MVV Environment Devonport
Local District Heating Conference

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MVV Umwelt GmbH

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Agenda

- Introductions
- Presentation on MVV‘s proposal
- Review of district heating potential
- Review of housing associations stock condition
- Alternatives to district heating
- Information requirements
- Future actions

Introduction

MVV Energie CHP and district heating references

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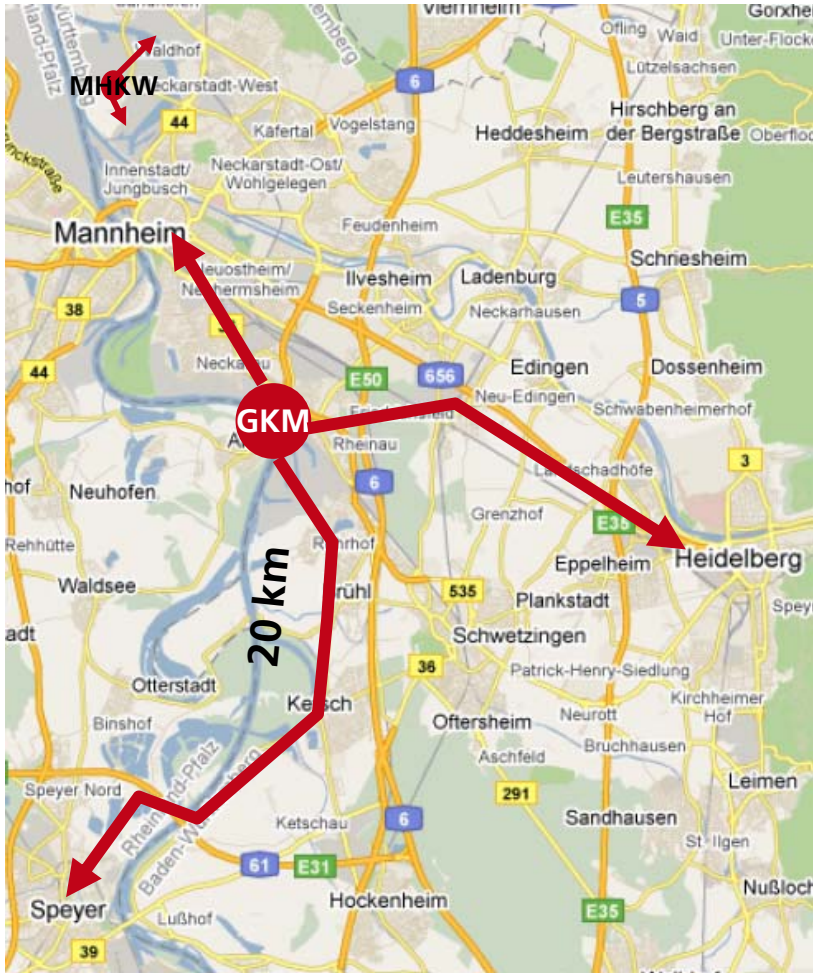
fact sheet district heating
MVV Energie

- 1,667,000,000 kWh district heat supplied per year in Mannheim
  - Ranked 3rd in Germany
  - Ranked 6th in Europe
- CHP operater since 1960's
- fuel supply for district heating
  - coal base load
    (1675 MW el., up to 1000 MW th)
  - natural gas and fuel oil peak load
- long distance heat supply
  - Heidelberg: 8.5 km
  - Speyer: 21 km
- public process steam supply in Mannheim
  - fuelled by EfW + Biomass plant
- district heating system in
  - Offenbach
  - Kiel
  - Ingolstadt
  - Czech Republic

MVV Energie total heat delivery 7,217,000,000 kWh / a

……district heating in the region



Heat supply for:

330.000 people in Mannheim
140.000 people in Heidelberg
50.000 people in Speyer
and other in connected regions

MHKW: MVV EfW with CHP

GKM: Großkraftwerk Mannheim

Supply direction

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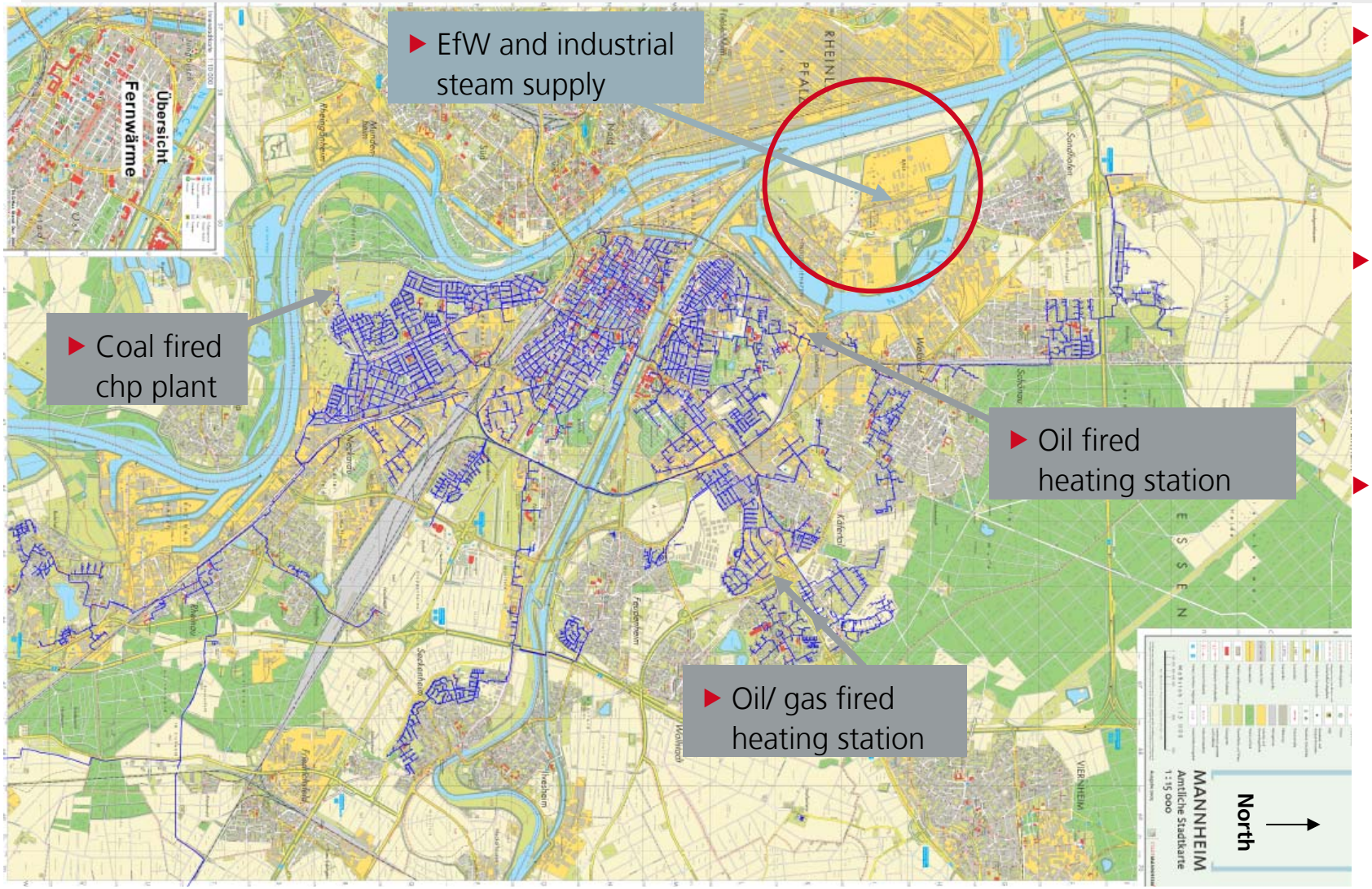
district heating systems Mannheim



