SIMATIC
Energy Management

Integrated and transparent

SIEMENS

Agenda

Energy Management Overview

SIMATIC Energy Management Portfolio

Integrated Energy Measurement

SIMATIC Energy Suite

SIMATIC S7 Energy Efficiency Monitor

SIMATIC Energy Manager

Energy Manager Edge / MindSphere App

Further information

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Energy Management Overview

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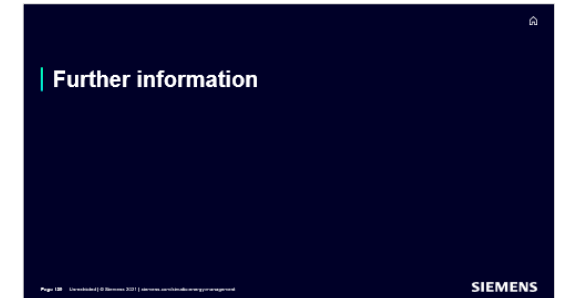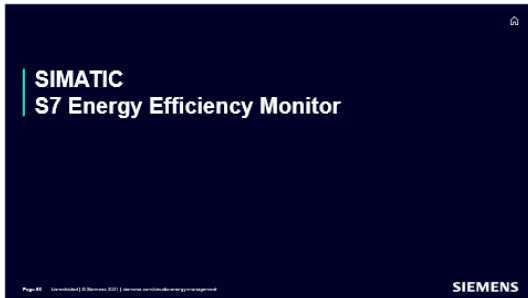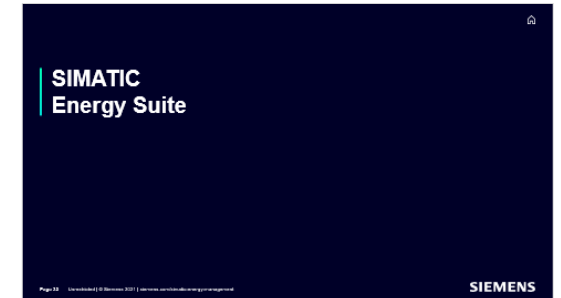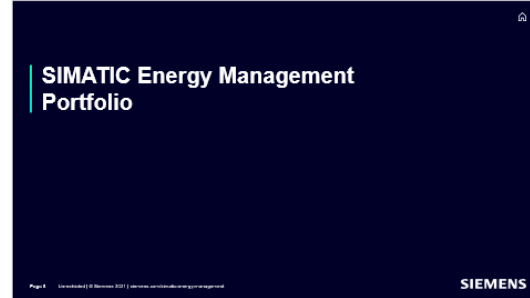
Motivation for energy management

Energy costs

Energy costs 2000-2021[1], Germany, industry

~6%

Average annual increase in electricity price (Ø '00 – '21)

Significant cost factor in production

Laws and climate protection

UN climate summit 2021[5], Glasgow, Scotland

1,5°C

Limiting the temperature rise worldwide

Statutory measures to achieve environmental targets

Change of energy supply

Share of renewable energies: 2020[3] in power consumption in Germany

>45%

From 6.3% in the year 2000. Should rise to 80% by 2050

New boundary conditions as a consequence of changing energy resources and continued requirements for supply reliability

Responsibility for environment and image

CO_2-neutral business operations by 2030[2] at SIEMENS

54%

Reduction of global CO_2 emissions since start of the energy efficiency program

Energy-efficient production as a key marketing argument
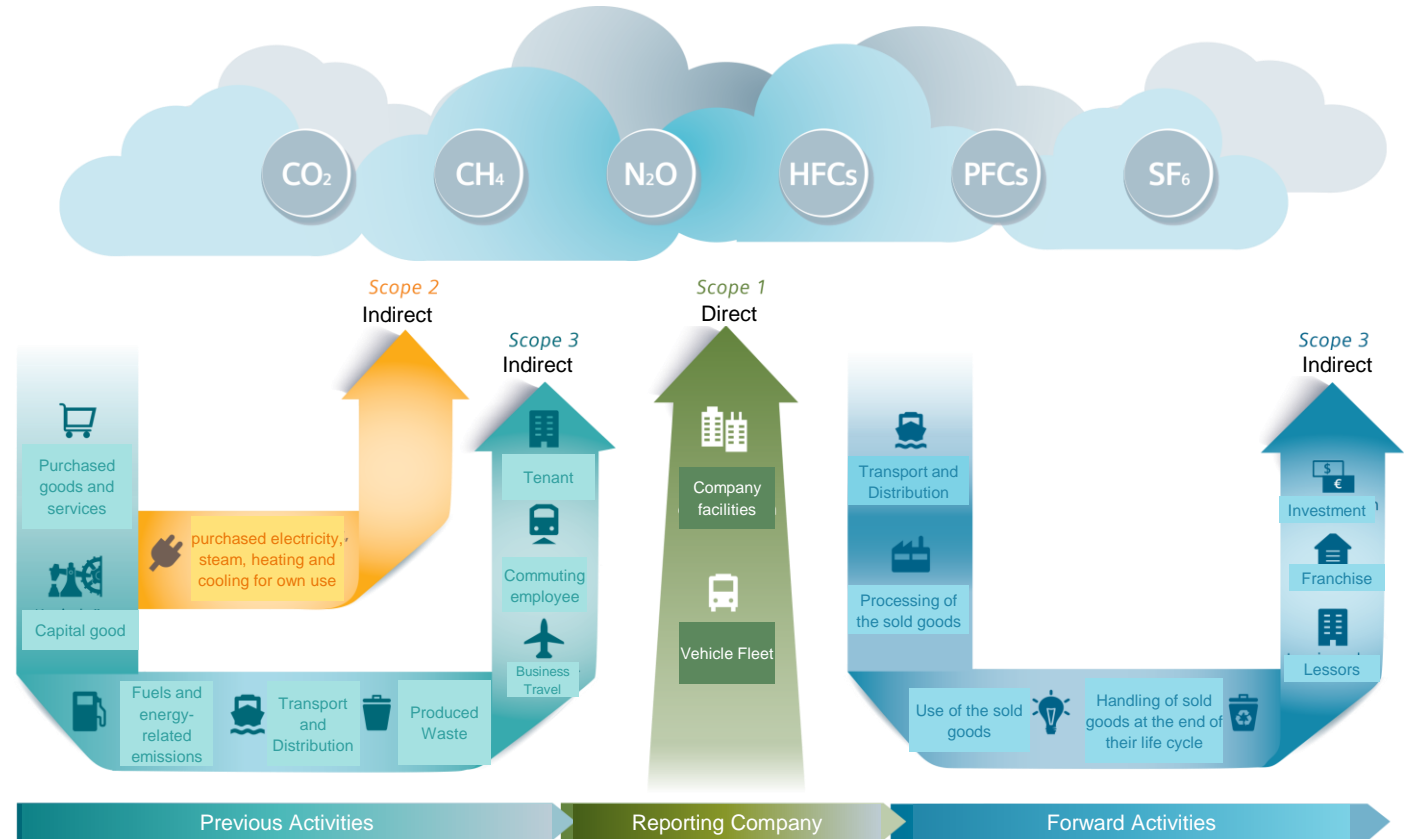

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What drives our customers?
The CO2 footprint is becoming increasingly important

The carbon footprint as a key figure to indicate the development of the commitment to sustainability

Customers demand environmentally friendly products and include this in their purchasing decisions

Investors evaluate climate risks and expect compliance with environmental and climate protection standards


CO_2 CH_4 N_2O HFCs   PFCs SF_6

Scope 2
Indirect

Scope 3
Indirect

Scope 1
Direct

Scope 3
Indirect

Purchased goods and services

purchased electricity, steam, heating and cooling for own use

Capital good

Fuels and energy-related emissions

Transport and Distribution

Produced Waste

Tenant

Commuting employee

Business Travel

Company facilities

Vehicle Fleet

Transport and Distribution

Processing of the sold goods

Use of the sold goods

Handling of sold goods at the end of their life cycle

Investment

Franchise

Lessors

Previous Activities   Reporting Company   Forward Activities

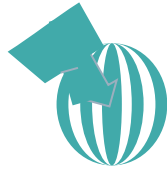**Active, transparent handling of the CO2 issue is essential!**

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Energy management -
Objectives and challenges

Typical drivers and objectives

Fluctuating energy costs, regulatory requirements and sustainability objectives
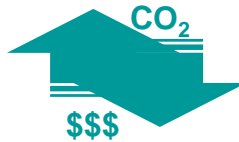
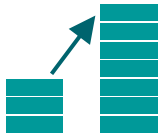Fulfill and exceed production and efficiency objectives

Continuous detection of saving potentials

Challenges during realization

Scalable standard solution, which grows together with requirements

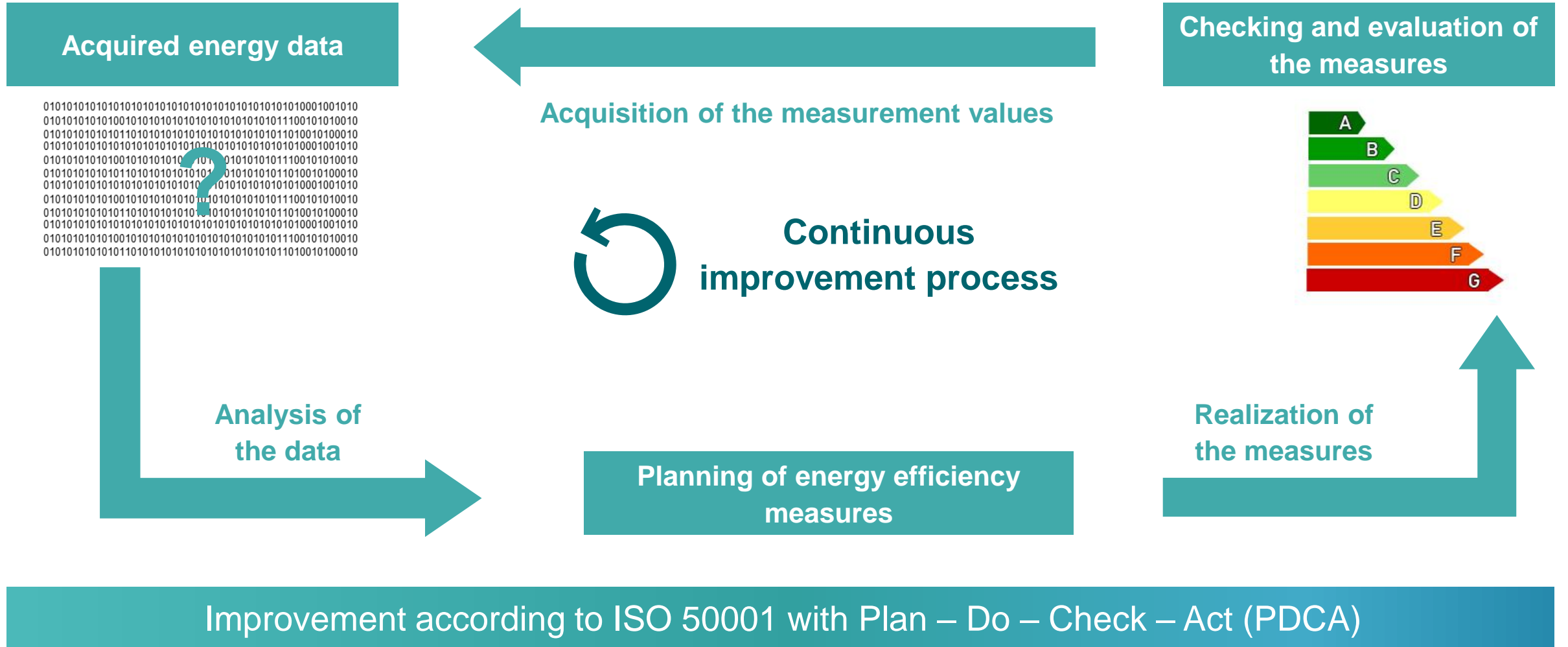Dealing with the lack of resources (financial & personnel-wise)

To make reasonable investment decisions it is necessary to quantify saving potential

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Energy efficiency measures based on energetic transparency

Acquired energy data

Checking and evaluation of the measures

Acquisition of the measurement values

Continuous improvement process

Analysis of the data

Realization of the measures

Planning of energy efficiency measures

Improvement according to ISO 50001 with Plan – Do – Check – Act (PDCA)

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SIMATIC Energy Management Portfolio

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Introduction Video - Integrated Energy Management

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SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

SIMATIC Energy Manager

ISO 50001 certified

Energiedaten-management-system
Regelmäßige Überwachung

TÜVRheinland
ZERTIFIZIERT

www.tuv.com
ID 0000049036

Management level

Processing and monitoring with WinCC

Edge

Production level

Acquisition

Field level, e.g. drive motor

SIMATIC Energy Manager
Plant and company-wide energy analysis

S7 EE-Monitor
Standardized efficiency evaluation of machines

SIMATIC Energy Suite
Energy data acquisition and Load management – simple and integrated

Integrated energy measurement
Directly in the field: For example with SIMATIC Energy Meter (ET 200SP)

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Energy Management goes production

MES
SCADA
Energy Management

Execution

Energy management on factory and enterprise level

1-15 min

- Long term evaluation and energy controlling
- Plant / product / batch related EnPI
- Energy monitoring and reporting
- ISO 50001 conformity

Energy management on machine and plant level

Ready for Energy Management

1 sec

- Short term evaluation allows immediate reaction
- Monitoring, machine related EnPI
- Role-oriented information
- Integrated, cost effective metering

Integrated energy metering

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Integrated
Energy Measurement

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SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

ISO 50001 certified

Management level

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Production level

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Field level, e.g. drive motor

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Integrated energy measurement
Directly in the field: For example
with SIMATIC Energy Meter (ET 200SP)

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Measuring all types of energy
Extensive portfolio simply integrated

	Meters				Metering incorporated in device		
	Electrical energy			Non-electrical types of energy	Electrical energy		
Product			MID*				
Name	SIMATIC ET 200SP Energy Meter	SIMATIC S7-1200 SM 1238	Sentron 7Kx PAC-Series	SITRANS-Series flow, pressure, temp,… Water-amount WFx 40	Molded Case Circuit Breaker 3VA	SINAMICS-converters	SIMOCODE pro Motor Management

Comfortable Integration of energy data with SIMATIC Energy Suite

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Measuring of electrical energy
Application examples

Measuring in control cabinets and in production

Energy distribution

10 KV   400V

*)

SIMATIC HMI

SIMATIC ET 200SP CPU & Energy Meter
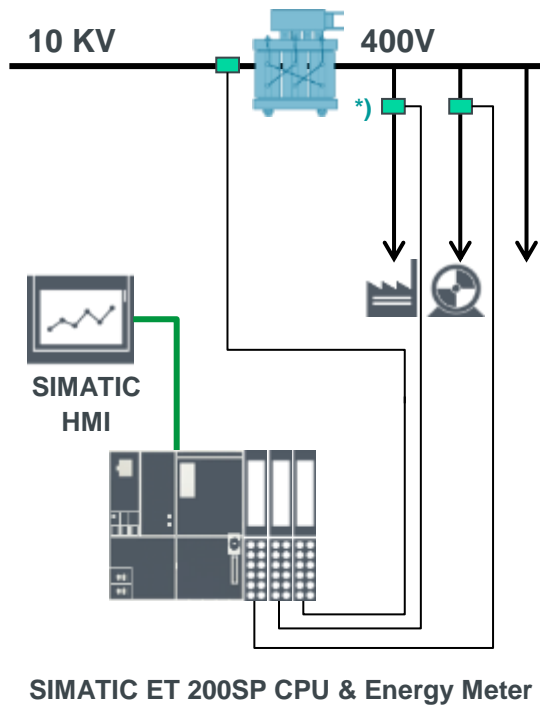
) current transformer

Advantages

Cost-saving thanks to the simplest integration in automation (TIA)

Values update to 50ms basis

Flexibility as support for voltage and current transformers

Simple configuration through diagnostics and limit monitoring in the meter

Cost-saving due to high ET 200SP channel density and use of only one HMI panel

Production machine

400V

Application

SIMATIC HMI

AI / DO / DI

SIMATIC S7-1500 + ET 200SP Periphery

SIMATIC ET 200SP Energy Meter

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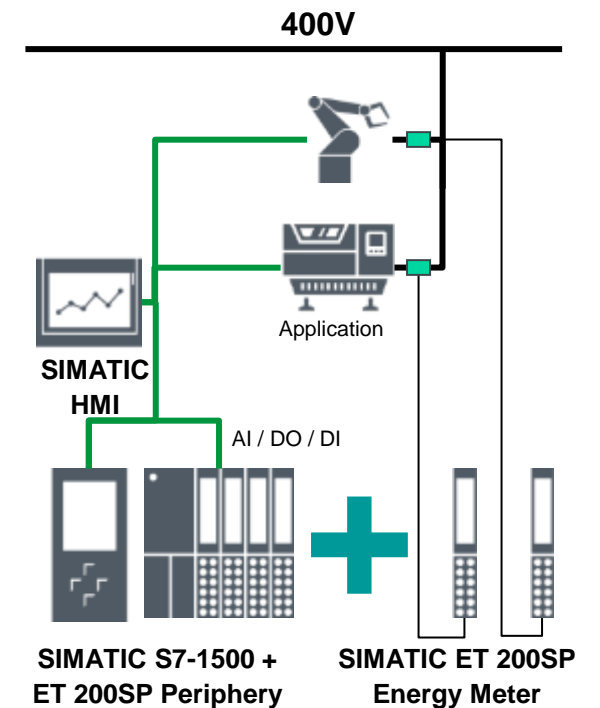
Electrical energy measurement
Two types of the energy measurement module with extended network analysis

⌂

AI Energy Meter 480VAC CT HF
(6ES7 134-6PA00-0CU0)

Option 1 – for CT use:
- **CT**: **C**urrent **T**ransformer
  (typical 1A or 5A CTs)

Features Current Transformers:
➕ Cost-efficient
➕ Minimized mounting time and effort when split-core CTs are used

AI Energy Meter 480VAC RC HF
(6ES7 134-6PA20-0CU0)

Option 2 – for current measuring via RC
- **RC**: **R**ogowski **C**oil

Features Rogowski-Coil:
➕ Easy and cost-effective mounting
➕ Typical use in **brownfield** plants
➕ Compares to SENTRON PAC4200

Special features of both alternatives	Measuring down to ~0VAC (phase-to-earth) and for TT, TN, **IT**-grids, due to 24VDC-supply
	Grid analysis functionalities: Harmonics 1. ... 40. (current, voltage), analysis (overvoltage and –current, voltage drop), residual current (I1, I2, I3, IN), distortion factor

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Electrical energy measurement
What are the advantages of the Integrated energy measurement?
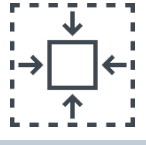
Correlation of Energy and further data possible (machine status / quantity) +
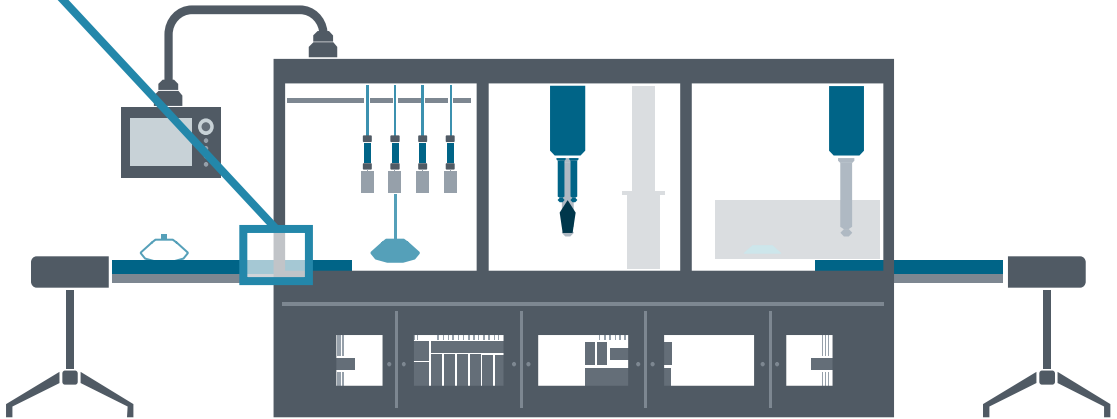
Space-saving +

No additional IP-addresses necessary +

Just one engineering tool: TIA Portal +

Modular expandable: 1 to n measuring points +

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Electrical energy measurement
Price /performance overview of metering devices

Price

Advanced

Design / Infrastructure

Power quality

Expert

Entry

Industry

Performance
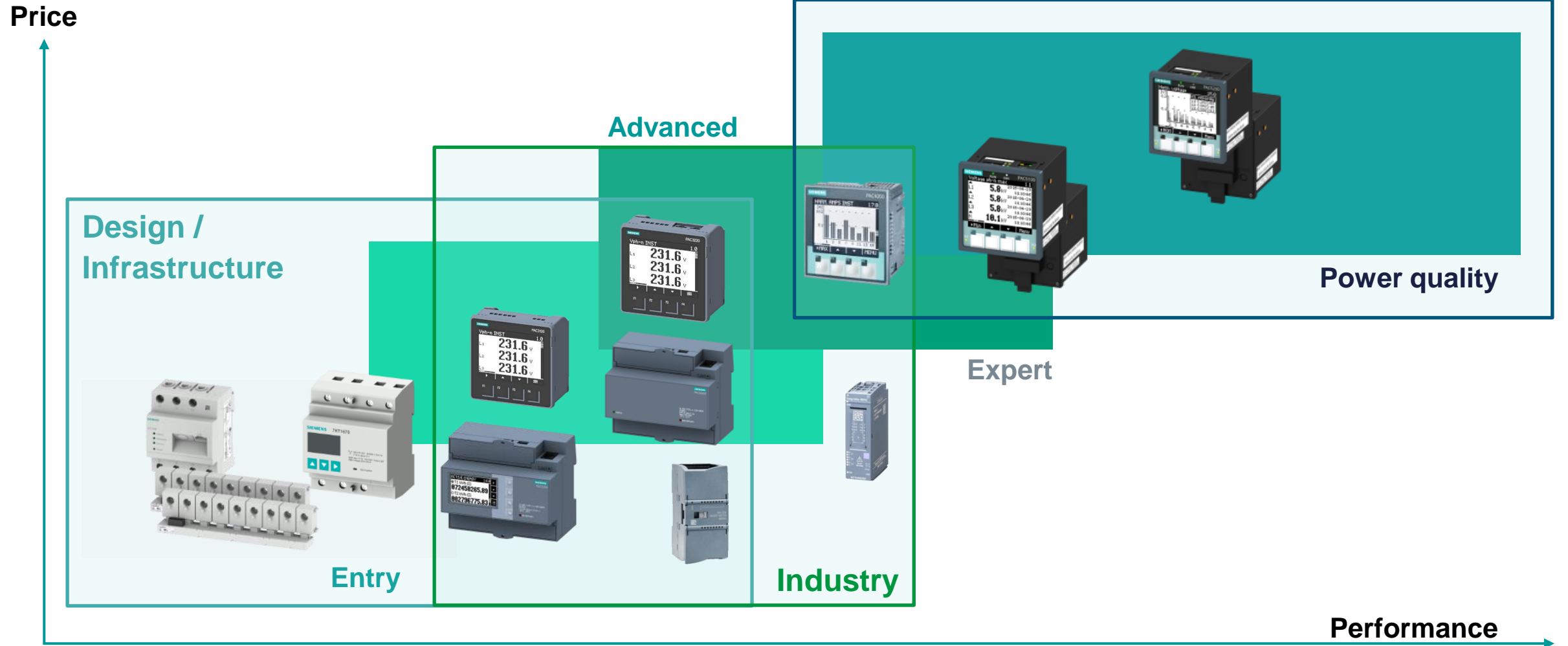
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Electrical energy measurement
The right energy metering devices according to functional needs

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Ingenuity for life

SENTRON portfolio for power monitoring

	Multichannel current measuring system 7KT PAC1200	Measuring device 7KT PAC1600	Multichannel current measuring system SEM3	Measuring device 7KM PAC2200	Measuring device 7KM PAC3120	Measuring device 7KM PAC3200T	Measuring device 7KM PAC3220	Measuring device 7KM PAC4200	Measuring device 7KM PAC5100/ 7KM PAC5200	Multifunctional recorder SICAM Q100/Q200	Modular measuring device AI Energy Meter
	The flexible solution for multichannel measuring in final circuits	The entry-level solution when it comes to energy measurement	The efficient solution for multichannel current measuring in the main distribution	The energy meter solution for DIN rail	The cost-effective solution for digital measurement	The compact solution for precise energy measurement	The specialist solution for precise energy measurement	The professional solution for communication and monitoring	The specialist solution for measured value recording and power supply quality	The class A solution for power supply quality	The integrated energy measurement in automation
U, I, P, f, λ	U ¹⁾, I, P, S, Q ¹⁾, f ¹⁾, λ ¹⁾	x	x	x	x	x	x	x	x	x	x
Apparent | active | reactive energy | cosφ	x | x | x | −	x | x | x | −	x | x | x | x	x | x | x | −	x | x | x | x	x | x | x | −	x | x | x | x	x | x | x | x	x | x | x | x	x | x | x | x	x | x | x | x
Maximum input voltage L-L/L-N	400 V / 230 V	456 V / 264 V	480 V / 277 V	480 V / 277 V	690 V / 276 V	480 V / 277 V	690 V / 400 V	690 V / 400 V	690 V / 400 V galvanically separated	690 V / 400 V galvanically separated	480 V / 277 V
Current transformer connection | direct measuring	x | x (up to 63 A)	x | x (up to 63 A − 1-phase, up to 80 A − 3-phase)	x | −	x | x (up to 65 A)	x | −	x | −	x | −	x | −	x | −	x | −	x | −
DI/DO	−	1/2	2/1	1/1	2/2	1/1	2/2 (10/6 with expansion module)	2/2 (10/6 with expansion module)	0/2	Q100: 2/2 Q200: 6/6	via ET200 / via S7-1200
Integrated communication	Modbus TCP	Modbus RTU, M-Bus, S0	BACnet IP, MSTP, SNMP, NTP, SMT, Modbus TCP, Modbus RTU	Modbus TCP, Modbus RTU, M-Bus	Modbus RTU	Modbus TCP	Modbus TCP	Modbus TCP	Modbus TCP	Modbus TCP, IEC61850	PROFINET PROFIBUS
Communication via expansion module	−	−	−	−	−	−	Modbus RTU PROFINET PROFIBUS	Modbus RTU PROFINET PROFIBUS	−	Q100: 1 x Modbus TCP + IEC61850 Q200: 2 x Modbus TCP + IEC61850	Modbus TCP via CPU
I(N), I(Diff)	−	−	−	−	−	−	with expansion module	with expansion module	−	x	−
Analog input	−	−	−	−	−	−	with expansion module	with expansion module	−	−	via ET200 / via S7-1200
Load profile record	x	−	x	−	−	−	−	x	x	x	in S7 CPU
Software interfaces	Webinterface, App (iOS & Android), powerconfig, powermanager	powerconfig, powermanager	Webinterface, powermanager	Webinterface, powerconfig, powermanager	powerconfig, powermanager	Webinterface, powerconfig, powermanager	Webinterface, SIMATIC Energy Suite, SIMATIC Energy Manager PRO, powerconfig, powermanager	Webinterface, SIMATIC Energy Suite, SIMATIC Energy Manager PRO, powerconfig, powermanager	Webinterface, powerconfig, powermanager	Webinterface / SICAM PQS / PQA, powermanager (online values)	SIMATIC / SIMATIC Energy Suite
THD | Flicker, fault recorder, EN50160 reporting	− | −	− | −	− | −	− | −	x | −	x | −	x | −	x | −	x | x ³⁾	x | x Transient recording up to 1 µs (Q200)	x | x
Harmonics	−	1. … 15. ²⁾	−	−	−	−	−	1. … 64.	2. … 40.	Q100: 2−50 kHz Q200: 2−63 kHz, 2−9 kHz, 9−150 kHz Harmonic Direction	2. … 40.
Customizable display	Statistical overview in web server	−	−	−	−	−	x	x	x	x	with SIMATIC HMI Visualization
Accuracy class active energy | reactive energy	1 ¹⁾ | 1 ¹⁾ 2 | −	1 | 2	0.2 | 1	1 | 1	0,5 | 2	0.5 | 1	0.5 S | 2	0.2 S | 2	0.5 S | 2	0.2 S | 2	0.5 | 1
Standard measuring devices	IEC 61557-12	IEC 50470-3, IEC 62053-21, IEC 62053-22	IEC 62052-11, IEC 62053-22, IEC 62053-23, IEC 61557-12	IEC 62053-22, IEC 62053-23, IEC 61557-12	IEC 62053-22, IEC 62053-23, IEC 61557-12, UL 61010-1	IEC 62053-22, IEC 62053-23, IEC 61557-12	IEC 62053-22, IEC 62053-23, IEC 61557-12, UL 61010-1	IEC 62053-22, IEC 62053-23, IEC 61557-12, UL 61010-1	IEC 62053-22, IEC 62053-23, IEC 61557-12, IEC 61000-4-30 ³⁾ UL 61010-1 ⁴⁾	IEC 62586-1, IEC 61000-4-30, IEC 61000-4-7, IEC 61000-4-15	IEC 61557-12
MID certified	−	x	−	x	−	−	−	−	−	−	−
Order information	siemens.com/ product?7KT12	siemens.com/ product?7KT16	siemens.com/ product?US2:SEM3	siemens.com/ product?7KM22	siemens.com/ product?7KM31	siemens.com/ product?7KM32	siemens.com/ product?7KM32	siemens.com/ product?7KM42	siemens.com/ product?7KM5	siemens.com/ product?7KG9	siemens.com/ product?6ES7

¹⁾ Measured in data manager
²⁾ 7KT PAC1600 Multimeter
³⁾ 7KM PAC5200
⁴⁾ 7KM PAC5100

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Expansion of the measurement infrastructure - current transformers

Current transformers are a special form of transformers
These must be used where the expected current can't be measured directly (size, galvanic isolation).

Current transformer selection
... should be dimensioned according to the expected rated current in order to minimise the error

Accuracy
... for the system accuracy all errors of the components in the measuring system must be considered (transducer and measuring device)

Short circuiting current transformers
... the current transformer secondary circuit should not be opened under any circumstances when current is flowing in the primary circuit (destruction/danger of life).

