

Sustainable Energy Policy Lao PDR

Power Sector Development

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BASIC FACTS ABOUT LAOS



1. Country: Centrally located in GMR Area = 236,800 km², Mountainous, land locked
2. Population: 5.6 million, 80% in rural areas, 2.6% annual Growth,
3. Economy:
Narrow base - resource exploitation
GNP per capita of US\$ 400,
GDP growth of 7% annually, 26.6% of GDP from industry and other remaining from Agriculture, and services sector
4. Hydropower Potential: over 23,000 MW.

47 % of Household electrified



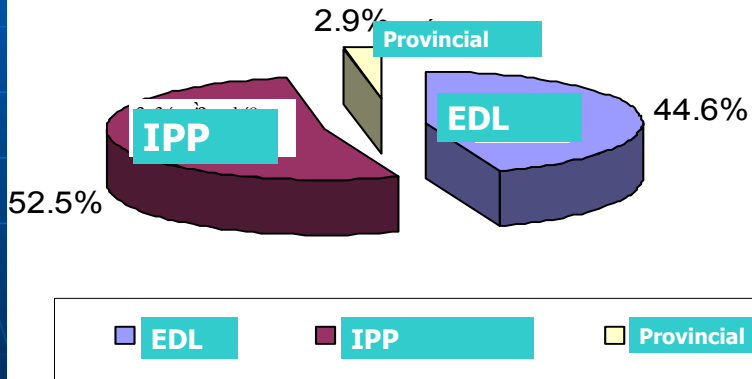
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0091-000-3100, www.mgsl.com

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Ownership of Generation

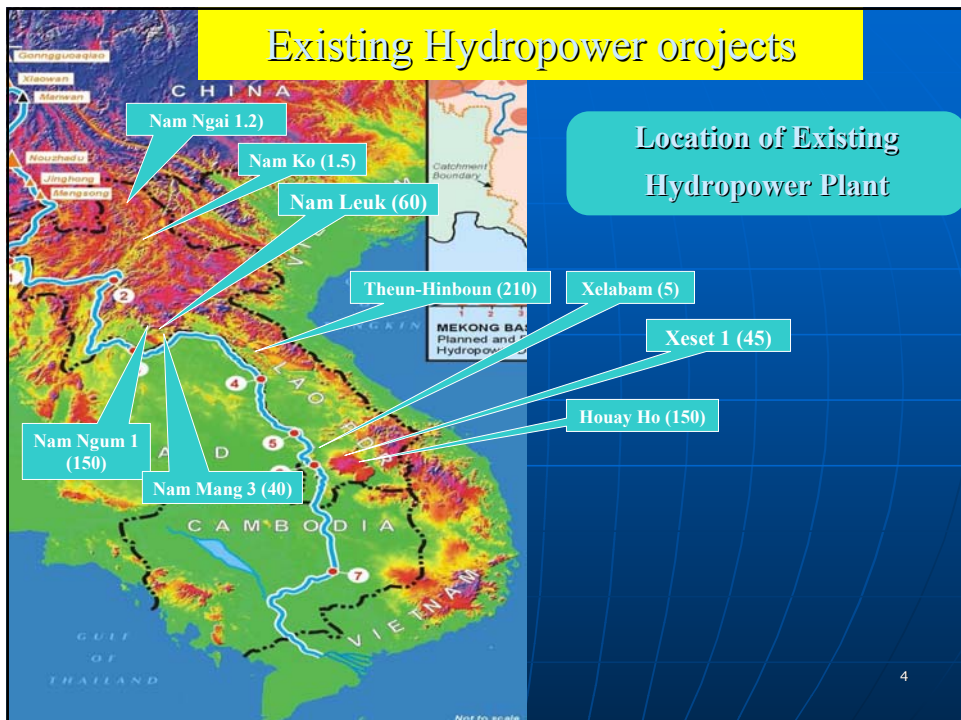
Installed Capacity: 690 MW: EdL 307.5 MW

