



## Project Implementation Report

(1 July 2021 – 30 June 2022)

<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>	<i>9219</i>
<b>UNIDO ID:</b>	<i>150036</i>
<b>GEF Replenishment Cycle:</b>	<i>GEF-6</i>
<b>Country(ies):</b>	<i>Thailand</i>
<b>Region:</b>	<i>EAP - East Asia and Pacific</i>
<b>GEF Focal Area:</b>	<i>Multifocal Area (MFA)</i> <i>Chemicals and Waste (CW) and Climate Change Mitigation (CCM)</i>
<b>Integrated Approach Pilot (IAP) Programs<sup>1</sup>:</b>	<i>Not applicable</i>
<b>Stand-alone / Child Project:</b>	<i>Stand alone</i>
<b>Implementing Department/Division:</b>	<i>ENV / IPM</i>
<b>Co-Implementing Agency:</b>	<i>Not applicable</i>
<b>Executing Agency(ies):</b>	<i>Department of Industrial Works and Industrial Estate Authority of Thailand under the Ministry of Industry;</i> <i>Pollution Control Department under the Ministry of Natural Resources and Environment;</i> <i>The Federation of Thai Industries; and</i> <i>Chemical Engineering Department, Kasetsart University.</i>
<b>Project Type:</b>	<i>Full-Sized Project (FSP)</i>
<b>Project Duration:</b>	<i>60</i>
<b>Extension(s):</b>	<i>NA at this stage</i>
<b>GEF Project Financing:</b>	<i>USD 8,966,000</i>
<b>Agency Fee:</b>	<i>USD 851,770</i>
<b>Co-financing Amount:</b>	<i>USD 120,062,700</i>
<b>Date of CEO Endorsement/Approval:</b>	<i>4/2/2019</i> <i>Insert the date as per letter from GEF CEO</i>
<b>UNIDO Approval Date:</b>	<i>7/16/2019</i> <i>Insert EB approval date of the project</i>
<b>Actual Implementation Start:</b>	<i>7/24/2019</i> <i>Insert the PAD issuance date of the project</i>

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

<b>Cumulative disbursement as of 30 June 2022:</b>	<i>To be completed by GEF Coordination Unit</i>
<b>Mid-term Review (MTR) Date:</b>	10/3/202210/3/2022 <i>If applicable, insert expected/actual date of MTR submission to the GEF.</i>
<b>Original Project Completion Date:</b>	7/24/20247/24/2024 <i>Insert the indicated project completion date as per CEO Approval / Endorsement document.</i>
<b>Project Completion Date as reported in FY21:</b>	6/30/2024Insert the project completion date as reported in the previous PIR for Fiscal Year 2021 (FY21)
<b>Current SAP Completion Date:</b>	7/24/2024Insert the project completion date as currently seen in the system
<b>Expected Project Completion Date:</b>	7/24/20247/24/2024 <i>If the date is the same as above, please confirm; if you plan to extend the project completion date, please indicate here and elaborate further under section III.2</i>
<b>Expected Terminal Evaluation (TE) Date:</b>	1/30/20241/30/2024 <i>Insert expected/actual date of TE submission to the GEF</i>
<b>Expected Financial Closure Date:</b>	1/15/20251/15/2025 <i>Insert a date <u>no later than</u> 12 months after the TE submission date</i>
<b>UNIDO Project Manager<sup>2</sup>:</b>	<i>Mr. Smail Alhilali</i>

## 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	<p><i>Support to transformational shifts towards a low-emission and resilient development path</i></p>	<p><i>Direct GHG reduction: 1,305,761 metric tons</i></p> <p><i>Indirect GHG reduction (bottom up): 2,611,522 metric tons</i></p> <p><i>Indirect GHG reduction (top-down): 3,153,904 metric tons</i></p>
5	<p><i>Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern</i></p> <p><i>(I) Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)</i></p>	<p><i>620 metric tons</i></p>

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

## Baseline

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. FY22. Please also provide a short justification for the selected ratings for FY22.

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. FY21, in the last column.

Overall Ratings <sup>4</sup>	FY22	FY21
Global Environmental Objectives (GEOs) / Development Objectives (DOs) Rating	<i>Moderately Satisfactory (MS)</i>	<i>Satisfactory (S)</i> <i>Satisfactory (S)</i>
<i>Due to the slowdown of investment affected by COVID-19 pandemic, the project is behind schedule of tracking the GEOs results based on the private sector's investment and impacts of the project implementation.</i>		
Implementation Progress (IP) Rating	<i>Moderately Satisfactory (MS)</i>	<i>Moderately Satisfactory (MS)</i>
<i>The project progress is still behind the original schedule. Efforts have been made in Q2 2022 to speed up work plan's activities.</i>		
Overall Risk Rating	<i>Moderate Risk (M)</i>	<i>Moderate Risk (M)</i>
<i>The project is still facing the moderate risk from the COVID-19 situation, which caused the delay of the project implementation. As preventive measure to COVID-19, most factories closed access to external visitors, which prevented the carry out planned activities and interventions.. The economic recession affected by, among other reasons, COVID-19 situation and worldwide inflation slowed down factories' investment to improve their efforts in improve their resource efficiency.</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.

