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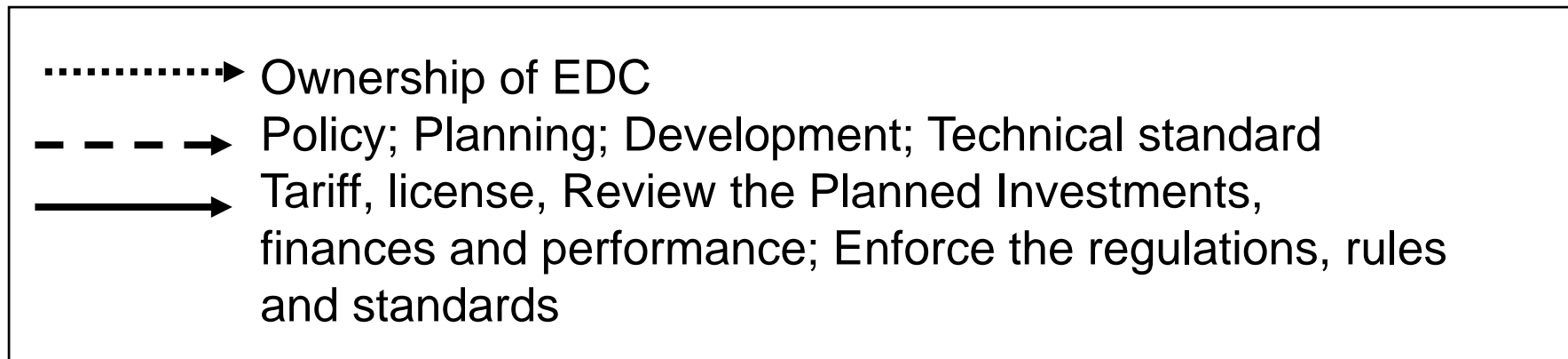
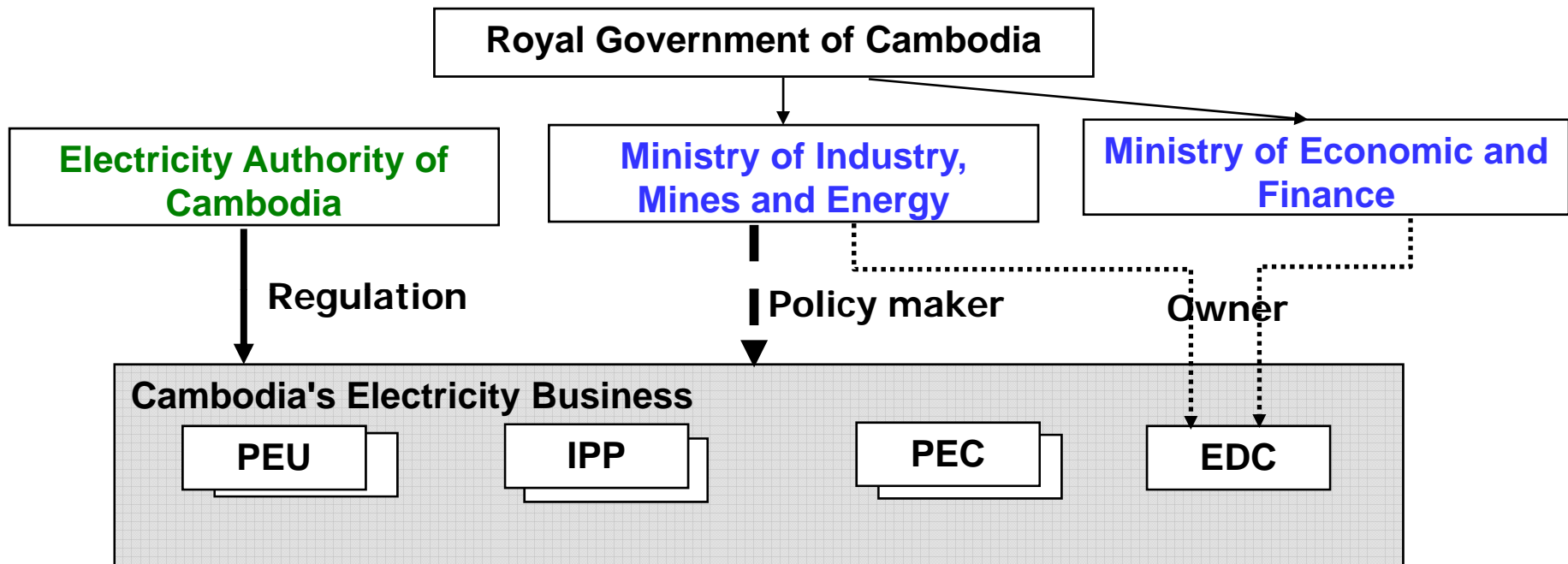
ELECTRICITE DU CAMBODGE

# Updated of Power Development of Electricité du Cambodge

**Dr. Praing Chulasa**

Director Corporate Planning & Projects  
Department

# Electricity Power Structure



# *EDC Mission*

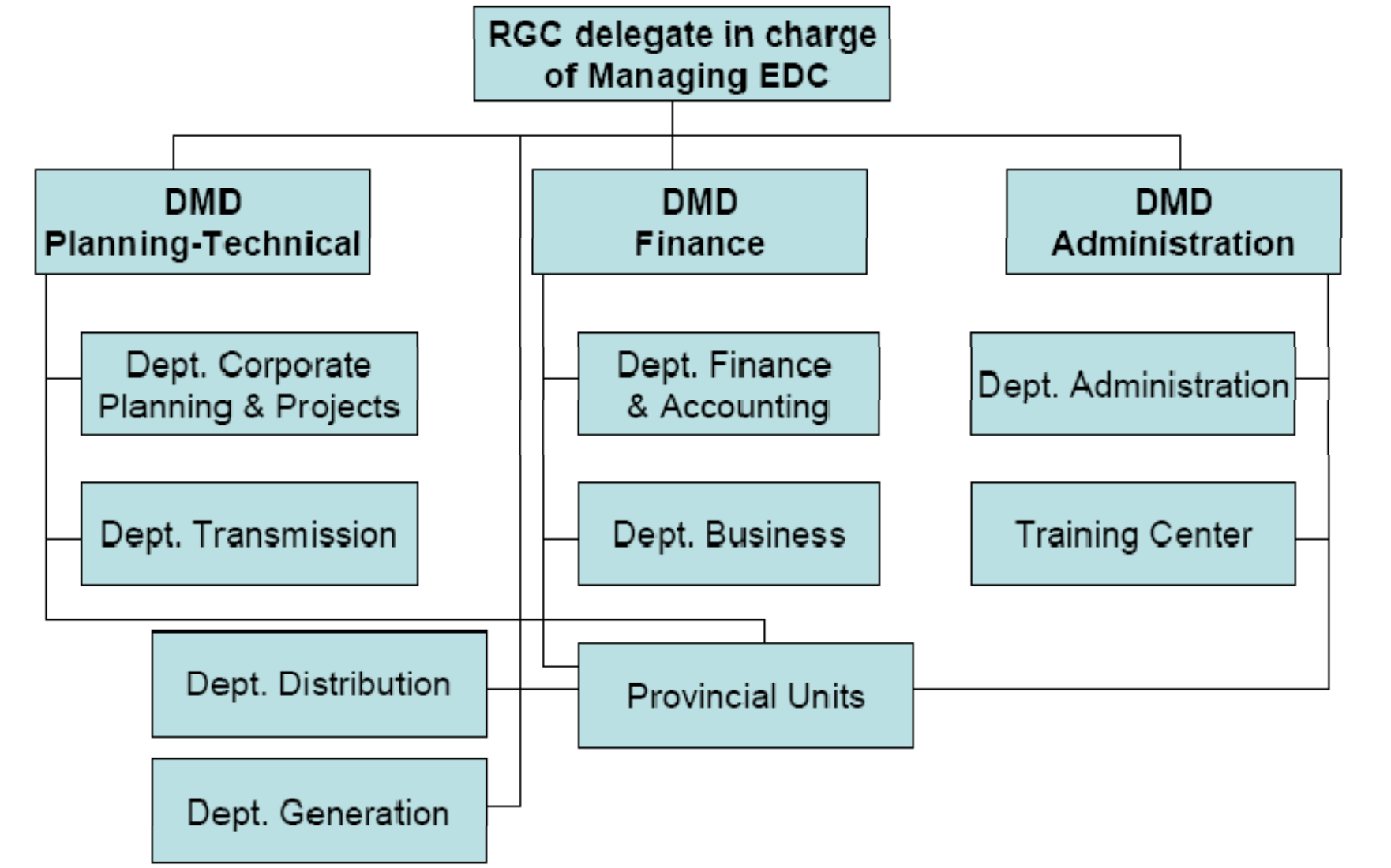
Electricity was introduced in Cambodia in 1906 by three Cambodian-French companies.

