

Savings Book

Energy efficiency pays off!

Energy Efficiency
Potential savings
Environmental protection
Investments that pay off

Energy Efficiency
Savings potential
Environmental protection

Take part in the energy revolution

Endress+Hauser



People for Process Automation

Energy efficiency –

The most important
cornerstone for reducing
costs in the long
term and protecting
the environment

Dear Readers,

Without a doubt, energy efficiency is the most effective lever for reaching energy and environmental goals.

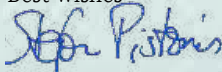
Energy that is NOT used or consumed saves real money while protecting the environment at the same time.

As an illustration: in the fields of compressed air, steam, cooling, heating and lighting alone, the German industrial landscape can lower its electricity consumption by some 60 billion kilowatt hours per year with intelligent process automation. Even today, technologies and solutions exist which, when used in many applications, allow total amounts of electricity of 30 - 50% to be saved. In short: **Energy efficiency pays off!**

Your processes are also sure to hold potential for substantial energy savings. Make an active contribution to energy efficiency!

The logical and necessary step towards attaining these goals is a comprehensive approach including various energy consumers. In this Savings Book, we show you real-world examples of how you can lower your energy costs for the long term.

Best wishes



Stefan Pistorius

Marketing Area Manager



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Examples among the most important energy carriers

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Up to 20%

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Up to 40%

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Lifecycle

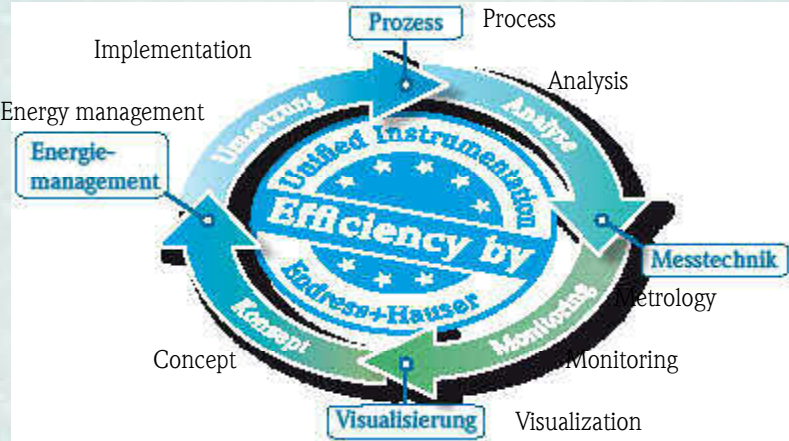
Up to 40%

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Energy efficiency services for process automation



Energy management from a single source

We provide you with manufacturer-independent advice about your plant, implement the projects and take over responsibility.

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Compressed air

The use of compressed air as an energy carrier has become established in almost all industries and processes. Compressed air production by means of electrically powered compressors is highly energy-intensive and incurs costs of approx. 1.5 - 3 euro cents/ Nm^3 . The current consumed for creating compressed air can equal 20 - 30% of a company's total energy costs.

Experience shows that targeted measures, such as optimizing compressed air production and processing, using a higher-level compressor control and minimizing leaks and pressure losses can add up to energy savings as high as 33%.

Intelligent compressor control

Compressed air must be available at all times in the correct quantity and quality and at the correct pressure level. However, any and all amounts of compressed air provided needlessly incur substantial costs without providing any benefit. Ineffective control systems are identified by wide pressure bands, which is why a higher system pressure has to be set to meet the required minimum pressure at all times.

