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MINISTRY OF ENERGY

Thailand's Power Development Plan 2015 (PDP 2015)

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Director General, Energy Policy and Planning Office

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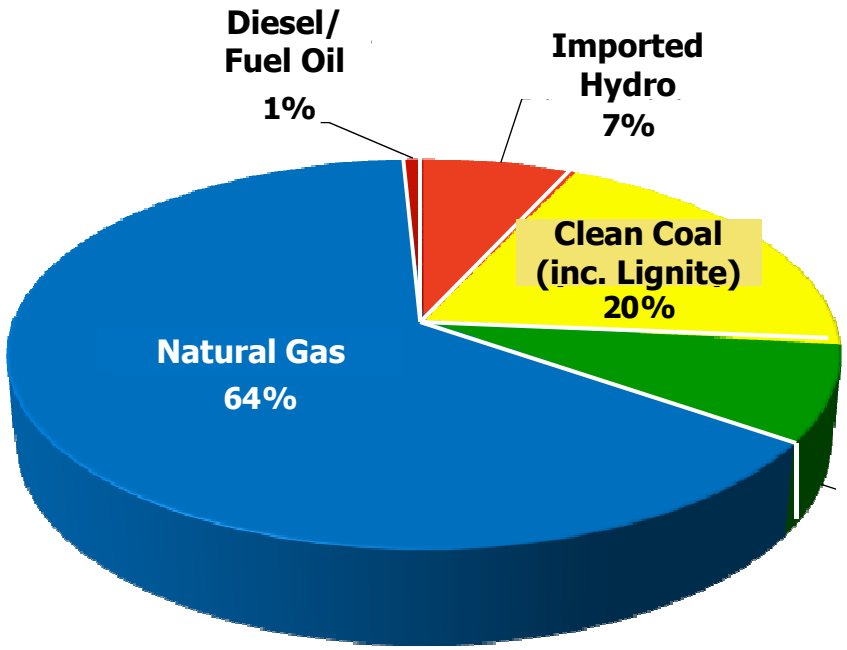
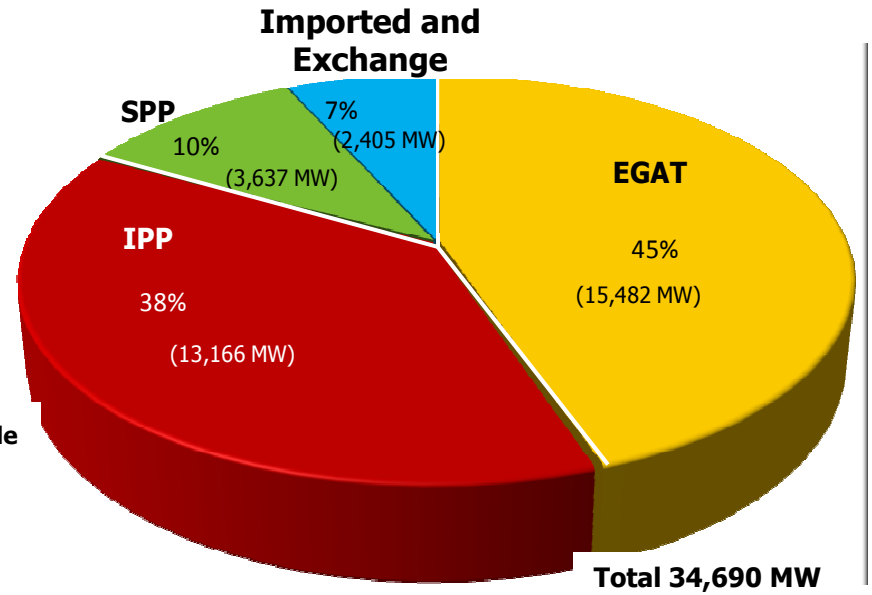
Current Power Generation Status

Power Generation by Fuel Type in 2014



Power Generation by Fuel Type



Power Generation by Producers

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PDP2015 Formulation Process

Sub-Comittee*

Principle and Process Determination for PDP 2015

Formulation of PDP 2015

Revision Process for PDP 2015

Propose to NEPC**

Open Public Hearing for PDP2015 Formulation Process

- **Bangkok**
  - 29 August 2014
  - Participants 817
- **Chiang Mai**
  - 16 September 2014
  - Participants 625
- **Khon Kean**
  - 10 September 2014
  - Participants 650
- **Suratthani**
  - 19 September 2014
  - Participants 556

Public Hearing for Drafted PDP2015

- **Focused Group**
  - 8 April 2015
  - Participants 161
- **Public Hearing**
  - 28 April 2015
  - Participants 557

*Sub-Committee on Load Forecast and Power Development Plan Formulation

**National Energy Policy Council

RATIONALE of the Formulation of PDP 2015

➢ Consideration Factors

1. Regional and Domestic economic situation which affect domestic energy consumption in Thailand such as Government's transportation infrastructure investment projects and the commencement of ASEAN Economic Community, AEC, in late 2015.

2. - National Energy Policy Council, NEPC, approved the Framework and Assumption as a principle for the formulation process of PDP2015 on the 22nd October 2014.

   - Formulation of PDP2015 in accordance with the National Economic and Social Development Plan

   - Integration with the formulation of Energy Efficiency Development Plan, EEDP, and Alternative Energy Development Plan, AEDP.

