ASE Technology Holding Co., Ltd.

Supplier Guidance Project for the Implementation of ISO 14064-1 Greenhouse Gas Inventory Social Return on Investment (SROI) Report

February 2020

pwc 資誠

SOCIAL VALUE
INTERNATIONAL

Statement of Report Assurance

Social Value International certifies that the report "Supplier Guidance for the Implementation of ISO 14064-1 Greenhouse Gas Inventory", published on 4 February 2020, satisfies the requirements of the assurance process.

The assurance process seeks to assess whether or not a report demonstrates a satisfactory understanding of, and is consistent with, the Principles of Social Value. Reports are independently reviewed by qualified assessors and must demonstrate compliance with the Social Value report assurance standard in order to be certified. The Social Value report assurance standard can be downloaded from the website socialvalueint.org.

Assurance here is against the Principles of Social Value only and does not include verification of stakeholder engagement, report data and calculations.

Awarded 4 February 2020

Ben Carpenter

Chief Executive Officer
Social Value International

Social Value UK carries out the assurance service on behalf of Social Value International. Social Value International is the global network focused on social impact and social value. We are the global network for those with a professional interest in social impact and social value. We work with our members to increase the accounting, measuring and managing of social value from the perspective of those affected by an organisation's activities, through the standardised application of the Principles of Social Value. We believe in a world where a broader definition of value will change decision making and ultimately decrease inequality and environmental degradation.

Disclaimer: Social Value International will not be responsible for any actions that an organisation takes based upon a report that has been submitted for assurance. An assured report does not grant Accredited Practitioner status to the author/authors of the report unless it is part of a full application for Accredited Practitioner status.

Acknowledgement

ASE Technology Holding Co., Ltd. would like to show appreciation to the team from PricewaterhouseCoopers, Taiwan, who as a consultant provided advice and assistance in the evaluation of the SROI result and the social value and the preparation of the SROI report of "Supplier Guidance Project for the Implementation of ISO 14064-1 Greenhouse Gas Inventory". We would also like to show our appreciation to all stakeholders for contributing their valuable time, experiences and views toward this SROI analysis and SROI report.

Table of Contents

List of Figures

List of Tables

Summary

Major manufacturers worldwide are beginning to take the green management of supply chains more seriously. ASE hopes to gradually promote carbon management measures to suppliers by assisting suppliers with the implementation of ISO 14064-1 Greenhouse Gas(GHG) management systems. This will allow suppliers to monitor their energy use and carbon emissions, and further lower their operating cost and improve their business reputation. In 2018, ASE and National Cheng Kung University(NCKU) Industrial Sustainable Development Center(ISDC) jointly carried out the guidance project for the implementation of ISO 14064-1 GHG Inventory by 10 suppliers, in hopes of further developing a green supply chain.

This study adopts the SROI methodology to review project data from May 3, 2018 to April 12, 2019 from the perspective of stakeholders. After engaging stakeholders, we found that the project's main impact is improving the business reputation of suppliers that received guidance, and strengthening the energy conservation and carbon reduction concepts of the organization and employees. This changes the company's procurement decisions

and individual purchase choices in daily life to further increase environmental benefits.

A comprehensive survey and analysis of this study shows that the Supplier Guidance Project for Implementation of ISO 14064-1 GHG Inventory has created the equivalent of NT$1.79 in social value for every NT$1 invested. The sensitivity analysis placed the result between NT$0.97 and NT$1.96. We also discussed the result and the stakeholder feedback received during the process of the study with management of ASE, in order to look for ways to improve and optimize the project. This was intended to allow adjustments and corrections whenever needed during the implementation process, and to maximize the project's impact, social value, and benefits.

Chapter 1 SROI Project Background

1.1 Project Origin

Major manufacturers worldwide are beginning to take the green management of supply chains more seriously. Enterprises must manage and supervise their own GHG emissions, and even list it as a major topic in their operations. As a link in the global supply chain, ASE must provide information on its GHG emissions to meet customer requirements. If we are able to properly monitor the GHG emissions of our supply chain, we may even be able to further lead the packaging and testing industry by promoting joint GHG disclosures by the supply chain. We are actively assisting our suppliers in gaining the ability to compile GHG inventories. Besides determining the carbon risk of our supply chain and showing our commitment to fulfilling our corporate social responsibility (CSR), this also shows our goal to mutually benefit and prosper with our suppliers.

This guidance project adopts the ISO 14064-1 standard for implementing GHG inventory. ISO 14064 is a three-part international standard. This standard specifies GHG data

management, report, and verification models. Companies can use this standardized method to calculate and verify emission data, ensuring that the method for measuring 1 metric ton CO2e is the same anywhere in the world. Furthermore, this standard has served as an important basis for carbon management since Taiwan's government enacted the Greenhouse Gas Reduction and Management Act (hereinafter referred to as the "Act") in 2015.

In the light of this, the project assists suppliers in implementing ISO 14064-1 to accurately determine their GHG emissions, so that they are prepared when the Act becomes stricter in the future, buying time for them to respond. By determining GHG emission hot spots, we can formulate improvement plans and plan control goals as preliminary preparations for domestic and foreign carbon trading systems, which will also improve our corporate image and allow us to fulfill our CSR.

National Cheng Kung University (NCKU) Industrial Sustainable Development Center (ISDC) was commissioned to provide guidance in the project. The center provides a variety of ISO guidance services in response to the rapid changes in the business environment and international trends, so as to help enterprises respond to changes in the macro environment. The center is also a

technical service provider recognized by the Industrial Development Bureau (IDB), Ministry of Economic Affairs (MOEA) for its service capabilities, and successfully implemented the project with its experience and capabilities.

The project's social impact is assessed through a Social Return on Investment Report, which provides the basis for ASE's subsequent planning and management of the activity series and other charity programs, such as grasping the supplier's CSR data (e.g. carbon emissions) to reduce supply chain risk management. ASE group hopes to make a positive impact on the global electronic industry supply chain and establish sustainable supply chains with its suppliers.

1.2 Analysis methodology

This report adopts the analysis framework set forth in A Guide to Social Return on Investment (2012 revised version; hereinafter referred to as the "SROI Guide") published by the U.K. in 2009. The methodology consists of six stages to illustrate and measure the changes brought by inputs, outputs, and outcomes of charitable activities. As the social and economic benefits resulted from the project are expressed in a monetary term, the impact of the project

is better presented. With more transparent and communicable information, we could hopefully make the most out of our project in the future.

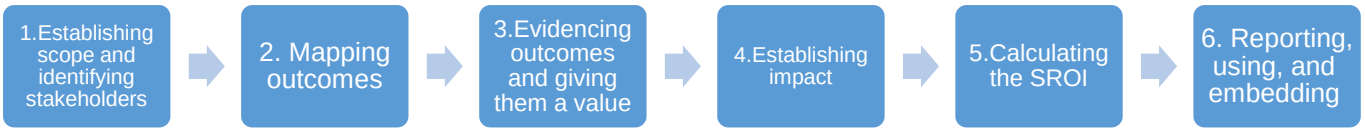

Figure 1 SROI analysis process

In addition, to prevent SROI from being misunderstood as merely a game of numbers, the seven principles of the SROI guide must be rigorously adhered to during the measurement process:

1. Involve stakeholders
2. Understand what changes
3. Value the things that matter
4. Only include what is material
5. Do not over-claim
6. Be transparent
7. Verify the result

This report uses actual data from the project period, and the changes and impact on stakeholders are calculated based on the changes during this period. Therefore, this report is classified1 as

[1] A Guide to Social Return on Investment., Cabinet Office, U.K., 2009,P8。

an evaluative SROI report according to A Guide to Social Return on Investment.

1.3 Scope of Report

This report focuses on the Supplier Guidance Project for the Implementation of ISO 14064-1 GHG Inventory jointly implemented by ASE and NCKU ISDC in 2018. ASE designated 10 suppliers to receive guidance in the project. Subjects that were analyzed include ASE, suppliers that received guidance and their participants, and NCKU ISDC. The project was implemented from May 3, 2018 to April 12, 2019, which is the scope of analysis in this report.

1.4 Risk analysis

Under the SROI framework, abstract, narrative or non-quantitative indicators are priced. Some of the variables and investigations are based on literature, assumptions, or the subjective judgment of stakeholders. Therefore, we analyzed risks that are more likely in this project based on the seven principles of SROI, and describe how we lower these risks to a tolerable degree through our professional judgment and corresponding methods.

SROI Principles	Limitations of the Study	Possible Effects on Outcomes	Response Method
1. Involve stakeholders	The population of actual participants in the guidance project cannot be fully determined.	SROI ratio is overestimated or underestimated	Due to the relatively small scale of the project, we looked into as many stakeholders as possible through a questionnaire

SROI Principles	Limitations of the Study	Possible Effects on Outcomes	Response Method
			survey and interviews, until interviews with supply chain related personnel reached data saturation.
2. Understand what changes	Questionnaire survey results showed no impact or change for a small number of stakeholders.	SROI ratio is underestimated	We conducted interviews with the stakeholders to verify their perception of participating in guidance and their situation before and after the project.
3. Value the things that matter	The reduction in electricity expenses is estimated based on the approximate number of kWh reduced in a single month, and the actual expense may be affected by production, air conditioning due to the weather, and energy conservation behavior.	SROI ratio is overestimated or underestimated	Due to the difference in scale of suppliers, questionnaire items are measured on a nine-point scale, and significantly different amounts are verified with stakeholders to reduce the margin of error.
4. Only include what is material	The extent of impact on stakeholders varies, and they are unable to accurately determined the materiality.	SROI ratio is overestimated or underestimated	A consensus is built with stakeholders through the questionnaire's pre-test and post-test and four phases of engagement. It does not entirely rely on a single result.
5. Do not over-claim	A small number of stakeholders believes that the impact can last for a	SROI ratio is overestimated	The duration of outcomes is included in the sensitivity analysis

SROI Principles	Limitations of the Study	Possible Effects on Outcomes	Response Method
	long period of time.		
6. Be transparent	Information on the impact map could not be fully disclosed in the same page.	Readers misunderstood the report	The calculation and deductive reasoning process are summarized and described. All information is disclosed in the report's appendix.
7. Verify the result	Due to time constraints, not all of the stakeholders in the study are invited to participate in the verification of results.	SROI ratio is overestimated or underestimated	Different scales of stakeholder representatives are sampled for engagement, and literature is used to verify that the parameters in calculations are not too biased.

Based on the above, the social return on investment figures of this project should not be compared with that of a different project. We responsibly disclosed this SROI Report, which expounds the deductive reasoning process and lists the assumptions and sensitivity analysis, in hopes of providing users with complete information for understanding the Supplier Guidance Project for Implementation of ISO 14064-1 GHG Management System and its social value.

Chapter 2 Involve stakeholders

2.1 Project Engagement Process

Stakeholder participation is a necessary procedure to understanding what they truly think and their outcomes according to the SROI Guide. The source of social impact is the theory of change between stakeholder inputs, outputs, and outcomes.

We divided stakeholders into groups based on the framework of the guidance project, specifically ASE, 10 suppliers that received guidance, participants in units receiving guidance, and NCKU ISDC. To gain complete responses from stakeholders, we divided the project into four different engagement phases. The meeting Date, stakeholders, method and content of each stage are summarized in Table 1 below.