IPP: 362.5 MW, Provincial: 20



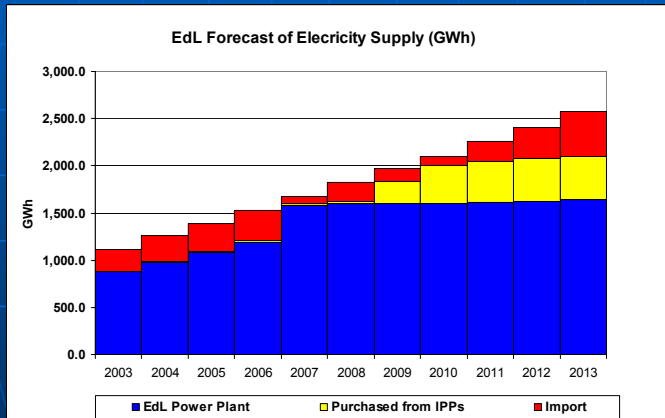
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Existing Hydropower projects



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ELECTRICITY DEMAND FORECAST



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ELECTRICITY DEMAND FORECAST

Table 3.2-1: Summary of Electricity Demand Forecast in Lao PDR

Description	Units	2003	2005	2010	2015	2020
Energy Consumption	(GWh)	1,101.7	1,608.7	2,684.1	3,650.8	4,854.7
Growth Rate	(%)		21.0	11.0	6.0	6.0
Peak Load	(MW)	232.3	328.3	510.7	694.6	923.6
Growth Rate	(%)		19.0	9.0	6.0	6.0
Load Factor	(%)	54.1	55.9	60.0	60.0	60.0

Table 2.7-1: Forecast of Incremental Demand in Lao PDR

Description	Units	2003-05	2003-10	2003-20
Additional Energy Consumption	(GWh)	507.1	1,582.5	3,753.0
Average growth per annum	(GWh)	253.5	226.1	220.8
Additional Peak Load	(MW)	96.0	278.4	691.4
Average growth per annum	(MW)	48.0	39.8	40.7

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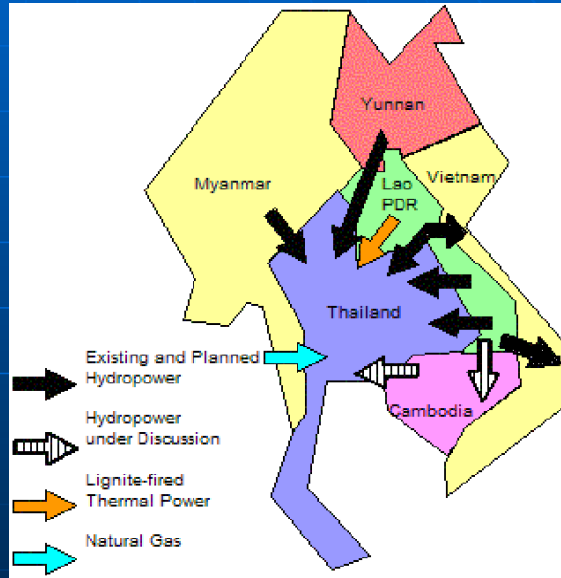
Potential Power Market

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Thailand –
principal
importer

Competition from:

- Myanmar
- China



Power Sector Policy

- Maintain and expand affordable, reliable and sustainable supply electricity to promote economic and social development
- Promote power generation for export to provide revenues to meet GOL development objectives
- Develop and enhance the legal and regulatory framework to effectively direct and facilitate power sector development
- Strengthen institutions and institutional structures and enhance the commercial function and streamline administration

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Objectives of the power development policy

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- **GOL aims to electrify 90% of households by 2020.**
- **GOL aims to electrify 70% of household by 2010**
- **GOL aims to electrify 45% of household by 2005**

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Objectives of the power development policy

- ✗ Provide a source of foreign exchange to fund economic and social development and alleviate poverty;
- ✗ Meet the commitments specified in intergovernmental MOUs with Thailand, Vietnam and Cambodia;
- ✗ Expand the customer base through grid extensions and satisfy growth in domestic demand;

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Objectives of the power development policy (Con't)

- **Explore and exploit mutually beneficial cross border exchanges of electricity with neighbouring countries of the sub-region.**
- **Extend off-grid rural electrification to promote better socio-economic conditions within isolated communities.**
- **Tariff policy support the move to cost recovery pricing over a period of time. Transparency and predictability in electricity pricing will assist present and potential developers and lenders in making informed decisions about electricity investment.**

