



ANDRITZ GROUP

MINI-GRID

RURAL ELECTRIFICATION
HYDROPOWER AND MORE...

2018 12 06

ANDRITZ

ENGINEERED SUCCESS

Who we are?

YOUR GLOBAL PARTNER FOR HYDRO SOLUTIONS

We are a global supplier of electro-mechanical systems and services ("from water-to-wire") for hydropower plants and a leader in the world market for hydraulic power generation.

- More than 175 years of turbine experience (1839)
- 120 years electrical equipment experience (1892)
- More the 7500 employees trough the world

LARGE HYDRO



hydro- and electro-mechanical equipment for large turn-key / expansion projects; as well as modification of existing plants

COMPACT HYDRO



world's leading provider for small and mini hydropower plants - providing the full spectrum of electro-mechanical equipment

SERVICE & REHAB



solution oriented state-of-the-art service and rehabilitation solutions to increase profitability and extend plant life span

PUMPS



pumps that meet the demand for ever-larger, higher performance units, whether for low flow rates or wear-resistant applications

CONTEXT

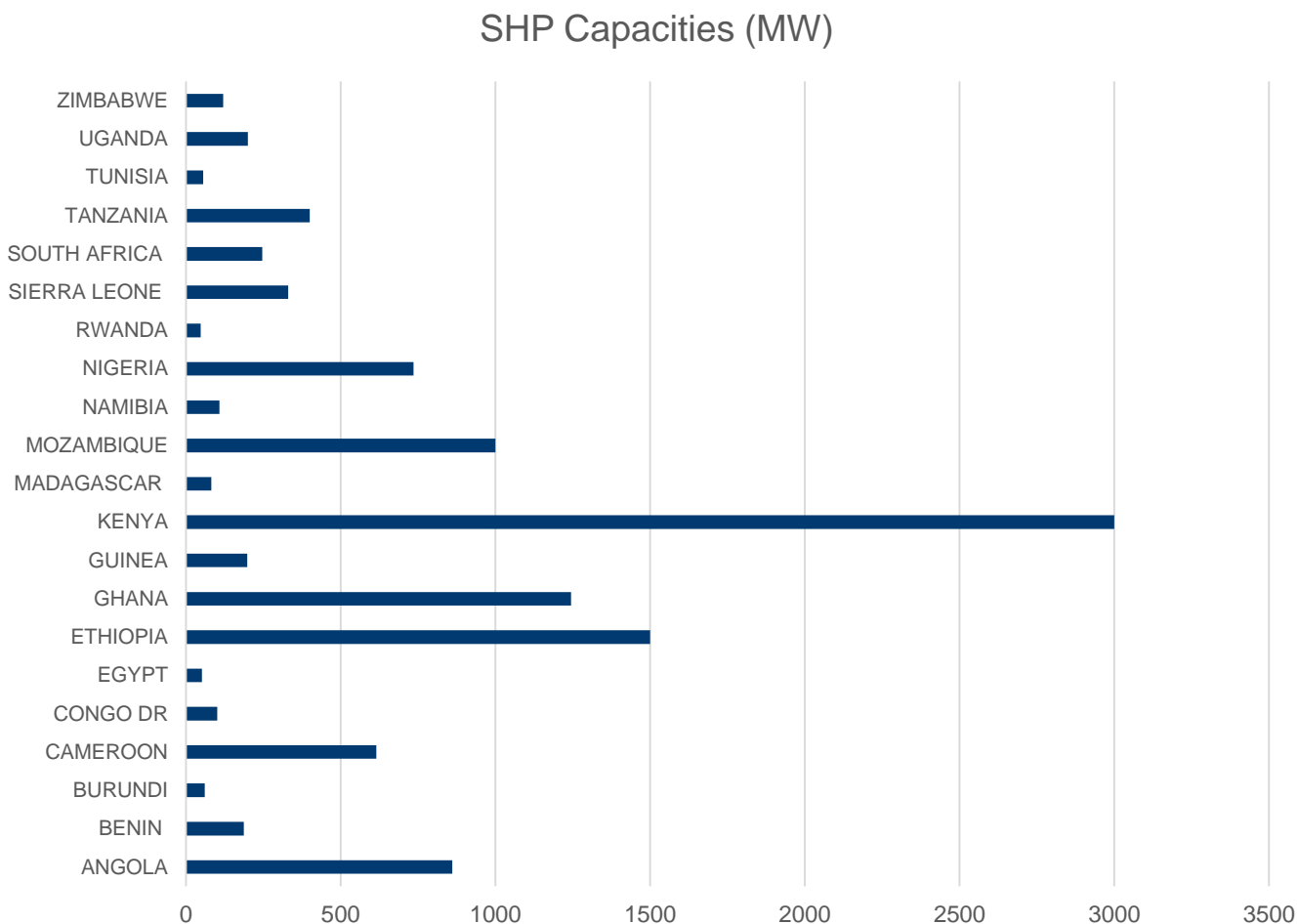
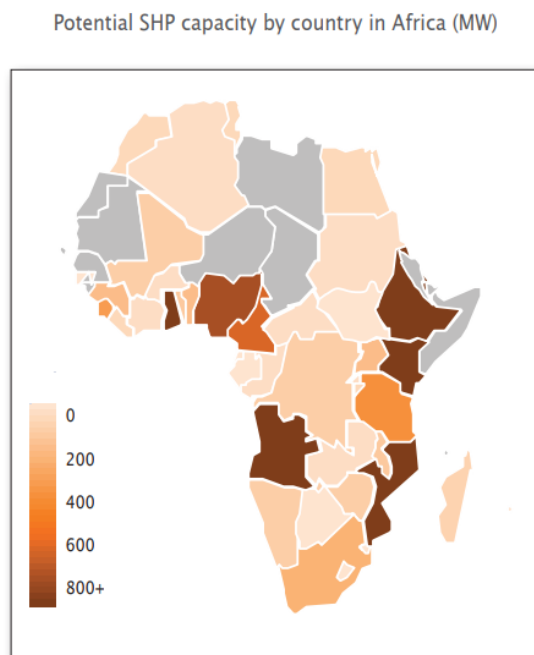


