

# NET ZERO EVENT

SOLUTIONS TOWARDS ENERGY SAVING  
CHALLENGES

**GRUNDFOS** 

Possibility in every drop

# Energy Optimization



The total amount of electricity consumed by pumps adds up to far more than most people realise

*Pumps account for a massive **10%** of the world's electricity consumption – way too much is pure waste*



**10 %**

## Small changes – great impact

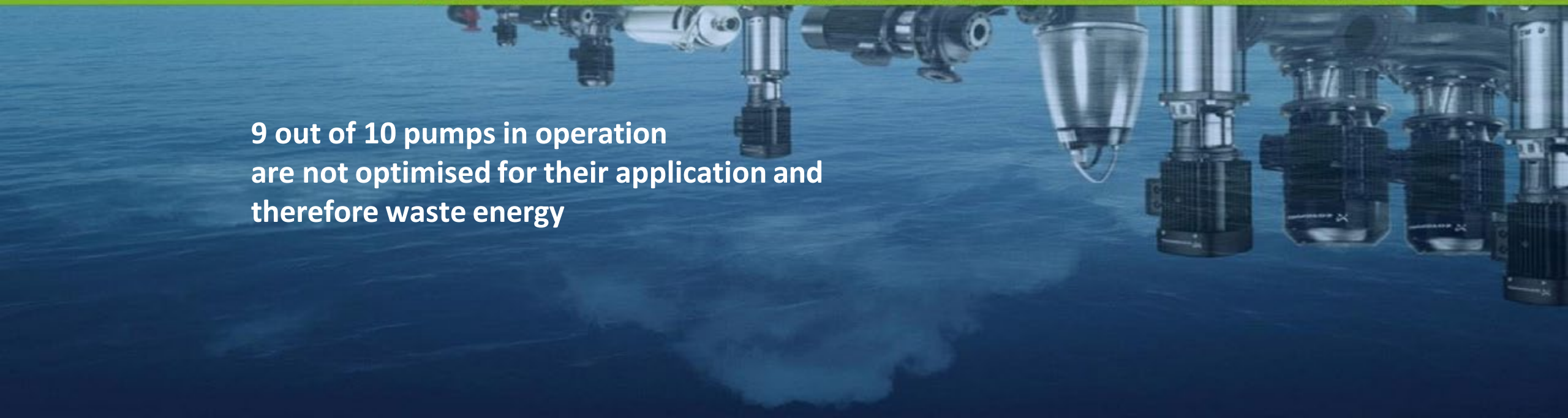
**Pumps account for a staggering 10% of the world's total electrical energy consumption.**

Even a slight reduction will have a huge impact on the environment worldwide, making energy optimisation an essential focus for all.



