

NATIONAL PRESENTATION NUCLEAR POWER PROGRAM IN THAILAND



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Overview

- Introduction of EGAT
- Current Status of Thailand Electricity Generation
- Development of Nuclear Power Program
- Current Challenges
- Conclusions

EGAT's Power Plants



Hydro

24 plants
3,436.18 MW.



Thermal Energy

3 plants
3,647 MW.



Diesel

1 plant
4.4 MW.



Combined cycle

6 plants
6,866 MW.



Renewable energy

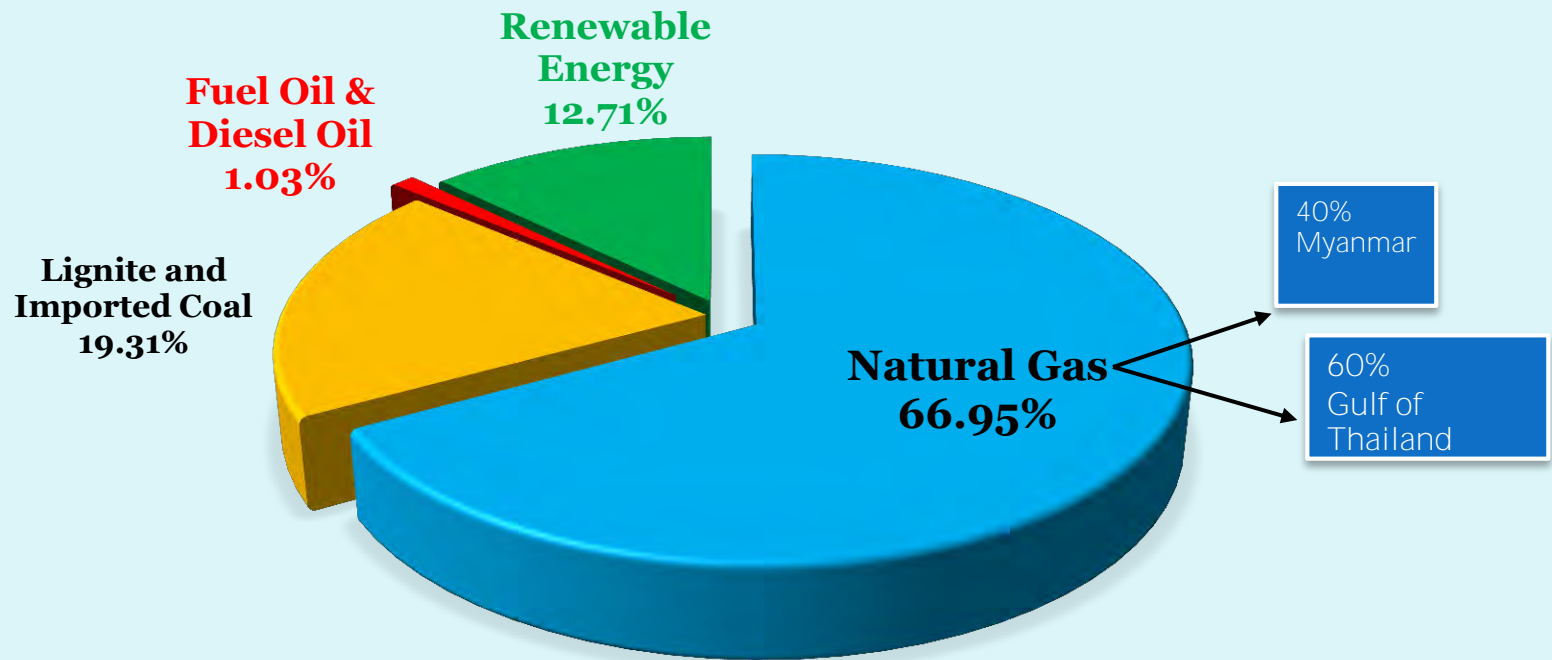
8 plants
4.55 MW.

