Appendix-3 Investigation Schedule

Investigation Schedule

(Master Plan Study for Rural Power Supply by Renewable in Mongolia)

	Speciality	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
			1998							1999												2000										
			9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	Team Leader／Power Supply Planner	Yoshitomo WATANABE	(9) 3		(75)	(2) 16	(28)		(15) 26 12			(60) 12	(30) 10			(15) 15	(30) 29				(15) 25 10		(30)			(12) 28 9						
2	Demand Estimtor／Power Supply System Specialist	Tomoyasu FUKUCHI	(9) 3		(75)	16	(30)		(15) 26 12			(60) 12	(30) 10			(15) 15	(30) 29				(15) 25 10		(30)			(12) 28 9						
3	Solar Power Planner	Deepak B.BISTA	(3)	9	(69)	16	(24)		(15) 26 12			(60) 12	(21) 10			(15) 15	(24) 29				(15) 25 10			(15)		(12) 28 9						
4	Wind Power Planner	Tsutomu DEI	(3)	9	(69)	16	(24)		(15) 26 12			(60) 12	(21) 10			(15) 15	(24) 29				(15) 25 10		(15)			(12) 28 9						
5	Tariff Analyst／Economic and Financial Analyst	Hiroshi NISHIMAKI	(3)	(66) 3		7	(24)				(45) 25		(21) 9				(24)				(15) 25 10			(27)		(12) 28 9						
6	Social and Organization Analyst	Kiyofumi TANAKA		(61) 17		16	(24)		(8) 26 5		(45) 25		(21) 9			(15) 15	(24) 29				(15) 25 10		(21)			(12) 28 9						
7	Coordinator	Kazuyuki TADA／Norio UEDA			(75) 3	16						(60) 12	10													(12) 28 9						
		Repors		Inception Report				Progress Report 1							Progress Report 2					Interim Report			Draft Final Report			Final Report						
			9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2

Legend : **In Mongolia** **In Japan**

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
The First Site Investigation Schedule

No.	Date	Day	Schedule	Accommodation
1	10/3	Sat	Kansai International Airport → (OM904) ULN	ULN
2	10/4	Sun	Internal Meeting	ULN
3	10/5	Mon	Courtesy Call to JICA Office, Embassy of Japan, Ministry of Infrastructure Development (MOID)	ULN
4	10/6	Tue	Kick Off Meeting with MOID, Investigation Work	ULN
5	10/7	Wed	Investigation Work	ULN
6	10/8	Thu	Investigation Work	ULN
7	10/9	Fri	Investigation Work	ULN
8	10/10	Sat	Investigation Work	ULN
9	10/11	Sun	Holiday	ULN
10	10/12	Mon	Investigation Work	ULN
11	10/13	Tue	Negotiation and Signing on Contract Agreement of Local Consultant	ULN
12	10/14	Wed	Investigation Work	ULN
13	10/15	Thu	Investigation Work	ULN
14	10/16	Fri	Data Arrangement, Internal Meeting	ULN
15	10/17	Sat	Holiday	ULN
16	10/18	Sun	Data Arrangement, Internal Meeting	ULN
17	10/19	Mon	**(Schedule A)** ULN AM 8:20 ～(OM571A) PM 0:20 Khovd	Khovd
18	10/20	Tue	Khovd AM 6:00 → AM 11:00 **Durgun (163)** Survey PM 2:30 → PM 5:00 Khovd	Khovd
19	10/21	Wed	Khovd AM 6:00 → AM 10:00 **Mankhan (159)** Survey PM 2:00 → PM 5:00 Khovd	Khovd
20	10/22	Thu	Khovd PM 1:10 ～(OM572) ULN PM 4:50	ULN
21	10/23	Fri	Holiday	ULN
22	10/24	Sat	Data Arrangement, Internal Meeting	ULN
23	10/25	Sun	**(Schedule B)** ULN AM 7:00 → Dalanzadgad PM 4:30	Dalanzadgad
24	10/26	Mon	Dalanzadgad AM 8:00 → AM 10:30 **Khurmen (12)** Survey PM 2:30 → PM 5:00 Dalanzadgad	Dalanzadgad
25	10/27	Tue	Dalanzadgad AM 6:00 → ULN PM 20:00	ULN
26	10/28	Wed	Holiday	ULN
27	10/29	Thu	Data Arrangement, Internal Meeting	ULN
28	10/30	Fri	**(Schedule C)** ULN AM 7:00 → Baruun-Urt PM 8:00	Baruun-Urt
29	10/31	Sat	Baruun-Urt AM 8:00 → AM 10:30 **Uulbayan (66)** Survey PM 2:30 → PM 5:00 Baruun-Urt	Baruun-Urt
30	11/1	Sun	Baruun-Urt AM 7:00 → ULN PM 8:30	ULN
31	11/2	Mon	Data Arrangement, Internal Meeting	ULN
32	11/3	Tue	Holiday	ULN
33	11/4	Wed	**(Schedule D)** ULN AM 7:00 → PM 5:00 Tsetserleg	Tsetserleg
34	11/5	Thu	Tsetserleg AM 8:00 → AM 11:00 *Tariat (116) Survey PM 4:00 → PM 7:00 Tsetserleg	Tsetserleg
35	11/6	Fri	Tsetserleg AM 8:00 → PM 5:00 Arvaikheer	Arvaikheer
36	11/7	Sat	Arvaikheer AM 8:00 → AM 11:00 *Bayan-Undur (92) Survey PM 3:00 → PM 8:00 ULN	ULN
37	11/8	Sun	Data Arrangement, Internal Meeting	ULN
38	11/9	Mon	ULN AM 6:00 → AM 11:00 *Adaatsag (87) Survey PM 3:00 → PM 8:00 ULN	ULN
39	11/10	Tue	Holiday	ULN

notes) 1. Schedule A, B, C and D : Site Survey of Objective Sum Centers for Pilot Plants and Preliminary Survey for Master Plan Study
(* : Objective Sum Centers for Pilot Plants)

No.	Date	Day	Schedule		Accommodation
			Team A	Team B	
40	11/11	Wed	Investigation Work	**(Schedule B-1)** ULN → Bayankhongor	ULN / Bayankhongor
41	11/12	Thu	**(Schedule A-1)** ULN AM8:20 ～ (OM571) PM0:20 Khovd	Bayankhongor → Altai	Khovd / Altai
42	11/13	Fri	**Khovd aimag Khovd [SMR]**	**Govi-Altai aimag Altai [SMR]**	Khovd / Altai
43	11/14	Sat	Khovd → Ulgii	Altai → Uliastai	Ulgii / Uliastai
44	11/15	Sun	**Bayan-Ulgii aimag Ulgii [SMR]**	Preparation of Seminar	Ulgii / Uliastai
45	11/16	Mon	Ulgii → Ulaangom	**Zavkhan aimag Uliastai [SMR]** → Tosontsengel	Ulaangom / Tosontsengel
46	11/17	Tue	**Uvs aimag Ulaangom [SMR]**	Tosontsengel → Tsetserleg	Ulaangom / Tsetserleg
47	11/18	Wed	Ulaangom PM0:35 ～ (OM574) PM4:45 ULN	Tsetserleg → ULN	ULN
48	11/19	Thu	Data Arrangement, Internal Meeting	Data Arrangement, Internal Meeting	ULN
49	11/20	Fri	Holiday	Holiday	ULN
50	11/21	Sat	Data Arrangement, Internal Meeting	Data Arrangement, Internal Meeting	ULN
51	11/22	Sun	Data Arrangement, Internal Meeting	**(Schedule B-2)** ULN → Bulgan	ULN / Bulgan
52	11/23	Mon	**(Schedule A-2)** ULN → Undurkhaan	**Bulgan aimag Bulgan [SMR]** → Murun	Undurkhaan / Murun
53	11/24	Tue	**Khentii aimag Undurkhaan [SMR]** → Choibalsan	**Khuvsugul aimag Murun [SMR]**	Choibalsan / Murun
54	11/25	Wed	**Dornod aimag Choibalsan [SMR]**	Murun → Erdenet	Choibalsan / Erdenet
55	11/26	Thu	Choibalsan → Baruun-Urt	Erdenet → ULN	Baruun-Urt / ULN
56	11/27	Fri	Preparation of Seminar	Data Arrangement, Internal Meeting	Baruun-Urt / ULN
57	11/28	Sat	**Sukhbaatar aimag Baruun-Urt [SMR]** → Undurkhaan	Holiday	Undurkhaan / ULN
58	11/29	Sun	Undurkhaan → ULN	**(Schedule B-3)** ULN → Mandalgovi	ULN / Mandalgovi
59	11/30	Mon	Holiday	**Dundgovi aimag Mandalgovi [SMR]**	ULN / Mandalgovi
60	12/1	Tue	**(Schedule A-3)** ULN → Arvaikheer	Mandalgovi → Dalanzadgad	Arvaikheer / Dalanzadgad
61	12/2	Wed	**Uvurkhangai aimag Arvaikheer [SMR]**	**Umnugovi aimag Dalanzadgad [SMR]**	Arvaikheer / Dalanzadgad
62	12/3	Thu	Arvaikheer → Bayankhongor	Dalanzadgad → Sainshand	Bayankhongor / Sainshand
63	12/4	Fri	**Bayankhongor aimag Bayankhongor [SMR]** → Shargaljuut	**Dornogovi aimag Sainshand [SMR]**	Shargaljuut / Sainshand
64	12/5	Sat	Preparation of Seminar	Sainshand → ULN	Shargaljuut / ULN
65	12/6	Sun	Shargaljuut → Tsetserleg	Holiday	Tsetserleg / ULN
66	12/7	Mon	**Arkhangai aimag Tsetserleg [SMR]**	Investigation work	Tsetserleg / ULN
67	12/8	Tue	Tsetserleg → ULN	Investigation work	ULN
68	12/9	Wed	Investigation Work, Internal Meeting		ULN
69	12/10	Thu	Investigation Work, Internal Meeting		ULN
70	12/11	Fri	Investigation Work, (Selection of Trader of Local Supply Machinery)		ULN
71	12/12	Sat	Investigation Work, Internal Meeting		ULN
72	12/13	Sun	Holiday		ULN
73	12/14	Mon	Investigation Work		ULN
74	12/15	Tue	Report to JICA Office, Embassy of Japan		ULN
75	12/16	Wed	ULN → (OM223) Beijing → (JL782) Narita		

notes) 2. Schdule A : Inventory Study for Team A ([SMR] :Seminar)
Schdule B : Inventory Study for Team B ([SMR] :Seminar)

3. → :Move by Four Wheel Drive Vehicle ～ :Move by Airplane

4. Name of Sum(##) ##:Sum Number of「Sum List for Master Plan」

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
The Second Site Investigation Schedule

(1999)

No.	Date	Day	Schedule	Accommodation
1	2/26	Fri	Narita (JL951) → Seoul (OM8028) → Ulaanbaatar	ULN
2	2/27	Sat	Internal Meeting	ULN
3	2/28	Sun	Holiday	ULN
4	3/1	Mon	Courtesy Call to JICA and Embassy of Japan	ULN
5	3/2	Tue	Explanation of Progress Report 1 to MOID	ULN
6	3/3	Wed	Preparatory Work of Seminar	ULN
7	3/4	Thu	Seminar	ULN
8	3/5	Fri	Meeting with MOID (Mr. Tanaka leave ULN)	ULN
9	3/6	Sat	Internal Meeting	ULN
10	3/7	Sun	Holiday	ULN
11	3/8	Mon	Additional Investigation	ULN
12	3/9	Tue	Additional Investigation	ULN
13	3/10	Wed	Meeting with MOID and Signing of M/M	ULN
14	3/11	Thu	Report to JICA and Embassy of Japan	ULN
15	3/12	Fri	Ulaanbaatar (OM8027) → Seoul (JD252) → Narita	

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
The Third Site Investigation Schedule

