



Cambodia Country Report

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Bangkok

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Overview

- ▶ Energy Policy
- ▶ Target of RGC in Power Sector
- ▶ Electricity Sources
- ▶ Transmission System
- ▶ Distribution System Backbone
- ▶ Electricity Market Model
- ▶ Total Primary Energy Supply

Energy Policy

- ▶ To provide and 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 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.

Target of RGC in Power Sector

- ▶ All villages in the Kingdom of Cambodia have access to electricity of any type by the year 2020
- ▶ At least 70% of all households in the Kingdom of Cambodia have access to grid quality electricity by the year 2030

Electricity Sources

Power Sources	2016			Estimated for 2017		
	MW	GWh	%	MW	GWh	%
1. Domestic Generation						
Coal	368.00	2,551.17	35.56	538.00	2,829.58	35.51
Hydro power	927.00	2,619.11	36.50	929.70	3,217.79	40.39
Fuel Oil	218.00	362.13	5.05	251.33	260.43	2.87
Renewable Energy	39.27	43.35	0.60	72.27	48.61	0.61
Captive Generation by Industry and Licensees	39.79	16.44	0.23	13.19	9.59	0.12
Total Domestic Generation	1,592.06	5,592.20	77.94	2,201.93	7,559.00	83.26
2. Import Power Sources						
Thailand	135.50	346.19	4.82	135.50	269.56	3.38
Vietnam	277.00	1,201.78	16.75	277.00	1,153.85	14.48
Lao	4.00	34.88	0.49	4.00	56.52	0.71
Total Import	416.50	1,582.85	22.06	416.50	1,479.93	18.58
3. Total Power Sources	2,008.56	7,175.05	100.0	2,220.99	7,966.18	100.0
4. Increase over prev. year	22.95	1,185.49	19.79	212.43	791.13	11.03

