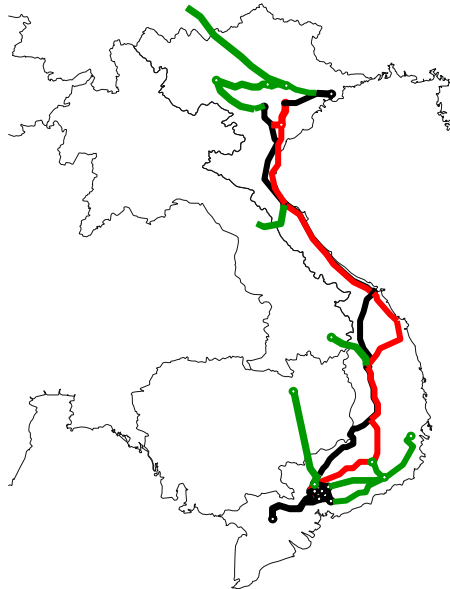


VIETNAM POWER sector

Review of Pdp vi and some issues in pdp vii



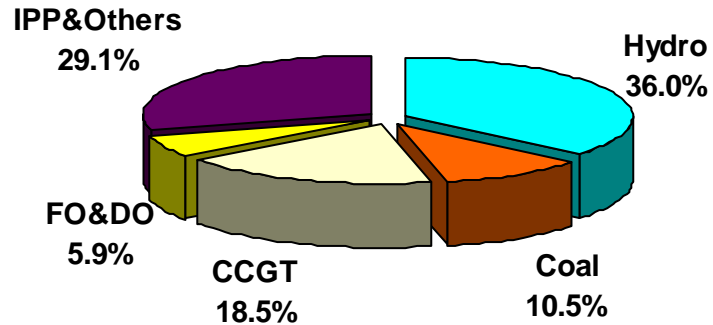
INSTITUTE OF ENERGY

key issues in power master plan 7

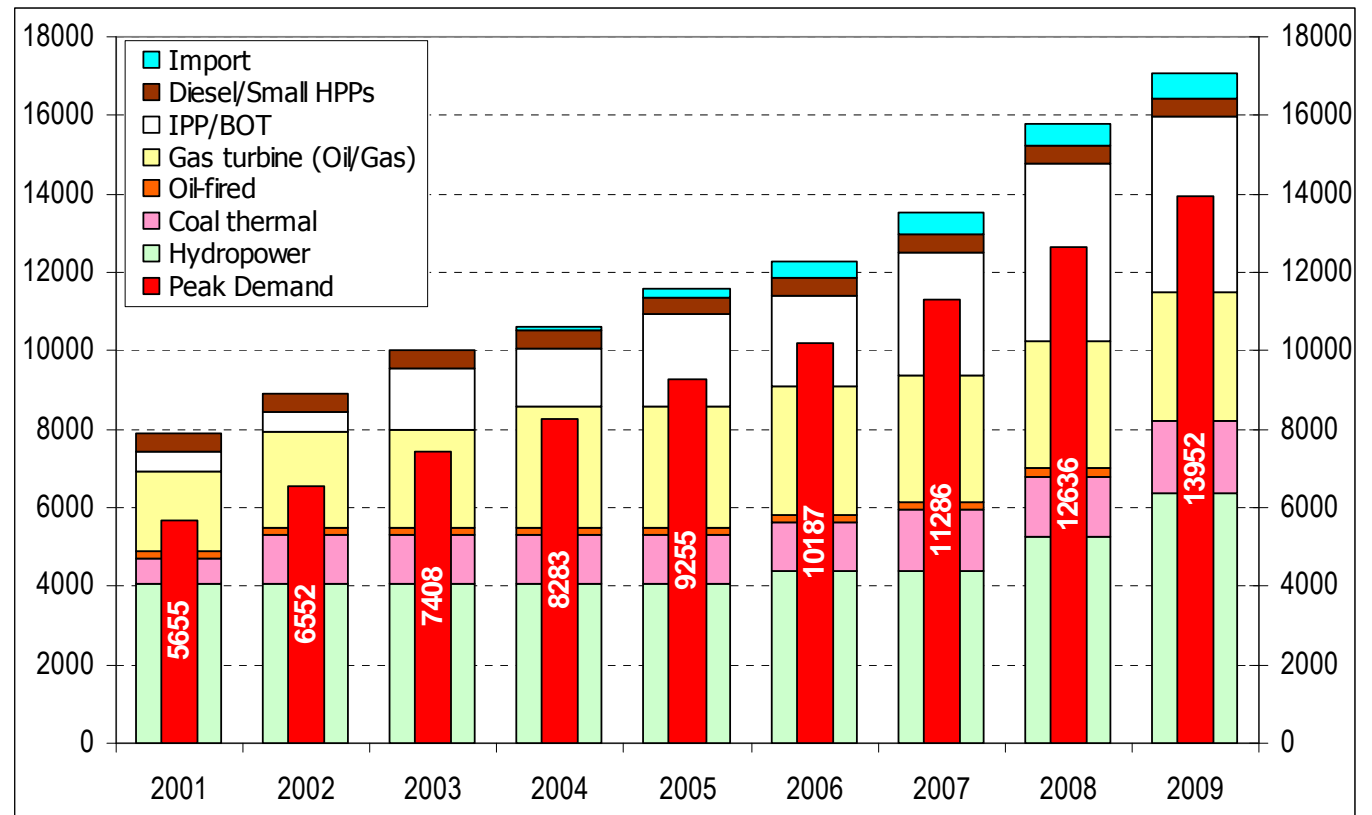
- 1. Current power system situation**
- 2. Review PDP VI - power plant & Transmission grid construction**
- 3. Power demand: Review Demand in PDP VI and new forecast**
- 4. The Power plant projects are under construction & proposed**
- 5. Imbalance regional power supply in short term**

