

ANNEX 9

ACCESS NETWORK

Annex 9

Access Network

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1. EXISTING WOODEN POLES

The Mongolian existing wooden poles were examined based upon the request of PTA.

The followings are our examination results.

1. Quality of the existing wooden pole is evaluated as reusable by our site survey and strength calculation.

2. Action on the existing pole for reuse.

The following actions are necessary for the reuse of the existing poles.

(1) Inclined poles should be re-erected.

(2) Subterranean depth of the poles should be secured enough depth.

(3) Joint method between concrete stump and wooden pole should be improved to get enough strength.

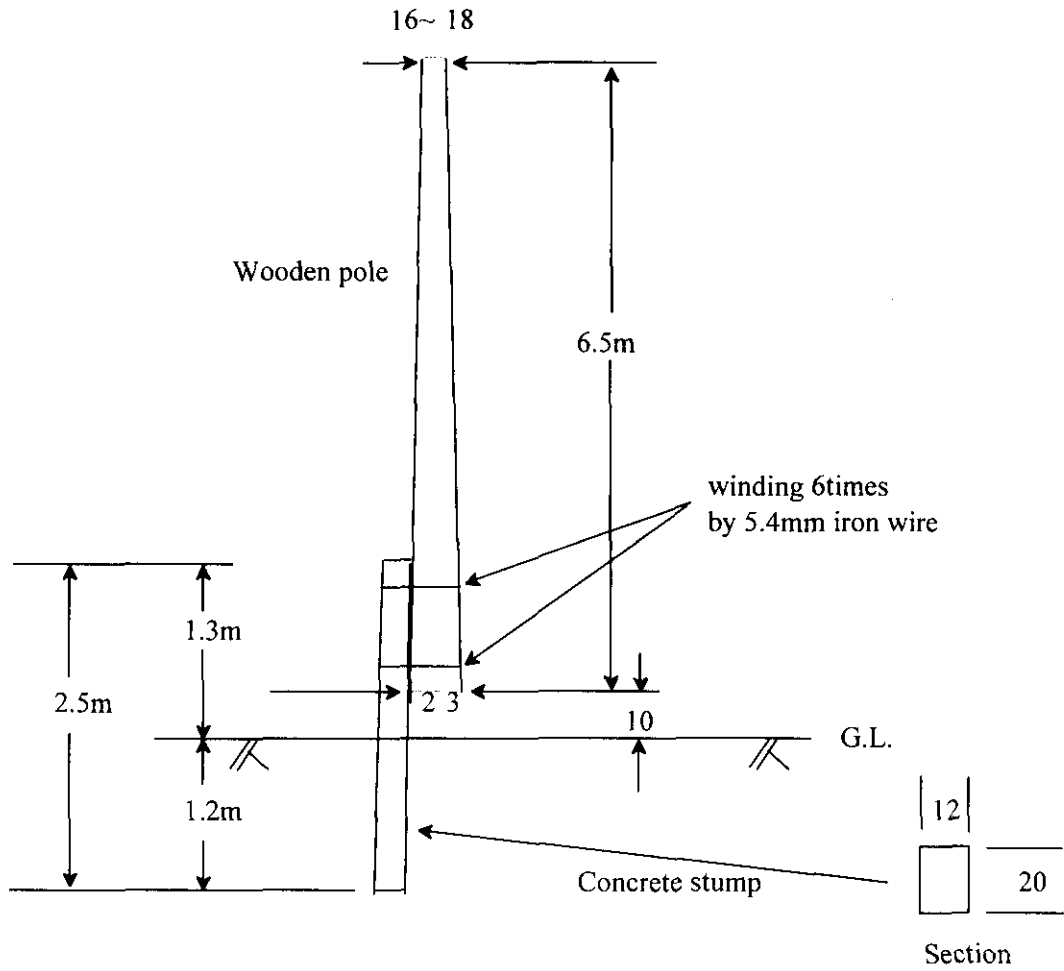
(4) Additional guy/struts are required.

Especially reinforcement work by two-sided lateral guy/strut and two-sided longitudinal guy/strut are required in junction cable route.

3. Construction of Mongolian wooden pole (attached Paper 1).

4. Strength calculation of Mongolian existing wooden pole (attached Paper 2).

1.1 Existing Wooden Intermediate Pole in Mongolia



1.2 Strength calculation of existing wooden intermediate pole

① Strength for materials of wooden pole

$$P_h = \frac{\pi \cdot D_o^3 \cdot f_h}{F_s \cdot 32 \cdot h} = \frac{3.14 \times 0.23^3 \times 4 \times 10^6}{2.5 \times 32 \times 6.1} = 313.15 \text{kg}$$

Where

- P_h : designing load changed horizontal load at action point (kg)
- D_o : diameter of wooden pole at bottom (m) = 0.23m
- h : height of load action point from ground level (m) = 6.1m (=6.5+0.1-0.5)
- f_h : bending break strength of wooden pole (kg/m²) = 4 x 10⁶kg/m²
above value : cedar (the weakest materials) $f_h(\text{larch tree}) > f_h(\text{cedar})$
- F_s : safety factor wooden pole itself = 2.5
- π : the ratio of the circumference of a circle to its diameter = 3.14

② Support strength by foundation of the ground

$$M_{ot} = P \cdot (h+t_o) \text{ (kg-m)} \quad \text{----- Fig. A}$$

$$M_{ot} \leq \frac{M_{ou}}{F_s} = M_{oa} \text{ (kg-m)}$$

$$M_{ou} = F_s \cdot M_{oa} = X \cdot (1/36) \cdot K_h \cdot s \cdot D_m \cdot t^4 \text{ (kg-m)} \quad \text{----- formula for wooden pole strength}$$

$$= 1 \cdot 0.028 \cdot 2 \times 10^6 \cdot 0.05 \cdot 0.175 \cdot 1.2^4$$

$$= 1,008 \text{kg-m}$$

$$P_{oa} = \frac{M_{oa}}{h+2t/3}$$

$$= 1,008 \cdot 2.5 / (6.6 + 2 \cdot 1.2/3)$$

$$= 340.5 \text{kg}$$

Where

- P_{oa} : horizontal load changed at action point (kg)
- M_{ot} : bending moment rotate on a centre by horizontal load (kg-m)
- M_{ou} : limit resistance moment (kg-m)
- M_{oa} : permissible resistance moment (kg-m)
- P : horizontal load (kg) = 257.8kg, see④
- H : height of action point of horizontal load from ground level (m) = 6.5-0.5+0.1=6.6m
- t_o : depth of rotate on a centre from ground level (m) = 2t/3=0.8m
- t : depth of pole from ground surface to bottom of pole (m) = 1.2m
- X : boring coefficient normal soil=1.0
- K_h : soil quality coefficient (kg/m⁴) normal soil=2 x 10⁶
- s : tangent of slanting angle ----- Fig. B = 0.05 ($\alpha = 3^\circ$)
- D_m : width of pole received soil pressure (m) -----Fig. C = 0.175

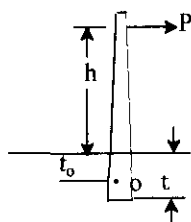


Fig. A

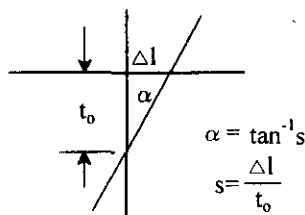


Fig. B

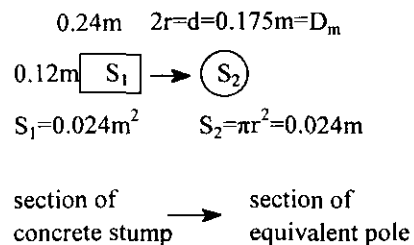


Fig. C

③ Wind pressure load to the pole

$$\begin{aligned}
 M_w &= (K/2) \cdot (\alpha H^3/3 + DH^2) \\
 &= 40 \cdot (0.009 \cdot 6.6^3/3 + 0.17 \cdot 6.6^2) \\
 &= 330.7\text{kg} \\
 P_w &= M_w/h \text{ (kg)} \\
 &= 330.7/6.1 \\
 &= 54.2\text{kg}
 \end{aligned}$$

Where

- P_w : horizontal load changed at action point (kg)
- M_w : bending moment by wind pressure at ground surface (kg-m)
- K : coefficient of each kind wind pressure 40m/sec : 80kg/m²
- α : taper of wooden pole =9/1000
- H : height of pole upper part of the ground surface (m) =6.6m
- h : height of pole from ground surface to load action point (m) =6.1m
- D : top of diameter of wooden pole (m) =0.17m

④ Wind pressure load to the cable

$$\begin{aligned}
 P_c &= K'' : \Sigma d \cdot S \\
 &= 110 \cdot 0.0375 \cdot 62.5 \\
 &= 257.8\text{kg}
 \end{aligned}$$

Where

- K'' : coefficient of each kind wind pressure (kg/m²) 40m/sec : 110kg/m²
- Σd : total diameter of cables and wires (m) 8C-SM-SS : 37.5mm
- S : each half span of both pole side (m) =62.5m

⑤ Maximum load to the pole

$$\begin{aligned}
 \Sigma P &= P_w + P_c \text{ (kg)} \\
 &= 54.2 + 257.8 \\
 &= 312\text{kg}
 \end{aligned}$$

⑥ Judgement of strength of the wooden intermediate pole

$P_h \geq P_w + P_c \text{ (kg)}$	besides	$P_{oa} \geq P_w + P_c \text{ (kg)}$	--- requirement
↓		↓	
$313.2 \geq 54.2 + 257.8 = 312.0\text{kg}$		$340.5 \geq 54.2 + 257.8 = 312.0\text{kg}$	--- result

∴ Existing wooden poles are reusable for optical fiber transmission line.

ANNEX 10

POWER FACILITIES

Annex 10.1 Power Supply Plans for Rural Telecommunication Network

Notes

1. The table is descriptive of the current situations of power supply to telecom offices at Aimag centers and Sums that are covered under the Master Plan Study.
2. Source of the current situations of power supply is Mongolian Telecommunication Company.
Power supply source:
C: Central Energy System, W: Western Energy System,
E: Eastern Energy System, S: Import from China,
A-DG: Aimag diesel generating station,
S-DG: Sum diesel generating station
3. Renewable energy potentials as surveyed under the Master Plan Study for Rural Power Supply by Renewable Energy in Mongolia (JICA, September 2000) are also indicated in the table, for reference, at the "Renewable Energy" column for applicable Sums. Classification of the potentials is as follows:
 - i) PV (annual average horizontal solar irradiation)
A: beyond 5.0kWh/m²/day; B: 4.5-5.0kWh/m²/day; C: 4.0-4.4kWh/m²/day
 - ii) Wind (average wind speed at a height of 10m above ground level in July and August:
A: 4.7m/s or more; B: 3.8-4.6mm/s; C: 2.9-3.7m/s
4. Power supply plans for short-term development up to 2008 as well as for mid- and long-term development up to 2020 are indicated in the table, for reference.