Our solution

- Technical and cost evaluation of a higher-level control system
- Reduction of the system pressure
- Optimization of the load/no-load characteristics
- Compressed air provided as needed

Your benefits

- Optimization of compressed air costs up to 12%
- Reduction of maintenance costs
- Decrease of machine wear
- Intelligent and self-teaching control system
- Documentation of consumption

Your potential savings

Assumptions

- | | |
|--|---|
| ■ Compressed air power consumption | 10 million Nm ³ /year (374.30 million SCFM/year) |
| ■ Electricity costs | 0.1 €/kWh |
| ■ Total compressed air costs | 150,000 € |
| ■ Percentage of no-load operation (previously) | 10% (relative to energy consumption) |
| ■ Percentage of no-load operation (afterwards) | 2% |

Savings

12,000 €/year

Your investment

Services

- | | |
|--------------------------------------|---------|
| ■ Potential analysis | 2,000 € |
| ■ Use of a compressor control system | 8,000 € |

Investment 10,000 €

Amortization period 10 months

Finding and eliminating leaks

Because compressed air is not considered a hazardous medium from a safety technology perspective, many companies neglect to pay attention to possible pipeline losses in this area.

A study shows that in 80 of 100 companies, up to 50% of the energy required for creating compressed air is lost on the way to the consumer.

Our solution

- Locating compressed air leaks using special measuring systems
- Quantifying the percentage of compressed air lost to leaks
- Eliminating the leaks with moderate effort
- Providing manufacturer-neutral advice about replacement components

Your benefits

- Lower compressed air costs
- Leaks reduced by up to 50%
- Decreased load on the generating station
- Increased availability

Your potential savings

Assumptions

- | | |
|-----------------------------|--------------------------------|
| ■ Electricity price | 0.1 €/kWh |
| ■ Number of operating hours | 24 hours a day/365 days a year |
| ■ Identification of | 200 leaks |
| ■ Leak costs per year | 150 €/leak |

Savings

30,000 €/year

Your investment

Services

- | | |
|---|----------|
| ■ Locating the leaks | 6,000 € |
| ■ Eliminating the leaks,
including materials | 14,000 € |

Investment

20,000 €

Amortization period

8 months

Example product

The specialist for compressed air measurement t-mass 65

Compressed air



- Tried-and-tested compressed air measurement
- Minimum pressure loss
- Mobile installation under process conditions



www.de.endress.com/t-mass



Steam

Due to its high energy content and highly calculable heat output, steam is a preferred carrier of heat.

Some 30% of industrial fossil energy consumption goes to generate steam. Steam boilers frequently operate 24/7, incurring costs of approx. 30 € per ton of steam.

Therefore, even small optimizations can provide large savings.

Up to 20% of energy can be saved by measures such as insulating steam lines, blocking off unused steam piping, optimizing the ventilation rate of the degassing vessel and blowing down or monitoring the condensate separator.

Because steam is not one of the media subject to mandatory verification, steam billing frequently involves discussions when calculations are contested. To measure the mass flow of steam accurately, you need a flow measurement system that includes pressure and temperature compensation. For this purpose, however, a total view of the error of all involved components is required in order to evaluate the measured value in a verifiable way. In most cases, this view is lacking.

Our solution

- For existing measurement system: steam service package with onsite calibration, including total view of error and post-installation check
- For a new measuring point: premounted, inspected and documented complete measurement section configured to the specific application:
 - Application-optimized measuring system with high overall accuracy
 - Traceable calculation oriented towards real-world conditions to IAPWS-IF97

Your benefits

- No more discussions about steam billing
- Verifiable measurement results with onsite calibration traceable to normal standards

Your potential savings

Assumptions

- | | |
|-------------------------------|------------------|
| ■ Steam consumption | 5 t/h |
| ■ Operating hours | 4,000 hours/year |
| ■ Steam costs | 30 €/t |
| ■ Measured error (previously) | 10% |
| ■ Measured error (afterwards) | 3.5% |

Savings

up to 39,000 €/year

Your investment

Services

- | | |
|-----------------------------|-----------|
| ■ Steam service packag | e 2,000 € |
| or | |
| ■ Steam measurement section | 6,500 € |

Investment

2,000 €

or 6,500 €

Amortization period

< 3 months

Mimimizing consumption

Steam boilers typically have a efficiency of 90 to 95%. If we consider the efficiency of the entire steam system, the efficiency is significantly lower. Reasons include uninsulated steam lines, leaks, contamination or defective condensate separators. Accurate measurements help to identify losses and monitor the steam system for worsened conditions.

