Pay Energy once -

use it several times

Improvement of the energetic treatment situation with use of the exhaust air of the sewer system

WÄTAS

IfaE Institut für angewandte Energieeffizienz GmbH

Delegation travel Budapest 7.-9. September 2010

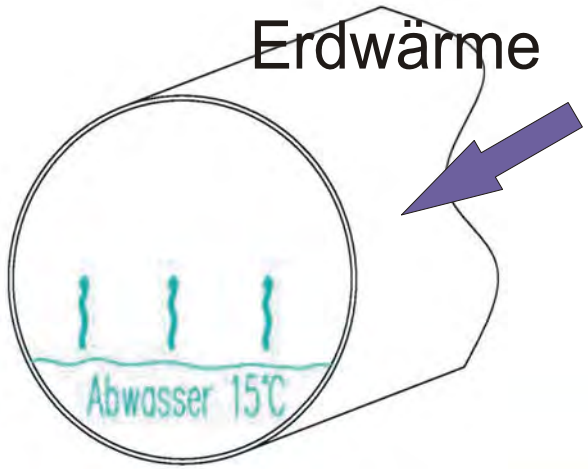
Scope:

- relay of the fossil fuel gas
- decline of CO_2 load
- liberation out of the central supply
- use of renewable energy trough innovative solutions

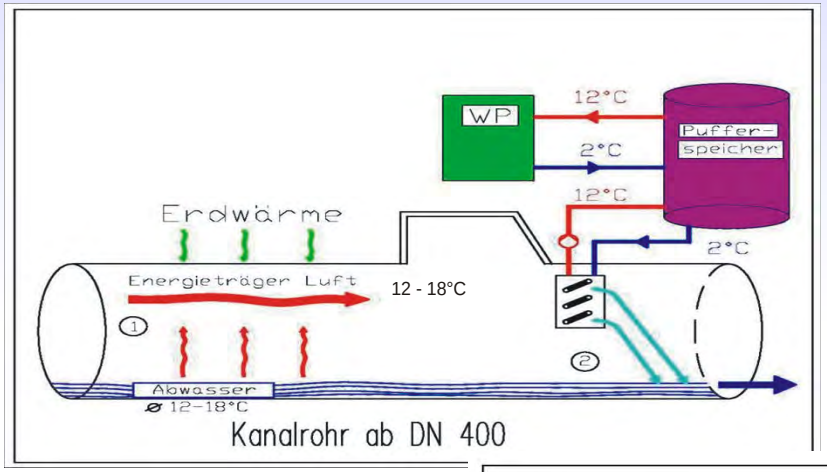
A alternative solution for the enregetic use of the sewer

- use of the energy source air –

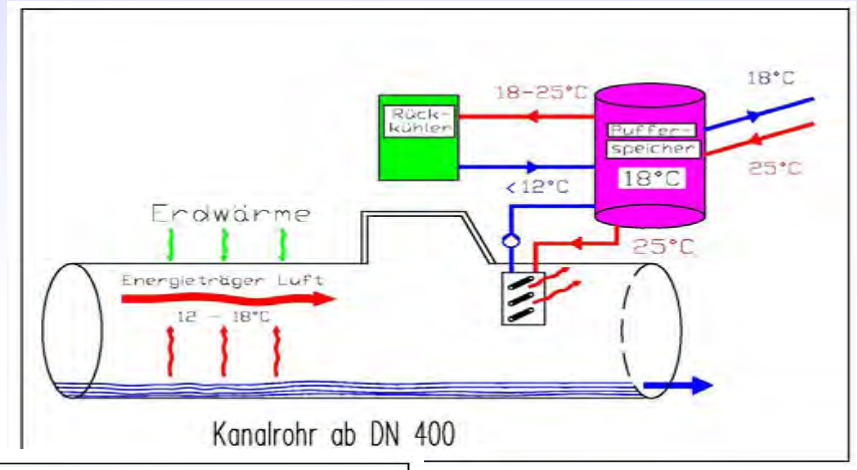
- relatively constant air temperature of 12 to 15 °C will be influenced from the sewer amount just slightly
- high relativ air humidity
- both ideal circumstances. 10 Kelvin are available for the energetic use for the heat pump system
- use of fin heat exchanger (material V2A/V4A)
  big surface for the temperature intake because of that
- no contact with dirty water
- relativly low capital costs
- from sewage and channel environment heated air rises in the channel
- cooled air is specific heavier than the environment air at the channel, falls down on the sewage surface and will be evacuated in flow direction