Table 1 engagement process schedule

Phase	Date	Stakeholders	Engagement methods	Contents
Phase 1	2018/7/30	Project manager of ASE (1 participant)	Interview	●Understood and determined the scope, timing, and suppliers of Supplier Guidance Project for Implementation of ISO 14064-1 ●Determined the participant of ASE

Phase	Date	Stakeholders	Engagement methods	Contents
				●Determined invested funds of project
	2018/8/5	1 Supplier (2 participants)	Interview	●Understood background and basic information： ■ Reason for participation ■ Resources input (money, participants and materials) ■ Implement other environmental management systems ■ State of the company before the implementation of ISO 14064-1 ■ Basic information of participants ■ Impact of other stakeholders (friends, family, colleagues) ●More information please see "*Appendix 2".*
	2018/9/28 ~ 2018/9/10	10 Suppliers (10 participants)	Questionnaire	● Based on the interview results, we established a questionnaire for all 10 suppliers to understand the basic information of all suppliers. ● The questionnaire please see "*Appendix 3*".
Phase 2	2019/4/1 ~ 2019/4/30	5 Suppliers (7 participants)	Interview	● Understood the items that suppliers had changed due to the implementation of ISO 14064-1. ■ Actual participants and inputs

Phase	Date	Stakeholders	Engagement methods	Contents
				■ Changes in company operations ■ Changes in the work environment of employees ■ Personal change (positive and negative) ■ Did it affect other stakeholders (e.g. family, friends, etc.) ● More information please see “Appendix 2 Engagement Outline”. ● Based on the aforementioned interview results, we established a questionnaire for Phase 3.
	2019/5/9	NCKU ISDC	Telephone interview	● Find out if there are changes cause project implementation.
	2019/5/15	Project manager of ASE	Interview	● Confirmed Actual participants and inputs ● Confirmed Chain of Events, Indicators and results of questionnaire ● Confirmed whether the participants have other negative changes (e.g. overtime work)
Phase 3	2019/5/1 ~ 2019/6/15	10 Suppliers (31 participants)	Questionnaire	● Distributed questionnaire that established based on phase 2. Please see “*Appendix 4 Stakeholder Engagement Questionnaire*”.
Phase 4	2019/7/3	2 Suppliers (2 participants)	Telephone interview	●Based on the results of the questionnaire survey, sampled two Suppliers to confirm the

Phase	Date	Stakeholders	Engagement methods	Contents
				correctness and consistent of the questionnaire feedback. Please see Appendix 5
	2019/8/13	Project manager of ASE	Interview	● Confirmed financial proxy and adjusting factors. ● Confirmed if there are missing items (e.g. stakeholders, other positive and negative changes, etc.)

We determined the data resolution based on management decision-making requirements with consideration to the time for implementing SROI analysis and limited resources. Since suppliers are the most direct stakeholders in this project, we gained a complete understanding of the participation of 10 suppliers in phase one. In phase two, we discussed with ASE and selected five suppliers of different types and scale for further interview. Changes in project participants are based on professional judgment. We continued to collect information until reaching data saturation. In phase three we distributed questionnaires based on the population of different stakeholders; questionnaires that were distributed to suppliers with the margin of error is plus or minus 5% in a confidence interval is 99%; random sampling was used for project participants, and the number of samples was selected with a 90% confidence level and 10% margin of error. In phase four we verified the results

summarized from the first three phases of engagement with stakeholder representatives, so as to improve the accuracy and lower the sampling error of our study. The number of stakeholders engaged in each phase are as follows:

Table 2 Number of stakeholders engaged

Stakeholder			Phase 1 Initial communication and understanding	Phase 2 Conduct interviews	Phase 3 Distribution of questionnaire	Phase 4 Verification of results
Type		Population				
ASE		1	1	1	0	1
Suppliers	Number of Suppliers	10	10	5	10	2
	Project participants	About 50	12	7	31	2
NCKU ISDC		1	0	1	0	0
Total number of people			13	8	31	2

2.2 Phase 1 Initial communication and understanding

During the initial phase of the project, we invited members responsible for the guidance project to understand the contents of activities, participants and stakeholders that were impacted. We achieved the following purposes and gained the following feedback in the process:

1. Understood the scope and implementation process of the project, and found potential stakeholders on this basis, namely: ASE,

suppliers that received guidance, participants in units receiving guidance, and NCKU ISDC.

2. Learned about the resources input into the project, specifically: the budget input by ASE, time inputs of participants in units receiving guidance.
3. From the perspective of suppliers and based on the guidance team's experience, we determined the changes brought by the project and its impact on ASE and the ultimate beneficiary.
4. We determined the project's deadweight, attribution, drop-off, and displacement from discussions with stakeholders.

Furthermore, we investigated the basic information of the 10 suppliers that received guidance, mainly through a questionnaire, and required that all suppliers provide the following information. The detailed questionnaire content was shown in Appendix 3.

1. Company scale
2. The implementation of other management systems
3. Background of participation in the guidance project
4. The company's implementation of energy conservation and carbon reduction and carbon management before implementing ISO 14064-1
5. Carbon management related projects
6. Regulatory compliance
7. Individual carbon reduction behavior of employees

In the light of this, we obtained the basic information of suppliers, looked into their carbon management strategies and plans, and

used these as parameters for different levels of analysis in subsequent phases.

2.3 Phase 2 Conduct interviews

To determine the changes in suppliers that occurred after implementing ISO 14064-1, our external consultant randomly selected a certain number of stakeholders to interview based on what we learned in phase one. Either ASE or an external consultant directly contacted the stakeholder and agreed on the time and place for an interview, so as to determine the role of each stakeholder group and the changes and impact brought by the project.

After face-to-face and telephone interviews, we understand the roles of various stakeholders in this project, and based on the information obtained from the interviews, we further confirm with the stakeholders whether their participation in the project involves other people or group, and changes and impacts on them and companies. We summarized the reason for including or excluding each type of stakeholder in the analysis, which is based on feedback from the contact person of each supplier, in the table below:

Table 3 Identifying Stakeholders

Potential Stakeholder	No. of persons interviewed	Analysis of inclusion/exclusion	Reason for inclusion/exclusion in project analysis
ASE	1	Yes	ASE is the main planner of the guidance project, invested funds to strengthen its supply chain environmental management, and may enjoy environmental benefits,

Potential Stakeholder		No. of persons interviewed	Analysis of inclusion/exclusion	Reason for inclusion/exclusion in project analysis
				better name recognition, and better brand image. However, since the purpose of the project is to sequentially implement green supply chain management, the company's name recognition and brand image are not key performance indicators, so only funding input was included in the project analysis.
Suppliers	Number of Suppliers	5	Yes	In the process of interviewing project participants, we found that suppliers are target group and direct beneficiaries of the project as they gained knowledge on carbon management in the process of implementing the carbon inventory system, and gained a better business reputation through the certification.
	Project participants	7	Yes	
	All employees	NA	No	Each supplier participant in the ISO 14064-1 project with limited staff. The main participants are the core managers of the financial department, environmental health and safety department or human-resources department of each company. After ISO system training, the participants may influence department colleagues in energy-saving concepts and action. However, the feedback from the project participants mentioned above, the actual impact on other colleagues was

Potential Stakeholder	No. of persons interviewed	Analysis of inclusion/exclusion	Reason for inclusion/exclusion in project analysis
			very indirect and not obvious, so it was excluded.
NCKU ISDC	1	Yes	The main executive unit of this guidance project. Based on the interviews, the NCKU ISDC learned from working with ASE that guidance for the management system not only involves implementation, but also assisting with the management of the entire supply chain. The change was significant and therefore included in analysis.
ISO 14064-1 External verification unit	NA	No	The external verification unit is part of a necessary audit procedure for obtaining the ISO 14064-1 certification. There was no significant difference in its role in the activity and its original work, and there were no identifiable changes. Hence, the external verification unit was excluded.

2.4 Stage 3 Distribution of questionnaire

After phase one and phase two engagement, we designed the information obtained through interviews, outcomes in the chain of events, deadweight, attribution, displacement, and drop-off into the questionnaire for suppliers that received guidance. As shown in

Appendix 4. This study used an online questionnaire and asked the person responsible for the guidance project at 10 suppliers to notify project participants. Each supplier was required to return at least one questionnaire. We hope to achieve the following purposes through the questionnaire survey:

(1) To verify the outcomes described. (Please refer to "3.3 Outcomes" for details)

(2) The impact of each outcome on different stakeholders is separately measured, and the extent of impact is used as the basis for calculating the value of outcomes. Not all outcomes appear the same among all stakeholders.

(3) This serves as the basis for adjusting deadweight, attribution, displacement, and drop-off.

(4) To confirm that the evaluation indicators designed into the questionnaires are adequately representative to measure the outcomes.

2.5 Phase 4 Verification of results

In this phase we find suitable financial proxies base on the outcomes and indicators determined in the three stages mentioned above, and discuss the outcomes with stakeholders to verify that there are no deviations or material differences in the outcomes, indicators, and financial proxies that we identified. Finally we discuss the conclusions of the report with our stakeholders and reference their opinions during the subsequent sensitivity analysis.

Please refer to Appendix 5 for more detailed interview outline.

It is worth noting that stakeholders felt the project's contribution to environmental benefits resulting from energy conservation and carbon reduction by suppliers, which helps reduce GHG emission and air pollution, cannot be overlooked. Therefore, after engagement, we included this in the assessment based on the principles of stakeholder participation and materiality, and added government agencies as a stakeholder for this outcome. Please see the analysis in 3.3.1 for details.

Chapter 3 Inputs, outputs, and outcomes

3.1 Inputs

ASE's inputs in the Supplier Guidance Project for Implementing ISO 14064-1 GHG Inventory can be divided into several aspects:

1. ASE's funding input for NCKU ISDC to handle project planning and implementation, including education and training for suppliers, providing guidance to suppliers for the establishment of an inventory data system, and external verification expenses.
2. Time inputs of participants in units receiving guidance: Through the interview phase we found that the contact person of suppliers that received guidance may need to input additional work hours to implement the ISO 14064-1 management system, leading to additional overtime expenses. Therefore, we gathered information on the overtime of the responsible person of each supplier, and used the minimum wage to calculate their input.

   In addition, we also discussed with the supplier whether they have any other procurement expenses or human resources after participating in the ISO 14064-1 project. In this regard, the supplier responded that the biggest impact on the company was the change of thinking, which was mainly to establish an internal

management system, instead of additional equipment or human resource. For example, purchasing at a low price may be the company's main purchasing behavior. After training, environmental factors may be included in procurement considerations, and the companies can get more environmental benefits in the future, not just considering recovery rates.

Based on the analysis above, we summarized total inputs of the ISO 14064-1 guidance project in 2018 in the table below:

Table 4 Total amount of project inputs

Item	Amount (NTD)
Budget input by ASE	2,500,000
Time of participants in units receiving guidance	158,400
Total amount of inputs	$2,658,400

3.2 Outputs

The project adopts a consistent guidance process, and the 10 suppliers that received guidance all generated the following outputs:

1. Kick-off meeting and education and training: Assembled a GHG inventory team and provided team members with education and training relating to the specifications of articles of ISO 14064-1.
2. On-site guidance: Verify the boundaries of operations and identify emission sources.
3. Document preparation: Procedures for compiling the GHG inventory, list of GHG emissions, and GHG inventory report.
4. Internal verification: Education and training for internal audits and

verification of emissions data.