Pumps account for a massive  
**10%** of the world's electricity  
consumption

**9 out of 10 pumps in operation  
are not optimised for their application and  
therefore waste energy**



# Energy Optimization



**85%**  
ENERGY CONSUMPTION



**5%**  
PURCHASE PRICE



**10%**  
SERVICE & MAINTENANCE

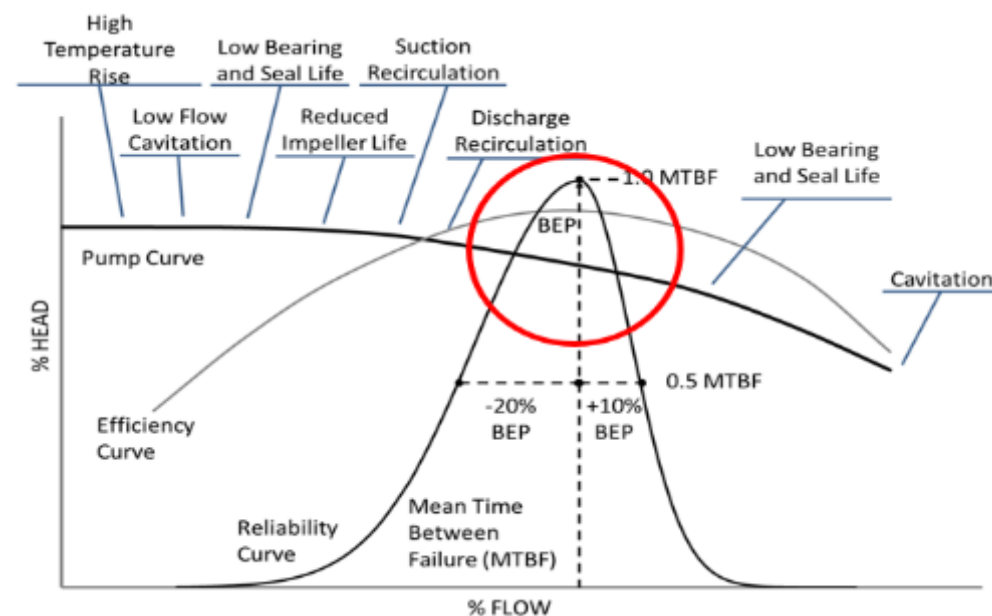
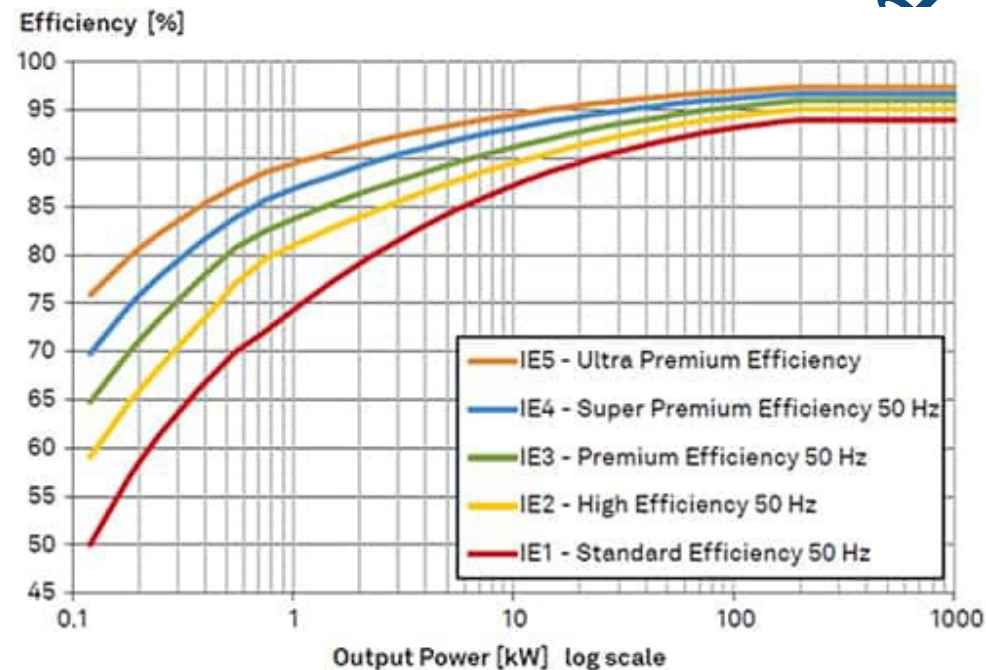


If you think pumps are expensive, consider the costs of running them

AVERAGE ENERGY PRICE INCREASE



You don't have to do the maths!



# Energy Optimization



How to identify the pumps that offer the greatest energy savings?

