

SOLAR ENERGY TECHNOLOGY

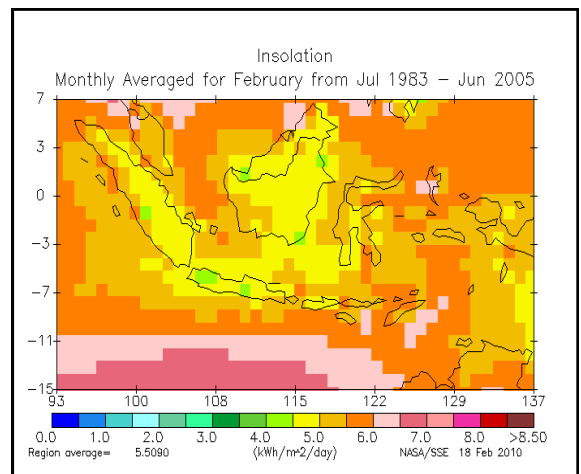
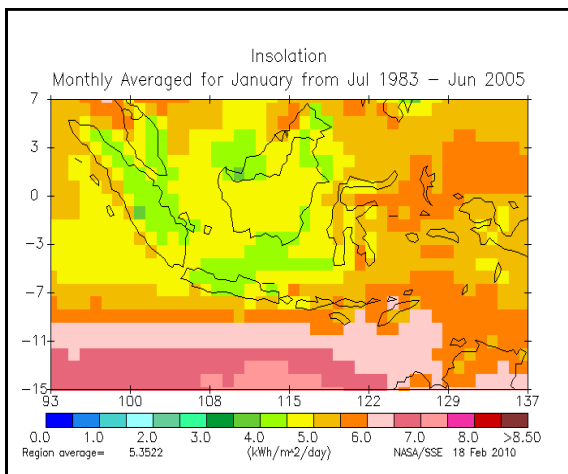
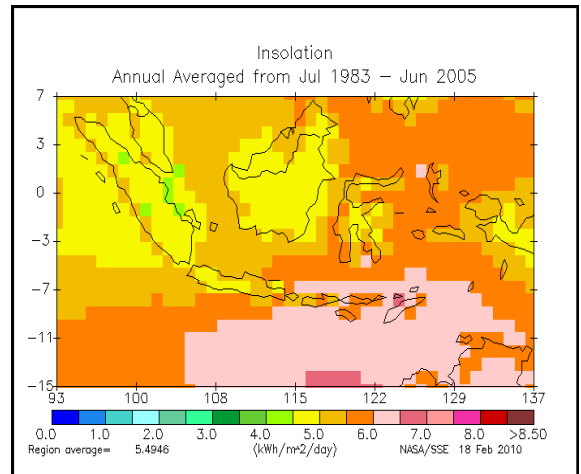
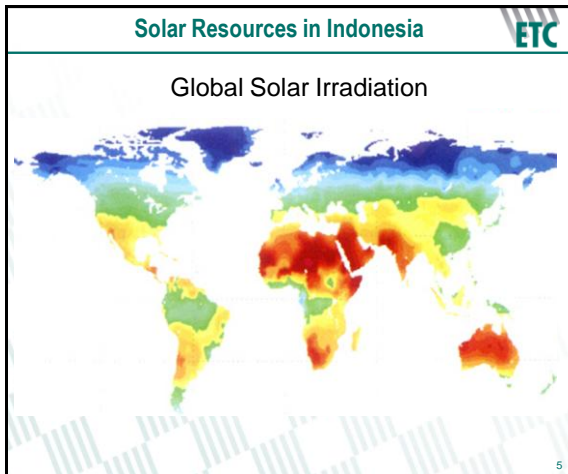
