



Workshop on “Sustainable Hydropower Development and Regional Cooperation”

STATUS OF MYANMAR ELECTRIC POWER AND HYDROPOWER PLANNING

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Ministry of Electric Power**

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Kempinski Hotel, Nay Pyi Taw

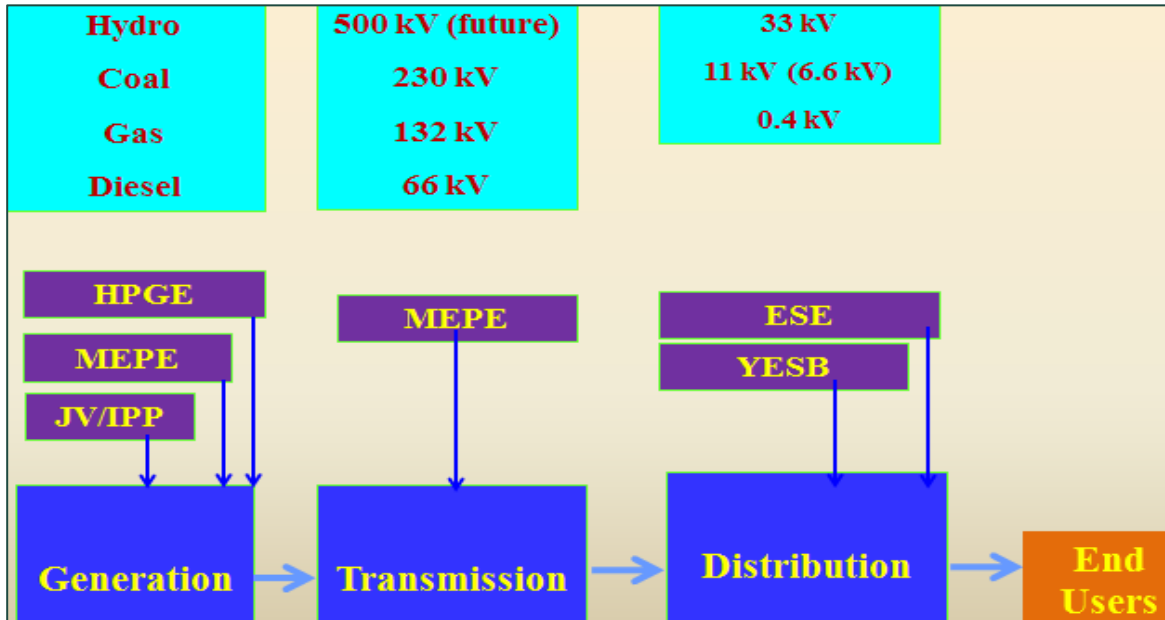
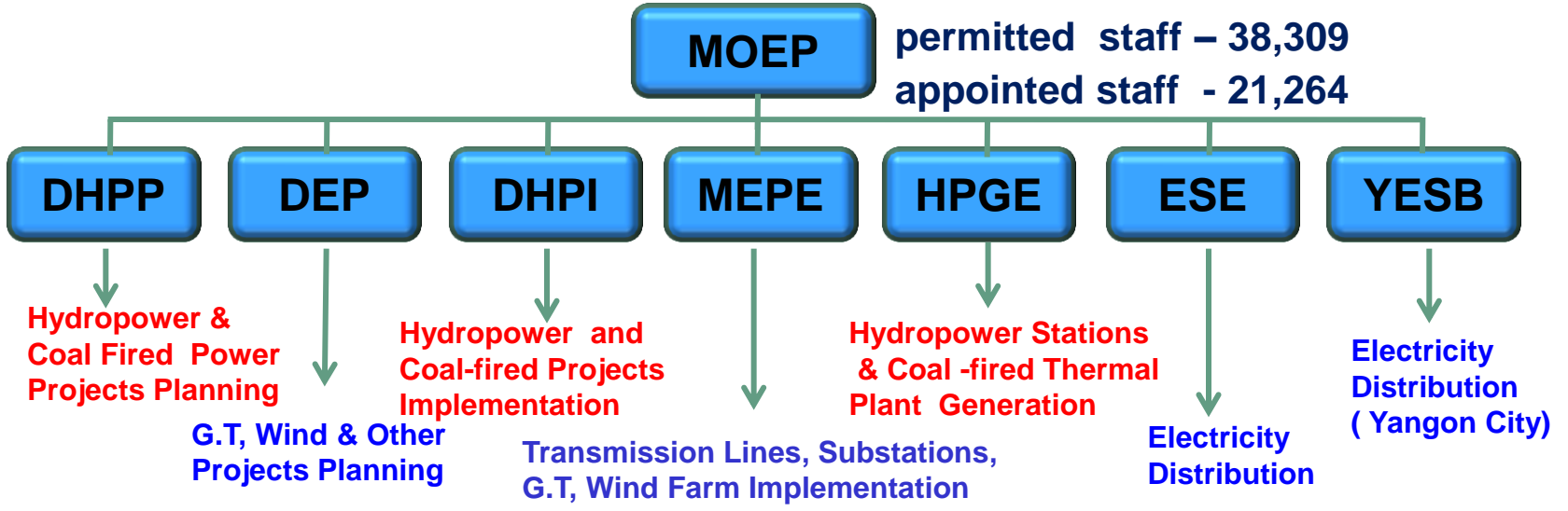
Potential Resources in Myanmar

