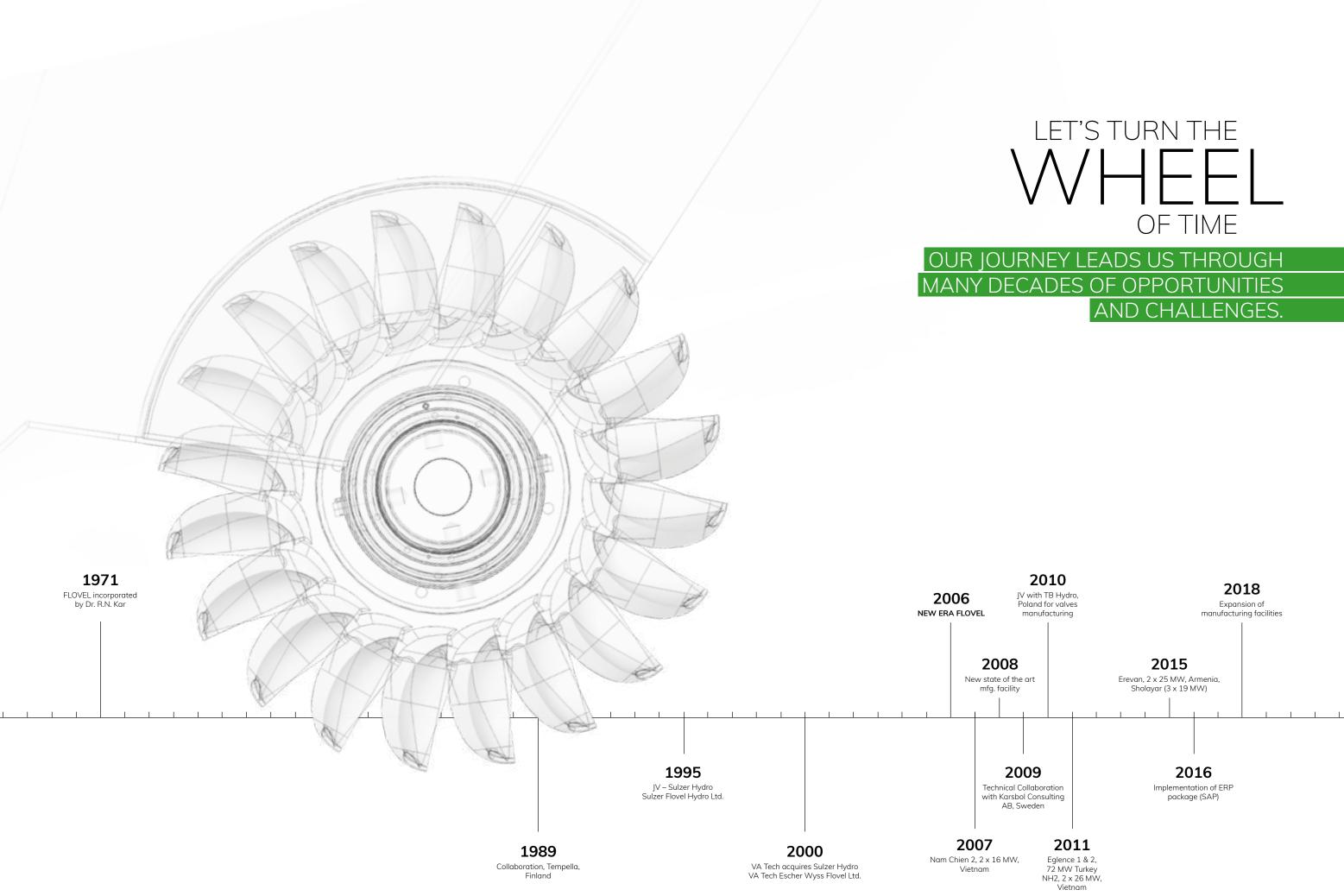


## ADVANTAGE ON YOUR SIDE

www.flovel.net





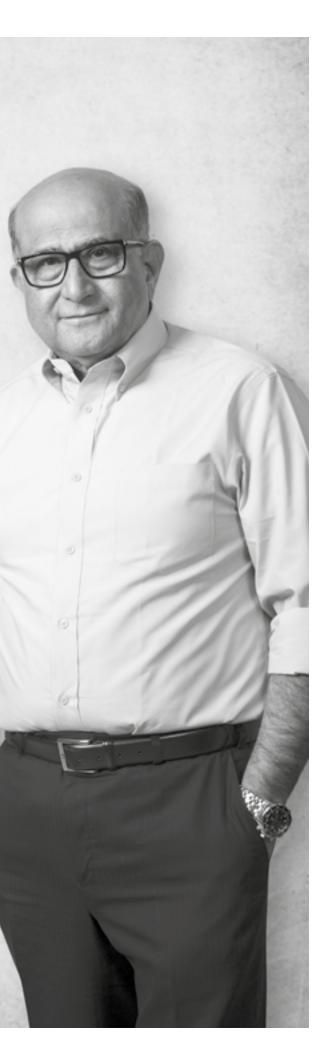
## NEVER LOSE THE FOCUS ON PERFORMANCE.

