WHY RENEWABLE ENERGY
A FOCUS ON INDONESIA

By
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President Commissioner
Glendale Partners

26th March 2009

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Country Profile

- Fourth Largest Nation on Earth
- Archipelago covers over 16,000 islands and approx. 5000 kms from East to West
- Land mass represents 1.92m sq kms
- Population 235m (285m in next 15 years) and 58% population expected to be in Java.
- Java is main centre with 83% industry and 60% of Rice Production.

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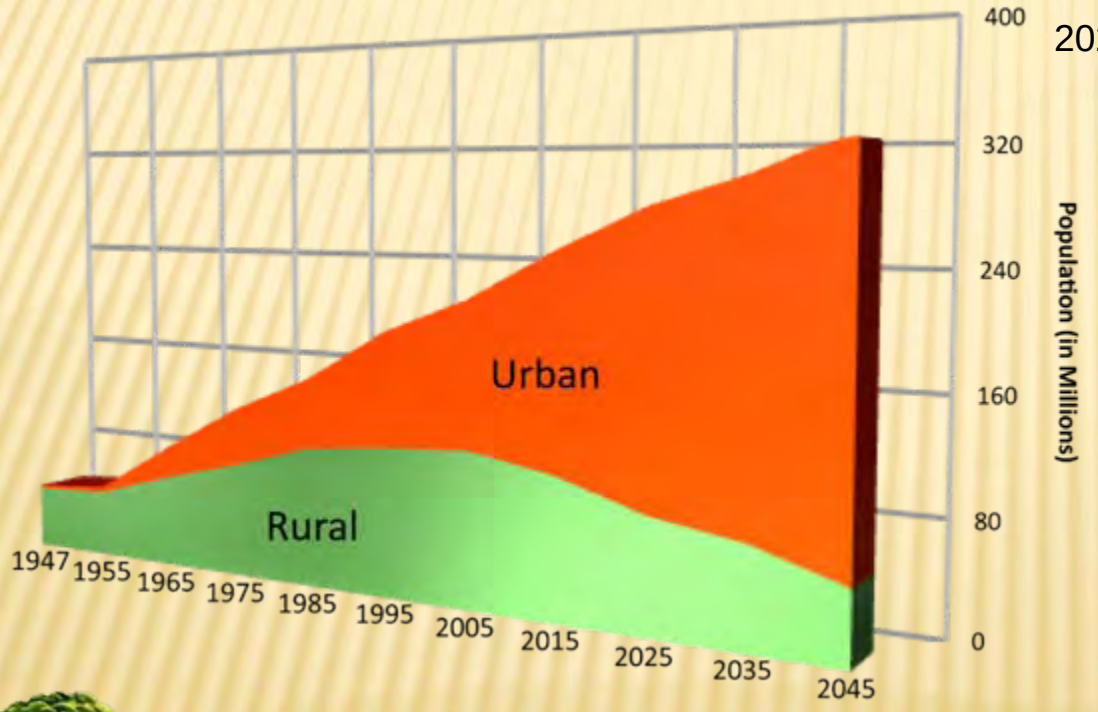
Urbanisation of Indonesia

Population Growth with time



Today : Urban / Rural ratio ~ 50/50

2020 : Urban / Rural ratio ~ 70/30

Region	Population	%
Sumatera	48,504,717	21%
Java / Bali	140,643,520	61%
NTT / NTB	8,842,789	4%
Kalimantan	12,618,693	5%
Sulawesi	16,403,378	7%
Maluku / Papua	4,955,939	2%
TOTAL	231,969,035	100%

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A Great Place to Invest

RI offers 'high investment return'

The Jakarta Post
Jakarta

Indonesia ranked fourth in countries with the highest return on equity in 2007 and is likely to perform better this year in line with other investment possibilities in Asia, Deutsche Bank said Wednesday.

The return on equity investment in the country averaged 54.1 percent thanks to the economy that grew by 6.3 percent last year, Deutsche Bank chief investment officer Chew Soon Gek told reporters in Jakarta.

"Indonesia's position comes after the China free ares in third place with 66.2 percent, India in second place with 73.1 percent and China's domestic market at 96.6 percent," she said, citing reports from Bloomberg.

