



HIDDEN OPPORTUNITY

The humble pump is the key to reduced energy consumption, lower carbon emissions and the best way to save money NOW

Take 10 minutes to read
how one little-known
action can immediately
reduce electrical
energy consumption

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In the fight against climate change, everybody is talking about sustainable energy



But there is an energy solution we could implement right now, which would have huge impact.

One of our greatest challenges and concerns in the 21st century is to ensure sustainable development. The needs of current and future generations cannot be met unless we change the way we use energy.

There are plenty of good ways to reduce energy consumption every day: change standard light bulbs to CFL, minimise standby power, control air-conditioning –just to mention a few. However some of these are just better than others. There is one particular initiative companies and organisations can apply now to change the status quo.

**The answer is hidden for most people.
Turn the page to see**

Hidden underground and inside buildings, pumps are the unseen energy users

Many of them needlessly waste energy and by replacing these, huge reductions in CO₂ and operational costs can be achieved.

Today, more and more companies and organisations are concerned about the environmental impact of their businesses. For many, socially responsible behaviour has become an integral part of operation strategy. This has resulted in a number of initiatives but the question must be asked:

WHY DON'T WE FOCUS ON THE AREA WHERE THE SINGLE BIGGEST SAVINGS CAN BE OBTAINED?

Putting pumps on the agenda can help you minimise your company's carbon footprint and offer significant economic savings. This handbook shows you how.

Changing and upgrading pumps and pump systems can help make your corporate identity much greener

Read more in ENERGY USERS

DID YOU KNOW THAT
PUMPS ARE BEHIND EVERY
PRODUCT PRODUCED...

OUR FRESH
WATER SUPPLY
DEPENDS ON
PUMPS



Pumps consume 10%
of global electrical
energy

RADIATORS
CAN'T OPERATE
WITHOUT
PUMPS



Pumps circulate
the coolant in
air-conditioning
systems



... AND ENERGY EFFICIENCY
IS THE FASTEST AND
CHEAPEST WAY TO
REDUCE CO₂ EMISSIONS?

Sustainability equals good business

A greener, more sustainable corporate agenda is good not just for the environment but also for business.



As a global corporation that supplies a full range of pumps and pump solutions, we at Grundfos realise that having our own environmental agenda isn't enough, we also have a responsibility to inform others about what they can do to help. We know our advanced technological pump solutions can help reduce energy consumption markedly and, at the same time, provide businesses with sound economic savings.

HUGE SAVINGS OPPORTUNITY

In fact, pumps and other motor-driven applications offer an approximate five time bigger savings opportunity when compared to the potential of other more well-known energy users such as residential lighting.

So to us, optimising pumps makes sense. Not just in terms of becoming greener, but also because of the financial benefits.

An investment in new pumps raised efficiency with 20% at Pfungstädter Brewery in Germany and reduced the brewery's cost by €9,202/year. Read more on page 26.

Check www.grundfos.com/energy to find out more about pumps and pump technology.

Pumps can ensure a constant supply of clean water, which is essential for the production of goods in industry.

Large airports usually use 2,000-3,000 pumps 24/7 to keep everything going.

Pumps can be used in many applications in hospitals ranging from maintenance to labs and in the operating room.

Pump systems make taking showers in high-rise hotels and apartments possible.