In 1958, Royal Government of Cambodia purchased the right and established “**Electricité du Cambodge**” as State own Enterprise responsible for Generation, Transmission and Distribution through-out Cambodia.

In March 1996, by the Royal decree, EDC became again a state owned limited liability company to generate, transmit and distribute electric power through-out Cambodia. EDC is then responsible for its profit and losses and liable for its debts to the extent of the value of its assets.

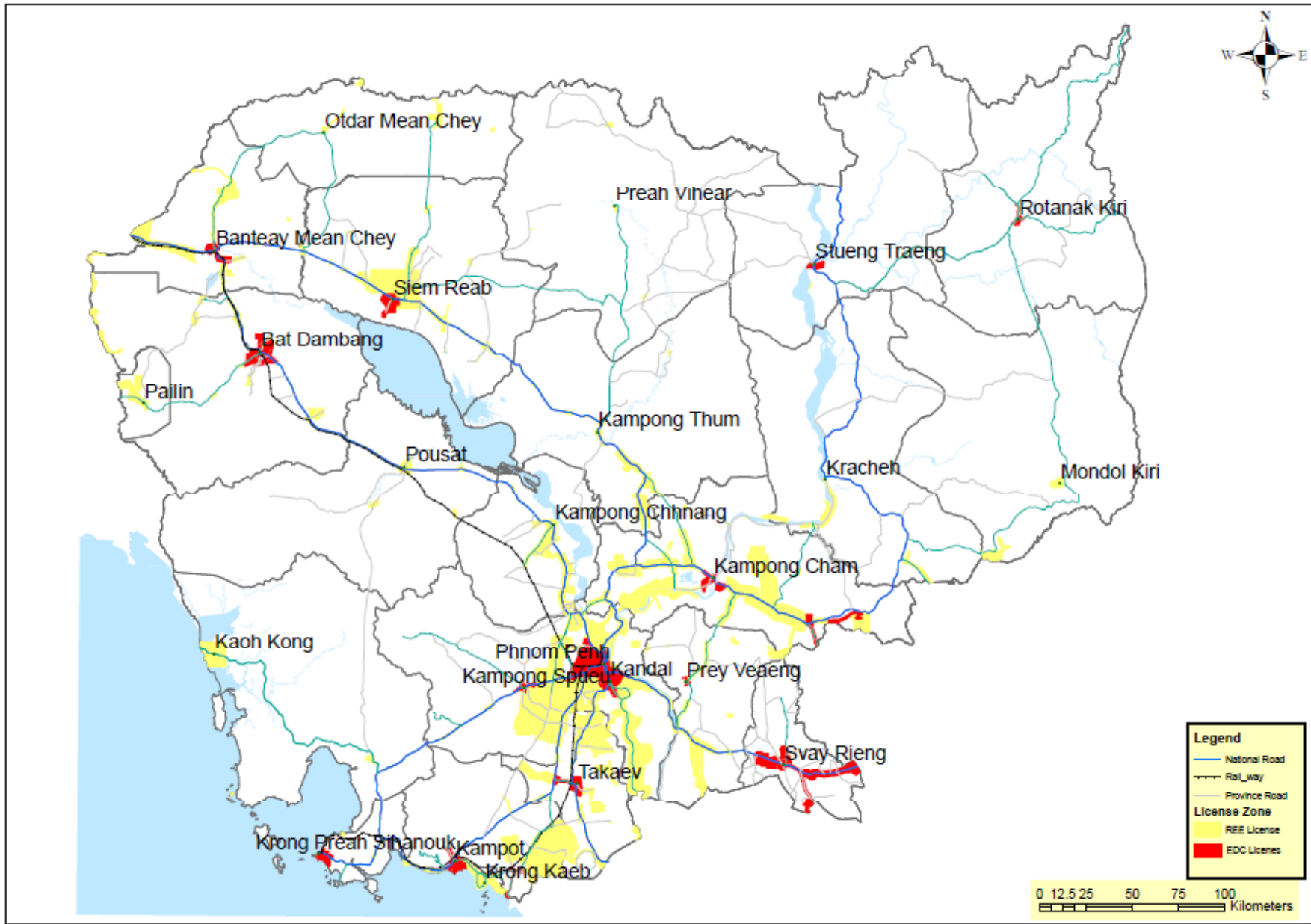
Today, EDC manages more than 80% of energy distribution in the country.

# *EDC Management*



# **Actual Operation Business in EDC**

# Electricity Supply Areas

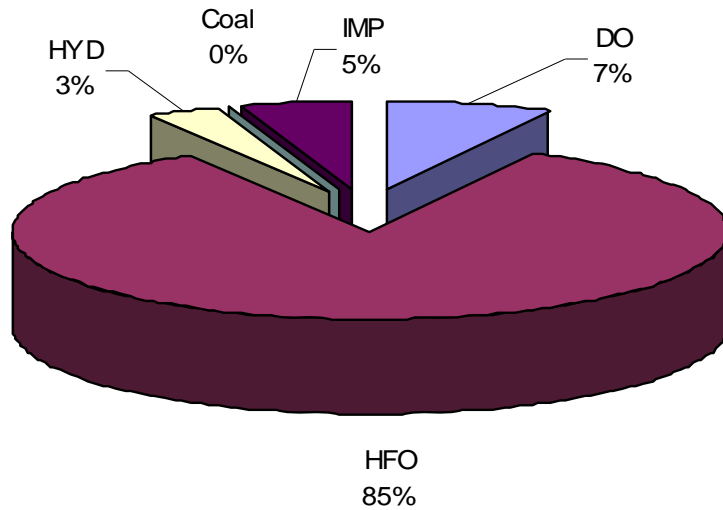


## *Generation in Whole EDC System*

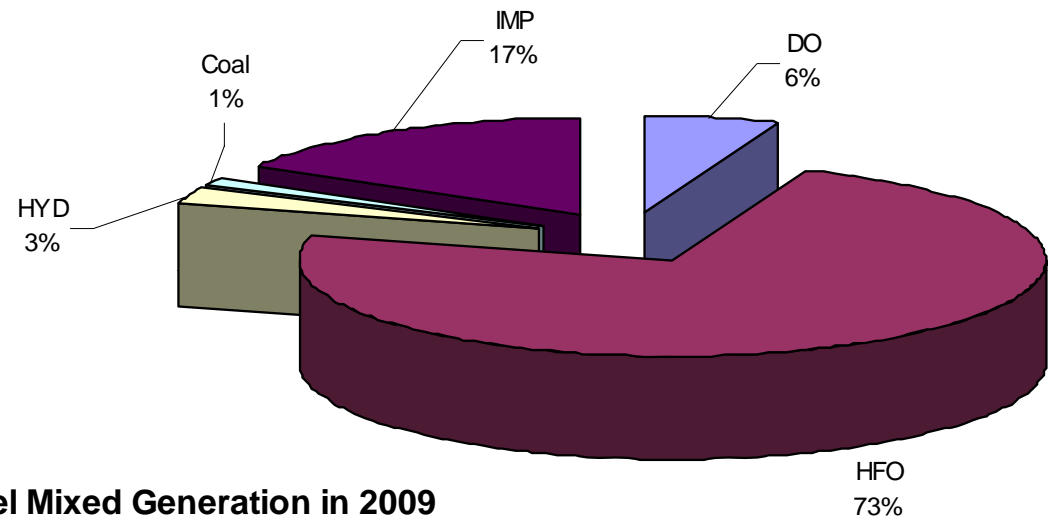
<b>I- Generation</b>	Unit	2007	2008	2009
Installed Capacity,	MW	386	408	516
Available Capacity,	MW	356	373	473
Total Generation,	GWh	1,423	1,622	1,818
<i>EDC Generation,</i>	GWh	294	163	100
<i>IPP Generation,</i>	GWh	1060	1190	1,013
<i>Import</i>	GWh	69	269	705
Generation by DO	GWh	105	93	30
Generation by HFO	GWh	1,200	1,190	1,001
Generation by Hydro	GWh	49	47	47
Generation by Coal	GWh	-	23	34

