Assessing Environmental Impact Assessment (EIA) in Thailand: Implementation Challenges and Opportunities for Sustainable Development Planning (Working Paper)

Asian Environmental Compliance and Enforcement Network (AECEN)

March 2015

(Photo by the Pollution Control Department, the Ministry of Natural Resources and Environment, Thailand)

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Suggested Citation: Supat Wangwongwatana, Daisuke Sano, and Peter Noel King. 2015. Assessing Environmental Impact Assessment (EIA) in Thailand: Implementation Challenges and Opportunities for Sustainable Development Planning (Working Paper). Asian Environmental Compliance and Enforcement Network (AECEN) Working Paper. Hayama, Japan: Institute for Global Environmental Strategies.

This report was prepared under the 2014 EIA Promotion in Asia project supported by the Ministry of the Environment, Japan.

PREFACE

As a result of rapid economic growth in the region, environmental problems are on the rise and thus the role of Environmental Impact Assessment (EIA) as a means of ensuring environmental and social safeguards for sustainable development has been highlighted.

The Ministry of the Environment, Japan commissioned IGES to conduct studies in six selected Asian countries to assess the implementation of EIA, identify common challenges, and propose possible responses to induce sound investment in the region.

Six countries – Cambodia, Indonesia, Korea, Myanmar, Thailand, and Vietnam, were selected to draw out various practices and lessons from countries with varied backgrounds such economic development stage and status of EIA regulatory systems and their implementation. It is hoped this study will be of use for the government officials and practitioners who are engaged in work associated with strengthening safeguards and investment in the region.

Authors would like to thank Ms. Piyanan Soponkanabhorn, Ms. Indhira Euamonlachat and Ms. Rosalind Amornpitakpun, the Office of Natural Resources and Environmental Policy and Planning, Ministry of the Natural Resources and Environment, Thailand, for providing insightful information for the study.

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March 2015

SUMMARY

This report presents the existing EIA systems and implementation practices in Thailand as of December 2014 and their challenges and recommendations. Chapter 1 provides an overview of the systems of assessment (EIA and environmental and health impact assessment or EHIA) and their procedures; Chapter 2 identifies major challenges and opportunities for EIA/EHIA implementation based on the existing documents and interviews with the officials in charge of EIA implementation in Thailand; Chapter 3 presents illustrative examples of how EIA/EHIA functioned and Thai authorities and communities acted in practice; and lastly Chapter 4 summarizes key recommendations for the improvement of EIA systems and their implementation.

Thailand's EIA system has a long history of practice since 1975, when the Enhancement and Conservation of National Environmental Quality Act (NEQA) was first enacted. The NEQA has been regularly revised and improved and the current law of 1992 serves as the legal framework today for the development and strengthening of the EIA system in Thailand with provisions on EIA Screening, Preparation, Review Process, Timing, Mitigation Measures and Monitoring. Presently, there are 35 types and sizes of projects and activities as listed in Annex 1 for which EIA is required. Additionally, Article 67 of the previous Constitution of Thailand (2007) requires projects and activities that may cause severely adverse impacts to the community with respect to environment quality, natural resources and health to submit Environment and Health Impact Assessment (EHIA). There are 11 types and sizes of project and activities which are required to submit EHIA as listed in Annex 2.

EIA reports have to be prepared by consultants registered with the Office of Natural Resources and Environmental Policy and Planning (ONEP) in accordance with the guidelines published by ONEP. The environmental impact assessment has to cover the following aspects, i.e. physical resources, biological resources, human use value and quality of life. The projects and activities must comply with all applicable environmental and other standards. Public participation is required at least twice during the preparation of the EIA report. ONEP reviews the EIA report and submits it with its preliminary comments within 30 days to an Expert Review Committee (ERC) appointed by the National Environment Board (NEB). The ERC will have 45 days to review and approve or disapprove the EIA report after receiving the EIA report from ONEP. If the ERC fails to do so, the EIA report is considered approved.

The permit for the proposed project can be granted by the designated permitting agencies once the EIA report is approved. The mitigation measures and monitoring requirement specified in the approved EIA report and the recommendations of the ERC are considered as conditions to the granted permit. For the project and activities that may cause severely adverse impacts to the community with respect to environmental quality, natural resources and health, the approved EIA/EHIA report will have to be submitted to an independent organization on environment and health for review and comments before a permit is granted. Permitting agencies are responsible for overseeing compliance of mitigation actions and monitoring.

In 2014, there were a total of 2,404 EIA reports including new and resubmission reports submitted to ONEP of which 586 were approved. Information on the EIA including the EIA report is considered as official information and has to be disclosed if requested in accordance with the Official Information Act (1997).

Three case studies on the implementation of the EIA system in three different sectors in Thailand, namely industrial sector, waste disposal sector and power sector, are presented to illustrate how the EIA system in Thailand is implemented, challenges, how problems and controversies occurred, and how they were dealt with in the court cases and compensation, and by community and public involvement. The first case study is the Map Ta Put (MTP) Industrial Estate located in Map Ta Put District in Rayong Province almost 200 kilometers east of Bangkok. It has been developed as a part of the Eastern Seaboard Development in Thailand since the early 1990s and is the largest petrochemical industrial complex in Thailand operated by the Industrial Estate Authority of Thailand, consisting of upstream to downstream petrochemical industries, i.e. oil refineries and natural gas separation plants to various types of plastic industries and utility plants. MTP also has several deep sea ports for transport of raw materials and products.

The EIA report for the overall framework of the MTP Industrial Estate was approved by the NEB in 1992. Each individual industry or project to be established in the industrial estate must submit an EIA report of its own industry or project if the proposed activity falls into the type and size of project for which an EIA is required, and industry or project is required to meet all applicable environmental quality standards (pollutant releases and others) taking into account the cumulative effects on environmental quality and health and the carrying capacity of the surrounding areas.

Continuous expansion of industrial development in the MTP area has resulted in increasing cumulative releases of pollutants reaching the assimilative capacity of the area for SO_2 and NOx (by modelling) and increasing health risks to the surrounding communities. People filed complaints on health effects, in particular cancers and mal-odor associated with chemical substances released from industries, and requested to stop further industrial expansion with lawsuits filed with the Administrative Court. The Administrative Court ordered the Ministry of Natural Resources and Environment (MoNRE) to declare the MTP area as a Pollution Control Area under which actions have to be taken to reduce and mitigate the pollution problem and to implement Article 67 of the Constitution of Thailand (2007) which requires projects and activities that may cause severely adverse impacts to the community with respect to environment quality, natural resources and health to submit an Environment and Health Impact Assessment (EHIA).

The NEB adopted for the first time in Thailand an Emission Trading and Offset Scheme for SO_2 and NOx for the MTP area under which new projects will be allowed in the MTP area only if they can demonstrate that existing emissions of SO_2 and NOx in the MTP area will be reduced to offset the emissions from the new projects. The scheme enables further industrial development in the MTP area while reducing the cumulative emissions of SO_2 and NOx.

The second case is the Better World Green (BWG) Industrial Waste Management Center located in Huay Haeng District, Saraburi Province which received a permit in 1997 as a Central Waste Stabilization facility and subsequently received additional permits as a central industrial non-hazardous waste facility (sanitary landfill) in 1998 as well as a central industrial hazardous waste facility (secured landfill) in 2003 for which an EIA report was approved in 2002. The landfill operation was not properly operated at the early stage before 2000 which resulted in constant complaints from the surrounding communities of the environmental and health impacts. Investigations by relevant government agencies were launched and the BWG was required to implement various corrective measures in the landfill operations after which monitoring data has shown reducing levels of heavy metals in the monitoring wells, surface water stream and underground water wells, except for parameters reported to have already high natural background levels (manganese (Mn) and arsenic (As)).

The communities opposed the approval of the EIA report and granting of the permit for the central industrial hazardous waste facility of the BWG. The EIA for the hazardous industrial waste secured landfill was approved in 2002 since there had not been sufficient scientific evidence to prove the impacts. Subsequently, a permit was granted to the BWG in 2003 and the operation was started in 2006. In response, people filed lawsuits against relevant government agencies for negligence by unlawfully issuing a permit to the BWG and requested the court to make an order to revoke the permit. These cases were dismissed by the court which concluded that the permit was issued properly and lawfully and that the BWG had taken corrective measures as ordered by the Department of Industrial Works and it was not conclusive that there was dispersion of pollution from the BWG facility, therefore there was no reason to give an order to revoke the permit. Additionally, the Criminal Court also dismissed a separate lawsuit against the BWG on the ground that BWG had followed the orders given by competent officials in taking corrective actions to mitigate the problems.

The third case is the Mae Moh lignite-fired thermal power plant located in Amphoe Mae Moh, Lampang Province which was the first of its kind in Thailand and has been operated by the Electricity Generating Authority of Thailand (EGAT), one of the state enterprises of the government. The plant consisted of 13 generating units (3 x 75 MW, 4 x 150 MW and 6 x 300 MW) with a total installed electricity generating capacity of 2,625 MW. The Mae Moh power plant (Unit 1-13) did not have an EIA and only Unit 12 and 13 had Flue Gas Desulfurization (FGD) system with 95% SO_2 removal efficiency in their original project engineering design.

Located in the middle of a horse-shoe valley topography and with the influence of a high pressure system moving in from southern China during the winter season, the dispersion of the large amount of SO_2 emitted from the Mae Moh power plant was limited causing high peaks of ground level SO_2 concentrations between late morning and early afternoon. During the 1990s, there were two incidents of impacts caused by SO_2 emitted from Mae Moh power plant during which hourly average ground level SO_2 concentration[1] of as high as 1,300 ppb and 890 ppb were observed in 1992 and 1998, respectively. A large number of people living in several villages located downwind from the power plant sought medical attention for symptoms which included stinging nose and throat, cough, chest tightness, asthmatic attack, nausea, vomiting, dizziness, malaise and occasionally wheezing and shortness of breath. In addition, plants and agricultural crops were reported to wither and fall to the ground overnight. After both incidents, the EGAT paid compensation of around 10 and 30 million baht to the affected people, respectively.

As a result, the Pollution Control Department (PCD) introduced and enforced the ambient air quality standard for hourly average SO_2 concentration of 300 ppb. The Mae Moh power plant was then required by the Government to retrofit Units 4 to 11 with FGD systems having SO_2 control efficiency of at least 98% in order to be in compliance with the respective ambient air quality standard. The plan of the EGAT to build additional lignite-fired thermal power plants was also cancelled.

In 2004, the communities in Mae Moh area filed several lawsuits with the Chiang Mai Administrative Court against EGAT and various government agencies for negligence of duty required by law which led to the release of SO_2 into the atmosphere in violation of applicable standards and caused impacts to the health of the plaintiffs and to the surrounding environment. Environmental remedial actions and compensation were requested from EGAT. In 2009, the Chiang Mai Administrative Court found EGAT guilty of negligence and dismissed the negligence accusation against various government agencies. The court also granted

[1] Current ambient air quality standard for hourly average SO_2 concentration is 300 ppb.

compensation of almost 25 million baht to be paid by EGAT. In February 2015, the Supreme Administrative Court ordered EGAT to take measures to reduce dust particles dispersion in the air from mining activities and turn its golf course at the plant site forest, but no compensation to the affected villagers was ordered (Bangkok Post 2014).

The three small units (Units 1 to 3) of the Mae Moh power plant have been decommissioned due to end of service life and there will be no replacement. Units 4-7 will be decommissioned soon for the same reason. The EIA report of the replacement (one unit of 600 MW) of Unit 4-7 has recently been approved by the NEB. The new 600 MW replacement unit will employ more energy efficient technology and will be equipped with a FGD system with SO_2 removal efficiency of 97.9%. Additionally, electrostatic precipitators with 99.48% control efficiency and a Selective Catalytic Reduction (SCR) system with 50% control efficiency in addition to over-fired air and low NOx burners will be employed for particulate matter and NOx emission control respectively.

Although it has been almost 40 years since the EIA system in Thailand was first introduced in 1975 and in the meantime the system has been constantly developed, improved and implemented under the NEQA (1975) and NEQA (1992). there are still problems, obstacles, gaps and challenges with respect to project screening, terms of reference development and preparation of EIA reports, EIA report review process, EIA monitoring and evaluation. Several recommendations for both the short- and long-term were made below through several consultation meetings organized by ONEP with various stakeholders, i.e. government agencies, EIA consultants, private sector, non-governmental organizations (NGOs), academia and the ERCs, literature review and interviews with key stakeholders.

RECOMMENDATIONS FOR THE SHORT-TERM

- Project Screening
  - ONEP to regularly update and review the types and sizes of projects and activities for which an EIA report is required to suit the current situation and prevent the avoidance of EIA report preparation.
  - ONEP to consider a 'Code of Practice' instead of EIA report for projects and activities which are not very complicated such as small housing projects and small-scale power plants.

- EIA Report Preparation
  - ONEP to oversee registered EIA consultants in the preparation of the EIA report and to enforce appropriate penalties strictly.
  - ONEP to propose amendment of the Ministerial Notification of MoNRE on licensing EIA consultants to include licensing of individual experts to be accountable for the EIA report and not only the EIA consulting company.
  - ONEP to provide capacity building to government agencies and state enterprises as project proponents to supervise, oversee and monitor registered EIA consultants in the preparation of the EIA report.
  - ONEP to increase understanding of registered EIA consultants to improve the quality of the preparation of the EIA report.

- EIA Report Review

- ONEP to regularly update and improve the guidelines for the preparation and the review of EIA report taking into consideration views and comment of ERCs.
- ONEP to develop a web-based information system on the status of the review of the EIA reports submitted to ONEP so that the review process can be followed and monitored.
- ONEP and/or permitting agencies to take legal action if the proposed project is launched prior to the EIA approval and permit.
- ONEP to hold regular consultation meetings on the preparation of the EIA report with registered EIA consultants, ERCs, project proponents and permitting agencies.
- ONEP and permitting agencies to regularly hold seminars or workshops among all stakeholders involved in the EIA process to build common understanding of the benefits of the preparation of EIA report and implementing measures specified in the approved EIA report.
- ONEP or an independent researcher to conduct a feasibility study on the decentralization of EIA report reviewing to provincial or local levels in order to reduce the workloads at ONEP.

- <u>EIA Monitoring and Evaluation</u>
  - ONEP to strengthen its mandate and capacity on compliance monitoring included in its institutional framework.
  - ONEP to coordinate with permitting agencies on their roles on EIA monitoring and evaluation and to develop EIA monitoring programs to be incorporated into their annual work plans and budget.
  - ONEP to develop a web-based information system for sharing information on the results of compliance monitoring and monitoring reports submitted by the project proponents including status of the review of such reports.
  - Applying modern technologies in compliance monitoring and environmental impact assessment.
  - ONEP, Department of Environmental Quality Promotion (DEQP), independent organizations and/or NGOs to build capacity of the communities and people on their rights and duty in public participation processes and right to access project information and their capacity to participate in the public participation process throughout the EIA process to obtain meaningful participation.

<u>RECOMMENDATIONS FOR THE LONG-TERM ON AMENDMENT OF NEQA (1992)</u>

- <u>EIA Monitoring Requirement</u>
  - Provisions to require permitting agencies to put all mitigation measures and monitoring requirement specified in the EIA report as conditions to the granted permit with which the project proponents will have to legally comply.
  - Provisions on the role of relevant parties in EIA monitoring, i.e.
    - Project proponents : self-monitoring and reporting
    - Permitting agencies : compliance monitoring
    - ONEP : compliance monitoring

- Provisions to provide authority for ONEP with appropriate resources including human and financial resources to conduct onsite inspection after an EIA is approved.
- ONEP or an independent researcher to conduct a feasibility study of establishing an independent organization to handle EIA monitoring or decentralization of EIA monitoring responsibility to Regional Environmental Offices or local authorities.

- Public Participation
  - Provisions on public participation to provide its legal basis in the management of environmental quality. In particular, the requirement for public participation should be clearly specified in the provisions related to EIA.

- Environmental Health Impact Assessment (EHIA)
  - Provisions to support the requirement under Article 67 of the Constitution of Thailand (2007) on types and sizes of projects and activities deem to have severely adverse impacts to the community with regard to environmental quality, natural resources and health, health impact assessment, independent organizations on health and environment and relevant processes and procedures. This may enable integrating EIA and EHIA to create a single comprehensive procedure.

- Strategic Environmental Assessment (SEA)
  - Provisions to provide a legal basis for SEA in Thailand by explicitly requiring government agencies to use SEA as a decision support tool for all major development policies, plans and programs proposed by the Government.

- Others
  - Provisions to limit the timeframe within which the approved EIA report is used to acquire a permit and a revised EIA report to reflect the changing situation and environment is required if it fails to comply.
  - ONEP or an independent researcher to conduct a study on the feasibility of the establishment of an EIA/EHIA Fund to which the project proponents are mandated to make a financial contribution in order to support the preparation of EIA reports, work of ERCs, public participation activities and compliance monitoring carried out by permitting agencies, ONEP and communities.

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Acronyms

ADB	Asian Development Bank
BWG	Better World Green Industrial Waste Management Center in Huay Haeng District
DEQP	Department of Environmental Quality Promotion
EGAT	Electricity Generating Authority of Thailand
EHIA	Environment and Health Impact Assessment
ERC	Expert Review Committee
ESMS	Environmental and Social Management System
FGD	Flue Gas Desulfurization
GHG	Greenhouse gas
IEAT	Industrial Estate Authority of Thailand
IEE	Initial Environmental Examination
IFC/PS	International Finance Corporation Performance Standards
IO	Independent Organization
JICA	Japan International Development Agency
MoNRE	Ministry of Natural Resources and Environment, Thailand
MTP	Map Ta Put (industrial estate in Map Ta Put District)
NEB	National Environment Board
NEQA	Enhancement and Conservation of National Environmental Quality Act
NESDB	Office of National Economic and Social Development Board
NGO	Non-Governmental Organizations
ONEP	Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, Thailand
PCD	Pollution Control Department, MoNRE
SCR	Selective Catalytic Reduction
SEA	Strategic Environmental Assessment
SEF	Strategic Environmental Framework
USAID	United States Agency for International Development

1. BASIC INFORMATION ON THAI EIA POLICY

1.1 EIA POLICY FRAMEWORK

1.1.1 BACKGROUND AND ONGOING CHANGES OF NATIONAL EIA POLICY AND DRIVING FORCES

As a result of increasing environmental problems, Environmental Impact Assessment (EIA) has been applied in Thailand as a tool for environmental planning and management of economic development projects through a screening approach under the Enhancement and Conservation of the National Environment Quality Act (1975). In 1981, 10 types and sizes of the projects and activities that required EIA were specified by the first Ministerial Notification.

With the awareness of increasing environmental problems and concern for its protection, in 1992 the Enhancement and Conservation of National Environment Quality Act (NEQA, 1992) was issued replacing that of 1975. This Act incorporated the polluter-pays principle and provides the most fundamental and comprehensive basis for Thailand's environmental regulatory system today. In 2012, the Ministerial Notification of Ministry of Natural Resources and Environment (MoNRE) on types and sizes of projects and activities required to submit EIA including rules, procedures and guidelines for the preparation of EIA was updated. As of November 2014, the requirement for EIA has been expanded to cover 35 types and sizes of projects and activities as listed in Annex 1 and more attention has been given to health aspect. In addition, projects that may cause severely adverse impacts to the community with respect to environment quality, natural resources and health are required to submit Environment and Health Impact Assessment (EHIA) to be in accordance with Article 67 of the Constitution of Thailand (2007).

1.1.2 LEGAL FRAMEWORK

NEQA (1992) is the fundamental legislation that stipulates the existing EIA system in Thailand with provisions on EIA Screening, Preparation, Review Process, Timing, Mitigation Measures and Monitoring. The types and sizes of projects and activities which are required to submit EIA and EHIA including rules, procedures and guidelines for the preparation of EIA are specified in the Ministerial Notifications of MoNRE issued under NEQA (1992). The Ministerial Notifications have been regularly updated to meet the changing need and situation. General guidelines and specific guidelines are also available in Thai, English (translated) and Japanese (translated).

Additionally, under Article 67 of the Constitution of Thailand of 2007, any projects and activities which may cause severely adverse impacts to the community with respect to environmental quality, natural resources and health are required to prepare EHIA. Projects and activities which are required to prepare EHIA are issued in the Ministerial Notification of MoNRE and listed in Annex 2.

Of projects that require to prepare EIA, those by a government agency or of a state enterprise or to be jointly undertaken with private enterprises require the approval of the Cabinet, the EIA report has to be submitted to the National Environment Board (NEB) for its review and

comments and then submitted to the Cabinet for consideration. Other than that including private projects and activities, the EIA report has to be reviewed and approved by the Expert Review Committee (ERC) appointed under the NEB prior to obtaining the permit for construction or operation from a legally authorized permitting agency. The Office of Natural Resources and Environmental Policy and Planning (ONEP) of MoNRE is in charge of EIA coordinating with permitting agencies, consultants and project proponents and the Secretariat of the ERC. The ONEP is also in charge of preliminary review of the EIA reports and making preliminary comments to the ERCs.

1.1.3 PROJECT SCREENING

The lists of projects and activities which are required to submit EIA and EHIA announced in the Ministerial Notifications of MoNRE are used for screening. The proponents shall consider whether their investment projects are required to submit EIA and EHIA listed in the following Ministerial Notifications or Cabinet Resolutions.

- Ministerial Notifications of MoNRE (2012 and 2013[2]) on types and sizes of projects and activities required to submit EIA and the rules, procedures for EIA preparation (35 types of projects and activities requires EIA as listed in Annex 1)
- Ministerial Notification of MoNRE (2012) on types and sizes of projects and activities that may have severely adverse impacts to the community with respect to environmental quality, natural resources and health which are required to submit Environment and Health Impact Assessment (EHIA) (11 types of projects and activities requires EHIA as listed in Annex 2)
- Ministerial Notifications of MoNRE on Environmentally Protected Areas. There are areas in seven provinces, namely Phuket (2010), Krabi (2010), Pang-nga (2007), Suratthani (2014), Petchaburi (2010), Prajuab-Kirikan (2010), Chonburi (2010), which are designated as Environmentally Protected Areas. In each Environmentally Protected Area, there are specific measures for protecting environmental values including specific requirement on EIA and Initial Environmental Examination[3] (IEE).

1.1.4 EIA PROCEDURES

As stipulated in the Constitution of Thailand (2007) and the NEQA (1992), EIA procedures in Thailand depend on the nature of the project or activity which can be divided into two categories, i.e. EIA and EHIA. Each category has two review processes depending on whether the project or activity requires the approval from the Cabinet.

(A) EIA Review Process

(A-1) EIA review process for project or activity of private enterprises or project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises which does not require the approval of the Cabinet

[2] A slight revisions was made regarding the Project type 25 on Construction around and in the sea by removing one sub-type on Construction of Sea Wall next to Coastline in 2013 Notification.

[3] Applied cases are specified in the Remark of the Appendix II in the Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013 (Annex 1).

The proponent of project or activity for which the EIA report is required shall submit the EIA report to ONEP. ONEP examines the EIA report within 15 days to determine whether the submitted EIA report is correctly prepared in accordance with the rules and procedures. If not correctly made, ONEP shall notify the project proponent within 15 days from the date receiving such EIA report. Otherwise, ONEP shall make preliminary review and comment by ONEP officials and refer its preliminary comments to the ERC within 30 days from the date of receiving that EIA report. The ERC shall conclude its review and consideration within 45 days from the date of receiving that EIA report from ONEP. If the ERC fails to conclude its review and consideration within the said period, the report shall be deemed to have been approved by the committee.

In case the ERC approves the EIA report, the official legally empowered to grant permission shall accordingly order that the permission be granted to the person who applies for the permit.

In case the approval of EIA report is denied by the ERC, the EIA report has to be revised and resubmitted to the ERC by which the review and consideration shall be concluded within 30 days from the date of receiving that resubmitted EIA report otherwise the revised EIA report shall be deemed to have been approved. If the revised EIA report is denied by the ERC again, the review process will end. The project proponent may file a lawsuit if it disagrees with the conclusion of the ERC. The project proponent who agrees with the conclusion of the ERC and still would like to continue the project will have to revise the EIA report or prepare a new EIA report and resubmit to ONEP which will be considered as a new submission and a new review process will subsequently be initiated.

The schematic flow diagram of the EIA review process mentioned above is shown in Figure 1.

(A-2) EIA review process for project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises which requires the approval of the Cabinet

In accordance with the NEQA (1992), the project proponent shall have the duty to prepare the EIA report at the stage of conducting feasibility study and submit the EIA report to NEB for its review and comments after which the EIA report will then be submitted to the Cabinet for its consideration. However, in practice, the EIA report will be submitted to ONEP, and ONEP will examine the EIA report, make preliminary comments and then refer ONEP's preliminary comments to the ERC for consideration before submitting comments of the ERC to NEB (Figure 2). If the EIA report is approved by the Cabinet, the official legally empowered to grant permission shall accordingly order that the permission be granted to the agency responsible for the project.

