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FCG Finnish Consulting Group

Ex-Post Evaluation
of Concessional
Credit Scheme
Projects:

*Binh Duong Solid
Waste Treatment
Plant Project – phase
1*

*Binh Duong Solid
Waste Treatment
Plant Project – phase
2*

Evaluation Report

Ex-Post Evaluation of Concessional Credit Scheme Projects:

Binh Duong Solid Waste Treatment Plant Project – phase 1

Binh Duong Solid Waste Treatment Plant Project – phase 2

FCG Finnish Consulting Group Ltd

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ABBREVIATIONS

AD	Anaerobic Digestion
BIWASE	Southern Binh Duong Water Supply – Sewerage Environment Co. Ltd
BOQ	Bill of Quantities
CAPEX	Capital Expenditures
CBO	Community-based organization
CCS	Concessional Credit Scheme (of MFA of Finland)
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
DOC	Department of Construction (at Province or City level)
DONRE	Department of Natural Resources and Environment (at Province or City level)
DSTE	Department of Science, Technology and Environment (Ministry of Construction)
FS	Feasibility Study
GHG	Greenhouse Gas
HCMC	Ho Chi Minh City
EEP	Energy and Environment Partnership (MFA Finland programme type)
EEP Mekong	Mekong Energy and Environment Partnership Programme
ISWM	Integrated Solid Waste Management
MFA	Ministry for Foreign Affairs of Finland
MPI	Ministry of Planning and Investment, Vietnam
MOC	Ministry of Construction, Vietnam
MOH	Ministry of Health
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment
MSW	Municipal Solid Waste
ODA	Official Development Assistance



OPEX	Operational Expenditures
PIF	Public Sector Investment Facility
PPC	Provincial People's Committee
RBM	Results-Based Management
RDF	Refuse Derived Fuel
SDGs	Sustainable Development Goals
VEA	Vietnam Environment Administration
W2E	Waste to Energy

1. EXECUTIVE SUMMARY

Introduction

The present ex-post evaluation of *Binh Duong Solid Waste Treatment Plant Project – phase 1 and Phase 2*, financed through the Concessional Credit Scheme (CCS), is part of the Ministry for Foreign Affairs of Finland (MFA) efforts to strengthen the focus on development results and lessons learnt from CCS projects to support the programming, development, and management of the Public Sector Investment Facility (PIF) instrument.

The overall objective of this evaluation is to provide an external, independent, and objective assessment of the project phases. Through the evaluation the following was assessed:

- 1) Whether the project was implemented in an appropriate and efficient way,
- 2) How well it achieved the targets and goals laid out in the project plan, and
- 3) How sustainable the results of the project are, including any long-term development impacts.

According to the TOR, the evaluation also:

- Provides the MFA with lessons-learned that can be used in further development of the PIF funding instrument;
- Provides information about the synergies of different financing instruments (EEP Mekong and CCS);
- Evaluates further needs in landfill development in Southern Vietnam and perspective of solid waste treatment technology application (W2E) in Vietnam and the scalability of the approach used in the projects;
- Evaluates or reviews the impacts of the change in the overseeing ministry (Landfills fall under the responsibility of MONRE currently, earlier with MOC);
- Finally, the evaluation will generate information for the MFA on the development impact of the CCS funded projects and the sustainability of these results.

The evaluation focuses on the overall process related to the two project phases of the project, from the initial planning since 2002 till 2018, and evaluating the results and impacts up to present.

Background and context analysis

Waste management was not well organised in Vietnam in general in the early 2000s when the project was planned. The waste disposal was based on poorly constructed and managed dumping places, which caused serious environmental hazards. The dumping places were not properly founded, and they were scattered in districts and under-dimensioned, which resulted in a technically and environmentally poor waste treatment status in the Binh Duong province. Open burning at landfill sites was a common practice and in the main domestic waste management practice in many countryside areas.

The BIWASE waste treatment branch was established on August 31, 2004, under Binh Duong Water Supply, Sewerage and Environment Company (BIWASE). The area serviced by BIWASE is the whole Binh Duong province with 9 administrative units (3 cities, 2 towns and 4 districts).

In general, the waste management in Vietnam has developed considerably in the past 20 years both in terms of the waste management practices as well as the needs. The population has grown from 85.85 million in 2009 to 96,209 million in 2019.¹ Additionally there has been strong trend of urbanization and industrialization causing a strongly growing trend in waste generation. Currently the nationwide waste generation is more than 61,000 tons/day and in Binh Duong province 1,764 tons/day.² According to Ministry of Construction³, the rate of solid waste collection increases year by year, the collection rate in 2010 reached 81%, and in 2017 it reached 85.5%. In Binh Duong the rate is presently much higher due to the well managed development of waste collection and waste management (refer to table 2 in chapter 4.2 below).

The evaluated projects are the Binh Duong Solid Waste Treatment Plant Project – phase 1 and Binh Duong Solid Waste Treatment Plant Project – phase 2, implemented between 2011 and 2018. Preparation of the Phase 1 started in 2002, after the Vietnam Ministry of Planning and Investment (MPI) approached MFA with an inquiry to finance the construction of South Binh Duong solid waste treatment plant with a concessional credit. The first feasibility survey was conducted in 2003 and appraised in 2004. The handling of the project was however delayed 2004, and it was brought back to table in 2008. Due to inflation between 2004 and 2008, the original scope of the project was narrowed down, leaving out components such as wastewater treatment of the composting plant, industrial waste combustion with heat collector, and sludge recycling and treatment facility. The project was first tendered in 2009-2010 but the winning consortium dissolved, and the project owner organized a new round of bidding in 2011, which was won by Ferroplan Oy. Trade agreement was signed later in 2011 and the project commenced in December 2011. The first phase was implemented between 2011 and 2013. The second phase planning was initiated during the first phase implementation and appraised in 2013. The bidding took place in 2014 and the commercial contract was signed in November 2014. The start of the implementation was delayed for a few years due to financing arrangements etc. and was finally completed in 2017-2018.

Evaluation design and approach

The data collection methods have been determined by the evidence needed to address the evaluation questions, by the analyses that were used to translate data into meaningful findings in response to the evaluation questions, and by the type of data feasible to collect, given the constraints of time and resources. The data collection was organised in a manner that ensured that the viewpoints of both the direct and the indirect beneficiaries of the projects as well as all relevant stakeholders were gathered and analysed.

¹ General Statistics Office, 2010 - 2019

² State of Environmental Report, Viet Nam 2019

³ Ministry of Construction (2019): Report to Deputy Prime Minister on Domestic Solid Waste Management, January 21, 2019.

The data collection included interviews of key stakeholders in Vietnam and in Finland. Data collection in the field by the local evaluation team and in-depth review of documentation, reports and decisions are related to both project phases under evaluation.

Data analysis of the qualitative and quantitative data was carried out based on questions, indicators and data collection methods set out in the evaluation framework and matrix (**Annex 2** of this report). It was done jointly by the whole evaluation team, in line with the team responsibility matrix and under the leadership of the Team Leader. All the deliverables were further quality controlled by the FCG Home Office. Team meetings were held throughout the assignment to review the information and emerging conclusions and implications for the ongoing evaluation work.

- As a significant amount of the data are qualitative, thematic content analysis was used to analyse, interpret, verify, and identify themes and to group similar findings together to reveal conclusions. Thus, data was synthesized and presented to account for each of the evaluation criteria used in this evaluation, namely: relevance, effectiveness, efficiency, sustainability and impact, and for considerations on coordination and coherence as well as other aspects, such as creation of additional Finnish business opportunities. Contribution analysis was utilised for evaluating specific project contribution to observed change in combination with other processes and interventions.
- Data analysis led to the formulation of findings, conclusions, and forward-looking recommendations. The validity of the findings was ensured by triangulation of different sources of data and methods of data collection and by adhering to OECD DAC evaluation criteria⁴ and the MFA Evaluation Manual.⁵

Limitations, Risks and Mitigation Measures

This is an ex-post evaluation allowing a good opportunity to look into the results, sustainability and impacts of the past projects while detailed information of the implementation efficiency and effectiveness has been more difficult to get as several years have already passed since the implementation. Some of the key persons who were involved in the project in Vietnam, were not available for interviews anymore or could not remember the details of project related issues. However, all the evaluation questions are answered to the extent possible in this report. Due to the COVID-19 pandemic the international team members were not able to travel to Vietnam for data collection and therefore depended on the information collected by the national consultants. The team included three competent Vietnamese experts whose expertise cover SWM technical/engineering aspects, environmental and socio-economic aspects as well as broader policy and institutional capacity aspects. As this is an ex-post evaluation performed several years after the actual implementation of the evaluated project phases, the recommendations and lessons learned from the evaluation are directed towards the further development of the present PIF instrument rather than project specific recommendations that would not be applicable anymore.

⁴ Better Criteria for Better Evaluation - Revised Evaluation Criteria Definitions and Principles for Use (OECD/DAC Network on Development Evaluation 2019) <https://www.oecd.org/dac/evaluation/revised-evaluation-criteria-dec-2019.pdf>

⁵ Development Cooperation Evaluation Manual (MFA 2021) <https://um.fi/development-cooperation-evaluation-manual>

Findings, Conclusions and Recommendations

Note: In order to stress the importance of issues for successful project implementation, we present some recommendations, emerged during the evaluation process, that are already taken into account in the present PIF guidelines (the recommendations are further explained in chapter 6).

	Findings	Conclusions	Recommendations
RELEVANCE	1. Both phases of the project were highly relevant to the improvement of solid waste management in the Binh Duong province and to the local populations benefiting from improved waste management.	1. While relevant, both project phases would have benefited of more systematic analysis of changing scope and context during the prolonged process from planning till implementation.	1. MFA: There should be systematic follow-up of the changes in the project scope and context throughout the process, from the planning till actual implementation. The decisions regarding changed scope should be clearly documented and when necessary, the project should be re-appraised.
	2. The changing context and project scope during the long period from the planning and appraisal to implementation were not properly analysed and systematically documented in terms of project relevance.		
	3. The project phases were part of a larger programme initiated by Vietnam government for improvement of the sector services, and they contributed substantially to the Vietnam and Binh Duong province development plans and strategies.	2. The project phases were well in line with provincial, Vietnamese and Finland's plans, strategies, and development policies.	
	4. The project phases were well in line with Finland's development policy objectives and global development goals. This was ensured by different stages of the CCS process.		
EFFECTIVENESS	5. The project phases achieved the set immediate objectives in effective manner and contributed strongly to improving the solid waste collection and treatment capacity of BIWASE and thus improved the services that BIWASE offers to the households and communities in the province.	3. The project was effectively implemented largely due to strong and committed project owner and Finnish main contractors, that were well familiar with the implemented technologies and mobilising an	2. MFA and Project Developer: The PIF project selection process should aim to ensure the commitment and capacity of the project owner in the target country. If the project planned to be implemented following FIDIC Conditions of Contract, there should be proper FIDIC expertise within the
	6. The main success factors were the active and committed project owner BIWASE and the contractor's project manager who was well familiar with the local context and was present at the site throughout the project implementation during both phases.		

	Findings	Conclusions	Recommendations
	7. The main actors with crucial role in the successful implementation of the project phases were the active project owner (BIWASE) and the Finnish contractors managing the implementation process. The other important actors were the Vietnamese officials at different levels and the local sub-contractors doing the actual construction work on site. The role of the MFA was largely limited to the selection process of the contractor and to support for responding to Vietnamese administrative requirements through the Embassy.	experienced project manager on site.	team preparing the bidding documents. The projects should be within the core business for the Finnish contractor. Following the example from Vietnam, the role of the MFA and the Embassy should be strengthened especially in terms of the support for ensuring that committed local project owners are found and for the project monitoring during the project and for supporting finding further business.
EFFICIENCY	8. The project phases were efficiently implemented in terms of the budget, time, as well as the quantity and quality of the results attained. The project phases can also be deemed as good value for money as the tendering process ensured a competitive price from the contractor and the results attained were of higher quality that could have been achieved with local or regional implementation	4. The project phases were efficiently implemented due to the active project owner and contractor while the planning and procurement processes took a lot of time.	
	9. In terms of efficiency, as for effectiveness, the most important roles in the success of the project were played by the active project owner and the contractor's project manager. In terms of process the most successful element was the actual implementation while the most relevant bottleneck was the lengthy procurement of the Finnish contractor.		
IMPACT	10. The project succeeded well in achieving its overall objective and the positive impacts have continued to expand to a larger part of the province's population during the years after the implementation.	5. The project phases succeeded in producing positive social and health impacts through improved waste management, and employment and business creation leading to positive economic impacts.	3. Project Developer: The project planning should include proper setting of targets at different levels which enable systematic follow-up during and after implementation. The social and environmental impact assessments should be part of the planning process. The management of
	11. There have been positive socio-economic impacts for the people working in the related complex business area, as well as for the population as whole through improved waste management.		

	Findings	Conclusions	Recommendations
	12. The environmental impacts have been generally positive with the move to proper waste collection and management instead of dumpsites, and to constantly improving monitoring and management of the negative environmental impacts. Some negative environmental impacts are experienced in the surrounding areas mainly due to the air pollution (smell), pollution in groundwater during rainy seasons, and disturbance caused by the waste transportation trucks.	6. The environmental impacts were not fully estimated through proper ESIA processes; thus, the management of potential negative environmental impacts was not systematic.	potential negative impacts should be systematic and well documented. The current MFA PIF guidance addresses these issues well. The Project Developer should also consider likelihood of finding further business after the PIF project as part of the concept development.
SUSTAINABILITY	13. The systems constructed during the project phases are still in efficient and effective use, and further expanded. The overall BIWASE waste management operation is financially sustainable and working to continually improve its services and expand the processes implemented in the CCS project phases. Thus, the results of the project phases are proven to be exceptionally sustainable.	7. The project results have proved highly sustainable in terms of technical and financial aspects.	4. MFA and Project Developer: Proper attention should be paid to commit the project owner, and to proper estimation and management of potential negative social and environmental impacts during planning, implementation and post-implementation.
	14. Coordination between different projects and programmes was not systematically managed by Finnish actors but BIWASE managed the coordination to avoid undue overlaps between the different projects supporting the development in their complex.	8. There was no systematic coordination by the CCS projects with other initiatives on the site. The practical coordination was managed by BIWASE. The lack of EIA and proper follow-up of potential negative environmental impacts could potentially reduce the environmental and social sustainability of the project results.	
	15. The CCS projects themselves were not strongly working on the alignment and harmonization issues but these have been managed by BIWASE as part of the efforts to develop their services, partially based on external financing, such as ODA projects. There were no major policy contradictions found in the evaluation; however, the omission of a proper EIA for mitigating negative unintended environmental impacts can be seen as a minor contradiction.		

	Findings	Conclusions	Recommendations
COORDINATION, COMPLEMENTARY AND OTHER	16. The Finnish companies implemented the CCS projects as part of an effort to expand their operations in developing counties but there has been limited success to date while the references have been strong in the Finnish market – they are still the largest project references for both companies that implemented the project phases.	9. While the project phases were well in line within cooperation between the two countries, and part of contractor strategies for expansion of international operations, there was a limited success in finding additional work in Vietnam or other developing countries after the CCS project implementation.	5. MFA: The MFA should ensure the clarity of roles and responsibilities of the various MFA units and include related tasks in relevant personnel’s ToRs (KEO-50, regional unit, embassy etc.) for PIF project preparation and for agreeing with the local stakeholders and project owner on implementation support and follow-up, as well as for finding additional business opportunities based on PIF projects. The selection process should include considerations of likelihood of further business and for promotion of specific technologies that can be demonstrated through the project.
	17. The project phases continued the good cooperation relations between Finland and Vietnamese ministries, and they represent positive and important projects. The synergies with EEP Mekong project were utilized to a limited extent but in general it has been difficult to utilize synergies with bilateral projects due to the time taking CCS project processes.		
	18. The Vietnamese officials consider the projects important and strategic and see that there is a great need for the project replication in other parts of Vietnam even now.		
	19. There was a lack of support and financing for project preparation, and the roles of different units within MFA during project implementation were unclear in case of CCS projects in general.	10. There was lack of systematic MFA support for project preparation (financial support for preparation would also reduce risk for Finnish contractors initiating the process) and implementation in CCS process in general.	6. MFA: Financial and technical support especially for project preparation to ensure project plans include proper RBM tools such as targets at different levels and measurable indicators.

Lessons learned

There are several lessons that can be learned from the long process related to the two evaluated CCS projects. The most important lessons identified are:

- The local Project Owner (BIWASE) was very committed and competent which was a key factor in successful implementation of both project phases. There should be special attention paid to the commitment and capacity of the project owner in the selection process for all PIF projects and this should feature among the key criteria in project screening and appraisal.
- There were substantial changes to the scope of both project phases after the project appraisal which were not systematically analysed and documented. There should be an analysis and if necessary, a re-appraisal always when the project scope changes substantially during the process. All the decisions made regarding the project scope should be well documented and justified in all cases.
- The preparation of the evaluated projects had not included proper setting of targets and indicators which made evaluation and proper follow-up of results and impacts harder. These elements of RBM and also proper assessment and management of potential social and environmental impacts should be integral in the project planning and preparation. Financial and technical support for Project Developers may be needed to ensure the proper project preparation in these regards.
- The amount of landfill gas was finally not as high as the FS indicated and thus the electricity generation cannot be run at full capacity. The Feasibility Studies and technical details of financed projects should be properly checked even though the FS is the responsibility of the Project Owner.
- There was limited success for the Contractors of the two evaluated projects to find additional business based on the reference gained from these CCS projects, as well as in general in CCS. The MFA should focus more on supporting the Finnish companies in winning additional business after the implementation of Finnish financed projects (PIF). The potential for such further work could be considered in the selection process of projects proposed for financing, and the MFA and the Embassy should have clear roles and plans for the active support for such further work as a key goal of PIF financing. It must be kept in mind that the CCS and current PIF projects need to be economically non-viable so private sector financing for such projects is hard to find, therefore focus has to be in public and donor financing. Additionally, promotion of specific technologies that have been demonstrated through projects could be an effective way of promoting Finnish manufacturers in the developing markets.

2. INTRODUCTION

2.1 Purpose of the Evaluation

The present ex-post evaluation of two project phases, Binh Duong Solid Waste Treatment Plant Project – phase 1 and Phase 2, financed through the Concessional Credit Scheme (CCS), is part of the Ministry for Foreign Affairs of Finland (MFA) efforts to strengthen the focus on development results and lessons learnt from the past CCS projects to support the programming, development, and management of the Public Sector Investment Facility (PIF) instrument.

The Public Sector Investment Facility (PIF) is one of the Finnish government's financing instruments in the development policy field. Its purpose is to provide financial support to developing countries' public sector investments that are aligned with the UN sustainable development goals (SDGs) and that make use of Finnish technology and know-how. PIF financing is a form of concessional investment credit provided by a financial institution to the target country, which in addition to an interest subsidy element includes other support measures of the Finnish government's development cooperation.

PIF was launched in December 2016. It was preceded by the Concessional Credit Scheme (CCS) that was discontinued in 2012. The CCS was based on the same legal framework as PIF and it had similar objectives to PIF in promoting economic and social development in developing countries by making use of the experience and technology of Finnish companies. However, the scheme was criticized for not focusing sufficiently on achieving development results, which contributed to the decision to discontinue the scheme.

As part of the decision to launch the PIF instruments, steps were taken to ensure a stronger focus on development results. One of these steps is to increase the number of the end-of-project evaluations of PIF and CCS projects. The aim is to generate information on development results and lessons learned from the projects particularly to support programming and management of the PIF financial instrument.

2.2 Objectives of the Evaluation

The overall objective of the evaluation is to provide an external, independent and objective assessment of the project.

The evaluation will assess:

Through the evaluation the following was assessed:

- 1) Whether the project was implemented in an appropriate and efficient way,
- 2) How well it achieved the targets and goals laid out in the project plan, and
- 3) How sustainable the results of the project are, including any long-term development impacts of the project.

According to the TOR, the evaluation will also:

- Provide the MFA with lessons-learned that can be used in further development of the PIF funding instrument;

- Provide information about the synergies of different financing instruments (EEP Mekong and CCS);
- Evaluate further needs in landfill development in Southern Vietnam and perspective of solid waste treatment technology application (W2E) in Vietnam and the scalability of the approach used in the projects;
- Evaluate or review the impacts of the change in the overseeing ministry (Landfills fall under the responsibility of MONRE currently, earlier with MOC);
- Finally, the evaluation is expected to generate information for the MFA on the development impact of the CCS funded projects and the sustainability of these results.

2.3 Scope of the Evaluation

The evaluation focuses on the overall process related to the two phases of Binh Duong Solid Waste Treatment Plant Project, from the start of the planning in 2002 till 2018, evaluating the results and impacts up to present. The actual project implementation period was only a few years in both phases but the overall process related to these CCS projects is evaluated to learn also about the whole processes related to such projects.

Both evaluated project phases were implemented in the Binh Duong Solid Waste Treatment Complex and serve the Binh Duong Province population in Southern Vietnam. The evaluation focuses on both the actual work done at the site and the impacts of the projects in the broader area and population served by the solid waste management facility.

2.4 Evaluation methodology and approach

Data collection

The data collection methods have been determined by the evidence needed to address the evaluation questions, by the analyses that was used to translate data into meaningful findings in response to the evaluation questions, and by the type of data feasible to collect, given constraints of time and resources. The data collection was organised in a manner that ensured that the viewpoints of both the direct and the indirect beneficiaries of the projects as well as all relevant stakeholders were gathered and analysed.

Primary data: information collected directly from stakeholders. This information was obtained through Key Informant Interview (KIIs) and Focus Group Discussions (FGDs) which due to COVID-19 were largely



Figure 1 Interviewing beneficiaries in the project area (Source: Nguyen Hang, evaluation team)

conducted via teleconferencing, complemented by data collection and interviews by the national experts on site in the project area, province and also with national level stakeholders in Vietnam.

- KIIs are the best way to access key players in the project. This qualitative tool (based upon open-ended discussion guidelines) allows for rich information as it highlights the relevant links among the topics discussed. This technique also enables the evaluator to have an in-depth understanding of interviewees' experiences and their assessment of results and major obstacles encountered. Interviews should last no more than 60 minutes and were complemented by phone or written consultations (via-email) in case the respondent is not available for a full interview or if information needs to be complemented.
- FGDs were utilized to determine the perceptions among members of key stakeholder organisations, as well as with the project beneficiaries in the local communities. The FGDs were conducted in line with the project expected results. FGDs allow for nuanced and open-ended responses to more complex questions, furthermore eliciting information on experiences and perceptions that otherwise could not be obtained. As mentioned above the FGDs were partially conducted through teleconferencing in the current COVID situation.
- Field observations, photographs and videos as well as data collected by the field team was among the key sources of information that was discussed among the whole team during the process of field work through instant messaging and teleconferencing.

Secondary data: Sources of documentary evidence include project plans and monitoring reports including the Project Documents, Reports and other project related documents as well as available external studies and reviews or similar reports. The reports were carefully desk reviewed and analysed to collect coherent data for analysis.

