

Energy efficient solutions for the Glass Industry

Siemens Process Industries and Drives

Summary

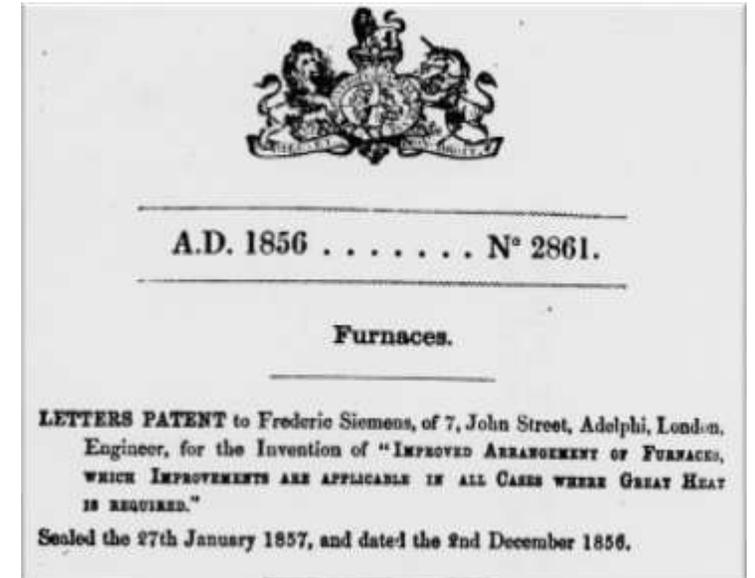
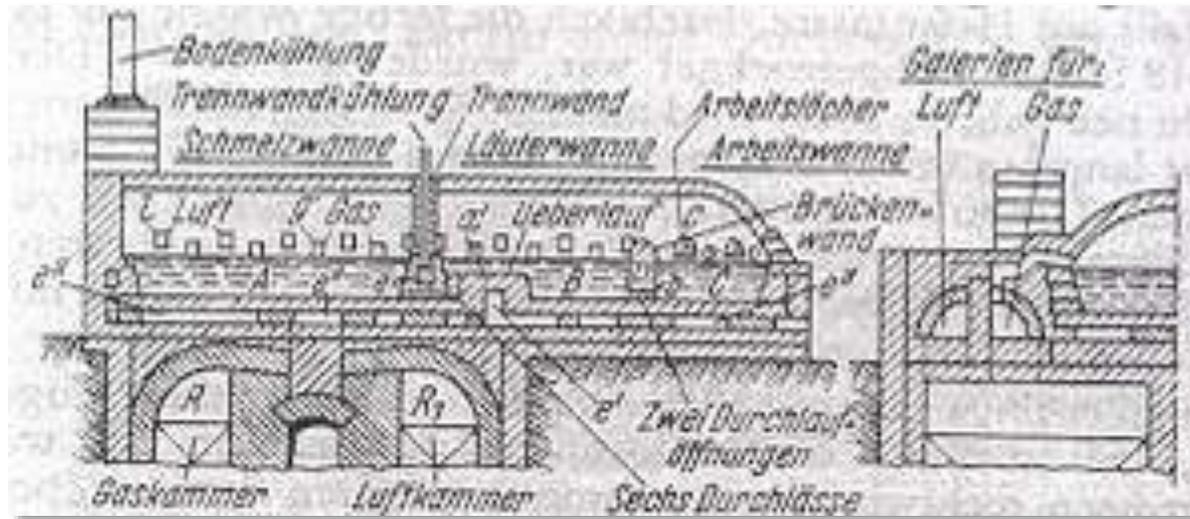
- Siemens portfolio for added value to the Glass Industry
- Key Trends in the Glass Industry
- The Energy Efficiency Directive
- Focus on Art. 8 : Energy audits and energy management systems
- Implementation of an energy management system
- Energy Data Management System SIMATIC B.Data : focus on key functions and benefits
- Siemens Service Offerings
- News from Hannover Fair : H2 production with SILYZER 200
- Conclusion

Siemens Tradition and Expertise in the Glass Industry

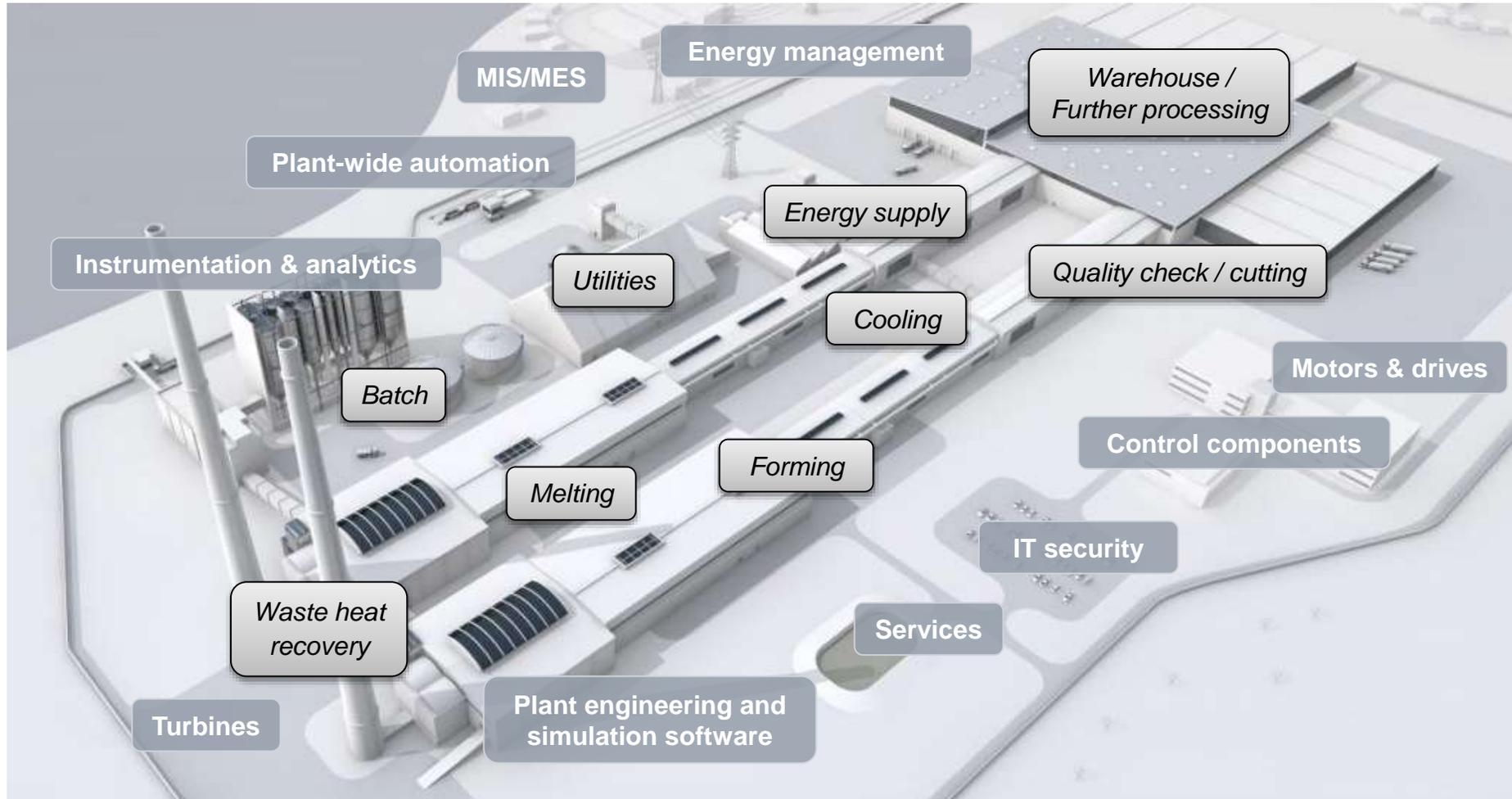
The invention of the regenerative furnace by Friedrich Siemens in 1856 marked the beginning of the industrial revolution in the glass industry



