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Ex-post Evaluation Report on the Project for Improving Heat Supply System in Khorezm, Uzbekistan

한국국제협력단

발간등록번호

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Ex-post Evaluation Report on the Project for Improving Heat Supply System in Khorezm, Uzbekistan

2013. 12



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This evaluation study was entrusted to Global Development Cooperation Consulting (GDC) by KOICA for the purpose of independent evaluation research. The views expressed in this report do not necessarily reflect KOICA's position.

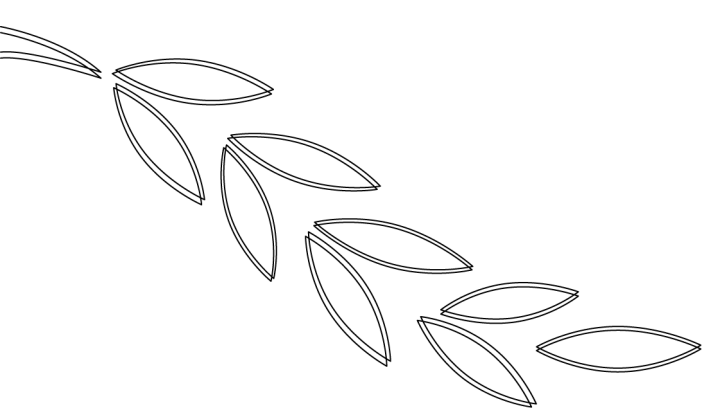
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Executive Summary

Evaluation grade table

1. Title of the Evaluated Project :

Improvement of Heat Supply System in Khorezm, Uzbekistan

2. Grade

- Relevance : ③ (very relevant)
 - Rationale : Project was relevant to the partner country's development needs and strategies, and the aid policy and strategies of Korea

- Effectiveness/Impact : ② (positive and effective)
 - Rationale : The project undeniably produced the expected outcome such as improved efficiency and reduced operating cost of the district heating facilities. However, the objective of stable heating was partially achieved due to electricity and gas supply that were operated by separate entities and often interrupted. Also, the exposed pipeline may hinder the improved system from producing effects (delivering hot water at the target temperature) because insulation of the pipeline was not included in the project scope.

- Efficiency : ③ (efficient)
 - Rationale : The project was completed with the original budget and within the promised duration. Also, PMC and the beneficiary organization chose small-size boiler rooms and public buildings such as schools and hospitals in an attempt to maximize the effect and to serve as many people as possible, which may indicate that the project utilized the limited resources very efficiently.

- Sustainability : ② (sustainable if issues were resolved)
 - Rationale : The operation crew was diligent and responsible for their tasks such as keeping the log, following the instruction, and staying on the post, which indicates sustainable human resource management system in place. However, the beneficiary organization still seemed to have financial difficulties in that little or no investment for system improvement has been made on its own after the project.

3. Overall Grade : Partially Successful



Executive Summary

1. Evaluation overview and methodology

- Purpose of the evaluation
 - The evaluation is an ex-post evaluation and focuses on whether the objective of improving the heat and water supply system in Kohorezm Uzbekistan is successfully achieved. The project was evaluated based on 5 criteria of OECD/DAC: the relevance, efficiency, effectiveness, impact and sustainability.
 - The evaluation focused on learning lessons and making recommendations based on the analysis of the project-related data in order to improve KOICA's future projects in terms project formation, planning, design, implementation, and evaluation.
- The below table summarizes specifics of the projects including project duration, purpose, and scope.

Project Title	Project for improving the heat and water supply system in Kohorezm Uzbekistan
Duration	1 year (2009-2010)
Purpose	To contribute to the stable and sufficient heating and water supply, improvement in the energy efficiency and upgrading quality of lives by improving the heat and water supply system in Khorezm, Uzbekistan
Project Scope	<ul style="list-style-type: none">• Improvement construction of the heating and water supply facilities (Design, audit and test run support to exchange machines including the hot/cold water pumps and heat exchangers)

	<ul style="list-style-type: none"> • Dispatch experts: Specialists in the equipment operation and automatic control • Training by invitation to Korea
Budget	USD 3.5 million
Project Site	Khorezm province (Located 1,000km west from Tashkent)
Beneficiary	People in around Khorezm
Implementing Agencies	Korea - KOICA
	Uzbekistan - Khorezm Province

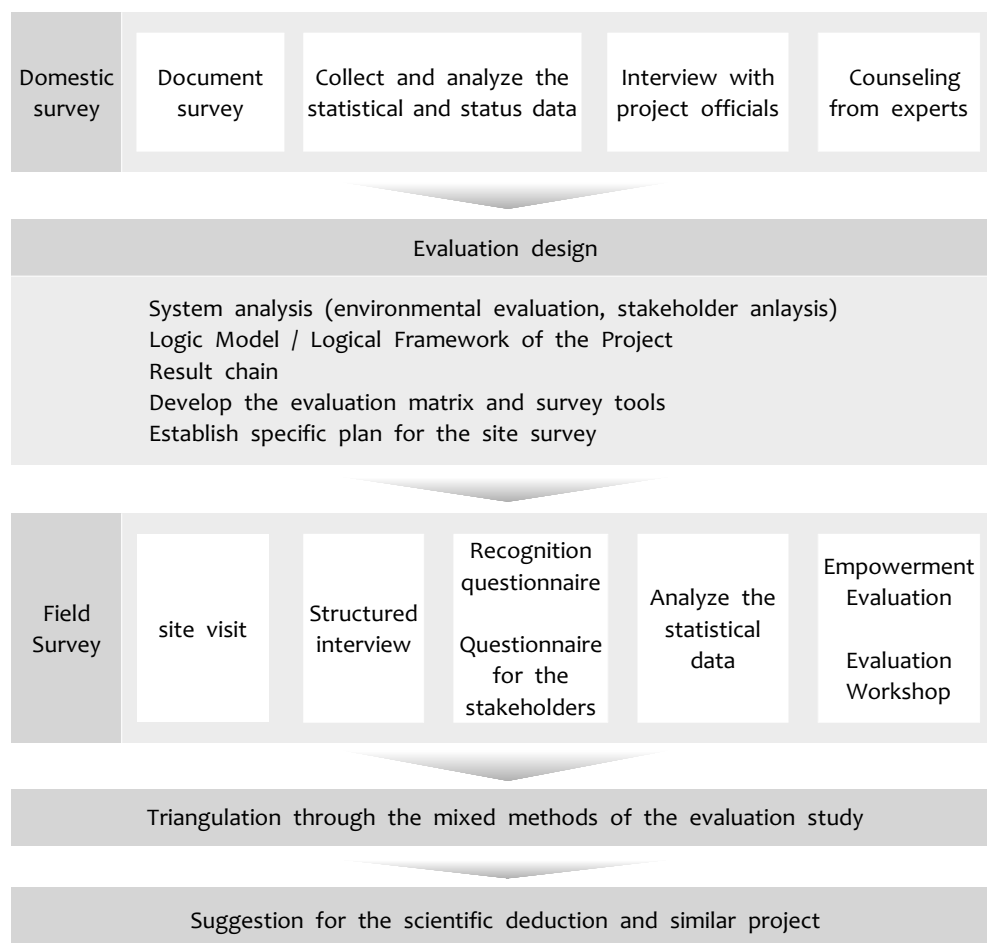
□ The range of the ex-post evaluation is as follows.

Evaluation Design	Domestic Survey	Field survey	Result Analysis	Write and submit the report
<ul style="list-style-type: none"> ▪ Evaluation criteria and methodology ▪ Assignment of roles for the evaluation team ▪ Write interview and survey questions ▪ Establish the evaluation plan 	<ul style="list-style-type: none"> ▪ Document study ▪ Policy documents of KOICA and other organizations ▪ Heat supply system and the Uzbekistan national development plan documents ▪ Major social and economic indicator survey 	<ul style="list-style-type: none"> ▪ Establish the site survey timetable ▪ Beneficiary interview and site visit ▪ Survey for the beneficiaries ▪ Report the site survey result 	<ul style="list-style-type: none"> ▪ Analysis collected data using mixed methods 	<ul style="list-style-type: none"> ▪ Report meeting and Review ▪ Final adjustment ▪ Submit the report

- Global Development Cooperation Consulting, Korea (GDC hereafter) was the contracted consultant for the evaluation. GDC formed the evaluation team, which consisted of an evaluation expert and a heat supply system expert.
- The team members were: Aaron Kim (PM and evaluation expert), a senior researcher from GDC, Jinhwan Yeo (heat supply system expert), CEO of Jinsung E&C, Ina Kang and Youngchang Yoon (research assistant), researchers from GDC.

2. Evaluation Methodology

- The evaluation method of the project may be summarized with the evaluation design based on systematic and scientific grounds, data collection and analysis as shown below.



□ Evaluation Procedure is as follows.

1. Desk review (related literature and project documents)
2. Collecting and analyzing the statistical data
3. An interview with domestic stakeholders
4. Foreign site survey
 - 4.1. site inspection (machine rooms, beneficiary facilities, residential areas)
 - 4.2. in-depth interviews with the stakeholders and project officials
 - 4.3. survey and in-depth interviews with beneficiaries

□ Limitations of the evaluation

- (No basic line data) There is no baseline data for the project area before and after the project, limiting to measure the mid- and long-term effect of the project, the major evaluation item
- (Limited evaluation budget and period) The evaluation is limited by a short period of evaluation including the site survey, interview and survey for a wide area and limited budget. The evaluation team visited several places based on arbitrary standards but the limitation exists in the sampling for the analysis with the statistical data for the features in the facilities.
- (Lack of willingness to provide the information from the recipient organization) The cooperation (beneficiary) organization for the project is Manbai Company under Urgenchi city, Uzbekistan and enjoys the largest direct benefits from upgrading the energy efficiency and saving maintenance efforts on the facility upgrade through the project. However, the organization has not provided the basic operation data despite continuous requests from the local coordinator and several visits by the evaluation team.

2. Evaluation Result

- As mentioned earlier, the project was evaluated according to DAC's 5 criteria: relevance, efficiency, effectiveness, impact, and sustainability.

1) Relevance

- In order to evaluate relevance of the project, the evaluation team reviewed a) evaluation formation processes, and b) evaluation planning and design processes.

Evaluation of project formation

- The project formation is an important evaluation subject as it is the first step to understand the project and establish the proper approaches and strategies.
- To evaluate the project formation, 3 items were reviewed and analyzed through the document, interviews and other data: a) relevance to the development policies of the partner country, b) relevance to the supporting strategies of Korea, and c) relevance of the project selection to the development needs of the partner country. Overall evaluation was 'very proper' regarding relevance of project formation.
- Uzbekistan government prioritize the supply hot water and heating in order to stabilize the lives of residents since heat supply is bare necessity during the winter. Also, replacement of old heat supply system was among the top items in the national development agenda.

Evaluation of the project planning

- The evaluation of the project planning reviews whether the planning and

design are properly established based on the information achieved from the project formation process and the project direction configured by the development strategies of the configuration country and KOICA.

- The planning and design to improve the project effectiveness are not clearly stated due to fixed approaches and implementation of the project planning due to the features in the project. Therefore, it is judged that the consideration on the factors which affect various projects and reflection on the project design are done by the basic researches and surveys at the proper level during the planning process of the project.
- However, the project is assessed 'partially proper' because it is impossible to check whether the project elements are reflected on the design (ex, logical relation with the achievement) considering the proposed target and development effectiveness and insufficient document data for the specific grounds.

2) Efficiency

□ Evaluation of the project implementation

- The evaluation of the project implementation is largely related to the efficiency and considers the items below during the implementation process.
- The implementation of the plan is achieved as planned without diminishing the range of the project or large modification and the injected elements are assessed as effectively
- The elements, understood as the structural causes, are managed not to largely impede the project through the aggressive communication and efforts by the residing officials and the cooperation country join the project

implementation process at the proper level based on the implementation agreement, contributing to the successful implementation of the project.

3) Evaluation of Impact and outcome (outcome evaluation)

- The project outcome is a crucial element in the ex-post evaluation.
 - The evaluation configures the result chain by specifically classifying the outcome from mid- and long-term and short-term output and collects document, interview and survey data to assess the item with various indicators.
 - The project outcome is classified as short-, mid- and long-term output and indicators are selected for each outcome to review the effectiveness and impact through the survey, statistical data and interview for each indicator.
- Short-term outcome
- First, the improvement in the heat efficiency in the water supply is achieved (about 30%) among the primary output of the project and no more suspension on the heat supply due to errors or misuse of the machine room or the equipment is reported owing to the stabilization in the system.
 - However, the data including the cost and profit structure for the actual heat supply and equipment operation are not provided, failing to be reflected on the evaluation.
 - The short-term outcome felt by the residents include the stable supply of the hot water, benefit increase by reducing the standby time in use and saving the cost for the hot water due to reducing the wasted hot water.

