



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



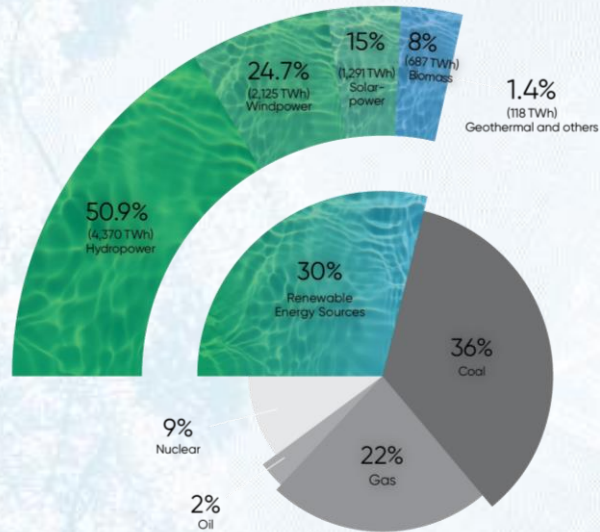
Hydropower generation

~4,416 TWh/year

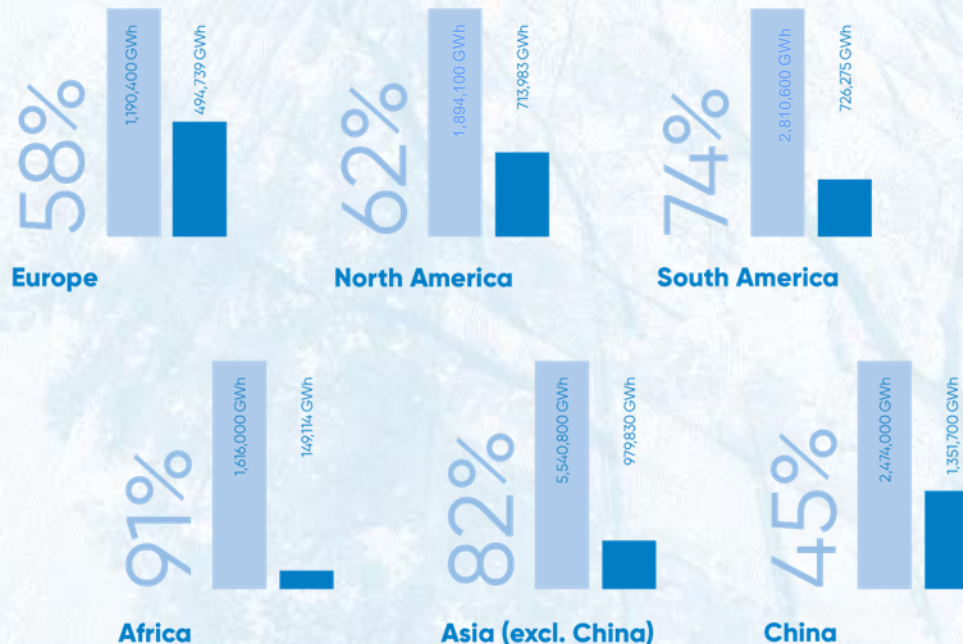


Technically feasible potential

~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 Lowhead

5 Very lowhead

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

COMPACT HYDRO

SERVICE & REHAB

TURBO GENERATOR

OTHER PRODUCTS

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
- 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”



