

# **Innovations in Comfort and Energy Efficiency in Buildings: Leveraging System Design Methods and Data Analytics**

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# HVAC Goes Digital



# Key Takeaways



1. HVAC goes Digital
  2. Cloud Integration of Building Data is a great opportunity to improve the performances of a building
  3. Think about content and not only about infrastructure!
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# St. Peters Basilica in Rom









# Where are Belimo products installed?



Burj Khalifa, Dubai



National Aquatic Center, Beijing



Empire State Building, NY



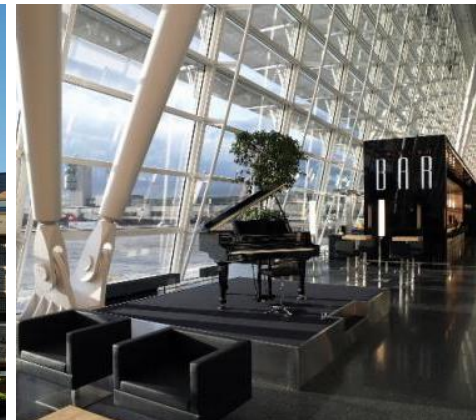
THE SQAIRE, Frankfurt (Source: Roland Horn)



Rail vehicles



Princeton University Princeton, NJ



Airport Zurich (Source: Flughafen Zürich AG)



Vessels

# Everywhere in buildings...



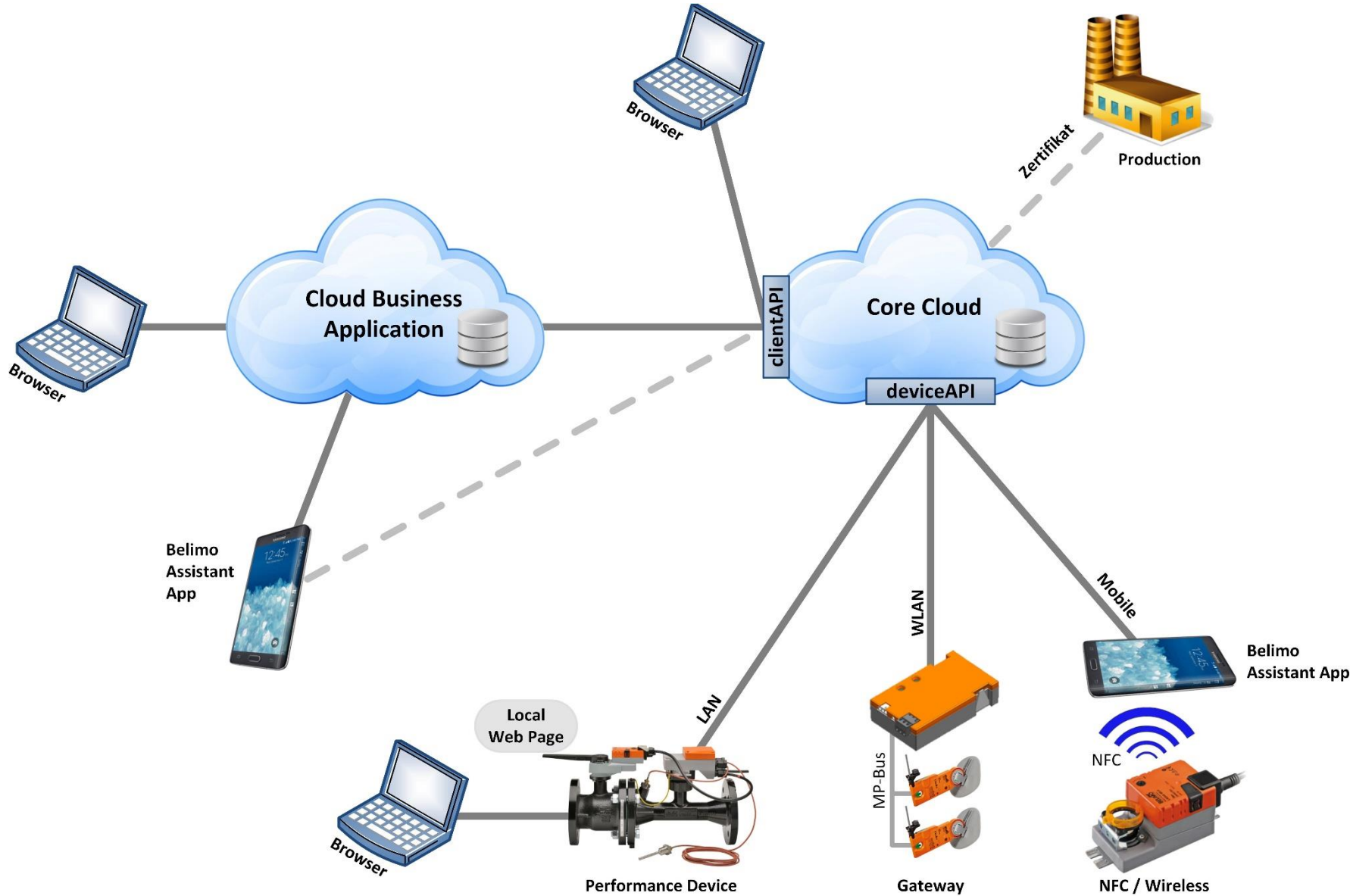


# smart and connected





# Belimo - Cloud



# Near Field Communication

## Diagnostic included




**Home Screen**

**Diagnosis**


**Self Check**

**Data Analysis**






**Buildings are an integral and elementary part of the global energy system**



**Buildings use about:**

- 40% of global energy
- 25% of global water
- 40% of global resources they emit 1/3 of GHG



