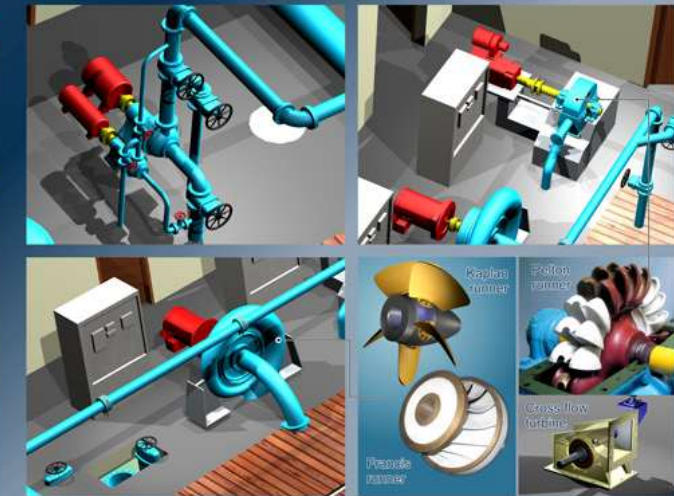
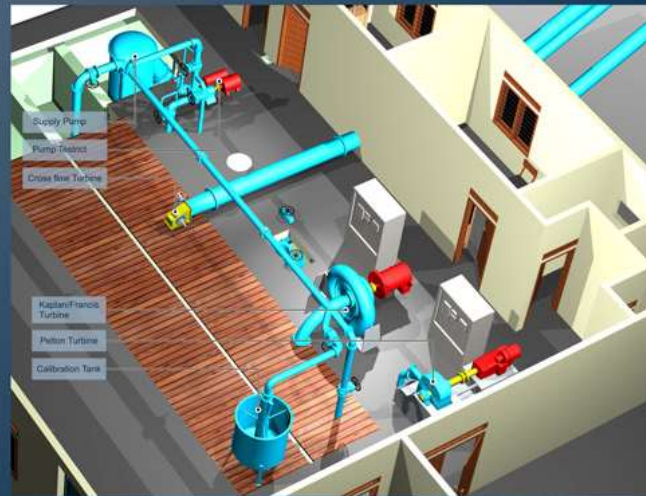


**HYCOM**  
ASEAN HYDROPOWER  
COMPETENCE CENTRE



Pusat Pengembangan dan Pemberdayaan Pendidik dan Tenaga Kependidikan - Bidang Mesin dan Teknik Industri (P3PTK/BMTI)



Website: [www.hycom.info](http://www.hycom.info)



## **HPNET - WEBINAR**

### **28.3.2019**

- **Training**
- **Experience Exchange & Networking**
- **Development and Research Assistance**

**to the Small-Scale Hydropower Sector**



**was established in 2011 with the support of:**

- **University FH Technik (Zuerich)** - *Laboratory equipment*
- **REPIC – renewable energy platform Swiss** - *Shipping costs*
- **ASEAN Center for Energy (ACE) and the German International Cooperation (giz)** – *PPP supporting construction costs*
- **TEDC**, Technical Education Development Centre (as well called PPPPTK-BMTI) – *Providing land in TEDC compound*
- **Entec AG and PT. Entec Indonesia** ) – *Design and implementation*
- **Giz/CIM** – *supporting integrated expert to establish HYCOM*

**The ASEAN-HYCOM is a private public partnership and is operated (self financed!) by a consortium between:**

- TEDC, Technical Education Development Centre (as well called PPPPTK-BMTI), Bandung
- PT. Entec Indonesia