	7KT120 ... *	3NJ69 ... – ... *	4NC5 ... – ...*
Rated current Primary side	60 A ..150 A	50 A .. 600 A	50 A .. 1500 A
Rated current Secondary side	5 A	1 A/5 A	1 A/5 A
Accuracy class	1	0,5/1	1/3
Nominal load	1,25 VA … 3,75 VA	1,0 VA … 5 VA	2,5VA … 10 VA

https://support.industry.siemens.com/cs/document/85477190/

*compatible with Energy Meter 480VAC and Sentron PAC

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Process instrumentation
for every customer need SITRANS product portfolio for other media at a glance

Flow Electromagnetic, Coriolis, Ultrasonic & Vortex

Temperature Rail, Field, Head, Sensor, Multipoint

Positioner

Level Capacitance, Radar and Guided wave radar, Ultrasonic

Pressure

Weighing

Software SITRANS Library, SIMATIC POM

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Measuring non-electrical media
Selection depends on - qualitative and quantitative consideration

qualitative
Criteria for effectively selecting the right measurement - Accuracy - Cost - Availability / Reliability - Integration - Monitoring - Operation / parameterization

quantitative
What number of measurements are necessary? - Survey of existing operational measurements - Percentage influence on energy management - Efficiency increase through additional digital channels - Stationary / Temporary

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Measuring non-electrical media
Which measuring principle for which application

Measuring principle	Flow & heat can be detected with which measurement		
■ Flow measurements *	Magnetic-inductive transducer	SITRANS FM	(flow)
■ Heat meters *	Vortex transducer	SITRANS FX	(pressure, temp & flow -> heat amount in one direction)
■ Temperature measurements *	Coriolis transducer	SITRANS FC	(Density, mass flow, temperature and fraction)
■ Pressure measurements	Ultrasonic transducer	SITRANS FS	(flow – higher temperature up to 200°C)
■ Level measurements	Ultrasonic clamp-on transducer	SITRANS FS	(flow – Very large nominal widths and retrofitting without intervention)
■ Weighing technology	Differential pressure transducer	SITRANS F P/O	(flow up to high pressure & temp)

* Mainly relevant for energy managem.

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SITRANS FS: clamp-on ultrasonic flow measurement SITRANS FS220

The **external sensors** of the SITRANS F S clamp-on
ultrasonic flowmeters can be **installed** quickly and easily **on the outside of the pipe**.
This makes them **perfect for retrofitting** or for applications where opening the pipe is not
possible due to corrosive or toxic liquids or high pressure.
The **cost-effective technology enables highly accurate measurements of liquids**
Suitable for liquids and gas measurements > 6 bar
- Cooling water, condensate water and glycol
- Chemicals (acids and alkalis)
- Crude oil and liquid gas

Installation without opening of pipes. No parts susceptible to dirt and wear. No pressure drop

Pipe diameter: DN 6 to DN 10000 with pipe wall thickness from 0.64 to 76.2 mm

Measurement accuracy: 1-2%

Communication possibilities:
Modbus RTU

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SITRANS FM - electromagnetic flow measurement

The SITRANS F M electromagnetic flowmeters are designed to measure the flow rates of **electrically conductive liquids** such as

- water,
- chemicals,
- food and beverages,
- sludges, sewage and paper sludges and mining sludges containing magnetic particles.

Properties:
- **Low-cost measurement** if installation effort is manageable (otherwise clamp-on)
- **Communication modules can** be **easily exchanged or extended**
- **Self-sufficient use** through long-life battery supply (up to 10 years)
- **Wireless transmission** possible (e.g. GPRS/GSM modem)

Pipe diameter: DN 6 to DN 2000 mm

Measurement accuracy: 0.2 and 0.4% respectively

Communication possibilities:
Pulse output, 4-20 mA HART, Profibus PA/DP, Modbus RTU, Foundation Fieldbus

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SITRANS FX - Vortex flow measurement
SITRANS FX330

Precise measurement of steam, gases, compressed air and conductive/non-conductive liquids

(no contamination/low viscosity/high flow velocity)

Properties:
- Completely redesigned to meet the **SIL 2/3 safety standard according to IEC 61508**
- Cost-effective energy calculation with **net heat quantity measurement by monitoring flow, pressure and temperature**
- **Integrated pressure and temperature compensation** for lower installation costs and higher accuracy
- Integrated nominal width reduction ensures high rangeability and thus more cost-effective installations and a lower risk of leakage

Pipe diameter: DN 15 to DN 300 mm
Measurement accuracy: 0.5%
Communication options:
4-20 mA HART, Profibus PA, Foundation Fieldbus

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SITRANS FC (Coriolis - product family)
Mass flow measurement

Suitable for **gases and liquids with air inclusions - even with low flow velocity**

Properties:
- Space-saving due to small size
- Integrated temperature compensation
- **High measurement accuracy** over a wide flow measuring range
- Measurement of non-conductive liquids

Pipe diameter: DI 1.5 to DN 150 mm
Measurement accuracy: 0.1% **mass flow measurement**
Communication options:
4-20 mA HART, Profibus DP/PA and Modbus RTU

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SITRANS P family
Pressure measurement without ifs and buts

Portfolio

SITRANS P is our portfolio for measuring **gauge pressure, differential pressure and absolute pressure**.
In addition to **high measurement accuracy and robustness**, the modular system is characterized by **outstanding user-friendliness** and functionality as well as a **perfect safety concept**.

Communication options:
4-20 mA HART, Profibus PA, Foundation Fieldbus

Innovations

SITRANS P320/420

- Faster control for more efficient processes
- New, larger and improved display acc. to Namur NE107 and quick start wizard
- Simple, advanced commissioning, patented Remote Safety Handling
- Communication protocol according to current HART 7 standard, including long tag support

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SITRANS T family (temperature)
TS500 - Because every degree is important

The SITRANS T series are the professionals for temperature measurement, even under extreme conditions.
Whether in hot, cold or hazardous areas

The communicative SITRANS T meets all the expectations, whatever the industry.

Whether you're looking for sensors, or transmitters for head, rail or field mounting – all are available as a complete measuring point or individually.

 Our cost-effective SITRANS T transmitters offer high precision in every application and are quick and easy to connect to thermocouples or resistance thermometers.

Communication options:
4-20 mA HART, Profibus PA, Foundation Fieldbus

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Connection of the measuring instruments

PROFINET

PROFIBUS

Modbus TCP

Modbus TCP

PROFINET

different gateways

BAC net

M-Bus

Modbus RTU
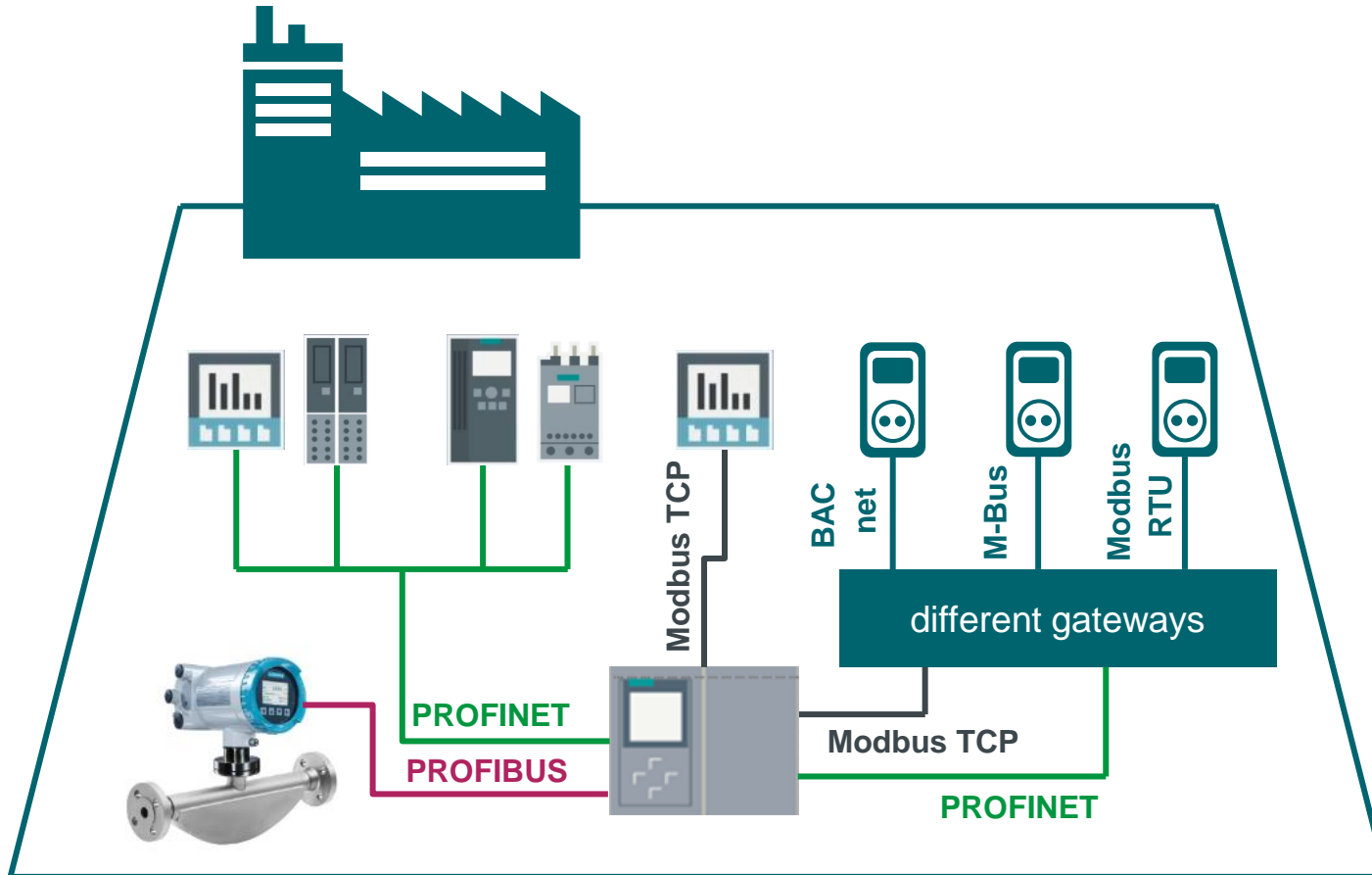
Step 2 – Acquisition of consumer

- Acquisition of the individual consumer or connection of the measuring instruments by means of an acquisition unit (e.g. S7-1500 CPU)

- Connection of SIEMENS field/measuring instruments via PROFINET, PROFIBUS, HART, Modbus

- Connection of third-party devices, if applicable via gateway; frequently used communication types:

  - BACnet (gateway required)

  - M-Bus (gateway required)

  - Modbus TCP (no gateway)

  - Modbus RTU (gateway required)

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Connection of the measuring instruments
Examples of gateways for fast PROFINET communication

Siemens gateways M-Bus/BACnet - PROFINET

- Gateway for PN/BACnet – MLFB: 6BK1621-0AA00-0AA0

- Gateway for PN/M-Bus – MLFB: 6BK1622-0AA00-0AA0

- Configuration of the hardware in TIA Portal
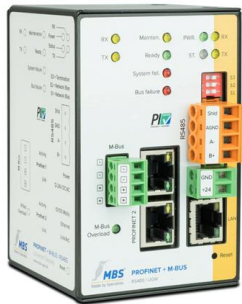
MBS gateway M-Bus/BACnet - PROFINET

- Gateways from MBS are generally recommended by Siemens

- Double-X series converts M-Bus and BACnet signals into PROFINET telegrams

- Configuration via built-in web server

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SIMATIC
Energy Suite

SIEMENS

SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

ISO 50001 certified

SIMATIC Energy Manager

Energiedaten-management-system
Regelmäßige Überwachung

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ID 0000049036

Management level

Processing and monitoring with WinCC

Edge

Production level

Acquisition

Field level, e.g. drive motor

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Plant and company-wide energy analysis

S7 EE-Monitor
Standardized efficiency evaluation of machines

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Integrated energy measurement
Directly in the field: For example with SIMATIC Energy Meter (ET 200SP)

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Transparency at the production level with TIA Portal + Energy Suite
Plant-level visualization and recording of energy data
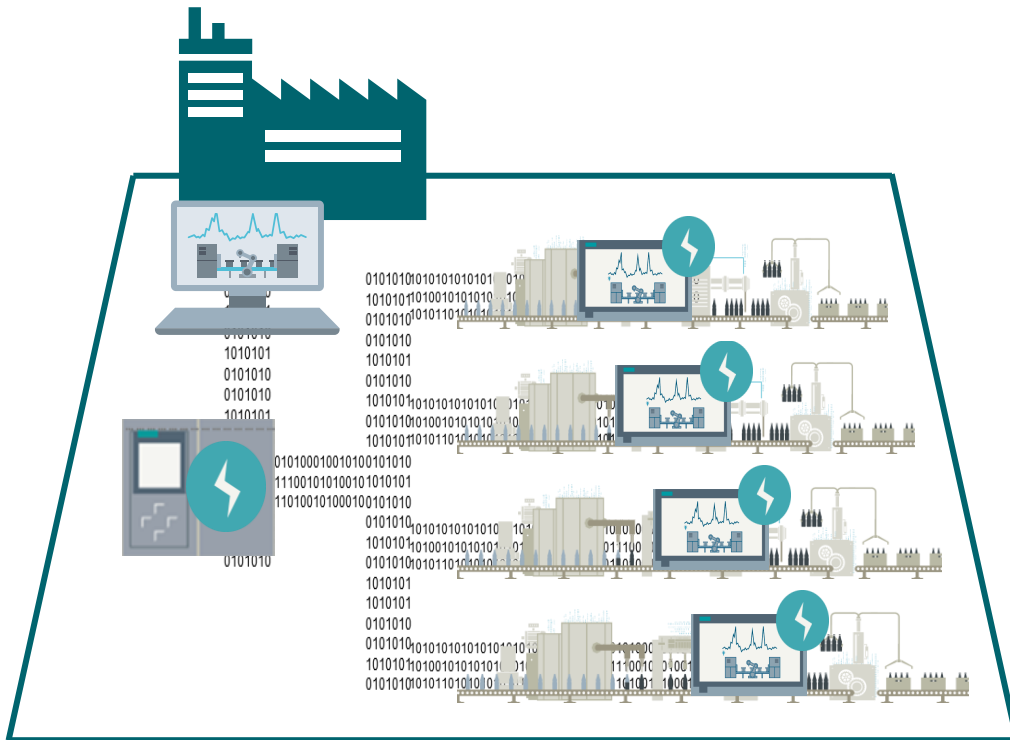
Customer benefits:

- **On-site visualization**: The system operator can use this information to evaluate the correct functioning of his machine directly on site
  In addition, the visualization of energy data can already create an **energetic awareness among the employees** and thus **achieve savings**

- **Cross-plant visualization** of energy flows in the SCADA control system WinCC Professional V17

- **Protection against loss of data** through buffering concept on the S7 control system + central archiving of energy data in the SCADA control system archive

- **Simple data export of** energy consumption values from the SCADA archive via standard report

- **Software standardization** through the "Energy Suite" standard library available in TIA Portal

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The simple solution for Integration and Monitoring
SIMATIC Energy Suite - Innovative, efficient, easy, quick

Measuring

SENTRON

SINAMICS

SIMATIC

SIMOCODE

SENTRON

3rd Party

Energy Suite

Easy Integration

Consistent Information

Data buffering at PLC

Engineering

Generation

instead of programming

Visualization
with SIMATIC HMI

Analysis
with SIMATIC Energy Manager

SIMATIC Energy Manager PRO

Archiving
with WinCC Professional

SIEMENS
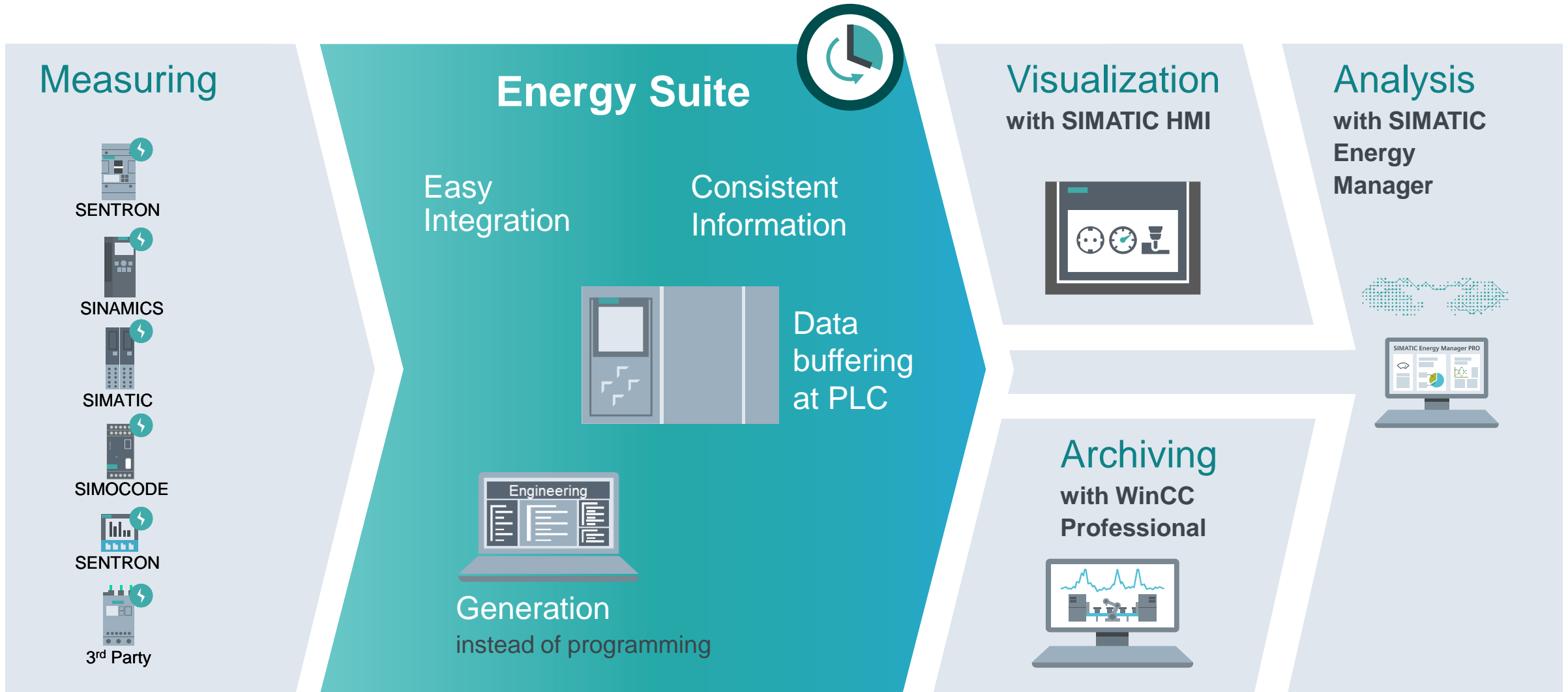
SIMATIC Energy Management
Architecture examples, energy data acquisition, archiving and monitoring

EnMPRO Web Client

Existing Office PCs
Windows 10
MS Office 2019
MS Edge, Google Chrome

EnMPRO Full Client (optional)

Engineering client
Windows 10
MS Office 2019

EnMPRO Server

Database and application server
WEB Server
MS Windows Server 2019

EnMPRO Mobile APP

Corporate LAN

DMZ / Router

S7 1512SP-1 PN +
Energy Suite + buffer

SCADA WinCC Prof V17 E-monitoring with Energy suite

Process LAN

PAC 4200 Gateway

MODBUS RTU

PAC 3100

PAC 3200

S7-300

PAC 3200   PAC 3200

Liquid (pulse)   Gas (analog)

4-20 mA

ET200SP-1PN + Energy Meter, AI, DI

Current transformer

Liquid (pulse)   Gas (analog)

4-20 mA

SIEMENS

SIMATIC Energy Suite
Architecture examples, energy data acquisition, archiving and monitoring

SIEMENS

Energy data acquisition with the SIMATIC Energy Suite
Control program configuration instead of programming

SIEMENS

SIMATIC Energy Suite - Visualizing energy data
Application example of F&B production

SIEMENS
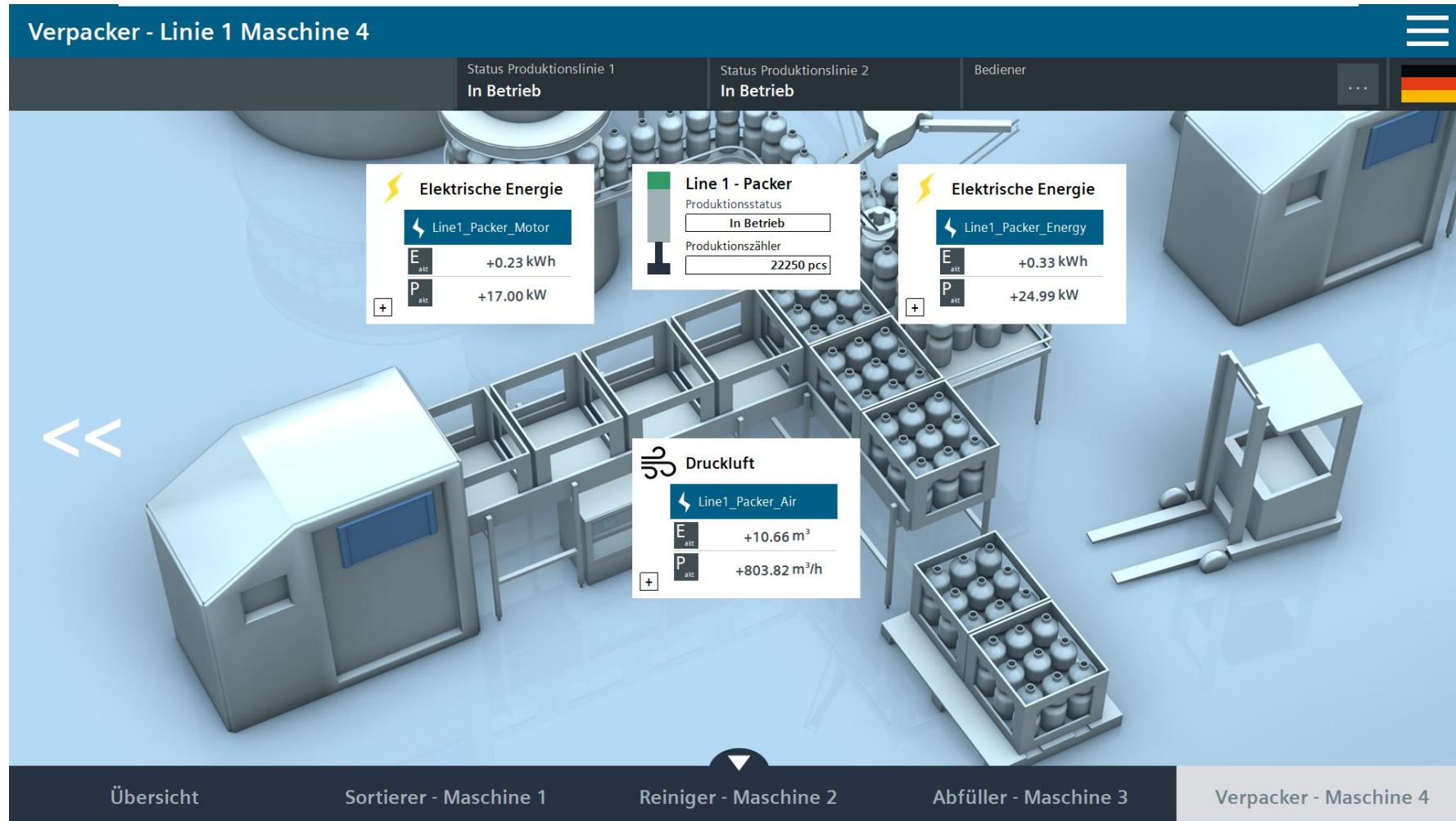
SIMATIC Energy Suite - Providing energy data available externally
Data export from the SCADA archive

SIEMENS

What is the advantage
of minimizing the maximum required connected power supply?

Calculation of the demand charge

- Determination of the **highest average power** (in kW) during a period (usually 15 minutes) within a year.
- **Multiplication** of this value by the agreed **price per kW** with the power supply company

Power consumption

1 year

Time

Price per kW

X

=
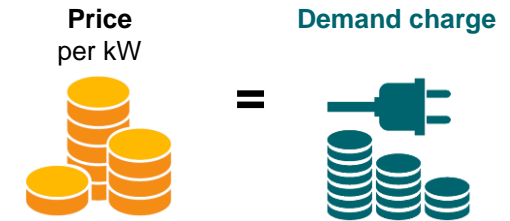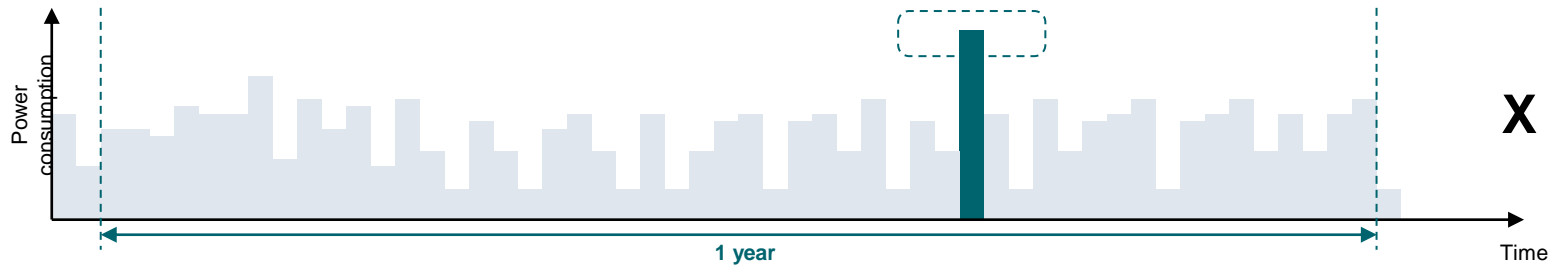
Demand charge

High costs with only **one-time** load peak

Customer requirement

- Reduction of demand change by avoiding load peaks
- **Automatic regulation** of the system without external influence
- Response of the system to **feedback** from the production process
- Production processes must **not be influenced** by this

e.g. small industrial customer 1MW * €100/kW/a = €100,000 demand charge

medium-sized industrial customer 5MW * €100/kW/a = €500,000 demand charge

Large industrial customer 10MW * €100/kW/a = €1,000,000 demand charge
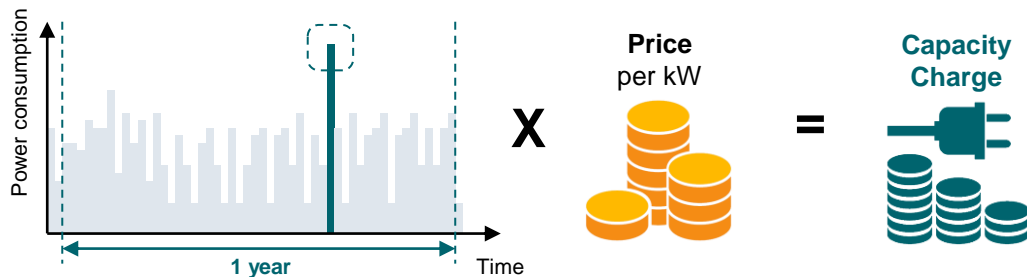
SIEMENS

SIMATIC Energy Suite Load Management –
Load peaks reduction

Customer requirements

- **Reduction** of the capacity charge through the avoidance of load peaks and more even power distribution
- Production processes **must not be influenced**
- **Automatic regulation** of the system without external influence
- Response of the system to **feedback** of the production process
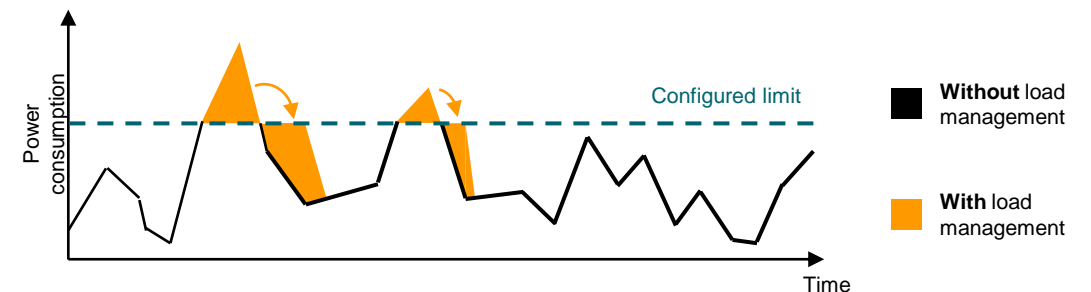
Calculation of the Capacity Charge

- Determination of the **highest average consumption** (in kW) during a period (usually 15 minutes) within a year
- **Multiplication** of this value by the contractually determined **price per kW** with the energy supplier company

Power consumption

X Price per kW = Capacity Charge

1 year   Time

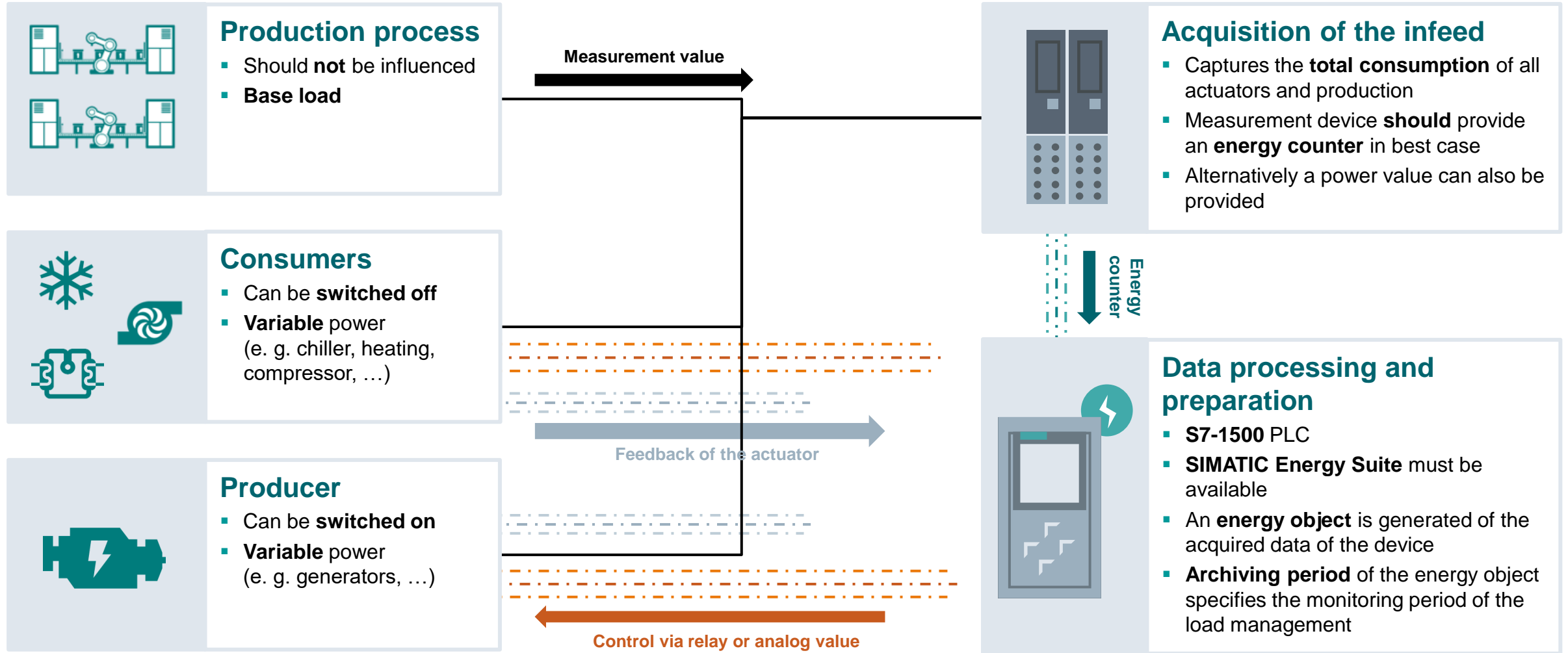**High costs** with only a **single** load peak

