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6.8 Calculation of Greenhouse Gas Emission Reductions

1. Member List of the Survey Team

1. Member List of the Survey Team

- First Survey (January 25, 2012 ~ March 24, 2012)

Name	Task	Organization
Ichiro ADACHI	Project Manager	Japan International Cooperation Agency Environmental Management Division 2 Environmental Management Group Global Environment Department
Hideki MATSUOKA	Planning Management	Japan International Cooperation Agency Environmental Management Division 2 Environmental Management Group Global Environment Department
Keiji IIZUKA	Chief Consultant/Biomass Heating System Planning	Mitsui Consultants Co., LTD.
Rokuro DENDA	Facility Design/ Natural Condition Survey(1)	Mitsui Consultants Co., LTD. (Private Consultant)
Kazuhide YAMANO	Facility Design/ Natural Condition Survey(2)	Mitsui Consultants Co., LTD. (Private Consultant)
Soji KURASAWA	Operation and Maintenance Plan/Feasibility Analysis	Unico International Corporation (Japan Environmental Consultants, LTD.)
Wataru SHIGA	Cost Estimation/Procurement and Equipment Plan	Unico International Corporation
Hiroshi IKEDA	Environmental and Social Considerations/ CDM Development	Mitsui Consultants Co., LTD.
Yukio NARA	Coordinator/GIS	Mitsui Consultants Co., LTD.

- Second Survey (June 3, 2012 ~ September 9, 2012)

Name	Task	Organization
Keiji IIZUKA	Chief Consultant/ Biomass Heating System Planning	Mitsui Consultants Co., LTD.
Rokuro DENDA	Facility Design/ Natural Condition Survey(1)	Mitsui Consultants Co., LTD. (Private Consultant)
Kazuhide YAMANO	Facility Design/ Natural Condition Survey(2)	Mitsui Consultants Co., LTD. (Private Consultant)
Soji KURASAWA	Operation and Maintenance Plan/ Feasibility Analysis	Unico International Corporation (Japan Environmental Consultants, LTD.)
Hideki KIDANI	Cost Estimation/Procurement and Equipment Plan	Unico International Corporation
Hiroshi IKEDA	Environmental and social considerations/ CDM development	Mitsui Consultants Co., LTD.
Yukio NARA	Coordinator/GIS	Mitsui Consultants Co., LTD.

- Third Survey (January 28, 2013 ~ February 3, 2013)

Name	Task	Organization
Hideki MATSUOKA	Project Manager	Japan International Cooperation Agency Environmental Management Division 2 Environmental Management Group Global Environment Department
Keiji IIZUKA	Chief Consultant/ Biomass Heating System Planning	Mitsui Consultants Co., LTD.
Rokuro DENDA	Facility Design/ Natural Condition Survey(1)	Mitsui Consultants Co., LTD. (Private Consultant)

2. Survey Schedule

2. Survey Schedule

2.1 First Survey

	Date	Day	Project Manager Ichiro ADACHI	Planning Management Hideki MATSUOKA	Chief Consultant/ Biomass Heating System Planning Keiji IIZUKA	Facility Design/ Natural Condition Survey(1) Rokuro DENDA	Facility Design/ Natural Condition Survey(2) Kazuhide YAMANO	Operation and Maintenance Plan/ Feasibility Analysis Soji KURASAWA	Cost Estimation/Procurement and Equipment Plan Wataru SHIGA	Environmental and Social/ Consideration and CDM Development Hiroshi IKEDA	Coordinator/GIS Yukio NARA
1	1/25	W	Departure from Japan							Departure from Japan	
2	1/26	T	Visit MoAFI and Prime Minister's Office, meeting with MoAFI Minister, site visit							Visiting to MoAFI and Prime Minister's Office, meeting with MoAFI Minister	
3	1/27	F									
4	1/28	Sat.									
5	1/29	S									
6	1/30	M	Meeting with MoAFI Minister and Director of 2KR-PIU, visit UNDP, signing M/D								
7	1/31	T									
8	2/1	W	Departure from Moldova		Visiting UNDP, site survey preparation	Site survey preparation	Visiting UNDP, site survey preparation	Meeting with CFU, visiting UNDP		Meeting with CFU, visiting UNDP	Visiting UNDP
9	2/2	Th.									
10	2/3	F									
11	2/4	Sat.									
12	2/5	S			Site survey, negotiation with subcontractor, meeting with Energy Efficiency Agency	Site survey, negotiation with subcontractor	Site survey, creating table for site survey	Site survey, meeting with CFU, Minister of Environment, visiting UNDP		Site survey, meeting with CFU, Minister of Environment, visiting Energy Efficiency Agency	Site survey
13	2/6	M									
14	2/7	T									
15	2/8	W									
16	2/9	Th.							Departure from Japan		
17	2/10	F									
18	2/11	Sat.							Meeting with 2KR-PIU		
19	2/12	S			Administrative work for subcontracting, visiting Ministry of Regional Development and Constructions, MOLD-AGROTECH 2012	Collecting questionnaire	Collecting questionnaire	Organizing survey data	Meeting with 2KR-PIU and local companies, visiting MOLD-AGROTECH 2012	Visiting MOLD-AGROTECH 2012, meeting with State Ecological Inspectorate	Assisting questionnaire collection
20	2/13	M									
21	2/14	T						Arrival to Japan			
22	2/15	W									
23	2/16	Th.									
24	2/17	F									
25	2/18	Sat.									
26	2/19	S			Meeting with MoAFI Minister, visiting briquette and pellet factories	Organizing questionnaire results, visiting briquette/pellet factories, site visit			Visiting agriculture machinery manufacture and distributors, briquette and pellet factories	Meeting with MoAFI Minister	Meeting with MoAFI Minister, assisting questionnaire collection,
27	2/20	M									
28	2/21	T									
29	2/22	W									
30	2/23	Th.								Arrival to Japan	
31	2/24	F									
32	2/25	Sat.									
33	2/26	S			Meeting with third secretary of Embassy of Japan	Site survey, organizing documents and materials			Meeting with construction companies, meeting with a person for World Bank projects		Site survey
34	2/27	M									
35	2/28	T									
36	2/29	W									
37	3/1	Th.			Organizing statistics, administrative work for purchasing equipments,	Site survey			Surveying equipment manufacture, meeting with UNDP		Assisting for purchasing equipments
38	3/2	F									
39	3/3	Sat.									

					visiting equipment manufacture						
40	3/4	S			Meeting with MoAFI and MSIF, site survey	Site survey		Obtaining procurement information, meeting with MoAFI Minister, site survey		Assisting for purchasing equipments
41	3/5	M									
42	3/6	T									
43	3/7	W									
44	3/8	Th.									
45	3/9	F									
46	3/10	Sat.									
47	3/11	S			Meeting with Ministry of Internal Affair: Direction of rescue and fire protection and emergency service, meeting with Ministry of Economy, local consultant survey	Site survey		Meeting with MoAFI technician, site survey, local consultant survey, visiting MOLDENERGY 2012		Site survey
48	3/12	M									
49	3/13	T									
50	3/14	W									
51	3/15	Th.									
52	3/16	F									
53	3/17	Sat.									
54	3/18	S			Writing report	Organizing survey results, writing report		Meeting with UNDP, third secretary of Embassy of Japan, MoAFI Minister, writing report		Meeting with MoAFI Minister
55	3/19	M									
56	3/20	T									
57	3/21	W									
58	3/22	Th.									
59	3/23	F									
60	3/24	Sat.			Arrival to Japan			Arrival to Japan		Arrival to Japan	

2.2 Second Survey

	Date	Day	Chief Consultant/ Biomass Heating System Planning Keiji IIZUKA	Facility Design/ Natural Condition Survey(1) Rokuro DENDA	Facility Design/ Natural Condition Survey(2) Kazuhide YAMANO	Operation and Maintenance Plan/ Feasibility Analysis Soji KURASAWA	Cost Estimation/Procurement and Equipment Plan Hideki KIDANI	Environmental and Social/ Consideration and CDM Development Hiroshi IKEDA	Coordinator/GIS Yukio NARA
1	6/3	S	Departure from Japan						
2	6/4	M	Meeting with 2KR-PIU and MoAFI Minister, site survey preparation, subcontract preparation						
3	6/5	T							
4	6/6	W							
5	6/7	Th.							
6	6/8	F							
7	6/9	Sat.							
8	6/10	S	Meeting with MSIF and UNDP, subcontract preparation						
9	6/11	M							
10	6/12	T							
11	6/13	W							
12	6/14	Th.							

13	6/15	F							
14	6/16	Sat.							
15	6/17	S	Obtaining Procurement information, meeting with MoAFI, subcontractor evaluation				Departure from Japan		
16	6/18	M					Obtaining procurement information, meeting with MoAFI Minister		
17	6/19	T							
18	6/20	W							
19	6/21	Th.							
20	6/22	F							
21	6/23	Sat.							
22	6/24	S	Obtaining site information, contracting with subcontractor, visiting MSIF				Organizing procurement information, obtaining local installation information, meeting with MSIF		
23	6/25	M							
24	6/26	T							
25	6/27	W							
26	6/28	Th.							
27	6/29	F							
28	6/30	Sat.							
29	7/1	S	Meeting with Ministry of Regional Development and Constructions, MoAFI Minister, local design companies	Departure from Japan	Departure from Japan		Meeting with Ministry of Regional Development and Constructions, MoAFI Minister, local design companies		Departure from Japan
30	7/2	M		Meeting with local design company					Meeting with local design companies
31	7/3	T							
32	7/4	W							
33	7/5	Th.							
34	7/6	F							
35	7/7	Sat.							
36	7/8	S	Subcontract preparation, meeting with MoAFI Minister, visiting briquette and pellet factories and UNDP boiler sites	Meeting with MoAFI Minister, visiting briquette and pellet factories and UNDP boiler sites			Meeting with MoAFI Minister, visiting briquette and pellet factories and UNDP boiler sites, requesting cost estimates		Meeting with MoAFI Minister, visiting briquette and pellet factories and UNDP boiler sites, administrative work for purchasing equipments
37	7/9	M							
38	7/10	T							
39	7/11	W							
40	7/12	Th.							
41	7/13	F							
42	7/14	Sat.							
43	7/15	S	Organizing site information, meeting with local design and installation company, administrative work for subcontracting	Design material preparation, local construction RFQ preparation,、visiting UNDP boiler sites	Design material preparation, local construction RFQ preparation		Meeting with local design companies		Assisting local construction RFQ preparation, visiting UNDP boiler sites, administrative work for purchasing equipments
44	7/16	M							
45	7/17	T							
46	7/18	W							
47	7/19	Th.							
48	7/20	F							
49	7/21	Sat.							
50	7/22	S	Contracting with subcontractor, meeting with MoAFI Minister, organizing site information	Design material preparation, meeting with local design company, construction work RFQ preparation			Visiting candidate sites for pelletizing equipments, UNDP, design companies, obtaining procurement information		Assisting local construction RFQ preparation, administrative work for purchasing equipments
51	7/23	M							
52	7/24	T							
53	7/25	W							
54	7/26	Th.							
55	7/27	F							
56	7/28	Sat.							
57	7/29	S	Organizing site information	Design material preparation, meeting with local design company, construction work RFQ preparation			Obtaining procurement information		Administrative work for purchasing equipments
58	7/30	M							
59	7/31	T				Departure from Japan		Departure from Japan	
60	8/1	W	Arrival to Japan	Site survey, organizing survey results	Site survey, considering pelletizing equipment sites	Project evaluation, meeting with 2KR-PIU and MoAFI Minister	Developing supporting materials for cost estimates	Organizing documents and materials, obtaining green house gas reduction information	Site survey, assisting software component planning
61	8/2	Th.							
62	8/3	F							
63	8/4	Sat.							
64	8/5	S		Creating cost estimate	Design work, obtaining	Sending questionnair	Visiting Ministry of	Meeting with MoAFI	Assisting cost estimate
65	8/6	M							

66	8/7	T		inquiry documents, meeting with MSIF and design company	procurement, transportation, material standard information	e, calculating cost for pellet production, research on pelletizing process, European pellet market	Economy, UNDP, MSIF, obtaining import, soft component, module information	Ministry, CFU, Institute of Ecology and Geography, Ministry of Economy, UNDP, MSIF	inquiry document development and soft component planning, obtaining GIS information, meeting with UNDP
67	8/8	W							
68	8/9	Th.							
69	8/10	F							
70	8/11	Sat.							
71	8/12	S		Creating cost estimate inquiry documents, meeting with MSIF, design company, third secretary of Embassy of Japan	Design work, obtaining procurement, transportation, material standard information	Boiler survey, creating comparison table, fuel cost calculation, pellet demand survey and calculation	Meeting with design company, developing supporting materials for cost estimates	Social and environment consideration survey, CDM project development survey	Assisting inquiry documents, collecting GIS information, administrative work for purchasing equipments
72	8/13	M							
73	8/14	T							
74	8/15	W							
75	8/16	Th.							
76	8/17	F							
77	8/18	Sat.							
78	8/19	S		Meeting with design company, writing report	Site field survey, regulation survey	Writing report, creating soft component planning table	Design material preparation, meeting with design company, UNDP, local companies	Green house gas emission reduction calculation, meeting with MoAFI Minister	Assisting software component planning, organizing GIS information
79	8/20	M							
80	8/21	T							
81	8/22	W							
82	8/23	Th.							
83	8/24	F							
84	8/25	Sat.							
85	8/26	S		Writing report, meeting with UNDP	Boiler capacity calculation	Creating soft component planning table, inquiring cost estimates	Design material preparation	Calculating green house gas emission reduction amount	Creating GIS maps, meeting with UNDP, obtaining software component information
86	8/27	M							
87	8/28	T							
88	8/29	W		Arrival to Japan					
89	8/30	Th.							
90	8/31	F							
91	9/1	Sat.							Creating GIS maps, attending UNDP workshop, obtaining software component information, meeting with MoAFI Minister
92	9/2	S							
93	9/3	M							
94	9/4	T							
95	9/5	W							
96	9/6	Th.							
97	9/7	F							
98	9/8	Sat.							
99	9/9	S							Arrival to Japan

2.3 Third Survey

	Date	Day	Project Manager Hideki MATSUOKA	Chief Consultant/ Biomass Heating System Planning Keiji IIZUKA	Facility Design/ Natural Condition Survey(1) Rokuro DENDA
1	1/28	M	Departure from Japan		
2	1/29	T	Explaining Moldova government Draft Final Report and discussion, creating M/D, signing M/D		
3	1/30	W			
4	1/31	Th.			
5	2/1	F			
6	2/2	Sat.			
7	2/3	S	Arrival to Japan		

3. List of Parties Concerned in the Recipient Country

3. List of Parties Concerned in the Recipient Country

Name	Title	Organization
Vasile BUMACOV (Mr)	Minister	Ministry of Agriculture and Food Industry (MoAFI)
Iuric SENIC (Mr)	Department Head	MoAFI / Organic Agriculture and Origin of Products Department
Petru MALERU (Mr)	Director	MoAFI / Payment Agency for Agriculture (AIPA)
Valeriu BULGARI (Mr)	Executive Director	MoAFI / 2KR-PIU
Liliana PELIN (Ms)	Monitoring and Evaluation Specialist	MoAFI / 2KR-PIU
Mihai DOLMA (Mr)	Director	Ministry of Economy/ Gaz & Energy Efficiency Department
Calin NEGURA (Mr)	Deputy Director	Ministry of Economy / Energy Efficiency Agency
Gheorghe SALARU (Mr)	Minister	Ministry of Environment
Valeriu HOLBON (Mr)	Head of Division	Ministry of Environment / State Ecological Inspectorate
Stela DRUCIOC (Ms)	Administrator	Ministry of Environment / Carbon Finance Unit
Marcel RADUCAN (Mr)	Minister	Ministry of Regional Development and Constructions
Alexandru BESLIU (Mr)	Minister Counselor	Ministry of Regional Development and Constructions
Svetlana ROGOV (Ms)	Head of International Relations and Investments Division	Ministry of Regional Development and Constructions
Vladimie CARLOV (Mr)	Chief Engineer	Ministry of Regional Development and Constructions/ National Institute of Research and Design in Field Spatial Territory, urbanization and Architecture
Anatolie GHILAS (Mr)	General Director	Cadastre and Land Relation Agency
Nagorneac SERGHEI (Mr)	Director	Cadastre and Land Relation Agency/ INGEOCAD
Nagorneac CONSTANTIN(Mr)	Chief of Technical Department	Cadastre and Land Relation Agency/ INGEOCAD
Veacheslav SHOKIN (Mr)	Procurement	Consolidated Agricultural Projects Management Unit (CAPMU)
Nadja VETTERS (Ms)	Portfolio Manager	United Nations Development Programme (UNDP)

Name	Title	Organization
Alexandru URSUL (Mr)	Project Manager	UNDP-MEBP
Nicolae ZAHARIA (Mr)	Senior Project Business Development	UNDP-MEBP
Tatiana CRACIUN (Ms)	Senior Project Officer Community Mobilization	UNDP-MEBP
Vsevlod VOLCOV (Mr)	Technical Engineer	UNDP-MEBP
Mihai MACIUCA (Mr)	Procurement Specialist	UNDP-MEBP
Waldemar SOCHACZEWSKI (Mr)	Advisor to MoAFI	European Union High level Policy Advice Mission
Aurelian ROTARU (Mr)	Expert to MoAFI	European Union High level Policy Advice Team
Robin DREWETT (Mr)	Team Coordinator	European Bank for Reconstruction and Development
Boris POPADIUC (Mr)	Executive Director	Moldova Social Investment Fund
Dumitru ROSCOVAN(Mr)	Team Leader	Moldova Social Investment Fund
Munteanu (Mr)	Technical Difficulties Assistant	Moldova Social Investment Fund
Ala MUSTEATA (Mr)		Moldova Social Investment Fund
Patrik STALGREN (Mr)	First Secretary	Embassy of Sweden, Chisinau

4. Minutes of Discussions

MINUTES OF DISCUSSIONS
THE PREPARATORY SURVEY ON THE PROJECT FOR BIOMASS HEATING SYSTEMS IN RURAL COMMUNITIES IN THE REPUBLIC OF MOLDOVA

In response to the request from the Government of Moldova, the Government of Japan decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the Project for Biomass Heating Systems in Rural Communities (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Moldova the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Ichiro ADACHI, Director of the Environment Management Division 2, the Global Environment Department, JICA, and is scheduled to stay in the country from 26th January to 1st February, 2012.

The Team held a series of discussions with the concerned officials of Moldova and conducted a field survey.

In the course of discussions and field survey, both sides confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Chisinau, 31st January, 2012

Mr. Ichiro Adachi
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Mr. Vasile Bumacov
Minister
Ministry of Agriculture and Food Industry
Moldova

Mr. Valeriu Bulgari
Executive Director
2KR Project Implementation Unit
Ministry of Agriculture and Food Industry
Moldova

ATTACHMENT

1. Objective of the Project

The objective of the Project is that heating systems using biomass fuel are provided and sustainably utilized in the rural communities of Moldova.

2. Project Site

The Project sites are to be selected from the public institutes in rural communities of Moldova except Transnistria. The map of Moldova is shown in Annex-1.

3. Responsible and Implementing Agency

The responsible agency is the Ministry of Agriculture and Food Industry, and the implementing agency is the 2KR Project Implementation Unit under the Ministry of Agriculture and Food Industry (hereinafter referred to as "PIU"). Organization chart is shown in Annex-2.

4. Items Requested by the Government of Moldova

Following the discussions with the Team, the items described in Annex-3 were finally requested by the Government of Moldova. Both sides confirmed that the appropriateness of the final components of the Project would be decided by the Japanese side.

In addition, both sides agreed that the possibility to introduce biomass boilers using pellets as fuel and pelleting machines is also studied during the Survey.

Moldovan side understood that some of the items may be procured in Japan as a result of the Survey.

5. Japan's Grant Aid Scheme

(1) The Team explained that the sub-scheme of the Project will be decided from "Grant Aid for General Projects", "Grant Aid for Environment and Climate Change (hereinafter referred to as "GAEC")", and "Grant Aid for Community Empowerment (hereinafter referred to as "GACE")" based on the result of the Survey.

(2) The Moldovan side understood the Japan's Program Grant Aid Schemes explained by the Team, as described from Annex-4 to 9.

(3) The Moldovan side will take necessary measures, as described in Annex-6 for Japan's Grant Aid for General Projects and Annex-9 for GAEC and GACE for smooth implementation of the Project, as the condition of the Japan's Grant Aid to be implemented.

(4) JICA will report to the Moldovan side if there are any other undertakings based on the result of this Survey.

6. Objective of the Survey

The Team explained that the objective of the Survey is to collect information to ensure the appropriateness of the Project.

7. Schedule of the Survey

(1) The consultant members of the Team will continue the 1st Survey in Moldova until the end of March, 2012.

(2) The Team explained that the schedule of the Survey as follows. However, it is subjected to change based on the progress of the Survey.

April to July 2012: 2nd Survey

November 2012: 3rd Survey to explain draft Preparatory Survey Report
January 2013: Submission of the final report

(3) The Team explained that the implementation of the Preparatory Survey is not the commitment of the approval of the Project.

8. Other Relevant Issues

(1) Inception Report

The contents of Inception Report that the Team explained was understood and accepted in principle by the Moldovan side.

(2) Arrangements for the Survey

As a response to the request by the Team, the Moldovan side agreed to assign necessary number of counterpart personnel for the Survey and provide all the data and information relevant to the Project for the smooth implementation of the Survey. The Moldovan side also agreed to provide an appropriate office space for the Team.

(3) Responsibility of each Agency Concerned with the Project

PIU will collaborate with the relevant organizations to support the implementation of the Survey.

(4) Priority of the Project Sites

The Moldovan side agreed that the number of the Project sites may be changed based on the financial reasons, and thus, the candidate sites will be identified in priority order.

(5) Budget Allocation for the Project by the Moldovan side

The budget necessary for the Project including operation and maintenance cost will be assessed in the Survey. The Moldovan side assures that appropriate budget will be put in place in each community, and each village administration is responsible for the operation and maintenance of the facilities. PIU will provide technical support to these communities.

(6) Contribution from the beneficiaries to the Project

The Moldovan side agreed that the foundation of the biomass boiler will be constructed by the beneficiary (e.g. community or village administration). Also, the beneficially should acquire the necessary permission for the construction of the system from the relevant authorities.

(7) Other Undertakings of the Moldovan side

Although general undertakings of both sides are shown in Annex-6 and 9, the Team emphasized the responsibilities of the Moldovan side to execute following matters and the Moldovan side agreed to it.

1) Tax Exemption
Both sides confirmed that import tax, customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services will be exempted. The Moldovan side will take necessary measures for tax exemption, if any.

2) Necessary measures for Operation and Maintenance of facilities and equipment
The Moldovan side will take any necessary measures and allocate the necessary budget, if any, to operate and maintain the facilities and equipment which would be provided by

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the Project.

(8) Avoidance of Duplication with Other Projects

Both sides agreed that any component of the Project will not be overlapped with any other project supported by other donor agencies, NGOs, and Moldovan official organization(s).

(9) Safety and Security

The Moldovan side agreed to take measures to secure the safety of the members of the Team.

(10) Careful Handling of the Survey Reports

The Team explained that certain information in both the draft and the final reports of the Survey should be dealt with confidentially until the tender is closed when the Project proceeds to actual implementation stage, since disclosure of the information would affect fairness of tender procedure. The Moldovan side understood the sensitivity in dealing with the Survey reports and agreed on careful handling of the reports for achieving fair tendering.

(11) Environmental and Social Considerations

Both sides agreed that the Moldovan side will take necessary measures regarding environmental impacts for implementation of the Project according to the relative laws and acts in Moldova. Also, the beneficiaries should consult with the communities and acquire the agreement on the construction of the system.

ANNEXES

Annex-1	Map of Moldova
Annex-2	Organization Chart of PIU
Annex-3	Requested Components of the Project
Annex-4 and 5	Japan's Grant Aid Scheme for General Projects
Annex-6	Major Undertakings by Each Government for General Projects
Annex-7	Japan's Grant Aid for Environment and Climate Change (GAEC)
Annex-8	Japan's Grant Aid for Community Empowerment (GACE)
Annex-9	Major Undertaking by Each Government for GAEC and GACE

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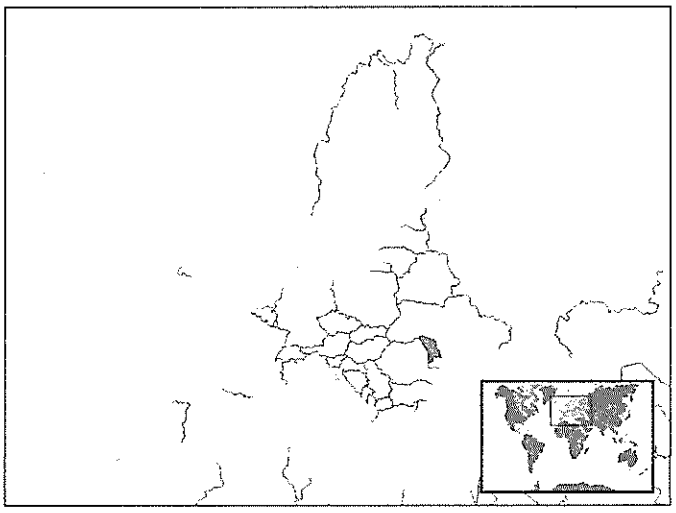
Annex-1

Map of Moldova



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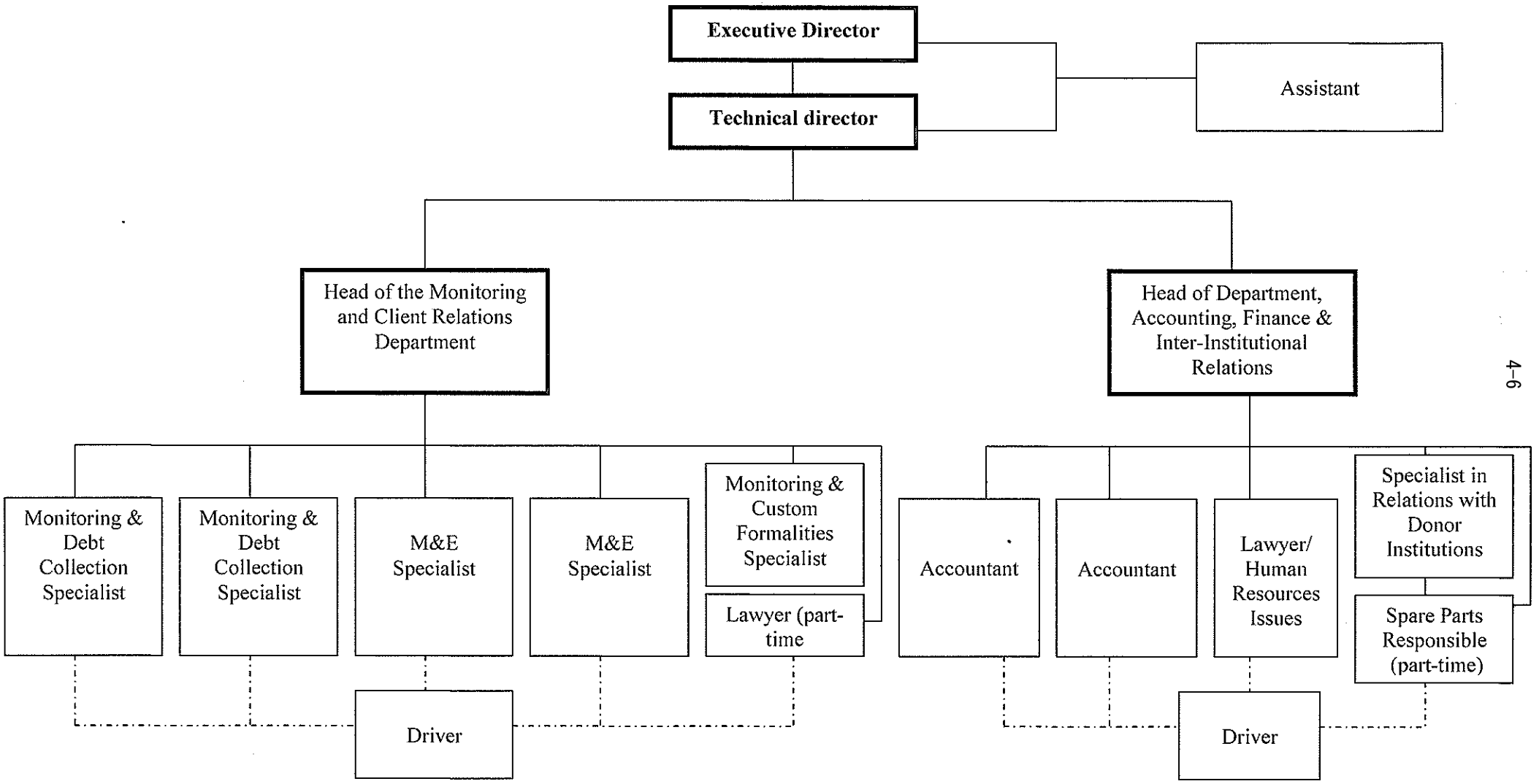
Annex 2

PIU Organizational Chart



Annex-3

Requested Components of the Project

	Items	Q'ty
1	Provision and Installation of Biomass Boilers - procurement of a biomass boiler - construction of the biomass boiler house - connection of the boiler to the heat exchanger	100 sets
2	Provision of a bailer	100 sets
3	Renovation and installation of heating pipe systems in the facility, if necessary	Not Identified Yet
4	Training of the community and government members for operation and maintenance	If necessary

These items are subject to change based on the Survey results.
The possibility to introduce biomass boilers using pellets as fuel and pelleting machines is also studied during the Survey.

