



## Project Implementation Report

(1 July 2022 – 30 June 2023)

<b>Project Title:</b>	<i>Applications of Industry-urban Symbiosis and Green Chemistry for Low Emission and Persistent Organic Pollutants (POPs)-Free Industrial Development in Thailand</i>
<b>GEF ID:</b>	9219
<b>UNIDO ID:</b>	150036
<b>GEF Replenishment Cycle:</b>	GEF-6
<b>Country(ies):</b>	Thailand
<b>Region:</b>	SA - Southeast Asia
<b>GEF Focal Area:</b>	Climate Change Mitigation (CCM) Chemical and Waste (CW)
<b>Integrated Approach Pilot (IAP) Programs<sup>1</sup>:</b>	Not applicable
<b>Stand-alone / Child Project:</b>	Stand-alone
<b>Implementing Department/Division:</b>	ENV / IPM
<b>Co-Implementing Agency:</b>	Not applicable
<b>Executing Agency(ies):</b>	Department of Industrial Works and Industrial Estate Authority of Thailand under the Ministry of Industry; Pollution Control Department under the Ministry of Natural Resources and Environment; The Federation of Thai Industries; and Chemical Engineering Department, Kasetsart University.
<b>Project Type:</b>	Full-Sized Project (FSP)
<b>Project Duration:</b>	60
<b>Extension(s):</b>	NA at this stage
<b>GEF Project Financing:</b>	USD 8,966,000
<b>Agency Fee:</b>	USD 851,770
<b>Co-financing Amount:</b>	USD 120,062,700
<b>Date of CEO Endorsement/Approval:</b>	4/2/2019
<b>UNIDO Approval Date:</b>	7/16/2019

<sup>1</sup> Only for GEF-6 projects, if applicable

<b>Actual Implementation Start:</b>	7/24/2019
<b>Cumulative disbursement as of 30 June 2023:</b>	4,406,389.22
<b>Mid-term Review (MTR) Date:</b>	12/12/2022
<b>Original Project Completion Date:</b>	7/24/2024
<b>Project Completion Date as reported in FY22:</b>	7/24/2024
<b>Current SAP Completion Date:</b>	7/24/2024
<b>Expected Project Completion Date:</b>	6/30/2026
<b>Expected Terminal Evaluation (TE) Date:</b>	7/31/2026
<b>Expected Financial Closure Date:</b>	6/30/2027
<b>UNIDO Project Manager<sup>2</sup>:</b>	Carmela Centeno

## I. Brief description of project and status overview

Project Objective		
<p><i>The project will focus on the application of industry-urban symbiosis and green chemicals for low emission and persistent organic pollutants (POPs)-free industrial development in Thailand. The main objective is to reduce greenhouse gas emissions, as well as releases of persistent organic pollutants and other harmful chemicals from industries and urban centers through the application of industry-urban symbiosis and green chemistry technology.</i></p>		
Project Core Indicators (GEF-6)		Expected at Endorsement/Approval stage
4	Support to transformational shifts towards a low-emission and resilient development path	Direct GHG reduction: 1,305,761 metric tons Indirect GHG reduction (bottom up): 2,611,522 metric tons Indirect GHG reduction (top-down): 3,153,904 metric tons
5	Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern (I) Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	620 metric tons

## Baseline

<sup>2</sup> Person responsible for report content

*Despite efforts made to reduce greenhouse gas (GHG) emissions, Thailand is the world's 19th largest emitter of carbon dioxide (CO<sub>2</sub>). 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 underpinned the environmental and human health risks associated with the exposure of u-POPs emissions and POPs-containing products (e.g. PFOS or POP-PBDE-containing equipment). The root causes are systematic problems at (i) national and provincial; (ii) industrial zone; and (iii) factory level, including problems associated with policy, capacity-building, lack of BAT/BEP demonstration, knowledge and awareness raising. Without GEF intervention this situation is unlikely to change. GEF funding is needed to cover the incremental costs related to the application of industry-urban symbiosis and green chemistry solution to ensure additional environmental and social benefits such as reduction of GHG, POPs and Hg.*

Please refer to the explanatory note at the end of the document and select corresponding ratings for the current reporting period, i.e. FY23. Please also provide a short justification for the selected ratings for FY23.

In view of the GEF Secretariat's intent to start following the ability of projects to adopt the concept of adaptive management<sup>3</sup>, Agencies are expected to closely monitor changes that occur from year to year and demonstrate that they are not simply implementing plans but modifying them in response to developments and circumstances or understanding. In order to facilitate with this assessment, please introduce the ratings as reported in the previous reporting cycle, i.e. FY22, in the last column.

Overall Ratings <sup>4</sup>	FY23	FY22
Global Environmental Objectives <b>(GEOs)</b> / Development Objectives <b>(DOs)</b> Rating	<i>Moderately Satisfactory (MS)</i>	<i>Moderately Satisfactory (MS)</i>
<i>The implementation of RECP measures by the factories participating in the activities under Component 3 contributed to a reduction of 64,512 tons CO<sub>2eq</sub>/year. On POPs, assessments are currently being conducted to verify the baseline and the committed GEBs,</i>		
Implementation Progress <b>(IP)</b> Rating	<i>Moderately Satisfactory (MS)</i>	<i>Moderately Satisfactory (MS)</i>
<i>The project has sped up the capacity building activities including awareness raising seminars and technical trainings. The project has already achieved the target of awareness workshop with community and waste management stakeholders (623 participants from a target of 500 participants). Although the start of activities related to new industrial POPs management was delayed, the project has proceeded with the survey to confirm the amount of HBCD in SE-grade EPS and PFAS in firefighting foam (output 2.1), which will be the basis for the policy and plan recommendation (output 1.1) and demonstration projects (output 3.1) in FY24.</i>		
Overall <b>Risk</b> Rating	<i>Moderate Risk (M)</i>	<i>Moderate Risk (M)</i>
<i>The project is still facing the moderate risk from the economic impact after the COVID-19 situation, which caused the delay of the investment in RECP project. The election in May 23 has transpired but the new cabinet has not been set yet, which may reflect the moderate risk on political uncertainty.</i>		

<sup>3</sup> Adaptive management in the context of an intentional approach to decision-making and adjustments in response to new available information, evidence gathered from monitoring, evaluation or research, and experience acquired from implementation, to ensure that the goals of the activity are being reached efficiently

<sup>4</sup> Please refer to the explanatory note at the end of the document and assure that the indicated ratings correspond to the narrative of the report

## II. Targeted results and progress to-date

Please describe the progress made in achieving the outputs against key performance indicator's targets in the project's **M&E Plan/Log-Frame at the time of CEO Endorsement/Approval**. Please expand the table as needed.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
<b>Component 1 – Policy development</b>				
Outcome A: GHG emissions and releases of POPs reduced through industry-urban symbiosis by transferring low carbon and green chemistry technologies, improving capacity, enhancing infrastructure, promoting innovative business models and raising awareness				
Output 1.1: Necessary legislative and policy measures on industry-urban symbiosis principles, management of new POPs and market-based instruments enhanced	Number of policy measures/ guidelines and market-based instruments endorsed by stakeholders	Some of new POPs were listed as the hazardous substances by law, however, there is no other actions taken since the new national implementation plan is under preparation. Currently, limited MBIs relevant to industry-urban symbiosis were implemented for example fee collection for operating waste-to-energy plant.	Proposed policy improvements/ guidelines and market-based instruments endorsed by the stakeholders.	Study of policy and plan recommendation to support RECP implementation and promotion under eco-industrial development concept is completed. Six stakeholder consultation meetings were organized in Jul 22 with 401 participants (194 females and 207 males).  The recommendation has been presented to the related technical committee at national level. The project's Technical Working Group on RECP will meet soon to discuss the next step on mobilizing the policy recommendation.
<b>Component 2 – National capacity building and awareness raising on industry-urban symbiosis and POPs</b>				
Outcome A: GHG emissions and releases of POPs reduced through industry-urban symbiosis by transferring low carbon and green chemistry technologies, improving capacity, enhancing infrastructure, promoting innovative business models and raising awareness				
Output 2.1: Inventory of new POPs and intervention plan developed for the three selected provinces	Number of participants attending the new POPs inventory and MFA/SFA training	There is no inventory and intervention plan of new POPs at the provincial level.	At least 30 researchers and representatives of the project partners attend the trainings	Based on the updated national inventory and PSC's decision, the project has selected four groups of new industrial POPs to study under this project consisting of HBCD, PFAS, decaBDE and SCCPs. The activities to survey the SE-grade EPS containing HBCD and firefighting foam containing PFAS (PFOS, PFOA, and PFHxS) have been carried out in FY23.
Output 2.1: Inventory of new POPs and intervention plan developed for the three selected provinces	Availability of MFA/SFA of new POPs in the three selected provinces	Limited capacity of researchers and government officers to collect sampling and analyse the new POPs.	MFA/SFA reports of new POPs in three selected provinces	The guideline for survey of SE-grade EPS (expanded polystyrene) containing HBCD is under development. Two technical hearings with the experts and were carried out on 17 Jan and 27 Feb 23 with 26 participants (11 females and 15 males). Three stakeholder consultation meetings were organized in April and May 23 with 163 participants (113 females and 50 males). Two trainings were organized on 9 May and 6 Jun 23 with 65 participants (32 females and 33 males).
	Availability of provincial intervention plan for three selected provinces	There is no baseline information of some emerging POPs such as SCCP. Therefore, it is difficult for the responsible agency to take action.	Provincial intervention plans for the three selected provinces adopted by Pollution Control Department (PCD) and relevant stakeholders	
	Monitoring results showing the performance of the intervention plan implemented		Monitoring reports of new POPs contamination in three selected provinces	

