

# Wind Power Resources, Potential and Recent Initiatives in Myanmar

1-2 November 2012

Presented by  
Saw Si Thu Hlaing  
Department of Electric Power  
Ministry of Electric Power

# Contents

- \* Energy Policies Framework
- \* Primary Energy Resources and their Potentials
- \* Wind Energy and Potential
- \* Recent Initiatives of Wind Power in Myanmar
- \* Large Scale Wind Power Projects in Myanmar
- \* Advantages and Disadvantages of Wind Generated Electricity
- \* Conclusions

# Energy Policies Framework

- \* To maintain the status of energy independence
- \* To Promote wider use of new and renewable sources of energy
- \* To promote energy efficiency and conservation
- \* To promote use of alternative fuels in household

# Primary Energy Resources and their Potentials

1	Crude Oil (Offshore & Onshore) (Proven + Probable)	609.39 MMBBL
2	Natural Gas (Offshore & Onshore)(Proven+ Probable)	166.13 TSCF
3	Hydro	108,00 MW
4	Coal	711 Million Metric Tons
5	Biomass	52.5 % of total land area covered with forest potential available annual sustainable yield of woodfuel-19.12 Million Cubic Ton
6	Wind	365.1 TWH per year Coastal strip of 2832 Km with South-westerly wind -9 months North-easterly wind-3 months
7	Solar Power	51973.8 TWH per year
8	Geothermal	93 Locations

# Institutional Arrangement in the Energy Sector

- |   |  |
|---|--|
| (1) Petroleum   | Ministry of Energy                     |
| (2) Electric Power (Hydropower, Thermal, transmission and distribution) | Ministry of Electric Power             |
| (3) Biomass and Fuelwood  | Ministry of Forestry                   |
|   | Ministry of Agriculture and Irrigation |
| (4) Renewable   | Ministry of Science and Technology     |
| (5) Solar   | Ministry of Industry                   |

## **Related Organization (Non Government)**

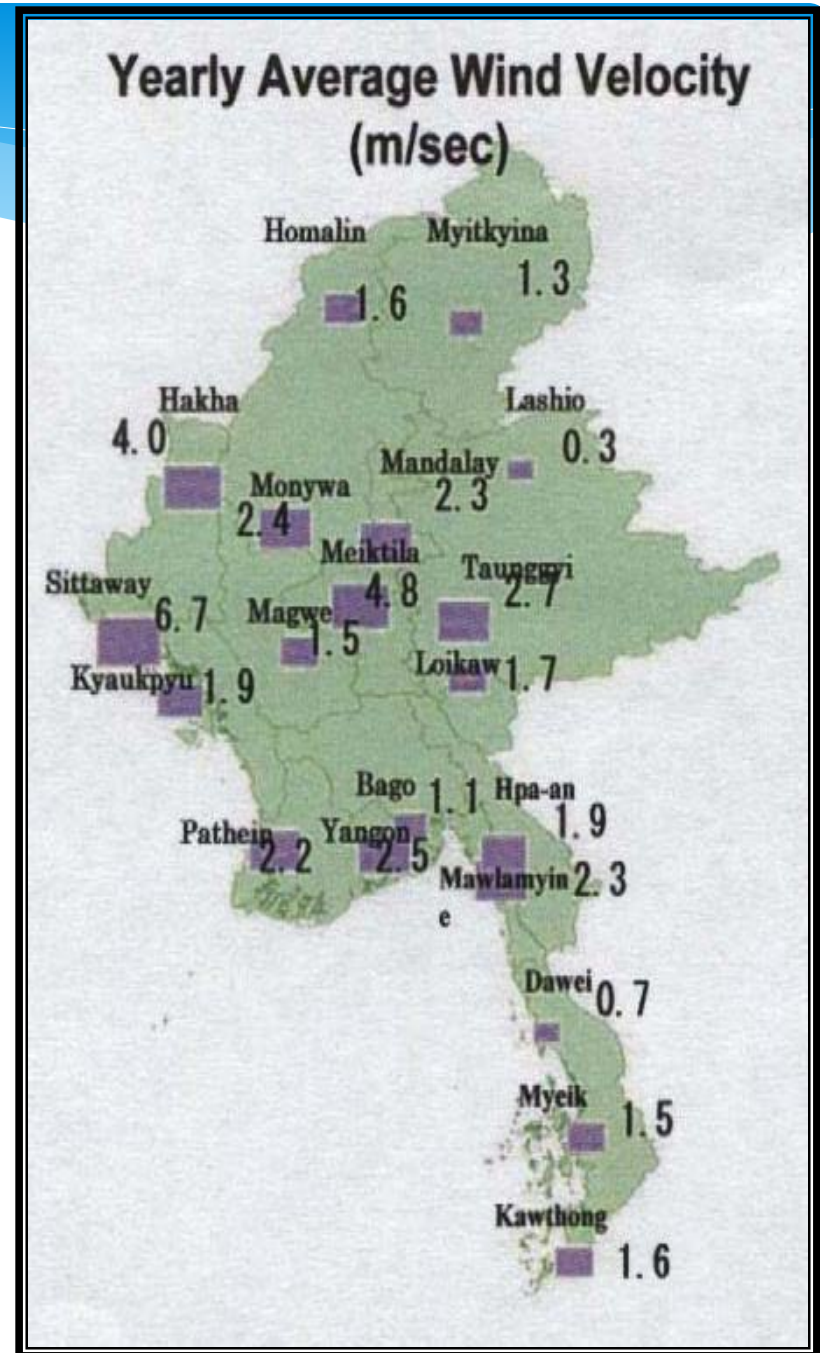
- (1) Myanmar Engineering Society
- (2) Renewable Energy Association Myanmar