# Generation in Whole EDC System

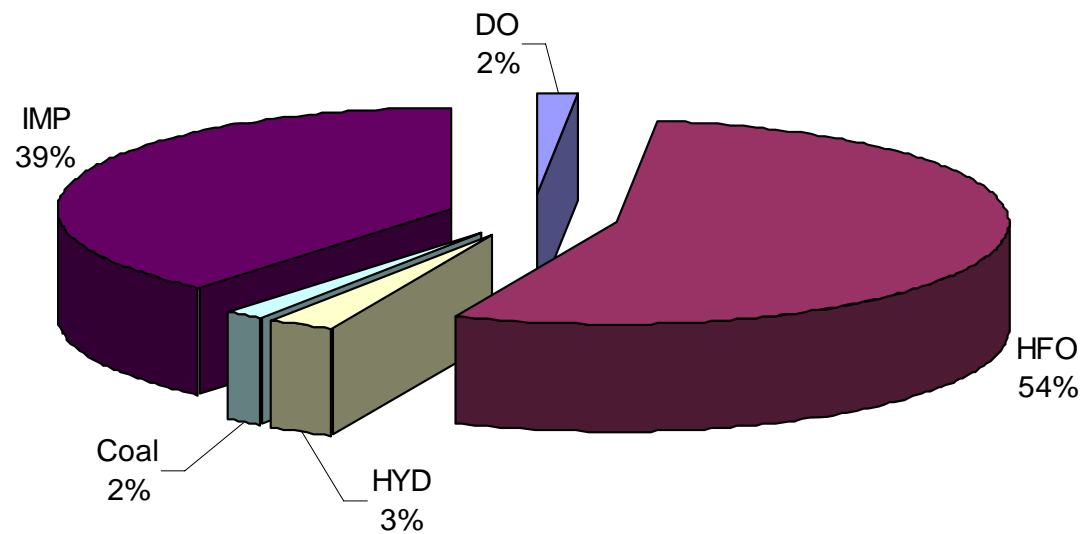
Fuel Mixed Generation in 2007



Fuel Mixed Generation in 2008

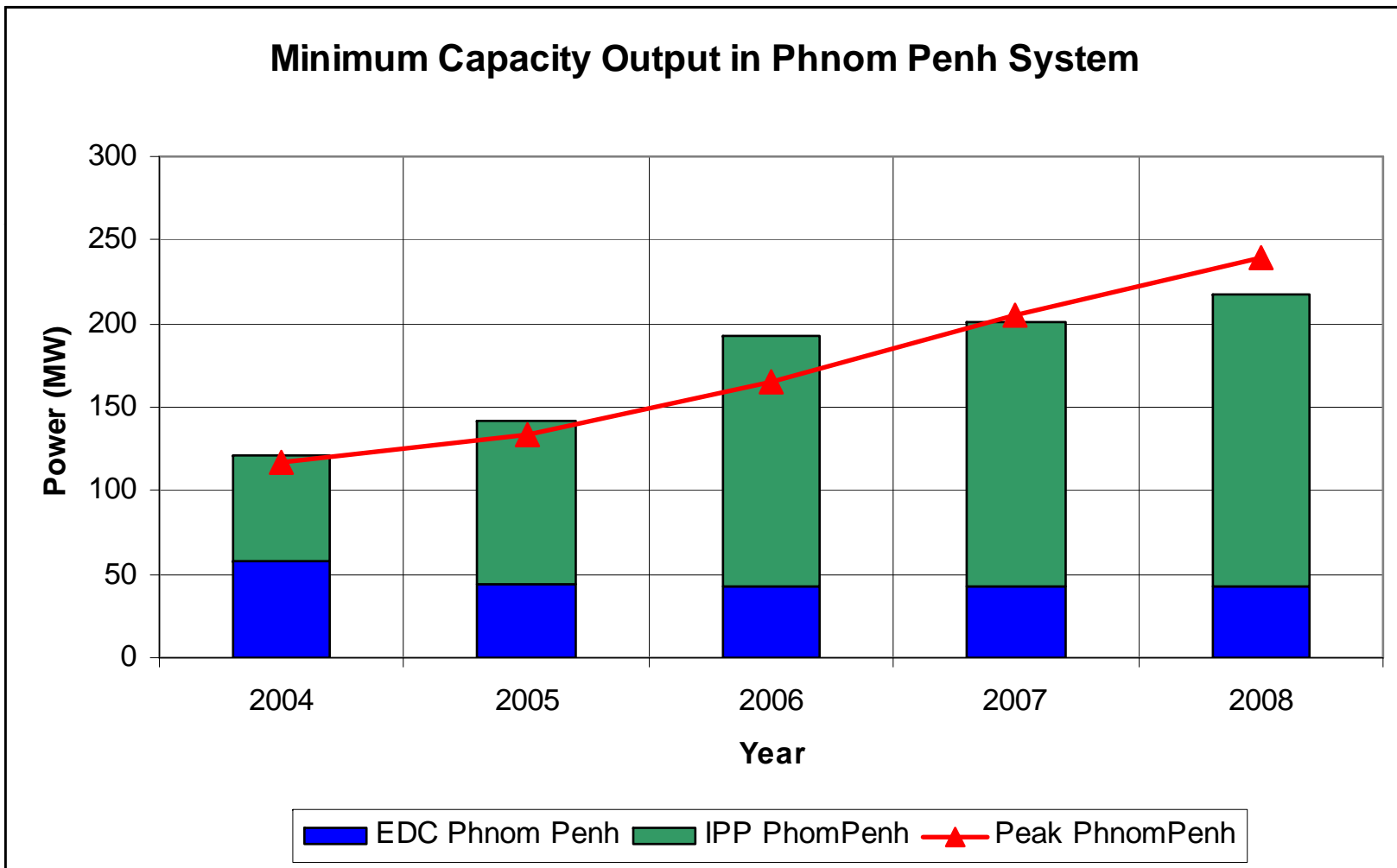


Fuel Mixed Generation in 2009

