

Independent Terminal Evaluation

VIET NAM

Eco-industrial Park Initiative for Sustainable Industrial Zones in Viet Nam

UNIDO Project No.: 100052

GEF Project ID: 4766



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Acronyms and abbreviations

| Abbreviations | Meaning |
|----------------------|---|
| BAT/BEP | Best Available Technologies/Best Environmental Practices |
| BOD | Biological Oxygen Demand |
| COD | Chemical Oxygen Demand |
| CWWTP | Centralized Waste Water Treatment Plant |
| EE | Energy Efficiency |
| EIP | Eco-industrial park |
| GCTF | Green Credit Trust Fund (SECO) |
| GHG | Greenhouse Gas |
| IA | Implementing Agency |
| ISP/NRE | Institute of Strategy and Policy on Natural Resources and Environment |
| IS | Industrial symbiosis |
| IZ | Industrial zone |
| IZMB | Industrial Zone Management Board |
| MDG | Millennium Development Goals |
| MOF | Ministry of Finance |
| MOIT | Ministry of Industry and Trade (MOIT) |
| MONRE | Ministry of Natural Resources and Environment |
| MOST | Ministry of Science and Technology |
| MPI | Ministry of Planning and Investment |
| NPC | National Project Coordinator |
| NPD | National Project Director |
| NPM | National Project Manager |
| PMU | Project Management Unit |
| POPs | Persistent organic pollutants |
| PSC | Project Steering Committee |
| PTS | Persistent Toxic Substances |
| RECP | Resource efficient and cleaner production |
| SC | Stockholm Convention |
| SECO | The State Secretariat of Economic Affairs, Switzerland |
| TEQ | Toxic Equivalents |
| TNA | Technical Needs Assessment |

| Abbreviations | Meaning |
|---------------|---|
| TOE | Ton of Oil Equivalent (42 GJ) |
| TSS | Total Suspended Solids |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme (now UN Environment) |
| UNIDO | United Nations Industrial Development Organization |
| UP-POPs | Unintentionally produced POPs |
| VACNE | Viet Nam Association for Conservation of Nature and Environment |
| VDB | Viet Nam development bank |
| VEPF | Viet Nam Environment Protection Fund |
| VNCPC | Viet Nam Cleaner Production Centre |
| WB | World Bank |

Project data

| | |
|---|--|
| Project title | Eco-industrial Park Initiative for Sustainable Industrial Zones in Viet Nam |
| UNIDO ID | 100052 |
| GEF Project ID | 4766 |
| Region | Asia |
| Country(ies) | Viet Nam |
| Project donor(s) | GEF, Switzerland (SECO), and UNDP Viet Nam (supplementary support latter added) |
| Project implementation start date | 17 October 2014 |
| Expected duration | Three years/ actual duration four years |
| Expected implementation end date | 30 June 2019 |
| GEF Focal Areas and Operational Project | Chemical & Waste, Climate Change, and International Water |
| Implementing agency(ies) | UNIDO |
| Government coordinating agency | Ministry of Planning and Investment |
| Executing Partners | Ministry of Planning and Investment |
| UNIDO RBM code | HC3 Safeguarding the Environment |
| Donor funding | GEF: USD 3,524,000 SECO: USD 1,000,000 (commitment) or EUR 655,085 (actual, equivalent to USD 753'348 on 28 Jan 2019) UNDP Viet Nam: USD 101,441 (supplementary support) |
| Project GEF CEO endorsement / approval date | 26 December 2013 |
| UNIDO input (in kind, USD) | USD 230,000 (USD 200,000 in kind) |
| Co-financing at CEO Endorsement, as applicable | USD 49,597,265 |
| Total project cost (USD), excluding support costs and PPG | USD 53,993,165 |
| Mid-term review date | 02 December 2016 |
| Planned terminal evaluation date | 30 June 2019 |

Glossary of evaluation-related terms

| Term | Definition |
|---------------------------------------|---|
| Baseline | The situation, before an intervention, against which progress can be assessed. |
| Co-processing of waste | The use of waste as an alternative fuel or raw material in the production of cement. |
| Effect | Intended or unintended change due directly or indirectly to an intervention. |
| Effectiveness | The extent to which the development intervention's objectives were achieved or are expected to be achieved. |
| Efficiency | A measure of how resources/inputs (funds, expertise, time, etc.) are converted to results. |
| Impact | Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention. |
| Indicator | Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention. |
| Industrial Symbiosis | A collaborative pattern among enterprises aimed at improving resource efficiency and creating shared services and infrastructure |
| Lessons learned | Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations. |
| Logframe (logical framework approach) | A management tool used to facilitate the planning, implementation, and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results-based management) principles. |
| Outcome | The likely or achieved (short-term and medium-term) effects of an intervention's outputs. |
| Outputs | The products, capital goods, and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes. |
| RECP | Resource Efficient and Cleaner Production |
| Relevance | The extent to which the objectives of intervention are consistent with beneficiaries' requirements, country needs, global priorities, and partners' and donor's policies. |
| Risks | Factors, generally outside the scope of an intervention, which may affect the achievement of an intervention's objectives. |
| Sustainability | The continuation of benefits from an intervention, after the development assistance, has been completed. |
| Target groups | The specific individuals or organizations for whose benefit an intervention is undertaken. |
| Theory of Change | A set of hypotheses on how and why an initiative works. |

Executive summary

The main objective of the project was to increase the transfer, deployment, and diffusion of clean and low-carbon technologies and practices for the minimization of GHG emissions, and releases of POPs and water pollutants as well as the improved water-efficiency and the sound management of chemicals in industrial zones (IZ) of Viet Nam. The project was financed with a grant from the Global Environment Facility for USD 3,524,000 and two grants from The Swiss State Secretariat for Economic Affairs (SECO) and UNDP Viet Nam amounting to USD 854,789. Several central ministries, provincial governments, and financial institutions in Viet Nam also committed co-financing for USD 45,026,265.

The expected project outcomes were:

1. Legislation and policies on IZ planning and management, IZ environmental and industrial pollution management, responsibilities and investment facilitation for clean & low-carbon technology adopted to meet eco-industrial park (EIP) criteria;
2. Strengthened institutional capacities on eco-industrial park planning and management at central and provincial government level and IZ authorities in selected provinces;
3. Strengthened capacities on technology transfer, clean & low-carbon technologies and resource-efficient and safe practices at company level in the selected IZ and government level;
4. Potential for clean & low-carbon technologies and resource-efficient technical solutions identified, and community enhancement projects clarified;
5. EIP projects to reduce GHG, water consumption, water contaminants and unintentionally produced POPs demonstrated, and community enhancement initiated;
6. Increased public awareness on issues concerning EIP development; and,
7. Effective project management, monitoring, and evaluation implemented.

Project activities started on May 2015 and the project closed on June 2019. UNIDO was the implementing agency, and the executing agency was the Viet Nam Ministry of Planning and Investment (MPI). The project demonstrations took place in three industrial zones: Khanh Phu in the northern province of Ninh Binh, Hoa Khanh in the central province of Danang, and Tra Noc 1 & 2 in the southern city of Can Tho. A Project Steering Committee (PSC), ensured good coordination and collaboration during implementation. *MPI* chaired the PSC. The PSC included representatives of the Ministry of Natural Resources and Environment (MONRE), the Ministry of Industry and Trade (MOIT), Ministry of Science and Technology (MOST) and the Ministry of Finance (MOF), representatives from the Provincial People's Committees (PPC) of the provinces participating in the project, representatives from the participating industrial zones management boards and from the IZs surrounding communities, and the National Project Director (NPD) and the UNIDO Project Manager.

Projects results and contributions to the conditions necessary for the transformation of industrial zones to eco-industrial parks.

The project was highly effective and fully achieved its targeted outcomes and made important contributions to the necessary conditions for the transformation from industrial zones to eco-industrial parks in Viet Nam. The project was also highly efficient, it adopted a comprehensive and integrated approach which involved interventions in diverse sectors,

scales and localities, and engaged the participation of a large array of stakeholders to support the adoption of resource-efficient and cleaner production (RECP), industrial symbiosis (IS), and investments to increase efficiency and reduce waste at the scale of the industrial zone. The project was highly relevant to Viet Nam's policies towards sustainable industrial development. The project was also highly relevant to the GEF as it helped build capacities in Viet Nam to make better use of resources and prevent GHG emissions and pollution discharges. The project contributed to the following necessary conditions for the transformation to eco-industrial parks.

Awareness and Capacities for EIP management at the central, provincial, and EIP levels. Awareness-raising and capacity development went hand in hand. The project approach was to simultaneously support capacities development for EIP management of central, provincial, and park authorities, enterprises, and academicians. Project workshops and capacity building activities reached more than 2300 persons in Hanoi and the three parks and provinces. The project steering committee (PSC) meetings were also used to disseminate information and promote feedback and exchanges among the different participating entities. This approach was key to develop a shared understanding of the EIP opportunities across the different regions, levels of public administration, enterprises, and other stakeholders.

Identification and transfer of technology and business models conducive to EIPs.

The project supported the development of capacities in Viet Nam to identify, test, and transfer technologies for the transition to EIPs. The project demonstrated three approaches to identify opportunities to promote cleaner production and more efficient use of resources.

- The project supported 73 enterprises in the identification of more 730 opportunities of Resource Efficient and Cleaner Production (RECP), 96% of which were implemented or in the process of implementation at the time the project closed in June 2019.
- The project developed in-depth assessments and feasibility studies for 18 industrial symbiosis opportunities in Can Tho and Da Nang. By the time the project closed, of these opportunities, 12 were implemented, or enterprises were committed to their implementation. These opportunities took place between two or more companies and other times at the scale of the industrial zone.
- The project developed a study for the introduction of co-processing waste in cement plants in the province of Can To. Co-processing is a technology by which cement kilns are adapted to process solid waste as fuel. The project also financed studies for the introduction of photovoltaic energy generation using rooftops in Da Nang and Ninh Binh, did a simple proposal for a rooftop photovoltaic (PV) option in an individual company in Con Tho, it proved also the feasibility of individual PV systems and developed studies on the wastewater treatment needs in the three targeted IZs.

Capacities to address community concerns regarding environmental accidents and pollution. As production activities in the IZs expanded the uncontrolled an increase of pollution that affected the welfare of IZ surrounding communities. The community's initial response was to report these incidents to district authorities. When responses from the authorities did not come or were slow, the communities took matters in their own hands by blocking the entrance of the IZ or stopping trucks from using rural roads. The project sought to provide for alternative solutions by developing channels communication between the communities, industrial zone management boards, and the authorities. The project also

developed a handbook and trained community representative on readiness and response to accidents, and on how to identify conditions in which accidents could take place.

Policy and regulatory conditions supportive to eco-industrial parks. The project had a key role in supporting the preparation of Decree 82, which defines inter alia the conditions and requirements for the recognition as Eco industrial park in Viet Nam. The main role of the project was to demonstrate the feasibility and benefits of EIPs in Viet Nam, and to demonstrate the multiple benefits of resource-efficient and cleaner production (RECP), industrial symbiosis (IS) to small and medium enterprises (SME). The project sponsored study tours by public officials, business leaders, and academicians to help them understand first-hand the benefits of eco-industrial parks. Two expert group meetings allowed experts from Viet Nam and other countries to compare information, learn from other experience, and to explore the challenges and opportunities in the establishment of eco-industrial parks and the applicability of industrial symbiosis. Through these events, the project provided a stage in which Viet Nameese key stakeholders jointly develop a common understanding of what worked in their country conditions. The project developed a roadmap for the formation of EIP in Viet Nam and also supported the development of environment, social and economic Indicators for EIP, including a detailed overview of monitoring requirements, targets against indicators, guidelines for the calculation of indicators.

Financing for RECP, IS, and EIP investments. An initial project assumption was that the main barrier to SMEs and IZ financing was the lack of information among SMEs and IZ on how to access financing of the established financial institutions. Early in the implementation process the project developed guidelines on the requirements of financial institutions in Viet Nam. But by August 2018, none of the enterprises participating in the RECP assessments had accessed financing. Lack of financing had prevented the implementation of some of the identified RECP options. The project carried out several activities to address this issue. One of them was to support SMEs to develop funding proposals to financial institutions. By June 2019, one out of nine that had been submitted were selected for funding and one was approved for funding and other seven ones were refused because of lending mechanism change. After eight months of multiple information requests from the financial institution, the loans of the two eligible proposals had yet to be approved. The project's experience illustrated the difficulties in overcoming the administrative barriers to SME financing. Unless solutions are found, it is very likely that once low hanging fruits are exhausted, administrative barrier swill become a major hurdle as further progress for SME to be part of EIP.

Project impacts

The project met or exceeded most of its environmental targets. Avoidance of CO_{2eq} emissions are expected to considerably surpass the target. The project did not meet its targets on POPs because there were very few opportunities to implement technologies that would reduce POPs emissions in the IZs where the project operated. Two firms that had significant POPs emissions closed or deduced significantly (50%) operations after the project started for reasons unrelated to the project. It is likely that the project could have met this target that the selected IZ had a different composition of industries.

Projected lifetime environmental benefits and targets at CEO endorsement.

| Pollutant or resource | Current and approved Investments (per year) | Pipeline investments (per year) | Total projected to life of investments | Targets at CEO endorsement |
|------------------------------|--|--|---|-----------------------------------|
| CO_{2eq} * | 32,361 t | 128,300 t | 2,901,681 t | 1,273,000 t |
| COD reduction | 75 118 kg | -- | 225,354 kg/y | 76,900 kg/y |
| Water use reduction | 2,705,333 m ³ | -- | 8,115,999 m ³ /y | 6,000,000 m ³ /y |
| UP POPs** | 6,754 µg | -- | 20,262 µg/y | 810 mg/y** |
| Solid waste | 5,750 t | 82,440 t | 669,774 t/y | -- |

The new models and technologies, in addition to reducing pollution and use of resources, also reduced costs, increased income, and improved the enterprises capacity to compete in the market. During 2016 and 2018, the participating enterprises adopting RECP options invested in total over USD 11 million and got a total return of USD 9.6 million. Enterprises participating on IS invested USD 2,744,498 during 2019 and in return got USD 1,162,867. The studies for strategic park level investments also made good business case for these investments. The Co-processing plant for Can Tho would require a far smaller investment than the investment on landfills or incinerators. Co-processing is also easier to implement given the likely opposition to land fields and incinerators by local residents. It is also much safer under the proper operating conditions. The photovoltaic studies also indicate annual savings of USD 443,100 in Tra Noc and USD 503,400 in Hoa Khanh.

While there is still significant room for improvement in respect to labor and social conditions in IZ, the incorporation of RECP and IS into the production processes has resulted less clutter and more organized and cleaner working environment for workers and have reduced the risk of accidents in the factory floor. The better communication between community leaders, enterprises, and authorities, the training carried out on preventing environmental accidents, and the channels of communication developed with the help of the project are likely to improve flow of information and to lead to quicker response to environmental accidents.

Ensuring the sustainability of the development trajectory to Eco-industrial parks.

The project made important contributions to the conditions necessary for the transformation from IZ to EIP in Viet Nam by helping to build the foundations for a sustainable industrial development trajectory. The project has also fostered the mainstreaming, replication, and scaling-up of innovations that can help retain the development momentum towards EIPs. But the transition will take place through an interactive process of continuous improvement over time. To maintain this trajectory of development, it will be necessary to continue to foster the conditions necessary for the transformation from IZs to EIPs, which will require an ongoing effort to identify and

manage risks and barriers that endanger or obstruct this development trajectory. The evaluation identified the following risk to the sustainability of the new trajectory of development.

- The message does not reach the enterprises that need to implement change
- Labor and technical capacities are insufficient to implement the needed technologies at the required scales.
- The SME difficulties in obtaining financing keep adoption of innovations to “low hanging fruits.”
- Conflict resurgence in account of an insufficient follow-up to the strengthening communication channels and capacities among communities, IZs, and enterprises to prevent environmental accidents
- While the adoption of Decree 82 was an important step in the establishment of the policy framework for EIPs, multiple regulatory barriers remain that prevent the adoption of RECP and IS options.

Recommendations

Recommendation 1. MPI, MONRE and MOST should ensure a quick drafting of the circulars for Decree 82. This process should engage key stakeholders through a consultation that fosters dialogue among central government ministries, provincial governments, industrial zone development boards, SME representatives, representatives of IZ surrounding communities, academia, and NGOs.

Recommendation 2. MPI, MONRE, MOIT and other relevant institutions should immediately initiate a process to set standards that remove the following regulatory barriers to EIP development:

- The one-megawatt restriction of electricity generation by entities connected to the grid.
- The prohibition of the use of used industrial wastewater after it has been properly treated.
- The lack of a comprehensive policy pertaining solid waste management that ensures maximum recycling (material and thermal) as well as proper and safe disposal of waste that can't be recycled.

Recommendation 3. The government of Viet Nam, SECO, VEPF, and other financial institutions in Viet Nam should continue to explore ways to overcome administrative barriers that prevent SMEs from having access to the financial resources necessary to invest in technologies needed in the transition to EIPs.

Recommendation 4. UNIDO and MPI should in future projects more closely examine *ex ante* the enterprises financial health and business plans to help reduce the enterprises drop off rate during implementation. UNIDO and MPI should also ensure that in future projects IZ selected include enterprises with productive activities that will make it feasible to meet the project's environmental targets.

Recommendation 5. MPI and the governments of the provinces of Can Tho, Danang, and Ninh Binh should build on the constructive experience of the project to continue to enhance communication between industrial zone management boards and surrounding communities and to develop mechanisms to give voice to communities in the planning and monitoring of industrial zones.

| # | <u>Evaluation criteria</u> | <u>Mandatory rating</u> |
|----------|--|-------------------------|
| A | Impact (or progress toward impact) | |
| B | Project design | S |
| 1 | • Overall design | S |
| 2 | • Logframe | S |
| C | Project performance | HS |
| 1 | • Relevance | HS |
| 2 | • Effectiveness | HS |
| 3 | • Efficiency | HS |
| 4 | • Sustainability of benefits | HS |
| D | Cross-cutting performance criteria | HS |
| 1 | • Gender mainstreaming | S |
| 2 | • M&E: ✓ M&E design ✓ M&E implementation | HS |
| 3 | • Results-based Management (RBM) | HS |
| E | Performance of partners | HS |
| 1 | • UNIDO | HS |
| 2 | • National counterparts | HS |
| 3 | • Donor | S |
| F | Overall assessment | HS |

Project ratings

| Score | | Rating Definition |
|-------|------------------------------|--|
| 6 | HS Highly satisfactory | Level of achievement exceeds expectations, and there is no shortcoming. |
| 5 | S Satisfactory | Level of achievement meets expectations (indicatively, over 80-95 percent), and there is no or minor shortcoming. |
| 4 | MS Satisfactory | Level of achievement more or less meets expectations (indicatively, 60 to 80 percent), and there are some shortcomings. |
| 3 | MU Moderately Unsatisfactory | Level of achievement is somewhat lower than expected (indicatively, less than 60 percent), and there are significant shortcomings. |
| 2 | U Unsatisfactory | Level of achievement is substantially lower than expected, and there are major shortcomings. |
| 1 | HU Highly unsatisfactory | Level of achievement is negligible, and there are severe shortcomings. |

I. Introduction

UNIDO started conversations with the government of Viet Nam on project in 2010. At this time, Viet Nam had experienced ten years of rapid economic growth driven mainly by the processing and manufacturing sectors. Viet Nam's economic reforms and macroeconomic management since 1990 had led to a gross domestic product (GDP) growth that averaged about 7 percent per year. To facilitate the emergence of new industries by 2013, the government had established 173 industrial zones (IZ) with an average of 90 companies in each zone. At this time, when UNIDO prepared the project, basic environmental legislation was in place but, insufficient regulations and enforcement capacity had done little to halt environmental degradation.

Provincial authorities under strong competition to attract investors to IZ were often lenient in the enforcement of environmental standards and IZ authorities also minimized fees made to companies for infrastructure services. Approximately 70% of wastewater from industrial zones was directly discharged without any treatment affecting agriculture and aquaculture and causing severe pollution of surface and underground water as well to the marine ecosystems. Untreated solid waste in industrial zones with a high proportion (20%) of hazardous solids was also in the rise. These conditions contributed to an adverse change in human health of IZ neighbouring communities and on environmental degradation. The fast-paced economic development also contributed to a high consumption of natural gas, electricity, and especially coal resulting in a rapid growth of GHG emissions.

In response to this situation, the Viet Nameese government had by 2013 started a series of broad programs, not restricted to IZ, to optimize industrial processes and introduce environmental controls. Viet Nam is a party to the Stockholm Convention from its beginning and made the reduction, or elimination of persistent organic pollutants (POPs) releases a national priority. Thus, the government had adopted laws and regulations prohibiting of the production and use of all POPs pesticides.

The government had also received multiple grants and support from the GEF, the European Community, DANIDA and other donors to address issues related to industrial pollution. At the time of project preparation, UNIDO was implementing a global program on RECP and had been active in Viet Nam since 1996. UNIDO had also helped to launch the Viet Nam Cleaner Production Centre (VNCPC) by the end of the 1998 which by 2013 had grown to a national center of excellence recognized by the national and international stakeholders.

During project preparation, UNIDO identified four key barriers to sound environmental management in industry and environmentally sound management in IZs in Viet Nam:

- Lack of knowledge by in companies and service providers of available clean & low-carbon technology and practices and optimization strategies;
- Lack of awareness about alternative financial sources for investments in environmentally friendly technologies, such as the Swiss Green Credit Trust Fund or the Viet Nam Environment Protection Fund (VEPF);
- Lack of public economic incentives and confidence in the recycling economy and company cooperation within the IZ;

- Little enforcement of environmental legislation, unclear responsibility among authorities, lack of relevant expertise in the IZ management boards, and a lack of conditions and guidelines for the transformation of IZ into eco-industrial parks.

GEF approved the project in December 2013 as a first multifocal area project in the areas of climate change, international waters and Persistent Organic Pollutants (POPs). Subsequently, the project went through an approval process within the Government of Viet Nam, and it started operations in May of 2015. The GEF granted an extension on September 2017, operation lasted four years, and the project closed in June of 2019.

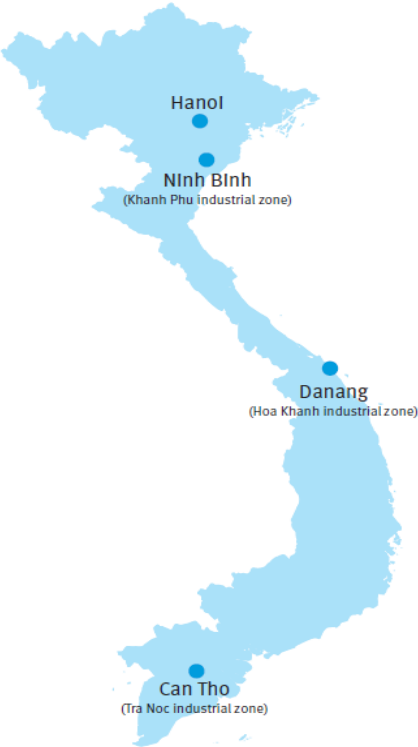
II. Project Design

A. Project objectives and components

The main objective of the project is “Increased transfer, deployment and diffusion of clean and low-carbon technologies and practices for the minimization of GHG emissions, POPs releases and water pollutants as well as improved water-efficiency and the sound management of chemicals in industrial zones (IZ) of Viet Nam.”

Expected Outcomes:

- Legislation and policies on IZ planning and management, IZ environmental and industrial pollution management, responsibilities and investment facilitation for clean & low-carbon technology adopted to meet eco-industrial park (EIP) criteria;
- Strengthened institutional capacities on eco-industrial park planning and management at central and provincial government level and IZ authorities in selected provinces;
- Strengthened capacities on technology transfer, clean & low-carbon technologies and resource-efficient and safe practices at company level in the selected IZ and government level;
- Potential for clean & low-carbon technologies and resource-efficient technical solutions identified, and community enhancement projects clarified;
- EIP projects to reduce GHG, water consumption, water contaminants and unintentionally produced POPs demonstrated, and community enhancement initiated;
- Increased public awareness on issues concerning EIP development; and,
- Effective project management, monitoring, and evaluation implemented.



The project had demonstrations in three industrial zones Khanh Phu in the northern province of Ninh Binh, Hoa Khanh in the central province of Danang and Tra Noc 1 & 2 in the southern city of Can Tho (Figure 1 / Map)

B. Implementation arrangements,

UNIDO was responsible to the GEF for the implementation of the project. The selection of sub-contractors was in line with UNIDO’s rules and regulations and consultation with the Viet Nameese government. A project manager in UNIDO Headquarters (Vienna), who was aided by two assistants in Vienna, was appointed to supervise the project implementation.