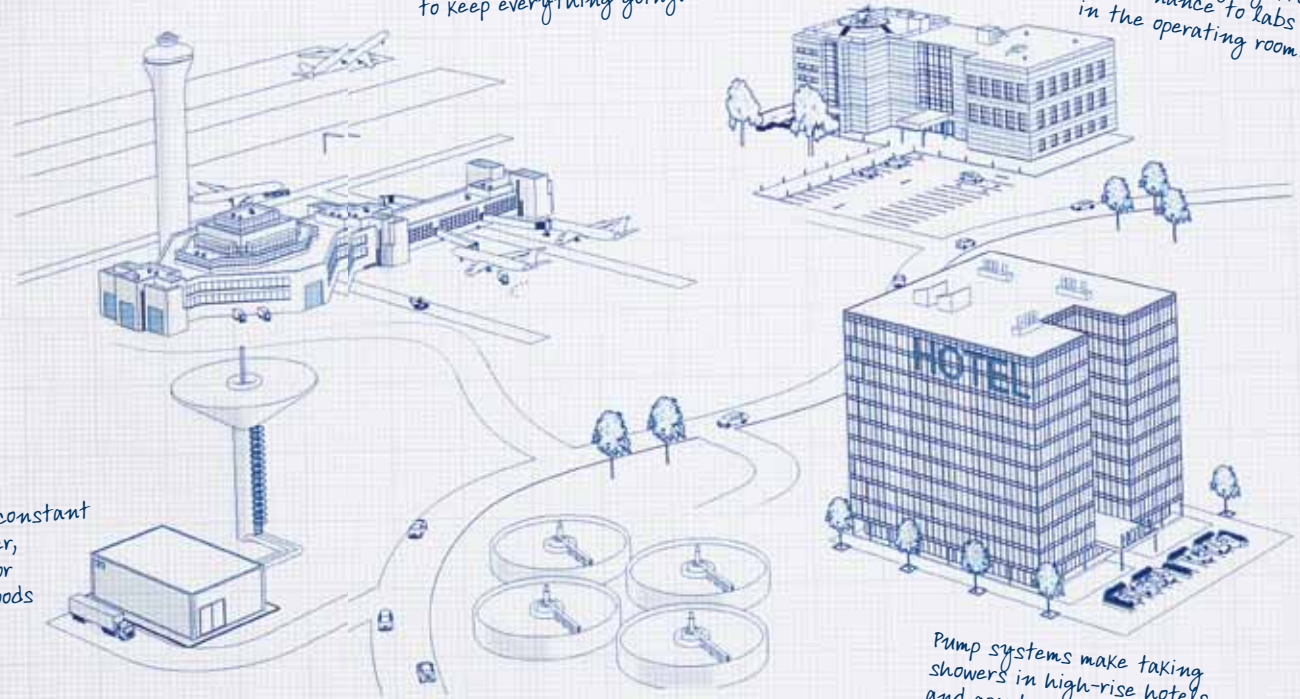
Pumps are hidden everywhere in our society

Industrial installations and a variety of pumps for specific applications are a necessity for life today. They help us keep our modern world spinning and we are totally reliant on them for many things, including the water we drink.

A pump is a machine used for raising, transferring or pressurising liquids, slurries or gasses. They come in many sizes and are designed for a number of different purposes such

as cooling, heating and water treatment – in fact anywhere that liquid needs to be moved.

They are usually hidden – housed in basements or found behind inner walls and in cabinets in buildings. They are used in large numbers in industry, in buildings like hotels and hospitals, and in private homes. They are essential in order to keep water running, air cooled, buildings heated, production running and swimming pools clean.





TO DO:

- Find out how many pumps you have
- Check savings potential/call Grundfos
- Discuss with chief decision maker

Don't blame the engineer:
The responsibility of putting pumps on the agenda also lies on your desk

Replacing a pump system or its integral parts is not always easy, but to improve your business's performance, it is an excellent place to start.

Technical staff and system engineers might maintain pumps, but as pumps are a part of your company's technical installations, it most likely also makes them a responsibility of your chief operating officer or chief accountant. Unfortunately, pumps have no novelty value. We have used them for decades and decades but they are taken for granted by most people. And for that reason they are today overlooked by most businesses in the debate about energy efficiency, carbon footprints and corporate social responsibility – all this despite the impressive evolution of technology, which means pumps should come under mandatory consideration by all businesses. In fact, you can help to put pumps on the agenda.

Read more in HOW TO PROCEED



Sustainability is rooted in our DNA...

... and we continuously pursue ways to be even better

Grundfos has been committed to sustainable development since its founding in 1945. Today sustainability and corporate social responsibility are integral parts of our business. We see ourselves as being on a journey on which we seek to constantly minimise our ecological footprint. This means greater efficiency and a commitment to acting responsibly on a human, ethical, economic and environmental level. We believe innovation, profitable business and sustainability go hand-in-hand. That belief is embedded in our DNA.



