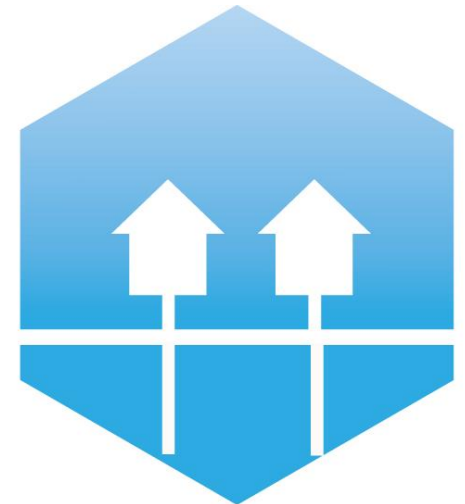
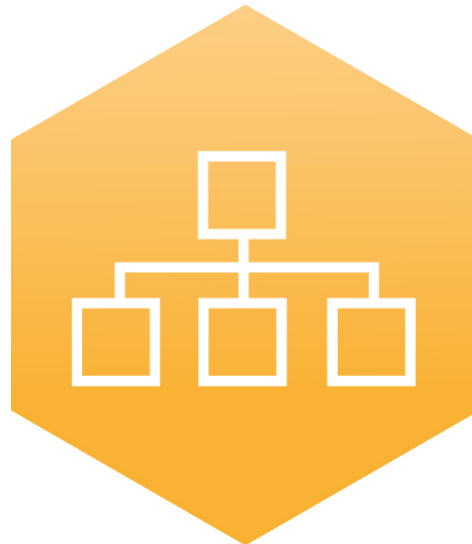


**Superior system efficiency :
Casestudies and concepts from a german smart-
system approach for
next generation district heating**