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GOL POLICY ON FOREIGN INVESTMENT in Power Sector

- Hydropower capacity to date has been funded by bilateral and multi lateral funding agencies
- Small & medium sizes for Domestic needs
- Large scale for export
- To honor MOUs there is a need for private sector financing using BOT type mechanisms
- The GOL is willing to share risk and reward on an equitable basis
- GOL support GMS Power Trade & Interconnections
- GOL support ASEAN Grid

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INVESTMENT INCENTIVES

- *Income Tax*
- *Profit Tax*
- *Tax Holidays*
- *Return on Investment*
- *Repatriate of Capital / Dividend*
- *No nationalization of private properties*

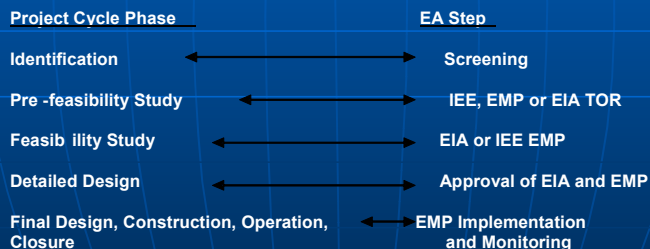
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EA Process in Power Sector

Article 6: Timing of the EA Process during the Project Cycle

(1) The EA process shall be integrated into the project planning activities and the project cycle as soon as the principle features of the proposed project and its environmental impacts can be conceptualized.

(2) Unless there are special circumstances, the EA process steps should occur at the following stages of the project cycle:



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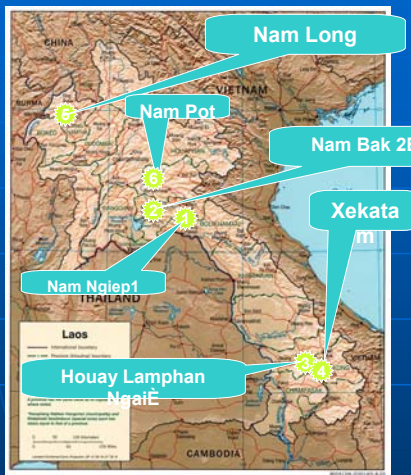
Domestic Generation 2006CE2010



1. Xeset 2 (76MW/ 309 GWh),
2. Viengphoukha Lignite Power Plant (50 MW/225 GWh)
3. Nam Sim 7.8 MW/34 GWh,
4. Nam Beng (20MW/67 GWh),
5. Nam Theun 2 off take (75 MW/275 GWh)
6. Nam Lik1/2 100 MW/347GWh
7. Xepone 3 (75 MW/301 GWh)

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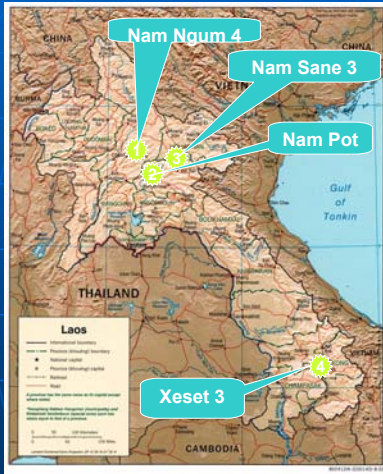
Domestic Generation 2011CE2015



1. Nam Ngiep 1 offtake 16 MW/200 GWh
2. Nam Bak 2B 116 MW/ 563 GWh
3. Houay Lamphan Ngai 60MW/ 354 GWh
4. Xekata 60MW/210 GWh
5. Nam Long 11MW/ 53 GWh
6. Nam Pot 20 MW/105 GWh