Nine years old Nirina

- Nine At nightfall nine year old Nirina is finishing her work for the day in the light of candles. She fetches the tea, lukewarm from the fading sun – the family has no refrigerator -, but she has to hurry, because her little brother Miaro doesn't like to sleep alone, it is too dark. The house has no electricity, they cannot afford the diesel for a generator and candles are lasting not long enough. After wiping out the candles Nirina cuddles her little brother in his sleep...



HYDROPOWER IN AFRICA



Water = Energie = HydroPower = Turbine??

RURAL ELECTRIFICATION: 100% HYDRO



Ambatomanoina, Madagascar – 100 kW

- The purpose of the project is to provide electricity to the municipalities Ambatomanoina, Amparihibe and Mananjary.
- from a micro-hydroelectric power station of 100 kW on the Mananara River
- with a transmission line of 9.15 km
- and a distribution network of 8.32 km.
- The rural municipality of Ambatomanoina has 23,425 inhabitants and has a target population of 8,538 clients. Agriculture is the main activity of the local population

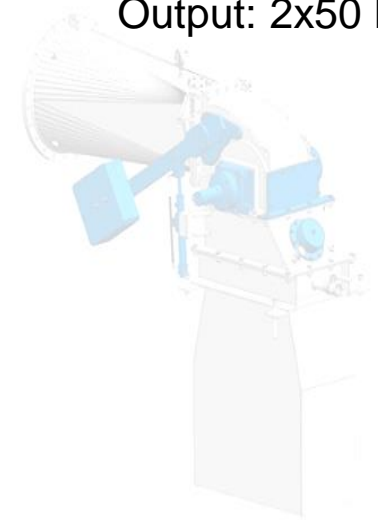


Technical data:
Off grid application

Off Grid Governing Concept:
*Frequency regulation by energy dissipation
Hybrids with other renewable energy sources*

