1. SUMMARY INFORMATION

| Implementing Country/Technical Partner: | Kingdom of Thailand |
| Reporting Period:                     | From 10/01/2018 to 09/30/2019 |
| Report Date:                          | 09/30/2019 |
| Implementing Agency:                  | Thailand Greenhouse Gas Management Organization (Public Organization) |
| Contact Person:                      | Dr. Puttipar Rotkittikhun  
                                          Dr. Muanjit Chamsilpa |

| Grant Executed By:                    | Kingdom of Thailand |
| Grant Effectiveness and Closing Dates:| 02/16/2016 - 12/31/2019 |
| Grant Amount (USD):                   | USD 3,000,000 |
| Funding Mobilized (USD):              | USD 3,681,484 |
| Funding Committed (USD):              | USD 2,935,075 |

2. OVERVIEW

Objective
The Project Development Objective (PDO) is to provide selected technical and analytical support to Thailand that informs policy decisions to develop readiness of market-based instruments to reduce greenhouse gas (GHG) emissions in Thailand.

The Thailand MRP’s objectives are to design and initially implement a domestic market mechanism to reduce energy consumption and GHG emissions in energy sector with a view to transform to Emission Trading Scheme (ETS) in the future. In this phase, it will be focused on preparation for a demonstration of the Energy Performance Certificate Scheme (EPC), including supporting infrastructure such as database and MRV system and a study on legal framework for the ETS. Another objective is to promote and support municipalities and local communities to implement GHG mitigation actions while achieving sustainable development and low carbon society goals through domestic market mechanism named Low Carbon City Program (LCC).

Indicators
PDO level results indicators are as follows:
  i) Submission of the core EPC readiness components (target setting methodology and MRV system) for the policy consideration of DEDE (The Department of Alternative Energy Development and Efficiency, Ministry of Energy).
  ii) Local GHG Abatement Plans for 24 cities submitted to city management to inform city’s priority abatement projects.
iii) Submission of the policy recommendation on legal framework to establish the ETS for TGO Board’s consideration.

The project comprises of four components:

**Component 1** Preparation of key market components of Energy Performance Certificate scheme (EPC);

**Component 2** Development of Local Greenhouse Gas Abatement Plans and a study on pricing mechanism for Low Carbon City program (LCC);

**Component 3** Policy recommendation on legal framework to establish the Emission Trading Scheme (ETS);

**Component 4** Project Management.

Component 1, 2 and 3 will each support a different domestic carbon market scheme which will together contribute to the overall future domestic carbon market development in Thailand.

For the progress made towards the PDO, firstly, the four project officers, as a support team for the Project Management Unit (PMU), have been on board. The three individual consultants, CS-1 Technical Officer for EPC, CS-2 Technical Officer for LCC, and CS-3 Assistant Technical Officer/Procurement, deal with the works, including execute procurement processes, visit sites of participating factories and municipalities, coordinate with the key stakeholders, prepare periodic reports on progress of implementation, follow up/monitor the operation in progress of the consultants, prepare Working Group meetings and PMU meetings, and consolidate all key deliveries of the three components for disseminations. Furthermore, in June 2019, TGO received approval from TTL to extend the contracts of CS-1, CS-2 and CS-3 from October, 2019 to December, 2019. CS-4 Financial officer is responsible for the overall project financial management aspects.

Secondly, for the firm consultancy services, the activities under the Component 1: CS-16 Development of Mobile Application on GHG emissions in Buildings was completed in March, 2019, CS-14 Study on Pricing Mechanism for EPC’s surplus allowances and LCC-TVER credits, Development of EPC’s Sink Fund and Incentives for LCC Program, and CS-6 A legal study to support the readiness preparation for the Energy Performance Certificate (EPC) scheme in Thailand, were completed in June, 2019, and the last ToR: CS-10, Target setting for EPC scheme, was completed at mid of July, 2019. For the Component 2 activities, CS-15 Development of Mobile Application on City Carbon Footprint (CCF) was completed in June, 2019, and the 3 ToRs of Study on GHG emission and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 25 municipalities including Develop GHG abatement plan guideline and Environmental and Social Management Framework (ESMF) were completed in July, 2019. The Component 3, Policy recommendation on legal framework to establish the ETS, was completed in March, 2019. In conclusion, all consulting services activities of the Thailand PMR were completed with the key deliverables as stated in the ToRs.

Thirdly, meetings with the project key stakeholders were organized periodically to inform the progress of the works and to seek for suggestions including;

1) **The PMU meetings** – 4 times in December, 2018, March, July and September 2019 to present overall progress of the project and consider the work plan and budget plan;

2) **The EPC Working Group** – 4 times in November, 2018, January, March, and May 2019 to consider progress of the works under the component 1, EPC scheme;

3) **The LCC Working Group** – 3 times in November, 2018, January, and April 2019 to consider progress of the works under the component 2, LCC program;

4) **The Carbon Market Subcommittee** – 3 times in January, June, and September, 2019 to present overall progress of the project;

5) **The Legal Framework Working Group** – 6 times in November, 2018, January, March, July, August and September, 2019 to present progress of the legal framework studies;
6) The Meetings with Designated Factories and Buildings (DF&Bs) under the EPC scheme – 16 times to present the analytical results of the studies on Legal Frameworks of ETS and EPC, energy targets setting for DF&Bs, Thailand EPC Roadmap, pricing of energy saving surplus and incentive for the EPC.

7) The Meetings with the 25 participating municipalities under the LCC program – at least 25 times of consultation meetings were organized to finalise the GHG Abatement Plan of each municipality.

Finally, during October, 2018 – September, 2019, there were seminars and trainings/workshops organized under the PMR support, such as the Seminar on the Achievement of Thailand PMR on 01 August, 2019. Moreover, the World Bank team visited TGO on 14 March, 2019 to undertake the third Implementation Support Mission of the Thailand PMR. The objectives of the mission were to: (i) update project implementation status and discuss related procurement issues; (ii) coordinate PMR activities with other related ongoing donor support activities; (iii) meet jointly with the Department of Alternative Energy Development and Efficiency to discuss the latest developments with regards to implementation of energy conservation measures for designated factories and buildings and ensure coordination with EPC activities; and (iv) discuss progress of environmental and social safeguard related activities. On 19 August 2019, the World Bank team visited TGO to monitor the project implementation and to carry out a brainstorming meeting with TGO team for the PMR’s Successor Program preparation.

