



Kingdom of Cambodia
Nation Religion King
3



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Energy Outlook in Cambodia

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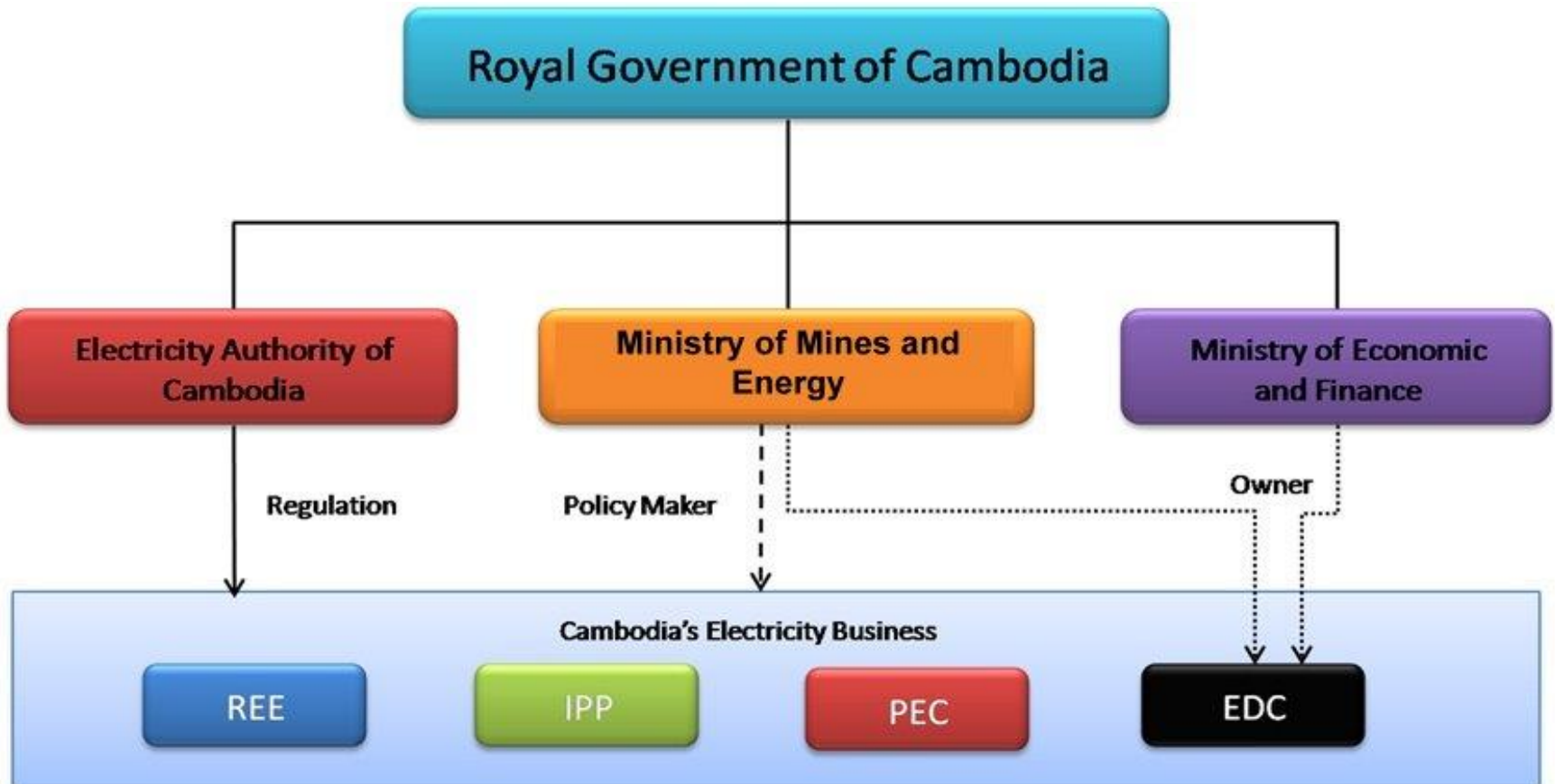
Energy Policy

Background

- ❖ Official name: **Kingdom of Cambodia**
- ❖ Total area: **181, 035 sq. Km**
- ❖ Population: **14.7 million (2015)**
- ❖ Capital city: **Phnom Penh**
- ❖ GDP Growth rate: **7.0% (2015)**
- ❖ GDP Per capita: **1,220 USD (2015)**
- ❖ GDP by sector (2015):
 - Agriculture: **23%**
 - Industry: **36%**
 - Services: **41%**



Structure of Electricity Organization



-Ownership of EDC



-Policy, Planning, Technical Standard



-Tariff, License, Financial Performance, Enforce the regulations, Rule and Standard.

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 reasons 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.

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.

Cambodia Power Strategy

A-Development of Generation

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.

B-Development of Transmission lines

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

C-Development of Rural Electrification

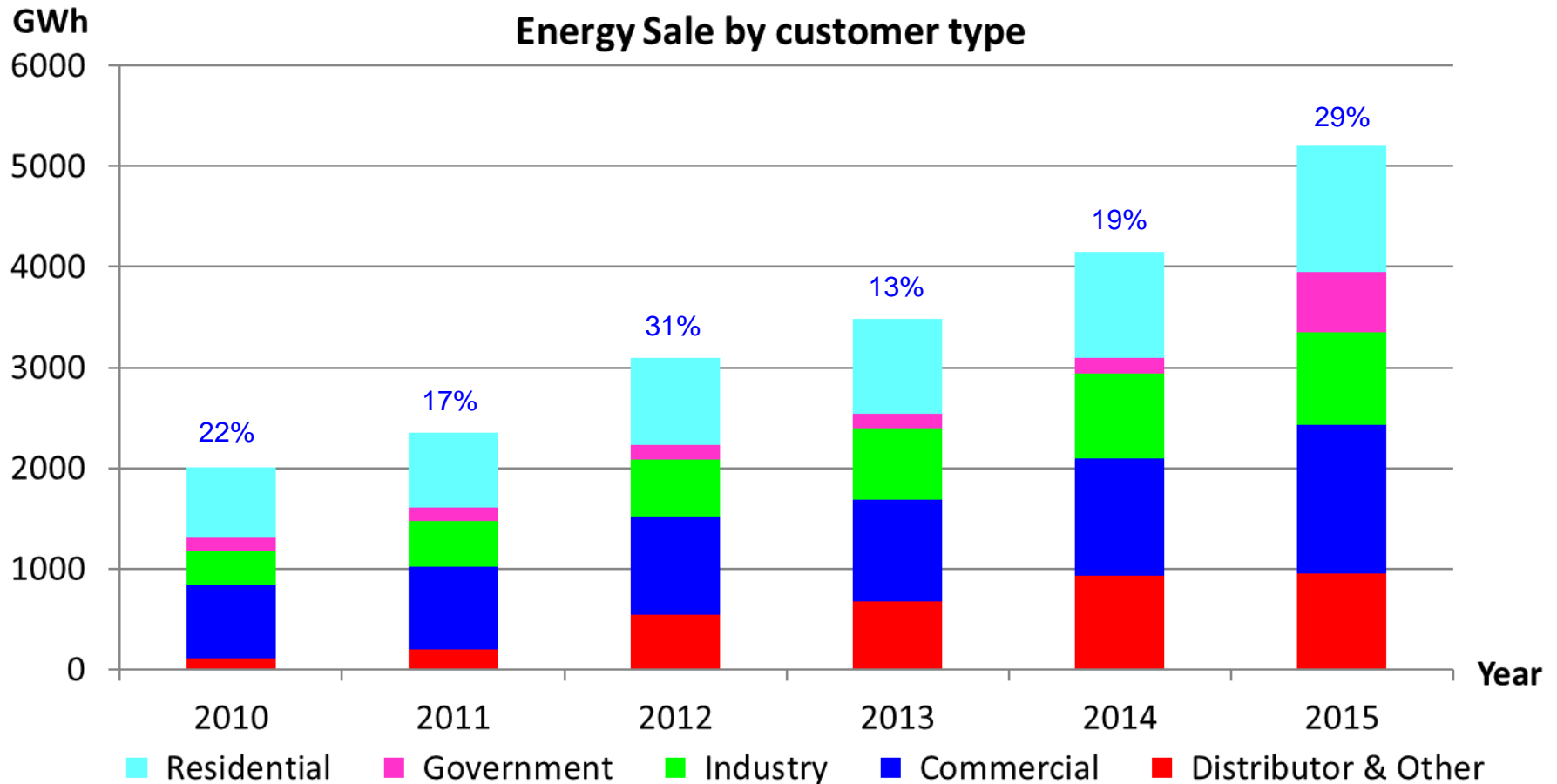
Supply from the National Grid, Mini-grid, Grid extension and stand-alone system;
Renewable energy(biomass, solar, hydro)



