

Monitoring & Evaluation (M&E) Plan and Impact Statement Form

Objective of the M&E Plan and Impact Statement:

- The M&E Plan and Impact Statement must be designed based on the Technical Assistance Response Plan and must enable the Implementer to complete the Closure Report at the end of the assistance.

Process for filling in the form:

- The Implementer must identify relevant quantitative and qualitative indicators as specified in the Closure Report. A sub-set of indicators to monitor and assess must be chosen among these.
 - The Implementer may also identify other specific, measurable, achievable, relevant, and time-bound indicators suitable to monitor Activities, Outputs and anticipated Outcomes from the technical assistance and add to the M&E Plan and Impact Statement.
 - During implementation of the TA or FTA, the Implementer must collect all relevant data as described in the Monitoring & Evaluation Plan. Aggregated data on selected indicators as well as an updated version of the Impact Statement will be presented in the Closure Report at the end of the assistance.
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| Basic Information | |
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| Title of response plan | Development of a national hydrogen strategy and action plan for accelerating Thailand's net-zero target |
| Technical assistance reference number | CTCN 22-013 |
| Country/ countries | Thailand |
| NDE focal point and organisation | Dr. Surachai Sathitkunnarat, The Office of National Higher Education Science Research and Innovation Policy Council (NXPO) |
| Sector(s) addressed | Agriculture, Industry, Renewable Energy, Transport |
| Technologies supported | Establishing national strategy |
| Implementation period and total duration | October 2022 ~ June 2024 |
| Total budget for implementation | USD 260,000 |
| Designer of the response plan | National Institute of Green Technology |
| Implementer of response plan | National Institute of Green Technology |

| (A) Outputs and Activities as described in the Response Plan | (B) Indicator | (C) Results | (D) Method and frequency for data collection | (F) Comments | | | | | | | | |
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| <p>Output 1: Development of implementation planning and communication documents</p> <p>Activity 1: A detailed work plan, a monitoring and evaluation plan, an impact description, a closure and data collection report</p> | <p><i>Number of deliverables produced during the assistance</i></p> | <p>4 Deliverables:</p> <ul style="list-style-type: none"> - Implementation plan - M&E plan - Impact description - Closure report | <p>Literature review; detailed work and budget plan; M&E plan with given indicators; revision process through feedbacks; etc.</p> | <p><i>Completed</i></p> | | | | | | | | |
| <p>Output 2: Assessment report on the potential use of hydrogen in three key economic sub-sectors in Thailand</p> | <p><i>Number of deliverables produced during the assistance</i></p> | <p>1 Deliverable: Deliverable 2</p> | - | <p><i>Completed</i></p> | | | | | | | | |
| <p>Activity 2.1: Hold a kick-off meeting for the presentation of technical assistance with the different stakeholders</p> | <p><i>Number of events organized by proponents and implementing partners</i></p> <p><i>Number of participants in events</i></p> <p>a) Male</p> <p>b) Female</p> | <p>2 Events:</p> <ul style="list-style-type: none"> - Kick-off meeting - Seminar on green hydrogen <table border="1" data-bbox="710 1344 906 1496"> <thead> <tr> <th>Event1</th> <th>Event2</th> </tr> </thead> <tbody> <tr> <td>16</td> <td>200</td> </tr> <tr> <td>9</td> <td>NA</td> </tr> <tr> <td>7</td> <td>NA</td> </tr> </tbody> </table> | Event1 | Event2 | 16 | 200 | 9 | NA | 7 | NA | <p>Organizing the event; presenting the plans; networking and collecting information; etc.</p> <p>Counting the participants</p> | <p><i>Completed</i></p> <ul style="list-style-type: none"> - In Thailand - In Thailand (+online) |
| Event1 | Event2 | | | | | | | | | | | |
| 16 | 200 | | | | | | | | | | | |
| 9 | NA | | | | | | | | | | | |
| 7 | NA | | | | | | | | | | | |
| <p>Activity 2.2: Identify and select key economic sub-sectors with the potential use of hydrogen</p> | NA | <p>NA (included in Deliverable 2)</p> | <p>Literature review; collecting data from the NDE Thailand (NXPO), e.g., energy consumption and CO₂ emission of economic sectors; etc.</p> | <p><i>Completed</i></p> | | | | | | | | |
| <p>Activity 2.3: Finalize and select three key economic sub-sectors</p> | <p><i>Identification of 3+ key sub-sectors for hydrogen utilization in Deliverable 2</i></p> | <p>4 Sub-sectors:</p> <ul style="list-style-type: none"> - Cement - Refinery - Road transport - Power generation | | | | | | | | | | |

