



United Nations Industrial Development Organization

TERMS OF REFERENCE

Provision of services for Policy development and recommendation to support the RECP implementation and promotion under Eco-industrial Development concept

Project Title: Application of industry-urban symbiosis and green chemistry for low emission and persistent organic pollutants free industrial development in Thailand

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Output: 1.1

A. Background:

Climate change has been recognized as a threat to Thailand, which was the ninth hardest-hit country by extreme weather events between 1993 and 2012. Despite the efforts made to reduce greenhouse gas (GHG) emissions, the country is the world's 19th largest emitter of carbon dioxide (CO₂) releasing 327 million tons of carbon dioxide equivalent (CO₂e) in 2013. This is evidenced by the Thailand Greenhouse Gas Management Organization Report (2000 – 2010), which breaks down emission released by sector. The energy sector was identified as the largest emitter of GHG, accounting for 69% of Thailand's total emissions amounting to 80 million tons of CO₂e in 2010.

In terms of the release of persistent organic pollutants (POPs), a report from Greenpeace International on the industrial releases of POPs and other harmful chemicals in the Chao Phraya Basin underlined the seriousness of the current situation. This is confirmed by a study that collected a total of 300 surface water samples in 31 locations along the Chao Phraya River and concluded that higher PFOS concentrations were measured in more industrialized and more densely populated areas. Following the washing of textile and electronic equipment after the coating process, the wastewater is treated in internal factory treatment plants equipped with activated sludge and anaerobic digestion process. However even though POPs are partially removed from wastewater, they remain in the sludge, presenting a hazard.

UNIDO has proved track record on Resource Efficient and Cleaner Production (RECP), and Thailand has experience on eco-industrial town implementations in several industrial estates. By combining this solid expertise from two parties, the UNIDO-GEF project (Annex A) entitled "*Application of industry-urban symbiosis and green chemistry for low emission and persistent organic pollutants free industrial development in Thailand*" aims to reduce greenhouse gas emissions, as well as release of persistent organic pollutants and other harmful chemicals from industries and urban centers through the application of industry-urban symbiosis and the deployment of green chemistry. The focus is on three provinces chosen based on their economic structure to address the previously identified GHG and POPs issues as well as their root causes by applying industry-urban symbiosis concept and green chemistry technology. The proposed provinces are Samut Prakarn, Rayong and Chon Buri focusing on the boundary that identified in the Department of Industrial Works (DIW)'s eco-town master plan.

The project offers a holistic approach to reduce releases of GHG emissions and POPs at their source at factory, industrial zone and urban area level. The combination of proposed methodologies will encourage investment in technological solutions at three levels by applying a step-by-step approach: (i) within factories; (ii) among factories (eco-industrial zones), and (iii) between industry and urban centers (eco-industrial town).

B. Context

Resource efficiency is a crucial measure stated in the Thailand's relevant national strategies and plans including the recent National Economic and Social Development Plan. The relevant agencies have implemented energy efficiency, water efficiency and waste minimization projects for several decades. However, these projects are viewed as an ad-hoc practice by the majority of industrial sectors.

One of the barriers to upscale RECP, which contribute to the improved environmental quality is a lack of continuity and supporting system to sustain its implementation. Thai government agencies and industrial associations realized this issue and tried to resolve by issuing the recognition schemes as an incentive for industry such as Green Industry Mark (GI Mark) and Eco Factory for individual factory and Eco-industrial Town criteria for the eco-industrial estate/park and nearby area. The eco-industrial town has been highlighted as one of the national strategies to improve the environmental quality and quality of life of both industrial personnel and nearby residents, and at the same time to mobilize the sustainable industrial development.

The DIW and Industrial Estate Authority of Thailand (IEAT) have implemented the eco-industrial town development criteria for many years with the audit process to award the success of the participated eco-industrial parks and eco-industrial town. The RECP measures, industrial symbiosis and industry-urban symbiosis were integrated as the key criteria, but different interpretation of implementation practices. In 2018, the 20-year national strategy has been issued with the target of 40 eco-industrial towns in 37 provinces. Under the national strategy, the eco-industrial town activities are mobilized by the eco-industrial town committee with the participation from the communities.