The national executing agency was the Ministry of Planning and Investment (MPI). Overall, MPI was also responsible for coordination with other participating ministries and agencies in executing the project. Other important participating ministers included:

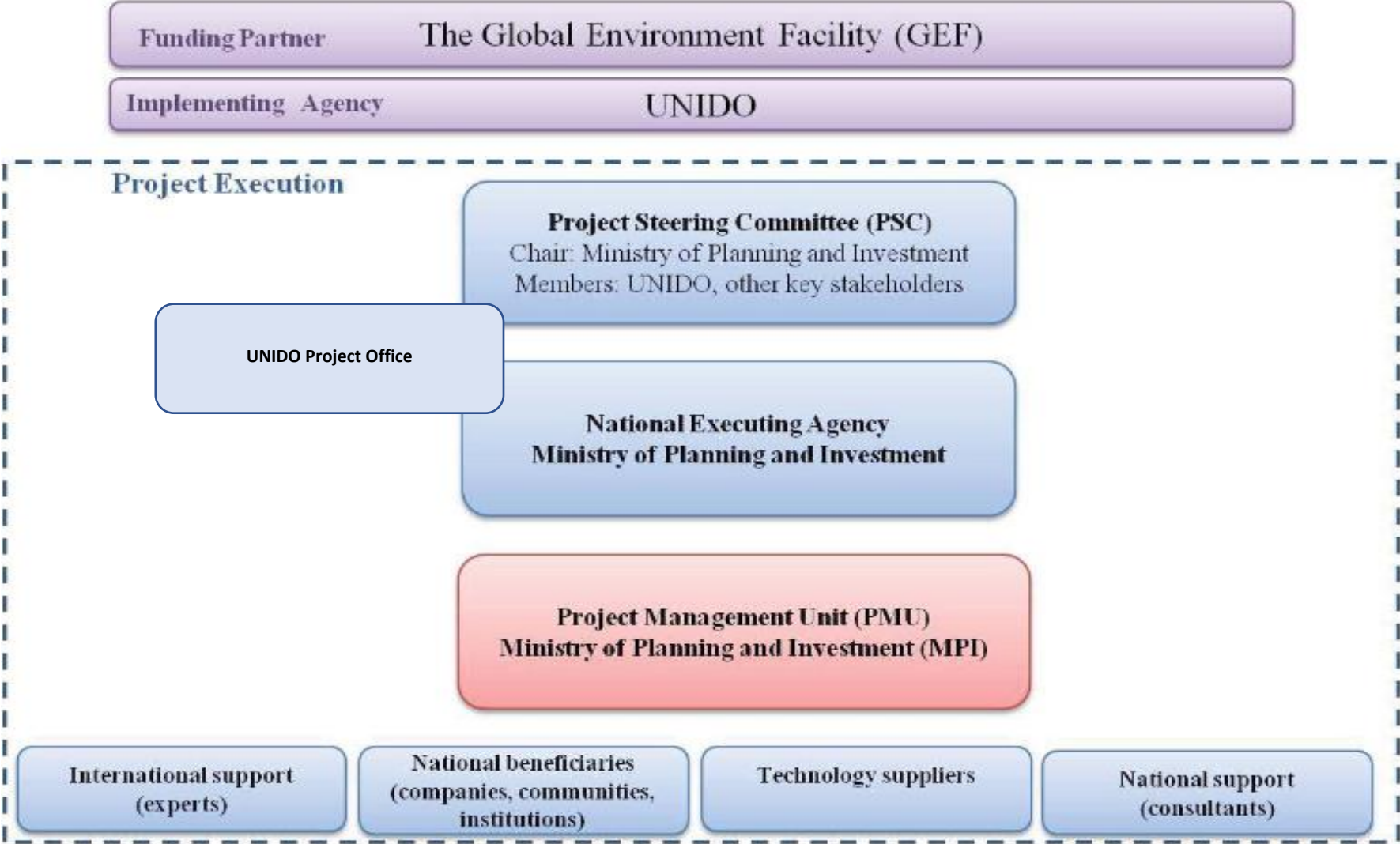
- The Ministry of Natural Resources and Environment (MONRE) to address issues related to regulations and policies on environmental management of IZ and sustainable production.
- The Ministry of Industry and Trade (MOIT) addressed institutional capacity building on IZ development and strengthening regulatory and policy framework.
- The Ministry of Science and Technology (MOST) supported the project on issues related to the technology innovation and application program according

A Project Steering Committee (PSC), ensured good coordination and collaboration among the various participating ministries, provincial and city authorities, park management boards, community representatives, and other stakeholders. The MPI chaired the PSC and included representatives of MONRE, MOIT, MOST and the Ministry of Finance (MOF), representatives from the three selected provinces and their respective Provincial People's Committees (PPC), representatives from the industrial zones management boards and IZ surrounding communities, and the National Project Director (NPD) and the UNIDO Project Manager. The PSC's responsibilities were to:

- Provide overall guidance for project execution to the PMUs, especially on cross-cutting issues which require consensus from the various stakeholders involved in the project;
- Ensure that recommended policy and institutional renovation undertaken under the project are consistent with the country's overall agenda;
- Ensure full cooperation of various stakeholders under their jurisdictions to provide access and support to the PMU in carrying out their tasks;
- Review and monitor the project execution progress.

The Project Management Unit (PMU) was responsible for the overall project execution on behalf of the PSC and in coordination with UNIDO. The PMU consisted of the National Project Director (NPD), employed and appointed by MPI, a National Project Coordinator (NPC) also appointed by MPI to assist the NDP in the regular monitoring of project execution (Figure 2).

Figure 2 Project implementation arrangement



C. Project budget

On December 2013 the GEF CEO endorsed a grant for USD 3 524 000 (plus the agency fee of USD 352 000) for an implementation period of 4.5 years (including six months inception phase). At the time of CEO endorsement, several ministries and funds in Viet Nam, the Switzerland State Secretariat of Economic Affairs (SECO) and UNIDO committed co-financing for USD 49 705 265. This resulted in an overall project commitments of USD 53,229,265. (Table 1).

Table 1. Project Financing Summary

| Source of funds | At CEO Endorsement |
|---------------------------------------|--------------------|
| Financing (GEF) | 3,524,000 |
| Financing SECO | 1,000,000 |
| Other Co-financing (Cash and In-kind) | 48,567,265 |
| Total (USD) | 53,229,265 |

Co-financing at CEO endorsement included USD 1 800 000 of in-kind financing and USD 47,797,265 in cash financing. Cash co-financing commitments at CEO endorsement were mostly from the People's Committee of the three provinces of the targeted industrial zones (Danang, Can Tho, and Ninh Binh), The Viet Nam Environment Protection Fund (VEPF), the Green Credit Trust Fund (GCTF) of SECO, the Viet Nam Development Bank (VDB), The Ministry of industry and trade (MOIT) and other ministries. Co-funding commitments at CEO endorsement also included USD 1 230 000 from SECO and UNIDO (Table 2). Country financial sources programmed financing for new investments.

Table 2. Co-financing at CEO Endorsement and at project completion (June 2019)¹

| Name of Co-financier (source) | In-kind | Cash | Total committed (USD) | Realized Co-financing |
|---|-----------|------------|-----------------------|-----------------------|
| Ministry of planning and investment (MPI) | 1,500,000 | 108,000 | 1,500,000 | 1,570,178 |
| Ministry of industry and trade (MOIT) | 50,000 | | 50,000 | 256,917 |
| Ministry of science and technology (MOST) | 50,000 | | 50,000 | 1,878,656 |
| Ninh Binh People's Committee | | 10,572,359 | 10,572,359 | 9,228,239 |
| Danang People's Committee | | 19,500,000 | 19,500,000 | 2,364,167 |

¹ Annex 3 includes a table produced by MPI that provides a detailed explanation of the utilization of co-financing during the project. Information on SECO and the investments carried out by enterprises on RECP and IS was obtained from the project data base managed by UNIDO in Vienna.

| Name of Co-financier (source) | In-kind | Cash | Total committed (USD) | Realized Co-financing |
|---|------------------|-------------------|-----------------------|-----------------------|
| Can Tho People's Committee | | 6,924,906 | 6,924,906 | 8,878,656 |
| Green Credit Trust Fund (GCTF) of SECO | | 3,000,000 | 3,000,000 | 0 |
| Viet Nam Environment Protection Fund (VEPF) | | 5,000,000 | 5,000,000 | 0 |
| Viet Nam development bank (VDB) | | 1,770,000 | 1,770,000 | 0 |
| UNIDO | 200,000 | 30,000 | 230,000 | 0 |
| UNIDO/ SECO | | 1,000,000 | 1,000,000 | 854,789 ² |
| Participating enterprises (RECP related) | | | | 11,070,561 |
| Participating enterprises (IS related) | | | | 2,744,498 |
| Total Co-financing (USD) | 1,800,000 | 41,797,265 | 49,597,265 | 38,846,661 |

By the time of the terminal evaluation, the total co-financing commitments realized during the project were of USD 38, 776,483. But the investments pledged by the three provincial governments were expected to be completed after the project ended. The Danang and Lien Chieu wastewater systems were expected to be finished within a year of project completion. The wastewater treatment plant in Con Tho, phase II was also expected to be in operation end of 2019. Construction on these wastewater systems was delayed due to negotiations with local residents to clear the construction sites. During implementation, co-financing by SECO was adjusted from USD one million to USD 753,348 in account of fluctuations in the exchange rate. SECO also provided a new contribution through UNDP for USD 101,441. GCTF/SECO halted operations in account of internal administrative issues. By project completion VDB had not finance any of the participating enterprises because enterprises did not meet the bank's lending requirements. VEPF was in the process of reviewing two loans by the time the evaluation took place, but loans had not been approved. Despite these shortfalls and delays, the province of Can Tho and the participating enterprises carried out additional investments not anticipated during CEO endorsement that amounted to more than USD 16 million. Thus, it is highly likely that within a year of project completion realized co-financing will surpass the co-financing pledged at CEO endorsement.

Funds provided by the GEF and SECO were programmed to support processes leading to policy reforms, institution and capacity development, and to studies to identify opportunities for Resource Efficient and Cleaner Production (RECP), Industrial Symbiosis (IS) and industrial zone strategic services and investments (Table 3). The co-financing by

² The project document at CEO approval indicates that SECO would provide USD 1 000 000 as co-financing. This figure was calculated based on the exchange rate at the time of commitment of EUR 655,085. Exchange rate fluctuations rendered the SECO contribution to USD 753,348

provincial governments was mostly destined to pilot demonstrations and investments and to finance capacity building activities in the respective ministries.

Table 3. Financing plan summary breakdown³

| Component | GEF Grant | SECO | UNDP | Co-financing at CEO Endorsement | Total |
|---|------------------|----------------|----------------|--|-------------------|
| 1. Policy | 150,000 | | | 133,000 | 283,000 |
| 2. Institutions & 3. Capacity | 370,000 | 47,706 | 19,721 | 930,000 | 1,367,427 |
| 4. Potential for improve environmental management | 1,336,000 | 10,580 | 98,831 | 3,120,000 | 4,565,411 |
| 5. Pilot demonstrations & 6. Awareness | 1,300,000 | | | 45,026,265 | 46,326,265 |
| 7 M&E | 200,000 | 695,062 | | 125,000 | 1,020,062 |
| 8. Project Management | 168,000 | | | 263,000 | 431,000 |
| Total | 3,524,000 | 753,348 | 101,441 | 49,597,265 | 52,976,054 |

³ Source: Project document & Progress Report. Column of Country Financing Includes USD 48,367,265 of country co-financing plus USD 1,000,000 of SECO contribution through UNIDO and USD 230,000 of in-kind contribution by UNIDO.

III. Objectives and approach of the evaluation

A. Evaluation Objectives

This evaluation has two objectives. One is to assess the project performance. To this end, the evaluation provides an analysis of the effectiveness, efficiency, and relevance of the project outputs and outcomes. The effectiveness assessment focuses in analysis of the extent and forms by which project output and outcomes contributed to the necessary conditions to achieve the long-term objectives of the project. The assessment of project efficiency provides an analysis of the use of time, money and technical expertise by the project. The relevance assessment examines the extent to which project objectives and results of the project matches the needs and expectations of the various stakeholders engaged in the project, including among them the government, provinces, enterprises, communities, and donors. The sustainability assessment concentrates mostly on the extent to which the development trajectory and momentum towards EIPs is likely to be sustained after the project ends. This assessment includes an analysis of the mechanism that are in place to catalyse the broader adoption of technologies, practices, and behaviour promoted by the project and the identification of the risks to the development trajectory that was supported by the project.

The second objective of this evaluation is to develop a series of findings and recommendations for enhancing the transformational change initiated by the project and to improve the design and performance of similar projects. As such, this terminal evaluation will include examples of high accomplishment and of areas that require further attention. The evaluation will also identify the factors that have contributed or hindered project accomplishments. The terminal evaluation (TE) covers the duration of the project from its starting date 17 October 2014 to June 2019.

B. Evaluation Questions

This evaluation addresses the following key questions:

1. What are the project's key results (outputs, outcome, and impact)? Did the project achieved the expected results or how likely is it that the expected results will be achieved? Were results cost-effective (did they provide good value for money)? To what extent will the achieved results sustain after the completion of the project?
2. To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute conditions leading to the sound management of IZs and cleaner and more efficient production in the selected IZs?
3. What are the key factors that enabled or limited the project contributions to the necessary conditions to reach the long-term transformation of IZs to EIPs?
4. What are the key recommendations and lessons that emerge from this project?

C. Evaluation Approach

This terminal evaluation follows the UNIDO Evaluation Policy⁴. The evaluation was carried out using a participatory approach seeking the perspectives and consulting the key stakeholders of the project. The evaluation team adopted a theory of change approach to identify the causal links between project activities, outputs, and outcomes and to assess the

⁴ UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)

extent to which the project contributed to conditions necessary for the transformation of three targeted industrial zones (IS) to Eco-industrial parks (EIP). The evaluation gave considerable attention to assessing the extent to which the project helped develop links across scales, stakeholders and time. This included the analysis of the links between the enterprises, the industrial park, provincial governments and central government policies and legal and regulatory system. Evaluation also assessed the extent to which the project helped put in place mechanisms to continue to promote the adoption of changes after the project ended and beyond the specific companies and industrial zones targeted by the project.

The evaluation team used mixed methods to gather and triangulate information (qualitative and quantitative), to assess results and causality, to assess diverse factors affecting the achievement of results and when possible explore counterfactual scenarios (Garcia and Zazueta 2015). The project manager in Vienna provided the evaluation team full access to the project data base. This data bases included a wealth of information pertaining project preparation documents, project monitoring spreadsheets, the project's technical reports, minutes of the Project Steering Committee (PSC) meetings, project publications, the project website, etc. Country visit took place from June 2 to 14, 2019 (Annex 1). In Hanoi, the team interviewed officers from the central ministries, project staff, donors and the UNIDO country representative.

The evaluation team also visited the three industrial parks targeted by the project and interviewed company managers, community representatives, park officials, provincial authorities and contractors. In total, the evaluation team interacted with 74 stakeholders, 47 men, and 27 women. The evaluation team kept constant communication with the project experts and the UNIDO project management. Given the extremely technical nature of this project, these interaction with staff proved to be extremely fruitful as they allowed the evaluation team to develop a better understanding of the nuances and the specific opportunities and challenges facing the project and also helped to interpret and assess the reliability of information. The evaluation team verified all information by checking the sources of aggregated data, assessing methods to aggregate data and through spot-checking information during interviews with stakeholders.

D. Theory of Change

The theory of change (TOC) is a heuristic approach to help clarify the links between project activities and long-term objectives. As few projects under implementation have developed TOCs; evaluators typically develop a tentative TOC that is verified and amended during interviews with project managers and project stakeholders. Critical in the development of a TOC is the identification of the conditions likely to bring about the behavioural changes required to achieve the long-term goal of the project (Chen 1990; Mayne 2008), now referred to as system transformations.

Given the complex nature of the interactions of human behaviour and the environment (the social-ecological system), and the unpredictability of outcomes of these interactions, it is also critical to identify the key assumptions made during project design and the ways project management adapted to unexpected circumstance during implementation (Folke *et al.* 2002; Levin 2003).

The use of a theory of change in evaluation does not mean that the project will be held accountable for having resulted in system change. System transformations take place in

time scales go far beyond the duration of any specific project. Evaluators use the TOC to assess the extent to which project activities contribute the conditions that are likely lead to the long-term goals transformations. Evaluators also use the TOC as a tool to better understand how a project interacts with the process it seeks to influence and to derive lessons and provide recommendations to improve future interventions.

There was no explicit TOC developed for this project. However, the project document included six project components, each of which included a set of activities that contributed to one project outcome. The promised outcomes identified in the project document mostly correspond to conditions necessary to steer change towards the transformation to more efficient and cleaner production in industrial zones. The project log frame (Annex 2) outlines the intended chain of causality and identifies the indicators, baseline, and targets to track the extent to which the project delivered its promised outputs and outcomes.

The TOC for the project (Figure 3) provides a framework for analysis and a set of lines of inquiry to assess the extent and forms by which the project contributed to the process of transformation from IZ to EIPs in Viet Nam. These lines of inquiry pertain to:

- The necessary conditions for the transformation of the system in the following domains: cultural (mostly related to knowledge and awareness raising), administrative (related to institutional capacities), technological, financial and legal & regulatory.
- The interactions among domains and subsystems, scales, and stakeholders. For example, the extent to which adoption of new technology participating enterprises and IZs contributed to regulatory and administrative reforms that remove barriers to the further adoption of technology.
- The mechanisms that need be in place to ensure (catalyze) the broader adoption of the new practices once the project ends.

The project document also specified the boundaries of the system and the scales targeted by the project and on which project results could be expected. For example, the project sought to contribute to the transition to eco-industrial parks by testing and introducing new practices and technologies at the scale of the enterprise, the industrial zone and on specific provincial and national policies and regulations.

When addressing social issues and specifically the prevention of environmental accidents, the project focused on the improvement of the communication between industrial zone management boards and the IZ surrounding communities and the strengthening of community's capacities for identification of conditions and to respond to environmental accidents. The clear definition of the targets and boundaries helped project managers identify and capitalize opportunities that emerge along the way. One example of those opportunities was the collaboration with IFC in the development of EIP indicators.

The project adopted an integrated approach that included activities to strengthen capacities in different scale and sector simultaneously. For example, the project supported the development of a regulatory framework at the national level while working with provincial governments to adopt national regulations and building capacities to transfer the new technologies.

The TOC of the EIP project makes the following assumptions:

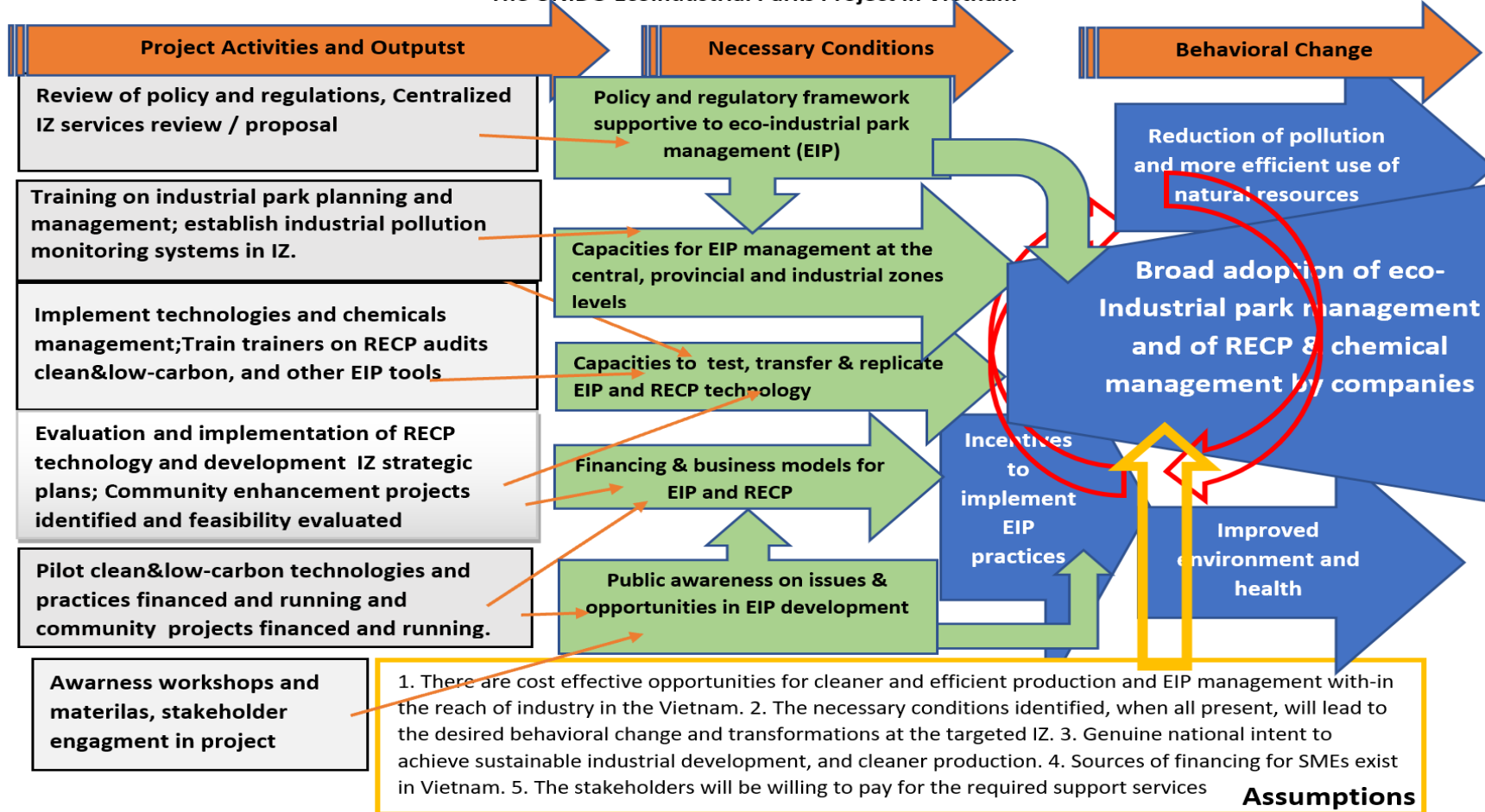
- Genuine Viet Nam government intent to achieve sustainable and environmentally sound industrial development.
- There are cost-effective opportunities for cleaner and efficient production and EIP management with-in the reach of industry in the Viet Nam.
- The stakeholders will be willing to pay for the required support services
- Sources of financing for SMEs exist in Viet Nam.
- The identified necessary conditions will result behavioral changes that will lead to the transformation of IZs to EIPs.

The evaluation team verified the theory of change (Figure 3) during consultation with the team managing the project and other stakeholders. The evaluation team subsequently used the TOC as the framework to assess the extent to which the project contributed to the necessary conditions to support the long transformation of IZs to EIPs.

Figure 3

Theory of Change

The UNIDO Ecoindustrial Parks Project in Vietnam



IV. Project results

A. Project effectiveness

Effectiveness assesses the extent to which the project's achieved its intended outcomes and to which it contributed to its long-term objectives. The project fully achieved its intended outputs (Annex 2), helped remove barriers and contributed to the necessary conditions for the transformation from industrial zones to eco-industrial parks Viet Nam. To do so, the project adopted a comprehensive and integrated approach which involved interventions in diverse sectors, scales and localities, and engaged the participation of a large array of stakeholders to support the adoption of resource-efficient and cleaner production (RECP), industrial symbiosis (IS), and investments to increase efficiency and reduce waste at the scale of the industrial zone⁵.

Project outputs and outcomes contributed to the conditions necessary for transformation identified in the TOC in the following ways:

1. **Awareness raising and Capacities for EIP management at the central, provincial, and EIP levels.**

The project document indicates that at the start of the project, there was a lack of comprehensive awareness and understanding of the eco-industrial park initiatives in Viet Nam. One of the first activities of the project was to commission a communication strategy that identified the key stakeholders that the project needed to target in the public administrations, enterprises, communities, and academia. Awareness-raising and capacity development went hand in hand. The project approach was to simultaneously support capacities development for EIP management at the central, provincial, and park authority administrative, and enterprises and academicians. Project workshops and capacity building activities took place at the central level and in the three parks and provinces. This approach helped develop a shared understanding of the EIP opportunities across the different regions, levels of public administration, enterprises, and other stakeholders.

The consultant's final report on industrial symbiosis points out how the integration of awareness-raising, dissemination of knowledge, and capacity building contributed to high adoption rates of IS opportunities.⁶ The project introduced new frameworks, practices, and technologies using multiple strategies. The project also carried out more than 50 workshops in Hanoi and the three targeted provinces on issues related to EIP management, industrial symbiosis, solid waste management, hazardous chemicals management and water treatment. In total, the project helped develop capacities of over 3000 people, including representatives from the private companies, provincial governments, industrial zone authorities, central government officials, academia and research institutions, NGOs and IP surrounding communities. The project also established a website which reported on

⁵ Industrial Symbiosis (IS) refers to collaborative patterns among enterprises aimed at improving resource efficiency and creating shared services and infrastructure

⁶ VNCP/SOFIES. Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam: Industrial Symbiosis Feasibility Study and Implementation. May 10, 2019, p. 59.

the results of Project Steering Committee (PSC), meetings, published guidelines and handbooks and provided information on project activities.⁷

The project also sponsored the participation of 17 key decision makers from different sectors in a course EIPs in Switzerland, and also supported study tours to Japan, China and several countries in Europe where participants could see firsthand the management of eco-industrial parks. In the case of the EIP course in Switzerland and the study tours, participants from different ministries, provinces, and enterprises had the opportunity to learn and interact with each other in ways that would not have been likely under other circumstances. The project also organized two expert meetings in which experts from around the world and from Viet Nam shared their experience on themes relevant to Eco-industrial Park such as clean production and industrial symbiosis. The study tours and expert meetings were critical to bring on-board high-level decision-makers from MPI and the Viet Nam Academy of Social Sciences and other key entities. Key stakeholders from these two institutions, in particular, were initially skeptical of foreign fixes, but once convinced of the relevance of these approaches to industrial development in Viet Nam, they became the champions in the incorporation of EIP principles into national policies.

The project steering committee (PSC) meetings were also used to disseminate information and promote feedback and exchanges among the different participating entities. These interactions led to a fluid exchange of perspectives among different stakeholders that ultimately resulted in a shared understanding of the challenges and opportunities for action to advance EIPs in Viet Nam.

The first expert meeting organized by the project in 2016 is a good example of the efficacy of this approach. This meeting consisted of 140 participants, including officers from MPI, MONRE, six additional central ministries, the provinces, industrial zone management boards and representatives of enterprises. The meeting provided the opportunity to have a multi-stakeholder discussion of key EIP concepts and to the arrival of some key consensus points that were subsequently incorporated into the revision of the national policy to industrial zones in Decree 82.

The project also supported the development of a course on eco-industrial parks mainly for Universities and in 2018 the project trained 70 persons, including officers, teachers, and managers from the MPI, Institute of Regional Sustainable Development, Viet Nam Economics Institute, and the National Economics University. The faculty of the National Economics University considered that the workshop addressed a knowledge gap in Viet Nam and recommended to develop course on eco-industrial parks management in Graduate Academy of Social Sciences in the Faculty of Sustainable Development.

At the provincial level, the project awareness raising, and capacity building activities help officials to reconcile environmental and development priorities. Authorities in the three provinces faced the challenge of balancing industrial development with the growing demands for environmental safety by the local populations and the emergence of new economic sectors such as tourism. This would require better prevention of environmental accidents and the attraction of clean high value-added industries. One of the key barriers to attracting such industries is that the current model of industrial zone administration stresses renting land to industry while only providing very basic services. The project

⁷ <https://eipvn.org/tieng-viet-activities/guidance-documents/>

worked with the three provincial and park administration authorities to find models of park administration to reconcile the different development needs. One of the key lessons derived during the study tours and the expert meetings is that parks to attract clean industries parks need to provide services that industries value. The project helped to move this agenda forward by conducting assessments pertaining key park level services.

Important challenges remain. Considering the growing number of IZ in Viet Nam⁸, there is a need to continue building capacities and knowledge among provincial and park authorities, SMEs to access financial resources needed to invest in new technology. Enterprises continue to be reluctant to share with park authorities or other companies within the same IP the data on their production process necessary to identify IS opportunities. There is also a need for regulations to specify conditions in which treated wastewater and solid waste can be exchange among enterprises is allowed.⁹

2. Identification and transfer of technology and business models conducive to EIPs.

The project supported the development of capacities to identify, test, and transfer technologies for the transition to EIPs. The project drew of three approaches to identify opportunities that support this technological transition. These were Resource Efficient and Cleaner Production (RECP), industrial symbiosis (IS) and strategic studies for industrial park level investments.