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| Output 3: Identify the suitable technological options to produce and transport hydrogen | <i>Number of deliverables produced during the assistance</i> | 1 Deliverable: <i>Deliverable 3</i> | <i>Literature review; data analysis; estimation of CAPEX & OPEX; scenario analysis; interviews on local & Korean experts; etc.</i> | <i>Completed</i> |
| Activity 3.1: Identify resources for production of hydrogen | NA | NA <i>(included in Deliverable 3)</i> | | |
| Activity 3.2: Identify technologies for production of hydrogen | NA | NA <i>(included in Deliverable 3)</i> | | |
| Activity 3.3: Undertake cost estimation for production of hydrogen | NA | NA <i>(included in Deliverable 3)</i> | | |
| Output 4: Draft documents related to the National Hydrogen Strategy Vision | <i>Number of deliverables produced during the assistance</i> <i>Anticipated number of policies, strategies, plans, laws, agreements or regulations proposed as a result of the TA</i> | 2 Deliverables: - <i>Deliverable 4.1</i> - <i>Deliverable 4.2</i> 1 Strategy | | |
| Activity 4.1: Draft a national action plan and technology roadmaps | <i>Number of tools and technical documents developed</i> | 1 National Strategy and Action Plan: <i>Deliverable 4.1</i> | <i>Literature review; data analysis; 1 survey & interviews on local experts; etc.</i> | <i>Completed</i> |
| Activity 4.2: Draft a GCF Concept Note | <i>Number of tools and technical documents developed</i> <i>Anticipated amount of funding/investment leveraged as a result of TA</i> | 1 GCF Concept Note: <i>Deliverable 4.2</i> USD 28.5 million | <i>Collaboration with local consultant</i> | <i>Completed</i> |

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| Output 5: Provide Capacity Building for Policy Makers | Number of deliverables produced during the assistance | 1 Deliverable: Deliverable 5 | - | Completed | |
| Activity 5.1: Hold a workshop for Policy makers including private sector engagement | Number of training organized by proponents and implementing partners | 1 2-day Capacity Building Workshop | Organizing the event; presenting the plans; networking and collecting information; etc. | Completed - In Thailand | |
| | Number of participants in training | | Counting the participants | (Attendees list) | |
| | a) Male | | | | |
| | b) Female | | | | |
| | Number of institutions trained | | Counting institutions of the participants | (Attendees list) | |
| | a) Governmental | | | | |
| | b) Private sector | | | | |
| | c) Nongovernmental | | | | |
| | Percentage of participants reporting satisfaction with CTCN training | | Survey results indicating 4+ on a 5-pt scale | | |
| | Percentage of participants reporting increased knowledge, capacity, and/or understanding as a result of CTCN training | | Survey results indicating 4+ on a 5-pt scale | | |
| a) Male | | | | | |
| b) female | | | | | |
| Number of other information materials created | NA | Summarizing discussions in the workshop | | | |
| Anticipated number of direct and indirect beneficiaries as a result of the TA | NA | Estimating the anticipated number of people who will benefit from the workshop | | | |