# Wind Energy and Potential

- New Energy and Industrial Technology Development Organization(**NEDO**) of Japan performed in **1997** a study on renewable energy potentially available Wind Energy of **365.1 TWh** per year.
- Promising areas to harness wind energy are in three regions, namely Hilly Regions of Chin and Shan states. Coastal regions in the south and western part of the country and central part of Myanmar.
- Use of wind energy is at the very initial stage. Due to the expensive initial cost, the utilization of wind energy needs to be implemented in cooperation with foreign participants under technology transfer and financial assistance program.
- General observation shows that wind power potential in Myanmar is relatively low and irregular. There is a considerable measure of stagnant period which occur even in generally windy areas.
- Some potential areas are identified by **JICA/ NGO** joint survey in **2001**. Coastal, islands, wind corridor inland and high plateau areas have potential but particular survey to size and design the system is essential before implementation. **Solar** power is found to be a most potential one **to hybrid with wind power** in Myanmar.
- Only a very few small wind generators are used in lower part of the country. Ready made wind generator of **around 300-600 W** capacity are available in private market and mostly are imported from China.

# Wind Energy and Potential

- 2832 Km costal strip facing the bay of Bengal and Andaman sea.
- Potential available wind energy **365.10 TWh/Yr** (NEDO, 1997)
- Only on R & D Phase
- Individual scale of water-pumping, wind mill & generate electricity in rural area.
- Source: NEDO Japan(1997)



# Recent Initiatives

## Chaung Thar Hybrid Power Supply System Project

Objective: Demonstrative research on a grid-connected PV systems

NEWJEC, INC

Dept. of Electric Power, MOEP

US\$ 5 million



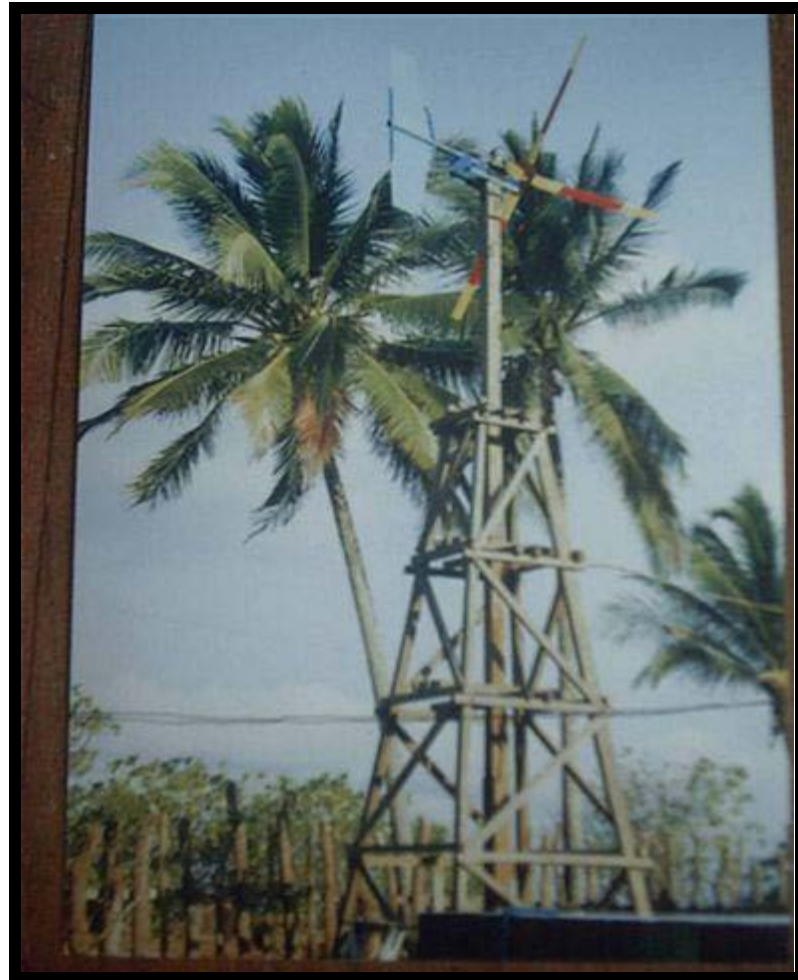


# Chaung Thar Hybrid Power Supply System Project

- Street lighting contributing to the extension of villagers' economic and productive activities
- Clinic lighting, more vaccine refrigeration and more power for medical equipment usage.
- Approx. **98.8 ton** of **carbon dioxide reduction** in a year