Project support to resource efficient and cleaner production

The project applied the RECP approach to identify opportunities for improvement in the production lines within enterprises. UNIDO defines RECP as “the continuous application of preventive environmental strategies to processes, products, and services to increase efficiency and reduce risks to humans and the environment. RECP addresses the three sustainability dimensions individually and synergistically: a) heightened economic performance through improved productive use of resources, b) environmental protection by conserving resources and minimizing industry’s impact on the natural environment, and c) social enhancement by providing jobs and protecting the wellbeing of workers and local communities”¹⁰.

| Table 4: Implementation of RECP recommendations by enterprises | | |
|---|-----|-------|
| Total RECP recommendations | 758 | 100 % |
| Implemented and maintained | 676 | 89 % |
| Planned for implementation | 33 | 4.4% |
| Still under consideration | 19 | 2.6% |
| Unlikely to be implemented | 30 | 4 % |

⁸ By the time the evaluation took place there were 325 IZs in Viet Nam, compared to 173 in 2013.
⁹ VNCP/SOFIES. Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam: Industrial Symbiosis Feasibility Study and Implementation. May 10, 2019, p59.
¹⁰ <https://www.unido.org/our-focus/safeguarding-environment/resource-efficient-and-low-carbon-industrial-production/resource-efficient-and-cleaner-production-recp>

From June 2016 to December 2018 the project carried out three batches of RECP assessments in 73 enterprises within the three selected industrial parks. These assessments identified over 1000 opportunities for RECP that were narrowed down to 758 after a second review. By the time of that fieldwork for this evaluation took place, 56 enterprises had implemented 676 (89%) of the identified opportunities, 33 (4.4%) of the identified opportunities were under implementation, 19 (2.9%) were under consideration and only 30 (4%) were reported as unlikely to be implemented (Table 4). The participating enterprises immediately implemented no or low-cost interventions such as good housekeeping, process control, on-site reuse, and recycle. In the case of the 19 options that were still under consideration, a factor in the decision was lack of access to capital to invested changes in equipment. Many of the 30 opportunities that are unlikely to be adopted pertain to enterprises that had gone out of business, that had been recently acquired by other organizations and were under new management, and that had changed their product lines and made the investments no longer relevant.¹¹

Project support to industrial symbiosis.

IS is a collaborative pattern among enterprises aimed at improving resource efficiency and creating shared services and infrastructure. The project carried out most of the IS activities during 2017 and 2018. The project developed in-depth assessments and feasibility studies for industrial symbiosis opportunities in Can Tho and Da Nang. Some of these opportunities took place between two or more companies and others at the scale of the industrial zone. The project identified 18 IS opportunities by reviewing the RECP assessments that had been carried out for the 73 enterprises and through a questionnaire sent to over 200 enterprises in the three industrial zones. The project surveyed a total of 137 companies and identified 61 IS candidate interventions. These candidates were assessed based on four criteria: technical feasibility, economic viability, environmental and social aspects, and governance and legal aspects. Subsequently, the project held workshops in the three provinces to hold detailed discussions with SME managers and gather additional information to help fine-tune the feasibility studies. In total, the project trained 167 persons during this process. The project also used these workshops to identify concrete next steps for the implementation of IS. A key consideration during the selection was to secure the commitment of IZ management boards and the targeted enterprises to the further analysis of the IS opportunities, as assessments require considerable information and engagement from the enterprises and IZs.

| Table 5: Implementation of industrial symbiosis recommendations by enterprises | | |
|---|------------|------------|
| Companies surveyed | 137 | |
| Companies with IS opportunities identified | 61 | |
| Companies with IS opportunities studied | 18 | 100% |
| Companies with planning IS opportunities (committed) | 12 | 67% |
| IS opportunities under / up for implementation | 10 | 39% |
| IS opportunities Implemented | 2 | 11% |

¹¹ One of the recommendations of the consultant is that in the future the selection process should give more attention to the financial aspects of the enterprises as there is a large number of turnovers among SMEs in Viet Nam. (VCRECP XXXX)

By May 2019, enterprises had implemented two opportunities, ten were under implementation, and two were planned for implementation. In other words, two-thirds of the opportunities detected have been adopted by stakeholders. It is uncertain if the companies will carry out the remaining recommended options (Table 5).

As in the case of the RECP opportunities, there was a high rate of adoption of IS by participating enterprises. But challenges remained. The consultant's final report identified lack of access to financial resources to invest in new technology as a key factor affecting the adoption of IS opportunities. The report also indicated that it the gathering standardized and consistent data necessary to identify industrial symbioses opportunities is difficult and time consuming. Companies were also frequently reluctant to share data on raw materials, energy, and water consumption. Waste data is considered sensitive by some companies. Also, enterprises are sometimes reluctant make their production process reliant on the operation of other enterprises. The report also indicated that "Since environmental concerns are often neglected by companies, environmental standards sometimes not enforced, some RECP interventions are not economically interesting for companies."¹²

3. Project support to identify strategic investments and at the industrial zone scale

One of the key lessons derived participants during the study tours, and the expert meetings sponsored by the project is that there are many opportunities to improve production by sharing services at the park level. Another lesson is that parks that attract cleaner and higher value-added industries are also parks that offer an array of services to their tenants. Thus, also supporting efficiencies at the scale of the enterprise, the project also sought opportunities to improve resource use efficiencies and waste management at the scale of the industrial zone. In 2017, the project supported studies in the three IZ to identify the wastewater content to more precisely develop water treatment strategies. The project also financed studies for the introduction of more efficient technologies that could be implemented at the park scale.

Co-processing. One was the study on co-processing waste in cement plants as an alternative solution for solid waste disposal in Can Tho¹³. The preliminary findings of the study indicated that there is only one license firm doing co-processing in Viet Nam with other waiting for official permits or just having conducted trial burns. Co-processing has the potential of substituent 7.5 million tons of coal and reducing emissions by 14.5 million tons of CO₂e in the country.¹⁴ The consultant report indicates that "Viet Nam government has provided a relevant legal framework for co-processing activities that cement plants can follow. Although the national government is promoting co-processing technology, some provincial/ district governments still have limited knowledge about the practice and thus a wrong perception about co-processing." The report also points out that "Clear technical guidelines for pre-processing activities are missing. Pre-processing activities include the process to turn waste into alternative fuels and raw materials. The pre-processing activity

¹² VNCPC/SOFIES. Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam: Industrial Symbiosis Feasibility Study and Implementation. May 10, 2019.

¹³ Co-processing is a technology by which cement kilns are adapted to process solid waste as fuel.

¹⁴ Dieter Mutz, Co-processing Waste Material in Cement Plants. A solution for EIP. Implementation of Eco-industrial park initiative for sustainable industrial zones in Viet Nam, Project closing Workshop. June 12, 2019.

is necessary for successful operation of co-processing and treat waste safely in kilns without creating impact to the cement product quality.”¹⁵

Photovoltaic power generation. Technical studies in Da Nang and Ninh Binh also indicate the feasibility of photovoltaic electrical plants that using about one-third of the rooftops of existing buildings to install photovoltaic panels could cover 31% of the electricity demand in Tra Noc and 14% in Hoa Khanh with a payback period of around eight years. These investments would result in a savings of around half a million USD in each industrial zone and would avoid over 33 000 t/CO₂ annually. The technology proposed by the project has been tested in Viet Nam. Deep-C, a private park developer in Viet Nam, already installed a photovoltaic plant to provide electricity in one industrial park that is not connected to the grid. The studies indicated that these opportunities are technically feasible and economically viable. But the current regulations on electricity do not provide incentives for the necessary investments as it limits to one megawatt a year the amount of electricity that a private operator can sell to the grid.

During interviews for this evaluation, park authorities in the three provinces indicated that they are considering the implementation of the opportunities for investment identified by the project. But they also expressed concerns that echoed the concerns that have been expressed by the enterprises and IZ authorities pertaining to the fact that national regulatory barriers prevented the implementation and broad adoption of these opportunities. While there are enterprises that would be willing to invest in the new technology and in providing such services to park tenants, these enterprises also indicated MONRE and MOIT needed to revise environmental and RE regulations before undertaking the investments.

Financing for RECP, IS, and EIP investments.

The transition to EIP will require that enterprises and industrial park developers have access to the resources needed to finance investments in new technology. During project preparation, UNIDO determined that programs existed to finance investments by SMEs. The project assumed that the barrier in accessing funds was related to the lack of information among SMEs on how to access such funds. Also, during project preparation, and to ensure that SMEs had access to the necessary financial resources for technological transition, UNIDO invited three funding institutions to pledge to co-financing to the project. These were Viet Nam Environment Protection Fund (VEPF) with USD five million, Viet Nam Development Bank (VDB) with USD1.7 million and Green Credit Trust Fund (GCTF) of SECO with USD three million.

Acting on the assumption that the main barrier to financing was the lack of information among SMEs and IZ on how to access financing of the established financial institutions, early in the implementation process the project commissioned a set of guidelines on the financing requirements of 15 different institutions for SMEs financing in Viet Nam. But in the 2017 PSC meeting, several stakeholders highlighted the need to assist further enterprises to secure the financing needed to carry out the RECP investments that were outside their reach. Still, by August 2018, none of the enterprises participating in the RECP assessments

¹⁵ INSE. Co-processing Alternative Fuels and Raw Materials (AFR) in Cement Plants in Viet Nam, Subset 1 report prepared for UNIDO, May 17th, 2019.

had accessed financing. To address this constraint, the project commissioned a consultancy to update the guidelines to financial institutions, develop and carry out training workshops for enterprises and industrial zone managers in the three IZs and help enterprises develop 15 bankable proposals to financial institutions.

The consultants developed the Handbook on *How to Access Green Financing in Viet Nam* by November 2018 and workshops in the three IZs that trained 68 persons (including enterprises, park authorities, and provincial authorities). Consultants also reviewed investment options for 46 enterprises and identified 14 cases in which bankable proposals were feasible and in which SMEs had expressed interest to submit a proposal for funding.¹⁶ By November 2018, only nine SMEs had provided the information needed to write the proposal.

The consultant's review of the credit institutions also made evident that by 2018, there were only four active suitable financial institutions. The Green Credit Trust Fund, which had been one of the initial key partners in the process, was closed. SECO decided to hold granting activity in account difficulties stemming from the way the Green Credit Trust Fund was structured. SMEs found that the financing terms of most of the granting institution were not attractive (collateral requirements were too high; interest rates were at market rates or repayment time too short). The participating enterprises chose to submit the funding proposals to VEPF as this agency had the most attractive terms (financing 50% of the investment with a 2.6% interest rate). The nine proposals were submitted for funding to VEPF in late 2018.

In the meantime, in January 1, 2019 VEPF changed its financing criteria which excluded eligibility for water treatment plants in enterprises. This decision disqualified seven of the funding proposals for funding. By the time the evaluation took place on June 2019, the two qualifying loans were still under review. VEPF also dropped the priority ranking of energy efficiency projects, significantly reducing the possibilities that this fund would finance the photovoltaic project. The manager of one of the two enterprises that had remained eligible under the new criteria indicated to the evaluation team that the process had been extremely cumbersome and uncertain. Despite complying with multiple information requests from VEPF, they did not know when they would be getting the loan.

The consultant report indicates that enterprises that participated in the green financing workshops were hesitant in applying for funding to Vietnamese financial institutions despite the preferential rates. They feared that the red tape, complicated procedures and delays would affect their business performance. Thus, enterprises often prefer to limit their investments to their available resources.¹⁷ This attitude of SME entrepreneurs is consistent with the developments in the project by which enterprises invested over USD 11 million in implementing RECP and USD 2.7 million in IS. The willingness of SME entrepreneurs to invest their resources in RECP and IS was an important factor in moving forward the EIP agenda. But it is also clear that the administrative difficulties in accessing credits are a

¹⁶ The consultants included some firms that had not completed RECP assessments among the selected enterprises. In such cases they carried out the necessary technical screening.

¹⁷ SEN 26 Trading Consultant Company Limited. Provision of services to support companies process funding requests; and for updating and providing training on the Green Financial Guidelines, in response to RFP No.7000003038/MD/GOc for Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam. Final Report for UNIDO, December 14, 2018.

barrier to EIP development in Viet Nam. Some of the necessary investments are simply out of the reach from SMEs, other investments (such as in-plant water treatment systems) that will reduce pollution but that do not generate economic returns will not be attractive to SMEs unless environmental regulations are strictly enforced.

4. Capacities to address community concerns regarding environmental accidents and pollution.

The project document identified several social issues pertaining the interactions between local communities and enterprises such as minimum wages of men and women workers, tensions caused by environmental accidents and pollution, and the need for community enhancement projects. During implementation of the project, it soon became apparent that this was a very sensitive issue. There were frequent disputes over pollution and environmental accidents between park authorities and communities. For example, community stakeholders in Ninh Binh reported to the evaluation team that before the establishment of the IZ, the surrounding community did not give much thought to environmental impact and incidents due to low industrial activities. As production activities in the IZs increased members of the community gradually became more aware of the negative environmental impacts of the IZ such as uncontrolled discharges of contaminated water, thick smoke, and dust emitted from factories. The community's initial response was to report these incidents to district authorities. The commune would then wait for a solution by the authorities. When responses from the authorities did not come or were slow, the communities took matters in their own hands by blocking the entrance of the IZ or stopping trucks from using rural roads. A member of commune leadership recalled:

“At the beginning, we thought that IZ would mean more employment for our villagers. Then we understood that more enterprises meant more pollution. Heavy trucks damaged our roads, made a lot of dust, and dropped waste along the road. We were frustrated and block our roads. At that time, our relations with the IZ management was bad.”

The project faced the challenge of finding the common ground for collaboration among the different parties. In 2016 the project carried out an in-depth assessment, including three consultation workshops on the level of awareness on environmental, labor and gender aspects in the three industrial zones and assessed the interactions between provincial authorities, IZ developers, enterprises and the surrounding communities¹⁸. The report indicates that in the three targeted IZs there was some collaboration between companies and local authority in resolving environmental incidents but generally this collaboration not very effective. Communication among stakeholders was poor. Different line provincial departments often operated independently and with little coordination. Industrial Zone Management Boards (IZMBs) often did little to promote community participation in solving issues pertaining labor practices, natural resource use, and pollution. This study that provided a baseline on the perception, knowledge, attitude, and practices of internal and external stakeholders.

¹⁸ Nguyen To Tran and Le Hoang Lan 2016 *Community Screening Report*, Ninh Binh, Da Nang, and Can Tho. UNIDO

The assessment also found that all parties agreed on the need improve prevention and response of environmental incidents and pollution. Thus, the project focused on the improving communication between IZMBs and communities to prevent and report environmental accidents, and in raising awareness and building capacities within communities to respond to environmental accidents. The project also carried out a study in the selected IZs¹⁹ that identified the risks of environmental accidents and the number of residents that could be affected if environmental accidents occur. Another report focused on the awareness of communities on the risks of environmental accidents and the importance of prevention, preparedness, and response activities.²⁰ These two reports were used to develop a handbook for the prevention, preparedness, and response to environmental accidents from IZs. The project also developed outreach materials and leaflets that targeted the IZ developers, enterprises in IZs, and people living around IZs. Those the materials are designed with eye-catching content to reinforce the key messages of the handbook and training workshops.

The handbook presents information that equips the users with a basic understanding common conditions that could cause environmental accidents from IZs and also provides ways to assess potential risks. The handbook also defines the responsibilities and necessary actions before, during, and after accidents for each stakeholder group based on existing regulations and international and domestic experiences.

Based on handbooks and leaflets, the project carried out six training workshops, 2 in each province. These workshops had two main target groups: (i) Local authorities, mass organizations (such as Women's Union, Farmers' Association, Association of Veterans, Youth Union) and community living around the IZs; and (ii) Enterprises in IZs, IZ developers, IZMBs and provincial departments (DONRE, DOLISA, Department of Construction, Department of Health, DOSTE, DOIT). As Figure 4 indicates, these workshops included 208 participants (of which 64% were male, 36% were female).²¹

At the level of the individual, the training delivered by the project helped raise awareness and understanding of when under what conditions and in what forms environmental accidents can occur. Participants also have a better understanding of the channels (formal or informal) they can use to communicate to authorities, accidents and possible environmental risks. Individuals interviewed by the evaluation team that were trained by the project reported that as a result of the training they were better aware of the importance of a better prevention, preparedness, and response to environmental accidents from IZs. Some indicated that training led to more proactivity in prevention and reporting of environmental accidents in IZs. The evaluation team also found anecdotal evidence of behavioral changes in this direction. For example, local people have stopped collecting used boxes, bottles, and drums discarded by enterprises in IZs for their domestic use and stopped using dead fishes to feed animals. Some households living next to the IZs constructed glass walls to prevent smoke from enterprises in entering their homes.

¹⁹ Nguyen Trinh Huong et. al (2019), *Assessment Report on Status of Communities Living Near IZs of Ninh Binh, Da Nang and Can Tho*, the Centre for Environment and Community Development (CECoD).

²⁰ Ngo Minh Cong et. al (2019), *Awareness of Environmental and natural Disaster Risks in Selected IZs*, CECoD.

²¹ *Source of Figure 4: Training Report on Prevention, Preparedness, and Response to Environmental Accidents from Industrial Zones, March 2019*

At the community level, the Commune People’s Committees have been more proactive in addressing environmental and safety concerns. The commune leaders reported that they encourage villagers to plant more trees, clean up their gardens to prevent fires and to keep access roads clear. The interactions during the workshops have also helped develop relationships between industrial zone management boards, provincial authorities, and community leaders, which increased the likelihood of cooperation in the prevention and solution of environmental accidents. The project has also promoted the use of “Good Morning Show” in the national television system as a channel available to community stakeholders to report environmental accidents. A community leader of the Khanh Phu Commune People’s Committee reported that this new informal channel is quite effective as it has led to prompter response to environmental problems from provincial authorities and IZ developers.

While these are important initial accomplishments, there is still a need to further strengthen the role and voice of the community. None of community in three pilot IZs has drafted their community enhancement plan yet. Various reasons may explain for that. Commune representatives said that they did not have enough time to discuss development of such plans. The trainings have just finished (in Ninh Binh from March 7th-8th, 2019; in Da Nang from March 13th - 14th, 2019; and in Can Tho from March 11th -12th, 2019). Even though the communities in the three IZs have more channels to report environmental concerns, they don’t always have the means to ensure prompt action by provincial authorities or IZDBs. Most efforts to prevent and respond to environmental accidents were still internal to the community. While the project has helped to open some communication channels with the authorities, community leaders still feel that more needs to be done to ensure that communication is two ways. Under these conditions, some community leaders were not confident that community plans could be implemented if developed.

5. Policy and regulatory conditions supportive to eco-industrial parks.

On May 2018 the Government of Viet Nam approved Decree 82/2018/ND-CP: The Management of Industrial Parks and Economic Zones (Decree 82) which introduced the concept of Eco-industrial park into the national legislation. Moving beyond the Green Growth Strategy which focuses on of GHGs and pollution reduction, Decree 82 emphasizes the need for holistic approaches to transform the production process and identified the eco-industrial park as a key aspect of the new policy. Decree 82 also called for incentives for “enterprises operating within eco-industrial parks that participate in cleaner production activities, efficient use of resources and industrial symbioses” and for enterprises developing infrastructure for eco-industrial parks. Decree 82 specified responsibilities for several ministries and park management authorities in ensuring the sound environmental management of EIP.

Decree 82 included the following five articles on EIPs:

- Article 40: Objectives of development of eco-industrial parks
- Article 41: Encouragement policies on development of eco-industrial parks
- Article 42: Criteria for determination of eco-industrial parks: 9 (RECP and IS)
- Article 43 Incentives granted to enterprises operating within eco-industrial parks
- Article 44: Processes and procedures for applying for registration for certification of eco-industrial parks

Many factors led to this important policy decision. Environmental accidents and specifically, the Formosa accident that resulted in April 2016 in a massive fish kill in the coastline of Ha Tinh, Quang Binh, Quang Tri, and Thua Thien Hue. These accidents contributed to an awareness and concern among the public and policymakers of the risks of uncontrolled industrial development.

In this context, the EIP project had an important supportive role during the development of Decree 82 by demonstrating the relevance and feasibility of EIPs in Viet Nam and by demonstrating the benefits of RECP and IS to SMEs. The project approach to sponsor study tours for public officials, business leaders, and academicians helped them understand firsthand the benefits generated by eco-industrial parks. The expert group meetings allowed experts from Viet Nam and other countries to get to know, compare and learn from the experience in many countries and to discuss challenges and opportunities in the establishment of eco-industrial parks and novel concepts such as industrial symbiosis. Through these events, the project provided the conditions by which Viet Nameese key stakeholders jointly develop a common understanding of what worked for the case of Viet Nam. For example, the first expert group meeting sponsored by UNIDO and the World Bank included 140 participants of which 78 were from local, provincial and national decision-making bodies relevant to industrial zones and 25 were national and international experts on different aspects related to EIP. One of the outputs of this expert group meeting was a definition of EIP adapted to the Viet Nameese context:

“An eco-industrial park is a model of industrial zone that combines in harmony the three pillars of sustainable development: economy, society, and environment. In an EIP, economic development activities including site planning, investments, and marketing foster resource efficiency, dissemination of clean technologies, and environmental protection” (Massard et al 2018).

As indicated above, the concepts and discussion carried out during these meetings also served as a solid technical foundation for the development of Decree 82 and the circulars that were under elaboration at the time this evaluation took place. Three circulars will be drafted by MPI, MONRE and MOST. While typically difficulties in inter-ministerial cooperation in Viet Nam pertain, all ministries involved anticipate that the collaborative process begun in the project was likely to continue and that it is likely to have the circulars drafted by the end of 2019 or early 2020.

Two additional project contributions to the formulation of policies are: One, the support to the development of environment, social and economic indicators for EIP, including a detailed overview of monitoring requirements, targets against indicators, guidelines towards calculation of indicators, (presented and discussed during a consultation meeting with several stakeholders) and two, a proposed roadmap to help in the formation of EIPs.

Stakeholders all agreed that these are important steps in the process but also that there remain key regulatory barriers that continue to prevent the adoption of the opportunities for RECP, IS, and further development of EIP in Viet Nam. The barriers frequently mentioned by stakeholders pertained to the generation of electricity, prohibitions of the use of treated water, a lack of a comprehensive approach to industrial solid waste management and administrative barriers to the access of financial resources by SMEs.

B. Impacts

The project impact pertains to the environmental, economic, and social changes the project generated or is expected to generate. Impacts can be positive or negative and intended or unintended. One important consideration in the assessment of project impacts is that project meant to contribute to the necessary conditions that would lead to a long-term transformation. The impacts of projects that seek transformational changes can be expected to take place on a time scale that goes beyond the duration of the project.

1. Global environmental benefits

GEF approved the project as a multifocal project that was expected to generate benefits in the focal areas of Climate Change, International Waters, and POPs. Table 6 presents the calculation of the environmental benefits over the lifetime of the technologies that were adopted or are expected to be adopted by enterprises or IZs on the advice of the project. These calculations indicate that the project is likely to exceed most of its targets on environmental benefit. Annex 3 presents the methodology used in the calculation of global environmental benefits, including the replication factor for RECP options and the assumptions of lifetime of technology for RECP and IS options.

These calculations assume that there will be a replication effect of a factor of three for RECP options, an assumption present in project document at CEO endorsement.²² The evaluation could not verify the replication factor of three because the practices and technologies introduced by the project are recent, and there has not been enough time for replication to take place. Nevertheless, there are indications that the replication factor of three is likely to be met in the short run. This is so because most innovations introduced by the project have high economic returns and are well within the reach of the targeted enterprises. Similarly, the project included the support of outreach and promotion to other enterprises and IZ. This promotion has resulted in expressions of interest by other enterprises and industrial zones managers.

Table 6: Projected lifetime environmental benefits and targets at CEO endorsement.

| Pollutant or resource | Current and approved Investments (per year) | Pipeline investments (per year) | Total projected to life of investments | Targets at CEO endorsement |
|-----------------------|---|---------------------------------|--|-----------------------------|
| CO _{2eq} * | 32,361 t | 128,300 t | 2,901,681 t | 1,273,000 t |
| COD reduction | 75 118 kg | -- | 225,354 kg/y | 76,900 kg/y |
| Water use reduction | 2,705,333 m ³ | -- | 8,115,999 m ³ /y | 6,000,000 m ³ /y |
| UP POPs** | 6,754 µg | -- | 20,262 µg/y | 810 mg/y** |
| Solid waste | 5,750 t | 82,440 t | 669,774 t/y | -- |

The GHG emissions reductions of current RECP innovations (including replication of a factor of 3) are calculated to 1 005, 681 CO_{2eq} **tons** per year (t/y). When adding the

²² The calculations on the environmental benefits generated by innovations related to industrial symbiosis (IS) only include the lifetime of the technology because they tend to be case-specific and with low replication potential.

investments proposed by the project, that are now under consideration by the three provincial governments and other investors, the GHGs reductions comes to a total of 2,901,681 CO_{2eq} t/y (Table 7). Three key IZ level investments proposed by the project include photovoltaic plants in Tar Noc and Hoa Khanh to generate electricity and a co-processing plant in Ninh Binh to treat solid waste. An important barrier for the construction of the two photovoltaic plants on a regulation wish limits to one megawatt the amount of electricity that operators can transfer through the grid. The project has raised this limitation to the government of Viet Nam. The time ripe to address these barriers given the existing technology, market conditions, and high potentials for photovoltaic energy in Viet Nam.

Table 7: CO_{2eq} Tons reductions of confirmed and proposed investments

| Investments | A. Estimated annual Tons per year reductions | B. Replication factor | C. Estimated annual Tons reduction with replication (AxB) | D. Expected lifetime of technology | E. Total expected Ton reductions (Cx D) |
|-------------------------------------|---|------------------------------|--|---|--|
| Confirmed investments | | | | | |
| 1. RECP | 32,361 | 3 | 97,083 | 7 | 679,581 |
| 2. Industrial Symbiosis | 45,500 | 1 | 45,500 | 7 | 318,500 |
| 3. PV Plant Tang Long Paper | 344 | 1 | 344 | 20 | 7,600 |
| Total confirmed investments | 78,205 | | 142,927 | | 1,005,681 |
| Proposed investments | | | | | |
| 4. PV plant in Tra Noc | 15,600 | 1 | 15,600 | 20 | 312,000 |
| 5. PV plant in Hoa Khanh | 18,700 | 1 | 18,700 | 20 | 374,000 |
| 6. Co-processing plant in Ninh Binh | 69,000 | 1 | 69,000 | 15 | 1,035,000 |
| 7. Industrial Symbiosis | 25,000 | 1 | 25,000 | 7 | 175,000 |
| Total proposed investments | 128,300 | | 128,300 | | 1,896,000 |
| TOTAL PROJECTED REDUCTIONS | | | | | 2,901,681 |

In the case of co-processing, Ninh Binh, like many other rapidly industrialized provinces in Viet Nam, this province is running out of options to dispose of their solid waste safely. Viet Nam has only one licensed cement in operation with a permit for co-processing waste in its plant. The study commissioned by the project indicates that coprocessing presents technically and economically feasible solution for recovery of industrial solid waste in Ninh Binh. Co-processing will nonetheless require the shipment of solid waste to a different province to a cement plant which will require new regulations on transportation and other safety standards, and interprovincial coordination.

The project could not achieve the targets in POPs reductions. The project reports achievements of POPs reduction of 20,262 µg TEQ per year considering a replication factor of three. Target in the Pro Doc: 810 mg TEQ per year. The proposed co-processing project in Ninh Binh when deployed and the reductions of solid waste by RECP innovations (indicated in table 7) will contribute to the reduction of POPs by preventing disposal of waste material in landfills with uncontrolled burning or by preventing the incineration in old incinerators with missing air pollution devices. But POPs reduction of these project was not calculated.

The project could not achieve the POPs because project did not manage to implement any air pollution control technology, which would give higher POPs reduction (Over 55% of the UP-POPs in Viet Nam airborne). There were no incinerators in the three pilot IZs, there were only smaller steel rolling companies and no foundry. In Ninh Binh, a fertilizer factory and a glass manufacturer did not participate in the RECP program due to economic problems which resulted in the closure of the fertilizer company and the reduction of the glass manufacturing capacity to 50% of its original capacity.