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
				The guideline for survey of firefighting foam containing PFAS is under development. One technical hearing with the experts was carried out on 27 Feb 23 with 26 participants (4 females and 22 males). Three stakeholder consultation meetings were organized in Mar and Apr 23 with 155 participants (81 females and 74 males). Two trainings were organized on 7 and 9 Jun 23 with 153 participants (38 females and 118 males).
Output 2.2: Opportunities for industry-urban symbiosis elaborated through material and waste stream analysis	<p>Number of industrial symbiosis or industry-urban symbiosis identified</p> <p>Number of online waste database</p>	<p>Limited industrial symbiosis and industry-urban symbiosis implemented in Thailand. The companies under the same corporate carried out most of the industrial symbiosis.</p> <p>Some industry-urban symbiosis exist, but on ad-hoc basis as the CSR/CSV project. Most of the industry-urban symbiosis emphasized on the product development instead of the whole value chain of the potential business.</p>	<p>At least 3 industrial symbiosis or industry-urban symbiosis opportunities and their business model identified and ready for implementation in Output 3.1.</p> <p>One pilot online waste database for one industrial estate/park.</p>	The project is working on upgrading the Circular Material Hub (CMH), which is the industrial waste exchange platform initially developed by the Federation of Thai Industries (FTI), one of the project partners. The 2 <sup>nd</sup> round of stakeholder meeting to present the demo version of the upgraded CMH was carried out and 4 meetings took place in Nov 22 with totally 173 participants (103 females and 70 males). Three events to promote the upgraded platform and invite the factories to be a case study were organized in Mar 23 with 173 participants (103 females and 70 males). Currently, the project is monitoring the usage of the upgraded CMH and preparing the case studies.
Output 2.3: Increases capacity and awareness on risks of new POPs and the benefits of (i) resource efficient and cleaner production, (ii) green chemistry, (iii) industry-urban symbiosis	<p>Development of awareness programs and materials.</p> <p>Number of participants attending the project organized awareness raising events (disaggregated by gender)</p> <p>Number of participants attending technical training (disaggregated by gender)</p> <p>Number of curricula and course materials developed for RECP, low-carbon technologies, green</p>	<p>Lack of knowledge and understanding of new POPs among industries, government agencies and communities.</p> <p>Limited knowledge sharing and trainings available on RECP, low carbon technologies, green chemistry, BAT/BEP and industry-urban symbiosis.</p> <p>There is no mechanism to sustain the knowledge sharing on RECP, low carbon technologies, green chemistry, BAT/BEP and industry-urban symbiosis.</p>	<p>At least 10 leaflets and factsheets developed to promote RECP, low carbon technology, green chemistry, BAT/BEP, and industry-urban symbiosis including the waste separation and POPs contaminated wastes management.</p> <p>2,500 participants from factory, industrial zone/estate and government agency, consultant, supplier and service provider, and other relevant stakeholders attend the awareness raising seminar (equal access to seminars for men and women ensure, with average of 30% female participants- aggregate ration by area and stakeholder is in Annex N of the project document).</p>	<p>Dissemination materials:</p> <p>During this FY, the project leaflet was disseminated to the relevant stakeholders during the meetings, seminars, workshops, trainings and companies' visits. Two leaflets about HBCD and PFAS were disseminated to the relevant stakeholders during the stakeholder consultation and trainings.</p> <p>Also, the project website is available to disseminate news about the project and promote awareness seminars/workshops and organize training events. More technical information will be added in the future to promote RECP and POPs management.</p> <p>URL: <a href="http://www.industry-urban-symbiosis-project.com">www.industry-urban-symbiosis-project.com</a></p> <p>Online learning: During this FY, Four courses (Topics: eco-industrial development in Thailand, GHG and low carbon society, RECP assessment, and good practices on waste management) and one webinar</p>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
Output 2.3: Increases capacity and awareness on risks of new POPs and the benefits of (i) resource efficient and cleaner production, (ii) green chemistry, (iii) industry-urban symbiosis	<p>chemistry and industry-urban symbiosis.</p> <p>Development of online learning and information sharing platform</p> <p>Number of online contents for the online learning and information sharing platform</p>		<p>500 participants from community, local authority, wastes collector and recycle facility attend the awareness raising event/seminar/workshop (equal access to event/seminar/workshop for men and women ensure, with average of 30% female participants – aggregate ratio by area and stakeholder is in Annex N of the project document)</p> <p>At least 3,000 participants attend user trainings, 500 participants attend intensive trainings and 100 candidates are qualified as national experts (equal access to training for men and women ensure, with average of 30% female participants - aggregate ratio by area and stakeholder is in Annex N of the project document)</p> <p>Three academic courses developed for RECP, low-carbon technologies, green chemistry and industry-urban symbiosis At least one online training course for each topic covering RECP, low carbon technology, new POPs, green chemistry, industry-urban symbiosis produced and available for stakeholders At least one new information material in various formats for example pdf file, short video clip, live interview session updated monthly</p>	<p>recording on carbon capture and utilization) are available on the platform. Learning platform was promoted through the project partner's websites and during upcoming meetings, seminars and trainings.</p> <p>URL: <a href="https://learning.industry-urban-symbiosis-project.com">https://learning.industry-urban-symbiosis-project.com</a></p> <p>Training and academic course development:</p> <p>KU team conducted the train-the-trainer for the 2<sup>nd</sup> training course on fundamental of GHG and low carbon technology, which later will be used by FTI to provide training to factories' personnel. KU team is developing the 3<sup>rd</sup> training course on circular economy.</p> <p>The 2<sup>nd</sup> academic course on carbon footprint of organization has been developed and tested with a small class of students. KU team is developing the 3<sup>rd</sup> academic course on circular economy and biorefinery.</p> <p>Awareness seminar/workshop:</p> <p>FTI has organized ten awareness-raising workshops for communities and stakeholders in waste management sector during the period July 2022 to June 2023, which are the following:</p> <ul style="list-style-type: none"> <li>- 7 Jul 22: awareness workshop for stakeholders in waste management sector in Bangkok - 74 participants with 58% female, 43 females and 31 males</li> <li>- 6 Sep 22: awareness workshop for communities in Rayong – 71 participants with 76% female, 54 females and 17 males</li> <li>- 7 Sep 22: awareness workshop for communities in Rayong – 43 participants with 72% female, 31 females and 12 males</li> <li>- 21 Sep 22: awareness workshop for communities in Samut Prakan – 69 participants with 57% female, 39 females and 30 males</li> <li>- 22 Sep 22: awareness workshop for communities in Rayong – 55 participants with 62% female, 34 females and 21 males</li> <li>- 23 Sep 22: awareness workshop for stakeholders in waste management sector in Samut Prakan - 41 participants with 59% female, 24 females and 17 males</li> <li>- 26 Sep 22: awareness workshop for communities in Samut Prakan – 38</li> </ul>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
				<p>participants with 84% female, 32 females and 6 males</p> <ul style="list-style-type: none"> <li>- 27 Sep 22: awareness workshop for communities in Chonburi – 44 participants with 57% female, 25 females and 19 males</li> <li>- 20 Oct 22: awareness workshop for communities in Chonburi – 42 participants with 79% female, 33 females and 9 males</li> <li>- 7 Sep 22: awareness workshop for communities in Chonburi – 47 participants with 64% female, 30 females and 17 males</li> </ul> <p>In total, there were 524 participants (345 females and 179 males) from communities and stakeholders in waste management sectors. They all attended the awareness raising workshop (equal access to the event has been encouraged with an average of 66% female participation).</p> <p>FTI has organized 19 awareness-raising seminars for factory personnel, consultant, government agency, and other relevant stakeholders during the period July 2022 to June 2023, which are the following:</p> <ul style="list-style-type: none"> <li>- 11 Jul 22: Awareness seminar (online) to promote efficient water usage – 109 participants with 54% female, 59 females and 50 males</li> <li>- 19 Jul 22: Awareness seminar (online) to promote waste management and circular economy – 87 participants with 68% female, 59 females and 28 males</li> <li>- 23 Jul 22: Awareness seminar in Chonburi to promote GHG reduction – 112 participants with 75% female, 84 females and 28 males</li> <li>- 20 Aug 22: Awareness seminar in Chonburi to promote environmental management – 101 participants with 67% female, 68 females and 33 males</li> <li>- 23 Aug 22: Awareness seminar in Rayong to promote eco-industrial development – 79 participants with 62% female, 49 females and 30 males</li> <li>- 31 Aug 22: Awareness seminar in Rayong to promote the industrial waste management – 96 participants with 55% female, 53 females and 43 males</li> <li>- 11 Oct 22: Awareness seminar (online) to promote the industrial waste management – 97 participants with 53% female, 51 females and 46 males</li> </ul>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
				<ul style="list-style-type: none"> <li>- 21 Oct 22: Awareness seminar in Songkhla to promote the industrial waste management – 78 participants with 59% female, 46 females and 32 males</li> <li>- 29 Oct 22: Awareness seminar in Chonburi to promote the good practice on chemical management – 63 participants with 70% female, 44 females and 19 males</li> <li>- 10 Nov 22: Awareness workshop in Rayong to promote the industrial waste management – 84 participants with 54% female, 45 females and 39 males</li> <li>- 17 Nov 22: Awareness workshop in Chiang Mai to promote the industrial waste management – 84 participants with 49% female, 41 females and 43 males</li> <li>- 26 Nov 22: Awareness workshop in Chonburi to promote eco-industrial development – 47 participants with 68% female, 32 females and 15 males</li> <li>- 19 Jan 23: Awareness workshop in Rayong to promote eco-industrial development – 97 participants with 63% female, 61 females and 36 males</li> <li>- 3 Feb 23: Awareness workshop in Chiang Rai to promote the industrial waste management – 100 participants with 58% female, 58 females and 42 males</li> <li>- 23 Mar 23: Awareness workshop in Samut Prakan to promote GHG reduction – 72 participants with 50% female, 36 females and 36 males</li> <li>- 24 Mar 23: Awareness workshop in Samutsakorn to promote the good practice on waste management – 38 participants with 53% female, 20 females and 18 males</li> <li>- 10 May 23: Awareness workshop in Rayong to promote CFO (carbon footprint of organization) – 66 participants with 73% female, 48 females and 18 males</li> <li>- 19 May 23: Awareness workshop in Chonburi to promote GHG reduction – 128 participants with 70% female, 90 females and 38 males</li> <li>- 15 Jun 23: Awareness workshop in Rayong to promote CFO (carbon footprint of organization) – 123 participants with 55% female, 68 females and 55 males</li> </ul> <p>In total, there were 1,661 participants (1,012 females and 649 males) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers. They</p>



Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
				<p>all attended the awareness raising seminar (equal access to the event has been encouraged with an average of 61% female participation).</p> <p>Training:</p> <p>FTI has organized 13 trainings during the period July 2022 to June 2023, which are the following:</p> <ul style="list-style-type: none"> <li>- 25 - 26 Jul 22: Training course in Chonburi on energy management system and energy efficiency - 60 participants with 37% female, 22 females and 38 males</li> <li>- 10 - 11 Aug 22: Training course in Samut Prakan on circular economy - 61 participants with 57% female, 35 females and 26 males</li> <li>- 29 - 30 Aug 22: Training course in Rayong on RECP - 42 participants with 48% female, 20 females and 22 males</li> <li>- 22 - 23 Sep 22: Training course in Samut Prakan on environmental management system - 40 participants with 43% female, 17 females and 23 males</li> <li>- 26 - 27 Sep 22: Training course in Samut Prakan on energy management system and energy efficiency - 119 participants with 33% female, 39 females and 80 males</li> <li>- 6 - 7 Oct 22: Training course in Bangkok on eco-industrial development - 55 participants with 58% female, 32 females and 23 males</li> <li>- 7 - 8 Nov 22: Training course in Bangkok on industrial thermal system optimization – 36 participants with 28% female, 10 females and 26 males</li> <li>- 10 - 11 Nov 22: Training course in Bangkok on steam system optimization - 40 participants with 18% female, 7 females and 33 males</li> <li>- 21 - 22 Feb 23: Training course in Bangkok on eco-industrial development - 39 participants with 62% female, 24 females and 15 males</li> <li>- 20 - 21 Mar 23: Training course in Rayong on renewable energy and energy efficiency - 78 participants with 28% female, 22 females and 56 males</li> <li>- 1 - 2 Jun 23: Training course in Saraburi on renewable energy and energy efficiency - 112 participants</li> </ul>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
				<p>with 20% female, 22 females and 90 males</p> <ul style="list-style-type: none"> <li>- 15 - 16 Jun 23: Training course in Bangkok on eco-industrial development - 34 participants with 59% female, 20 females and 14 males</li> <li>- 20 - 21 Jun 23: Training course in Bangkok on steam system optimization - 40 participants with 20% female, 8 females and 32 males</li> </ul> <p>In total, there were 756 participants (278 females and 478 males) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers, and other relevant stakeholders attended the training (equal access to the event has been encouraged with average of 37% female participants).</p> <p>Details of these materials can be found in the Annex 2-23.</p>

### Component 3 - Pilot demonstration of cleaner production, new POPs management and industry-urban symbiosis

Outcome A: GHG emissions and releases of POPs reduced through industry-urban symbiosis by transferring low carbon and green chemistry technologies, improving capacity, enhancing infrastructure, promoting innovative business models and raising awareness

Output 3.1 Industry-urban symbiosis implemented through the demonstration of low carbon and green chemistry systems in selected enterprises, industrial zones and neighbouring urban settlements.	<p>Number of assessment and feasibility study to support the GHG reduction and POPs disposal through the application of RECP, low carbon technology, green chemistry, BAT/BET, and industry-urban symbiosis.</p> <p>Number of RECP, low carbon technology, green chemistry, BAT/BET, and industry-urban symbiosis projects implemented with support from the project.</p>	<p>Limited case study to demonstrate the implementation of RECP, low carbon technologies, green chemistry, BAT/BEP of new POPs and industry-urban symbiosis. Some guidelines on energy audit and energy saving are available, but with limited case study.</p> <p>Increasing interest of waste-to-energy as a part of industry-urban symbiosis. Code of Practice is available. However, the community raise their concern about environmental issues, especially release of air pollution.</p> <p>Recently, E-waste became a pressing issue in Thailand. In addition to the domestic e-waste, the problem of</p>	<p>200 RECP assessment conducted, when appropriate including the application of low carbon technologies, green chemistry implication, energy management system and system optimization measures.</p> <p>Technical and financial feasibility study report for 100 facilities.</p> <p>50 implementation projects related to the application of RECP, low carbon technologies, green chemistry or BAT/BEP carried out</p> <p>3 demonstration projects on industrial symbiosis between the companies/estate and communities carried out</p>	<p><u>RECP Assessment – phase 1</u> The project has conducted the RECP assessment in totally 127 factories.</p> <ul style="list-style-type: none"> <li>- 2021: 45 factories</li> <li>- 2022: 35 factories</li> <li>- 2023: 47 factories</li> </ul> <p><u>Feasibility Study – phase 2</u> The project has worked with the designated team from the factories to carry out the feasibility study of potential measures identified during the RECP assessment.</p> <ul style="list-style-type: none"> <li>- 2021: 3 factories</li> <li>- 2022: 9 factories</li> <li>- 2023: 22 factories</li> </ul> <p><u>Implementing RECP project – phase 3</u> Currently, the project is working with 11 factories to implement the RECP projects.</p> <p>Although there are 11 factories implementing the RECP measures with the project, some factories have implemented the RECP measures by themselves using the results of the assessment report and the feasibility study.</p> <p>Based on the follow up with 77 factories, there is a total reduction of 64,512 54,600 tons CO<sub>2eq</sub>/year (from</p>
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Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
		illegally imported e-waste is increasing. The e-waste management is dominated by informal sector without using the PPE. Their dismantling and recycling facilities are poorly managed with the high risk of environmental and health impacts.	1 demonstration project for waste management and waste-to-energy  1 demonstration project for e-waste management and its dismantling and recycling plant	calculation and actual measurement) The project is working on the verification of the amount collected by the consultants.  <u>Working with the project partners in private sectors:</u>  - PTT, PTTLNG and PTT Global Chemical (GC) have re-set up the working teams to collaborate with KU team due to the changing of team members. Several meetings have been carried out between the working teams and KU team.  - GC invested approximately 1.5 million US dollar in GHG reduction projects, which can reduce GHG emissions by up to 54,600 tons CO <sub>2eq</sub> /year. (This is the project in FY21-22 but is not reported in the previous PIR due to the factory's access restriction and change of working team.)  - The project is working with 7 factories in Saha-Pathana's industrial park to install solar rooftop with the target of 15 MW (20% of the electricity usage in the industrial park).

#### Component 4 – Development of National Eco-Industrial Town Framework and its supporting system

Outcome A: GHG emissions and releases of POPs reduced through industry-urban symbiosis by transferring low carbon and green chemistry technologies, improving capacity, enhancing infrastructure, promoting innovative business models and raising awareness

Output 4.1 Continuous improvement and sustaining the industry-urban symbiosis	Development of national eco-industrial town framework  Demonstration of national eco-industrial town framework.	There is no national eco-industrial town framework available. There are two eco-industrial town criteria sets provided by Department of Industrial Works (DIW) and Industrial Estate Authority of Thailand (IEAT).	A national eco-industrial town framework endorsed by the stakeholders  At least one industrial estate/zone in each selected province assessed by using the national eco-industrial town framework  3 selected provinces assessed by using the national eco-industrial town framework	Development of national eco-industrial framework to support RECP implementation, industrial symbiosis and industry-urban symbiosis is completed. Seven stakeholder consultation meetings were organized in Jul and Aug 23 with 292 participants (171 females and 121 males). After the final draft of framework was ready, the four focus group meetings with key stakeholders were organized in Nov 23 with 49 participants (30 females and 19 males).  The framework has been presented to the related technical committee at national level. The project's Technical Working Group on RECP will meet soon to discuss the next step on mobilizing the NEDF.
Outcome B: Project achieves objective on time through effective	Existence of project management structure	UNIDO and GEF monitoring and evaluation procedures are new for some of the	Monitoring and evaluation activities implemented and project implementation monitored	The project team has kept records of project activities implemented.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
monitoring and evaluation	Timely availability of reports.	project staffs and project partners.	and evaluated to achieve project objectives.	<p>The official meetings with project partners have been organized time to time via online meeting platforms to ensure the smooth operation of project activities.</p> <p>The communication and coordination between the project team and the focal points of project partners has been carried out regularly.</p> <p>The Midterm Review was carried out in December 2022. The midterm review report was disseminated to the PSC members in Jun 23.</p>

### III. Project Risk Management

1. Please indicate the overall project-level risks and the related risk management measures: (i) as identified in the CEO Endorsement document, and (ii) progress to-date. Please expand the table as needed.