Our solution

- Designing the measuring system
- Installing systems for measurement of steam quantities
- Visualizing and archiving the consumption quantities

Your benefits

- Correct energy balancing
- Allocating the steam consumption to the appropriate cost center
- Well-founded basis for optimization measures
- Consistent long-term monitoring of consumption

Your potential savings

Assumptions

- | | |
|---|-----------------|
| ■ Steam consumption | 5 t |
| ■ Steam costs | 30 €/t |
| ■ Operating hours | 4000 hours/year |
| ■ Losses from missing insulation,
defective condensate separators
and leaks | 5% |

Savings	30,000 €/year
---------	---------------

Your investment

Services

- | | |
|---|----------|
| ■ Measuring system and
automation components | 15,000 € |
| ■ Engineering | 10,000 € |
| ■ Optimization measures | 10,000 € |

Investment	35,000 €
------------	----------

Amortization period	1 year
---------------------	--------

Example product

The specialist for steam calculation

EngyCal RH33

Steam



- Reliable steam computer
- Fast commissioning
- Easy remote readout



www.de.endress.com/RH33



Cooling

Many areas of industry require refrigeration for processes. Refrigerating units such as chillers work with electricity, a cost-intensive form of energy. As during the refrigeration process, heat does not move on its own from a colder to a warmer body, the heat is transported from the colder location to the warmer location using costly mechanical work.

Over the entire lifecycle, the costs for the energy used in this process exceed the procurement costs many times over. Therefore, it is important to ensure high energy efficiency both during the engineering of a refrigeration system and during ongoing operations. A potential for optimization by up to 15% can be realized using measures such as designing the refrigerating plant according to requirements, recovering waste heat and minimizing consumption.

Recovering waste heat

Many industrial processes generate residual heat that goes unused. Recovering waste heat allows the primary energy consumption in other processes to be reduced. Critical factors for waste heat recovery are the temperature, availability and the carrier of the heat. There is a high potential for waste heat recovery in the flue gas of melting furnaces. At the same time, a large amount of cooling is required (cold water at a temperature of 6 °C/12 °C). The problem is how to use the recovered waste heat to generate cold.

Our solution

- Using waste heat recovered from the flue gas to generate cold water (6 °C/12 °C) by means of an absorption chiller
- Refrigeration process sized according to requirements with use of open and closed-loop control engineering to lessen the load on the existing chillers
- Using frequency-controlled pumps
- Using an adiabatic recooling system
- Concept, planning and project engineering

Your benefits

- Using excess heat
- Reducing primary energy consumption and thus saving substantial costs
- Proper implementation of engineering services
- Taking into account possible synergy effects for refrigeration

Your potential savings

Assumptions

- Using waste heat recovered from the flue gas to generate cold water (6 °C/12 °C) using an absorption chiller approx. 280,000 €/year

Savings 280,000 €/year

Your investment

Services

- Planning
- 1 chiller
- Pipe, assemblies, pumps and measuring system

Investment 820,000 €

Amortization period 2.9 years

Verifiable balancing

To discover potential energy savings in the refrigeration process and take appropriate action, the efficiency of the refrigeration system must be determined and the individual consumers measured. However, highly accurate measurement is also useful at transfer stations at which refrigeration is billed, as only in this way can billing reflect the actual consumption.

Our solution

- Highly accurate measurement of the amount of cooling with the EngyCal energy computer with electronically paired temperature sensors
- Recording electrical energy
- Calculating the energy efficiency and thermal energy values
- Creating energy consumption charts

Your benefits

- Continuous monitoring of energy efficiency or key energy figures
- Deriving optimization measures by evaluating the efficiency of each process (e.g. insulating tanks and piping)

Your potential savings

Assumptions

- Power consumption 4,000 megawatt hours (MWh) per year
- Electricity costs 66 €/MWh
- Optimization of refrigeration process 5%

Savings 13,200 €/year

Your investment

Services

- Cold measurement 4,000 €
- Current measurement 1,000 €

Investment 5,000 €

Amortization period 6 months

Example product

The specialist for refrigerant measurement

Promag 50



- Reliable flow measurement
- No pressure loss
- Simple installation



www.de.endress.com/MID



Heat

Heat is required in almost every industry, whether for chemical reactors, auxiliary circuits or for preserving food. Some 75% of energy used goes towards generating heat. Both the generation and distribution of heat offer large potential energy savings totaling up to 20%.