Despite the fact that the concepts of eco-factories, eco-industrial estates and eco-industrial already exist in Thailand, interactions among companies and between industries and urban areas are still rare. It is obvious that the Thai government has a clear direction towards inclusive and sustainable industrial development (ISID) to reduce GHG emissions, however, the existing legislation and other environmental policy instruments as well as the institutional framework have not fully supported such ultimate goals.

To tackle major constraints of symbiosis among industries and between industry and urban areas, the legislative framework and system of industrial waste management in Thailand should be studied. The policy recommendation and suitable tools should be proposed to the responsible agencies to facilitate the symbiosis through resource, energy and waste exchange.

In addition to waste and hazardous substance related policies, market-based instruments (MBIs) should be assessed and adopted. MBIs are policy instruments that use market, price and other economic variables as incentives for companies. Within this project, the purpose of MBIs will be to incentivize polluters to reduce or eliminate negative environmental externalities and to support the establishment of eco-system of industry-urban symbiosis.

Therefore, the project aims to add value by facilitating the uptake of the government's eco-industrial town concept and provide the policy/plan recommendation to strengthen the development and adoption

of RECP, green chemistry and industry-urban symbiosis through the implementation of environmentally sound technologies in Thailand under the eco-industrial town concept.

C. Contract Objectives

The objective of the services under this ToR is to carry out the policy and plan study, including the institutional framework, to come up with a new policy/plan or revised policy/plan and MBIs to the legislative authority for formal appraisal based on the need to promote and implement RECP, low carbon technology, industrial symbiosis and industry-urban symbiosis within the existing eco-industrial town development strategy of the Ministry of Industry.

D. Scope of Contracted Service and required methodology

The contractor is required to carry out the following activities:

D.1 Review relevant documents and coordination

- 1.1 Review relevant national context such as economic situation and trade barriers.
- 1.2 Review the National Strategy, Master Plan under National Strategy, National Economic and Social Development Plan, Government Action Plan relevant to industry, Master Plan and Action Plan on Eco-industrial Town Development, Strategy of national mobilization with BCG economic model, other relevant policies and plans, legislation and regulations, projects implemented, and actions taken by private sectors relevant to the eco-industrial town development with the application of the following tools; RECP, low carbon technology application, industrial waste and municipal waste management, Corporate Social Responsibility (CSR), Green Industry, industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange), to achieve the targets and objectives of eco-industrial town development.

The review has to consider the context of eco-industrial development including the eco-factory, eco-industrial zone/park/estate and eco-industrial town.

Moreover, the review and study should cover the linkage and alignment among the SDGs, policies and plans reviewed, and the project under this ToR.

- 1.3 Review the international agreements and standards relevant to the eco-industrial town development with the application of the following tools: RECP, low carbon technology application, industrial waste and municipal waste management, Corporate Social Responsibility (CSR), industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange), to achieve the targets and objectives of eco-industrial town development.
- 1.4 Review and extract lessons learned from other countries on the practice and implementation of RECP, low carbon technology application, industrial waste and municipal waste management, CSR, industrial symbiosis, and industry-urban symbiosis including shared resource and waste/by-product exchange (or similar practices in other terminologies such as Japan's Eco-town). The initial list of countries and reason of selection should be described in the proposal.

- 1.5 Review the institutional framework and management structure of eco-industrial town development in Thailand (at National, Central, Provincial and local levels), the budget provision, the market-based and economic instruments, and mechanism to mobilize the implementation of the eco-industrial town in Thailand. The review should cover the main agencies such as Ministry of Industry, Ministry of Natural Resources and Environment, and Ministry of Interior including the relevant Cabinet's decisions.
- 1.6 For the review under 1.1. to 1.4, the gender sensitivity and equality as well as the roles of female and male in mobilizing the eco-industrial development should be reviewed as recorded in the documents.
- 1.7 Cooperate and follow up with the designated company/institute who conducts the National Eco-industrial Development Framework Project and incorporate the study results from such project to the activities under this ToR.
- 1.8 Collaborate with the designated consultants (National and/or International, as applicable) and project partners to acquire comments and suggestions for the study results under this ToR.