	(i) Risks at CEO stage	(i) Risk level FY 22	(i) Risk level FY 23	(i) Mitigation measures	(ii) Progress to-date	New defined risk <sup>5</sup>
1.1	Lack of awareness on technical opportunities for adopting environmentally sound technologies	Low-medium	Low-medium	<p>Encourage a participatory approach and provide adequate information and training on planning and implementation of clean and low carbon technologies.</p> <p>The online training course, which provide an on-demand learning, will be another alternative for the participants who could not attend the in-class training.</p>	<p>The project leaflet was disseminated during seminars and training. The project website providing project news and information is available.</p> <p>The online learning platform with four courses and one webinar record is available for public.</p>	<input type="checkbox"/>
1.2	Reluctance of private sectors (factory's personnel, owner and staff of recycling facilities, etc.) to actively participating in the capacity building component.	Low	Low	<p>FTI will play the focal point to access to the industrial sectors through their established network. The relevant institutes and associations for example Plastic Institute of Thailand will be involved to use their expertise and networks to attract the participants in those specific industries.</p> <p>Training needs will be assessed, and pre-and post-training analysis will be undertaken.</p>	<p>The project is working closely with DIW, IEAT and FTI as well as other project partners to encourage the private sectors to participate in the project's activities.</p> <p>The project has resumed to the normal practices on seminar, workshop and training arrangement. The various seminar and training topics related to RECP and POPs management have been provided to respond to different needs of the industries.</p>	<input type="checkbox"/>
1.3	Low participation and interest from	Medium	Medium	Awareness raising activities will be carefully designed by considering	The project is working closely with the project partners to prepare the	<input type="checkbox"/>

<sup>5</sup> New risk added in reporting period. Check only if applicable.

	the communities, school and the public in the awareness raising program.			the different needs and background of the target audiences. The mixed media will be used, for example infographic and short video clips, to generate their interest and participation.	<p>suitable awareness program including the information sharing activities. The workshop was specifically designed to address daily operations related to waste management and the usage of recycle waste materials. Several workshops with communities were carried out with the support from the local authorities and nearby industries.</p> <p>The business model competition to support industry-urban symbiosis is a part of capacity building and awareness raising program. The network was established and expanded to other nearby communities by the community team participated in the competition.</p>	
1.4	Inadequate RECP, low carbon technology, green chemistry, BAT/BEP, and industry-urban symbiosis implementation, which lead to the lower quantified figure of the expected reduction target.	Low-medium	Low-medium	<p>During the implementation phase, the potential demonstration projects will be carefully assessed of their technical and financial feasibility as well as the socio-economic impact. The selection criteria of the demonstration project will be carefully set by the expert team under the close consultation with the project partners and key stakeholders.</p> <p>The training for calculating GHG and POPs reduction will be provided to ensure that the results reported will be on the same standard.</p>	<p>The project in collaboration with FTI's team has set up the criteria for selecting the qualified plants to implement RECP projects.</p> <p>The project together with the project partners (DIW and IEAT) has initiated the business model competition to demonstrate the industry-urban symbiosis. The project provided the capacity building for community and relevant industries on industry-urban symbiosis. The increasing of revenue from the products made from industrial wastes/by-products is used to motivate the community to participate in the project. The project also provided the basic training of GHG reduction calculation from the products produced from industrial wastes.</p>	<input type="checkbox"/>
2.1	Reluctance of industries to change towards climate resilient development, considering it as a burden instead of an opportunity. Besides cultural resistance, SMEs are often unable to undertake large investments, even though in the long run these generally pay off.	Low-medium	Low-medium	<p>Awareness raising and capacity building initiatives will reinforce the environmental and socio-economic advantages of eco-industrial towns and the adoption of environmentally sound technologies. Examples of best practices and successful projects implemented by UNIDO will be presented to stakeholders based on results and indicators. Technical and financial feasibility studies will be offered by the project and investment plans will be developed for the companies, if needed. As awareness will be raised on national certification mechanisms and financial schemes available in the country, facilitating access to these schemes will also serve as an</p>	<p>Although the severity of COVID-19 is lower than its initial phase, the economic impacts to the industry are still obvious, especially to the SMEs in Thailand.</p> <p>The project has provided the seminars and trainings with various topics related to GHG reduction and RECP to address different needs of the industries. We have noticed the increasing number of participants for the seminar and training directly related to GHG reduction and energy efficiency. The increasement of participants reflects the higher awareness of industries on climate change. The project will use this opportunity to emphasize on the potential actions with low-cost</p>	<input type="checkbox"/>

				incentive for companies to participate in the project.	investment to encourage the industries to take action.	
3.1	Developing industry-urban symbiosis is a complex undertaking and demands integration across many fields of planning and decision-making. Lack of collaboration and engagement among ministries, companies, local communities and other stakeholders may hinder the success of the project.	Medium	Medium	The Project Steering Committee (PSC) will establish the institutional linkages among the stakeholders. The Project Management Unit will consult with executing partners and stakeholders to ensure their commitment to and ownership of the project. Meetings and workshops to strengthen the collaboration among main stakeholders will be organized on a regular basis to identify potential issues and develop adequate mitigation measures. During the preparatory phase of the project, DIW and IEAT showed a strong commitment to co-host the national eco-industrial town framework with elements to enhance the industry-urban symbiosis. Moreover, the initial discussion with key stakeholders in the targeted areas have been carried out several times to raising their awareness of industry-urban symbiosis.	<p>The stakeholder meetings, which include the local authorities, communities, industries, waste transporters, and recycle facilities have been carried out.</p> <p>The creative approaches such as arranging the competition of business model for products made from industrial wastes have been used to mobilize the industry-urban symbiosis. The community participated in the competition acted as the accelerator to other nearby communities to seek the opportunities of industry-urban symbiosis.</p>	
4.1	The proposed regulatory framework is not adopted and enforced.	Medium	Medium	Decision makers will be engaged early in the project preparation and implementation to ensure their long-standing commitment. The key institutional stakeholders will be represented in the PSC to express their ideas and concerns with respect to roles and responsibilities of their own institution and to participate in the development process.	There is a change of Ministry of Industry's policy during FY2023. The eco-industrial development will be merged and operated under the umbrella of Green Industry (GI). The relevant measures proposed in the National Eco-industrial Development Framework and recommendation of RECP policy will be reviewed and selected to implement under Green Industry mobilization. DG of DIW has assigned the GI team to work with the project to incorporate the relevant measures to mobilize GI.	
5.1	Political instability due to a military coup, violent protests and political division of society between different factions may affect the project's development. Change of government policy and its priority of environmental issues caused by the industrial development	Low	Medium	Members of the PSC and UNIDO Regional Office in Thailand will monitor the political situation. Potential changes or adaptation of project activities will be discussed and endorsed by the PSC.	The nation-wide election was carried out on 14 May 2023. However, the new cabinet has not been established yet. The project is closely monitoring the political risk and regularly checking with the project partners' focal point for any changes.	
6.1	Natural disasters in the form of prolonged droughts and	Low	Low	Sensitivity to climate risks will be taken into account when selecting the industrial estates/	During FY 2022, there is no crucial issue on the natural disasters.	

	severe floods may interrupt the project's progress.			parks where the project will have demonstrations. During the preparatory phase of the project, the reselection of the three targeted provinces have taken this climate risk into account. Ayutthaya province was removed due to its high risk of flooding.		
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2. If the project received a **sub-optimal risk rating (H, S)** in the previous reporting period, please state the **actions taken** since then to mitigate the relevant risks and improve the related risk rating. Please also elaborate on reasons that may have impeded any of the sub-optimal risk ratings from improving in the current reporting cycle; please indicate actions planned for the next reporting cycle to remediate this.

NA

3. Please indicate any implication of the **COVID-19** pandemic on the progress of the project.

*The Thai Government has strictly executed various measures during the outbreak of COVID-19 since the beginning of the outbreak in early of 2020. At that time, most of the factories in Thailand strictly prohibited the access to external visitors. In the beginning of FY 2022, most of the measures on COVID-19 were removed. However, most of the factories have slowed down their investment due to the negative economic impacts.*

4. Please clarify if the project is facing delays and is expected to request an **extension**.

*During the COVID-19 pandemic, both the Thai government and private sectors have implemented several measures to control the number of infections including the restriction of external visitors to the factory's premises. The project was affected by such measures and uncertainty of the situation, which cause the delay of project implementation such as RECP assessment, pilot project, and capacity building activities.*

*The delay caused by COVID-19 pandemic was confirmed by the MTR's findings. In the MTR report, it is recommended to request an extension. The request of extension was discussed during the PSC meeting held on 4 Jul 23. In the meeting, a report on the progress of the project and the challenges faced due to the delays were discussed. Thus, the members of the PSC unanimously endorsed the alignment of the project implementation date to the national approval date.*

*The expected completion of all national level activities is 31 August 2025 and a terminal closure until 30 June 2026 is requested to allow the project to undertake the terminal evaluation, the final project workshop and the formulation of the final report.*

5. Please provide the **main findings and recommendations of completed MTR**, and elaborate on any actions taken towards the recommendations included in the report.

*The MTR of the project was conducted in December 2022. Based on a detailed assessment of the project design, effectiveness, management, stakeholder performance, sustainability, and safeguards, the MTR concluded that:*

- *The project's implementation management has been in line with UNIDO-GEF guidelines. Key enabling factors of the management arrangements have been a PMU staffed by experienced staff and close collaboration among key stakeholders.*
- *The project has made significant progress towards its targets related to training activities. In particular, the technical trainings delivered by the project have received positive feedback. However, the opportunity for international trainings and exchange visits have been limited due to COVID-19.*

- *The project is well behind on achieving targets for piloting RECP, green chemistry, and symbiosis activities, mostly due to COVID-19 caused delays. Whereas, the activities on POPs started significantly late due to resolving issues of implementation arrangements. Consequently, the project has not made any significant progress towards achieving its objective-level targets of GHG reduction and POPs management.*
- *The project will need additional time to complete all planned activities.*
- *The project has mainstreamed Gender in most activities. Whereas, the activities undertaken thus far have posed no environmental risks.*
- *The sustainability of project activities and outputs is subject to effective collaboration between all relevant stakeholders and a conducive policy environment.*

**Recommendations:**

- *The PMU, in collaboration with all key stakeholder organizations, undertake an assessment of the time it will require to complete its planned activities. Accordingly, a request for a no-cost extension is to be submitted to the GEF.*
- *The project extends its geographic scope to at least one additional province.*
- *The RECP feasibility studies undertaken by the project should be disseminated broadly in order to facilitate uptake by a broader range of stakeholders.*
- *it is recommended that the project organizes technical trainings in Thailand by international stakeholders. Furthermore, there is a need to organize exchange visits for public and private sector stakeholders to improve their understanding of policy and practices with respect to POPs, Eco-Industrial Framework, and Symbiosis, etc.*
- *The project should provide trainings to staff of relevant agencies in their implementation of newly developed National Eco-industrial Development Framework and RECP policy recommendations.*
- *While the project has not undertaken any activities yet with adverse environmental implications, it is recommended that to mainstream Environmental Safeguards, the RECP assessments also include environmental safeguards, going forward.*
- *It is recommended that PCD prioritizes the project's activities and closely monitors progress to ensure compliance with work plans for the remainder of the project.*
- *It is recommended that the Government of Thailand introduce supportive measures such as financial incentives for implementation of RECP projects.*
- *To ensure effective implementation of the National Eco-Industrial Framework, it is recommended that various agencies of the government collaborate when implementing the framework.*
- *Order to facilitate an objective assessment of project progress at MTR, it is recommended that the UNIDO include mid-term targets in the Results Frameworks for future projects.*
- *It is recommended that the project is provided a no-cost extension to allow it to overcome the implementation delays caused by COVID-19 and complete its planned activities.*

*For more details, please see Annex 1 MTR.*

#### **IV. Environmental and Social Safeguards (ESS)**

**1.** As part of the requirements for **projects from GEF-6 onwards**, and based on the screening as per the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP), which category is the project?

