HVAC Know-how on the road

Training Belimo Austria

Presentations Belimo training van

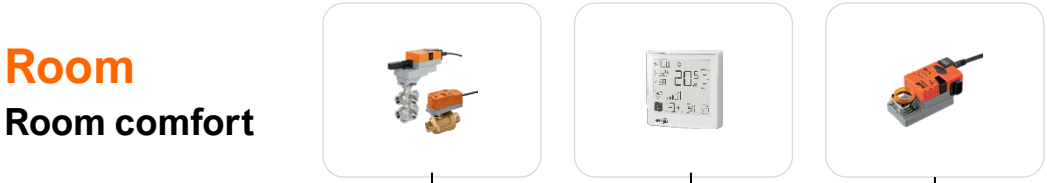
- Part 1 (page 2): Company presentation
- Part 2 (pages 4-16): Standards (taxonomy, CSRD, EPBD, etc.)
- Part 3 (pages 17-41): RetroFIT+
- Part 4 (pages 42-66): Plant manufacturer concept
- Part 5 (page 67-79): VAV ZoneEase

Field devices for the energy-efficient control of HVAC systems

- Founded **in 1975**
  Headquarters: Hinwil, Switzerland
- Listed on the Swiss Stock Exchange (SIX) since **1995**
- More than **2,400 employees** in **80+ countries** on all continents
- Global **market leader** in the development and production of **HVAC field devices**
- Around **10 million actuators** are shipped worldwide **every year**

Room

Room comfort



Water

Cooling Tower

Cooling Plant

Heating system

Air

Fire and smoke protection

Air handling unit

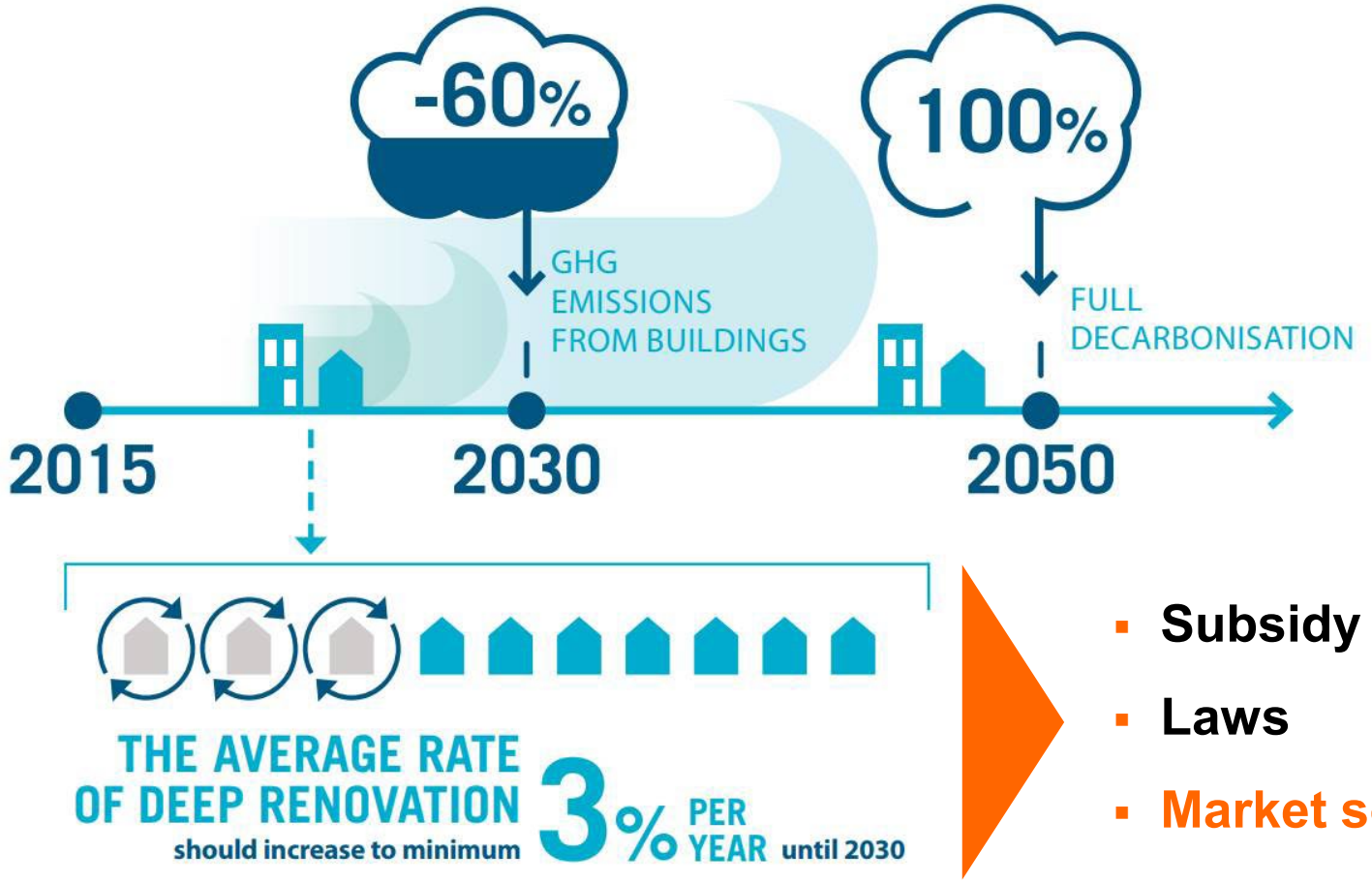
RetroFIT+ Presentation 2025

Standards, guidelines, etc.

- EU taxonomy
- ESG
- EPBD
- etc.

EU regulations – Why?

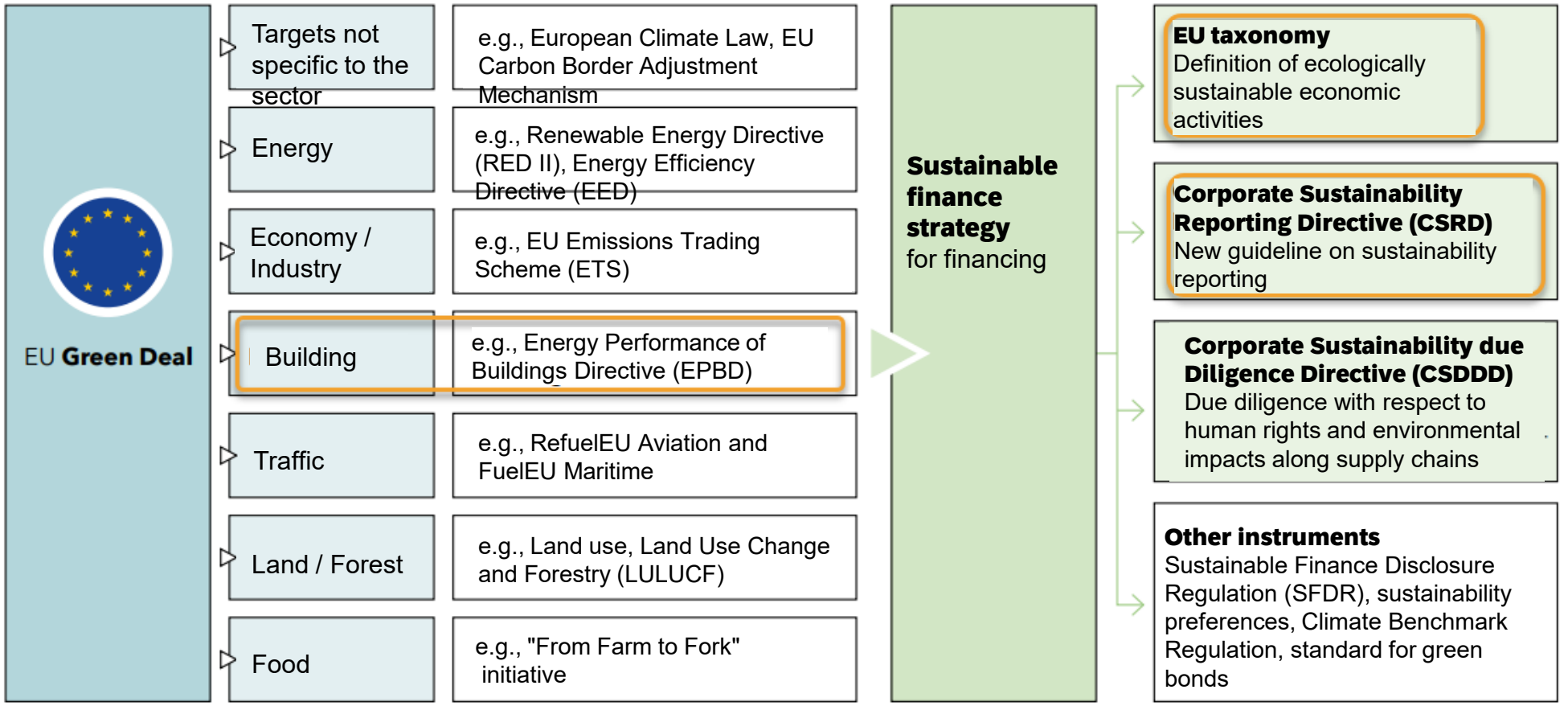
- Refurbishment rate as the key to success



- **Subsidy programmes**
- **Laws**
- **Market solutions**

EU Climate Protection Act

- Green Deal
- EPBD
- EU taxonomy



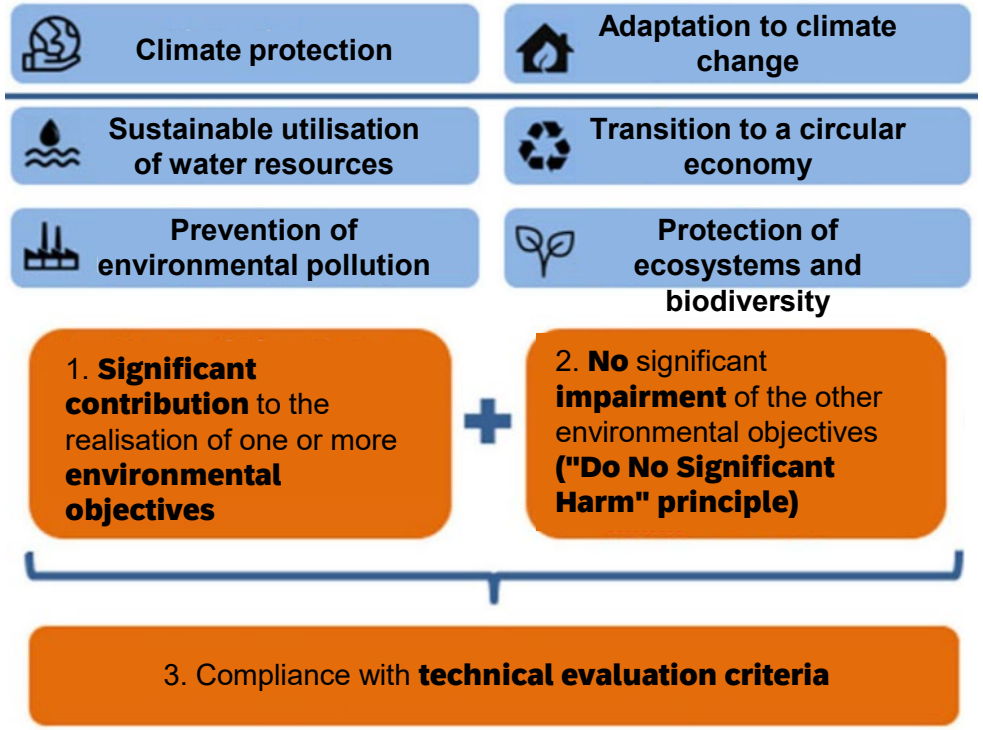
EU taxonomy

"Financial instruments" for financing climate neutrality

- **Regulation** governing the economic activity of companies with regard to sustainability through six environmental targets; including:
  - **Environmental target 1: significant contribution to climate protection**

    Economic activity must make a significant contribution to stabilising greenhouse gas concentrations in the atmosphere by avoiding or reducing greenhouse gas emissions in line with the Paris Climate Agreement ("1.5 degree target").
  - **Environmental target 2: adaptation to climate change**

    Economic activity includes adaptation solutions that significantly reduce the risk of negative impacts of climate change on economic activity without increasing the risk of negative impacts on people, nature or assets.



EU taxonomy

- Catalogue of criteria

	New Building	Refurbishment	Acquisition and ownership
Substantial contribution to climate change mitigation (mitigation criteria)	The primary energy requirement (PED) is at least 10% below the threshold value defined for the requirements for a nearly zero-energy building (NZEB) in the national measures. Buildings >5,000 m^2: Air tightness test and Global Warming Potential (GWP) in the life cycle	Two variants: a) The building refurbishment fulfils the applicable requirements for major refurbishments[2] b) Relative improvement: at least 30% reduction in primary energy demand in comparison with before the refurbishment[3]	Built after 31. December 2020: the building fulfils the requirements for new buildings Built before 31. December 2020: residential building: Class A energy performance certificate; alternatively, the building is in the top 15% of the national or regional building stock For larger non-residential buildings: efficient operation through energy management.
DNSH (Do No Significant Harm)	(2) Climate change adaptation: assessment of various climate risks, Appendix A, Annex 1 (3) Water: sustainable use and protection of water and marine resources (no information regarding acquisition and ownership) (4) Transition to a circular economy: at least 70% by weight of the non-hazardous construction and demolition waste must be prepared for re-use or sent for recycling or other material recovery,... (no information regarding acquisition and ownership) (5) Pollution prevention and control, Appendix C, Annex 1 (no information regarding acquisition and ownership) (6) Protection and restoration of biodiversity and ecosystems, Appendix D, Annex 1 (new construction only)		

CSRD

Corporate Sustainability Reporting Directive

- Is the guideline for the reporting standard, linked to the EU taxonomy
- The CSRD is intended to ensure that investors and other interest groups have access to information on the impact of companies subject to reporting requirements on people and the environment

Mandatory / date:

- Starting 2025 (for financial year 2024): companies that are already subject to NFDR
- Starting 2026 (for the 2025 financial year): large companies that fulfil two out of three of the following criteria:
  - >250 employees; >EUR 20 million total assets; >EUR 40 million sales
- **ATTENTION**: There may also be an "indirect" reporting obligation, e.g., in the context of an activity for a client!

Oberbank

Privatkunden Firmenkunden Private Banking Service Oberbank AG

Was passiert, wenn ich keine oder unvollständige Reports mache?

Die gesellschaftspolitische Verantwortung in den Themen CSR und Nachhaltigkeit steigt massiv; auch der politische Druck, durch neue Berichtspflichten, die Pflicht zur externen Prüfung der Nachhaltigkeitsinformationen, die EU-Taxonomie und auch das Lieferkettengesetz. Außerdem gehen Sie finanzielle Risiken ein, denn die CO2-Steuer hat bereits massive Auswirkungen und diese steigen weiter an. Darüber hinaus wird der Zugang zu günstigen, attraktiven Finanzierungen künftig schwieriger, wenn Sie Nachhaltigkeitsmanagement in Ihrem Unternehmen klein schreiben. Auch für InvestorInnen gewinnt das Thema weiter stark an Bedeutung.

Aus rechtlicher Sicht riskieren verpflichtete Unternehmen bei fehlender bzw. unvollständiger Berichterstattung eine behördliche Veröffentlichung des Verstoßes inkl. Abmahnung. Bei Wiederholung drohen Bußgelder und mögliche Klagen von KundInnen und InvestorInnen sowie ein entsprechender Image-Schaden bei Angabe von falschen Daten. Nicht zuletzt aber sollte Nachhaltigkeitsmanagement als strategischer Ansatz erkannt werden – z.B. durch das Erschließen neuer Geschäftsmöglichkeiten. Unabhängig von den in Aussicht gestellten gesetzlichen Verpflichtungen steigt damit der Druck auch auf nicht-berichtspflichtige Unternehmen an. Schon jetzt ein funktionierendes und transparentes Nachhaltigkeitsmanagement im Betrieb aufzubauen, ist daher sicher eine wichtige Investition in die nahe Zukunft.

Rechtliche Grundlagen der neuen Berichtspflicht?**

Als Basis für die Nachhaltigkeitsberichterstattung dient aktuell die Richtlinie über die Angaben nicht-finanzieller Informationen (NFRD). In Österreich ist die Richtlinie umgesetzt in § 243b Abs. 1 UGB. Die EU-Kommission hat eine Überarbeitung der NFRD in Form der zukünftig geltenden Corporate Sustainability Reporting Directive (CSRD) gestartet. Als Basis für die Offenlegung von spezifischen Leistungsindikatoren von Finanz- als auch von Nicht-Finanzunternehmen dient Art. 8 der EU-Taxonomie-Verordnung. Der Anwendungskreis der Taxonomie-VO erstreckt sich auf den gleichen Adressatenkreis wie die aktuelle NFRD.

Die EU-Taxonomie ist eine EU-Verordnung, die Vorgaben für nachhaltige Investitionen definiert. Ihr Ziel ist es, mehr Geld in nachhaltige Wirtschaftsaktivitäten zu lenken, um so die Ziele des Pariser Klimaschutzabkommens zu erreichen. Mit diesem Klassifizierungssystem für ökologisch nachhaltige Wirtschaftsaktivitäten wurde das Fundament für mehr Nachhaltigkeit in der Wirtschaft gelegt. In Art. 8 der Taxonomie-VO wird der allgemeine Rahmen zur nachhaltigkeitsbezogenen Offenlegungspflicht für die wichtigsten Leistungsindikatoren geregelt. Mit dieser neuen Reglung sind Unternehmen künftig angehalten offenzulegen, in welchem Ausmaß sie einen Beitrag zu den Umweltzielen der EU leisten.

