

District Heating factors for BER calculations

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Sustainable Energy Authority of Ireland

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1. Introduction

A calculation methodology is under development for district heating factors for use in BER and Part L calculations. In the meantime, new defaults have been approved by SEAI, DECC and DHLGH to facilitate two prospective district heating schemes, the South Dublin County Council Tallaght District Heating Scheme (TDHS), and the Dublin City District Heating Scheme (DDHS), based on their submitted data. According to their submission, these two schemes would satisfy the definition of "Efficient district heating and cooling" in the Energy Efficiency Directive (EED).

Default district heating primary energy and CO₂ factors in DEAP and NEAP have been updated to include new default options:

1. Cogeneration Waste to Energy + gas for Dublin District Heating scheme (**DDHS**)
2. Data centre waste heat + heat pumps for Tallaght South Dublin District Heating scheme (**TDHS**)

These factors may be used to assess buildings planned to be connected to these schemes. The enduring calculation methodology will continue to be developed in parallel and these defaults will be replaced by actual calculated factors, based on data verified by a Regulator of District Heat Networks (to be established) or an independent competent body appointed by the Department of the Environment, Climate and Communications once the methodology is implemented.

The new default factors are approximated figures. They are based on calculations that follow the approach from EPB Standard EN 15316-4-5. The assumptions made in applying this approach are reasonably conservative and consider a balance of aspects to facilitate the entry of TDHS and DDHS in DEAP and NEAP before the implementation of a verification method by a Regulator of District Heat Networks (to be established) or an independent competent body appointed by the Department of the Environment, Climate and Communications.

Conditions are attached to the use of the default factors for Efficient DH by TDHS and DDHS, including, but not limited to:

- Monthly metering data of energy, fuel and heat in and out of the system, and sold to dwellings and commercial building units to be logged and made available for review and to monitor the performance of the district heating with respect to the default factors
- The default factors may be subject to review depending on:
 - the actual performance of the district heating with respect to these factors, or
 - changes to regulations, standards or methodologies affecting the assumptions on which the defaults were based

Developers or operators of district heating schemes that believe their system would satisfy the definition of "Efficient district heating and cooling" in the Energy Efficiency Directive (EED), should contact SEAI for guidance on submitting their energy data. New defaults for other schemes may be established subject to verification by SEAI.

2. New default factors

New default factors are now available for selected Efficient District Heating system, as shown in Table 1.

New default factors for district heating	Symbol	Efficient DH using waste heat ¹	
		DDHS (Cogeneration Waste to Energy + gas)	TDHS (Data centre waste heat + heat pumps)
Total Primary energy factor	$f_{P_{tot,DH}}$	0.8	0.8
CO2 emission factor [kgCO2/kWh]	$f_{CO2,DH}$	0.08	0.08
Renewable and waste heat ratio to total output	$(RER+WHR)_{DH}$	0.93	0.69

Table 1– New default factors for DH in DEAP and NEAP

The factors above can be entered in the DEAP and NEAP methodologies and related software, as outlined in Table 2 and Table 3, until the software is updated to reflect the use of (RER+WHR) for buildings connected to Efficient DH schemes:

DEAP Inputs	Factor to be entered	Efficient DH using waste heat	
		DDHS (Cogeneration Waste to Energy + gas)	TDHS (Data centre waste heat + heat pumps)
CO2 emission factor	$f_{CO2,DH}$	0.08	0.08
Non renewable PEF	$f_{P_{tot,DH}} * [1 - (RER+WHR)_{DH}]$	0.06	0.25
Renewable PEF ²	$f_{P_{tot,DH}} * (RER+WHR)_{DH}$	0.74	0.55

Table 2– How to enter the new default factors in DEAP

SBEM Input	Factor to be entered	Efficient DH using waste heat	
		DDHS (Cogeneration Waste to Energy + gas)	TDHS (Data centre waste heat + heat pumps)
CO2 conversion factor of the DH network	$f_{CO2,DH}$	0.08	0.08
Overall PE conversion factor of the DH network	$f_{P_{tot,DH}}$	0.8	0.8
Renewable PE conversion factor of the DH network	$f_{P_{tot,DH}} * (RER+WHR)_{DH}$	0.74	0.55

Table 3– How to enter the new default factors in iSBEMie for NEAP

3. Guidance for BER Assessors on use of new default factors

When assessing a building connected to a district heating system, the BER Assessor needs to assess and verify the items on Table 4:

Item	Evidence for provisional BERs	Evidence for New Final and Existing BERs
The building or dwelling assessed is connected to district heating	Connection contract or statement signed by DH developer/operator for future connection of the designed building under assessment, specifying the exact property address.	Connection contract by DH developer/operator for the building under assessment, specifying the exact property address + photo evidence of connection (heat meter, HIU or other suitable evidence)
Which district heating scheme the building is connected to	Same as above, stating the name of the district heating scheme	Connection contract by DH developer/operator for the building under assessment, specifying the exact property address and stating the name of the district heating scheme

Table 4– Checks and evidence required for District Heating entries

When buildings are planned for connection to one of the district heating schemes, and the building is designed on this basis, the default factors may be used in the Provisional BER, provided the appropriate evidence is available. If the connection is delayed and/or an alternative system is chosen, the New Final BER must reflect the actual system installed in the building at the time of BER publication.