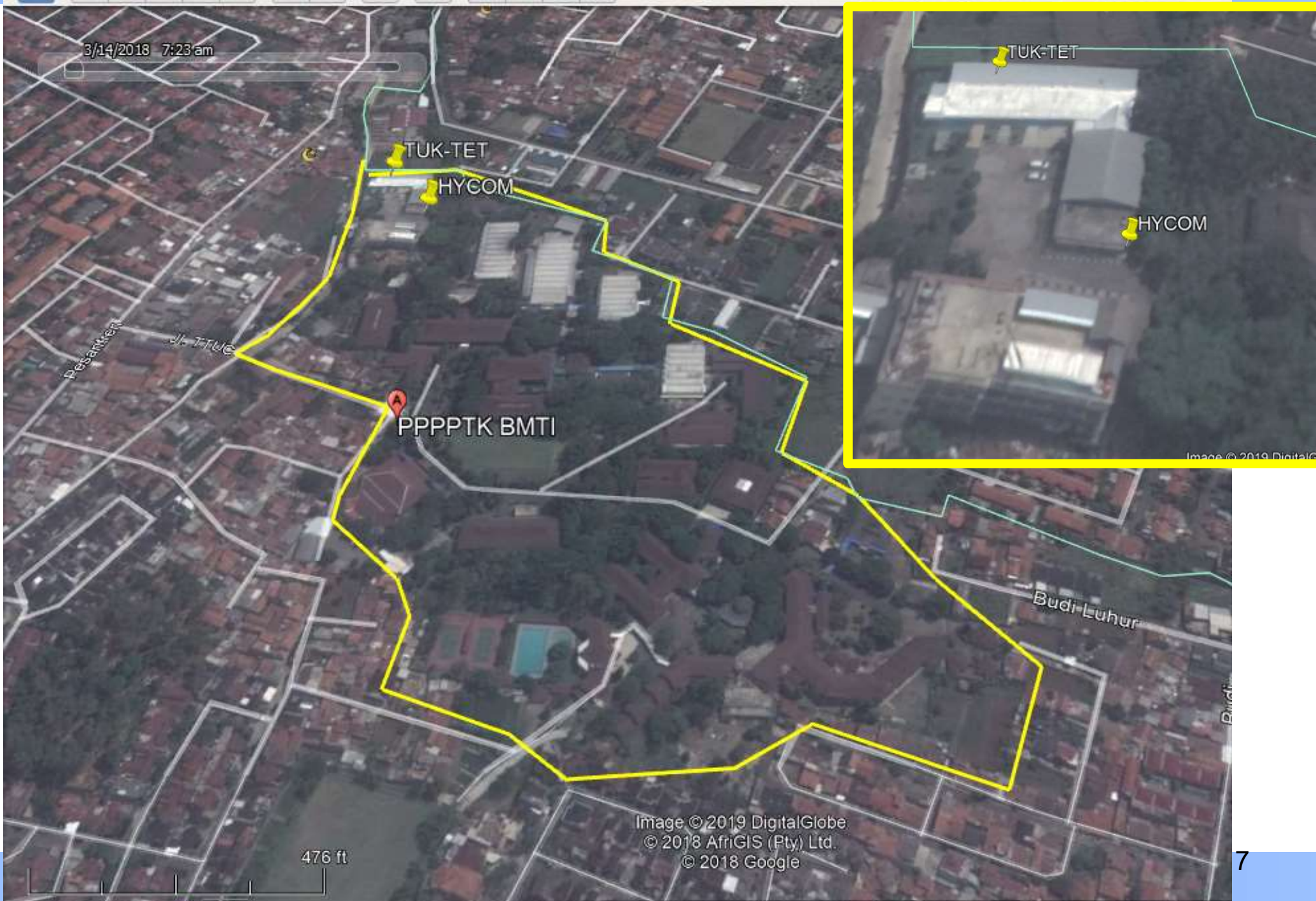


**HYCOM's target groups** and potential customers are private and public sector actors and educational institutions actively involved in MHP development:

- Equipment manufacturers, suppliers, consultants
- Lecturers, trainers and students from private and state universities, vocational schools and other educational institutions.
- Mini hydro associations
- Operators and managers of MHP plants
- Regional, bilateral and national MHP support programs
- Political decision makers and representatives of Government departments
- Potential investors and financiers, banks
- Appropriate technology and research institutions active in mini hydropower technology development and dissemination

Since 2018 HYCOM is up-graded to a Renewable Energy Centre (Hydro, Wind, Solar and Bio energy and waste management) and is a certification body for the Indonesian Government on Vocational School Level.





HYCOM offer the following **products** and **services**:

- Conduction of standard and tailor-made trainings;
- Development of core competencies and qualifications of teachers and trainers (HYCOM is closely linked to TEDC, which is experienced in vocational education and up-grading teachers and trainers in the field of technology and vocation);
- Centre for competence of technicians, supervisors designers etc.;
- Systems of standards, quality assurance, accreditation, and measurement to promote greater quality & efficiency and enhance cost effectiveness of local/regional production of MHP equipment and constructions.