On the one hand, using alternative fuels can lower costs or improve the CO₂ balance. On the other hand, heat consumption can be reduced using optimally designed and maintained heat exchangers.

Mimimizing use of raw materials

Using secondary fuels is an opportunity to lower energy costs in the thermal part of the process and save primary energy. Heavy oil, waste oil and solvent are frequently used as liquid secondary fuels. However, their properties frequently change with each new delivery.

To ensure an optimum burner flame and injection, for example, heavy oil must be heated to a certain temperature; in this specific case, the temperature is 130 °C.

Our solution

- Continuous measurement of mass flow, fluid density, temperature and viscosity of the secondary fuel, thus optimizing the burner control.

Your benefits

- The measured mass flow, in combination with the continuous viscosity measurement, enables optimization of the burner control system to control the energy input and the distribution of the fuel flow. Based on the currently measured viscosity, the heavy oil is now heated only to the extent necessary. This allows the average heating temperature to be reduced.

Your potential savings

Assumptions

- Decrease of the average heating temperature 7 °C
- Steam costs 30 €/t

Savings 70,000 €/year

Your investment

Services

- Measuring system, commissioning 14,500 €

Investment 14,500 €

Amortization period < 3 months

Recognizing heat losses early

For generating heat, depending on the application, hot water, thermal oil or steam is used as an energy carrier. The energy is transmitted in heat exchangers. The efficiency of the heat exchanger is critical for the energy input. Another important reason to measure energy input may be to monitor the sequence of chemical reactions.

Our solution

- Heat quantity measurement, complete with data recording, via Engycal RH33 or RS33
- Documentation of the output of the heat exchanger
- Monitoring of the process (e.g. chemical endothermic reaction)

Your benefits

- Minimizing loss of heat/liquids using monitoring
- Billing the costs to the individual processes
- Quality monitoring (of the process)
- Identifying possibilities for optimization

Your potential savings

Assumptions

- | | |
|---------------------|-------------------------|
| ■ Steam consumption | of heat exchanger 1 t/h |
| ■ Operating hours | 4,000 hours/year |
| ■ Steam costs | 30 €/t |
| ■ Potential savings | 10% |

Savings	12,000 €/year
---------	---------------

Your investment

Services

- | | |
|--|---------|
| ■ Heat quantity measurement per unit, including installation and commissioning | 7,000 € |
|--|---------|

Investment	7,000 €
------------	---------

Amortization period	< 1 year
---------------------	----------

Maintaining the efficiency of the heating boiler

In large buildings and in industry alike, heating boilers are needed to generate steam and hot water.

Nowadays, the efficiency of these boilers is very high.

The efficiency can be between 90% and 95%. However, poor operating conditions can impair the efficiency over the long term.

Our solution

- Recording gas volumes consumed
- Calculating the differential enthalpy
- Measuring the enthalpy of the fed and drained water (steam boiler)
- Energy efficiency calculation with alarm when values fall below limit values

Your benefits

- Monitoring the energy efficiency and, as a result, maintaining optimum operating conditions with maintenance
- Recording energy consumption curves
- Optimization thanks to improved boiler control

Your potential savings

Assumptions

- | | |
|-----------------------|----------------------------|
| ■ Steam consumption | 5 t/h |
| ■ Energy demand (gas) | 3.5 MWh
108,000 MW/year |
| ■ Potential savings | 2% |

Savings	10,500 €/year
---------	---------------

Your investment

Services

- | | |
|--|---------|
| ■ Gas measurement system | 3,000 € |
| ■ Differential enthalpy measurement system | 5,000 € |
| ■ Boiler feed water measurement system | 5,000 € |
| ■ Efficiency calculation | 3,000 € |

