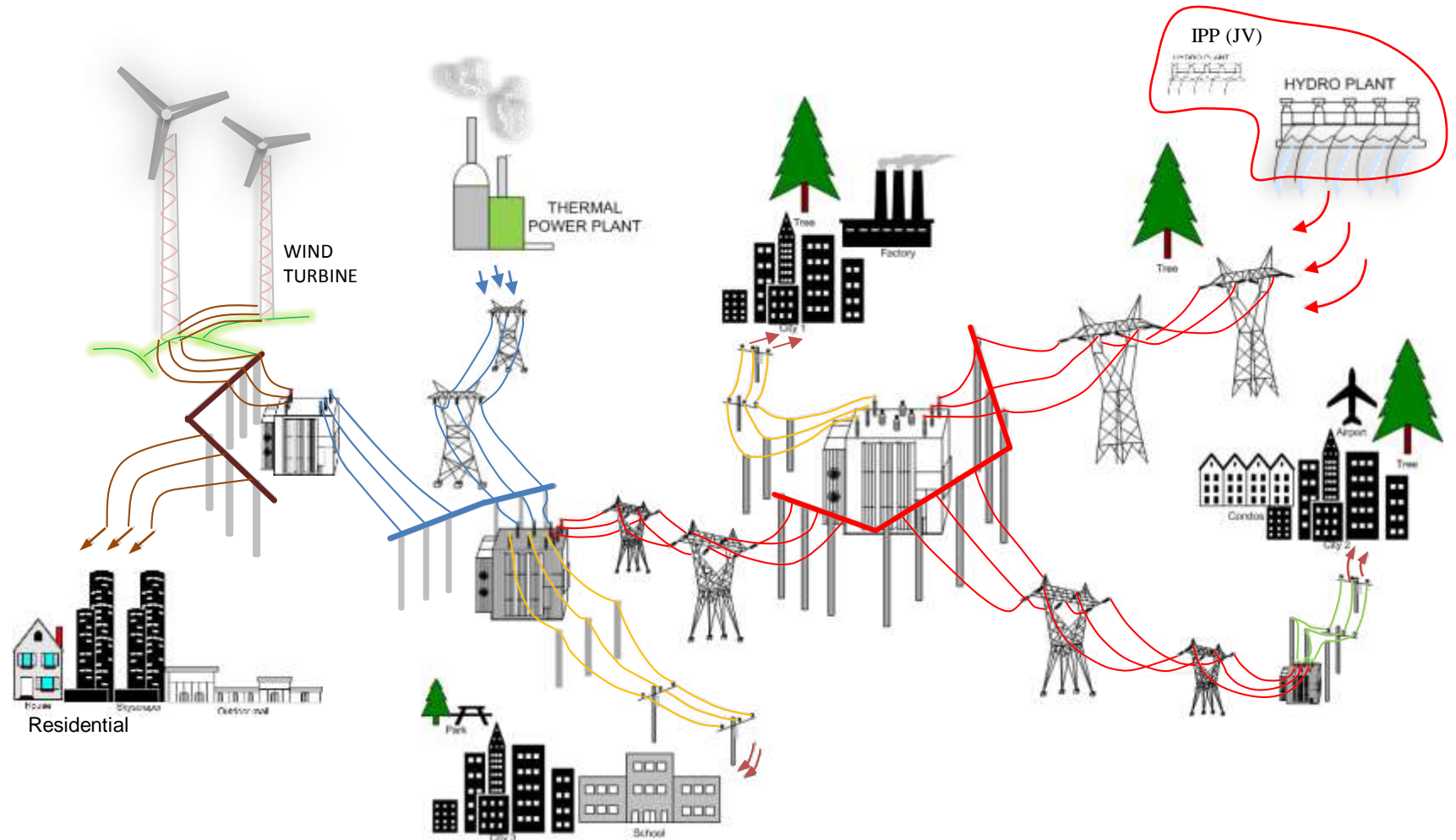
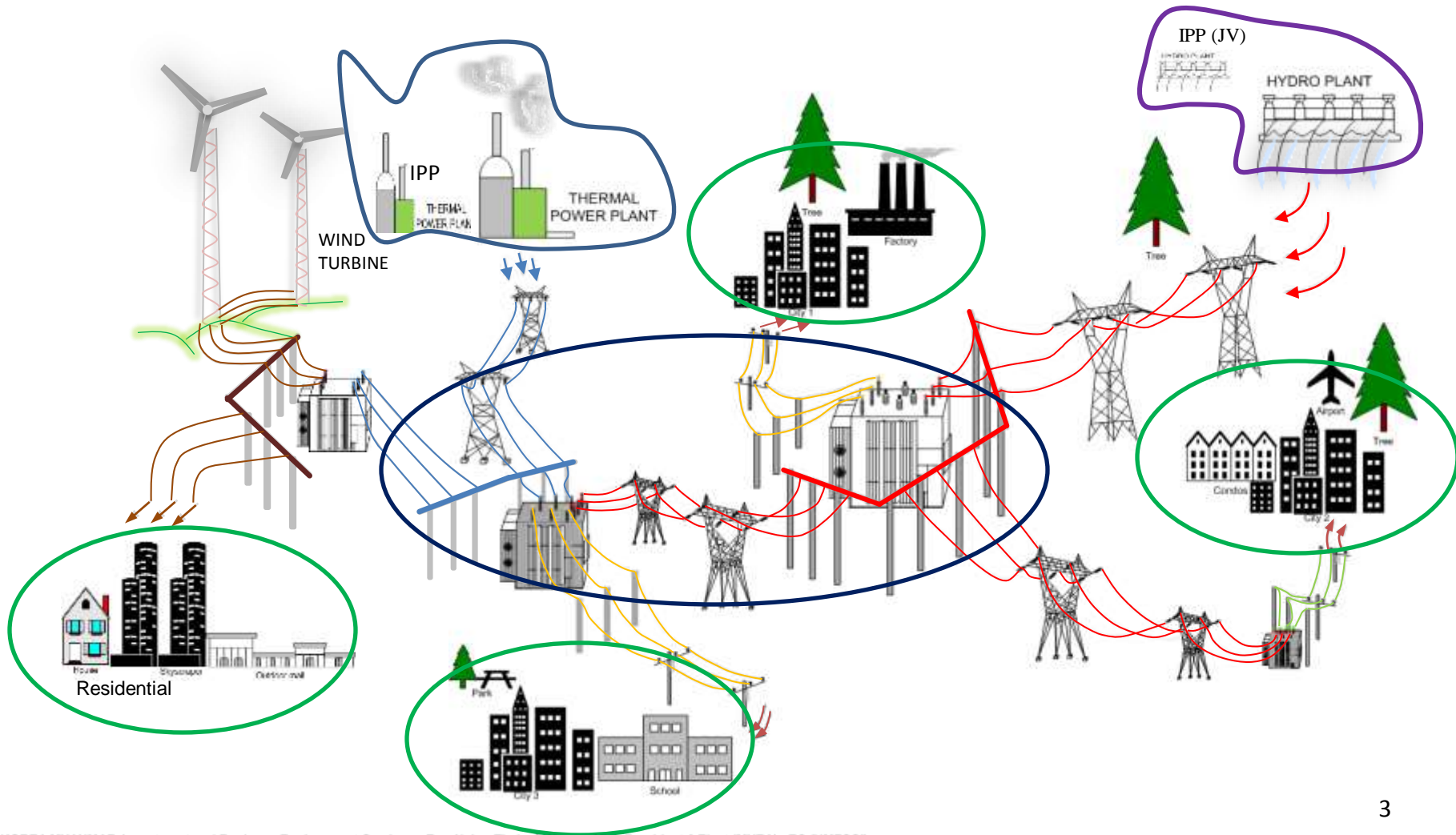