1. current power system situation

Installed capacity - 2009



generation fuel mix in 2009

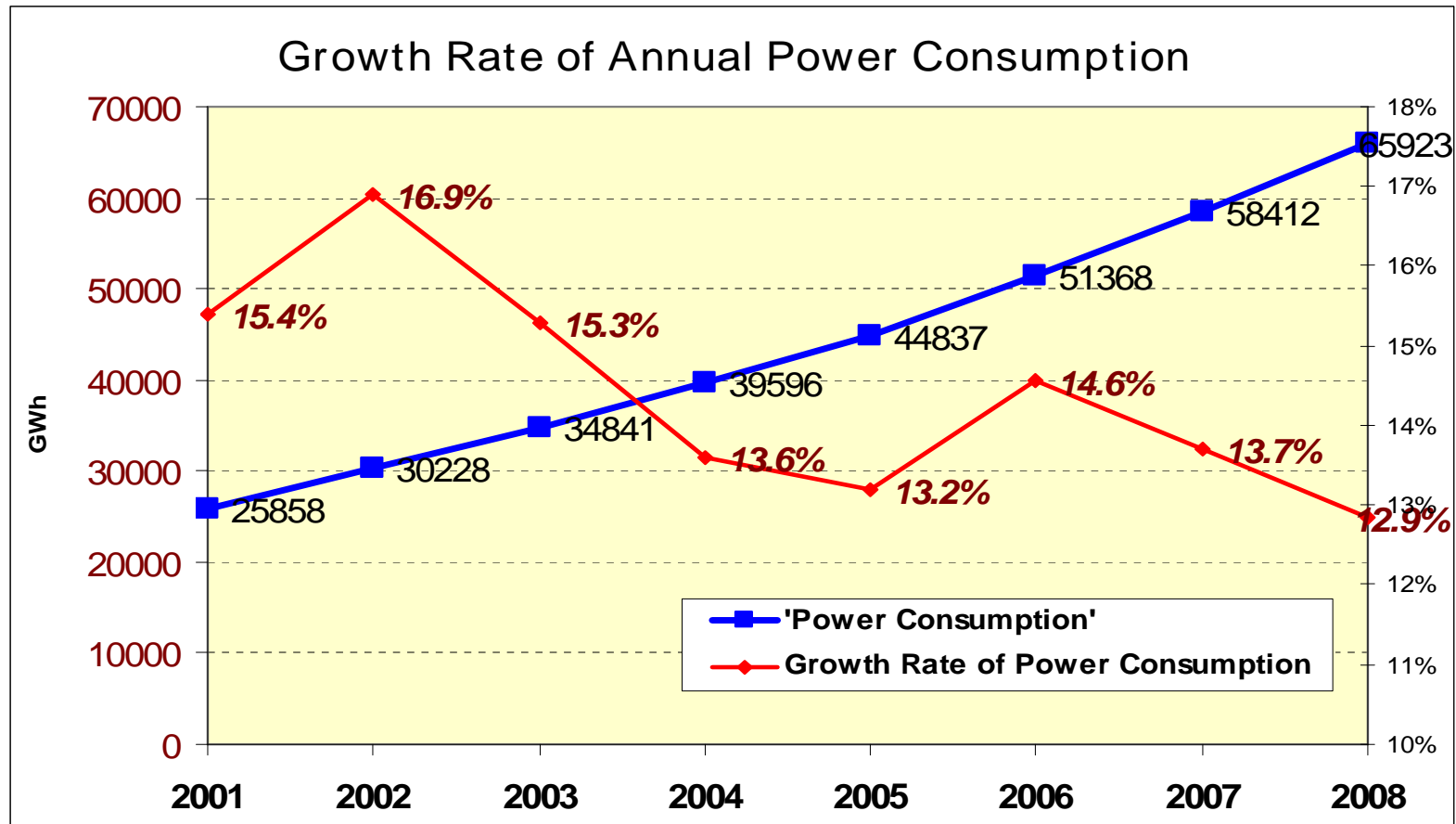


installed capacity 2005 - 2009

Year	Total - MW	Hydropower		Coal thermal		Oil thermal		Gas turbines- CCGT		Diesel & Small HPPs		IPP/BOT/ Import		Add. Cap.- MW
		MW	%	MW	%	MW	%	MW	%	MW	%	MW	%	
2005	11576	4069	35.2	1245	10.8	200	1.7	3084	26.6	454	3.9	2524	21.8	949