Resource		Reserve
Hydropower		>100 GW (Estimate)
Wind		365 TWh/year
Solar		52,000 TWh/year
Coal		540 million tons (Estimate)
Crude Oil	Onshore	102 MMbbl (Proven)
	Offshore	43 MMbbl (Proven)
Natural Gas	Onshore	5.6 TCF (Proven)
	Offshore	11 TCF (Proven)

Hydropower Resources (2009)

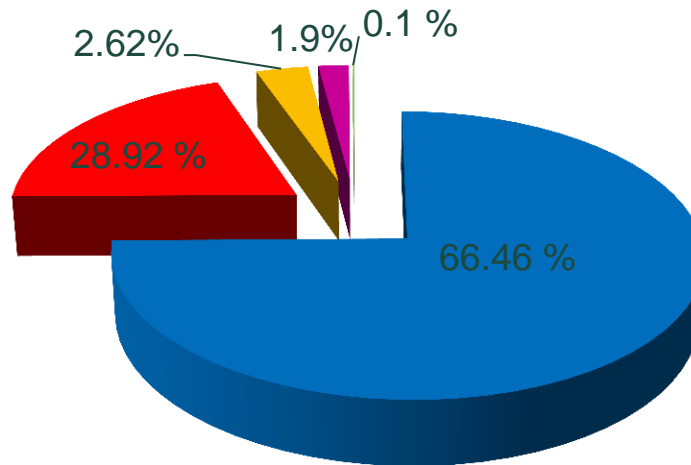
	No. of Potential	Installed Capacity
➤ < 10 MW	210	231.25 MW
➤ Bet; 10 MW & 50 MW	32	806.3 MW
➤ > 50 MW	60	45293.0 MW
Total	302	46330.55 MW

Ministry of Electric Power (MOEP)



Current Generation Mix

Item	Grid System (MW)	Isolated (MW)	Total (MW)	Percentage
Installed Capacity	4,456	125	4,581	100.00%
Hydroelectric	3,011	33	3,044	66.46%
Gas	1,325	-	1,325	28.92%
Coal	120	-	120	2.62%
Diesel	-	87	87	1.90%
Bio Mass	-	5	5	0.10%