ESG

E = Environment
S = Society
G = Corporate governance

- As a reporting instrument, part of the CSRD
- Three categories:
  - Environmental
  - Social
  - Governance (corporate governance)
- ESG reporting ≠ Sustainability report
  - ESG reporting is more detailed

- Controlled by CSRD obligations
- **PLEASE NOTE**:
  - There may also be an "indirect" reporting obligation, e.g., in the context of activities for a client!
  - "Stranded assets" – devaluation of properties

Quelle: ESG-konforme Immobilienbewertung, Wüest Partner

EPBD

- Directive = binding
- Implementation in Austria by mid-2026

- EPBD Directive = Energy Performance of Buildings Directive
- Measure from the Green Deal:
  - Building sector to be decarbonised by 2050
- Improving the energy efficiency of buildings through refurbishment:
  - MEPS = Minimum Energy Performance Standards
- Financing: the EU Commission must present a study on financing by the end of 2025
  - A combination of EU and national funds is planned

EPBD

- Decarbonisation of properties

Target: complete decarbonisation for existing buildings (rapid refurbishment) and new buildings (zero-emission buildings) by 2025

Planning

- **National refurbishment plan**
  - Mandatory target paths
  - Replaces current refurbishment strategy
- **Refurbishment certificates**
  - Number of maximum steps towards zero-emission buildings by 2025
- **One-stop shop**
  - Technical advice on all refurbishment issues
- **Social and health objectives**

Inventory

- **Effective date: 2020**
- **Refurbishment rate**
  - MEPS set the framework for refurbishment
- **Residential buildings**
  - Average consideration
  - Primary energy consumption
- **Non-residential buildings**
  - Consideration of the individual building
  - Choice: Primary or ultimate energy consumption

New Building

- **Specification of the zero-emission building**
  - 0% fossil energy consumption on site
  - Beginning 2030 for all buildings
  - Beginning 2028 for public buildings
- **Harnessing solar potential**
- **E-mobility**
- **Building technology**

EN ISO 52120-1

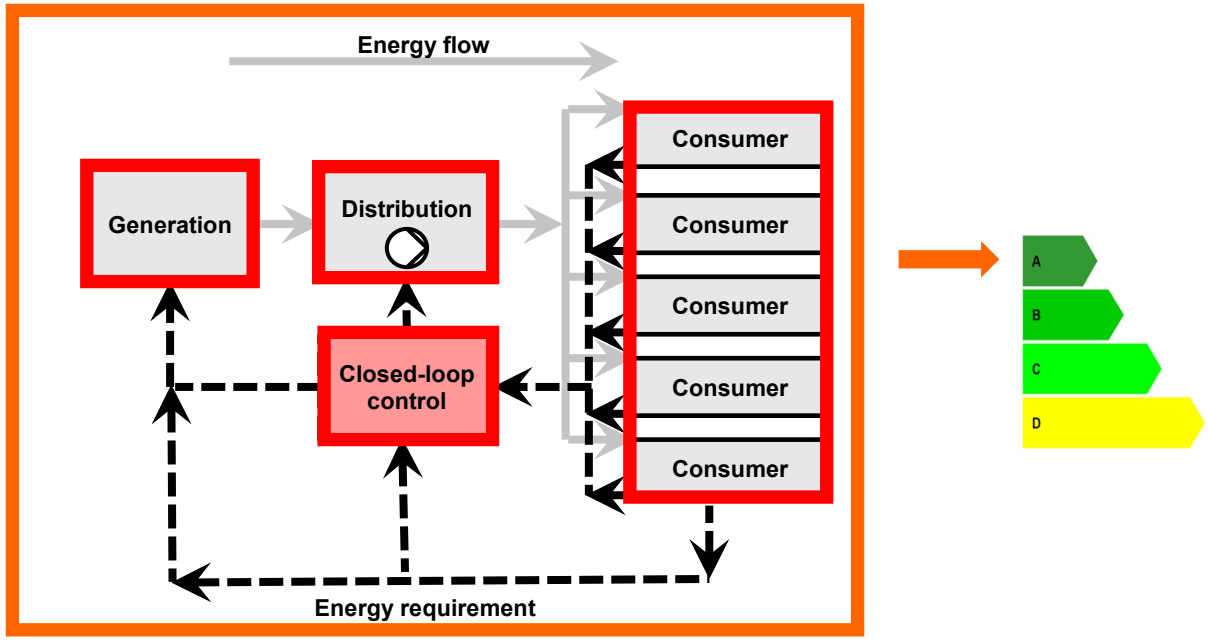
Other

- **Mobility**
  - Mandatory for e-mobility
  - Right to a charging point
- **Ban on fossil fuel boilers**
- **Digitalisation**
  - Central database for energy certificates and "Global Warming Potential"
- **Financing to be made possible**

Source: WKO

- Complete system view
- Measurements for correct power control
- Energy-efficient system behaviour

Energy demand and supply model



EPBD

- Via EN ISO52120-1
- EN ISO52120-1 = Building automation

EN ISO 52120-1

Question 07	Hydronic balancing (heat distribution)				Class		Functional description (text for tender/specification)
	How is hydronic balancing carried out in the heat distribution system? If there are more than ten heat exchangers, then this question also includes balancing between groups of ten heat exchangers each. [ISO 52120-1:2021; 1.4a]				WG	NWG	
	As is	Target					
	O	O	a)	No balancing – neither static (manual) nor dynamic (automatically continuous)	D	D	Hydronic balancing does not take place. [ISO 52120-1:2021; 1.4a.0]
	O	O	b)	Static (manual) balancing between individual heat exchangers; no group balancing	C	D	Hydronic balancing takes place statically (manually) between the individual heat exchangers. Balancing between groups of ten heat exchangers each does not take place. [ISO 52120-1:2021; 1.4a.1]
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	O	O		Dynamic (automatically continuous) balancing between the individual heat exchangers	A	A	Dynamic balancing takes place dynamically (automatically and continuously) between the individual heat exchangers. [ISO 52120-1:2021; 1.4a.4]

EN ISO 52120-1

Pump control

Question 06

Control of circulation pumps				Class		Functional description (text for tender/specification)
How are the circulation pumps operated (with respect to the "on" and "off" states or the speed)? [ISO 52120-1:2021; 1.4]				WG	NWG	
As is	**Target**					
O	O	a)	No automatic control (e.g., pumps in continuous operation)	D	D	The circulation pumps are operated without automatic control. The pumps are operated in continuous operation. [ISO 52120-1:2021; 1.4.0]
O	O	b)	Two-setpoint control	C	C	The circulation pumps are operated via an on/off control. [ISO 52120-1:2021; 1.4.1]
O	O		Multi-stage control (i.e., the pumps are operated at different performance levels)	B	B	The circulation pumps are operated via a multi-stage control system that allows the pump to be operated at different performance levels. The required capacity level is determined using heat meters or temperature sensors in the supply and return circuits. [ISO 52120-1:2021; 1.4.2]
O	O		Control of the variable pump speed via assessment by the (internal) pump unit	A	A	The circulation pumps are operated by controlling a variable pump speed, depending on the load (i.e., based on variable or constant differential pressure). The required power performance is determined and controlled internally by the pump itself. [ISO 52120-1:2021; 1.4.3]
O	O		Control of the variable pump speed (external demand signal)	A	A	The circulation pumps are operated by controlling a variable pump speed, depending on the load (i.e., based on variable differential pressure). The required power output level is determined via pressure sensors in the supply and return circuits. [ISO 52120-1:2021; 1.4.4]

EN ISO 52120-1

- Great savings potential through building automation

Hotel

32%

Educational building

20%

Hospitals

14%

Restaurants

32%

Shopping Centres

40%

Office Building

30%

Source: FH Aachen DE

Savings potential through the use of an A-class system in comparison with the C-class reference.

RetroFIT+

Is your building one of the 90% with inefficient operation?

Harald Kreuter | 0664 8585924 | Belimo Austria

Why operate buildings properly?

Statutory requirements

Economic incentives

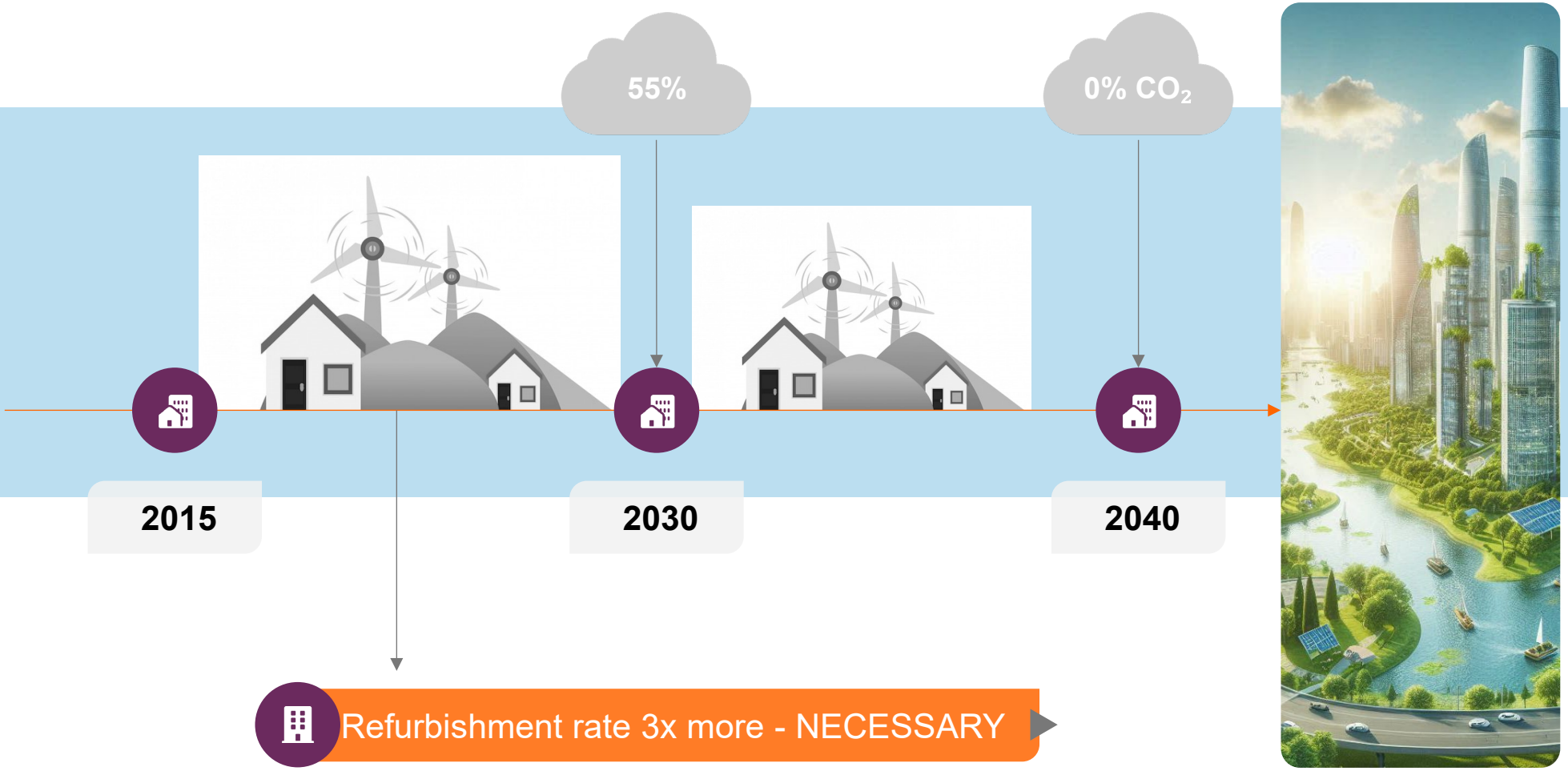
Technological innovation

Market demand and competitiveness

Social and environmental responsibility

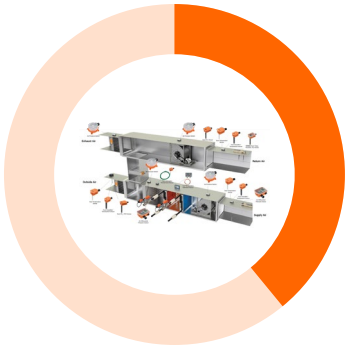
Limiting global warming – Climate-neutral!

Paris Climate Agreement (2015) → EU environmental policy → Austrian climate targets



The huge potential in the building stock

2,400,000 buildings (Austria)



16% (Co2)

HVAC systems not optimally operated 90% of the time (global)

Why this potential?

Comfort not guaranteed

Energy consumption too high

CO_2 load too high

Incorrect dimensions

- Valves
- Pipes
- Air heaters / air coolers
- …

Not very efficient

- Pumps
- Fans
- …

Regulation too simple

- Air/water circuits
- Pump/fan control
- Low differential temperature
- …

Maintenance of the systems

- Awareness
- Skilled workers
- Lack of transparency
- …

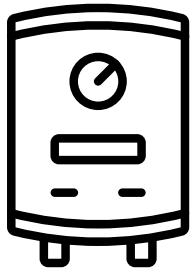
Investment options for energy optimisation

