



Sustainability in the use of Energy to secure Access to Water and to protect of Climate Change Impact

WILO AT A GLANCE. BEST PRACTICE .



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Thank you for your comprehension.

WILO AT A GLANCE.
OUR VISION. OUR MISSION.

Wilo, the water solution leader
for a smart and resource efficient
world.

Inventing and managing responsible water solutions
that benefit everyone, everywhere.

wilo

DRINKING WATER PUMPING STATION JORDAN

Just a small pilot project

Secure supply of drinking water for
50,000 people.

Energy savings of more than
1.5 million kWh per year.

Reduction of costs by more
than 110,000 Euro.

CO₂ emission lowered
by 1,100 tonnes per year.



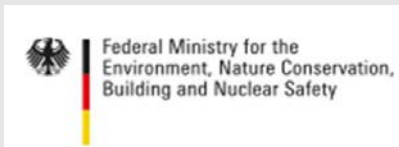


Drinking Water Pumping Station Financing pilot project 2009

- Energy saving pays off investment → ppp
- Investment and operation
1/3 GIZ - 2/3 by water company
- Pre-financing by Wilo
- Payback < 3 years
→ financing by high efficient solution

- 5 years

secure supply
no break down
no maintenance
no costs for spares
no "hidden costs"





 **Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit**

 **giz** Deutsche Gesellschaft
für Internationale
Zusammenarbeit GmbH



**Safe provision of drinking
water to 50,000 people**

**Reduction of costs by more
than 110,000 Euro p.a.**

**Energy saving of more
than 1.5 Million kWh p.a.**

**CO₂ emissions lowered
by 1,100 tonnes p.a.**

Handing Over Certificate

This is to certify the successful completion of the PPP-project
Pumping Station Ebquoreyeh

Certified by Ministry of Water and Irrigation

The new Wilo technology
maintenance free

German
Ambassador
Ralph Tarraf



Ralph Tarraf:
„... that Wilo as
innovation leader
has realised this
light house project
excellently...“

Drinking water
for the City of Madaba

Morocco

The municipal swimming pool in the capital of Morocco



About the project

The second largest swimming pool in the world
17 000 m² supplied from seawater Atlantic ocean.

Challenge

Tender requirement of material was Duplex, we
have changed it to Cast iron with Wilo Ceram
Coating.

Result

**Cost reduction of 40%
& lead time 5 weeks!**

Scope of supply (submersible pumps)
5 x FA 15.95T

Sea water
Collection and
Transport



Morocco - vertical turbine irrigation project

Ensure irrigation processes with optimized water consumption



Situation before replacement



About the project

Low efficiency pumps with constant speed and distribution by water towers have been in use

Approach

Installation of high efficiency raw water intake pumps with VFD control

Scope of solution

6 high efficient Vertical turbines > 10.000 m³/h

Value

No need to use water towers anymore

Energy saving > 30%



Situation after replacement

Pumping Station „NIANGON 2“ Ivory Coast - Yopougon



Dec. 2014

President Alassane Ouattara
Vice President Daniel Kablan Duncan
Inauguration of the important potable water
pumping station **for 2 Mio. people**

Project

Shortage of potable water in Yopougon
44.000 m³ per day

Sustainable solution

12 Wilo borehole pumps



Installation of high efficient solution



Irrigation and process cooling system



Project

- Upgrading of the inefficient and out-of-date pumping and cooling system of a vineyard in SA

Challenge

- Comprehensive energetic analysis of the situation
- Energy consumption < 50%

Green Solution

- High efficient Booster Systems
- Result ?

70% energy saving for the irrigation system!

85% energy saving for the cooling system!



Birtouta Pumping Station



Hydrotravaux



SAHEL Pumping Complex Algiers



BENI MERED Water Treatment



Challenge Drinking Water Supply

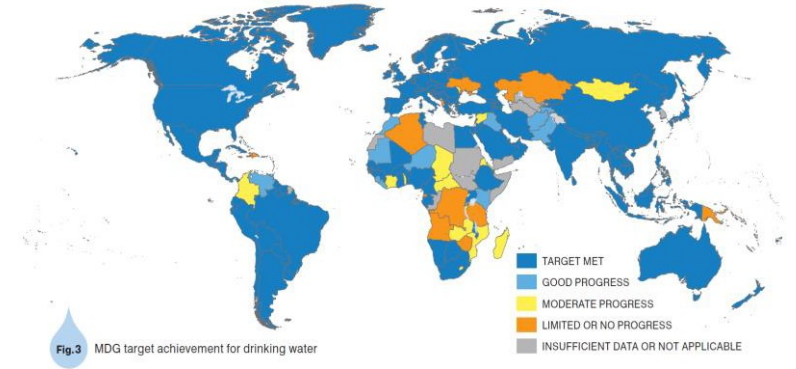
2.6 billion people have gained access to an improved drinking water source since 1990 which is an increase from 76% to 91% globally.