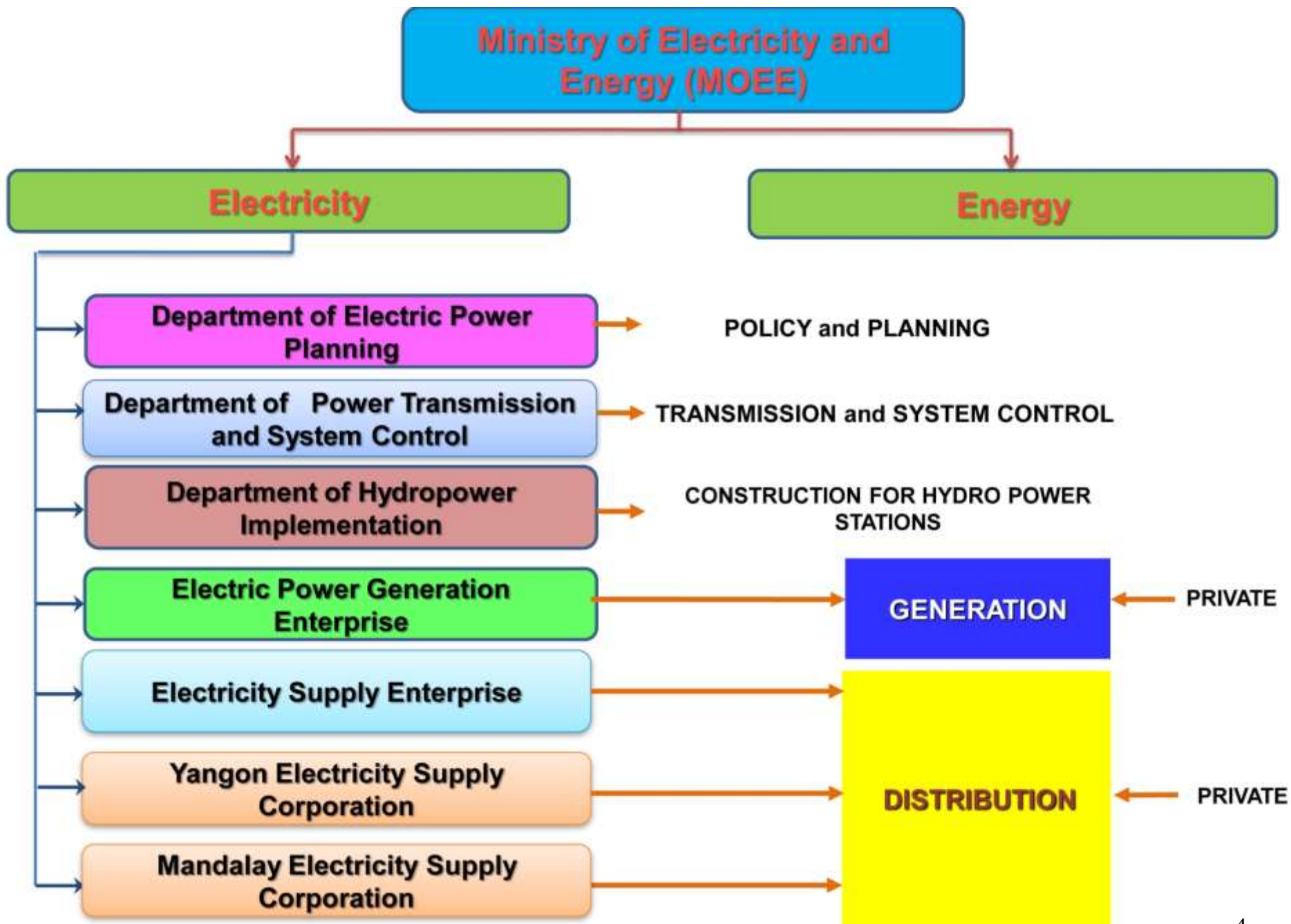
Current Status and Opportunity in Electric Power Sector MYANMAR

Electric Generation, Transmission and Electric Power Distribution in Electric Power System



Electric Generation, Transmission and Electric Power Distribution in Electric Power System





Policies for Electric Power Sector

1. For sufficient electricity supply throughout the country, to expand the national power grid for effective utilization of generated power from the available energy resources such as hydro, wind, solar, thermal and other alternative ones.
2. To conduct the electricity generation and distribution in accordance with the advanced technologies and to uplift and enhance the private participation in regional distribution activities.
3. To conduct Environmental and Social Impact Assessments for power generation and transmission in order to minimize these impacts.
4. To restructure the power sector with cooperation, boards, private companies and regional organizations for more participation of local and foreign investments and formation of competitive power utilities.
5. To formulate the electricity acts and regulations with the assistances of the local and international experts in order to align with the open economic era.

Objectives for Electric Power Sector

1. In order to transmit the generated power, through National Grid System to Regions and States by implementing the Transmission Lines and Primary Substations, and by carrying out the Distribution Plans for electricity supply to the Industries and Public.
2. To provide the technical know-how and policy support for using renewable energy such as bio-mass with cooperation and participation of the local people in rural areas, remotely located from the National Grid.
3. To meet the electricity demand for the inaccessible areas to National Grid, to be supplied by Mini Hydro and Diesel Generators.
4. In order to be reliable the quality of National Grid System for generation, transmission, distribution and consumption of electricity at the Standard Voltage Level with the least of power interruption and losses, to be carried out by our skilled staffs and by getting technical know-how from abroad.
5. In order to fulfill the electricity demand of Myanmar, to encourage the Power Generation not only Hydro and also Natural Gas and Coal, and to be widely and commercially operated by Wind and Solar Power Plants.
6. To generate more electricity from the renewable energy resources.

Related Law and Plans

❖ Electricity Law

- Electricity Law had been enacted on 27th October 2014.
- By-law is still in conducting.

❖ National Electricity Master Plan

National Electricity Master Plan had been conducted by the assistance of Japan International Cooperation Agency (JICA).

❖ National Electrification Plan

National Electrification Plan had been jointly conducted by Ministry of Electricity and Energy and World Bank in June 2014.