Improvement of building envelope

Savings potential
up to 50%

Return on Investment
10 to 60 years
Ø

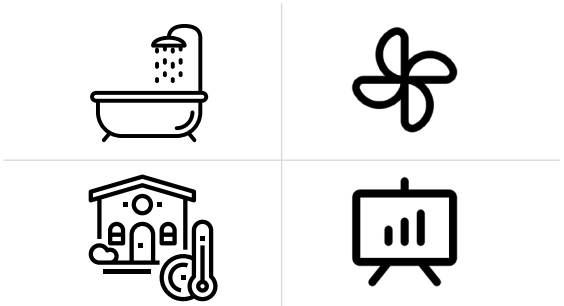
Replacement for plants



Potential savings from 10-60%

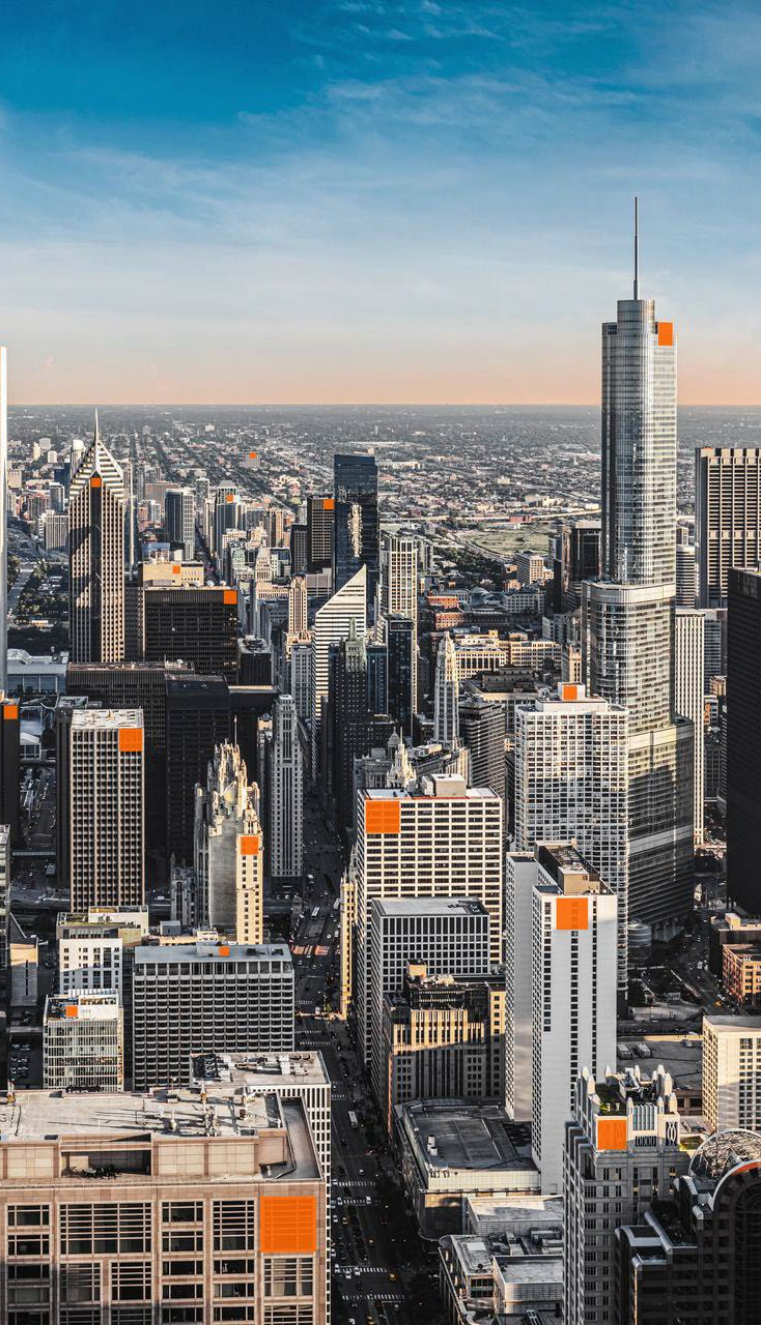
Return on Investment
10 to 60 years
Ø

Optimisation via intelligent field devices and automation

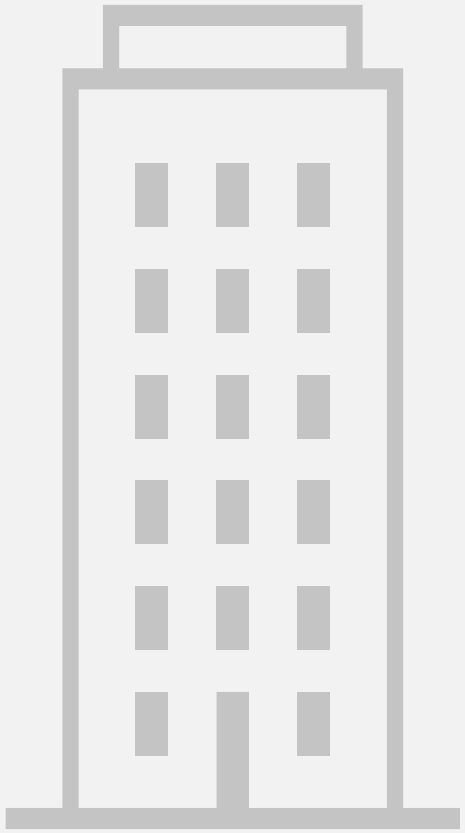


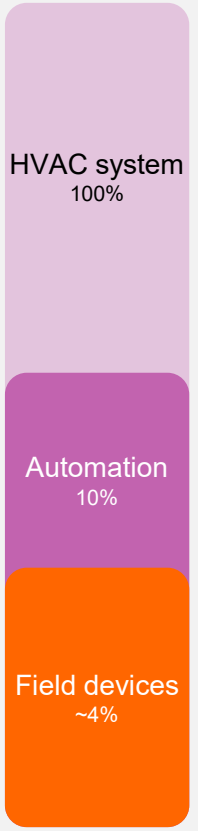
Savings potential
up to 30%

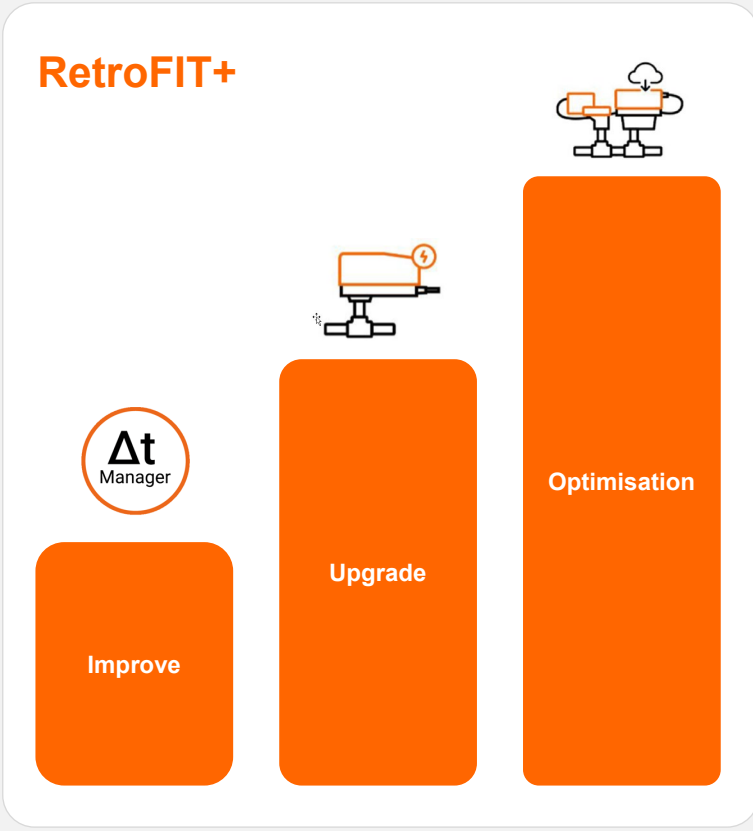
Return on Investment
2 to 10 years
Ø



RetroFIT+ the quick wins in building optimisation







HVAC field devices and automation

Optimisation via intelligent field devices and automation

Savings potential
up to 30%

Return on Investment
2 to 10 years

Energy

Electricity

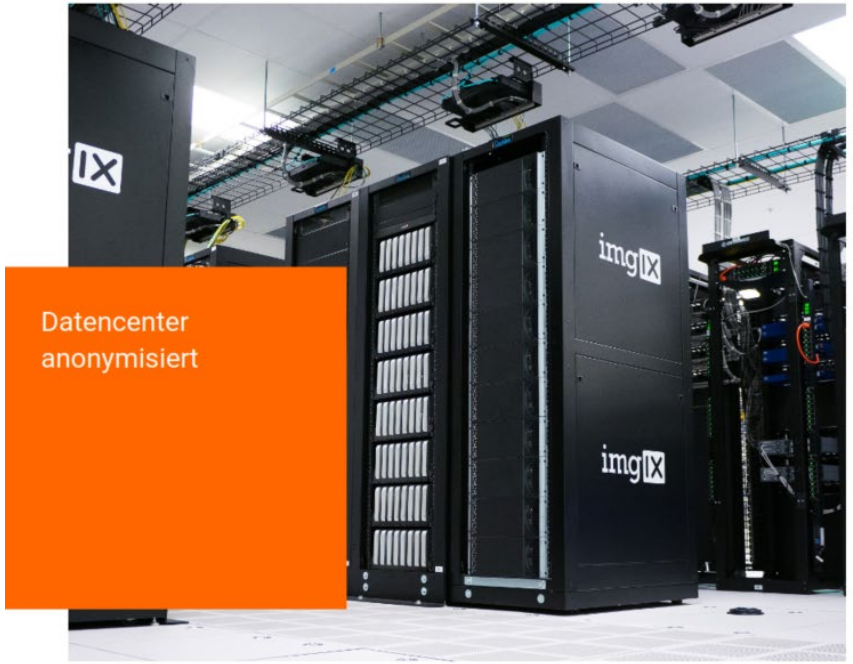
?

CO_2

Money

HVAC assessment

- **EN ISO 52120-1**
- Effects on energy efficiency
- Building automation
- Building control
- Building management, etc.



- **A** Demand-controlled
- **B** Presence-controlled
- **C** Time-controlled
- **D** Manually controlled

EN ISO 52120-1: Energy efficiency of building automation

Office | School | Hotel

Trades

- Heating
- Ventilation
- Cooling
- Light
- Other

Building automation

- Highly efficient
- Higher quality
- Default
- None

- Variable occupancy
- Variable pump control
- Occupancy detection
- Variable room control
- Adaptive programmes
- Variable ventilation
- External cooling
- Variable heating
- Fixed programmes
- Constant
- Manually

- A — Demand-controlled
- B — Presence-controlled
- C — Time-controlled
- D — Manually controlled

EN ISO 52120-1: Energy efficiency of building automation

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EN ISO 52120-1: Energy efficiency of building automation

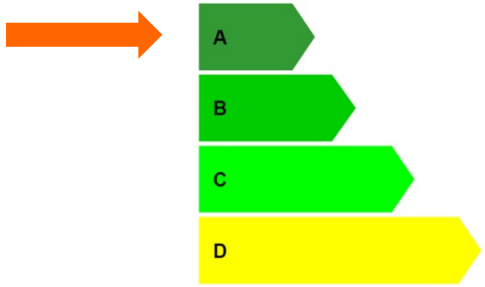
BELIMO

		Trades							
		Heating			Ventilation			Cooling	Light and more…
		Office	School	Hotel	Office	School	Hotel		
		Reduction potential thermal energy			Reduction potential electrical energy				
A+	Addl. Prog.	+	+	+	+	+	+	**Completely optimised**	
A	Demand-controlled	0.70	0.80	0.68	0.87	0.86	0.90	Highly efficient BA networked trades	
B	Presence-controlled	0.80	0.88	0.85	0.93	0.93	0.95	Higher-value BA Individual trades	
C	Time-controlled	1	1	1	1	1	1	Standard BA	
D	Manually controlled	1.51	1.20	1.31	1.10	1.07	1.07	No BA	

BA Efficiency ISO 52.120

EN ISO 52120-1: Energy efficiency of building automation

Savings potential through the use of an A-class system in comparison with the C-class reference.



Hotel

32%

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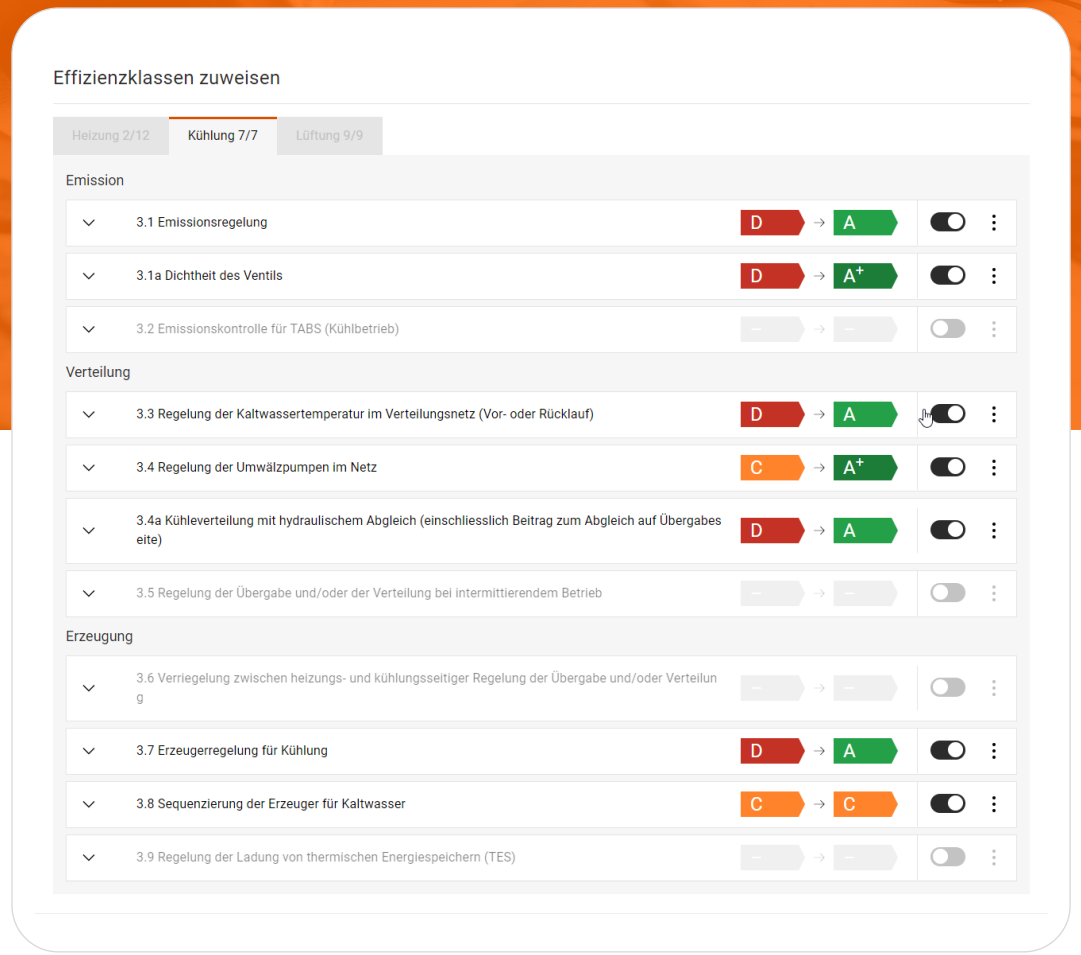
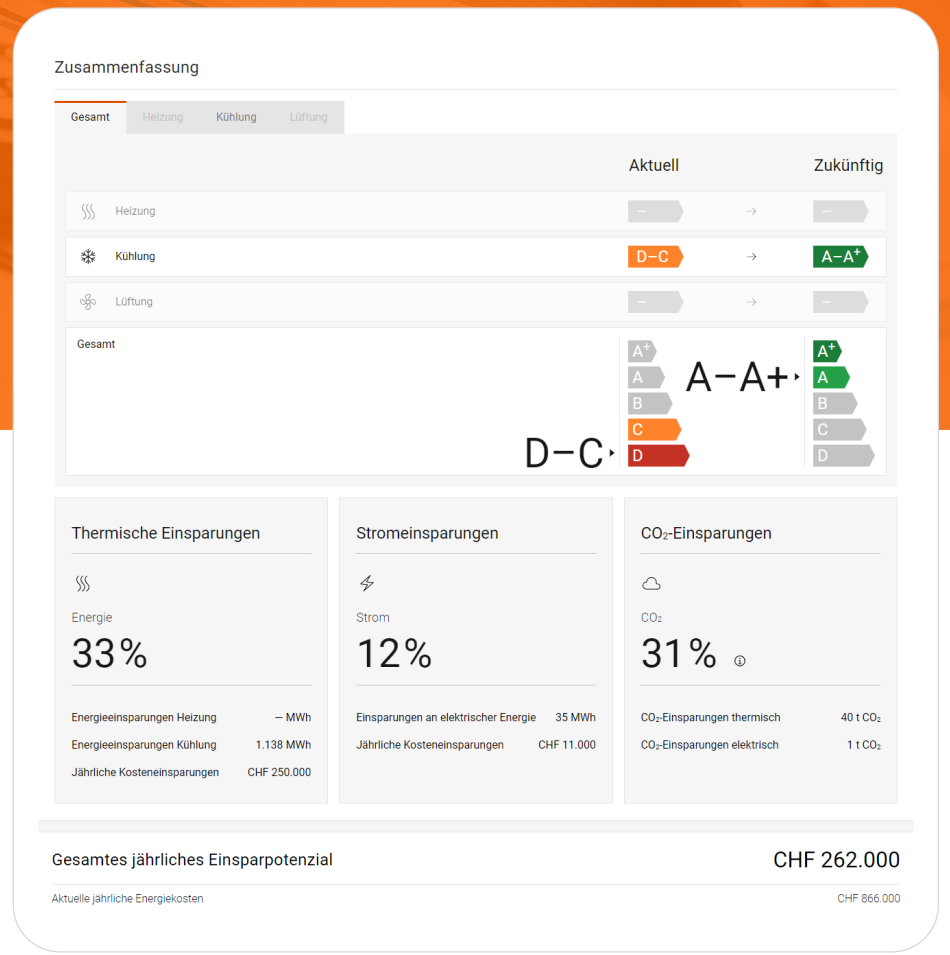
Source: FH Aachen DE

HVAC assessment





Innovation project for early replacement of heating groups

Research and development Lemon Consult

Innovation project for early replacement of heating groups

Project participants

- Innovation project Federal Office of Energy
- Lemon Consult AG – Engineering office
- Allgemeine Baugenossenschaft Zürich (ABZ)
- Baugenossenschaft Rotach Zürich
- BELIMO Automation AG

Initial situation

The current state of research shows that **heat pumps are oversized**, i.e. larger than necessary, **when** existing fossil fuel boilers are **replaced**. This leads to **avoidably high investment costs and reduces the efficiency of the system**.

Project hypothesis

Existing system

- Inefficient settings
- Hydronic balancing not observed, because of sufficient burner output
- Calculation of the new generation is based on consumption measurement of the existing system

New system

Heat pumps are based on incorrect assumptions and are therefore often oversized

Thesis

For properties with multiple heating groups, it makes **economic and ecological** sense to carry out optimisation before replacing the generation.

Evaluation of the objects

Allgemeine Baugenossenschaft Zürich (ABZ)

Zweierstrasse

- **1 x 250 kW** condensing gas boiler
- **3 valves** (heating groups) and a measuring point for domestic hot water

Baugenossenschaft Rotach Zürich

Rotach District

- **2 x 1.2 MW** condensing oil boilers
- **10 valves** (heating groups) and three measuring points for domestic hot water