Table A10-1 Power Supply Plans for Rural Telecommunication Network

No	Aimag	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply	Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW			(y or n)	Capacity	PV	Wind	Main
1	Arkhangai	1	Aimag center	C	n	n		DG-30kW			C		C	
		2	Battsengel	C	n	n					C		C	
		3	Bulgan	C	n	n					C		C	
		4	Jargalant	C	n	n					C		C	
		5	Ikht-tamir	C	n	n					C		C	
		6	Ugii-Nuur	C	n	n					C		C	
		7	Ulziit	C	n	n					C		C	
		8	Undur-ulaan	C	n	n					C		C	
		9	Tariat	C	n	n			PV - 0.6kW			C		C
		10	Tuvshnuulekh	C	n	n						C		C
		11	Tsakhir		n	y	2 x 60kW					PV	S-DG	PV S-DG
		12	Tsenkher	C	n	n						C		C
		13	Tsetserteg	C	n	n						C		C
		14	Chuluut		n	y	3 x 60kW		PV - 0.6kW			PV	S-DG	PV S-DG
		15	Khairkhan	C	n	n						C		C
		16	Khangai		n	y	2 x 60kW					PV	S-DG	PV S-DG
		17	Khashaat	C	n	n						C		C
		18	Khotont	C	n	n						C		C
		19	Erdene-Mandal	C	n	n			PV - 0.6kW			C		C
2	Bayan-Ulgii	1	Aimag center	W	y			DG-30kW			W		W	
		2	Altai		n	y	1 x 100kW		PV - 0.6kW		PV	S-DG	PV S-DG	
		3	Altantsegis		n	y	1 x 60kW		PV - 0.6kW		PV	S-DG	PV S-DG	
		4	Bayan-nuur		n	y	1 x 100kW		PV - 0.6kW		PV	S-DG	PV S-DG	
		5	Bugat	W	n	n					W		W	
		6	Bulgan		n	y	1 x 100kW, 1 x 60kW		PV - 0.6kW			PV	S-DG	PV S-DG
		7	Buyant	W	n	y	1 x 60kW					W		W
		8	Deluun		n	y	1 x 100kW, 1 x 60kW		PV - 0.6kW			PV	S-DG	PV S-DG

No	Aimag	Sum	Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply	Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply	
					(y or n)	No. x kW			(y or n)	Capacity	Main	Sub
		9	Sagsai	n	n					W		W
		10	Ulaankhus	n	n					W		W
		11	Nagoon-nuur	n	y	2 x 100kW	PV - 0.6kW			PV	S-DG	PV S-DG
		12	Khotgor	n	y	1 x 60kW	PV - 0.6kW			PV	S-DG	PV S-DG
		13	Tolbo	n	n		PV - 0.6kW			PV	S-DG	PV S-DG
		14	Tsagaan-nuur	n	y	1 x 100kW, 1 x 60kW	PV - 0.8kW			PV	S-DG	PV S-DG
		15	Tsengel	n	n					W		W
3	Bayankhongor	1	Aimag center	y	n		DG-30kW			A-DG		A-DG
		2	Bogd	n	y	3 x 60kW	PV-0.5kW			PV	S-DG	PV S-DG
		3	Bembeger	n	y	3 x 60kW				PV	S-DG	PV S-DG
		4	Buutsagaan	n	y	2 x 100kW	PV - 0.6kW			PV	S-DG	PV S-DG
		5	Bayangovi	n	y	2 x 100kW		B		PV	S-DG	PV S-DG
		6	Bayantlig	n	y	1 x 100kW, 1 x 60kW	PV - 0.8kW	B		PV	S-DG	PV S-DG
		7	Bayan-undur	n	y	3 x 100kW	PV-0.4kW	B	B	PV	S-DG	PV S-DG
		8	Bayan-ovoo	y	n					A-DG		A-DG
		9	Bayantsagaan	n	y	3 x 60kW	PV - 0.8kW	B		PV	S-DG	PV S-DG
		10	BayanBulag	n	y	2 x 60kW	PV-0.6kW, DG-16kW	B		PV	S-DG	PV S-DG
		11	Baatsagaan	n	y	3 x 60kW		B		PV	S-DG	PV S-DG
		12	Gurvanbulag	n	y	2 x 60kW		C		PV	S-DG	PV S-DG
		13	Galut	n	y	3 x 60kW		C		PV	S-DG	PV S-DG
		14	Zag	n	y	2 x 60kW		B		PV	S-DG	PV S-DG
		15	Jargalan/Baidrag	n	y	3 x 100kW	PV-1.5kW, DG-16kW	C		PV	S-DG	PV S-DG
		16	Uzait	y	n					A-DG		A-DG
		17	Shine-jinst	n	y	2 x 100kW		B	B	PV	S-DG	PV S-DG
		18	Khureemarl	n	y	2 x 60kW	PV - 0.6kW	B		PV	S-DG	PV S-DG
		19	Shargaljuut	y	y	1 x 100kW				A-DG		A-DG
		20	Erdeneetsogt	n	y	1 x 100kW, 2 x 60kW		C		PV	S-DG	PV S-DG

No	Aimags	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG (y or n)	Stand-alone Power Supply		Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply			
		No	Name				(y or n)	Capacity		PV	Wind	Main	Sub	Main	Sub
4	Bulgan	21	Jinst		n	y	2 x 100kW	n	B		PV	S-DG	PV	S-DG	
		1	Aimag center	C	n	n		n			C		C		
		2	Bayanagt	C	n	n		n			C		C		
		3	Bayan nuur	C	n	n		n			C		C		
		4	Bugat	C	n	n		n			C		C		
		5	Bureg Khangai	C	n	n		n			C		C		
		6	Gurvanbulag	C	n	n		n			C		C		
		7	Dashinchulen	C	n	n		n			C		C		
		8	Mogod	C	n	n		n			C		C		
		9	Orkhon	C	n	n		n			C		C		
		10	Rashaant	C	n	n		n			C		C		
		11	Saikhan	C	n	n		n			C		C		
		12	Selenge	C	n	n		n			C		C		
		13	Teshig	C	n	n		n			C		C		
		14	Khangal	C	n	n		n			C		C		
		15	Khishig undur	C	n	n		n			C		C		
		16	Khutag undur	C	n	n		n			C		C		
17	Khyalganat	C	n	n		n			C		C				
5	Govi-Altai	1	Aimag center		y			y	DG-30kW		A-DG		A-DG		
		2	Altai		n	y	2 x 60kW	y	PV - 0.6kW	B	PV	S-DG	PV	S-DG	
		3	Bayan-uul		n	y	2 x 100kW	y	PV - 0.6kW	B	PV	S-DG	PV	S-DG	
		4	Bayantoorol		n	y	2 x 100kW	n				PV	S-DG	PV	S-DG
		5	Biger		n	y	2 x 60kW	y	PV - 0.8kW	C	PV	S-DG	PV	S-DG	
		6	Bugat		n	y	2 x 60kW	y	PV - 0.3kW	C	PV	S-DG	PV	S-DG	
		7	Darvi		n	y	3 x 60kW	y	PV - 0.4kW	C	C	PV	S-DG	PV	S-DG
		8	Delger		n	y	2 x 60kW, WS-Gaulin	n				PV	S-DG	PV	S-DG
		9	Jargalan		n	y	2 x 60kW	y	PV - 0.6kW	B		PV	S-DG	PV	S-DG
		10	Tarshir		n	y	2 x 60kW	y	PV - 0.4kW	B	C	PV	S-DG	PV	S-DG
		11	Tonkhil		n	y	3 x 60kW	y	PV - 0.8kW			PV	S-DG	PV	S-DG
		12	Tegreg		n	y	2 x 60kW	y	PV - 0.4kW	C		PV	S-DG	PV	S-DG

No	Aimag	Sum		Power Supply from Grids (C, W, E, S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity	PV	Wind	Main	Sub	Main	Sub	
6	Govt-Sumber	13	Khaliun	n	n	2 x 60kW	y	PV - 0.4kW	C	B	PV	S-DG	PV	S-DG		
		14	Khekhmorit	n	n	3 x 60kW	y	PV - 0.8kW	B		PV	S-DG	PV	S-DG		
		15	Tsogt	n	n	3 x 100kW	y	PV - 0.8kW	C		PV	S-DG	PV	S-DG		
		16	Tseel	n	n	3 x 100kW	y	PV - 0.4kW	C	B	PV	S-DG	PV	S-DG		
		17	Chandmana	n	n	3 x 100kW	y	PV - 0.8kW	C	C	PV	S-DG	PV	S-DG		
		18	Sharga	n	n	2 x 60kW	y	PV - 0.6kW	n		C	PV	S-DG	PV	S-DG	
7	Darkhan-uul	19	Erdene	n	n	3 x 100kW	y	PV - 0.6kW	C		PV	S-DG	PV	S-DG		
		20	Gulin	n	n	2 x 100kW	y	PV - 0.3kW	n		PV	S-DG	PV	S-DG		
		1	Aimag center	n	n	WS-400kW	y	DG-16kW	y		C		C			
		2	Shiveegovi	n	n		n		n		C		C			
		3	Bayantal	n	n		n		n		C		C			
		1	Aimag center	n	n		n	DG-100kW	y			C		C		
8	Dornogovi	2	Sharn gol	n	n		n		n		C		C			
		3	Khongor	n	n		n		n		C		C			
		4	Orkhon	n	n		n		n		C		C			
		5	Salkhit	n	n		n		n		C		C			
		1	Aimag center	n	n		n	DG-30kW	y			C		C		
		2	Airag	n	n		n		n		C		C			
		3	Ahanshree	n	n	2 x 100kW	y		n		C		C			
		4	Dalanjargalan	n	n		n		n				PV	S-DG	PV	S-DG
		5	Delgereh	n	n	2 x 100kW	y		n	B	C	PV	S-DG	PV	S-DG	
		6	Zulegt	n	n		n		n			C		C		
		7	Mandakh	n	n	2 x 60kW	y		y	PV - 0.8kW	A	C	PV	S-DG	PV	S-DG
		8	Urgun	n	n		n		n				C		C	
		9	Saikhandulaan	n	n	2 x 100kW	y		y	PV - 0.8kW	A	A	PV	S-DG	PV	S-DG
		10	Ujaanbadrakh	n	n	2 x 100kW	y		y		A	A	PV	S-DG	PV	S-DG
11	Khatarbulag	n	n	2 x 100kW	y		y	PV - 0.8kW	A	C	PV	S-DG	PV	S-DG		
12	Khuvsul	n	n	2 x 100kW	y		y	PV - 0.8kW	A		PV	S-DG	PV	S-DG		
13	Erdene	n	n	1 x 100kW	y		y	DG-16kW	A		C		C			
14	Zuunbayan	n	n		n		y	Yamaha-1.2			C		C			

No	Aimag	Sum		Power Supply from Grids (C, W, E, S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity	PV	Wind	Main	Sub	Main	Sub	
9	Dornod	15	Zamin-und	S	n	n	0	y	DG-16kW	A		S		S		
		16	Ikh-khet	C	n	n	0	n				C		C		
		17	Khajuu-ulaan		n	n	0						PV	S-DG	PV	S-DG
		18	Sulinkheer		n	n	0		y	PV - 0.8kW			PV	S-DG	PV	S-DG
		1	Aimag center		y	n	0		y	DG-16kW			A-DG		A-DG	
		2	Bayandun		n	y	2 x 100kW	n			C		PV	S-DG	PV	S-DG
		3	Bayantumen		y	n	0	n					A-DG		A-DG	
		4	Bayanuul		n	y	2 x 100kW	y		PV - 0.8kW	C		PV	S-DG	PV	S-DG
		5	Bulgan		y	n	0	n					A-DG		A-DG	
		6	Gurvanzagal		n	y	1 x 30kW	y		PV - 1 kW			PV	S-DG	PV	S-DG
		7	Dashbalbar		n	y	2 x 60kW	n					PV	S-DG	PV	S-DG
		8	Matad		n	y	2 x 60kW	y		PV - 1.2 kW	C	C	PV	S-DG	PV	S-DG
		9	Sergelen		n	y	2 x 60kW	n					PV	S-DG	PV	S-DG
		10	Khalkh gol		n	y	3 x 100kW	y		DG-16kW	C		PV	S-DG	PV	S-DG
		11	Khelenbuir		n	y	2 x 60kW	y		PV-1.2kW	C	C	PV	S-DG	PV	S-DG
		12	Tsagaan ovoo		n	y	3 x 100kW	n			C		PV	S-DG	PV	S-DG
		13	Choibalsan		y	n	0	n					A-DG		A-DG	
		14	Ereentsav		n	n	0	n					PV	S-DG	PV	S-DG
15	Sumber		n	n	0	n		DG-16kW PV-2.4kW			PV	S-DG	PV	S-DG		
10	Dundgovi	1	Aimag center	C	n	n	0	y	DG-30kW			C		PV	C	
		2	Adaatsag		n	y	2 x 100kW	y		B	A	PV	S-DG	PV	S-DG	
		3	Delgertsogi	C	n	n	0	n				C		C		
		4	Deren	C	n	n	0	y	DG-16kW			C		C		
		5	Govt ugtal	C	n	n	0	n				C		C		
		6	Gurvan saikhan	C	n	n	0	n				C		C		
		7	Tsagaan delger	C	n	n	0	n				C		C		
		8	Bayan jargalan		n	y	2 x 100kW	y		PV - 0.6kW	B	B	PV	S-DG	PV	S-DG
		9	Ender shil		n	y	2 x 100kW	y		PV - 0.6kW	B	C	PV	S-DG	PV	S-DG
		10	Ulziit		n	y	2 x 100kW	y		PV - 0.6kW	B	C	PV	S-DG	PV	S-DG