The evaluation matrix (Annex 2) is the key document guiding the evaluation – outlining the main evaluation questions as well as the sources of data, data collection methodologies and the key indicators used to evaluate these questions. The matrix is based on the evaluation questions set forth in the ToR (Annex 1) for the present assignment with additional detailed questions added to ensure all key elements of the evaluation are covered.

Data collection in the field

- Due to international travel restrictions, field data collection was done by locally based consultants.
- Observations in the solid waste complex guided by an observation check list. Observations were recorded through photos and videos as well as comprehensive reports with data collected from relevant agencies, which were used solely for evaluation purposes.
- Interviews with BIWASE management and equipment and machinery operators and workers. Interviews with Binh Duong PPC, MONRE, MPI and other relevant authorities.
- Observations in the communities surrounding the solid waste complex; discussions with the community representatives.

Data analysis of qualitative and quantitative data was carried out based on questions, indicators and data collection methods set out in the evaluation framework and matrix (**Annex 2** in this report). It was done jointly by the whole evaluation team in line with the team responsibility matrix and under the leadership of the Team

Leader. All the deliverables were further quality controlled by the FCG Home Office. Team meetings were held throughout the assignment to review the information and emerging conclusions and implications for the ongoing evaluation work.

- As a significant amount of the data are qualitative, thematic content analysis was used to analyse, interpret, verify, and identify themes and to group similar findings together to reveal conclusions. Thus, data was synthesized and presented to account for each of the evaluation criteria used in this evaluation, namely: relevance, effectiveness, efficiency, sustainability and impact, and for considerations on coordination and coherence as well as other aspects, such as creation of additional Finnish business opportunities. Contribution analysis was utilised for evaluating specific project contribution to observed change in combination with other processes and interventions.
- Data analysis led to the formulation of findings, conclusions, and forward-looking recommendations. The validity of the findings was ensured by triangulation of different sources of data and methods of data collection and by adhering to OECD DAC evaluation criteria and standards⁶ as well as the MFA Evaluation Manual.⁷

2.5 Limitations, Risks and Mitigation Measures

This is an ex-post evaluation giving a good opportunity to look into the results, sustainability and impact of the past projects while detailed information of the implementation efficiency and effectiveness has been more difficult to come by as several years have already passed since the implementation. Some of the key persons who were involved in the project in Vietnam, were not available for interviews anymore or could not remember the details of project related issues. However, all the evaluation questions will be answered to the extent possible in this report.

Due to the COVID-19 pandemic the international team members were not able to travel to Vietnam for data collection and depended on the information collected by the national consultants. The team included three competent Vietnamese experts whose expertise covers SWM technical/engineering aspects, environmental and socio-economic aspects as well as broader policy and institutional capacity aspects. The national experts did the legwork for collecting field data from central level agencies, Binh Duong province and stakeholders there, BIWASE and the waste management complex staff as well as local beneficiaries and authorities in different localities in Binh Duong province in southern Vietnam. The team has been in constant contact to ensure common understanding of the evaluation objectives and questions. During the national experts' visit to the BIWASE complex, the team stayed in touch through an on-line messaging application to receive updates and make clarifications. The field team members prepared extensive reports on their findings and on the data collected; they are among the key sources of information for this evaluation.

⁶ Better Criteria for Better Evaluation - Revised Evaluation Criteria Definitions and Principles for Use (OECD/DAC Network on Development Evaluation 2019) <https://www.oecd.org/dac/evaluation/revised-evaluation-criteria-dec-2019.pdf>

⁷ Development Cooperation Evaluation Manual (MFA 2021) <https://um.fi/development-cooperation-evaluation-manual>

The field data collection in Vietnam had to be postponed due to COVID-19 related travel and to meeting restrictions in country but could finally be completed in December 2021 with some additional interviews conducted in January 2022. At the time when travel within Vietnam became restricted, we considered the option of finalizing the evaluation solely based on secondary data, but a decision was made to rather delay the finalization of the assignment, rather than compromise its reliability and level of detail. We appreciate MFA's flexibility and patience for accepting the delay from the original plan.

As this is an ex-post evaluation performed several years after the actual implementation of the evaluated project phase, the recommendations and lessons learned from the evaluation are directed towards the further development of the present PIF instrument, rather than project specific recommendations that would not be applicable anymore.

3. DESCRIPTION OF THE CONTEXT AND THE EVALUATED PROJECT

3.1 Context of the Project

Solid Waste Management situation and related environmental issues at the start of project planning

Waste management, in general, was not well organised in Vietnam in early 2000 at the time when the project was planned. The waste disposal in Vietnam in general, as well as in Binh Duong province, was based on poorly constructed and managed dumping places, which caused serious environmental hazards. The dumping places were not properly founded, scattered in districts and under-dimensioned, which resulted in a technically and environmentally poor waste treatment status in the Binh Duong province. The waste management varied to some extent between the districts of the South Binh Duong area, but the problems were mainly the same. Solid waste was collected mainly in urban areas only, while the practice of solid waste collection in other areas, especially in rural areas, was very limited. In rural areas, even though the government had been trying to increase the rate of waste collecting, the situation was poor.

Open burning at landfill sites was a common practice in a few cities with the purposes of lowering the total volume of waste at those sites as well as increasing the capacity of the sites. Open burning was also observed as the main practice of managing domestic solid waste in some countryside areas and in most of the rural areas back in the early 2000s. Local people in those poor areas burned their solid waste right in their home yards. However, these practices of open burning introduced a large number of pollutants into the atmosphere. Because of this practice, humans were exposed to and suffering from serious health problems.



Figure 2 Local dumpsite and waste separation by pickers in 2004⁸

Landfilling was the most common practice of solid waste managing in Vietnam together with incinerators and open burning locally and in landfills. It was estimated in early 2000s that about 76-82% of total municipal solid waste ended up in landfills which were not generally well managed. There were about one hundred open dumping sites and landfills around the country and only some sites had proper practices in treating solid waste, while the rest of the sites were operating in an unhygienic fashion. Furthermore, many open dumping sites and landfills, especially the ones located in large cities, were overloaded as the total volume of solid waste was increasing remarkably every year but the land is a limited resource.

The general situation of the municipal waste management in the districts of the project area at the time of project appraisal in 2004 can be characterized as follows:

- Waste management was undeveloped and inefficient, and none of the existing dumps in 2003, excluding the Ho Chi Min City treatment plant, met the requirements of a modern treatment.
- There were problems in the collection and transportation system in the Project area. All waste could not be collected, and the capacity of the dumping places was becoming to a bottleneck.
- The recycling of waste was not industrial based, but rather dependent on individuals sorting different types of waste on their own benefit. These people were mostly women and children. The conditions were health threatening and unsanitary, which exposed these people to various health problems and diseases.
- Sorting and recovery of the waste was not practiced at the source but domestic waste, agricultural waste, dry waste, wet waste etc. were mixed up together and transported and disposed to the dump. This decreases the efficiency of treatment and recycling of waste and increases of waste volumes at the dump.

⁸ Ramboll Finnconsult Oy (2004) appraisal mission, pictures by Herkko Torssonen.

- The waste dumps were not covered at all, which caused serious environmental hazards especially during rain. The leakage water was spreading to the surrounding areas causing environmental damage and pollution. The lack of coverage also caused unintentional large scale dump fires, which was also an unsolved issue and very hazardous for the surrounding environment.
- The leakage water was not collected nor taken care of, but rather lead to the local rice fields and other surroundings which exposed the people and the environment to a large scale of pollution, environmental damage, and health hazards.
- There was not any reliable statistical data on waste quality and quantity.⁹

Development of Solid Waste Management policies and institutional structures

The BIWASE phase 1 ending report clarifies that the BIWASE was instructed in 2003 by the provincial leadership to receive collected waste and to develop the waste management complex starting 2004. The waste treatment branch was established on August 31, 2004, under Binh Duong Water Supply, Sewerage and Environment Company (BIWASE). The area serviced by BIWASE is the whole Binh Duong province with 9 administrative units (3 cities, 2 towns and 4 districts). The province has a small land area of 2,694 km² and a population of over 2.6 million people out of which about 2.2 million people live in urban areas, the urbanization rate is about 82%. In 2010 the Urban Domestic Waste generation was 845 tons/day, with 84% collection rate and according to Department of Construction (DOC) Binh Duong, domestic waste generated was about 2,102 tons/day on average in 2021, with collection rate of 98%. According to the statistics, the volume of uncollected waste stands at 39 tons/day, generated in rural areas. All waste generated in urban areas gets collected.

The waste management unit started operating in the areas of collection, transportation, and treatment of domestic, industrial, and hazardous wastes, composting production. Before the CCS project, during the period between 2004 and 2011, BIWASE utilized both internal finances and counterpart funds (other donors) to construct for example a proper sanitary landfill, construction of buildings, fences, roads and a sewerage system for the complex. Site clearance was also already conducted for 75 hectares complex area. However, the waste management situation was still not good in 2011 and there still was a clear need for the investment in improved collection, management, and re-use of waste (sorting and composting).¹⁰

In general, the waste management in Vietnam has advanced considerably in the past 20 years both in terms of waste management practices as well as the needs. The population has grown from 85.85 million in 2009 to 96,209 million in 2019.¹¹ Additionally there has been a strong trend of urbanization and industrialization causing a strongly growing trend in waste generation. Currently the nationwide waste generation is more than 61,000

⁹ Ramboll Finnconsult Oy (2004); Interviews; document review.

¹⁰ BIWASE (2013a); Field data collection.

¹¹ General Statistics Office, 2010 - 2019

tons/day and in Binh Duong Province 1,764 tons/day.¹² According to Ministry of Construction¹³, the rate of solid waste collection increases year by year, the collection rate in 2010 reached 81%, and in 2017 it reached 85.5%. In Binh Duong the rate is presently much higher due to the well managed development of waste collection and management (refer to table 2 in chapter 4.2 below).

According to the report by World Bank (2018)¹⁴ and MONRE (2019)¹⁵, currently about 24% to 28% of the collected waste is put into different treatment facilities instead of landfills nationwide so around 72% to 76% of the waste is still landfilled. In Binh Duong only about 40% to 45%¹⁶ of waste is landfilled while the **National Strategy on Integrated Management of Solid Waste (ISWM) to 2025 with vision towards 2050** (first approved on December 27, 2009 via Decision 2149/QD-TTg, and later adjusted via Decision No. 491/QD-TTg dated May 7, 2018 by the Prime Minister) sets out ambitious numerical objectives for 2025. The current version includes the following key goals, among others:

- A ratio of domestic solid waste treated by landfills should be below 30% of the total amount of domestic waste treated by 2025;
- Collection and treatment rate of 90% for urban waste;
- 100% rate of replacement of non-biodegradable plastic bags in trade centers and supermarkets with environmentally friendly plastic bags;
- Closure of 90 to 95% of landfill sites and reconversion of such sites.¹⁷

Meeting such ambitious goals to limit landfilling and increase recycling and reuse of waste would require a sizable investment in new waste management technologies. Waste reduction and cost-effective solutions for waste management and recycling are very important in this context. Meeting these goals will require great efforts to improve waste management and recycling practices throughout the country. Waste separation at the source is still a difficult issue in Vietnam. For example, In 2017, BIWASE was a member of the implementation of the pilot project of waste separation at source issued together with the decision No. 358/QD-UBND dated 28/2/2017 of the People's Committee of Binh Duong province. The separation was done during collection to organic waste

¹² State of Environmental Report, Viet Nam 2019

¹³ Ministry of Construction (2019): Report to Deputy Prime Minister on Domestic Solid Waste Management, January 21, 2019.

¹⁴ Report “Solid & industrial hazardous waste management assessment: Option and action areas to implement the national strategy” - WB 2018

¹⁵ Report on “Review and assessment of solid waste treatment technology in Viet Nam, Proposal solutions in the future”- MONRE 2019

¹⁶ Field data collection; Annex 6 – Field Review of Technologies.

¹⁷ National Strategy on Integrated Management of Solid Waste (ISWM) to 2025 with vision towards 2050

and other waste. This pilot failed due to lack of awareness raising and political action at all levels and the rising collection costs. Thus, the solid waste in the province is still not separated at the source.¹⁸

The governance of the solid waste management sector in Vietnam is historically plural. According to the Law on Environmental Protection of 2014 (repealing the text of 2005) and related decrees, each ministry participates to the management of the waste generated by its field of activity, in collaboration with other Ministries. Since 2020, according to Directive 41 of the Prime Minister on a number of urgent solutions to strengthen solid waste management, the functions and tasks of the Ministry of Construction in the field of domestic solid waste management were transferred to the Ministry of Natural Resources and Environment.

3.2 Scope and Overview of the Evaluated Project

The evaluated projects are the Binh Duong Solid Waste Treatment Plant Project – phase 1 and Binh Duong Solid Waste Treatment Plant Project – phase 2, implemented between 2011 and 2018.

The project owner BIWASE has an exceptionally wide mandate as it is responsible for water supply, sanitation, wastewater, sewerage, solid waste management and the environment (parks, graveyards etc.) for the whole province. BIWASE is considered as one of the best public facilities in the country. BIWASE was responsible for the preparation and implementation of the project, and while there were delays (i.e. in Phase 1), most of these were caused by external factors¹⁹.

Preparation of the Phase 1 started in 2002, after the Vietnam Ministry of Planning and Investment (MPI) approached the MFA with an inquiry to finance the construction of South Binh Duong solid waste treatment plant with a concessional credit. The first feasibility survey was conducted in 2003 and appraised in 2004.²⁰ The handling of the project was however delayed 2004, and it was brought back to table in 2008. Due to inflation between 2004 and 2008, the original scope of the project was narrowed down, leaving out components such as wastewater treatment of the composting plant, industrial waste combustion with heat collector, and sludge recycling and treatment facility.



Figure 3 In 2004 the complex area was still largely covered by rubber plantations

¹⁸ Interviews; Field data collection.

¹⁹ Niras (2013). Appraisal of the South Binh Duong Solid Waste Treatment Project, Vietnam. Final report, June 2013.

²⁰ Ramboll Finnconsult Oy (2004). Figure 2 by Herkko Torssonen, appraisal mission.

The project documents were finalized and reviewed in 2008-2009 and the MFA of Finland approved the project for funding in the new proposed scope, with the assumption that the Vietnamese would manage the wastewater treatment components independently, and with their own funding. The project was tendered by the Vietnamese 2009-2010 and the contract was awarded to the sole bidder, the consortium of BAFO Oy and Econet Engineering Oy. The trade agreement was signed in 2010 between the project owner (Southern Binh Duong Water Supply – Sewerage Environment Co. Ltd, BIWASE) and the consortium. However, the consortium of the two companies broke up later in 2010, which resulted in dissolution of the trade agreement.²¹

Soon after dissolution of the trade agreement, the project owner signed a trade agreement through direct procurement with YIT Engineering. However, as direct procurement was in this case against the procurement rules, MFA did not grant the concessional credit funding, and asked the project owner to arrange a new bidding. The project owner organized a new round of bidding in 2011, which was won by Ferroplan Oy. Trade agreement was signed later in 2011 and the project commenced in December 2011²².



Figure 4 Composting building under construction in early 2012. (Source: Jussi Kukkula, Ferroplan)

²¹ Ulkoasiainministeriö (2012). Kehityspoliittinen osasto. Hanke-esitys 19.12.2012; Niras (2013).

²² Ulkoasiainministeriö (2012). Kehityspoliittinen osasto. Hanke-esitys 19.12.2012.

Phase 1 – Major milestones of the project process

- 2002, July – MPI, Vietnam proposed project to Finland
- 2003 – Feasibility Study conducted by (Prof Lam Minh Triet/University of Chi Minh Institute for Environment and Resources), Lemcon as the project promoter from Finland
- 2003, October – MPI submitted Vietnam approved FS to Finland
- 2003, November – Lemcon Ltd. Concessional Credit Application to MFA of Finland 12.11.2003
- 2004, April-May – Project Appraisal commissioned by MFA of Finland, conducted by Ramboll-Finnconsult. Appraisal Report 26.5.2004
- 2004, July – Field appraisal report shared with Vietnam.
- 2006, October – BIWASE shared bidding documents with Finland
- 2006-2007 –Review of Draft Bidding Documents commissioned by MFA of Finland, conducted by Pöyry– Report 27.3.2007
- 2007, June – Project owner -BIWASE - shared revised bidding documents
- 2007, September – Embassy commissioned Framework consultant to support project owner in updating the bidding document
- 2008, March – MFA of Finland commissioned Feasibility Assessment, conducted by Pöyry 26.3.2008 – Project is feasible but the overall budget should be increased due to inflation.
- 2008, April - Ramboll Project Implementation Summary – Endorses Pöyry review
- 2009, March – Project owner announced bidding
- 2009, October – Commercial contract signed between BIWASE and JV Bafo-Econet 23.10.2009
- 2010, February – MFA approval of the project financing
- 2010, May-June – The contract with JV Bafo-Econet cancelled by project owner due to disagreement between Bafo and Econet
- 2010, December – MFA decision of cancelling the project financing.
- 2011, February – MFA of Finland commissioned Review of Vietnamese Procurement laws, conducted by KPMG, 8.2.2011 – New bidding required
- 2011 – The new bidding process was conducted in Spring 2011
- 2011, July – Commercial Contract Signed between BIWASE and Ferroplan 26.7.2011
- 2011, October – MFA final approval of project financing 4.10.2011
- 2011, December – The project commenced – Ferroplan as the Finnish main Contractor
- 2013, July – Project completion and inauguration 5.7.2013, final completion in September 2013

One of the 2011 bidding consortiums – a consortium of Bafo cc OY and Oy Kron Plastic Ab – made a complaint against the MFA for not sharing the exact content of the trade contract (i.e. what deliveries and services were included in the contract and the Ferroplan Oy's share of costs in euros and percentages), which would have allowed the assessment of how the contract responded to the tender request. The plaintiff took the case up to

the Court of Appeal²³. The case was finally resolved in September 2020 for the benefit of the defendant²⁴. The contract type used in Phase 1 and Phase 2 was the FIDIC contract for “Plant and Design-Build”, i.e. the FIDIC Yellow book.^{25 26}.

The project site was the South Binh Duong solid waste complex (located in Chanh Phu Hoa Commune, in Ben Cat

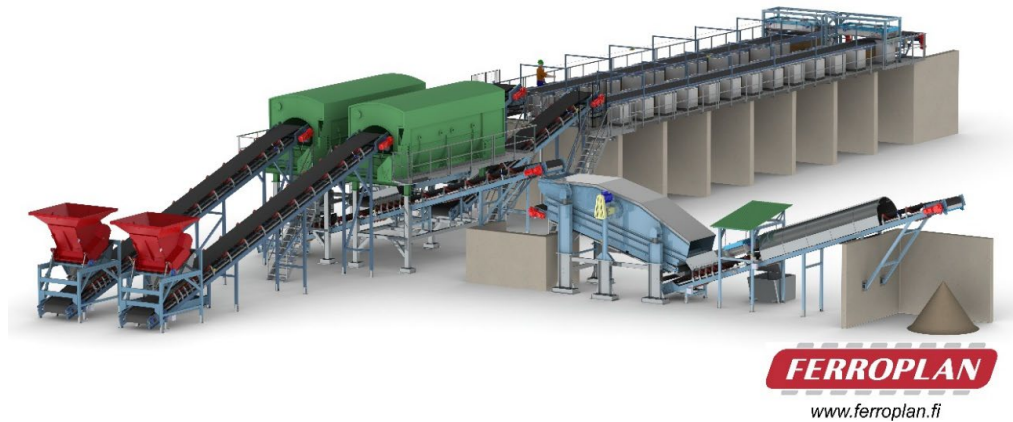


Figure 5 Pre-treatment line in Binh Duong (source: Ferroplan)

Phase 1 project:

Technology:

- Solid waste separation line and composting facility with a capacity of 420 tons per day; design, supply and installation of the plant and equipment.
- 12 waste collection vehicles
- Equipment for landfill operation, training and technology transfer services.

Budget:

- € 7.1 million, consisting of 6,7 million contract value + guarantee premium. Credit period 14 years.

Duration:

- Ground-breaking in December 2011, completion in September 2013.

Contractor:

- Ferroplan

²³ Helsingin hovioikeus (2019). Tuomio Nro 1628. 27.12.2019.

²⁴ Asianajotoimisto Jaatela & Helenius Oy (2020). e-mail from Jarkko Jaatela, dated 2.10.2020.

²⁵ Contract Agreement (2011). Supply and Installation of Equipment and Construction of Solid Waste Composting Plant with Services for Binh Duong Waste Treatment Complex, Vietnam. Agreement between BIWASE (the Employer) and Ferroplan Oy (the Contractor). 26. July 2011.

²⁶ Contract Agreement (2014). Supply and Installation of Equipment and Civil Works for Southern Binh Duong Waste Treatment Complex, Phase 2 (Funded by Finnish ODA). Agreement between BIWASE (the Employer) and Doranova Oy (The Contractor).

District), with an area of 74 ha. The complex includes a land fill for dumping of waste. The landfill was improved in 2009 by constructing a modern wastewater treatment plant using a multistage treatment process (capacity of 480 m³ per day) that prevented leachate from the landfill from overflowing the area. As the capacity of the WWTP was running out, an additional, similar technology WWTP was constructed in 2012 (funded through Spanish concessional credit).

Phase 2

Components that were left out from the Phase 1 – i.e. the wastewater treatment plant for the solid waste composting facility - were considered critical for the technical and economical sustainability of the new facility. The project owner updated the feasibility study in March 2012 and based on it the GoV decided to continue project preparations. The new proposal included a WWTP for leachate from the composting facility, as well as increasing the wastewater treatment capacity to cover the needs of the nearby households and industries²⁷. The objective of BIWASE was to improve environmental and hygiene conditions in the existing waste treatment complex and the surrounding residents²⁸.

At the request of MFA, the domestic wastewater treatment of nearby residences was left out from the Phase 2 project, as it was a new element that was not included in the original project. The feasibility study suggested that the Phase 2 was merely an extension or update of the original project, and the Appraisal of Phase 2 noted that there could be justifications to request single source procurement. However, according to MPI the Phase 2 was considered as a new project, which requires approval from the Prime Minister’s office. Therefore, procurement for Phase 2 main contractor was done through competitive bidding from among Finnish suppliers. The Phase 2 Bidding



Figure 6 Foundations for the gas pump and generator area in 2018 (Source: Doranova Oy)

²⁷ Niras (2013). Appraisal of the South Binh Duong Solid Waste Treatment Project, Vietnam. Final report, June 2013.

²⁸ Binh Duong Water Supply, Sewerage and Environment Co. Ltd (2012). Re: Extension of waste and wastewater treatment scope under South Binh Duong Solid Waste Treatment Complex.

Documents²⁹ and the Procurement Process & Commercial Contract³⁰ were evaluated by an external consultant. The final content of the Phase 2, as detailed in the project Final Report (2018)³¹ is listed in the below box. Finally, the content does not include treatment for leachate from the composting facility, which was the main justification for the Phase 2.