- **Pipeline length**
  = 525 km
- **Max. heat load**
  = 829 MW
- **Supply**
  = 1,667,000 MWh
  = 100,000 (59%) house holds

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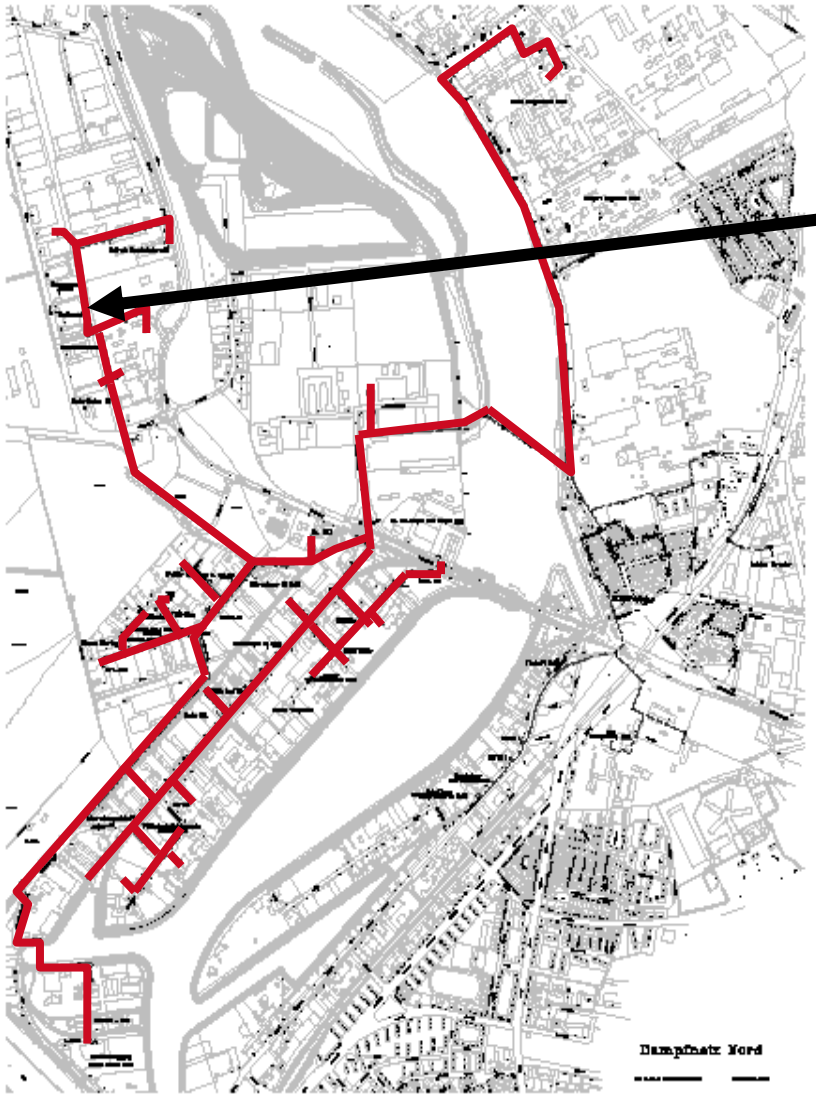
process steam system Mannheim

pipeline length:

in total:	15.1 km
medium pressure:	5.5 km
low pressure:	9.6 km
number of clients:	15
supply year:	400 GWh



EfW plant Mannheim:

- 3 EfW boilers
- 625,000 t/a waste
- 300,000 MWh/a el

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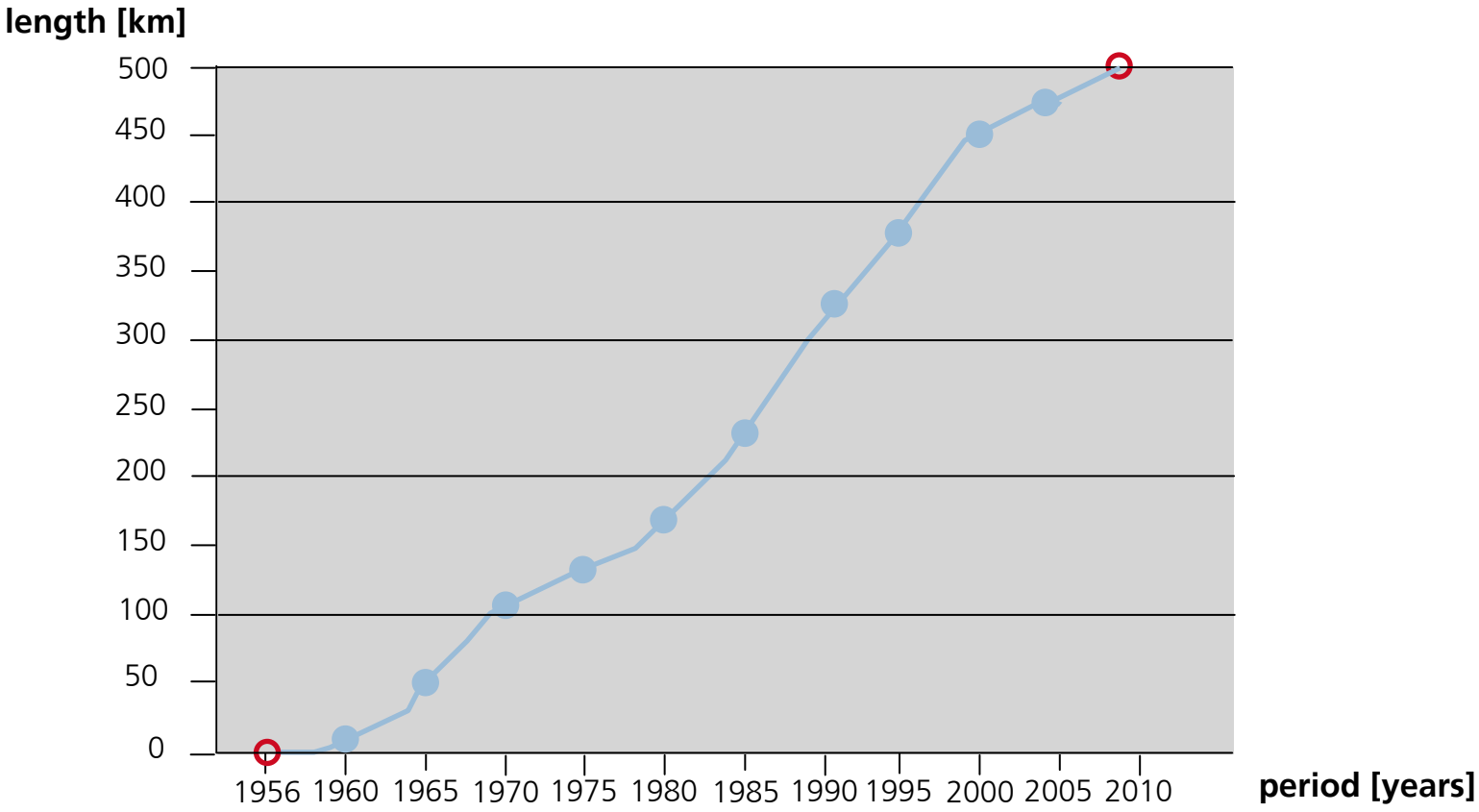
District heating in Mannheim and region is a long term development