3. IMPLEMENTATION REPORT BY COMPONENT

Differences between the Objectives/Activities in the Market Readiness Proposal and the Grant Agreement

Are there any important and material differences between the objectives/activities proposed in the Market Readiness Proposal and endorsed by the Partnership Assembly of the PMR and those agreed to in the Grant Agreement with the Delivery Partner and described in the Project’s Results Framework?

No

There are no substantive differences between the objectives/activities proposed in the Market Readiness Proposal endorsed by the PA of the PMR and those agreed to in the Grant Agreement with the World Bank as a Delivery Partner.

Implementation Progress by Component

A. Component 1: Preparation of key market components of Energy Performance Certificate (EPC) scheme

Status: Completed

This component focuses on planning for establishing the voluntary EPC scheme, which is planned to be a “voluntary target-and-reward scheme” targeting the DF&Bs of the intensive energy consumption sectors which in turn leading to intensive GHG emissions.

The PMR’s support for Component 1 focuses on 6 activities. The details are concluded as follows;
• **Activity 1: Reviewing and analyzing policies, laws, regulations and institutional arrangement required in order to implement the EPC**

This activity aims to deliver a proposed legal and institutional framework for the EPC scheme, through conducting a review of existing policies, institutional arrangements, and legal instruments in selected jurisdictions and assessing current legal and institutional frameworks in Thailand in order to identify whether there is a need for amendment or enactment of new legislation to support the establishment of the EPC scheme, and thereby propose the legal and institutional framework for the EPC scheme. The contract was signed in August, 2018 and the final report was submitted in June, 2019 with the results of:

1. **Review existing policies, institutional arrangements, and laws** in selected countries relating to the EPC or similar energy efficiency schemes, namely India, Republic of Korea, Japan and New South Wales, Australia.

2. **Assessment of existing, institutional arrangements, and provisions of present laws in Thailand** which can be of relevance to the EPC, in which the consultant focused on the Energy Conservation Promotion Act B.E. 2535 and the policies and measures in place by the Department of Alternative Energy Development and Efficiency (DEDE).

3. **Proposals of a legal and institutional framework for the EPC in Thailand**, in which the consultant suggested amendments to the Energy Conservation Promotion Act B.E. 2535 and related Royal Decrees and proposed an enactment of a new Ministerial Regulation in order to specify necessary details for the implementation of the EPC.

• **Activity 2: Developing the MRV system for the EPC in Thailand**

This activity aims to develop MRV Guidelines and IT platform to support the EPC scheme implementation, including electronic data interchange between DEDE and TGO. This work started in December 2016. The consultant submitted final report to TGO in August 2018 with the key deliverables as follows:

1. **Development of data reporting format for EPC scheme**
   Data reporting templates for factories and buildings are in line with energy management report of DEDE. The data collection consists of three parts which are general information, Energy data and Greenhouse gas information (optional).

2. **Review existing MRV system**
   Similar MRV systems, such as DEDE, and PAT scheme, were reviewed and then suggestions for improvement, identification for additional data elements and requirement of procedures and system were proposed.

3. **MRV guidelines for supporting implementation of EPC Scheme**
   MRV guidelines for each targeted sectors were outlined to ensure that the measurement, reporting and verification process is reliable and applicable for the implementer.

4. **The electronic data interchange between DEDE and TGO**
   Methodologies and tools for data interchange between the DEDE’s annual energy report system and TGO’s system were proposed including
preservation of data confidentiality and security of data transmission over the network.

5. The electronic reporting platform
   The electronic platform was developed in form of a web based application to facilitate data reporting of the DF&Bs. The application software, application testing report and application handbook were delivered.

• Activity 3: Assessing the DF&Bs energy management system and updating Specific Energy Consumption (SEC) for 11 sectors

This ToR aims to analyze sector-specific energy usage pattern, potential improvement to reduce energy consumption, energy profile, GHG emissions and Specific Energy Consumption (SEC) at product(s) level by review energy data from DEDE database and by modelling from data collection of DF&Bs. Activity 3 was conducted since January 2017. The final report was submitted to TGO in August 2018 with the main results as follows:

1. Study and propose methodology for Specific Energy Consumption (SEC) analysis of the DF&Bs
   The review of methodologies for SEC development from national and international papers was conducted. There are 2 approaches proposed to study, 1) development of average SEC from DEDE database and 2) development of SEC equations from data collection of the DF&Bs.

2. Review and collect data of the DF&Bs from the energy databases of the DEDE
   Data from the Energy Management Report of DF&Bs submitted to DEDE were gathered for review and analysis. However, some technical parameters were not completed. Therefore, the questionnaires were sent to the DF&Bs for deeper analysis.

3. Grouping of the DF&Bs – 11 Sectors
   The target DF&Bs were classified based on Thailand Standard Industrial Classification (TSIC).

4. Analyze the energy data and SEC of the target DF&Bs
   Analytical energy data and SEC results of the DF&Bs 11 sectors were presented including uncertainty evaluation.

5. Analyze potential improvement to reduce energy consumption
   Potential of energy improvement/reduction of the products in each sector were analyzed by comparison between SEC results from this study with referenced SEC from Domestic and International data.

6. Develop SEC Benchmarks of the DF&Bs – 11 sectors
   The SEC benchmarks at product level of each sector were set up and compared to the International SEC benchmarks.

• Activity 4: Verifying energy data of participating DF&Bs and setting up the baseline

This activity aims to verify energy data of participating DF&Bs in order to establish baseline for EPC implementation, pilot test the MRV guidelines and EPC data.

1(i) Cement (ii) Ceramic (iii) Iron & Steel (iv) Petro-chemical (v) Paper (vi) Food & Beverage (vii) Thermal power plant (viii) Department store (iv) Office (x) Hotel and (xi) Hospital.
template and also to study on potential improvement to reduce energy consumption and GHG Emissions. Activity 4 was started January 2017. The final report was submitted in October, 2018, the results could be concluded as;

1. **Select the potential participating sectors**

The sectors for implementing data verification were selected based on the proposed criteria and discussion among DEDE, TGO and consultant. The criteria used for considering the eligible sector are as follows:

- Total energy consumption in each sector
- Average total energy consumption of participants in each sector
- Energy management report submission rate
- Amount of factory/building in each sector
- Specific Energy Consumption
- Average age of equipment
- The number of manufacturing process (only industrial sector)
- Benchmarking/Baseline/SEC study in the last 5 years

Two sectors of factories and two types of buildings were selected including ceramic (sanitary ware), frozen seafood, hospital and department store. There were 38 DF&Bs participating in the project (10 department stores, 14 hospitals, 4 ceramic sanitary ware factories and 10 frozen food factories). In accordance with the ToR, energy data and related parameter for baseline setting was gathered for analysis.

