

Reporting on the sustainability of district heating networks: *development of a uniform calculation method*

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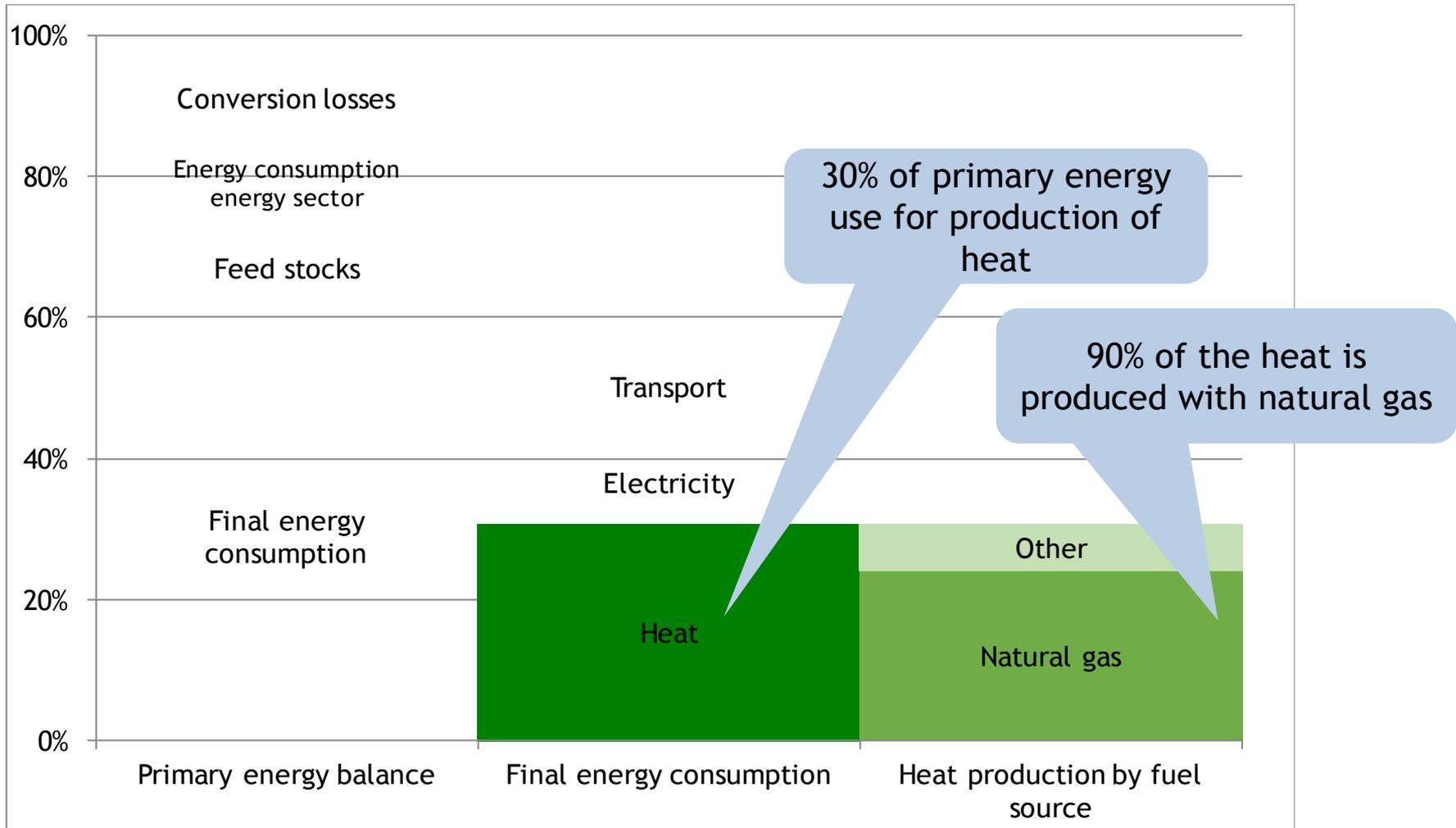