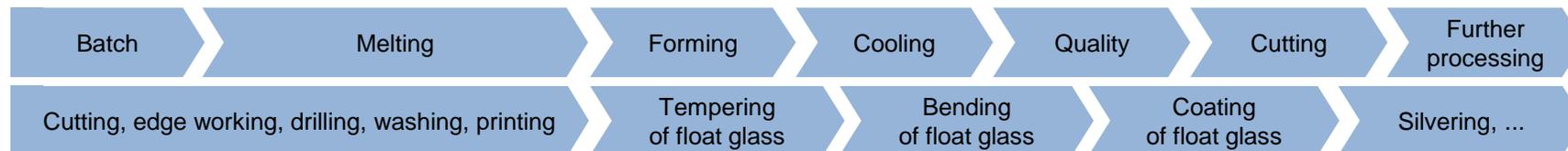
Friedrich Siemens



A Unique Portfolio for added value to the Glass Industry



A Unique Portfolio for added value to the Glass Industry



Key Trends in the Glass Industry

Product innovation

Self cleaning

Low emission

Solar applications

Light bottles



Economic pressure

Raw material costs

Energy costs

Low cost competition

Globalization



Environmental protection

Global warming

Recycling

Resources

Energy



Complex value chain

Hybrid industry

Complex technology

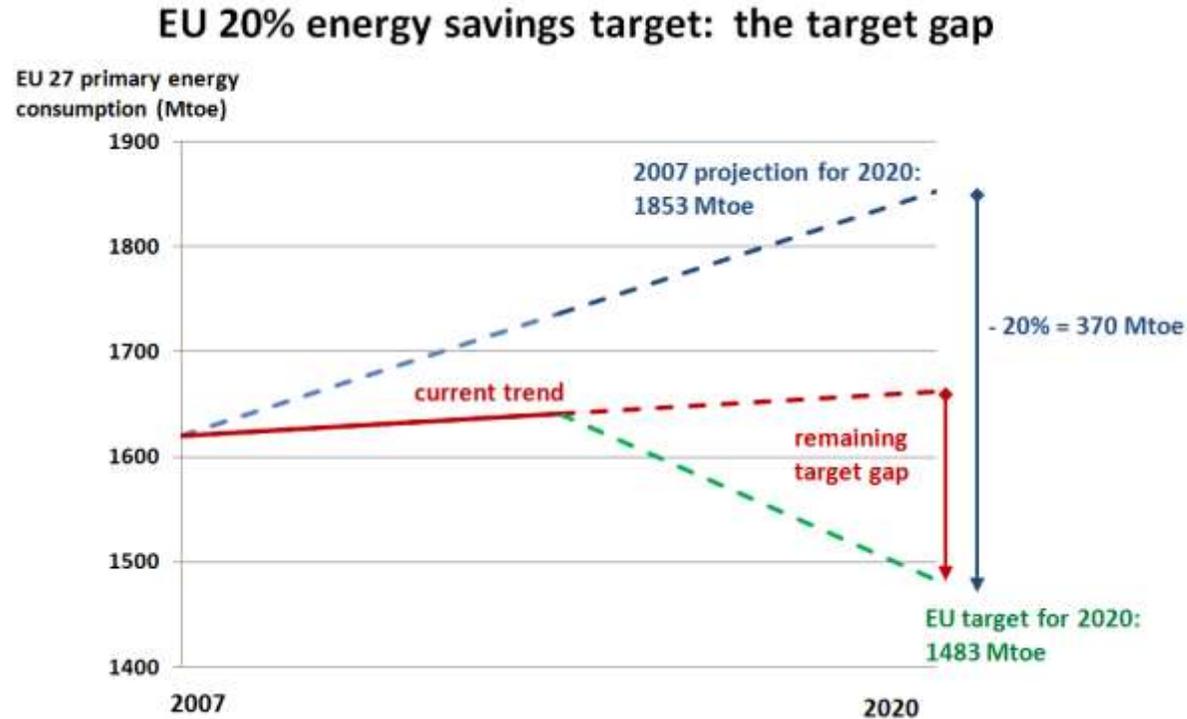
Non stop manufacturing

Product changes



Objective of the Energy Efficiency Directive (EED) Implications on Industry and Businesses

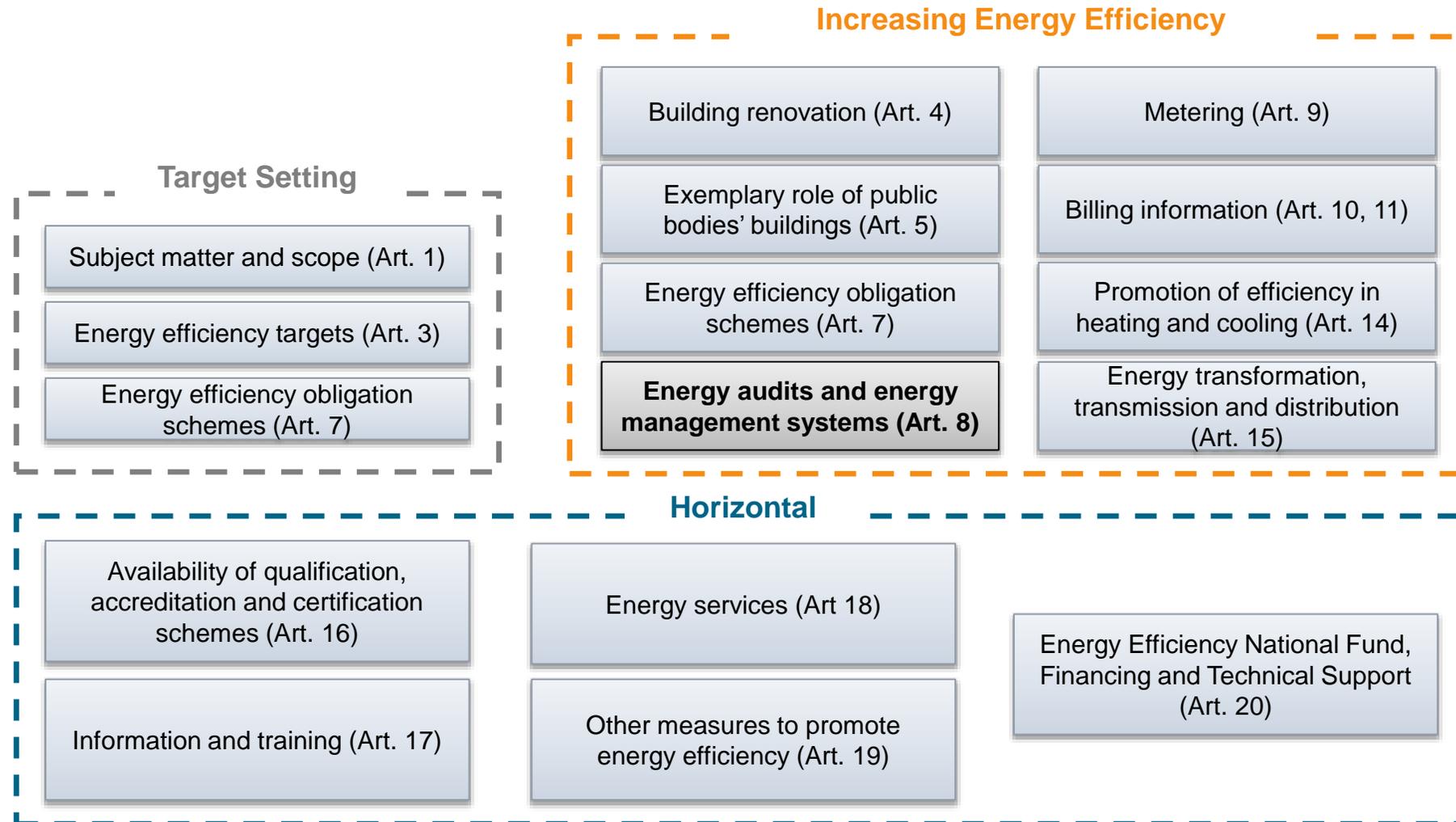
The EU Energy Efficiency Directive (2012/27/EU) was published on 25th October 2012 and entered into force on 4th December 2012.



