



# Kingdom of Cambodia Nation Religion King

**Ministry of Mines and Energy  
General Department of Energy**



## **Renewable Energy Statistics Training**

### **Current Status of Renewable Energy in Cambodia**

12-14 December 2016, Bangkok, Thailand

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# ENERGY POLICY



To provide an adequate supply of energy throughout Cambodia at reasonable and affordable price,



To ensure a reliable and secured electricity supply at reasonable price, which facilitates investment in Cambodia and development of national economy,



To encourage exploration and environmentally and socially acceptable development of energy resources needed for supply to all sectors of Cambodia economy,



To encourage the efficient use of energy and to minimize the detrimental environmental affects resulted from energy supply and consumption.

# CAMBODIA POWER STRATEGY

**A-Development of  
Generation**

**B-Development of  
Transmission lines**

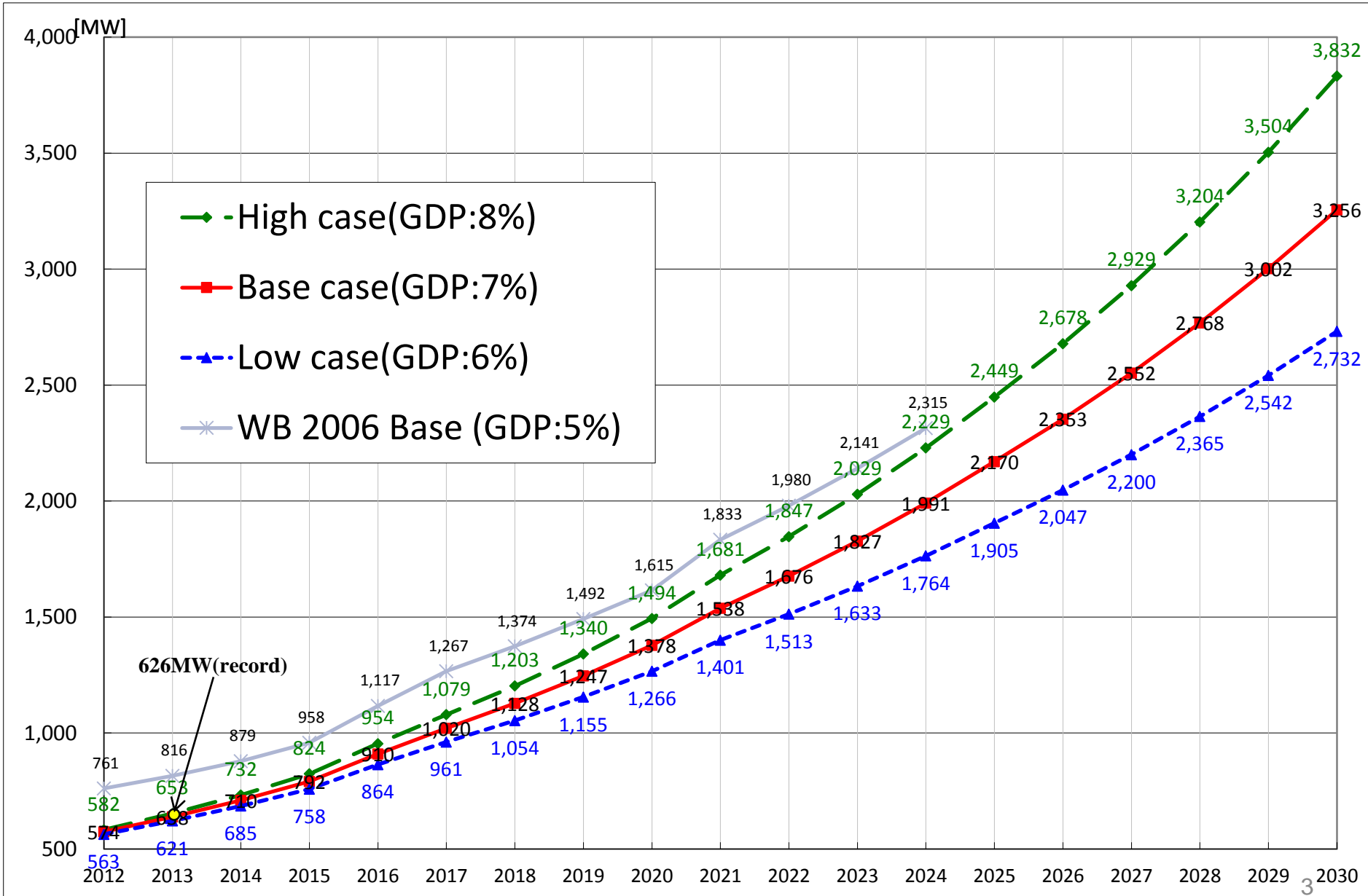
**C-Development of  
Rural Electrification**