Table 8: Investments on RECP opportunities by participating enterprises (2016-2018) USD

| Province | RECP Investment | Returns |
|--------------|-------------------|------------------|
| Can Tho | 3,257,281 | 5,403,967 |
| Da Nang | 3,213,404 | 1,959,610 |
| Ninh Binh | 4,599,875 | 2,284,524 |
| Total | 11,070,561 | 9,648,102 |

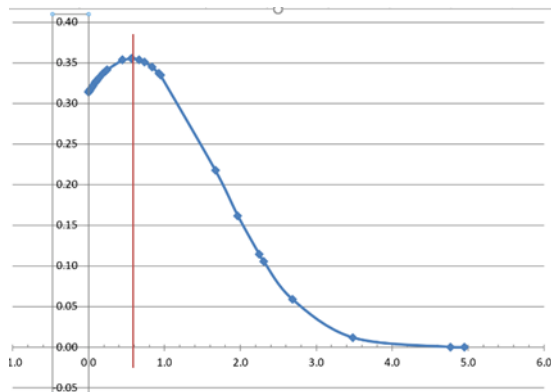
Also, the POPs target for the project was not realistic. There was no baseline of POPs in Viet Nam at the time the project was designed. The 2015 report of the implementation of the Stockholm convention in Viet Nam reported in 2015 the total of POPs 568 g TEQ/y. With around 102g produced in the industrial sector.²³ Industrial Zones account for around 40% of the industrial production of the country, which represent around 40g. There were 249 industrial zone in operation in Viet Nam in 2018. In average, each industrial zone would be producing some 160mg TEQ /y of POPs (40g/249). This would mean that three IZs supported by the project would produce around 482mg TEQ/y. The project was expected to reduce 168% of the POPs produced in the three IZ (810mg/482).

²³ 10 years Report for the Stockholm convention implementation in Viet Nam, UNDP, 2015, page 36.

2. Economic benefits

The project introduced new models and technologies that, in addition to reducing pollution and use of resources, also reduced costs, increased income, and improved their enterprises capacity to compete in the market. During 2016 and 2018, the participating enterprises adopting RECP options invested in total over USD 11 million and got a total return of USD 9.6 million (Table 8). The average payback period for investments was of seven months. Only six of the opportunities had a payback time longer than two years (Figure 5).

Figure 5: Payback time (moths) of RECP



In the case of the IS opportunities identified by the project, the total investment required for the implementation of the 18 identified options was calculated at USD 4 579 000. By June 2019, the project reported to the evaluation team that enterprises had invested so far USD2.7 million in the IS opportunities implemented so far. The expected returns for these investments were of just over one USD million, and the average expected payback was of 28 months (Table 9).

Table 9: Industrial symbiosis investments and expected benefits (USD)

| Province | Capital already invested or committed (USD) | Expected benefit (USD/year) ²⁴ | Average Payback Time (months) |
|--------------|---|---|-------------------------------|
| Ninh Binh | - | | |
| Can Tho | 1,745,113 | 750,655 | 28 |
| Da Nang | 999,385 | 412,212 | 29 |
| Total | 2,744,498 | 1,162,867 | 28 |

The studies for strategic park level investments also made good business scene. The Co-processing plant would require around a 10 Million USD investment to equip for co-processing an existing cement plant. This investment is far smaller than the investment on a land field or an incinerator. Co-processing is also easier to implement given the likely opposition to land fields and incinerators by residents. It is also a safe option under proper operating conditions. The photovoltaic studies also indicate savings of USD 443,100 Tra Noc and USD503400 in Hoa Khanh

3. Social Benefits

The incorporation of RECP and IS into the production processes has resulted less clutter and more organized and cleaner working environment for workers and have reduce the risk of accidents in the factory floor. For example, the RECP study identified lack of insulation of vapor transmission lines in a paper mill as a source of heat losses. These heat losses significantly increased the costs of production. They also contributed to high temperatures in the working environment. A modest investment in the insulation of the transmission lines significantly reduced energy costs while at the same time improving

²⁴ The calculation of the annual returns of IS investments did not consider operational costs

working conditions for operators. Similarly, less clutter, reduction of leakage of resources, and waste along the production line helped reduce the risk of accidents. The improvement of labor conditions has an important gender dimension as 50% to 60 % of the factory workers in the factories are women and workers in the production line also tend to be disproportionately women.

The better communication between community leaders, enterprises and authorities, the training and channels of communication introduced by the project are likely to improve flow of information and to lead to quicker response to environmental incidents. Similarly, the awareness building workshops and posters developed by the project have provide important information to people in the IZ surrounding communities on environmental risks and actions to prevent accidents. More important is that the project demonstrated that better communication and information helps to prevent accidents and is in the interest of all concerned. The project demonstrated some options to more by which community concerns can be incorporated in EIP development. Nonetheless, this were initial steps and is an area in which big gains can be achieved.

In addition to the short-term benefits, in the long run, the broader adoption of RECP and IS and the implementation of the strategic park scale investments proposed by the project, have a strong potential to expand environmental, economic and social benefits. The continuous identification and application of practices that make business sense are environmentally sound, and address to social needs will be key to the transformation of IZs to EIP. The approach introduced by the project also provide key strategic elements that would allow provincial governments reconcile their development objectives in the industrial and tourism sectors, prevent environmental accidents while also improve opportunities for the local populations.

C. Efficiency.

Efficiency pertains to the extent to which resources or inputs (time, funds, and expertise) are converted to results. Project efficiency was highly satisfactory. The project had an initial delay while it was approved by the government of Viet Nam. Once in operation, the project take-off took more time than expected due to the need to convince enterprises to participate in the RECP trials. These unexpected conditions resulted in a delay for which the GEF provided a one-year no-cost extension. The initial delay allowed for a broad discussion of the project within the Viet Nam government that ultimately contributed to a strong country ownership and also secured the participation of a critical mass of enterprises in the project. The GEF project extension allowed the project to complete all activities and deliver the expected outcomes.

The PMU managed a total of USD 4 158 789. Of these GEF provide USD 3 524 000, and SECO provided 854 789. The project was also highly efficient when considering the conversion of money to environmental benefits. Despite falling short on the POPs target and considering only GHG emission reduction of the investments that have taken place or are highly likely to take place (these are the investments in RECP replication), the cost per CO_{2eq t} paid by the project was less than one-third of the costs of a CO_{2eq t} in the market in March 2019²⁵.

²⁵ At a market price of USD 15.1 per ton on Mach 2019, the 1 005, 681 CO_{2eq t} had a cost of USD 15 185783. This is more that times the USD 4 158 789 in grants provided by the GEF and SECO (<http://calcarbondash.org/> consulted on July 14m 2019). Investments by enterprises are not included as the investments incurred had very high and quick returns.

More importantly the project outputs were fully achieved and key capacity development outcomes were fully achieved. Table 10 presents a summary of key activities and outputs generated with these funds. These included the training of at least 2360 people on different aspects of RECP, IS and EIP in 38 events that took place in Hanoi, Ho Chi Minh City and the three provinces, a EIP training course in Switzerland, two expert group meetings and the recruitment of 40 national and international experts and study tours to Europe, Japan and China. The way the project went about generating outputs was also key to ensure that resources build local capacities for the transformation to EIPS. For example, the mixed-use of national and international experts was key in the project because it provided country stakeholders with information on how similar challenges are addressed in other countries while at the same time fostered a dialogue on utility adaptation to the conditions in Viet Nam. Ultimately it was the various country stakeholders who decided when and how to adopt technologies and business models.

Table 10: EIP Viet Nam: Project outputs

| | |
|--|------------------|
| Participants trained | 2360 |
| Enterprises reached | 76 |
| Provinces reached | 3 |
| Industrial Symbiosis studies | 18 |
| Events organized (national /provincial) | 38 |
| Expert group meetings (2) | 140 participants |
| Experts recruited | 40 |
| EIP training course in Switzerland | 17 participants |
| International study tours | 3 |
| Publications | 20 |
| Industrial Park assessments (Photovoltaic, co-processing; wastewater management) | 3 |

D. Relevance

Relevance pertains to the assessment of the extent to which the project addressed the needs and priorities of its clients or target groups and other key stakeholders. The project objectives and the achieved results were highly relevant to Viet Nam; they directly supported the implementation of the Viet Nameese national Social Economic Development Strategy 2011-20, the Green Growth Strategy for the period 2011-2020 and the related Provincial Development strategies. One of the key objectives of these strategies was the transition to a low carbon economy. The project contributed to objective by introducing new concepts and testing technologies that not only reduced GHG emissions but also reduced waste and improved the use of natural resources. In so doing the project also helped Viet Nam to set the foundations for the transition from industrial zones (IS) to Eco-industrial parks (EIP).

The project was highly relevant for participating enterprises because it provided access business models and technology that made enterprises more profitable and competitive by

reducing costs and allowing them to retain or expand market share. Participating enterprises also developed their capacities to improve energy efficiency, improve the use of natural resources, and pollution at a time in which implementation of environmental regulations by the government becoming more strict.

The project results were highly relevant to the local populations because it helped establish links between park developers, enterprises, and communities to address environmental accidents and other community concerns. The project also introduced new approaches to prevent and respond to environmental accidents.

One indicator of the relevancy of the project to the country stakeholders is their level of satisfaction with their participation and utility they derived from the project. The project commissioned a survey to assess the levels of satisfaction of project trainees. Participants expressed high levels of satisfaction. In a four grades stake, enterprises participating in RECP indicated that they were satisfied (40%), happy (46) or very happy (10%).²⁶ Participants responded that study tours were either “positive” or “very positive,” and all but three respondents indicated that training was good or very good.²⁷

The project was relevant to the GEF because it introduced technology and helped build capacities that contribute to address Climate Change by reducing GHGs emissions. The project results were also relevant to GEF International waters focal area as it helped improve water use efficiency and helped reduce waste and polluting discharges to land and waterways that contaminate underground water tables and international water bodies. The project also helped introduce regulations, technology, and capacities that will mitigate the emission of POPs. All these contributions also aligned well with SECO’s priority of supporting sustainable industrial development in Viet Nam. The project was also highly relevant to UNIDO as it tested an innovative, comprehensive approach to support sustainable industrial development by targeting the scale of the industrial park and because of its contributions to the Sustainable Development Goals.

²⁶ 4% of the respondents did not answer the survey.

²⁷ Oesch, Sonja. 2018. Implementation of Cleaner Production: survey on existing barriers, challenges and problems for companies of Viet Nam. Master theses; MAS Umwelttechnik und–management

V. Sustainability of the transformational trajectory supported by the project

Sustainability provides an assessment of the likelihood that the project results will last. Typically, sustainability focuses on the risks to the benefits generated by the project. The environmental, economic, and social benefits generated thus far by this project are highly likely to be sustained after the project ends. This is so because these benefits are a result of new practices that make good business, they have made enterprises and IZs more competitive. Other changes make good sense because they have helped address community concerns and to reduce tensions between communities and IZ. While there is still much work to be done in addressing community concerns, the project introduced approaches that helped reduce the risks of environmental accident by building readiness and response capacities within the communities and to reduce conflict by improving the communication between industrial zone management boards and the local communities.

The benefits that have taken place are important, but it is key to keep in mind that the ultimate objective of this project went much further than reducing a certain amount of CO₂ or making a certain number of SMEs more profitable as they adopted RECP or IS. The project's ultimate objective was to support the transformation of IZ to EIP in Viet Nam. The project has contributed to the conditions necessary for this transformation by building stakeholder capacities to assess, identify and carry out changes in different domains (in policies, technology, and business models) and scales (national, provincial, industrial zone, enterprise). These contributions are but initial steps in a process that reaches beyond the spatial and temporal niche in which the project operated.

Non-alignment between the project duration and the time necessary to bring about behavioural change at broader scales requires catalytic mechanisms to continue the adoption of new behaviours. The sustainability of the new development trajectory will be greatly enhanced by mechanisms that continue the process of transformation once the project ends. Key to the analysis of the sustainability of the transformational trajectory are

- 1) the extent to which by the end of the project there are mechanisms set up to foster the broader adoption in time and space of the innovations introduced by the project, and
- 2) the extent to which provisions are taken to manage foreseeable risks to the conditions necessary for the desired transformation.

A. Mechanisms in place to foster the broader adoption

Successful transformational projects typically support mechanisms to mainstream, replicate, and scale-up the adoption of demonstrated approaches, technologies, or models²⁸. This section assesses the extent to which the project helped set up such mechanisms for broader adoption.

²⁸ Zazueta, A. (2017). "Principles for the Development of Integrated Climate Change and Chemicals and Waste," A Scientific and Technical Advisory Panel Information Document. Global Environment Facility, Washington, D.C.

http://www.stapgef.org/sites/default/files/publications/Final_Principles%20for%20%20Development%20of%20Integrated%20CCM%20and%20ChW%20Projects_October%202017.pdf

1. Mainstreaming

Mainstreaming takes place when stakeholders incorporate information, lessons, or specific results generated by the project to their broader mandates and initiatives such as business models, policies, regulations, and programs.

At the scale of the enterprise, several managers of enterprises reported during the evaluation that they apply RECP principles seeking a continuous improvement of their production process in their operation which indicated that, at least in the cases visited, managers, are mainstreaming the RECP approach into their business model. While it is likely that over time the returns for new investments will diminish, the interviewed SMEs managers felt that the RECP approach could still lead to benefits, particularly if the government removed regulatory barriers to the reuse or trade of by-products and served waters, and the administrative barriers to access credit.

The consultant's final report on the promotion of industrial symbiosis provides an account of the potential for broader adoption among enterprises and park managers. "Park management and their tenant companies have proved to be motivated and reliable partners in identifying and implementing industrial symbioses. In addition to their commitment to implement two-thirds of identified opportunities, they also provided numerous new ideas of industrial symbioses during the project's workshops and training. This constitutes a solid basis for the long-term development of the approach. In this perspective, Local Departments (Department of Plan and Investment, Department of Industry and Trade, Department of Natural Resource and Environment, etc.) can also build on these results and use the feasibility study models developed during this project to expand industrial symbiosis implementation at the local level, for instance through awareness-raising workshops and other communication activities on industrial symbiosis".²⁹ At a broader level, decision-makers in the provincial government understand the relevance of the approach followed by the project to reconcile their long-term policy objectives in the sectors of industry and tourism.

2. Replication

Replication takes place when the initiatives, technologies, or models supported by a project are reproduced or adopted at a comparable scale, often in different geographical area or region.

Anecdotal evidence indicates that replication is taking place at the scale of the enterprise. All enterprises visited reported that they had shared lessons and accomplishments with other enterprises and that other enterprises had expressed interest to adopt the innovations. The project has developed promotional material that have been used by MPI and other agencies to disseminate the lessons from the project. Demand for the technical assistance provide by the project has also increase to the point that the project had to turn away or postpone the engagement of interested enterprises and IZ. The beginning of the project in 2013, UNIDO and MPI dedicated more time than anticipated in convincing enterprises to participate in the program. Now, in a SECO funded follow-up project, they are having to contend with demand from more firms and industrial parks that the project can accommodate. There are also indications of specific steps that provinces are adopting to replicate the RECP and IS. In the case of Danang, a high-level officer of the Industrial

²⁹ VNCP/SOFIES. Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam: Industrial Symbiosis Feasibility Study and Implementation. May 10, 2019, p59.

Zones Authority for the province reported to the evaluation team that the province is programming resources to replicate gradually the RECP assessments among enterprises in the industrial zone as part of the provincial Social and Economic Development Strategy for 2021-2030 (15 enterprises per year). The provincial authorities in Ninh Binh and Can Tho also indicated that they were making provisions to include lessons from the project into their upcoming 2020-2019 provincial strategies.

3. Scaling-up

Scaling-up take place when initiatives supported are implemented at a larger geopolitical or administrative scale, often expanded to include new aspects or concerns that may be political, administrative, or ecological. In the case of the EIP Viet Nam project, the project was designed to address conditions taking place at different scales simultaneously. The adoption of Decree 82 by the Viet Nam government is likely to catalyze the expansion of RECP IS, and EIPs across the country.

In addition to Decree 82, The Institute for Regional Sustainable Development in the Viet Nam Academy of Social Sciences has reported to the evaluation team that the EIP and IS will be included in the Viet Nam Social and Economic Development Strategy for 2021-2030 and is exploring ways to include EIP in the up-coming Communist Party of Viet Nam Central Committee (CPVCC) resolutions. These are two documents that identify the highest policy priorities for the country. The inclusion of EIP and IS in these policy documents will also ensure a high priority and financing from the different line ministries and provinces. Also, an officer of MPI responsible for reviewing and commenting draft provincial Social and Economic Development Strategy for 2021-2030, indicated that many of the provincial strategies include objectives related to the establishment of eco-industrial parks. This indicates that provincial officers across the country are anticipating broader policy change, and they are including the support of EIPs in their new development strategies.

B. Risks to the conditions necessary for the transformation from IZ to EIP.

The project made major contributions to the conditions necessary for the transformation from IS to EIP in Viet Nam by helping to build the foundations for a sustainable industrial development trajectory. The transition will take place through an iterative process of continuous improvement in a development trajectory that will take place over time. To maintain this trajectory of development, it is necessary to continue to foster the conditions necessary for the transformation from IZs to EIPs, this will require an ongoing effort to identify and remove risks and barriers that endanger or obstruct this development trajectory.

1. Awareness-raising and capacity development and the risks to the catalytic function for broader adoption

The high adoption rates of the RECP and IS options during the project are an indicator of the high potential for broader adoption in the three IZ and across other IZs in the country. But to ensure replication, there is need for ongoing information dissemination and promotion. This role should be shared by MPI and other relevant ministries, provincial authorities, park management boards, and the participating enterprises. This will in terms require further investments in the development of the catalytic capacities of these agents.

Strong capacities of catalytic stakeholders are critical to avoid the risk that the message will not reach in time and in the right form to the enterprises that need to implement change.

2. Insufficient human capital to sustain the rates of adoption of new technologies.

Technological innovation and adoption of new technologies will continue to be key in the process of transformation to EIP. As the process moves forward and low hanging fruits get exhausted, there will be a need to adopt increasingly sophisticated technologies. This will require investments on the formation of human capital with the required capacities support the new and more sophisticated technologies. This will, in turns, require a trained labor that have the skills to fulfill these functions.

3. Financial risks to the adoption of technologies and practices.

The project found that among the different conditions necessary for the transformation to EIPs, the barriers to SMEs financing were the most difficult to overcome. The production processes in many of the enterprises presented many opportunities for big gains with small investments. Nevertheless, there were some in which enterprises could not implement full suite of options because the investments necessary were beyond their capacity. In other times investments that generated environmental benefits were not financially attractive SMEs. As SMEs exhaust “low hanging” opportunities, access to financing will become increasingly important in the transition to EIPs. The project’s efforts to develop access to financial resources testify to the difficulties in structuring effective mechanisms for SME financing.

4. Health and safety risks to labor and surrounding communities.

The project has demonstrated initial steps to prevent and reduce the risk of environmental accidents, facilitate the communication between communities, industrial park boards and authorities, and to help in resolving disputes between communities and IZs. It is important to continue to improve two-way communication between community, industrial zone management boards, and the relevant authorities, and to strengthen community’s engagement in EIP design, monitoring, and evaluation. It is also important to explore opportunities to generate benefits to all parties concerned such as development of symbiosis links between enterprises and communities and higher commitment to social responsibility by IZDBs, and enterprises operating in EIP. Some of the new technologies and practices such as co-processing, and the transportation and trade of by-products, will require the development and enforcement of safety standards to prevent accidents.

5. Policy and regulatory risks to the progress to EIPs in Viet Nam.

There is a consensus among all parties that the circulars for Decree 82 are a priority. There is also a consensus that MPI, MONRE, and MOST should develop such circulars in the same collaborative, intersectoral and participatory way that was followed by the project. The stakeholders interviewed during the project also expressed a high level of commitment to this process. It is thus likely the circulars will be developed and approved within the coming months.

The evidence generated by the project trials, discussions in the PSC and the expert meetings have identified following policy, and regulatory barriers represent important risks to the progress towards EIPs.

- The one-megawatt restriction of electricity generation by entities connected to the grid. This restriction prevents the development of photovoltaic electrical systems in EIP which project studies indicate could meet at least 30% of the energy of the park.
- The prohibition of the use of treated water. Currently, enterprises are required to treat water but are not allowed to use that water. This prevents implementation of RECP and IS options such as the deployment of systems to reticle or reuse or trade treated water.
- The lack of a comprehensive policy pertaining industrial waste management. There is a need to develop a comprehensive approach to solid waste management in industrial zones to ensure safe disposal of waste. Under current regulations park developers are responsible for ensuring that enterprises hire a service to remove waste, but there is no monitoring of what happens to the waste once removed from the premises.

A follow up project financed by SECO through UNIDO's Global Eco-industrial Parks project which is now under review by the government of Viet Nam will further contribute to the sustainability of the project results by supporting the definition and drafting of the circulars, scale up awareness raising and capacity building.

VI. Factors contributing or hampering project objectives

A. Factors internal to the project

Comprehensive project design. During design, UNIDO carried out a comprehensive assessment of the factors affecting EIP development in Viet Nam and on those bases determined the project components and activities. UNIDO designed project components and activities in mutually supportive ways that provided integrated solutions to the challenges to EIP development.

UNIDO Implementation approach had several attributes that contribute to success. First, there was a good balance between centralized and decentralized management. The UNIDO team in Vienna and a team of international consultants provided technical and administrative to support the PMU in Hanoi. The PMU focused on the executing the activities. The project cultivated ownership by introducing innovations that increase productivity and were valued by stakeholders and by regularly involving partners and collaborators in PSC meetings as well as in project activities such as workshops, conferences and demonstration visits. During implementation, the project typically paired international consultants with national consultants. This approach to technical assistance had the several benefit. This approach helped expose local stakeholders to knowledge from international experiences. It also ensured that the application of knowledge derived from external experiences considered country conditions. This approach also provided the basis for consistent follow-up and contributed to capacity development in Viet Nam.

Donor support. The GEF and SECO adopted a hands-off approach leaving it up to UNIDO to assume implementation. The no-cost extension the GEF granted to UNIDO for this project allowed the project to achieve its objectives fully.

Project execution and ownership by MPI. MPI was very active in the project and interacted almost daily with the PMU on the project operation. The regular participation of high-level MPI officers in project events was also key to the participation of other ministries and the effective functioning of the PSC as a decision-making body. MPI engagement of provincial offices was also critical to ensure access to IZ management boards and communities. MPI also had a critical role in the incorporation of EIP concepts into Decree 82 and on the projects contributions to other policies and regulations. It is also MPI which will assure sustainability, up-scaling and “political” anchoring of environmental issues in new Government programs.

Synergies with other programs and organizations. The project was proactive in establishing partnerships, collaboration in events, and exchanging information with related initiatives of other organization. Two examples are the project’s collaboration with the World Bank during the first expert meeting and with the IFC on the development of the monitoring system for EIPs. The project also cooperated closely with GIZ (German Development Cooperation) in the promotion of photovoltaic in EIPs

Initial project delays. The initial reluctance of enterprises to participate in the project caused delays in the early stages of the project. The project overcame this obstacle by intensifying outreach to enterprises. Joint visits of the project and the park authorities to

enterprises and the initial RECP informative workshops helped overcome this reluctance. UNIDO's cumbersome procurement process also contributed to a slow start of the project.

Gender inclusion. The project document indicates that in Viet Nam in the last 15 years 70% of workers in IZs are immigrants from other Viet Nameese provinces, and 60% of these are women, mostly working on the factory floor. The project document also indicates it is possible that man and women are exposed to different types of risks related to U-POPS and other hazardous chemicals. By 2018 the industrial development in Viet Nam resulted in a considerable increase in job opportunities for women, but occupational segregation continued with women disproportionately occupying lower paying jobs in the factory floor³⁰. While not specifically targeting women, project activities by improved labour conditions factory floor generated significant benefits for women. With regards to the gender dimensions of the project management team, National Project Coordinator (NPC) was a woman. The project considered gathering gender information on the SMEs that were supported by the project, but this was difficult as some owners did not feel comfortable in sharing this information. It is also difficult to interpret the gender implications of this information as some enterprises are registered to the name of the husband, but they are managed jointly by the husband and wife. In terms of the gender distribution of stakeholders that participated in the training activities of the project, project expert consultants estimate that 70% of the trained persons were male and 30% were female. With respect to the important EIP training course in Switzerland 59% were women and 41% were men.

B. Factors external to the project.

This section presents an assessment of the assumptions made by the project which the evaluation team identified at the time of developing the implicit theory of change of the project.

- **The government of Viet Nam intends to promote equitable and sustainable development.** This assumption was mostly correct. The increase in environmental accidents that has taken place in recent years in Viet Nam, the risks these accidents represent for the population, and the public's strong reaction to these accidents has resulted in stronger enforcement of environmental regulations. Policymakers have also become increasingly aware of the need to find development pathways that makes business sense, create wealth for all, and safeguard the environment.
- **There are cost-effective opportunities for sound environmental management in industries and IZ management with-in the reach of the industry in Viet Nam.** The project has demonstrated that there are many opportunities within the reach of SMEs to improve the efficiency of resources, reduce GHG emissions, and reduce pollution that are available to SMEs in Viet Nam.

³⁰ World Bank. 2011. *Viet Nam Country Gender Assessment*
<http://documents.worldbank.org/curated/en/894421468321306582/Viet-Nam-Country-gender-assessment> ;World Bank. 2018. *Viet Nam's Future Jobs. The gender dimensions.*
<http://documents.worldbank.org/curated/en/398191532522140333/pdf/128839-WP-PUBLIC-P163147-WBFutureJobsGenderDimensionTA.pdf>

- **Sources of preferential financing for SMEs exist in Viet Nam.** This assumption held only partially. While there are some financing programs for SMEs in Viet Nam, these programs are not attractive for SMEs in account of their administrative requirements that increase transaction costs and that integrate uncertainty and delays in the SME production process.
- **The stakeholders are willing to pay for the required support services.** Stakeholders that have experienced the benefits of RECP and IS have demonstrated that they are willing to invest in the options that improve their production processes. When asked if they would be willing to pay for the technical advice to identify RECP or IS opportunities, the response was yes, if the advice would help reduce costs or help meet regulations. Enterprises located in IZs that have not benefited of the project or enterprises that have not witnessed the benefits generated by the new practices are likely to be less willing to pay. The expansion of RECP, IS, and EIP to other IZs will most likely continue to require investments on information dissemination, promotion, and technical assistance.
- **The necessary conditions identified, when all present, will lead to the desired behavioral change.** The evidence derived during the evaluation indicate that the necessary conditions identified do contribute to the transition to EIPs. Most likely, these conditions will change over time and will require attention to specific aspects in different localities. It is also likely that new conditions will emerge. In the case of the Implementation of the EIP project in Viet Nam, during the evaluation it became clear that the good communication between IZMB and communities and the engagement of local communities in EIP planning and monitoring is an important necessary condition to the transition to EIP that requires more attention in the future.