# Why to establish HYCOM in Bandung/Indonesia?

Beginning 1991

Bandung is home to about 350 qualified people representing a experience of about

**5000 Man/Years**

in all aspects of building and operating MHP in the range up to 500kW



# Technology Transfer: Activities in Indonesia 1991-2019

Activities:

- 1. Turbine** technology transfer  
(Cross flow, propeller, Pelton....)  
in design, manufacturing,  
installation & commissioning
2. Development and introduction of  
standardized **Civil** structure  
designs
3. Development of **Control**  
Technology (DTC, ELC, IGC...)
4. Various appropriate technology for  
**productive end-use** activities
- 5. Institutional aspects**



## EXAMPLE:

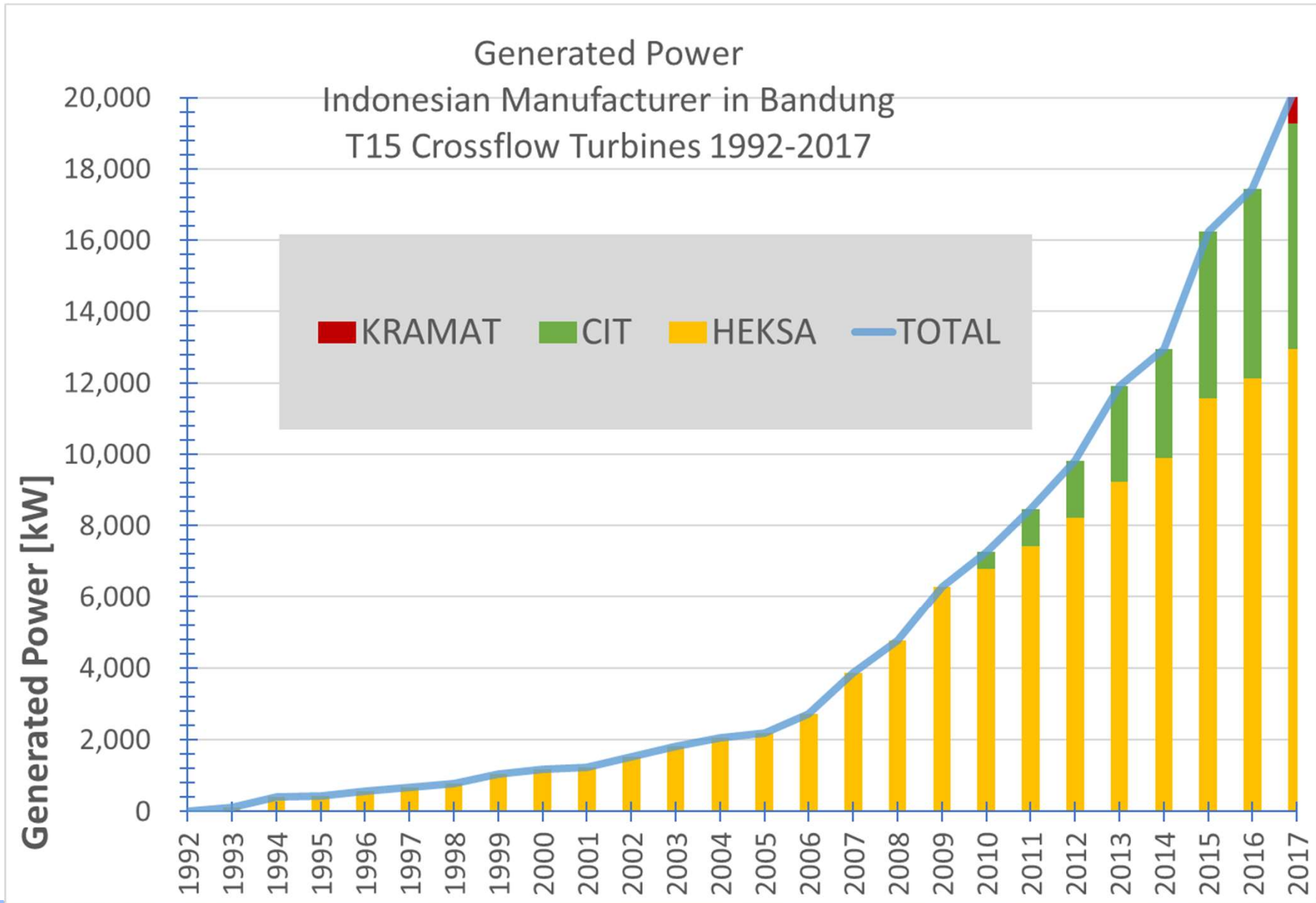
# Summary produced turbines as direct result of technology transfer program 1991-2018