D.2 Stakeholder analysis

- 2.1 Based on the review conducted in D.1, identify key stakeholders at national, center level, provincial level, and local level, with at least related to the Ministry of Industry, Ministry of Natural Resources and Environment, and Ministry of Interior. The gender sensitivity and equality as well as the inclusion of marginal group and networks relevant to the development of eco-industrial town should be considered during the identification process.
- 2.2 Use the sound and proven research methodologies with the gender equality principle to collect the necessary information from the key stakeholders such as questionnaire, in-depth interview and focus group. The selected methodologies and their initial design should be described in the proposal.

The data collected has to include the comments/feedbacks from the management of key agencies, stakeholders and experts with experiences of mobilizing the eco-industrial development in Thailand. The data collection methods to ensure that the required information would be collected such as in-depth interview or other suitable approaches has to be proposed in the Technical Proposal. The list of management, key stakeholders and experts has to be approved by UNIDO in consultation with the secretariat of Technical Working Group before taking further actions.

For the meeting with stakeholders who have experiences on eco-industrial development and stakeholders expected to be part of the eco-industrial development in the future, it should be organized based on the following guideline.

- 1 time in Bangkok for central agencies and nearby provinces with at least 50 participants. The venue cost and catering, facilitator (if any), translation cost (if non-Thai speakers used), and compensation for transportation cost should be covered by the contractor.
- 4 times in other regions in Thailand for areas with various industrial intensity and development phase. The participants should be the members of the Committee and Working group of eco-industrial town mobilization at provincial and local level. The total participants should be at least 160. The venue cost and catering, facilitator (if any), translation cost (if non-

Thai speakers used), and compensation for transportation cost should be covered by the contractor.

The meeting location (province) and venue (with the facilitation compatible to 4-star hotel), and the list of organizations/individual to be invited has to be approved by UNIDO in consultation with the secretariat of Technical Working Group. The number of meeting and participants per meeting can be adjustable with strong justification, but the total participants have to be at least 210. The written confirmation from UNIDO in consultation with the secretariat of Technical Working Group is required for any adjustment.

The contractor has to beware of the COVID-19 situation and strictly follow the government's order, regulation and instruction. If the situation does not allow to organize the regular meeting, the contractor has to inform UNIDO. UNIDO, in consultation with the Technical Working Group might allow the alternative meeting format to suit the COVID-19 situation at that time.

The design of data collection has to include the approaches to ensure that the key stakeholders understand the implementation of RECP, low carbon technology application, industrial waste and municipal waste management, CSR, industrial symbiosis, and industry-urban symbiosis including shared resource and waste/by-product exchange under the mobilization of Thailand's eco-industrial development.

- 2.3 Analyze their roles, mandates, responsibilities and relevant projects implemented of the key stakeholders.
- 2.4 Analyze the effectiveness, barriers, challenges and success factors of the key stakeholders in the institutional framework studied in D.1 regarding the mobilization of RECP implementation, industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange) as well as eco-industrial town.
- 2.5 The analyzing methods should be adequately explained in the proposal.

D.3 Analysis and alternatives development (for policy development and recommendation to support the RECP implementation)

- 3.1 Define problems and gaps towards promoting and strengthening the practice of RECP, low carbon technology application, CSR, industrial symbiosis, industry-urban symbiosis under the concept of eco-industrial town and mobilizing of eco-industrial town in Thailand. Moreover, it should cover the shared resource and waste/by-product exchange, which contribute to the implementation of industrial symbiosis and industry-urban symbiosis. The analysis concept and tools have to be preliminarily described in the Technical Proposal.