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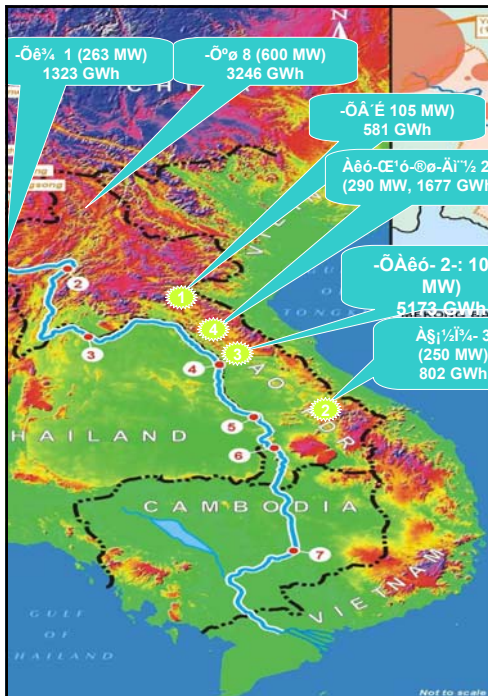
Domestic Generation 2016CE2020



1. Nam Ngum 4 (54 MW/267Gwh)
2. Nam Pot (20 MW/105 GWh)
3. Nam Sane 3 (30 MW/285 GWh)
4. Xeset 3 (20 MW/69 GWh)

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Export Plan up to 2010



1. Nam Mo (105MW/581 GWh)
2. Xekaman 3 (250 MW/ 298 GWh)
3. Nam Theun 2(1088MW/5173)
4. Nam Thuen-Hinboun Extension 2 (290 MW/1677 GWh)

1 (263 MW)
1323 GWh

8 (600 MW)
3246 GWh

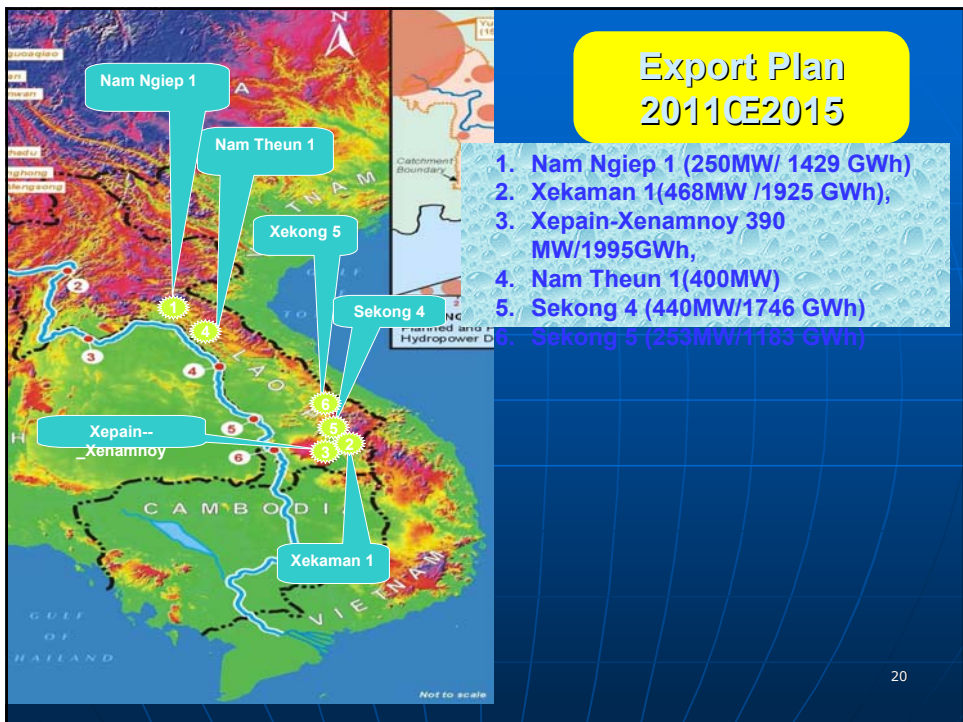
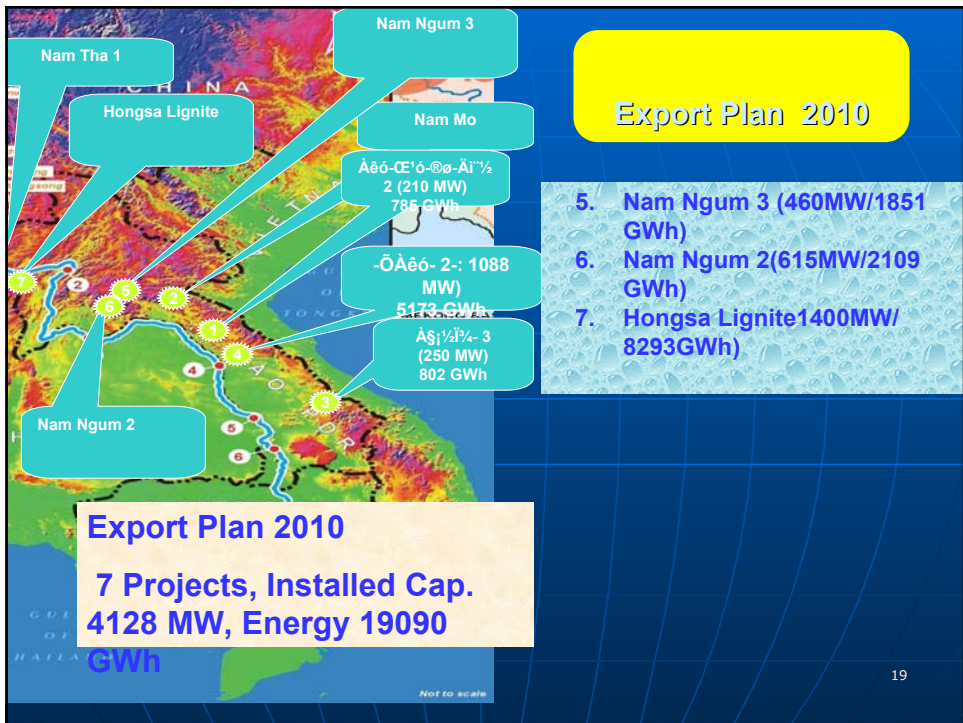
105 MW)
581 GWh