Transmission System



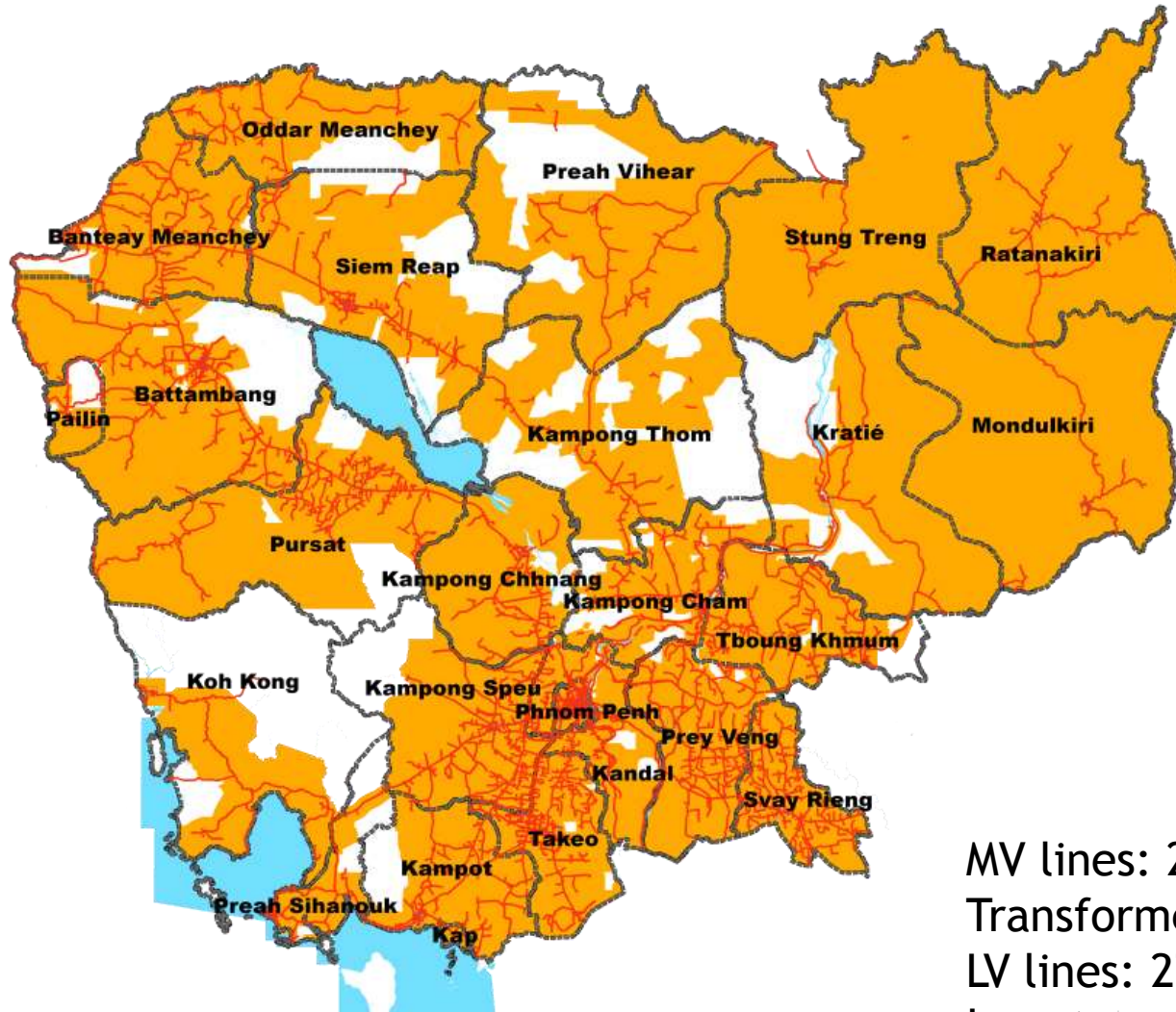
Details about Transmission System

Project	Transmission Lines	Substations
1. South Grid	230kV : 271 km (x2) 115 kV:230 km (x1)+ 54 km (x2)	12 Grid Substations
2. West Grid	115 kV : 230 km (x1)	5 Grid Substations
3. Connection between South and West Grid	230 kV: 297 km (x2)+ 175 km (x2) + 79 km (x2)	4 Grid Substations
4. Phnom Penh– Kampong Cham	230 kV : 126 km (x2)	2 Grid Substations
5. LPDR – Preah Vihear (Chheb) line	115 kV : 55 km (x2)	1 Grid Substation
6. Phnom Penh – Prey Veng – Svay Rieng Grid	115 kV : 155 km (x2)	2 Grid Substations
7. Kampong Cham –Kratie – Steung Treng Grid	230kV : 240 km (x2)	2 Grid Substations
8. Battambang – Rattanak Mondul	115kV : 34 km (x1);	1 Grid Substations
Total Project	115kv-230 kV = 1,957km	30 substations can supply directly to 18 (+3) city/provinces