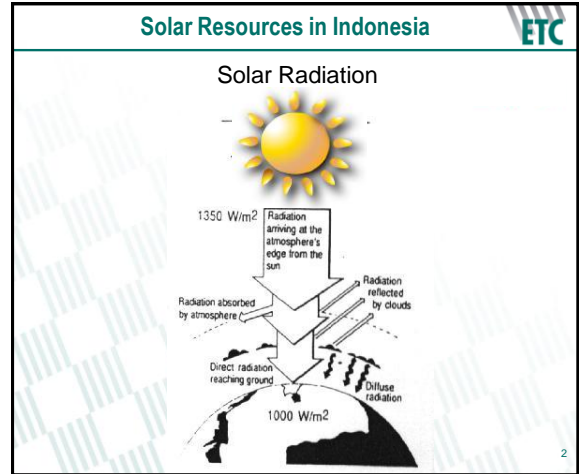
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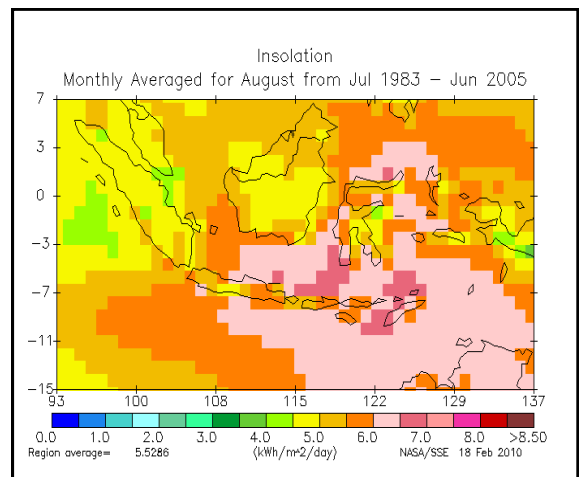
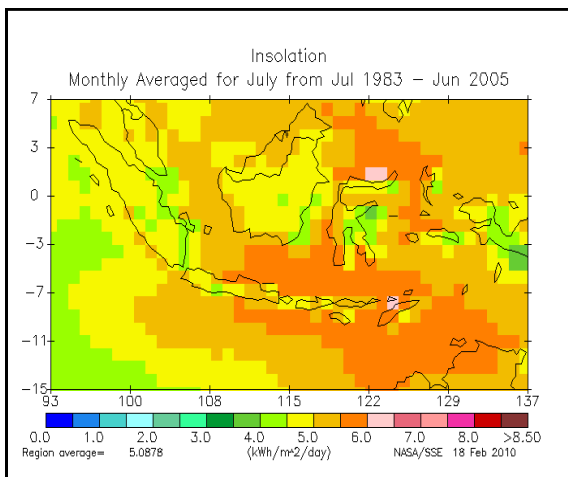