According to the project Final Report (2018), the phase 2 project content was modified during the implementation by replacing the water master unit with additional CHP and gas filtration units to produce more electricity. According to the project final report the change was due to customer needs and requests: the need for water master unit had decreased during the over two-year project preparation phase, and secondly the own electricity consumption had increased i.e. in waste fractioning and due to increased waste collection amounts.

Phase 2 – Major milestones of the project process

- 2012, April – Binh Duong PPC, Vietnam Proposal for next phase submitted to Finland 23.4.2012 – Focus on components dropped from 1st phase such as wastewater management, sludge handling & burning, electricity from Bio-gas
- 2012, August – BIWASE Updated Feasibility Study for next phase
- 2012, December – MFA Project Proposal process started
- 2013, June – MFA commissioned Project Appraisal conducted by Niras
- 2013, October - BIWASE Letter Confirming the Scope of the 2nd Phase 31.10.2013. – The larger wastewater treatment component (including surrounding area) to be removed from project scope
- 2014 – Bidding for second phase September-October 2014
- 2014, November – Commercial Contract between BIWASE and Doranova 7.11.2014
- 2017, February – Project Works Started, Doranova as the main Finnish Contractor
- 2018, January – Completion of the Project – Taking over ceremony 10.1.2018, final commissioning May 2018

²⁹ Niras Finland Oy (2014). South Binh Duong Solid Waste Treatment Complex, Phase 2. Evaluation of Bidding Documents. June 2014.

³⁰ Kääriä (2015). South Binh Duong Solid Waste Treatment Complex, Phase 2, Vietnam. Evaluation of the Procurement Process and Commercial Contract. 22.2.2015.

³¹Saalasti, M. (2018). Binh Duong Water Supply Sewerage Environment Limited Company (BIWASE) Project Final Report. Doranova Oy. 15 May 2018.



Figure 7 Covered landfill with the gas transfer lines and the installed CHP units. (Source: Doranova Oy)

Phase 2 expected impact/main purpose is to reduce greenhouse gas (GHG) emissions to atmosphere. Collection and burning of landfill gas turn methane gas into 30 times less harmful carbon dioxides. According to the project Final Report (2018)³², in total, CHP of 800 kW reduces the GHG emissions by 35,127 t/a (or 89%), assuming that gas collection works around the year with full installed capacity. With the additional CHP technology (of 800 kW) the reduction can be even doubled, when used with the maximum capacity. Another impact is improved air quality (and thereby improved living conditions) as smells from the landfill are reduced. The added capacity of incineration also means lower amounts of waste on the landfill.

³² Saalasti, M. (2018). Binh Duong Water Supply Sewerage Environment Limited Company (BIWASE) Project Final Report. Doranova Oy. 15 May 2018

Phase 2 project:

Technology:

- Combined-heat-power (CHP) technology for utilizing the landfill gas for electricity production. CHP unit 4 x 200kW + additional CHP unit with the same capacity.
- Waste incineration line with capacity of 100tons/day
- Top turn unit, 2 wheel loaders and an excavator for the composting facility

Budget:

- € 6,2 million.

Duration:

- Works started in February 2017; commissioning of incineration line in December 2017; Commissioning of CHP units in May 2018.

Contractor:

- Doranova

The TOR also notes that Finland supported BIWASE through EEP Mekong Grant funding for collecting biogas for power generation. This aimed at increasing BIWASE’s capacity to use landfill gas to produce power (810kW) and heat (813kW) with Combined-Heat-Power (CHP) technology, while reducing methane emissions to the atmosphere. This investment was 1.5 million €, of which 975.000 € was financed by BIWASE and 525.000 € with grant support from EEP Mekong. Finnish supplier in the project was BioGTS Finland that was replaced by MR construction Oy at later stage of the project completion. The project started in December 2017 and was scheduled to complete in January 2019. The actual gas collection was reported as not at the expected level. The complementarity of the two financing instruments supporting BIWASE will be assessed in this evaluation.

Project technical components actually implemented – Phases 1 and 2

The originally proposed project was quite comprehensive and included several components as it was first designed. Due to the limitations of funding, it was decided to implement only the selected components. The first stage was carried out with the following components:

- Solid waste separation line and composting facility with a capacity of 420 tons per day; design, supply and installation of the plant and equipment.
- 12 waste collection vehicles.
- Equipment for landfill operation, training, and technology transfer services.



Figure 8 Post-treatment process implemented in Binh Duong (source: Ferroplan)

The waste separation follows the technology presented in the first phase of the CCS project and the process for domestic waste management in the complex is briefly as follows:

- After being transported to the complex, the domestic waste is gathered in a covered area to prevent rainwater from mixing into leachate and control odors and insects.
- Sorting line to be divided into several types ready for recycling.
- About 60% of the waste is organic and will be processed into different fertilizers for agriculture.
- Plastic waste such as plastic bags, PE plastic, PET bottles etc. are divided into categories to provide recycling factories.
- Metals are also separated through the magnetic separator for recycling.
- Combustible materials are brought to the incinerator for destruction and the waste ash is recycled into bricks.
- The remaining parts are taken to the landfill and the landfill gas is utilized to generate electricity.

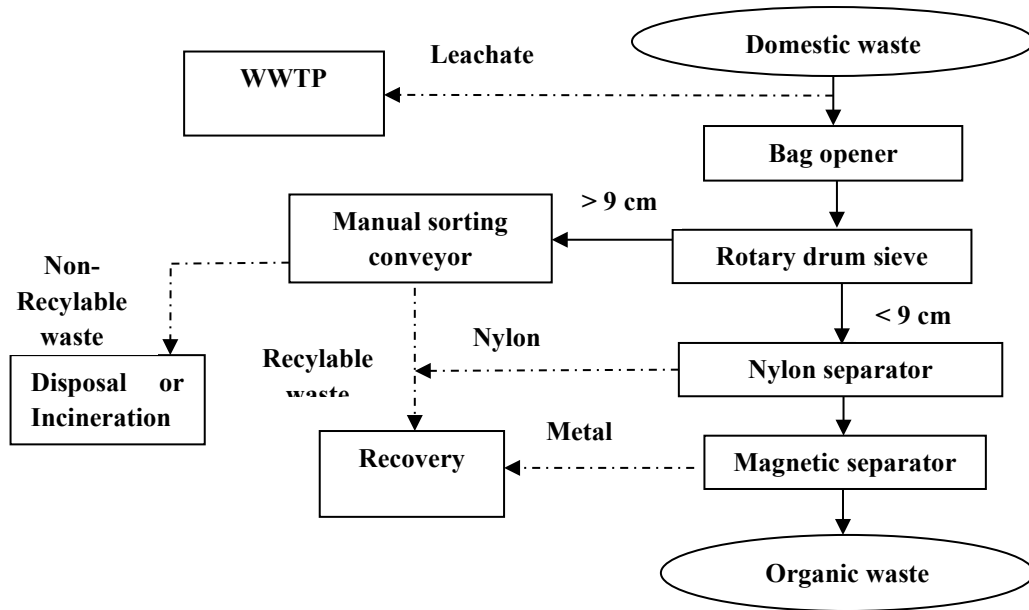


Figure 9 Domestic waste management procedure (Source: BIWASE)

Upon completion of the first phase of the project, preparations began for the next phase first planning to implement the leftover elements from the first phase but finally shifting towards focus on landfill gas utilization.

The second phase was implemented with the following main components:

- Combined-heat-power (CHP) technology for utilizing the landfill gas for electricity production. CHP unit 4 x 200kW + additional CHP unit with the same capacity.
- Waste incineration line with capacity of 100tons/day.
- Top turn unit, 2-wheel loaders and an excavator for the composting facility.

In particular, the components implemented in the second phase of the project differ significantly from the project content defined at the beginning of the project. This was mainly due to the general development of waste management in Vietnam and to the change in waste management priorities during that time as there was a considerable time taken since the initial project design. In addition, it should be remembered that the development of waste management was supported by several financiers, who were



Figure 10 Drilling the gas collection wells. (Source: Doranova Oy)

responsible for e.g. the construction of a wastewater treatment plant and a landfill.

More details regarding this process as well as the details of handling the medical and industrial waste including the process diagrams as well as the composting, fertiliser production and landfill gas processes can be found in the technical field evaluation report (Annex 6 of this report).

3.3 Key Stakeholders and their Roles

The key stakeholders related to the evaluated CCS project phases and their roles are presented below.

Stakeholder	Interest	Legal framework:
Finland		
Ministry for Foreign Affairs (MFA)	<p>Project approving agency in Finland. Provides funding for the interest subsidy and grant portion (of the total concessional credit amount) from the Government of Finland ODA funds.</p> <p>Responsible for supervising that the concessional credit is used for the purpose determined in the funding decision. Requests Supplier to provide semi-annual procedure reports on the Project.</p>	Act of Concessional Credits
Embassy of Finland in Vietnam	<p>Under the guidance of the MFA worked together with MPI for CCS project pipeline development and facilitating the process of project screening, appraisal and selection.</p> <p>Monitoring and support to CCS projects.</p>	MoU between Finland and Vietnam on CCS projects (2003)
FINNVERA	Provides the Buyer Credit Guarantee to the Guarantee Holder.	Act on the State's Export Credit Guarantees
Lending bank (Handelsbanken)	<p>Contract party to the loan granted to the borrower (Ministry of Finance).</p> <p>Responsible for processing the payments of the Grant and Credit portions of the fund to the Supplier, under the terms agreed in the commercial contract, upon request by Borrower.</p>	
<p>Finnish contractors: Ferroplan Oy (Phase I) and Doranova Oy (Phase II)</p>	<p>Responsible for:</p> <ul style="list-style-type: none"> executing and completing the works and remedying any defects. <p>The Contract Agreement consisted of the following documents, in the given order: 1) Contract Agreement; 2) Negotiation minutes of contract performance; 3) Schedule of rates and</p>	

	prices; 4) Letter of acceptance; 5) Contractor’s bid and appendices; 6) Special conditions of the contract; 7) general conditions of contract/FIDIC Yellow book; 8) Employer’s requirements including technical specifications and environmental management plan; 9) specifications of equipment; 10) detail drawings of tendering; 11) schedule of supplies, erection and installation works.	
Vietnam national level		
Ministry of Planning and Investment (MPI)	<p>Proposes annual budget for National Assembly validation. Responsible for the validation of the investments planning, the execution and the control of the investments.</p> <p>CCS Project approving authority in Vietnam. Acted as the focal point in mobilizing, coordinating and performing state management of the Concessional Credit. Conducted periodic monitoring of the Project.</p>	
Ministry of Finance (MOF)	<p>MOF is in charge of government’s debt management and external financing (foreign loans) and controls the National Assembly approved budget execution.</p> <p>Borrower for CCS Project, responsible for management of debt and foreign debt repayment.</p>	
Ministry of Natural Resources and Environment (MONRE)	<p>Responsible for:</p> <ul style="list-style-type: none"> • <i>Regulating</i> waste management with a view to protecting the environment and for giving strategic guidelines; • Management of <i>hazardous waste</i>; • Collection and transport of <i>domestic waste</i>; • Controlling the transport and treatment steps of the <i>medical waste</i>. • Appraisal of waste treatment technology/equipment (constructed by MOC), other than for treatment of medical waste. <p>MONRE became the project overseeing ministry when landfill construction was shifted from MOC under the purview of MONRE.</p> <p>MONRE approved the Binh Duong Complex’s EIA documents, i.e. the “Solid waste treatment complex in South Binh Duong area³³” in 2005; and “Increasing the capacity of the waste</p>	Law on Environmental Protection (LEP) of 2005, 2014, 2020

³³ Decision No. 237/QD-BTNMT dated 02/03/2005

	<p>treatment plant in Nam Binh Duong by 420 tons/day³⁴ in 2013; and "Investment to increase treatment capacity of South Binh Duong Solid Waste Treatment Complex³⁵ in 2016.</p> <p>MONRE has granted a license to BIWASE to practice transport, treatment and disposal of hazardous waste³⁶.</p>	
Ministry of Construction (MOC)	<p>Responsible for:</p> <ul style="list-style-type: none"> • Management of construction and demolition waste. • Investments management and the construction of urban domestic waste treatment infrastructure (including for sludge from septic tanks and urban drainage systems). Waste treatment facilities constructed by MOC may include treatment of medical, industrial or any hazardous waste (for which other Ministries are responsible for). <p>MOC was the project overseeing ministry at the beginning of Phase 1. MOC was responsible for:</p> <ul style="list-style-type: none"> • Guiding the implementation of regulations on hiring foreign consultants in construction activities and granting & revocation of construction operation permits for the contractor. • Formulation of the investment program and submitting it to the Prime Minister for approval. • Guiding the project implementation, after its approval. • Promulgating and guiding the inspection of the implementation of technical regulations and national standards on construction; methods of setting up and managing costs, methods of pricing services of collection, transportation and treatment etc. 	<p>Law on Environmental Protection of 2014;</p> <p>Decree N°38</p>
Ministry of Health (MOH)	Responsible for implementing regulation related to the management of medical waste and waste generated from burials and cremation in case of epidemiological diseases.	Law on Environmental Protection of 2014
Ministry of Agriculture & Rural Development (MARD)	Responsible for the management of agricultural waste, including leachates and sludge generated.	Law on Environmental Protection of 2014

³⁴Approved by the Ministry of Natural Resources and Environment on February 7, 2013;

³⁵ Approved by Decision No. 43/QD-BTNMT dated January 8, 2016;

³⁶ Hazardous waste management code number 5-7-8.028.VX issued for the first time on October 19, 2012; for the second time on 23/5/2019 valid until 2022.

Ministry of Science & Technology (MOST)	Intervenes in case of new technologies dedicated to waste management.	
Local level		
Binh Duong Provincial People's Committee (PPC)	CCS Project Executive Agency Mandated to oversee the implementation of the project and give strategic guidance to the Project owner (BIWASE).	
Southern Binh Duong Water Supply – Sewerage Environment Co. Ltd, BIWASE	CCS Project owner and Employer. Contract party Commercial contract between BIWASE and the Finnish lead contractor. Contract parties' obligations stipulated in the Contract Agreement and attached FIDIC Yellow Book. BIWASE appointed a Project Supervisor 'FIDIC Engineer', whose responsibility was to supervision of the project and project management. Responsible for: <ul style="list-style-type: none"> • Solid Waste treatment, covering the entire Binh Duong • Collection of solid waste (in cooperation with Public Works Enterprises of the districts and towns) 	
Department of Natural Resources and Environment (DONRE)	Responsible for solid waste management, environmental monitoring, inspection of landfills/solid waste complexes. Related to BIWASE and the CCS project, DONRE's role has been to: <ul style="list-style-type: none"> • Periodically assess the state of the environment in the locality; investigate and identify polluted environmental areas, make a list of establishments causing environmental pollution in the area. • Periodically report to the provincial People's Committee and MONRE in accordance with the law. Inspect the implementation of measures to remedy environmental pollution; • Supervision of the quarterly Environmental monitoring report of "Southern Binh Duong Solid Waste Treatment Complex" from 2013 to present. 	

3.4 Theory of Change Reconstruction

The project design and the reporting during the phase 1 or phase 2 did not include an explicit spelling out of the theory of change or a logical framework that would represent the theory of change as understood in the project design. Thus, it is rather difficult to fully reconstruct the intervention logic and theory of change for the project phases. Additional complication is caused by the long period of project process including many changes in scope and the very different focus of the 2 phases and thus a lack of coherent theory of change continuing from the first phase to the second. There was no comprehensive review of the theory of change during the long process from planning to implementation of the first phase even though the situation on site was changing and also the scope of the project was changed during the process.

The reconstruction of the Results Framework below is prepared based on the description of the project objectives and outcomes in the different project planning documents³⁷ and reports as well as the logical framework of the phase 1 presented in the BIWASE End of Project Report³⁸. This logical framework was not found in the project planning documents but is the only such framework found for the first phase project.

The long-term objective of the South Binh Duong Solid Waste Treatment Project was to improve the environmental conditions in the province by increasing the collection and improving the treatment of the solid waste generated in the area. The project focused on residential solid waste originating from households, services and industrial parks, industrial waste and industrial hazardous waste, as well as street sweeping waste. Collection and treatment of digested sludge from public and household sources are also included in the scope of the Project.

The immediate objective of the Project Phase 1 was to improve the present waste management situation by establishing a new waste treatment plant that can process the collected waste, direct the recovered materials to re-use and dispose the remaining waste in a safe landfill. In addition, the transportation of the waste was strengthened and the financial stability of BIWASE supported by development of marketable products such as fertilizer in the first phase and by utilizing the landfill gas in second phase. The sustainability of the investment is supported by a component for training the operators in the use of the provided technology, machinery, and equipment as well as the financial sustainability through the mentioned products and electricity generated etc.

In short, the project in both phases has been formulated based on a theory change grounded on the thinking that physical improvements in the waste management at the waste management complex and improvements in waste collection contribute to the objective of *Development of a proper waste management system that ensures proper collection, sorting, utilisation and safe final landfilling of waste in the area* which in turn contributes to the long-term impact of *Protecting the environment and improving the health and welfare of the population in the Southern Binh Duong Province*. The different major infrastructure and capacity development components of the two project phases can be seen as the major outputs contributing toward the overall outcome and impact.

The project plans did not specifically outline the theory of change and these impacts, outcomes and outputs and these were not really reported on or measurable indicators followed on these. The reporting focused on the status of physical construction and the utilization of finances in the project phases. This is of course unfortunate; a proper logical framework and indicators would serve the management and follow-up of any project by showing also the progress towards reaching the different levels of objectives apart from only physically completing the planned project components. As the indicators were not clearly set in planning there is no clear baseline and end line data available for many of the indicators presented below.

³⁷ Eg. Project contract agreements 2011, 2014; MFA internal statements and project proposals (e.g. Lausunto and Hankeesitys) during the process and Project completion report of Phase 2.

³⁸ BIWASE (2013). Report on Program Ending. Finnish ODA Loan, South Binh Duong Solid Waste Treatment Complex Project. 1.6.2013

Table 1 Results Framework Reconstruction

RESULTS	INDICATORS	BASELINE	TARGET LEVEL	SOURCES OF VERIFICATION	RISKS / ASSUMPTIONS
Long term impact: Environment protected and health and welfare of the population improved in the Southern Binh Duong Province. Advantageous conditions created for further investments in the area.	Reduction of diseases related to environmental pollution in the Southern Binh Duong Province Increased economic growth	NA	NA	Provincial and national statistics	Other factors related to health and economic development remain unchanged
Outcome/ Objective: Development of a proper waste management system that ensures proper collection, sorting, utilisation and safe final landfilling of waste in the area	Waste collection and treatment improved in the province Compost, recycled materials and electricity generated.	NA	NA	BIWASE reporting	
Outputs:					
Waste collection improved through delivery of waste collection trucks	Waste collection rates improved	NA	NA	BIWASE reporting	BIWASE staff are trained and motivated to use the new equipment. The components are maintained in working condition for long term outcome and impact.
Material recovery and composting complex in operation	Compost produced from municipal waste	0	420t / day	BIWASE reporting	
Landfill gas utilisation in operation and electricity generated	Electricity generation from landfill gas	0	1600KW	BIWASE reporting	
New proper incineration facilities in operation for hazardous waste etc	Improved incineration capacity at the waste management complex	100t/day	200t/day	BIWASE reporting	

4. KEY FINDINGS

4.1 Relevance

Evaluation question: Was the project relevant to solid waste management and the local populations that were to benefit from the project?

Finding 1 Both phases of the project were highly relevant to the improvement of solid waste management in the Binh Duong province and to the local populations benefiting from improved waste management.³⁹

Before the start of project waste disposal in the Binh Duong province was based on poorly constructed and managed dumping places, which caused serious environmental hazards such as groundwater pollution, air pollution and contamination of the soil further causing health hazards to the population of the province. The dumping places were scattered in districts and largely under-dimensioned, which resulted in a technically and environmentally poor waste treatment status in the province. The waste management varied for some extent between the Districts of the South Binh Duong area, but the problems were mainly the same and only a small proportion of the waste was properly managed. The general situation of the municipal waste management in the districts of the project before the start of the CCS project (2004-2011) can be characterized as follows:

- Waste management was undeveloped and inefficient and none of the dumps met the requirements of modern treatment which caused groundwater and air pollution as the dumpsites were not properly founded and open burning was commonly practiced.
- There were problems in the collection and transportation system in the Project area. All waste was not collected, and the capacity of the official dumping sites (in BIWASE waste management complex) were becoming to form a bottleneck.
- Sorting and recovery of waste was not practised but domestic waste, agricultural waste, dry waste, wet waste etc. were mixed up together and transported and disposed to the dump. This decreased the efficiency of treatment and recycling of waste and increased the waste volumes at the dump.
- There was not any reliable statistical data on waste quality and quantity.

Those waste management problems and the disadvantages caused made the project relevant to improving the state of the environment and human well-being.⁴⁰

There was a gap of over 7,5 years between the project appraisal and the start of the implementation due to issues in the tendering processes etc. as described above in chapter 3.2. There was no new thorough appraisal of the situation during this time as the focus was on the tendering process and appraisal of the budget and financial value for money analysis during this time. It is clear that during this time the waste management in the

³⁹ Project planning documents and reports, MFA internal documents, interviews in Finland and in Vietnam.

⁴⁰ Ramboll Finnconsult Oy (2004).; BIWASE (2012b).

province developed somewhat and in 2011 the South Binh Duong Solid Waste Treatment Complex had some better managed landfill areas in use and improved waste collection compared to the time of the appraisal – for example the number of waste collection trucks in the CCS proposal was reduced as some of these had already been purchased with local funds.⁴¹ During the period of waiting (between 2004 and 2011) for the CCS funded project BIWASE utilised internal finances and counterpart funds (other donors) to construct for example a proper sanitary landfill, construction of buildings, fences, roads and a sewerage system for the complex. Site clearance was also already conducted for 75 hectares complex area⁴² The time delay caused a clear reduction in the scope of the project from originally planned due to inflation and raise in construction prices. Overall, the waste management situation was still not good in 2011 and there still was clear need for the investment in improved collection, management and re-use of waste (sorting and composting).⁴³ The delay and further development in the waste management complex area during that time may have also affected positively in the capacity of the BIWASE to manage and oversee the project components under the CCS project. The elements finally implemented during the first phase were relevant in improving the collection and waste management capacity of the BIWASE complex and thus reducing the need for local dumpsites and open waste burning. The sorting facility constructed under the CCS project could process about half of the domestic waste generated in 2010 and one third of the 2015 figures (refer to table 2 in 4.2. below). Thus, there continued to be a need for improved capacity and the BIWASE constructed another sorting and composting line with the same technology soon after the CCS project. The second phase of the CCS project helped to reduce air pollution and GHG emissions⁴⁴ by developing the landfill gas utilisation and proper incineration capacity of the BIWASE. The improvements contributed to reducing the pollution and related health hazard to the population of the province. The leachate and wastewater treatment in the complex area was finally not addressed by the Finnish financed projects but wastewater treatment facilities have been constructed by other financing and are functional.⁴⁵

In general, all the informants found the project highly relevant and the overall impact positive and this was echoed in the reports reviewed. The solid waste management situation in the area has improved substantially after the project and the local population are now well served with waste management apart from the most remote communities. This was among the first proper sorting lines in the country and the waste could be managed and re-used much better than in most places. Also, the second phase of the project is generally seen

⁴¹ Pöyry (2008). Recommendation for Project Implementation. 26.3.2008.