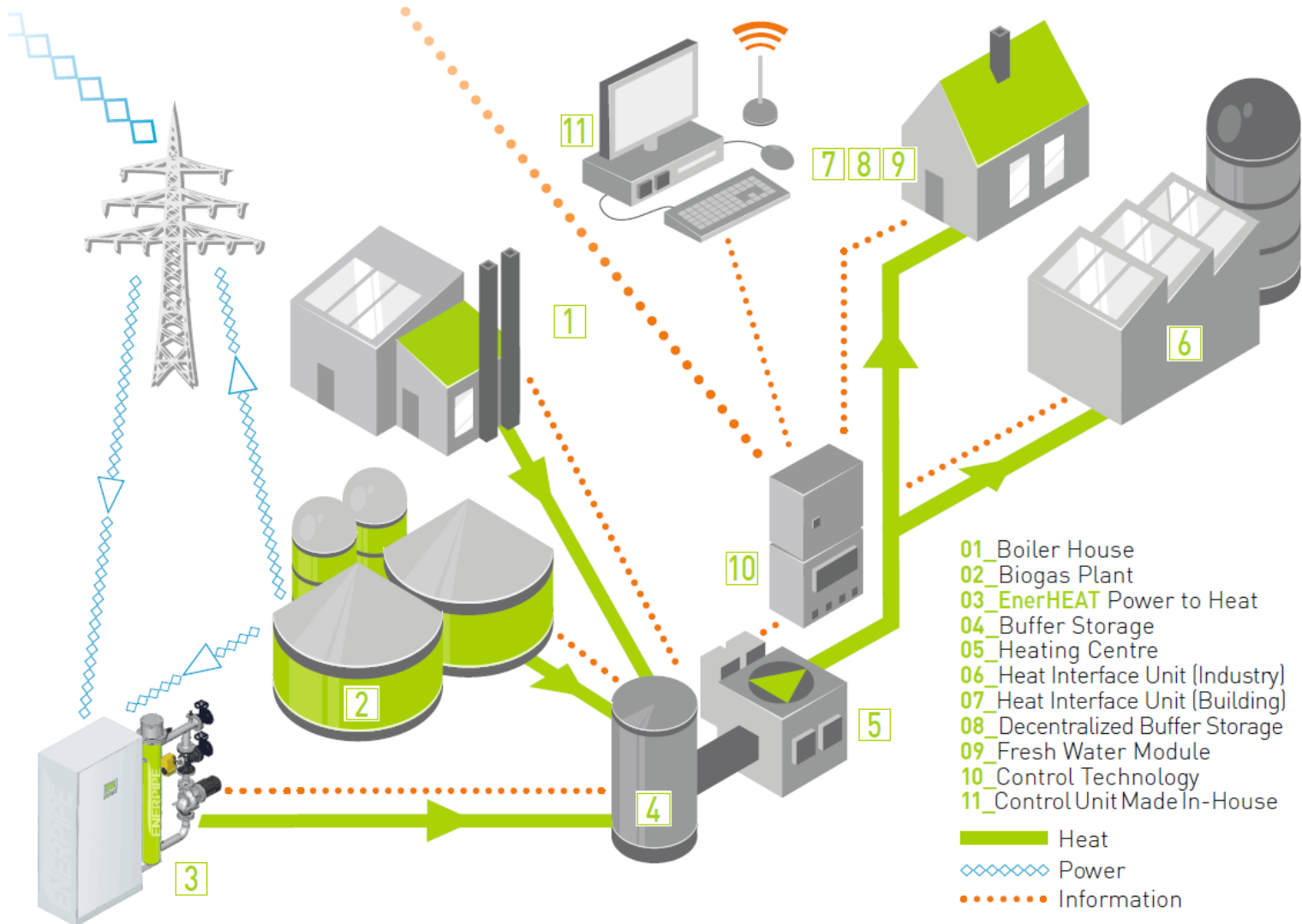
Management Summary



- ✓ DHC 4th generation concepts are well documented
- ✓ Practical execution lacks integrated solutions and empiric data
- ✓ Enerpipe has an exciting success track in small-/mid-size projects
- ✓ Aggregated data over the last years, within many monitored projects prove heat-distribution efficiency rates of up to 85% (within 1 MWh project-size)
- ✓ This result is a mix of:
 - ✓ Selected implementation of 4th generation concepts
 - ✓ Ongoing project monitoring and usage of aggregated data as knowledge base
 - ✓ Integration of optimized components

