

# flow04

FLOVEL Company  
Magazine  
June 2023



6,690+  
units delivered

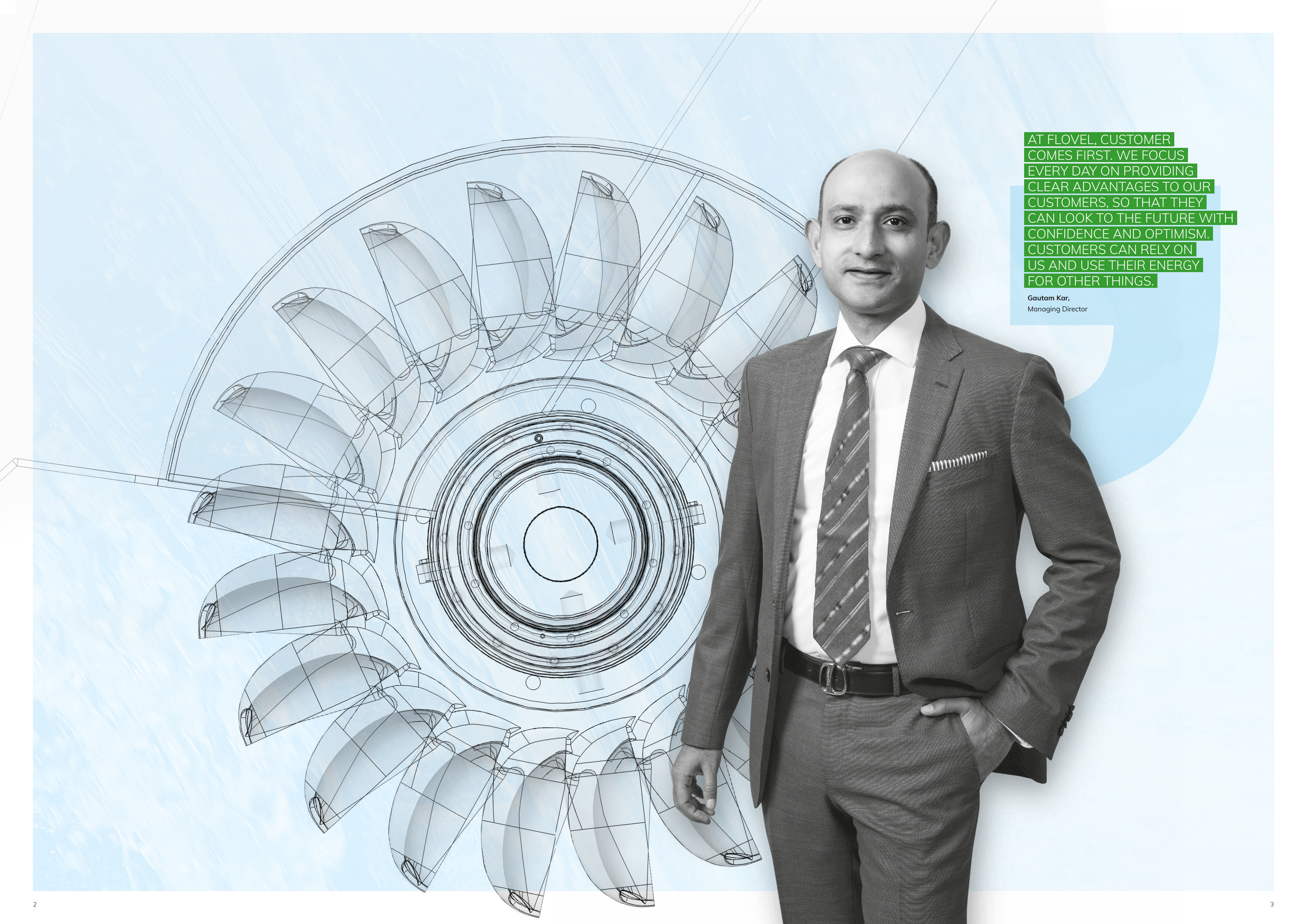
6,000+ MW  
capacity served

300+  
employees

300+  
projects  
executed  
across 14 countries

50+ years  
of global Hydro  
experience





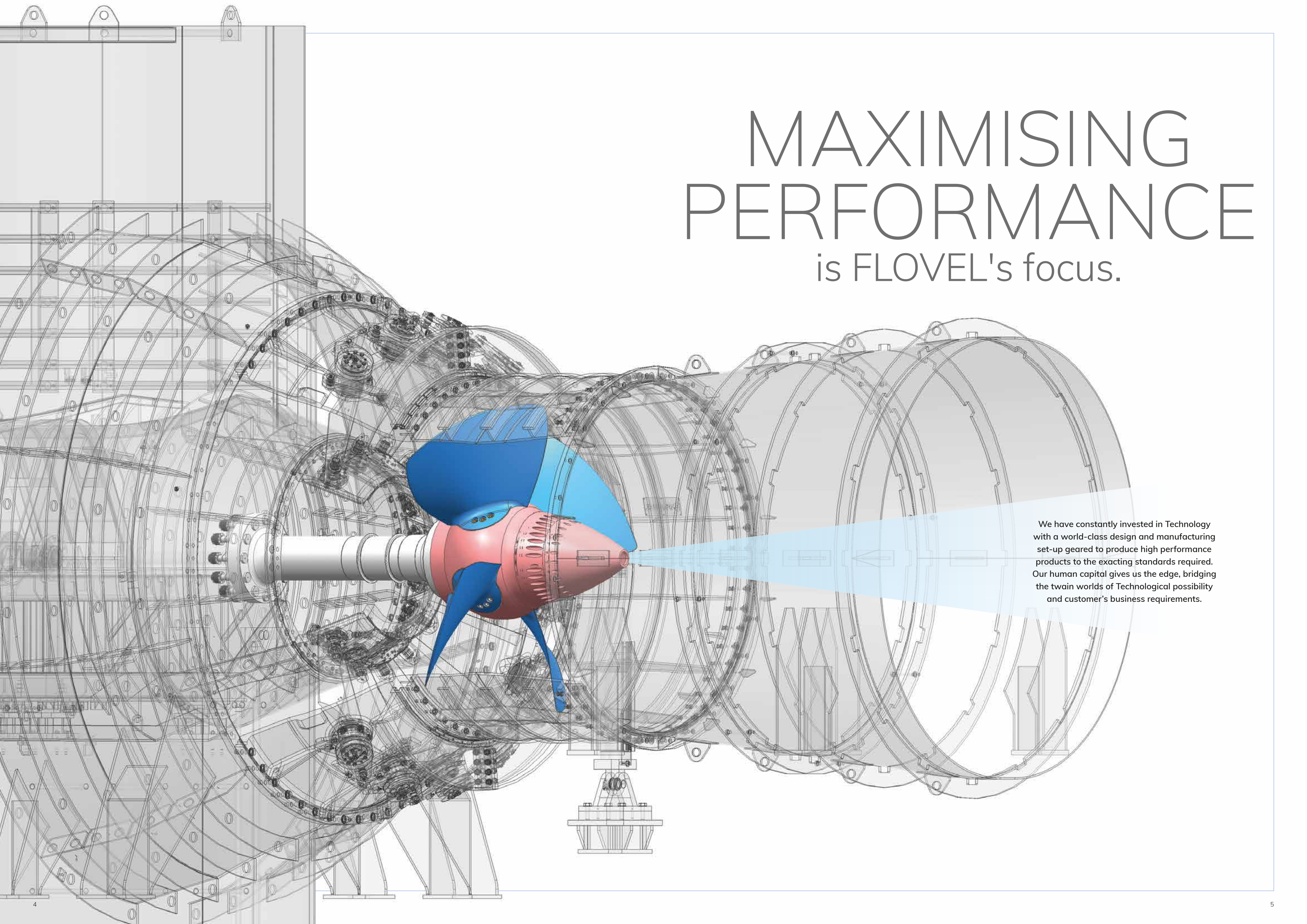
AT FLOVEL, CUSTOMER COMES FIRST. WE FOCUS EVERY DAY ON PROVIDING CLEAR ADVANTAGES TO OUR CUSTOMERS, SO THAT THEY CAN LOOK TO THE FUTURE WITH CONFIDENCE AND OPTIMISM. CUSTOMERS CAN RELY ON US AND USE THEIR ENERGY FOR OTHER THINGS.