The problems and gap should cover all three aspects of sustainable development, institutional structure, administration, budget provision, market-based and economic instruments, knowledge and expertise of relevant stakeholders, supporting elements (physical and management aspects) and at least three implementation levels, at factory, industrial park/zone/estate level and provincial level. The issues related to gender sensitivity and equality should be addressed during the process.

Under this topic, the contractor has to incorporate the results of the National Eco-industrial Development Framework Project carried out by the designated company/institute to ensure the alignment and support to each other.

- 3.2 Construct and predict outcomes of relevant measures/development approaches and MBIs to implement and up-scale the RECP implementation, low carbon technology application, CSR, industrial symbiosis, industry-urban symbiosis (including shared resource and waste/by-product exchange) under the concept of eco-industrial town to make the eco-industrial development as the national agenda enhancing the living together between industry and community. The measures/development approaches and MBIs should be generated with the concerns of gender sensitivity and equality.

The measures/development approaches have to take into account the execution process by other agencies, which at least cover the Ministry of Industry, Ministry of Natural Resources and Environment, and Ministry of Interior.

The identified measures should at least cover the following issues.

- Improvement of eco-industrial town management such as in form of committee.
 - Improvement and development of legislation and regulation to facilitate the eco-industrial town development including the mobilization of RECP implementation, low carbon technology application, industrial waste and municipal waste management, Corporate Social Responsibility (CSR), industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange) under the concept of eco-industrial town development.
 - Promoting and acknowledgement of eco-industrial town, and awareness raising of importance of eco-industrial town to all sectors
 - Promoting the use of RECP, low carbon technology application, industrial waste and municipal waste management, Corporate Social Responsibility (CSR), industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange) to the industry.
 - Promoting, raising awareness and building up capacity of the community to support the eco-industrial town development and participating in the application of industry-urban symbiosis.
 - The operational integration of government agencies, private sector, society and non-profit organization to mobilize the use of RECP, low carbon technology application, industrial waste and municipal waste management, Corporate Social Responsibility (CSR), industrial symbiosis, and industry-urban symbiosis (including shared resource and waste/by-product exchange) to the industry under the concept of Eco-industrial Town.
 - AI study to support the project planning of eco-industrial town in the future.
 - Establishment of supporting system/mechanism to increase the efficiency of committee/working group under the management structure of eco-industrial town development.
 - Development of confidence of eco-industrial town standard, eco-industrial zone standard, eco-factory standard and CSR standard
- 3.3 Construct and predict outcomes of the policy/plan alternatives, the institutional framework and structure, the suitable organization (at National, Central, Provincial and local levels), the budget

allocation pattern, the mechanism to effectively mobilize the eco-industrial town implementation in the existing areas and the up scaling to the nation-wide implementation.

It should cover the suggestions, approaches or method of waste exchange among industry and between industrial sector and community.

The alternatives and their mechanisms should align with the 20-year National Strategy, which aim to promote the eco-industrial town in at least 40 areas in 37 provinces, and other policies and plans, which is already effective and under preparation, for example the National Economic and Social Development Plan, and Strategy of national mobilization with BCG economic model.

Moreover, the contractor has to incorporate the results of the National Eco-industrial Development Framework Project carried out by the designated company/institute to ensure the alignment and support to each other.

- 3.4 Comprehensively analyze and evaluate the trade-off of alternatives in 3.2 and 3.3 to come up with the proposed new policy/eco-industrial town development action plan or add-on of the existing policy/eco-industrial town development action plan consisting of the effective and sound measures, MBIs and recommendation, which can fill the gap identified in this study and drive the implementation of eco-industrial town strategy to strengthen the implementation of RECP, low carbon technology application, CSR, industrial symbiosis and industry-urban symbiosis (including shared resource and waste/by-product exchange).

The analysis techniques/methods should be preliminarily described in the technical proposal.