Increasing diversify of power supply such as Hydro, Coal power, Importing electricity, biomass and others renewable energies to meet the electricity demand and reduce fuel oil for power generation.

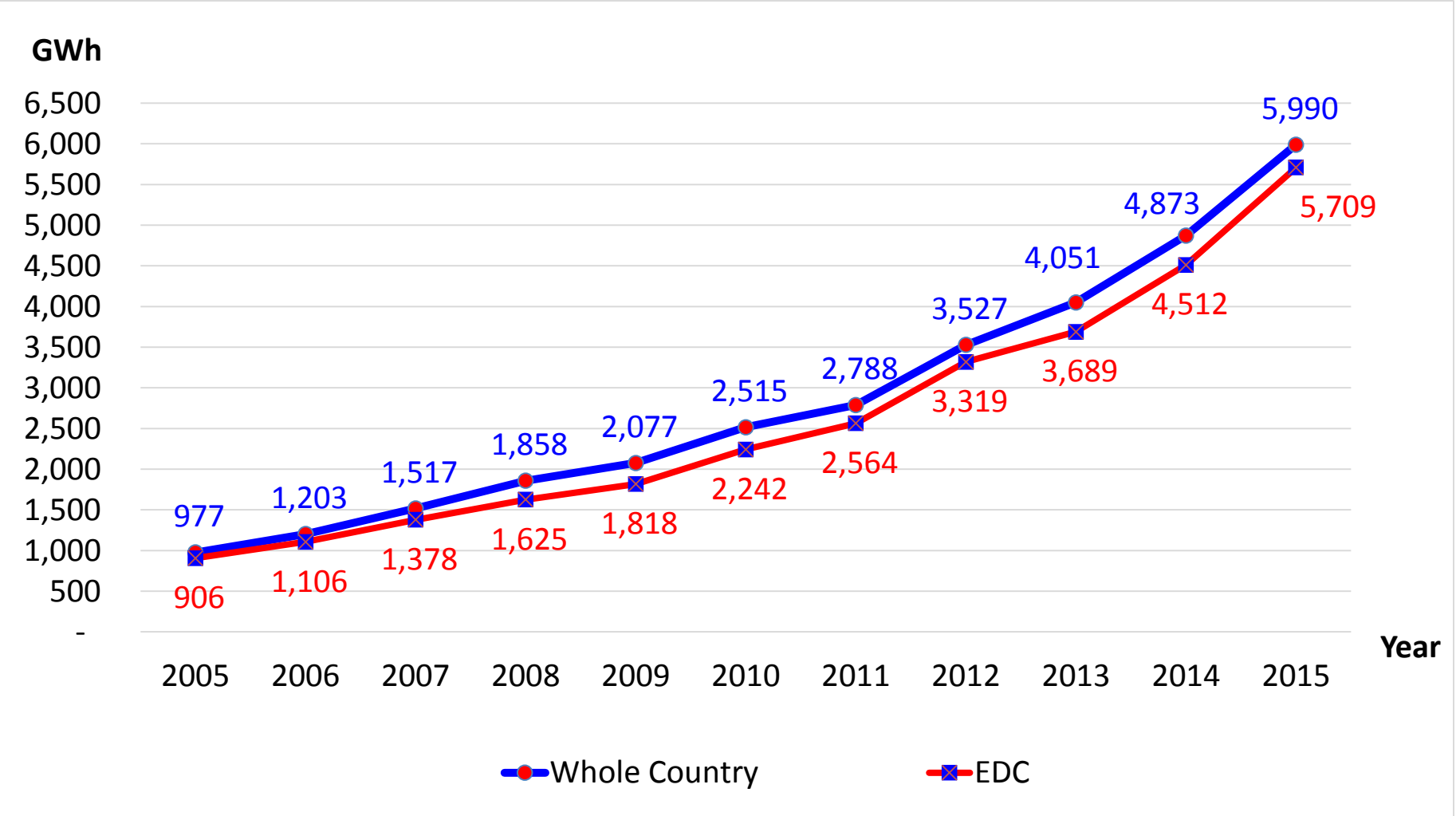
Develop the national transmission line, GMS & ASEAN power grid, maximize mini-grid to rural areas, upgrading the HV, MV & LV.