“ We understand sustainability as the forms of progress that meet the present without compromising the ability of future generations to meet theirs. ”
 (Source: Grundfos Sustainability Report 2009)

The launch of our Innovation Intent has been extremely beneficial. The Intent outlines our dream for 2025 and has led us onto our next sustainability initiatives, which includes The Footprint Project.

The Footprint Project introduces two initiatives. The first is a system that enables us to calculate the emissions generated by our production and analyses ways to reduce them. The second involves the evaluation of all our operations' CO₂ emissions. The initial emphasis is placed on the reduction of carbon emissions, with the long-term goal of greater dependence on CO₂-neutral energy sources. The process has already paid dividends: in 2009 we reduced overall emissions levels by 10.10% with a 15% reduction in our production facilities alone.

OUR IMPACT ON BUSINESS

Essentially we are always greatly mindful of how our business affects people and society and that is why continuous improvement is the basis of everything we do.

THE FOOTPRINT PROJECT

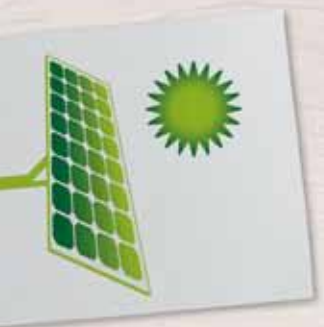
Throughout the years we have implemented several initiatives and it is our hope to inspire and help others introduce sustainable practices.

CSR MILESTONE

- 1957:** "HUNGARY HELP" Grundfos holds a donation ball to help out a group of Hungarian migrants in Denmark.
- 1968:** SHELTERED WORKSHOPS Grundfos founds its first sheltered workshop in Denmark. More will follow.
- 1970:** EFFICIENCY Introduction of a policy that new pumps must be at least 10% more efficient than their predecessor.
- 1990:** CODE OF CONDUCT All Grundfos managers sign a code of conduct on how to act in a responsible manner.
- 1996:** ISO 14001 CERTIFICATION Grundfos achieves the international environmental certification ISO 14001.
- 2000:** OHSAS 18001 Grundfos achieves occupational health and safety management system certification.
- 2002:** UN GLOBAL COMPACT Grundfos signs up for the UN Global Compact.

- 2003:** ECO AWARD The Schleswig-Holstein council in Germany awards Grundfos for its environmental initiatives.
- 2005:** Introduction of an EU-wide voluntary energy label for circulator pumps.
- 2006:** ENCOURAGING DISADVANTAGED YOUTH Young people with criminal pasts are enrolled into Grundfos' production facility work programmes.
- 2008:** FOOTPRINT STRATEGY A strategy is introduced that aims to minimise Grundfos' negative impact on the climate and reduce CO₂.
- 2009:** 4.08% of all Grundfos employees are hired on special terms, meaning people with physical, mental or other disabilities.
- 2010:** SUSTAINABLE WATER PROJECTS Beginning of the global CSR programme 'Grundfos Brings Water to Life', in which our employees help give third-world people access to clean water.

The hidden energy users



There are a number of ways to save energy, but some save more than others

Hidden pumps are the case in point

Pumps can offer significant savings to operators of commercial buildings, industrial applications, public buildings and water utilities. Already European companies of all kinds and sizes have given their pump systems a thorough check, which has led to inefficient pumps being replaced and substantial energy savings made.



Here are some examples:

Commercial and public buildings

Keeping people comfortable in commercial and public buildings means having control over air-conditioning, heating, water supply and wastewater – and efficient and reliable pumps are crucial for this.