2 MGX-6
Runner diameter: 400 mm

Head: 10.7 m
Output: 2x50 kW



RURAL ELECTRIFICATION: 100% HYDRO



La Motte Josserand, France – 32 kW

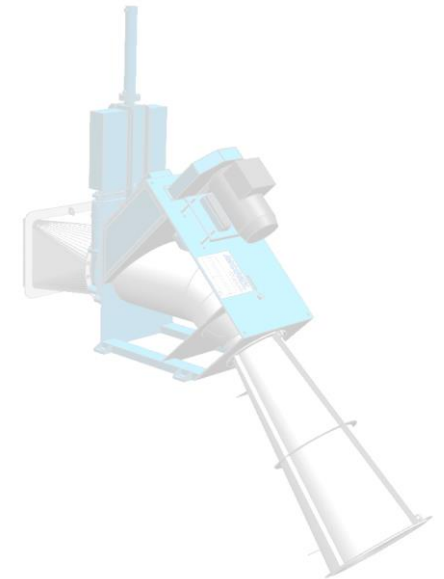
- A mill of a miller family
- His objectives
 - Selling on the grid
 - Revitalizing the mill



Technical data: On Grid application

MGK-4
Runner diameter: 400 mm
MGK-6
Runner diameter: 580 mm

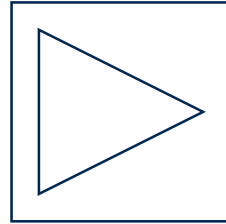