MOTOR  
SIZE

AGE  
OF THE  
PUMP

USAGE  
PUMP  
RUNNING  
HOURS

ENERGY  
PRICE

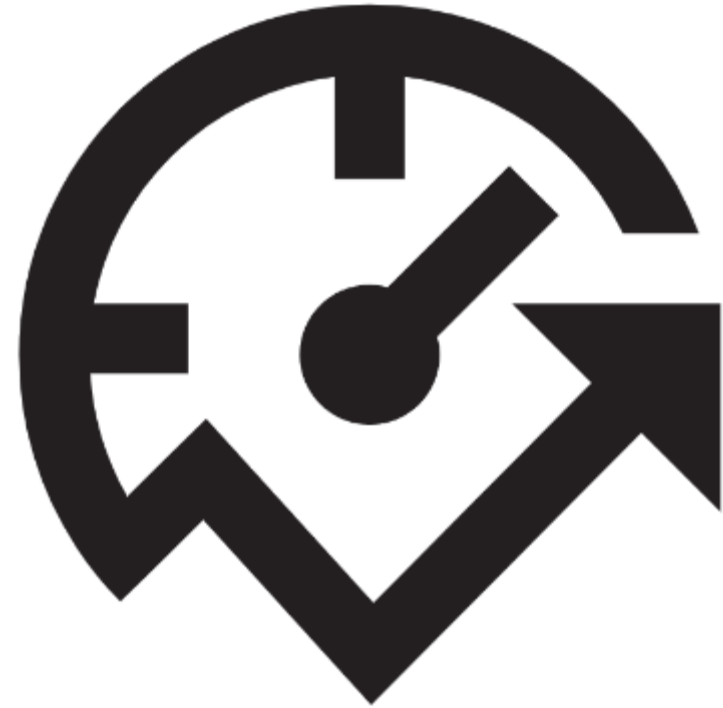
OVERSIZED  
OR WRONGLY  
SIZED  
PUMPS

There are five categories that if applied to any pump could help determine the pump ability to offer high energy savings and/or low pay-back time.



# **Grundfos Service & Solutions**

## **Energy Optimization Program**



# Energy optimization services



COST LEVEL

## Energy check basic



## Energy check



## Energy check advanced

Time View

Power usage

Aug 2021 Aug 2022

Grundfos Energy Check sensors and wireless router

## Pump Audit

Grundfos Pump Audit 3.0

POWER, FLOW, AMPI

COMPLEXITY & LEVEL OFF EFFICIENCY POTENTIAL



# Energy Check

**Energy Check identifies opportunities for improvement of energy efficiency in your system based on pump nameplate specifications.**

The energy check process includes:

- Site visit to gather data from your pumping system
- Energy check report
- Presentation of final report

The energy check report provides recommendations for replacement pumps with the same specifications but lower energy consumption.

TYPE	_____	ANY PUMP	_____
Q:	_____ <b>820</b> _____	m <sup>3</sup> /h	H: _____ <b>32</b> _____
n:	_____ <b>XXX</b> _____	rpm	Efficiency _____ <b>65</b> _____
NPSHr:	_____ <b>X.X</b> _____	m	P motor _____ <b>XXX</b> _____
Serial No.	_____		Mfr Date _____

TYPE	_____	ANY PUMP	_____
Q:	_____ <b>820</b> _____	m <sup>3</sup> /h	H: _____ <b>32</b> _____
n:	_____ <b>XXX</b> _____	rpm	Efficiency _____ <b>82</b> _____
NPSHr:	_____ <b>X.X</b> _____	m	P motor _____ <b>XXX</b> _____
Serial No.	_____		Mfr Date _____



# Energy Check Advance - Wireless Power Sensors



- The sensors are installed on one of three phases in the pump control panels.
- The sensors log the P1 absorbed power of the pumps and enable us to build accurate load profiles for the monitored pumps.
- Sensors then feed the information to a bridge, which then sends the data to our monitoring site.
- The sensors give very accurate data which we can use to understand how the pumps are running and what we can do to reduce power consumption.
- Access can be given to the customer for the monitoring site and also the mobile app to view real-time data being logged.



# Connecting the customer site...

- Need to be a qualified electrician and of course have customer permission
  - Service engineer with relevant qualification
  - Customer representative if qualified
- Need to document with pictures if possible:
  - Name of control panel
  - Name of control circuit/ equipment being measure
  - Serial number of sensor/s used
  - Serial number of data bridge

## TIPS

1. Keep data bridge as close to control panel as close as possible
2. Check bridge has 2 green lights: may need extended antenna
3. Arrow on sensor must follow flow of current
4. Measure voltage and take notes



# References:



## Executive Summary

**SAVINGS (KWh/yr)**  
**29,825**

**PAYBACK TIME (YR)**  
**1.51**

**ENERGY SAVINGS (\$/YR)**  
**76,475**

**ANNUAL REDUCTION (CO<sub>2</sub> T/yr)**  
**49.71**

**INVESTMENT COST (\$K)**  
**47,000**

We have now finished your Energy Check and it shows that you can save 29,825 kWh/yr. usually you energy expenses through water relatively straightforward improvements to your pump installation.

This savings estimate is based on our inspection of 4 pumps installed in your facilities. By investing in more energy efficient pumps and other small improvements, your organization can reduce energy usage by 26,514.80 kWh per year. Your investment to make these improvements is MYR 47,000.00, which translates to a payback time of 1.51 years. This report replaces an email that has been sent to you earlier this.

Our recommendations list the opportunities presented in this Energy Check Report in considered carefully. We are ready to help you every step of the way in achieving these savings, and look forward to helping you realize the additional operational, environmental and business benefits of these recommendations.