No.	Date	Day	Team-1 (Watanabe)	Team-2 (Fukuchi)	Team-3 (Nishimaki)	Team-4 (Tanaka)	Team=5 (Dei, Bista)
1	5/12	Wed	Kansai International Airport → (OM904) ULN (Watanabe, Fukuchi, Bista, Dei)				
2	5/13	Thu	Courtesy Call to JICA Office, Embassy of Japan, Ministry of Infrastructure Development (MOID)				
3	5/14	Fri	Kick Off Meeting with MOID				
4	5/15	Sat	Preparation of Contract (Local Consultant, Contractor for Pilot Plant Installation) and Procurement of Installation and Distribution Materials				
5	5/16	Sun	Holiday				
6	5/17	Mon	Contract Signing (Local Consultant, Contractor for Pilot Plant Installation) and Order for Installation and Distribution Materials				
7	5/18	Tue	Preparation of Sample Survey and Pilot Plant Installation				
8	5/19	Wed	Preparation of Sample Survey and Pilot Plant Installation				
9	5/20	Thu	Preparation of Sample Survey and Pilot Plant Installation				ULN → Adaatsag
10	5/21	Fri	Preparation of Sample Survey and Pilot Plant Installation				Installation Supervision
11	5/22	Sat	Preparation of Sample Survey and Pilot Plant Installation				Installation Supervision
12	5/23	Sun	Investigation	ULN → Adaatsag			Installation Supervision
13	5/24	Mon	Investigation and Meeting	Installation Supervision			Installation Supervision
14	5/25	Tue	Investigation and Meeting	Installation Supervision			Installation Supervision
15	5/26	Wed	Investigation and Meeting	Adaatsag → ULN	Kansai International Airport → (OM904) ULN (Nishimaki, Tanaka)		Installation Supervision
16	5/27	Thu	Preparation of Sample Survey				Installation Supervision
17	5/28	Fri	Preparation of Sample Survey				Installation Supervision
18	5/29	Sat	Holiday				Installation Supervision
19	5/30	Sun	ULN → Adaatsag				Installation Supervision
20	5/31	Mon	Technology Transfer for Pilot Plant				
21	6/1	Tue	Adaatsag → Erdenedalai (One Person from Team-5)				Adaatsag → ULN (One Person)
22	6/2	Wed	Sample Survey				Holiday
23	6/3	Thu	Erdenedalay → Guchin-Us				ULN → Bayan-Undur
24	6/4	Fri	Sample Survey				Installation Supervision
25	6/5	Sat	Guchin-Us → ULN				Installation Supervision
26	6/6	Sun	Holiday				Installation Supervision
27	6/7	Mon	Internal Meeting for Sample Survey				Installation Supervision
28	6/8	Tue	Investigation and Meeting	ULN → Bayan-Undur	ULN → Bayan-Ovoo	ULN → Bayan-Undur	Installation Supervision
29	6/9	Wed	Investigation and Meeting	Technology Transfer for Pilot Plant	Sample Survey	Technology Transfer for Pilot Plant	
30	6/10	Thu	Investigation and Meeting	Technology Transfer for Pilot Plant	Sample Survey	Bayan-Undur → DALANZADGAD	Installation Supervision
31	6/11	Fri	Investigation and Meeting	Bayan-Undur → BAYANKHONGOR	Sample Survey	DALANZADGAD → Nomgon	Installation Supervision
32	6/12	Sat	Investigation and Meeting	BAYANKHONGOR → ALTAI (Aimag Center)	Bayan-Ovoo → Matad	Sample Survey	Installation Supervision
33	6/13	Sun	Investigation and Meeting	ALTAI (Aimag Center) → Altai	Sample Survey	Sample Survey	Installation Supervision
34	6/14	Mon	Investigation and Meeting	Sample Survey	Sample Survey	Sample Survey	Installation Supervision

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
The Third Site Investigation Schedule

No.	Date	Day	Team-1 (Watanabe)	Team-2 (Fukuchi)	Team-3 (Nishimaki)	Team-4 (Tanaka)	Team=5 (Dei, Bista)
35	6/15	Tue	ULN → BLUGAN	Sample Survey	Sample Survey	Nomgon → Mandakh	Bayan-Undur → ULN
36	6/16	Wed	BULGAN → MURUN	Sample Survey	Matad → Tuvshinshiree	Sample Survey	Holiday
37	6/17	Thu	MURUN → Santmarugats	Altai → KHOVD	Sample Survey	Sample Survey	ULN → Tariat
38	6/18	Fri	Sample Survey	Holiday	Sample Survey	Sample Survey	Installation Supervision
39	6/19	Sat	Sample Survey	KHOVD → Tolbo	Sample Survey	Mandakh → ULN	Installation Supervision
40	6/20	Sun	Santmargats → Tosontsengel	Sample Survey	Tuvshinshiree → ULN	Holiday	Installation Supervision
41	6/21	Mon	Tosontsengel → Khatgal	Sample Survey	Holiday	Holiday	Supervision, Sample Survey in Khangai
42	6/22	Tue	Sample Survey	Sample Survey	Holiday	ULN → BAYANKHONGOR	Supervision, Sample Survey in Khangai
43	6/23	Wed	Sample Survey	Tolbo → KHOVD	ULN → Khotont (Grid connected Sum)	BAYANKHONGOR → Bogd	Supervision, Sample Survey in Khangai
44	6/24	Thu	Khatgal → BULGAN	KHOVD → ALTAI	Sample Survey	Sample Survey	Supervision, Sample Survey in Khangai
45	6/25	Fri	BULGAN → ULN	ALTAI → TOSONTSENGEL	Sample Survey	Sample Survey	Installation Supervision
46	6/26	Sat	Holiday	TOSONTSENGEL → Tariat	Sample Survey	Sample Survey	Installation Supervision
47	6/27	Sun	Holiday	Installation Supervision	Khotont → Tariat	Bogd → ALTAI	Installation Supervision
48	6/28	Mon	ULN → TSETSERLEG	Technology Transfer for Pilot Plant		ALTAI → Khalium	Technology Transfer for Pilot Plant
49	6/29	Tue	TSETSERLEG → Tariat	Installation Supervision	Tariat → ARVAYKHEER	Sample Survey	Installation Supervision
50	6/30	Wed	Inauguration Ceremony of Pilot Plant		ARVAYKHEER → Mandal-Ovoo	Sample Survey	Inauguration Ceremony of Pilot Plant
51	7/1	Thu	Tariat → Kharkhorin		Sample Survey	Sample Survey	Installation Supervision
52	7/2	Fri	Kharkhorin → ULN		Sample Survey	Khalium → BAYANKHONGOR	Tariat → TSETSERLEG
53	7/3	Sat	Holiday		Mandal-Ovoo → ULN	BAYANKHONGOR → ULN	TSETSERLEG → ULN
54	7/4	Sun	Holiday		Holiday		
55	7/5	Mon	Additional Investigation		Holiday		
56	7/6	Tue	Additional Investigation and Meeting with MOID				
57	7/7	Wed	Additional Investigation and Meeting with MOID				
58	7/8	Thu	Additional Investigation and Meeting with MOID				
59	7/9	Fri	Report to JICA Office, Embassy of Japan, ULN (OM301) → Seoul (JD252) → Narita (Tanaka, Nishimaki)				
60	7/10	Sat	ULN (OM903) → Kansai International Airport (Watanabe, Fukuchi, Bista, Dei)				

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
The Fourth Site Investigation Schedule

No.	Date	Day	Schedule	Accommodation
1	10/15	Fri	Narita (JL951) → Seoul (OM302) → Ulaanbaatar (ULN)	ULN
2	10/16	Sat	Internal Meeting	ULN
3	10/17	Sun	Data Arrangement	ULN
4	10/18	Mon	Courtesy Call JICA, EOJ, MOID	ULN
5	10/19	Tue	Explanation of Progress Report 2 to MOID	ULN
6	10/20	Wed	ULN → Adaatsag, Investigation of Pilot Plant and Technology Transfer → Erdenedalai	Adaatsag
7	10/21	Thu	Erdenedalai → Bayan-Undur, Investigation of Pilot Plant and Technology Transfer → Arvaykheer	Arvaykheer
8	10/22	Fri	Arvaykheer → Tsetserleg	Tariat
9	10/23	Sat	Tsetserleg → Tariat、Investigation of Pilot Plant and Technology Transfer → Tsetserleg	Tsetserleg
10	10/24	Sun	Tsetserleg → ULN	ULN
11	10/25	Mon	Meeting with MOID and EA	ULN
12	10/26	Tue	Data Collection and Meeting with MOID	ULN
13	10/27	Wed	Meeting with MOID and Signing of M/M	ULN
14	10/28	Thu	Report to JICA, EOJ	ULN
15	10/29	Fri	ULN (OM301) → Seoul (JD252) → Narita	Japan

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia

The Fifth Site Investigation Schedule

No.	Date	Day	Schedule	Accommodation
1	2/25	Fri	Narita (JL951) → Seoul (OM302) → Ulaanbaatar (ULN)	ULN
2	2/26	Sat	Internal Meeting	ULN
3	2/27	Sun	Data Arrangement	ULN
4	2/28	Mon	Courtesy Call JICA, EOJ, MOID	ULN
5	2/29	Tue	Explanation of Interim Report to MOID	ULN
6	3/1	Wed	Group A : ULN → Adaatsag, Investigation and Appraisal of Pilot Plant	Adaatsag
			Group B : ULN → Tsetserleg	Tsetserleg
			Group C : Explanation of Interim Report and Meeting with MOID	ULN
7	3/2	Thu	Group A : Adaatsag → Bayan-Undur, Investigation and Appraisal of Pilot Plant → Arvaykheer	Arvaykheer
			Group B : Tsetserleg → Tariat, Investigation and Appraisal of Pilot Plant → Tsetserleg	Tsetserleg
			Group C : Meeting with MOID and Data Collection	ULN
8	3/3	Fri	Group A : Arvaykheer → ULN	ULN
			Group B : Tsetserleg → ULN	ULN
			Group C : Arrangement for Technology Transfer Seminar 2	ULN
9	3/4	Sat	Rehearsal of Technology Transfer Seminar 2	ULN
10	3/5	Sun	Data Arrangement	ULN
11	3/6	Mon	Technology Transfer Seminar 2	ULN
12	3/7	Tue	Meeting with MOID on Interim Report	ULN
13	3/8	Wed	Meeting with MOID	ULN
14	3/9	Thu	Signing of M/M, Report to JICA, EOJ	ULN
15	3/10	Fri	ULN (OM301) → Seoul (JD252) → Narita	Japan

Group A : Mr. H. Nishimaki, Mr. D. B. Bista

Group B : Mr. T. Fukuchi, Mr. T. Dei

Group C : Mr. Y. Watanabe, Mr. K. Tanaka

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia

The Sixth Site Investigation Schedule

No.	Date	Day	Schedule	Accommodation
1	7/29	Sat	Haneda (NH143) → Kansai (OM904) → Ulaanbaatar (ULN)	ULN
2	7/30	Sun	Internal Meeting	ULN
3	7/31	Mon	Courtesy Call JICA, EOJ, MOID	ULN
4	8/1	Tue	Explanation of Draft Final Report to MOID	ULN
5	8/2	Wed	Rehearsal of Technology Transfer Seminar 3	ULN
6	8/3	Thu	Technology Transfer Seminar 3	ULN
7	8/4	Fri	Meeting with MOID on Draft Final Report	ULN
8	8/5	Sat	Data Arrangement	ULN
9	8/6	Sun	Holiday	ULN
10	8/7	Mon	Meeting with MOID and Signing of M/M	ULN
11	8/8	Tue	Report to JICA, EOJ	ULN
12	8/9	Wed	ULN (OM903) → Kansai (JL342) → Haneda	ULN

Appendix-4 List of Counterparts

The Master Plan Study for Rural Supply by Renewable Energy in Mongolia
List of Counterparts

No.	Name	Organization	Division and Position
1.	Mr. R.Bud	Integrated Policy and Strategic Planning Department, Ministry of Infrastructure Development Mongolia (MOID)	General Director
2.	Mr. G.Damdinsuren	Integrated Policy and Strategic Planning Department, (MOID)	Deputy Director General
3.	Mr. R.Sundui	Integrated Policy and Strategic Planning Department, (MOID)	Director
4.	Mr. D.Ganbaatar	Renewable Energy Corporation	Manager
5.	Mr. M.Ulziitogtokh	Renewable Energy Corporation	Deputy Director General
6.	Mr. B.Munkhbayar	Renewable Energy Corporation	Science Research Specialist
7.	Mr. G.Purevdorj	Renewable Energy Corporation	Engineer
8.	Mr. G.Gochoo	Renewable Energy Corporation	Head of Biomass Energy Division

Appendix-5 List of Interviewees

The Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia
List of Interviewee at the First Investigation

No.	Aimag	No.	Name	Division and Position
I	UMUNUGOVI Aimag	1	B. Tsedensamba	Governor
		2	Tsetseg-Ulgii	Assistant of the governor
		3	OyuunBat	Charge of Infrastructure
		4	Amarjargal	Charge of diesel generator
		5	Tumursukh	Chief engineer of meteorologic agency
		6	G. Tseveg	Manager of power station
		7	I. Amarjargal	Chief engineer of power station
II	GOVI-ALTAI Aimag	1	Mr. Janchivdorj	Governor
		2	Mr. Byambajav	Assistant of the governor
		3	Mr. Bolddorj	Charge of electlicity
III	BAYANKHONGOR Aimag	1	B. Bayarsaikhan	Governor
		2	D. Bolooj	Manager of the general affairs department
		3	G. Batjargal	Charge of electricity
IV	DORNOGOVI Aimag	1	Mr. Luvsangiin Ishdorj	Governor
		2	Mr. Battsengel	Assistant of the governor
		3	Mr. Uhnaa	Charge of Infrastructure
V	SUKHBAATAR Aimag	1	G. Adiya	Chairman of sum assembly
		2	B. Jargalsaikhan	Manager of accounting department
		3	G. Gantumur	Charge of Infrastructure
VI	DORNOD Aimag	1	M. Baljinnyan	Charge of account
		2	J. Dulamjav	Secretary
VII	KHENTII Aimag	1	Ch. Enkhee	Governor
		2	Lkh. Enkhsaikhan	Member of sum assembly
		3	Ts. Gurtseden	Member of sum assembly
		4	D. Tserendamba	Charge of electlicity
VIII	DUNDGOVI Aimag	1	Khuukhenbaatar	Governor
		2	Sharav	Manager of power station
		3	Danii	Manager of financial department
		4	Gansukh	Charge of Infrastructure
IX	UVURKHANGAI Aimag	1	Mr. Batmunkh	Governor
		2	D. Bayartogtokh	Engineer of power plant
		3	S. Dulamsuren	Engineer of power plant
		4	Z. Dashizeveg	Charge of Infrastructure
		5	Mr. Otgon	Charge of international cooperation
		6	Baasanjav	Manager of power station
		7	Jargal	Engineer
		8	B. Badran	Manager of economics department
		9	Ts. Jamsran	Director
X	KHUVSGUL Aimag	1	Batsuuri	Governor
		2	Sukhbaatar	Manager of power station
		3	Nyamdorj	Cheef Engineer
		4	Lhagvaa	Manager of personal department
XI	ARKHANGAI Aimag	1	Mr. Erhembayar	Governor
		2	Mr. Munkhbat	Assistant of the governor
		3	Z. Dashizeveg	Charge of Infrastructure
		4	Mr. Jamsran	Charge of Infrastructure
		5	Mr. Bidran	Financial department
		6	Mr. Batdelger	Intelligence department
		7	Baasanjav	Manager of power station
		8	D. Bayartogtokh	Engineer of Power Plant
		9	S. Dulamsuren	Engineer of Power Plant
		10	Jargal	Engineer