At FLOVEL, we take great pride in our contribution to the three key aspects of the modern world: Technology, Energy and Environment. Over four decades of our existence has led to 245+ Hydropower plants worldwide with combined capacity of over 5,000 MW, delivering clean energy and preserving the environment.

We have constantly invested in Technology with a world-class design and manufacturing set-up geared to produce high performance products to the exacting standards required. Our human capital gives us the edge, bridging the twain worlds of Technological possibility and customer's business requirements.

There are no compromises, no second-best in the world of FLOVEL. We remain committed to excellence, integrity and ushering in a better world everyday.

Maharaj Kar, Chairman & Managing Director





## OPPORTUNITIES WITH HYDRO-POWER

## HYDROPOWER OFFERS NEW OPPORTUNITIES FOR THE WORLD.

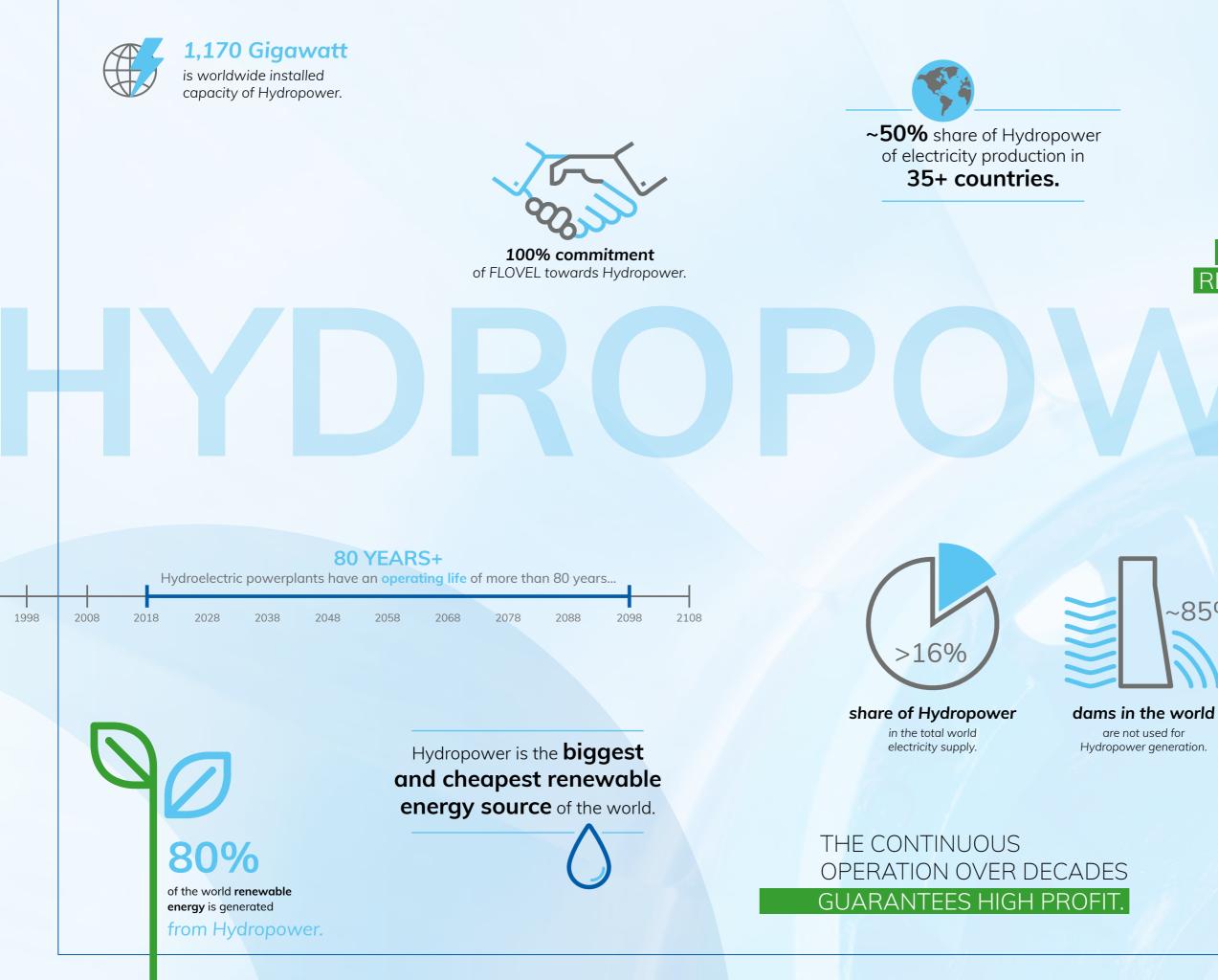
It is estimated by historians that waterpower was used about 5,000 years ago. In earlier years the mechanical energy was used directly. Today the same energy is transformed into electrical energy with generators. Waterpower plants exist since about 100 years. More than 16% of the total worldwide electricity is generated by hydropower. Hydropower is the most attractive and efficient renewable energy source on the planet.