Supply from the National Grid, Mini-grid, Grid extension and stand-alone system;  
Renewable energy(biomass, solar, hydro)

# Power Demand Forecast of National Grid



# Energy Generation from 2005 - 2015



Sources: Electricite Du Cambodge (EDC)

## Power Development Plan

No.	Generation Expansion Plan	Fuel Type	Install	
			Capa.MW	COD
1	Kamchay Hydro Power Plant	Hydro	194.1	2011
2	Kirirom III Hydro power Plant	Hydro	18	2013
3	Stung Atay Hydro Power Plant	Hydro	120	2013
4	200 MW Coal Power Plant (I) in Sihanouk Province - Phase 1	Coal	100	2013
5	Stung Tatay Hydro Power Plant	Hydro	246	2014
6	Lower Stung Russei Chrum Hydro Power Plant	Hydro	338	2015
7	700 MW Coal Power Plant (II) -Phase 1	Coal	270	2014-2015
8	700 MW Coal Power Plant (II) -Phase 2	Coal	100	2017
9	700 MW Coal Power Plant (II) -Phase 3	Coal	100	2018
10	200 MW Coal Power Plant (I) in Sihanouk Province - Phase 2	Coal	135	2016
11	Lower Se San II Hydro Power Plant	Hydro	400	2017
12	700 MW Coal Power Plant (II) -Phase 4	Coal	100	2018
13	Stung Chay Areng Hydro Power Plant	Hydro	108	2019
14	700 MW Coal Power Plant (II) -Phase 5	Coal	100	2019
15	Sambor Hydro Power Plant	Hydro	450/2600	2019
16	Coal Power Plant (III) or Gas Power Plant	Coal/Natural Gas	400	2020
17	Stung Treng Hydro Power Plant	Hydro	900	2020
<b>Total</b>			<b>4,279.1</b>	<b>(6,429.1)</b>

# Electrification Target

- ❖ **Target:** Improve the current level of electrification by promote electrification in those areas not serviced yet by grid expansion, cross border supply, mini grids and renewable energy.

## Year 2016

Presently, 74.80% of villages and 65% of households access to grid quality electricity.

## Year 2020

100% of villages in Cambodia have access to any type of electricity's services by 2020.

## Year 2030

At least 70% of all households in Cambodia have access to grid quality electricity by the year 2030.

