• Training
• Experience Exchange & Networking
• Development and Research Assistance
to the Small-Scale Hydropower Sector
HYCOM 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-grated 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
Summary produced turbines as direct result of technology transfer program 1991-2018

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

E&m equipment is exported to other countries like: England, Swiss, Germany, Philippines, Nepal, Madagascar, Ethiopia, Uganda, Tanzania, Papua New Guinea, Cameroon, Zaire, Kyrgyzstan, Mozambique, Congo, Nigeria, Turkey, Thailand, South Africa etc.
EXAMPLE:

Total produced Cross flow turbines T12 and T15 in Indonesia

Generated Power
Indonesian Manufacturer in Bandung
T15 Crossflow Turbines 1992-2017
EXAMPLE: Controllers

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

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Controllers</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renerconsys</td>
<td>1040 Controllers</td>
<td>about 40MW</td>
</tr>
<tr>
<td>PME</td>
<td>700 Controllers</td>
<td>about 10MW</td>
</tr>
<tr>
<td>others</td>
<td>No data</td>
<td>No data</td>
</tr>
</tbody>
</table>
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)
HYCOM IMPACT

- Strengthening hydro power sector and associations worldwide
- 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 tailor 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

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