Procedure

September 2023
Conversion work on heating manifolds

1. **Part heating period 23/24**
   Measurement unregulated state

January 2024
Optimisation with Belimo Energy Valve™

2. **Part heating period 23/24**
   Measurement in optimised state

May 2024
Results

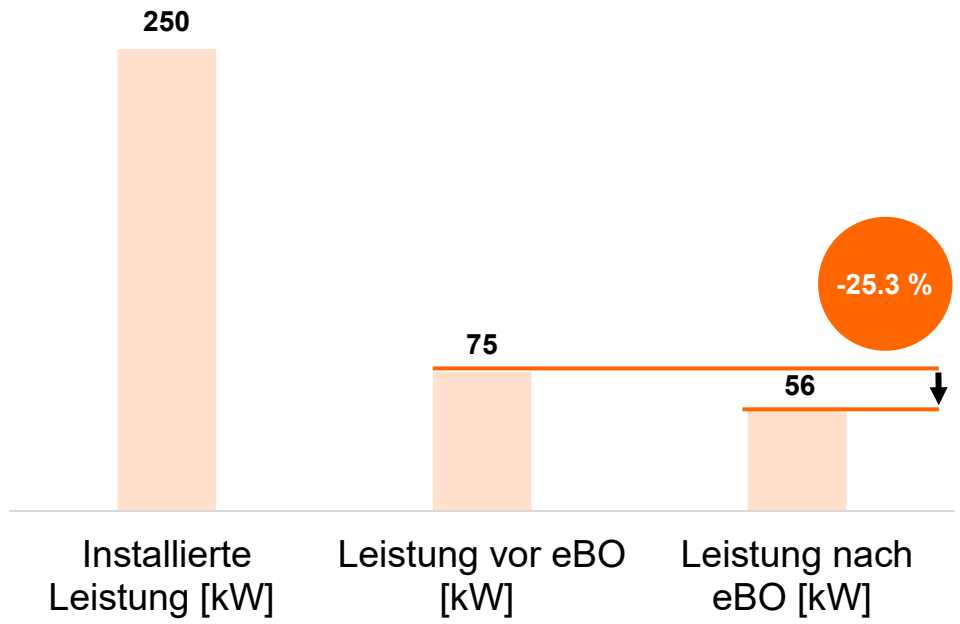
Heating distribution Zweierstrasse

Before refurbishment

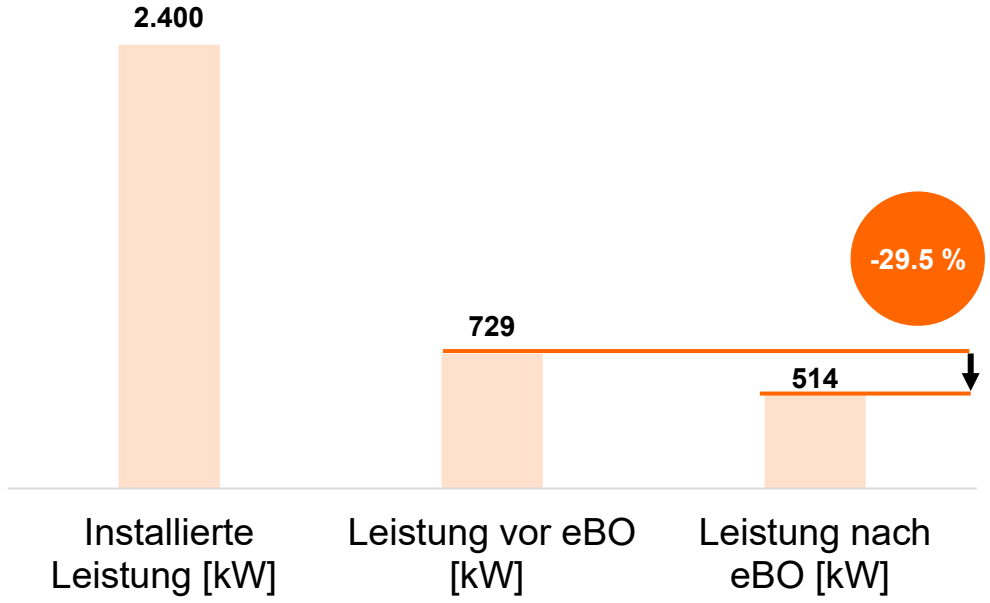
After refurbishment

Result savings in heating capacity

Savings in heating capacity ABZ Zweierstrasse

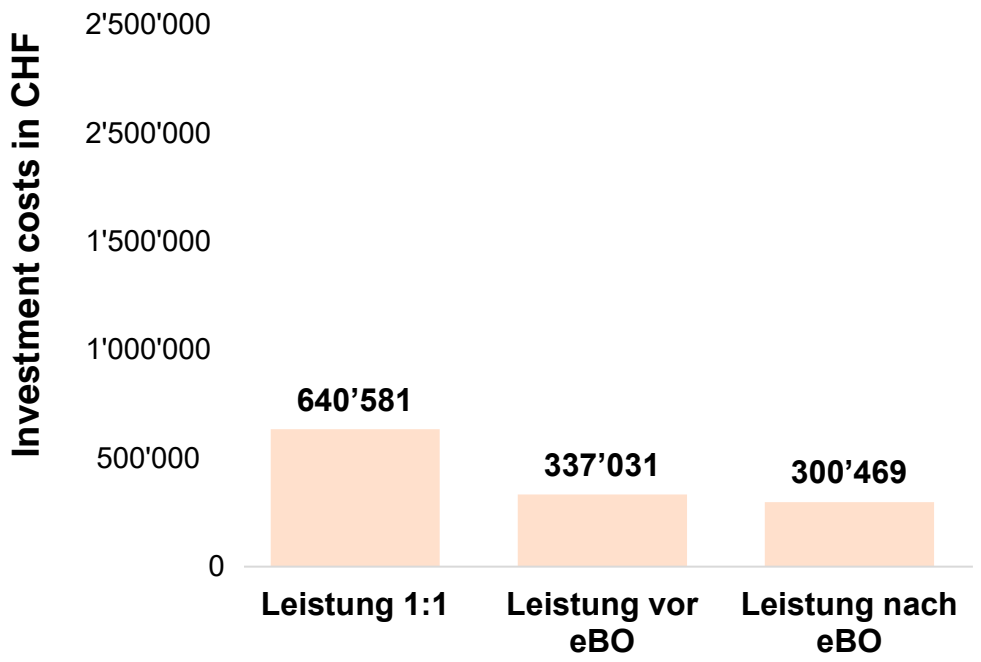


Savings in heating capacity Rotach District

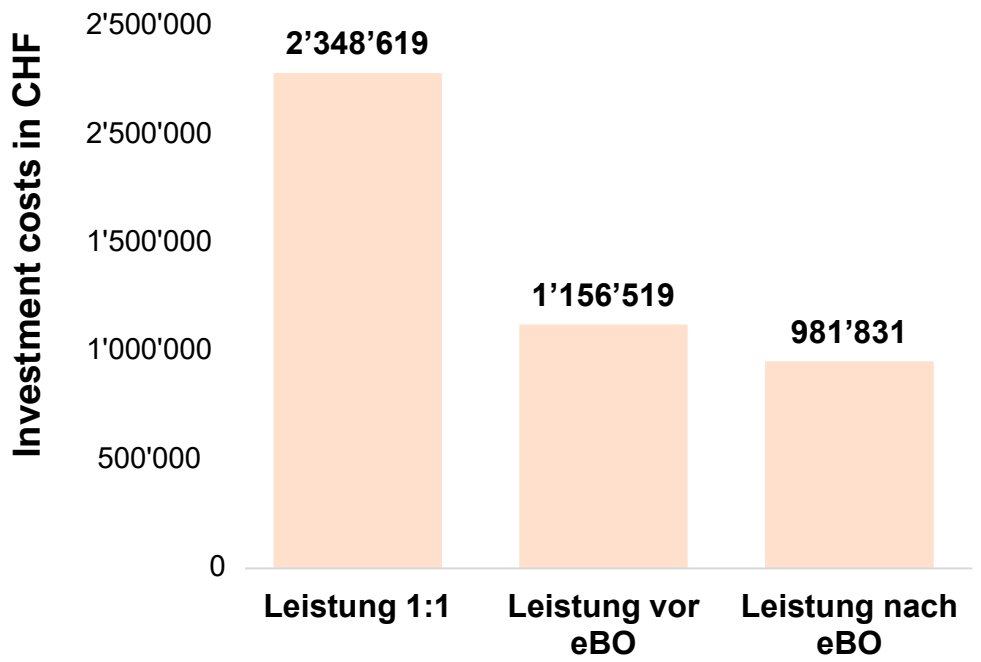


Investment costs, Zweierstrasse

Replacement with *air-to-water* heat pump



Replacement with *geothermal probes* heat pump



Key takeaways

Key takeaways

HVAC components and regulation

- Quick wins in energy and CO_2 reduction

Evaluate/correct hydronics first

- Tackle how heat is generated in the second step

Collaboration with RetroFIT+ specialists

- Specialist companies, Belimo, Belimo-RetroFIT+ Partners

Is your building (park) still one of the 90 percent?

Energy-efficient hydronics

Das Konzept «Anlagebau» von Belimo

EU taxonomy for sustainable activities

BELIMO

Concept "Plant manufacturer"

Efficiency through standardisation in planning and execution

How can the "Plant manufacturer" concept support our customers?

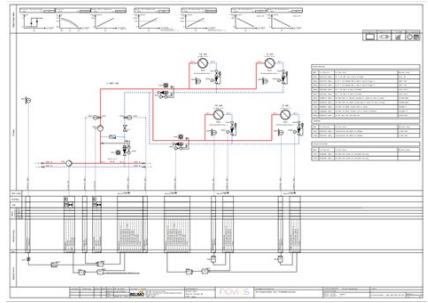
- **We need simple and clear solutions that take the pressure off skilled workers**
  - The Belimo application library replaces the hydronic concept
  - Ready-made draft plans with part lists and bills of material items reduce the planning effort
  - Prefabricated hydronic components facilitate assembly and simplify commissioning

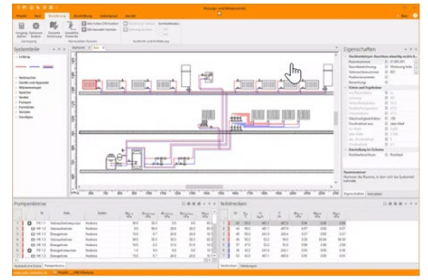
- **All solutions must be fully digitalisable**
  - With the CQ24A-BAC, hydronic balancing is carried out via BACnet or Modbus
  - All mechanical components such as differential pressure controllers or balancing valves have been replaced with modern components

- **A design plan must be drawn up for each system constellation**

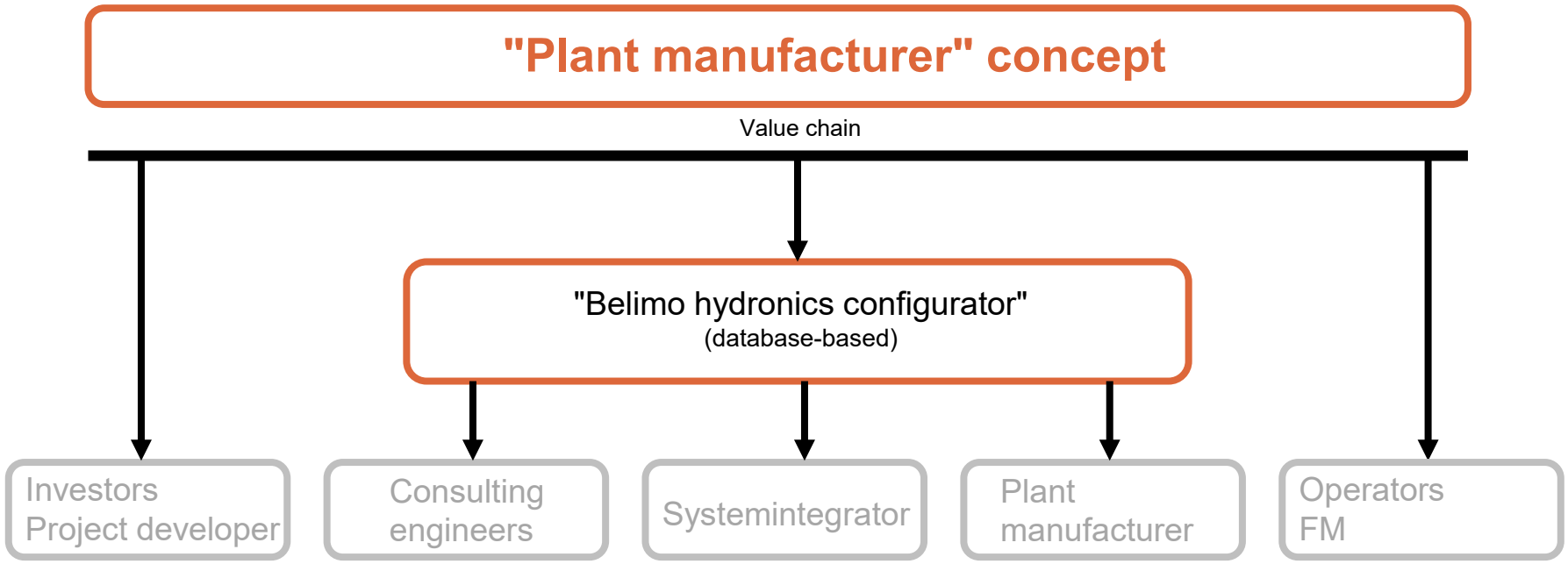
(copy template for consulting engineers and contractors)

- The Belimo application library is constantly being expanded and adapted to market requirements





"Plant manufacturer" concept



- ✓ Increase order quality
- ✓ Create standards
- ✓ Cover legal topics (e.g., EU taxonomy)
- ✓ …

- ✓ Obtain tender texts, schemes, gross price quotations, etc. through 4-step configuration
- ✓ …

- ✓ Templates for SW-based planning
- ✓ Data sheets
- ✓ Net price offer
- ✓ ….

- ✓ Templates for SW-based planning
- ✓ Data sheets
- ✓ Net price offer
- ✓ ….

- ✓ Key data in CAFM
- ✓ …

Concept "Plant manufacturer"

- Increase in order quality
- Counteracts the shortage of skilled labour

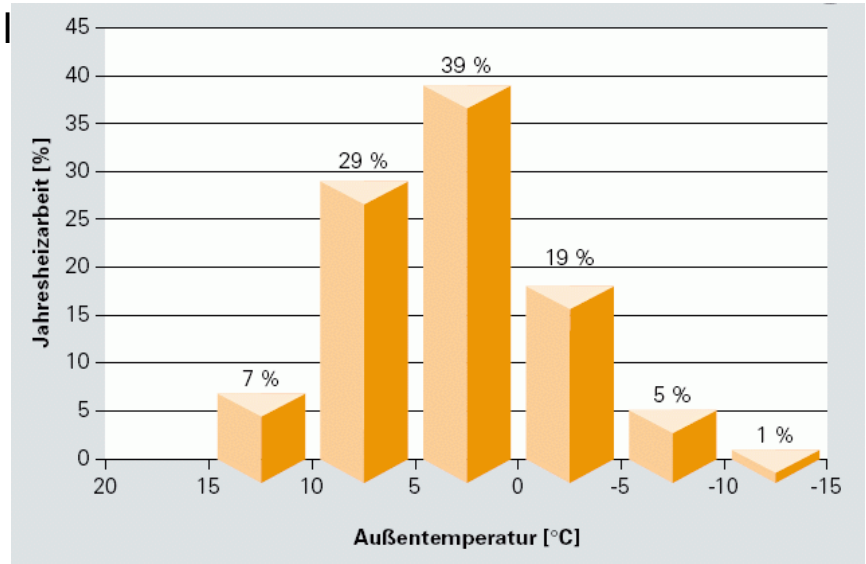
Applications

Possible applications for pressure-independent valves

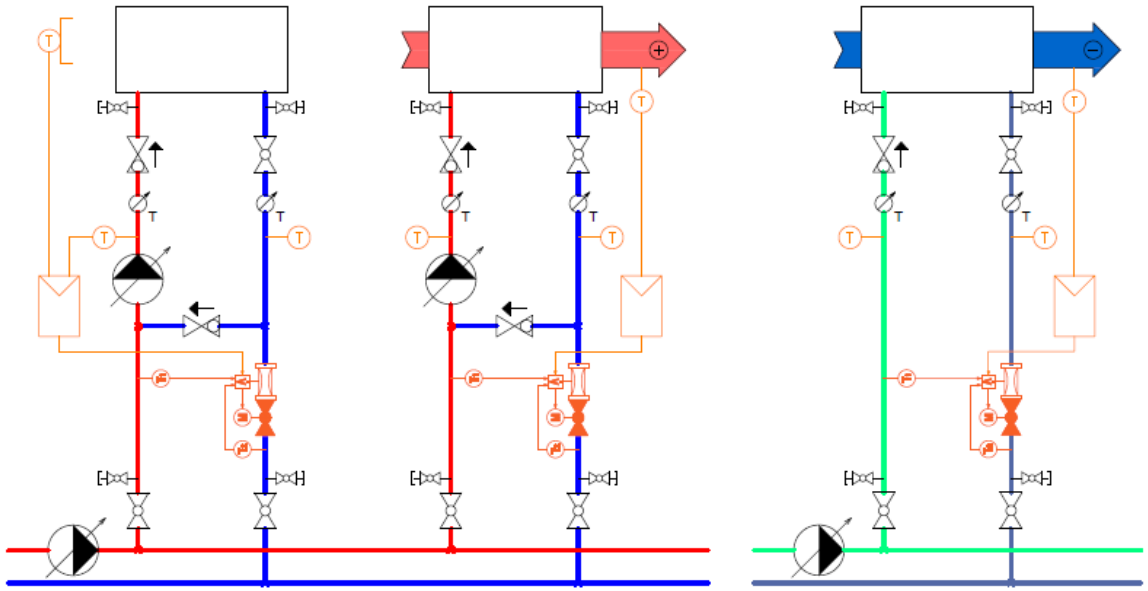
Hydronic

- Great potential with respect to energy efficiency

- Over 90% partial load operation – designed for full l
- Statically balanced hydronic systems
- Oversupply or undersupply to systems
- Suitable regulating devices and fittings
- Demand-controlled pump performance
- Integration into building automation system



- Heating and cooling groups
- Supply temperature control
- Air heater or air cooler
- Applications with risk of freezing
  Glycol monitoring



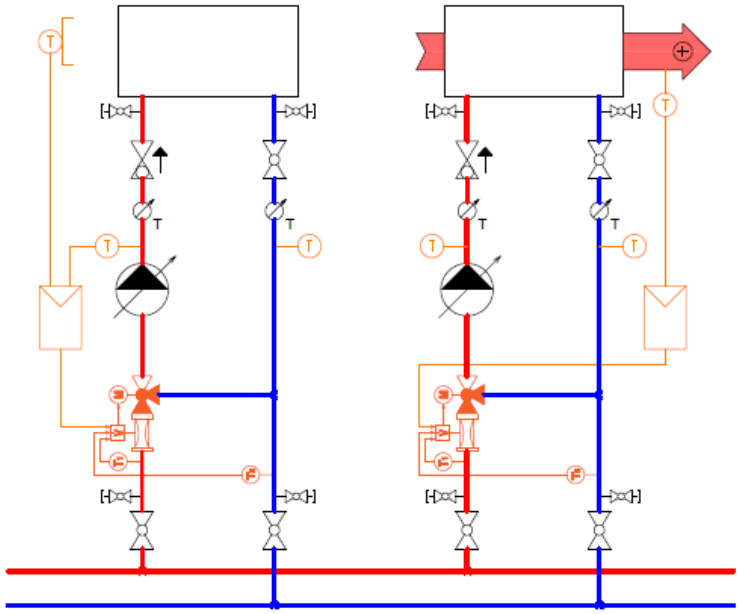
Hydronics application (pressurised, 2-way)