⁴² BIWASE (2013a). Report on Program Ending. Finnish ODA Loan, South Binh Duong Solid Waste Treatment Complex Project. 1.6.2013.; Field data collection.

⁴³ Interviews, field observations and interviews. Internal MFA documents.

⁴⁴ Saalasti (2018). “CHP of 800 kW reduces the GHG emissions by 35,127 t/a (or 89%)”. The installed capacity was finally 1 600 kW but the current level of utilization and thus GHG emission reduction is closer to the originally planned figures.

⁴⁵ Interviews, field observations and interviews. BIWASE (2013a); Saalasti (2018); Annex 6.

as relevant and beneficial even though the electricity generation from landfill gas does not reach the planned levels. It is however among the priorities for the BIWASA to improve their financial status.⁴⁶

Finding 2 The changing context and project scope during the long period from the planning and appraisal to implementation were not properly analysed and systematically documented in terms of project relevance.⁴⁷

The project appraisal for the first phase was conducted already in 2004. As the implementation was delayed, the Pöyry consultancy in 2008⁴⁸ reviewed the changes in the project scope (mainly from financial point of view) and also recommended the MFA to consider making a more detailed Desk Appraisal of the project and the changed scope but this was not conducted in our understanding. The evaluation team sees that a more thorough appraisal of the changed situation and project scope closer to the actual implementation would have been beneficial. It took over 7,5 years from the project appraisal to actual implementation of the first phase in late 2011 and also the project scope was changed due to inflation and raise in prices during this period. Such a systematic review or appraisal would have helped to ensure the relevance of the project in the changed situation as well as to analyse the rationale of the scope changes and present needs in the project area.

The second phase of the project was first planned to cover the scope that was dropped from the first phase due to budget limitations – especially focusing on the wastewater treatment in the waste management area and considering also possibilities for wastewater management in the surrounding areas. This scope was finally changed in 2013-2014 to focus more on landfill gas utilisation for electricity generation for the complex as well as waste incineration (which was part of the original scope as well). This scope change was not very well documented in the project process related documents and plans (either in MFA documents, consultant reports or Vietnamese documents) and seemed to come at a rather late stage. The informants interviewed felt that there was no great need for wastewater treatment in 2014 (the issues had been handled or were under works by other donors) but the component was still prominent in the project scope during the Project Appraisal of 2013. The change of scope was initiated by local project owner, but it should have been more clearly documented and analysed also in MFA decision making as the financier of the project. Due to lack of appraisal after changing the project scope for both Phase I and again in Phase II, it's difficult to now say whether the wastewater and leachate treatment was managed in appropriate and timely manner in the area. It's possible that pollution of ground water in the surrounding area continued during and after Finnish investments.⁴⁹

⁴⁶ Interviews, field observations, project reports, MFA internal documents.

⁴⁷ Project planning documents and reports, MFA internal documents, interviews.

⁴⁸ Pöyry (2008). Recommendation for Project Implementation. 26.3.2008.

⁴⁹ Niras (2013); Interviews; field observations.

Evaluation question: Did the project contribute to Vietnam and particularly Binh Duong province development plans and sector strategies?

Finding 3 The project phases were part of a larger programme initiated by Vietnam government for improvement of the sector services, and they contributed substantially to the Vietnam and Binh Duong province development plans and strategies.⁵⁰

The project was initiated by the Vietnamese officials as urgent measures were taken for solid waste management in the municipal and industrial areas approved by Prime Minister (according to the 199/TTg instruction issued on 3/4/1997). After that, Solid Waste management strategy in Vietnamese municipal and industrial areas up to 2020, approved by the Prime Minister (according to the 152/QÑ-TTg decision issued on 10/07/1999), demonstrate huge efforts from the Government in scoping with these environmental matters now and in the future. According to that decision, managing and treating municipal and industrial waste was a most importance duty for the sector actors under the strategy. In the beginning of the year 2004 solid waste in general and urban solid waste in particular formed a problem that was strongly engaging attention and interest from the government, ministries and province/city authorities.⁵¹ The project was initiated and planned in this framework and was integral to the provincial and central level strategies in Vietnam. The project was a forerunner in proper waste management and re-use of waste and still is among the best managed solid waste management, recycling and re-use centers in the country. The Complex serves 98% of the Binh Duong province. Only the most remote rural areas are not properly served by the waste management complex.⁵² Both project phases focused on improving waste management, re-use and recycling also in accordance with the current policies and regulations of the Government including the Law on Environmental Protection 2020 and the commitments for greenhouse gas emission reduction in Vietnam.⁵³

⁵⁰ Document review; interviews; field observations

⁵¹ Ramboll Finnconsult Oy (2004).

⁵² Interviews; field observations; project reports.

⁵³ Interviews; Field data collection.

Evaluation question: Was the project in line with Finland's development policy objectives and global development goals?

Finding 4 The project was well in line with Finland's development policy objectives and global development goals which was ensured by different stages of the CCS process.⁵⁴

The Project Appraisal of 2004 concluded that the project was well in line with the development policy and strategies of the Finnish Government and global development goals both in respect with the poverty reduction, environmental protection, social equity and good governance. It involved aspects of social development particularly through its expected health and economic impacts.⁵⁵ It was a clear continuation of Finnish cooperation in Vietnam and as an environmental management and waste management project.⁵⁶

However, there was no detailed ESIA done on the project apart from some considerations in the Feasibility Studies (probably due to the Vietnamese regulations at the time) so the actual environmental impacts of the plant were not properly analysed beforehand.⁵⁷ According to the document review, observations and interviews the plant development has been largely positive in terms of environmental impacts and the negative impacts to environment and groundwater have been quite limited. The control and testing of pollutants have improved during the process and especially during the last few years.⁵⁸

At the local level, the Vietnam CCS pipeline was discussed in joint meetings between the Embassy and MPI and thus there was understanding on both sides regarding priority projects. The Embassy actively worked with MPI and the future project owners to provide the necessary information to MFA for the process of project screening, appraisal and contracting. The Embassy also had three agreements with local framework consultants (during the most active years of CCS in Vietnam from 2006 till early 2010s) who could support the future project owner in the project document and later the bidding document preparation as required. The Embassy also actively facilitated the project bidding, negotiation and approval process as well as throughout the implementation with frequent visits, follow-up of reports and post-monitoring. The official administrative handling process in Vietnam is described in the annex 1 to the 2003 MoU.⁵⁹ This practice was not common in other countries but was done in Vietnam as there were many projects proposed and also several implemented in the country under the CCS.

⁵⁴ Report review, interviews.

⁵⁵ Ramboll Finnconsult Oy (2004).

⁵⁶ Interviews.

⁵⁷ Interviews; BIWASE (2012b). Updated Feasibility study.

⁵⁸ Interviews; field observations; design and project completion reports.

⁵⁹ GOF-GOV 2003.

To facilitate this process, there is a local programme officer with dedicated time for supporting the process in the Embassy. In the process for CCS project development the Feasibility Study clarifies the feasibility and alignment of the project with global, Finnish and local policies and strategies, the Project Appraisal further confirms the relevance of the project and finally this is discussed in the quality group in MFA before decision is made on the financing. The MFA quality group discussions and the documentation prepared for those work as a final tool ensuring that all the funded development projects are in line with the policy objectives of Finland. The development impacts and the relevance of the project to Finnish policies were considered systematically. Some of the informants feel that the CCS projects should also relate to realistic plans to create further business, and this has not always been well understood and seriously considered in MFA.⁶⁰

4.2 Effectiveness

Evaluation question: To what extent did the project achieve its immediate objective of significantly improving the solid waste treatment capacity of BIWASE, hence improving the services to local households and communities?

Finding 5 The project phases achieved the set immediate objectives in effective manner and contributed strongly to improving the solid waste collection and treatment capacity of BIWASE and thus improved the services that BIWASE offers to the households and communities in the province.⁶¹

The start of the first phase implementation was delayed severely due to issues in the selection process for the Finnish contractor and related needs to retender as described above in chapter 3.2. When the project finally was implemented, it was managed effectively within the timeframe and budget allocated. The CCS project achieved its objectives fully and the construction was completed effectively within the planned timeframe and utilising 89,6% of the planned overall budget.⁶² The informants also uniformly stated that the objectives were fully achieved for phase 1 and after the project the BIWASE has also expanded similar composting plants through their own resources and there are now two plants with same design as phase 1 doubling the capacity and current construction of 2 additional similar process lines to further double the



Figure Dec 20

⁶⁰ MFA internal documents (hanke-esitys, lausunto etc.); interviews.

⁶¹ Reports; interviews; field observations.

⁶² BIWASE (2013a).

capacity. This demonstrates the BIWASE appreciation for the results achieved. While proven very effective and sustainable solution in Binh Duong, the same process has not been copied in other provinces of Vietnam yet. The lack of proper logical framework with targets and indicators as well as limited reporting focusing on financial and physical progress makes detailed analysis of the results apart from delivering the components as agreed in the contract difficult. However, both the reporting, field observations and interviews show positive results also beyond merely building the agreed infrastructure components.⁶³

The second phase was also effectively implemented, in fact the construction and installation work was completed substantially ahead the schedule. The amount of landfill gas that can be utilised is not as high as the FS indicated so the electricity generation is not at the level expected and the system cannot be run on full capacity. During the time of the field visit in December 2021 the electricity generation from landfill gas was running at 30% of the current maximum capacity of 2 320 kW so there is around 700 kW electricity production. This is close to the originally planned capacity of 800 kW which was finally doubled in the CCS project (to 1 600 kW) after a request from BIWASE and additionally increased by 720 kW with the EEP financed project. This, however, is not an issue caused by the project implementation but rather the unrealistic estimates of the BIWASE commissioned FS regarding the amount of gas that could be utilised with the system installed. We could not verify whether there is leakage of gas or if the gas collection could have been implemented in a more effective manner but there is no indication of issues or mistakes during the implementation of the system. amount of gas available but this has not been done yet. The incineration plant and equipment delivery packages of the contract were also effectively implemented as planned.⁶⁴ The landfill gas utilisation has been expanded later and the system serves BIWASE well by reducing the need for buying electricity as well as the environmental impact of reduced GHG emissions and smell reduction through proper management and utilisation of the landfill gas even though the amount of gas utilised is currently not as high as planned. There have been indications that the BIWASE is planning expand the gas collection system in the closed landfill areas to increase the utilisation of the installed capacity and thus also the gained financial and environmental benefits.⁶⁵

⁶³ Project reporting; BIWASE reports; Interviews, field observations and data collection.

⁶⁴ Saalasti, M. (2018).; Interviews.

⁶⁵ Interviews; field observations; Annex 6



Figure 12 The CHP units and related infrastructure in 2021. In the front are the filters installed during the CCS project. The blue containers are the CCS project installed capacity of 1 600 kW and the black containers in the back the additional 720kW implemented in the EEP financed project. (Source: Hoai Le, evaluation team)

The project also supported in enhancing the effectiveness of waste collection and currently the BIWASE directly covers the waste collection and transportation from 4 of the 9 districts in the province. The model of the solid waste collection and transportation utilised in other areas is that different self-organised private HH based or cooperative team collects the waste from the HHs and take these to a main collection site of the villages/street. From these sites the respective local district/city authority can sign a contract with public or private urban environment company for collection and transportation of the waste to the BIWASE complex. BIWASE does not operate the services in the most remote areas where ethnic and poor people (Minh Hoa Commune Dau Tieng District) live because they have not felt the need for paying for waste management and handle it locally. The project design didn't include any specific elements to help BIWASE reach the most remote rural areas, and hence the fact that these communities don't receive waste collection service is not seen as a shortcoming in project effectiveness. In general, the service to local communities and households has been greatly improved due to the development of the waste management complex partially supported by the two phases of the CCS project. The

waste management in the province as a whole has greatly improved and the service currently reaches almost the whole province apart from some very remote areas.⁶⁶

According to Department of Construction (DOC) Binh Duong, waste generated was about 2,102 tons/day on average in 2021 with solid waste collection rate app. 98%. Industrial waste generation was around 6,386 tons/day in 2020 with 100% collection of hazardous waste and 95% of other waste. Medical waste quantity is lower and it is 100% collected.⁶⁷ Development of domestic, industrial and medical waste generation and collection Binh Duong is shown in Table 2 below.

Table 2 Generation and collection ratio of solid waste in Binh Duong from 2010 to 2020⁶⁸

Year	Type of waste	Quantity of generation (tons/day)			Collection Ratio (%)
		Normal	Hazardous	Total	
2010	Urban Domestic waste	845	-	845	84.0
	Industrial waste	883	169	1,052	-
	Medical waste	3.43	0.62	4.05	91.3
2015	Urban Domestic waste	1,333	-	1,333	84.0
	Industrial waste	1,594	987	2,581	95.0*/100**
	Medical waste	10.26	1.84	12.1	100
2020	Domestic waste	2,102	-	2,102	98.0
	Industrial waste	3,638	2,748	6,386	95.0*/100**
	Medical waste	20	1.27	21.27	100

Note: * Collection Ratio of normal industrial Solid waste

** Collection Ratio of hazardous industrial Solid waste

⁶⁶ Interviews; field observations and data collection from local level.

⁶⁷ DOC (2021). Report by DOC Binh Duong, October 2021

⁶⁸ State of Environment report of Binh Duong period from 2005-2010; 2011-2015 and 2016-2020

In terms of volume of treated waste, the Project Appraisal of 2004 expected that the amount of waste treated at the opening of the plant would be approximately 165,000 tn/year. However, the data collected from BIWASE (Annex 6) shows that in 2010 the plant already handled more than 200,000 tn/year and in 2020 770,000 tn/year. The total volume of treated waste has increased about 400% during the operation of the plant which shows a huge improvement in both waste collection and handling capacity of the complex. The waste sorting and composting line constructed under the CCS project handles 420 tons per year which is around 153 000 tons per year – so it could cover about half of the waste amount in 2014 and thus was quickly replicated by BIWASE to double the capacity. The capacity is being further doubled to better meet the present needs that have more than doubled from 2014 already. The complex is presently processing a considerable portion of domestic waste produced in the province and current plans for expansion would raise the percentage to around 80%. Hazardous waste is also largely handled by the complex but there is still much more improvement needed to enhance the collection and treatment of industrial waste. ⁶⁹



Figure 13 Waste incinerator in 2021 (Source: Hoai Le, evaluation tam)

Table 3 The total volume of treated waste (source: BIWASE provided data).

Year	Total volume (ton)	Ton/day
2010	200,115.27	548.26
2014	349,546.51	957.66
2016	465,218.31	1,274.57
2018	675,673.89	1,851.16
2020	770,251.75	2,110.28

⁶⁹ Field data collection (Annex 6) and interviews.

In total, bit over one third of the waste received in the BIWASE complex can be recycled or composted. The volume of inert waste that cannot be recycled into compost accounts for about 30-35% of the initial volume. This waste is separated in the sorting line as described above and in the Annex 6 of this report. Of the initial organic waste component, a portion (accounting to about 10% of the input waste) including inert substance in the composting and those elements that cannot completely decompose must also be disposed in the landfill. Thus, the total volume of inert waste that needs to be disposed of is around 40%-45% of the input material. Leachate treatment is needed for about 6% of the input material. In the end, the amount of waste produced into compost fertiliser accounts for 31.6% of the total amount of domestic waste and recyclable waste such as plastic bags, bottles, etc., accounts for 2.82%. Rest of the waste amount is incinerated or landfilled.⁷⁰ The complex is producing several types of compost fertilisers and there is a good market for the products also producing a considerable amount of finance for BIWASE. The products form a considerable part of the overall solid waste business and make a decent profit as detailed in the table 5 below in chapter 4.5. The evaluation of solid waste treatment technology currently applied at the South Binh Duong Solid Waste Treatment Complex is based on the criteria in Decision 1040/QD-BKHCHN dated 13/05/2014 by the Vietnamese Ministry of Science and Technology on the assessment of domestic solid waste treatment technology being applied in Vietnam and shows that the complex is doing very well in most of the criteria even though there still remains some needs for improvement in the percentages of waste that can be further recycled as well as the automation systems and some elements of the process.⁷¹



Figure 14 Organic waste at the end of the sorting line (Source: Hoai Le, evaluation team)

The project has also been effectively supporting and ensuring the raising trend of employment at the BIWASE waste management complex while reducing the numbers of worker in the hazardous sorting process by installing 50% automatic sorting procedures technology, which is safer and ensures better productivity than manual processing applied before. BIWASE has been active in finding new employment for employees moved from automatised processes and many have been transferred to work in the recycling process of producing new products (e.g. the sludge from the incineration has been used to producing the different types bricks). This company approach does help to keep stability of the workers and create more jobs and income to its employees.

⁷⁰ Field data collection (Annex 6) and interviews.

⁷¹ Field data collection (Annex 6).

The complex is also strongly focusing on ensuring the workers safety and ensuring a good working environment and benefits for the workers.⁷²

The construction of the components in both phases was carried out in compliance with the intended schedule



Figure 15 Composting tanks and maturing stage (Source: Hoai Le, evaluation team)

and quality requirements and highly increased the capacity of the BIWASE to collect and process waste. The technology utilised was considered safe and environmentally sound and thus the environmental impacts of waste management were reduced by concentrating the province’s waste management into this properly managed waste management complex. The utilised technologies are also considered economically effective and are still in use years after commissioning. At the end of phase one the collection in urban areas and industrial parts had risen to 90% and is even higher now which has helped to reduce the environmental pollution caused by waste in the Binh Duong province. The waste management complex is also scoring well in fulfilling the environmental and operation standards as shown in the Annex 6 (Table 18) of this report.⁷³

Evaluation question: What were the key success factors or bottle necks that contributed to the project either achieving or falling short of its objectives?

Finding 6 The main success factors were the active and committed project owner BIWASE and the contractor’s project manager who was well familiar with the local context and was present at the site throughout the project implementation during both phases.⁷⁴

⁷² Interviews; field observations; BIWASE and DOC reporting; Reports of monitoring working environment by the BIWASE Centre in 2019 and 2020.

⁷³ Saalasti, M. (2018); BIWASE (2013a); Interviews; field observations; project reporting; Annex 6.

⁷⁴ Document review; Interviews.

The most important success factor was the BIWASE commitment to the project and the development of waste management in the province as well as the ambition to make it a model for solid waste management in Vietnam. BIWASE also manages the water supply, sewage and drainage in the province and thus it is a large-scale actor with proper resources and capacity to handle such a province-wide operation also in solid waste management. Also, the cooperation with the Finnish project contractor worked well in both phases and BIWASE was actively involved in supervision and oversight of the project implementation. The PMU of BIWASE was already experienced in implementing ODA projects and thus able to ensure proper implementation.⁷⁵

The Finnish project manager working on site for both phases contributed substantially to Finnish companies managing to implement the project phases as planned. The project manager's presence on site and understanding of the local working environment was crucial for managing to implement the project effectively in both phases. Also, the contractors' familiarity with the main technology components (sorting and composting plant in first phase for Ferroplan and landfill gas utilisation equipment in second phase for Doranova) being delivered in both phases was among the key success factors.⁷⁶



Figure 16 Landfill gas collection system in Dec 2021
(Source: Hoai Le, evaluation team)

The key bottlenecks included the long CCS process in Finland where it took 9,5 years from the first plans to implementation in the first phase – and thus some components needed to be dropped due to inflation and some changed due to not being relevant anymore as the wastewater treatment in the second phase. Also, the Finnish companies were changed a few times during the process of selection of contractor for the first phase. Vietnamese administrative requirements was also among the factors delaying disbursement and implementation. Especially the VAT, customs and disbursement issues were found cumbersome by the Finnish contractors who had no earlier working experience working in Vietnam and thus had to learn the processes during this project. Instability of electricity network caused some issues for phase 2 higher technology components, but these issues were solved. In general, the MFA and Embassy support in both phases was not very active but the embassy helped in solving issues with the local administrative requirements. There is not a clearly defined role for Embassies in the MFA in CCS (or current PIF) project implementation, which is also problematic.⁷⁷

⁷⁵ BIWASE (2013a).; Interviews; field observations; project reporting.

⁷⁶ Interviews; project reports.

⁷⁷ Saalasti, M. (2018); Interviews.

One of the bottlenecks for such projects was the Vietnamese thinking based on FIDIC Red Book type of construction (employer’s design) while both project phases were in fact FIDIC Yellow Book type (contractor’s design). There was little understanding that the contractor has the right to change the plans as long as these are within the employer’s requirements, as the general thinking was based on fixed design and following the progress based on this. Such control towards staying in original designs can make it difficult to implement projects in changing context. Milestone based payments were difficult for Vietnamese administrators to comprehend as the normal concept in the country was based on fixed design and BOQs.⁷⁸

Evaluation question: What was the role/contribution of the different actors (project owner, contractor and other stakeholders including the MFA)?

Finding 7 The main actors with crucial role in the successful implementation of the project phases were the active project owner (BIWASE) and the Finnish contractors managing the implementation process. The other important actors were the Vietnamese officials at different levels and the local sub-contractors doing the actual construction work on site. The role of the MFA was largely limited to the selection process of the contractor and to support for responding to Vietnamese administrative requirements through the Embassy.⁷⁹

The expected roles of the key stakeholders are summarised above in chapter 3.3. The Project owner (BIWASE) was active in controlling and guiding the work in both phases, as well as in the broader development of the waste management in the province. The MOC as the project overseeing ministry and sector ministry gave guidance in overall strategic direction of the developments and provided national level oversight and guidance to the project, while BIWASE was controlling the day-to-day implementation of the project phases. BIWASE activities in the project phases covered almost all the work and support normally expected from the project owner and other participants in the project. BIWASE prepared the bidding documents and handled the selection process of the Contractors with oversight from MOC in Vietnam and MFA of Finland. Based on the interviews, the project has been guided in the changing circumstances during the project planning, according to the needs and requirements of BIWASE in the changing context. Due to the changing context and financial aspects the final content of the project phases differs significantly from the goals originally defined in 2004. This was reflected in the final bidding documents in both phases that were finally implemented as per the final content, and as defined in the bidding documents and the agreements with oversight by BIWASE.⁸⁰

The Finnish contractor handled the actual implementation together with BIWASE supervisor (FIDIC engineer). The contractor’s PM was a key individual who had been involved from earlier design phase through to Phase 1 and then Phase 2. Based on the interviews, the project owner has been satisfied with the contractors and the

⁷⁸ Interviews.

⁷⁹ Interviews; reports; field observations.