Siemens offering – SIMATIC Energy Suite with load management

- Direct **integration** into the **production level** due to PLC-based solution
  ➔ No intervention of IT systems in the production level necessary
- Avoidance of load peaks through **integrated prediction algorithm**
- **Smooth load distribution** due to **independent switch** of consumers or activation of generators
- **Future-proof** due to a **modular function block concept**
  ➔ Simple extension of the number of actuators
- **Fast integration** into an existing **visualization** including all relevant data of the actuators and the entire system
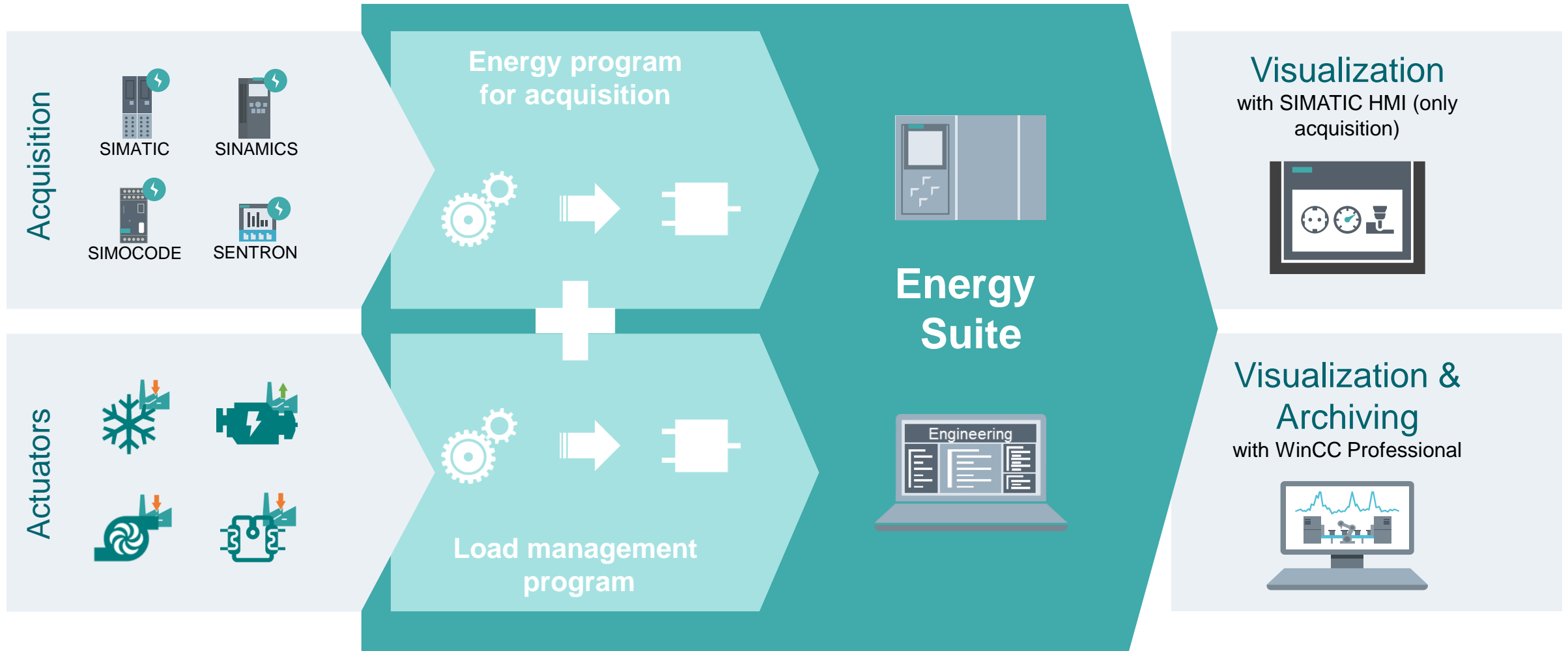- **Archiving** of every switching action and limit violation

Power consumption

Configured limit

Time

Without load management

With load management

SIEMENS

SIMATIC Energy Suite Load Management –
Basic preconditions

Production process
- Should **not** be influenced
- **Base load**

Measurement value

Acquisition of the infeed
- Captures the **total consumption** of all actuators and production
- Measurement device **should** provide an **energy counter** in best case
- Alternatively a power value can also be provided

Energy counter

Consumers
- Can be **switched off**
- **Variable** power (e. g. chiller, heating, compressor, …)

Feedback of the actuator

Producer
- Can be **switched on**
- **Variable** power (e. g. generators, …)

Control via relay or analog value

Data processing and preparation
- **S7-1500** PLC
- **SIMATIC Energy Suite** must be available
- An **energy object** is generated of the acquired data of the device
- **Archiving period** of the energy object specifies the monitoring period of the load management
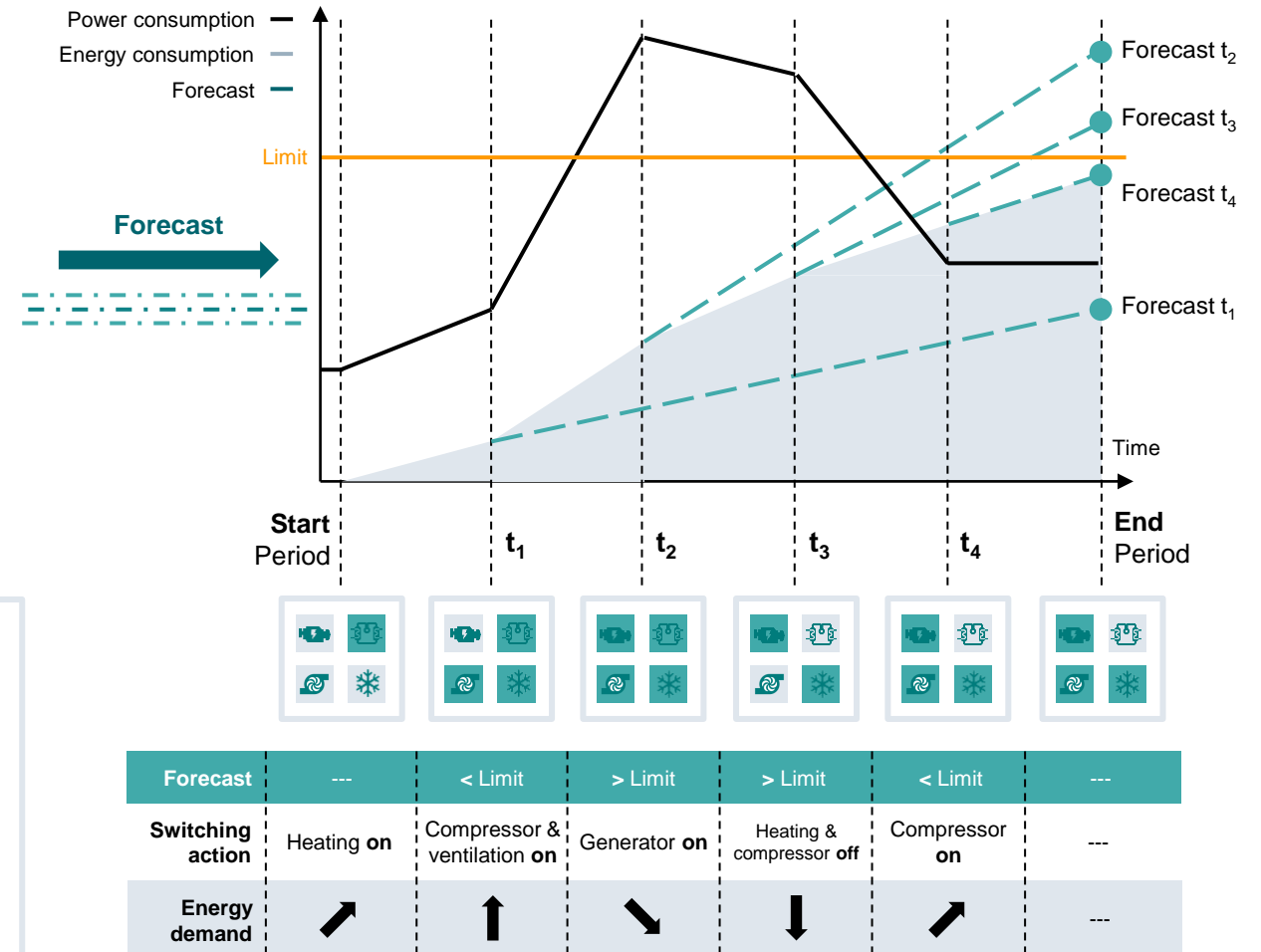
SIEMENS

SIMATIC Energy Suite load management –
Load management in the Energy Suite

Acquisition

SIMATIC
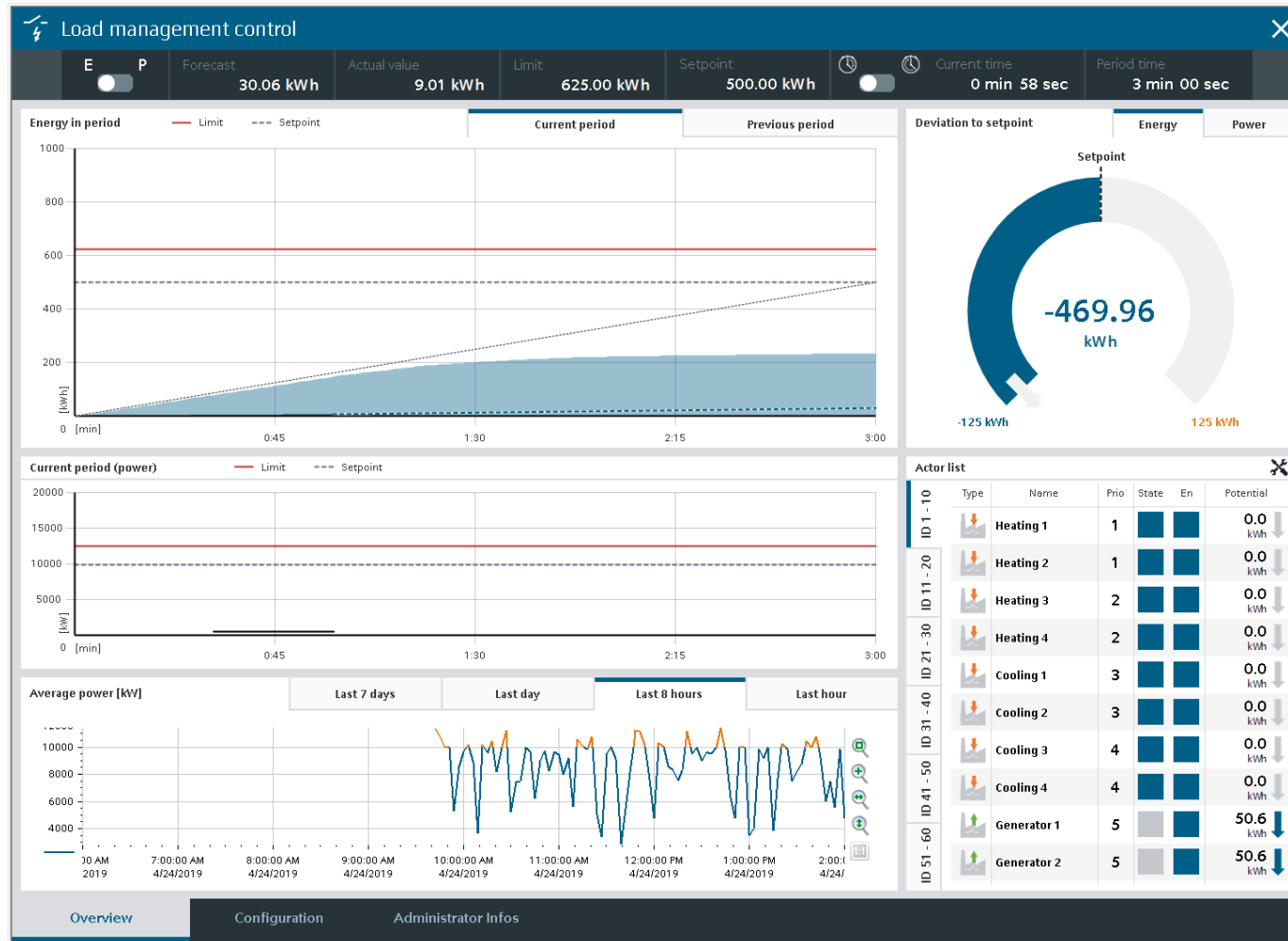SINAMICS
SIMOCODE
SENTRON

Energy program for acquisition

+

Load management program

Actuators

Energy Suite

Engineering

Visualization
with SIMATIC HMI (only acquisition)

Visualization & Archiving
with WinCC Professional

SIEMENS

SIMATIC Energy Suite load management –
Functionality

Load management software

- Continuously **calculates** the forecast of the energy demand at the end of the period
- **Switches actuators** on or off depending on available potential
- Actuators are switched **according to configured priority**
- The **lower** the priority (relevance for the production process), the **more often** the actuator is switched

Priority

1		Generator
2		Heating
3		Compressor
4		Ventilation

Power consumption
Energy consumption
Forecast

Limit

Forecast

Forecast t₂
Forecast t₃
Forecast t₄
Forecast t₁

Time

Start Period	**t₁**	**t₂**	**t₃**	**t₄**	**End** Period

Forecast	---	< Limit	> Limit	> Limit	< Limit	---
Switching action	Heating **on**	Compressor & ventilation **on**	Generator **on**	Heating & compressor **off**	Compressor **on**	---
Energy demand	↗	↑	↘	↓	↗	---

SIEMENS

SIMATIC Energy Suite load management –
Visualization example

Overview of the load management

- Presentation of the previous and current period using a triangle diagram
- Historical values of the infeed up to 7 days
- List of all actors including status and configuration possibility

Detail view per actuator

- All relevant information at a glance
- Subsequent configuration possible
- Operation of the manual mode

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SIMATIC Energy Suite load management –
License concept

Concept

Acquisition objects

- **One** energy object license per acquisition object

CoL

Actuator object

- **Three** energy object licenses per actuator object

CoL

PLC

- Energy object licenses as a kind of "currency", usable for **acquisition objects as well as actuator objects**
- Licenses as **bundles of 5 or 10**

Example

54x Acquisition objects

➜ **54x** Energy object licenses

80x Actuator objects

➜ **240x** Energy object licenses

Total: **294x** EnO licenses

➜ e. g. **29x 10** bundle
   + **1x 5** bundle

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SIMATIC Energy Suite V17
License concept

License name	Article no.	Download = ⬇ /DVD = ⚫	L1-Price
Engineering			
SIMATIC Energy Suite V17 Engineering incl. 10 Energy Objects (2 x 5 EnO)	6AV2108-0AA07-0AH5	⬇	816,- €
	6AV2108-0AA07-0AA5	⚫	916,- €
SIMATIC Energy Suite V17 Engineering Trial	SIOS: 109761410		
	6AV2108-0AA07-0AA7	⚫	27,50,- €
SIMATIC Energy Suite Engineering, SW Update Service	6AV2108-0AA00-0AY0	⬇	122,- €
	6AV2108-0AA00-0AL0	⚫	137,- €
Runtime - SIMATIC Energy Suite S7-1500			
5 Energy Objects (1x 5 EnO)	6AV2108-0CF00-0BH0	⬇	204,- €
	6AV2108-0CF00-0BB0	⚫	228,- €
10 Energy Objects (2x 5 EnO)	6AV2108-0DF00-0BH0	⬇	408,- €
	6AV2108-0DF00-0BB0	⚫	458,- €
50 Energy Objects (5x 10 EnO)	6AV2108-0FH00-0BH0	⬇	2040,- €
	6AV2108-0FH00-0BB0	⚫	2289,- €
100 Energy Objects (10x 10 EnO)	6AV2108-0HH00-0BH0	⬇	4080,- €
	6AV2108-0HH00-0BB0	⚫	4578,- €

Benefits for the customer:

- **Cost sensitive entry** even for small applications

- **Scalable** Customer only has to buy what he needs

- **Future-proof** RT-License is version-independent

- **Flexible** Licenses can be distributed in the site

Note:
- All Runtime Licenses are countable and version neutral
- Runtime Licenses are provided as CoL

EnO – Energy object | **CoL** – Certificate of License

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SIMATIC Energy Suite V17
Licensing examples

Customer A - Typ: »central«

NO Energy Suite RT License*)

14x 10er EnO License
1x 5er EnO License

CoL

HMI

SCADA

Central Energy PLC

Pulse Analog Counter

. . .

144 Measuring Points

Customer B - Typ: »distributed«

NO Energy Suite RT License*)

13x 10er EnO License
3x 5er EnO License

CoL

CoL – Certificate of License

HMI

SCADA

Building #1
7x 10 EnO
1x 5 EnO
75x

Building #2
2x 10 EnO
1x 5 EnO
25 x

Building #3
4x 10 EnO
1x 5 EnO
44 x

∑ = **144 Measuring Points**

EnO – Energy object (1x Energy object = 1x Measuring point)

Flexible license concept offers individual licensing and allows licensing of the most important customer scenarios: Distributed systems and continuous expansion

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SIMATIC Energy Suite load management –
When do I achieve the ROI?

Exemplary use case
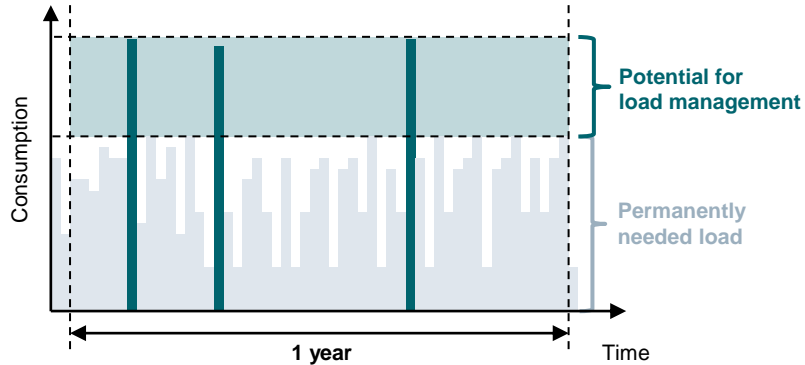
Highest load peak:	**9.000 kW**
Price per kW/year:	100,00 €/kW
Capacity Charge per year:	**900.000,00 €**

Potential for load management

Permanently needed load

Highest load peak:	**8.000 kW**
Price per kW/year:	100,00 €/kW
Capacity Charge per year:	**800.000,00 €**

Savings

Base load remains stable

Costs of LMGT

Hardware (PLC, Server,…):	30.000,00 €
Software (EnS, WinCC):	5.000,00 €
Licenses for actuators (80x):	9.600,00 €

Return on Invest (ROI)

Savings per year:	**100.000,00 €**
Costs for LMGT:	44.600,00 €
Return of Invest (ROI):	**0,45 years**

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SIMATIC Energy Suite load management –
Benefits
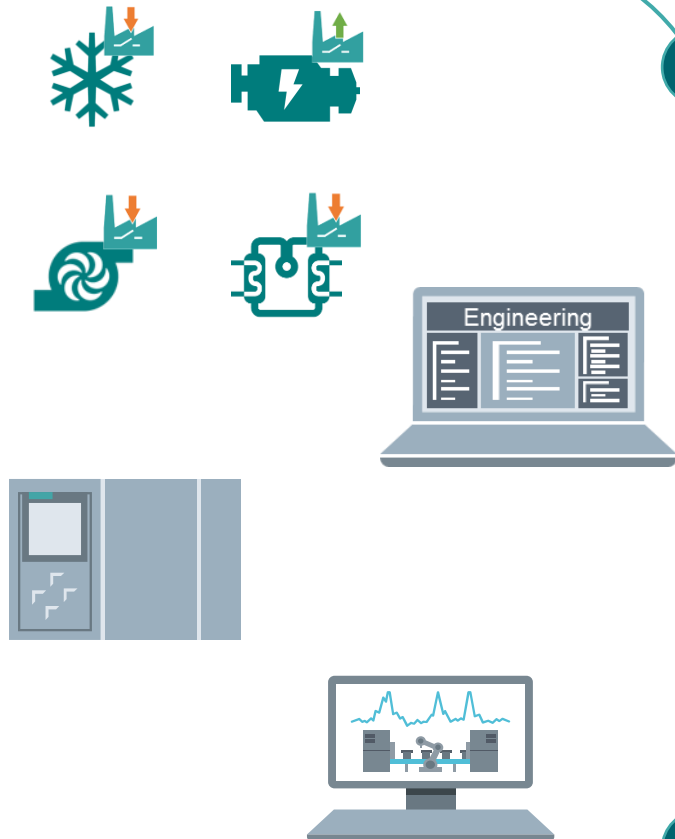
High time savings due to automatic program generation

Load management is **configured** via user interface in the TIA Portal and the program is then **generated**. The configuration is then completed in the visualization.

Fast and calculable Return of Invest

Through **fixed acquisition costs and predictable savings** through configurable performance limit.

High flexibility for future extensions

When actuators will be **extended in the future**, they can be **created in engineering** and the program can then be **regenerated**.

Short reaction time with fluctuating tariffs

Power limit can be modified **at runtime** and can therefore be adapted to **different tariffs** (e.g. day and night tariff)

Prefabricated visualization

Visualization for WinCC Professional **included in scope of delivery**, which provides all relevant information for the entire system, as well as the actuators, at a glance

SIEMENS

SIMATIC Energy Suite in TIA Portal –
One integrated solution

Benefits

1 **Integrated in the TIA Portal and in automation**
… permits conclusions between production and energy data

2 **Intuitive configuration and automatic generation**
… avoidance of faults and considerably reduced configuration time

3 **SIMATIC Energy Manager PRO pre configuration**
... for efficient vertical integration

4 **Making energy visible – Basis for further analyses**
... Switch-off concepts, Standby consumption optimization.

SIMATIC Energy Suite (TIA Portal)

Integration of energy management in automation

SIEMENS

SIMATIC
S7 Energy Efficiency Monitor

SIEMENS

SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

SIMATIC Energy Manager

ISO 50001 certified

Energiedaten-management-system
Regelmäßige Überwachung

TÜVRheinland
ZERTIFIZIERT

www.tuv.com
ID 0000049036

Management level

Processing and monitoring with WinCC

Edge

Production level

Acquisition

Field level, e.g. drive motor

SIMATIC Energy Manager
Plant and company-wide energy analysis

S7 EE-Monitor
Standardized efficiency evaluation of machines

SIMATIC Energy Suite
Energy data acquisition and Load management – simple and integrated

Integrated energy measurement
Directly in the field: For example with SIMATIC Energy Meter (ET 200SP)

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Norms and standards alleviate our everyday way of life

The simple efficiency evaluation of
household appliances is already standard
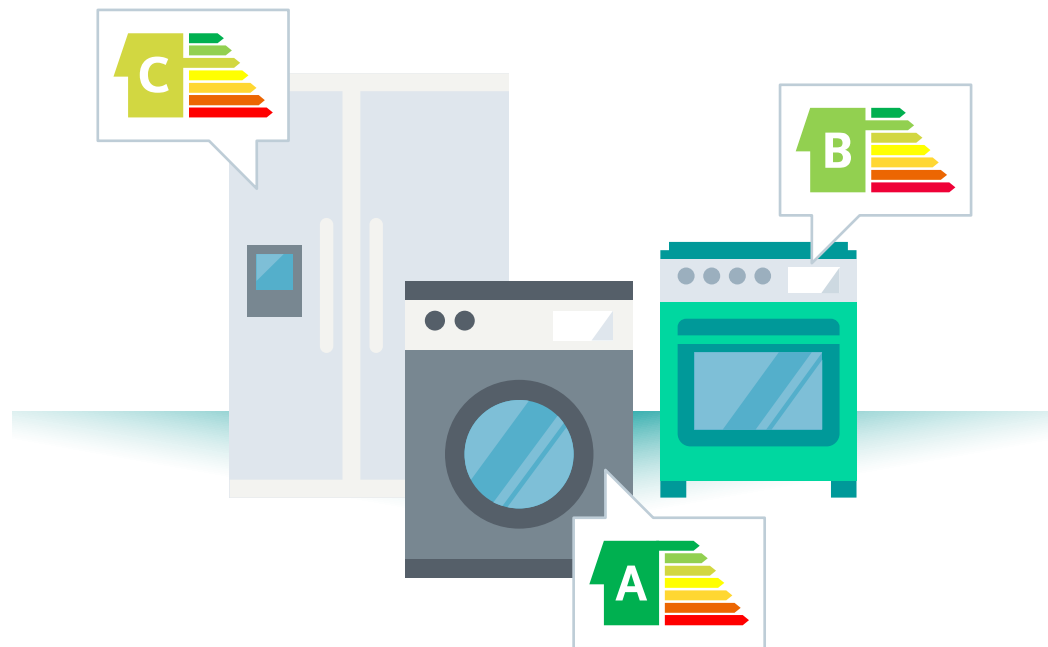
Now, the reliable
efficiency evaluation for industrial machinery is also possible
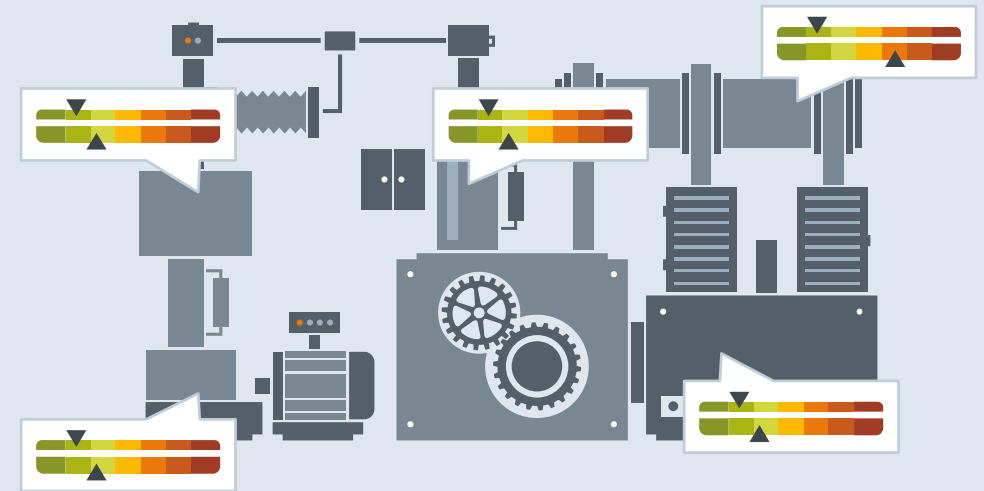
This does, however, require expertise and the right tools

SIEMENS

Requirements for a comparative and valid energy efficiency evaluation

Continuous analysis

Monitoring of energy efficiency of machines and also in particular an efficient mode of operation of this machine
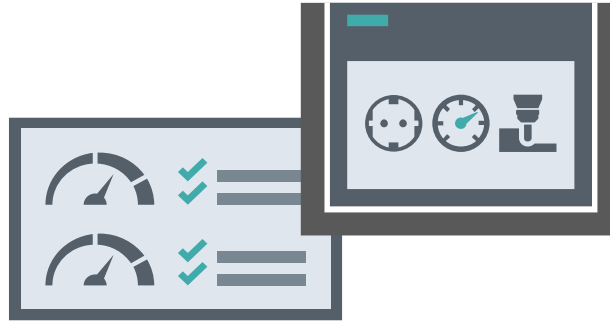
Status-related energy analysis

From shutdown condition to ongoing operation

Operation

Ready for op.