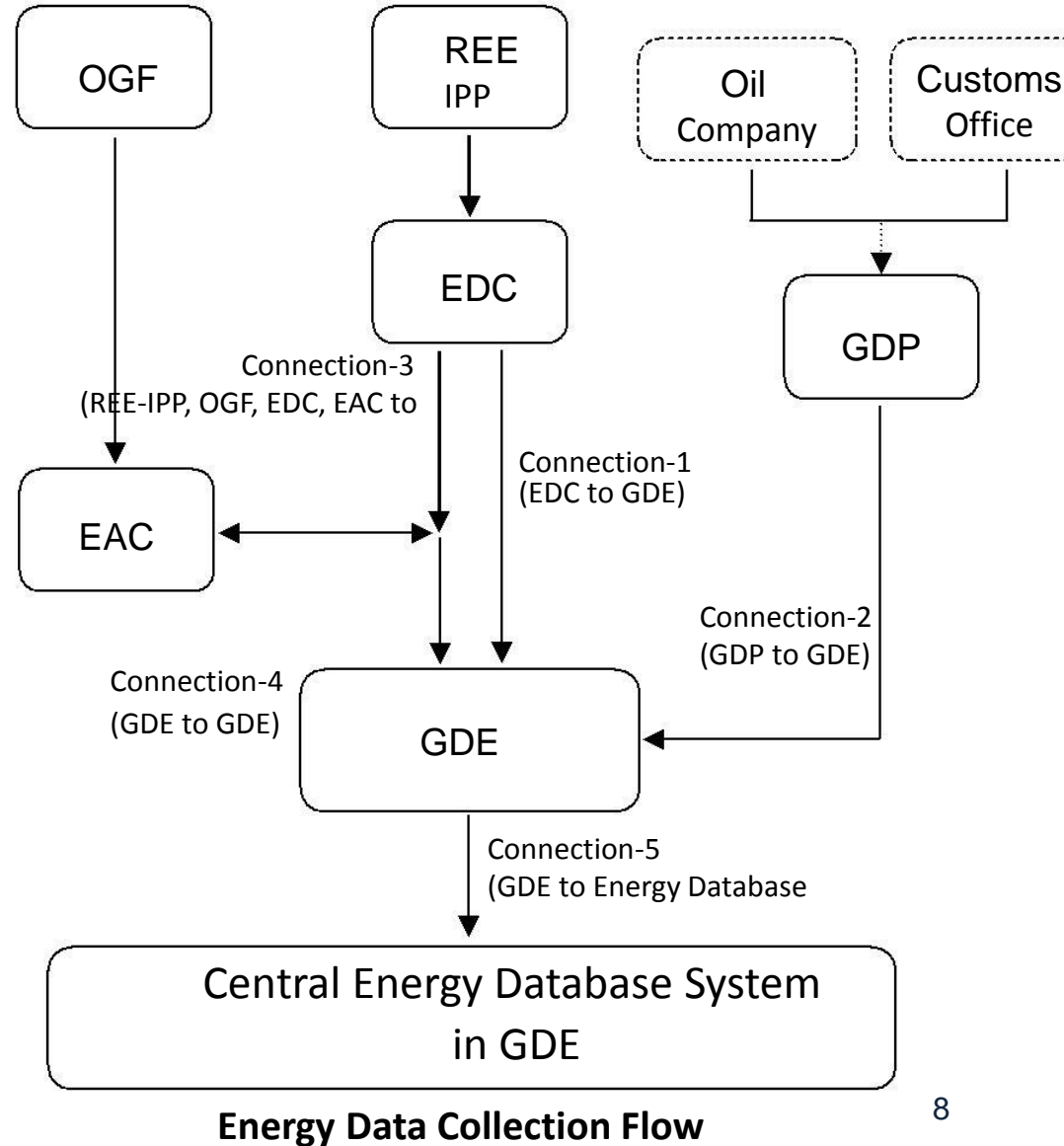
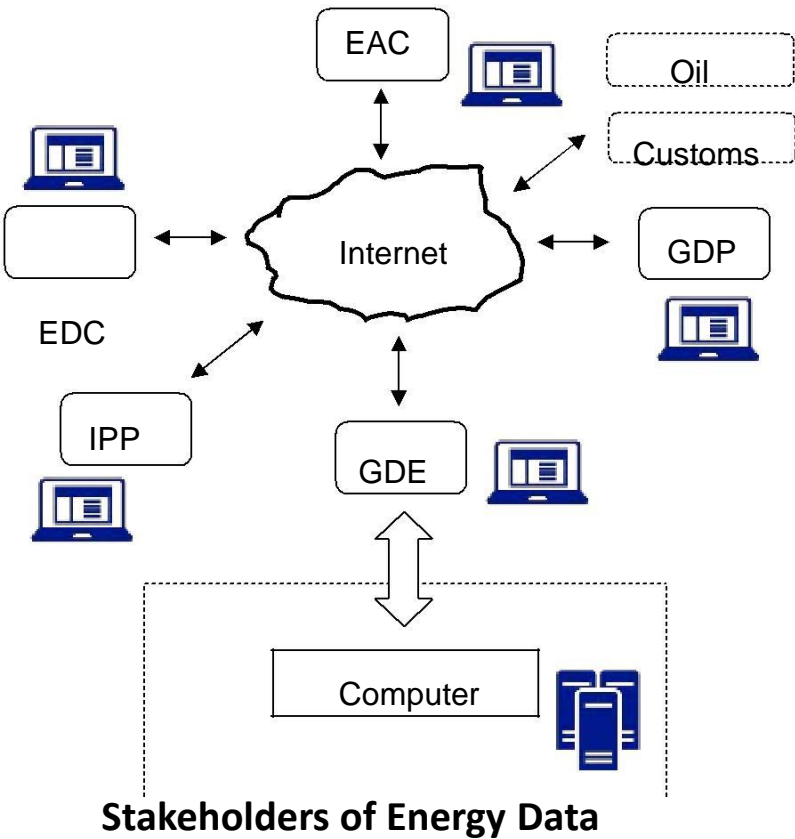