No.	Aimag	No.	Name	Division and Position
XII	ZAVKHAN Aimag	1	Mr. Dashzaveg	Governor
		2	Mr. Ganbold	Assistant of the governor
XIII	BULGAN Aimag	1	Mr. B. Erdenetgos	Assistant of the governor
XIV	UVS Aimag	1	L. Rachaadorj	Engineer of power plant
		2	S. Baterdene	Engineer of power plant
		3	Ts. Sabyutargal	Member of sum assembly
		4	B. Yadamsuren	Member of sum assembly
XV	KHOVD Aimag	1	Mr. Z. Haidav	Assistant of the governor
		2	Mr. Munaa	Manager of power station
		3	J. Turdagva	Office worker
		4	Batkhuu	Charge of account
		5	Ganbold	Engineer
XVI	BAYAN-ULGII Aimag	1	O. Nigmet	Chairman of sum assembly
		2	A. Kharii	Assistant of the governor
		3	X. Beken	Manager of accounting department
		4	G. Mandat	Charge of Infrastructure
		5	N. Sanatbek	Accounting specialist
		6	K. Khabai	Chairman of village
		7	Kh. Darmen	President of ERCHIM company
		8	S. Khidirpatsha	President of ARKHA society

ATTANDANTS' LIST FOR EXPLANATION OF PROGRESS REPORT 2

Oct.19.1999

1.Mr.Sundui	Head of Energy Division MOID
2.Mr.Purevdorji	Expert, Institute of Renewable Energy
3.Mr.Odgerei	Director, Information Monitoring Evaluation Department, MOID
4.Ms.Enkhtuya	Expert of Liquid and Gas Fuel, Energy Division, MOID
5.Mr.Bataa	Expert of Central Energy System, Integrated Policy and Strategic Planning Department, MOID
6.Mr.M.Ulziitogtokh	Renewable Energy Corporation, Researcher
7.Mr.Ch.Mangaijav	Mongolian Technical University, Head of Faculty
8.Mr.B.Enkhbat	Energy Consulting" Company, Engineer
9.Mr.D.Ganbaatar	REC Manager
10.Mr.Ts.Batbayar	REC Researcher
11.Ms.T.Khishigbayar	REC Researcher
12.Dr.G.Dorjpurev	Director of Energy Conservation Company
13.Mr.M.Jargaisaikhan	REC Researcher
14.Mr.Munkhbayar	REC Researcher

Technology Transfer in Bayan-Undur (Oct.21, 1999)

NAME	OCCUPATION
1.Mrs.Z.Unenbat	President of Hospital
2.Mr.T.Dorjgotov	Principal
3.Mrs.J.Davaadulam	Sum Vice-headman
4.Mrs.A.Nergui	Financial Officer at Sum Center
5.Mrs.D.Chimedtseyen	Officer for Social Policy at Sum Center
6.Mrs.E.Nasantsogt	Weather forecaster of Sum Center
7.Mr. Purev	Operator

Technology Transfer in Tariat (Oct.23, 1999)

NAME	OCCUPATION
1.Mr.G.Byambadagva	Sum Headman
2.Mr.Ch.Batsaikhan	President of Hospital
3.Mrs.Z.Horolmaa	Accountant of Sum Center
4.Mr.P.Choyonjurmed	Bag Headman
5.Mr.I.Delgersaikhan	Head Manager of Power Generation Planning

Technology Transfer in Adaatsag (Oct.20, 1999)

NAME	OCCUPATION
1.Mr.To.Munhbat	Sum Vice-headman
2.Ms.G.Togostsetseg	Weather Forecaster of Sum Center
3.Mr.G.Ochkhuu	Electrical Engineer of Sum Center
4.Ms.ChOyuntsetseg	Accountant of Sum Center
5.Ms.T.Ahantuya	Doctor
6.Mr.S.Bayaraa	Sum Headman

Focus Group Discussion Participants (1999-6-29) Khalium

1.Mr. Ya.Seseer	Veterinarian
2.Mr. M.Badarch	Top Executive
3.Mr. D.Gungaajamts	Merchant
4.Mr. Ch.Purevdorj	President of Electrical Heat Company
5.Mr. M.Batmunkh	Principal
6.Mr. B.Zayabaatar	Merchant(Ex-sum Headman)
7.Mr. A.Erdenesuren	Vice Head Man
8.Mr. Ts.Namjid	Headman
9.Mr. G.Nyamdorji	Official for Policy of Livestock

Focus Group Discussion Participants (1999-6-25) Bogd

1.Mr. L.Baatar	Chairman of Congress
2.Mr. Bjoosrai	Head Officer of Transmission Department
3.Mr. C.Batsuuri	the Sixth Headman of Sum
4.Mr. T.Bold	Unemployment
5.Mr. D.Tegshjargal	Top Executive
6.Mrs. M.Tsetsgee	Official for Weather
7.Mr. Sh.Lhaaizm	Veterinarian
8.Mrs. N.Badamhand	President of Hospital
9.Mr. D.Chadraaval	Teacher
10.Mrs. J.Tseveen	Principal
11.Mrs. L.Enhchimeg	President of Bank
12.Mr. D.Ulzii-Orshikh	Sum Headman

Focus Group Discussion Participants (1999-6-18) Mandakh

1.Mr. L.Ulziichuluu	Unemployment
2.Mr. D.Baatar	Officials for Post Office
3.Mr. D.Navaanjants	Unemployment
4.Mr. D.Ivanov	Owner of Felt Plant
5.Mr. Ts.Munkhtogoo	Chairman
6.Mr. M.Enkhbat	Driver
7.Mr. N.Boldsaikhan	Sum Headman
8.Mr. B.Darjkhuyag	Vice Headman

Focus Group Discussion Participants (1999-6-14) Nomgon

1.Mr. A.Tumurbaatar	Chairman
2.Mr. B.Bayarsaikhan	Vice Headman
3.Mr. N.Todbaatar	Specialist for Agriculture and Stock Raising
4.Mr. N.Batchimeg(female)	Official for Tax
5.Mr. J.Baatartseren	Top Executive
6.Mr. Uerdenechuluun	Accountant
7.Mr. A.Tuvsuinbaatar	Police Officer
8.Mr. Ts.Buyanchimeg(female)	Secretary of Sum
9.Mr. D.Oyunchuluun	Sum Headman
10.Mr. N.Naranhuu	Head Manager of Power Station

Focus Group Discussion Participants (1999-6-22) Hatgal

1.Mr. Togtokhnyam	Governor
2.Mr. Myagmarsuren	Deputy Governor
3.Mr. Khishigsuren	Accountant
4.Mr. Ziina	Accountant
5.Mr. Seldamba	Pensioner
6.Mr. Nyamjav	Operator for D/G
7.Mr. Tserendulam	Operator for Elec. Sale
8.Mr. Enkhbold	Operator for D/G
9.Mr. Chultemjanits	Guard
10.Mr. Riina	Head Officer of Transmission Department
11.Mr. khagva	Assistant of Head Officer for Transmission Department
12.Mr. Alagaa	Supervisor
13.Mr. Nyan-Ochir	Business Man

Focus Group Discussion Participants (1999-6-18) Santmamgat

1.Mr. Otgontsetseg	Unemployment
2.Mrs. B.Adyasuren	Secretary
3.Mr. D.Tumenbayajav	
4.Mr. Nisgegch	
5.Mr. N.Jalgalsaikhan	
6.Mr. Kh.Yumchinsuren	
7.Mr. J.Narmandakh	
8.Mr. S.Sukh-bat	

9.Mr. B.Nyamdorji	Sum Headman

Focus Group Discussion Participants (1999-6-04) Guchin—Us

1.Mr. Byambatogtokh	Accountant and Guard
2.Mr. Batdorj	Accountant and Librarian
3.Mrs. Enkhtuya	Foreign Languages Teacher
4.Mr. Tserenbanzragch	Accountant
5.Mr. Battulga	Governer
6.Mr. Battumur	Inspector for Electricity
7.Mr. Baatar	Public Service Officer
8.Mr. Battulga	Chief of the Sum's Parliament
9.Mr. Gombojav	Vice Governer
10.Mrs. Narantsetseg	Director of the High School

Focus Group Discussion Participants (1999-6-14) Altai

1. Mr. I.Gerelchuluun	Teacher of Elementary School
2. Mr. G.Dolgor	Language Teacher
3. Mr. T.Lhagvasuren	Chemistry Teacher
4. Mr. Z.Tonga	Veterinarian
5. Mr. K.Bandai	Official of further Education School
6. Mr. N.Khishgree	Head of Cooperative Society
7. Mr. Ch.Tsendgombo	Headman
8. Mr. N.Ganjuur	Head Official of Further Education School

Focus Group Discussion Participants (1999-6-16) Tuvshin-Shiree

1.Mr. Jadambaa.S	Governor
2.Mr. Lhagvasuren.S	Deputy Governor
3.Mr. Tugjichamba.Sh	Chief of the Sum's Parliament
4.Mr. Amartuvshin.J	Officer of the Sum's Parliament
5.Mr. Gundsambuu.Ch	Inspector for Veterinary

Focus Group Discussion Participants (1999-6-20) Tolbo

1.K.Erhumar	Vice President
2.D.Kazakstan	Chairman
3.T.Togtarkhaan	Sum Headman
4.N.Murat	Operator for Diesel Engine

5.B.Baiden	Tax Collector
6.Bahitgul	Officer for Residential Congress
7.N.Hekei	Head Officer of Transmission Center
8.U.Mambar	Official of Sum
9.B. Sarsekbai	Official of Library
10.K. Begzat	Chairman for Elderly Comittee
11.K. Tjrseinkhan	Accountant of Sum Office
12.K. Marat	Accountant of Sum School
13.K. Ashim	Dean
14.B. Tilek	Operator for Diesel Engine

Focus Group Discussion Participants (1999-6-21) KHANGAI

1.Mr. Battulga	Governor
2.Mr. Lubsandagva	Deputy Chief of Admin.Department
3.Mr. Turbat	Chief of Telecom.Center
4.Mr. Baysagalan	Chief of Hospital
5.Mrs. Yanjimaa	Director of High School
6.Mr. Bayanmunkh	Accountant
7.Mrs. Narantuya	Accountant
8.Mr. Dorjragchaa	Inspector
9.Mr. Munkbat	Inspector
10.Mrs. Dorjpalam	Cleaner

Focus Group Discussion Participants (1999-6-9) BAYAN-OVOO

1.Mr. Damdinsuren.L	Deputy governor
2.Mr. Ganbaatar.D	Chief of the Sum's Parliament
3.Mrs. Erdenechimeg.P	Chief of Telecom.Center
4.Mr. Tumurtogoo.J	Officer of Admin.Department
5.Mr. Baasanjav.L	Director of High School
6.Mr. Ulzii.P	Accountant
7.Mrs. Erdenetuya.I	Manager of Further Education School
8.Mrs. Ariuntungalag.R	Doctor
9.Mr. Gandora.S	Teacher
10.Mr. Gankhuu.Ch	Own Business
11.Mrs. Jargal.J	Own Business
12.Mr. Bayansaikhan.S	Unemployed

13.Mr. Delgerbat	Unemployed

Focus Group Discussion Participants (1999-6-2) Erdenedalai

1.Mr. Tumurkhuyag.Sh	Chief of Admin. Department
2.Mrs. Tsetsegmaa	Chief of the Sum's Parliament
3.Mr. Purevsuren.Sh	Deputy Governor
4.Mr. Jigmedbat.B	Chief of Telecom.Center
5.Mr. Baatar.D	Heating Expert of Admin.Department
6.Mr. Deleg.D	Expert of Admin.Department
7.Mr. Tsogtbaatar.D	Economist
8.Mr. Bayanbajav.Ts	Accountant
9.Mrs. Sunjidmaa	Accountant
10.Mr. Dorjsuren.M	Technician
11.Mr. Zolboot.Z	Driver
12.Mr. Zagdaa	Driver
13.Mr. Oyunbaatar.Z	Driver

Focus Group Discussion Participants (1999-6-14) MATAD

1.Mr. Prevdorj.Ts	Governor
2.Mr. Namjildorj.N	Chief of the Sum's Parliament
3.Mr. Bold.A	Admin.Officer
4.Mr. Dorj.Sh	Accountant
5.Mr. Uranbileg.Sh	Chief Accountant of Sum
6.Mr. Ganpurev.T	Nature Guard
7.Mr. Dorjgotov.S	Inspector of Tax
8.Mr. Dondog.J	Chief of Amin.Office
9.Mrs. Khaltarkhuu.Y	Statistician
10.Mrs. Enlhbaatar.Z	Operator of the Diesel Power Plant
11.Mrs. Enkhbayar.Z	Chief of Meteorological Station

Focus Group Discussion Participants (1999-6-14) MANDAL-OVOO

1.Mr. Tsogbadrakh	Governor
2.Mr. Gongor	Chief of Admin.Department
3.Mr. Yondonjamts	Deputy Director
4.Mr. Unurbat	Director of High School
5.Mr. Mandakh	Director of Hospital

6.Mrs. Ganchuluun	Midwife
7.Mrs. Tsedevsuren	Teacher
8.Mrs. Chnngee	Teacher
9.Mr. Erdenesaikhan	Accountant
10.Mr. Nasanbat	Unemployed
11.Mrs. Dolgorjav	Teacher
12.Mr. Ulziisaikhan	Own Business
13.Mr. Lanjin	Operator of the Diesel Power Plant
14.Mr. Tserenpuntsag	Operator of the Diesel Power Plant
15.Mr. Erdenetugs	Unemployed
16.Mr. Enkhtur	Operator of the Diesel Power Plant
17.Mr. Munkhjargal	Unemployed
18.Mr. Narmandakh	Unemployed
19.Mr. Chuluunbaatar	Unemployed
20.Mr. Dorjdagva	Director of Further Education School
21.Mr. Munkhchuluun	Teacher

Appendix-6 List of Collected Data

Form

List of Collected Data

Issued on 5th of Nov.

