Demand-Side Management and Customer Binding Programs as Prerequisite for SDH

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Rainer Bahnmüller; Klosterneuburg, Austria

ALLPLAN
Die Umweltmanager.

Starting point, strategic aspects of DSM

The main aspect of a demand side approach is a completely different relation with the customer. The DH business is customer oriented.

New business philosophy

- Does the business even have a customer orientated approach?
- How high is the customer satisfaction exactly?
- Does an organisation geared towards the customer exist?

Viewpoint of the customer

- Security of supply
- Contractual matters
- Fair pricing
- Technical support,
- Accounting – composition of the bill, simplified bills, mode of accounting
- Confidence in the business, confidence building measures

Heat cost allocation, the basic measure of DSM I

Advantages:

- Transparent heat bill
- A transparent heat bill is the most important means of communication between the DH and its customer and is
- The best customer loyalty measure
- Customers are protected against future tariff increases
- The measure initiates further saving measures by the households
- The saving potential of the existing IHS is used
- Free capacities for more heat customers
- Heat production according to the real needs of the customers.

Heat cost allocation, the basic measure of DSM II

Change to a demand driven heat production.

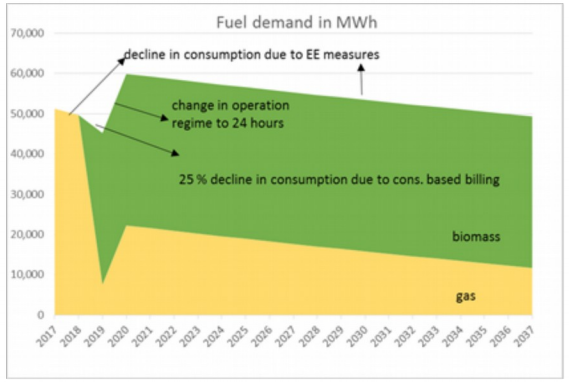
Key element is the heat substation

Customers communicate their demand by thermostatic valves,

Many buildings in Serbia are already equipped with substations. But these control systems are not really used as only few apartments have thermostatic valves, the first part of the control chain.

Effects of other saving and efficiency measures do not have their full impact as most customers can not regulate their demand. This results in much higher fuel consumption, higher heating costs and dissatisfied customers.