- Throttle and injection circuit with Energy Valve / EPIV
- Operation independent c temperature and differential pressure

Hydronics application (depressurised, 3-way)

Mixing circuit with the Energy Valve

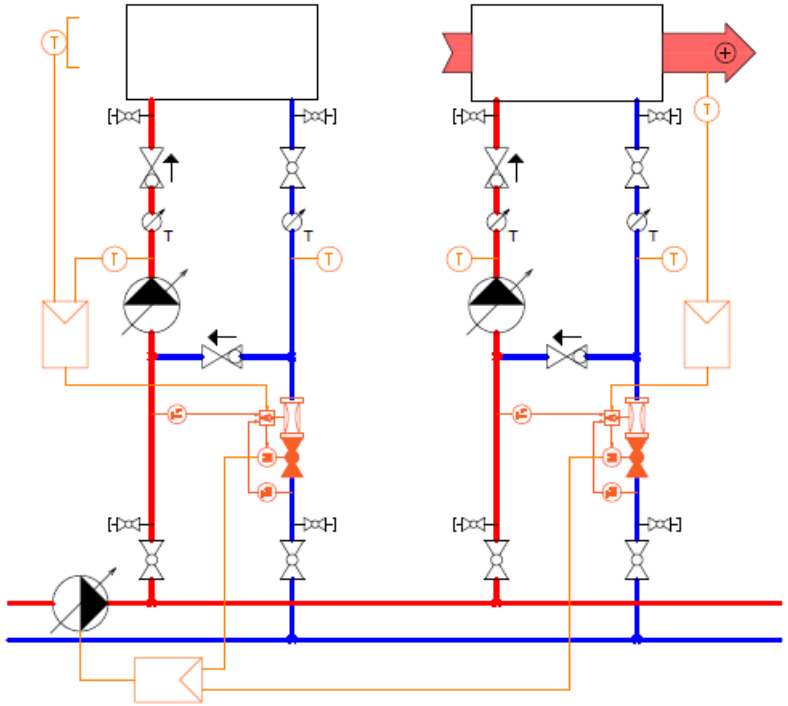
- Heating groups
- Weather-compensated supply temperature control
- Supply air temperature control wit heating coil



Hydronics application (closed control loop)

- Pump optimiser
- High energy efficiency and maximum user comfort

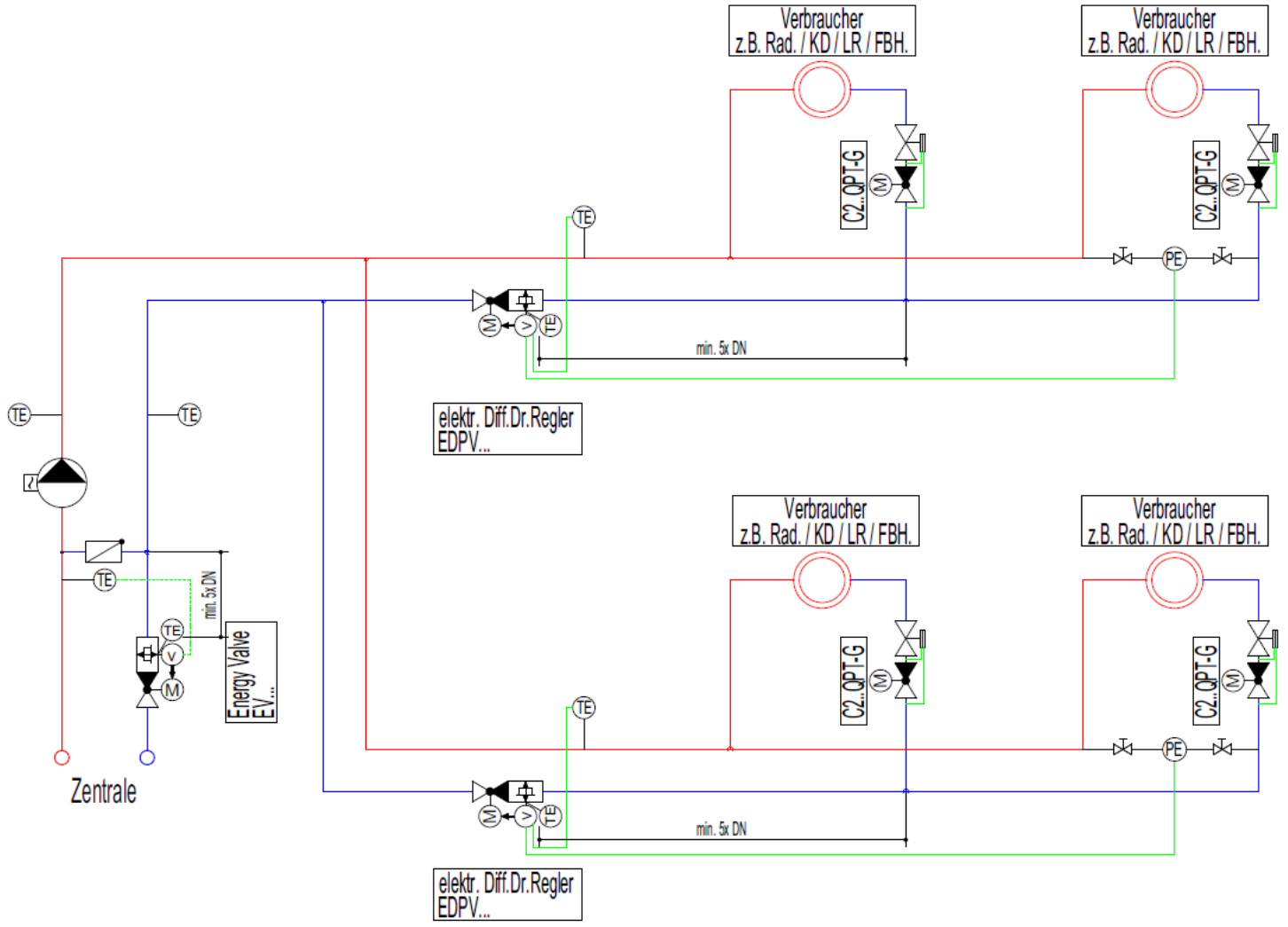
- Benefits of the combination flow measurements on the valves
- Valve opening defines effective pump operation
- Permanent pump speed optimisation while maintaining a constant water volume
- Desired water volume > Heating or cooling output thus ensured at all times



Belimo hydronics configurator

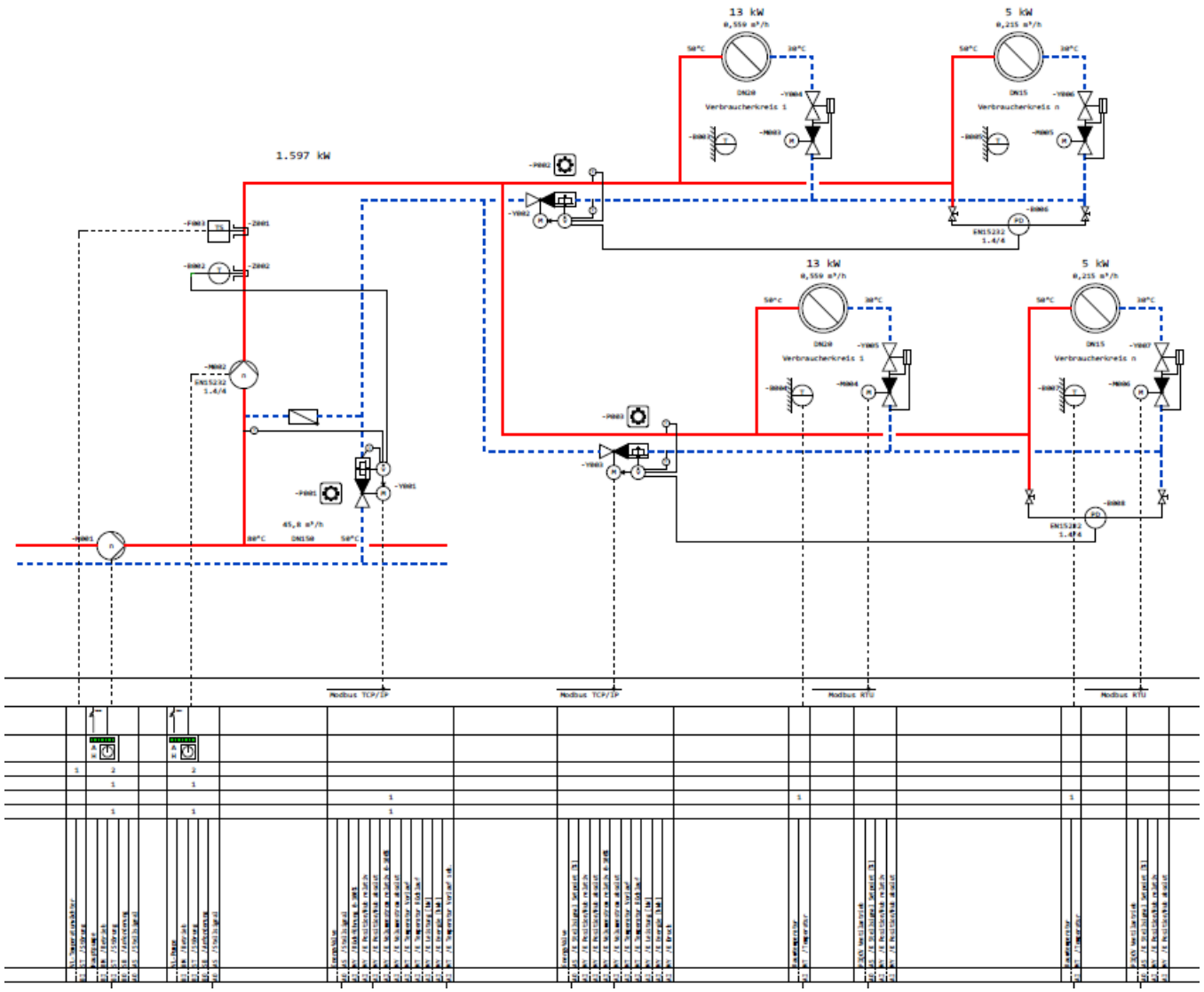
"Plant manufacturer" concept (plant manufacturer)

- e.g., Plancal data set
- Energy monitoring
- Continuous pressure-independent



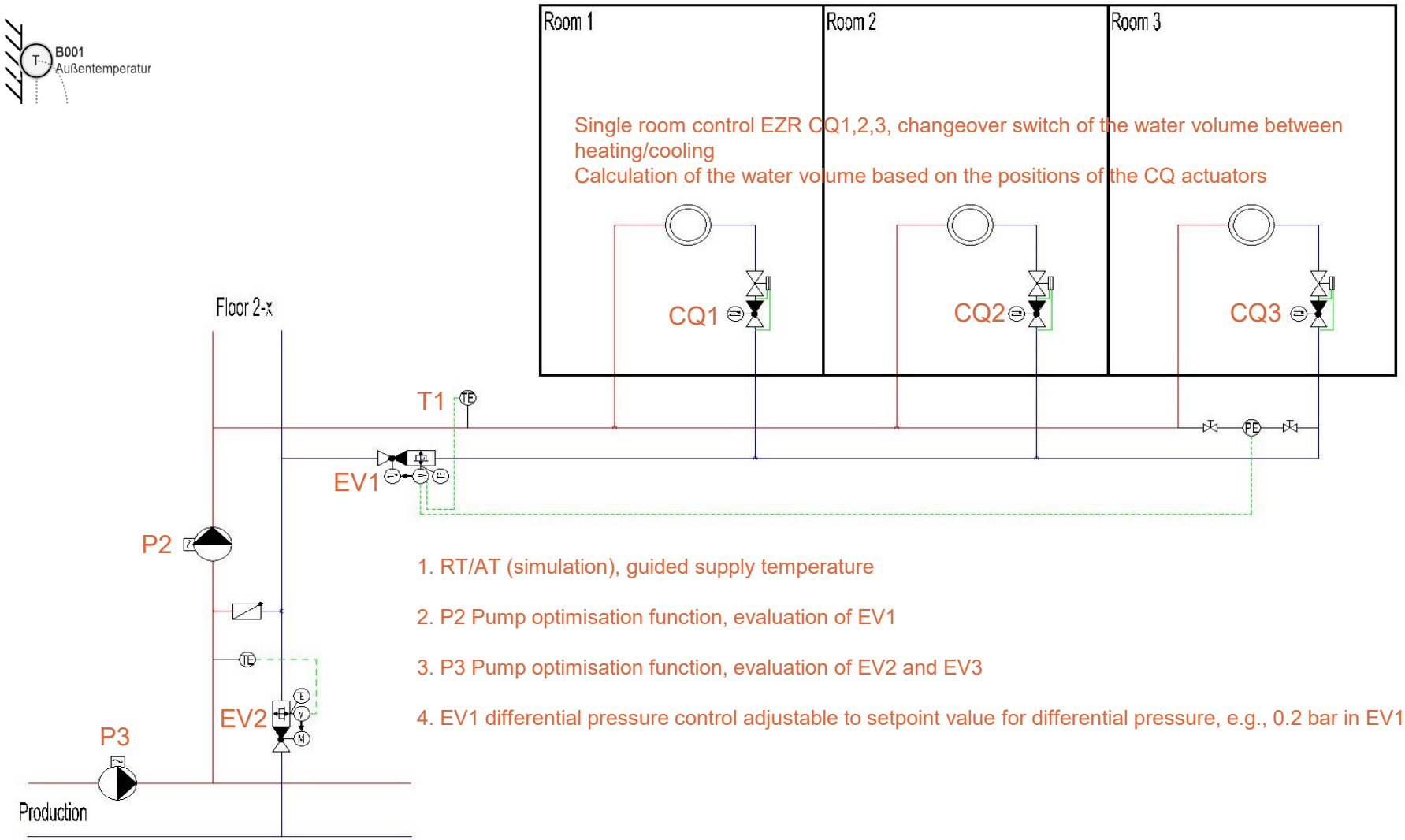
"Plant manufacturer" concept (System integrator)

- e.g., RR dataset
- Basis for, e.g., switch cabinet construction



"Plant manufacturer" concept in the mini-van

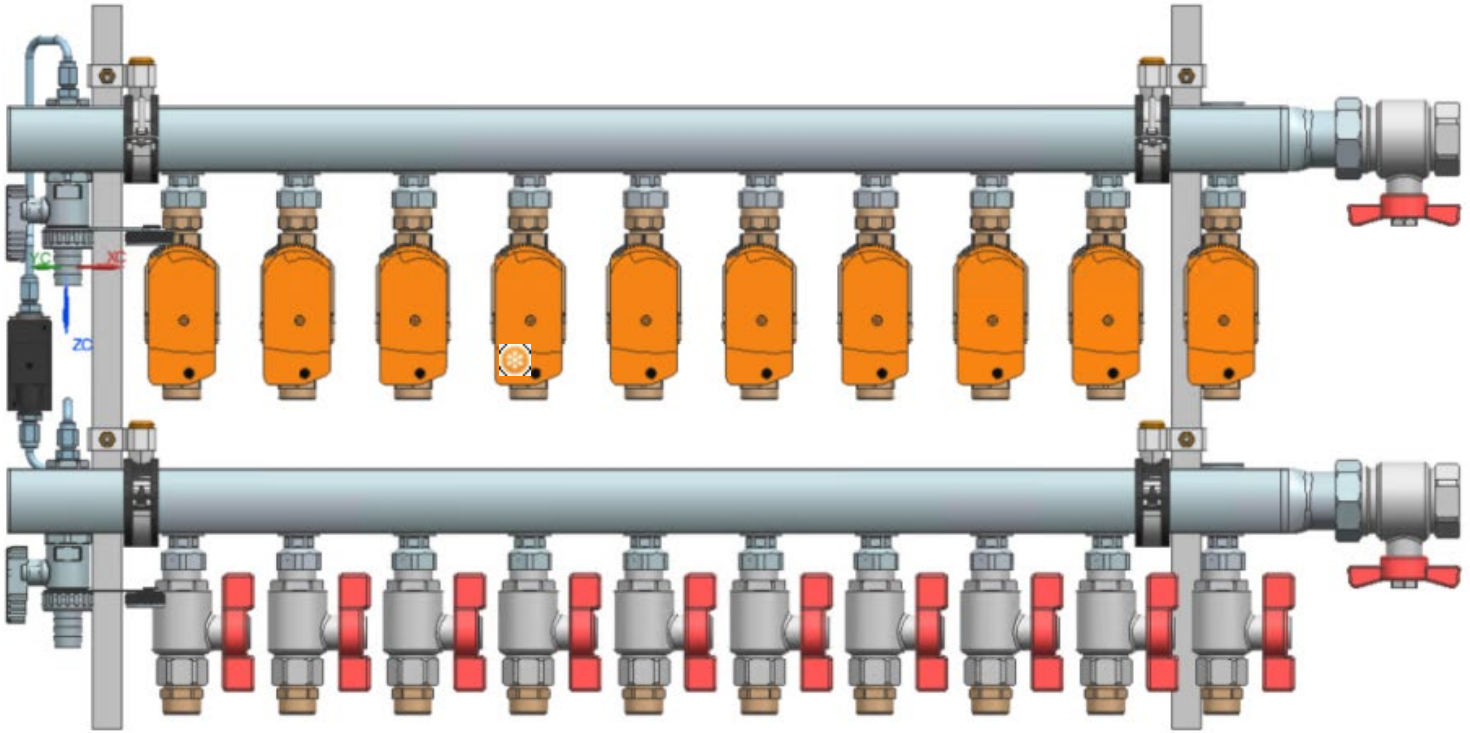
- Simulation
- Training regarding product details