Turbine type	Quantity	installed Capacity	
Produced Cross flow turbines T12	70	1,750	MW
Produced Cross flow turbines T14/T15	377	19,500	MW
Produced T15 (license out of Indonesia)	250	15,000	MW
local designes Sumatra+Sulawesi	300	7,500	MW
Produced Pelton turbines	20	1,670	MW
Propeller	101	4,400	MW
<b>Total Turbines produced 1991-2018</b>	<b>1,118</b>	<b>49,820</b>	<b>MW</b>

E&m equipment is exported to other countries like:

England, Swiss, Germany, Philippines, Nepal, Madagascar, Ethiopia, Uganda, Tanzania, Papua New Guinea, Cameroon, Zaire, Kyrgystan , Mozambique, Congo, Nigeria, Turkey, Thailand, South Africa etc.

## Total produced Cross flow turbines T12 and T15 in Indonesia



## EXAMPLE: Controllers

Beside turbines as well controllers are produced in Bandung. The 2 leading manufacturers produced until 2018

Renerconsys	1040 Controllers	about 40MW
PME	700 Controllers	about 10MW
others	No data	No data

## Trainings for the Hydro Power Sector on national and international level have a long tradition in Bandung



## But this tradition started earlier:

The deep impact of trainings is proven looking at series of trainings in the late 80s conducted by the **Mini Hydro power Group MHPG** (ITDC, FACT, SKAT, GATE, GIZ) -the predecessor of **Hp-net**

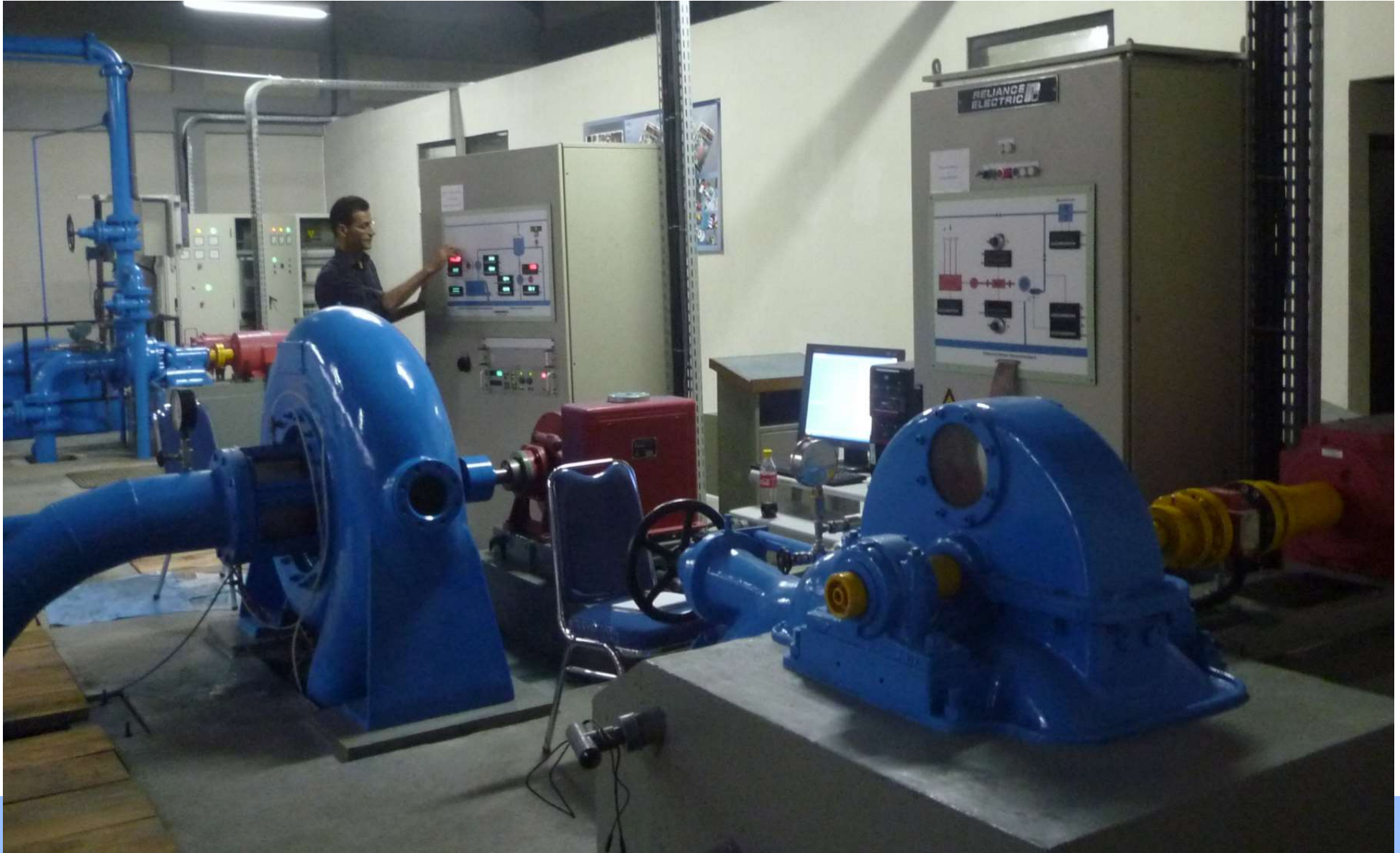
A series of trainings in Nepal, Phillipines and Switzerland (using Universities and Hydro Training centers at that time) supported a decade long development of the micro hydro sector, by bringing together and motivating engineers and technicians.







