
สำนักงานนโยบายและแผนพลังงาน
ENERGY POLICY AND PLANNING OFFICE

สำนักงานนโยบาย
และแผนพลังงาน
กระทรวงพลังงาน

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Forum for Nuclear Cooperation in Asia (FNCA)
The 4nd Panel Meeting

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Nuclear Power Program
Development Office
MINISTRY OF ENERGY

Outline

1 Overview

2 Thailand's Nuclear Power Program

3 Challenges in Asian Countries

4 NPP HRD of Thailand

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Overview

2007

- Incorporate Nuclear Power Plant in Thailand Power development Plan : PDP 2007
- **2,000 MW : 1st NPP 1,000 MW in Dec 2020, 2nd one 1,000 MW in Dec 2021**

Mar 2010

- PDP 2010 Rev. 3 (2010-2020) approved by the Cabinet in Mar 2010
- **5,000 MW from NPP, each 1,000 MW in 2020, 2021, 2024, 2025 and 2028**

Dec 2010

- First IAEA INIR Mission
- Focus on Phase 1

Mar 2011

- March 11, accident in Fukushima Daiichi Nuclear power plant
- Thai Government postponed NPP Project for 3 years

Jun 2012

- PDP Rev.3 : the new government postpone the NPP Project for other 3 years
- **2,000 MW from NPP with operation in 2026 and 2027**

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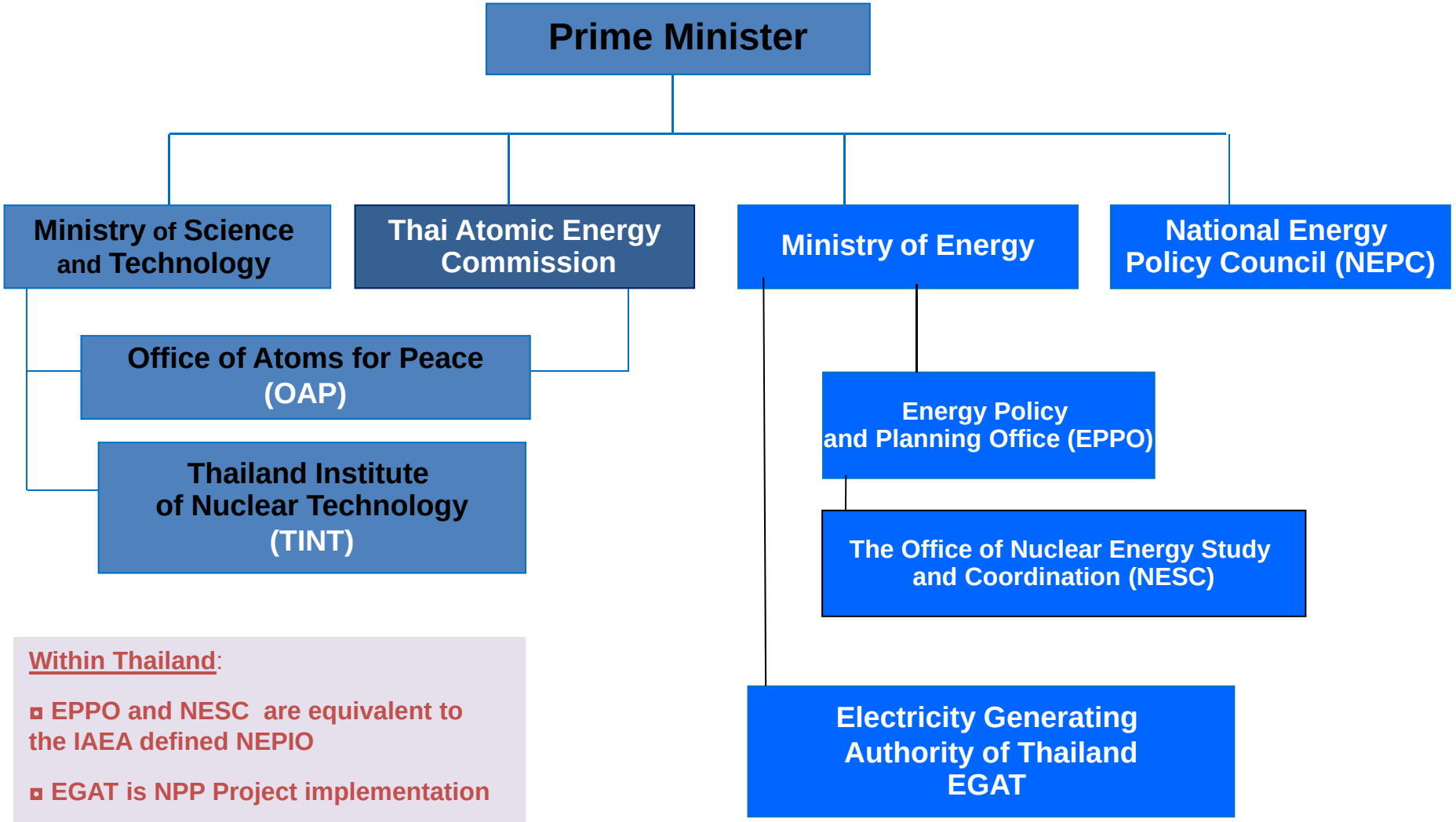
Current Status on NPP Thailand Schedule