# National Policy on Rural Electrification by Renewable Energy

- 1) Endeavor to provide access to reliable, safe electricity services, with insignificant impact on the environment and at an affordable price for rural communities;
- 2) Provide effective legal, regulatory frameworks and various to an encouragements and train the private sector to participate in providing electricity services by renewable energy in the rural areas;
- 3) Act as a market enable, through various incentives, for enabling equity in access to reliable and safe electricity services, with insignificant impact on the environment, at an affordable price for the rural communities;
- 4) Encourage the efficient generation, transmission and distribution of electricity using the renewable energy technologies, through tariffs, which are in conformity with the Electricity Authority of Cambodia (EAC)'s regulation;
- 5) Promote electricity systems by renewable energy at least cost for rural communities, through research and pilot development, as part of RGC's portfolio on grid and off-grid technologies; and
- 6) Ensure adequate resources, appropriate institutional mechanisms and training to empower the poor involving in rural electrification to participate.



# Data Collection Flow of Existing Data



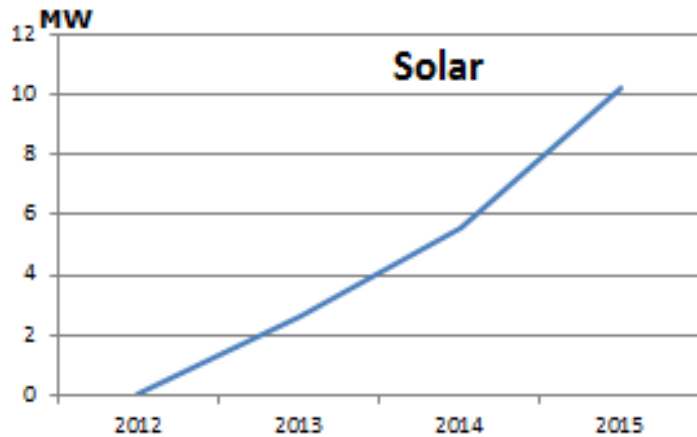
EAC = Electricity Authority of Cambodia,  
GDE = General Department of Energy,  
IPP = independent power producer,  
REE = rural electricity enterprise

EDC = Electricité du Cambodge  
GDP = General Department of Energy  
OGF = off-grid factory,

# RE Potentials and ongoing activities Project

## Solar Energy

- ❖ the average sunshine duration of 6-9 hours per day, giving an average of 5 kWh/day. thus, considerable potential of solar energy.