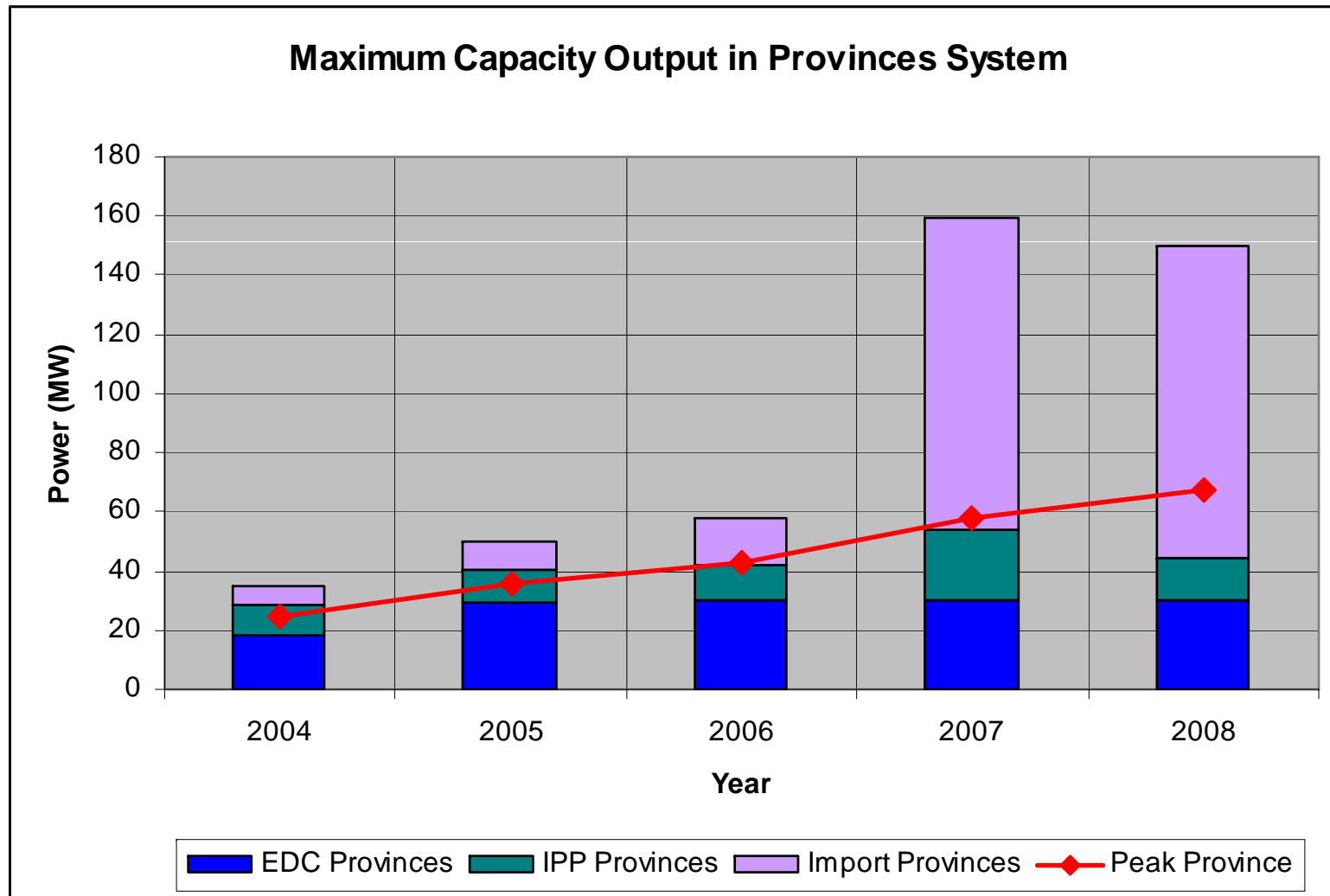




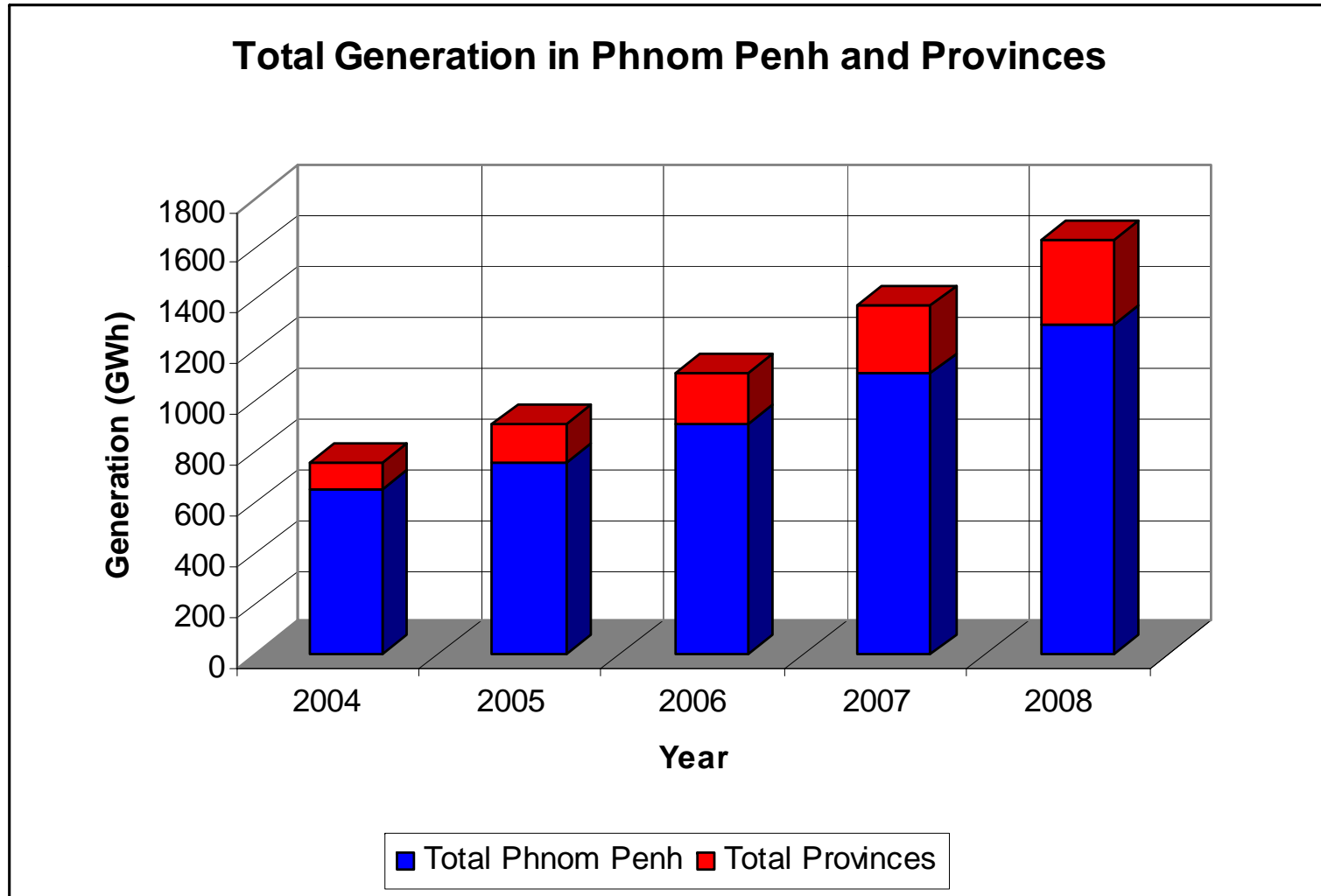
# Available Power Supply and Peak demand in Phnom Penh System



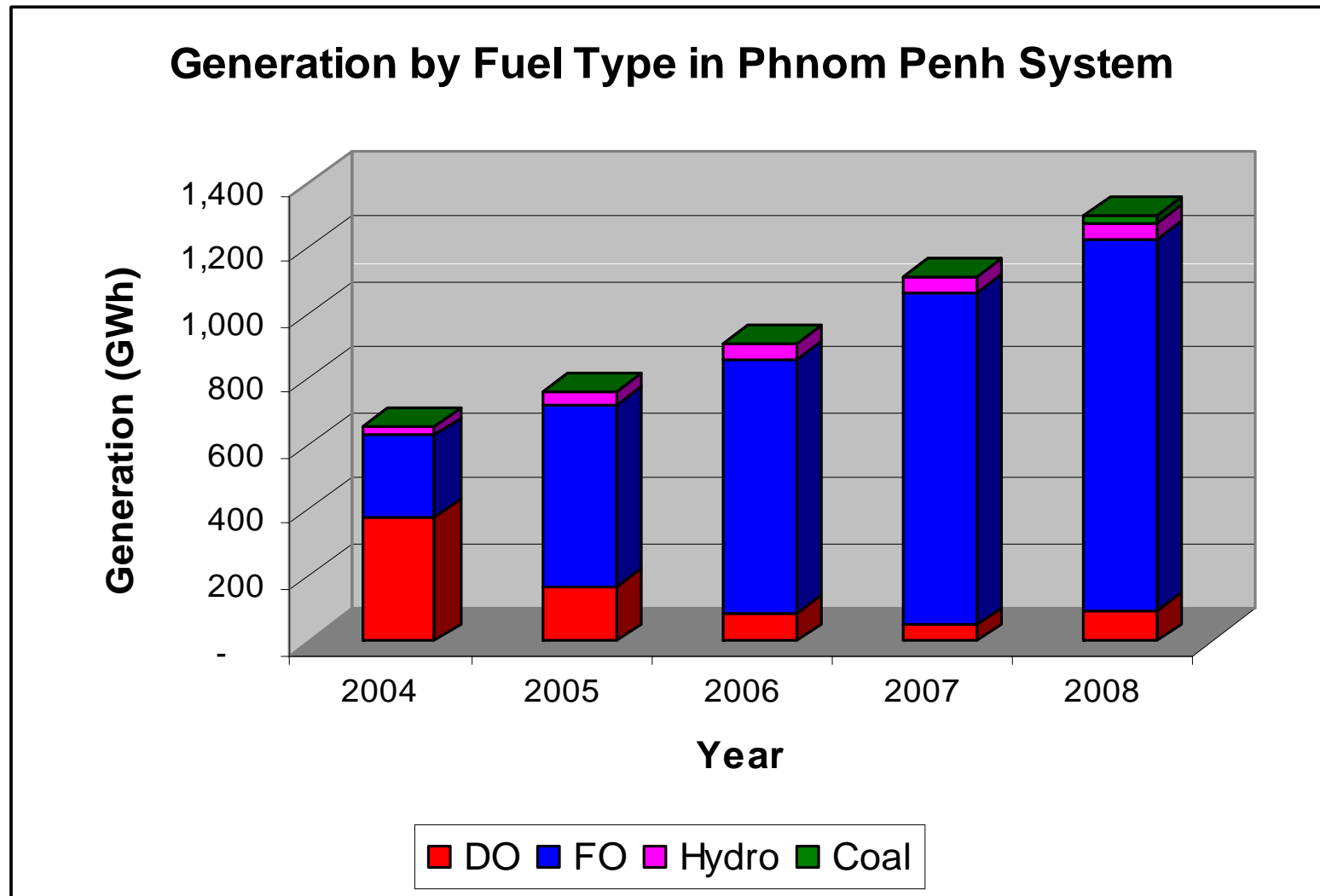
# Available Power Supply and Peak demand in Provinces System