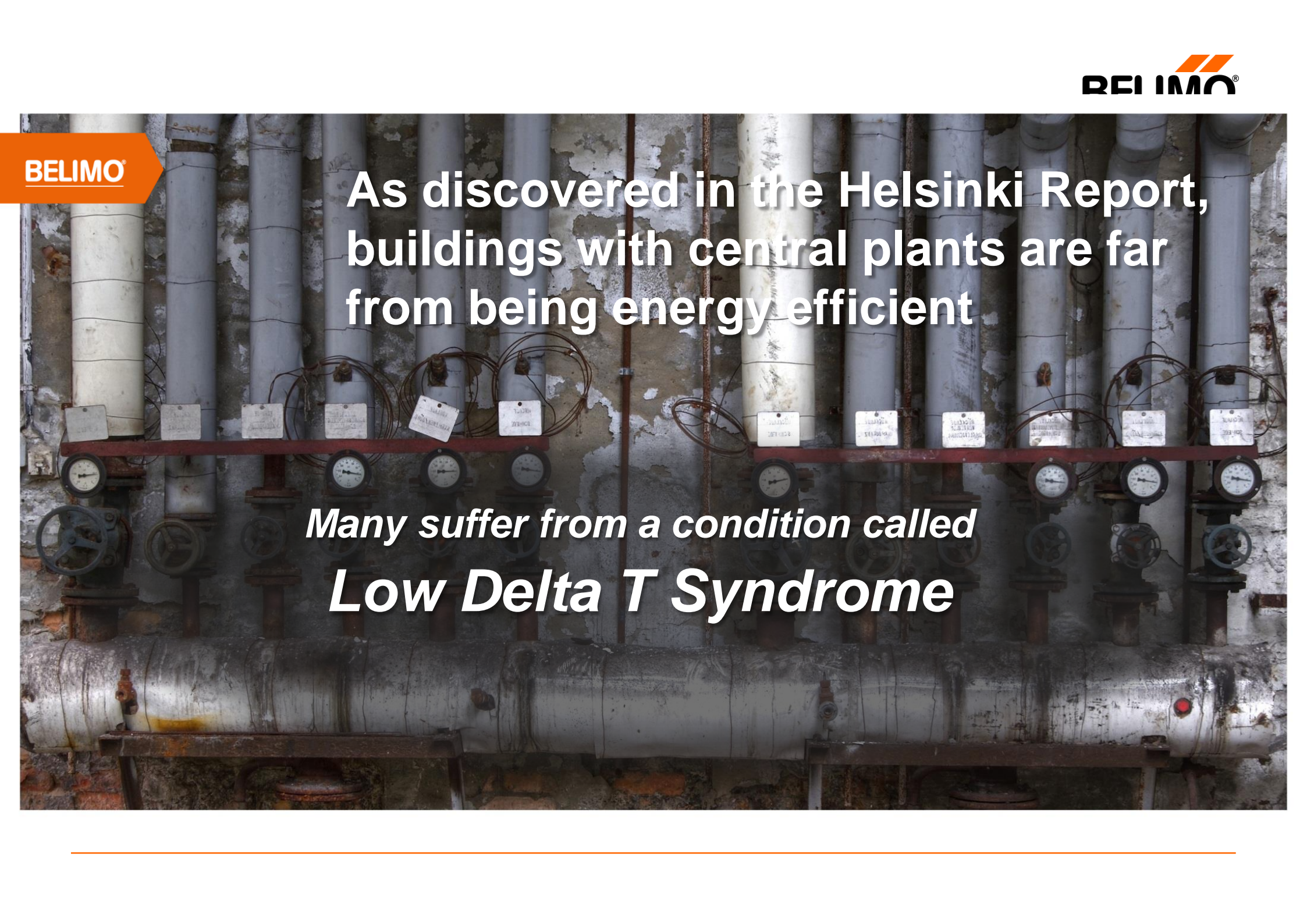
The logo for BELIMO, consisting of the word "BELIMO" in a white, bold, sans-serif font, set against a dark orange arrow-shaped background pointing to the right.A wooden boardwalk with dark railings leads from the foreground towards a large, gnarled tree. The tree is positioned at the edge of a desert landscape on the right and a blue ocean on the left. The sky is a mix of blue and orange, suggesting a sunset or sunrise. The boardwalk is made of dark wooden planks and has a railing on both sides.

For buildings to be able to realize their potential, they must first and foremost be energy efficient

According to LEED 33- 39% of a building's energy use is HVAC

Greenbuild estimates that 6% of the world's energy is used for cooling



A photograph of a mechanical room with a wall of vertical pipes. A horizontal metal rail runs across the pipes, holding several pressure gauges and electrical control boxes. A large horizontal pipe is visible at the bottom of the frame. The wall behind the pipes is peeling and shows signs of age.