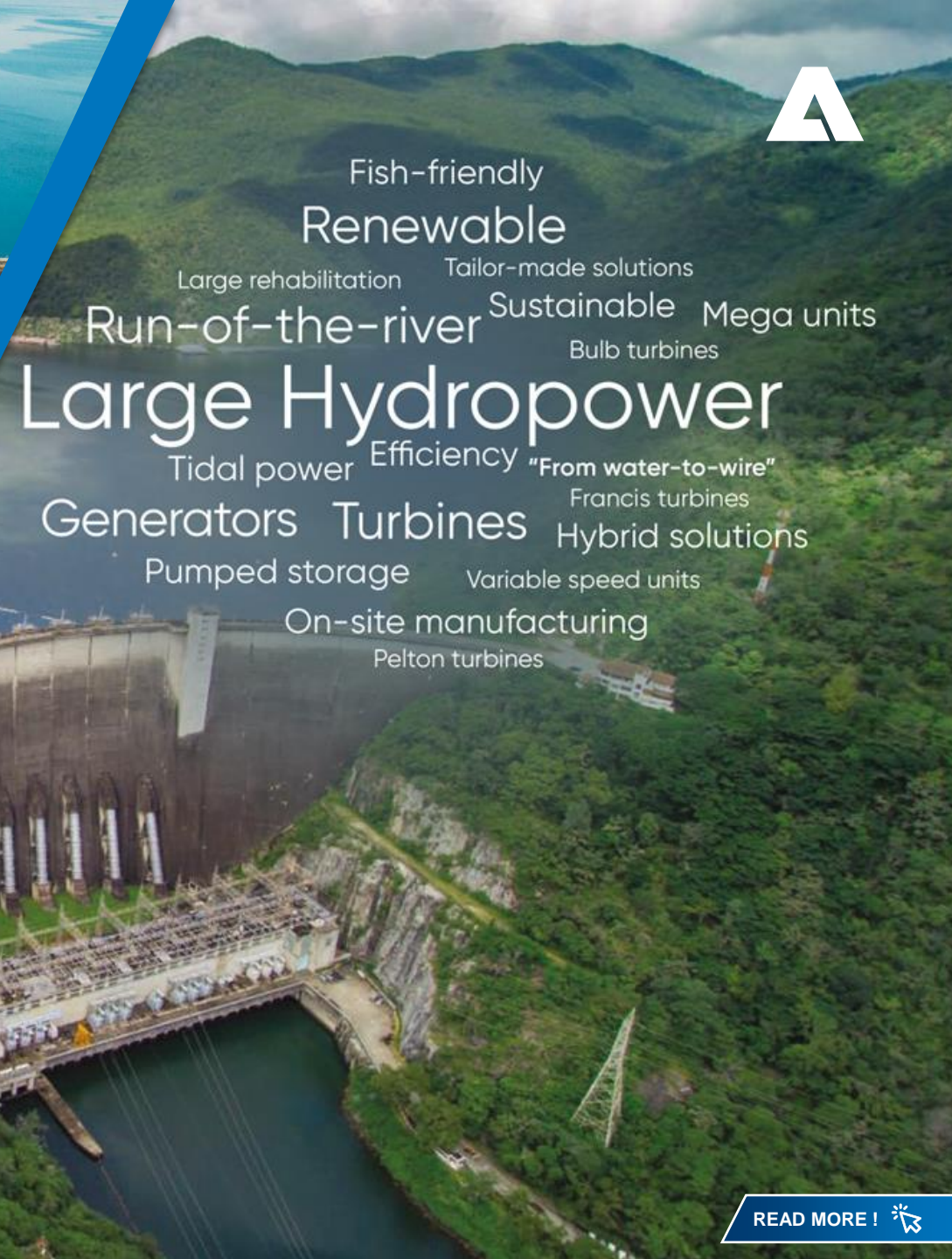
- 
- 1 Gates
  - 2 Penstocks
  - 3 Inlet valve
  - 4 Turbine
  - 5 Generator
  - 6 Automation, control and protection
  - 7 Medium voltage switchgear
  - 8 Power transformer
  - 9 Large battery storage
  - 10 High voltage switchgear
  - 11 Transmission line

# “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

# COMPACT HYDRO

Turnkey solutions (< 30 MW / unit)

Modular system design

Off-grid design



Global supplier  
Compact Hydro  
Short delivery  
Mechanical auxiliaries  
Quality  
Automation  
Clean  
Governor  
Upgrade  
Customer  
Ecological  
Kaplan  
Service  
Low investment  
Worldwide  
Pre-assembled  
Economical  
Electrical equipment  
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