2. **Invite the DF&Bs to participate in the project**

All target participants were invited to participate, including signing the MOU, organizing consultation meetings with industrial associations and kick off meeting for project explanation.

3. **Check information required for the EPC scheme**

The data reporting template for EPC scheme developed from the Activity 2 were test with the participants and proposed recommendation for adjustments

4. **Audit and verify energy data of the participating DF&Bs**

All participants were supported budget for energy audit by accredited energy auditor and prepared audit reports for submission to DEDE.

5. **Analyze the collected data**

All data from verification and audit reports were analyzed including:

- Compare existing technology used in targeted sectors and the best available technology.
- Evaluate potential improvement to reduce energy consumption and GHG emission.
- Evaluate the cost effectiveness of the implementation of EE measures in participating sectors.

6. **Set up baselines**

Baseline energy consumption of each participant was set up and consultation meetings to finalize the suitable baseline were also organized. These baselines will be a part of target setting for Thailand EPC scheme in Activity 5.

7. **Improve data quality and MRV system**

From the test of MRV system, proposal of how to improve data quality and MRV system and to revise the EPC data template and MRV Guidelines was delivered to the consultant of Activity 2 for improvement.
Activity 5: Analyzing target setting methods for different industrial sectors and buildings

This activity aims to analyze energy target setting methods for different industrial sectors and commercial buildings and provide the most suitable methodology, collect all relevant data, and then set up of the target with the specific level and timeframe. The contract was signed in December 2017. The consultant submitted the final report in June, 2019 with the main results as follows:

1. Review of existing national and international energy policies related to the EPC scheme

The literature reviews of government policies and action plans on energy, energy efficiency measures, and related statistical databases of Thailand were conducted, including energy management schemes and energy target setting in other countries.

2. Study on energy target setting methodology

The energy saving target setting of the international schemes were studied and compared their pros. and cons. The 7 international schemes were consolidated, such as Carbon Reduction Commitment (CRC) of the UK, EU ETS, Top-1000 Energy Consuming Enterprises Program of China.

3. Review and collect data for setting up the energy target

The energy data of Thailand were reviewed and summarized from the 5 long-term energy plans of Thailand, such as Power Development Plan (PDP), Energy Efficiency Plan (EEP), and Alternative Energy Development Plan (AEDP). Three levels of separated data were proposed, (1) National Level (2) Sub-sector Level and (3) Specific Factory Level and there were three sets of energy efficiency indicators.

4. Setting up the energy target(s) under the EPC scheme

For Thailand EPC, setting up of energy saving target consists of 3 steps;
Step 1 Setting of energy saving target for DF&Bs in the country
Step 2 Setting of energy saving target for DF&Bs in the designated sectors
Step 3 Setting of energy saving target for every DF&Bs

5. Finalisation of the targets

SWOT analysis was carried out to determine the optimal targets for improving energy efficiency under the Thailand EPC scheme.

6. Development of Step-by-Step Practical Guidelines for the DF&Bs

The Guidelines for the 11 sectors were developed to initiate the EPC implementation in Thailand from pilot phase to completed implementation phase.

7. Development of Thailand EPC Roadmap

A roadmap for EPC implementation in Thailand was developed. Key deliverable of this process is a comprehensive analytical report in title “Roadmap for Implementation of Thailand Energy Performance Certificate Scheme (EPC)”. The time frame in roadmap is set based on current status of the schemes.
development. The first phase of the voluntary EPC for general DF&Bs (exclude thermal power plant) will be started in 2020 and finished in 2023.

- **Activity 6: Analyzing potential performance-based incentive and pricing mechanism for EPC**

This activity aims to propose the appropriate pricing guidelines for EPC’s energy saving units as well as to develop a proposal on establishment the EPC’s Sink Fund in Thailand. The activity was started since January 2018 and the final report was submitted in May 2019 with the main results as follows;

1. **Research literacy/review international experiences on existing sink funds and existing price structure of energy performance certificates scheme in other countries.**

   Five (5) international existing EPC Schemes and Four (4) international existing sink funds were reviewed. In addition, 5 (five) potential sources to support the establishment of the EPC’s Sink Fund were also reviewed, i.e. Global Environment Facility (GEF), Green Climate Fund (GCF) and Adaptation Fund (AF).

2. **Study institutional and legal framework of existing energy and environmental funds in Thailand.**

   Four (4) institutional and legal framework of existing energy and environmental funds in Thailand were reviewed, including (1) Environmental Fund (2) Energy Conservation and Promotion Fund (Encon Fund) (3) Oil Fund and (4) Power Development Fund.

3. **Propose appropriate pricing guidelines for Energy Performance Certificate (EPC) in Thailand.**

   To obtain the appropriate pricing model for EPC’s Energy Saving Certificate, the following tasks were conducted:

   a) Review options for pricing EPC’s Energy Saving Certificate and estimate appropriate price of EPC’s Energy Saving Certificate.

   b) Study on incentives and penalties of existing energy performance certificate schemes in other countries in order to identify the existing options for Thailand’s EPC scheme.

   c) Propose an appropriate pricing model to incentivize EPC’s participants, i.e. Evaluation of sizes of EPC’s sink fund according to the options for incentivizing EPC’s participants identified in the earlier part, and Establishment of recommendation on an appropriate pricing model by assessing impacts on attractiveness of EPC’s participants and effectiveness of the sink fund.

4. **Propose policy recommendations on establishment of EPC Sink Fund in Thai context and draft a proposal to request for supporting the establishment of EPC sink fund.**

   Based on the result of the study, it is found that the most promising source of fund for the establishment of EPC sink fund for the first phase is the Encon Fund. However, the implementation of the EPC program for the first phase should be launched as a target-and-reward program since the trading is still too complicated for project participants and for Thai context. It is challenging to deal with the
reimbursement of budget from the Encon Fund. Therefore, to incentivize participants to achieve energy saving target for the establishment of the EPC Sink Fund, it is recommended the government should provide a performance subsidy to all energy savings over the baseline when participants can achieve their targets. The targets can be achieved by either implementing EE measures themselves or buying energy saving units from the sink fund at the rate higher than subsidy.