5. External verification: Obtain an ISO 14064-1 statement certified by a third party.

3.3 Outcome

3.3.1 Chain of Events and Indicators

Through the engagement process described above, we have gained an understanding of the context of changes to stakeholders. We employed the chain of events approach to explain the causal relationship between the outputs and outcomes, and further defined the final outcome. After making an initial judgment that the stakeholder may have the outcome, we verified the importance and extent of outcomes through interviews and questionnaires based on the SROI principles of materiality and Do Not Over-claim. We then determined if the outcome should be included or excluded from calculation based on the indicator and related evidence that the outcome occurred. Among stakeholders of the project, changes in suppliers that received guidance and participants of the guidance project are calculated based on average occurrence of the change, while the entire organization is used for assessments of suppliers, and an outcome is only considered to have occurred when the change is 100%.

In the SROI report, indicators are used to measure whether if an outcome occurred. To provide evidence that an outcome did indeed occur, we summarized individual changes in interviewees through

phases one and two engagement, and confirmed the appropriateness of these indicators with stakeholders. The questionnaire distributed in phase three, we used the facts that a certain outcome occurred as options for stakeholders to choose from, using it as an indicator for measuring the outcome. In the phase four engagement process, the indicator is fully discussed to avoid any bias in the outcome. We considered the feedback of stakeholders and the purpose of project management, due to the diversification of outcome indicators and covering the specific facts that will occur in the real situation, it is sufficient to capture the changes of each company or individual. Therefore, any option that stakeholders choose is used as the basis that the outcome occurred,

1. Suppliers that received guidance

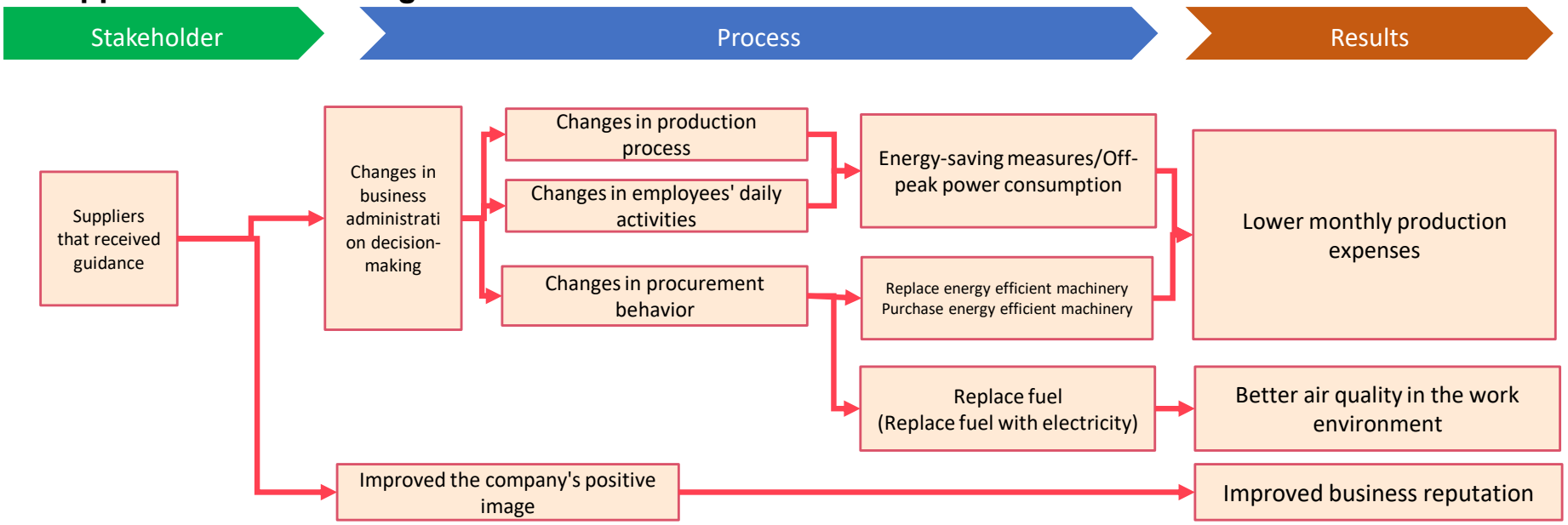

Figure 2 Chain of events of suppliers that received guidance

Table 5 Analysis of indicators for suppliers that received guidance

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
Lower monthly production expenses	Whether the reply in the questionnaire indicated the occurrence of said outcome: Subjective: Environmental factors are now considered during procurement after gaining a better understanding of energy conservation and carbon reduction, changing the company's procurement policy, attitude, behavior, or standard operating procedures. Objective: -Will give priority to domestic and foreign products with the	1. Based on the interviews in phases two and four, suppliers stated that they gained a better understanding of GHG emission hot spots after participating in the project. Due to industry characteristics, GHG emissions of most suppliers are mainly from purchased electricity. Therefore, energy management and GHG management are inseparable. 2. When a company has expansion and procurement needs, cost benefit analysis will show that the payback period of equipment with higher energy efficiency is	This result was related to the establishment of a management system. It had a long-term impact on the company's future purchase considerations and expenses. According to the SROI principle of materiality, the outcome was determined to be material and thus included.

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
	Green Mark -Takes product life cycle into consideration -Will select more energy efficient equipment. Even though the equipment is more expensive -Will ask suppliers to provide or independently look into the energy consumption information of products -Begin to promote energy conservation topics during the Company's internal meetings -Begin to include environmental conditions into supplier screening principles	longer, but when long-term benefits and environmental benefits are taken into consideration, companies will be inclined to purchase equipment with higher energy efficiency (such as water chillers, air conditioners, and energy-saving lights). 3. In terms of the current system, changes that are the easiest to make are smaller and cheaper equipment, such as replacing lights and office energy-saving measures (e.g. turning lights off at fixed times, air conditioning temperature).	
Better air quality in the work	Whether the reply in the questionnaire indicated the occurrence of said outcome:	Based on the interviews in phases two and four, some suppliers implemented energy-saving	This outcome was based on the improvement of large and major power

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
environment	-Replaced equipment, such as replacing forklifts that run on conventional fuel with electric forklifts, and using low pollution fuels in boilers, to reduce odor	measures and replaced equipment that runs on fuel with electrical equipment. Results show better air quality in the work environment and reduced volatile organic compounds and gas emissions.	equipment in the factory, which directly and long-term affects employees. According to the SROI principle of materiality, the outcome was determined to be material and thus included.
Improved business reputation	Whether the reply in the questionnaire indicated the occurrence of said outcome: -Improved the positive image of your company, such as providing the ISO 14064-1 certificate on your website, and complying with customers' audit requirements	Based on the discussion of questionnaire survey results in phase four, suppliers stated that participating in the project benefited quality, environmental, and safety and health systems, which affected their business reputation and led to changes in the amount of purchase orders.	This impact can be directly observed in the supplier's business volume. According to the SROI principle of materiality, the outcome was determined to be material and thus included.

This study not only send questionnaires to all suppliers but also ensured that each supplier responded, so there was no concern about sample representation. After participating in this project, only one of the ten suppliers showed no change at all. We reconfirmed through the fourth stage interview that we knew that this supplier was the first to contact the carbon management issue. Because the supplier did not use too much energy-intensive equipment, so the introduction of the ISO system was more passive and had already replaced more energy-efficient lamps before participating the project. However, investment to replace other large equipment (e.g. air-conditioning) was not easy, so no plans for the present. The supplier only executes if the customer has additional needs (e.g. product carbon footprint label and GHG inventory) Therefore, the ISO 14064-1 project does not bring publicity benefits to this company.

2. Participants in units receiving guidance

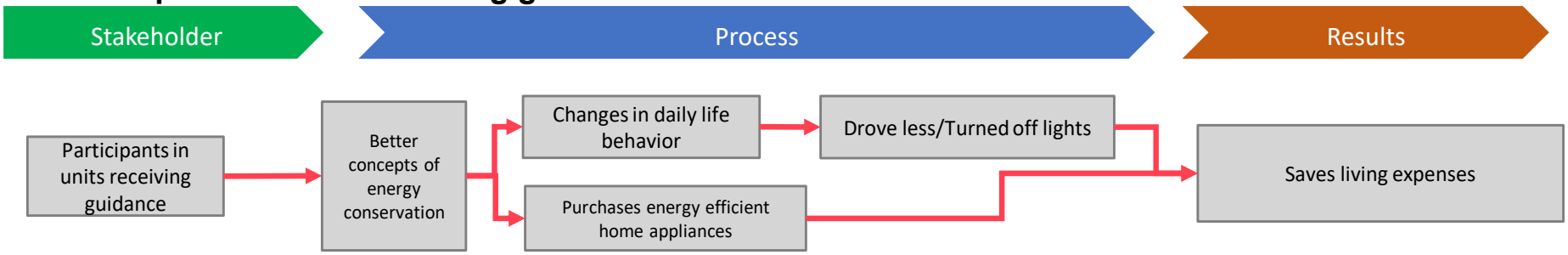

Figure 3 Chain of events of participants in units receiving guidance

Table 6 Indicator analysis for participants in units receiving guidance

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
Saves living expenses	Whether the reply in the questionnaire indicated the occurrence of said outcome: Subjective: Whether if there is higher environmental protection awareness and willingness to implement carbon reduction measures Objective:	Based on the interviews in phases two and four, participants stated that they gained knowledge on carbon reduction from participating in the project, and will prioritize energy efficient home appliances. They would also think about carbon footprint when purchasing products, and are inclined to purchase certified	Rising awareness of environmental protection will affect individual purchase choices in daily life. According to the SROI principle of materiality, the outcome was determined to be material and thus included.

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
	-Will choose more efficient models when purchasing home appliances -Stopped driving to work one day each week -Reduced the amount of domestic waste generated each day -Raised the air conditioner temperature by 1 degree -Reduced daily water consumption -Reduced the amount of time the computer and monitor is turned on -Reduced the amount of time watching TV by 1 hour	products.	

During the first and second interviews, all stakeholders thought that this project would not have a negative impact on suppliers and participants. We further found relevant public information from the spectator point of view and used professional judgement. We supposed that the employees assigned to participate may cause pressure due to the promotion and implementation of the carbon inventory project, and the need to be responsible for task that are not within their original duties. Therefore, in phase three, we designed the question and provided an open

option to investigate whether the workload of the participants had changed. The statistical results showed that only 22% of the responses will increase the working hours by about one day every month. Through the verification at the fourth stage of engagement, stakeholders said that because the company required relevant departments to submit carbon management data every month, it will need to invest extra time to assist units as much as possible to understand how to collect information. But it doesn't become a workload because the work was not complicated and related to duties. After multiple confirmations in different stages of this research, it is considered that this outcome was not significant, but more material to company's management system based on the feedback from stakeholders. Therefore, we only included the average increase of employees' working hours per month in the assessment.