Gautam Kar,  
Managing Director



# MAXIMISING PERFORMANCE

is FLOVEL's focus.



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.



Suoi Sap 2A  
2 x 33 MW



Hang Dong A1  
8.4 MW

Suoi Sap 1  
21 MW

Khao Mang  
30 MW

Khao Mang  
Thuong  
24.5 MW

Hang Dong B  
35 MW

Suoi Sap 2A  
66 MW

EA SUP  
Solar  
490 MVA

# A success story in Vietnam: THE ENERGY FLOWS between XUAN THIEN and FLOVEL.

Vietnam Hydropower market was opening up. FLOVEL, with strong technical focus and relationship based dealings, found it a fit market to enter, and was looking for expansion. Xuan Thien, a large Vietnamese group with interest in multiple sectors, was looking for a trustworthy partner. The two sealed their first contract in 2009, on the back of a table napkin! Today, FLOVEL has executed six Hydro projects with the group, including its largest Greenfield project yet, the 66 MW capacity Suoi SAP 2A.



FLOVEL received an enquiry from Xuan Thien Group for 2 x 10.5 MW Suoi Sap 1 project and made an offer in the middle of 2009. Xuan Thien is a big group in Vietnam having interests in Energy, Building Materials, Real Estate, High-Tech Agriculture, Tourism & Logistics. (Refer Xuan Thien Profile enclosed). We were informed that the Owner will choose Non-Chinese Equipment Manufacturer as they are looking for good quality products. Subsequent to making offer and clarifications on few technical points, our Executive Director Mr. Sanjeev Talwar with Chief Vietnam Representative Mr. Vu Van Hai, visited the Owner in Phu Yen during September. We were asked to give our best price during the discussions which we did. Owner Mr. Nguyen Van Thien informed us that our price was the best out of the three shortlisted Indian offers they had. But he was reluctant to go with us as FLOVEL was a small company and this being their group's first Hydropower Project, they did not want to take any risk. He also mentioned that if FLOVEL failed he will have big problems with other shareholders including his family members in explaining the reasons of choosing FLOVEL. He asked Mr. Hai what he would have done in his position. Mr. Hai assured him that he himself has left his earlier association with VA TECH and joined with FLOVEL as local representative as he was sure that FLOVEL will neither fail nor run away and in case of any problem Mr. Thien can at least catch hold of Mr. Hai. Somehow this confidence was very much appreciated by Mr. Thien and he immediately said yes and shook hand. He just took a white table napkin

from the restaurant table we were sitting at and put contract name, capacity and price and signed on it and asked us also to sign. Contract was subsequently signed on 18th November 2009. From that day it was the beginning of a long-lasting relationship which has now grown to six Hydro Projects totalling to 185 MW installed capacity including 66 MW Suoi Sap 2A and Electrical and SCADA works of 490 MVA Solar Power Project in Vietnam.

All supplies to Suoi Sap 1 were completed in time and project was under erection, when we were called for negotiations of another 2 x 4.2 MW Hang Dong A1 project and we signed second contract with Mr. Thien during October 2011.

First project, Suoi Sap 1 was commissioned successfully in January 2012 and second project Hang Dong A1 was also commissioned in December 2012. The customer was very happy with Project Management as well as equipment performance of FLOVEL. Customer started development of 2 bigger capacity projects named Khao Mang HEP (2 x 15 MW) and Khao Mang Thuong HPP (2 x 12.25 MW) in end September and invited our technical team to find best solution and equipment for these two very prestigious projects. Our design engineering and marketing teams worked very closely with customer working on various options to find the most suited equipment/solution for these two projects. Both these contracts were formally signed

PROJECTS IN VIETNAM

SL.NO.	YEAR OF ORDER	PROJECT NAME	NO. OF UNITS	TURBINE TYPE	UNIT GENERATOR OUTPUT (MW)	TOTAL INSTALLED CAPACITY (MW)
1	2009	Suoi Sap 1	2	HF	10.5	21.0
2	2010	Hang Dong A1	2	HF	4.2	8.4
3	2012	Khao Mang	2	VF	15.0	30.0
4	2012	Khao Mang Thuong	2	VF	12.3	24.5
5	2017	Hang Dong B	2	HF	17.5	35.0
6	2018	Suoi Sap 2A	2	VF	33.0	66.0
Total			12			184.9 MW
7	2020	EA SUP 1 Solar	1	110 kV switchyard equipment, 24 kV Switchgear panels, SCADA System, Weather Monitoring Station		110 MVA
		EA SUP 2 Solar	1			110 MVA
		EA SUP 3 Solar	1			110 MVA
		EA SUP 4 Solar	2			80 MVA
		EA SUP 5 Solar	2			80 MVA
Total			7			490 MVA



Solar EaSup 3 & 5  
Sub-Sation



Solar EaSup 1  
Switchgear Panels



Suoi Sap 1  
2 x 10.5 MW



Suoi Sap 2A  
2 x 33 MW



Suoi Sap 2A  
2 x 33 MW

in December 2012. Signing of these two contracts were an extremely good achievement for FLOVEL. A very important highlight regarding negotiation phase of these two projects was that the techno commercial discussions which spread over 3-4 days were held starting from 9.00 PM till wee hours in the morning. It took some time for these projects to take off due to some procedural issues and finally, Khao Mang Thuong was commissioned in October 2015 and Khao Mang HEP in January 2017.

Xuan Thien group came up with 2 more larger capacity projects in 2016. These two projects were 2 x 17.5 MW Hang Dong B HPP and 2 x 33 MW Suoi Sap 2A HEP. Both projects had envisaged Vertical Francis Turbines. There were many rounds of techno commercial discussions and finally two Indian parties were shortlisted. Hang Dong B being a high head Francis unit was a small turbine with runner diameter of 1,180 mm at rated speed of 600 RPM. FLOVEL worked very hard and offered both Vertical and Horizontal configuration for Hang Dong B project to reduce project cost. Horizontal option was cheaper by more than 10% as compared to

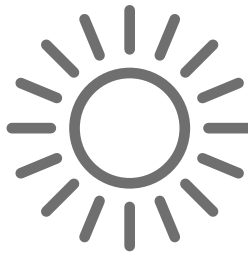
the vertical option. Customer was quite happy with this alternative as this brought cost in their budget. Further customer desired that generator of Suoi Sap 2A be sourced from Europe. FLOVEL worked with two reputed Generator manufacturers for Suoi Sap 2A Generators and was able to offer an excellent technical solution to the customer as a package meeting all customer's requirements. Final specifications and price were agreed and hand shake was done in August 2017 for both projects. This was the biggest milestone for FLOVEL. Hang Done B being the largest capacity Horizontal Francis and Suoi Sap 2A being the largest capacity project done by FLOVEL till date.