The program is being pursued in accordance with the guidance of the International Atomic Energy Agency (IAEA).

Phase	Duration	Old Schedule	New Schedule
Preliminary	1 year	2007	-
Pre-Project Activities Government Approval to Proceed	3 years	2008 – 2010	- Postpone for 6 years
Program Implementation	3 years	2011 – 2013	2016-2019
Construction	6 years	2014 – 2019	2020-2025
Commercial Operation for 1st unit		December 2020	December 2026

Organization dealing with NPP



Within Thailand:

- EPPO and NESC are equivalent to the IAEA defined NEPIO
- EGAT is NPP Project implementation
- OAP is NPP regulatory body

Current Status on Nuclear Power Program

The Nuclear Power Program in Thailand is in the end of Phase 1 activity,

- **The readiness report is already prepared and waiting for cabinet approval.**
- **The review of the Status of the National Nuclear Infrastructure in Thailand has been done and the final report has been submitted to the Ministry of Energy on May 18, 2011.**
- **Overall a lot of work in phase 1 has been done using the IAEA documents**
- **EPPO and the Office of Nuclear Energy Study and Coordination will be responsible for coordinating with related organizations on implementing the program in Phase 2**

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Current Status on Nuclear Power Program

To revise report and plan on Thai Nuclear Power Program during 3 years postponement period based on:

- **Revision of "siting" selection criteria;**
- **Revision on cost as well as social and environmental friendly to confirm economic benefit of nuclear power plant;**
- **Revision on nuclear power plant safety in coping with lesson learned from "Fukushima Daiichi" accident.**

Current Status on Nuclear Power Program Program

- **Activities on Legal improvement and preparation on international protocols alliances will be continuously followed up.**

- **Provision of knowledge through medias will have to be implemented based on truth and facts with formal reference.**

- **Other improvement on contents in provision of public knowledge and participation programs include national energy security necessity, energy source selection and criteria, Scale and benefit from surrounding plant fund, emergency and mitigation plan as well as its practicability and stakeholders.**