Moreover, the draft proposal for establishing EPC’s Sink Fund to the ENCON Fund was developed covering 5 key elements:

- Development of the EPC scheme and transition to Emission Trading Scheme (ETS) including establishment, strategies and fund mobilization for EPC’s Sink Fund,
- Institutional framework of EPC and EPC’s Sink Fund,
- Guidelines for the Management of the Demonstration Project on EPC scheme,
- Risks and critical success factors of the EPC’s Sink Fund, and
- Guidelines for requesting funds to establish EPC’s Sink Fund.

- Additional ToR- Development of Mobile application on GHG emissions in buildings.

The contract was signed in November, 2018. The final report and the application were submitted to TGO in March 2019 with the results as follows;

1. Review data for SEC and GHG emissions analyses of the 6 Building types.
2. Develop back office and front office of the mobile application and dissemination.

Comments:

TGO consulted and proposed the study results of the EPC scheme development to DEDE and they were agreed in its principle. DEDE will also submit funding proposal to the Energy Conservation and Promotion Fund (ENCON Fund) of the Ministry of Energy to request for supporting of the pilot EPC implementation in Thailand. It is expected to start the EPC pilot phase in 2020.

Regarding reward of the EPC from the ENCON fund, the results from activity 6 show that there are options to provide performance subsidy to all energy savings over the baseline when participants can achieve their targets while targets can be achieved by either implementing EE measures themselves or buying energy saving units from the fund at the rate higher than subsidy is selected. However, it is found that trading is too complicated for project participants at this stage as well as difficult in reimbursement of budget from the ENCON Fund. The fund will reward the participants in 3 cases as follows;

- For participants achieve targets, 3,800 THB/toe will be provided.
- For participants who cannot achieve targets, 3,000 THB/toe will be provided.
- For participants who achieve over targets, 4,500 THB/toe will be provided.

However, for effective implementing, it is necessary to study more in-depth in specific data of participating DF&Bs, i.e. identification of energy saving target
for each participant and each sector which needs more specific data on their potential, investment plans and budgets, procurement and installation plans and etc.

B. Component 2: Development of Local Greenhouse Gas Abatement Plans and a study on pricing mechanism for Low Carbon City (LCC) program

**Status:**

Completed

LCC program aims to support municipalities and communities to shift towards a low carbon society by implementing GHG emission reduction activities. The projects developed by municipalities may apply the Thailand Voluntary Emission Reduction Program (T-VER) for certifying and issuing carbon credits. The T-VER program is a project-based mechanism.

This component focuses on activities including study on GHG emission, identifies potential GHG emission reduction, and develops local GHG abatement plans and guidelines for municipalities. It shall also study on the pricing mechanism for LCC-TVERs (Thailand Voluntary Emission Reduction Program credits generated under LCC program) and incentive options for LCC-TVERs buyers respectively.

The LCC program consists of four main activities for the preparation and operation phases including:

**Activity 1** Study on GHG emission and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 1);

**Activity 2** Study on GHG emission and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 2);

**Activity 3** Study on GHG emission and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 3). Develop GHG abatement plan guideline that include Environmental and Social Management Framework (ESMF)

**Activity 4** Study on pricing mechanism for LCC-TVERs and incentive options for LCC-TVERs buyer.

The contract of Activity 3 was signed in April 2017 and the final report was submitted in March, 2019, while those of Activities 1 and 2 were signed in July 2017 and the final reports were submitted in January, 2019. Outputs of each Activity are concluded as follows;

**Activity 1:** Study on GHG emissions and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 1); City Carbon Footprint (CCF) for 8 municipalities (Nonthaburi, Khukhot, Si Sa Ket, Buriram, UbonRatchathani, Lamphun, Yasothon, and MahaSarakham) were conducted including identification of the major of greenhouse gas emission activities within local context, estimation the emission amount of those activities and prediction the emission trend of Business as Usual (BAU), potential GHG emission reduction of each participating municipality or local community through consultation with
local stakeholders. The potential abatement activities were suggested and screened for environmental and social benefits and impacts per guidance developed in the ESMF. The consultation meetings on GHG abatement plan were organized for each municipality to finalise the suitable plans that have high potential to implement in the near future.

**Activity 2: Study on GHG emissions and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 2)**

City Carbon Footprint for 8 municipalities (Songkhla, HatYai, Si Satchanalai, Roi Et, Loei, NongSamrong, Chum Phae, and UdonThani) were conducted including identification of the major of greenhouse gas emission activities within local context, estimation the emission amount of those activities and prediction the emission trend of Business as Usual (BAU), potential GHG emission reduction of each participating municipality or local community through consultation with local stakeholders. The potential abatement activities were suggested and screened for environmental and social benefits and impacts per guidance developed in the ESMF. The consultation meetings on GHG abatement plan were organized for each municipality to finalise the suitable plans that have high potential to implement in the near future.

**Activity 3: Study on GHG emissions and identify potential GHG emission reduction. Develop Local GHG Abatement Plans in 8 municipalities (Region 3)**

Develop GHG abatement plan guideline that include Environmental and Social Management Framework (ESMF);

City Carbon Footprint for 9 municipalities (Patong, NakhonSawan, Amnat Charoen, Hua Hin, Nan, Trang, Banchang, SakonNakhon, and Khaosamyod) were conducted including identification of the major of greenhouse gas emission activities within local context, estimation the emission amount of those activities and prediction the emission trend of Business as Usual (BAU), potential GHG emission reduction of each participating municipality or local community through consultation with local stakeholders. The potential abatement activities were suggested and screened for environmental and social benefits and impacts per guidance developed in the ESMF. The consultation meetings on GHG abatement plan were organized for each municipality to finalise the suitable plans that have high potential to implement in the near future.

Moreover, the three guidelines were developed under the activity 3 as follows;

1. The Guideline for Developing the City Carbon Footprint including GHG inventory classification, standard of calculation methodology, and consolidation approach on emission boundary and scope with suggested methodology for emissions estimation and the prediction of emissions trend in Business as Usual (BAU) case for setting up emission baseline.
2. The Guideline for Developing the GHG Abatement Plan (including Environmental and Social Management Framework, ESMF) including the necessary steps to develop the GHG abatement plan and the selection
criteria for abatement technology, taking into account the implementation feasibility and requirements of environment and social management framework.

