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# Progress made by Ghana on RE Project Implementation and lessons learned for AREA

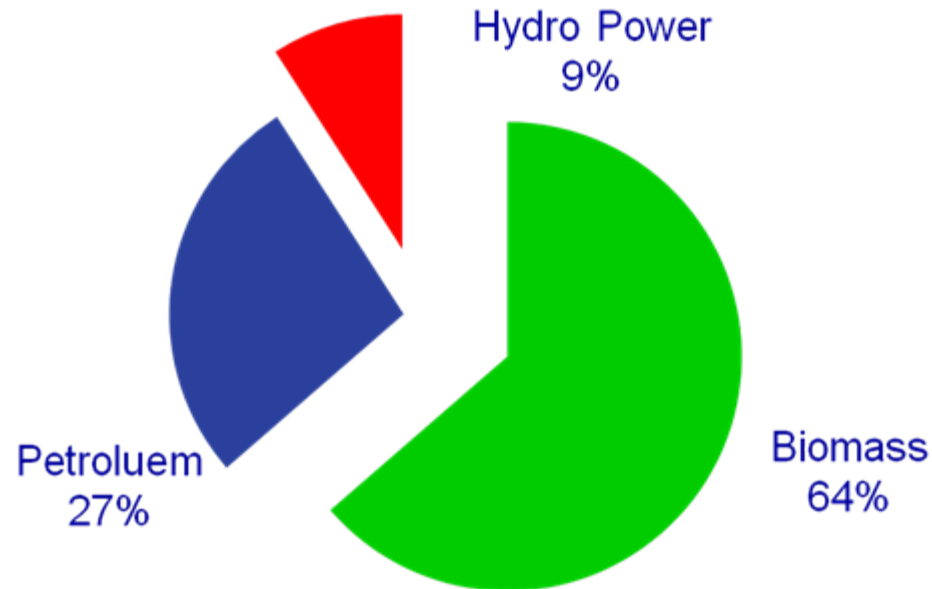
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# Introduction to Renewable Energy

- Renewable Energy - Using non-depleting natural resources to meet energy need
  - *Resource is locally available and sustainable*
  - *Environmentally benign than conventional energy and emits little or no CO<sub>2</sub> – reduces global warming*
- Industrialized countries: UK, Spain, Germany, etc
  - Mandated under the UNFCCC (Kyoto protocol) to reduce CO<sub>2</sub> emission level to 1990 level by 2015.
  - European Union Commitment (20-20-20)
- **Achievable through energy efficiency and the use of renewable energies.**

# Energy Consumption in Ghana



- Traditional form of Renewable Energy accounts for more than 70% of total energy use in the country.
- Woodfuel (Charcoal & Firewood) together contributes about 64% of total energy consumed in the country.

# Rational for Dependence on Traditional Renewable Energy Technologies

- Resource (Hydro and Biomass) is locally available and cheap
- Guarantees security of energy supply.
- Job creation
- Requires little or no foreign exchange for operation and management



Hydro Power Plant provides cheap electricity to support economic development and growth in Ghana (<\$0.05/kWh)

# Key Policy Issues

- Woodfuel
  - Health and environmental implications on inefficient conversion devices for woodfuel
  - Bush fire leading to deforestation.
- Hydro
  - Flooding leading to lose of farmlands and displacement of animal and human settlement