Current Status of Electricity Supply in 2015-2016

Electrification in 2015-2016

Electrified Towns	Rural Electrification			Electrified Household		
	Total Nos. of Villages	Electrified Villages	%	Total Household (Million)	Electrified Household (Million)	%
422	63,860	30,350	48%	10.877	3.70	34%

Transmission Line and Substation in 2015-2016

Voltage (kV)	Transmission Line		Substation	
	Nos. of Line	Line Length (mile)	Nos. of Substation	Capacity (MVA)
230	59	2,603.51	46	5,865
132	40	1,366.68	36	2,193.5
66	166	3,034.62	140	2,622.1
Total	265	7,004.81	222	10,680.6

Current Status of Electricity Supply in 2015-2016

Installed Capacity of Power Plant in 2015-2016

Type of Plant	Coal	Hydro	Gas	Diesel	Total
Capacity (MW)	120	3,185	1,829	101	5,235
Energy Mix by Capacity	2%	61%	35%	2%	100%

Power Generation in 2015-2016

Type of Plant	Coal	Hydro	Gas	Diesel	Total
Generation (GWh)	-	9398.98	6517.75	55.23	15,971.96
Energy Mix by Generation	-	58.85%	40.80%	0.35%	100%

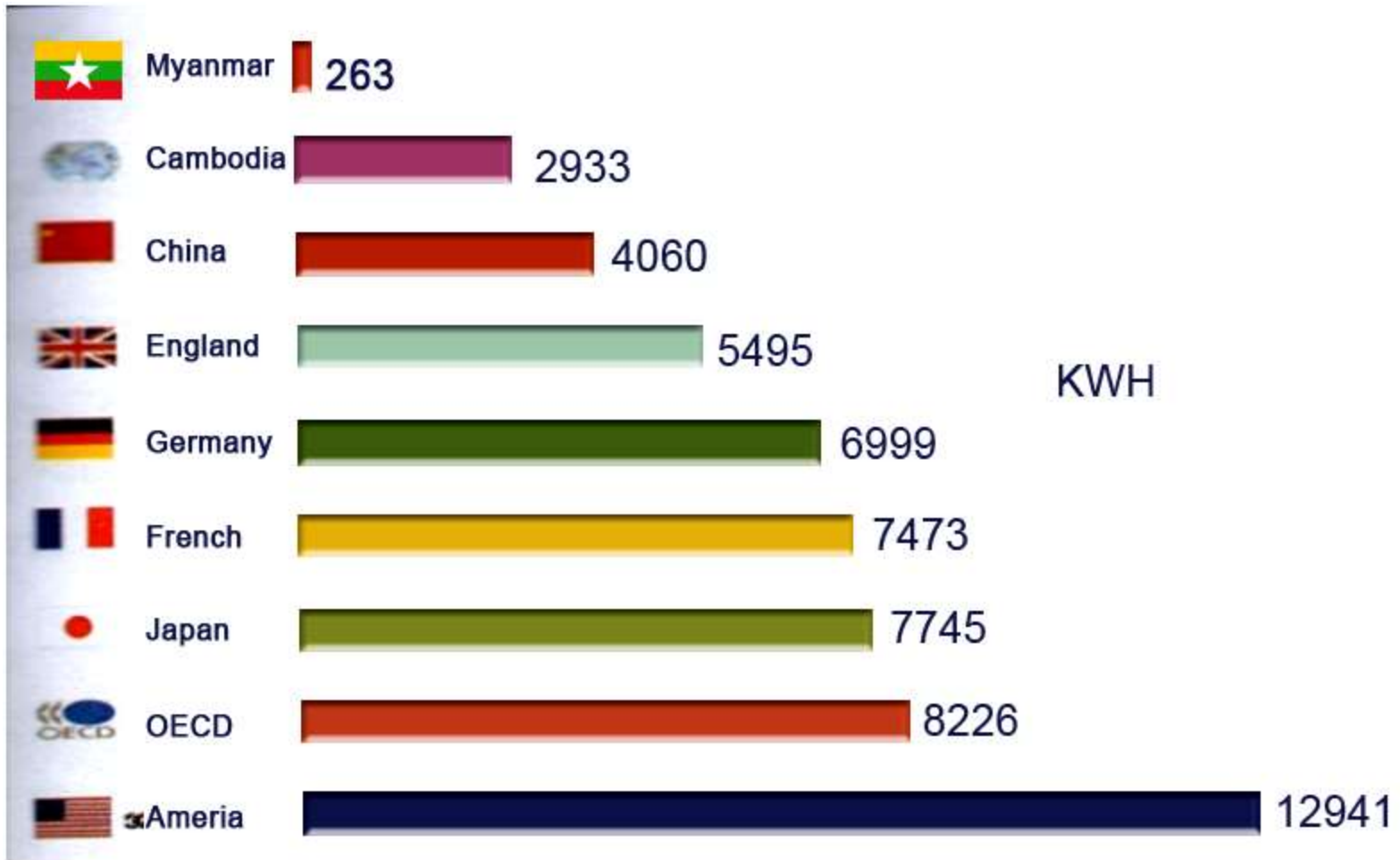
Electricity Consumption in 2015-2016

Type of Use	Industrial	Residential	Commercial	Others	Total	Per Capita Consumption
kWh Million	4,120.768	6,674.658	2,506.079	248.762	13,550.267	263kWh/year
Percentage	30.41%	49.26%	18.49%	1.84%	100%	

Potential Resources

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)
Biomass (Biogas, Rick Husk, Forest Residue, Biofuel etc.)		9242 KTOE (62%)
Geothermal		?
Unconventional Hydrocarbon (Shale Gas, Tight Sand and Coal Bed Methane etc.)		?

Current Status and Opportunity



(Fact of Myanmar is based on 2015)

Worldwide per capita Electric Power Consumption 2014

Electricity Tariff and Subsidies

Block Rate Tariff		Average Selling Price	Cost of Generation, Transmission & Distribution		Average Cost of Overall	Subsidies
Residential		71.10	Hydro Power Station		93.67	22.57
up to 100kWh	35		MOEE	18.51		
from 101kWh to 200kWh	40		Privates	52.84		
from 201kWh and above	50		Natural Gas Power Station			
Industrial & Commercial			MOEE	161.09		
up to 500kWh	75		Privates	142.27		
501kWh to 10,000kWh	100		Coal Fired Power Station			
10,001kWh to 50,000kWh	125		Privates	105.54		
50,001kWh to 200,000kWh	150		Transmission	3.00		
200,001kWh to 300,000kWh	125		Distribution	5.18		
300,001kWh and above	100					

