Status of the First NPP Project in Thailand

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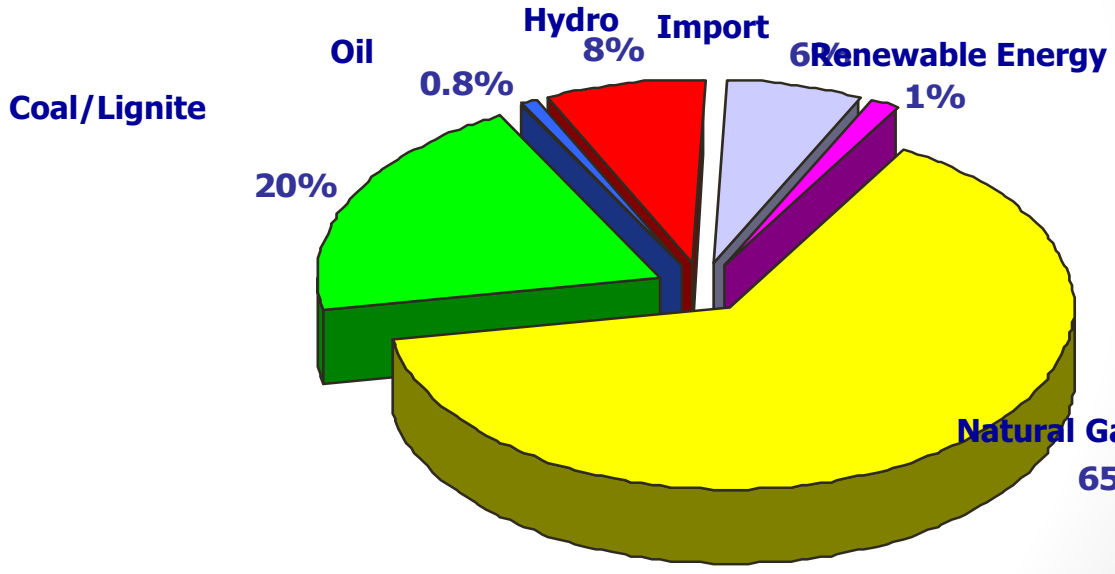
อดีตที่ปรึกษาโครงการพัฒนาโรงไฟฟ้าพลังงานนิวเคลียร์
ประธานอนุกรรมการความปลอดภัยทางนิวเคลียร์และการประเมินผลกระทบสิ่งแวดล้อม

Thailand Electricity Generation

Power Generation Share by Fuel Type (January - April 2012)

Total: 57,481 GWh



Nuclear power plant was initially incorporated in Thailand's Power Development Plan in 2007 (PDP 2007).

Source : Energy Power Planning Office, MOE

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Brief Background

- **In December 2007, The Cabinet approved "the Nuclear Power Infrastructure Establishment Plan" (or NPIEP)**
- **roadmap for nuclear power plant development**
- **operation date in late 2020**
- **aligned with the IAEA guideline NG-G-3.1 – "Milestones in the Development of a National Infrastructure for Nuclear Power"**
- **Nuclear Power Program Development Office (NPPDO) under the Ministry of Energy, and the appointment of Nuclear Power Infrastructure Establishment Cooperation Committee (or NPIECC)**

National Power Development Plan (PDP)

PDP 2010 (2010-2030) is a long term power development plan to ensure country's electricity availability, affordability and security.

- approved by The Cabinet On March 2010
- operation from 2020 to 2028
- about 10% of electricity generation
- in case of postponement or without NPP from having additional LNG or coal to replace the existence of NPP.

PDP 2010 revision 2 (March 2011) after Fukushima accident
4x1000 MWe NPP in 2023-2024 and 2027-2028
PDP 2010 revision 3(2012)
2x1000 MWe NPP in 2026 and 2027