Head: 1,75 m
Output: 23 kW + 9 kW



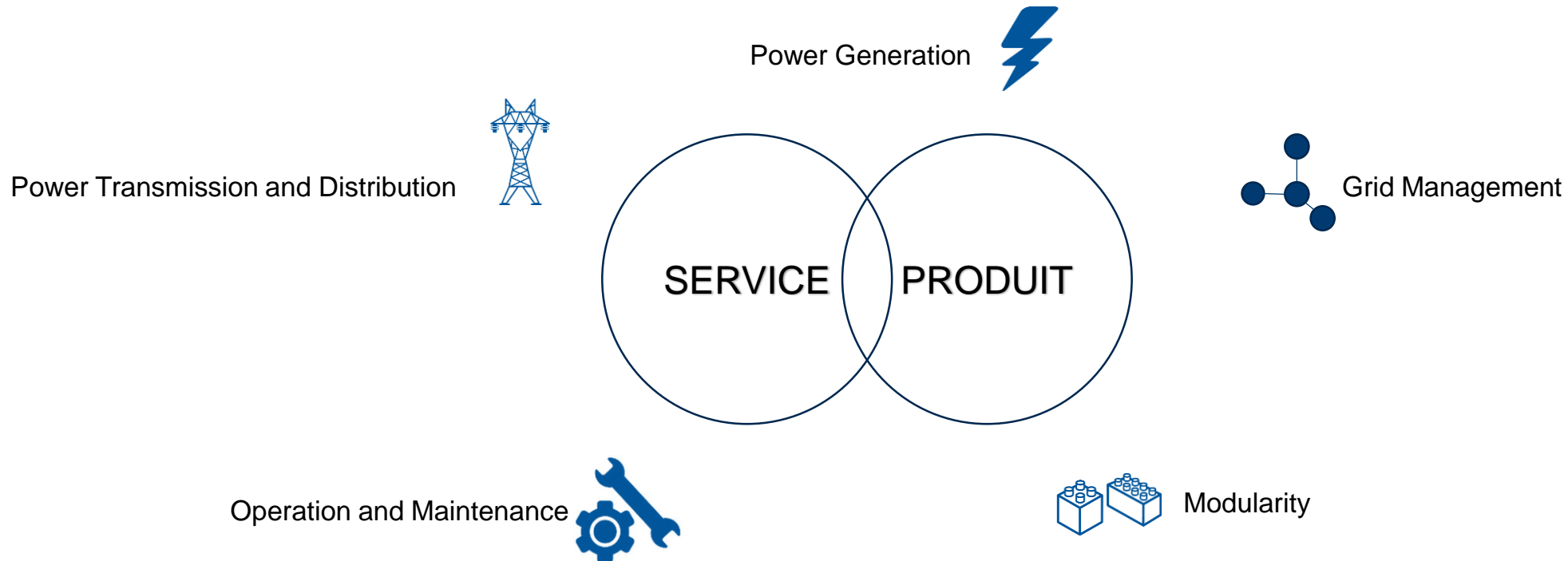
MINI-GRID PRODUCT



An integrated solution



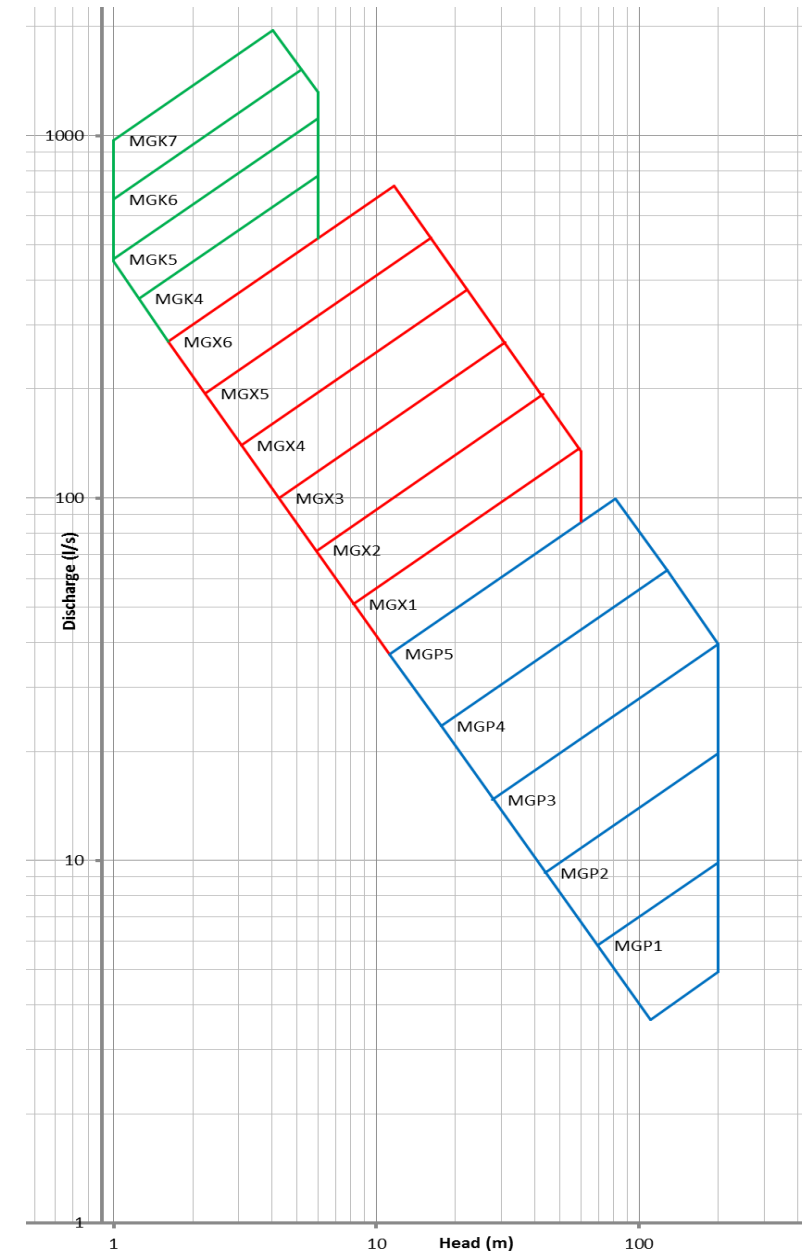
- Simple
- Cost-Effective
- Reliable
- Modular



MINI-GRID PRODUCT

ANDRITZ HYDRO developed a range of standard products

- Output : 5 to 69 kVA
- Head : 1 to 200 m
- Off-grid or Grid connected application
- Manual or automatic operation mode