**Table 1: Province wise information on number of SHS installed to rural household or under Installation.**


Description	2013	2014	2015	2016
SHS-50Wp	9,890	4,000	9,240	12,500
SHS-30Wp	2,110	--	--	--
SHS-5Wp	--	--	11,240	--
<b>Total (kW)</b>	<b>557.8</b>	<b>200</b>	<b>518.2</b>	<b>625</b>


**Table 2: Status of Solar project investment in Cambodia**

Developer	Status	Project Name	City/Province	Online Date	Capacity (MW)
IFEC	Under Development	Solar Photovoltaic	Kompong Spur	Present	10
Global Purity Power Co., Ltd	Under Development	Solar Photovoltaic	- Kom Pong Chhangg - Kom Pong Spur - Takeo	Present	10
Sunseap International Pte., Ltd	Under Development	A bidding on Solar Farm	Bavet City, Svay Rieng Province	Present	10
SOMA Energy	Under Development	Solar Photovoltaic	Kompong Thom province	Present	5

# RE Potentials and ongoing activities Project (Cont.)

## Wind Energy

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- ❖ The southern part of the great lake Tonle Sap, the mountainous districts in the southwest and the coastal regions, such as Sihanoukville, Kampot, Kep and Koh Kong have the annual average wind speed of 5m/s or greater. The total area around 5%.

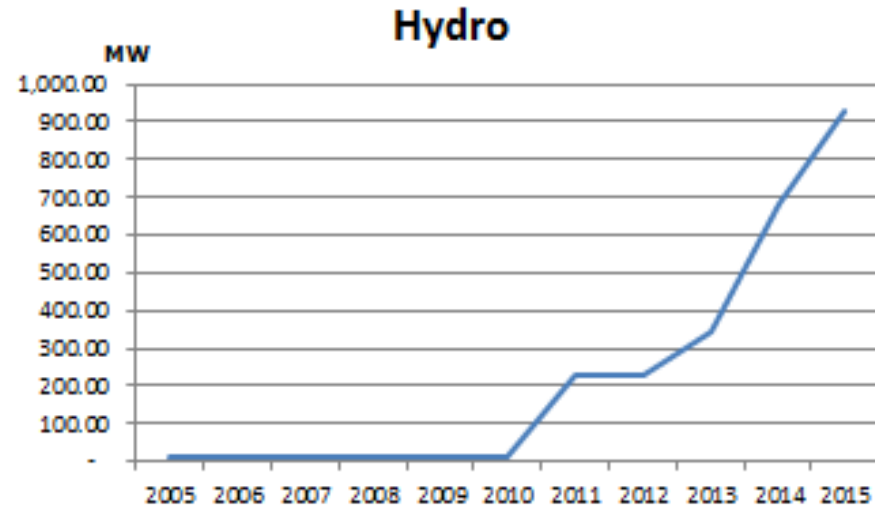
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- ❖ **(Wind Water Pump)** Pump cost between \$800-1500, can pump 6 -12 m<sup>3</sup> per hour and 50 meters deep. Start pumping by 2m/s.

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- ❖ Wind Turbine has installed in Sihanoukville Autonomous Port,

# RE Potentials and ongoing activities Project (Cont.)

## Hydro Power

- ❖ The Hydropower potential is approx. 10,000 MW, but currently contribution to electricity production less than 1,000 MW and other projects are under development & feasibility studies.

