Kingdom of Cambodia

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Hydropower Development in Cambodia

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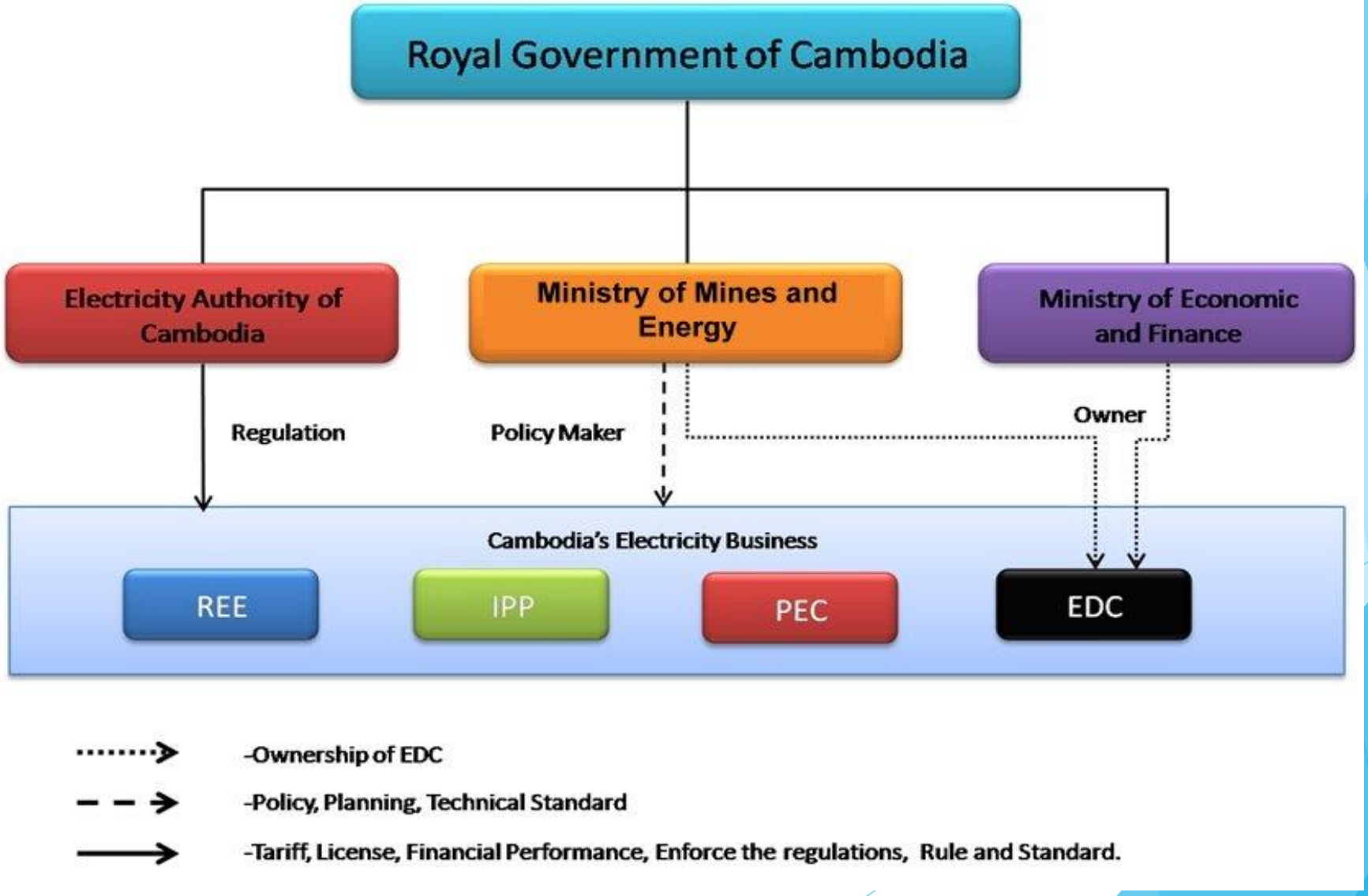
Introduction

- Cambodia is one of the South-East Asian Country.
- Cambodia is bordered nearby: Laos to the North, Vietnam to the East and South, Thailand to the West and North.
- Area 181,035 sq km,
- Population 16 Millions.

Structure of Electricity Organization



Energy Policies

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.