⁸⁰ Project reports and communications; interviews.

project results. In both phases of the project, the contractors have worked on schedule, within the budget and met the quality requirements set for the work.⁸¹

The role of the Finnish Ministry for Foreign Affairs (MFA) as the project donor was strong during the process of selection but less so during the implementation. The MFA oversaw the tendering process as financier in Finland and reviewed the bid evaluation before finally agreeing to finance the project. Following the tender and finally the contract signing between BIWASE and the contractor, the MFA was not actively involved in project management, contractor support or other project activities. The Embassy in Vietnam supported the Contractor in dealing with the local administrative requirements and also conducted annual monitoring visits to the project site. Support to the Finnish companies for finding additional contracts after the CCS project was not consistent. Based on the interviews, the limited role of the MFA is perceived as problematic, even though the MFA is not an official party to the project contract. The contractors would have expected more support in dealing with the practical issues that arose during the project as well as in the monitoring the utilisation of Finnish funds that were partially grant. It was found that in the MFA in general there is no clear guidance or assigned responsibility given to the regional units or Embassies in relation to the CCS or to the present PIF projects, and their roles should be further clarified to ensure that proper support can be given. In the case of Vietnam, due to the large number of CCS projects in the pipeline and implementation in Vietnam, there was dedicated support from the Embassy for CCS projects, both in terms of coordination with the MPI and other ministries, and in terms of monitoring and implementation support. This model on the basis of Vietnam experiences could be considered for other countries where there is considerable interest for PIF project. Implementing the project in accordance with the Finnish development aid principles would require closer monitoring and guidance as well as support to the proper definition of related objectives and indicators.⁸²

The sub-contractors for implementing the local construction works were among the key stakeholders. They managed well their components after some initial issues during getting to know the contractor.⁸³

4.3 Efficiency

Evaluation question: How efficiently were available resources transformed into intended results in terms of quantity, quality and time? Can the project be deemed to have been good value for money?

Finding 8 The project phases were efficiently implemented in terms of the budget, time, as well as the quantity and quality of the results attained. The project phases can also be deemed as good value for money as the

⁸¹ Interviews; Project reporting and communications.

⁸² Interviews; communications.

⁸³ Interviews.

tendering process ensured a competitive price from the contractor and the results attained were of higher quality that could have been achieved with local or regional implementation.⁸⁴

As described above in chapter 4.2. The project in both phases achieved the expected results in the required quantity and quality in less time and within the budgeted resources. Thus, the project phases were efficient as well as effective.

In terms of financial flows, the Ministry of Finance of the Government of Vietnam was the borrower on behalf of the Binh Duong Provincial People’s Committee and the loan was then lent to the local level, thus the benefit of the concessionality of the credit was felt mainly at the central level. As the concessional credit financing came from Finland, a Finnish contractor had to be used. Vietnamese regulations required competitive bidding, in order to obtain the lowest price offer from among the likely suppliers, which in this case were Finnish construction companies in the sector. As the project was put out to tender, the price was in line with the market situation at that time and the selected contractors were substantially lower priced than some of the competition in both phases. There were no similar facilities to which the prices of the contracts could be compared at the time of tendering, but the planned budget was checked and deemed realistic during the process in both phases. In general, the interviewees at all levels thought that the value for money was very good and the results and development impacts achieved were good.⁸⁵

Evaluation question: What were the key success factors/bottle necks that contributed/constrained implementation (planning, procurement, implementation, risk management, monitoring, follow-up after close of project)? What was the role/contribution of the different actors?

Finding 9 In terms of efficiency, as for effectiveness, the most important roles in the success of the project were played by the active project owner and the contractor’s project manager. In terms of process the most successful element was the actual implementation of the project phases while the most relevant bottleneck was the lengthy procurement of the Finnish contractor.⁸⁶

Project planning process was cumbersome and delayed, which can be contributed to facts such as: the lack of clearly defined process and support mechanisms for project planning, no agreement on responsibilities of different stakeholders of the planning process, combined with the lack of familiarity with the Vietnamese legal and administrative requirements. The overall implementation of the project phases, once they started, was efficient as well as effective as described above. Thus, it can be said that the implementation of the project was the key success while the planning and especially the procurement process in Finland were bottlenecks in the process in terms of time taken and the non-systematic revision of the plans based on the changing situation. The key bottleneck regarding efficiency was the long planning and procurement period due to the cumbersome

⁸⁴ Project reporting; interviews; field data collection.

⁸⁵ Interviews; field observations; review of the appraisals and other reports during the planning process.

⁸⁶ Interviews; document review.

process considering both the Finnish and Vietnamese procurement laws, as well as issues requiring re-selection of contractors before the first phase. The requirements for the form of financing were unclear to many parties involved regarding the share of Finnish workload and procurement. During the implementation there were delays, related to taxes, duties, and other payments but they did not unduly hamper the efficiency of implementation. The project efficiency was good, largely due to the active project owner and locally present project manager, as well as the good experience of the contractors with the technology being delivered. During the implementation monitoring and follow-up was actively done by BIWASE. The MFA monitoring was conducted mainly by the Finnish Embassy through constant follow-up of project progress reporting, periodic visits and support to solving any outstanding issues brought to their attention. The Embassy's local programme officer focusing on CCS projects held a project diary and a CCS projects monitoring plan that were reported to the MFA. To guide the ongoing CCS projects and to prioritize and select the possible future projects the Embassy (ambassador) chaired Joint Working Group (JWG) meetings with MPI and MOF to review the ongoing projects. In total 32 JWG meetings were held during 2005-2018.⁸⁷

4.4 Impact

Evaluation question: How well did the project succeed in achieving its overall objective to improve the quality of life of the beneficiary population, contribute to economic development?

Finding 10 The project succeeded well in achieving its overall objective and the positive impacts have continued to expand to a larger part of the province's population during the years after the implementation.⁸⁸

Both project phases achieved their expected results and objectives, improving waste management, and recycling and re-using of waste products, as well as ensuring employment for a large number of people in the waste management complex and related businesses. Thus, the project also generated substantial socio-economic impacts in the province, surrounding communities and the waste management complex. In general, the complex has been able to demonstrate how waste management can be made financially sustainable (details in the table 5 below) and well organised. The systematic recycling of waste is still not common in Vietnam – apart from the one done already before any waste management by removing any valuable parts from the waste.⁸⁹

Socio-economic impacts for the broader population of Binh Duong included benefits from proper management of solid waste and related reduction of environmental pollution from local dumping of waste and burning of waste. One of the most significant changes is that there are no local waste dumps in the province, as there used to be before. Such illegal dumpsites continue to be utilised in many other provinces of the country. Old dumpsites

⁸⁷ Interviews; project report; communications.

⁸⁸ Interviews; project reports; field observations.

⁸⁹ BIWASE (2013a); Saalasti (2018); interviews; field observations.

have been closed and the land area utilized for other purposes. The evaluation was not able to collect evidence of whether the closure of old dumpsites has been done in environmentally safe way, meeting the environmental standards of the country. The possibility that pollution of ground and surface water continues from old dump sites could not be disclosed by this evaluation. Binh Duong is currently among the very few provinces in Vietnam where there are no big waste problems and environmental pollution spots (dump sites).

The waste collection service covers now all 9 administrative units of the Binh Duong Province. It is reported to be accessible to most of the poor people and ethnic minorities in rural areas. However, the most remote area inhabited by ethnic minority people and poor people (Minh Hoa Commune in Dau Tieng District) is not covered by BIWASE's service. This is by the choice of the residents, who do not see it worthwhile to pay for the waste tariff, but instead choose to burn the waste locally. In general, the tariff level is considered to be affordable to poor residents in urban areas and to rural population. There is a set monthly tariff level per household, which is 25,000 VND. The fee level is decided by the PPC.⁹⁰

The diarrheal cases in the province have been reducing for example from 2000 cases in 2020 to 1300 cases in 2021 which is due to combination of many factors, but the improved waste management and reduced pollution of environment can be seen to be among these. During the current Pandemic situation, the role of BIWASE has been critical, as they can take large volumes of medical waste that could otherwise pose a serious health hazard.⁹¹

With regard to project impacts on people gaining income from waste sector, it is clear that the impact on employment, working terms and conditions are mostly positive and the complex has put a lot of effort in putting in place proper conditions and considerations to support the workers. In 2013 the complex employed 395⁹² people while at present the Complex provides employment for 1142 people. There has been a strongly increasing trend in number of employees but during the last few years the number of employees has become more stabilised at the present level.

⁹⁰ 2016 Decision N 64/QD_UB

⁹¹ BIWASE (2013a); Saalasti (2018); interviews; field observations.

⁹² BIWASE (2013a).

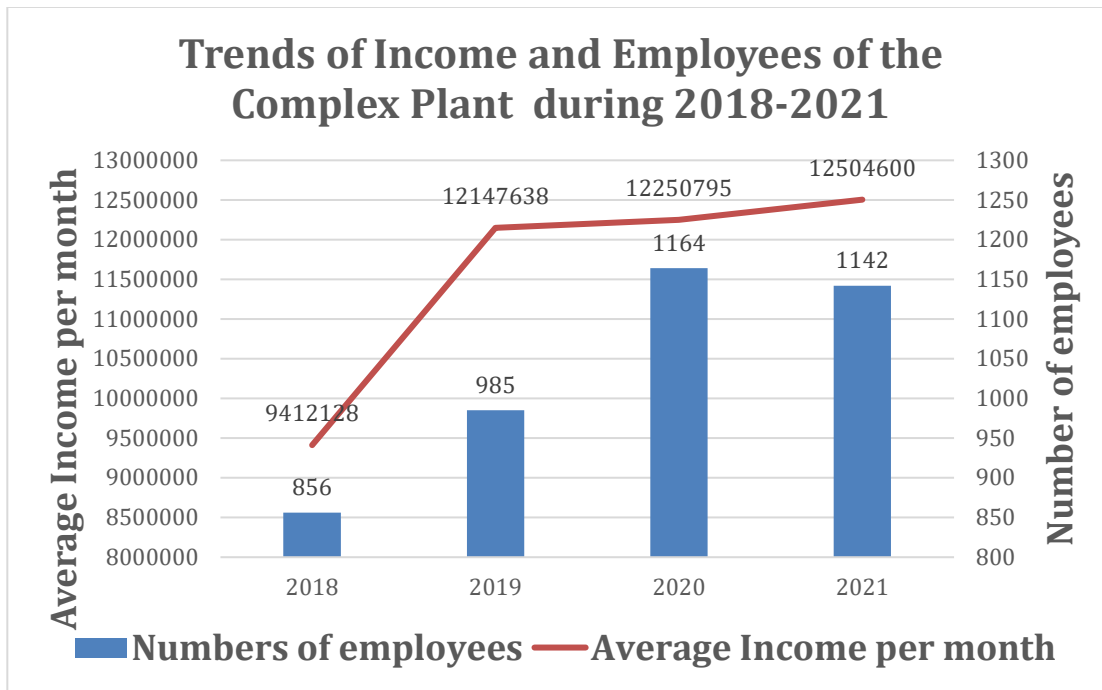


Figure 17 Number of employees and average salaries (Source: BIWASE December 2021)

There are clear gender based differences in the employment rate and tasks. Vast majority, 87% of the employees are men. This is because of the nature of the work: most of the work tasks are physically demanding and considered ‘dangerous’ and seen to be more suitable for men. Women are employed for office tasks, but also for work in the sorting process. This is not characteristic only to BIWASE, rather it is the common trend in the sector globally.

In terms of fair pay and income stability, BIWASE is performing well. Job stability is reported to be good. When there is reduction in one function (e.g. due to automatization), the company policy is, instead of laying off people, to transfer them to other functions that are growing (e.g. to production of marketable products). The average monthly income was 12,504,600 VND in 2021, or around 490€. The staff are provided on average 10% increase to their salary annually, which is well above the annual inflation rate in Vietnam.⁹³ In addition, the company applies a reward system for good performance during the year. The company provides 5-10% monthly salary increase for especially dangerous work (applied e.g. in manual waste sorting).

In terms of health and safety, BIWASE is found to meet all 5 norms determined by the Ministry of Health during 2020 monitoring. In 2019, the Complex fell short on 1 norm, concerning poisonous gases, which were reported higher than the norm but this seems to be better controlled now.⁹⁴ The Company has taken various measures to

⁹³ Annual inflation rate was 3.2% in 2020. <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=VN>

⁹⁴ Interviews; field observations; review of local documents and reports.

improve workers' safety and health, including providing working clothes and safety equipment, health checks twice a year (additional policy by the company; the law requires health checking once a year), and providing labour insurance policy as required by the law. There are clear working procedures in different working areas, which help to maintain safe working condition and minimize chances of accidents. There are several other benefits provided for the employees, which extend beyond the legal requirements. These include providing one meal per working day, a set of holiday clothes and a paid holiday in a selected holiday location. Improvements in automation of the processes (i.e. in sorting technology) have reduced workers' exposure to most unhygienic tasks and conditions. The evaluation team's field visit to the site confirmed that Health & Safety is at a good level (considering the type of plant) and that the company management puts priority in these aspects to retain staff in the complex.

In terms of project impact on businesses related to waste recycling, it was found out that BIWASE is running the business on fertilizer production and sales which is currently producing nine types of compost-based fertilisers and producing a considerable amount of income for the operation (details below in table 5 in chapter 4.5). Composting is an outcome of the waste sorting system established in Phase I and expanded out of BIWASE's own initiative/through other funding in a later stage. Currently, the market demand for the fertiliser products is higher than the complex can produce. Economically BIWASE is an important employer and also contributes to the economy of province by product development, improved waste management, recycling etc. that support the business development in the province in general.⁹⁵

In addition to direct employment by BIWASE, an industry has developed around the waste centre (including a brick factory utilising ash from the incinerators), which also employs a lot of local people through hundreds of companies working in recycling related business in the province as shown in the table 4 below. Recycling and sales of plastic, paper and metal is done by a Limited Company, which operates depending on BIWASE's work, utilising the waste sorted by BIWASE sorting technology implemented in the first phase of the CCS project. The company purchases recycling products from BIWASE, but it also employs workers who work in the sorting process. The average income revenue is reported as 1-2 billion VND/year for this business.⁹⁶

In addition, the Department of Investment and Planning (DPI) has information on recycling business registration in general in the province. This information shows a growing trend in the number of businesses working in recycling in the province over the last 10 years, as indicated in the table 4 below. In addition, it is informed that by November 2021, the total number of companies working in the recycling was 1 445 with the registered fund of 54 923 billion VND.

⁹⁵ Interviews; field observations; review of local documents and reports.

⁹⁶ Interviews; field observations; local reporting.

Table 4 Registration of new businesses in recycling in Binh Duong province

Year	Registered businesses	Year	Registered businesses
2012	16	2017	165
2013	27	2018	166
2014	44	2019	196
2015	81	2020	223
2016	115	Till November 2021	196

Source: Provided by DPI staff of Binh Duong province (December 2021)

Evaluation question: What other noticeable impact did the project have (intended/unintended, positive/negative), particular in terms of human rights, gender equality, inequalities and environmental sustainability?

Finding 11 There have been positive socio-economic impacts for the people working in the related complex business area, as well as for the population as whole through improved waste management.⁹⁷

The Project provided sustainable socio-cultural benefits through improving waste management in the whole area of the province, including in schools where also public health education has improved. The development of the complex has also provided proper work for many of the waste pickers who worked with no security at the old dumpsites and the local population in general as described above. Most of the waste pickers were women (also children) in the past, and many have found proper employment at the complex or in the attached businesses. Inevitably there has been some loss of income for such pickers but many of the people formerly doing the waste picking work in very hazardous conditions have now found a proper employment in the waste management complex. In general, the project plans and appraisals define women and children as the main beneficiaries who benefit from the cleaner environment and cleaner household made possible by the improved waste management in the province partially attributable to the improvements implemented by the CCS projects.⁹⁸

Finding 12 The environmental impacts have been generally positive with the move to proper waste collection and management instead of dumpsites, and to constantly improving monitoring and management of the negative environmental impacts. Some negative environmental impacts are experienced in the surrounding areas mainly due to the air pollution (smell), pollution in groundwater during rainy seasons, and disturbance caused by the waste transportation trucks.⁹⁹

⁹⁷ Document review; interviews; field observations.

⁹⁸ Interviews; Ramboll Finnconsult (2004); Niras 2013; BIWASE (2013a); Saalasti (2018); field observations.

⁹⁹ Document review; interviews; field observations.

Regarding environmental impacts, the Finnish financed projects did not really touch on the possible environmental issues regarding wastewater, leachate treatment etc. even though these were included in the original designs. According to the interviewees the original landfill on the site was not properly based but the later phases, built after 2004, have been properly planned and implemented. Therefore 4/5 of the landfill area has a proper foundation and there should not be large scale leakage to groundwater. The original landfill is already closed. The complex has wastewater and leachate treatment nowadays, which treats the water to a level that it can be used for watering of plants and cleaning inside the complex. The groundwater quality is being checked and the wastewater and leachate from the processes treated within the waste management complex.¹⁰⁰

The second phase of the project reduced greenhouse gas (GHG) emissions to atmosphere as the collection and burning of landfill gas turns methane gas into 30 times less harmful carbon dioxides. According to the project Final Report (2018), in total, CHP of 800 kW reduces the GHG emissions by 35,127 t/a (or 89%), assuming that gas collection works around the year with full installed capacity. With the additional CHP technology (of 800 kW) the reduction can be even doubled, when used with the maximum capacity. Another impact is improved air quality (and thereby improved living conditions) as smells from the landfill are reduced. The added capacity of incineration also means lower amounts of waste are ending up in the landfill.¹⁰¹

Environmental impacts to the neighbouring area are quite well controlled nowadays but there are some negative impacts due to air pollution/smells from the Complex, air pollution and noise from truck traffic, and pollution of ground water. Smells are spreading from the Complex, particularly during the rainy season from April to June and/or during certain wind conditions, affecting the nearby residential areas. There have been some cases of people complaining about these also in the media.¹⁰² According to the local people interviewed, the situation has improved since 2020, when BIWASE started taking action to reduce smelly gases for example by investing in a filtering system and sprays in different stages of the sorting process (with a cost of several billion VND annually). Currently the most serious negative impact to local residents around the complex is caused by the truck traffic (over 100 trucks per day), affecting the Hamlet 1B that is located next to road DH605. It is further worsened by the fact that many privately owned trucks that service the Complex are very old and therefore pollute heavily. Pollution of well water is another issue, according to interviews. The team did not manage to collect water quality test reports that would provide evidence on how serious the issue is, or how long it has lasted. The Complex have also been among the factors reducing the property prices next to the Complex. There has not been any compensation for the negative effects caused by the Complex to the local residents. Residents are not aware of

¹⁰⁰ Project plans; appraisals; MFA documents; Interviews and field observations.

¹⁰¹ Saalasti (2018)

¹⁰² Moitruong.net.vn (2021)

any ESIA process at the time of Complex construction or expansion, during which the impacts would have been assessed and mitigation measures planned.¹⁰³

BIWASE has started to better monitor the environmental situation in the residential areas through doing visits and distributing survey forms to local residents. Residents can also report issues through the ward People’s Council. This has helped to reduce the conflict between the complex and the local residents. Additionally, DONRE has systems in place to monitor the situation. Residents can send complaints to DONRE’s ‘hotline’ website, and DONRE has also a system to monitor BIWASE’s environmental controlling system.¹⁰⁴

4.5 Sustainability

Evaluation question: How sustainable are the results achieved in the project? Have stakeholders in Vietnam taken steps to ensure sustainability e.g. in budgeting or other processes? Are the project results still relevant and are the systems installed/other outputs of the project still in efficient and effective use?

Finding 13 The systems constructed during the project phases are still in efficient and effective use, and further expanded. The overall BIWASE waste management operation is financially sustainable and working to continually improve its services and expand the processes implemented in the CCS project phases. Thus, the results of the project phases are proven to be exceptionally sustainable.¹⁰⁵

The sustainability of results has been very good due to BIWASE being active in management and expansion of similar services. The composting line has been copied and landfill gas generation expanded. The evaluated project was strategically important and enjoys both national and provincial priority and support. BIWASE is very well organized and managed, and local employees are motivated and committed to their work. BIWASE is a good employer as described above. In general, the BIWASE is technically competent and commercially oriented, which has made the operation economically sustainable. The complex produces compost, bricks and other recycled products for the market and generates substantial income. Currently the operation is financially sustainable and making a profit on the overall operation as shown below. BIWASE is a pioneer in waste management sector in Vietnam. The waste management complex is known throughout Vietnam and its waste management operations are considered exemplary and its practices are replicated in other provinces.¹⁰⁶

¹⁰³ Interviews; field observations; review of local documents and reports.

¹⁰⁴ Interviews.

¹⁰⁵ Interviews; field observations and data collected from the field.

¹⁰⁶ Interviews; field observations and data collection.

Table 5 Income and Expenditure of BIWASE waste management operation

	Bill. VND			Mill EURO		
	2018	2019	2020	2019	2020	2020
Revenue						
Recycling of Solid Waste	73.6	84.1	83.4	2.83	3.23	3.21
Fertilizers	12.6	28.6	31.9	0.48	1.10	1.23
Expenditure						
Recycling of Solid Waste	57.3	65.9	70.2	2.20	2.53	2.70
Fertilizers	9.9	26.0	28.7	0.38	1.00	1.10
Profit						
Recycling of Solid Waste	16.3	18.2	13.2	0.63	0.70	0.51
Fertilizers	2.70	2.57	3.20	0.10	0.10	0.12

Source: provided by Biwase/SWCP staff in December 2021

The solutions implemented in the project phases have been found to be effective in Vietnamese conditions. They are still effectively in use and expanded further by BIWASE. For example, the waste sorting line and composting plant have been copied and implemented by BIWASE to increase capacity, doubling it. There are presently plans to further double the capacity of 4 similar lines of treatment. Also, the landfill gas delivery system was very successful. BIWASE bought the additional components from Doranova with their own money to expand the operation. The systems continue to work well and there are plans for further expansion, while the amount of gas that the landfills produce is not up to the expected level. At the time of the evaluation the power generation was reported at 30% level of the expanded capacity of 2 320 kW. The power generated is around 700 kW, which is close to the originally planned capacity of 800 kW. To increase the utilization of the installed capacity, the landfill gas collection system should be expanded. More details of the technical processes and status of the technical components can be found in the Field Technical Review (Annex 6).¹⁰⁷

As shown in the pictures below and the analysis of technical status of the components (Annex 6), the technical components are in effective use and in good condition today, several years after the completion of the project. Many of the elements built during the CCS project phases have also been expanded and replicated to increase the capacity while utilizing the exact process implemented by the Finnish contractors, which has proven to be effective and sustainable in the local context. The waste separation and composting line implemented in the first phase have been copied doubling the present capacity. The further implementation of another two similar lines are? in process, while the landfill gas utilisation has been expanded from the 1 600 kW, implemented in the CCS project, to 2 320 kW with EEP financing.

¹⁰⁷ Field observations and data collection (Annex 6); Interviews.



Figure 18 Waste sorting in 2014 (left) and in 2021 (right). Sources: Minna Patosalmi, Ferroplan and Hoai Le, evaluation team)



Figure 19 Final compost packing in 2014 (left) and in 2021 (right). Sources: Minna Patosalmi, Ferroplan and Hoai Le, evaluation team)



Figure 20 CHP units in 2018 and in 2021 (Sources: Doranova Oy and Hoai Le, evaluation team)

4.6 Coordination, complementarity, coherence, aid effectiveness

Evaluation question: How were other programmes and cooperation relevant to the project taken into account?