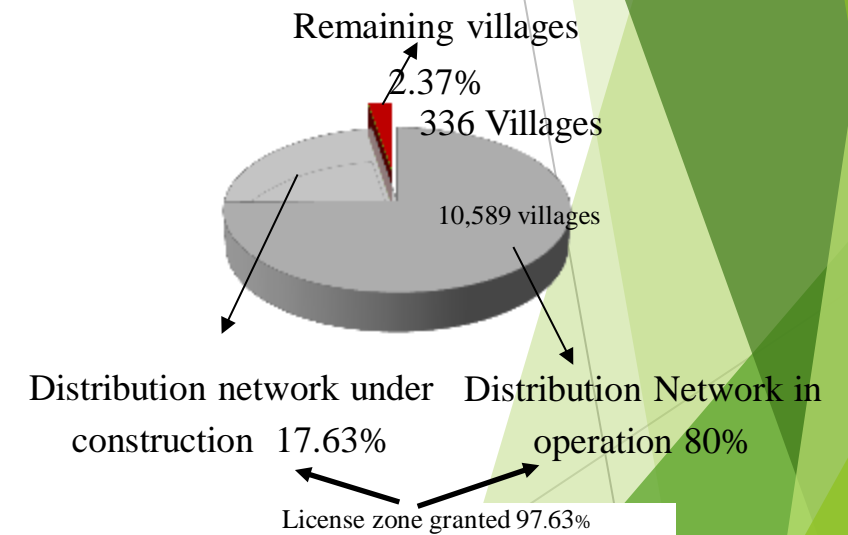
Project Of Transmission Lines

Project	Transmission Lines	Substations
1. Steung Treng – Rattanakiri Grid, and Kratie – Mondul Kiri Grid	115 kV:105 km (x2)+ 140 km (x2)	construct 3 new substations in Rattanakiri, mining site, and in Mondul Kiri
2. Preah Sihanouk-Chamkaloung Grid, Chamkaloung – Phnom Penh Grid	230 kV : 50 km (x2) 500 kV : 140km (x2)	construct 1 new substation in Chamkaloung and a 500kV Substation in Bek Chan
3. Prey Veng - Svay Antor – Suong Grid	115 kV: 45 km (x2)+ 230 kV: 60 km (x1)	construct 1 new substations in Svay Antor
4. Kampong Cham – Kampong Thom – Siem Reap – Battambang Grid	230 kV : 326 km (x2)	construct 2 new substations: 1 in Kampong Thom, and 1 in Siem Reap
5. Kampong Thom – Preah Vihear (Chheb) Grid	115 kV : 138 km (x2)	
6. Krolanh Siem Reap – Oddor Meanchey Grid	115 kV : 75 km (x1)	construct a new substation in Oddor Meanchey
7. Kampong Cham town – Prek Brosob (Kratie) Grid	115 kV : 95 km	construct a new substation in Prek Brosob (Kratie)
8. Sre Ombel – Botumsakor Grid, and additional Grid in Koh Kong Town Tatay – Phnom Penh	115 kV : 27 km (x1); 230 kV : 71 km (x2); 230 kV : 220 km (x2)	construct 3 new substations in Koh Kong
9. Rattanak Mondul – Pailin Grid	115kV : 45 km (x1)	construct a new substation in Pailin
10. Baek Chan – East PP – Suong Grid	500kV : 135km (x2)	construct 2 new substation in East PP and Suong
Total Project	115kv-230 kV-500kV = 1,672 km	add 16 new substations and NG can supply directly to whole country

Distribution System Backbone



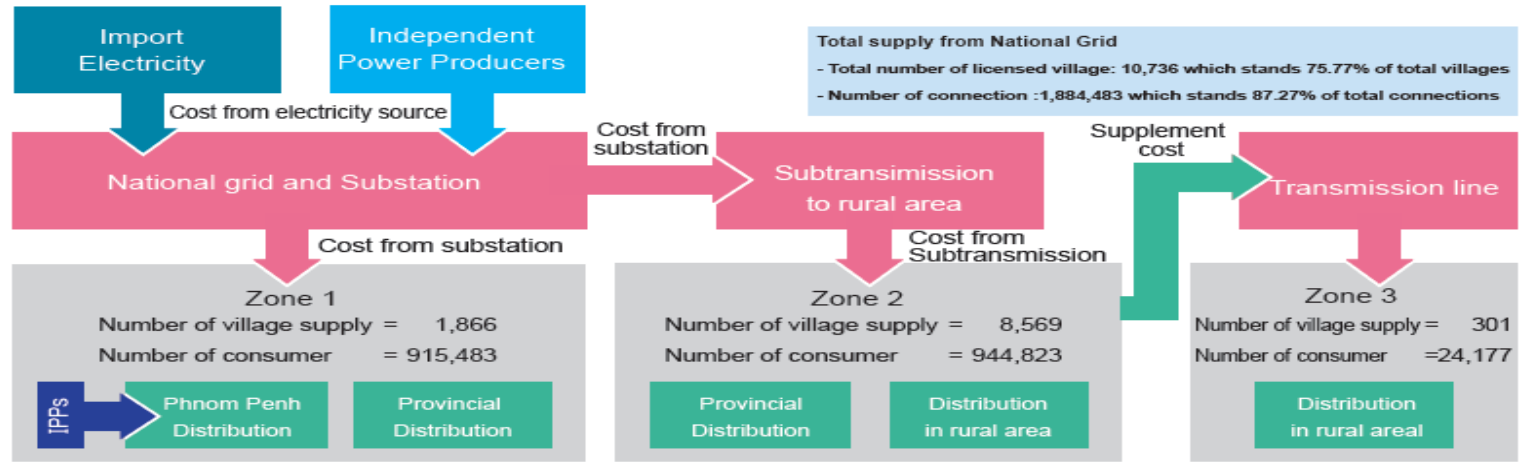
Situation of Electrification in Cambodia (City + Rural as at December 2016)