But there are more than **700 million** people who still rely on unimproved water sources (surface water from lakes, rivers, dams, or springs)

With modern technique like solar pumps, UV filtration and desalination a strong improvement can be provided

Energy-efficient products can reduce the energy consumption up to **60 %**

147 countries¹ have met the MDG drinking water target



- **Technological background for sustainable efficiency by Wilo**

Wilo has invested in research and development in the last years 60 -70 Mio. € /year. Wilo is cooperating with German Universities and Institutes and is supporting them.

The average number of patents, claimed by Wilo in the last years was > 20 / year.

Wilo is one of the innovation leaders concerning pumps to move water in the world.

The high quality standards of the Wilo group are identical for all factories in the world.

Sustainability by Wilo covers the entire value chain.

Wilo has developed successfully new motor-technologies, hydraulics, steering and control systems and materials to achieve the highest efficiencies for pumps and systems to move water.

The most efficient pumps in the world.



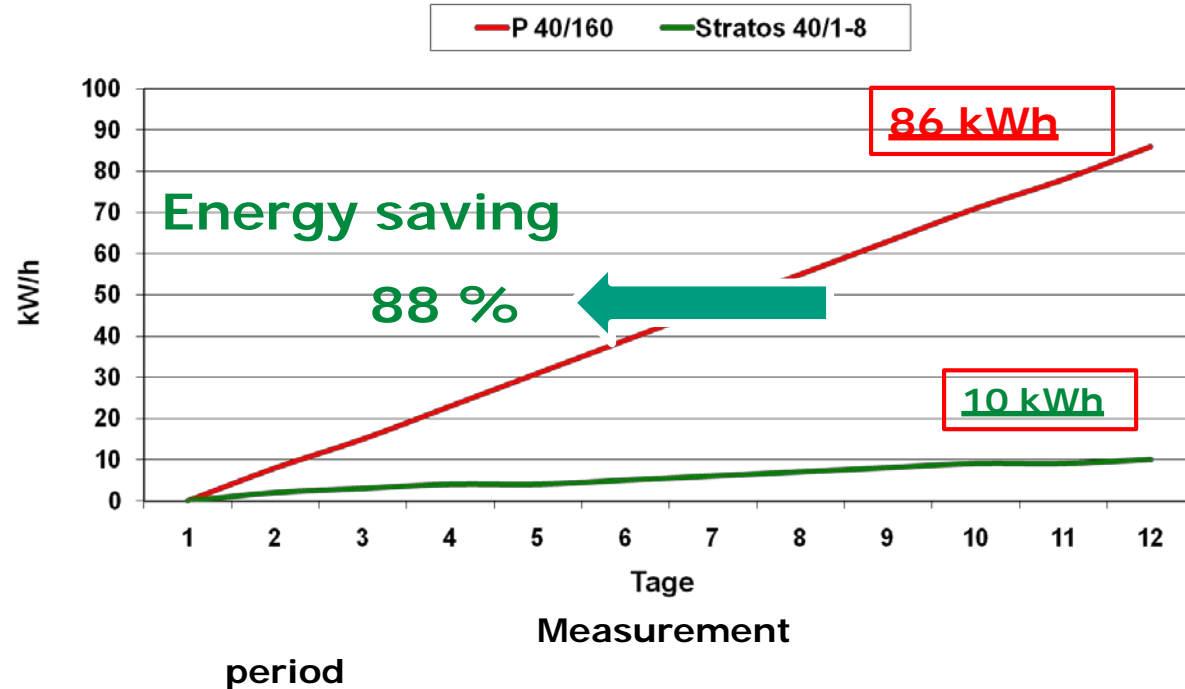
Energy saving by pump replacement



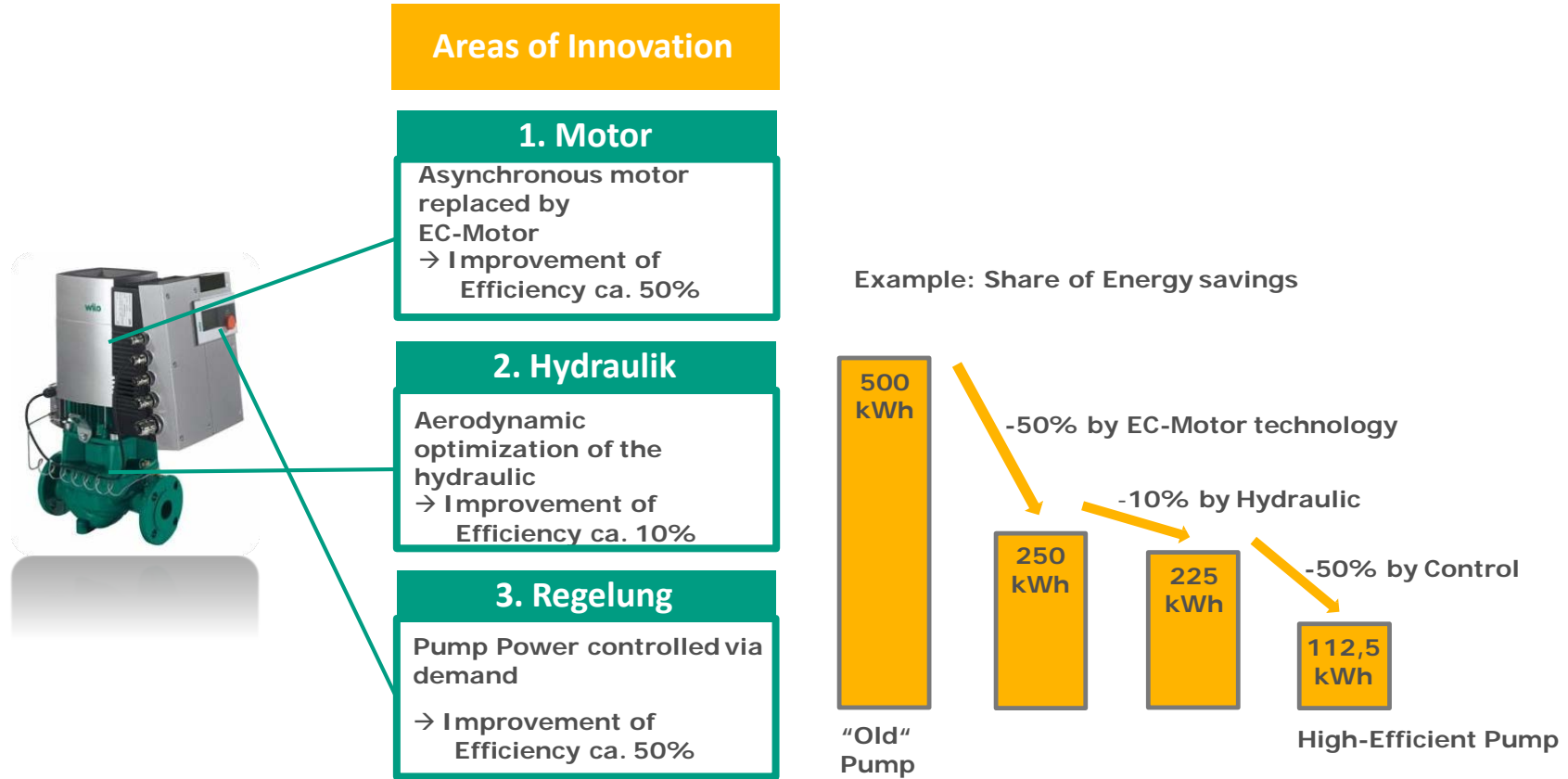
old

new

Project
Maritim Hotel
Hannover



Research and Technology results by Wilo → high efficiency !