The closing of the fertilizer enterprise, a factor out of the control of the project, resulted prevented the project from meeting its targets on POP emissions. The evaluation found no instances or evidence that require any further follow up, such as financial mismanagement, violation of environmental or social safeguards or evidence of unintended other negative impacts or risks.

C. Project M & E

The project had a highly effective M&E system to track project results. The consultant teams hired to implementing project activities were responsible for developing baselines, tracking information, and regularly reporting progress on project activities and results to the CPU and the management team in UNIDO. Each major consultancy (such as the initial assessments of solid waste and wastewater, RECP, IS, the development the green funding guidelines and the development of funding proposals) were also required to submit a final report that provided an analysis of project accomplishments, challenges, and lessons derived from the experience. Consultants submitted the monitoring data, and reports to the PMU.

The UNIDO appointed a person in Vienna to compile the data received and review these data for inconsistencies, duplication, and other possible errors. This information was summarized and reported in the PSC meetings every year and reported to the GEF in the annual PIR. The meticulous monitoring and documentation of the key aspects of the project

provided the evaluation with a wealth of information that allowed provide a reliable assessment of the results of the project.

The project, in collaboration with the IFC and MPI, is also in the process of developing a system of EIP indicators adapted to the conditions in o Viet Nam. Once completed, this system of indicator will be used by MPI to track and report progress in the national transition to EIPs. This indicator system will benchmark and publish the extent of the progress achieved by the different industrial parks in Viet Nam.

VII. Lessons and recommendations

A. Lessons

RECP and IS are effective tools to support the development of EIPs, and to improve competitiveness of enterprises while at the same time reduce the use of resources, GHG emissions and pollution.

Most SMEs located in Viet Nam industrial zones lack specialized managers or technical staff which required a higher effort than originally anticipated by the project to develop awareness and capacities in the early stages of engagement with SMEs

Long term development partnerships, such as the twenty years partnership between UNIDO and VCPC, are effective ways to develop capacities for sustainable development.

Collection of data required to identify IS opportunities is time consuming and requires a strong commitment of participating enterprises and industrial zone management boards.

B. Recommendations

Recommendation 1

MPI, MONRE, and MOST. Should ensure a quick drafting of the circulars for Decree 82. This process should engage key stakeholders through a consultation that fosters dialogue and consensus among central government ministries, provincial governments, industrial zone development boards, SMEs representatives, representatives of IZ surrounding communities, academia, and NGOs.

Recommendation 2

MPI, MONRE, MOIT and other relevant institutions should immediately initiate a process to set standards and remove the following regulatory barriers:

- The one-megawatt restriction of electricity generation by entities connected to the grid.
 - The prohibition of the use of used industrial water that has been properly treated.
- The lack of a comprehensive policy pertaining solid waste management that ensures proper and safe disposal of waste.

Recommendation 3

The government of Viet Nam, SECO, VEPF and other financial institutions in Viet Nam should continue to explore ways to search for effective mechanisms for SME financing to invest in the transition to EIPs.

Recommendation 4

UNIDO and MPI should in future projects, during the identification of partner SMEs, undertake more consultation with the industrial zones management boards and more closely examine the enterprises financial health and business plans to help reduce the enterprises drop off rate during implementation. UNIDO and MPI should also ensure that in future projects IZ selected include enterprises with productive activities that will make it feasible to meet the project's environmental targets.

Recommendation 5

MPI and the governments of the provinces of Can Tho, Danang, and Ninh Binh should build on the constructive experience of the project to continue to enhance communication between industrial zone management boards and surrounding communities and to develop mechanisms to strengthen the communities voice in the planning and monitoring of industrial zones.

ANNEXES:

Annex 1: List of people interviewed during the mission

| Date | Province | Time | Agency | Name | Position | Male | Female |
|--------------|-----------|-------------|---|----------------------|---|------|--------|
| Mon. 03 June | Hanoi | 9:00-12:00 | PMU | Heinz Leuenberger | Technical Advisor | 1 | |
| | | | | Dieter Mutz | Technical Advisor | 1 | |
| | | | | Tran Thanh Phuong | PMU manager | | 1 |
| | | | | Nguyen Tram Anh | PMU staff | | 1 |
| | | 14:00-16:00 | MPI | Tran Duy Dong | PMU Director, Director of DOLTE, MPI | 1 | |
| Tue. 04 June | Hanoi | 8:00-9:00 | MONRE (Dept. of Env. Quality Management) | Nguyen Duc Hung | Vice Director of Department | 1 | |
| | | | | Truong Manh Tuan | Department staff | 1 | |
| | | 10:00-11:00 | UNIDO Hanoi | Le Thi Thanh Thao | Country Representative | | 1 |
| | | 13:00-14:30 | GEF Office/VEPF | Nguyen Duc Thuan | VEPF Director, Operational Focal Point for Viet Nam GEF | 1 | |
| | | 16:00-17:00 | Institute for Regional Sustainable Dev. (Viet Nam Academy of Social Sciences) | Nguyen Dinh Chuc | Director General of the Institute | 1 | |
| Wed. 04 June | Ninh Binh | 9:00-11:00 | MPI | Mr. Giang | Staff, Dept. of Econ. Zone Mgt, MPI | 1 | |
| | | | DONRE | Le Xuan Thang | Vice Director | 1 | |
| | | | DONRE | Dinh Thi Tuyet Nhung | Vice Head, Env. Protection Bureau | | 1 |
| | | | IZ Authority | Tran Duc Cuong | Vice Director | 1 | |

| Date | Province | Time | Agency | Name | Position | Male | Female |
|--------------|----------|---------------------|--------------------------------------|-----------------------|--|------|--------|
| | | | IZ Authority | Bui Trong Trung | Env. Pollution Controller | 1 | |
| | | | IZ Authority | Do Manh Thang | Vice Head, Investment Division | 1 | |
| | | | IZ Authority | Pham Duc Dzung | Staff, Investment Division | 1 | |
| | | 13:30-15:00 | Eni – Florence company | Vu Quang Trieu | Technical Vice Director | 1 | |
| | | | | Pham Hong Giang | Head of Production Mgt. Unit | 1 | |
| | | 15:30-17:00 | Khanh Phu Commune | Vu Van Luu | Vice Chairman, People's Committee | 1 | |
| | | | | Le Thanh Thu | Chairman, Viet Nam Fatherland Front | 1 | |
| | | | | Tran Ngoc Thuyen | Head of Youth Union | 1 | |
| | | | | Nguyen Thi Thu Thai | Staff in charge of cultural affairs | | 1 |
| | | | | Pham Van Kiem | Pedestrian officer | 1 | |
| | | | | Nguyen Van Nam | Chairman, Veterans' Association | 1 | |
| | | | | Nguyen Manh Kha | Chairman, Farmers' Association | 1 | |
| | | Dinh Thi Minh Trang | Administrator | | 1 | | |
| Thu. 06 June | Can Tho | 14:30-15:10 | Thanh The seafood processing company | Pham Ngoc Truyen | Director Assistant, Director of Nam Hai Com. | 1 | |
| | | | | Ung Minh Thu | Environment Protection Staff | | 1 |
| | | | | Nguyen Van Tinh | Staff, Unit of Machinery and Equipment | 1 | |
| | | 15:15-16:00 | Sai Gon Western Beer Company | Nguyen Duc Tuan | Director | | |
| | | | | Nguyen Trong Nghia | Staff, Technical Unit | 1 | |
| | | 16:00-17:00 | City Authority | Truong Quang Hoai Nam | Vice Chairman, People's Committee | 1 | |
| | | | | Nguyen Thi Kieu Duyen | Vice Director, IZ Authority | | 1 |
| | | | | Ngo Bao Ngoc | City Office Administrator | | 1 |
| | | | | Tran Quoc Trung | Vice Director of PMU and of DEZM | 1 | |

| Date | Province | Time | Agency | Name | Position | Male | Female |
|--------------|---------------------------|---------------------|------------------------------------|-----------------------|--|------|--------|
| Fri. 07 June | IZ Authority | 9:00-11:00 | IZ Authority | Nguyen Thi Kieu Duyen | Vice Director, IZ Authority | | 1 |
| | | | IZ Authority | Dang Van Thanh | Vice Head, Env. Protection Division | 1 | |
| | | | DONRE | Cao Thi Minh Thao | Staff member | | 1 |
| | | 14:00-15:00 | Tra Noc Ward | Tran Ngoc Mai | Vice Chairwoman, People's Committee | | 1 |
| | | | | Nguyen Thi Nhung | Chairwoman, Women's Union | | 1 |
| 15:00-16:00 | WWTP in Tra Noc IZ | Nguyen Duy Tin | Focal Point in Can Tho, WWTP staff | 1 | | | |
| Mon. 10 June | Da Nang | 9:00-11:00 | IZ Authority | Le Hoang Duc | Vice Director, IZ Authority | 1 | |
| | | | IZ Authority | Ngo Van Minh | Staff, Env. Protection Division | 1 | |
| | | | DONRE | Nguyen Thi Lien | Vice Head, Env. Pollution Control Division | | 1 |
| | | | MPI | Vuong Thi Minh Hieu | Project Coordinator, staff of DEZM | | 1 |
| | | 14:00-1600 | Tan Long paper company | Ha Ngoc Thong | Director | 1 | |
| | | | | Nguyen Thi Thu Ha | Vice Director | | 1 |
| | | | | Ha Thi Minh Anh | Director Assistant | | 1 |
| Le Thi Hoang | Env. Pollution Controller | | | | 1 | | |
| Tue. 11 June | Hanoi | 8:00-9:30 | VNCPC | Le Xuan Thinh | Director | 1 | |
| | | | | Dinh Manh Thang | Staff | 1 | |
| | | | | Dang Nguyet Nhung | Staff | | 1 |
| | | | | Nguyen Thanh Trung | Staff, focal point for RECP M&E | 1 | |
| | | 10:00-11:30 | SECO | Jonas Grunder | Deputy Head of Cooperation | 1 | |
| | | | | Do Quang Huy | National Program Officer | 1 | |
| 17:00-18:00 | MPI | Vuong Thi Minh Hieu | Project Coordinator, staff of DEZM | | 1 | | |

| Date | Province | Time | Agency | Name | Position | Male | Female | |
|---------------|----------------------------------|-------------|--------------------------------------|-----------------------|---|-----------|-----------|-----------|
| Wed. 12 June | | 9:30-9:45 | Deep C | Bruno Jaspaert | General Director | 1 | | |
| Thu. 13 June | | 14:00-16:00 | Debriefing in Intercontinental Hotel | Tran Duy Dong | PMU Director, Director of DOLTE, MPI | 1 | | |
| | | | | Vuong Thi Minh Hieu | Project Coordinator, staff of DEZM, MPI | | 1 | |
| | | | | Le Thi Thanh Thao | UNIDO Country Representative | | 1 | |
| | | | | Hoang Duc Long | Director, Ninh Binh IZ Authority | 1 | | |
| | | | | Le Hoang Duc | Vice Director, Da Nang IZ Authority | 1 | | |
| | | | | Nguyen Thi Kieu Duyen | Vice Director, Can Tho IZ Authority | | 1 | |
| | | | | Ngo Van Minh | Staff, Da Nang IZ Authority | 1 | | |
| | | | | Alessandro Flammini | UNIDO | 1 | | |
| | | | | Jelena Baier | UNIDO | | 1 | |
| | | | | Jerome Stucki | UNIDO | 1 | | |
| | | | | Tran Thanh Phuong | Staff, PMU | | 1 | |
| | | | | Tran Ngoc Hieu | Staff, PMU | 1 | | |
| | | | | Do Thi Hong Giang | Staff, PMU | | 1 | |
| | | | | Nguyen Tram Anh | Staff, PMU | | 1 | |
| | | | | Heinz Leuenberger | Technical Advisor, PMU | 1 | | |
| | | | | Dieter Mutz | Technical Advisor, PMU | 1 | | |
| Jonas Grunder | Deputy Head of Cooperation, SECO | 1 | | | | | | |
| | | | | TOTAL | | 74 | 47 | 27 |

Annex 2: Project logical framework

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|---|---|---|---|--|--------------------------------|-------------------------|
| Project Objectives: | | | | | 1) RECP tool 2) RECP report | Annex 2 |
| (a) Introduce and implement an EIP-management system to reduce and eliminate GHG, water consumption, water pollution, POPs, and other chemicals of global concern. (b) demonstrate innovative clean & low-carbon technologies and practices in the industry | Tons of GHG, m ³ of water, kg of water pollutants and g TEQ of UP-POPs reduced | Inefficient use of fossil energy and water, the untreated release of water and air contaminants | Avoidance of around 182,000t/ CO ₂ eq direct emissions and related UP-POPs, 6million m ³ /a water and water effluent quality according to international standards | GHG, water and POPs tracking reports | | |
| Component 1 | | | | | | |
| Outcome 1: Legislation and policies on IZ planning and management, IZ environmental and industrial pollution management responsibilities and investment facilitation | | In Viet Nam, regulation on sustainable planning, development, and management of IZ are limited to generic | A new set of guidance/guidelines particularly focusing on EIP planning and | Copies of officially adopted regulations | | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|--|---|---|---|--|--|---|
| for clean & low-carbon technology adopted to meet EIP criteria | | provisions in the planning and construction legislation. No incentive mechanism for promoting innovative resource- and energy-efficient technologies and production practices in IZ exists. | management drafted and implemented | | | |
| Output 1.1: | A set of regulatory instruments compliant with EIP criteria on IZ management adopted. | Currently, to improve the environmental situation in IZ, a decision on wastewater treatment plants is being enforced. No legislation on holistic planning and environmental management of IZ exist. | Regulatory instruments, like a framework regulation on EIP creation and transformation, is drafted, submitted to the relevant legislative bodies, and officially adopted. | Meeting reports, copy of the officially adopted regulatory instrument. | 1) Report: Review and access the existing legal framework, policies and regulations on industrial park | 1)By reviewing the current legal framework on the establishment and operation of IPs in Viet Nam, identifying existent legal issues in the establishment, management and operation of IPs and studying international experiences in the implementation of ecological industrial model (South Korea, China, Kalundborg, Denmark,..) the report provided proposals and solutions to develop the legal frame of EIP in Viet Nam (institutionalize the concept of EIP, develop EIP criteria..) and transition process from industrial parks to eco-industrial parks in Viet Nam |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|-------------------------|------------|----------|--------|-------------------------|-----------------------|---|
| | | | | | | <p>2)A set of indicators selected for the Viet Nam EIPs were based on best practices observed across various other nations as well as on site surveys and stakeholder engagement to be in line with Viet Nameese context . The indicators selected were first categorized as per their applicability to the four major criteria of eco-industrial parks: Firm Environment & Social Management and Resource Efficiency and Cleaner Production (RECP); Industrial symbiosis and circularity; Green infrastructure; Economic performance. The indicators were further sub-categorized pertaining to the sustainability aspects of EIPs: Air emissions, Waste; Water; Energy; Multiple resources; Economy value-added; Knowledge management; Landscape and architecture; social</p> <p>3)EIP scoring methodology for Viet Nam was proposed to track performance of industrial parks with respect to environmental</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|-------------------------|------------|----------|--------|-------------------------|-----------------------|---|
| | | | | | | <p>sustainability through quantitative and qualitative criteria that leads to categorization of EIPs under three levels of performance: bronze, silver and gold. Scoring of EIPs is based on 2 steps: (1) Prequalification / Minimum Requirements: These are minimum requirements that need to be fulfilled by each IP before applying for the EIP program (2) Rating based on EIP indicators: There are three types of EIP indicators: (i) Participation level indicators (ii) Firm Level Indicators (iii) IP developer level indicators</p> <p>4). Decree 82/ ND- CP dated 22nd May, 2018 and took effect in July 2018 which regulates the formation of EIP including the following articles: Article 40: Objectives of development of eco-industrial parks</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|-------------------------|------------|----------|--------|-------------------------|-----------------------|---|
| | | | | | | <p>Article 41: Encouragement policies on development of eco-industrial parks</p> <p>Article 42: Criteria for determination of eco-industrial parks: 9 (RECP and IS)</p> <p>Article 43 Incentives granted to enterprises operating within eco-industrial parks</p> <p>Article 44: Processes and procedures for applying for registration for certification of eco-industrial parks</p> <p>The decree also regulates that some Circulars will be issued by relevant ministries (MOST, MONRE, and MOC) to regulate the detail guidelines for EIP formulation 5). Environment, social and economic Indicators for EIP, with a detailed overview of monitoring requirements, targets against indicators, guidelines towards calculation of indicators. A roadmap to form an EIP was proposed</p> |

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| IZ policy and regulatory framework reviewed and formulated | | | | | 2) Technical and financial Diagnostic of Eco-opportunities in Industrial Parks of Viet Nam 3) Technical guiding report on EIPs for Viet Nam: Environmental Aspect 4) Decree 82/2018/ND-CP dated 22 May 2018 of the Government on industrial zone and economic zone management 5) Eco-Industrial park Viet Nam: Stakeholder analysis and development roadmap | |
| Output 1.2: | A set of centralized services like emergency response, waste management, maintenance developed and proposed | Very few services provided by IZ authority to companies and concentrated on pollution control and marketing. | Various centralized services evaluated based on an economic and environmental analysis, documented and adopted in regulations to support EIP transformation. | Service analysis report with international best practice, meeting reports; a copy of the regulatory instrument. | 1) Performance report on 3 waste water treatment plants 2) Status Report on 3 waste water treatment plants (Ninh Binh, Da Nang, Can Tho) 3) Recommendation report on 3 waste water treatment | Assessment and performance enhancing recommendations for the three Central wastewater treatment plants (CWWTP) in 3 IPs. The results have been achieved as follows: Investigation of current operational conditions of the IZ and its CWWTP: Characteristics of the IZ, current conditions of water infrastructure of each IZ (water supply, rain water and waste water collection system), Pre-treatment facilities for wastewater at |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | plants (Ninh Binh, Da Nang , Can Tho) | <p>company level, current physical & performance quality of the CWWTP.</p> <p>Assessment of CWWTP performance through sampling and analysis: parameters for analysis to evaluate the treatment efficiency are: flow, pH, temperature, COD, BOD5, Suspended Solids (SS), Ammonia Nitrogen (NH4-N), Total Nitrogen (TN), Total Phosphorus (TP)</p> <p>Recommendations on improvement measure in terms of technical, operational, legal and management are mainly on: IZ's water infrastructure and management system (Upgrading the rain & wastewater collection system, Improvement of industrial wastewater collection rate); Pre-treatment facilities at company level (Classifying types of tenants, technical and economic measures (to encourage investment on pre-treatment system at company level...; CWWTP (Improvement for</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | all defects of key equipment, Setting up operational measures for operation of bio-reactors under low-load conditions... |
| Centralized services for IZ evaluated, prioritized and proposed for implementation | | | | | | |
| Component 2 | | | | | | |
| Outcome 2: | Several staff from governmental institutions and IZ are provided with the necessary skills to carry out technical and administrative tasks related to the planning of new and transformation of existing IZ. | Currently, the capacity of the governmental institution and IZ authority on implementing the provisions of an EIP is scarce. | At least 40 core staff covering local and central governments and IZ authorities of the three project provinces and 120 staff of other provinces intensively trained to implement EIP management awareness. | Training curricula Number of trainees. | | |
| Strengthened institutional capacities on eco-industrial park planning and management at central and provincial government level and IZ authorities in selected provinces. | | | | | | |
| | | | | | | |
| Output 2.1: | Capacity building needs for governmental institutions and IZ | A representative of the three IZ and MPI, MOIT and MONRE were selected during project | An EIP working group of at least 40 selected people will be trained on all the technical, | Report on training effectiveness properly | 1) EIP Trainings for local officials and IZ authorities: (Training | 1) 43 local officials (18% female) from Provincial People committee, Department of Science and technology, Department of Natural |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | <p>authorities are assessed.</p> <p>The number of training addressing identified needs are designed and carried out successfully.</p> | <p>preparation and can serve as an initial working group to be trained on eco-industrial park planning and management.</p> | <p>managerial, financial, environmental and social aspects of eco-industrial park planning and management enabling them to conduct training to other relevant stakeholders.</p> | <p>measured (feedback from the trainees) and documented.</p> <p>Training material translated in Viet Nameese and made available for future training courses.</p> | <p>workshop: " EIP planning and measurement capacity building" for local government in Danang on 14-15/7/2016)</p> <p>2) Government officials Training on EIP: + 4 training workshops in Hanoi, Ninh Binh, Nghe An, Hoi An + 3 study tour trainings in Japan and China; Denmark, and Austria and Switzerland</p> | <p>Resources, Department of Industry and Trade, IP Management of 3 provinces were trained on EIP models, social and environmental requirements of EIP, solutions for EIP transition:</p> <p>2) 168 government officials, experts, researchers (MONRE, MOST, MOIT, MPI, MOC, MOF, DONRE, DOIT, DOC, VUSTA, Environmental Industry Association, Viet Nam SME Association, Hanoi University of Science, Hanoi University of Science and Technology, Hanoi University of Industry were trained on International EIP models; Social and environmental requirements of EIP development; Development, implementation and management of EIP; New policy and technical guidelines for EIP in VN.:</p> <p>+ EIP planning and measurement capacity building for 37 MPI officials (37.8% female) in Ninh Binh (22-24/7/2016)</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | <p>+ Training on " Government officials training on EIP" in Hanoi (25/11/2016) for 56 officials (51.7% female) form relevant ministries and other organizations</p> <p>+ Training on " New policy and technical guidelines for EIP in VN " for 35 MPI officials (37.1% female) (1&2/6/2018)</p> <p>+ Training on development, Implementation and management of EIP for 40 MPI officials and 3 Park management authorities (Nghe An, 20-22/7/2018)</p> <p>3) 43 government officials (MPI, MOIT, MOF, MOST, MOC) and local officials of 3 provinces (DONRE, IP management) participated in study tour in Japan, China, Denmark, Austria and Switzerland and were trained on establishment, development and operation of EIP, institutional and policy requirements for EIP, technical and social minimum requirements for EIP, Industrial Symbiosis..</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Capacity on eco-industrial park planning and management built/strengthened among government staff and IZ authorities in the central and provincial level. | | | | | | |
| Output 2.2: Technical capacity of IZ authorities in 3 project provinces strengthened to properly perform tasks and functions on the supervision of environmental protection in IZ | Number of IZ authority staff trained on the monitoring of environmental pollution and supervision of environmental performance of companies in 3 IZs. Three pilot projects on wastewater monitoring successfully implemented in 3 IZ. | Currently, the technical capacity of IZ authorities in the monitoring of the environmental performance of the companies in IZ is still poor. | An online system of industrial pollution monitoring will be developed to support IZ authorities in 3 project provinces in undertaking tasks and functions in industrial pollution management and environmental protection. | An online wastewater monitoring system will be developed and piloted in each of the three projects IZ authorities. | As the procurement and installation of online monitoring systems in Viet Nam should follow regulations and procedures stated in the Law on Procurement which is time consuming, the target was slightly shifted to studying and proposing recommendation to improve the performance of the 3 WWTPs. Report for evaluation: Status and recommendation | 1) Three continuous online wastewater quality monitoring systems were developed to monitor the inlet waste water quality which is collected in the equalization tanks of three CWWTs. The parameters to be monitored are: pH, Chemical Oxygen Demand (COD), Ammonium- Nitrogen (N-NH ₄), total Nitrogen (TN, Suspended Solids (SS), total Phosphorous (TP). However, no online system industrial monitoring be developed because of obstacle in justifying the ODA investment for equipment to private beneficiaries. Instead of that, an implementation plan of all no and low-cost solutions for each WWTP have been studying. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | Report on 3 waste water treatment plants (Ninh Binh, Da Nang , Can Tho) | |
| Outcome 3: | The number of technical staff from companies and governmental institutions (MOIT, MOST) is provided the necessary information to initiate investment into clean & low-carbon technologies and to facilitate technology transfer as well as to implement resource efficient and safe practices. | <p>Currently, governmental institutions (MOIT) work on regulations for facilitating clean & low-carbon technologies.</p> <p>The capacity of a governmental institution on promoting innovative and efficient technology is modest.</p> <p>At company level capacity on clean & low-carbon technologies is scarce and resource efficient, cleaner and safe production is not widely adopted yet</p> | <p>Core staff covering companies and central government and IZ authorities of the three selected IZ trained on clean & low-carbon technologies.</p> <p>The number of company workers trained on safe, resource efficient, and cleaner production (RECP) and selected people trained as RECP-trainers.</p> | <p>Training curricula.</p> <p>The number of trainees.</p> | | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Strengthened capacities on technology transfer, clean & low-carbon technologies, and resource efficient and safe practices at the company level in the selected IZ and government level. | | | | | | |
| Output 3.1 | The number of staff trained to identify and implement clean & low-carbon and resource efficient technologies as well as proper chemical management according to SAICM. | Information basis on clean & low-carbon technology and chemical management at the company level is weak and capacity building at the governmental level for new regulations necessary. | At least 200 selected technical managers from companies of the three selected IZ in Ninh Binh, Danang and Can Tho and government responsible trained in two years on application range, properties and environmental aspects of technologies and practices. | Training reports and feedback from trainees. | 1) Training on electricity efficiency in Industrial zones (Ninh Binh: 30/10-2/11/2017): 01 2) Trainings on benefits of a modern chemical management in industries: 04 | 1) Training on electricity efficiency: + 292 technical managers and staff from companies located in 3 industrial parks and central officials were trained on electricity efficiency in industrial zones and chemical management in industries + Training on electricity efficiency for 26 technical managers and staff from companies in Khanh PHU Industrial zones 2) 04 Training courses on benefits of a modern chemical management in industries for 266 technical managers and staff from companies in Hanoi, Khanh Phu IZ, Hoa Khanh IZ, Tra Noc IZ (8&9/5/2017; 5&6/7/2017;; 12&13/7/2017; 20&21/7/2017; 10&11/7/2017) |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Capacity built/strengthened to implement clean & low-carbon technologies and chemicals management. | | | | | | |
| Output 3.2 | Number of staff trained to conduct RECP audits and to optimize manufacturing processes | A limited number of personnel can conduct internal RECP audits | At least 200 company staff of the three selected IZ in Ninh Binh, Danang and Can Tho trained on methodology and implementation of RECP Around 20 local consultants trained as future RECP trainers | Training reports and tests on learning progress. | 1) RECP Training workshops : 8 2) RECP dissemination workshop: 8 | 1) 267 company staff and technical managers from companies located in 3 selected industrial parks were trained 8 in-class RECP trainings organized from January 2016 to September 2017 on the following topics: RECP concept and its benefits; RECP methodology; RECP options; 5 thematic modules: raw material, energy, water efficiency, chemicals safety and waste management. In addition, hands-on trainings through a combination of the training modules and coaching during the RECP assessment at company-level were conducted. 2) 309 technical managers and company staff participated in 8 RECP dissemination workshops 3) 54 trainees were trained In 2 depth RECP trainings : 2 days/course, 1 in HN and 1 in HCMC (9/2018) in the following |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | topics: Technical audit skills, Material assessment skills, Electrical energy assessment skills, Thermal energy assessment skills, Waste management assessment skills, Water & wastewater assessment skills, RECP Monitoring guideline. |
| Capacity on resource efficient and cleaner production (RECP) built/strengthened among company staff. | | | | Finalized RECP assessments conducted by future RECP-trainers. | 3) In- depth training courses in RECP (Hanoi and Hochiminh) | |
| Component 3 | | | | | | |
| Output 4.1: | Criteria for the selection of companies fulfilling eligible criteria. | No comprehensive assessments of companies in the selected IZ available. | At least 45 companies in the three selected IZ assessed in RECP and potential for implementation of clean & low carbon technology incl. BAT/BEP and training needs identified and reported. | Eligibility criteria for the companies. | 1) RECP summary report of 73 companies (3 batches) | 1) 73 companies in the three selected IZ assessed in RECP (Ninh Binh 16, Da Nang 25, Dan Tho 32 and 3 batches: NB: 2 batches, DN: 3, CT: 3). The total number of RECP solutions suggested for 73 companies was 1039 , of which 933 solutions have been implemented by companies. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | <p>2)The total investment for implementing RECP solutions is USD 9.1 mil. (NB 4.5; DN: 2.1; CT: 2.5) from companies' own capital By implementing the suggested RECP solutions, the companies have achieved economic benefits USD 3.3 mil. (NB: 0.617; DN: 0.666; CT: 2.051) thanking to the reduction of material, energy, water and chemicals consumption during their manufacturing processes. Additional benefits: Input cost saving, environment</p> <p>3) RECP Monitoring: 53 out of 73 companies participated in RECP monitoring and 758 solutions have been applied</p> |
| Companies for RECP and technology gap evaluation selected and assessed. | | | | | | |
| | | | | Detailed company status reports. | 2)Detail reports of 72 companies | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | 3) RECP monitoring report | |
| Output 4.2 | The overall procedure for IZ transformation about inter-company collaboration on re-use and recycling of by-products and waste, efficient use of energy and water, BAT/BEP and chemicals management established for three selected IZ and code of practices implemented. | No strategic plans about clean & low-carbon technologies and practices for IZ available. | Needs of IZ authority to adapt to the new EIP structure/requirements assessed particularly on environmental management, waste exchange data management, logistics, legal compliance monitoring. Service and technology gap identified at IZ authority and in company assessments in three selected IZ summarized and documented. Code of practice elaborated and adopted. | Three strategic plans for the three selected IZ Code of practices document. | 1)Waste inventory report 2) Report on joint-conducted survey in Da Nang by IFC-WBG: the problem and solution strategies for Industrial symbiosis development 3) Industrial symbiosis report: feasibility study and implementation | Requirements assessed particularly on environmental management, waste exchange data management, logistics: (1)Developed a waste inventory for each IZ based baseline information which were collected by analyzing the waste production of the neighboring communities and surveying all companies situated in the 3 industrial parks discharge waste including: (i)type of waste: municipal waste, industrial waste and hazardous waste (ii) Amount of waste per day, month and year (iii) Disposal facility or recycling/treatment patch and facility. (2)Evaluated the current waste management in each Industrial parks including the waste disposal facility or treatment, the final disposal site for waste utilities and describe the organizational |