The equity returns in Indonesia, she said, were apparently higher than its "strong" regional counterparts such as Singapore with 28.3 percent and Japan with minus 4.1 percent.

The Asia region as a whole, excluding Japan, gave an average return of 40.5 percent, far above Europe with 14.4 percent.

Chew also said Asia would not be affected by the U.S.-led subprime mortgage crisis as the region now included emerging economies that helped to stabilize the global supply-demand chain, particularly China.

"We are positive the Asia equity market will promise better returns because their economies are improving and not much affected by the U.S. economic subprime crisis," she said.

For this year, she recommended investments in agribusiness commodity futures, particularly those in soybean, corn and wheat.

"The improvement of the economic condition in Asia helped to improve people's purchasing power. This led to the higher demands for foods with high proteins. Thus, an increase of prices," she said.

For conservative investors with high yield expectations, she recommended gold and hedge funds – an instrument to protect investment capital from inflation, global economic turmoil and the weakening of the U.S. dollar.

"The gold prices will likely hike up to US$1,000 per troy ounce in this twelve-month period. That is why it's still profitable like it was last year," she said.

Last year, gold saw 31.4 percent in returns and international current prices stand at around $833 per troy ounce.

Chew said she recommended global investors put 20 percent of their capital in hedge funds to make sure all of their investment didn't slump if stock markets went down.

"Hedge fund returns are attractive and remain stable due to its favorable diversification," she said (ant)

EQUITY RETURNS 2007

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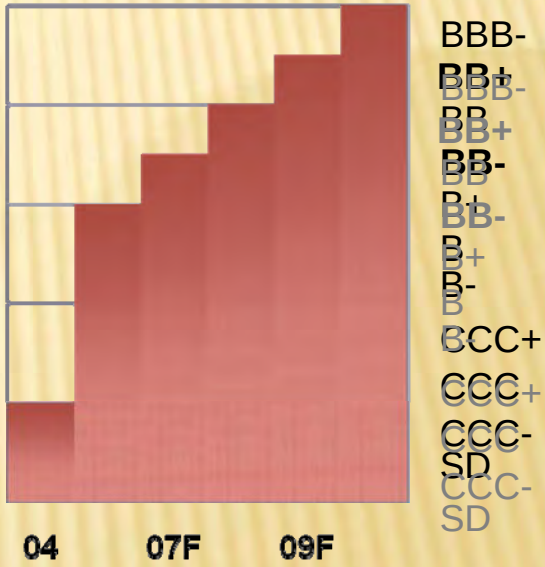
Growth



Indonesia's Risk Rating by Standard and Poor's (BBB- = Investment Grade) 2010

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Climate Change

- Climate Change Debate raised the profile of Renewable Energy
- Need for increased self-dependence
- Indonesia well endowed with alternatives to fossil fuels

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Climate Change

Sub-disciplines

- Weather and climate processes:
  - meteorology
  - climatology
  - atmospheric chemistry & physics
- Climate history
  - geology
  - palaeoceanography
  - quaternary science
- Data processing & Virtual reality
  - mathematics – statistics
  - modelling

Drivers of Change

- Variation in energy released from sun
- Orbit of Solar system in galaxy
- Orbital change to Earth
- Bacteria in Ground (consumer of C)
- Changing ocean currents
- Plate tectonic and continent movement
- Supernova eruptions

Human Influences

Human Impact

- Population “Explosion”
- Population 235m (285m in next 15 years) and 58% population expected to be in Java.
- Increased numbers in poverty
- Require more efficient use of resources
- Sustainable development in practice bottom up, empowerment

Seven Questions

- Is the climate in period of change?
- What impact does human activity have on the change?
- Will the change lead to need for human life adjustment?
- How much?
- Will humanity make the adjustment?
- Will it matter?
- What about over population, poverty, water, food security, sustainable development?

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Where do Human global carbon emissions come from?

- 75% from hot spots-large urban community and their industries, transport activities.
- 20-25% from land use change and deforestation

From climate change mitigations, from human activities,

Requirement to make impact on these.