OFFICE BUILDING

Application: Heating

Size: 35 circulation pumps

Reduced energy consumption:

29,117 kWh per year

Energy savings: 61.1%

Investment: € 27,193

Saved money: € 7,225 per year

PAYBACK TIME: 4.7 YEARS



HOTEL

Application: Chilled water air-conditioning

Size: 195 rooms plus conference facilities

Reduced energy consumption:

162,202 kWh per year

Energy savings: 25%

Investment: € 14,500

Saved money: € 16,000 per year

PAYBACK TIME: 0.9 YEARS



HOSPITAL

Application: Pump systems for heating and ventilation

Size: 77 beds, 39 pumps

Reduced energy consumption:

37,766 kWh per year

Energy savings: 68%

Investment: € 27,565

Saved money: € 8,110 per year

PAYBACK TIME: 3.4 YEARS



CAMPUS

Application: Pressure boosting

Size: 11 boosters with a flow range of 10 to 60 gpm

Reduced energy consumption:

680,973 kWh per year

Energy savings: 80%

Investment: € 135,000

Saved money: € 54,000 per year

PAYBACK TIME: 2.5 YEARS



Industrial applications

Pumps are used in every industrial application. They play a vital role in dairies, breweries, slaughterhouses, textile and chemical production, power stations, shipping and in the production of cars, yeast, juice and pharmaceuticals – to name but a few. Most people are unaware that every production industry is dependent on them.

DID YOU KNOW
that motors account for
30% of all electrical power
consumed in the EU?
Source: Segment Director Grundfos Water Utility

PHARMACEUTICAL

Application: Pump system offices and laboratory
Size: Mid-size pharmaceutical company
Reduced energy consumption:
172,416 kWh per year
Energy savings: 68.8%
Investment: € 118,641.80
Saved money: € 37,008 per year
PAYBACK TIME: 3.2 YEARS



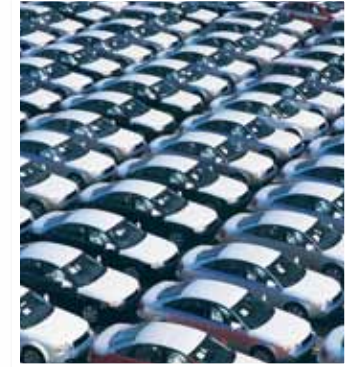
BREWERY

Application: Pump systems for production (Heating, Cooling, Water supply and Water Treatment)
Size: Mid-size brewery. Full process audit done
Reduced energy consumption:
57,136 kWh per year
Energy savings: 73.7%
Investment: € 31,000
Saved money: € 9,141 per year
PAYBACK TIME: 3.5 YEARS



AUTOMOTIVE PLANT

Application: Central cooling system for lubricant supply
Size: Central cooling lubricant supply with a max. circulation volume of 2000 m³/h
Reduced energy consumption:
814,000 kWh per year
Energy savings: 36.5%
Investment: € 120,500
Saved money: € 74,900 per year
PAYBACK TIME: 1.7 YEARS



STEEL CABLE PRODUCTION

Application: Cold water pumps
Size: Annual flow capacity at 1,644,785 m³
Reduced energy consumption:
226,200 kWh per year
Energy savings: 48.6%
Investment: € 56,600
Saved money: € 23,750 per year
PAYBACK TIME: 2.3 YEARS



ENGINE RESTORATION PLANT

Application: Pump systems for heating and water supply
Size: Annual capacity for restoration of 200 trains, 1000 employees
Reduced energy consumption:
79,000 kWh per year
Energy savings: 64%
Investment: € 18,000
Saved money: € 8,000 per year
PAYBACK TIME: 2.6 YEARS



Water Utility

The pumping of drinking water and removal of wastewater are absolute necessities in modern society. And in order to maintain comfort a lot of pressure must be generated. In far too many instances this pressure is maintained when the need for it ceases. This means that pumps waste precious water and energy needlessly.