Total 39 plants

Contract Capacity 13,958.13 MW

(about 42.78 % of the country's
32,629 MW generating capacity)

Current Status of Thailand Electricity Generation



FUEL CONSUMPTION FOR ELECTRICITY GENERATION 2013

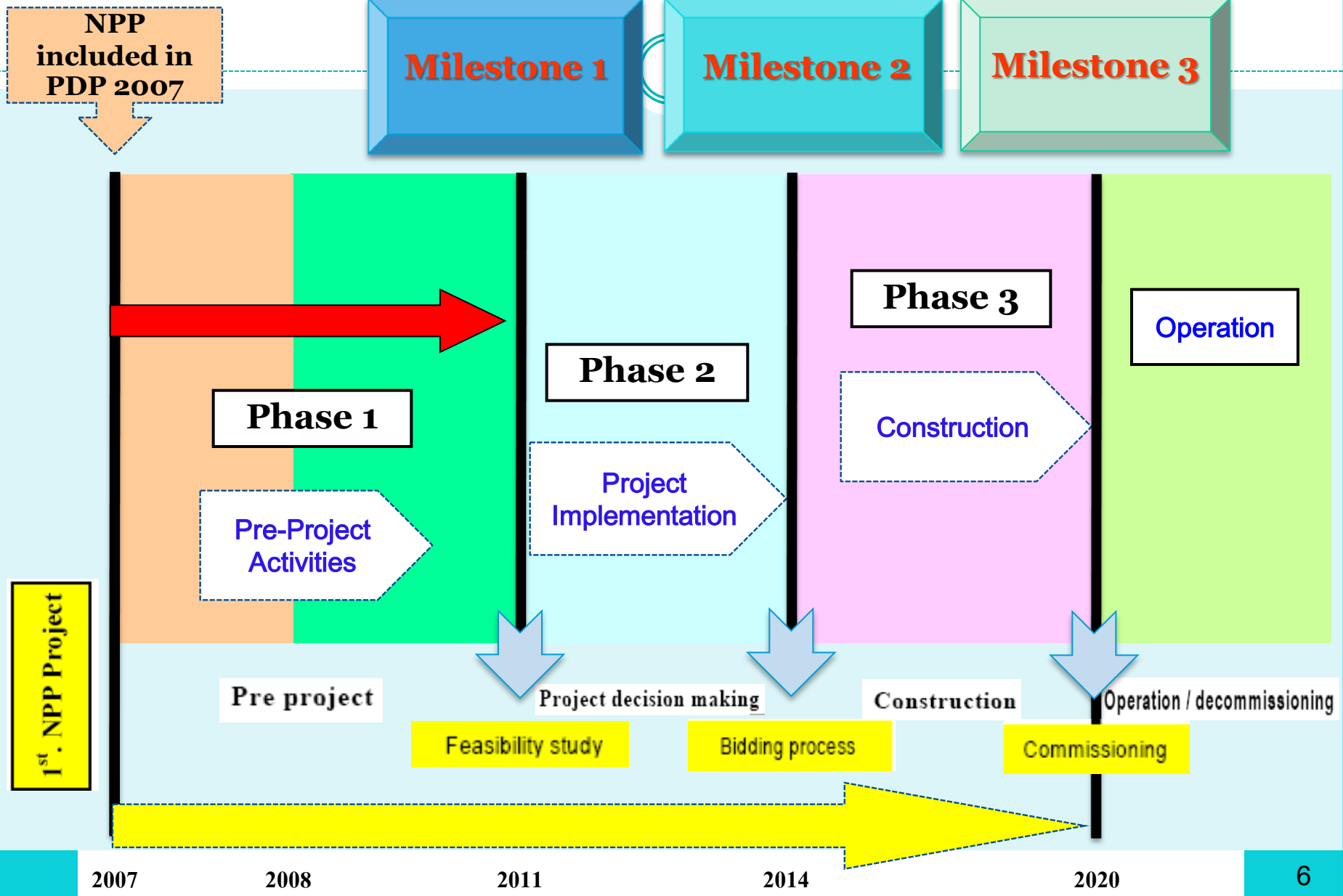
Nuclear Power in National Energy Plan

(Before Fukushima Accident)