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| | | | | | | <p>framework and structure for waste management as well.</p> <p>(3) Recommended plans for (i) improvement of collection, recycling, transport and disposal by establishing establishes the separate legal unit under IZ Infrastructure Construction Company to build the general waste treatment factory in IZ to treat all generated waste. (ii) Reuse waste by developing industrial symbiosis.</p> <p><i>Developed Industrial Symbiosis in 3 Industrial parks</i></p> <p>(1) 61 Industrial symbiosis opportunities were identified in the four industrial zones, including three for urban symbiosis after reviewing the RECP assessments already carried out during a previous phase of the Project and collecting information from questionnaires distributed among companies and site visits to selected companies</p> |

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| | | | | | | <p>(2) 3 seminar consultation workshops held in Da Nang, Ninh Binh, Can Tho to select feasibility industrial symbiosis (42 participants from Park management, tenants, DONRE)</p> <p>(3) 3 workshops on Industrial symbiosis feasibility study and implementation in NB, DN, CT (68 participants as local authorities and park managements, company representatives)</p> <p>(4) 18 industrial symbiosis opportunities were selected to be further developed in a more detailed feasibility study (technical feasibility and economic viability) Until now, there has been : 2 opportunities were already implemented, 5 opportunities are being implemented, and 5 opportunities are being planned</p> <p>(5) 146 company staff and park management representatives were trained on Industrial symbiosis and EIP</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Strategic plans for IZ transformation developed. | | | | | | |
| | | | | | | |
| Output 4.3: | Criteria for community enhancement projects at three IZ developed and the number of projects identified fulfilling eligibility criteria. | No evaluation of community enhancement potential in the context of IZ development available. | Needs of communities at three IZ to adapt to the new EIP structure assessed particularly on supplier companies, environmental dispute, and social facilities and under consideration of environmental, economic, and social benefits. | Needs assessment and project feasibility report. | 1) Base line assessment (2016), 2) Consultation seminar on the involvement/ awareness level of stakeholders on social, environment and community issues in EIP (3 provinces) | 2) Community screening assessment Report Ninh Binh, Da Nang, Can Tho : By collecting and analyzing information on level of social and environmental impacts, perception, attitude, practice and expectation of those stakeholders, the report showed that: There is lack of effective coordination and support among enterprises, IZMBs, local authorities and communities in all three provinces. Different group of stakeholders do not communicate and share information effectively on issues affected their work and lives including environment impacts, labour practices, community development, livelihood and income generation. Enterprises, especially the SMEs still do not apply the standard on national |

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| | | | | | | labour law and that caused badly effective in community health and safety, as well as community relation. 1) 3 Consultation seminars on the involvement/ awareness level of stakeholders on social, environmental and community held in Ninh Binh, Da Nang and Can Tho on July and August, 2016 (82 participants) |
| | Community enhancement projects identified and feasibility evaluated. | | | | | |
| Component 4 | | | | | | |
| Outcome 5 EIP projects to reduce GHG, water consumption, water contaminants, and unintentionally produced POPs demonstrated and community enhancement initiated. | Number of submitted clean & low carbon technologies investment proposals. Number of successfully implemented EIP investment projects. Amount of GHG, water, water pollutants, UP-POPs reduced. | | Numerous bankable clean & low-carbon technology investment projects developed in three IZ by experts and company representative and implemented. (Targets??) Relevant policy and guideline covering | | Technical specifications. Investment reports. Tracking tools for GHG, IW, UP-POPs | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | environmental dispute and community compensation drafted and approved. | | | |
| <u>Output 5.1</u> | The number of selected companies. | There is not enough knowledge at the company level to satisfy the need for appropriate innovative clean & low-carbon technology and the elaboration of bankable investment projects, especially at SME. | At least 30 bankable clean & low-carbon technology investment projects developed in detail by experts and company representative. | 1) Handbook green financing (2015) 2) Hanbook on how to access green financing in Viet Nam (2019) | 1) Support for 23 investments on clean & low -carbon technology, energy efficiency and environment protection (furnace innovation, compressor replacement, beer icing store, new ladie (refining) and continuous casting; Power savings by renovating the fish icing; Solar Energy Electricity generating system; Wastewater treatment system; Separate oil from the waste water to reuse) to get loans at preferential interest rate in VEF and Green Credit Trust Fund. 2) 41 investments on clean &low -carbon technology, energy efficiency and environment protection based on RECP solutions solutions being chosen to implement in detail by companies and expert | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Companies for clean & low-carbon technology investment projects selected and investment projects developed. | The number of developed investment projects. | | Appropriate financial facilities selected and loan requests elaborated. | Technical investment reports. Investment proposals for the respective financial facilities. | 3/Report: Provision of services to support companies process funding requests; and for updating and providing training on the Green Financial Guidelines | |
| Output 5.2 Pilot clean & low carbon technologies and practices established on identified production sites | Number of implemented and successfully operating technologies and practices. Investment amount in clean & low-carbon technology and co-finance share. | Currently, only scattered and insufficient financial assistance for clean technology without coordination exists. | At least 30 clean & low-carbon technology investment projects commissioned, implemented, and functional. | Installation acceptance reports. | 1) List of clean & low- carbon technology invested by companies 2)Report on applied proposal for financial facilities | 1) 41 clean & low - carbon technology, energy efficiency and environment protection (based on RECP options)projects were invested by companies with total amount of USD 11,101,570. Some prominent investments: Replace the whole plate grid casting system (8 casting machines) by an automatic system with new technology; Replace a new glass furnace; Install a coal drying system which utilizes wasted heat from glass furnace ; replace aluminum furnaces; Install capacitor with sufficient capacity; replace lamp T8-36W or T10-40W by LED lamps |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | <p>18W;invest a new wastewater treatment plant for environmental protection; Invest vacuum pump for heat exchange system, recycle cooling water ...</p> <p>2) 9 bankable project have been submitted to VEF, 2 of which have been accepted by VEF with total loans of 28 billion VND; 7 of which could not access to soft loans as VEPF changes its priorities for providing loans (total needed loans will be 232,5 billion VND</p> <p>3) 48 company staff were trained on how to access green financing (in Can Tho, Đà Nẵng and Ninh Bình on 4, 7 and 11/12/2018)</p> |
| | | | | Technical specifications of the installed technology. | | |
| | | | | Reports on implemented new business models (e.g, chemical leasing) | | |
| Output 5.3 | The number of supported and implemented community enhancement projects with supra-regional | Insufficient public investment generally for social facilities and environmental protection available. | Policy for environmental dispute, particularly about mediation and avoidance of juridical | Meeting reports, copy of the adopted policy, and guideline. | 1)Viet Nameese policy documents for supporting communities to monitor | 1)Evaluation of the capacity of the relevant stakeholders (community representatives, residential companies, IP management,) of 3 provinces on the identification of |

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| | environmental significance. | | cases supported, drafted, and adopted. | | <p>environmental impacts from industrial zones and Experiences and practices from other countries</p> <p>2) Prevention preparedness and response to environmental accidents for communities, workers, and experiences and practices from other countries</p> <p>3)Assessment report on Status of communities living near IZs of Ninh Binh, Da Nang and Can Tho</p> | <p>environmental accident/natural disaster risks</p> <p>Evaluation on the relevant stakeholders' awareness about the measures of preparedness, control and response to environmental accidents</p> <p>2) Assessment of public and stakeholders awareness on the risks of environment accidents happening in selected IZs and the importance of prevention, preparedness and response activities</p> <p>4)Developed Handbook – Prevention, preparedness and response to environmental accidents from IZs to help strengthening the capacity of communities and stakeholders (Management Board, Developer, tenants, representative organizations of community) in IZs to identify and assess risks of environmental accidents (technical</p> |

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| | | | | | | <p>or manmade: fire, explosion, chemical leak/spill, Oil spill, Incident of waste water treatment, Incident of exhaust gas treatment system, Incidents of waste leak/spill; Natural: Floods, Storm, Typhoons, Tornadoes, Landslides, Earthquakes) from IZs and the ability to prevent and respond to these environmental accidents.</p> <p>3) 178 community representatives (District People’s Committee, Commune People’s Committee, Famer Association, Women Union, Youth Union...) Park management, residential company representatives were trained on guideline of responding to environmental incidents and natural disasters in the IZ p (3 training workshops in Ninh Binh, Da nang, Can Tho on 3/7/2019;</p> <p>4) Developed Leaflet for investors, enterprises, communities, - Prevention, preparedness and</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | | response to environmental accidents from IZs (3) |
| Pilot community enhancement projects established. | | | | | | |
| | | Numerous cases of public demonstrations due to environmental problems. | Guideline for companies on community compensation drafted and adopted. | | 4)Handbook – Prevention, preparedness and response to environmental accidents from IZs | |
| | | | One community enhancement project with supra-regional environmental and social benefits supported. | | 5)Leaflet for investors, enterprises, communities, - Prevention, preparedness and response to environmental accidents from IZs (| |
| Outcome 6 Increased public awareness on issues concerning EIP development | The number of relevant public awareness workshops held. The number of stakeholders aware of the potentials associated with the transformation of IZ in EIP and of the benefits of managing them in an environmentally sound manner. | The awareness of the eco-industrial park issue in particular about the adoption of innovative clean & low-carbon technology is limited even among the IZ authorities. | At least 3 Awareness Workshops held on EIP issues. Numerous IZ authorities, public institutions, associations, scientific institutions, and NGOs with increased awareness on EIP transformation and management. | Awareness raising workshops reports. | | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| Output 6.1: | The number of stakeholders targeted and participating in awareness raising events. | Identification of target stakeholders for awareness raising on EIP issues never carried out. | At least 20-25 organizations (incl. scientific institutions (universities), NGO, public institutions, IZ authorities, associations) identified and participating in awareness raising events. | Awareness raising plan. | <p>1) Communication materials and strategies are formulated and implemented</p> <p>2) Website was developed and has been gradually updated in Viet Nameese and English languages and linked to many relevant stakeholders organizations (incl. scientific institutions (universities), NGO, public institutions, IZ authorities</p> <p>The website has been received with more post and viewers.</p> | <p>1) 343 persons from 142 enterprises, Park managements, developers participated in 3 project introduction workshops in Ninh Binh, Da Nang and Can Tho</p> <p>2) 137 persons from 65 organization participated in Expert Group meeting 1 (Hoi An- 29&30/9/2016)</p> <p>3) 50 park management representatives, developers, companies, local authorities participated in the workshop on potentially industrial symbiosis in Hoa Khanh IZ held on 27/9/2016.</p> <p>4) 34 participants from universities, NGO, institutes were trained on using GEF tool to monitor environmental protection targets (Hanoi - 29&30/3/2017)</p> <p>5) 91 participants from universities, Institutes, ministries, media were in workshop on " EIP: from concept to reality" co-organized by VASS and MPI (Hanoi 13/1/2017)</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
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| | | | | | <p>3) Trainings in different topics were provided to different stakeholders:</p> <p>4) Regular reports were sent to Ministries and PSC members</p> | <p>6) 146 persons from 74 organizations participated in EGM 2 (Ho chi Minh city - 8&9/11/2018)</p> <p>7) 41 persons from IP management, developers, universities...participated in Consultation workshop on Eco-Industrial park technical Guidelines for Viet Nam (Hanoi- 27/6/2017)</p> <p>8) 178 persons from 104 organizations participated in the Dissemination workshop to introduce technical results for EIP and communities (NB, DN, CT: 8, 12 &24/3/2019)</p> <p>9) 130 participants in final workshop in Hanoi</p> <p>10) 3 reports of Steering committee in 2016, 2017 and 2018 were sent to Ministries and PSC members</p> |
| Stakeholder engagement, including NGOs, community representative, and government established. | | | | List of targeted stakeholders contacted. | | |
| | | | | Reports of awareness raising initiatives. | | |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|-------------------------|-----------------------------|---|--|--|--|--|
| Output 6.2: | Awareness raising material. | No awareness raising material on EIP is available in the country, neither for the general public nor for specific stakeholders. | Awareness raising material specifically developed for public institutions, IZ authorities, and associations. | Dissemination materials specifically prepared for each target group. | <p>1) Pilot training: EIP: Theory and Practice (CENSUD)</p> <p>2) EIP presentations in international and national workshop</p> <p>3) Project Website and uploaded training materials</p> | <p>1) 97 master and Ph.D. students of the Graduate Academy of Social Sciences were trained on the pilot trainings of EIP. The primary evaluation of students on the pilot training courses is encouraging, which becomes the practical foundation for developing and officially teaching on eco-industrial parks in the Academy, an educational unit that was certificated by the Ministry of Education and Training.</p> <p>2) Developed materials for pilot training course " EIP : theory and Practice" for master and Ph.D students</p> <p>3) 71 Presentations on EIP and the benefits for companies and stakeholders in international and national workshops</p> <p>4) Training materials on EIP (programme, EIP -related presentations : energy efficiency,</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|--|--|--|---|--|---|---|
| | | | | | | chemical management, industrial symbiosis, renewable energy...), EIP studies (EIP legal frame, industrial symbiosis, how to assess green financing..) were uploaded in the Project Website |
| Development and implementation of training and awareness programs. | The number of awareness-raising events held. | | Website established for the disclosure of environmental performance of companies in selected IZ and knowledge sharing on EIP and in particular on international waters issues under the “IW Learn” mechanism. | | | |
| Component 5 | | | | | | |
| Outcome 7: Effective project management, monitoring, and evaluation implemented. | Timely monitoring and reporting of project performance indicators. | M&E activities with other projects established at PMU. | M&E system for tracking implementation progress towards outcomes and outputs in place. | Documentation on responsibilities, timelines and deliverables. | 1) PMU establishment decision (Decision No. 207/QĐ-BKHĐT dated 25/02/2015 and Decision No. &38/QĐ-BKHĐT dated 27/05/2015 on establishment of PMU) 3) PMU operational mechanism: Decision | A Project Management Unit (PMU) was established within MPI to undertake the roles and responsibilities of the execution of the overall project execution on behalf of the PSC and in coordination with UNIDO. The PMU was headed by the National Project Director (NPD) employed and appointed by MPI. A National Project Coordinator (NPC) also was appointed by MPI to assist the NDP in the regularly monitoring of project execution. Besides, other staff from MPI were allocated to |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|-------------------------|------------|----------|--------|-------------------------|---|---|
| | | | | | No.1005/QD-BKHDT dated 14/09/2015 on operation regulation of PMU; PIOM. | provide necessary support to facilitate the project execution on demand. The PMU was operated with the professional support for day-to-day business provided by a working team consisting of a National Project Manager (NPM), a project officer and an accountant as administrative staff (Admin staff). A Chief Technical Advisor (CTA) was hired by UNIDO to liaise with experts, trainers and technology providers. Short-term international and national consultants were also recruited based on actual needs to undertake the project activities. The PMU was responsible for the preparation of regular project plans and progress reports under the guidance given by the NPD and the CTA to submit to UNIDO and the PSC for their endorsement and approval. The CTA provided the specific technical and operational expertise to prepare and develop capacity |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Report for Evaluation | Project accomplishments |
|--|--|---|--|------------------------------|---|---|
| | | | | | | building of the PMU to facilitate the project execution process. |
| | Corrective measures in place in case of variations. | | Project management operational and PMU established within MPI. | | | |
| Output 7.1: M&E mechanism and PMU developed and implemented. | Number of reports on project progress and corrective measures taken. | No M&E and project management for EIP projects have been applied. | Regular monitoring and analysis of performance indicators. | Progress reports. | 1) Progress reports (2016, 2017 and 2018) | 1) 3 progress reports and implementation plans were made to report the updated results, regularly monitor and develop a year plan 2) 3 Steering committee meetings were held in 2016, 2017 and 2018 (102 participants) 3) mid-term review 3) Other adhoc reports required by the Government of Viet Nam, UNIDO and SECO. |
| | | | Annual project review. | Steering committee meetings. | 2) Steering committee meetings | |
| | | | Mid-term project review. | Visits to field sites. | | |
| | | | Terminal project evaluation. | | | |

Annex 3: Country co-financing realized during the project*

| | Name of Project | Commitment | | Implementation (up to 30, June 2019) | | Note |
|--|--|--------------------|---------------------|---------------------------------------|----------------------|--|
| | | Co-financing (VND) | Co- financing (USD) | Co - financing (VND) | Co - financing (USD) | |
| Da Nang (Letter No 4737/UBND-SKHĐT dated 15/7/2019 of Da Nang People Committee) | | | | | | |
| 1 | Project: Bau Tram Lake rehabilitation | 6.256.646.400 | 321.832 | 0 | 0 | Da Nang People committee decided to postpone this project (dredging Bau Tram Lake). This activity will take place with construction of embankment and lake landscape |
| 2 | Project: Construct drainage system from Hoa Khanh Industrial zone to Cu De River | 44.000.999.400 | 2.200.000 | 19.185.600.000 | 842.582 | The construction achieved 42% of the total volume and the remaining has been being postponed due to delays with the clearing of the site |
| 3 | Project: Lien Chieu Waste water treatment Plan | 340.000.000.000 | 17.000.000 | 34.646.492.333 | 1.521.585 | The project started later than planned due to delays with site clearance and is 20% complete. |
| Sum (1) | | | 19.521.832 | 53.832.092.333 | 2.364.167 | |
| Ninh Bình(Letter No 37/BQL-DT dated 27, June 2019 of Ninh Binh Industrial Zones Authority) | | | | | | |
| 1 | Project: Develop lighting system and transformer stations of Industrial zone | 238.303.989.949 | 10.572.359 | 210.127.000.000 | 9.228.239 | Most items of the two projects have been completed until 6/2019, the remaining items will be completed by 2020 |
| 2 | Project: Complete industrial park infrastructure phase 1 | | | | | |
| Sum (2) | | | 10.572.359 | 210.127.000.000 | 9.228.239 | |

| | Name of Project | Commitment | | Implementation (up to 30, June 2019) | | Note |
|--|--|--------------------|---------------------|---------------------------------------|----------------------|--|
| | | Co-financing (VND) | Co- financing (USD) | Co - financing (VND) | Co - financing (USD) | |
| Can Tho (Letter No 492/BQL-QLTN&MT dated 11, July 2019 of Can Tho Export Processing and Industrial Zones Authority) | | | | | | |
| 1 | Project: Construct waste water drainage system in Tra Noc Industrial zones (phase 1) | 141.960.573.000 | 6.924.906 | 141.960.573.000 | 6.224.906 | 100% completed |
| | Project: Construct waste water drainage system in Tra Noc Industrial zones (phase 2) | | | 45.000.803.340 | 1.956.556 | phase 2 of project was not counted to co-financing at the beginning and have completed 50% so far |
| 2 | Project: Install and operate burning equipment for hazardous waste in Tra Noc IZ | 7.859.064.000 | 383.369 | 7.859.064.000 | 345.150 | 100% completed |
| Sum (3) | | | 7.308.275 | 194.820.440.340 | 8.526.612 | |
| Ministry of Science and Technology (Letter No 2046/BKHCCN-CNN dated 10, July /2019 of MOST) | | | | | | |
| 1 | GEF Project: Promotion of Non-Fired Brick Production (NFB) and Utilization in Viet Nam | 1.024.950.000 | 50.000 | 42.770.000.000 | 1.878.348 | Justification of MIT for including MOST research projects "Implementing the commitment to in-kind co-financing, MOST provided funding to implement a number of tasks in scientific research and technological development with goals of using and transferring clean and low- carbon technologies. The two projects are prominent ones for that purposes. The purposes of 2 |

| | Name of Project | Commitment | | Implementation (up to 30, June 2019) | | Note |
|---|---|--------------------|---------------------|---------------------------------------|----------------------|---|
| | | Co-financing (VND) | Co- financing (USD) | Co - financing (VND) | Co - financing (USD) | |
| | | | | | | projects are very much in line with EIP project for minimization of GHG emissions as fossil fuel was not used in producing project's productions. Non-fired brick is widely used in civil construction, urban and industrial areas" |
| 2 | Project: "Research, design, manufacture equipment lines and technology to produce autoclaved aerated concrete bricks with a capacity of 200,000 m3/year" funded by MOST | | | | | |
| | | Sum (4) | 50.000 | 42.770.000.000 | 1.878.656 | |
| Ministry of Industry and Trade (Letter No 4951/BCT-KHCN dated 11, July 2019 of MOIT) | | | | | | |
| 1 | Capacity building, cleaner production assessment within the implementation of Strategy on Cleaner Production in Industry toward 2020 | 1.024.950.000 | 50.000 | 5.850.000.000 | 257.790 | |
| | | Tổng (5) | 50.000 | 5.850.000.000 | 256.917 | |
| Ministry of Planning and Investment | | | | | | |
| 1 | Framework of the capacity Building Component of the Industrial Pollution Management Project implemented in industrial | 30.748.500.000 | 1.500.000 | 34.155.000.000 | 1.500.000 | 100% completed |

| | Name of Project | Commitment | | Implementation (up to 30, June 2019) | | Note |
|---|---|-----------------------|---------------------|---------------------------------------|----------------------|--|
| | | Co-financing (VND) | Co- financing (USD) | Co - financing (VND) | Co - financing (USD) | |
| | parks on the basin of Dong Nai river and Nhue- Day river | | | | | |
| | Sum (6) | 30.748.500.000 | 1.500.000 | 34.155.000.000 | 1.500.000 | |
| Viet Nam Development Bank (Letter No 1166/NHPT-VNN dated 27, June 2019 of VDB) | | | | | | |
| 1 | Viet Nam Climate change global loan" funded by EIB | 36.283.230.000 | 1.770.000 | 0 | 0 | VDB did not receive any loan packages which met the bank's requirement |
| | Sum (7) | | | | | |
| Co- funded by companies in 3 Industrial parks* | | | | | | |
| | Companies invested to RECP options given by EIP project: 41 investment projects | | | 234.794.454.000 | 10.570.423 | 41 investment projects carried out with the companies' own capital. These sources of finance were not counted to the co-financing at CEO Endorsement. |
| | Companies invested to Industrial symbiosis options given by EIP project: 2 IS solutions | | | 25.080.000.000 | 1.078.407 | 2 IS solutions were invested by companies including: (1) Mutualisation of the Use of Boilers Between Three Companies (Can Tho fertilizer company, Cobay company and Nam Hung Phat company) in Tra Noc 1&2 (2) Biogas Recovery at Heineken |

| | Name of Project | Commitment | | Implementation (up to 30, June 2019) | | Note |
|--|-----------------|------------------------|---------------------|---------------------------------------|----------------------|--|
| | | Co-financing (VND) | Co- financing (USD) | Co - financing (VND) | Co - financing (USD) | |
| | | | | | | Company for use as Fuel in the Boiler . These sources of finance were not included at CEO endorsement. |
| | Sum (8) | | | 259.874.454.000 | 11.648.830 | |
| | Total | 847.462.902.749 | 40.772.466 | 801.428.986.673 | 35.403.421 | |

* Information provided by the Ministry of Industry and Trade

** The evaluation used the information on co-financing by enterprises provided by UNIDO as this information was more up to date (RECP: USD 11,070,561 and IS:USD 2,744,498).