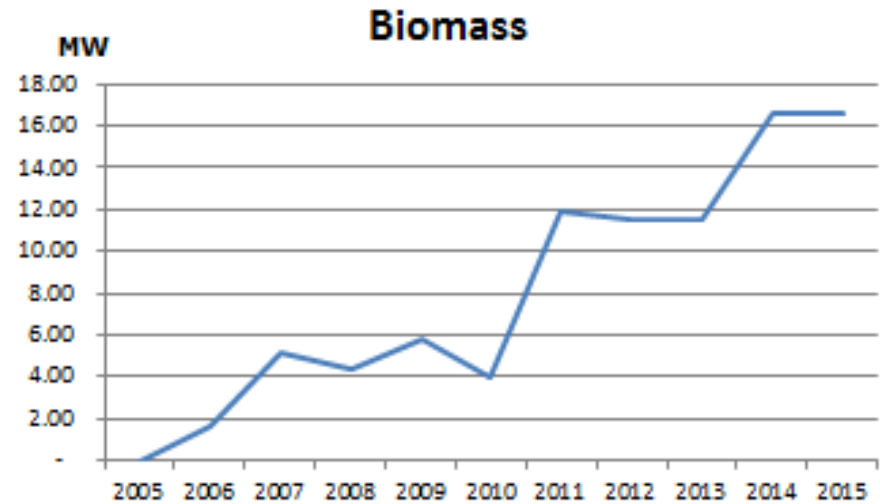


Sources: Department of Hydro power, MME

# RE Potentials and ongoing activities Project (Cont.)

## Biomass

- ❖ The report prepared by NEDO on “the Assistance Project for the Establishment of an Energy Master Plan” identified significant biomass energy resources from a variety of agricultural residues such as rice husk, acacia , Cassava, Luscenia, Coconut, ..



Sources: Department of Energy Development, MME



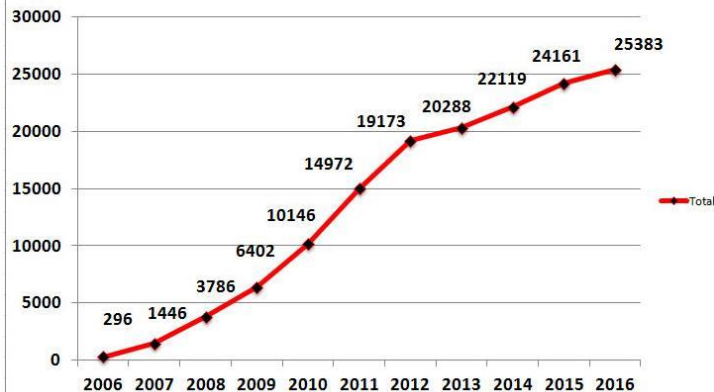
# RE Potentials and ongoing activities Project (Cont.)



## Biogas

- ❖ The effectiveness of small scale biogas has been demonstrated in Cambodia by a number of different projects. The use of animal wastes to generate high quality gas for lighting and cooking have significant economic, social and environment benefits for poor rural households.