MINI-GRID: PRODUCT RANGE



MGK: Mini-Grid Kaplan



1 - 6 m



400 – 1940 l/s



Diameter	400 / 480 / 580 / 700 mm
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Net Head	From 1 to 6 m
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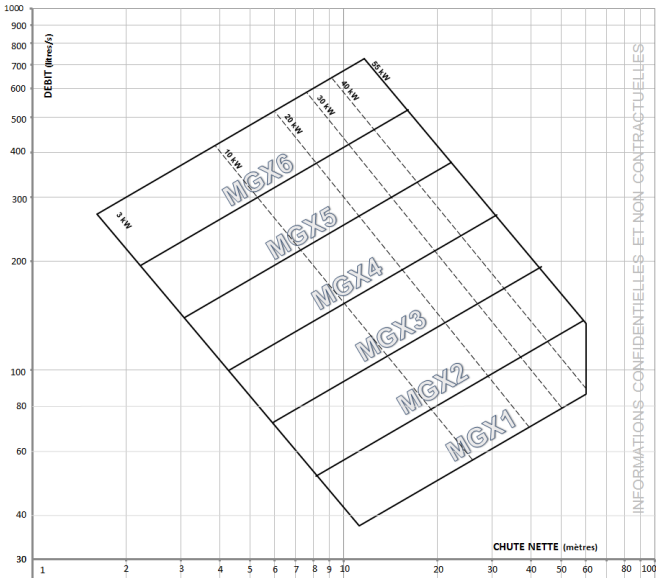
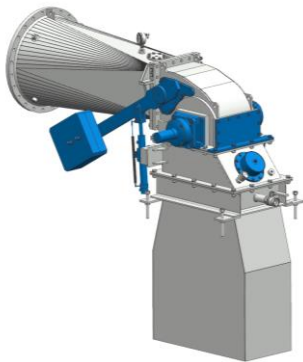
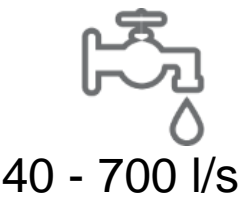
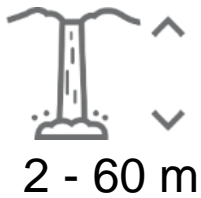
Discharge	From 400 to 1940 l/s
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MINI-GRID: PRODUCT RANGE



MGX: Mini-Grid Crossflow



Diameter	From 300 to 400 mm
Width	From 100 to 650 mm
Net Head	From 2 to 60 m
Discharge	From 40 to 700 l/s



MINI-GRID: PRODUCT RANGE



MGP: Mini-Grid Pelton

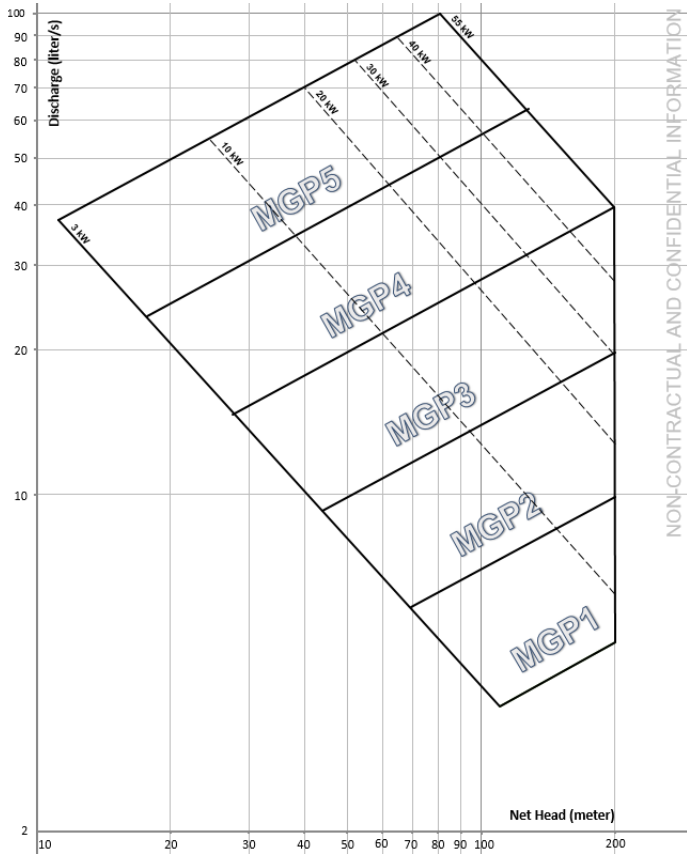
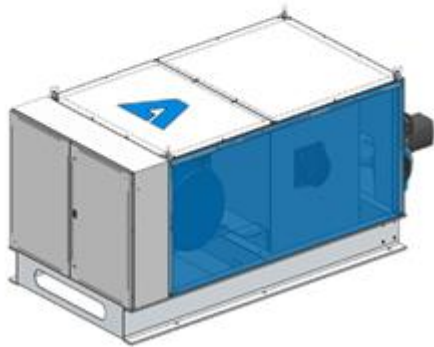
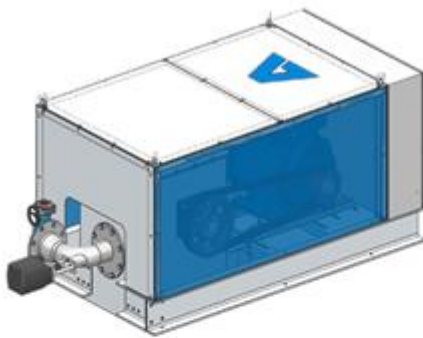