Hydropower Resource

- **Total hydropower potential is estimated about 10,000 MW.**
- **50% in the Mekong River mainstream,**
- **40% in the tributaries of Mekong River and**
- **10% in the South-western coastal area outside the Mekong Basin.**

Table: Classification of Hydropower Plants (HPP)

Type of HPP	Installed Capacity (kW)
Small - Micro (including Pico)	Up to 500
- Mini	501 – 5,000
- Small	5,001 – 10,000
Medium	10,001 – 50,000
Large	more than 50,001

Existing Hydropower Projects

No.	Name of Hydropower Plant	Location	Installed Capacity (MW)	COD	BOT Period
1	Kirrirom 1	Kampong Speu	12	2003	30
2	Kamchay	Kampot	194	2012	40
3	Kirrirom 3	Koh Kong	18	2012	30
4	Atay	Pursat	120	2013	30
5	Lower Stung Russei Chrum	Koh Kong	338	2014	30
6	Tatay	Koh Kong	246	2015	37
7	Lower Sesan 2	Stung Treng	400	2018	40

Total Installed Capacity of Hydropower Projects = 1328 MW

KIRRIROM 1 HYDROPOWER PROJECT (12 MW)

Location	**: Koh Kong Province, 120 km South-West of Phnom Penh**
Project Type	**: Reservoir**
COD	**: July 28, 2003**
Installed Capacity	**: 12 MW**
Turbine Type and Units	**: Pelton (6 MW x 2 Units)**
Annual utilization times	**: 5349 hours**
Gross head	**: 400.16 m**
Design discharge	**: 3.94 m^3/s**
Dam Type	**: Earth core rock-fill dam**
Dam Height	**: 34m above ground**
Dam Length	**: 343m**
Base Energy	**: 41 GWh (revised)**
Interconnection Point	**: Kirirom I Switchyard (Outgoing line bay)**
Transmission Line	**: 120 km (115KV single circuit)**

KIRIROM 3 HYDROPOWER PROJECT (18MW)

Location Project	**: Koh Kong Province**
Type	**: Reservoir**
Installed Capacity	**: 18 MW**
COD	**: 27.09.2012**
Turbine Type & Units	**: Pelton (2 Units x 9 MW)**
Annual utilization time	**: 4364 Hours**
Gross head	**: 268.50 m**
Design discharge Dam	**: 8.12 m^3/s**
Type	**: Earth-Rock Fill Dam**
Dam Height Dam	**: 51.50 m**
Length	**: 588 m**
Based Energy	**: 78.55 GWh**

KAMCHAY HYDROPOWER PROJECT (194.1 MW)

Location	: 15 Km from Kampot town
River Name	: Kamchay
Project Type	: Reservoir
COD	: August 1, 2012
Installed Capacity	: 194.1 MW
Rated head	: 124.1 m
Design discharge	: 165.3 m^3/s (3 units x 55.1 m^3/s)
Turbine Type and Units	: PH1-Francis (3×60MW) PH2-Bulb (3×3.1MW+1×0.8MW) PH3-Francis (1×4MW)
Annual availability	: 2450 hours
hours Dam Type	: Concrete Face Rock Fill Dam
Dam Height	: 114 m
Dam Length	: 568 m
Base Energy	: 498 GWh
Payment Condition	: Base Energy
Interconnection Point	: Kampot Substation

ATAY HYDROPOWER PROJECT (120 MW)

Location	:	PURSAT, 15km from O'Som Substation
Project Type	:	Reservoir
COD	:	September 1, 2013
Head	:	Upper Station (PH1) – 32.5 m
		Lower Station (PH2) – 178 m
Discharge	:	Upper Station (PH1) – 35 m^3/s
		Lower Station (PH2) – 15.6 m^3/s
Turbine	:	Upper Station (PH1) – Francis (2 Units × 10 MW)
		Lower Station (PH2) – Francis (4 Units × 25 MW)
installed capacity	:	120 MW
Base Energy	:	465.89 GWh
Payment Condition	:	Base Energy
Interconnection Point	:	115kV O'Som Substation

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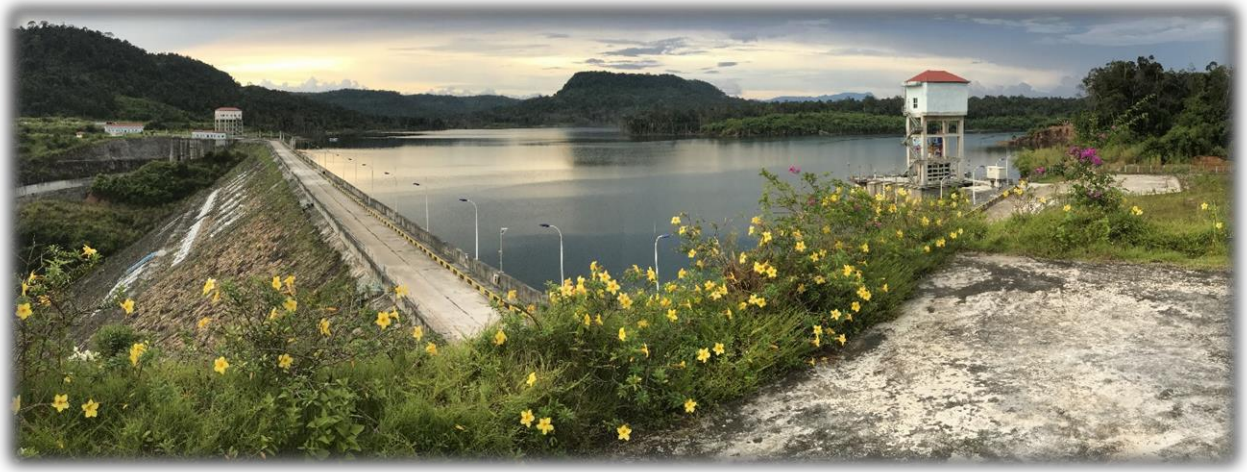
LOWER STUNG RUSSEI CHRUM HYDROPOWER PROJECT (338 MW)

