Sustainable Energy for Essential Humanitarian Services

Photo Credit: ICRC

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United Nations Institute for Training and Research

Tell us about you!

- Poll -


- Agenda-

Presenter

Olivier Jacquet, Global Account Manager Refugees, Emergencies and War – Sustainable Development – Schneider Electric

Olivier studied electrical engineering at University College, London UK, and at the French High School Centrale-Supélec. After he graduated his MSc, he also studied his MBA at College des Ingénieurs in Paris, France. Since 1998, Olivier hold various positions at Schneider Electric in solution sales, manufacturing, and entered general management roles since 2004, as Factory Manager in Western France, then as Zone Manager in Vietnam Philippines and Cambodia, and lately Senior Vice President for international projects in EMEA region.

Access to Energy

Delivering development for better lives

Presented by: Olivier Jacquet, Access to Energy – Sept. 19th 2019

Global Account Manager, Refugees, Crisis, Emergencies & A2E Business Development Vice President

Life Is On Schneider Electric

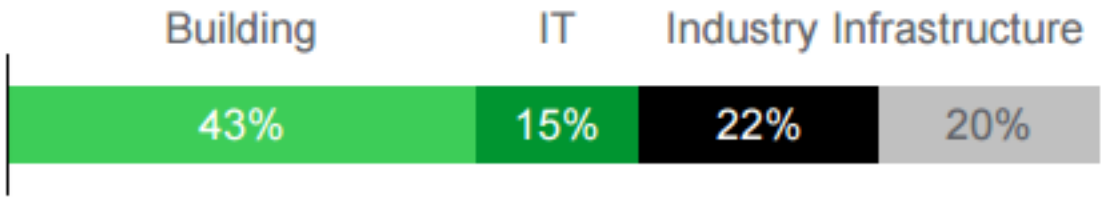
Schneider Electric, the Global Specialist in Energy Management and Automation

€24.7 billion
FY 2016 revenues

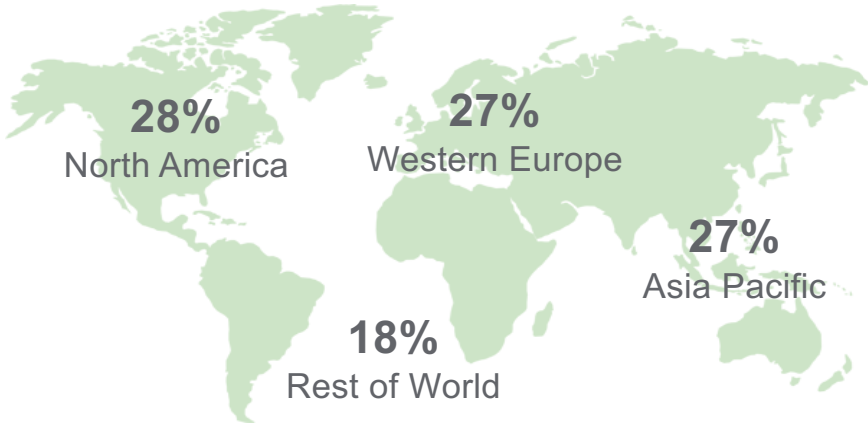
~5%
of FY revenues devoted to R&D

160,000+
people in 100+ countries

Four integrated and synergetic businesses
– FY 2016 revenues



Balanced geographies – FY 2016 revenues



As the global specialist of energy management and automation,

WE BELIEVE ACCESS TO ENERGY IS A BASIC HUMAN RIGHT

How do you provide energy access to people who are deprived of it?

According to the International Energy Agency, nearly 1 billion people still lack access to electricity in 2018.

~1 Billion

people don't have access to energy in the world

3 Billion

with an unsafe, expensive and fossil-based access

Up to 30%

of their revenue spent on inefficient , dangerous, and polluting energy

Life Is On Schneider Electric

OUR CHALLENGE:

We want everyone on our planet to have access to reliable, safe, efficient, and sustainable energy

Access to Energy programme

Provide safe, clean electricity to communities by actively involving local stakeholders, including residents, end customers, and beneficiaries

Offers & business models
for the design and deployment of adequate electrical distribution offers.

Investments
Investment funds for innovative energy entrepreneurship locally.

Vocational training
Training, both technical and business, to address local skill shortages.

Offers and Business Models

A2E Offer – **Our current offer**

Our comprehensive portfolio of products and solutions answer to every energy access needs

Home Systems

Individual lighting & phone charging

Mobiya

- Light
- Phone charging

Individual electrification

Homaya

- Light,
- Phone charging
- Fans,
- TV
- Radio

Collective Solutions

Collective electrification

Villaya

- Electricity for schools, health center, and other public buildings
- Battery charging
- Lights for public areas & roads
- Easier access to water

Didactic

Vocational training

Training

- Didactical benches
- Courses contents

Villaya Emergency

Clean and cost effective power for emergency response

Robust
20 years life span
Fully tested in house
5 years warranty

Clean Energy
Solar energy
Environment friendly batteries specifically designed for tropical environment

Cost Effective
4 years ROI compared to genset
No maintenance
Fast installation

Mobile and connected
Plug & Play
Remote monitoring
Scalable

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Application

Schneider Electric, leader of the Digital Transformation of Energy Management and Automation, provides a complete set of end to end solutions for people without access to energy.

Villaya Emergency is a mobile hybrid microgrid which takes the most of solar energy and storage technologies while matching diesel price. This solutions is preassembled, transportable, "plug and play" and green!

Product Specifications

Container	10 feet
PV power	From 7kWp to 35kWp (24 to 120 modules) as a standard
Power Conversion system	From 24 V/2kVA to 48V to 21kVA
Battery storage	From 10 kWh to 60 kWh

Join us on LinkedIn
Access to Energy by Schneider Electric

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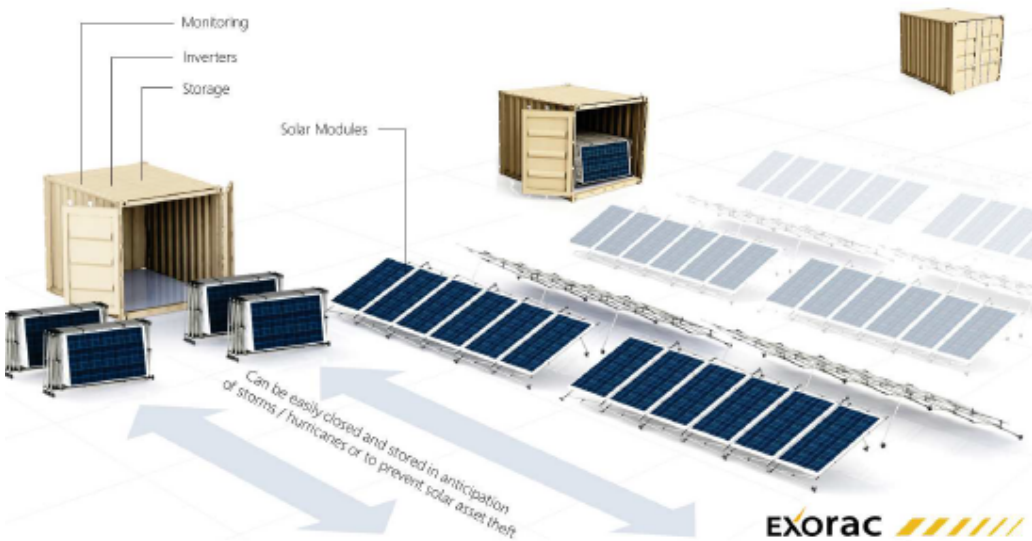
@SchneiderA2E

