by heat source for a given [time period] (kWh) / Total heat generated by all heat sources for a given [time period] (kWh).	Reported KPI	**[Design heat fraction]**	Previous 12 months Measured on monthly rolling basis

KPI ID	KPI	KPI Description	KPI measurement methodology	Assessed KPI or Reported KPI	KPI Target (at O&M stages unless specified)	Time period (at O&M stages unless specified)
EC-KPI-17	Efficiency of each heat generation item or source	Heat generated by heat source, measured at the Energy Centre heat source (EC2) as a proportion of the input fuel energy, measured at the **Energy Centre energy input (EC1)**, displayed as a percentage (%) per heat generation item, unless otherwise specified. To be done as a combined source rather than individual modules of the same type of heat generation. For example, bank of boilers or heat pump modules.	Efficiency = Heat source heat generation (kWh) for given [time period] / Heat source energy input at (kWh) for given [time period]. This calculation methodology applies, unless otherwise specified.	Assessed KPI	≥ [targets specified in Table 6] Relevant for each applicable heat generation technology	Previous 12 months Measured on monthly rolling basis
EC-KPI-18	Network Distribution pump energy use	Total pump energy use (kWh) measured at the Energy Centre pump electricity meter (EC4) over the given [time period]. Applicable for network distribution pumps. Not applicable for equipment shunt pumps.	Total pump energy use (kWh) over given [time period].	Assessed KPI	**Design:** <1% of annual heat generation (kWh) **Operation:** ≤ 120% of **[design annual pump energy use]**	Previous 12 months Measured on monthly rolling basis

Table 5: Key Performance Indicators - Energy Centre

**It should be noted that interruptions are to be assigned to the element which they originated in. Therefore, an interruption at an element which was caused by an issue outside of the control of that element, would not count towards the total interruptions for that element.*

Heat generation technology	KPI Target	Units	Calculation methodology
Gas (natural gas or LPG) or oil boiler	80	%	Gross efficiency
Biomass boiler	75	%	Gross efficiency
Electric boiler	98	%	Gross efficiency
Heat pump	2.0	-	Coefficient of performance (COP)
Combined heat and power (CHP)	105	-	Quality Index (QI)*

Table 6: KPI Targets for EC-KPI-17 (Efficiency of each heat generation item or source).

**The Quality Index (QI) is an efficiency metric for CHPs, defined by the Combined Heat and Power Quality Assurance (CHPQA) scheme. The CHPQA standard [1] should be consulted for more detail on the QI, including the calculation methodology.*

6.1 Monitoring Points

ID	Element	Monitoring Point	Data required at monitoring point	Minimum frequency of reads	Further comments
EC1	Energy Centre	Heat source energy input	Meter read (kWh) *Note: Original measurement can be in different units (for example, m^3). Conversion to be applied where different units for original measurement.*	30 minutes	Energy (fuel) input for each type of heat source (for example, gas, electricity). If there are multiple heat sources that use the same input energy, sub-metering shall be required to determine the energy input into each different heat source. For example, electric boilers and heat pumps will require separate electricity meters. Likewise, gas boiler and CHP will require separate gas meters.

ID	Element	Monitoring Point	Data required at monitoring point	Minimum frequency of reads	Further comments
EC2	Energy Centre	Heat source	Meter read (kWh) Instantaneous power (kW) Flow rate (m^3/h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m^3 or l) Error Codes *Note: Where used on ambient networks, meter shall be dual mode (heat and cool).*	5 minutes	Required for each type of heat source. Not required for each individual module or a same heat source. For example, only one meter required per bank of heat pumps, boilers etc.
EC3	Energy Centre	Boundary	Meter read (kWh) Instantaneous power (kW) Flow rate (m^3/h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m^3 or l) Error Codes Note: Where used on ambient systems, meter shall be dual mode (heat and cool).	5 minutes	Required at the boundary of the Energy Centre, to determine the total heat delivered to the heat network.
EC4	Energy Centre	Distribution pump set	Meter read (kWh)	30 minutes	Required to measure pump energy consumption. Required per pump set, rather than individual pumps when contained within pump set.
EC5	Energy Centre	Water meter	Volume (m^3 or l)	30 minutes	Required to measure volume of top-up water entering the network.

ID	Element	Monitoring Point	Data required at monitoring point	Minimum frequency of reads	Further comments
EC6	Energy Centre	Defined differential pressure measurement point	Differential pressure (kPa, bar)	5 minutes	Location is determined by the Designer on a project basis. Likely to be located externally to the Energy Centre at the index point(s) of the distribution network. Where this isn't the case, this differential pressure measurement may be within the Energy Centre (across the pumps).
EC7	Energy Centre	Defined differential pressure exceedance measurement point	Differential pressure (kPa, bar)	5 minutes	Location shall be determined by the Designer on a project basis.
EC8	Energy Centre	Defined operating pressure measurement point	Pressure (kPa, bar)	5 minutes	Location shall be determined by the Designer on a project basis.

Table 7: Minimum required monitoring points – Energy Centre

7. References

Department for Energy Security and Net Zero, “Combined heat and power quality assurance (CHPQA) standard,” March 2021. [Online]. Available: https://www.gov.uk/government/publications/chpqa-standard. [Accessed March 2025].