ASEAN Electricity Tariff 2014 | Talk Energy

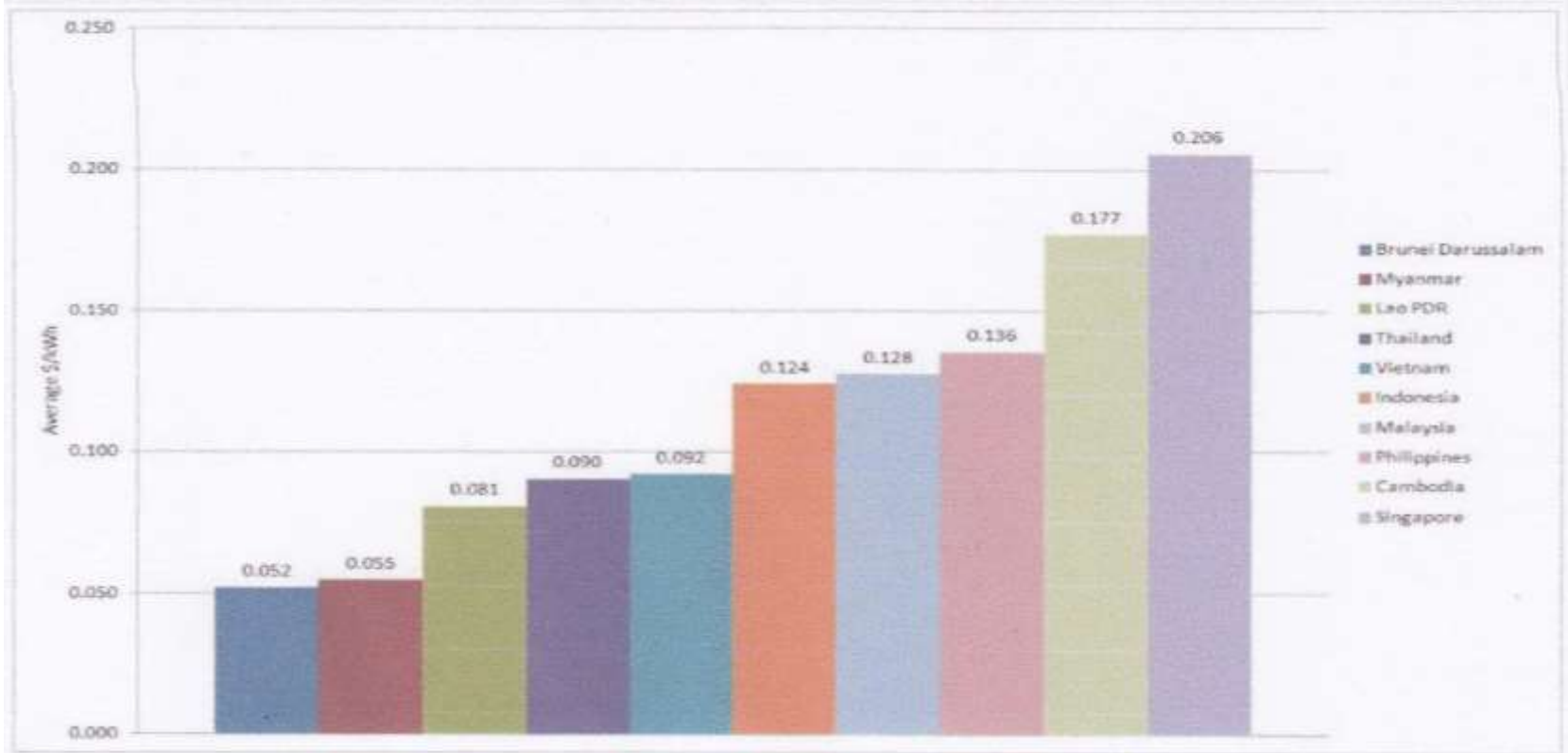
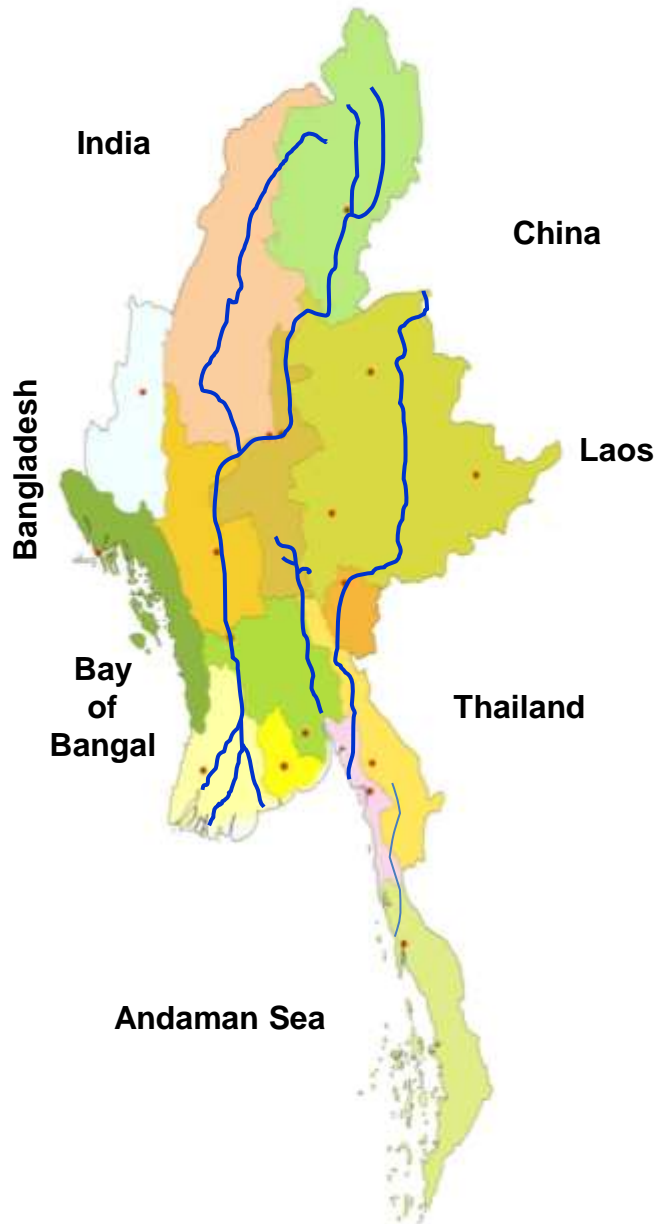


Table 2. Electricity Tariff for ASEAN: Domestic Consumer (as of May 2014)

