Ministry of Energy

Opportunities in The Ghana Renewable Energy Act 2011, Act 832

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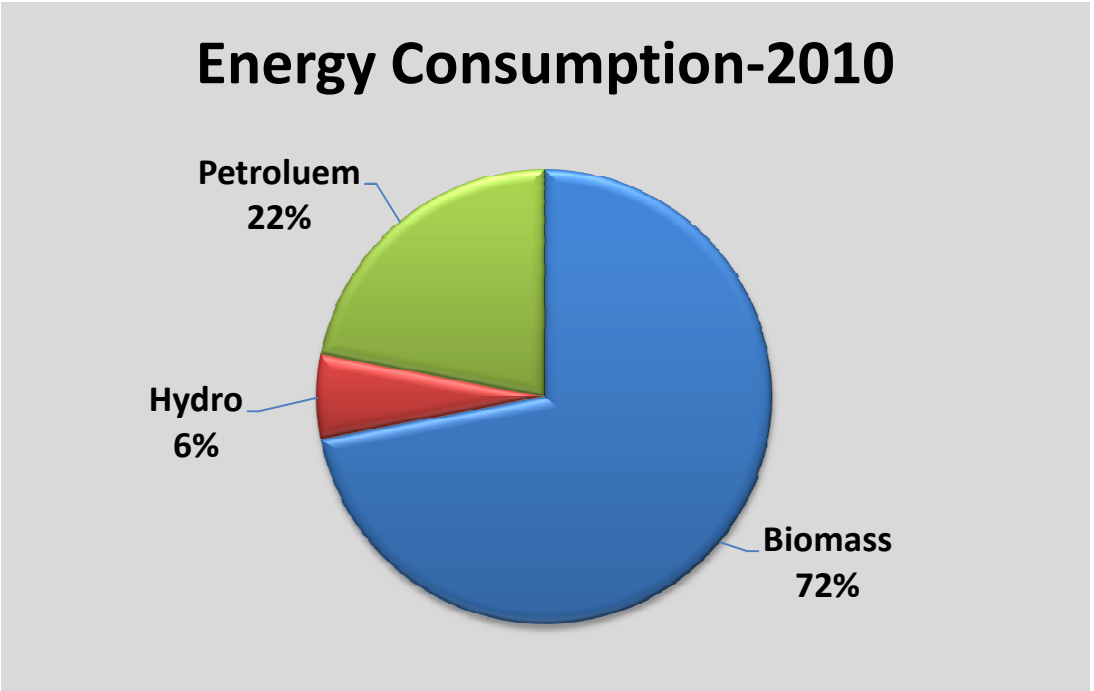
-Ministry of Energy- NRED