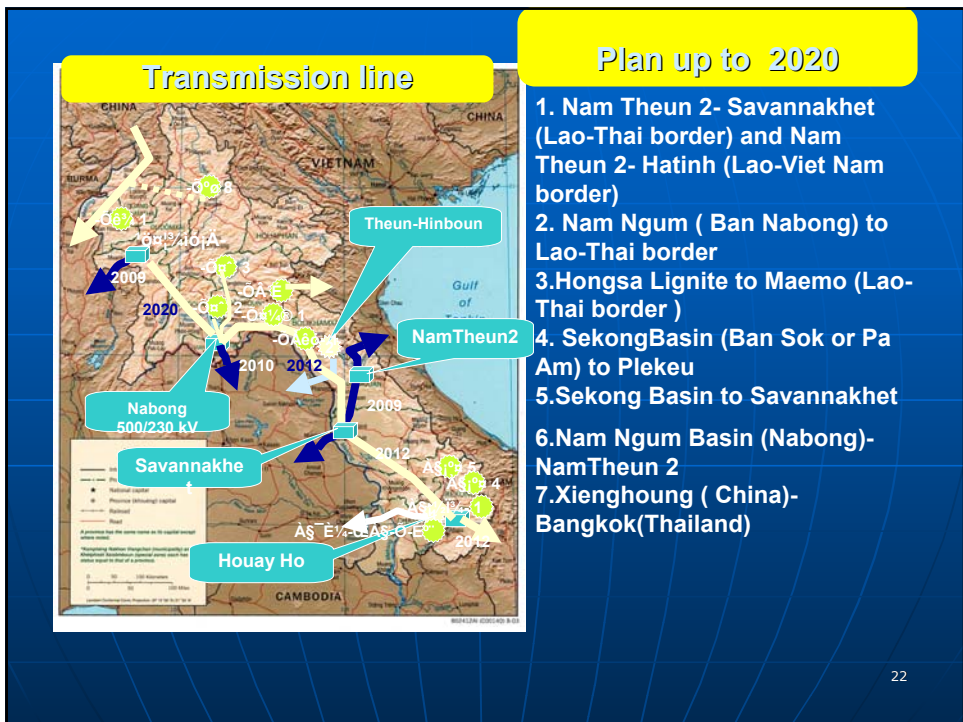
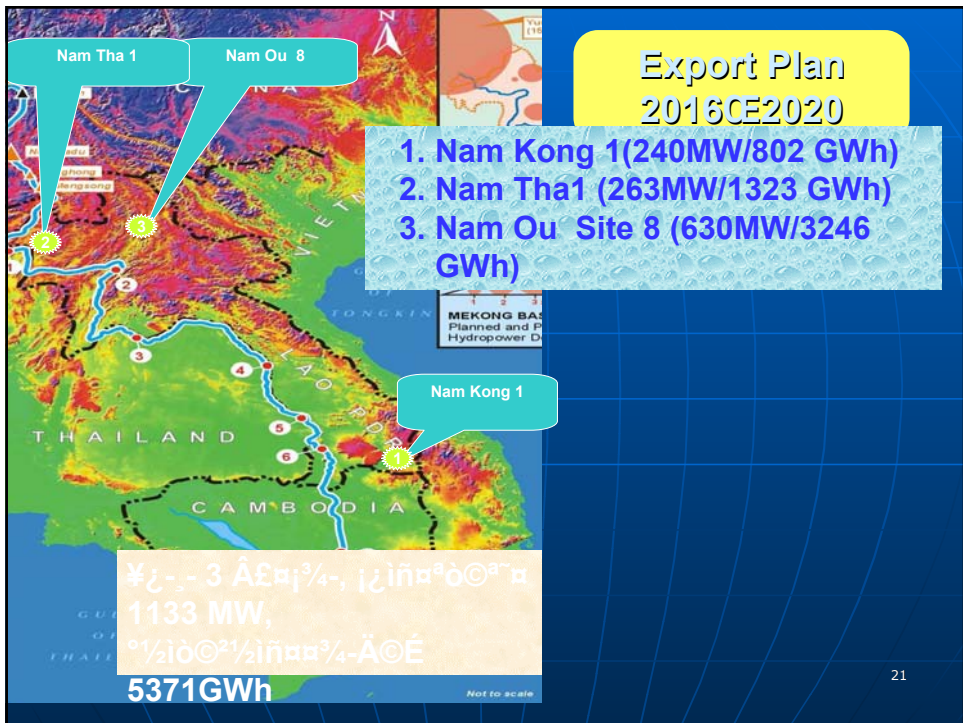
2
(290 MW, 1677 GWh)