The schematic flow diagram of the EIA review process mentioned above is shown in Figure 2.

(B) EHIA Review Process

The Ministerial Notification of MoNRE on rules, regulations, procedures and guidelines for the preparation of the environmental impact assessment report for the project or activity that may cause severely adverse impact to the community with respect to environmental quality, natural resources and health was issued in 2009 and amended twice in 2010 and 2012. The Ministerial Notification added a few more steps to the ordinary EIA review process for the review of such project or activity with regard to the public participation and the review by an independent organization on environment and health in order to be in accordance with Article

67 of the Constitution of Thailand (2007). The Ministerial Notification also provides the following guidelines for such project or activity:

- Guidelines on the preparation of the environmental impact assessment report
- Guidelines on health impact assessment
- Guidelines on public and stakeholder hearing to be taken in the environmental impact assessment and review processes
- Public and stakeholder hearing process to be taken by the project proponent for the development terms of reference and methods for the assessment of environmental and health impacts
- Public and stakeholder hearing process to be taken by the project proponent during the environmental and health impact assessment process and the preparation of the EIA report
- Public and stakeholder hearing process to be taken by the project proponent to review the draft EIA report
- Guidelines on public and stakeholder hearing to be taken by the permitting agency

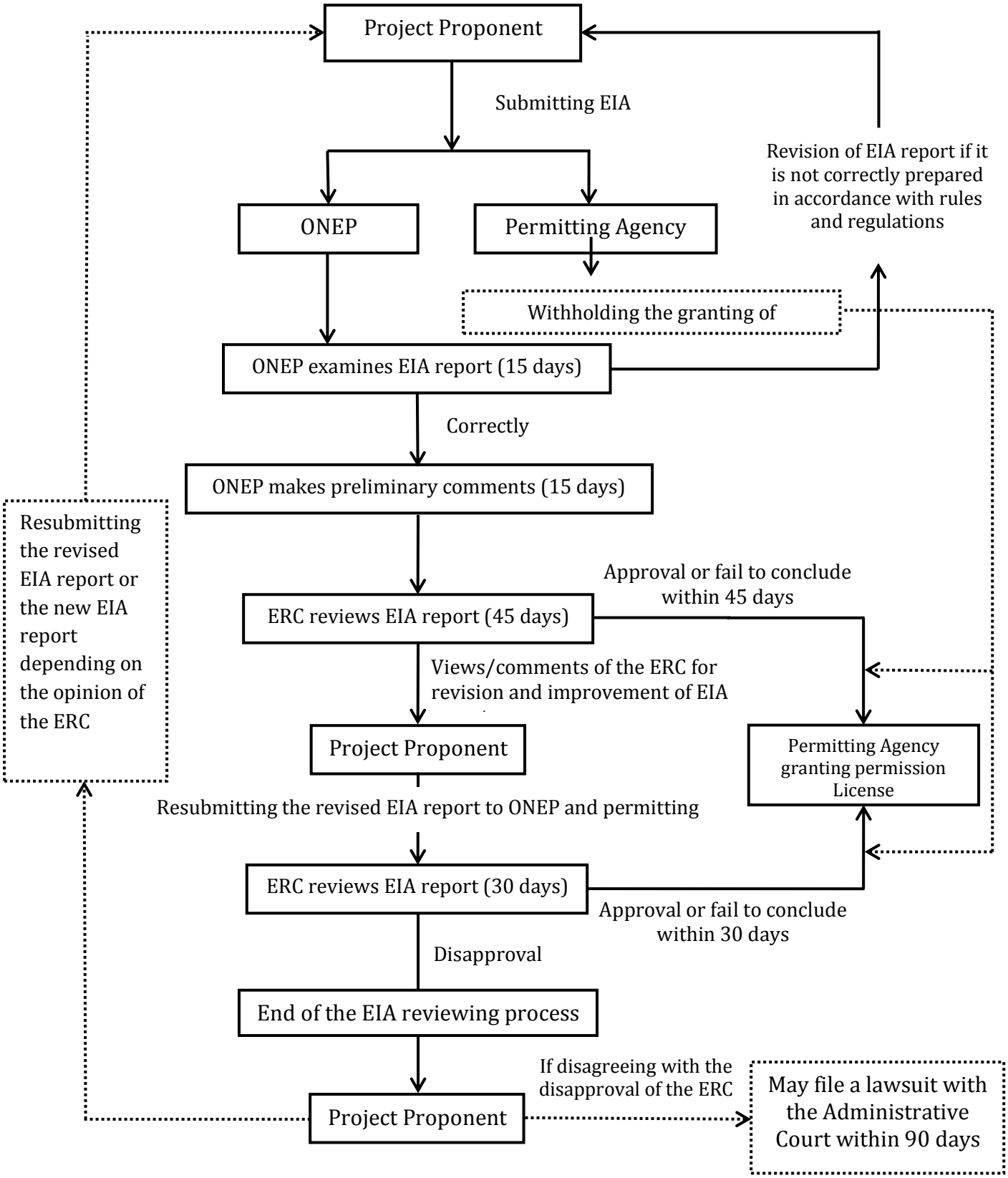

Figure 1. EIA review process for project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises required to submit the EIA report which does not require the approval of the Cabinet

(Reference: Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013)

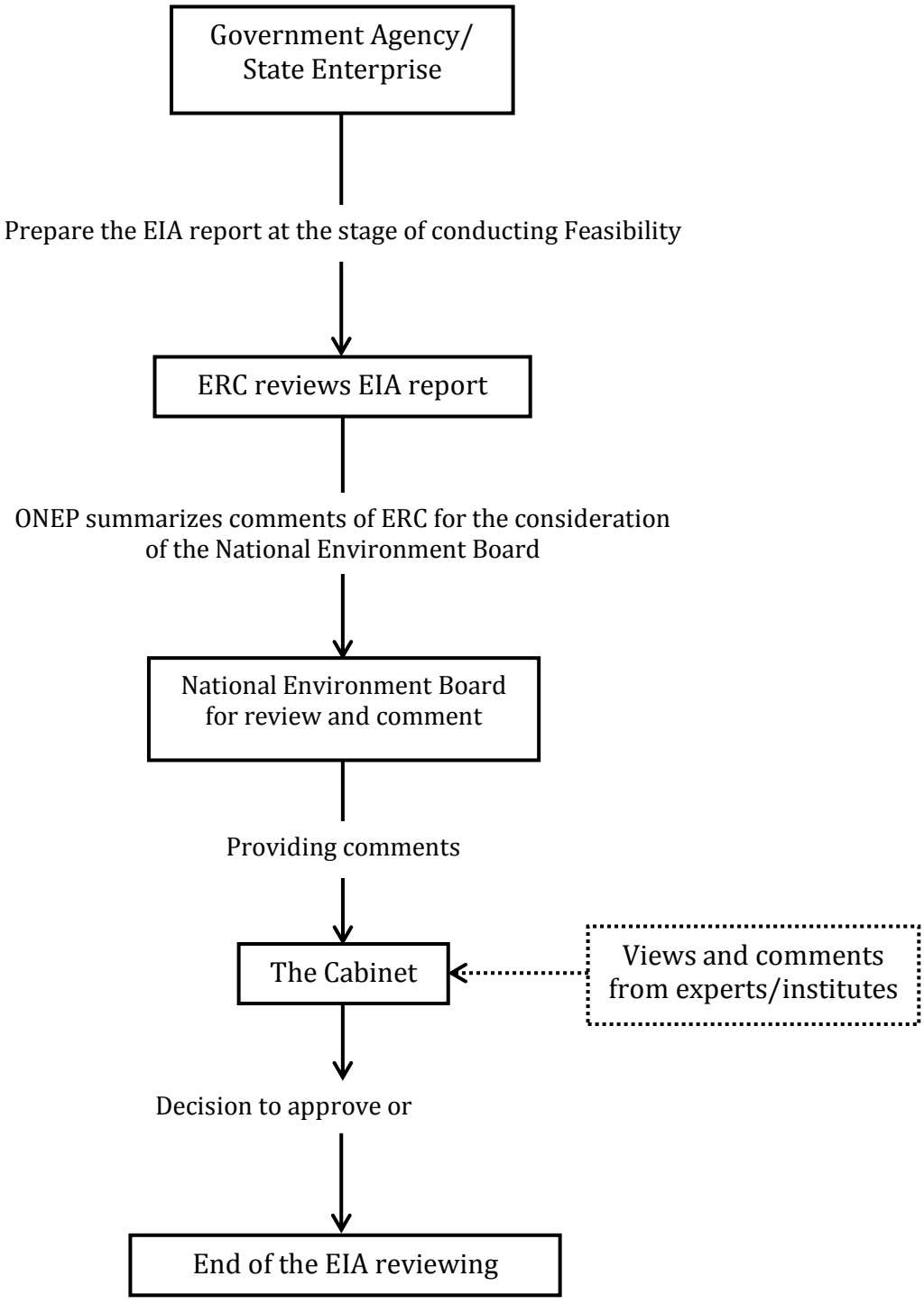

Figure 2. EIA review process for project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises required to submit the EIA report which requires the approval of the Cabinet

(Reference: Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013)

(B-1) EHIA review process for project or activity of private enterprise or project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises which does not require the approval of the Cabinet

The EHIA review process follows the ordinary EIA review process with a few additional steps. After the EIA report is approved by the ERC, ONEP shall send the approved EIA with the comments of the ERC to an Independent Organization (IO) on environment and health and to the government agency or state enterprise responsible for such project or activity or the permitting agency.

The IO shall review, consider and then submit comments on the project and the EHIA report to the government agency or state enterprise responsible for the project or activity or the permitting agency within 60 days from the date of receiving the EHIA report from ONEP.

After receiving the approved EIA report with the comments of the ERC from ONEP, the government agency or state enterprise responsible for the project or activity or the permitting agency shall organize public and stakeholder hearing.

The results from the hearing, comments from IO on environment and health and comments from ERC are to be taken into consideration by the government agency or state enterprise responsible for the project or activity in the implementation of the project and by the permitting agency in granting the permit.

The schematic flow diagram of the EIA review process mentioned above is shown in Figure 3.

(B-2) EHIA review process for project or activity of government agency, state enterprises, or to be jointly undertaken with private enterprises which requires the approval of the Cabinet

The EHIA review process for project or activity of government agency, state enterprises, or to be jointly undertaken with private enterprises which requires the approval of the Cabinet follows the same process as that for the project or activity which does not requires the approval of the Cabinet with some difference and one additional step.

The ERC will only make comments on the EIA Report, not approval. ONEP shall send the EIA with views and comments of the ERC to Independent Organization (IO) on environment and health and to government agency or state enterprise responsible for the project.

The IO shall review, consider and then submit comments on the project and the EHIA report to ONEP within 60 days from the date of receiving the EHIA report from ONEP whereas government agency or state enterprise responsible for the project shall organize a public and stakeholder hearing and then submit the outcomes to ONEP.

ONEP shall submit the EIA report together with views and comments of the committee of ERC experts, and of the IO and outcomes from the public and stakeholder hearing to the National Environment Board for its review and comment to be further submitted for the consideration of the Cabinet.

The schematic flow diagram of the EIA review process mentioned above is shown in Figure 4.

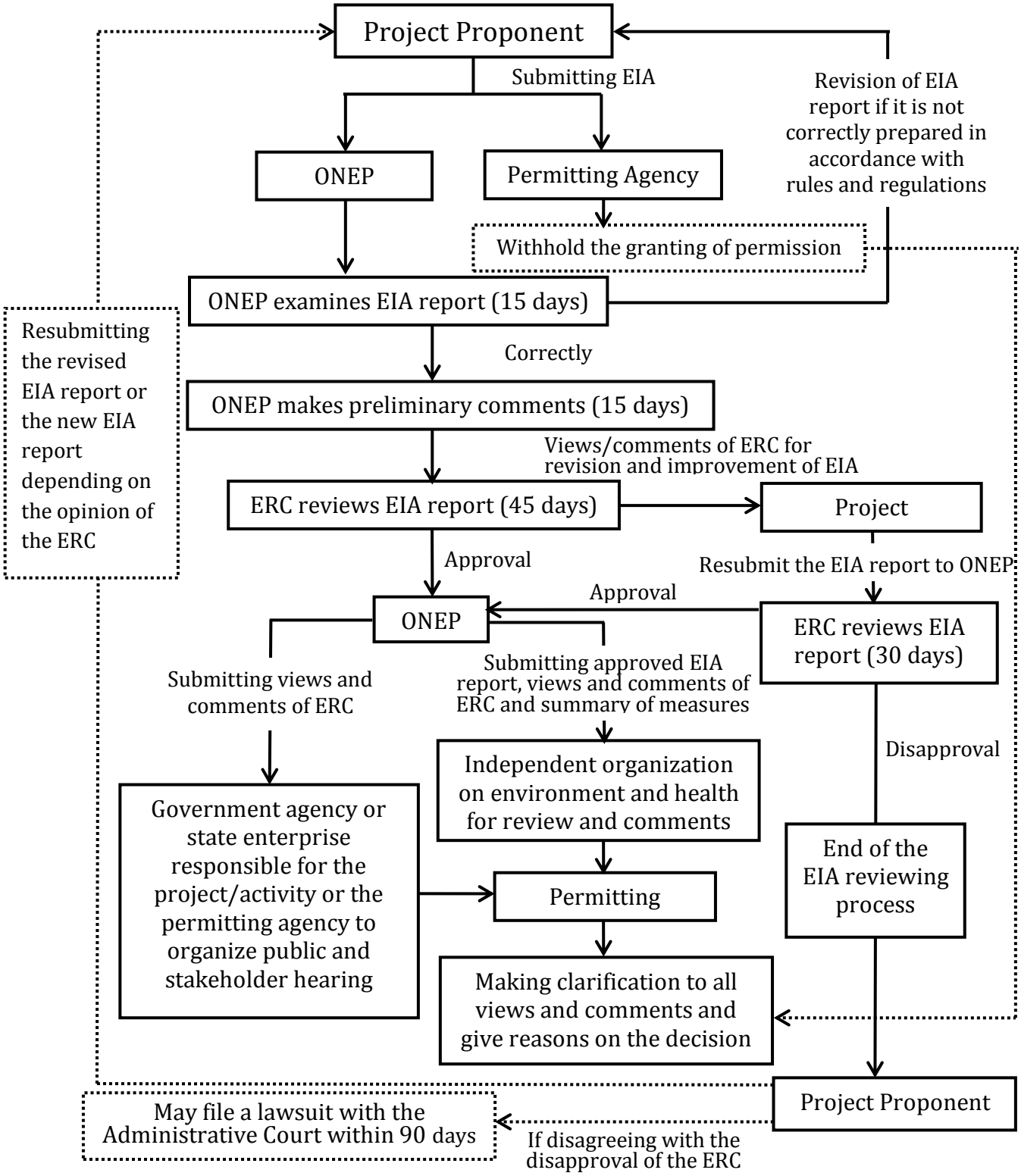

Figure 3. EHIA review process for project or activity of private enterprise or project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises which may have severely adverse impacts to the community with respect to environmental quality, natural resources and health and does not require the approval of the Cabinet

(Reference: Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013)

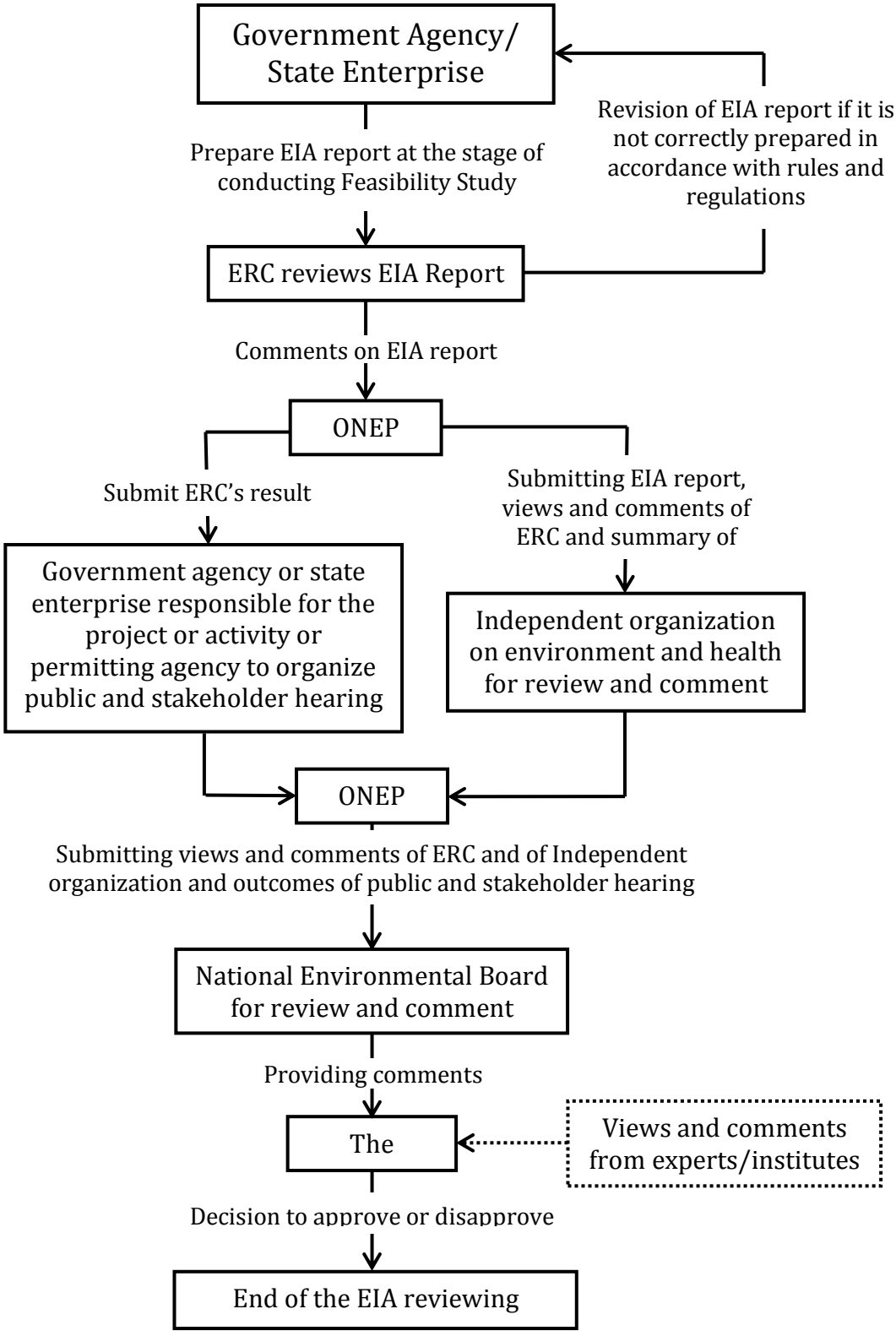

Figure 4. EHIA review process for project or activity of private enterprise or project or activity of government agency, state enterprise, or to be jointly undertaken with private enterprises which may have severely adverse impacts to the community with regard to environmental quality, natural resources and health and requires the approval of the Cabinet

(Reference: Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013)

1.1.5 POLICIES ON STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

In 2003, the NEB established a Subcommittee on Strategic Environmental Assessment (SEA) to formulate a policy recommendation on SEA development in Thailand. The draft SEA Guideline was developed and subsequently submitted for the consideration of the NEB in 2009. The NEB approved the SEA Guideline and agreed on the following;

- Government agencies should use the approved SEA guideline for the assessment of environmental impacts of any proposed development policy and plan as appropriate.
- ONEP was assigned to disseminate the approved SEA guideline to relevant agencies for implementation.
- The Office of National Economic and Social Development Board (NESDB) was assigned to submit to the NESDB to apply the approved SEA guideline to the proposed mega projects of the government or to the projects to be jointly undertaken with the private enterprises.
- In case of policy formulation, planning and development of mega projects that may cause impacts to the environment, the NEB may require the responsible agency to carry out SEA as appropriate on a case by case basis.

Since it is a time consuming process and requires resources, the SEA has not really been put into practical use in Thailand. Although the SEA Guideline was approved by NEB in 2009 and it was agreed as an administrative order for government agencies to apply the SEA Guideline in the formulation of major development policy and plan which may have severely impacts to the environment, but it is not a mandatory requirement by law. So far, there has been only a case study on "Development of a Strategic Environmental Framework towards Eco Industrial Town: A Case Study of Map Ta Put, Rayong Province" funded by Thai Health Promotion Foundation. The study aimed at building a learning process of concerned stakeholders on SEA and promoting stakeholder engagement in preparing Strategic Environmental Framework (SEF) for a subsequent SEA. There are cases which SEA were claimed but they were done at the project level rather than at the policy level. Other SEAs were either area based or project based.

1.1.6 EFFECT OF EIA RESULT ON PROJECT APPROVAL BY THE COMPETENT GOVERNMENT AUTHORITY-USING CASE EXAMPLES

For the projects or activities which the EIA is required by the NEQA (1992) and its associated Ministerial Notifications of MoNRE, the competent government authorities empowered to grant permission (Permitting agencies) to such projects or activities shall hold the granting of permission to any of such projects and activities until the EIA report is approved by the ERC. The permit will be granted by the competent government authority only to the project or activity of which the EIA report is approved.

The competent government authorities or permitting agencies shall stipulate all mitigation measures proposed in the approved EIA report including comments of the ERC as the legally mandatory conditions of the permit which has to be implemented by the project proponent.

1.1.7 SCOPE OF ASSESSMENT

1.1.7.1 Contents of EIA

The EIA report must show details of project, existing state of environmental quality, assessment of environmental impacts, mitigation measures and monitoring programs. The

environmental impact assessment has to cover four main aspects, namely physical resources, biological resources, human use value and quality of life. The scope of each aspect is shown in Table 1.

Direct and indirect, short and long term environmental impacts from the project must be assessed and included in the EIA report. The assessment should address the severity of the impacts from the project on the four main aspects, including irreversible and irretrievable losses of environmental resources and values. Mitigation measures to prevent, correct and reduce the impacts to the environment and to compensate the damages incurred should be described. Plans to compensate for irreversible and irretrievable environmental damage and to replace resources which will be destroyed must be demonstrated. Under the current framework, climate change is not a mandatory requirement for EIA. However, it could be included on a voluntary basis. For the resettlement issue, if there is a need to relocate people, it will be included in the assessment of impacts and the mitigation measures on a case by case basis.

Last but not least, a monitoring plan to continuously monitor environmental impacts from the project and the effectiveness of implemented mitigation measures throughout the project must be included. The plan should include description of monitoring site, parameters, frequency, method, applicable standards or references, and period of reporting. The EIA report should also demonstrate the participation of public and community in the development of the project and the process of the development of the EIA report. Views and comments of the concerned public and community must be reflected in the EIA report.

1.1.7.2 EIA implementation aspect

Project phase subject to EIA

The EIA report shall be submitted to ONEP and permitting agency before construction. The assessment, mitigation measures and monitoring program shall cover construction phase and operation phase. Some project types such as mining, oil and gas drilling and production, closure and post closure phases shall be included as well. A rehabilitation plan is required for mining projects.

Cumulative environmental impacts

The EIA shall assess cumulative impacts, i.e. air quality impact assessment, water quality impact assessment, etc., taking into account other relevant existing sources in the project and surrounding areas and the associated assimilative capacity of the areas. The assessment could be made by applying mathematical modeling.

Alternative project plan

The EIA shall consider alternatives to develop the project that serve similar propose but have different impacts to the environment.[4] The alternatives may be alternatives in project design, alternatives for different routes or sites, and alternatives for process or technology. Advantages, disadvantages and impacts to the environment of each alternative shall be evaluated and

[4] Specified in the General Guidelines in Preparing EIA Report section of the Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013.

compared with each other for the consideration on the selection of the alternative which will have least impacts but still serve the purpose of the project.