No	Aimag	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity	PV	Wind	Main	Sub	Main	Sub	
11	Uvurkhangai	11	Khuld	C	n	n		y	DG-16kW	B	C	C	C	C		
		12	Luus	C	n	n		y	DG-16kW			C	C	C		
		13	Saikhan ovoo	C	n	n		n					C	C		
		14	Delgerkhangai	C	n	y	2 x 60kW	y		PV-0.8kW	B	B	C	C	C	
		15	Erdenedalai	C	n	n		y		DG-8 kW			C	C	C	
		1	Aimag center	C	n	y	1 x 60 kW	y		DG-16kW			C	C	C	
		2	Bayanundur	C	n	y	2 x 60kW	n					C	C	C	
		3	Burd	C	n	n		n					C	C	C	
		4	Batulzi	C	n	n		n					C	C	C	
		5	BB Ulaan		n	y	3 x 60kW	n			B		PV	S-DG	PV	S-DG
		6	Bayangol	C	n	n		n					C	C	C	
		7	Guchin-Uls		n	y	3 x 60kW	y			B	B	PV	S-DG	PV	S-DG
		8	Zuil	C	n	n		n					C	C	C	
		9	Ulziit	C	n	n		n					C	C	C	
		10	ZB Ulaan	C	n	n		n					C	C	C	
11	Bogd		n	y	3 x 60kW	y			B		PV	S-DG	PV	S-DG		
12	Narinteel	C	n	y	3 x 60kW	n			B		C	C	C			
13	Sant	C	n	y	1 x 60kW	n					C	C	C			
14	Taragt	C	n	n		n					C	C	C			
15	Tugrug	C	n	y	2 x 60kW	y					C	C	C			
16	Yanga	C	n	n		n					C	C	C			
17	Khairhandulaan		n	y	3 x 60kW	n				B		PV	S-DG	PV	S-DG	
18	Hujirt	C	n	n		n						C	C	C		
19	Kharkhorin	C	n	n		n						C	C	C		
20	Bayanteeg		n	y	3 x 60kW	y						PV	S-DG	PV	S-DG	
12	Ummugovi	1	Aimag center		y	n		y	DG-30kW			A-DG		PV	A-DG	
		2	Bayan dalai		n	y	2 x 100kW	n			B	C	PV	S-DG	PV	S-DG
		3	Bayan ovoo		n	y	2 x 60kW	y			A	C	PV	S-DG	PV	S-DG
		4	Bulgan		n	y	2 x 100kW	y			A	C	PV	S-DG	PV	S-DG
		5	Gurvan tes		n	y	2 x 100kW	y			A	B	PV	S-DG	PV	S-DG
		6	Mandal ovoo		n	y	2 x 100kW	y			A		PV	S-DG	PV	S-DG

No	Aimag	Sum		Power Supply from Grids (C, W, E, S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply	Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW			(y or n)	Capacity	Energy Class	Main	Sub
		7	Manlai	n	n	y	2 x 60kW	y	PV	A	PV	S-DG	PV	S-DG
		8	Nomgon	n	n	y	2 x 100kW	n	A	C	PV	S-DG	PV	S-DG
		9	Noyon	n	n	y	2 x 100kW	y	PV-0.6kW DG-8kW	A	PV	S-DG	PV	S-DG
		10	Sevrei	n	n	y	2 x 100kW	y	PV-1kW	A	PV	S-DG	PV	S-DG
		11	Khanbogd	n	n	y	2 x 60kW	y	PV-1kW	A	PV	S-DG	PV	S-DG
		12	Khankhongor	y	n	n		n		B	A-DG		A-DG	
		13	Khurmen	y	n	n		n		B	A-DG		A-DG	
		14	Tsogt ovoo	n	n	y	2 x 60kW	n		A	PV	S-DG	PV	S-DG
		15	Tsogt tsetsyi	n	n	y	2 x 100kW	y	PV-1kW DG-8kW	A	PV	S-DG	PV	S-DG
		16	Tavantolgoi											
13	Sukhbaatar	1	Aimag center	y	n	y		y	DG-25kW		A-DG		A-DG	
		2	Dariganga	n	y	n	2 x 100kW	n		B	PV	S-DG	PV	S-DG
		3	Naran	n	y	n	1 x 100kW	n		B	PV	S-DG	PV	S-DG
		4	Ongon	n	y	y	2 x 100kW	y	PV-0.8kW	B	PV	S-DG	PV	S-DG
		5	Bayandelger	n	y	y	2 x 100kW	y	PV-0.8kW	B	PV	S-DG	PV	S-DG
		6	Khalzan	y	y	y	1 x 100kW	n			A-DG		A-DG	
		7	Uuibayan	n	y	y	1 x 100kW	n			PV	S-DG	PV	S-DG
		8	Menkhi khaan	n	y	y	1 x 100kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		9	Sukhbaatar	n	y	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		10	Erdene tsagaan	n	y	y	2 x 100kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		11	Tumentsogt	n	y	y	3 x 100kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		12	Tuvshinshiree	n	y	y	1 x 100kW	n		B	PV	S-DG	PV	S-DG
		13	Asgat	y	y	y	1 x 100kW	n			A-DG		A-DG	
		14	Taibulag	y	n	n		n			A-DG		A-DG	
14	Selenge	1	Aimag center	n	n	y		y	DG-60kW		C		C	
		2	Altanbulag	n	n	n		n			C		C	
		3	Eruu	n	n	n		n			C		C	
		4	Zuunburen	n	n	n		n			C		C	
		5	Khushaat	n	n	n		n			C		C	

No	Aimag	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply (y or n)	Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply	
		No.	Name			No. x kW	(y or n)		PV	Wind	Main	Sub	Main	Sub
		6	Orkhon	C	n	n	n	n			C	C	C	C
		7	Sant	C	n	n	n	n			C	C	C	C
		8	Khuder	C	n	n	n	n			C	C	C	C
		9	Tsagaannuur	C	n	n	n	n			C	C	C	C
		10	Bugant	C	n	n	n	n			C	C	C	C
		11	Orkhontuul	C	n	n	n	n			C	C	C	C
		12	Baruunburen	C	n	n	n	n			C	C	C	C
		13	Dulaankhaan	C	n	n	n	n			C	C	C	C
		14	Javkhalant	C	n	n	n	n			C	C	C	C
		15	Shaamar	C	n	n	n	n			C	C	C	C
		16	Tushig	C	n	n	n	n			C	C	C	C
		17	Saikhan	C	n	n	n	n			C	C	C	C
		18	Khutul	C	n	n	n	n			C	C	C	C
		19	Zuunkharaa	C	n	n	n	n			C	C	C	C
		20	Bayangol	C	n	n	n	n			C	C	C	C
		21	Tunkhel	C	n	n	n	n			C	C	C	C
15	Tuv	1	Aimag center	C	n	n	y	DG-18kW			C	C	C	C
		2	Altanbulag	C	n	n	n	n			C	C	C	C
		3	Argalant	C	n	n	n	n			C	C	C	C
		4	Batsumber	C	n	n	n	n			C	C	C	C
		5	Bayan	C	n	n	n	n			C	C	C	C
		6	Bayan urjuul	C	n	n	n	n			C	C	C	C
		7	Bayanjargalan	C	n	n	n	n			C	C	C	C
		8	Bayankhangai	C	n	n	n	n			C	C	C	C
		9	Bayantsagaan	C	n	n	n	n			C	C	C	C
		10	Bayantsogt	C	n	n	n	n			C	C	C	C
		11	Bornuur	C	n	n	n	n			C	C	C	C
		12	Buren	C	n	n	n	n			C	C	C	C
		13	Delgerkhaan	C	n	n	n	n			C	C	C	C
		14	Jargalant	C	n	n	n	n			C	C	C	C
		15	Zaamar	C	n	n	n	n			C	C	C	C

No	Aimag	Sum		Power Supply from Grids (C, W, E, S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply	Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply	
		No.	Name			(y or n)	No. x kW		(y or n)	Capacity	PV	Wind	Main	Sub
		16	Lun	C	n	n		n			C		C	
		17	Undur shireet	C	n	n		n			C		C	
		18	Sergelen	C	n	n		n			C		C	
		19	Sumber	C	n	n		n			C		C	
		20	Ugtaal	C	n	n		n			C		C	
		21	Tseel	C	n	n		n			C		C	
		22	Erdene	C	n	n		n			C		C	
		23	Erdensant	C	n	n		n			C		C	
		24	Arkhuist	C	n	n		n			C		C	
		25	Bayanchandmani	C	n	n		n			C		C	
		26	Janchivlan	C	n	n		n			C		C	
		27	Bayandelger	C	n	n		n			C		C	
		28	Mungunmorit	C	n	n		n	Akk		C		C	
16	Uvs	1	Aimag center	W	y	n		y	DG-30kW		W		W	
		2	Baruunturuun		n	n		y	DG-16kW PV-3.5kW		PV	S-DG	PV	S-DG
		3	Bukhmurun		n	y	1 x 60kW	n			PV	S-DG	PV	S-DG
		4	Davst		n	y	1 x 60kW	n			PV	S-DG	PV	S-DG
		5	Zavkhan		n	y	1 x 60kW	n		C		PV	PV	S-DG
		6	Zuungobi		n	y	2 x 100kW	y	DG-4kW PV-0.8kW	C	PV	S-DG	PV	S-DG
		7	Zuunkhangai		n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		8	Maichin		n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		9	Naranbulag		n	y	1 x 60kW	n			PV	S-DG	PV	S-DG
		10	Ulgii	W	n	y	1 x 60kW	n			W		W	
		11	Umnugobi	W	n	y	1 x 60kW	y	PV-0.8kW		W		W	
		12	Undurkhangai		n	y	2 x 100kW	y	PV-0.8kW		PV	S-DG	PV	S-DG
		13	Sagji	W	n	n		n			W		W	
		14	Tarialan	W	n	n		n			W		W	
		15	Turgen	W	n	n		n			W		W	
		16	Tes		n	y	2 x 100kW	y	PV-0.8kW		PV	S-DG	PV	S-DG

No	Aimag	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply			
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity		Main	Sub	Main	Sub		
17	Khovd	17	Kharhiraa									PV	S-DG	PV	S-DG	
		18	Khovd		n	y	1 x 60kW	n				PV	S-DG	PV	S-DG	
		19	Khyargas		n	y	2 x 100kW	n					PV	S-DG	PV	S-DG
		20	Tsagaanhairkhan		n	y	2 x 100kW	n					PV	S-DG	PV	S-DG
		1	Aimag center	W	n	n		y	DG-48kW				W		W	
		2	Altai		n	y	2 x 60kW	n			C		PV	S-DG	PV	S-DG
		3	Bulgan		n	y	2 x 100kW	y		DG-7.5kW, PV-0.8kW	C		PV	S-DG	PV	S-DG
		4	Buyant	W	n	n		n					W		W	
		5	Darvi		n	y	2 x 100kW	y		PV-0.5kW	C		PV	S-DG	PV	S-DG
		6	Dergen		n	y	2 x 60kW	y		PV-0.4kW	C		PV	S-DG	PV	S-DG
		7	Duut		n	y	2 x 60kW	y		PV-0.4kW			PV	S-DG	PV	S-DG
		8	Zereg		n	y	2 x 60kW	y		PV-0.6kW	C		PV	S-DG	PV	S-DG
		9	Mankhan		n	y	2 x 60kW WS-150kW	n			C		PV	S-DG	PV	S-DG
		10	Menkh Khairkhan		n	y	1 x 60kW	y		PV-0.8kW			PV	S-DG	PV	S-DG
		11	Mest		n	y	2 x 60kW			DG-7.5kW PV-1.2kW			PV	S-DG	PV	S-DG
		12	Myangad		n	n		n					W		W	
		13	Uench		n	y	2 x 60kW	y		DG-7.5kW, PV-1.4kW	C		PV	S-DG	PV	S-DG
		14	Ilkhovd	W	n	n		n					W		W	
		15	Tsetseg		n	y	1 x 60kW			PV-0.6kW			PV	S-DG	PV	S-DG
		16	Chandmani		n	y	2 x 60kW			PV-0.6kW	C		PV	S-DG	PV	S-DG
17	Erdeneburen	W	n	n		n					W		W			
18	Khuvsdul	1	Aimag center		y	n		y	DG-37.5kW			A-DG		A-DG		
		2	Alag-Erdene		n	y	2 x 100kW	n				PV	S-DG	PV	S-DG	
		3	Arbulag		n	y	2 x 100kW	n				PV	S-DG	PV	S-DG	
		4	Bayanzurkh		n	y	2 x 100kW	n				PV	S-DG	PV	S-DG	
		5	Burentogtokh		n	y	2 x 100kW	n			C		PV	S-DG	PV	S-DG
		6	Burenkhaan		n								PV	S-DG	PV	S-DG
		7	Galt		n	y	2 x 100kW	n					PV	S-DG	PV	S-DG
		8	Jargalant		n	y	2 x 100kW	n					PV	S-DG	PV	S-DG