2006	12270	4383	35.7	1245	10.1	200	1.6	3248	26.6	454	3.7	2726	22.2	694
2007	13513	4393	32.5	1545	11.4	205	1.5	3248	24.0	454	3.4	3668	27.1	1243
2008	15763	5257	33.4	1545	9.8	200	1.3	3263	20.7	454	2.9	5044	32.0	3493
2009	17652	6362	36.0	1845	10.5	584	3.3	3263	18.5	454	2.6	5144	29.1	4139

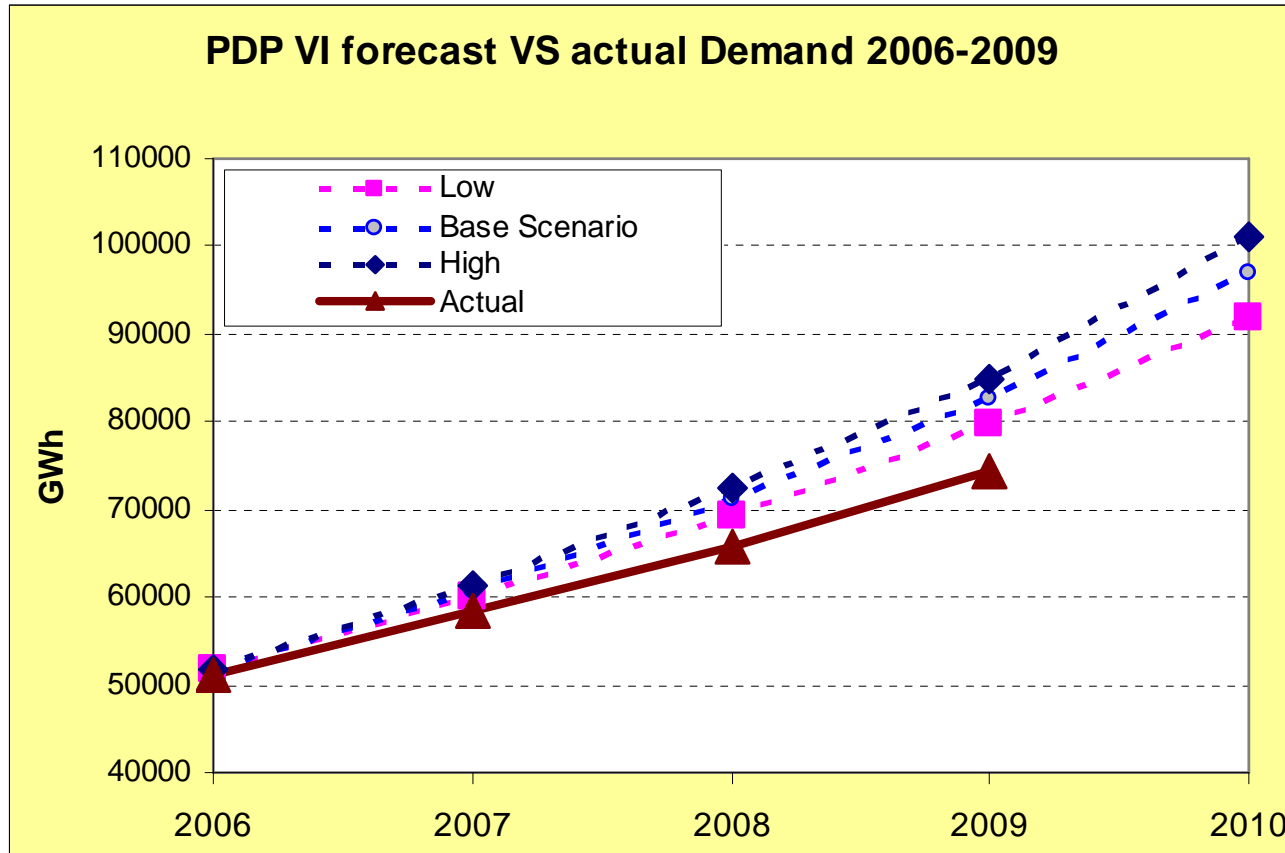
Average Installed Capacity grew in 2006-2009: 11,1%/annum (including import from China)