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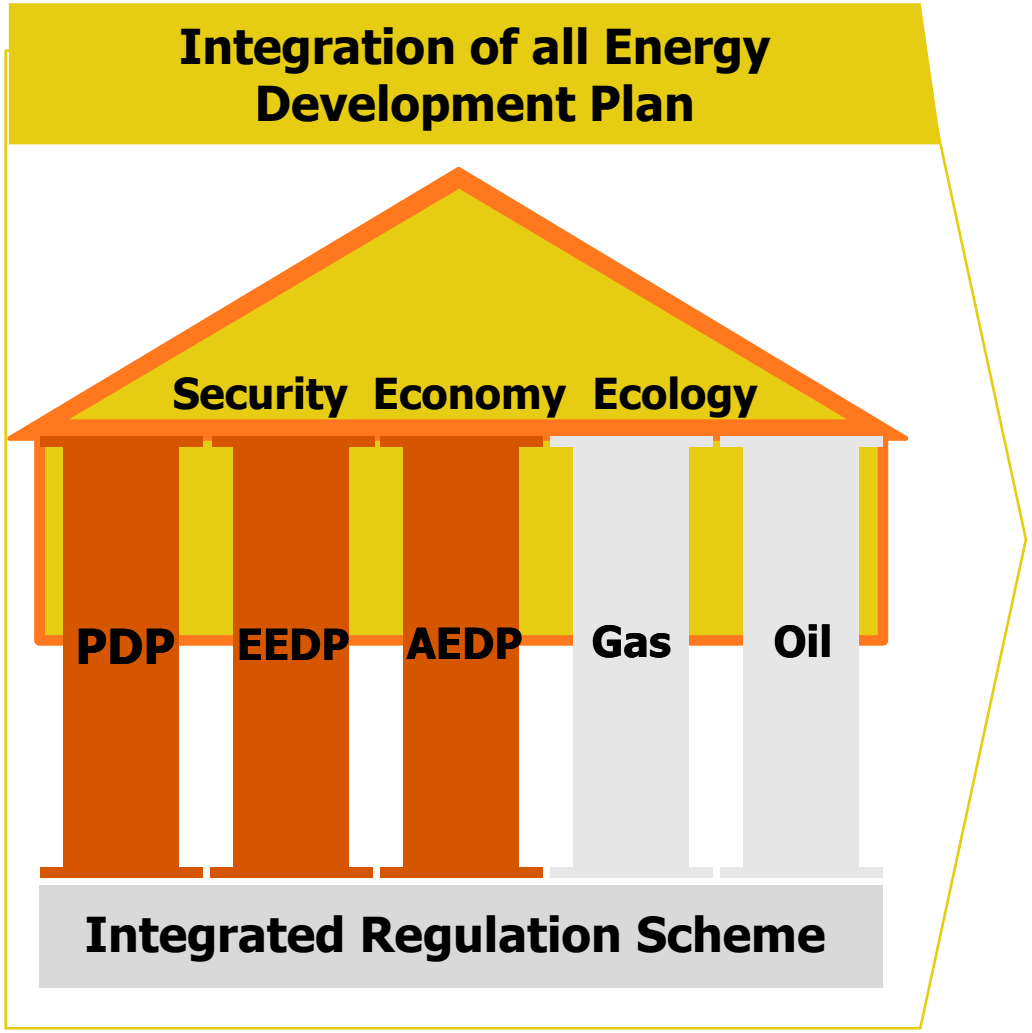
RATIONALE of the Formulation of PDP 2015

3. Main Objectives



1) Security

- Ensure the Security of all Power System Components
- Power Generation, Transmission and Distribution
- Fuel Diversification to reduce the risk of fuel dependency

2) Economy

- Appropriate determination of Power Tariff to reflect the primary cost

3) Ecology

Reduce / Minimize Ecological Impact to Environment and Community

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PRINCIPLE for the formulation of PDP2015

1. Fuel Diversification

- Reduce fuel dependence on Natural Gas
- Increase the fuel mixed proportion for Clean Coal Technology
- Higher proportion of Imported Power from Neighboring Countries
- Improved Renewable Energy Sources Percentage in fuel mix
- Nuclear Power Plant Projects at the end of PDP2015

2. Appropriate Reserve Margin at above 15 percent of peak power demand

3. Power System Infrastructure Investment Projects

- Transmission and Distribution Infrastructure to support the development of AEC and GMS power integration
- Development of Smart Grid Technology to optimize the integration of Renewable Energy Sources

4. Integration with EEDP and AEDP

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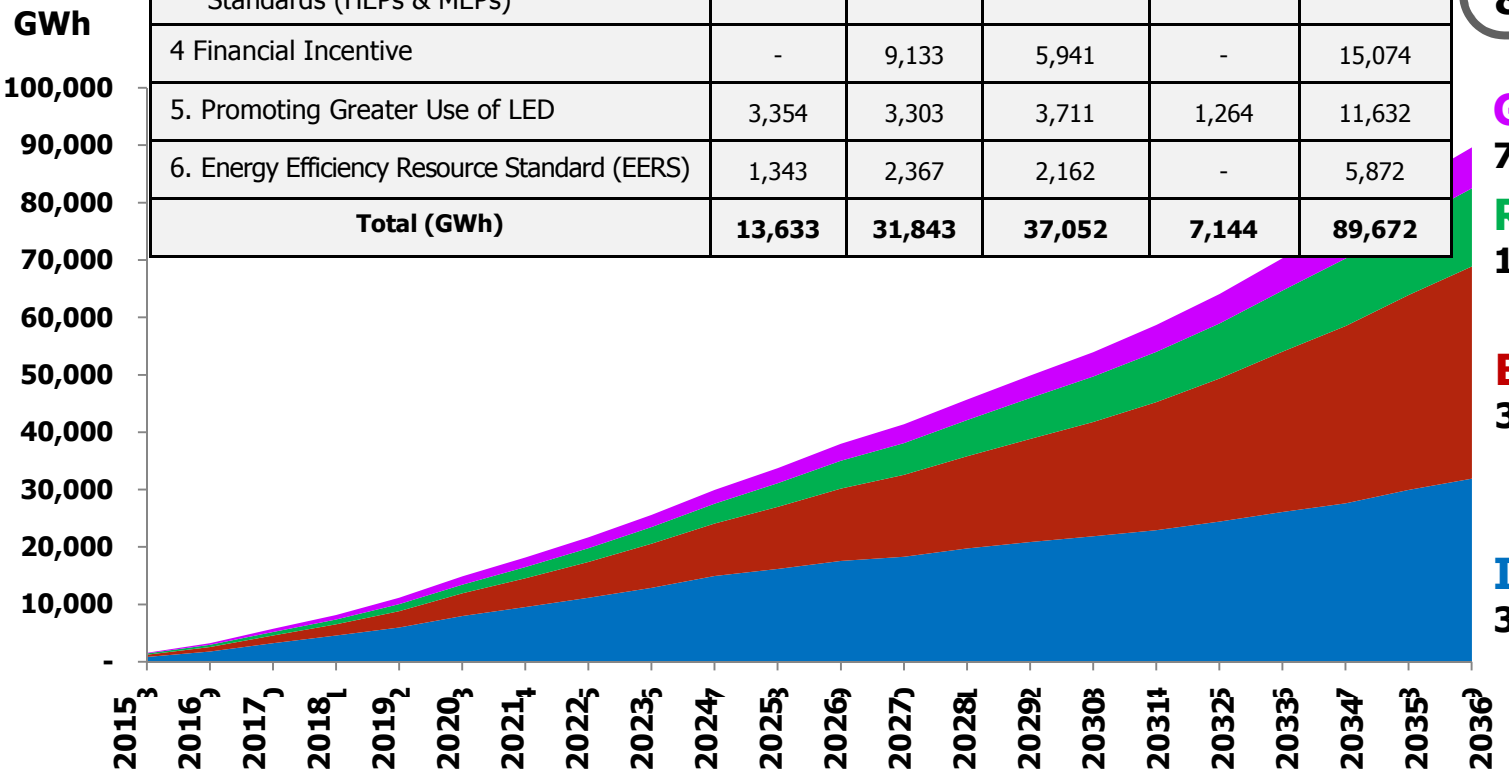
PRINCIPLE for the formulation of PDP2015