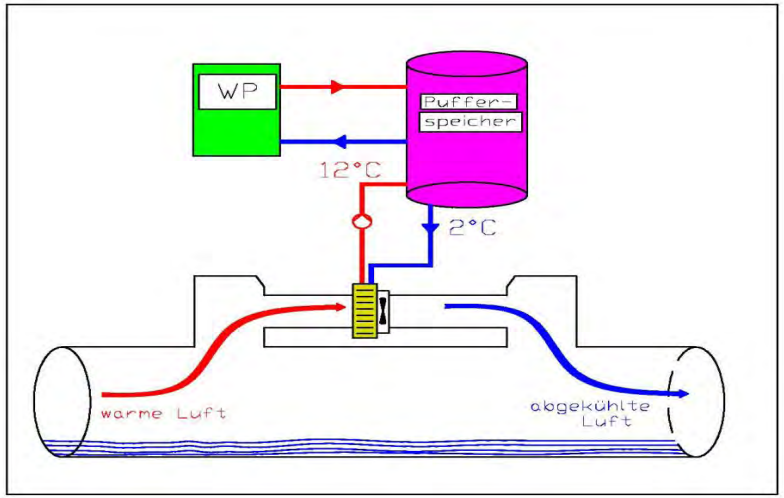
Innovative use of energy from channel systems



