

Like to save, too..? Others already have

Discover your potential savings
with Grundfos Pump Audit





Improving energy efficiency is one of the easiest ways to reduce energy consumption and carbon emissions. Efficient energy use is achieved primarily by means of a more efficient technology or process, which ultimately stimulates global economic development, creates new jobs and secures a better environment.

The EU is committed to reducing its overall energy consumption by 20% by 2020. This is expected to cut emissions by almost 800m tonnes a year and save around €100bn in the EU alone*. Even though many are disappointed with COP15 and the Copenhagen Accord, it is beyond doubt that European industries and manufacturers have to act now to help combat climate change.

Pumps are vital for helping society and thus humans' way of living but are often overlooked, as such technical equipment is invisible to most people. However, it is a fact that today pumps account for more than 12% of the world's electricity consumption. In addition, surveys show that approx. 83% of all pump systems in the process industry operate inefficiently. It therefore makes perfect sense to optimise your pump systems.

Greater energy efficiency not only reduces our collective carbon footprint and environmental impact, it also results in substantial savings in operating costs within your company. That's why optimisation is an all-round winner: it's two sides of the same coin.

Grundfos Pump Audit is a quick and efficient 4-step tool to find out whether your pump system is operating at its optimal level of efficiency. With very little disturbance to plant operations we can help you reduce your energy consumption and CO₂ emissions – and save money at the same time. Others already have.

Enjoy a selection of the latest Pump Audit cases and read more about the new EU legislation on electrical motors.

Best regards
Henning Sandager

Group Senior Vice President, Industry

* http://ec.europa.eu/index_en.htm

GRUNDFOS PUMP AUDIT WINS 2009 GREEN APPLE AWARD IN THE UK

For the 5th consecutive year Grundfos was announced as winners of the highly regarded Green Apple Award for Environmental Best Practice. The awarding institution is The Green Organisation in the UK, which recognises, rewards and promotes environmental best practice around the world.

Grundfos' Pump Audit Tool won the 2009 Engineering Category for its ability to explain the real benefits of efficient pump systems to corporate and end users, and why they should give such a level of focus to their pump systems.



Pumps are the single largest user of electricity in industrial and commercial applications in the UK. In fact they consume an incredible 47.4 TWh of electricity, which in turn represents some 32% of all electric motor consumption in industry and commerce.

The judges could see the obvious benefits of Grundfos' Pump Audit Tool and how it helps businesses save money on electricity bills as well as contributing towards conserving precious energy resources.

WE ARE WITH YOU ALL THE WAY

Your business *is* our business! Because it is only by helping our customers excel that we can show you the true nature and the true value of entering a partnership with Grundfos.

We will be your professional partner when it comes to optimising your pump systems, delivering new pumps to you and developing your employees' competencies.

Grundfos Pump Audit steps in to find out whether you can operate your pumps more efficiently – and Grundfos Pump School takes over to train your employees in how to select, operate and maintain the most optimum pumps for the job at hand.

Our global relationship with Carlsberg and Carlsberg's purchasing company Entec International is a good example of how a partnership with Grundfos can work in practice.



Carlsberg is the world's fourth largest brewery group with production facilities around the globe. Rather than performing complete Pump Audits at the individual sites, Carlsberg and Grundfos decided to get an overview of the variation in energy consumption and efficiency among the European plants.

A comprehensive pump review was performed on the approx. 300 heating, cooling, wastewater and water utility pumps used in the process lines of two test plants. Best practices in relation to efficient pump operations, energy usage and more then serve as benchmarks for all operations managers and future Pump Audits at the individual plants.