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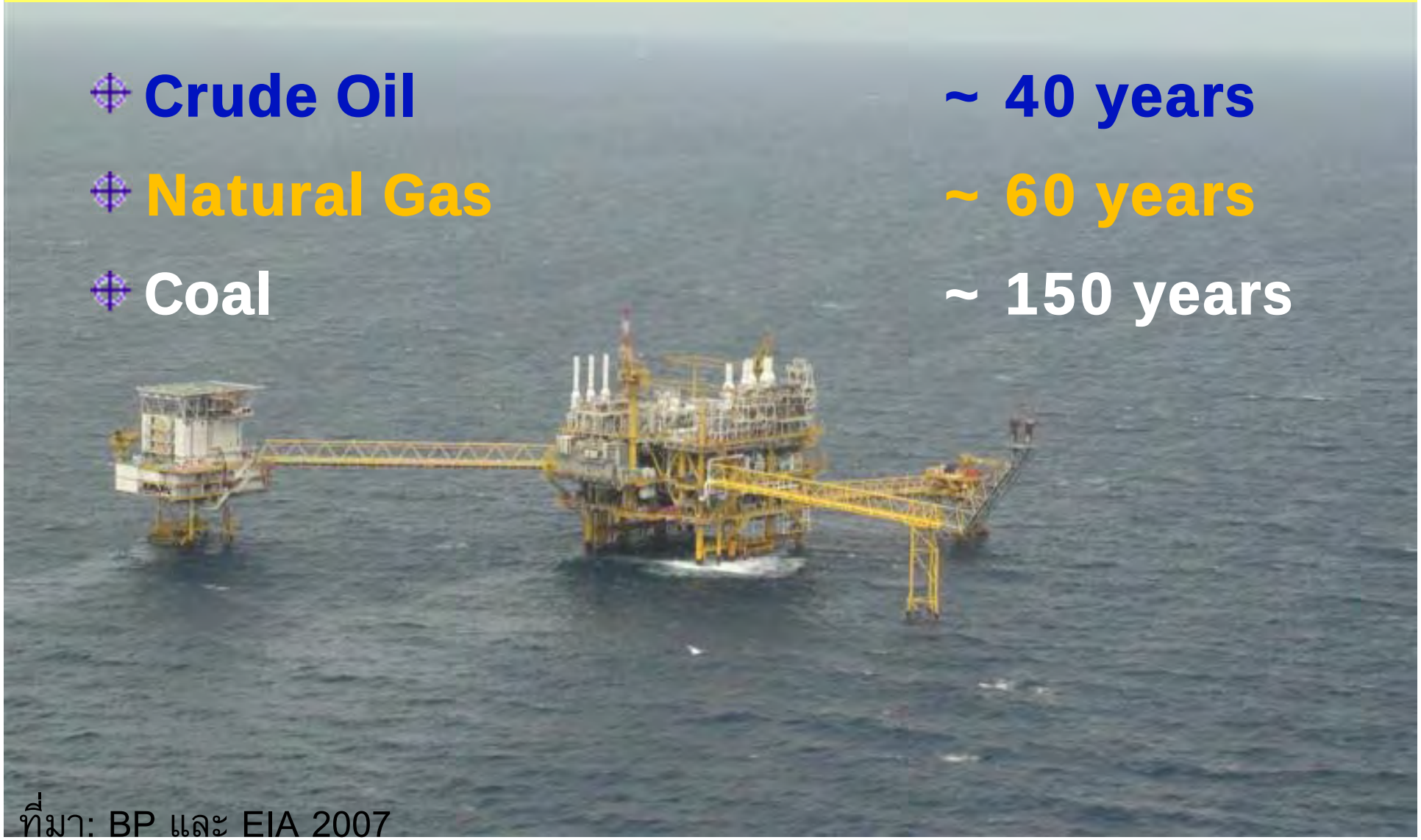