Constructing a district heating network turns out to be a long-term project.

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General Information on district heating

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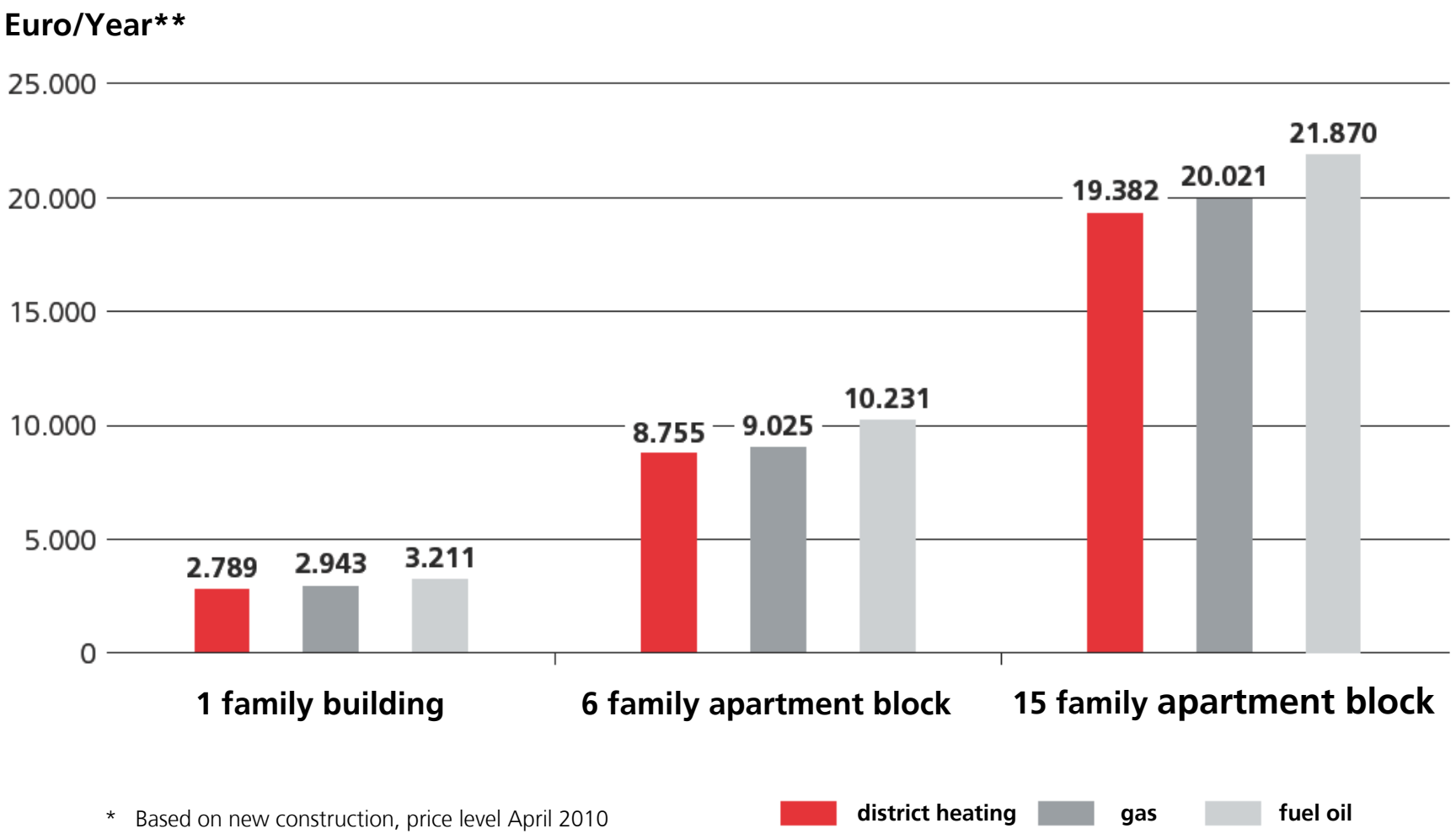
Comparison of heating sources

attribute	fuel oil	natural Gas	electric Power	district Heating
price fluctuation	high	high	medium	low to medium
required space	increased	low	low	low
clean handling	high	higher	higher	very high
pre-financing of fuel	yes	no	no	no
replacement investment	high	low	medium	low
operation and maintenance requirements	medium	low	low	very low
chimney cleaning and emission control	yes	yes	no	no
environmental impact	medium	low	medium	very low