Table 1. Four main environmental aspects to be covered by the EIA report

Aspect	Area	Scope	Regulation (environmental standards) or others
Physical resources	Geomorphology	- Topography - Elevation - Unique physical feature, e.g. island, cliff, etc.	NA
	Soil	- Profile and extent of soil type - Sedimentation - Erosion - Physical and chemical Characteristics	- Soil quality standards
	Geology	- General description of the geology of the site - Seismicity - Type and quality of mineral resources	NA
	Surface and underground water	- Water resources, stratification (if any), quantity and quality , flow rate, etc.	- Surface and underground water quality standards
	Sea water	- Oceanographic characteristic, current, quality, stratification, etc.	- Coastal water quality standards
	Air	- Climatic characteristic (rainfall, intensity, temperature) - Air quality - Incidence of inversions, fog, storm	- Ambient air quality standards
	Noise	- Intensity and frequency	- Noise standards
Biological resources	Animal / plant	- Ecology, species, number, distribution - Habitat and migration	NA
	Rare species	- Species, number and its importance	NA
Human use value	Drinking water/ water usage	- Sources, quantity, quality and adequacy	- Drinking water quality standards
	Transport	- Route, traffic	NA
	Electricity and energy	- Source, type, adequacy	NA
	Flood control/ drainage	- System and efficiency	NA
	Agriculture activities	- Agriculture development/ promotion - Irrigation system - Reforestation	NA
	Industry	- Type and number of Industry	NA
	Mining	- Type and number of Mining	NA
	Recreation	- Type and use of green area	NA
	Land use	- Existing land use - Specific zoning	- Land use plan
Quality of life	Socio-economic	- Population profile (i.e. occupation, income, language, religion)	NA
	Health	- Morbidity Rate, Mortality Rate, infectious disease, epidemic, health services	NA
	Occupational health	- Occupation disease and illness, accident, health risk	NA
	Historical value	- Historical site, archaeological site, traditional custom, culture	NA

	Recreational value	- Site, value and importance	NA

(Reference: Developed by authors based on the information from the Environmental Impact Assessment in Thailand (booklet), 2nd edition, June 2013)

Monitoring plan and its implementation

Monitoring programs should aim at measuring the environmental impacts from the construction phase to the operation phase of the project and, in some cases, to after the closure of the project, for example, mining, oil and gas drilling and production and hazardous waste disposal, and to confirm the effectiveness of the implemented mitigation measures. Monitoring plans should describe monitoring sites, parameters, frequency, and methods monitoring, applicable standards or references, and reporting period and frequency.

1.1.8 ENVIRONMENTAL QUALITY STANDARDS

Standards, rules and regulations on environment to be used as reference in the EIA are summarized in Table 2. Inquiry to and consultation with ONEP should be made if there are no applicable standards, rules or regulations in Thailand.

Table 2. Reference environmental standards, rules and regulations for EIA

Atmospheric environment	Air Quality Standards (Ambient and Emission) Odor Standards (Ambient and Emission) Noise Standards (Ambient and Emission)
Water environment	Surface Water Quality Standards, Groundwater Quality Standards, Groundwater Quality Standards for drinking purpose Coastal Water Quality Standards Effluent Standards
Soil environment	Soil Quality Standard
Biodiversity and natural environment	Biodiversity Guideline (draft)
Landscape and amenity	Visual Impact Assessment Guideline
Waste management	The Factory Act The Hazardous Substance Act The Public Health Act The Public Health Ministerial Order for infectious waste management
Climate change mitigation and adaptation	Climate Change Strategy Plan

(Reference: Developed by authors from various sources of the MoNRE)

1.1.9 METHODOLOGIES

Technical guidelines for the preparation of EIA reports for various types of the projects such as industry, transportation, water resources, and buildings are available at ONEP and shall be used for the EIA preparation.

- Public participation and social impact assessment guideline
- Air quality modeling guideline
- General guidelines for the preparation of EIA reports
- Guideline on health impact assessment in EIA reports

- Guidelines for the preparation of EIA reports for specific sectors, projects and activities, i.e. thermal power project, land transport project, industrial project, petroleum exploration and production project, petroleum refinery project, petrochemical industry project, housing project, etc.

1.1.10 IMPACT MITIGATION FRAMEWORK

Mitigation measures to be proposed in EIA shall address and be related to the result of the impact assessment. Significant negative impacts shall be emphasized. Mitigation hierarchy will start from avoiding impacts, prevention, minimizing impacts, correcting impacts to the minimum level, and compensation for unavoidable damages.

1.1.11 MONITORING

The monitoring plan shall include description of monitoring site, parameters, frequency, measuring methods, responsible agencies. The project proponents has to submit a monitoring report to ONEP and permitting agencies every 6 months.

1.2 EIA IMPLEMENTATION CAPACITY

1.2.1 NUMBER OF EIA REPORTS PROCESSED IN 2010-2014

The number of EIA reports submitted to ONEP has been constantly increasing and is presented in Table 3.

Table 3. EIA report submission to ONEP and final approval in 2010-2014

Year	First submission	Revised EIA	Total EIA reports submitted	Final approval by ERCs
2010	505	665	1168	NA
2011	467	1101	1568	470
2012	483	1150	1633	377
2013	799	1258	2057	491
2014	886	1518	2404	586

(Reference: Developed by authors based on information from EIA Bureau, ONEP)

1.2.2 INSTITUTIONS INVOLVED IN EIA REVIEW, APPROVAL AND MONITORING

ONEP is the primary agency receiving the EIA report from the project proponent. After receiving the EIA report, ONEP will review and make preliminary comments on the EIA report to be presented to the ERC of which ONEP serves as the Secretariat.

The ERC reviews the EIA report and either gives approval for projects or activities which are not required by law to obtain the approval of the Cabinet or makes comments on the EIA report for the consideration of the NEB and the Cabinet for projects or activities of government agencies or state enterprises, or to be jointly undertaken with private enterprises which are required by law to obtain the approval of the Cabinet. Division of tasks in the EIA review process is presented in Table 4.

Table 4. Division of tasks in EIA review process

Steps	Institution involved/role	Third party/ local

		government involved
EIA Review	ONEP : preliminary review Expert Review Committee : review	For projects located in environmental protected areas, Initial Environmental Examination and EIA of some types of project or activity are reviewed by committee of experts in the provinces. ONEP is in charge of preliminary review of the EIA reports and making preliminary comments to the ERCs.
Approval	Expert Review Committee : For projects or activities which are not required by law to obtain the approval of the Cabinet Cabinet: For projects or activities of government agencies or state enterprises, or to be jointly undertaken with private enterprises which are required by law to obtain the approval of the Cabinet. The ERC will review and provide comments for the consideration of the NEB and the Cabinet, respectively.	Same as EIA review
Monitoring	Permitting agencies: Mitigation measures in the approved EIA report will be attached to the permit and become legalized. Monitoring will be made by the project proponent in accordance with the monitoring plan indicated in the approved EIA report. Monitoring report will be submitted to the permitting agency and ONEP every 6 months. ONEP and Permitting Agencies will regularly monitor whether the project is in compliance with the EIA report.	Third party and community involved in monitoring especially for important projects such as industries, power plant, etc.

(Reference: Developed by authors based on information and documents from EIA Bureau, ONEP)

As of 7 November 2014, there are 15 ERCs appointed by the NEB as listed below. Each ERC consists of representatives from relevant government agencies and specialists.

1) ERC on licensing of consultants qualified for the preparation of EIA report
2) ERC on mining project
3) ERC on petroleum development
4) ERC on refinery, petroleum, petrochemical and gas separation/transformation industries
5) ERC on industry and supported infrastructure system
6) ERC on building, real estate and community services
7) ERC on thermal power plants
8) ERC on land and air infrastructure
9) ERC on water infrastructure
10) ERC on water resource development
11) ERC for Phuket environmental protected area
12) ERC for Chonburi environmental protected area

13) ERC for Petchburi environmental protected area
14) ERC for Prajuab-Kirikan environmental protected area
15) ERC for Surat Thani environmental protected area

1.2.3 NUMBER OF STAFF IN EACH EIA RELATED DEPARTMENT

Listed in Table 5 is the number of staff in departments working related to EIA. There are a total of 73 permanent staff and 49 temporary staff in the Environmental Impact Evaluation Bureau of ONEP.

Table 5. Number of staff in EIA-related departments

Organization/Department	Permanent staff	Temporary staff	Total staffs
Office of Natural Resources and Environmental Policy and Planning (Environmental Impact Evaluation Bureau)	73	49	122
Department of Royal Irrigation (Environment Group)	10	8	18
Department of Highway (Environment and Public Participation Bureau)	12	-	12
Airport of Thailand PLC. (Environmental Department)	22	2	24
Electricity Generating Authority of Thailand (EIA Division)	16	-	16
Department of Industrial Works (Public Participation Bureau)	19	-	19
Industrial Estate of Thailand (Environmental and Energy Division)	6	-	6
Department of Mineral Fuel (Safety and Environment Division)	20	2	22
Energy Regulatory Commission (Energy and Environmental Department)	12	2	14

(Reference: Developed by authors based on information from EIA Bureau, ONEP)

1.2.4 COLLABORATION WITH OTHER MINISTRIES

In the EIA process, ONEP works closely with other ministries, for example; Ministry of Industry, Ministry of Interior and Ministry of Energy which are the permitting agencies; Ministry of Transport and Ministry of Agriculture and Cooperatives which are project proponents; Ministry of Education and Ministry of Public Health which support experts in the ERCs.

1.2.5 HUMAN RESOURCE AND TECHNICAL CAPACITY OF EIA CONSULTANTS

All consultants who are qualified to prepare the EIA report shall register with ONEP in accordance with the Ministerial Notification of MoNRE on Qualification of EIA Specialist, Rules and Procedures to obtain EIA Consultant License and Control of License. Review of the application of the consultants to obtain a license and approval for licensing are made by the ERC on licensing of consultants qualified for the preparation of EIA reports.

Each registered consultant must have at least one full time expert and three full time technical staff for preparing EIA reports. The expert must have at least a Bachelor degree on

Environmental Science, Sanitary Science, Ecology, Environmental Engineering, Sanitary Engineering, or Environmental Economics with at least 5 years of experience in EIA or environmental research. It is also required that the full time technical staff must have at least a Bachelor degree in Science, Engineering or Social Science.

In order to be a registered EIA consultant, the expert will be interviewed for his or her understanding of the role of an EIA expert to ensure the ability and capacity to prepare a good quality EIA reports. As of 8 December 2014, there are 72 consultants registered with ONEP (http://www.onep.go.th/eia/images/6interest/consults.pdf) for the preparation of EIA reports which include private consulting firms, universities and research institutes. The registered consultant must provide additional technical experts in the fields necessary for the preparation of the EIA report. In the case of report falsification or negligence which may lead to damage, the license of the registered consultants may be suspended or revoked. In the preparation of the EIA report for a project or activity, EIA consultants will normally establish a team of technical experts consisting of specialists in various fields depending upon the nature of the project and associated impacts which may arise from the project. In many cases, many specialists are from well-known universities in Thailand and in some cases they are international experts.

1.3 COMPARISON OF THAI EIA SYSTEM WITH INTERNATIONAL STANDARDS (IFC/PS) AND JAPANESE EIA SYSTEM

Comparisons of the EIA system in Thailand with international standards, i.e., the International Finance Corporation Performance Standards (IFC/PS) and Japanese EIA system are presented Annex 3 and Annex 4, respectively. Similarities and differences between the Thai EIA system and international standards (IFC/PS) and the Japanese EIA System are summarized below.

1.3.1 COMPARISON OF THAI EIA SYSTEM WITH INTERNATIONAL STANDARDS (IFC/PS)

There are similarities in many issues such as IFC/PS requirement of environmental and social management system (ESMS) that cover (1) identification of impacts (2) mitigation and performance improvement measures (3) monitoring (4) stakeholder engagement, as well as issues to be identified in PS2-8. Using the category system for projects requiring ESMS is also quite similar to the listing system of projects requiring EHIA/ EIA /IEE in Thailand but there are some differences in the details.

There is a significant difference in the issue of climate change mitigation and adaptation as the IFC/PS covers more details starting from identification of risks and impacts of GHGs, consideration of alternatives and implementation of technically and financially feasible and cost effective options to reduce project-related GHGs.

1.3.2 COMPARISON OF THAI EIA SYSTEM WITH JAPANESE EIA SYSTEM

Thai and Japanese EIA systems are similar in key steps of the EIA process including screening, scoping, preparation of draft and final EIA reports, review and monitoring. However, there are important differences in the legal framework and the details in some steps.

On the legal framework, Japan has a national EIA law and local governments' EIA law while Thailand has only a national EIA law as a part of the National Enhancement and Conservation of Environmental Quality Act (1992).

On the screening step, the Japanese EIA system has a Primary Environmental Impact Consideration Report as a screening tool for EIA requirement while the Thai EIA system

screens projects on whether an EIA will be required or not by the list of types and sized of projects for which EIA is required in the Ministerial Notification of MoNRE. The Thai EIA system also has IEE with a separate list of types and sizes of projects for which an IEE is required.

On the review process, Japanese EIA reports are reviewed by the prefectural governor, responsible ministers and the environmental minister and there is no time limitation for EIA review. On the other hand, Thai EIA reports are first reviewed by ONEP which is the central government agency for the subsequent review for approval by Expert Review Committees. Additionally, there are time limits for the review process specified in the NEQA (1992) for the projects which require permits to operate under other laws as described in Section 1.1.4.

1.4 CONTACTS RELATING TO EIA

1.4.1 GOVERNMENT AGENCIES RELATING TO EIA (INCLUDING OTHER RELATED MINISTRIES)

Government agencies related to EIA can be classified into 3 groups as follows:

1.4.1.1 Government agencies involved in reviewing EIA reports

ONEP of the MoNRE is the main agency responsible for the administration of the Thai EIA system including the development of EIA system and EIA review process. ONEP is responsible for reviewing and making proposals on types and sizes of projects or activities for which EIA is required as well as rules and regulations for the preparation of EIA reports to NEB for approval, the development of guidelines for the preparation of EIA reports for various types of projects or activities, and the registration of EIA consulting firms.

EIA reports are reviewed and approved by the ERCs for which ONEP serves as the Secretariat. The ERCs appointed by the NEB consist of representatives from other relevant government agencies, i.e. Department of Health, Department of Industrial Works, Pollution Control Department, Department of Local Administration, Department of Public Works and Town & Country Planning, Industrial Estate Authority of Thailand, and others.

1.4.1.2 Permitting agencies

For projects or activities required by law to obtain permission prior to construction or operation, the permitting agencies shall withhold the granting of the permission until they have been notified by ONEP of the result of EIA approval. Furthermore, the permitting agencies shall stipulate the conditions of permission all mitigation measures and comments of the ERC included in the approved EIA (Table 6).

Table 6. EIA permitting agencies in Thailand

Types of Projects	Permitting agencies	URL
Industry	Department of Industrial Works, Ministry of Industry Industrial Estate Authority of Thailand, Ministry of Industry	www.diw.go.th www.ieat.go.th
Mining	Department of Primary Industries and Mines Ministry of Industry	www.dpim.go.th
Power plant	Office of Energy Regulatory Commission Ministry of Energy	www.erc.or.th

Port	Marine Department Ministry of Transport	www.md.go.th

(Reference: Developed by authors based on the available information)

1.4.1.3 Project Proponent

EIA is required for projects and activities included in the Ministerial Notification of MoNRE on types and sizes of projects or activities for which EIA is required regardless of whether project proponent is government agency or private enterprise. Therefore, some government agencies and state enterprises are involved in EIA as the project proponent such as Department of Royal Irrigation, Ministry of Agriculture and Cooperatives; Department of Highways, Expressway Authority of Thailand, Ministry of Transport; the Electricity Generating Authority of Thailand, Ministry of Energy; Industrial Estate Authority of Thailand, Ministry of Industry; National Housing Authority, Ministry of Social Development and Human Security; etc.

1.4.2 OTHER INSTITUTIONS AND ORGANIZATIONS THAT CAN PROVIDE ADVICE ON EIA DEVELOPMENT AND IMPLEMENTATION

In the development and implementation of EIA system in Thailand, ONEP has been in close cooperation, collaboration and consultation with relevant stakeholders involved in the EIA process on a regular basis, including ERCs, government agencies, state enterprises, academia, research institutes, registered EIA consultants, private sector, non-governmental organizations (NGOs), and international organizations. The Office of National Health Commission has played a significant role in the development and implementation of health impact assessment system in Thailand under the requirement of Article 67 of the Constitution of Thailand (2007).

In particular, NGOs both national and international have played an important and significant role in the development and implementation of EIA system in Thailand since they represent the recipients (i.e. people, environment and natural resources) of impacts caused by projects or activities which are not carefully developed and implemented. They are, for example, Thailand Environmental Institute, Stop Global Warming Association, Healthy Public Policy Foundation, Wildlife Fund Thailand, Greenpeace Thailand, etc.

Various international organizations, such as the World Bank, ADB, JICA, and USAID, have also provided support for the development of EIA system in Thailand since EIA is required for the projects or activities funded by them.

1.5 OTHERS

Thailand has a few types of funds available set up for certain sectors or environmental activities in general. Power projects offer a Community Development Fund for areas surrounding the power plant. The Mining Fund is used for rehabilitation after mine closure or compensation for health impacts caused from the operation. The Environment Fund can be used for communities or NGOs for environmental activities upon approval of the submitted proposal by the Environmental Fund Committee and for other environmental activities as approved by the NEB.

The latest list of guidelines available from the website of EIA Bureau is presented below (as of March 2015):

- Manual on Projects or Activities which are required to prepare Environmental Impact Assessment Report (Thai, April 2014)
- Manual on Environmental Impact Assessment for Japanese Investors (Thai and Japanese, October 2012
- Environmental Impact Assessment in Thailand (EIA) (English, June 2013)
- Manual on Environmental Impact Assessment System in Thailand (Thai, April 2014)
- Guideline for Health Impact Assessment in an Environmental Impact Assessment Report (Thai, April 2013)
- Manual on Strategic Environmental Assessment (SEA) (September 2011)
- Guideline for the Preparation of Environmental Checklist for the Project in Forest Protected Areas (Thai, December 2012)
- Ecological Impact Assessment Guideline - Terrestrial Ecosystem (Thai, date and year not available)
- Guideline for Public Participation and Impact Assessment of Social Environment in Environmental Impact Assessment Process (Thai, August 2006)
- Guideline on the Use of Model for the Assessment of Air Pollution Dispersion (Thai, September 2013)
- Guidelines for the preparation of EIA reports for specific sectors, projects and activities, i.e. thermal power project, land transport project, industrial project, petroleum exploration and production project, petroleum refinery project, petrochemical industry project, housing project, land reclamation project, etc. (Thai)
- Guidelines for the Preparation of Monitoring Report for specific sectors, projects and activities, i.e. mining project, transport project, building and housing project, industrial project, petroleum exploration and production project, petroleum refinery project, etc, (Thai)
- Manual on the Application for License for the Preparation of EIA Reports (Thai, June 2012)

Other relevant regulation and others:

- Regulation of the Office of the Prime Minister on Public Consultation by Public Hearing (1996)
- Article 67 of Thailand Constitution (2007) on projects or activities which might cause significant adverse impact to the communities

  (Quotation)
  "The right of a person to give to the State and communities participation in the conservation, preservation and exploitation of natural resources and biological diversities and in the protection, promotion and preservation of the quality of the environment for regular and continued livelihood in the environment which is not hazardous to his or her health and sanitary condition, welfare or quality of life, shall be protected as appropriate.

  Any project or activity which may seriously affect the community with respect to the quality of the environment, natural resources and health shall not be permitted, unless, prior to the operation thereof, its impacts on the quality of the environment and on public health have been studied and assessed and a public hearing process has been conducted for consulting the public as well as interested persons and there have been obtained opinions of an independent organisation, consisting of representatives from private organisations in the field of the environment and health and from higher education institutions providing studies in the field of the environment, natural resources or health.

  The right of a community to bring a lawsuit against a Government agency, a State agency, a State enterprise, a local government organisation or other State authority which is a juristic person for the performance of duties under this provision shall be protected."

2. CHALLENGES AND OPPORTUNITIES ON EIA SYSTEMS AND THEIR IMPLEMENTATION

It has been almost 40 years since 1975 that the EIA system has been constantly developed, improved and implemented in Thailand under the NEQA (1975) and NEQA (1992). In 2013, ONEP held several consultation meetings in 2013 in order to identify problems, obstacles and gaps in the existing EIA system in Thailand for further improvement to ensure that the impacts to the environment and the health of the people from the development projects and activities will be minimized while the economic development is still maintained for the sustainable development of the country.

The consultation meetings organized by ONEP in 2013 were attended by relevant stakeholders, namely representatives of various government agencies of Ministry of Agriculture and Cooperatives, Ministry of Energy, Ministry of Industry, and Ministry of Transport with the roles of the project proponents and permitting agencies, representatives of the project proponents from private sector, representatives of registered EIA consultants and members of ERCs. The views and comments of the people sector and NGOs on the EIA system in Thailand were obtained from National Health Assembly meetings.

Problems, obstacles and gaps and recommendations on the existing EIA system in Thailand and its implementation compiled from the consultation meetings and the meetings of National Health Assembly are summarized and grouped according to the roles of each group in the EIA system.

The section below presents identified challenges and opportunities based on the results from the consultation meetings organized by ONEP and literature review and interviews with key stakeholders conducted in September-December 2014 by the authors.

2.1 GOVERNMENT AGENCIES WITH THE ROLES OF THE PROJECT PROPONENTS AND PERMITTING AGENCIES

Government agencies of the Ministry of Agriculture and Cooperatives, Ministry of Energy, Ministry of Industry, and Ministry of Transport with the roles of the project proponents and permitting agencies identified problems, obstacles and gaps of the EIA system according to the steps in the EIA process in priority as follows:

2.1.1 PROJECT SCREENING

- Types and sizes of projects or activities for which an EIA report is required should be reviewed and revised to be more appropriate and clearly defined.
- Code of Practice may be more suitable for some types of projects or activities instead of EIA.

2.1.2 TERMS OF REFERENCE DEVELOPMENT AND PREPARATION OF EIA REPORT

- Insufficient quality of EIA reports.
- Wrong, incomplete, confused and inconsistent data and information.
- Lack of integration among the impact assessment of various environmental aspects.

- Copying carelessly information from one EIA report to the other.
- Status of the project reported in the EIA report not in line with the real situation. For example, the EIA report reports that the construction of the project has not been started but in reality the construction has already been started.
- Registered EIA consultants do not have experts and budget allocated appropriately for the assessment of important environmental aspects.
- Some government projects or activities do not have permitting agency.

2.1.3 EIA REVIEW

- There are many EIA reports submitted to ONEP.
- ERC sometime requires too much in-depth information on specific areas.
- New issues raised by ERC have implication on the budget allocated for the study which results in the delay of the amendment of the EIA report.
- Guidelines for the preparation of the EIA report is changed with the change of ERC.

2.1.4 EIA MONITORING AND EVALUATION

- Delay in submitting EIA monitoring report.
- Information reported in EIA monitoring report is incomplete.
- Misunderstanding on the role of EIA monitoring and some permitting agencies do not carry out EIA compliance monitoring.
- Some permitting agencies are not able to put every mitigation measure required in the EIA report as conditions in the permit.

2.1.5 OTHERS

- For projects or activities classified as having severely adverse impacts to the community with respect to environmental quality, natural resources and health, there are too many hearing steps.
- There is no timeframe specified for the permitting step of permitting agencies.

2.2 PROJECT PROPONENTS FROM PRIVATE SECTOR

- There are too many EIA reports, in particular housing projects, submitted to ONEP which cause the delay in the review process.
- Review of EIA reports is made at central level which might not have sufficient information of the area of the project site. It is therefore recommended for ONEP to decentralize the review process to regional or local levels.
- The project proponents are willing to follow rules and regulations on environment and request ONEP to clearly inform all relevant parties.
- It is recommended for ONEP to disseminate information and knowledge to and build capacity of the operators and related professional on EIA.
- Guideline for the preparation of the EIA report is changed with the change of ERC. Relevant parties are not well-informed of new guidelines including when it will be applied.

- Land title document should not be required for the project site in the review process since after the EIA report has been prepared. The project proponent might find it not economically feasible to implement the project.
- Consideration should be given to the necessity of letter of certificates for services provided by government agencies since it is the duty and responsibility of government agencies to provide such services.
- It is recommended for ONEP to develop a database on the works completed by registered EIA consultants. Additionally, registered EIA consultants might be classified based on their expertise in specific area of EIA.
- It is recommended to compile views and comments of ERCs on the EIA reports and distributed on regular basis to relevant parties as a guideline for the implementation of the project.

2.3 REGISTERED EIA CONSULTANTS

- The project proponents do not bring all parties involved in the project to be involved in the preparation of the EIA report from the beginning of the design of the project in particular environmental consultant and this makes the revision of the project during the preparation of the EIA report complicated.
- There should be consultation meetings among the project proponent, project designers both engineering and architectural design, ERC and ONEP constantly so that the outcomes of the meeting will be implemented.