Rijksdienst voor Ondernemend
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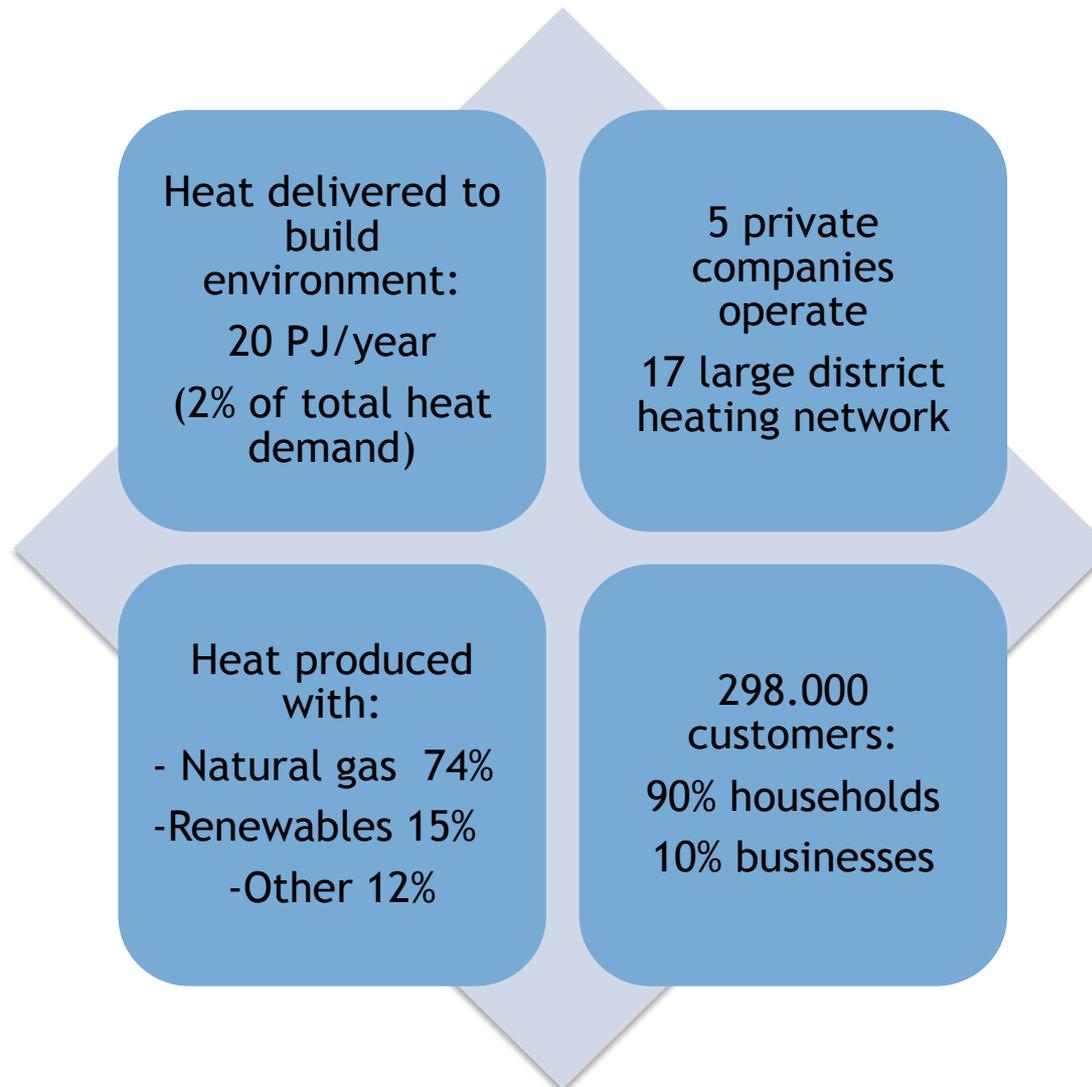
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Energy consumption in the Netherlands