Cost comparison of heating sources full costs in Mannheim*



* Based on new construction, price level April 2010
** inlcusive VAT

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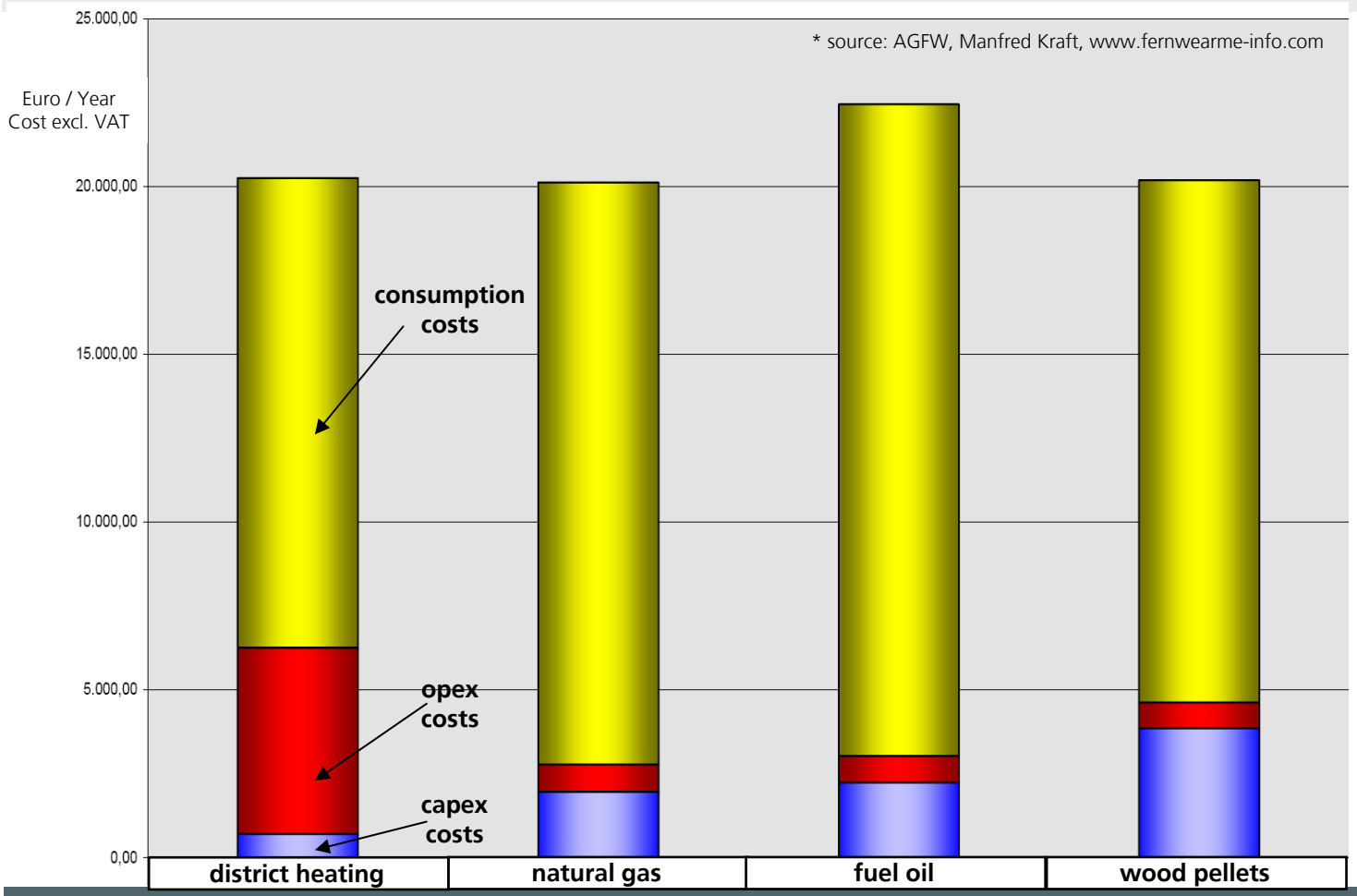
Full cost comparison of refurbished apartment block with 2,000 sqm heated space

	Consumption related cost elements	Operational cost elements (opex)	Capital cost elements (capex)
included in example	▸ Fuel costs natural gas, fuel oil, wood pellets, delivered heat ▸ Auxiliary energy power for lighting, blower, pumps ▸ Working materials	▸ maintenance ▸ servicing ▸ Repairs ▸ Inspections and customer care ▸ Chimney sweep ▸ Emission control test ▸ Invoicing of users	▸ Oil tank and auxilaries ▸ Connections (from street to house) ▸ Heat generator with auxiliaries (boiler, house station) ▸ Combustor with auxilaries (burner, blower, pump) ▸ Heat exchanger and water heater ▸ Pipe works, pumps, flow control
NOT included in example	▸ Return for pre payment of fuels (fuel, wood pellets)	▸ Operation, actuation of heat unit is assumed to be done by house owner ▸ Other Costs ▸ Assurance ▸ Administrative charges ▸ Cleaning, caretaker	▸ structural works ▸ chimney refurbishment (not chimney itself, only new flues)

Full cost comparison of 2,000 sqm apartment block VDI 2067, price level October 2010*



