

# Welcome to Grundfos Commercial Building Services





In 2007, the European Union agreed to reduce CO<sub>2</sub> emissions by 20% by 2020. All 27 EU member countries have to commit to this target.



This will give all hotel owners a good opportunity to save money and improve the business.



***Green Profile  
CO<sub>2</sub> Reduction  
Cost Saving***



## Where to find energy savings

In all hotels comfort systems are an important part, so can we save energy and keep a high comfort level?



The answer is  
**Yes!**

As a pump supplier, we focus on reducing energy consumption for pumps in comfort systems like:

- Air-conditioning
- Heating
- Pressure boosting
- Hot water systems

*...and we would like to share our knowledge*



## Why look at the pump installations?

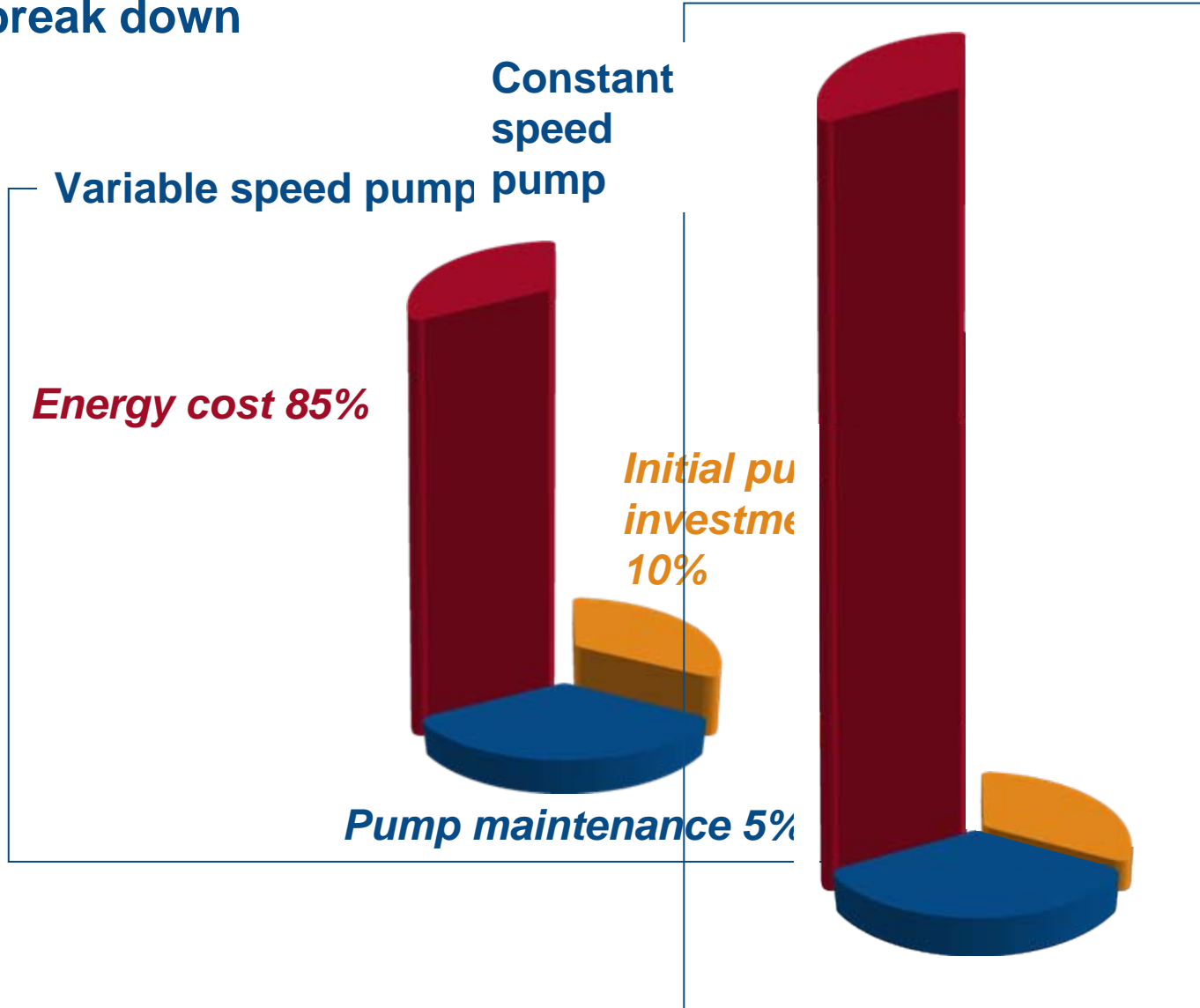


- A minimum of 10% of the total global electrical energy consumption is related to driving pumps.
- Pump motors account for 24% of all power used by motors.
- **2/3** of all pumps run at constant speed today. This is only needed in **4-5%** of the time.
- Pump energy consumption can be reduced with **20% to 60%** if pumps are changed to variable speed.

**It is feasible to look closer into all pump installations**



## Pump cost break down





# Replacement and Energy Check



- One-to-one replacement: **5 to 10% saving.**