Energy Efficiency Target for Power Sector

Measure	Residential	Industrial	Business	Government	Total (GWh)
1. ENCON Act for Designated Factories and Buildings + Specific Energy Consumption	-	10,814	5,654	3,180	19,648
2. Building Energy Code (BEC)	-	-	11,975	1,711	13,686
3. High and Minimum Energy Performance Standards (HEPs & MEPs)	8,936	6,226	7,609	-	23,760
4 Financial Incentive	-	9,133	5,941	-	15,074
5. Promoting Greater Use of LED	3,354	3,303	3,711	1,264	11,632
6. Energy Efficiency Resource Standard (EERS)	1,343	2,367	2,162	-	5,872
Total (GWh)	**13,633**	**31,843**	**37,052**	**7,144**	**89,672**



89,672 GWh

Government
7,144 GWh (8%)

Residential
13,633 GWh (15%)

Business
37,052 GWh (41%)

Industrial
31,843 GWh (36%)

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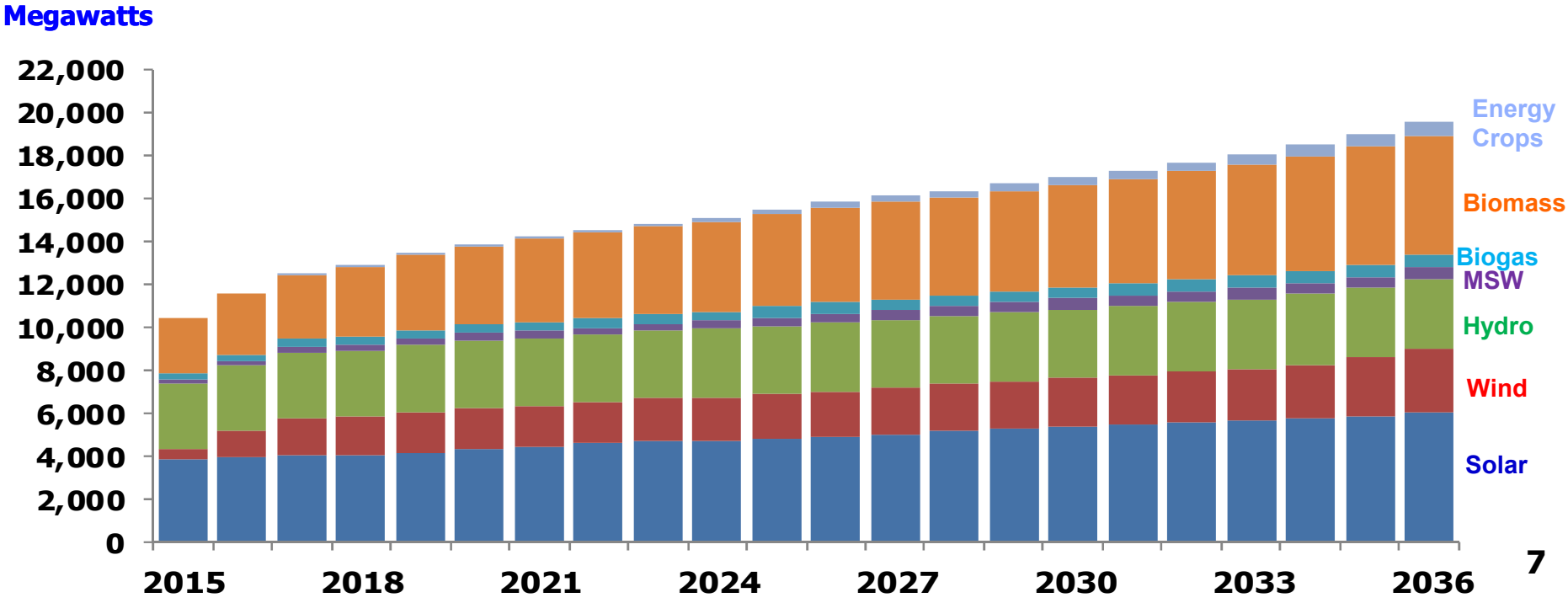
PRINCIPLE for the formulation of PDP2015

Alternative Energy Target

Type	Solar	Wind	Hydro	Mini Hydro (<12MW)	MSW	Biogas	Energy Crops	Biomass	Total
Installed Capacity 2014	1,298.5	224.5	2,906.4	142	65.7	311.5	-	2,541.8	7,490.4
Installed Capacity 2036	**6,000**	**3,002**	**2,906.4**	**376**	**500**	**600**	**680**	**5,570**	**19,634.4**