| Impact Statement | |
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| Challenge | <p>The Thailand LEDS states that Thailand aims to more than half of its carbon emissions by 2050, and the energy sector is designated as a key sector to achieve to target. In achieving the national Net-Zero target, Thailand needs to fully utilize the potential of hydrogen in overall social sectors.</p> <p>The TA successfully supported to design the blueprint of hydrogen economy development in Thailand by identifying the potential of domestic hydrogen production and delivering the framework of the national plan and technology roadmap to develop the relevant infrastructure. The next challenge would be the optimization of draft national plan and design the detailed strategy for each sector.</p> |
| CTCN assistance | <p>This TA successfully supported hydrogen production in Thailand with following activities:</p> <ul style="list-style-type: none"> • Techno-economic assessment of hydrogen production technologies considering potential resources, technologies, geographical areas, and so on • Establishment of a national action plan for the implementation of the best suitable application area and technologies • Development of hydrogen technology roadmaps to efficiently adopt the hydrogen production value chain |
| Anticipated impact | <ul style="list-style-type: none"> • Enhancement of infrastructure resilience by suggesting an effective national hydrogen production plan with the following technology roadmaps • Contribution to achieving the national Net-Zero emission target by 2065 • Institutional capacity and coordination mechanisms in place to coordinate climate action relevant to NDE and STI policy units |
| Anticipated co-benefits from the TA | <ul style="list-style-type: none"> • The TA can evoke economic development in overall sectors by stimulating the expansion of hydrogen-related industries. • By suggesting well-organized guidelines to materialize the hydrogen economy, it can contribute to Just Transition in Thailand. |
| Gender aspects of the TA | <ul style="list-style-type: none"> • The TA designed the framework of capacity building for hydrogen engineers, scientists, and policymakers and promote participation from women engineers, scientists, and policymakers. • The TA offered 2-day workshop for Thailand policymakers and private stakeholders to emphasize the importance of fostering women scientists and researchers. |
| Anticipated contribution to NDC | <ul style="list-style-type: none"> • Establishment of the national plan and following technology roadmaps for developing hydrogen-related infrastructure • Priority listing of potential hydrogen production technologies including applicable resource(s) and geographical area(s) |
| The narrative story | <p>Hydrogen production and application have become one of the global trends. The importance of hydrogen and its role as a key component for reducing carbon emissions has been emphasized in all of the international agreements and national Net-Zero plans over the globe.</p> <p>Thailand also announced its strong ambition in achieving a Net-Zero emission target by 2065 and included hydrogen application as one of the major assignments in their national plan. For example, in New Energy Power Policy, Thailand states hydrogen is one of the seven major components to achieve carbon neutrality. Also, in Innovation Roadmap for Industrial Decarbonization, the Thailand government emphasizes the importance of hydrogen production and application and aims to apply green hydrogen on a full scale by 2050-2065. Despite its great willingness, currently, Thailand still has not formulated its national strategies for hydrogen development and has not developed related infrastructure enough. As Thailand is in the extremely early stage of hydrogen application, it is urgent to assess relevant potential</p> |

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| | <p>resources and identify applicable technologies.</p> <p>In this project, we identified applicable resources for hydrogen production in Thailand and the following technologies which have high efficiency considering local conditions. Based on the result, the project suggested the draft national action plan to stimulate hydrogen application in Thailand and technology roadmaps for identified hydrogen production technologies.</p> |
| <p>Contribution to SDGs</p> | <p>This CTCN TA directly contributed to the UN Sustainable Development Goal (SDG) 7: Ensure access to affordable, reliable, sustainable, and modern energy for all. This TA assessed the potential hydrogen production technologies for Thailand and promoted them to establish the relevant infrastructure for hydrogen technology development and its application by designing a proper national action plan and technology roadmaps.</p> <p>This TA also contributed to SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. By suggesting the framework of hydrogen application in Thailand, this TA contributed to enhance the resiliency of relevant infrastructure in Thailand and stimulate sustainable economic development in overall social sectors.</p> <p>Last but not least, this TA supported Thailand in terms of SDG 13: Take urgent action to combat climate change and its impacts. As hydrogen is one of the most important components to achieve the Net-Zero target, it is necessary to identify applicable technology and resource options and design a national political framework to apply them. As this TA successfully covered all the aforementioned activities, it can promote urgent action in Thailand to cope with the climate crisis.</p> |
| <p>Reference to knowledge products</p> | <p>UNFCCC (2016). “Enhancing Implementation of Technology Needs Assessments: Guidance for Preparing a Technology Action Plan”</p> |