district heating	
	13,992.80 €
	5,542.89 €
	710.85 €

natural gas	
	17,337.67 €
	809.71 €
	1,968.16 €

fuel oil	
	19,402.12 €
	790.92 €
	2,245.40 €

wood pellets	
	15,553.07 €
	767.64 €
	3,860.62 €

District heating delivers stable, future proof heat prices

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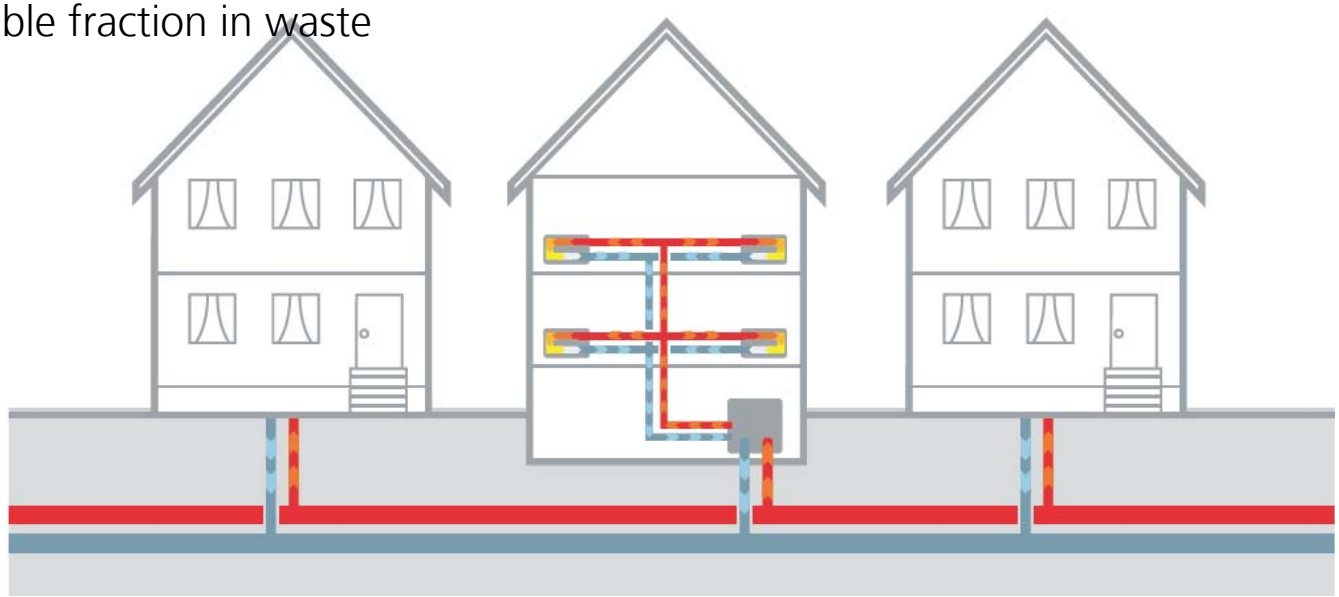
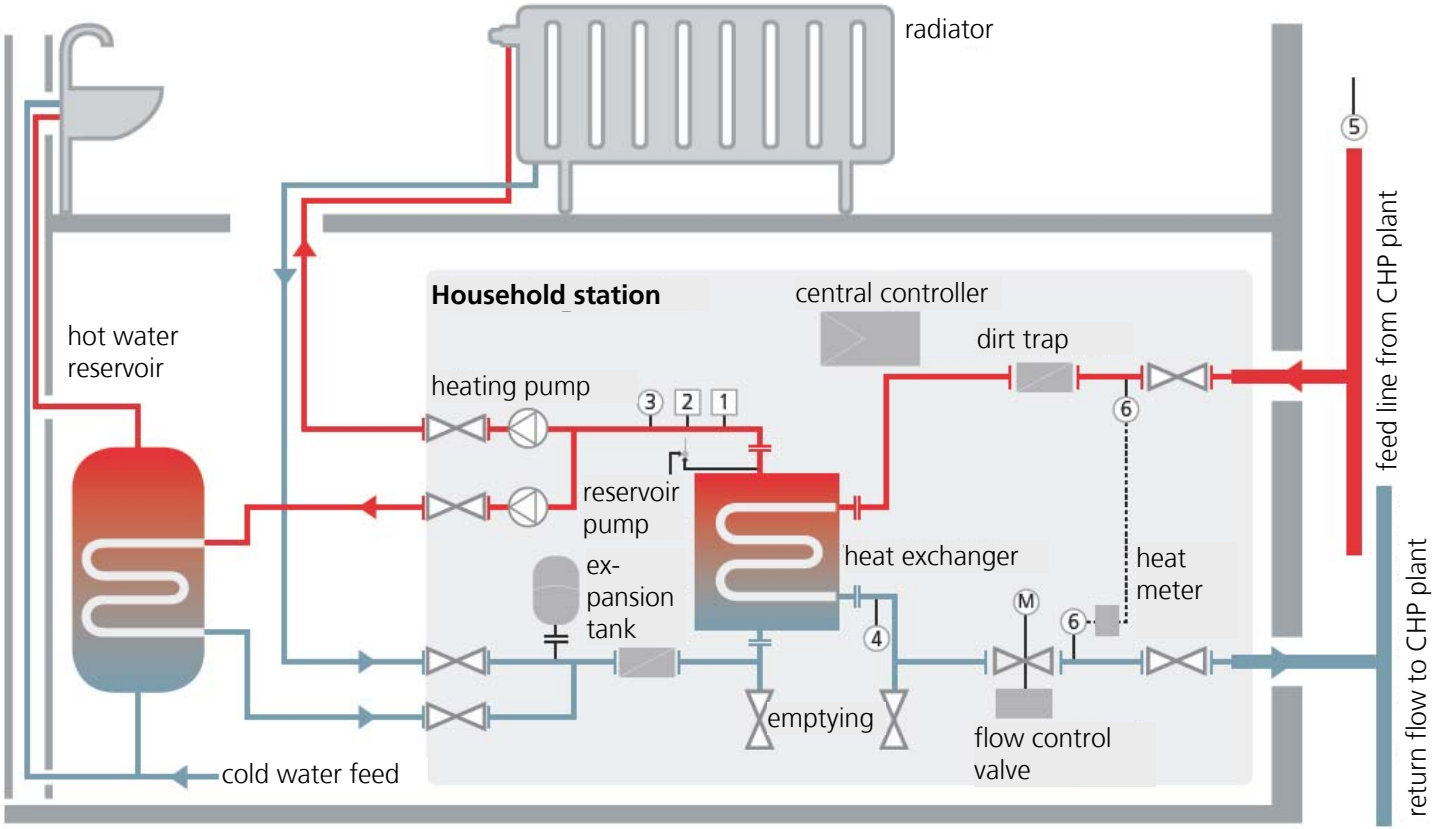
District heating
basic informations

- Closed hot water pipe circuit
- Hot water is by-product of power generation in combined heat and power
- CO2 savings due to good quality CHP and biodegradable fraction in waste
- Easy installation if centralized hot water system is replaced
- Low maintenance efforts / costs
- Secure supply (non flammable heat transfer)



schematic use of district heating household station



(1) **safety temperature probe**	(3) **feed line temperature probe**	(5) **outdoor temperature probe**
(2) **temperature control**	(4) **return flow temperature probe**	(6) **temperature probe for heat meter**