1. RT/AT (simulation), guided supply temperature
2. P2 Pump optimisation function, evaluation of EV1
3. P3 Pump optimisation function, evaluation of EV2 and EV3
4. EV1 differential pressure control adjustable to setpoint value for differential pressure, e.g., 0.2 bar in EV1

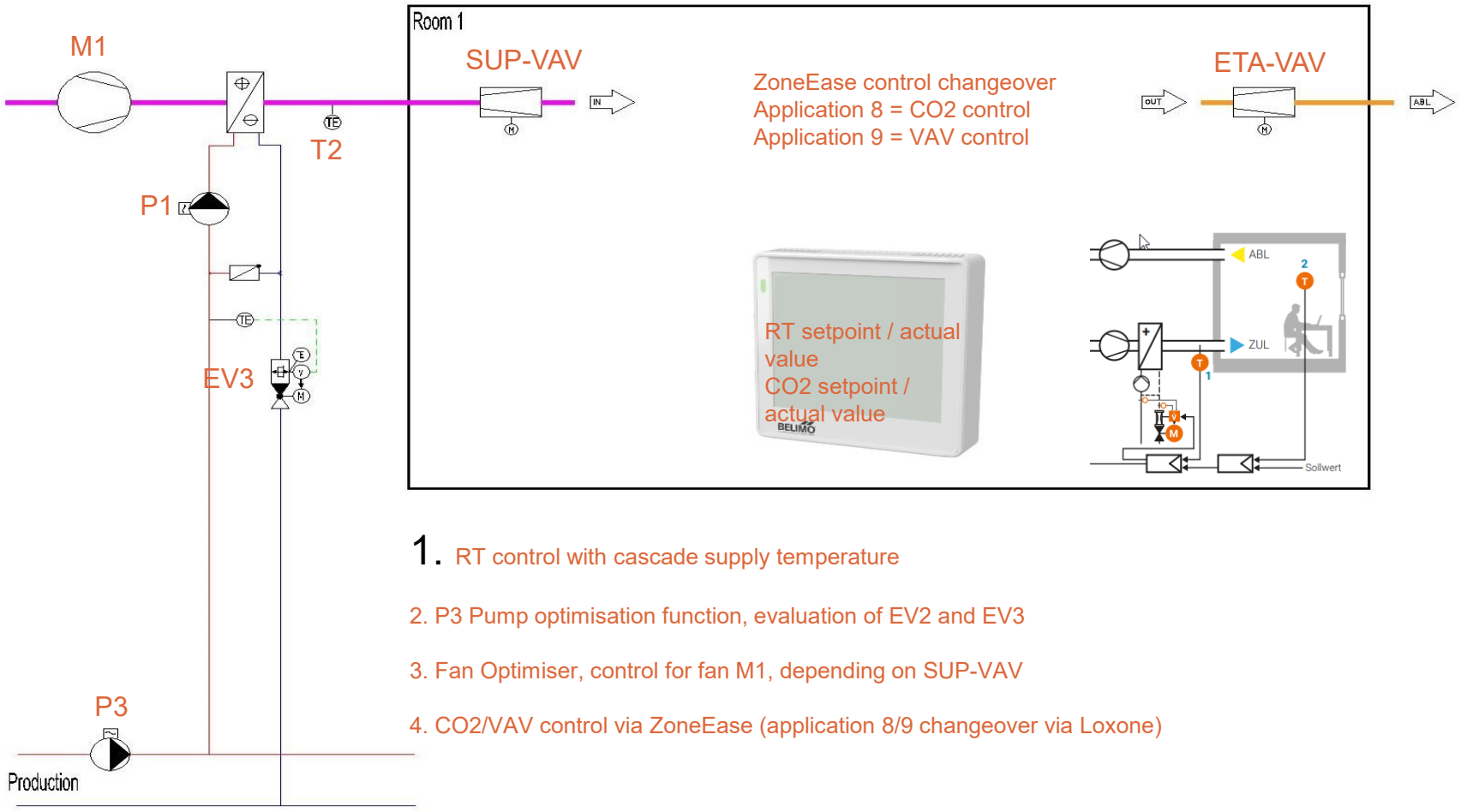
Energy manifold

- Digital commissioning
- Pressure-independent

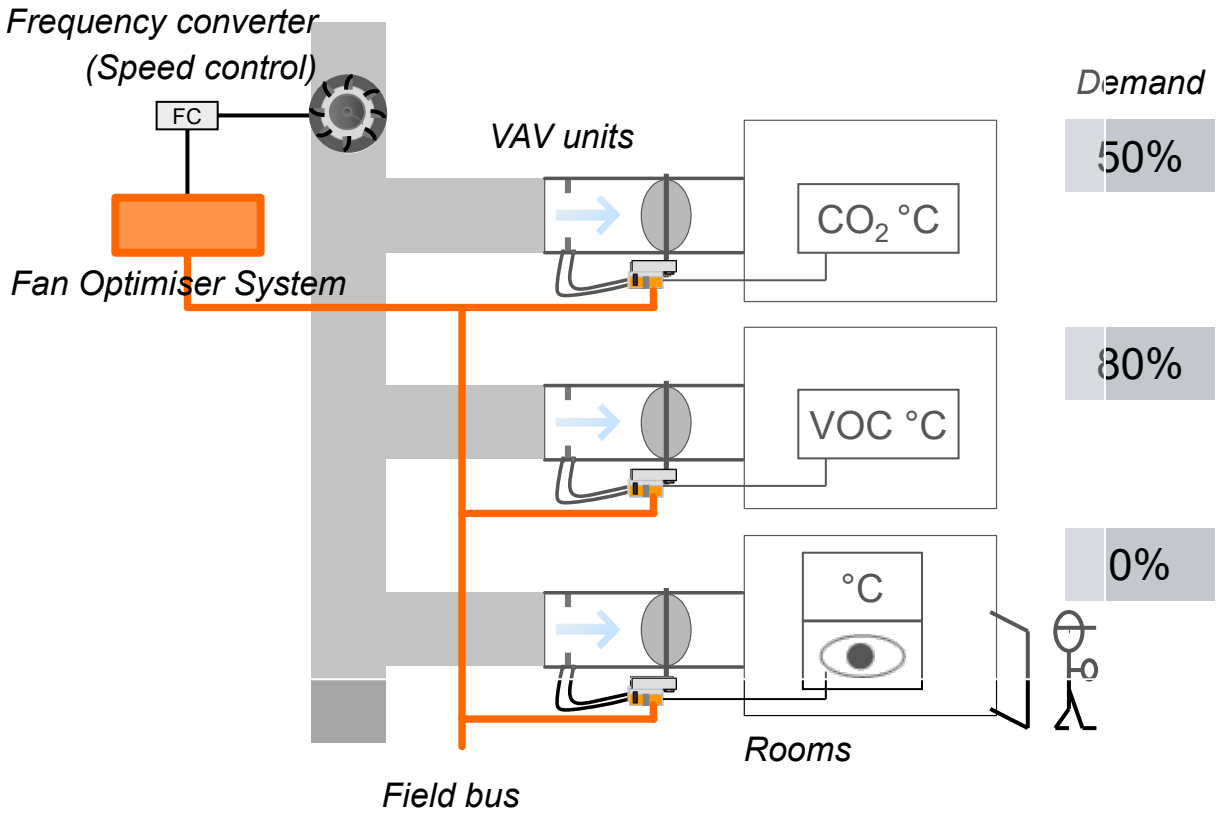


Air handling unit in a mini-van

- Inlet RT cascade
- ZoneEase (application 8/9)



1. RT control with cascade supply temperature
2. P3 Pump optimisation function, evaluation of EV2 and EV3
3. Fan Optimiser, control for fan M1, depending on SUP-VAV
4. CO2/VAV control via ZoneEase (application 8/9 changeover via Loxone)



Ventilation (in the zone)

- Fan Optimiser
- Poor point control by means of feedback of the damper position (VAV)

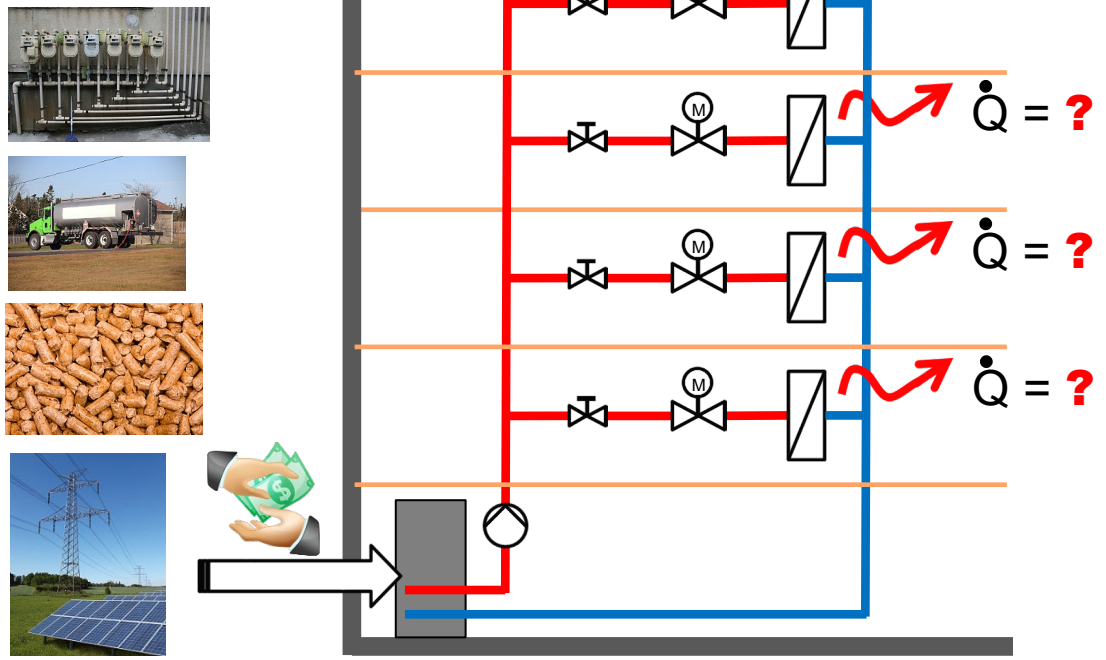
Creating transparency

Electronic pressure-independent characterised control valve with energy monitoring – Belimo Energy Valve™

Use of heating and cooling energy

- Energy manifold essential for energy efficiency and user comfort

- How much energy is actually needed?
- Does every consumer get the amount of energy they need?



Energy Valve

- All-in-one solution

Energy-efficient operation

Data collection

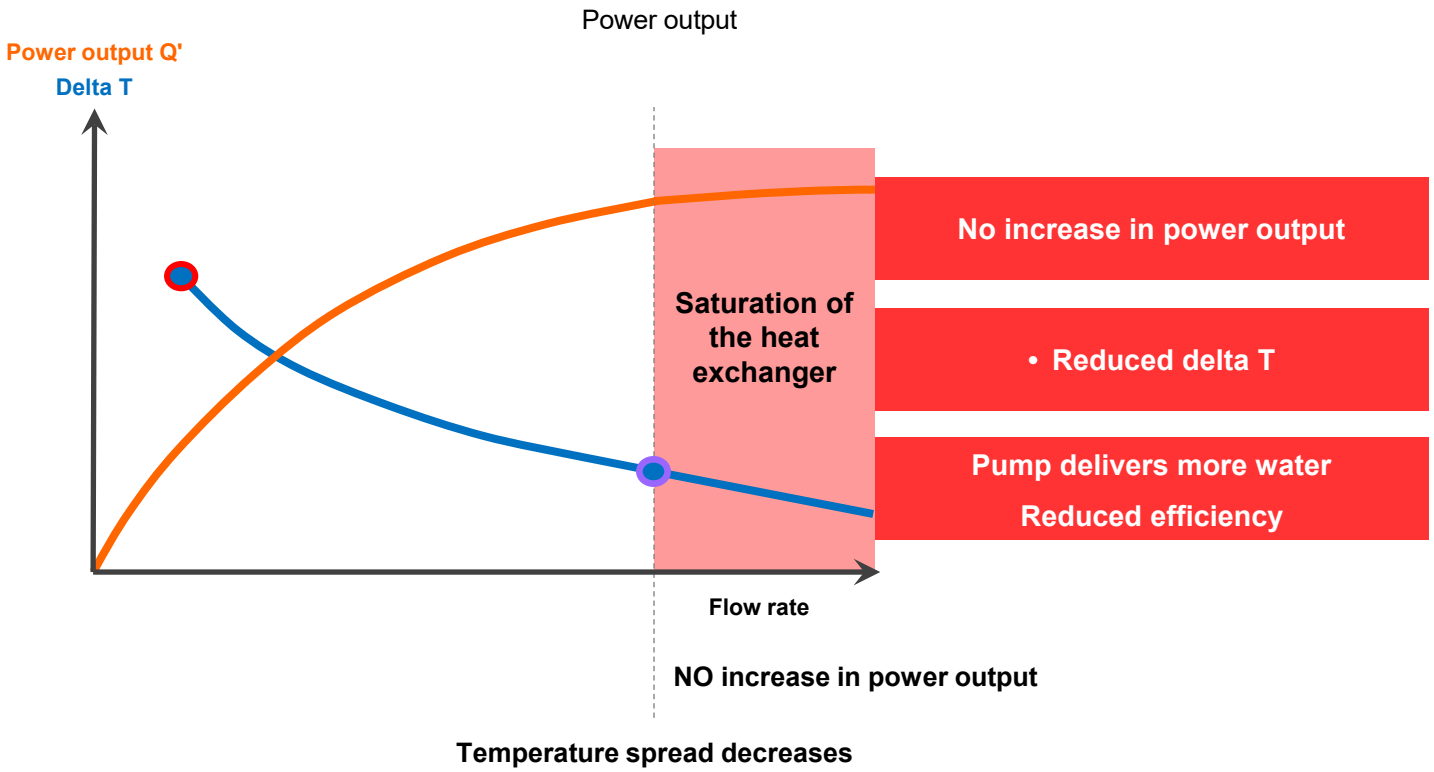
Belimo Energy Valve™

Optimisation/maintenance

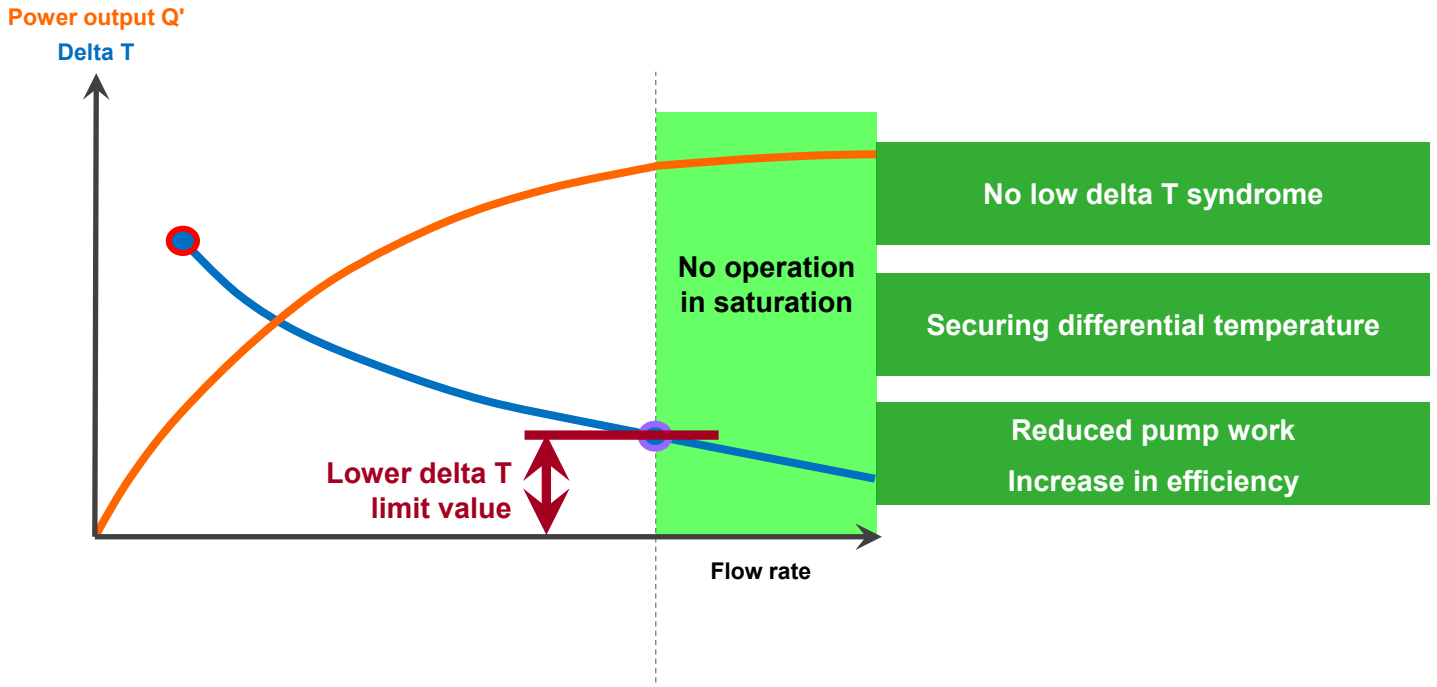
Evaluation/monitoring

Low delta T syndrome – The problem

- Excessive volumetric flow reduces the temperature spread and leads to inefficiency!