Hang Dong B was formally signed in November 2017 and Suoi Sap 2A in March 2018. Signing of these two projects proved FLOVEL's inherent strength in providing best quality equipment and services to our customers resulting in repeat orders. Finally, Suoi Sap 2A project was commissioned in May, 2022 and became the highest capacity project commissioned in FLOVEL history, with installed capacity of 66 MW.

Continuing with this long-time relationship between Xuan Thien and FLOVEL, Xuan Thien invited FLOVEL to supply, install and commission Switch gear, Switchyard equipment, SCADA and weather monitoring system for their 490 MVA Solar project in January 2020 when Covid had just started to engulf the whole world. FLOVEL took up the challenge and contract were signed in March 2020 with a very tight schedule of supplying all equipment in seven months i.e by October 2020 and commissioning by December 2020. FLOVEL achieved this with the full support from customer.



184.9 MW  
Total Installed  
Hydropower  
Capacity for  
XUAN THIEN



490 MVA  
Solar project:  
Supply, erect and  
commission







# FLOVEL's contribution to the GREEN ENERGY GLOBALLY

---

Hydropower is the most attractive and efficient renewable energy source on the planet. More than 16% of the world's electricity is generated by Hydropower. Hydroelectric power is the most efficient technology to produce electricity, with minimum operating consumables, long-life, endless consistent supply, low recurring cost. In recent decades, FLOVEL has been delivering highly efficient and cost-effective solutions for Hydropower plants, using innovative and reliable operating technologies. We have executed more than 300+ Hydropower projects around the world, delivered 6,000 + MW Hydropower capacity. We are helping shape the future with one of the most efficient and sustainable ways to generate energy, HYDROPOWER.

Our customized solutions are tailored for maximum performance and reliable operations. 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. We build sustainable relationships by exceeding customer expectations, bringing the advantage on the side of customer. With technological expertise and senior management commitment FLOVEL brings the Small & Medium Hydro projects alive on time, with maximum performance and minimum downtime. Five decades of experience have also enabled us to think and implement projects calmly and clearly. Our customers are glad to have chosen FLOVEL for their Hydropower project.

---



# India

FLOVEL was incorporated in April 1971 promoted by Late Dr. Raj Nath Kar, a World-renowned technocrat in the field of Hydropower. Initially FLOVEL started with the business of manufacturing of all types of industrial Butterfly valves, as there was a very small market for the Small Hydro during those days. First Order for Hydropower project, Rukti HEP with 4 units of 375 KW each from Himachal Pradesh State Electricity Board (HPSEB), was bagged by FLOVEL in 1976. This was followed by a 15 KW project in Leh in 1977 and 3 units of 250 KW Khonsa HEP in Arunachal Pradesh.

The period of years 1980-1990 proved to be years of consolidation for FLOVEL in India. FLOVEL secured 43 projects totalling to 60 MW (25 Horizontal Francis, 14 'S' Type, 1 Pit and 3 Horizontal Pelton) during this period. FLOVEL expanded its operation securing contracts from North Eastern states of Sikkim, Manipur, Tripura, Arunachal and Mizoram to Northern states of Himachal and Jammu Kashmir mainly with Horizontal Francis and Horizontal Pelton turbines.

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	144	314	1,195
B.	Projects Commissioned	136	297	1,073
C.	Projects with Supplies Completed (waiting Commissioning)	4	9	43
D.	Project Under Execution	4	8	78

The Hydropower sector was opened to private sector in early 90's and the first Hydropower Project in private sector, 12 MW Maniyar HPP was awarded to FLOVEL in 1991 with 3 units of 'S' Type Turbine in the state of Kerala. This Project was developed by Carborundum Universal Ltd., a very large Industrial group from South of India. The next big breakthrough came in 1994 when FLOVEL bagged 2 prestigious projects in the state of Tamilnadu, Sathanur with 1 unit of 7.5 MW Vertical Full Kaplan Turbine and Lower Bha-wani with 2 units of 4.0 MW Horizontal 'S' Type Turbine. This was followed by 5 projects with 'S' Type turbine for Bhoruka Power Corporation in the state of Karnataka. After entering into a Joint Venture with Sulzer Hydro, Germany, in the year 1995, FLOVEL made a flying start by bagging an extremely prestigious project named KCP with 11 machines of Bevel Gear Bulb Turbine (BGBT) for Ramakrishna Cements in Andhra Pradesh. All these machines were built

Sirmour HEP  
(2 x 13.2 MW)



in India and commissioned in record time. This great success was followed in 1996-97 by securing 10 machines (3 projects) of 4.0 MW each, 'S' Type turbine and 3 units of 7.0 MW Horizontal Francis in South India. First EPC contract including Civil, Hydro-Mechanical and Electro-Mechanical works, Harangi HEP with 2 units of 4.0 MW was secured and executed to perfection in 1996-98.

FLOVEL kept on building its references, growing strength to strength, in succeeding years. FLOVEL bagged and executed many prestigious projects from 2001 to 2005. In addition to numerous Small Hydro projects, FLOVEL in 2001 signed first Large Hydro project Baglihar with 3 units of 150.0 MW each, followed by 2 units of 150.0 MW Varahi, 1 unit of 25.0 MW Neriamanglam and 4 units of 33.0 MW Teesta Low dam in 2004. Many prestigious Small Hydro projects were executed during this period.

FLOVEL were the Market leaders in Small Hydro sector during the period of the JV Company until August 2006, with more than 35%

market share in India and had executed 259 projects aggregating to 679 MW. FLOVEL again started its business in new Avatar in November, 2006 under the leadership of Mr. Maharaj Kar, Chairman & Managing Director as FLOVEL Energy Private Limited. With the established credibility of more than three decades, FLOVEL secured some good, prestigious orders in the initial few months of its new beginning. These initial successes set the pace for many more orders to follow.

New state of the art Manufacturing facility became fully operational in 2008. Next 2 years were years of consolidation and getting ready for bigger challenges. FLOVEL also secured 10 projects with various type of Turbines in India. In addition to consolidating its Market share in Indian Hydro Sector, FLOVEL also started operations in 11 countries by 2018. To be able to cater to the bigger market, FLOVEL is augmenting its manufacturing facility by adding two more sheds much bigger and higher in size and with more than double crane capacity, and construction is planned to be completed by Mid, 2023.

Presently scenario for Small and Medium Hydropower sector in India, looks very upbeat and positive and we expect good numbers of Hydro Projects to be running on Ground and FLOVEL is well equipped to secure our share of Business here.

# Vietnam

Based on FLOVEL's proven track record of supplying quality equipment, providing professional services during Project execution, good relationship and hand holding with which FLOVEL supported their clients post commissioning of Projects, FLOVEL is able to earn faith and confidence of many Hydro Project Owners in Vietnam. As a result, FLOVEL has maintained its Market share among the top two Market leaders in Vietnam Hydro Market, during the last 7 to 8 years. There are many notable milestones which FLOVEL India has achieved during its successful journey in Vietnam Hydro Market.

FLOVEL's success in Vietnam Hydro Market can be testified by considerable share of its Business secured in Vietnam and large proportion of Projects successfully Completed, i.e. around 2<sup>nd</sup>/3<sup>rd</sup> of Projects secured, during last 14 years or so:



Ngoi Hut 2 HEP  
(2 x 26.4 MW)

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	58	116	972
B.	Projects Commissioned	39	79	672
C.	Projects with Supplies Completed (waiting Commissioning)	11	22	204
D.	Project Under Execution	8	15	96

FLOVEL is looking forward to further strengthening its presence in Vietnam Hydro Market and continuing to supply high quality

Hydro Equipment with latest technology and providing professional services as Partners to Hydro Project Owners.