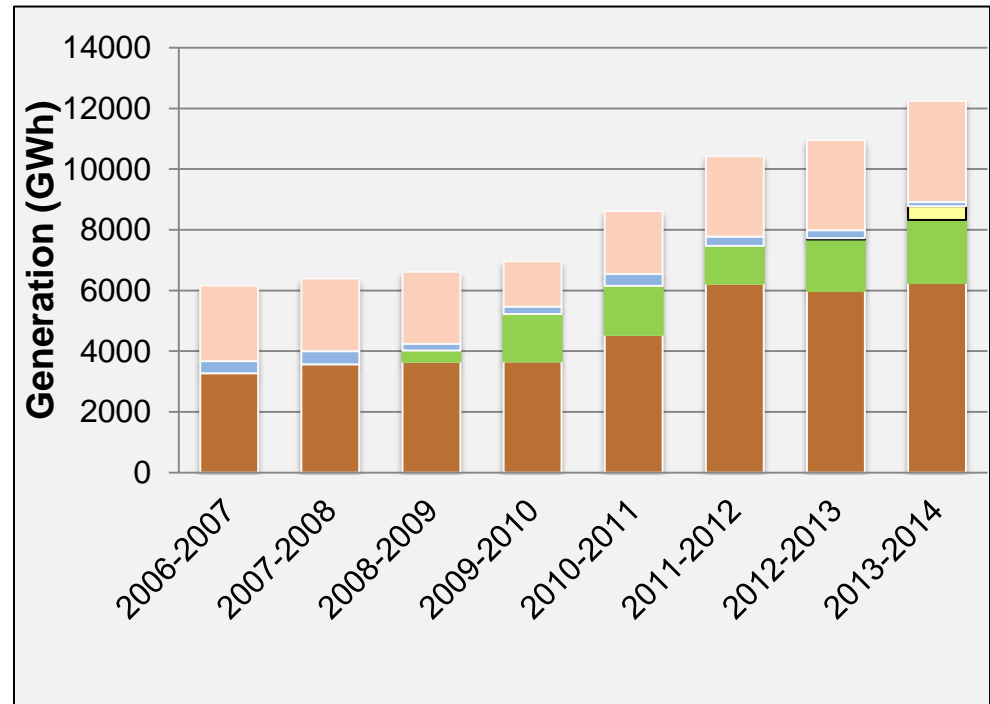
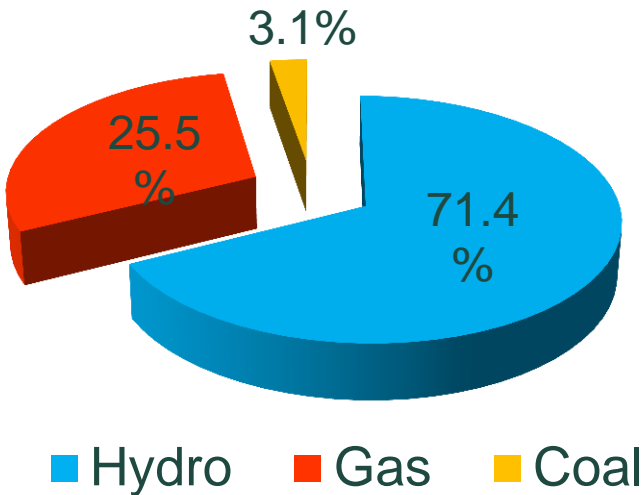