Avoidance of "Low delta-T syndrome"

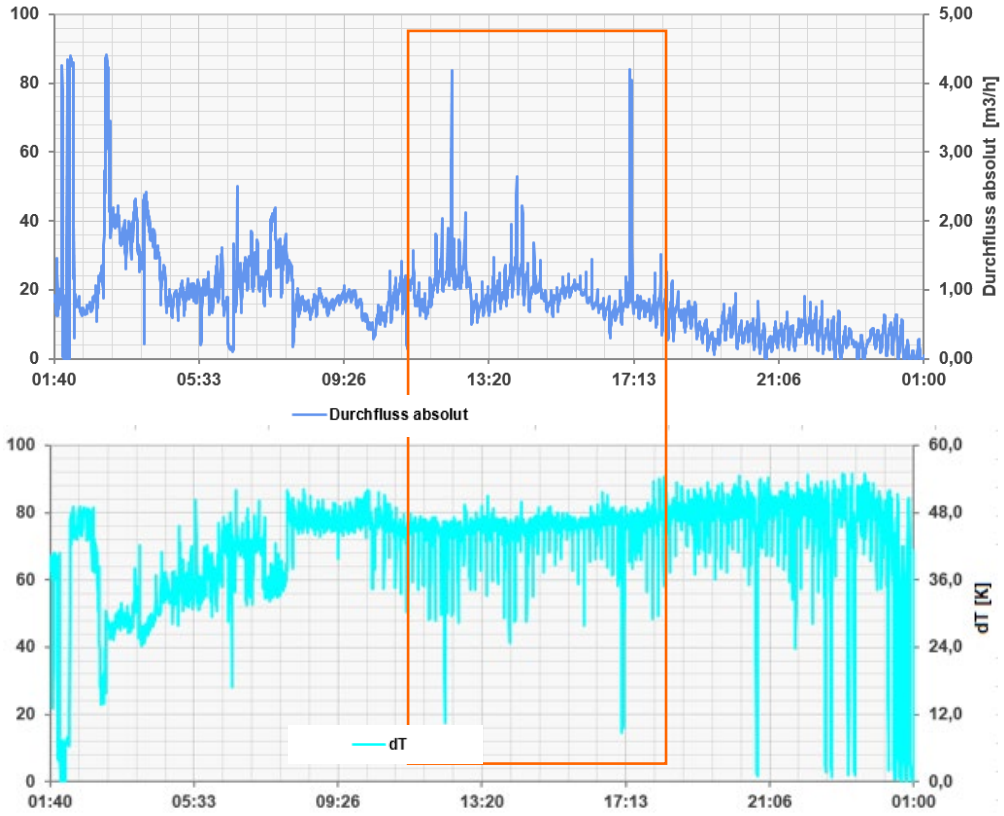


Low delta T syndrome – The solution!

- The delta T manager on the Energy Valve ensures that the planned temperature spread is maintained for every load case

Monitoring

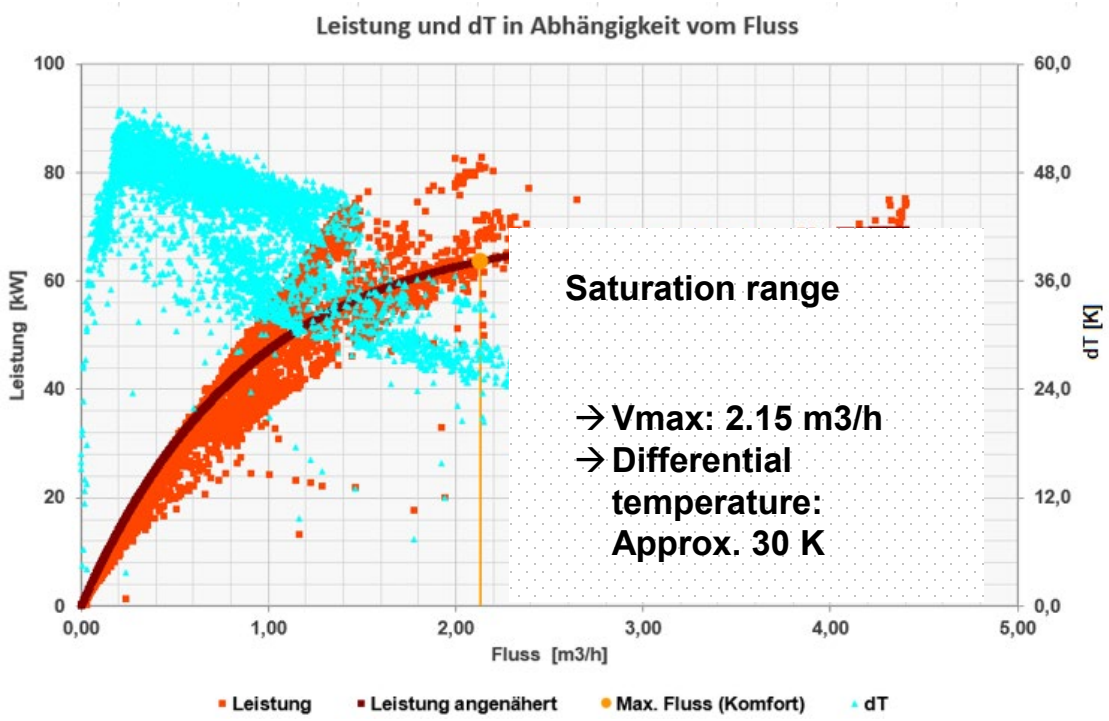
"What cannot be measured cannot be controlled!"
(Peter Drucker)



- Energy valve DN32 heating coil ventilation
- Data range: 2016-11-01 - 2017-04-01
- Setting: Vmax: 4.4 m3/h
- Flow Control

Delta T management

- Integrated energy monitoring on the Energy Valve



- Energy valve DN32 heating coil ventilation
- Data range: 2016-11-01 - 2017-04-01
- Setting: Vmax: 4,4 m3/h
- Flow control

Pressure-independent solutions from Belimo

Pressure-independent valves

- Mechanically pressure-independent
  DN 15...25
- Electronic pressure-independent
  DN 15...150

Pressure-independent flow limiter valve
PIFLV

The ideal application for pure open/close applications.
Pressure-independent limitation even without actuator

Pressure-independent quick compact valve
PIQCV

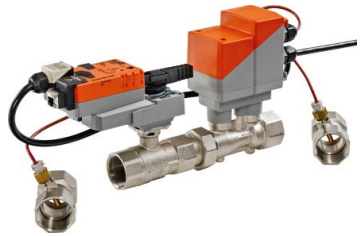
The ideal solution for an energy-saving, malfunction-free zone control

Pressure-independent 6-way zone valve
6-way EPIV

The perfect solution for 4-pipe systems

Pressure-Independent Characterised Control Valve
EPIV

Four functions in a single unit:
Measuring, controlling, dynamic balancing and air-bubble tight shut off



Belimo Energy Valve™

Full system transparency thanks to energy monitoring.
Unique functions such as power control and delta T manager

ZoneEase (VAV)

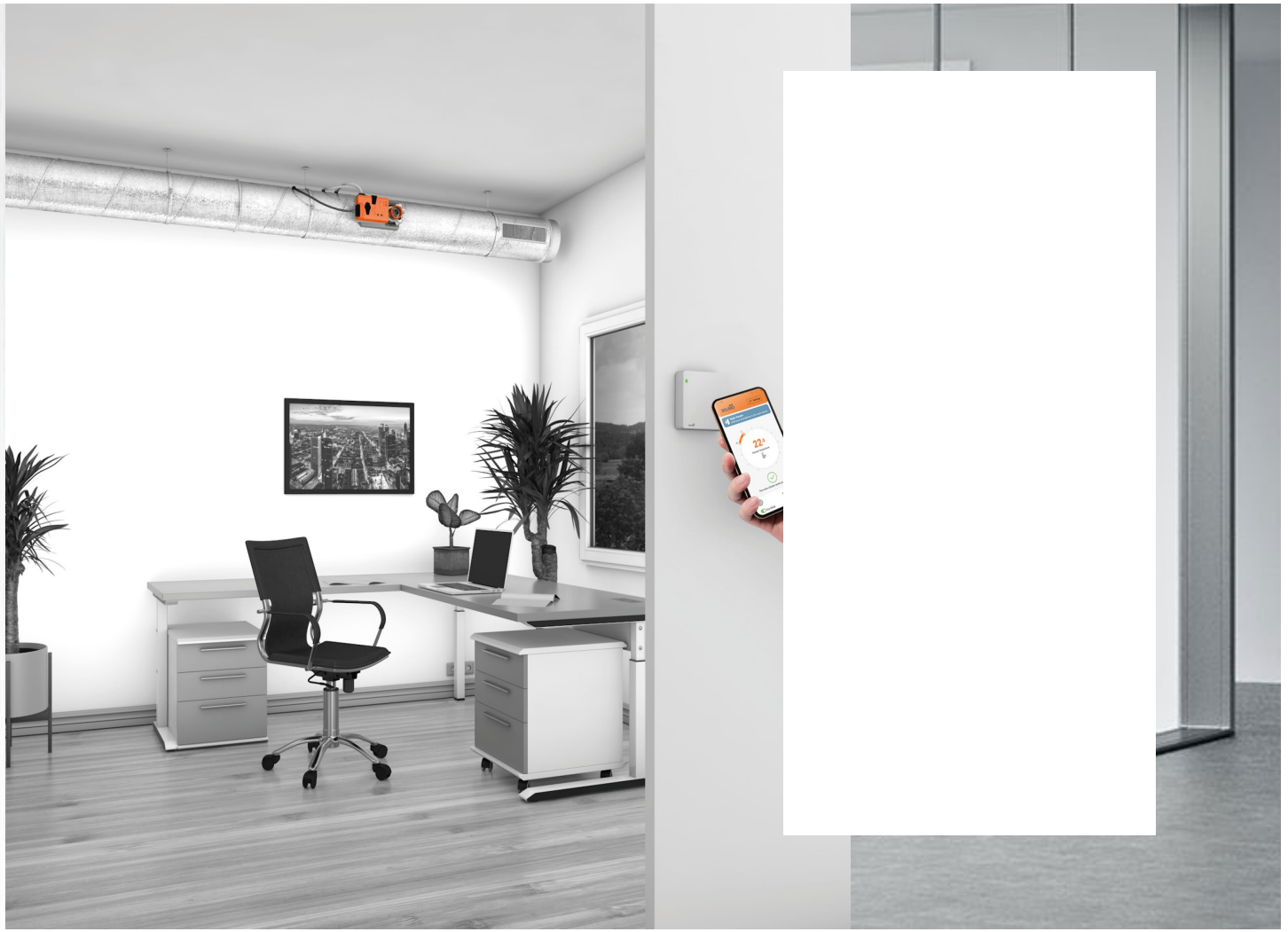
- Belimo ZoneEase™ VAV – the facts
- Application overview
- Typical applications
- Ecosystem overview / Technical data
- Workflow description / Cloud interface and Excel
- Q&A

Belimo Cloud

Near Field Communication

BACnet

Modbus



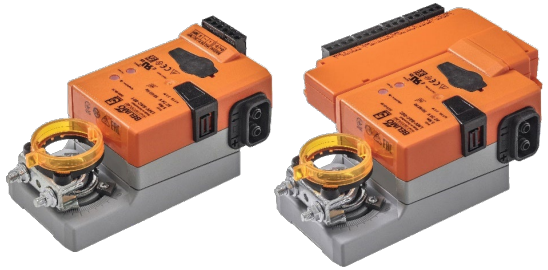
The simplest zone solution – ZoneEase

- full integration of: VAV (master), room operatin unit, zone valve (QVC), etc.

ZoneEase™ – the Ecosystem

- Actuators and sensors for self-sufficient single room control

ZoneEase VAV controller 5/10 Nm



Room operating units and display app

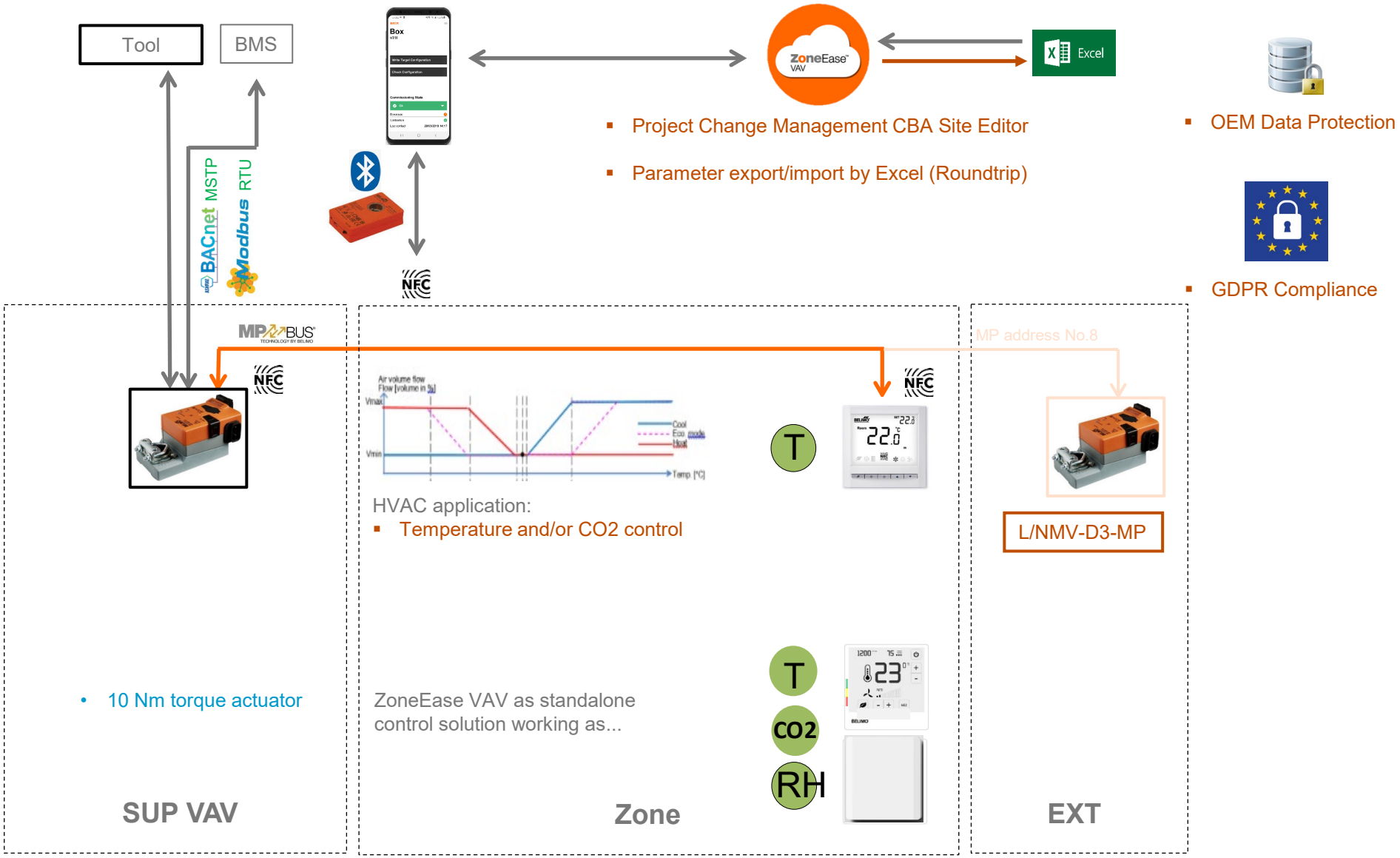
Duct sensors (temp. / CO_2)

Additional VAV controller 5/10 Nm

Zone valve actuator (2P or modulating)

ZoneEase™ – the Ecosystem

- Principle structure



- Project Change Management CBA Site Editor
- Parameter export/import by Excel (Roundtrip)

- OEM Data Protection

- GDPR Compliance

ZoneEase™ – the Ecosystem

- Actuators and sensors in detail

- LMV/NMV-BAC-001
  - 5/10 Nm VAV control actuator
  - BACnet MS/TP or Modbus RTU
  - Integrated dp sensor
  - Pluggable terminals
  - NFC unpowered/electrically powered
  - AI for external sensor (temp. or CO2)

- LMV/NMV-BAC-002
  - + 3 digital outputs for reheater / fan control

- LMV/NMV-D3-MP-A7
  - VAV-Compact for extract air or 2nd supply air controller
  - 5/10 Nm
  - Application-specific MP-Bus communication

- CQ24A-MPL-A8
  - Valve actuator for reheaters
  - Application-specific MP-Bus communication

- 22DC11 – CO2 duct sensor
  - 0..2000 ppm measuring range
  - 0-10 V output signal
  - +/- 50 ppm + 3% MV

- 22DT-12H – Temperature duct sensor
  - Pt1000 1/3 DIN
  - 0-10 V output signal
  - 8 selectable measuring ranges

ZoneEase™ – the Ecosystem

Room operating units in detail

ZoneEase VAV room operating units with ePaper touch display

- Variants:
  - P-22RT-1T00D-1 – Room temperature
  - P-22RTH-1T00D-1 – Room temperature + relative humidity
  - P-22RTM-1T00D-1 – Room CO_2 + temperature + relative humidity

- Key features:
  - High-resolution, low-power ePaper touch display
  - Configurable display elements
  - Configurable access rights
  - Display colour invertible
  - DI for occupancy switches or reheater monitoring

ZoneEase VAV room operating units with virtual display

- Variants:
  - P-22RT-1T-1 – Room temperature
  - P-22RTH-1T-1 – Room temperature + relative humidity
  - P-22RTM-1T-1 – Room CO_2 + temperature + relative humidity

- Key features:
  - No physical display – tamper-proof
  - Virtual display with Belimo Display App
  - Configurable access rights
  - DI for occupancy switches or reheater monitoring