DID YOU KNOW?
Every day 45 million m³
of pure drinking water
is lost through leakages.
That is enough to serve
200 million people.
Source: World Bank 2006

POTABLE WATER DISTRIBUTION

Application: Pumping systems for potable water distribution

Size: Annual capacity at 4,800,000 m³

Reduced energy consumption:

182,300 kWh per year

Energy savings: 23%

Investment: € 50,000

Saved money: € 23,280 per year

PAYBACK TIME: 2.7 YEARS



WASTEWATER

Application: Waste water treatment

Size: Annual flow capacity at 3,257,000 m³

Reduced energy consumption:

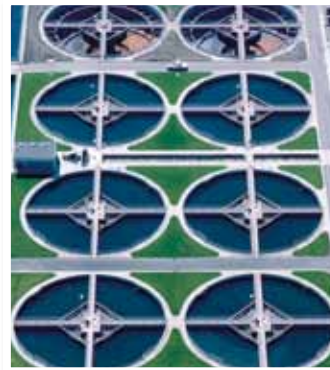
140,538 kWh per year

Energy savings: 25%

Investment: € 22,832

Saved money: € 12,973 per year

PAYBACK TIME: 1.83 YEARS



PRESSURE MANAGEMENT

Application: Pump system and controls for proportional pressure management

Size: Municipal water supply, 5 mio m³ per year

Reduced energy consumption:

50,000 kWh per year

Energy savings: 7.4%

Investment: € 10,000

Saved money: € 50,000 per year

PAYBACK TIME: 0.25 YEARS



GROUNDWATER ABSTRACTION

Application: Submersible pumps

Size: Midsize utility, pumping 1,4 mio. water m³ per year

Reduced energy consumption:

75,943 kWh per year

Energy savings: 28%

Investment: € 20,368

Saved money: € 9,113 per year

PAYBACK TIME: 2.2 YEARS



GROUNDWATER ABSTRACTION

Application: Submersible pumps for well field

Size: Midsize utility, pumping 1,4 mio m³ water per year

Reduced energy consumption:

304.000 kWh per year

Energy savings: 63%

Investment: € 20,000

Saved money: € 34,500 per year

PAYBACK TIME: 0.5 YEARS



A return on investment



Lower energy consumption pays off

2/3 of all pumps installed today are inefficient and use up to 60% too much energy. Replacement offers significant savings.

Most pumps currently installed are larger than necessary for the job at hand. In addition, the majority of the motors that are chosen to drive them are inefficient and often run continuously at their maximum speed regardless of actual requirements. In reality, most pump motors only have to run at full-speed 5% of the time. This leads to massive energy wastage all day, every day.

Replacing pump systems can make an immediate difference and in many cases return on investment will be reached within just a few years, after which the new system results in pure savings.

See savings examples on page 19-23 or go to page 30 and see how to address the issue practically.

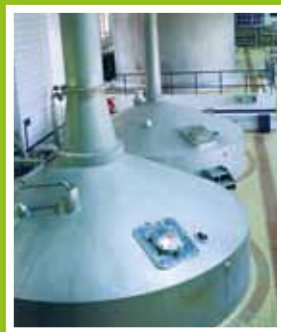
Case

Pfungstädter Brewery

No less than 450,000 hectolitres of beer are produced each year at the 175-year-old Pfungstädter Brewery in Germany. A volume that often demands 24/7 production and creates considerable pressure in the brewery's supply pumps.

With help from Grundfos, a life cycle cost analysis comparing old and new pumps was undertaken. This revealed a pump system with surprisingly low efficiency, and which is why in 2009 the brewery decided to change large parts of their system. This raised efficiency markedly and gave an annual CO₂ reduction of 37 tonnes. It furthermore resulted in an economic saving at €9,202 which equates to savings of 61% per year.

Assuming investment costs of €3,800 for the replacement of one of the pumps, the entire investment will already have paid itself back after five months. Since installation control measurements demonstrate the Pump Audit's recommendation has been almost 100% correct.