■ Hydroelectric ■ Gas ■ Coal ■ Diesel ■ Bio Mass

Grid-Connected Generation

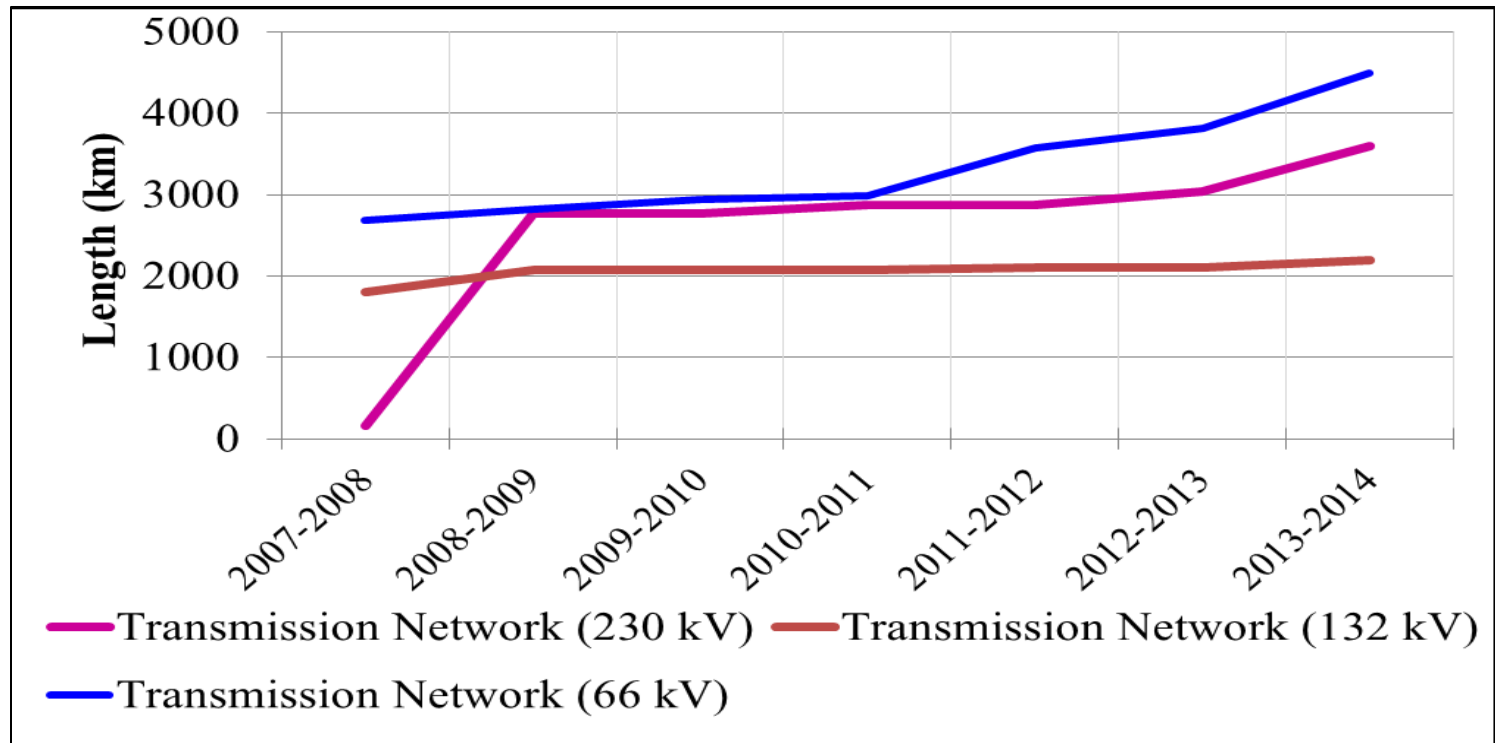
- ❖ Fresh water inflow **1.13 trillion m³** (7.7% of Asia, 16.7% of Southeast Asia)
- ❖ Hydro controls 71.4% of grid-connected electricity.
- ❖ Due to system base load instability, insufficient power supply occurs in summer.

Existing (Installed Capacity)



- Ministry (hydro)
- Ministry (coal-fired)
- JV/B.O.T (hydro)
- Ministry & BOT (gas & oil-fired)
- B.O.T (hydro)

Transmission, Distribution Lines and Substations (as of August 2014)

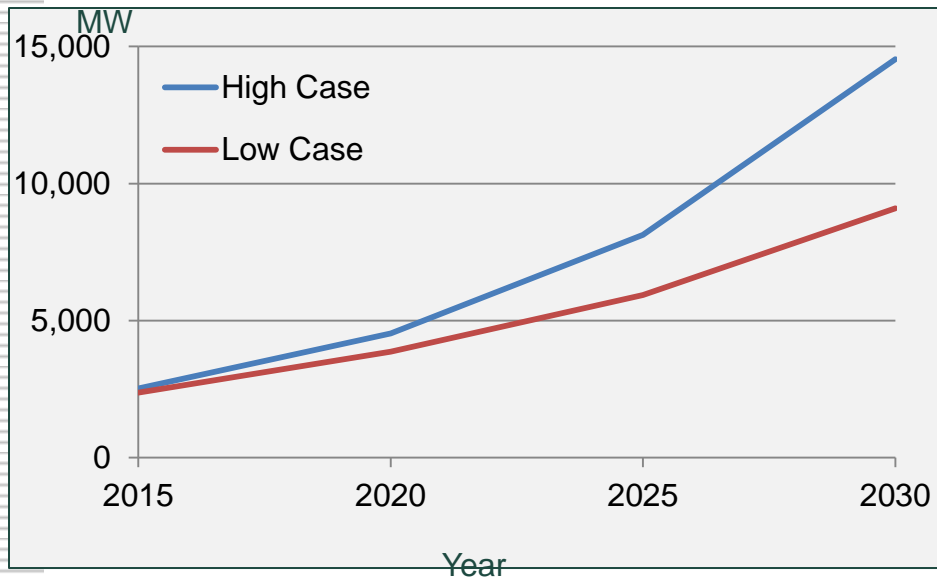


Voltage (kV)	Length (km)	Substations	Capacity (MVA)
230	3156	32	4105
132	2189	21	1248
66	3003	188	2421
Total	8348	241	7774

Demand Forecast Results

The maximum power demand in Myanmar will vary from the minimum at around 9,100 MW to the maximum at 14,542MW by 2030, forecasted based on macro analysis.