3.NCKU ISDC

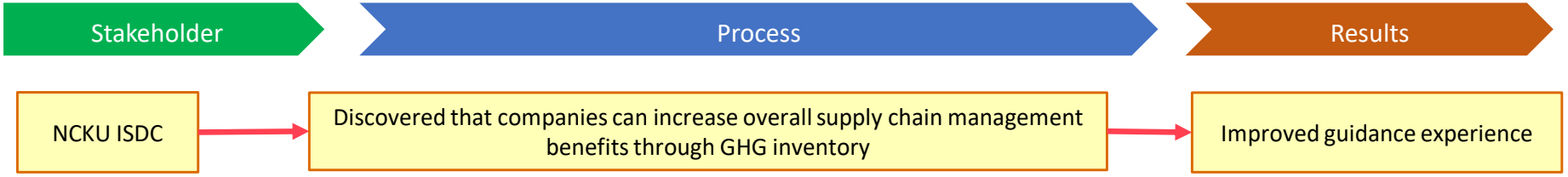

Figure 4 Chain of events of the NCKU ISDC

Table 7 Indicator analysis for the NCKU ISDC

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
Improved guidance experience	Conducted an interview to verify whether if the outcome occurred: -Did the project produce more abundant contents that benefit business	Based on the interviews in phase two, the guidance team stated that even though their GHG inventory technique did not improve after participating in the project, learning together with other major companies was a unique experience, and the greatest change was their way of thinking and logic. Very few enterprises are willing to share resources for supply chain management, so it is a market that cannot be imitated.	This experience is unique to the stakeholder. According to the SROI principle of materiality, the outcome was determined to be material and thus included.

4. Government agencies

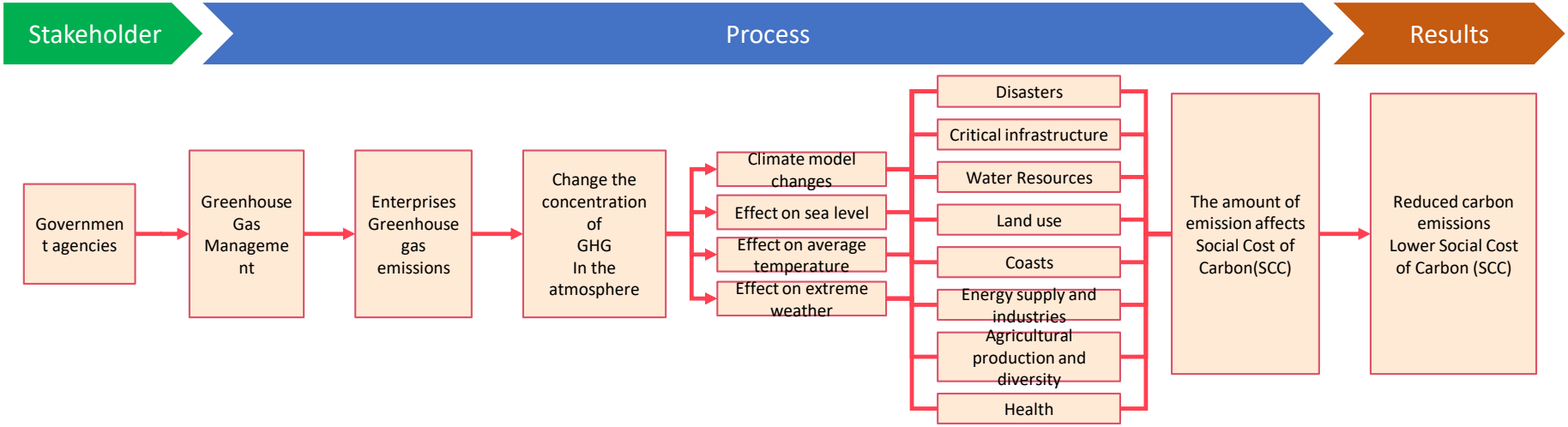

Figure 5 Chain of events of government agencies

Table 8 Indicator analysis for government agencies

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
Lower Social Cost of Carbon (SCC)	The National Adaptation Action Plan to Climate Change announced by the National Development Council clearly specifies climate change factors caused by GHG, and summarizes potential impacts of relevant locations. The overall adaptation plan needs to establish a system for economic and financial planning in response to climate change, and implement cost benefit analysis that takes climate risks into consideration.	According to the National Adaptation Action Plan to Climate Change, government agencies need to further complete adaptation planning based on the organizers and co-organizers listed in the Action Plan, and sequentially complete the plans. In order to lay a solid foundation for climate change adaptation, Taiwan's government asked the Ministry of Finance, Executive Yuan Directorate-General of Budget, Accounting and Statistics, Ministry of Economic Affairs, and National Development Council to look into sustainable financial plans and mechanisms in response to climate change. Furthermore, the government agencies were asked to implement an	Companies voluntarily implementing carbon reduction measures will lower the government's carbon management cost, and can also lower cost effectiveness of climate risk. According to the SROI principle of materiality, the outcome was determined to be material and thus included.

Defined outcome	Indicators	Stakeholder feedback	Inclusion in analysis
	Suppliers replied in the questionnaire whether if their procurement behavior changed -Subjective perception of whether there were changes -Objective observation of changes in specific behavior	economic incentives system and carry out cost benefit analysis that takes climate risks into consideration. However, Taiwan's Social Cost of Carbon (SCC) has not yet been disclosed. Therefore, we referenced the Technical Support Document for the Social Cost of Carbon(SCC) announced by the US Environmental Protection Agency, which clearly describes the relationship between GHG emissions and SCC, as well as the losses sustained from its social impact.	

3.3.2 Duration of outcomes

The duration of each outcome is different. To comply with the principle of Do Not Over-claim and to be consistent with the time frame of the report's analysis as well as the verifiability of the calculated data, we can obtain the duration of each outcome from the results of stakeholder discussions and questionnaires, which we will elaborate below:

1. For suppliers that received guidance: Statistics of the questionnaire in phase three show that suppliers subjectively predicted the outcomes from participating in the guidance project will last an average of 3 years. Based on feedback from stakeholder engagement in phases two and four and professional judgment, in order to maintain outcomes, information must be periodically updated after participating in the one-year guidance project, such as receiving information on global trends in energy conservation and carbon reduction, as well as international laws and regulations. Therefore, with consideration to the different scale of suppliers, the project calculates the duration of outcomes based on feedback from stakeholders in the questionnaire, and includes the duration of outcomes in the sensitivity analysis based on the principle of Do Not Over-claim.
2. For individual participants: From the perspective of participants in units receiving guidance, they learned about the environmental pollution caused by GHG through the project, and

the greatest change was higher awareness of environmental protection, which led them to engage in eco-friendly behavior in daily life. This voluntary change has a longer lasting effect. Based on results of the questionnaire survey, some participants indicated that the outcomes lasted 4-5 years. To not over-claim and eliminate extreme values, we used the average of 3 years among participants for calculation.

3.3.3 Financial proxy

Financial proxies serve to convert the changes experienced by various stakeholders into a suitable monetary value. We use different steps to verify if the value of outcomes is reasonable and representative.

First, we used the descriptions and experience of stakeholders in the phase two interviews to discuss and find a suitable valuation method with stakeholders. Next, in the phase three engagement process, we used the cost method for computing value and displacement method, and listed 5-10 options with varying frequencies or degrees of each outcome, using an open questionnaire for stakeholders to choose and answer the value that most reasonably represents the outcome. In phase four, we used the average value of answers in the questionnaire for calculation. And the value in currency for each outcome were uniformly converted to be expressed in "annual" units. Finally, we asked stakeholders to verify the outcome, valuation method, and price selected. To ensure that final pricing was appropriate for each

outcome.

1. Suppliers that received guidance

Outcome	Financial proxy	Pricing method	Calculating SROI (NTD)	Description of data
Lower monthly production expenses	Electricity expense saved by the company each month	Cost method for computing value	Calculating the average value of outcomes based on the survey of each company	Stakeholders' questionnaire responses
Better air quality in the work environment	Type and budget of air purifier	Displacement method	Calculating the average value of outcomes based on the survey of each company	Stakeholders' questionnaire response
Improved business reputation	Budget for advertising to gain the same level of improvement in the company's positive image	Displacement method	Calculating the average value of outcomes based on the survey of each company	Stakeholders' questionnaire response

2.Participants in units receiving guidance

Outcome	Financial proxy	Description	Calculating SROI (NTD)	Source
Saves living expenses	Reduced monthly living expenses	Cost method for computing value	On average 615/person	Stakeholders' questionnaire response

3.NCKU ISDC

Outcome	Financial proxy	Description	Calculating SROI (NTD)	Source
Improved guidance experience	Third party environmental engineering courses	Displacement method	2,000/ person	Feedback from stakeholder interviews

4.Government agencies

Outcome	Financial proxy	Description	Calculating SROI (NTD)	Source
Lower Social Cost of Carbon (SCC)	Social Cost of Carbon	After inflation conversion, regional PPP[2] conversion, and exchange rate conversion	Calculating the average value of outcomes based on the survey of each company	The reduction in carbon emission is calculated based on the reduction in electricity expenses, and the social cost of carbon is used for valuation

[2] Purchasing power parity

Chapter 4 Building the SROI model

4.1 Adjusting factors

Based on the SROI Guide, before converting the value of an outcome into impact, factors that may affect project outcomes must be identified and excluded. Hence, we followed the principle of Do Not Over-claim and considered the four adjusting factors in each phase of the engagement process. We mainly had stakeholders assess individual outcomes in the questionnaire, and then further asked stakeholders to verify outcomes with significant differences. Each factor is further described below:

1. Deadweight: This refers to an outcome occurring regardless of the existence of a project. The deadweight of most outcomes in this study was 50-60%, and was verified through the questionnaire and interview. We found that this was because 80% of suppliers had already included climate change issues into their business policy before the guidance project. Hence, even if they did not participate in the guidance project, the management systems already implemented by these suppliers can also achieve similar effects.
2. Attribution: Refers to methods or channels other that the project that stakeholders can gain the same outcomes from. In other words, the contribution of other factors to this outcome must also be considered. We designed a question group in the questionnaire that asked stakeholders if they had the opportunity

to participate in other similar education and training, seminars, and conferences on related topics, and used it as the basis for calculating attribution.

3. Displacement: Represents the effects of the project on other stakeholders inside and outside of the project. In other words, even though the project achieved the outcome in the target group, it may displace the problem to other places. A study[3] on the effect of climate change on human society and economy pointed out that Earth becoming warmer will cool down economic growth, and will also increase the wealth gap. Statistics show[4] that if average temperature rises by one standard deviation, it will increase the probability of group conflict, such as riot and civil war, by 14%. The main outcomes of the project are reducing energy consumption expenses of suppliers and participants, improving the living environment through carbon reduction strategies, and improved the company's positive image. There is no significant displacement in social, environmental, and economic aspects, so it is not considered in the calculation of outcomes.
4. Drop-off: This refers to the effect of an outcome deteriorating over time. It is observed that the effectiveness of an outcome tends to decrease slowly over a period of time. Therefore when evaluating the benefits of a future outcome, the drop-off must also be

[3] Burke, M., Hsiang, S. M., & Miguel, E. (2015). Global non-linear effect of temperature on economic production. *Nature*, *527*(7577), 235.

[4] Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. Science, 341(6151), 1235367.

estimated. In the project, suppliers passively cooperated instead of actively compiling GHG inventories. Based on the principle of Do Not Over-claim, we discussed using an average drop-off each year with stakeholders.