Area	ULN	NAME OF INVESTIGATION TEAM	RENEWABLE ENERGY IN MONGOLIA	Investigation Type	RENEWABLE ENERGY	Issued Section	1
Country	Mongolia			Period of Site Investigation	From month, year, through month, year		Yoshitomo WATANABE

No.	Name of Document	Status	Revised No.	Page No.	Original Copy	Obtained No.	Collected Authority or Issuing Institute	Donation・Purchase	Selection	Use	NAME	Purchase Date	Confirmation
1	Zab Khan river hydropower project	Half bound	A4	47	Copy	1	MOID	Donation					
2	Report on reconnaissance and feasibility study of charge it hydropower station	Half bound	A4	47	Copy	1	UCS	Donation					
3	Pre-feasibility study 'ovoot' mini HPP in Khovd province	Bookbound of Plastic	A4	15	Copy	1	UCS	Donation					
	Statistics of Population in Sum (Across nation)	Copy	A4	4	Copy	1	Statistic Department	Purchased					
	Income Data	Copy	A4	1	Copy	1	Statistic Department	Purchased					
	A young population (England)	Copy	A4			2	U.N.	Purchased					
	" (Mongolian)	Copy	A4			2	U.N.	Purchased					

Form

List of Collected Data

Issued on 9th of August, 2000

Area	ULN	NAME OF INVESTIGATION TEAM	RENEWABLE ENERGY IN MONGOLIA	Investigation Type	RENEWABLE ENERGY	Issued Section	1
Country	Mongolia			Period of Site Investigation	From month, year, through month, year		Yoshitomo WATANABE

No.	Name of Document	Status	Revised No.	Page No.	Original Copy	Obtained No.	Collected Authority or Issuing Institute	Donation・Purchase	Selection	Use	NAME	Purchase Date	Confirmation
1	The Collected low in connection with Environment	binding	A5	223	Original	1	MOID	Donation					

Form

List of Collected Data

No	Title	Size	Pages	Original/Copy	Published
1	TERMS OF REFERENCE FOR THE STUDY ON GEOTHERMAL EXPLORATION AND ENERGY DEVELOPMENT IN THE HOT SPRING AREAS, CHULUUT, ARKHANGAI AIMAG AND SHARGALJUUT, BAYANHONGOR AIMAG IN MONGOLIA	A4	25	Copy	Collected from MOID Published by DOWA ENGINEERING
2	TECHNICAL AND ECONOMIC FEASIBILITY STUDY ZAVKHAN RIVER HYDROPOWER PROJECT	A4	49	Copy	Collected from MOID Published by LAHMEYER
3	LOCAL DEVELOPMENT PROGRAMME for Eguur, Mongolia	A4	27	Copy	Collected from MOID Published by MCS
4	FEASIBILITY STUDY FINAL REPORT FOR EGIIN HYDROELECTRIC PROJECT, MONGOLIA Main Report Part 1	A4、A3	250	Copy	Collected from MOID Published by ADB
5	FEASIBILITY STUDY FINAL REPORT FOR EGIIN HYDROELECTRIC PROJECT, MONGOLIA Main Report Part 2	A4、A3	100	Copy	Collected from MOID Published by ADB

Form

List of Collected Data

Issued on

Area	ULN	NAME OF INVESTIGATION TEAM	RENEWABLE ENERGY IN MONGOLIA	Investigation Type	RENEWABLE ENERGY	Isued Section	2
Country	Mongolia			Period of Site Investigation	From month, year, through month, year		Tutomu DEI

No.	Name of Document	Status	Revised No.	Page No.	Original Copy	Obtained No.	Collected Authority or Issuing Institute	Donation・Purchase	取扱区分	利用表示	NAME	Purchase Date	Confirmation
1	Data of Weather	F.D.			Copy	1	Meteorological Agency	purchase			Tutomu DEI	'99.5.18	

Appendix-7 Memorandum of Meeting

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-1

Subject : Electricity pricing and financial situations in power sector

Date and Time : October 8, 1998 11: 00 am - 12: 00 pm

Place : Conference Room in Ministry of Infrastructure Development

Attendance : Ministry of Infrastructure Development
: Mr. Shaaluu Churhai

JICA Study Team : Mr. H. Nishimaki (Economist)

Followings were subjects in the meeting.

1) Prices
Until 1990, the CES imposed a uniform price throughout the system.
Between 1990-96, the cabinet approved all the price changes.
Now the prices are liberalized.
The Energy Authority submits a proposal to the MOID which in return approves the proposal.
Sum centers can now determine the electricity prices on their own.

The average Aimag power tariff: 90 tug/kWh for business
50 tug/kWh for household

The average power production cost: 140-50 tug/kWh. Thus aimag in red by 7-80 tug/kWh

There is no data on Sum as Sum are independent from MOID. The majority of demand in Sum centers come from public facilities.

2) Finance
CES has 3-4 billing tug of surplus over a year. But no enough to invest in a new capacity. CES gives about 3.5 billion tug per year subsidy to independent aimag centers which runs deficits.

3) Fuel Prices
Diesel in UBL 280 tug/liter

End

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-2

Subject : Activities of TACIS

Date and Time : October 9, 1998 10: 00 am - 11: 00 am

Place : Conference Room in TACIS Consultant NIFES

Attendance : TACIS Consultant NIFES
: Mr. Kevin O'Kane

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

1) Main Activities

- Renewable Energy Resource Demonstration - 3 sites (3-5 kW)
  Hybrid of solar and wind, supplying to one facility such as hospital or school.
  Current status: wind measurement at five site which started Aug. 1998.

- Micro-hydro power generation
  Working with the Renewable Energy Institute
  Current status: site identification underway for the capacity of around 1 MW. in Khovd.
  Consultant: LDK(Greece)

- Training course
  Planned next May or June, potential subject
  a. renewable energy source identification techniques to be delivered to Aimag governors.
  b. diesel maintenance and distribution network installation.

2) Suggestions

Power demand at Sum centers are relatively small. To get attain economic efficiency, a view to promote industries to consume energy is crucial.

End

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-3
(Meeting with Energy Authority on Power Generation Facilities)

Subject : Current Power Generation Facilities Conditions and Issues, and Rehabilitation and Development Program

Date and Time : October 9, 1998 11: 00 am - 12: 30 pm

Place : Conference Room in Energy Authority

Attendance : Energy Authority : Mr. B. Badral (Deputy Director of Generation and Operation)

JICA Study Team : Mr. Y. Watanabe (Team Leader)
Mr. K. Tada (Administrator)
Mr. D. Ueda (Interpreter)

Followings were subjects in the meeting.

1. Current Power Generation Facilities Conditions and Issues

(1) The major existing power generation facilities in 1998 are as follows:
(a) Ulaanbaatar No.2 Coal Thermal P/S: 7.17 MW x 3 sets
(b) Ulaanbaatar No.3 Coal Thermal P/S: 17 MW x 8 sets
(c) Ulaanbaatar No.4 Coal Thermal P/S: 100 MW x 3 sets + 80 MW x 3 sets
(d) Darkhan Coal Thermal P/S: 14.67 MW x 3 sets
(e) Erdenet Coal Thermal P/S: 12 MW x 3 sets
(f) Choibalsan Coal Thermal P/S: 8 MW x 3 sets

(2) Current Conditions and Issues
(a) Low efficiency of plant factor by deterioration
(b) High energy station losses
(c) Shortage of spare parts
(d) Insufficiency of operation and maintenance budget
(e) Poor technology of maintenance staff

2. Rehabilitation Program

(1) Choibalsan Coal Thermal P/S:
8 MW x 3 sets Sep. 1998 - Mar. 2000 Germany 8 M.US$

(2) Ulaanbaatar No.3 Coal Thermal P/S:

17 MW x 5 sets	Feb. 1996 - Jun. 1999	ADB	34 M.US$

(3) Ulaanbaatar No.4 Coal Thermal P/S:

90 MW x 3 sets	Mar. 1997 - Apr. 1999	OECF	40 M. US$
90 MW x 3 sets	End/1998 - End/2000	OECF	under negotiation

(4) Diesel P/S at Aimag centers (6 Aimag Centers):

800 kW x 5 sets	1997 - 1999	USAID	Grant
800 kW x 5 sets	1998 - 1999	USAID	Grant

3. Development Program

(1) Egiin Hydroelectric P/S: 220 MW Fund: IPP, not yet finalized.

(2) Saynshand Thermal P/S: 100 MW Fund: looking.

(3) East Ulaanbaatar Geothermal P/S: not surveyed yet.

(4) Adoption of combined cycle power generation: future plan.

4. Upgrading of SCADA system

(1) The existing system is manual operation system. A part of the system will be upgraded by computer aided automatic system under the Germany finance.(Honeywell equipment, USA made)

(2) Communication system which made by Russia is complicated. This should be replaced with the recent high speed and large capacity system.

(3) Four feeders of 220 kV transmission lines are interconnected with Russian system for power trading. However, Russian system is always operating with low frequency, 49.2 Hz to 49.8 Hz. As the Russian system is quite large, the Mongolian system can not control the frequency to the standard frequency of 50 Hz. This should be rectified.

5. Environmental Protection Act

Recently, the Mongolian Government issued the Environmental Protection Act. The Ministry of Environmental Protection has a responsibility for supervision of the Act. In the near future, this Act will be applied for all the thermal and diesel power stations. MOID and Energy Authority might be considered to remedy the existing conditions of the power generation facilities complying to the Act.

End

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-4

Subject : Public finance and energy sector

Date and Time : October 9, 1998 11: 00 am - 12: 00 pm

Place : Conference Room in Ministry of Finance Institutional Restructuring Division

Attendance : Ministry of Finance Institutional Restructuring Division
: Mr. Mavlet

JICA Study Team : Mr. H. Nishimaki (Economist)

Followings were subjects in the meeting.

1) General Direction of Institutional Restructuring
a. Decentralization
b. Efficiency improvement

2) Future options
a. Unification of Aimags and Sum centers to increase efficiency.
The number of Sums may possibly be reduced to one third.
b. Mongolia may be divided into four large provinces for enhanced regional coordination and cooperation for development.
c. Gradual elimination of subsidies and larger autonomy to Aimags for budgetary decisions and tax.
d. Profit sharing of public businesses between the central and local government.

3) Sum centers
The governors of Aimag appoint the chief of Sums. Sum centers which totals to 360 were established to provide with basic needs of rural population. Even if the number of Sums may be reduced in the future, its role to deliver civilized life to nomads and provide with basic public services such as education, electricity and health care.

The budgets of Sum centers are allocated by the Aimag. The Sum centers also collect taxes such as tax on cattle per head. A land tax has been debated but proved to be very difficult.

4) Large investment project
Only the central government can borrow a large foreign loan.

End

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-5
(Meeting with Energy Authority on Mini Hydro Power Plant Planning)

Subject	: Current Mini Hydro Power Plants Conditions and Issues, and Rehabilitation and Development Program	
Date and Time	: October 9, 1998 15: 00 pm - 16: 00 pm	
Place	: Conference Room in UCS State Owned Co., Ltd. (Energy Authority)	
Attendance	: Energy Authority	: Mr. Pureviin Baatar (Deputy Director of UCS)
		: Mr. B. Ochirjav (Chief engineer of UCS)
	JICA Study Team	: Mr. Y. Watanabe (Team Leader)
		Mr. T. Fukuchi (Power supply system)
		Mr. H. Nishimaki (Economist)
		Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

1. Current Mini Hydro Power Plants Conditions and Issues

(1) The major existing Mini Hydro Power Plants in 1998 are shown on the attached table.

(2) Current Conditions and Issues
(a) Low efficiency of plant factor by deterioration
(b) Shortage of spare parts
(c) Insufficiency of operation and maintenance budget
(d) Stoppage of power station in winter season

2. Rehabilitation Program

There is no rehabilitation plan because of no budget.

3. Development Program

There is a lot of development plan prepared by the foreign institutes. However, as the Mongolian Government does not have enough budget for the implementation of the projects, the projects are suspended to be implemented at present. The development plans are shown on the attached table.