power consumption 2001-2009



Power Consump. in 2009: 74.479 GWh
Power Consump. 2006-2009 grew: 13,5%/ann.

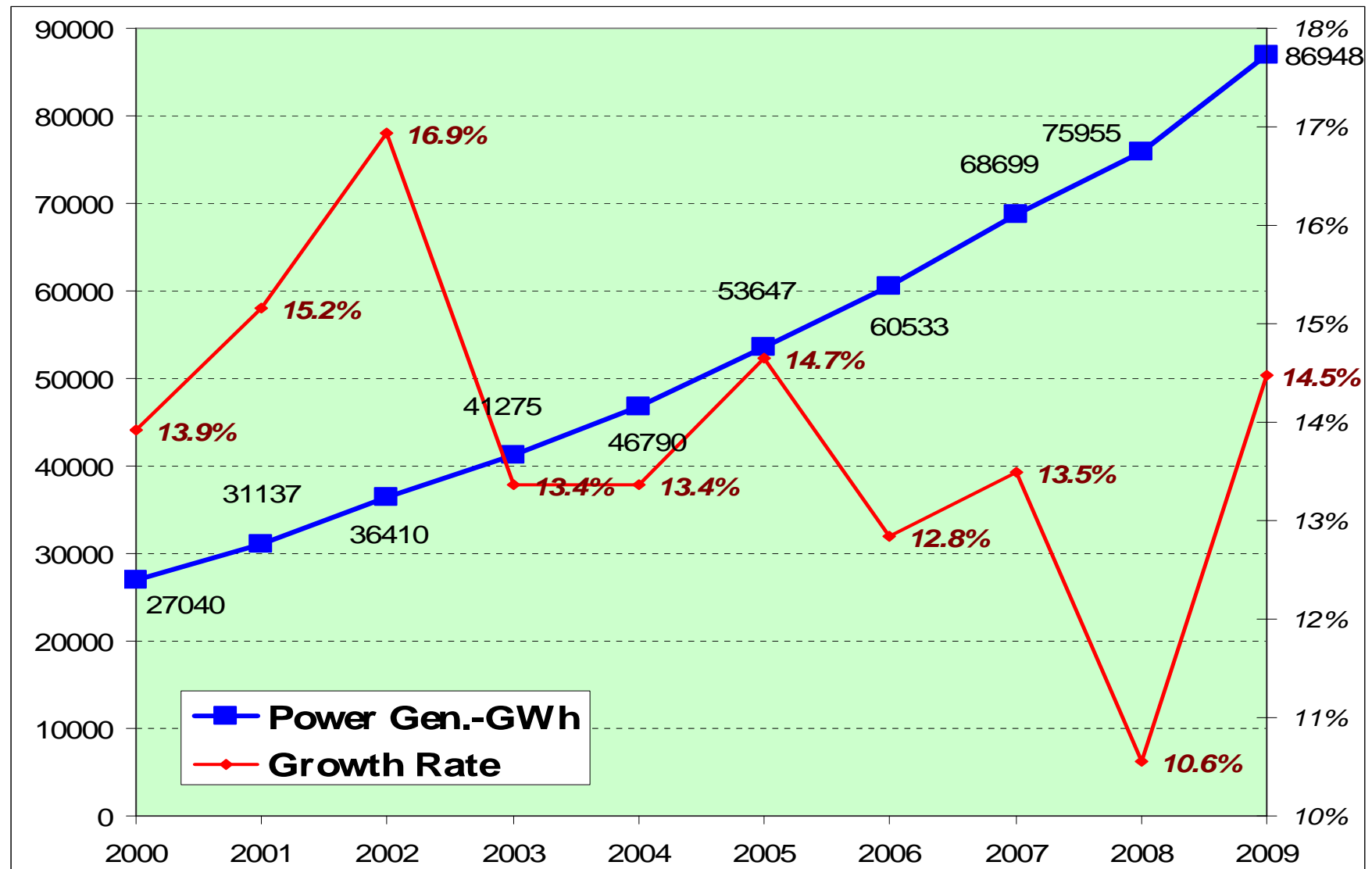
Review Demand forecast and actual 2006 - 2009