# Indonesia

FLOVEL entered Indonesia during the years 2011-2012 and secured its first Project, Cibatarua HPP (2 x 2.5 MW + 20% COL) in the province of West Java. Consolidating the good start in Indonesia through Cibatarua HPP, FLOVEL gained the confidence of many IPP Developers in Indonesia and became one of the formidable Option for Hydro E&M Equipment suppliers in the Indonesian Hydro Market. FLOVEL has so far executed 12 Projects in Indonesia. Due to Covid Pandemic situation during 2020 and 2021,

the Hydropower sector in Indonesia became sluggish and only few of the Projects could actually take off, resulting in very few E&M Contracts moving on the ground during these two years. With the world coming to normalcy, we foresee some traction in Indonesia Hydro Market during the year 2022 and 2023, accordingly FLOVEL is fully geared up to take good share of pie from the E&M Contracts of Hydro Projects expected to be awarded in coming months. Following are the list of Projects executed in Indonesia:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	12	23	70
B.	Projects Commissioned	11	21	63
C.	Project Under Execution	1	2	7



Aek  
Sibundong HPP  
(2 x 6 MW)





# Nepal

Super Mai HPP  
(2 x 3.9 MW)



For decades, Nepal has been endorsed as a water-resource rich country with immense potential to generate Hydroelectricity. However, converting this potential into reality of Projects Generating Electricity was a daunting task a decade before due to a variety of constraints. But with improved management, concentrated thrust by Nepal Government as well as keen interest of Independent Power Producers to contribute in harnessing the Hydro Potential in

Nepal, this resulted in improved power generation and 'load-shedding' in Nepal has now become a thing of the past. With more than 1 GW of installed capacity, Hydropower is sufficient to cater to almost all of Nepal's domestic electricity generation on the grid. Nowadays, despite so many challenges, Nepal has become a hub for Hydropower development, attracting all Electromechanical Equipment Players across the Globe to operate actively in this market.

FLOVEL was a bit late to enter Nepal Hydro Market during 2014, however presently FLOVEL is standing strongly and firmly with a total References of 16 Hydropower projects in Nepal where FLOVEL supplied complete E&M package totalling to Installed Capacity of 169.72 MW.

Due to excellent Project Management and execution capabilities, FLOVEL has maintained a track record of timely completion of projects among all the players in the Nepal market. FLOVEL is now considered as one of the most reputed and trusted E&M partners for Project Owners in Nepal.

Details of Projects secured in Nepal are as below:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	16	34	169.72
B.	Projects Commissioned	7	14	64.1
C.	Projects with Supplies Completed (waiting Commissioning)	4	9	54.6
D.	Project Under Execution	5	11	51.02



# Turkey

FLOVEL ventured in Turkey during the year 2010 by associating with one of the local Partners, and were successful in securing its first Project, Ambarlik HPP, with capacity of 9 MW. Those were the times when Turkey was maturing as a good market for Small Hydro Projects, and Developers were looking for an option, offering quality better than Chinese options and Prices economical than European options. FLOVEL provided that option and owing to this, in a short span of time during 2011 and 2012, FLOVEL gained the acceptance from some of the big Private Developers in Turkey and secured Projects totalling to 117 MW in Turkey.

During the past few years, the Government changed the regulations for Importing the Equipment for Hydro Projects in Turkey, making it tough for Equipment manufacturers from outside Turkey to supply. However, we are hopeful of finding a solution to this and continue doing business in Turkey, from where we left in the past.



Eglence 1  
(2 x 18.06 MW &  
1 x 8.66 MW)

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Commissioned	7	17	117



# Lao PDR

FLOVEL entered the Country of Lao PDR by securing the E&M Contract of Nam Sana Hydropower Project (3 x 5.15 MW) in the year 2012. This success was achieved with the EPC Company from Thailand, M/s. Nawarat Patnakaran Public Company (NPPC) and they executed this Project on EPC basis for the Largest Government Utility Company in Laos, Electricite-Du-Laos (EDL). This Project got commissioned in September, 2014. This is the first ever Project by FLOVEL where we supplied mechanically linked Pressure Relief Valve (PRV) owing to very long water conductor system. FLOVEL have executed three Projects in Lao PDR, with details as below:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	3	8	43
B.	Projects Commissioned	2	5	25
C.	Project Under Execution	1	3	18



Nam Sana HPP  
(3 x 5.15 MW)



# Armenia

Yerevan HPP  
(2 x 25 MW)



Canadian Consulting Company, i-Energy Power Expert Consulting Inc. were looking for a Reliable and Technology Driven Company from India for the Major Rehabilitation works of Yerevan Hydropower Project (2 x 25 MW) in Armenia, which was owned by International Energy Corporation JSC, Armenia (MEK). This company thoroughly evaluated FLOVEL India for capabilities in E&M works and recommended FLOVEL to the leader of Consortium, M/s. Power Engineering and Consulting PTE. LTD. (PEC). A Consortium of Firms, led by PEC bid for Complete Rehabilitation works, where FLOVEL was responsible for Replacement of Vertical Francis Turbine, Inlet Butterfly Valves, Digital Governor, Mechanical BOP Systems, SCADA and C & R Panels. After successful commissioning of Project, Project Owner, MEK, Armenia applauded the performance of Equipment supplied by FLOVEL.

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Commissioned	1	2	50



# Sri Lanka

FLOVEL have executed following Projects in Sri Lanka:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Commissioned	2	4	4.8





# Uganda

We made our inroads into African market through Uganda where our commissioned project i.e., 9 MW Buseruka Small Hydro Project has been in successful operation for nearly a decade. With experience of successfully implementing project in Africa and with a decade long operational excellence, we have secured another project in Uganda in 2021 which is under execution.

With our expertise and gainful experience in Uganda, we look forward to increasing our presence in the Hydropower market of African continent.



**Buseruka**  
(3 x 3.6 MW)

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	2	5	18.3
B.	Projects Commissioned	1	3	10.8
C.	Project Under Execution	1	2	7.5



# Japan

**Omokawa**  
(1 x 110 kW)



FLOVEL achieved its historical milestone of entry into the Japan market in the year 2017 with its first project Omokawa (1 x 110 kW). The partner in this success was FLOVEL's Japan representative, who played an important role in FLOVEL's efforts in convincing the Japanese Customer of the world-class quality of equipment and services offered by FLOVEL. The stringent environmental regulatory norms and impeccable quality requirements set Japan apart from other Hydropower markets. Successful commissioning of Omokawa became an example of FLOVEL's capabilities and cleared the road for the future projects in Japan Hydro market.

So far, FLOVEL has been awarded with 4 projects with details as follows:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	4	4	3.6
B.	Projects Commissioned	2	2	0.29
C.	Projects with Supplies Completed (waiting Commissioning)	1	1	0.31
D.	Project Under Execution	2	2	3.00



# Philippines

The Philippines is seeking to rapidly expand its power generating capacity while minimising costs to consumers, particularly to cater to its rising demand from manufacturing industry. In spite of the huge untapped Hydropower potential of the country, estimated to be around 13 GW of power, the country's Hydropower sector

has experienced limited capacity growth in recent years but still accounts for 18 percent of total installed capacity. There are significant projects under development and FLOVEL has already started implementing a business plan by securing one Small Hydropower project and now aims to secure its bigger share of pie in this important market.