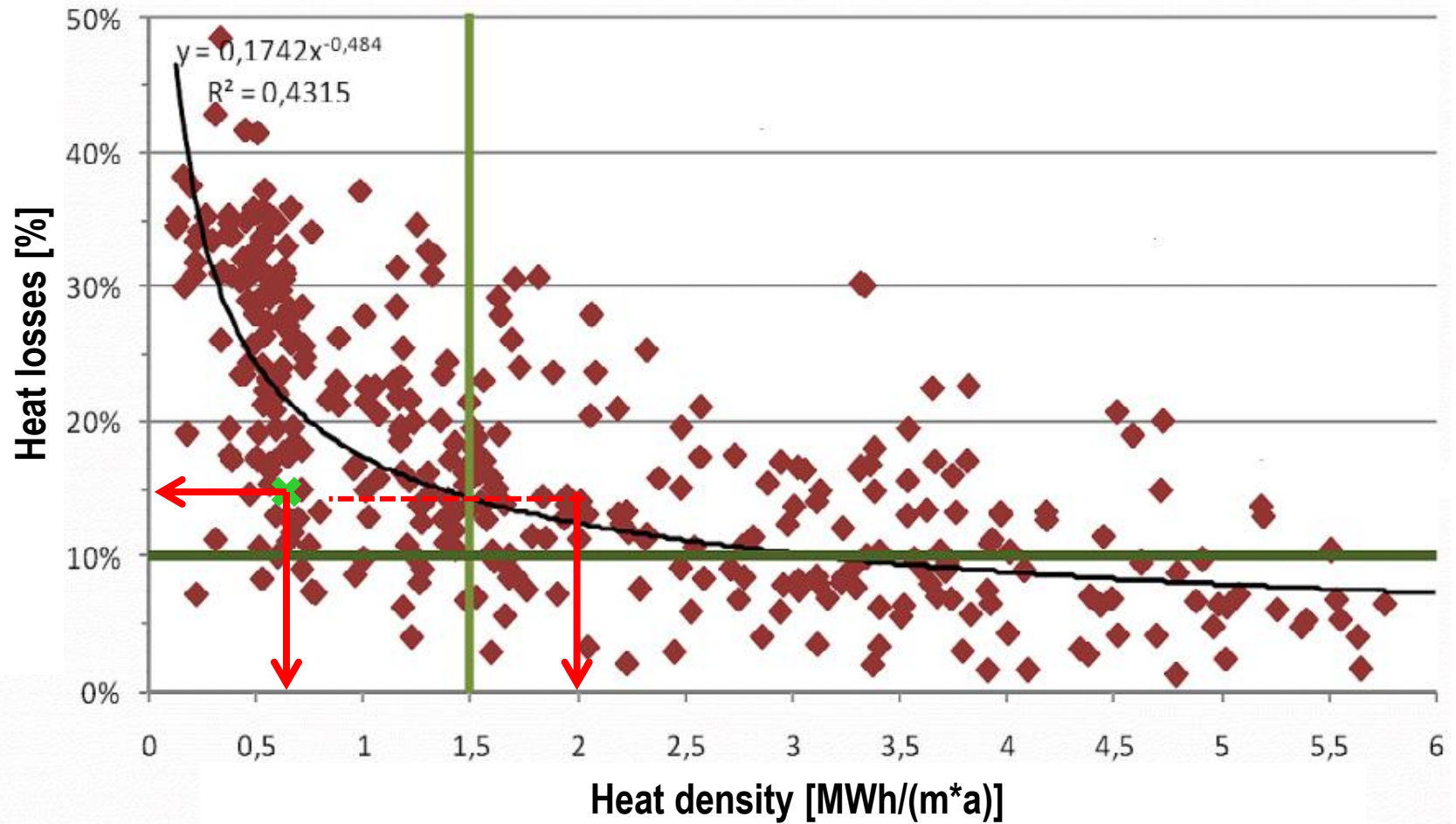


Enerpipes System-Approach for CHP networks



Case Study Findings

HEAT DENSITY AS LIMITING FACTOR



Case Study Findings

STATISTIC BASED ANALYSIS OF HEAT DEMAND



Heat load of each to be connected property is the **key figure** for the design of each district heating scheme!

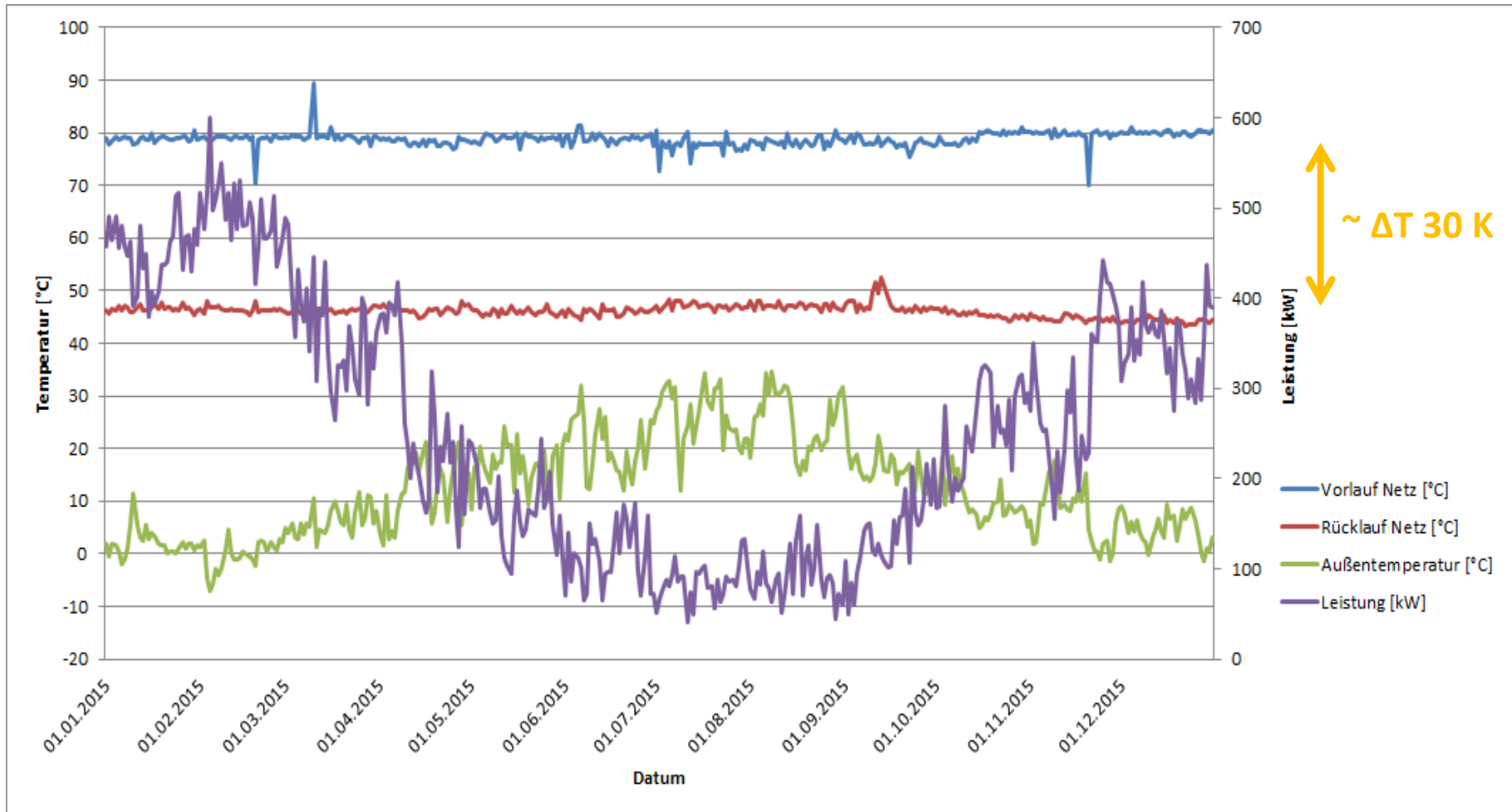
Due to that the **data collection is essential** for the calculation of the correct heat load