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Annex-4

JAPAN'S GRANT AID for General Projects

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

・Preparatory Survey
- The Survey conducted by JICA

・Appraisal &Approval
-Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet

・Authority for Determining Implementation
-The Notes exchanged between the GOJ and a recipient country

・Grant Agreement (hereinafter referred to as "the G/A")
-Agreement concluded between JICA and a recipient country

・Implementation
-Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and

effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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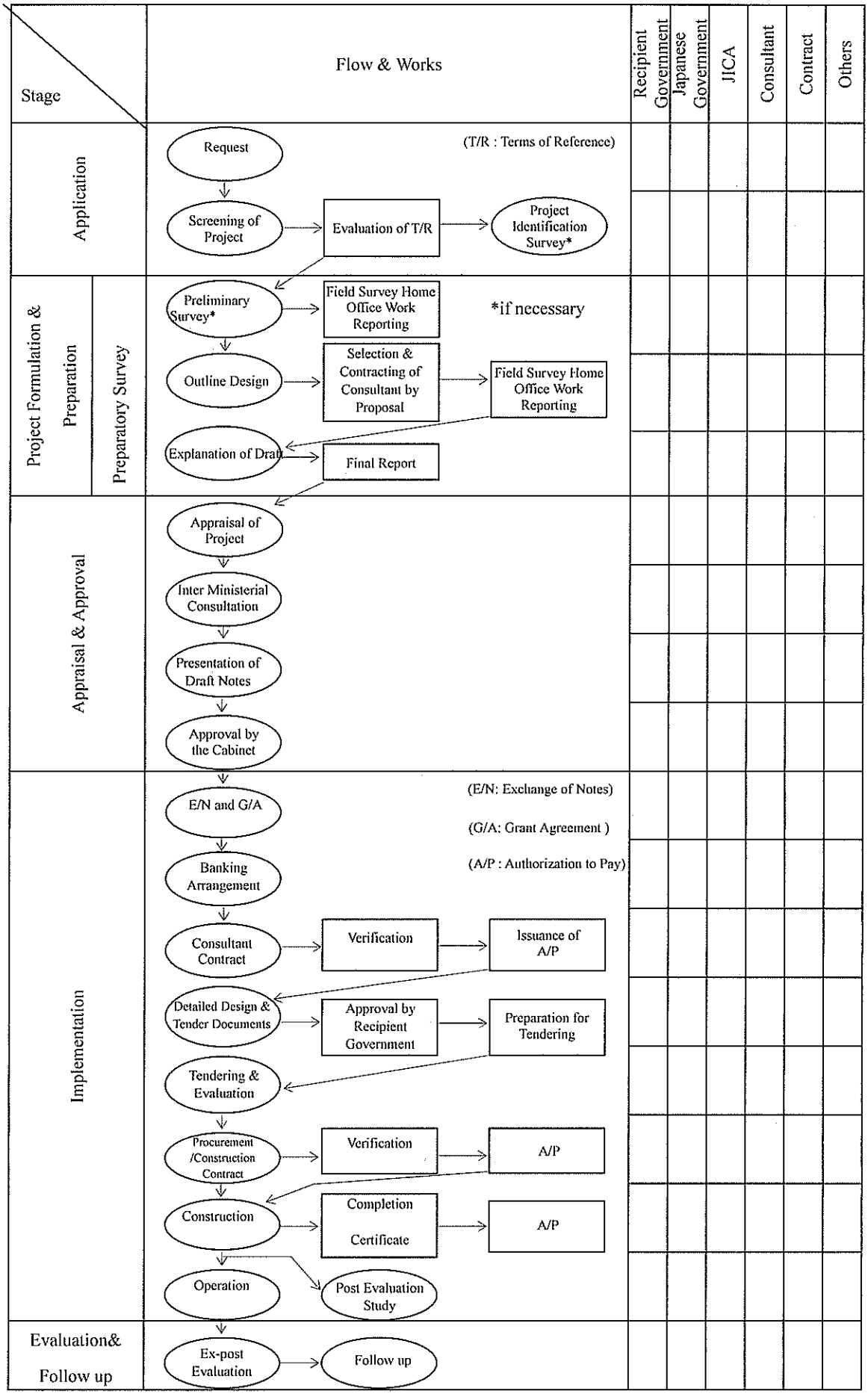
Annex-5

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-6

Japan's Grant Aid for General Projects

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure [a lot] /[lots] of land necessary for the implementation of the Project and to clear the [site]/[sites];		●
2	To construct the following facilities		
	1) The building	●	
	2) The gates and fences in and around the site		●
	3) The parking lot	●	
	4) The road within the site	●	
	5) The road outside the site		●
3	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the [site]/[sites]		
	1) Electricity		
	a. The distributing power line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the site)		●
	b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
4	To ensure prompt [unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products] / [customs clearance of the products and to assist internal transportation of the products in the recipient country]		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services [be exempted] / [be borne by the Authority without using the Grant]		●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To ensure that [the Facilities and the products]/[the Facilities]/ [the products] be maintained and used properly and effectively for the implementation of the Project		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

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Annex-7

Programme Grant Aid for Environment and Climate Change of the Government of Japan

(Provisional)

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, the new JICA law was entered into effect on October 1, 2008. Based on the law and the decision of GOJ, Japan International Cooperation Agency (hereinafter referred to as "JICA") has become the executing agency of the Programme Grant Aid for Environment and Climate Change (hereinafter referred to as "GAEC").

The Grant Aid provides a recipient country (hereinafter referred to as "the Recipient") with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

GAEC aims toward emission reduction such as achievement of energy saving (environmental-easing measures) and environmental damage control by climate change. Multiple components can be combined to effectively meet the needs. Contractors, suppliers or consultants are not confined to Japanese firms only, and construction can be done based on the local method.

1. Procedures for GAEC

GAEC is executed through the following procedures.

Application	(Request made by the Recipient)
Study	(Outline Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by GOJ and Approval by the Cabinet)
Determination of Implementation	(The Notes exchanged between the GOJ and the Recipient)
Grant Agreement (hereinafter referred to as "the G/A")	(Agreement concluded between JICA and the Recipient)

Firstly, the application or request for a GAEC programme submitted by the Recipient is examined by GOJ (the Ministry of Foreign Affairs) to determine whether or not it is eligible for GAEC.

Secondly, if the request is deemed appropriate, JICA conducts the Outline Design Study, using Japanese consulting firms.

Thirdly, GOJ appraises the programme to see whether or not it is suitable for Japan's GAEC, based on the Outline Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the programme, once approved by the Cabinet, becomes official with the Exchange

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of Notes (E/N) signed by GOJ and the Recipient. Simultaneously, the Grant will be made available by concluding a grant agreement between the Government of the Recipient or its designated authority and JICA (hereinafter referred to as "the G/A").

JICA is designated by GOJ as an organization responsible for the execution of the Grant.

Procurement Agent ("the Agent") is designated to conduct the procurement services of products and services (including fund management, preparing tenders, contracts and so on) for GAEC on behalf of the Recipient. The Agent is an impartial and specialized organization and shall render services according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by GOJ and agreed between the two Governments in the Agreed Minutes ("A/M").

2. Outline Design Study

1) Contents of the Study

The aim of the Outline Design Study ("the Study"), conducted by JICA on a requested programme ("the Programme"), is to provide a basic document necessary for the appraisal of the Programme by GOJ. The contents of the Study are as follows:

(1) Confirmation of the background, objectives, and benefits of the Programme and also institutional capacity of agencies and communities concerned of the recipient country necessary for the Programme's implementation.
(2) Evaluation of the appropriateness of the Programme to be implemented under the Grant Aid Scheme for Environment and Climate Change from a technical, social and economic point of view;
(3) Confirmation of items agreed upon by both parties concerning the basic concept of the Programme.
(4) Preparation of an outline design of the Programme.
(5) Estimation of cost for the Programme.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid programme. The Outline Design of the Programme is confirmed considering the guidelines of Japan's Grant Aid scheme.

GOJ requests the Government of the Recipient to take whatever measures are necessary to ensure its self-reliance in the implementation of the Programme. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Programme. Therefore, the implementation of the Programme is confirmed by all relevant organizations of the Recipient through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses registered consulting firms. JICA selects

firms based on proposals submitted by interested firms. The firms selected carry out an Outline Design Study and write a report, based upon terms of reference set by JICA.

The consulting firms to work on the Programme's implementation after the Exchange of Notes could be, in principle, of any nationality as long as the Firm satisfies the conditions specified in the tender documents.

3. Implementation of GAEC after the E/N

1) Exchange of Notes (E/N) and Grant Agreement (G/A)

GAEC is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the programme, period of execution, conditions and amount of the Grant Aid, etc., are confirmed. The conclusion of the Grant Agreement (hereinafter referred to as "the G/A") between JICA and the recipient government will be followed to define the necessary engagement to implement the project such as payment conditions, responsibilities of the recipient government and procurement conditions.

2) Procedural details

Procedural details on the procurement of products and services under GAEC will be agreed upon between the Recipient and JICA at the time of the signing of the E/N and G/A.

Essential points to be agreed upon are outlined as follows:

a) JICA is in a position to expedite the proper execution of the program.

b) The products and services shall be procured and provided in accordance with "Procurement Guidelines for Environment and Climate Change of JICA.

c) The Recipient shall conclude an employment contract with the Agent.

d) The Agent is the representative acting in the name of the Recipient concerning all transfers of funds to the Agent.

3) Focal Points of "The Procurement Guidelines of Japan's (Type I - E) Grant Aid for Environment and Climate Change"

a) The Agent

The Agent is the organization which provides procurement services of products and services on behalf of the Recipient according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by GOJ and agreed between the two Governments in the A/M.

b) Agent Agreement

The Recipient shall conclude an Agent Agreement, within two months after the date of entry into force of the E/N and the G/A, in accordance with the A/M. The scope of the Agent's services shall be clearly specified in the Agent Agreement.

c) Approval of the Agent Agreement

The Agent Agreement, which is prepared as two identical documents, shall be

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submitted to JICA by the Recipient through the Agent. JICA confirms whether or not the Agent Agreement is concluded in conformity with the G/A and the Procurement Guidelines for Disaster Reconstruction Grant Aid, and approves the Agreement.

The Agent Agreement concluded between the Recipient and the Agent shall become effective after the approval by JICA in a written form.

d) Payment Methods

The Agent Agreement shall stipulate that "regarding all transfers of the fund to the Agent, the Recipient shall designate the Agent to act on behalf of the Recipient and issue a Blanket Disbursement Authorization ("the BDA") to conduct the transfer of the fund (Advances) to the Procurement Account from the Recipient Account."

The Agent Agreement shall clearly state that the payment to the Agent shall be made in Japanese yen from the Advances and that the final payment to the Agent shall be made when the total Remaining Amount becomes less than 3 % of the Grant and its accrued interest.

e) Products and Services Eligible for Procurement

Products and services to be procured shall be selected from those defined in the G/A.

f) Firms

In principle, a firm of any nationality could be contracted as long as the Firm satisfies the conditions specified in the tender documents.

The Firm, with approval by JICA, may be Japanese nationals and the products to be procured may be the products made in Japan or produced or manufactured by Japanese manufacturer(s) and/or its (their) affiliate(s) in any country.

g) Experts for Technical Assistance

Expert(s) could be deployed to carry out technical assistance. The expert(s) may be recommended by JICA when the conceptual consistency with the Studies is required. In principle, expert(s) is/are preferable to be Japanese nationals if appropriate.

h) Method of Procurement

In implementing procurement, sufficient attention shall be paid so that there is no unfairness among tenderers who are eligible for the procurement of products and services.

For this purpose, competitive tendering shall be employed in principle.

i) Tender Documents

The tender documents should contain all information necessary to enable tenderers to prepare valid offers for the products and services to be procured by GAEC.

The rights and obligations of the Recipient, the Agent and the Suppliers of the products and services should be stipulated in the tender documents to be prepared by the Agent. Besides this, the tender documents shall be prepared in consultation with the Recipient.

j) Pre-qualification Examination of Tenderers

The Agent may conduct a pre-qualification examination of tenderers in advance of the tender so that the invitation to the tender can be extended only to eligible firms. The

pre-qualification examination should be performed only with respect to whether or not the prospective tenderers have the capability of accomplishing the contracts concerned without fail. In this case, the following points should be taken into consideration:

(1) Experience and past performance in contracts of a similar kind

(2) Property foundation or financial credibility

(3) Existence of offices, etc. to be specified in the tender documents.

k) Tender Evaluation

The tender evaluation should be implemented on the basis of the conditions specified in the tender documents.

Those tenders which substantially conform to the technical specifications, and are responsive to other stipulations of the tender documents, shall be judged in principle on the basis of the submitted price, and the tenderer who offers the lowest price shall be designated as the successful tenderer.

The Agent shall prepare a detailed tender evaluation report clarifying the reasons for the successful tender and the disqualification and submit it to the Recipient to obtain confirmation before concluding the contract with the successful tenderer.

The Agent shall furnish JICA with a detailed evaluation report of tenders, giving the reasons for the acceptance or rejection of tenders.

l) Additional Procurement

If there is an additional procurement fund after competitive and / or selective tendering and / or direct negotiation for a contract, and the Recipient would like an additional procurement, the Agent is allowed to conduct an additional procurement, following the points mentioned below:

(1) Procurement of the same products and services

When the products and services to be additionally procured are identical with the initial tender and a competitive tendering is judged to be disadvantageous, the additional procurement can be implemented by a direct contract with the successful tenderer of the initial tender.

(2) Other procurements

When products and services other than those mentioned above in (1) are to be procured, the procurement should be implemented through a competitive tendering. In this case, the products and services for additional procurement shall be selected from among those in accordance with the G/A.

m) Conclusion of the Contracts

In order to procure products and services in accordance with the G/A, the Agent shall conclude contracts with firms selected by tendering or other methods.

n) Terms of Payment

The contract shall clearly state the terms of payment. The Agent shall make payment from the "Advances", against the submission of the necessary documents from the Firm on

the basis of the conditions specified in the contract, after the obligations of the Firm have been fulfilled. When the services are the object of procurement, the Agent may pay certain portion of the contract amount in advance to the firms on the conditions that such firms submit the advance payment guarantee worth the amount of the advance payment to the Agent.

4) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid Programme, the recipient country is required to undertake such necessary measures as the following:

a) To secure land necessary for the sites of the Programme and to clear, level and reclaim the land prior to commencement of the Programme,
b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
c) To secure buildings prior to the procurement in case the installation of the equipment,
d) To ensure prompt unloading and customs clearance at the port of disembarkation and to assist internal transportation therein,
e) To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the Components including the employment of the Agent,
f) To accord all the concerned parties, whose services may be required in connection with supply of the products and services under the contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work,
g) To ensure that the Facilities and/or the Components be maintained and used properly and effectively for the implementation of the Programme,
h) To bear all the expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of the Programme, and
i) To give due environmental and social consideration in the implementation of the Programme.

(3)

5) Proper Use

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

6) Re-export

The products purchased under the Grant Aid should not be re-exported from the recipient country.

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Annex-8

Grant Aid for Community Empowerment
of the Government of Japan
(Provisional)

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, the new JICA law was entered into effect on October 1, 2008. Based on the law and the decision of the Government of Japan (hereinafter referred to as "the GOJ"), JICA has become the executing agency of the Project or the Programme Grant Aid for Community Empowerment ("GACE") Grant Aid.

The Grant Aid provides a recipient country ("the Recipient") with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Procedures for GACE

GACE is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Outline Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by the Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)
Grant Agreement (hereinafter referred to as "the G/A")	(Agreement concluded between JICA and a recipient country)

Firstly, the application or request for a GACE Project or the Programme submitted by the Recipient is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for GACE.

Secondly, if the request is deemed appropriate, JICA (Japan International Cooperation Agency) conducts the Outline Design Study, using Japanese consulting firms.

Thirdly, the Government of Japan appraises the Project or the Programme to see whether or not it is suitable for Japan's GACE, based on the Outline Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the Project or the Programme, once approved by the Cabinet, becomes

official with the Exchange of Notes (E/N) signed by the Governments of Japan and the Recipient. Simultaneously, the Grant will be made available by concluding a grant agreement between the Government of the Recipient Country or its designated authority and the Japan International Cooperation Agency (JICA) (hereinafter referred to as "the G/A").

JICA is designated by the Government of Japan as an organization responsible for the proper execution of the Grant.

Procurement Agent ("the Agent") is designated to conduct the procurement services of products and services (including fund management, preparing tenders, contracts and so on) for GACE on behalf of the Recipient. The Agent is an impartial and specialized organization and shall render services according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the Agreed Minutes ("A/M").

2. Outline Design Study

1) Contents of the Study

The aim of the Outline Design Study ("the Study"), conducted by JICA on a requested Project or the Programme ("the Project or the Programme"), is to provide a basic document necessary for the appraisal of the Project or the Programme by the Government of Japan. The contents of the Study are as follows:

(1) Confirmation of the background, objectives, and benefits of the Project or the Programme and also institutional capacity of agencies and communities concerned of the recipient country necessary for the Project or the Programme's implementation.
(2) Evaluation of the appropriateness of the [Project] / [Project or the Programme] to be implemented under the Grant Aid Scheme for Community Empowerment from a technical, social and economic point of view;
(3) Confirmation of items agreed upon by both parties concerning the basic concept of the Project or the Programme.
(4) Preparation of an outline design of the Project or the Programme.
(5) Estimation of cost for the Project or the Programme.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project or the Programme. The Outline Design of the Project or the Programme is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the Recipient to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project or the Programme. Such measures must be guaranteed even through

they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project or the Programme. Therefore, the implementation of the Project or the Programme is confirmed by all relevant organizations of the Recipient through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses registered consulting firms. JICA selects firms based on proposals submitted by interested firms. The firms selected carry out an Outline Design Study and write a report, based upon terms of reference set by JICA.

The consulting firms to work on the Project or the Programme's implementation after the Exchange of Notes could be, in principle, of any nationality as long as the Firm satisfies the conditions specified in the tender documents.

3. Implementation of GACE after the E/N

1) Exchange of Notes (E/N) and Grant Agreement (G/A)

GACE is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project or the Programme, period of execution, conditions and amount of the Grant Aid, etc., are confirmed. The conclusion of the Grant Agreement (hereinafter referred to as "the G/A") between JICA and the recipient government will be followed to define the necessary engagement to implement the project such as payment conditions, responsibilities of the recipient government and procurement conditions.

2) Procedural details

Procedural details on the procurement of products and services under GACE will be agreed upon between the Recipient and JICA at the time of the signing of the E/N and G/A.

Essential points to be agreed upon are outlined as follows:

a) JICA is in a position to expedite the proper execution of the Project or the Programme.
b) The products and services shall be procured and provided in accordance with "Procurement Guidelines for Japan's Grant Aid for Community Empowerment of JICA.
c) The Recipient shall conclude an employment contract with the Agent.
d) The Agent is the representative acting in the name of the Recipient concerning all transfers of funds to the Agent.

(3)

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3) Focal Points of "The JICA's Procurement Guidelines of Japan's Grant Aid for Community Empowerment (Type I – C)"

a) The Agent

The Agent is the organization which provides procurement services of products and services on behalf of the Recipient according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the A/M.

b) Agent Agreement

The Recipient shall conclude an Agent Agreement, within two months after the date of entry into force of the E/N and the G/A, in accordance with the A/M. The scope of the Agent's services shall be clearly specified in the Agent Agreement.

c) Approval of the Agent Agreement

The Agent Agreement, which is prepared as two identical documents, shall be submitted to the Government of Japan by the Recipient through the Agent. The Government of Japan confirms whether or not the Agent Agreement is concluded in conformity with the G/A and the JICA's Procurement Guidelines of Japan's Grant Aid for Community Empowerment, and approves the Agreement.

The Agent Agreement concluded between the Recipient and the Agent shall become effective after the approval by the Government of Japan in a written form.

d) Payment Methods

The Agent Agreement shall stipulate that "regarding all transfers of the fund to the Agent, the Recipient shall designate the Agent to act on behalf of the Recipient and issue a Blanket Disbursement Authorization ("the BDA") to conduct the transfer of the fund (Advances) to the Procurement Account from the Recipient Account."

The Agent Agreement shall clearly state that the payment to the Agent shall be made in Japanese yen from the Advances and that the final payment to the Agent shall be made when the total Remaining Amount becomes less than 3 % of the Grant and its accrued interest.

e) Products and Services Eligible for Procurement

Products and services to be procured shall be selected from those defined in the G/A.

f) Firms

In principle, the consultant firm who carried out the Outline Design Study will be recommended by JICA to the recipient country as the supervisor after the E/N and the G/A signing, in order to maintain technical consistency. Besides,

consultants of any nationality will be contracted for detailed design study and supervising works. Firms of any nationality could be contracted as contractors and suppliers as long as the firm satisfies the conditions specified in the tender documents.

g) Method of Procurement

In implementing procurement, sufficient attention shall be paid so that there is no unfairness among tenderers who are eligible for the procurement of products and services.

For this purpose, competitive tendering shall be employed in principle.

h) Tender Documents

The tender documents should contain all information necessary to enable tenderers to prepare valid offers for the products and services to be procured by GACE.

The rights and obligations of the Recipient, the Agent and the Suppliers of the products and services should be stipulated in the tender documents to be prepared by the Agent. Besides this, the tender documents shall be prepared in consultation with the Recipient.

i) Pre-qualification Examination of Tenderers

The Agent may conduct a pre-qualification examination of tenderers in advance of the tender so that the invitation to the tender can be extended only to eligible firms. The pre-qualification examination should be performed only with respect to whether or not the prospective tenderers have the capability of accomplishing the contracts concerned without fail. In this case, the following points should be taken into consideration:

(1) Experience and past performance in contracts of a similar kind
(2) Property foundation or financial credibility
(3) Existence of offices, etc. to be specified in the tender documents.

j) Tender Evaluation

The tender evaluation should be implemented on the basis of the conditions specified in the tender documents.

Those tenders which substantially conform to the technical specifications, and are responsive to other stipulations of the tender documents, shall be judged in principle on the basis of the submitted price, and the tenderer who offers the lowest price shall be designated as the successful tenderer.

The Agent shall prepare a detailed tender evaluation report clarifying the reasons for the successful tender and the disqualification and submit it to the Recipient to obtain confirmation before concluding the contract with the successful tenderer.

The Agent shall furnish JICA with a detailed evaluation report of tenders,

giving the reasons for the acceptance or rejection of tenders.

k) Additional Procurement

If there is an additional procurement fund after competitive and / or selective tendering and / or direct negotiation for a contract, and the Recipient would like an additional procurement, the Agent is allowed to conduct an additional procurement, following the points mentioned below:

(1) Procurement of the same products and services

When the products and services to be additionally procured are identical with the initial tender and a competitive tendering is judged to be disadvantageous, the additional procurement can be implemented by a direct contract with the successful tenderer of the initial tender.

(2) Other procurements

When products and services other than those mentioned above in (1) are to be procured, the procurement should be implemented through a competitive tendering. In this case, the products and services for additional procurement shall be selected from among those in accordance with the G/A.

l) Conclusion of the Contracts

In order to procure products and services in accordance with the G/A, the Agent shall conclude contracts with firms selected by tendering or other methods.

m) Terms of Payment

The contract shall clearly state the terms of payment. The Agent shall make payment from the "Advances", against the submission of the necessary documents from the Firm on the basis of the conditions specified in the contract, after the obligations of the Firm have been fulfilled. When the services are the object of procurement, the Agent may pay certain portion of the contract amount in advance to the firms on the conditions that such firms submit the advance payment guarantee worth the amount of the advance payment to the Agent.

(3)

4) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid Project or the Programme, the recipient country is required to undertake such necessary measures as the following:

(a) to secure lots of land necessary for the implementation of [the Project] / [the Programme] and to clear the sites ;

(b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of [the Project] / [the Programme] outside the sites referred to in (a) above;

(c) to ensure prompt unloading and customs clearance at ports of disembarkation

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in the Recipient and to assist internal transportation therein of the products;

(d) to ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Components as well as the employment of the Agent be exempted or borne by its designated authority without using the Grant and its accrued interest;

(e) to accord Japanese nationals and / or nationals of third countries, including such nationals employed by the Agent, whose services may be required in connection with the supply of the Components such facilities as may be necessary for their entry into the Recipient and stay therein for the performance of their work (The term "nationals" whenever used in the G/A means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons in the case of Japanese nationals, and physical or juridical persons of third countries in the case of nationals of third countries.);

(f) to ensure that the Facilities and / or the Components be maintained and used properly and effectively for the implementation of [the Project] / [the Programme];

(g) to bear all the expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of [the Project] / [the Programme]; and

(h) to give due environmental and social consideration in the implementation of [the Project] / [the Programme].

5) Upon the request of JICA, the Government of the Recipient shall provide JICA with necessary information on [the Project] / [the Programme].

6) With regard to the shipping and marine insurance of the products, the Government of the Recipient shall refrain from imposing any restrictions that may hinder fair and free competition among the shipping and marine insurance companies.

7) The products referred to in Article 3 shall not be exported or re-exported from the Recipient Country.

8) The Government of the Recipient shall ensure that any official of the Government of the Recipient does not undertake any part of the Japanese nationals' work and/or the work of nationals of third countries on purchase of the Components.

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Annex-9

Grant Aid for Environment and Climate Change (GAEC)
Grant Aid for Community Empowerment (GACE)
Major Undertakings to be taken by Each Government

	Items	To be covered by the Grant	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1)Electricity		
	a.The distributing line to the site		●
	b.The drop wiring and internal wiring within the site	●	
	c.The main circuit breaker and transformer	●	
	2)Water Supply		
	a.The city water distribution main to the site		●
	b.The supply system within the site (receiving and/or elevated tanks)	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	Payment commission		●

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9	1) Marine(Air) transportation of the products from Japan to the recipient country at the entry to the recipient country	•	
	2) Tax exemption and customs clearance of the products at the port of disembarkation, inland transportation to the country		•
	3) Internal transportation from the port of disembarkation to the project site	(•)	(•)
10	To accord all concerned parties, whose services may be required in connection with the supply of the products and the services under the approved contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
11	To exempt or bear of all concerned parties from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the approved contract		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		•
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•
14	To ensure environmental and social consideration for the Programme.		•

(B/A: Banking Arrangement, N/A: Not Applicable)

(3)

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MINUTES OF DISCUSSIONS ON THE PREPARATORY SURVEY ON THE PROJECT FOR EFFECTIVE USE OF BIOMASS FUEL IN THE REPUBLIC OF MOLDOVA (EXPLANATION OF DRAFT REPORT)

From January to March and June to September 2012, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a preparatory survey team on the Project for Effective Use of Biomass Fuel (hereinafter referred to as "the Project") to the Republic of Moldova (hereinafter referred to as "Moldova"), and through discussions, field survey, and technical examination of the results, JICA prepared the Draft Preparatory Survey Report (hereinafter referred to as "Draft Report").

In order to explain the contents of the Draft Report and to consult with the officials concerned of the Government of Moldova (hereinafter referred to as "the GOM"), JICA sent the Draft Report Explanation Team (hereinafter referred to as "the Team") to Moldova, which is headed by Mr. Hideaki Matsuoka, Deputy Director, the Environmental Management Division 2, Global Environment Department, JICA, from 29th January to 2nd February, 2013.

As a result of the discussions, both parties confirmed the main items described in the attached sheets.

