



**SOLAR ENERGY TECHNOLOGY**

**ETC ENERGY**

## Overview of Indonesian RE Situation

Gerrit Jacobs

14-18 June 2010  
Jakarta  
Indonesia

Training Course on Renewable Energy Part II - MEMR CASINDO





Programme			
Part II : 14-18 June 2010			
Day	Module	Sessions/ Presentations	Duration (minutes)
<b>14 June 2010</b>			
Day 1	<b>6: Solar energy technology by Gerrit Jacobs, ETC Netherlands</b>		
	s1	Summary of Indonesian RE situation	30
	s2	Introduction Solar Energy Technology	120
	s3	Solar resources in Indonesia	30
	s4	Applications and Functionality of PV Solar Systems	60
	s5	Modelling Software for RE Systems	60
	s6	Solar pump applications and functionality	60
<b>15 June 2010</b>			
Day 2	<b>7: Geothermal energy technology by Nenny Saptadji, ITB</b>		
		Introduction	30
		How does the technology work	70
		Potential and costs of geothermal energy	70
	<b>8: Solar Home Systems by Gerrit Jacobs, ETC Netherlands</b>		
	s7	Introduction to Solar Home Systems	120
	s8	Role of the user	30
	s9	Life Cycle Cost Analysis	30

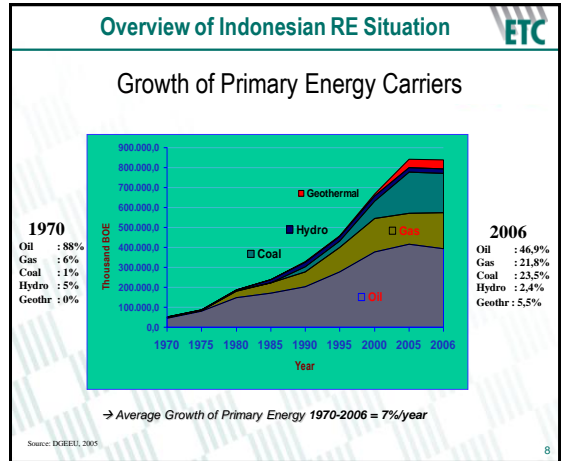
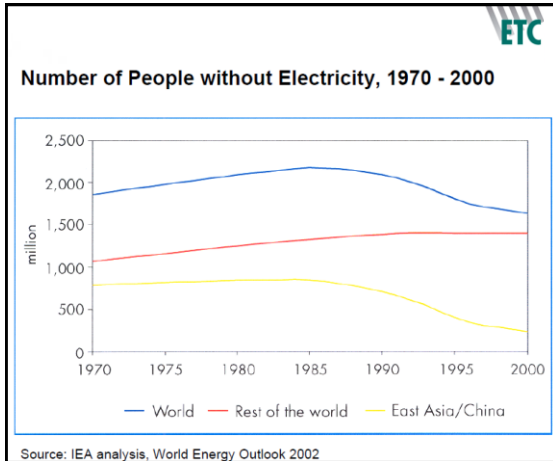
Programme			
16 June 2010			
Day 3	<b>7: Geothermal energy technology (continued) by Nenny Saptadji, ITB</b>		
		Role of geothermal energy in meeting Indonesian future energy demand	45
		Latest technological developments and expected future developments	60
		Practical exercise/case study	60
	<b>8: Solar Home Systems(continued) by Gerrit Jacobs, ETC Netherlands</b>		
	s10	Delivery models for SHS systems- Introduction	90
	s11	Delivery models- Financing and Case Study	90
<b>17 June 2010</b>			
Day 4	<b>9: Renewable Energy Project Development by Patrick van Schijndel, TUE</b>		
		How to develop a RE project?	30
		Selection, needs assessment, feasibility study, construction	60
		How entrepreneurs can get involved in the RE business	40
		Financing options	40
	<b>10: Wind energy technology by Gerrit Jacobs, ETC Netherlands</b>		
	w1	Introduction to wind energy	180
<b>18 June 2010</b>			
Day 5	<b>10: Wind energy technology by Gerrit Jacobs, ETC Netherlands(continued)</b>		
	w2	Wind resources for Indonesia	30
	w3	Small wind generators	150
	<b>11: Evaluation of the training course by Gerrit Jacobs and MEMR-ETCERE</b>		
		Feedback from participants on course content and suggestions for possible follow up training	60

## Introduction

### Who is Who?

- Name
- Where you work
- Hobbies
- Why you attend this training
- What do you expect to learn
- How you use the information
- etc.....