With Base scenario: the Actual demand in 2009 is lower 10% than Demand forecast

Main reason? affected from global economy crisis?...

power generation 2001-2009



Power Gen. 2006-2009 grew: 12,8%/ann (inculding export to Cambodia~200 GWh).

2. Review PDP VI-power plant construction

Additional capacity - MW	2006	2007	2008	2009	Est. 2010	2006-2010
- Approved by PM Decision-MW	861	2096	3271	3393	4960	14,581
- Actual - MW	756	1297	2251	1789	3737	9,830
- Percentage of implementation	87.8%	61.9%	68.8%	52.7%	75.3%	67.4%

...Review PDP VI-Transmission grid construction

Projects (2006 – est. 2010)	Planned		Actual		(%)	
	Amount	MVA-km	Amount	MVA-km	Amount	Capacity
500kV Substation						
New & expansion	15	8400	9	4950	60%	59%
500kV line						
New & upgraded	12	1339	6	549	50%	41%
220kV Substation						
New & expansion	87	19326	40	8938	46%	46%
220kV line						
New & upgraded	117	4666	52	2323	44%	50%

Assessment of construction status of power plants

The reasons of delayed construction of the power projects

- *Global Economy*
- *Many power plant projects are under construction in the same time (29 projects)*
- *Lack of investment, capital loan procedures prolonged*
- *The weaknesses on:*
 - *the Bidding processes,*
 - *the Contractors, Consultants,*
 - *The project Management boards*
- *Equipment price increase sharply*
- *Southern coal fired power plants could not find the coal supply resource (import)*
- *Compensation & resettlement being more difficult gradually...*

The construction of power plant project Delay might be continued

the measures to overcome the Delay

1. **Focusing on the most urgent power plants in order to avoid spreading investment;**
2. **Reviewing the electricity demand forecast for next 5 years by 3 regions;**
3. **Selecting/encouraging power plants which must not be delayed;**
4. **If necessary, the developer of a delayed important project shall be changed;**
5. **The coordination shall be harmonious among ministries, sectors in order to overcome barriers on finance release, resettlement, land preparation, etc;**
6. ...

3. power demand forecast

Power Demand forecast in MP 7 is taking into account:

- The power demand increases again after the impact of economics crisis;
- The consequence of global economics crisis impact
- The New long term Socio-Economic Development scenarios
- Initiative results from National energy efficiency & saving Program
- DSM program of EVN
- Power tariff will be increased

draft of macro-economics development scenarios

Past trend of GDP Growth

	2000	2005	2006	2007	2008
GDP	6,79	8,4	8,2	8,48	6,23
Agriculture	4,63	4,0	3,7	3,4	3,79
Industry-Construction	10,07	10,6	10,4	10,6	6,33
Service	5,32	8,5	8,3	8,7	7,2

GDP growth rates period 2011 – 2030 (%)