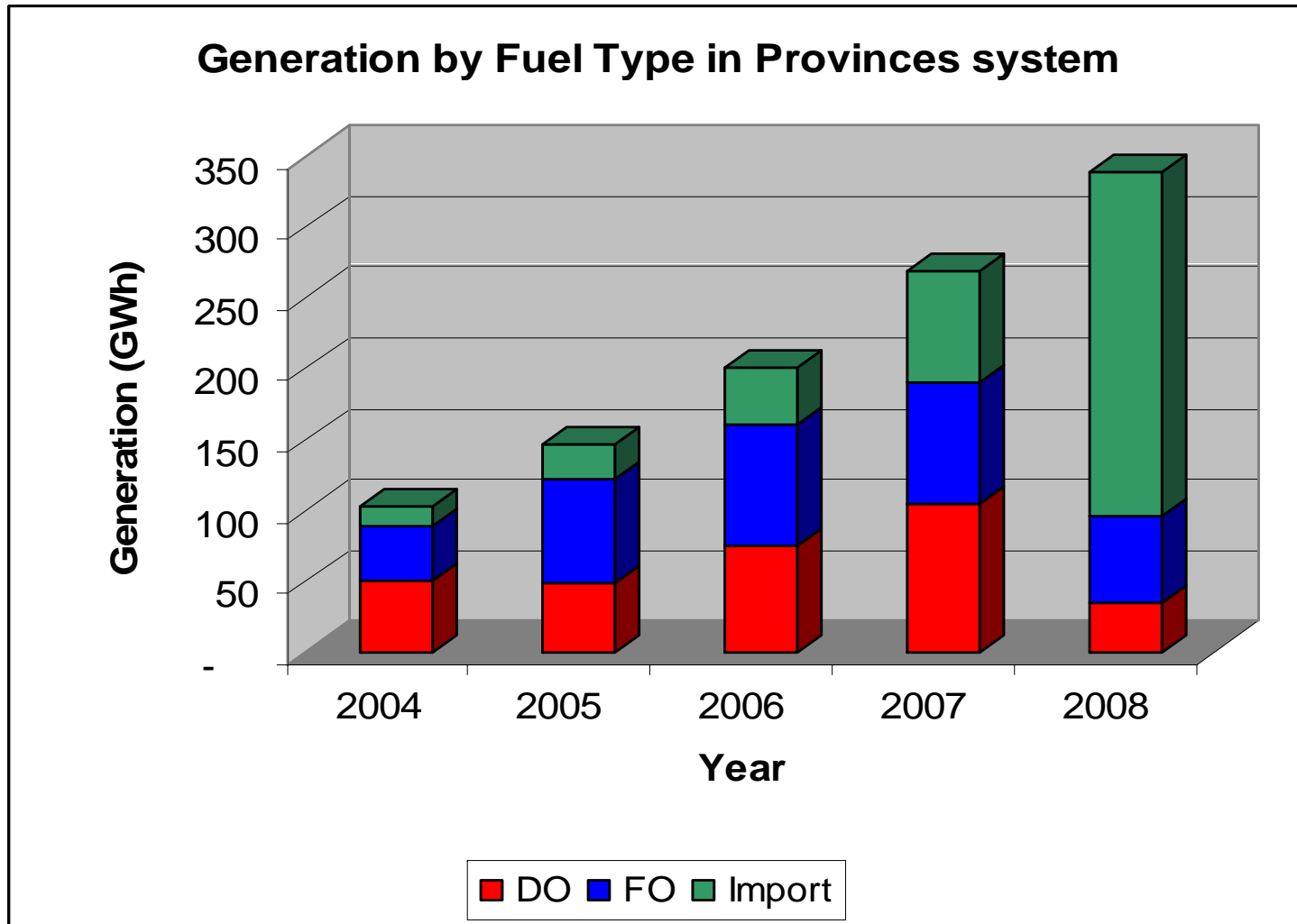
# Energy Generation in Phnom Penh and Provinces



# Energy Generation by Fuel Type in Phnom Penh System



# Energy Generation by Fuel Type in Provinces System



# *Transmission in Whole EDC System*

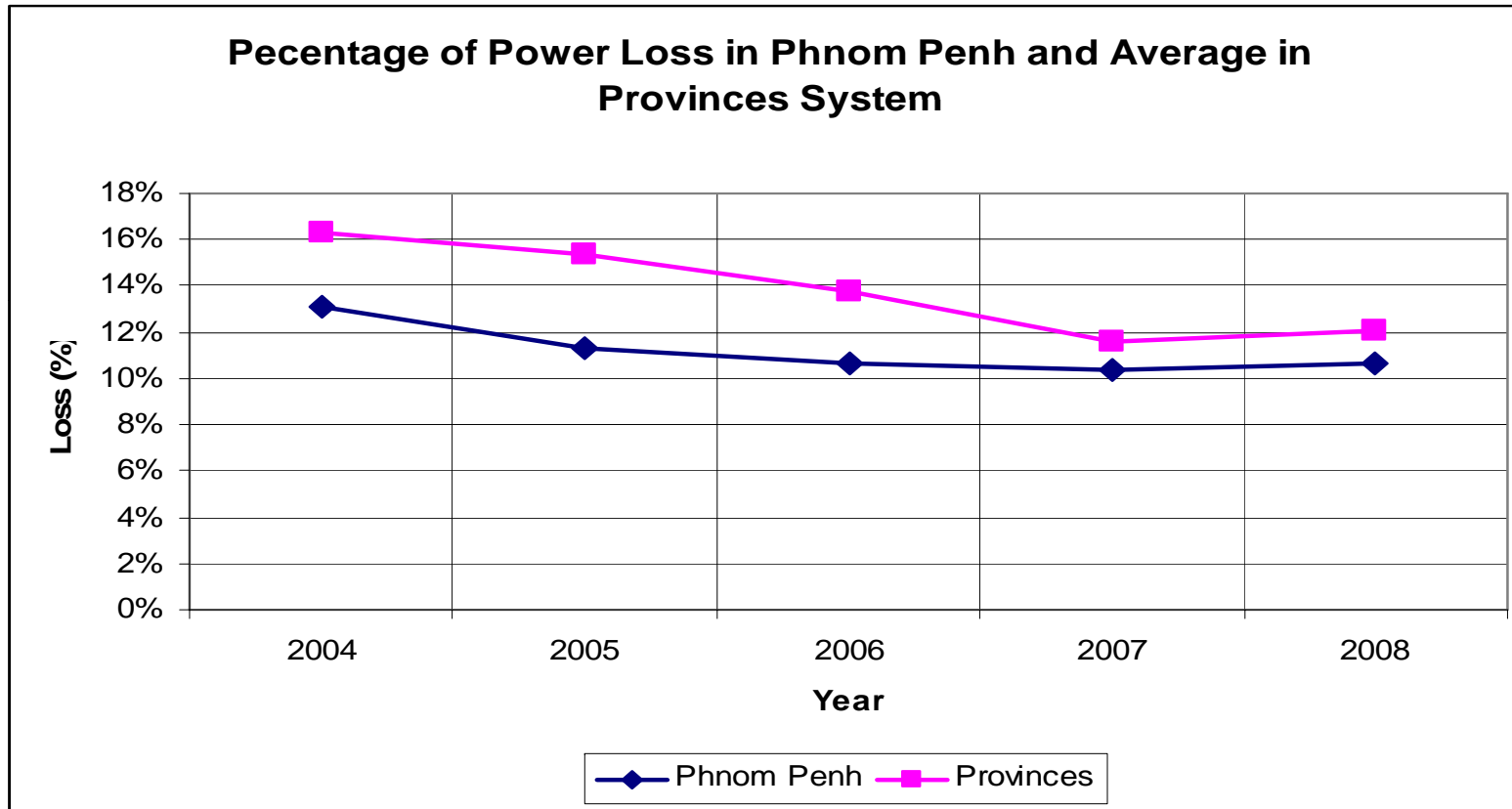
<b>II-Transmission</b>	Unit	2007	2008	2009
Transmission 115 kV (Single)	km	283	283	260*
Transmission 115 kV (Double)	km	46	46	83
Transmission 230 kV (Double)	km	-	-	109
Substation 115 kV	Number/ MVA	4/206	7/306	7/406
Substation 230 kV	Number/ MVA			2/416

\*In 2009, the 23 km of 115 kV single circuit is re-enforced to be double circuits

## *Distribution in Whole EDC System*

<b>III-Distribution</b>		Unit	2007	2008	2009
MV	UG	km	430	456	469
	OH	km	638	884	1,253
LV	UG	km	166	176	178
	OH	km	1,355	1528	1,701
SUB	MV/LV	Number Transformer	1,563	1,745	3,159
		MVA	729	838	957