Role and characteristics of district heating



Reporting obligation

- Why?
 - Government objectives: move away from natural gas > expanding & greening districting heating systems (DHS)
 - Requires increase transparency in reporting
- Reporting: Mandatory indicators
 - CO₂ emissions (kg) per unit of delivered heat,
 - Primary fossil energy use (GJp) per unit of delivered heat,
 - Share of renewable heat (%)
- Furthermore obligatory reporting on:
 - Type and number of customers
 - Subsidiary energy
 - Heat produced and supplied by source
 - Heat losses.

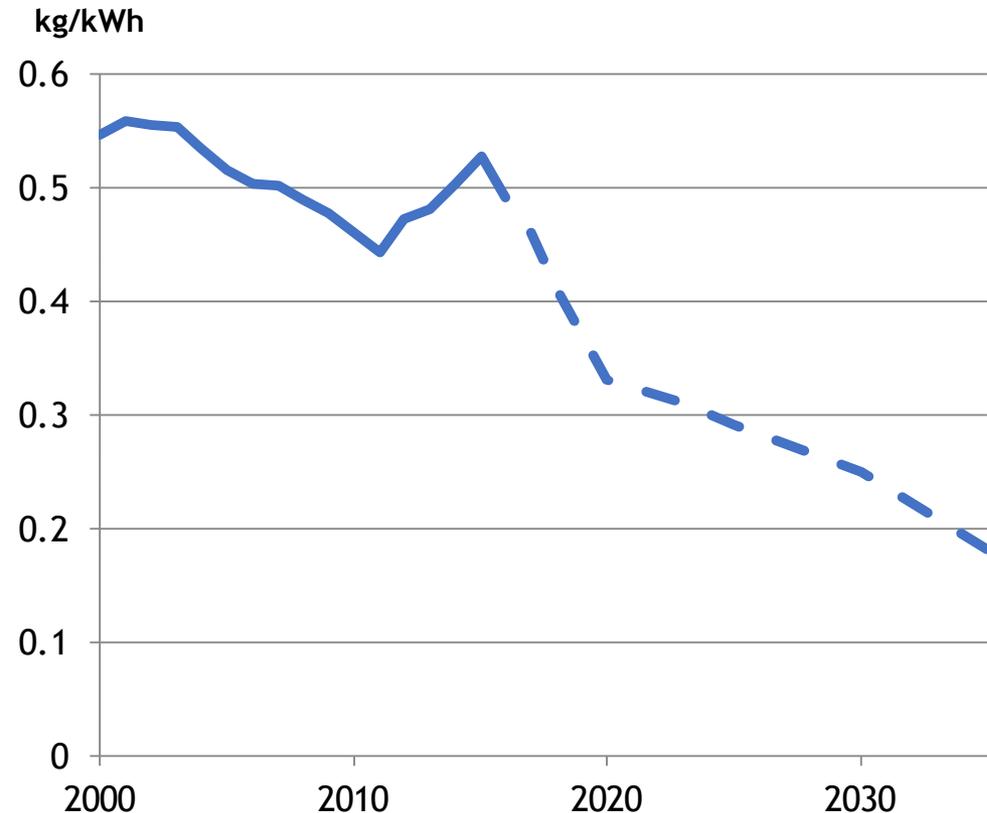
Principles in developing the calculation method

- Reporting on individual district heating networks
- Calculation method based on accepted standards and methods:
 - EMG standard (Energy performance standard for provisions at district level), that is aligned with the European Standard EN 15316-4-5
 - EC Directive on Renewable energy & Dutch Protocol Monitoring Renewable Energy
 - Calculation method for Nearly Zero Energy Buildings
- Calculations should reflect actual sustainability of supplied heat
- Green Certificates are not valued

Considered heat supply sources (#1)