2

Power Development Plan

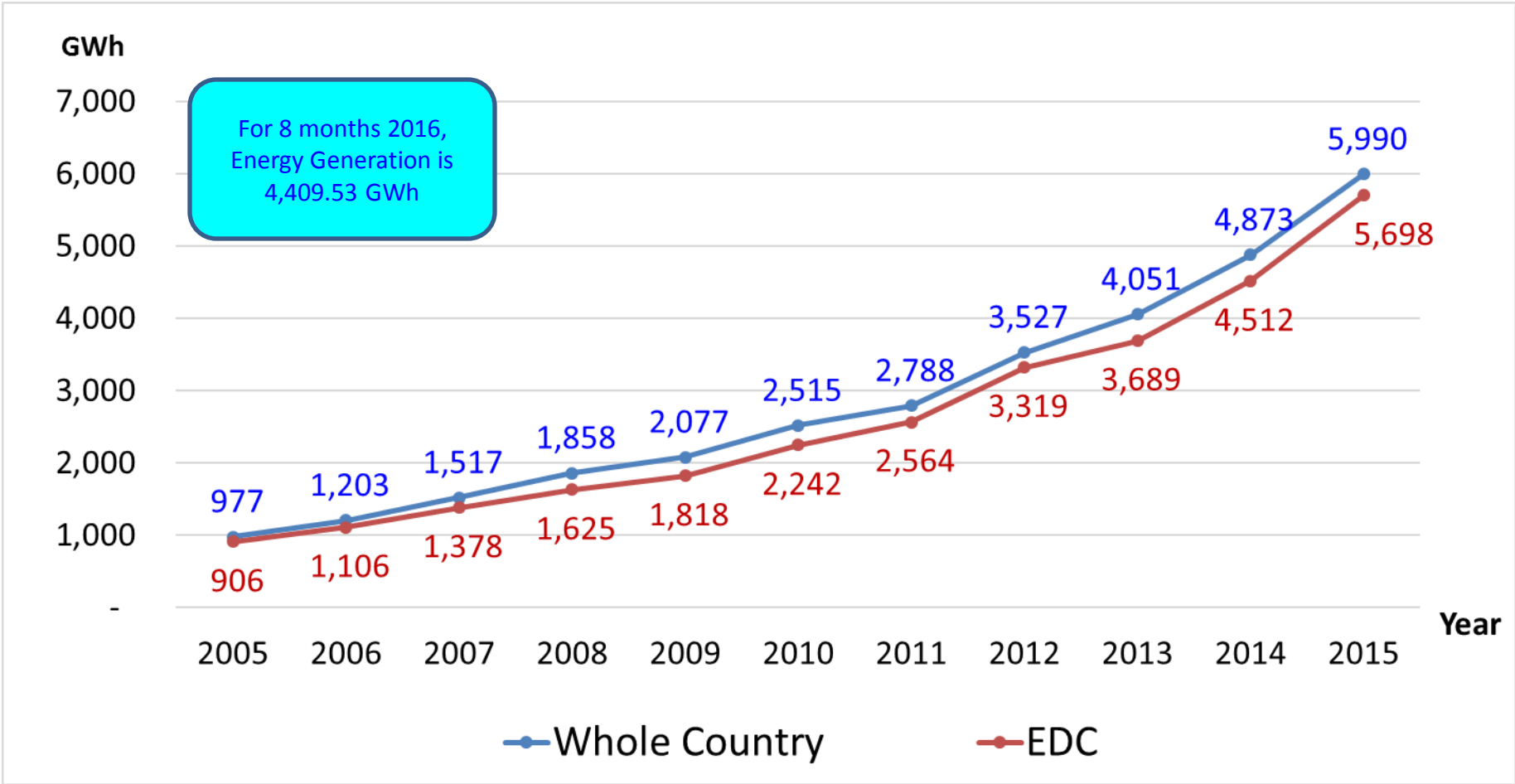
Energy Consumption and Customer



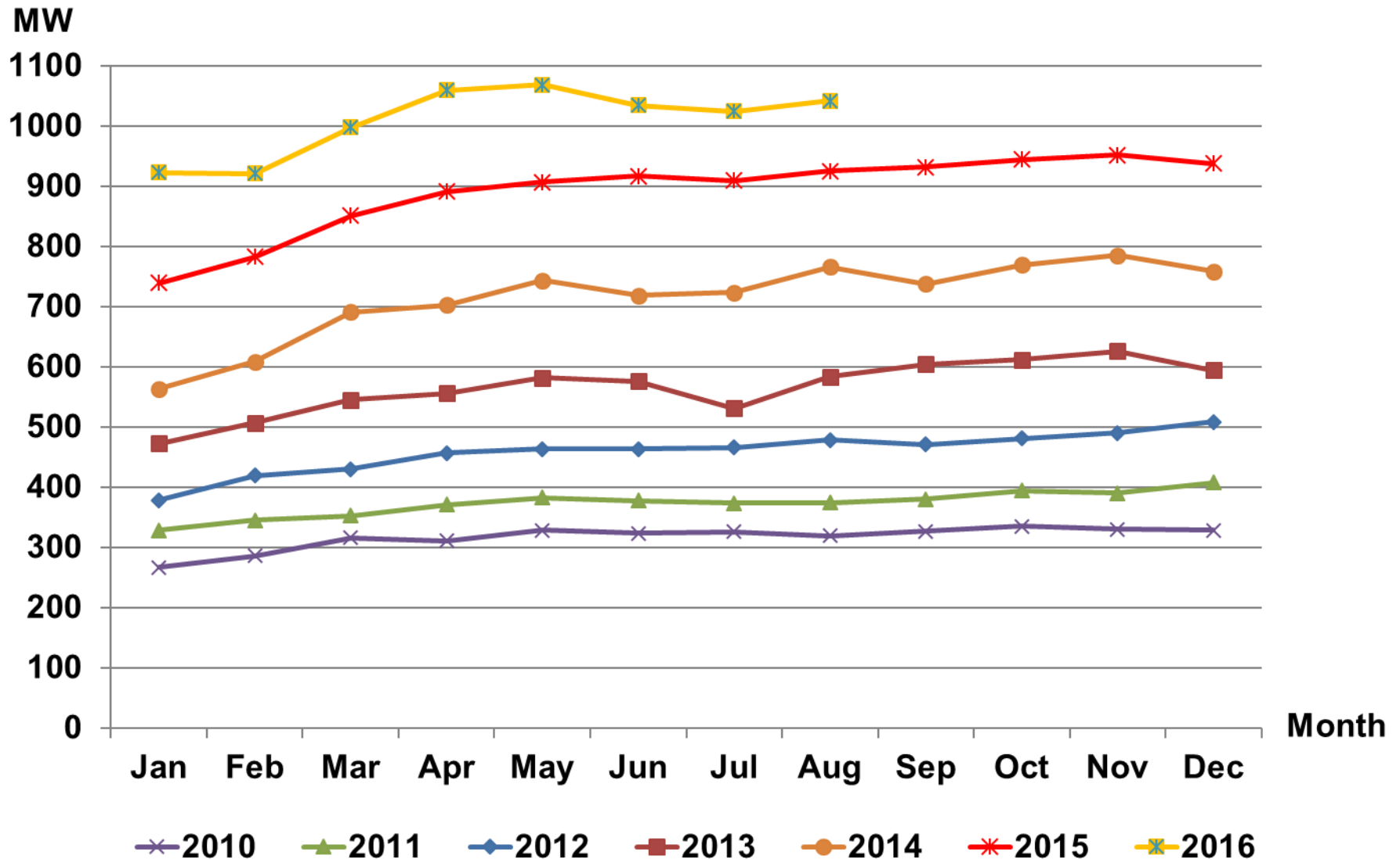
Note: Other is include Distributor (REE)

Type	Unit	2010	2011	2012	2013	2014	2015	8 months 2016
Energy Sale	GWh. (%)	2,059.41 (22.41%)	2,353.50 (17.13%)	3,091.11 (31.34%)	3,483.66 (12.70%)	4,151.73 (19.18%)	5,340.56 (28.63%)	4,011.21
Customer Number	Conn. (%)	375,997 (10.46%)	418,066 (11.19%)	460,984 (10.27%)	502,859 (9.11%)	541,141 (7.59%)	774,613 (43.14%)	881,822