ZoneEase™ Application overview

- Preloaded configurable applications

Air quality (CO_2) and volumetric flow control

[08] Indoor air quality control (CO_2)

[09] Volumetric flow control (VAV)

Room comfort

[02] Cooling only

[03] Cooling/heating (changeover)

[04] Cooling + 1-stage electric reheater

[05] Cooling + 2-stage electric reheater

[06] Cooling + on/off hot water reheater

[07] Cooling + modulating hot water reheater

Room comfort with parallel fan

[10] Cooling only

[11] Cooling + 1-stage electric reheater

[12] Cooling + 2-stage electric reheater

[13] Cooling + on/off hot water reheater

[14] Cooling + modulating hot water reheater

Room comfort with in-line fan

[15] Cooling only

[16] Cooling/heating (changeover)

[17] Cooling + 1-stage electric reheater

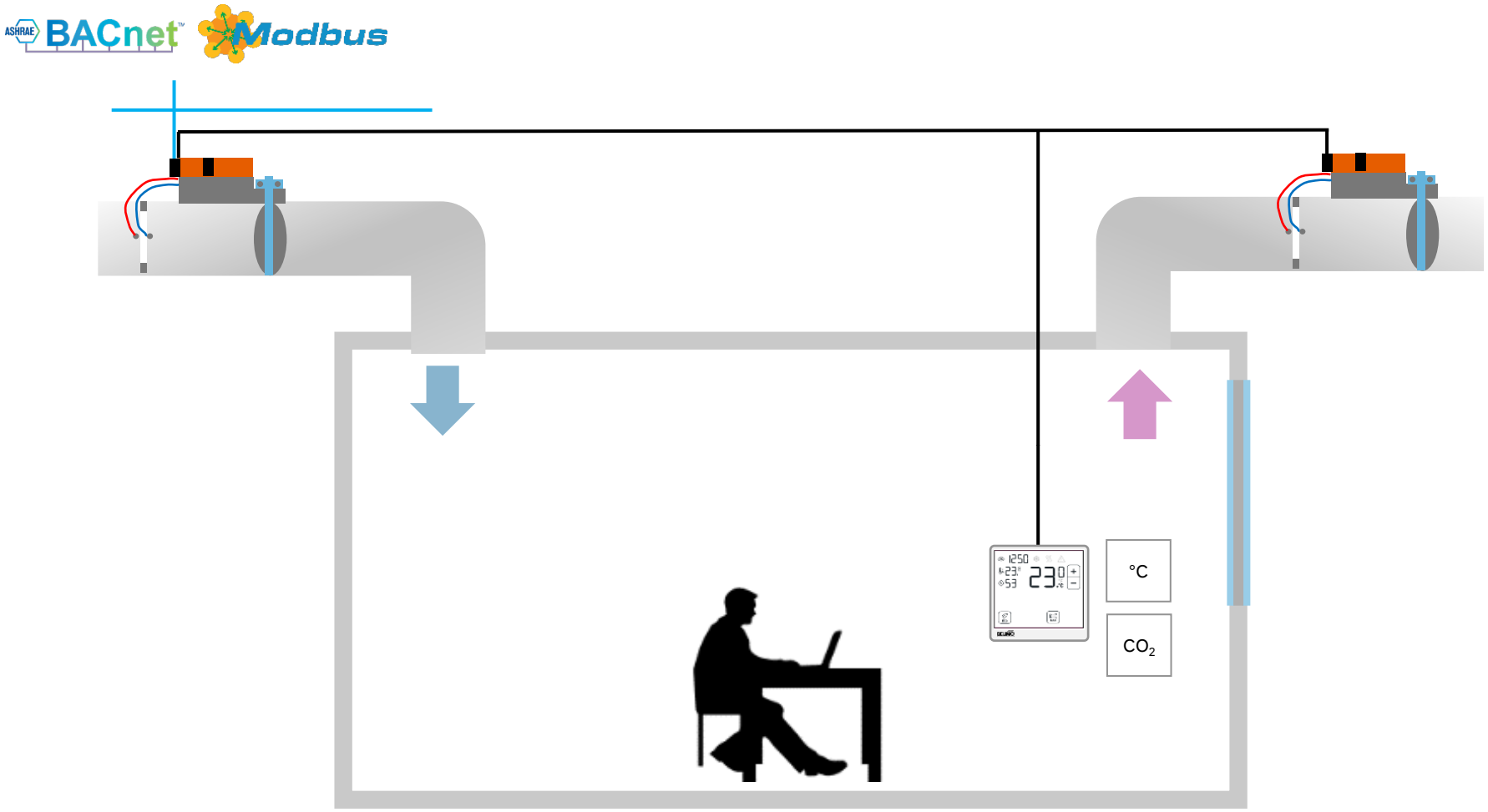
[18] Cooling + 2-stage electric reheater

[19] Cooling + on/off hot water reheater

[20] Cooling + modulating hot water reheater

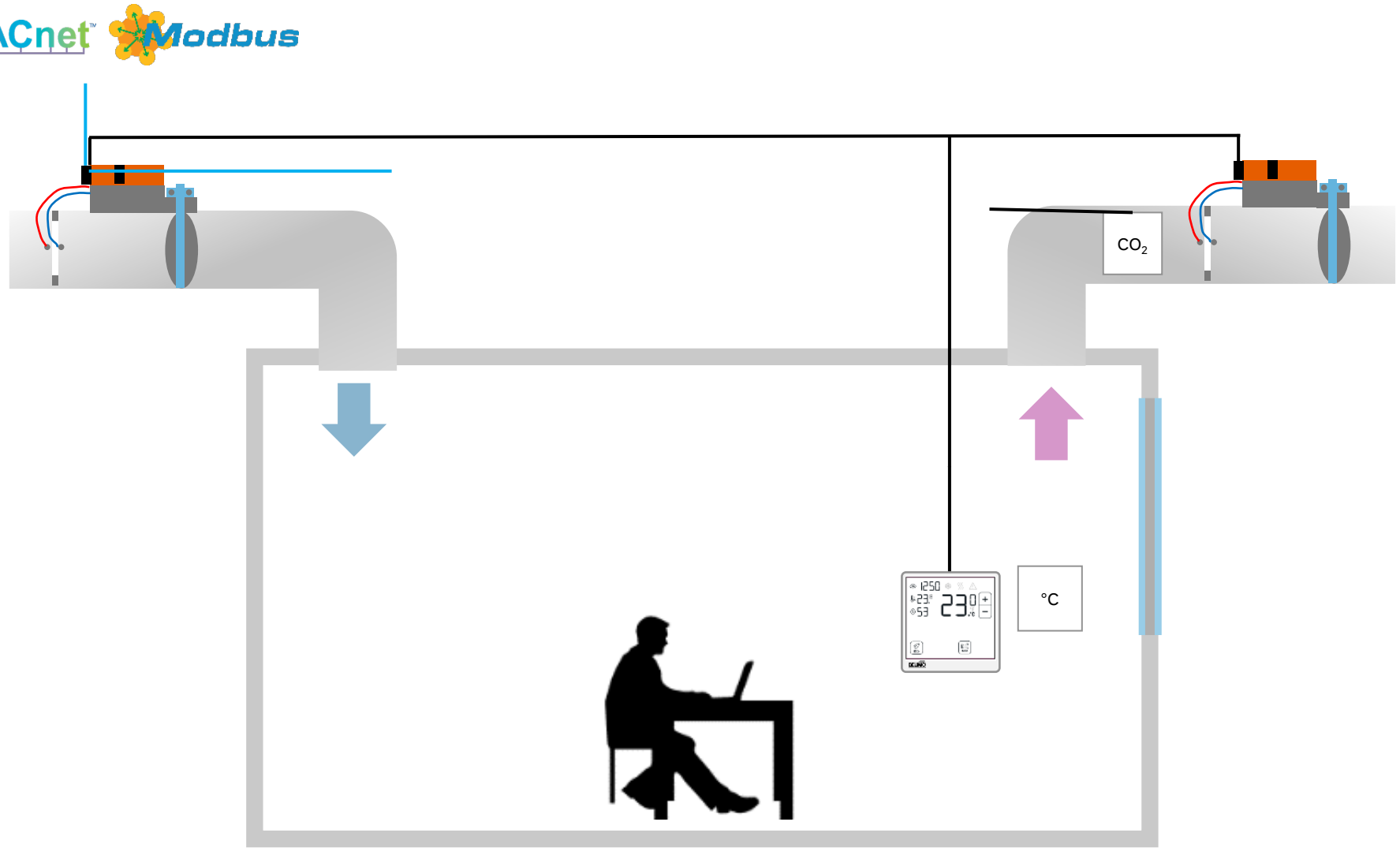
ZoneEase™ Application overview (ID08)

- Air quality control/CO2 measurement with room operating unit



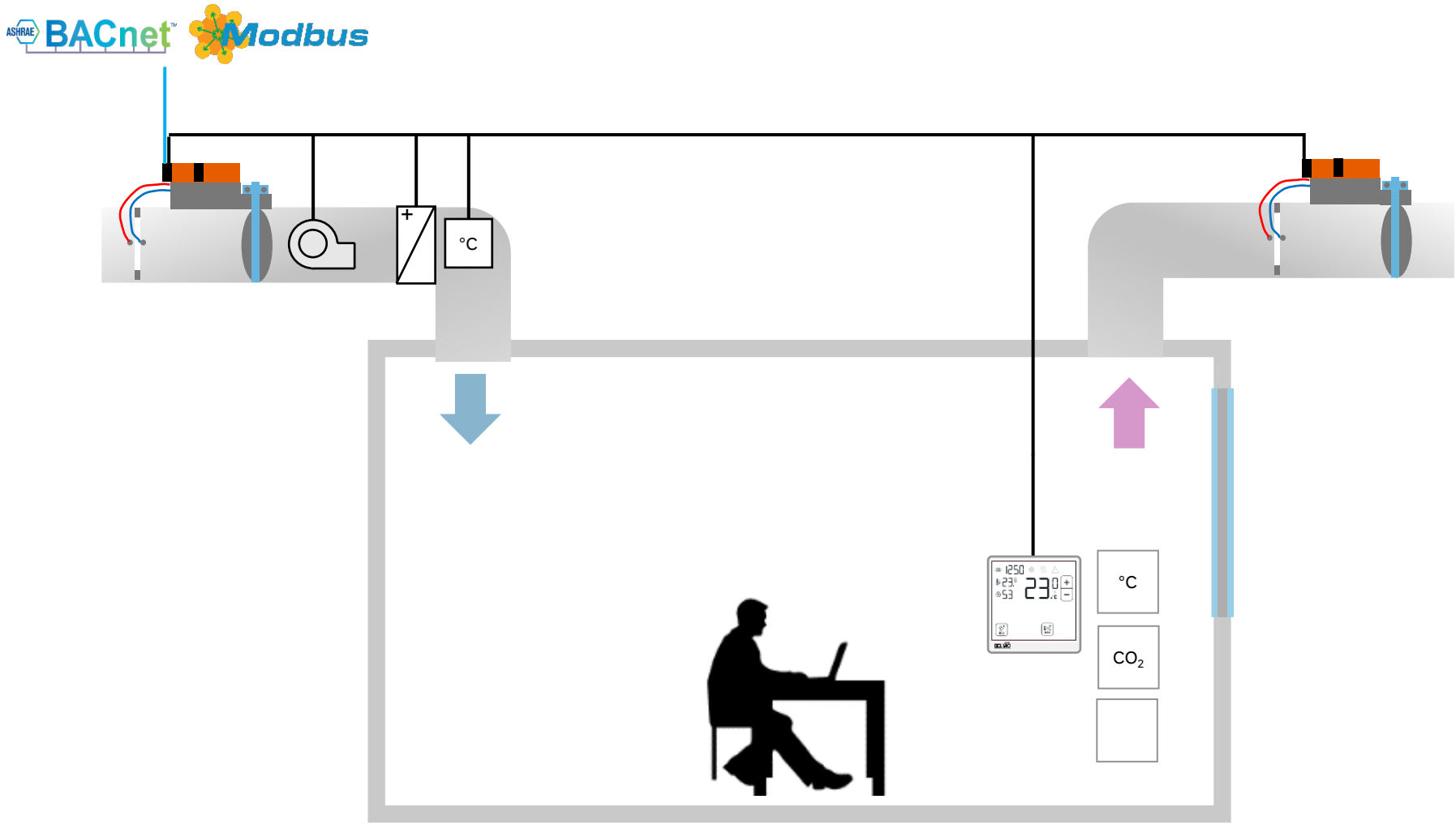
ZoneEase™ Application overview (ID08)

- Air quality control/CO2 measurement with duct sensor



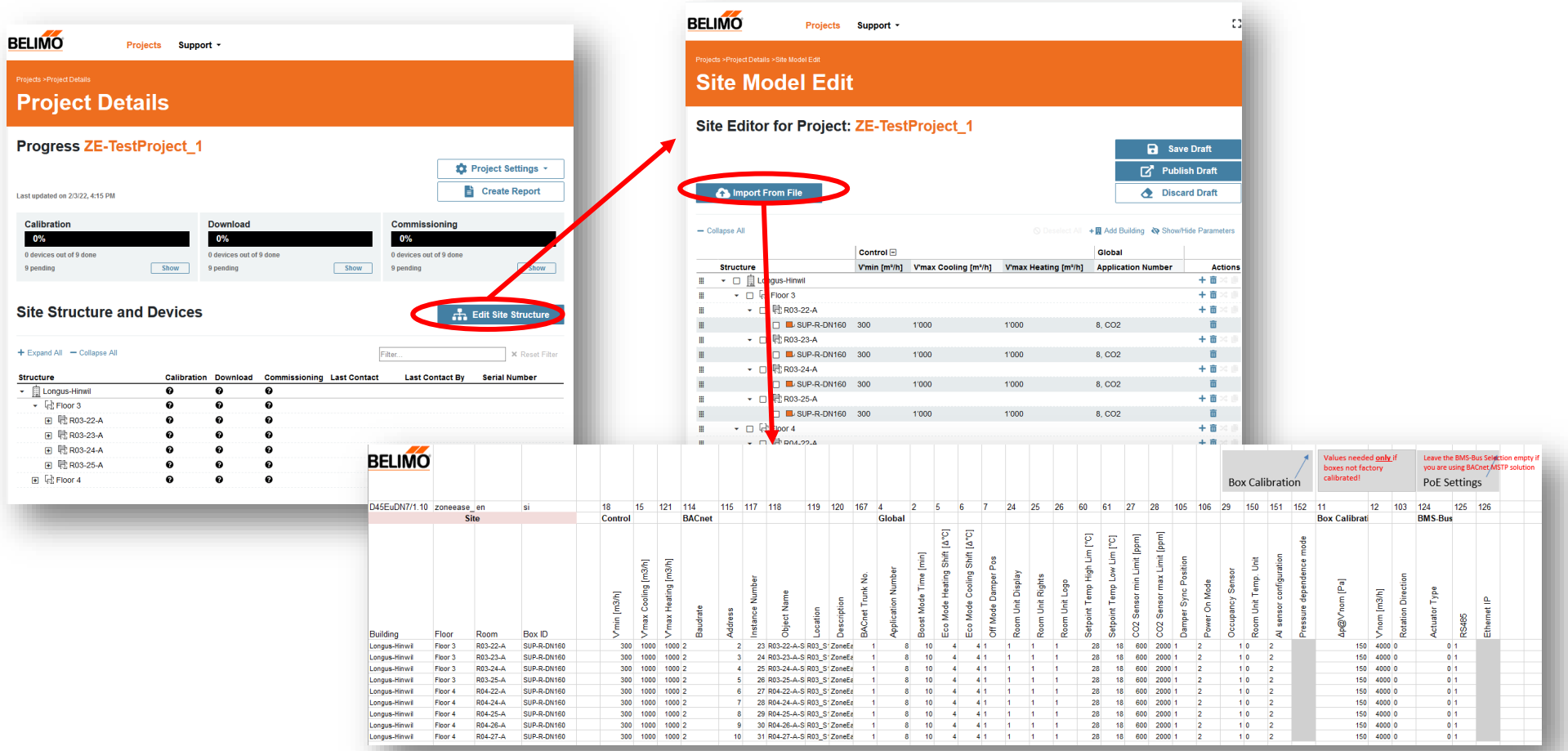
ZoneEase™ Application overview (ID18)

- Cooling/heating and modulating water reheater



ZoneEase™ IoT features

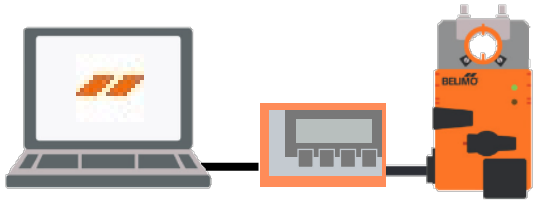
- Cloud front end
- Project and documentation management



ZoneEase™ IoT features

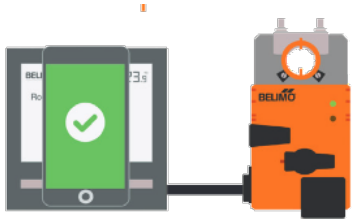
- Cloud-based project planning and commissioning
- Seamless import and export of project data

1 directly in the Cloud or through XLS template



2 **Project export**
Upload into the Belimo ZoneEase™ app

3 VAV unit manufacturing and calibration at the OEM factory



4 **Commissioning**
Download into the ZoneEase controllers via NFC through room units or directly

5 **Progress tracking**
Commissioning progress is synchronised with the Cloud interface

6 **Confirmation**
Successful finalisation is confirmed with handover report


BELIMO®