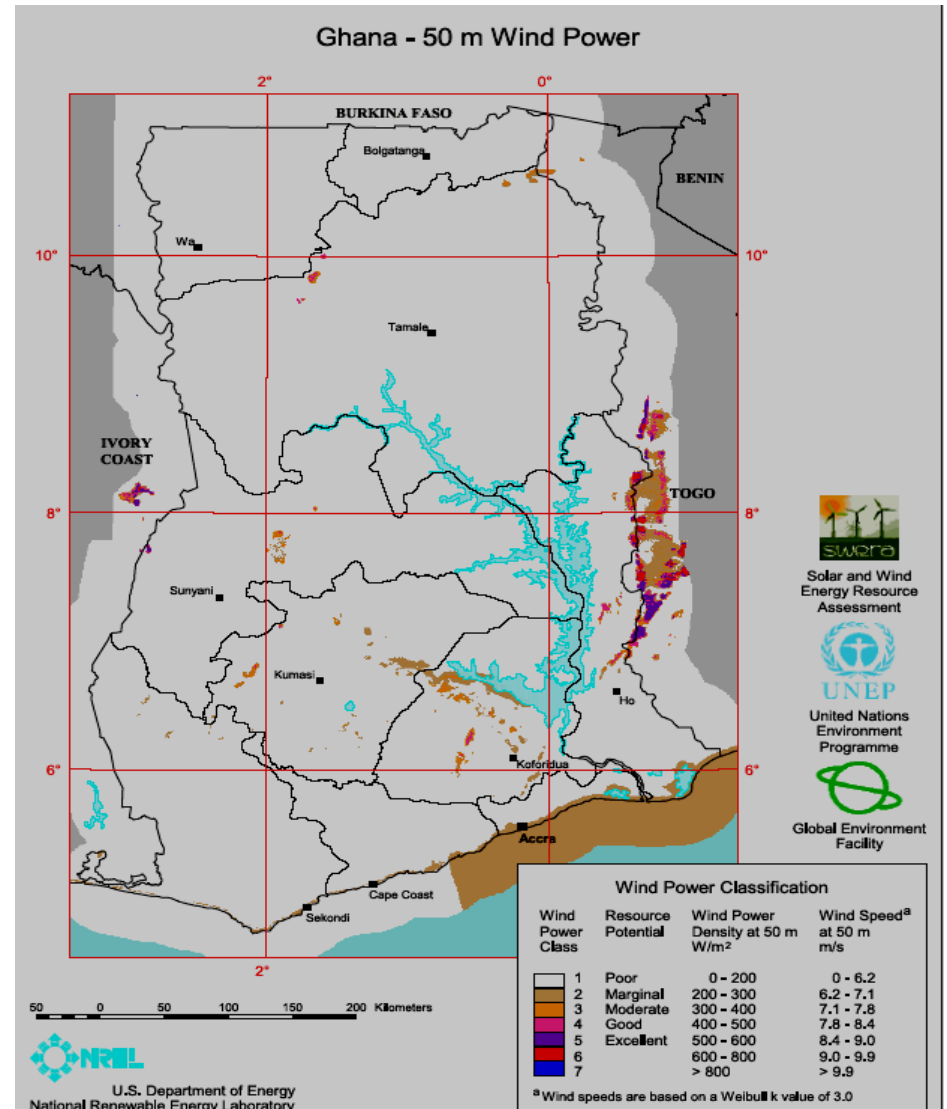
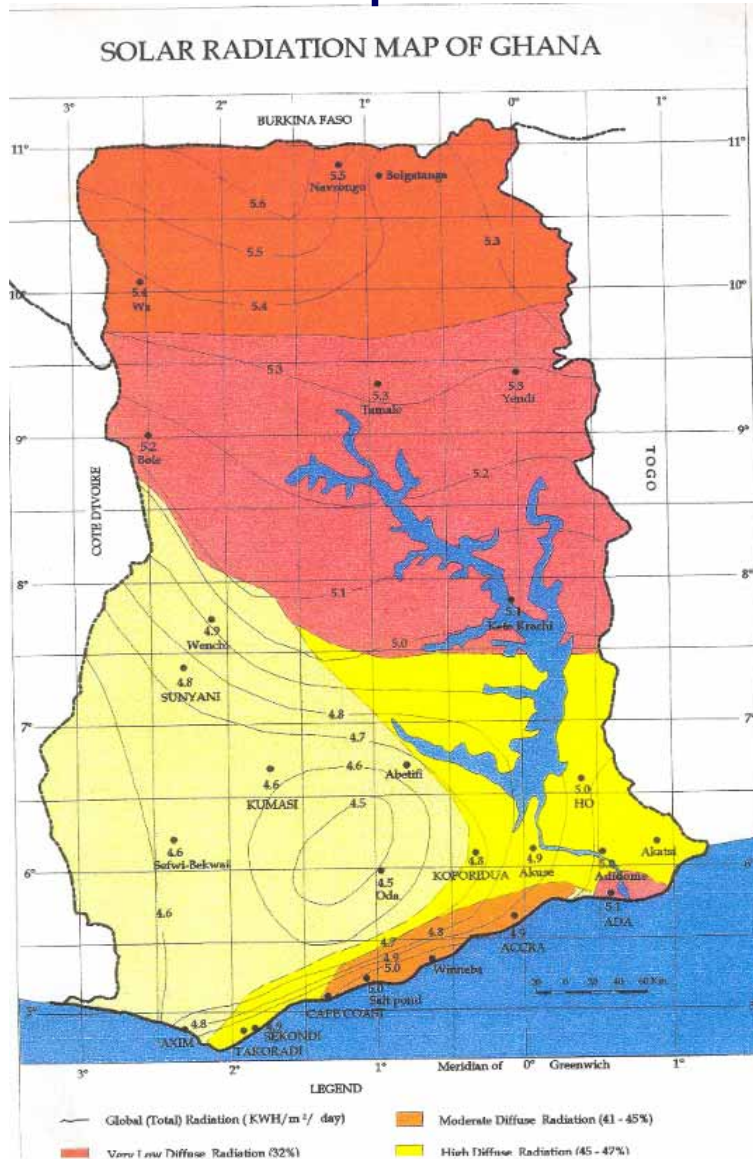