*Please fill in the below table or make a reference to any supporting documents that may be submitted as annexes to this report.*

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date
<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 in progress. The literature and document review were carried out. The 1 <sup>st</sup> round of stakeholder meeting was carried out in November and December 2021. 17 sessions (both onsite and online meetings) were organized with a total of 623 participants (314 female and 309 male). The draft policy and workplan recommendations were prepared. It would be ready for the 2 <sup>nd</sup> round of stakeholder meeting planned in July 2022.
<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	The Technical Working Group (TWH) (for POPs management) met on 10 May 2022. TWG took the following decisions related to the output 2.1. - According to the updated national baseline data on new industrial POPs <sup>5</sup> , most of the new industrial POPs are in the use phase and end-of-life phase, which make the area-based implementation no longer valid. The TWG has decided to adjust the activities to study the selected new industrial POPs consisting of HBCD (Hexabromocyclododecane), PFOS (Perfluorooctane sulfonic acid) including PFOA (Perfluorooctanoic acid) and PFHxS (Perfluorohexane sulfonic acid), decaBDE (Decabromodiphenyl ether) and
	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	
Output 2.1: Inventory of new POPs and intervention plan developed for the three selected provinces	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		Monitoring reports of new POPs contamination in three selected provinces	

<sup>5</sup> Thailand's 2017 POPs Inventory Assessment Report (March 2020)

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date
	performance of the intervention plan implemented			<p>SCCP (Short-chain chlorinated paraffins) across Thailand.</p> <ul style="list-style-type: none"> <li>- The study and implementation of new industrial POPs will be focused on the relevant chemicals such of HBCD, PFOS (plus PFOA and PFHxS), and decaBDE. The study of SCCP will be included as originally stated in the project document.</li> </ul> <p>Two competitive biddings for provision of services related on "Survey and registration of SE-grade EPS containing HBCE" and "Survey and registration of firefighting foam containing PFOS, PFOA and PFHxS" were launched in June 2022.</p>
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>	<p>Kasetsart University (KU) Team, the executing entity for this output, has carried out the following activities to prepare the material-flow-analysis (MFA) and identify the potential cases of industrial symbiosis or industry-urban symbiosis:</p> <ul style="list-style-type: none"> <li>- Analyze the MFA by using STAN (subSTance flow ANalysis) to simulate and calculate the material flow.</li> <li>- Identify potential industrial symbiosis application including of 1) using casava pulp as an ingredient for sweetener production, 2) using fly ashes and dregs ingredients in concrete, 3) Using scrap rubber for carbon black production and 4) using wastewater for biogas production</li> <li>- Identify the potential industry-urban application including of 1) using rags, textile scraps and fibre scraps for bedding industry production, 2) using industrial residues for fertilizer production, and 3) using pineapple leaves for natural fibre production.</li> </ul> <p>TWG will select the most promising applications (potential industrial symbiosis and industry-urban symbiosis), which will be demonstrated under output 3.1.</p> <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 1<sup>st</sup> round of stakeholder meeting was carried out and 4 meetings took place in May 2022 with totally 151 participants (83 female and 68 male). Currently, the study team is</p>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date
				developing alternatives to upgrade the CMH.
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 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>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 ratio by area and stakeholder is in Annex N of the project document).</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>Dissemination materials: During this FY, the project leaflet were disseminated to the relevant stakeholders during the meetings, seminars, workshops, trainings and companies' visits.</p> <p>Also, the project website was created 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, the online learning platform was developed. Three courses (Topics: eco-industrial development in Thailand, GHG and low carbon society, and RECP assessment) and one webinar recording on carbon capture and utilization) were uploaded to the platform. The online learning platform was in the commissioning phase during this FY. Learning platform's promotion through the project partner's websites and during upcoming meetings, seminars and trainings will be carried out in the early of next FY.</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 1<sup>st</sup> training course on fundamental of RECP assessment, which later has been used by FTI to provide training to factories' personnel. KU team is developing the 2<sup>nd</sup> training course on GHG and low carbon technology.</p> <p>The 1<sup>st</sup> academic course on cleaner technology has been developed and tested with a small class of master's degree students (Chemical Engineering Faculty). KU team is developing the 2<sup>nd</sup> academic course on carbon footprint.</p> <p>Awareness seminar/workshop FTI has organized two awareness-raising seminars/workshops during the</p>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date
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			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>period July 2021 to June 2022, which are the following:</p> <ul style="list-style-type: none"> <li>- 8 Dec 21: awareness workshop for community in Samutprakarn province -value-added product from industrial wastes (Total of 27 participants with 89% female, 24 females and 3 males)</li> <li>- 16 Dec 21: Awareness seminar in Nakhon Pathom province to promote RECP and energy efficiency (Total of 22 participants with 23% female, 5 females and 17 males)</li> <li>- 13 May 22: Awareness seminar (online) to promote RECP following eco-factory criteria (Total of 98 participants with 61% female, 60 females and 38 males)</li> <li>- 16 May 22: awareness workshop for community in Rayong province – value-added product from industrial wastes (Total of 30 participants with 70% female, 21 females and 9 males)</li> <li>- 18 May 22: awareness workshop for community in Chonburi province – value-added product from industrial wastes (Total of 42 participants with 81% female, 34 females and 8 males)</li> <li>- 18 June 22: Awareness seminar in Chonburi to promote industrial waste management and utilization (Total of 87 participants with 68% female, 59 females and 28 males)</li> </ul> <p>In total, there were 306 participants from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers, communities and other relevant stakeholders. They all attended the awareness raising seminar and workshop (equal access to the event has been encouraged with an average of 66% female participation).</p> <p>Training: FTI has organized seven (7) trainings during the period July 2021 to June 2022, which are the following:</p> <ul style="list-style-type: none"> <li>- 20-21 Sep 21: Training course on energy management system in SMEs - online (Total of 40 participants with 30% of female, 12 females and 28 males)</li> <li>- 23-24 Sep 21: Training course on energy management system in SMEs - online (Total of 55</li> </ul>