Follow us on Twitter
@SchneiderA2E

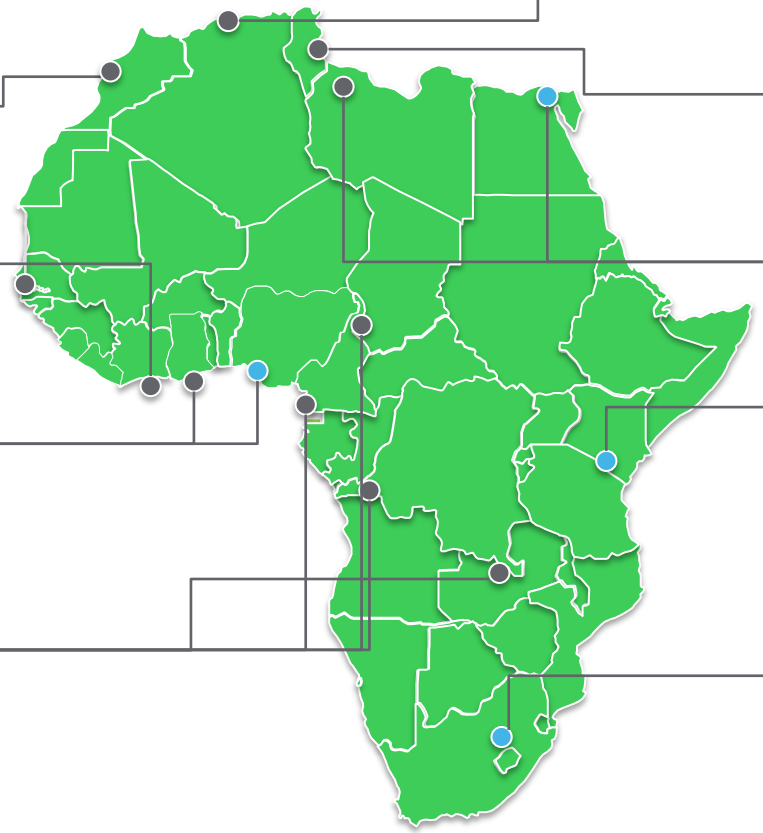
More informations on: **schneider-electric.com/accesstoenergy**



WE ARE THE BEST PARTNER OF CHOICE

We have technologies, worldwide presence, experience

Global presence in Africa for 40+ years: more than 2000 employees



Morocco
67 years of presence

Francophone West Africa
18 years of presence

Nigeria & Ghana
35 years of presence
SOLUTION CENTER

Central Africa
+20 years of presence

Algeria
50 years of presence

Tunisia
37 years of presence

North East Africa
18 years of presence
SOLUTION CENTER

East Africa
+35 years of presence
SOLUTION CENTER

Southern Africa
+20 years of presence
SOLUTION CENTER

Focus: Schneider Electric Solution Centre, Kenya

The most advanced electrical equipment factory within whole Africa.

35 years of industrial experience

Full suite of services including:

- Project engineering center
- MV/LV workshop
- Asset management and maintenance
- Site installation
- Test, commissioning, decommissioning and advanced services

Manufacturing Capacity

The products manufactured include:

- Low voltage switchgear
- High voltage switchgear
- Cable management systems including Lan cabinets
- Light fixtures and Luminaires
- Feeder pillars for power stations
- Local Area Network (LAN) Cabinets

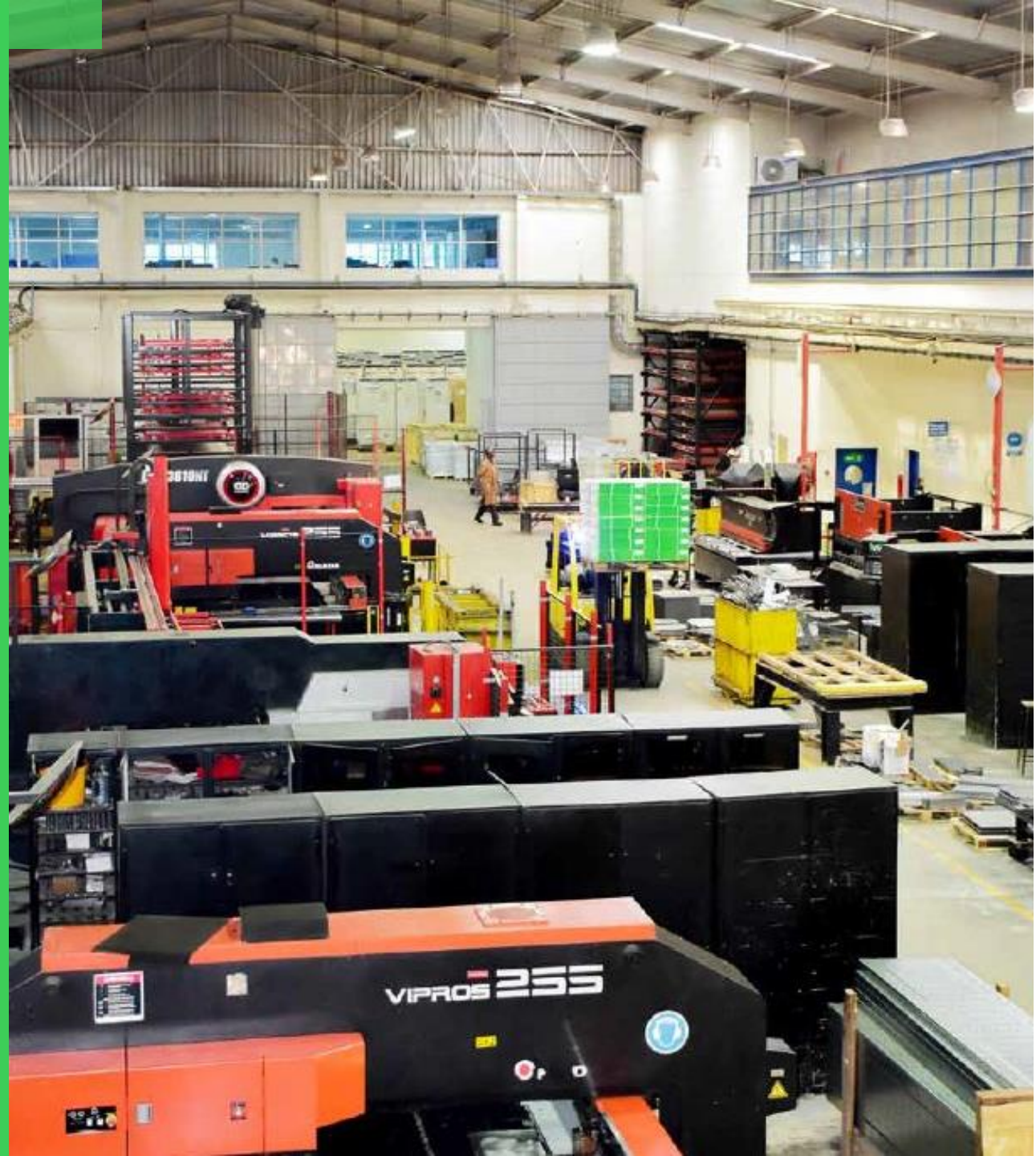
The metal workshop floor is stocked with several Amada CNC machines, operated by highly skilled technicians.

All of our products are treated with the “Tribo Powder Coating System”.

This utilizes spray guns to paint the steel items ensuring that products have a smooth finish and that they are adequately protected from rust.

Powder Coating

The powder coating system used is referred to as Tribo and is German technology. Once items are coated they are cured in an oven at 160 – 180 degrees for 15 minutes. The coat is an even film of 90-100 microns.



WANT TO PLAY A PART?

www.schneider-electric.com/accesstoenergy/

@SchneiderA2E

https://www.linkedin.com/groups/2830580

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Questions?