2.4 EXPERT REVIEW COMMITTEES

- Several projects were designed just to meet the minimum requirement or at the level required by laws. Instead, they should be designed with some reservation for flexibility in case there is a need to revise the project design to reduce the environmental impacts.
- The project should be designed with the consideration to minimize environmental impacts. In some case, ERC might suggest the project proponent to design the project to be better than what are required by law. Clarification can be made with ERC, if it is not possible to do as suggested by ERC.
- Content of the EIA report should not be more than necessary. It should only contain important information and substances which are necessary for the consideration of environmental impacts.

2.5 PEOPLE SECTOR THROUGH NATIONAL HEALTH ASSEMBLY

2.5.1 EIA PRINCIPLES AND SYSTEM

- NEQA (1992) should be amended to include requirement for Strategic Environment Assessment (SEA) which is then linked to EIA/EHIA and requirement for studying carrying capacity of the area and the NEB should be empowered to order a preparation of SEA for any development policy and plan and to order any project or activity which deems to have severely adverse environmental impact and not required by law to prepare an EIA/EHIA report to prepare an EIA/EHIA report.
- Feasibility study of a project should have the following aspects,
  - Feasibility should be linked to EIA/EHIA

- Calculation of economic return of the project should include capital cost of environment, natural resources and health and economic and social aspects of the community. If EIA/EHIA shows that there will be severely adverse impacts and there is no suitable measure to reduce impacts, the project regardless of whether it is government or private project should be cancelled.

- Local authority should use EIA/EHIA report for the consideration of granting the permission for the project and taking any actions related to the project.

- Registered EIA consultants tend to prepare EIA reports in favor of the project proponent since they are paid by the project proponent to prepare EIA report with the goal to get the approval from ERC. With this kind of arrangement, reliability and credibility of the EIA report becomes a question. It is suggested to establish an EIA/EHIA Fund to which the project proponent will make financial contribution. An independent organization will then hire a registered EIA consultant to prepare the EIA/EHIA report with support from the Fund. The works of ERC, promotion of stakeholder participation and compliance monitoring will also be supported by the Fund.

- The approved EIA/EHIA report should be used within 2-3 years for the permit application after which a new or revised EIA/EHIA report will have to be prepared for ERC approval.

- A complaint system should be established if the project proponent intentionally avoids preparing an EIA report.

- There should be a fixed timeframe for the review and revision of the types and sizes of projects or activities for which EIA report is required.

- A fixed timeframe should be established for the revision of the EIA report by the project proponent and the registered EIA consultant.

- The registered EIA consultant has to engage certified experts who have skill and expertise in the participatory public hearing process.

- The review of EIA report should be disclosed to the public, for example, by having community representation in the review process of ERC.

- Measures in the approved EIA report must be put as conditions to the permit by the permitting agencies. Fail to comply with the measures will lead to warning, probation and revoking of the permit.

- For large projects or projects which pose high environmental impacts, the project proponent shall submit a monitoring and compliance report every 6 months and a multilateral committee which includes local community and academic institution should be established to monitor EIA compliance.

- Compliance monitoring should be decentralized to Regional Environmental Offices and local authority which have the capacity to do so. Additionally, collection of tax from the project for which EIA report is required should be decentralized to local authority in order for local authority to have sufficient budget and as an incentive to local authority.

2.5.2 PUBLIC PARTICIPATION

- Public participation process should be improved to focus on objectives and outcomes.

- A system should be established for the appointment of technical advisors to assist and give advice to the community on technical matters with support from the EIA/EHIA Fund.
- Information, data, documents and EIA/EHIA report throughout the EIA process (preparation, review and post approval phases) should be disclosed to the public and other organizations. Currently, project proponents are required to provide necessary information to the public when a public hearing is held. Reports of such meetings are required to be disclosed under the Information Act.
- Capacity building should be provided to the community on public participation processes and on access to project information throughout the EIA process.

3. CASE STUDIES ON CHALLENGES, RESPONSES, AND OPPORTUNITIES ON EIA SYSTEM AND ITS IMPLEMENTATION

Case studies on the implementation of the EIA system in Thailand are given below in three different sectors, namely industrial sector, waste disposal sector, and power sector. Each case will demonstrate how the EIA system is being implemented, challenges, problems and controversies faced, and how they were dealt with, including court cases and compensation, and community and public involvement.

3.1 MAP TA PUT (MTP) INDUSTRIAL ESTATE AND DEEP SEA PORTS

3.1.1 BACKGROUND

Map Ta Put (MTP) Industrial Estate located in Map Ta Put District, Amphoe Muang, Rayong Province almost 200 kilometers east of Bangkok has been developed as a part of Eastern Seaboard Development in Thailand since in early 1990s. It is operated by the Industrial Estate Authority of Thailand (IEAT) which is a state enterprise under the Ministry of Industry. Presently, it is the biggest petrochemical industrial complex in Thailand consisting of upstream to downstream petrochemical industries, i.e. oil refineries and natural gas separation plants to various types of plastic industries including polyethylene plastic, polypropylene plastic, Acrylonitrile Butadiene Styrene, Polyvinylchloride, etc., and utility plants including natural gas-fired gas turbine thermal power plants and coal-fired steam turbine thermal power plants. MTP also has several deep sea ports for transport of raw materials and products. During the past 20 years, MTP Industrial Estate has been expanded with increasing numbers and varieties of industries.

Additionally, the land use plan of Map Ta Put District has been revised several times. In order to support more industrial development in Map Ta Put District, land allocated for other uses, for example, areas for government uses, residential area, and green area were changed to area for industrial development. As a consequence, many industrial estates and industrial parks permitted by IEAT have been established in the Map Ta Put area around the MTP Industrial Estate, for example, Pha Daeng Industrial Estate, Asia Industrial Estate, Hemaraj Eastern Industrial Estate, Eastern Industrial Estate and RIL Industrial Estate, with more varieties of industries but still focusing on the petrochemical industry as shown in Figure 5. At present, there are 58S[5] industrial plants in MTP Industrial Estate and 453[6] industrial plants in the Map Ta Put area, including those in other industrial estates and industrial parks around MTP Industrial Estate.

Industrial estates of all sizes are classified as a type of project under the Ministerial Notification of MoNRE on types and sizes of projects or activities for which an EIA is required. MTP Industrial Estate and other industrial estates in Map Ta Put District are no exception. An EIA report for the overall framework of the MTP Industrial Estate was approved by NEB in 1992 and the same for other industrial estates in the following years. With respect to air pollution aspects, sulfur dioxide, nitrogen oxides and particulate emission rates for each project to be permitted in the MTP Industrial Estate by IEAT as the permitting agency were limited to not more than 13.5, 13 and 7.5 kg/hectare-day, respectively.

[5] Source: Industrial Estate Authority of Thailand (IEAT)
[6] Source: Department of Industrial Works (Map Ta Put, Neun Pra, Tub Ma and Huay Pong Districts)

Each individual industry or project to be established in the industrial estate must submit an EIA report of its own industry or project if it is classified as a type and size of project under the Ministerial Notification of MoNRE on types and sizes of projects or activities for which an EIA report is required and is required to meet all applicable limits or standards for pollutant release and environmental quality standards taking into account the cumulative effects on environmental quality and health and the carrying capacity of the surrounding areas.

Figure 5. Industrial estates and deep seaports in Map Ta Put area
(Source: Estate map (top) by the Industrial Estate Authority of Thailand (IEAT), the rest by Google images*)*

3.1.2 CHALLENGES

Continuous expansion of industrial development in Map Ta Put District during the last 20 or more years has resulted in increasing cumulative releases of pollutants and hence cumulative effects on the surrounding communities' environmental quality, health and social aspects which will be briefly described below. Therefore, these impacts have created a challenge for further

industrial development in the Map Ta Put area since the surrounding communities strongly resisted new industrial establishment and required existing industries to implement additional mitigation measures. On the other hand, the Government still wanted to have more industrial development in the area to support economic development of the country, as did the private sector which wants to make additional investment in Map Ta Put since all the infrastructure necessary for industrial production, including electricity, water supply and logistics arrangements (land and sea transport) have been fully established in the area.

3.1.2.1 Social aspect

Although economic growth in the Map Ta Put area has been realized it seems that local people do not really benefit very much.

- Most of the skilled workers in industries come from Bangkok, not from the local area.
- Local authorities in the area received less budget from the Government than they should have. This is because the budget allocated to the local authorities is based on the officially registered population in the area. However, a lot of workers and professionals employed in industries are from Bangkok and other areas and they do not move their officially registered permanent residence to the Map Ta Put area. Local resources are being consumed by the increasing population in the area, but local authorities do not receive sufficient budget proportionally for the management of local resources and infrastructure.
- Industries located in Map Ta Put usually register their businesses in Bangkok which means that they pay corporate tax to Bangkok, not to local authorities.
- Other social problems increase with the increasing population and other associated activities.

3.1.2.2 Environmental quality and health aspects

Although each industry might be in compliance with applicable limits or standards of pollutant releases but with the increasing number of industries in the area, there is a consequent increase in cumulative releases of pollutants to the environment which then results in deteriorating environmental quality and a higher health risk. People have often filed complaints on bad odor caused by odorous substances released from industries which was found to be from fugitive emissions or safety releases. Fugitive emissions of volatile organic compounds were often overlooked in EIA reports. Accidental releases of chemical substances, fire and explosion from industrial operations often happened and sometime caused casualties. Inefficient response and confused and unreliable information on what really caused the problem then made people lose confidence and trust in the Government and industries.

People also filed complaints on health effects, in particular cancers, associated with chemical substances released from industries. However, there has not been any scientifically sound cause-effects study supporting such health effect complaints.

3.1.2.3 Technical aspects

Although monitoring data reported from the Pollution Control Department (PCD) air quality monitoring stations have indicated that ambient SO_2 and NOx concentrations have not violated the respective standards, their cumulative concentrations calculated from air quality dispersion models for new projects proposed to be established in Map Ta Put area taking into account emissions from existing industries indicated violation of standards in some locations where

there is no monitoring station. As a result, EIA reports of many proposed new industrial projects in the Map Ta Put area, covering approximately 76 projects, were put on hold.

3.1.2.4 Legal aspects

Non-governmental organizations (NGOs) and communities raised an issue on the implementation of Article 67 of the Constitution of Thailand (2007) which requires any project or activity deemed to cause severely adverse impacts to the community with respect to environmental quality, natural resources and health to carry out a health impact assessment which will have to be reviewed and commented on by an independent organization on environment and health before any permit can be granted.

They also strongly opposed the permission of the proposed new projects of which EIA reports were put on hold and requested them to be scrapped. Additionally, the NEB was requested to declare Map Ta Put area as a Pollution Control Area in accordance with Article 59 of NEQA (1992) and require an action plan to reduce and mitigate the pollution to be developed by the local authorities.

Subsequently, in 2008, NGOs and communities filed lawsuits against NEB with the Administrative Court requesting the court to order NEB to declare Map Ta Put area as a Pollution Control Area in accordance with Article 59 of NEQA (1992) and to reduce and mitigate pollution problems in the area by implementing Article 60 to Article 63 of NEQA (1992). Additionally, the court was requested to order NEB to implement Article 67 of the Constitution of Thailand (2007) and to scrap the proposed new projects in Map Ta Put area of which EIA reports were put on hold.

The Administrative Court granted the first two requests made by NGOs and communities but not the request to scrap the proposed new projects of which EIA reports were put on hold. Nevertheless, they have to comply with NEQA (1992) on the EIA requirement and with Article 67 of the Constitution of Thailand if they are classified as a project which is deemed to cause severely adverse impacts to the community with regard to environmental quality, natural resources and health.

3.1.3 RESOLUTIONS

Following the Administrative Court's orders in December 2009 which included an order of conducting EHIA for 65 out of 76 projects, NEB issued the Notification in 2009 declaring Map Ta Put area in Rayon Province as the Pollution Control Area covering 6 districts, namely Map Ta Put, Huay Pong District, Neun Pra District and Tub Ma District of Amphoe Muang; Map Kha District of Amphoe Nikom Pattana; and Ban Chang District of Amphoe Ban Chang; and the offshore area of around 5-6 kilometers from the shoreline as illustrated in Figure 6. In 2012, MoNRE issued Ministerial Notification on types and sizes of projects and activities that may have severely adverse impacts to the community with respect to environmental quality, natural resources and health which are required to submit an Environment and Health Impact Assessment (EHIA) (11 types of projects and activities require EHIA as listed in Annex 2).

In order to achieve sustainable development in the Map Ta Put area which will enable development to continue while maintaining or even reducing emissions of SO_2 and NOx, MoNRE proposed that NEB implement an emission trading and offset scheme in the Map Ta Put area, which was approved by NEB in 2010. The trading and offset scheme, named as the 80:20 Trading and Offset Scheme (80:20 Scheme), enabled the proposed new projects of which EIA reports were on hold to receive EIA approval and permissions.

The 80:20 trading and offset scheme allows a new project to be established in the Map Ta Put area with a condition that if the new project emits 80 ton/hr of SO_2 or NOx, the new project has to find a partner or partners in the Map Ta Put area to reduce existing emissions of SO_2 or NOx of 100 ton/hr to offset the emissions added to the area by the new project. This means that existing cumulative emissions of SO_2 or NOx will be reduced by 20 ton/hr. With the 80:20 trading and offset scheme, the cumulative emissions of SO_2 and NOx in Map Ta Put area will be reduced with increasing new projects. Consequently, it is expected that ambient concentrations of SO_2 and NOx in Map Ta Put area will be reduced.

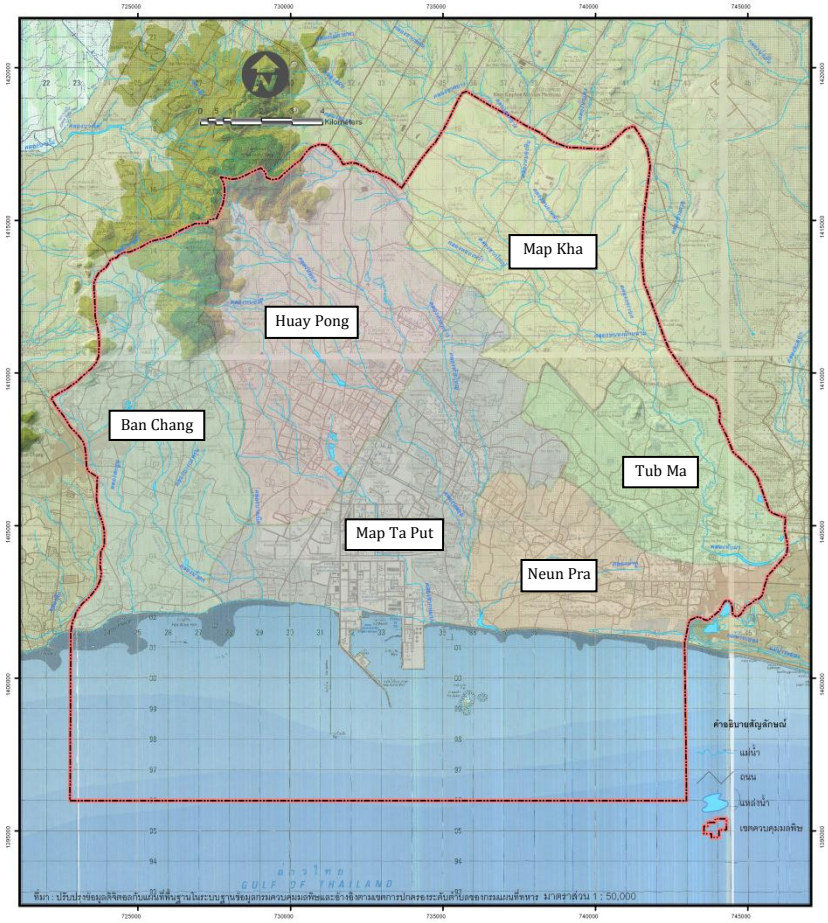

Figure 6. Map Ta Put Pollution Control Area
(Source: Pollution Control Department)

The trading and offset scheme was accepted by relevant stakeholders because of the following reasons.

- It has been very attractive and there have been strong desires by the private sector to establish new industrial projects in the Map Ta Put area since all infrastructure necessary for industrial projects, i.e. electricity, water supply, land and sea transports, etc., have been put in place in the area.
- Many projects emitted SO_2 and NOx in their actual operation less than what specified in the approved EIA reports since the application of the worst case scenario is required in the assessment in the EIA report. The remaining permitted emission amounts are kept as reserves and can provide the project with the opportunity for its future expansion or trading.

- Equipment and machinery of many industries were established in the early stages of Map Ta Put Eastern Seaboard Development and they are getting antiquated. Having newer plants is an opportunity for the industries to acquire newer, more modern technologies with more energy efficient and lower pollutant releases while obtaining emission reductions which could be kept as emission reserves (banking) for their own new and expanded projects or traded to new projects of other proponents.
- The cumulative emissions of SO_2 and NOx in the area will be reduced with new industrial development and consequently ambient air concentrations of SO_2 and NOx and their associated impacts to the environment and health will be reduced from the existing levels.

Presently, the 80:20 Scheme for SO_2 and NOx is still being applied to new projects proposed to be established in Map Ta Put area.

3.2 BETTER WORLD GREEN INDUSTRIAL WASTE MANAGEMENT CENTER

3.2.1 BACKGROUND

Better World Green (BWG) Industrial Waste Management Center is located in Huay Haeng District, Amphoe Kaeng Khoi, Saraburi Province as shown in Figure 7. BWG received a permit in 1997 for Industrial Category 101 – Central Waste Stabilization facility and subsequently received additional permits for Industrial Category 105 – Central industrial non-hazardous waste management by sanitary landfill in 1998 and Central industrial hazardous waste management by secured landfill in 2003.

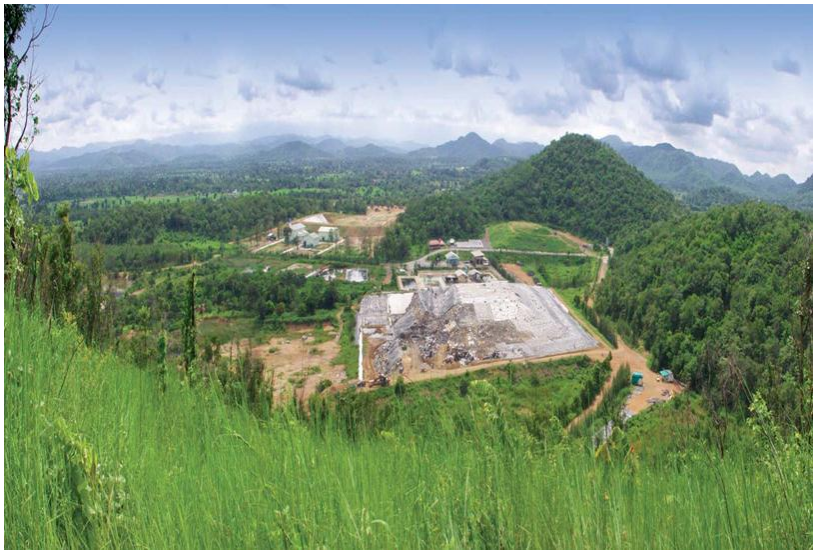

Figure 7. Better World Green (BWG) Industrial Waste Management Center located in Huay Haeng District, Amphoe Kaeng Khoi, Saraburi Province
(Source: Pollution Control Department)

As a central industrial hazardous waste management center which is listed as one of the types and sizes of projects or activities for which EIA is required under the Ministerial Notification of

MoNRE, BWG was required to submit an EIA report for approval before the Department of Industrial Works was able to issue the permit to BWG to operate its industrial hazardous waste management part. BWG submitted the EIA report which was approved by the responsible ERC on 20 November 2002, received the permit from the Department of Industrial Works on 22 May 2003, and started receiving industrial hazardous wastes for secured landfill in January 2006. The layout of the BWG facility is shown in Figure 8.

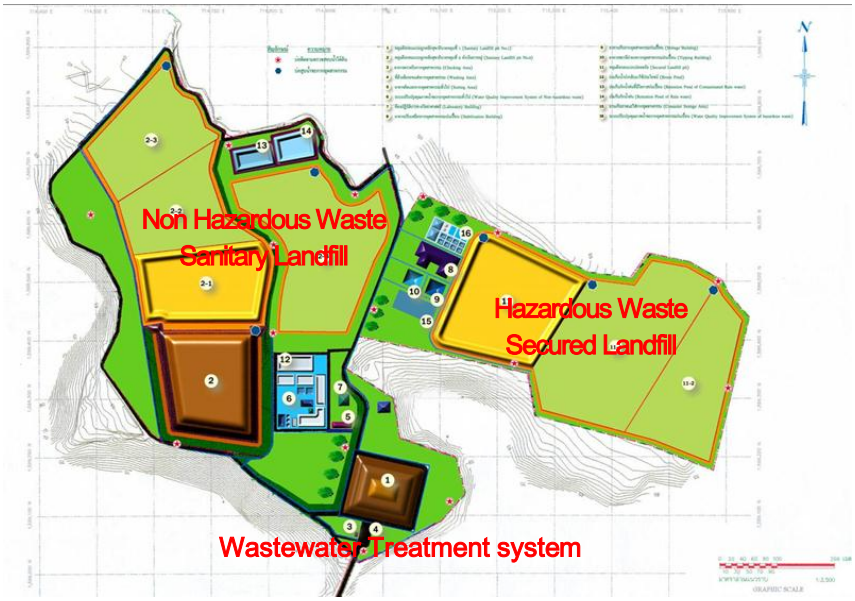

Figure 8. Layout of Better World Green (BWG) Industrial Waste Management Center
(Source: Pollution Control Department)

3.2.2 CHALLENGES

Since early 2000, villagers living around the BWG facility constantly filed complaints to relevant government agencies including PCD about nuisance from mal-odor and polluted water including both surface and underground water from the operation of the BWG facility. At the time, the BWG only operated the sanitary landfill of non-hazardous industrial waste of the whole BWG facility. However, the BWG was in the process of acquiring a permit to operate a secured landfill for hazardous industrial waste which is classified under the Ministerial Notification of MoNRE as a project or activity for which EIA is required. Thus, the proposed secured landfill for hazardous industrial waste was opposed strongly by the people. Demonstrations of villagers including closure of the highway and entrance to the BWG facility were held requesting the responsible government agencies to take actions against BWG to mitigate the problem and not to approve the EIA report for the proposed secured landfill for hazardous industrial waste by the BWG.

In response, an investigation was launched in 2003 by competent government agencies, including Department of Industrial Works, Pollution Control Department, and Department of Under Groundwater Resources. It was found that the BWG did not operate the sanitary landfill properly according to what was specified in the EIA report. As a result, the BWG was required to implement various measures to mitigate the problem. Nonetheless, the EIA for the hazardous

industrial waste secured landfill was approved in 2002. Subsequently, its permit was granted to the BWG in 2003 and operations were started in 2006.

3.2.2.1 Social aspects

Similar to other cases, communities around the BWG facility did not have any social and economic benefits from the operation of the BWG facility. Very few people from the villages were employed by the BWG. Villagers were skeptical about the operation of the BWG facility and thought that the BWG might also accept hazardous industrial wastes for disposal in its sanitary landfill which was not designed for that purpose. Hence they were worried about the pollution problems and health impacts that might happen to them. On the other hand, BWG also reacted very strongly to the accusation made by the communities. The relationship between the communities and the BWG was not harmonious and villagers were dissatisfied more and more with the BWG operation, which resulted in constant disputes and confrontation. Consequently, many lawsuits were filed with the courts by both sides.

3.2.2.2 Technical aspects

The BWG facility is situated on the slope at the foot of a hill which is the water source area for both surface and underground water consumed by the communities for their agriculture especially during the rainy season. If not operated properly in accordance with the measures specified in the EIA report, there might be a possibility that the water will be contaminated with polluted run-off flowing through the facility. Measures in the EIA report included a berm surrounding the facility, storage ponds for the run-off, and biological and chemical treatment of leachate from the landfill and reuse of treated wastewater in the facility boundaries.

Additionally, if the landfill were not operated carefully and properly, there might be a possibility of generating mal-odor from such improper operations such as not covering the wastes with compacted soil completely on a daily basis and accumulation of contaminated water (run-off and leachate) on the surface of the landfill area as shown in Figure 9 and Figure 10.