- However, in some cases, the beneficiaries felt no changes because the equipment in the end-user including the pumps installed in each building occurred.
- Mid-term outcome
 - There is no meaningful and realistic cost reduction (more than 10 - 20%) for the heating cost among the residents.
 - The local officials and residents do not recognize the mid- and long-term effects.
- Long-term effect and impact
 - It is difficult to expect a wide range of economic and social impact due to partly improving the cold and hot water supply system.
 - However, it is assessed that the project partly contribute to the development impact and the ripple effect from the viewpoint of Khorezm and Uzbekistan including the mid-term development plan in that the project contributes to long-term development through support which meets the urban development strategies and implementation goals of the Uzbekistan government.
 - Therefore, the score is assigned not the impact evaluation now, but the expected impact in the future. The residents show very positive attitude to the long-term performance and have positive views on the development in the industrial development long-term economic growth.
 - The project may be categorized as "more than 80% of the planned effect" and assessed effective.

4) Sustainability

- The sustainability, one of the 5 DAC benchmarks, is reviewed by 2 viewpoints below.
- The district heating system in Ulaanbaatar was established from the aid of the former Soviet Union and the equipment and facilities were outdated. However, the human system for the management and operation is relatively well-organized.
- In addition, the manpower and the management system to collect the fees as a measure to secure the financial stability. The water supply is immediately suspended without paying the fees in the due date and most users faithfully pay the fees for the water use.
- The financial revenue additionally secured by upgrading the heat efficiency is used for the improvement project by the Public Facility Management Administration, maintenance and establishment of the central control system, meaning to secure the financial sustainability.
- Based on the issued mentioned above, the project is assessed "very sustainable"

3. Suggestions for the similar future projects

A. Result-based design and management

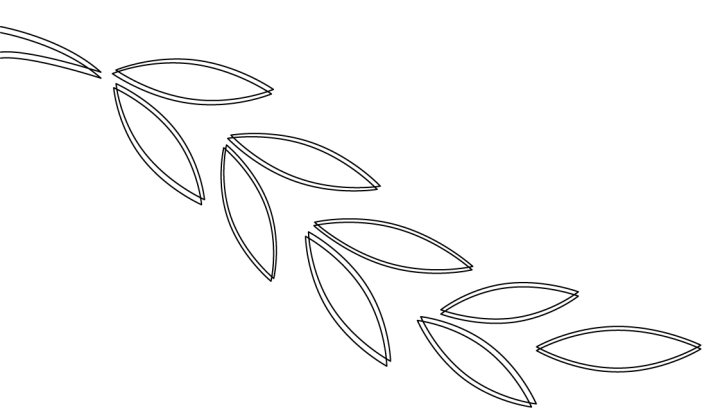
- The final goal and the result-based design and management - Understand the process of finding out the result in the reverse direction with the final goal as the starting point and reflect on the project design by understanding major factors for the performance.
- Not only the design, but also the major process in achieving the goal is used as the milestone for each phase to effectively perform the result-based project management.
- Such result of the project eventually provides the basic framework for the monitoring and evaluation, as well as the monitoring information required for the project entities to enable them to make decisions based on the objective data and information.

B. Thorough analysis of context, stockholders, issues, and culture

- The mandatory ex-ante studies and surveys shall be performed to plan the management and the result-based project design.
- The factors which affect the project shall be understood and the interaction and correlation of the project elements, national, regional and cultural factors shall be analyzed to provide required data for the design and plan on improving the effectiveness.
- This includes the research topics or ex-ante evaluation which may assess the effect or impact through the national strategies and future projects and establishment of the program theory or logic model through in-depth studies or surveys.

C. Meet the international standard and quality

- The project attempts to use high quality materials and meet the international standards and above. It is desirable to continuously observe the standards to reduce the maintenance cost and upgrade the durability of the facilities even though the scope of the project is contracted in the future.
- Also, the possibility for joining the future development project may be increased by building the confidence on the companies and upgrading the image of Korea in the cooperation country.
- The result of the interview with the administrator of the public facility management states that most of the equipment is made in Korea and there exists difficulties in supplying the part during the maintenance and it would be easy to supply additional parts even after the project under the direct ties with the Korean manufacturers.



I . Evaluation overview and methodology

1. Overview
2. Evaluation Methodology
3. Limitations of Evaluation



I

Evaluation overview and methodology



1. Overview

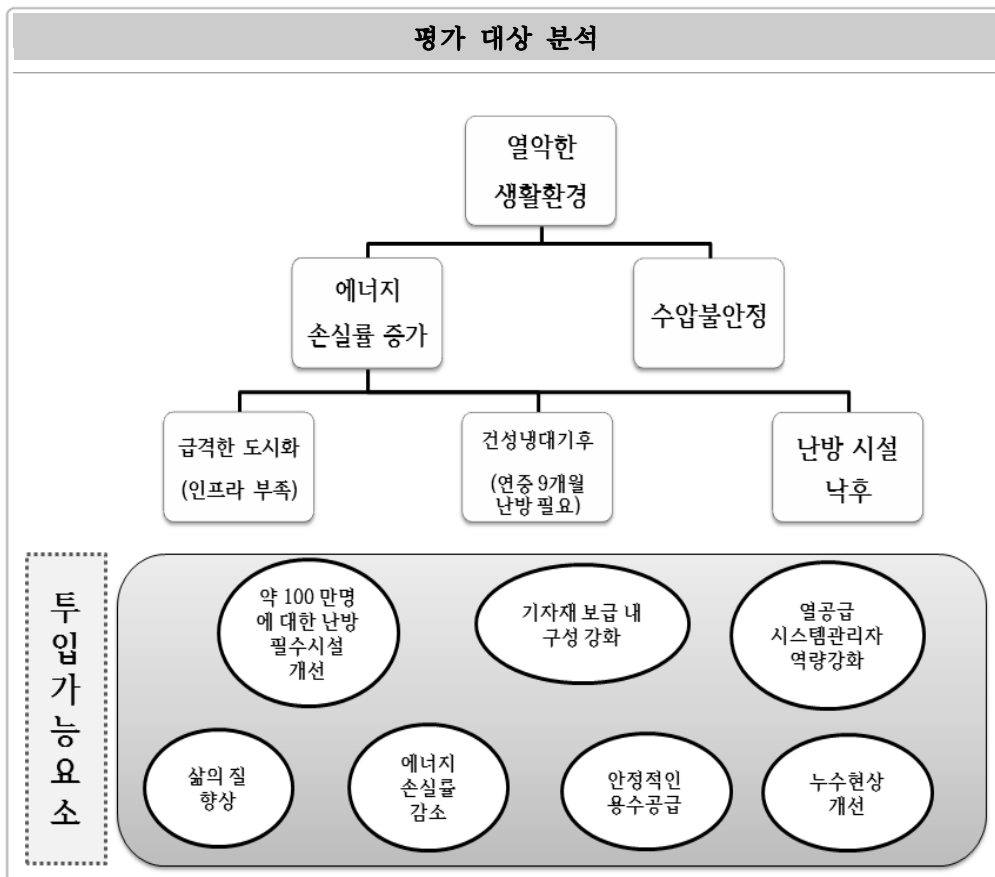
1) Background

- Uzbekistan has the continental dry climate with the temperature reaches as low as -40°C in winter. Stable heating is required during winter and temperature difference between summer and winter is very large.
- The district heating facilities installed in 1970s with the aid of the former Soviet Union had exceed the lifespan of 20 years and show difficulties in providing stable district heating and water supply with very low thermal efficiency (50%).
- In addition, due to recent climate change the water level of the Sea of Aral near Khorezm has been lowered. The life of the district heating facilities was shortened due to the degradation of water quality.

[Recipient country governments]

- The government of Uzbekistan gave priority to investment increase in power sector such as heating power plant expansion and saving fuel consumption to improve heat supply system
- To improve heat supply system, they made a plan such as "local replacement of aging and inefficient boilers program" and "introduction of energy-saving technologies in public buildings.

- To address this urgent need, Uzbekistan government tried to replace aging boilers with new boilers. But due to the lack of funds, only 12 units was replaced.
- The below table shows the result of the analysis of ‘Project for improving the heat supply system in Kohorezm Uzbekistan’



2) Purpose of the evaluation

- The evaluation is a ex-post evaluation and focuses on whether the objective of improving the heat and water supply system in Kohorezm Uzbekistan is successfully achieved. For this purpose, the evaluation performs the analysis based on 5 criteria of OECD/DAC: the relevance, efficiency, effectiveness, impact and sustainability.
- The evaluation focuses on learning lessons and making recommendations based on the analysis of the project-related data in order to improve KOICA's future projects in terms project formation, planning, design, implementation, and evaluation.

3) Description of the Project to Evaluate

- The below table summarizes specifics of the projects including project duration, purpose, scope, and so forth.

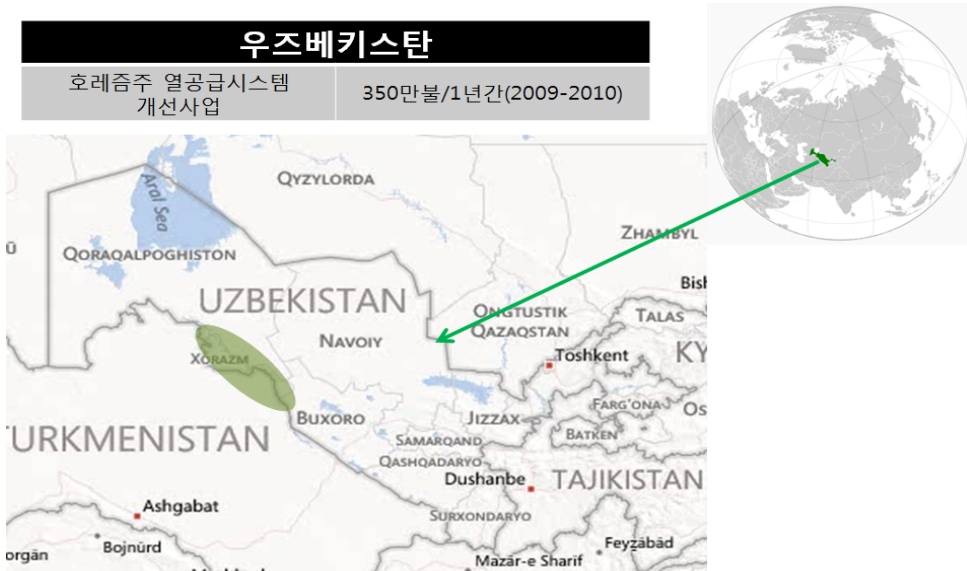
<Table 1-1 Project for the evaluation>

Project Title	Project for improving the heat and water supply system in Kohorezm Uzbekistan
Project duration	1 year (2009-2010)
Purpose	To contribute to the stable and sufficient heating and water supply, improvement in the energy efficiency and upgrading quality of lives by improving the heat and water supply system in Khorezm, Uzbekistan
Project Scope	<ul style="list-style-type: none">• Improvement construction of the heating and water supply facilities (Design, audit and test run support to exchange machines including the hot/cold water pumps and heat exchangers)• Dispatch experts: Specialists in the equipment operation and automatic control• Training by invitation to Korea

Budget	USD 3.5 million
Project Site	Khorezm province (Located 1,000km west from Tashkent)
Beneficiary	People in around Khorezm
Implementing Agencies	Korea - KOICA
	Uzbekistan - Khorezm Province

- The project was scheduled to complete in 1 years from 2009 to 2010 with the budget of USD 3.5 million US dollars. The project scope includes a) the replacement of the equipments in 54 boiler room b) training personnel for capacity building for operation and maintenance of the heat and water supply facilities.
- The project is to improve the issues of degraded heat efficiency due to aging district heating facilities built by the support from the former Soviet Union in the 70s and to upgrade the benefits for the residents by producing and supplying inexpensive and abundant heat energy for the purpose of 1) upgrading the heat efficiency of the water supply system through supporting the equipment and construction services, 2) upgrading the maintenance and operation of the water supply facilities by providing invitation training and dispatching experts for Uzbekistan engineers and 3) promoting the excellence in the advanced facilities of Korea to lead the local facility companies to enter the Uzbekistan market.
- The project achieves the targeted improvement and shows positive effects including the energy efficiency upgrade, effective post management of the recipients and propelling the improvement project on its own. However, the mid- and long-term effects and the impact of the project are limited.

<Figure 1-1 우즈베키스탄 사업 지역>



4) Evaluation Scope

- The scope of the ex-post evaluation is as follows.
- The range of the ex-post evaluation is as follows.