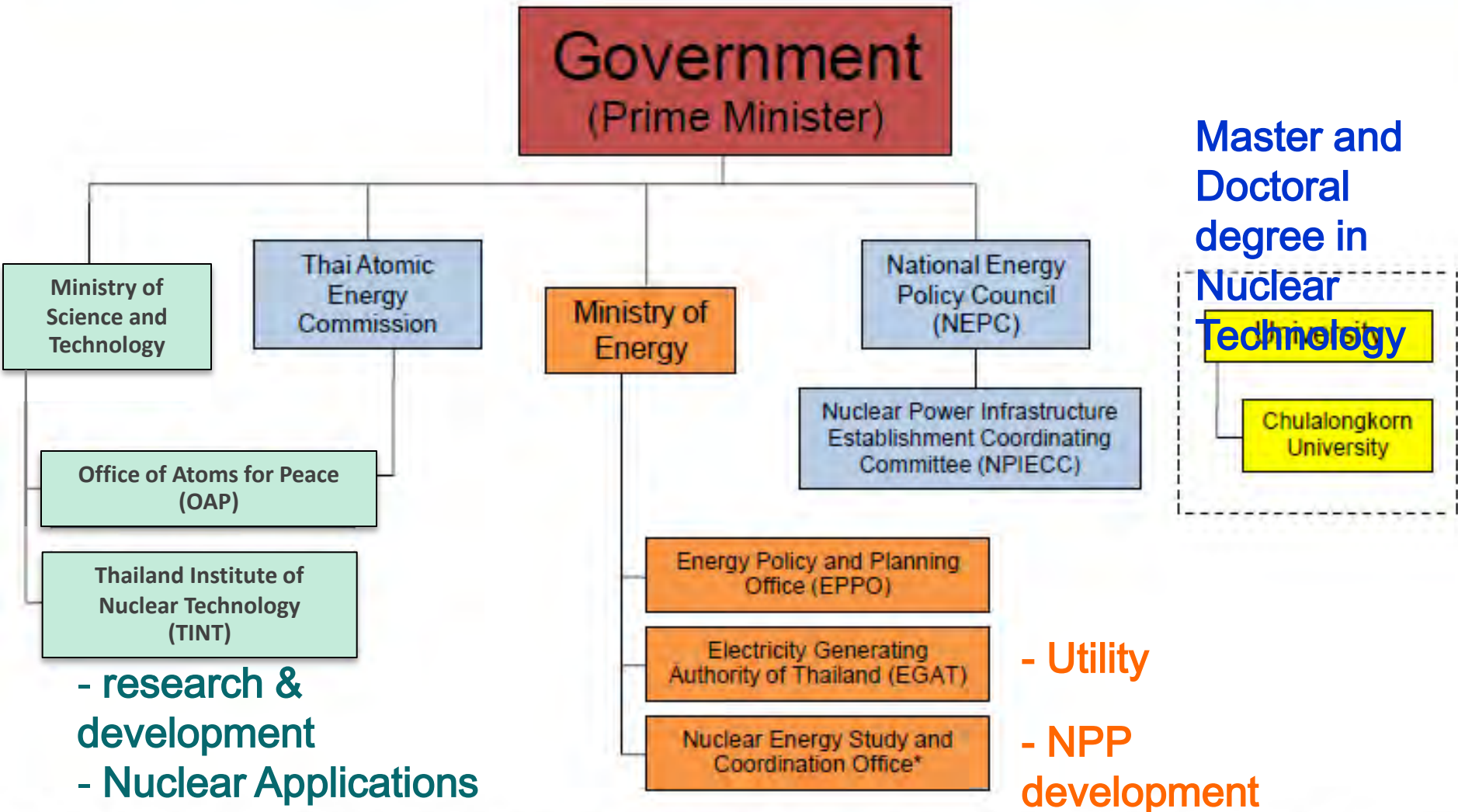
Power Development Plan (PDP) – a long term environmental friendly power expansion plan to ensure electricity availability, affordability and security

Power Development Plan	Nuclear Power Plant Description
PDP 2007 (15 years: 2007-2021)	4 units of 1,000 MWe: 2020(2 units) and 2021(2 units)
PDP 2007 Revision 2 (15 years: 2007-2021)	2 units of 1,000 MWe: 2020 and 2021
PDP 2010 <i>(20 years: 2010-2030)</i>	5 units of 1,000 MWe: <i>2020-2021, 2024-2025 and 2028</i>

Thailand NPP Project Schedule (IAEA Milestones)



Organizations involved in Nuclear Energy



*Note: Nuclear Energy Study and Coordination Office was set up to replace Nuclear Power Program Development Office (NPPDO)

Phase 1 : Pre-Project Activities Phase (2007-2010)

Major activities include:

- Commence the work on infrastructure establishment to accommodate a nuclear program
- Survey potential sites for construction and perform initial environmental examination
- Complete nuclear power plant feasibility study including human resources development plan
- Promote public communication and participation

Utility Preparation

For Pre-Project Activities Phase (2007-2010)

- **Electricity Generating Authority of Thailand (EGAT)** responsible for the first nuclear power station
 - planning, feasibility study, site selection, project implementation, construction and operation
- EGAT had been working with Consultant to conduct Nuclear Power Plant Pre-Feasibility Study