Population increase, urbanization and increasing energy demands are exhausting the conventional energy sources. Climate change is making people rethink about how to protect our planet and the focus today is on renewable energy sources.

In recent decades, FLOVEL has been delivering highly efficient and cost effective solutions for Hydropower plants, using highly innovative and reliable operating technologies. We have executed more than 245+ hydropower projects around the world, delivering 5,000+ MW hydropower capacity. We are helping shape the future with one of the most efficient and sustainable ways to generate energy: HYDROPOWER.

Central Central	South America	Europe	Africa	Asia	Australasia / Oceania
44,8	39,6	28,7	31,7	40,2	52
37	23,4	48,8	7,5	24,1	21,5
18,2	37	22,5	60,8	35,7	26,5
15,3	13,7	17,2	2,8	49,8	1,2
4,5	18,9	3,1	14	59,4	0,1
8,2	12,6	2,2	15,9	61	0,1

Source: The international journal on Hydropower & Dams, 2017





Hydropower enables creating regional growth centres and local jobs.

## **ELECTRICITY FROM** RENEWABLE ENERGY





## most efficient

Hydroeletric powerplants are the most efficient technology to produce electricity. Zero consumables, long-life, endless supply, low recurring cost.



**Small hydropower has no CO<sub>2</sub> emissions,** which would be produced from other energy sources. This is an **important contribution to the climate protection.** 

> No resources are wasted and the nature is not polluted with waste products.



unlimited Waterpower is an

unlimited energy source.



noiseless Waterpower plants are noiseless.

WELL ENGINEERED TECHNOLOGIES ENSURE RELIABLE FUNCTIONING AND

LONG LIFETIME.

The barrages of waterpower plants form **living space for human and nature** and prevent uncontrolled floods.

## E OLDEST REGENERATIVE ENERGY SOURCE AND CLIMATE STABILIZATION.

sustainable water supply for irrigation.

Waterpower secures jobs.

## "OUR VISION IS TO BE A TECHNOLOGY LEADER, AND TO BE AMONGST THE TOP HYDRO POWER EQUIPMENT MANUFACTURERS GLOBALLY, BY LEVERAGING TECHNOLOGICAL AND COMMERCIAL ACUMEN, TO EXCEED CUSTOMER EXPECTATION AND TO BE THE MOST RESPECTED BRAND."



As manufacturer of Hydraulic Turbines and Valves, we are a full line supplier of Electromechanical Equipment & Services for small & medium Hydropower projects including Renovation, Modernisation, Upgrading and aftermarket services for existing power plants.

We provide turnkey Hydro Power Solutions - with cohesive integration of design, manufacturing, execution and service support. With our incessant focus on quality and total customer satisfaction, we have set new benchmarks in 'implementation finesse' that have translated into sustainable benefits for our customers.

## DELIVERING EXCELLENCE THE STRENGTH OF FLOVEL IS TO OFFER WATER-TO-WIRE PACKAGES FOR



S&M Hydro Small & Medium Hydro (up to 60 MW units)

Design & Engineering Manufacturing

Cutting Edge Technology

Modern Machinery & Facilities





RenServ (Renovation, Modernisation and Upgradation)