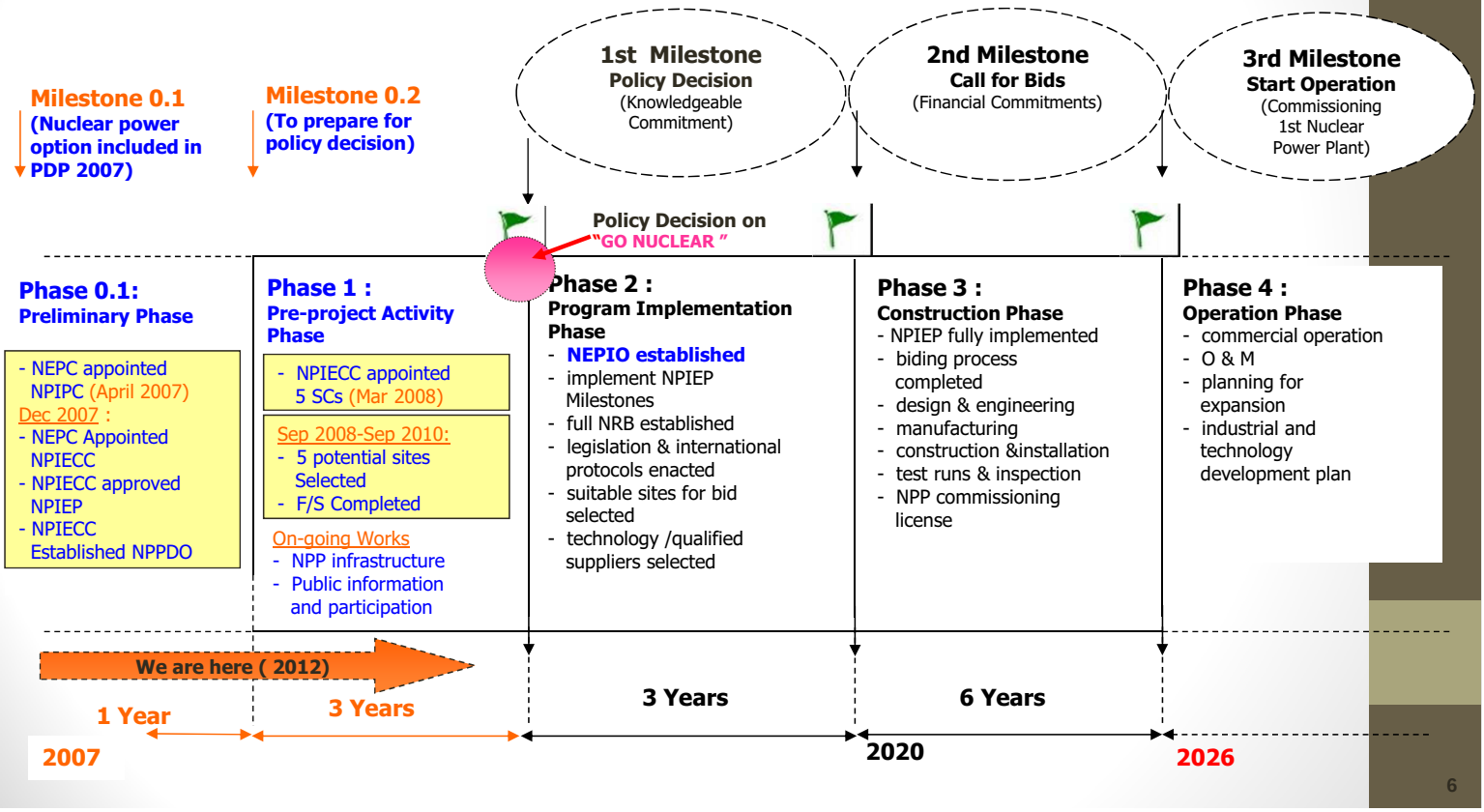
NPIECC and appointed sub-committees (SC) :

5 Sub – Committees were appointed by NPIECC on March 6, 2008

Appointed in March 2008	
SC 1	Legal System, Regulatory System and International Protocols
SC 2	Nuclear Power Utility Planning
SC 3	Industrial Infrastructure, Technology Transfer, Technology Development, and Human Resources Development
SC 4	Nuclear Safety and Environmental Protection
SC 5	Public Information and Participation Programs
Appointed in January 2010	
SC 6	Readiness Report Preparation (to wrap up comprehensive report on preparedness of Thailand on NPP for NEPC and Thai Cabinet consideration and approval)
Appointed in December 2010	
SC 7	The Study and Preparation of Thailand to be a Party to International Agreements relating to Nuclear Power Plant

NPIEP Milestones for Nuclear Power Program Implementation (based on IAEA NG-G-3.1)

NPIEP : Nuclear Power Infrastructure Establishment Plan
NPP : Nuclear Power Program
NPPDO : Nuclear Power Program Development Office
NRB : Nuclear Regulatory Body



Progress of NPP
Nuclear Power Plant Implementation Planning

In September 2010, the F/S completed in 6 tasks by BRA under EGAT assignment :

Tasks
1. Energy Economics and Financing
2. Technical and Safety Aspects of Nuclear Power
3. Fuel Cycle and Waste management
4. Reactor Technology Supplier, and Fuel Supplier Selection
5. Site and Environment Study
6. Human Resources Development and Management Aspects