3. The Guideline for Project Evaluation including the methodology for evaluating the GHG emission reduction and evaluation criteria for assessing the benefits of project implementation such as co-benefit and sustainable development.

In conclusion, the outputs of LCC component include Greenhouses Gas emission inventory, prediction the emission trend of Business as Usual (BAU), potential GHG emission reduction and the potential abatement activities. These could be integrated with the Local Performance Assessment (LPA) which is the annual performance assessment of local administration in 5 practices which are management, human resources management, financial management, public services management and good governance practices conducted by the Department of Local Administration. Greenhouses gas emissions inventory and greenhouse gas management policy are indices of the assessments in public services management practices. The outputs of LCC component could support the local administration in both indices.

Furthermore, there are the other LCC projects carried out by TGO under the national budget supports;

- In 2011, TGO launched the Carbon Footprint for Organization (CFO) project which aims to promote carbon footprints calculation in local administrative organizations. The results of the project include the development of local government organization carbon footprints calculation guidelines and greenhouse gases reduction approaches as well as the development of Low Carbon City (LCC) benchmarks. The number of local administrative organizations participated in the project up to the fiscal year 2019 are 180 organizations.

- In 2014, TGO launched the City Carbon Footprint (CCF) project by using the government budget. The objectives of the project are to assess overall GHG emissions in cities and to identify GHG mitigation potential, hence leading these cities to develop their low-carbon policies and activities. In fiscal year 2018 (01 October 2017 – 30 September 2018), 23 municipalities are participating in the CCF project that makes the total number is 94 municipalities. Even though, the CCF project is not a part of Component 2 but this work is a good start and provides the useful information for the implementation of the LCC program. Recently, TGO has worked closely with Department of Local Administration (DLA) on the development of CCF. Since FY 2018, DLA has put the development of CCF as a Local Performance Assessment (LPA) of every municipality in country.

- TGO has organized trainings and workshops to develop numbers of independent validators and verifiers, named Validation and Verification Body (VVB) for T-VER program. As of September 2019, 18 organizations have been registered as the VVB. A guideline to develop the T-VER project has been conducted and
Activity 4: Study on pricing mechanism for LCC T-VER and incentive options for LCC-TVERs buyer.

Activity 4 of this component was merged with Activity 6 of the Component 1 to be one ToR since these activities are related to the study on pricing mechanism and also the incentives for the relevant stakeholders.

This activity aims to propose effective incentives for the LCC Program in order to create demand on carbon credits from the LCC and Thailand Voluntary Emission Reduction Program (T-VER), so called LCC T-VER, and to propose appropriate pricing guidelines for LCC T-VER’s carbon credits. The activity was started since January 2018 and the final report was submitted to TGO in May 2019 with the main results as follows:

1. Conduct research literacy/review international of existing voluntary GHG emission reductions schemes in Thailand and in other countries.
   Seven (7) existing voluntary GHG emission reductions schemes in Thailand and in other countries were reviewed as follows:
   a) Verified Carbon Standard (VCS);
   b) Chinese Certified Emission Reductions (CCER);
   c) J-Credit Scheme of Japan;
   d) Climate Action Reserve (CAR) in the North American carbon market;
   e) Carbon Farming Initiative (CFI) of Australia;
   f) Forestry in New Zealand ETS; and
   g) Thailand Voluntary Emission Reduction Program (T-VER)

2. Propose appropriate pricing guidelines for LCC T-VER carbon credits (TVERs).
   To obtain the appropriate pricing model for LCC T-VER carbon credits, the following tasks were conducted:
   a) Review and assess the supply of LCC T-VER’s credits, including:
      • Potential supply of LCC T-VER’s credits;
      • LCC T-VER’s credit generation costs;
   b) Review and assess the demand of LCC T-VER’s credits, including:
      • Demand assessment of LCC T-VER’s credits and Thailand Carbon Offsetting Program (TCOP)
      • Potential T-VER market size
   c) Propose appropriate Pricing Models for LCC T-VER carbon credits:
      • Scenario#1: LCC T-VER’s credits are only eligible for voluntary market
      • Scenario#2: LCC T-VER’s credits are eligible for both voluntary market and compliance market
      • Scenario#3: LCC T-VER’s credits are eligible for international market

3. Propose policy recommendations/measures on appropriate and effective incentives for LCC Program in order to create demand for LCC T-VER credits.
In order to develop and propose effective incentives for the LCC Program and thus create demand for LCC T-VER credits, many interviews with existing buyers, sellers, potential buyers and aggregators were conducted to gather feedbacks and suggestions from the stakeholders. The study found three main barriers to increase the demand for LCC T-VER credits which are:

a) Lack of information and guidance on T-VER prices and TVERs functions;

b) Lack of liquidity in the T-VER market;

c) Lack of financial support/incentives/motivations to purchase TVERs.

Therefore, based on the study, it is proposed that four policy recommendation to create demand for LCC T-VER credits are:

- Develop LCC-TVERs guideline.
- Expand offsetting channels for LCC-TVERs.
- Reduce transaction costs of sale-purchase LCC-TVERs.
- Increase incentives and demand for LCC-TVERs through compulsory measures.

The study results show that at present there are lack of liquidity and limited demand in the LCC T-VER’s credits in the market, as a result high transaction cost. Under the study, it is suggested that the LCC Fund should be established to serve as a one-stop-service for both sellers and buyers and to reduce the transaction cost. The figure below shows supply and demand analysis of the LCC T-VER’s credits and the LCC fund.

The LCC fund can be designed to create confident in the market and encourage more investment in GHG emissions reduction projects of the municipalities by:

- Creating partnership with gas stations (e.g. PTT, Bangchak, Shell, etc.) & electricity distributors to provide wholesale volumes of LCC T-VER’s credit;
- Creating a standard template of the emission reduction sale/purchase agreement (or named as “T-VER’s credits sale/purchase agreement”), which would help save time and legal expenses for all parties; and
- Making an offer to purchase LCC-TVERs with certain price and volume under the forward contract(s).