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Presenter

Morten Riis, Group Director – Water Utility, Grundfos Holding A/S

For more than 25 years, Morten Riis has worked in the field of technology & engineering, i.e. working with advanced systems - in the recent years focused on both energy and water – and in this respect participated in addressing the challenges on both globally. Morten is board member at the green think tank, Concito, at the Danish Water Forum ao. Previously, he has previously likewise served as member of the advisory board of the China Europe Water Platform (Integrated Urban Water Management) as well as member of the Steering Board at 2030 Water Resources Group. Before joining Grundfos, he served in other global companies such as ABB and Oracle. Morten has a background with degrees in engineering as well as Business Economics besides diplomas in journalism, process consulting and management.

Presenter

Geraldine Tsui Yee Lin, Global Product Manager – Water Utility, Grundfos Holding A/S

Geraldine has worked as Global product manager in Grundfos for 10 years, based in Denmark, and has been involved in the Solar Water solution almost ever since joined Grundfos. Throughout the last decade, Geraldine has been responsible for solar program management, product development as well as global solar market development with extensive cooperation with aid-organizations, private and public sectors. Before her employment in Grundfos, Geraldine has an engineering degree in Mechanical Engineering with a focus on Material Science. Followed her education, she worked in the semiconductor development in Hong Kong for 8 years.

Grundfos: Sustainable solutions addressing the Water Energy Nexus.

Geraldine Tsui Yee Lin, Global Product Manager.
Morten Riis, Group Director

Grundfos Holding A/S

be
think
innovate

GRUNDFOS

Sustainable Engagement: A part of the Grundfos DNA.

The Grundfos Purpose

We pioneer solutions to the world's water and climate challenges

and improve quality of life for people.

"The world is full of problems that can be solved in a better way – If you think about it"

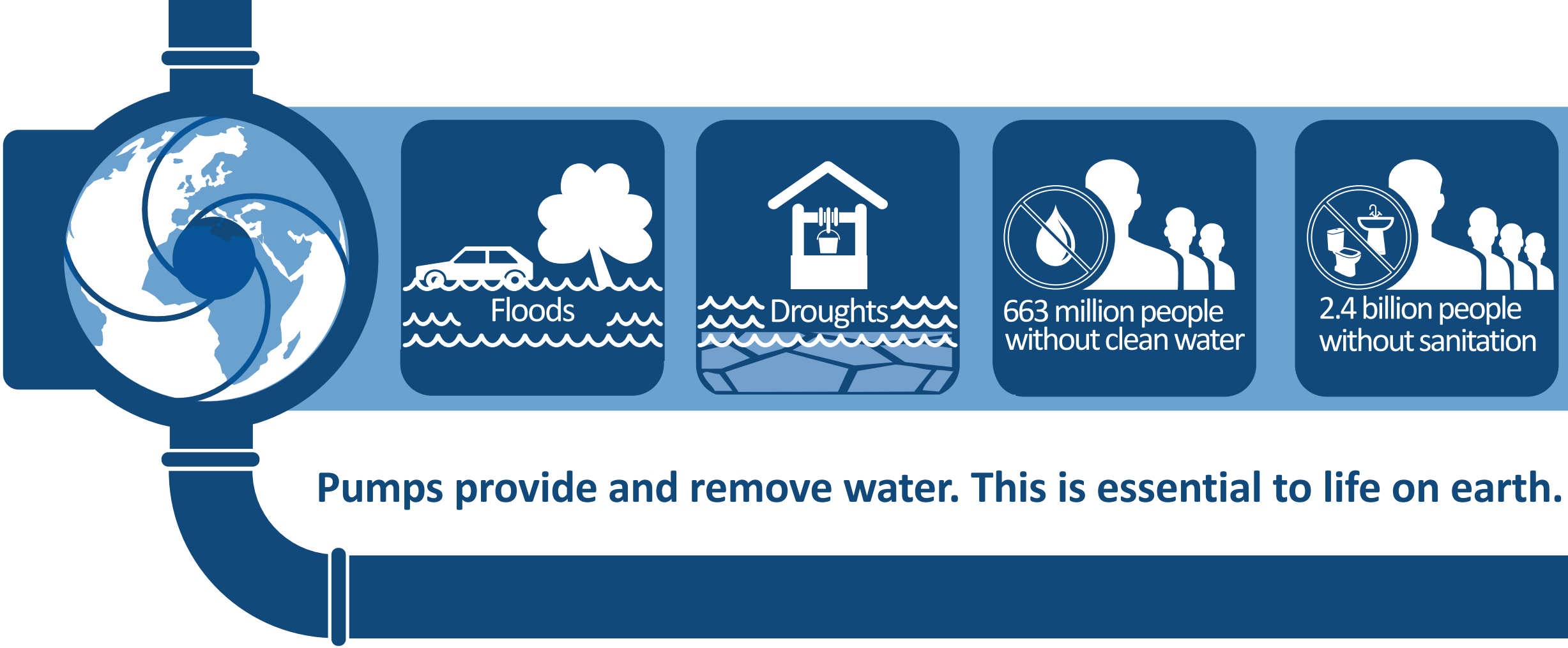
Poul Due Jensen

"I believe that we all want to deliver the world to the next generation in a better state than we inherited it."

Niels Due Jensen

The Poul Due Jensen Foundation is the major owner of Grundfos. The ownership ensures that Grundfos stays independent, financially strong and relentlessly ambitious, with a strong focus on business, innovation and social responsibility.

Profit is not an end goal but an enabler…



Pumps provide and remove water. This is essential to life on earth.

SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

6 CLEAN WATER AND SANITATION

Energy Usage in the water sector

Electricity costs are estimated at

5% to 30%

of the total operating cost of water and wastewater utilities (World Bank, 2012b), but in some developing countries such as India and Bangladesh, it is as high as **40%** of the total operating cost (Van Den Berg and Danilenko, 2011)

Source: The United Nations World Water Development Report 2014, p4.

http://unesdoc.unesco.org/images/0022/002269/226961E.pdf

CRS: Energy consumption by public drinking water and wastewater utilities, which are primarily owned and operated by local governments, can represent **30-40%** of a municipality's energy bill. At drinking water plants, the largest energy use (about 80%) is to operate motors for pumping.

CRS: Congressional Research Service, US
http://fas.org/sgp/crs/misc/R43200.pdf

http://fas.org/sgp/crs/misc/R43200.pdf

Energy as part of a pumps total life cycle cost

The life cycle cost of a pump system is the total cost of all system components over their lifetime. This is typically 10 - 20 years.

The life cycle cost of a pumping system is calculated as:

$LCC = C_{ic} + C_{in} + C_e + C_o + C_m + C_s + C_{env} + C_d$

Where:

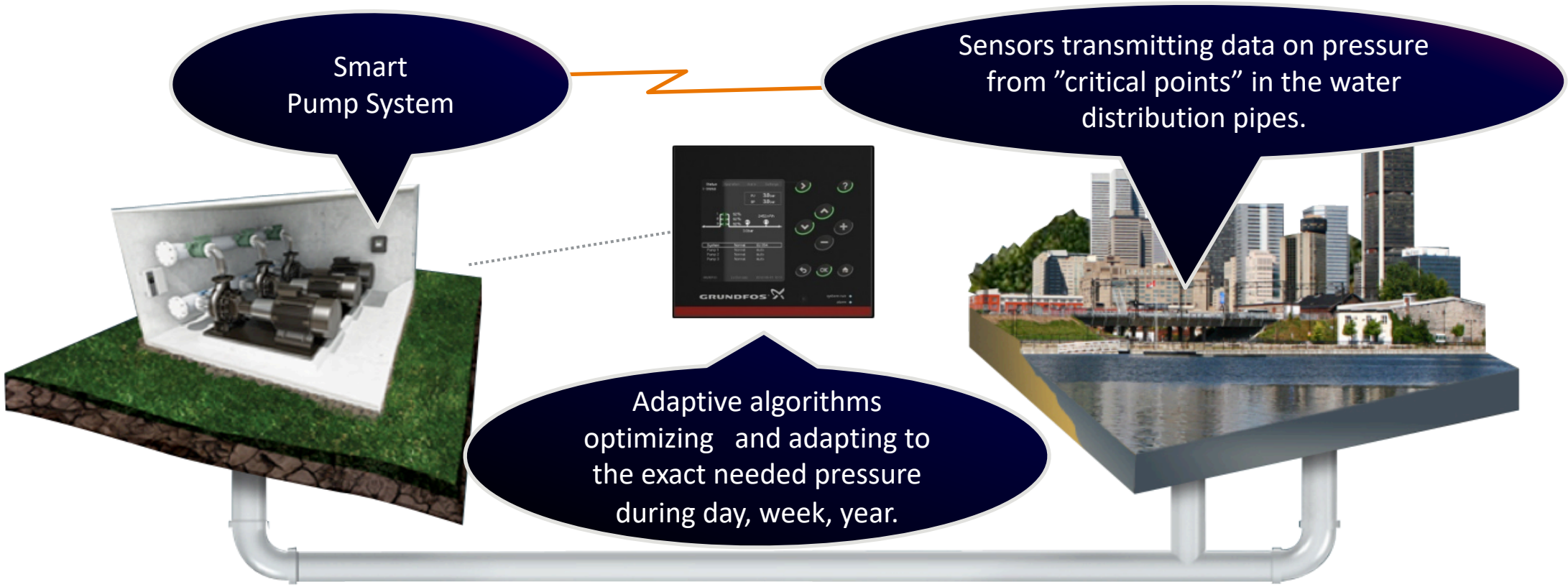
LCC = life cycle cost
C_{ic} = initial costs, purchase price
C_{in} = installation and commissioning costs
C_e = energy costs
C_o = operating costs
C_m = maintenance and repair costs
C_s = downtime costs (loss of production)
C_{env} = environmental costs
C_d = decommissioning/disposal costs

The most significant life cycle costs are initial costs, energy costs, and maintenance and repair costs. As shown on the graph, energy costs are by far the greatest of all costs.

Suggestion: Focus on Total Cost of Ownership.

http://www.grundfos.com/service-support/encyclopedia-search/life-cycle-cost-equationforpumpingsystems.html

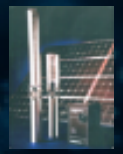
System optimization – an example:
Smart water solution: saving water and energy



Up to 20 percent reduction in energy consumption and 20 percent reduction in water loss.
– besides reducing maintenance cost (due to less pipe bursts which creates pipe leaks).

GRUNDFOS SOLAR SOLUTION | Our engagement to SDG 6 since 1980

SA1000 (1980) · SA1500 (1988) · SA400 (1995) · SQFlex (2002) · CRFlex (2011) · RSI (2015) · 2016

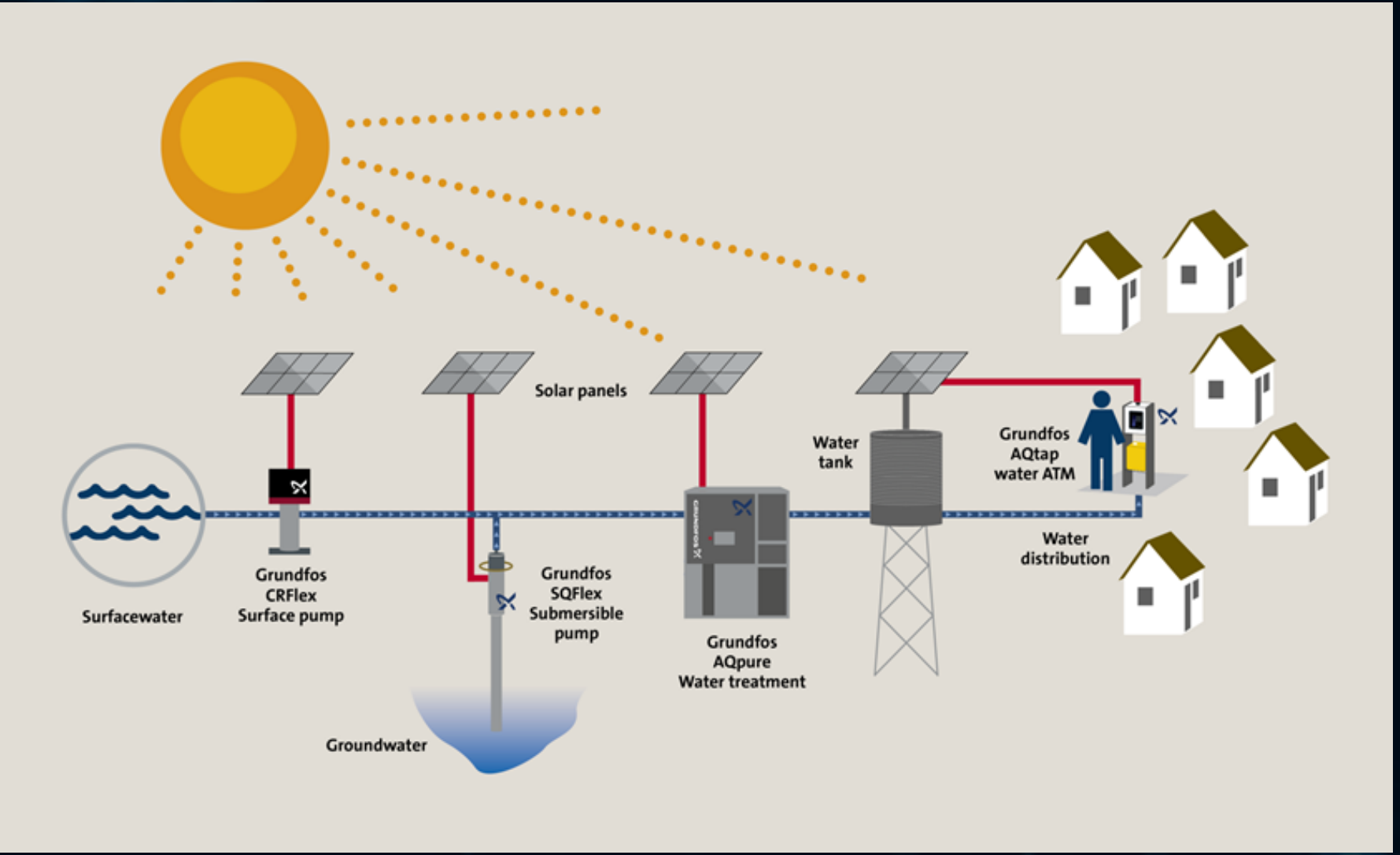


Lifelink 2.0 · AQtap · AQPure



- Our engagement on SDG6 started ***since 1980***
- ***Over 300,000 SQFlex installed*** around the world in the last decade providing drinking water to millions of people in need
- Holistics approach to ***promote responsible water consumption***
- Solar-driven water purification to ***ensure safe drinking water supply***

GRUNDFOS SOLAR SOLUTION | How does our solution looks like?



GRUNDFOS SOLAR SOLUTION | Our ambition towards 2030

SUSTAINABLE

RESILIENT

CONNECTED

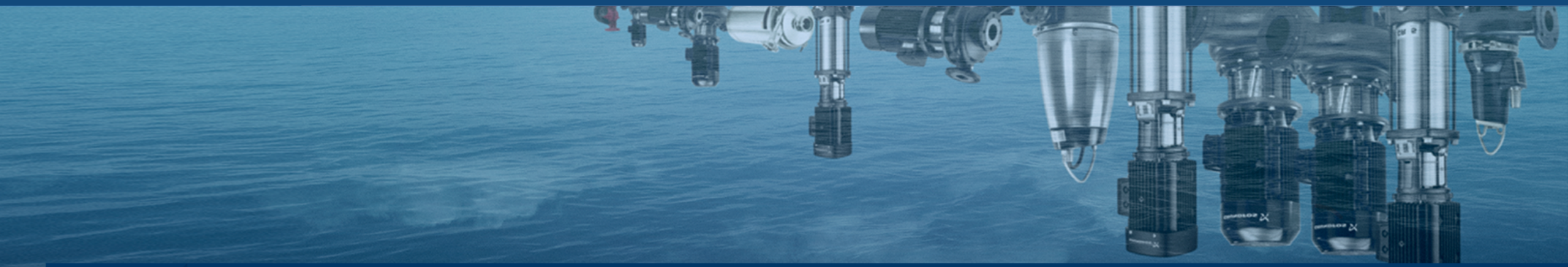
6 CLEAN WATER AND SANITATION

We will halve our own water consumption by 2025.