Extraction of warmth

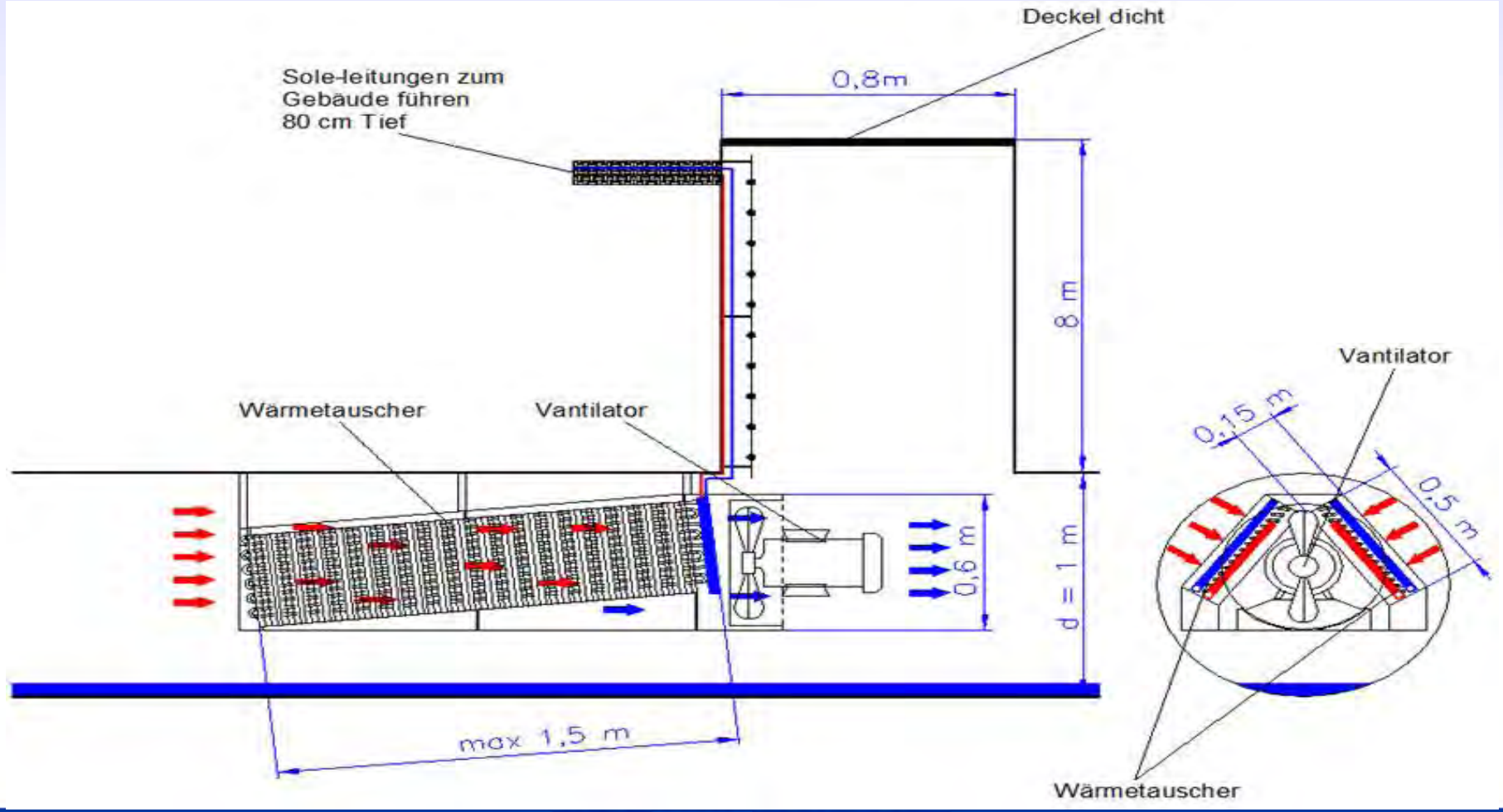


Extraction of cooling temperature



Bypass- solution for special physical conditions

Placement of Heat Exchanger



Technical data

Heat demand office building	30 kW heating 4 kW service water
Sewer	DN 1000
Usable length	approx. 400 Meter
Volume flow	average 148.000 m³/ hour at 0,2 till 0,8 m/ sec
Relativly humidity	average 72%
Capacity of special heat exchanger in the channel	34 kW
power consumption effective pump for circuit bond system	130 Watt
Heat pump heating capacity	34 kW
Power consumption including heat pump	3 kW
COP heat pump at 45/ 40 °C	4,1

CO_2 saving

Brennstoff Erdgas:	Heizwert	kWh/m³	10	10	10
z.Zt. Benötigte Wärmemenge:		kWh/a	103.850	54.250	38.750
Emissionsfaktor CO_2- Erdgas		kgCO_2/m³	1,777	1,777	1,777
Vollnutzungsstunden		Std	1.550	1.550	1.550
vorhandene Leistung		kW	**67**	**35**	**25**
Volumen Erdgas / a		m³/a	10.385	5.425	3.875
z.Zt. Vorhandener CO_2 Ausstoß		kg/CO_2/a	18.454	9.640	6.886
Einsparung mit Wärmepumpe:					
Annahme Stromerzeugung mit Erdgas					
Einsatz Leistung WP		kW		35	25
Cop		W/W		5,6	5,6
Heiztemp.		°C		35	35
elektr. Leistungsaufn.		kW		6,3	4,5
Brennstoff Erdgas:	Heizwert	kWh/m³		10	10
Vollnutzungsstunden		Std		1.550	1.550
Wärmemenge /a		kWh/a		54.250	38.750
elektr. Leistungsaufn.		kWh/a		9.688	6.920
Emissionsfaktor CO_2- Strom bei Erdgas		kg CO_2/kWh		0,662	0,662
CO_2 Ausstoß		kg/CO_2/a		6413	4581
Einsparung an CO_2		**kg/CO_2/a**		**3227**	**2305**
Einsparung an CO_2		**%**		**33**	**33**

Thank you for your attention

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