4. Major Problem for Implementation of the Projects

(1) As there is no feasibility study for the development of mini-hydro power plants, the projects proposed by the foreign institutes can not be taken up for implementation by the Mongolian Government.

(2) There is no budget for detailed survey and design of the proposed projects by the Mongolian Government and no financial source for implementation of the projects by the foreign institutes.

End

Master Plan Study
on
Rural Power Supply by Renewable Energy
in
Mongolia

Memorandum of Meeting-6

Subject : Local production of renewable energy resource equipment

Date and Time : October 12, 1998 15: 30 am - 17: 30 pm

Place : Conference Room in Institute of Renewable Energy

Attendance : MonMar Co.
: Mr. Chadraa Batbayar
Mr. Dangaa Gansukh

JICA Study Team : Mr. H. Nishimaki (Economist)

Followings were subjects in the meeting.

Established in 1989 as a joint-venture with an English company, Martec.
1) Production
workers: 7-8 which used to be 32.
one type of 50 W wind mill.
Annual sales of 200-500 sets
400 wind mills / '97

price
Wind mill: 176,000 tug including one fluorescent lamp set (11W) and battery.
Solar panel(50W): 396,000 tug including switch and battery.

Due to a small scale of production, 2-3 year worth of parts and materials are imported in one lot. 1-2000 sets are produced in three months and stocked. 1500 sets of cores of dynamo were stacked on the assembly shop floor.
2) Facility
Assembly Shop : power tester, balance tester, thermoplastic plastic molding M/C, drilling m/c.
thermoplastic plastic molding M/C for making the housing for cores.
Machining shop: metal shearing m/c, lathe, and punching m/c
Casting shop: electric furnace, molds.
Plastic injection shop: injection molding m/c 300t (Windsor India),crane.
Machining shop II:grinder, milling m/c, lathe
Paint shop: oven dryer, painting box.

3) Cost
Material cost 50%
Tax: sales tax 10%, business tax 13% (import tariff used to be 15%. Now negligible)

Battery(75A): 36,000-65,000 tug. Chinese made lasts only one year while American made lasts 5-6 years. Kyocera brought battery for the NEDO experiment lasted five years.

DC B/W TV (28W) :41-48000 tug
DC Color TV (70W):150,000 tug
Solar panel $250/panel.

4) Management
A long turn over period makes the management of the company very difficult. No definite local sales agents. But there are informal representatives. No profits have been made, nor the investment for the equipment has been recovered.

5) Suggestions
The company should sell the equipment and subcontract the job to reduce the financial burden.

End

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Memorandum of Meeting-7
(Meeting with Energy Authority on Transmission and Distribution Facilities)

Subject	: Current Transmission and Distribution Facilities Conditions and Issues, and Rehabilitation and Development Program	
Date and Time	: October 9, 1998 16: 00 pm - 17: 30 pm	
Place	: Conference Room in Energy Authority	
Attendance	: Energy Authority	: Mr. R. Davaanyam (Deputy Director of Transmission and Distribution, Energy Authority)
		: Mr. V. Myagmarsuren (Chief engineer)
	JICA Study Team	: Mr. Y. Watanabe (Team Leader)
		Mr. T. Fukuchi (Power supply system)
		Mr. H. Nishimaki (Economist)
		Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

1. Current Transmission System Facilities Conditions and Issues

(1) The major existing transmission system facilities in 1998 are shown on the attached table.

(2) Current Conditions and Issues on the transmission system facilities
(a) High rate of voltage drop. There is no static capacitor for compensation of voltage drop.
(b) Rate of 220 kV and 110 kV transmission lines losses is 2~3%.
(c) System voltage stability is very low. Voltage fluctuation is high.
(d) Line length is far long. As there is distorsion of phase angle, operation is very difficult.
(e) Power supply reliability of the system is very low because transmission line is normally designed with one circuit in spite of line length is far long, and no peak and back-up power is available.
(f) SCADA system is not installed at present. Manual type load dispatching system has been installed at the center building of the Energy Authority. Upgrading to SCADA system is required. A part of SCADA system is planned to be installed at the center building of the Energy Authority under the KFW(Germany) loan in 1998.

2. Rehabilitation Program of Transmission System

There is some rehabilitation plan of the transmission system, but it depends on the allocation of the Government budget (Refer to the attached sheets).

3. Development Program of Tansmission System

(1) 110 kV Transmission line:
Choibalsan - Baruun Urt Mar. 1998 - Jul. 1999 60 %
completed by own budget

(2) 35 kV Transmission line:
35 kV lines to sum center: 4~5 lines/year It depends on the Government budget.
35 kV lines to be extended from 1998 to 2000 are proposed to be 19 lines and shown on the attached table.

4. Current Distribution System Facilities Conditions and Issues

(1) The major existing distribution system facilities in 1998 are shown on the attached table.

(2) Current Conditions and Issues on the distribution system facilities
(a) High rate of voltage drop, especially for overhead lines to Gel Camp.
(b) Rate of distribution lines losses is 18~19% at Ulaanbaatar including non-technical losses.
Baganuur: 13 %, Darkhan: 15 %, Bayanhongor: 17 %, Uliastai: 30 %
(c) Destruction of overhead line pole by strong wind velocity.
(d) Insufficient budget for rehabilitation of the distribution lines.
(e) Tariff system and the collection system are not functioned effectively.

5. Development Program of Distribution System

(1) Ulaanbaatar: Ulaanbaatar

(2) 5 Aimag centers: Umnugovi, Bayankhongor, Govi-Altai, Khuvsgul, Zavkhan

(3) Choibalsan: Choibalsan

Financial source: World Bank Total budget for the above (1)+(2)+(3): 30 M.US$
Construction time: 1999 - 2001

6. Others

(1) Distribution system which made by Russia is complicated for the power supply control. This should be improved for the enhance of the power supply to each consumer. Tariff system and collection system shall be upgraded with the recent high technology for fair collection of the tariff.

(2) Loss reduction consideration for the overhead distribution line shall be taken for saving energy costs.

(3) Underground power cables are deteriorated due to long time use. The cables are replaced with new underground power cables.

End

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Memorandum of Meeting-8

Subject : Public administration reform and decentralization

Date and Time : October 15, 1998 11: 00 am - 12: 00 pm

Place : Conference Room in UNDP

Attendance : UNDP
: Ms. Janar Aitjanova (assistant res. rep)
Mr. Kenta Goto
Mr. Paul Groenewegen
Mr. Atsushi Yamanaka

JICA Study Team : Mr. H. Nishimaki (Economist)

Followings were subjects in the meeting.

1) Related on-going project
"Governance and economic development" under which there is a subproject 'Decentralization and Democracy Support Program.' Basically conducting dialogs with government officials in high positions to promote reform. There is divergent arrays of opinions on how reform should be conducted but no single consensus since the issue is quite political.

For rural development they have a program called "Information and Communicaton Technologies for Sustainable Human Resource Development" which generally support community activities but not engaging in infrastructure development.

The projects are undertaken in 6 aimags of Khovd, Ubulhangai, DondoGov, Huskul, and Spatal.

2) Decentralization
ADB provided a SAL to promote public administration reform in Mongolia. The basic idea of reform of streamlining government activities to policy making and procuring public services was borrowed from that implemented by the NewZealand government. A "Public System Management Act" was drafted and then submitted by the previous cabinet to the parliament but was not approved. Therefore the second phase of the ADB SAL, $17million was suspended.

Though direct application of NewZealand Model appears to be difficult for Mongolia where the culture, level of development, and natural conditions are quite different, there still remains a

commitment in the government and the three prominent party leaders and the house speaker proclaimed that there should be an agreement by the end of 1998.

3) Current Status of Public Finance
The Mongolian government is facing a real tough time this year with substantial shortfall in the revenue which was caused by fall in copper and Kashmir, major export items of Mongolia. The commodity price drops are causing balance of payment problem as well. To the ailment of the government, the tax revenue has fallen due to introduction of VAT with the abolishment of sales tax. IMF suggested the introduction of gold tax but was rejected in the parliament. Import tax on gasoline was introduced to offset the shortfall in tax revenue but its effect is yet to be seen.
The government has committed a substantial portion of the budget to health and education sectors. Therefore, the areas that the government can cut are military and infrastructure development.

Unification of Sums are discussed and may be implemented, but the role of Sum will not diminish since nomad households also need basic public services of education and medical care.

4) Other Agencies in Rural Development

Internet
Soros Foundation Mr. Chris Finch,
Ministry of Health, Information Center,

End

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Memorandum of Meeting-9

Subject : Electricity Tariff

Date and Time : October 15, 1998

Place : Conference Room in Energy Authority, Planning and Finance Division

Attendance : Energy Authority, Planning and Finance Division
: Ms. Gantuya (Manager)

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

1. Pricing Mechanism
Formally, the cabinet approved the electricity tariff. After de

The users are classified into three categories of;
1) Factory
2) Public facilities
3) Household

The current price of 32 tog per kWh will add 13% of VAT and comes out to be 35 tog per kWh.
1998 The Energy Authority has a budget of 18.1 billion tog for investment related cost. However, it is generally known that 60% of the investment is used up for repair purposes. Though the EA has a surplus of 3.5 billion tug(planned) this year, the loan repayment for the ADB financed projects will start in 1999 thus, the financial situation will become much tighter in the years to come. In general aimag grids charge a higher price than the central grid due to the higher production cost. For metered users such as a factory is charged differently according to time zones. For instance in Droned Aimag, the electricity tariff is 57 tog per kWh between 6:00 and 17:00, 114 tog between 17:00 and 22:00 and 21 tog between 22:00 and 6:00.
The pricing is based on a formula which adds 4-5% profit margin to the calculated production cost. The adjustment for input price changes is supposed to follow an automatic tariff adjustment formula which has been approved by the cabinet. However, actual pricing receives substantial political influences due to its large impact.

The electricity tariff in Mongolia is based on a strict volume pricing, i.e. it has no fixed portion such as connection charge, ampere charge or basic charge of any sort.

End

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Memorandum of Meeting-10

Subject : Electricity Tariff Collection

Date and Time : October 16, 1998

Place : Conference Room in Energy Department of Tov Aimag

Attendance : Energy Department of Tov Aimag
: Mr. Baatar

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

The main responsibility of the department is to collect the electricity tariff money and also to maintain the transmission lines within the aimag. There are 8 Sums within this aimag and each sum has 1-2 tariff collectors and one technician. There are 74 workers within the department of energy in Tuv. The aimag distributes 13 GWh of electricity and its sales totals to 350 million tog per year. There are 5500 household users and 450 public and business users. Within Sums there are 2950 household users and 295 public users. The users within Sums are not attached with meters. The Russian meters costs 9500 tog and the Chinese ones cost 8880 tog per set. All the records of users and its money collections are stored in excel worksheets. The tariff charges are set uniform within the same central grid at 32 tog per kWh. For apartment users were given a preferential tariff before which contributed to the loss of the revenue.

End

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Memorandum of Meeting-11

Subject : Electricity Tariff

Date and Time : October 16, 1998

Place : Urmot Sum

Attendance : Sum

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

Population: 1985
household summer: 200
winter : 600
The sum is located within Tuv Aimag which surrounds Ulanbaatar.

Income statistics: The sum is mandated to collect income statistics but it is limited to the production based estimate. Since barter trade is very frequent, such transactions are not recorded or are attempted to be estimated.

School enrollment ratio up to 8th grade is 100%. High school students move to the Aimag center by either staying at the dormitory or their relatives. Some may opt for vocational training after mandatory education such as driving or computer training. High school is also free of charge inclusive of food.
There are two doctors and two nurses in this Sum.
There are no major medical equipment.

End

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Memorandum of Meeting-12

Subject : Investment in Energy Sector

Date and Time : October 16, 1998

Place : Private Office in Ministry of Finance Chief of Investment Division

Attendance : Energy Department of Tov Aimag
: Mr. Gusengiin Hayanhyarvaa

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

According to the party commitments, 40 Sums are to be connected to the grid between 1996-2000. In 1997, 10 Sums were connected to the grid and in 1998, 11 Sums have been or are being connected to the grid. If the government can continue the current pace of transmission connection, the commitment will be fulfilled on time. The government allocates approximately 6 billion tog per year for transmission extension.

As for hydropower generation, the government installed 2 MW hydropower generation system in Zavkhan in 1997 and 150 kW system in Mankhan of Khovd in 1998. There is a plan to install PV systems in Sums and have them connected to the grid.

The government policy is to allocate 20% of GDP to investment. Energy sector is a focal point of investment. Private sector participation in infrastructure cannot be anticipated until 2005 or so. The Fourth Thermal Power Plant will receive 2 billion tog investment for its rehabilitation and Dornot 200 million Tog. Darnzat will receive 100 million Tog for heating (???)
As for restructuring of the administrative system, there is a policy paper called "Development Policy by Region in Mongolia." Some Sums and Aimags are not efficient, thus it is quite likely to merge those Sums.

End

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Memorandum of Meeting-13

Subject : Rural Health

Date and Time : October 16, 1998

Place : Conference Room in Ministry of Health

Attendance : Ministry of Health

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

There are 350 Sum hospitals in Mongolia. 50% of such hospitals have no access to electricity. Electricity is very essential for proper medical care, especially for emergency treatment. There are many emergency patients in rural areas such as gun wounds. Another common urgent patients are prenatal women. Some Sums have doctors capable of conducting operations but often the hospital lack in sterilizing facility which should be run by electricity. The best equipment is the one equipped with ultraviolet lamp to keep the implements clean and ready at all times. What is more essential is the provision of proper lighting during nights. Since the emergency patients are expected at any time of the day, the basic lighting is indispensable for the treatment. Some Sum hospitals conduct treatments under candle lights.