In summary, stakeholders are already using different methods to control and manage their GHG emissions to different extents in response to global climate change. Therefore, the main cause of the outcome may not be the guidance project. After each phase of engagement above, the ratio of adjusting factors was assessed to be as follows:

Table 9 Ratio of adjusting factors

Stakeholder		Outcome	Deadweight	Attribution	Drop-off
Suppliers that received guidance	Advantek Inc.	Lower monthly production expenses	75%	25%	25%
		Improved business reputation	50%	50%	33%
		Better air quality in the work environment	75%	25%	25%
	Fusheng Electronics Corporation	Lower monthly production expenses	75%	25%	33%
	Phoenix Pioneer Technology Co., Ltd.	Lower monthly production expenses	50%	50%	33%
		Improved business reputation	50%	50%	33%
		Better air quality in the work environment	50%	50%	33%
	Resound Technology Inc.	Lower monthly production expenses	50%	50%	33%
		Better air quality in the work environment	50%	50%	25%
	Tanaka Electronics Taiwan Co., Ltd.	Lower monthly production expenses	60%	35%	27%
		Improved business reputation	63%	50%	50%
	Mitsui High-Tec (Taiwan) Co., Ltd.	Improved business reputation	25%	25%	33%
	Sumitomo Bakelite (Taiwan) Co., Ltd.	Improved business reputation	50%	63%	100%
	Chemleader Corporation	Lower monthly production expenses	50%	0%	33%
		Improved business reputation	50%	0%	33%
		Better air quality in the work environment	25%	0%	33%

	Sun Surface Technology Co., Ltd.	Lower monthly production expenses	75%	25%	25%
		Improved business reputation	75%	13%	39%
		Better air quality in the work environment	75%	38%	43%
Participants in units receiving guidance		Saves living expenses	55%	35%	43%
NCKU ISDC		Improved guidance experience	0%	50%	0%
Government agencies		Lower Social Cost of Carbon (SCC)	61%	31%	0%

4.2 Calculating the Values of Outcomes

In the section above, we confirmed the stakeholders' processes of changes and outcomes, and identified the indicators, financial proxies and adjusting factors. We then calculated the values of these outcomes for each of our stakeholders.

The discount rate used in this report is 1.04%, the one-year interest rate for fixed deposits offered by Chunghwa Post, as of January 2018. The project's SROI is calculated by dividing the total present value of outcomes by the total value of inputs: 4,745,253/2,658,400=1.79.

Table 10 Calculating the Values of Outcomes

Total impact	$4,830.392
Present value (PV)	$4,745,253
Total inputs	$2,658,400
Social return on investment (SROI)	$1.79

The calculation results and details for each type of stakeholder are summarized below:

1. Suppliers that received guidance

Table 11 Values of outcomes of suppliers that received guidance

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value Discount rate =1.04% Discounted total in each year
Name	Number of the stakeholders											
Advantek Inc.	1	Lower monthly production expenses	100%	1	4	Reduced expenses from energy conservation each month	72,000	75%	25%	25%	13,500	36,914
		Improved business reputation	100%	1	3	Amount input into advertising	376,667	50%	50%	33%	94,167	226,698
		Better air quality in the work	100%	1	4	Cost of air cleaning equipment	10,000	75%	25%	25%	1,875	5,127

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value	
Name	Number of the stakeholders											Discount rate =1.04%	Discounted total in each year
		environment											
Fusheng Electronics Corporation	1	Lower monthly production expenses	100%	1	3	Reduced expenses from energy conservation each month	24,000	75%	25%	33%	4,500		9,535

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value Discount rate =1.04%
Name	Number of the stakeholders											Discounted total in each year
Phoenix Pioneer Technology Co., Ltd.	1	Lower monthly production expenses	100%	1	3	Reduced expenses from energy conservation each month	2,400,000	50%	50%	33%	600,000	1,271,340
		Improved business reputation	100%	1	3	Amount input into advertising	500,000	50%	50%	33%	125,000	264,863
		Better air quality in the work environment	100%	1	3	Cost of air cleaning equipment	500,000	50%	50%	33%	125,000	264,863

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value	
Name	Number of the stakeholders											Discount rate =1.04%	
													Discounted total in each year
Resound Technology Inc.	1	Lower monthly production expenses	100%	1	3	Reduced expenses from energy conservation each month	60,000	50%	50%	33%	15,000		31,784
		Better air quality in the work environment	100%	1	4	Cost of air cleaning equipment	50,000	50%	50%	25%	12,500		34,180

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value	
Name	Number of the stakeholders											Discount rate =1.04%	
													Discounted total in each year
Tanaka Electronics Taiwan Co., Ltd.	1	Lower monthly production expenses	100%	1	4	Reduced expenses from energy conservation each month	14,400	60%	35%	27%	3,744		9,929
		Improved business reputation	100%	1	2	Amount input into advertising	2,515,000	63%	50%	50%	471,563		707,344

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value
Name	Number of the stakeholders											Discount rate =1.04%
												Discounted total in each year
Mitsui High-Tec (Taiwan) Co., Ltd.	1	Improved business reputation	100%	1	3	Amount input into advertising	500,000	25%	25%	33%	281,250	595,940
Sumitomo Bakelite (Taiwan) Co., Ltd.	1	Improved business reputation	100%	1	1	Amount input into advertising	300,000	50%	63%	100%	56,250	56,250

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value
Name	Number of the stakeholders											Discount rate =1.04%
												Discounted total in each year
Chemleader Corporation	1	Lower monthly production expenses	100%	1	3	Reduced expenses from energy conservation each month	12,000	50%	0%	33%	6,000	12,713
		Improved business reputation	100%	1	3	Amount input into advertising	500,000	50%	0%	33%	250,000	529,725
		Better air quality in the work environment	100%	1	3	Cost of air cleaning equipment	50,000	25%	0%	33%	37,500	79,459

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Impact (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value Discount rate =1.04% Discounted total in each year
Name	Number of the stakeholders											
Sun Surface Technology Co., Ltd.	1	Lower monthly production expenses	100%	1	4	Reduced expenses from energy conservation each month	115,200	75%	25%	25%	21,600	59,063
		Improved business reputation	100%	1	3	Amount input into advertising	450,000	75%	13%	39%	98,438	218,005
		Better air quality in the work environment	100%	1	3	Cost of air cleaning equipment	218,333	75%	38%	43%	34,115	64,644
Subtotal											2,252,000	4,478,373

2. Participants in units receiving guidance

Table 12 Values of outcomes of participants in units receiving guidance

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Influence (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value Discount rate =1.04% Discounted total in each year
Name	Number of the stakeholders											
Participants in units receiving guidance	50	Implementation of personal eco-friendly behavior	90%	45	3	Reduced monthly living expenses	7,380	55%	35%	43%	98,120	185,927
Subtotal											98,120	185,927

3. NCKU ISDC

Table 13 Values of outcomes of the NCKU ISDC

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Influence (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value	
Name	Number of the stakeholders											Discount rate =1.04%	Discounted total in each year
NCKU ISDC	5	Improved guidance experience	100%	5	1	Third party environmental engineering courses	20,000	0%	50%	0%	50,000	50,000	
Subtotal											50,000	50,000	

4. Government agencies

Table 14 Values of outcomes of government agencies

Stakeholder		Outcome	How much change was there	Number of changes(A)	Duration	Financial proxy	Valuation of outcome (NT$)(B)	Deadweight(d)	Attribution(c)	Drop-off(f)	Influence (G) G=A*B*(1-c)*(1-d)*(1-f)	Present value	
Name	Number of the stakeholders											Discount rate =1.04%	Discounted total in each year
Government agencies	1	Lower Social Cost of Carbon (SCC)	100%	1	3	Social Cost of Carbon. After inflation conversion, regional PPP conversion, and exchange rate conversion	107,821	61%	31%	0%	29,023		116,092
Subtotal											29,023		116,092

4.3 Sensitivity Analysis

SROI measures the monetary value of qualitative, narrative information. Hence, it will inevitably involve many assumptions and estimates. According to the SROI Guide, each analysis report must include a sensitivity analysis and disclose relevant information to ensure that results are objective and verifiable.

The scope of assessment is the 10 suppliers that received guidance. The target group and their changes are clear, and most of the outcomes resulting from the project can be quantified based on corresponding facts, such as higher environmental protection awareness and energy conservation and carbon reduction behavior, which directly saves production expenses and living expenses. These are highly correlated and undistorted valuation methods that involve relatively few assumptions and subjective information. In general, there are relatively few uncontrollable factors and research limitations, but we still adjusted the scope of SROI, duration of outcomes, and adjusting factors based on the principle of Do Not Over-claim, so as to remain strict and objective. The range of the SROI sensitivity analysis for this project is determined to be between 0.97 and 1.96.

1. Sensitivity analysis for adjusting the range of SROI

To obtain fair and objective results, we determined the reasonable range of SROI to be the calculated value plus and minus 10%.

Table 15 Adjust range of SROI

SROI ratio	Adjustment	Details
1.96	SROI	Increased by 10%
1.61	SROI	Decreased by 10%

2. Sensitivity analysis for adjusting the duration of outcomes

Based on the interviews in phases two and four, a small portion of participants stated that related information should be periodically updated to maintain the outcome. To avoid the possibility of over-claiming the outcome, we adjusted the duration of supplier outcomes to 1 year and 2 years.

Table 16 Adjust duration of outcomes

SROI ratio	Adjustment	Details
0.97	Duration of supplier outcomes	All adjusted to 1 year
1.48	Duration of supplier outcomes	All adjusted to 2 year

3. Sensitivity analysis for adjusting factors

The ratios of the four adjusting factors were obtained based on stakeholder interviews and questionnaires and verified by the stakeholders. The result for some items was 0%. We do not rule out the possibility that there were factors not identified in the stakeholder engagement process, so we adjusted adjusting factors that did not reach 10% to 10% or 30%.

Table 17 Sensitivity analysis for adjusting factors

SROI ratio	Adjustment	Details
1.76	Attribution	< 10% adjusted to 10%
1.72	Attribution	< 10% adjusted to 30%
1.78	Deadweigh	< 10% adjusted to 10%
1.78	Deadweigh	< 10% adjusted to 30%
1.61	Displacement	0% adjusted to 10%
1.25	Displacement	0% adjusted to 30%

Chapter 5 Conclusion

5.1 Results Analysis

Based on the values of outcomes, the improvement in business reputation accounted for 54% of all outcomes. Because suppliers believe that the positive effect from participating in the guidance project is equal to considerable advertising benefits, and will improve the company's public image and social status.