Results of Demand Forecast

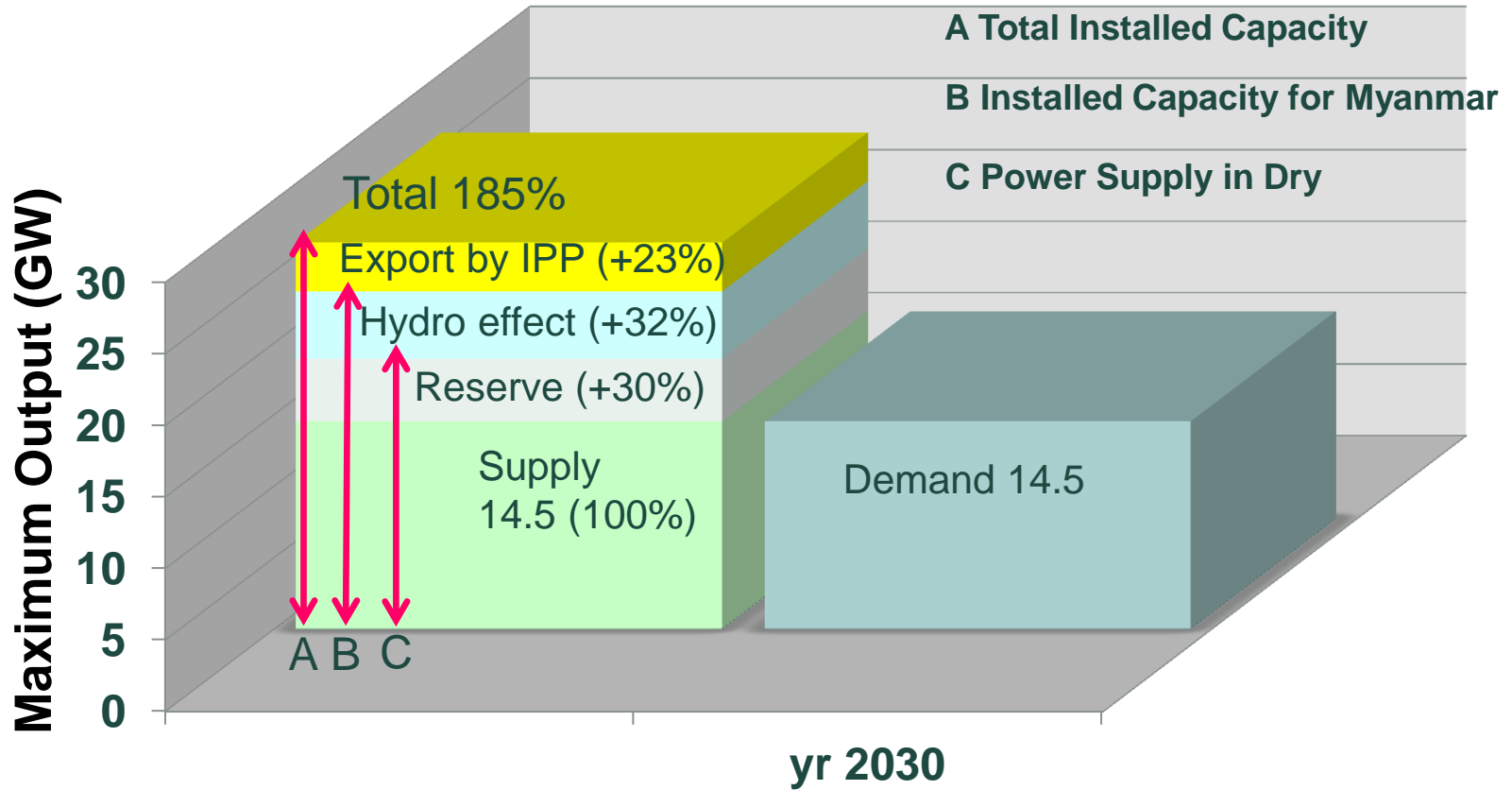


Results of Demand Forecast by region/state

Region /State	High Case (MW)		Low Case (MW)	
	FY2012	FY2030	FY2012	FY2030
Kachin	21	185	21	140
Kayah	8	162	8	130
Kayin	13	165	13	135
Chin	3	90	3	60
Mon	45	418	45	338
Rakhine	10	243	10	180
Shan	103	355	103	288
Sagaing	98	349	98	282
Tanintharyi	52	290	52	235
Bago	131	646	131	523
Magwe	106	293	106	238
Mandalay	457	2,731	457	2,203
Ayeyarwaddy	85	406	85	329
Yangon	742	8,209	742	4,019