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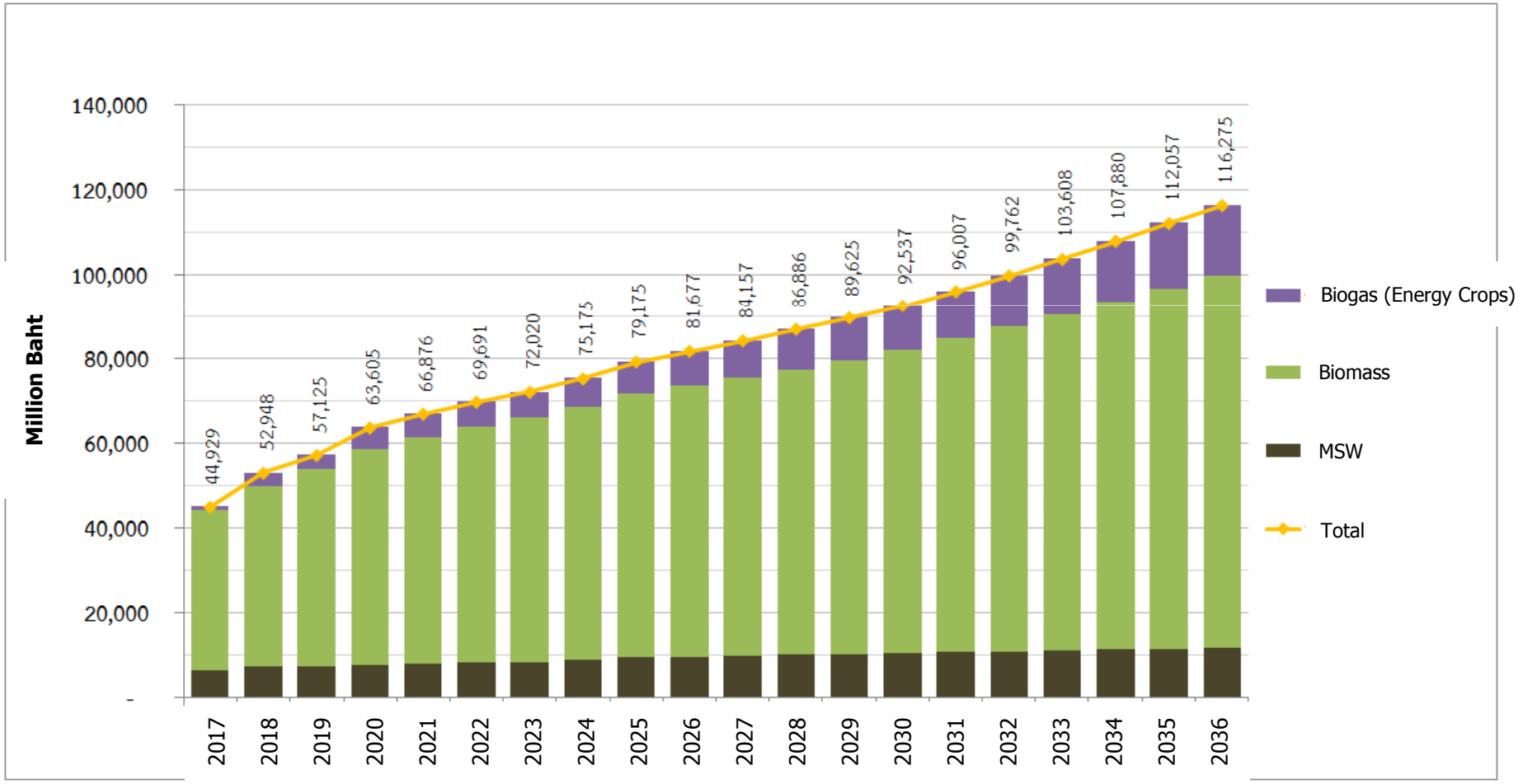
PRINCIPLE for the formulation of PDP2015

Benefit of RE fuel cost to community economy



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PRINCIPLE for the formulation of PDP2015

❖ Estimation of Fuel Mix for Power Generation in PDP2015

PDP 2015				PDP2010 rev3
Fuel Type	Sep 2014 (percentage)	2026 (percentage)	2036 (percentage)	2030 (percentage)
Imported Hydro	7	10-15	15 – 20	10
Clean Coal (inc. Lignite)	20	20-25	20 – 25	19
Renewable	8	10-20	15 – 20	8
Natural Gas	64	45-50	30 – 40	58
Nuclear	-	-	0 – 5	5
Diesel / Fuel Oil	1	-	-	-
TOTAL	100	100	100	100