PUMP REVIEW

OPTIMAL SCENARIO

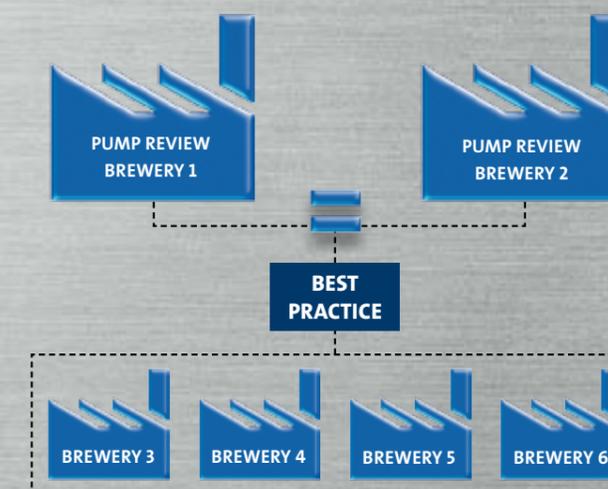
- Correct sized pumps and motors
- Correct pump types for the applications
- New pump technology
- Variable-speed solutions with frequency converter

NON-OPTIMAL SCENARIO

- Oversized pumps and motors
- Incorrect pump types for the applications
- Outdated pump technology
- Fixed-speed solutions without frequency converter

BEST PRACTICE

- Detailed report on best case and worst case scenarios
- Benchmark guidelines for energy efficiency of pumps and motors
- Recommendations to immediate and future pump replacements
- Grundfos Pump School seminars with focus on pump selection, pump operation and preventive maintenance





LIFE CYCLE COST ANALYSIS OF PUMPS OPTIMISES THE BREWING PROCESS

Thanks to a Grundfos Pump Audit Pfungstädter Brauerei in Germany can now look forward to a more efficient and less costly brewery production. And the investment in new feed pumps is paid back in just 5 months.

Around-the-clock operation calls for regular efficiency checks

Feed pumps in breweries often have to run around the clock and this means that the pumps should undergo regular efficiency checks.

For the technical management of the brewery, Rüttger Stieg, Technical Director, and Michael Schmitzer, Technical Systems Manager, it was therefore more or less a matter of course that Grundfos Service be commissioned to make a Pump Audit and produce a life cycle cost (LCC) analysis of the coolant feed pumps: "Obviously, we are constantly on the lookout for energy-efficient solutions."

New pumps raise the efficiency level by 20%

The condition of the circuit pumps for supply of process cooling, their efficiency and individual energy consumption were determined by listing the performance-related values. These values were then compared with potential new pumps, and the potential savings for each pump determined for identical duty points. It quickly became clear that with an efficiency level of 45%, the performance data for the existing pumps no longer matched the best technology available and resulted in excessive operating costs. A Grundfos series NB 125-200/221 end-suction pump was proposed as replacement. At the desired duty point, the 11 kW NB pump achieves an efficiency of 66% (P1 = 6.4 kW).

5 month payback time speaks for itself

Compared to the previous pump installation, this offers potential electricity savings of 92,020 kWh/year (based on 8,600 operating hours/year and 23 h/day). At an energy price of €0.10/kWh*, this corresponds to annual savings in operating costs of €9,202/year, or 61% of the operating costs of the old pumps. The replacement also involves a reduction in CO₂ emissions (lignite-generated energy) of 37,176 kg/year**.

Assuming investment costs of €3,800 for replacement of one of the pumps, payback of the entire investment will already be achieved after around five months. The recommended pump was installed in Pfungstädter Brauerei in August 2009, and control measurements showed that the data forecasted by the Pump Audit have been achieved almost 100%.