- 3.5 Carry out the comprehensive risk assessment and analysis of alternatives in 3.2 and 3.3, and propose the risk management measures.

- 3.6 Develop the draft policy/plan (eco-industrial town development action plan) or add-on of the existing policy/eco-industrial town development action plan in-line with the relevant measures or approaches.

- 3.7 Validate the new policy/ of the existing policy/eco-industrial town development action plan (final draft version) or add-ons of the existing policy/ of the existing policy/eco-industrial town development action plan prepared in 3.6. The validation approaches such as the stakeholder meeting, expert meeting or public hearing with the adequacy in terms of quantity and quality should be specified and described in the proposal. Please note that the gender sensitivity and equality issues as well as the marginal group should be taken into account during the validation process.

The data collected for validation has to include the comments/feedbacks from the management of key agencies, stakeholders and experts with experiences of mobilizing the eco-industrial development in Thailand. The data collection methods to ensure that the required information would be collected such as in-depth interview or other suitable approaches has to be proposed in the Technical Proposal. The list of management, key stakeholders and experts has to be approved by UNIDO in collaboration with the secretariat of Technical Working Group before taking further actions.

For the meeting with stakeholders who have experiences on eco-industrial development and stakeholders expected to be part of the eco-industrial development in the future. The meeting should be organized based on the following guideline.

- 1 time in Bangkok for central agencies and nearby provinces with at least 50 participants. The venue cost and catering, facilitator (if any), translation cost (if non-Thai speakers used), and compensation for transportation cost should be covered by the contractor.
- 4 times in other regions in Thailand for areas with various industrial intensity and development phase. The total participants should be at least 160. The venue cost and catering, facilitator (if any), translation cost (if non-Thai speakers used), and compensation for transportation cost should be covered by the contractor.

The meeting location (province) and venue (with the facilitation compatible to 4-star hotel), and the list of organizations/individual to be invited has to be approved by UNIDO in consultation with the secretariat of Technical Working Group. The number of meeting and participants per meeting can be adjustable with strong justification, but the total participants have to be at least 210. The written confirmation from UNIDO, which will act in consultation with the secretariat of Technical Working Group is required for any adjustment.

The contractor has to beware of the COVID-19 situation and strictly follow the government's order, regulation and instruction. If the situation is not allowed to organize the regular meeting, the contractor has to inform UNIDO. UNIDO, in collaboration with the Technical Working Group, might allow the alternative meeting format to suit the COVID-19 situation at that time.

- 3.8 Use the results from 3.7 to improve the final draft version of new policy/ of the existing policy/eco-industrial town development action plan or add-ons of the existing policy/ of the existing policy/eco-industrial town development action plan. Develop the guideline of preparing and mobilizing the action plan.

D.4 New policy/plan or add-on of the existing policy/plan submission

- 4.1 Submit the original and editable files together with the high-quality PDF file (in Thai and English) and 80 copies (in Thai) of the new policy/ of the existing policy/eco-industrial town development action plan or add-ons of the existing policy/ of the existing policy/eco-industrial town development action plan. It should be well designed with modern and attractive layout and illustration.
- 4.2 Submit the new policy/ of the existing policy/eco-industrial town development action plan or add-on of the existing policy/eco-industrial town development action plan to the legislative authority for formal approval. The initial list of legislative authority, which at least include DIW, should be identified and stated in the proposal.
- 4.3 Provide support to DIW on mobilizing the new policy/eco-industrial town development action plan or add-on of the existing policy/eco-industrial town development action plan. (require more obvious outputs) The support, at least, includes of the preparation of documents for submission to the authorized committee who can make decision on development direction of Thai industry, and the presentation as requested by limiting at 3 times.

Note: Should Covid-19 restrictions do not allow for meetings in presence, the Contractor may be requested to revise its technical and financial proposal to reflect the switch to online and remote activities.

D.5 Time Schedule

The deliverables required under the assignment shall be finalized no later than 15 months after signing the contract.