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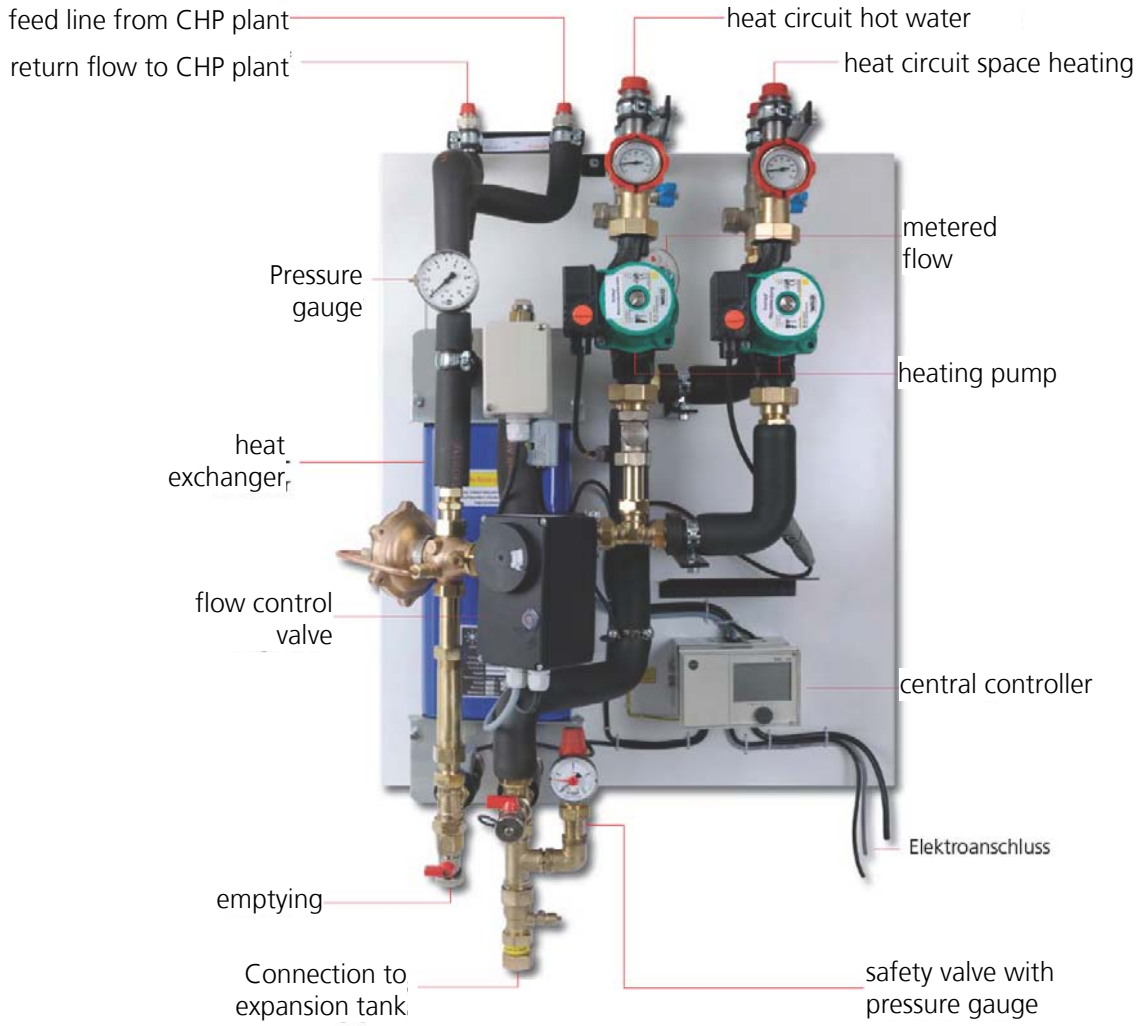
Example of household station
Taurus 50kW



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Responsibilities in connecting individual houses as practised in Mannheim

- **Esco tasks**
  - Execution of construction works in public area (e.g. diversion route, excavation)
  - Exclusion zone in street
  - Making of utility trench and wall break-through
- **House owner tasks**
  - Getting quote and signing of energy delivery contact with Esco
  - Free entry to the area of the utility trench
  - Contact your local heating engineer to prepare connection to existing boiler
  - Supply a floor plan of the basement to Esco

Building a district heating connection (1)











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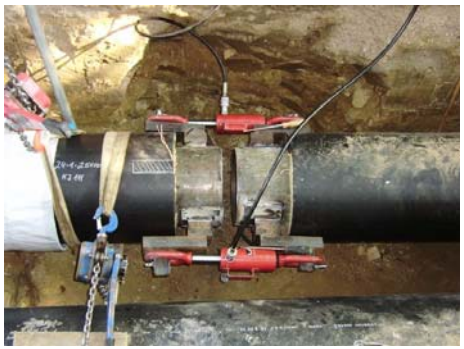
Building a district heating connection (2)



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Review of district heating potential

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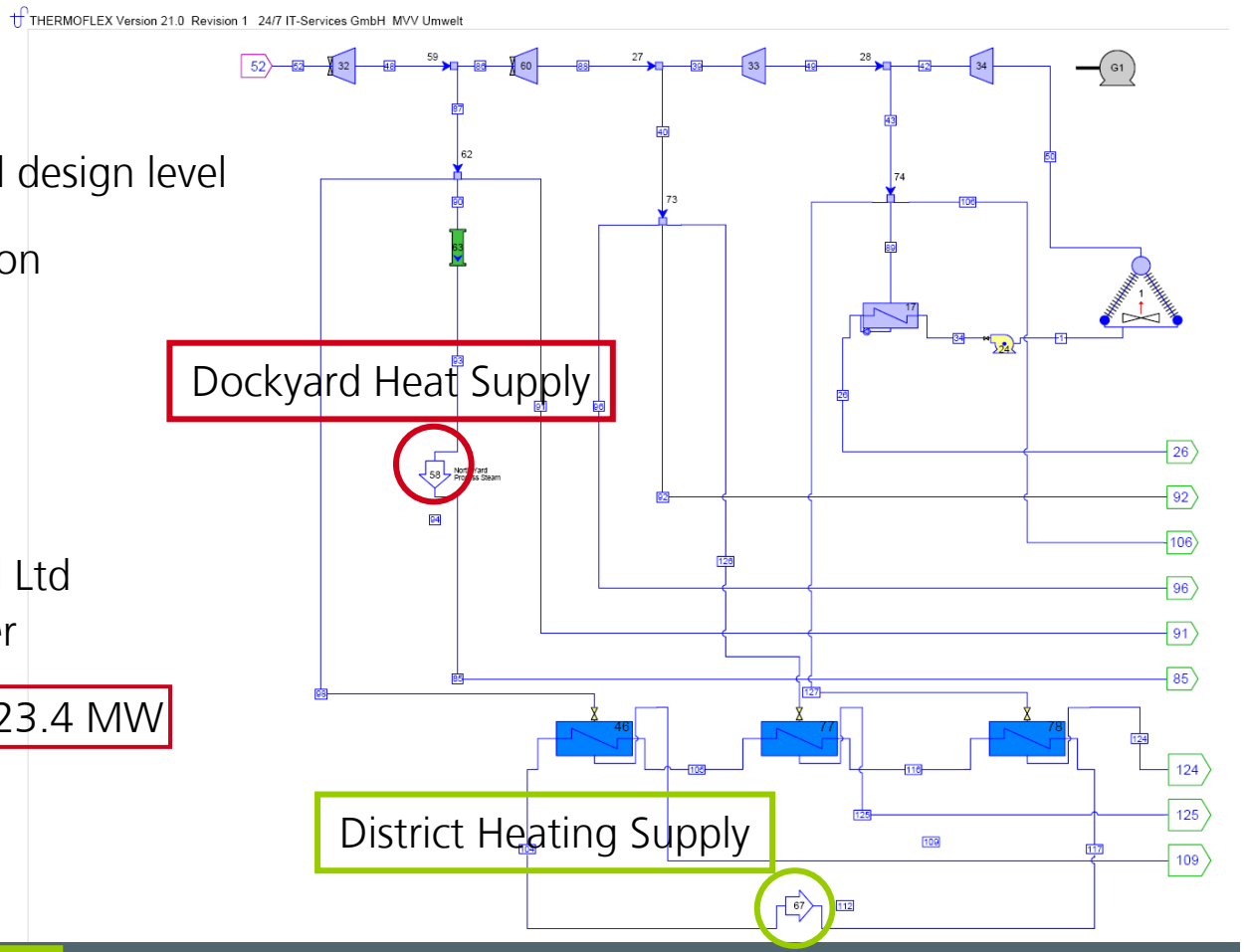
EfW maximum demand limitations