Stand-by

OFF

Energetic profile

And acceptance form based on the VDMA standard 34179 and energy efficiency report for detailed analysis

Energy efficiency evaluation

Analysis

Independent of the machine type ...through S7 instruction for production-related and standardized determination of energy consumption in machines

Energetic evaluation

Already during the procurement phase (low life cycle costs)

Determined average performance values

Can be repeatedly checked during production (automatic long-term measurement as integral part in the TIA Portal)

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SIMATIC S7-EE Monitor –
Overall concept Efficiency evaluation of machines at different levels

S7 EE-Monitor
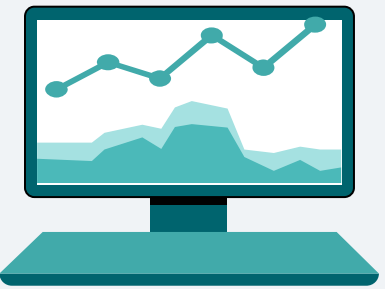
		+0.0%	-5.0%	-4.0%	-3.4%	+19.2%	+9.3%
Electrical Energy W		Off	Standby	Operational	Working	Powering up	Powering down
Compressed Air m³/h							
Cooling Water m³/h							
Speed Axis W	Ref Act	+0.0 / +0.0	+950.0 / +1000.0	+3358.3 / +3500.0	+8207.3 / +8500.0	+1788.4 / +1500.0	+1858.7 / +1700.0
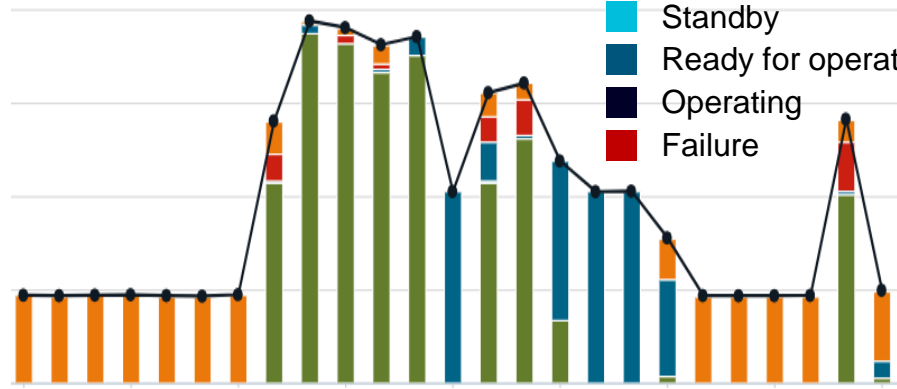
- **Integrated measurement**
- **Energy Profile VDMA 34179 (Performance Levels)**
- **Ready for Energy Management**

S7 EE-Monitor + Energy Manager PRO   Necessary for long-term evaluation

Necessary for long-term evaluation

- Standby
- Ready for operation
- Operating
- Failure
- Share of value-added energy
- Share of **non-value-added** energy

50,5 %

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The SIMATIC S7 EE-Monitor –
One solution for machine builders and end users

Machine builders

Supply your machine
"Ready for Energy Management"
with little effort
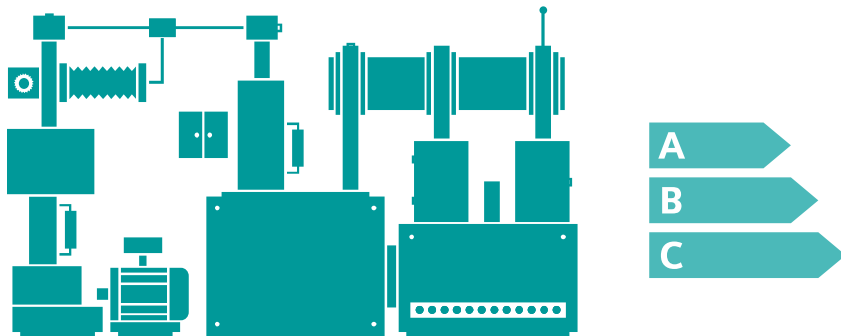
End users

Save **money**

Make your **production more efficient**

SIEMENS

Efficiency analysis of machines
Two-stage overall concept (S7-EE Monitor, EnMPRO)

1. Local evaluation on the machine

2. Central evaluation in EnMPRO

Production machine

Local Analyses

Factory Overview
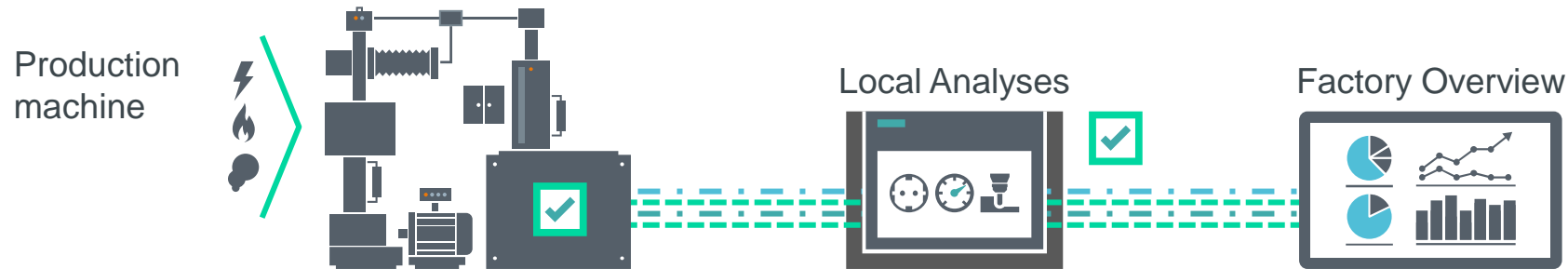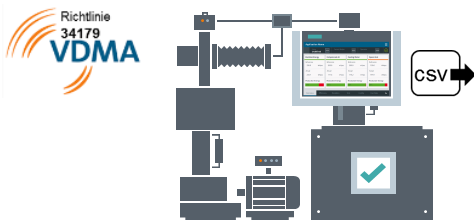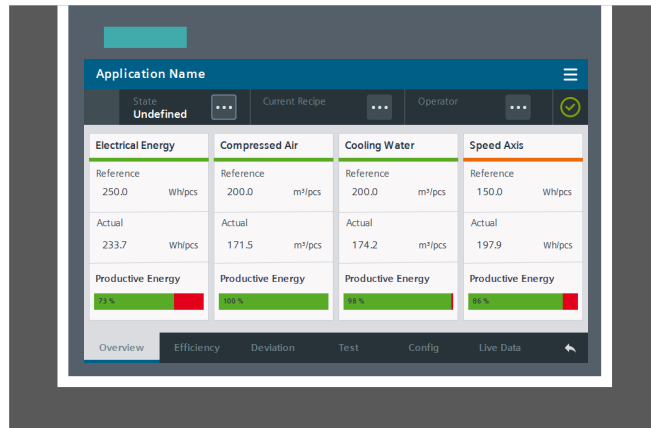
Machine builder

Machine operator (End customer)

SIEMENS

SIMATIC S7-EE Monitor + SIMATIC Energy Manager PRO
Performance evaluation for production machines

1. Local evaluation on the machine

Production machine

2. Central evaluation in EnMPRO

Machine builder

Mashine operator (end customer)

SIEMENS

S7 Energy Efficiency Monitor / Energy Manager PRO
Application example from Siemens plant
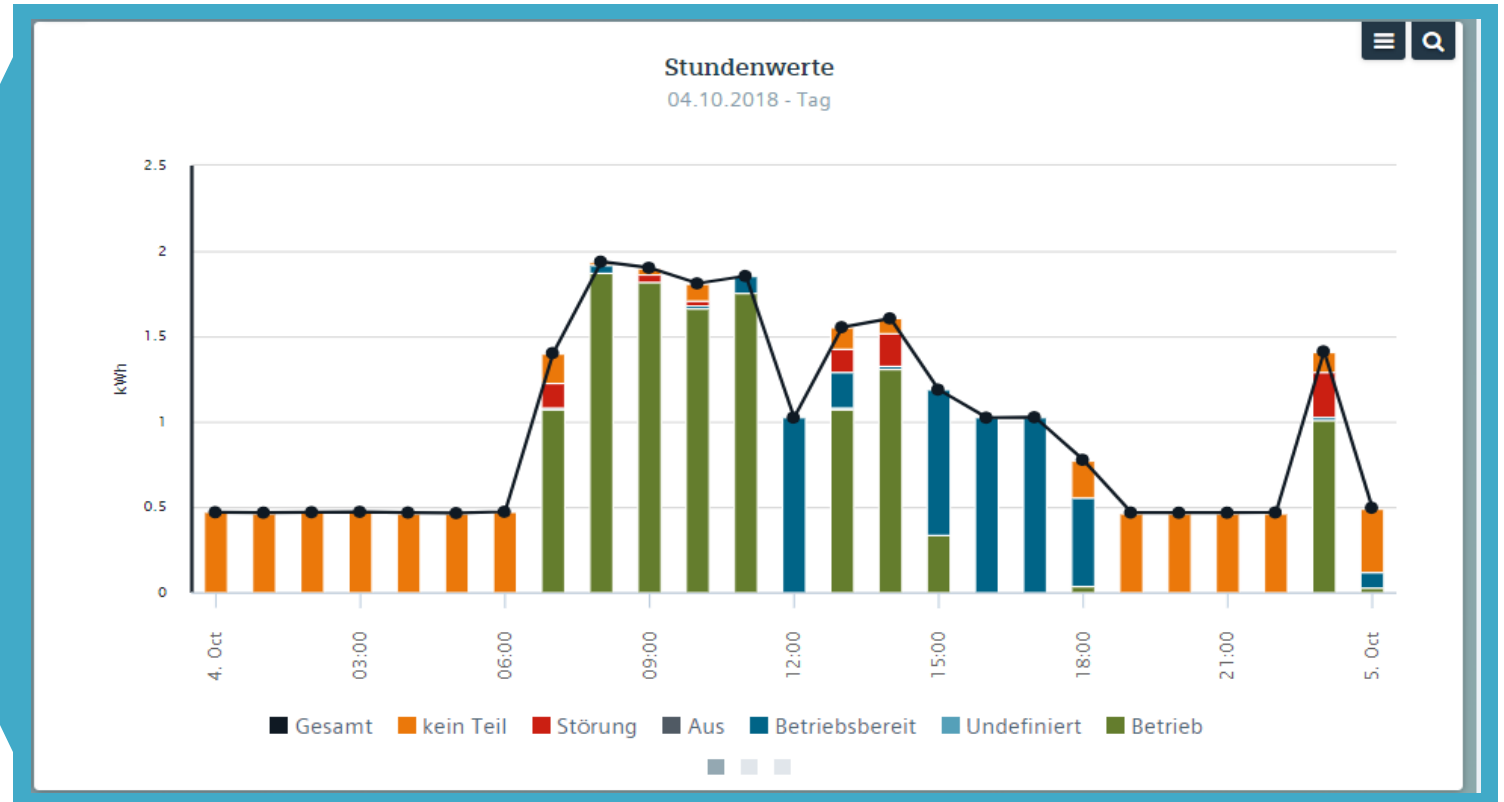
At a glance!

- **Energy per status**
- **Energy productive / non-productive**

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S7 Energy Efficiency Monitor
System- and Hardware requirements

Metering
- Up to 10 meters of any sort of energy

+

SIMATIC CPU
- S7-1200/1500 controller

+

TIA Portal V17 / STEP 7
- Activation of calculation through license for each machine

+

SIMATIC HMI
- Visualization directly on the panel

License name	Article no.		L1-Price
S7 EE-Monitor for Machines S7-1500/1200 [1]	6AV2108-1CF00-0BH0	⤓	204,- €
	6AV2108-1CF00-0BB0	⊚	228,- €

1) The correct number of existing license certificates must be configured in the properties of the CPU hardware in the TIA Portal

Use of the S7 EE-Monitor recommended, when:

The machine has various operating modes

In the machine, relevant energy sorts are metered

Optional: SIMATIC Energy Manager PRO

SIMATIC Energy Manager PRO

SIEMENS
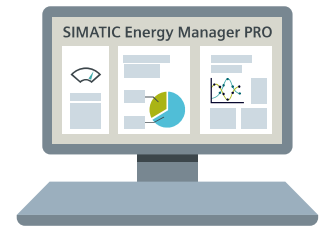
SIMATIC Energy Efficiency Package(s)
For sustainable energy management in production

SIMATIC Energy Efficiency Package (EM) **1**

The **SIMATIC Energy Efficiency Package (EM)** includes following components:

SIMATIC Energy Manager PRO Consumer incl. S7 EE-Monitor V7
(6AV6372-2DF67-1AX0)

AI Energy Meter 480V ET200SP
(6ES7134-6PA20-0BD0)

Base Unit ET200SP
(6ES7193-6BP00-0BD0)

Energy Efficiency Package (EM)

(6AV6372-3DF67-1AA1)
Listenpreis: 505 EUR

SIMATIC Energy Efficiency Package (PAC) **2**

The **SIMATIC Energy Efficiency Package (PAC)** includes following components:

SIMATIC Energy Manager PRO Consumer incl. S7 EE-Monitor V7
(6AV6372-2DF67-1AX0)

Sentron PAC 3220
(7KM3220-0BA01-1DA0)

Erweiterungsmodul Switched Ethernet PROFINET
(7KM9300-0AE02-0AA0)

Energy Efficiency Package (PAC)

(6AV6372-3DF67-1AA2)
L1-Price: 815 EUR

„All-round carefree packages" – Advantages at a glance

- Licenses included: For production machine and integration in SIMATIC Energy Manager PRO Server[1]   (at operator of machines)

- Measuring-Hardware (SIMATIC Energy Meter or 7KMPAC3220)

- All components: ISO50001 tested with TÜV certificate

- Energy management in production: standardized and easy implementation (e.g. via equipment specification)

- Price advantage against single product purchase

Benefits for machine builders ☑

- Energetic acceptance test of machines made simple
- Acceptance protocol exportable
- Efficiency monitoring according VDMA 34179 standard sheet on machine level[2]
- Provision of machine availability
- Marketing option „Machine Ready for Energy Management"

Benefits for machine operators ☑

- Basis for continuous optimization
- ISO50001 certification made simple
- Cross-vender solution (VDMA standard)
- Easy integration of machines[1]

[1]   SIMATIC Energy Manager PRO Server licence required (6AV6372-2DF07-2AH0)
[2]   Visualization as download Industry Online Support Portal: Beitrag 109753230

SIEMENS

Efficiency evaluation for machines
Advantages at a glance

For the machine operator

- Minimum investment - EnMPRO Server necessary only[1]

- Achieve energy efficiency and conformity in production through equipment specification of machines easily

- Most simple integration of machines through standardized connection and machine templates[2]

For the machine builder

- **SIMATIC Energy Efficiency Package(EM,PAC)** includes all components for the machine (HW, SW)

- Easy implementation (see S7 EE-Monitor)

- Including rights of use for SIMATIC Energy Manager PRO

1) To be ordered separately: SIMATIC Energy Manager PRO Server (6AV6372-2DF07-2AH0)
2) See SIMATIC Energy Manager PRO system manual (Industry Online Support Beitrags ID **109748841**

SIMATIC Energy Manager PRO

MindSphere

Standby
Betriebsbereit
Betrieb
Störung

S7 EE-Monitor

S7 EE-Monitor

S7 EE-Monitor

Machine 1

Machine 2

Machine n

SIEMENS
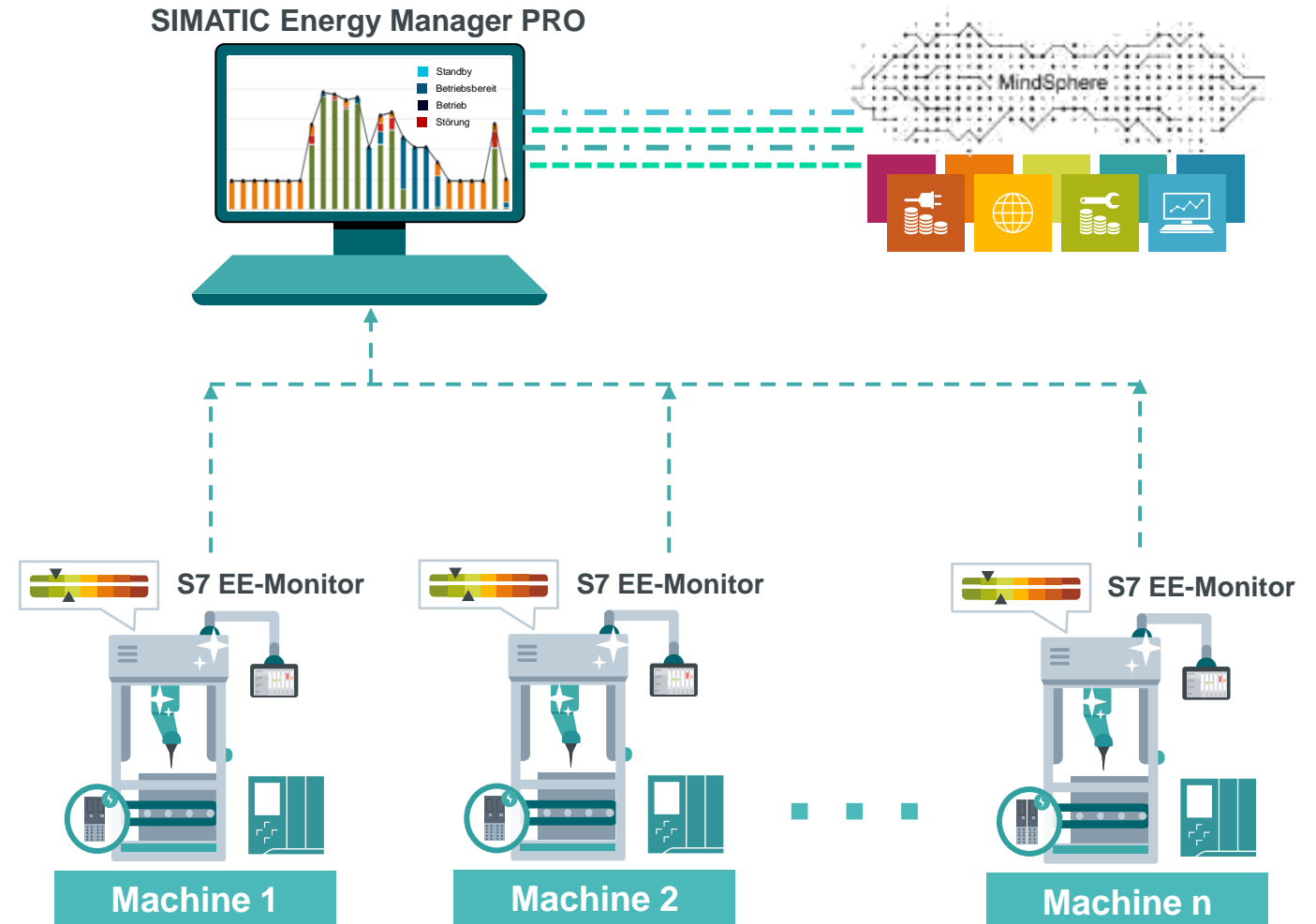
Standardized evaluation of the energy efficiency of machines
mit dem S7 Energieeffizienz-Monitor
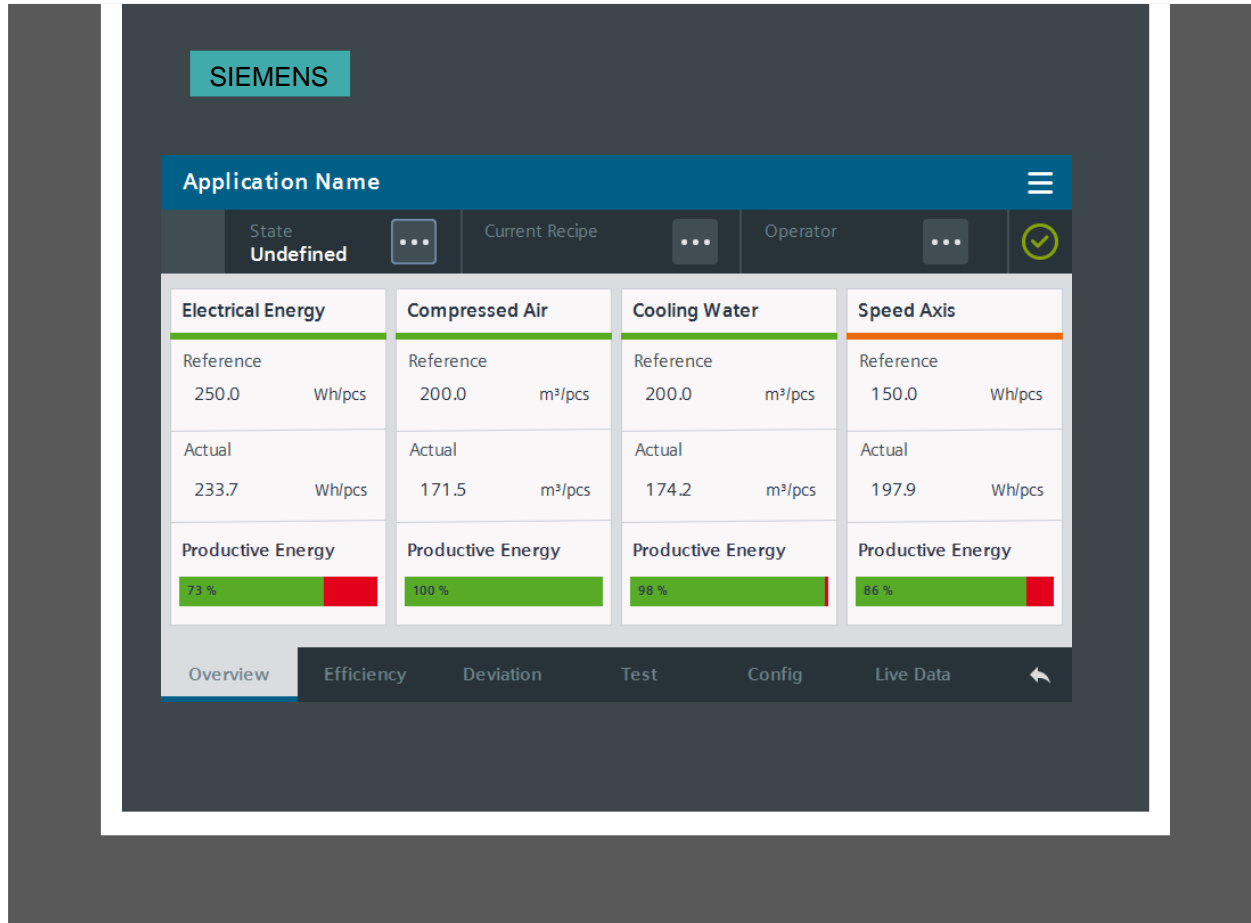
- Have you already been approached about whether your machine can provide an energetic footprint?

- Has there already been a request for a standardized energetic acceptance protocol?

- Do you know the share of non-value-added energy (e.g. standby) of the machine?

- Do you have an overview of the energy use of the different media per machine?

Then let the advantages of SIMATIC S7 Energy Efficiency Monitor convince you!

SIEMENS

S7 EE-Monitor visualization - details per measuring point
SIOS ID: 109753230

Selection measuring point

Current energy per piece

Target energy per piece

Value-added energy

Application Name

State	Current Recipe	Operator
Undefined		User Name

Electrical Energy
Wh

Compressed Air
m³

Cooling Water
m³

Speed Axis
Wh

Efficiency

EnPI

Target
250.0   Wh /pcs

Actual
245.4   Wh /pcs

Configuration

Productive   non Productive
73.3 %

SIEMENS
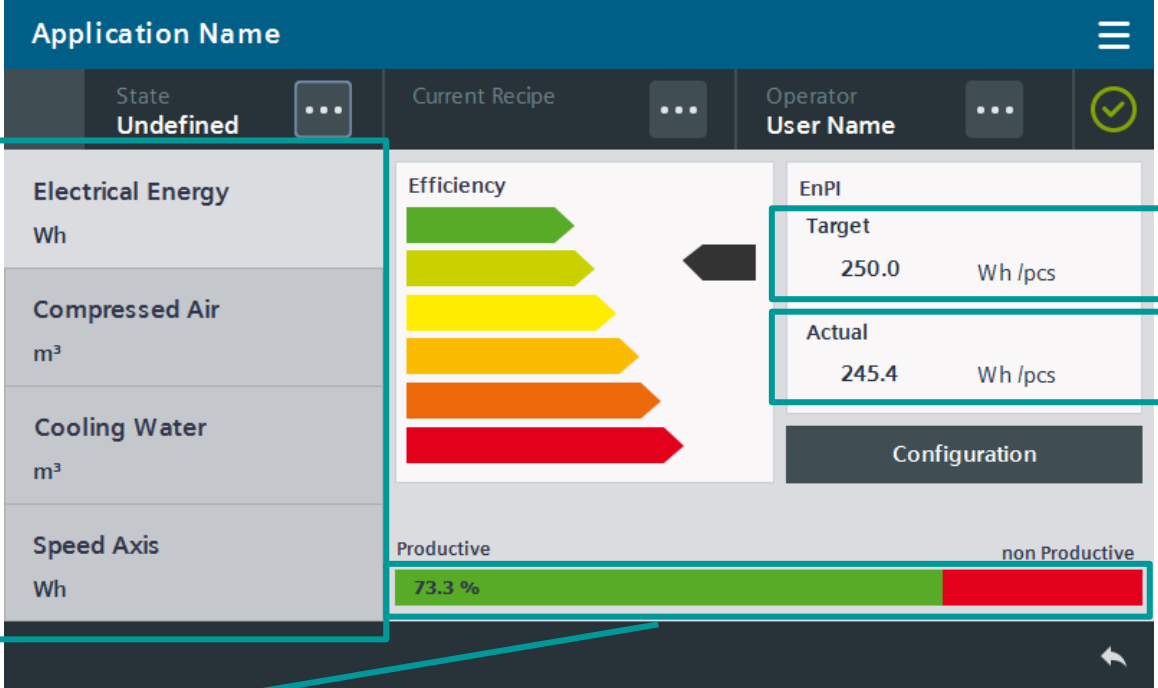
S7 EE-Monitor Visualization - Overview
SIOS ID: 109753230

Efficiency indicator

Value-added energy

Navigation
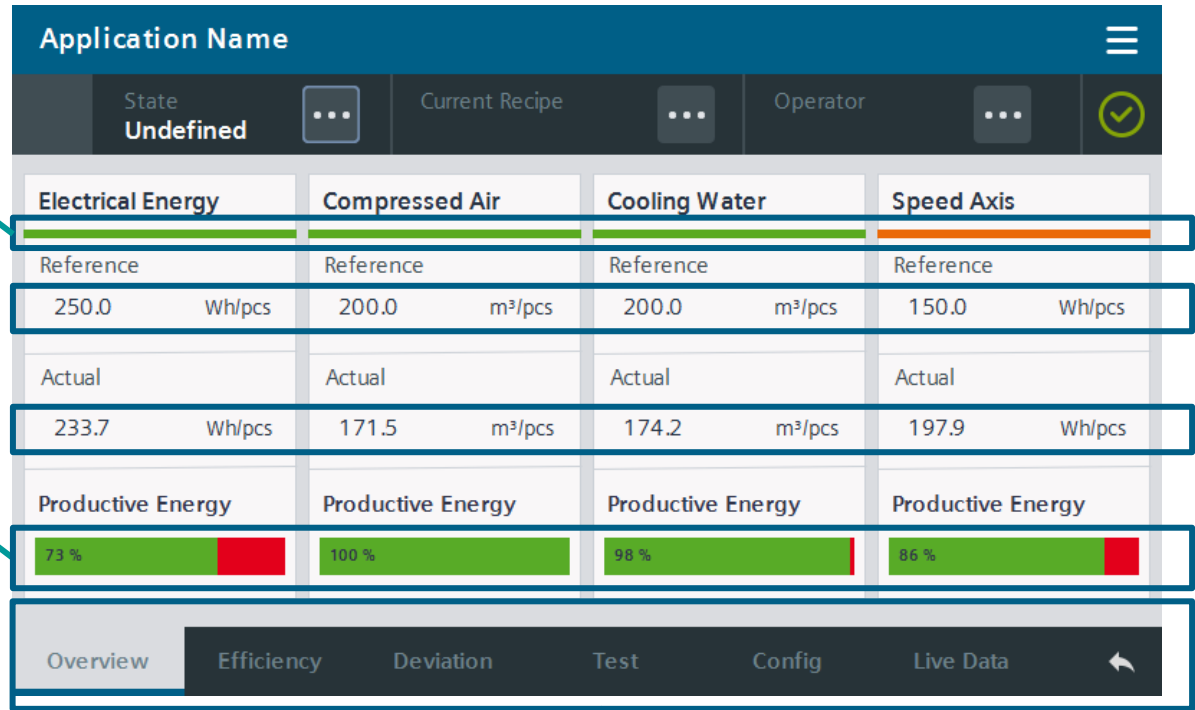
Target energy Per piece

Current energy per piece

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S7 EE-Monitor Visualization - Acceptance Test
SIOS ID: 109753230

Unrestricted | © Siemens 2021 | siemens.com/simatic-energy-management

SIEMENS
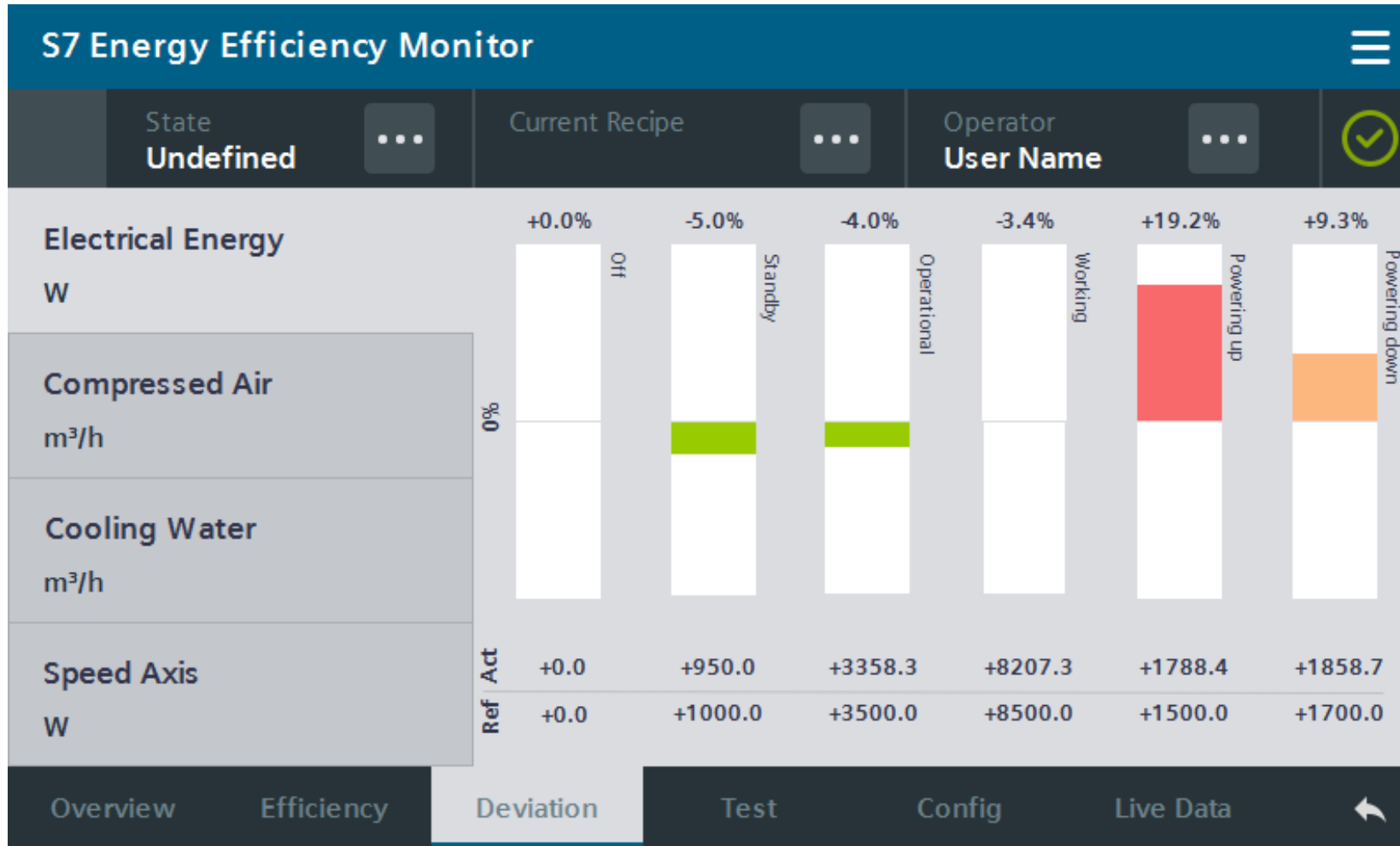
S7 EE-Monitor Visualization – Configuration EnMPRO Server
SIOS ID: 109753230
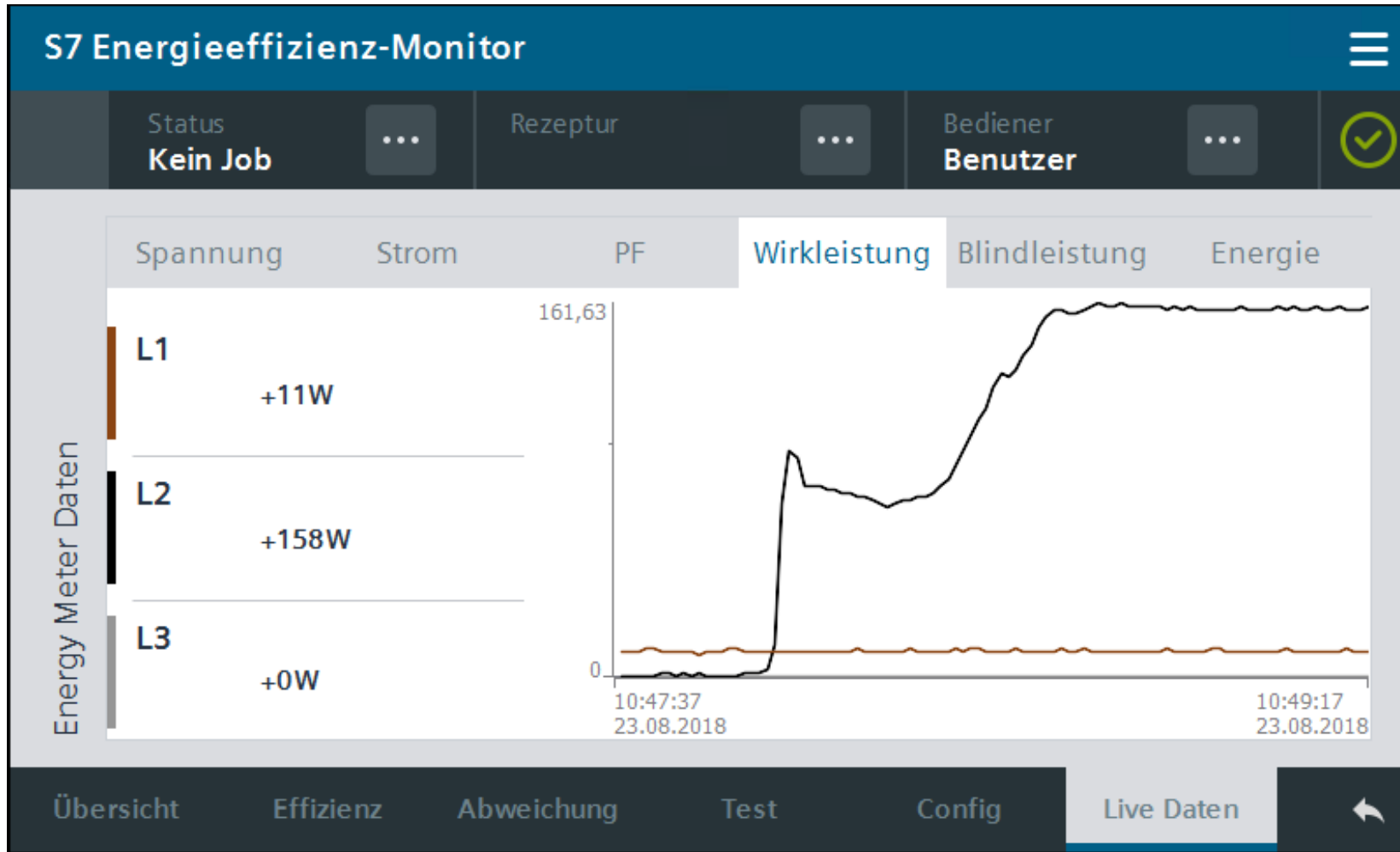
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SIEMENS
Ingenuity for life