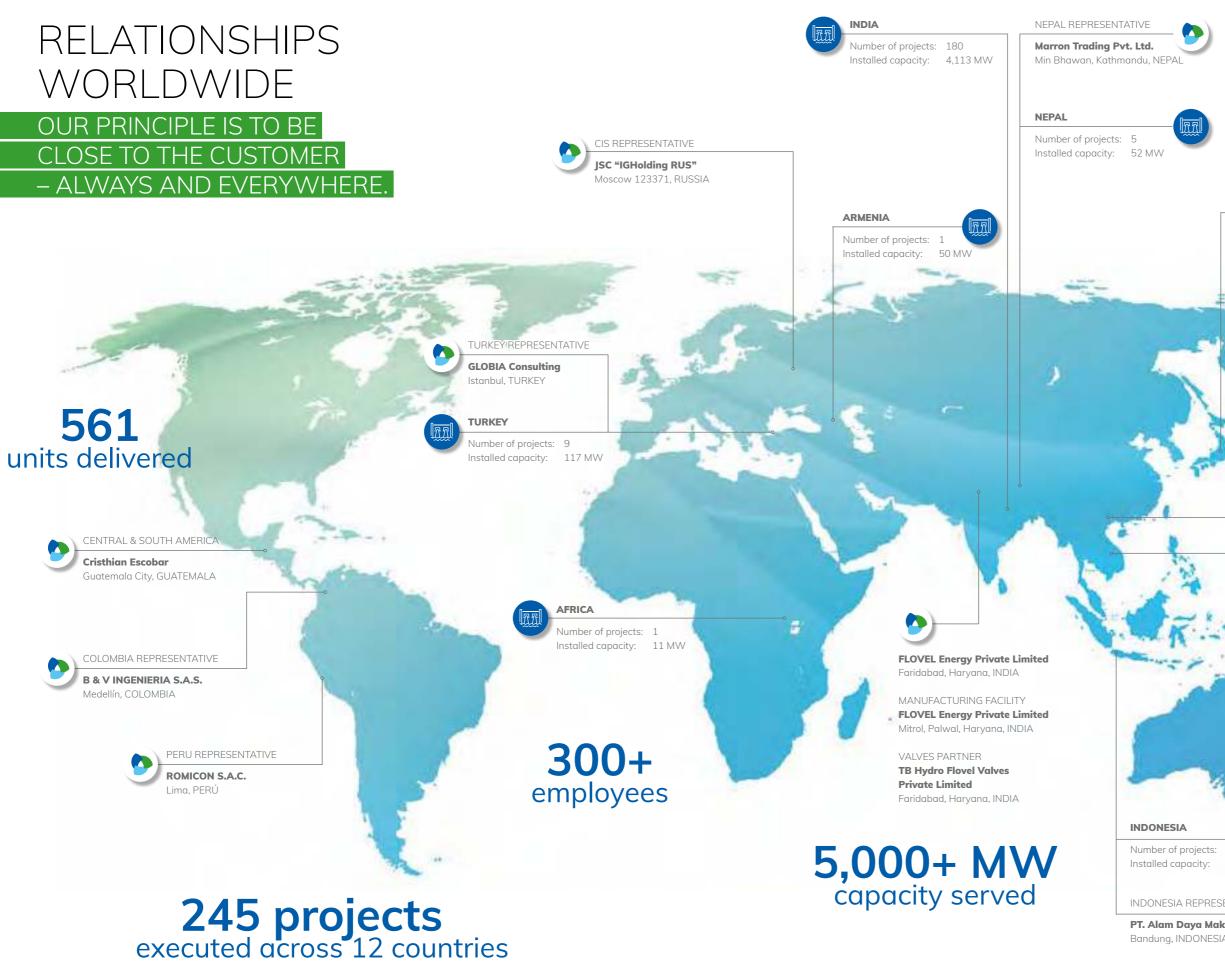
> Highly Skilled Personnel

Stringent Quality Checks & Processes

## Advanced Solutions

**» Safety:** Optimum Technology deployment for infallible safety and reassuring reliability

**» Performance:** Higher plant availability, system efficiency and Lower downtime



# **45+ years** of global Hydro experience

	JAPAN	
	Number of projects: Installed capacity:	1 0.11 MW
-		
C1 -	VIETNAM REPRESE	
	EID / Harmony Pov Cau Giay District, Ho	
3	VIETNAM	
TRA	Number of projects: Installed capacity:	34 589 MW
	LAOS	
-	Number of projects: Installed capacity:	2 25 MW
1 times	LAOS REPRESENTA	
	LEM Consultants C	
	Vientiane Capital, LA	AU PDR
	5	
"and	1	
rojects: 9 acity: 51 MW		
REPRESENTATIVE		

## ,,, THERE IS COMMITMENT IN THIS RELATIONSHIP.

At FLOVEL, customer comes first. We work closely with our customers to deliver optimal solutions by deploying cutting-edge technologies. Our custom-solutions are tailored for maximum performance and reliable operations. We build sustainable relationships by exceeding customer expectations, bringing the advantage on your side.



## ADVANTAGE ON YOUR SIDE

## CONTRACTING

- » No hidden clauses
- » Dedicated point of contact

### SOLUTION DEVELOPMENT

- » Collaborative approach
- » Fully equipped, technologically advanced design facilities

» Faster response time to issues

### **POST-IMPLEMENTATION**

- » High plant availability
- » Quick response to any issue

## Single source responsibility

## Senior management involvement

## Safe and high-performance products

Within budget, on-time delivery

Lower Cost of Ownership translating into higher returns

## **Profits &** Peace of Mind

FLOVEL is certified for Integrated Management Systems, which includes ISO:9001, ISO:14001, OHSAS 18001 and CE Certification



## PRODUCT MANUFACTURING

» State-of-the-art manufacturing facilities » Global standard quality checks & processes

## **PROJECT IMPLEMENTATION**

» On-time as guaranteed delivery

Manufacturing facility





## **MODEL TEST**

Should the customer require a model test to be performed, FLOVEL is equipped to have a model test conducted at an accredited / independent model testing laboratory.