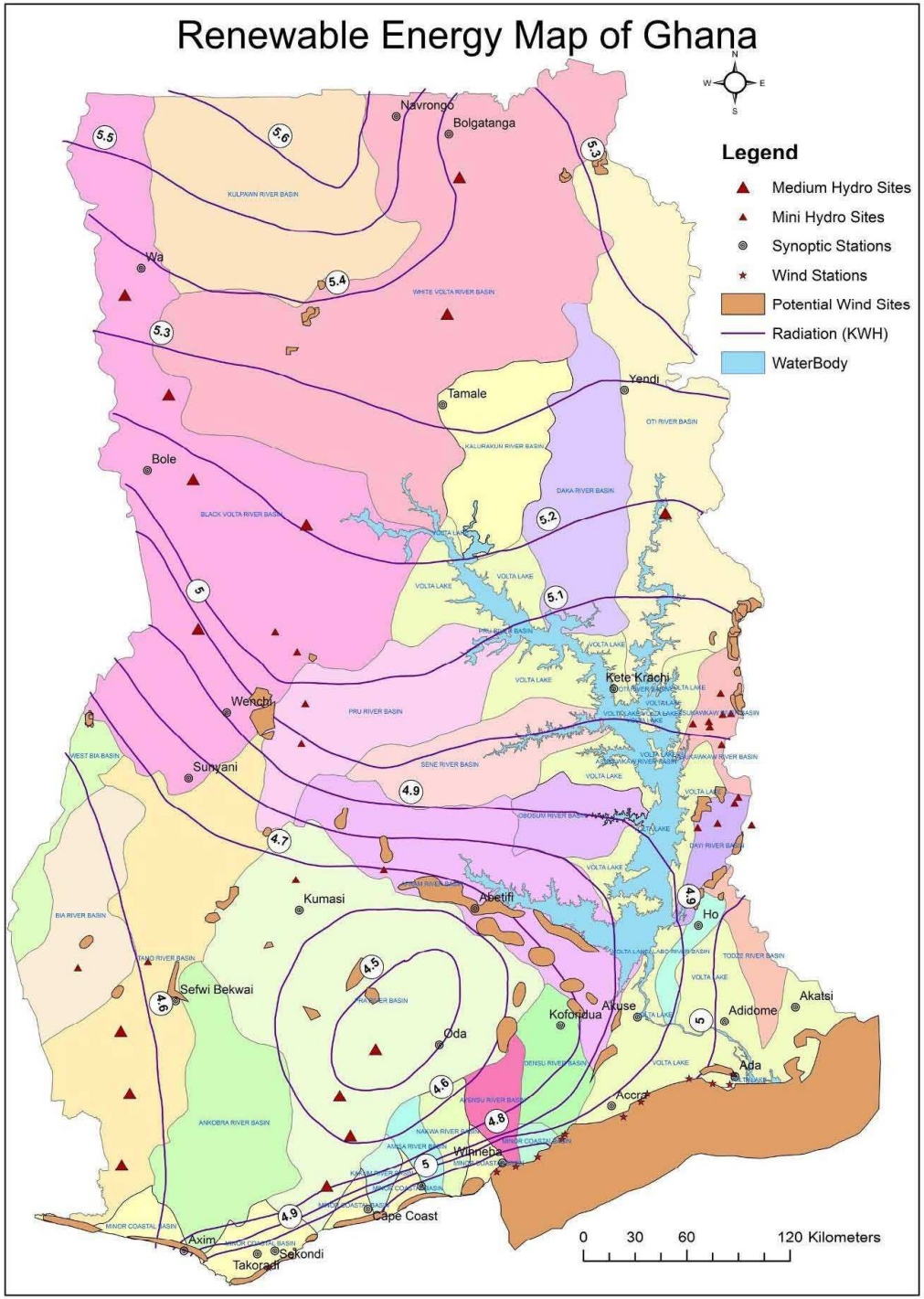


- Renewable Energy (biomass and hydro) accounts for 78% of total energy consumption in Ghana.
  - More than 60% of electricity generated is from hydro power - Akosombo & Kpong
- The share of modern renewable energy technologies (Wind, Solar PV, hydro below 100MW, Bio-fuel) for electricity is however very negligible (<0.1%).

Electricity Generation Capacity of Ghana (End of December 2010)

Plant	Fuel Type	Capacity (MW)	
		Installed	Dependable
Hydro Generation			
Akosombo	Water	1,020	900
Kpong	Water	160	140
Sub-Total		1,180	1,040
Thermal Generation			
Takoradi Power Company (TAPCO)	LCO/Diesel/Natural Gas	330	300
Takoradi International Company (TICO)	LCO/Diesel/Natural Gas	220	200
Sunon Asogli Power (Ghana) Limited	Natural Gas	200	180
Tema Thermal 1 Power Plant (TT1PP)	LCO/Diesel/Natural Gas	110	100
Mines Reserve Plant (MRP)	Diesel/Natural Gas	80	40
Tema Thermal 2 Power Plant (TT2PP)	Diesel/Natural Gas	49.5	45
Sub - Total		989.5	865
Total		**2,170**	**1,905**