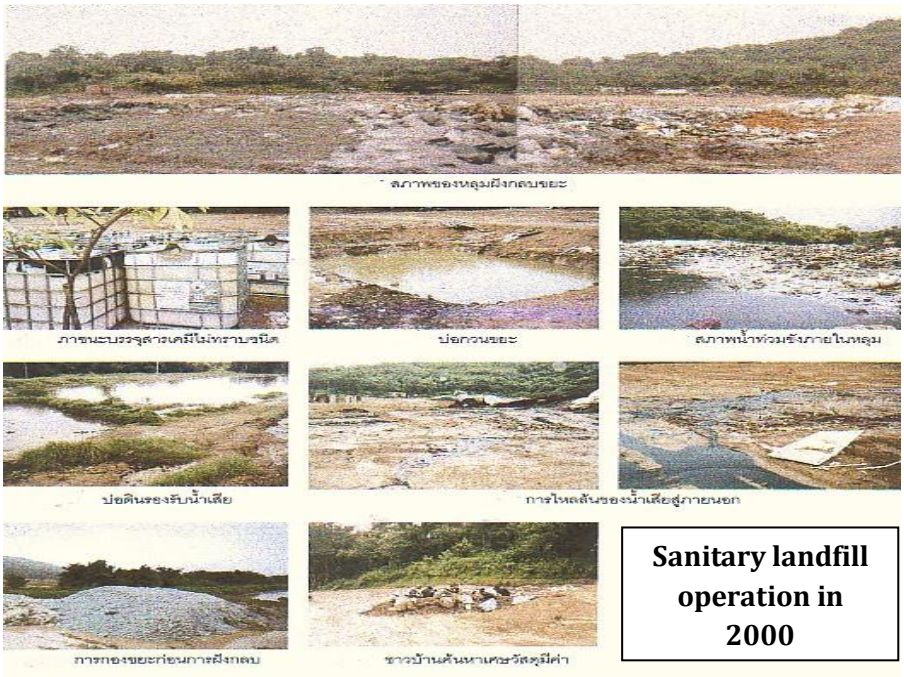

Figure 9. Improper operation of the first sanitary landfill pit in 2000
(Source: Polltuion Control Department)

Figure 10. Improper operation of the second sanitary landfill pit after the closure of the first pit
(Source: Pollution Control Department)

3.2.2.3 Environmental quality and health aspects

The investigation report in 2014 found the contamination of Ni, Mn, Cd, Pb, As, Hg-Total and Se in some of 15 monitoring wells higher than the underground water quality standards. However, their levels have declined since 2011 when BWG took actions to improve its landfill operation and management of leachate and wastewater. Monitoring results in November 2013 showed that only one well had Pb slightly over the standard, while other wells met the standards for all heavy metals. The report is made available upon request.

Between 2003 to 2011, some underground water wells around the BWG facility sometimes contained heavy metals, i.e. Ni, Mn, Zn, Cd, Pb, As, Hg-Total and Se higher than underground water quality standards. However, since the Department of Underground Water Resources cleaned those underground water wells in 2009, levels of heavy metals declined drastically and met underground water quality standards in 2013.

In the same period, it was also found that surface water around the BWG facility contained Cu, Ni, Mn, As and Hg-Total slightly higher than the surface water quality standards type 3 for consumption and agriculture use (especially Mn). Since 2012, surface water in the area only contained Mn, Pb and As slightly higher than the standards. However, the Department of Primary Industries and Mines reported that the BWG and surrounding areas have high natural background levels of Mn and As.

The monitoring results were not scientifically conclusive enough to decide if high levels of heavy metals in underground water and surface water were caused by the BWG facility.

Villagers around the BWG facility also complained about nuisance from mal-odor generated from the operation of the BWG facility. Monitoring of volatile organic compounds (VOCs) inside and around the BWG facility since 2008 did not show any violation of screening levels issued by PCD. However, odor from VOCs is normally detected by human sensory system at much lower concentrations than the screening levels.

3.2.2.4 Legal aspects

In 2003**,** the people living in the area around the BWG facility filed a lawsuit with the Administrative Court against the Saraburi provincial industrial officer, Director General of Department on Industrial Works, Permanent Secretariat of Ministry of Industry and Mayor of Huay Haeng District for negligence of unlawfully issuing a permit to BWG and requesting the court to revoke the permit. The case was dismissed by the Administrative Court in 2007 concluding that the permit was issued properly and lawfully and that BWG had taken corrective measures as ordered by Department of Industrial Works and it was not conclusive that there was dispersion of pollution from the BWG facility, therefore there was no reason to give an order to revoke the permit. The case was appealed and subsequently dismissed by the Supreme Administrative Court on 20 March 2013 following the verdict of the lower court.

In 2009, the people again filed a lawsuit with the Administrative Court against the Prime Minister, Governor of Saraburi Province, Mayor of Huay Haeng District, and BWG for negligence of not closing down the BWG facility as requested by the people. On 27 September 2013, the Administrative Court dismissed the case following the verdict of the Supreme Administrative Court on 20 March 2013 of the earlier case.

Additionally, the people also filed a lawsuit in 2007 with the Criminal Court against the BWG for not following the order of a competent official. On 29 June 2010, the court dismissed the case

on the ground that the BWG had followed the orders given by the competent official in taking corrective actions to mitigate the problem. The case was appealed and on 22 March 2011 the case was dismissed by the Appeal Criminal Court following the verdict of the lower court.

3.2.3 RESOLUTIONS

When the complaints were filed by the people living around the BWG facility, the investigation by competent government agencies was subsequently launched in response to the complaints. The investigation found that the BWG did not properly operate the sanitary landfill which might have caused the impacts to the surrounding areas. Although it was not scientifically conclusive whether there was pollution dispersion to the area outside the BWG facility, the BWG was ordered by competent government agencies to take corrective actions to operate the sanitary landfill properly and safely, which were followed by the BWG. The improvement of the situation has been observed. Monitoring wells which used to have various heavy metals higher than the standards are now in compliance with the standards except Pb which is slightly above the standard.

With all the problems and difficulties including several lawsuits with the Administrative Court and the Criminal Court, it made BWG much more careful in operating the industrial waste management center for both non-hazardous and hazardous industrial wastes to ensure that it complies with mitigation measures specified in the EIA report for secured landfill of hazardous industrial wastes. Additionally, BWG has to be even much more careful in its performance since it is a public company registered in the Stock Exchange of Thailand and in the eyes of the shareholders.

3.3 MAE MOH LIGNITE-FIRED THERMAL POWER PLANT

3.3.1 BACKGROUND

Mae Moh lignite-fired thermal power plant was the first of its kind in Thailand and has been operated by the Electricity Generating Authority of Thailand (EGAT) which is one of the state enterprises of the Government. Located in Amphoe Mae Moh, Lampang Province, it consists of 13 generating units (3 x 75 MW, 4 x 150 MW and 6 x 300 MW) with a total installed electricity generating capacity of 2,625 MW as shown in Figure 11. The power plants utilize lignite which is high in sulfur excavated from the nearby Mae Moh Lignite Mine (sulfur contents on the average of 3% by weight on a dry basis).

Out of 13 built units, units 1–3 were first in service in the late 1970s and early 1980s and were decommissioned after being in service for almost 30 years. They are not being replaced by new units since there are lignite deposits underneath the area on which they were located. Units 4–7 will be decommissioned in the near future and their replacements are in the process of preparation of an EIA report. All of these plants did not go through the EIA process since they were approved by the Government before the enactment of NEQA (1992). Nonetheless, they all have electrostatic precipitators with more than 99.5% particulate removal efficiency. Only Unit 12 and 13 had Flue Gas Desulfurization (FGD) system with 95% SO_2 removal efficiency in their original project engineering design. The estimated total SO_2 emission from all 13 units based on the original design was around 550,000 ton/yr. Additionally, the Government had a plan at the time to install several more new generating units in the nearby area with additional generating capacity of around 2,400 MW.

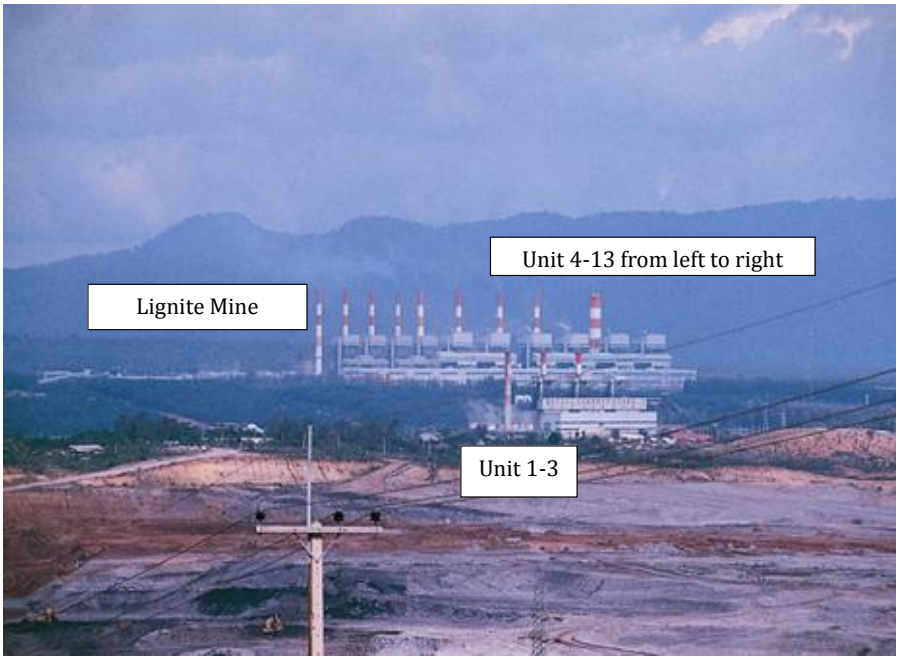

Figure 11. Mae Moh lignite-fired thermal power plant and Mae Moh lignite mine
(Source: Pollution Control Department)

3.3.2 CHALLENGES

After Units 10 and 11 (600 MW without FGD, adding SO_2 emission around 160,000 ton/yr to the existing emissions of 380,000 ton/yr from Unit 1-9) were brought into operation in early 1992, the SO_2 problem in Mae Moh was aggravated and started to cause impacts to the health of the people and to the environment. During October 1992 to the end of January 1993, hourly average ambient SO_2 concentration as high as 1,300 ppb was observed in late mornings in the area within 10 kilometers downwind from the power plant. At the time, Thailand only had daily and annual average SO_2 ambient air quality standards of 120 ppb and 40 ppb respectively but did not have an hourly average SO_2 ambient air quality standard. The current hourly SO_2 ambient air quality standard is 300 ppb. However, daily and annual average ambient SO_2 concentrations in Mae Moh area have been in compliance with the respective standards.

Although a decision was made to retrofit Units 4 to 11 of the power plants with FGD in order to mitigate the problem and this was under implementation, the problem of SO_2 emissions occurred for the second time in August 1998. This problem occurred because the installation of FGD was not completed for all designated units and two of the installed FGDs were out of service and some of them were shut down for maintenance but the associated generating units were still under operation. Additionally, there was also an abrupt change in the weather conditions, i.e. cooler air and rain, which limited the dispersion of SO_2. The maximum hourly average ambient SO_2 concentration was reported to be 890 ppb in the second incident.

3.3.2.1 Social aspects

Communities in Mae Moh area did not receive many social and economic benefits from the development of Mae Moh lignite-fired thermal power plant and Mae Moh lignite mine since the local people in the communities did not have enough technical skill to be employed for technical work. They were mostly employed for labor intensive work which did not have very high pay. On the other hand, they had to face pollution problems from the operation of the power plant

and mine, including air pollution (particulate matter, odor from spontaneous combustion of lignite, and SO_2), water pollution, noise pollution and vibration. Additionally, the communities had to compete for water with the power plant since the operation of the power plant required large amounts of water. The communities were not developed along with the development of the power plant and the mine. It resulted in dissatisfaction of the communities with the power plant and the mine and they started filing complaints against EGAT.

3.3.2.2 Environmental quality and health aspects

In1992 a large number of people living in several villages located downwind from the power plant sought medical attention for symptoms which included stinging nose and throat, cough, chest tightness, asthmatic attack, nausea, vomiting, dizziness, malaise and occasionally wheezing and shortness of breath. In addition, plants and yield crops were reported to wither and fall to the ground overnight. After the investigation by various government agencies, EGAT paid compensation of around 10 million baht.

Similarly, impacts to the health of the people, plants, crops and livestock were observed again in August 1998. For this second incident, EGAT paid compensation of over 30 million baht to the people in the Mae Moh area.

3.3.2.3 Technical aspects

High levels of ambient SO_2 concentration in the Mae Moh area only occurred in winter seasons during late October to the end of January due to meteorological conditions which limit the dispersion of air pollutants in the atmosphere in conjunction with emission of SO_2 higher than the assimilative capacity of the atmosphere during such meteorological conditions. Additionally, the dispersion of air pollutants was also limited by the horse-shoe valley topography where Mae Moh lignite-fired thermal power plant has been located in the middle as shown in Figure 12.

When Mae Moh valley was under the influence of a high pressure system moving in from south China during the winter season, diurnal variation of SO_2 concentrations regularly showed high peaks of ground level SO_2 concentrations between 10:00 a.m. and 02:00 p.m. as shown in Figure 13. Hourly average ground level ambient SO_2 concentration as high as 1,300 ppb was observed during the episode in October 1992. Concentrations above 400 ppb were frequently observed.

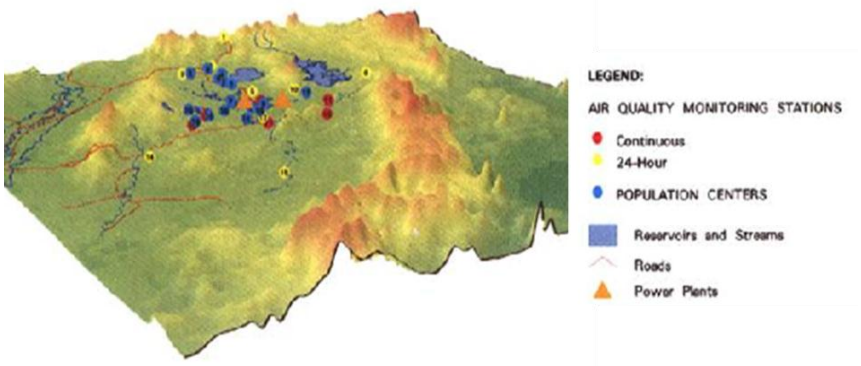

Figure 12. Horse-shoe Mae Moh valley topography of which Mae Moh lignite-fired thermal power plant is located in the middle
(Source: Electricity Generating Authority of Thailand)

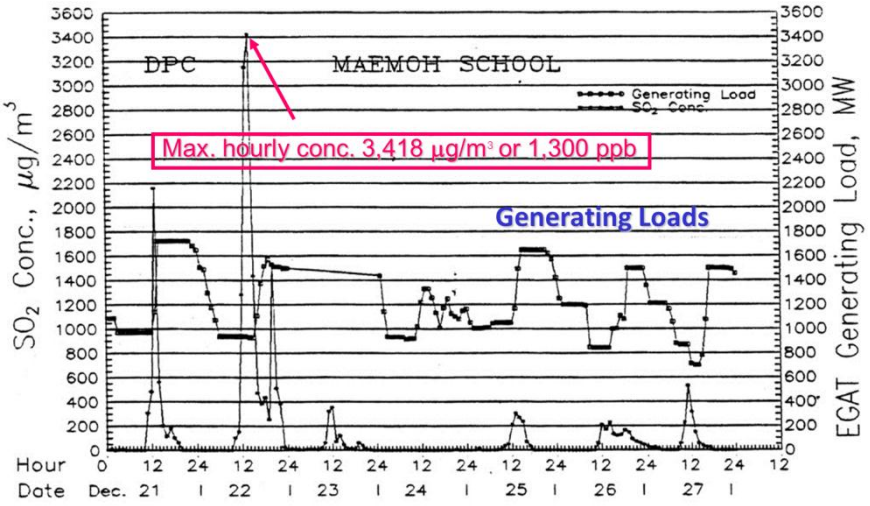

Figure 13. Diurnal variation of ambient SO_2 concentrations in Mae Moh area during the episode in 1992

(Source: Pollution Control Department)

High peak SO_2 concentrations during late morning through early afternoon in the Mae Moh area was caused by the fumigation of SO_2 trapped in the air overnight above the Mae Moh valley. Sulfur dioxide emitted from the Mae Moh power plant during the night time was trapped and accumulated above the valley in a strong stable surface inversion layer developed after the sunset during the winter time. Heat from the sun during morning hours gradually warmed up the ground and broke up the surface inversion layer where SO_2 was trapped and accumulated. Consequently, trapped SO_2 fumigated down to the ground causing a sudden rise in ground level ambient SO_2 concentration downwind from the power plant. The fumigation phenomenon of air pollutants is illustrated in Figure 14. When the atmosphere was warmed up more and more, it became more unstable which caused mixing of SO_2 and as a consequence ground level ambient SO_2 concentration declined.

Figure 14. Fumigation phenomenon of air pollutants caused by the breakdown of surface inversion during late morning

(Photo by Supat Wangwongwatana)

3.3.2.4 Legal aspects

In 2004, the communities in Mae Moh area filed several lawsuits with the Chiang Mai Administrative Court against EGAT and other government agencies including the Ministry of Industry, Department of Primary Industries and Mines, and PCD for negligence of duty required by law which led to the release of SO_2 into the atmosphere in violation of applicable standards and caused impacts to the health of the plaintiffs and to the surrounding environment. The plaintiffs also requested for environmental remedial actions and compensation from EGAT.

In 2009, the Chiang Mai Administrative Court found EGAT guilty of negligence and dismissed the negligence accusation against other government agencies. The court also granted a compensation of almost 25 million baht to the plaintiffs. In February 2015, the Supreme Administrative Court ordered EGAT to take measures to reduce dust particles dispersion in the air from mining activities and turn its golf course at the plant site forest, but no compensation to the affected villagers was ordered (Bangkok Post 2014).

3.3.3 RESOLUTIONS

Several health impact studies reported that there should not be health implications when exposure to hourly average ambient SO2 concentration is below 300 ppb. It was also observed during the case of the Mae Moh valley in 1992 that there was no significant health impacts reported when hourly average ambient SO2 concentration was below 300 ppb. However, the study conducted by the CPD, EGAT and USAID found that it was still technically feasible and cost-effective to curb SO2 emissions from Mae Moh power plant to bring hourly average ambient SO2 concentration in Mae Moh valley down to a level below 300 ppb without having to close down any of its 13 units.

In 2001, the PCD adopted a new national ambient air quality standard for hourly average concentration of SO2 of 300 ppb and applied to EGAT to control SO2 emission from Mae Moh power plant. However, if health impacts to the people living in Mae Moh valley were still observed after these SO2 emission controls, EGAT had to increase the degree of emission controls to alleviate the health impacts, although it meant that some generating units would have to be scrapped.

To achieve hourly average ambient air quality standard for SO_2 of 300 ppb, units 4 to 11 had to be retrofitted with SO_2 emission control technology with at least 98% SO_2 removal efficiency. Wet limestone forced oxidation FGD system was identified as the most cost-effective SO_2 emission control technology. Units 12 and 13 already had wet limestone forced oxidation flue gas desulfurization system with 95% SO_2 removal efficiency in their original installations which were completed in 1995.

In order to mitigate the problem, the Government through NEB decided to retrofit Units 4–11 of the Mae Moh lignite-fired thermal power plant with a FGD system with 98% SO_2 removal efficiency in order to reduce SO_2 emission from 150 ton/hr to not more than 11 ton/hr to control hourly average ambient SO_2 concentration not to exceed the respective hourly standard of 300 ppb. SO_2 emission during winter time was limited to not more than 7 ton/hr. Additionally, it was decided to cancel the plan to expand the lignite-fired thermal power plants in Mae Moh and nearby areas.

The installation of FGD for all generating units of Mae Moh power plant was completed in early 2000. In actual operation, SO_2 emission from Mae Moh power plant has been below 5 ton/hr and hourly average ambient SO_2 concentration in Mae Moh area has never exceeded 300 ppb and normally has been lower than 150 ppb.

There are several lessons to be learned from the case of Mae Moh lignite-fired thermal power plant. One of the most important lessons is that if an EIA were to be conducted from the beginning for Unit 1 to Unit 13, communities and Mae Moh power plant would not have to go through all the troubles and problems for more than 20 years. Additionally, the Mae Moh case has been regularly used by the people and NGOs to oppose major development projects, in particular power development projects in Thailand.

Replacement of Units 4 – 7

Unit 4 and 5 and Unit 6 and 7 (150 MW each and 600 MW in total) reached their 25 years of service in 2009 and 2010 respectively. It is proposed by EGAT to replace them with one 600 MW generating unit to be located next to the present Unit 13. Pulverized coal thermal power plant technology with higher efficiency (supercritical) is selected.

Wet limestone forced oxidation FGD system with 97.9% SO_2 removal efficiency will be employed which is similar to the existing FGD of Units 4–7. With FGD, the proposed new unit will emit 3,246 ton/yr of SO_2 compared to that of Units 4–7 of 10,434 ton/yr which is equivalent to a 69% reduction. The present total SO_2 emission of 37,512 ton/yr from Units 4–13 will be reduced to 30,324 ton/yr (from Units 8–13 plus the new 600 MW unit) which is equivalent to an overall SO_2 emission reduction of 19%.

An electrostatic precipitator with 99.48% control efficiency and Selective Catalytic Reduction (SCR) with 50% control efficiency in addition to over-fired air and low NOx burners will be employed for particulate matter and NOx emission control respectively.

The proposed new 600 MW generating unit for the replacement of Units 4–7 is classified as one of the projects or activities which is deemed to cause severely adverse impacts to the communities with regard to environmental quality, natural resources and health in accordance with the Ministerial Notification of MoNRE. Thus, it is required to conduct a health impact assessment and will have to go through the EHIA process. The EIA/EHIA report has just been reviewed, considered and endorsed by NEB in December 2014 for submission to the Cabinet for final approval.

4. SUMMARY OF CHALLENGES AND OPPORTUNITIES REGARDING THE EIA SYSTEM AND ITS IMPLEMENTATION

It is necessary to constantly develop and improve the EIA system in Thailand in order to reflect the changing situation. From the analysis of the information presented in the previous sections, the long experience of ONEP in the development and implementation of EIA system in Thailand and experience with EIA systems in other countries, i.e. United States of America, United Kingdom, Australia and ASEAN Member States (Figure 5), there are a few recommendations for the further development and improvement of the EIA system and its implementation in Thailand which are presented in the following subsections.

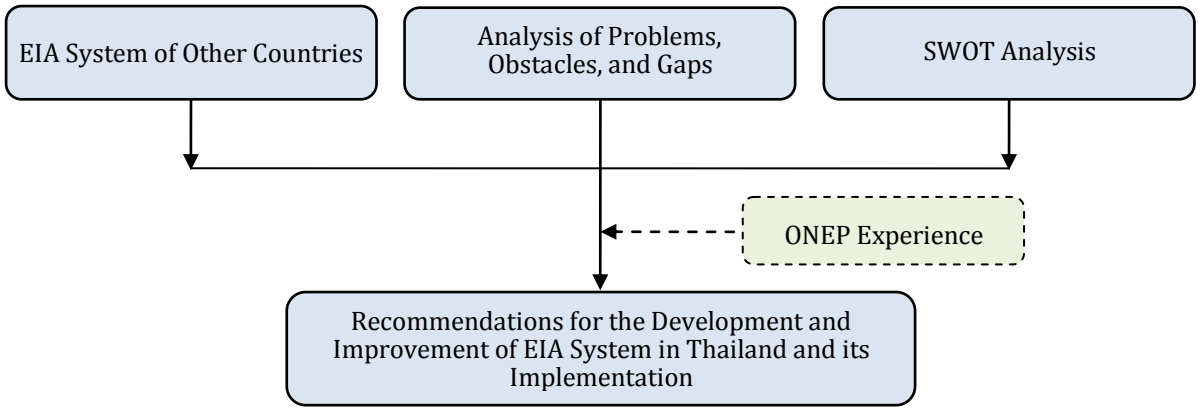

Figure 5. Further Development and Improvement of EIA System in Thailand

4.1 RECOMMENDATIONS FOR IMMEDIATE IMPROVEMENT WITHOUT THE AMENDMENT OF NEQA (1992)

4.1.1 PROJECT SCREENING

- ONEP to regularly update and review the types and sizes of projects and activities for which an EIA report is required to be clearly defined including the associated conditions such as production capacity, size, and area to suit the current situation and prevent the avoidance of EIA report preparation.
- ONEP to consider a 'Code of Practice' instead of EIA report for projects and activities which are not very complicated such as small housing projects and small-scale power plants.