- ✓ **SAVED MONEY €9,202/year**
- ✓ **REDUCED CO₂ 37 ton/year**
- ✓ **PAYBACK TIME 5 months**

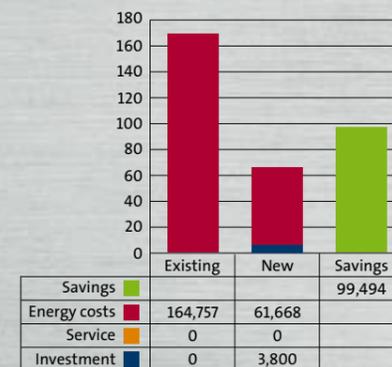


Michael Schmitzer (left) and Rüttger Stieg; on the right Grundfos consultant Rene Kopp

"We have to admit that we were very surprised just how uneconomic the operation of the old feed pumps was. Thanks to the clearly set-out and well-documented LCC analysis from Grundfos we had a reliable decision-making basis for our investment in the new pump."

Technical Director Rüttger Stieg and Technical Systems Manager Michael Schmitzer.

10-year savings (EUR)



*The assumed cost of 10 cents per kilowatt-hour is very low; there is a corresponding reduction in payback time if energy costs are higher.
**Source: the German Federal Environment Agency – 'Climate Change 05/07'.

WATER INTENSIVE INDUSTRY CUTS ANNUAL PUMP OPERATIONS COSTS BY 40%

The Grundfos Pump Audit has also proved its worth in other areas of the process industry where pumping of water and other liquids plays a significant role in the production process.

Hansol Paper is the biggest paper manufacturer in Korea with a production of more than 750,000 tons of paper every year. Grundfos was called upon to perform a Pump Audit on the company's boiler feeding process, high pressure shower line and water intake process from the river.



The Pump Audit was carried out according to plan and its replacement recommendations followed. Afterwards the new Grundfos CR/CRN multistage centrifugal pumps and HS horizontal split-case centrifugal pumps were measured in the field applications to verify that the Pump Audit kept its promises. And to everyone's delight the actual savings in energy consumption and CO₂ emissions were greater than first expected.

Other positive outcomes were that the person in charge of pumps was awarded "best improvement employee"– and that Grundfos can now look forward to a trustful and longstanding relationship with the customer.

- ✓ **SAVED MONEY €68,957/year**
- ✓ **REDUCED CO₂ 928 ton/year**
- ✓ **PAYBACK TIME 19 months**

CR pumps in utility operation.

'GREEN' BURGER BUNS FROM NOW ON

The East Balt Guenther Bakery in Belgium is part of the global alliance group of East Balt Guenther Bakery, which supplies buns and English muffins to one of the largest fast food restaurants in the world.

To maintain the competitive advantage, it is always seeking quality improvements in bakery execution strengths, new product innovation, technical capabilities and, of course, optimisation of process operations.

An all-round energy project was initiated by Andre Smedts of East Balt Guenther, who initially just wanted to purchase a Hydro MPC from Grundfos. But he soon realised that efficient pumps in the entire installation mean substantial money savings and a much greener profile for the bakery.

The bakery's water utility and booster pumps are working in full continuous profile 230 days/year 24 hours/day. The existing water supply was performed by old, so called on/off, systems and Grundfos DME pumps equipped with 15 kW motors.

The Pump Audit suggested that because water consumption is a maximum 3-4 m³, downsizing the entire system would be

advantageous. In addition, by bringing in a Grundfos Hydro MPC 2CRNE 5-16 booster system with electronically controlled, multistage centrifugal pumps, high-efficiency motors and integrated frequency converter, the bakery will be able to reduce its annual pump operations costs and CO₂ emissions quite substantially.

- ✓ **SAVED MONEY €9,018/year***
- ✓ **REDUCED CO₂ 64 ton/year***
- ✓ **PAYBACK TIME 18 months**

*Potential savings. The bakery has yet to decide whether to implement the full Pump Audit recommendations now or at a later date.

“COOL” PUMP AUDIT AT UNILEVER

Unilever Ice Cream UK produces a wide variety of ice cream worldwide. Since the factory opened 25 years ago, the product range and internal manufacturing processes have undergone considerable modification to keep pace with hygiene guidelines and an ever-evolving product range. With a Grundfos Pump Audit, Unilever saw an opportunity to economise on power consumption, to reduce their carbon footprint and to save operational costs.