**As discovered in the Helsinki Report,  
buildings with central plants are far  
from being energy efficient**

*Many suffer from a condition called  
**Low Delta T Syndrome***

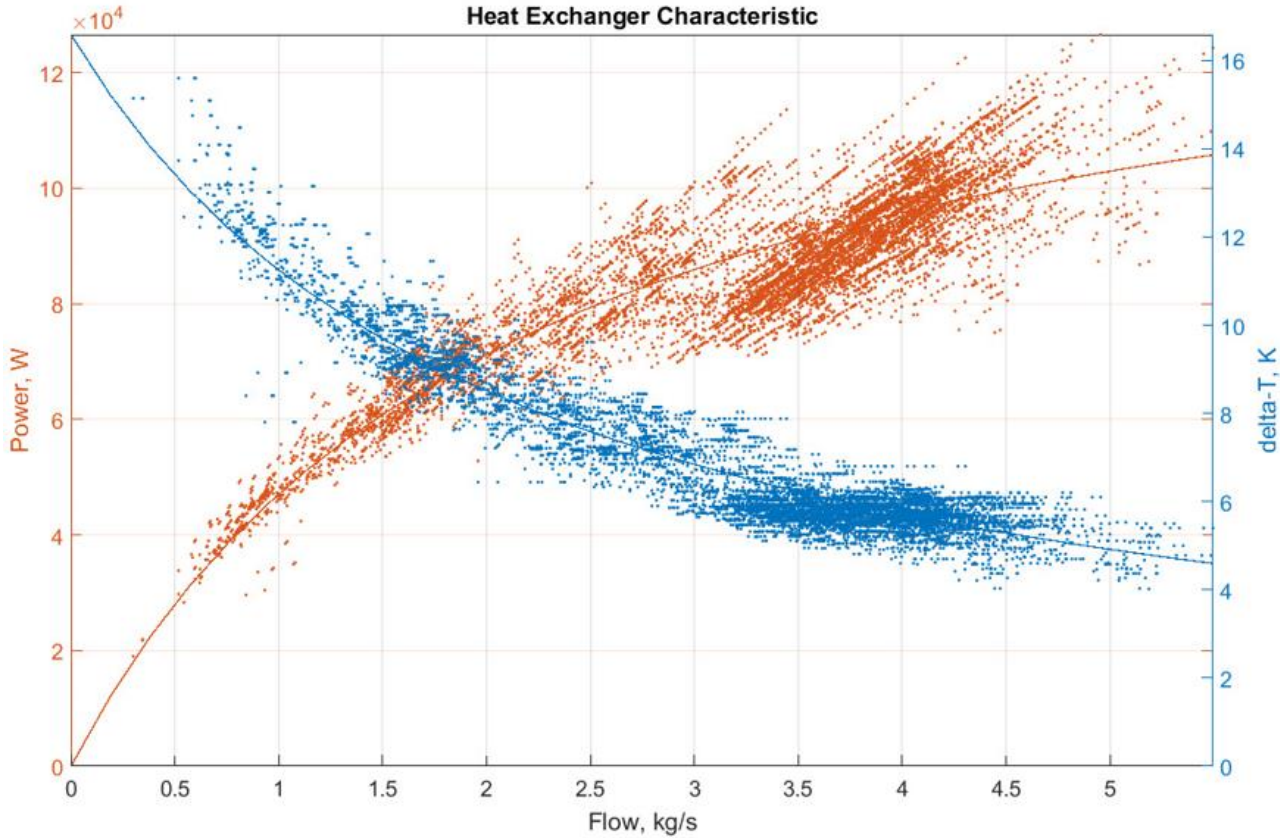
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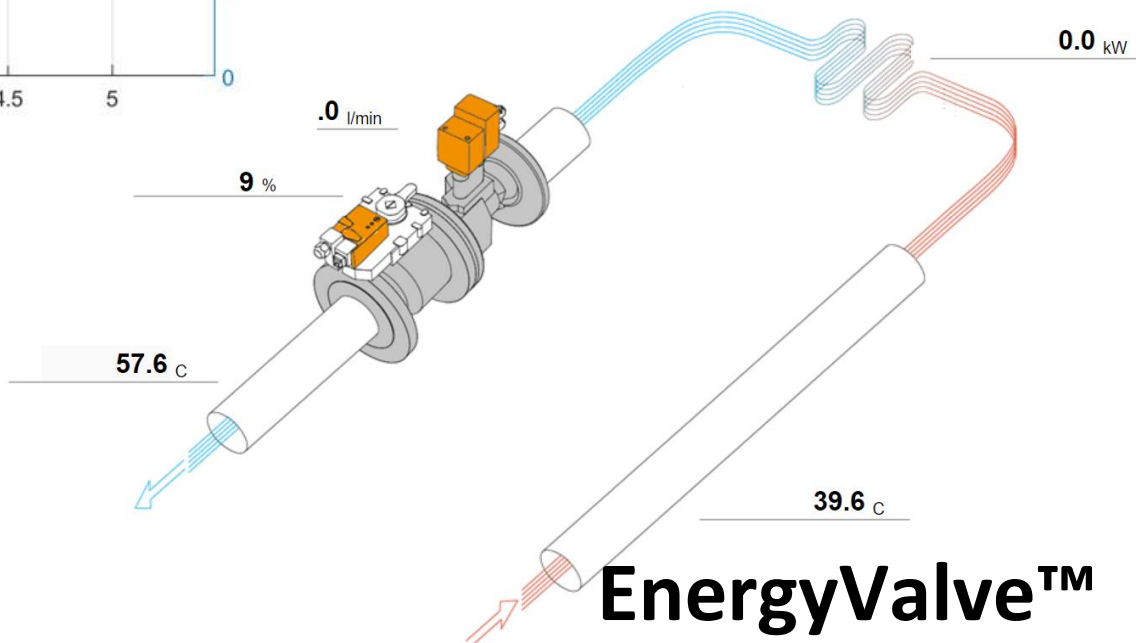
# EnergyValve™, the problem solver



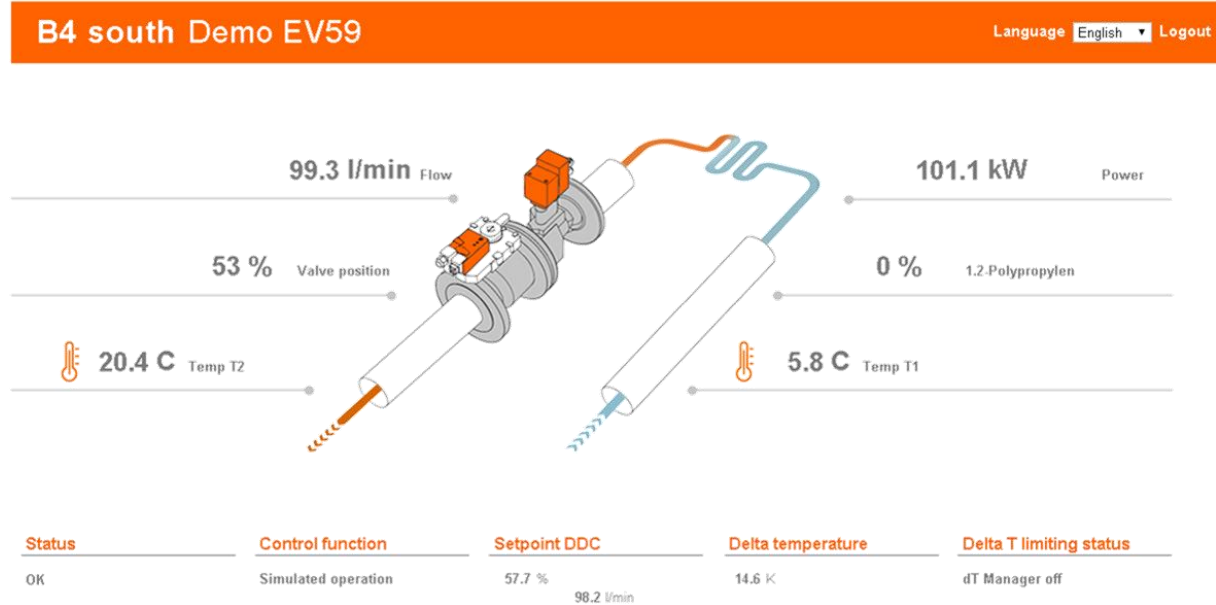
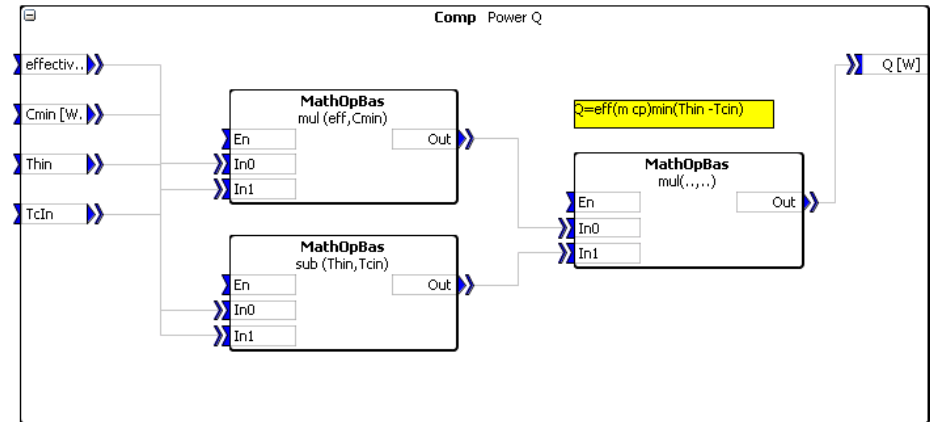