3.1 Distribution Loss factor

The new default factors in Section 2 are assumed to account for all heat losses in the primary network. For apartment blocks or non-domestic units served by a bulk connection to district heating, however, they do not account for losses in the secondary network (see Figure 1).

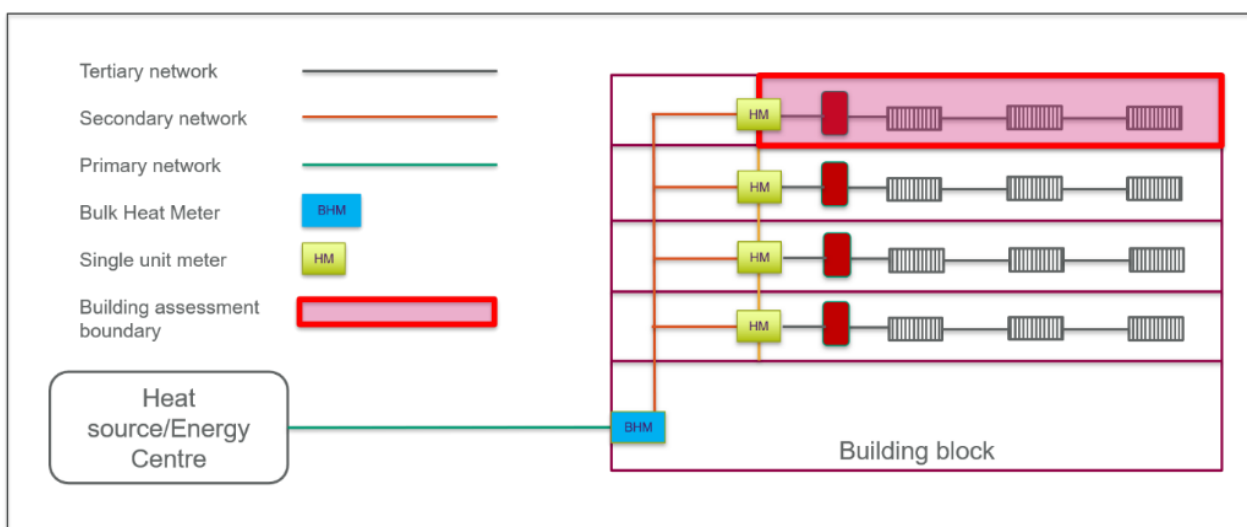


Figure 1 – Heat network hierarchy with bulk heat exchanger/meter and HIU/metering point for each building unit.

For non-domestic building units served by a bulk heat exchanger and apartment blocks, it must be assumed that accounting for secondary heat losses is **not** included in the district heating factors. In this case, the distribution loss factor must be set according to the DEAP methodology as a minimum. SEAI notes that this guidance may be reviewed in the future:

On domestic: for apartments, a distribution loss factor according to the DEAP Manual C1.1 Heat distribution must be used. As per DEAP Manual Table 9, this should be 1.05 as per "Modern pre-insulated piping system operating at 100°C or below, full control system installed in 1991 or later, variable flow system".

On non-domestic:

Where there is a bulk heat exchanger serving a number of building units through a secondary network, i.e. the bulk heat exchanger is not at the building boundary, the factors in Table 3 above need to be multiplied by 1.05 (assumed distribution loss factor) before being entered in iSBEMie or NEAP software.

3.2 Consideration for the connection of district heating to existing buildings

There is a potential for existing buildings with poor fabric to achieve relatively high BER ratings by connecting to DH while having a high space heating demand. This may be perceived as an indication of low heat consumption, and low energy costs to the building owner or occupier.

The risks of not capturing the multiple benefits associated with energy efficiency at building level should be mitigated by the district heating operator taking the following steps:

1. Strongly recommending and actively encouraging building owners to adopt measures to improve the fabric performance of buildings, before or after connection, and
2. Transparently informing building owners/homeowners on the predicted heat demand and heat costs for their building, before connection agreements are signed

By making use of the default factors, district heating operators commit to demonstrating how they will inform and support owners of existing buildings with poor fabric in taking action to improve the fabric and air tightness performance.

BER Assessors should assist in supporting this by advising their clients, where they believe this to be appropriate, that achieving a higher BER rating by connecting to a district heating system may not improve the energy efficiency of their building.

4. Renewable and Waste Heat Ratio components in Part L report pending software update

The Waste Heat Ratio component of the RER+WHR requirements in TGD L 2022 will not appear in the Part L report until a software change is carried out to enable this.

In the interim, when defaults for Efficient District Heating are used according to this document, a note should be added to the Part L report to indicate that the building is connected to an Efficient District Heating and that the RER includes a Waste Heat component. This is needed to clarify that the RER in the Part L report is not based solely on renewables but includes a waste heat contribution.



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