- Changing from constant speed to variable speed pumps: **30-40% saving.**
- One-to-one replacement will not compensate for over sizing of the old pump and poor control strategy.
- One-to-one replacement is recommended for smaller pumps up to 2,2 kW.

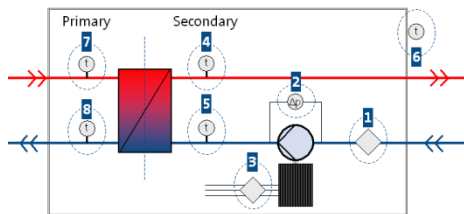
One-to-one replacement tool:  
WinCAPS / WebCAPS



## Replacement based on Energy Audit



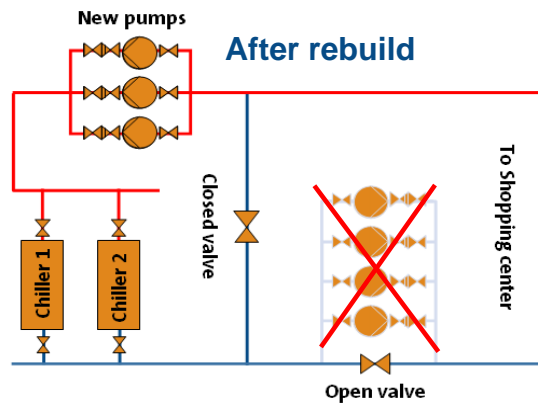
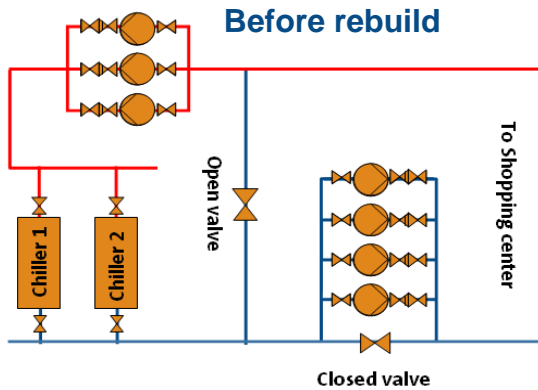
- “Energy flow” is checked by measuring flow, head, temperatures and power consumption.
- **20-60%** potential saving by replace old pumps and introduce new control strategies
- Focus on providing a control strategy for the system to be able to keep the right comfort level.
- The Energy Audit is mainly for medium and large systems.



**Investment cost**  
**Life Cycle Cost, LCC**  
**Pay-back time, PBT**  
**Saved CO<sub>2</sub> emissions**



# Case study: Energy Audit in a shopping centre in Rio de Janeiro



## Background:

The technical manager calculated the cost of operation of the buildings air-con system to be 45% of the total energy cost of the shopping center.

The air-con system was rebuild in 2005 due to expansion of the center. It deliver sufficient chilled water, but at a very high cost.