Chisinau, 31st January, 2013

Mr. Hideaki Matsuoka
Leader
Draft Report Explanation Team
Japan International Cooperation Agency
Japan

Mr. Vasile Bumacov
Minister
Ministry of Agriculture and Food Industry
Moldova

Mr. Valeriu Bulgari
Executive Director
2KR Project Implementation Unit
Ministry of Agriculture and Food Industry
Moldova

ATTACHMENT

1. Contents of the Draft Report

The Moldovan side agreed and accepted in principle the contents of the Draft Report explained by the Team. The outline of the Draft Report is attached in Annex 4.

2. Japan's Grant Aid Scheme

The Team explained that this Project will be implemented under the sub-scheme of Grant Aid for Environment for Climate Change (hereinafter referred to as "GAEC").

The Moldovan side understood the Japan's Grant Aid Scheme, as attached in Annex 1 to 3, and will take the necessary measures as described in the Annex. The Moldovan side will also allocate necessary budget for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

The Moldovan side recognized, as the Embassy of Japan explained, that the Project will be formulated and conducted in accordance with the "Green Growth" policy of the Government of Japan, which emphasizes utilizing the major equipment such as pellet production plant and biomass boilers made by Japan's small - and - medium - sized enterprises.

3. Tentative Schedule of the Project and the Survey

JICA will complete the Final Report in accordance with the confirmed items and send it to the Government of Moldova by April 2013.

4. Confidentiality of the Project

(1) Detailed Specifications

Both sides confirmed all the information related to the Project including detailed specifications of the facilities, equipment and other technical information shall not be released to any other party(ies) before the signing of all the contract(s) for the Project.

(2) Project Cost Estimate

The Team explained to the Moldovan side the estimated project cost to be borne by the Government of Japan (hereinafter referred to as "the GOJ") and the GOM in Annex 5. The Team also explained that it is a provisional estimate and would be further examined by the GOJ for the approval of the Grant. The Moldovan side understood that the project cost estimate is subjected to be modified.

Both sides agreed that the project cost estimate should never be duplicated in any form nor disclosed to any other party(ies) before the signing of all the contract(s) for the Project. This confidentiality of the estimated project cost is necessary to ensure fairness of the tender procedure.

5. Other Relevant Issues

(1) Undertakings of the Moldovan Side

Both sides confirmed that the GOM would carry out the issues shown in Annex 3 and 4 in accordance with the implementation schedule of the Project in addition to the previous minutes.

Main undertakings by Moldovan side are as follows.

a. Construction of a Building for the Pellet Production Plant

A building for the pellet production plant should be constructed at the secured land of 2KR Project Implementation Unit by July 2014. This construction work includes other incidental work, such as electricity and water supply.

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b. Preparation for Pellet Boilers

The central assembly factory should be arranged by March 2014.

Also, a foundation of the biomass boiler and incidental work, such as secondary pipe installation, electricity and water supply, should be prepared at each site by April 2014 according to the work schedule in Annex 4. The work at each site should be completed under the proper support from 2KR Project Implementation Unit.

(2) Strengthening Operation and Maintenance

According to the results of the Preparatory Survey, the Team requested the Moldovan side to take necessary actions which were proposed in the Draft Report such as allocation of adequate budget and qualified personnel for proper, effective and sustainable operation and maintenance of the facilities and equipment, even after the Project completion.

The Team also requested that the necessary actions for recruitment of staffs and operators of the pellet production plant and biomass boilers be taken in time, since the training for the personnel as Technical Assistance will be started before the procurement of the equipment.

(3) The Number of the Project Sites and Supplied Equipment

The Team explained that the total Project cost has not been finalized and is subjected to change. In case of any change of the Project cost, the number of the Project sites and supplied equipment may also be changed according to the priority list of the sites. The Moldovan side understood it.

(4) Technical Assistance

The Team explained that the contents of the technical assistance as "Soft Component" would focus on the subjects as described in Annex 4, and the Moldovan side agreed on it.

The Moldovan side committed to assign responsible staff and operators before the Soft Component starts as described in the Draft Report.

(5) Project Title

Both sides agreed that the Project title will be changed from "The Project for Biomass Heating Systems in Rural Communities in the Republic of Moldova" to "The Project for Effective Use of Biomass Fuel in the Republic of Moldova" based on the discussions.

ANNEXES

Annex-1 to 3	Japan's Grant Aid Scheme
Annex-4	The Outline of the Preparatory Survey (Draft Report)
Annex-5	Project Cost Estimate

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Annex-1

JAPAN'S GRANT AID for General Projects

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

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JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and

effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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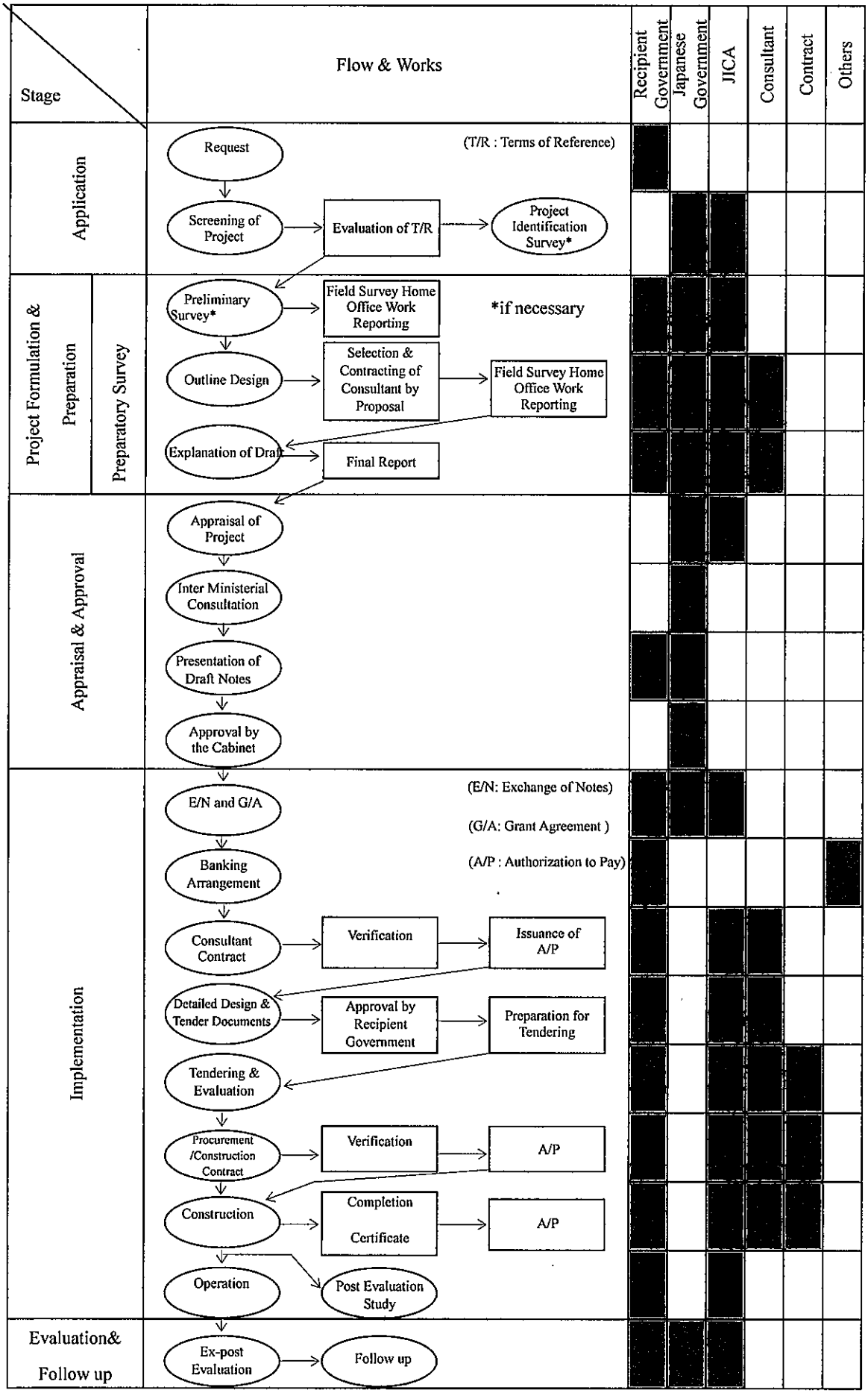
Annex-2

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-3

Japan's Grant Aid for General Projects

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure lots of land necessary for the implementation of the Project and to clear the sites		●
2	To construct the following facilities		
	1) The building for a pellet production plant at the 2KR-PIU workshop		●
	2) The foundation of pellet boilers at each site		●
	3) The gates and fences in and around the sites		●
	4) The parking lots		●
	5) The road within the site		●
	6) The road outside the site		●
3	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project in or outside the sites		
	1) Electricity		
	a. The distributing power line to the sites		●
	b. The drop wiring and internal wiring within the sites		●
	c. The main circuit breaker and transformer		●
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)		●
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the site)		●
	b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site		●
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site		●
	5) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
4	To ensure prompt [unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products] / [customs clearance of the products and to assist internal transportation of the products in the recipient country]		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To ensure that the facilities and equipment be maintained and used properly and effectively for the implementation of the Project		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

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Annex 4

2KR Project Implementation Unit
Ministry of Agriculture and Food Industry
Republic of Moldova

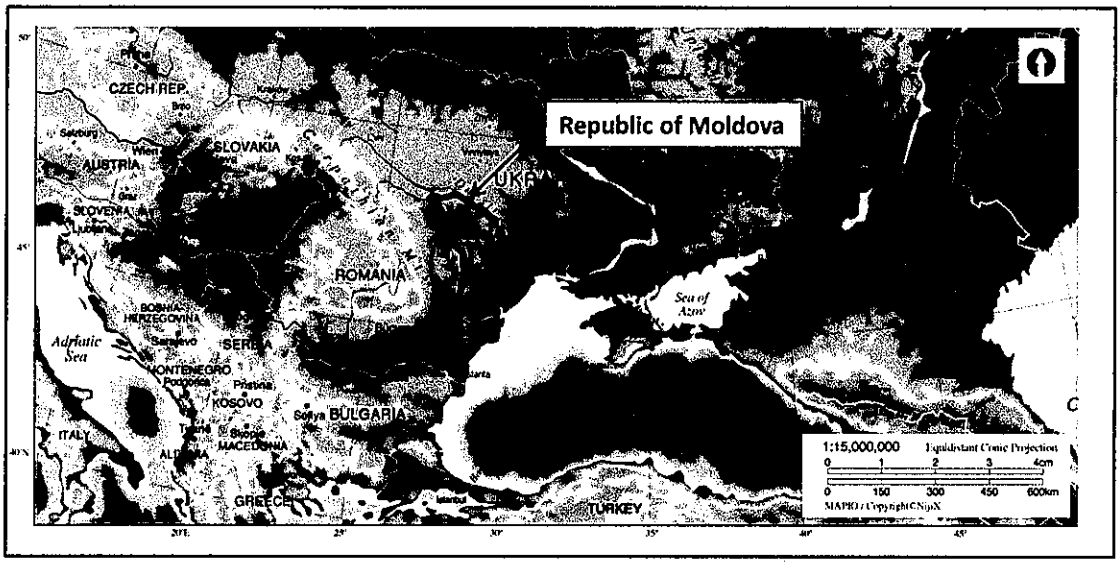
The Preparatory Survey on the Project for Effective Use of Biomass Fuel in the Republic of Moldova

Outline of Draft Final Report

January 2013

JAPAN INTERNTIONAL COOPERATION AGENCY

MITSUI CONSULTANTS CO., LTD.
UNICO INTERNATIONAL CORPORATION



Location Map

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Abbreviations

2KR-PIU	2KR Project Implementation Unit, Ministry of Agriculture and Food Industry
BOCM	Bilateral Offset Credit Mechanism
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
COP	Conference of the Parties, United Nations Framework Convention on Climate Change
E/N	Exchange of Note
EU	European Union
G/A	Grant Aid Agreement
GoM	Government of Moldova
IMS	Information Management System
JICA	Japan International Cooperation Agency

JIS	Japan Industrial Standards
JST	JICA Survey Team
MDL	Moldova Lei
MoAFI	Ministry of Agriculture and Food Industry
MSIF	Moldova Social Investment Fund
NTC	National Training Center, 2KR-PIU
ODA	Official Development Assistance
OIR	Operation Information Reporting
O&M	Operation and Maintenance
UNDP	United Nations Development Programme
USD	US dollar

Exchange Rate: 104.55 JPY/ Euro (6-month average from 1-Feb-2012 to 31-Jul-2012)
6.68 JPY/MDL (6-month average from 1-Feb-2012 to 31-Jul-201)
15.4120 MDL/Euro (Calculated from the rates above)
81.06 JPY/USD (6-month average from 1-Feb-2012 to 31-Jul-201)

Chapter 1 Basic Concept of the Project

1.1 Overall Goal and Project Purpose

The Republic of Moldova has very few domestic energy resources such as natural gas, oil and coal. They are being imported from Russia, Romania and Ukraine. Therefore the Government of Moldova (herein after referred as "the GoM") promotes developing more self-supply energy to make its economy stable.

In January 2006, difficulties were experienced in the negotiations on natural gas price with Russia, which in turn, resulted in suspension of natural gas supply to Moldova and Ukraine from Russia. This break in natural gas supply literally froze the Moldovan people. In the winter months, gas consumption normally increases 8-9 more than the summer months, hence, the GoM and the Moldovan people were in extreme distress because of no natural gas supply.

In the Moldovan rural communities, agriculture is a main industry and local authorities there do not have enough tax revenues for energy procurement. Consequently, the public facilities such as kindergartens and schools have problems for heating buildings and some of them had to be closed during the coldest month in the past.

The GoM hopes to improve the present energy situation in rural communities through introduction of alternative energy using straw, biomass energy resource. According to "the Energy Strategy of the Republic of Moldova until 2020", one of national policies for energy sector, the target share of alternative energy shall be 6% by 2010 and 20% by 2020 and "the PLAN Government Actions for the period 2011 – 2014" also states that the target share of alternative energy shall be 10% by 2015. Consequently, efficient use of energy and use of alternative energy for the public facilities (schools, kindergartens and hospitals etc.) are being facilitated. Thus, the GoM is urgently introducing new energy supply system.

A Grant Assistance for Grass-roots Human Security Project (Improvement of Heating System for the Kindergarten and School in Hirtopul Mare Village) was implemented by Japan in 2008. Two sets of biomass heating systems were installed and they verified that the effectiveness of the biomass heating system. The GoM officially requested the Government of Japan to assist expansion of the biomass heating system in 2009. In response to the request, Japan International Cooperation Agency (hereinafter referred as "JICA") conducted a preliminary study for collection of basic information and confirmation of the request in February 2011. The preliminary study concluded that it had high potentials to expand the biomass heating system in Moldova.

This project aims to contribute (1) energy cost reduction, (2) sustainable heating system operation, and (3) improvement of living conditions in the Moldovan rural communities, through installation of a pellet producing plant and biomass heating systems (boilers fuelled with the pellet made from agricultural residue) at public facilities (mainly education facilities such as primary schools).

In addition, through the expansion of the biomass heating systems, it intends to secure education opportunities for infants and children living in the rural areas and promote energy transformation from fossil energy to renewable energy as well as improve self-sufficiency in energy and reduce greenhouse gas emissions as an overall goal.

1.2 Basic Concept of the Project

To achieve the above-mentioned purposes, the Project shall procure and install biomass heating systems at public facilities (mainly education facilities such as primary schools) in the Moldovan rural communities and provide technical assistance for operation and maintenance. This will reduce dependence of imported natural gas, while the gas price has been increasing for the recent years, and cut down energy cost paid by local authorities. In addition, it will enable public facilities to operate heating systems continuously, which in turn, ensure education opportunities of rural children through fewer emergency school closure dates during the coldest season.

In line with this Project concept, the support plan under the Japanese Assistance will include (1) procurement and installation of 25 biomass boilers fuelled with the pellet made from agricultural residue at public facilities (mainly educational facilities such as primary schools) in rural communities

in the Central Region and one set of pellet production plant in Chisinau, and (2) technical assistance for operation and maintenance of these pellet boilers and the pellet production plant.

1.3 Summary of Social and Environmental Considerations

(1) Applicability of Clean Development Mechanism (CDM) to the Project

Japan will not participate in the second commitment period of the Kyoto Protocol after 2013 and is trying to establish new mechanisms to complement the current CDM including the Bilateral Offset Credit Mechanism (BOCM).

Regarding the CDM project utilizing Official Development Assistance (ODA), the Kyoto Mechanisms stipulate that "Public funding for the CDM project activities must not result in the diversion of the Official Development Assistance." There had been only one CDM project conducted by the Japanese ODA, "Zafarana Wind Power Plant Project, Arab Republic of Egypt". The Government of Japan issued an official document which confirmed that the public funding used for this project did not result in a diversion of Official Development Assistance.

In addition, "non-additional CERs" has been discussed worldwide for the CDM project by the ODA after COP3. Currently, it is a common international opinion that additional official fund besides current ODA only makes it possible to purchase the CERs.

Therefore the following two options have possibilities to obtain the CERs by this project.

1) After the Government of Japan issues an official document which clearly refers that the public funding used in the project does not result in a diversion of ODA, a host country discusses the applicability.
2) The Government of Japan and the host country discuss the purchase of CERs by "additional official fund" at an official level.

(2) Estimation of Greenhouse Gas Emission Reductions

Switching fuel from fossil fuel (coal and natural gas) to biomass enables reduction of CO_2. CO_2 emission reduction through the Project is estimated as shown below.

1) Project Boundary

Boundary of the Project is set as the following.

1) Baling agricultural residue at fields
2) Transportation of agricultural residue from the fields to the pellet production plant
3) Pellet production
4) Transportation of pellet from pellet production plant to boilers
5) Boiler operation

2) Baseline Emissions

Baseline emissions (BE_y) consist of 1) CO_2 emission from burning process of fossil fuels ($BE_{PFi,y}$) and 2) CO_2 emission of existing boilers for power consumption ($BE_{e,y}$). BE_y can be calculated by the following formula.

$$BE_y = BE_{PFi,y} + BE_{e,y}$$

$BE_{PFi,y}$ and $BE_{e,y}$ were calculated to be 8,066.8 tCO_2/y and 104.0 tCO_2/y.

From the above calculations, the baseline emission (BEy) from 24 boilers was calculated to be 8,170.8 t CO_2/y.

3) Project Emissions

As biomass fuel is carbon neutral in accordance with the Kyoto Protocol, CO_2 emission from biomass burning is considered to be "zero". Therefore the processes which CO_2 is emitted under the Project are considered as the following.

(a) Baling process of agricultural residue ($PE_{rol,y}$);
(b) Transporting process of agricultural residue from the fields to the pellet production plant ($PE_{F\text{-}P,y}$);

(c) Pellet production process ($PE_{pel,y}$);
(d) Transporting process of pellet from pellet production plant to boilers ($PE_{PF\text{-}BL,y}$);
(e) Boiler operation process ($PE_{boiler,y}$)

Project emissions (PE_y) can be calculated by the following formula.

$$PE_y = PE_{rol,y} + PE_{F-P,y} + PE_{pel,y} + PE_{P-B,y} + PE_{boiler,y}$$

Table 1.3.1 CO_2 Emission Data by Process

Emission process		CO_2 emission	
Baling of agricultural residue at fields	$PE_{rol,y}$	17.9	tCO_2/y
Transportation of baled agricultural residue from fields to pellet factory	$PE_{F\text{-}P,y}$	17.1	tCO_2/y
Pellet production	$PE_{pel,y}$	1,496.8	tCO_2/y
Pellet transportation	$PE_{P\text{-}B,y}$	836.9	tCO_2/y
Boiler operation	$PE_{boiler,y}$	172.9	tCO_2/y
Total		2,541.6	tCO_2/y

Source: JICA Survey Team

Project Emissions (PE_y) were calculated to be 2,541.6 tCO_2/y.

4) Estimated CO_2 Emission Reductions

As described below, emission reductions (ERy) are estimated to be 5,629.2 tCO_2/y.

$$ER_y = BE_y - PE_y$$
$$= 8,170.8 - 2,541.6$$
$$= 5,629.2\ tCO_2/y$$

Chapter 2 Outline Design of the Requested Japanese Assistance

2.1 Design Policy

This Project shall be undertaken under the Japan's Grant Aid scheme in accordance with the "Green Growth" policy, which emphasizes utilizing the major equipment manufactured by the Japanese small and medium sized enterprises. It means that this Project is a Japan tied grant project to Moldova.

Accordingly, the following are basic design policies of the Project.

- Country of origin of key equipment and materials has to be Japan.
- Both pellet boilers and pellet production plant consist of various equipment, various mechanical materials, various instrument materials and various electrical materials and have to be designed by integrated engineering capability in quality, cost and delivery.
- Both plants have to be designed by the technical information integrated in the manufacture(s) that has enough experiences in design, manufacturing, construction, operation and maintenance of such plants, combining the necessary Moldavian relating information including regulations.

2.1.1 Natural Conditions and Design Policy

(1) Natural Conditions

The data of monthly average temperature, monthly maximum temperature, monthly minimum temperature, monthly average rain fall, monthly average wind velocity, and annual duration of daylight hours and the records of earthquake in main cities are summarized in the tables hereinafter.

Table 2.1.1 Monthly Average Temperature Data in the 3 Regions

Region	North (Briceni)				Central (Chişinău)				South (Cahul)			
Year	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
January	2,5	-2,4	-2,8	-7,4	3,9	-1,5	-0,1	-5,2	3,7	-1,3	-0,1	-4,2
February	-1,2	1,2	-0,2	-2,9	0,5	2,3	1,5	-0,9	1,9	2,7	2,0	0,1
March	6,4	5,0	2,4	3,1	7,1	7,2	3,9	4.0	7,2	8,1	4,8	4,8
April	9,3	9,9	11,1	10,3	10,6	11,0	12,2	11.0	10,9	11,7	11,8	11,6
May	17,5	14,4	15,1	16,2	18,9	15,5	16,6	16,8	18,7	15,8	16,8	17,2
June	20,2	19,0	19,1	19,4	23,2	20,9	21,7	21.0	23,2	20,9	21,6	20,7
July	21,9	19,8	21,4	21,8	25,8	22,2	24,0	23,3	26,0	22,2	24,4	23,2
August	20,8	20,5	19,7	22,4	23,9	23,8	22,3	24,9	23,8	24,2	22,7	24,9
September	14,5	13,6	16,7	13,9	16,7	15,5	18,7	16,1	16,4	16,2	18,4	17,1
October	9,3	10,5	9,2	5,9	11,3	12,4	11,5	7,5	11,9	12,7	12,3	8,6
November	1,1	4,0	5,4	8,2	3,0	5,1	6,5	10,3	3,7	6,0	7,1	11,1
December	-1,7	0,5	-2,1	-4,3	-0,4	1,3	-0,1	-2,1	-0,3	2,6	0,0	-0,7
Annual Mean Temp.	**10,1**	**9,7**	**9,6**	**8,9**	**12,1**	**11,3**	**11,4**	**10,6**	**12,3**	**11,8**	**11,8**	**11,2**

Table 2.1.2 Monthly Maximum Temperature Data in the 3 Regions

Region	North (Briceni)				Central (Chişinău)				South (Cahul)			
Year	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
January	13,1	10,4	6,0	3,6	13,5	9,6	8,7	11,3	15,0	9,5	11,5	15,4
February	8,0	18,2	13,0	6,7	15,8	19,1	13,9	13,3	16,2	19,3	14,9	14,1
March	19,0	17,5	15,3	21,3	20,0	20,5	18,2	20,6	22,0	20,9	19,9	21,1
April	23,4	21,5	24,0	22,7	21,1	21,8	22,9	22.0	23,2	23,9	23,5	22,5
May	32,0	27,5	29,3	26,6	34,2	26,5	28,5	25,9	32,9	27,5	28,6	28,9
June	33,8	30,8	31,4	32,3	35,4	32,1	34,5	34,1	36,6	33,7	34,0	33,8
July	35,6	32,2	33,5	32,5	39,5	33,5	36,3	32,8	39,4	33,5	37,9	32,4
August	34,7	34,0	31,6	35,3	39,1	37,5	33,7	36,6	38,4	37,9	34,4	36,8
September	24,8	30,0	29,2	24,7	27,6	32,6	32,6	26,4	27,8	32,5	32,5	28,1
October	23,0	22,5	25,4	14,1	24,3	23,7	26,0	15,4	24,8	24,6	25,7	16,4
November	9,4	18,4	15,6	20,9	11,0	19,9	18,4	22,8	11,6	22,0	18,6	23.0
December	7,4	15,4	11,6	9.0	9,2	16,2	14,2	13.0	10,0	17,0	16,0	16.0
Annual Max. Temp.	**36,6**	**34,0**	**33,5**	**35,3**	**39,5**	**37,5**	**36,3**	**36,6**	**39,4**	**37,9**	**37,9**	**36,8**

Table 2.1.3 Monthly Minimum Temperature Data in the 3 Regions

Region	North (Briceni)				Central (Chişinău)				South (Cahul)			
Year	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
January	-10,7	-18,6	-14,9	-27,4	-9,1	-15,3	-12,1	-21,8	-8,4	-17.0	-10,6	-21,2
February	-18,1	-12,4	-8,7	-14,9	-16.0	-9,8	-6,6	-11,8	-15,8	-9,7	-5,7	-10,7
March	-2,1	-3,4	-8.0	-10,4	-0,3	-0,7	-6,2	-8,8	-1,8	-0,2	-5,5	-8,7
April	-0,5	0,9	-0,2	1,7	0,6	3,2	1,9	2,9	1,9	3,1	1,2	3,4
May	-2.0	4,5	3,9	7,5	3,3	6,3	7,3	9,3	4,1	6,6	8,2	8,5
June	10,4	1,5	8,4	9.0	14,2	8,8	11,1	12,7	13,4	8,8	11,8	10,6
July	11,4	10,9	10,4	13,3	12,6	13,7	13,9	13,9	12,3	12,7	15.0	14,5
August	9,8	8,9	9,2	7,9	13,5	10,2	13,5	11,8	11,6	10,2	13,1	12,7
September	3,6	4,8	5,5	5,8	8,2	4,8	8,8	7,8	5,9	5,1	7,2	8,4
October	-0,3	0,8	-2,6	-3.0	1,9	2,8	-1,1	-2.0	2,6	3,6	0.0	-2,5
November	-7,9	-5,9	-3,6	-6,3	-4,9	-5,5	-3,3	-0,9	-4,9	-3,8	-5,2	0.0
December	-11,9	-13,3	-19,7	-13,6	-8,8	-11,9	-16,8	-12,1	-9,8	-12,3	-16,7	-10,7
Annual Min. Temp.	**-18,1**	**-18,6**	**-19,7**	**-27,4**	**-16.0**	**-15,3**	**-16,8**	**-21,8**	**-15,8**	**-17.0**	**-16,7**	**-21,2**

Table 2.1.4 Monthly Average Rainfall & Humidity Data in the 3 Regions

Region	North (Briceni)				Central (Chişinău)				South (Cahul)			
Year	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
January	29	27	32	62	44	26	25	86	41	14	32	35
February	41	19	32	40	62	6	26	62	27	2	21	43
March	21	27	40	23	34	36	63	29	44	33	48	29
April	18	127	9	34	37	48	3	45	21	47	18	23
May	62	54	24	109	19	43	33	69	25	49	49	82
June	88	37	95	205	27	63	39	85	37	95	20	121
July	121	212	41	196	4	51	68	67	0	43	34	146
August	91	71	34	38	34	31	33	53	105	20	20	25
September	42	89	4	76	26	75	22	46	39	46	41	31
October	46	46	67	45	71	16	30	69	49	22	35	80
November	38	29	23	56	60	16	9	40	63	13	13	20
December	21	35	44	76	62	55	95	83	66	60	74	64
Annual Rainfall (mm)	**618**	**773**	**445**	**960**	**480**	**466**	**446**	**734**	**517**	**444**	**405**	**699**
Annual Rainy Days	**131**	**146**	**132**	**159**	**114**	**107**	**122**	**134**	**95**	**114**	**101**	**140**
Annual Mean Humidity (%)	**73**	**76**	**71**	**76**	**64**	**70**	**68**	**74**	**67**	**71**	**68**	**73**

Table 2.1.5 Monthly Average Wind Velocity & Duration of Daylight Data in the 3 Regions

Region	North (Briceni)				Central (Chişinău)				South (Cahul)			
Year	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
January	2,8	3,2	1,8	2,3	2,2	2,2	3,1	3,2	4,1	3,7	3,4	3,9
February	3,0	2,4	1,8	3,2	1,9	2,0	3,3	3,6	4,6	3,7	4,0	4,3
March	3,4	2,8	2,5	2,8	2,1	2,2	3,1	3,6	4,7	4,4	3,9	4,1
April	2,5	2,6	2,7	2,8	1,9	1,9	3,8	3.0	3,4	4,1	3,8	3,6
May	2,3	1,9	2,2	2,4	2,0	2,8	3,0	2,9	4,1	3,2	3,5	3,1
June	1,7	1,7	2,1	2,1	1,8	2,6	3,1	3,2	3,2	2,7	3,1	3,2
July	1,5	2,1	1,9	1,6	1,9	3,4	3,0	2,8	3,7	3,1	3,0	2,6
August	1,2	1,6	1,4	1,7	1,6	2,9	3,4	2,8	3,3	2,9	3,2	2,9
September	1,8	1,7	1,5	2.0	1,8	3,2	2,6	2,7	3,4	3,3	2,9	3,1
October	1,6	1,9	2,1	2,2	1,5	2,9	2,6	3.0	2,8	3,1	3,0	3,6
November	2,6	2,5	2,7	2,6	2,1	3,1	2,8	3,3	3,8	3,3	3,1	3,4
December	2,3	2,8	2,6	2,3	1,8	3,8	2,7	3,1	3,3	4,3	3,2	3,1
Annual Average Wind Speed (m/sec)	**2,2**	**2,3**	**2,1**	**2,3**	**1,9**	**2,8**	**3,2**	**3,1**	**3,7**	**3,5**	**3,8**	**3,4**
Duration of day light (hours)	**1791**	...	...	**1874**	**2320**	**2188**	**2327**	**2226**	**2031**	...	...	**2207**

Table 2.1.6 Records of Major Earthquakes in Moldova

Date of occurrence	Time of occurrence (Greenwich Mean Time)	Epicenter		Depth of Epicenter (km)	Magnitude (Richter)	Intensity at Chişinău
		Latitude	Longitude			
2005/5/14	1:53	45°60′	26°51′	140	5.3	IV
2005/6/18	15:16	45°68′	26°71′	130	5.4	III-IV
2006/2/16	2:49	45°59′	26°72′	100	4.4	0
2006/3/16	10:40	45°44′	26°63′	100	4.4	III
2007/2/14	6:56	45°38′	26°34′	150	4.2	0
2007/2/15	2:32	45°72′	26°81′	100	4.1	0
2008/3/21	16:18	45°80′	27°17′	30	4.1	0
2008/7/5	8:00	45°29′	30°90′	20	5.5	III-IV
2008/6/9	19:48	45°77′	26°56′	20	4.1	0
2009/4/25	17:18	45°70′	26°66′	100	5.3	III-IV
2009/8/5	7:49	43°85′	28°39′	30	5.0	0
2010/6/8	15:16	45°62′	26°38′	110	4.7	II
2010/9/30	5:31	45°60′	26°35′	140	4.7	II-III

(2) Design Policy

1) Environmental Conditions

A) Atmospheric Temperature

(a) Process design temperature for calculation of heat balance

- Maximum outdoor temperature: 40 °C
- Minimum outdoor temperature: -16 °C
- Indoor temperature: 22 °C (for kindergarten)
  18 °C (for other facilities)

(b) Mechanical design temperature

- Maximum outdoor temperature: 50 °C
- Minimum outdoor temperature: -30 °C

B) Humidity 40-60%

C) Wind Velocity

Depending upon the meteorological data of Moldova, average wind speed is not so high but sudden gusts of wind have to be considered for the design of buildings and outdoor structures in mid-summer and/or mid-winter.