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REDD and Indonesia

- Indonesia probably has highest REDD emissions and best opportunity for reduction
- Indonesia played a proactive role in the international negotiations of new requires of commitments and incentives
- Now has 2 years to prove REDD mechanisms can work and global community can benefit from a full-scale REDD inclusion in a post-Kyoto regime

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AGROFORESTRY AND REDD

(Reducing Emission from Deforestation & Degradation)

By planting trees and utilising intercropping systems that remove the greenhouse gas CO2 from the atmosphere, poor farmers could claim an important share of the carbon market and generate funds that could be used locally to promote rural development

AGROFORESTRY AND REDD

- Farmer carbon agroforestry also can be critical in stabilising deforestation
- It can have a major important REDD as 42% of deforestation is driven by small scale agriculture and shifting cultivation is a considerable percentage of this-issues linked to poverty and lack of economic alternatives

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Benefit from Tackling Issues

- Climate change mitigation of carbon emissions through sequestration in soil and biomass, as well as conservation of forest carbon stocks
- Adaptation: increased soil water holding capacity, soil facility; integration of drought resilient stress into agricultural systems

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Benefit from Tackling Issues

- Livelihoods: food security, income security, long-term sustainability, no-cash benefits, diversification of productive base.
- Biodiversity: habitat structure connectedness and direct increase in species richness and evenness
- Empowering local communities through supporting sustainable land use systems helping to ensure permanent bio-carbon sequestration

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Mankind and Ecological Processes

- Consequences range from local water pollution to global climate change
- Most of Earth's terrestrial surface may now be considered "Human dominated"
- Direct and intentional human interaction with land use responsible for large proportion of environmental impacts.

Pilot Action

- Carbon neutral city (China), housing/commercial complex (Abu Dhabi)
- Forestry/intercropping (South Africa) (sustainable development)
- Change to renewable energy

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Indonesia's Energy Profile

Sumatera	2005	2010
Sales (TWh)	13.3	16.3
No.of Cust. (M)	6.3	7.1
Capacity (GW)	3.6	6.0
Electrif Ratio (%)	55.9	61.9
IPP	0.9	

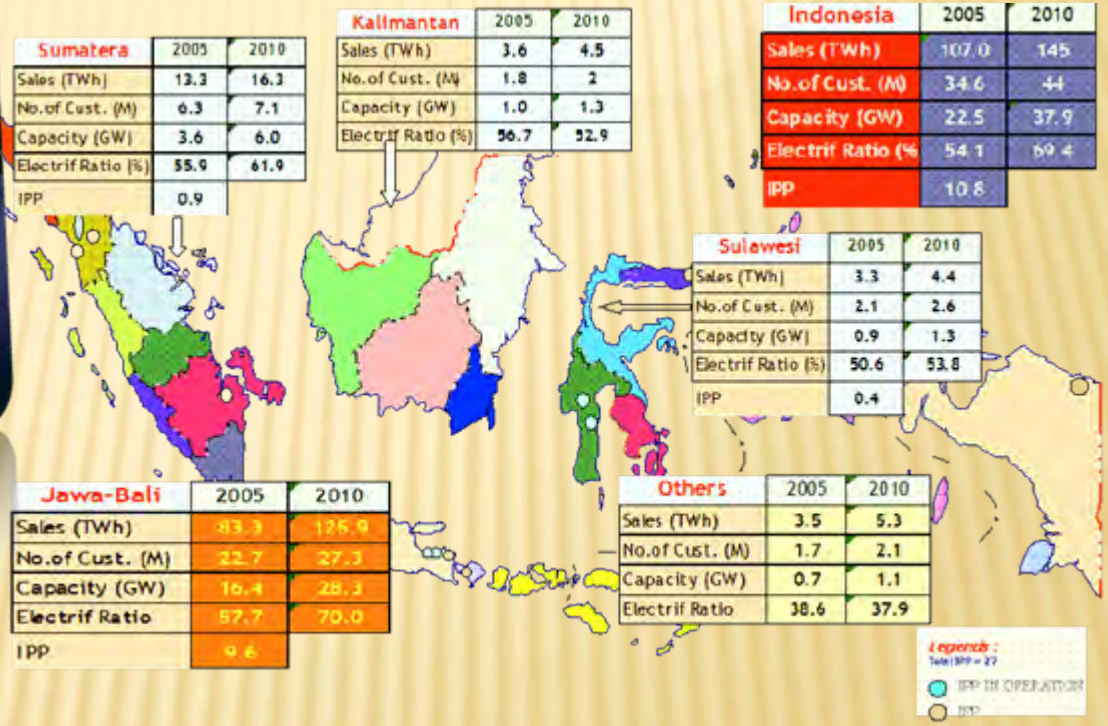
Kalimantan	2005	2010
Sales (TWh)	3.6	4.5
No.of Cust. (M)	1.8	2
Capacity (GW)	1.0	1.3
Electrif Ratio (%)	50.7	52.9