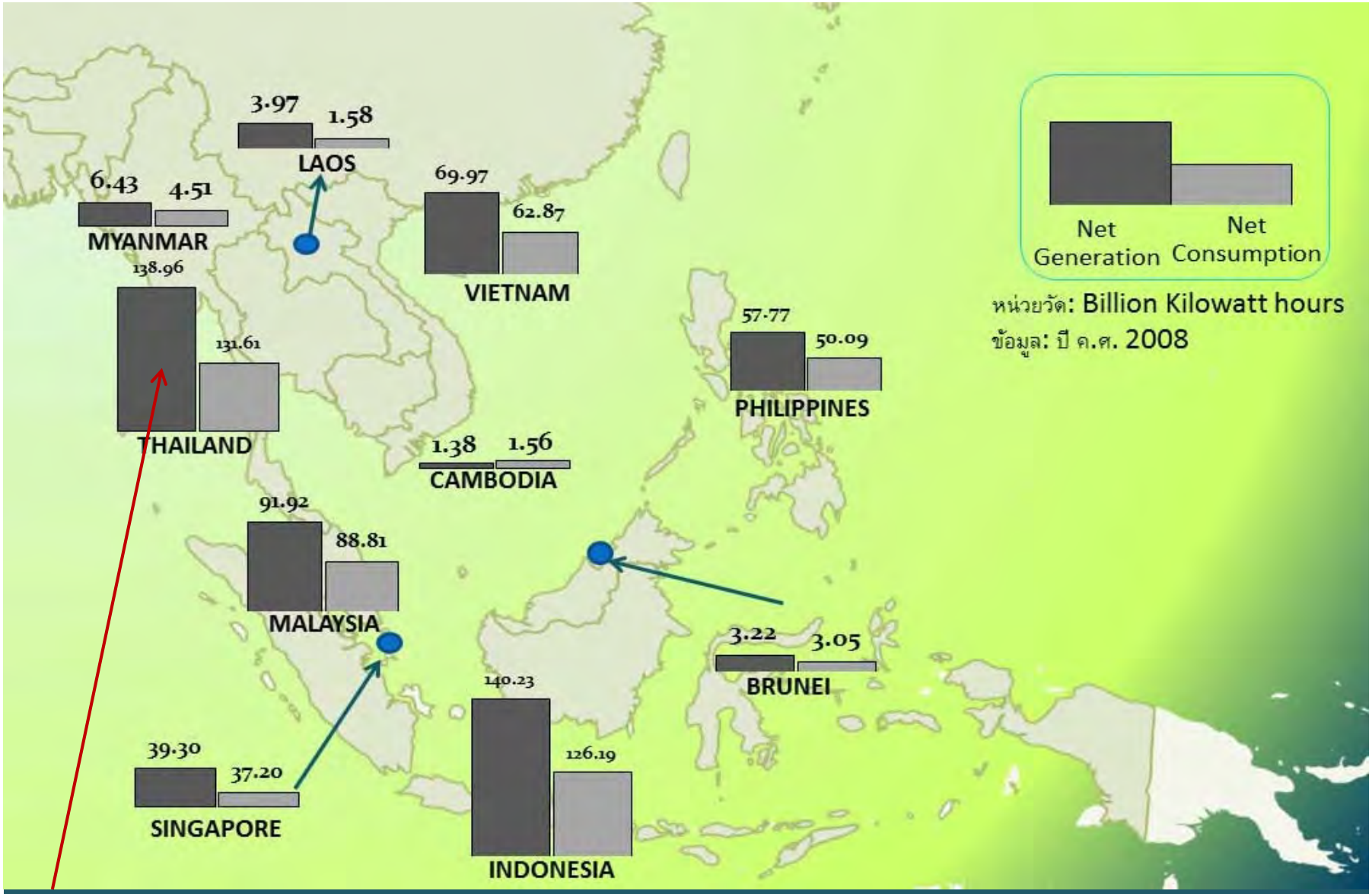
World Energy Reserve
For how long....????