Energy efficiency protocol: Energy and media consumption of a machine

Project information

Operator:		Manufacturer:	Siemens AG	Licence:	1234567891000000
Project:	MyProject	Machine:	Filling_Machine	Serial number:	100000E5S75

Conditions (independent of state)

reference measurement	Notes:
Start: 09.11.2017 06:18 Duration: 00:08:32 [hh:mm:s	
energy measurement	
Start: 09.11.2017 07:23 Duration: 00:35:38 [hh:mm:s	

Machine tool-specific measured values

Measuring station		Off		Standby		Powering_UP		Powering_Down		Operational		Working	
Electrical Energy W electrical	set	100,0	W	350,0	W	2500,0	W	2000,0	W	3000,0	W	3500,0	W
	act	25,6	W	350,0	W	2229,4	W	2225,0	W	3500,0	W	8828,1	W
	diff	-74,5	-74,5%	0,0	0,0%	-270,6	-10,8%	225,0	11,3%	500,0	16,7%	-671,9	-7,1%
Compressed Air m³/h Air	set	0,0	m³/h	15,0	m³/h	20,0	m³/h	20,0	m³/h	30,0	m³/h	30,0	m³/h
	act	0,0	m³/h	11,5	m³/h	19,7	m³/h	19,7	m³/h	28,0	m³/h	37,0	m³/h
	diff	0,0	0,0%	-3,5	-23,6%	-0,3	-1,3%	-0,3	-1,5%	-2,0	-6,8%	7,0	23,3%

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What does the S7 Energy Efficiency-Monitor offer -
Highlights at a glance
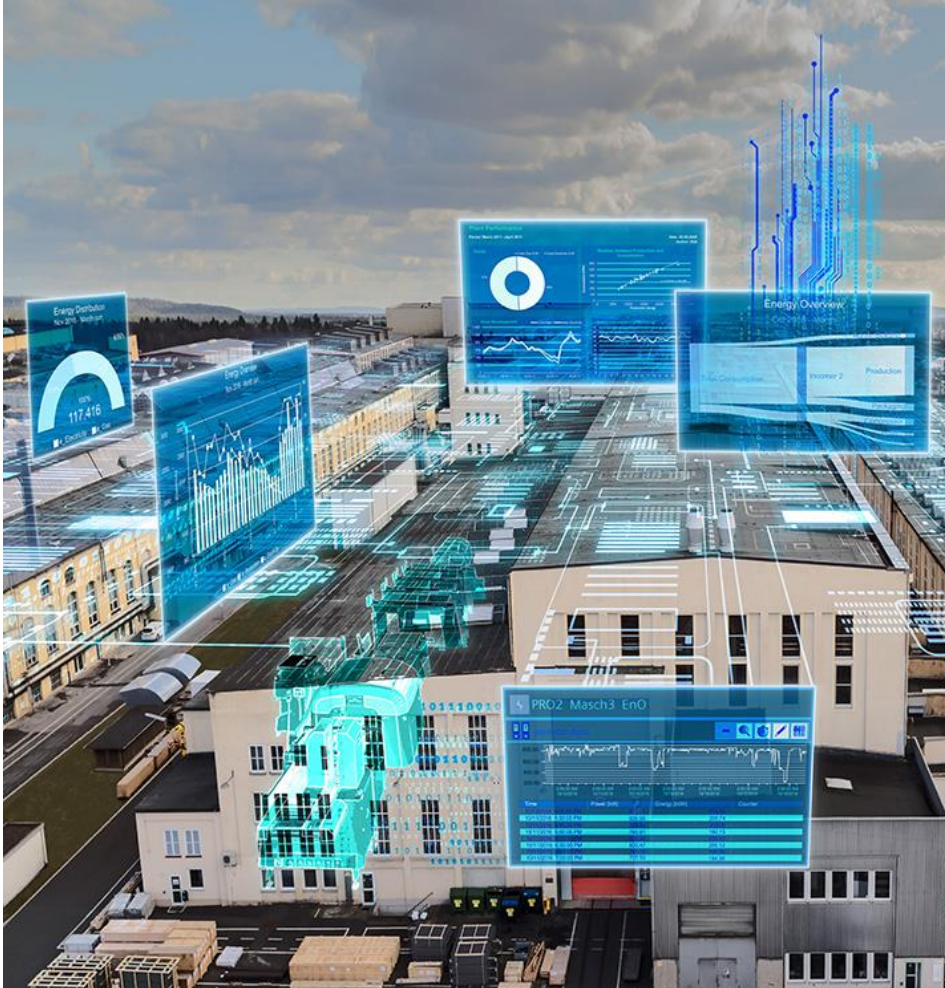
✔ **Vendor-independent machine analysis**
in accordance with measuring specification VDMA 34179

✔ **Easy to integrate into existing S7 program**
As S7 instruction, it is an integral part of the TIA Portal

✔ **Easy energy acceptance process**
Due to standardized evaluation and uniform acceptance form

✔ **Reduced energy costs**
Identification of savings potentials through status-related analysis

SIEMENS

SIMATIC
Energy Manager

SIEMENS

SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

ISO 50001 certified

SIMATIC Energy Manager
Plant and company-wide energy analysis

Management level

Processing and monitoring with WinCC

Edge

S7 EE-Monitor
Standardized efficiency evaluation of machines

SIMATIC Energy Suite
Energy data acquisition and Load management – simple and integrated

Production level

Acquisition

Integrated energy measurement
Directly in the field: For example with SIMATIC Energy Meter (ET 200SP)

Field level, e.g. drive motor

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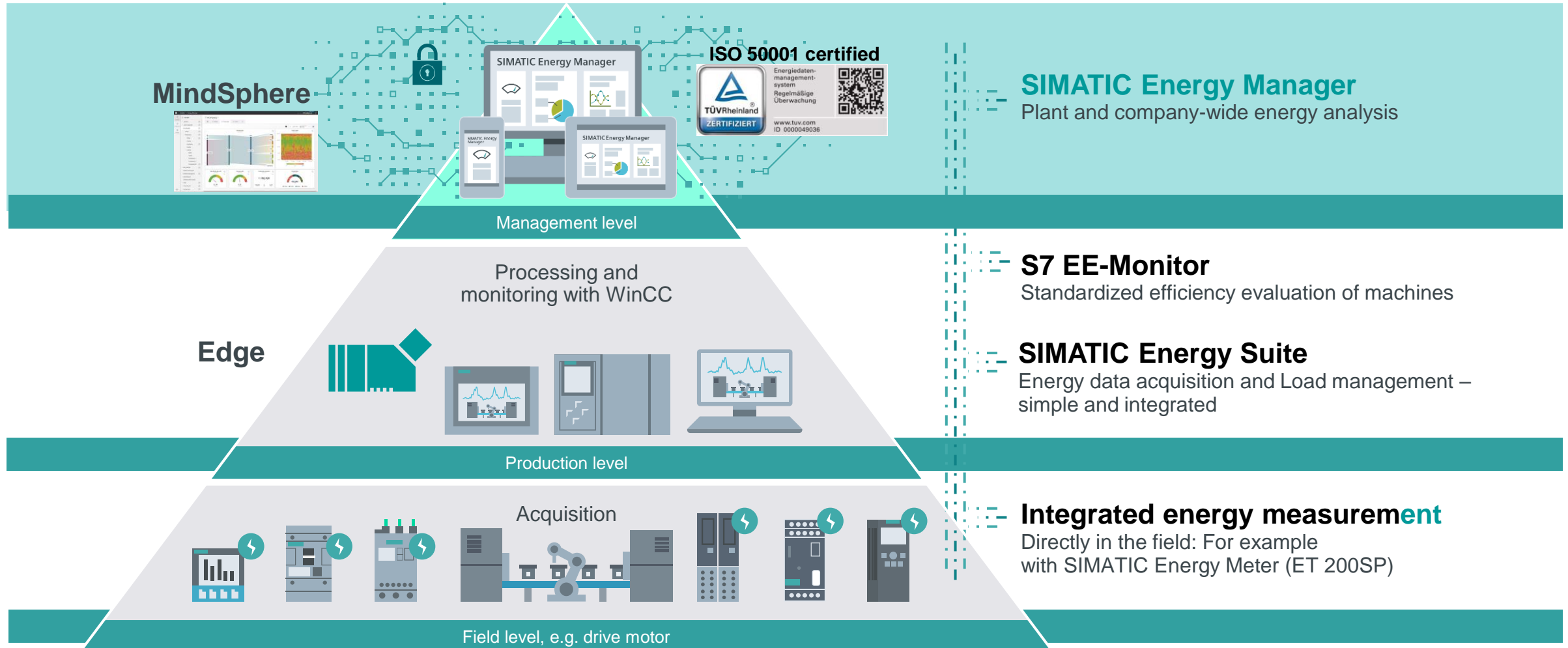
How can I generate information from data?

- Flexible KPI/EnPI definition

- User-specific data preparation

- Integrated statistics functions

- Access to the "right" information with one click

- KPI definition using the drag-and-drop function and flexible representation (widget)

Representation down to mobile devices

Representation of parameters
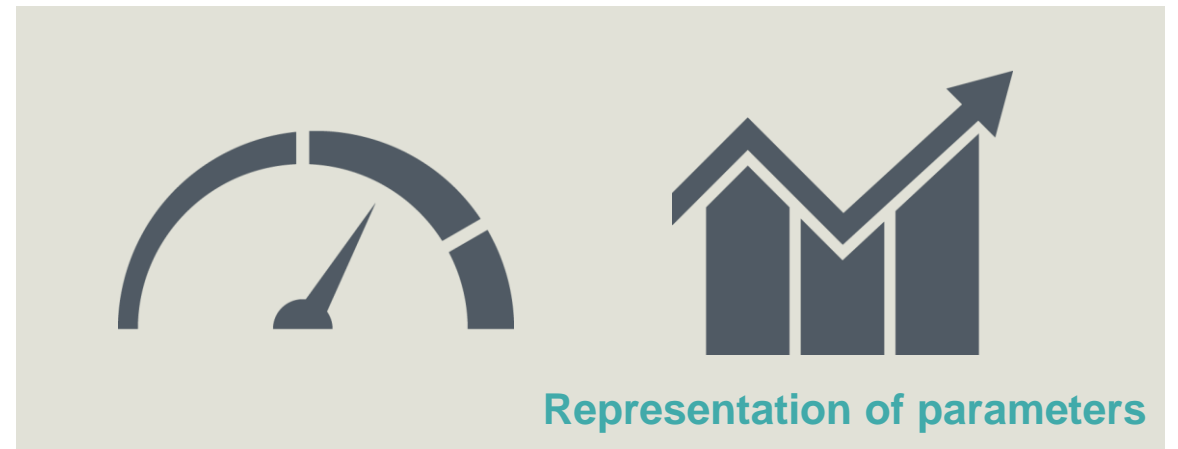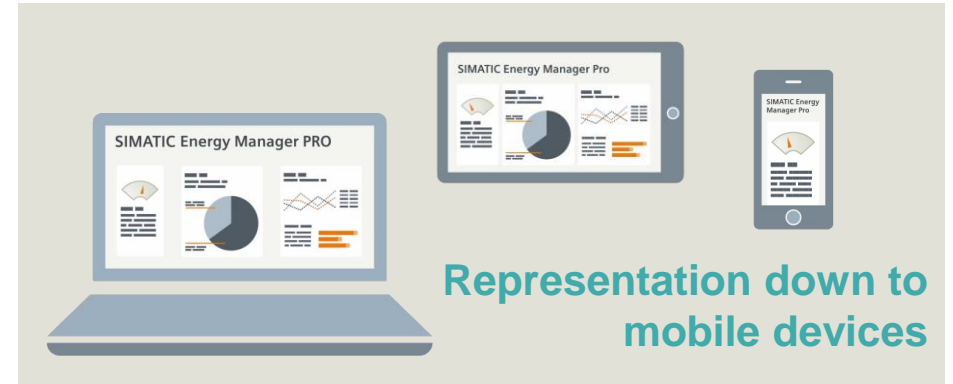
Display of the data for quick decision-making

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Advantage of a simple Energy Monitoring

- Reduced engineering effort

- Simple Display functionalities combined with integrated analysis capabilities in Web Client

- Create energy visibility (main consumer, energy behavior, standby consumption,..)

The first step establish basic transparency

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The right displaying option for the appropriate case

- Availability of a very flexible web dashboard

  - Charts like pie, line, bar

  - Gauge, traffic light, Text, Image,

  - Sankey, Head map, Map, Alarms

- Integrated statistic and analysis functionalities

Increasing the acceptance by using the proper displaying option

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SIMATIC Energy Manager
Dashboard across several sites

From high level views to the details

- The map widget supports

  - Geographical position of the site

  - Important EnPIs for this site

  - Direct navigation to the e.g. plant dashboard
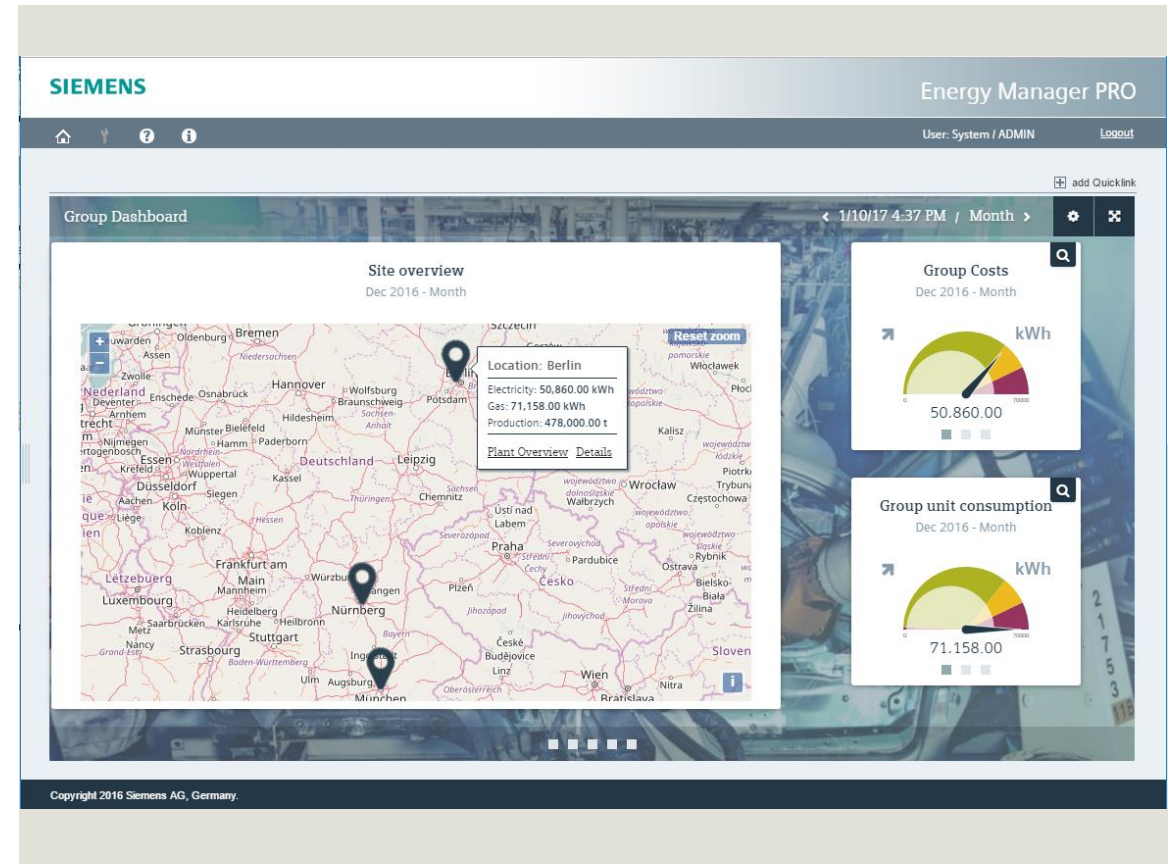
Fast overview and the possibility performing a deep dive to the appropriate information

SIEMENS

Data analysis manageable for all different user

- From trend analysis until a Multivariable Regression Analysis

- Integrated directly into the Widget

- Further extended possibilities within the reporting

Integrated analysis functionalities supports the operator during the daily work

SIEMENS

What are the energy controlling requirements?

- Flexible EnPI configuration via drag & drop

- Bringing KPIs in relation to other time frames

- Various displaying possibilities

- Benchmark functionalities

- Sustainability reporting

- Target setting and watching there achievement

Thanks to Energy Performance Indicators you have your energy efficiency under control!

SIEMENS
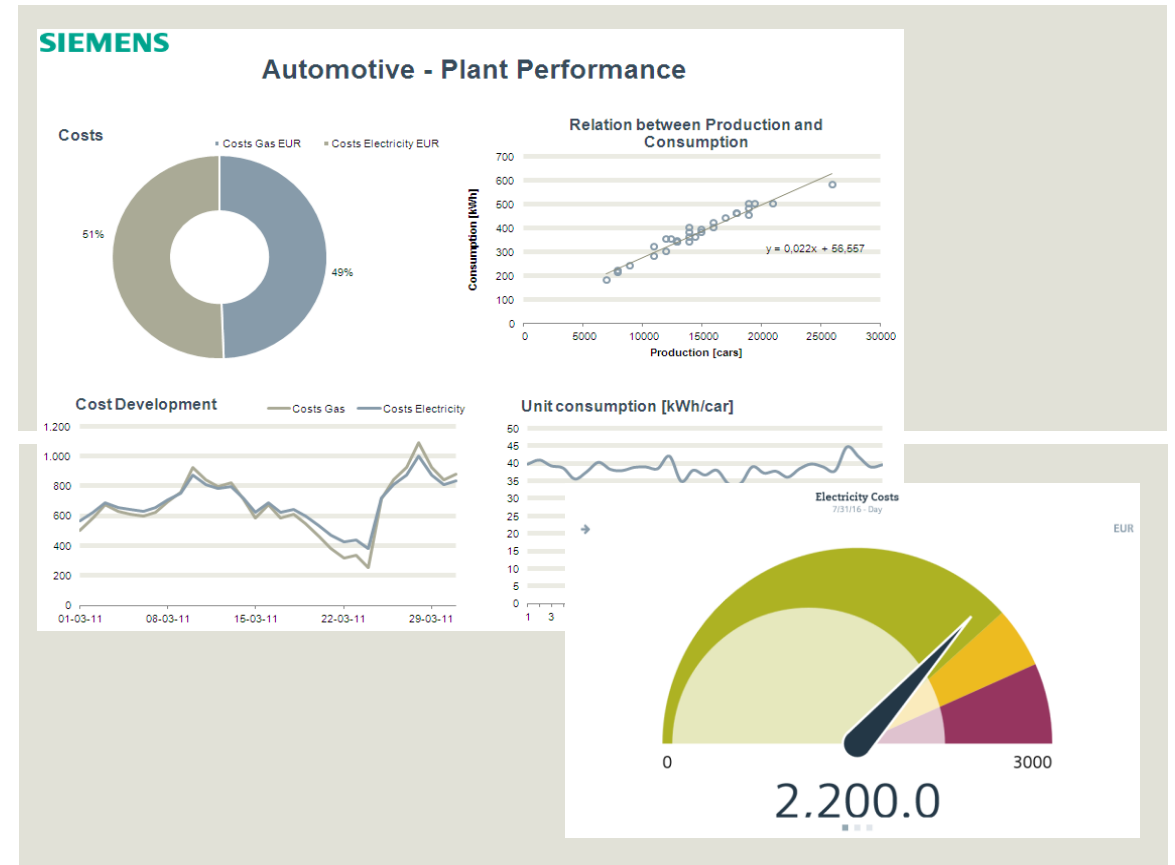
Why cost causer accounting!

- Change the behavior through cost assignment

- From simple to complex cost assignment models

- Automatic transfer of KPIs to the ERP level.

- Provision of Information through email printer or Web Client

Cost transparency as fundament for optimization measures!

SIEMENS

Trust but verify

- Invoice verification based on real energy data and the current contract

- Contract simulation getting a clear picture concerning the impact to costs

- Usage of hourly prices from e.g. stock exchange

- …

The invoice verification increase the secureness

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SIMATIC Energy Manager
Mapping of complex tariff models

Easy configuration of complex tariff models

- Energy costs depend on time of the day, day of the week or the whole months of energy consumption

- Analysis based on the tariff model could be calculated easily

- New offers of tariff models from energy supplier can be easily simulated and evaluated

Fast detection of saving potential in the tariff contract

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Data analysis on batch, product, or equipment level

- Data analysis based on equipment or materials

- Comparison of products produced by different lines

- Batch related energy balance across the production process
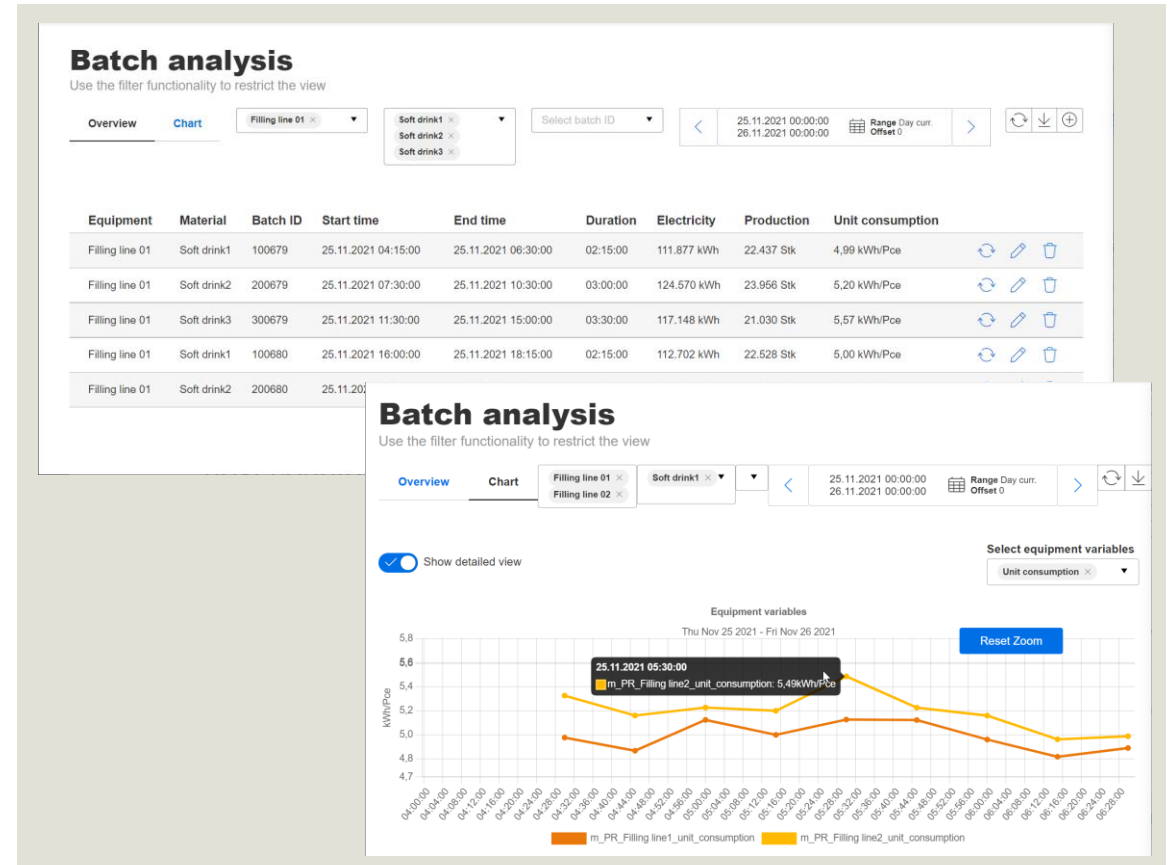
Energy consumption on product level allows CO2 food print calculations

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Get the baseline for your plant or equipment

- The baseline is the theoretical energy consumption considering the actual circumstances

- Verifying the deviation between baseline and actual consumption

- Cumulative sum of this deviation shows changes in the energy efficiency
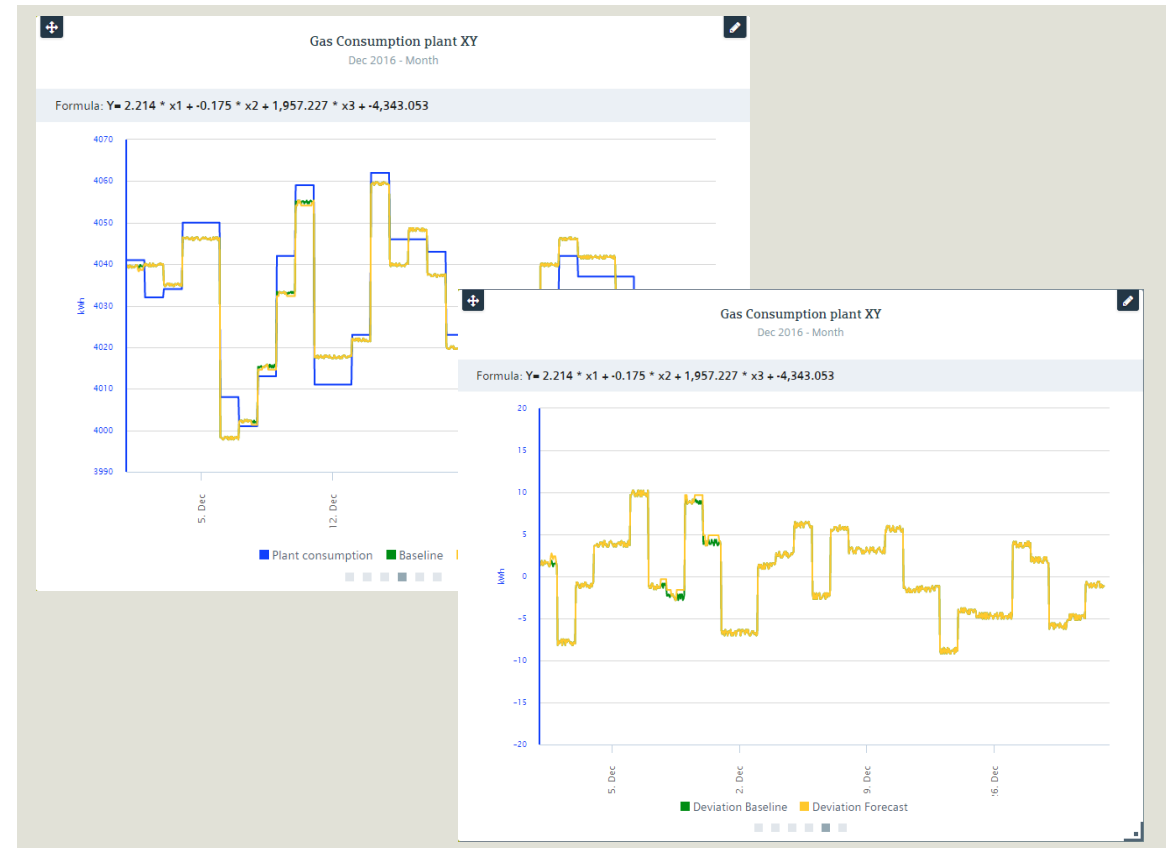
Based on the baseline you can immediately detect inefficiencies

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SIMATIC Energy Manager
Energy controlling

What are the energy controlling requirements?

- Flexible EnPI configuration via drag & drop

- Bringing KPIs in relation to other time frames

- Various displaying possibilities

- Benchmark functionalities

- Sustainability reporting

- Target setting and watching there achievement

Thanks to Energy Performance Indicators you have your energy efficiency under control!