Indonesia	2005	2010
Sales (TWh)	107.0	145
No.of Cust. (M)	34.6	44
Capacity (GW)	22.5	37.9
Electrif Ratio (%	54.1	69.4
IPP	10.8	

Sulawesi	2005	2010
Sales (TWh)	3.3	4.4
No.of Cust. (M)	2.1	2.6
Capacity (GW)	0.9	1.3
Electrif Ratio (%)	50.6	53.8
IPP	0.4	

Jawa-Bali	2005	2010
Sales (TWh)	83.3	125.9
No.of Cust. (M)	22.7	27.3
Capacity (GW)	16.4	28.3
Electrif Ratio	57.7	70.0
IPP	9.6	

Others	2005	2010
Sales (TWh)	3.5	5.3
No.of Cust. (M)	1.7	2.1
Capacity (GW)	0.7	1.1
Electrif Ratio	38.6	37.9



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Energy: Supply and Demand Issues

- Supply:

  - Trade in fossil fuels

  - Sources vs. Population Distribution and Consumption Demand

- Demand:

  - Rapid Urbanisation (70% of world population in urban-development lifestyle in 20 years)

  - Need and opportunity to make cities more energy efficient, and reliably less polluted

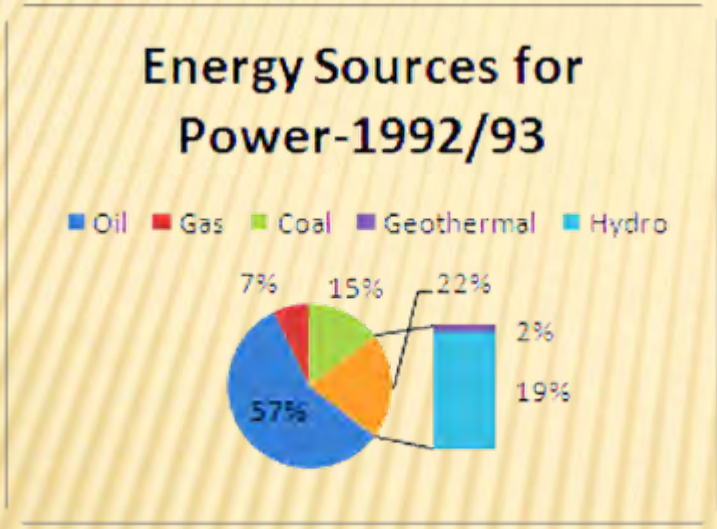
Renewable Energy Sources - ASEAN

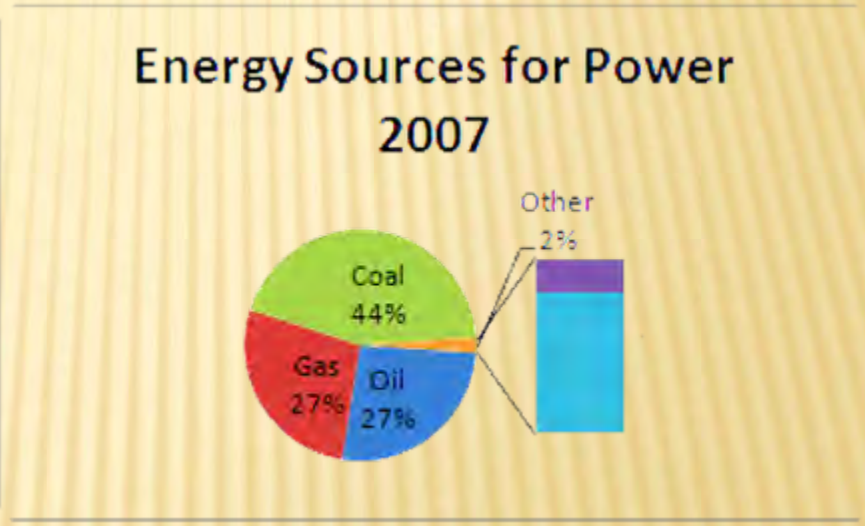
Country	Biomass	Geo	Hydro	Micro Hydro	Solar	Wind	Total(MW)
BRUNEI	-	-	-	-	0.0024		0.0024
CAMBODIA	n.d	-	18	0.96	0.13	-	19.09
INDONESIA	302	363	4,246	21	8	0.4	4,940.4
LAO PDR	n.d	-	621	6	0.16	-	627.16
MALAYSIA	213	-	2,225	6	2.19	0.15	2,446.34
MYANMAR	-	-	340	83	0.24		423.24
PHILIPPINES	21	1,960	2,480	230	0.44	0.06	4,691.5