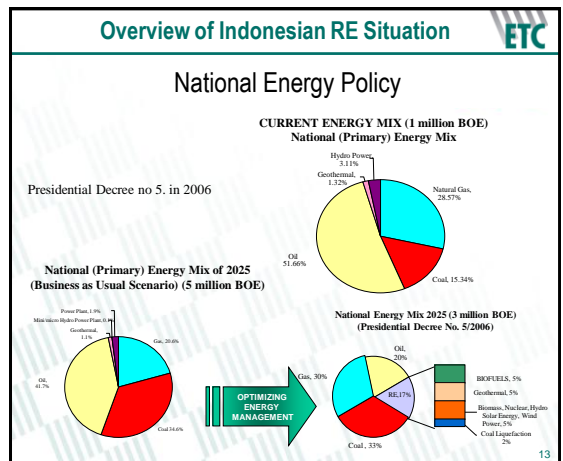
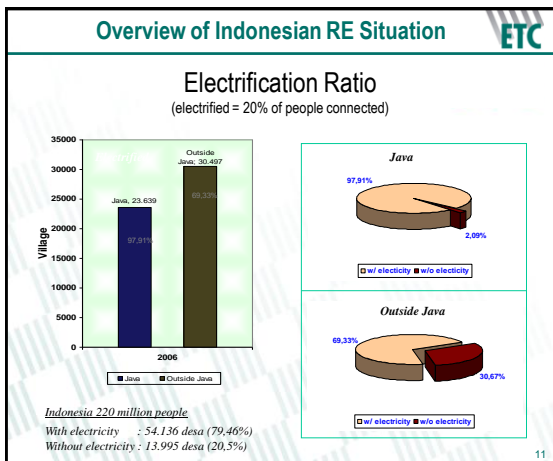
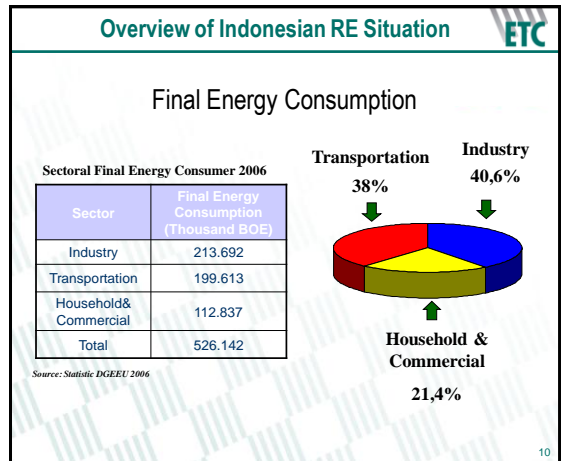
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#### Renewable Energy Potential

TYPE OF ENERGY	RESOURCES	POTENTIAL	UTILIZATION	INSTALLED CAPACITY
Large Hydro	845 million BOE	75,67 GW	6,851 GWh	4,200 MW
Geothermal	219 million BOE	27 GW	2,593,5 GWh	807 MW
Mini/Micro-hydro	500 MW	500 MW		207 MW
Biomass	49,81 GW			445 MW
Solar	4,80 kWh/m <sup>2</sup> /day			12 MW (*)
Wind	3-6 m/second			1 MW (*)
Uranium (Nuclear)	24,112 Tonne e.q.	3 GW for 11 years		

2006

1 BOE = 6.12 G Joules



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### Targets for RE Implementation

- Short-term :  
Small scale for fulfilling rural basic energy needs
- Long-term :  
To substitute fossil energy in achieving energy sustainable development
- In the year 2025 :  
At least 15% of the energy mix should be based on renewable energy (Based on National Energy Policy)