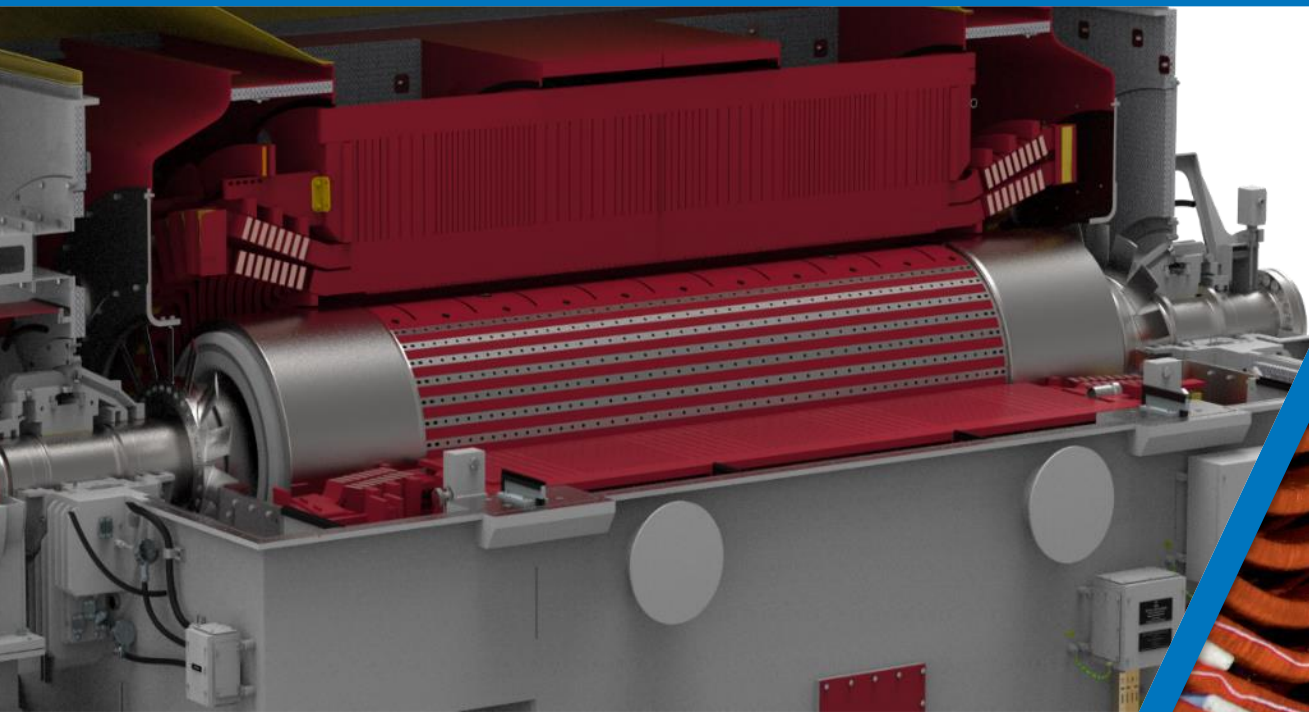
Modernization, upgrade, and uprate  
Automation and digitalization  
Operation & Maintenance solutions