Evaluation Design	Domestic Survey	Field survey	Result Analysis	Write and submit the report
<ul style="list-style-type: none"> ▪ Evaluation criteria and methodology ▪ Assignment of roles for the evaluation team ▪ Write interview and survey questions ▪ Establish the evaluation plan 	<ul style="list-style-type: none"> ▪ Document study ▪ Policy documents of KOICA and other organizations ▪ Heat supply system and the Uzbekistan national development plan documents ▪ Major social and economic indicator survey 	<ul style="list-style-type: none"> ▪ Establish the site survey timetable ▪ Beneficiary interview and site visit ▪ Survey for the beneficiaries ▪ Report the site survey result 	<ul style="list-style-type: none"> ▪ Analysis collected data using mixed methods 	<ul style="list-style-type: none"> ▪ Report meeting and Review ▪ Final adjustment ▪ Submit the report

5) Evaluation performance

○ The project performs the evaluation with the stages below.

#	Task level	Action plan	Output	Schedule
1	Initiation Report session	Ex-post evaluation design Initiation report session	Initiation report	6/4
2	Local ex-ante survey	Document survey, statistical survey	Basic survey and local research product	May~ Mid June
		Consultant, local expert selection, interview	Interview questionnaire, transcript, recorded file, consulting report	
2	Establish the evaluation plan	Determine the evaluation standard and survey method under the cooperation with KOICA Establish specific plans for the ex-post evaluation Propose the ex-post evaluation standard and methodology Develop the local survey tools	Service plan Local survey tools - Questionnaire, interview questionnaire, etc.	5/30
3	Site survey Plan and preparation	Select the local data survey		May~ Mid of June
		Designate the local coordinator and translator		
		Set up the site survey timetable	Task implementation plan, service initiation report	
		Write and report the site survey plan	Action plan	
4	Site survey	Site survey - Stakeholder group survey, in-depth interview, focal group discussion	Survey result, transcript, recorded file	6/23 - 29
		Meeting - Project plan, task assignment, negotiation and coordination, etc.	R/D (Consultation proceeding)	

#	Task level	Action plan	Output	Schedule
		Secure the basic data and request additional data		
		Site survey	Site survey output	
		Attendance, observation	Field note	
		Meeting with local relevant organizations		
5	Apply the evaluation strategy and method	Apply the implementation, monitoring strategies and method	Apply the evaluation strategy and method	June ~Aug
		Perform the ex-post evaluation		
6	Data analysis and consulting	Data analysis based on the site survey and evaluation data Consulting from relevant organizations and through network	Data with evaluation and analysis	July ~Sep
7	Interim report	Interim report session	Report on the site survey result	8/27
8	Collect and analyze the survey result	Integrate and analyze the Korean and local site survey		10/16
9	Final Report session	Final report session (11/11)	Final report draft (11/11)	11/11
10	Final report	Reviewed and confirmed by the evaluation review board of KOICA	Confirmed report by reflecting the result from the evaluation review board	End of Nov

- Global Development Cooperation Consulting forms the evaluation team as below to perform the evaluation. The team consists of Aaron Kim, a senior researcher Global Development Cooperation Consulting and in charge of the assessment, CEO Jinhwan Yeo at Jinsung E&C, researchers Ina Kang and Youngchang Yoon.

<Table 1-2 The evaluation team>

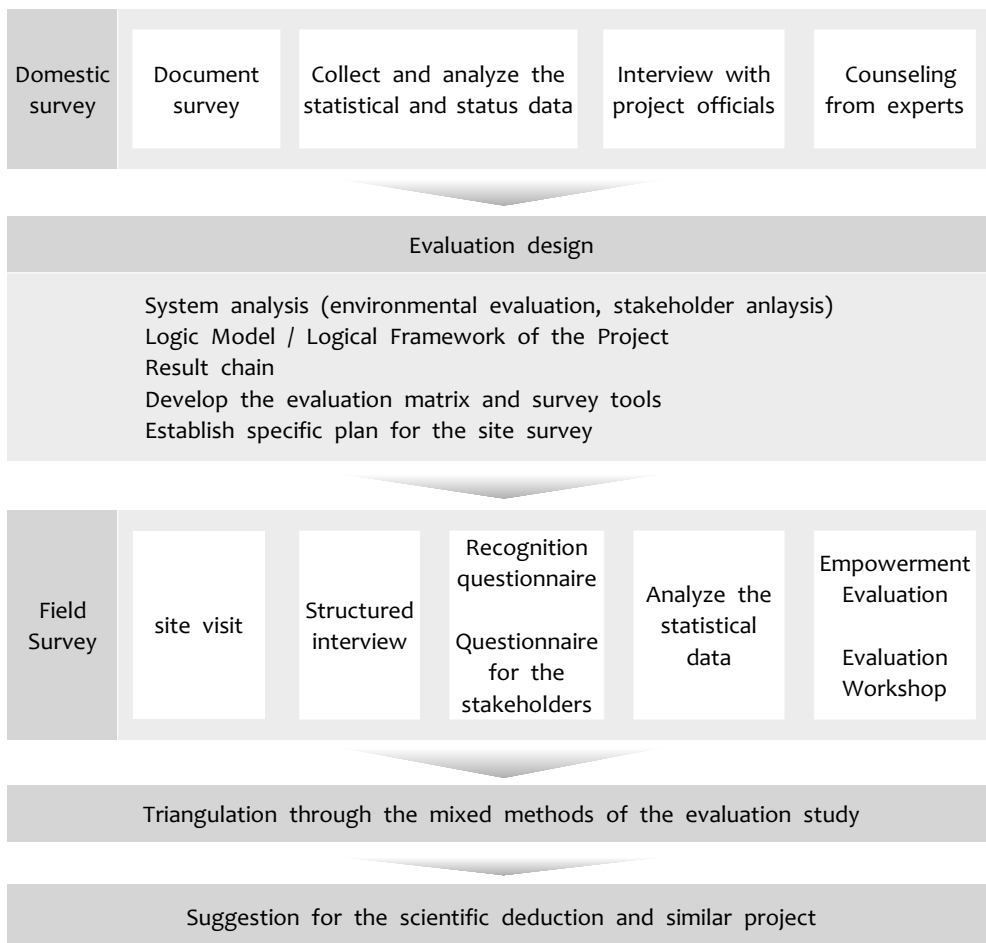
Specification	Name	Organization and title	Role in the team
Senior researcher (PM)	Aaron Kim	GDC Consulting Principal researcher	<ul style="list-style-type: none"> • Oversee the evaluation - Evaluation expert • Oversee the preparation and implementation of the site survey • Design the evaluation methodologies, perform the evaluation and analyze the result • Write the evaluation matrix and questionnaire • Site survey in Uzbekistan • Write the project evaluation report
Co-researcher (Co-researcher)	Youngwoo Park	GDC Consulting Principal researcher	<ul style="list-style-type: none"> • Design the evaluation methodologies, perform the evaluation and analyze the result • Write the project evaluation report
Co-researcher	Jinhwan Yeo	Jinsung E&C Tech office Representing director	<ul style="list-style-type: none"> • Expert in the heat supply system • Local and foreign document study, analyze the statistical data • Site survey in Uzbekistan • Analyze the survey result and write the report
Assistant researcher	Ina Kang	GDC Consulting Researcher	<ul style="list-style-type: none"> • Collect the basic data and analyze the document • Collect and analyze the site survey result • Administrative support and assist in writing the report
Assistant researcher	Youngchang Yoon	GDC Consulting Researcher	<ul style="list-style-type: none"> • Collect the basic data and analyze the document • Assist in local report • Site survey in Uzbekistan • Assist in data survey and collection
Assistant researcher	Hyunjung Kang	GDC Consulting Researcher	<ul style="list-style-type: none"> • Collect the basic data and analyze the document • Assist in local report • Assist in data survey and collection



2. Evaluation Methodology

1) Evaluation Methods

- The evaluation method of the project may be summarized with the evaluation design based on systematic and scientific grounds, data collection and analysis as shown below.



2) Evaluation Procedure

(1) Document study

[List of the document study]

Survey data	
KOICA internal documents	• PDM
	• Preliminary feasibility study
	• Record of discussion
	• Completion report
	• Khorezm FS
	• Khorezm implementation agreement report
	• Khorezm implementation agreement report,TOC
	• List of invited trainees
	• KOICA / Korea District Heating Corporation (2009), final report
Recipient country Document	• The State Committee of the Republic of Uzbekistan on statistics
	• The Governmental Portal of the REpublic of Uzbekistan
Others	• ODA Korea (2012), National cooperation strategy CPS Uzbekistan
	• Ministry of Foreign Affairs (2012), Status of Uzbekistan
	• ERINA (2013), Trend analysis of Northeast Asia

(2) Collect and analyze the statistical and status data

- The local statistical data are collected to measure the mid- and long-term project effect and impact to compare and analyze with the statistical data acquired from the ex-ante and ex-post evaluation.
- Analyze the available statistical data selected from each evaluation matrix (ex: Local environment and economic indicators, etc.)

- Utilize the informations from aid-related international organizations including the OECD/DAC, World Bank and UNDP, local survey and statistical data archive, other informations from the donating countries and statistical site for the cooperation country

(3) Interview with Domestic Stakeholders

- Interviews with domestic parties concerned have been done in order to collect opinions from all walks of life related to this project, in Korea. The interviews mainly focused on the relationship of the project with Korea ODA policy, KOICA's achievement, and agreement process with interested parties, relationship with previous projects. etc Interviewees were people from.. KOICA. PMC. and experts of the dispatch and training project.
- Upgrade the understanding of the complementary project establishment, implementation process and status through individual or group interviews for the poor analysis from the document study.
- Upgrade the understanding of the special knowledge on the evaluation of the project through interviews with heat supply system experts and meeting with project group
- Interview and question
 - Structured interview to secure specific data for each criterion
 - Secure the project-related information and data for successful evaluation

[List of the domestic interviewees

Specification	Interviewee	
External experts	Kichang, Lee Bongkyun, Kim	KDHC(Korea District Heating Corp)
	Jinseock, Kim	JangHan engineering

(4) Foreign site survey

- The foreign site survey is performed by various methods including the site inspection, in-depth interviews with the stakeholders and project officials, survey and in-depth interviews with beneficiaries and local workshop

A. Site survey

- Machine rooms with improved the heat supply system (Station No. 1, 5, 9, 14, 22, 23)
 - Check the improvement in the machine room and output,
 - Interview the machine room manager
 - Check the operation log
- Apartments for the residents where the improved heat supply system is supplied (Around station No. 1)
- Hospital where the improved heat supply system is supplied with 80 rooms (URGENCHI No 2 Hospital)

B. Interview the stakeholders and project officials

- The visit to the major organizations during the site survey is performed for major stakeholders directly engaged in each evaluation related to the ex-post evaluation.
- The key questions for each item are proposed by the proposed evaluation framework, tasks of the interviewees and the participation range of the projects supported by KOICA

Organization	Interviewee	Major collected data
KOICA Uzbekistan Branch	Local office head and deputy head	<ul style="list-style-type: none"> • Project planning, relevance with the implementation process, evaluation and opinion from the responsible government organizations for the efficiency and effectiveness of the project • Related basic data (Document, measured figures, other related data) • Data for handling complaints • Related socioeconomic indicator (Population, income, spending, etc.)
Khorezm Province	Personnel who was responsible for Project implementation	
Manbai company	Personnel who was CEO and responsible for Project implementation Personnel who is responsible for the operation of heating supply facilities.	<ul style="list-style-type: none"> • Evaluation and opinion from the beneficiaries for the relevance of project planning and implementations, the efficiency and effectiveness of the project • Operation data
Service area	Resident interview	Evaluation and opinion from the beneficiaries for the effectiveness of the project

○ Use the structured and in-depth interview

- The tools for the in-depth interview shall be structured to be compatible with the ex-ante document study and statistical data analysis. The analysis result shall be designed for the complementary and covered.
- The data selection tools including primarily developed interview data based on the document study shall be translated to the local language and developed after the pilot test for 1 or 2 local people (The process, called the formative evaluation, is an important process of acquiring required data to check and revise with various standards including accuracy on specific contents, proper language and consistency in the answer with the participants)

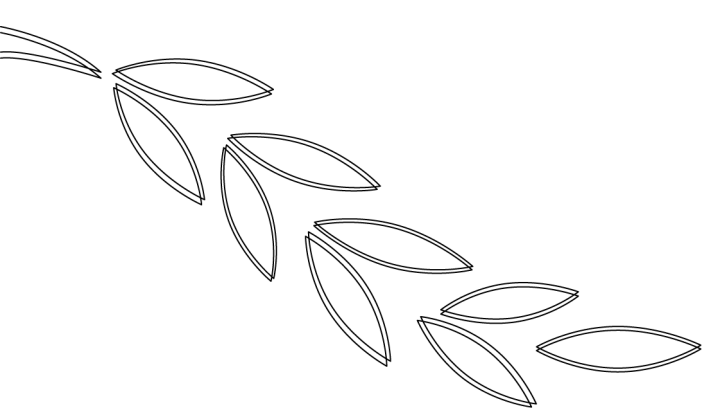
- The validity and reliability of the tools are upgraded through the process
- The following small group test and pilot test are omitted considering the limitation in the time and cost for the ex-post evaluation
- Select a total of 10 - 20 people for each stakeholder group through the local coordinator before the site survey and perform the interview (expected multiple interviews due to time limit)
- Use the structured interview paper and collect the interview data through the field note
- Record the whole interview process and make transcript for the analysis



3. Limitations of evaluation

- (Difficulties in securing the database for the status data) The biggest hurdle in assessing the heating and water supply project in is to secure the database for the status data. In particular, it is difficult to relatively compare and conclude the effect of the project due to without local indicator data to measure the mid- and long-term effect of the project, the major evaluation item.
- (No basic line data) There is no baseline data for the project area before and after the project, limiting to measure the mid- and long-term effect of the project, the major evaluation item
- (Limited evaluation budget and period) The evaluation is limited by a short period of evaluation including the site survey, interview and survey for a wide area and limited budget. The evaluation team visited several places based on arbitrary standards but the limitaton exists in the sampling for the analysis with the statistical data for the features in the facilities.