Objective:

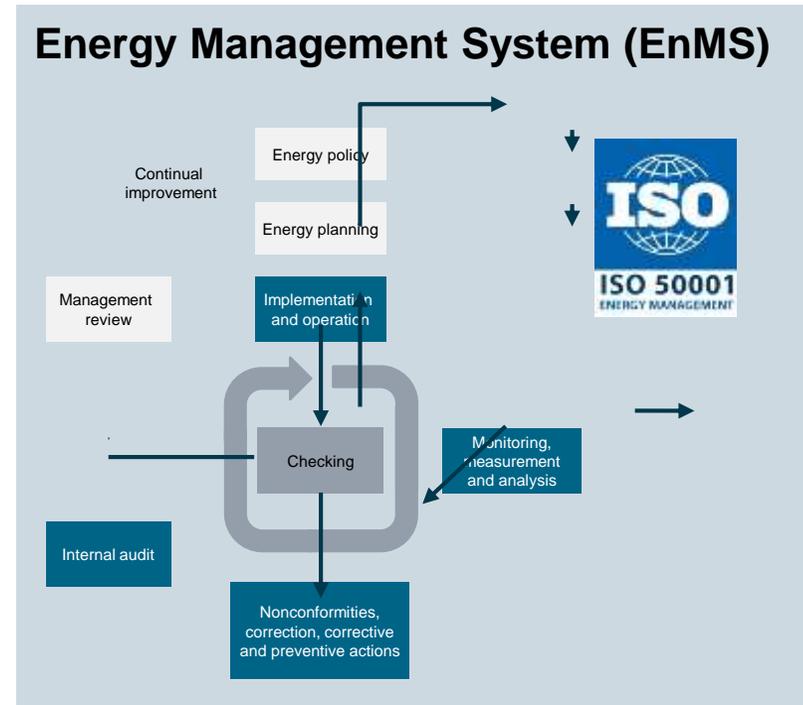
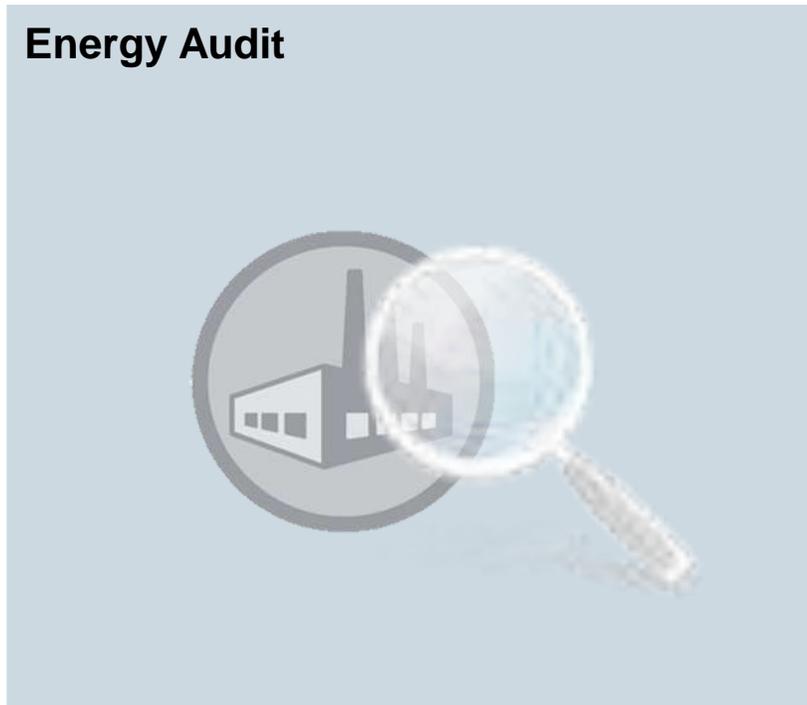
Introduction of a **common framework to support energy efficiency in the EU**; this framework is supposed to ensure that the EU energy efficiency target in 2020 is met through the definition of Indicative National Efficiency Targets.

EU-EED Content Overview



Focus on Article 8 : Energy Audits and Energy Management Systems

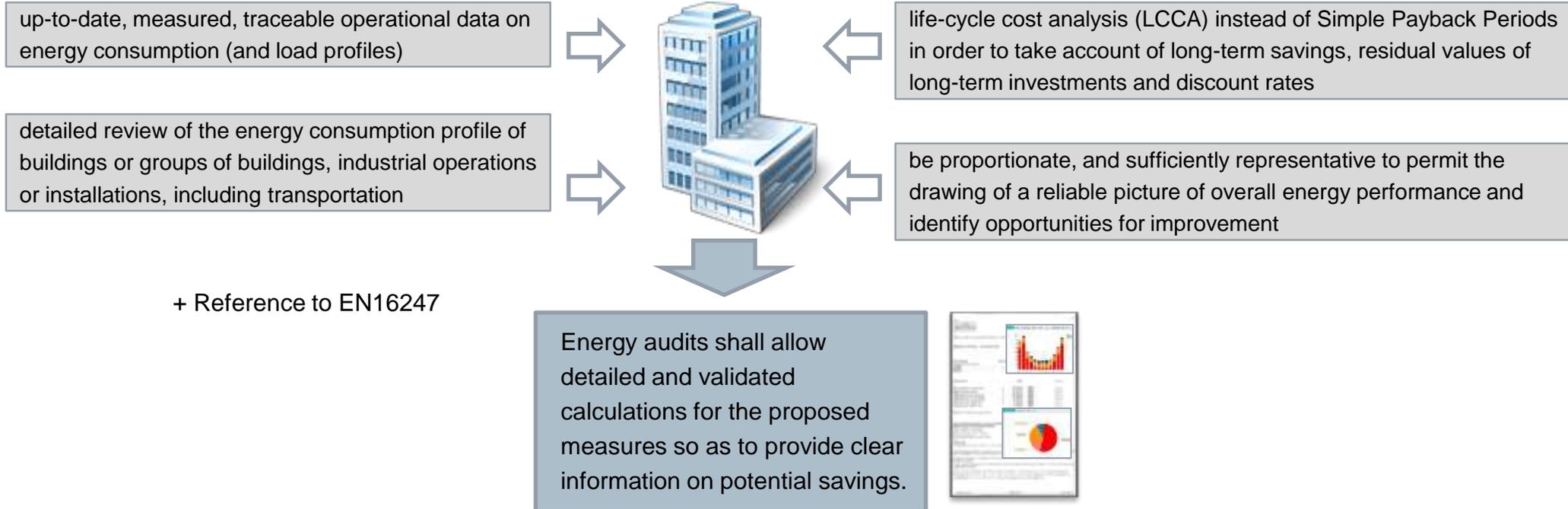
Large enterprises have to conduct an **energy audit (EA) every 4 years** and are exempted from this requirement if they are implementing an **energy or environmental management system (EnMS) by 5 December 2015**



ISO50001 compliant EnMS include annual Technical Analyses as part of the Energy Planning Procedure

National Implementations – Energy Audits and EnMS

Energy Audits shall be based on the following guidelines:’ (Annex VI)



Energy or Environmental Management System (Art. 8)



EU-EED at a glance

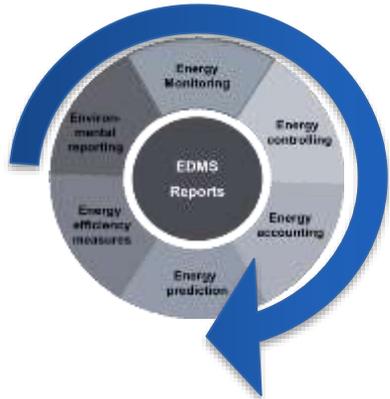
- ***EU wide obligation***
 - EU EED is being rolled out in all member states
 - Differences in national legislations have to be carefully taken into consideration
 - Compliance Date: 5 December 2015
- ***Non-SME: Cumulative Approach – Group Approach***
 - Small affiliates of larger groups may be covered by the scheme (e.g. small offices)
- ***Energy Audits compliant to EN16247***
 - Coverage of transport energy demand in some countries compulsory
 - De minimis rule depending on national implementation
- ***Requirements to Auditors depend on national implementation***
 - Accreditation by national authority
- ***ISO50001 usually guarantees full compliance***
 - Corporate approach as well as single-site approach