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

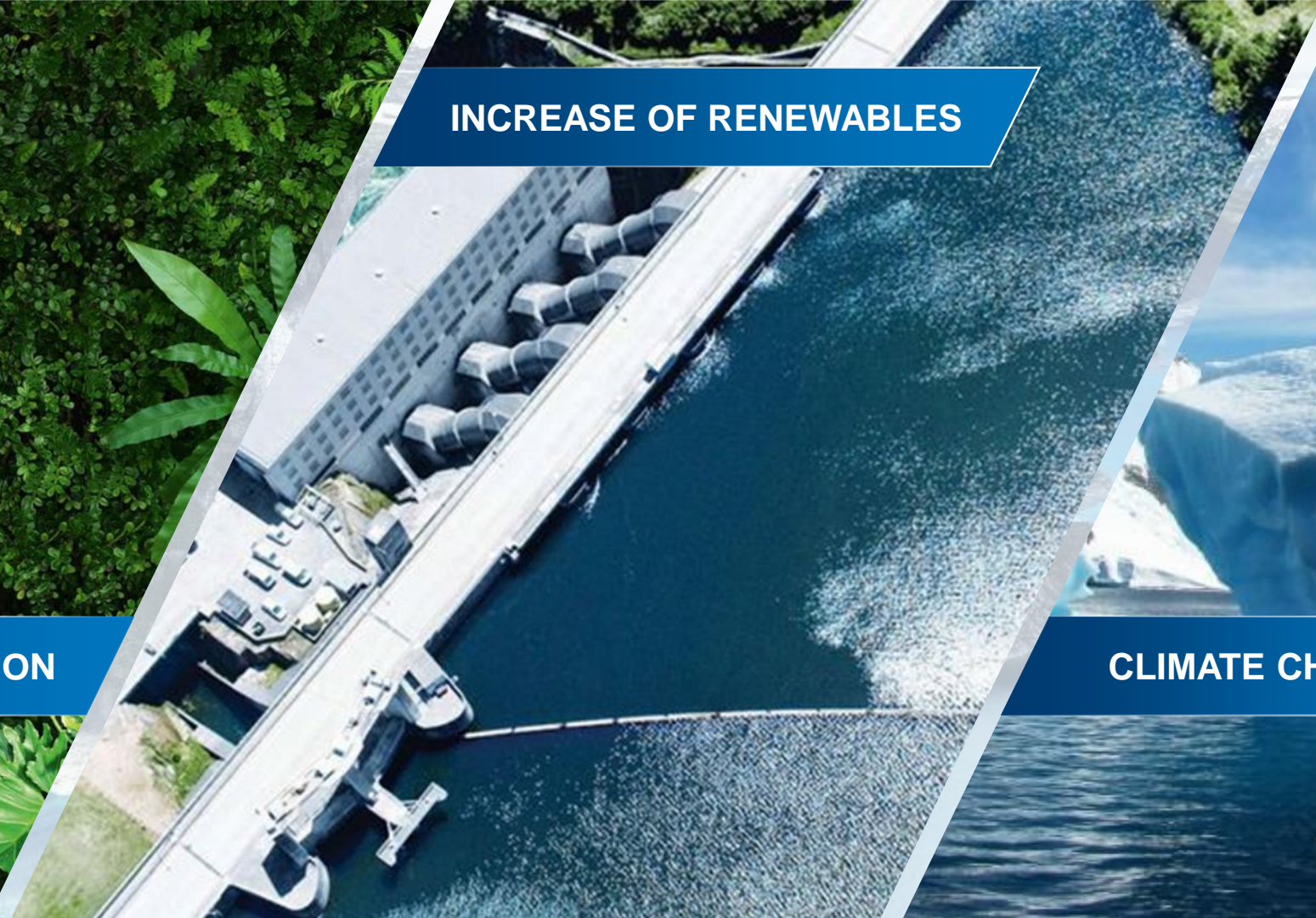


READ MORE ! 