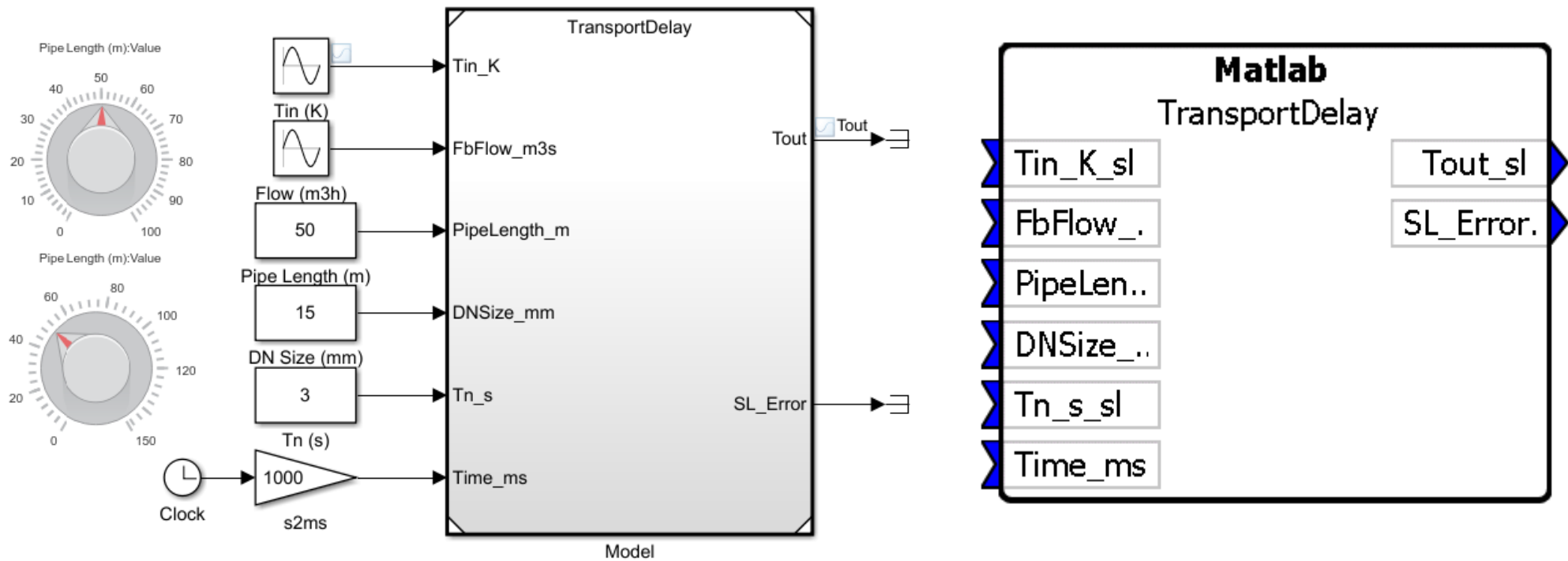
# Online Data analytics to prevent energy waste



- **Strengths**
  - HVAC Control
  - Graphical Programming
  - Belimo Cloud Integration
  - Integrated Web Server
- **Limitations**
  - Real time simulation
  - Complex logic, state machines