Estimation and **assuming** heat loads often **effects oversizing**, what results into an non-efficient system with **higher investment** and **operating costs**



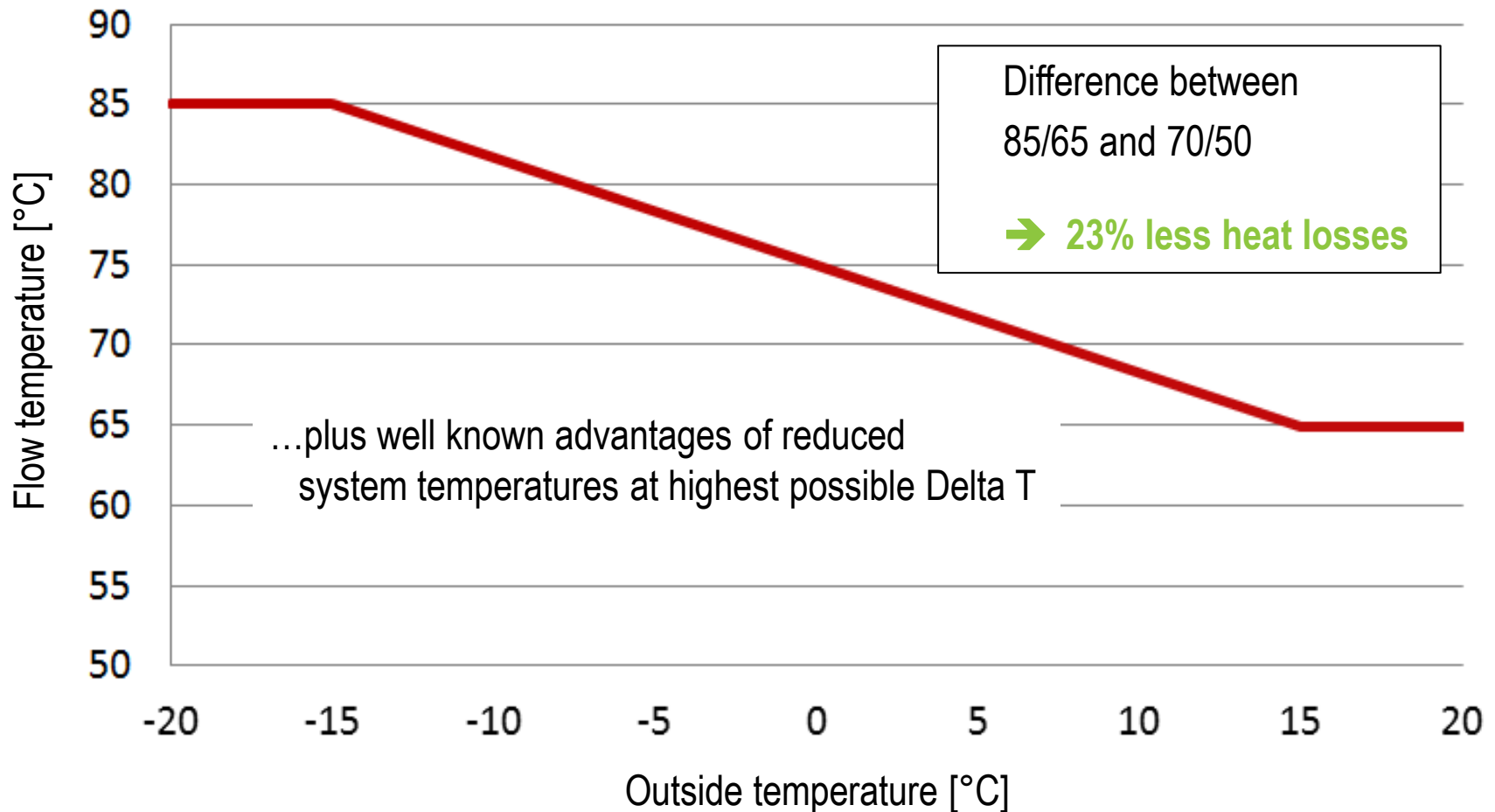
Case Study Findings

DH TEMPERATUR MONITORING 2015



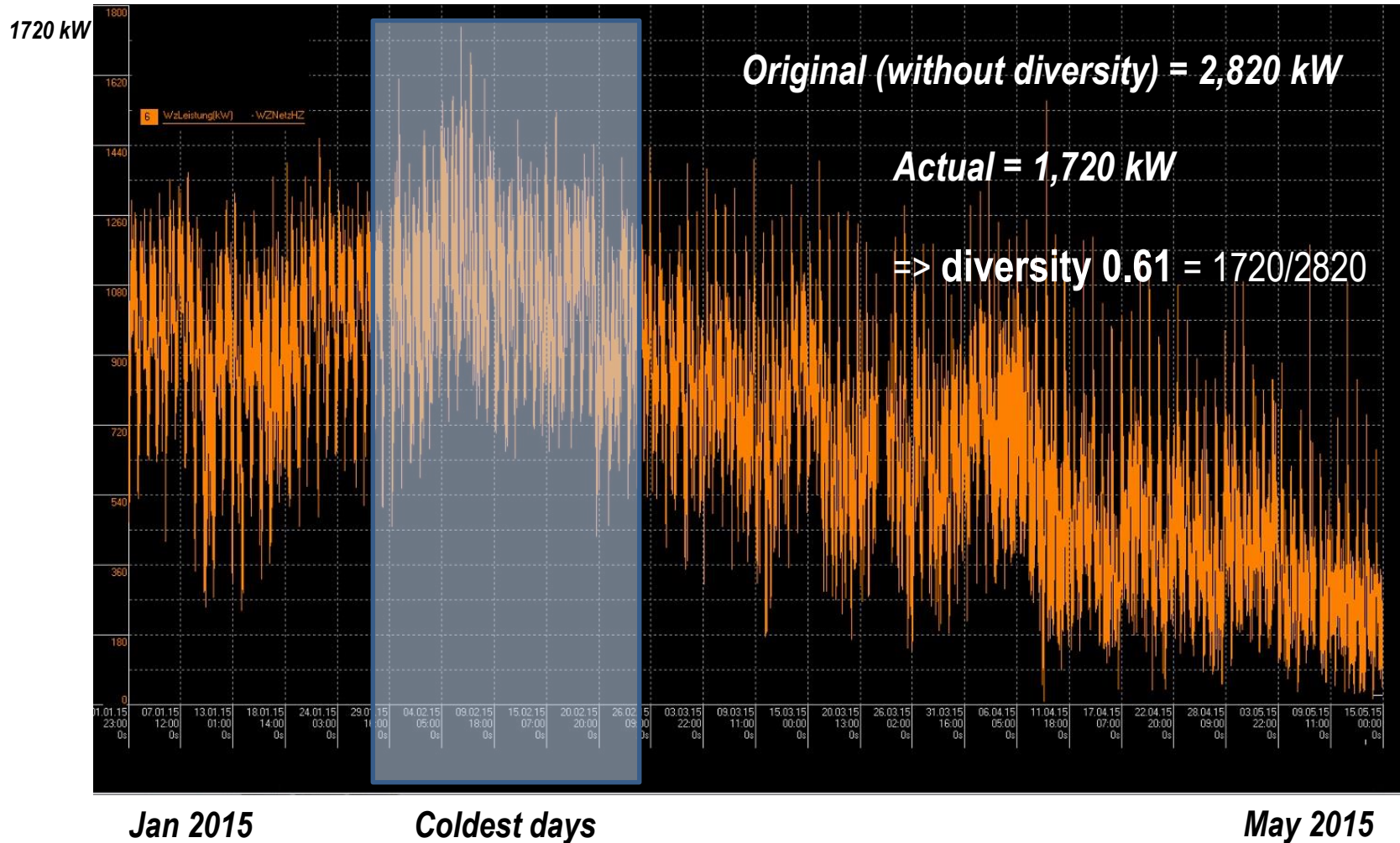
Solutions through planing