Hydropower Potential in Myanmar

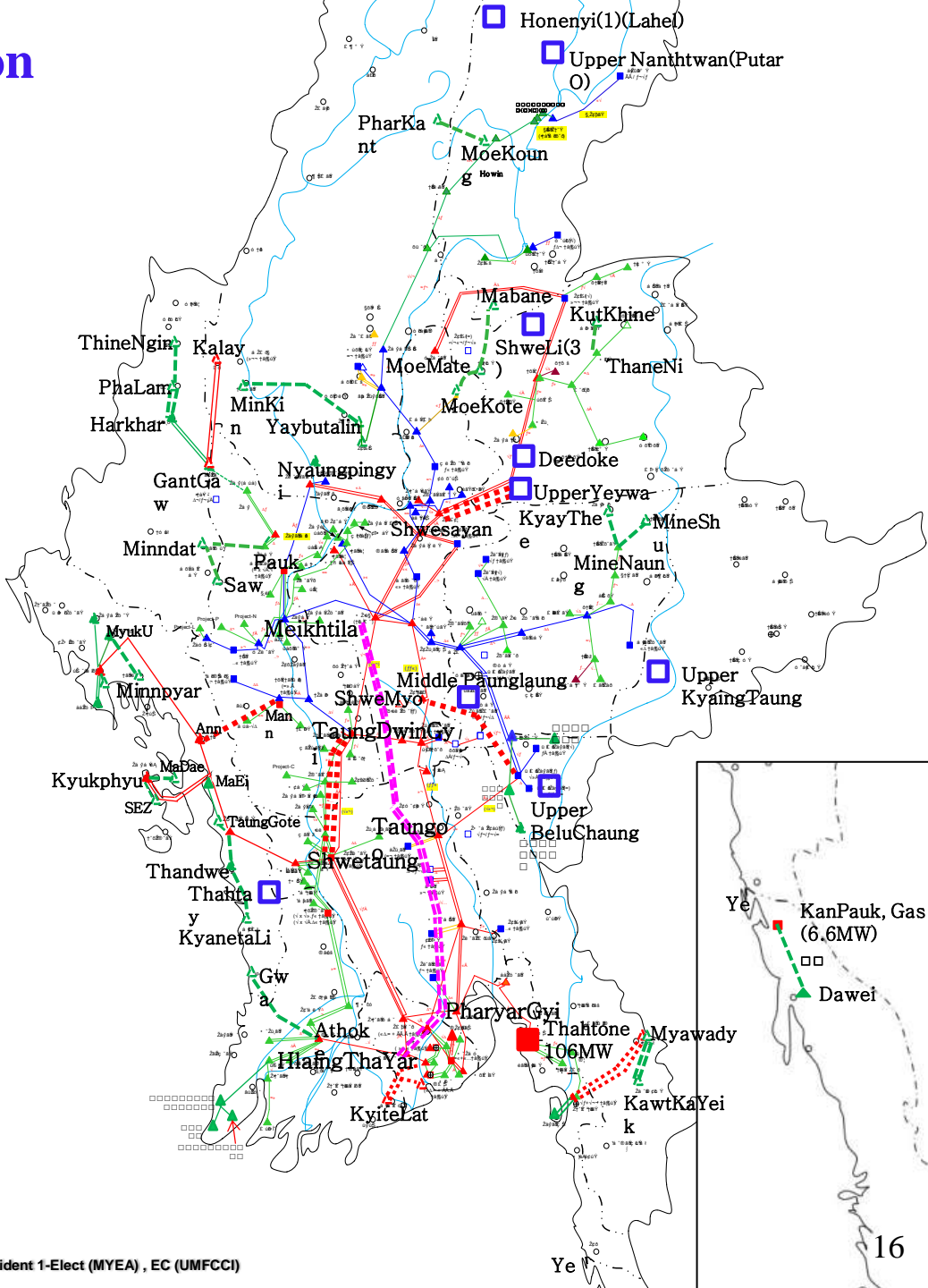


Sr. No	State / Region	Numbers of Potentials		Capacity (MW)
		>10MW ≤50 MW	>50 MW	
1	Kachin State	5	14	18,744.5
2	Kayah State	2	3	954.0
3	Kayin State	1	8	7,064.0
4	Sagaing Region	2	4	2,830.0
5	Taninthayi Region	5	1	711.0
6	Bago Region	4	4	538.0
7	Magway Region	2	3	359.0
8	Mandalay Region	3	6	1,555.0
9	Mon State	1	1	290.0
10	Rakhine State	3	3	764.5
11	Shan States			
	East	1	3	719.8
	South	3	5	7,569.5
	North	-	5	4,000.0
12	>10 MW	32	60	46,099.30
13	<10MW	210		231.25
	Total	302		46,330.55

Power Projects Under Construction

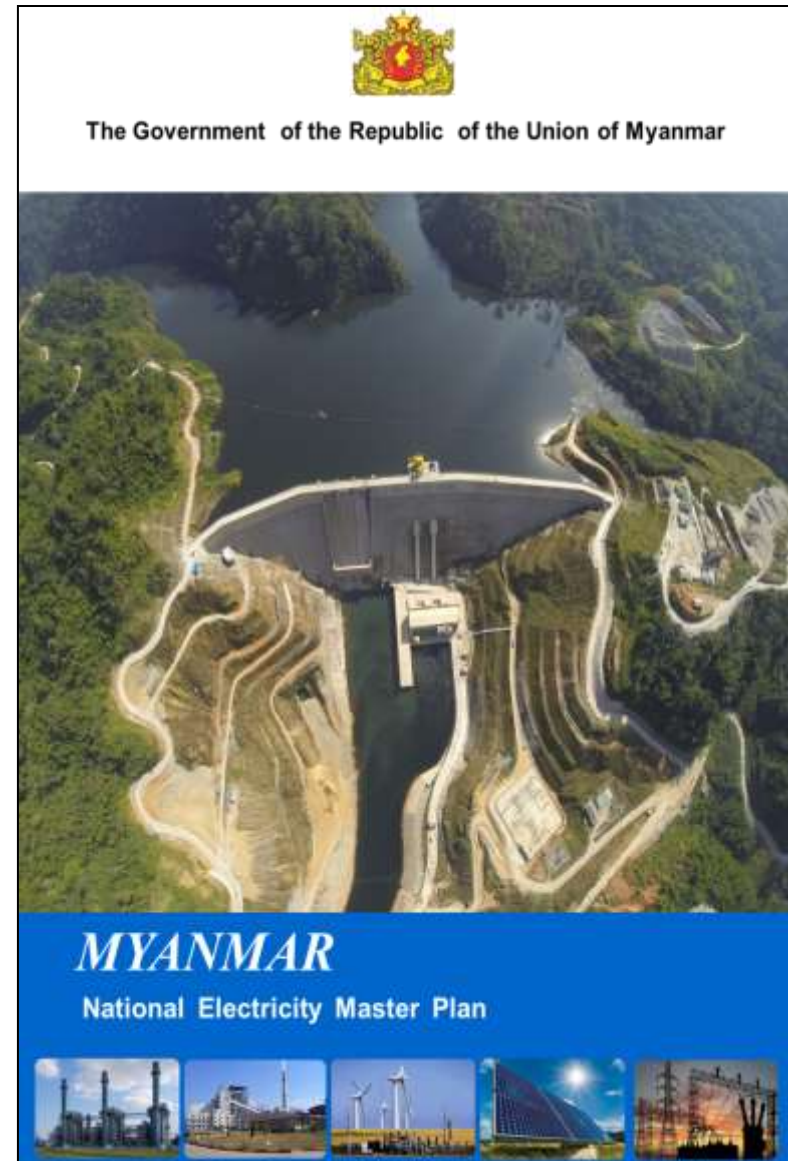
Sr.	Project	MW
1	Honeyi (Hydro)	6
2	Upper Nanhtwan (Hydro)	3.2
3	Shweli (3) (Hydro)	1050
4	Deedoke (Hydro)	66
5	Upper Yweywa (Hydro)	280
6	Middle Paunglaung (Hydro)	100
7	Upper Kyaingtaung (Hydro)	51
8	Upper Beluchaung (Hydro)	30.4
9	Thahtay (Hydro)	111
10	Thahton(Gas)	106