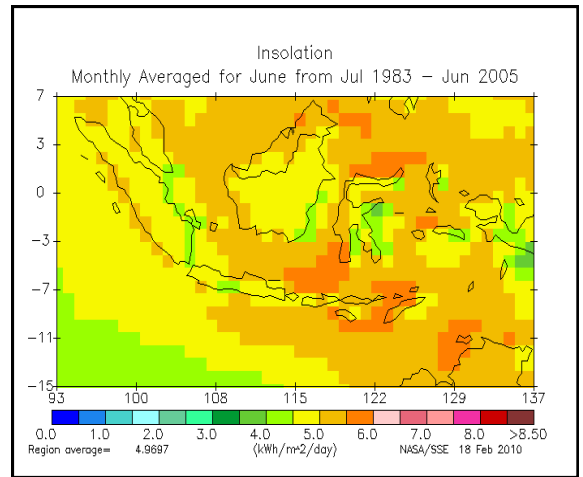
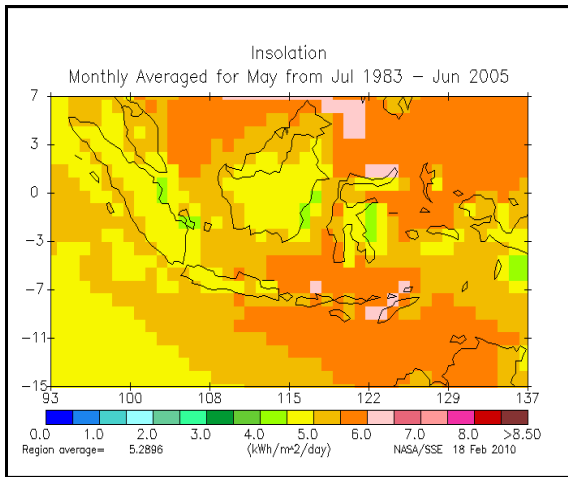
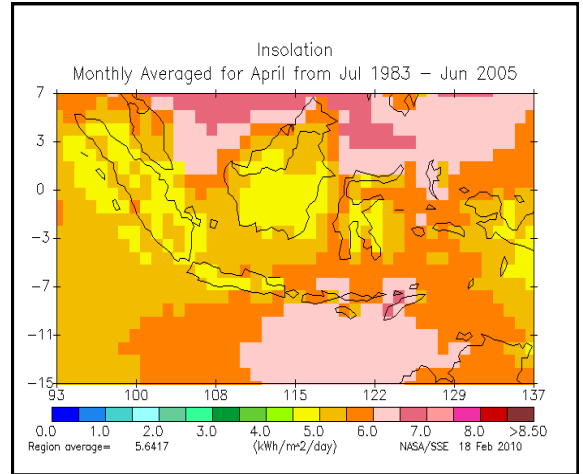
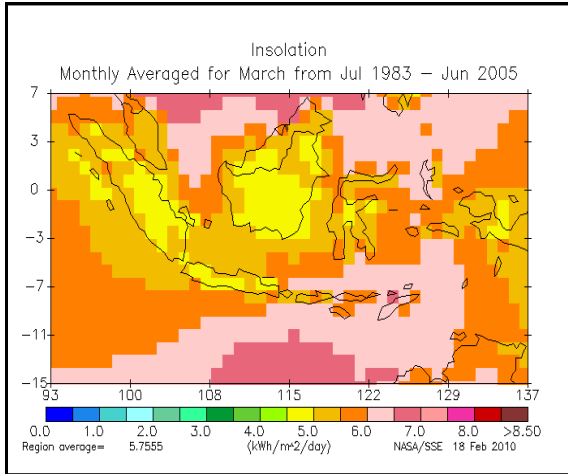
Solar Resources in Indonesia