Population	6325/ 1307 households
Public Facilities:	1 High School 2 Monasteries with 2 Community Halls 1 Hospital with 16 Beds 1 Police Station 1 MEPE office 1 Post & Telecom Office & Street Lighting

# SPV/Wind Hybrid power system demonstration Wind power trial for a coastal farm



# Wind Power Plants for Electrification in Myanmar

Sr. No	State & Region	Number of Plants
1.	Kayin State	10
2.	Sagaing Region	14
3.	Ayeyarwaddy Region	1
	Total	25

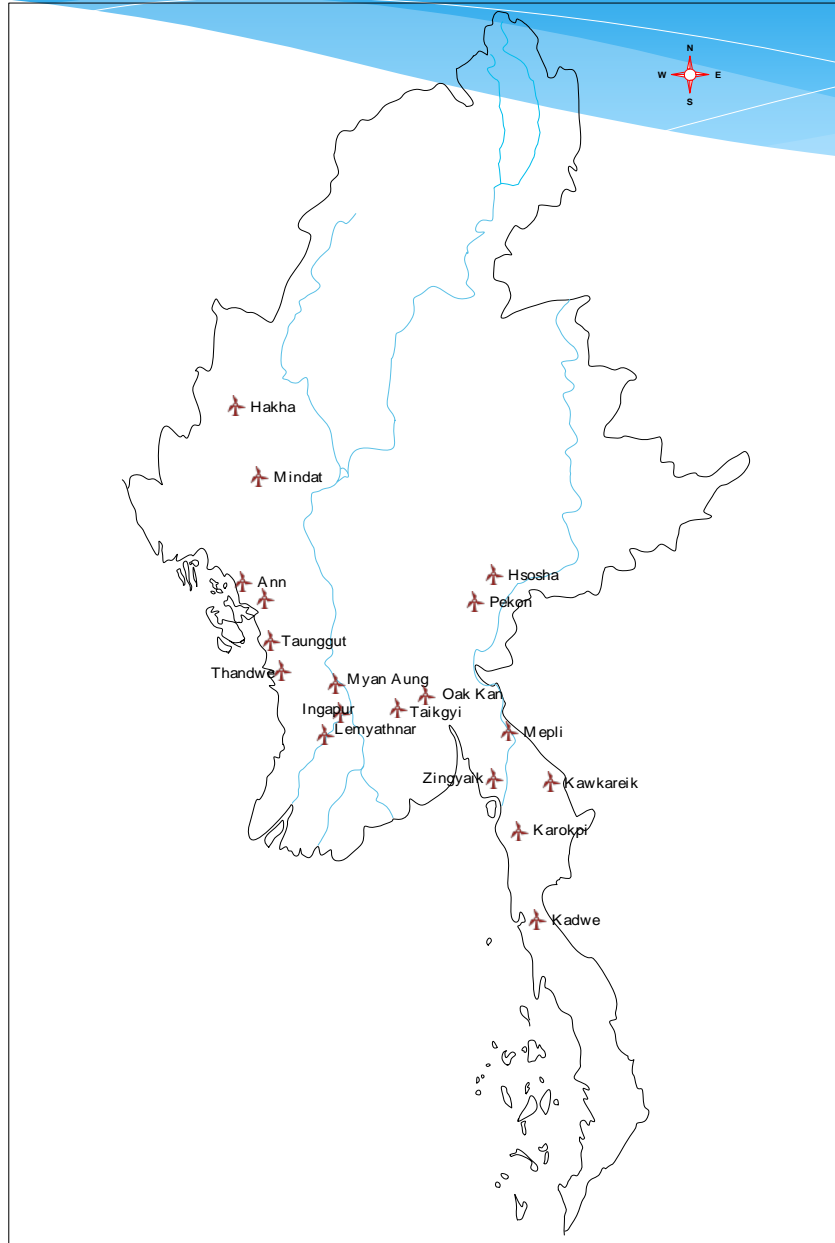
# Large Scale Wind Power Projects in Myanmar

- At present, two foreign companies, Gunkul Engineering Public Co and China Three Gorges Co are already signed MOU with Department of Electric Power and on going to make **Feasibility Study**.
- Available Install Capacity is **4032 MW**.