Energy Generation from 2005 - 2015

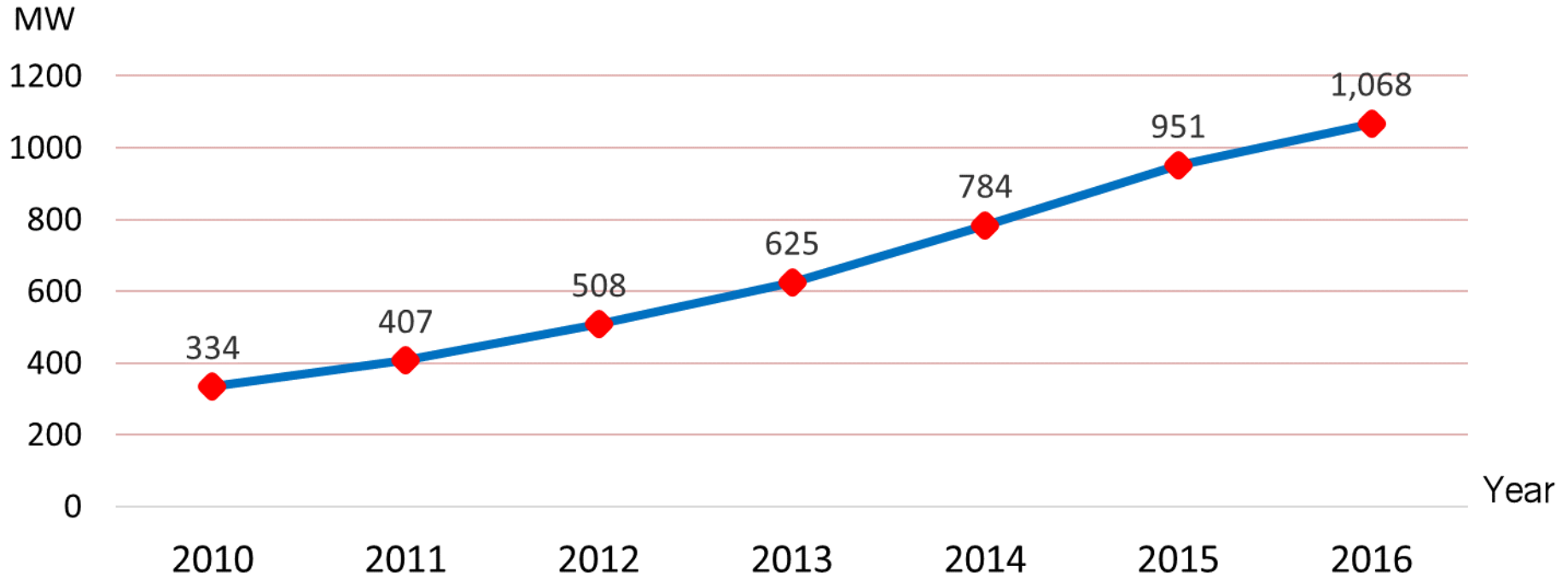


Peak Demand in National Grid

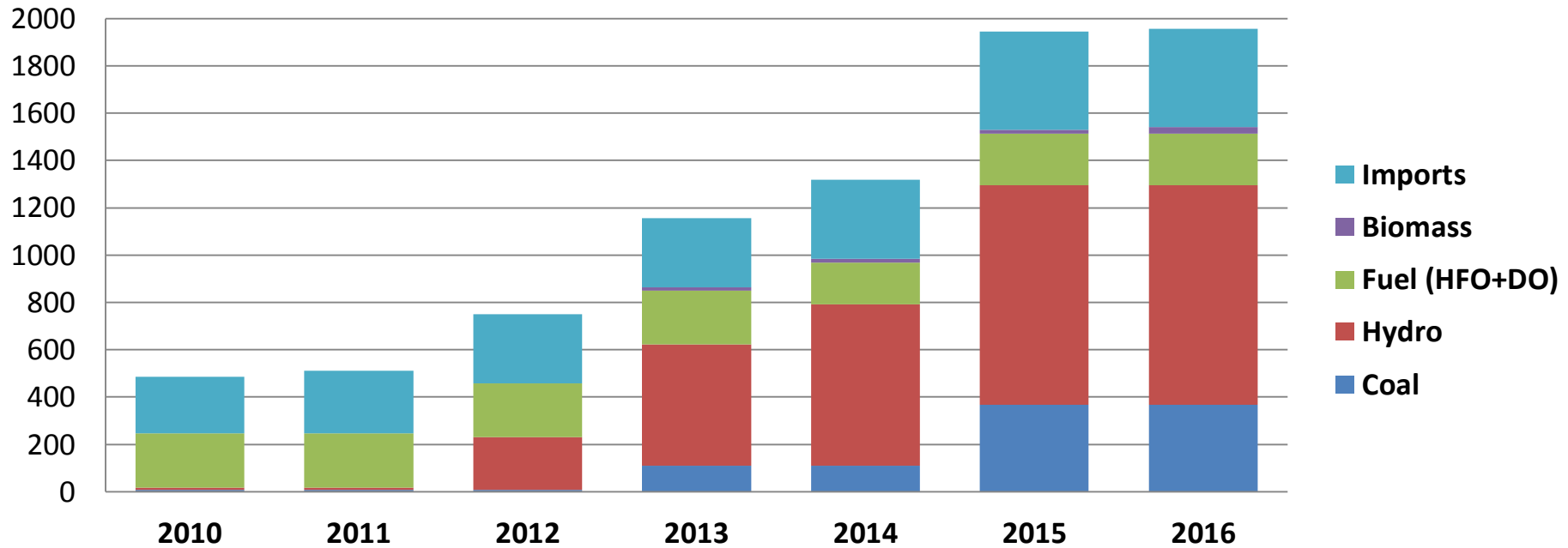


Peak Demand in National Grid

Yearly Peak Demand	2009	2010	2011	2012	2013	2014	2015	2016
Peak Demand (MW)	274	334	407	508	625	784	951	1,068
Month Peak	Nov	Oct	Dec	Dec	Nov	Nov	Nov	May

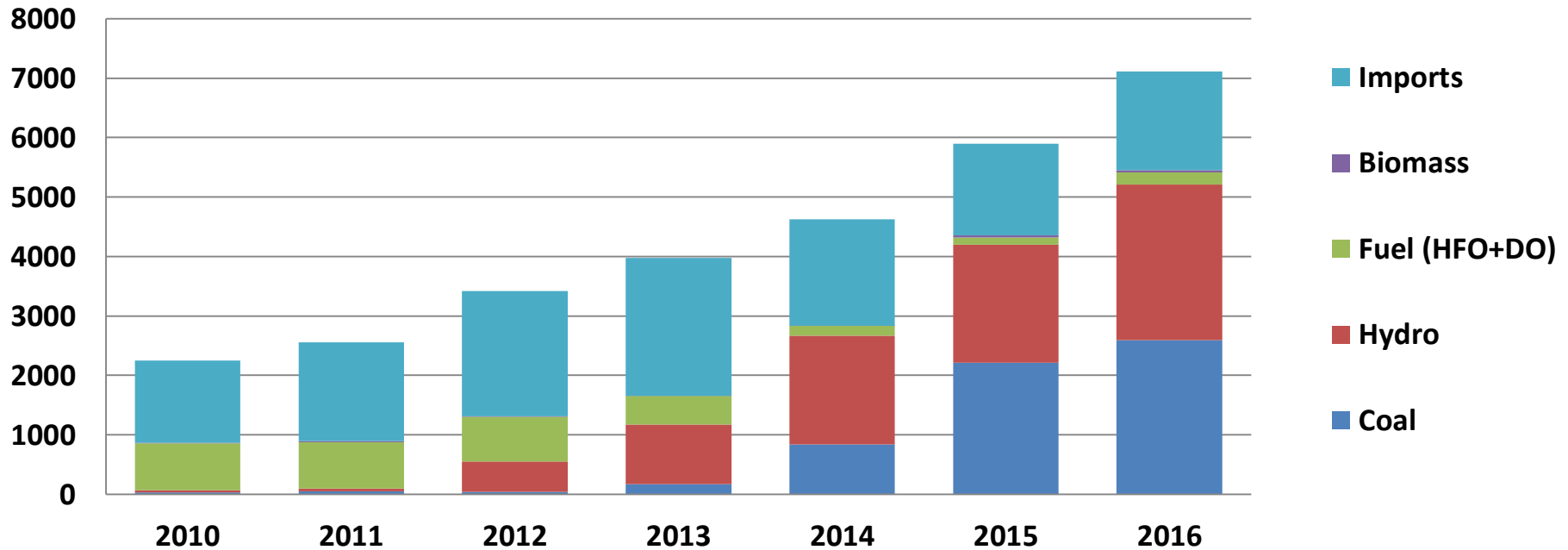


Power Generation (MW)



