



HYDROPOWER

RENEWABLE ENERGY SOLUTIONS

COMPANY PRESENTATION

MARCH 2024

ANDRTZ

ENGINEERED SUCCESS

MULTIPLE ROLES OF HYDROPOWER



ELECTRICITY

transportation, heat,
power & light

WATER STORAGE



flood mitigation, irrigation,
water supply & navigation



ENERGY STORAGE

peak load generation,
energy balancing & grid stability

POSSIBILITIES AND OPPORTUNITIES



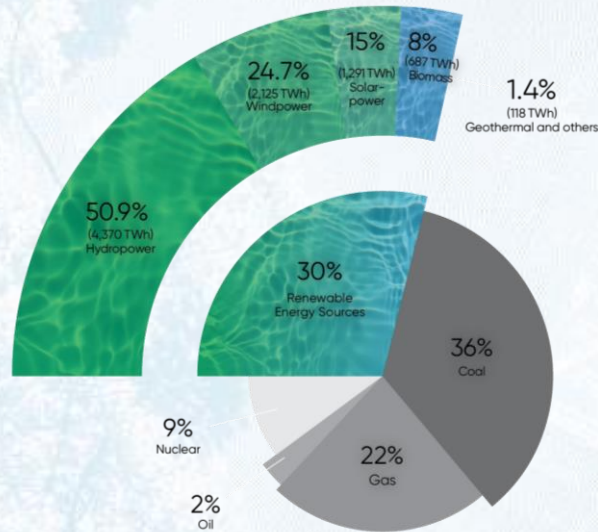
Hydropower generation

~4,416 TWh/year

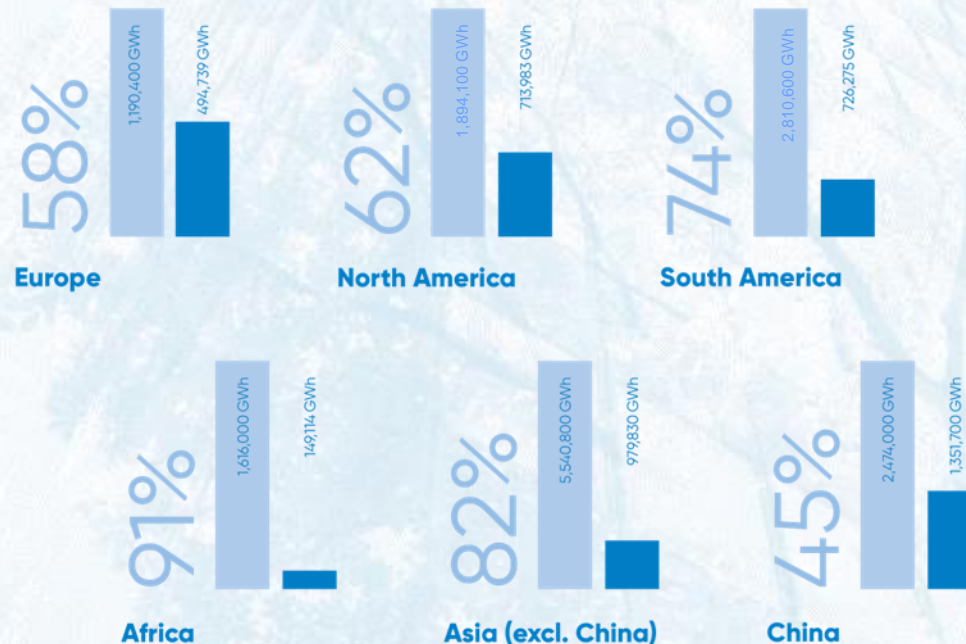


Technically feasible potential

~15,526 TWh/year



Source:
IEA World Energy Outlook 2023



Source:
Hydropower & Dams World Atlas 2023

Technically feasible hydropower potential (GWh/year)
 Power generation from hydropower (GWh/year)