OPTIMISED TEMPERATURES



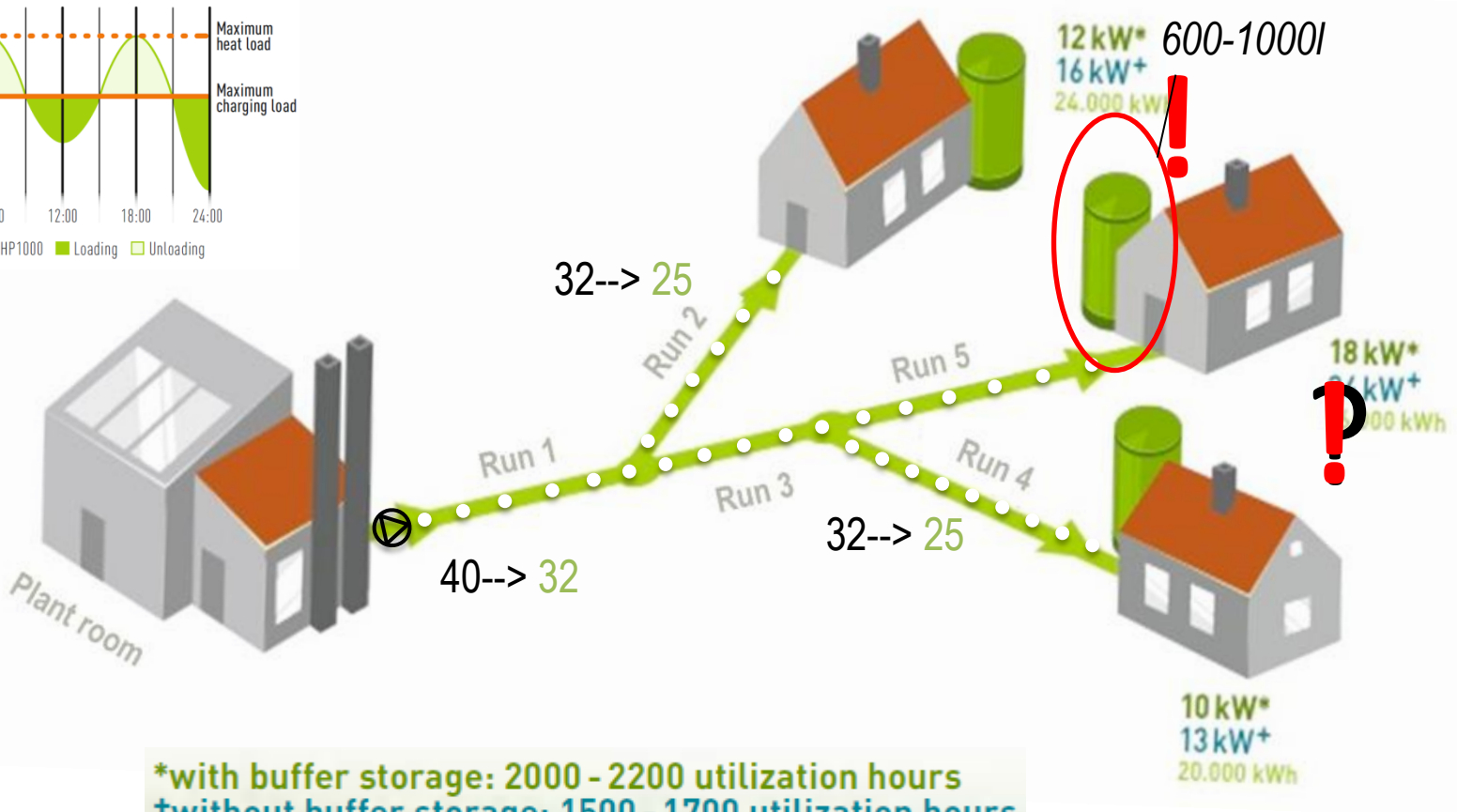
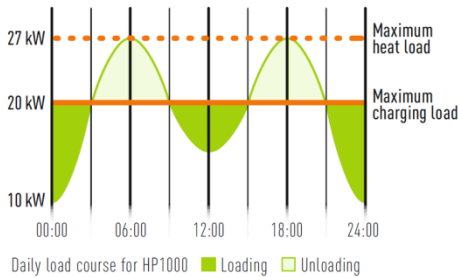
Case Study Findings

MONITORING – MAX. PEAK LOAD



Case Study Findings

REDUCING PEAK HEAT DEMAND VIA DECENTRAL BUFFER



Case Study Findings

INCREASING DELTA T DUE TO EFFICIENT HEAT TRANSFER VIA DECENTRAL BUFFER



- Volumetric **flow rate** can be **adjusted** on demand
 - **Return** can be **restricted**
 - **Good heat transfer** from primary to secondary circuit
 - Instantaneous hot water supply helps to reduce the return (typical design temperature 75/45°C)
- ⇒ **Smaller pipes can be installed**
- ⇒ **Heat losses and pumping costs will be reduced**