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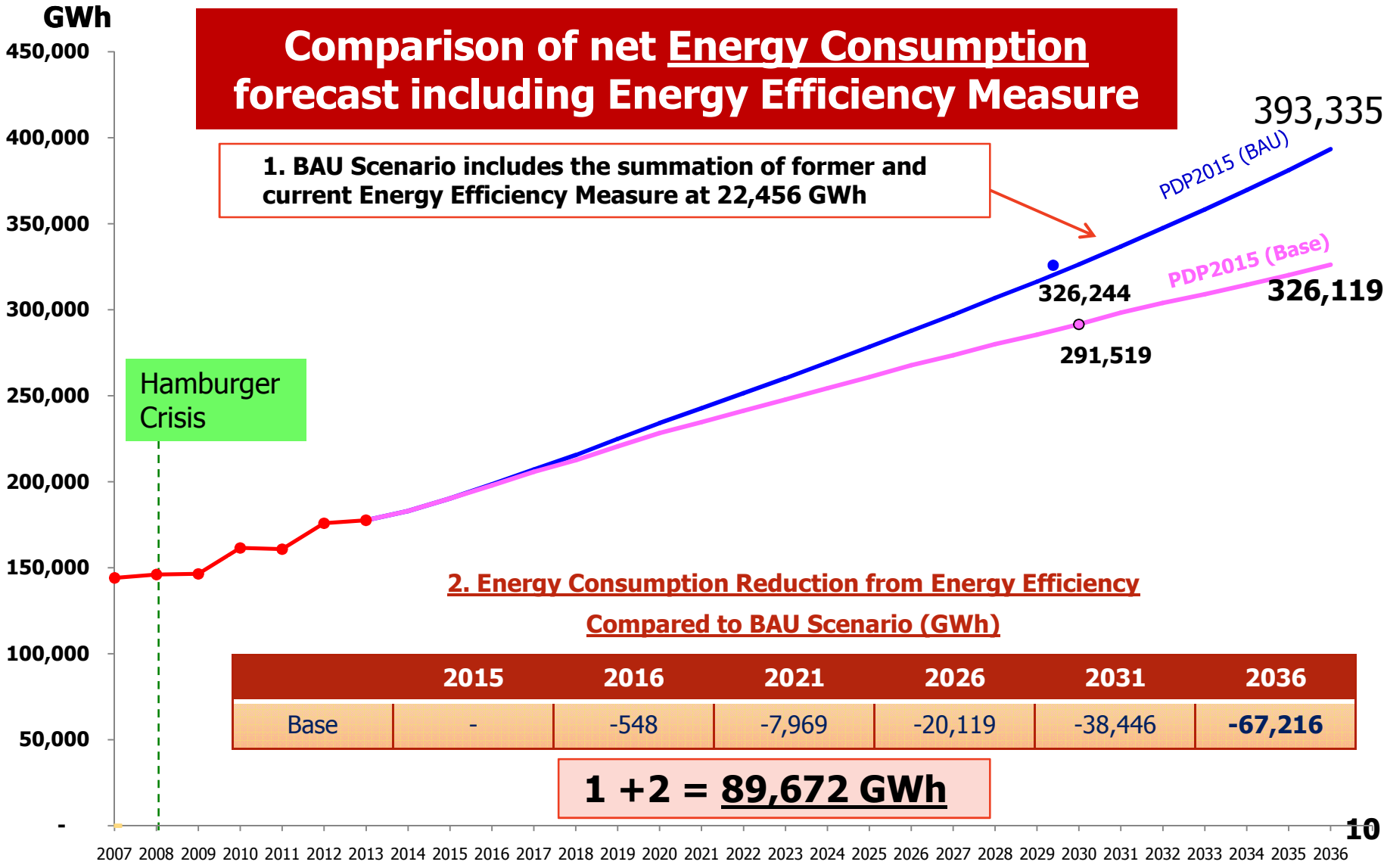
Summary of PDP2015

Load Forecast from 2015 - 2036



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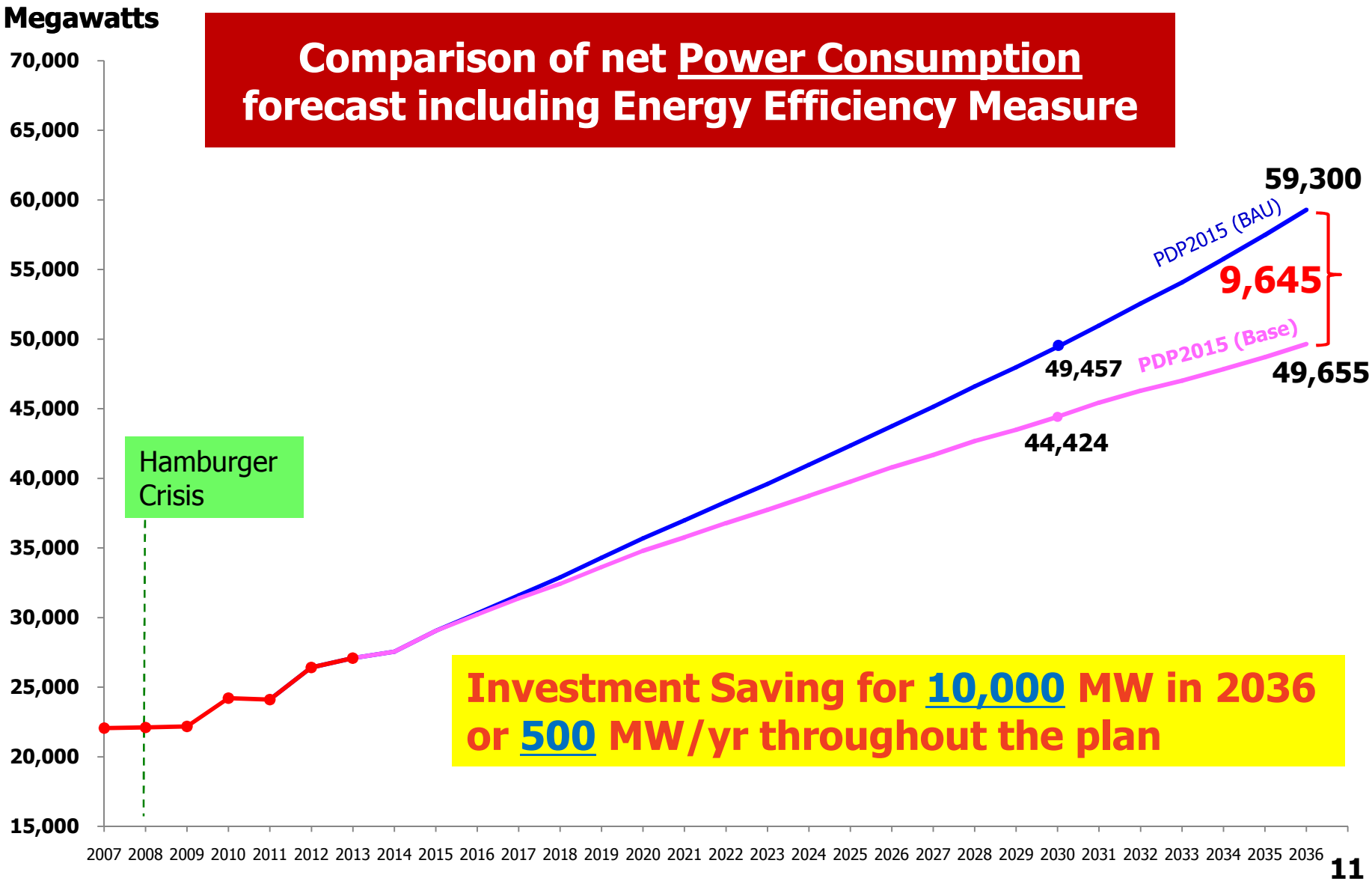
Summary of PDP2015