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date
				<p>participants with 33% female, 18 females and 37 males)</p> <ul style="list-style-type: none"> <li>- 13-15 Dec 21: Intensive course on eco-industrial town planning – Bangkok (Total of 61 participants with 43% female, 26 females and 35 males)</li> <li>- 17 Dec 21: Business model canvas workshop – Bangkok (Total of 48 participants with 71% female, 34 females and 14 males)</li> <li>- 11-12 Apr 22: Training course on action plan for eco-industrial town development – Online (Total of 33 participants with 52% female, 17 females and 16 males)</li> <li>- 13-14 Jun 22: Training course on RECP implementation – online (Total of 85 participants with 53% female, 45 females and 40 males)</li> <li>- 23-24 Jun 22: Training course on RECP implementation – Samutprakarn (Total of 60 participants with 50% female, 30 females and 30 males)</li> </ul> <p>In total, there were 382 participants 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 48% female participants).</p> <p>Additional capacity building program:</p> <p>The PMU has organized one international webinar on carbon capture and utilization.</p> <ul style="list-style-type: none"> <li>- 22 Jun 22: Webinar on carbon capture and utilization (Total of 88 participants - 27 females, 30 males and 31 not specified).</li> </ul>



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 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.</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>1 demonstration project for waste management and waste-to-energy</p> <p>1 demonstration project for e-waste management and its dismantling and recycling plant</p>	<p><u>RECP Assessment</u> The result of 1<sup>st</sup> batch of RECP assessment:</p> <ul style="list-style-type: none"> <li>- FTI's consultants have worked with 45 factories via online meetings to collect data (any external visitor wasn't allowed to visit the plant during COVID-19 pandemic).</li> <li>- FTI submitted the assessment report of 145 factories.</li> </ul> <p>FTI's consultants are working with another 21 factories for the 2<sup>nd</sup> batch of RECP assessment.</p> <p><u>Feasibility Study</u> FTI's consultants are working with 9 factories to carry out the technical and financial feasibility study to implement 39 resource efficiency measures such as solar rooftop, recycle of zinc and aluminium scrap, changing to less toxic chemical (green chemistry), water recycle and biogas production.</p> <p><u>Working with the project partners in private sectors:</u></p> <ul style="list-style-type: none"> <li>- PTT, PTT LNG and PTT Global Chemical (GC) have re-set up the working teams to collaborate with KU team due to the changing of team members.</li> <li>- Several meetings have been carried out between the working teams and KU team.</li> <li>- KU team has analyzed data, which were collected by the company's team. The preliminary identification of hot spot areas with high potential of GHG reduction has been carried out.</li> <li>- The Sahapathana Interholding company has installed the floating solar system to produce the electricity with the partial support from the project (technical support). For the next phase, the project will provide the technical support to study the smart grid system, which will improve the energy efficiency of the Sahapathana Industrial Park managed by the Sahapathana Interholding.</li> </ul>