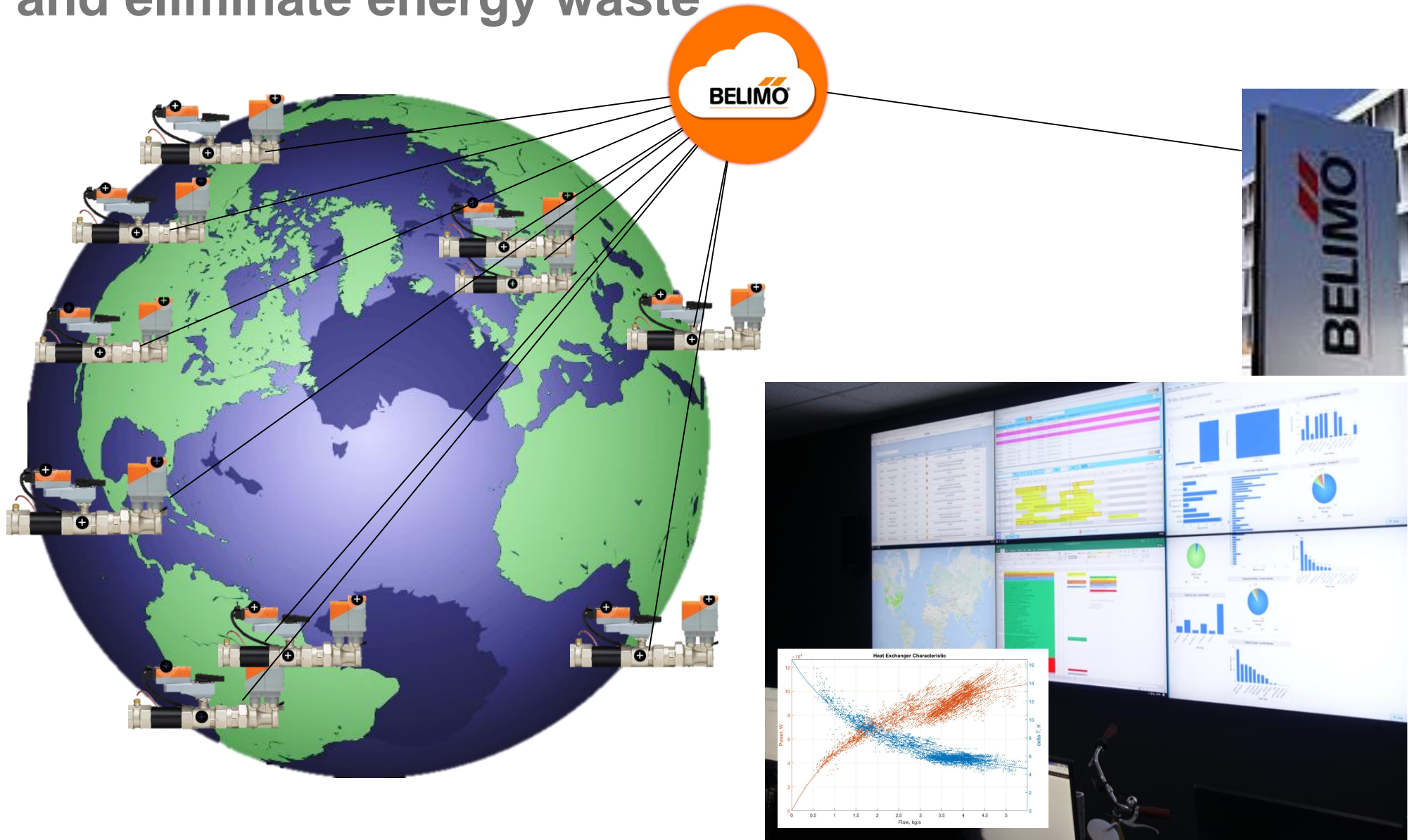


- **Simulink:** Model based design and testing, rapid development, and code generation.