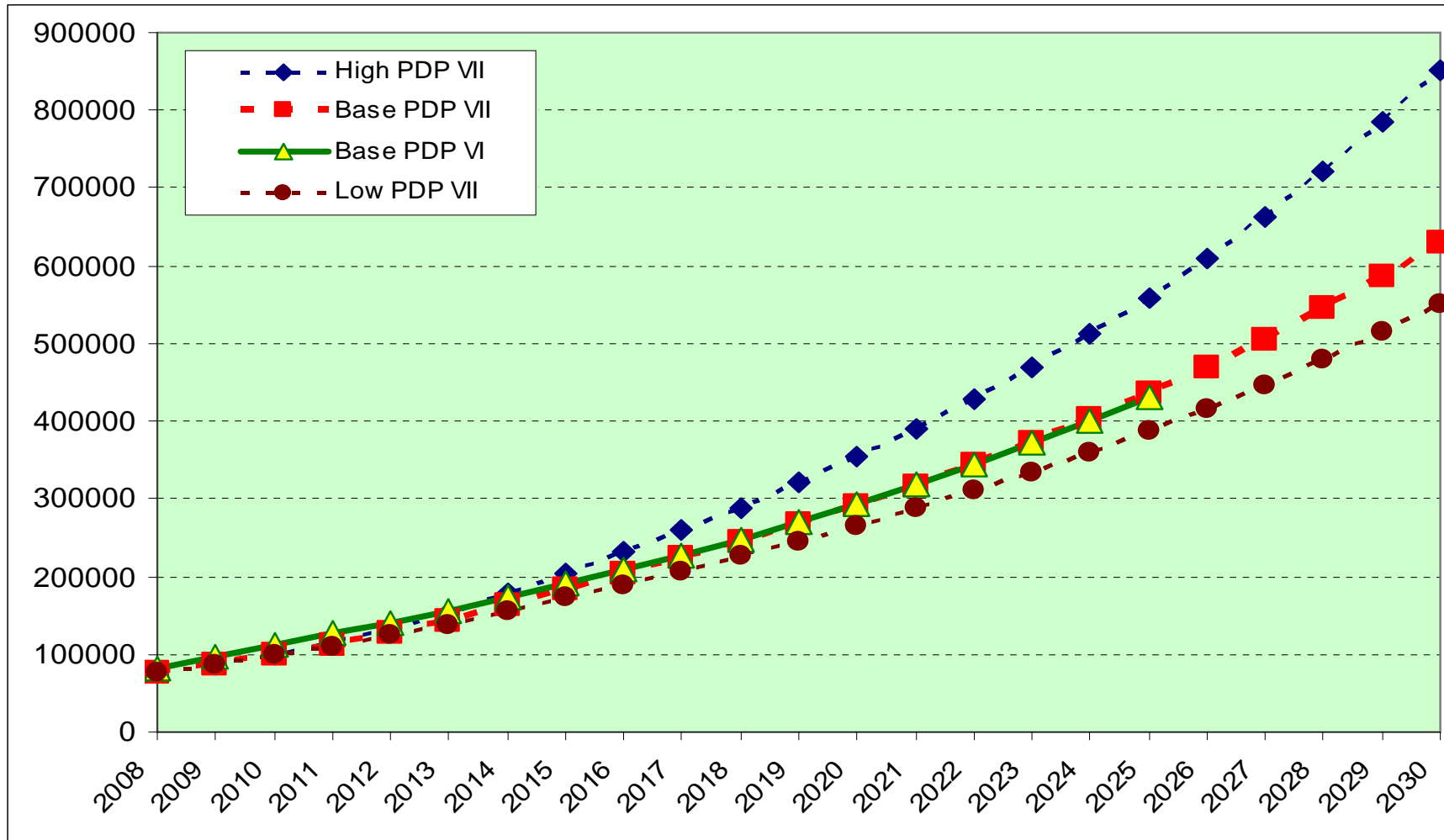
Scenario	2011 - 2015	2016 - 2020	2021 - 2030
High	9.1	9.6	9.8
Base	7.5	8.1	8.0
Low	7.1	7.7	7.6

Draft of assumption: Economics experts of MPI & IE

power demand forecast 2011-2030 (preliminary)

Items \ Year	2009		2010		2015		2020		2025		2030	
	GWh	%	GWh	%	GWh	%	GWh	%			GWh	%
High scenario												
Agriculture	700	0.92	773	0.90	1608	0.90	1973	0.64	2081	0.43	2170	0.29
Industry-Construction	38501	50.63	43824	51.00	94494	52.88	164159	53.47	251211	51.51	370627	49.67
Commercial-Service	3512	4.62	4098	4.77	9752	5.46	15236	4.96	23049	4.73	35491	4.76
Publish-Household	30534	40.15	33901	39.45	64305	35.99	109119	35.55	182228	37.37	290166	38.89
Others	2799	3.68	3335	3.88	8529	4.77	16500	5.37	29109	5.97	47663	6.39
Sale	76046	100	85932	100	178687	100	306986	100	487678	100	746117	100
T&D Losses		9.70		10.0		9.0		8.0		7.5		7.0
Plant use		3.0		3.1		3.6		4.0		4.5		4.5
Generation	87109		98886		204448		348848		554179		843070	
Peak (MW)	13867		15731		32411		55111		87247		133668	
Base scenario												
Agriculture	700	0.92	773	0.90	1433	0.90	1720	0.68	1830	0.48	1931	0.35
Industry-Construction	38501	50.63	43824	51.00	84190	52.88	134649	53.48	200782	53.06	289243	52.70
Commercial-Service	3512	4.62	4098	4.77	8688	5.46	12253	4.87	16521	4.37	22536	4.11
Publish-Household	30534	40.15	33901	39.45	57293	35.99	89625	35.60	137499	36.34	202342	36.87
Others	2799	3.68	3335	3.88	7599	4.77	13516	5.37	21747	5.75	32748	5.97
Sale	76046	100	85932	100	159202	100	251763	100	378379	100	548800	100
T&D Losses		9.70		10.0		9.0		8.0		7.5		7.0
Plant use		3.0		3.1		3.6		4.0		4.5		4.5
Generation	87109		98886		182154		286094		429977		620113	
Peak (MW)	13867		15731		28876		45197		67693		98318	