# Large Scale Wind Power Projects in Myanmar

- \* **Gunkul Engineering Public Company (Thai)** is making Feasibility Study for Wind Power Plants (**2930 MW**) in Mon State, Kayin State, Thaninthayi Region, Shan State and Kaya State.
- \* **China Three Gorges Company (China)** is making Feasibility Study for Wind Power Plants (**1102 MW**) in Chin State, Rakhaing State, Ayeyawaddy Region and Yangon Region.

## Site Location for Feasibility Study of Wind Power



# Gunkul Engineering Public Co Ltd

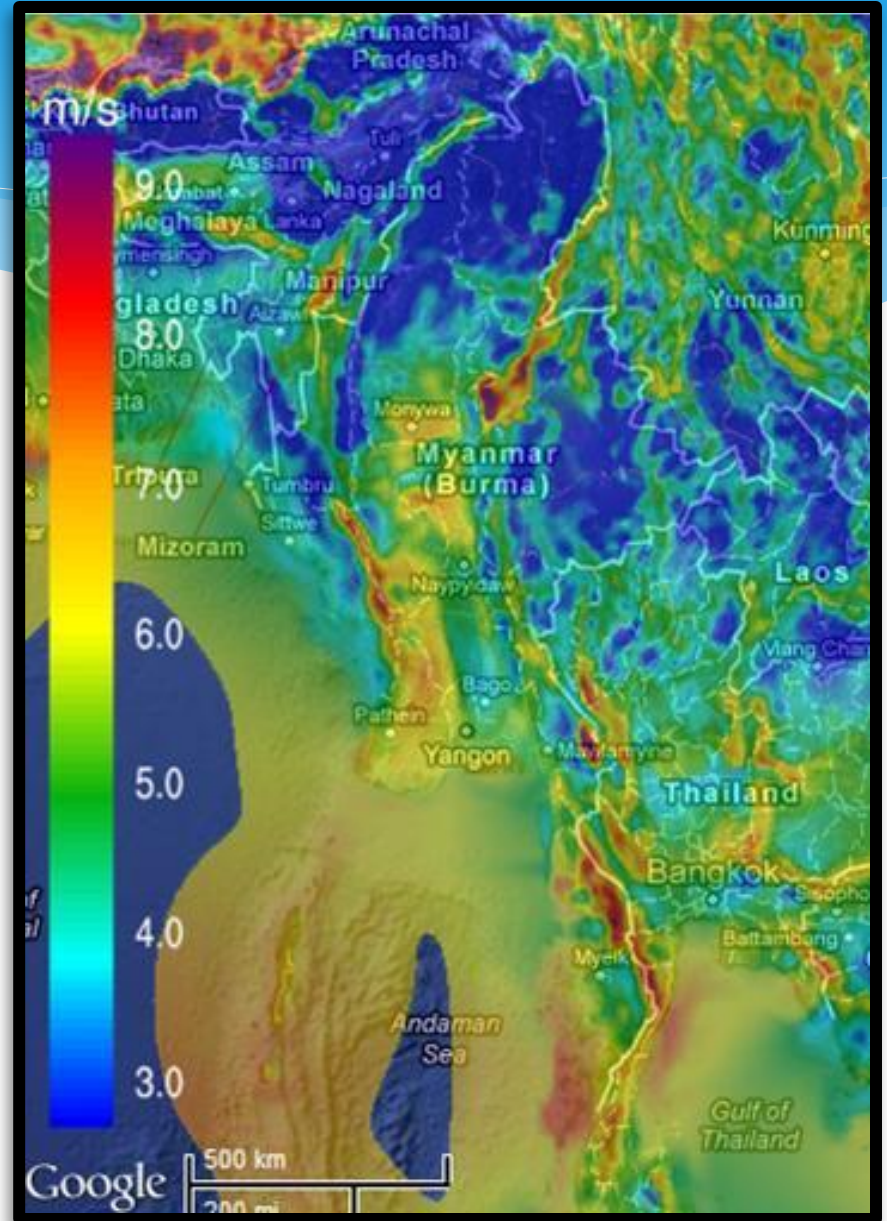
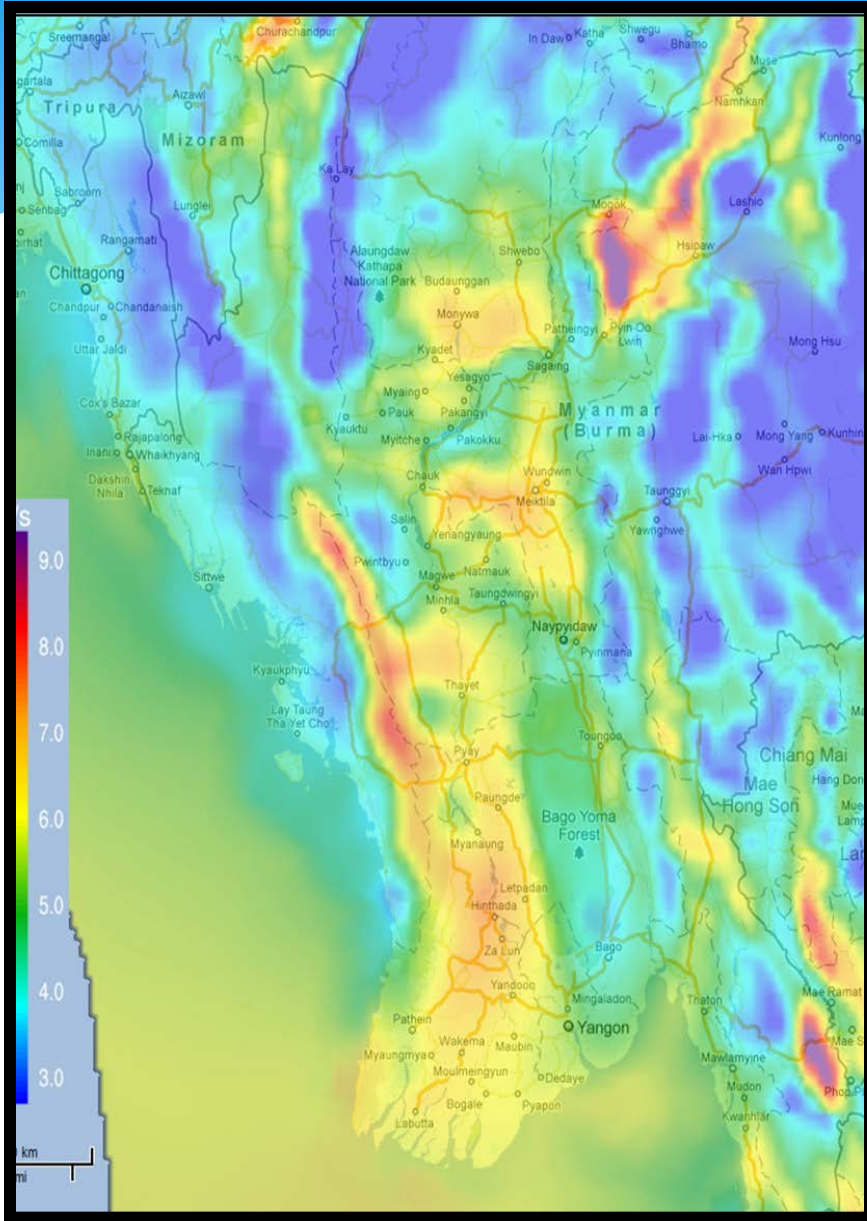
No.	Site Name	Location	Area and length		Installed capacity (MW)	Min Average wind speed (m/s)
			Area (km <sup>2</sup> )	Length (km)		
1	Pekon	Kaya	473		950	4.2
2	Kadwe	Tanintharyi	107		220	4.6
3	Karokpi	Mon	252		510	3.9
4	Zingyaik	Mon	76		160	4.2
5	Kawkareik	Kayin	288		580	5.0
6	Hsohsa	Shan	108		220	3.9
7	Mepli	Kayin	145		290	4.4
<b>Total:</b>					<b>2930</b>	