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	The study of national eco-industrial development framework is in progress. The literature and document review were carried out. The 1 <sup>st</sup> round of stakeholder meeting was carried out in February 2022. 5 sessions (both onsite and online meetings) were organized with a total of 257 participants (140 female and 117 male). One stakeholder meeting focusing on technical issue <del>technical hearing</del> of the supporting system was organized in Jun 2022 with a total of 98 participants (54 female and 44 male). The alternatives of national framework have been drafted. They would be ready for the 2 <sup>nd</sup> round of stakeholder meeting in July 2022.
Outcome B: Project achieves objective on time through effective monitoring and evaluation	Existence of project management structure  Timely availability of reports.	UNIDO and GEF monitoring and evaluation procedures are new for some of the project staffs and project partners.	Monitoring and evaluation activities implemented and project implementation monitored and evaluated to achieve project objectives.	The project team has kept records of project activities implemented. The official meetings with project partners have been organized time to time via online meeting platforms to ensure the smooth operation of project activities.  The communication and coordination between the project team and the focal points of project partners has been carried out regularly.  The Mid Term Review is scheduled in the Q4 of 2022.

### 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.

*Describe in tabular form the risks observed and priority mitigation activities undertaken during the reporting period in line with the project document. Note that risks, risk level and mitigations measures should be consistent with the ones identified in the CEO Endorsement/Approval document. Please also consider the project's ability to adopt the adaptive management approach in remediating any of the risks that had been sub-optimally rated (H, S) in the previous reporting cycle.*

	(i) Risks at CEO stage	(i) Risk level FY 21	(i) Risk level FY 22	(i) Mitigation measures	(ii) Progress to-date	New defined risk <sup>6</sup>
1.1	Lack of awareness on technical opportunities for adopting environmentally sound technologies	Low - medium	Low - medium	Encourage a participatory approach and provide adequate information and training on planning and implementation of clean and low carbon technologies.  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.	The project leaflet was disseminated during seminars and training. The project website providing project news and information is now available.  The online learning platform with three courses and one webinar record is available for public.  The project has adopted the use of online meeting platform for seminar and training during the COVID-19 pandemic. Due to many waves of COVID-19 pandemic, project has switched between the in-person seminar/training and online seminar/training based on the pandemic situation.	<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	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. Training needs will be assessed, and pre-and post-training analysis will be undertaken.	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.  The project has adopted the use of online meeting platform for seminar and training during the COVID-19 pandemic, the project has switched between the in-person seminar/training and online seminar/training based on the pandemic situation. The number of participants may not be different; however, it is more difficult to observe the level of interest and participation.	<input type="checkbox"/>
1.3	Low participation and interest from the communities, school and the public in the awareness raising program.	Medium	Medium	Awareness raising activities will be carefully designed by considering 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.	The project is working closely with the project partners to prepare the 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.	<input type="checkbox"/>
1.4	Reluctance of industries to change towards climate resilient	Low - medium	Low - medium	Awareness raising and capacity building initiatives will reinforce the environmental and socio-economic advantages of eco-industrial towns	The project is working closely with DIW, IEAT and FTI as well as other project partners to encourage the	<input type="checkbox"/>

<sup>6</sup> New risk added in reporting period. Check only if applicable.

	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.			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 incentive for companies to participate in the project.	private sectors to be participate in the project's activities.  The project is working with some factories that are willing to conduct the feasibility study for some RECP projects proposed in the assessment report. The presentation and other supports to the factory's team is available upon request.  However, the uncertainty and ambiguity caused by the COVID-19 situation has slowed down the investment.	
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	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 incentive for companies to participate in the project.	Due to COVID-19 awareness programs and training courses are provided by the project. In close consultation with the project partners, the project team is looking for innovative approaches to raise awareness of the relevant stakeholders. The learner-centered approach is used to design the training courses that are mixed between the presentation, individual exercises, and group exercises. The aim is to enhance skills improvement.  The project has identified the industries' training needs regarding the GHG reduction and brought in the international experts to support the capacity building activities and technology transfer for example the arrangement of carbon capture and utilization webinar.	<input type="checkbox"/>
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.	To support the project, PSC has assigned two Technical Working Groups, one for RECP and one for POPs management. The Deputy Director General of DIW and PCD are appointed as the chairpersons of each group to provide advice and ensure that the proposed measures aligned with government policy.  The stakeholder meetings, which include the local authorities, communities, industries, waste transporters, and recycle facilities have been carried out. The creative approaches such as the competition of business model for products made from industrial wastes have been used to mobilize the industry-urban symbiosis.	<input type="checkbox"/>