- **Physical limitations**
  - Extraction pressure to hold design level
  - Mass flow at each extraction
  - Make up water capacity
- **Contractual limitations**
  - Heat energy supply of Devonport Royal Dockyard Ltd Fleet Accomodation Center
  - Guaranteed Maximum of 23.4 MW thermal load



Low free capacity (max. 3.75 MW th) for additional heat supply

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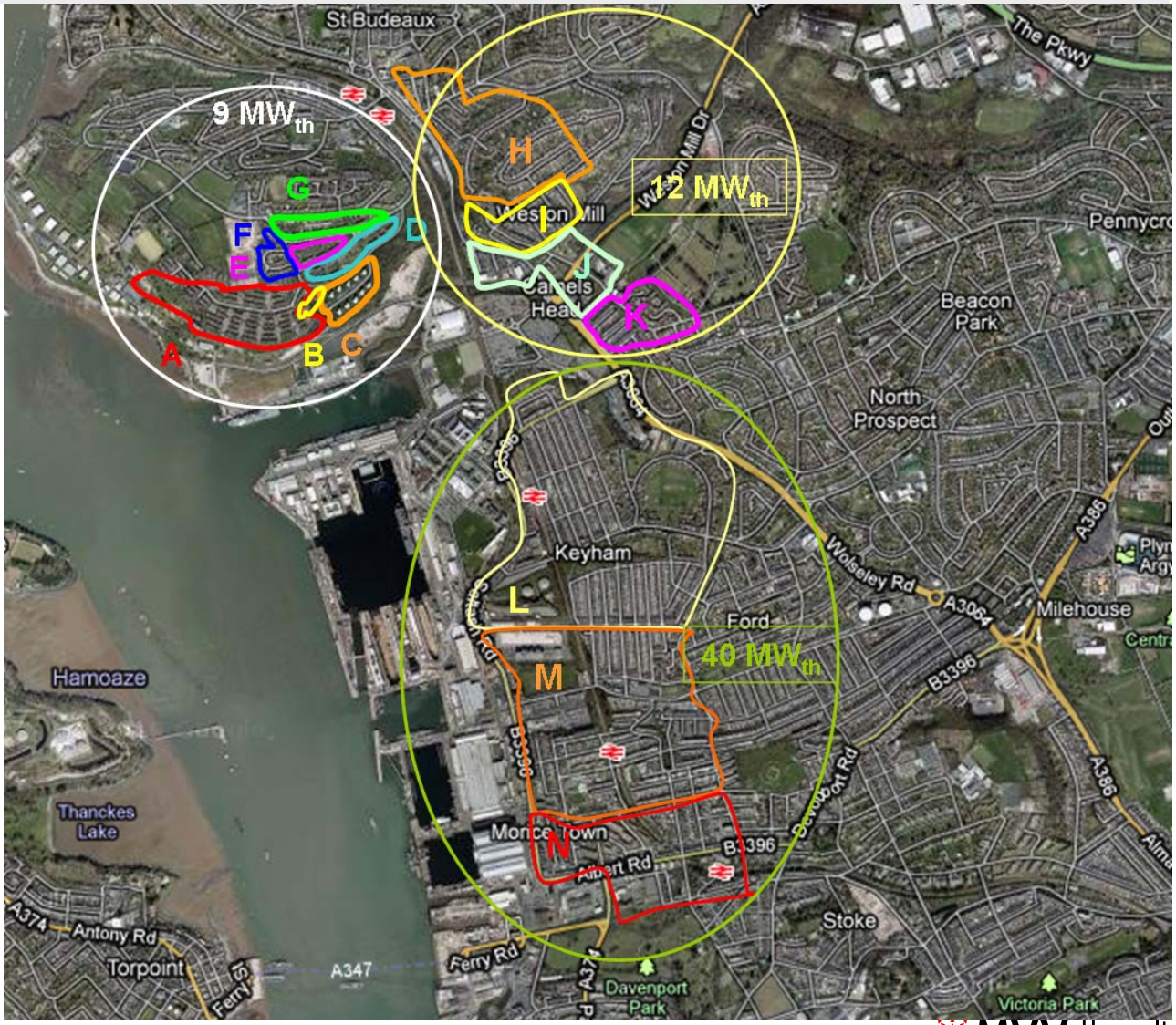
Potential district heating supply areas maximum connection demand

- Buildings with low insulation
- Heat transfer coefficient calculated with outer size of building
- Air change of 1.5
- Long year minimum temperature -10°C
- Average room temperature +20°C
- District heating supply rate 100% in each area



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district heating in Barne Barton
maximum connection demand