Electrical Network in Ghana

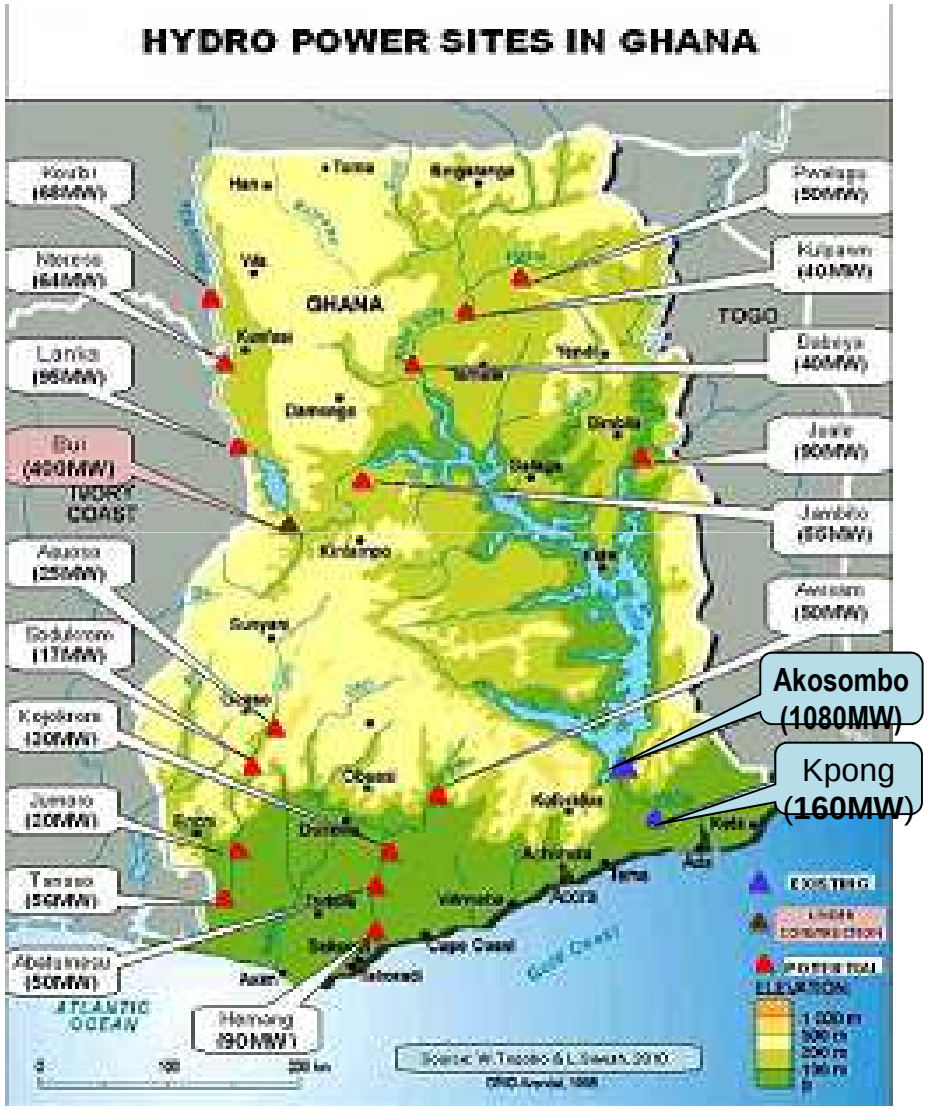

Renewable Energy Map of Ghana
N
W
E
S
Legend
Medium Hydro Sites
Mini Hydro Sites
Synoptic Stations
Wind Stations
Potential Wind Sites
Radiation (KWH)
WaterBody
Navrongo
Bolgatanga
Wa
Tamale
Yendi
Bole
Wenchi
Sunyani
Kete Krachi
Kumasi
Abetifi
Ho
Sefwi Bekwai
Oda
Koforidua
Akuse
Adidome
Akatsi
Ada
Accra
Winneba
Cape Coast
Axim
Sekondi
Takoradi
5.5
5.6
5.3
5.4
5.3
5
5.2
5.1
4.9
4.7
4.9
4.5
4.9
4.6
4.8
5
4.9
5
0
30
60
120 Kilometers

Biomass Energy Potential

- Biomass is Ghana's dominant energy resource in terms of endowment and consumption.
- Resources cover about 20.8 million hectares of the land mass of Ghana (23.8 million hectares)
- Used mainly for cooking and heating in the country.

Hydro Power

- Potential is about 2,420MW
- Akosombo & Kpong. (1,180MW) provide 60-70% of electricity requirement
- Bui (400MW) under construction
- **Remaining sites (21) with total capacity of about 840MW are yet to be developed.**



Classification of Hydropower

- Three size categories:
  - Up to 1 MW (small-scale)
  - 1 MW to 10 MW (medium-scale)
  - 10 MW to 100 MW (large-scale)
- The largest potential for new hydro power plants exists for “medium scale hydro sources” of up to 100 MW, summing up to about 1,243 MW (Energy Commission 2006b).