- Crude Oil ~ 40 years
- Natural Gas ~ 60 years
- Coal ~ 150 years

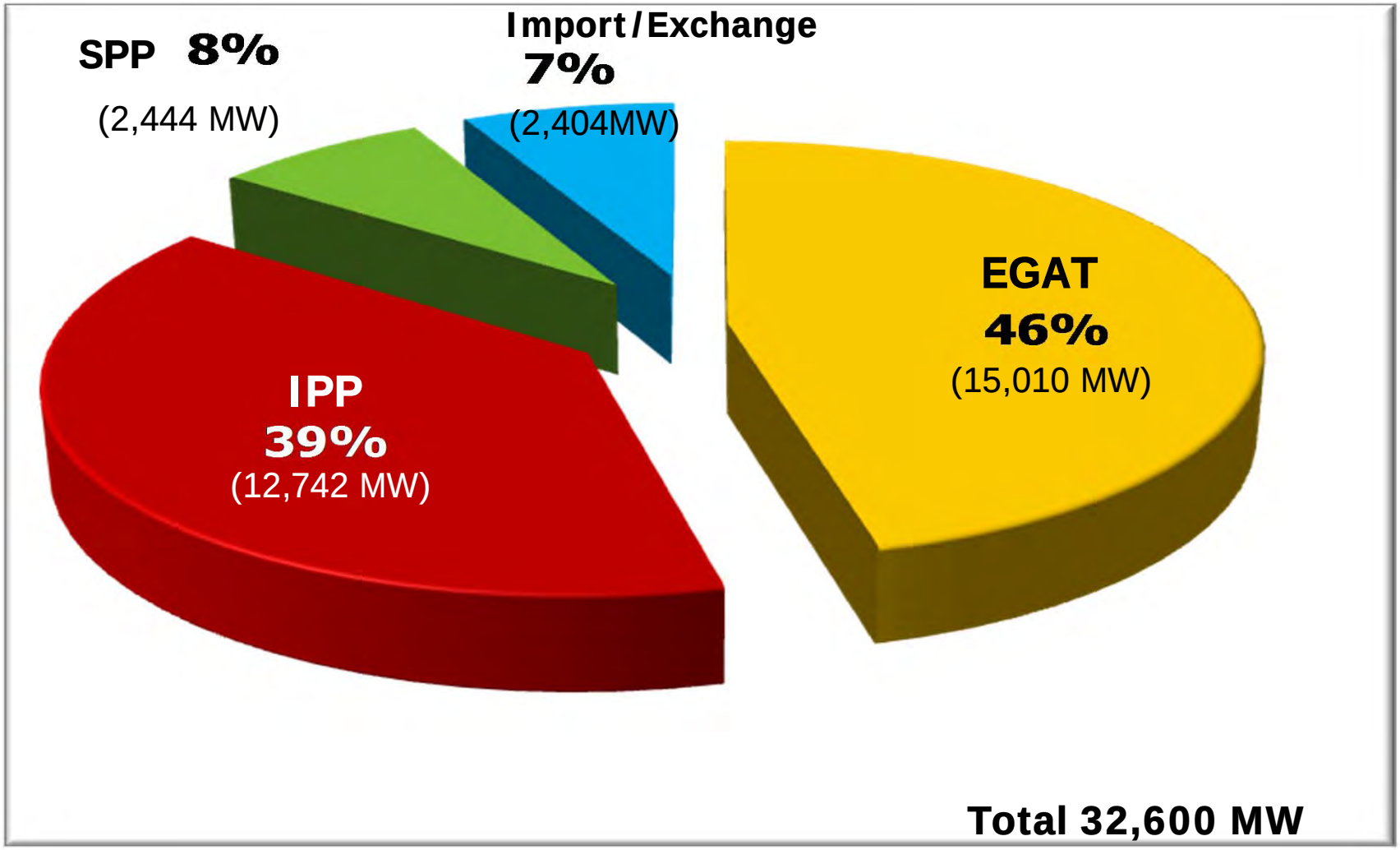
ที่มา: BP และ EIA 2007

Electricity Production and Demand in ASEAN



Thailand's in the 1st ranks for electric-power needs, so we imports from neighbouring countries

Thailand Power Generation – Installed Capacity as of December 2012



Thailand Energy Demand Outlook

Energy Demand Forecast in 2012 (GDP Growth Rate 3-4%)

- **Primary Energy Demand increase** **3.8%**
- **Petroleum Products increase** **1.7%**
- **Natural gas increase** **5.1%**
- **Lignite / Imported coal increase** **2.9%**
- **Electricity demand increase** **4%**

Challenges in Power Sector in Thailand

Challenges we are facing, being impact on achieving power security and stability, are as follows:

1. **Continuous growth of World and Thailand economy**
   - **increase in power demand**
2. **New power plants protest**
3. **Limitation of domestic electricity fuels**
   - **LNG import**
   - **Solar and wind is unstable**
   - **Biomass: small scale**