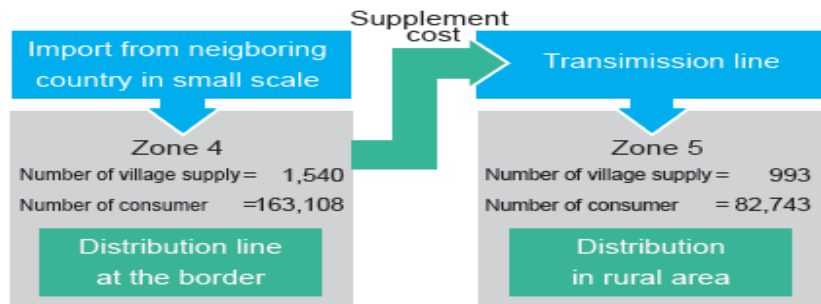
MV lines: 28,975km
Transformers: 13,695
LV lines: 27,862 km
Investment Cost: 1,217 mUSD

Electricity Market in Cambodia (2017)

1. Electricity supplies through National Grid



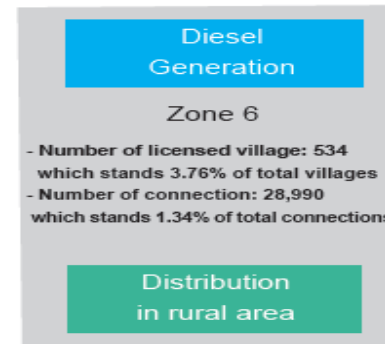
2. Import from neighboring Country in small scale



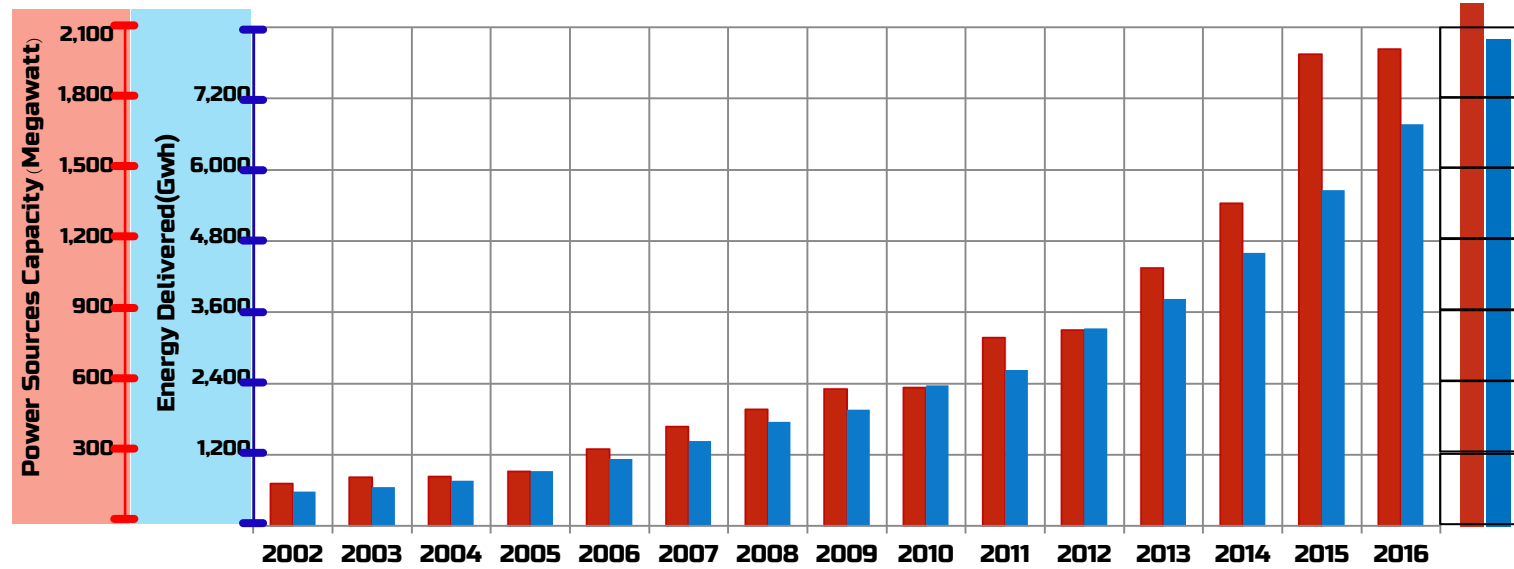
Total supply by importing from neighboring countries