- (Relevance in the evaluation timing) The site survey is performed in the season without providing the heat (summer), difficult to understand the actual operation status of the project.
- (Requirement for the ex-ante survey for effective evaluation) The evaluation consists of 1 site survey process and preparation for the survey through document studies in Korea. However, only the document study is not enough to effectively perform the site survey and there exists the danger of the trial and error in the site survey to the degradation of the evaluation quality. Therefore, it is required to add the preparation ex-ante survey to form the frame for effective evaluation and perform faithful site survey.
- (Lack of willingness to provide the information from the recipient organization) The cooperation (beneficiary) organization for the project is Manbai Company under Urgenchi city, Uzbekistan and enjoys the largest direct benefits from upgrading the energy efficiency and saving maintenance efforts on the facility upgrade through the project. However, the organization has not provided the basic operation data despite continuous requests from the local coordinator and several visits by the evaluation team.



II . Evaluation Framework and Matrix



Evaluation Framework and Matrix

- The system improvement project for the heat supply in Mongolia focuses on stable water supply.
- The matrix is formed for the performance evaluation based on the performance model below.

Injection (resources)	Activity	Output	Outcome	Impact (long-term outcome)
<ul style="list-style-type: none"> • Budget • Human resources • Project site and space • Knowledge, technology 	<ul style="list-style-type: none"> • Equipment installation • Design and construction • Dispatch experts • Invitation training • Project space • Other supports 	<ul style="list-style-type: none"> • System improvement • Upgrade the heat efficiency • Stable water supply • Elongate the system lifecycle • Capacity building for the managers 	<ul style="list-style-type: none"> • Improve the residential lives • Decrease the diseases • Save the heating costs • Save the costs for the water supply • Save the resources • Transfer related technologies 	<ul style="list-style-type: none"> • Upgrade the quality of lives • Upgrade the health conditions for the residents • Revitalize the local economy • Population increase • Industrial technology development

- In addition to the performance evaluation, the process evaluation matrix is additionally prepared to assess the project formation, planning and implementation and the questions for the interview and questionnaire are prepared based on the matrix to collect the data.

- The matrix plays a role as a table of contents which categorizes, analyzes and is proposed as the result for each evaluation item.
- This facilitates the review and discussions on the result of the evaluation for each project phase and assists in systematically providing the suggestions.
- The process evaluation matrix is as follows.

<Table 2-1 Process evaluation matrix>

Evaluation Benchmark	Evaluation item	Specific question for the evaluation	Evaluation indicator	Data source
① Project formation				
Relevance	1. Consistency with the development policies of the cooperation country	<ul style="list-style-type: none"> ○ Whether the project meets the development strategies and policy direction of the cooperation country 	<ul style="list-style-type: none"> ○ Status of the ODA reception for the cooperation country ○ Weight for each sector and trend ○ Contents of the policy documents and strategic documents 	<ul style="list-style-type: none"> ○ Request for support ○ Report on the project feasibility ○ Plan on the project implementation
	2. Consistency with the support strategies of KOICA	<ul style="list-style-type: none"> ○ Whether the project meets the development strategies and policy direction of KOICA 	<ul style="list-style-type: none"> ○ Support status of the cooperation country by KOICA ○ Portion and trend in the aid budget ○ Priority ○ Contents of the policy documents and strategic documents 	<ul style="list-style-type: none"> ○ Strategic documents for each cooperation country of KOICA ○ Use as the statistical data on the aid for the cooperation country with KOICA
	3. Relevance of the project selection	<ul style="list-style-type: none"> ○ Properness for the survey and study on the project demand ○ Project efficiency ○ Realization of the project 	<ul style="list-style-type: none"> ○ Specific grounds for the demand analysis and basic survey ○ Project element 	<ul style="list-style-type: none"> ○ Survey report on the project feasibility, interview with the officials

Evaluation Benchmark	Evaluation item	Specific question for the evaluation	Evaluation indicator	Data source
		<ul style="list-style-type: none"> Whether the project contains meaningful ripple effect and impact 		
② Project planning				
Relevance	1. Feasibility for the purpose	<ul style="list-style-type: none"> Whether the short-, mid- and long-term goals of the project are properly established 	<ul style="list-style-type: none"> Logical relation with the process in achieving the goals Understand the external factors Understand the major assumptions Whether to reflect on the design 	<ul style="list-style-type: none"> Project feasibility survey Plan on the project implementation Report on the site survey result PDM review
	2. Design Feasibility	<ul style="list-style-type: none"> Whether the project design is proper and the solutions to various issues in the project implementation are appropriate 	<ul style="list-style-type: none"> Relevance of the technical supports related to the feasibility review Relevance of the injection (budget, technology, human resources) - Effective, efficient Allocate the support from KOICA with the cooperation country against the total project cost Select the proper purchase method Consider risks, external conditions and major assumptions in achieving the expected effect of the project 	<ul style="list-style-type: none"> Project feasibility survey Plan on the project implementation Interview the responsible officials PDM review

Evaluation Benchmark	Evaluation item	Specific question for the evaluation	Evaluation indicator	Data source
③ Project implementation				
Efficiency	1. Progress against the plan	<ul style="list-style-type: none"> ○ Is the project completed without modification based on the implementation plan? 	<ul style="list-style-type: none"> ○ Difference in the actual implementation from the plan ○ Delay the project cost, procurement and implementation 	<ul style="list-style-type: none"> ○ Review the project report ○ Interview the implementing organizations ○ Site survey
	2. Injection element	<ul style="list-style-type: none"> ○ Are all the resources effectively injected into the purchase and construction? 	<ul style="list-style-type: none"> ○ Price changes in various equipment during the project ○ Additional cost due to unexpected technical flaws ○ Unexpected cost on the environment 	<ul style="list-style-type: none"> ○ Review the project report ○ Interview the implementing organizations ○ Site survey
	3. Structural issues	<ul style="list-style-type: none"> ○ Are there any structural causes inhibiting the efficiency? ○ Are the problems in the structural causes effectively solved? 	<ul style="list-style-type: none"> ○ Constraints recognized by each stakeholder 	<ul style="list-style-type: none"> ○ Interview with project officials
Effectiveness, Relevance	4. Participation from the cooperation country	<ul style="list-style-type: none"> ○ How much does the cooperation country join the project design and implementation? 	<ul style="list-style-type: none"> ○ Participation of the cooperation country in the project selection and purchase procedure ○ Participation of the stakeholders in the project for support 	<ul style="list-style-type: none"> ○ Request for support ○ Plan on the project implementation ○ Interview with the officials in the cooperation country ○ Interview with the recipients

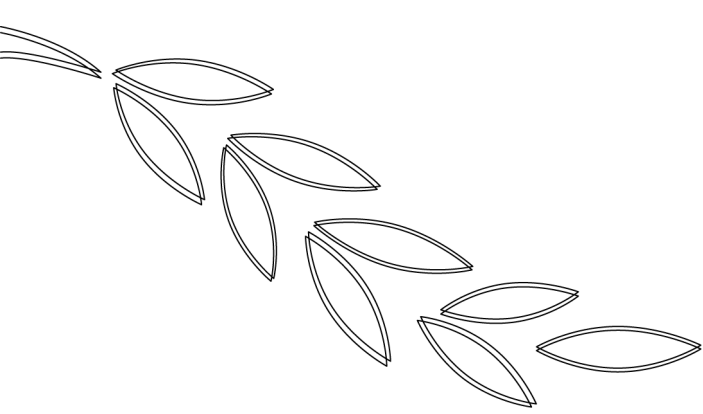
Evaluation Benchmark	Evaluation item	Specific question for the evaluation	Evaluation indicator	Data source
④ Sustainability				
Unsustainability	1. Sustainability for the human and institutional system	<ul style="list-style-type: none"> ○ Is there any stability in the human or institutional system to back up the project sustainability? 	<ul style="list-style-type: none"> ○ Whether to secure human resources for the proper maintenance and management ○ Concreteness and realization for the exit strategy ○ Concreteness and realization for the following measures ○ Concreteness and realization for the ex-post management ○ Ownership and willingness of the cooperation country for the project 	<ul style="list-style-type: none"> ○ Interview with government officials ○ Implementation cooperation ○ Report on the final construction ○ Interview the responsible officials ○ Interview the implementing organizations
	2. Financial sustainability	<ul style="list-style-type: none"> ○ Is there any financial stability to back up the project sustainability? 	<ul style="list-style-type: none"> ○ Price of the output from the supporting project ○ Financial soundness in the project organizations ○ Secure the budget for the proper management and maintenance 	<ul style="list-style-type: none"> ○ Interview with government officials ○ Financial report from the project organizations ○ Interview with the officials in the project organizations

- The performance evaluation matrix potentially selects specific performance indicators from the performance model mentioned above, collects data and uses the questions for the beneficiaries to collect the survey data by developing the questions into each specific category.
- The performance evaluation matrix is as follows.

<Table 2-2 Performance evaluation matrix>

Item	Performance level	Item for the performance evaluation	Performance indicator	Data source
Field		Environment evaluation	Air and water quality	Interview, Survey, statistics
Impact	Long-term effect	Quality of life upgrade	Evaluation by the residents in the project site (recognition) Upgrade the life (owing to relatively saving the heating cost)	
		Upgrade the health conditions for the residents	Statistics of the diseases in the winter (Attack rate, death rate)	
		Population increase	Population increase in the project site	
		Local economy Vitalization	Economic indicators in the project site (income, total production)	
		Industrial technology development	Trend in the production based on new industrial technologies	
		Local community Other effects	Satisfaction	
		Employment	Direct and indirect employment	
		Economic development effect	Local economy production (Local economy) Number of registered employers for type, tax revenue or sales (Production GDP) For industries, regions (Income) For households, individuals	
		Performance	Mid-term performance	

		Decrease the diseases	Statistics related to the diseases in the winter (attack rate, death rate)	
		Save the resources	Save the cost for the local heat supply, Save the heating cost for households	
		Related technology transfer	Status of effective maintenance in the local heating facilities Suspend and retrieve the service Exceed the expected maintenance cost Overall issues, solutions and process	
	Short-term performance	Water supply cost reduction	Cost of the water use per household	
		Heat efficiency upgrade	Heat efficiency	
		Stable water supply	Supply volume	
			Required volume / Consumed volume	
			User satisfaction	
			Water supply cut	
			Stable temperature and pressure (goal)	
Number of users in the water supply system				



III. Evaluation Results

1. Evaluation of business formation
2. Efficiency
3. Evaluation criteria based on inspection-result



Evaluation Result



1. Evaluation of business formation

- In chapter 3, evaluation is classified, presented and analyzed according to the five DAC criteria.
- Business formation is first step for establish an appropriate approach direction and a strategy..
- Premise the feasibility and viability of the business are examined sufficiently in the previous step.
- It is based upon the premise that is the feasibility and realistic possibility of the business were examined sufficiently in the previous step. Business evacuation and feasibility study were excluded in this range of evaluation.
- Evaluation items and questions for the business formation of evaluation are as fallows;

Item	Detailed evaluation questionnaire	grade
1. Consistency of partner country's development policy	Is it consistence with partner coutry's policy?	appropriacy
2. Consistency of KOICA's support strategy	Is it consistence with KOICA's policy?	