By 2030, we will have contributed to providing safely-managed drinking water to 300 million people in need.

In addition, through water efficiency and water treatment we will have saved 50 billion m³ of fresh water.

THANK YOU



be
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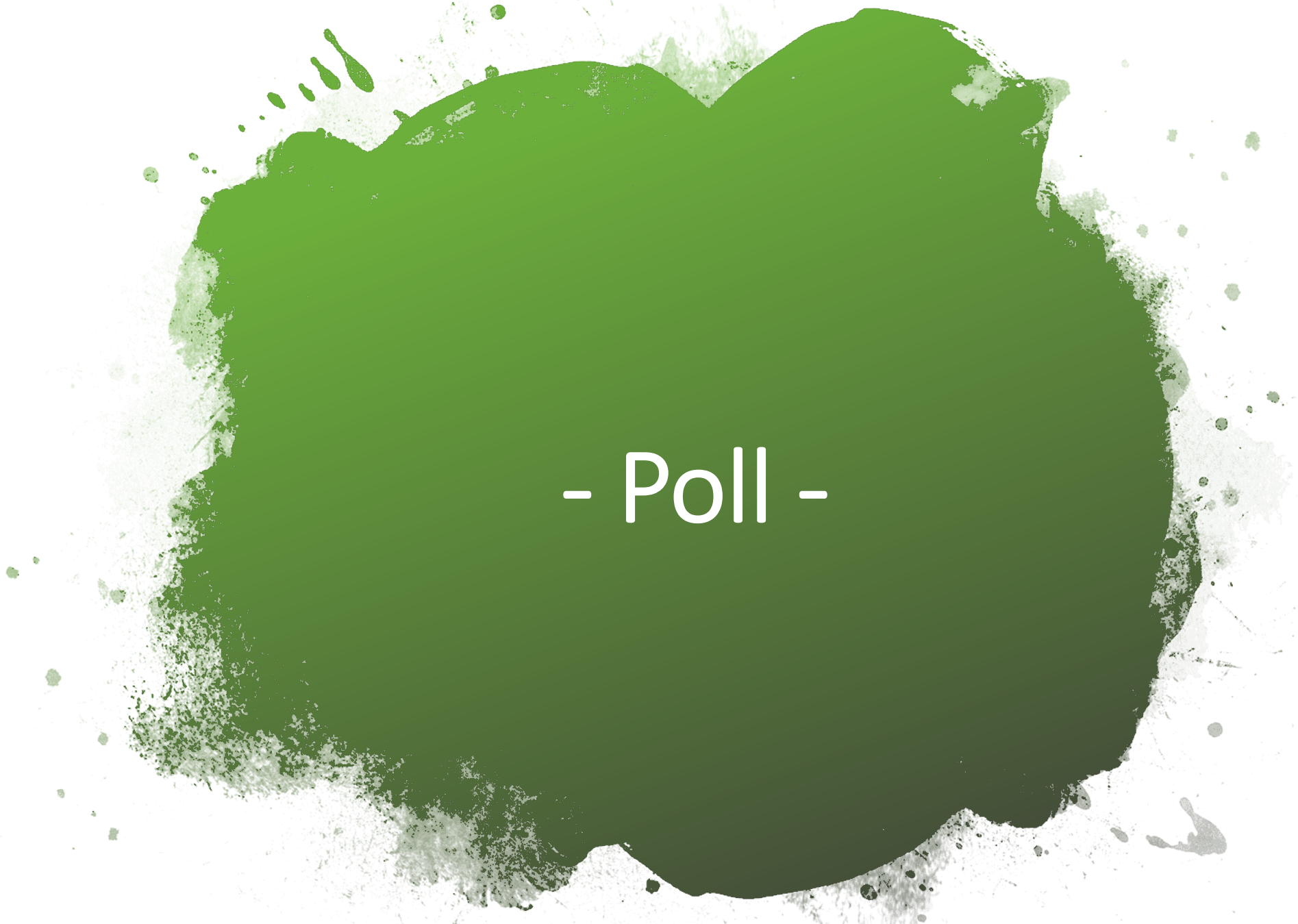

- Poll -

Presenter

Christian Lenz, Deputy Water and Habitat Coordinator, International Committee of the Red Cross (ICRC), Lebanon

Christian holds a Master of Science in Mechanical Engineering from ETH in Zurich, Switzerland and is currently an EMBA candidate at Politecnico di Milano, Italy. After graduating from ETH, he co-founded a startup in the field of electro-acoustic solutions for concert venues, gaining on eight years of experience as a live sound engineer. Since 2016 he is part of the ICRC engineering team having worked in Iraq, Yemen and currently in Lebanon. As Deputy Water and Habitat Coordinator, he supervises all projects related to access to essential services (water, wastewater, power supply, healthcare provision, education) for refugees and resident communities.