No	Aimag	Sum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply	
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity		Wind	Main	Sub	Main
		9	Ikhi-Uul	C	n	n		n		PV	C	C	C	
		10	Rashaant	C	n	n		n			C	C	C	
		11	Renchinikhumbе	C	n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		12	Tarialan	C	n	y	1 x 60kW	y	PV-0.8kW		C	C	C	
		13	Tosontsengel	C	n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		14	Tumurbulag	C	n	y	2 x 60kW	n		C	PV	S-DG	PV	S-DG
		15	Tunel	C	n	y	2 x 60kW	n			PV	S-DG	PV	S-DG
		16	Ulaan-Uul	C	n	y	2 x 100kW	y	PV-1kW		PV	S-DG	PV	S-DG
		17	Khanikh	W	n	n		n			W	W	W	
		18	Khatgal	C	n	y	2 x 100kW	y	PV-1kW		PV	S-DG	PV	S-DG
		19	Tsagaannuur	C	n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		20	Tsagaan-Uul	C	n	y	2 x 100kW	y	PV-1kW		PV	S-DG	PV	S-DG
		21	Tsagaan-Uur	C	n	y	2 x 60kW	n			PV	S-DG	PV	S-DG
		22	Tsetserteg	C	n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
		23	Chandmana-Undur	C	n	y	2 x 60kW	n			PV	S-DG	PV	S-DG
		24	Shire-Ider	C	n	y	2 x 100kW	y	PV-1kW		PV	S-DG	PV	S-DG
		25	Erdenebulgan	C	n	y	2 x 100kW	n			PV	S-DG	PV	S-DG
19	Khentii	1	Aimag center	C	y	n		y	DG-50kW		C	C	C	
		2	Batorov	C	n	n		n			C	C	C	
		3	Baishireet	C	n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		4	Bayanadrаgа	C	n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		5	Bayanmenikh	C	n	n		y	DG-8kW		C	C	C	
		6	Bayan ovoo	C	n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		7	Bayan khutagt	C	n	n		n			C	C	C	
		8	Binder	C	n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		9	Gaishir	C	n	y	2 x 60kW	y	PV-0.8kW	B	PV	S-DG	PV	S-DG
		10	Dadal	C	n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		11	Darkhan	C	n	n		n			C	C	C	
		12	Delgerkhaan	C	n	n		n			C	C	C	
		13	Jargaltkhaan	C	n	n		n			C	C	C	
		14	Murun	C	n	n		n			C	C	C	

No	Aimag	Stum		Power Supply from Grids (C,W,E,S)	Power Supply from Aimag DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply	Renewable Energy Class	Short-term Power Supply		Mid- & Long-term Power Supply		
		No.	Name			(y or n)	No. x kW			(y or n)	Capacity	Wind	Main	Sub
		15	Norovlin		n	y	2 x 60kW	y	PV	C	PV	S-DG	PV	S-DG
		16	Ulziti	C	n	n		n			C		C	
		17	Umnudelger	C	n	n		n			C		C	
		18	Tsenkhermandal	C	n	n		n			C		C	
		19	Gurvan bulag		n	n		n			PV	S-DG	PV	S-DG
		20	Berkh	C	n	n		n			C		C	
		21	Khajuu ulaan		n	n		n			PV	S-DG	PV	S-DG
		22	Bor undur	C	y	n		n			C		C	
20	Orkhon-Uul	1	Aimag center	C,W	y	n	DG-50kW	y	DG-50kW		C,W		C,W	
		2	Jargalant	C,W	n	n		n			C,W		C,W	
		3	Ulaantolgoi	C,W	n	n		n			C,W		C,W	
21	Zavkhan	1	Aimag center		y	n	DG-30kW	y	DG-30kW		A-DG		A-DG	
		2	Aidarkhaan		n	y	1 x 100kW	y	DG-4kW	B	PV	S-DG	PV	S-DG
		3	Asagt		n	y	3 x 100kW	n		C	PV	S-DG	PV	S-DG
		4	Bayantes		n	y	3 x 100kW	n		C	PV	S-DG	PV	S-DG
		5	Bayankhairkhan		n	y	3 x 100kW	n		C	PV	S-DG	PV	S-DG
		6	Tosontsengel		n	y	2 x 500kW	y	DG-16kW		PV	S-DG	PV	S-DG
		7	Durvuljin		n	y	3 x 100kW	n	DG-20kW		PV	S-DG	PV	S-DG
		8	Zavkhanmandal		n	y	3 x 100kW	y	DG-8.5kW	B	PV	S-DG	PV	S-DG
		9	Ider		n	y	3 x 100kW	n	PV-0.8kW	C	PV	S-DG	PV	S-DG
		10	Ikh-Uul		n	y	2 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		11	Numrug		n	y	2 x 100kW	n		C	PV	S-DG	PV	S-DG
		12	Oigon		n	y	1 x 60kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		13	Santmargats		n	y	3 x 100kW	n		C	PV	S-DG	PV	S-DG
		14	Songino		n	y	3 x 100kW	y	PV-0.8kW	C	PV	S-DG	PV	S-DG
		15	Tudevtei		n	y	1 x 60kW	y	DG-16kW	C	PV	S-DG	PV	S-DG
		16	Tes		n	y	1 x 100kW	y	DG-4kW	C	PV	S-DG	PV	S-DG
		17	Telmen		n	y	1 x 100kW	n	PV-0.8kW	C	PV	S-DG	PV	S-DG

No	Aimags	Sum		Power Supply from Grids (C, W, E, S)	Power Supply from Aimags DG (y or n)	Power Supply from Sum DG		Stand-alone Power Supply		Renewable Energy Class		Short-term Power Supply		Mid- & Long-term Power Supply	
		No.	Name			(y or n)	No. x kW	(y or n)	Capacity	PV	Wind	Main	Sub	Main	Sub
		18	Urgamal	n	n	y	3 x 100kW	n		PV		PV	S-DG	PV	S-DG
		19	Tsagaankhairkhan	n	n	y	1 x 60kW	y	PV-0.8kW	B		PV	S-DG	PV	S-DG
		20	Tsagaanchuluut	n	n	y	1 x 60kW	n		B		PV	S-DG	PV	S-DG
		21	Tsetsen-Uul	n	n	y	3 x 100kW	n		C		PV	S-DG	PV	S-DG
		22	Shiluuste	n	n	y	1 x 60kW	y	PV-0.8kW	B		PV	S-DG	PV	S-DG
		23	Erdenekhairkhan	n	n	y	3 x 100kW	n		C		PV	S-DG	PV	S-DG
		24	Yaruu	n	n	y	2 x 60kW	n		C		PV	S-DG	PV	S-DG
22	Baga-Nuur	1	Baganuur city	C	n	n		y	DG-65kW			C		C	
23	Nalaikh	1	Nalaikh city	C	n	n		y	DG-30kW			C		C	
		2	Tereij	C	n	n		n				C		C	
		3	Shokhot	C	n	n		n				C		C	
		4	Arjanchivian	C	n	n		n				C		C	
		5	Nisekh /Gordok/	C	n	n		n				C		C	
		0			n	n		n				C		C	
		Total No.													

ANNEX 11

PRIORITY PROJECT AND FEASIBILITY STUDY PROJECT

Annex 11

Priority Project and Feasibility Study Project

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Annex 11-1 Selection of Important Aimags (1/6)

1. Objective Sums

All Sums except Sums in Ulanbaatar, Aimag centers

2. Establishment of selection criteria

Selection criterias are composed of five (5) categories below:

- (1) Aimag evaluation as total sums scores by rural development needs factor
- (2) Aimag evaluation as total sums scores by key economic indicators
- (3) Sums where fixed telephone demand forecasts are considerably big
Sums where populations, GRDPs are big and many people enjoy telecommunications services
- (4) Sums where initial investment costs are smaller and investments are very effective
Sums where digitalisation of networks is cost effective (mainly new transmission systems can be utilized existing and/or planned transmission systems)
- (5) Sums where power supply is available
Sums where power supply is available and stable (by commercial power line or others)

3. Evaluation method

- (1) 1 to 5 score points are given to each criteria
- (2) Comprehensive evaluation is made by the total given score points of 5 criterias, giving 1 to 5 score points as below:

Total score points:	Comprehensive evaluated score points
5-9:	1
10-13:	2
14-17:	3
18-20:	4
21-25:	5

Table-1 Total evaluation of Sums for telecommunication development

Name of Aimag	Name of Sums	Criteria				Total Score Points	Comprehensive evaluated score points
		(1) Rural Development Needs factor <Table-2>	(2) Key Economic Indicators <Table-3>	(2) Demand forecast (fixed Tels in 2020) <Table-4>	(3) Cost effective investment <Table-5>		

Annex 11-1 Rural Development Needs Factors and Evaluation (2/6)

1. Evaluation unit: Aimag level

2. Evaluation factors(3)

- (1) Basic Social Service Needs: Health care, Poor Alleviation, Distance Education, Disaster Prevention
- (2) Development Potentials: Sum Accessibility to AimagC and UB, Proximity to Boarder, Rural Population, Agriculture Productivity, Tourism Resources, Mining
- (3) Preparedness Factors: Action Plans or Implementation Plans by each aimag, Long Term Development Scheme (such as Millennium Road)

3. Evaluation method

- (1) 1-5 point is given to each factor
- (2) Point is scored by deviation level from the average of all Aimag
- (3) Total evaluation is done by the total given points, giving 1-5 point as below

Deviation points:	Evaluation point
under -53:	1
-54~-15:	2
-16~23:	3
24~61:	4
over 62~:	5

Table-2 Rural development needs factors

	Aimag	(1) Basic Social Service Needs Index	(2) Development Potentials Index	(3) Preparedness Factors Index	Total points index	Evaluation points	average= 180 point deviation from @	Rural Dev Needs	Key Economic Indicators	Total points	Total Evaluation Points	average= 6.0 deviation from @	regional points	weighted average
Western Region	1.Bayan-Ulgii	61	47	43	151	3	-9	3	1	4	2	-2.0	16	0.62
	2.Uvs	73	38	43	155	3	-5	3	2	5	3	-1.0		
	3.Khovd	71	46	60	176	3	16	3	2	5	3	-1.0		
	4.Zavkhan	91	43	49	183	3	23	3	4	7	5	1.0		
	5.Govi-Altai	60	44	30	135	2	-25	2	3	5	3	-1.0		
Khangai Region	6.Khuvsgul	100	52	38	190	4	30	4	3	7	5	1.0	29	1.71
	7.Arkhantai	77	51	90	218	4	58	4	4	8	5	2.0		
	8.Bayankhongor	81	54	45	180	3	20	3	4	7	5	1.0		
	9.Bulgan	56	53	36	145	2	-15	2	5	7	5	1.0		
	10.Orkhon	39	14	16	69	1	-91	1	5	6	4	0.0		
	11.Uvurkhangai	95	64	67	226	5	66	5	3	8	5	2.0		
Central Region	12.Selenge	36	72	61	169	3	9	3	2	5	3	-1.0	24	1.00
	13.Darkhan-Uul	36	26	42	104	1	-56	1	1	2	1	-4.0		
	14.Tuv	59	100	100	259	5	99	5	2	7	5	1.0		
	15.Dundgovi	78	41	45	163	3	3	3	4	7	5	1.0		
	16.Umnugovi	58	49	46	153	3	-7	3	5	8	5	2.0		
	17.Govisumber	38	19	19	77	1	-83	1	3	4	2	-2.0		
	18.Dornogovi	40	59	19	118	2	-42	2	3	5	3	-1.0		
	19.Khantii	54	60	73	187	4	27	4	4	8	5	2.0		
Eastern Region	20.Sukhbaatar	44	48	33	125	2	-35	2	5	7	5	1.0	13	0.69
	21.Dornod	54	61	61	176	3	16	3	2	5	3	-1.0		

	Aimag	Total points	average	deviation from @	Ranking
Western Region	1.Bayan-Ulgii	4	5.2	-1.2	3
	2.Uvs	5		-0.2	2
	3.Khovd	5		-0.2	2
	4.Zavkhan	7		1.8	1
	5.Govi-Altai	5		-0.2	2
Khangai Region	6.Khuvsgul	7	7.2	-0.2	2
	7.Arkhantai	8		0.8	1
	8.Bayankhongor	7		-0.2	2
	9.Bulgan	7		-0.2	2
	10.Orkhon	6		-1.2	3
	11.Uvurkhangai	8		0.8	1
Central Region	12.Selenge	5	5.4	-0.4	2
	13.Darkhan-Uul	2		-3.4	3
	14.Tuv	7		1.6	2
	15.Dundgovi	7		1.6	2
	16.Umnugovi	8		2.6	1
	17.Govisumber	4		-1.4	3
	18.Dornogovi	5		-0.4	2
Eastern Region	19.Khantii	8	6.7	1.3	1
	20.Sukhbaatar	7		0.3	2
	21.Dornod	5		-1.7	3

Annex 11-1 Key Economic Indicators and Evaluation (3/6)

1. Evaluation unit: Aimag level

2. Evaluation factors(3)

- (1) GRDP/Capita(2000): Economic size & development factor
- (2) Economically active population/population(%): Economic activity factor
- (3) Government public service, Education & Health components out of GRDP/Capita: human development factor.