... some hurdles when implementing energy management



Energy Data Management System SIMATIC B.Data

Key functions and benefits



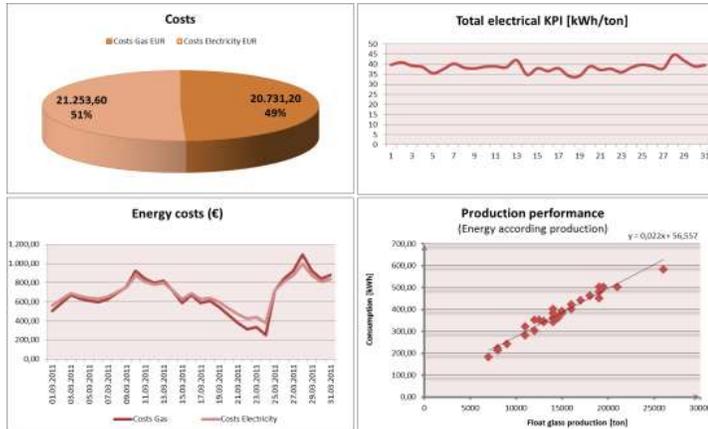
Energy Monitoring	Energy Controlling	Energy Accounting	Energy Prediction	Energy Efficiency Measures	Environmental reporting
<ul style="list-style-type: none"> • Energy consumption overview • Discover energy-guzzlers • Support for load management • Identify relevant consumption • Improve stand-by-operation 	<ul style="list-style-type: none"> • Efficiency overview • Identify potentials • Target achievement • Benchmarks • Detection of maintenance • Energy/Production • Identify tendencies 	<ul style="list-style-type: none"> • Transparency for all consumers: <ul style="list-style-type: none"> • Costs • Consumption • Indiv. contribution to energy policy • Awareness • Basis for: <ul style="list-style-type: none"> • Energy Mngmt. process • Reporting • ERP 	<ul style="list-style-type: none"> • Enhanced planning reliability • Optimized energy purchase • Identify forecast deviations e.g. during "stand-by" • Basis for energy buy and sell • Correlation: energy vs. production 	<ul style="list-style-type: none"> • Support for ISO50001 compliance • Track invests and savings realized • Track CO2-emission • Track improvements 	<ul style="list-style-type: none"> • Quick overview for management • Automated reporting • Supports quality audits • Full-size-reporting for environment • Plant- and corporate reporting



Energy monitoring



Plant performance report



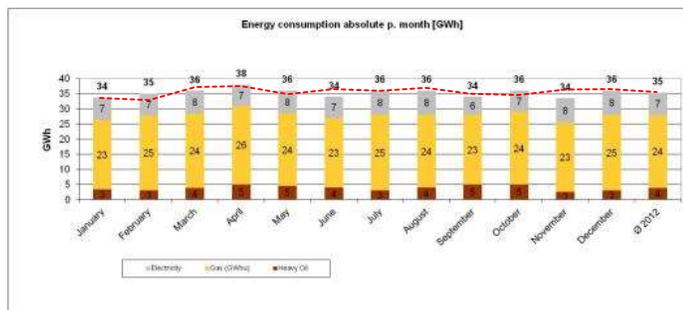
Energy consumption overview



Energy utilization report

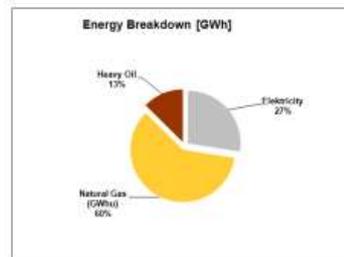


Energy usage

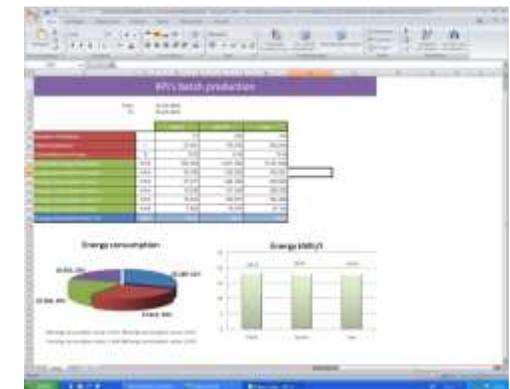


BD	Actual 2012	Actual 2011	Budget 2013	
Electricity	22	14	17	GWh
Natural Gas	45	42	37,4	GWh
Heavy Oil	50	71	25	GWh
Total	117	127	80,4	GWh

involten. T.p. 83,672 | 44,688 | 349,740 | to



Batch report

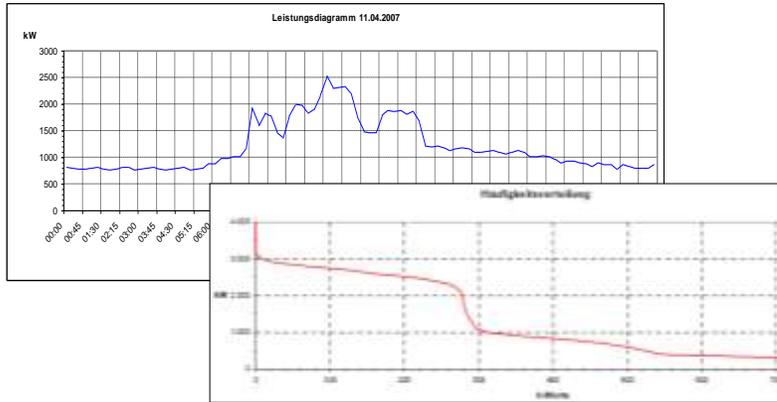




Energy controlling (1/2)



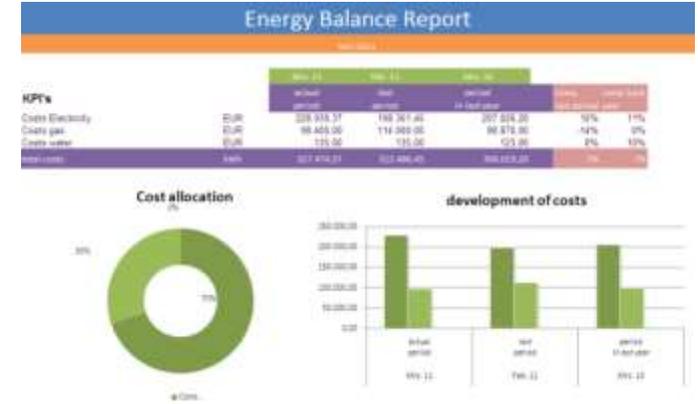
Peak Load Management



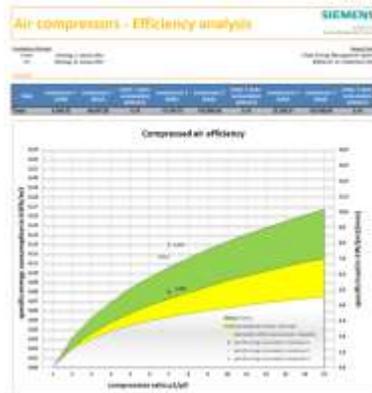
Benchmark report

Plant	Year	Costs	Energy	Costs	Energy	Costs	Energy	Costs	Energy
Plant 1	2010	10.000.000	5.75 TWh	17.380.000	8.720 TWh	18.000.000	9.000 TWh	18.500.000	9.250 TWh
Plant 2	2010	10.000.000	5.75 TWh	17.380.000	8.720 TWh	18.000.000	9.000 TWh	18.500.000	9.250 TWh
Plant 3	2010	10.000.000	5.75 TWh	17.380.000	8.720 TWh	18.000.000	9.000 TWh	18.500.000	9.250 TWh
Plant 4	2010	10.000.000	5.75 TWh	17.380.000	8.720 TWh	18.000.000	9.000 TWh	18.500.000	9.250 TWh
Plant 5	2010	10.000.000	5.75 TWh	17.380.000	8.720 TWh	18.000.000	9.000 TWh	18.500.000	9.250 TWh