ICRC

Solarization of Pumping Stations in Arsal, Lebanon

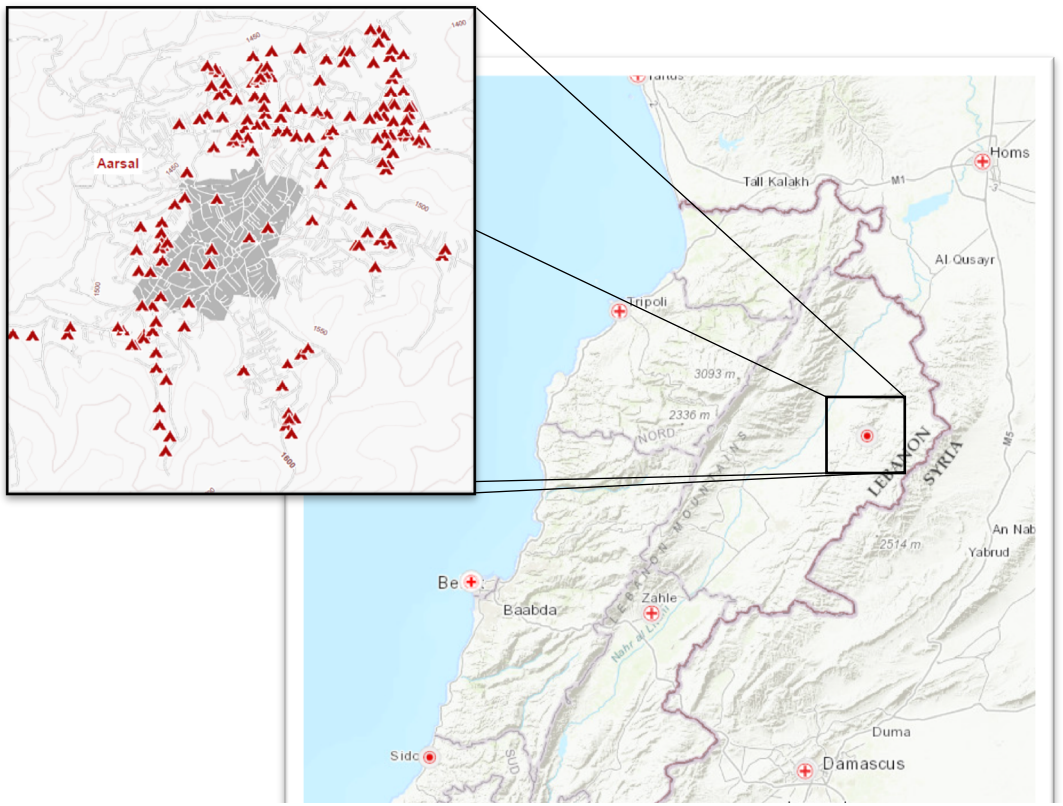
Case Study

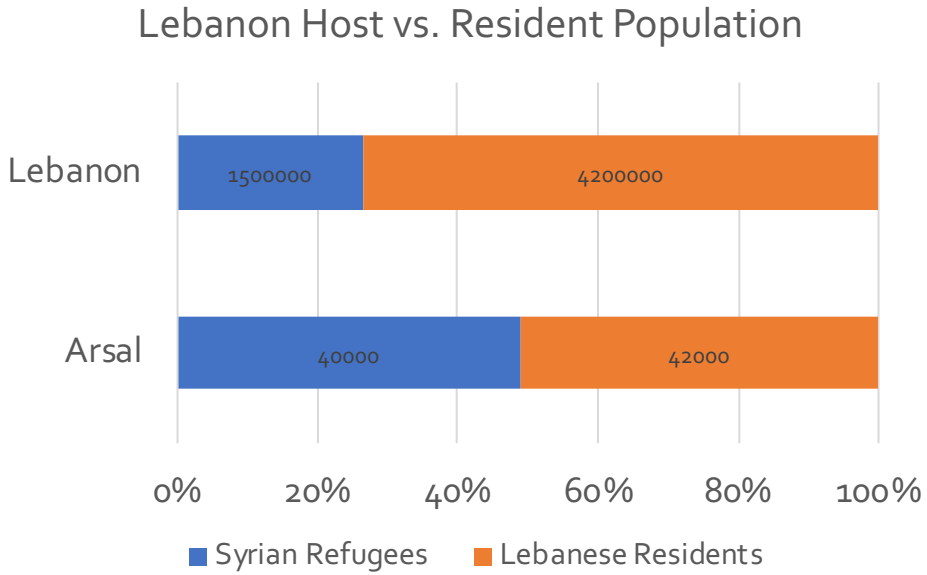
ICRC

Outline

- Introduction of the context in Lebanon / Arsal
- ICRC's systemic support approach
- Arsal water system and electricity problematic
- Design considerations and setup of solar system
- Wrap up and conclusions

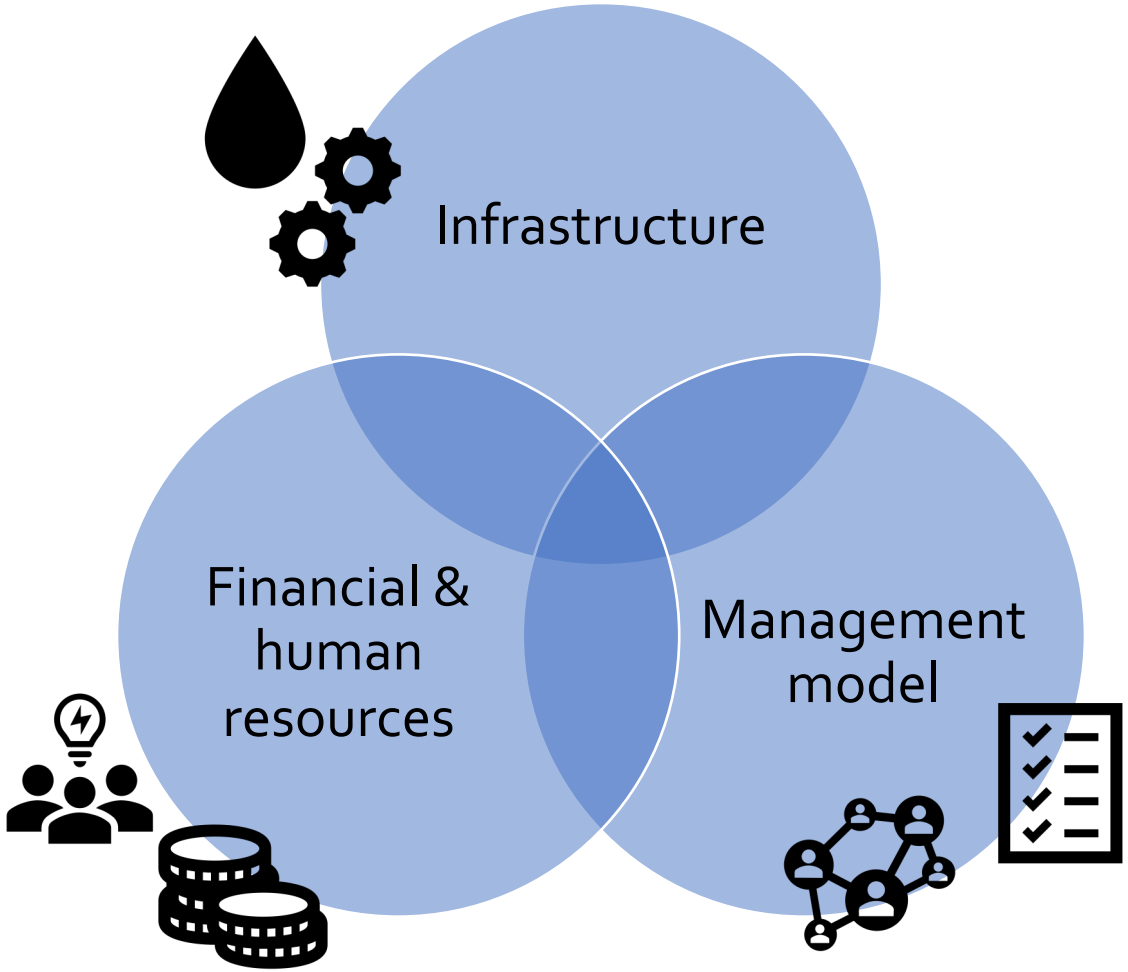
Why is ICRC in Lebanon / Arsal?



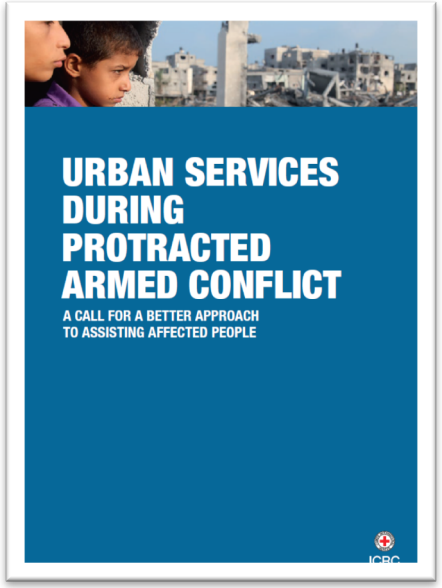


- Emergency response, 2014-17
- Systemic support, since 2017

Systemic support



- Reconciliation of
  - Infrastructure
  - Financial & human resources
  - Management model
- Resilience at the core