4.1.2 EIA REPORT PREPARATION

- ONEP to oversee registered EIA consultants in the preparation of the EIA report and to enforce penalties strictly, i.e., warning in case of insufficient quality of EIA report, reducing licensing period or suspending license in case of negligence which leads to damages, and revoking the license in case of falsification.
- ONEP to propose an amendment of the Ministerial Notification of MoNRE on licensing EIA consultants to include licensing of individual experts to be accountable

for the EIA report as well, not only the legal entity. Additionally, the preparation of the scientific aspect of EIA reports has been prescribed under the Promotion of Science and Technology Profession Act (2008) to be profession under control of the Act. Therefore, a license will be required for an individual expert who will be involved in the preparation of EIA report on scientific aspect and the professional code of conduct will have to be followed.

- ONEP to provide capacity building to government agencies and state enterprises as project proponents to supervise, oversee and monitor registered EIA consultants in the preparation of the EIA report and screen the EIA report before submission to ONEP for subsequent review by the responsible ERC.
- ONEP to understanding of registered EIA consultants to improve the quality of the preparation of the EIA reports.

4.1.3 EIA REPORT REVIEW

- ONEP to regularly update and improve the guidelines for the preparation and the review of EIA reports taking into consideration views and comments of ERCs.
- ONEP to develop a web-based information system on the status of review of the EIA reports submitted to ONEP so that the review process can be followed and monitored remotely.
- ONEP and / or permitting agencies to take legal action if the proposed project is launched prior to the EIA approval and permit.
- ONEP to hold regular consultation meetings on the preparation of the EIA report with registered EIA consultants, ERCs, project proponents and permitting agencies.
- ONEP and permitting agencies to regularly hold seminars or workshops among all stakeholders involved in the EIA process to build common understanding of the benefits of the preparation of EIA reports and implementing measures specified in the approved EIA report.
- ONEP or an independent researcher to conduct a feasibility study on the decentralization of EIA report reviewing to provincial or local levels in order to reduce the workloads at ONEP, to be more time efficient and to make use of local familiarity with the area and conditions of the project site. However, capacity at the provincial and local levels has to be increased as well.

4.1.4 EIA MONITORING AND EVALUATION

- ONEP to strengthen its mandate and capacity on compliance monitoring included in its institutional framework.
- ONEP to coordinate with permitting agencies on their roles on EIA monitoring and evaluation and to develop an EIA monitoring program to be incorporated into their annual work plans and budget.
- ONEP to develop a web-based information system for sharing information on the results of compliance monitoring and monitoring reports submitted by the project proponents including status of the review of such reports.
- Applying modern technologies in compliance monitoring and environmental impact assessment.
- ONEP, Department of Environmental Quality Bureau (DEQP), independent organizations and / or NGOs to build capacity of the communities and people on their rights and duty in public participation processes and right to access project

information and their capacity to participate in the public participation process throughout the EIA process including the preparation, review and approval of the EIA report including the granting of the permission and compliance monitoring. Public participation processes should be improved, focusing more on outcomes instead of process to obtain meaningful participation.

4.2 RECOMMENDATIONS FOR LONG-TERM IMPROVEMENT WITH AMENDMENT OF NEQA (1992)

The EIA system in Thailand has been developed and regularly improved for almost 40 years based on NEQA (1975) and NEQA (1992) which has provided the basic framework for the EIA system. In order to further improve the EIA system, it is also necessary to amend NEQA (1992) since it does not provide sufficient legal basis for some specific improvements. Some important issues for the amendment of NEQA (1992) are discussed and recommended below.

4.2.1 EIA MONITORING REQUIREMENT

NEQA (1992) does not have provision on EIA monitoring, therefore in order to strengthen EIA monitoring it is necessary to amend NEQA (1992) in order to provide a legal basis for further development of Ministerial Notification or Decree of MoNRE on EIA monitoring by specifying, for example, the following aspects,

- Provisions to require permitting agencies to put all mitigation measures and monitoring requirement specified in the EIA report being conditions to the granted permit with which the project proponents will have to legally comply.
- Provisions to specify clearly the role of relevant parties in EIA monitoring, i.e.
    - Project proponents : self-monitoring and reporting
    - Permitting agencies : compliance monitoring
    - ONEP : compliance monitoring
- Provisions to provide authority for ONEP with appropriate resources including human and financial resources to conduct onsite inspection after an EIA is approved.
- ONEP or an independent researcher to conduct a feasibility study of establishing an independent organization to handle EIA monitoring or decentralization of EIA monitoring responsibility to Regional Environmental Offices or local authorities.

4.2.2 PUBLIC PARTICIPATION

NEQA (1992) does not have any provision on public participation which is one of the most important aspects of any participatory environmental quality management program but particularly in the EIA system. Therefore, NEQA (1992) should be amended to include specific provisions on public participation to provide its legal basis in the management of environmental quality. In particular, the requirement for public participation should be clearly specified in the provisions related to the development of Terms of Reference, preparation of EIA reports, EIA review process, EIA approval, permit granting and monitoring, including requirement for disclosure of information, documents and EIA/EHIA reports to the public and relevant organizations. In addition, procedural manuals would be needed to conduct appropriate public participation in the EIA process to supplement the existing guideline.

4.2.3 ENVIRONMENTAL HEALTH IMPACT ASSESSMENT (EHIA)

Article 67 of the Constitution of Thailand (2007) requires any project or activity deemed to cause severely adverse impacts to the community with respect to environmental quality,

natural resources and health to carry out a health impact assessment which will have to be reviewed and commented by an independent organization on environment and health before the permit will be granted. NEQA (1992) does not have any provision which directly conforms to Article 67. Health impact assessment is only incorporated as a part of environmental impact assessment under NEQA (1992). Therefore, there is a need to amend NEQA (1992) to clearly support the requirement under Article 67 to include provisions on types and sizes of projects and activities deemed to have severely adverse impacts to the community with regard to environmental quality, natural resources and health, health impact assessment, independent organizations on health and environment and relevant processes and procedures. It may be desirable to integrate EIA and EHIA to create a single comprehensive procedure. [It should be noted that at the time of writing report the new Constitution of Thailand was being drafted and it was not certain whether the provision in Article 67 of the Constitution of Thailand (2007) would be included in the new one.]

4.2.4 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

Strategic Environmental Assessment (SEA) is still new to Thai society. It is regarded as a decision support tool which can integrate environmental considerations into key decision-making at policy, plan and program level. SEA is a systematic framework and analytical process which evaluates capacity and limitations of the environment at the policy formulation and plan- or program making stages. It aims to assess the impact of a policy, plan or program based on a holistic approach by looking at potential environmental, economic, and social impacts and comparing alternatives. There has not been any legal basis for the requirement on SEA in Thailand. SEA is considered suitable for large-scale government/state policies and plans, but there has not been any application of SEA in a strict sense. There could be a concern at the government side that SEA may not approve or could delay large-scale projects that the Government wishes to launch.

NEQA (1992) does not have any provision on SEA. There is only the resolution of NEB as an administrative order which approved the SEA guideline and required government agencies to use the approved SEA guideline for the assessment of environmental impacts of any proposed development policy and plan as appropriate, in particular the proposed mega-projects of the Government or projects to be jointly undertaken with private enterprise (Section 1.1.5).

NEQA (1992) should be amended to provide a legal basis for SEA in Thailand by explicitly requiring government agencies to use SEA as a decision support tool for all major development policies, plans and programs proposed by the Government which will then be linked to the subsequent EIA and EHIA taking into account the environmental carrying capacity of the areas of concern.

4.2.5 OTHERS

NEQA (1992) should be amended to include provisions to limit the timeframe within which the approved EIA report is used to acquire a permit from the permitting agencies, for example two years, otherwise the approved EIA report should be reviewed and revised to reflect the changing situation and environment or a new EIA report should be prepared.

ONEP or an independent researcher should conduct a study on the feasibility of establishing an EIA/EHIA Fund to which the project proponents are mandated to make a financial contribution in order to support the preparation of EIA reports, work of ERCs, public participation activities and compliance monitoring carried out by permitting agencies, ONEP and communities.

5. REFERENCES

Bangkok Post. 2014. Mae Moh golf course to be destroyed Court stops short of payment to villagers. Article published in the Bangkok Post on 11 February 2015. http://www.bangkokpost.com/news/general/471658/egat-must-give-up-mae-moh-golf-course (Accessed 11 February 2015)

Ministry of Natural Resources and Environment. 2006. "Guideline for Public Participation and Impact Assessment of Social Environment in Environmental Impact Assessment Process" (in Thai). สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม, 2549. "แนวทางการมีส่วนร่วมของประชาชนและการประเมินผลกระทบสิ่งแวดล้อมทางสังคมในกระบวนการวิเคราะห์ผลกระทบสิ่งแวดล้อม." http://lib.mnre.go.th/index.php/2012-04-30-03-57-01/2012-10-12-09-13-14/220-2012-10-16-07-29-00 (Accessed 1 December 2014)

Office of Natural Resources and Environmental Policy and Planning (ONEP). 2006. "Development and Improvement of Environmental Impact Assessment in Thailand" (in Thai). อินทิรา เอื้อมลฉัตร, 2557, " การพัฒนาปรับปรุงระบบการวิเคราะห์ผลกระทบสิ่งแวดล้อมของประเทศไทย " ผลงานวิชาการลำดับที่ 1 เพื่อขอรับการประเมินบุคคลในตำแหน่งผู้เชี่ยวชาญเฉพาะด้านสิ่งแวดล้อม, สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม (Accessed 1 December 2014)

Office of Natural Resources and Environmental Policy and Planning (ONEP). 2013. "Environmental Impact Assessment in Thailand." http://www.onep.go.th/eia/images/7handbook/Environmental_Impact_Assessment_in_Thailand.pdf (Accessed 1 December 2014)

Office of Natural Resources and Environmental Policy and Planning (ONEP). 2013. "Guideline for Health Impact Assessment in an Environmental Impact Assessment Report" (in Thai). สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม, 2556. "แนวทางการประเมินผลกระทบทางสุขภาพในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อม." http://www.onep.go.th/eia/index.php?option=com_content&view=article&id=69:b-ehia&catid=12 (Accessed 1 December 2014)

Office of Natural Resources and Environmental Policy and Planning (ONEP). 2014. Strategic Environmental Assessment: SEA (in Thai). สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม, 2557. "การประเมินสิ่งแวดล้อมระดับยุทธศาสตร์." http://www.onep.go.th/library/index.php?option=com_content&view=article&id=71:-strategic-environmental-assessment-sea&catid=22:2012-03-12-02-54-55&Itemid=31 (Accessed 1 December 2014)

Sadler B., 1996, International Study of Effectiveness of Environmental Assessment, Environmental Assessment in a Changing World: Evaluating Practice to Improve Performance. International Association for Impact Assessment.

ANNEX 1 TYPES AND SIZES OF PROJECTS AND ACTIVITIES FOR WHICH THE EIA REPORT IS REQUIRED

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
1.	**Mining defined by the Mineral Act:**		
	1.1 Mining projects as follow:		
	1.1.1 Coal Mining	All sizes	Submit during apply for mining concession
	1.1.2 Potash Mining	All sizes	Submit during apply for mining concession
	1.1.3 Rock Salt Mining	All sizes	Submit during apply for mining concession
	1.1.4 Limestone Mining for cement industry	All sizes	Submit during apply for mining concession
	1.1.5 All Metal Mining	All sizes	Submit during apply for mining concession
	1.2 Underground Mining Projects	All sizes	Submit during apply for mining concession
	1.3 All Mining Projects located in the following areas:		
	1.3.1 Class 1 Watershed area according to cabinet resolution	All sizes	Submit during apply for mining concession
	1.3.2 Sea	All sizes	Submit during apply for mining concession
	1.3.3 Conservation Forests added by cabinet solution	All sizes	Submit during apply for mining concession
	1.3.4 RAMSAR Sites	All sizes	Submit during apply for mining concession
	1.3.5 Areas located next to Ancient Remains, Archaeological Resources, Historical Sources or Parks regulated by Ancient Monuments, Antiques and National Museum Act or World Heritage Sites inscribed in World Heritage List according to World Heritage Convention within 2 kilometer distance	All sizes	Submit during apply for mining concession
	1.4 Mining Projects with explosive materials	All sizes	Submit during apply for mining concession
	1.5 Other Mining Projects defined by the Mine Act except for item 1.1, item 1.2, item 1.3 and item 1.4	All sizes	Submit during apply for mining concession

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
2.	**Petroleum Industry** 2.1 Petroleum Exploration by means of geophysical drill	All sizes	Submit during apply for project approval form related government agencies or permitting agencies defined by Petroleum Act
	2.2 Petroleum Production Industry	All sizes	Submit during apply for project approval form related government agencies or permitting agencies defined by Petroleum Act
3.	**Petroleum and Fuel Pipeline System Project**	All sizes	Submit during apply for project approval from related government agencies
4.	**Industrial Estate as defined by the Industrial Estate Authority of Thailand Act or Projects with identical feature or Land Allocation Project for industrial development**	All sizes	Submit during apply for a permit of project construction or operation
5.	**Petrochemical Industry using chemical process in production**	Productivity is 100 tons/day or more	Submit during apply for a permit of project construction or operation
6.	**Petroleum Refining Industry**	All sizes	Submit during apply for a permit of project construction or operation
7.	**Natural Gas Separation Industry or Natural Gas Reforming Industry**	All sizes	Submit during apply for a permit of project construction or operation
8.	**Chlor-alkaline Industry that required Sodium Chloride as raw material to produce Sodium Carbonate, Sodium Hydroxide, Hydrochloric Acid, Chlorine, Sodium Hypo-Chloride and Bleaching powder**	Productivity each or total products are 100 tons/day or more	Submit during apply for a permit of project construction or operation

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
9.	**Cement Industry**	All sizes	Submit during apply for a permit of project construction or operation
10.	**Pulp Industry**	Productivity is 50 tons/ day or more	Submit during apply for a permit of project construction or operation
11.	**Pesticide Industry or Industry producing active ingredient by chemical process**	All sizes	Submit during apply for a permit of project construction or operation
12.	**Chemical Fertilizer Industry using chemical process**	All sizes	Submit during apply for a permit of project construction or operation
13.	**Sugar Industry** 13.1 Producing raw sugar, white sugar and refine sugar 13.2 Producing Glucose, Dextrose, Fructose or other products alike	All sizes Productivity is 20 tons/ day or more	Submit during apply for a permit of project construction or operation Submit during apply for a permit of project construction or operation
14.	**Iron or Steel Industry**	Productivity is 100 tons/ day or more	Submit during apply for a permit of project construction or operation
15.	**Mineral Smelting Industry, Mineral Dressing Industry or Metal Melting Industry except Iron or Steel**	Productivity is 50 tons/ day or more	Submit during apply for a permit of project construction or operation
16.	**Liquor and Alcohol Industries including beer and wine** 16.1 Liquor and Alcohol Industries	Productivity is 40,000 liter/ month or more (calculated at 28 degrees)	Submit during apply for a permit of project construction or operation

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	16.2 Wine Industry	Productivity is 600,000 liter/month or more	Submit during apply for a permit of project construction or operation
	16.3 Beer Industry	Productivity is 600,000 liter/month or more	Submit during apply for a permit of project construction or operation
17.	**Central Waste Treatment Plant defined by the Factory Act**	All sizes	Submit during apply for a permit of project construction or operation
18.	**Thermal Power Plant**	Productivity of electricity is 10 MW or more	Submit during apply for a permit of project construction or operation
19.	**Expressway as defined by the Expressway and rapid Transit Authority of Thailand Act or other projects alike**	All sizes	Submit during apply for project permission or approval
20.	**Highway or road which defined by the Highway Act, passing through the following areas:**		
	20.1 Wildlife sanctuaries and Wildlife non-hunting area defined by Wildlife Conservation and Protection Act	All sizes	Submit during apply for project permission or approval
	20.2 National Park which defined by National Park Act	All sizes	Submit during apply for project permission or approval
	20.3 Watershed area classified as class 2 by the cabinet resolution	All sizes	Submit during apply for project permission or approval
	20.4 Mangrove forests designated as National Forest Reserve	All sizes	Submit during apply for project permission or approval

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	20.5 Coastal area within 50 meters of the highest sea level by nature	All sizes	Submit during apply for project permission or approval
	20.6 Areas located next to RAMSAR sites or World HeritageSites inscribed in World Heritage List according to World Heritage Convention within 2 kilometer distance	All sizes	Submit during apply for project permission or approval
	20.7 Areas located next to Ancient Remains, Archaeological Resources, Historical Sources or Parks regulated by Ancient Monuments, Antiques and National Museum Act or World Heritage Sites inscribed in World Heritage List according to World Heritage Convention within 2 kilometer distance	All sizes	Submit during apply for project permission or approval
21.	**Rail-Type Mass Transit System**	All sizes	Submit during apply for project permission or approval
22.	**Port**	With capacity of vessels for 500 gross tons or more Or with the total length of the front port is 100 meters or more Or with the total port area is 1,000 square meter or more	Submit during apply for project permission or approval

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
23.	**Recreational Port**	With capacity of 50 vessels or more	Submit during apply for project permission or approval
24.	**Land Reclamation**	All sizes	Submit during apply for project permission or approval
25.	**Construction or Expansion of Structures close to or in the sea** 25.1 Seawall next to coastline	The total length is 200 meters or more	Submit during apply for project permission or approval
	25.2 Groin, Training Jetty, Training Wall	All sizes	Submit during apply for project permission or approval
	25.3 Offshore Breakwater	All sizes	Submit during apply for project permission or approval
26.	**Aviation Transportation System** 26.1 Construction or Expansion of commercial airport or temporary take-off or landing strips for commercial purposes	The runway length is 1,100 meters or more	Submit during apply for project permission or approval
	26.2 Water Airport	All sizes	Submit during apply for permission of airport establishment or of aircraft take-off-landing
27.	**Building which defined by the Building Control Act that has location or building utilization as follow:** 27.1 Building that located near rivers, seacoast, lakes or beaches or in the vicinity or inside National Parks or Historical Parks which may potentially cause unpleasant impact to environmental quality	With 23 meter height or more Or the total floor area or individual area in the same building is equal to 10,000 square meters or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	27.2 Building used for wholesale or retail business	With 23 meter height or more Or the total floor area or individual area in the same building is equal to 10,000 square meters or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
	27.3 Building used as private office	With 23 meter height or more Or the total floor area or individual area in the same building is equal to 10,000 square meters or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
28.	**Land Allocation for residential or commercial purposes which defined by the Land Allocation Act**	500 plots of land or more Or total allocated area is more than 100 Rai (16 hectares)	Submit during apply for a permit of land allocation defined by the Land Allocation Act
29.	**Hospitals or Nursing Homes that defined by the Medical Services Act located in the following area:**		

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	29.1 Areas are near rivers, seacoast, lake or beaches within 50 meters distance	Total 30 in-patient's bed or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
	29.2 Other areas from 29.1	Total 60 in-patient's bed or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
30.	**Hotel or Resort which defined by the Hotel Act**	Total 80 rooms or more or total utilization area is 4,000 square meters or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
31.	**Residential Building which defined by the Building Control Act**	With 80 rooms or more Or total utilization area is 4,000 square meters or more	Submit during apply for a permit for construction or at a time of notification to local officials in case of no permit required which defined by the Building Control Act
32.	**Irrigation**	Irrigated area of 80,000 Rai (12,800 hectares) or more	Submit during apply for project permission or approval
33.	**All projects located in the areas classified as Class 1 watershed area by the cabinet resolution**	All sizes	Submit during apply for project permission or approval

Item	Type of projects or activities	Sizes	Principle. Method. Procedure
34.	**Trans Watershed Diversion** 34.1 Trans major watershed diversion as temporarily operated except for disaster or impact to public security	All sizes	Submit during apply for project permission or approval
	34.2 International trans watershed diversion as temporarity operated except for disaster or impact to public security	All sizes	Submit during apply for project permission or approval
35.	**Sluicegate in the Major River**	All sizes	Submit during apply for project permission or approval

Remark : Types and sizes of the projects or activities No. 1.5 and 26.2 that shall be subject to the preparation of Initial Environmental Examination reports.

ANNEX 2 TYPES AND SIZES OF PROJECTS AND ACTIVITIES WHICH MAY CAUSE SEVERELY ADVERSE IMPACTS TO THE COMMUNITY WITH RESPECT TO ENVIRONMENTAL QUALITY, NATURAL RESOURCES AND HEALTH

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
1.	**Land reclamation in the sea or lake in the external existing coastline except it is done for seashore improving purpose.**	More than 300 Rai of land	Submitted for project's approval or project's permission
2.	**Mining with defined by the Mineral Act as follow:**		
	2.1 Underground mining which the structure has been specifically designed for subsidence after stopping operation without being suspended or without refilling substituted material to avoid subsidence.	All sizes	Submitted for mining concession
	2.2 Lead mine, Zinc mine or other metal which used Cyanide or Mercury or Lead Nitrate in production process or other metal mine which used Arsenopyrite as associated mineral.	All sizes	Submitted for mining concession
	2.3 Coal mining which is specifically loaded Coal from the area by trucks.	More than 200,000 ton per month or 2,400,000 ton per year	Submitted for mining concession
	2.4 Marine mining	All sizes	Submitted for mining concession
3.	**Industrial Estate in accordance to Industrial Estate Act or Project with identical characteristics of Industrial Estate mentioned as follow:**		

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	3.1 Industrial Estate or Project with identical characteristics of Industrial Estate which is established to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2 more than 1 factory.	All sizes	Submitted for project's approval or project's permission
	3.2 Industrial Estate or Project with identical characteristics of Industrial Estate which is expanding area to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2	All sizes	Submitted for project's approval or project's permission
4.	**Petrochemical Industry that mentioned in the following:**		
	4.1 Upstream Petrochemical Industry	All sizes or extensive productivity more than 35% of the existing production	Submitted for construction's permission, operational permission or expansion
	4.2 Intermediate Petrochemical Industry which is mentioned as follow:		
	4.2.1 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimulant group 1 as raw material	Productivity is more than 100 ton per day or total extensive production is more than 100 ton per day	Submitted for construction's permission, operational permission or expansion
	4.2.2 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimu lant group 2A as raw material	Productivity is more than 700 ton per day or total extensive production is more than 700 ton per day	Submitted for construction's permission, operational permission or expansion

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
5.	**Mineral Smelting Industry or Melting Metal Industry which is mentioned in the following:**		
	5.1 Ironworks Industry	Quantity of Ore input of production is more than 5,000 ton per day or the total quantity of ore input in production process is more than 5,000 ton per Day	Submitted for construction's permission, operational permission or expansion
	5.2 Ironworks Industry which is manufactured Coke Coal or provided with sintering process	All sizes	Submitted for construction's permission, operational permission
	5.3 Mineral Smelting Industry of Copper, Gold or Zinc	Quantity of Ore input of production process is more than 1,000 ton per day or the total quantity of ore input in production process is more than 1,000 ton per day	Submitted for construction's permission, operational permission or expansion
	5.4 Smelting Lead	All sizes	Submitted for construction's permission, operational permission

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
	5.5 Melting Metal (except Iron and Aluminum) Industry	Quantity of output is more than 50 ton per day or the total output is more than 50 ton per day	Submitted for construction's permission, operational permission or expansion
	5.6 Melting Lead Industry	Quantity of output is more than 10 ton per day or the total output is more than 10 ton per day	Submitted for construction's permission, operational permission or expansion
6.	**Manufacturing, disposal or modification of radioactive substance**	All sizes	Submitted for operational permission
7.	**Central Waste Treatment Plant or buried garbage or unused material manufacturer as defined by the Factory Act which is burning or buried hazardous waste except burning in cement oven that used hazardous waste as substituted raw material or additional fuel**	All sizes	Submitted for construction's permission, operational permission
8.	**Project of aviation transportation system**	With the construction or expansion or extension of runway is longer than 3,000 meters	Submitted for project's approval or project's permission

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
9.	**Port**	1. With the berth length is 300 meters or more Or port area is 10,000 square meters or more except port that local people use in daily life and for tourism purpose	Submitted for project's approval or project's permission
		2. With the digging of water course is 100,000 cubic meters or more	Submitted for project's approval or project's permission
		3. which used in loading hazard material or hazardous waste which is cancer stimulant group 1 in total quantity of 25,000 tons per month or more or 250,000 tons per year or more	Submitted for project's approval or project's permission
10.	**Dam or reservoir**	1.With the capacity of stored water is 100 million cubic meters or more	Submitted for project's approval or project's permission
		2. The area of stored water is 15 square kilometers or more	Submitted for project's approval or project's permission

Item	Type of projects or activities	Sizes	Principle, Method, Procedure
11.	**Thermal Power Plant as follow:**		
	11.1 Electric Plant using coal as fuel	Total productivity of electricity is more than 100 megawatts	Submitted for construction's permission, operational permission
	11.2 Electric Plant that used biomass fertilization as fuel	Total productivity of electricity is more than 150 megawatts	Submitted for construction's permission, operational permission
	11.3 Electric Plant that used natural gas as fuel which is co-thermal system of combined cycle or co-generation	Total productivity of electricity is more than 3,000 megawatts	Submitted for construction's permission, operational permission
	11.4 Nuclear Power Plant	All sizes	Submitted for construction's permission, operational permission

ANNEX 3 EIA POLICY COMPARISON

Item		Japanese EIA system	International standards (IFC-PS/EHS guidelines/ESRPM)	Thailand
Overall framework				
Legal framework	Major national EIA law, rules and regulations	**Environmental Impact Assessment (EIA) Law** **Ordinance for the enforcement of EIA Law** (Specifies the type of projects subject to EIA) **Rule for the enforcement of EIA Law** (Specifies the contents of the EIA documents, as well as the disclosure and public consultation processes)	The client will establish an overarching policy defining the environmental and social objectives and principles that guide the project to achieve sound environmental and social assessment and management process, and specifies that the project will comply with the applicable laws and regulations of the jurisdictions in which it is being undertaken, including those laws implementing host country obligations under international law. The policy should be consistent with the principles of PS (PS1-para6 Policy) Implications from the development in the discussions on country safeguard system.	The Enhancement and Conservation of National Environment Quality Act, 1992 (NEQA,1992) Notification of Ministry of Natural Resources and Environment specifying types and size of projects required to submit EIA and EHIA as well as rules, procedures for EIA preparation.
	Local governments' EIA law, rules and regulations	All prefectural governments have their own EIA ordinances and guidelines. These can be applied for those projects out of the scope of national EIA Law, and also often prescribe specification on the scope of assessment, standards and guidelines, as well as additional procedures such as dedicated stakeholder consultations and third-party review processes, reflecting on local realities.		Notification for specifying Environmental Protected Areas. There are 7 areas i.e. Phuket, Krabi, Pang-nga, Suratthani, Petchaburi, Prajuab-Kirikan, Pattaya specified as Environmental Protected Areas. In this area, there will be specific measures for protecting environmental values including specific requirement of EIA and IEE.