POWER GENERATION FROM HYDROPOWER

SCENARIO 2050



1 Pumped Storage

2 Run-of-River

3 Small Hydropower

4 Low-head

5 Very low-head

6 Hybrid (Hydro and Wind)

7 Tidal current array

8 Hybrid (Hydro and Solar)



WORLD MARKET LEADER for hydraulic power generation

YOUR

leading in **SERVICE & REHABILITATION**

>185 YEARS of turbine experience

GLOBAL

>135 YEARS electrical equipment experience

Complete range up to more than **800 MW**

>33,200 turbines (>489,000 MW) installed

PARTNER

>20% of all turbines in operation worldwide

>25 GW total installed capacity of Compact Hydro units



FROM THE HISTORIC PIONEERS OF TECHNOLOGY TO A MODERN MARKET LEADER

THE PIONEERS CREATED THE FOUNDATION

OUR PIONEERS (ALPHABETICAL ORDER):

AFI ANDRITZ Andritz VA TECH HYDRO Ateliers des Charmilles
Ateliers de Constructions Mécaniques de Vevey (ACMV) Baldwin-Lima-Hamilton
Bell Bouvier Boving C.E.G.B. Dominion Engineering ELIN English Electric
Escher Wyss Finnshyttan GE Hydro GE Hydro Inepar General Electric
Hammerfest Strom Hemi Controls HMI Construction Hydro Vevey
I.P.Morris KAMEWA KMW Kvaerner Møller NOHAB Pelton Water Wheel
Pichlerwerke Precision Machines Ritz Pumpenfabrik SAT Sulzer Hydro
Tampella VA TECH HYDRO VOEST Voest MCE Waplans

- 2023** Inauguration of new test rig (world record)
- 2022** Hybrid energy solution (Gandhi Sagar, India)
- 2021** Co-located energy plant (Kidston, Australia; PSP, Solar, Wind)
- 2016** First commercial tidal current array unit (Meygen, Scotland)
- 2012** World largest Hydromatrix plant (Ashta, Albania)
- 2011** World largest Bulb turbine (Jirau and St. Antonio, Brazil)
- 2008** World largest tidal power plant (Sihwa, South Korea)
- 2008** 770 MW Francis turbine (Simon Bolivar, Venezuela)
- 2002** First var speed motor-generator outside Japan (Goldisthal, Germany)
- 1991** World largest manifold (Tarbela, Pakistan; World Record)
- 1896** First large commercial hydropower plant
- 1892** Foundation of Pichlerwerke, Austria
- 1839** First turbine supplied
- 1805** Foundation of Escher Wyss & Cie, Switzerland

GLOBAL PRESENCE

CLOSE TO OUR LOCAL CUSTOMER



* by end of 2023

xxx Locations with manufacturing capabilities

FACTS AND FIGURES



LARGE HYDRO

SERVICE & REHAB

TURBO GENERATOR

OTHER PRODUCTS

SMALL HYDRO

Figures
2023

Order intake
2,020.9 MEUR

Order backlog
3,398.8 MEUR

Revenue
1,521.7 MEUR

EBITA
88.1 MEUR

[READ MORE !](#)

ISO 9001:2015
Quality Management

ISO 14001:2015
Environmental Management

BS OHSAS 18001:2007
Occupational H&S Management

ISO 45001:2018
Occupational H&S Management

ISO 19600:2014
Compliance Management

ISO 27001:2013
Information Security Management

ISO 37001:2016
Anti-bribery Management

ISO 55001:2014
Asset Management

[READ MORE !](#)