SIEMENS
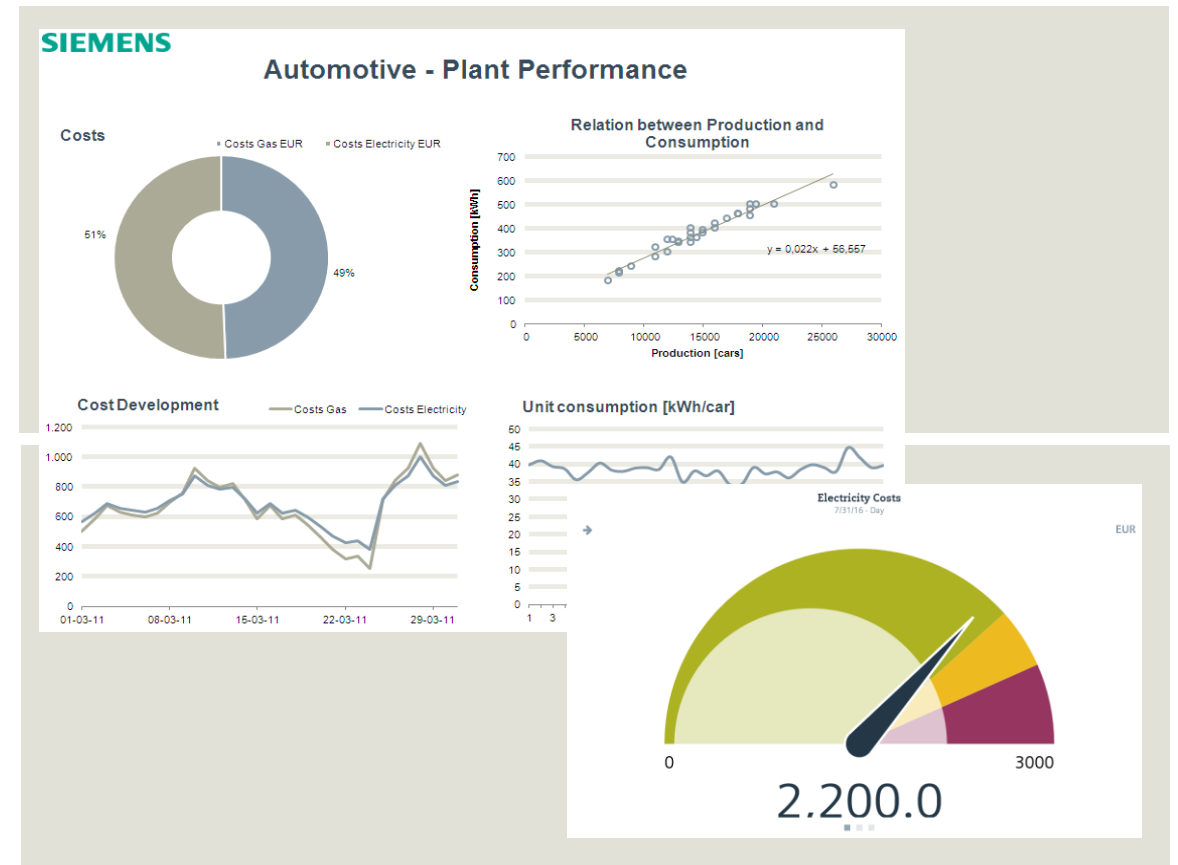
The view to the future with EnMPRO

- The several prediction models can be combined according the requirements

  - Regression analysis

  - Typical day method

  - Production plan based prediction

- The automatic generated energy schedule can be handed over to the energy supplier
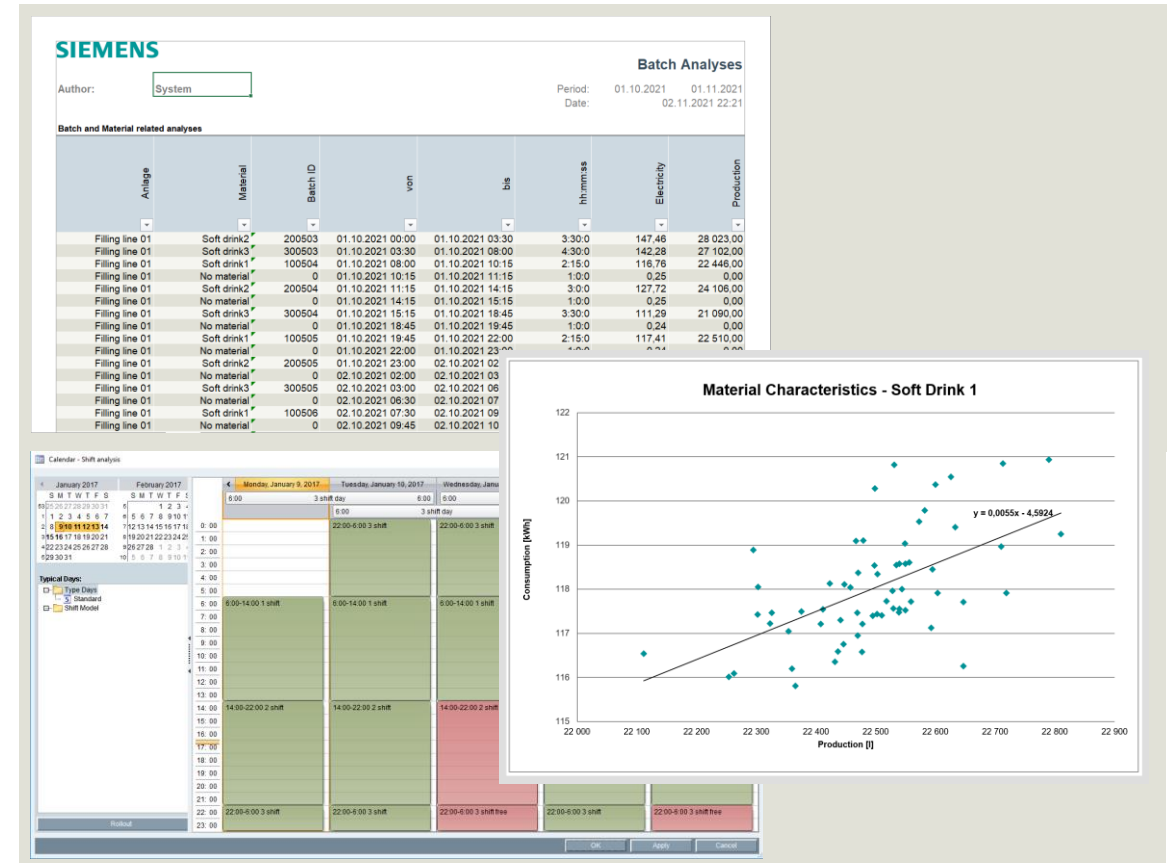
Prediction is a door opener for new way in energy procurement

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SIMATIC Energy Manager
Manual data collection

How data can be collected manually?

Not all data is available in an automatic way. Production figures or consumption data can also be entered manually

- Mobile Data Recording

- Matrix (Web, Full Client)

- Automatic data reading form MS Excel

Energy Manager Smart APP

An automatic data recording is not mandatory

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SIMATIC Energy Manager
Comprehensive reporting

With few clicks to an automatic reporting

- High flexibility in report design (Excel, Word, pdf)

- Simple configuration instead of programming

- Automatic report creation and distribution via email, printer

- Available in the Web Client

The automatic reporting supports in distributing the information

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Comprehensive authority concept

- Restricting the view to the information – The user shall only see what is provided for him

- Restricting the functionality – The user shall only do what is provided for him

- User Management via Active Directory
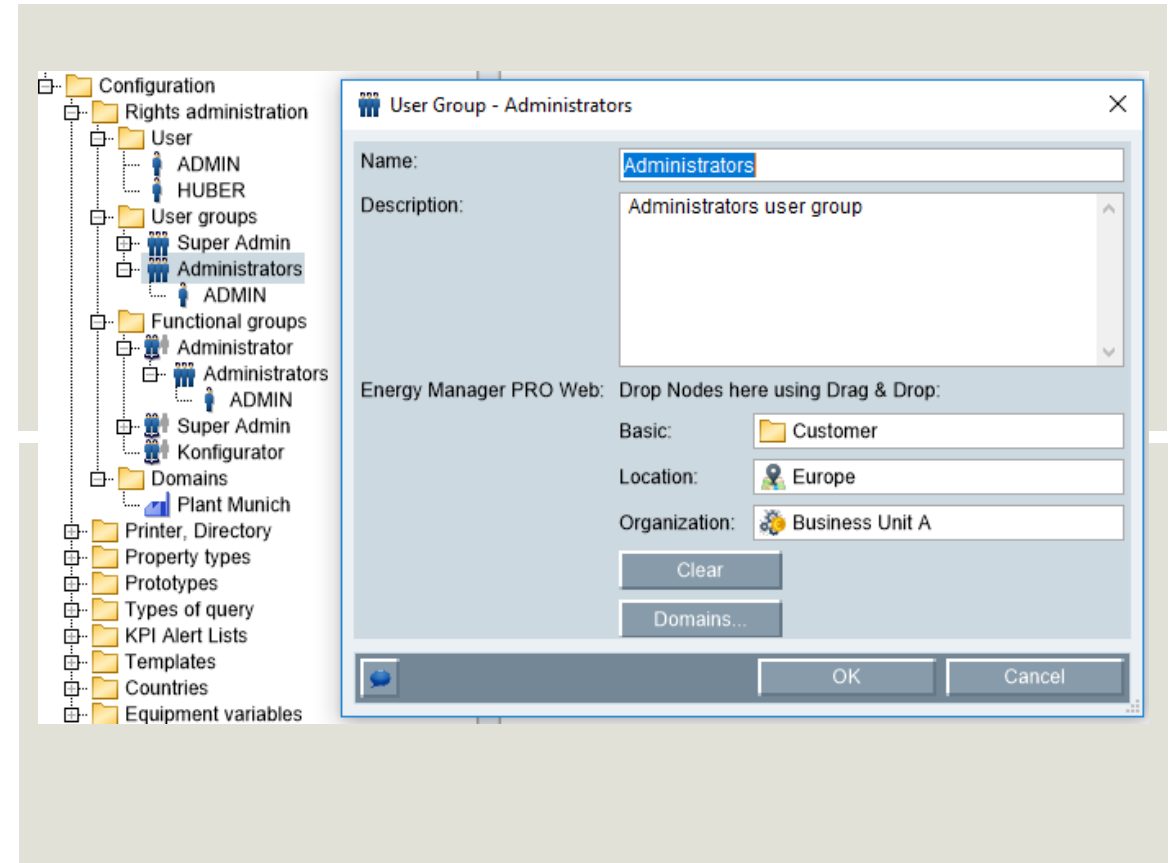
Different views to the system increase the system acceptance

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Integrated Counter Management

- Configuration and consideration of counter overflows, counter changes,…

- Automatic calculation of consumption and power

- Report including the information when the next counter calibration shall take place

Increasing data quality via the integrated counter management

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Data monitoring and alarming

- Definition of plausibility limits

- Notification center for total overview of all messages/maintenance comments

- Gap detection of collected data and monitoring of KPI/EnPI-Limits

- Alarming via E-Mail

- Data validation report shows data quality in the system

Quick reaction through early fault detection

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Comply to ISO 50001 Measure Management

- Comply to ISO 50001

- Overview about all energy efficiency measures

- Log real savings for each measure

- Overview about possible savings considering costs and CO_2 emissions

Energy Efficiency Measure						
▼ Overview	▶ Common	▶ Responsibility	▶ Saving Capabilities	▶ Cost Effectiveness	▶ Domains	▶ Attachments

Project

Name:	Heat Exchanger	Status:	Initial
Region:	Vienna	Category:	A-Project
Business Unit:	IA	Responsible User:	ADMIN

Savings

Planned Savings:	15,680.00 €/Year	Realized Savings:	16,640.00 €/Year
Planned CO_2 Reduction:	9,800.00 t/Year	Realized CO_2 Reduction:	10,400.00 t/Year

Costs and Efficiency

Investment:	50,000.00 €	Payback Period:	3.30 Years
Annual Costs:	1,500.00 €	NPV:	122,581.68 €

Close

Provides information about how much and where you should spend your many

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SIMATIC Energy Manager
Horizontal integration of the value chain

Reporting

Data analysis with chart

Dashboard

Monitoring

Accounting

Controlling

Prognosis Purchase

EE-Measure Management (ISO 50001)
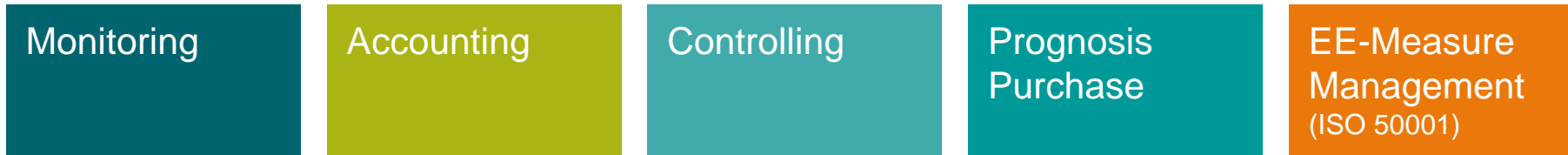
Supported Functionality

- Key Performance Indicators
- Counter management (overflow, change, ...)
- Alarming
- Replacement strategy
- Authority concept

Data collection across all divisions

Supply

Transformation

Distribution

Consumption

Disposal

SIEMENS
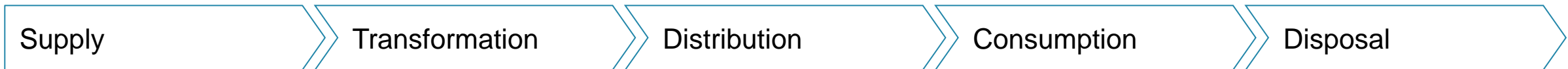
SIMATIC Energy Manager Basic V7.3
A new product for an easy access

Easy access – „Energy Manager Basic"

- Configuration with the Web Client

- Easy Dashboard- and report configuration

- Interfaces like OPC, Energy Suite, WinCC, Modbus/TCP

- Easy user management

- Available languages are DE, EN, IT, FR, ES, CN

- Upgrade possibility to EnMPRO with License key

- Installation of all software components on one PC

Upgrade possible at any time

Energy Manager Basic		Energy Manager PRO

Web engineering

Web engineering

+ Full Client configuration for advanced topics

Customer benefit

- Easy and fast entry to energy data management

- Intuitive Web engineering

- Scalable solution thanks to easy upgrade to the Energy Manager PRO

SIEMENS
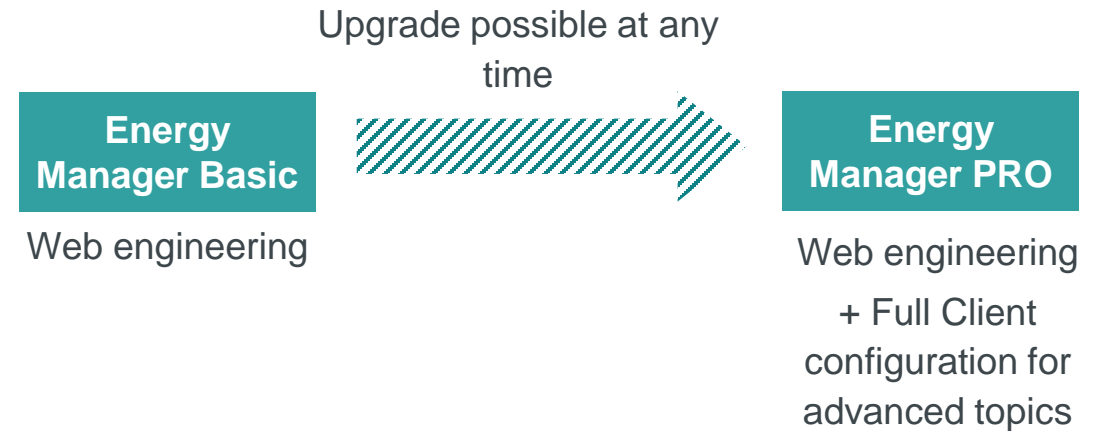
SIMATIC Energy Manager PRO V7.3 –
Enhanced functionality by upgrading to Energy Manager PRO

Energy Manager PRO

Additional functions:

- Full client configuration (total functional scope)
- advanced reporting with global templates
- Batch and material analysis, Forecasting possibilities
- S7 EE Monitor interface including template and instance concept
- Energy efficiency measures
- Additional Interfaces: OLE DB, ASCII-File, S7
- Additional data acquisitions (further locations)

Customer benefit

- Individually adaptable energy management system
- Baseline management
- Cross-disciplinary machine analysis/ calculation of key performance indicators
- Benchmark of machines

EnMPRO

MindSphere

PROFINET

SCADA

Energy Suite

Machine

S7 EE-Monitor

SIEMENS
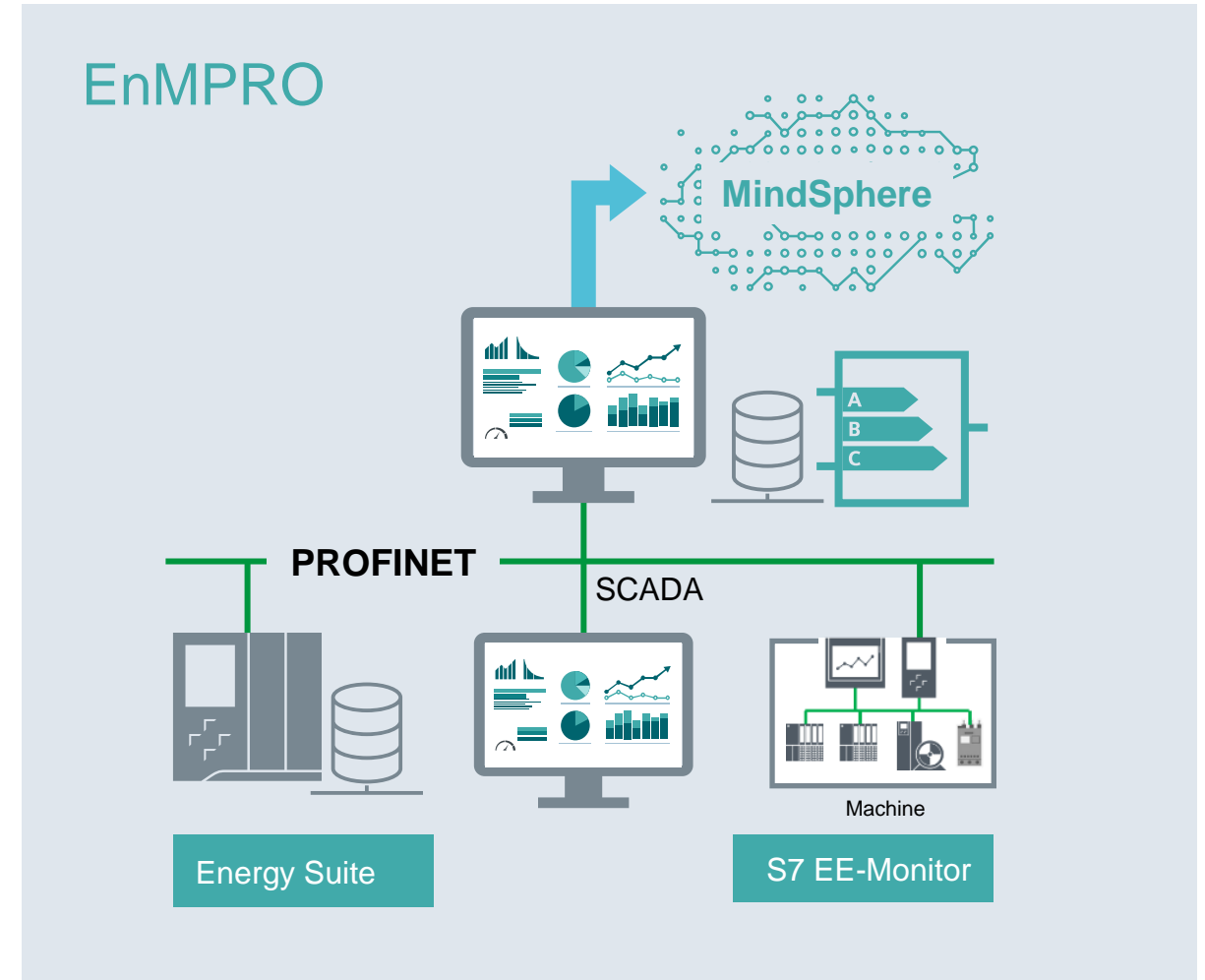
How does the system architecture look like?

- Scalable architecture with up to 30.000 tags

- Distributed Acquisition units

- Windows Server 2019 operating system

- SQL Server 2017 Standard Edition
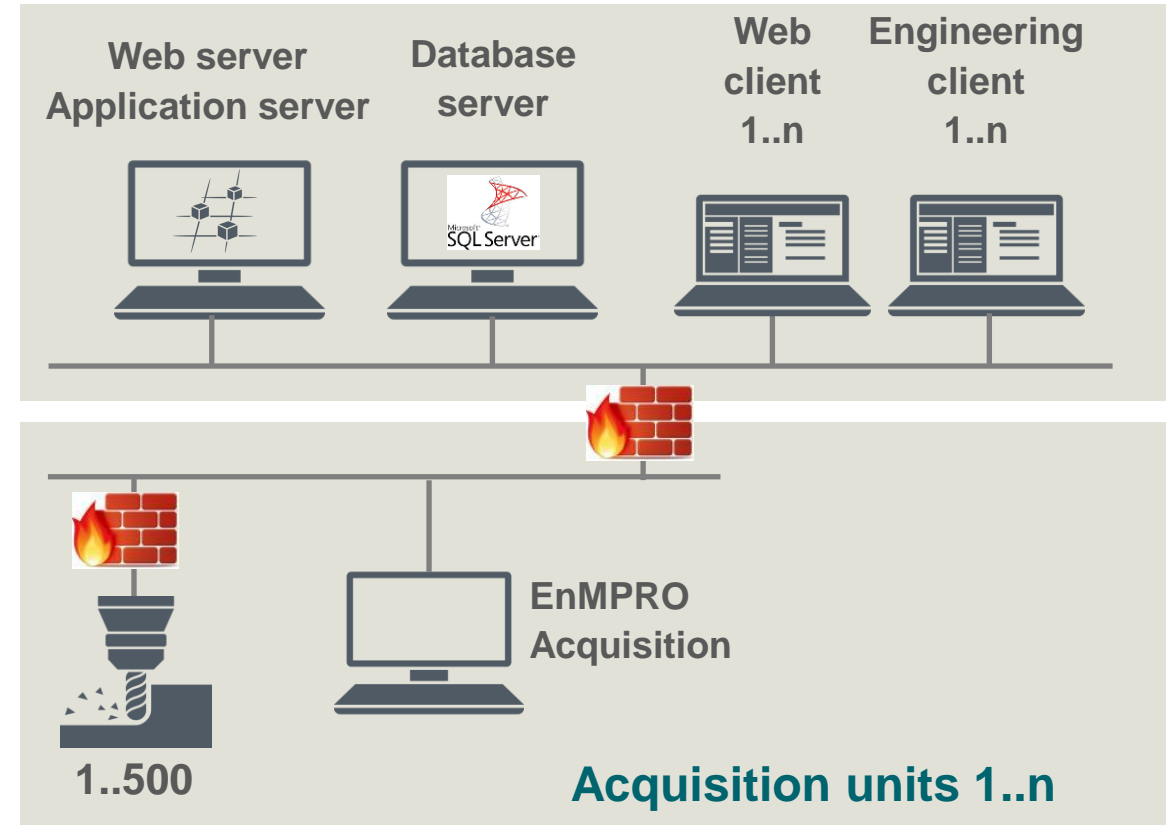
The suitable architecture for any requirement from a single station to a distributed architecture

SIEMENS

Advantage of decentralized data acquisition

- Pre-calculation of data (non-linear correlation)

- Standardization of data (counter, consumption, power)

- Compression of data and additional calculation of statistical values

- Limit monitoring ++

- Secure data transfer (3DES 256-Bit)

EnMPRO Server

Pre-calculation

compression + statistics

standardization

Limit monitoring

Secure communication

EnMPRO Acquisition

Interface Management
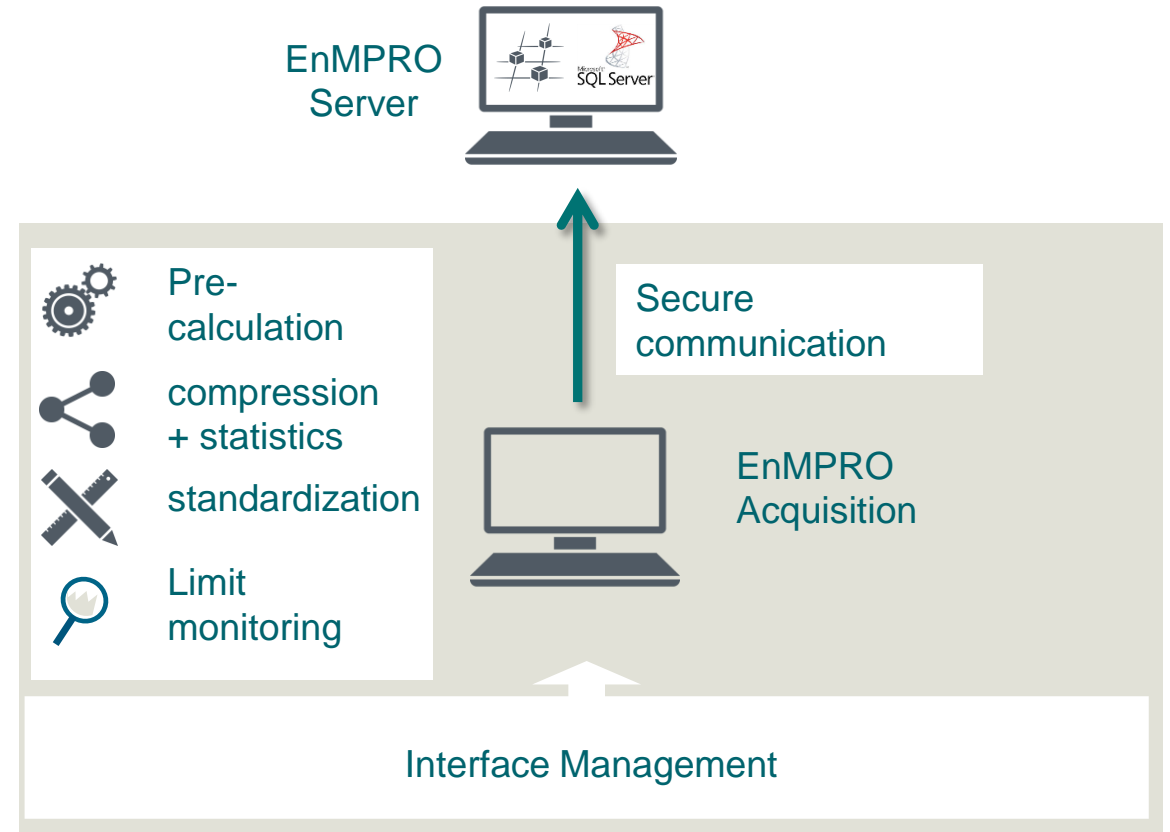
Preparation of data starts at the (decentralized) data acquisition

Energy Manager PRO
Interfaces

„Connectivity" in main focus

- Numerous data interfaces to collect the necessary information

- Support of int. standards like OPC UA,..

- Open system to calculate e.g. KPIs/EnPI or costs and provide the results to other systems

- Mobile data acquisition

Interface Management

Energy Manager Smart APP

EnMPRO

XML/CSV Export (e.g.ERP)

OPC UA HA Server

MindSphere (IOT System)

Energy Suite WinCC / PCS7	OPC UA (DA / HA)	OPC DA, HDA	Modbus TCP
S7 via SIMATIC NET OPC Server	OLE DB	(s)FTP (ASCII, XML)	Desigo CC BMS (Building m.)
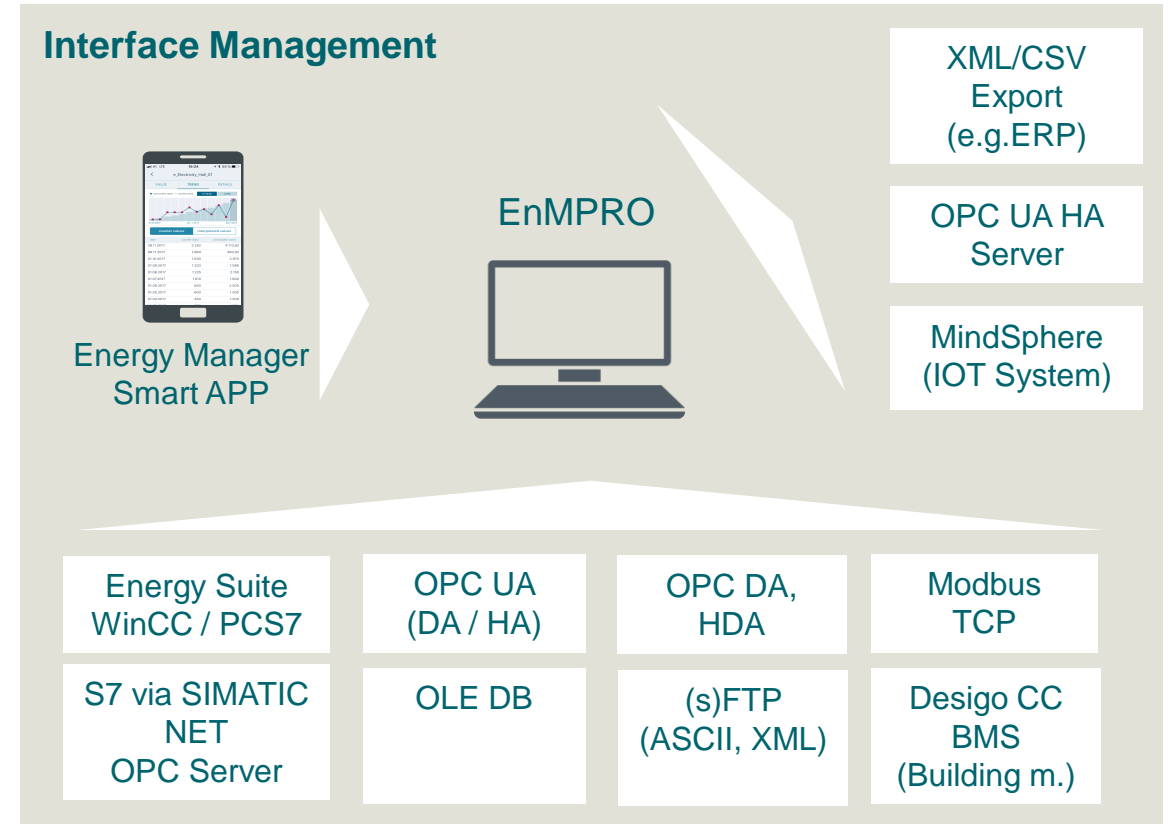
Openness to collect data for global transparency and export possibility of results

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SIMATIC Energy Manager V1.0
IOS and Android App for a mobile data acquisition

Functions

- **Synchronization** of the route and the corresponding data point configuration as well as the plausibility settings
- Counter identification with scanning of the **QR- or Barcode**
- **Plausibility review** during the data entry
- Translation of the counter value into a consumption value
- Value correction of the different acquisition cycles (28., 3., 5. of the month)
- **Graphical trend representation** of the last 12 acquired as well as interpolated values
- **Offline mode** – data acquisition possibility
- Support of **encrypted communication** (https)

Customer benefit

- Full transparency of the energy consumption
- Increase of data quality through plausibility review and counter identification
- Easy and intuitive handling

Apple App-Store:

Google Play-Store:
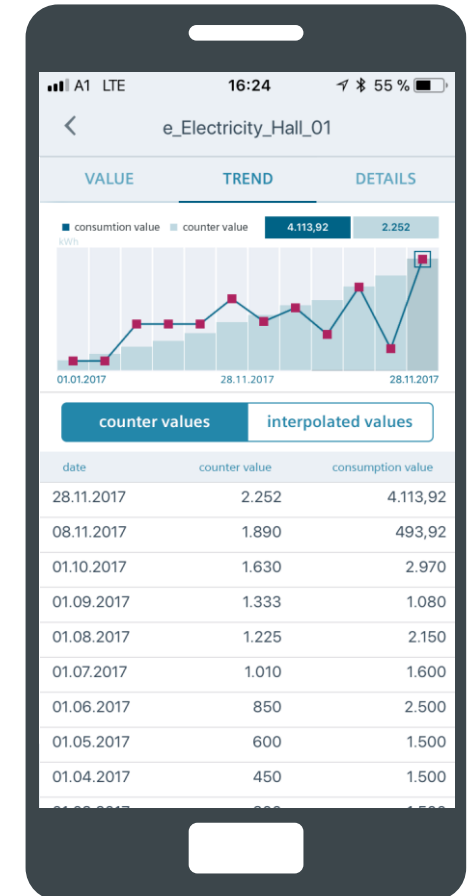
SIEMENS

SIMATIC Energy Manager V7
MindSphere Connectivity with Basic and PRO

Connectivity to MindSphere

- Automatic creation of the **variables** in the MindSphere (Cloud)

- Cyclic and secure **data transmission of** time series

Customer benefit

- In addition to the on-premise analysis option for the data, the Energy Manager Basic / PRO is used as **data collector and data pre-processor** with an **Interface** towards the **MindSphere**