Investment	16,000 €
------------	----------

Amortization period	1.5 years
---------------------	-----------

Example product

The specialist for heat calculation

RMC621



- Universal energy computer
- Highly accurate process calculation
- Large LCD screen



www.de.endress.com/RMC621



Use of resources

In addition to the auxiliary media, various other starting points for minimizing energy costs are available. The later in production chain the savings can be attained, the greater their effect, as all production steps are inherently associated with losses. This makes it possible to reduce the necessary production quantity, for example by minimizing filling losses. This enables compressed air, steam, heat and cold to be saved in all preliminary stages. Another consideration is optimizing production in terms of energy consumption. In many cases, the focus is placed on product quality without regard to the amount of energy consumed. In these situations, intelligent measurement and control technology provides the ability to attain maximum quality with minimum energy consumption.

Optimizing oxygenation in sludge activation

In the municipal area, sewage treatment plants are often the largest single consumers of electricity. According to a study carried out by the German Association for Water,

Wastewater and Waste (DWA), Germany's sewage treatment plants consume an estimated 4.4 TWh of electricity per year for wastewater purification. The primary object of attention is the main consumer of electricity: the aeration for the activated sludge. For the plant operator, this provides the first starting point for an optimization.

Our solution

- Direct online measurement of ammonium and nitrate
- Process optimization of nitrification and denitrification
- Load-dependent control of air supply to the biological stage
- Suitable for small medium-sized plants with intermittent or simultaneous nitrification/denitrification

Your benefits

- Improvement and standardization of discharge values due to the load-dependent ventilation control in biological treatment
- Optimizing energy efficiency through targeted ventilation control in biological treatment
- Minimization of operation and investment costs

Your potential savings

Assumptions

■ Plant size	40,000 population equivalent (PE)
■ Spec. power consumption	40 PE/kWh*a
■ Total electricity consumption	1.6 million kWh/year
■ Number of activation zones	2
■ Potential savings	up to 40%

Savings up to 76,800 €/year

Your investment

Services

■ Measuring system	13,000 €
■ Decentralized control unit, data recording, installation and commissioning	25,000 €

Investment 38,000 €

Amortization period (at 40%) 6 months

Minimizing wastewater costs

In many operations, neither the quantity nor the load of the wastewater is measured continuously. In these cases, the fees are determined from the fresh water consumption using factors. Experience shows that in some cases, the wastewater volume billed is greater than the quantity actually generated by a wide margin.

Mechanical water gauges with a measurement inaccuracy of up to $\pm 8\%$ can also provide a disadvantage.

Our solution

- Suitable measuring systems with regard to function, performance and price
- Recording technology for safe recording of history
- Optional analytical measuring devices for determining the wastewater quality

Your benefits

- Accurate documentation for billing wastewater costs
- Gaining transparency as to when wastewater is generated and in what quantities
- Increasing employee awareness
- Protecting the environment

Your potential savings

Assumptions

■ Wastewater volume	50,000 m ³ /year
■ Overcharged wastewater (5%)	2,500 m ³ /year
■ Wastewater reduction through transparency (5%)	2,375 m ³ /year
■ Wastewater costs	1.50 €

Savings 7,312.50 €/year

Your investment

Services

■ Measuring system	2,000 €
■ Recorder	3,000 €
■ Installation and commissioning	1,000 €

Investment 6,000 €

Amortization period < 1 year

Minimizing losses with accurate metering

Bottling liquid media poses constantly new challenges for mechanical engineering companies as well as producers and contract bottlers: shorter product cycles, increased requirements for cleaning (such as for aseptic production), fast and efficient handling of various products in different batch sizes. The problem lies in accurate metering and in preventing losses.