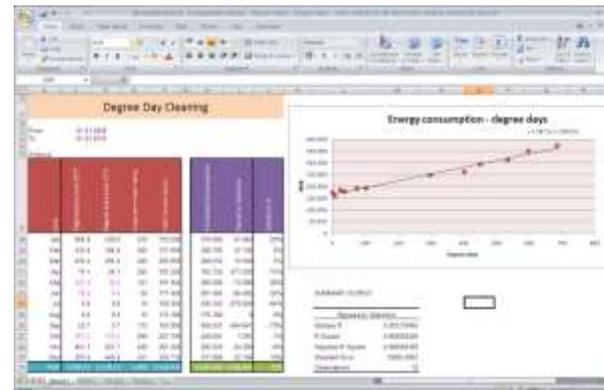
Energy balance report compared to previous periods



Utility efficiency report



Heating / Cooling degree day report



Glass trough KPI's per line or site





Energy controlling (2/2)



KPI Dashboards





Energy accounting



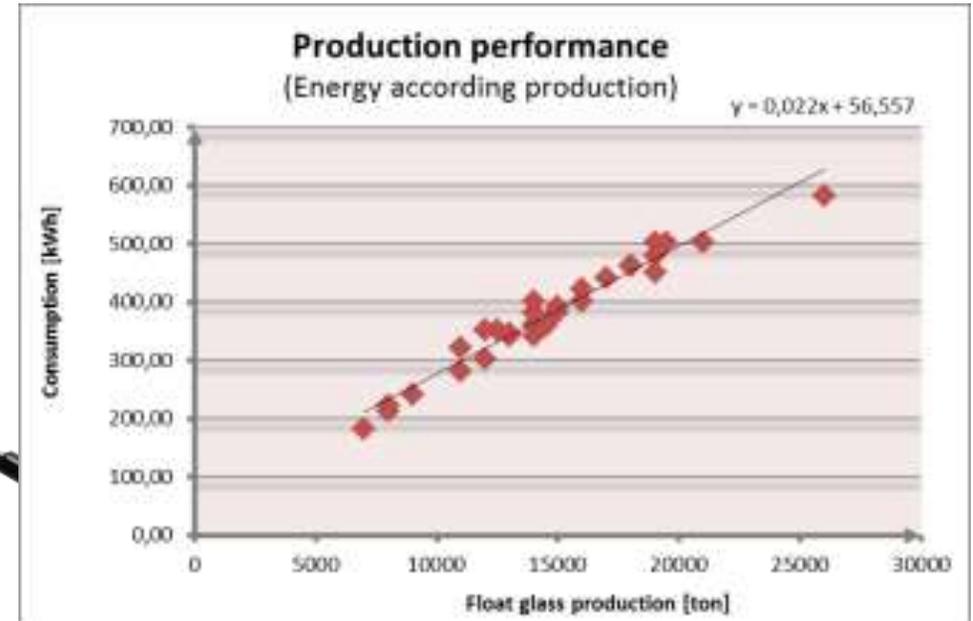
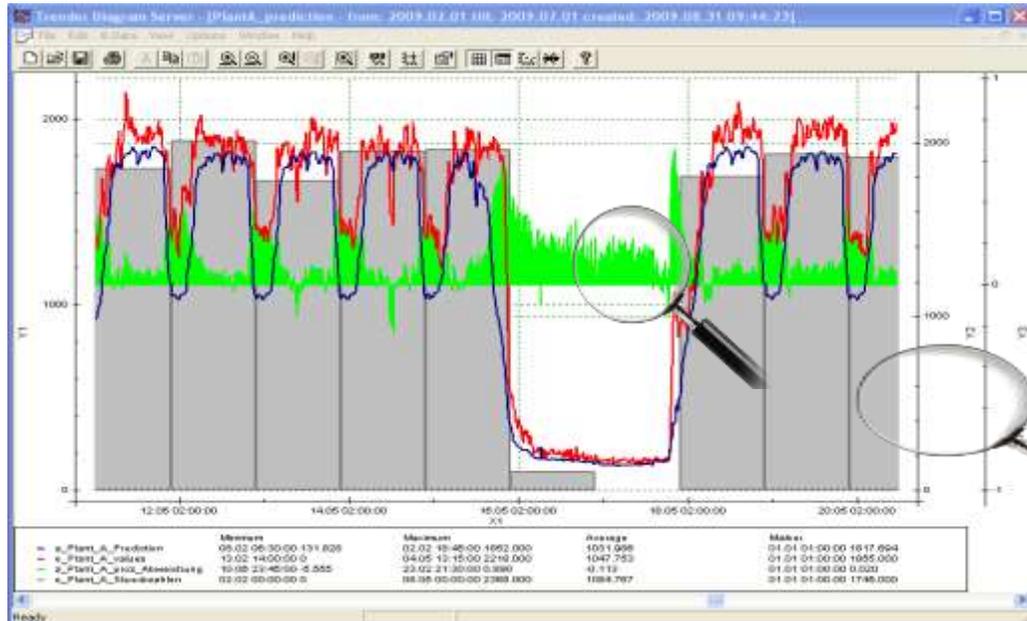
Costs Overview (cost and consumption transparency for all segments)

SIEMENS Energy Data Management B Data										
Costs Overview										
Apr 2015		total costs 456.120.472 €		total plant						
Medium	Energy Costs	Unit	refuse holding	bank form	water treatment	production 1	production 2	air decontamination	rest	
Electrical Energy	absolut	86.196.984 €	8.606.973	3.689.253	2.196.102	26.078.706	28.823.832	16.242.317	1.660.802	
	percentage	81,89%	10,0%	4,2%	2,5%	30,3%	33,4%	17,7%	1,0%	
Technical Heat	absolut	16.965.687 €	933.113	239.733	4.794.651	6.468.763	3.289.868	73.026	1.176.533	
	percentage	15,98%	5,5%	1,4%	29,3%	39,1%	19,4%	0,4%	6,9%	
Room Heat	absolut	2.446.423 €	1.592.347	17.371	463.228	128.836	94.093	7.527	143.022	
	percentage	2,30%	65,1%	0,7%	18,9%	5,3%	3,8%	0,3%	5,8%	
Natural Gas	absolut	26.400 €	2.640	2.200	2.640	5.632	4.400	4.400	4.488	
	percentage	0,02%	10,0%	8,3%	10,0%	21,3%	16,7%	16,7%	17,0%	
Compressed Air	absolut	131.951 €	397	26.456	39.685	19.346	19.842	19.842	6.383	
	percentage	0,12%	0,3%	20,1%	20,1%	14,7%	15,0%	15,0%	4,8%	
Portable Water	absolut	35.667 €	66	1.686	4.822	11.889	15.852	169	1.296	
	percentage	0,03%	0,2%	4,4%	13,5%	33,3%	44,4%	0,4%	3,6%	
Waste Water	absolut	367.360 €	4.013	4.000	316.693	11.680	17.312	11.392	3.270	
	percentage	0,50%	1,1%	1,1%	69,9%	3,2%	4,7%	3,1%	0,9%	
Sum Rest I	absolut		507.424	89.645	358.181	896.463	836.757	298.484	2.084.946	
Staff Factor I	percentage		17%	3%	12%	30%	20%		16%	
Sum Rest II	absolut		388.030	238.788	746.211	696.969	596.969	417.078	10.948	
Staff Factor II	percentage		13%	8%	25%	20%	20%		14%	
Total Sum	absolut	196.170.472 €	12.034.001	4.208.931	8.921.212	34.207.273	33.897.926	16.075.026		
	percentage		12,44%	48,31%	16,22%	10,83%	3,91%	4,12%		