Finding 14 Coordination between different projects and programmes was not systematically managed by Finnish actors but BIWASE managed the coordination to avoid undue overlaps between the different projects supporting the development in their complex.¹⁰⁸

BIWASE waste and wastewater management operations have been supported by several donors over the years since 2004, with the most important donor projects being financed by Asian Development Bank (ADB), German International Cooperation Organization (GIZ) and the World Bank (WB).

There was not clear coordination from the Finnish side with other projects and programmes working in the site but the BIWASE themselves managed the coordination with different projects and programmes relevant to them. There was coordination and cooperation with EEP for phase 2 issues as there was an EEP financed project implemented at the same site for expanding the power generation capacity utilizing landfill gas. EEP finance was also used for commissioning and conducting FSs for potential waste-to-energy projects that could have been implemented either with commercial financing or through another donor funding. However, these projects have not been realized due to many reasons, including Vietnamese partners finding cheaper technologies from Asian

¹⁰⁸ Interviews; document review.

manufacturers in some cases. There have been ideas for binding the CCS projects with bilateral projects but in practice the long timeframes of CCS project from planning to implementation has made this difficult.¹⁰⁹ Binding PIF work with other financing instruments would require more coordinated and systematic approach to planning.

Evaluation question: How well did the project promote ownership, alignment, harmonization, management for development results and mutual accountability?

Evaluation question: Were there contradictions with other policy areas and how were they handled?

Finding 15 The CCS projects themselves were not strongly working on the alignment and harmonization issues but these have been managed by BIWASE as part of the efforts to develop their services, partially based on external financing, such as ODA projects. There were no major policy contradictions found in the evaluation; however, the omission of a proper EIA for mitigating negative unintended environmental impacts can be seen as a minor contradiction.¹¹⁰

BIWASE's operations as a waste management company that have been groundbreaking in Vietnam, and its operating model that has been found to be good and efficient. The company operates in a sustainable and cost-efficient manner with high level of ownership and guidance towards its own development, which has further promoted and ensured alignment, harmonization, management for development results and mutual accountability among all the different donors and projects active in the waste management sector in the province. The CCS projects themselves were not strongly working on the alignment and harmonization issues but these have been managed by BIWASE as part of the efforts to develop their services, partially based on outside financing, such as ODA projects.¹¹¹

No clear contradictions between the project objectives and different policy areas and strategies were found by the evaluation either regarding the policies of Finland or Vietnam. The project phases were both socio-economically and environmentally in line with the policies and strategies. However, normally detailed EIAs are required for projects in solid waste management sector, and the omission of a proper EIA in this case can be seen as a contradiction to the policy requirements and may have caused environmental and social issues that have not been properly managed and recorded. The EIA procedures were completed in terms of fulfilling the Vietnamese regulations, MONRE approving the Binh Duong Complex's EIA documents, i.e. the "Solid waste treatment complex in South Binh Duong area¹¹²" in 2005; and "Increasing the capacity of the waste treatment plant in Nam Binh Duong by 420 tons/day¹¹³" in 2013; and "Investment to increase treatment capacity of South

¹⁰⁹ Interviews.

¹¹⁰ Interviews; field data collection

¹¹¹ Interviews; field data collection.

¹¹² Decision No. 237/QD-BTNMT dated 02/03/2005

¹¹³ Approved by the Ministry of Natural Resources and Environment on February 7, 2013;

Binh Duong Solid Waste Treatment Complex¹¹⁴ in 2016. However, there was no clear environmental or social management plan implemented during the projects. The social and environmental negative impacts have been followed up and controlled better in past few years, but this is not related to the Finnish financed CCS project phases as these improvements have taken place after the project phases.

4.7 Other

Evaluation question: Did the project open up new business for the Finnish companies in Vietnam or to other emerging markets? Was the project part of a strategy by the companies to expand operations in developing countries?

Finding 16 The Finnish companies implemented the CCS projects as part of an effort to expand their operations in developing countries but there has been limited success to date while the references have been strong in the Finnish market – they are still the largest project references for both companies that implemented the project phases.¹¹⁵

The references of the project phases were good for the overall business of the contractors of both phases as these were and still are the largest projects for the companies in terms of budget. This benefit did not materialize in large scale new business in Vietnam or in other developing markets even though there have been efforts towards that. After the Phase 1, the contractor tried to expand in Vietnam and other developing markets, and used considerable amount of resources in marketing without success in gaining new projects. They also got some support from Finnpartnership for finding further business in the area. The reference of Binh Duong has been useful for the company in Finnish market. The Phase 2 contractor did also concentrate on finding new business in Vietnam and in the region, and did manage to sell 2 additional gas pumping components to BIWASE. There was also financing from the EEP project for commissioning and conducting FSs for potential waste-to-energy projects. The company is still actively looking into expanding in the Vietnamese market and hoping for more projects as the COVID pandemic situation gets better. Expansion in Vietnam and in developing countries, and finding new business based on the CCS experience was part of the strategy of both companies but there has been limited success in this area.

This brings forth the question of whether MFA could do something more systematically to support the companies in finding new business after CCS/PIF projects while there are several instruments available and it is certainly the company who need to do the work of finding business. According to Vietnamese informants many localities are currently in need of organic waste treatment to be organized by 2023 according to the provisions of the Law on Environmental Protection 2020. The law stipulates that all provinces must separate waste at source and transport organic waste into a separate treatment. Thus, it was strongly felt by the interviewed Vietnamese

¹¹⁴ Approved by Decision No. 43/QD-BTNMT dated January 8, 2016;

¹¹⁵ Interviews.

central and local agencies representatives that investing in replicating the Finnish composting treatment technology to other localities could solve the issues of treating the waste separated at source. MFA has studied and evaluated the different private sector development instruments but there is no clear solution for better supporting Finnish companies for finding business in developing markets. MFA could consider more strongly the promotion of specific Finnish technologies showcased in the implemented CCS projects. In Vietnam this has been successful for example in the cases of firefighting equipment and meteorological equipment where the Finnish supplier participated in the CCS projects. Similarly, many components of the evaluated projects are praised by BIWASE staff and other stakeholders as good and reliable etc. but there have been limited further sales of the component products. More systematic promotion of the specific technologies that have been demonstrated through CCS/PIF projects could be an effective way of promoting Finnish manufacturers and suppliers for further sales in the developing markets.¹¹⁶

Evaluation question: How did the project contribute more broadly to cooperation and relations between Finland and Vietnam? Were there synergies with other Finnish cooperation in the region?

Finding 17 The project phases continued the good cooperation relations between Finland and Vietnamese ministries, and they represent positive and important projects. The synergies with EEP Mekong project were utilized to a limited extent but in general it has been difficult to utilize synergies with bilateral projects due to the time taking CCS project processes.¹¹⁷

The projects financed under the CCS instrument continued the strong cooperation relations between Finland and Vietnam. After the delays in procurement process, the evaluated projects were among the last CCS projects in Vietnam and as such important successful cooperation projects in the area of environmental development. The projects financed through the CCS instrument were seen as a gateway from bi-lateral cooperation projects to regular foreign trade cooperation. Even while these particular projects were successful there has been limited success for Finnish companies in selling such products directly in Vietnam without external financing. Regarding synergies, there was some synergy with EEP Mekong project, which financed feasibility studies for potential CCS / PIF projects, and a smaller biogas project, also in the BIWASE complex. This EEP project was finally implemented after phase 2 of the CCS project and components were not really comparable to the CCS project. In general, as said above, the long processes in CCS project process have made it difficult to fully utilize potential synergies with bi-lateral or other development projects.¹¹⁸

¹¹⁶ Interviews and communications in Finland and Vietnam.

¹¹⁷ Interviews; document review.

¹¹⁸ Interviews; MFA internal documents.

Evaluation question: How was the project viewed by local ministries and did it meet their objectives?

Finding 18 The Vietnamese officials consider the projects important and strategic and see that there is a great need for the project replication in other parts of Vietnam even now.¹¹⁹

The project was considered an important and strategic project from the start. When the project was initiated the waste management situation in the province was very bad and there was an urgent need for improved services. The CCS project was an integral part of the overall program to enhance this situation by making BIWASE a professional waste management service provider with proper collection, sorting and processing facilities. This process was started in 2004 and utilized Vietnamese financing and several ODA projects to improve the situation. Even though the start of the CCS project was severely delayed, the project was viewed as a very positive and successful also by the Vietnamese ministries. The Finnish components were copied and expanded later as the technologies were found effective and sustainable. The BIWASE waste management operation has been a kind of flagship for proper waste management that serves as a model in the country. Both project phases focused on improving waste management and recycling also in accordance with the current policies and regulations of the Government including the Law on Environmental Protection 2020 and the commitments for greenhouse gas emission reduction in Vietnam. The interviewed Vietnamese officials felt that there would be great need for replicating the effective Finnish technology in other localities in Vietnam in the context of the present National Strategy on Integrated Management of Solid Waste. Waste reduction and cost-effective solutions for waste management and recycling are very important in this context and the waste management work implemented in Binh Duong Province is a strong step towards meeting these goals. The development in the province has been good and the present situation in the province is already much above the national average.¹²⁰

Additional findings related to the CCS instrument

On top of the evaluation questions (based on the ToR) analyzed in this report, the evaluation covered broader topics related to the CCS instrument as a whole to draw some findings and further conclusions and recommendations for the development of the instrument itself (nowadays PIF).

Finding 19: There was a lack of support and financing for project preparation, and the roles of different units within MFA during project implementation were unclear in case of CCS projects in general.¹²¹

The informants felt that there should be some funds available for planning of projects to ensure that the quality of planning is at a required level and the implementation can be conducted with proper follow-up and results. Earlier there were some funds available for export project development through the MFA support for economic,

¹¹⁹ Interviews; document review.

¹²⁰ National Strategy on Integrated Management of Solid Waste (ISWM) to 2025 with vision towards 2050; Interviews; Field data collection.

¹²¹ Interviews; document review.

industrial and technological cooperation (“TTT määräraha”) and also the Finnpartnership had Feasibility Study (FS) support. External support for FS preparation could enhance the quality of planning and reduce the risk for companies initiating such processes. The PIF consultant support and newly established Finnpartnership support for project preparation can partially solve these problems in the present context of PIF programming. It was also proposed that the MFA could support companies more in understanding the procurement laws and practices in considered countries – or make lists of preferred countries for PIF implementation with clarity on such issues available. Additionally, there should be better clarity on the actual decision-making processes in the target country and support to companies in tackling with administrative requirements and other country specific issues.¹²²

In general, it was felt that the CCS instrument was quite isolated from the bilateral aid and country programming of MFA. In general, there were no official roles for the regional unit or the Embassy in the CCS project implementation, even though in Vietnam the role of the Embassy was more active. The process was fully managed from the KEO-50. However, the resources in Helsinki (KEO-50) were/are limited and thus the management of CCS/PIF projects, in general, has little support from MFA side after the selection of the contractor and after the project financing has been approved. The MFA involvement is strong during the procurement process with project appraisal before bidding, review of the bidding documents and appraisal of the evaluation process after the evaluation is conducted. During the implementation phase the MFA involvement is often more unofficial and depending on personal interests – which is also understandable as the MFA is not a party to the project agreement once the loan is given to the project country. The MFA does monitor the projects to some extent, as a financier, with some visits to the project site. The progress reporting to MFA was focused on physical and financial progress. In Vietnam some more strategical planning of CCS projects was done through the dedicated local staff and counterparts in Vietnamese ministries, due to the number of potential projects in the pipeline. However, in general, this was also not the case in CCS. Business Finland has partially been supportive of CCS projects and for finding further business for the Finnish companies but there has not been a strategic linkage to broader regional and country strategies of Finland. It was also noted by some of the informants: the CCS selection process could look more into the opportunities for further business after the CCS project has been implemented, with focus on sectors where this is more likely possible. It was also found important to maintain a balance between implementing Finland’s development policy objectives and related monitoring and reporting on these, and maintaining the instrument as a support to private sector expert business where the companies are seeking for further business opportunities.¹²³

¹²² Interviews

¹²³ Interviews.

5. CONCLUSIONS

5.1 Relevance

1. While relevant, both project phases would have benefited of more systematic analysis of changing scope and context during the prolonged process from planning till implementation. *(Based on Findings 1 and 2)*
2. The project phases were well in line with provincial, Vietnamese and Finland's plans, strategies, and development policies. *(Findings 3 and 4)*

5.2 Effectiveness and Efficiency

3. The project phases were effectively implemented largely due to strong and committed project owner and Finnish main contractors, that were well familiar with the implemented technologies and mobilising an experienced project manager on site. *(Findings 5, 6 and 7)*
4. The project phases were efficiently implemented due to the active project owner and contractor while the planning and procurement processes took a lot of time. *(Findings 8 and 9)*

5.3 Impact

5. The project phases succeeded in producing positive social and health impacts through improved waste management, and in employment and business creation leading to positive economic impacts. *(Findings 10 and 11)*
6. The environmental impacts were not fully estimated through proper ESIA processes, thus the management of potential negative environmental impacts was not systematic. *(Finding 12)*

5.4 Sustainability

7. The project results have proved highly sustainable in terms of technical and financial aspects. *(Findings 10, 11 and 13)*
8. There was no systematic coordination by the CCS projects with other initiatives on the site. The practical coordination was managed by BIWASE. The lack of EIA and proper follow-up of potential negative environmental impacts could potentially reduce the environmental and social sustainability of the project results. *(Findings 14 and 15)*

5.5 Coordination, complementarity, coherence, aid effectiveness & Other

9. While the project phases were well in line within cooperation between the two countries, and part of contractor strategies for expansion of international operations, there was a limited success in finding additional work in Vietnam or other developing countries after the CCS project implementation. *(Findings 16, 17 and 18)*

- 10. There was lack of systematic MFA support for project preparation (financial support for preparation would also reduce risk for Finnish contractors initiating the process) and implementation in CCS process in general. (*Finding 19*)**

6. RECOMMENDATIONS

- 1. MFA: There should be systematic follow-up of the changes in the project scope and context throughout the process, from the planning till actual implementation. The decisions regarding changed scope should be clearly documented and when necessary, the project should be re-appraised. (Based on conclusions 1 and 2).**

Analysis of the proposed scope changes has been taken into use more systematically in the present PIF projects where the project owners/Finnish contractors need to ask for MFA's permission or at least inform MFA of any changes in the projects scope during the project development phase. MFA checks if the changed scope is still within PIF requirements and gives a decision and advice accordingly regarding the proposed changes. If there are substantial changes after the project appraisal a re-appraisal may also be considered.

- 2. MFA and Project Developer: The PIF project selection process should aim to ensure the commitment and capacity of the project owner in the target country. If the project planned to be implemented follows FIDIC Conditions of Contract, there should be proper FIDIC expertise within the team preparing the bidding documents. The projects should be within the core business for the Finnish contractor. Following the example from Vietnam, the role of the MFA and the Embassy should be strengthened especially in terms of the support for ensuring that committed local project owners are found, for the project monitoring during the project and for finding further business. (Based on conclusions 3 and 4).**

The present PIF project process considers this quite well as one of the criteria for choosing new PIF concepts for further development is the capacity of the project owner in the target country. For monitoring purposes, there is a pilot underway for improving monitoring, which will be applied to all PIF projects during the implementation phase. The model of active Embassy monitoring and support from Vietnam CCS (described in more detail under Finding 4 on page 38 and the Finding 9 on page 50 of this report and in GOF-GOV 2003) can also be utilized for countries with a considerable interest for PIF projects.

- 3. Project Developer: The project planning should include proper setting of targets at different levels which enable systematic follow-up during and after implementation. The social and environmental impact assessments should be part of the planning process. The management of potential negative impacts should be systematic and well documented. The current MFA PIF guidance addresses these issues well. The Project Developer should also consider likelihood of finding further business after the PIF project as part of the concept development. (Based on conclusions 5 and 6).**

The present PIF guidance and PIF project development process includes a more rigorous setting of targets as well as focus on social and environmental impact assessments.

- 4. MFA and Project Developer: Proper attention should be paid to commit the project owner, and to proper estimation and management of potential negative social and environmental impacts during planning, implementation and post-implementation. (Based on conclusions 7 and 8).**

The present PIF guidance and PIF project development process includes assessment of project owner’s capacity as well as focus on social and environmental impact assessments. The capacity and commitment of the project owner are key issues for successful project and they should be core issues for project development and selection for financing.

5. **MFA: The MFA should ensure the clarity of roles and responsibilities of the various MFA units and include related tasks in relevant personnel’s ToRs (KEO-50, regional unit, embassy etc.) for PIF project preparation and for agreeing with the local stakeholders and project owner on implementation support and follow-up, as well as for finding additional business opportunities based on PIF projects. The selection process should include considerations of likelihood of further business and for promotion of specific technologies that can be demonstrated through the project. (Based on conclusion 9).**

During the present PIF process the likelihood of replicating the PIF concept is given positive consideration during the initial screening of PIF concepts. The roles of the MFA actors are currently clearer than they were during the CCS time: KEO-50 is in charge of the instrument but in close cooperation with the Embassy and the regional unit together with the Embassy are consulted during the initial concept screening phase. The regional unit is kept in the loop in all stages of the project and consulted especially regarding the political aspects. The recommendation should be implemented in terms of ensuring that these arrangements are followed in systematic manner and by assigning duties related to PIF projects for the relevant personnel in the respective Embassy and regional unit to ensure their commitment to supporting the PIF projects in the assigned role.

6. **MFA: Financial and technical support, especially for project preparation, should be available to ensure that project plans include proper RBM tools such as targets at different levels and measurable indicators. (Based on conclusion 10).**

There are already support mechanisms in use as the KEO-50 offers technical support for project document development to new PIF concepts, and for those companies that don’t otherwise advance after the external appraisal. This support can ensure that the project proposal include all the needed elements of proper RBM. Financial support for project preparation is available from Finnpartnership since 2022. These modes of support should be systematically utilized and publicized so that the potential PIF project Contractors and project owners could benefit from the available support.

7. LESSONS LEARNED

There are several lessons that can be learned from the long process related to the two evaluated CCS projects. The most important lessons identified are:

- The local Project Owner (BIWASE) was very committed and competent, which was a key factor in successful implementation of both project phases. Special attention should be paid to the commitment and capacity of the project owner in the selection process for all PIF projects and this should feature among the key criteria in project screening, selection and appraisal.
- There were substantial changes to the scope of both project phases after the project appraisal, which were not systematically analysed and documented. There should be an analysis and if necessary, a re-appraisal always when the project scope changes substantially during the process. All the decisions made regarding the project scope should be well documented and justified in all cases.
- The preparation of the evaluated projects had not included proper setting of targets and indicators which made the evaluation and proper follow-up of results and impacts harder. These elements of RBM and a proper assessment and management of potential social and environmental impacts should be integral in the project planning and preparation. Financial and technical support for Project Developers may be needed to ensure the proper project preparation in these regards.
- The amount of landfill gas was finally not as high as the FS indicated and thus the electricity generation cannot be run at full capacity. The Feasibility Studies and technical details of financed projects should be properly checked even though the FS is the responsibility of the Project Owner.
- There was limited success for the Contractors of the two evaluated projects to find additional business based on the reference gained from these CCS projects, as well as in general in CCS. The MFA should focus more on supporting the Finnish companies in winning additional business after the implementation of Finnish financed projects (PIF). The potential for such further work could be considered in the selection process of projects proposed for financing, and the MFA and the Embassy should have clear roles and plans for the active support for such further work as one key goal of PIF financing. It must be kept in mind that the CCS and current PIF projects need to be economically non-viable so private sector financing for such projects is hard to find, therefore the focus has to be in public and donor financing. Additionally, promotion of specific technologies that have been demonstrated through projects could be an effective way of promoting Finnish manufacturers in the developing markets.

ANNEX 1: TERMS OF REFERENCE

MINISTRY FOR FOREIGN AFFAIRS OF FINLAND
Department for Development Policy

9 March 2021

Terms of Reference

Ex-Post Evaluation of Concessional Credit Scheme Projects:

Binh Duong Solid Waste Treatment Plant Project – phase 1
Binh Duong Solid Waste Treatment Plant Project – phase 2

1. OVERALL BACKGROUND TO THE EVALUATION

The Public Sector Investment Facility (PIF) is one of the Finnish government's financing instruments in the development policy field. Its purpose is to provide financial support to developing countries' public sector investments that are aligned with the UN sustainable development goals (SDGs) and that make use of Finnish technology and know-how. PIF financing is a form of concessional investment credit provided by a financial institution to the target country, which in addition to an interest subsidy element includes other support measures of the Finnish government's development cooperation.

PIF was launched in December 2016. It was preceded by the Concessional Credit Scheme (CCS) that was discontinued in 2012. The CCS was based on the same legal framework as PIF and it had similar objectives to PIF in promoting economic and social development in developing countries by making use of the experience and technology of Finnish companies. However, the scheme was criticized for not focusing sufficiently on achieving development results, which contributed to the decision to discontinue the scheme.

As part of the decision to launch the PIF instruments, steps were taken to ensure a stronger focus on development results. One of these steps is to increase the number of end of project evaluations of PIF and CCS projects. The aim is to generate information on development results and lessons learned from the projects particularly to support programming and management of the PIF financial instrument.

2. BACKGROUND TO THE PROJECT TO BE EVALUATED

Binh Duong province is a North-West adjacent area of Ho Chi Minh city with area of 2,700km² and population of almost 2 million. The province is well-known internationally as the most successful example of Vietnam economy reform (since 1986) and transition from agriculture/forest based economy to industry based economy.

Binh Duong has several industrial parks spread more than 10,000 has and housing almost 3,000 has. It covers several FDI projects worth of several billion dollars from over 60 countries including Finland. The province is second to HCM city in FDI attraction, accounting roughly 1/10 of total FDI capital to Vietnam.

Province capital is Thu Dau Mot city – one of most active cities in smart city development of Vietnam.

With industrialization and urbanization process, Binh Duong province was planning to have an adequate solid waste treatment complex to meet the development needs and to protect the environment. Since 2003, the Ministry of Planning and Investment of Vietnam had approached Finland to support the project development.

With support from Finland, The South Binh Duong Solid Waste Treatment Complex has become an example of good solid waste treatment facility and management in Vietnam. Via the project, not only technology but especially management skill has been transferred to Vietnamese project owner Binh Duong Water Supply, Sewerage and Environment Ltd (BIWASE) and its staff.

Binh Duong Water Supply, Sewerage and Environment Ltd currently employs more than 1200 workers. The company provides clean water supply to 245,000 households, industrial parks; treats 54,000m³/day wastewater, 1,700 tons of domestic solid waste per day; 700 tons/day of hazardous and industrial waste. The company was privatized in 2016, with current 25% stake owned by Binh Duong provincial people committee.

Over the span of over a decade, Finland has supported BIWASE in developing solid waste treatment complex in South Binh Duong with 3 projects:

Binh Duong Solid Waste Treatment Plant Project – phase 1 (concessional credit scheme)

The Binh Duong Solid Waste Treatment Project focused on an immediate improvement of the present under-dimensioned and technically poor waste treatment in the Province. The technology provided was for a combination of material recovery, composting, combusting hazardous waste and land filling.