- Wind velocity for mechanical design: 40 m/sec

D) Rainfall

- Maximum hourly rainfall for mechanical design: 50 mm/hour

E) Snowfall

- Maximum hourly snowfall for mechanical design: 30 mm/hour
- Maximum snow accumulation for mechanical design: 1.5 m

F) Earthquake

- Maximum horizontal acceleration for mechanical design: 400 Gal

2) Requirement and/or Regulation for Mechanical Design

A) Equipment and/or Materials Exported from Japan

- shall be in accordance with Japan Industrial Standards (JIS).

B) Temperature of Hot Water Discharged from Pellet Boilers

- Normal: 80 °C Maximum: 90 °C

C) Painting

(a) Color: Manufacturer's standard color

(b) Painting: Rust preventing: Once
Finishing: Twice

D) Hanging Rig

Four pieces of hanging rig shall be equipped on module and/or skid for pellet boiler under the consideration of weight balance.

3) Requirements and/or Regulation for Electrical and/or Instrument Design

A) Equipment and/or Materials Exported from Japan

- shall be in accordance with Japan Industrial Standards (JIS).

B) Electricity

- Power electricity: 380 V, 3-phase, 50 Hz
- Instrument electricity: 220 V, Single, 50 Hz

2.1.2 Survey Results of Japanese Manufacturers

The potential suppliers for the Project will be selected from the Japanese manufacturers and the JICA Survey Team (hereinafter referred as JST) surveyed possible manufacturers in Japan.

(1) Pellet Boiler

So far it has been confirmed that there are 4 possible companies and each of them has its own line-up machines as listed hereunder.

Table 2.1.7 Pellet Boiler Line-up by Manufacturer

Capacity (1,000kcal/h)	60	100	150	200	300	450	500	800	1,000
A Company	○	○	○	○	○	○	○(600)	○	○
B Company		○	○	○ ○(250)	○ ○(350)	○(400)	○		
C Company		○	○	○ ○(250)	○(350)		○		
D Company		○			○		○		

Source: JICA Survey Team

Essentially, boiler size should be decided based on the specific conditions of the beneficial buildings/facilities in accordance with the Moldovan laws/regulations. However, it will be costly to design and produce many boilers of specific capacities. Hence, the following 5 types of capacities are selected under the consultation with the MoAFI.

	1,000 kcal/h	or	kWh[1]
1.	100		116
2.	200		232
3.	300		348
4.	350		407
5.	500		584

Details of the companies and their products are described in the tables below.

[1] In Japan, "kcal/h" is widely used to indicate boiler capacity while "kWh" is commonly adopted in Moldova. Conversion factor: 1 kW = 0.86 kcal/h

Table 2.1.8 Comparison of the Boilers by Manufacturer

Element		A	B		C	D
Function	Equipment		Smoke tube	Water tube		
Boiled type		Non-pressurized hot water heat generator	<=	<=	<=	<=
Fuel supply	Hopper	reverse pyramid	<=		<=	<=
	First step screw feeder	metering screw	None		metering screw	<=
	Rotary valve	Exist	None		None	None
	Anti back-fire	Emergency shut-off dumper	Back-fire extinction		<=	<=
	Second Step Screw feeder	Exist	metering screw		None	Exist
	Fuel supply type	Drop down	Underfeed		Drop down	<=
Furnace	Grate	SS circle plate	Cast iron low corn sharp		SS circle plate	Horizontal Cylindrical grate
	Clinker breaker	Rotary breaker	Ring breaker		Pop-up combustion Fluidized combustion	Automatically intermittent movement
Ignition	Mechanism	L-oil pilot burner	Embers		L-oil pilot burner	L-oil pilot burner
	Pilot fuel tank	60 - 80L	No necessary a pilot burner		60 - 80L	60 - 80L
Air supply	Furnace inside pressure control	Inside pressure balanced control	<=		<=	<=
	Ventilation fun	Exist	<=		<=	<=
	Exhaust fun	Exist	<=		<=	<=
Furnace	Furnace wall	Fireproof brick	Water jacket		Partially water jacket	Double pipe air cooling
	Ash treatment	Tray manual exhaust	<=		<=	Automatic exhauster
Heat generating system		Water surface is open to atmosphere	<=	<=	<=	<=
	Heat generator	Vertical plate type	Vertical smoke pipe type	Horizontal water pipe type	Horizontal water pipe type	Vertical smoke pipe type
	Hot gas flow	Up & Down counter flow	<=	Rectangular flow	<=	Up flow
	Water supply	Automatic supply	<=		<=	<=
System control & Aram	Control	Generator water temperature	<=		<=	<=
		Fuel & air supply ON, OFF	<=		<=	<=
	Aram	Low water level alarm	<=		<=	<=
Dust collect	Dust Collector	Cyclone	<=		<=	<=
Primary circulation	Pump	In-line pump	<=		<=	<=
Heat Exchange	Heat Exchanger	Plate type	<=		<=	<=

Note: Symbol <= indicates same as the left column.

Table 2.1.9 List of Pellet Boiler Manufacturers

Item	Unit	A	B	C	D
Funded Year		1 November 1983	1 September 1981	April 1947*	12 August 1948
Capital	M Yen	10	10	12.16*	8
Employee number	person	8	10	70*	102
Factory location		Hokkaido	Shizuoka	Niigata*	Kagoshima
Site area	m2	11,154*	3,487	3,901*	14,248
Building area	m2	2,363*	974	1,277*	6,490
Timing of handing over		Factory shipment	Factory shipment	Factory shipment	Factory shipment
Condition of payment					
Contract		30%	30%	30%	30%
Middle of production		40%	40%	40%	40%
Final handing over		30%	30%	30%	30%
Engineering Capability					
Design Capability		Planning/Design	Planning/Design	Planning/Design	Planning
Purchasing Capability		Yes	little weak	Yes	Yes
In-house production Cap.		None	In-house production	Nonee	In-house production
Outsourcing production Cap.		Contract to out	Partially	Contract to out	Partially
Elec.& Inst. works		Contract to out	Contract to out	Contract to out	Contract to out
SV Capability		Yes	Yes	Yes	Yes
Past experienced record					
Pellet boiler		10	202 (include export)	34	None
Wood chip boiler		22	None	None	Wood chip boiler 3units
Others (Gas, Oil, boiler & Biomass Dryer etc.)		700 (include export)	Oil Boiler 60 - 100units/y	Oil & Gas boiler more than 100/y	Steam Fumigator 71units (include export)
Wood Biomass Boiler Sum		32	202	34	3

Note: Symbol * indicates outsourcing producer.

(2) Pellet Production Plant

The key equipment of pellet production plant is a pelletizer. In general, there are two types for pelletizing, one is flat die type and the other is ring die type. In Europe, the ring die type is commonly used as the pellet production increases. In Japan, both types are available from several manufacturers.

There are not so big differences in performance between the flat die type and the ring die one. In general, the ring die type is more suitable to a large capacity (more than 1.5 ton/h) plant but the flat die type is more suitable to a small capacity plant.

2.1.3 Potential Local Subcontractors for Construction and/or Installation Works

(1) Central Assembling Factory for Pellet Boiler

After importing parts of boilers from Japan, pellet boilers shall be assembled as module at a factory in Chisinau. (Refer to "2.1.4 Basic Design Policy" for details.) There is one potential factory in Chisinau and the outline is as follows.

Employee: Present 120 Possible 400

Facilities: Machine (Lathe, Cutting, Plasma Flat Cutting, Sand Blast), Welding, Painting, etc.

Area: 49,686 m^2

Building Area: 11,856 m^2

Max. Handling Size: Manufactured 5 m diameter object in the past, 4 m x 12 m length

(2) Transportation of Boilers

It is possible to transport an object of 4 m width x 4 m height x 12 m length under official permission issued by the Moldovan authority concerned.

(3) Installation Work

There are several local installation companies who have many experiences of the similar projects of UNDP and MSIF.

2.1.4 Basic Design Policy

(1) Pellet Boiler

As a result of site and domestic survey, basic design policies for pellet boiler are as follows.

- Use the pellets produced from the agricultural waste such as straw, leaves/stalks of sunflower and maize, and pruning twigs from orchards and/or vineyards in rural area in Moldova.
- Burning efficiency of pellet boiler should not be less than 80 %.
- Specification of gas emissions and waste ash from pellet boiler should be in accordance with the Japanese rules and regulations.
- Operation of pellet boiler shall be fully automatic including the safety devices such as back fire preventer. In addition, continuous operation for 6-month period (winter season) shall be possible except for brief shutdown for maintenance.
- All parts including piping, wiring and related peripheral devices for a pellet boiler shall be mounted and installed on a skid[2] constructed by steel structure at the central assembling factory in Chisinau in order to (1) reduce the installation workloads at site, (2) maintain the quality of products, and (3) minimize the total project cost.

(2) Pellet Production Plant

- Pellet production plant shall produce the pellets from the agricultural waste such as straw, leaves/stalks of sunflower and maize, and pruning twigs from orchards and/or vineyards in rural area in Moldova.

[2] The housing with skid is referred as "module".

- Specification of gas emissions and waste from the plant should be in accordance with the Japanese rules and regulations.
- Production rate shall be minimum 1 ton/h. This capacity has to be demonstrated with at least one material of the materials mentioned described.

2.2 Basic Plan (Construction Plan / Equipment Plan)

2.2.1 Selection of Sites for Pellet Boiler Installation

JST started the selection processes for pellet boiler installation for the Project by examination of the list of 138 candidate villages prepared by 2KR-PIU. In March 2012 when the first survey work in Moldova was completed by the JST, there were 119 candidate villages where 182 public facilities were included. Among them, the public facilities with more than 100 beneficiaries (including both pupils and employees) accounted for 118 in the 93 villages.

2KR-PIU had been accepting applications for the Project from rural villages during the first survey work period in Moldova, and the additional applications amounted to 88 villages and 92 public facilities at the end of March 2012. After pre-screening of these candidate villages by 2KR-PIU, these 58 additional candidate villages with 83 public facilities (over 100 beneficiaries) had been surveyed together with the remaining 22 candidate villages during the second survey work period in Moldova which started in June 2012. In the end, 117 villages had been selected as candidate sites for pellet boiler installation in the end of July 2012. The distribution of candidate villages by Region and Rayon is shown below.

Table 2.2.1 Distribution of 117 Candidate Villages by Region and Rayon

North		Center		South	
Rayon	Site No.	Rayon	Site No.	Rayon	Site No.
Briceni	3	Anenii Noi	2	Basarabeasca	2
Donduşeni	2	Călăraşi	4	Cahul	6
Drochia	9	Criuleni	3	Cantemir	6
Edineţ	6	Dubăsari	1	Căuşeni	2
Făleşti	3	Hînceşti	3	Cimişlia	3
Floreşti	3	Ialoveni	4	Leova	2
Glodeni	5	Nisporeni	3	Ştefan Vodă	1
Ocniţa	3	Orhei	8	Taraclia	1
Rîşcani	2	Rezina	4	UTA Găgăuzia	7
Sîngerei	5	Străşeni	3		
Soroca	2	Teleneşti	3		
		Ungheni	2		
		Mun. Chişinău	4		
Sub total	43	Sub total	44	Sub total	30

Source: JICA Survey Team

As for the selection criteria of candidate villages, the JST and MoAFI agreed the following basic points on 5 March 2012.

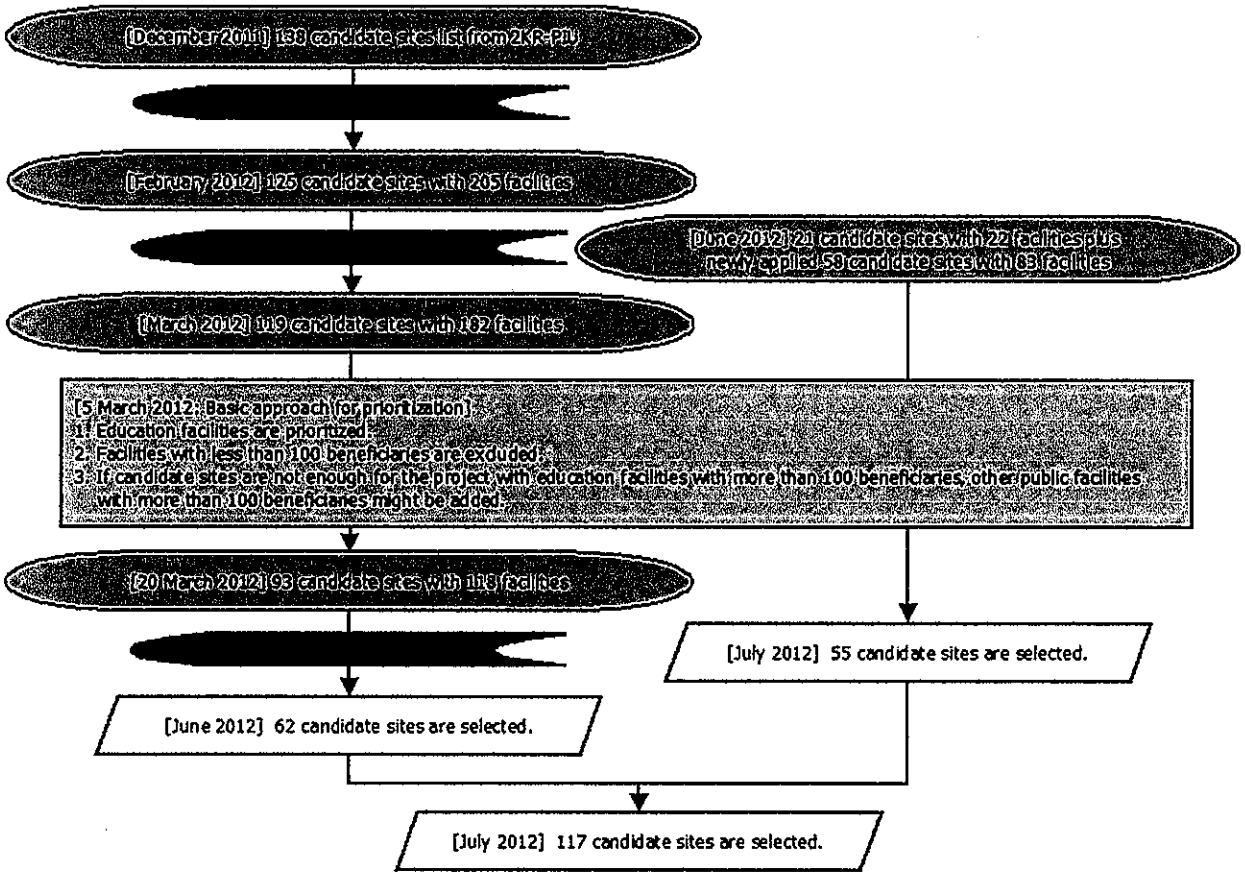
1. Educational facilities have higher priorities than other public ones. This resulted from the fact that other public facilities such as community centers and clinics nominated by village authorities have relatively fewer beneficiaries per site as compared to educational facilities.
2. Among the educational facilities, higher priority will be given to those with more beneficiaries (including both pupils and employees) from the viewpoint of efficiency, and those educational facilities with fewer than 100 beneficiaries will be excluded, in principle. This point is based on quantitative efficiency of one boiler procured through the Project.
3. In case that the educational facilities with over 100 beneficiaries are not enough for total project cost, other public facilities with over 100 beneficiaries will be examined as

candidate sites.

In addition, the JST and MoAFI agreed the ideas shown below.

4. Several facilities can be regarded as one candidate site if they could be heated by one pellet boiler because of their proximity based on the site survey result. (e.g. In case a primary school is located next to a community center and it concludes that installation of one pellet boiler between the two facilities could provide heating for the both two facilities.)
5. In case several facilities are applied as candidate sites from one village, the facility with more beneficiaries can be the first candidate site from that village after consultation with the village mayor.

The process flow diagram is indicated below.



Source: JICA Survey Team

Figure 2.2.1 Selection Flow Diagram of 117 Candidate Sites

Based on the following criteria, the 117 candidate sites were scored. Facility conditions were evaluated by visual inspection when the JST and its subcontractor visited the site.

Table 2.2.2 Evaluation Criteria for Site Prioritization

Criteria	Score
1. Educational Facilities	10
2. Non-educational Facilities	1
3. Number of Beneficiaries	Number of Beneficiaries x 0.01
4. Facility Conditions (3-level evaluation: A, B, C)	
Building -Windows, ceiling, wall (heat retention)	A:3, B:2, C:1
Indoor/outdoor piping, Indoor radiators (heat transfer)	A:5, B:3, C:1

Source: JICA Survey Team

It was agreed with 2KR-PIU that 30% of the six scores of the facility conditions are used for prioritization, and all the 117 candidate sites were prioritized by total score as shown below.

Table 2.2.3 Result of the 117 Candidate Sites Prioritization

S/N	Code No.	Region (1:North, 2:Central, 3:South)/ Rayon	Village	Building Information			Facility Condition						Agriculture performance	Total Score **
				Facility type *	Persons of Full day use	No. of Visitors	Windows Condition A:3, B:2, C:1	Ceiling Condition A:3, B:2, C:1	Wall Condition A:3, B:2, C:1	Outdoor Piping System	Indoor Piping System	Original Radiator		
				A	B		C	D	E	F	G	H	I	J
1	1903	2 Ialoveni	Răzeni	4	896		3	3	3	3	5	3		24.96
2	1802	2 Hînceşti	Lăpuşna	1	791		3	3	3	5	5	3		24.51
3	802	3 UTA Gagauzia	Congaz	4	1,060		1	1	1	3	3	3		24.20
4	1301	1 Briceni	Corjeuţi	4	820		3	3	3	3	5	3		24.20
5	1101	1 Glodeni	Ciuciulea	1	830		3	3	3	3	3	3		23.70
6	1003	1 Sîngerei	Sîngerei Noi	4	642		3	3	3	5	5	5		23.62
7	2202	2 Anenii - Noi	Mereni	112	658		3	3	3	3	5	5		23.18
8	304	1 Drochia	Sofia	4	557		3	3	3	5	5	5		22.77
9	805	3 UTA Gagauzia	Ceadîr - Lunga	3	807		1	1	2	3	5	3		22.57
10	604	1 Floreşti	Ghindeşti	4	520		3	3	3	5	5	5		22.40
11	3201	2 Rezina	Ignaţei	4	490		3	3	3	5	5	5		22.10
12	7203	2 NISPORENI	VARZARESTI	14	740		3	2	2	3	2	3		21.90
13	6902	1 FLORESTI	FRUMUSICA	4	658		3	3	2	3	3	3		21.68
14	2103	2 UNGHENI	COSTULENI	14	698		3	2	2	3	2.5	3		21.63
15	404	3 Cantemir	Goteşti	4	565		2	3	3	5	3	3		21.35
16	303	1 Drochia	Cotova	4	450		3	3	3	3	5	5		21.10
17	402	3 Cantemir	Pleşeni	3	436		2	3	2	5	5	5		20.96
18	1302	1 Briceni	Larga	4	400	50	2	3	3	5	5	5		20.90
19	1005	1 Sîngerei	Cotiujenii Mici	13	369		3	3	3	5	5	5		20.89
20	6802	1 FALESTI	CALINESTI	4	530		3	3	3	3	3	3		20.70
21	6301	3 CANTEMIR	COCIULIA	4	587		3	2	2	3	3	3		20.67
22	1706	2 Orhei	Jora de Mijloc	13	447		3	3	3	5	3	3		20.47
23	7702	2 STRASENI	MICAUTI	36	537		2	3	3	3	3	3		20.47
24	1712	2 Orhei	Susleni	4	326		3	3	3	5	5	5		20.46
25	801	3 UTA Gagauzia	Chirşova	138	618		1	2	2	3	3	3		20.38
26	1501	3 UTA Gagauzia	Cişmicioi	4	578		2	2	2	3	3	3		20.28
27	7703	2 STRASENI	SCORENI	4	480		3	3	3	3	3	3		20.20
28	1803	2 Hînceşti	Buţeni	3	360		3	3	3	5	5	3		20.20
29	306	1 Drochia	Suri	4	465		3	3	3	3	3	3		20.05
30	2104	2 Ungheni	Pîrliţa	3	400		3	3	3	5	3	3		20.00
31	1714	2 Orhei	Furceni	13	342		2	2	2	3	3	3	2	19.92
32	2701	3 UTA Gagauzia	Cioc - Maidan	14	486		2.5	2.5	2.5	3	3	3		19.81
33	1601	3 Taraclia	Cairaclia	4	307		3	3	3	3	5	5		19.67
34	403	3 Cantemir	Ciobalaccia	4	456		2	3	3	3	3	3		19.66
35	8102	3 GAGAUZIA	BESALMA	4	570		1	2	2	3	2	3		19.60
36	1108	1 Glodeni	Glodeni	1	292		3	3	3	3	5	5		19.52
37	1110	1 Glodeni	Sturzovca	38	378		3	3	2	5	3	3		19.48
38	1705	2 Orhei	Trebujeni	3	223		3	3	3	5	5	5		19.43
39	1702	2 Orhei	Brăneşti	13	195		3	3	3	3	3	3	2	19.35
40	501	3 Cahul	Burlacu	4	410		2	3	3	3	3	3		19.20
41	2802	3 Căuşeni	Copanca	1	200		3	3	3	5	5	5		19.20
42	8002	2 CHISINAU	CRICOVA	1	485		3	2	2	2	2	3		19.05
43	2602	1 Drochia	Gribova	3	184		3	3	3	5	5	5		19.04
44	1303	1 Briceni	Criva	3	180		3	3	3	5	5	5		19.00

S/N	Code No.	Region (1:North, 2:Central, 3:South)/ Rayon	Village	Building Information			Facility Condition						Agriculture performance	Total Score **
				Facility type *	Persons of Full day use	No. of Visitors	Windows Condition A:3, B:2, C:1	Ceiling Condition A:3, B:2, C:1	Wall Condition A:3, B:2, C:1	Outdoor Piping System	Indoor Piping System	Original Radiator		
				A	B		C	D	E	F	G	H	I	J
45	301	2 REZINA	CUIZAUCA	4	344		3	3	3	3	3	3		18.84
46	1107	1 GLODENI	DUSMANI	139	381	70	1	2	2	2	2	1	2	18.81
47	6101	2 ANENII NOI	MAXIMOVCA	1	230		3	1	2	3	3	3	2	18.80
48	7401	1 OCNITA	SAUCA	3	191		3	3	1	3	3	3	2	18.71
49	2401	2 TELENESTI	CAZANESTI	13	328		3	3	3	3	3	3		18.68
50	6302	3 CANTEMIR	TARTAUL	13	473		3	2	2	3	2	1		18.63
51	8004	2 CHISINAU	BUBUIECIU	11	471		2	2	2	2	2	3		18.61
52	3501	1 Soroca	Căinarii Vechi	1	137		3	3	3	5	5	5		18.57
53	6603	1 DROCHIA	POPESTII DE SUS	14	404		3	2	1	3	3	3		18.54
54	7501	2 REZINA	MATEUTI	13	303		3	2	2	3	2	3	1	18.53
55	701	3 Leova	Ceadîr	3	216		3	2	3	3	5	5		18.46
56	1009	1 Sîngerei	Ciucîueni	133	216		2	2	2	5	5	5		18.46
57	6402	2 CALARASI	TIBIRICA	4	452		3	2	2	3	2	1		18.42
58	1206	1 Edineţ	Ruseni	3	180		3	3	3	3	5	5		18.40
59	2901	3 Ştefan Vodă	Feşteliţa	1	179		3	2	2	5	5	5		18.39
60	8003	2 CHISINAU	TOHATIN	13	409		3	2	2	2	2	3		18.29
61	6601	1 DROCHIA	MINDIC	3	362		3	2	2	3	2	3		18.12
62	6901	1 FLORESTI	ZALUCENI	3	101		2	3	3	3	3	3	2	18.11
63	7201	2 NISPORENI	SISCANI	3	300		3	3	3	3	2	3		18.10
64	1708	2 ORHEI	CHIPERCENI	3	217		1	3	3	1	2	3	2	18.07
65	1711	2 Orhei	Piatra	13	325		3	2	2	3	3	3		18.05
66	7202	2 NISPORENI	CALIMANESTI	129	198		1	2	2	3	2	3	2	17.88
67	6701	2 DUBASARI	OXENTEA	18	366		2	2	2	3	2	3		17.86
68	6202	3 BASARABESCA	CARABETOVCA	4	290		3	2	2	3	3	3		17.70
69	7801	2 TELENESTI	TINTARENI	4	371		3	3	2	3	1	1		17.61
70	7101	2 IALOVENI	HANSCA	3	200		1	2	2	3	3	1	2	17.60
71	202	2 Criuleni	Măşcăuţi	29	334		1	2	2	3	3	3		17.54
72	8101	3 GAGAUZIA	CONGAZCIC	13	332		1	2	2	3	3	3		17.52
73	1004	1 Sîngerei	Copăceni	3	180		1	2	3	5	5	3		17.50
74	6602	1 DROCHIA	TARIGRAD	4	259		2	2	2	3	2	2	1	17.49
75	506	3 Cahul	Larga Nouă	13	264		1	3	3	3	3	3		17.44
76	706	3 Leova	Tochile Răducani	3	204		3	3	3	3	3	3		17.44
77	7001	2 HINCESTI	IVANOVCA	13	223		1	2	2	3	3	3	1	17.43
78	6201	3 BASARABESCA	SADACLIA	1	148		3	3	3	3	3	1	1	17.28
79	7701	2 STRASENI	MICLEUSENI	1	162		1	1	1	3	3	3	2	17.22
80	504	3 Cahul	Alexanderfeld	3	209		2	3	3	3	3	3		17.19
81	7402	1 OCNITA	HADARAUTI	13	236		3	3	3	2	2	3		17.16
82	7601	1 SINGEREI	MARINESTI	13	265		3	2	2	3	2	3		17.15
83	1202	1 EDINET	HANCAUTI	3	182		1	2	2	2	2	2	2	17.12
84	6401	2 CALARASI	DERENEU	49	211	50	1	2	2	1	2	2	2	17.11
85	1105	1 Glodeni	Iabloane	33	289		2	2	2	3	3	2		17.09
86	401	3 Cantemir	Vişneovca	3	198		3	3	2	3	3	3		17.08
87	6604	1 DROCHIA	MOARA DE PIATRA	3	185		2	2	2	3	2	3	1	17.05
88	1405	1 Rîşcani	Hilinţi	13	255		2	2	2	3	3	3		17.05
89	1201	1 Edineţ	Parcova	3	163		3	3	3	3	3	3		17.03