Energy prediction

Quality of prediction and graphical KPI analysis



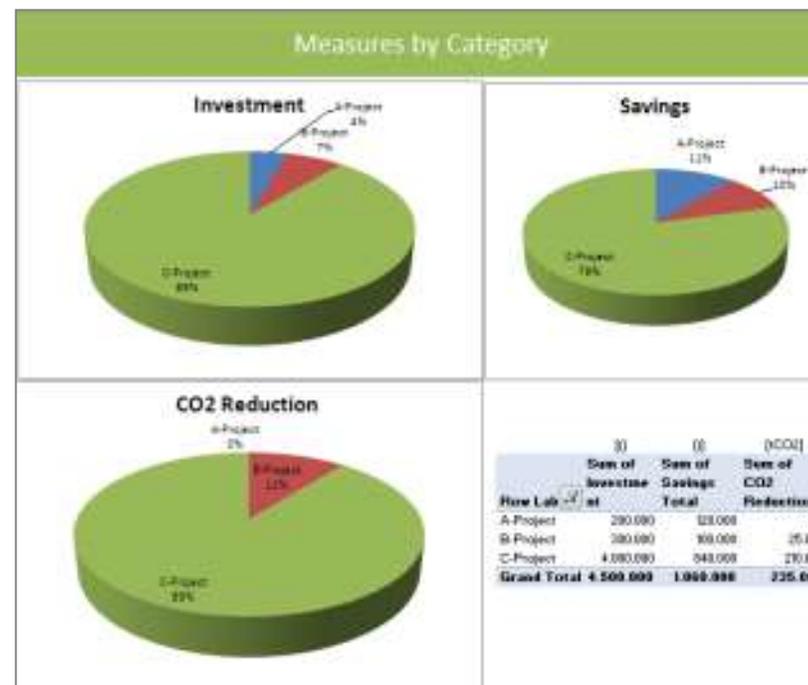


Energy efficiency measures



Performance and monitoring of actual efficiency figures

Energy Efficiency Project Management							
Date	17.02.2012 10:20						
All Measures	[€]	[€]	[tCO2]	[Years]			
Project Name	Category	Saving	Region	Business Unit	Investment	CO2 reduction	Payback
Compressed Air	C-Project	52	Linz	IA	10.000	501	18,1
EnergieDataManagement System	A-Project	120	Munich	DT	15.000	1500	9,3
Ice Water	D-Project	4000	Praha	DT	11.000	4000	2,0
Lighting	B-Project	4100	Linz	BT	1.000	0	0,2
Water leakage	B-Project	400	Berlin	BT	1.000	0	2,5
Pay Back < 2 years	[€]	[€]	[tCO2]	[Years]			
Project Name	Category	Saving	Region	Business Unit	Investment	CO2 reduction	Payback
Lighting	B-Project	4100	Linz	BT	1.000	0	0,2