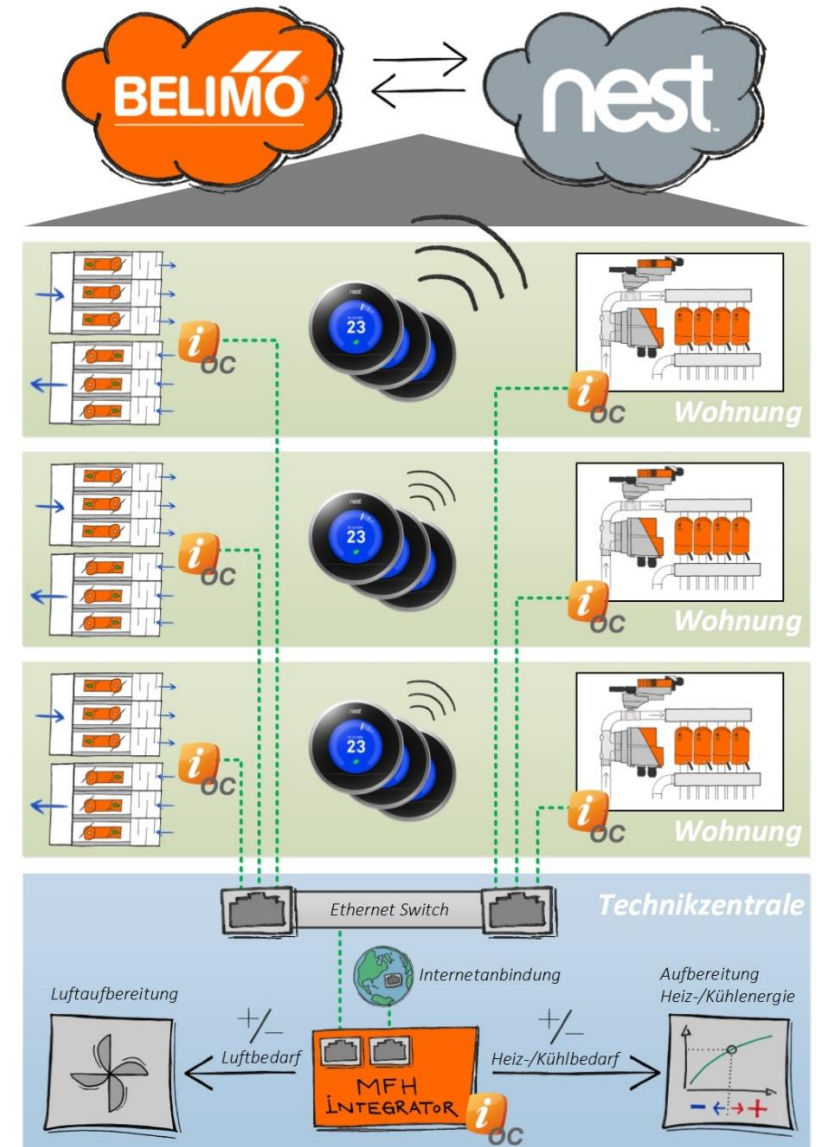




# INTERNET connected to optimize operation and eliminate energy waste



# Added value studies - «Concept Cars»



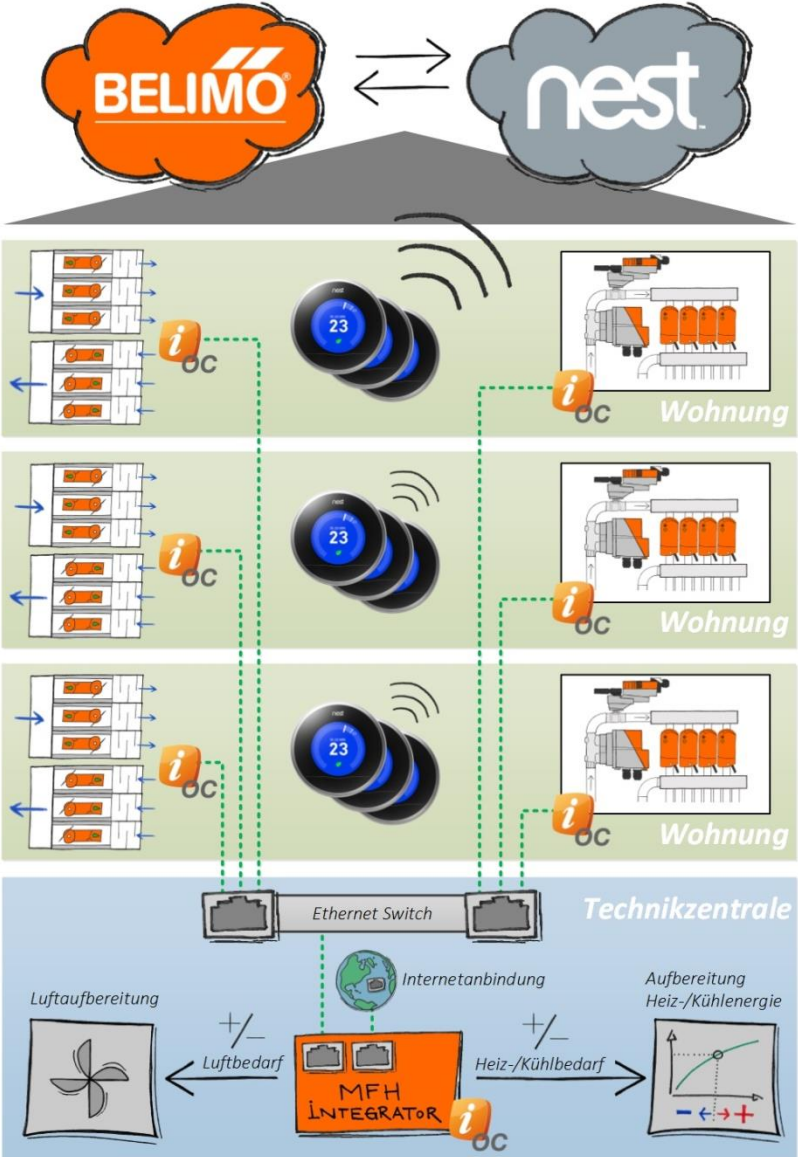


# Apartmentum Hamburg

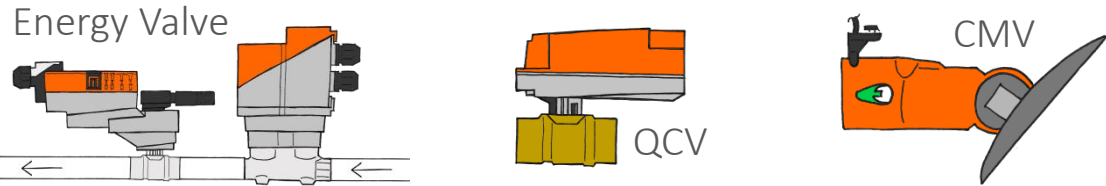




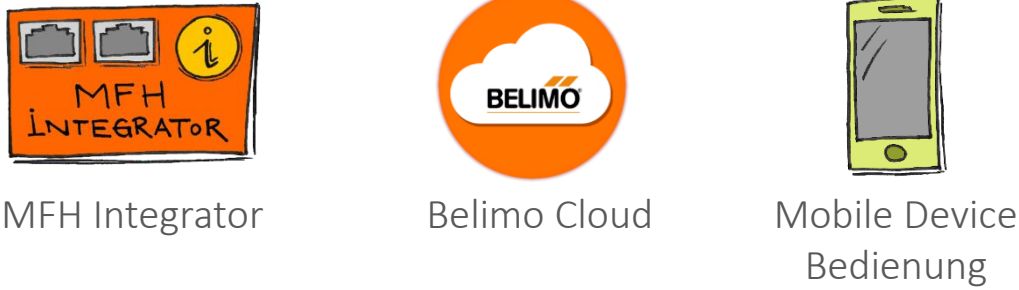