	Other relevant laws, rules and regulations	National and prefectural environmental quality standards and guidelines, and ordinances by prefectural governments or competent ministries, such as the Ministry of Land, Infrastructure, Transport and Tourism, the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Economy, Trade and Industry	IFC uses the following three sets of documents to implement its environmental and social safeguard policy with clients: **IFC Performance Standards (PS) on Environmental and Social Sustainability –**The Performance Standards are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities **IFC's Environmental and Social Review Procedures Manual** (ESERPM) **IFC's Environmental, Health and Safety Guidelines (EHS Guidelines)** –technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) defined in IFC-PS3. Regarding the overall framework for environmental and social safeguard, PS1 (para5) requires clients the establishment of an Environmental and Social Management System (ESMS), which includes policy, identification of risks and impacts, management programmes, organisational capacity and competency, emergency preparedness and response, stakeholder engagement, monitoring and review	National Environmental standards and such as Air Quality Standard, Noise standard, Water Quality Standard, Soil Quality Standard. Technical Guidelines such as guideline for specific types of projects: industry, transportation, water resources, buildings, etc. and sector guidelines i.e. public participation and social impact assessment guideline, air quality modelling guideline, etc.

Overall EIA process	EIA Process flow	**(1) Primary Environmental Impact Consideration Report** (←Opinions from public, prefectural governor, Environment and other competent ministers) (Project planning) (Screening) **(2) Scoping document** (EIA methodologies) (←Disclosure and explanation sessions, opinions from public, prefectural governor, Environment and other competent ministers) **(3) Draft EIA Report** (←Disclosure and explanation sessions, opinions from public and prefectural governor) **(4) Final EIA Report** (←Opinions from project licensing authority and Environmental minister) (Review and approval) (Implementation of projects, environmental mitigation measures and follow-up monitoring) **(5) Monitoring Report** (←Opinions from project licensing authority and Environmental minister)	Requirements of environmental and social management system (ESMS) process, prescribed by PS: **(1) Identification of risks and impacts**–scoping, measurement and evaluation (PS1-para7-12) **(2) Management Programs**–describing mitigation and performance improvement measures and actions that address the identified environmental and social risks and impacts of the project (PS1-para13) **(3) Monitoring and review**–procedures to monitor and measure the effectiveness of the management programme, as well as compliance with any related legal and/or contractual obligations and regulatory requirements (PS1-para22) **(4) Stakeholder engagement**–stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to affected communities (PS1-para25) IFC-funded projects are subject to the following process, in accordance with the IFC's Environmental and Social Review Procedures Manual: **Direct investments:** (1) Pre-mandate initial review, concept review and E&S specialist(s) assignment (2) Appraisal (3) Disclosure and commitment (4) Managing non-routine events (5) Supervision **Financial intermediary investments:** (1) Early review and appraisal (2) IFC disclosure and commitment (3) Supervision	**(1) Term of References (TOR) or scoping document** (specifying issues and geographical boundaries to be studied in EIA) (public participation shall be organized at scoping stage) **(2) Draft EIA Report** (including all topics as required by EIA such as project description, existing environment, assessment, mitigation measures and monitoring programs) (public participation shall be organized at Draft EIA stage) **(3) Final EIA Report** (To submit to ONEP and committee of expert that includes project licensing authority for review and approval) (mitigation measures and monitoring program will be condition of project license to be issued by project licensing authority) **(4) Monitoring Report** (Project proponent submit monitoring report to project licensing authority and ONEP every 6 months)

	Duration of EIA process	Not specified		Duration of EIA process is specified by law. For project of private sector or project of government agency, state enterprises, or to be jointly undertaken with private enterprise which is not required the approval of the cabinet, ONEP examines EIA report within 15 days. In case it is correct and complete. ONEP shall make preliminary review and comments within 30 days from the date of receiving that EIA report. Then, ONEP shall refer its preliminary comments to committee of expert for further consideration. This consideration shall be carried out within 45 days from the date of receiving that EIA report from ONEP. In case of EIA revision, committee of expert shall review revised EIA by 30 days. For project of government agency, state enterprises, or to be jointly undertaken with private enterprises which is required the approval of the cabinet, project proponent shall submit EIA to National Environmental Board (NEB) for its review and comments and then submit to the cabinet for consideration. For this process, there is duration of EIA review specified by law.
	Rapid assessment		For IFC-funded projects, Category C/IF3 projects are not scored in the appraisal process and exempted from subsequent procedures	Detailed assessment is required for EIA preparation.
	Effect of EIA results on project approval	Licenses, subsidies or other types of funds are not granted if the environmental considerations are insufficient.		EIA approval is linked to project license. By NEQA, 1992, in case the committee of experts approves EIA, the permitting agencies empowered to grant permission to the proponent. But in case the committee of experts disapproves EIA, the permitting agencies shall withhold granting of permission until the proponent resubmits EIA that has been revised as requirement by the committee of experts.
	Relationship between EIA, SEIA, HIA and SIA	Strategic EIA Implementation Guidelines –Specify SEIA process and methodologies in making upstream development plans	EIA, HIA and SIA are all incorporated in IFC's environmental and social safeguard policy	National Environmental Board (NEB) approves Guideline for SEA and ONEP is responsible for disseminating SEA guideline to the government agencies for SEA preparation at the planning stage. HIA and SIA are incorporated in EIA.
Organisational structure	EIA authority (EIA process, review, approval and monitoring)	Project proponents principally take responsibility for conducting EIA process, but specific components of the process specified by prefectural or sectoral ordinates can be supported by the authority responsible for the ordinate. EIA documents are reviewed by the prefectural governor, responsible ministers and the environmental minister. Final project approval is granted from the project licensing authority.	Establish, maintain and strengthen an organisational structure that defines roles, responsibilities, and authority to implement ESMS (PS1-para17)	Project proponents prepare EIA by working with registered EIA consulting firm, then submit EIA to ONEP for review. EIAs are reviewed ONEP and expert of committee (including permitting agency). For the government projects required to submit to cabinet, NEB will also make its comment for cabinet approval. Final project license or permit is granted by from the permitting agency.

	Responsibilities of EIA proponents		Establish and implement ESMS as the above defined	Project proponents principally take responsibility for their EIA starting from EIA preparation, public participation, review (project proponent has to attend in the meeting of expert committee and they have to give more information that the committee may ask), monitoring (proponent must implement the measures proposed in approved EIA and submit monitoring report every 6 months).
	Third-party EIA reviewer			
	External experts		Involve external experts for projects posing potentially significant adverse impacts or where technically complex issues are involved, to assist in the risks and impacts identification process and to verify monitoring information (PS1-para19/22)	For some important EIA such as dams or reservoir that cover many impacts issues and need a lot of experts for review. In case there is no experts in some issues such as expert of the spreading of saline soil, ONEP may hire external expert to support the committee.
	Other relevant institutions			

Elements of EIA process				
Project screening	Projects subject to EIA (including relationship with SEIA, HIA and SIA)	Projects subject to the national EIA policy are those licensed, subsidised or partly funded by the national government, including road construction, river works, railway, airport, power plant, waste landfill, land reclamation, land replotting projects, development of new residential zones, development of industrial parks, port development plan, etc., with specifications on project scale Upstream development plans are expected to follow SEIA process specified by the Strategic EIA Implementation Guidelines	IFC-funded projects are categorised into the following three categories, respectively for direct and financial intermediary investments: **Category A/FI-1:** Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented. **Category B/FI-2**: Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. **Category C/FI-3**: Business activities with minimal or no adverse environmental or social risks and/or impacts Categories A/FI-1 and B/FI-2 projects are scored ESRR, and subject to subsequent, disclosure, commitment and supervision	Screening for EIA requirement is specified by Notification of Ministry of Natural Resources and Environment and the Cabinet Resolution as follows: • Notification for types and size of projects required to submit EIA and the rules, procedures for EIA preparation, 2012 and 2013 (35 types of projects requires EIA). • Notification for types and size of projects that may seriously affect to community in the quality of environment, natural resources and health required to submit Environment and Health Impact Assessment (EHIA), 2010 (11 types of projects requires EHIA). • Notification for specifying Environmental Protected Areas. There are 7 areas i.e. Phuket, Krabi, Pang-nga, Suratthani, Petchaburi, Prajuab-Kirikan, Pattaya specified as Environmental Protected Areas. In this area, there will be specific measures for protecting environmental values including specific requirement of EIA and IEE. • Cabinet Resolution for Forest Conservation Area, 2011 • Cabinet Resolution for Wetland Conservation, 2009

	Projects subject to rapid assessment	Authorities responsible for licensing the project decide on whether to conduct EIA on Class-2 projects (not mandated to apply the procedures prescribed by the national EIA Law). Even those projects exempted from the application of the national EIA Law can be subject to the prefectural governments' EIA ordinances and guidelines	In IFC-funded projects, Category C/FI-3projects do not require in general any subsequent project disclosures	Detailed assessment is required for EIA.
	Immunity	-	-	
Scoping	Environmental, health and social attributes	EIA Law, in one of its supplemental tables, specifies environmental attributes required to be addressed in EIA. These are: **Atmospheric environment** –air quality, noise, vibration and odour **Water environment**–water quality, sediment, quality, flow and level of groundwater **Soil environment** –geography and soil pollution **Biodiversity and ecosystems** **Amenity and landscapes** **Waste management** **GHG emission**. The above listed include both environmental and health aspects. For example, national water quality standards are grouped into two: 'standards for human health' and 'standards for conservation of the living environment'. In addition, prefectural or sectoral ordinances or guidelines prescribe locally or sector-specifically important additional aspects subject to EIA, which sometimes include social attributes such as cultural heritage. For example, Tokyo Metropolitan Government's EIA technical guidelines prescribe additional locally important aspects such as shade, electromagnetic interference, wind environment as well as historical and cultural heritages.	The process will consider all relevant environmental and social risks and impacts of the project, including the issues identified in Performance Standards2 through 8, and those who are likely to be affected by such risks and impacts (PS1-para7): **PS2. Labour and working conditions**–safe and healthy working conditions and the health of workers for contracted or supply chain workers; child labour **PS3. Resource efficiency and pollution prevention** –resource efficiency (energy, water, other resources and material inputs); GHG emission, water consumption and wastes **PS4. Community health, safety and security**–Health or safety risks to affected communities, including exposure to hazardous materials and substances and to water-related, vector-borne and communicable diseases **PS5. Land acquisition and involuntary resettlement**–resettlement and restriction on access to land or use of other resources including communal property and natural resources **PS6. Biodiversity conservation and sustainable management of living natural resources**–Risks and impacts from projects that i) located in modified, natural and critical habitats, ii) potentially impact on or are dependent on ecosystem services (priority ecosystem services), or iii) include the production of living natural resources; Upstream supply chain (e.g. primary production for food and fibre commodities) **PS7. Indigenous peoples**–Project affected indigenous peoples **PS8. Cultural heritage**–Identification and protection of cultural heritage, including by 'Chance Find procedures', non-replicable cultural heritage, crucial cultural heritage, as well as the use of cultural heritage	EIA content include details of project description, environmental existing, assessment, mitigation measures and monitoring programs. The environmental existing and assessment will cover 4 main aspects: ▪ Physical resources, ▪ Biological resources, ▪ Human use value, ▪ Quality of life. Each aspect includes relevant parameters such as Physical resources includes geomorphology, soil, geology, air quality, noise, surface and underground water, coastal water.

	Target project phase	Construction, commissioning and operation	Start from early development stages through entire life cycle (design construction, commissioning, operation, decommissioning, closure, post-closure) (PS1, para 4)	Construction, operation,decommissioning (esp. mining, oil and gas exploration).
	Facilities and area	The area(s) subject to indirect but recognisable changes in environmental attributes, and to direct physical changes by the propose project, taking into account the characteristics of environmental parameters, projects and the areas.	The Area of Influence, defined in PS1,encompasses(i) the **primary project site(s) and related facilities** that the client (including its contractors) develops or controls; (ii) **associated facilities** that are not funded as part of the project and whose viability and existence depend exclusively on the project; (iii) areas potentially impacted by **cumulative impacts** from further planned development of the project; and (iv) **areas potentially affected by impacts from unplanned but predictable developments** caused by the project that may occur later or at a different location.	Scoping area should cover areas that may affect by project impacts such as upstream and downstream of dam, two sides of the area along the road. Area to be studied in EIA is case by case consideration and should cover sensitive area nearby the projects.
	Cumulative impacts	Some sectoral or prefectural ordinances on EIA specify requirements for cumulative impacts. For example, the EIA technical guidelines of the Tokyo Metropolitan Government requires EIA to incorporate the areas subject to interlinked and cumulative environmental impacts, and to take into account interlinked and cumulative environmental impacts in making impact predictions.	Identification of **cumulative impacts**, such as incremental contribution of gaseous emissions to an airshed, reduction of water flows in a watershed due to multiple withdrawals, increases in sediment loads to a watershed, interference with migratory routes or wildlife movement. (PS1, para 8)	EIA shall assess cumulative impacts especially for air quality impact assessment and water quality impact assessment. The existing sources of air pollution will be calculated by the mathematical model.
Environmental standards and methodological aspects (Including parameters, standards, methodologies for baseline measurement and impact evaluation)	General /principles	Environmental quality standards, environmental master plans and other environmental policy documents by national or local governments that prescribe environmental benchmarks are referred to in evaluating predicted impacts. These include national standard on: Ambient and emission air quality and dioxin Odour Surface water quality from human health and environmental perspectives Ground water quality Sediment contamination Soil pollution Biodiversity (endangered species specified by the species protection law and the IUCN Red List) Resource efficiency GHG emission	When host country regulations differ from the Environmental quality standards levels and measures presented in the **EHS Guidelines**, project proponents will be required to achieve whichever is more stringent. (PS3-para5) EHS Guidelines prescribe General Guidelines and Industry Sector Guidelines. The followings are those listed under the General Guidelines:	Environmental quality standards, environmental master plans and guidelines issued by Ministry of Natural Resources and Environment and other relevant ministries are applied in assessing predicted impacts. Examples of Environmental quality standards and guideline i.e.: Ambient Air Quality Standard, Emission Standard, Noise Standard, Surface Water Quality Standard, Groundwater Quality Standard, Coastal Water Quality Standard, Ground Water Quality Standard for Drinking Purpose Soil Quality Standard, Biodiversity Guideline (draft) , etc.

Atmospheric environment	**Air quality**: National standards (Addendum 1-1) prescribes standards and evaluation methodologies for ambient and emission air quality and dioxin. Additional and locally important parameters, or stricter standards, are often prescribed by prefectural ordinances. **Noise and vibration**: National standards prescribes noise and vibration standards for different types of projects (Addendum 1-2) **Odour**: Odour Prevention Law provides overall rules, and prefectural ordinances provide parameters, standards and specification of areas subject to the law	**EHS Guidelines on Air Emissions and Ambient Air Quality**–detailed parameters, standards and monitoring methodologies for ambient air quality, point sources, fugitive sources, mobile sources and greenhouse gases. http://www.ifc.org/wps/wcm/connect/532ff4804886583ab4d6f66a6515bb18/1-1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES **EHS Guidelines on Noise**–detailed parameters, standards and monitoring methodologies for noise. http://www.ifc.org/wps/wcm/connect/06e3b50048865838b4c6f66a6515bb18/1-7%2BNoise.pdf?MOD=AJPERES	**Air Quality Standard**: National standards (Addendum 1-1) prescribe standards and measurement methods for ambient air quality and emission from various types of projects. **Noise and vibration**: National standards prescribes noise and vibration standards for different types of projects (Addendum 1-2) • **Odour**: National standards prescribe odour concentration from industrial zone, outside industrial zone and livestock farm.
Water environment	**Surface water quality**: National standards (Addendum 1-3) prescribe two sets of parameters, standards and evaluation methodologies for the protection of human health as well as for environmental conservation **Groundwater quality**: National standards (Addendum 1-4) specify parameters, standards, and measurement methodology for groundwater pollution. **Sediment**: National standards specify the parameter, standards and measurement methodology on mercury, PCB and dioxin **Water circulation**: Prefectural guidelines specify parameters related to water circulation, including the state and dynamics of groundwater, springs, surface water (including rivers and lakes) and sea.	**EHS Guidelines on Wastewater and Ambient Water Quality**–detailed parameters, standards and monitoring methodologies for general liquid effluent quality, as well as good practices in wastewater management. http://www.ifc.org/wps/wcm/connect/026dcb004886583db4e6f66a6515bb18/1-3%2BWastewater%2Band%2BAmbient%2BWater%2BQuality.pdf?MOD=AJPERES **EHS Guidelines on Water Conservation**–good practices in water conservation, including water monitoring and management, process water reuse and recycling, building facility operations, cooling systems and heating systems. http://www.ifc.org/wps/wcm/connect/8de35e0048865835b4b6f66a6515bb18/1-4%2BWater%2BConservation.pdf?MOD=AJPERES	**Surface water quality**: National standards (Addendum 1-3) prescribe classification and water usage and standard value of water quality parameters for each water class. **Groundwater quality**: National standards (Addendum 1-4) specify parameters, standards, and measurement methodology for groundwater pollution. **Water circulation**: ONEP Guideline for EIA Preparation of Dam and Reservoir Project specifies the study of water stratification especially for deep water reservoir.

Soil and geology	**Soil pollution**: National standards on soil pollution (Addendum 1-5) **Geology/soil**: Prefectural guidelines specify parameters (geology/soil categories and their engineering aspects, soil stability, groundwater state and dynamics, etc.) and methodology for measurement and impact prediction	**EHS Guidelines on Contaminated land**–good practices in risk screening, interim risk management, detailed risk assessment, permanent risk reduction measures, as well as in occupational health and safety considerations. http://www.ifc.org/wps/wcm/connect/4f4ca40048865833b49ef66a6515bb18/1-8%2BContaminated%2BLand.pdf?MOD=AJPERES	**Soil pollution**: National standards on soil pollution (Addendum 1-5) - **Geology/soil**: ONEP Guideline for Mining Projects and Dam and Reservoir Project requires detailed study of geology/soil i.e. general description of the geology of the site, seismicity, type and quality of mineral resources, soil classification, soil suitability, etc.
Biodiversity and ecosystems	**Biodiversity**: Species Protection Law, with the list of endangered species provided by the ministerial ordinance and the IUCN's red list, specifies endangered species, their habitats, as well as measures for their protection. Prefectural guidelines prescribe parameters, as well as methodology for baseline measurement and impact prediction. **Ecosystems**: Prefectural guidelines prescribe parameters, as well as methodology for baseline measurement and impact prediction. Parameters include the function and structure of ecosystems, as well as important species and their populations that characterise the ecosystem, including the umbrella, dominant or keystone species. In addition, a ministerial-level expert committee provides a detailed technical guidelines and good practices for ecosystems impact assessment	Identification of risks and impact from projects (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g., agriculture, animal husbandry, fisheries, forestry). (PS6, para 5)	**Biodiversity and ecosystem**: ONEP guidelines require the study of animal / plant ecology, species, number, distribution, habitat and migration. For rare species, it is needed to study types of species, number and its importance.

	Amenity/recreation	**Landscape (view)**: Prefectural guidelines prescribe parameters, as well as methodology for baseline measurement and impact prediction. Parameters include locally characteristic landscape view, view from major viewpoints, oppressiveness, etc. **Amenity**: Prefectural guidelines prescribe parameters, as well as methodology for baseline measurement and impact prediction. Parameters include the state, function and utility of amenity places, as well as related factors such as water and geological environment. In addition, a ministerial-level expert committee provides a detailed technical guidelines and good practices for impact assessment relating to amenity of natural environment.		**Landscape (view)**: ONEP guideline for EIA preparation of Building and community services require the study of visual impact assessment especially for high rise condominium or buildings closed to important places such as palaces, temples, churches, etc. Opinion of the public and expert will be surveyed and assessed. - **Amenity**: In case of project within or close to Recreational site. EIA should explain description of the site, value and its importance.
	Waste management	Sectoral/prefectural guidelines specify the environmental attributes relating to waste management subject to EIA, and refer to parameters, as well as the methodologies for baseline measurement, impact prediction and impact evaluation, which are prescribed by other laws, rules and regulations of the national or local governments. For example, the EIA Technical Guidelines of Tokyo Metropolitan Government refers to national 'Fundamental Law for Establishing a Sound Material-Cycle Society' and 'Ministerial Ordinance on Basic Direction Relating to the Promotion of Efficient Resource Use', as well as the prefectural/municipal ordinance on waste management. For example, the Fundamental Law for Establishing a Sound Material-Cycle Society mandates project proponents to take measures for reducing waste generation, reusing recycled materials, and appropriately disposing of unrecyclable materials.	Avoidance the generation of **hazardous and non-hazardous waste materials**. (PS3, para 12) **EHS Guidelines on waste management**–good practices in general waste management (waste management planning, waste prevention, recycling and reuse, as well as treatment and disposal) and hazardous waste management (waste storage, transportation, treatment and disposal, as well as monitoring) http://www.ifc.org/wps/wcm/connect/6e4e348048865839b4cef66a6515bb18/1-6%2BWaste%2BManagement.pdf?MOD=AJPERES	ONEP guideline for EIA preparation of various projects specifies assessment of waste management including general waste, hazardous waste, and infectious waste. EIA must describe sources, type, amount, collection and disposal systems.