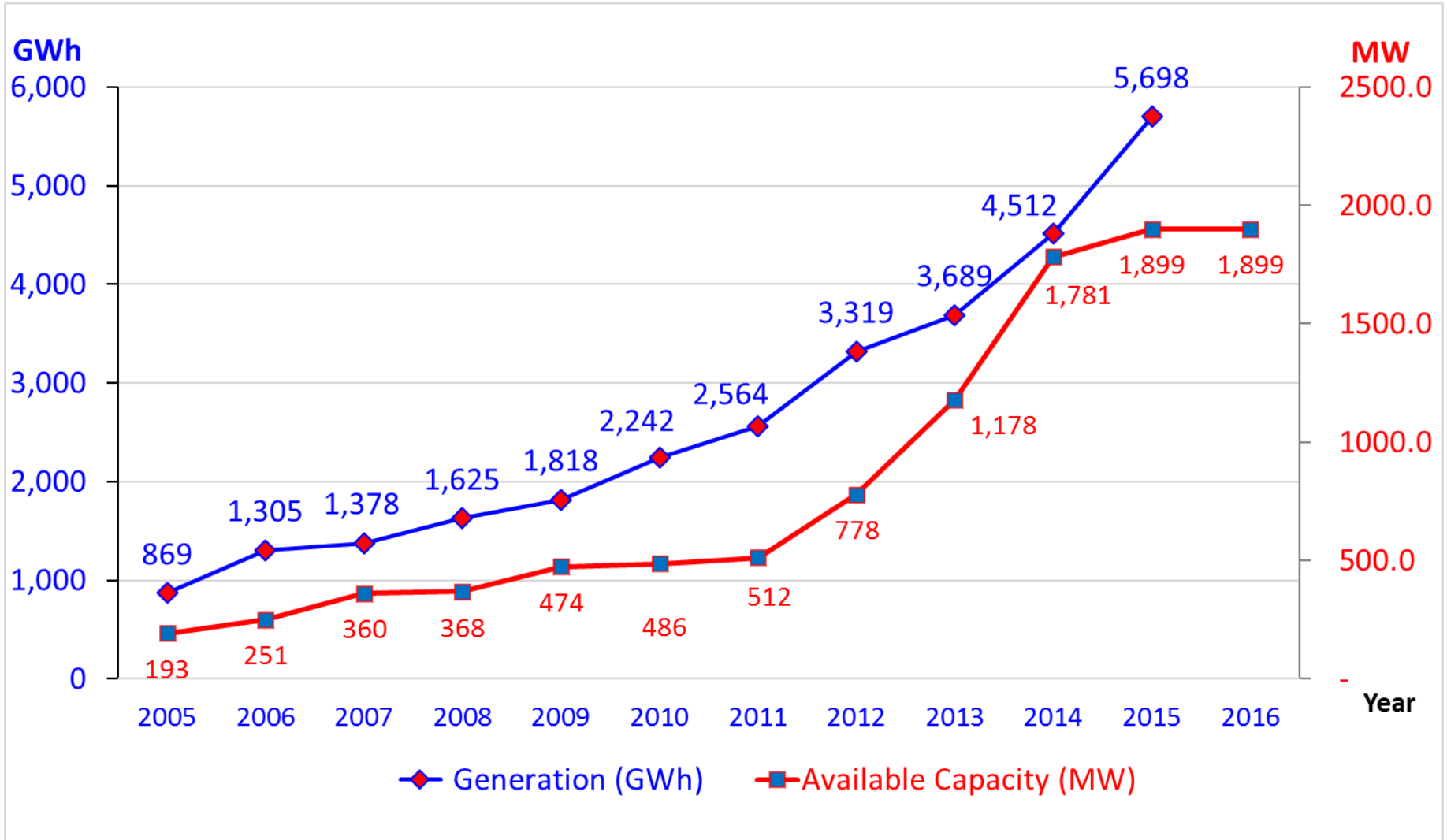
239	263	293.8	293.8	333.8	416	416	Imports
0	0	0	14.57	16.57	16.57	28	Biomass
229	230	227	227	177	211	218	Fuel (HFO+DO)
11	11	223	512	682	927	927	Hydro
7	7	7	110	110	368	368	Coal
486	511	750.8	1087	1359	1985	1992	Total (MW)

Generation Capacity (GWh)

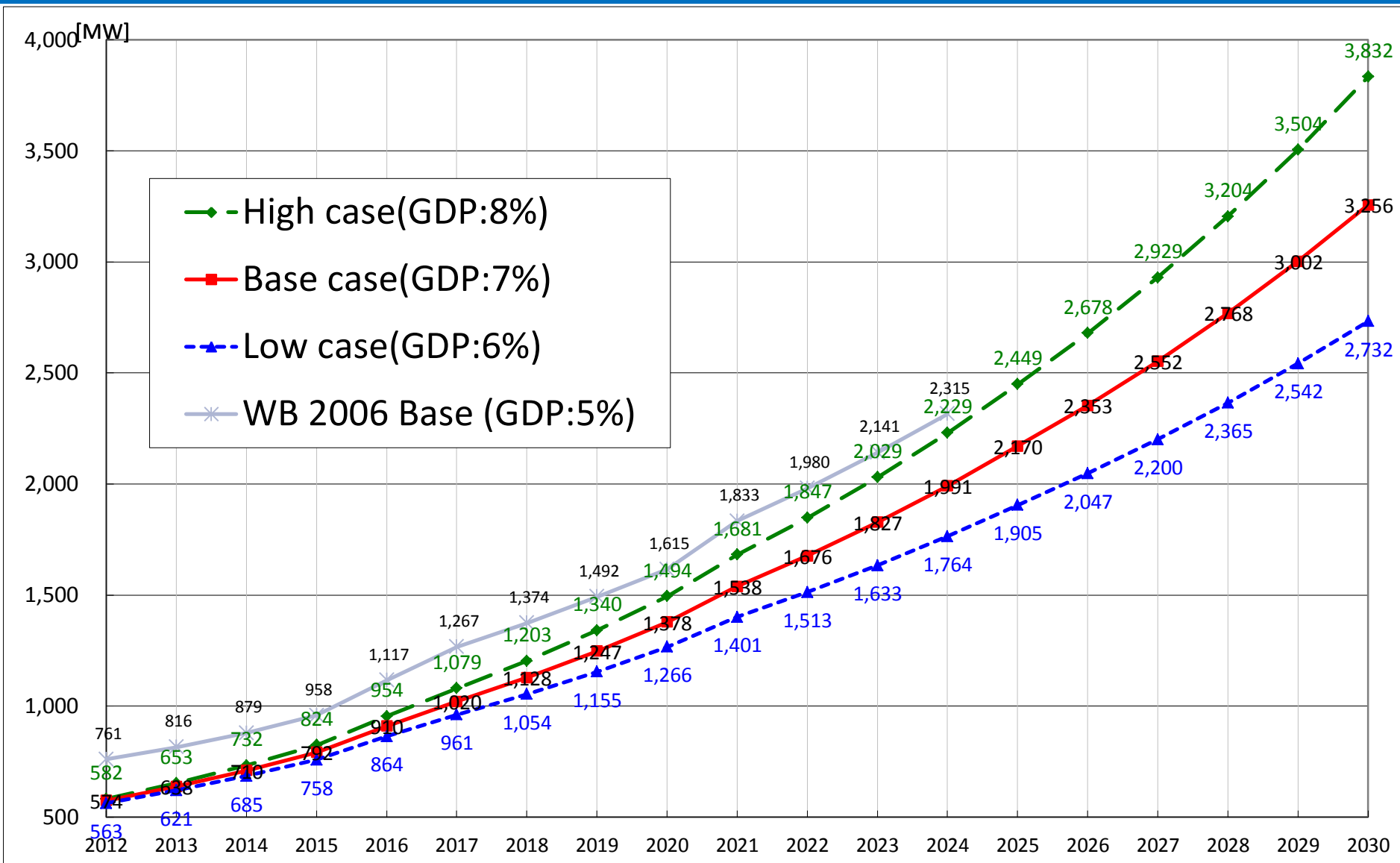


2010	2011	2012	2013	2014	2015	2016	
1384	1662	2104	2312	1794.2	1541	1660.4	Imports
14	14	11	6	2.9	38.04	29.15	Biomass
787	783	747	479	159.9	117.7	207.17	Fuel (HFO+DO)
35	47	516	1006	1829.8	1988	2620.7	Hydro
32	46	37	169	840.33	2210	2589.9	Coal
2252	2552	3415	4050	4713.1	5989	7194	Total (GWh)