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.	DIW, the lead project partner, is working on the PSC establishment order.  To support the project, PSC has assigned two Technical Working Groups, one for RECP and one for POPs management.. The Deputy Director General of DIW and PCD are appointed as the chairpersons of each group to provide advice and ensure that the proposed measures aligned with government policy. The stakeholder meeting is incorporated as one of the essential activities for all policy and plan studies.	<input type="checkbox"/>
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	Medium	Low	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.	Currently, there is no crucial issue on the political stability. Thailand is preparing for the next nation-wide election in 2023.	<input type="checkbox"/>
6.1	Natural disasters in the form of prolonged droughts and severe floods may interrupt the project's progress.	Low - medium	Low	Sensitivity to climate risks will be taken into account when selecting the industrial estates/ 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.	During FY 2022, there is no crucial issue on the natural disasters.	<input type="checkbox"/>

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.

*Thai Government has strictly executed various measures during the outbreak of COVID-19 since the beginning of the outbreak in early of 2020. The Government could control the low number of infections until March 2021, when the number of infections dramatically increased. Since March 2021, most of the factories*

*in Thailand are strictly prohibiting access to external visitors. Moreover, most of the factories have slowed down their investment due to the uncertainty of the outbreak duration and negative economic impacts.*

*The on-site visits in factories to collect data on RECP assessment could not be done in 2021 and mid-2022 (until to May 2022). Therefore, the data collection relied on factory's team inputs, which caused delays and limitation in identifying resource efficiency measures. The technical support to the private sector partners (PTT, PTTLNG, PTTGC and Sahapathana) was also delayed due to the same reason (access and data collection).*

*Although the COVID-19 situation seems to improve in Thailand, the project implementation is still not back to the business-as-usual scenario due to the uncertainty of the next wave of pandemic and its preventive measures executed by the industry.*

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

*MTR will be carried out in Q4 2022, main findings will suggest if a project extension should be requested.*

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

*NA*

*MTR will be carried out in the Q4 of 2022.*

#### 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).

*Notes on new risks:*

- If new risks have been identified during implementation due to changes in, i.e. project design or context, these should also be listed in (ii) below.*
- If these new/additional risks are related to Operational Safeguards #2, 3, 5, 6, or 8, please consult with UNIDO GEF Coordination to discuss next steps.*
- Please refer to the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) on how to report on E&S issues.*

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	Not applicable for FY 2022 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 2022 because the activities have not started yet
	Ensure the use of PPE (personal protection equipment) for protection against noise exposure	Mandatory ear protection	Not applicable for FY 2022 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 2022 because the activities have not started yet
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.	Not applicable for FY 2022 because the activities have not started yet.
Construction site for large scale installation of equipment and/or machine to improve resource efficiency and/or to support industry symbiosis (if required)			
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 2022 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 2022 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 2022 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 2022 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	Not applicable for FY 2022 because the activities have not started yet

		used if needed	
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 2022 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 2022 because the activities have not started yet
	Ensure the use of PPE for protection against noise exposure	Mandatory ear protection	Not applicable for FY 2022 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 2022 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 2022 because the activities have not started yet.
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 2022 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 2022 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 2022 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 2022 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 2022 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 2022 because the activities have not started yet.
	Ensure the use of PPE for protection against noise exposure	Mandatory ear protection	Not applicable for FY 2022 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

- *Technical Working Group (Eco-industrial development) meetings on 6 Oct 21 and 21 Apr 22.*
- *Technical Working Group (POPs management) meeting on 10 May 22.*
- *Study of policy and plan recommendation to support RECP implementation and promotion under eco-industrial development concept: The 1<sup>st</sup> round of stakeholder meeting was carried out in November and December 2021. Totally, there were 17 sessions for both onsite and online meetings with 623 participants (314 female and 309 male).*
- *Upgrading the Circular Material Hub (CMH): The 1<sup>st</sup> round of stakeholder meeting has been carried out and 4 meetings in May 2022 with a total of 151 participants (83 female and 68 male).*
- *Study of national eco-industrial development framework: The 1<sup>st</sup> round of stakeholder meeting was carried out in February 2022. Totally, there were 5 sessions for both onsite and online meetings with 257 participants (140 female and 117 male).*

### Challenges

- *The COVID-19 pandemic has been critical in FY2022 with the dramatically increasing of infected cases in Thailand. The restriction of in-person meeting and site visit has been regulated almost the full period of FY2022.*

### Outcomes

- *The flexibility of meeting/seminar/training arrangements have been adopted. The project evaluated the situation of COVID-19 pandemic and then selected either in-person meeting/seminar/training or online meeting/seminar/training to adhere to Thai government guidelines and keep the infection risk low. For the stakeholder meeting, the hybrid setting of using both in-person and online meeting is used to balance between stakeholders' engagement and health risk. The online brainstorming tools such as mentimeter and break out room have been implemented to enhance the stakeholder's engagement.*

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.).