Comparison of net Power Consumption forecast including Energy Efficiency Measure



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Summary of PDP2015

Unit : Megawatts

Installed Capacity 2015-2036	PDP2015
Installed Capacity at the end of 2014	**37,612**
New Installed Capacity	**57,459**
Retired	**-24,736**
Installed Capacity at the end of 2036	**70,335**

New Installed Capacity 2015-2036	Total
Clean Coal Technology	7,390 (9 Plants)
Natural Gas	17,478 (15 Plants)
Nuclear	2,000 (2 Plants)
Gas Turbine	1,250 (5 Plants)
Cogeneration	4,119
Renewable	12,105
Pumped Storage Hydropower	2,101
Imported	11,016
TOTAL	**57,459**

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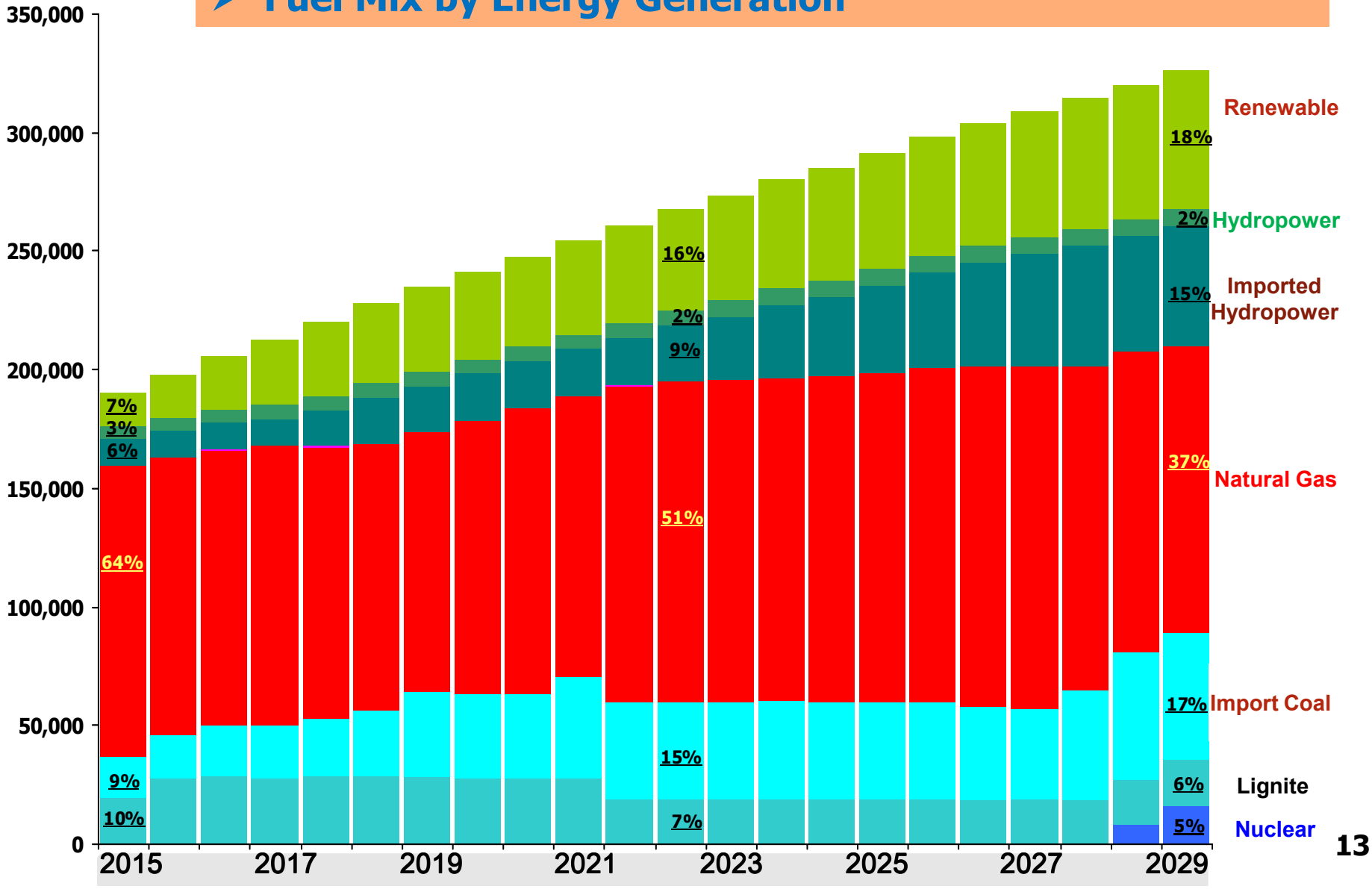
Summary of PDP2015