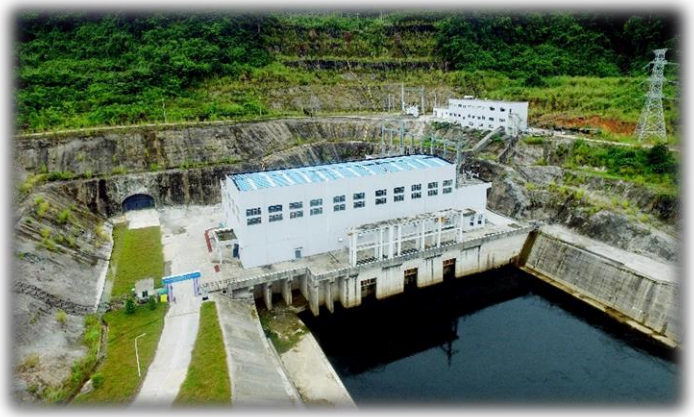
Location : **KOH KONG, 36km from Koh Kong City**
COD : **July 15, 2014**
Turbine Type : **Upper station - Francis (2 Units × 103 MW**
Lower station - Francis (2 Units × 66 MW)
Installed Capacity : **338 MW**

Description	Unit	Upper Station	Lower Station
Type of reservoir		Cascade	Cascade
Storage capacity	Mil.m³	401.8	16.7
Full supply level (FSL)	m	263	108
Minimum operation level	m	231	100
Dam type		Concrete face rock fill dam	Roller compacted concrete gravity dam
Crest elevation	m	266	110.5
Maximum dam high	m	125	58.5
Dam crest width	m	8.7	6
Dam crest length	m	428.8	322



TATAY HYDROPOWER PROJECT (246 MW)

Location : **KOH KONG**
COD : **22 June 2015**
Turbine Type : **Francis 3 Units × 82 MW**
Installed Capacity : **246 MW**



Description	Unit	Parameter
Storage capacity	Mil.m^3	406.5
Full supply level (FSL)	m	215
Minimum operation level (MOL)	m	180
Type		CFRD
Crest elevation	m	220
Maximum dam height	m	115
Dam crest width	m	10
Dam crest length	m	882.3

LOWER SE SAN 2 HYDROPOWER PROJECT (400 MW)

Location Project : STUNG TRENG Province
Type : Run-of-River
Turbine Type : Bulb (8 Units × 50 MW)
Installed Capacity : 400 MW
SCOD : December 2018

Description	Unit	Parameter
Storage capacity	Mil.m^3	1,792.5
Full supply level (FSL)	m	75
Minimum operation level (MOL)	m	74
Tail water elevation	m	45.6
Dam Type: Compacted earth fill dam		
Crest elevation	m	80
Maximum dam high	m	33
Dam crest width	m	8
Dam crest length	m	6,036

Underconstruction Hydropower Projects

Location Project **PURSAT Province**
Turbine Type **2 Units × 40 MW**
Installed Capacity **80 MW**

Description	Unit	Parameter
Storage capacity	Mil.m^3	1,385.6
Full supply level (FSL)	m	180
Minimum operation level (MOL)	m	160
Tail water elevation	m	113
Dam Type: Compacted earth fill dam		
Crest elevation	m	184
Maximum dam high	m	100.5
Dam crest width	m	7
Dam crest length	m	687.22

Challenges

-Limited experts on hydropower dam.
-Limited baseline data (hydrological, rainfall, water level,…etc.)
-Lack of managerial know-how.
-No Institute and University in Cambodia provide curriculum for hydropower dam.
-Need to secure the quality and safety of hydropower dams.

Solutions

-Established Specific Requirements for Electric Power Technical Standards for hydropower (SREPTSHP) and promulgated its since May 2010.

-Requested the developers to pay for rental the National Expert and International Independent Expert to inspection the dam safety for the projects.

Thank for your time