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured (waiting Commissioning)	1	2	1.4



# Thailand

Small Hydro Projects, even with capacities as low as 1 MW are developed by Government utilities in Thailand and Hydro Sector is still not privatised for Development by IPPs. This restricts the opportunities to do Projects in Thailand for any Electromechanical Equipment Supplier.

FLOVEL have executed one Project for Government Utility, EGAT, through the EPC Contractor Right Tunnelling, Thailand, who executed the Project as EPC Company.



**Khlong Tron HPP**  
(2 x 1.25 MW)

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Commissioned	1	2	2.5



# Bhutan

Bhutan has huge Potential of Hydro Projects with big rivers flowing through its territory. They are one of the few Asian countries who are energy surplus due to these Hydro plants. India being one of the largest consumers, is involved in such Hydropower development as early as 1961 in Bhutan as most of the power generated are imported to India. As of end of 2021, Bhutan had exported 117,715 GWh of electricity to India which amounts to 75 percent of the total Hydro generation.

Bhutan and its Friendly neighbour and Partner in Development of Hydro Projects, India, have always concentrated on studies and planning of only Large Hydro Projects with Capacities, mostly higher than 100 MW, 200 MW. However, the potential for Small, Micro & Mini Hydro plants are huge and not yet explored properly so far. In spite of this background, FLOVEL have executed three Projects in Bhutan as per details below. First Export Order for project Nagu HEP with 2 units of 25 KW was a gift from Government of India to Royal Govt. of Bhutan in the year 1980.

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Commissioned	3	8	3



# Latin America

**Huayquichuma HEP, Ecuador**  
(2 x 3.25 MW)



FLOVEL have been trying to mark our Foot Prints in Latin American Countries Hydro Market, since the time we started our efforts during 2017 – 2018. In the process FLOVEL have made strategic partnerships and tie-ups by appointing Representatives in some of the Lat-Am countries like Brazil, Peru, Colombia, Honduras, Bolivia, Ecuador, Venezuela and Chile.

Resultant to our perseverance and consistent Business Development efforts for about 5 years in Lat-Am Countries, recently we are awarded with Huayquichuma Hydroelectric Power Project for Sipenergy S.A in Ecuador.

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Project under Execution (in Ecuador)	1	2	6.5



Renovation and Modernisation of Unit 3 of Sholayar HEP.



# RenServ: Services and Renovation Works

Looking into the past, till the years 1996-1997, Rehabilitation and Renovation works of old, existing Hydro plants were mostly done by the Government and Public sector companies in India. As the equipment and machinery installed in many old Hydro plants started ageing and had operated for more than 20-30 years, need of augmenting and strengthening of resources and options for carrying out Rehabilitation and Renovation of equipment was much evident. Resultant to this, during the years 1998 to 2000, government project owners started to reach out private equipment suppliers, many of them having tie-ups with European technology

suppliers, whether as JV company in India or operating from their own offices located in India.

Accordingly, during the years 1998 to 2004, FLOVEL did some prestigious and big value Renovation and Modernization works for some of the higher capacities old Hydropower plants in India.

Some of the noteworthy RenServ projects with considerable scope of new supplies as well as repair and modernization of old equipment in the projects are as follows:

YEAR OF ORDER	CUSTOMER NAME	PROJECT NAME	NUMBER OF UNITS	UNIT GENERATOR OUTPUT (MW)	TOTAL INSTALLED CAPACITY (MW)
1998	KPTCL	MGHE Jog Falls	4	13.2	52.8
			4	21.2	84.8
1999	KPTCL	Shivasamudram	4	6.0	24.0
			6	3.0	18.0
2002	Tamil Nadu Electricity Board	Mettur Dam PH	4	12.0	48.0
2002	Tamil Nadu Electricity Board	Papanasam	4	8.0	32.0
2003	Karnataka Power Transmission Corpn. Ltd.	Nagjhari	6	135.0	810.0
2015	Kerala State Electricity Board	Sholayar	3	19.8	59.4
2018	Viyat Power Pvt. Ltd.	Iruttukanam	3	1.5	4.5
2021	Uttarakhand Jal Vidyut Nigam Limited	Dhakrani HEP	3	12.4	37.2

As of 2006, FLOVEL was lead player in the Renovation, Modernisation and Upgradation services of old existing Hydropower stations and had executed 21 projects aggregating to 641 MW. With a dedicated team of Marketing responsible for RenServ business and rich experience of successfully executing and commissioning many RenServ projects during last two and half

decades, FLOVEL is very well placed to serve the Hydro project owners looking for Renovation and Modernisation of their old, ageing Hydropower projects.

Following are the details of all the RenServ projects executed by FLOVEL:

S.NO.	DESCRIPTION	TOTAL PROJECTS (NOS.)	TOTAL UNITS (NOS.)	TOTAL CAPACITY (MW)
A.	Projects Secured	48	141	2,960
B.	Projects Commissioned	39	120	2,705
C.	Project Under Execution	9	21	255

Before Renovation:



After Renovation:





A successful journey to  
**NEPAL**  
and miles to go!