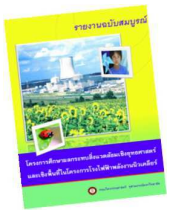
Main Results:

1) Technology selection:
NPP size 1,000-1,400 MWe will be concluded in early of phase 2 (2011-2013)

2) Potential site selection:
from 17 to 2 concluded

Progress of NPP
Safety and Environmental Protection

2 programs were completed in 2010:



(1) Strategic Environmental Impact Assessment (SEA) and Environmental Impact Assessment (EIA) Frameworks

Results are: SEA and EIA Frameworks, Site Approval guideline, SAR Guideline and HIA Guideline

(2) Emergency and Mitigation Plan Framework

Results are: Emergency and mitigation plan, Scope of works of 3S/NRB/SSAC/Fuel Cycle/ Radioactive Waste

SC1: Sub-Committee on Legal, Regulatory and International Protocols

Treaties and International Conventions which Thailand *plans to be a party of* :

- **Convention on Nuclear Safety**
- **Convention on the Physical Protection of Nuclear Material**
- **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management**
- **Convention on Supplementary Compensation of Nuclear Damage**

National Position

The government's commitment to nuclear power utilization represented by the official documentation as follow :

- Atomic Energy for Peace Act 1961,
- Atomic Energy Act 1965 (no.2),
- Ministerial Regulation on Radioactive Waste Management 2003
- Ministerial Regulation on Licensing for Radiation Source and Nuclear Materials 2007

Current Status on Nuclear Power Program

At the present, 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

- NPPDO or NEPIO will be responsible for coordinating with related organizations on implementing the program in Phase 2

Key Comments from IAEA Expert Team and Gaps to be Filled

Nuclear Legal Framework

- **The Atomic Energy for Peace Act 1961 regulates and controls nuclear and radioactive utilization of present research reactor.**
- **Thai Cabinet endorsed in principle of Atomic Energy for Peace Act revision 3 which is follow up the IAEA Safety Standards publication GS-R-1 [6]. This will include:**
    a. Establishment of the NPP authorization and licensing process;
    b. Development of specific regulations and guides;
    c. Safety review and assessments;
    d. Inspections;
    e. Coordination with other national and international bodies;
    f. Provision of adequate supporting technical resources.
- **The Atomic Energy for Peace Act has to be revised based on IAEA Fundamental Safety Principle and Standards**
- **The drafting of the new Act by OAP is currently in conjunction with NPPDO legal study.**

Key Comments from IAEA Expert Team and Gaps to be Filled

Human Resources Development

- **The power generating operator (EGAT) has prepared a complete HRD Plan for NPP based on US NPP and decontrolized approach.**
- **Required manpower and training program are identified in the Feasibility report conducted by Burn and Roe Enterprise**
- **NPPDO, OAP, TINT and EGAT have organized the necessary training and studying courses in NPP**
- **In 2010, 8 training courses under IAEA assistance on nuclear safety were organized in house by OAP**
- **IAEA expert team notified intensive HRD plan for leadership of NRB's "nuclear safety Bureau" should be specifically defined;**

Comments from IAEA Expert Team On Good Practice

Feasibility study of Nuclear Power Plant are well conducted by EGAT with clearly results:

Siting

- Preliminary Site Selection for NPP was prepared in accordance with IAEA Doc.SG-59 1979 (Safety Guide on Site Survey for NPP);
- 5 candidate sites are scored and selected from 17 potential sites and based on criteria, the candidate sites are limited to 3 preferable sites.

Technology Selection

- LWR has been preferable.
- BWR/PWR has not decided yet.
- 1000-1400 MWe range is feasible.

Funding and Economics

- 3 ownership options were analyzed.
- 100% corporate funding provides lowest tariff.
- Potential sources of financing agents are identified.
- Nuclear liability study will be reviewed.