E. Reports and deliverables

The contractor shall submit to UNIDO and the Project Management Unit (PMU) the following reports and deliverables both Thai and English language in word file and pdf file with 10 hard copies:

Report	Content	Timing of submission from the countersignature of the contract	Format
Inception report	<ul style="list-style-type: none"> - Executive summary - Work plan - Methodologies, techniques and tools used during the study - Initial review and its results 	month 1	in word file and pdf file with 10 hard copies
1 st progress report	<ul style="list-style-type: none"> -Executive summary -Literature review -Baseline data regarding the relevant policies/plans and their context -Stakeholder analysis results -Contents covered all activities and outputs from item D.1 to D.2 -Adjustments to the approved workplan, if any - Barriers, constraints and challenges 	month 5	
2 nd progress report	<ul style="list-style-type: none"> -Executive summary -Contents covered all activities and outputs from item D.1 to D.3 (3.1 to 3.5) -Adjustments to the approved workplan -Barriers, constraints and challenges 	month 10	
Final Report	<ul style="list-style-type: none"> -Executive summary -Contents covered all activities and outputs from item D.1 to D.4 	Month 15	

	-Barriers, constraints challenges and success factors		
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In addition to the above reports and deliverables, a one-page summary (in English) of work progress, barriers and challenges, and workplan for next month should be sent to UNIDO and PMU at the end of each month during the contract duration except the last month.

Note: The copyright of all materials developed under this ToR will be owned by UNIDO and the project partners. All materials have to include the credit of all project partners, UNIDO and GEF.

F. Coordination and Communication

The coordinator shall liaise with UNIDO and the Project Management Unit (PMU), as deemed necessary, to report on progress achieved and problems faced. The contractor shall ensure the participation to coordination meetings and conference calls with the above, as required by the project.

The contractor will be invited to the Technical Working Group or coordination meetings to provide updates and progress of the activities.

G. Requirements of the Contractor

G.1 Company/Institute's qualification

The Contractor shall demonstrate experience, through the submission of at least three project references in its technical proposal, in the following relevant areas:

- Specialized knowledge on policy and programming for RECP implementation and promotion under Eco-Industrial Development concept including the eco-factory, eco-industrial zone/park/estate and eco-industrial town. as well as consolidated experience in RECP, industrial symbiosis and industry-urban symbiosis.
- Prior experience in carrying-out projects entailing large stakeholders' consultations with diverse roles, mandates and responsibilities through in-depth interviews and focus groups, in performing gap analysis, in defining of criteria and indicators o for RECP implementation and promotion under Eco-Industrial Development
- Prior experience and familiarity in the region as well as with the Thai industry environment.

H Key personnel's qualification

The contractor shall submit the CVs of key experts described as part of the technical proposal and indicate scheduling of experts for various inputs. At least the following key-personnel shall be provided:

- Project manager with at least Master's degree in Environmental Engineering, Environmental Management, Environmental Science, Environmental Economic, Political Science or other relevant fields, good English skills and proficiency in Thai (speaking, listening and writing) and at least 10-year experience on providing leadership to a team and on managing the process from planning to completion of similar project;

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- Project coordinator with at least Bachelor’s degree in Environmental Engineering, Environmental Management, Environmental Science, Environmental Economic or other relevant fields, good English skills and proficiency in Thai (speaking, listening and writing) and at least 3-year working experience in executing specific tasks of a project of similar projects;
- Policy/plan expert with at least Master’s degree in Environmental Management, Environmental Economic, Political Science or other relevant fields, good English skills and (speaking, listening and writing) and at least 10-year experience on policy/plan analysis and development;
- Industrial symbiosis/industry-urban symbiosis expert with at least Master’s degree in Environmental Engineering, Environmental Management or other relevant fields, good English skills (speaking, listening and writing) and at least 10-year experience on RECP, industrial symbiosis and/or industry-urban symbiosis.

Annex:

Annex 1: GEF-approved CEO endorsement