SINGAPORE	220	-	-	-	-	-	220
THAILAND	1,230	0.3	2,886	94	8	0.17	4,218.47
VIETNAM	n.d	-	3294	62	0.11	0.15	3,356.26
ASEAN -10	1,986	2,323.3	16,110	502.95	19.27	0.93	20,942.46

Renewable Energy Status for Power Generation in Asia (2000) in MW

Current Energy Usage

- Indonesian Profile





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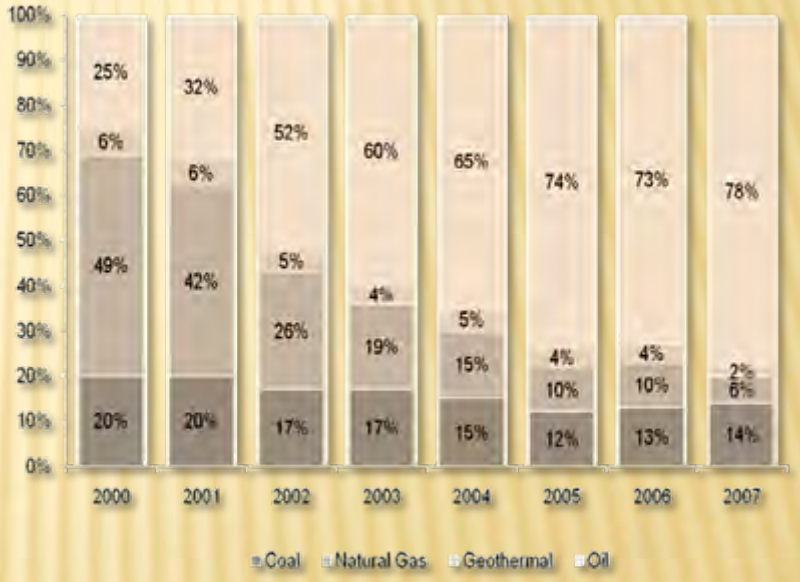
Fuel Sources

Table 1. Potential Energy Sources

Fossil Energy	Total Reserve	Proven Reserve	Production	Supply
Crude Oil	56.6 billion bbl	8.4 billion bbl	384 million bbl	24 years
Gas	334.5 TSCF	165 TSCF	2.79 TSCF	59 years
Coal	90.5 billion ton	18.7 billion ton	201 million ton	93 years
Coal Bed Methane	453 TSCF	–	–	–

Renewable Energy	Generating Potential	Installed Capacity
Hydro	75,670 MW	4,200 MW
Biomass	49,810 MW	300 MW
Geothermal	27,000 MW	1,052 MW
Wind	9,290 MW	0.5 MW
Mini/Micro Hydro	450 MW	84 MW

Figure 1. PLN Fuel Cost Mix



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Renewable Sources

The sources of energy that can be truly defined as renewable are:

- Solar
- Hydro
- Geothermal
- Biomass – Agricultural by-product
- Wind
- Tidal
- Waste
- Biocrops

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Geothermal

- Two Jurisdictions
- Cost and risk in drilling for tapping resources
- Tariff vs. risk
- Low temperature geothermal