1. Electricity

- Used as auxiliary energy
- Associated CO₂ emissions and primary energy calculated by taking full mix of production facilities into account (incl. renewables)
- Numbers for most actual year are used



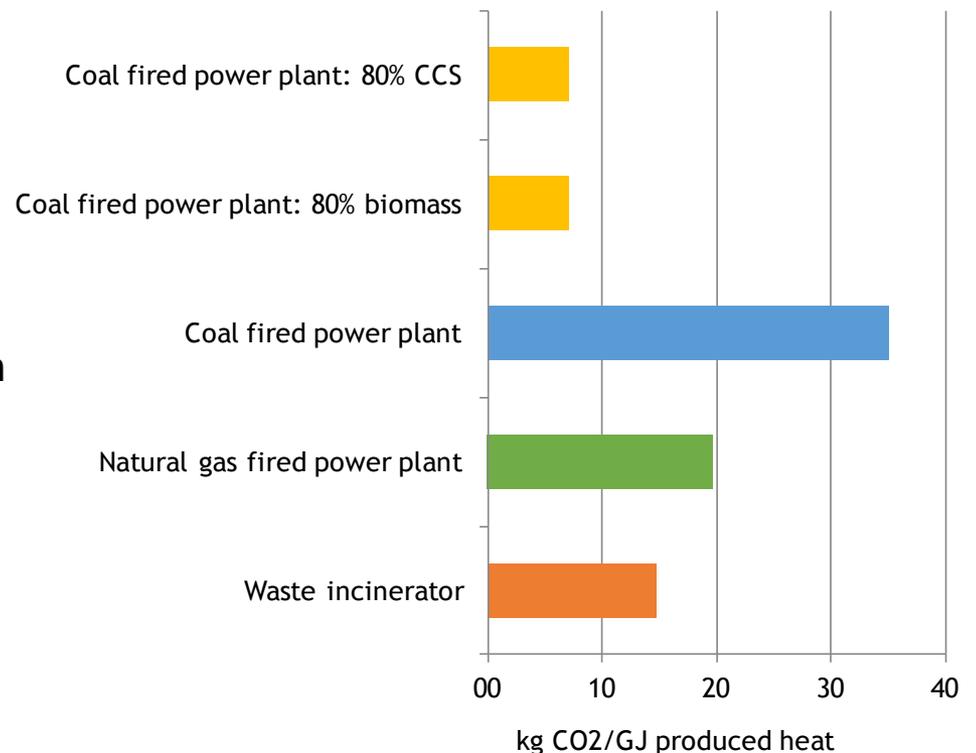
Considered heat supply sources (#2)

2. Heat supplied by heat driven CHP installations

- “Power Bonus” method used to allocate CO₂ emissions and primary fossil energy use