Total	1,874	14,542	1,874	9,100

Year	High Case (MW)			Low Case (MW)		
	Total	Non-industry	Industry	Total	Non-industry	Industry
2012	1,874	1,265	609	1,874	1,265	609
2020	4,531	3,060	1,472	3,862	2,390	1,472
2030	14,542	9,819	4,723	9,100	5,631	3,468
Year	Special Economic Zone (MW) **					
	Thilawa	Kyaukphyu	Mandalay	Dawei		
2020	180 – 200	100	100	180		
2030	400 – 500	180	300	300 - 500		

Balance between Demand and Supply (2030)

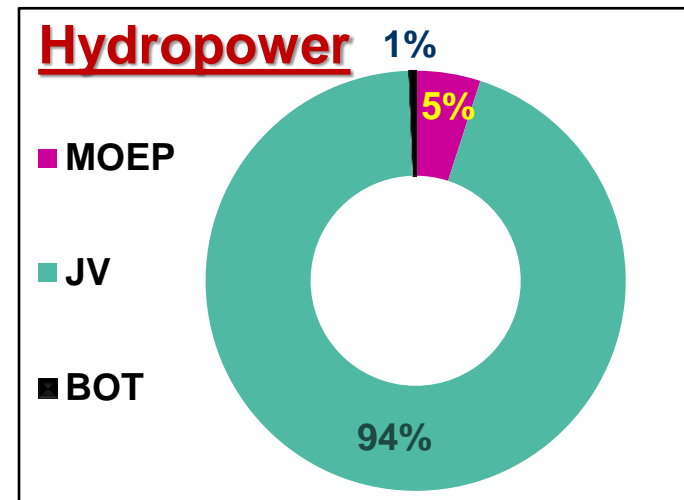
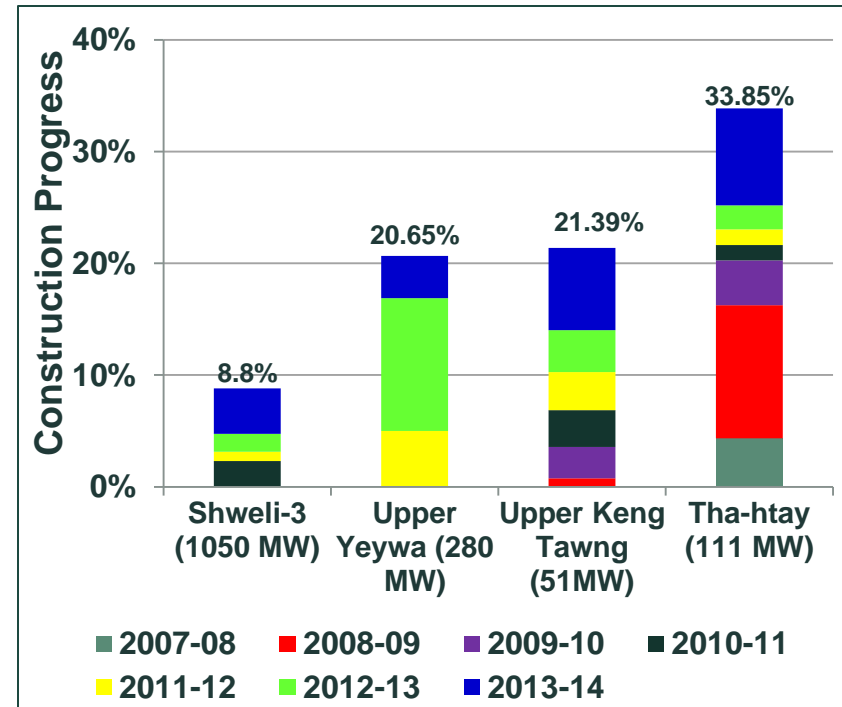