A disc jockey on the radio started to call for assistance to promote electricity supply to villages. Mr. Chandra(the minister of Science Academy) is heading the volunteer group which calls for electrification in rural areas.

The basic equipment to be installed are:

- Sterilizing Case with ultraviolet light
- Refrigerator for vaccine
- Electric heater for water
- Inspection machine for white cell count
- Sterilize
- Lamps

End

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Memorandum of Meeting-14

Subject : Unit Construction Prices for Transmission

Date and Time : November 10, 1998

Place : Conference Room in Energy Authority Electricity Investment Division

Attendance : Energy Authority Electricity Investment Division
: Mr. Balbar
: Mr. Dashdawaa

JICA Study Team : Mr. H. Nishimaki (Economist)
Mr. Y. Erdenebat (Interpreter)

Followings were subjects in the meeting.

According to the cost estimates carried out in ADB Power Sector Master Plan(1996), the unit construction costs for transmission lines are as follows;

1) 35 kV	3 phase	70 m/m	US$ 3200/km

According to the cost estimates carried out in ADB Power Sector Master Plan(1996), the unit construction costs for transmission lines are as follows;

1) 35 kV	3 phase	70 m/m	US$ 3200/km
2) 110 kV	3 phase	150 m/m	US$ 80,000/km
3) 110 kV	3 phase	320 m/m	US$ 110,000/km
4) 110 kV	6 phase	150 m/m	US$ 130,000/km
5) 110 kV	6 phase	320 m/m	US$ 180,000/km

However, the actual implementation costs turned out to be much lower than the above projected costs.

The actual prices(adjusted to 1998 prices for foreign exchange rate changes: 855 tog/dollar)

1) 10 kV	3 phase	35-50 m/m	4,500,000 tog/km (wood pole)
2) 35 kV	3 phase	70 m/m	10,500,000 tog/km
3) 110 kV	3 phase	120 m/m	12,600,000 tog/km

Transformer including installation(equipment cost)

1) 10kV/0.4kV	100 kVA	3,800,000 tog (1,500,000 tog: Russian-made)
2) 10kV/0.4kV	250 kVA	4,300,000 tog (2,300,000 tog: Russian-made)
3) 10kV/0.4kV	400 kVA	5,000,000 tog (3,000,000 tog: Russian-made)
4) 10kV/0.4kV	1000 kVA	N.A. tog (12,000,000 tog: Russian-made)
5) 35kV/0.4kV	250-400 kVA	15,000,000 tog
6) 35kV/10kV	1000 kVA	168,000,000 tog
7) 110kV/10kV/6kV	10 MVA	500,000,000 -600,000,000tog
8) 110kV/35kV/10kV	10 MVA	901,200,000 tog

Distribution Construction Cost

1) 0.4 kV	3 phase	35 m/m	2,500,000 tog/km
2) 0.22 kV	-	25-35 m/m	1,800,000 tog/km

End

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Memorandum of Meeting － 1

(Meeting with UCS on Hydropower Development Plan)

Subject	: Hydropower Development Plan	
Date and Time	: May 16, 1999 14:00 pm – 16:00 pm	
Place	: Conference Room in UCS	
Attendance	: UCS(Energy Authority)	Mr. Pureviin Baatar (Deputy Director) Mr. B. Ochirjav (Chief Engineer)
	JICA Study Team	Mr. Y. Watanabe (Team Leader) Mr. M. Ulambadrakh (Interpreter)

Followings were subjects in the meeting.

1. Development Plan of Hydropower Project

At present, the Development Plans of Hydropower Project in Mongolia are as listed in the Progress Report 1. One additional study of the development of hydropower project is progressed by TACIS. That is the Uyench mini-hydropower development project where is located at Khovd Aimag. Although this project seems to be feasible, it is not considered as an alternative power source in the Study because the feasibility study of this project can not be completed in time of the Study.

2. Feasibility Report of Hydropower Project

Following feasibility reports of the hydropower projects are available in English:

(1) Egiin hydropower project (226 MW)
(2) Chargait hydropower project (8 MW)
(3) Taisir hydropower project (8 MW)

(4) Monkhairkhan hydropower project (150 kW)
(5) Baruunturuun hydropower project (200 kW)

In the above five hydropower project, items (1) – (3) are used for power supply to the consumers through the Transmission Network. Therefore, These three hydropower projects are not considered in the Study. The two hydropower projects, item (4) and (5), are considered as an alternative power source in the Study. One set of the feasibility study reports for the Monkhairkhan and Baruunturuun hydropower projects was sent to the Study team for further study.

3. Detailed Data of Two Hydropower Projects

The detailed data of two hydropower projects are tabulated in a sheet and sent to the Study team.

End.

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Memorandum of meeting － 2
(Meeting with Institute of Meteorology and hydrology
on meteorological data in Mongolia)

Date and Time : May 18h, 1999, 2:00pm – 3:00pm

Place : Institute of Meteorology and hydrology

Attendance : Institute of Meteorology and hydrology
:Dr.L.NATSAGDORJ (Director)
: JICA Study team : Mr.Deekpak B.BISTA (Solar Power)
: Mr. Tsutomu DEI (Wind Power)
: Mr. Erdenebat (Interpreter)

The JICA study team have requested the remaining meteorological data of surveyed Sums. The following was requested.

1) Wind speed Monthly Average / 29 Sums
2) Ambient Temperature Monthly Average / 18 Sums
3) Precipitation Monthly Average / 16 Sums

END

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Memorandum of Meeting－３

Subject : Conversation by Telephone with USAID Mongolia about ceremony of Pilot plant at Tariat.

Date and Time : June 24, 1999 9:30 am – 10:00 am

Place : From Hotel room.

Attendance : USAID Mongolia.
: John Tichotsky, Ph.D./Economic Growth Adviser
JICA Study Team : Mr. D. Bista (Solar energy)

Followings were the subjects at the telephone conversation:

By telephone, conformation was made whether USAID personal likes to attain the ceremony of Pilot plant installation at TARIAT Sum of Arhangai Aimag. Conformed that USAID is willing to participate but as the information was late need to readjust. Therefore definite conformation will be made later.

John Tichotsky informed that at donors meeting held recently in Mongolia, Japan has committed 150 million US$. Total commitments by the donor country's was 320 million US$ even thought Mongolia has requested only 270 million US$. In the meeting renewable energy was not much discussed. The subject was focused

mainly on Urban-energy, Improvement of basic infrastructure.

End

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Memorandum of Meeting－４

Subject : Meeting with UNDP Mongolia about ceremony of Pilot plant at Tariat.

Date and Time : June 24, 1999 10:20 am – 11:20 am

Place : UNDP office building.

Attendance : UNDP Mongolia.
: Kent Goto / Associated Expert
Governance and Economic Transition
: Paul Groenewegen / Programme Officer
: S.Enkhtuya / Programme Officer
: Dr. M. Badarch / Sustainable Development Advisor

JICA Study Team
: Mr. D. Bista (Solar energy)

Followings were the subjects at the conversation:

Conformation was made whether UNDP personal will attain the ceremony of Pilot plant at TARIAT Sum of Arhangai Aimag. UNDP showed their willingness to participate but having other programs already finalized, need to readjust whether they could actually attain the ceremony or not.

Found out UNDP also implementing many demonstration projects. Within the

demonstration program of PROVISION OF ENERGY-EFFICIENT SOCIAL SERVICES, UNDP has supplied Photovoltaic lighting system for schools, community centers, hospital etc within the range of 50Wp to 200Wp systems. The earlier target was to install 80-demonstration plant of straw bale houses but the revision was made and reduced to 56 in number. Under the demonstration program 8 such project has been already installed.

Demonstration Project Information:

Project Title: Provision of Energy-Efficient Social Services
Project Number: MON/97/301/H/01/99
Demonstration Project period: From 1997 to April 2002.

Attachment:

(1) Project Revision paper.
(2) List of Selected Institutional New Straw-Bale Buildings for 1999.

End

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Memorandum of Meeting－５

Subject : Meeting with TACIS about ceremony of Pilot plant at Tariat.

Date and Time : June 24, 1999 11:30 am – 12:10 pm

Place : TACIS office room at MOID office building.

Attendance : TACIS

: Kevin O'Kane / Team Leader
Rational Use of Energy Project
The Tacis Mongolia

JICA Study Team : Mr. D. Bista (Solar energy)

Followings were the subjects at the conversation:

Conformation was made whether TACIS personal will attain the ceremony of Pilot plant installation at TARIAT of Arhangai Aimag. TACIS showed their willingness to participate but due to other already arranged programs TACIS member could not attain the ceremony.

TACIS team leader informed that they are looking forward to install three systems at sum mentioned below. The installation of the system is arranged at middle of the August 1999 at present, the detail combination of the system and installation are left to the related experts (Team

members), so all the program and system will be known after the arrival of other team members in Mongolia.

TACIS team leader mention that he has focused about exchange of information and related data's to the donor which JICA study team has requested before. TACIS also looking forward to get data's from USAID wind station in Mongolia to plan the large size wind turbine system.

The installation site of the TACIS Pilot plant in Mongolia:

(1) Bogd of Uvurkhangai Aimag.
(2) Guchin-us of Uvurkhangai Aimag.
(3) Bayan-Undur of Bayankhongor Aimag.

End

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Memorandum of Meeting－６

Subject : education in rural areas

Date and Time : July 4 , 1999

Place : Office
Attendance: Mr.Ayushiin Batjargal Deputy Dir Information, Monitoring and Assessment
Ministry of Science, Technology, Education, and Culture

JICA Study Team : Mr. H. Nishimaki

Followings were the subjects at the conversation:
Budget in education budget in Sums:

The Budget comprises of two parts

1) Fixed Cost
-- Heating and electricity and other utilities, about 40% of the budget

2) Variable Cost
-- Teacher's Salary

Unit cost
Primary School 43000 tog per student
Middle School 47-48000 tog per student

High school 52000 tog per student

The final budget has to be approved by the Sum Parliament.

The central government gives subsidies to dormitory operations. The government also assists library book rentals.

During 1992-94, as the people embraced freedom in any issues, 10% of the primary school students did not go to school. The current non -compliance ratio is 2.5%.

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Memorandum of Meeting－ 7

Subject : health care in rural areas

Date and Time : July 5, 1999

Place : Office
Attendance: Ch. Chuluunbaatar : Ministry of Health and Social Welfare

JICA Study Team : Mr. H. Nishimaki

Followings were the subjects at the conversation:
UNICEF has installed solar power system in 60% of rural hospitals that do not have access to the central grid system. The power source is the largest problem now at these hospitals. Some medicene like vaccine is highly expensive and not durable. The storage of these medicine requires good refrigation system. Even the system is installed, the maintenance poses another problem since the hospital has only a driver who may have any knowledge of mechanics or engineering.

As the market economy becomes a more predominant mode of operation, health care is adapting itself to this practice. Doctors can choose the location of practice freely, thus leaving some sums without properly trained doctors. In Sept. 1999, there will be a new report "Mongolia Health Sector Review."

End

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Memorandum of Meeting－８

Subject : rural electrification

Date and Time : July 6 , 1999

Place : Office
Attendance: R Davaanyam Deputy director of transmission

Energy Authority
JICA Study Team : Mr. H. Nishimaki : Mr. Y. Watanabe : Mr. Fukuchi

Followings were the subjects at the conversation:
Decentralizaion is the basic policy of the Energy Authority.

The cost of diesel power generation at 6 Aimag Centers is 240 tog/kWh on the average in 1996 which is sold to household users at 50 tog/kWh and to the business users at 90 tog/kWh. It is unfair that the users at sums unconnected to the central grid to pay much higher fees. However, it is the central government responsibility to assist these rural users directly. It may be possible to have a threshhold line at 50kWh per month consumption as to giving subsidies from the government. It is more like a free pass for buses in Ulaanbaatar.
Pricing of electricity used to require approval from the parliament, but now rests with the Energy Authority. There is a certain formula.

At Sum level power distribution, presumably there is a large percentage of

loss. Technical loss of electricity accouts as much as 20% of the total revenue. The rest is non-technical. The basic policy is to comple sums to adopt self-reliant power supply business in the future.
Move toward consolidating Sums and Aimags

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Memorandum of Meeting－９

Subject : rural decentralization

Date and Time : July 6 , 1999

Place : Office
Attendance: Mr. D Batmunkh Ministry of Finance
Expenditure, Financing Division

JICA Study Team : Mr. H. Nishimaki

Followings were the subjects at the conversation:
Move toward consolidating Sums and Aimags

There should not be real concern over the sums under the project to be consolidated. It took four years to consolidate four sums in Khenti Aimag. The consensus had to rise from bags, all the way to the parliament. These sums used to be two different sums. Thus it was considered most natural choice to merge these sums. However, the opinion of the residents were split into two opposing sides; one claiming the merit stemming from the scale and the other need for geographic dispersion of public services for thinly populated area.