S/N	Code No.	Region (1:North, 2:Central, 3:South)/ Rayon	Village	Building Information			Facility Condition						Agriculture performance	Total Score**
				Facility type *	Persons of Full day use	No. of Visitors	Windows Condition A:3, B:2, C:1	Ceiling Condition A:3, B:2, C:1	Wall Condition A:3, B:2, C:1	Outdoor Piping System	Indoor Piping System	Original Radiator		
				A	B		C	D	E	F	G	H	I	J
90	9002	2 Criuleni	Raculesti	3	219		2	2	3	3	3	3		16.99
91	1204	1 Edineţ	Bleşteni	3	158		3	3	3	3	3	3		16.98
92	1709	2 Orhei	Ivancea	3	147		2	2	2	3	3	3	1	16.97
93	2402	2 TELENESTI	ZGARDESTI	13	142		3	3	3	3	2	1	1	16.92
94	8001	2 CHISINAU	SINGERA	3	344		2	2	2	3	2	0		16.74
95	2503	3 Cimislia	Cimislia	1	187		1	3	3	3	3	3		16.67
96	1205	1 EDINET	CORPACI	3	166		2	2	2	2	1	1	2	16.66
97	906	1 Donduşeni	Scăieni	3	180		2	3	2	3	3	3		16.60
98	2601	1 DROCHIA	DROCHIA	3	240		2	2	2	3	2	3		16.60
99	6403	2 CALARASI	TEMELEUTI	3	177		2	3	3	3	2	3		16.57
100	8201	1 DONDUSENI	TAUL	3	266		1	2	2	3	2	3		16.56
101	2502	3 Cimislia	Satul Nou	1	104		3	3	3	3	3	3		16.44
102	2301	2 Călăraşi	Bravicea	1	160		2	3	2	3	3	3		16.40
103	1203	1 EDINET	ALEXANDRENI	36	159	21	2.5	2.5	2.5	3	2.5	3		16.39
104	3001	1 Ocniţa	Lencăuţi	3	187		1	3	2	3	3	3		16.37
105	1403	1 Rîşcani	Branişte	3	185		2	2	2	3	3	3		16.35
106	2001	1 FALESTI	NATALIEVCA	1	120		3	3	2	3	3	3		16.30
107	502	3 Cahul	Ursoara	1	125		3	3	3	5	3	3	-1	16.25
108	201	2 Criuleni	Işnovăţ	3	200		2	3	3	3	3	3	-1	16.10
109	9001	3 Cahul	Doina	3	189		3	2	1	3	2	2		15.79
110	302	2 REZINA	LIPCENI	13	178		2	2	2	3	2	2		15.68
111	2801	3 Căuşeni	Hagimus	3	200		1	1	1	3	3	3		15.60
112	7103	2 IALOVENI	ULMU	1	106		3	2	2	3	2	3		15.56
113	502	3 Cahul	Lebedenco	3	143		1	2	3	5	3	3	-1	15.53
114	7102	2 IALOVENI	PUHOI	1	104		3	2	2	3	2	1		14.94
115	2504	3 CIMISLIA	TROITCOE	3	182		1	2	2	3	1	1		14.82
116	3401	1 SOROCA	RACOVAT	1	164		0	0	0	3	3	3		14.34
117	6801	1 FALESTI	TAXOBENI	6	100		3	3	3	3	3	3	2	9.40

*Note1: Facility type: 1: Kindergarten, 2: Primary school, 3: Gymnasium, 4: Lyceum, 5: Other school, 6: Community & Culture Center, Library, Gym, 7: Church, 8: Hospital, Medical clinic, Rehabilitation Center, 9: Mayoralty office

**Note2: Total score (J): If the facility type (A) is educational (1-5), the total score (J) is calculated from the following formula: J = 10 + B*0.01 + (C+D+E+F+G+H)*0.3 + I. If the facility type (A) is non-educational (6-9), the total score (J) is calculated from the following formula: J = 1 + B*0.01 + (C+D+E+F+G+H)*0.3 + I.

Source: JICA Survey Team

After the second site survey in Moldova, 25 sites in the Central Region had been finally selected as the sites for pellet boiler installation through a series of discussions. (See the table below.)

Table 2.2.4 List of the 25 Candidate Sites for Boiler Installation

S/N	Priority Ranking	Code	Rayon	Community	Kinds of Beneficial Facility	Persons of Full day use	No. of Visitors	Proposed Boiler Size (kW)
1	1	1903	IALOVENI	RĂZENI	Lyceum	896		580
2	2	1802	HÎNCEŞTI	LĂPUŞNA	Lyceum	791		580
3	7	2202	ANENII - NOI	MERENI	2 Kindergartens + Primary school	658		348
4	11	3201	REZINA	IGNAŢEI	Lyceum	490		348
5	12	7203	NISPORENI	VARZARESTI	Kindergarten + Lyceum	740		580
6	22	1706	ORHEI	JORA DE MIJLOC	Kindergarten + Gymnasium	447		348
7	23	7702	STRASENI	MICAUTI	Gymnasium + Culture Center	537	150	580
8	24	1712	ORHEI	SUSLENI	Lyceum	326		232
9	27	7703	STRASENI	SCORENI	Lyceum	480		580
10	28	1803	HÎNCEŞTI	BUŢENI	Gymnasium	360		580
11	30	2104	UNGHENI	PÎRLIŢA	Gymnasium	400		348
12	31	1714	ORHEI	FURCENI	Kindergarten + Gymnasium	342		348
13	38	1705	ORHEI	TREBUJENI	Gymnasium	223		232
14	39	1702	ORHEI	BRĂNEŞTI	Kindergarten + Gymnasium	195		232
15	42	8002	CHISINAU	CRICOVA	Kindergarten	485		232
16	45	301	REZINA	CUIZAUCA	Lyceum	344		407
17	47	6101	ANENII NOI	MAXIMOVCA	Kindergarten	230		232
18	51	8004	CHISINAU	BUBUIECIU	2 Kindergartens	471		232
19	54	7501	REZINA	MATEUTI	Kindergarten + Gymnasium	303		348
20	57	6402	CALARASI	TIBIRICA	Lyceum	452		580
21	60	8003	CHISINAU	TOHATIN	Kindergarten + Gymnasium	409		348
22	63	7201	NISPORENI	SISCANI	Gymnasium	300		348
23	64	1708	ORHEI	CHIPERCENI	Gymnasium	217		232
24	65	1711	ORHEI	PIATRA	Kindergarten + Gymnasium	325		232
25					2KR Training Center in Chisinau			116
Total						10,421		

Source: JICA Survey Team

2.2.2 Basic Structure

(1) Pellet Boiler

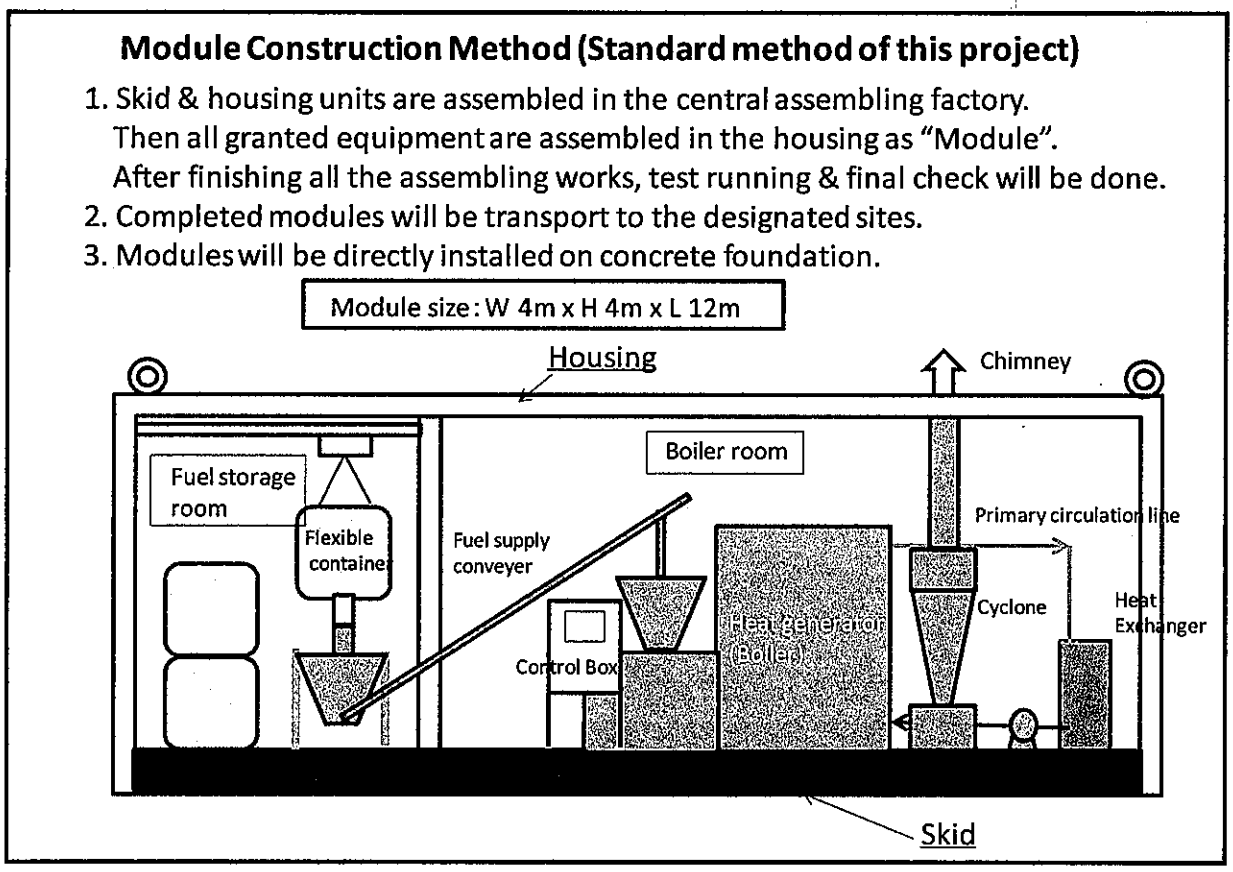
Pellet Boiler shall be installed on the skid and skid shall be installed in the housing in the central assembling factory as described in "2.1.4 Basic Design Policy".

However the module which is assembled in the central assembling factory will be;

4 m width x 4 m height x 12 m length

This size is possible to be transported on the Moldovan official roads but there are some sites where the road width is not enough for transportation of the module. Therefore, the following two methods are planned.

1) Module Method



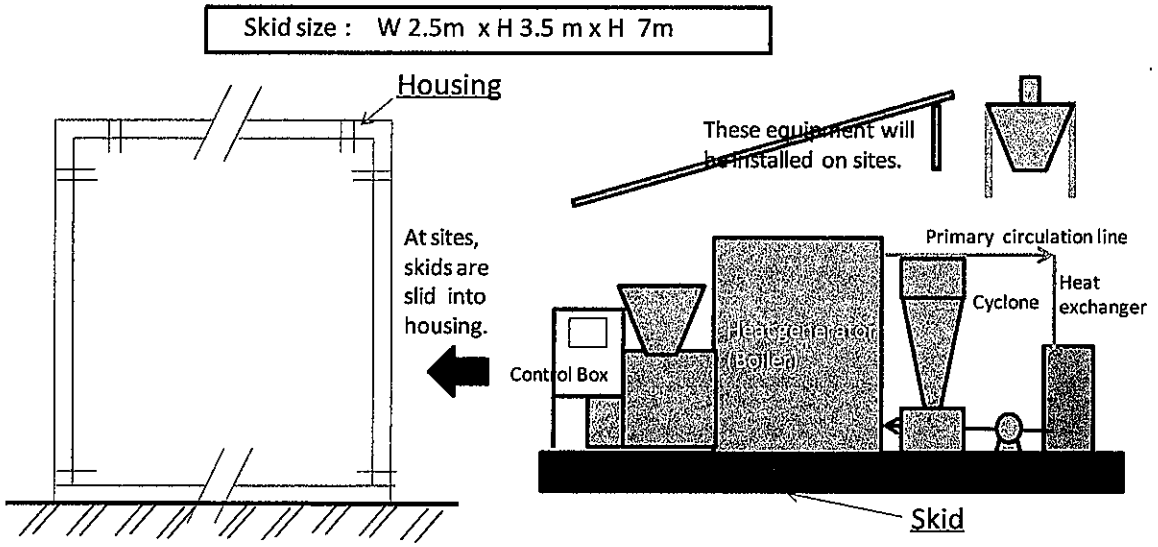
Source: JICA Survey Team

Figure 2.2.2 Module Method

2) Skid and Housing Method

Skid Construction Method (Impossible to transport modules to the sites)

1. Skids will be assembled in the central factory, then granted main equipment are assembled on it as "Skid". Tentative assemble test will be done.
2. Skids will be forwarded & transported to the designated sites. Housing parts will be assembled on the sites.
3. Skid & peripheral parts will be installed into the housing.



Source: JICA Survey Team

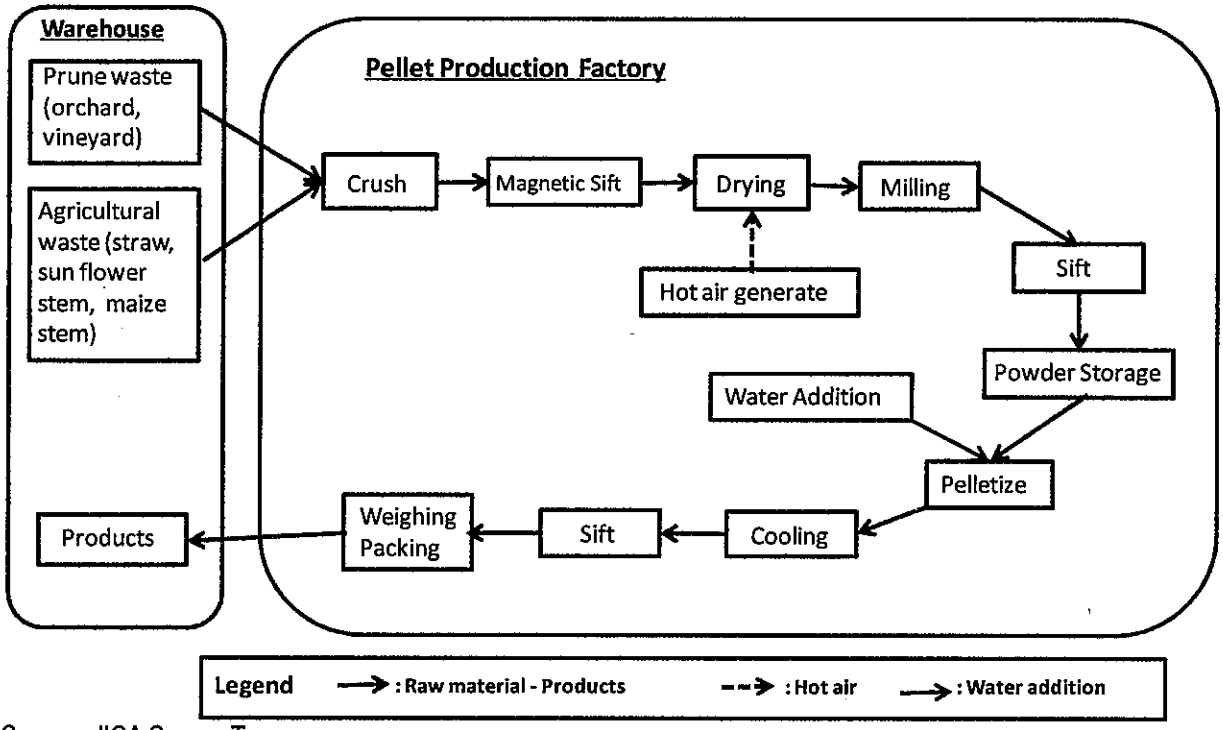
Figure 2.2.3 Skid and Housing Method

(2) Pellet Production Plant

Pellet production plant is the kind of biomass processing plant to produce the pellet fuels from the agricultural waste such as straw, leaves/stalks of sunflower and maize, and pruning twigs from orchards and/or vineyards in rural area in Moldova. The simplified block chart of the plant is shown in the Figure 2.2.4.

This plant consists of various kinds of equipment. Components/materials and key issues of the plant are as follows.

- The raw materials have various physical and chemical characteristics, hence the plant needs to be equipped with flexible and wide range operation ability.
- For some kinds of equipment such as crusher, dryer and milling machine, both hard materials (like pruning twigs) and soft materials (like straw) need be processed in the same line.
- The plant simultaneously handles dried biomass powder and operates a firing unit in the same line. Therefore, fire protection and safety measures have to be carefully considered.



Source: JICA Survey Team

Figure 2.2.4 Block Diagram for Pellet Production Plant

2.2.3 Installation Sites and Equipment Quantities

(1) Pellet Boiler

Pellet boilers shall be installed at the 25 sites in rural areas and the number of boilers by capacity shall be referred to the following table.

Table 2.2.5 Number of Pellet Boilers to Be Installed

Boiler Capacity			Number of Boilers
1.	100,000kcal	(116 kw)	1
2.	200,000kcal	(232 kw)	8
3.	300,000kcal	(348 kw)	8
4.	350,000kcal	(407 kw)	1
5.	500,000kcal	(584 kw)	7
			25

Source: JICA Survey Team

(2) Pellet Production Plant

One set of pellet production plant with 1 ton/hour capacity shall be installed within the premises of 2KR-PIU in Chisinau.

2.2.4 Basic Specifications of the Equipment

(1) Pellet Boiler

Pellet boiler shall consist of the following main equipment and/or facilities.

1) Pellet feed tank: 0.5-1.0 m^3
2) Pellet feeder: Screw type and automatic feed control
3) Pellet conversion & hot water generator:
   - Non-pressure hot water generator with alarm systems, back fire preventer, hot water

temperature controller, hot water level detector, level detector for pellet feed tank and earthquake sensor.

- Maximum hot water temperature shall be 90 °C, normal output temperature is 80 °C
- Heat efficiency shall be 80 % and 85% is preferable.
- Manual ash discharging
- Minimize the clinker stuck and scale on the surface of heat tube

4) Igniter shall be equipped. (either gas, oil burner or direct ignition on pellet)
5) The exhaust gas from boiler shall clear the limitation of Japanese standards.
6) Countermeasures for long term blackout

(2) Pellet Production Plant

Pellet production plant shall consist of the following main equipment and/or facilities

1) Stock yard for raw materials such as straw, sunflower, maize and twigs from orchard and vineyards
2) First step crusher of raw materials
3) Intermediate stock tank after first step crasher
4) Dryer of the materials with hot air generator:
   - Dryer shall be rotary kiln type and be installed with safety devices which immediately segregate the rotary kiln from hot air generator in an emergency such as electric power failure.
   - Hot air generator shall be able to burn spec-off pellet.
5) Second step crusher of the materials from the dryer:
   - Milling type is preferable.
6) Fine material stock tank for pelletizer
7) Pelletizer:
   - Consist of two trains and 0.5 ton/hour capacity each.
   - Materials shall be agricultural waste in Moldova such as straw, sunflower, maze and twigs from orchards and vineyards.
8) Pellet cooling facility
9) Sifter
10) Pellet filling facility:
    - Filling 1 m^3 flexible container bag
11) Countermeasures for long term blackout

2.2.5 Equipment Plan

The principal equipment specification, quantities and purpose of use are shown as below;

Table 2.2.6 Equipment specification, quantities and purpose of use

Name	Specification	QTY	Purpose of use
Pellet boiler (116kW)	Calorie: over 100,000kcal Dimensions: within 3.0 x 1.7 x 2.1(L x W x H (m)) Mileage: Approx. 30kg/hour Ignition: either gas, oil burner or direct ignition on pellet	1	For kindergarten, primary school, Gymnasium and Lyceum (educational facilities)
Pellet boiler (232kW)	Calorie: over 200,000kcal Dimensions: within 4.4 x 2.0 x 2.3(L x W x H (m)) Mileage: Approx. 60kg/hour Ignition: either gas, oil burner or direct ignition on pellet	8	For kindergarten, primary school, Gymnasium and Lyceum (educational facilities)

Name	Specification	QTY	Purpose of use
Pellet boiler (348 - 407kW)	Calorie: 300,000 - 350,000kcal Dimensions: within 4.5 x 2.3 x 2.6(L x W x H (m)) Mileage: Approx. 90kg/hour Ignition: either gas, oil burner or direct ignition on pellet	8	For kindergarten, primary school, Gymnasium and Lyceum (educational facilities)
Pellet boiler (407 - 464kW)	Calorie: 350,000 - 400,000kcal Dimensions: within 5.0 x 2.4 x 2.8(L x W x H (m)) Mileage: Approx. 120kg/hour Ignition: either gas, oil burner or direct ignition on pellet	1	For kindergarten, primary school, Gymnasium and Lyceum (educational facilities)
Pellet boiler (580kW)	Calorie: over 500,000kcal Dimensions: within 5.5 x 2.5 x 3.0(L x W x H (m)) Mileage: Approx. 150kg/hour Ignition: either gas, oil burner or direct ignition on pellet	7	For kindergarten, primary school, Gymnasium and Lyceum (educational facilities)
Pellet production plant	1. Primary crusher 2. Secondary grinder 3. Dryer 4. Raw material volumetric feeder 5. Pelletizer (1,000kg/hour capacity) (Flat die type or ring die type) 6. Chiller 7. Product screener 8. Silo for pellet storage 9. Packing machine with flexible container bag 10. Delivery conveyor between equipment 11. Cyclone dust collector 12. Main power board, control box 13. Other necessary equipment or devices	1	For fuel (pellet) supply to pellet boilers
Test stand	1. Flexible tube 2. Valves 3. Flow meter 4. Calorie meter 5. Circulation pump 6. Filter 7. Cooling tower	1	For performance test (boiled water supply and water leakage etc.) of boilers before installation

Source: JICA Survey Team

2.3 Outline Design Drawing

(1) Pellet Boiler

The following are the outline design drawings, which are attached in Appendix 2.

- Simplified diagram of Pellet Boiler: JST-FD-005-001
- Conceptual drawing of Test Stand: JST-FD-005-010
- Outline drawing of Module and the lay-out in Module:
  JST-LY-005-580-A, JST-LY-005-407.348-B, JST-LY-005-232-C, JST-LY-005-116-TW
- Structures of Module:
  JST-MD-005-580-A, JST-MD-005-407.348-B, JST-MD-005-232-C, JST-MD-005-116-TW
- Structure of Skid and Piping: JST-SK-005-580-A, JST-SK-232-C
- Plot Plans by site: 24 sites (except for 2KR-PIU site)

(2) Pellet Production Plant

Sample drawings of the pellet production plant are available only in Japanese.

2.4 Implementation Plan

2.4.1 Implementation Policy

The Project shall be implemented under the Grant Aid Scheme of Japan, therefore the following policies are applied to the implementation.

- After conclusion of the Exchange of Note (E/N) between Moldova and Japan, JICA and 2KR-PIU will have the Grant Aid Agreement (G/A) for the Project. In accordance with the specified period under the G/A, all the processes such as components confirmation, contractor selection through bidding, equipment procurement and installation, commissioning and reception shall be properly completed.
- Through good relationships between 2KR-PIU, a consultant team and a contractor, the project shall be smoothly implemented.

After signing the G/A between 2KR-PIU and JICA, a Japanese consultant team having a contract with 2KR-PIU shall perform the Project together with 2KR-PIU. On the other hand, the contractor, which will be selected through the bidding process, shall procure and install the equipment and facilities.

The Project is categorized as "equipment procurement" type. Pellet boilers and pellet production plant are two major components of the Project. Some construction works (e.g. making foundation for module) and preparation of educational buildings are undertakings of the Moldovan side. As for the pellet boilers, a module method will be introduced and the module will be produced by a local sub-contractor. The pellet boilers are necessary to accommodate the local laws as heating system. The fabrication of the module including the pellet boiler shall be conducted at a factory in Chisinau; the module shall be transported to the site and installed at the site.

The principal roles of the client, consultant and contractor for the Project are shown as below.

(1) Client

Ministry of Agriculture and Food Industry (MoAFI) is responsible for the Project. Implementation organization will be 2KR-PIU under MoAFI. 2KR-PIU will be a primary organization for the project implementation regarding consultant agreement and equipment procurement under the G/A.

(2) Consultant

After signing of the G/A, 2KR-PIU shall execute a consulting service agreement with a Japanese consulting firm (consultant) recommended by JICA. The consultant shall bear obligations on the agreement for the Project. The consultant shall give the following consulting services for the client.

Design confirmation and bidding arrangement

The consultant will provide technical assistance for Moldova such as final confirmation of the facilities and equipment (Specifications and quantities of the facilities and equipment, beneficiaries' obligations, etc.) including basic design amendment, making tender documents, opening tender and evaluation.

Procurement supervision

The consultant will supervise the procurement services such as shop inspection, pre-shipment inspection, transportation, fabrication, installation test run, initial operation training, etc. for the client and beneficiaries.

Soft Component

The following purposes are set for the Soft Component of the Project in accordance with "Soft Component Guideline (October 2010)" issued by JICA.

1) The Project proceeds smoothly. (Including undertakings by Moldova)

2) Good output is sustainably obtained.

Planned services are operation management and equipment maintenance and are shown as follows.

- Establishment of operation management system
- Reinforcement of the operation management system

· Enlightenment activity on biomass heating system

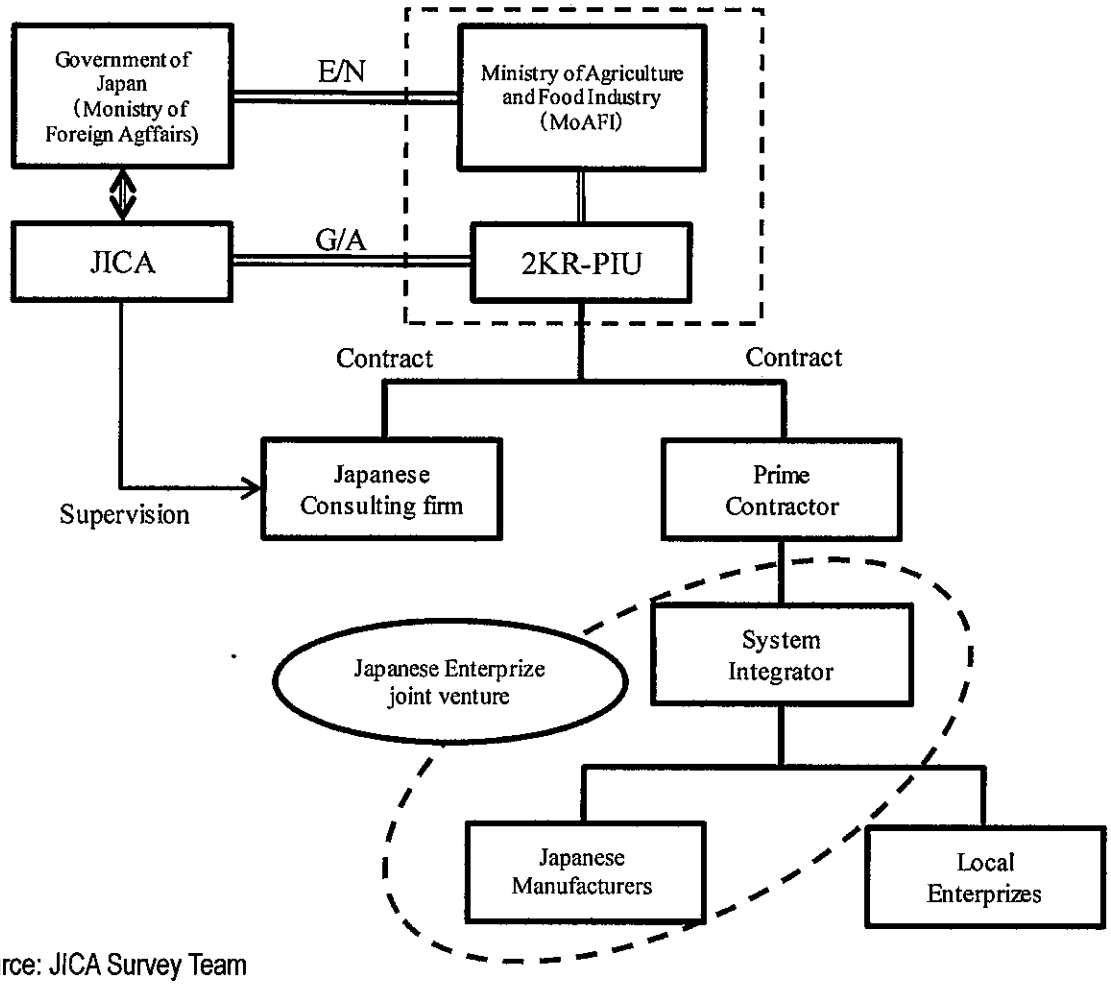
(3) Contractor

After the G/A conclusion, a Japanese contractor, which will be selected through a tender organized by the Moldovan side, shall make an equipment procurement contract with 2KR-PIU. The contractor shall make a subcontract with local firms for local procurement (boilers and modules fabrication, transportation and installation of the modules and commissioning). Besides, the consultant and the contactor shall have series of meetings and site inspection to confirm the beneficiaries' undertakings to complete the Project. The services of the contractor are as follows.