Our solution

- Prefabricated package solution for optimizing existing filling plants
- Versatile and modular hardware and software concept for individual adaptation
- State-of-the-art flowmeters combined with preconfigured control software

Your benefits

- High productivity thanks to minimal machine changeover times
- No mechanical wear due to omission of piston-type fillers
- Reduced cleaning times thanks to easy-to-maintain measuring system
- Greater flexibility through integrated recipe management
- Prevents overfilling

Your potential savings

Assumptions (all costs due to losses at the machine)

- Filling cosmetic products into small containers
- Compressed air losses 720 €/year
- Energy losses 300 €/year
- Malfunctions in production 127,200 €/year
- Malfunctions in cleaning 72,000 €/year

Savings 200,220 €/year

Your investment

Services

- Measuring system 8,000 €
- Filling system incl. control for 8 filling tips in line 40,000 €
- Commissioning 6,000 €

Investment 54,000 €

Amortization period < 4 months

Accepting or discharging liquids in large containers (drums, containers, road tankers, rail tank cars and tanker ships) is a great challenge for users and their agents, particularly in systems for custody transfer, which are used both for sales and/or in customs and duty applications. This is complicated by the fact that due to multi-chamber systems, the sub-quantities are not only small, but can also differ in their chemical composition.

Our solution

- Package solution with loading system in accordance with EC type-examination certificate with state-of-the-art flowmeters, approved loading control systems including recording
- Versatile, modular software and hardware concept for individual adaptation of security requirements and further processing of recorded quantities

Your benefits

- No (intermediate) weighing of tankers
- High resolution of measured values
- No tampering due to operator error
- Easy operation, even by untrained personnel
- Maintenance-free long-term operation

Your potential savings

Assumptions

- 3 ships loaded/week, in the presence of a surveyor (expert for quantity measurement)
- Daily rate 400 €
- Duration for loading a ship 8 - 10 hours
- Costs per week 1,200 €

Savings 60,000 €/year

Your investment

Services

- Measuring system 15,000 €
- Loading system 38,000 €
- Commissioning 2,000 €
- Calibration (MI005 conformity assessment procedure) 4,000 €

Investment 59,000 €

Amortization period < 1 year

Example product

The specialist for accurate filling

Promass 84F



- Custody transfer measurement
- Accuracy at 0.1% o.r.
- Maintenance-free



www.de.endress.com/84F



Lifecycle

"The measuring device costs far too much." These could be the words of a purchasing clerk who goes by the purchase price alone. However, this thinking is somewhat short-sighted. Consider the example of purchasing a new car for your household. Based on the purchase price of versions A (inexpensive), B (moderately priced) and C (expensive), you choose version A. However, if we include other components such as gasoline consumption, tire format, spare part costs, the purpose for which the car will be used, or even the service mobility guarantee or proximity to the next workshop, some people will decide for B or C, as A incurs many more costs over its entire service life. The situation when evaluating measuring systems is similar. Investing in better technologies frequently means a lower total cost of ownership.

To estimate all costs incurred by capital investments, the key consideration is the lifecycle cost, also called the Total Cost of Ownership (TCO). The acquisition costs (direct costs) alone do not provide conclusive information. To ensure efficient long-term operation, the possible follow-up costs (indirect costs) must be determined.

Our solution

- Support in the planning phase
- Standardization and type reduction for your spare parts stock
- Premounted measuring points
- Device displays with intuitive, user-guided plain text operation
- Error diagnostics according to NE 107

Your benefits

- Long-term, low-maintenance operation of the measuring point with perfectly adapted sensors
- An optimized stockkeeping and spare parts concept
- Minimized plant downtimes with fast commissioning and return to service, quick error diagnostics and maximized calibration cycles

Example without optimized stockkeeping

Assumptions

■ Pressure measuring devices in stock	26
■ Device costs	400 €/device
Investment	10,400 €
■ Data maintenance and storage costs	250 €/year per stock location
Stockkeeping costs	6,500 €/year

Example with optimized stockkeeping

Assumptions

■ Pressure measuring devices in stock	10
■ Device costs after type reduction	700 €/device
Investment	7,000 €
■ Data maintenance and storage costs	250 €/year per stock location
Stockkeeping costs	2,500 €/year

Savings	(one-time) 3,400 €
	+ 4,000 €/year

Amortization period < 1 year

Calculation tool for lifecycle costs

According to ZVEI calculations, energy savings of 10 to 25% can be attained in German industrial and municipal facilities simply by using requirements-based automation technology. This corresponds to 88 billion kilowatt hours of energy equivalents. Up to 7 billion euros in energy costs could thus be saved each year in Germany. This is true even though some companies have already introduced extensive energy efficiency measures.