Demand : **14.5GW** in High case
 Supply : **18.9GW** in Dry season available by installed capacity for Myanmar 23.6GW & total installed capacity 27.0 GW

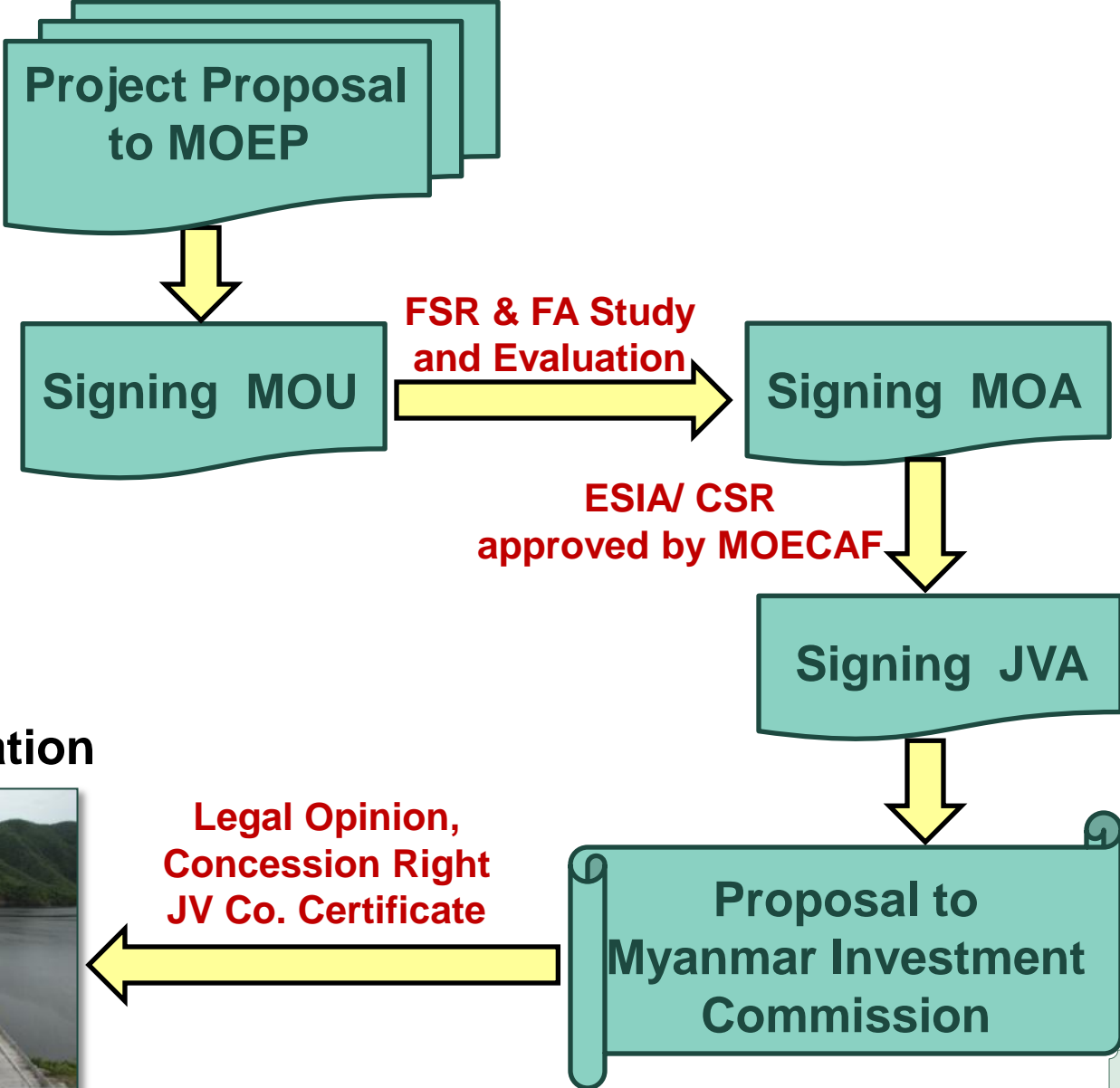
Power Supply Strategies

- (1) Sole investment of Ministry
- (2) B.O.T by local entrepreneur
- (3) JV/B.O.T by foreign investor