power demand forecast 2011-2030 (preliminary)



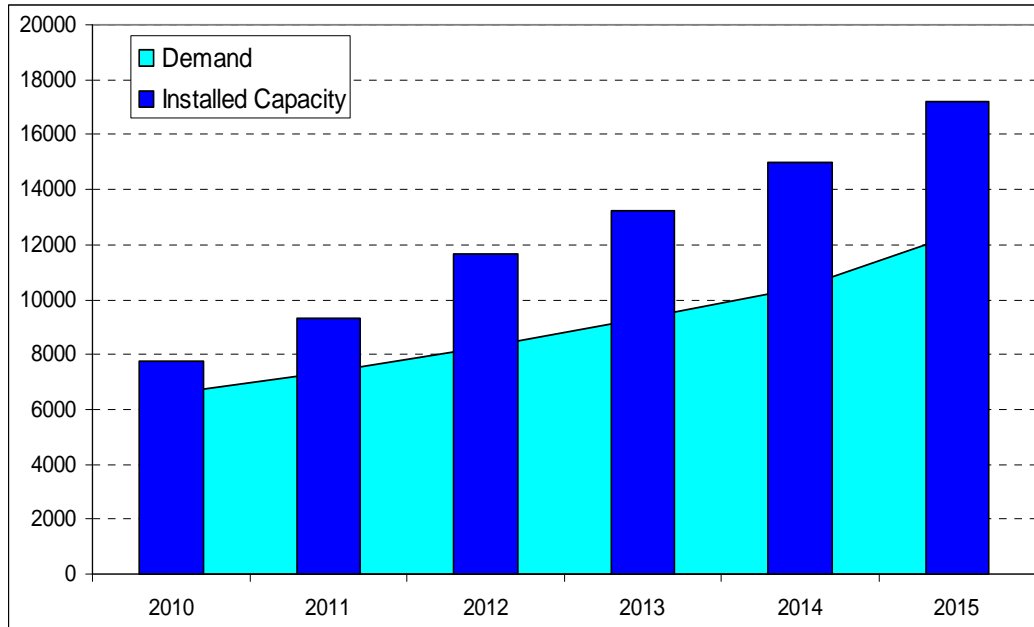
	Low	Base	High	
Growth rate Power consumption period 2011--2015:	11.7	13.0	15.6	%/ann.
2016--2020:	8.6	9.4	11.3	%/ann.
2021--2030:	7.4	8.0	9.2	%/ann.

4. progress of power generation Development

- Number of Power Plant Projects are under construction **29 (20 Hydropower & 9 Thermal Power Plants)**
- Total capacity **10,029 MW (62.9% of capacity are HPPs)**
- Expected the capacity will be put in to operation by:
 - **2010: 3737 MW:** HPP: Son La #1, Cua Dat, Ban Ve; Srepok 3&4, An Khe KN, S.Tranh2, D.Nai 3; Coal TP: Hai Phong I, Campha1&2, Quang ninh1&2, Son Dong, Win PP BinhThuan
 - **2011: 2962 MW:** HPP: Son La #2,3, Nam Chien, A Luoi, 4, D.My 4D.Nai 4, SKM 3 (Lao)...; Coal TP: Uong bi Exp II, CCGT Nh. Trach II
 - **2012: 2472 MW:** HPP: Son La #4,5,6, Ban Chat, Khe Bo, N.Que 3,... Coal TPP: Hai Phong II, U.Bi Exp 2, Win PP Ninh Thuan...
 - **2013: 2420 MW**
 - **2014: 6229 MW**
 - **2015: 5550 MW**
- Estimated up to 2015: ~ 250MW Win power
- Average annual capacity added in 2011 - 2015: **4100 MW/annual; 2016-2020: 3300MWW & 2021-2025: 5600MW**
- **1st unit of Nuclear PP wil be in operation by 2020**