If you need any further help in explaining these findings to you or anyone else in your organization, please don't hesitate to contact me.

Adrian Shafrin  
Operations Manager  
adrian@grundfos.com

	Tag	Model	Pump Quantity	Operating Time (hours)	Pump Flow (GPM)	Pump Flow (m3/hr)	Outlet pressure (Bar)	Inlet pressure (Bar)	Head (m)	Rated P2 (kW)	Motor Efficiency class	VFD	Power P1 (kW)	Total Efficiency	Energy (kWh/year)	Energy Cost (MYR/year)
Existing	UDI WATER PUMP	AB B33.4B.2	2	4380	480.0	109.0	5.5	0.5	51.0	37.0	STD	YES	36.19	41.8%	317,011	\$ 123,634
Replacement	UDI WATER PUMP	NK 65-225/232	2	4380	480.0	109.0	5.5	0.5	51.0	30.0	IE3	YES	21.91	69.0%	191,932	\$ 74,853
														Savings	125,079	\$ 48,781
															39.5%	

### Breakdowns of the potential savings

From the data collected during the Energy Check we have calculated the potential energy savings for each assessed pump. We then considered the price of purchasing newer, more energy efficient pumps, the annual operating cost with the new pumps and the related payback time.

For an investment of MYR 47,000.00 a potential energy savings of 76,474.80 kWh/yr can be achieved with a payback time of 1.51 years.

Where do I get the data from?

**Pump data**

Number of pumps assessed	4
Number of pumps with potential energy savings	4

**Supplied data**

Water pressure (bar)	4.71
Energy price (kWh/kWh)	0.00
Efficiency of the existing pump (%)	0.00
Expected target pressure (bar)	7.00
CO <sub>2</sub> price (\$/tCO <sub>2</sub> e)	400.0

**Pump life cycle**

Savings over 10 year period	360,000.00
Savings over 11 year period	504,000.00

**Financial data**

Water pump replacement (MYR)	47,000.00
Installation (MYR)	0.00
Operation during (MYR)	0.00
Insurance (MYR)	0.00
Service contract (MYR)	0.00
Maintenance of rest of existing system (MYR)	0.00
Energy/maintenance (MYR)	0.00
Total investment (MYR)	47,000.00