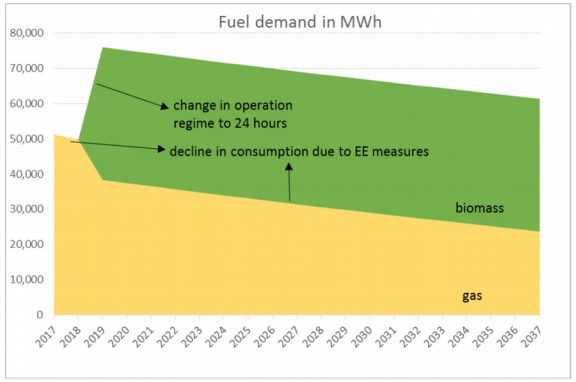
Fuel demand with heat cost allocation



Gas consumption: next 10 years 268 GWh

next 20 years 411 GWh

Fuel demand without heat cost allocation

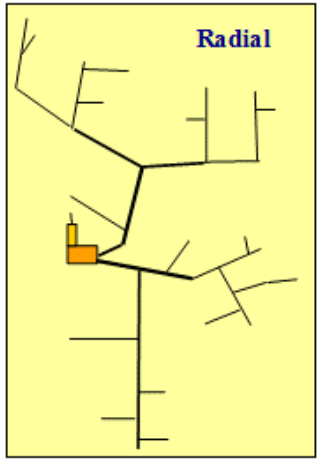


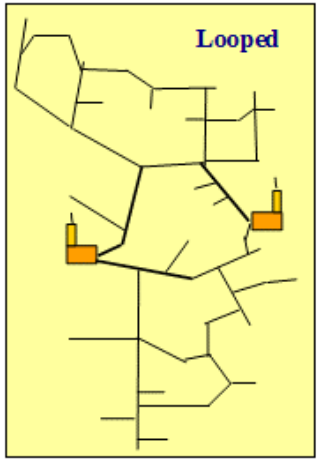
Gas consumption: next 10 years 414 GWh

next 20 years 686 GWh

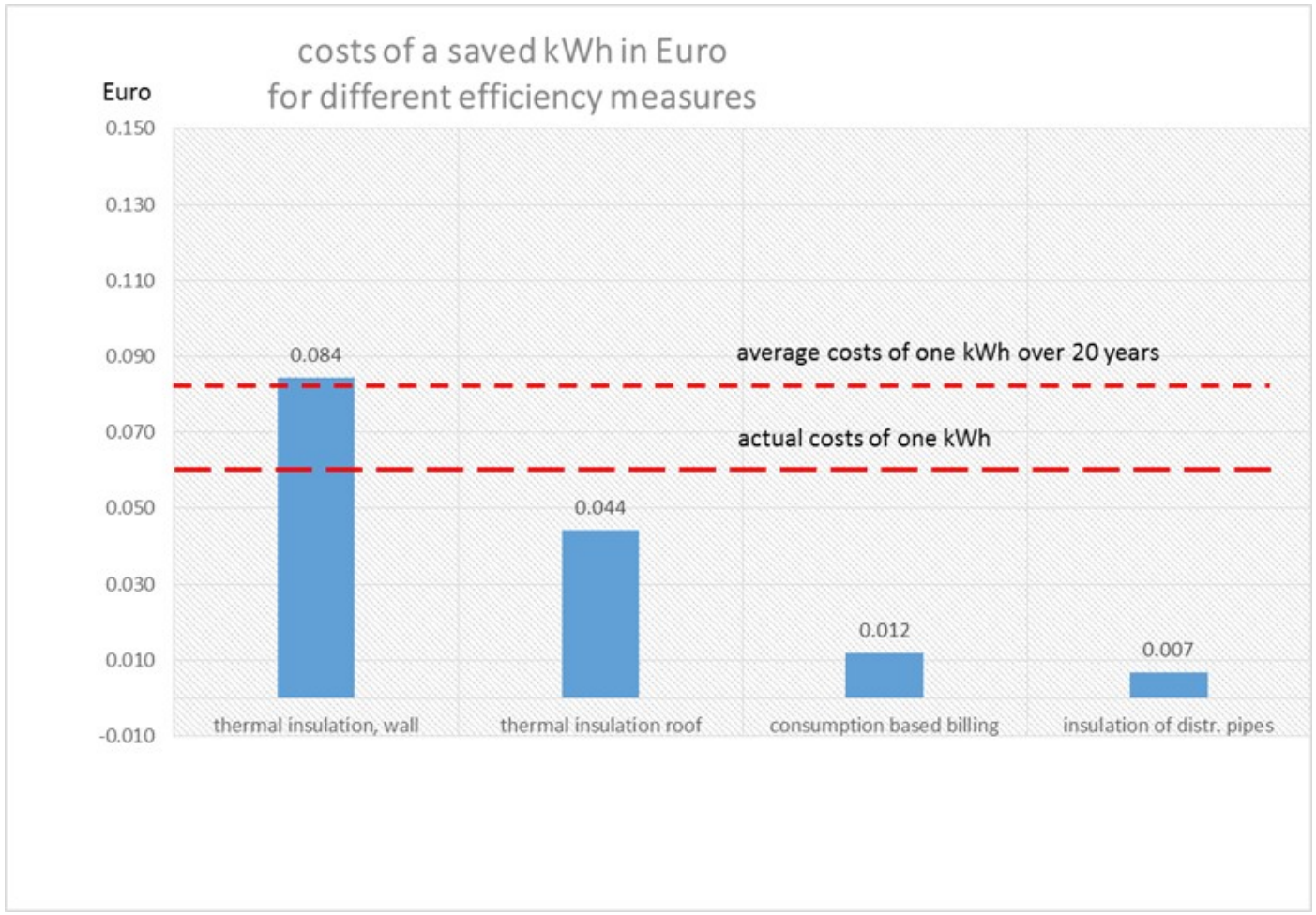
Different operation philosophies and their implications

load dispatch	No load dispatch except at the heat source, a number of different heat sources operating in a united network in parallel
reserve capacity	Reserve capacity has to be located at the same site where the main (single) heat source exists and sized at 50-100% of the real heat load. Therefore, little excess reserve capacity, about 10% of the real heat load, is needed and the different locations are alternative ways to by-pass the damaged network section. Costs of reserve capacity remain modest.
sizing of the network	Water flows in radial systems are relatively big, because cooling is low. Water flows in looped systems are smaller, because the cooling is high. The pipelines are small in diameter.





Aspects of demand side efficiency and saving measures



Dimensioning

The correct dimensioning of different components is often neglected:

Less than 10% of the distribution systems in buildings is hydraulically balanced. This is the reason for oversized pumps.

There are two main reasons for oversized components:

- The installation is planned oversized for security reasons,
- Heat insulation of old buildings without adopting the heat installation to the new demand.