Contract date: July 2011

Finnish contractor: Ferroplan

MFA approved Concessional Credit financing of Euro 7.1 million (contract – Euro 6.7 million + guarantee premium). Interest subsidy was estimated at Euro 5 million.

FCG Finnish Consulting Group Ltd

Groundbreaking in December 2011

Completion in September 2013

Binh Duong Solid Waste Treatment Plant Project – phase 2 (mixed credit scheme)

The phase 2 project comprised of three main components (1) land-field gas collection and generation system (2) incinerator and (3) supply additional equipment vehicle for solid waste treatment completion in complementary to phase 1. The phase 2 first objective was to utilize the existing landfill gas in electricity production. The capacity of the landfill gas was estimated to be 2 MW. Second main deliverable of the project was waste incineration line, which doubles the incineration capacity of waste management facility from 100 t/d to 200 t/d. During phase 1, a waste separation line was delivered to area and the leftovers from the fractioning process was planned to be incinerated with mixed waste with Phase 2 investments. On top of the two main deliverables there was a top turn unit, two wheel loaders and an excavator delivered for compost facility to improve to efficiency and operation capacity of the plant.

The main environmental impact are the reduced greenhouse gases (GHG) through the collected landfill gas. Assuming that collection is working around the year with full installed capacity, reduction of GHG emissions is roughly equivalent to 16,000 cars GHG emissions on yearly average. Other environmental impact is the reduction of odors from the landfill due better management of waste. Covering the landfill with tarps also reduced the amount of trash spreading from landfill area and thus improved the conditions in nearby areas.

The biggest financial impact of the project comes from the produced electricity that can increase the incomes and feasibility of the landfill. Price of electricity is roughly 90€/MWh and the production potential is up to 12 500 MWh/year with added CHP capacity. This could mean in savings up to 1.1 million € / year in electricity invoices for waste separation units.

Sept 2013: FS was submitted

Nov 2014: Contract was signed with Doranova

April 2015: MFA approved the project financing the contract value of € 6.2 million (of which € 4.5 million of credit and € 1,7 million of grant)

Nov 2016: Loan agreement signed

February 2017: Implementation

May 2018: Commissioning of final CHP units

For the evaluations purposes, it is also important to know that Finland supported BIWASE with another project that was more innovative in its nature through EEP Mekong Grant funding.

Collecting biogas for power generation (EEP Mekong grant)

The project aimed at increasing BIWASE's capacity to use landfill gas to produce power (810kW) and heat (813kW) with a modern combined-heat-power (CHP) technology, while reducing methane emissions to the atmosphere.

The project total investment was 1.5 million € of which 975.000 € was financed by BIWASE and 525.000 € with grant support from EEP Mekong. Finnish supplier in the project was BioGTS Finland that was replaced by MR construction Oy at later stage of the project completion. The project started in December 2017 and was scheduled to complete in January 2019. The actual gas collection was reported as not at the expected level.

3. OBJECTIVES OF THE EVALUATION

The overall objective of the end of project evaluation is:

- To provide an external, independent and objective assessment of the project.
- The evaluation is expected to enable the MFA to evaluate whether the project was implemented in 1) an appropriate and efficient way, 2) how well it achieved the targets and goals laid out in the project plan, and 3) particularly how sustainable the results of the project are, including any long-term development impacts of the project.

The evaluation is expected also:

- To provide the MFA with lessons-learned that can be used in further development of the PIF funding instrument.
- To provide information about the synergies of different financing instruments (EEP Mekong and CC)
- Evaluate further needs in landfill development in Southern Vietnam and perspective of solid waste treatment technology application (W2E) in Vietnam and the scalability of the approach used in the projects.
- Evaluate or review the impacts of the change in the overseeing ministry (Landfills will under the responsibility of MONRE currently, earlier with MOC)
- Finally, the evaluation is expected to generate information for the MFA on the development impact of the CCS funded projects and the sustainability of these results.

4. SCOPE AND GENERAL APPROACH OF THE EVALUATION

The evaluation should focus on the project implemented in Vietnam as specified in the project document. It should analyze the planning and implementation phases of the project as well as actions taken to ensure sustainability of results after the completion of the project. It should consider actions taken by the project owner and key stakeholders in Vietnam, the private sector companies involved in implementing the project in Finland, Vietnam and elsewhere and it should consider the support provided by key stakeholders facilitating the CCS-instrument including the MFA.

The project should be analyzed in the context of relevant development strategies of Vietnam and the development policy of the Government of Finland particularly in the context of the CCS instrument at the time. Further, particular attention should be paid to gender and social equality, human rights including equal participation of marginalized groups and environmental sustainability. The evaluation should also provide information on outcomes of the project for the ultimate beneficiaries. This could require constructing a results framework ex-post and indicators as the project document does not explicitly provide these. The evaluation should also provide information on how the project contributed to the longer-term operations of the Finnish company involved in the project in developing country markets.

5. ISSUES TO BE STUDIED

The main issues should be studied against the evaluation criteria below. The evaluation team may also take up other issues.

Relevance

- Was the project relevant to solid waste management and the local populations that were to benefit from the project?
- Did the project contribute to Vietnam and particularly Binh Duong province development plans and sector strategies? Was the project in line with Finland's development policy objectives and global development goals?

Effectiveness

- To what extent did the project achieve its immediate objective of significantly improving the solid waste treatment capacity of BIWASE, hence improving the services to local households and communities?
- What were the key success factors or bottle necks that contributed to the project either achieving or falling short of its objectives? What was the role/contribution of the different actors (project owner, contactor and other stakeholders including the MFA)?

Efficiency

- How efficiently were available resources transformed into intended results in terms of quantity, quality and time? Can the project be deemed to have been good *value for money*?
- What were the key success factors/bottle necks that contributed/constrained implementation (planning, procurement, implementation, risk management, monitoring, follow-up after close of project)? What was the role/contribution of the different actors?

Impact

- How well did the project succeed in achieving its overall objective to improve the quality of life of the beneficiary population, contribute to economic development and support the delivery of public services such as education and health.
- What other noticeable impact did the project have (intended/unintended, positive/negative), particular in terms of human rights, gender equality, inequalities and environmental sustainability?

Sustainability

- How sustainable are the results achieved in the project? Have stakeholders in Vietnam taken steps to ensure sustainability e.g. in budgeting or other processes? Are the project results still relevant and are the systems installed/other outputs of the project still in efficient and effective use?

Coordination, complementarity, coherence, aid effectiveness

- How were other programmes and cooperation relevant to the project taken into account?
- How well did the project promote ownership, alignment, harmonization, management for development results and mutual accountability?
- Were there contradictions with other policy areas and how were they handled? How did the project impact debt sustainability of Vietnam?

Other

- Did the project open up new business for the Finnish companies in Vietnam or to other emerging markets? Was the project part of a strategy by the companies to expand operations in developing countries?
- How did the project contribute more broadly to cooperation and relations between Finland and Vietnam? Were there synergies with other Finnish cooperation in the region?
- How was the project viewed by local ministries and did it meet their objectives.

6. METHODOLOGY

The evaluation team is expected to determine the most appropriate methodology to use in the evaluation, particularly taking into account that ex-post there is limited availability of documentation. The team is expected to use multiple methods, both quantitative and qualitative, to ensure best outcome of the evaluation. The work should include a desk review of existing material, possible identification of further relevant material, data analysis of available statistics/indicators, interviews with relevant stakeholders and a field visit. The assignment includes an inception phase, field work and final analysis and reporting phase. The team is also expected to construct ex-post a results framework and to identify/construct indicators to evaluate results. Results should be validated using multiple sources.

The evaluation should be conducted in close cooperation with the MFA. At a minimum, the evaluation team is expected to hold (i) a kick-off meeting to discuss selection of evaluation methodology and detailed work plan; (ii) a meeting prior to the field mission that presents the Inception Report and outline detailed plans for the field visit; (iii) a meeting following the field visit that presents preliminary findings; and (iv) presentation of the final report and recommendations to the MFA. Further, the evaluation team is also expected to be available to participate in a public launch of the report.

7. WORK PLAN

The evaluation should be completed by September 2021 with a public launch of the report tentatively during the last week of September 2021.

The evaluation is divided into three phases. The outputs of the assignment are as follows:

- An Inception Report will be produced within three weeks of the start of the assignment, and before the field visit.
- A first draft of the Final Report will be produced within two weeks of the field visit. The MFA and key stakeholders identified by the MFA will have two weeks in which to comment the draft report.
- The Final Report will be submitted within one week after receiving comments on the first draft by the MFA and other stakeholders. The Final Report will be commented and the final clearance will be provided by the MFA.

The evaluation team is also expected to propose and implement a quality assurance system for the evaluation. The proposal needs to specify the quality assurance process, methodology and tools.

8. EXPERTISE REQUIRED

The team should have expertise related to the substance of the project, including the technology provided; experience in development cooperation and development evaluations relevant to the region; knowledge of the CCS and PIF instrument; expertise in human rights based approach, gender, and environmental assessments.

The service provider is expected to nominate the team in accordance with the Framework Agreement on the supply of the provision of assessment, monitoring and evaluation of Public Sector Investment Facility (PIF) and Concessional Credit projects financed by the Ministry for Foreign Affairs of Finland (*PIF Framework Agreement*). The team proposed is subject to approval by the Ministry.

9. REPORTING

The team is expected to provide an inception report, a draft final report and a final report as well as a presentation of preliminary findings and a presentation of evaluation findings. Each report is subjected to approval by the MFA. The final report should not exceed 50 pages (plus annexes) with clear findings and conclusions, as well as recommendations and any lessons learned following logically from the findings and conclusions. The Final Report should include an executive summary of two pages. All reports will be submitted to the MFA in English in electronic format.

10. TENTATIVE BUDGET AND WORKPLAN

The company shall be responsible for the hiring of the personnel and financial management. The company shall also take the responsibility of adequate backup services to the evaluation team.

The budget is based on the cost structure agreed to in the *PIF Framework Agreement*. The total available budget for this evaluation is 65 000 Euros (excluding VAT), which cannot be exceeded.

11. MANDATE

The evaluation team is expected to and entitled to discuss with relevant parties, government authorities, local authorities, civil society organizations, private sector and individuals relevant to the assignment.

The consultant is not, however, authorized to make any commitments on behalf of the Government of Finland or represent him or herself as representative of the Government of Finland.

The team shall share this TOR and/or the letter of introduction of the assignment with the stakeholders they work with.



The evaluation team is responsible for organizing the meetings and field visit related to the evaluation. The MFA will seek to provide support in arranging meetings particularly at the official level.

ANNEX 2: EVALUATION MATRIX

Evaluation Matrix Based on the Evaluation Questions outlined in the ToR and the proposed detailed Evaluation Questions

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
<u>Evaluation Criterion: Relevance</u>			
1. Was the project relevant to solid waste management and the local populations that were to benefit from the project?	<ul style="list-style-type: none"> Did the project respond to the needs of solid waste management development in the Province? Was the project relevant to the needs of the local population? 	<ul style="list-style-type: none"> Extent to which the project was in line with Vietnam and provincial strategies in the sector Extent to which the project contributed to solving solid waste related issues faced by the local population? 	<ul style="list-style-type: none"> Desk review of relevant GoV and project documents, Interviews and observations
2. Did the project contribute to Vietnam and particularly Binh Duong province development plans and sector strategies?	<ul style="list-style-type: none"> To what extent did the project contribute to the sector and provincial plans and strategies? Were the changes in the scope and content of the project, i.e. during the implementation of Phase 2, relevant to the needs and in line with priorities and strategies? 	<ul style="list-style-type: none"> Extent to which the project was in line with the goals of the Vietnam and provincial priorities in the sector The extent to which the made changes correspond to the strategies 	<ul style="list-style-type: none"> Desk review of relevant GoV and project documents, Interviews Desk review of relevant GoV and project documents, Interviews
3. Was the project in line with Finland's development policy objectives and global development goals?	<ul style="list-style-type: none"> How well was the project and the achieved results in line with the Finland's development policy 	<ul style="list-style-type: none"> Extent to which the project objectives were in line with Finnish and global priorities 	<ul style="list-style-type: none"> Desk review and interviews

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
	objectives and global development goals?		
Evaluation Criterion: Effectiveness			
<p>4. To what extent did the project achieve its immediate objective of significantly improving the solid waste treatment capacity of BIWASE, hence improving the services to local households and communities?</p>	<ul style="list-style-type: none"> To what extent is the improvement of solid waste treatment in the province attributable to the project? To what extent the project components were implemented as planned? Operational status of the project components at the end of project (and at present)? 	<ul style="list-style-type: none"> Solid waste treatment capacity increase in the province during the project. Percentage completion of the project components compared to plans. Performance capacity of the plant components. 	<ul style="list-style-type: none"> Desk review and interviews (provincial and company representatives and documents) Completion reports of the project phases. Completion reports, present status of plant – observations, interviews and desk review
<p>5. What were the key success factors or bottle necks that contributed to the project either achieving or falling short of its objectives?</p>	<ul style="list-style-type: none"> To what extent the project outcomes and objectives were met and why? To what level project contributed to meeting the environmental standards of the solid waste complex? Did the project succeed in generating additional resources/revenue to BIWASE as expected? 	<ul style="list-style-type: none"> Extent of reaching outcomes and objectives Extent of completion of environmental standards and management Increase in BIWASE revenue after the project commissioning 	<ul style="list-style-type: none"> Completion reports, interviews and observations Comparison of environmental standards and guidelines with the implemented measures and present situation – desk review, interviews observations BIWASE reporting and interviews

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
<p>6. What was the role/contribution of the different actors (project owner, contactor and other stakeholders including the MFA)?</p>	<ul style="list-style-type: none"> • How did the different actors contribute to the project completion? • How does the gas-to-electricity components financed through the CCS perform as compared to similar components financed by the EEP Mekong grant? 	<ul style="list-style-type: none"> • Roles and responsibilities mapping of the projects • Performance and financial revenue from the electricity generation component 	<ul style="list-style-type: none"> • Desk review and interviews with all key actors • BIWASE documents, desk review and interviews
Evaluation Criterion: Efficiency			
<p>7. How efficiently were available resources transformed into intended results in terms of quantity, quality and time? Can the project be deemed to have been good value for money?</p>	<ul style="list-style-type: none"> • To what extent was the project cost efficient and good value for money? 	<ul style="list-style-type: none"> • Utilisation of funds compared to results achieved 	<ul style="list-style-type: none"> • Desk review of project documents complemented with interviews • Comparative analysis of similar projects
<p>8. What were the key success factors/bottle necks that contributed/constrained implementation (planning, procurement, implementation, risk management, monitoring, follow-up after close of project)? What was the role/contribution of the different actors?</p>	<ul style="list-style-type: none"> • What were the steps and bottlenecks in the project planning, including i.e. feasibility studies? Did the project planning include assessment of environmental and social impacts? • How diligently was the FIDIC contract implemented? • How efficiently the gas-to-electricity components financed through the CCS were transformed into results as compared to similar components 	<ul style="list-style-type: none"> • Steps and timeline for project planning and its aspects • To what extent were the elements of the FIDIC contract implemented • Comparison to EEP Mekong grant results and processes 	<ul style="list-style-type: none"> • Desk review of project documents complemented with interviews • FIDIC contract review reflecting the project implementation • Desk review of project documents and EEP Mekong documents

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
	financed through the EEP Mekong grant? <ul style="list-style-type: none"> How did the change in overseeing Ministry (landfills were previously under MOC, but were shifted under the responsibility of MONRE) affect the project? 		
Evaluation Criterion: Impact			
9. How well did the project succeed in achieving its overall objective to improve the quality of life of the beneficiary population, contribute to economic development.	What are the project impacts in different levels: <ul style="list-style-type: none"> Solid waste complex staff: were there improvements to workers' health and safety, work stability, number of jobs created, other? People in communities surrounding the solid waste complex: what are the changes in the quality of living environment? Is this reflected e.g. in the property values? Population of Binh Duong: were there improvements in waste collection service, living environment, waste recycling related livelihood/business opportunities etc.? 	<ul style="list-style-type: none"> Improvements in staff numbers, stability and safety Changes in quality of living environment of surrounding communities (smells, waste collection); Extent to which improvements in the surrounding areas can be attributed to the project Business opportunities related to waste reuse Improvements in general in province – attributability to the project difficult to evaluate 	<ul style="list-style-type: none"> BIWASE documents, interviews with staff, observations Desk review, interviews and observations in surrounding communities Interviews with business operators (formal & informal sectors) Desk review, interviews, observations
10. What other noticeable impact did the project have	<ul style="list-style-type: none"> Did the positive project impacts reach marginalized or vulnerable communities? I.e. is waste collection 	<ul style="list-style-type: none"> Extent to which the impacts reached all beneficiaries 	<ul style="list-style-type: none"> Interviews and observations and progress reporting

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
(intended/unintended, positive/negative), particular in terms of human rights, gender equality, inequalities and environmental sustainability?	<ul style="list-style-type: none"> extended to all communities, including marginalized? Is waste collection service affordable to all? What are the impacts on GHG emissions? What are the impacts on surface and ground water quality, other environmental impacts? Are there any negative environmental impacts? 	<ul style="list-style-type: none"> Environmental indicators for the area (water quality, etc) 	<ul style="list-style-type: none"> BIWASE waste collection reports; tariff reports Provincial reporting on environmental aspects, interviews, observations
Evaluation Criterion: Sustainability			
11. How sustainable are the results achieved in the project? Have stakeholders in Vietnam taken steps to ensure sustainability e.g. in budgeting or other processes? Are the project results still relevant and are the systems installed/other outputs of the project still in efficient and effective use?	<ul style="list-style-type: none"> Present status of the project and prospects for further sustainability? Level of institutional ownership and structures for sustainably handling the project? Is the additional revenue generated by the project used for operation and maintenance of the facilities; Are there re-investments in upgrading the complex, including the landfill? 	<ul style="list-style-type: none"> Extent to which the project components are still functional Level of staff and finances for the waste treatment facility Level of financial independence Extent of re-investments, major repairs or further extension of the facility 	<ul style="list-style-type: none"> BIWASE reporting, interviews, observations BIWASE reporting, interviews, observations BIWASE reporting, interviews, observations BIWASE reporting, interviews, observations
Evaluation Criterion: Coordination, complementarity, coherence, aid effectiveness			
12. How were other programmes and cooperation relevant to the project taken into account?	<ul style="list-style-type: none"> To what extent was the project coordinated and complementary to other programmes? 	<ul style="list-style-type: none"> Extent of cooperation with relevant programmes 	<ul style="list-style-type: none"> Desk review of documents, interviews with key informants

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
13. How well did the project promote ownership, alignment, harmonization, management for development results and mutual accountability?	<ul style="list-style-type: none"> Extent to which the project included the local stakeholders during all stages and promoted development results in the process 	<ul style="list-style-type: none"> Extent of local stakeholders involvement in the planning and implementation 	<ul style="list-style-type: none"> Desk review of documents, interviews with key informants
14. Were there contradictions with other policy areas and how were they handled?	<ul style="list-style-type: none"> Identified issues with policies and strategies and mitigation measures taken? 	<ul style="list-style-type: none"> Compliance with policies 	<ul style="list-style-type: none"> Desk review, interviews
Other			
15. Did the project open up new business for the Finnish companies in Vietnam or to other emerging markets? Was the project part of a strategy by the companies to expand operations in developing countries?	<ul style="list-style-type: none"> Did the involved companies implement further business in Vietnam or elsewhere or was this case taken as an example by other Finnish companies? Did the involved companies use the project as strategic entry to developing countries markets? 	<ul style="list-style-type: none"> Extent of further business in Vietnam or developing countries 	<ul style="list-style-type: none"> Desk review of company documents, interviews with company representatives
16. How did the project contribute more broadly to cooperation and relations between Finland and Vietnam? Were there synergies with other Finnish cooperation in the region?	<ul style="list-style-type: none"> Did the project impact on Finland and Vietnam relations? Were the synergies with other cooperation such as EEP well utilized? Were further needs in solid waste treatment technologies in Vietnam, including Waste to Energy (W2E) technologies and the scalability of 	<ul style="list-style-type: none"> Extent to which the project was recognized in Vietnam? Other projects or cooperation linked with the project? Number of similar projects implemented in Vietnam or in the region 	<ul style="list-style-type: none"> Interviews Interviews Desk review, interviews

Evaluation Questions in ToR	Detailed Evaluation Questions	Indicators for the Questions	Source of data and/or method for data collection
	the approach used in the project identified?		
17. How was the project viewed by local ministries and did it meet their objectives?	<ul style="list-style-type: none"> Did the local ministries see the projects as important part of their development plans? Is there still recognition, remembrance of the projects? 	<ul style="list-style-type: none"> Extent to which the local ministries recognized the project as part of their priorities 	<ul style="list-style-type: none"> Interviews with ministries representatives

To avoid repetition, please consider that:

Sampling is purposive for major stakeholders identified in project documents.

Methods for data analysis will be content analysis and contribution analysis.