➢ Fuel Mix by Energy Generation



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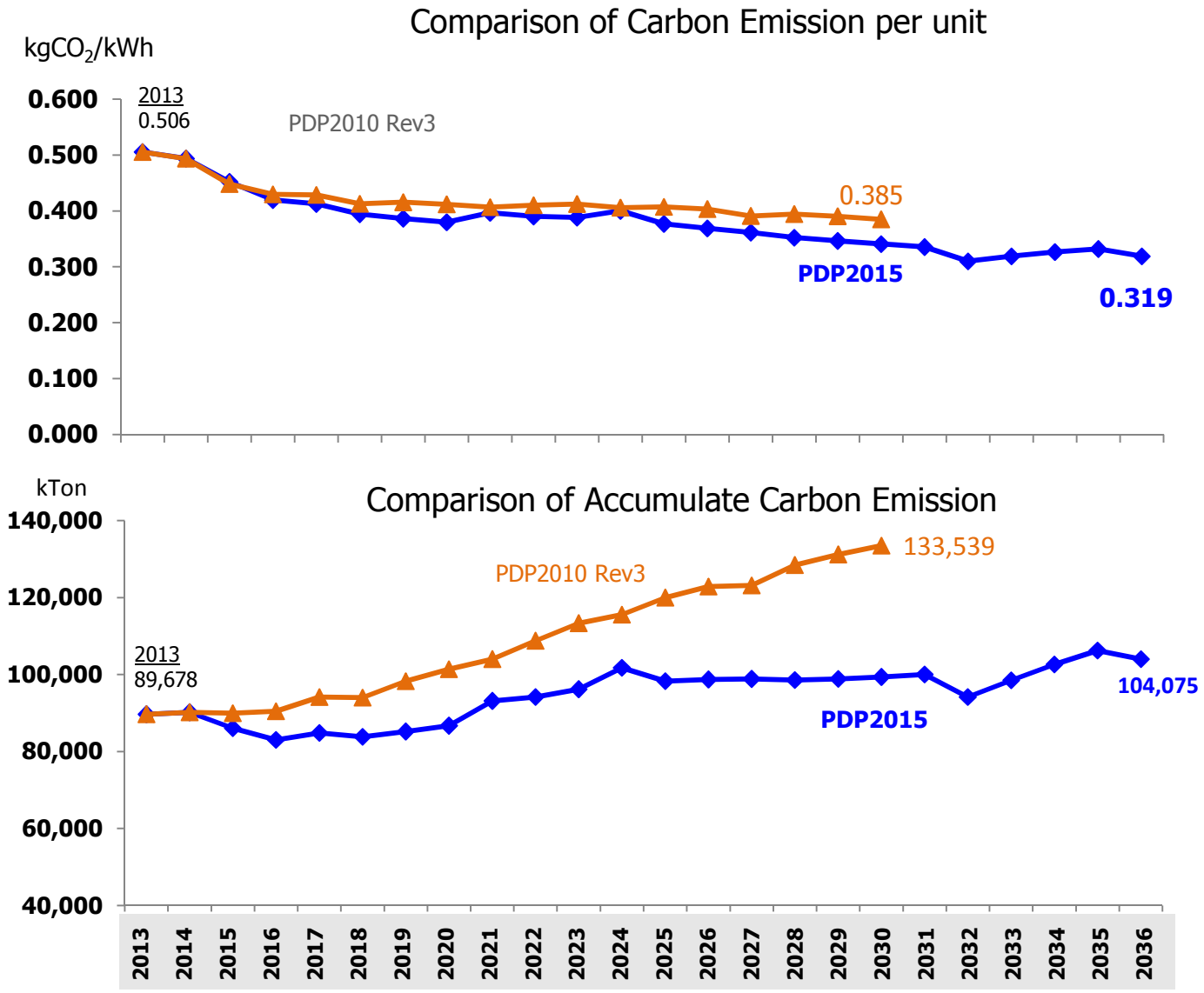
Summary of PDP2015

➢ Carbon Emission



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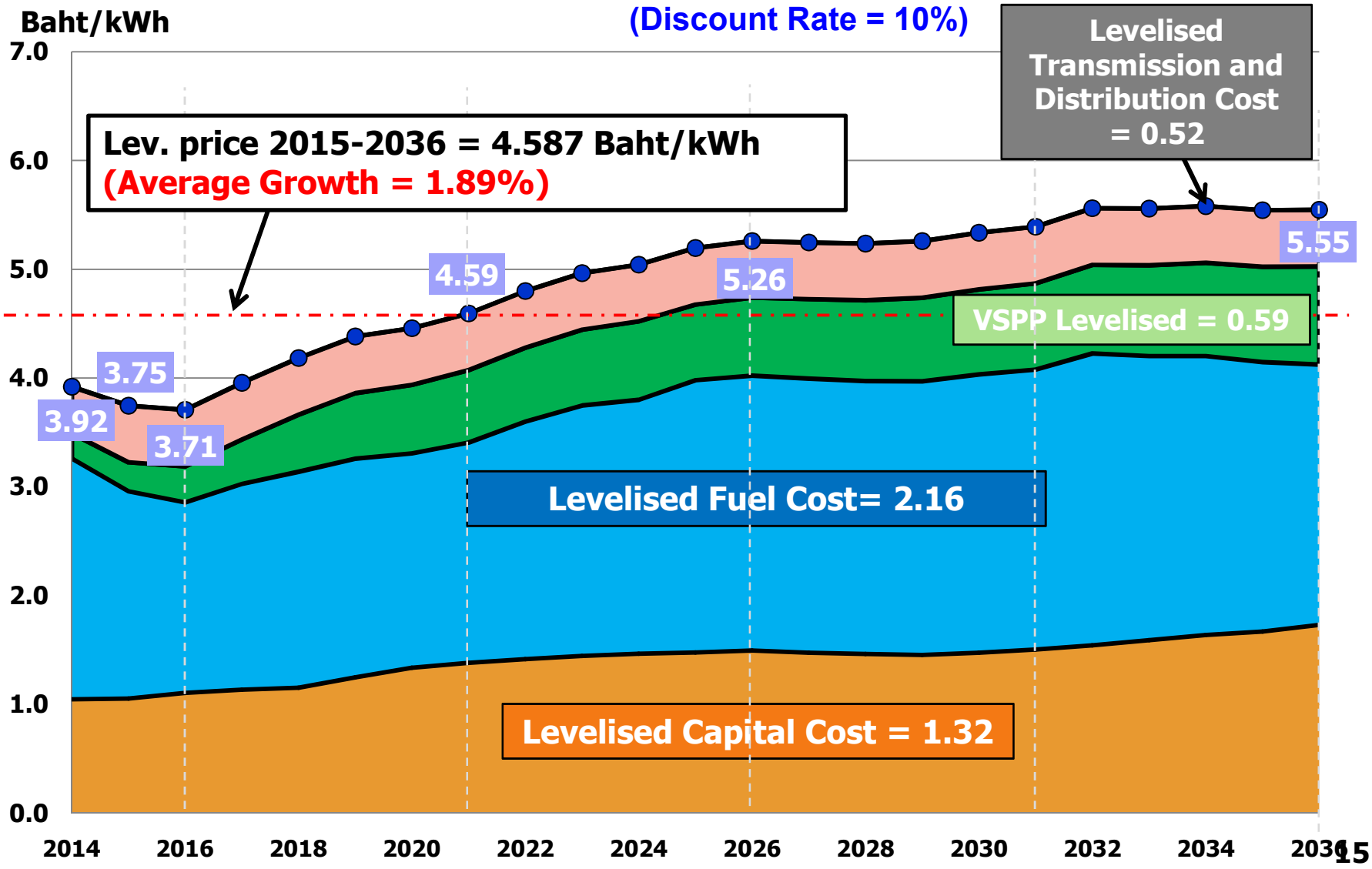
Summary of PDP2015