https://www.icrc.org/en/document/urban-services-protracted-conflict-report

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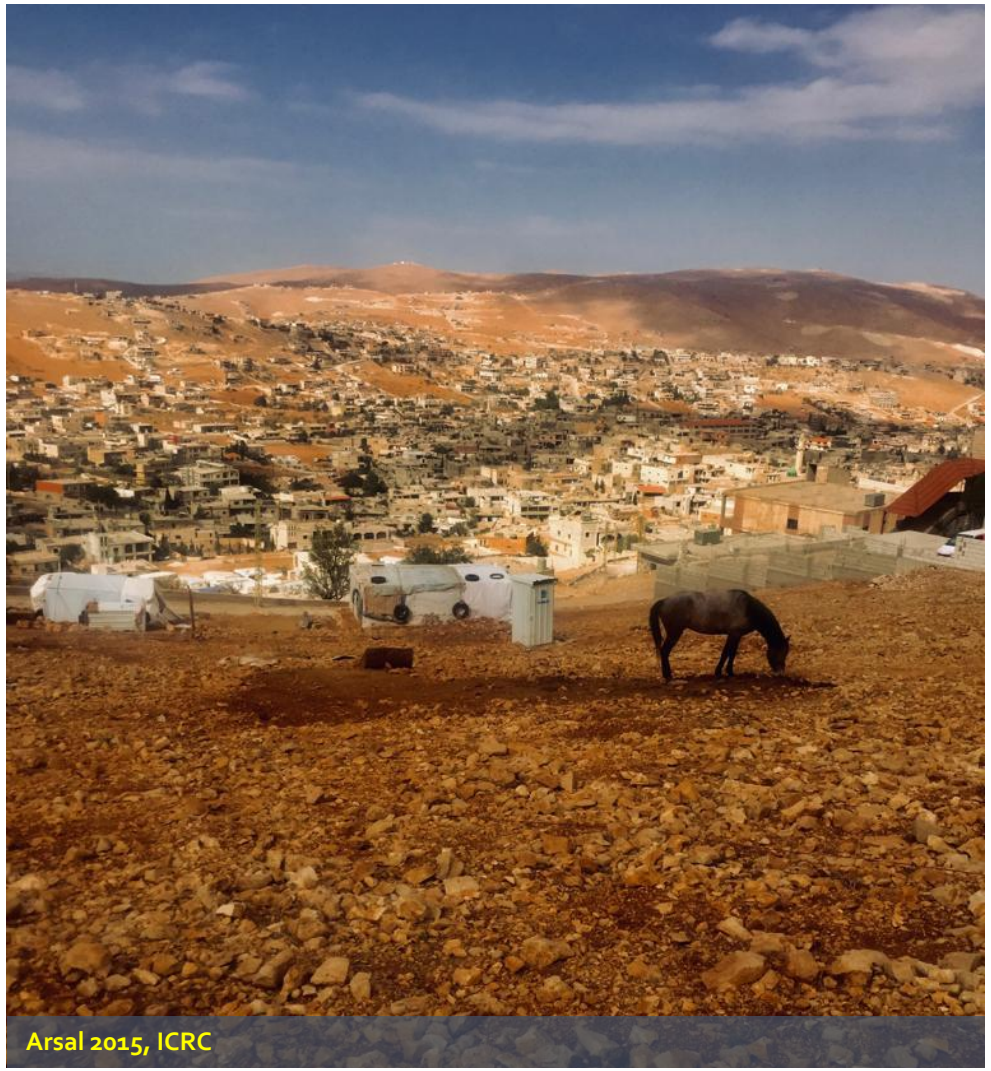
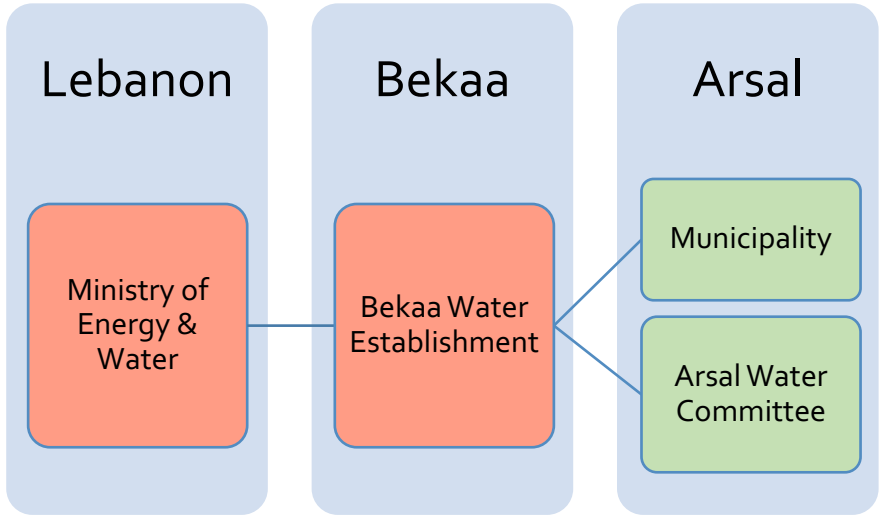


Water provision in Arsal



ICRC

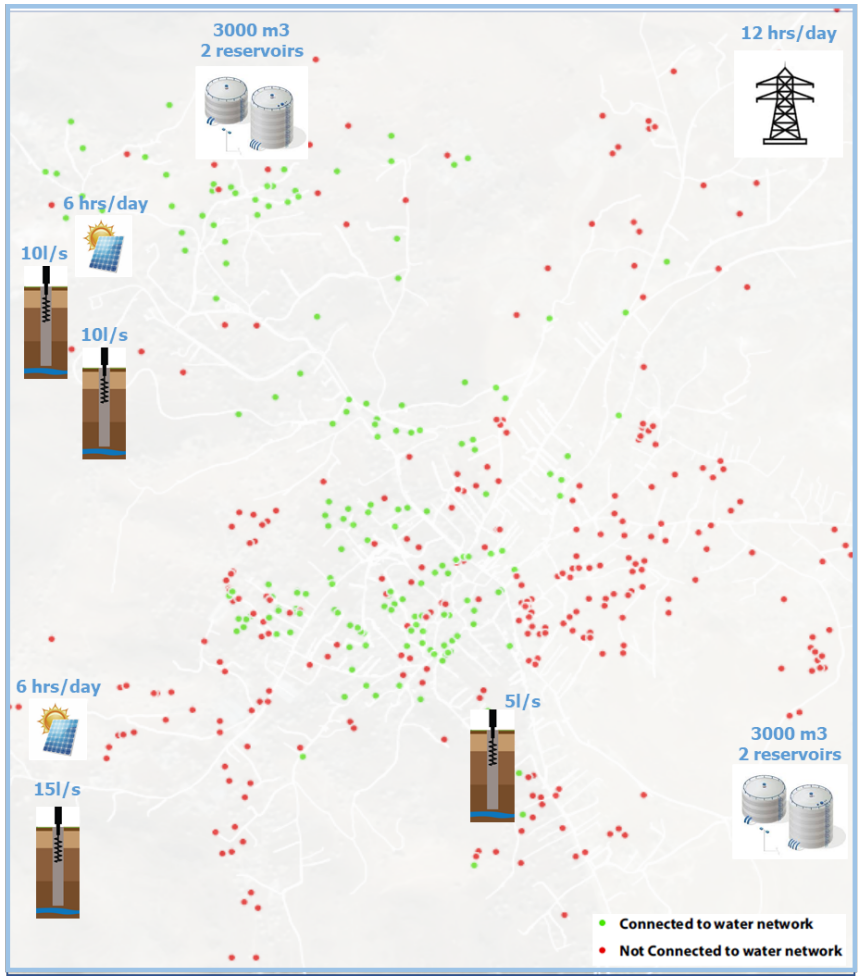
Systemic support for Arsal water systems

- Benefiting both resident and refugee population
- Pragmatic partnership with relevant authorities (BWE - Arsal Municipality / Water Committee)