Development Stage		Projects	Installed (MW)
Hydropower	Existing	24	3011
	Implementation	7	1662.4
	JVA	4	12700
	MOA	19	16970
	MOU	12	8583
	Planning/Proposal	4	783.1
Steam/Gas-fired	Existing	14	714.9
	Implementation	12	1255.35
	JVA	-	-
	MOA	2	703
	MOU	4	1899
	Planning/Proposal	1	106
Coal-fired	Existing	2	128
	Implementation	-	-
	JVA	-	-
	MOA	-	-
	MOU	12	10090
	Planning/Proposal	10	8710
Other RE	(Wind) MOU	25	4032
	(Solar) MOU	4	530
	(Geothermal) MOU	5	200



Procedures for Joint Venture Development



Project Implementation



Terms and Conditions for JV Projects

- Royalty (Free share) - 10 % or 15 %
- Royalty (Free power) - 15% or 10% } *About 25 %*
- Power purchase - up to 50 % including free power
- Exemption - By Foreign Investment Law
- Tax - By Existing Law

SOME EXAMPLES

● SHWELI -1 Hydropower Project (600 MW)

Free Power (15 %), Free Share (10%),

Power Purchase by MEPE : currently 300 MW, negotiating 100 MW

Tariff to JV Co. 0.2008 RMB/kWh in normal

0.2410 RMB/kWh in summer

0.1647 RMB/ kWh in rainy season

● Dapein-1 Hydropower Project (240 MW)

Free Power (8%) for some reason, Free Share (15%)

Power Purchase on Local Entrepreneur's Projects



SOME EXAMPLES

- **Baluchaung-3 Hydropower Project (52 MW)**
Implemented by Future Energy Co., Ltd.
Power purchase by MEPE (**64.5 kyats/kWh**)
- **Thaukyegat-2 Hydropower Project (120 MW)**
Implemented by Gold Energy Co., Ltd
Power purchase by MEPE (**70 kyats/kWh**)



Legal and Logistic Preparations

❖ National Energy Policy

The Policy had been accomplished with the help of ADB. (7-energy related ministries are cooperating under the National Energy Management Committee, patronage by Vice President)

❖ Electricity Law

On 27 October 2014, Electricity Law was legislated by the Union Parliament. By-laws are also ongoing.

❖ National Electricity Master Plan

National Electricity Master Plan (final draft II) was prepared by JICA and submitted to Ministry in Aug.2014.

❖ National Electrification Plan

To electrify the whole country in 2030-31 fiscal year, Myanmar National Electrification Plan was jointly prepared by Ministry of Electric Power, Ministry of Livestock, Fishery and Rural Development and World Bank in June 2014.

Energy Policy Framework



- To ensure **energy security** for the sustainable economic development in the country
- To provide **affordable and reliable energy** supply to the consumers, especially to those living in the remote areas
- To achieve the Government's overarching objective of **poverty reduction** and improvement in the **quality of life**
- To increase foreign exchange earnings through **energy exports** after meeting the national demand

Electric Power Sector Policies



- To employ **gas turbine** power generation **in short term** plan and **hydro power** generation **in long term** plan for energy sufficiency
- To generate and distribute **more electricity** for economic development
- To conduct ESIA for power generation and transmission in order to **minimize** these **impacts**
- To **reduce losses and conserve** electric **energy** for future energy sufficiency
- To **promote** electricity production from **new and renewable** energy sources

Challenges



- ❖ **Great pressure to fulfill high-rising electricity demand**
- ❖ **Inefficient and ineffective institutional procedures**
- ❖ **Scarcity of human capital**
- ❖ **Limited budget**
- ❖ **Technology**

Way Forward

- ❖ Ineffective and inefficient **institutional procedures and practices** should be eliminated.
- ❖ **Annually targeted generation rate** accompanied with action plan should be secured by implementing priority projects.
- ❖ **Public consultation** shall be closely handled for sustainability of projects.
- ❖ **Capacity building, skill promoting and career nurturing systems** to uplift skills and motivation of staff should be conducted.
- ❖ Subsidization and cross-subsidization by Government should be released gradually.



THANK YOU ALL!