3. Evaluation method

- (1) 1-5 point is given to each factor
- (2) Point is decided by deviation level from the average of all Aimags
- (3) Total evaluation is done by the total given points, giving 1-5 point as below

Deviation points:	Evaluation point
under -4:	1
-3~-2:	2
-1~0:	3
1~2:	4
over 3~:	5

Table-3 Key Economic Indicators Evaluation

	Aimag	(1) GRDP /Capita	(2) Economic active population(%)	(3) Government service, etc./Capita	Total points	Evaluation points
Western Region	1.Bayan-Ulgii	1	1	2	4	1
	2.Uvs	1	3	2	6	2
	3.Khovd	3	2	2	7	2
	4.Zavkhan	2	5	3	10	4
	5.Govi-Altai	2	5	2	9	3
Khangai Region	6.Khuvsugul	3	4	2	9	3
	7.Arkhangaï	4	5	2	11	4
	8.Bayankhongor	3	5	2	10	4
	9.Bulgan	5	3	4	12	5
	10.Orkhon	5	3	4	12	5
	11.Uvurkhangai	1	5	3	9	3
Central Region	12.Selenge	2	1	4	7	2
	13.Darkhan-Uul	1	1	1	3	1
	14.Tuv	2	3	1	6	2
	15.Dundgovi	1	5	5	11	4
	16.Umnugovi	4	5	5	14	5
	17.Govisumber	2	1	5	8	3
	18.Dornogovi	4	1	4	9	3
Eastern Region	19.Khentii	5	1	4	10	4
	20.Sukhbaatar	5	5	3	13	5
	21.Dornod	1	1	4	6	2

average
9

deviation
from @

-5
-3
-2
1
0
0
2
1
3
3
0
-2
-6
-3
2
5
-1
0
1
4
-3

Annex 11-1 Demand Factor and Evaluation (4/6)

1. Evaluation unit: Sum level

2. Evaluation method

(1) 1-5 point is given to each Sum

(2) Point is decided by transmission system distance between Aima

Existing/planned transmission system	Evaluation points
More than 80km from Aimag Center	3
80km-40km from Aimag Center	4
less than 40km from Aimag Center or less than 40km from existing Optical Fiber Route	5

Table 5 Cost Effective Factor

Aimag	Sum	Evaluated score points

Annex 11-1 Cost Effective Factor and Evaluation (5/6)

1. Evaluation unit: Sum level

2. Evaluation method

- (1) 1-5 point is given to each Sum
- (2) Point is decided by transmission system distance between Aimag Center/existing OFT route and Sum Center as below

Existing/planned transmission system	Evaluation points
More than 80km from Aimag Center	3
80km-40km from Aimag Center	4
less than 40km from Aimag Center or less than 40km from existing Optical Fiber Route	5

Table 5 Cost Effective Factor

Aimag	Sum	Evaluated score points

Annex 11-1 Power Supply Factor and Evaluation (6/6)

1. Evaluation unit: Sum level

2. Evaluation method

(1) 1-5 point is given to each Sum

(2) Point is decided by availability of power supply systems as below:

Availability of Power Supply System	Evaluation points
Power is not available	1
Limited power supply by Stand-alone	2
Power supply from Sum DG + Renewable energy	3
Power supply from Aimag DG	4
Power supply from grids	5

Table-6 Power Supply Factor

Aimag	Sum	Evaluated score points

Annex 11-2 Evaluation Result of Important Sums (1/6)

Aimags/District	Aimags Centre/Sum	Study						Government			Evaluation Results		
		Criteria & Score Points						Comprehensiv e Evaluated Score Points ①	PTA's Category (A/B/C/D) ②	Planned Inter- Sum Centres ③			
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points						
<p>P-1: ①: 5 or 4 and ②: A or B) or (③: A or B) P-2: ①: 5 or 4 or ②: A or B) P-3: Demand-00 and other than P-1/2 P-4: Demand-00 and other than P-1/2</p>													
1. ARVANGAI	1	Aimags center											
	2	Battsengel	4	4	4	4	5	21	6	A			P-1
	3	Bulgan	4	4	3	5	5	21	6	D			P-2
	4	Zargalant	4	4	3	3	5	19	4	B			P-1
	5	Ikhtemir	4	4	4	5	5	22	6	A			P-1
	6	Ugiiinuur	4	4	3	3	5	19	4	C			P-2
	7	Uziit	4	4	3	3	5	19	4	B			P-1
	8	Unhur-Ulaan	4	4	3	3	5	19	4	B			P-1
	9	Tarlat	4	4	4	3	5	20	4	A	X		P-1
	10	Taashiruduh	4	4	5	4	5	22	5	B			P-1
	11	Tsakhir	4	4	2	3	3	16	3	B			P-2
	12	Taashir	4	4	3	5	5	21	5	D			P-2
	13	Taashirbag	4	4	3	3	5	19	4	C			P-2
	14	Chakult	4	4	3	3	3	17	3	C			P-3
	15	Khalkhitan	4	4	4	3	5	20	4	C			P-2
	16	Khongal	4	4	3	3	3	17	3	D			P-3
	17	Kheshaat	4	4	2	3	5	18	4	C			P-2
	18	Khotont	4	4	4	3	5	20	4	A			P-1
	19	Erdeneemendel	4	4	4	3	5	20	4	A	X		P-1
2. BAYAN-ULGI	1	Aimags center			0				1				
	2	Allal	3	1	2	3	3	12	2	B			P-2
	3	Altantsagts	3	1	2	4	3	13	2	D			P-4
	4	Bayanuur	3	1	3	3	3	13	2	C			P-3
	5	Bugat	3	1	2	5	5	16	3	A			P-2
	6	Bulgan	3	1	3	3	3	13	2	C			P-3
	7	Buysant	3	1	2	4	3	13	2	D			P-4
	8	Deluun	3	1	3	3	3	13	2	A	X		P-1
	9	Nogoonuur	3	1	3	3	3	13	2	C			P-3
	10	Tolbo	3	1	3	4	2	13	2	C			P-3
	11	Ulaanukha	3	1	3	4	5	16	3	B			P-2
	12	Segaal	3	1	3	5	5	17	3	B			P-2
	13	Tsengel	3	1	3	4	5	16	3	B			P-2
	14	Khotgor	3	1	2	4	3	13	2	A			P-2
	15	Tsagaanuur	3	1	3	4	3	14	3	A			P-2
3. BAYANHONGOR	1	Aimags center			0				1				
	2	Sharbaguid	3	4	2	4	4	17	3	A			P-2
	3	Uziit	3	4	4	5	4	20	4	D			P-2
	4	Jinri	3	4	3	3	3	16	3	C			P-3
	5	Dogd	3	4	4	3	3	17	3	B	X		P-1
	6	Bayanlig	3	4	3	3	3	16	3	B			P-2
	7	Bayangol	3	4	3	3	3	16	3	B			P-2
	8	Bayantsagaan	3	4	3	3	3	16	3	A			P-2
	9	Bayantsagaan	3	4	4	3	3	17	3	B	X		P-1
	10	Bayan-Undur	3	4	2	3	3	16	3	C			P-3
	11	Shinejinst	3	4	2	3	3	16	3	B			P-2
	12	Bumbugur	3	4	3	3	3	16	3	C			P-3
	13	Buutsagaan	3	4	5	3	3	18	4	B	X		P-1
	14	Khursermeral	3	4	4	3	3	17	3	C			P-3
	15	Bayanbulag	3	4	3	3	3	16	3	B			P-2
	16	Gurbanbulag	3	4	3	3	3	16	3	B			P-2
	17	Zag	3	4	3	3	3	16	3	C			P-3
	18	Jargalant	3	4	5	3	3	18	4	A	X		P-1
	19	Gakult	3	4	3	3	3	16	3	D			P-3
	20	Bayan-Oboo	3	4	3	5	4	19	4	D			P-2
	21	Erdeneisogi	3	4	3	5	3	18	4	D			P-2
4. BULGAN	1	Aimags center			0				1				
	2	Bayan-Agt	2	5	3	3	5	18	4	B			P-1
	3	Bayanuur	2	5	3	3	5	18	4	C			P-2
	4	Bugat	2	5	2	4	5	18	4	D			P-2
	5	Darughangal	2	5	3	4	5	19	4	C			P-2
	6	Gurbanbulag	2	5	3	3	5	18	4	B			P-1
	7	Dashinchilin	2	5	4	3	5	19	4	B	X		P-1
	8	Mogod	2	5	3	3	5	18	4	A			P-1
	9	Orkhon	2	5	3	5	5	20	4	C			P-2
	10	Rashaant	2	5	5	3	5	20	4	A			P-1
	11	Salkhan	2	5	4	3	5	19	4	B			P-1
	12	Selenge	2	5	4	3	5	19	4	A			P-1
	13	Teehly	2	5	3	3	5	18	4	A			P-1
	14	Khvangel	2	5	5	3	5	20	4	D			P-2
	15	Khishi-Undur	2	5	4	4	5	20	4	B	X		P-1
	16	Khutag	2	5	5	3	5	20	4	A	X		P-1
	17	Khylgarnat	2	5	5	3	5	20	4	C			P-2

Annex 11-2 Evaluation Result of Important Sums (2/6)