# Power Losses Rating in Phnom Penh and Average in Provinces System



In 2009 the power loss in the whole system of EDC is 9.72 %

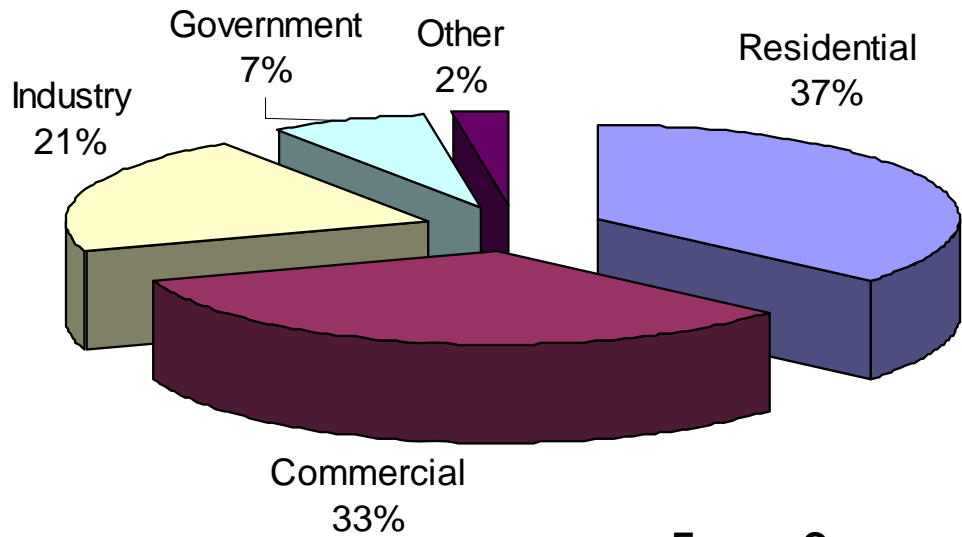


# *Commercial Aspect of EDC*

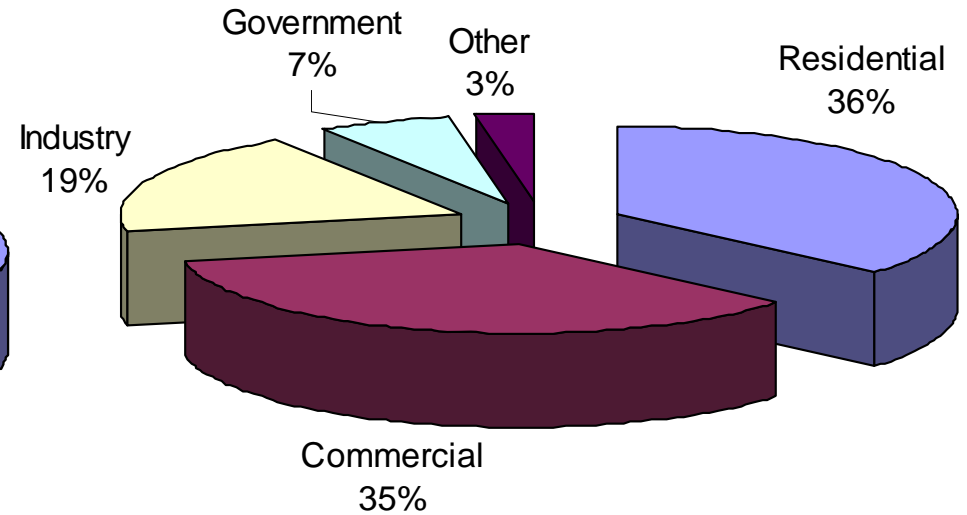
<b>IV-Commercial</b>	<b>Unit</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Customer Number	Conn.(%)	286,758	315,505 (10.02%)	340,396 (7.89%)
Residential	Conn.	264,351	289,304	310,355
Commercial	Conn.	19,490	23,106	26,758
Industry	Conn.	1,048	1,052	1,097
Government	Conn.	1,573	1,737	1,851
Other	Conn.	296	306	335
Energy Sale	GWh (%)	1,222.56	1,451.42 (18.72%)	1,641.56 (13.06%)
Residential	GWh	445.73	527.25	621.74
Commercial	GWh	405.36	515.21	562.56
Industry	GWh	254.99	274.05	275.34
Government	GWh	87.52	95.40	109.79
Other	GWh	28.96	39.50	72.14
Debt Recovery Period	Day	15	11	5

# Commercial Aspect of EDC

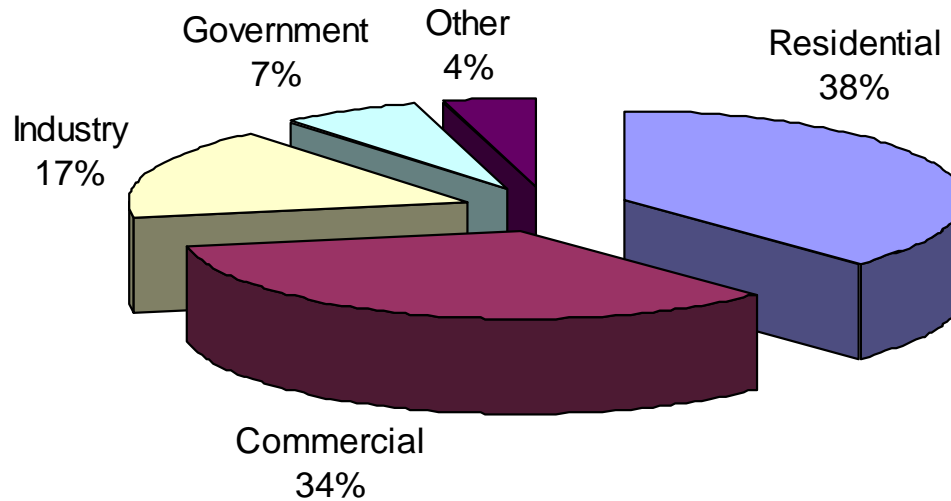
Energy Consumption by Sector in 2007



Energy Consumption by Sector in 2008



Energy Consumption by Sector in 2009



## **5 years Action Plan 2009-2013**

**The main strategy in electricity power development 2009 – 2013 is to reduce the generation cost and increase the rate of electrification by :**

- Import lower cost power source from neighbor countries**
- Construction and put in service the large scale generation such as hydro, coal, gas...**
- Power transmission from the generation source and interconnected between provincial towns**
- Extension distribution network**



## Generation Planning in National Grid for 2010-2013

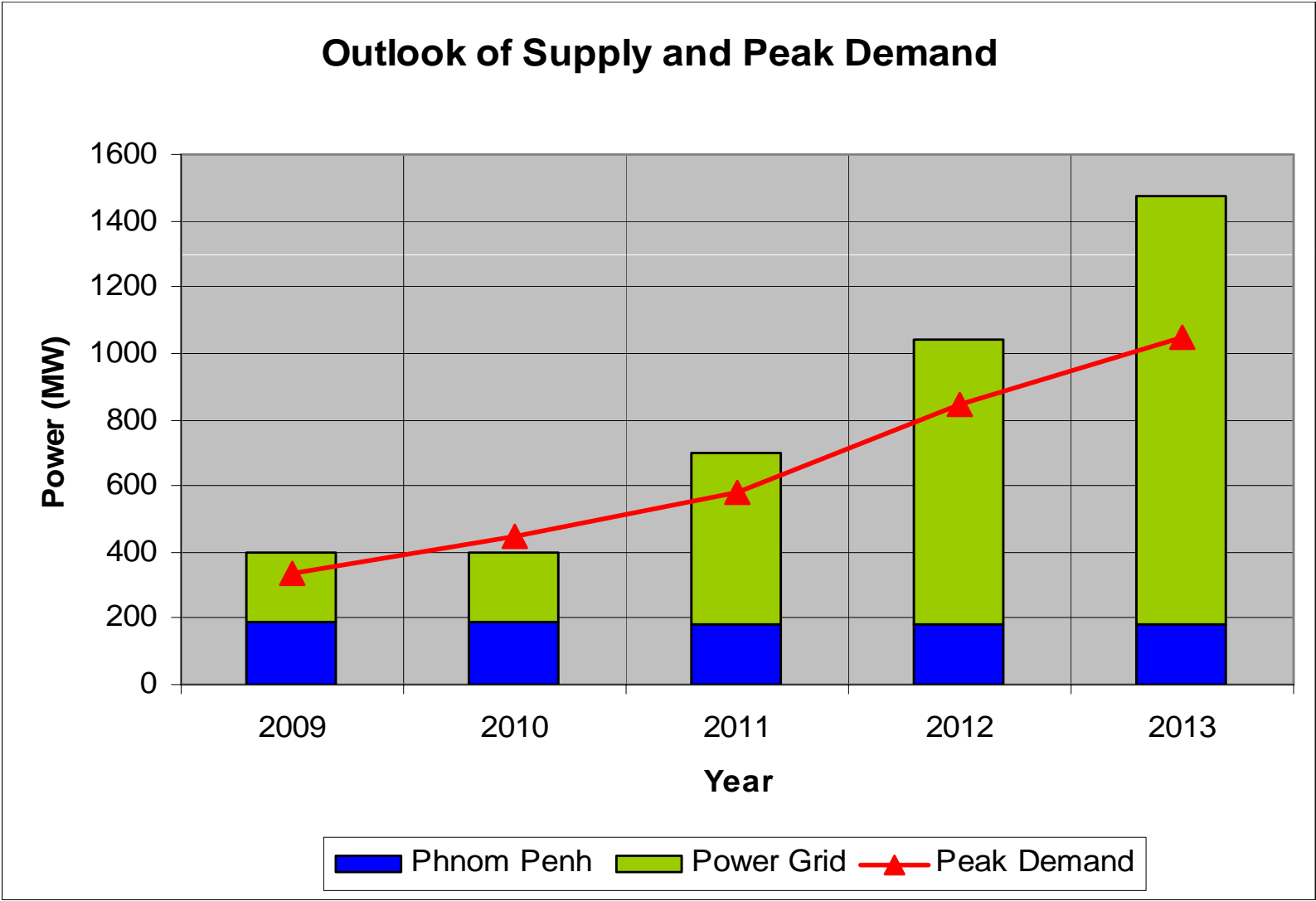
Sources	Type of Generation	2010		2011		2012		2013	
		MW	GWh	MW	GWh	MW	GWh	MW	GWh
Vietnam	Import	200	1,181	200	1,090	200	1,137	200	964
Kirrirom I	Hydro	12	44	12	44	12	44	12	44
Kirirom III	Hydro	-	-	18	71	18	71	18	71
Kamchay	Hydro	-	-	190	394	190	498	190	498
Coal Power Plant I in SHV	Steam	-	-	-	-	-	-	100	494
Stung Atay	Hydro	-	-	-	-	-	-	120	344
VN-KGC *	Import	-	-	-	-	60	368	60	368
Thailand *	Import	-	-	-	-	60	313	60	312