FROM WATER TO WIRE



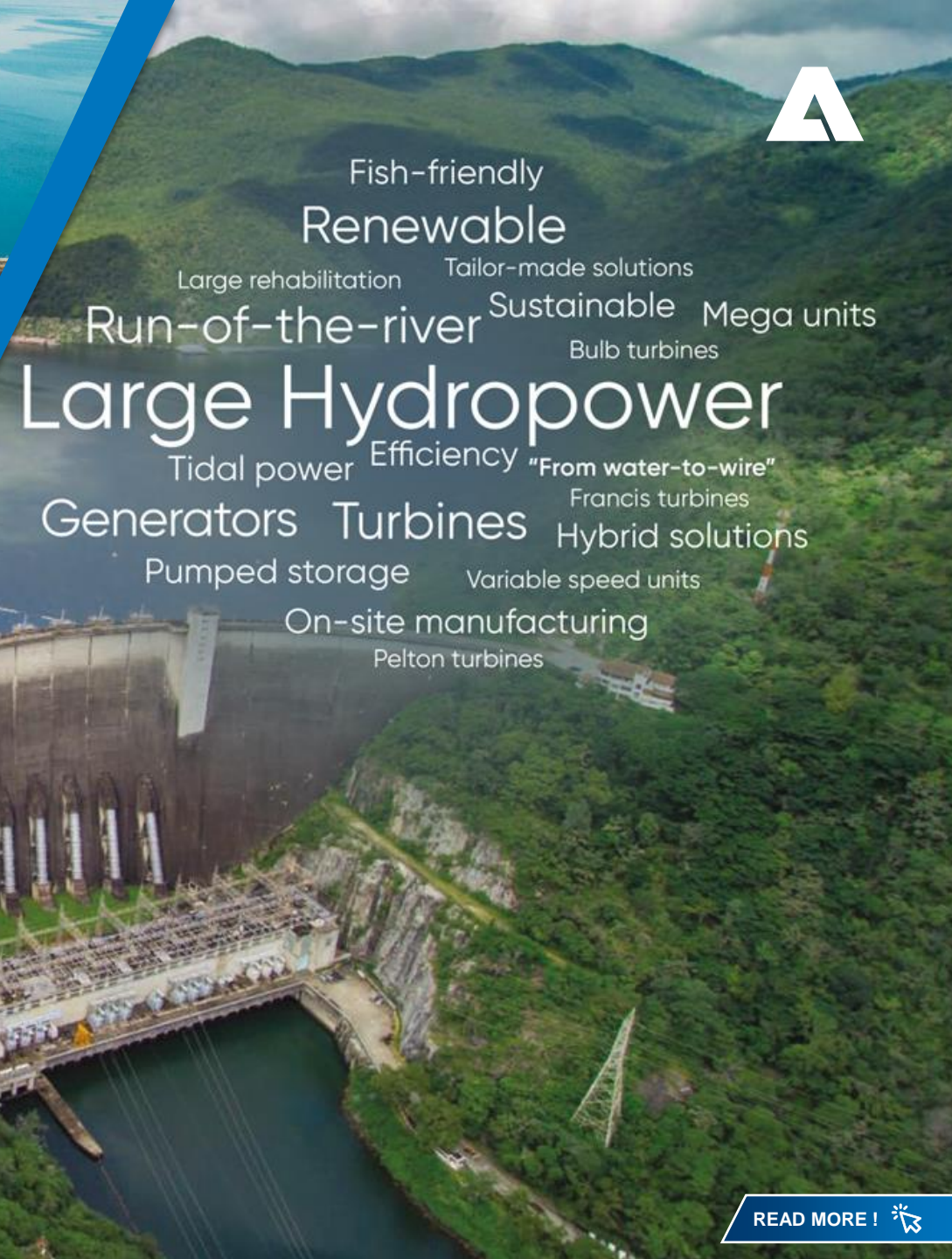
-
- 1 Gates
 - 2 Penstocks
 - 3 Inlet valve
 - 4 Turbine
 - 5 Generator
 - 6 Automation, control and protection
 - 7 Medium voltage switchgear
 - 8 Power transformer
 - 9 Large Battery Storage
 - 10 High voltage switchgear
 - 11 Transmission line

FROM WATER TO WIRE



We support the
WHOLE LIFE CYCLE
of a power plant!