3. The adequacy of selected project	Is it appropriate of the research about the project demand?	
	Is the project has an effectiveness?	
	Is the project has a feasibility?	
	Is the project has an influence?	

1) Relevance

A. Consistency of partner country's development policy

a. Literature materials

- MGD(Based Comprehensive National Development Strategy of Uzbekistan) is promoting for a poverty reduction and a expand foreign investment as "Strategies of national welfare development(2008-2010) and "Industrial development 5 year plan(2011-2015).
- In this strategies, policy issues are presented as 3 ways such as "Strengthen national competitiveness through the development of human resources", "Strengthen market economy system through the administration information and system maintenance" and National health improvement through the system improvement". (Country Cooperation Strategy - Bangladesh, Uzbekistan, the Philippines, Mongolia, Cambodia (2012). p. 134).
- Especially, Uzbekistan lags in infrastructure, it was built by the former Soviet union. Thus the government highlight as a priority about an extension Heating power plant, modernization of the power plant and reduction of the fuel consumption. This project is very important.
- This project belongs to the urban development area. Since this nation is continental climate, air temperature is -30 degree in winter. Almost

Uzbekistan residents rely on district heating. When considering the need of heating, this project is necessary.

- Moreover, as raise energy efficiency, it contributes to resource saving and protection of environment. Also it has relevance for the promotion of social welfare.

Source
Country Cooperation Strategy - Bangladesh, Uzbekistan, the Philippines, Mongolia, Cambodia (2012)

b. Interview data

- In the literature materials, this project is directly linked with residents's survival. Also it was a long-awaited project for a recipient country.
- When considering the literature materials, weather characteristic and life environment, this project is very suitable.

B. Consistency of KOICA's support strategy

a. Literature materials

- According to the Mongolia CPS strategic goals of KOREA, goals are contribution for the balanced growth.
- Therefore, cooperation strategy of KOREA focused on 3 kinds of areas of cooperation.

- ① Improve the transparency and efficiency of public sector → Improve ICT-based public administration
- ② Balanced growth of the country and support sustainable development of cities → Urban Development
- ③ Improve agriculture productivity, enhance food security and income generation through → Agricultural Development

- This project was not significantly higher relevance.
- However, when considering the nation had a budget problem, it was judged a meaningful program.
- Also, in terms of improvement a effectiveness through accumulated technique, "Urban Development" was high relevant.
- Korea had experienced city problems because of rapid industrialization. Korea solved problems through a comprehensive land development plans and urban development plans.
- KOREA was in project for variety infrastructure such as not only a heat supply system improvement in the Khorezm, but also major river renovation plan in the Absheron.
- This project was coincide with urban development area. Through KOREA's experiences and abilities, it could be help cooperation nation's development.

Source
Country Cooperation Strategy (2012)- Bangladesh, Uzbekistan, the Philippines, Mongolia, Cambodia
KOREA district heating corporation (2010). heat supply system improvement project outcome report in the Khorezm, Uzbekistan

C. The relevance of selected project

○ This assessment item is a review of the process of be selected.

- Is the research suitably for a project demand?
- Is high business effectiveness?
- Is high the business realistic possibility?
- Is there the business has a effectiveness?

a. Literature materials

○ Investigation and research of project demands were analyzed about project destination and beneficiary group.

○ (Development demands of Uzbekistan) A heating supply system in the Khorezm was built with concept of district heating by former Soviet Union. After the independence in 1991, it didn't renovation and replacement. Because the system was too old, it had a water leak and increase maintenance expenditure easily. The system was effected to residents life quality.

○ (Low thermal efficiency) Because of the old boiler system, thermal efficiency is low. Also, residents used central heating system because of the low density. Thus, this system was lower thermal efficiency than existing system.

Source

KOICA(2009). A heating supply improve project pre-feasibility study report. Khorezm, Uzbekistan

b. Interview data

- When interviewing with project associates, the reason of request came out into open that various reasons such as energy efficiency, improve resident life and resource conservation.
- Another thing is that KOICA's local office checked the procedure about project performance after preliminary research and consultation process.
- Because of the budget problems, only 54 of the heating systems were selected out of 124.
- Consideration of the influence and ripple effect paid due regard to their convenience.
- Finally, the relevance of select project had a suitable research.
- However, because the absence of documents and records, "Project formation" has a limitation.

2) Evaluation of project planning

○ Project planning and design has been reviewed as the progress direction.

Evaluation items	Evaluation questionnaires	Criteria
1. Feasibility of setting goals	Is set properly as Short-term and long-term performance of the business?	appropriacy
2. Feasibility of design	Is set properly the design and problem-solving approach?	

A. Feasibility of setting goals

○ The following is reviewed for a propriety.

- Logical connection of the objectives achievement process
- Identify external factors
- Identify the major premise
- Reflected in the design

○ Examination was accomplished based on the "preliminary research report", "conduct consultation result report" and "intermediate evaluation result report".

○ (Logical connection of the achieving goals process) At that time, this project's objective was little ambiguous.

○ In the execution discuss report, was subspecialized with "Through the improvement heating supply system, progress the thermal efficiency and reduce the heating energy consumption", "Stabilizing of heating and hot water supply system" and "Demonstrate the superiority of KOREA' technology".

- In the pre-investigation, logical connection of the achieving goals process was not stated. However, water supply was an essential living environment, so this project had a logical connection to improve the quality of life.
- Also the achieving goals process was understood enough. Because the report included a detailed product.
- (External factors and main prerequisite) All reports that were contained pre-inspection to conclusion evaluation reports had a analysis of external factors and main prerequisite.
- The most important pre-inspection activity was interview with project associates and site visit.
- After the execute a conference, it was checked that complicated management system. And also confirmed the each institution's tasks.
- There was a discussion about what factors affect to each project such as the expected risk and political and cultural consideration.
- Also for the successful project, procedural requirements should be improved because it was not clear.
- (Design reflect whether) It was difficult to judge about reflection of major information and external factors. Because the design related documents were not exist.

Source
KOICA (2009). A heating supply improvement project pre-feasibility report. Khorezm,
KOICA (2009). A heating supply improvement project Conducted consultation report. Khorezm, Uzbekistan
KOICA (2010). A heating supply improvement project final reports Khorezm, Uzbekistan
KOICA (2011). A heating supply improvement project final reports final evaluation report Khorezm, Uzbekistan

B. Feasibility of design

- The following was reviewed from the documents that is related design. The topic of discussions are "appropriate project design", and "appropriate problem-solving approach".

- Adequacy of the technical support related to the feasibility examination
- Adequacy of Input(budget, technique, human resources)
- Distributed the total project cost
- The selection of an appropriate purchase method
- Consideration or not of risks, external factors and main prerequisite

- But it was judged that essential project design documents are not exist.
- Thus, it is too difficult to judge to whether or not the enforce. Also the proposed index is not appropriate to apply.
- According to the report of project conclusion evaluation, the consideration of the various external factors was reflected in a machine room, apparatus, training program and Ect.
- It was confirmed when interviewed with PMC institution and agency representative also and through the aggressive activity, it was able to confirm the effort for an improvement
- When interviewing with PMC institution, it was checked the District heating corporation's ability of project management and process such as the working group's project management certificate, technician certificate.
- Project design and perform were implied effective process.

3) Results of Relevance Evaluation

- Because this project focused on the improvement of living condition and thermal efficiency. So, it was judged that incontrovertible project.
- Uzbekistan government prioritize the supply water and heating. Thus, in the national level, it was coincide with the policy and priority.
- However, almost facilities focused on the hospital and school residents area's facilities were only 6. It needed analysis of relevance and effectualness.

Evaluation items	Evaluation questions	Scores
1. Consistency of partner country's development policy	Is it consistence with partner coutry's policy?	3
2. Consistency of KOICA's support strategy	Is it consistence with KOICA's policy?	3
3. The adequacy of selected project	Is it appropriate of the research about the project demand?	3
	Is the project has an effectiveness?	
	Is the project has a feasibility?	
	Is the project has an influence?	
1. Feasibility of setting goals	Is set properly as Short-term and long-term performance of the business?	2
2. Feasibility of design	Is set properly the design and problem-solving approach?	3
The participation of partner countries	Participation of partner country in the purchase process and selections.	3
Overall adequacy- Very appropriate		3



2. Efficiency

1) Evaluation of project implementation

○ The follow is a evaluation items that related with efficiency.

Evaluation items	Evaluation questions	Scores
1. Transition degree	Is it finished on time?	Efficiency
2. Commitment element	Are all resources put efficiently?	
3. Structural factors	-Is disturb cause about efficiency exist? -Are the structural factors problems solved efficiently?	
4. Participation of partner country	Is the partner country participate in project design and performance initiatively?	Appropriacy,

○ The following is literature materials for the evaluation.

Literature materials
KOICA (2009). A heating supply improvement project pre-feasibility report. Khorezm,
KOICA (2009). A heating supply improvement project Conducted consultation report. Khorezm, Uzbekistan
KOICA (2010). A heating supply improvement project final reports Khorezm, Uzbekistan
KOICA (2011). A heating supply improvement project final reports final evaluation report Khorezm, Uzbekistan

A. Transition degree

○ Transition degree was reviewed as 2 ways.

- difference existence and nonexistence of the plan and execution
- The delay of project costs, procurement and implementation.

○ (Difference existence and nonexistence of the plan and execution) Based on the market research and Uzbekistan's request, it was selected a improve machine rooms and facilities specifications.

○ According to the based on computational, the facilities were selected.

Division	Plan	Implement	Excution Rate
Boiler	118	113	96%
Heating Changer	54	54	100%
Pump(primary, secondary)	108	108	100%
Gas meter	54	54	100%

○ (Project expense, delay of obtain and process) In case of Uzbekistan, in November starts winter, so heating supply is necessary. It was confirmed that the process was follow the schedule for the protect from delay.

Schedule of Project Promotion of Conduct Consultations Result Report

Division	2009	2010			
	4/4	1/4	2/4	3/4	4/4
Site visit and Design	■ ■				
Equipment Purchase and Trassport		■ ■ ■			
Demolish Old Facilities			■ ■ ■ ■ ■		
Installation and Commissioning of New Equipment			■ ■ ■ ■ ■	■	
Dispatch Experts		■	■ ■ ■	■ ■	■
Invited Trainees			■		
Local Training				■ ■	
Report				■ ■	

Source: Conduct Consultations Result Report

Schedule of Project Promotion of

Division	2009년	2010년			
	4/4	1/4	2/4	3/4	4/4
Site visit and Design		■ ■ ■			
Support equipment					
- Specification decision		■			
- Production and Purchasing		■ ■			
- Transportation and Inspection			■ ■		
- Installation and commissioning inspection			■ ■ ■ ■ ■		
Invited training and Local Training					
- Invited training			■		
- Local Training					■ ■
Dispatch Experts		■ ■ ■	■ ■	■ ■ ■	■
Evaluation			■		■

Source: Conclusion evaluation report

- Original schedule was to start from the March to August. During this time, the plan was to make the almost facilities 's construction.
- PMC institution stated the list of equipment and construction schedule.
- Performance part was confirmed that all process finished within a certain period of time.
- But project areas residents was unaware of water supply problem result from construction delay.
- Transition degree was judged efficiently, but it was not promoted to residents enough.

B. Input

- heck that all resources has used efficient.

- Check whether price change about equipment is true or not
- Check whether unexpected additional price result from mechanical failure is true or not
- Check whether unexpected environment cost is true or not

- The 3 ways are for a countermeasures. Major target is whether troubleshooting is true or not.
- In case of this project, it didn't have any countermeasure of increase the cost of construction, reserve stocks.
- In the execute real process, it didn't have unexpected expenses. For improve the effectiveness, it was started after the examination.

Project History and the budget

Division	Plan	Implement	Execution Rate(%)
Design and construction of heat supply systems	377,000	337,695	89.5
PMC(Project Management Coonsultintg)	19,800	18,347	92.6
Project management	16.000	8,079	50.4
Total	412,800	364,121	88.2

Source: Conclusion evaluation report

C. Frame Factors

- It is detailed section to check the frame factors which could be limited to conduct for successful project through the interview with the stakeholders.

- a limit factor being aware by each stakeholders

- Special frame factors of this project was not grasped.

D. Participation of Cooperation Country

- The participation of cooperation country was a significant factor to conduct project effectively and affect on its achievement.
- Therefore, in the evaluation of execution process, the participation level was considered during the process of cooperation country project.

- Participation of cooperation country in the project selection and purchase process

- Main cooperation agency, Manbai company from Uzbek provided the required information at the process of selecting the mechanical room and participated to calculate its required capacity, moreover, participated in early stage for sharing the information regarding the current situation of the mechanical room.
- Manbai company suggested the required capacity of facilities in mechanical room according to the calculated capacity. At the final stage of selecting process, they discussed with PMC.