The budgeting process:

The　budget from the central government is allocated to each Aimag Center. Then Aimag Center will distribute the subsidies to each sum. There is some standard formula for budgeting. The sum population is not the base but the the capacities of public facilities are the bases for budgeting. If a sum decides to change from central heating to building based heating, the amount of subsidy is reduced.　There is an argument that the central government should control resources directly in the field　of education and health care.

There will be a new registration concerning bidding system in the public sector this fall.

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Memorandum of Meeting-1

(Meeting with Energy Authority on their Possible Roles in Power Supply in Sum Center)

Subject	:	Possible Roles of Energy Authority in Power Supply in Sum Center	
Date and Time	:	October 25th, 1999 15: 30 - 17: 00	
Place	:	Energy Authority	
Attendance	:	Energy Authority:	Mr. Yondongombo (General Director, Energy Authority)
		JICA Study Team:	Mr. Y. Watanabe (Team Leader) Mr. K. Tanaka (Social Survey Expert) Mr. D. Bista (Solar Power Expert) Mr. T. Dei (Wind Power Expert) Mr. Erdenebat (Interpreter) Mr. Dawa (Interpreter) Mr. Erdene (Energy Consulting)

After JICA Study Team explained the summary of the Master Plan proposed in Progress Report 2, Mr. Yondongombo of Energy Authority (EA) gave the following comments and information:

1. Roles of Sum Power System Supporting Organization proposed in Progress Report 2

Energy Authority (EA) can play these proposed roles of Sum Power System Supporting Organization. EA can deal with diesel power station as well as renewable energy. (Currently EA does not have engineers specialized in renewable energy, but if the mandate is given to EA, EA can recruit these engineers. Note: Institute of Renewable Energy is a research institute under Mongolian Academy of Science, so it cannot become an implementation agency.)

But to play such roles, EA needs the official order (in the form of the bylaw) from Ministry of Infrastructure Development (MOID), so EA hopes JICA Study Team meet and discuss this matter with Mr. Bataa, Adviser to the Minister for Infrastructure Development.

2. Draft of the New Law on Power and its Relation with EA

Mongolian Government is now discussing the new Law on Power, and if the National Congress adopts this new law, EA will be restructured. Right now EA plays two roles: 1) Government implementation agency, and 2) a power generation/transmission/distribution company. Under the new law, the second part will become independent state-owned companies (power generation companies, power transmission companies, and power distribution companies). For example, No. 3 Thermal Power Station, No. 4 Thermal Power Station, and Aimag Power Stations will become

separate state-owned companies. (In the beginning, the Government will have 100% of stocks of these companies, but in future the Government may sell some portion of stocks to the private sector. So creating state-owned companies can be seen as the first step to privatization of the power sector.)

The first part will remain as EA, and the roles of the restructured EA will be limited to monitoring and coordination of these newly-created companies. So the restructured EA will have a small number of staff (around 100 or so). Even though Aimag Power Stations will be independent from EA, EA can retain its Aimag Offices which monitor and support Sum power operation technically and managerially.

3. Subsidy to Power Supply in Sum and Electricity Tariff Gap between CES and Sums

Since EA will soon stop power supply operation, EA cannot give any subsidy to power supply operation and high electricity tariff in Sum Centers. It is the responsibility of the Government (i.e., MOID). The electricity tariff is calculated with the cost and the benefit, and the cost is more expensive in Sum Centers than in CES.

4. Extension of Transmission Lines

Currently if EA extends the transmission line, it will only increase the EA's deficit because the number of users in Sum is too small. After the new system, the newly-created transmission company should invest the extension of transmission lines with its own fund, but in reality it will be very difficult. Since Sum offices are suffering from shortage of budget, Sum office cannot share the cost of extending transmission lines.

Obtained Document: Draft of the New Regulations on the Energy Authority (in Mongolian)

End

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Memorandum of Meeting-2

(Meeting with Ministry of Health and Social Welfare on Health Development Plan at Sum Level)

Subject : Health Development Plan at Sum Level

Date and Time : October 26th, 1999 11: 00 - 12: 15

Place : Ministry of Health and Social Welfare

Attendance : Ministry of Health and Social Welfare:
Mr. Enkhbat (Director, Department of Policy Coordination)
Mr. Chuluunbaatar (Senior Officer, Dept. of Policy Coordination)
Mr. Lodoi (Investment Officer, Dept. of Policy Coordination)
Ms. Tsetsegma (Head, Health Division, Dept. of Policy Coordination)
JICA Study Team:
Mr. K. Tanaka (Social Survey Expert)
Mr. Dawa (Interpreter)

The following information is obtained:

1. Master Plan for Health Development

Ministry of Health and Social Welfare (MOHSW) is now developing a master plan for health development, and currently only basic directions (such as promotion of privatization, etc.) are decided and the details of the master plan are not yet decided.

During these 5 years, Ministry of Health and Social Welfare (MOHSW) has already reduced the number of hospital beds by about 4,400 nationally , and the current number of hospitals and beds will be maintained in future as long as the number of Sums remains the same. If Sum is merged into another Sum or downgraded to Bag under the administrative reform, the Sum hospital will be closed accordingly.

MOHSW has received requests from 62 Sum Hospitals in 14 Aimags to install PV system for their hospitals. After receiving requests from all of 21 Aimags, MOHSW will transfer these requests to MOID and JICA.

2. Privatization in the health sector

Ministry of Health and Social Welfare (MOHSW) encourages the privatization in the health sector. MOHSW is promoting a management contract between Sum Office and the management team. If Sum Office thinks a management contract is useful for their Sum Hospital, they can send an

application form to Aimag Government, and after Aimag Government's approval, Sum Office can make a management contract with a management team. Currently in 49 Sum Hospitals, Sum Office contracts out the hospital operation to the management team which consists of the head of the hospital, doctors, nurses and other staff (usually around 5 persons in total). The contract period is 1 to 3 years, and Sum Office can renew or stop the contract based on the performance of the management team, so it will increase the quality of service in the hospital. The status of the hospital staff remains as the civil servants, so their salary is paid by Sum Office. Hospital facilities also remain as the Government properties.

The contract gives the management team the power to use the budget provided by Sum Office freely, so it is hoped that this arrangement enables the management team to use the hospital budget more efficiently and to spend more on cure and prevention than on non-medical costs such as heating, electricity, etc (Note: the latter is financed by the regular Sum budget, and the former is financed by the health insurance).

3. Health Insurance

The health insurance system in Mongolia was introduced in 1994. Basically all residents between 16 to 60 years old have to pay the insurance fee. Employed persons pay 3% of the salary as the health insurance fee every month and the employer pays another 3%, so in total 6% is paid as the health insurance fee. But in reality, it is difficult for a tax collector in Sum Office to collect health insurance fee from self-employed herders (Note: People can pay health insurance fee by animal products such as wool, sheep's hide, etc. instead of money.). In general, 30% of Mongolian population pay health insurance fee, but 90% of population receive the benefit from the health insurance fund.

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Memorandum of Meeting-3

(Meeting with State Property Committee on Privatization of the Power Sector)

Subject	:	Privatization of the Power Sector
Date and Time	:	October 26th, 1999 14: 30 - 15: 30
Place	:	State Property Committee
Attendance	:	State Property Committee: Mr. Batsukh, Mr. Boldbaatar JICA Study Team: Mr. K. Tanaka (Social Survey Expert) Mr. Dawa (Interpreter)

The following information is obtained:

1. Privatization in Mongolia

In 1997, the Government decided the list of state-owned enterprises to be privatized by 2000, but this list does not include the infrastructure sector including the power sector. The new Government and Prime Minister recently declared that the power sector will be privatized soon, and the method of privatization (for example, auction, sell stocks, and so on) and schedule are now discussed in the Government but nothing has been decided so far. We believe that restructuring of the power sector is necessary before privatization. The first step towards privatization will be 1) transforming Energy Authority's No. 3 Thermal Power Station, No. 4 Thermal Power Station, Transmission Department, Distribution Department into separate state-owned companies, as well as 2) transforming the state-owned Power Sector Repair Factory into a private company.

The State Property Committee's role is to implement a privatization process after the Government decides which state-owned enterprises will be privatized and how and by when. The Committee consists of 8 Committee Members from various Ministries and has around 130 staff. The new Chairman of the Committee is Mr. D. Zorigt. There is Privatization Law approved in early 1990s, but it is out-of-date and it does not include privatization of the power sector.

2. Power Supply at Sum Level

Before the market economy, Sum Centers had enjoyed 24-hour electricity supply through diesel power stations which were directly operated by then Ministry of Energy. In 1996, the Government decided to hand over all diesel power stations in Sum Centers to Sum Offices. Since then, Sum Offices are in charge of operation of power stations in Sum Centers, but due to their limited financial capability, the electricity supply at Sum level becomes very difficult. (The Central Government also stopped to subsidy the power supply at Sum Level.)

In 1996, the Government also allowed Sum Offices to privatize power stations in Sum Centers, and some Sum Offices privatized power stations, but the result is not good because the power sector needs technical expertise. So we agree the necessity of Sum Power System Supporting Organization proposed in Progress Report 2, and we think MOID or Aimag Government should establish a new department which can monitor and support power operation at Sum level. (Aimag Government's financial capacity will be soon increased, because many state properties have been transferred to Aimag Government already.)

End

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Memorandum of Meeting-4

(Meeting with Ministry of Science, Technology, Education and Culture
on Educational Development Plan at Sum Level)

Subject : Educational Development Plan at Sum Level

Date and Time : October 27th, 1999 9: 30 - 10: 30
October 28th, 1999 9: 30 - 10: 30

Place : Ministry of Science, Technology, Education and Culture

Attendance : Ministry of Science, Technology, Education and Culture:
Mr. A. Batjargal (Deputy Director, Information, Monitoring and Assessment Department)
Mr. J. Nurzed (Officer, Project Implementation Coordination Department)
JICA Study Team:
Mr. K. Tanaka (Social Survey Expert)
Mr. Dawa (Interpreter)

The following information is obtained:

1. Master Plan for Educational Development

Ministry of Science, Technology, Education and Culture (MOSTEC) developed a master plan for human resource development and educational reform in 1994 with technical assistance from Asian Development Bank (ADB), but the contents of this master plan are already out-of-date, so MOSTEC is now developing a new medium/long-term development plan under Education Sector Development Program (a new ADB loan from 1998 to 2005).

After the introduction of market economy, Mongolia experienced the population movement from Bag to Sum, from Sum to Aimag Center and big cities such as Ulaanbaatar, Erdenet and Darkhan. So the schools in big cities are most congested with increased students, and MOSTEC's priority is to rehabilitate existing schools and construct new schools in these big cities and Aimag centers. (Note: JICA dispatched a basic design team to rehabilitate primary schools in Ulaanbaatar this year, and also conducted a preliminary survey to rehabilitate and construct primary schools in Erdenet and Darkhan this year.) There is no plan to construct new schools at Sum level, because school-age population has decreased in most Sums, but there is a need for rehabilitation (including increase of classrooms) of the center schools (10-grade school) which cover the surrounding five Sums.

MOSTEC appreciated Japanese Small Grant Program which donated solar systems to five Sum schools in Govi area, and MOSTEC hopes that by 2010, all Sum schools in Sums not connected with power transmission lines will have renewable energy source such as solar and wind power. MOSTEC conducted a survey on the needs for the renewable energy in Sum schools, and the result will be provided.

The latest educational statistic book was published in 1995, and the latest educational statistics are included in the latest Statistical Yearbook 1998 published by National Statistical Office.

2. School-age Population Projection up to 2015/16

There is an unofficial projection of school-age population (3 to 15 years old) in the whole Mongolia up to 2015/16. In 1998, the Education Law was revised and the age to enter primary schools becomes 6 to 8 years old. Currently only 1.0% of 6-year-old children are enrolled in primary schools, and by 2015/16 it is planned that 5.0% of 6-year-old children will be enrolled in primary schools.

Kindergarten enrollment rate for 6 and 7-year-old children is projected to increase from 28.5% in 1998/99 to 55.0% in 2015/16. Primary school (Grade 1 to 4) enrollment rate for 6 to 11-year-old children is projected to increase from 69.7% in 1998/99 to 90.4% in 2015/16. Lower secondary school (Form 1 to 4) enrollment rate for 12 to 15-year-old children is projected to increase from 70.9% in 1998/99 to 99.8% in 2015/16.

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Memorandum of Meeting

(Meeting with Energy Authority on their Proposal of Organizational Reform)

Subject	:	Planned Organizational Reform of Energy Authority	
Date and Time	:	March 1, 2000	9: 00 - 10: 00
Place	:	Energy Authority	
Attendance	:	Energy Authority:	Mr. Yondongombo (General Director, Energy Authority) Mr. B. Erdenebileg (Head, International Cooperation Dept.)
		JICA Study Team:	Mr. Y. Watanabe (Team Leader) Mr. K. Tanaka (Social Survey Expert) Mr. M. Ulambadrakh (Interpreter)

After JICA Study Team explained the summary of the Interim Report, Mr. Yondongombo of Energy Authority (EA) gave the following information:

1. Proposed Organizational Reform of Energy Authority

The drafts of the new energy laws (the energy law, the electricity law, the energy conservation law), which intend to allow the privatization of the energy sector, were presented and discussed in the autumn session of the parliament last year, but were not approved due to the opposition by the opposition party. These drafts will be discussed again in the spring session of the parliament, but there will be little chance for these drafts to be approved before the general election in June 2000. Mr. Yondongombo expressed his personal opinion that Mongolian government should not make haste in privatizing energy sector, because the same process took 5 years in Switzerland.