To strengthen consideration of lifecycle costs in the public and private sectors, the German Electrical and Electronic Manufacturers' Association (ZVEI) and Deloitte have developed a practical tool for various user groups. This presents investment alternatives in a transparent manner and makes it possible to compare them in terms of energy efficiency and their economic effects.

The calculation tool can be used immediately. In addition to consideration of individual components (e.g. speed-controlled pumps, energy-efficient motors, high-quality measuring instruments for process optimization), embedding in the comprehensive specific application is possible (e.g. consideration of an entire sewage treatment plant). As a result, such aspects as the meaning of energy efficiency in the overall context are made transparent, and interactions are taken into account.

The following illustration is a calculation example based on a specific real-world application, the Bachwis-Fällanden sewage treatment plant in Switzerland. The page after that explains the calculation tool developed by Deloitte.

Initial situation

Pure time control of the aeration cycles

■ Energy costs	95,246 €/year
■ New investment in blowers	77,937 €
■ Operating costs	1,732 €/year
■ Time period considered	15 years
■ Discount rate	3%

Lifecycle costs (present value) 1,235,922 €

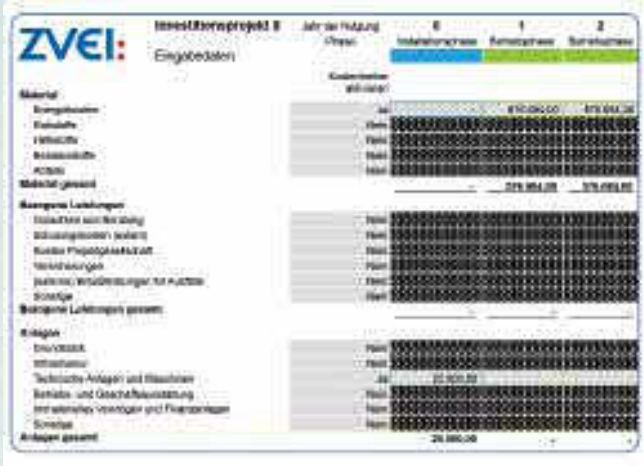
Your potential savings

Optimizing the aeration control system with online measuring system and control

■ Energy costs	54,560 €/year
■ New investment in blowers and measuring system incl. wiring and programming	180,119 €
■ Operating costs	5,196 €/year
■ Time period considered	15 years
■ Discount rate	3%
■ Lifecycle costs (present value)	893,829 €
■ Total savings over 15 years	27.7%

Savings 342,567 €

Excerpt from the calculation tool as an example



The calculation tool presents the result of the comparison of investment projects in an easy-to-understand manner.

Energieeffizienz	Investitionsprojekt I	Investitionsprojekt II	Differenz
Barwert Energiekosten (Euro)	9.962.812,00	9.766.456,20	196.356,70
Jährliche Anzahl der Energiekosten (Euro)	572.143,18	540.866,88	11.276,10
Prozentuale Energiekostenreduzierung			2,0%

By entering other cost types, you can also calculate whether an investment project is economical considering the total lifecycle costs and thus get an idea of its overall cost-effectiveness.



Additional potential energy savings

Numerous starting points exist for reducing energy costs and ensuring long-term plant efficiency. A comprehensive energy management system provides the solid basis for this. Energy management is the predictive, organized and systematic coordination of the procurement, conversion, distribution and use of energy to meet the requirements, taking into account environmental and economical objectives. Only in this way can companies minimize the effects of increasing energy prices over the long term while gaining clear competitive advantages, complying with legal requirements and firmly establishing climate protection as a part of corporate policy.