# 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

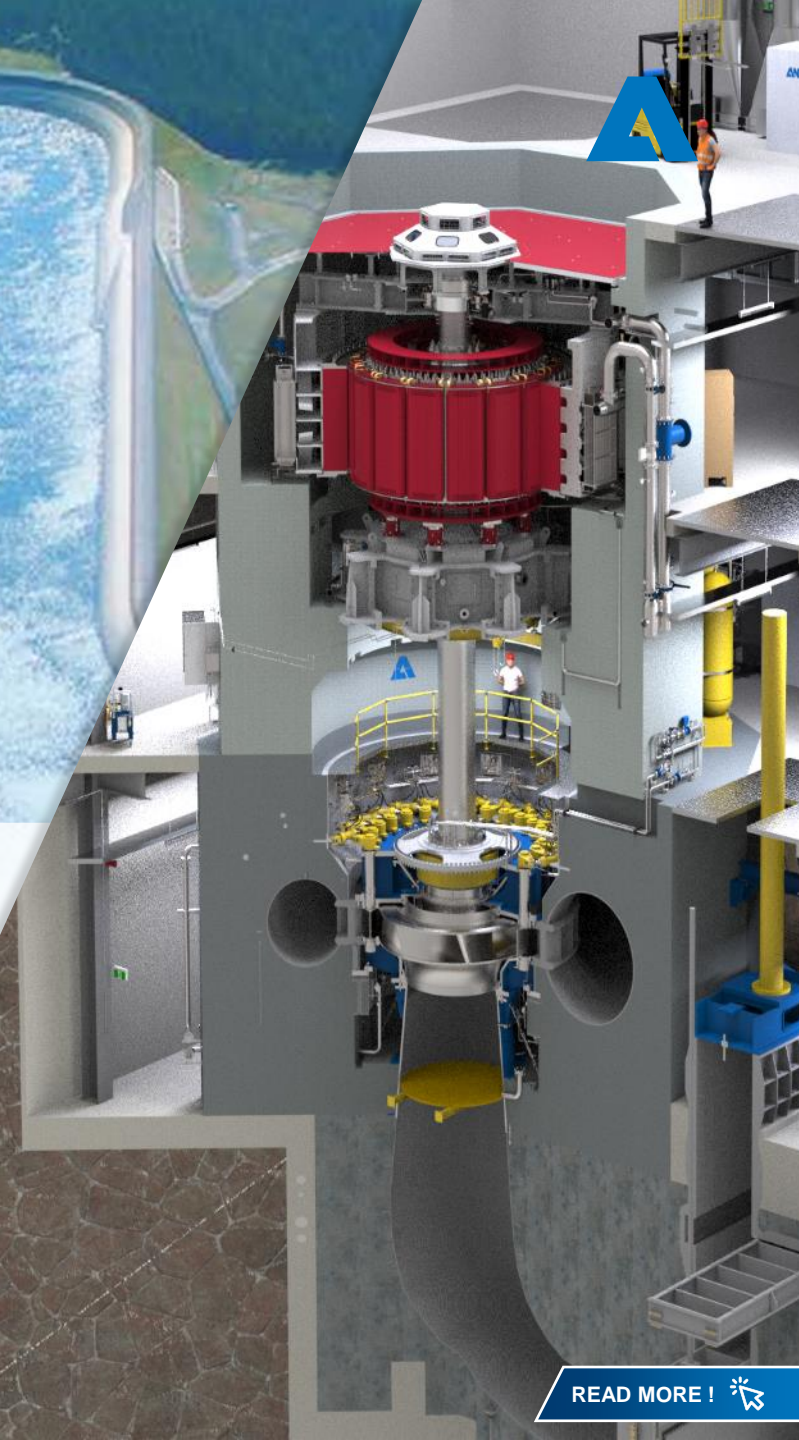
# PUMPED STORAGE: FOR THE CHANGE

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/mid-term 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

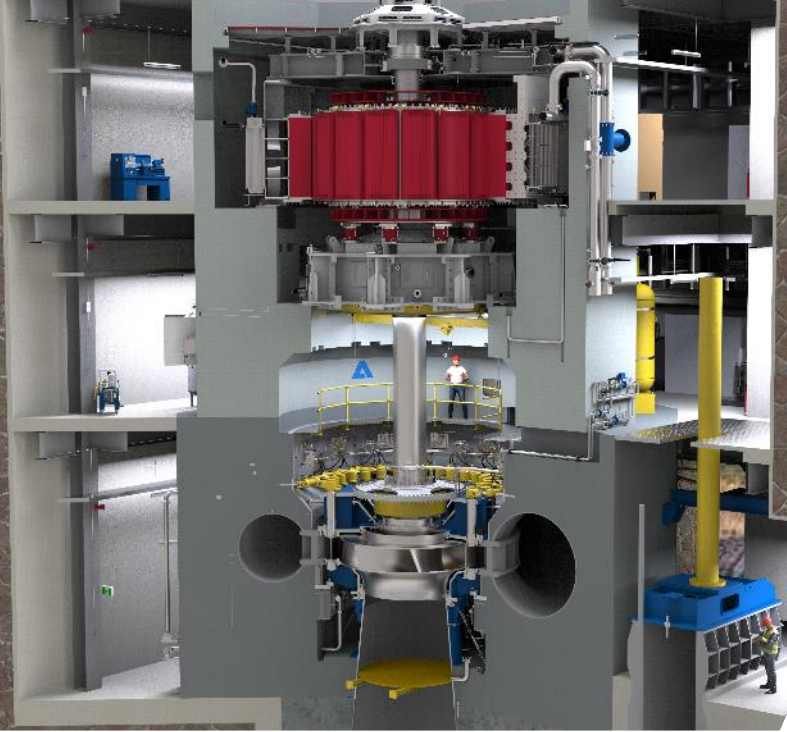


**TECHNOLOGY:** stand-alone synchronous machine

**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 HYDROPOWER SOLUTIONS

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