### Energy Check results

**SAVINGS (KWh/yr)**  
**29,825**

**PAYBACK TIME (YR)**  
**1.51**

**ENERGY SAVINGS (\$/YR)**  
**76,474.80**

**INVESTMENT COST (\$K)**  
**47,000**



### Calculation details

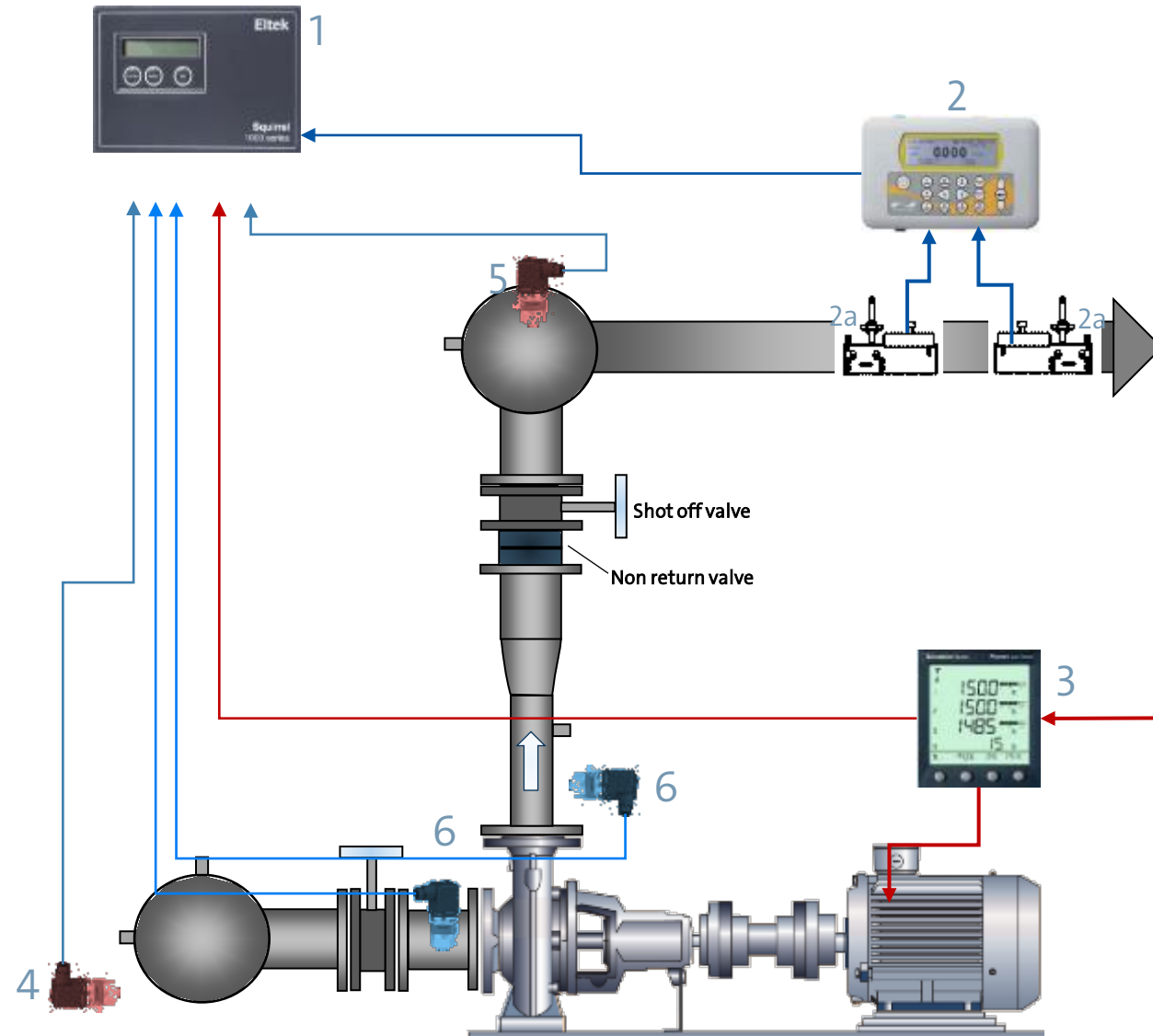
For UDI pump:  
 -Measured flow 329GPM  
 -Head 51m  
 -Measured Power 24.8kW  
 The resulting efficiency for the existing pump is 41.8%

# How to do Energy Audit and how to get the data analysed?



## Energy Audit Example for Single pump application

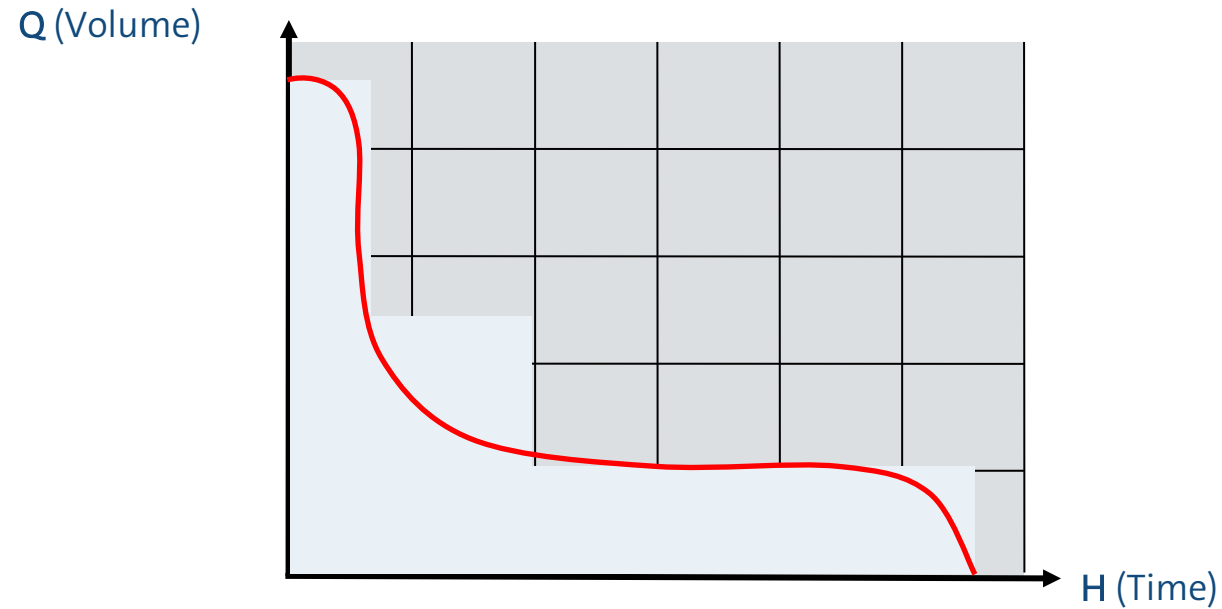
1. Data logger
2. Flow meter [2a ultra sonic sensors]
3. Power meter
4. Pressure sensor inlet
5. Pressure sensor discharge
6. Optimal place for pressure sensors