- Design
- Model test
- Manufacturing
- Installation
- Commissioning
- Training
- Spare part Service
- Maintenance
- Operation



Fish-friendly
Renewable

Large rehabilitation Tailor-made solutions
Run-of-the-river Sustainable Mega units
Bulb turbines

Large Hydropower

Tidal power Efficiency "From water-to-wire"
Generators Turbines Francis turbines
Hybrid solutions
Pumped storage Variable speed units

On-site manufacturing
Pelton turbines

LARGE HYDRO

- Turnkey electro-mechanical equipment
- Large Rehabilitations and Upgrades
- Greenfield hydropower plants

SMALL HYDRO

Turnkey solutions (< 30 MW / unit)

Modular system design

Off-grid design



Global supplier
Compact Hydro
Short delivery
Mechanical auxiliaries
Automation
Clean
Quality
Governor
Upgrade
Customer
Ecological
Kaplan
Service
Low investment
Worldwide
Pre-assembled
Electrical equipment
Economical
Low environmental impact
Efficiency
Francis
Pelton
Growing market
Modernization
Single source
Modular design
Mini Compact Hydro
Sustainable
Optimum solution
Generator
Renewable
"From water-to-wire"
Limited interfaces
Leader



SERVICE & REHAB

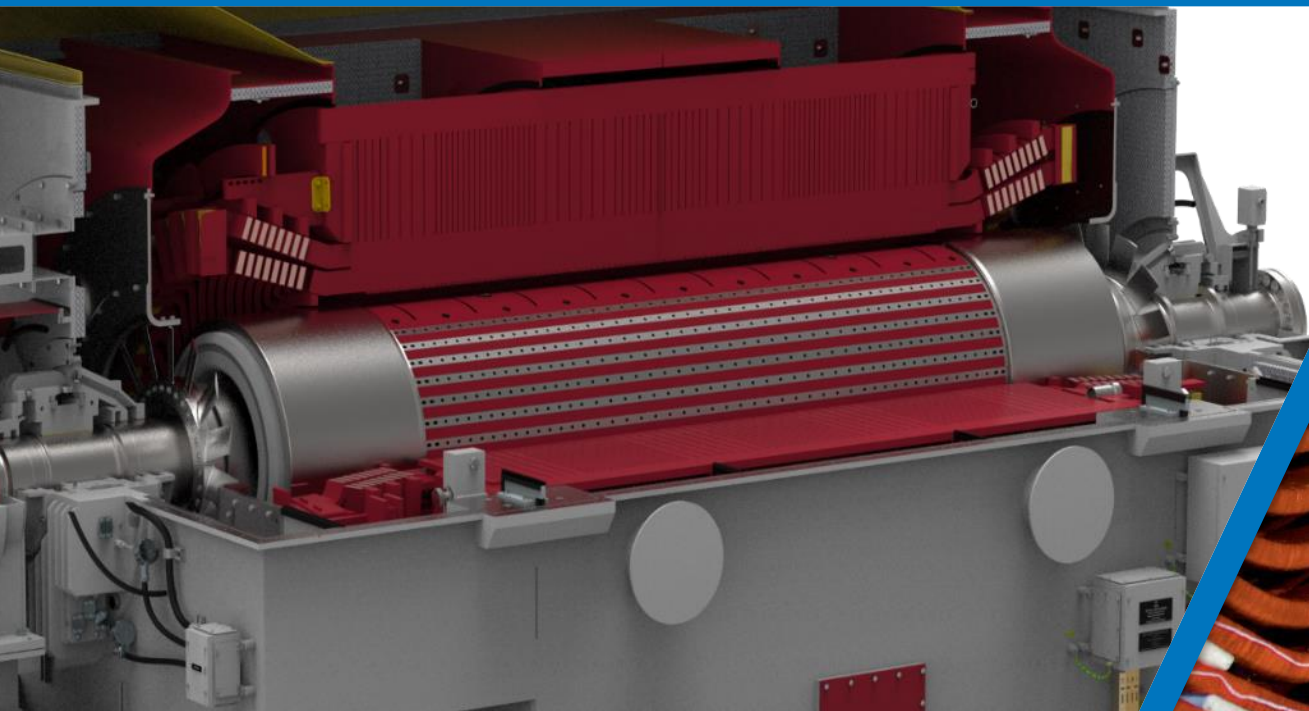
Modernization, Upgrade, and Uprate
Automation and Digitalization
Operation & Maintenance Solutions



Service
"From water-to-wire"
Tailor-made solutions Electro-mechanical
Value Operation and Maintenance
Renewable Rehabilitation
Modernization Spare parts 24 / 7
Digitalization Global Training Overhaul Repair
Life cycle analysis Upgrading Flexibility
Competence Modernization Three-Phase-Approach
Diagnosis Innovation Hydro-mechanical
Improved performance