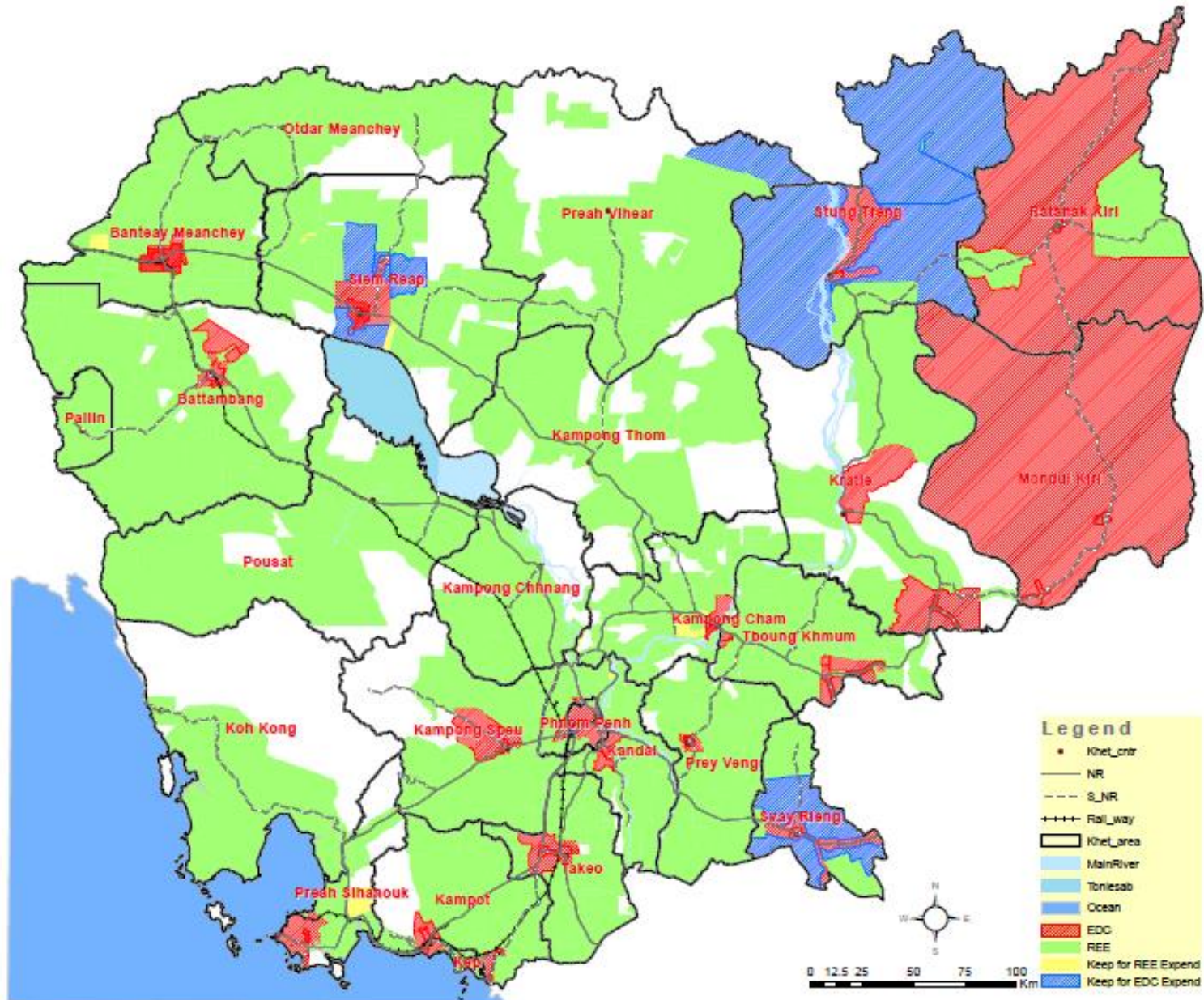
Energy Generation and Available Capacity in EDC Systems



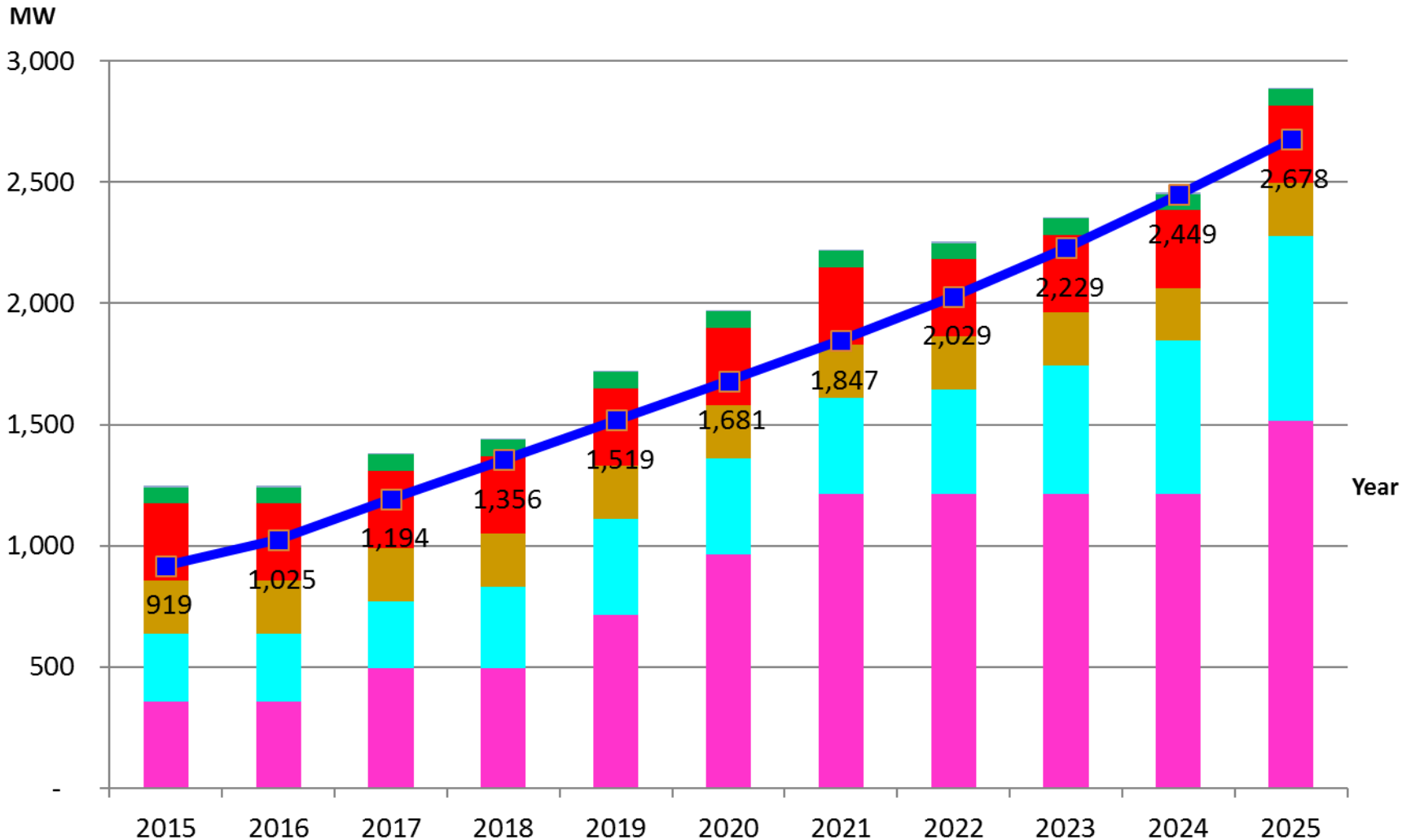
Power Demand Forecast of National Grid



Electricity Coverage Area



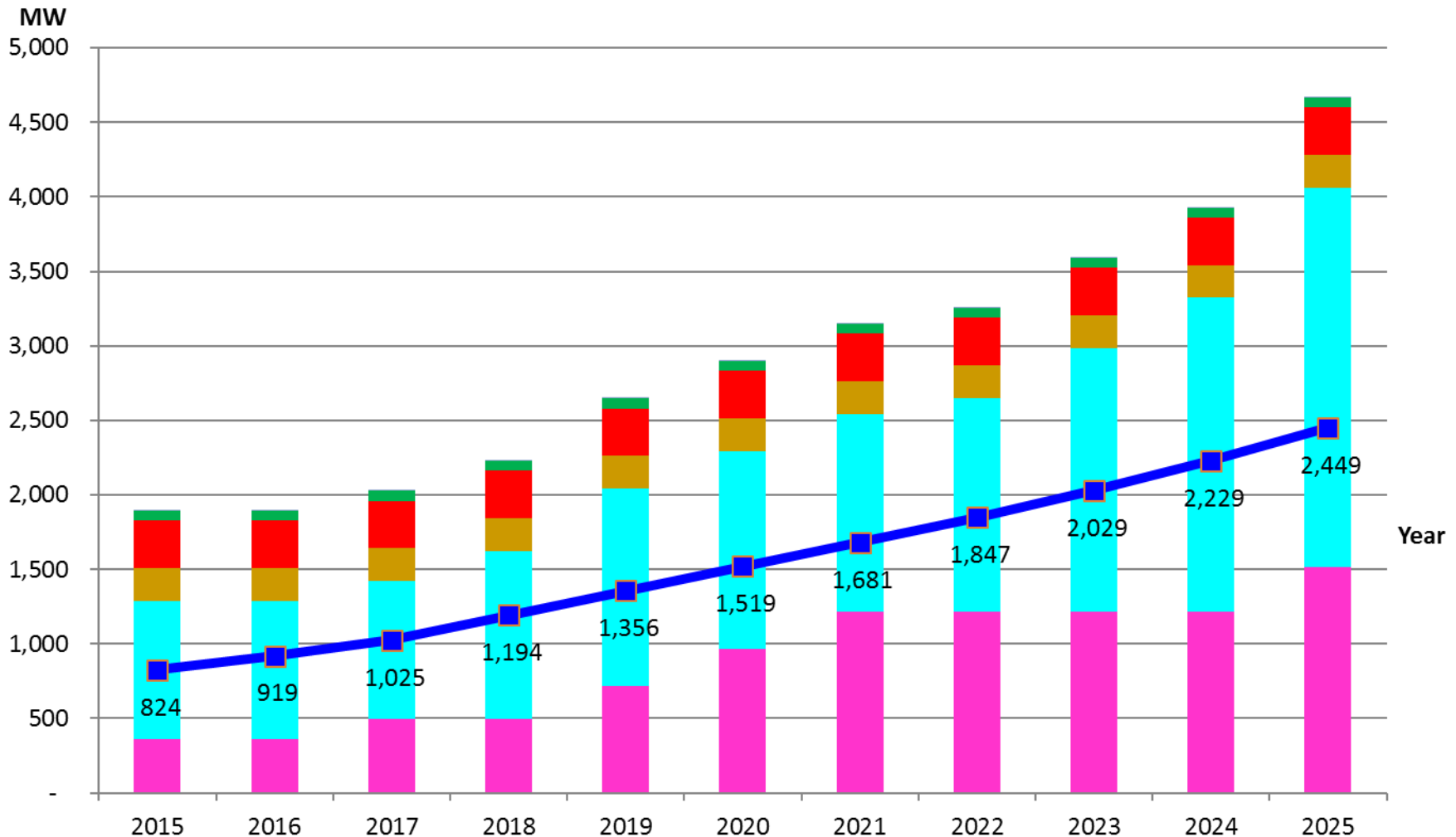
Outlook Of Supply and Peak Demand 2015-25 in Dry Season