# Co-evolution of products and needs



## Belimo standard products



## Belimo pre-series



# Concluding Remarks and Outlook

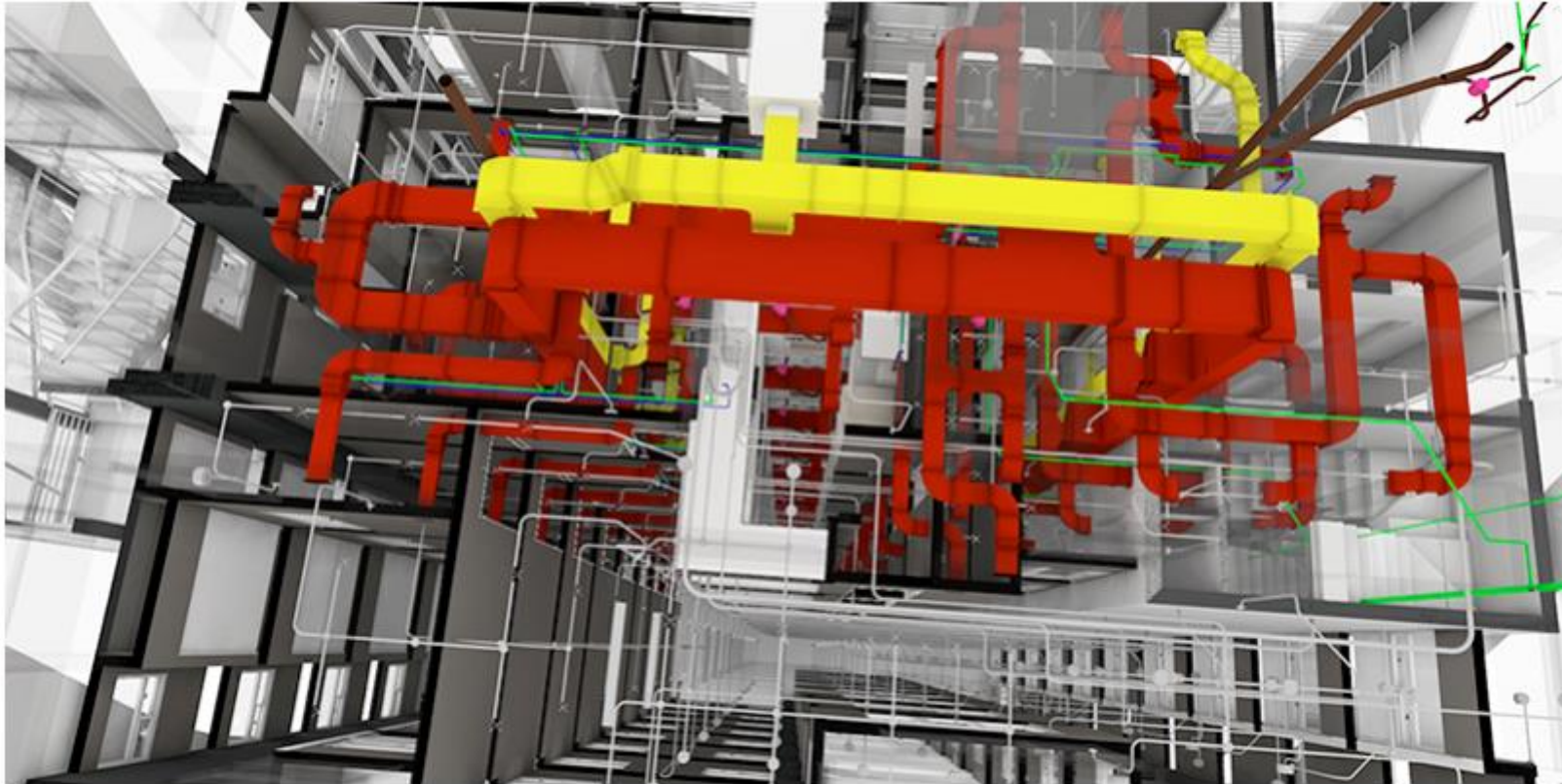


- A Vision becomes Reality: Digitalization in Building Design and Management

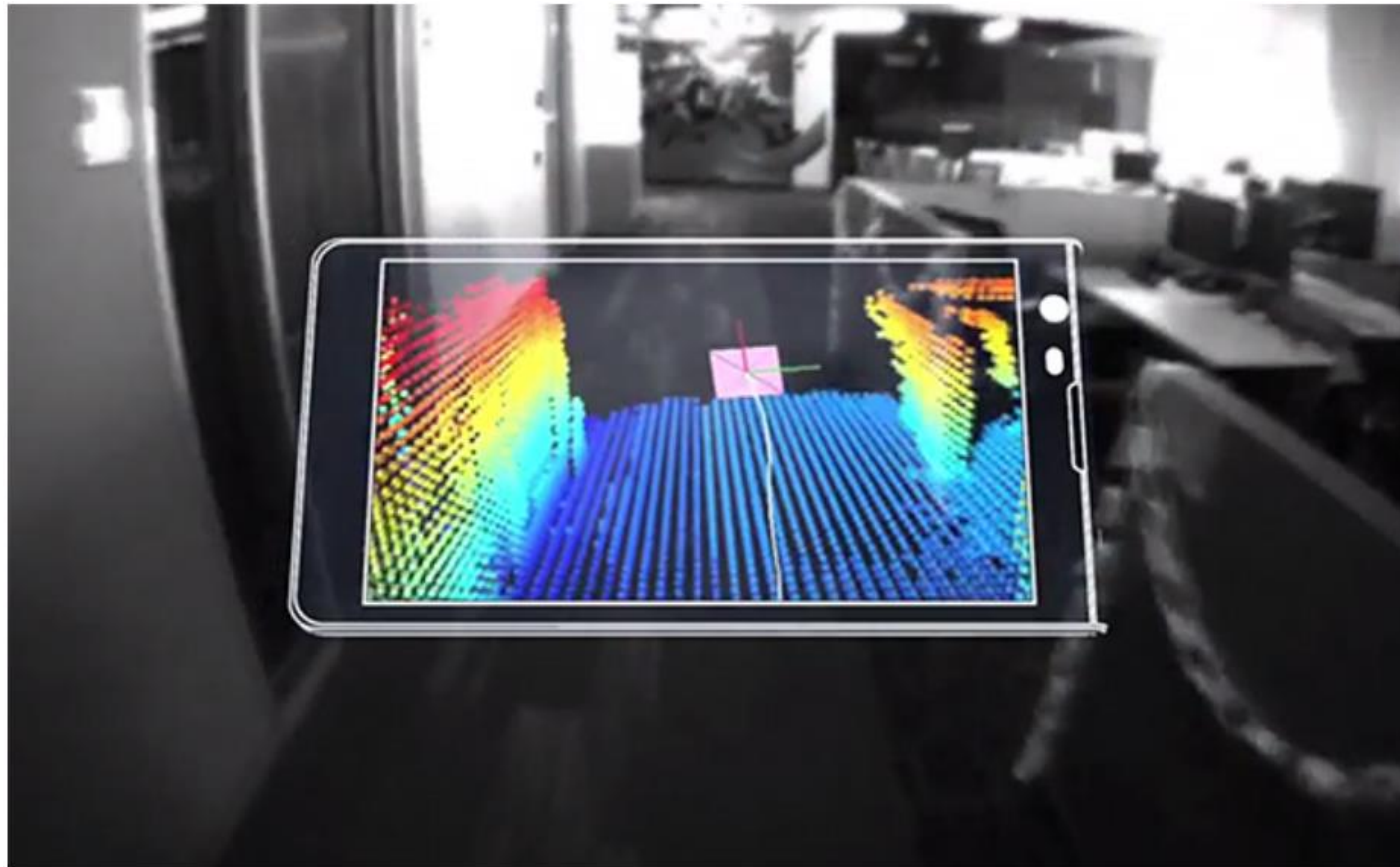




# Digital Planing and simplified commisionning



Energy, Comfort Simulations



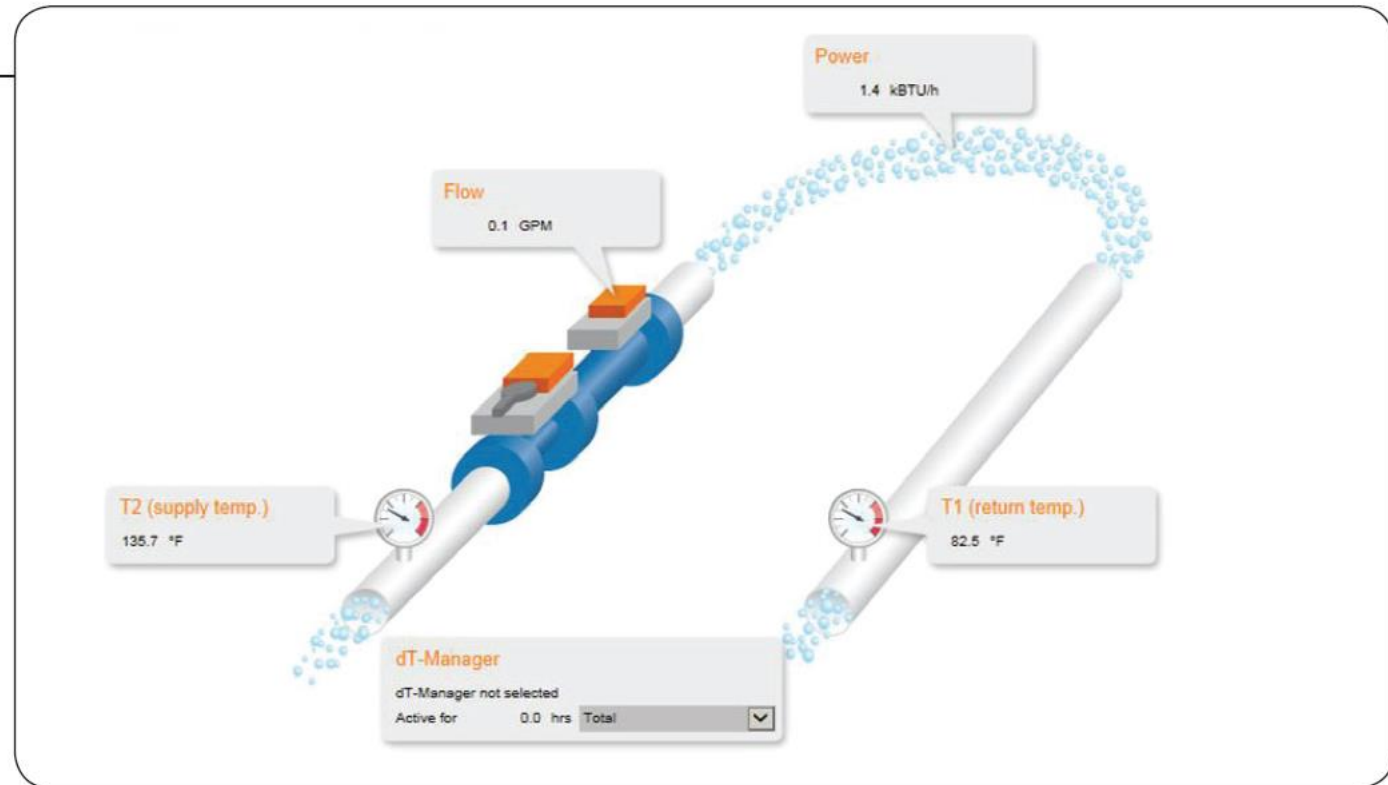