ISO 55001:2014 // ISO 27000: 2013

TURBO GENERATORS



Generators up to 350 MVA
Service and Maintenance



[READ MORE !](#)

OTHER PRODUCTS

Ocean energy solutions for:

- Tidal power plants
- Tidal current power plants

Controllable pitch propellers



[READ MORE !](#)

THE GLOBAL MEGA TRENDS



ENERGY TRANSITION



INCREASE OF RENEWABLES



CLIMATE CHANGE



Hydro-
power

FOR THE CHANGE

OUR RENEWABLE SOLUTIONS
FOR STRONG AND STABLE GRIDS

ANDRITZ

ENGINEERED SUCCESS

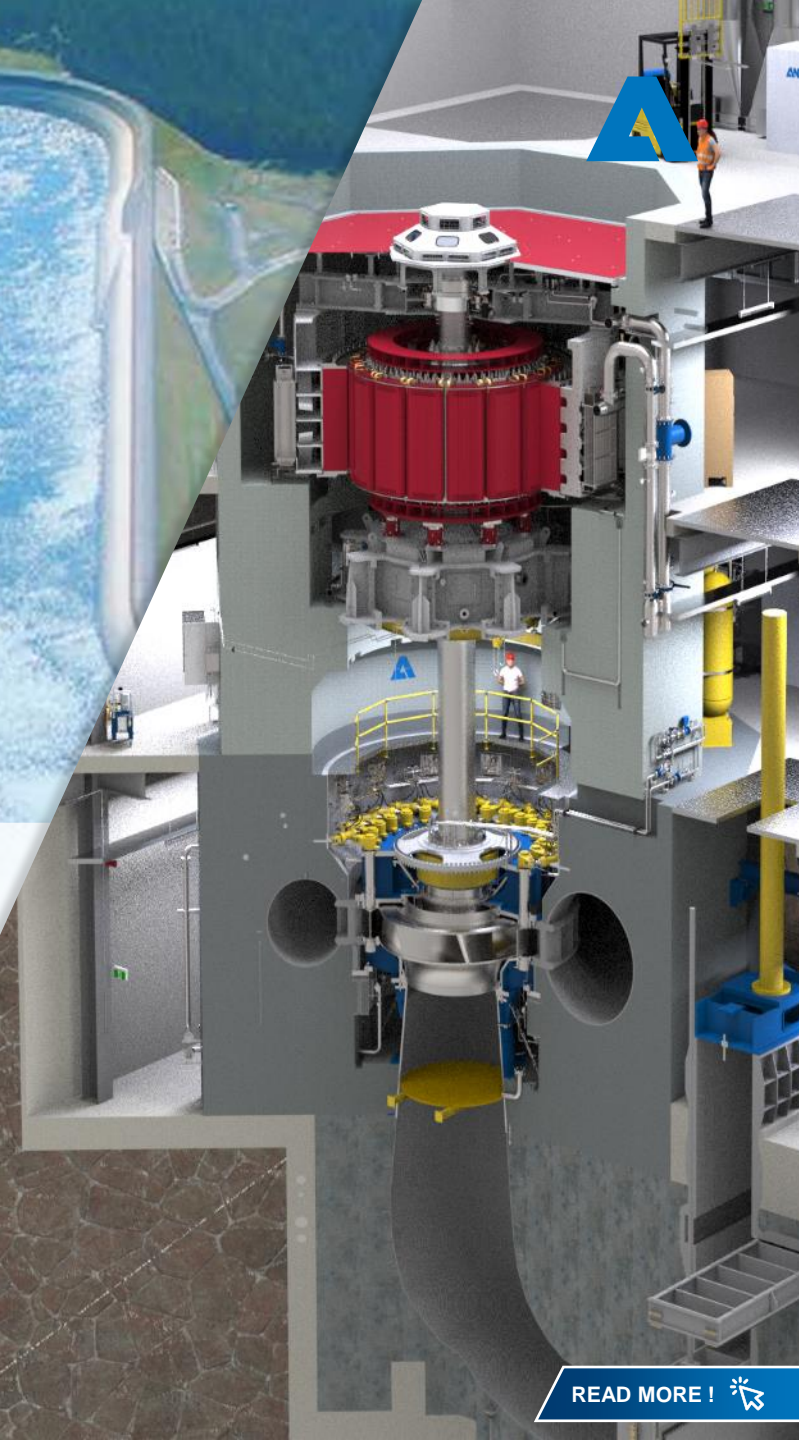
PUMPED STORAGE: FOR THE CHANGE

PUMPED STORAGE PLANTS FACILITATE THE INTEGRATION
OF LARGER SHARES OF VARIABLE RENEWABLES

TECHNOLOGY: **pumped storage solution "from water-to-wire"**

HIGHLIGHTS: **fixed or variable speed**

APPLICATIONS: **short/midterm storage, grid stabilization, integration of
variable renewable energy, stabilizing of energy supply
for hydrogen production**





HIGH INERTIA: FOR THE CHANGE