Total project details w.r.t. turbine and capacity

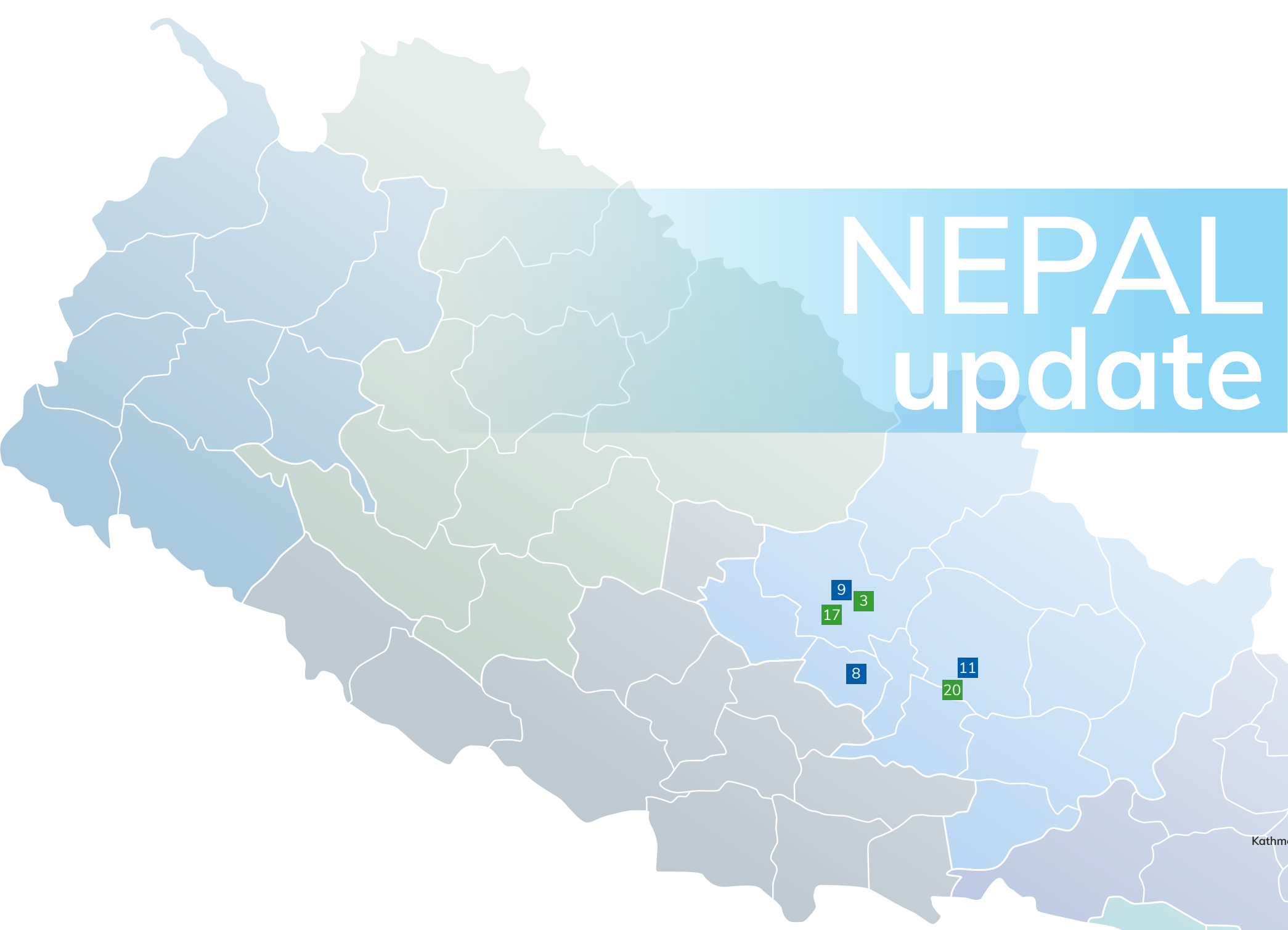
COMPETE ELECTRO-MECHANICAL SOLUTIONS

S.NO.	DESCRIPTION	TOTAL PROJECTS (Nos.)	TOTAL UNITS (Nos.)	TOTAL CAPACITY (MW)
1	Total Projects Secured in Nepal	16	34	169.72
2	Total Project secure with Francis Turbine	8	17	82.30
3	Total Project secure with Pelton Turbine	8	17	87.42
4	Total Projects Commissioned	7	14	64.10
5	Total Projects with Supplies completed (waiting for final commissioning)	4	9	54.60
6	Total Projects under execution	5	11	51.02

OUR ONLY PREMIUM VALVE SUPPLIES & COMMISSIONING

S.NO.	DESCRIPTION	TOTAL PROJECTS (Nos.)
1	Only Valve (MIV & PPV) supply orders secured in Nepal	4
2	Total Projects Commissioned	3
3	Total Projects Under execution	1





# NEPAL update

## FEW NOTABLE PROJECTS AND DETAILS:

### Largest Size project in Nepal

**Karuwa Seti HPP  
(3 x 10.667 MW)**

Again, when the QUALITY comes first followed by TRUST, this project is a best example in Nepal for Hydropower. It is our 11<sup>th</sup> project in Nepal. Though, FLOVEL had done many projects of capacity ranging between 50-80 MW, it is our largest project of total plant capacity of 32 MW in Nepal till now.



### Highest Head Project

**Liping Khola HPP (2 x 8.13 MW)**

FLOVEL already has vast experience of executing high head projects. After witnessing the high head capabilities, we have been awarded this project Liping Khola HPP having Net Head of 786 m.

This is our highest head project. Considering a highly earthquake prone area and difficult mountain, the powerhouse type is underground and location very near to China border in Nepal near Tatopani, Sindhupalchok District.

### Project with PRV

**Tallo Khare Khola HPP (2 x 5.5 MW)**

This is our 3<sup>rd</sup> project after re-entering Nepal. Speciality in this project is that equipped with Pressure Release Valve (PRV). Because of very difficult terrain, it was never possible to construct the surge Tank for this Francis turbine project. In case of Francis turbine, the surge tank is mandatory. However, we have equipped this Francis turbine with PRV as a substitute of Surge tank for trouble free operation.

These PRVs are manually and auto operated to maintain a certain pressure rise within set limits inside the penstock during sudden load rejection and grid failure conditions. This is third installation in Nepal and performing very well with full satisfaction of the Employer.

#### LIST OF PROJECTS WITH COMPLETE EM SOLUTION

S.NO.	PROJECT	RATING	TYPE OF TURBINE	STATUS
1	Chilime HPS (in JV with Sulzer)	2 x 11.05 MW	2J HP	Commissioned in 2003
2	Ghatte Khola HPP	2 x 2.5 MW	2J HP	Commissioned in December 2020
3	Ghalemdi Khola HPP	2 x 2.5 MW	HF	Commissioned in February 2020
4	Tallo Khare Khola HPP	2 x 5.5 MW	HF with PRV	Commissioned in November 2021
5	Super Mai HPP	2 x 3.9 MW	HF	Commissioned in October 2018
6	Suri Khola HPP	2 x 3.5 MW	3J HP	Commissioned in May 2022
7	Lower Jogmai HPP	2 x 3.2 MW	HF	Commissioned in November 2021
8	Daram Khola HPP	2 x 4.8 MW	HF	Under Commissioning
9	Rele Khola HPP	2 x 3 MW	2J HP	Under Commissioning
10	Upper Suri Khola HPP	2 x 3.5 MW	2J HP	Under Commissioning
11	Karuwa Seti HPP	3 x 10.667 MW	HF	Supplies Completed
12	Liping Khola HPP	2 x 8.13 MW	2J HP	Under Supply
13	Lower Chirkhwa HPP	2 x 2.03 MW	3J HP	Under Supply
14	Jogmai Cascade HPP	2 x 2.6 MW	HF	Under Design
15	Sagu Khola HPP	3 x 6.667 MW	3J HP	Under Design
16	Sagu Khola 1 HPP	2 x 2.75 MW	HF	Under Design

#### PROJECTS WHERE WE HAVE SUPPLIED OUR QUALITY VALVES ONLY

S.NO.	PROJECT AND RATING	TYPE OF VALVE	DIAMETER (MM)	PRESSURE (PN)	STATUS
17	Thapa Khola HPP 13.6 MW	PPV Butterfly Valve	1,300 mm	6 PN	Commissioned
18	Likhu 1 HPP 77 MW	PPV Butterfly Valve	2,200 mm	14 PN	Commissioned
19	Likhu 2 HPP 55 MW	PPV Butterfly Valve	2,500 mm	17 PN	Under Commissioning
20	Seti Phewa HPS 1 MW	MIV Butterfly Valve	1,200 mm	7 PN	Commissioned

■ Commissioned    ■ Under Execution





## Recent Key Project Awards to Quality & Trust i.e. FLOVEL Energy

**Sagu Khola HPP, 20 (3 x 6.667 MW) and Sagu Khola 1 HPP, 5.5 MW (2 x 2.75 MW)**



These Sagu Projects are our 3<sup>rd</sup> and 4<sup>th</sup> Project from the same developer stamping our best equipment, services and after sales support in Nepal. For this group, we had already executed Suri Khola HPP (7 MW) and another project Upper Suri HPP (7 MW) is under commissioning.

### Project Key Parameters

#### Sagu Khola HPP (20 MW)

- » Type of Turbines: 3 Jet Horizontal Pelton
- » Rated Head: 360.4 m
- » Installed Plant Capacity: 20 MW
- » Site Altitude: Approx. 1,262 m masl
- » Powerhouse Type: Surface

#### Sagu 1 Khola HPP (5.5 MW)

- » Type of Turbines: Horizontal Francis
- » Rated Head: 138.77 m
- » Installed Plant Capacity: 5.5 MW
- » Site Altitude: Approx. 1,630.3 m masl
- » Powerhouse Type: Surface



**Liping Khola HPP, 16.26 MW (2 x 8.13 MW)**



It is our highest head project ever, net head is 786 m with 2 machines of 8.13 MW, 2J HP. Liping Khola Project is located in Sindhupalchok District, Central Development Region of Nepal. It is our 12<sup>th</sup> Project in Nepal.