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Hydro

- Large dams ~ big resources ~ big social/environmental footprint ~ Possible local climate impact
- Run of river schemes ~ small environmental impact : suitable for isolated communities
- Greater than 10 MW output for IPP PPA

Major (> 50 MW)			
Location	Capacity (MW)	Energy	Year Built
Asahan III-inalum	400		
Tangga	317	2,054	1983
Sigura-gura	286	1,868	1982
Singkarak	172	936	
Maninjau	68	270	1984
KotoPanjang	220	615	
Kerinci	180		
Besai	90		
Cirata	1,008	1,694	
Saguling	700	1,974	1985
Jatiluhur	187	790	1960/1980
Sudirman	180	600	1988
Brantas -PJB	281	1,034	
Sutami/Karangkates	105	488	1973
Wlingi	54	166	1978
Larona	165		
Bakaru	252		

Hydro

- Need suitable “take or pay” offtake agreement
- Pump storage schemes : only when integrated energy supply and supply power and … arrangement

Table 2 Categories of Hydropower Scheme

Type	Capacity MW	Typical scheme	Suitability	Typical constraints
Major	>50	Large storage dam with power tunnels.	Supply to national grid for peak power.	Reservoir resettlement
Medium	5-50	Storage but also run of river with power tunnels, often lake in catchment	As major but also local district networks.	Risk of unknown tunnel geology.
Mini	0.1-5	Weir and steel penstocks exploiting natural river feature.	Small towns /relatively isolated communities in hilly areas.	Cost of transmission and distribution.
Micro	0.1<	As mini above and use in hill irrigation systems.	Village communities and operated by them.	Responsibility for O&M.

Table 1 Hydropower Status in Indonesia

Status	*Operations*		*Under construction*		*Planned*	
Region	Units	Capacity (MW)	Units	Capacity (MW)	Units	Capacity (MW)
Sumatra	9	524.02	2	243	24	
Java-Madura	27	2,535.32	0	0.00	11	
Bali-Nusa Tenggara	0	0.00	0	0.00	8	
Kalimantan	1	30.00	0	0.00	7	
Sulewesi	4	177.38	1	0.00	15	
Maluku	0	0.00	0	0.00	5	
Irian Jaya	0	0.00	0	0.00	2	
TOTAL	41	3,266.72	3	261.70	72	7,380

Hydro

Table 7.1 Existing and Proposed Hydropower Capacity

Region	Operating (2005)		Under Construction (2006)		Planned (2006- 2010)	
	Units	Capacity MW	Units	Capacity MW	Units	Capacity MW
Sumatra	48	566	2	292	1	180
Java	100	2,409				
Bali&Nusa Tenggara	5	1				
Kalimantan	4	30				
Sulawesi	25	190	1	20	2	150
Maluku &Irian Jaya	7	3	1	19		
Indonesia	**189**	**3,199**	**4**	**331**	**3**	**330**

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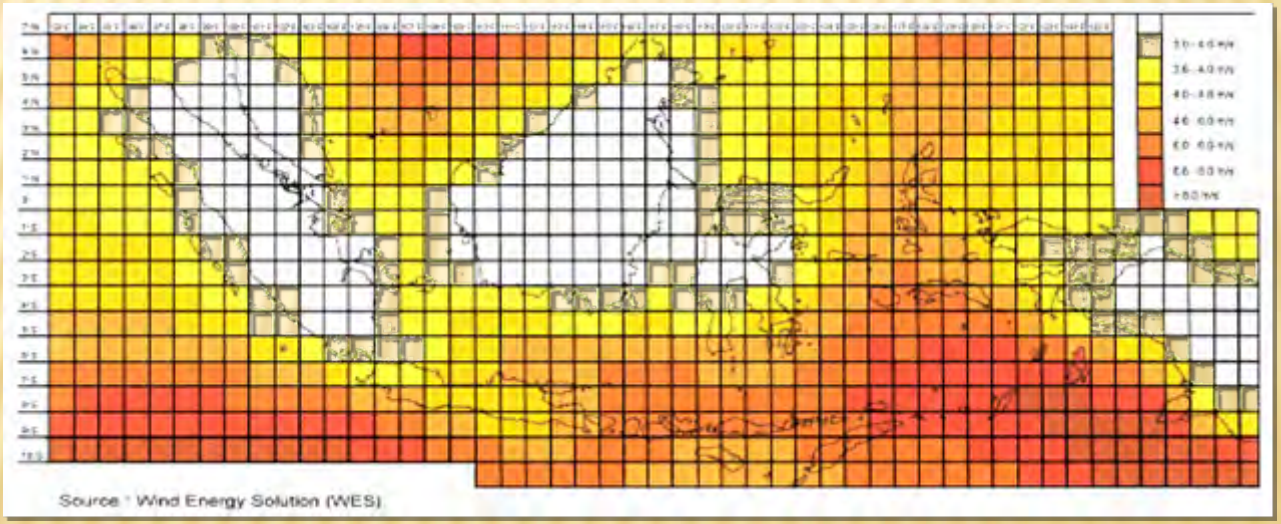
Wind Power