	Climate change mitigation and adaptation	Sectoral/prefectural guidelines specify the environmental attributes relating to GHG emission subject to EIA, and refer to parameters, as well as the methodologies for baseline measurement, impact prediction and impact evaluation, which are prescribed by other laws, rules and regulations of the national or local governments. For example, the EIA Technical Guidelines of Tokyo Metropolitan Government refers to the national 'Act on Promotion of Global Warming Countermeasures' and 'Act on Enhancing Energy Efficiency', as well as the GHG reduction goals, plans and measures provided by the national, prefectural and municipal governments. For example, the Act on Promotion of Global Warming Countermeasures' mandates the project proponents to reduce GHG (CO2, CH4, N2O, Specified HFC/PFC and F6S) emission in corporation with national and local governments.	Identification of risks and impacts including the **emissions of GHG gas**, the relevant risks associated with a **changing climate and the adaptation** opportunities Consideration of alternatives and implement technically and financially feasible and cost-effective options to **reduce project-related GHG emissions** during the design and operation of the project For projects that are expected to or currently **produce more than 25,000 tonnes of CO2-equivalent annually**, **quantification of direct emissions** from the facilities owned or controlled within the physical project boundary as well as **indirect emissions** associated with the off-site production of energy used by the project. (PS1, para 7 and PS3, para 7,8) **EHS Guidelines on energy conservation**–good practices in implementing process heating, process cooling and compressed air systems. http://www.ifc.org/wps/wcm/connect/c25b18004886583db4eef66a6515bb18/1-2%2BEnergy%2BConservation.pdf?MOD=AJPERES	There is no mandatory requirement for climate change mitigation and adaptation measures in the EIA system in Thailand. However, it could be done on a voluntary basis.
	Health and safety	Environmental quality standards as specified for the above listed environmental attributes generally include human health aspects. The followings are examples: National water quality standards are grouped into two: 'standards for human health' and 'standards for conservation of the living environment'. National standards on soil pollution deals with hazardous pollutants	Evaluate the risks and impacts to the **health and safety of the Affected Communities** during the project life-cycle. (PS4-para5) **EHS Guidelines on occupational health and safety**–good practices in general facility design and operation, communication and training, management of physical hazards, chemical hazards, biological hazards, radiological hazards, personal protective equipment, special hazard environments, as well as monitoring http://www.ifc.org/wps/wcm/connect/9aef2880488559a983acd36a6515bb18/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES **EHS Guidelines on community health and safety**–good practices in managing water quality and availability, structural safety of project infrastructure, life and fire safety, traffic safety, transport of hazardous materials, disease prevention, emergency prepared ness and response http://www.ifc.org/wps/wcm/connect/dd673400488559ae83c4d36a6515bb18/3%2BCommunity%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES	ONEP guideline for EIA preparation of various projects specifies assessment of public Heath or Health Impact Assessment (HIA).it will cover health of community (Morbidity Rate, Mortality Rate, infectious disease, epidemic, endemic disease, health services, health impacts such as disease , accident). For the workers, occupational health will be studied such as occupation disease and illness, accident, health risks(The study should cover workers at the construction and operation phase).

	Hazardous materials	-	**EHS Guidelines on Hazardous materials management** –good practices in hazard assessment, management actions, preventive measures, control measures, emergency preparedness and response, as well as community involvement and awareness http://www.ifc.org/wps/wcm/connect/47d9ca8048865834b4a6f66a6515bb18/1-5%2BHazardous%2BMaterials%2BManagement.pdf?MOD=AJPERES	ONEP guideline for EIA preparation of industry, power plant, mining, specifies assessment of hazardous waste management including sources, type, amount, and collection and disposal system. Hazardous waste will be controlled by Material Safety Data Sheet (MSDS) and manifest system under The Factory Act.
	Cultural heritage	Prefectural or sectoral ordinances or guidelines prescribe locally or sector-specifically important additional aspects subject to EIA, which sometimes include social attributes such as cultural heritage.	The project proponent will **identify and protect cultural heritage** by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented. (PS8, para 6)	ONEP guideline requires assessment of Quality of life that covers historic issue including historical site, archaeological site, traditional custom and culture.
Impact mitigation	Policy	Specifications are prescribed by ordinances of prefectural governments or competent ministries, and their technical guidelines and good practices are provided by a ministerial-level expert committee By principle, the project owners are required to prioritise the avoidance or minimisation of significant environmental impacts, or to offset the impacts if unavoidable (**mitigation hierarchy**).They are also required to meet environmental standards prescribed by the national and local governments	**Mitigation hierarchy:** The mitigation hierarchy to address identified risks and impacts will favour the avoidance of impacts over minimization, and, where residual impacts remain, compensation/offset, wherever technically and financially feasible. (PS1, para 14)	Mitigation Measures to be proposed in EIA shall relate to the result of impact assessment. Significance negative impacts shall be emphasized. Mitigation hierarchy will start from avoiding impacts, minimizing impacts, correction impacts to the lowest level (compensation).

	Methods	EIA makes suggestions on an impact mitigation plan to the project owner, which is developed through the following steps: 1) Develop a basic direction for impact mitigation 2) Make impact mitigation plans for different phases of project implementation 3) Organise multiple options for impact mitigation, with advantages and disadvantages, regarding different environmental elements subject to significant changes by the project 4) Evaluate the impact of the mitigation plan implementation on other environmental elements 5) Verify the appropriateness of the mitigation plan –Is the best and feasible technology is adopted, among other options? 6) Evaluate the mitigation plan, relating to its effect to avoid or mitigate anticipated impacts, and in accordance with the national and local government's environmental standards and policies.	**Biodiversity offset**: The mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimization, and restoration measures have been applied. A biodiversity offset should be designed and implemented to achieve **a net gain for critical habitats**. The design of a biodiversity offset must adhere to the **"like-for-like or better" principle** and must be carried out in alignment with **best available information and current practices**. When a project proponent is considering the development of an offset as part of the mitigation strategy, **external experts** with knowledge in offset design and implementation must be involved. (PS6, para 10)	Mitigation measures cover at least two phases: mitigation measures for construction phase and mitigation measures for operation phase. For some projects such as dams, mining are required mitigation measure at the preparation phase. For oil and gas Development and mining are required mitigation measures at decommission phase. The committee of expert will consider the suitability of mitigation measures that should be practical, feasible in technology and budget.
	Implication to project design	Project owners are required to implement the impact mitigation plan within their capacity, which possibly cause the changes in the project design.		

Monitoring and follow-up actions	Policy	EIA Law mandates project owners to conduct a follow-up monitoring on those parameters with significant uncertainty, or with insufficient information, in regards to the accuracy of the baseline measurement, prediction and evaluation. The follow-up monitoring 1) verifies whether the actual project impacts on specified parameters are within the predicted range, 2) assesses whether the impact mitigation measures are sufficiently effective, and 3) proposes the project owner to take additional mitigation actions if significant impacts beyond the predicted range are observed	ESMS needs to start from early development stages through the entire life cycle (PS1-para4). This principle could be applied to monitoring and follow-up actions.	The monitoring measures shall include description of monitoring site, parameters, frequency, measuring methods, responsible agencies. The monitoring measures aim to follow up whether the mitigation measures are implemented and also to assess effectiveness of proposed mitigation measures. By the monitoring result, the environmental quality within and nearby the projects will be monitored and evaluated. This is important data whether we need to improve or add more mitigation measures.
	Methods	It is basically recommended to apply the same measurement methodologies as the ones used in the baseline measurement, to enable comparison with the EIA results Project owners often spontaneously carry out environmental monitoring and disclose monitoring results. These monitoring initiatives are proactively utilised. In addition, a ministerial-level expert committee provides a detailed technical guidelines and good practices of monitoring specific parameters in and after the project implementation	Monitoring methods are specified in EHS guidelines for each environmental attribute, which are listed out in the above section on 'environmental standards and methodological aspects'.	• The method to be used in environmental monitoring shall follow the standard for measurement. • Project proponents have to submit monitoring report to ONEP and permitting agencies every 6 months. • ONEP provides the guideline for preparation of Monitoring report.
	External verification	External experts can be involved, as needed, to provide objective and scientific basis for the monitoring scope and methods.	For projects with significant impacts, Retaining **external experts to verify its monitoring information**. (PS1, para 22)	-

	Disclosure	Details of follow-up monitoring need to be specified in the draft and final EIA Reports, including the reasons for conducting the follow-up monitoring, its parameters and measurement methodologies, measures to be taken if significant environmental impacts are observed, as well as the timing of the disclosure The results of the follow-up monitoring needs to be disclosed at the earliest possible timing at appropriate places.	Provision of **periodic reports to the Affected Communities** that describe progress with implementation of the project Action Plans on issues that involve ongoing risk to or impacts on Affected Communities and on issues that the consultation process or grievance mechanism have identified as a concern to those Communities. (PS1, para 36)	Monitoring reports are disclosed. The public can ask for monitoring reports. EIA consultants also use for assess cumulative impact for other projects in the same area such as assessment of air quality of the industries in the same industrial estate.
Public /stakeholder participation	Public information and comments	National EIA Law stipulates the requirements for public information and comments in EIA process, i.e. relating to the four EIA deliverables as follows: 7) Primary Environmental Impact Consideration Report: Disclosure, public opinions and their reflection on the scoping document 8) Scoping document: Disclosure (1 month), explanation sessions, submission of opinion letters (closed 2 weeks after the disclosure), and their reflection on the draft EIA Report 9) Draft EIA Report: Disclosure (1 month), explanation sessions, submission of opinion letters (closed 2 weeks after the disclosure), and their reflection on the final EIA Report		By the Notification of Ministry of Natural Resources and Environment, the requirements for public participation shall follow ONEP Guideline. EIA requires at least 2 public participation opportunities: 10) At the scoping stage 2) Draft EIA EHIA requires 4 public participation that 3 public participation (scoping, preparation, draft EHIA) will be responsible by the project proponent and 1 public participation will be organized by the permitting agency before its decision making.

	Stakeholder involvement	Ordinances of prefectural governments or relevant ministries stipulate detailed guidelines for stakeholder involvement. For example, The EIA Ordinance of the Tokyo Metropolitan Government requires holding consultation sessions with public and the project proponents.	**Consultation with affected communities**: Effective consultation is **a two-way process** that should: (i) begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise; (ii) be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to Affected Communities; (iii) focus inclusive engagement on those directly affected as opposed to those not directly affected; (iv) be free of external manipulation, interference, coercion, or intimidation; (v) enable meaningful participation, where applicable; and (vi) be documented. (PS1, para 30) **Informed consultation and participation (ICP):**For projects with potentially significant adverse impacts on Affected Communities, the project proponent will conduct an **Informed Consultation and Participation (ICP)** process that will build upon the two-way consultation and will result in the Affected Communities' informed participation. ICP involves a more in-depth exchange of views and information, and an organized and iterative consultation, leading to the project proponent's incorporating into their decision-making process the views of the Affected Communities on matters that affect them directly. (PS1, para 31) **Grievance mechanism:** Where there are Affected Communities, Establishment of a grievance mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance. (PS1, para 35)	Identification of stakeholder stipulate in ONEP public participation guideline that shall cover 7 groups as follow: 1) Affected people 2) Agencies that are responsible for EIA preparation (project proponent and registered consultants) 3) Agencies that are responsible for EIA review (ONEP, committee of expert, NEB, permitting agencies, the cabinet) 4) Other relevant government agencies i.e. Department of Forestry, Royal Department of irrigation, Regional Environmental Office, Natural resources and Environment at province level. 5) Environmental NGOs 6) Press 7) General public.
	Reflection on EIA process	Public opinions on the Primary Impact Consideration Report, Scoping Document and the Draft EIA Report are reflected on in the subsequent documentation process.		Public comments at the scoping stage will be used for consideration of the scope of EIA study. Public comment at the Draft EIA will be used for revision of Draft EIA before submit EIA to ONEP.

ANNEX 4 - COMPARISON WITH INTERNATIONAL STANDARDS (IFC, PERFORMANCE STANDARDS)

IFC, PS		Para	Requirement	Thailand
PS1 : Assessment and Management of Environmental and Social Risks and Impacts	Scope	Para 3	Business should avoid infringing on the human rights of others and address adverse **human rights** impacts business may cause or contribute to.	Human rights are considered within the topic of socio economic. Public participation process is important mechanism that people involve in project development as well as EIA process. People may protect their rights and inform their comments through participation process.
		Para 12	Identification of individuals and groups that may be affected by the project because of their **disadvantaged or vulnerable status**, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status.	Study in socio economic topic covers all population profile (such as occupation, income, language, religion) and in health impacts assessment, risk groups or **vulnerable groups** will be specially considered.
PS2 Labor and Working Conditions	Scope	Para 6&7	Promotion of safe and healthy working conditions and the health of workers for **contracted workers and supply chain workers**.	Mitigation measures concerning of workers **(contracted workers and supply chain workers)**: -Hiring of local worker must be considered before foreign worker in order to prevent outside infectious disease spreading and avoiding of social conflict between worker and the local people. - safe and healthy working measures such as providing of personal protective equipment, annual health check, etc.
	Grievance Mechanism	Para 20	Provision of a **grievance mechanism** for workers (and their organizations, where they exist) to raise workplace concerns.	Grievance mechanism is provided by Ministry of Labor.
	Child Labor	Para 21	**Not employ children (a person under age 18)** in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.	This issue is not included in Environmental Law or EIA guideline but the Labor Law. Child labor refers to an employee who is over the age of 15 years old but less than 18 years of age and employment that prohibits employers. **Employment of children under 15 years** are not employed by any employer. Child labor shall not work in hazardous working condition. Types of working places and duration of working are control by the Labor Law.
PS4 Community Health, Safety, and Security	Infrastructure and Equipment Design and Safety	Para 6	Project Proponent will design, construct, operate, and decommission the structural elements or components of the project in accordance with good international industry practice, taking into consideration **safety risks to third parties or Affected Communities.**	Project proponent shall design, construct, operate, alteration and decommission of the buildings as according to Building Law control. Project proponent shall submit for building permit. Safety risks of the building are considered by the permitting agency (local authority). However, environmental impacts from building that may **affect communities** both in construction and operation phase will be considered in EIA process.

		Para 6	When structural elements or components, such as dams, tailings dams, or ash ponds are situated in high-risk locations, and their failure or malfunction may threaten the safety of communities, the project proponent will engage one or more **external experts**, separate from those responsible for the design and construction, to **conduct a review** as early as possible in project development and throughout the stages of project design, construction, operation, and decommissioning.	In case of project required EIA such as dam, mining with tailing ponds, committee of expert will consider its location, details of geology and geomorphology as well as other relevant data. In case of risk, EIA shall propose feasible and practical mitigation measures. Alternatives for other locations shall be considered.
	Health and Safety	Para 7	Avoidance or minimization of the potential for community **exposure to hazardous materials and substances** that may be released by the project.	The mitigation hierarchy is avoidance then minimization of the potential for community **exposure to hazardous materials and substances** that may be released by the project. Some tailing ponds will be laid by high density polyethylene (HDPE) to prevent contamination to outside the project.
		Para 9&10	Avoidance or minimization of the potential for community **exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases** that could result from project activities; and transmission of communicable diseases that may be associated with the **influx of temporary or permanent project labor**.	There are mitigation measures for avoidance or minimization of the potential for community **exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases** that could result from project activities; and transmission of communicable diseases that may be associated with the **influx of temporary or permanent project labor** especially for the dam or reservoir project.
	Emergency Preparedness and Response	Para 11	Assistance and collaboration with the Affected Communities, local government agencies, and other relevant parties, in their **preparations to respond effectively to emergency situations**	There are mitigation measures for assistance and collaboration with the Affected Communities, local government agencies, and other relevant parties, in their **preparations to respond effectively to emergency situations** especially for industry, petrochemical industry, power plant, oil and gas exploration, mining, high rise condominium, etc.
	Security Personnel	Para 12	When the project proponent retains direct or contracted workers to provide security to safeguard its personnel and property, it will **assess risks posed by its security arrangements** to those within and outside the project site.	
		Para 12	Provision of a **grievance mechanism** for Affected Communities to express concerns about the security arrangements and acts of security personnel.	

PS5 Land Acquisition and Involuntary Resettlement	Scope	Para 2	Where involuntary resettlement is unavoidable, it should be minimized and appropriate measures to mitigate adverse impacts on displaced persons and **host communities** should be carefully planned and implemented.	The same principle is applied. However if involuntary resettlement is unavoidable. It is needed to **consult** with the affected community to study the suitable mitigation measures with their acceptance. However in Thailand, in many cases, people do not want to move to planned resettlement area but need enough compensation for seeking their own places. In the resettlement process, **consultation** with the people (both displaced person and host community) shall be considered.
		Para 5	Where **restriction on access to land or use of other resources including communal property and natural resources** such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and grazing and cropping areas is unavoidable, it should be minimized and appropriate measures to mitigate adverse impacts on Affected Communities.	The same principle is applied. An example is the case of water resources to be supplied in industrial estate. There will be conflict with the local rice farming. It is needed to consult with the local people, try to minimize impacts. Water usage agreement is needed for this case.
	Project Design	Para 8	Consideration of **feasible alternative project designs** to avoid or minimize physical and/or economic displacement, while balancing environmental, social, and financial costs and benefits.	The same principle is applied. **Alternative project designs** are **important** to **avoid** or minimize impacts.
	Compensation	Para 9	When displacement cannot be avoided, the project proponent will offer displaced communities and persons **compensation for loss of assets at full replacement cost** and other assistance to help them **improve or restore their standards of living or livelihoods.**	The same principle is applied. However, it should be realized that displacement and compensation will be at the lowest level of the mitigation hierarchy.
		Para 9	Where livelihoods of displaced persons are **land-based,** or where **land is collectively owned**, the project proponent will, where feasible, offer the displaced land-based compensation.	
		Para 9	**Taking possession** of acquired land and related assets **only after compensation has been made available**	The detail of compensation rate, process and condition will be considered by the Compensation Committee of the project. This step is not included in EIA.
		Para 17	Compensation for persons who have **no recognizable legal right or claim** to the land or assets they occupy or use.	
		Para 18	Avoidance, minimization and compensation for **economic displacement** caused by project-related land acquisition and/or restrictions on land use	
	Community Engagement	Para 10	**Disclosure of relevant information and participation of Affected Communities and persons will continue** during the planning, implementation, monitoring, and evaluation of compensation payments, livelihood restoration activities, and resettlement to achieve outcomes	The same principle is applied.

	Grievance Mechanisms	Para 11	Establishment of a **grievance mechanism** as early as possible in the project development phase.	
	Cut-off date	Para 12	In the absence of host government procedures on involuntary resettlement, the client will establish a **cut-off date** for eligibility.	
	Compensation Audit	Para 15	The **completion audit** should be undertaken once all mitigation measures have been substantially completed and once displaced persons are deemed to have been provided adequate opportunity and assistance to sustainably restore their livelihoods.	For some project such as dam or reservoir, industry, the project proponent has to submit audit report as required by the expert committee.
	Resettlement Action Plan	Para 19	A Resettlement Action Plan will be designed to mitigate the negative impacts of displacement; identify development opportunities; develop a resettlement budget and schedule; and **establish the entitlements of all categories of affected persons**	The same principle is applied.
		Para 19	**Documentation of all transactions** to acquire land rights, as well as compensation measures and relocation activities.	
		Para 25	In the case of projects involving **economic displacement** only, development of a Livelihood Restoration Plan to compensate affected persons and/or communities and offer other assistance	
	Government-managed Resettlement	Para 31&32	If government physical resettlement measures do not meet the relevant requirements of the Performance Standard, the project proponent will prepare a Supplemental Resettlement Plan	
PS6 Biodiversity Conservation and sustainable Management of Living Natural Resources	Critical Habitat	Para 16	**Critical habitats** are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered11 species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.	
		Para 8	For Critical Habitats, retaining **external experts** with appropriate regional experience to assist in the development of a mitigation hierarchy.	In case of projects may affect to critical habitat. The project proponent with the EIA registered consultant will retain **competent professionals** to assist in the identification and development of suitable mitigation measure.

		Para 17	The project does not lead to a net reduction in the global and/or national/regional population of any **Critically Endangered or Endangered species** over a reasonable period of time;	
		Para 17	For the project in critical habitats, a robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the project proponent's management program.	The same principle is applied.
	Alien species	Para 22	All introductions of alien species will be subject to a risk assessment to determine the potential for invasive behavior. The project proponent implements measures to avoid the potential for accidental or unintended introductions.	
	Ecosystem Services	Para 24	Where a project is likely to adversely impact ecosystem services, conducting **a systematic review to identify priority ecosystem services**, which are (i) those services on which project operations are resulted in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations	
	Sustainable Management of Living Natural resources	Para 26&27	Where primary production practices are codified in globally, regionally, or nationally recognized standards, the implementation of **sustainable management practices** to one or more relevant and credible standards as demonstrated by independent verification or certification.	
	Supply chain	Para 30	Where a project proponent is **purchasing primary production** (especially but not exclusively food and fiber commodities) that is known to be produced in regions where there is a risk of significant conversion of natural and/or critical habitats, systems and verification practices will be adopted as part of the ESMS to evaluate its primary suppliers.	

PS7 Indigenous Peoples	Definition	Para 5	The term "**Indigenous Peoples**" is used in a generic sense to refer to a distinct social and cultural group possessing the following characteristics in varying degrees: ・ Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; ・ Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories; ・ Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture; or ・ A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.	In case that there are indigenous people in the vicinity of project. Details of indigenous people will be studied in socio –economic part in EIA. It will cover their cultures, languages, religions, economic, social, etc. Impacts to indigenous people and mitigation will be studied through public participation process. However, only few cases of EIA found impacts to indigenous people
	Scope	Para 8	Identification of project affected indigenous people	Study of socio economic topic in EIA covers identification of project affected indigenous people (if any).
	Indigenous Peoples Plan	Para 9	The project proponent's proposed actions will be developed with the **ICP** of the Affected Communities of Indigenous Peoples and contained in a **time-bound plan**, such as an Indigenous Peoples Plan, or a broader community development plan with separate components for Indigenous Peoples.	
	FPIC	para 12	**Free, Prior and Informed Consent (FPIC)** builds on and expands the process of ICP and will be established through good faith negotiation between the client and the Affected Communities of Indigenous Peoples.	
		Para 12, 13 & 14	If the project proponent proposes to locate a project on, or commercially develop natural resources on **lands traditionally owned by, or under the customary use of, Indigenous Peoples,** and adverse impacts can be expected, the project proponent will obtain the FPIC of the Affected Communities of Indigenous Peoples. At the same time, the project proponent will assess and document the Affected Communities of Indigenous Peoples' resource use without prejudicing any Indigenous Peoples' land claim, and ensure continued access to natural resources, identifying the equivalent replacement resources, or, as a last option, providing compensation and identifying alternative livelihoods if project development results in the loss of access to and the loss of natural resources independent of project land acquisition.	In case of project may affects indigenous people, consultation and public participation can support project proponent and indigenous communities to achieve win- win solutions.

		Para 15	The project proponent will consider feasible alternative project designs to avoid the relocation of Indigenous Peoples from **communally held lands and natural resources subject to traditional ownership or under customary use.** If it is unavoidable, the project proponent will obtain the FPIC of the Affected Communities of Indigenous Peoples.	
		Para 16&17	Where a project may **significantly impact on critical cultural heritage** that is essential to the identity and/or cultural, ceremonial, or spiritual aspects of Indigenous Peoples lives, and significant project impacts on critical cultural heritage are unavoidable, the client will obtain the FPIC of the Affected Communities of Indigenous Peoples. Where a project proposes to **use the cultural heritage including knowledge, innovations, or practices of Indigenous Peoples** for commercial purposes, the client will inform the Affected Communities of Indigenous Peoples of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; (iii) the potential consequences of such development; and (iv) obtain their FPIC.	
		Para 11	Where project proponents need to obtain FPIC, the project proponent will engage **external experts** to assist in the identification of the project risks and impacts.	
	Government Responsible for Managing IP Issues	Para 21	Where the **government has a defined role in the management of Indigenous Peoples issues** in relation to the project, and government capacity is limited, the client will play an active role during planning, implementation, and monitoring of activities to the extent permitted by the agency.	
PS8 Cultural Heritage	Capacity	Para 7	The project proponent will retain **competent professionals** to assist in the identification and protection of cultural heritage.	In case of projects may affect to cultural heritage. The project proponent with the EIA registered consultant will retain **competent professionals** to assist in the identification and protection of cultural heritage.
	Chance Find Procedures	Para 8	The environmental and social risks and impacts identification process should determine whether the proposed location of a project is in **areas where cultural heritage is expected to be found**. In such cases, the project proponent will develop provisions for managing chance finds through a chance find procedure.	

	Non-Replicable Cultural Heritage	Para 12	The project proponent will not **remove any non-replicable cultural heritage**, unless all of three following conditions are met: there are no technically or financially feasible alternatives to removal; the overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and any removal of cultural heritage is conducted using the best available technique.	In case of projects may affect to **any non replicable cultural heritage.** Appropriate mitigation measures will be proposed by the consultation and participation of the affected communities.
	Critical Cultural Heritage	Para 13	**Critical cultural heritage** consists of one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation.	
		Para 14	The project proponent should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances when **impacts on critical cultural heritage are unavoidable**, the project proponent will use a process of Informed Consultation and Participation (ICP) of the Affected Communities.	In case of **impacts on critical cultural heritage are unavoidable,** appropriate mitigation measures will be proposed by the consultation and participation of the affected communities.
		Para 15	In circumstances where a proposed **project is located within a legally protected area or a legally defined buffer zone**, the project proponent will: comply with defined national or local cultural heritage regulations or the protected area management plans; consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area.	In case of a proposed **project is located within a legally protected area**, the project proponent shall comply with regulations of the protected area.
	Use of Cultural Heritage	Para 16	The project proponent will not proceed with **commercialization of cultural heritage** unless it (i) enters into a process of ICP and which uses a good faith negotiation process that results in a documented outcome and (ii) provides for fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with their customs and traditions.	

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