Mini Hydro sites

REGION	SITE	POWER MIN (kW)	POTENTIAL . (kW)
Upper East and Upper West	1. Akunki Obota at Gowri	22	100
	2. Abimogar at Bolgatanga	16	100
	3. Nanpumago at Nansa (Tumu)	160	400
	4. Tumu	200	1000
	5. Bele at Anhiwiemu	30	150
	6. Bogdoo at Mempeasem	40	200
	7. Doli at Mempeasem	13	50
	8. Doli at Dole	18	100
	Total	**499**	**2,100**
Northern	1. Wusuri at Wusuri Damongo	40	200
	2. Sorto at Sorto	40	200
	3. Gushie at Gushie Tampion	44	200
	4. Peli at Zoggo	77	400
	5. Mbuom at Pong Tamale	10	50
	6. Persuo at Savelugu	30	150
	7. Stillum at Stillum Kumbugu	20	100
	8. Kaungawni at Gushiegu	20	100
	9. Daka at Yendi + Sambu	100	500
	10. Nacahnkpeni at Zabzugu	20	100
	11. Nachankpeni (Dam 4)	100	500
	12. Badoloo at Takpagaya	68	300
	13. Nayogo at Ngoribogu	100	500
	14. Kuma at Baala Wulesi	20	100
	15. Kumoo at Mampe	220	1000
	16. Achibunya at Busunu	4	20
	Total	**913**	**4,420**
Brong Ahafo	1. Pamu at Kosan (Dorma Ahenkro)	6	50
	2. Pamu at Atesikurom	6	50
	3. Pamu Sromani	6	50
	4. Yifaw aat Yifaw	6	50
	5. Tain at Berekum	300	1,500
	6. Fia at Nkaranza	40	200
	Total	**364**	**1,900**