Annex 4: Evaluation criteria

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Division uses a six-point rating system, where 6 is the highest score (highly satisfactory), and one is the lowest (highly unsatisfactory) as follows:

| Score | | Definition | Category |
|-------|---------------------------|--|----------------|
| 6 | Highly satisfactory | Level of achievement exceeds expectations, and there is no shortcoming. | SATISFACTORY |
| 5 | Satisfactory | Level of achievement meets expectations (indicatively, over 80-95 percent), and there is no or minor shortcoming. | |
| 4 | Moderately Satisfactory | Level of achievement more or less meets expectations (indicatively, 60 to 80 percent), and there are some shortcomings. | |
| 3 | Moderately Unsatisfactory | Level of achievement is somewhat lower than expected (indicatively, less than 60 percent), and there are significant shortcomings. | UNSATISFACTORY |
| 2 | Unsatisfactory | Level of achievement is substantially lower than expected, and there are major shortcomings. | |
| 1 | Highly unsatisfactory | Level of achievement is negligible, and there are severe shortcomings. | |

Annex 5: Project Terms of reference



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

Independent terminal evaluation of project

Eco-industrial Park Initiative for Sustainable Industrial Zones in Viet Nam

UNIDO ID: 100052

GEF Project ID: 4766

January 2019

Contents

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 - 1. Project factsheet
 - 2. Project context
 - 3. Project objective and expected outcomes
 - 4. Project implementation arrangements
 - 5. Main findings of the Mid-term review (MTR)
 - 6. Budget information
- II. Scope and purpose of the evaluation
- III. Evaluation approach and methodology
 - 1. Data collection methods
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 - 3. Rating system
- IV. Evaluation process
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- VI. Evaluation team composition
- VII. Reporting
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Annex 1: Project Logical Framework

Annex 2: Detailed questions to assess evaluation criteria

Annex 3: Job descriptions

Annex 4- Outline of an in-depth project evaluation report

Annex 5: Checklist on evaluation report quality

Annex 6: Guidance on integrating gender in evaluations of UNIDO projects and Projects

Table 1. Financing plan summary

Table 2. Financing plan summary - Outcome breakdown

Table 3. Co-Financing source breakdown

Table 4. UNIDO budget execution

Table 5. Project evaluation criteria

Table 6. Project rating criteria

Table 7. Major timelines

I. Project background and context

1. Project factsheet³¹³²

| | |
|---|--|
| Project title | Eco-industrial Park Initiative for Sustainable Industrial Zones in Viet Nam |
| UNIDO Project ID | 100052 |
| GEF Project ID | 4766 |
| Region | Asia |
| Country(ies) | Viet Nam |
| Project donor(s) | GEF ,Switzerland (Seco), and UNDP Viet Nam |
| Project implementation start date | 17 October 2014 |
| Expected duration | 3 years |
| Expected implementation end date | 30 June 2019 |
| GEF Focal Areas and Operational Project | Chemical & Waste, Climate Change and International Water |
| Implementing agency(ies) | UNIDO |
| Government coordinating agency | Ministry of Planning and Investment |
| Executing Partners | Ministry of Planning and Investment |
| UNIDO RBM code | HC3 Safeguarding the Environment |
| Donor funding | GEF: USD 3,524,000 SECO: EUR 655,085 (equivalent to USD 753'348 on 28 Jan 2019) UNDP Viet Nam: USD 118,552 |
| Project GEF CEO endorsement / approval date | 26 December 2013 |
| UNIDO input (in kind, USD) | USD 230,000 (USD 200,000 in kind) |
| Co-financing at CEO Endorsement, as applicable | USD 49,597,265 |
| Total project cost (USD), excluding support costs and PPG | USD 53,993,165 |
| Mid-term review date | 02 December 2016 |
| Planned terminal evaluation date | May-July 2019 |

(Source: Project document)

2. Project context

Viet Nam has undergone rapid economic growth over the last 10 years driven mainly by the processing and manufacturing sectors. To facilitate the emergence of new industries, the government has established industrial zones (IZs) with the provision of common environmental infrastructure. However, the recent industrial growth has also brought

³¹ Data to be validated by the Consultant

about adverse change impacts in on the human health of neighbouring communities and on environmental quality:

- The wastewater from some IZs is thus directly discharged with poor or without any treatment;
- Air pollution is concentrated in IZs as a result of enterprises using obsolete technologies or lacking air emission treatment systems; and,
- The volume of solid waste increased significantly.

To tackle these issues, the Ministry of Planning and Investment (MPI) and UNIDO jointly developed a project with the objective to introduce and implement an eco-industrial park (EIP) management system to reduce and/or eliminate greenhouse gas emissions, water consumption, water pollution, persistent organic pollutants and other chemicals of global concern, and to demonstrate innovative clean and low-carbon practices in industries. To achieve this objective, the project focuses on the following components:

- i. Policy and guidelines to facilitate the transformation of IZs into EIPs;
- ii. Capacity building on EIP strategy and measures;
- iii. Identification of EIP pilot projects; and,
- iv. Pilot projects in IZs and communities, including information dissemination.

3. Project objective and expected outcomes

The main objective of the project is “Increased transfer, deployment and diffusion of clean and low-carbon technologies and practices for the minimization of GHG emissions, POPs releases and water pollutants as well as improved water-efficiency and the sound management of chemicals in industrial zones (IZ) of Viet Nam.”

Expected Outcomes:

1. Legislation and policies on IZ planning and management, IZ environmental and industrial pollution management, responsibilities and investment facilitation for clean & low-carbon technology adopted to meet EIP criteria;
2. Strengthened institutional capacities on eco-industrial park planning and management at central and provincial government level and IZ authorities in selected provinces;
3. Strengthened capacities on technology transfer, clean & low-carbon technologies and resource efficient and safe practices at company level in the selected IZ and government level;
4. Potential for clean & low-carbon technologies and resource efficient technical solutions identified and community enhancement projects clarified;
5. EIP projects to reduce GHG, water consumption, water contaminants and unintentionally produced POPs demonstrated and community enhancement initiated;
6. Increased public awareness on issues concerning EIP development; and,
7. Effective project management, monitoring and evaluation implemented.

4. Project implementation arrangements

The project management structure as designed is provided in Figure 1.



Figure 1: Project implementation arrangement

5. Main findings of the Mid-term review (MTR)

The project formulation and design is based on a clear identification of the needs and problems of IZs in Viet Nam, and is formulated as a multi-focal area project within GEF, including GHG reduction, International Water and Chemicals objectives. The project design is clear and ambitious, with outputs and achievements formulated on a broad range of topics, which is not realistic for a three-year project. In components 3 and 4, it is not clear whether and which part of the achievements of the eco-industrial park pilot projects are focused on specific in-company RECP type of improvements, or in-company cross-cutting technologies implementation with a wider (potential) application range in the IZs, or park-level centralized improvements. The overall budget and allocation for all components, outputs and activities is realistic and well prepared.

The project approval procedures within MPI /GoV have taken a long time and have led to a significant delay of the start of the project. The outcome of the complex approval process is seen as satisfactory by all parties, and the current cooperation between UNIDO and MPI is considered to be constructive. A large number of activities are in the process of being started or extended, but because of the initial delay the project is lagging behind at least one year. Based on the delays and the assessment of the remaining activities, in combination with the remaining budget, and based on the opinion of the participants expressed during the MTR interviews, there is consensus that with an extension of 2 years the project could be completed successfully.

In general there are many opportunities for upscaling, replication and/or synergy with other projects and programs. However, since the implementation of the project is not halfway, no initiatives for upscaling and/or replication have been taken until now.

UNIDO, the responsible GEF Agency for the project, carries general backstopping and oversight responsibilities. Technical supervision is undertaken by the Chief Technical Advisor – CTA. MPI is national governing, executing and lead agency. The PMU staff at MPI provides the project's main supervision and project management. Project execution is considered to be satisfactory, with some specific issues both at UNIDO and MPI. The PSC, which is the main project oversight body, meets once per year during the project implementation period.

However, given the challenges of this complex project, more frequent meetings of the PSC will be helpful not only in ensuring that the project is on track, but also in getting PSC member institutions to actively involve themselves. The consideration of Gender aspects in the project was integrated in the Community Screening assessment as cross-cutting issue, but was not included in the other project activities. In the policy component, the project has directly and indirectly supported the development of a number of important policies and regulations to facilitate the transformation of IZ into EIP in Viet Nam. In addition, the project supported MPI in taking the lead role in revising the Decree 29. The project also decided to develop a set of criteria defining the framework of EIP.

In the capacity component, the project has successfully undertaken a general awareness building of the EIP concept primarily for the staff of IP/IZ experts within national level ministries, IP/IZ management boards and companies' managers. However, no progress has been made on capacity building of EIP planning and management. The Technical capacity building activities have increased the awareness of the concept on EIP and related RECP

activities. However, the technical capacity for the different stakeholders was not yet achieved, and train-the-trainer components have not yet been started. The selection of individual companies for RECP assessments is relatively successful and ongoing; the link to selection criteria for cross-cutting technologies and park level solutions not clear. Selection of strategic projects for IZ transformation is lagging behind. Identification of community projects did not yet take place, as a first activity a community screening assessment was made.

The results of the first batch of RECP assessment show concrete results in low- and no-cost options on energy efficiency and water reduction. The results cover a limited range of solutions on other environmental aspects, and do not cover the park level assessment. Up to date only two investment projects were identified. Community enhancement and stakeholders' awareness programs mostly still have to be started.

Regular monitoring and evaluation of the project is implemented, and now that implementation data become available, specific verification of industry data and use of the GEF tracking tools has to be started.

6. Budget information

Table 1. Financing plan summary

| USD | <i>Project Preparation</i> | <i>Project</i> | <i>Total (USD)</i> |
|---------------------------------|----------------------------|-------------------|--------------------|
| Financing (GEF / others) | | 3,524,000 | 3,524,000 |
| Financing SECO | | 753,348 | 753,348 |
| Financing UNDP | | 118,552 | 118,552 |
| Co-financing (Cash and In-kind) | | 49,597,265 | 49,597,265 |
| Total (USD) | | 53,993,165 | 53,993,165 |

Source: Project document / progress report

Table 2. Financing plan summary - Outcome breakdown³³

| Project outcomes | Donor (GEF/other) (USD) | Co-Financing (USD) | Total (USD) |
|-------------------------|---|---------------------------|--------------------|
| 1. Policy | 150,000 | 133,000 | 283,000 |
| 2. Institutions | 370,000 (GEF) | 930,000 | 1,367,427 |
| 3. Capacity | 47,706 (SECO) 19,721 (UNDP) | | |
| 4. Potential identified | 1,336,000 10,580 (SECO) 98,831 (UNDP) | 3,120,000 | 4,565,411 |

³³ Source: Project document.

| Project outcomes | Donor (GEF/other) (USD) | Co-Financing (USD) | Total (USD) |
|--------------------------------------|--------------------------------|---------------------------|--------------------|
| 5. Pilot demonstrations | 1,300,000 | 45,026,265 | 16,326,265 |
| 6. Awareness | | | |
| 7. Project monitoring and evaluation | 200,000 | 125,000 | 325,000 |
| Project management | 168,000 695,062 (SECO) | 263,000 | 1,126,062 |
| Total (USD) | 4,395,900 | 49,597,265 | 53,993,165 |

Source: Project document / progress report

Table 3. Co-Financing source breakdown

| Name of Co-financier (source) | In-kind | Cash | Total Amount (USD) |
|---|------------------|-------------------|---------------------------|
| Ministry of planning and investment (MPI) | 1,500,000 | | 1,500,000 |
| Ministry of industry and trade (MOIT) | 50,000 | | 50,000 |
| Ministry of science and technology (MOST) | 50,000 | | 50,000 |
| Ninh Binh People's Committee | | 10,572,359 | 10,572,359 |
| Danang People's Committee | | 19,500,000 | 19,500,000 |
| Can Tho People's Committee | | 6,924,906 | 6,924,906 |
| Green Credit trust Fund (GCTF) of SECO | | 3,000,000 | 3,000,000 |
| Viet Nam Environment Protection Fund (VEPF) | | 5,000,000 | 5,000,000 |
| Viet Nam development bank (VDB) | | 1,770,000 | 1,770,000 |
| UNIDO | 200,000 | 30,000 | 230,000 |
| UNIDO (SECO contribution) | | 1,000,000 | 1,000,000 |
| Total Co-financing (USD) | 1,800,000 | 47,797,265 | 49,597,265 |

Source : Project document

Table 4. UNIDO budget execution

| Items of expenditure | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total expend. |
|----------------------------|---------------|----------------|------------------|----------------|------------------|----------------|------------------|
| Contractual Services | 0 | 588,190 | 301,531 | 60,006 | 623,151 | 0 | 1,572,878 |
| International Meetings | 0 | 3,851 | 118,274 | -1,204 | 70,248 | 805 | 191,973 |
| Local travel | 0 | 48,536 | 49,794 | 52,529 | 53,875 | 9,412 | 214,146 |
| Staff travel | 0 | 582 | 15,973 | 6,295 | 12,981 | 0 | 35,830 |
| Nat. Consult./Staff | 9,437 | 80,796 | 185,234 | 175,981 | 170,181 | 89,241 | 710,870 |
| Other Direct Costs | -18 | 64,371 | 71,094 | 15,007 | 12,718 | 10,808 | 173,980 |
| Staff & Intern Consultants | 0 | 49,770 | 267,777 | 185,023 | 96,507 | 72,782 | 671,859 |
| Train/Fellowship/Study | 10,121 | 31,383 | 77,832 | 135,275 | 111,514 | 6,578 | 372,703 |
| Grand Total | 19,541 | 867,479 | 1,087,508 | 628,910 | 1,151,174 | 189,627 | 3,944,239 |

Source: UNIDO Project Management database as of 29 January 2019

II. Scope and purpose of the evaluation

The purpose of the evaluation is to independently assess the project to help UNIDO improve performance and results of ongoing and future programmes and projects. The terminal evaluation (TE) will cover the whole duration of the project from its starting date in October 2014 to the estimated completion date in June 2019.

The evaluation has two specific objectives:

- (i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact; and
- (ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy³⁴ and the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle³⁵. In addition, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies will be applied.

The evaluation will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project will be informed and consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Independent Evaluation Division (ODG/EIO/IED) on the conduct of the evaluation and methodological issues.

The evaluation will use a theory of change approach and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. The learning from this analysis will be useful to feed into the design of the future projects so that the management team can effectively manage them based on results.

1. Data collection methods

Following are the main instruments for data collection:

- (a) **Desk and literature review** of documents related to the project, including but not limited to:
 - The original project document, monitoring reports (such as progress and financial reports, mid-term review report, output reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - Notes from the meetings of committees involved in the project.
- (b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussion. Key stakeholders to be interviewed include:

³⁴ UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)

³⁵ UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGA1.17/Rev.1, 24 August 2006)

- UNIDO Management and staff involved in the project; and
 - Representatives of donors, counterparts and stakeholders.
- (c) **Field visit** to project sites in April-May 2019.

2. Evaluation key questions and criteria

The key evaluation questions are the following:

- (b) What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?
- (c) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?
- (d) What have been the project's key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent the achieved results will sustain after the completion of the project?
- (e) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and explain how these risks may affect the continuation of results after the project ends. Table 5 below provides the key evaluation criteria to be assessed by the evaluation. The details questions to assess each evaluation criterion are in annex 2.

Table 5. Project evaluation criteria

| # | <u>Evaluation criteria</u> | <u>Mandatory rating</u> |
|----------|--|-------------------------|
| A | Impact | Yes |
| B | Project design | Yes |
| 1 | • Overall design | Yes |
| 2 | • Logframe | Yes |
| C | Project performance | Yes |
| 1 | • Relevance | Yes |
| 2 | • Effectiveness | Yes |
| 3 | • Efficiency | Yes |
| 4 | • Sustainability of benefits | Yes |
| D | Cross-cutting performance criteria | |
| 1 | • Gender mainstreaming | Yes |
| 2 | • M&E: ✓ M&E design ✓ M&E implementation | Yes |
| 3 | • Results-based Management (RBM) | Yes |

| # | <u>Evaluation criteria</u> | <u>Mandatory rating</u> |
|----------|--------------------------------|-------------------------|
| E | Performance of partners | |
| 1 | • UNIDO | Yes |
| 2 | • National counterparts | Yes |
| 3 | • Donor | Yes |
| F | Overall assessment | Yes |

Performance of partners

The assessment of performance of partners will ***include*** the quality of implementation and execution of the GEF Agencies and project executing entities (EAs) in discharging their expected roles and responsibilities. The assessment will take into account the following:

- Quality of Implementation, e.g. the extent to which the agency delivered effectively, with focus on elements that were controllable from the given GEF Agency's perspective and how well risks were identified and managed.
- Quality of Execution, e.g. the appropriate use of funds, procurement and contracting of goods and services.

Other Assessments required by the GEF for GEF-funded projects:

The terminal evaluation will assess the following topics, for which ***ratings are not required:***

- Need for follow-up:** e.g. in instances financial mismanagement, unintended negative impacts or risks.
- Materialization of co-financing:** e.g. the extent to which the expected co-financing materialized, whether co-financing was administered by the project management or by some other organization; whether and how shortfall or excess in co-financing affected project results.
- Environmental and Social Safeguards³⁶:** appropriate environmental and social safeguards were addressed in the project's design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

3. Rating system

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Division uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory).

³⁶ Refer to GEF/C.41/10/Rev.1 available at: http://www.thegef.org/sites/default/files/council-meetingdocuments/C.41.10.Rev_1.Policy_on_Environmental_and_Social_Safeguards.Final%20of%20Nov%2018.pdf

Table 6. Project rating criteria

| Score | | Definition | Category |
|-------|---------------------------|--|----------------|
| 6 | Highly satisfactory | Level of achievement clearly exceeds expectations and there is no shortcoming. | SATISFACTORY |
| 5 | Satisfactory | Level of achievement meets expectations (indicatively, over 80-95 per cent) and there is no or minor shortcoming. | |
| 4 | Moderately satisfactory | Level of achievement more or less meets expectations (indicatively, 60 to 80 per cent) and there are some shortcomings. | |
| 3 | Moderately unsatisfactory | Level of achievement is somewhat lower than expected (indicatively, less than 60 per cent) and there are significant shortcomings. | UNSATISFACTORY |
| 2 | Unsatisfactory | Level of achievement is substantially lower than expected and there are major shortcomings. | |
| 1 | Highly unsatisfactory | Level of achievement is negligible and there are severe shortcomings. | |

IV. Evaluation process

The evaluation will be conducted from May to July 2019. The evaluation will be implemented in five phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

- i. Inception phase: The evaluation team will prepare the inception report providing details on the methodology for the evaluation and include an evaluation matrix with specific issues for the evaluation; the specific site visits will be determined during the inception phase, taking into consideration the findings and recommendations of the mid-term review.
- ii. Desk review and data analysis;
- iii. Interviews, survey and literature review;
- iv. Country visits;
- v. Data analysis and report writing.

V. Time schedule and deliverables

The evaluation is scheduled to take place from to May to July 2019. The evaluation field mission is tentatively planned for 03-14 June 2019. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project. The tentative timelines are provided in Table 7 below.

After the evaluation field mission, the evaluation team leader will visit UNIDO HQ for debriefing and presentation of the preliminary findings of the terminal evaluation. The draft TE report will be submitted 4 to 6 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO PM, UNIDO Independent Evaluation Division, the UNIDO GEF Coordinator and GEF OFP and other stakeholders for receipt of comments. The ET leader is expected to revise the draft TE report based on the comments received, edit the language and form and submit the final version of the TE report in accordance with UNIDO ODG/EIO/EID standards.

Table 7. Tentative timelines

| Timelines | Tasks |
|-----------------------------|---|
| Mid-May 2019 | Desk review and writing of inception report |
| End of May 2019 | Briefing with UNIDO project manager and the project team based in Vienna through Skype |
| Tentatively 03-14 June 2019 | Field visit to Viet Nam |
| Tentatively 17-19 June 2019 | Debriefing in Vienna Preparation of first draft evaluation report |
| July 2019 | Internal peer review of the report by UNIDO's Independent Evaluation Division and other stakeholder comments to draft evaluation report |
| End of July 2019 | Final evaluation report |

Vi. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as the team leader and one national evaluation consultant. The evaluation team members will possess relevant strong experience and skills on evaluation management and conduct together with expertise and experience in innovative clean energy technologies. Both consultants will be contracted by UNIDO.

The tasks of each team member are specified in the job descriptions annexed to these terms of reference. The ET is required to provide information relevant for follow-up studies, including terminal evaluation verification on request to the GEF partnership up to three years after completion of the terminal evaluation.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation.

The UNIDO Project Manager and the project team in Hanoi will support the evaluation team. The UNIDO GEF Coordinator and GEF OFP(s) will be briefed on the evaluation and provide support to its conduct. GEF OFP(s) will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

An evaluation manager from UNIDO Independent Evaluation Division will provide technical backstopping to the evaluation team and ensure the quality of the evaluation. The

UNIDO Project Manager and national project teams will act as resourced persons and provide support to the evaluation team and the evaluation manager.

VII. Reporting

Inception report

This Terms of Reference (ToR) provides some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the Team Leader will prepare, in collaboration with the national consultant, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Manager.

The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework (“evaluation matrix”); division of work between the International Evaluation Consultant and national consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable³⁷.

Evaluation report format and review procedures

The draft report will be delivered to UNIDO’s Independent Evaluation Division (the suggested report outline is in Annex 4) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO’s Independent Evaluation Division for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The ET will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission. The TE report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons. Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in annex 4.

³⁷ The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO ODG/EVQ/IEV.

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by UNIDO Independent Evaluation Division. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO Independent Evaluation Division, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO's Independent Evaluation Division).

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 5. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO Independent Evaluation Division should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Independent Evaluation Division, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