\* Connect to National Transmission in 2012

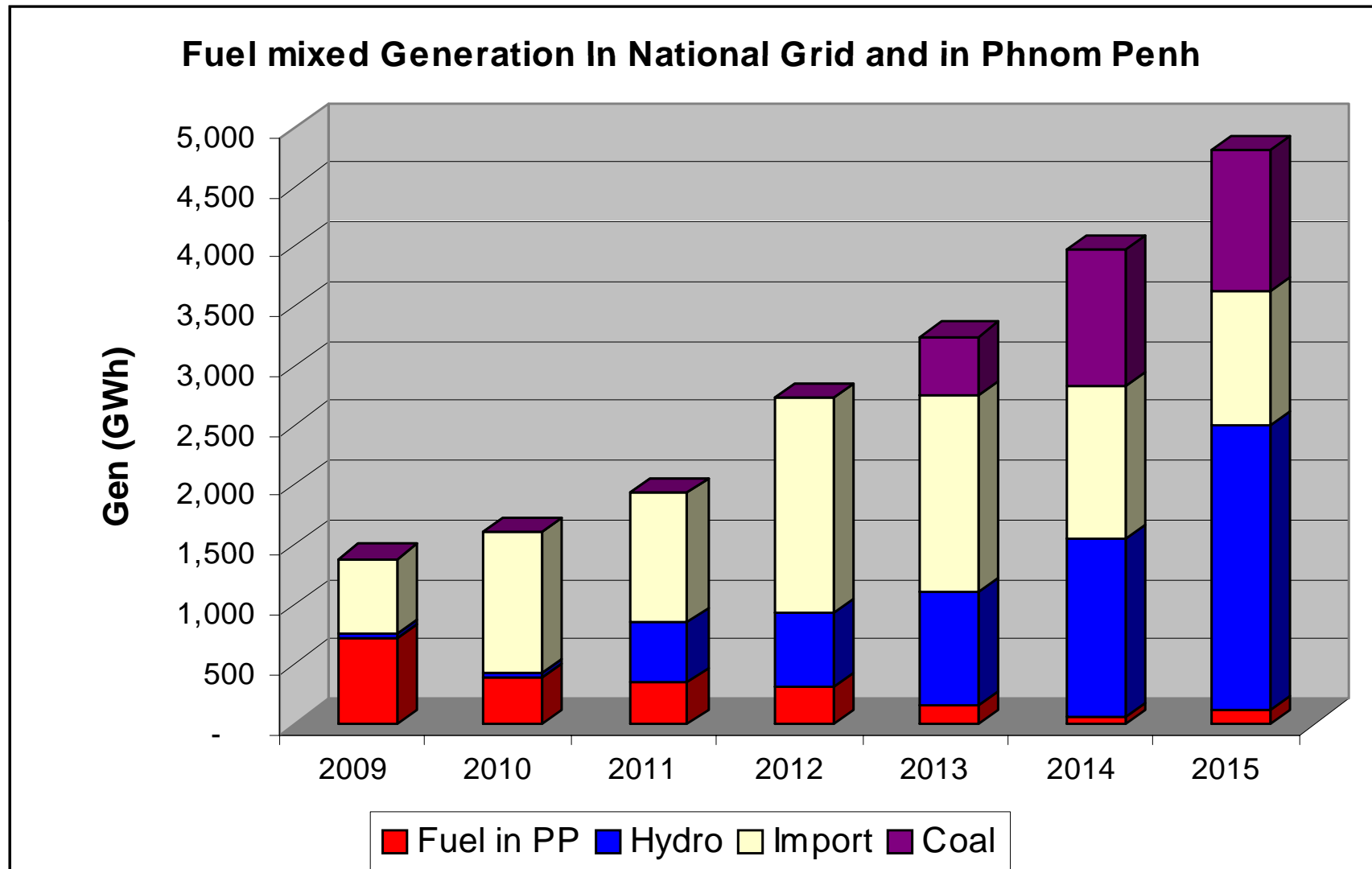
# National Power Transmission 2009-2013

Year	Voltage	National Transmission Connection
2009	220kV	From Vietnam to Phnom Penh via Takeo
2010	220kV	Takeo- Kampot
2010	115kV	From Vietnam to Kampong Cham (upgrade to 230 kV delay up to 2012)
	115kV	From Laos to Stung Treng (upgrade to 230 kV delay up to 2013)
2011	230kV	From Kampot to Sihanoukville
2012	230kV	From Phnom Penh to Kampong Chhnang, Pursat, Battambang, Osom
	230kV	From Phnom Penh to Kampong Cham
	230 kV	Stung Treng, Kratie
2013	230kV	From Phnom Penh to Sihanoukville

# Outlook Of Supply and Peak Demand 2009-13



# *Fuel Mixed Generation*





# Estimated Generation Investment

	Up to 2008		2009 - 2013		
	Capacity. MW		Capacity. MW		Investment MUS\$
	Installed	Available	Installed	Available	
EDC	78	72			
Private	218	190	1.060	810	1.874
Import	106	106	260	260	Trans. Inv
Total	<b>402</b>	<b>368</b>	<b>1.320</b>	<b>1.070</b>	<b>1.874</b>
Cumulative			<b>1.722</b>	<b>1.430</b>	