Example: 500 KW high efficiency pump requires only 112.5 kWh, i.e. approximately 75% energy savings

The Zetos K 8 in comparison



Unit Type
Duty
Power P2
Material

2015 Price

Extra's

Annual Energy
Consumption:

Annual Carbon
Emission:



Original (2010)

Competitor
39.7L/s @ 163Mtr
101.98
Pressed 304SS

€38,875

None

€ 95,980

801mtCO2



Existing (2014)

NK87-10 / NU911
40.5 L/s @ 165Mtr
84Kw
Cast Iron/Bronze

€42,711

Efficiency Coating

€ 91,146

761mtCO2



ZETOS (2015)

K8.130-10/NU801
40.5 L/s @ 165Mtr
74Kw
Cast 316 SS

€28,757

None

€ 69,642

581mtCO2

Energy Cost
Savings
€26,334 p.a.
27% Saving
on Energy

Ceram CT coating

Comparison	Wilo-EMU KM 1301 (3-stage) in well, without coating	Wilo-EMU KM 1301 (3-stage) in well, with Ceram CT coating
Flow rate	661 m ³ /h	661 m ³ /h
Head	141 m	141 m
Power consumption	274 kW	267 kW
Total efficiency	70.7 %	72.5 %

Calculation: Energy savings with Ceram CT coating subsequently applied

Difference in power consumption	281 kW – 267 kW	14 kW
Annual operating time	365 days x 20 h	7,300 h
Energy costs	0.15 €/kWh	
Tot. energy cost savings per year	7,300h x 0.15 €/kWh x 14 kW	€ 15,330.-
Updating costs	€ 3,500.-	
Payback time	83 days	
Total cost savings*	€ 15,330.- x 10 years	€ 153,300.-



Opportunities in Waste Water Treatment

> 300.000 treatment plants worldwide

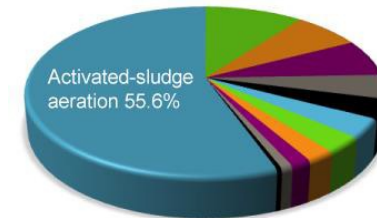
~ 70 million basic treatment tanks worldwide

Total potential of 50 % energy savings in waste water treatment

5 million tons CO₂ per year, if we update all existing treatment plants to state-of-the-art technique



Focus on the "Big Opportunities" on road to "Energy Neutrality"



- Activated-sludge aeration, 55.6%
- Primary clarifier and sludge pump, 10.3%
- Heating, 7.1%
- Solids dewatering, 7.0%
- Influent pump station, 4.5%
- Secondary clarifier and RAS, 3.7%
- Process water, 3.6%
- Postaeration/chlorine mixing, 3.1%
- Lighting, 2.2%
- Thickener and sludge pump, 1.6%
- Effluent filters, 0.9%
- Headworks, 0.4%

Data extracted from the "Energy Awareness in Wastewater Systems" report by WERF, June 4, 2008



Wastewater Treatment Plant Mannheim, Germany

Background

Since 1996 WILO submersible mixers operate successfully in the 5 activation lines, which are divided into 11 cascades.

Cascade 1-2: Bio-P (rectangular tank)

Cascade 3-4: Preliminary denitrification (circulation channel)

Cascade 5-7: Nitrification – alternating operation (circulation channel)

Cascade 11: Bivalent zone (rectangular tank)

Mannheim is the 3rd largest plant in Germany, with 750 000 inhabitant equivalents.



Products and Technical Data

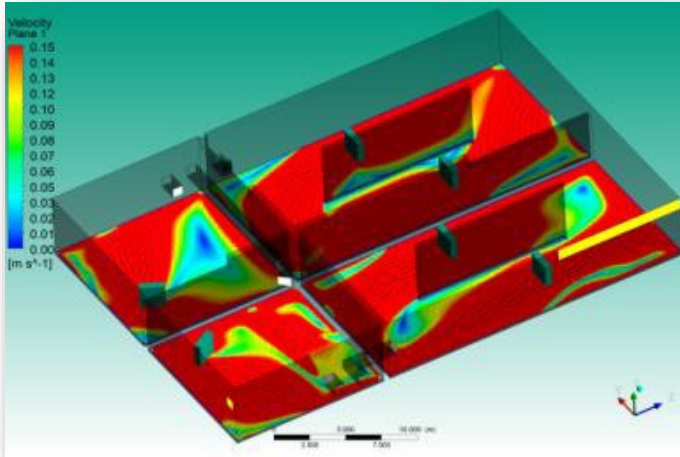
	Cascade 1 – 2 old	Cascade 3 – 7 old	Cascade 10 – 11 Old	Modification all cascades
	TR 225.30-4/8V	TR 225.39-4/12	TR 225.23-6/8	TR 221.39-6/8
Propeller diameter [mm]	2400	2400	2400	2100
Absorbed power [kW]	3,1	5,51	1,7	1,8
Thrust/power coefficient [N/kW]	903	648	1105	906
Quantity	10	50	10	70

Challenge

In 2012 water council Mannheim asked WILO to optimize the machinery regarding energy consumption and power input .

