

Experience with & challenges facing commercial microhydro industry in Indonesia

**HEKSA
HYDRO**

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PT HEKSA PRAKARSA TEKNIK
Small Hydropower Engineering

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MICROHYDRO – BRIEF DEVELOPMENT IN INDONESIA

- *Tea Estate and Java Island , 1885 – 1925, more than 400 units micro-mini hydro built in Indonesia, all of the equipments imported from Europe*
- *IKIP Padang, R.M. Enoch , 1980, vocational teacher*
- *WRI, Irian Jaya, M. Johnson, 1985, Missionary*
- *FAKT, YTDS, Toraja and North Sumatra, 1987, Missionary*
- *GTZ-gate Yayasan Mandiri, 1991-1994, Technology Cooperation*
- *Directorate of Electricity and Energy Development, 1991, Government*
- *Heksa (steel structure), 1992, Manufacturer, Private Company*
- *Kramatraya Sejahtera, 1993, Manufacturer, Private Company*
- *HeksaHydro, 1994, EPC and Manufacturer, Private Company*
- *Yayasan IBEKA, 1994, EPC and Developer, NGO*
- *Cihanjuang Inti Teknik, 2001, Manufacturer, Private Company*
- *2001 – Present , more than 10 microhydro manufacturers established*
- *2001 – Present , 5 ministry have microhydro program (ESDM, PDT, Kesra, PU, Depkop)*
- *2001 – Present, more than 30 regency have microhydro program*
- *2001 – Present, many estates and developers are interested in micro-mini hydro*

HEKSAHYDRO – BRIEF PRODUCTION 1992-2008

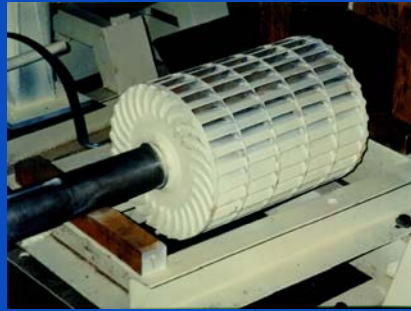
- Pioneer Periods 1992 – 2000, total productions **42** units, *per year 4 – 6 units, infrastructures (400 m² office-workshop, 15 employees, 11 kVA power, 1 lathe machine, 1 milling machine, 2 welding machine, 30% machining works were outsourcing)*
- Survival Periods 2001 – 2005, total productions **27** units, *per year 4 – 6 units, infrastructures (400 m² office-workshop, 15 employees, 11 kVA power, 1 lathe machine, 1 milling machine, 2 welding machine, 30% machining works were outsourcing)*
- Booming Period 2006, total productions **24** units, *per month 2 – 3 unit, infrastructures (800 m² office-workshop, 30 employees, 60 kVA power, 4 lathe machine, 3 milling machine, 6 welding machine, 2 shapping machine, 2 slotting machine, less than 10% machining works were outsourcing in case of overload only)*
- Booming Period 2007, total productions **35** units, *per month 2 – 4 unit, infrastructures (1200 m² office-workshop, 40 employees, 130 kVA power, 7 lathe machine, 7 milling machine, 12 welding machine, 3 shapping machine, 3 slotting machine, 1 sand blasting machine, no machining works were outsourcing)*
- Booming Period 2008, total productions **36** units, *per month 2 – 4 unit, infrastructures (1200 m² office-workshop, 40 employees, 130 kVA power, 7 lathe machine, 7 milling machine, 12 welding machine, 3 shapping machine, 3 slotting machine, 1 sand blasting machine, no machining works were outsourcing)*