Additional ToR proposed in the revised work plan in February, 2018:
Development of mobile application on City Carbon Footprint (CCF)

The contract was signed in January 2019 and then the final report and the mobile
application were submitted to TGO in May 2019. The App. “Low-carbon City” could be used for evaluating GHG emissions of the 4 types of cities, including industry, tourism, residence, and agriculture, analyzing potential of GHG reduction, and proposing measures for reducing emissions.

**Comments:**

- For the component 2, Study on GHG emissions and identify potential GHG emissions reduction of the 25 municipalities, the ToRs were divided into the 3 consultants with similar scope of work. The consultants should have the same direction on operation, methodology for analysis and calculation, and identification of GHG reduction measures. To cope with this matter, periodic meetings between TGO and the consultants and close monitoring of their operation shall be conducted since the beginning of each activity.
- Leaders and staff of the municipalities have requirements for continuous support on GHG mitigation implementation and training workshop organization.

### C. Component 3: Policy recommendation on legal framework to establish the ETS

**Status:**

| Completed |

This component aims to support and enable the Government to make practical formulation of appropriate legal instruments and institutional arrangements for the establishment of the ETS in Thailand, in line with national circumstances.

The main tasks under this component are:

- Comparative analysis of policies, legislation, regulations, and institutional arrangements in relation to the ETS
- Legal assessment of existing policies, legislation, regulations, and institutional arrangements in Thailand
- Recommendations on the formulation of appropriate legal framework and draft legislation for the ETS
- Identification of potential impacts from the implementation of the draft legislation and recommendations on regulatory impact assessment (RIA) to support decision-making

The contract was signed in August 2017. The consultant submitted the final report in February, 2019 with the main results as follows:

1) **Legal framework and draft legislation for reporting of greenhouse gas emissions for ETS**

Including provisions on controlled/regulated entities required for reporting (coverage criteria and reporting threshold), reporting procedure (MRV) and platform, institutional arrangements, confidentiality treatment and disclosure, as well as compliance/enforcement.

2) **Legal framework and draft legislation on the establishment of the ETS**

Including provisions on institutional arrangements, formulation of plans for the implementation of ETS, designation of regulated entities, allocation of allowances, treatment of allowances (including trading provisions), means to promote market stability, as well as appeal and fines for noncompliance.

The policy recommendation on legal framework to establish the ETS are:
1. To incorporate the main legal provisions on GHG reporting as part of the Climate Change Act B.E. ..., with further technical details provided in a subordinate legislation.

2. To formulate an Act on the ETS which can either be a stand-alone legislation or a legislation issued under the Climate Change Act B.E. ..., with the provisions on GHG reporting referring to the above-mentioned legal provisions.

The policy recommendation, together with the legal framework, will be incorporated with other technical components of the study on the ETS in order to formulate a proposal for policy consideration on the appropriate formulation of the ETS to promote greenhouse gas reduction in Thailand.

The legal frameworks and the policy recommendation were proposed to the TGO Legal Subcommittee and the TGO Executive Board.

The seminars and progress meetings with TGO legal development working group/subcommittee were conducted to review the progress under this component and provide recommendations, while 5 consultation meetings were held to receive views and comments from relevant government agencies and private sectors.

Additionally, 2 seminars on ETS law were held in November 2018 and June 2019 consecutively to promote sharing of views and experiences on developing and implementing ETS law in different jurisdictions, with experts from the EU, Germany, the Republic of Korea, China, and Singapore.

Comments: N/A
4. PROGRESS, CHALLENGES, AND LESSONS LEARNED

Important policy or regulatory developments related to the Grant’s objectives and activities:

<table>
<thead>
<tr>
<th>Developments:</th>
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<tbody>
<tr>
<td>1. Paris Agreement</td>
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<td>Thailand signed the Paris Agreement on April 22, 2016 at a High-level Signature Ceremony convened by the Secretary General in New York and deposited its instrument of ratification at a High-level Event on the Entry into Force of the Paris Agreement on September 21, 2016 at the UN headquarters in New York.</td>
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<td>2. Thailand Nationally Determined Contribution (NDC)</td>
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<td>Thailand communicated its INDC to the UNFCCC on October 1st, 2015. Thailand intends to reduce greenhouse gas emissions economy-wide by 20 percent from the projected business-as-usual (BAU) level by 2030. The level of contribution could increase up to 25 percent, subject to adequate and enhanced access to technology development and transfer, financial resources and capacity building support through a balanced and ambitious global agreement under the United Nations Framework Convention on Climate Change (UNFCCC). The baseline emission is projected from BAU scenario from reference year 2005 in the absence of major climate change policies. The baseline emission in 2030 is projected to be 555 MtCO$_2$e. As indicated in NDC, Thailand will continue to explore the potentials of bilateral, regional and international market mechanisms as well as various approaches that can facilitate, expedite and enhance technology development and transfer, capacity building and access to financial resources that support Thailand’s efforts towards achieving sustainable, low-carbon and climate-resilient growth, as appropriate.</td>
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<td>In 2016, ONEP as the Thailand’s national focal point to the UNFCCC developed the NDC roadmap in parallel with the study on mitigation potential in LULUCF sector. The NDC roadmap covers 3 sectors including energy and transport, waste and IPPU. To achieve the NDC, there are many sectoral plans and projects involved such as Energy Efficiency Plan (2015-2036), Alternative Energy Development Plan (2015-2036), Waste Management Plan (2016-2021) etc. The NDC roadmap was approved by the National Committee on Climate Change Policy (NCCC) on February 10, 2017, then approved by the Cabinet on May 23, 2017. The timeframe of preparation phase and implementation phase are 2017-2020 and 2021-2030, respectively.</td>
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<td>3. Twelfth National Economic and Social Development Plan (2017-2021)²</td>
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<td>The Cabinet approved the Twelfth National Economic and Social Development Plan (NESDP) (2017-2021) on September 13, 2016. Under the Twelfth NESDP, the development of GHG mitigation mechanisms and measures to support GHG reduction in all sectors is indicated. In addition, the revision of regulations and develop urban infrastructure to move towards the environmentally friendly and low carbon city is indicated.</td>
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<td>4. National Reform Plan</td>
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<td>On February 15, 2018, the National Strategy Committee which chaired by Prime Minister, approved the National Reform Plan in all 11 areas. This plan was published in the Royal Gazette on April 6, 2018. Under environment issue 3 (Encouraging all sectors to engage in addressing climate change), sub-issue 3.3 (Formulate appropriate mechanism[s] to provide economic incentives to reduce greenhouse gas emission by private sector), there are 2 activities which will be conducted including 1) Develop provisions under Climate Change Act B.E. .... concerning appropriate mechanism[s] to provide economic incentives. For instance, by</td>
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setting overall greenhouse gas emissions threshold for each manufacturing sector, including allocation of emissions allowances for each place of business and allow for trading of such allowances (cap and trade system) and 2) Relevant agencies conduct study on appropriate approaches and modalities to develop a system to enable implementation by the private sector 5 years after the enactment of the Act.