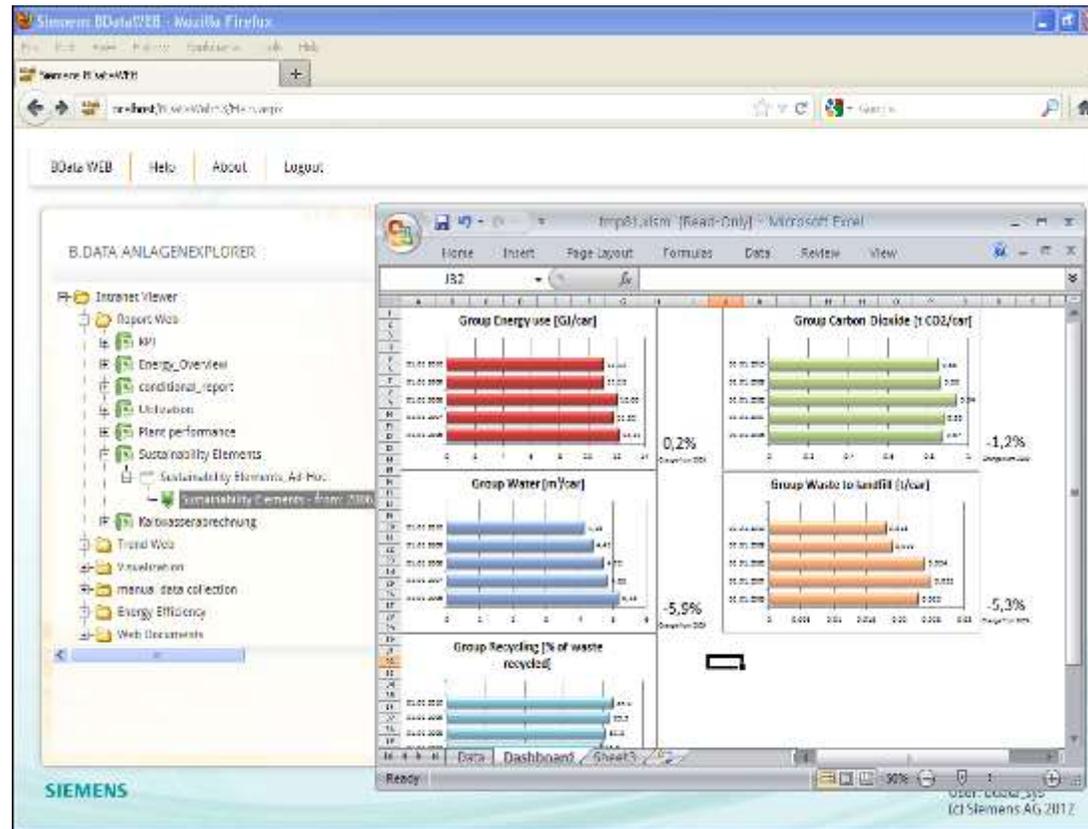




Environmental reporting

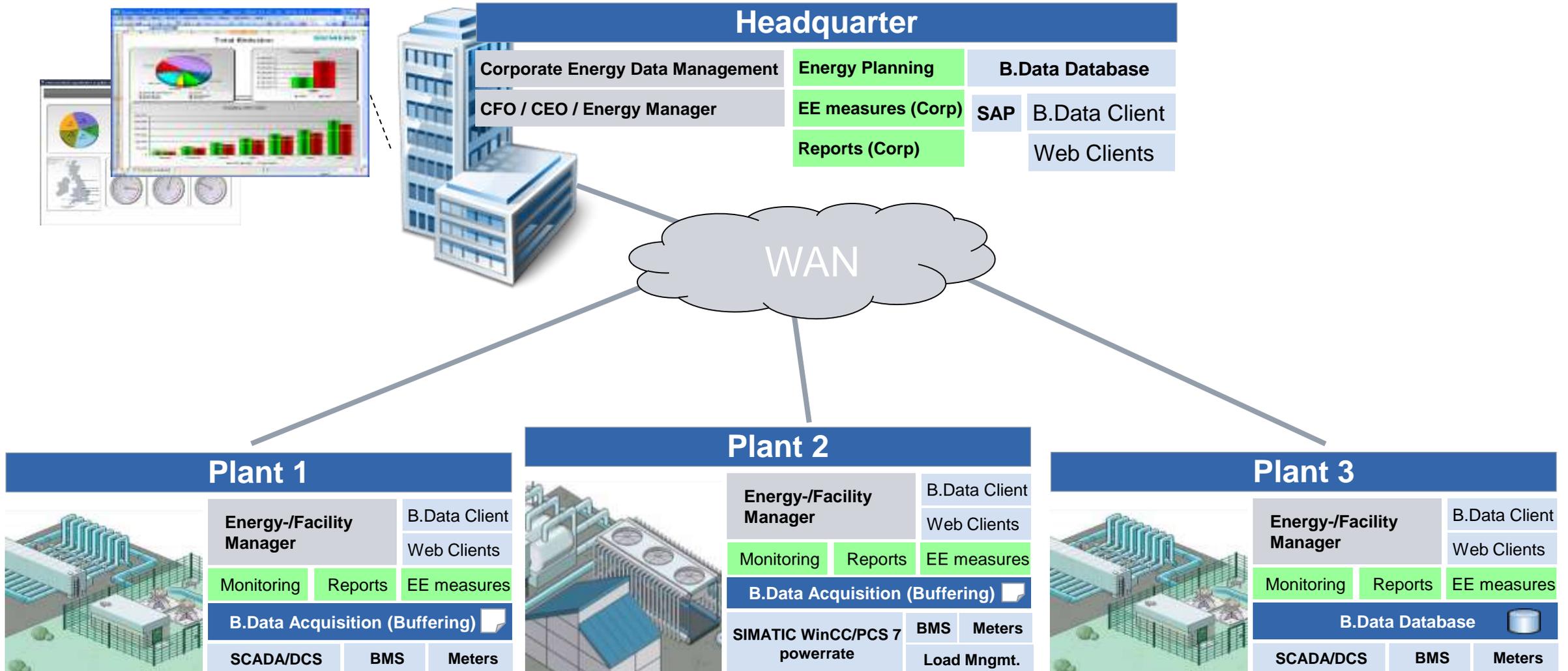


Web-viewer for corporate wide reporting



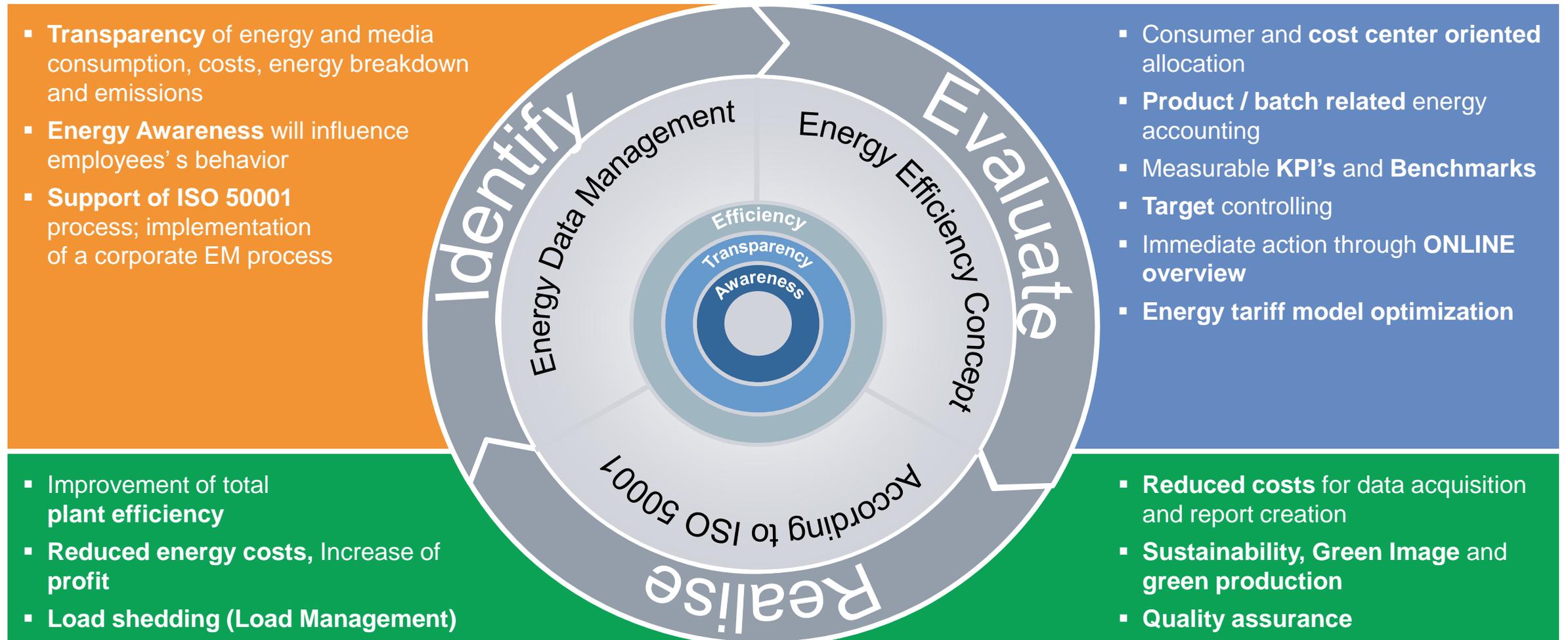
Energy Data Management System SIMATIC B.Data