Major Limitations/Risks are availability/accessibility of stakeholders. Stakeholders biases will be contained through redundancy of source

ANNEX 3: MEETINGS AND INTERVIEWS

Meeting	Participants	Date
Kick off meeting	Hannele Tikkanen, Antti Piispanen, Matti Tervo, Karri Eloheimo, Henna-Riikka Pihlapuro from the MFA of Finland and the Evaluation Team international members	28.4.2021
Interview (teleconference)	Minna Patosalmi & Pentti Patosalmi, Ferroplan	3.5.2021
Interview (teleconference)	Mikko Saalasti, Doranova	3.5.2021
Interview (teleconference)	Jussi Kukkula, Project Manager on-site for both phases	6.5.2021
Interview (teleconference)	Tauno Kääriä, involved as consultant in the appraisal and other processes of the project over long period of time	12.5.2021
Interview (teleconference)	Eero Kontula, former Water Sector Advisor MFA	18.5.2021
Interview (teleconference)	Antti Rautavaara, Water Sector Advisor MFA	20.5.2021
Interview (teleconference)	Tomi Särkioja, former Counsellor at Embassy of Finland in Vietnam	21.5.2021
Interview (teleconference)	Esa Sippola, former representative of Lemcon and later YIT in Vietnam. Involved in project identification and early development	25.5.2021
Interview (teleconference)	Oskar Kass, Head of Private Sector Instruments unit in MFA (2011-2013 & 2016-2018)	25.5.2021
Interview (teleconference)	Max von Bonsdorff, MFA	28.5.2021
Interview (teleconference)	Marko Saarinen, MFA	31.5.2021
Interview (teleconference)	Janne Sykkö, former MFA CCS/PIF coordinator and former Counsellor at Embassy of Finland in Vietnam	3.6.2021
Interview (teleconference)	Matti Leppäniemi, Econet	9.6.2021

Meeting	Participants	Date
Interview (teleconference)	Finnish Export Credit Guarantee Agency Finnvera Liisa Tolvanen; Outi Homanen & Hannele Matilainen	16.6.2021
Interview (teleconference)	Satu Santala, MFA	18.6.2021
Interview (national experts)	Southern Binh Duong Water Supply – Sewerage Environment Co. Ltd, BIWASE management representative Mr Long- Vice head of Organisation and Human Resources Management Division	6.12.2021
Interview (national experts)	Department of Natural Resources and Environment (DONRE) - Mr Mua, Head of the office	6.12.2021
Interview (national experts)	Southern Binh Duong Water Supply – Sewerage Environment Co. Ltd, BIWASE Key staff and workers-; Mrs.Thuy- Staff in charge of Work and Safety of the division; Mr. Long Team Leader of the Processing area; Mr. Giang- Vice director of the Industrial Waster water Processing Unit; Mr Le Hoang Vu- Technical Staff of the CHP unit	6.12.2021
Interview (national experts)	Binh Duong Provincial People’s Committee (PPC); Executive Agency - Mr.Mai Hung Dung- Vice Chairman (With DONRE, DOC, DPI and BIWASE leaders)	7.12.2021
Interview (national experts)	Department of Construction OC Binh Duong - Mr. Thuy Head of Technical Infrastructure Management and Urban Development Division; Mr. Hoang Lan	7.12.2021
Interview (national experts)	Department of Planning and Investment (DPI) of Binh Duong - Nguyen Pham Thanh Huy- Staff of Sectoral Economics Division	7.12.2021
Interview (national experts)	Department of Health - Provincial Health Centre of Monitoring working environment, Mr. Pham Huyen- in charge of Working Environment issues; M.Dr Pham Khuc Nguyen	7.12.2021
Interview (national experts)	Provincial Preventive Health Center, M.Dr Ngo Bach Dang	7.12.2021
Interview (national experts)	Meeting with Staff of the Solid Waste Management Complex - Mr. Cuong- Staff of Electricity Power Biogas; Mr. Hao - Staff of the Processing Complex; Mr. Dang- Staff of the Processing Complex; Mrs. Vui- Staff working at the sorting section of the Complex	8.12.2021
Interview (national experts)	Loc Thien Phu Company, Director Mr. Pham Huu Hau	9.12.2021

Meeting	Participants	Date
Interview (national experts)	<u>Meetings with Community/ward level staff and Households (HHs)</u>	8.-10.2021
Interview (national experts)	Chanh Phu Hoa Ward - Ben Cat town, Mrs. Hoa- The Ward's Vice Chairman; Mrs. Diep- Ward Women Union Chairman; Mrs. Chau- Head of Hamlet 1 B of the Ward; Mrs. Lieu- Head of Hamlet Women Union	8.12.2021
Interview (national experts)	Lai Thieu Ward, Thuan An Town - Mr. Phi- Staff in charge of Environment issues of the ward; Mr. Nguyen Van Nhan- Head of Nguyen Trai Hamlet of the ward; Mrs. Ngan- Member of Youth Union	8.12.2021
Interview (national experts)	Meeting with Ethnic Minorities living in a remote areas of the province- Minh Hoa Commune, District Dau Tieng, Binh Duong province - Mr. Nguyen Van Liem- Vice Chairman of the Commune; Mrs. Pham Thi Hong- Commune staff in charge of Environment issues	9.12.2021
Interview (national experts)	Ethnic Minorities Group- Cham Village, Mr. Du So- Vice head of the Cham village Churd; Mr. Mo Ham Met- Member of the village Chuurd	9.12.2021
Interview (national experts)	Women and Girls group of the Ethnic Minorities Group- Cham Village, Mrs. Mariam; Mrs. Khozigia; Mrs. Mari	9.12.2021
Interview (national experts)	Ben Cat Town People's Committee - Mr. Long- Vice Head of Town DONRE; Ms. Huong- Staff of the Town DONRE	9.12.2021
Interview (national experts)	Local people living along 1 B Street/Hamlet of the Chanh Phu Hoa Ward - Mr. To Hoang Phuoc- ; Mr. Liem- 247, N.9 of the Hamlet; Mrs. Huynh Thi Hien- having her House next to the Complex gate	9.12.2021
Interview (national experts)	Binh Chuan Ward, Thuan An Town - Mr. Sang- Ward staff is in charge of environment and land issues	10.12.2021
Interview (national experts)	Ministry of Construction (MOC) - Mrs. Dang Anh Thu- Deputy General Director of Administration of Technical Infrastructure and Mr. Nguyen Khanh Long- Head of Solid Waste Management Division	11.1.2022
Interview (national experts)	Ministry of Natural Resource & Environment (MONRE) - Mr. Nguyen The Chinh Director General of Institute of Strategy and Policy on Natural Resources and Environment (from 2015-2020); Mrs. Tran Thi Minh Ha Director of Department of International Cooperation (from 2004-2014);	27.1.2022

Meeting	Participants	Date
Interview (national experts)	Ministry of Planning and Investment (MPI) - Mr. Nguyen Huy Hoang – Expert, Foreign Economic Department	27.1.2022
Interview (national experts)	Prof. Lam Minh Triet, University of Ho Chi Minh National University; conducted the feasibility study in 2003	27.1.2022

ANNEX 4: DOCUMENTS REVIEWED

Document
Project documents
<u>PHASE 1</u>
Contract (2009). Supply and Installation of Equipment and Construction of Solid Waste Composting Plant and Services for Binh Duong Waste Treatment Complex, Vietnam. Contract between BIWASE (the Employer) and BAFO – Econet Group (the Contractor). 23.10.2009.
Contract Agreement (2011). Supply and Installation of Equipment and Construction of Solid Waste Composting Plant with Services for Binh Duong Waste Treatment Complex, Vietnam. Agreement between BIWASE (the Employer) and Ferroplan Oy (the Contractor). 26. 7.2011.
Negotiation Minutes for Contract Performance (2011). Contract: Supply and Installation of Equipments and Construction of The South Binh Duong Solid Waste Treatment Complex, Vietnam. Between BIWASE and Water Supply and Environment Consulting JSC and Ferroplan Oy and Thanh An 665. 26.7.2011.
<u>PHASE 2</u>
Contract Agreement (2014). Supply and Installation of Equipment and Civil Works for Southern Binh Duong Waste Treatment Complex, Phase 2 (Funded by Finnish ODA). Agreement between BIWASE (the Employer) and Doranova Oy (The Contractor). 7.11.2014.
Progress and Final Reports
<u>PHASE 1</u>
BIWASE (2013a). Report of Program Ending, Finnish ODA Loan, South Binh Duong Solid Waste Treatment Project. 1 June 2013.
<u>PHASE 2</u>
Saalasti, M. (2018). Binh Duong Water Supply Sewerage Environment Limited Company (BIWASE) Project Final Report. Doranova Oy. 15 May 2018.
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Government of Finland-Government of Vietnam (2003). The Administrative Handling Procedure Through the Project Cycle for Concessional Credit Process Between Finland and Vietnam. 4 June 2003.
Ulkoasiainministeriö (2004a). Lausunto. Kehityspoliittinen osasto KEO-12. 1.3.2004.
Ulkoasiainministeriö (2004b). Kokousmuistio. Kehitysyhteistyösasto KYO-12. 8.3.2004.
Embassy of Finland, Hanoi (2004). Mission Memorandum. 4.4.2004.
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Valtioneuvosto (2011). Pöytäkirja. Raha-asiainvaliokunnan istunto. 28.9.2011.
Ulkoasiainministeriö (2011b). Päätösluettelo. 4.10.2011.
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Ulkoasiainministeriö (2013b). Lausunto laaturyhmälle. Toimialapolitiikan yksikkö KEO-20. 30.1.2013.
Ulkoasiainministeriö (2013c). Pöytäkirjan ote. Toimialapolitiikan yksikkö KEO-20. 15.2.2013.
Ulkoasiainministeriö (2015). Varainmyöntöesitys. Kehitysrahoituslaitosten yksikkö KEO-50. 12.3.2015.
Ministry for Foreign Affairs of Finland (2015). The Decision of the Minister for International Development of March 2015. 30.3.2015.
Helsingin hovioikeus (2019). Tuomio Nro 1628. 27.12.2019.
Finnvera documents
Finnvera (2011). Conditional Guarantee Commitment BC 167-11. 17.6.2011
Finnvera (2014). Description of the origins in the export contract
Vietnamese Government and Provincial Documents and Reports
Provincial People Committee, Binh Duong Province (2010). Decision on approval of the commercial contract. 1.4.2010.
Provincial People Committee, Binh Duong Province (2012). Proposal for fund allocation to enlarge solid waste treatment area and leachate treatment area under the South Binh Duong Solid Waste Treatment Complex Project. 23.4.2012.
The Prime Minister's Decision No. 2149/QD-TTg of December 17, 2011 - National Strategy on Integrated Management of Solid Waste (ISWM) to 2025 with vision towards 2050
Becamex Investment & Development Corporation. Binh Duong Water Supply – Sewerage – Environment Co., Ltd (2012). Progress report. 25.4.2012.
Binh Duong Water Supply, Sewerage and Environment Co. Ltd (BIWASE 2012). Re: Extension of waste and wastewater treatment scope under South Binh Duong Solid Waste Treatment Complex. 14.5.2012.
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Ministry of Natural Resources and Environment (MONRE) (2020). State of Environmental Report, Viet Nam 2019.
Ministry of Construction (2019). Report to Deputy Prime Minister on Domestic Solid Waste Management, January 21, 2019
MONRE (2019). Review and assessment of solid waste treatment technology in Viet Nam, Proposal solutions in the future.
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Provincial People Committee, Binh Duong Province. State of Environment report of Binh Duong period from 2005-2010; 2011-2015 and 2016-2020.
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Finnconsult (2003). Preliminary Assessment of a Concessional Credit Application. 17.12.2003
Ramboll Finnconsult Oy (2004). Final Report. Appraisal of a Concessional Credit Proposal. South Binh Duong Solid Waste Treatment Project. 26.5.2004.
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Other relevant documents
Asianajotoimisto Jaatela & Helenius Oy (2020). e-mail from Jarkko Jaatela, dated 2.10.2020.
Moitruong.net.vn (2021). Binh Duong – Lesson 1: People are frustrated because the solid waste complex causes environmental pollution. website accessed 29.4.2021.

Document
Bình Dương - Bài 1: Người dân bức xúc vì Khu liên hợp xử lý chất thải hoạt động gây ô nhiễm môi trường - Tạp chí điện tử Môi trường & Cuộc sống (moitruong.net.vn)

ANNEX 5: INTERVIEW GUIDES

The below guide outlines the key questions guiding the interviews with different stakeholders. We will prepare specific interview questions outlines for each particular stakeholder or group of stakeholders. The questions are supportive to guiding the semi-structured interviews but the focus of the interview will be dynamically managed in order to facilitate open sharing by the respondent.

Additional questions will also be added as the evaluation progresses to validate initial findings and examine emerging issues deeper.

Ex-Post Evaluation of Concessional Credit Scheme Projects:

Binh Duong Solid Waste Treatment Plant Project – phase 1

Binh Duong Solid Waste Treatment Plant Project – phase 2

Interview questions for project contractors

Introduction – background

1. What was your role in /how do you know the project?
2. How were you involved in project decisions?
3. How did the project implementation go in general?

Relevance

4. Did the project respond to the needs of solid waste management development in the Province?
5. To what extent did the project contribute to the sector and provincial plans and strategies?
6. Was the project relevant to the needs of the local population?
7. Did the design process for the project include these local actors?
8. To Doranova - Were the changes in the scope and content of the project, i.e. during the implementation of **Phase 2**, relevant to the needs and in line with priorities and strategies?

Effectiveness

9. How much do you think the project contributed to the overall improvement of solid waste treatment in the province?
10. To what extent the project components were implemented as planned? Were there changes? Why?

11. To what extent the project outcomes and objectives were met and why?
12. To what level project contributed to meeting the environmental standards of the solid waste complex?
13. Did the project succeed in generating additional resources/revenue to BIWASE as expected?
14. What were the different actors related to the project implementation? What were their roles and contributions?
15. **To Doranova – Phase2** - How does the gas-to-electricity components financed through the CCS perform as compared to similar components financed by the EEP Mekong grant?

Efficiency

16. To what extent was the project cost efficient and good value for money? Can you give any examples of similar projects and their costs in similar settings?"
17. What were the steps and bottlenecks in the project planning, including i.e. feasibility studies? Did the project planning include assessment of environmental and social impacts?
18. How diligently was the FIDIC contract implemented?
19. **Doranova phase 2** How efficiently the gas-to-electricity components financed through the CCS were transformed into results as compared to similar components financed through the EEP Mekong grant?
20. How did the change in overseeing Ministry (landfills were previously under MOC, but were shifted under the responsibility of MONRE) affect the project?

Impact

What are the project impacts in different levels:

21. Solid waste complex staff: were there improvements to workers' health and safety, work stability, number of jobs created, other?
22. People in communities surrounding the solid waste complex: what are the changes in the quality of living environment? Is this reflected e.g. in the property values?
23. Population of Binh Duong: were there improvements in waste collection service, living environment, waste recycling related livelihood/business opportunities etc.?
24. Did the positive project impacts reach marginalized or vulnerable communities? I.e. is waste collection extended to all communities, including marginalized? Is waste collection service affordable to all?

25. What are the impacts on GHG emissions? What are the impacts on surface and ground water quality, other environmental impacts? Are there any negative environmental impacts?

Sustainability

26. What is the present operational status of the project implemented components and prospects for further sustainability?
27. Level of institutional ownership and structures for sustainably handling the project?
28. Do you know whether the additional revenue generated by the project used for operation and maintenance of the facilities and have there been re-investments in upgrading the complex?

Coordination, complementarity, coherence, aid effectiveness

29. To what extent was the project coordinated with and complementary to other programmes
30. How were the local stakeholders included in the process and how the results were promoted and advocated to other levels of actors in Vietnam?

Other

31. Did your company implement further business in Vietnam or elsewhere based on this project experience or was this case taken as an example by other Finnish companies?
32. Have you been able to use this project as an entry point or key reference for other developing countries markets or other donors?
33. Were the synergies with other cooperation such as EEP well utilized?
34. Were further needs in solid waste treatment technologies in Vietnam, including Waste to Energy (W2E) technologies and the scalability of the approach used in the project identified?
35. Did the local ministries see the projects as important part of their development plans? Is there still recognition, remembrance of the projects?

Ex-Post Evaluation of Concessional Credit Scheme Projects: Binh Duong Solid Waste Treatment Plant Project – phase 1; Binh Duong Solid Waste Treatment Plant Project – phase 2

Interview questions for MFA

Introduction – background

1. What was your role in /how do you know the project?
2. How did the project implementation go in general?

Relevance

3. Did the project respond to the needs of solid waste management development in the Province?
4. To what extent did the project contribute to the sector and provincial plans and strategies?
5. Was the project relevant to the needs of the local population?
6. Did the design process for the project include these local actors?
7. Were the changes in the scope and content of the project, i.e. during the implementation of **Phase 2**, relevant to the needs and in line with priorities and strategies?
8. How well was the project and the achieved results in line with the Finland’s development policy objectives and global development goals?

Effectiveness

9. How much do you think the project contributed to the overall improvement of solid waste treatment in the province?
10. To what extent the project components were implemented as planned? Were there changes? Why?
11. To what extent the project outcomes and objectives were met and why?
12. To what level project contributed to meeting the environmental standards of the solid waste complex?
13. Did the project succeed in generating additional resources/revenue to BIWASE as expected?
14. What were the different actors related to the project implementation? What were their roles and contributions?
15. How do the gas-to-electricity components financed through the CCS perform as compared to similar components financed by the EEP Mekong grant?

Efficiency

16. To what extent was the project cost efficient and good value for money?
17. What were the steps and bottlenecks in the project planning, including i.e. feasibility studies? Did the project planning include assessment of environmental and social impacts?
18. How diligently was the FIDIC contract implemented?
19. How efficiently the gas-to-electricity components financed through the CCS were transformed into results as compared to similar components financed through the EEP Mekong grant?
20. How did the change in overseeing Ministry (landfills were previously under MOC, but were shifted under the responsibility of MONRE) affect the project?

Impact

What are the project impacts in different levels:

21. Solid waste complex staff: were there improvements to workers' health and safety, work stability, number of jobs created, other?
22. People in communities surrounding the solid waste complex: what are the changes in the quality of living environment? Is this reflected e.g. in the property values?
23. Population of Binh Duong: were there improvements in waste collection service, living environment, waste recycling related livelihood/business opportunities etc.?
24. Did the positive project impacts reach marginalized or vulnerable communities? I.e. is waste collection extended to all communities, including marginalized? Is waste collection service affordable to all?
25. What are the impacts on GHG emissions? What are the impacts on surface and ground water quality, other environmental impacts? Are there any negative environmental impacts?

Sustainability

26. Level of institutional ownership and structures for sustainably handling the project?
27. Do you know whether the additional revenue generated by the project used for operation and maintenance of the facilities and have there been re-investments in upgrading the complex?

Coordination, complementarity, coherence, aid effectiveness

28. To what extent was the project coordinated with and complementary to other programmes?
29. How were the local stakeholders included in the process and how the results were promoted and advocated to other levels of actors in Vietnam?

Other

30. Were further needs in solid waste treatment technologies in Vietnam, including Waste to Energy (W2E) technologies and the scalability of the approach used in the project identified?
31. Did the local ministries see the projects as important part of their development plans? Is there still recognition, remembrance of the projects?

Ex-Post Evaluation of Concessional Credit Scheme Projects: Binh Duong Solid Waste Treatment Plant Project – phase 1; Binh Duong Solid Waste Treatment Plant Project – phase 2

Interview questions for Vietnamese officials

Introduction – background

1. What was your role in /how do you know the project?
2. How did the project implementation go in general?

Relevance

3. Did the project respond to the needs of solid waste management development in the Province?
4. To what extent did the project contribute to the sector and provincial plans and strategies?
5. Was the project relevant to the needs of the local population?
6. Did the design process for the project include these local actors?

Effectiveness

7. How much do you think the project contributed to the overall improvement of solid waste treatment in the province?
8. To what extent the project components were implemented as planned? Were there changes? Why?
9. To what extent the project outcomes and objectives were met and why?
10. To what level project contributed to meeting the environmental standards of the solid waste complex?

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Local data collection

IN GENERAL WASTE MANAGEMENT STATUS 2004-2021

Waste Management development 2004-2021 in Vietnam and Binh Duong

- Laws (Environment / Waste), development of environmental laws? Have the laws changed?
- Waste Management development in Vietnam
 - o Description of SWM development / situation
 - o Waste generation 2004-2021
 - o Waste recovery 2004-2021
 - o Waste collection level 2004-2021
 - o Hazardous waste collection and treatments?
 - o Medical waste collection and treatments?
 - o Use of biowaste?

If there are some diagrams / statistics concerning those issues??

- Waste Management development in BD
 - o Description of SWM development / situation
 - o Waste generation 2004-2021
 - o Waste recovery 2004-2021
 - o Waste collection level 2004-2021
 - o Hazardous waste collection and treatments?
 - o Medical waste collection and treatments?
 - o Use of biowaste

If there are some diagrams / statistics concerning those issues??

- Impact of Binh Duong project in field of SWM sector
 - o Binh Duong is higher/lower level in field of SWM compared other areas in Vietnam??
 - o Impact of this project to the SWM sector in BD
 - o SWM coverage 2004 -2021 in BD/Vietnam
- Organization chart of SWM in BD
- SWM future in Vietnam/ BD

Project Process

- How was the project planning process conducted? How were the local authorities involved?
- Who were the key local level actors involved during the construction and what were their roles (such as authorities, BIWASE, contractors, others)?
- Were there any unforeseen issues or changes in the project during implementation?

- How have the project components functioned after completion? Any issues with O&M?
- Are the Finnish supported components bringing additional income to BIWASE and how is this utilized?
- Have there been any further upgrades or re-investments to the facilities after the Finnish project?

WASTE MANAGEMENT CENTER

The System of collecting and transporting waste

- Short description of waste collection in BD
 - o collection system
 - o Private company / public company / something else take care of collection
 - o amount of lorries
 - o amount of staff
 - o other details

Waste reception

How much waste is transported to the waste center per year?

All waste is weighed, checked, and recorded at the waste reception?

Statistics for the years 2004-2021?

Material recovery facility (MRF)

Brief description of the MRF and its operation.

How much waste does the facility sort per year?

Materials to be sorted?

- o Cardboard?
- o Paper?
- o Plastic?
- o Metal?
- o etc.

Has the facility had any technical problems?

If the plant does not work what will be done to the incoming waste during that time?

Does the waste go to temporary storage or is it taken directly to a landfill?

Are there buyers for sorted waste?

Has the operation been financially viable? Any idea to improve treatment or operational solutions?

Composting treatment

How much waste the facility treats per year?

Brief description of the composting treatment and its operation.

- Primary treatment
- Fermentation phase
- Maturation phase
- Refining and bagging phase

Any technical problems? Compost contains a lot of plastic based on the pictures. Has there been a problem with that?

Are there buyers for treated composting material?

Has the operation been financially viable?

Any idea to improve treatment or operational solutions?

Combined-heat-power (CHP)

Brief description of CHP

Energy production per year? Use of that?

If the plant does not work what will be done to the waste during that time?

Any technical problems?

Waste incineration line with capacity of 100tons/day

Brief description of waste incinerator?

What kind waste facility use? Solid waste, Medical waste, Hazardous waste?

How much waste the facility uses per year?

Ash production per year?

Landfill area

Brief description of the landfill area and its operation.

What kind waste goes to the landfill? Ash of incinerator, plastic, etc...

Landfill layout with some sections?

What kind is bottom construction of landfill cell?

What kind is leachate water collection system?

Description of operation:

- Landfilling methods,
- compaction of waste,
- daily covering,
- How many cells is already closed?
- What kind is final cover of closed cell?
- Total lifetime of landfill area?
- Any ideas to improve operation?

Work safety:

- Waste management center / landfilling area is fenced and closed?
- Only staff you can work in the landfill area?
- Staff is using safety equipment's? Helmet, mash, etc..
- Daily cover is done et the end of every working day
- Any dangerous situation with landfill gas or fire in landfill site?

Landfill gas collection and treatment

Brief description of the treatment?

- Gas collection description (manholes/collection pipes/ pumping station / treatment)
- Design capacity?
- Realized capacity?
- Need to improve gas production?
- Quality of gas?
- Any technical problems? If any, reasons for problems??
- Any idea to improve landfill gas collection or treatment solutions?

Leachate water treatment

Brief description of the leachate water treatment?

- Method of treatment / process diagram?
- Design Capacity (l/s)
- Realized capacity?
- Any technical problems? If any, reasons for problems??
- Any idea to improve leachate water collection or treatment solutions?

Measure for mitigating and controlling the negative impacts on environment and community health

- Air pollution control?
- Water sources pollution control?
- Soil pollution control?
- Risks reduction? Risk management plan is done?
- Solid waste flow control?
- Traffic (waste transporting- any problems?)
- Safety area around the SWM Center and distance between permanent housing?
- SWM center is closed and fenced area? Outsiders are not allowed to stay in the area
- Mitigation of community reaction / public relations?

Old dumpsites

Before SWM center in BD had a lot of dumpsites. Are those dumpsites still open without capping?
Any environmental control with old dumpsites?

ANNEX 6: FIELD REVIEW OF TECHNOLOGIES