- Limited to certain areas of Indonesia
- Not base load power : Linked with other resource - hybrid or feeding into grid
- Operate in selective wind speed range
- European costs have come down 80% in past 20 years. Now competitive with Coal and Natural Gas



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Solar Power

- Day time energy source
- Large areas required currently
- Photovoltaic storage cells still at relatively immature stage of development
- Installation still relatively expensive but costs dropping
- Cheap alternative in mixed energy arrangement for buildings; saving on central grid supply

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Bio Crops and Biomass

- Biocrops - food crops, e.g. sugar, corn, cassava grown produce ethanol
  - fuel output only, jatropha
  - controversial, competing with food
  - often subsidised, e.g. USA
  - Indonesian market immature

- Biomass - waste from growing of food e.g. rice, coconut palm oil
  - potential for expansion

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Suggested Goal of Power Resource Mix

Location	Pop.	Resources							
	Mil	Coal	Gas	Oil/Diesel	Hydro	Geoth.	Biomass	Wind	Solar
Java/Bali	140.6	p	s/t	t	s	s	s/t	t	t
Sumatra	48.5	p	t	t	p	p	s		t
Kalimantan	12.6	p	s		t		t		
Sulawesi	16.4	p	s	t	p/s	s	s		t
Maluku/ Papua	4.9		s	t	p	s	t	s	s
NTT/ NTB	8.8	s		s/t	p	t	t	s	s
TOTAL	231.9	Note: p = primary; s = secondary; t = tertiary							