HYCOM is equipped with Model turbines from a Swiss University Swiss (Pumps, Pelton, Kaplan/Francis) to study characteristics



# Grid - Synchronizing Unit with ELC to study Pelton turbine operation behavior during interconnection



# Simulation of a stand alone village grid using a Indonesian built **cross flow turbine**. The equipment can be dismantled for **practical operator training**



# ELC Load Controller operation and trouble shooting (Village Simulation)



- Strengthening hydro power sector and associations world wide
- International networking and experience exchange
- Improving feasibility studies and design for MHP
- Improving operation and setup of MHP by operator training
- Supporting implementing hydro power standards
- Initiating renewable energy introduction and certification in the vocational school sector
- Supporting expertise for the setup of national Hydro power standards (SNI)
- Preparing the ground for a renewable energy center within TEDC for vocational training in ASEAN

About 500 visitors from all over the world visited HYCOM already





**Our strength:  
Offering taylor made  
MHP Training Packages**



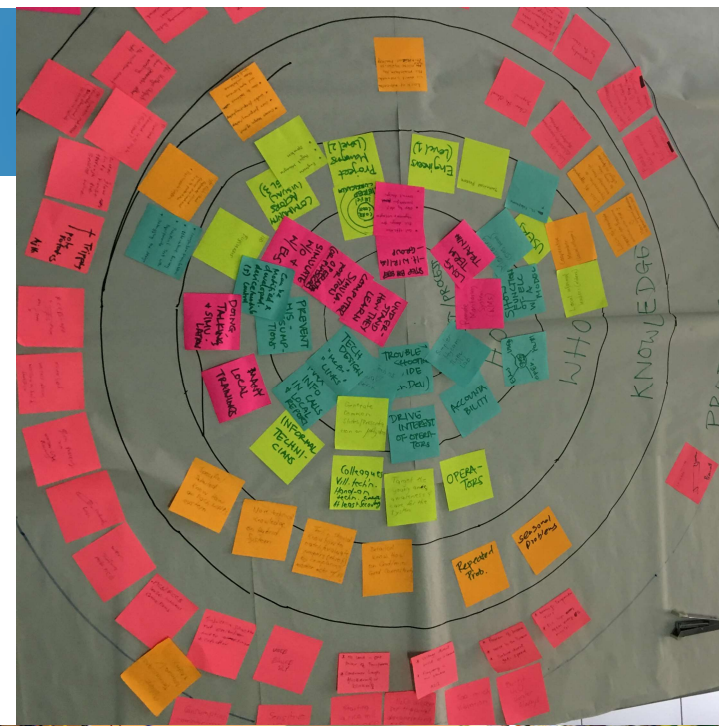
About 300 participants from about 25 countries participated in **workshops** and trainings





# EXAMPLE: HP-net ELC Load Controller operation and trouble shooting training





## Examples of HYCOM Training Modules

The various training modules offered comprise comprehensive knowledge of and practical exercises on the following topics:

- 01 – Introduction to MHP & Best Practices
- 02 – Management of MHP Projects
- 03 – MHP Project Development
- 04 – Operation and Maintenance of MHP Schemes
- 05 – Site Identification for MHP
- 06 – MHP Feasibility Study
- 07 – Equipment and Turbine Fabrication for MHP