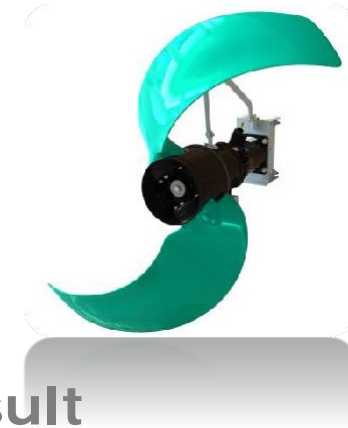
A flow velocity of 0,20 – 0,25 m³/s was to be achieved.

Wastewater Treatment Plant Mannheim, Germany



Approach

- New technical selection
- CFD (Computational Fluid Dynamics) simulation
- Test operation of 2 mixers
- Flow velocity measurement



Result

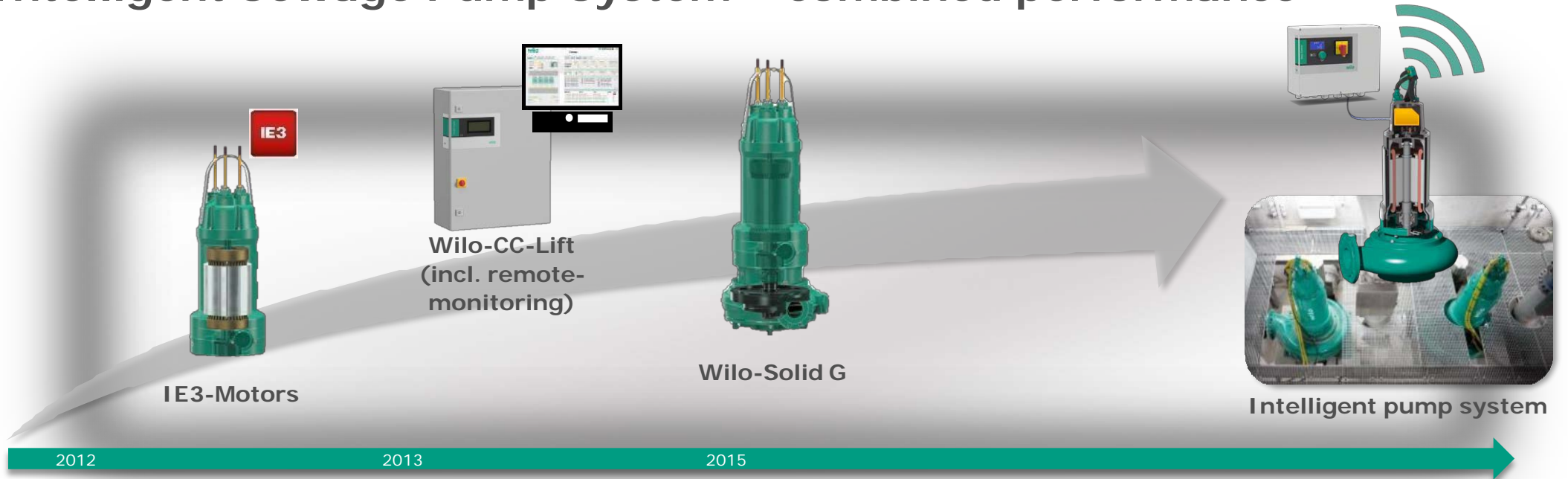
Flow velocity of 0,25 m/s achieved

Energy cost savings in **10 years 700 k€**

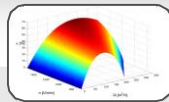
Return of invest in 7 years



Intelligent Sewage Pump System – combined performance



High EFFICIENCY



- High efficient motors
- Intelligent pump adaptation
- Reduced pipe friction

High RELIABILITY



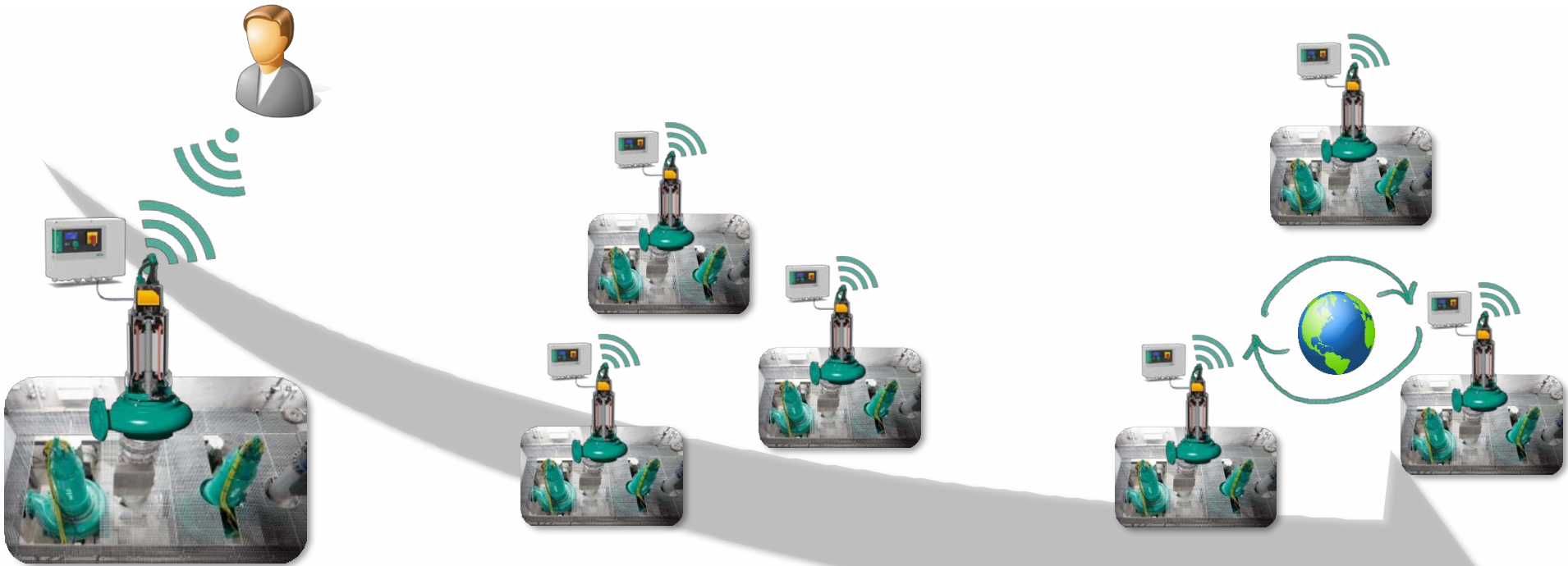
- Electronic cleaning sequences
- Modern sensoric
- Special impeller designs

High CONNECTIVITY



- Cloud- und App-Services
- Advanced sensor monitoring
- Open network interfaces

Intelligent pump systems – communication networks



Intelligent pump station

- ➔ Automatic operation
- ➔ User communication

Connected pump stations

- ➔ Inter-pump exchange
- ➔ Optimized networks

Internet-based intelligence

- ➔ Real-time information
- ➔ Autonomous reaction



As researchers or practitioners what are the possible interactions/collaboration with practitioners resp. researchers to improve/upscale your activities

- ▶ WILO would welcome young (or not so young) researcher and/or practitioners from Africa to join us on a temporary basis for exchange of experience and joint research practice;
- ▶ WILO does not practice “white collar” research, while WILO is cooperating with “white collar researchers”;
- ▶ For WILO it is essential that all partners share the same values and principles concerning sustainability and business ethics, which are those of the UN and agreed upon by the German Government;
- ▶ An important area of learning, where WILO is keen on possible interaction and collaboration, is concerning cultural acceptance of innovative technology;





What are the potential aspects of the research that can be transformed into practice?

- ▶ **WILO best practice examples gives, in our understanding, a good example for research can be transformed into practice;**
- ▶ **To transform research output into practice and to achieve tangible impact for our clients, is our business;'**