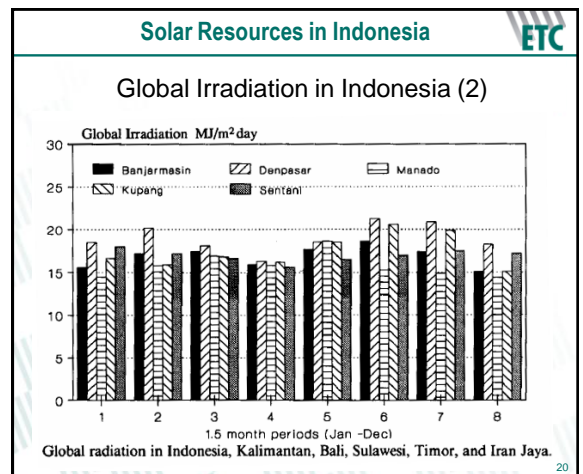
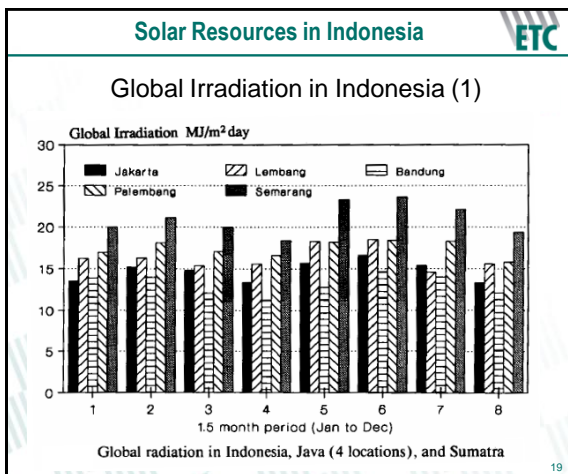
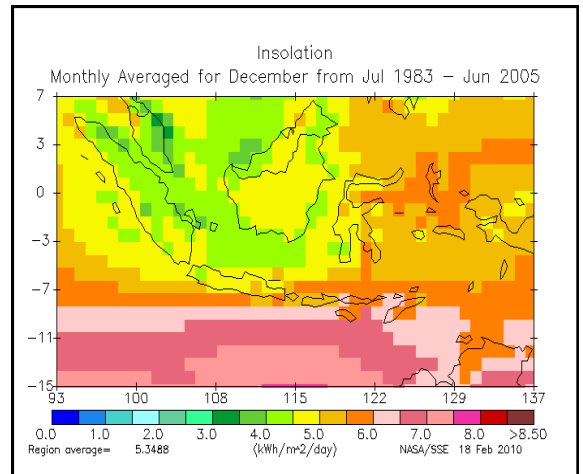
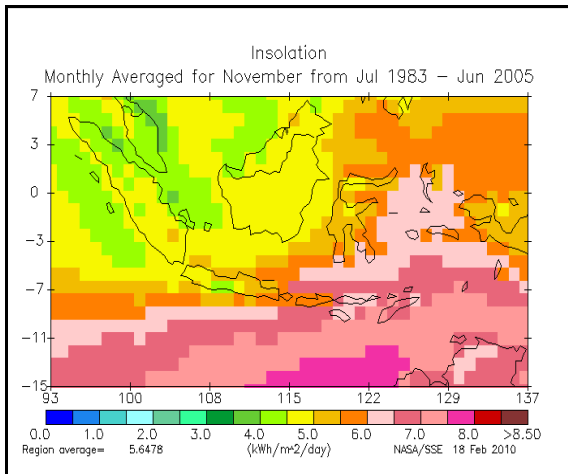
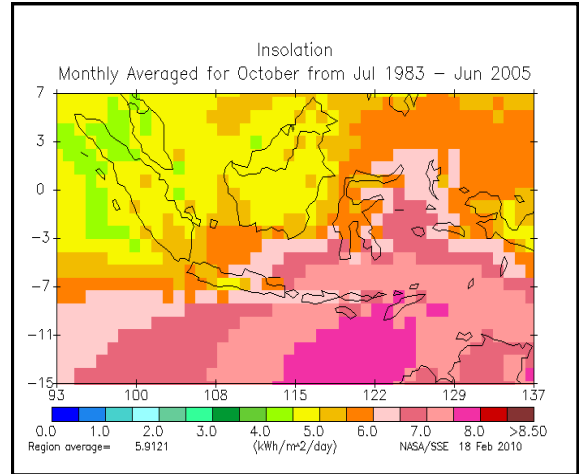
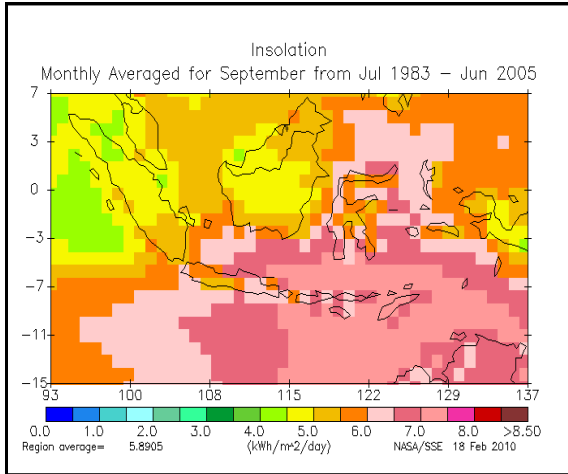
Gerrit Jacobs