☐ Category A project



☒ Category B project

☐ Category C project

(By selecting Category C, I confirm that the E&S risks of the project have not escalated to Category A or B).

Please expand the table as needed.

	E&S risk	Mitigation measures undertaken during the reporting period	Monitoring methods and procedures used in the reporting period
<b>(i) Risks identified in ESMP at time of CEO Endorsement</b>			
Retrofit/Installation of equipment and/or machine to improve resource efficiency (small scale)			
Noise generation from the use of machines and equipment could pose impact on workers and nearby community	Minimize noise from equipment and machine	The manufacturer recommended engine maintenance programs will be implemented	Noise protection equipment is provided.
	Ensure that all workers are aware of noise	Occupational safety training will be provided	The regular safety training is provided. All personnel including contractor and supplier, who work on the installation project must pass the safety training by the factory's certified safety officers.
	Ensure the use of PPE (personal protection equipment) for protection against noise exposure	Mandatory ear protection	The worker in the area with loud noise is required to wear the noise protection equipment.
	In case of major noise disturbance to nearby community is expected, inform nearby community	Mechanism to record and respond to complaints will be prepared and communicated to the nearby community	The activity with potential noise impact to the community shall be carried out only daytime. If there is a need to carry out such activity during nighttime, the community leader must be informed in advance.
Hazardous waste generation from the retrofit/installation of the equipment and/or machine.	Ensure the proper hazardous waste management.	The hazardous waste management should be conformed to Thai regulation such as the transportation and safe disposal by the licensed subcontractor and facility.	The waste segregation is promoted. The different categories of trash containers are provided on site. The hazardous management is conformed to Thai regulation. This is supervised by the factory's authorized officers.
Construction site for large scale installation of equipment and/or machine to improve resource efficiency and/or to support industry symbiosis (if required)			

	<b>E&amp;S risk</b>	<b>Mitigation measures undertaken during the reporting period</b>	<b>Monitoring methods and procedures used in the reporting period</b>
Water pollution from the construction site	Control storm water flowing onto and throughout the construction site	The professionally designed drainage system should be made available	Not applicable for FY 2023 because the activities have not started yet
	Provide the sanitary wastewater treatment system at the construction site, if needed	At least the toilets with septic tanks should be provided	Not applicable for FY 2023 because the activities have not started yet
	Prevent the contamination of hazardous substance/waste to the waterway	Segregate and properly design storage areas for hazardous waste and fuels should be provided	Not applicable for FY 2023 because the activities have not started yet
Air pollution from the construction site	Minimize dust from material handling sources	Covers and/or control equipment will be applied	Not applicable for FY 2023 because the activities have not started yet
	Minimize dust from open area sources	Enclosures and covers will be used. Dust suppression techniques such as applying water to minimize dust will be used if needed	Not applicable for FY 2023 because the activities have not started yet
Noise generation from the use of machines and equipment could pose impact on workers and nearby community	Minimize noise from equipment and machine	The manufacturer recommended engine maintenance programs will be implemented	Not applicable for FY 2023 because the activities have not started yet
	Ensure that all workers are aware of noise	Occupational safety training will be provided.	Not applicable for FY 2023 because the activities have not started yet
	Ensure the use of PPE for protection against noise exposure	Mandatory ear protection	Not applicable for FY 2023 because the activities have not started yet
	In case of major noise disturbance to nearby community is expected, inform nearby community.	Mechanism to record and respond to complaints will be prepared and communicated to the nearby community	Not applicable for FY 2023 because the activities have not started yet
Hazardous waste generation from the construction site.	Ensure the proper hazardous waste management.	The hazardous waste management should be conformed to Thai regulation such as the transportation and safe disposal by the licensed subcontractor and facility.	Not applicable for FY 2023 because the activities have not started yet.

	E&S risk	Mitigation measures undertaken during the reporting period	Monitoring methods and procedures used in the reporting period
Operation of waste-to-energy plant			
Excessive emission of pollutants and environmental pollution caused by an inappropriate maintenance and operation of the waste-to-energy plant	Establish the BEP in the facility	Training on BEP will be provided by the project.	Not applicable for FY 2023 because the activities have not started yet.
	Strictly implement the BEP in the facility	The appropriate BEP will be integrated into the work procedure/instruction.	Not applicable for FY 2023 because the activities have not started yet.
	Regularly implement the comprehensive maintenance program	The specific maintenance program including manufacturer recommended maintenance practices will be implemented.	Not applicable for FY 2023 because the activities have not started yet.
	Ensure that the vulnerable groups such as female and elderly workers will be taken care	Specific training on occupational health and potential threats will be provided to the vulnerable groups	Not applicable for FY 2023 because the activities have not started yet.
Noise generation from the use of machines and equipment could pose impact on workers.	Minimize noise from equipment and machine	The manufacturer recommended engine maintenance programs will be implemented.	Not applicable for FY 2023 because the activities have not started yet.
	Ensure that all workers are aware of noise	Occupational safety training will be provided.	Not applicable for FY 2023 because the activities have not started yet.
	Ensure the use of PPE for protection against noise exposure	Mandatory ear protection	Not applicable for FY 2023 because the activities have not started yet.

## V. Stakeholder Engagement

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes** regarding engagement of stakeholders in the project (based on the Stakeholder Engagement Plan or equivalent document submitted at CEO Endorsement/Approval).

### Progress of stakeholder engagement

- Project Steering Committee meeting on 9 Aug 22.
- Technical Working Group (Eco-industrial development) meeting: TWG (Eco-industrial development) met regularly (15 times) in FY23 to follow up the progress of the relevant activities and provide feedbacks to progress reports submitted by the consultants.
- Technical Working Group (POPs management): The 2<sup>nd</sup> TWG (POPs) meeting was organized on 23 Jan 23. The TWG (POPs) has designated the Sub-working Group on HBCD and PFAS management to supervise and provide feedbacks on the studies relevant to HBCD and PFAS. The SWG (HBCD and PFAS) has met 5 times during FY23 to follow up the progress of the HBCD and PFAS projects.
- Study of policy and plan recommendation to support RECP implementation and promotion under eco-industrial development concept: Six stakeholder consultation meetings were organized in Jul 22 with 401 participants (194 females and 207 males).
- Survey and registration of SE-grade EPS containing HBCD in Thailand: Two technical hearings with the experts were carried out on 17 Jan and 27 Feb 23 with 26 participants (11 females and 15 males).

Three stakeholder consultation meetings were organized in April and May 23 with 163 participants (113 females and 50 males).

- Survey of firefighting foam containing PFAS in Thailand: One technical hearing with the experts was carried out on 27 Feb 23 with 26 participants (4 females and 22 males). Three stakeholder consultation meetings were organized in Mar and Apr 23 with 155 participants (81 females and 74 males).
- Upgrading the Circular Material Hub (CMH): The 2nd round of stakeholder meeting to present the demo version of the upgraded CMH was carried out and 4 meetings took place in Nov 22 with totally 173 participants (103 females and 70 males). Three events to promote the upgraded platform and invite the factories to be a case study were organized in Mar 23 with 173 participants (103 females and 70 males).
- Study of national eco-industrial development framework: Seven stakeholder consultation meetings were organized in Jul and Aug 23 with 292 participants (171 females and 121 males). After the final draft of framework was ready, the four focus group meetings with key stakeholders were organized in Nov 23 with 49 participants (30 females and 19 males).

#### Challenges

- The project found that the stakeholders related to new industrial POPs management were reluctant to share the information on their possession of products or materials containing the new industrial POPs such as PFOS. The legislation requires that the owner must inform their possession to the responsible agencies. However, some owners may not report their possession to the responsible agencies and are reluctant to share the information with the project.
- The issues on new industrial POPs and RECP mobilization are not specific to some areas, but across Thailand. The on-site stakeholder consultation at different regions across Thailand is costly. Therefore, the project tried to use both onsite and online meeting to encourage the participation of stakeholders from various provinces and to make the meeting more cost-efficient.

#### Outcomes

- The regular TWG and SWG meetings allowed the project to closely follow up the work progress carried out by the consultants and timely provide guidance to adjust the workplan and the relevant activities when facing the problems or constraints.
- Although the project faced some difficulties to organize the stakeholder meeting in some specific topics such as new industrial POPs, the adoption of the alternative approaches for example combining the knowledge sharing session with the discussion session increase the number of participants and feedbacks from the relevant stakeholders.
- The concerns raised during the stakeholder meeting such as the legislation issue were used to plan the next phase of POPs management and communicated to the project partners for their actions.

2. Please provide any feedback submitted by national counterparts, GEF OFP, co-financiers, and other partners/stakeholders of the project (e.g. private sector, CSOs, NGOs, etc.).

Please summarize relevant feedback received on the project.