# The majority of pumps are oversized



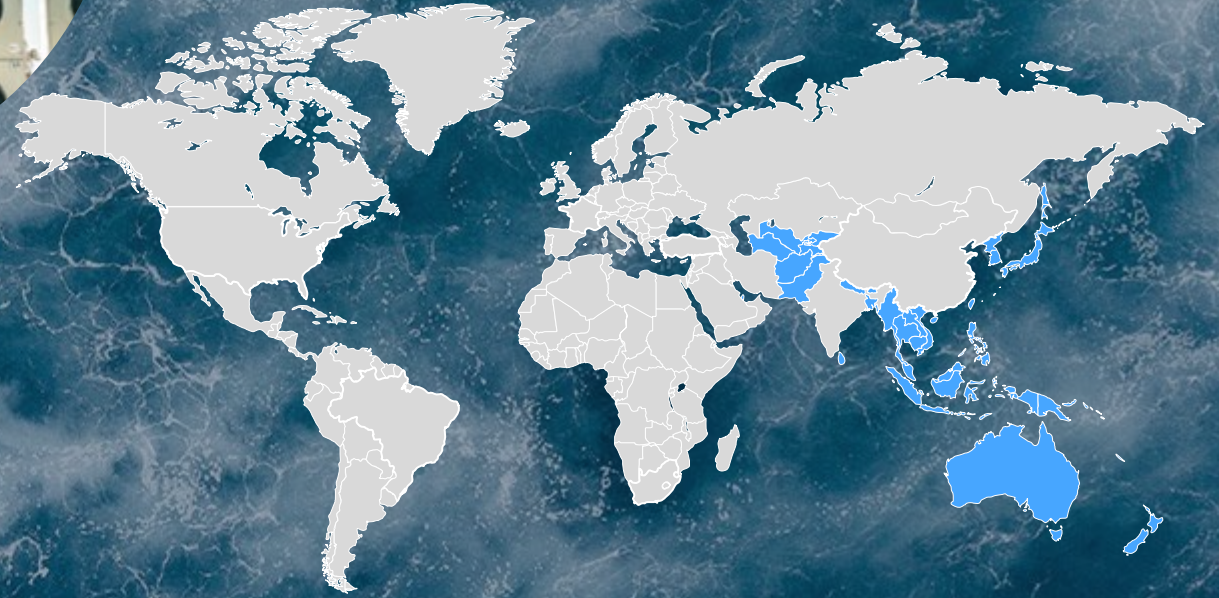
Most pumps only need to operate at 100% of their duty for a short time – if ever.



The rest of the time energy is wasted...  
Do you want to know how much?



# Case References Malaysia



# Project References 1:



- Application: UDI Water Transfer
- Issue: Customer looking new pump to replace the existing
- Grundfos recommend to carried out the Energy Audit & pump assessment to identify the correct value to optimize the system and create the saving. After completed the audit Grundfos will suggest the exact pump model with lower kw and size.



Energy saving:  
76,475 kwh/year



Return on Investment:  
1.5 year



CO2 Reduction:  
49.71 kwh/year



Earning in MYR:  
29,825.-/year



# Project References 2:



- Application: Condenser Pump / Chiller
- Issue: Existing pump running with over size, they always throttling valve at 80%. Pump is 185kw for condenser and 110kw / 90kw for Primary and Secondary pump.
- Solution: Grundfos recommend to carried out the Energy Audit & pump assessment to identify the correct value to optimize the system and create the saving. After completed the audit Grundfos will suggest the exact pump model with lower kw and size.



Energy saving:  
807,234 kWh/yr.



Return on Investment:  
1.1 year



CO2 Reduction :  
524.7 ton/year



Earnings in MYR:  
290.604,-/year



# Q & A



**THANK YOU!**