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Jakarta
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Training Course on Renewable Energy Part II - MEMR
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Solar Resources in Indonesia

Solar Energy in Indonesia

- Average annual irradiation is 4 to 5.5 kWh/m² per day (1kWh=1MJ/3600*1000)
- Average mid-day irradiation approximately 1000W of energy on every m² of ground surface


Solar energy regime in Indonesia is highly suited to solar electricity generation and solar pumping

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Solar Resources in Indonesia

Putting Solar Energy into Perspective

The Earth receives from solar radiation in 10 days as much energy as the known fossil reserves



- 2007 World energy primary consumption: 138×10^{12} kWh
- But about 100×10^{12} kWh of equivalent electricity
- Growing at a rate of 2.3%/y
- Equivalent to the energy produced annually by 10^9 CPV dishes of 36 kWp each
- Requires 360,000 km² or an area of 600 x 600 km

Area of solar generation for world consumption

Solar Resources in Indonesia



Area of solar generation for world consumption

0 500 km
0 300 miles

Solar Resources in Indonesia

Springerville Solar Generating Station, Arizona

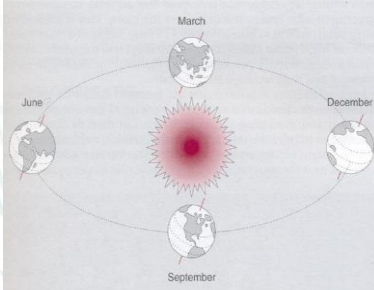
8 GWhrs p.a. 0.00004 % of global electricity generation



Solar Resources in Indonesia

Tilt and Orientation

The earth circles the sun with its polar axis tilted at an angle of 23.5°. In summer the sun appears higher in the sky, giving a higher energy density.



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Solar Resources in Indonesia

Tilt and Orientation

To collect as much radiation as possible, a surface must be tilted towards the sun. How much is dependent on the latitude and the time of the year most solar collection is required.

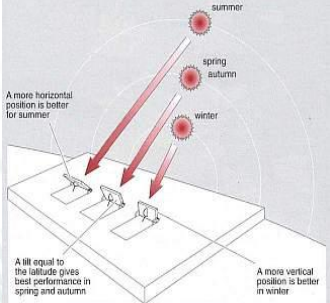
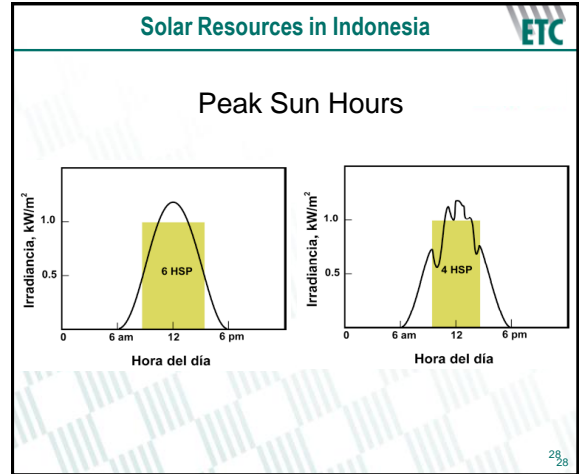
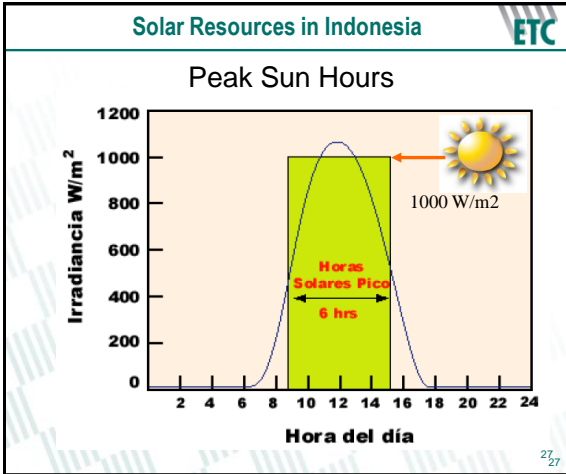


Figure - Optimizing the tilt for different seasons

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QUESTIONS ?

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