- *Request to allow more flexible modes of meeting/seminar/training.*

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

### Annexes to PIR (separate sheets):

- (1) Technical working group (TWG) meeting agenda*
- (2) Meeting minutes TWG meetings*
- (3) Stakeholder meeting agenda*
- (4) Summary of stakeholder meetings*
- (5) Learning platform, training course and webinar*

## 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),.

*The gender equality and sensitivity has been integrated in the planning and implementation of project activities. The following measures and actions have been taken.*

- The gender expert recruited by the project worked closely with the consultants of each study to monitor the participation of female and underrepresented stakeholders. The expert provided suggestion to questionnaires and list of questions used during the stakeholder meeting to ensure that the gender equality and sensitivity issues have been considered.*
- The gender issue has been raised and communicate with the stakeholder as one session of the seminar and training, the expert is responsible to monitor the implementation of recommendations made.*
- The sex disaggregated data has been collected in all events and are duly reported*
- The expected average % of female participants for seminar and training is 30%. Currently, there are 66% and 48% and 61% of female participants for awareness activity and training, respectively.*

## 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 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. Three courses and one webinar record are available on the platform.*

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

- Project leaflet*
- Project's website: <https://industry-urban-symbiosis-project.com>*
- Project's online learning platform: <https://learning.industry-urban-symbiosis-project.com>*

*All attachments are to be named as per the GEF required format, i.e.: "GEFID\_Document Title", e.g. 9714\_Flyer.*

## 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

- Study of policy and plan recommendation to support RECP implementation and promotion under eco-industrial development concept: The 1<sup>st</sup> round of stakeholder meeting was carried out in November and December 2021. The draft policy and plan recommendation to support RECP implementation and promotion under eco-industrial development concept is ready for the 2<sup>nd</sup> round of stakeholder meeting.
- The TWG on POPs management has cleared two ToRs on survey and registration of SE-grade EPS containing HBCE” and “survey and registration of firefighting foam containing PFOS, PFOA and PFHxS”. These ToRs are in the bidding process and will be finalized in August-September 2022.
- MFA report to identify the potential cases of industrial symbiosis and industry-urban symbiosis was submitted.
- Upgrading the Circular Material Hub (CMH): The 1<sup>st</sup> round of stakeholder meeting has been carried out 4 meetings in May 2022.
- The online learning platform is available for access with three training courses and one webinar record.
- The 1<sup>st</sup> training course, fundamental of RECP assessment, was submitted to the project and used for the 2-day training.
- The 1<sup>st</sup> academic course on cleaner technology has been developed and tested with the small class of master's degree students (Chemical Engineering Faculty).
- The 2<sup>nd</sup> training course, GHG and low carbon technology, is under development.
- The 2<sup>nd</sup> academic course, carbon footprint, is under development.
- Six awareness seminars and workshops were carried out with 306 participants (203 female and 103 male) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers, communities, and other relevant stakeholders.
- Seven trainings were carried out with 382 participants (182 female and 200 male) from factories, industrial zone/estates and government agencies, consultants, suppliers and service providers, and other relevant stakeholders.
- One international webinar on carbon capture and utilization was carried out with 88 participants (27 female, 30 male, and 31 not specify).
- The 1<sup>st</sup> batch of RECP assessment (45 factories) has been completed. There are 21 factories applied for the 2<sup>nd</sup> batch of RECP assessment.
- There are nine factories working on the feasibility study of 39 resource efficiency measures.
- Technical support to PTT, PTTLNG and GC: The preliminary identification of hot spot area with high potential of GHG reduction has been carried out.
- Technical support to Sahapathana Interholding: The floating solar system to produce the electricity was installed with the partial support from the project (technical support).
- Study of national eco-industrial development framework: The 1<sup>st</sup> round of stakeholder meeting was carried out in February 2022.

### Challenges

- The COVID-19 pandemic has been critical in FY2022 with the dramatically increasing of infected cases in Thailand. The restriction of in-person meetings and site visits has been regulated almost the full period of FY2022.
- The industries either postponed or slowed down their investments due to negative economic impacts due to the long period of COVID-19 pandemic.
- The national inventory of new industrial POPs confirmed that most of the targeted POPs under this project is in the use-phase and distributed across Thailand. The hot spot has not been identified, which affect the approach to manage the new industrial POPs.