2-: 1088
MW)
5173 GWh

3
(250 MW)
802 GWh

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ASEAN Interconnection Master Plan Study (AIMS)

Background

- **ASEAN Vision 2020**
 - Establishment of ASEAN Power Grid
 - Establishment of interconnecting arrangement in the field of energy for electricity and natural gas through the APG and the TAGP projects

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Background

Establishment of AIMS WG.

AIMS WG. was formed during the 16th Meeting of the Forum of HAPUA in April 2000, Chiang Rai, Thailand

The objective is to conduct and formulate an indicative Master Plan on Power Interconnections in the ASEAN countries

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Background

Composition of the WG.

Member of the ASEAN Interconnection Master Plan Study Working Group

- | | |
|-----------------------------|--|
| 1. Brunei Darussalam | : Mr. Robin Yong |
| 2. Cambodia | : Mr. Chan Sodavath |
| 3. Indonesia | : Mr. Eden Napitupulu
Mr. Prianda |
| 4. Lao PDR | : Mr. Davong Phonenekeo
Mr. Boun Oum Syvanpheng |

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Background

Composition of the WG. (Contd.)

Member of the ASEAN Interconnection Master Plan Study Working Group

- | | |
|---------------------------|---|
| 5. Malaysia | : Mr. Charanjit Singh
Mr. Zainudin Yusof |
| 6. Myanmar | : U Aung Khaing |
| 7. The Philippines | : Mr. Rizalino Santos |
| 8. Singapore | : Mr. Soh Siew Cheong |

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Background

Composition of the WG. (Contd.)

Member of the ASEAN Interconnection Master Plan Study Working Group

9. Thailand : Mr. Prutichai Chonglertvanichkul
Mr. Varavoot Siripol
10. Vietnam : Dr. Nguyen Manh Hien
Mr. Nguyen Van Vy

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Terms of Reference

Coverage of Study

AIMS shall cover all the ten ASEAN member countries:

Brunei Darussalam	Cambodia
Indonesia	Lao PDR
Malaysia	Myanmar
Philippines	Singapore
Thailand	Vietnam

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Terms of Reference

Objective

To formulate an ASEAN Interconnection Master Plan that will facilitate economic generation and transmission of electricity, enhance security of power system and provide opportunities for future energy trading among ASEAN member countries.