➢ Estimation of retailed power tariff



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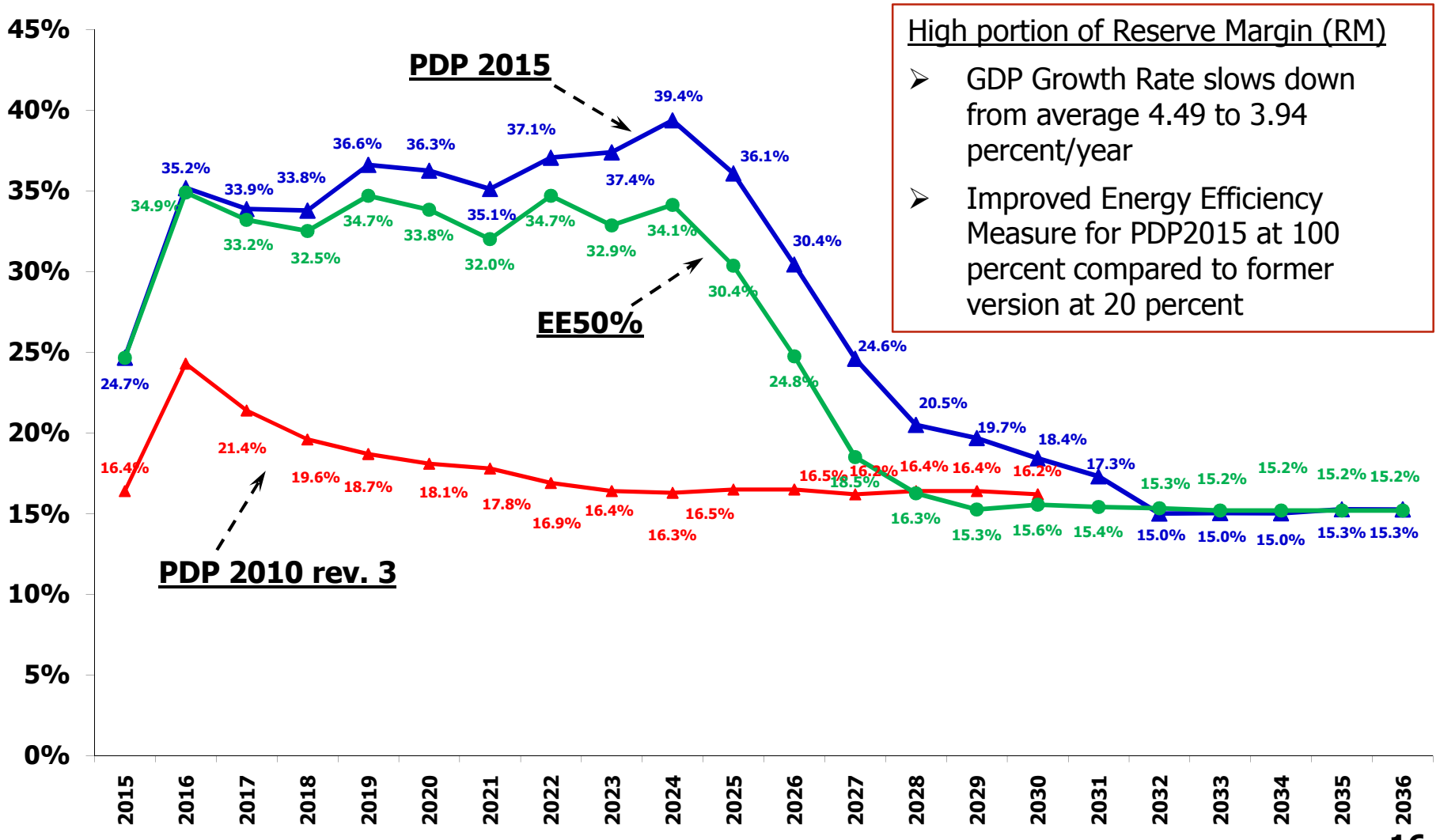
Summary of PDP2015

➢ Reserve Margin



High portion of Reserve Margin (RM)

- GDP Growth Rate slows down from average 4.49 to 3.94 percent/year
- Improved Energy Efficiency Measure for PDP2015 at 100 percent compared to former version at 20 percent

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Key Success factors from PDP2015

1. Key measure to decrease reserve margin is so difficult because many projects are binded from the previous PDP plan.

2. Emphasize on energy efficiency, renewable energy and fuel diversification to increase security and decrease environmental impacts, especially the global warming.

3. Retailed power tariff is appropriated reflecting the primary cost.

4. The Committee on Energy Policy Administration is assigned by the National Energy Policy Council, NEPC, to find out the measure to solve high reserve margin.

Thank you