5. Climate Change Act

The National Reform Plan on Natural Resources and Environment, published in the Royal Thai Government Gazette on 6 April 2018, provides a mandate to the Ministry of Natural Resources and Environment to develop “Climate Change Act B.E. ....” to provide a legal foundation to encourage all sectors to engage in addressing climate change. The Act will include provisions on, among others, climate change impact/risk assessment of large-scale government projects, central database on greenhouse gas emissions and area-based risk of climate change, as well as formulation of appropriate mechanism(s) to provide economic incentives to reduce greenhouse gas emissions from private sector.

The Office of Natural Resources and Environmental Policy and Planning (ONEP) is in the process of studying appropriate formulation of the draft Climate Change Act B.E. ...., together with Thailand Greenhouse Gas Management Organization (Public Organization): TGO and relevant government agencies.

The framework of the Climate Change Act B.E. .... are under consideration by the ONEP and will address institutional arrangements, reporting obligations, mitigation and adaptation provisions, as well as supporting mechanisms. As required by the National Reform Plan, the Act will include provisions on, inter alia,

- Climate change impact/risk assessment of large-scale government investment projects and counter-measures
- Central database on GHG emissions in Thailand and area-based risk of climate change
- Appropriate mechanisms to provide economic incentives to reduce GHG emissions by private sector

The ONEP plans to conduct consultation within the MONRE and with other relevant agencies in the formulation of the framework of the Act prior to submitting to the Cabinet for its consideration at the principle level by the end of 2020. Consultation meeting with relevant agencies, including the ONEP, will be held to consider alternative approaches in case there is a potential delay in the consideration of the Act.

Challenges:

At the moment, there are no policy and regulation on mandatory carbon pricing instruments in the country. Under the PMR support, a study on the legal, policy and administrative landscape for establishing of a GHG reporting system to support the ETS and a study on legal, policy and administrative landscape for establishing the ETS in Thailand will be useful for application in the future. Furthermore, the results from the PMR Policy Analysis, which the PMR PA 16 endorsed in March 2017 will be critical and relied on to inform policy option regarding the role of carbon pricing in supporting the national GHG mitigation target and the suitability of carbon pricing instruments on the key sectors.

Lessons learned: N/A

Important changes in the technical design or approach related to the Grant’s activities:

Developments:

- From the first ISR in 2016, Component 2 was planned to provide support to 24 municipalities in Thailand to develop their local GHG abatement plans which will be used to guide mitigation actions and low-carbon investment. However, after the invitation of municipalities to participate in this project and discussion between TGO and the consultants, 25 municipalities were selected.
- There are two additional ToRs as the revised work plan in February, 2018. The first one is in Component 1, Development of mobile application on GHG emissions in buildings which aims to develop the mobile application and simplify the calculation of Specific Energy Consumption (SEC) in building sectors, including evaluation of GHG emissions and potential of reduction. And the last one for Component 2, Development of mobile application on City Carbon Footprint (CCF) which aims to support implementation of LCC.

**Challenges:**
The above-mentioned minor changes will not affect the implementation of the MRP. The budgets for the additional activities come from the remained budget after the revision of the work plan in February 2018.

**Lessons learned:**
- Development of the mobile application could be a modern and simple tool to support assessment of GHG emissions, potential of reduction and possible measure/technology.

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### Key capacity issues (implementation, technical, financial management, procurement) related to the Grant’s activities:

**Developments:**
- During the PMR implementation phase 2016-2019, there were at least 89 seminars, training workshops and meetings organized under the PMR support. Basic of the carbon pricing instruments were disseminated to the key stakeholders in both public and private sectors.
- For the LCC T-VER project, kick off meetings and trainings on T-VER project development were organized for all participating municipalities. Currently, 14 of 25 municipalities have already been registered as the T-VER project and have readiness to move forward to the carbon credit issuance step. Some of the municipalities have plans to develop other activities to be T-VER by using their own budgets.

**Challenges:**
- For the Financial Management (FM) issue, a new version of the Client Connection system is better in signing process of signatory. However, there is a bit technical problem with the One Time Password (OTP) sending to the clients’ e-mail.
- Regarding the procurement process which requires the country to submit the documents through the World Bank’s online system named STEP, although the system is modified in 2019 but it is still not stable and there are some technical problems. Therefore, it takes more time than expected.
- Focusing on readiness preparation of the carbon market in Thailand, the important technical and facility components have been developing under supporting of the Thailand PMR implementation phase from 2016 to 2019 and the National Budget, including Measurement Reporting and Verification (MRV) system, Registry system, Mock-up Trading Platform, Institutional Arrangement, legal framework for GHG reporting system, legal framework for ETS establishment, and capacity buildings and disseminations on basic of the carbon market. However, one of the most important components to drive the mechanism is a “Market Player” who will relate with the overall processes from making a decision on selection of measures to achieve specific target of organization, planning for investment budget, to operating and monitoring. Readiness preparation of the market players in private sectors could conduct by building their capacity in parallel with learning by doing from trial implementation.

**Lessons learned:**
- The procurement processes under the World Bank regulations have some differences from the Thai’s
regulations. TGO as a Project Management Unit (PMU) has got a good experience from obstacle in the procurement. For project in the future, consultation meetings on the procurement process in detail between the World Bank’s procurement expert team and TGO should be conducted continually.

### Coordination with other carbon pricing initiatives, including those funded by other donors:

#### Developments:

- **Achieving Low Carbon Growth in Cities through Sustainable Urban Systems Management in Thailand**
  
  This project funded by GEF and has UNDP as a delivery partner. This project aims to strengthen the capacities and processes at local level for bottom-up integrated low carbon development planning and the implementation & sustainable management of low carbon development projects. The 4-year project will focus on low carbon urban systems, in particular waste management and sustainable transport.