SYNCHRONOUS CONDENSERS BALANCE GRID
VOLATILITY EFFECTED BY WIND AND SOLAR

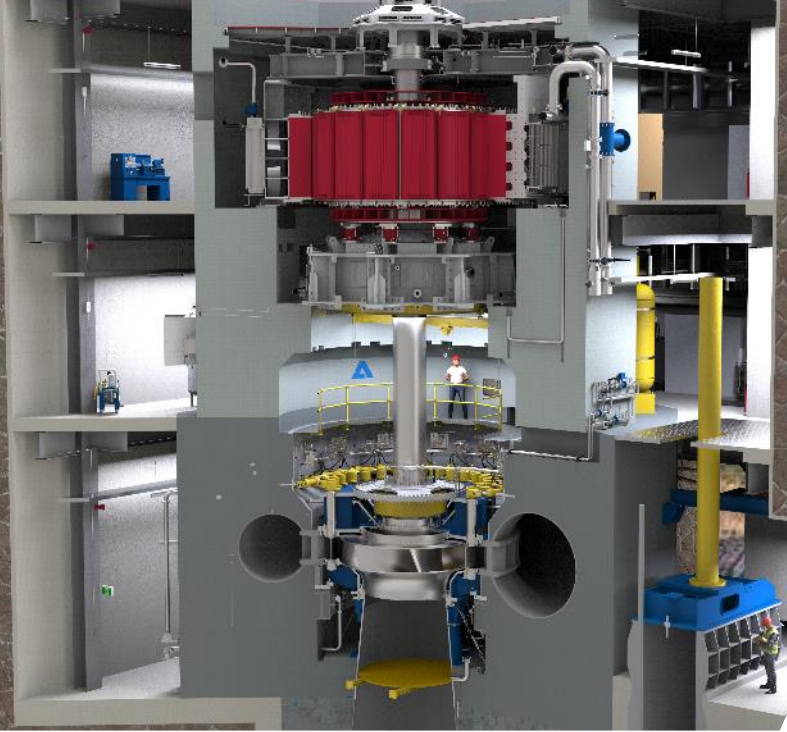


TECHNOLOGY: stand-alone synchronous machine

HIGHLIGHTS: high rotating mass

APPLICATIONS: power grid stability

World's largest air-cooled salient pole synchronous condenser



HYBRID ENERGY SOLUTION: FOR THE CHANGE

TECHNOLOGY: combination of different co-located
renewable energy technologies

HIGHLIGHTS: pumped storage and joint operation

APPLICATIONS: regulated power off-take to the grid



AUTOMATION AND DIGITALIZATION: FOR THE CHANGE

SEAMLESS AND SECURE ACCESS
WITH MODERN DIGITAL SOLUTIONS

READ MORE! 

TECHNOLOGY: **automation solutions from
unit level to full fleet control**

HIGHLIGHTS: **digital operation and maintenance,
cyber security**

APPLICATIONS: **integrated automation for
local/remote operation**



YOUR GLOBAL PARTNER FOR HYDRO SOLUTIONS

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