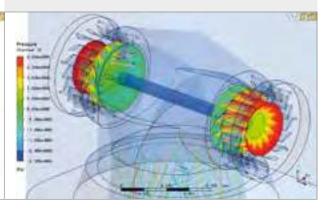
## RESEARCH & DEVELOPMENT

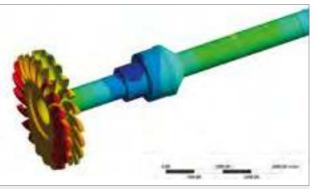
## OUR DNA

"Innovation" is the keyword of success in our business. It is our priority to invest time and money into research, development and innovation. Combination of state of the art technology and quality is the base for our leadership position. It is our responsibility to deliver solutions with the best interest of customers in our mind.

## CFD

Tools to accurately predict flow characteristic. CFD is used to improve hydraulic design of turbine water passages, including the runner and static components. For renovation projects CFD is a very important tool for improving turbine output, efficiency and cavitation characteristics.





## FEM

Finite element method (FEM) tools for calculating stresses, strains and deflections in components of a hydraulic turbine.

## KARSBOL CONSULTING AB., SWEDEN

Karsbol is a world leading technology provider for hydraulic turbines based out of Sweden. Karsbol specialises in research and development and design of Pelton, Francis, Kaplan and Axial Flow units.



## A GOOD JOB FOR AN EXCITING MARKET

FLOVEL's key personnel and co-workers in all functions are among the best in the Country with right educational qualifications and vast experience in their respective field and trained at various international locations to work to global standards. FLOVEL has a total strength of more than 300 people who by their knowledge, experience and innovative approach assure a competitive edge to the market and to a long term development of the company.



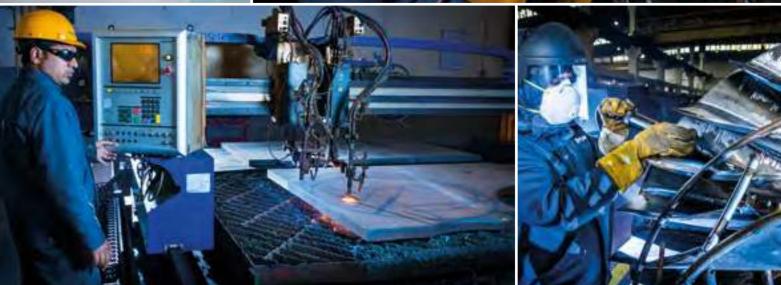






PFLOVEL

DFLOVE



» PRODUCTION

## OUR MANUFACTURING FACILITIES. WHERE EXCELLENCE IS MADE.

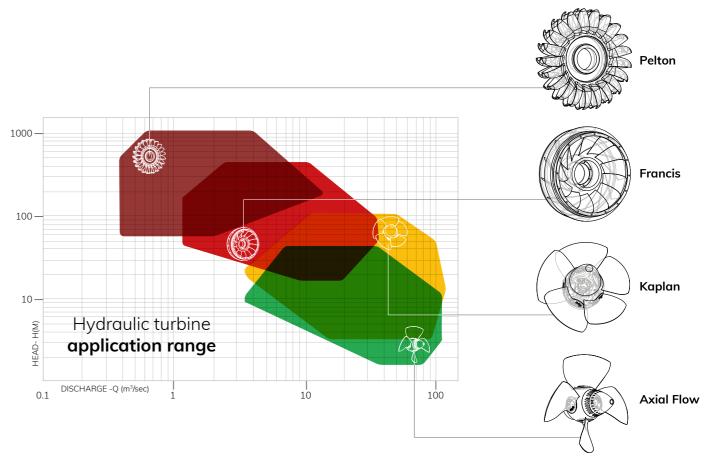
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## PRODUCT OVERVIEW

It is our commitment to produce quality in all spheres of operation. FLOVEL is a single source supplier and integrator of all components of hydropower plants including inlet valves, hydraulic turbines, generators, control systems, switchyard equipment and much more.