Nuclear Power Plant Pre-Feasibility Study



1. Energy Economics and Financing
2. Technical and Safety Aspects of Nuclear Power
3. Fuel Cycle and Waste Management
4. Reactor Technology, Reactor
 - safety and technical matters
 - economics
 - performance and reliability
5. Site and Environmental Study
 - IAEA Guidelines , US. NRC regulations
 - Safety and Engineering Aspects, Environmental Aspects, Cost Estimate.
6. Human Resources Development and Management Aspects

INIR Mission (Integrated Nuclear Infrastructure Review) Dec 13-18, 2010

Main Conclusion

“INIR Mission Team reviewed all of the 19 issues based on the IAEA reference documents. The Team concluded that based on the progress in addressing 19 issues, which will be included in Readiness Report, **Thailand can make a knowledgeable decision on the introduction of nuclear power.**”

REPORT on THE INTEGRATED NUCLEAR INFRASTRUCTURE REVIEW (INIR) MISSION to Review the Status of the National Nuclear Infrastructure in Thailand

Nuclear Power in National Energy Plan

(After Fukushima Accident)

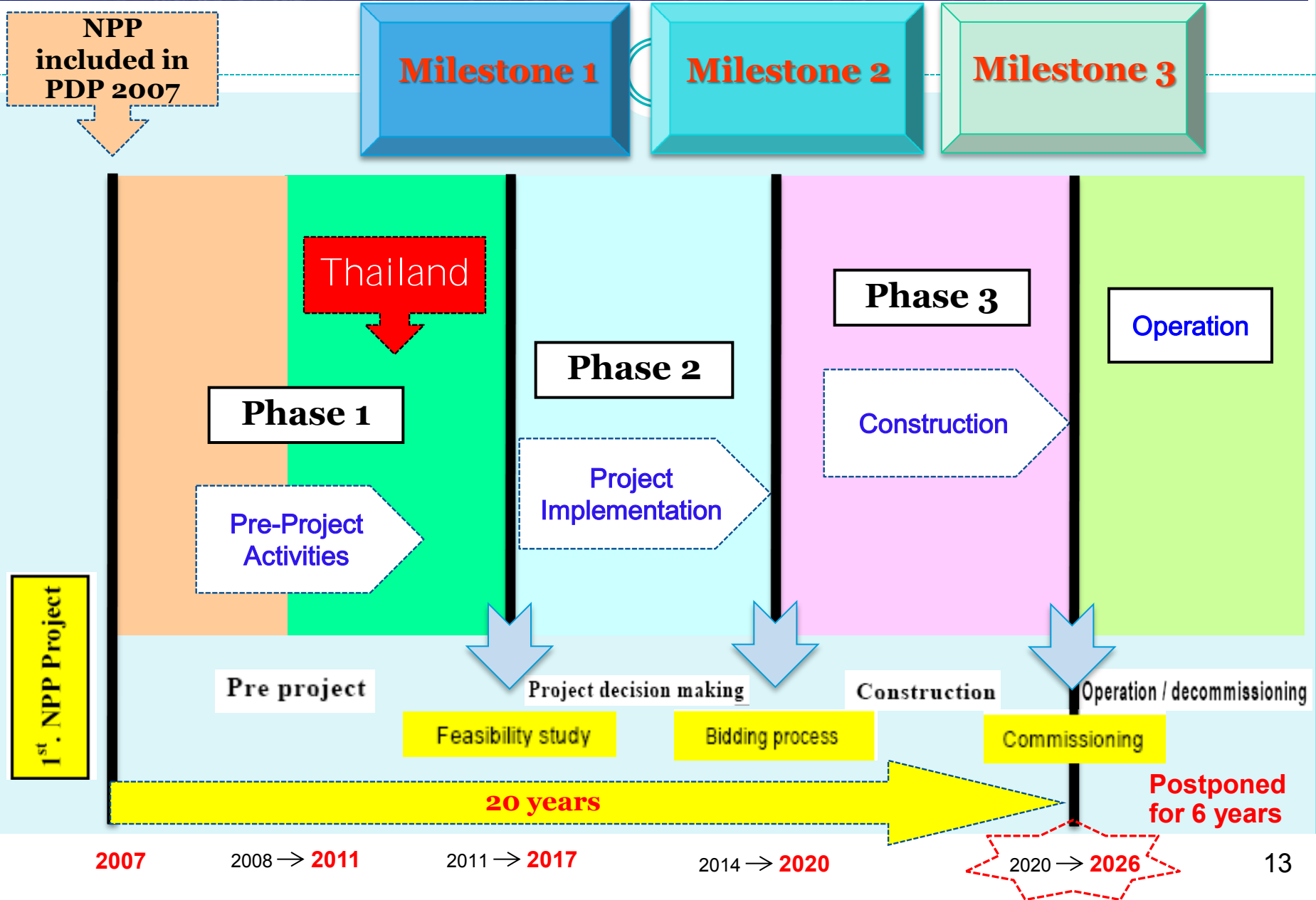
Revision of PDP 2010 (2010-2030)