Note: the hydro power can generate only 30% of their capacity during dry season

Source: Power Development Master Plan

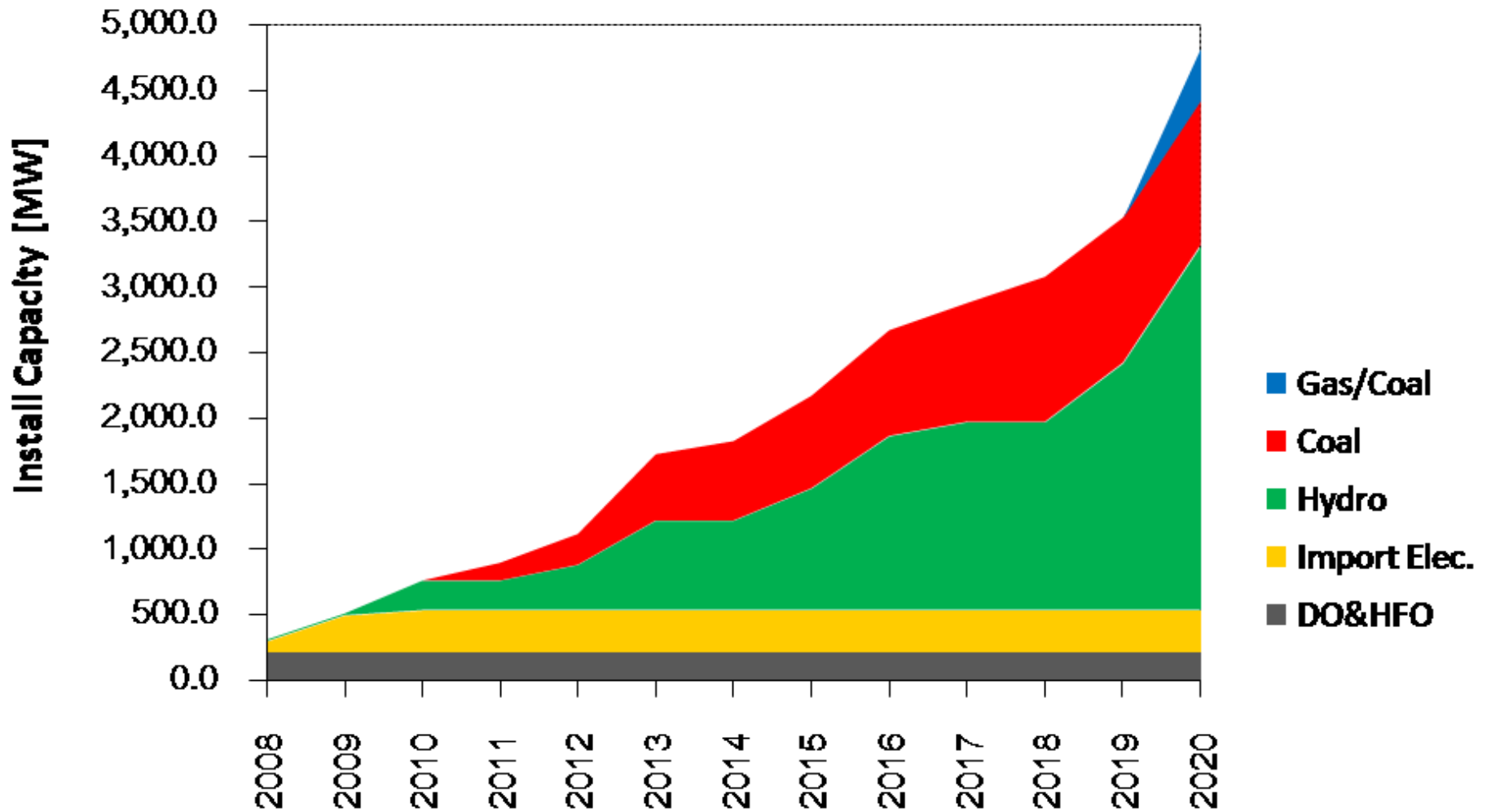
Outlook Of Supply and Peak Demand 2015-25 in Rainy Season



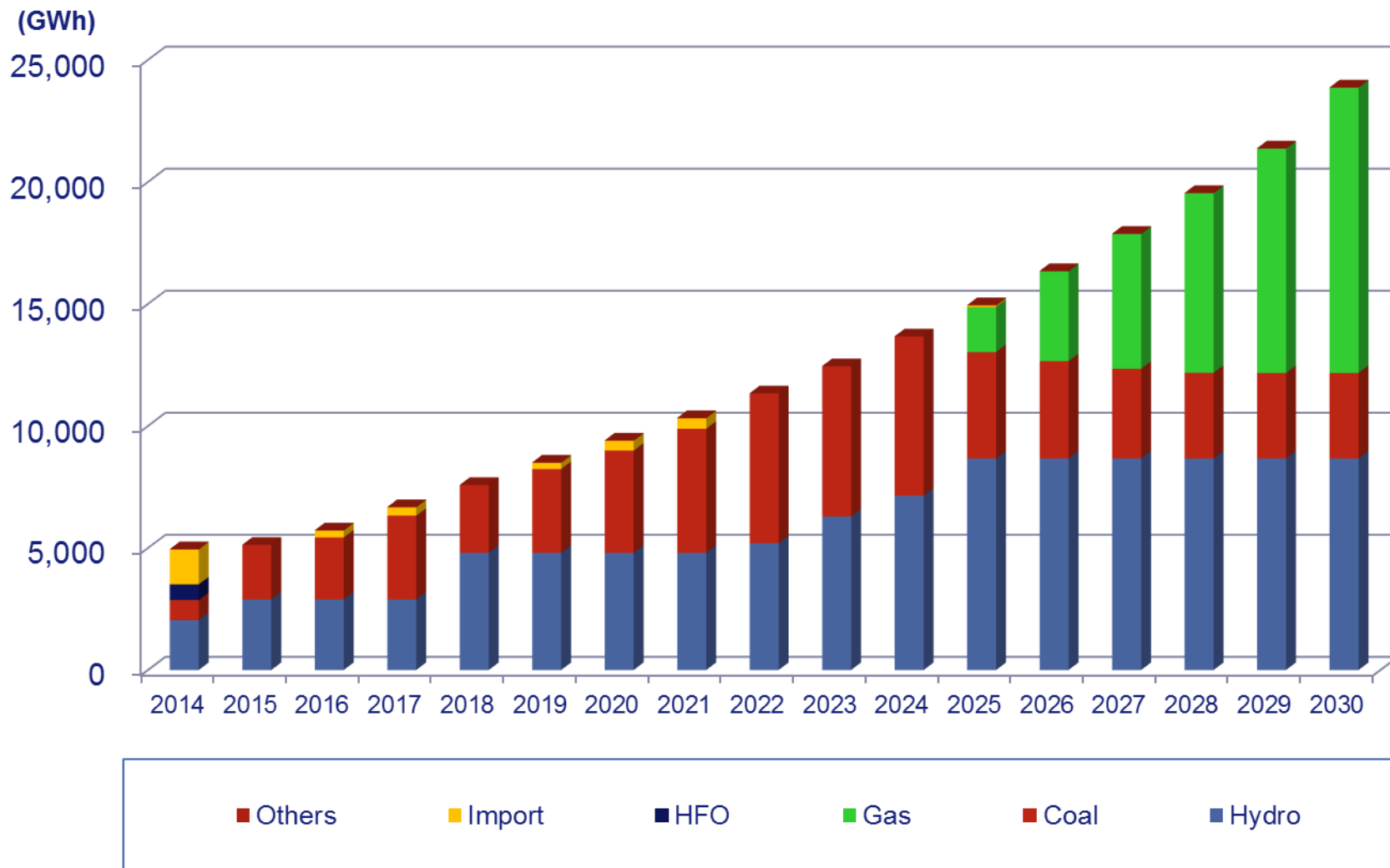
Note: the hydro power can generate only 30% of their capacity during dry season