Verification I: Is everything mounted at the right place



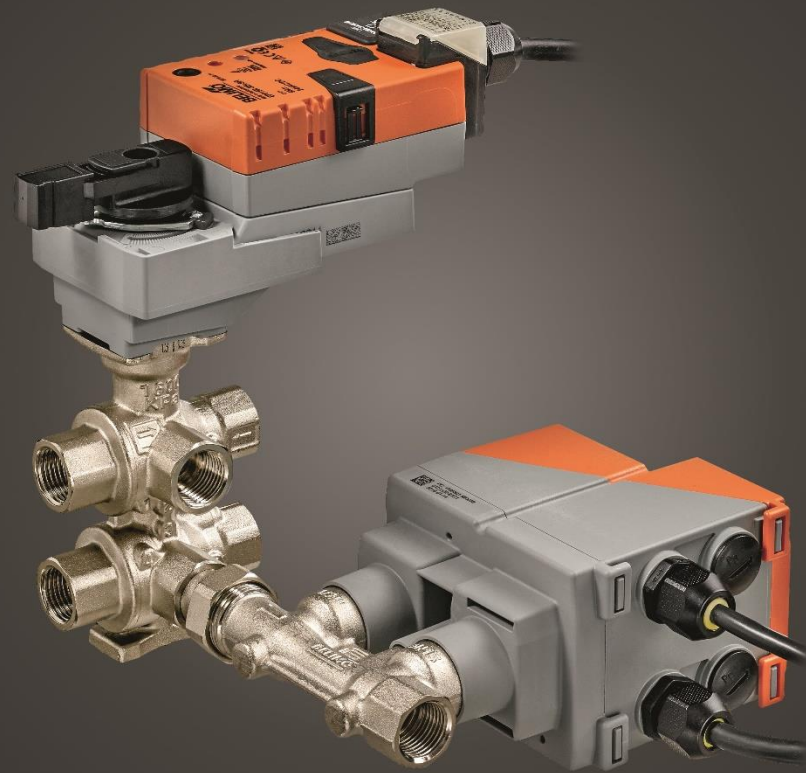
# A Vision becomes Reality: Digitalization in Building Design and Management

## Dashboard

Provides a dynamic view of the current flow, power and temperature values.



Validation Performance/ Continuous Improvement/Documentation:



Thank You