· Procurement, transportation and receipt of the equipment

· Fabrication, installation, test run and initial operation training of the equipment

Relations of the organizations concerned are indicated in the figure below.



Source: JICA Survey Team

Figure 2.4.1 Implementation Organizations

2.4.2 Implementation Conditions

To implement the equipment procurement such as transportation, fabrication, installation and commissioning smoothly, the client, the consultant and the contractor shall have to cooperate with close coordination and fulfill own duties without delay. All the parties involved in the Project have to pay attention to the points below.

(1) Considerations in Equipment Procurement

This Project aims to utilize the Japanese high-tech product which is manufactured not only by large enterprises but also small and medium enterprises and the suitable product will be granted to

Moldova. Pellet boilers and pellet production plant are objective equipment.

Necessary documents for importing the equipment from Japan to Moldova are as follows.

- Specifications and photos of boilers
- Translated manufacturers' catalogues (Romanian or Russian. English acceptable)
- The heat efficiency (above 80%) should be indicated. (It is enough written on the catalogue.)
- Pellet production plant requires the same documents as above.

The submission of above documents can be done by the consultant to 2KR-PIU, and they will proceed to MoAFI and the Ministry of Economy. According to the Ministry, approval of the documents will take about one month.

In Moldova, several laws described below are under revision to conform to the EU standards, and new legislation, "Law on Introduction of Biomass Energy" is under preparation.

- LAW on Energy Efficiency Nr. 142
- LAW on Renewable Energy Nr. 160
- National Program of Energy Efficiency 2011-2020, Nr. 833

(2) Considerations during Construction Work

The following are to be considered during the construction period.

- To confirm procurement schedule of boilers, transportation schedule to the sites and installation schedule
- Concrete foundation work by the Moldovan side should avoid winter season to keep quality. It is recommendable to commence the concrete work after spring.
- Before arrival of the pellet boilers from Japan, local production management and fabrication schedule should be discussed to prevent problems.
- About 8 and 9 housings will be produced per month, and fabrication, installation and commissioning of them are planned to take for 3 months. To avoid delay, schedule management and production management should be well-coordinated.

The modules will be fabricated at a factory in Chisinau. The factory need following safety measures.

- There are a lot of process machines, long raw materials and limitations of workers' pass in a factory. Factory workers should pay attentions carefully.
- While working with a crane in a factory, an accidental fall may occur. Paying attention before working is indispensable.
- Protect goggle, leather glove and helmet must be put if necessary.

After the modules completion in a factory, the modules will be delivered to each site. During delivery and installation works, the following are necessary.

- To avoid bumping of modules to overhead road crossing objectives (e.g. gas pipelines, phone lines and power cables) while transporting (taking a detour)
- Wrecker trucks will be necessary while unloading the modules at sites. It needs careful attention to parking place considering the own weight of wrecker truck and modules. Besides, it needs to pay attention to overhead objectives during the work period.

Work flow of the housing and boiler fabrication is attached in Appendix 3.

Some Japanese engineers from the manufacturer will come to Moldova for the installation work of the pellet production plant. Operators for the pellet production plant should work together with the Japanese engineers to understand the system for the proper operation after the completion.

2.4.3 Scope of Works

For the implementation of the Project, the Government of Japan and the Government of Moldova shall be responsible for the procurement and installation of the project components as shown below.

(1) Undertakings to be Borne by the Japanese Side

- Consulting services on design validation, tender documents preparation, tender arrangement and procurement supervision
- Procurement of the equipment manufactured in Japan in the equipment list
- Transportation, receipt, fabrication, installation, test run and initial operation training of the equipment
- Establishment of operation management system by the soft component

(2) Undertakings to be Borne by the Moldovan Side

Pellet boiler

- To build up a foundation for the module (including materials for the construction work)
- To supply electric power and clean water for the module
- To prepare fire protection and fire extinguishing facilities
- To prepare temporary ash storage
- To prepare facilities for operators (toilet, washing basin, etc.)
- To recruit the operators

Pellet production plant

- To prepare a building for the pellet production plant
- To prepare carriers (e.g. forklift)
- To supply electric power and clean water for the pellet production plant
- To prepare fire protection and fire extinguishing facilities
- To prepare facilities for operators (toilet, washing basin etc.)
- To recruit the operators

2.4.4 Consultant Supervision

(1) Procurement Planning

Pellet boiler

Because it is considered to be impossible to produce all the necessary boilers by one boiler manufacturer, the boilers will be procured from several manufacturers. Therefore, it is necessary to implement the Project on schedule considering the points below.

- To coordinate production plan of boilers in Japan and local production plan of housings carefully
- To make an effort to get the updated transportation information, especially marine transportation
- To confirm the transportation route from Chisinau to the sites
- To confirm the beneficiaries' preparations (concrete foundation for the module and secondary plumbing in the buildings)

Pellet production plant

- To make an effort to get the updated transportation information, especially marine transportation like the pellet boilers
- To confirm the beneficiaries' preparations (a building for the pellet production plant)

(2) Consultant Supervision

The construction work period will take 5 months. It will start with meetings for the construction work and complete after the initial operation training of the installed equipment.

Pellet boiler

Five-sized boilers shall be procured according to each site condition. In addition, several

manufacturers will provide them. The local subcontractor will need to fabricate the various boilers under different conditions. Therefore, all the concerned parties will have to have careful meetings on the manufacturer's detail specifications and drawings to avoid work delay.

Pellet production plant

Engineers from the Japanese manufacturer will install the pellet production plant on site. All the components and necessary parts shall be brought from Japan, but several materials shall be procured locally. The Japanese engineers and the local sub-contractor will have to clarify the critical points for fabrication in meetings before the work. Through the meetings, both parties will be able to work smoothly and immediately from the beginning of the work.

Table 2.4.1 Responsibilities by Work

Contents	Pellet boiler		Pellet production plant	
	Principal work	Initial operation skill	Principal work	Technical transfer for
Unpacking / arrangement	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff
Equipment layout	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff
Fabrication	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff
Installation	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff
Test run	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff
Initial operation training for operators	Local sub-contractor	Japanese supervisor	Japanese engineer	Local staff

Source: JICA Survey Team

2.4.5 Quality Control Plan

The quality control will start with sorting out various drawings (equipment fabrication drawings, detail drawings and shop drawings) to prepare work plans and procedures (fabrication and installation), and site control (arrangement) plan. As for the equipment, damages and quantities will be required as pre-delivery inspection and pre-shipment inspection.

(1) Equipment

Pellet boiler

Combustion test shall be done at a manufacturer's factory in Japan. The performance test with a test stand (dummy load) at Chisinau shall include all of the parts and devices without secondary plumbing.

Pellet production plant

Pre-delivery inspection at a manufacturer's factory in Japan shall be done for each equipment unit separately.

(2) Installation

Pellet boiler

While fabricating the boilers and housing, it will need to check the size and route of plumbing with the drawings, and water supply and leakage as intermediate approval. After installation on the sites, commissioning confirmation will be done with the beneficiaries as overall work completion.

Pellet production plant

After fabrication and installation of the equipment, test production of pellet will be done with the local raw material. Size, moisture content and forming condition of the test pellet will be measured, and approval of completion will be issued if all the parameters meet the specifications.

2.4.6 Procurement Plan

The major equipments which will be procured by the Project are as follows.

Table 2.4.2 Major Equipments Procured by the Project

	Equipment	Procured from	Country of origin	QTY
1	Pellet boiler (116kW)	Japan	Japan	1
2	Pellet boiler (232kW)	Japan	Japan	8
3	Pellet boiler (348 - 407kW)	Japan	Japan	8
4	Pellet boiler (407 - 464kW)	Japan	Japan	1
5	Pellet boiler (580kW)	Japan	Japan	7
6	Hoist with electric trolley	Japan	Japan	33
7	Roller conveyor	Japan	Japan	25
8	Pellet production plant	Japan	Japan	1
9	Flexible container bag	Japan	Japan	500
10	Test stand	Moldova	Moldova	1

Source: JICA Survey Team

The items from 1 to 9 in the above table will be procured in Japan as well as ancillary parts such as primary pipes between the boiler and heat exchanger. The materials for housing of the boilers will be locally procured. Secondary pipes from the heat exchanger to buildings are undertakings by the Moldovan side.

As for the pellet production plant, cables between units of the equipment will be procured in Japan, but power cables and power panel will be procured locally.

2.4.7 Operational Guidance Plan

Some pellet boilers have already been imported from other countries (Greece, Poland, Germany, Ukraine, etc.), and secondhand pellet production plants are also there in Moldova; therefore both kinds of equipment are not so rare equipment. But mechanical system of the boilers made in Japan for the Project is completely different from other countries' products. The Japanese boilers have semi-automatic control function from pellet supply to exhaust gas emission. Production capacity of the newly introduced pellet production plant will be same as the secondhand pellet production plant, but the plant size of the new plant is larger than the used one because the new one is equipped with semi-automatic function including conveyance between the different processes.

Manuals for basic operation and maintenance will be translated into either Romanian or Russian and initial operation guidance will be provided for operators. There are differences on operation between semi-automatic and conventional equipment, so it needs to teach them to the operators during the initial operation guidance. The major points are specified as follows.

Pellet boiler

Even though the operation is semi-automatic, human supervision is indispensable.

(i) The pellet is automatically supplied from the silo to the boiler, but it needs to supply the pellet to the silo by manpower. Therefore in case of alert for the pellet shortage in the silo, operators need to supply the pellet to the silo manually.

(ii) Clinker, which is produced in a furnace, is automatically removed. The clinker generation differs by raw material composition; therefore the operators should watch the clinker generation, and sometimes may need to remove the clinker manually.

(iii) Ash must be discharged by manpower.

(iv) Different raw materials by season and production location make the produced pellet various characteristics. Therefore it should avoid using the mixture of different pellets, and should use the single kind of pellet. It will be necessary to adjust operation because of different calorie and different clinker production if the mixture of different pellets is used.

(v) In case of power failure, proper manual operation is necessary to cope with poor combustion

because semi-automatic operation doesn't work. (e.g. manual combustion control for remaining pellet by stop of air blower and cyclone dust collector)

Pellet production plant

(i) It should avoid inputting different raw materials while the pelletizer is working.

(ii) It requires changing or adjusting a die before using different raw materials.

(iii) It needs careful operation for the raw material drying unit when power failure occurs.

(iv) Proper moisture content should be maintained.

It isn't considered that the above-mentioned cautions have been common so far, and adequate procedures for the optimum operation should be thoroughly instructed.

Reporting guidance

After installation of the pellet boilers and pellet production plant on the designated sites, the beneficiaries have to do a report of the equipment operation for the project evaluation. But a training of this reporting service is not included in the operational guidance; therefore the training of the reporting will be done in the soft component.

2.4.8 Soft Component (Technical Assistance) Plan

(1) Necessity of Soft Component Plan

Besides actual operation and maintenance of the installed equipment and plant, soft component (technical assistance) plan is required in order to manage and to have the 25 pellet boilers and 1 pellet production plant in good operation conditions for its long-term sustainable operation.

(i) Strengthening the project management skills for the smooth starting-up of the equipment in large numbers (=Necessity to develop information management system (IMS) and strengthen operation and maintenance skill to operate the IMS)

(ii) Planning of pellet supply chain model for diffusion on use of pellet boilers

(iii) Environmental education and information sharing for diffusion of pellet boiler

(2) Outline of the Soft Component Plan

1) Purpose

Goal of the soft component plan is to achieve the project purpose and as a result of reaching the project purpose, to reach the overall goal by developing necessary functions to realize the continuous operation of the granted equipment. (See "1.1Overall Goal and Project Purpose" for the project purpose and overall goal.)

2) Expected Results

The following three results are expected as a result of implementation of the soft component plan.

Result 1: Operation and maintenance (O&M) of pellet boilers are realized.

Result 2: O&M of pellet production plant is realized.

Result 3: Benefits of biomass utilization will be recognized by the public.

(3) Contents

Table 2.4.3 Activities of the Soft Component Plan

Result	Activities	Target persons/groups
Result 1 O&M of pellet boilers are realized.	○Project evaluation and monitoring method development ○Information management system (IMS) development ○IMS operation and maintenance skill development ○Development of reporting rule, education program and reporting manual for boiler operation information gathering	●2KR-PIU
	○Reporting rule education program for site managers ○Reporting rule education program for boiler operators ○Reporting rule operation monitoring program	●Mayor, Assistant ●Site Manager, assistant, boiler operator

Result	Activities	Target persons/groups
Result 2 O&M of pellet production plant is realized.	○Development of reporting rule, education program and reporting manual for pellet production information gathering	●2KR-PIU
	○Supply chain planning ○Education to develop skills to diffuse the pellet production	●2KR-PIU
	○Reporting rule education program for plant manager ○Reporting rule operation monitoring program	●2KR-PIU ●Plant manager, assistant, operators
Result 3 Benefits of biomass utilization will be recognized by the public.	○Web-site ○Web-site management skill development, operation manual development	●2KR-PIU
	○Workshop	●Members of related ministry, university, organization and donors
	○Education program ○Tool development	●Pellet boiler installed site users(teachers, student)

Source: JICA Survey Team

(4) Schedule

Three (3) JICA experts with different skills will cooperate to accomplish the three (3) goals of the soft component plan.

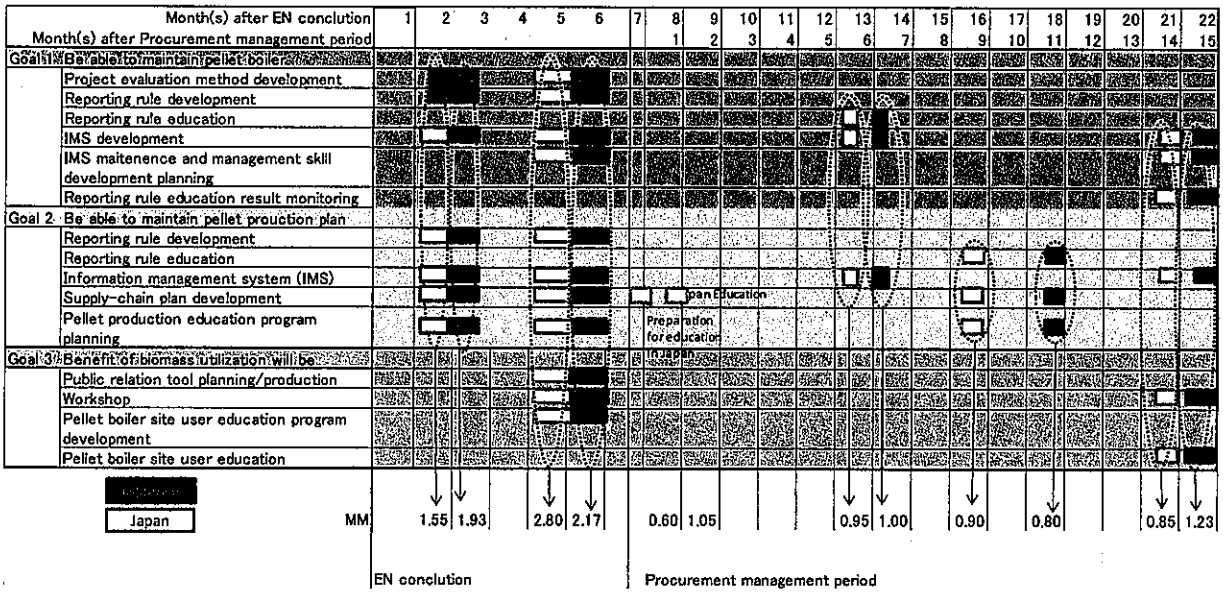
Table 2.4.4 Roles of Experts

		Soft Component Manager	Information Management System (IMS) expert	Facility Expert
Goal 1	Be able to maintain pellet boiler			
	Project evaluation method development	◎		
	Reporting rule development	◎		△ (Technical support)
	Reporting rule education	◎		△ (Technical support)
	IMS development	○	◎	△ (Technical support)
	IMS maitenence and management skill development planning		◎ (Instructor=Local resource)	
	Reporting rule education result monitoring	◎	△	
Goal 2	Be able to maintain pellet prouction plan			
	Reporting rule development	◎		
	Reporting rule education	◎		○
	Information management system (IMS) development		◎	
	Supply-chain plan development	◎ (Business planning)		◎ (Facility/technology)
	Pellet production education program planning	◎ (Business planning)		◎ (Facility/technology)
Goal 3	Benefit of biomass utilization will be recognized			
	Public relation tool planning/production	◎	△ (Involvement of IMS)	△ (Technical support)
	Workshop	◎	○ (IMS instructor)	
	Pellet boiler site user education program development	◎		△ (Technical support)
	Pellet boiler site user education	◎		

Source: JICA Survey Team

Soft component plan requires timely action along with the equipment/plant procurement, installation and start-up schedule. As a result, the period of soft component plan will take 22 months from the E/N conclusion.

Table 2.4.5 Schedule of Soft Component Plan



Source: JICA Survey Team

2.4.9 Implementation Schedule

Following the decision of the project implementation by the Government of Japan, the detailed design work (including final confirmation of the undertakings by the Moldovan side) shall be done by the Japanese consultant team, and a contractor for procurement and installation of the equipment shall be selected through competitive bidding. After the contractor bidding, the equipment procurement shall begin with the procurement meetings (preparation of shop drawings, verification of the drawings and approval of the drawings by the client).

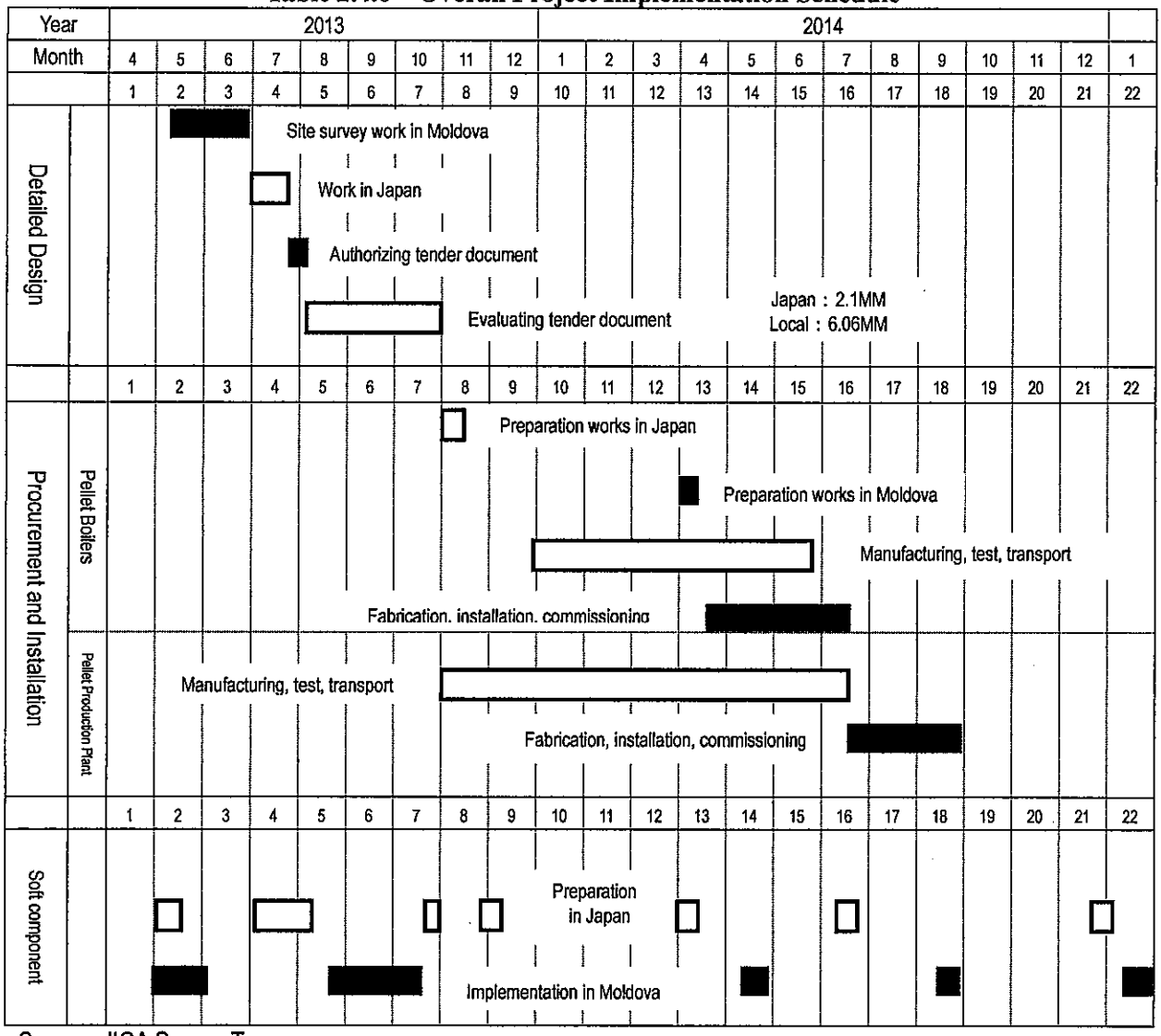
During the detailed design works by the consultant team, it shall need to get official importation approval of the equipment manufactured in Japan from the Ministry of Economy of Moldova. (Refer to "2.4.2 Implementation Conditions".) Hence, the term for the detailed design works is planned a bit longer than the normal one.

The following contents indicate the undertakings of Japan and Moldova during the project implementation period.

Undertakings of Japan	Undertakings of Moldova
- Document preparation for acquisition of importation approval of the equipment made in Japan	- Submission of the document to the agencies concerned
- Preparation of mechanical and shop drawings	- Confirmation of willingness to meet obligations by the beneficial local authorities
- Manufacturing, checkup and transportation of the equipment procured in Japan	- TAX exemption
- Procurement of other equipment in Moldova	- TAX exemption
- Installation work	- TAX exemption
- Inspection of the installation work	- Confirmation of completion
- Technical assistance for operation management (Soft component)	- Recruitment of necessary personnel for operation of the equipment

The table below shows overall schedule of the Project including the above contents.

Table 2.4.6 Overall Project Implementation Schedule



Source: JICA Survey Team

Chapter 3 Obligations of Recipient Country

3.1 Pellet Boiler

Principally, the materials to be set up on the skid shall be procured in Japan and shall be transported to Moldova, and the pellet boiler including peripheral accessories shall be installed in the dedicated housing. The equipment imported from Japan shall be fabricated on the skid and installed in the housing at a central assembly factory in Chisinau. After assembly of all the necessary equipment, the modules and the skids shall be transported to the 25 sites and installed at each site. Before commencement of the work, the following obligations shall be met by the Moldovan side.

- To prepare land and buildings of the central assembly factory (necessary to discuss with the Moldovan side for the details)
- To make sure the following preparations at each site
  - To build up a foundation for the module
  - To arrange secondary pipe installation (between the module and the beneficial buildings and plumbing with radiators in the buildings)
  - To supply electric power
  - To supply clean water
  - To arrange drainage for the module
  - To pave an access road to the foundation
  - To build a storage for the pellet (for seven days)
  - To prepare temporary ash storage
  - To prepare fire protection and fire extinguishing equipment
  - To prepare carriers (e.g. forklift)
  - To prepare facilities for operators (e.g. toilet, washing basin)
  - To install fences
  - To recruit the boiler operators

The above contents shall be thoroughly discussed during the detailed design works.

3.2 Pellet Production Plant

All the parts of the pellet production plant shall be procured in Japan, and each of them shall be inspected before shipping. Also pipes, valves, fittings and wires/cables shall be counted and inspected in accordance with the specifications before shipping. Some common parts or materials shall be procured in Moldova.

On the other hand, the following shall need to be prepared or procured by the Moldovan side.

- To prepare factory land and a building for the pellet production plant (Basic design and the necessary data for the equipment layout and loading data shall be supplied by a Japanese manufacturer.)
- To supply electric power
- To supply clean water
- To arrange drainage
- To pave an access road to the foundation
- To prepare temporary raw material storage
- To prepare fire protection and fire extinguishing equipment
- To prepare carriers (e.g. forklift)
- To prepare facilities for operators (e.g. toilet, washing basin)
- To install fences

V. B.

- To recruit the pellet production plant operators

3.3 Soft Component (Technical Assistance) Plan

For the effective and sustainable utilization of the equipment procured by the Project, 2KR-PIU needs to implement the following activities.

- To utilize the various manuals and regulations which shall be prepared during the plan implementation, and revise them, if any
- To secure enough budget to manage the information management system and its web site properly
- To secure enough budget for information terminal devices (data transmission of calorie meters)
- To secure enough budget for regular monitoring of the equipment
- To maintain environmental education on biomass energy utilization to the pellet boiler users

Chapter 4 Project Operation Plan

4.1 Responsibility of Operation Management and Finance

The equipment shall be handled under the expected structure shown below.

Table 4.1.1 Expected Operation Management Structure

	Pellet boiler	Pellet production plant
O&M responsibility	24sites: Mayor Demonstration boiler: 2KR-PIU Director	2KR-PIU
Equipment/plant owner	24sites: Pellet boiler installing site manager (School master) Demonstration boiler: 2KR-PIU Director	2KR-PIU
Operator	24sites: Operator hired by pellet site or local authority Demonstration boiler: NTC staff	Operator hired by 2KR-PIU or organization which is entrusted by 2KR-PIU on pellet production plant operation
O&M expense sharing	24sites: Pellet boiler installing site Demonstration boiler: NTC	2KR-PIU

Source: JICA Survey Team

Cost allocation and financial sources for the equipment are expected as shown below.

Pellet boiler

At present, the budget for education facilities such as gymnasiums and kindergartens are directly allocated by rayon, which means gymnasiums and kindergartens will bear the expenses for the pellet boiler operation. Expenses of other public facilities will be borne by the local authority. In case the pellet boiler supplies the heating to both education and public facilities, there shall be a cost sharing rule between the two facilities. Expense includes pellet purchase cost, operator labor cost, electricity, consumables and maintenance service fees. Mayor of the local authority will take responsibility on project management and evaluation aspect, in any cases.

2KR-PIU will be responsible for management of a demonstration boiler installed in Chisinau National Training Center (NTC). Labor and operational cost will be borne by Chisinau NTC.

Pellet production plant

O&M expense shall be covered by the sales of pellets, but, for the start-up period, it shall be borne by 2KR-PIU. 2KR-PIU will manage the pellet production, but they can also entrust the O&M to other organization such as National Training Center (NTC) under the Ministry of Agriculture and Food Industry. The expense includes raw material procurement, operator labor cost, electricity/fuel, consumables and maintenance service fees.