15 - 200 m

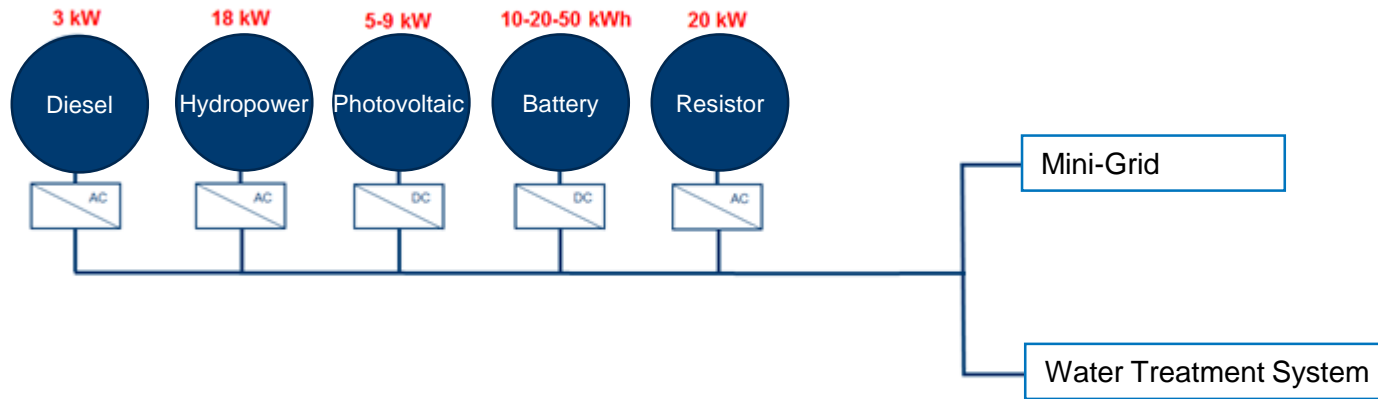


5 - 100 l/s

Diameter	390 /500 mm
Net Head	From 15 to 200 m
Discharge	From 5 to 100 l/s



HYDROPOWER & HYBRID MINI-GRID



- **Diesel:** Backup system
- **Hydropower:** HP unit (continuous operation)
- **Photovoltaic :** Photovoltaic unit (during the day)
- **Battery:** Storage usable during peak period
- **Resistor:** Dissipation in case of overuse

- Accommodate with seasonal and periodic resource fluctuations
 - Day/Night
 - Winter/Summer
- Facilitate energy transition
- Bring flexibility to the final users
- Enhance the amount of energy

OUR MINI-GRID PROJECT



Why should we work together?

- Use of tested hydraulic model (CFD)
- EXW in 6 months
- Remote Control
- Less Civil Works (container possibility)
- On Grid or Off Grid Application
- Simple
- Cost-Effective
- Reliable
- Modular



DO IT YOURSELF... YOU ARE NOT ALONE

Optional Services

- Installation Supervision
- Installation
- Commissioning

Optional Package

- Spare Part Kit

Additional Package

- Training package

OUR MINI-GRID PROJECT



Let's create the opportunity for a partnership?

Hybrid Mini-Grid

100% HydroPower

Off Grid

On-Grid

**Installation and/or
Commissioning Team**

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ENGINEERED SUCCESS

MINI-GRID CONTACT



YOUR GLOBAL PARTNER FOR HYDRO SOLUTIONS



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