# MHP Technology is Supporting Rural Development



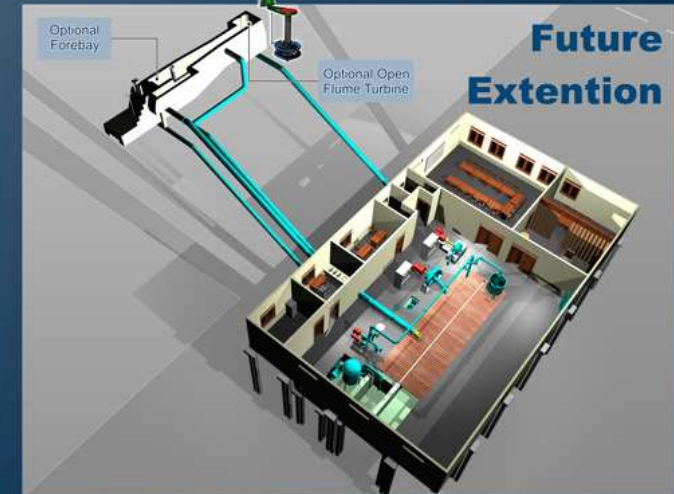
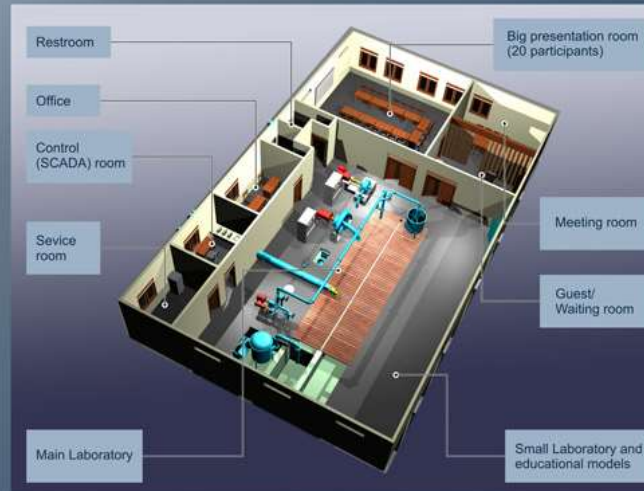


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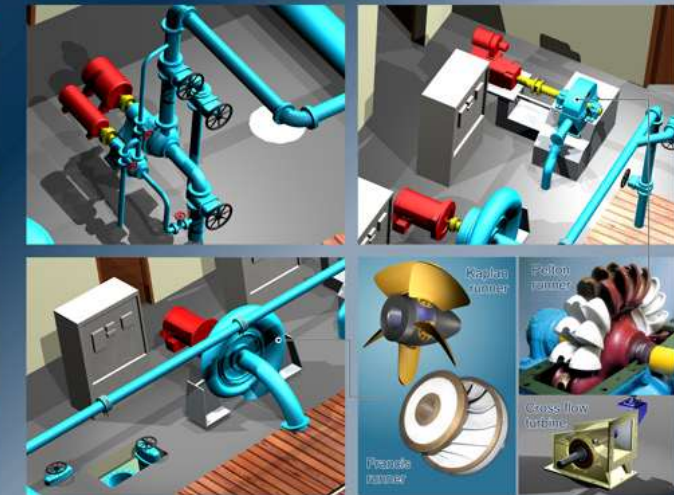
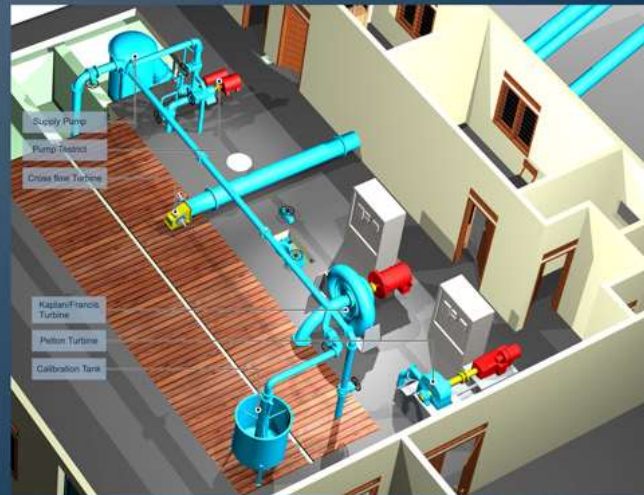
# HYCOM

ASEAN HYDROPOWER  
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pt entec  
indonesia

Pusat Pengembangan  
dan Pembinaan, Pendidikan  
dan Tenaga Kependidikan -  
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