# China Three Georges Co Ltd

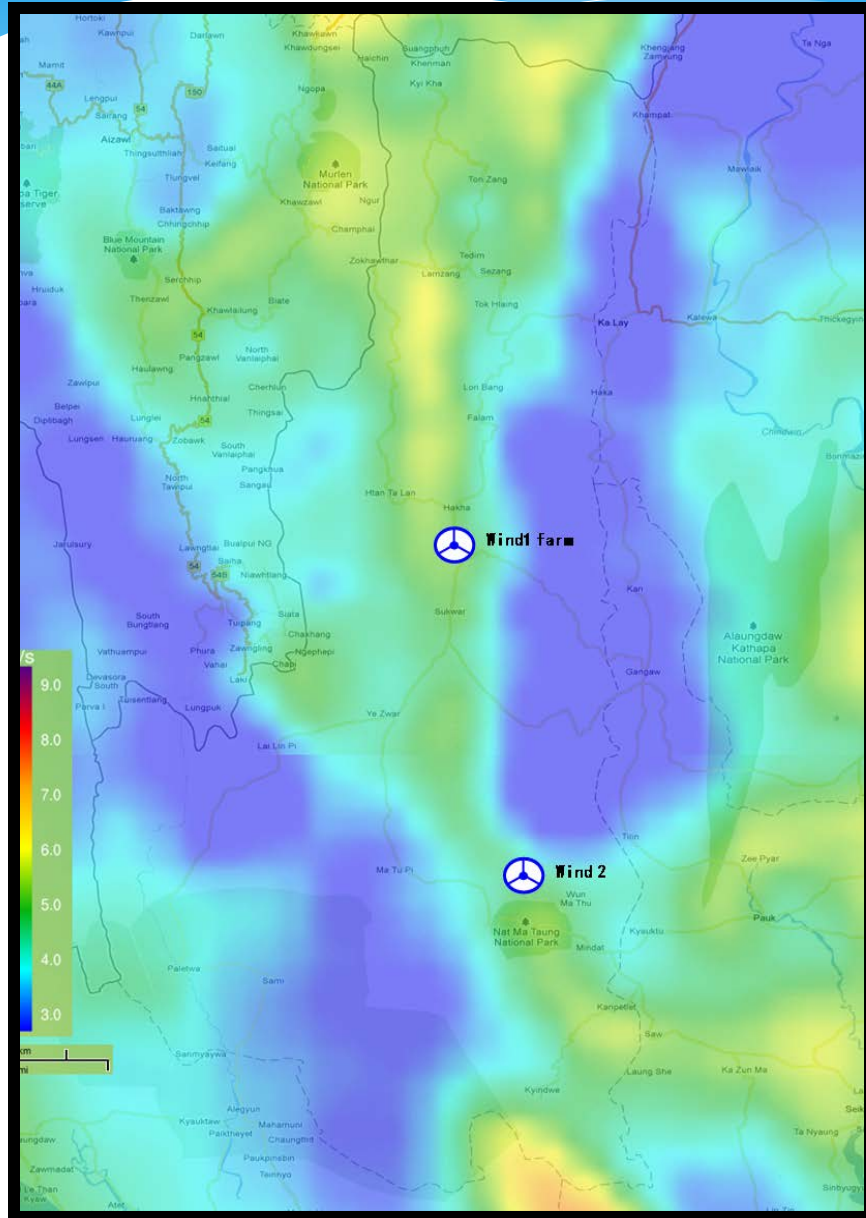
No.	Site No.	Location	Area and length		Installed capacity (MW)	Average wind speed (m/s)
			Area (km <sup>2</sup> )	Length (km)		
1	Hakha	Chin		12	72	6.2
2	Mindat	Chin		15	90	6.0
3	Ann	Rakhine		40	240	7.5
4	Ann	Rakhine		20	120	7.1
5	Taunggut	Rakhine		16	96	7.8
6	Thandwe	Rakhine		14	84	6.8
7	Myan Aung	Ayeyawaddy	10		100	7.0
8	Ingapur	Ayeyawaddy	12		120	6.9
9	Lemyathnar	Ayeyawaddy	9		90	6.0
10	Oak Kan	Yangon	5		50	6.1
11	Taikgyi	Yangon	4		40	5.9
<b>Total:</b>					<b>1102</b>	