No.	Line	Nos of Line	Miles
(A)	500 kV	1	146
(B)	230 kV	6	452.423
(C)	66 kV	17	509



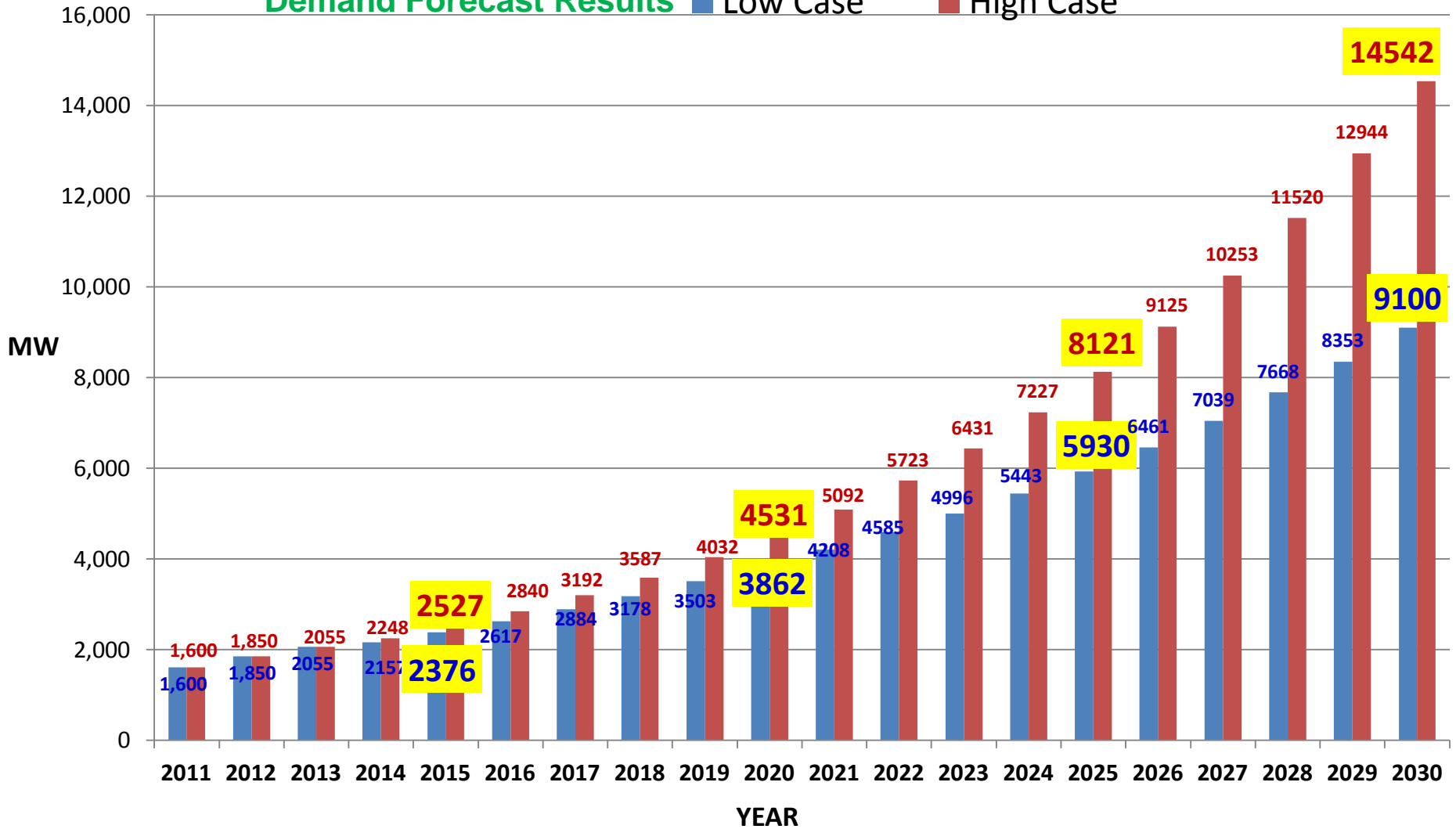
National Electricity Master Plan

- National Electricity Master Plan had been conducted by the assistance of Japan International Cooperation Agency (JICA).