(Below are the feedbacks during MTR)

- The geographic scope of the project being restricted to only three provinces which are already a part of the designated economic zones and are therefore well served by multiple government agencies and other service providers. FTI, as the executing agency for the project on RECP assessment, has requested the extension of project's geographical scope to other provinces.
- The project should provide more technical trainings in Thailand by international experts.
- The project should organize exchange visits for public and private sector stakeholders to improve their understanding of policy and practices with respect to POPs, Eco-Industrial Framework, and Symbiosis, etc.

3. Please provide any **relevant stakeholder consultation** documents.

Annexes to PIR (separate sheets):

- 1) 9714\_Meeting minutes of the 2<sup>nd</sup> PSC meeting
- 2) 9714\_Meeting minutes of TWG meetings: the 2<sup>nd</sup> TWG (POPs) meeting and the 4<sup>th</sup> TWG (RECP) meeting
- 3) 9714\_Stakeholder consultation reports

## VI. Gender Mainstreaming

1. Using the previous reporting period as a basis, please report on the **progress** achieved on **implementing gender-responsive measures** and **using gender-sensitive indicators**, as documented at CEO Endorsement/Approval (in the project results framework, gender action plan or equivalent),.

*Component 1: Policy Recommendation Development including the development of gender-related indicators and the incorporation of gender mainstreaming into the establishment of national standards, regulatory instruments, and mechanisms. Legislative and policy measures related to industry-urban symbiosis principles have been recommended, with a recommendation about gender composition at the decision-making level and gender indicators.*

*Component 2: National Capacity Building and Awareness Raising has made efforts to integrate gender considerations throughout the project. Gender-related issues have been incorporated into invitation letters, training materials and all awareness-raising activities. Regarding strengthening capacity and awareness, materials for awareness-raising and training, including training for trainers, have been developed to equip individuals and groups with the necessary knowledge and skills. These materials and training take into account the different impacts on men and women, tailoring them to meet specific needs. It is crucial to develop technical training programs and curricula with a gender and social component and evaluate their effectiveness through pre-test and post-test evaluations. Despite the challenges posed by COVID-19 and its aftermath, awareness-raising activities have reached in total 87% of the targeted participants, with female participants outnumbering males in most categories. Efforts have been made to adapt to the pandemic, including providing online training opportunities that are more accessible to women. The overall percentage of female participants in various categories ranged from 33.3% to 100%.*

*Component 3: Stakeholder meetings and the development of business models for industry-urban symbiosis have also taken a gender-sensitive perspective. Ensuring the inclusivity and gender sensitivity of the final products, along with their evaluation and necessary modifications, is highlighted. Moreover, the gender component is included in the staff's and consultants' capacity-building process.*

*Component 4: Development of National Eco-Industrial Development Framework and its Supporting System involves the development of a National Eco-Industrial Development Framework. Gender-related indicators are being developed and included as key performance indicators. A committee is being established to oversee gender considerations, and sex-disaggregated data is being collected for monitoring and evaluation.*

*Component 5: Monitoring and Evaluation, incorporates gender-responsive indicators, targets, and baselines, which are regularly monitored. Sex-disaggregated data and qualitative information are collected and analyzed for midterm monitoring and evaluation.*

*Based on the Project Result Framework, the average of 30% female participants is recommended for all awareness seminar, workshop, and trainings. In FY23, the performance of the gender indicator is shown below.*

- *Awareness seminar: 19 awareness raising seminars were organized with 1,012 female participants and 649 male participants. In average, there is 61% of female participants.*
- *Awareness workshop: Ten awareness raising workshops were organized with 345 female participants and 179 male participants. In average, there is 66% of female participants,*
- *Training: 13 trainings were organized with 278 female participants and 478 male participants. In*

average, there is 37% of female participants.

## VII. Knowledge Management

1. Using the previous reporting period as a basis, please elaborate on any **knowledge management activities / products**, as documented at CEO Endorsement / Approval.

- The project leaflet has been disseminated to the stakeholders during the seminar, training, and factory visits. The additional leaflets on HBCD and PFAS were disseminated to the relevant stakeholders during the seminar and training.
- The project's website is available for public (in Thai and English language). The brief information about project and news have been published on the project website.
- The project's online learning platform is available for public. Four courses and one webinar record are available on the platform.

2. Please list any **relevant knowledge management mechanisms / tools** that the project has generated.

- 9714\_Project leaflet
- 9714\_Leaflet – HBCD basic information, risk and management
- 9714\_Leaflet – PFAS basic information, risk and management
- 9714\_Project's website: <https://industry-urban-symbiosis-project.com>
- 9714\_Project's online learning platform: <https://learning.industry-urban-symbiosis-project.com>

## VIII. Implementation progress

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes achieved/observed** with regards to project implementation.

### Progress

- Six stakeholder consultation meetings to provide feedback on the draft recommendations were organized in Jul 22. The recommendation to support RECP implementation and promotion under eco-industrial development concept has been presented to the related technical committee at national level.
- The stakeholder consultation on draft guideline for survey of SE-grade EPS containing HBCD was carried out in Apr and May 23. Currently, it is in the finalization process.
- The consultant is conducting the field survey of SE-grade EPS containing HBCD and data collection.
- The stakeholder consultation on draft guideline for survey of firefighting foam containing PFAS was carried out in Mar and Apr 23. Currently, it is in the finalization process.
- The consultant is conducting the field survey of firefighting foam containing PFAS and data collection.
- The 2<sup>nd</sup> round of stakeholder meeting to present the demo version of the upgraded CMH (Circular Material Hub platform) was carried out and 4 meetings took place in Nov 22.
- The online learning platform is available for access with four training courses and one webinar record.
- The 2<sup>nd</sup> training course, GHG and low carbon technology, was submitted to the project and used for the 2-day training.

- The 2<sup>nd</sup> academic course, carbon footprint, has been developed and tested with the small class of master's degree students (Chemical Engineering Faculty).
- Ten awareness workshops were carried out with 524 participants (345 females and 179 males) from communities and waste management sector.
- 19 awareness seminars were carried out with 1,661 participants (1,012 females and 649 males) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers.
- 13 trainings were carried out with 756 participants (278 females and 478 males) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers, and other relevant stakeholders.
- In FY 23, there are 47 RECP assessment carried out. (In total, 127 factories)
- In FY 23, there are 22 feasibility studies carried out. (In total, 34 factories)
- The implementation of RECP measures in 11 factories are going on.
- Technical support to PTT, PTTLNG and GC: Several meetings have been carried out between the working teams and KU team GC invested approximately 1.5 million US dollar in GHG reduction projects, which can reduce GHG emissions by up to 54,600 tons CO<sub>2eq</sub>/year.
- Technical support to Sahapathana Interholding: The project is working with 7 factories in Saha-Pathana's industrial park to install solar rooftop with the target of 15 MW (20% of the electricity usage in the industrial park).
- Development of National Eco-industrial Development Framework: Seven stakeholder consultation meetings were organized in Jul and Aug 23. After the final draft of framework was ready, the four focus group meetings with key stakeholders were organized in Nov 23. The framework has been presented to the related technical committee at national level.
- The Midterm Review was carried out in December 2022. The midterm review report would be disseminated to the PSC members in Jul 23.

### Challenges

- Although Thailand has decreased the severity of COVID-19 situation from pandemic to seasonal disease since the beginning of FY23, the negative impacts of COVID-19 are still existed, which affect the decision to implement RECP measures and the investment to improve energy efficiency.
- The legislation related to industrial waste management restricted the direct waste exchange among industries as well as the usage of industrial waste by community. The long process of approval and limited list of industrial wastes allowed to exchange, or use is urging the relevant stakeholders, especially DIW and the industrial sector, to seek for the alternative mechanisms to promote the waste exchange.
- The lack of awareness and legal mandates for producers to ensure chemical safety of products, coupled with the fear of possible legal implication, have resulted in low collaboration from stakeholders, especially EPS foam converters and facility owner.

### Outcomes

- The requirement of alternative mechanism to support the industrial symbiosis and industry-urban symbiosis is addressed and acknowledged by the key stakeholders consisting of DIW and the industrial sectors. The study and demonstration project to support then are agreed by the project partners to tackle this challenge and provide the innovative mechanism to support the industrial waste exchange.

**2. Please briefly elaborate on any **minor amendments**<sup>6</sup> to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).**

<sup>6</sup> As described in Annex 9 of the *GEF Project and Program Cycle Policy Guidelines*, **minor amendments** are changes to the project design or implementation that do not have significant impact on the project objectives or scope, or an increase of the GEF project financing up to 5%.



Please tick each category for which a change has occurred and provide a description of the change in the related textbox. You may attach supporting documentation, as appropriate.

<input type="checkbox"/>	Results Framework	NA
<input type="checkbox"/>	Components and Cost	NA
<input type="checkbox"/>	Institutional and Implementation Arrangements	NA
<input type="checkbox"/>	Financial Management	NA
<input checked="" type="checkbox"/>	Implementation Schedule	Project extension to 31 August 2025 was discussed at the 3 <sup>rd</sup> PSC meeting further to the recommendation from the MTR. The delay was caused by Covid-19.
<input type="checkbox"/>	Executing Entity	NA
<input type="checkbox"/>	Executing Entity Category	NA
<input type="checkbox"/>	Minor Project Objective Change	NA
<input type="checkbox"/>	Safeguards	NA
<input type="checkbox"/>	Risk Analysis	NA
<input type="checkbox"/>	Increase of GEF Project Financing Up to 5%	NA
<input type="checkbox"/>	Co-Financing	NA
<input type="checkbox"/>	Location of Project Activities	NA
<input type="checkbox"/>	Others	NA

### 3. Please provide progress related to the **financial implementation** of the project.

According to the MTR's findings, the Government co-financing, the largest contribution was made by IEAT, equalling more than three times the committed amount. On the other hand, 1% of the private-sector co-financing came through from KU and FTI contributions, while Saha Pathana Inter-Holding have also provided nearly 50% of the committed co-financing of USD 24.65 Million. In addition, the other private sector partners have also contributed resources during their cooperation with the project for implementation of activities such as the MFA. Whereas the remaining contribution from private sector will be mostly subject to the implementation of pilot demonstration projects under Component 3.