### Outcomes

- The flexibility of meeting/seminar/training/assessment arrangement has been adopted. Some of the awareness, training, meeting, and assessment activities were switched to online mode. The project is fully aware of the disadvantage of the online meeting tools such as low engagement level. The additional

*tools and event design have been used to enhance the stakeholder's participation during the online mode of meeting/seminar/training/assessment activity.*

- *Based on the consultation with the project partners and decision of TWG, the area-based activities have been replaced by the chemical-based activities for new industrial POPs management.*

**2. Please briefly elaborate on any **minor amendments**<sup>7</sup> to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).**

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	
<input type="checkbox"/>	Components and Cost	
<input type="checkbox"/>	Institutional and Implementation Arrangements	
<input type="checkbox"/>	Financial Management	
<input type="checkbox"/>	Implementation Schedule	
<input type="checkbox"/>	Executing Entity	
<input type="checkbox"/>	Executing Entity Category	
<input type="checkbox"/>	Minor Project Objective Change	
<input type="checkbox"/>	Safeguards	
<input type="checkbox"/>	Risk Analysis	
<input type="checkbox"/>	Increase of GEF Project Financing Up to 5%	
<input type="checkbox"/>	Co-Financing	
<input checked="" type="checkbox"/>	Location of Project Activities	<i>The implementation of new industrial POPs management has been nation-wide expanded because most of the new industrial POPs are in the products, which are in the use-phase not the production phase. The usage of the products containing new industrial POPs is not limited to three selected provinces.</i>
<input checked="" type="checkbox"/>	Others	<i>The Project Steering Committee (PSC) has decided to adjust the project activities to suit the updated baseline of new industrial POPs. The TWG assigned by the PSC has decided to adjust the activity from area-based activities in three selected provinces to the chemical-based activities, which suited the fact of new industrial POPs usage across Thailand. Therefore, the action plan to manage new industrial POPs in three provinces will be the action plan to manage new industrial POPs in Thailand. The inventory of new industrial POPs in three selected provinces will be adjusted to the survey to confirm the amount and distribution of products containing new industrial POPs in Thailand.</i>

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

*Please provide a description of the main expenditures during the reporting period. Describe the current status of funds mobilization activities and the related implications for project implementation. Provide information*

<sup>7</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%.

## IX. Work Plan and Budget

1. Please provide an updated project work plan and budget for the remaining duration of the project, as per

		Funds available	Expenditures
		USD	USD
Component 1	Policy development	213,200	137,400
Component 2	Inventory of new POPs and intervention plan developed	-96,000	0
Component 2	Opportunities for industry-urban symbiosis elaborated	-15,708	220,798
Component 2	Increased capacity and awareness on risks of new POPs and the benefits	428,952	1,119,064
Component 3	Industry-urban symbiosis implemented through the demonstration of low carbon and green chemistry systems	574,14	811,018
Component 4	Development of National Eco-Industrial Town Framework	281,477	250,293
Component 5	Project Management	53,809	361,499
Component 5	Evaluation	65,158.00	1,571

last approved project extension. Please expand/modify the table as needed.

Expected Outcome/Output/Activity	2020				2021				2022				2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome A:</b> 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																				
<b>Component 1: Policy development</b>																				
<i>Output 1.1 Necessary legislative and policy measures on industry-urban symbiosis principles, management of new POPs and market-based instruments enhanced</i>																				
Activity 1.1.1 Review current legal, regulatory, policy and institutional frameworks on waste- and chemical management of new POPs including their BAT/BEP and industry-urban symbiosis mechanisms							RECP								POPs					
Activity 1.1.2 Identify needed policy reforms, potential tools and system required to ensure large-scale implementation of RECP, green chemistry and industry-urban symbiosis																				
Activity 1.1.3 Develop and submit a draft policy to the legislative authority for formal appraisal based on the need to manage new POPs and to promote and implement industry-urban symbiosis within the existing eco-industrial town development strategy of the Ministry of Industry																				
Activity 1.1.4 Support the development of other related policies in order to channelize the collection and recycling of POPs containing end-of-life products																				
Activity 1.1.5 Assess existing MBIs and if needed develop and introduce the most appropriate incentives to support the implementation of RECP, green chemistry, POPs management including its contaminated wastes, and industry-urban symbiosis																				