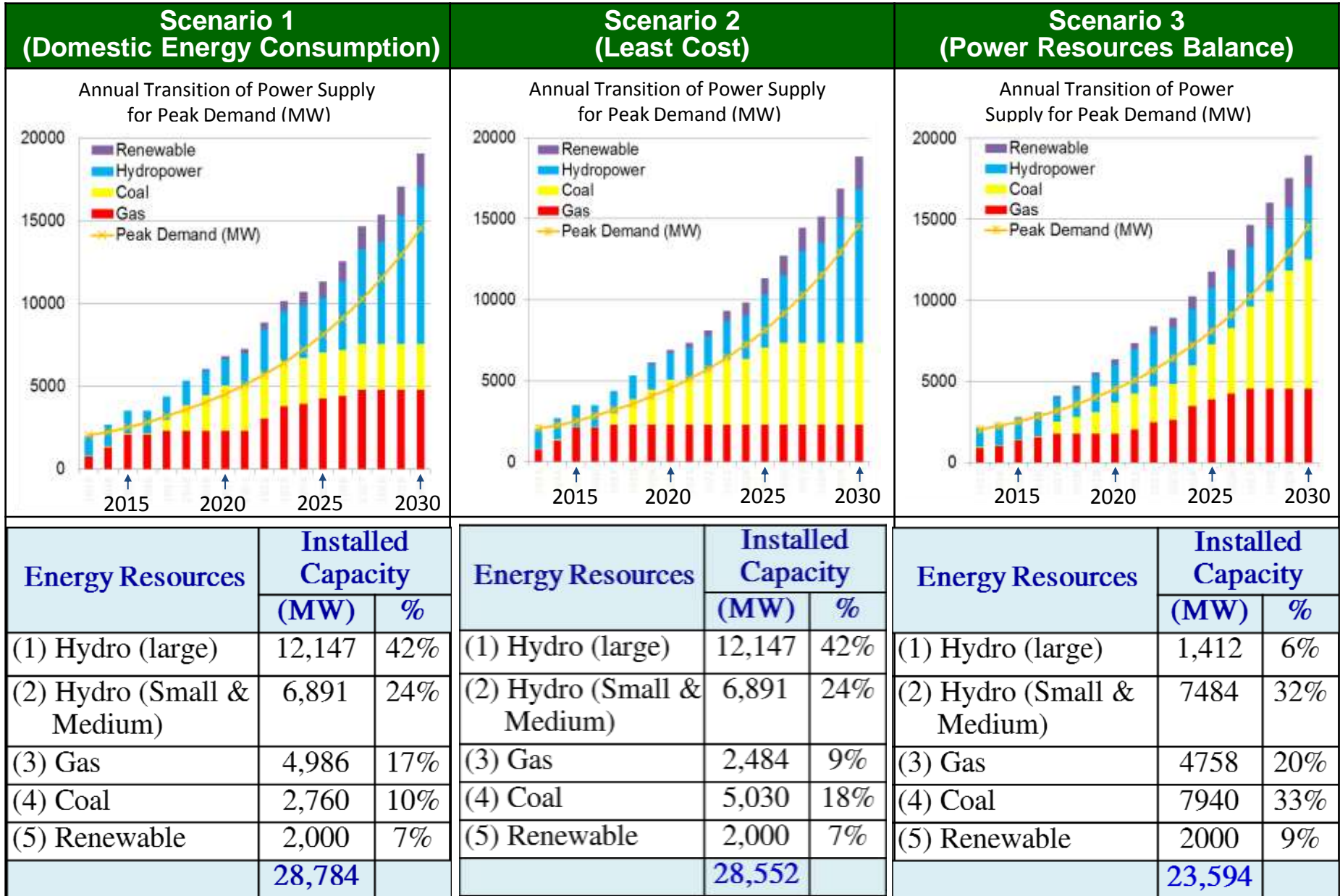


Demand Forecast for 20 years period (2011-2030)

Demand Forecast Results ■ Low Case ■ High Case



Installed Capacity and Power Supply in Scenarios for 2030



Changes of Energy Mix by Generation of Power Plant (from year 2010-11 to 2015-16)



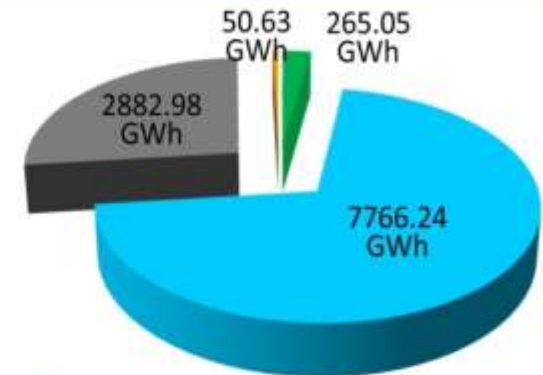
■ Coal (4.54%) ■ Hydro (71.76%)
■ Gas (23.32%) ■ Diesel (0.38%)

Year 2010-11 (8,625.11GWh)



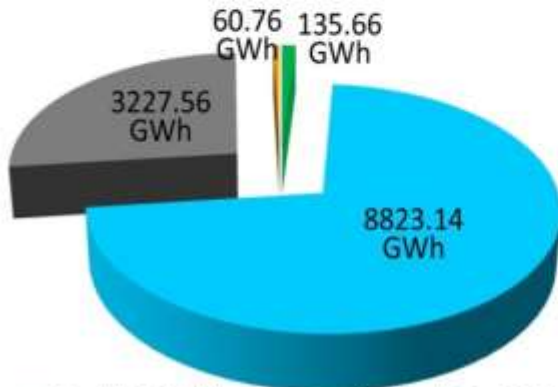
■ Coal (2.99%) ■ Hydro (72.11%)
■ Gas (24.53%) ■ Diesel (0.37%)

Year 2011-12 (10,425.03GWh)



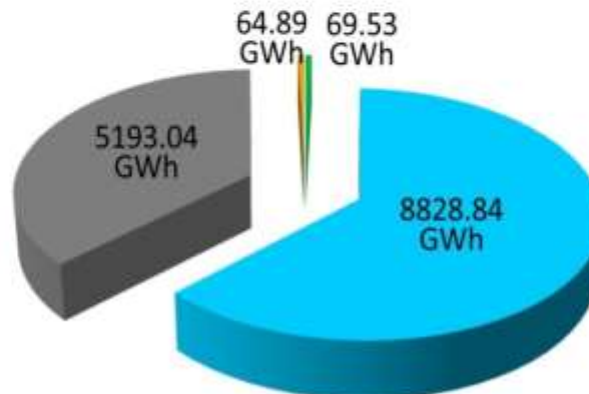
■ Coal (2.42%) ■ Hydro (70.83%)
■ Gas (26.29%) ■ Diesel (0.46%)

Year 2012-13 (10,964.90GWh)



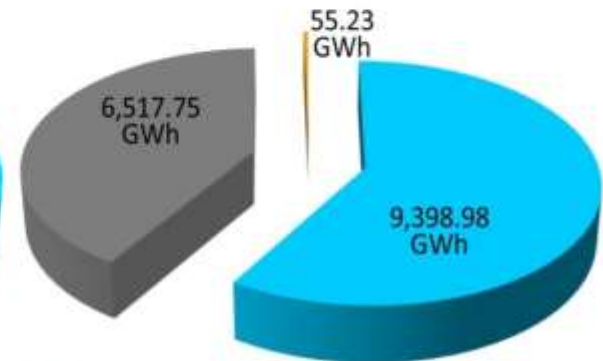
■ Coal (1.11%) ■ Hydro (72.04%)
■ Gas (26.35%) ■ Diesel (0.5%)

Year 2013-14 (12,247.12GWh)



■ Coal (0.49%) ■ Hydro (62.37%)
■ Gas (36.68%) ■ Diesel (0.46%)