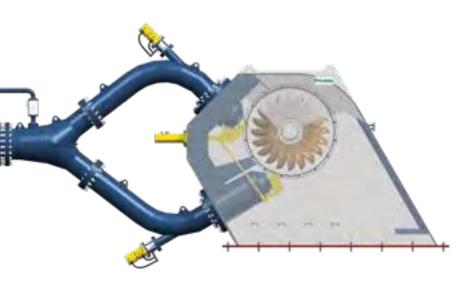






## **PELTON** TURBINES for high head applications

Pelton Turbine is an impulse turbine used primarily for applications with high head and small flows. FLOVEL's Pelton turbines are based on decades of know-how and state-ofthe-art technology. These Pelton turbines guarantee the highest operating efficiency and reliability.





- » Fully Forged or Cast runner
- » Runner mounted on extended shaft of the generator
- » Full unit assembled in factory and shop tested
- » Internal or external Servomotor options
- » Simple interface with civil works
- » Guarantees for efficiency based on model test

### **Application Range:**

- » Heads up to 1,000 Meters
- » Horizontal axis (1 to 3 jets)
- » Vertical axis (2 to 6 jets)

## **KAPLAN** TURBINES for low head applications

Kaplan Turbine is a reaction turbine used primarily for applications with low head and large flows. FLOVEL's Kaplan turbines are based on decades of know-how and state-of-the-art technology. These Kaplan turbines guarantee the highest operating efficiency and reliability.



## FEATURES

- » Oil free runner hubs
- » Internal or external Servomotor option
- » Maintenance free water-lubricated guide bearing
- » Blade dismantling without runner removal
- » Library of 20 models available to choose from
- » Guarantees for output, efficiency and cavitation based on model test



## FRANCIS TURBINES

## for medium head applications

Francis Turbine is a reaction turbine used primarily for applications with medium head and large flows. FLOVEL's Francis turbines are based on decades of know-how and state-of-the-art-technology. These Francis turbines guarantee the highest operating efficiency and reliability.

## FEATURES

- » Weld fabricated or Forged runners
- » Library of 40 models available to choose from
- » Guarantees for output, efficiency and cavitation based on model test
- » Runner mounted on extended shaft of the generator
- » Common base frame concept for horizontal units

## **Application Range:**

- » Heads up to 450 Meters
- » Horizontal or Vertical axis
- » Steel or Concrete Spiral





## FEATURES

- » Library of 20 models to choose from
- » Oil free runner hubs
- » Internal or external Servomotor option
- » Maintenance free water-lubricated guide bearing
- » Blade dismantling without runner removal
- » Guarantees for output, efficiency and cavitation based on model test

## **Application Range:**

- » Heads up to 35 Meters
- » Runners with 3 to 6 blades
- » Double or Single regulated
- » With or without Gearbox
- » Horizontal, Diagonal or Vertical orientation

# head w st

## Application Range:

» Heads up to 70 Meters

» Runners with 3 to 8 blades

» Double or Single regulated

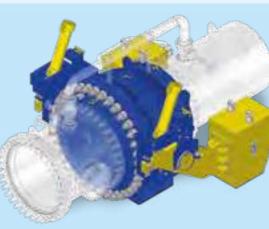
» With or without Gearbox

» Steel, Concrete Spiral or Syphon Intake

## **AXIAL FLOW** TURBINES for very low head applications

Axial Flow units are used primarily for applications with low head and large flows. FLOVEL's Axial Flow units are based on decades of know-how and state-of-the-arttechnology. These Axial Flow units guarantee the highest operating efficiency and reliability.







## VALVES

FLOVEL manufactures full range of Valves under its joint venture with TB Hydro, Poland. These valves are manufactured by JV company TB Hydro Flovel Valves Private Limited.

## TYPES

- » Butterfly Valves
- » Spherical / Ball Valves
- » Pressure Relief Valves etc.



## MECHANICAL BOP & AUXILIARIES

## SCOPE

- » Oil Pressure System for turbine, MIV & PPV
- » Cooling Water System
- » Drainage System
- » Dewatering System
- » Crane
- » Fire Fighting System
- » Ventilation & Air Conditioning
- System
- » Compressed Air System
- » Bearing Lubrication System
- » Oil Filtration System
- » Flow & Level Measurement System
- » Vibration Measurement System

## **GENERATOR, AVR &** AUXILIARIES

- » Control & Protection System
- » Generator Transformers » AC-DC distribution
- » LV and MV-switchgear
- » Bus Ducts
- » Cables, HV, LV, Control & instrumentation
- » Outdoor Switchyard equipment
- » Integration of automation system, governing system, electrical system, mechanical system etc.
- » Digital automation of mechanical, electrical, LV system & other auxiliaries



## **ELECTRICAL** BOP

We deliver tailor-made systems as per customer requirements. Our solutions are safe, reliable and provide cost-effective operation. We are a single source provider ensuring complete service and seamless availability for your hydropower plant and all its components and systems. Our long-term process know-how and control system expertise in hydropower applications coupled with high efficiencies and post implementation service brings the Advantage on your side.