The summary of co-financing is shown below.

	Committed (USD)	Materialized (USD)			Percentage Committed
		2020	2021	2022	
DIW	7,800,000	822,970.87	676,450.52	466,972.27	25%
MONRE	1,000,000	811.21	5,248.05	5,095.54	1%
IEAT	1,300,000	1,342,838.20	1,252,126.4	1,541,006.39	318%
<b>Total Govt. Co-financing</b>	<b>10,100,000</b>	<b>824,502.18</b>	<b>683,214.55</b>	<b>472,688.65</b>	<b>19.6%</b>
FTI	2,000,000	4,880.43	128,716.24	13,543.19	7%
KU	100,000	9,597.25	16,204.43	1,045.39	27%
PTT	58,362,700	-	-	-	0%
PTT LNG	6,060,000	-	-	-	N/A *
PTT Global Chemical	18,590,000	-	-	-	N/A*
Saha Pathana Inter-Holding	24,650,000	12,201,073.69	-	-	49.5%
<b>Total Private Co-financing</b>	<b>109,762,700</b>	<b>12,215,551.37</b>	<b>144,920.67</b>	<b>14,588.58</b>	


\* The actual monetary value of contributions by other private sector partners was not readily available at the time of the MTR and is therefore not reported here.



The expenditure from 1 July 2022 to 30 June 2023 (including obligations) is USD 1,080,969.14, resulting in the expenditure rate in FY2023 of 12% of the total funding. Output 2.3 had the highest disbursement rate (40% of the total expenditure).

The accumulative expenditure as of 30 June 2023 (including obligations) is USD 4,406,389.22, resulting in the expenditure rate as of 30 June 2023 of 49% of the total funding. Approximately 41% of the accumulative expenditure is for contractual services, 6% for national consultant, and 3% for international consultant.

Details of the financial implementation in FY2023 can be found below.

 <b>PROJECT DELIVERY REPORT</b>		Project:		150036 - APPLICATIONS OF INDUSTRY-URBAN SYMBIOSIS AND GREEN CHEMISTRY FOR LOW EMISSION AND PERSISTENT ORGANIC POLLUTANTS (POPS)-FREE INDUSTRIAL DEVELOPMENT IN THAILAND		Project Manager:		Camela Centeno		Project Validity: Status:		01.01.2016 - 24.07.2024 Implement			
Reporting Period:		24.07.2019 - 30.06.2023		Project Theme:		Energy and Environment		Country:		Thailand		Region		Asia and Pacific	
Sponsor Nr.		Sponsor		Grant		Grant Description		Fund		Currency		Grant Status		Grant Validity	
400150		GEF - Global Environment Facility		2000004196		GFTHA_150036		GF		USD		Authority to implement		24.07.2019 - 24.07.2024	

	Description	Released Budget Current Year (a)	Obligations Current Year (b)	Disbursements Current Year (c)	Expenditures Current Year (d=b+c)	Total Agreement Budget (e)	Released Budget (f)	Obligations + Disbursements (g)	Funds Available* (h=f-g)	Support Cost (i)	Total Expenditures (j=g+i)
2000004196											
150036-1-01-01	1.1. Legal and policy measures enhanced	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	679.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1500	Local Travel	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1700	Nat.Consult./Staff	37,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2100	Contractual Services	174,173.75	(53,703.63)	53,703.63	0.00	0.00	0.00	108.96	(108.96)	0.00	108.96
3500	International Meetings	38.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.35	10.35
150036-1-01-01	Total	213,091.20	(53,703.63)	53,703.63	0.00	0.00	0.00	108.96	(108.96)	10.35	119.31
150036-1-02-01	2.1. Intervention plan on new POP's	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1500	Local Travel	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1700	Nat.Consult./Staff	20,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2100	Contractual Services	162,000.00	(61,588.80)	61,648.34	59.54	295,878.50	295,878.50	308,938.04	(13,059.54)	0.00	308,938.04
3000	Train/Fellowship/Study	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29,349.11	29,349.11
150036-1-02-01	Total	192,000.00	(61,588.80)	61,648.34	59.54	295,878.50	295,878.50	308,938.04	(13,059.54)	29,349.11	338,287.15
150036-1-02-02	2.2. Ind-Urban symbiosis opportunities	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	8,232.77	3,255.68	8,358.41	11,614.09	0.00	0.00	14,794.78	(14,794.78)	0.00	14,794.78
1500	Local Travel	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1700	Nat.Consult./Staff	7,700.00	0.00	0.00	0.00	(3,000.00)	(3,000.00)	0.00	(3,000.00)	0.00	0.00
2100	Contractual Services	44,661.09	(4,134.26)	40,575.54	36,441.28	0.00	0.00	52,497.41	(52,497.41)	0.00	52,497.41
5100	Other Direct Costs	2,291.99	0.00	340.68	340.68	3,000.00	3,000.00	520.19	2,479.81	0.00	520.19
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,442.17	6,442.17
150036-1-02-02	Total	64,885.85	(878.58)	49,274.63	48,396.05	0.00	0.00	67,812.38	(67,812.38)	6,442.17	74,254.55

	Description	Released Budget Current Year (a)	Obligations Current Year (b)	Disbursements Current Year (c)	Expenditures Current Year (d=b+c)	Total Agreement Budget (e)	Released Budget (f)	Obligations + Disbursements (g)	Funds Available* (h=f-g)	Support Cost (i)	Total Expenditures (j=g+i)
150036-1-02-03	2.3. Increased capacity on risks-benefit	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	21,628.55	9,537.46	8,900.22	18,437.68	(123,878.50)	(123,878.50)	42,819.85	(166,698.35)	0.00	42,819.85
1500	Local Travel	5,700.19	(1,662.00)	0.00	(1,662.00)	0.00	0.00	7,637.81	(7,637.81)	0.00	7,637.81
1700	Nat.Consult./Staff	34,729.40	5,025.96	8,845.41	13,871.37	0.00	0.00	13,810.48	(13,810.48)	0.00	13,810.48
2100	Contractual Services	(18,963.23)	383,018.68	7,900.00	390,918.68	(127,000.00)	(127,000.00)	391,073.71	(518,073.71)	0.00	391,073.71
3000	Train/Fellowship/Study	42,000.00	0.00	0.00	0.00	(45,000.00)	(45,000.00)	0.00	(45,000.00)	0.00	0.00
3500	International Meetings	38.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5100	Other Direct Costs	23,599.68	287.85	413.97	701.82	0.00	0.00	1,068.50	(1,068.50)	0.00	1,068.50
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43,359.01	43,359.01
150036-1-02-03	Total	108,732.91	396,207.95	26,059.60	422,267.55	(295,878.50)	(295,878.50)	456,410.35	(752,288.85)	43,359.01	499,769.36
150036-1-03-01	3.1. Ind-Urban symbiosis implemented	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	205,034.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1500	Local Travel	10,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1700	Nat.Consult./Staff	16,244.91	5,025.96	8,845.42	13,871.38	0.00	0.00	13,496.19	(13,496.19)	0.00	13,496.19
2100	Contractual Services	276,794.51	394,995.00	79,420.41	474,415.41	0.00	0.00	493,156.75	(493,156.75)	0.00	493,156.75
3000	Train/Fellowship/Study	41,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4500	Equipment	95,532.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5100	Other Direct Costs	10,690.63	0.00	9.25	9.25	0.00	0.00	32.59	(32.59)	0.00	32.59
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48,135.15	48,135.15
150036-1-03-01	Total	655,796.46	400,020.96	88,275.08	488,296.04	0.00	0.00	506,685.53	(506,685.53)	48,135.15	554,820.68

	Description	Released Budget Current Year (a)	Obligations Current Year (b)	Disbursements Current Year (c)	Expenditures Current Year (d=b+c)	Total Agreement Budget (e)	Released Budget (f)	Obligations + Disbursements (g)	Funds Available* (h=f-g)	Support Cost (i)	Total Expenditures (j=g+i)
150036-1-04-01	4.1. Sustaining Ind-Urban symbiosis	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	19,109.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1500	Local Travel	5,500.00	0.00	0.00	0.00	(500.00)	(500.00)	0.00	(500.00)	0.00	0.00
1700	Nat.Consult./Staff	(80,000.00)	0.00	0.00	0.00	(80,000.00)	(80,000.00)	0.00	(80,000.00)	0.00	0.00
2100	Contractual Services	219,474.32	0.00	0.00	0.00	0.00	0.00	(4.95)	4.95	0.00	(4.95)
3000	Train/Fellowship/Study	35,000.00	0.00	0.00	0.00	(2,000.00)	(2,000.00)	0.00	(2,000.00)	0.00	0.00
5100	Other Direct Costs	429.89	0.00	0.00	0.00	500.00	500.00	0.00	500.00	0.00	0.00
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.47)	(0.47)
150036-1-04-01	Total	199,513.38	0.00	0.00	0.00	(82,000.00)	(82,000.00)	(4.95)	(81,995.05)	(0.47)	(5.42)
150036-1-51-01	Project management	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	4,947.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1500	Local Travel	12,000.00	233.37	5,844.27	6,077.64	0.00	0.00	6,077.64	(6,077.64)	0.00	6,077.64
1700	Nat.Consult./Staff	112,844.48	55,323.87	55,089.03	110,412.90	80,000.00	80,000.00	109,900.45	(29,900.45)	0.00	109,900.45
2100	Contractual Services	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3000	Train/Fellowship/Study	0.00	0.00	688.37	688.37	0.00	0.00	688.37	(688.37)	0.00	688.37
3500	International Meetings	824.76	0.00	0.00	0.00	2,000.00	2,000.00	1,175.24	824.76	0.00	1,175.24
4500	Equipment	2,543.97	0.00	33.12	33.12	0.00	0.00	109.11	(109.11)	0.00	109.11
5100	Other Direct Costs	2,319.36	(95.08)	1,873.60	1,778.52	0.00	0.00	4,014.33	(4,014.33)	0.00	4,014.33
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,586.71	11,586.71
150036-1-51-01	Total	136,480.44	55,462.16	63,528.39	118,990.55	82,000.00	82,000.00	121,965.14	(39,965.14)	11,586.71	133,551.85
150036-1-53-01	Mid-term Evaluation	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
1100	Staff & Intern Consultants	7,825.66	(5,682.50)	5,758.80	76.30	0.00	0.00	17,250.64	(17,250.64)	0.00	17,250.64
1500	Local Travel	213.12	(2,521.69)	2,731.55	209.86	0.00	0.00	3,996.74	(3,996.74)	0.00	3,996.74
1700	Nat.Consult./Staff	24,734.54	0.01	2,686.50	2,686.51	0.00	0.00	3,951.97	(3,951.97)	0.00	3,951.97
3000	Train/Fellowship/Study	2,158.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5100	Other Direct Costs	7,816.69	0.00	(13.26)	(13.26)	0.00	0.00	170.05	(170.05)	0.00	170.05
9300	Support Cost IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,410.11	2,410.11
150036-1-53-01	Total	42,748.01	(8,204.18)	11,163.59	2,959.41	0.00	0.00	25,369.40	(25,369.40)	2,410.11	27,779.51
2000004196	Total	1,613,248.25	727,315.88	353,653.26	1,080,969.14	0.00	0.00	1,487,284.85	(1,487,284.85)	141,292.14	1,628,576.99
150036	USD Total	1,613,248.25	727,315.88	353,653.26	1,080,969.14	0.00	0.00	1,487,284.85	(1,487,284.85)	141,292.14	1,628,576.99