- **Asia-Pacific Carbon Market Roundtable**
  
  TGO’s representatives participate the carbon market roundtable of Asia-Pacific region to update the information on market development of the countries in this region and share experiences.

#### Challenges:

- It is important to integrate different components from the activities under the MRP and other projects being done by TGO and relevant agencies to build the complete carbon pricing instrument.

#### Lessons learned:

- Experiences shared from the experts and other countries are useful for the carbon pricing instruments development.

### Stakeholder engagement related to the Grant’s activities:

#### Developments:

- EPC working group and LCC working group meetings were organized every two months. The working groups considered progress of the works under the EPC scheme and LCC program and also discussed and commented on the final result of the works.

- Consultation meetings on local GHG Abatement Plan with the 25 municipalities were organized at the municipality offices for finalising the suitable GHG Abatement Plan, including ensuring that the municipalities could continue the GHG reduction activities by themselves in the future. Training workshop on Development of GHG mitigation projects, T-VER, for municipalities’ activities was held to enhance capacity of municipalities’ staff on development of city GHG emissions data, Project Design Document (PDD) for T-VER project registration, incentives for LCC T-VER carbon credits, and fundamental of carbon market and emissions trading.

- In the final step of the PMR implementation phase, consultation meetings with industrial sectors to finalise the energy target setting and roadmap of the EPC scheme were organized. As a result, TGO have closed collaboration with the Designated Factories and Buildings (DF&Bs) 11 sectors including (i) Cement (ii) Ceramic (iii) Iron & Steel (iv) Petro-chemical (v) Paper (vi) Food & Beverage (vii) Thermal power plant (viii) Department store (ix) Office (x) Hotel and (xi) Hospital. Their energy and GHG emissions data and potential of reduction are studied and ready to move forward to further actions. TGO also has 38 pilot DF&Bs to test the MRV system developed under the PMR.

- Final Seminar for dissemination of Thailand PMR project achievement was organized to present the final results of readiness preparation of the 3 schemes, EPC, LCC and ETS.
Challenges:

- Building capacities and raising awareness for the stakeholders are the key important issues of the readiness preparation project.
- There are many projects which involve the DF&Bs implementing currently; therefore, it may increase the burden of the DF&Bs.
- Moving forward to the full implementation of the developed schemes in future, stakeholder engagement should be carried on continuously.

Lessons learned:

- Stakeholder consultation is one of the key factors for the successful implementation. TGO and consultants have organized the meetings at every municipality’s office with the municipality’s working group. Moreover, we organized stakeholder consultations with the municipalities and related agencies in the area to get the comments and their interest. Recently, TGO has worked closely with Department of Local Administration (DLA) on the development of CCF. Since FY 2018, DLA has put the development of CCF as a Local Performance Assessment (LPA) of every municipality in country.

Other issues related to the Grant’s activities

N/A

5. ADDITIONAL INFORMATION

From the 16th meeting of the PA (PA16), Thailand received the additional funding to carry out the study on impact of Carbon Pricing Instruments (CPIs) on national economy and contribution to NDC. This policy analysis will complement the ongoing MRP by filling in analytical gaps at the national policy level, in particular, aiming to understand the linkage between climate policy, carbon pricing and economy of Thai context. The policy analysis will help answer what role carbon pricing can play in helping country achieve NDC in the cost-effective manner and what is the impact on the economy if carbon pricing is adopted.

The ToR was drafted in cooperation between TGO and the World Bank as a delivery partner. This assignment comprises the three following tasks:

Activity 1: Economic modelling and scenario analysis of carbon pricing instruments

Activity 2: Interaction and consistency between the country’s ETS/carbon tax and national existing policies and regulations

Activity 3: Support to cross-sectoral, inclusive policy development and dialogue for the carbon pricing instruments

The contract was awarded to the consortium, Cambridge Econometrics (CE), and then CE leads a consortium with the partners Ricardo Energy and Environment (Ricardo E&E) and Creagy. The purposes of the assignment are to provide recommendations on the suitable policy options for carbon pricing instruments to support Thailand’s NDC mitigation goals, and to evaluate the economic impacts of potential policies on stakeholders.

Progress of the Activity

The consortium submitted the progress report #2 in November 2018 (more than 20 model runs and key policy
The results of the model runs were reviewed and consulted with the TGO and the World Bank’s expert teams. However, there are several issues and questions from the outcomes of these analyses from the World Bank’s expert team. These include certainty around the NDC target especially in the transport sector (leading to reduction of oil imports and positive GDP of Thailand), and the complexities of the scenarios where the Carbon Pricing Instruments (CPIs) only applied to selected sectors (replaced NDC) while others still carrying on with the NDC policies. This makes interpreting macroeconomic impacts difficult.

The World Bank team has suggested a new approach to address the above issues. Instead, the CPIs should be used as a tool to help Thailand achieve emission reductions that contribute to its NDC target. The consortium was asked to run another set of the models to apply the carbon price rates which were similar to current rates around the world (especially reviewing some examples from other developing countries). This will ensure that the recommendation is realistic and acceptable to wider audience in Thailand. At present, the proposed new scenarios for the model runs are being confirmed with the World Bank team, and once they are agreed, the consortium will run the models and bring the results to analyze and propose policy recommendations for Thailand. It is expected that all the outcomes of the study shall be finalized before December 2019.

Request for Additional funding to PMR in 2020

For Thai-ETS readiness preparation, the Measurement Reporting and Verification (MRV) system for ETS and Registry system were developed by using National Budget, while legal framework and institutional arrangement were developed under the PMR support, including Policy Analysis on the impacts of Carbon Pricing instruments on Thailand economy. However, one of the most important components to drive the mechanism is a “Market Player” who will relate with the overall processes from making a decision on selection of measures to achieve specific target of organization, planning for investment budget, to operating and monitoring. Readiness preparation of the market players in private sectors could conduct by building their capacity in parallel with learning by doing from trial implementation.

TGO would like to request for additional funding to the PMR for the further activities, including (i) build up capacity of the key stakeholders on Carbon Pricing Instruments, Internal Carbon Pricing and Green Investment, and (ii) develop sectoral specific case studies for analyzing best practice and lessons learnt. Approximate proposed budget is USD 200,000 and time frame is January – November, 2020.