Ensuring long-term energy efficiency

Do you want to discover potential energy savings, justify or review investments in optimization measures, but lack a reliable data pool of energy figures?

Do you know that your consumption is too high, but are unable to identify the culprit? You have many energy meters, but they have to be read off manually in a labor-intensive process and condensed into key figures. Do you want to have the ability to predict your energy demand for multiple production units?

Do you want to be able to identify problems that make your use of energy less efficient at an early stage?

Our solution

- Inventory of the present situation in your facility
- Creating a comprehensive concept for an energy management solution
- Project engineering, installation and commissioning of the system, from the energy meter to the energy management software
- Energy efficiency analyses/optimizations

Your benefits

- Transparency of all important energy flows in accordance with EMAS or DIN EN 16001
- Increasing employee awareness by visualizing consumption
- Solid basis for planning optimization measures
- Lowering costs with maintenance according to requirements
- Long-term savings with continuous monitoring

Your potential savings

Assumptions

- | | |
|---|------------------|
| ■ Energy costs in the company | 1 million €/year |
| ■ Savings from transparency and increased awareness | 3% |

Savings

30,000 €/year

Your investment

Services

- | | |
|--|----------|
| ■ Inventory of the present situation, concept creation | 5,000 € |
| ■ Energy management software for 50 measuring points | 5,000 € |
| ■ Measuring system, automation components | 50,000 € |

Investment

60,000 €

Amortization period

2 years

Taking advantage of tax breaks

Now more than ever, cutting energy costs is critical to companies' competitiveness. A wide variety of opportunities are available for benefiting from tax allowances and reductions. However, many companies find the idea of looking into these possibilities too complex, and bureaucracy makes things even more difficult.

Our solution

- We have an overview of where to submit your application, what grants and subsidies are available and who to talk to
- We offer target-oriented advice about grants and subsidies related to your specific technical project
- We support you in obtaining certification to EN 16001
- We help you submit your application

Your benefits

- You reduce your renewable energy assessment with the special offset provisions
- You use tax allowances for certain processes
- You receive a partial reimbursement of the environmental tax according to criteria

Your potential savings

Assumptions

- Fulfillment of the criteria for gross value creation
- Fulfillment of electricity consumption >10GWh
- Volume of purchased electricity 15,000 MWh
- Hours of use 4,800 h
- Renewable energy assessment
(preliminary figure for 2011) 35.30 €/MWh
- Amount of the renewable energy assessment 529,500 €

Possible reimbursement 469,800 €

Your investment

Services

- Preliminary audit for the renewable
energy assessment 10,000 €
- Support in obtaining certification 8,000 €

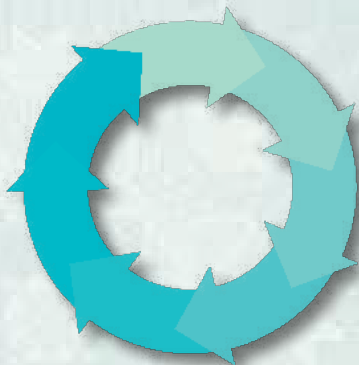
Investment 18,000 €

Amortization period 1 month

Continuous life cycle management services throughout the project

One contact person...

- For all external energy supplies
- From inventory of the present situation to optimizing energy efficiency
- Over the entire life of the project



Service portfolio

- Energy efficiency analyses
- Energy efficiency optimizations
- Energy management software
- Performance specification
- Project management
- Non-proprietary system selection
- Field devices, instrumentation
- Electrical measuring, control and regulation planning
- PLC programming
- Cabinet assembly
- Electrical measuring, control and regulation system installation
- Commissioning, installation monitoring
- DIN EN 16001 certification
- Staff training



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Publishing information

Publisher

Endress+Hauser
Messtechnik GmbH+Co. KG
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Layout

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Marketing Communications

Print run

3,400

Printing

Straub Druck+Medien AG,
78713 Schramberg, Germany

The publisher is responsible
for the content.

Copies may be made
only with the publisher's
permission.

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CP00085Z/11/EN/01.11
71141285
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