## Findings:

The measurement clearly showed a too low temperature difference (3,5 °C). The designed difference is 5 °C. This is a clear indication of a too high flow (750 m<sup>3</sup>/h)

The too high flow also indicate unnecessary high pressure loss (37,5 m).

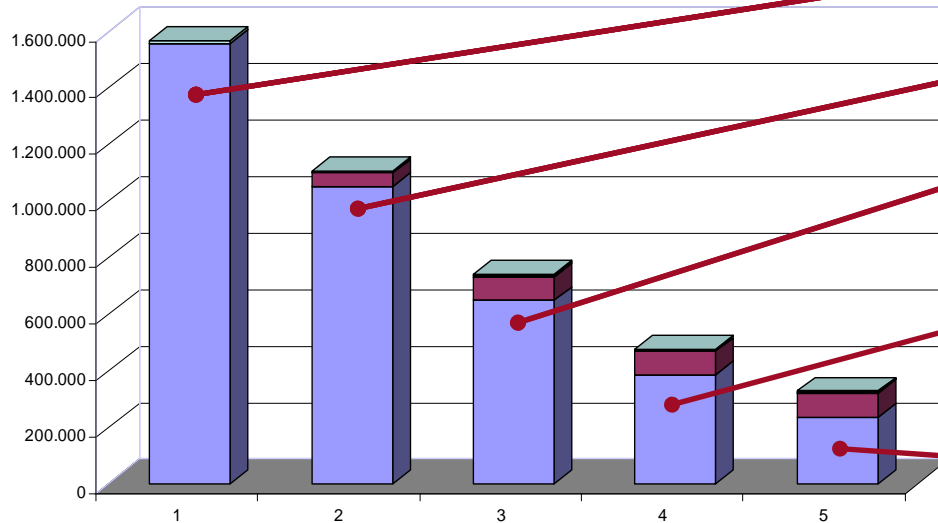
**The solution** was to redesign the system and replace the old existing pumps and disconnect the 5 year old pumps.

	$\Delta t$	m <sup>3</sup> /h	m	kW	h	kWh/year	
<b>Existing system</b>	1	3,5	750	37,7	150	5460	819.000
	2	3,5	750	37,5	101,4	5460	553.644
	3	4,2	625	27	62,4	5460	340.704
	4	5	525	19	37	5460	202.020
	5	6	438	13	22,6	5460	123.396

Energy calculation for the new proposal



# Savings due to Energy Audit



1. Existing system with constant flow
2. New and more efficient pumps
3. Variable flow strategy. Temperature difference to 4,2 °C
4. Variable flow strategy. Temperature difference increased to 5,0 °C
5. Variable flow strategy. Temperature difference increased to 6,0 °C

Energy saving calculation									Life Cycle Cost 10 years						
								Saving	Energy cost	Initial cost	Audit cost	Maintenance cost	Total cost		PBT
	Δt	m <sup>3</sup> /h	m	kW	h	kWh/year	€/year	€/year	€	€	€	€	€	Index	Months
1	3,5	750	38	150	5460	819.000	155.610		1.556.100	0		9.200	1.565.300	100	
2	3,5	750	38	101	5460	553.644	105.192	50.418	1.051.924	46.000	4.500	4.600	1.107.024	71	27
3	4,2	625	27	62	5460	340.704	64.734	90.876	647.338	83.000	4.500	4.600	739.438	47	9
4	5	525	19	37	5460	202.020	38.384	117.226	383.838	83.000	4.500	4.600	475.938	30	6
5	6	438	13	23	5460	123.396	23.445	132.165	234.452	83.000	4.500	4.600	326.552	21	3



## Savings due to Energy Audit

Initial investment:

€ 88.000

Energy cost saving:

79 %

Saving over 10 yrs:

€ 1.240.000

Pay back time, PBT:

Less than a year

Equals 950 more sold rooms per year





For more information about energy systems, audits and savings in commercial buildings:

[www.cbs.grundfos.com](http://www.cbs.grundfos.com)  
[www.grundfos.com/energy](http://www.grundfos.com/energy)  
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