Annex 1: Project Logical Framework

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|---|--|--|--|
| <p>Project Objectives: (a) Introduce and implement an EIP-management system to reduce and/or eliminate GHG, water consumption, water pollution, POPs and other chemicals of global concern. (b) demonstrate innovative clean&low-carbon technologies and practices in industry</p> | Tons of GHG, m ³ of water, kg of water pollutants and g TEQ of UP-POPs reduced | Inefficient use of fossil energy and water, untreated release of water and air contaminants | Avoidance of around 182,000t/a CO ₂ eq direct emissions and related UP-POPs, 6million m ³ /a water and water effluent quality according to international standards | GHG, water and POPs tracking reports | The financial facilities and companies will commit funds to invest into new efficient clean&low-carbon technologies |
| Component 1 | | | | | |
| <p>Outcome 1: Legislation and policies on IZ planning and management, IZ environmental and industrial pollution management responsibilities and investment facilitation for clean&low-carbon</p> | A set of regulatory instruments compliant with EIP criteria on IZ management adopted.. | In Viet Nam, regulation on sustainable planning, development and management of IZ is limited to generic provisions in the planning and construction legislation. No incentive mechanism for | A new set of guidance/guidelines particularly focusing on EIP planning and management drafted and implemented. | Copies of officially adopted regulations | The government of Viet Nam is committed to timely adopt regulatory tools which will obligate stakeholders at managing IZ in an environmental sound manner. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|---|--|---|--|
| technology adopted to meet EIP criteria | | promoting innovative resource- and energy-efficient technologies and production practices in IZ exists. | | | |
| Output 1.1: IZ policy and regulatory framework reviewed and formulated | A set of regulatory instruments compliant with EIP criteria on IZ management adopted.. | Currently, to improve the environmental situation in IZ a decision on waste water treatment plants is being enforced. No legislation on holistic planning and environmental management of IZ exist. | Regulatory instruments, like a framework regulation on EIP creation and transformation is drafted, submitted to the relevant legislative bodies, and officially adopted. | Meeting reports, copy of the officially adopted regulatory instrument. | Agreement among stakeholders on the content of the regulatory tool incl. responsibilities will be reached rapidly and effectively. |
| Output 1.2: Centralized services for IZ evaluated, prioritized and proposed for implementation | A set of centralized services like emergency response, waste management, maintenance developed and proposed | Very few services provided by IZ authority to companies and concentrated to pollution control and marketing. | Various centralized services evaluated based on an economic and environmental analysis, documented and adopted in regulations to support EIP transformation. | Service analysis report with international best practice, meeting reports; copy of the regulatory instrument. | Centralized services in IZ are requested and funded by IZ companies willing to outsource non-core businesses and lower the overall impact of IZ. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|--|--|--|---|--|
| Component 2 | | | | | |
| Outcome 2: Strengthened institutional capacities on eco-industrial park planning and management at central and provincial government level and IZ authorities in selected provinces. | Number of staff from governmental institutions and IZ are provided with the necessary skills to carry out technical and administrative tasks related to the planning of new and transformation of existing IZ. | Currently, capacity of governmental institution and IZ authority on implementing the provisions of an EIP is scarce. | At least 40 core staff covering local and central governments and IZ authorities of the three project provinces and 120 staff of other provinces intensively trained to implement EIP management awareness. | Training curricula. Number of trainees. | The project will be fully supported by MPI, MONRE, MOIT, IZ authorities of 3 project provinces and other provinces nationwide. |
| Output 2.1: Capacity on eco-industrial park planning and management built/strengthened among government staff and IZ authorities in the central and provincial level. | Capacity building needs for governmental institutions and IZ authorities are assessed. Number of training addressing identified needs is designed and carried out successfully. | Representative of the three IZ and MPI, MOIT and MONRE were selected during project preparation and can serve as initial working group to be trained on eco-industrial park planning and management. | An EIP working group of at least 40 selected people will be trained on all the technical, managerial, financial, environmental and social aspects of eco-industrial park planning and management enabling them to conduct training to other relevant stakeholders. | Report on training effectiveness properly measured (feedback from the trainees) and documented. Training material translated in Viet Nameese and made available for future training courses. | A sufficient number of people from governmental institutions and IZ authorities is willing to attend the training and to subsequently train other stakeholders on the topic. A skilled working group represents one of the key resource for ensuring the sustainability of EIP development. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|---|---|---|--|
| <p>Output 2.2: Technical capacity of IZ authorities in 3 project provinces strengthened to properly perform tasks and functions on the supervision of environmental protection in IZ</p> | <p>Number of IZ authority staff trained on the monitoring of environmental pollution and supervision of environmental performance of companies in 3 IZ.</p> <p>Three pilot projects on waste water monitoring successfully implemented in 3 IZ.</p> | <p>Currently, the technical capacity of IZ authorities in monitoring of environmental performance of the companies in IZ is still poor.</p> | <p>An online system of industrial pollution monitoring will be developed to support IZ authorities in 3 project provinces in undertaking tasks and functions in industrial pollution management and environmental protection.</p> | <p>An online waste water monitoring system will be developed and piloted in each of the 3 project IZ authorities.</p> | <p>The activities under this output will require the proactive participation of provincial IZ authorities in the 3 project provinces</p> |
| <p>Outcome 3: Strengthened capacities on technology transfer, clean&low-carbon technologies and resource efficient and safe practices at company level in the selected IZ and government level.</p> | <p>Number of technical staff from companies and governmental institutions (MOIT, MOST) are provided the necessary information to initiate investment into clean&low-carbon technologies and to</p> | <p>Currently, governmental institutions (MOIT) work on regulations for facilitating clean&low-carbon technologies. Capacity of governmental institution on promoting innovative and</p> | <p>Core staff covering companies and central government and IZ authorities of the three selected IZ trained on clean&low-carbon technologies.</p> <p>Another significant number of company workers trained on safe, resource efficient and cleaner production</p> | <p>Training curricula. Number of trainees.</p> | <p>The project will be fully supported by MONRE and MOIT</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|---|--|---|---|--|---|
| | facilitate technology transfer as well as to implement resource efficient and safe practices. | efficient technology is modest. At company level capacity on clean&low-carbon technologies is scarce and resource efficient, cleaner and safe production is not widely adopted yet | (RECP) and selected people trained as RECP-trainers. | | |
| Output 3.1 Capacity built/strengthened to implement clean&low-carbon technologies and chemicals management. | Number of staff trained to identify and implement clean&low-carbon and resource efficient technologies as well as proper chemical management according to SAICM. | Information basis on clean&low-carbon technology and chemical management at company level is weak and capacity building at governmental level for new regulations necessary. | At least 200 selected technical managers from companies of the three selected IZ in Ninh Binh, Danang and Can Tho and government responsible trained in two years on application range, properties and environmental aspects of technologies and practices. | Training reports and feedback from trainees. | A sufficient number of technical decision makers of companies and staff from governmental institutions will attend the trainings. |
| Output 3.2 Capacity on resource efficient and cleaner production (RECP) | Number of staff trained to conduct RECP audits and to optimize | Limited number of staff are able to conduct internal RECP audits | At least 200 company staff of the three selected IZ in Ninh Binh, Danang and Can | Training reports and tests on learning progress. | The project will be fully supported by MOIT and established and |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|--|--|--|---|
| built/strengthened among company staff. | manufacturing processes | | Tho trained on methodology and implementation of RECP Around 20 local consultants trained as future RECP trainers | Finalized RECP assessments conducted by future RECP-trainers. | proven training programs will be applied. |
| Component 3 | | | | | |
| Outcome 4: Potential for clean&low carbon technologies and resource efficient technical solutions identified and community enhancement projects clarified. | Number of eligible clean&low-carbon as well as community enhancement projects identified. Strategic plans for the selected IZ on implementation of technical improvements. | No needs assessment on the status of clean&low-carbon technology implementation in IZ available. Basic initiatives on community enhancement with regard to social facilities (e.g. child care). | At least 45 companies in the three selected IZ assessed and potential for clean&low carbon technology incl. BAT/BEP implementation identified and reported. Strategic plans developed and used for future upgrade of IZ. Community enhancement projects identified and described for further processing. | Company assessment reports on technology gaps and inappropriate practices. Documented strategic plans for three IZ. Summary report on community enhancement baseline and possible improvements | The project will be fully supported by MOIT and IZ authorities. |
| Output 4.1: Companies for RECP and technology gap | Criteria for the selection of | No comprehensive assessments of companies in the | At least 45 companies in the three selected IZ assessed in RECP and | Eligibility criteria for the companies. | A sufficient number of companies is willing to be |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|---|--|---|--|---|--|
| evaluation selected and assessed. | companies fulfilling eligible criteria. | selected IZ available. | potential for implementation of clean&low carbon technology incl. BAT/BEP and training needs identified and reported. | Detailed company status reports. | assessed and interested in manufacturing process improvement and technology investments. The companies represent the key resource for the demonstration of innovative technical solutions and practices. |
| Output 4.2 Strategic plans for IZ transformation developed. | The overall procedure for IZ transformation with regard to inter-company collaboration on re-use and recycling of by-products and waste, efficient use of energy and water, BAT/BEP and chemicals management established for three selected IZ and code of | No strategic plans with regard to clean&low-carbon technologies and practices for IZ available. | Needs of IZ authority to adapt to the new EIP structure/requirements assessed particularly on environmental management, waste exchange data management, logistics, legal compliance monitoring. Service and technology gap identified at IZ authority and in company assessments in three selected IZ | Three strategic plans for the three selected IZ. Code of practices document. | The early identification of needs of the IZ authorities and companies and strengthening of the IZ authority is important for the implementation of the project and will ensure sustainability of project activities after project end. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|---|--|--|---|---|---|
| | practices implemented. | | summarized and documented. Code of practice elaborated and adopted. | | |
| Output 4.3: Community enhancement projects identified and feasibility evaluated. | Criteria for community enhancement projects at three IZ developed and number of projects identified fulfilling eligibility criteria. | No evaluation of community enhancement potential in the context of IZ development available. | Needs of communities at three IZ to adapt to the new EIP structure assessed particularly on supplier companies, environmental dispute and social facilities and under consideration of environmental, economic and social benefits. | Needs assessment and project feasibility report. | The project will be fully supported by VACNE and IPONRE. Activities under the project supplement ongoing governmental efforts to improve community status. |
| Component 4 | | | | | |
| Outcome 5 EIP projects to reduce GHG, water consumption, water contaminants and unintentionally produced POPs demonstrated and community enhancement initiated. | Number of submitted clean&low carbon technologies investment proposals. Number of successfully implemented EIP investment projects. | | Numerous bankable clean&low-carbon technology investment projects developed in three IZ by experts and company representative and implemented. Relevant policy and guideline covering environmental dispute | Technical specifications. Investment reports. Tracking tools for GHG, IW, UP-POPs | Appropriate and sufficient sources of finance will be accessed and suitable, efficient and cost effective technologies identified and implemented by the companies within the project period. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|--|--|--|---|
| | Amount of GHG, water, water pollutants, UP-POPs reduced. | | and community compensation drafted and approved. | | |
| Output 5.1 Companies for clean&low-carbon technology investment projects selected and investment projects developed. | Number of selected companies. Number of developed investment projects. | There is not enough knowledge at company level to satisfy the need for appropriate innovative clean&low-carbon technology and for the elaboration of bankable investment projects especially at SME. | At least 30 bankable clean&low-carbon technology investment projects developed in detail by experts and company representative. Appropriate financial facilities selected and loan requests elaborated. | Technical investment reports. Investment proposals for the respective financial facilities. | A sufficient number of companies is willing to invest into clean&low carbon technologies with the subsidizing conditions set forth by the GEF project. Suitable experts on clean&low-carbon technologies are to be identified who can properly interact with company representatives to develop transparent investment projects. |
| Output 5.2 Pilot clean&low-carbon technologies | Number of implemented and successfully | Currently only scattered and insufficient | At least 30 clean&low-carbon technology investment projects | Installation acceptance reports. | Financial facilities approve the |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|---|--|---|---|---|
| and practices established on identified production sites. | operating technologies and practices. Investment amount in clean&low-carbon technology and co-finance share. | financial assistance for clean technology without coordination exist. | commissioned, implemented and functional. | Technical specifications of the installed technology. Reports on implemented new business models (e.g. chemical leasing) | companies' requests for a loan. |
| Output 5.3 Pilot community enhancement projects established. | Number of supported and implemented community enhancement projects with supra-regional environmental significance. | Insufficient public investment generally for social facilities and environmental protection available. Numerous cases of public demonstrations due to environmental problems. | Policy for environmental dispute particularly with regard to mediation and avoidance of juridical cases supported, drafted and adopted. Guideline for companies on community compensation drafted and adopted. One community enhancement project with supra-regional environmental and social benefits supported. | Meeting reports, copy of the adopted policy and guideline. | Community enhancement project at Bau Tram Lake, Danang ready for further support. The project will be fully supported by VACNE and IPONRE, IZ authority. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|---|---|---|--|---|---|
| <p>Outcome 6 Increased public awareness on issues concerning EIP development</p> | <p>Number of relevant public awareness workshops held.</p> <p>Number of stakeholders aware of the potentials associated with the transformation of IZ in EIP and of the benefits of managing them in an environmental sound manner.</p> | <p>The awareness of the eco-industrial park issue in particular with regard to adoption of innovative clean&low-carbon technology is limited even among the IZ authorities.</p> | <p>At least 3 Awareness Workshops held on EIP issues.</p> <p>Numerous IZ authorities, public institutions, associations, scientific institutions and NGOs with increased awareness on EIP transformation and management.</p> | <p>Awareness raising workshops reports.</p> | |
| <p>Output 6.1: Stakeholder engagement including NGOs, community representative and government established.</p> | <p>Number of stakeholders targeted and participating in awareness raising events.</p> | <p>Identification of target stakeholders for awareness raising on EIP issues never carried out.</p> | <p>At least 20-25 organizations (incl. scientific institutions (universities), NGO, public institutions, IZ authorities, associations) identified and participating in awareness raising events.</p> | <p>Awareness raising plan. List of targeted stakeholders contacted. Reports of awareness raising initiatives.</p> | <p>Identification of the relevant target group is essential for an effective awareness raising on EIP. Target stakeholders identified are willing to participate in awareness raising events. The level of awareness is measurable by</p> |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|---|---|---|--|--|---|
| | | | | | means of properly conducted questionnaire surveys. |
| Output 6.2: Development and implementation of training and awareness programs. | Awareness raising material. Number of awareness raising events held. | No awareness raising material on EIP is available in the country, neither for the general public nor for specific stakeholders. | Awareness raising material specifically developed for public institutions, IZ authorities and associations. Website established for the disclosure of environmental performance of companies in selected IZ and knowledge sharing on EIP and in particular on international waters issues under the "IW Learn" mechanism. | Dissemination materials specifically prepared for each target group. | Further awareness raising on EIP with IZ authorities and associations expected from governmental staff. |
| Component 5 | | | | | |
| Outcome 7: Effective project management, monitoring and evaluation implemented. | Timely monitoring and reporting of project performance indicators. | M&E activities with other projects established at PMU. | M&E system for tracking implementation progress towards outcomes and outputs in place. | Documentation on responsibilities, timelines and deliverables. | Project implementation arrangement established and responsibilities accepted by all project partners. |

| Hierarchy of Objectives | Indicators | Baseline | Target | Sources of Verification | Assumptions |
|--|--|---|--|---|---------------------------------|
| | Corrective measures in place in case of variations. | | Project management operational and PMU established within MPI. | | |
| Output 7.1: M&E mechanism and PMU developed and implemented. | Number of reports on project progress and corrective measures taken. | No M&E and project management for EIP projects have been applied. | Regular monitoring and analysis of performance indicators. Annual project review. Mid-term project review. Terminal project evaluation. | Progress reports. Steering committee meetings. Visits to field sites. | The M&E plan is fully budgeted. |

Annex 2: Detailed questions to assess evaluation criteria: See Annex 2 of the UNIDO Evaluation Manual

Annex 3: Job descriptions



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

| | |
|---------------------------------|--|
| Title: | International evaluation consultant, team leader |
| Main Duty Station and Location: | Home-based |
| Missions: | Missions to Vienna, Austria and Viet Nam |
| Start of Contract (EOD): | 20 th May 2019 |
| End of Contract (COB): | 31 st July 2019 |
| Number of Working Days: | 42 working days spread over the above mentioned period |

1. ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

2. PROJECT CONTEXT

Detailed background information of the project can be found the terms of reference (TOR) for the terminal evaluation.

| MAIN DUTIES | Concrete/ Measurable Outputs to be achieved | Working Days | Location |
|--|---|--------------|------------|
| <p>1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data). Define technical issues and questions to be addressed by the national technical evaluator prior to the field visit. Determine key data to collect in the field and adjust the key data collection instrument if needed. In coordination with the project manager, the project management</p> | <ul style="list-style-type: none"> Adjusted table of evaluation questions, depending on country specific context; Draft list of stakeholders to interview during the field missions. Identify issues and questions to be addressed by the local technical expert | 6 days | Home-based |

| MAIN DUTIES | Concrete/ Measurable Outputs to be achieved | Working Days | Location |
|---|---|--------------|---|
| team and the national technical evaluator, determine the suitable sites to be visited and stakeholders to be interviewed. | | | |
| 2. Prepare an inception report which streamlines the specific questions to address the key issues in the TOR, specific methods that will be used and data to collect in the field visits, confirm the evaluation methodology, draft theory of change, and tentative agenda for field work. Provide guidance to the national evaluator to prepare initial draft of output analysis and review technical inputs prepared by national evaluator, prior to field mission. | <ul style="list-style-type: none"> • Draft theory of change and Evaluation framework to submit to the Evaluation Manager for clearance. • Guidance to the national evaluator to prepare output analysis and technical reports | 5 days | Home based |
| 3. Briefing with the UNIDO Independent Evaluation Division, project managers and other key stakeholders at UNIDO HQ (included is preparation of presentation). | <ul style="list-style-type: none"> • Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to interview and site visits); mission planning; • Division of evaluation tasks with the National Consultant. | 2 day | Through skype |
| 4. Conduct field mission Viet Nam in 2019 ³⁸ . | <ul style="list-style-type: none"> • Conduct meetings with relevant project stakeholders, beneficiaries, the GEF Operational Focal Point (OFP), etc. for the collection of data and clarifications; • Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks; • Evaluation presentation of the evaluation's preliminary findings, conclusions and recommendations to | 14 days | Hanoi and 3 pilot provinces (specific project site to be identified at inception phase) |

³⁸ The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

| MAIN DUTIES | Concrete/ Measurable Outputs to be achieved | Working Days | Location |
|---|---|--------------|-----------------|
| | stakeholders in the country, including the GEF OFP, at the end of the mission. | | |
| 5. Present overall findings and recommendations to the stakeholders at UNIDO HQ | • After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed. | 2 day | Vienna, Austria |
| 6. Prepare the evaluation report, with inputs from the National Consultant, according to the TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report. Share the evaluation report with UNIDO HQ and national stakeholders for feedback and comments. | • Draft evaluation report. | 10 day | Home-based |
| 7. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and edit the language and form of the final version according to UNIDO standards. | • Final evaluation report. | 3 day | Home-based |
| | TOTAL | 42 days | |

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism
3. Respect for diversity

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision-making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:

Advanced degree in environment, energy, engineering, development studies or related areas.

Technical and functional experience:

- Minimum of 15 years' experience in evaluation of development projects and programmes
- Good working knowledge in environmental management
- Knowledge about GEF operational programs and strategies and about relevant GEF policies such as those on project life cycle, M&E, incremental costs, and fiduciary standards
- Experience in the evaluation of GEF projects and knowledge of UNIDO activities an asset
- Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks
- Working experience in developing countries

Languages:

Fluency in written and spoken English is required.

All reports and related documents must be in English and presented in electronic format.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

| | |
|---------------------------------|--|
| Title: | National evaluation consultant |
| Main Duty Station and Location: | Home-based |
| Mission/s to: | Travel to potential sites within Viet Nam |
| Start of Contract: | 20 th May 2019 |
| End of Contract: | 31 st July 2019 |
| Number of Working Days: | 32 days spread over the above-mentioned period |

ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

The national evaluation consultant will evaluate the projects according to the terms of reference (TOR) under the leadership of the team leader (international evaluation consultant). S/he will perform the following tasks:

| MAIN DUTIES | Concrete/measurable outputs to be achieved | Expected duration | Location |
|---|---|--------------------------|-----------------|
| Desk review Review and analyze project documentation and relevant country background information; in cooperation with the team leader, determine key data to collect in the field and prepare key instruments in English (questionnaires, logic models); If need be, recommend adjustments to the evaluation framework and Theory of Change in order to ensure their understanding in the local context. | Evaluation questions, questionnaires/interview guide, logic models adjusted to ensure understanding in the national context; A stakeholder mapping, in coordination with the project team. | 4 days | Home-based |
| Carry out preliminary analysis of pertaining technical issues determined with the Team Leader. In close coordination with the project staff team verify the extent of | <ul style="list-style-type: none"> Report addressing technical issues and question previously identified with the Team leader | 6 days | Home-based |

| MAIN DUTIES | Concrete/measurable outputs to be achieved | Expected duration | Location |
|---|--|------------------------------------|-----------------|
| achievement of project outputs prior to field visits. Develop a brief analysis of key contextual conditions relevant to the project | <ul style="list-style-type: none"> • Tables that present extent of achievement of project outputs • Brief analysis of conditions relevant to the project | | |
| Coordinate the evaluation mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with project staff in the field. | <ul style="list-style-type: none"> • Detailed evaluation schedule. • List of stakeholders to interview during the field missions. | 2 days | Home-based |
| Coordinate and conduct the field mission with the team leader in cooperation with the Project Management Unit, where required; Consult with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks. Conduct the translation for the Team Leader, when needed. | <ul style="list-style-type: none"> • Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission. • Agreement with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks. | 12 days (including travel days) | In Viet Nam |
| Follow up with stakeholders regarding additional information promised during interviews Prepare inputs to help fill in information and analysis gaps (mostly related to technical issues) and to prepare of tables to be included in the evaluation report as agreed with the Team Leader. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and proof read the final version. | <ul style="list-style-type: none"> • Part of draft evaluation report prepared. | 8 days | Home-based |
| TOTAL | | 32 days | |

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism
3. Respect for diversity

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced university degree in environmental science, engineering or other relevant discipline like developmental studies with a specialization in industrial energy efficiency and/or climate change.

Technical and functional experience:

- Excellent knowledge and competency in the field of chemical and waste management
- Evaluation experience, including evaluation of development cooperation in developing countries is an asset
- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project is desirable.

Languages: Fluency in written and spoken English and Viet Nameese is required.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

Annex 4- Outline of an in-depth project evaluation report

Executive summary (maximum 5 pages)

Evaluation purpose and methodology

Key findings

Conclusions and recommendations

Project ratings

Tabular overview of key findings – conclusions – recommendations

1. Introduction

1.1. Evaluation objectives and scope

1.2. Overview of the Project Context

1.3. Overview of the Project

1.4. Theory of Change

1.5. Evaluation Methodology

1.6. Limitations of the Evaluation

2. Project's contribution to Development Results - Effectiveness and Impact

2.1. Project's achieved results and overall effectiveness

2.2. Progress towards impact

2.2.1. Behavioral change

2.2.1.1. Economically competitive - Advancing economic competitiveness

2.2.1.2. Environmentally sound – Safeguarding environment

2.2.1.3. Socially inclusive – Creating shared prosperity

2.2.2. Broader adoption

2.2.2.1. Mainstreaming

2.2.2.2. Replication

2.2.2.3. Scaling-up

3. Project's quality and performance

3.1. Design

3.2. Relevance

3.3. Efficiency

3.4. Sustainability

3.5. Gender mainstreaming

4. Performance of Partners

4.1. UNIDO

4.2. National counterparts

4.3. Donor

5. Factors facilitating or limiting the achievement of results

5.1. Monitoring & evaluation

5.2. Results-Based Management

5.3. Other factors

5.4. Overarching assessment and rating table

6. Conclusions, recommendations and lessons learned

6.1. Conclusions

6.2. Recommendations

6.3. Lessons learned

6.4. Good practices

Annexes (to be put online separately later)

- Evaluation Terms of Reference
- Evaluation framework
- List of documentation reviewed
- List of stakeholders consulted
- Project logframe/Theory of Change
- Primary data collection instruments: evaluation survey/questionnaire
- Statistical data from evaluation survey/questionnaire analysis

Annex 5: Checklist on evaluation report quality

Project Title:

UNIDO ID:

Evaluation team:

Quality review done by:

Date:

| Report quality criteria | UNIDO IEV assessment notes | Rating |
|--|----------------------------|--------|
| a. Was the report well-structured and properly written? (Clear language, correct grammar, clear and logical structure) | | |
| b. Was the evaluation objective clearly stated and the methodology appropriately defined? | | |
| c. Did the report present an assessment of relevant outcomes and achievement of project objectives? | | |
| d. Was the report consistent with the ToR and was the evidence complete and convincing? | | |
| e. Did the report present a sound assessment of sustainability of outcomes or did it explain why this is not (yet) possible? (Including assessment of assumptions, risks and impact drivers) | | |
| f. Did the evidence presented support the lessons and recommendations? Are these directly based on findings? | | |
| g. Did the report include the actual project costs (total, per activity, per source)? | | |
| h. Did the report include an assessment of the quality of both the M&E plan at entry and the system used during the implementation? Was the M&E sufficiently budgeted for during preparation and properly funded during implementation? | | |
| i. Quality of the lessons: were lessons readily applicable in other contexts? Did they suggest prescriptive action? | | |
| j. Quality of the recommendations: did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can these be immediately implemented with current resources? | | |
| k. Are the main cross-cutting issues, such as gender, human rights and environment, appropriately covered? | | |
| l. Was the report delivered in a timely manner? (Observance of deadlines) | | |

Rating system for quality of evaluation reports

A rating scale of 1-6 is used for each criterion: Highly satisfactory = 6, Satisfactory = 5, Moderately satisfactory = 4, Moderately unsatisfactory = 3, Unsatisfactory = 2, Highly unsatisfactory = 1, and unable to assess = 0.

Annex 6: Guidance on integrating gender in evaluations of UNIDO projects and Projects

A. Introduction

Gender equality is internationally recognized as a goal of development and is fundamental to sustainable growth and poverty reduction. The UNIDO Policy on gender equality and the empowerment of women and its addendum, issued respectively in April 2009 and May 2010 (UNIDO/DGB(M).110 and UNIDO/DGB(M).110/Add.1), provides the overall guidelines for establishing a gender mainstreaming strategy and action plans to guide the process of addressing gender issues in the Organization's industrial development interventions.

According to the UNIDO Policy on gender equality and the empowerment of women: Gender equality refers to the equal rights, responsibilities and opportunities of women and men and girls and boys. Equality does not suggest that women and men become 'the same' but that women's and men's rights, responsibilities and opportunities do not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men. It is therefore not a 'women's issues'. On the contrary, it concerns and should fully engage both men and women and is a precondition for, and an indicator of sustainable people-centered development.

Empowerment of women signifies women gaining power and control over their own lives. It involves awareness-raising, building of self-confidence, expansion of choices, increased access to and control over resources and actions to transform the structures and institutions which reinforce and perpetuate gender discriminations and inequality.

Gender parity signifies equal numbers of men and women at all levels of an institution or organization, particularly at senior and decision-making levels.

The UNIDO projects/projects can be divided into two categories: 1) those where promotion of gender equality is one of the key aspects of the project/project; and 2) those where there is limited or no attempted integration of gender. Evaluation managers/evaluators should select relevant questions depending on the type of interventions.

B. Gender responsive evaluation questions

The questions below will help evaluation managers/evaluators to mainstream gender issues in their evaluations.

B.1. Design

- Is the project/project in line with the UNIDO and national policies on gender equality and the empowerment of women?
- Were gender issues identified at the design stage?
- Did the project/project design adequately consider the gender dimensions in its interventions? If so, how?
- Were adequate resources (e.g., funds, staff time, methodology, experts) allocated to address gender concerns?

- To what extent were the needs and priorities of women, girls, boys and men reflected in the design?
- Was a gender analysis included in a baseline study or needs assessment (if any)?
- If the project/project is people-centered, were target beneficiaries clearly identified and disaggregated by sex, age, race, ethnicity and socio-economic group?
- If the project/project promotes gender equality and/or women's empowerment, was gender equality reflected in its objective/s? To what extent are output/outcome indicators gender disaggregated?

B.2. Implementation management

- Did project monitoring and self-evaluation collect and analyze gender disaggregated data?
- Were decisions and recommendations based on the analyses? If so, how?
- Were gender concerns reflected in the criteria to select beneficiaries? If so, how?
- How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries?
- If the project/project promotes gender equality and/or women's empowerment, did the project/project monitor, assess and report on its gender related objective/s?

B.3. Results

- Have women and men benefited equally from the project's interventions? Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision making authority)?
- In the case of a project/project with gender related objective/s, to what extent has the project/project achieved the objective/s? To what extent has the project/project reduced gender disparities and enhanced women's empowerment?

Annex 6: Methodological note on the calculation of GHG reduction

Methodological note on the calculation of GHG reduction and other environmental benefits.

GHG Reductions

Confirmed investments

1. RECP Monitoring Report 2018 (corrected figures in project data base): 32,361 t CO_{2eq}/y. The project document assumed a replication of 3 (97,083 t CO_{2eq}/y) and the lifetime of the technology is assumed to be 7. This results in a total reduction of **679,581 t CO_{2eq}**.
2. Industrial Symbiosis. GHG reduction through 12 Industrial Symbiosis measures (18 options generated: 8 under implementation or in planning phase, 3 implemented, 1 stopped): the 8 measures which are in the planning phase or are already under implementation or have been implemented amount to 45,500 tCO₂ /year. Lifetime saving is assumed to be 7 years (no replication considered): total **318,500 t CO₂**
3. Photovoltaic plant in the Tan Long Paper and carton board factory, Da Nang. Credit approved by environmental fund, project in implementation. Production: 841 KWp. CO₂ reduction: 384 t CO₂/y. Lifetime savings for the technology (assumption of 20 years production, no replication is assumed): **7,600 t CO₂**.

Proposed investments under consideration

4. Solar photovoltaic feasibility study in Tra Noc Industrial Park. Potential CO₂ savings of 15,600 t CO₂/y. Consider 20 year lifetime of technology, 25 years minus 5 years for gradual loss of efficiency due to degradations of panels: **312,000 t CO₂**
5. Solar photovoltaic feasibility study in Hoa Khanh Industrial Park. Potential CO₂ savings of 18,700 t CO₂/y. Consider 20 year lifetime of technology, 25 years minus 5 years for gradual loss of efficiency due to degradations of panels: **374,000 t CO₂**
6. Co-processing in a cement plant in Ninh Binh. The company is producing 1 Mio t of cement per year, it needs as fuel 200,000 t of coal per year. If 30% of the fuel can be replaced by waste: 60,000 t per year of coal will be reduced, 1 t coal contains 780 kg of carbon. 60,000 t are equal to 171,600 t CO₂ emission. Only 40 % are max. CO₂ neutral (organic materials), so the savings will be 69 000 t CO₂ per year. Annual CO₂ reduction is multiplied by 15, the lifetime of the investment: **1,035,000 t CO₂**.

Water use reduction

RECP Monitoring report 2018: 606,816 m³/year. Assume a replication factor of 3, therefore water reduction by RECP investments is calculated to be **1.82 Mio m³ per year**.

Water use reduction through 12 Industrial Symbiosis measures (18 options generated, 12 in planning phase, 7 under implementation, 2 implemented). Studies assessed water reduction by the 12 planned industrial symbiosis investments as a total of 885,333 m³/year, The total water use reduction is projected to **2,705,333 m³ per year** (Target Pro Doc: 6,000,000 m³ per year).

COD Reduction

VNCPC monitoring Report 2018: **75,118 kg per year**. This figure was subsequently corrected to 75,461 kg per year (Target Pro Doc: 76,900 kg per year)
BOD and TSS were not monitored, but BOD and TSS were also achieved if COD reduction was done, in all three IP centralized WWT plant are now in operation.

UP-POPs reduction

VNCPC Monitoring report 2018 indicated 5,888 µg TEQ per year. This number was subsequently corrected to **6,754 µg TEQ** per year following a revision by an independent POP expert, applying a replication factor of 3 (since these reductions were due to RECP interventions), the result is 20,262 µg TEQ per year. Target in the Pro Doc: 810 mg TEQ per year

Waste reduction

RECP program reported a reduction of 3,746 t per year of chemicals and raw material. Waste reduction through 12 Industrial Symbiosis measures (18 options generated: 8 under implementation or in planning phase, 3 implemented, 1 stopped) is expected to be 2,004 t / year from confirmed investments, plus 82,440 t /year from potential pipeline investments. The expected total waste reduction is of $(3,746*3 + 2,004 + 82,440)*7 =$ **669,774 t/ year**.

Annex 7: List of documents reviewed

Chen, Huey T., 1990. *Theory-Driven Evaluations*. Sage.

Folke, C. et al., 2002. "Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations." *AMBIO: A Journal of the Human Environment* 31 (5): 437–40. doi:10.1579/0044-7447-31.5.437.

Garcia, J. R., and A. Zazueta. 2015. "Going Beyond Mixed Methods to Mixed Approaches: A Systems Perspective for Asking the Right Questions." *IDS Bulletin* 46 (1): 30–43.

Levin, S., 2003. "Complex Adaptive Systems: Exploring the Known, the Unknown, and the Unknowable." *Bulletin of the American Mathematical Society* 40 (1): 3–19.

Mayne, J., 2008. "Contribution Analysis: An Approach to Exploring Cause and Effect." ILAC Brief Number 16.

UNIDO/UNEP 2009 Joint UNIDO–UNEP Project on Resource Efficient and Cleaner Production () in Developing and Transition Countries, Project Document.

Zazueta, A., and J. R. Garcia. 2014. "Multiple Actors and Confounding Factors." *Evaluating Environment in International Development*, 194.