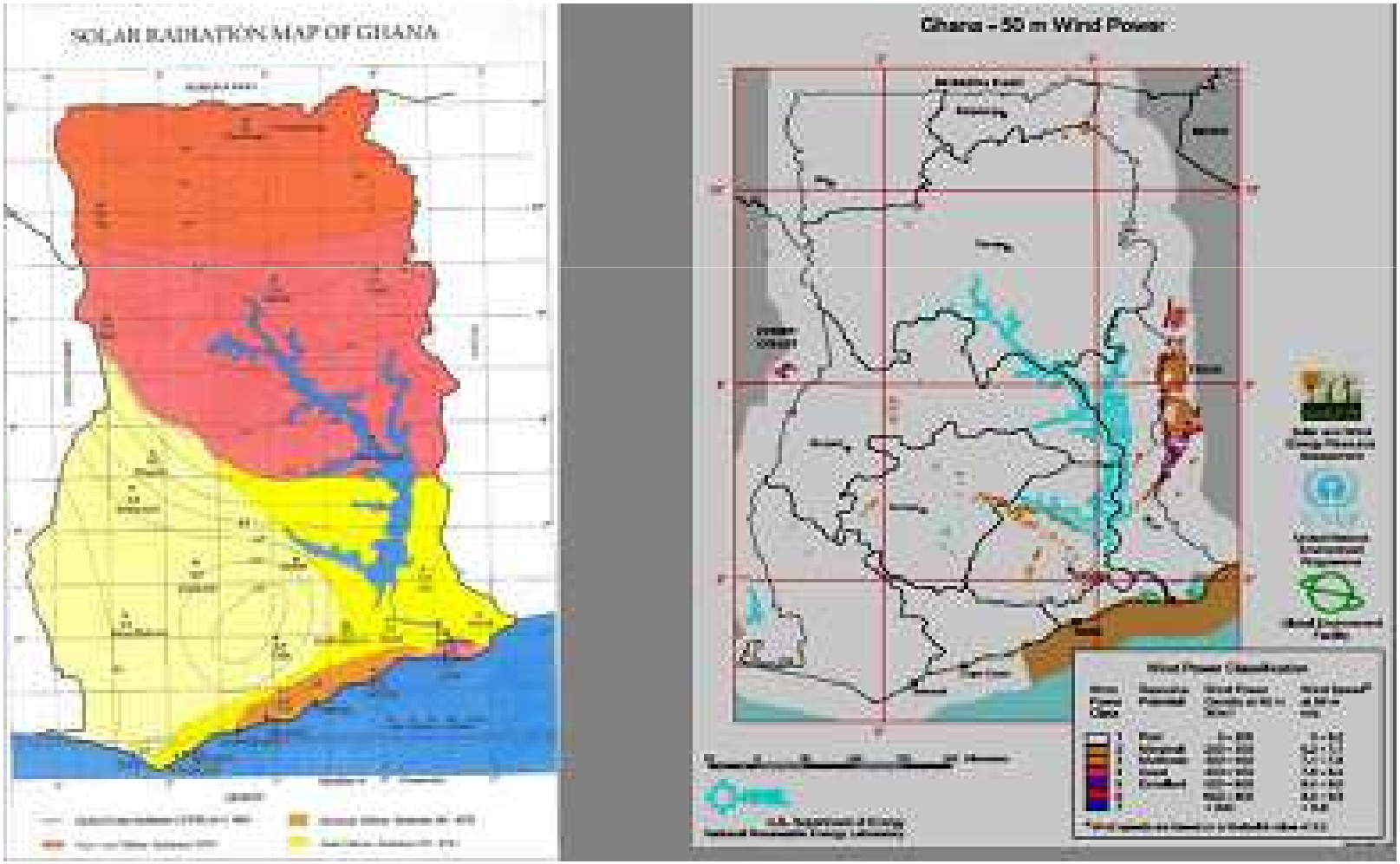
Medium Hydro Sites

RIVER BASIN	CATCHMENT AREA (KM^2)	POTENTIAL (MW)	ANNUAL ENERGY (GWH)
Black Volta			
Koulbi		68	392
Ntereso		64	257
Lanka	**146820**	95	319
Bui		400	1000
Jambito		55	180
		Total: 682	**2,148**
White Volta			
Pwalugu		48	184
Kulpawn		36	166
Daboya		43	194
		Total: 127	**544**
Oti River			
Juale		90	405
		Total: 90	**405**
River Tano			
Asuaso		25	129
Sedukrom		17	67
Jomoro	**14700**	20	85
Tanoso		56	256
		Total: 118	**537**
Pra River			
Awiasam		50	205
Hemang	**22290**	90	336
Abatumesu		50	233
Kojokrom		30	136
		Total: 220	**910**
Total		**TOTAL POTENTIAL: 1237**	**4544**

SHP Potential Sites in Ghana

Solar & Wind Resource Potential

- Ghana has proven Solar and Wind Energy potentials for off-grid and grid connected electricity generation.



RE Policy Direction

- Promotion of all forms of renewable energy resources in the country to.
  - achieve at 10% contribution of modern renewable energy services in the electricity generation mix by 2020.
  - reduce the demand on woodfuels from 72% to 50% by 2020 through the use of efficient technologies and alternative options such as LPG, biogas etc.
  - develop of other RETs for mechanical, heat and transport energy including biofuels for export (where appropriate).

Opportunities in RE Act 2011, Act 832

- Renewable Energy Act 2011 (Act 832) provides the necessary fiscal incentives for renewable energy development by the private sector (IPP)
  - Legal and regulatory framework
  - Feed-in-Tariff
  - Obligatory purchase
  - Renewable Energy Fund
- Support for the development of RE regulatory and pricing frameworks for grid connected RE systems

Opportunities in RE Act 2011, Act 832

- Support for resource assessment and feasibility studies for grid-connected RE systems based on wind, biomass, hydro and solar.
- Support for estate developers, Institutions and households to integrate grid tie RE in buildings.
- Support for use of decentralized mini-grid and off-grid RE systems for remote communities and Islands that cannot be connected to grid electricity within the next 5-10 yrs

RE Strategies: Woodfuels

- Support for the regulation of the woodfuel industry (production, transportation & marketing)
- Promote production and used of improved and more efficient woodfuel technologies
  - efficient charcoal production technologies,
  - improved cookstoves (charcoal & firewood)
- Promote the use of alternative fuels such as LPG, biogas etc.
- Support sustained regeneration of woody biomass resources through legislation and fiscal incentives – RE Act 2011, Act 832

Investment Opportunities in Renewable Energy Sub-sector (solar, biomass, mini-hydro and wind)

Target is to attain 10% *RE* by 2020

Energy Source	Exploitable Potential (MW)	Investment Requirement US$ (million)
Wind	200-300	250-400
Solar	20	100-150
Medium – small Hydro	150	200-300
Modern Biomass /waste to energy	90	90-150
TOTAL	**500MW**	**640-1,000**