<Summary for minutes of agreement between the two countries>

Korea	Uzbek
1. Improving heat-supply system (1) Site-visit and detailed design (2) Equipments-supply for 54 boiler rooms ○ Supply of Boiler, Pump, Gas-meter ○ Supply and Installation of Pipe, Valve, Control-equipment, Control-panel ○ Reinforced concrete floor construction in Boiler room and base construction for equipments ○ Decide the detailed specification and quantity of equipments after discussion (3) Transportation fee of equipments from Korea to Ulgenchi train-station (4) Commissioning for boiler, pump, heat-exchanger (5) 1 year warranty after installation 2. Dispatching specialist (1) Dispatching specialist from PMC for technical advice regarding project execution (2) Dispatching Korean engineers (reside) for site-survey, design, construction	1. Administration Section (1) Securing budget and manpower from Uzbek side (2) Provide data and information in English version (3) Appoint the relevant staff 2. Improving heat-supply system (1) Demolish deteriorated facilities (2) Repairing building finishes, painting, windows, doors (3) Change in licensing procedure and its cost (4) Custom clearance for equipments (5) Cost for unloading and storage (6) Maintenance of facilities after project completed 3. Work for Korean specialist (1) Securing the project manpower for successful execution and skill transfer (2) Provide the office, other required services to Korean specialist (3) Provide data and related information, report (4) Managing visa, residential matter for Korean specialist

(3) Daily expenses for dispatched Korean specialist	(5) Equal treatment of Korean specialist with other specialist from the aid country
(4) Travel cost for dispatched Korean specialist	(6) Tax free
(5) Advise cost for problem happened in local, Uzbek	(7) Cooperation for safety
3. Uzbekistan technician training	4. Work for training
(1) Invited training in Korea : 10 persons 2weeks	(1) Manpower recruitment for training
(2) Invited training cost	(2) Provide the lecture room, other facilities at local training
(3) Korean technician in local training : 3 persons dispatch, 100 technicians, 2week time	(3) Provide the proper place for trainee after its completion

Reference: final execution agreement report

- At the process of executing discussion, there was to establish clear-cut limes of work-scope and responsibility between the execution agency of cooperation country and Korea. When the problem was happened, it was possible to conduct the effective execution of project at the process of planning the next project through prior-consultation for solution plan.
- At the process of executing discussion, there was to establish clear-cut limes of work-scope and responsibility between the execution agency of cooperation country and Korea. When the problem was happened, it was possible to conduct the effective execution of project at the process of planning the next project through prior-consultation for solution plan.

2) Sustainability

- The sustainability, one of the 5 DAC standards, was configured as an evaluation item and the sustainability for the project was checked from the 2 aspects as below:

Sustainability Evaluation

Items	Questionnaire	평가 기준
1. Human and systematic sustainability	Is there any stability in the human or institutional system to back up the project sustainability?	Sustainability
2. Financial sustainability	Is there any financial stability to back up the project sustainability?	

A. Human and Institutional Sustainability

- 5 aspects were considered to check the human and systematic sustainability as below :

- Whether to secure human resources for the proper maintenance and management
- Concreteness and realization for the exit strategy
- Concreteness and realization for the ex-post measures
- Concreteness and realization for the ex-post management
- Ownership and willingness of the cooperation country for the project

a. Desk Review

- First, the review was performed on the application of the improved equipment to the life cycle and the existence in the human resources and capability for the maintenance.

- (Whether to secure the human resources for the proper management and maintenance) The enforcement agency Manbai company in Uzbek, has maintained and managed the deteriorated water supply facilities and equipment since socialism days and was the organization equipped with administrative manpower and engineers to handle complaints and collect heating and water fees even to its engineers and managers including the residents.
- It was deemed that since socialism days, there was sufficient manpower secured but was not equipped with the capabilities for the maintenance and management of the specially improved equipment and facilities.
- Therefore, the project faithfully provided the training to the working-level manpower (managers and engineers) in Manbai company in order to utilize the improved facilities up to its life cycle even after the completion of project.
- The training result was included in the final report and the training program organized by the site technical experts was conducted in Korea and Mongolia. It was reported that all the trainees achieved the knowledge required for the work.
- There were 10 participants in the invited training and 80 Uzbek technicians participated in the local training.
- Through the interview, it was verified that there was no difficulties in operating the facilities due to its effective training.
- The overview of the invitation and local training program were as follow:

Contents of training program for invitation

Division	Date	Contents	Remark
Arrival / Orientation	24 May	<ul style="list-style-type: none"> ○ Arrival and move to KOICA ICTC (10 persons) ○ Orientation 	KOICA ICTC
Lecture	24 May ~ 26 May	<ul style="list-style-type: none"> ○ District heating system ○ Vacuum hot-water boiler ○ Boiler feed water and fuel oil system ○ Pump and Control system ○ Boiler auto-control system ○ Expansion tank ○ Heat exchanger 	KOICA ICTC
Cultural Experience	29 May ~ 30 May	<ul style="list-style-type: none"> ○ KyungBok Palace, 63 Building, Nam-San Tower ○ Folk village, Samulnori, Visit In-Da Dong Street 	Seoul, KyungGi
Site Tour & Practical Training	27 May, 28 May, 31 May ~ 4 June	<ul style="list-style-type: none"> ○ Site tour <ul style="list-style-type: none"> - JanGan Tech. - Busta Boiler - Hyundai Motor Inc. - Korea District Heating Public Cooperation ○ Practical training <ul style="list-style-type: none"> - Pump-Function Test - Pump-Assembly & Disassembly - Heat-Exchanger Assembly & Disassembly - Expansion-Tank Control - Vacuum Hot-Water Boiler Structure - Vacuum Hot-Water Boiler Control and Maintenance - Vacuum Hot-Water Boiler Commissioning - Defect Treatment Method - User Facilities Management 	
Completion Ceremony and Departure	4 June 5 June	<ul style="list-style-type: none"> ○ Completion ○ Incheon → Tashekent 	KOICA ICTC

Reference: Final Result Report

Contents of Local Training Program

Date	Content	Remark
27 Oct. ~ 1 Nov.	Heat-supply System Control and Maintenance Practical Training	Training
2 Nov. ~ 5 Nov.	Vacuum Hot-Water Boiler Control and Maintenance Practical-Tranning	
8 Nov.	Heat-Supply System, Pump Auto-Control, Heat Exchanger	Theory
9 Nov.	Expansion Tank, Vacuum Hot-Water Boiler Introduction Boiler Control and Maintenance	

Reference: Final Result Report

- (Specific features and realization of the exit strategy) The training was also a exit strategy of the project and actually there was no report or opinion from the interviewees regarding its difficulties due to insufficient training or knowledge except the actual maintenance of the facilities.
- Such an exit strategy focusing on the training was a acutal alternative due to the limits in the international development cooperation project but in cases, it helped upgrade the sustainability where the additional plans should be sought due to transfer or retirement of the trained workforce. In the case of Uzbek, it was verified through interview that there was not yet change jobs.
- Through the training program and nurturing lecturers for training, it was possible to transfer the knowledge and technology acquired and it would be desirable to support simple problem-solving capabilities by using tools or data for the manual.
- Actually, the construction company produced and distributed the manual and the operation log book (which were provided to cover 2 years) for utilizing in each machine room.
- Through an actual inspection, it was observed that the logbook provided

by the construction companies was thoroughly recorded and managed. Furthermore, the site inspection was performed according the required capacity and criteria of the actual operation based on the log data (refer to the sample of the log as below).

Записи Эксплуатации(1)																
Наименование котельной		N23 <i>рассол</i>		Дата		28.01.2018										
Оператор		<i>М.Молдобаев</i>		Погода		+11										
Наим. Оборуд.	Контрольный список	Ед. изм.	Стандарт	Время												
				2	4	6	8	10	12	14	16	18	20	22	24	
Котел	Темп. нагреваемой жидк.	°C	80↓	88	89	87	89	88	89	89	90	89	90	89	90	
	Давление газа	кПа	1.5↓	1	1	1	1	1	1	1	1	1	1	1	1	
	Уровень вакуума	кПа	50	40	38	48	35	40	35	35	38	35	35	35	35	
Теплообменник Отопление	Перв. контур	Темп. на входе	°C	80↓	56	58	58	58	58	60	62	64	64	64	64	
		Темп. на выходе	°C	60↓	50	54	54	54	54	56	58	60	60	60	50	60
	Давл. на входе насоса	#1	Бар	1-2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.6
		#2	Бар	1-5-4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Разница давл.	#1	Бар	0.3↓	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		#2	Бар	0.3↓	42	44	44	46	46	46	48	48	48	48	48	48
	Втор. контур	Темп. на входе	°C	50↓	42	44	44	46	46	46	48	48	48	48	48	48
		Темп. на выходе	°C	70↓	50	52	54	58	58	58	58	58	58	58	58	58
	Давл. на входе насоса	#1	Бар	2-3	2.6	2.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
		#2	Бар	2.5-5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Разница давл.	#1	Бар	0.3↓	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		#2	Бар	0.3↓												
Теплообменник ГВС	Перв. контур	Темп. на входе	°C	80↓												
		Темп. на выходе	°C	60↓												
	Давл. на входе насоса	#1	Бар	1-2.5												
		#2	Бар	1-5-4												
	Разница давл.	#1	Бар	0.3↓												
		#2	Бар	0.3↓												
	Втор. контур	Темп. на входе	°C	50↓												
		Темп. на выходе	°C	70↓												
	Давл. на входе насоса	#1	Бар	2-3												
		#2	Бар	2.5-5												
	Разница давл.	#1	Бар	0.3↓												
		#2	Бар	0.3↓												

- (Concreteness and realization of the follow-up actions and the ex-post management) It was deemed that there was no clear factors or plans for the follow-up actions and the ex-post management in this project.
- However, considering that the equipments (no being available any spare parts in local area) used as well as no Korean companies in local area, it was deemed that the follow-up actions and the ex-post management for improving the sustainability could be obstructive factor in actual possibility.
- For the stable heat-supply based on the feature of district heating, heat-source facilities and heat-transport facilities should be improved together in order to achieve the effective outcomes. Unfortunately in this

project, only heat-source facilities were included but not heat-transport facilities. As a result, due to its deterioration of heat-transport facilities, it was less effective to beneficiaries. For better effective heat-supply project, it should be performed together with heat-source and heat-transport facilities even its scope decreased.

- (Ownership and willingness of the cooperation country's government) Even though the project was supported by GRA fund from the Korean government, it was found that the stakeholders in the cooperation country had a keen interest and sense of ownership, for instance, they complained about even minor errors and showed efforts for the maintenance.
- Most of all, even after the project completed, Manbai company thyself secured the budget in order to maintain the district heating and water supply system. They prepared a plan for having the training of stakeholders.

B. Financial sustainability

- Output cost of assistance project
- Financial solidity of project execution agency
- Security of required budget for the proper maangement and maintenance

- There was the information required to Minbai company for evaluating items, however, it was not provided even there was sustainable request from local coordinator and the evaluation team.
- Therefore, it was difficult to evaluate the financial sustainability due to failing to secure the original data for the energy efficiency, one of the achievement in the project, securing the budget through the operation data

and financial integrity.

- However, as mentioned before, it was deemed to be improved for the financial sustainability as shown that the heating and water supply system was sustained by its own budget.

3) Outcomes of Evaluation

- The project outcomes are a crucial element in the ex-post evaluation and propulsion motive in the project.
- In this evaluation, it was configured the execution model by specifically classifying the execution from mid/long-term and short-term output. Moreover, it was collected reference, interview and questionnaire in order to evaluate the related item with various indexes.
- The evaluation was analyzed for the project goal including the improvement in the living conditions and heat efficiency and provided the evaluation items as below:

Items	Detailed evaluation items
Mid-term outcome	Improve living quality
	Saving resources
	Transfer the related skill
Short-term outcome	Saving the cost of water-supply
	Upgrade heat efficiency
	Stable heat-supply

A. Short-term Outcomes

a. Saving the cost of water-supply

Heating cost for beneficiary

- Due to sustainable and stable heating, the heating equipments for personal used before the project-started were reduced and it was effective on reducing additional cost for heating.

b. Upgrade heating efficiency

Saving resources

- The main facilities (boiler, heat-exchanger, pump) related in heat-supply were replaced to the latest-model of high-efficiency facilities. Therefore, the energy usage (etc. gas, electricity) was reduced.
- The existing boiler of brick-type's efficiency was very low as 60%, but the new installed vacuum heat-water boiler's efficiency was very high as 90%. Therefore, through this project, its thermal efficiency was improved to 30% as well as reduced its fuel usage.
- During the interview with the governor in Holejuum Province, its thermal efficiency was mentioned. Also one of beneficiaries, no.28 hospital director mentioned its raised thermal efficiency during the interview. It was verified that beneficiaries and residents was aware of this issue not only stakeholders in Manbai company. The director of residence department also mentioned that as it is not only important to supply hot-water and heating, but it is also important to utilize the resource.

c. Stable heat-supply

User satisfaction

- Uzbek project was focused on improving boiler room of public facilities such as hospital and school.
- Therefore, main users were stakeholders and operators of the public facilities such as hospital and school and some residents living in an apartment.
- The interviewees were very highly satisfied.
- Most of all, they were satisfied in the immediacy of improved thermal efficiency and hot-water supply, however, unsatisfied in unstable heating and hot-water supply caused by the gas pressure and indicated its improvement point.
- Most of public facility users didn't recognize the difference between the before and the after of project regarding heating and hot-water supply system, but satisfied in the use of heating and hot-water.