Aim	Subproject	Year				
		2018	2019	2020	2021	2022
Increase water production	Solarization of two existing boreholes					
	Drilling of two new boreholes					
	Construction of two new pumping stations					
	Solarization of two new pumping stations					
Understand system	Data Collection – Citizen Satisfaction Survey					
	Installation of 270 household water meters & bulk flow meters					
	Water meter readings – Baseline					
	Data Collection – Citizen Satisfaction Survey					
Systemic support	Local capacity building / Integration of AWC in BWE					
	GIS to connect customers to infrastructure					
	Support management of the water system					
	Establish cost recovery scheme					

today

Water system overview and main deficiencies



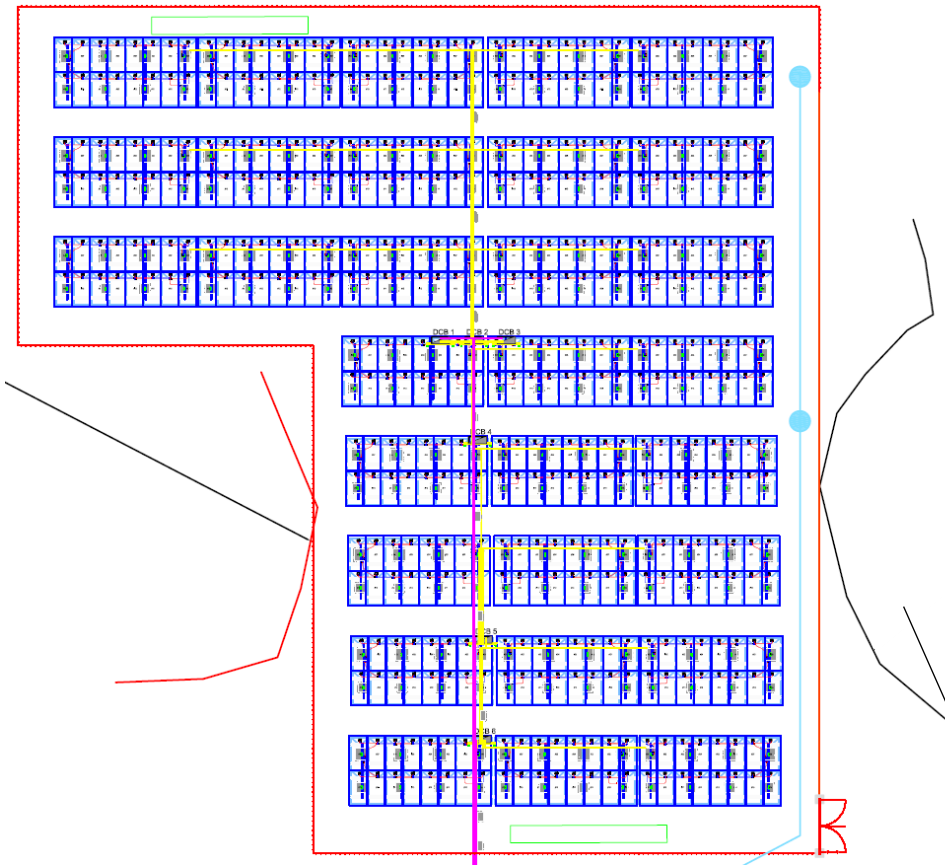
- About 12 h unstable and irregular power per day
- Water production: 1'080 m^3/d (~25% of need)
- Leaking distribution network (~25-50% losses)
- Expensive coping mechanisms, water trucking, bottled water, private networks
- Weak water system management and irregular supply to different zones

Key design considerations

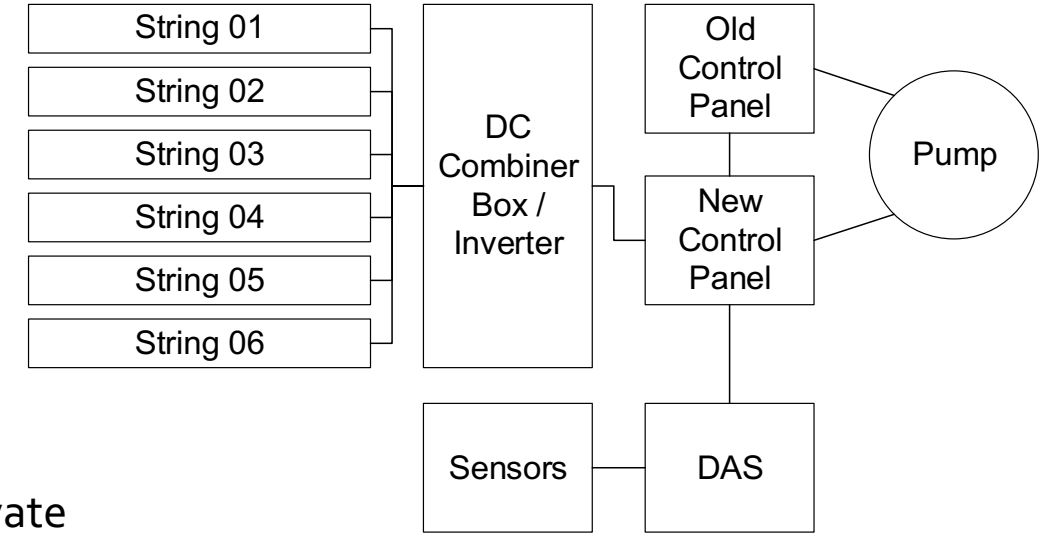
- Integrate existing infrastructure
- Optimization on location (inclination and land issues)
- Optimization of net cash saving after 10 years
- Safety considerations (quarry, lightning)

ICRC

System configuration



- Total power: 153.6 kWp
- PV array: 480 panels à 320 Wp
- Average pumping: 5.21 hours/day
- System cost: ~ 150'000 USD

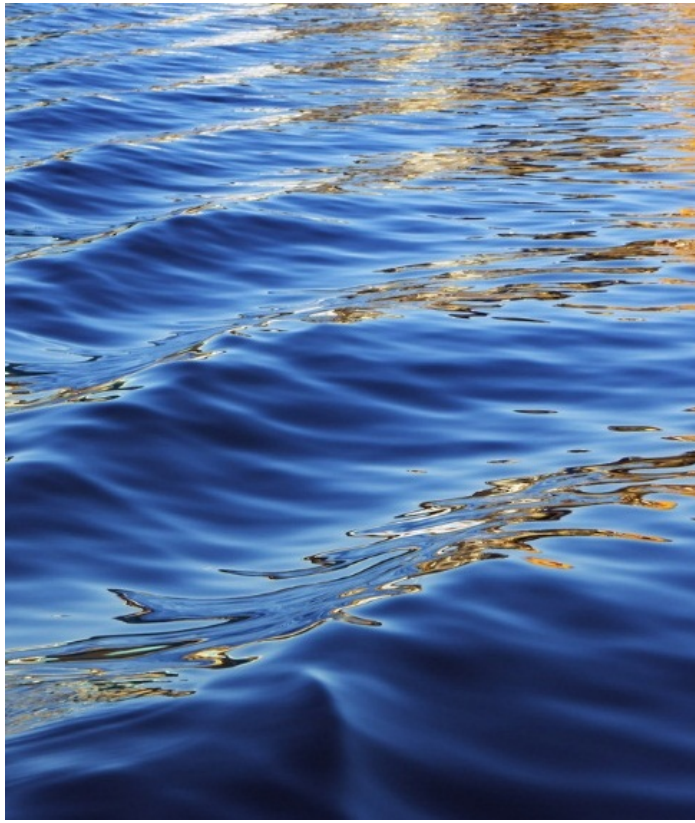


Concluding on results and challenges

- Challenges
  - Limited choice of location
  - Landowndership issues
  - Fragile organizational environment
  - Limited technical knowledge and skills of operators
  - Integration with other systemic support activities
- Results
  - Water production increase by 35.7% (405 m^3/d), serving 3'375 additional individuals
  - Reduced operational cost
  - Redundancy

Thank you

Christian Lenz – clenz@icrc.org




- Q&A -

Thank you

- Feedback: info@energypedia.info
- Webinar documentation/Additional Resources: https://energypedia.info/wiki/Webinar_Series:_Sustainable_Energy_in_Humanitarian_Settings#2nd_Webinar

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