Inspection of 60 pumps and 10 supply systems

Despite the many changes to the processes on Unilever Ice Cream UK's product lines, the process water supply remains the same as it was on day one 25 years ago. After an initial survey of some 60 pumps on the site, a more detailed evaluation was performed on ten supply systems. The evaluation highlighted numerous sources to energy wastage, such as over-pumping, valving back, over-sized pumps and inefficient motors.

“Our process has seen many changes over the years so we needed an accurate study of the current duty requirements”, explains Grant Burgess, engineering technician at Unilever.

The 37 kW single-speed pumps supplying the process water were getting on in years. They were running constantly, and the flow was controlled by valving back the water.

15 kW is enough for the job at hand

On the 37 kW pumps the Pump Audit tested a duty point that was specific to the site's requirements. The audit concluded that they were costing more than €20,000 per annum to operate.

Once the correct duty point had been calculated, it was agreed that replacement pumps could be rated at 15 kW.

Greater control of the process with a variable-speed solution

Reducing motor size from 37 kW to 15 kW meant that even a fixed-speed pump could be operated at less than half the cost.

To further increase savings by 20%, Unilever opted to install Grundfos variable-speed pumps.

The variable-speed solution has given Unilever greater control over the process, and the new pumps need only operate at a running speed of 45 Hz to supply the process. The payback period for the new pumps was a mere 12 months.

The new pumps installed at Unilever Ice Cream UK are: Grundfos NBE end-suction E-pumps, CRNE multistage centrifugal E-pumps, F&B-HYGIA single-stage end-suction sanitary pumps, multi booster sets and NOVALobe rotary lobe pump with positive displacement.



“The use of variable-speed pumps will give even more savings and leave us with the flexibility to speed up the pump to accommodate any future additions to the process load”.

Grant Burgess
Engineering Technician at Unilever

Meet the energy challenge

NOW

New EU legislation on electrical motors means that energy efficiency requirements to motors sold in the EU will get gradually tougher and tougher.

2011

By 2011 all motors must meet an IE2 standard.

2015

By 2015 all 7.5- 375 kW motors must meet an even stricter IE3 standard.

2017

By 2017 0.75-7.5 kW motors must also meet the IE3 standard.

Motors offer the single biggest savings opportunity. Because many pump motors only run at one speed and not in accordance with system demands, despite the fact that the majority of motors only have to operate at full speed around 5% of the time. There is no need to wait for high-efficiency motor technology. It is readily available: Grundfos motors already meet all 2011 energy efficiency requirements.

START SAVING TODAY. SWITCH TO A GRUNDFOS SOLUTION NOW!

Ready to contact Grundfos to hear more?

www.grundfos.com/pumpauidit



Save money and save energy with Grundfos Pump Audit

One of the simplest ways to reduce energy consumption and carbon emissions is to improve energy efficiency through a more efficient technology or process. But not many people realise that pumps consume around 12% of the world's electricity, and that up to 83% of pumps in the process industry work inefficiently.

In an easy 4-step process, a Grundfos Pump Audit will determine whether your pumps operate as efficiently as they can. In most cases you will experience substantial savings in operations costs and reduced CO₂ emissions – and not least a payback time on the investment that is much shorter than you think possible.

See for yourself how a Grundfos Pump Audit can help businesses save money and energy. A selection of our recent Pump Audit cases from, among others, Carlsberg, Unilever and Pfungstädter Brauerei all demonstrate that a scrutiny of pump systems in the process lines is a very good idea indeed.

They all saved more than they expected. Now it's your turn!

GRUNDFOS MANAGEMENT A/S

Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Tel: +45 87 50 14 00

www.grundfos.com

The name Grundfos, the Grundfos logo, and the payoff Be–Think–Innovate are registered trademarks owned by Grundfos Management A/S or Grundfos A/S, Denmark. All rights reserved worldwide.