Under these new laws, the following three organizations are proposed to be established:

1) Energy Agency as an implementing agency of the government policy, which is based on the present Energy Authority;
2) National Electricity Control Center which facilitate smooth communication and coordination among power stations, transmission network, and distribution network; and
3) National Electricity Coordination Board, which issues the license to private companies and coordinate electricity tariff

But since the new laws will not be approved soon, Energy Authority (EA) instead proposed the Ministry of Infrastructure Development (MOID) that EA would like to reform its organization under

the current law. The government will discuss this proposal from EA soon and the conclusion is expected to be made within this month (March 2000).

In this proposal, EA would like to function the roles of the above 1) and 2). EA would also like to establish a new section which deals with renewable energy, by absorbing Post and Telecommunication Authority's (PTA's) Photovoltaic Division into EA, because this division has already completed the original mission to install solar panels in communication centers all around the country. EA expects that this new section will play the role of the implementing agency of the master plan which JICA Study Team is now preparing.

Major revenue sources for new EA will be a dividend on the stocks of share-holding corporations (power stations, transmission company, and distribution company), service charges (license, etc.), and other sources.

2. Training Center on Renewable Energy

EA also expressed their hope that JICA helps EA to establish a new training section on renewable energy in existing EA's Training Center in Ulaanbaatar, which is recommended in Interim Report. EA's Training Center, which conducts training on electricity, heating, welding, etc., was established under Asian Development Bank loan, and is now under rehabilitation under GTZ's grant aid. Rehabilitation is expected to complete in 2001, but it does not include the facility for renewable energy.

3. Power Stations in Aimag Centers

Power stations in Aimag centers have already become the independent state-owned corporations, and it is proposed that they will become stock companies. EA proposed that EA will own 51% of their stocks, the company's employees will own 6 - 8%, and the government will own the rest. Although EA operates without any financial assistance from the government, power stations in Aimag centers cannot operate independently and depends on the financial assistance from EA. Electricity tariff in the Aimag center is decided by the Aimag governor, because it will have a serious impact on people's life in Aimag, and the Aimag governor is responsible for the government budget (including the subsidy from EA). The total amount of EA's subsidy to power stations in Aimag centers was 4.7 million US dollars in 1999, which means the urban people are helping the people in Aimag centers in terms of electricity tariff.

Obtained Document: Draft of the New Organization Chart on the Energy Authority (in Mongolian)

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Memorandum of Meeting

(Meeting with Ministry of Infrastructure Development on Telecommunication Development)

Subject : Telecommunication Development

Date and Time : March 7, 2000 16: 00 - 16: 30

Place : Ministry of Infrastructure Development

Attendance : Ministry of Infrastructure Development:
Mr. T. Naranmandah
(Head, Project & Program Division,
Policy Implementation & Coordination Dept.)
Mr. Amgalanbat Batsuren
(Officer, Policy Implementation & Coordination Dept.)
JICA Study Team:
Mr. T. Fukuchi (Power Demand & Power Supply System)
Mr. K. Tanaka (Social Survey Expert)
Mr. Dawa (Interpreter)

JICA Study Team explained that telecommunication network among Sum centers, Aimag centers, and Ulaanbaatar should be upgraded and improved for the better monitoring and management of the proposed power supply system in Sum centers in the year 2015. JICA Study Team asked about the development policy and plan in the telecommunication sector, especially one related with Sum Centers, and Mr. T. Naranmandah of Ministry of Infrastructure Development (MOID) gave the following information:

1. Telecommunication Network Improvement Plan for Rural Areas

Telecommunication network up to all of 21 Aimag centers will be upgraded by 2002 under Telecom 2 Project (covering Western Area), Telecom 3 Project (covering Eastern Area) and VSAT Project for Rural and Remote Areas (covering 9 Aimag centers). All projects are financed by loans from KfW, Germany. At this moment, there is no plan/projects to improve telecommunication network up to Sum centers.

While MOID understands better telecommunication service in Sum centers is an important precondition for economic and social development at Sum level, rural telephone services (domestic long distance calls) are widely considered as unprofitable, and no private company seems interested in entering into this market. Currently rural telephone services (domestic long distance calls, calls within Aimag centers) are operated in the red and heavily subsidized by the profits earned from international calls and city calls within Ulaanbaatar, which has been made possible due to Mongolian Telecom's monopolistic operation.

2. Privatization in Telecommunication Sector

The 1995 Law on Telecommunications established Communication Regulatory Commission (CRC) which coordinates telecommunication tariff and issues licenses for the private companies which would like to operate telecommunication services. Based on the First Phase Privatization Program, Mongolian Telecommunication Company was separated into Post and Telecommunication Authority (PTA) and Mongolian Telecom (MT) in 1995. PTA borrowed the foreign loan, invested it on telecommunication networks and facilities, and leases them to MT. The government holds 51% of MT's stocks and Korea Telecom 40% of stocks. MT's monopoly right to provide basic telephone service (telephone, fax and telex) and Mobicom Corporation's monopoly right to provide cellular telephone service ended in December 31, 1998, but MT's monopoly right to provide international telephone service was extended up to December 31, 2001.

Since PTA has been plagued by inefficient management and an operating deficit, MOID has a plan (the Second Phase Privatization Program) to merge PTA and MT into one monopolistic state-owned company, tentatively named New Mongolian Telecom (NMT), to improve management efficiency and enhance PTA's capacity to repay the loan.

Obtained Documents:

1) The Law of Mongolia on Telecommunications (November 16, 1995)
2) Mongolian Telecommunications Sector Policy Statement (September 3, 1998)
3) Post and Telecommunications Network Development Plans for 1997 - 2003 and Financing Needs
4) Telecommunication Sector: Medium Term Strategy (MTS) and Public Investment Program (PIP) for the year 2000 - 2002

Appendix-8 Terms of Reference

Project for Rural Power Supply by Renewable Energy

Terms of Reference for Consulting Services

1. Background and Rationale

In Mongolia some 50% of the people are nomadic families. For the nomadic families sum centers are key places for supplying their vital goods, and also for taking the public services such as administration, medical care, education, etc.

As of November 1997, the electric power at 117 sum centers out of 314 sum centers in total in Mongolia is being supplied from the national power transmission network. At the remaining 197 sum centers, the electric power is supplied by the diesel engine generators to sum centers independently. The most of these diesel engine generating facilities were manufactured in the former Soviet Union and installed long ago during 1963 through 1990.

During the Social Republic era of the country, Mongolia depended on the Soviet Union in the supply of spare parts necessary for maintenance of the generating equipment and technical guidance. Due to the corruption of the Soviet Union's economy in 1991 and associated transition to the market economy, the following four factors are caused troubles to the operation and maintenance of the sum's generating facilities.

(1) the lack of business operating senses,
(2) the interruption of spare parts supply,
(3) the lack of technical capability, and
(4) shortage of management budget.

Much equipment has been obliged to stop operation after failure, as operators cannot repair them. Generation quantity, and aggravated the conditions of daily lives of people in sum center and caused serious affects to socio-economic activities of the sum centers.

Under such situations, the Government of Mongolia decided to supply the electric power adequately to the sum centers by the renewable energy that is generated by indigenous and abundant solar and wind energy resources. The adoption of the power supply facilities by the renewable energy contributes to save the valuable fossil energy and to reduce outflow of foreign currency reserves.

In 1995 the Government of Mongolia asked the Government of Japan to formulate the master plan on the rural power supply by renewable energy. In response to the request from the Government of Mongolia, the Government of Japan dispatched the Project Selection Team to Mongolia in June 1997 and Project Formulation Basic Study Team in

December 1997. In the meeting the scope of work was concluded between Government of Mongolia and the Government of Japan in June 1998. After that the master plan study was conducted by the Japanese Study Team and completed the formulation of the master plan in 2000.

Now, the Sums electricity operation is in a huge red due to high fuel price, and it is not possible to rise the electricity charge to maintain a balance of the electricity operation because it causes down of living level of Sum people.

On the other hand, the Government of Mongolia (the current ruling party) has committed to give a high priority for development of rural electricity supply system. Power source for rural electricity supply is found out the least cost alternatives through independent diesel engine generator sets, solar power system, wind power system and hydropower system. At present a grant aid project by Japan in the power sector is under implementation of which the project includes procurement and installation of diesel engine generator sets. This project contributes the stable power supply for the respective Sum centers, but still remains a management problem of procurement of adequate fuel oil.

To meet with the required power demand in the target Sum centers, the development of renewable energy power plant is required as an alternative power source. It is convinced that the development of renewable energy potentials and realization of the project contributes to guarantee the people's stable livelihood, and to improve the current condition of rural power supply system that is one of the commitment of the Government.

2. Objectives of Consulting Services

The objectives of the Consulting Services required for the Project implementation are to provide appropriate design, to assist the Client in tendering and contracting and to complete the Project work smoothly of which the Services shall include the following major works:

(1) to collect additional and up-to-date data and information, review and analyze the findings, and revise the plans and principle features of the Project presented in the previous study reports,

(2) to conduct additional field investigation works for obtaining more adequate data necessary for the detailed design,

(3) to prepare basic design and detailed design of the Project facilities, materials and structures,

(4) to prepare tender documents,

(5) to assist the Client in tendering and contracting and to supervise the installation and construction work,

(6) to prepare various reports and documents necessary for the Project implementation, and

(7) to carry out transfer of knowledge and technology related to the Project design and operation and maintenance to the staff participated in the work.

3. Scope of Services

The Consulting Services for the Project shall be carried out smoothly by the reputable international consultants in close cooperation with the Client staff assigned to the work. The services will include but not necessarily be limited to the followings:

I. Detailed Design Stage

(1) Review of available data and information related to the Project

(a) To acquire additional data and information in particular latest records of methodology and socio-economy.

(b) To review the previous study incorporating updated data and information, and identify any planning and design issues which should be incorporated for achieving the most favorable definite plan and design of the Project.

(2) Field investigation and survey

(a) To conduct the environmental impact survey to supplement and update the findings in the previous survey.

(b) To conduct the field investigation to acquire the land for the construction work of the Project facilities.

(c) To conduct the topographic survey to supplement the information obtained during the previous survey, if necessary.

(3) Preparation of basic design and detailed design

(a) To prepare basic design including design criteria and design conditions for the Project facilities covering methodology, analysis and computation criteria, etc.

(b) To make a final review and revision of the layout plans and the optimum scale of the facilities.

(c) To prepare detailed design of the Project facilities consisting of civil and building works, renewable energy equipment, switchgear equipment, outdoor distribution facilities, indoor building wiring materials and electrical facilities.

(d) To study and prepare detailed construction time schedule.

(e) To estimate construction cost in detail with breakdown sheets.

(f) To confirm economic feasibility of the Project.

(4) Preparation of Tender Documents

(a) To prepare the documents of pre-qualification questionnaires for the Project, if necessary.

(b) To prepare the Tender Documents for the Project facilities.

II. Construction and Installation Works Stage

(5) Assistance in tendering and contracting

(a) To provide the documents of pre-qualification questionnaires for the Project and assistance in selection of pre-qualified Tenderers, if necessary.

(b) To provide assistance in tendering and contracting for selection of contractors, evaluation of tenders and award of the contract.

(6) Construction and Installation Supervision Works

(a) To supervise construction and installation works carried out by the contractors during the construction and installation periods, and also to assist the Client in strengthening of organization, coordination among government agencies concerned.

(b) To make design modification during the construction and installation periods, when necessary, including addition to and omission from the original design.

(c) To provide field and overseas technical training for the Client staff during construction and installation periods.

(7) Transfer of Knowledge

To transfer technical knowledge related to the work items listed above to the

counterparts during the Services period.

4. Input of Consultants Staff to the Services

The Consulting Services will be completed in about twenty-eight (28) months from the commencement of the assignment of the consultants. Total input of the consultants' staff will be required for the proposed Services is provisionally estimated to be approximately 120 men-months (design stage: 40 men-months, supervision stage: 80 men-months) for foreign experts and 100 men-months for local experts (total 220 men-months). Following foreign experts are to be assigned to the proposed Services.

(1) Project leader

(2) Transmission Engineer

(3) Distribution Engineer

(4) Substation Engineer

(5) Solar Power Engineer

(6) Wind Power Engineer

(7) System Design Engineer

(8) Environmentalist/Sociologist

(9) Economist/ Management Specialist

(10) Civil and Building Engineer

(11) Construction Plan and Cost Estimate Specialist

5. Reporting Requirements

The consultants will prepare and submit the following reports and documents.

(1) Inception report (10 copies)

(2) Field investigation report with data books including specific report on environmental impact assessment (10 copies)

(3) Basic design report with design criteria, design conditions, design calculation and drawings (10 copies)

(4) Tender documents (30 copies)

(5) Cost Estimate and evaluation procedure with selection criteria (10 copies)
(6) Quarterly progress reports

6. Work Schedule

The preliminary work schedule for the Consulting Services is prepared taking into consideration of the overall Project schedule. The Services will be carried out in two stages by a team of international consultants. The stage 1 will start with reviewing the previous study and field investigation for confirmation of layout and power demand. Power supply system facilities will then be designed to meet the power demand forecast reviewed, and their economic parameters will be evaluated. The environmental impact assessment will be performed in stage 1. After completion of stage 1, tendering and contracting works are proceeded in stage 2. The construction and installation works are scheduled for 13 months. The overall implementation schedule is shown in the attached table.