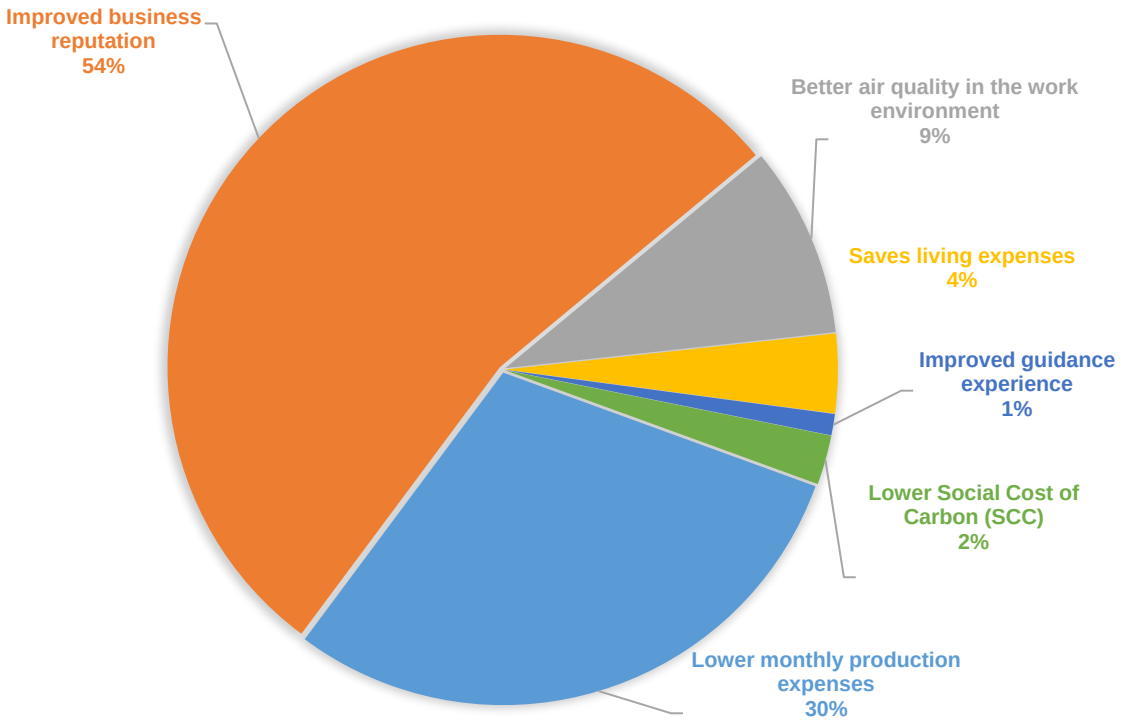

Figure 6 Overview of SROI Analysis

The secondary outcome is that suppliers that received guidance were able to lower their monthly production expenses, and accounted for 30% of the total value of outcomes, in which the decision-making behavior of 70% of suppliers changed. The most common change was the promotion of energy-saving issues in the company's internal meetings, and product life cycle being considered in procurement.

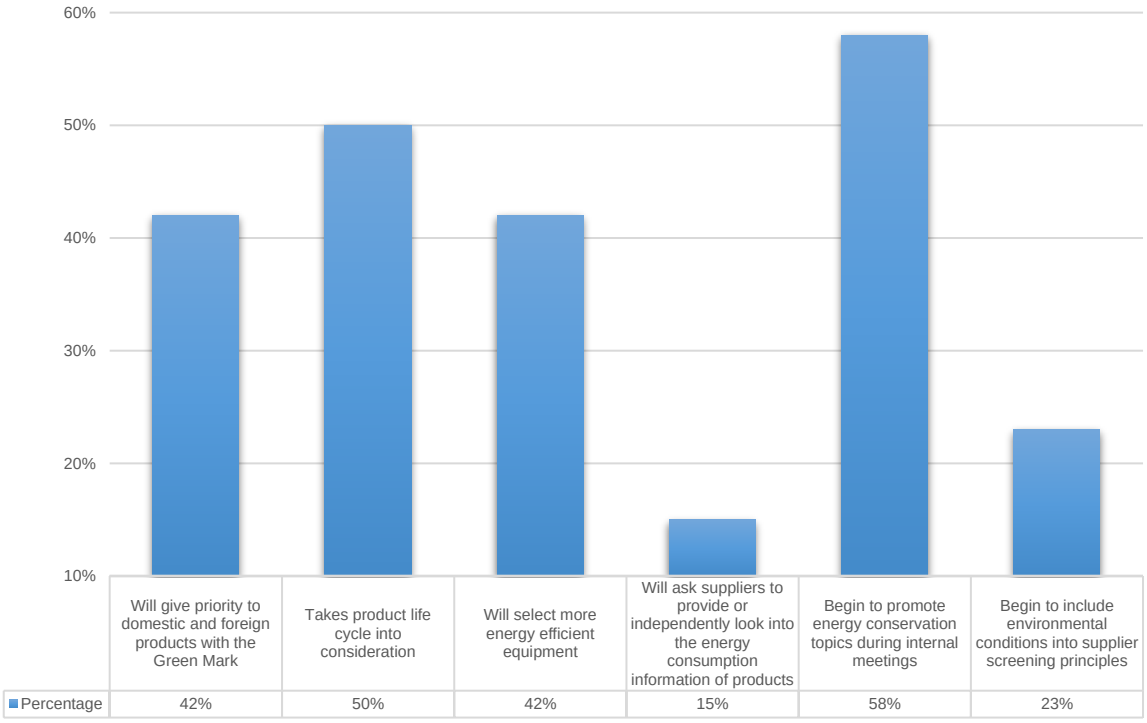

Figure 7 Analysis of changes to decision-making and procurement behavior

Even though the value of outcomes of participants in units receiving guidance only accounted for 4% of the total value of outcomes, up to 90% of participants gained higher awareness of environmental protection and engage in eco-friendly behavior in daily life. This shows that the project does have a certain effect on

strengthening employees' energy conservation and carbon reduction concepts, and was only less effective among 5% of participants because they already had environmental protection concepts and habits before participating in the project.

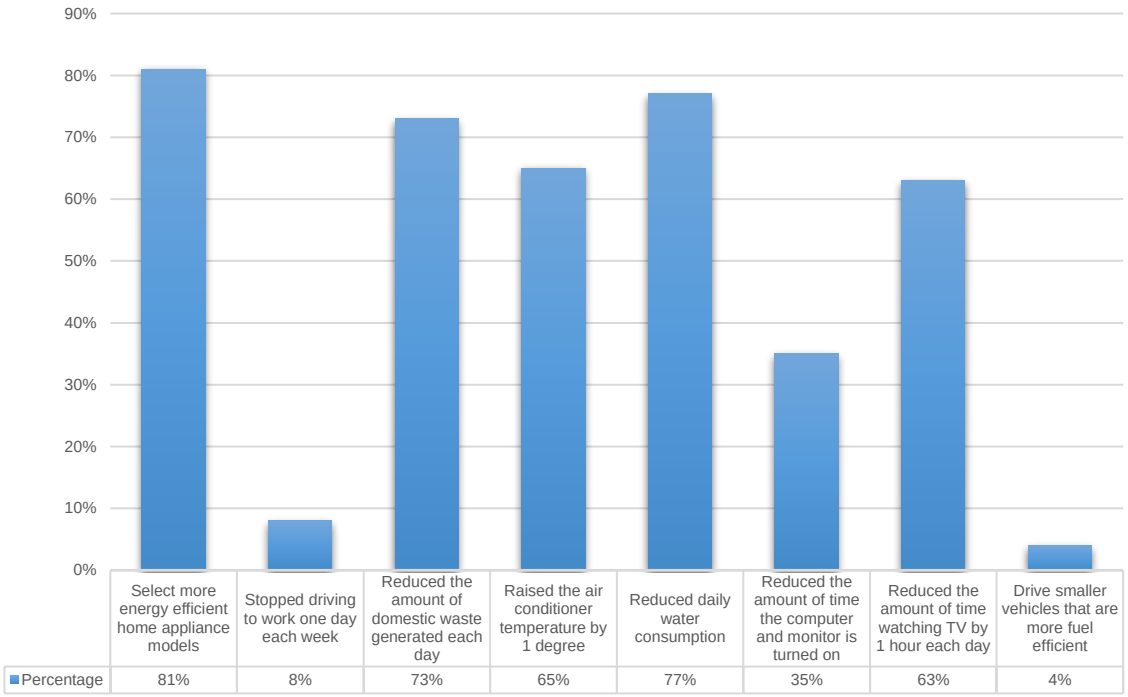

Figure 8 Analysis of individual energy-saving behavior

5.2 Follow-up Management

The most important purpose of this project is not to calculate the SROI value, but to provides a basis on which rolling management can be carried out. During the calculation process, we made the following findings and offer the following suggestions based on stakeholder feedback and calculation results:

1. There is no absolute relation between the outcomes of suppliers and their scale

We divided suppliers that received guidance into small, medium-small, medium, and large based on their number of employees for preliminary analysis, but could not find consistent results. This is due to the differently levels of involvement and amount of resources input into GHG inventory work, and is highly related to their conditions before participating in the guidance project.

Overall, we found three situations based on assessment results: First, suppliers with high control over their GHG emissions did not change as much after receiving guidance. Second, suppliers that have not implemented any energy conservation and carbon reduction measures are more likely to see the benefits from receiving guidance. Third, suppliers showed greater changes and benefits if they voluntarily participated in the GHG inventory.

We suggest strengthening the guidance for suppliers with relatively low control over techniques for compiling GHG inventories, or dividing beginner and advanced guidance items, which will help improve energy conservation and carbon reduction concepts based on the needs of each unit, and further affect the company's policies or actions. In addition, based on the feedback from suppliers that received guidance, compiling GHG inventories improved the company's positive image. Hence, suppliers can be encouraged to conduct self-inspections from the perspective of business expansion, and allow suppliers that received guidance to clearly understand that the project's purpose is not to simply comply with regulations, but also has managerial implications that will enable

them to gain a competitive advantage.

2. Helped improve the energy conservation and carbon reduction concepts of participants

Based on the analysis above and stakeholder feedback, participation in the guidance project does indeed raise employees' environmental protection awareness with up to 90% of employees being affected. We suggest increasing the participation of employees in different departments, so that employees will have the opportunity to come in contact with the guidance project through different aspects and channels. For example, regularly organizing workshops for employees who participated in the guidance project to engage in exchanges with others will allow the project to make a greater impact.

References

1. Nicholls, J., E. Lawlor, E. Neitzert, and T. Goodspeed., A Guide to Social Return on Investment., Cabinet Office,U.K., 2009
2. Burke, M., Hsiang, S. M.,&Miguel, E.(2015). Global non-linear effect of temperature on economic production. Nature, 527(7577), 235.S. M. Hsiang, M. Burke, E.
3. Hsiang, S. M., Burke, M.,&Miguel, E.(2013). Quantifying the influence of climate on human conflict. Science, 341(6151), 1235367.
4. National Development Council (2014). **National Climate Change Adaptation Program.** Taipei: National Development Council, Executive Yuan.
5. Council for Economic Planning and Development (2012). **National Climate Change Adaptation Policy Outline**. Taipei: Council for Economic Planning and Development, Executive Yuan

Appendix 1 Impact map

Spreadsheet for developing SROI analysis. See guidance tab for further details.