Most buildings have an oversized substation capacity, due to wrong calculation of heat load or no adaptation of the substation after thermal retrofitting.

component	overdimensioned physical size	factor - overdimensioning
pumps	electric capacity	up to 8 compared with high efficiency pumps
radiator	ratio dimension of radiator / heat capacity of the room	1.7
valves	flow rate value - k_{vs} m^3 / h	7 to 10
heat source	ratio dimension of heat source / heat capacity of building	1.8

Demand side strategies, future - overview

Heat Service,

Load Shifting:

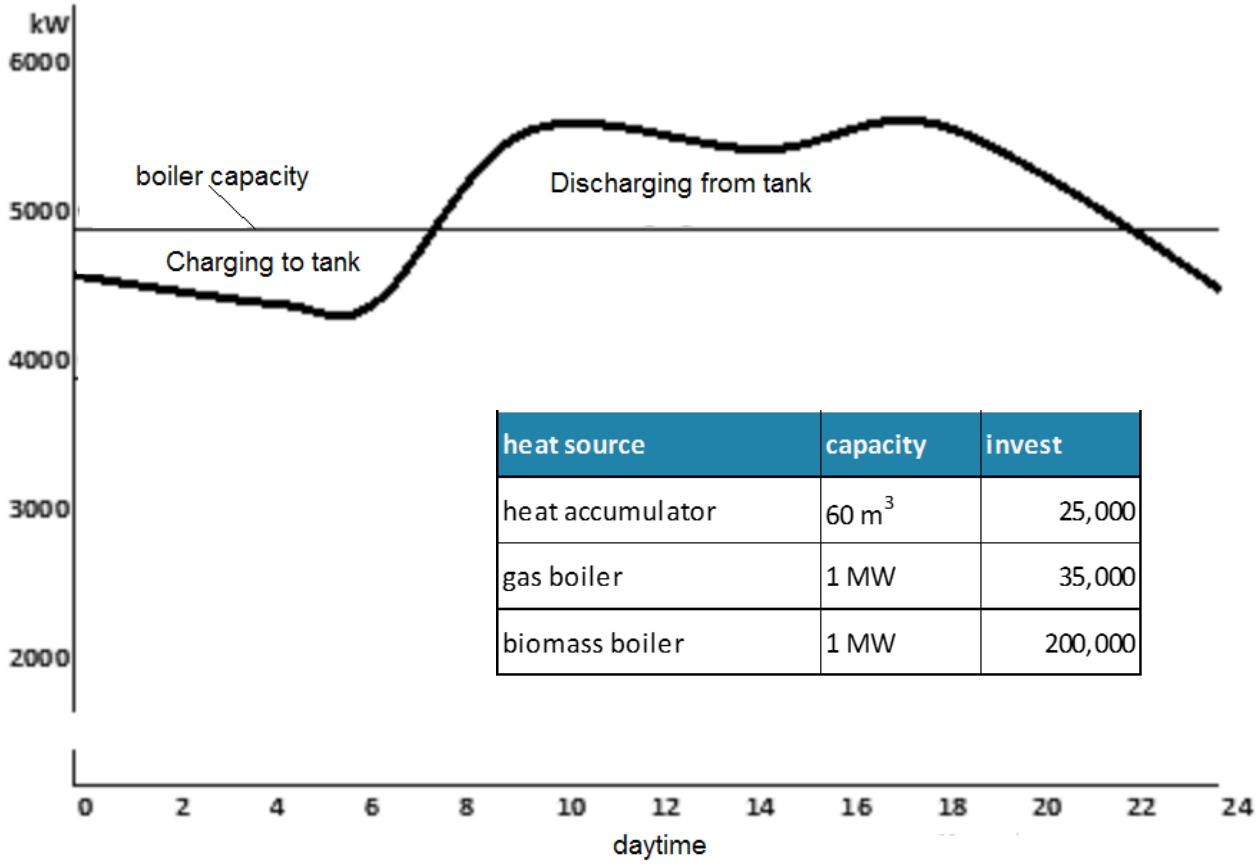
The most common means of load shifting are heat accumulators:

- Shaving the peak load, thus reducing the need of boilers
- Smoothing the daily heat load variations caused by domestic hot water - DHW supply and air conditioning systems
- Supplying the DHW load in summer time when the load is much below the optimal minimum of the boiler.
- Acting as water emergency source in case of network burst to maintain the static pressure.
- In case of a combined heat power production, load is shifted from peak load - heat only boilers to a CHP.

Low supply and return temperature:

- Less distribution losses
- Increased electrical output from CHP-plants
- Increased heat recovery from industrial excess heat and geothermal heat
- Increased the heat recovery from flue gas condensation
- Increased coefficient of performance if solar collectors or heat pumps are used in heat generation.

Heat storage



heat source	capacity	invest
heat accumulator	60 m^3	25,000
gas boiler	1 MW	35,000
biomass boiler	1 MW	200,000

Advantages:
- Reduction of peak loads, thus reducing the harmful on off operation mode;
- Smoothing the daily heat load variations caused by DHW;
- Supplying the DHW load in summer time when the load is much below the optimal minimum of the boiler.
- Water emergency source in case of network burst to maintain the static pressure

Disadvantages:
High investment costs
Heat losses

~ 400 Euro / m3 for boilers < 1.500 m3

Thank You !

Rainer Bahnmüller

r.bahnmueller@hotmail.com

+43 664 523 8265