Aimags/District	Aimags Center/Sum	Study						Comprehensiv ly Evaluated Score Points ①	Government		Evaluation Results P-1: ①: 5 or 4 and ②: A or B) or (③ Inter Sum) P-2: ①: 5 or 4 or ③: A or B) P-3: Demand > 90 and other than P-1/2 P-4: Demand > 90 and other than P-1/2
		Criteria & Score Points							PIA's Category (A/B/C/D) ②	Planned Inter- Sum Centres ③	
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points				
5. GOBI-ALTAI	1	Aimags center			0			1			
	2	Altai	2	3	3	3	3	14	3	A	X
	3	Bayan-Uul	2	3	4	3	3	16	3	C	X
	4	Bayankooreo	2	3	2	3	3	13	2	B	
	5	Biger	2	3	4	3	3	15	3	B	X
	6	Bugat	2	3	3	3	3	14	3	A	
	7	Darui	2	3	3	3	3	14	3	B	
	8	Delger	2	3	4	3	3	15	3	C	
	9	Jargalan	2	3	2	3	3	13	2	B	
	10	Takhir	2	3	2	5	3	15	3	D	
	11	Tonkhil	2	3	4	3	3	15	3	A	X
	12	Tugrug	2	3	3	3	3	14	3	A	X
	13	Khalkun	2	3	2	3	3	13	2	D	
	14	Khukhnori	2	3	3	3	3	14	3	C	
	15	Tsoot	2	3	5	3	3	16	3	B	
	16	Tseel	2	3	2	3	3	13	2	A	
	17	Chandmani	2	3	3	3	3	14	3	C	
	18	Sharga	2	3	2	4	3	14	3	D	
	19	Erdene	2	3	3	3	3	14	3	C	
	20	Gulin	2	3	4	3	3	15	3	C	
6. DORNIOVI	1	Aimags center			0			1			
	2	Airag	2	3	4	5	5	19	4	A	X
	3	Altanshiree	2	3	3	3	5	16	3	B	
	4	Delantargalan	2	3	2	5	2	14	3	A	
	5	Delgerekh	2	3	2	3	3	13	2	B	
	6	Bkhkhet	2	3	3	3	5	16	3	D	
	7	Mandakh	2	3	2	3	3	13	2	B	
	8	Urgun	2	3	3	5	5	18	4	A	
	9	Salkhandulaan	2	3	2	3	3	13	2	A	
	10	Ulaanbodakh	2	3	2	3	3	13	2	B	
	11	Khulanbulag	2	3	2	3	3	13	2	B	
	12	Khuvsgul	2	3	2	3	3	13	2	C	
	13	Erdene	2	3	3	5	3	16	3	A	
	14	Zuunbayan	2	3	5	4	4	18	4	A	X
	15	Zarniin-Uud	2	3	5	5	3	18	4	A	X
	16	Zukeg	2	3	2	3	1	11	2	A	
	17	Khajuuulaan	2	3	2	5	2	14	3	D	
	18	Sulinkheer	2	3	2	3	2	12	2	D	
7. DORNOD	1	Aimags center			0			1			
	2	Khalkhogol	3	2	2	3	3	13	2	A	
	3	Matad	3	2	2	3	3	13	2	B	X
	4	Khukhbulur	3	2	2	3	3	13	2	B	
	5	Bayankumen	3	2	2	5	4	16	3	D	
	6	Tsagaan-Ovoo	3	2	2	3	3	13	2	C	
	7	Bayan-Uul	3	2	3	3	3	14	3	A	X
	8	Bayandun	3	2	2	3	3	13	2	C	
	9	Dashbalbar	3	2	2	3	3	13	2	A	
	10	Gurbanzagal	3	2	2	3	3	13	2	D	
	11	Kherlen Kholbalsavi	3	2	2	4	4	15	3	B	
	12	Ereentsav	3	2	3	3	3	14	3	C	X
	13	Bulgan	3	2	2	4	4	15	3	C	
	14	Sergelen	3	2	2	4	3	14	3	C	
	15	Sumber	3	2	2	3	2	12	2	A	
8. DUNDGOBI	1	Aimags center			0			1			
	2	Adoatsag	3	4	2	3	3	16	3	D	
	3	Delgertsagt	3	4	2	5	5	19	4	B	
	4	Deren	3	4	3	4	5	19	4	A	
	5	Gobi-Ligtaal	3	4	3	3	5	18	4	C	
	6	Gurbansaikhan	3	4	2	4	5	18	4	A	
	7	Tsagaan-delger	3	4	2	3	5	17	3	C	
	8	Bayanjargalan	3	4	2	3	3	15	3	D	
	9	Undurshil	3	4	2	3	3	15	3	B	
	10	Uizik	3	4	2	3	3	15	3	B	X
	11	Khuld	3	4	2	3	5	17	3	C	
	12	Lums	3	4	2	4	5	18	4	C	
	13	Salkhan-Ovoo	3	4	2	3	5	17	3	A	
	14	Delgerkhangaal	3	4	2	3	5	17	3	B	
	15	Erdenedalai	3	4	5	3	5	20	4	A	X

Annex 11-2 Evaluation Result of Important Sums (3/6)

Aimags/District	Aimags Centre/Sum	Study						Government			Evaluation Results	
		Criteria & Score Points						Comprehensive Evaluated Score Points ①	PTA's Category (A,B,C,D) ②	Planned Inter-Sum Centres ③		
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points					
9. ZAVKHAN	1 Aimags center			0				1				
	2 Aldarkhaan	3	4	3	5	3	18	4	D		P-2	
	3 Aagal	3	4	2	3	3	16	3	D		P-4	
	4 Bayantes	3	4	2	3	3	16	3	C	X	P-1	
	5 Bayankhalkhin	3	4	2	3	3	16	3	C		P-4	
	6 Buhai	3	4	5	3	3	18	4	A	X	P-1	
	7 Darvuzin	3	4	2	3	3	16	3	B		P-2	
	8 Zevkhanmandal	3	4	2	3	3	15	3	B	X	P-1	
	9 Ider	3	4	3	4	3	17	3	B		P-2	
	10 Ikh-Uul	3	4	2	3	3	16	3	B		P-2	
	11 Khunrui	3	4	2	3	3	15	3	B		P-2	
	12 Otgon	3	4	2	3	3	15	3	B		P-2	
	13 Santmargaz	3	4	2	3	3	15	3	C		P-4	
	14 Songino	3	4	5	3	3	18	4	B		P-1	
	15 Tudevtei	3	4	4	3	3	17	3	A	X	P-1	
	16 Tes	3	4	3	3	3	16	3	A		P-2	
	17 Telman	3	4	2	3	3	15	3	B		P-2	
	18 Urganjal	3	4	2	3	3	15	3	B		P-2	
	19 Tsagaankharkhan	3	4	2	5	3	17	3	C		P-4	
	20 Tsagaanxukhul	3	4	2	5	3	17	3	C		P-4	
	21 Tseltausuul	3	4	3	3	3	16	3	C		P-3	
	22 Shikustel	3	4	3	3	3	16	3	C	X	P-1	
	23 Erdenekhalkhan	3	4	2	3	3	15	3	B		P-2	
	24 Yovuu	3	4	2	4	3	16	3	D		P-4	
10. UVURKHANGAI	1 Aimags center			0				1				
	2 Bayan-Undur	5	3	2	3	5	18	4	C		P-2	
	3 Burd	5	3	2	3	5	18	4	B		P-1	
	4 Bat-Ulzii	5	3	4	3	5	20	4	B		P-1	
	5 BB-Uhaan	5	3	2	3	3	16	3	D		P-4	
	6 Bayngol	5	3	3	4	5	20	4	B	X	P-1	
	7 Guchin-Uu	5	3	3	3	3	17	3	B		P-2	
	8 Zvi	5	3	3	3	5	19	4	B		P-1	
	9 Ulzii	5	3	2	3	5	18	4	C		P-2	
	10 ZB-Uhaan	5	3	3	4	5	20	4	B		P-1	
	11 Bogd	5	3	3	3	3	17	3	B		P-2	
	12 Narintseel	5	3	3	3	5	19	4	D	X	P-1	
	13 Sant	5	3	2	3	5	18	4	B		P-1	
	14 Taragt	5	3	2	5	5	20	4	D		P-2	
	15 Tugrug	5	3	2	3	5	18	4	C		P-2	
	16 Yanga	5	3	5	4	5	22	6	A		P-1	
	17 Kharkhandulaan	5	3	2	4	3	17	3	C		P-4	
	18 Khuzirt	5	3	5	3	5	21	6	A		P-1	
	19 Kharkhorin	5	3	5	3	5	21	6	A	X	P-1	
	20 Bayanbaag	5	3	2	3	3	16	3	D		P-4	
11. UMNUGOBI	1 Aimags center			0				1				
	2 Bayandatal	3	5	2	3	3	16	3	B		P-2	
	3 Bayan-Ovoo	3	5	2	3	3	16	3	A		P-2	
	4 Bulgan	3	5	3	3	3	17	3	B		P-2	
	5 Gurbantes	3	5	3	3	3	17	3	A		P-2	
	6 Mandal-Ovoo	3	5	3	3	3	17	3	C		P-3	
	7 Mantai	3	5	2	3	3	16	3	C		P-4	
	8 Norngon	3	5	4	3	3	18	4	B		P-1	
	9 Noyon	3	5	2	3	3	16	3	A		P-2	
	10 Savrel	3	5	2	3	3	16	3	A	X	P-1	
	11 Khabogd	3	5	2	3	3	16	3	A		P-2	
	12 Khabkhongor	3	5	3	5	4	20	4	D		P-2	
	13 Khumen	3	5	2	4	4	18	4	D		P-2	
	14 Tsogt-Ovoo	3	5	2	3	3	16	3	B		P-2	
	15 Tsogtsetgal	3	5	2	3	3	16	3	B		P-2	
	16 Tavantolgoi	3	5	2	3	3	16	3	C	X	P-1	

Annex 11-2 Evaluation Result of Important Sums (4/6)

Aimags/District	Aimags Centre/Sum	Study						Comprehensive Evaluated Score Points ①	Government		Evaluation Results P-1: (⊙: 5 or 4 and ⊕: A or B) or (⊙: Inter Sum) P-2: (⊙: 5 or 4 or ⊕: A or B) P-3: Demand=90 and other than P-1/2 P-4: Demand=90 and other than P-1/2
		Criteria & Score Points							PTA's Category (A/B/C/D)	Planned Inter-Sum Centres ③	
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points				
12. SUHBAATAR	1 Aimags center			0				1			
	2 Dariganga	2	5	2	3	3	15	3	B		P-2
	3 Naran	2	5	2	3	3	15	3	C		P-4
	4 Ongon	2	5	4	3	3	17	3	A	X	P-1
	5 Bayandolgor	2	5	3	3	3	16	3	B		P-2
	6 Khvatsan	2	5	3	4	3	17	3	D		P-3
	7 Uulbayan	2	5	4	4	3	18	4	B		P-1
	8 Munkhkhayan	2	5	4	5	3	19	4	D	X	P-1
	9 Sukhbaatar	2	5	3	4	3	17	3	C		P-3
	10 Erdenebileg	2	5	4	3	3	17	3	A	X	P-1
	11 Tumertsogt	2	5	5	3	3	18	4	A		P-1
	12 Tuvshinshree	2	5	2	3	3	15	3	C	X	P-1
	13 Asgal	2	5	3	4	4	18	4	D		P-2
	14 Talbulag (uurkhal)	2	5	2	4	4	17	3	C		P-4
13. SELENGE	1 Aimags center			0				1			
	2 Altanbulag	3	2	4	5	5	19	4	A		P-1
	3 Eruu	3	2	4	4	5	18	4	B	X	P-1
	4 Zuvshuren	3	2	3	5	5	18	4	B		P-1
	5 Khushaat	3	2	2	5	5	17	3	D		P-4
	6 Orkhon	3	2	2	5	5	17	3	C		P-3
	7 Sant	3	2	3	5	5	18	4	B		P-1
	8 Khuder	3	2	2	3	5	15	3	C		P-4
	9 Tsagaanmuur	3	2	4	3	5	17	3	B	X	P-1
	10 Bugant	3	2	3	3	5	16	3	D		P-3
	11 Orkhontuul	3	2	3	5	5	18	4	A		P-1
	12 Baruunburen	3	2	3	5	5	18	4	C		P-2
	13 Davaankhayan	3	2	2	5	5	17	3	D		P-4
	14 Javkhant	3	2	2	5	5	17	3	C		P-4
	15 Shaamar	3	2	4	5	5	19	4	A		P-1
	16 Tushig	3	2	2	3	5	15	3	C		P-4
	17 Saikhan	3	2	5	5	5	20	4	D		P-2
	18 Khutul	3	2	5	5	5	20	4	A		P-1
	19 Zuunkhuraa	3	2	5	5	5	20	4	A	X	P-1
	20 Bayangol(Baru unhalaa)	3	2	5	5	5	20	4	A		P-1
	21 Tunkhal	3	2	2	5	5	17	3	B		P-2
14. TUV	1 Aimags center			0				1			
	2 Altanbulag	5	2	2	5	5	19	4	C		P-2
	3 Argalant	5	2	3	3	5	16	4	C		P-2
	4 Batsumber	5	2	3	5	5	20	4	D		P-2
	5 Bayan	5	2	3	5	5	20	4	B		P-1
	6 Bayan-Unzuul	5	2	2	3	5	17	3	C		P-4
	7 Bayanjaragan	5	2	2	3	5	17	3	C		P-4
	8 Bayankhangal	5	2	3	3	5	18	4	B		P-1
	9 Bayantsagaan	5	2	2	3	5	17	3	C		P-4
	10 Bayantsogt	5	2	3	3	5	18	4	B	X	P-1
	11 Bornuur	5	2	4	5	5	21	5	B		P-1
	12 Buren	5	2	2	3	5	17	3	C	X	P-1
	13 Delgerkhaan	5	2	2	3	5	17	3	D		P-3
	14 Jargalant	5	2	5	5	5	22	5	A	X	P-1
	15 Zaamar	5	2	4	3	5	19	4	A		P-1
	16 Lun	5	2	5	3	5	20	4	A	X	P-1
	17 Undurshireet	5	2	2	3	5	17	3	D		P-4
	18 Sergelen	5	2	2	5	5	19	4	D		P-2
	19 Sumber	5	2	3	5	5	20	4	D		P-2
	20 Ugtal	5	2	4	3	5	19	4	A	X	P-1
	21 Tsael	5	2	4	3	5	19	4	B		P-1
	22 Erdene	5	2	3	5	5	20	4	A		P-1
	23 Erdenesant	5	2	5	3	5	20	4	A	X	P-1
	24 Arkhast	5	2	2	5	5	19	4	D		P-2
	25 Bayanchandmani	5	2	5	3	5	20	4	A	X	P-1
	26 Zanchhion	5	2	2	5	5	19	4	D		P-2
	27 Bayandolgor	5	2	3	5	5	20	4	D		P-2
	28 Mungunmork	5	2	2	4	5	18	4	C		P-2