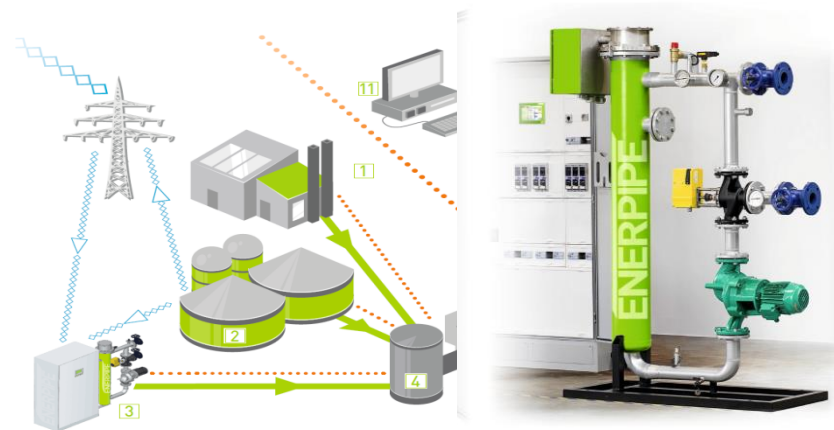
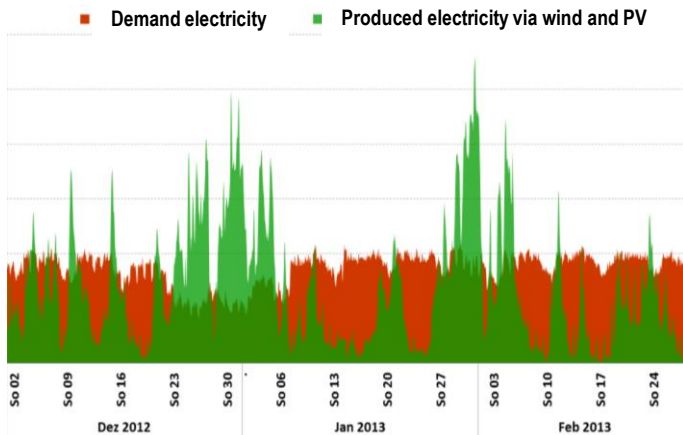
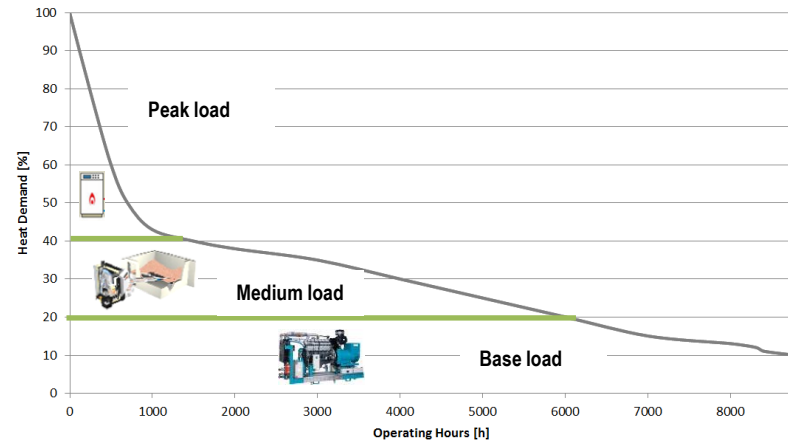
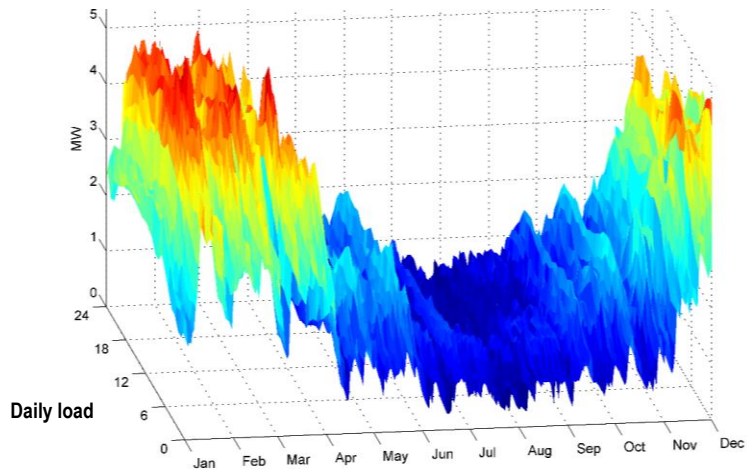
Case Study Findings