Stage 1		Stage 2			Stage 3								Deadweight% (d)	Displacement % (e)	Attribution% (c)	Drop-off% (f)	Impact (G)	Stage 5				
Stakeholders		Inputs		Outputs	The Outcomes (what changes)													Calculating Social Return				
Who do we have an affect on? Who has an effect on us?	Number of the stakeholders	What do they invest?	What is the value of the inputs in currency (NT$)	Summary of activity in numbers	Description: How would the stakeholder describe the changes?	Indicator: How would you measure it?	Source: Where did you get the information from?	Quantity: number of changes (A)	Duration: How long does it last after end of activity?	Financial Proxy: What proxy would you use to value the change?	Value in currency (B): What is the value of the change? (NT$)	Source: Where did you get the information from?	What would have happened without the activity?	What activity did you displace?	Who else contributed to the change?	Does the outcome drop off in future years?	G=A*B*(1-c)*(1-d)*(1-e)*(1-f)	Discount rate%	1.047%			
																		Year 1 (post-activity)	Year 2	Year 3	Year 4	Year 5
Advanced Semiconductor Engineering, Inc.		funding	2500000																			
Advantek Inc.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	4	Reduced expenses from energy conservation each month	72,000	Questionnaire	75%	0%	25%	25%	13,500	13,500	10,125	7,594	5,695	0
					Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	3	Amount input into advertising	376,667	Questionnaire	50%	0%	50%	33%	94,167	94,167	62,778	41,852	27,901	0
					Better air quality in the work environment	Whether the reply in the ques	interview and questionnaire	1	4	Cost of air cleaning equipment	10,000	Questionnaire	75%	0%	25%	25%	1,875	1,875	1,406	1,055	791	0
Fusheng Electronics Corporation.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	3	Reduced expenses from energy conservation each month	24,000	Questionnaire	75%	0%	25%	33%	4,500	4,500	3,015	2,020	0	0
Phoenix Pioneer technology Co., Ltd.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	3	Reduced expenses from energy conservation each month	2,400,000	Questionnaire	50%	0%	50%	33%	600,000	600,000	402,000	269,340	0	0
					Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	3	Amount input into advertising	500,000	Questionnaire	50%	0%	50%	33%	125,000	125,000	83,750	56,113	0	0
Resound Technology Inc.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	3	Reduced expenses from energy conservation each month	60,000	Questionnaire	50%	0%	50%	33%	15,000	15,000	10,050	6,734	0	0
					Better air quality in the work environment	Whether the reply in the ques	interview and questionnaire	1	4	Cost of air cleaning equipment	50,000	Questionnaire	50%	0%	50%	25%	12,500	12,500	9,375	7,031	5,273	0
Tanaka Electronics Taiwan Co., Ltd.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	4	Reduced expenses from energy conservation each month	14,400	Questionnaire	60%	0%	35%	27%	3,744	3,744	2,733	1,995	1,456	0
					Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	2	Amount input into advertising	2,515,000	Questionnaire	63%	0%	50%	50%	471,563	471,563	235,781	0	0	0
Mitsui High-Tec (TAIWAN) Co., Ltd.	1			4	Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	3	Amount input into advertising	500,000	Questionnaire	25%	0%	25%	33%	281,250	281,250	188,438	126,253	0	0
	1			4	Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	1	Amount input into advertising	300,000	Questionnaire	50%	0%	63%	100%	56,250	56,250	0	0	0	0
Chemleader Corporation	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	3	Reduced expenses from energy conservation each month	12,000	Questionnaire	50%	0%	0%	33%	6,000	6,000	4,020	2,693	0	0
					Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	3	Amount input into advertising	500,000	Questionnaire	50%	0%	0%	33%	250,000	250,000	167,500	112,225	0	0
Sun Surface Technology Co., Ltd.	1			4	Lower monthly production expenses	Whether the reply in the ques	interview and questionnaire	1	4	Reduced expenses from energy conservation each month	115,200	Questionnaire	75%	0%	25%	25%	21,600	21,600	16,200	12,150	9,113	0
					Improved business reputation	Whether the reply in the ques	interview and questionnaire	1	3	Amount input into advertising	450,000	Questionnaire	75%	0%	13%	39%	98,438	98,438	60,211	36,829	22,527	0
					Better air quality in the work environment	Whether the reply in the ques	interview and questionnaire	1	3	Cost of air cleaning equipment	218,333	Questionnaire	75%	0%	38%	43%	34,115	34,115	19,445	11,084	0	0
Participants in units receiving guidance	50	work hours	158400		Saves living expenses	Whether the reply in the ques	interview and questionnaire	45	3	Reduced monthly living expenses	7,380	Questionnaire	55%	0%	35%	43%	98,120	98,120	55,928	31,879	0	0
National Cheng Kung University(NCKU) Industrial Sustainable Development	5				Improved guidance experience	Conducted an interview to ver	interview and questionnaire	5	1	Third party environmental engineering courses	20,000	Telephone interview	0%	0%	50%	0%	50,000	50,000	0	0	0	0
Government agencies	1				Lower Social Cost of Carbon (SCC)	Suppliers replied in the questi	interview and questionnaire	1	3	Social Cost of Carbon(Technical Support Document: Technic	107,821	The reduction in	61%	0%	31%	0%	29,023	29,023	29,023	29,023	29,023	0
Total			2,658,400.00												Total		2,429,142.94	2,429,142.94	1,470,653.38	828,815.49	101,780.08	0.00

Present value of each year	2,429,142.94	2403973.343	1,440,334.87	803,318.16	97,626.81	0
Total Present Value (PV)	4745253.19					
PV minus the investment	2086853.19					
SROI	1.79					

Appendix 2 Stakeholder Engagement Outline

A. Project participation

1. How many people participated in the ISO 14064-1 project?
2. When did your firm participate in the guidance project of ISO 14064-1? What are the determining factors for this decision? (Voluntary or mandatory reporting under the Regulatory compliance)
3. What role(s) did your firm play in the guidance project of ISO 14064-1? Could you briefly describe the tasks that you completed?
4. Have you (your firm) participated in other similar projects? Like other environmental management system. If you have, could you describe the differences or similarities between the two activities? What prompted your firm to join the guidance project of ISO 14064-1?

B. Changes in outcomes

1. Before participating in the guidance project of ISO 14064-1, did your company have energy saving and carbon reduction plans? Has your company incorporated climate change issues into its operating policies?
2. Before participating in the guidance project of ISO 14064-1, did your company know about the company's greenhouse gas emissions?
3. Since participating in the guidance project of ISO 14064-1, have your firm experienced any changes or influences?

4. Has the company's work environment changed because of the introduction of the ISO project?
5. Please explain the approximate monthly electricity bill before and after the implementation of ISO 14064-1 project. (If there is/are change(s) in energy efficiency and saving after ISO 14064-1 project.)
6. Since you joined this project, have you personally experienced any changes or influences (such as your thoughts, behaviors and attitudes toward life in general) or in the people and things around you (such as your friends, family and colleagues)?
7. (If applicable) These changes, have there been any reduction in living expenses?
8. Which of the above changes do you think are more important?
9. How long did these changes last? Or how long do you think such changes may last?
10. If your firm hadn't participated in this project, what do you think is the probability of your experiencing the same changes?
11. Let's assume that participating in the guidance project of ISO 14064-1 requires a fee. How much are you or your firm willing to pay in order to join this project and achieve the same changes?
12. Have there been any negative influences since participating in the guidance project of ISO 14064-1?

Appendix 3 Background Information Survey of ISO 14064-1 Pre-implementation

#	Question	Option
1	Company：	
2	Has your company implemented	
3	Has your company implemented any environment-related systems?	ISO 14001 Environmental Management System
		ISO 14067 GHG - Carbon footprint of products
		ISO 14046 Environmental management - Water footprint
		ISO 50001 Energy Management System
		Other environment-related system_____
		The above systems are not implemented
4	Reason for implementation of ISO 14064-1	Helps improve operations
		Helps expand business in the future
		Requirement of clients
		It is expected to become the target of laws and regulations in the future.

#	Question	Option
		Previously, it was planned to introduce the ISO 14064-1 system, and this was an opportunity to cooperate and introduce together.
		Other _____
5	Before your company participated in the ISO 14064-1 project, which of the following descriptions is closest to the company's energy saving and carbon reduction practices?	No discussion about energy saving and carbon reduction practices. Do for regulatory compliance only.
		The company responds to the promotion and initiatives of the government, the media or business partners, and post slogans or posters on energy conservation and carbon reduction in obvious places, but without specific company's policy or regulations.
		The company plans some energy-saving and carbon-reduction plans and activities, such as temperature adjustment and turning off the lights.
		The company has specific plans/projects and understanding of energy saving and carbon reduction, and actively replace high efficiency equipment and materials, such as light bulbs, fire extinguishers, refrigerators, and join Earth Day lights off activities.

#	Question	Option
		The company has more ambition to plan to input more resources or invest for energy saving and carbon reduction, e.g., installing solar panels, purchasing green power, etc.
		The company has more ambition to plan project/programme for energy saving and carbon reduction, such as changing the factory building to a green building, replacing the the production line to clean production with low environmental impact, changing processes, or optimizing to reduce the carbon emissions per unit product.
6	Before your company participated in the ISO 14064-1 project, has your company started to include climate change issues into operating policies?	Not at all. The issue of climate change has never been discussed.
		Not many, there have been brief discussions on climate change issues within the company, but only for a brief discussion.
		Yes, the company regularly discusses the issue of climate change, but has not yet combined with the company's operations.
		Yes, the company will develop short and medium-term plans and activities related to climate change issues.

#	Question	Option
		Yes, the company's current operating strategies and activities have been fully integrated with climate change issues.
7	Before your company participated in the ISO 14064-1 project, which of the following descriptions is closest to understanding of company's annual GHG emission?	The company has not carried out any inventory of greenhouse gas emissions.
		The company has a understanding of the emission hotspots, but has no quantity emissions data.
		According to company's own method to quantify the hotspot (the top1 or 2) GHG emissions
		According to company's own method to quantify the most GHG emissions
		According to company's own method to quantify all GHG emissions
		According to internationally recognized methodology to quantify scope 1 GHG emission. (direct GHG emission)
		According to internationally recognized methodology to quantify scope 2 GHG emission. (indirect GHG emission)
		According to internationally recognized methodology to quantify scope 1+2 GHG emission.

#	Question	Option
8	Please indicate that before participating in the ISO 14064-1 project, your company's annual electricity cost is approximately: _____ NTD.	
9	The question above, your company's annual **gasoline** cost is approximately: _____ NTD.	
10	The question above, your company's annual **diesel** cost is approximately: _____ NTD.	
11	Participating in the ISO 14064-1 project coaching program usually requires cross-departmental cooperation and communication. Before participated in the ISO 14064-1 project, how often does the company work across departments?	No, never.
		Very few opportunities for cross-department cooperation and communication.
		Sometimes, about once a year
		Often, about every six months
		Frequently, about every quarter
		Usually, about every month
12	Before your company participated in the ISO 14064-1 project, which of the following	Energy saving and carbon reduction have no place in my life
		I know the concept of energy saving and carbon reduction, but no concrete action.

#	Question	Option
	descriptions is closest colleagues background information	I practice energy saving and emission reduction in my everyday life, like turn off the lights etc.
		I do some energy-reduction and carbon-reduction actions, such as maintaining the air conditioner over 26°C
		I actively implement energy reduction and carbon reduction activities/appliances, such as buying energy-saving products
		Not only do I actively implement energy saving and carbon reduction, but also influence my friends and relatives.
13	Before your company participated in the ISO 14064-1 project, how much additional budget are you willing to invest a month in energy saving and carbon reduction activities (such as purchasing energy-saving products)?	<500 NTD / month
		About 1,000 NTD / month
		About 3,000 NTD / month
		About 6,000 NTD / month
		About 10,000 NTD / month
		About 20,000 NTD / month
		About 100,000 NTD / month
14	Before your company participated in the ISO 14064-1	One day a week without driving to work, driving a total of ten kilometers less.
		Reduce one kilogram of garbage each day.