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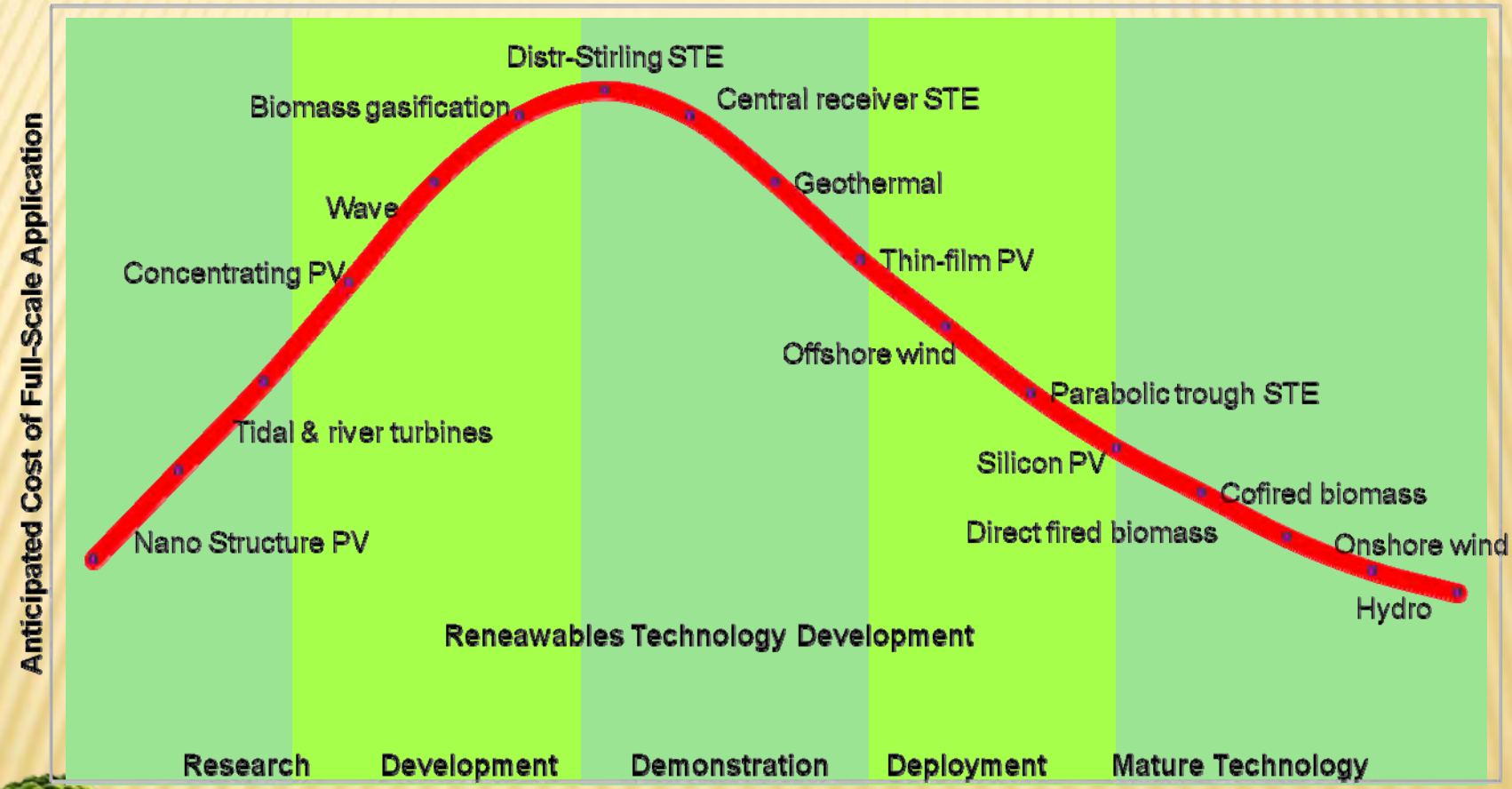
Key Points

- Acceleration of interest in renewable forms of energy resulting from focus on impact of global climate change
- Indonesia well endowed with suitable renewable sources (as well as with fossil fuels)
- Presentation limited to snapshot overview

Development



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Is there a Consensus ?

- ‘Let’s be clear: the work of science has nothing whatever to do with consensus. Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right, which mean that he or she has result that are verifiable by reference to the real world. In science consensus is irrelevant. What is relevant is reproducible result. The greatest scientist in history are great precisely because they broke with the consensus….’

By writer Michael Crichton

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Concern Over Basis of IPCC Curve

- Location of temperature monitoring sites – 90% on land
- Local conditions at many measurement sites have changed
- No of measurement sites used varies dramatically over time

  1850 – 200
  1965 - >14,000
  2000 - > 5,000
- Use of average daily max & min temperature readings – statistically doubtful
- IPCC won't release data for separate independent analysis

Sustainability

EAST BALI POVERTY PROJECT

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EAST BALI POVERTY PROJECT

MISSION AND VISION

- Eliminate illiteracy
- Eliminate malnutrition
- Promote good health
- Reduce poverty and promote culturally sensitive sustainable social and economic development in impoverished rural communities that have little or no choice to alleviate their own plight

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EAST BALI POVERTY PROJECT

General

- No people: 15,000 across 19 villages/hamlets
- Area of Desa Ban: 7,000 ha
- Costs till 2007: US$1.3m
- Administration: 15% of costs
- Staffing: British founder and 100 Local Balinese
- Full sustainability: 12 years
- Private Sector funding only

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NUTRITION IMPROVEMENT FOR CHILDREN IN EBPP SCHOOL

1998

Almost all children were malnourished

84.5% children aged 6-12 suffer Palpable Goitre

(Government Health Department survey)

2008

Nutritious meal every school day; a glass of fortified milk, multivitamin tablet

Nutrition education programme

our children are the tallest and healthiest in their village by the age of 14-15

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Profile of EBPP (15,000 People)

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Thank You

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