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Terms of Reference

Scope of Work

- a) Review of the Existing Studies**
- b) Review of the Existing Practices and Technical Coordination**
- c) Assessment of ASEAN Demand and Supply**
- d) Optimization of The Interconnection Plan**
- e) Regulatory and Commercial Issues**

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Terms of Reference

Duration

AIMS shall be completed within two years from July 2000.

The AIMS was later agreed to extend the completion date to be **March 2003**.

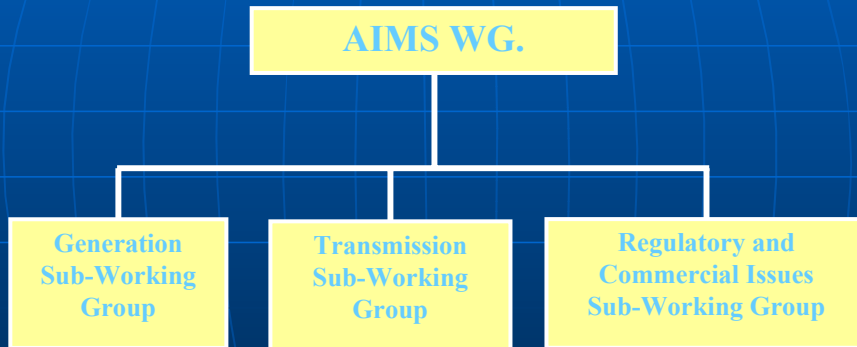
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Work Plan of AIMS

- Total 11 Meetings of Working Group for technical discussions
- Demand forecasting
- Generation development plan studies
- Transmission network development studies
- Economic evaluation studies
- Regulatory and commercial issues studies
- Formation of Sub-Working Groups

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Sub Working Groups

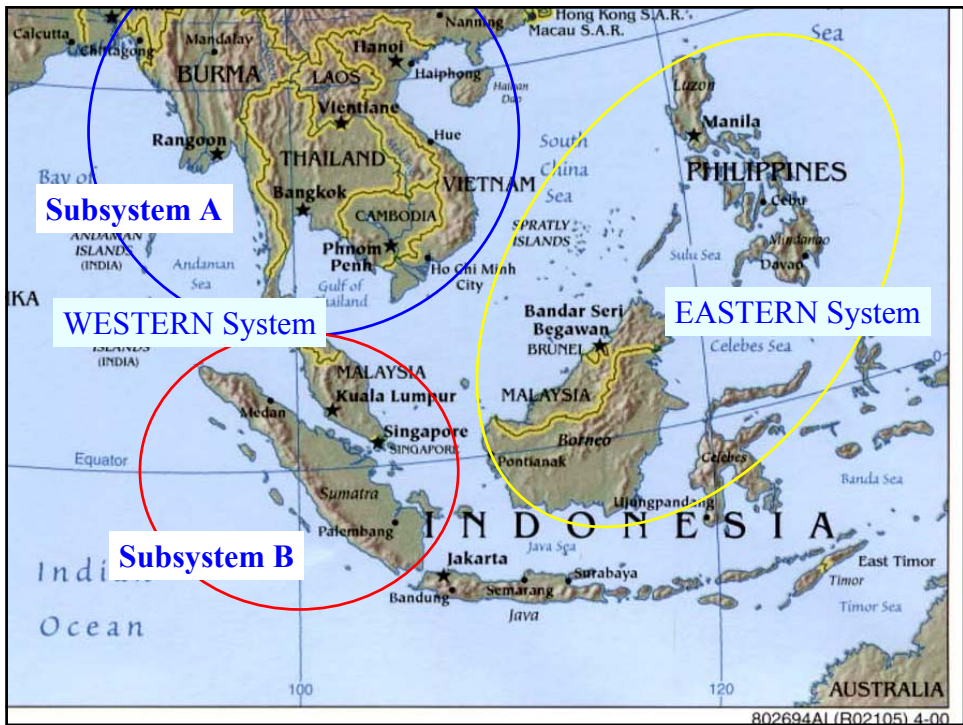


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Expected Benefits

- Peak Load Reduction
- Reserve Cost Reduction
- Operating Cost Reduction
- Increase Reliability