HEKSAHYDRO – EXPORT RECORD 1994- 2009

- Tear Fund, Kagando Hospital, Kasese, Uganda, 60 kW, 1994
- WEM GmbH, Louzi, Zaire, 5 kW, 1995
- Green Empowerment-Borneo Project, Long Lawen, Serawak, Malaysia, 10 kW, 2001
- SUA, Kindimba, Tanzania, Africa, 40 kW, 2001
- YAMOG, Saloy, Davao, Philippine, 25 kW, 2003
- Mokondiba Water Works, Manyemen, Cameroon, 5 kW, 2003
- Structo Nepal P. Ltd., Basa Kholo, Nepal, 40 kW, 2003
- Pacos Trust, Terian, Sabah, Malaysia, 5 kW, 2004
- Pacos Trust, Bantul, Sabah, Malaysia, 5 kW, 2004
- Dulas Ltd. c/o Alwen Water Treatment Works, Powys, Wales, United Kingdom, 25 kW, 2006
- Entec ag c/o Nam Ka Hydro, Nam Ka, Laos, 15 kW, 2006
- Bario Hydro Committe, Bario, Sarawak, Malaysia, 40 kW, 2007
- YAMOG, Bug Ang & Balea- Negros, 30 kW, Karim-40 kW, Philippine, total 3 units, 2007
- Entec ag c/o Hydroelectrque Centrale, Madagascar, Africa, 2 x 50 kW, 2008
- Pacos Trust, Buayan, Sabah, Malaysia, 10 kW, 2008
- YAMOG, Baclao, Negros, Philippine, 30 kW, 2008
- YAMOG-Sapad-40 kW, REDCREST-Sitio-35 kW, Philippine, Pacos-Md.Abun-40 kW, 2009



The First T-7 (in Bandung)
Curug Agung, 1992
3 units only , terminated in 1993



The First T-12 (in Bandung)
Cibitung, 1993
around 50 units, terminated in 1998



The First T-14 D300 (in the World)
Sedau, Lombok, 1998
Now we are making the 58th to 65th

PROFILE *progress step by step*

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The First T-14 D300 100 kW
Bili-Bili, 1999
Followed by Dewata 120 kW (2002)



The First T-14 D150
Long Lawen, Sarawak, Malaysia, 2001
Now we are making the 61st to 81st



The First T-15 D500 (in The World)
Melong, West Java, 2005
Now we are making the 6th



MHPG-SKAT-GTZ gate
hydropower training course
Swiss, 1992



Universitat Stuttgart , entec ag
laboratory test T-14
Germany, 1998



Water Research Lab. PSDA
turbine-pump test
Bandung, 2002

PROFILE *technology and partnership*

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Badiklat, ESDM
Microhydro Simulator
Jakarta, 2002



Green Empowerment
asian microhydro training course
Bandung, 2003



P3TEK, ESDM
test bed impulse turbine
Jakarta, 2004



Survey and Design
Micro and Mini Hydro
up to 2000 kW



Manufacture and Construction
Turbine dan Controller
up to 1000 kW



Supply and Construction
Turbine, Generator, dan Controller
up to 2000 kW

PROFILE *range of services*

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Repair, Maintenance and Up Grade
Micro and Mini Hydro
up to 1000 kW



Hydropower Training
Site Identification Survey
Operation and Maintenance



Hydropower Kits
Display and Test Bed
Hydropower Survey Kits



X-flow Turbine T-14 D300
head: 3 – 100 meter
power: 10 – 150 kW



X-flow Turbine T-14 D150
head: 3 – 40 meter
power: 3 – 30 kW



X-flow Turbine T-15 D500
head: 5 – 100 meter
power: 50 – 600 kW

PROFILE *product - turbine*

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Peltric Turbine
head: 15 – 100 meter
power: 1 – 30 kW



Propeller S-Turbine
head: 2 – 13 meter
power: 10 - 150 kW



Pelton Turbine
head: 70 – 300 meter
power: 50 – 1000 kW



ELC-MC1 HeksaHydro
isolated grid
power: 3 – 250 kW



IGC HeksaHydro
isolated or grid connected
power: 1 – 100 kW



ELC-SINKRO HeksaHydro
grid connected
power: 10 – 1000 kW

PROFILE *product - controller*

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Electronics Load Controller
PLTMH Dadapan, Sumatera Selatan
ELC-MC1 HeksaHydro- 30 kW