- Total number of licensed village: 2,533 which stands 17.88% of total villages
- Number of connection: 254,851 which stands 11.39% of total connections

3. Mini-Grid

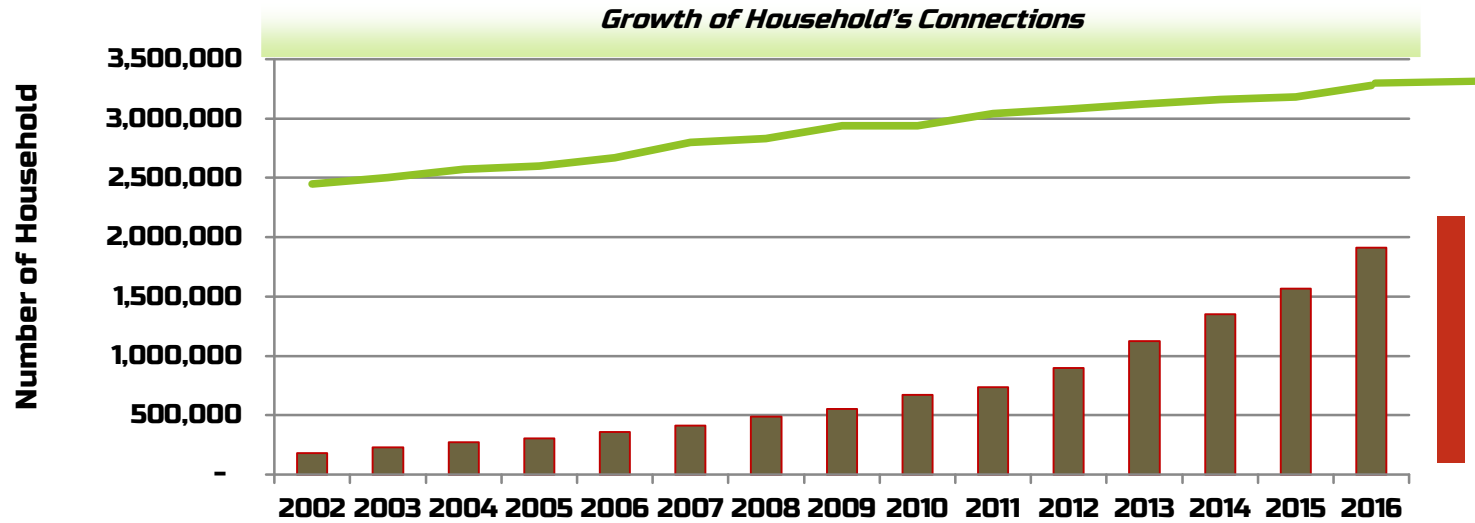


Growth of Power Sector



Power Sources Capacity (MW)	180	205	208	231	325	419	490	579	584	793	825	1,088	1,359	1,986	2,008	2,221
Energy Delivered (GWh)	614	693	814	977	1,203	1,517	1,858	2,077	2,515	2,788	3,527	4,051	4,713	5,990	7,175	7,966
Energy Increase (%)		13.28	15.41	19.80	24.46	26.73	22.52	11.76	21.08	13.26	23.84	14.83	16.35	27.09	19.79	11.03