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### RE Development Plan

Type	Unit	2010	2015	2020	2025
Bio-diesel	Kilo liter	1.160.000	3.000.000	11.800.000	4.160.000
Bio-ethanol	Barrel	42.860	48.110	55.340	60.320
Bio oil	Kilo liter	244.000	257.000	627.000	4.863.000
Biomassa : Waste	MW	30	60	120	200
Geothermal	MW	1.320	4.340	5.090	5.270
Wind Power	MW	10	40	80	160
Solar Energy	MW	80	100	120	580
Microhydro	MW	450	740	950	950


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### Applications of Renewable Energy

- Electrification
- Water Pumping
- Battery Charging
- Rural Health Center Refrigerator
- Telecommunication
- Solar Cooker
- Water Heater
- Agriculture/Fishery Product Drying
- Water Distillation
- Fuel for Transportation

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### Rural Electrification Development

- Development of isolated system in remote areas with the utilization of local energy resources, such as micro hydro, wind, solar PV, etc., through:
  - Stand alone
  - Hybrid system: Diesel-Solar PV, Micro hydro-Solar PV, Wind-Solar PV.
- Existing Renewable Energy Installed Capacity for Rural Electrification:
  - Solar PV : 12 MW
  - Micro hydro : 207 MW
  - Wind : 1 MW
  - Biomass : 150 kW
- Target to be achieved in 2025 → Rural Electrification 95%


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### Rural Electrification Projects (2007)

No	Type of Energy	Location	Units	Installed Capacity
1	Solar			2146 kW
	a. Solar Home System	29 Provinces	40,888 x 50 Wp	
	b. Solar Power Plant	Riau, West Java, Central Java & East Java	4x18 kWp	
2	Mini/Micro-Hydro	Bali	1x32 kWp	1171 kW
		- West Java	1x30 kW & 1x37 kW	
		- Banten	1x40 kW	
		- Central Java	1x30 kW, 1x50 kW & 2x15 kW	
		West Sumatera	1x52 kW	
Central Sulawesi (interconnected)	1x890 kW			
3	Wind	- North Sulawesi	2x80 kW	480 kW
		- Bali	4x80 kW	
<b>Total</b>				<b>3797 kW</b>

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### Rural Electrification Projects (2008)

- Located in 29 provinces
- Consist of:
  - solar energy : SHS ( 35,000 units @ 50 Wp) and centralized solar (4 units @10 kW)
  - mini/micro-hydro (capacity: 20 – 500 kW)
  - wind energy (± 150 units @ 50 Wp)
  - Hybrid: wind-diesel and solar-diesel

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### Self Sufficient Energy Village Programmes

- SSEV is a village having capability to produce a part/whole their energy demand for consumptive and productive use.
- CRITERIA
  - Utilization of locally available energy (renewable energy)
  - Creation of productive activities
  - Job creation
- PROGRAM:
  - Utilization of locally available energy resources
  - Development of productive activities
  - Development of applicable technologies
  - Development of institution and people participatory

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### SSEV Types

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graph TD
    A[SELF-SUFFICIENT ENERGY VILLAGE] --> B[BIOFUEL-BASED]
    A --> C[NON BIOFUEL-BASED]
    B --> B1[Jatropha Curcas]
    B --> B2[Coconut]
    B --> B3[Palm]
    B --> B4[Cassava]
    B --> B5[Sugar Cane]
    C --> C1[Micro-hydro]
    C --> C2[Wind Turbine]
    C --> C3[Solar Energy]
    C --> C4[Biogas]
    C --> C5[Biomass]
  
```

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### Indonesia PV System Target Market 2005 - 2025

**SHS for off-grid remote area electrification target:**

- SHS for low income Household : 615.000 HH
- PV System for medium income Household : 1,047 million HH

**PV System on-grid for City and Urban Housing target:**

- PV System for high income (Household 2 kWp) : 314.000 HH

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### Indonesia PV System Target Market 2005 - 2025

**PV System off-grid target:**

- SHS 50 Wp for low income HH : 30,75 MWp
- PV System by Hybrid and, or Large Module SHS 150 Wp : 157,05 MWp

**PV System on-grid target:**

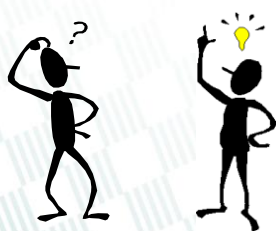
- PLTS on-grid 2 kWp : 628 MWp

**Total PV System Installed Target : 815,80 MWp**

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### QUESTIONS ?



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