Scalable solution from local up to corporate level

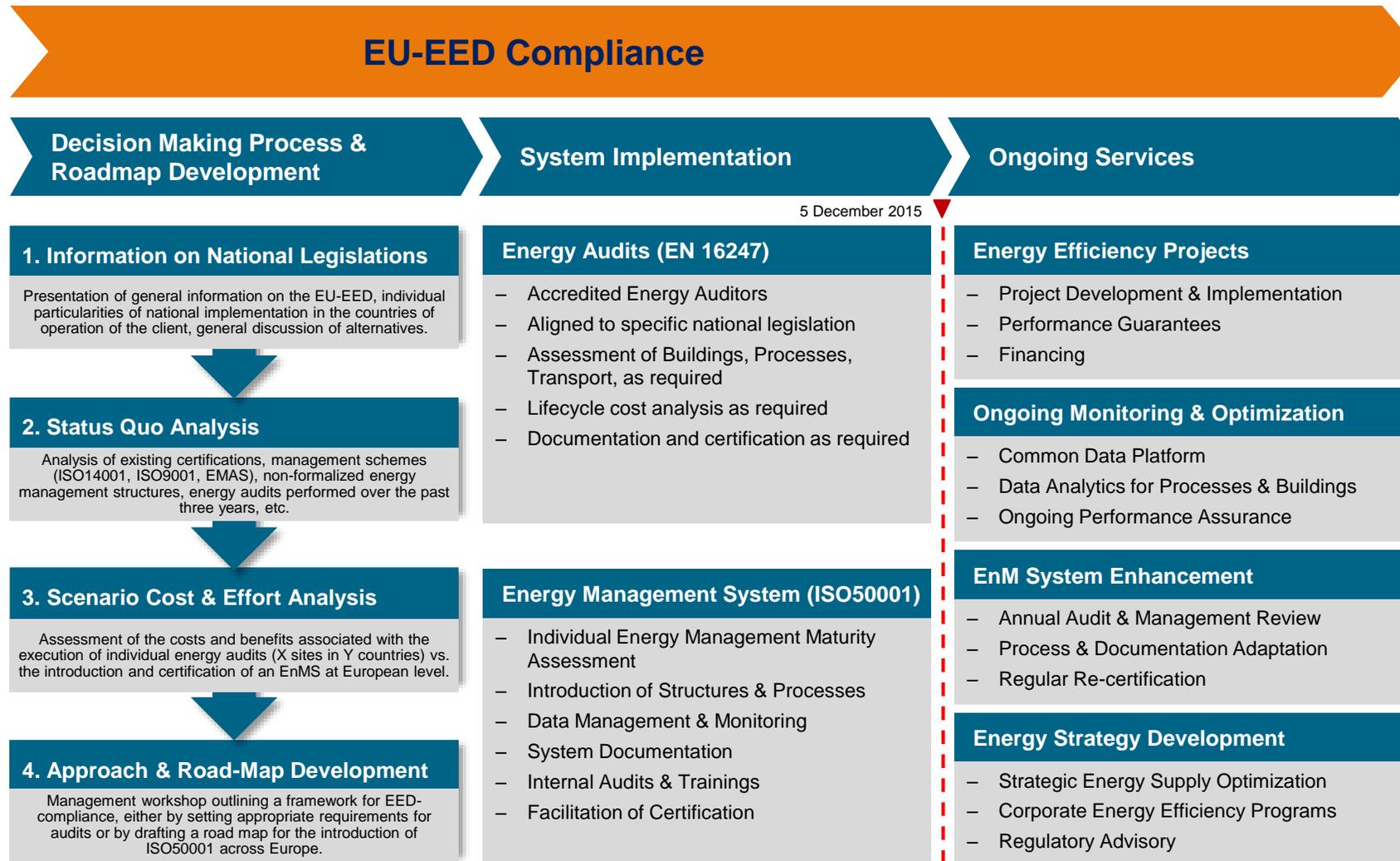


Energy Data Management for Glass SIMATIC B.Data

Summary benefits



Siemens Service Offerings



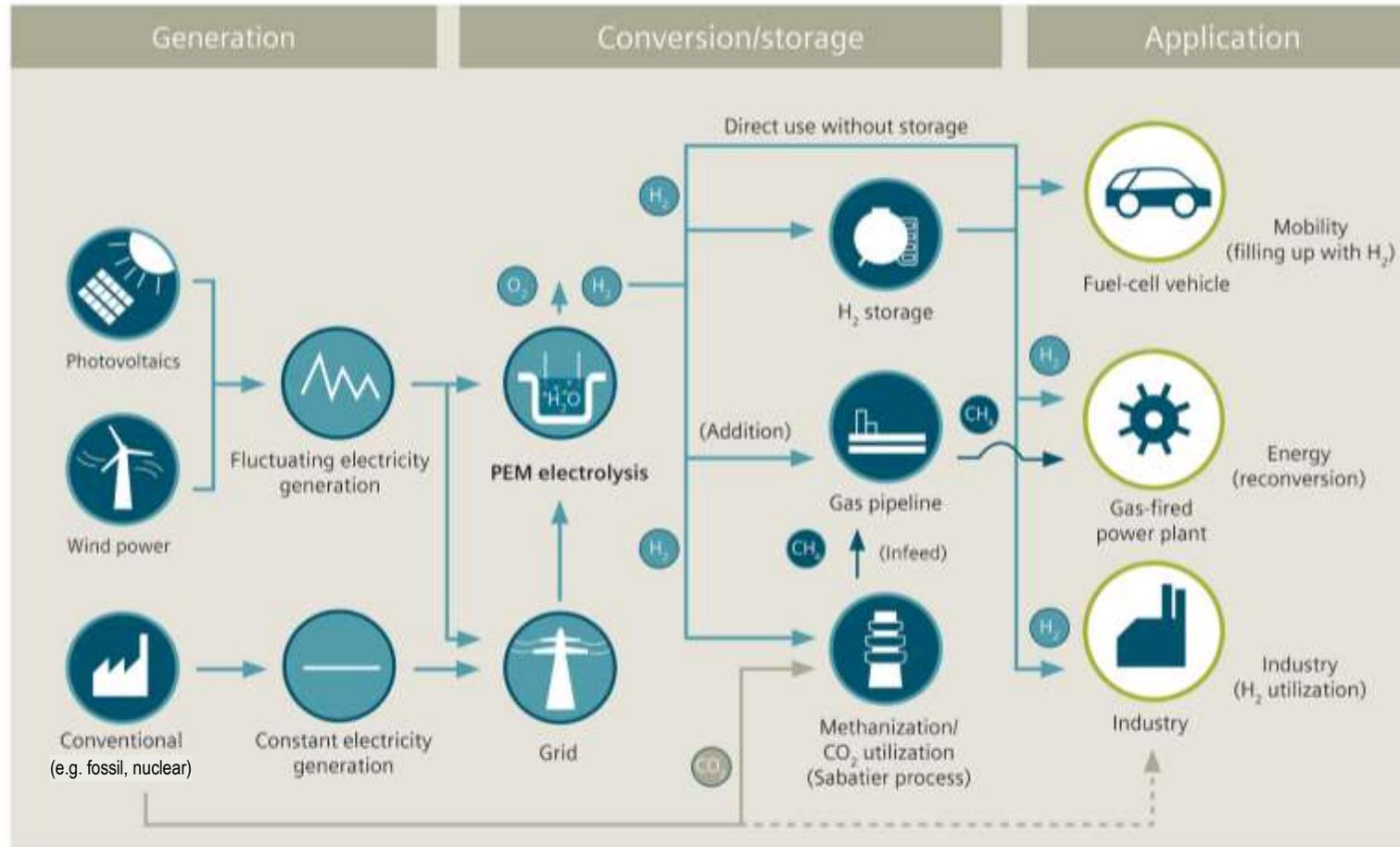
Do you want to increase the overall efficiency and sustainability of your plant?

SIEMENS

New !



PEM water electrolyzer technology – a perfect match with renewable energy requirements to convert electrical into chemical power



H₂ drives the convergence between energy & industry markets

Outstanding performance paired with technical options allows integration in any project scope

SIEMENS



Main Technical Data - SILYZER 200

▪ Electrolysis type / principle	PEM
▪ Rated Stack Power	1.25 MW
▪ Dimension Skid	6,3 x 3,1 x 3,0 m
▪ Start up time (from stand-by)	< 10 sec
▪ Output pressure	Up to 35 bar
▪ Purity H ₂ (depends on operation)	99.5% - 99.9%
▪ H ₂ Quality 5.0	DeOxo-Dryer option
▪ Rated H ₂ production	225 Nm ³ /h
▪ Overall Efficiency (system)	65 – 70 %
▪ Design Life Time	> 80.000 h
▪ Weight per Skid	17 t
▪ CE-Conformity	yes
▪ Tap Water Requirement	1,5 l / Nm ³ H ₂

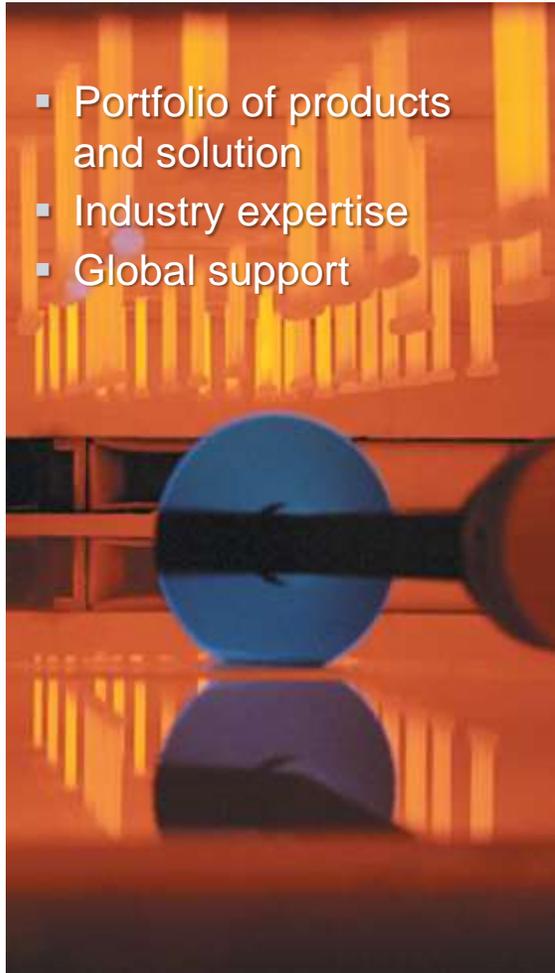
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Glass Industry

Siemens

Your Partner for the Glass Industry

SIEMENS



- Portfolio of products and solution
- Industry expertise
- Global support
- Innovative glass solutions based on our complete portfolio of systems and products
- Comprehensive service offering, providing excellent customer support
- Our global scale and financial strength secures our customers' investment in our products
- Totally Integrated Automation (TIA) : Our products are easy to install and seamlessly integrate into your system
- Strong partnership with leading machine builders and system integrators for higher overall performance
- Strategic investment in R&D ensures continuation of our vision and our commitment to glass industry since 1856

Thank you for your attention!

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