4.2 Equipment Maintenance

Equipment is planned to be maintained under the following structure

Table 4.2.1 Expected Equipment Maintenance Structure

	Pellet boiler	Pellet Production Plant
Manual/Guidance book	Equipment supplier JICA Consultant	Equipment supplier
Daily check	Operator hired by site owner	Operator hired by 2KR-PIU or organization entrusted by 2KR-PIU
Periodical check (beginning and end of heating season)	Equipment supplier or its agent	Equipment supplier or its agent
Emergency	Equipment supplier or its agent	Equipment supplier or its agent

Source: JICA Survey Team

4.3 Supply Chain System of the Pellet

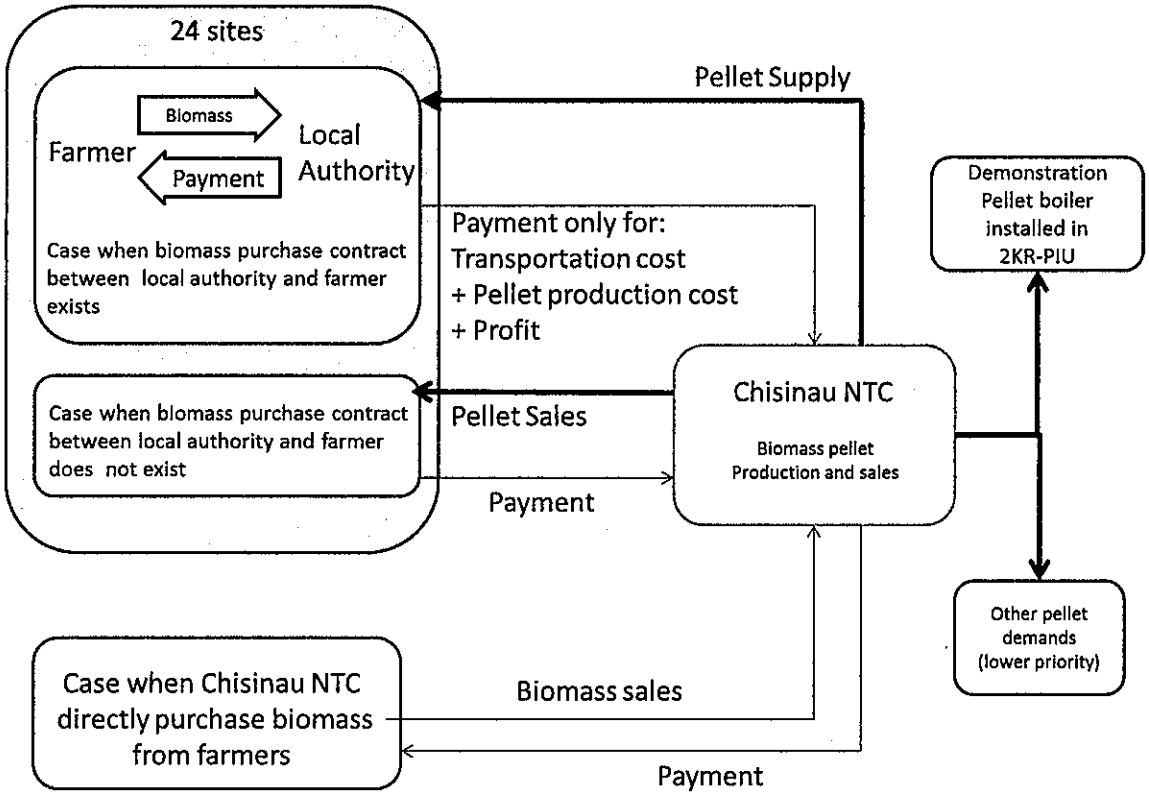
The supply chain system of the raw material and pellet product shall be planned within the soft

component plan. The draft idea is described in the diagram below.

There are two kinds of farmers: farmers living in the villages where 24 pellet boilers will be installed and farmers besides the 24 boiler sites. The pellet production plant will basically purchase the raw material from both of the farmers, and conclude a contract between local authorities for the pellet supply.

Also local authorities of the 24 boiler sites can conclude a procurement contract of raw material between the farmers within their own authorities, purchase the raw material and entrust to the pellet production plant. In this case, local authorities can save the intermediate margin.

The pellet production plant shall basically fulfill demand of the 25 sites (including demonstration boiler at 2KR-PIU), then sell the remains to other customers.



Source: JICA Survey Team

Figure 4.3.1 Structure of Pellet Supply Chain System

Chapter 5 Project Cost Estimation

5.1 Initial Cost Estimation

The summary of the initial cost is attached in Annex 5.

5.2 Operation and Maintenance Cost

5.2.1 Pellet Boilers

Five (5) sizes of pellet boilers between 116kW to 580kW are planned to be installed according to the heat demand volume of each site. Labor cost and operation information reporting (OIR) expenses are expected to be the same among the five-size boilers, but pellet, electricity, consumables and maintenance service expenses varies depending on the boiler size.

Table 5.2.11 Operation and Maintenance Cost by Boiler Size

Boiler Size	Cost					Total
	Operation ratio	17%				Lei/Year
	Pellet	Electricity	Maintenace	Labor	Reporting	
116 kW	51,237	2,031	12,000	19,750	1,000	86,018
232 kW	102,474	4,061	14,400	19,750	1,000	141,686
348 kW	179,330	7,107	25,200	19,750	1,000	232,387
407 kW	204,949	8,123	28,800	19,750	1,000	262,621
580 kW	256,186	10,153	36,000	19,750	1,000	323,089

Note 1: Estimation based on maintenance fee of 116kW boiler, 12,000 MDL. (e.g. 232kW/116kW x 0.6 x 12,000MDL = 14,400 MDL)
Note 2: Data above do not include the OIR related labor cost such as personnel expenses of local authority.
Source: JICA Survey Team

5.2.2 Pellet Production Plant

Production capacity of the pellet production plant which will be installed has 1 ton/hour, and the facility is planned to be operated 300 days/year, 14 hours/day. Output volume of pellet will be 90% of input amount (4,200 ton/year) which is 3,780 ton/year, considering the evaporation of moisture and residues. As a result, pellet production plant will require 5,482,820 MDL/year for operation and maintenance expense.

- Raw material procurement:
  1,218,000 MDL/year (raw material purchase: 4,200ton/year, transportation fee: 50km radius, storage fee)
- Product sales:
  472,500 MDL/year (product: 3,780ton/year, packing, transportation fee: 80km radius)
- Labor cost: 240,000 MDL/year (average 2,500 MDL/year per person x 8 person)
- Electricity: 1,552,320 MDL/year (1.54MDL/kWh x 300kWh x 0.8 x 14hours x 300days)
- Consumables: 1,500,000 MDL/year (shredder, pelletizer, heat furnace)
- Others: 500,000 MDL/year (maintenance service fee)

5.2.3 2KR-PIU

2KR-PIU will require maintenance budget for IMS related cost which is estimated to 18,155 MDL/year. 2KR-PIU will also require budget for biomass boiler diffusion activity, if necessary. The following cost does not include the labor cost of 2KR-PIU.

- IMS maintenance 18,155 MDL/year (system maintenance and consulting fee)
- Others (such as biomass boiler extension activity)

5. Soft Component (Technical Assistance) Plan

2KR Project Implementation Unit, Ministry of Agriculture and Food Industry
Republic of Moldova

The Preparatory Survey on the Project for
Effective Use of Biomass Fuel in the Republic of Moldova

Soft-Component Plan for Information Management System (IMS) implementation/training and Promotion of Biomass Heating System Utilization

March 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

MITSUI CONSULTANTS CO., LTD.
UNICO INTERNATIONAL CORPORATION

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What is “Soft-Component”?

“Soft-Component” is a technical support provided together with “Hard Component (facility, equipment)” which will be constructed or procured by the grant aid project. Soft-Component is aiming two purposes; 1) to support the smooth start-up of the project, 2) to secure minimum sustainability of the project.

1 Backgrounds for Soft-Component planning

This project aims to establish the use of biomass heating system in the rural area of Moldova through the installation of biomass heating systems at public facilities and also by installing one set of biomass pellet plant for supplying sufficient pellet fuel to the granted biomass heating systems.

1－1 Background of the project

The Republic of Moldova has very few domestic energy resources. Crucial energy commodities such as natural gas, oil and coal are imported from Russia, Romania and Ukraine. The Government of Moldova (herein after referred as “the GoM”) promotes the development of domestic energy sources to make its economy more stable.

Agriculture is the main industry of many Moldovan rural communities, and local authorities often do not have enough tax revenue for energy procurement. As a result, public facilities such as kindergartens and schools struggle to heat classrooms. In the past, some schools have had to close their doors during the coldest month of the year.

A Grant Assistance for Grass-roots Human Security Project (Improvement of Heating System for the Kindergarten and School in Hirtopul Mare Village) was implemented by Japan in 2008. Two sets of biomass heating systems were installed and their effectiveness as biomass heating system was confirmed empirically. The GoM issued an official request to the Government of Japan for assistance in expanding the biomass heating system in 2009. In response to the request, the Japan International Cooperation Agency (hereinafter referred as “JICA”) conducted a preliminary study to collect basic information and confirm the request in February 2011. The preliminary study concluded that expansion of the biomass heating system in Moldova had strong potential.

Table 1－1　Project Outline

Upper goal	Promotion of biomass heating system utilization
Project goal	Establish the use of biomass heating system in the rural area of Moldova
Expected output	Output 1.　Biomass heating system will be installed in all targeted sites Output 2.　Supply chain of the pellet fuel to the targeted site will be secured continuously Output 3.　Biomass heating system will be stably used and maintained
Supports	1)　25 sets of pellet boiler module (1 set will be installed at 2KR facility as demonstration) 2)　1 set of pellet production line 3)　Training programs for system maintenance

Source: JICA Study Team

1－2　O&M structure and training program

1－2－1　Managing and operation expense responsibility

It is intended that pellet boiler and pellet production plant equipment shall be operated and managed under the structure summarized in the table below.

Table 1-2 Expected Operation Management Structure

	Pellet boiler	Pellet production plant
O&M responsibility	(24) Rural sites: Mayor Demonstration boiler: 2KR-PIU Director	2KR-PIU
Equipment/plant owner	(24) Rural sites: Pellet boiler installation site manager (e.g. School master) Demonstration boiler: 2KR-PIU Director	2KR-PIU
Operator	(24) Rural sites: Operator(s) to be hired by installation site or local authority Demonstration boiler: NTC staff	Operator hired by 2KR-PIU or 2KR-PIU sub-contracted organization
O&M expense sharing	(24) Rural sites: Pellet boiler installation site Demonstration boiler: NTC	2KR-PIU

Source: JICA Study Team

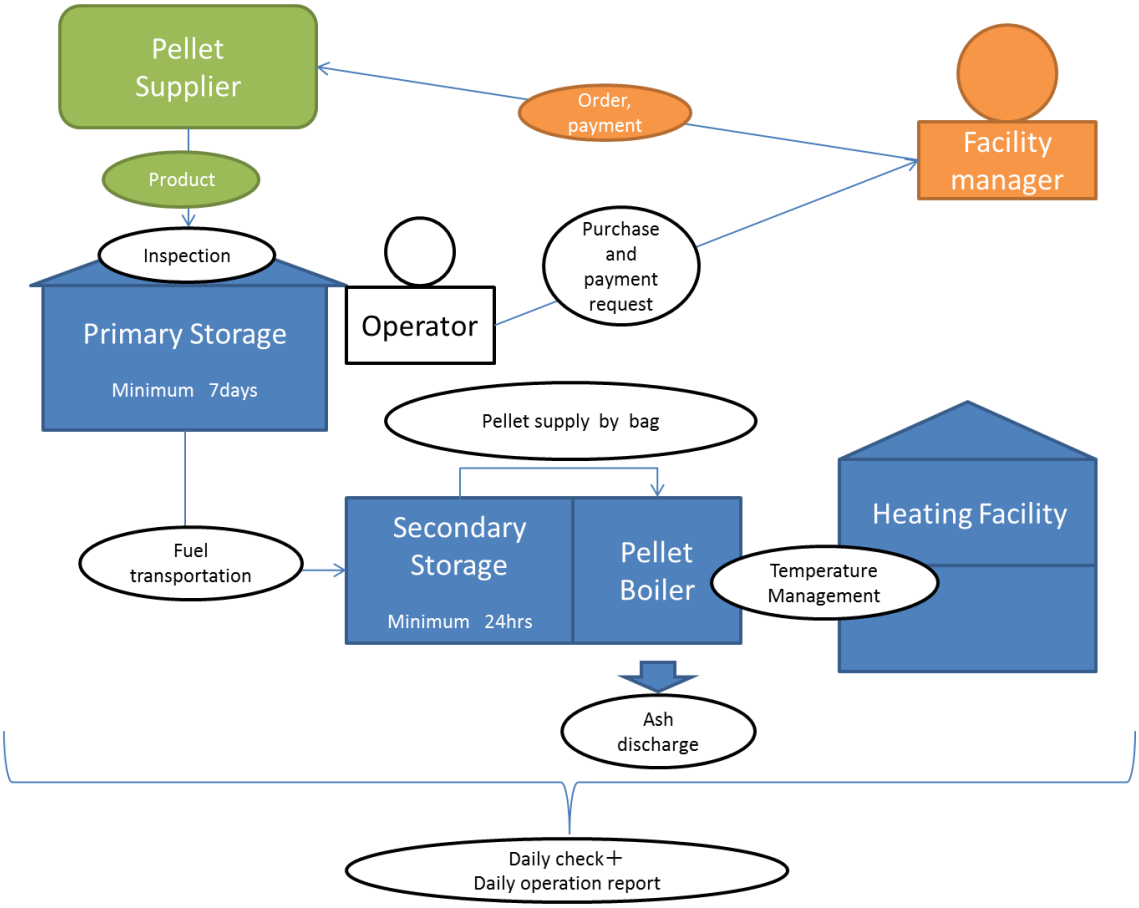


Figure 1-1 Operation flow of pellet boilers

Anticipated allocation of costs for management and operation is shown below.

Pellet boiler

At present, budgets for gymnasiums kindergartens and other education facilities are allocated directly by rayon, which means gymnasiums and kindergartens will bear expenses involved in pellet boiler operation. Associated expenses for other public facilities will be borne by the local authority. In cases where an installed pellet boiler supplies heating to both educational facilities and other public facilities, there shall be a cost sharing rule between the two facilities. Expense includes pellet purchase cost, operator labor cost, electricity, other consumables and maintenance service fees. The chief of the local authority (e.g. Mayor) will be responsible for project management and evaluation aspect.

2KR-PIU is responsible for management of one demonstration boiler, which is planned to be installed in Chisinau National Training Center (NTC). Labor and other operating costs will be borne by Chisinau NTC.

Pellet production plant

As the project matures, proceeds from pellet sales are expected to cover production plant O&M expenses, but during the start-up period these costs will be borne by 2KR-PIU. 2KR-PIU will manage the pellet production, but may entrust O&M functions to other appropriate organizations such as National Training Center (NTC) under the Ministry of Agriculture and Food Industry. Primary plant expenses are expected to include raw material procurement, operator labor cost, electricity/fuel, consumables and maintenance service fees.

1－2－2　Operator and their work

The expected equipment maintenance structure is summarized in the following table.

Table 1-3　Expected Equipment Maintenance Structure

	Pellet boiler	Pellet Production Plant
Original provision of manuals/guidance materials	Equipment supplier JICA Consultant	Equipment supplier
Daily operation and inspections	Operator hired by site owner	Operator hired by 2KR-PIU or organization entrusted by 2KR-PIU
Regular (seasonal) inspections (start and end of heating season)	Equipment supplier　agent in Moldova	Equipment supplier or its agent
Emergency maintenance	Equipment supplier agent in Moldova	Equipment supplier or its agent

Source: JICA Study Team

(1) Biomass boiler

Table 1－4　Biomass boiler O&M work descriptions

Regular (seasonal) inspections	<Mechanical check before and after heating season> 【Purpose】For smooth start-up of the heating system ＊Education of new operators, if any. 【Checking points】 Boiler, pipelines(including pipelines within the heating facility), heat exchanger, circulation pump, controlling devices, fuel supply system, building, fuel transporting equipment, water softener, fuel stock
Daily operation and inspections	【Purpose】 ・To supply heat demanded by heating facility ・Minimum operation for preventing pipelines from freezing during the winter season 【Checking points】

	・Boiler (mechanical movements, furnace condition, water temperature, water tank volume) ・Fuel condition check, fuel supply and stock confirmation ・Control and telecommunication device ＜Emergency＞ ・Emergency stop procedure, reporting to management and agent
Reporting	【Purpose】 ・ Operation information collection/ management/ analysis for feeding back information for stable operation of the boilers. ・Project evaluation 【Content】 (1) Daily operation report Daily reporting from operators to heating facility director. Each operators fill in the reporting sheet on required operation information/data during their shift. Information are date, time, name of operator, outside temperature, boiler water temperature, accumulated calorie, pellet stock, boiler tank water volume, maintenance check list. ＊Troubles/breakdown, specific findings during maintenance, deterioration of parts shall be noted if founded. (2) Monthly report Monthly reporting from heating facility director to the mayor. Above daily report will be attached to the summarized monthly reporting format. (3) Annual report Annual reporting from Mayor to 2KR-PIU. Annual report will be send by Fax or mail. Following information will be provided and fill into the format. ・Operation information（date of start and stop of heating system, summary of monthly report） ・Fuel information（Supplier, purchased volume, unit price, supply frequency） ・Expenditure result（Difference and analysis between budget and result） ・Budget of next season

(2) Pellet production line

Table 1－5　Pellet production line O&M work descriptions

Regular (seasonal)	【Purpose】 ・Stable operation of pellet production line for stable supply of pellets to the boilers

inspections	【Contents】 <Pre-operation check points> ・Shredding machine（Motor/reducer, Blade breakage/attrition） ・Dryer（Firing equipment, fuel supplying equipment, fans, cleaning up furnace and ash collector） ・Molding machine（Motors, Dye breakage/attrition） ・Cooling machine ・Conveyer breakage/attrition, rollers, motors ・Electronic measurement devices ・Building ・Transportation equipment ・Stock check（Raw material remains in the storage） ・Raw material management（Moisture content） ＜Emergency＞ ・Emergency safe stop ・Emergency reporting rule
Reporting	【Purpose】 ・Operation information collection/ management/ analysis for feeding back information for stable operation of the boilers. ・Project evaluation 【Content】 (1) Daily operation report Daily reporting from operators to pellet production line operation director. Each operators fill in the reporting sheet on required operation information/data during their shift. Information are date, time, name of operator, outside temperature, inside temperature, humidity, raw material stock, electricity consumption, moisture rate and origin of raw material consumed, daily machine maintenance check list. ＊Troubles/breakdown, specific findings during maintenance, deterioration of parts shall be noted if founded. (2) Monthly report Monthly reporting from pellet production line director to 2KR-PIU. Above daily report will be attached to the summarized monthly reporting format. ・Operation information（summary of monthly report） ・Raw material information（Supplier, purchased volume, unit price, supply frequency）

	・Expenditure result（Difference and analysis between budget and result） ・Plan and budget of next season

1－2－3　Training of O&M skills

Both pellet boiler and pellet production line requires training in order to operate and maintain the equipment installed, as it is still rather new technology in Moldova.

The training of O&M must be conducted efficiently as the project is installing 25 pellet boilers and 1 set of pellet production line. The project includes training expenses implemented by Japanese suppliers (machine manufacturer, engineering company, trading company) to the local agents who will be supporting the sites in terms of O&M. Training expenses necessary for local agents to train operators of the pellet boilers and pellet production line are also borne by the project. Reporting rule training is not included in both O&M training program.

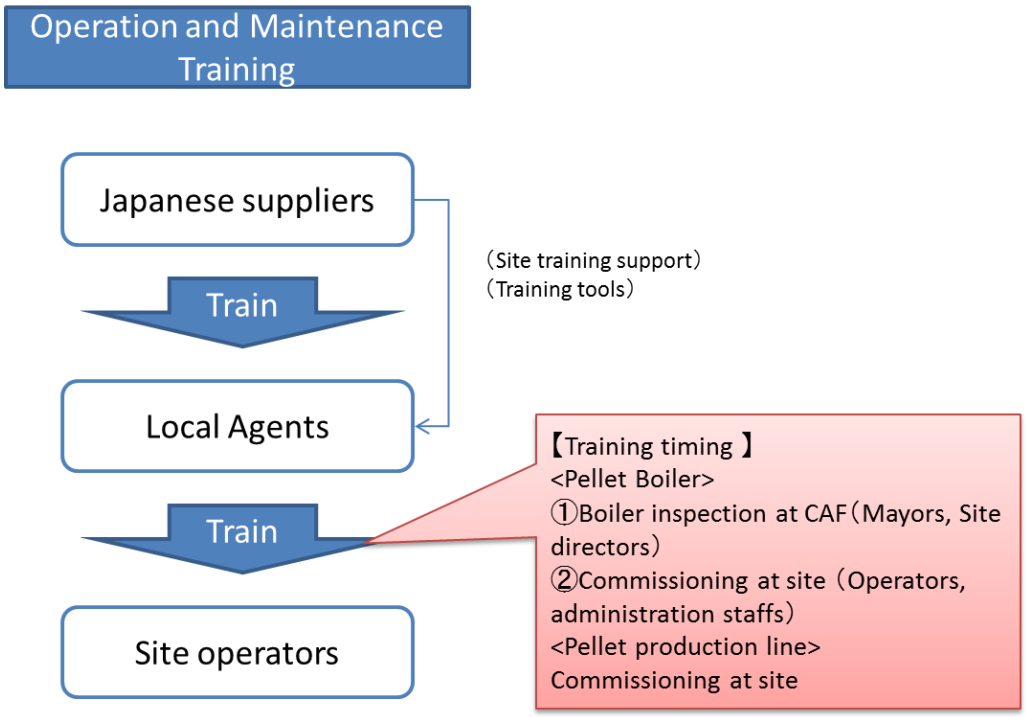


Figure 1－2　　Training timing

1－3　Necessity of "Soft-Component"

In addition to actual operation and maintenance training of the installed equipment and plant, a "Soft-Component" plan concentrating on technical assistance is required in order to support the management of the project and to ensure appropriate operating conditions and long-term sustainable operation of the twenty-five pellet boilers and the pellet production plant. Key tasks of the Soft-Component plan include the following.

(i) Strengthening project management skills to streamline the simultaneous introduction of new equipment in large numbers; Developing the required information management system (IMS) and strengthening operation and maintenance skill to effectively implement and operate the IMS.

(ii) Planning/ design of pellet supply chain model for promotion on use of pellet boilers

(iii) Environmental education and information sharing for promotion of pellet boiler

1－3－1 Necessity of IMS development and its operation and maintenance skill

The granted equipment through this project are 25 pellet boilers (for 25 sites) and1 set of pellet production line.

IMS development and its O&M skill development is necessary for collecting, accumulating, analyzing and feeding back the biomass heating system O&M information to the site for their continuous operation. It is also necessary for implementing project evaluation/monitoring by small human resource. IMS will take into account of future extension of monitoring biomass heating system installed by other projects.

<Activities>

・Reporting rule development
・Information collection system development
・Information analysis skill development
・Reporting rule implementation status monitoring

1－3－2 Necessity of pellet supply-chain model planning

The activity will support the smooth start-up of pellet production activity and its distribution. 2KR-PIU staff will visit to Japan to observe the example of supply chain model for better planning. One of the purposes of installing pellet production line in this project is to use it as training facility to obtain technical skills (e.g. machine operation, pellet quality management) and business information, to develop pellet market. The activity requires setting up a program to train the “future trainers” on pellet production.

<Activities>

・Planning of pellet supply-chain model
・Pellet production trainer training program

1－3－3 Necessity of Public Relation Strategy and Biomass Heating System Promotion

Soft-Component is aiming the continuous utilization of granted biomass heating system by sharing

information collected by IMS and pellet supply chain model to prevent problems to occur or solve the problem quickly. But it is also useful to raze the public awareness on effectiveness of biomass heating system by implementing public relation and environmental education activities.

<Activities>

・Planning of biomass heating system public relation strategy

・Planning, development, implementation of public relation activities

- Information Sharing Platform (ISP) establishment
- Planning of environmental education aiming beneficiaries of the heating facility and preparation of educational tools

・Opening a workshop to share information about the project to other donors, government officials, institutions / agencies

<Expected Effects>

(1) Effects by O&M information sharing

・Efficient fuel procurement

(Pellet price standardization by area/raw material, cost reduction by joint purchase of pellets, recognition of pellet stock)

・Cost reduction

(Outsourcing cost reduction by sharing information for small repair/maintenance, sharing breakdown examples for breakdown prevention)

・Budget planning support

(Parts/maintenance timing information sharing. pellet market price tendency)

(2) Effects by public relation and promotion activity

・More utilization of biomass heating system, possibility of more sales of Japanese technology

・More utilization of biomass

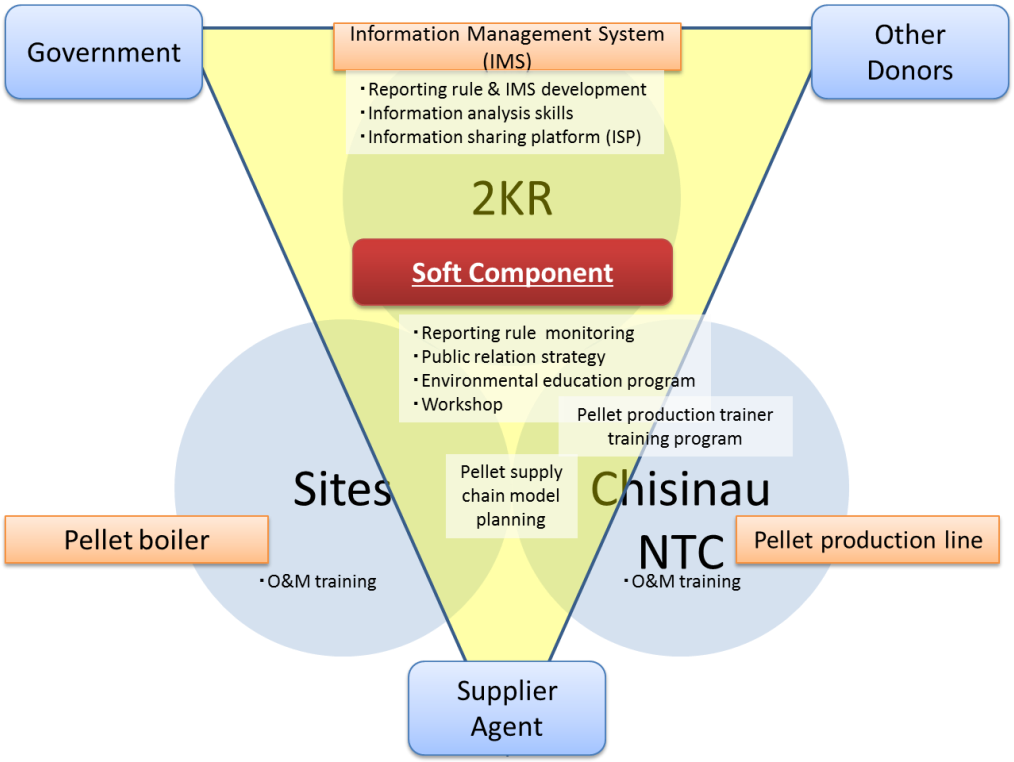


Figure 1－3　Soft-Component outline (inside triangle)

2 Role of Soft-Component within the Project

This project aims to accomplish three primary goals through the installation of biomass heating systems at public facilities and the installation of one biomass pellet plant: (1) energy cost reduction, (2) sustainable heating system operation, and (3) improvement of living conditions in the Moldovan rural communities.

The primary goal of the Soft-Component plan is to achieve the project purpose and to reach the overall goal by supporting to develop necessary functions to realize the continuous operation of the granted equipment.

<Expected Results>

The following three results are expected as a result of implementing the Soft-Component plan.

Result 1: Appropriate operation and maintenance (O&M) of the pellet boilers is instituted.

Result 2: Appropriate O&M of the pellet production plant is instituted.

Result 3: The general public is made aware of the benefits of biomass utilization.

1) Appropriate operation and maintenance (O&M) of the pellet boilers is instituted

The result will increase the social credibility of biomass heating system which will be the backbone of more utilization of the system. By developing and implementation of "reporting rule", the project will be able to collect, accumulate, analyze and share various O&M information among the biomass heating system users to support the better O&M.

The project participants must develop structure and join to the reporting system shown in below figure 2-1.