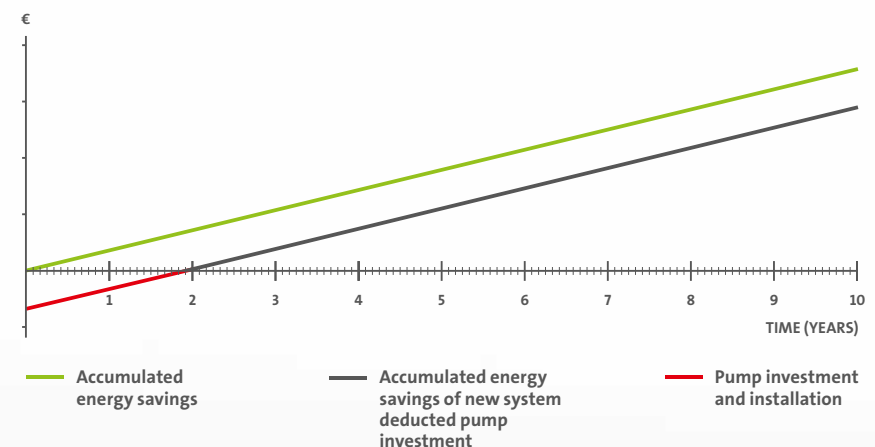
“We were very surprised with the inefficiency of our old supply pump systems.”

Rüttger Stieg

Pump efficiency is constantly improved by new technology

Over the years the pump industry has changed greatly. Enormous progress has been made, and the pumps we have today are far more efficient than ever before. This is partly due to intelligent, variable speed motor technology, which is used to make the pumps run. But it is also due to advanced pump technologies.

Pump optimisation can pay for itself in less than 24 months



¹ Almeida, Anibal T. et al; EUP Lot 11 Motors Final Report, University of Coimbra, December 2007, p: 68

² COMMISSION REGULATION (EC) No 640 of 22 July 2009

³ GMBH, Grundfos Food Beverage Pharma: Pfungstädter Brauerei – Effiziente und kostengünstigere Prozesskälteversorgung, 2010

How to proceed?

REMEMBER TO:

- Assemble basic information
- Write a to do list
- Conduct quick pump check
- Order a Pump Audit

Take action now!

One of the first things you can do is to assemble some basic information about your company's or organisation's current pump system and its annual cost. Taking action is not necessarily a difficult or time-consuming process.

1. CONTACT YOUR CHIEF OPERATING OFFICER (COO) IN ORDER TO FIND OUT:

- Who is in charge of the pump installations?
- Your annual electricity consumption
- The share of electricity consumption pumps account for

And if possible:

- How has the pumps' electricity consumption progressed over the last five years?

2. TALK TO THE PERSON RESPONSIBLE FOR PUMPS AND CHECK:

- How many pumps and motors are installed?
- How old are the pumps?
- What types of pumps are installed?

Outcome:

- A preliminary list of all the pumps and their location

3. CALL YOUR LOCAL GRUNDFOS ENERGY EFFICIENCY EXPERT FROM THE PUMP AUDIT TEAM AND LET US HELP CALCULATE YOUR COMPANY'S POTENTIAL SAVINGS IN TERMS OF CO₂ AND OPERATING COSTS

Following these three quick steps will help you decide whether a pump system overhaul would make sound environmental and business sense for your company.

Conduct a pump check

Having found all basic information about the pump system in your company you can also visit www.grundfos.com/energy. There you will find practical information on how to check your current pump system for energy efficiency, durability and cost.

By completing a questionnaire you will get an immediate indication of your savings potential. If you have the most basic information about your company's pump system it only takes a few minutes to complete and could turn out to be one of the best investments you ever make. It will also provide you with key figures you can present to your key decision makers.



Presently 8 Pump Audit pilot projects are carried out at SGS – the world's leading inspection, verification, testing and certification company, headquartered in Geneva. SGS employs over 59,000 people to operate a global network of more than 1000 offices and laboratories around the world.

“Pumps aren't visible to the eye, they are hidden and you just don't consider them immediately to be a cause of energy wastage. For us, the Grundfos Pump Audit has helped our company realise the importance of pumps in our building. Pumps can represent up to 40% of overall energy use of a building. Just by making them more energy efficient we are able to reduce our carbon footprint substantially – and that's of great benefit, especially to those countries where the CO₂ per kWh is high because of their energy sources.”