CHOOSING THE BEST AVAILABLE HEAT SOURCES – SMART CONTROL



4DH

4th Generation District Heating
Technologies and Systems



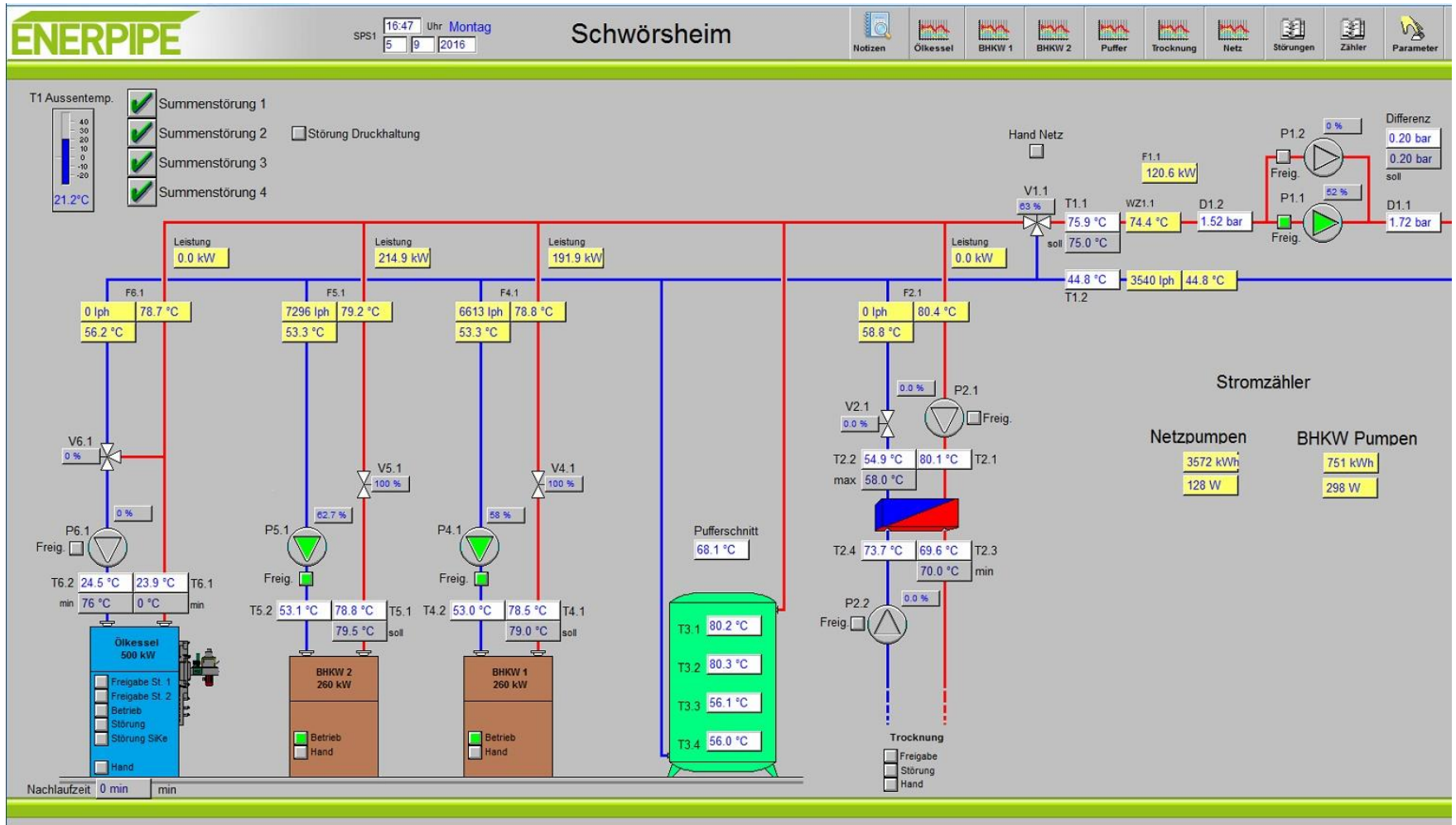
Case Study Findings

MONITORING – A BASE FOR OPTIMISATION



4DH

4th Generation District Heating
Technologies and Systems



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Lets talk about it



Hear and now,
later during the conference,
or whenever you believe we should talk...

robert.schneider@brainchain.ch



AALBORG UNIVERSITY
DENMARK

2nd International Conference on Smart Energy Systems and
4th Generation District Heating, Aalborg, 27-28 September 2016