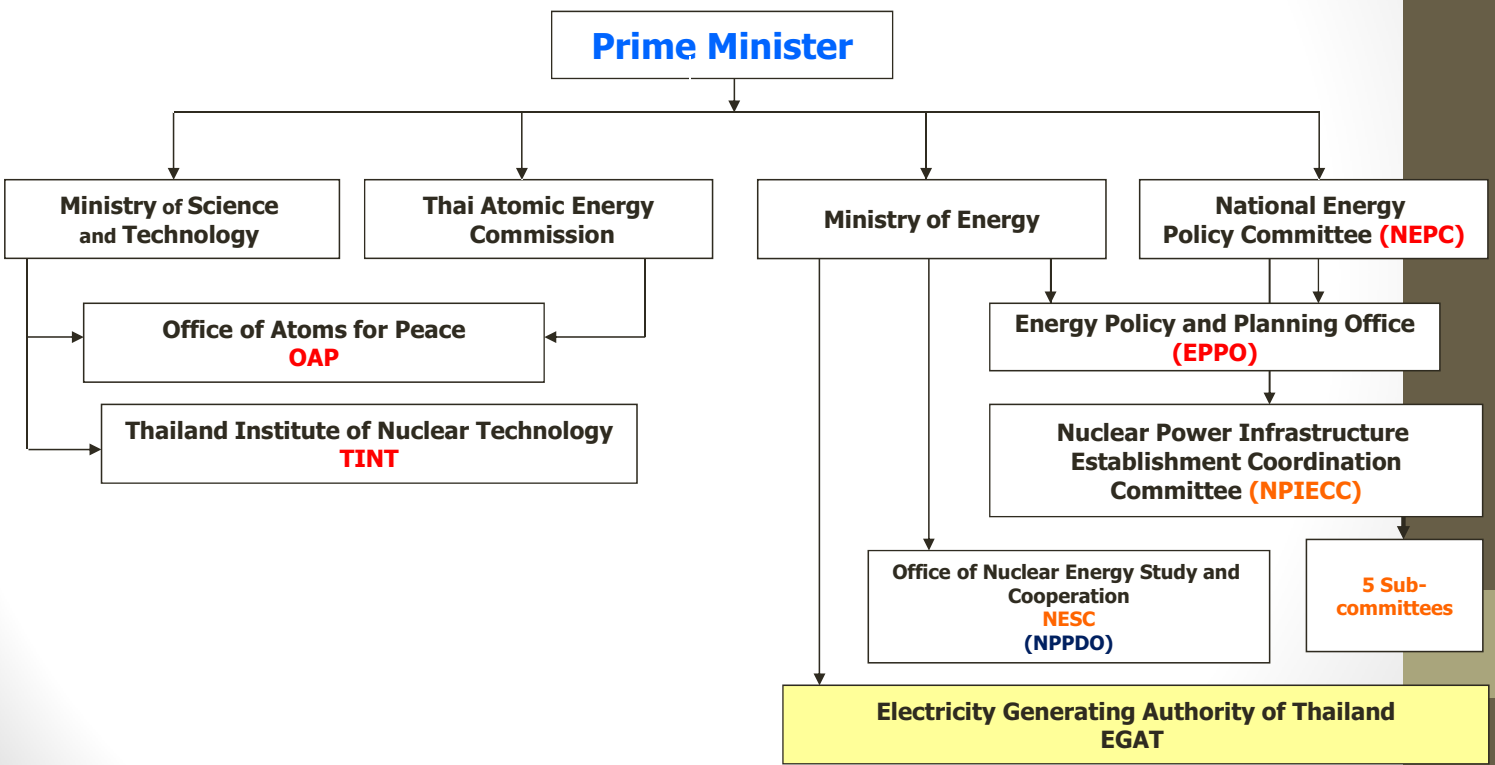
On-going Activities on Nuclear Power Program

NEPC / Thai Cabinet and latest NPIECC Resolution on May 6, 2011:

- **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.
- **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.**

National institution building process

Existing Nuclear Energy Organization Chart



19 Issues in The Self-Evaluation Report based on IAEA NG-T-3.2

1. National Position	11. Stakeholder Involvement
2. Nuclear Safety	12. Site and Supporting Facilities
3. Management	13. Environmental Protection
4. Funding and Financing	14. Emergency Planning
5. Legislative Framework	15. Security
6. Safeguards	16. Nuclear Fuel cycle
7. Regulatory Framework	17. Radioactive Waste
8. Radiation Protection	18. Industrial Involvement
9. Electrical Grids	19. Procurement
10.Human Resources	

Preparedness of Thailand in 19 issues, 16 have been well considered and prepared.

Recommendation on improvement in 3 issues of which **issues 5, 7 and 11**.

Ref: Integrated Nuclear Infrastructure Review (INIR, IAEA Mission 2010)

IAEA Technical Assistance to Thailand
Under TC 4015 in the process of proposal for the period of 2013-2014

The activities will be as follows:

1. Fellowship for Training
   - Nuclear Safety, Radiation protection, Nuclear Security,Safety Assessment, Waste management, Safety culture
   - Construction Management, Project risk management,
   - Licensing of NPP

2. IAEA Expert Mission
   - Licensing of NPP
   - Siting, Evaluation of External events
   - Emergency preparedness
   - INIR follow-up mission

3. Workshop on public communication

4. Procurement of Documents, Software

Thank You for Your Attention