## **GOVERNOR,** AUTOMATION & SCADA



## DIGITAL GOVERNOR TECHNOLOGY

- » Integration of automation system, governing system, electrical system, mechanical system etc.
- » Digital automation of mechanical, electrical, LV system & other auxiliaries.





Type of Turbines: Horizontal Pelton 2 Jets Rated Head: 236.42 m Installed Capacity: 2 x 5,432 kW

16

116







## Gemciler, Turkey

Type of Turbines: Horizontal Francis Rated Head: 26.50 m Installed Capacity: 3 x 2,800 kW



Akinci – I/II, Turkey

Type of Turbines: 'PIT' Type – Axial Flow

AN TOAN BE SAN XUAT

SAN XUAT PHAT



Omokawa, Japan

Type of Turbines: Horizontal Francis 28.38 m Rated Head: Installed Capacity: 1 x 110 kW





## Noong Phai, Vietnam

Type of Turbines: Vertical Francis Rated Head: 87.50 m Installed Capacity: 2 x 11,600 kW



Buseruka, Uganda Type of Turbines: Horizontal Pelton 2 Jets 316.00 m Rated Head: Installed Capacity: 3 x 3,600 kW



## Brua, India

Type of Turbines: Horizontal Pelton 2 Jets 572.74 m Rated Head: Installed Capacity: 2 x 4,950 kW



## Ngoi Hut 2, Vietnam

Type of Turbines: Vertical Pelton 6 Jets 322.50 m Rated Head: Installed Capacity: 2 x 26,400 kW







Saray, Turkey Type of Turbines: Vertical Full Kaplan Rated Head: 24.87 m Installed Capacity: 2 x 6,750 kW



## Lebak Barang, Indonesia

Rated Head: Installed Capacity: 3 x 2,673 kW

Type of Turbines: Horizontal Francis 50.39 m



## FURTHER PROJECTS

### Ambarlik, Turkey

Type of Turbines: Horizontal Pelton 3 Jets Rated Head: 247.84 m Installed Capacity: 2 x 4,500 kW

### **Bac Na, Vietnam**

Type of Turbines: Vertical Pelton 4 lets Rated Head: 279.00 m Installed Capacity: 2 x 9,350 kW

### **Eglence – I, Turkey**

Type of Turbines: Vertical Francis 276.23 m Rated Head: Installed Capacity: 2 x 18,060 kW + 1 x 8,663 kW

### Eglence – II, Turkey

Type of Turbines: Horizontal Francis Rated Head: 168.90 m Installed Capacity: 2 x 11,025 kW + 1 x 5,250 kW

### Erevan – 1, Armenia (Renovation Project)

Type of Turbines: Vertical Francis Max. Net Head: 88.35 m Installed Capacity: 2 x 25,000 kW

### **Ghatte Khola, Nepal**

Type of Turbines: Horizontal Pelton 2 Jets Rated Head: 322.50 m Installed Capacity: 2 x 2,750 kW

## Hang Dong B, Vietnam

Type of Turbines: Horizontal Francis Rated Head: 174.00 m Installed Capacity: 2 x 17,500 kW

## Khlong Tron, Thailand

Type of Turbines: Horizontal Francis Rated Head: 30.55 m Installed Capacity: 2 x 1,250 kW

## Mukerian, India (Renovation Project)

Type of Turbines: Vertical Kaplan 16.80 m + 22.00 m Rated Head: Installed Capacity: 6 x 15,000 kW + 6 x 19,500 kW

### Nam Cum 4, Vietnam

Type of Turbines: Vertical Francis Rated Head: 147.60 m Installed Capacity: 2 x 27,000 kW

### Nam Sana, Laos

Type of Turbines: Horizontal Francis Rated Head: 145.77 m Installed Capacity: 3 x 5,159 kW

### Nilwande, India

Type of Turbines: Vertical Full Kaplan Rated Head: 38.50 m Installed Capacity: 2 x 4,200 kW

### Perunthenaruvi. India

Type of Turbines: 'S' Type – Axial Flow Rated Head: 17.33 m Installed Capacity: 2 x 3,300 kW

## **Power Plants on Abohar Branch Canal, India**

(Renovation Project) Type of Turbines: Semi Kaplan Installed Capacity: 8 x 2,750 kW

## Power Plants on Bathinda Branch Canal, India

(Renovation Project) Type of Turbines: Full Kaplan Installed Capacity: 8 x 2,150 kW

### Ranja Ala Dunadi, India

Type of Turbines: Horizontal Francis 148.50 m Rated Head: Installed Capacity: 2 x 8.250 kW

## Shanan, India (Renovation Project)

Type of Turbines: Vertical Pelton & Horizontal Pelton Rated Head: 487.70 m Installed Capacity: 1 x 50,000 kW + 4 x 15,000 kW