Expected Outcome/Output/Activity	2020				2021				2022				2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Component 2: National capacity building and awareness raising on industry-urban symbiosis and POPs</b>																				
<i>Output 2.1 Inventory of new POPs and intervention plan developed for the three selected provinces</i>																				
Activity 2.1.1 Conduct training sessions on new POPs analysis especially sampling, transport and storage of samples and inventory methods for the inventory of new POPs using material/substance flow analysis of new POPs <del>at the provincial level for the three selected provinces</del>													HBCD PFOS	decaBDE SCCP						
Activity 2.1.2 Draft an inventory report for new POPs in use and in waste streams <del>in the three selected provinces</del>													HBCD PFOS	HBCD PFOS	decaBDE SCCP	decaBDE SCCP				
Activity 2.1.3 a material/substance flow analysis (MFA/SFA) on new POPs including the e-waste, will be carried out in <del>the three targeted provinces</del> Thailand.													HBCD PFOS	HBCD PFOS	decaBDE SCCP	decaBDE SCCP				
Activity 2.1.4 Under the consultation with the project partners and the responsible agencies including the local authorities, draft the intervention plan <del>at provincial level to implement in the three selected provinces</del> Thailand.																				
Activity 2.1.5 Identify the monitoring points and monitoring new POPs for tracking the new POPs contamination in environment and update the database annually to assess the impacts of intervention plan																				
<i>Output 2.2 Opportunities for industry-urban symbiosis elaborated through material and waste stream analysis</i>																				
Activity 2.2.1 Collect field information and build the material flow model to highlight material paths for energy, industrial wastes and municipal wastes																				
Activity 2.2.2 Develop material flow and waste databases at industrial estate/park level using collected data to encourage entrepreneurship and information exchanges																				
Activity 2.2.3 Based on the MFA and specific needs of each area and with stakeholder consultation and consideration of past experience and lessons learned in each area, develop business models for various types of industry-urban symbiosis including material, social and economic symbiosis																				



Expected Outcome/Output/Activity	2020				2021				2022				2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>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</i>																				
Activity 2.3.1 Organize seminars and workshops on the principles and benefits of RECP, low carbon technologies, industry-urban symbiosis and wastes management as well as on the risks of new POPs to human health and the environment																				
Activity 2.3.2 Disseminate the project information, lessons learned and best practices from component 3 through seminars, workshops, publications and outreach/educational materials																				
Activity 2.3.3 Develop various awareness programs on the topics to suitably use in universities, technical colleges and schools																				
Activity 2.3.4 Review the current activities and infrastructure of project partners, relevant agencies and institutions																				
Activity 2.3.5 Design training programs and adapt academic curricula on the challenges faced in implementing RECP, low carbon technologies, green chemistry, BAT/BEP of new POPs and industry-urban symbiosis in Thailand																				
Activity 2.3.6 Train technical staff and experts from partner institutes, the respective industrial zones, beneficiary industries, consultants, suppliers and service providers																				
Activity 2.3.7 Review the existing online learning and information sharing practice at the international and national level																				
Activity 2.3.8 Develop the online learning and information sharing platform for the project																				



Expected Outcome/Output/Activity	2020				2021				2022				2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Component 3: Pilot demonstration of cleaner production, new POPs management and industry-urban symbiosis</b>																				
<i>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</i>																				
Activity 3.1.1 Conduct RECP assessments in 200 facilities and when appropriate introduce low carbon technologies, green chemistry application, energy management system and system optimization measures																				
Activity 3.1.2 Demonstrate industrial symbiosis between companies and establish partnerships between industries and urban areas																				
<b>Component 4: Development of National Eco-Industrial Town Framework and its supporting system</b>																				
<i>Output 4.1 Continuous improvement and sustaining the industry-urban symbiosis</i>																				
Activity 4.1.1 Review the relevant Thai Eco-industrial standard and criteria as well as the international criteria																				
Activity 4.1.2 Develop a national eco-industrial town framework and its supporting system																				
Activity 4.1.3 Promote and implement the national eco-industrial town framework and its supporting system																				
<b>Outcome B: Project achieves objective on time through effective monitoring and evaluation</b>																				
<b>Component 5: Monitoring and evaluation</b>																				
<i>Output 5.1 Periodic monitoring and evaluation of project implementation completed</i>																				
Set up a Project Steering Committee																				
Prepare the detailed annual monitoring and evaluation plan																				
Organize PSC meeting																				
Organize inception workshop (postponed due to COVID)																				
Prepare and submit PIR																				
Prepare and submit annual report																				
Midterm evaluation																				
Final evaluation																				

## X. Synergies

1. **Synergies** achieved:

*Not applicable for FY 2022*

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

*Not applicable for FY 2022*

## EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2021 – 30 June 2022.
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 is <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.