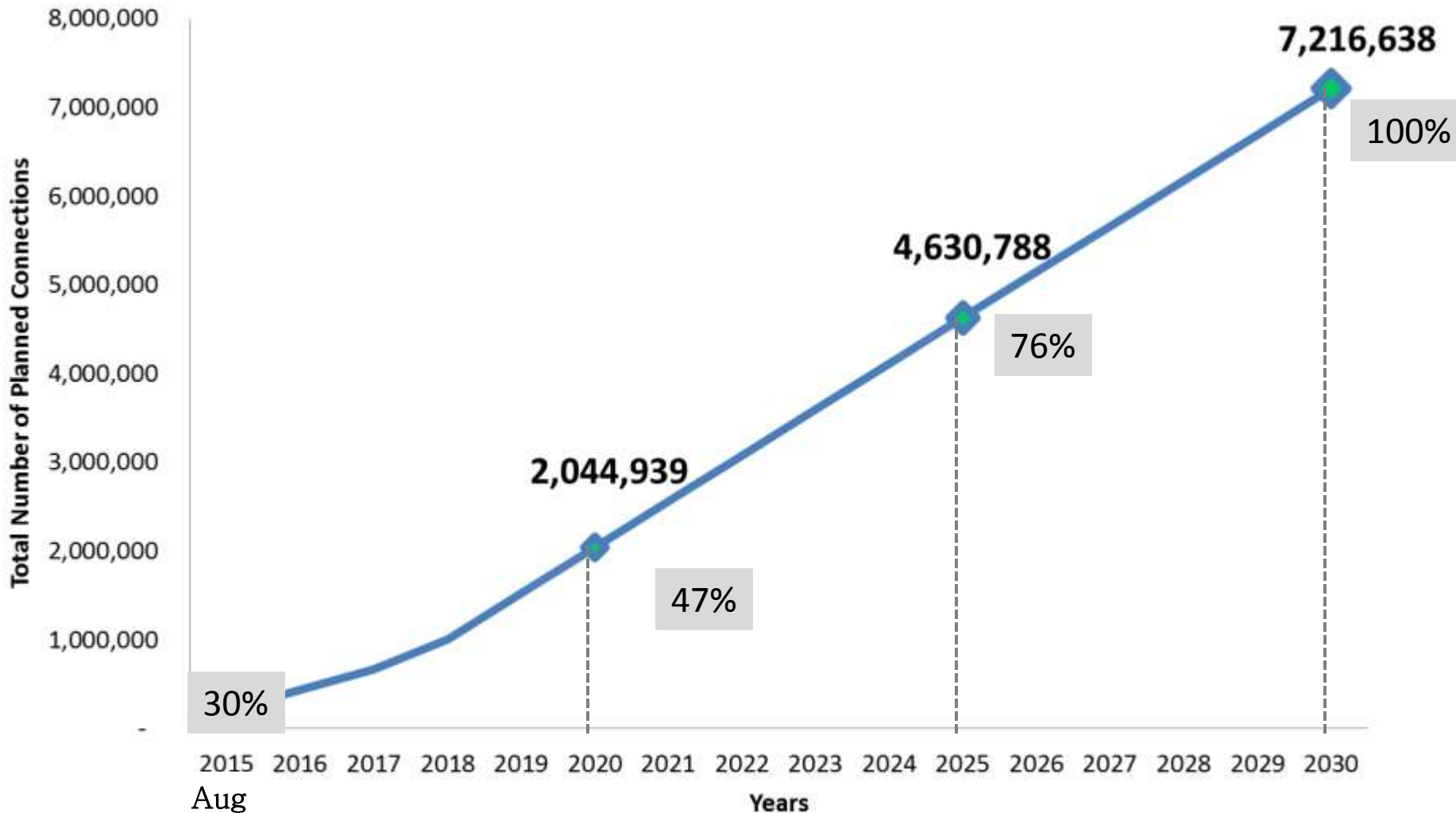
Year 2014-15 (14,156.30GWh)



■ Hydro (58.85%) ■ Gas (40.80%)
■ Diesel (0.35%)

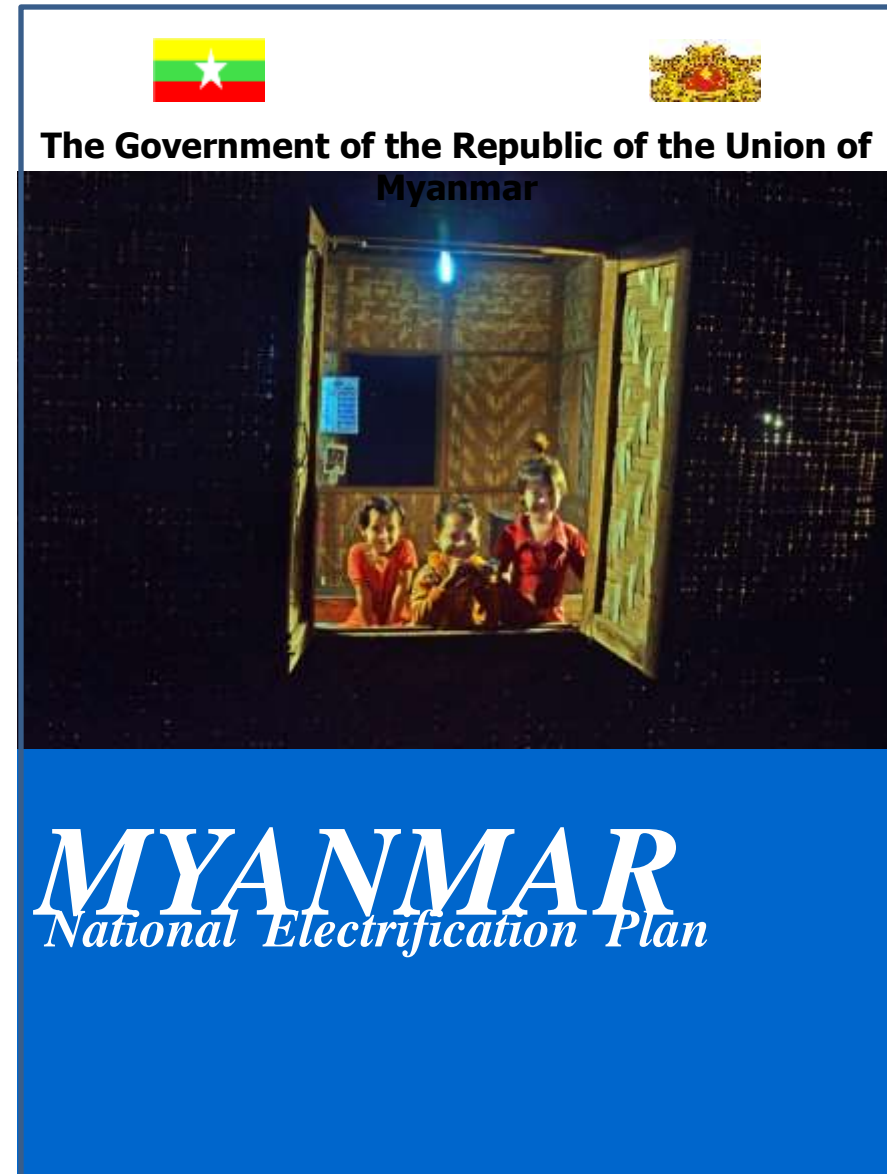
Year 2015-16 (15,971.96GWh)

Goal of National Electrification Plan up to 2030



National Electrification Plan

- National Electrification Plan had been jointly conducted by Ministry of Electric Power and World Bank in June 2014.



National Electrification Plan

- ❖ (1.7) millions of house-hold will have access to electricity in 2015-2019 (5 –year plan).
- ❖ 99 % of house-hold will have access to electricity in 2030.
- ❖ USD (5.8) billions shall be needed for electricity distribution.
- ❖ **Key issue** : Further investments shall be needed to extend the Electricity Generation and Transmission.

Opportunities

Estimated Calculation Based on National Energy Management Committee (NEMC) & National Electrification Planning (NEP)

Power Generation (Installed Capacity)	-	22000 MW	(within 14 years)
Power Transmission & Power System Control	-	33 Billion USD	(within 14 years)
Power Distribution	-	10 Billion USD	(within 14 years)

IPP/ BOT	EPC	Consultants	Financial Institutions
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Challenges

- Cannot get Sovereign Guarantee For IPP
- Public Awareness & Consultation
- Insufficient Human Resources