Annex 11-2 Evaluation Result of Important Sums (5/6)

Aimags/District	Aimags Centre/Sum	Study						Government		Evaluation Results	
		Criteria & Score Points						Comprehensiv e Evaluated Score Points ①	PTA's Category (A/B/C/D) ②		Planned Inter- Sum Centres ③
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points				
15. UVS	1 Aimags center			0				1			
	2 Barusanturuun	3	2	3	3	2	13	2	A	X	P-1
	3 Bokhmurum	3	2	2	3	3	13	2	B	X	P-1
	4 Davst	3	2	2	3	3	13	2	C		P-4
	5 Zavkhan	3	2	2	3	3	13	2	C	X	P-1
	6 Zuungobi	3	2	2	3	3	13	2	B		P-2
	7 Zuunkhangal	3	2	2	3	3	13	2	B	X	P-1
	8 Malchin	3	2	2	3	3	13	2	C		P-4
	9 Naranbulag	3	2	2	3	3	13	2	D		P-4
	10 Uglj	3	2	2	5	5	17	3	C		P-4
	11 Umnugobi	3	2	2	5	5	17	3	A	X	P-1
	12 Undukhangal	3	2	3	3	3	14	3	B		P-2
	13 Sagji	3	2	2	4	5	16	3	C		P-4
	14 Tartalan	3	2	3	5	5	18	4	C		P-2
	15 Targen	3	2	2	5	5	17	3	D		P-4
	16 Tes	3	2	2	3	3	13	2	A	X	P-1
	17 Kherkhraa	3	2	2	5	3	15	3	D		P-4
	18 Khovd	3	2	2	3	3	13	2	C		P-4
	19 Khrygas	3	2	2	3	3	13	2	C	X	P-1
	20 Tsagaankharkhan	3	2	2	3	3	13	2	B		P-2
16. KHUVD	1 Aimags center			0				1			
	2 Alai	3	2	2	3	3	13	2	A		P-2
	3 Bulgan	3	2	5	3	3	16	3	A	X	P-1
	4 Buyant	3	2	3	5	5	18	4	C		P-2
	5 Darvi	3	2	3	3	3	14	3	A	X	P-1
	6 Durgan	3	2	3	3	3	14	3	C		P-3
	7 Duul	3	2	2	4	3	14	3	D		P-4
	8 Zareg	3	2	2	3	3	13	2	B		P-2
	9 Mankhan	3	2	3	4	3	16	3	B	X	P-1
	10 Munkhdhshan	3	2	2	3	3	13	2	C		P-4
	11 Must	3	2	3	3	3	14	3	B		P-2
	12 Myngad	3	2	2	4	5	16	3	B		P-2
	13 Uanch	3	2	4	3	3	15	3	A		P-2
	14 Khovd	3	2	2	5	5	17	3	D		P-4
	15 Tsatsag	3	2	3	3	3	14	3	B		P-2
	16 Chandman	3	2	2	3	3	13	2	B		P-2
	17 Erdeneburen	3	2	2	4	5	16	3	B		P-2
17. KHUVSUL	1 Aimags center			0				1			
	2 Alag-Erdene	4	3	3	4	3	17	3	D		P-3
	3 Arbulag	4	3	3	4	3	17	3	C		P-3
	4 Bayanzurich	4	3	3	3	3	16	3	C		P-3
	5 Burenogtokh	4	3	4	4	3	18	4	B		P-1
	6 Burenkhshan	4	3	2	3	3	15	3	D		P-4
	7 Galt	4	3	3	3	3	16	3	B		P-2
	8 Jargalant	4	3	4	3	3	17	3	A		P-2
	9 Ikh-Uul	4	3	4	3	5	19	4	A		P-1
	10 Reshaant	4	3	3	3	5	18	4	A		P-1
	11 Renchinkhumbel	4	3	3	3	3	16	3	A	X	P-1
	12 Tartalan	4	3	5	3	5	20	4	A	X	P-1
	13 Tosontsengel	4	3	3	4	3	17	3	C		P-3
	14 Tumurbulag	4	3	3	4	3	17	3	C		P-3
	15 Tunet	4	3	3	4	3	17	3	C		P-3
	16 Ulaan-Uul	4	3	3	3	3	16	3	B		P-2
	17 Khanh	4	3	3	3	5	18	4	B		P-1
	18 Khotgal	4	3	5	3	3	18	4	A	X	P-1
	19 Tsagaanuur	4	3	3	3	3	16	3	C		P-3
	20 Tsagaan-ool	4	3	4	3	3	17	3	A	X	P-1
	21 Tsagaan-uur	4	3	3	3	3	16	3	B		P-2
	22 Tsatsarleg	4	3	3	3	3	16	3	B		P-2
	23 Chandman Undur	4	3	3	3	3	16	3	C		P-3
	24 Shine-Ider	4	3	3	3	3	16	3	B	X	P-1
	25 Erdenebulgan	4	3	3	3	3	16	3	B		P-2

Annex 11-2 Evaluation Result of Important Sums (6/6)

Aimag/District	Aimag Centre/Sum	Study						Government		Evaluation Results	
		Criteria & Score Points						Comprehensiv e Evaluated Score Points ①	PTA's Category (A/B/C/D) ②		Planned Inter- Sum Centres ③
		(1) Rural Development Needs	(2) Key Economic Indicators	(3) Demand Forecast	(4) Cost Effective Investment	(5) Power Supply	Total Score Points				
18. KHENTI	1 Aimag center			0				1			
	2 Galsnar	4	4	2	3	3	16	3	B		P-2
	3 Bayankhulagt	4	4	3	5	5	21	6	D		P-2
	4 Darkhan	4	4	2	3	5	18	4	A		P-1
	5 Bayanmurkh	4	4	2	3	5	18	4	B		P-1
	6 Delgerkhaan	4	4	3	5	5	21	6	B		P-1
	7 Jargalkhaan	4	4	3	5	5	21	6	B		P-1
	8 Tsenkhermandal	4	4	2	5	5	20	4	B		P-1
	9 Murun	4	4	2	5	5	20	4	D		P-2
	10 Umnudalger	4	4	4	3	5	20	4	A	X	P-1
	11 Bayanadrags	4	4	3	3	3	17	3	C		P-3
	12 Blinder	4	4	3	3	3	17	3	B		P-2
	13 Batshireet	4	4	2	3	3	16	3	C		P-4
	14 Batnorov	4	4	2	3	5	16	4	B		P-1
	15 Berkh	4	4	5	4	5	22	5	A	X	P-1
	16 Bayan-Ovoo	4	4	2	3	3	16	3	B		P-2
	17 Khajuu-Ukaan	4	4	3	3	3	17	3	D		P-3
	18 Norovin	4	4	2	3	3	16	3	C	X	P-1
	19 Dadal	4	4	3	3	3	17	3	A		P-2
	20 Utzhi	4	4	3	5	5	21	5	C		P-2
	21 Gurzanbulag	4	4	2	3	3	16	3	C		P-3
	22 Bor-Undur	4	4	5	3	5	21	6	A	X	P-1
19. DARRHAN-UUL	1 Aimag center			0				1			
	2 Sharlin gol	1	1	5	4	5	16	3	A		P-2
	3 Khongor	1	1	3	5	5	15	3	B		P-2
	4 Orkhon	1	1	2	5	5	14	3	B		P-2
20. ORKHON	1 Aimag center			0				1			
	2 Jar galant	1	5	5	5	5	21	5	B		P-1
21. GOBISUUMBER	1 Aimag center			0				1			
	2 Shiveegobi	1	3	4	5	5	18	4	A		P-1
	3 Bayntal	1	3	2	5	5	16	3	B		P-2
22. MALAUKH	1 Nalaikh city			0				1			
	2 Terell	1	1	4	5	5	16	3			P-3
	3 Shokhol	1	1	2	5	5	14	3			P-4
	4 Arzanchivan	1	1	2	5	5	14	3			P-4
	5 Ntsakh GORDOK	1	1	2	5	5	14	3			P-4
23. BAGANUIUR	1 Baganuur city										
		1	1	5	5	5	17	3			

Note 1: PTA's Category

Category A = Large and cost effective Sums having high development priority
 Category B = Sums having high national needs for adjustment of telecom service level imbalance point
 Category C = Large Sums other than A & B
 Category D = Other common Sums

Note 2: Evaluation Result

Study Evaluation ①, Government category ② and Inter-Sum plan ③ are reflected in the results

P-1: Priority-1	120	35.4%
P-2: Priority-2	128	37.2%
P-3: Priority-3	39	11.5%
P-4: Priority-4	54	15.9%
Aimag/District C	23	
Total	362	
Inter-Sum "X"	68	

Annex 11-3 Outline of Priority Projects**1. Rehabilitation and Expansion Project of Telecommunications Network in Uvurkhangai Aimag of Khangai Region**

- (1) Target Sums in Aimag: 12 Sums within 20 Sums
 - (a) Burd
 - (b) Bat-ulzil
 - (c) Bayangol
 - (d) Zyil
 - (e) ZB Ulaan
 - (f) Narilnteel
 - (g) Sant
 - (h) Yanga
 - (i) Khuzirt
 - (j) Kharkhorin
 - (k) Guchin-Us
 - (l) Bogd
- (2) Demand fulfilment: 93%
- (3) Objectives:
 - (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.
- (4) Implementation period: Year 2003-2005
- (5) Total project cost estimate:
 - (a) Foreign currency portion: US\$ 5.4 Million
 - (b) Local currency portion: US\$ 0.6 Million
 - (c) Total cost: US\$ 6.0 Million

2. Rehabilitation and Expansion Project of Telecommunications Network in Umnugovi Aimag of Central Regions

- (1) Target Sums in Aimag: 9 Sums within 16 Sums
 - (a) Nomgon
 - (b) Sevrei

- (c) Tavantoigoi
- (d) Bulgan
- (e) Gurbantes
- (f) Noyon
- (g) Khanbogd
- (h) Khankhongor
- (i) Tsogttseitsil
- (2) Demand fulfilment: 69%
- (3) Objectives:
 - (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.
- (4) Implementation period: Year 2004-2009
- (5) Total project cost estimate:
 - (a) Foreign currency portion: US\$ 4.5 Million
 - (b) Local currency portion: US\$ 0.5 Million
 - (c) Total cost: US\$ 5.0 Million

3. Rehabilitation and Expansion Project of Telecommunications Network in Zavkhan Aimag of Western Region

- (1) Target Sums in Aimag: 11 Sums within 24 Sums
 - (a) Bayantes
 - (b) Bulnai
 - (c) Zavkhanmandal
 - (d) Songino
 - (e) Tudevtei
 - (f) Shullstel
 - (g) Aldarkhaan
 - (h) Ider
 - (i) Otgon
 - (j) Tes
 - (k) Erdenekharikhan
- (2) Demand fulfilment: 76%
- (3) Objectives:

- (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre;
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.
- (4) Implementation period: Year 2004-2009
- (5) Total project cost estimate:
- (a) Foreign currency portion: US\$ 5.4 Million
 - (b) Local currency portion: US\$ 0.6 Million
 - (c) Total cost: US\$ 6.0 Million

4. Rehabilitation and Expansion Project of Telecommunications Network in Khentii Aimag of Eastern Region

- (1) Target Sums in Aimag: 14 Sums within 22 Sums
- (a) Darkhan
 - (b) Bayanmunkh
 - (c) Delgerkhaan
 - (d) Jargalkhaan
 - (e) Tsenkhermandal
 - (f) Umunudergel
 - (g) Batnorov
 - (h) Berikh
 - (i) Norovlin
 - (j) Bor-undul
 - (k) Bayankhutagt
 - (l) Binder
 - (m) Dadal
 - (n) Ulzilt
- (2) Demand fulfilment: 83%
- (3) Objectives:
- (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre;
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.