### Sholayar, India (Renovation Project)

Type of Turbines: Vertical Francis Rated Head: 303.00 m Installed Capacity: 3 x 19,800 kW

## Segara 2, Indonesia

Type of Turbines: Horizontal Pelton 2 Jets Rated Head: 140.30 m Installed Capacity: 2 x 1,000 kW

## Suoi Sap 1, Vietnam

Type of Turbines: Horizontal Francis Rated Head: 100.38 m Installed Capacity: 2 x 10,500 kW

### Super Mai, Nepal

Type of Turbines: Horizontal Francis 123.93 m Rated Head: Installed Capacity: 2 x 4,290 kW

### **Trung Xuan, Vietnam**

Type of Turbines: Vertical Full Kaplan Rated Head: 17.50 m Installed Capacity: 2 x 5,250 kW

## Upper Sindh - II, India (Renovation Project)

Type of Turbines: Vertical Francis Rated Head: 224.00 m Installed Capacity: 3 x 35,000 kW

### Yan Tann Sien, Vietnam

Type of Turbines: Horizontal Pelton 2 Jets Rated Head: 633.21 m Installed Capacity: 2 x 9,750 kW

<sup>e</sup>Flexible Efficient Passion Sustainable Excellence

Accessible Commitment Uncompromising Trust Integrity Integrity Responsive Excellence Efficient Efficient Technology Integrity Reliable Efficient Technology Integrity Responsive Excellence Flexible Provide Prov

essional Relationship Relationship Innovation Relationship Accessible Reliable Transparency Responsive Accessible Technology Passion No o

Flexible Passion Reliable Responsive II us to be a second and the Professional Professional Integrity Integrity Passion Excellence Trust Professional Integrity R Efficient Sustainable Flexible

## IntegrityInnovation Relia

Excellence ransparency Passion Commitment Sustainable Integrity Passion Integrity Commitment Reliable Accessible No cutting corner Accessible Responsive Trust

With everything that comes with our daily business we reflect on our core-values. Together these values bring:

## THE ADVANTAGE **ON YOUR SIDE**







### **FLOVEL Energy Private Limited**

15/3 Mathura Road, Faridabad – 121008, Haryana, India Phone: +91 129 4090600 Fax: +91 129 4090650 Email: contact@flovel.net

### MANUFACTURING FACILITIES

FLOVEL Energy Private Limited Mitrol – Deeghot Road (Near Railway Crossing), 72 KM Stone, Delhi-Mathura Road, District Palwal – 121102, Haryana, India Phone: +91 7082214002, 3 & 4

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EID / Harmony Power Room 904, N07B1 Building, Thanh Thai Street, Dich Vong, Cau Giay District, Hanoi, Vietnam Phone: +84915900666 Email: phamha.hydro@gmail.com

## NEPAL REPRESENTATIVE Marron Trading Pvt. Ltd.

Min Bhawan, Kathmandu, Nepal Phone: +977 4106637, 4106638 Fax: +977 4106628 Email: marronmarket@wlink.com.np muktinsharma@wlink.com.np

### VALVES PARTNER

**TB Hydro Flovel Valves Private Limited** 15/3, Mathura Road, Faridabad – 121008 Haryana, India Phone: +91 129 4090600 Fax : +91 129 4090650 Email: contact @tfvalves.com Web: www.tfvalves.com

### INDONESIA REPRESENTATIVE **PT. Alam Daya Makmur**

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## COLOMBIA REPRESENTATIVE

**B & V Ingenieria S.A.S.** Calle 25 Sur # 46 - 15, Casa 118 / Envigado - Colombia. Phone: +57 44442882 Email: gerencia@byv.com.co Web: www.byv.com.co

### LAOS REPRESENTATIVE LEM Consultants Co. Ltd.,

Ban Sokkham Unit 12, Saysettha District, P.O. Box, 6480 Vientiane Capital, Lao PDR Phone: +85621 461978 Email: somsavanh@lemconsultants.com

### TURKEY REPRESENTATIVE GLOBIA Consulting

GLOBIA Consulting Ataturk Mah. Vedat Gunyol Caddesi, Yakut Sok, Zumrut Sitesi Blok: 10 Daire1 34758 Atasehir, Istanbul – Turkey Phone: +90 216 548 1220 Fax: +90 216 548 1221 Email: bulent.birol@globia.com.tr Web: www.globia.com.tr

## CIS REPRESENTATIVE JSC "IGHolding RUS"

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## CENTRAL & SOUTH AMERICA

**Cristhian Escobar** General Manager (Business Development) FLOVEL Energy Private Limited 1C 20-10 Z.17 A19, Guatemala City – 01017, Guatemala Mobile: +502 54136030 Email: cristhian.escobar@flovel.net

### PERU REPRESENTATIVE

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