### Project Key Parameters

- » Type of Turbines: 2J HP with Forged runners
- » Rated Head: 786 m
- » Installed Plant Capacity: 16.26 MW
- » Powerhouse Type: Underground
- » Site Altitude: 1,735 m masl

**Jogmai Cascade HPP, 5.2 MW (2 x 2.6 MW)**



This is again our 2<sup>nd</sup> project with the same group developing Hydropower projects in Nepal. We had already executed Lower Jogmai HPP (6.2 MW) for the same customer with their full of satisfaction.

### Project Key Parameters

- » Type of Turbines: Horizontal Francis
- » Rated Head: 115.12 m
- » Installed Capacity: 5.2 MW
- » Site Altitude: Approx. 653 m masl.
- » Powerhouse Type: Surface

**Karuwa Seti HPP, 32 MW (3 x 10.667 MW)**



This is our 11<sup>th</sup> project with complete EM Works and our single largest project in Nepal with 32 MW plant size. Karuwa Seti Hydro Project is located in Machhapuchre Rural Municipality, Ward No. 1, Kaski District, Gandaki Province of Nepal. The project site is just one hour drive from Pokhara, a tourism capital of Nepal.

### Project Key Parameters

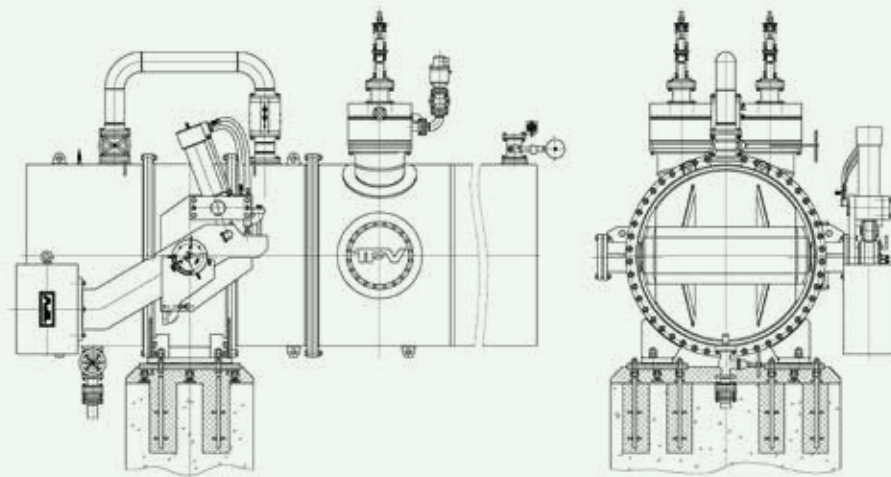
- » Type of Turbines: Horizontal Francis
- » Rated Head: 241.5m
- » Installed Capacity: 32 MW
- » Site Altitude: 1,280 m masl

## OUR QUALITY VALVES

### Likhu 1 & 2 PPV (MV Dugar Group, Nepal)

When quality is the foremost requirement and no compromises is the motive for equipment being used in Hydropower, a responsible person will always reject a poor one and finally the solution at FLOVEL for the desired one.

We have been awarded two giant Penstock Protection Valves (PPV) for Likhu 1 & 2 HPP in Nepal. The diameter of the valves for Likhu 1 & 2 are 2,200 mm and 2,500 mm respectively. These valves are also equipped with air release valve / anti vacuum system for its enhanced performance.



## Fastest commissioned project

### Super Mai HPP (2 x 3.9 MW)

We have commissioned Super Mai HPP in a record time of 12 months and 15 days starting from the commencement date to project handing over. This was our 4<sup>th</sup> project after re-entering Nepal market. However, we commissioned Super Mai HPP first. Since October 2018, date of commercial operation this project is running successfully & trouble free.



Excellent turbine efficiencies and quality of equipment are the first reason for the Performance award win from Nepal electricity authority. Further, this project has been honoured by 2-3 more awards to after its commercial start date. Recently, they have announced a flat 30% dividend to its shareholders which is one of very few examples.



## WORKSHOP ON EM EQUIPMENT

Proper operation of the Hydropower plant and maintenance is a regular concern for Nepal Hydropower industry, which often leads to suboptimal productivity, revenue losses and plant shutdowns. To address these issues, in Nepal, for the first time we have organised workshop on the Electro-mechanical equipment on 4th Aug 2022. Huge presence of 60-65 key engineers from Nepal Hydro sector attended the said workshop for knowledge sharing and technical discussions.

The full day workshop was held by the FLOVEL team of Mr. Luciano Andre Devinar, Chief Technical Officer (Design & Engineering) and Mr. Sudhir K. Midha, Functional Head – System Engineering covering Mechanical equipments, electrical equipments and SCADA.



## HYDRO EXPO 2022

FLOVEL have participated in the Himalayan Hydro Expo 2022 in first week of April 2022.

It was a reunion with all our prestigious customers from the Hydro fraternity and more enthusiastic visits this time to us like in the past, stamping our 50 Years of Excellence in Hydropower and commitment to after Advantage on Your Side. Specially, we were horned by the prestigious presence of Minister of Energy, Water Resources and Irrigation, Nepal accompanied by IPPAN Team (Independent Power Producers' Association, Nepal) in our stall.



## OUR PRESENCE IN NEPAL

### Suresh Chandra

Country Manager (Nepal)

Mob.: +977-9823665787, +977-9869501780

Email: suresh.chandra@flovel.net



FLOVEL is also looking forward to further strengthen its presence in Nepal Hydro market by establishing its full flagged office in Kathmandu. This proposed office will be facilitated by a dedicated quick responses service team (Electrical Engineer, Mechanical Engineer & SCADA / Control engineer) for Nepal Hydro projects only. It will also maintain the inventory of mandatory spare parts.

## Our Local Partners in Nepal

### Mr. Mukti Nath Sharma, Managing Director

Mob.: +977-9851035185

Email: muktinsharma@marrongroup.com.np

Marron Trading Pvt. Ltd.



### Mr. Ranjil Basnet, Chairman

Mob.: +977-9851064789

Email: k2r.ent@gmail.com

K2R Enterprises Pvt. Ltd.





# iNDUS

## Advance digitalization solution for Hydropower Plants

Green Energy and Digital world, are two hot trends and we have fused the two to enable new age Hydropower Plant that require minimal manual intervention.

Welcome to the world of iNDUS, our in-house cutting-edge solution, that automates the operating processes and uses built in data-based intelligence to maximise performance and minimise risks. It enables digital commissioning, monitoring and management of your Hydropower plants. iNDUS not only automates the plant control and management at the site, but it also enables remote access. It doesn't matter where you are, it is always possible to know the operating parameters of your Hydropower plant in real time through our digital solution which can be accessed from Laptop, Mobile and LSD.

One big advantage of iNDUS over existing solutions is that it is not an adapted solution, instead it has been developed with state of art technology and has been specifically designed for Hydropower plants. Adapted systems are bulky and making them work for Hydropower plants is a challenge. The installation of new patches/ software and recommissioning of the system are time consuming and laden with issues. Often new versions do not support the old hardware.