Areas of Investment in the RE

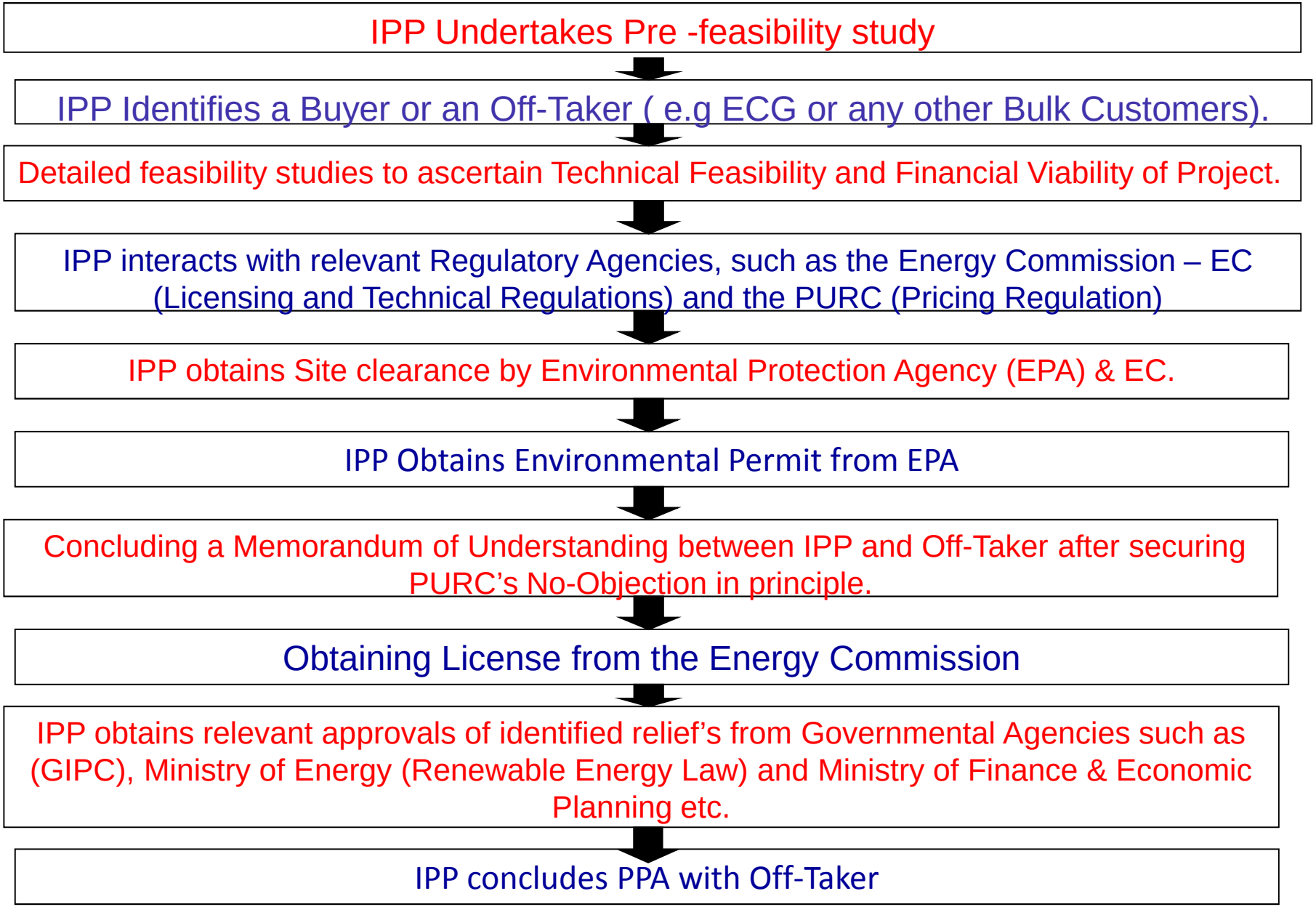
- Production
- Transportation
- Storage
- Distribution, Sale and Marketing
- Importation
- Exportation and Re-exportation &
- Installation and Maintenance

Licensing Requirements

- Energy Commission prescribed fee.

- Acknowledgement of receipt within 5 working days and final decision in writing within 60 days after the 5 days.

PROCEDURES FOR AN IPP ENTRY INTO THE ELECTRICITY MARKET



Conclusion

- The Renewable Energy Sector will attract over 1.0 billion USD in investment in the next 8 year.
- Private sector participation is key.
- The Government is committed to the renewable energy action plan to attract international support and investments from the private sector

Thank you

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