Increase in unite price

4. **Low carbon society**
   - **MOEN established 10 year- AEDP, 20 year-EEDP**

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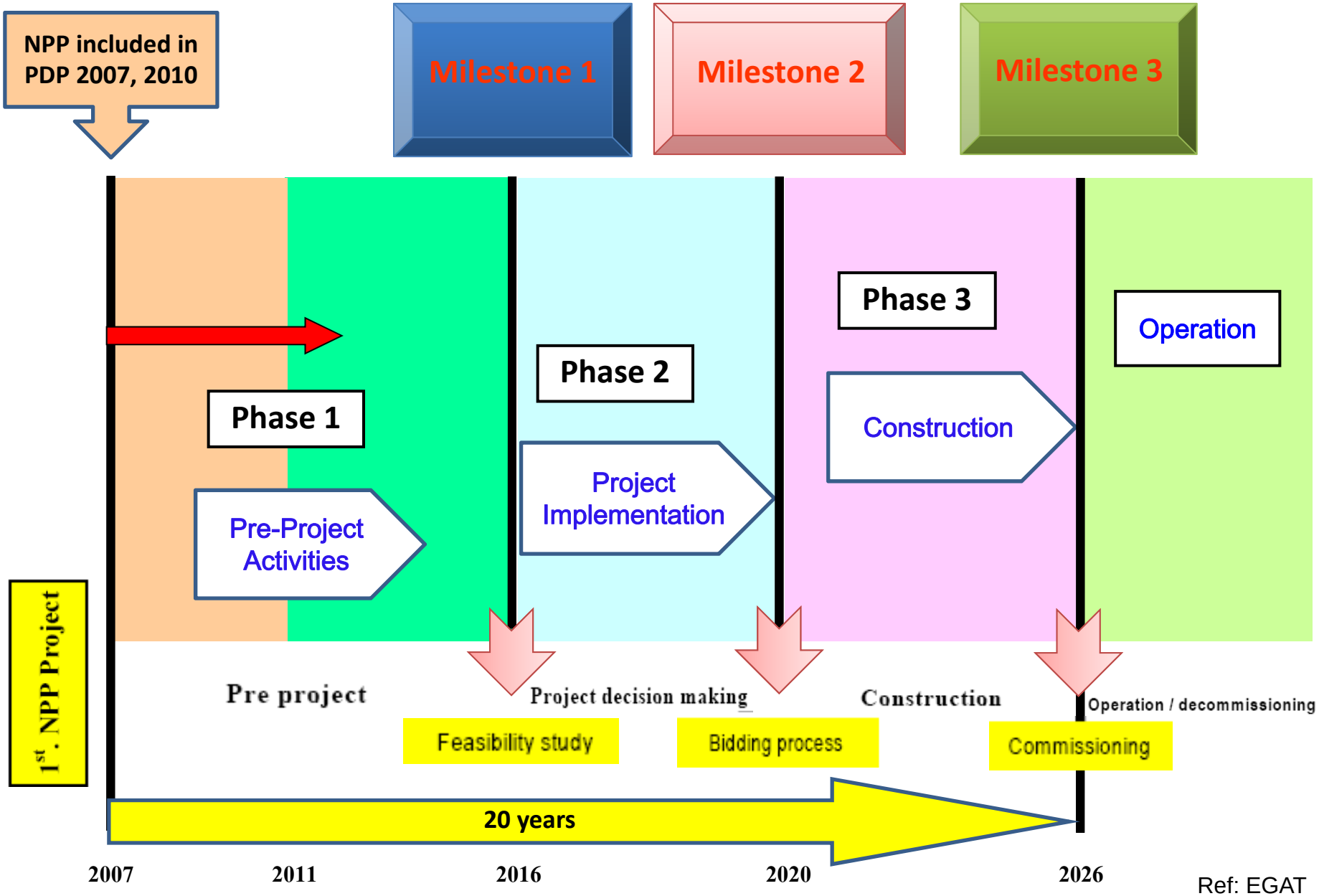
Thailand NPP Project Schedule (IAEA Milestones)



Ref: EGAT

OAP HRD Plan : APPROACH

This HRD plan is designed base on NPP phase approach.