3. Heat supplied by electricity driven CHP installation

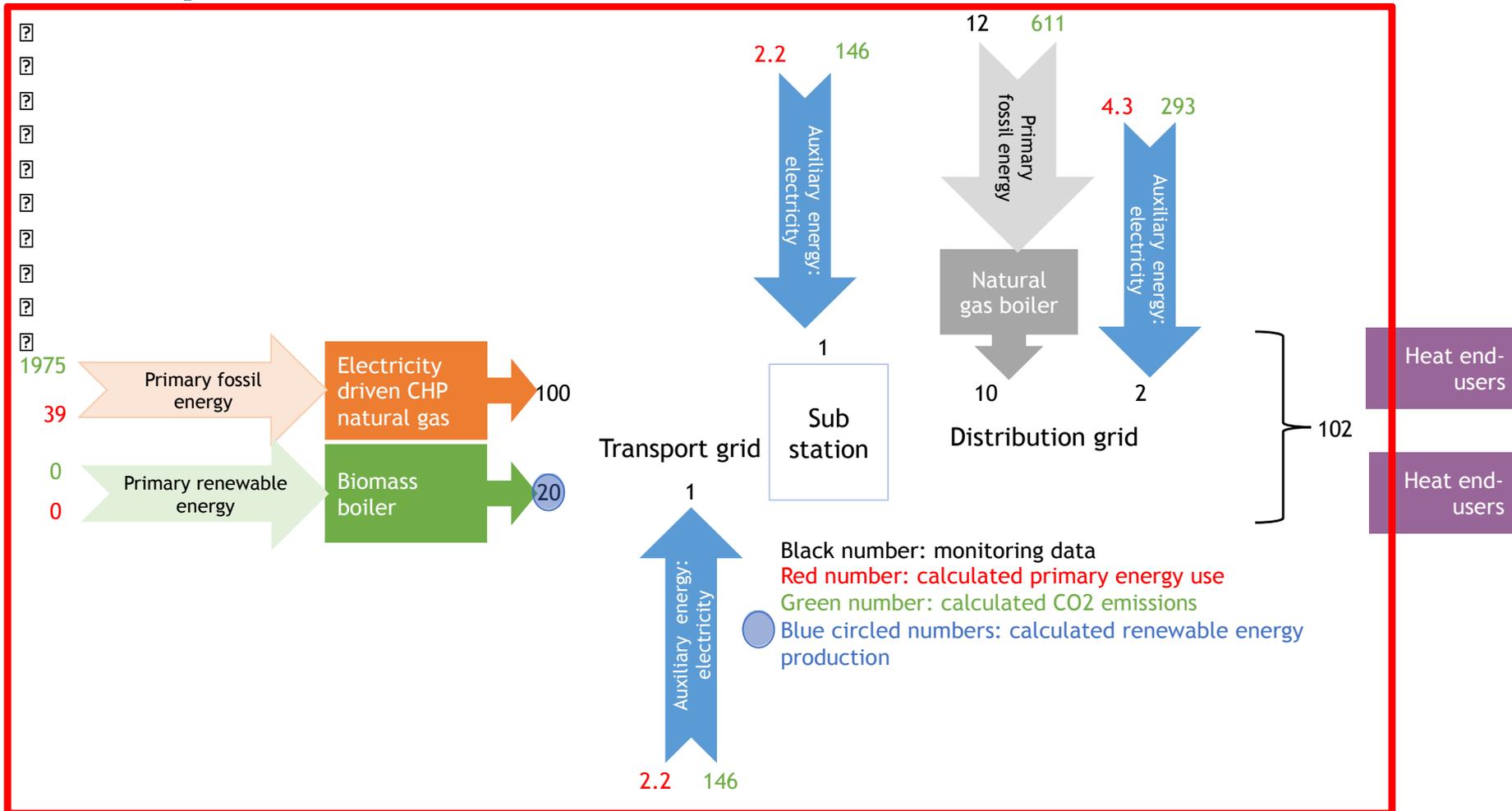
- Includes power stations and waste incinerators
- Assumption: losses in electricity production are offset by additional production in all power station feeding into the grid
- Method “corrects” for carbon contents of fuels used in individual installations



Considered heat supply sources (#3)

4. Heat supplied by a boiler
5. Residual heat
 - Heat would be otherwise be discharged
 - Does not require additional fuel input
6. Heat from geothermal sources
 - General principle: all electricity consumed within the system boundaries is allocated to utilized heat and / or cold