Induction Generator Controller
PLTMH Cipaleubuh, Jawa Barat
IGC HeksaHydro – 15 kW



ELC-SINKRO HeksaHydro
PLTMH Melong, Jawa Barat
Grid Connected -100 kW



TRASH RACK
Manual-Automatic Cleaning



Sluice Gate
Manual-Motorized



PULLEY FLAT BELT
up to dia 1400 mm

PROFILE *product-auxillaries*

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EXPANSION JOINT
up to dia 1400 mm



DISMANTLING JOINT
up to dia 1400 mm



ROLLED WELDED PIPE
up to dia 1400 mm



KAGANDO, Kasese, Uganda
X-flow T-12, ELC-60 kW
1994



Louzi, Zaire
X-flow T-12, IGC-Milling-5 kW
1995



Boro, Ermera, Timor Loro Sae
X-flow T-12, IGC-10 kW
1997

PROFILE *projects quote 1994-1999*



Sedau-1, Lombok Barat, NTB
X-flow T-14, IGC-25 kW
1998



Nunca, Kepulauan Sula, Maluku
X-flow T-14, IGC-15 kW
1999



Bili-Bili, Gowa, Sulsel
X-flow T-14, ELC-2x100 kW
1999



MARON, Mojokerto, Jatim
X-flow T-14, ELC-25 kW
2000



Long Lawen, Serawak, Malaysia
X-flow T-14, ELC-Milling-10 kW
2001



Kindimba, Morogoro, Tanzania
X-flow T-14, ELC-Huller-Milling-40 kW
2001

PROFILE *projects quote 2000-2002*



Cipaleubuh, Cisompet, Jabar
X-flow T-14, IGC-Milling-15 kW
2002



Cisanggiri, Garut, Jabar
X-flow T-14, ELC-Test Plant-90 kW
2002



Cikahuripan, Dewata, Bandung
X-flow T-14, DTC-14-2x120 kW
2002



Nono Kuni, Soe, NTT
X-flow T-14, ELC-Huller-Milling-50 kW
2003



Mokondiba, Cameroon
X-flow T-14, Multi Stage Pump-5 kW
2003



Saloy, Mindanao, Philippina
X-flow T-14, ELC-Huller-Milling-25 kW
2003

PROFILE *projects quote 2003-2004*



Dompyong, Trenggalek, Jatim
X-flow T-14, ELC-35 kW-Grid PLN
2004



BSB, Cisarua, Jabar
X-flow T-14, ELC-25 kW-Mini-Grid
2004



Basa Khola, Solokhumbu, Nepal
X-flow T-14, ELC-40 kW
2004



Santong, Lombok, NTB
X-flow T-14, ELC-35 kW-Grid PLN
2004



Cineang, Garut, Jabar
X-flow T-14, Centrifugal Pump-2 kW
2004



Terian, Sabah, Malaysia
Peltric P-14, ELC-Milling-5 kW
2004

PROFILE *projects quote 2004-2005*



Bantul, Sabah, Malaysia
Peltric P-14, ELC-Milling-5 kW
2005



Melong, Subang, Jabar
X-flow T-14 D500, ELC-100 kW-Grid PLN
2005



Melong, Subang, Jabar
X-flow T-15 D500, ELC-100 kW-Grid PLN
2005



Long Meton, Malinau, Kaltim
X-flow T-14, ELC-25 kW
2006



Alwen WTW, Wales, UK
X-flow T-14, IMAG-25 kW
2006



Alwen WTW, Wales, UK
X-flow T-14, IMAG-25 kW
2006

PROFILE *projects quote 2006-2007*



Alasa, Long Alango, Sakarenik
X-flow T-14, ELC-40 kW
2006



Lantan, Lombok, NTB
X-flow T-15 D500, ELC-100 kW-Grid PLN
2006



Nam Ka, Laos, project for entec
X-flow T-14 -15 kW-Solar-Grid
2006



*"We may survive without hydropower, but
Can we live without water ??"*
THANK YOU -Terima Kasih