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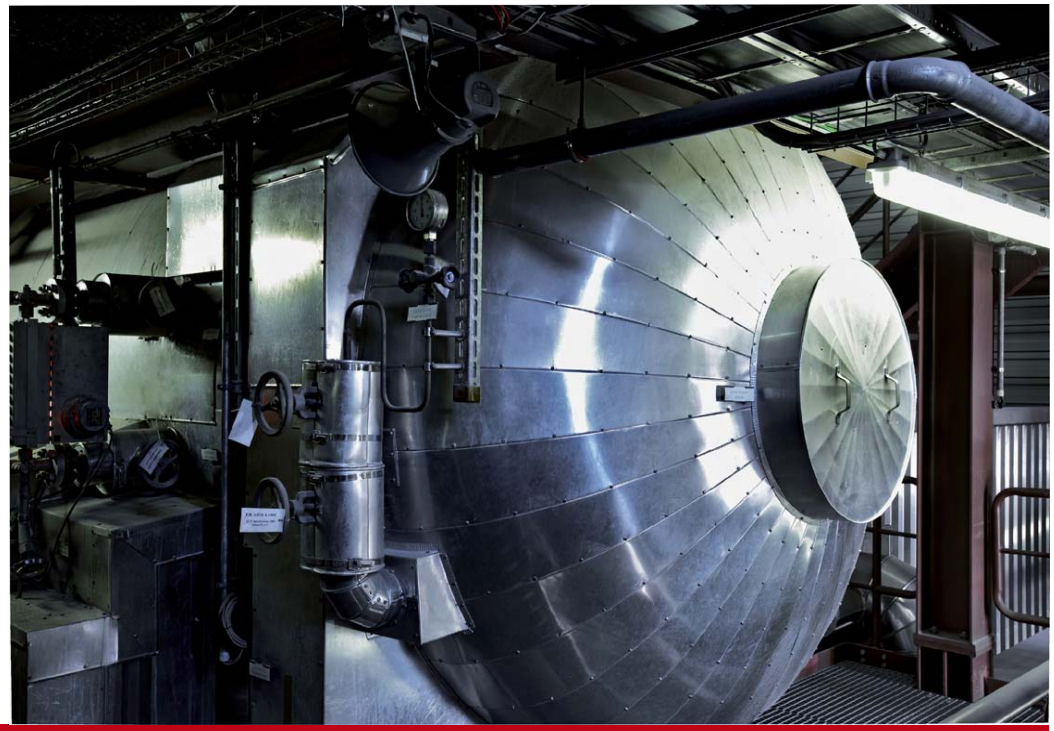

Review of housing stock conditions

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Alternatives of district heating

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District heating alternatives and other carbon saving measures

- **Centralized heating alternatives**
  - Biomethane as fuel
  - Wood pellet boiler
  - Solar thermal heat
- **Other carbon saving alternatives**
  - Insulation improvements
  - Photovoltaics

Information requirements

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Information requirements
MVV heating enquiry form

MVV Environment Devonport Limited

Heating Enquiry Form

Question	Answer	Comment
Name of Organisation		Please confirm name of technical contact as well as principal contact for this work
Number of residential properties within 1000 metres of Blackies Wood		
Type of heating in residential properties (eg hot water, electric storage, electric hot air etc)		Please advise details of different
Use of heat (space heating and/or hot water)		
Location of properties		If possible please provide a map showing the location of each separate building
Approximate age of residential properties		
Nature of glazing (eg single, double, triple etc)		
Nature of thermal insulation (eg roof, cavity etc)		
Thermal capacity installed		
Current hot water temperature in feed flow		

Information requirements
further information for detail study

- Heating source fuels
  (natural gas, electricity, other?)
- Heating utilisation
  - Space heating only
  - Hot water and space heating
  - Central/decentral heat source(s)
- Current thermal capacity installed
- Yearly energy consumption for heating
- Current feed hot water temperature
- Current situation on insulation
- Current situation on glazing
- Floor plans with location of radiators
- Energy performance certificate

Information requirements energy performance certificate

Energy Performance Certificate

SAP
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17 Any Street,
Any Town,
County,
YY3 5XX

Dwelling type:	Detached house
Date of assessment:	02 February 2007
Date of certificate:	[dd mmmm yyyy]
Reference number:	0000-0000-0000-0000-0000
Total floor area:	166 m²

This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO_2) emissions.

Energy Efficiency Rating

	Current	Potential
Very energy efficient - lower running costs		
(92-100) A		
(81-91) B		
(69-80) C		73
(55-68) D		
(39-54) E		
(21-38) F	37	
(1-20) G		
Not energy efficient - higher running costs		
England & Wales	EU Directive 2002/91/EC	

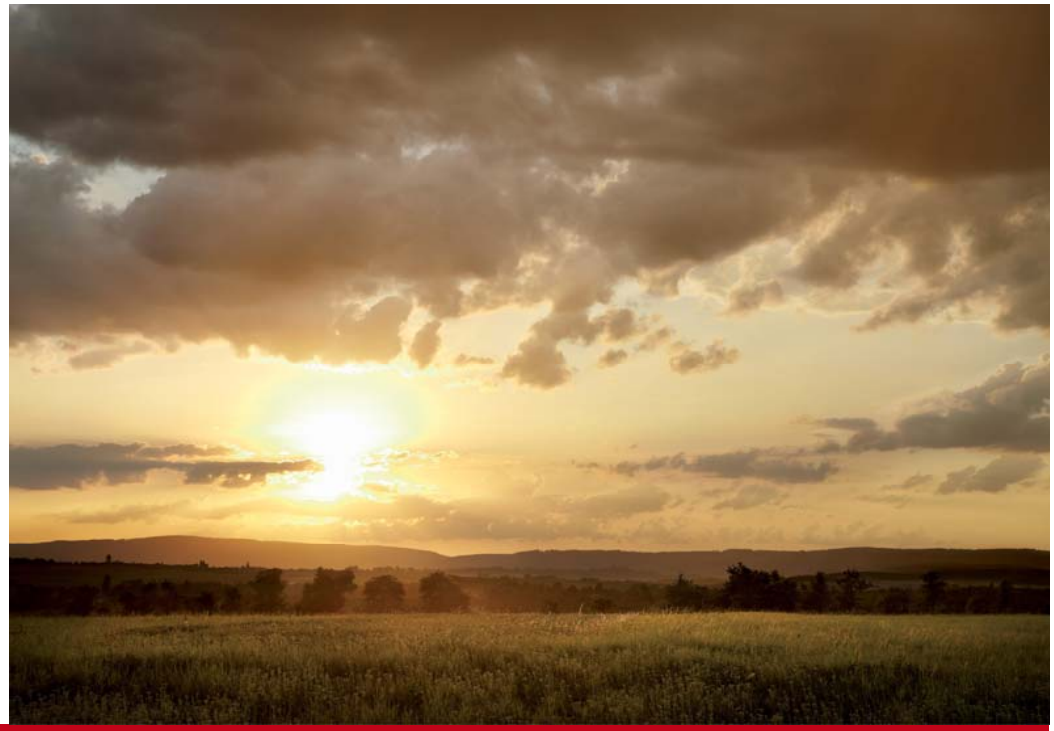
The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be.

Environmental Impact (CO_2) Rating

	Current	Potential
Very environmentally friendly - lower CO_2 emissions		
(92-100) A		
(81-91) B		
(69-80) C		69
(55-68) D		
(39-54) E		
(21-38) F	31	
(1-20) G		
Not environmentally friendly - higher CO_2 emissions		
England & Wales	EU Directive 2002/91/EC	

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

Future actions



Thank you for your attention!

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