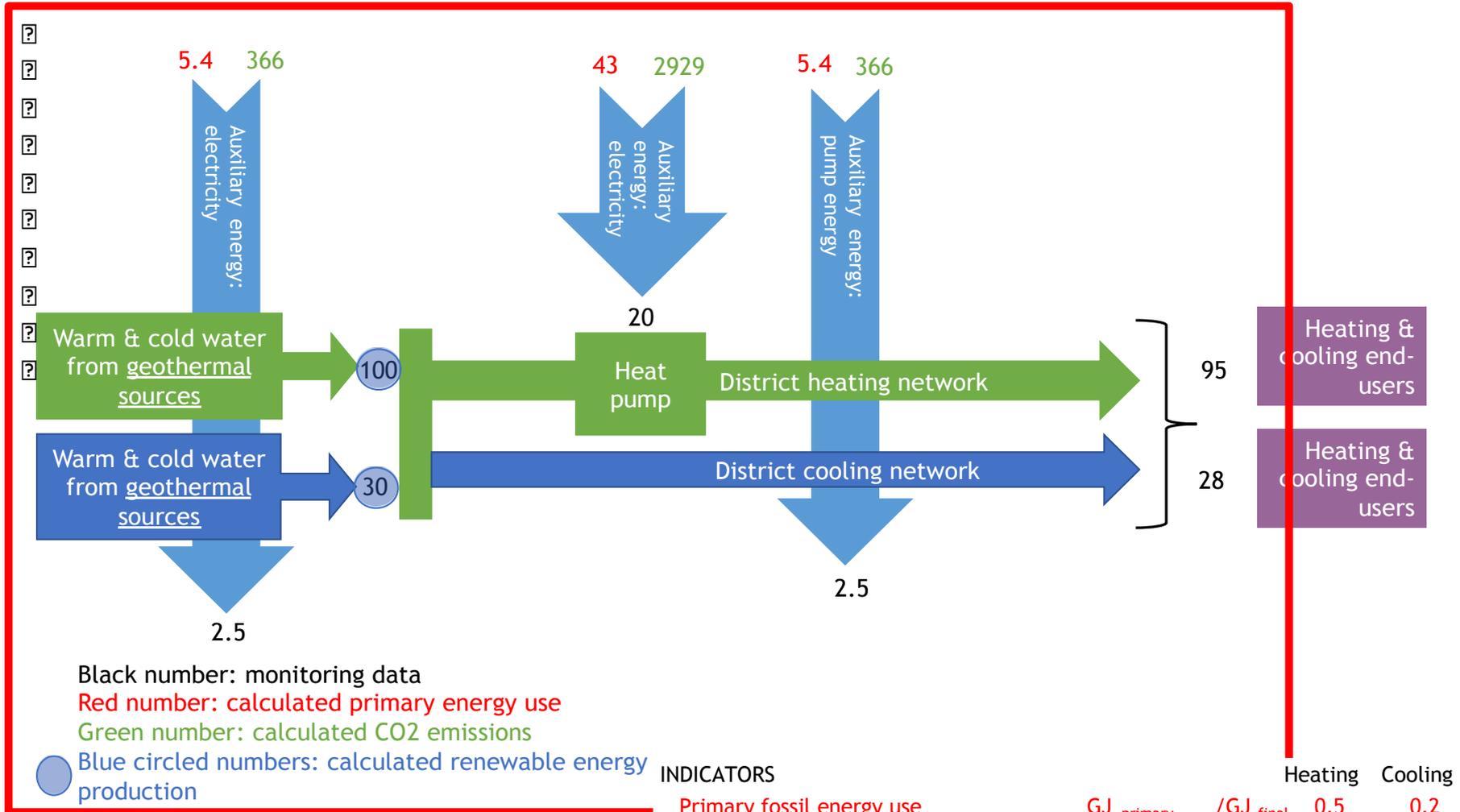
Example #1



INDICATORS

Primary fossil energy use	GJ _{primary}	0,6
Share of renewable energy	%	25%
CO ₂ emissions	kg/GJ _{heat}	31

Example #2



INDICATORS

		Heating	Cooling
Primary fossil energy use	GJ _{primary} /GJ _{final}	0,5	0,2
Share of renewable energy	%	68%	82%
CO ₂ emissions	kg/GJ _{final_energy}	37	6

Conclusions/discussion

- A method to gain insight the sustainability of district heating systems calculating three indicators can be established using existing standards and employing already available data
- Methods can be starting point to develop methods in other European countries. However, discussion on harmonisation of methods around Europe is probably necessary to address issues like:
 - how to deal with a growing share of renewables?
 - how to rate this in the sustainability of district heating.