Source: Power Development Master Plan

Power Development Plan



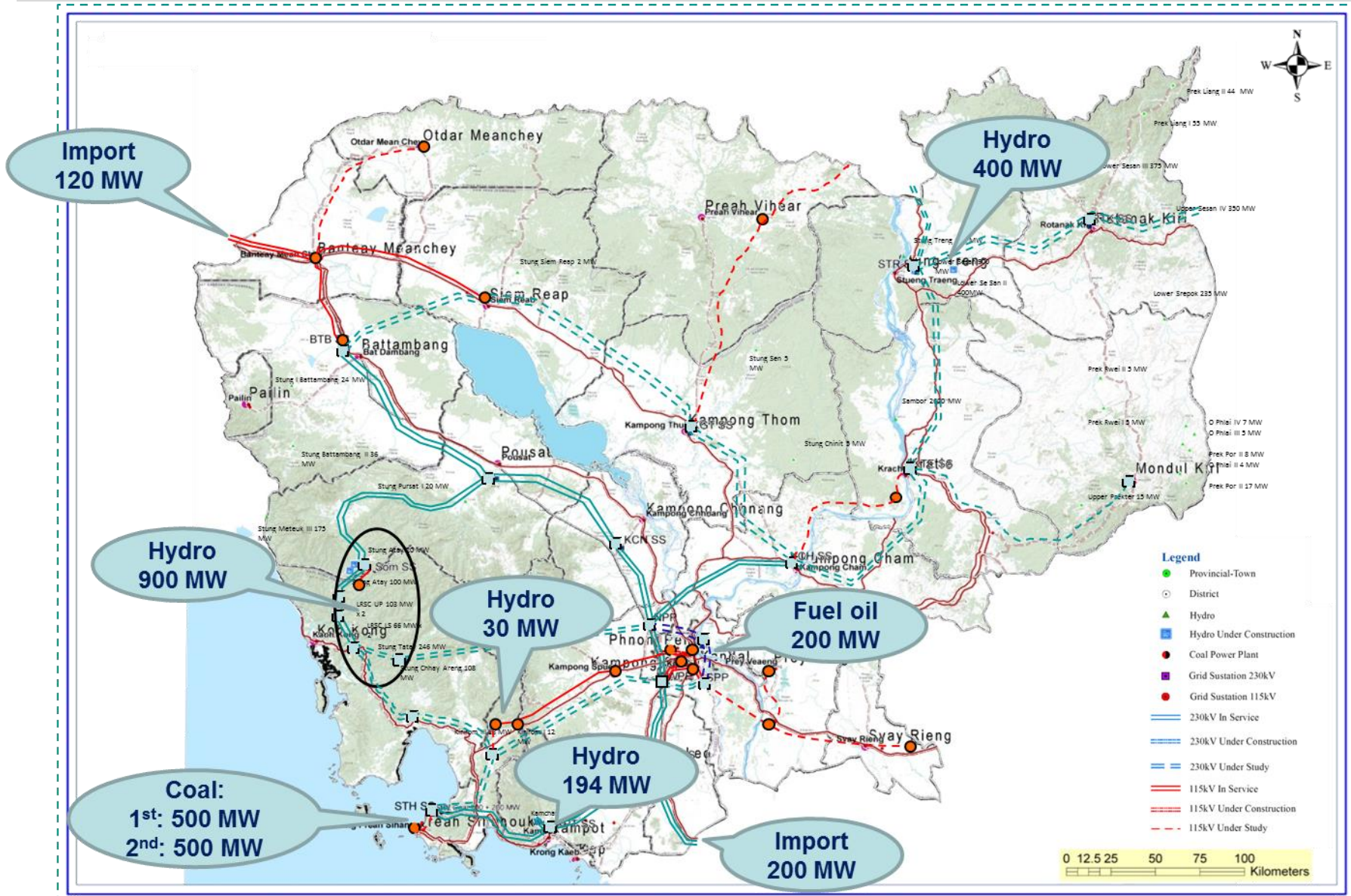
Energy Generation by Fuel Type 2014-30



Source: Power Development Master Plan

Note: If Cambodia can explore the Domestic Natural Gas, Gas Power Plant can be considered from 2025.

Actual Power Transmission and Plan





3

Alternative Energy Develop. Plan

Current and Future Plan

<i>No.</i>	<i>Project</i>	<i>Install Cap. MW</i>	<i>IA/PPA/LA</i>	<i>COD</i>	<i>Achievement</i>
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Existing Project

1	Kirirom I	12	BOT	2001	100%
2	Ochum	1	-	2002	100%
3	Coal plant	10	BOO	2010	100%
4	Kamchay Hydro	194.1	BOT	2011	100%
5	Kirirom III	18	BOT	2013	100%
6	Coal Power Plant	100	BOO	2013	100%
7	Atay Hydro	120	BOT	2014	100%
8	LSt. Russei Chhrum	338	BOT	2014	100%
9	Coal Power Plant	270	BOO	2014	100%
10	Tatay Hydro	246	BOT	2015	100%

Project Under Construction

1	Coal Power Plant	135	BOO	2016	45%
2	Lower Sesan II	400	BOT	2017	10%

Current and Future Plan (cont.)

<i>No.</i>	<i>Generation Expansion Plan</i>	<i>Fuel Type</i>	<i>Install Capa.MW</i>	<i>COD</i>
1	Lower Stung Russei Chrum Hydro Power Plant	Hydro	338	2015
2	700 MW Coal Power Plant (II) -Phase 1	Coal	270	2014-2015
3	700 MW Coal Power Plant (II) -Phase 2	Coal	100	2017
4	700 MW Coal Power Plant (II) -Phase 3	Coal	100	2018
5	200 MW Coal Power Plant (I) in Sihanouk Province - Phase 2	Coal	135	2016
6	Lower Se San II Hydro Power Plant	Hydro	400	2017
7	700 MW Coal Power Plant (II) -Phase 4	Coal	100	2018
8	Stung Chay Areng Hydro Power Plant	Hydro	108	2017
9	700 MW Coal Power Plant (II) -Phase 5	Coal	100	2019
10	Sambor Hydro Power Plant	Hydro	450/2600	2019
11	Coal Power Plant (III) or Gas Power Plant	Coal/Natural Gas	400	2020
12	Stung Treng Hydro Power Plant	Hydro	900	2020

Kamchay Hydro Power Plant



- Install Capacity: 194.1 MW
(3 x 60 MW, 3 x 3.1 MW,
0.8 MW, 4 MW)
- Reservoir
- Location: Kampot Province
- COD: 1-Aug-2012



Kirirom III Hydro Power Plant



- Install Capacity: 18 MW
(2 x 9 MW)
- Reservoir
- Location: Koh Kong Province
- COD: 27-Sept-2012



Hydro PP: Atay Hydro Power Plant

- Install Capacity: 120 MW (4 x 25 MW, 2 x 10 MW)
- Reservoir
- Location: Pursat Province
- COD: 1-Sept-2013



Tatay Hydro Power Plant



- Install Capacity: 246 MW (3 x 82 MW)
- Reservoir
- Location: Koh Kong Province
- COD: 22 Jun 2015



Lower Reussey Chrom Hydro Power Plant



- Install Capacity: 338 MW
(2 x 103 MW, 2 x 66 MW)
- 338 MW is commissioning
- Reservoir
- Location: Koh Kong Province
- COD: 15-July-2014



Sihanouk Ville Coal Power Plant N.1



- Install Capacity: 2 x 50 MW
- Location: Sihanouk Province
- COD: 2-Dec-2013



Sihanouk Ville Coal Power Plant N.2

Sihanoukville 7 × 135MW coal-fired power plant aerial view



- Phase 1: 2 x 135 MW
- Location: Sihanouk Province
- COD: 19-03-2015
- 1x135 MW
- Operation date at the end of 2016



Phnom Penh Sugar Power Plant (Biomass: Sugar Cane)



- Installed Capacity: 5 MW
- Location: Kampong Speu
- Operation Date: 2013



KAMADHENU VENTURES (Biomass: Sugar Cane)