- This data can be used for further analyses and services in the MindSphere

EnM Basic / PRO V7

MindSphere

SCADA

Machine

Energy Suite

S7 EE-Monitor

SIEMENS
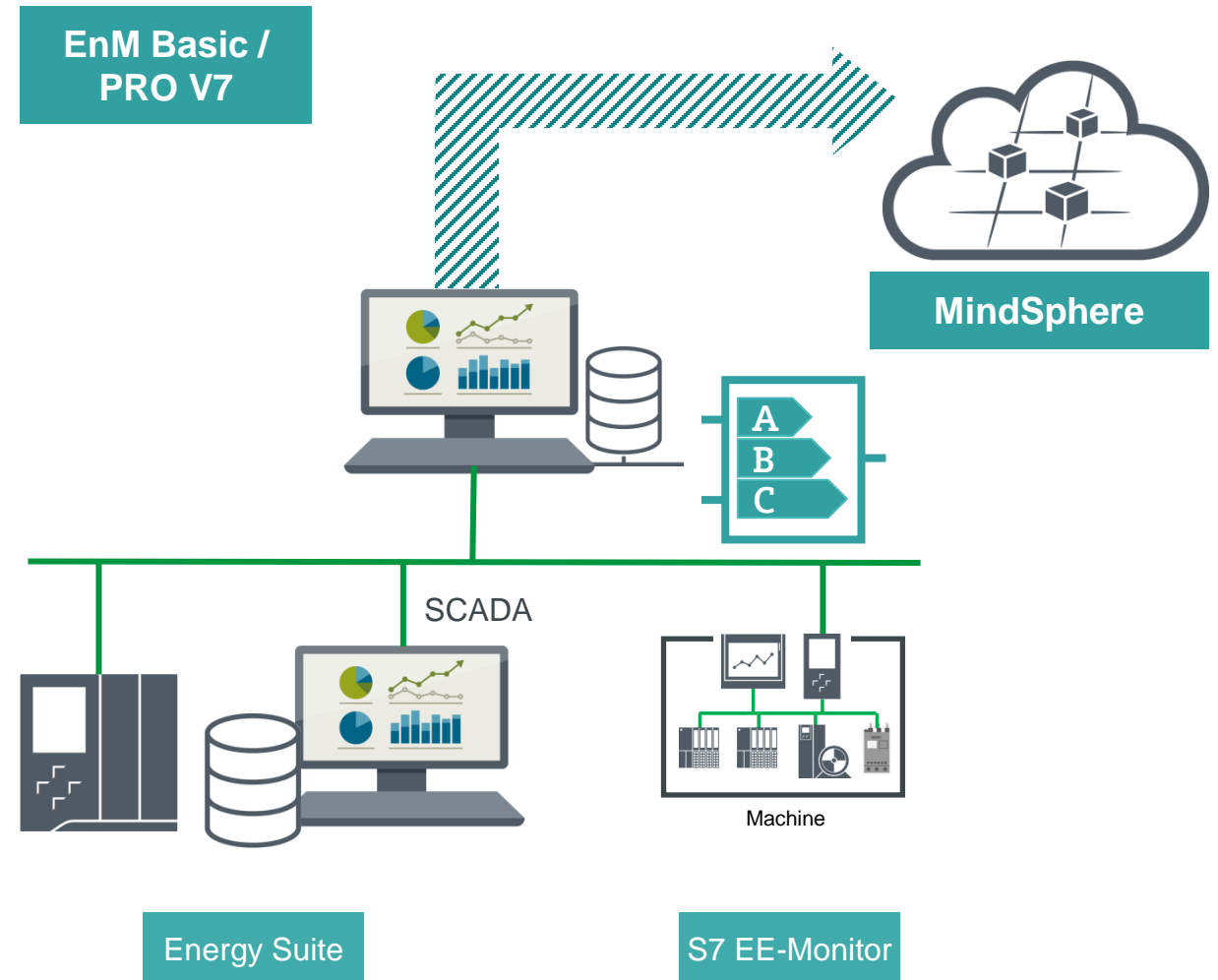
SIMATIC Energy Data Management
Energy Acquisition / Energy Monitoring / Energy Management

EnMPRO Web Client

Existing Office-PCs
Windows 10
MS Office 365
MS Edge, Google Chrome

EnMPRO Full Client (optional)

Engineering client
Windows 10
MS Office 365

EnMPRO Server

Database- and Applicationserver
WEB Server
MS Windows Server 2019

EnMPRO Mobile APP

Corporate LAN

S7 1512SP-1 PN + Energy Suite + Buffer

WinCC Prof V17 E-Monitoring (Energy Suite)
+EnMPRO Acquisition

DMZ / Router

Prozess LAN

S7 300

PAC 4200 Gateway

MODBUS RTU

PAC 3100

PAC 3200

PAC 3200

PAC 3200

Liquid (pulse)

Gas (analog)

4-20 mA

ET200SP-1PN + Energy Meter, AI, DI

current converter

Liquid (pulse)

Gas (analog)

4-20 mA

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SIMATIC Energy Management
Distributed Data Architecture for additional locations + Cloud

EnMPRO Mobile APP

EnMPRO Full Client

Existing Office-PC
Windows 10
MS Office 365
MS Internet Explorer 11,
Edge, Chrome, Safari, Firefox

EnMPRO WEB Clients

Existing Office-PC
Windows 10
MS Office 365
MS Internet Explorer 11,
Edge, Chrome, Safari, Firefox

EnMPRO Server

EnMPRO Server
MS WIN Server 2019, IIS
MS Office 365
SQL Server 2017 Standard
Edition in EnMPRO included

MindConnect-Lib

MindApps

MindSphere

Ethernet (TCP/IP)

WAN/ LAN

Corporate-LAN

Site A

Data Acquisition
NanoBox IPC227E

EnMPRO (Acquisition-component)

Router/ Firewall

Site B

Router/ Firewall

Ethernet (TCP/IP)

Process - LAN

Sentron PAC 4200

MODBUS TCP

Sentron PAC 3100/1600

MODBUS RTU

Gas

Electrical Energy

PAC 1600 (MID)

Data Acquisition
PLC S71510SP-1PN
AI Energy-Meter, DI
Simatic ET 200 SP

Gas
Compressed air
Cold water
Hot water

Electrical Energy

Production data server (OPC UA)

SCADA

EnMPRO (Acquisition-component)

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Basic licenses and Tag Packages

SIMATIC Energy Manager V7.3	MLFB for Download	MLFB	Download-Price
SIMATIC Energy Manager Basic (incl. 50 Tags) [1]	6AV6372-1DF07-3AH0	6AV6372-1DF07-3AX0	3 060 €
SIMATIC Energy Manager PRO (incl.50 Tags) [1]	6AV6372-2DF07-3AH0	6AV6372-2DF07-3AX0	6 120 €
SIMATIC Energy Manager Powerpack Basic -> PRO	6AV6372-2DF07-3AH3	6AV6372-2DF07-3AX3	3 060 €
SIMATIC Energy Manager Tag Packages	**MLFB for Download**	**MLFB**	**Download-Price**
SIMATIC Energy Manager Tag Package 50 [2]	6AV6372-2DF07-0CH0	6AV6372-2DF07-0CX0	4 080 €
SIMATIC Energy Manager PRO Tag Package 100 [2]	6AV6372-2DF07-0DH0	6AV6372-2DF07-0DX0	7 140 €
SIMATIC Energy Manager PRO Tag Package 250 [2]	6AV6372-2DF07-0EH0	6AV6372-2DF07-0EX0	10 200 €
SIMATIC Energy Manager PRO Tag Package 500 [2]	6AV6372-2DF07-0FH0	6AV6372-2DF07-0FX0	14 280 €
SIMATIC Energy Manager PRO Tag Package 1000 [2]	6AV6372-2DF07-0GH0	6AV6372-2DF07-0GX0	24 480 €
SIMATIC Energy Manager PRO Tag Package 5000 [2]	6AV6372-2DF07-0HH0	6AV6372-2DF07-0HX0	28 560 €
SIMATIC Energy Manager PRO Tag Package 30000 [2]	6AV6372-2DF07-0JH0	6AV6372-2DF07-0JX0	34 680 €

Note

1. Included components: 1 Acquisition, 1 Client, 1 Web-Client, Mobile Data acquisition; embedded database: Microsoft SQL Server 2017 Standard Edition embedded
2. With the tag packages the number of tags can be extended dynamically. The total number of tags is extended by the number of tags in the tag package

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License overview – Energy Manager
Extension- and SUS licenses

Extensions	MLFB for Download	MLFB	Download-Price
SIMATIC Energy Manager 3 Web Clients [1]	6AV6372-2DF27-0AH0	6AV6372-2DF27-0AX0	2 040 €
SIMATIC Energy Manager 20 Web Clients [1]	6AV6372-2DF27-0BH0	6AV6372-2DF27-0BX0	7 650 €
SIMATIC Energy Manager 60 Web Clients [1]	6AV6372-2DF27-0CH0	6AV6372-2DF27-0CX0	15 300 €
SIMATIC Energy Manager PRO Client [1]	6AV6372-2DF37-0AH0	6AV6372-2DF37-0AX0	1 326 €
SIMATIC Energy Manager PRO Planung & Prognose [3]	6AV6372-2DF47-0AH0	6AV6372-2DF47-0AX0	6 120 €
SIMATIC Energy Manager PRO Acquisition component [2]	6AV6372-2DF57-0AH0	6AV6372-2DF57-0AX0	2 040 €
SUS up to 50 Tags and/or 1 Consumer Package	6AV6372-2DF00-0CY0	6AV6372-2DF00-0CL0	1 224 €
SUS up to 100 Tags and/or 5 Consumer Package	6AV6372-2DF00-0DY0	6AV6372-2DF00-0DL0	1 836 €
SUS up 500 Tags and/or 25 Consumer Package	6AV6372-2DF00-0FY0	6AV6372-2DF00-0FL0	3 672 €
SUS up to 5000 Tags and/or 100 Consumer Package	6AV6372-2DF00-0HY0	6AV6372-2DF00-0HL0	6 120 €
SUS > 5000 Tags and/or more than 100 Consumer Packages	6AV6372-2DF70-0XY0	6AV6372-2DF70-0XL0	8 160 €

Note

In general, licenses are placed on the EnMPRO Application-Server with the Automation License Manager (ALM).
1. All Full Client as well as Web Client licenses are Floating licenses. The number of clients can be increases in the same way like the Tag Packages
2. Additional Acquisition components for further data acquisition (always related to PC hardware)
3. Is JUST needed to use the production plan manager (prediction based on a production plan)

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Energy Manager
Licensing

Upgrade Lizenz

Energy Manager Basic -> Energy Manager PRO

Energy Manager Basic

Energy Manager PRO

Tag Packages

Web Client

SUS

Tag Packages

Web Client

SUS

Weitere Optionen

Tag Package and Web Client can be used for both products

SUS can be used for both products. The 50 tags from the start package are included
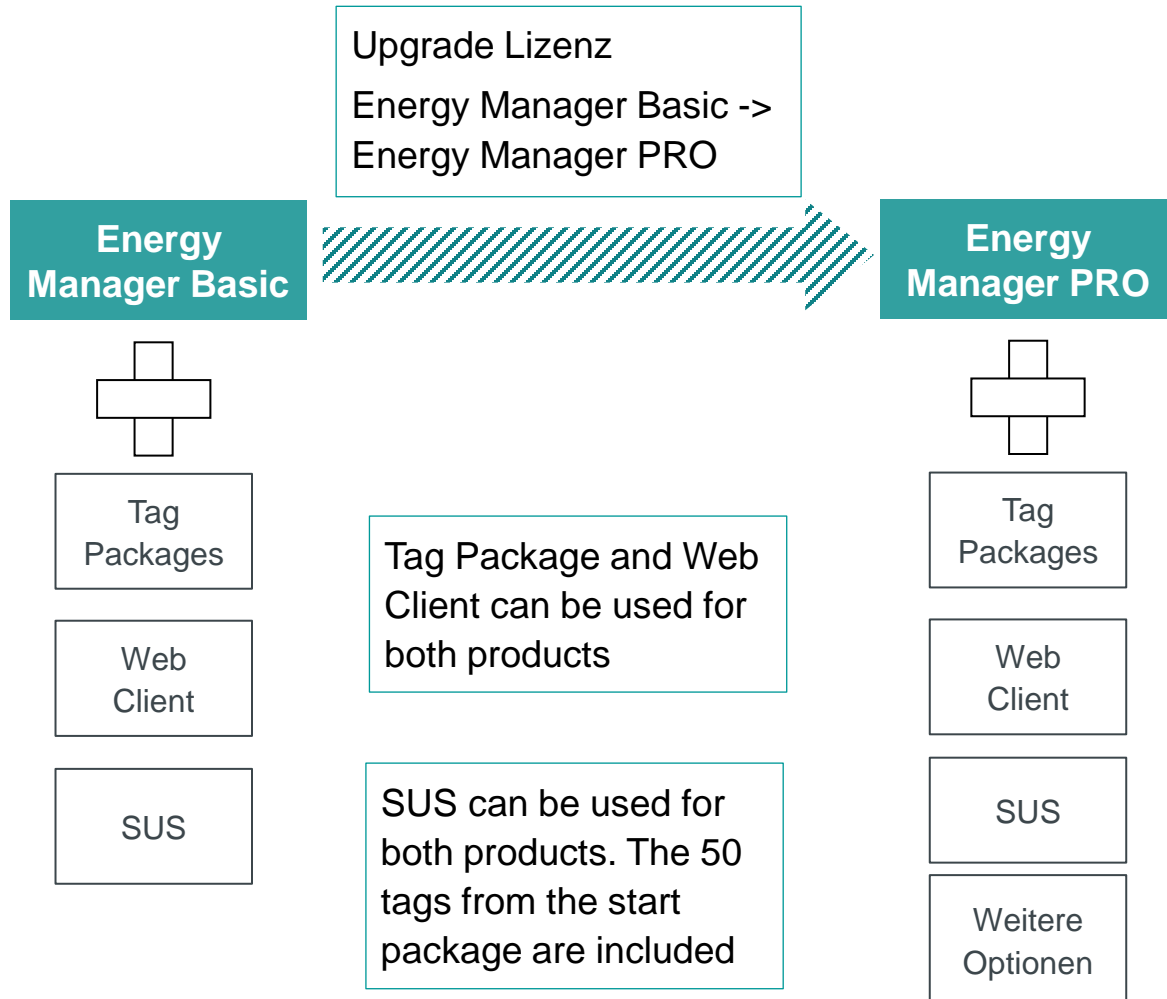
Option: further components

1	Energy Manager PRO Client
2	Energy Manager PRO Acquisition
3	Energy Manager PRO Prognosis & Planning

Option: Consumer licenses

4	Energy Manager PRO Consumer Package 1 (excl. EE Monitor)
5	Energy Manager PRO Consumer Package 5 (excl. EE Monitor)
6	Energy Manager PRO Consumer Package 25 (excl. EE Monitor)
7	Energy Manager PRO Consumer Package 1 (incl. EE Monitor)
8	Energy Manager PRO Consumer Package 5 (incl. EE Monitor)
9	Energy Manager PRO Consumer Package 25 (incl. EE Monitor)

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Energy Manager PRO 7.3
S7 EE-Monitor // EE@Transline

⌂

The OEM is the motivator		The end customer is the motivator

Variant 1

Only EE-Monitor

Variant 2

Optional: Extension to EnMPRO

Variant 3

Consumer + S7 EE-Monitor

| EnMPRO Server (Start Package) **6.120,- €** | + | Tag Packages |
| | | SUS |

| EnMPRO Consumer (TIA) license excl. S7 EE-Monitor **255,- €** | | Options |
| | | Service |

| EE-Monitor license **204,- €** | + | |

Each Machine

Each machine

| EnMPRO Server (Start Package) **6.120,- €** | + | Tag Packages |
| | | SUS |

| EnMPRO Consumer license Incl. S7 EE-Monitor **408,- €** | | Options |
| | | Service |

Each machine

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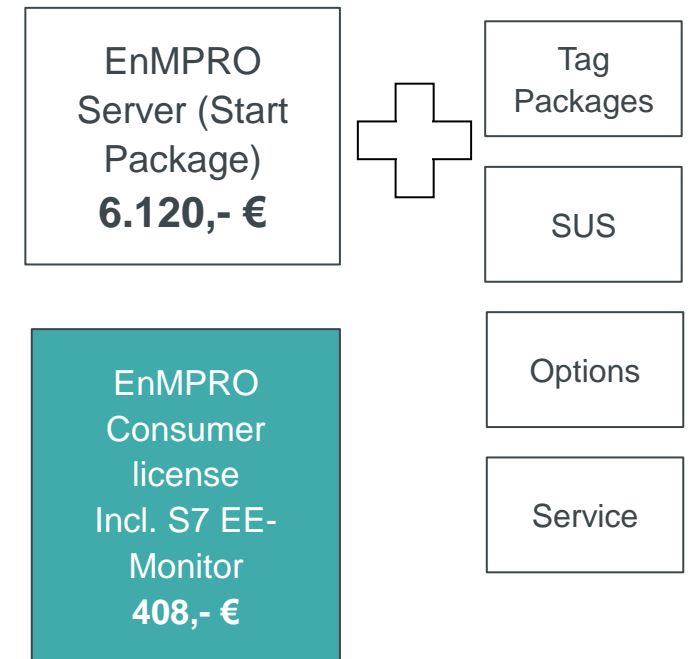
Energy Manager PRO 7.3
Included tags at Consumer License

	Consumer incl. EE-Monitor	Consumer excl. EE-Monitor
EE-Monitor / EE@Transline	COL can be used to unlock the S7 EE monitor on the PLC	
	up to 72 tags included	up to 72 tags included
	Type instance concept can be used directly via the interface wizard (machine)	Type instance concept can be used directly via the interface wizard (machine)
Type – Instance Without S7-PLC blocks	up to 15 tags included UC 1: 5 tags per machine - No additional tags needed UC 2: 25 tags per machine. 10 tags are deducted from the tag packages	up to 15 tags included UC 1: 5 tags per machine - No additional tags needed UC 2: 25 tags per machine. 10 tags are deducted from the tag packages

Licenses (1 Consumer is included)

0	EnMPRO has incl. 1 License	€ 0 ,-
1	Consumer incl. S7 EE-Monitor	€ 408 ,-
2	Consumer excl. S7 EE-Monitor	€ 255,-

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License overview – Energy Manager
Consumer und Upgrade licenses

Consumer instance	MLFB for Download	MLFB	Download-Price
Consumer Package 1 incl. EE Monitor [1]	6AV6372-2DF67-1AH0	6AV6372-2DF67-1AX0	408 €
Consumer Package 5 incl. EE Monitor [1]	6AV6372-2DF67-1BH0	6AV6372-2DF67-1BX0	2 040 €
Consumer Package 25 incl. EE Monitor [1]	6AV6372-2DF67-1CH0	6AV6372-2DF67-1CX0	10 200 €
Consumer Package 1 excl. EE Monitor [1]	6AV6372-2DF77-1AH0	6AV6372-2DF77-1AX0	255 €
Consumer Package 5 excl. EE Monitor [1]	6AV6372-2DF77-1BH0	6AV6372-2DF77-1BX0	1 275 €
Consumer Package 25 excl. EE Monitor [1]	6AV6372-2DF77-1CH0	6AV6372-2DF77-1CX0	6 375 €
Upgrade licenses	**MLFB for Download**	**MLFB**	**Download-Price**
Upgrade of systems with up to 50 Tags and/or 1 Consumer Package	6AV6372-2DF07-3CH4	6AV6372-2DF07-3CX4	2 448 €
Upgrade of systems with up to 100 Tags and/or 5 Consumer Package	6AV6372-2DF07-3DH4	6AV6372-2DF07-3DX4	3 570 €
Upgrade of systems with up to 500 Tags and/or 25 Consumer Package	6AV6372-2DF07-3FH4	6AV6372-2DF07-3FX4	7 140 €
Upgrade of systems with up to 5000 Tags and/or 100 Consumer Package	6AV6372-2DF07-3HH4	6AV6372-2DF07-3HX4	12 240 €
Upgrade of systems with more than 5000 Tags and/or more than 100 Consumer Packages	6AV6372-2DF77-3XH4	6AV6372-2DF77-3XX4	16 320 €

Note

In general, licenses are placed on the EnMPRO Application-Server with the Automation License Manager (ALM).
1.   With the consumer licenses the machine instance functionality is available. With the Consumer Package licenses the number of consumers can be dynamically increased in the same way like the Tag Packages
2.   All upgrade packages cover additional the 50 tags of the basic package (e.g. "Upgrade up to 100 Tags" covers 150 license tags)

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SIMATIC Energy Manager
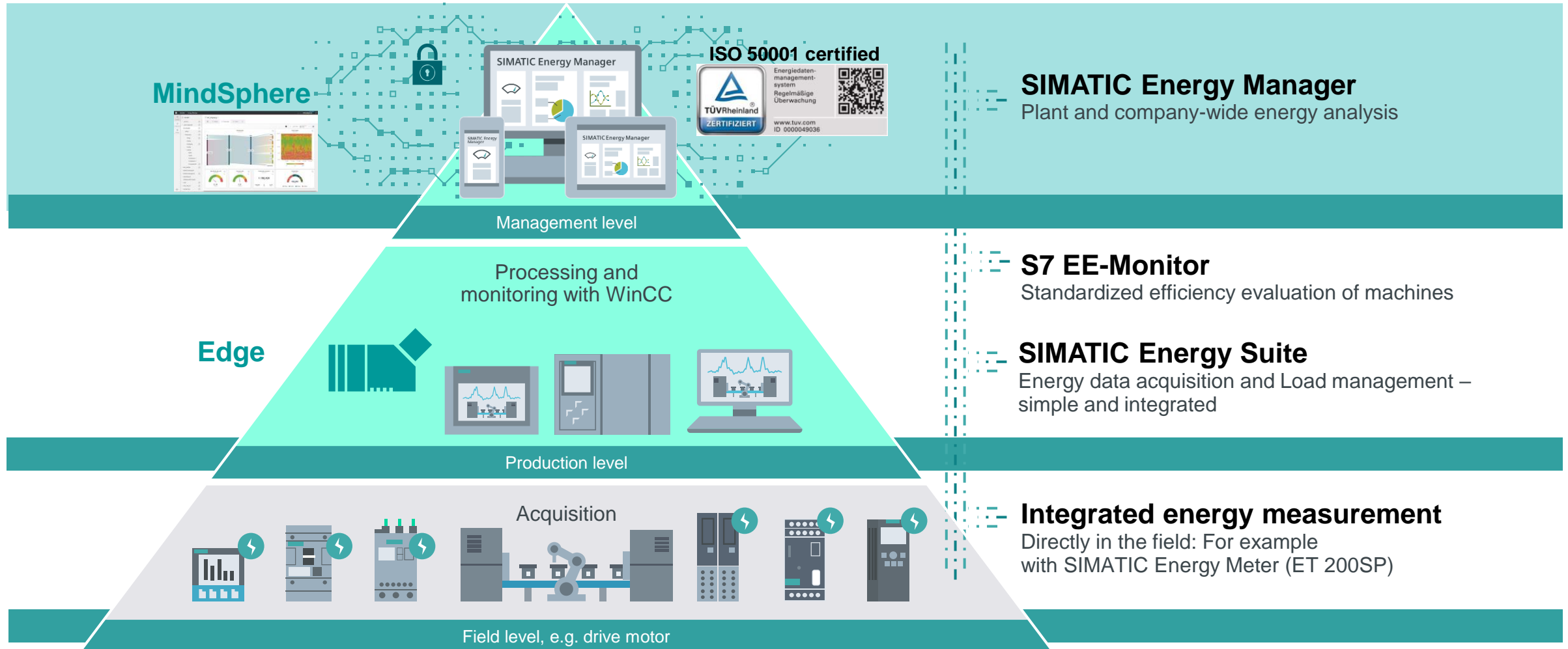## Advantages at a glance

- It creates **company-wide transparency**, thanks to continuous **energy balancing and materials balancing** for the power generation systems and loads.

- Enables **cost-by-cause energy cost allocation** and facilitates **connection to the accounting system**, for example, SAP R/3.

- Makes sound statements about **increasing energy efficiency** based on **key figures**.

- Provides planning reliability thanks to **production-related load and demand forecasts**.

- Supports the purchasing department in the **optimization** of the **energy procurement**.

- **It fulfills the legal obligations** for monitoring of and reporting on **greenhouse gas emissions** (CO2 emissions) through **automatic power reporting.**

- Supports customers in continuously improving energy efficiency through integrated **energy efficiency measures management** and thus meets the requirements of **ISO 50001**.

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Energy Manager
Edge / MindSphere App

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SIMATIC Energy Management –
Transparency and efficiency from machine level to company level

MindSphere

SIMATIC Energy Manager

ISO 50001 certified

Management level

Edge

Processing and monitoring with WinCC

Production level

Acquisition

Field level, e.g. drive motor

SIMATIC Energy Manager
Plant and company-wide energy analysis

S7 EE-Monitor
Standardized efficiency evaluation of machines

SIMATIC Energy Suite
Energy data acquisition and Load management –
simple and integrated

Integrated energy measurement
Directly in the field: For example
with SIMATIC Energy Meter (ET 200SP)

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Industrial IoT apps based on open standards
around Cloud Computing and Edge Computing

MindSphere app

Cloud apps
with global access to data

Edge apps
for local data processing close to machines

Industrial Edge app

Edge devices

IoT gateway

Mobile apps
for fast reactions and easy interaction

With Mobile client app

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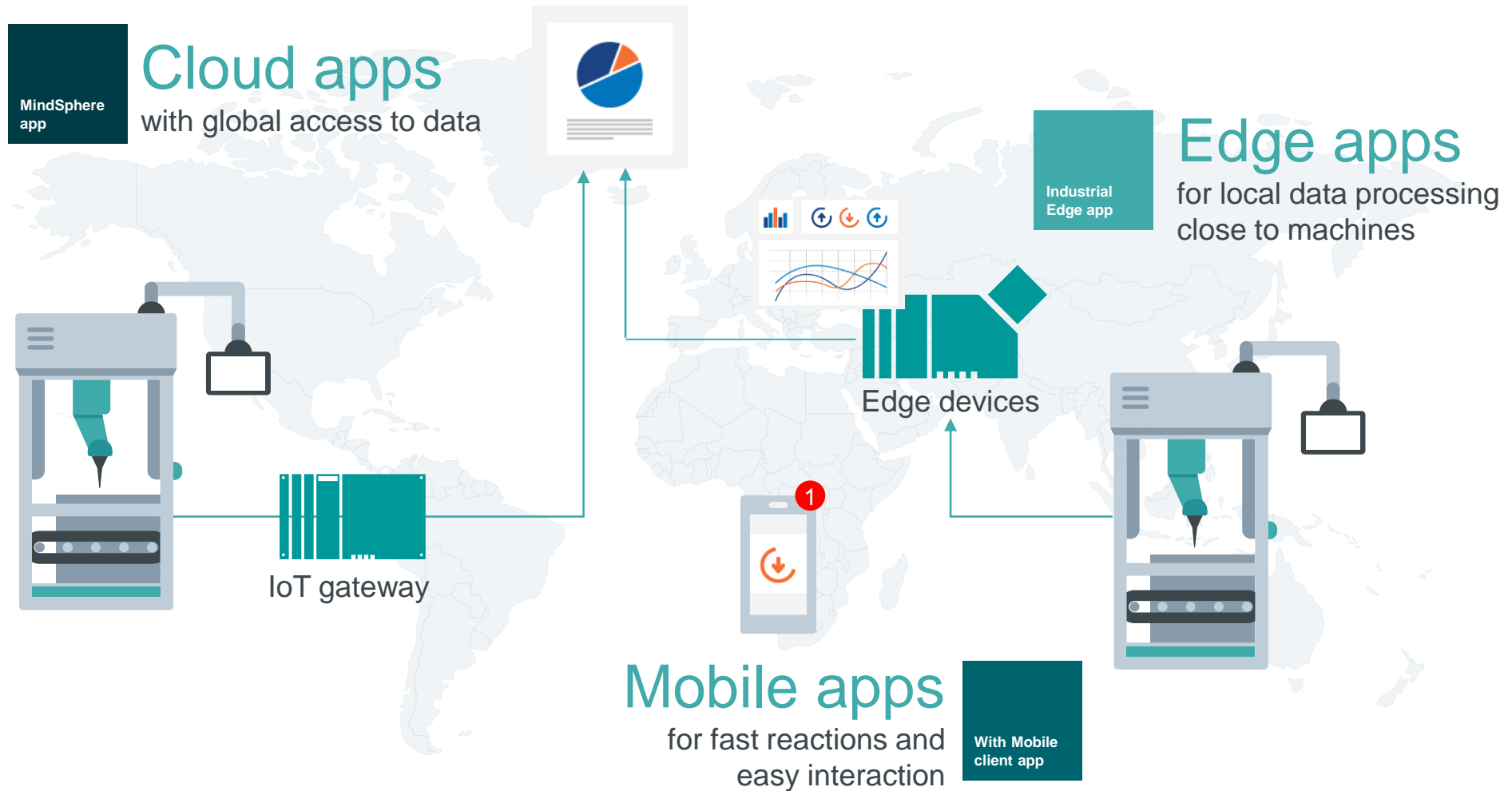
Industrial Cloud/Edge – Application for production machines and - plant

Transparency on consump-tion with **Energy Manager**

Easy Dashboarding with **Performance Insight**

Digital maintenance cockpit in **Machine Monitor**

Error and alarm logbook in **Machine Insight**

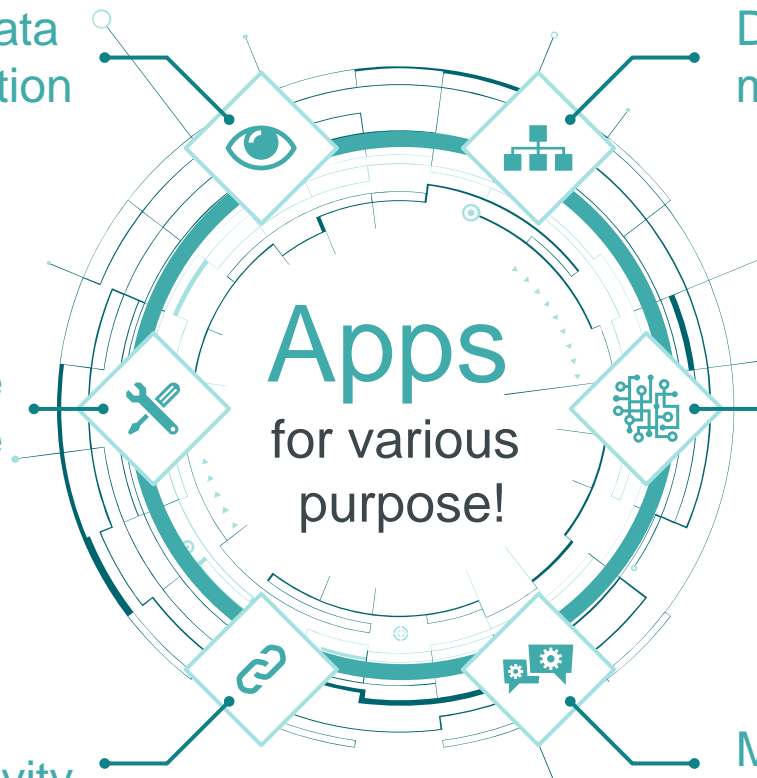Root Cause analysis with **Collaboration Board**

Connect the shopfloor with Industrial Edge **Connectors**

Data visualization

Device management

Machine service

Apps
for various purpose!