Service interruption rate

- By replacing the new boiler, the danger from safety accidents such as gas leak and electrical short explosion was reduced.
- Due to the function as changing speed itself of new-model pump, the usage of electricity was reduced as well as its failure rate.
- Residents and public facility users commented that in a year, generally the interruption of heating was happened 3 or 4 times because of discontinuance of supply gases or electricity required in boiler room for its

operation, but it was not the matter of failure of heating system.

- During the interview with operator in boiler room, it was obstacle to maintain a stable heat-supply due to unstable electricity and gas-supply.

□ Number of user in water-supply system

- The local heat-supply system was focused on the multiplex house, public facilities such as hospital, school and kindergarten. The private houses were supplied the heat-supply by thyself. But in the multiplex house, it was possible to be supplied the heat-supply autonomously if they wants. In the period of the before project, most of residents did not use the central heating system because of its low efficiency and interruption. However, after the project completed, most of residents wanted to use the central heating system due to its efficient heat-supply system. Actually in Shavat area, there were 10% beneficiaries increased to be received the heating.

B. Mid-term outcome

a. Improvement of resident life

- Most of interviewees commented that the improved heat-supply project contributed to improve the resident life in winter time.

b. Saving resource

- In the past, there was constant-speed pump used without the concern of heat-usage, however, the new installed pump through this project was able to be controled its speed according to the usage. Therefore, it was possible to save the electricity usage.

Comparison of Energy usage between before and after the project

	09.11~10.03	10.11~11.03	Reduction Rate
Gas usage(m ³)	4,126,017	2,749,354	33%
Electricity usage(kWh)	1,156,267	757,760	34%

Reference: completed evaluation report

c. Transfer the related skills

- Facility operation and maintenance by local technicians
- In order to raise the understanding of heat-supply system and transfer the operation and maintenance method of new installed facilities, 10 technician from Uzbek was invited to Korea for being trained during 2-weeks time. Also Korean technicians were dispatched to Uzbek for training 80 local technicians. Through this activities, the local technicians's skills for the operation and maintenance of heat-supply facilities were improved.
- Also most of trainees worked constantly in Manbai company, but the instruction of skills were also continually performed due to changing job by number of the staff.
- Ultimately, the instruction of related skills were well performed during the process of project, and since then it was found that the know-how was developed autonomously and minimized the change job of the staffs. Furthermore, particularly controlling the new boiler was much easier than the old one.

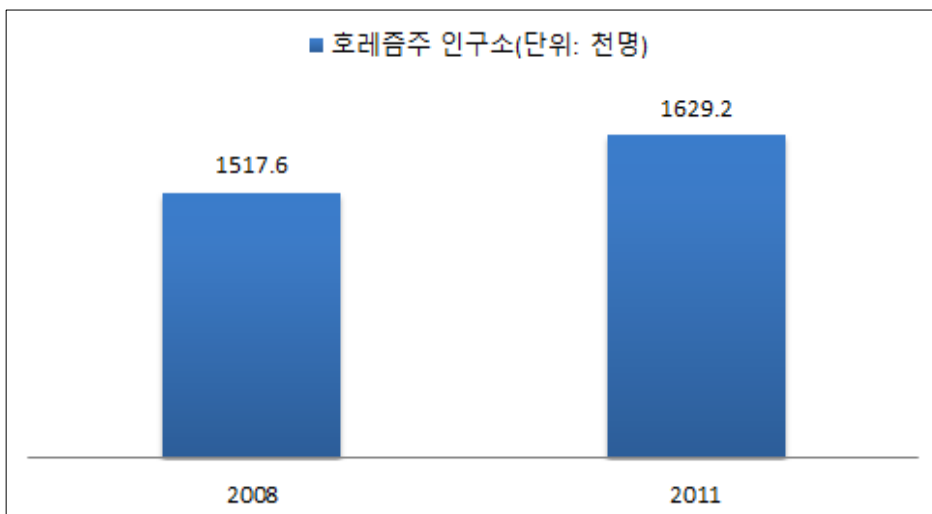
C. Long-term outcomes and impact

- The following various items might be considered as the long-term outcomes and impact.

- Population increase
- Vitalizing local economic
- Developing industrial technologies

a. Population increase

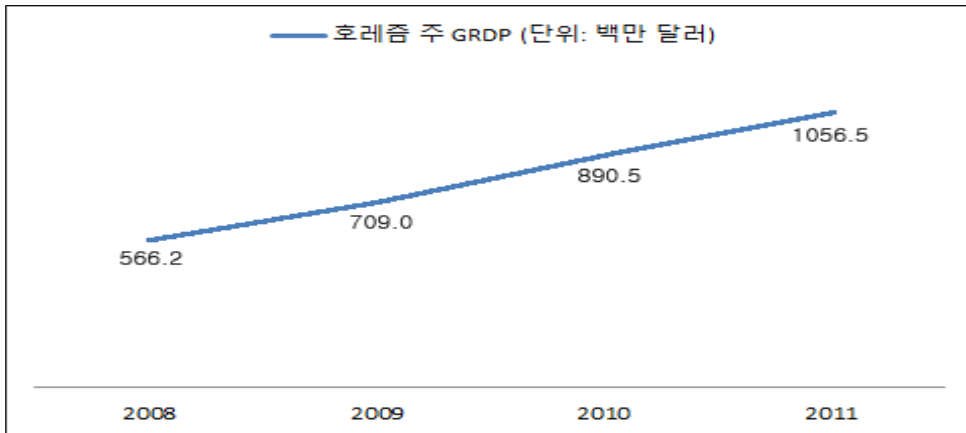
- The population in the district heating project area, Khorezm province, was 1.52 million in 2008 (before the project) but in 2011 (after the project), it was 1.63 million that mean being 7.35% growth rate in last 3 years. It was conspicuous increase as considered its geographical condition where is located by corner of Uzbek.



Reference: Uzbekistan National Statistical Office

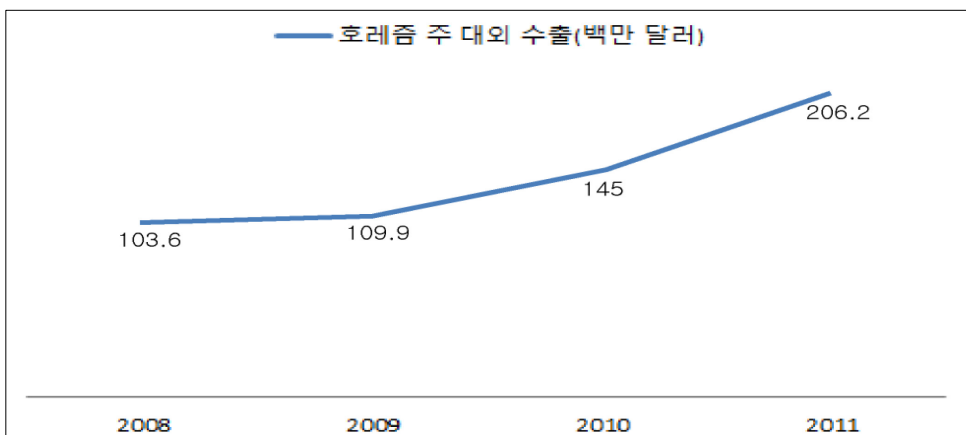
b. Vitalizing local economic

- As shown the below table of GRDP in Khorezm, since 2008 there was constantly increased by 20%. It was not only reason of hot-water and heating-supply system but it was clearly contributed to the local development.

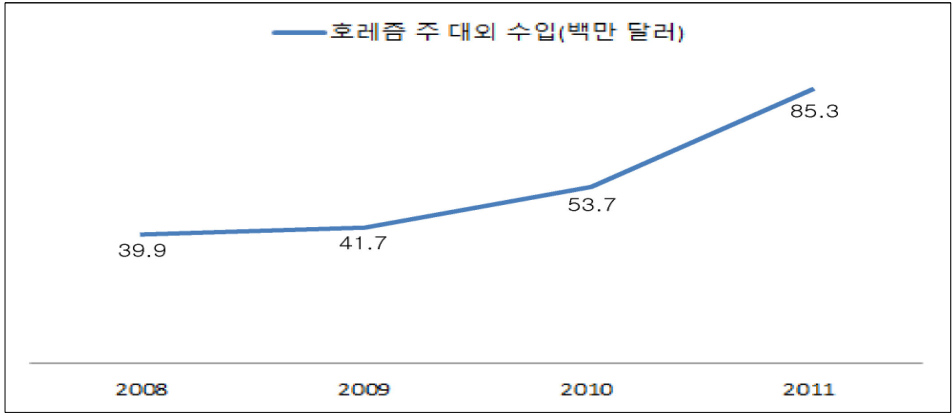


Reference: Uzbekistan National Statistical Office

- As shown the below table of import/export increase in Khorezm, it was indicated that the economy in Khorezm was vitalized. Since 2009 (completion of project), it was dramatically increased and influenced on indirect impact.



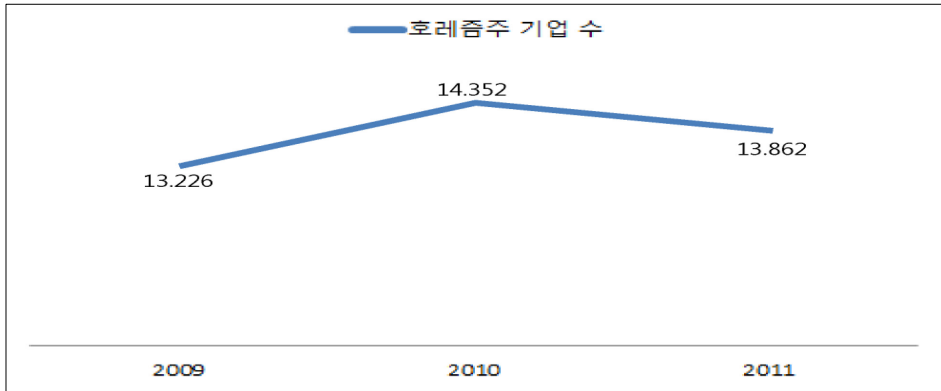
Reference: Uzbekistan National Statistical Office



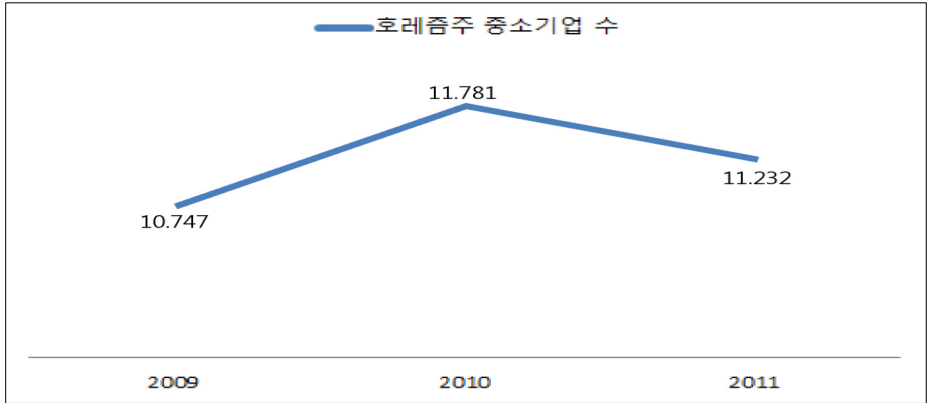
Reference: Uzbekistan National Statistical Office

c. Developing industrial technologies

○ As shown the below tables regarding the number of companies, from 2009 to 2011, the number of companies were increased.