- Installed Capacity: 20 MW
- Location: Kratie
- Operation Date: 2013



Transmission and Distribution Lines



Takeo – Kampot 230 kV Transmission Line



Posat – O Soam 230 kV Transmission Line



22 kV MV Line at Mondulkiri Province



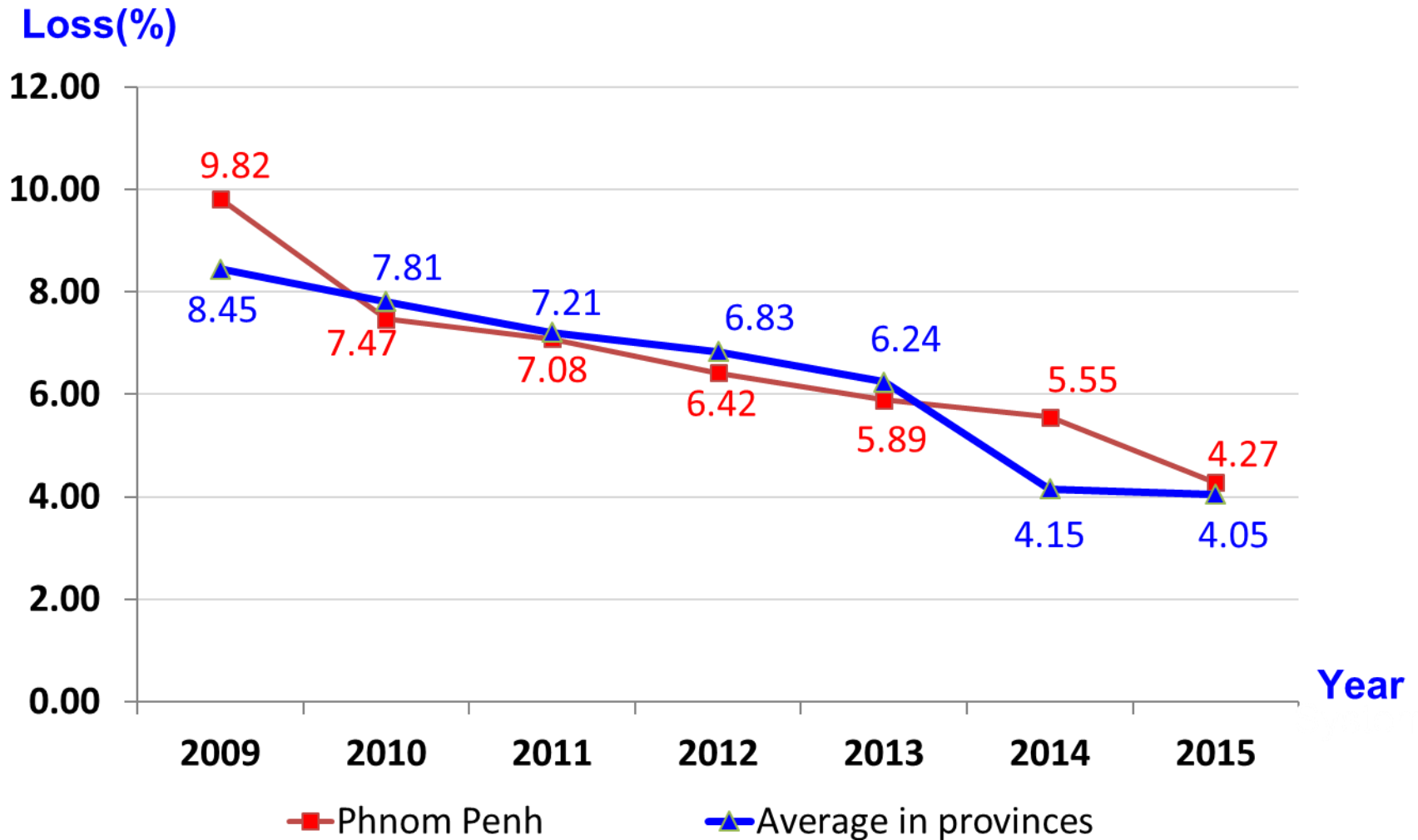
22 kV MV Line at Kampot Province



4

Current Status of EE

Distribution Losses Rating in Phnom Penh and Average in Provinces System



Energy Efficiency Policy

- ❖ **Energy Efficiency Target:** to reduce future national energy demand by 20% until 2035, based on 2010.

- ❖ National Energy Efficiency Policy set out 5 activities as priority areas:
 - ❑ **Industry Activities:** Reduce energy intensity per unit of production.

 - ❑ **End User Products Activities:** Improve energy efficiency of end user products by energy labeling system.

 - ❑ **Building Activities:** Energy efficiency code for new buildings, Energy manager certification programs, Green standard for new buildings.

 - ❑ **Rural Electricity Generation and Distribution Activities:** Introducing and enforcing standards on electricity generation and distribution, Training of REEs in operating their systems more effectively.

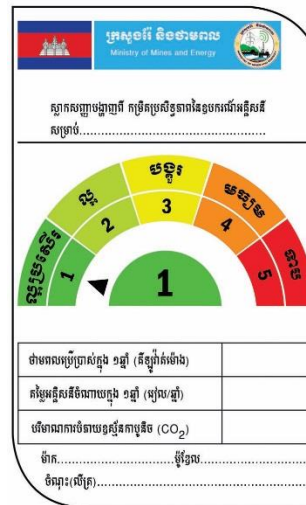
 - ❑ **Biomass Activities:** Firewood and charcoal consumption is reduced by utilization of more efficient technologies.

Energy Efficiency

- ❖ National Energy Efficiency Policy, Strategy and Action: not yet approval
- ❖ Energy Efficiency competition program: got 1st prize for building sector (2013)
- ❖ Capacity Building: energy audit for industry and commercial sector (ECCJ)
- ❖ Draft on Air conditioning Roadmap (MEPS): under ASEAN-SHINE program
- ❖ Draft on regulation of refrigerator (MEPS): almost done.



1. Draft Regulation

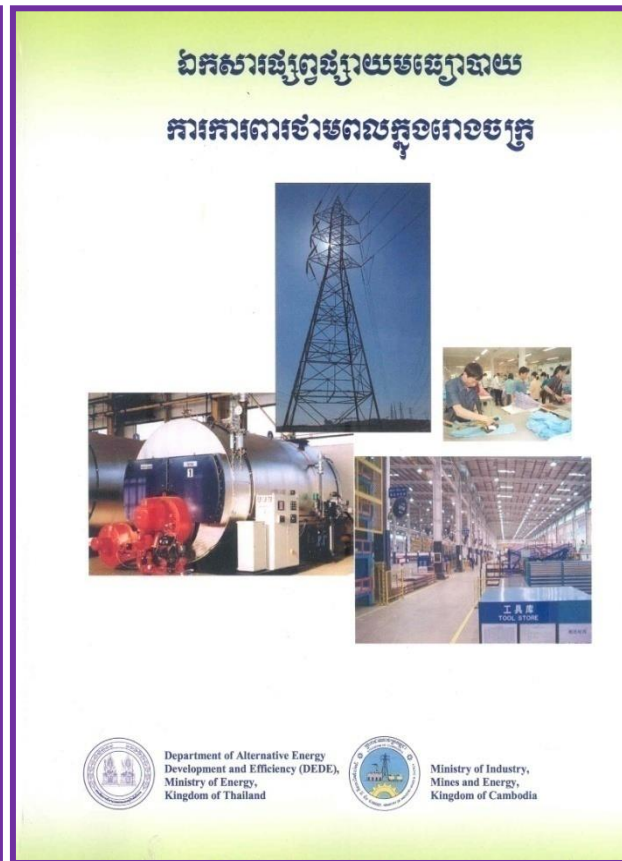
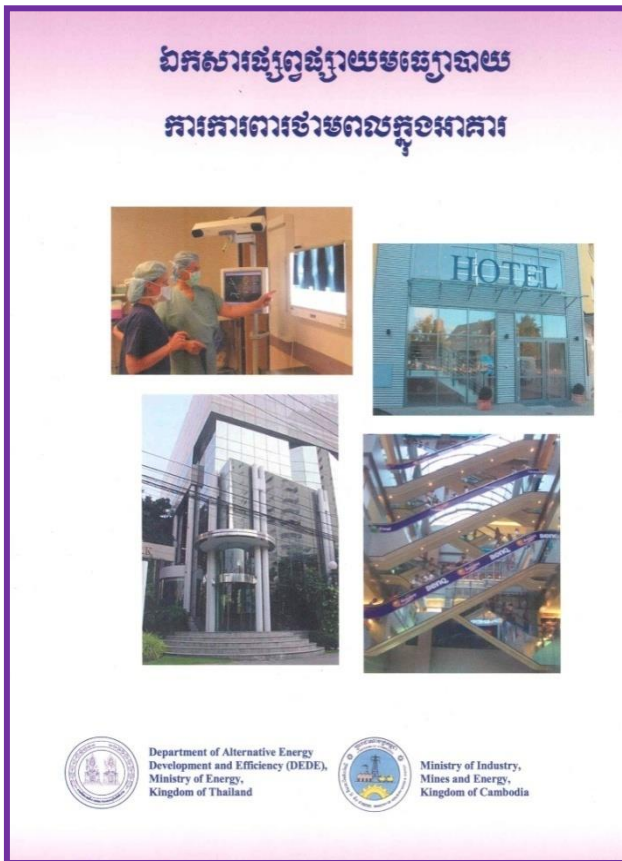


2. Draft EE Labeling Sign (Model 1)



3. Draft EE Labeling Sign (Model 2)

Energy Saving Cooperation Projects



1. Guideline on Energy Efficiency Measuring, by JICA (2008).

2. Guideline on Energy Conservation in Buildings, by DEDE (2006).

3. Guideline on Energy Conservation in Factories, by DEDE (2006).

Improved Cookstove Programs

❖ Environmental:

- ❑ 1.6 billion tonnes of wood saved,
- ❑ 2.4 million tonnes of CO₂ emissions avoided.





5

Conclusion

Conclusion

- ❖ **Cambodia needs to develop power generation and national smart grid to meet the demand and supply as well as economic development,**
- ❖ **Renewable energy and enhance energy efficiency regulation are the key player 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 of Svay Rieng Province be connected to the grid in the First Quarter of 2017 is a good signal to scaling up solar energy development,**
- ❖ **Improve accessibility 100% of villages by 2020 and 70% of households by 2030 required huge investment, Need participation from Gov't and Private sector to take part,**
- ❖ **Capacity building, technology transfer is the need .**

*Fireboat Decoration of Ministry of Mines and Energy
@ Water Festival in Cambodia Nov. 2016*



Thank You