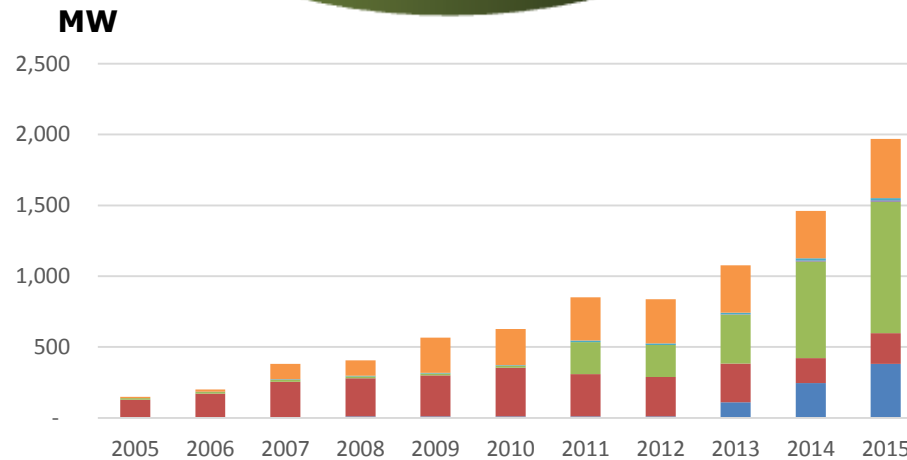
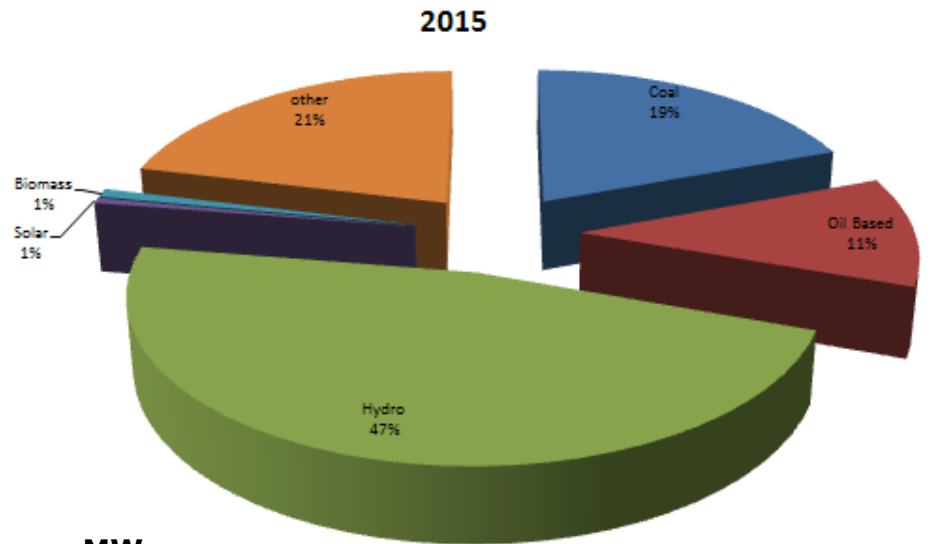
Total Plant Completion 2006-2016 ( Sept )



BIODIGESTER SIZE (M3)	TOTAL COST (US\$)	SUBSIDY FROM NBP (US\$)	FARMER COST (US\$)	USE OF BIOGAS STOVE DURATION (HOUR)	USE OF BIOGAS LAMP DURATION (HOUR)
2	304	150	154	1 - 2	1 - 2
3	381	150	231	1 - 2	1 - 2
4	550	150	400	2 - 4	8 - 16
6	620	150	470	4 - 6	16 - 24
8	720	150	570	6 - 8	24 - 32
10	800	150	650	8 - 10	32 - 40
15	1100	150	950	10 - 15	40 - 60

Sources: National Bio-digester program, Ministry of Agriculture

# Available Generation Capacity in 2015



■ Coal ■ Oil Based ■ Hydro ■ Solar ■ Biomass ■ other



# Challenges of adoption RE in Cambodia

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- **Lack of an RGC renewable energy/generation target**
- **The on-grid RE regulatory environment is unclear**
- **Lack of fair value paid for excess generation sent to grid**
- **Access to finance**
- **Taxation issues**
- **High cost of electricity from RE other than big hydro**
- **Limitation of potential of other RE**
- **High upfront investment cost of RE**

# Conclusion

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- ❖ **Cambodia need to develop the renewable energy and enhance energy efficiency regulation and activities to reduce energy intensity for long-term energy security,**
- ❖ **Recent years , power generation from solar energy significantly reduce, the first solar farm 10 MW in Bavet be connected to the grid in 2017 is a good signal to scaling solar energy development,**
- ❖ **Capacity building, technology transfer is the need .**
- ❖ **Developing Database on Renewable Energy**



**Thank you for your attention !**