\* Does not include Unapproved Obligations

## IX. Work Plan and Budget

1. Please provide **an updated project work plan and budget** for the remaining duration of the project, as per last approved project extension. Please expand/modify the table as needed.

Please fill in the below table or make a reference to a file, in case it is submitted as an annex to the report. Expected Outcome/Output	2023		2024				GEF Grant Budget Available (\$)
	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Component 1: Policy development</b>							
Output 1.1 Necessary legislative and policy measures on industry-urban symbiosis principles, management of new POPs and market-based instruments enhanced	34,000	34,000					68,000
<b>Component 2: National capacity building and awareness raising on industry-urban symbiosis and POPs</b>							
Output 2.1 Inventory of new POPs and intervention plan developed for the three selected provinces	44,000	44,000	40,000	40,000	40,000	40,000	248,000
Output 2.2 Opportunities for industry-urban symbiosis elaborated through material and waste stream analysis	46,000	40,000	35,000	35,000	35,000	35,000	226,000
Output 2.3 Increased capacity and awareness on risks of new POPs and the benefits of (i) resource efficient and cleaner production, (ii) green chemistry, (iii) industry-urban symbiosis	210,000	215,000	250,000	250,000	250,000	250,000	1,425,000
<b>Component 3: Pilot demonstration of cleaner production, new POPs management and industry-urban symbiosis</b>							
Output 3.1 Industry-urban symbiosis implemented through the demonstration of low carbon and green chemistry systems in selected enterprises, industrial zones and neighboring urban settlements	450,000	440,000	250,000	250,000	250,000	250,000	1,890,000
<b>Component 4: Development of National Eco-Industrial Town Framework and its supporting system</b>							
Output 4.1 Continuous improvement and sustaining the industry-urban symbiosis	70,000	70,000	20,000	20,000	20,000	20,000	220,000
<b>Component 5: Monitoring and evaluation</b>							
Output 5.1 Periodic monitoring and evaluation of project implementation completed	50,000	50,000	40,000	40,000	40,000	40,000	260,000

## X. Synergies

### 1. Synergies achieved:

*During the mission to Vienna, Austria in May 2023 conducted by the delegation of Thai government partners in this project, a discussion between the government officials and the Hydro Programme of UNIDO was facilitated to explore synergies in the clean energy area. UNIDO team also organized a meeting between the Thai government representatives and the Technical University of Vienna, Faculty of Technical Chemistry and a visit to the University Hydrogen Labs. On the topic of waste management, the delegation had a visit at the Spittelau Waste Incinerator and discuss the best practices in waste collection and treatment.*

### 3. Stories to be shared (Optional)

*HBCD is one of the new industrial POPs used in Thailand. There is a limited knowledge on HBCD and its impacts to human and environment. Therefore, the project developed the short video clip to provide the basic information about HBCD, impacts to human and environment, the measures to prevent its contamination to human and environment. The clip is in the attachment.*

## XI. GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate.

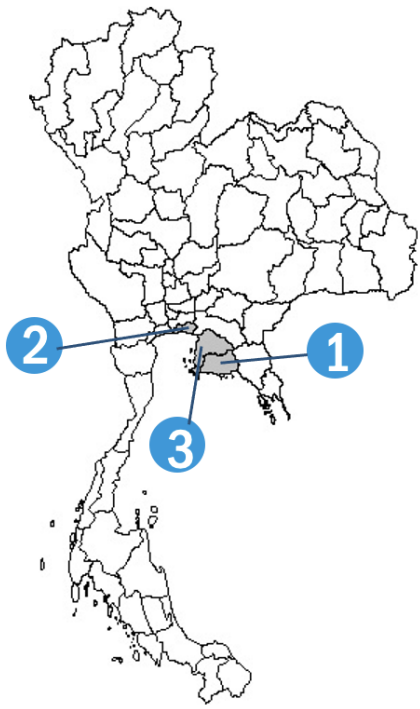
Web mapping applications such as [OpenStreetMap](#) or [GeoNames](#) use this format. Consider using a conversion tool as needed, such as: <https://coordinates-converter.com>

Please see the Geocoding User Guide by clicking [here](#)

Location Name	Latitude	Longitude	Geo Name ID	Location and Activity Description
Rayong province	12.83	101.43	1607017	Awareness workshops and trainings  RECP assessment in 44 factories

				Feasibility study for RECP measures in 12 factories  Implementation of RECP measures in 4 factories
Samut Prakan province	13.60	100.71	1606589	Awareness workshops and trainings  RECP assessment in 35 factories  Feasibility study for RECP in 5 factories  Implementation of RECP measures in 3 factories
Chonburi province	13.3  Saha-Pathana Industrial Park  13.08	101.3  Saha-Pathana Industrial Park  100.97	1611110	Awareness workshops and trainings  RECP assessment in 48 factories  Feasibility study for RECP measures in 17 factories  Implementation of RECP measures in 4 factories  Solar farm and solar rooftop with Saha-Pathana Inter holding
Bangkok	13.88	100.72	1609350	Awareness workshops and trainings

Please provide any further geo-referenced information and map where the project interventions is taking place as appropriate.



1

Rayong

2

Samutprakarn

3

Chonburi



## EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2022 – 30 June 2023.
2. **Responsibility:** The responsibility for preparing the report lies with the project manager in consultation with the Division Chief and Director.
3. **Evaluation:** For the report to be used effectively as a tool for annual self-evaluation, project counterparts need to be fully involved. The (main) counterpart can provide any additional information considered essential, including a simple rating of project progress.
4. **Results-based management:** The annual project/programme progress reports are required by the RBM programme component focal points to obtain information on outcomes observed.

Global Environmental Objectives (GEOs) / Development Objectives (DOs) ratings	
<b>Highly Satisfactory (HS)</b>	Project is expected to achieve or exceed <u>all</u> its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as "good practice".
<b>Satisfactory (S)</b>	Project is expected to <u>achieve most</u> of its <u>major</u> global environmental objectives, and yields satisfactory global environmental benefits, with only minor shortcomings.
<b>Moderately Satisfactory (MS)</b>	Project is expected to <u>achieve most</u> of its major <u>relevant</u> objectives but with either significant shortcomings or modes overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environmental benefits.
<b>Moderately Unsatisfactory (MU)</b>	Project is expected to achieve <u>some</u> of its major global environmental objectives with major shortcomings or is expected to <u>achieve only some</u> of its major global environmental objectives.
<b>Unsatisfactory (U)</b>	Project is expected <u>not</u> to achieve <u>most</u> of its major global environmental objectives or to yield any satisfactory global environmental benefits.
<b>Highly Unsatisfactory (HU)</b>	The project has failed to achieve, and is not expected to achieve, <u>any</u> of its major global environmental objectives with no worthwhile benefits.

Implementation Progress (IP)	
<b>Highly Satisfactory (HS)</b>	Implementation of <u>all</u> components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as "good practice".
<b>Satisfactory (S)</b>	Implementation of <u>most</u> components is in substantial compliance with the original/formally revised plan except for only few that are subject to remedial action.
<b>Moderately Satisfactory (MS)</b>	Implementation of <u>some</u> components is in substantial compliance with the original/formally revised plan with some components requiring remedial action.
<b>Moderately Unsatisfactory (MU)</b>	Implementation of <u>some</u> components is <u>not</u> in substantial compliance with the original/formally revised plan with most components requiring remedial action.
<b>Unsatisfactory (U)</b>	Implementation of <u>most</u> components in <u>not</u> in substantial compliance with the original/formally revised plan.
<b>Highly Unsatisfactory (HU)</b>	Implementation of <u>none</u> of the components is in substantial compliance with the original/formally revised plan.

Risk ratings	
Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risk of projects should be rated on the following scale:	
<b>High Risk (H)</b>	There is a probability of greater than <b>75%</b> that assumptions may fail to hold or materialize, and/or the project may face high risks.
<b>Substantial Risk (S)</b>	There is a probability of between <b>51%</b> and <b>75%</b> that assumptions may fail to hold or materialize, and/or the project may face substantial risks.
<b>Moderate Risk (M)</b>	There is a probability of between <b>26%</b> and <b>50%</b> that assumptions may fail to hold or materialize, and/or the project may face only moderate risk.
<b>Low Risk (L)</b>	There is a probability of up to <b>25%</b> that assumptions may fail to hold or materialize, and/or the project may face only low risks.