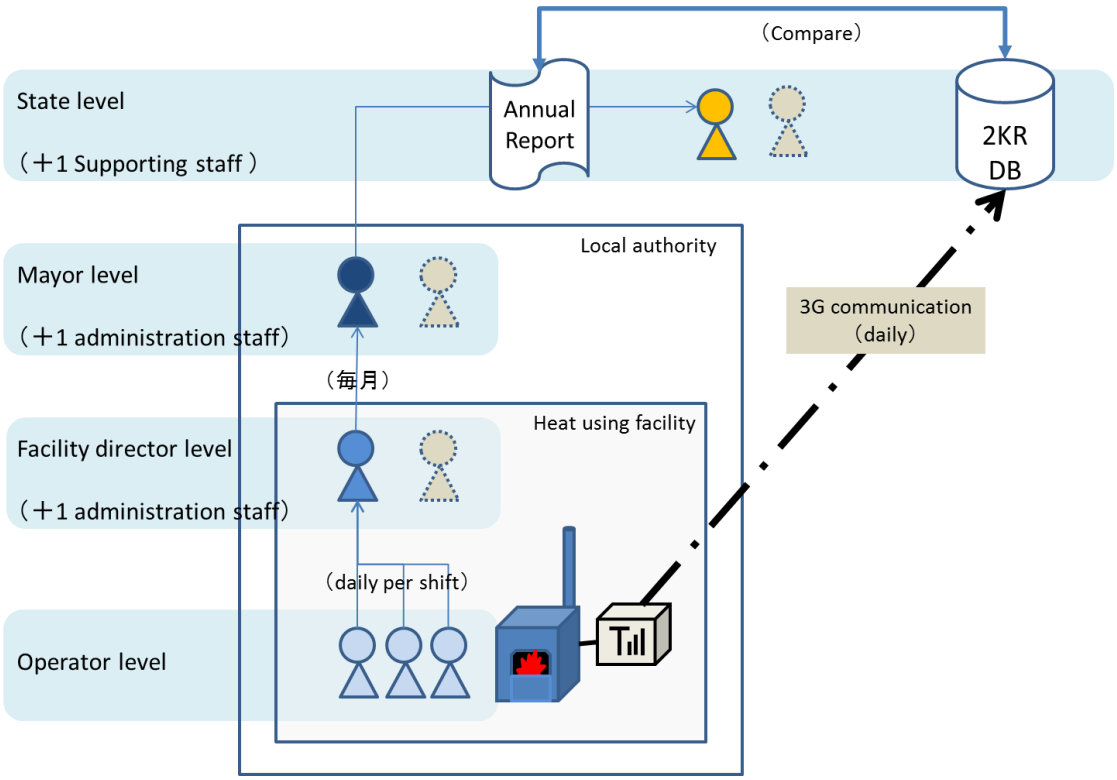
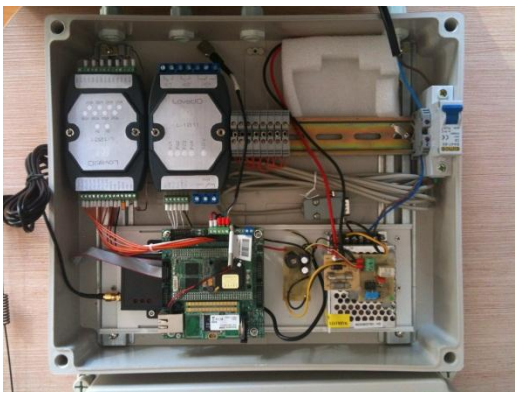


Figure 2－1　Biomass boiler O&M information reporting structure

The system includes information transfer system by using accumulating calorie meter and 3G telecommunication system. This will be the model for managing and utilization of many data by less staff. Also by checking both transferred data and hard-copy data from the annual report, monitoring of operation facts will be more accurately managed. System can support to maintain the high operation rate of the boilers as it can recognize the abnormity of the boiler from accumulative calorie meter data (temperature difference between in and out of heat exchanger, circulating water volume, operation time) more than once a day, and can support operators.

The system will consider about taking in the data from other projects and investments which is expected in near future. The cost for communication and maintenance of telecommunication devices is expected to be covered as pellet selling cost.

3rd generation mobile network is expected to be used, as the network covers morethan99% of the Moldavian territory. In order to use the network, project requires automatic telecommunication device and its telecommunication cost. Although the daily communication cost is small. Picture 2－1　shows the typical telecommunication device also used in some heating business in Moldova.




Picture 2－１　Telecommunication devices

After the development of reporting rule and reporting manual, three phases of training and monitoring program will be conducted under the Soft-Component.

【Phase 1：Mayor and heating facility director training】

Half day reporting rule training for mayor and heating facility director is planned to be held after the boiler inspection at the Central Assembling Factory, at Chisinau. Total 3 times of inspection is planned for 8 sites each so the training program will also follow this. Expected trainee are mayor and heating facility director (2 trainees per site, total 48 trainees), 2KR-PIU staffs, NTC staffs and Government officers (e.g. Ministry of Agriculture and Food Industry). Japanese consultant will attend in first class, and others will be held by 2KR-PIU.

【Phase 2：Operator and administration staff training】

Half day reporting rule training for operator and administration staff of mayor's office and heating facility is planned to be held after the boiler installation at each site. Total 25 times is planned. Expected trainee besides 2KR-PIU installing boiler are operators (3 staff per site), administration staff of mayor's office and heating facility (1 staff each) and mayor and heating facility director, which is total 7 personnel per site (grand total: 168). Expected trainee at 2KR-PIU are operators, 2KR facility manager, administration staff and director. Japanese consultant will attend approximately 5 classes, and others will be held by 2KR-PIU.

【Phase 3：Monitoring on implementation status of reporting rule 】

Japanese expert together with 2KR-PIU monitoring expert will visit 25 sites for monitoring the implementation status of reporting rules, after the boiler modules are install and start

operation. Monitoring team will also find any necessary improvements in initial reporting rules. Monitoring team will visit 2 sites per day

2) Appropriate O&M of the pellet production plant is instituted.

Japanese consultant and 2KR-PIU staff will plan a pellet supply-chain model which includes planning of necessary activities and structure in order to supply the pellet fuel from pellet production line installed in Chisinau to the pellet boiler in each site.

The activity include training and site visit of 2KR-PIU staff to Japan. The purpose of the training is to see the actual situation of pellet fuel supply chain in Japan, and refer to the planning in Moldova. The site will be local authorities and private companies which are collecting (purchasing) and producing pellets, facilities utilizing the pellet. The delegations will also planning to visit the boiler and pellet production machinery producer.

Table2-1 Japan training schedule

day	Location	Activity	Contents
1	Moldova	Transportation	
	Vienna		
2	Tokyo	Transportation	
		Orientation	Training program introduction
3		Transportation	
	Kagoshima	Training	Operation organization visit
4		Training	Operation organization visit, Producer visit
5	Tokyo	Transportation	
6		(Sunday)	
7		Transportation	
	Hokkaido	Training	Operation organization visit
8		Training	Operation organization visit, Producer visit
9	Tokyo	Transportation	
	Gunma	Transportation	
10		Training	Operation organization visit
11		Training	Operation organization visit, Producer visit
	Tokyo	Transportation	
12		Planning	Wrap-up meeting
13		Transportation	
	Vienna		
14	Modlova	Transportation	

Other activity is to set up a program to train 2KR-PIU staff and NTC staff, for them to be the trainer to people in Moldova who is interested in pellet production.

3) The general public is made aware of the benefits of biomass utilization.

The activity will start up “Information Sharing Platform (ISP)” which is a website for introducing basic information on biomass and heating system, sharing benefits and operation/maintenance information, for the purpose to raise awareness and spread biomass heating system.

The activity plans environmental education program for beneficiaries of the biomass heating system (e.g. students, teachers, parents), and implement the short education along with the reporting rule monitoring.

The activity plans to open a half day work shop at Chisinau, inviting institution, agencies, other donors governmental officers to introduce the project activity and result. The work shop will be held after the boilers are installed.

Pamphlets, brochures, panels, flyers are also prepared for the above activities.

2－1 Target

Soft-Component will support the continuous operation of granted equipment by the project to realize project target (Establish the use of biomass heating system in the rural area of Moldova) and as a result to reach upper goal(Promotion of using biomass heating system）.

2－2 Output

<Expected Results>

The following three results are expected as a result of implementing the Soft-Component plan.

Result 1: Appropriate operation and maintenance (O&M) of the pellet boilers is instituted.

Result 2: Appropriate O&M of the pellet production plant is instituted.

Result 3: The general public is made aware of the benefits of biomass utilization.

2－3 Performance measuring method

Following method and tools are considered to use for performance measuring of the expected output.

Table 2－2　　Performance measuring indicators and tools for obtaining the indicator

【Expected Result】		Indicators	Tools for obtainng indicators
Task-1	Maintance of the boiler can be done by Moldavian side	○Infrastructure to operate and manage the project (e.g human resource, equipment, management structure and rule) are existing at 25 sites. ○Reporting rule will be implemented as planned. ○Financial assurance for maintaining the project is secured.	○Project evaluation report ○Operation daily report・Monthly report・Annual report ○Accumulative calorimeter data
Task-2	Maintance of the pellet production line can be done by Moldavian side	○Reporting rule will be implemented as planned. ○Financial assurance for maintaining the project is secured. ○Pellet fuel supply chain plan for the target area is provided. ○Pellet production education program can be implemented by Moldovian side, by using the pellet production line installed in this project.	○Operation daily report・Monthly report・Annual report
Task-3	Benefit of biomass utilization will be well known to the public	○Website for education and publicity of biomass boiler will be established. ○Environment education for the beneficiaries (students, teachers, parents) will be implemented.	○Website access statistics ○Questionnaire after environmental education

Source：JICA　Study Team

2－4　Activities（Input plan）

2－4－1　Activities

Activities necessary to satisfy the expected output are as follows;

Table 2-3 Activities of the Soft-Component Plan

Result	Activities	Target persons/groups
Result 1: Appropriate O&M of pellet boilers	○2KR-PIU and JICA experts develops project evaluation and monitoring method ○2KR-PIU, JICA experts and IT system integrator develops information management system (IMS) ○IT system integrator provides program for 2KR-PIU on IMS operation and maintenance skill development ○2KR-PIU and JICA expert develops reporting rule, education program and reporting manual for boiler operation information gathering	●2KR-PIU
	○2KR-PIU and JICA experts implements reporting rule education program for site managers	●Mayor, Assistant ●Site Manager, assistant, boiler

Result	Activities	Target persons/groups
	○2KR-PIU and JICA experts implements reporting rule education program for boiler operators ○2KR-PIU and JICA experts develops reporting rule operation monitoring program	operator
Result 2: Appropriate O&M of pellet production plant	○2KR-PIU and JICA experts develops reporting rule, education program and reporting manual for pellet production information gathering	●2KR-PIU
	○2KR-PIU and JICA experts plans pellet supply chain ○2KR-PIU and JICA experts develops education program to develop skills to promote the pellet production	●2KR-PIU
	○2KR-PIU and JICA experts implements reporting rule education program for plant manager ○2KR-PIU and JICA experts develops reporting rule operation monitoring program	●2KR-PIU ●Plant manager, assistant, operators
Result 3: Awareness of biomass utilization benefits	○2KR-PIU, JICA experts and IT system integrator plans and develop the Web-site ○IT system integrator provides program for 2KR-PIU on Web-site management skill development, operation manual development	●2KR-PIU
	○2KR-PIU and JICA experts plans and open a Workshop to introduce the project ○2KR-PIU and JICA experts develops and implement education program for the beneficiaries ○2KR-PIU and JICA experts develops tools for education program	●Members of related ministry, university, organization and donors ●Pellet boiler installed site users(teachers, student)

Source: JICA Study Team

2－4－2 Work product

Work products as output of these activities are as follows;

Table 2－4 Work products as output of the activities

Output	Work products
Result1 Appropriate O&M of pellet boilers	【Common product of result 1、2】 ○IMS ○Reporting rule ○Reporting format (daily, monthly, annual) ○Monitoring manual ○Monitoring report format ○Database operation manual ○Database format
Result2 Appropriate O&M of pellet production plant	【Result 2】 ◯Site visit report

	○Supply chain plan ○Education tools
Result 3: Awareness of biomass utilization benefits	○ISP ○Website maintenance manual ○Environment education tools

Source: JICA Study Team

2－4－3 Input

The main targeted personnel of obtaining various skills through the activities are 2KR-PIU monitoring experts and engineers, whom will be involved in all activities to understand entire picture. Others targets are management and operation personnel of sites.

Japanese consultant will be cooperating with 2KR－PIU to reach the expected result and work products. Local resources are effectively joining the activity, such as IT integrator and Arc-GIS trainer. Japanese consultant consists from 3 members;

-Soft-Component Manager (overall planning and management)
-IMS expert
-Facility Expert

The role among Japanese experts is as follows;

Table 2-5 Role of Japanese consultants

		Soft Component Manager	Information Management System (IMS) expert	Facility Expert
Goal 1	Be able to maintain pellet boiler			
	Project evaluation method development	◎		
	Reporting rule development	◎		△ (Technical support)
	Reporting rule education	◎		△ (Technical support)
	IMS development	○	◎	△ (Technical support)
	IMS maitenence and management skIll development planning		◎ (Instructor=Local resource)	
	Reporting rule education result monitoring	◎	△	
Goal 2	Be able to maintain pellet prouction plan			
	Reporting rule development	◎		
	Reporting rule education	◎		○
	Information management system (IMS) development		◎	
	Supply-chain plan development	◎ (Business planning)		◎ (Facility/technology)
	Pellet production education program planning	◎ (Business planning)		◎ (Facility/technology)
Goal 3	Benefit of biomass utilization will be recognized			
	Public relation tool planning/production	◎	△ (Involvement of IMS)	△ (Technical support)
	Workshop	◎	○ (IMS instructor)	
	Pellet boiler site user education program development	◎		△ (Technical support)
	Pellet boiler site user education	◎		

Source: JICA Study Team

Input resources of Japanese side are;

- 3 consultants：Total 15.83MM（at Japan 8.7MM、at Moldova 7.13MM）
- English – Romanian interpreter：at Moldova 2.44MM
- Japanese – Romanian interpreter：at Japan 0.5MM
- Cost for IMS and ISP Development, maintenance training program for 2KR staffs for IMS and ISP, IT system integrator and Arc-GIS trainer hiring
- Cost for Japan visit (3 personnel, 2 weeks)
- Training/education program and workshop expenditure including document preparation

Input resources of Moldova side are;

- Planning human resource cost such as 2KR-PIUmonitoring expert and engineers
- Training related expenditures (e.g. transportation, accommodation, daily allowances, labor cost)

＊IMS and ISP maintenance expenditures and telecommunication cost will be required after the operation starts.

2－5　Procurement of implementation resources

2KR-PIU which is the management organization of the project has experience in agricultural equipment management, but the project handles 25 sites of pellet boiler, pellet production machines, IMS and ISP, which is rather new for 2KR-PIU. UNDP project which is ongoing also does not have plan of integrated management of boiler sites by IMS. Therefore, the project requires effective utilization of Japanese consultants and local resources for implementation of Soft-Components.

2－5－1 Japanese consultant team

3 Japanese consultants are planned to be engaging to the Soft-Component activities, together with local interpreter (English-Romanian). Japanese interpreter (Japanese – Romanian) will be also hired during the Moldavian delegation training at Japan.

1）Soft-Component manager

Soft-Component has various fields to consider. Soft-Component manager will be involved to the planning of all activities and act as the representative of Japanese consultant team to coordinate the activities together with 2KR-PIU experts. Soft-Component manager requires wide variety of knowledge in technical and commercial, coordination skill and experience in manager of projects and researches. Soft-Component manager also require a skill on public relation strategy development and promotion planning experience which is the major activity of Soft-Component of the project.

2）IMS expert

IMS expert will be designing the concept of IMS, and will be managing the developing procedure by coordinating with IT system integrator which is the local resource. The activity includes the development of telecommunication system between the boiler sites and 2KR-PIU utilizing accumulative calorie meter and 3G network. IMS expert will also prepare IMS O&M manual and training program for 2KR staffs together with IT system integrator. Prototype IMS requires to be ready before the boiler operation starts. IMS expert will start up and improve the prototype IMS during the first heating season (20 month after exchange of notes) and finalize the system. ISP establishment and combining to IMS will be done at the same period.

IMS expert requires skill on experience of working in system development or high education on IT system.

3) Facility expert

Major tasks of facility expert are to support on planning of pellet supply chain and development of pellet production expert training program. Facility expert also advice to the development of reporting

rule for both boiler and pellet production line and, contents planning for Information Sharing Platform such as technical information on boiler and pellet production.
Facility expert requires knowledge in biomass boiler and pellet production technologies, distribution and logistics.

2－5－2 Local resources

1） IT system integrator

IT system integrator will design in detail and develop/program the system based on conceptual design of IMS expert. IT system integrator requires an experience of importing telecommunication data to the system. IT system integrator also requires a function of training such as IMS O&M training to 2KR‐PIU staffs and reporting g rule training for boiler (Mayor and heating facility director class) and pellet production. Prototype IMS requires to be ready before the boiler operation starts. IT system integrator will start up and improve the prototype IMS during the first heating season (20 month after exchange of notes) and finalize the system together with IMS expert. ISP establishment and combining to IMS will be done at the same period.

2） Web designer

Web designer will establish the Information Sharing Platform (ISP) which is the website, based on basic design by Japanese consultant and 2KR-PIU staff. Web designer is idealistic to be in the IT system integrator, as scope of work involves the importing of ISP to IMS.

3） Arc-GIS Trainer

Arc-GIS will be introduced in IMS. The project will utilize the training program already provided by Arc-GIS agent.

2－6 Implementation Plan

Activity duration is planned to be completed by 22 months after the Exchange of Notes between the two counties. Japanese consultant will visit Moldova 12 trips in total.

2－7 Work products

Besides the work product mentioned in 2－4－2, Japanese consultants will submit Soft-Component status confirmation report and Soft-Component final report.

2－8 Obligations of recipient country

In order to ensure effective and sustainable use of equipment procured by the project, 2KR-PIU shall implement the following activities.

- Implementation of the various manuals and regulations prepared during plan implementation, and revision thereof, as necessary
- Securing adequate budget to manage the information management system and its web site properly
- Securing adequate budget for information terminal devices (for calorie meter data transmission)
- Securing adequate budget for appropriate regular monitoring of the equipment
- Provision of environmental education concerning biomass energy utilization to the pellet boiler users and beneficiary communities

Appendix-1:Project Design Matrix（PDM）1／4

Project：The Preparatory Survey on the Project for Effective Use of Biomass Fuel in the Republic of Moldova
Target country： Republic of Moldova

Outline of project		Indicators	Tools for obtainng indicators	External conditions
【Upper Goal】				
Promotion of using biomass heating system		○Amount of fossil fuel import	○Project evaluation report	Stable supply of domestic biomass fuel
【Project Goal】				
Establish the use of biomass heating system in the rural area of Moldova		○Operation rate of granted equipment	○Project evaluation report	Continuous existane of heat user (facility)
【Expected Result】		Indicators	Tools for obtainng indicators	
Task-1	Appropriate operation and maintenance (O&M) of the pellet boilers is instituted.	○Infrastructure to operate and manage the project (e.g human resource, equipment, management structure and rule) are existing at 25 sites. ○Reporting rule will be implemented as planned. ○Financial assurance for maintaining the project is secured.	○Project evaluation report ○Operation daily report・Monthly report・Annual report ○Accumulative calorimeter data	Telecommunication infrastructure is existing and effective
Task-2	Appropriate O&M of the pellet production plant is instituted.	○Reporting rule will be implemented as planned. ○Financial assurance for maintaining the project is secured. ○Pellet fuel supply chain plan for the target area is provided. ○Pellet production education program can be implemented by Moldovian side, by using the pellet production line installed in this project.	○Operation daily report・Monthly report・Annual report	Stable supply of biomass material
Task-3	The general public is made aware of the benefits of biomass utilization.	○Website for education and publicity of biomass boiler will be established. ○Environment education for the beneficiaries (students, teachers, parents) will be implemented.	○Website access statistics ○Questionnaire after environmental education	IT literacy and infrastructure Existance of heat user (facility)

Appendix-1:Project Design Matrix（PDM）2／4

【Activity】		【Input】(Moldavian side)	【Input】(Japanese side)
Task-1	Appropriate operation and maintenance (O&M) of the pellet boilers is instituted.		
	○Project evaluation and monitoring method development ・Planning and acquirement of skills for project evaluation and monitoring. ・information management system (IMS) operation and maintenance skill development	○Inputs for IMS development <Human resource for development> 2KR-PIU Monitoring expert, 2KR-PIU equipment manager, Energy efficiency agency monitoring expert <Oter inputs> ISM telecommunication maintenance cost, revision cost, tellecomunication cost	○Inputs for information management system (IMS) development <Human resource for development> ・Consultants（Soft component manager, IMS expert, Facility expert) ・Arc-GIS operation trainer (Local resource) ・IT System Integrator（Local resource)
	○Development of reporting rule, training program and reporting manual for gathering boiler operation information ・Based on project evaluation method and its monitoring method and, contents planned to be informed in "Information sharing platform (ISP)", 2KR-PIU monitoring expert and consultant develops training program and reporting manual for the operation of reporting system. ・The experience of IT system integrator will also be introduced for the development of better program and manual.	○Inputs for developing training program and reporting manual <Human resource for development> 2KR-PIU monitoring expert	○Inputs for developing training program and reporting manual <Human resource for development> ・Consultants（Soft component manager, IMS expert, Facility expert) ・IT System Integrator（Local resource) ・Study material preparation cost
	○Reporting rule training program for mayors and directors of the heating facility（Half day training) ・Training program will be conducted together with the inspection of boiler at CAF. ・Target trainnees are 1) mayor of the site, 2) Director of the heating facility (e.g school, kindergarten) ・8 sites/one training program（Total 4 times) ・2KR-PIU monitoring expert and IT system integrator will be the trainer of the training program ・First training course includes below participants besides the trainee from 8 sites; － 2KR equipment manager and engineers － National training centers member (voulantary) － Equipment/material contractor and their agents － Government officers(e.g Ministry of Agriculture and Food Industry), related agency officers(e.g Energy Efficiency Agency)	○Inputs for reporting rule training program (for site representatives, half day training, total 3 times) <Trainer> 2KR-PIU monitoring expert (2 members) <Trainee> (1st course) ・2KR-PIU : 8 staffs ・Engineer from agents: 10 staffs (1st to 4th course) ・8 mayors ＋8 person in charge of heating facility <Other input> ・Participation cost (e.g transportation, daily allowance, accomodation if necessary)	○Inputs for reporting rule training program (for site representatives, half day training, total 1 time) <Human resource for training> ・Consultants（Soft component manager, IMS expert, Facility expert) ・IT System Integrator（Local resource)
	○Reporting rule training program for boiler operators(Half day training) ・Traning program will be conducted at each site (Total 25 times) ・2KRPIU monitoring expert will be the trainer ・Target trainee: － Boiler operators － Administration staff of the heating facility － Administration staff from mayor's office of the site ＊ Mayor and director of the heating facility which was trained in reporting rule training program should also participate in this training program	○Inputs for rule training program (for boiler operators/managers, half day training, total 25 times) <Trainer> 2KR-PIU monitoring expert (2 members) <Trainee> ・3 operators per site (25 sites) ・Director of heating facility + heating facility administration staff ・Mayor + administration staff of mayor's office ・2KR－PIU Director＋Administration staff <Other inputs> ・Participation cost (e.g transportation, daily allowance, accomodation if necessary)	○Inputs for rule training program (for boiler operators/managers, half day training, total 5 times) <Human resource for training> ・Consultants（Soft component manager, IMS expert, Facility expert) ・IT System Integrator（Local resource) <Other inputs> ・Transportation cost for consultants
	○Reporting rule operation monitoring program ・Monitoring of software compponent implemetnation at site ・Update/revicing of reporting rule (if necessary)	○Inputs for monitoring activity(25 sites) ・2KR－PIU Monitoring expert、2KR－PIU Engineer ・Monitoring cost (e.g reporting and transportation cost)	○Inputs for monitoring activity(25 sites) <Human resource for monitoring> ・Soft component manager <Other inputs> ・Transportation cost for consultants

Appendix-1:Project Design Matrix（PDM）3／4

【Activity】		【Input】(Moldavian side)	【Input】(Japanese side)
Task-2	Appropriate O&M of the pellet production plant is instituted.		
	○Development of reporting rule training program and reporting manual for pellet production line ・Based on project evaluation method and its monitoring method and, contents planned to be informed in "Information sharing platform (ISP)" , 2KR-PIU monitoring expert and consultant develops training program and reporting manual for the operation of reporting system. ・The experience of IT system integrator and pellet production line/equipment supplier will also be introduced for the development of better program and manual.	○Inputs for development of reporting rule training program and reporting manual for pellet production line <Human resource for development> 2KR-PIU monitoring experts （2 persons）	○Inputs for development of reporting rule training program and reporting manual for pellet production line <Human rerource> ・Consultants （Soft component manager, IMS expert, Facility expert） ・Pellet production line/equipment supplier ・IT System Integrator （Local resource） <Other inputs> ・Study material preparation cost
	○Pellet production line reporting rule training program （Half day training） ・Reporting rule development to share information on pellte production, stock volume/quality/price information. ・2KR-PIU monitoring staff and pellet production line/equipment supplier will be the trainer	○Inputs for pellet production line reporting rule training program （Half day training, once） <Trainer> 2KR-PIU monitoring expert <Trainee> Approximately 24 persons ・2KR-PIU （8 staffs） ・Engineer from agents （5 staffs） ・Government officers (5 staffs) ・NTC Director and manager. 2KR Pellet production line manager, pellet production line operators <Other input> ・Participation cost (e.g transportation, daily allowance, accomodation if necessary)	○Inputs for pellet production line reporting rule training program （Half day training, once） ・Consultants （Soft component manager IMS expert, Facility expert） ・IT System Integrator （Local resource, Trainer）
	○Planning of pllet fuel supply-chain model ・Planning of pellet fuel supply-chain model among the equipments installed through this project ・Site visit to pellet fuel supply chain in Japan	○Inputs for pellet fuel supply-chain planning <Trainee> ・Pellet production line managing director, pellet production line manager, 2KR-PIU monitoring experts	○Inputs for pellet fuel supply-chain planning <Human rerource> ・Consultants （Soft component manager, Facility expert） <Other inputs> ・Travel and training expenses of Moldavian trainee to Japan （for 3 persons、approximately 2 weeks） ・Program and study material preparation cost
	○Pellet production trainer training program （1.5 day training） ・Training program to raise trainers for pellet production skills	○Inputs for pellet production trainer training program (1.5 day training, once) <Trainee> Approximately 24 persons ・2KR-PIU （8 staffs） ・Engineer from agents （5 staffs） ・Government officers (5 staffs) ・NTC Director and manager. 2KR Pellet production line manager, pellet production line operators <Other input> ・Participation cost (e.g transportation, daily allowance, accomodation if necessary)	○Inputs for pellet production trainer training program (1.5 day training, once) <Human rerource> ・Consultants （Soft component manager, Facility expert） ・Pellet production line/equipment supplier(Trainer) <Other inputs> ・Study material preparation cost

Appendix-1:Project Design Matrix（PDM）4／4

【Activity】		【Input】(Moldavian side)	【Input】(Japanese side)
Task-3	The general public is made aware of the benefits of biomass utilization.		
	○Starting-up the website ○Maintence skill development and operation manual preparation for website management ○Opening workshop for project publicity ○Education program implementation for heating facility beneficiaries ○Education/publicity material preparation	○Inputs for public relation strategy development <Human resource for planning> 2KR-PIU experts、MoAFI officers、Energy Efficiency Agency fficers ○Inputs for workshop (50 person, once) <Human resource for planning> 2KR-PIU experts、MoAFI officers、Energy Efficiency Agency fficers <Participants> ・Equipment agent staff, other donors, related institutions/universities/agencies, govenrmental officers <Other inputs> ・Transportation cost for consultants ○Inputs for education program implementation for heating facility beneficiaries(0.25 days ×25sites) <Human resource as trainer> ・2KR－PIU monitoring experts and engineers <Trainee> ・Beneficiaries (Student, teachers, parents) ○Inputs for education tool planning <Human resource for planning> 2KR-PIU staff, MoAFI staff, Energy Efficiency Agency staff	○Inputs for public relation strategy development <Human resource for planning> Soft component manager ○Inputs for workshop (50 person, once) <Human resource for planning> ・Consultants (Soft component manager、IMS expert) <Other inputs> ・Workshop expenses ・Publicity material preparation ○Inputs for education program implementation for heating facility beneficiaries(0.25 days ×25sites) <Human resource for planning> ・Soft component manager ○Inputs for education tool planning <Human resource for website preparation> ・IT System Integrator (Local resource) <Other inputs> ・Publicity material preparation
		○After website start-up ・Human resource for updating information ・Maintenance expense	