#	Question	Option
	project, · Do you have the following behaviors?	The air conditioning is increased by 1 degree.
		Use 1 Cubic metre less water daily.
		1 hour less computer and screen each day.
		Replacement of 60W tungsten filament bulbs with 11W electric bulbs.
		Watch TV less than an hour a day.
		Replace the 7.2W night light with a 0.8W LED light.
		other, please describe: _____

Appendix 4 Stakeholder Engagement Questionnaire

Project name		Questionnaire Survey on the Implementation of ISO 14064-1 GHG Inventory by Suppliers Under the Guidance of ASE Group
Introduction:		Major manufacturers worldwide are taking the green management of supply chains more seriously, and ASE Group hopes to create a green supply chain by assisting suppliers with the implementation of ISO 14064-1 GHG management systems. ASE compiled a Social Return on Investment Report this year to assess the social impact of the activity, and to provide a basis for subsequent planning and management of the activity series and other charity programs. This questionnaire will take about 15-20 minutes. We thank you for your precious time and feedback. * This questionnaire survey will only be used for ASE Group's supply chain management. You do not need to provide your name. Please express what you truly think. Thank you for your assistance!
		Question group 1: Basic information statistics
Fill in the blank	Q1	What is the name of your company?
Fill in the blank	Q2	What department are you in?
Multiple choice question	Q3	Before implementing ISO 14064-1, were you responsible for energy conservation and carbon reduction? □ Yes, my work was related to energy conservation and carbon reduction. □ No, before ISO 14064-1 was implemented, my work was not related to energy conservation and carbon reduction. □ Other: _____
Fill in the blank	Q4	What was the content of your work in the ISO 14064-1 project? (e.g. Identification of emission sources, provision of data for XX emission source, etc.) Description: _____

Question group A: Changes in the company's procurement behavior			
Multiple choice question	A	After your company began participating in ISO 14064-1, did your company take environmental factors into consideration because it gained a better understanding of energy conservation and carbon reduction? After it affected the decision-making process of management, did it change your company's procurement policy, attitude, behavior, or standard operating procedures?	
	□	Yes, it caused changes.	
	□	No, it did not cause any changes.	(Skip this question group)
	□	I don't know.	(Skip this question group)
Multiple answer question	A-1	Based on the previous question, what were specific changes to your company's procurement policy, attitude, behavior, or standard operating procedures after participating in ISO 14064-1?	
	□	Will give priority to domestic and foreign products with the Green Mark	
	□	Takes product life cycle into consideration, such as the impact of raw materials on the environment and waste recycling.	
	□	Will select more energy efficient equipment. Even though the equipment is more expensive, it will save electricity expenses in the long run.	
	□	Will ask suppliers to provide or independently look into the energy consumption information of products	
	□	Begin to promote energy conservation topics during the Company's internal meetings	
	□	Begin to include environmental conditions into supplier screening principles. (Such as requiring suppliers to have a carbon inventory, energy management system, and clean production)	
	□	Other situations: _____	
Fill in the blank	A-2	Based on the question above, how much energy conservation/carbon reduction benefits do you think the changes to the company's procurement policy, attitude, behavior, or standard operating procedures provide **each month**?	
	□	No difference each month	
	□	Saved NT$1,000 or less in electricity fees each month	
	□	Saved NT$2,000 or less in electricity fees each month	
	□	Saved NT$5,000 or less in electricity fees each month	
	□	Saved NT$10,000 in electricity fees each month	
	□	Saved NT$30,000 in electricity fees each month	
	□	Saved NT$50,000 in electricity fees each month	
	□	Saved NT$100,000 in electricity fees each month	
	□	Saved NT$200,000 in electricity fees each month	
	□	Saved NT$500,000 in electricity fees each month	
	□	Other amount_____	

Question group B: Changes to the Company's business reputation

Multiple choice question

B-1 After participating in the ISO 14064-1 guidance project, did it improve the positive image of your company, such as providing the ISO 14064-1 certificate on your website, and complying with customers' audit requirements?

- □ Yes, the company's business reputation improved.
- □ No, there were no significant changes to the company's business reputation. (Skip this question group)

Multiple choice question

B-2 Based on the question above, how much do you think the company will need to spend on advertising to gain the same level of improvement in the company's positive image:

- □ An extremely large amount, about NT$10 million in advertising
- □ A large amount, about NT$5 million in advertising
- □ A somewhat large amount, about NT$1 million in advertising
- □ An ordinary amount, about NT$500 thousand in advertising
- □ A small amount, about NT$100 thousand in advertising
- □ A very small amount, about NT$30 thousand in advertising
- □ None, almost nothing

Other amount:

Question group C: Better air quality in the work environment

Multiple choice question

C-1 After participating in the ISO 14064-1 guidance project, did your company begin to replace equipment, such as replacing forklifts that run on conventional fuel with electric forklifts, and using low pollution fuels in boilers, to reduce odor and improve the air quality in the work environment?

- □ Yes, the work environment changed and air quality improved.
- □ No, the work environment did not change. (Skip this question group)

Multiple choice question

C-2 Based on the question above, how much money do you think the company must spend to make the same extent of change to the work environment?

- □ Equal to a large scale improvement to ventilation that costs NT$500 thousand.
- □ Equal to a medical grade air purifier that costs NT$100 thousand.
- □ Equal to a commercial air purifier that costs NT$50 thousand.
- □ Equal to a home air purifier that costs NT$10 thousand.
- □ Equal to a personal purifier that costs NT$2 thousand.

Other amount _____

Fill in the blank

C-3 How many employees do you think this change affected?

_____people

Question group D: Raised individual environmental protection awareness

Multiple choice question

D-1 After participating in the ISO 14064-1 guidance project, did it raise your environmental protection awareness?
Yes, after participating in the project, I am more willing to take part in carbon reduction measures.
No, I did not change as a result of participating in the project. Skip this question group)

Multiple answer question

D-3 Based on the question above, I took the following energy conservation measures due to the project.
□ Will choose more efficient models when purchasing home appliances
□ Stopped driving to work one day each week
□ Reduced the amount of domestic waste generated each day.
□ Raised the air conditioner temperature by 1 degree.
□ Reduced daily water consumption.
□ Reduced the amount of time the computer and monitor is turned on.
□ Reduced the amount of time watching TV by 1 hour each day.
□ If your change is greater than the descriptions above, or there were other changes, please specify.
□ There were no other noteworthy changes. (Skip D-4)
Other eco-friendly behavior, please specify_____

Multiple choice question

D-4 Based on the question above, how much does the eco-friendly behavior above reduce your monthly living expenses?
Description: Includes all water, electricity, and gas fees and expenses on daily necessities.
□ Saved NT$100 in expenses each month
□ Saved NT$300 in expenses each month
□ Saved NT$500 in expenses each month
□ Saved NT$800 in expenses each month
□ Saved NT$1,000 in expenses each month
□ Saved NT$1,500 in expenses each month
□ Saved NT$2,000 in expenses each month
□ Saved NT$5,000 in expenses each month
□ Saved NT$10,000 in expenses each month
□ Saved NT$20,000 in expenses each month
Other amount _____

(Multiple choice question)

D-5 Did participating in the ISO 14064-1 guidance project increase the number of hours you work?
□ No. participating in the ISO 14064-1 guidance project did not increase my workload.
□ Yes, increased workload by about 1 day each month
□ Yes, increased workload by about 2 days each month
□ Yes, increased workload by about 4 days each month
□ Yes, increased workload by about 7 days each month
□ Other negative effects during other days or non-work hours, please specify_____

Changes to adjusting factors												
(Multiple choice question)	E-1	How much do you think ASE's ISO 14064-1 guidance project contributed to the following changes?	100% It's all thanks to the guidance project!	75% It was mostly due to the guidance project!	50% The project gets half of the credit!	25% It was mostly due to other reasons!	0% The company's changes have nothing to do with the guidance project!					
	(A)	Changes to the Company's procurement policy, attitude, behavior, or standard operating procedures										
	(B)	Changes to the company's image										
	(C)	Better air quality in the work environment										
	(D)	Raised individual environmental protection awareness										
	(E)	Increased work hours										
(Multiple choice question)	E-2	If it were not for the ISO 14064-1 guidance project, were there other similar management systems (e.g. ISO 14001 Environmental Management Systems), education and training, seminars, or conferences that contributed to your company's energy conservation and carbon reduction concepts and changes?	100% There are many ways for the company to gain the same change.	75% There are other ways for me to gain the same degree of change.	50% There's a 50% likelihood that I would experience the same change through other means as I did with the guidance project.	25% The other ways are not bad, but can't achieve the effect of the guidance project.	0% The changes I experienced through the guidance project are irreplaceable.					
	(A)	Changes to the Company's procurement policy, attitude, behavior, or standard operating procedures										
	(B)	Changes to the Company's business reputation										
	(C)	Better air quality in the work environment										
	(D)	Raised individual environmental protection awareness										
	(E)	Increased work hours										
(Multiple choice question)	E-3	After the ISO 14064-1 guidance project is over, how long do you think the company's changes will last?	Over 4 years	3	2	1	Half a year					
	(A)	Changes to the Company's procurement policy, attitude, behavior, or standard operating procedures										
	(B)	Changes to the Company's business reputation										
	(C)	Better air quality in the work environment										
	(D)	Raised individual environmental protection awareness										
	(E)	Increased work hours										
(Multiple choice question)	E-4	Please rank the importance of these changes to the company/you. Please give a score of 1 to 10 (10 being most important and 1 being least important)	10 points	9 points	8 points	7 points	6 points	5 points	4 points	3 points	2 points	1 points
	(A)	Changes to the Company's procurement policy, attitude, behavior, or standard operating procedures										
	(B)	Changes to the Company's business reputation										
	(C)	Better air quality in the work environment										
	(D)	Raised individual environmental protection awareness										
	(E)	Increased work hours										

Appendix 5 Outline of the Verification of Results

1. Please share with us why you participated in this ISO 14064-1 project?
2. What did the process impact on your company or you?
3. How long will this impact last? If it will last for more than one year, will such impact decrease after one year and how much it will decrease?
4. Based on our interview and questionnaires, stakeholders provided feedback of these changes and impact. Did you experience similar changes or impact?
5. Based on our interview and questionnaire, stakeholders provided feedback of the range of values for these outcome or feedback of options of activities that would result in the same impact. Do you agree with these feedback and pricing for one year?
6. Based on our interview and questionnaires, stakeholders provided feedback of the probability that the same outcome would also incur even without this ISO 14064-1 project. Is this feedback reasonable based on your experience?
7. Based on our interview and questionnaires, stakeholders provided feedback that there are other factors contributing to this outcome in addition to this ISO 14064-1 project. What are the proportion of contribution from other factors based on your experience?
8. Based on our interview and questionnaires, stakeholders provided feedback that participating in this ISO 14064-1 project will not negatively affect to other companies or people. Do you agree?
9. Based on your experience, do you think that our interview and survey results of this ISO 14064-1 project have missed other key stakeholders and things?