# Modern Renewable Energy Technologies

- Potential to increase modern energy access in remote areas where conventional energy cannot reach in the immediate future.
- Demonstrate commitment of Ghana in the fight against Global Warming (Climate Change)
- Improve health and environmental degradation
- Create jobs.
- *RE resources in Ghana includes*
  - *Biomass, Hydro, Wind and Solar*

# Progress on Promotion of Modern RE

## - Development of Solar & Wind Resource Map



# Solar PV

- Solar PV electrification - seen significant growth from 0.3MWp in 1987 to 2.1MWp in 2009
- Over 5,000 off-grid systems installed in remote rural communities.
  - Fee-for-service model
  - Dealer – Credit model
- Less than 100KWp installed for grid connection at MoEn, EC, KNUST among others.

# Solar Thermal

- Demonstrated the application of solar water heaters and solar crop dryers
  - market penetration very low due to higher initial cost compared to electric water heaters and apparent low electricity tariff.
  - Solar dryers for large-scale applications for export crops is very favourable and cost effective.
  - Solar cookers not suitable to preparing main staple food. (banku/TZ)



# Wind power

- Application small wind power for rural electrification and water pumping

# Some Experiences with Modern Bio-energy Applications

- Improved cookstoves (firewood & Charcoal)
- Improved charcoal production technologies
- Briquetting
- Co-generation (sawmill / palm residues )
- Biogas (municipal/farm waste, animal dung)
- Gasification (feasibility study/research)
- Biodiesel – Jathropha, oil palm, soya bean oil, coconut oil etc.



# Barriers to Renewable Energy in Ghana

- High cost of energy delivery from modern RETs.
- No favourable regulatory and fiscal regime to attract investment
  - Lack of favourable pricing policy and financing schemes
- Lack of awareness of funding opportunities to support RET development and promotion
- Uncoordinated R&D

# Renewed Targets for RE use in Ghana

1. Increase Share of modern RET in electricity supply system to 10% by the year 2020.
2. Increase the use of RE in remote and poor rural areas (RET's present the best alternative source of energy)
3. Increase the contribution of bio-diesel in the national transportation fuel supply

# Assumptions

- based on four assumptions:

<b>Energy Source</b>	<b>Exploitable Potential (MW)</b>
Wind	200-300
Solar	20
Medium – small Hydro	150
Modern Biomass	90



# Short to medium term policy actions

- **Development of a Renewable Energy Law**
  - Establish comprehensive RET policies
  - Create RET-friendly regulatory environment
  - Promote innovative market delivery models
  - Establish favourable pricing policies for RET's
  - Create awareness on the benefits of RET's
  - Support development of RET expertise
- **Policy current under discussion in Cabinet**
- **World Bank acknowledged for providing the required funds to support the development of the RE law**



# Current Instruments to encourage RE Technologies'

- Import duty waiver/tax reduction
  - Zero rating on solar and wind energy systems.
- Energy Fund to support the R&D and promotion of RE
- GEDAP to provide up to 50% partial capital subsidy for RE power systems.

# Conclusion

- Hydro Power Plant provides cheaper electricity to support economic development and growth in Ghana
- Wind, solar and biomass power plants are clean energy options but relatively more expensive and therefore will require a legislation to guarantee power purchase.
- They are also most suitable for isolated decentralised power generation
- Biodiesel development has the potential to create employment, alleviate poverty and contribute to increased food production if the appropriate regulatory policies are in place.

# Renewable Energy is Worth the Challenge. In Ghana, we take up this Challenge



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