Daniel Rüfenacht
Vice President Corporate Sustainability at SGS

A Pump Audit can really make a difference

A pump audit is the ideal way to find out whether your company's pump system is operating efficiently. A Pump Audit is an optimal way to reduce CO₂ emissions and save money by a thorough analysis of your installations.

DID YOU KNOW that approximately 85% of a pump's Life Cycle Costs are incurred by power consumption?

THIS IS HOW IT WORKS:

A pump auditor will visit your site and conduct a survey in order to collect necessary data. After analysing the data a recommendation will be prepared for you. In this, the Life Cycle Costs of your company's current pump system will be compared with the system you could have if the pumps were changed to more efficient models. Among other investigations, the auditor will check the overall efficiency of your company's pumps, look at the initial purchase price of a different pump solution and compare costs for both maintenance and power consumption.



CUT ENERGY CONSUMPTION UP TO 60%

Grundfos' Pump Audit team has helped everyone from water supply companies to industries and public buildings cut their energy consumption on average by 40% to 60%, just by looking at their pump systems.

Case

Unilever Ice Cream UK

After an initial survey of some 60 pumps at the UK Unilever Ice Cream site, a more detailed evaluation was performed on ten supply systems. This revealed numerous sources of energy wastage, such as over-pumping, throttling back, oversized pumps and inefficient pump motors. By reducing the pump size in the single-speed pumps supplying the process water Unilever were able to cut cost by more than € 10,000 a year.



To further increase savings by 20%, Unilever opted to install Grundfos variable-speed pumps. This has given Unilever greater control over the process. The payback period for the pumps was a mere 12 months.

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

Grant Burges,
Engineering Technician at
Unilever

National contact

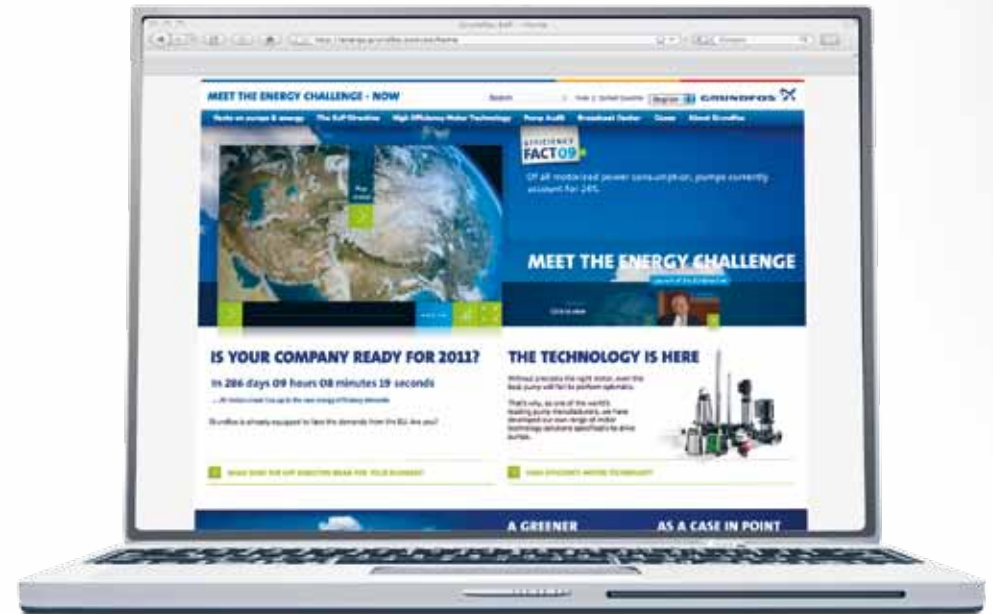
If you have any questions or concerns, please contact your local Grundfos office. We have an expert panel ready to assist you.

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You can also visit our website www.grundfos.com/energy to learn more about our company and pump systems. At the site you can read about new legislative energy efficiency demands and how pumps play a significant role. The site also features a Pump Audit calculator and information about why pumps typically account for up to 20-30% of a company's energy bill.



www.grundfos.com/energy

BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence



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