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GMS Countries
 Cambodia, Lao PDR, Myanmar, Thailand,
 Vietnam

GMS Countries

Demand Forecast (MW)

	<i>Cambodia</i>	<i>Lao PDR</i>	<i>Myanmar</i>	<i>Thailand</i>	<i>Vietnam</i>
2000	70	169	N/A	14,918	4,477
2001	71	198	N/A	16,184	4,988
2002	81	233	N/A	17,388	5,576
2003	95	279	N/A	18,587	6,250
2004	140	301	N/A	19,913	7,006
2005	180	325	N/A	21,222	7,838
2006	223	348	N/A	22,552	8,650
2007	293	372	N/A	23,951	9,552
2008	346	399	N/A	25,450	10,574
2009	398	429	N/A	27,232	11,716
2010	446	459	N/A	28,912	12,982
2011	500	488	N/A	30,587	14,236
2012	547	519	N/A	32,405	15,638
2013	623	551	N/A	34,352	17,166
2014	707	586	N/A	36,366	18,814
2015	809	623	N/A	38,519	20,703
2016	981	658	N/A	40,699	22,638
2017	1,122	695	N/A	42,852	24,826
2018	1,280	733	N/A	45,151	27,104
2019	1,466	774	N/A	47,525	29,646
2020	1,679	818	N/A	49,975	32,335
Avg Annual Inc (%)	10.40	17.22	8.20	N/A	6.23

GMS Countries

Existing and Committed Interconnections

- **Cambodia purchases from Vietnam**
 - Power Purchase 80.0 MW (2003)
 - Power Purchase 120.0 MW (2006)
- **Thailand purchases from Lao PDR**
 - Theun Hinboun (Hydro) 214.0 MW (1998)
 - Huoy Ho (Hydro) 126.0 MW (1999)
 - Nam Theun 2 (Hydro) 940.0 MW (2008)
 - Nam Ngum 2 (Hydro) 615.0 MW (2008)
 - Nam Ngum 3 (Hydro) 460.0 MW (2008)
 - Xekaman 1 (Hydro) 468.0 MW (2010)
 - Xepien-Xenamnoi (Hydro) 390.0 MW (2010)
 - Hongsa (Lignite) 720.0 MW (2010)

GMS Countries

Existing and Committed Interconnections (Cont.)

- **Thailand purchases from Myanmar**

Power Purchase	1500.0 MW	(2013)
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- **Vietnam purchases from Lao PDR**

Nam Mo	(Hydro)	100.0 MW	(2007)
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Xekaman 3	(Hydro)	218.0 MW	(2012)
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Nam Kong 1	(Hydro)	240.0 MW	(2012)
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Sekong 4	(Hydro)	440.0 MW	(2014)
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Nam Theun 1	(Hydro)	400.0 MW	(2014)
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Sekong 5	(Hydro)	253.0 MW	(2015)
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Nam Theun 3	(Hydro)	236.0 MW	(2016)
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GMS Countries

Results

Selected Plans

- **Power Purchase:**

Myanmar-Thailand	1,500 MW
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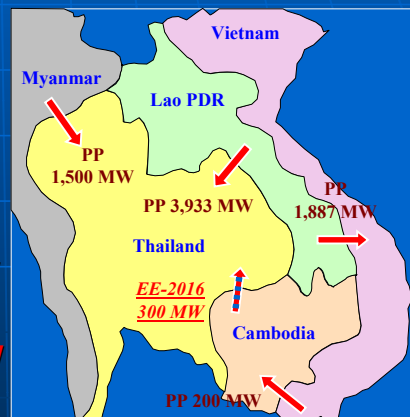
Laos-Thailand	3,933 MW
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Laos-Vietnam	1,887 MW
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Vietnam-Cambodia	200 MW
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- **Energy Exchange:**

Cambodia-Thailand	300 MW
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Thank you