Power Development Plan	Nuclear Power Plant Description
PDP 2010 Revision 2 Cabinet approved on May 3, 2011	4 units of 1000 Mwe: 2023-2024 and 2027-2028
PDP 2010 Revision 3 Cabinet approved on June 19, 2012	2 units of 1,000 MWe : 2026 and 2027

Main reasons to postpone NPP project

- Review Nuclear Safety Measures and Emergency Preparedness and Response Plan to include lessons learned from Fukushima Accident
- Prepare infrastructure to support NPP: Legislative Framework, Regulatory Framework, Stakeholder Involvement etc.
- Promote public acceptance on nuclear power

Thailand NPP Project Schedule (IAEA Milestones)



Extended Pre-Project Activities Phase Additional Activities for 2011-2016

- **Lessons learned from Fukushima Accident**
 - NPP Technical and Safety Review
 - NPP Site Selection Review
 - Emergency Preparedness and Response Plan
- **Infrastructure Preparation**
 - Laws and regulations for nuclear power plant
- **Human resources development**
- **Public communication, education and participation**

Reactor Technology Study

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Requirements for the study

- Unit size of 1,000 to 1,400 MW
- Generation III , III+
- PWR, BWR, and PHWR

Before Fukushima

Selection Criteria:

- Technical and Safety
- Economics
- Performance and Reliability

After Fukushima

- Concentrate on beyond design basis accident analysis
- Extreme natural events
 - Loss of safety functions
 - Severe accident management

Site and Environmental Study

IAEA Guidelines and US. NRC regulations

Before Fukushima

Step 1 – Potential sites to candidate sites

Step 2 – Candidate sites to preferred sites

Selection Criteria

- Safety and Engineering Aspects
- Environmental Aspects
- Cost Estimate

After Fukushima

- No additional study required since at candidate sites are not in earthquake and/or tsunami prone areas
- Survey other potential sites

Human Resource Development

- **In-house Training**
- **Oversea Training**
- **Diploma & Degree**

EGAT signed MOU for information exchange and educational training with

- ❑ Japan Atomic Power Company (JAPC)
- ❑ China General Nuclear Power Corporation (CGNPC)

Educational Training 2008-2013

In-house training	Basic Nuclear Engineering Seminar	6757
	Basic Nuclear Engineering Course	520
Overseas training	On the Job Training <i>Daya Bay NPP and Ningde NPP, China</i>	62
	GDF SUEZ Nuclear Training Program <i>Belgium</i>	6
Certificate & Degree	KINS- KAIST International Master's Degree Program on Nuclear and Radiation Safety	1
	KEPCO International Nuclear Graduate Program	2
	Advanced Nuclear Engineering Diploma Chulalongkorn University, Thailand	72

Education Program

- **Cooperate with Department of Non-Formal Education and Institute for the Promotion of Teaching Science and Technology to develop energy curriculums including nuclear energy**

Public Knowledge Program



ORGANIZATIONS IN PUBLIC INFORMATION



Public Knowledge Program

COMMUNICATION MEDIAS

- Nuclear journal , magazine, newsletter
- Brochure, handbooks, posters, painting book
- Radio Program
- TV Documentary
- Multimedia
- E-learning
- Webpage
- Social Network



International Cooperation



- International Atomic Energy Agency (IAEA)
- Japan Atomic Power Company (JAPC)
- JAIF International Cooperation Center(JICC)
- Japan Atomic Energy Agency (JAEA)
- China Guangdong Nuclear Power Group (CGNPC)
- KEPCO International Nuclear graduate School (KINGS)
- KINS-KAIST Korea
- GDF SUEZ- Belgium

Current Challenges



- **National position**
 - Government commitment
- **Public acceptance**
 - Promoting understanding and participation
 - Site survey and data collection
- **Infrastructure Preparation**
 - Laws and regulations for nuclear power

Conclusions



- **Nuclear power is still the option to produce electricity in Thailand**
- Preparation and development of nuclear infrastructures are underway
- Besides the national infrastructure; **regional and international cooperation** is also important. Especially in terms of information exchange, technical collaboration, sharing the best practice and emergency preparedness and **assistance**.



THANK YOU



Power for Thai Happiness