Data processing

Connectivity

Machine interaction

Scan and stock your network with **Inventory**

Update your systems with **SIMATIC Automation Tool**
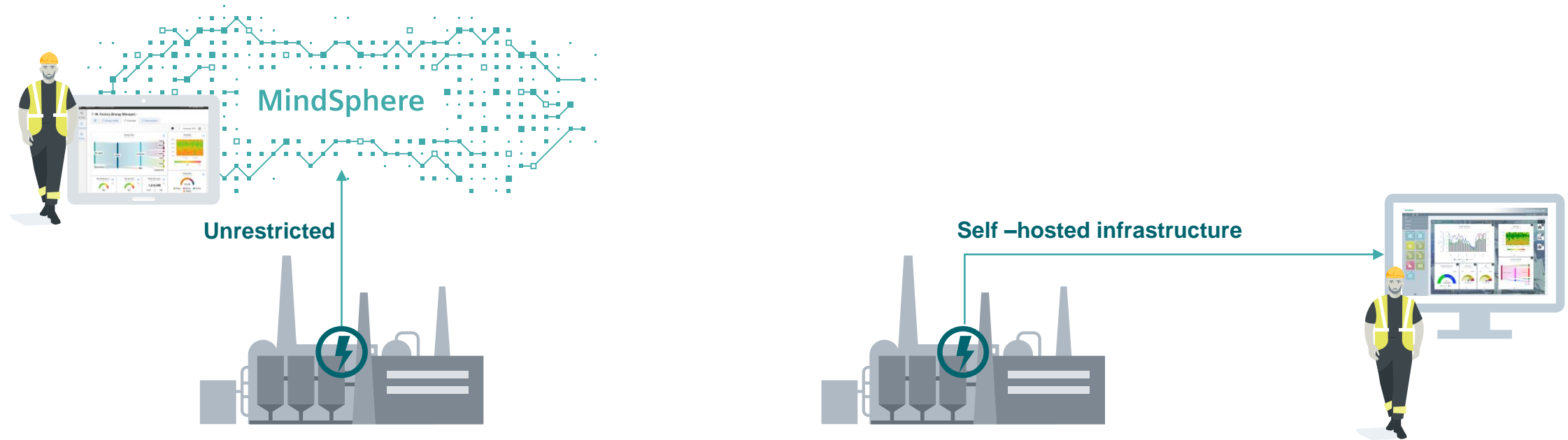
Flow based data prepro-cessing with **Flow Creator**

Run FMU simulations on your machine with **LiveTwin**

Receive Push notifications from machines with **Notifier**

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Comparison between Energy Manager MindSphere app and on-premise solution

MindSphere

Unrestricted

Self –hosted infrastructure

SIMATIC Energy Manager MindSphere app

- For global energy manager and plant operators
- Extended scalability due to cloud technology. Access all over the world
- Reduced engineering effort due to a pre-defined media analysis
- Data in MindSphere can be used also by other MindSphere Applications

SIMATIC Energy Manager on-premise

- For local energy manager and plant operators
- Very low delivery time within <1 second
- Combine data acquisition, data storage and data analysis within one User Interface – Scalability from machine to site level (Also multi sites)
- Advanced Functionality (Baseline management, prediction, flexible reporting, batch analysis, manual data collection)
- Data remains within the plant/factory

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Functional comparison of Energy Manager
## MindSphere / Edge app vs. on-premise solution

	MindSphere/Edge app	On-premise solution
Counter (Meter) management	✔	✔
KPI calculation	✔	✔
Dashboard	✔	✔
Reporting	✘	✔
Batch analysis	✘	✔ [1]
Baseline management	✘	✔ [1]
Prediction functionality	✘	✔ [1]
Extended authority concept	✘	✔ [1]
Manual data collection	✘	✔
Out-of-the-box media analysis	✔	✘

1 Functionality available in PRO version only

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Energy Manager MindSphere/Edge app
Transparency - Obtain the greatest value from data
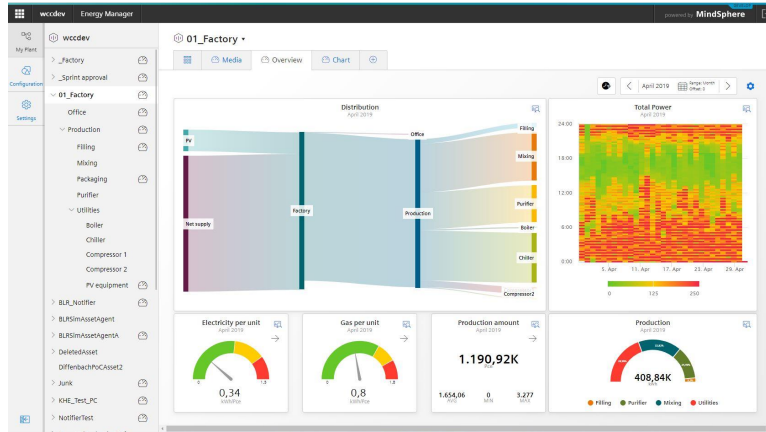
The SIMATIC Energy Manager MindSphere app allows to keep track over global distributed energy consumers. No matter if we talk about machines, lines or whole sites - Everything can be connected to MindSphere and can be accessed worldwide to benchmark energy consumers and to visualize optimization potential.
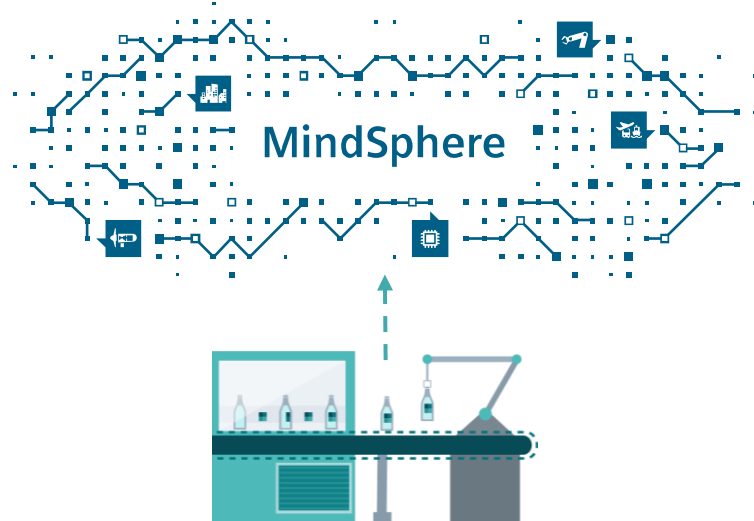
Benefits

- Energy transparency supporting ISO 50001
- Flexible KPI definition and user specific dashboards providing a holistic view about the energy consumption and can be used to derive energy efficiency measures
- Transparency about energy costs, consumption and CO_2 Emission from the machine level to your sites worldwide
- Get the most valuable information for precise decision-making to optimize energy efficiency

Features

- Out of the box energy media analysis (consumption, costs, CO_2 Emission)
- Flexible dashboard configuration with detail views for fast analysis
- Support of different widgets (charts, pie, gauge, Sankey, heat map) to visualize energy performance indicators
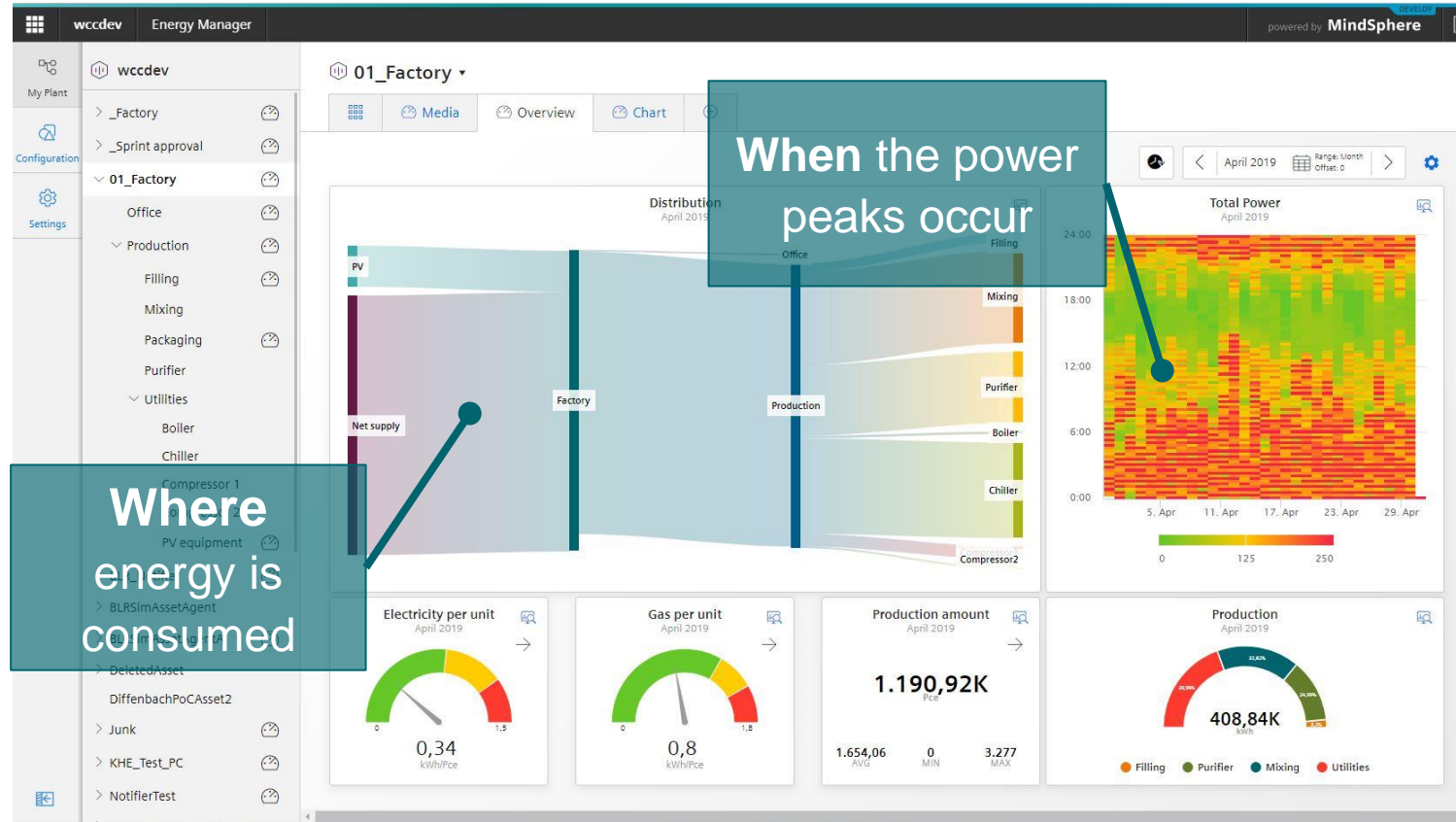
Industry focus

Cross industry based on flexible dashboard and KPI calculation

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Energy Manager MindSphere app
## Dashboards – From data to information

Benefits

Using custom dashboard with energy related widgets to transfer data to information

- Sankey Diagram provides an overview about the energy flow → see where energy is consumed

- In the heat map the value is represented as color. → see when energy is consumed.

- Additional Widget types like Gauge, Pie Chart, Value, Chart are used to display KPIs in a way that measures can derived immediately.

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SIMATIC Energy Manager MindSphere app
Ready to use media analysis

Consumption over time

Statistic

Detect dependencies and anomalies
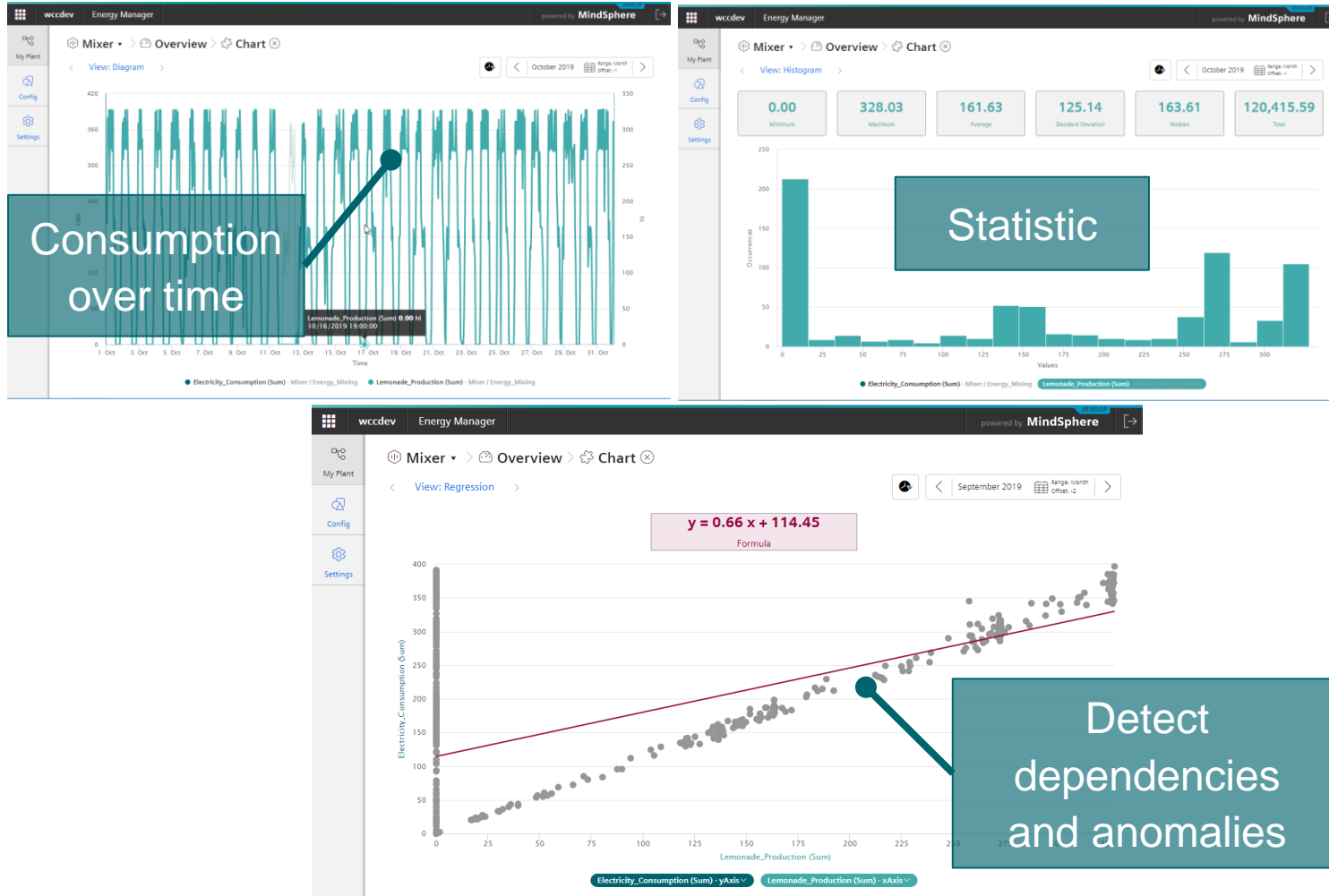
Benefits

Detailed information for each widget in the dashboard

- The diagram view provides detailed information in a configurable resolution (e.g. 1h) to see any anomalies like peaks,..

- Statistic view provides a histogram for each parameter including the statistic. (min, max, average, median, standard deviation and sum)

- Regression view provides the possibility to display the data in a x-y chart including a trend representing the plant characteristic.

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Energy Manager MindSphere/Edge app
Energyconsumption per machine state
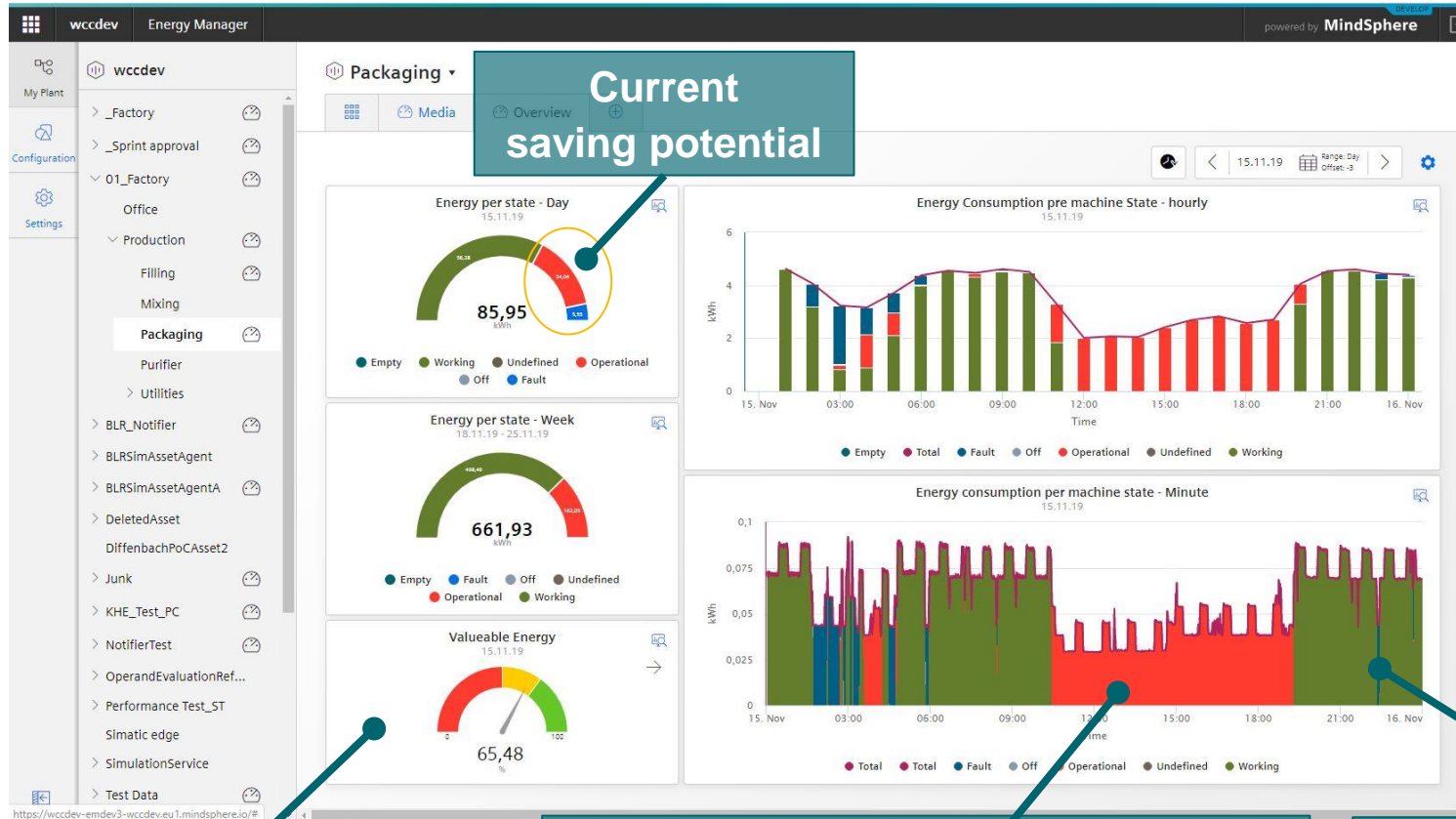
Benefits

Transparency about energy consumption in the different machine states (Working, Operational, Standby, Off,..).

- Efficiency evaluation of machine operation

- Value-added energy (Operating / Total)

- Losses due to inefficient machine operation

Current saving potential

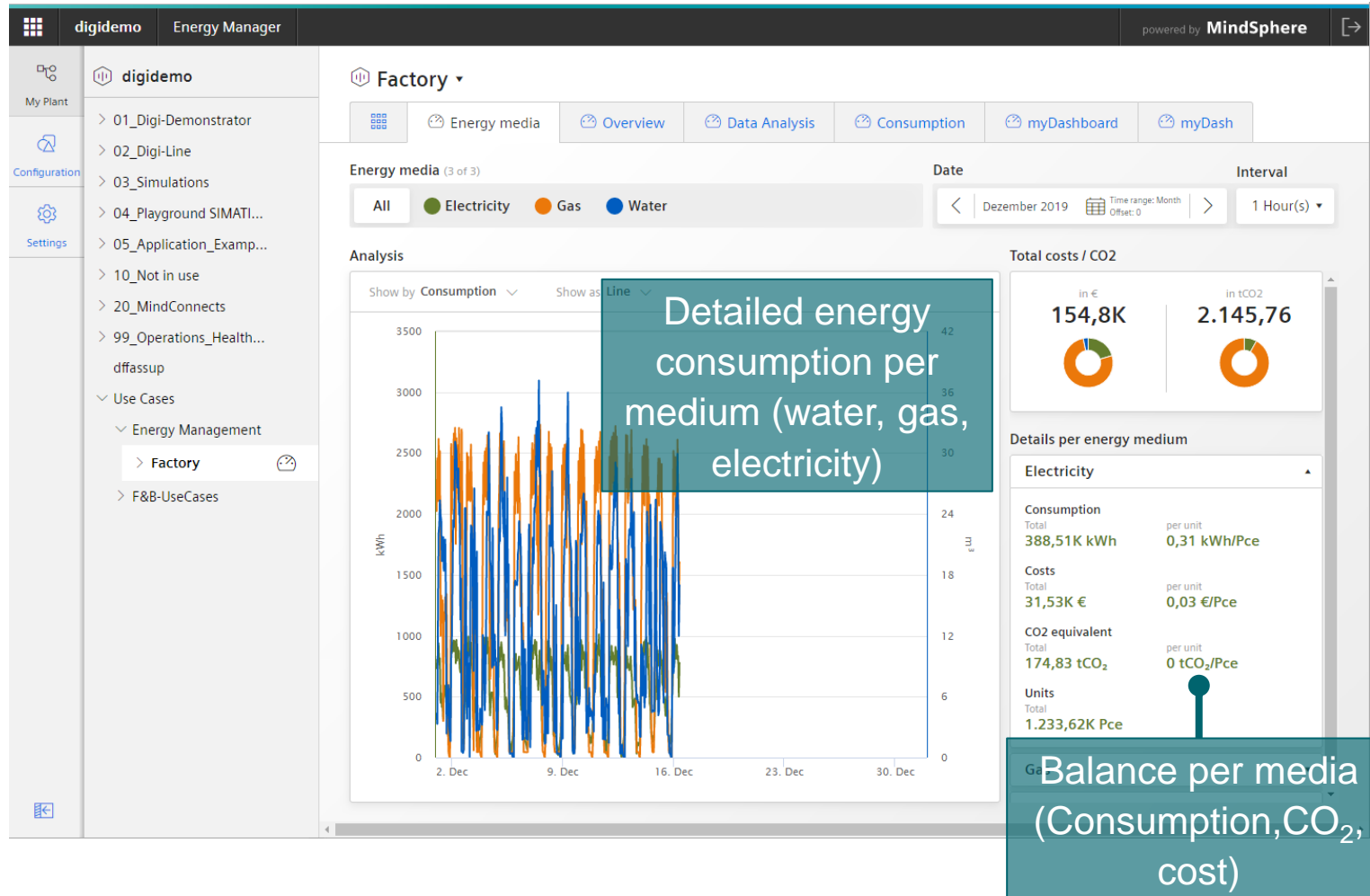**Efficiency indicator of machine operation**

Red: Energy consumption in standby state = Energy loss

Green: Energy consumption in "Operating" state

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Energy Manager MindSphere/Edge app
Media analysis - Energy transparency for all levels in the factory

Detailed energy consumption per medium (water, gas, electricity)

Balance per media (Consumption, CO_2, cost)

Benefits

Simple configuration with a high value

- Details about each consumed media in the chart (consumption, costs, CO_2 and these KPIs per unit)

- Summary of each media display the most important KPIs (consumption, costs, CO_2 and these KPIs per unit)

- The donut charts represents the total costs and the total CO_2 emission and the distribution to the several media

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MindSphere apps – Trial package
Your entry into the industrial IoT with MindSphere applications

3 month Free Software Trial

MindSphere apps trial package contains:

- **SINAMICS Analyze MyDrives:**
  The tool that allows you to monitor multiple drive systems from a single point.
- **SIMATIC Energy Manager:**
  The tool to increase energy efficiency of machines, lines or whole sites.
- **SIMATIC Notifier:**
  The tool for simple value monitoring and to stay tuned via push notifications.
- **SIMATIC Performance Insight:**
  The tool to increase productivity for any machine, line, and plant.
- **Machine Monitor:**
  The maintenance tool for machine builders and plant operators.
- **IoT Value Plan S:**
  Your entry plan for MindSphere (only needed if you don't already have an IoT Value Plan).

Further Information:

https://www.dex.siemens.com/mindsphere/applications/simatic-trial-package

After the 3-month free trial period, all products will change to a monthly subscription if not cancelled before. Cancellation on any day if possible, but no later than **14 days** before the end of the free trial period by email to : trial@mindsphere.io

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Media analysis
Transparency of energy consumption, energy costs and CO$_2$ emission

Factory Munich/Plant 123
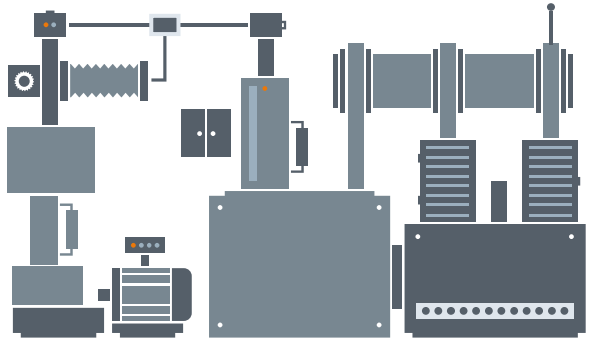
Production

Piec

Media

Electricity

Gas

000000

Water

000000

Available key figures per energy medium (electricity, gas,..) which are included in the media analysis.

Detailed Energy consumption per media (Water, Gas, Electricity)

Balance

Consumption	4.145,27 kWh	Consumption per unit	14,5 kWh/pc.
Cost	425,25 €	Cost per unit	4,6 €/pc.
CO$_2$ Emission	4,6 tCO$_2$	CO$_2$ per unit	0,2 tCO2/pc.

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References of SIMATIC Energy Management

SIMATIC Energy Management –
Successful Success Stories

GF Automotive – automotive supplier industry

- Conclusive **overall concept** from **field devices** to the **management level**
- Distributed and **automatic** energy data acquisition with SIMATIC ET 200SP **Energy Meter**
- Assurance of the energy management process certified according to **DIN EN ISO 50001**
- **Verification** of the **energy efficiency potential** of machines (die-cast machines)
- Tracing and implementation of **saving measures** (e.g. 4,500 m^3 compressed air/WE, 10% CO_2 emissions)

Saint Gobain Oberland – glass industry

- **Savings** in the two-digit **million range** per year – through tax cap for energy-intensive users and renewable energies levy
- **Optimized production** (glass melting tanks)
- Support of **investment considerations** based on energy consumption
- **Automatic** and comfortable **reporting**
- Scalability for **future expansions**

Schmitz Werke – textile industry

- Easy **identification** of **energy efficiency measures** (quiescent current and compressed air leakage)
- **Amortization** of the energy management system through identification of energy eaters directly **after installation**
- **Reduced personnel costs** through automatic detection
- Support of additional **cost savings** by 5%

Infratec – industry park

- Annual reduction of operating costs by 380,000 € to **446,000 €** through **savings relating to tax cap for energy-intensive users**
- Expectation of further cost savings through efficient **energy saving measures**
- Considerably **increased energy efficiency**
- Detailed allocation of energy consumptions

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Siemens is your partner!

- Siemens experts with more than 15 years experience in EDMS

- Many references

- A complete portfolio ensures a sustainable investment

- State-of-the-art IT security

- Global presence and world wide compliance procedures

Know How,   **Complete Portfolio**

IT Security   **Global presence**

Selected references

We are shaping the future together with you

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Transparent Operation
Energiemanagement

1 | Energiemanagement directly at the machine
...through production-related energy transparency, the status of the machine in view at all times

2 | Meet legal requirements
...with a TÜV-certified energy management solution according to ISO 50001

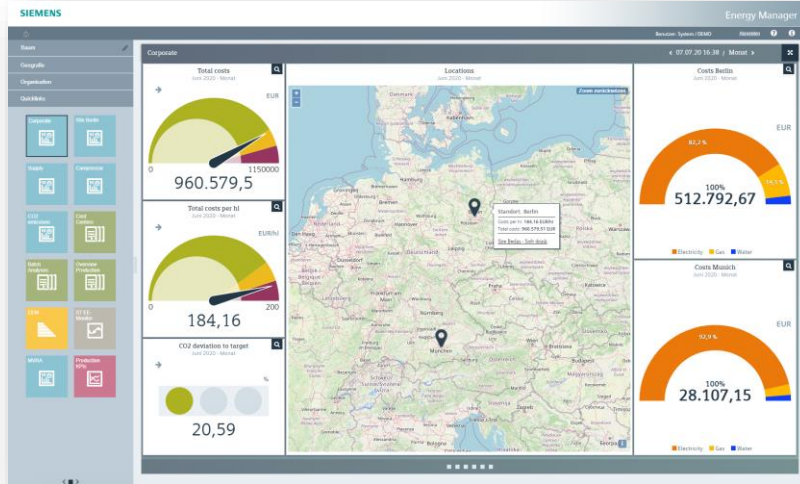## 3 | Increase productivity and quality with energy efficiency
...EnPI's can be easily formed by integration into automation

4 | Easily implement advanced requirements
...through an end-to-end, scalable energy management system - from the field to the management level

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SIMATIC Energy Manager
Online – demo server

Website for Login Request

www.siemens.com/energymanager

News !!! SIMATIC Energy Manager Demo Server

Do you want to explore our Demo Server?

> Login Request

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Further information

Unrestricted | © Siemens 2021 | siemens.com/simatic-energy-management

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Energy Management Media System

All information in one place

- Content
  - Product information
  - Tutorial videos
  - Links to application examples
  - Links to manuals
  - References
- Updated continuously

SIMATIC Energy Management

With the modular product portfolio for energy transparency of Siemens throughout the whole company.

Energy measurement

Energy measuring is the base of every energy management system and is ideal for integrating into the automation environment.

Energy data acquisition

Reliable energy data acquisition is a requirement for every energy management system.

Energy efficiency evaluation for machines

The standardized efficiency evaluation enables integration of status-based analysis of energy data into machines without great effort.

Energy analysis

In addition to increasing the efficiency of production, energy analysis must also meet legal requirements. Monitoring, archiving and documentation are important criteria for this.

Customer references

Learn more about the SIMATIC energy management projects.

https://support.industry.siemens.com/cs/de/en/view/109765100

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SIMATIC Energy Manager
360° communication

Pictures

Internet
- Internet/Intranet
- Newsletter

AV-Media

SIMATIC Energy Manager image film

Fair
- SPS
- Hannover

360°
SIMATIC Energy Manager

WWW

PR

G

Campaign
- SoMe (Twitter, LinkedIn)
- Trust campaign

Print
- Brochure
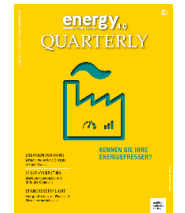- Roll ups
- Poster

Press

Press release: 4/2018

Publications

Energy 4.0
Edition 04/18

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SIMATIC Energy Management
Reduce Your Carbon Footprint

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

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siemens.com/simatic-energy-management

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