# Estimated Transmission Investment

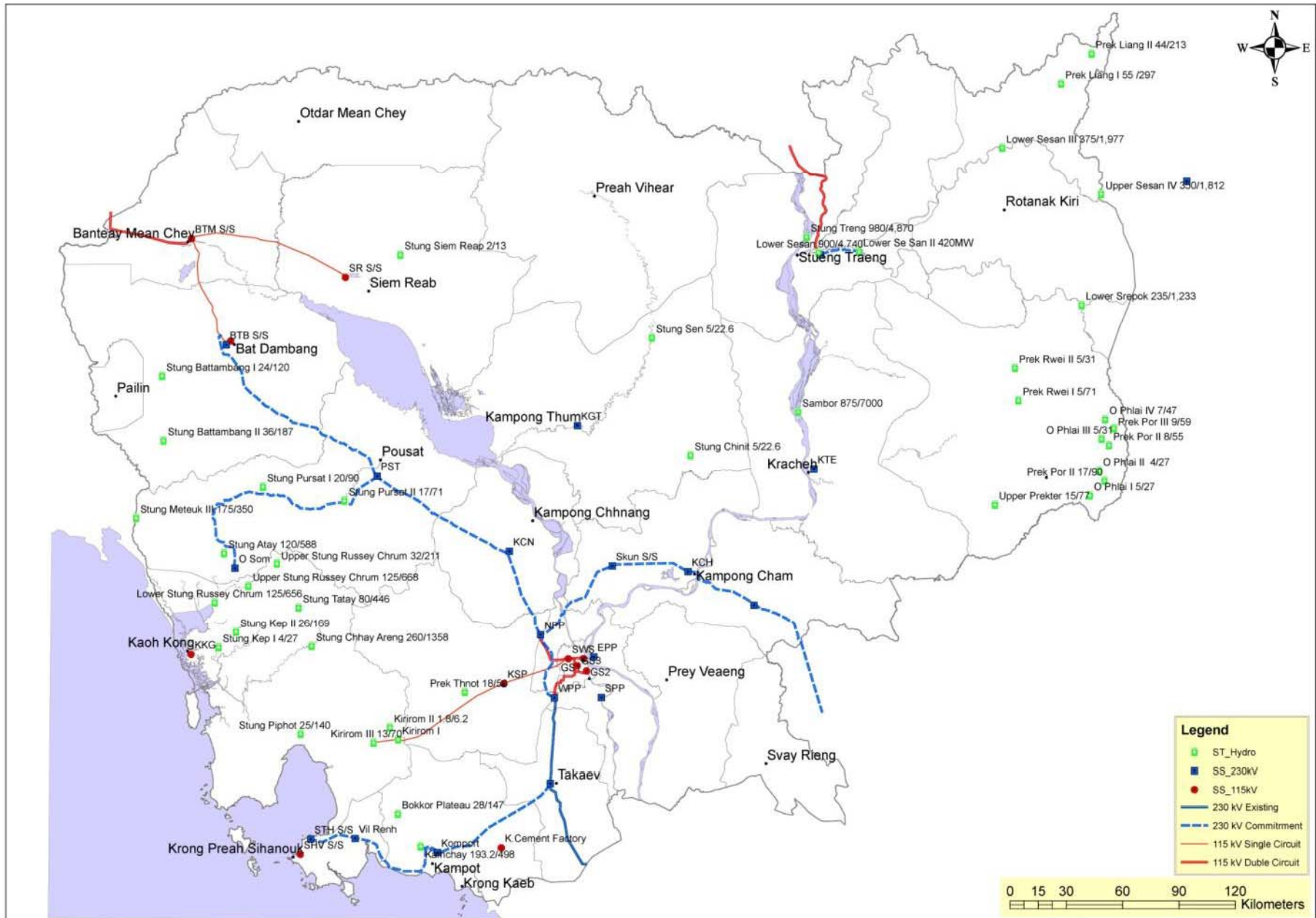
	Up to 2008			2009 - 2013		
	Single. km	Double. km	Investment MUS\$	Single. km	Double. km	Investment MUS\$
115 kV	303	46	52	63	364	70
230 kV					1.200	500
Total			<b>52</b>			<b>570</b>
Cumulative 115 kV	<b>303</b>	<b>46</b>	<b>52</b>	<b>343 *</b>	<b>433 *</b>	<b>122</b>
Cumulative 230 kV					<b>1200</b>	<b>500</b>

\* 23 km single circuit will be reinforced to be double circuit

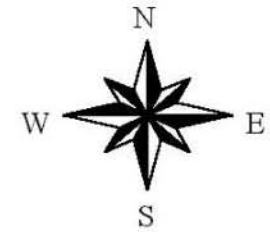
## Distribution Investment 2010-14

- KFW, Kampot & Takeo : 8 Million Euro
- Aus-Aid : 5 Million US\$
- China Exim Bank : 50 Million US\$
- WB : 30 Million US\$
- ADB : 25 Million US\$

# National Transmission up to 2013

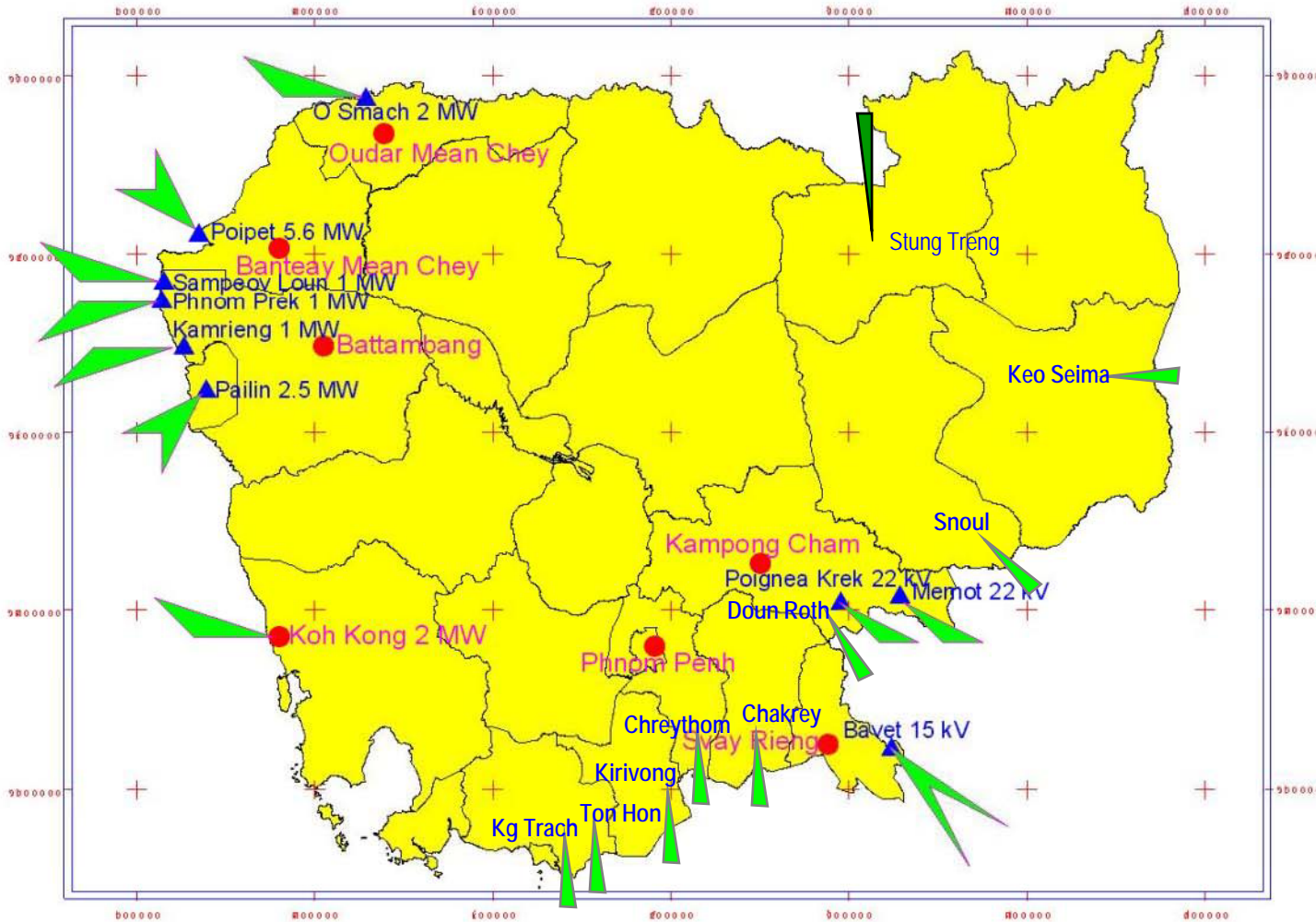


# MV Interconnection from Neighboring Countries



## Legend

- ▲ District Town
- Provincial Town
- Area Surface



- + Pailin, 18/05/01, 2.5 MW, BanPhakKad, PongNam Dis., Chanthaburi Province (5 Years).
- + Sampey Loun, 27/04/01, 1 MW, BankhaoDin, Khlong Hat Dis., Sa Keo Province (5 Years).
- + Kam Rieng, 1 MW, Ban Laem, ThepNIMith Subdistrict, Pong NamRon Dis., Chanthaburi province (5 Years).
- + Phnom Prek, 2 MW, 27/04, BanSubTalee, SoiDao Dis., Chanthaburi province (5 Years).
- + Poipet, 5.6 MW, 22 kV, BangKlong Luk, Aranyaprathase Dis., Sra Kaew Province (5 Years).
- + O Smach Oddor Meanchay, 2 MW, Kap Choeng Dis., Surin Province (5 Years).
- + Kok Kong, 2 MW, BanHoad Lek, Klong Yai Dis., Trat Province (10 Years)

# Power Business with Neighbor Countries

- With Vietnam
  - Actual: 11 points of 22 kV cross border
  - 230 kV to Phnom Penh via Takeo in 2009,
  - 230 kV to Kampong Cham in 2012,
- With Thailand
  - Actual: 7 points of 22 kV cross border, 115 kV in 2007
- With Lao PDR
  - 1 connection at 22 kV at Stung Treng
  - 230 kV to Stung Treng in 2013,



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