imbalance regional power supply in short term

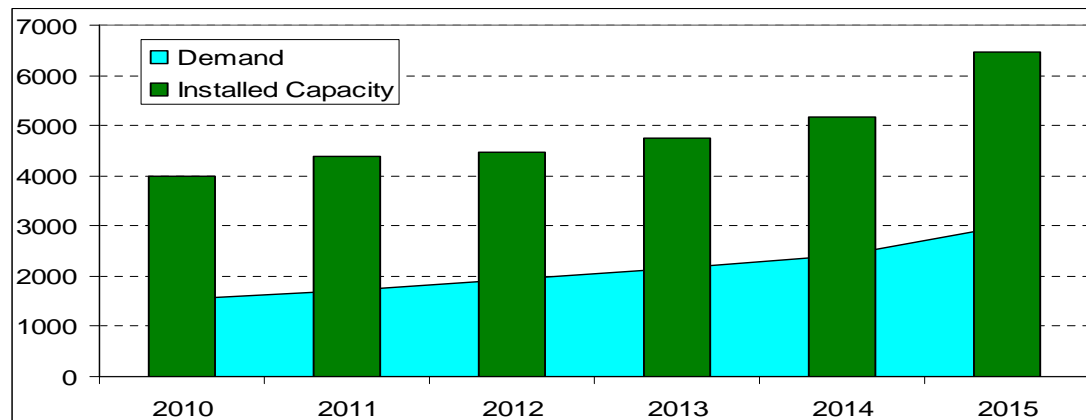
North-Base demand vs installed capacity



Reserved rates of installed Capacity vs. Peak Demand:

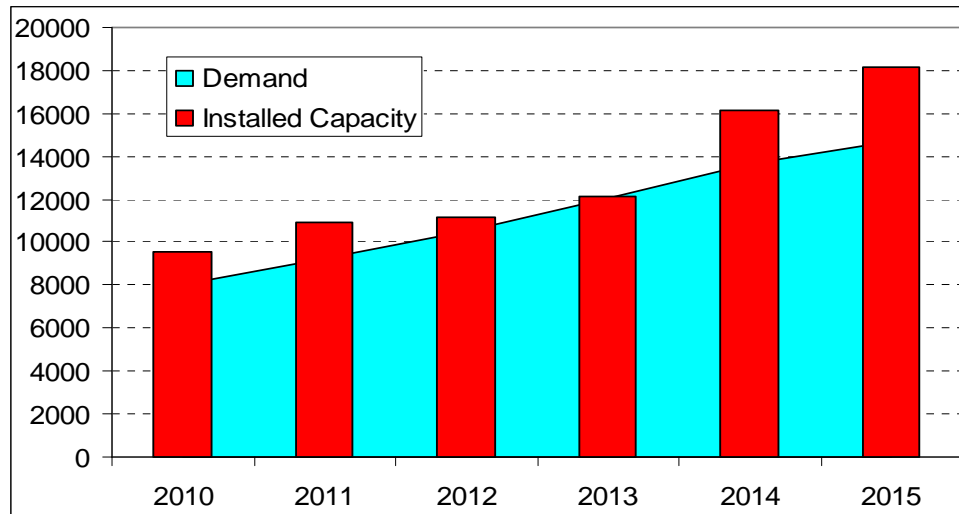
	<u>2012</u>	<u>2013</u>	<u>2014</u>
North	37.1%	30.6%	43.1%
Central	120%	118%	105%

central-Base demand



...imbalance regional power supply in short term

south-Base demand



Demand in the South shares 50-51% of whole country

Reserved rates of installed Capacity vs. Peak Demand:

	<u>2012</u>	<u>2013</u>	<u>2014</u>
North	37.1%	30.6%	43.1%
Central	120%	118%	105%
South-Base	no	no	18.8%
Country-Base	29.3%	27.7%	41.0%

=>High Capacity Flows from the North to the South (!)

7. the problems have to be solved in PDP VII

- **In short time: Imbalance of power supply among 3 regions**
- **Fuel supply to thermal power in the South (Coal, Gas)**
- **Security power supply in large city (Hanoi & Hochiminh city)**
- **Transmission from large power source to load centers**
- **Investment & mechanism for importing power from Lao & Cambodia**
- **Risk of implementation PDP**

thank you!