Growth of Household Connections



Total Household (M)	2.45	2.50	2.57	2.60	2.67	2.80	2.83	2.94	2.94	3.04	3.08	3.12	3.16	3.18	3.28	3.3
# of Household's connection	0.18	0.23	0.27	0.30	0.35	0.41	0.48	0.55	0.67	0.81	0.99	1.19	1.35	1.57	1.91	2.43
% of Household's connection	7.47	9.28	10.61	11.78	13.42	14.83	17.22	18.79	22.88	24.17	29.25	38.14	42.72	49.37	58.23	65.0

End User Tariff

No.	Electricity Tariff Riel per Kilowatthour	License Granted	Num. of Villages	Electricity Sale kWh	%	Num. of Consumers	%
1	below or equal 800R	280	11,675	5,513,871,387	96.84%	1,991,553	92.23%
2	range of 850R to 980R	15	818	119,976,979	2.04%	67,238	3.11%
3	range of 1,000R to 1,200R	18	478	35,361,551	0.65%	52,812	2.45%
4	range of 1,300R to 1,500R	13	298	15,852,543	0.28%	18,731	0.87%
5	range of 1,600R to 2,700R	24	336	8,884,903	0.15%	20,569	0.95%
6	range of 2,800R to 3,000R	8	198	2,520,279	0.04%	8,421	0.39%
8	range of 3,100R to 3,700R	no longer exist					
Total		342*	13,803	5,696,467,642	100%	2,159,324	100%

Non official note:

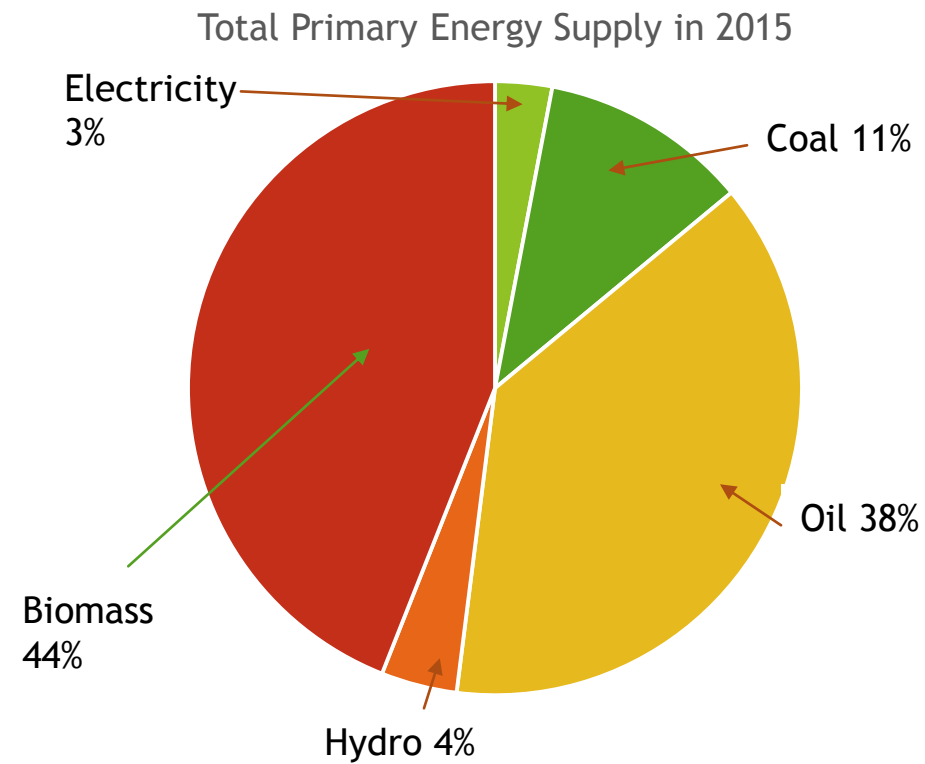
1UScent = 400 Riels

By Planning : 750Riels at year 2020.

Expected to lower the tariff at

680Riels/kWh at year 2025

Total Primary Energy Supply in 2015



THANK YOU!