Improvement of current staff competency

- Training
- On-the-job training
- Workshop, Seminar, Conference
- Scholarship/Fellowship to study at higher level
- Research

Recruitment

- Recruitment to support large scale tasks
- Scholarship/Fellowship for students

Recruitment: by NPP project phase

Positions / Specific technical areas	Current	NPP project phase						
		Siting	Design	Const appv	Const	Comm	Operation	Decomm
Project manager		1	1	1	1	1	1	1
Engineering								
Civil		3	5	5	5	3		
Chemical/ Material science/ Metallurgy	3		3	2	2	2	3	1
Electrical/ Instrument/ Control/ Power	2	1	5	5	5	5	4	1
Environmental		5	2	2	2	2	3	3
Mechanical	2	2	5	5	5	5	3	2
Industrial operation/ System development	1	1	5	3	2	5	5	5
Nuclear	12	5	20	15	5	15	15	15
Scientist (Chemist/Physicist/IT)	2	2	3	2	2	2	2	2
Technician	2	2	2	2	2	2	2	2
Support								
Lawyer	-	1	1	1	1	1	1	1
Quality assurance	-	-	1	2	2	1	2	2
Financial officer	-	-		2				
Administration	3	3	3	3	3	3	3	3
Site evaluation								
Seismic/ Geology	-	3	1					
Meteorology/ Hydrology	-	3	1					
Total	**27**	**32**	**58**	**50**	**37**	**47**	**44**	**38**

Parts of Basic training

Level-I

- ✓ Radiation protection and radiation safety
- ✓ Fundamentals and basic reactor physics and kinetics
- ✓ Site evaluation and licensing process
- ✓ Legislative and regulatory framework
- ✓ Workshop on training of inspection technique for research reactor
- ✓ Ageing determination and management
- ✓ Nuclear and radiological emergency preparedness
- ✓ Quality assurance for regulatory organization
- ✓ Physical protection
- ✓ Safety culture in nuclear installations

Level-II

- ✓ Professional training course on radiation protection
- ✓ Fundamental of nuclear engineering and reactor physics
- ✓ Training course on thermal hydraulics

OAP Training Approaches

Organization / Countries	Descriptions
IAEA	**Project THA012 and THA 2014 "Acquiring regulatory expertise in preparation for the first nuclear power plant and the new research reactor"**
EU-INSC	Project "Enhancing the capacity and effectiveness of the regulatory body and developing a national waste management strategy"
US-NRC	Technical cooperation through MOU between US NRC – OAP for the exchange of the technical information and cooperation in nuclear safety matters
Republic of Korea	Technical cooperation through MOU between KINS – OAP for the exchange of the technical information and cooperation in nuclear safety of research reactors

HRD Plan for Operator_EGAT base on PDP 2007

Milestone			Start Site Prep			Start Construction 1st NPP		Start of Contraction 2nd Unit	Fuel Load (1st Unit)	Commercial Operations (1st Unit) Fuel Load (2nd Unit)	Commercial Operations (2nd Unit)
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Department											
NPP Project Development	2	2	2	2	2	2	2	2	2	2	2
Licensing and Quality	15	24	33	40	49	48	51	51	50	45	42
Human Resources	8	10	15	19	19	19	15	12	10	10	8
Project Management	10	11	18	22	36	40	73	73	64	30	8
NPP Proj Dvpmt Engineering	11	21	29	34	39	41	45	51	51	41	26
Site and Operations	2	4	5	5	5	5	5	5	5	5	5
Operations	1	3	10	14	15	57	85	102	117	147	168
Testing & Comm'g/Plan'g & Schedulling	1	3	12	19	19	21	34	46	60	65	52
Maintenance	4	5	14	26	27	69	94	119	191	276	368
Radiation Protection	2	2	5	5	7	11	15	49	80	128	154
Plant Engineering	2	5	8	21	39	53	77	94	119	132	130
Business Management	8	18	32	36	42	45	46	50	52	52	50
Security	3	18	26	34	42	42	57	72	82	92	112
Training	2	2	13	13	21	35	45	56	57	55	40
Industrial Safety	0	1	4	5	6	8	8	11	11	9	6
Total Manpower	71	120	220	206	308	400	652	793	951	1089	1171

EGAT Training Approaches

Organization / Countries	Descriptions
Chulalongkorn University	**Basic and Advanced engineering course**
JAPC, Japan	Related nuclear matters
CGNPC, China	Related nuclear matters
KINS-KAIST, KEPCO, ROK	Certificate and degree programs nuclear engineering
IAEA	Project THA 012 and THA 2014

Thank You for Your Attention