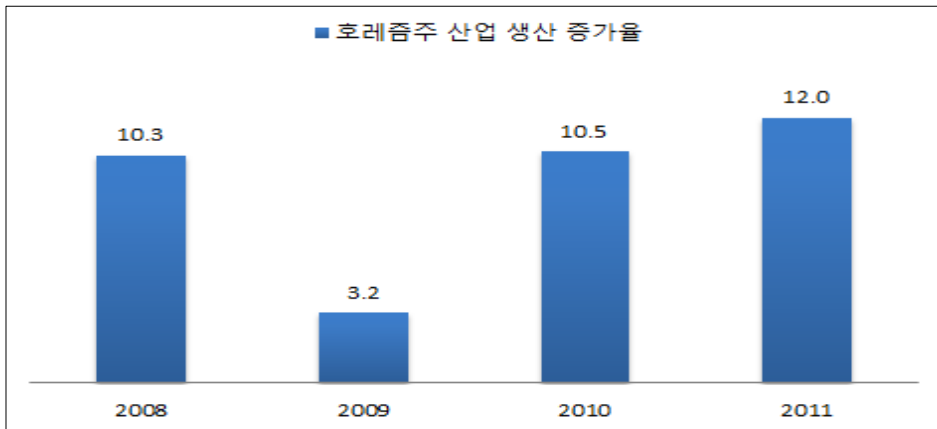


Reference: Uzbekistan National Statistical Office



Reference: Uzbekistan National Statistical Office

- The increase rates of production in industry, agriculture, construction sector in Khorezm were recorded in high portion. In particular, the increase rates of production in industry sector was achieved over 10% increase since 2010.



Reference: Uzbekistan National Statistical Office



3. Evaluation criteria based on inspection-result

1) Project goal setting and relevance of regional selection

- There was no doubt in its project 'relevance' because it was focused on the goal of improving the resident life and energy efficiency.
- Department of residence in Uzbek that requested the first to evaluate the project validity to KOICA placed their priority in water and heat-supply, furthermore, it was coincided with country policy.
- However, even though the project had a clear goal in the improvement of resident life, actual improvement project was conducted to focus on the hospital and school as well as only 6 residence areas. Therefore, it was necessary to analyse its relevance and effectiveness. (total 54 system improved)

Evaluation Items	Questionnaire	Grade
Consistency of cooperation country development policy	Coincidence with development strategy, policy direction of cooperation country	3
Consistency of KOICA assistance strategy	Coincidence with development policy and assistance strategy of KOICA	3
Relevance of Project	Appropriate of the research for project demand	3
	Project efficiency	3
	Project feasibility	2
	Ripple effect and impact	2
Validity of Goal setting	Short/long-term outcomes	2

Validity of Project Design	Project design and accessibility of problem-solving	3
Participation of Cooperation Country	Dominant Participation in design and execution	3
Overall		3

2) Input resources with its efficiency

- Considering the budget, 40% (Number of boiler room) out of total required area was improved and replaced by the supported equipments.
- There was effort to utilize the limited resource, for instance, to change the deteriorated facilities first, to improve many facilities for satisfying minimum capacity standards, and to consider the weak groups such as students and patients first.
- However, it was additionally necessary to analyse that the repair sector for the leak of heat-supply pipe (comparatively it is possible to get big effectiveness by using small cost) was not included in the project scope.
- Most of successful factors in this project were the process of active problem-solving from project execution team (PMC, Constriction company). In Uzbek, generally it took about 6months~10months for customs clearance, however, through the discussion of relevant agencies, it was possible to complete the transportation of materials including customs clearance within 3months. For this reason, the efforts of PM was highly evaluated (comments from PMX, KOICA local office).
- In a brief span of 10months, the project was effectively performed without a great loss (PMC completed evaluation report). It was one of evidence in the high-efficiency.

Evaluation Items	Questionnaire	Grade
Execution	Complete according to execution plan	3
Input	All materials in purchasing and construction efficiently applied	3
Structural factors	Any structural factors existing for hinderance of efficiency	3
	Overall	3
	Project feasibility	2
	Ripple effect and impact	2
Overall		3

3) Effectiveness of Execution

- As part of project goal and its 1st output, the increase of heat-efficiency and reduction of heat-supply cost were certainly verified as being 'effective' until these days.
- (based on Manbai company report) The gas usage was reduced about 20~25% and 80~90% for electricity usage.
- It was verified that the stable heat-supply was also one of project effectiveness. However, as an unsatisfactory supply of electricity and gas was the basic premise of stable heat-supply, actual awareness of local residents for improvement of stability were not distinguished.
- Futhermore, through the interviews and questionnaires, there was no actual and meaningful cost decrease (more than 10 - 20%) in the heating cost for the residents. In the previous time, there were personal heating equipments used without the big extra cost, therefore, actual awareness of residents in changes was not different compared to before.

- Actually in the case of the area being supplied the heat-supply through the improved system, there were only 10% of householder starting to receive Manbai company's service.
- However, in the case of the school and hospital, it was verified that there was actual change in stable heat-supply system. Students and residents mentioned that the school was much warmer than before and there was no discontinued heating-supply. For their parents, they knew the improvement of heat-supply system of Mabai company. (verified through interview with local residents, questionnaire)
- With regards to mid/long-term effectiveness, the local residents and officials, even the stakeholders in Manbai company did not recognize the mid/long-term effects.

Evaluation Item	Questionnaire for the evaluation	Grade
Improving resident life	Awareness of residents	1
	Improving the life	
Decrease the diseases	Saving the heating cost per householder	1
Transfer related skills	Effective maintenance of the district heating facilities (service suspension, overall issues, solving and process)	3
Saving the cost of water-supply	Cost for water-use per household	2
Improving heat-efficiency	Heat-efficiency	3
Stable water-supply	Supply volume	3
	Required volume / Consumed volume	
	User satisfaction	
	Water-supply cut	
	Stable temperture and pressure	
	Number of users in the water-supply system	
Overall		2.

4) Sustainability

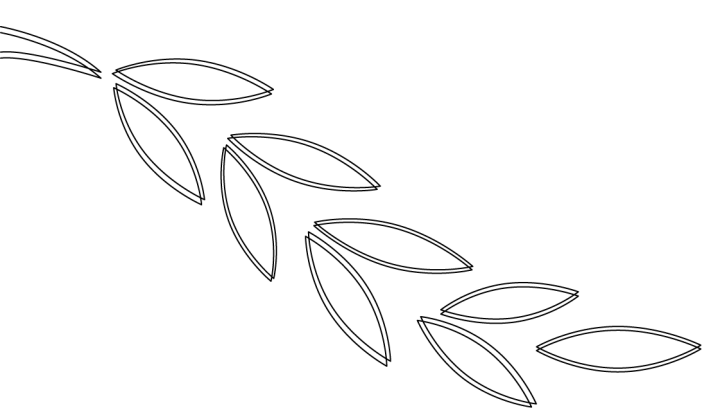
- It was deemed to expect a sustainable utilization, maintenance, sustainable effectiveness.
- Through the dairy record and training, most of trained technicians were working good, and there was no change of jobs. As considered this, it could be expected for sustainable utilization and good maintenance.
- However, there were some issues found that the spare parts were exhausted; the retraining was applied 2-years later since trained; due to the lack of skills, it took over a day to find out the problem-solving; the detailed contents were not included in the manual; they didn't understand on-screen instruction on the electrical display of all equipments. For this reason, if there is not any the following-step, it might be caused the matter of sustainability.
- Nevertheless, considering Manbai company's willingness for problem-solving (e.i. purchasing the spares and conducting sustainable upgrade by its own budget, and supporting senior engineers) and effective operation system, the sustainable effectiveness could be expected if there is the proper following-step.

Items	Questionnaire	Grade
Human/Institutional	Is there any human/institutional stability for project sustainability?	3
Financial	Is there any financial stability for project sustainability?	2
Overall		2

5) Impact

- Due to the current limited improvement, it was difficult to expect the ripple effect, however, the awareness for this system has been spread out because of the residents such as students including the parents and users of hospital. Therefore, in the view of long-term, the impact could be expected to improve the quality of life as well as overall heat-supply system.
- The main concern issue was that it could not be possible to appear the impact by only one improvement of heat-supply system.
- It was difficult to evaluate the impact in the current situation, but it could be possible to suggest the expecting impact by in-depth research.
- (working-level trainee - improving quality of life) Through the interview with the trained workers in Manbai company, regarding the question of 'what kind of impacts are there in actual resident life due to the project?', they replied as there was an absence rate reduced; and decreased the worry about cold in the winter time at school. In hospital, there was a decrease to be brought the personal heating system by patients after the project.

Items	Questionnaire	Grade
Improving the quality of life	Self-awareness of local residents	2
Population increase	Population increase in project area	3
Vitalizing local economy	Economical indexes in project area	3
Overall		2



IV. Conclusions and Recommendations

1. Overall evaluation results
2. Recommendations



1. Overall evaluation results

Relevance

- Project was relevant to the partner country's development needs and strategies, and the aid policy and strategies of Korea.
- The project has been evaluated as "very relevant."

Effectiveness/Impact

- The project undeniably produced the expected outcome such as improved efficiency and reduced operating cost of the district heating facilities.
- However, the objective of stable heating was partially achieved due to electricity and gas supply that were operated by separate entities and often interrupted.
- Also, the exposed pipeline may hinder the improved system from producing effects (delivering hot water at the target temperature) because insulation of the pipeline was not included in the project scope.
- The project has been evaluated as "partially effective."

Efficiency

- The project was completed with the original budget and within the promised duration.
- Also, PMC and the beneficiary organization chose small-size boiler rooms and public buildings such as schools and hospitals in an attempt to maximize the effect and to serve as many people as possible, which may indicate that the project utilized the limited resources very efficiently.
- The project has been evaluated as "very efficient."

Sustainability

- Operation crews were diligent and responsible for their tasks such as keeping the log, following the instruction, and staying on the post, which indicates sustainable human resource management system in place.
- However, the beneficiary organization still seemed to have financial difficulties in that little or no investment for system improvement has been made on its own after the project.
- The project has been evaluated as "sustainable if issues were resolved"

Overall grade have been assigned as "successful."



2. Recommendations

1) Recommendations for future similar project

- It is necessary to make a study being able to conduct 'result-based design and management' during the process of 'in-depth plan'.
- Thorough analysis of context, stockholders, issues, and culture (called as 'front-end analysis') during the process of project development and plan is required in this project. Furthermore, In this project plan, it is necessary to have a comprehensive and in-depth study even though there being using a logic-model or change-theory method as known.
- (Participating and finding out the impactive project corresponding with country development strategy) It is desirable to participate, find, and select the strategic project, in other words, the impactive project through the process of consulting and cooperation with the department of development cooperation or financial planing of cooperation country.
- It is necessary to find out the selection of the project based on the mutual discussion and understanding for country development strategy even if it is difficult to participate from the beginning stage of development strategy.
- It is required to establish the consulting process and specific analysis in order to achieve the project goal and improve its effectiveness.
- Therefore, it is recommended to prepare the management plan in order to control constantly the following-project and ex-post management with strengthening the function of consultation.
- For instance, through the country strategy and the following project, it is

necessary to conduct the research project or ex-ante evaluation¹⁾ for evaluating its impact before starting the project or at least through in-depth research and inspection, it is possible to establish the logic model or program theory of credit assistance project sector based on the country development strategy.

- (International standards and high quality) The project attempts to use high quality materials and meet the international standards and above. It is desirable to continuously observe the standards to reduce the maintenance cost and upgrade the durability of the facilities even though the scope of the project is contracted in the future.
- Also, the possibility for joining the future development project may be increased by building the confidence on the companies and upgrading the image of Korea in the cooperation country.
- In the case of this project, even though this was for infrastructure project, there was difficulty in the awareness of project (There is different character compared with the building constructions such as hospital or training center.).
- Actually through the interview with beneficiaries, it was found that most of them have never been heard regarding the improvement project of heat-supply system. Therefore, through the public relations, it is necessary to inform the project performed by KOICA assistance project at the planning stage.
- Also considering the equipments (no being available any spare parts in local area) used as well as no Korean companies in local area, it was deemed

1) The concept is in contrast with the ex-post evaluation and it is the evaluation which may review the effect and the impact of the project based on the model by understanding the factors which affect the project prior to the implementation and establishing the model. The ex-ante evaluation has benefits to facilitate various ex-post evaluation and effective management of the project, as well as decision-making.

that the follow-up actions and the ex-post management for improving the sustainability could be obstructive factor in actual possibility.

- For the stable heat-supply based on the feature of district heating, heat-source facilities and heat-transport facilities should be improved together in order to achieve the effective outcomes. Unfortunately in this project, only heat-source facilities were included but not heat-transport facilities. As a result, due to its deterioration of heat-transport facilities, it was less effective to beneficiaries. For better effective heat-supply project, it should be performed together with heat-source and heat-transport facilities even its scope decreased.

**Ex-post Evaluation Report on the Project for Improving Heat Supply
System in Khorezm, Uzbekistan**

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