Overall, they underperform and require continuous monitoring to prevent failure. A dedicated SCADA experts' team may be required for the purpose. None of the above issues are found with iNDUS which is built in house. Tailor made for the Hydropower plants, it is designed keeping in mind the needs of the Hydropower plants and is easy to operate and service. It offers a complete Digital Intelligence Ecosystem that pushes up the performance and puts the plant in your pocket.



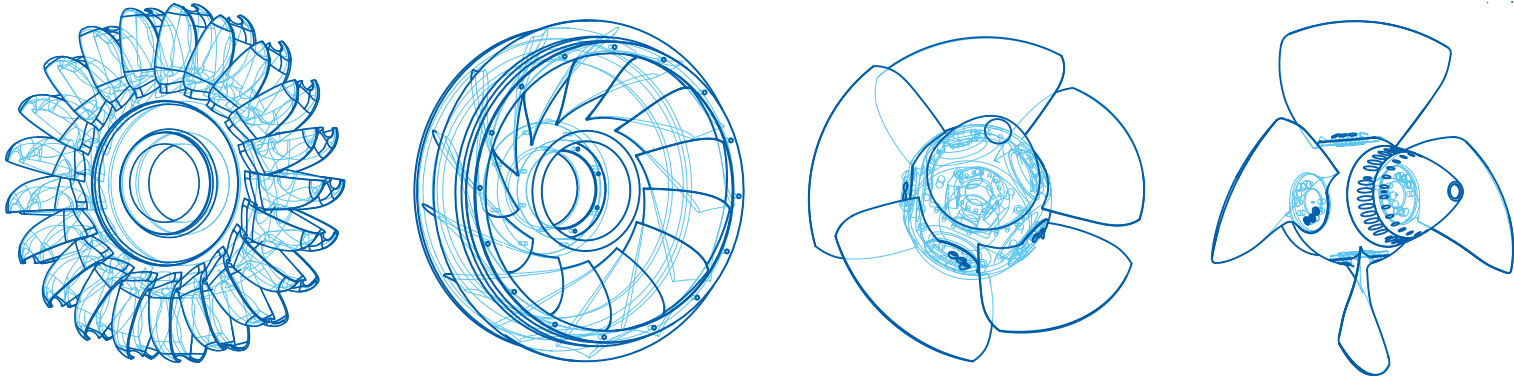
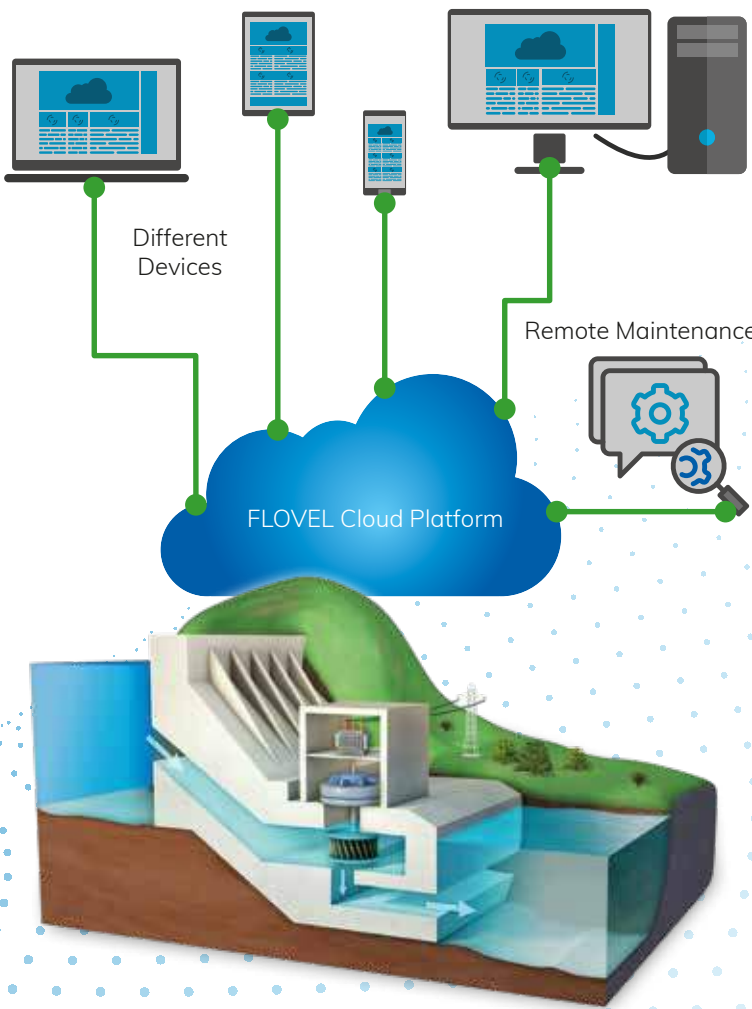
### Key features of iNDUS:

1. Digital Turbine Governor
2. Plant Level Software Interface for Control & Monitoring
3. Real-time Remote Monitoring (Mobile / Laptop / LSD)
4. Alarms Management, Push Notifications, Email Reporting
5. Gateway for Load Dispatch Center Communication
6. Real-time & Historical Data Storage, Integrated Data Security
7. Report Management

### Key advantages of iNDUS:

1. **Versatility:** Solution for all type of turbines & capacity. Can be deployed for new and existing plants.
2. **Flexibility:** Has multiple plug and play functionality and features.
3. **Easy:** User friendly Interface. Easy to maintain, operate and deploy.
4. **Cost Effective Solution:** The system is made specially for Hydro-power plants thus making it easy to operate and service. No need to have experts of SCADA system.
5. **Secure:** The system is designed with highly integrated security for data protection & safety.

### Architecture of system:





The iNDUS logo is centered within a circular graphic composed of binary code (0s and 1s) arranged in a spiral pattern, creating a tunnel-like effect. The background is a dark blue gradient with a grid of small dots.

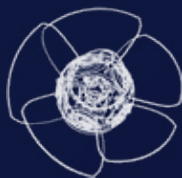
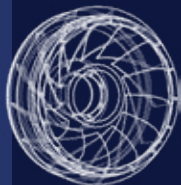
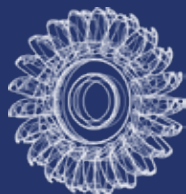
Digital Intelligence Ecosystem

## NEW DIGITALIZATION SOLUTION FOR HYDROPOWER PLANTS.

FLOVEL launches a premium digitalization solution for all types of turbines & capacity. It comprises with various plug and play features. **iNDUS** is very easy to maintain, operate and deploy unlike conventional solutions.

### FEATURES

- Digital Turbine Governor
- Plant Level Software Interface
- Control & Monitoring
- Real-time Remote Monitoring
- Push Notifications
- Report Management / Email Reporting
- Integrated Data Security
- Alarms Management
- Real-time & Historical Data Storage
- Gateway for Load Dispatch Center Communication



### FLOVEL Energy Private Limited

Vatika Mindscapes, Suite 101-A, Tower-B  
12/3, Mathura Road, Faridabad – 121 003, Haryana, India  
Phone: +91 129 4090600, Fax: +91 129 4090650  
Email: [contact@flovel.net](mailto:contact@flovel.net)  
[www.flovel.net](http://www.flovel.net)

The FLOVEL logo features a stylized circular icon with three curved segments to the left of the word "FLOVEL" in a bold, sans-serif font.

**FLOVEL**  
Advantage on your side