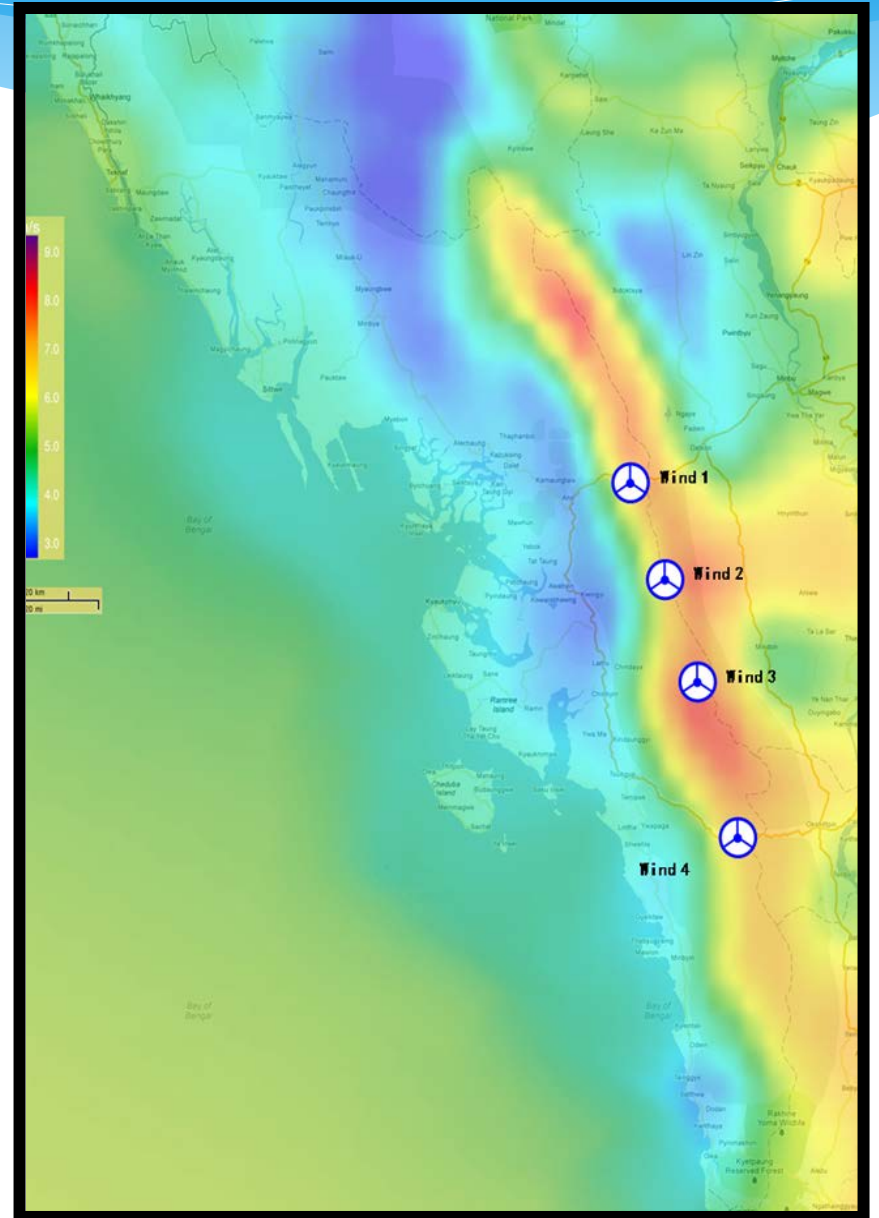
# Wind Map



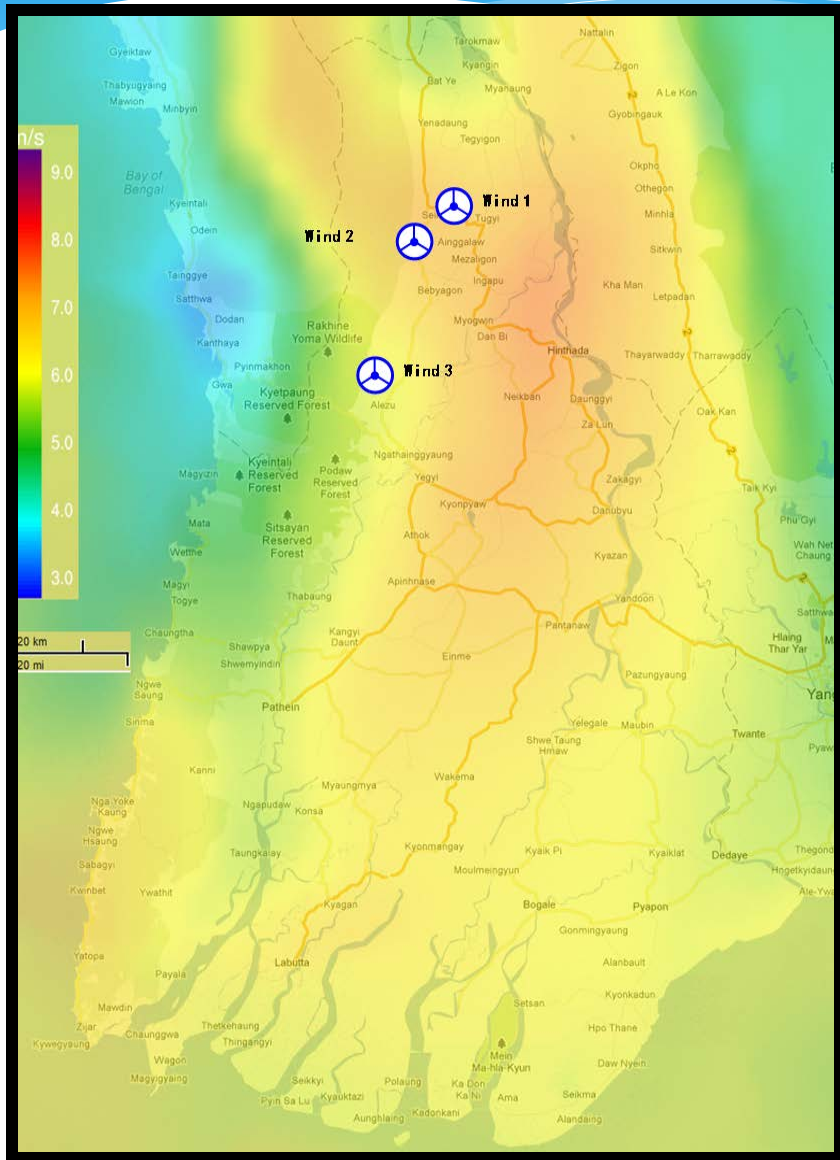
# Chin State



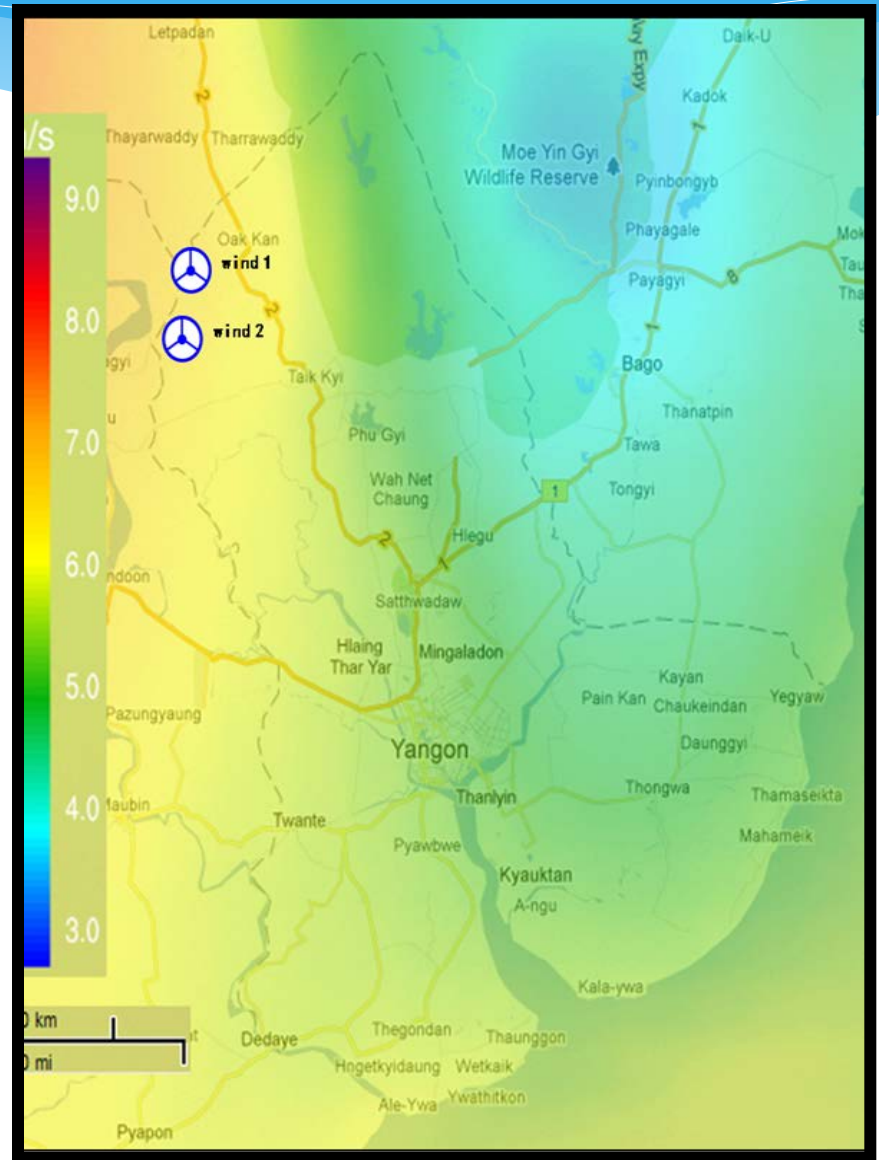
# Rakhine State



# Ayeyawaddy Region



# Yangon Region



# Advantages and Disadvantages of Wind Generated Electricity

## 1. A renewable Non-polluting Resource

- Free, Renewable Resource
- Clean, emits no air pollutants or greenhouse gases

## 2. Cost Issues

- Require a higher initial Investment than fossil-fueled Generators
- Wind costs are much more competitive with other generating technologies because no need to purchase fuel and minimal operating expenses

## 3. Environmental Concerns

- Noise produce by rotor blades
- Visual impacts
- Birds and bats having been killed

## 4. Supply and Transport Issues

- Intermittent and does not always blow when electricity is needed
- Wind generated Electricity can be stored
- Wind sites are often located in remote locations far from demand sites
- Uses of land may be more highly valued than electricity

# Conclusions

- 1 Use of Wind Energy is at the very initial stage.
- 2 Lack of Wind Power technologies.
- 3 High initial Investment.
- 4 The cooperation of foreign investors under technology transfer and financial assistance program is required.

# References

1. U Win Khaing, General Secretary, Myanmar Engineering Society (Renewable Energy and Rural Development in Myanmar)
2. U Lin, Vice President, Myanmar Engineering Society (Renewable Energy Projects and Business Opportunities- Myanmar)
3. Gunkul Engineering Public Co (Feasibility for 1000 MW Wind Power Project –Quarterly Project Report)
4. China Three Gorges Co(Preliminary Estimation on Wind Resources in Chin State, Rakhihe State, Ayeyawaddy Division and Yangon Division of Myanmar)
5. Wind Energy Development Programmatic EIS (Wind Energy Guide)

**Thank You**

**for**

**Your Attention**