- (4) Implementation period: Year 2004-2008
- (5) Total project cost estimate:
 - (a) Foreign currency portion: US\$ 5.4 Million
 - (b) Local currency portion: US\$ 0.6 Million
 - (c) Total cost: US\$ 6.0 Million

5. Rehabilitation and Expansion Project of Telecommunications Network in Dornogovi Aimag of Central Region

- (1) Target Sums in Aimag: 8 Sums within 18 Sums
 - (a) Airag
 - (b) Urgun
 - (c) Zuunbayan
 - (d) Zamin-Uud
 - (e) Altanshiree
 - (f) Dalanjargalan
 - (g) Khatanbulag
 - (h) Erdene
- (2) Demand fulfilment: 82%
- (3) Objectives:
 - (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre;
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.
- (4) Implementation period: Year 2004-2009
- (5) Total project cost estimate
 - (a) Foreign currency portion: US\$ 3.6 Million
 - (b) Local currency portion: US\$ 0.4 Million
 - (c) Total cost: US\$ 4.0 Million

6. Rehabilitation and Expansion Project of Telecommunications Network in Selenge Aimag of Central Region

- (1) Target Sums in Aimag: 12 Sums within 21 Sums
 - (a) Altanbulag
 - (b) Eruu

- (b) Zuunburen
 - (d) Samt
 - (e) Khuder
 - (f) Tsagannuur
 - (g) Orkhontuul
 - (h) Baruunburen
 - (i) Seikhan
 - (j) Khuutul
 - (k) Zuunkharaa
 - (l) Baruunharaa
- (2) Demand fulfilment: 89%
- (3) Objectives:
- (a) Digitisation of the transmission system between Aimag centre and Sum centre;
 - (b) Installation of the digital switching system in Sum centre for the fixed telephone service quality improvement;
 - (c) Rehabilitation and expansion of the subscriber access system in Sum centre;
 - (d) Provision of the sustainable power supply facilities; and
 - (e) Introduction of the Internet service in Sum centre.
- (4) Implementation period: Year 2003-2005
- (5) Total project cost estimate
- (a) Foreign currency portion: US\$ 4.1 Million
 - (b) Local currency portion: US\$ 0.5 Million
 - (c) Total cost: US\$ 4.6 Million

ANNEX 12

OPERATION AND MAINTENANCE PLAN

Annex 12

Operation and Maintenance Plan

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Annex 12-1: Service Quality management items in MT

(1) Performance Management in Headquarters

Operator Service
Telegraph delivery
Toll call appointed time notification
New Subscriber line installation
Fault location and repairing
International Circuits
Toll Circuits
Cable fault repair
Subscriber line
Power
Circuits fault between Aimag and Sum
Telex, Fax
Analogue SW in UB and Aimag centre
Digital SW in UB and Aimag centre

(2) QoS Management in Aimags

Achievement of reservation call
Delay of Telegraph delivery
Operator response time
Information service Response
Customer Satisfaction
Operator services
Information Centre
All of services
Billing
Telephone services
Fault repairing work

(3) QoS Management in Sum

Calls	Auto calls	
	Channel calls	
	Unsuccessful calls	
	Extension /which Aimag/	
	Outgoing telegram	
	Incoming telegram	
	Operator No	
Telephone	Main cable (pair)	Stolen
		Out of order
	Subscriber cable (pair)	Stolen
		Out of order
	Subscriber group (number)	Line, cable
		Entrance
		Telephone apparatus
	SW faults	
	Total faults	
From it:	Cleared in the target	
	Faulted more than 3 days	

Annex 12-2: (1) Research on Subscriber Services (May 2002) in MT

The research on subscriber service, May, 2002.

Question	Arkh angal	Baya r-n rhon Uligy	Buiga n Altay	Gobi- samb er	Dark han- Uul	Dom ogobi	Dom gobi	Zavkh an	Orkh on	Uvurkh angal	Umn ugobi	Sukh baata	Selen ge	Tuv	Uvs	Knov d	Huvs gul	Khens ily	Baga nuur	Nalai kh
International, long distance call (*1000)	26.6	43.8	41.9	32.3	35.3	11	187	124	34.4	74,488	38.1	25	59.8	71.9	36.8	43	34.3	32.3	15.2	42.5
Number of unsuccessful subscriptions	0	0	195	31	62	2007	0	377	0	0	0	0	0	4	17	3	6	5	19	0
Phone calls completed after 3 or more orders	0	0	0	0	1	0	0	21	0	0	0	0	0	0	0	0	3	0	0	0
Telegram (outgoing)	862	389	258	479	171	33	1222	172	503	110	298	484	335	466	420	308	899	849	77	57
From which delayed																				
Equipped by computers or faxes	862	323	184	140	171	33	777	105	348	80	78	296	85	177	420	165	213	693	77	57
Average term of respond from operator	10	7.9	3	10	9	5	7.5	4	7	5	3	10	2	8	9	8	10	11	8	7
Respond percentage of information service	99	99.7	98	100	98.4	100	100	100	99	100	100	92	94	95	95	100	100	98	97.7	100
Percentage of non respond	1	0.3	2	0	1.6	0	0	0	1	0	0	8	6	5	5	0	0	2	2.3	0
Answer duration of information service	1.5	7.1	4	10	10	4	7.8	3	10	15	2	9	8	8	8	10	7	3	7	6
Subscriber with additional services	1039	691	536	452	371	8663	145	845	619	387	4074	360	228	91	828	618	5	810	374	416
Payphones	5	5	6	4	41	6	4	0	36	8	8	5	5	5	5	8	5	5	0	5
Subscriber valuation, satisfaction percentage	85	98.2	99	98	94	91	100	100	98.6	100	100	92	95	95	95	94.5	91	97	98.9	99.2
Number of applies for telephone in relevant month	13	2	15	11	4	3	59	0	101	68	98	36	6	22	4	61	6	23	1	1
Number of newly installed telephone sets	23	8	11	7	2	3	62	1	18	68	3	29	7	3	22	7	46	3	4	9
Term of waiting for installation of telephone set. Up to 2 years	8	8	8	1	3	40	3	5	1	6	68	1	23	7	0	5	4	3	4	9
Up to 5 years		3	1	1	0	15	0	0	0	4	0	0	0	0	0	2	15	0	0	0
Up to 10 years		0	0	0	0	7	0	0	0	2	2	6	0	0	0	0	0	0	0	0
More than 10 years		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of waiting list	385	908	787	93	422	19	1070	887	770	422	1470	6839	435	665	416	301	279	74	974	1251
From which waiting up to 2 years	332	420	749	86	205	19	727	808	646	339	1228	4163	415	656	416	197	164	65	250	312
Up to 5 years	16	488	37	6	124	0	302	13	30	18	82	1255	20	15	0	26	115	9	242	211
Up to 10 years	17	1	1	1	83	0	29	61	54	65	160	827	14	0	68	11	0	482	152	
More than 10 years	15				0	12	5	40	0	402	0	0	0	0	0	0	0	0	0	
Total number of subscribers	1334	1790	1303	1453	1232	648	6512	1618	1490	1565	1592	6538	15250	1371	1020	1558	1413	1919	993	
Number of payers in-time	1051	1700	1153	1150	444	4681	1574	1300	1523	1451	3810	13429	1357	997	771	1291	1122	988	1961	
Not paid for the term of more than 2 months	21	89	146	80	87	1808	54	2	39	141	2104	1821	12	23	677	122	794	2	4	
Unable to pay	1	1	19	2	0	23	0	3	0	3	1	0	104	3	3	3	3	5	119	
Subscribers with incoming more than 500000 U.S\$	0	3	4	2	0	22	2	6	24	1	5	0	6	2	4	8	11	3	2	
Subscribers with incoming more than 1000 U.S\$	13	15	17	20	11	10	35	25	17	8	12	27	1	10	12	29	2	13	20	
Subscribers with 5-10 telephone sets	2	5	2	3	3	1	11	5	2	3	5	2	5	5	5	3	5	2	2	
Subscribers with 10-15 telephone sets	2	2	2	2	1	9	1	0	2	12	3	3	3	3	2	3	3	2	6	
Subscribers with Internal. Call permit	12	163	12	2	7	4	155	7	89	7	29	179	3	14	7	67	533	35	52	
Subscribers with Long dist. Call permit	410	1415	604	536	464	201	1920	235	215	475	430	1791	620	415	430	761	241	450	370	
Subscribers with International call permit through operator	912	23	12	68	98	2	127	5	83	4	122	2	29	348		149	724	325	204	

Annex 12-3: Performance Targets in MT

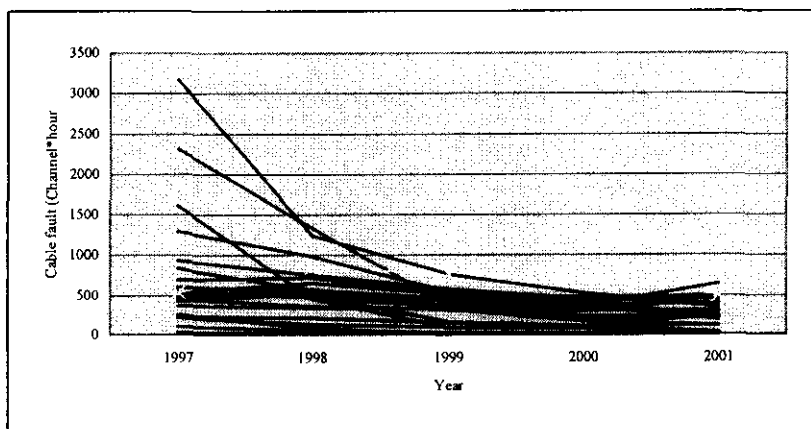
Connection of Waiting Call			
		by semi-automatic exchange	within 15 minutes
		by manual exchange for personal calls or calls between Aimag	within 30 minutes for the appointed time
		by manual exchange for personal calls or calls between the Sum in one Aimag and the Sum in other Aimag	within 1 hour for the appointed time
New Connection			
			3days with facility
			7days without facility
Fault repairing			
International Circuits			
		fault location	within 15 minutes
		repair	within 30 minutes
Toll Circuits			
Microwave equipment			
		change to emergency equipment	within 3 minutes
VSAT circuit			
		fault location	within 15 minutes
		repair of Central exchange	repair within 30 minutes
		repair of Aimag SW	within 4 hours
		repair of Sum SW	within 4 days
Multiplexer			
		fault location	within 15 minutes
		repair	within 30 minutes
Trunk cable			
		fault location	within 15 minutes
		repair	within 4 hours
Air line for International Circuits and national defence			
		fault location	within 10 minutes
		repair	within 2 hours
Wave guide of Microwave antenna			
		repair	within 3 hours for less than 100km
		repair	within 5 hours for 100km to 300km
Cable fault repair			
Fibre optical cable			
		fault location	within 30 minutes
		repair	within 24 hours
Copper cable			
		repair for the cable of less than 50 pairs	within 4 hours
		repair for the cable of less than 100 pairs	within 8 hours
		repair for the cable of less than 400 pairs	within 16 hours
		repair for the cable of less than 600 pairs	within 24 hours
		repair for the cable of less than 1200 pair	within 32 hours
		repair for the cable of less than 2400 pair	within 40 hours
		repair for the cable of less than 1801 pair	within 48 hours

Annex 12-3: Performance Targets in MT (continued)

Subscriber line		
	repair	average 4 hours
		remark: fault that is complained or found between 17:00 to 8:00 of next day is counted as next day's fault
Power		
	change to spare battery	within 10 minutes
	Start of Diesel generator	within 30 minutes
	Start of in UB or City	within 5 minutes
Circuits fault between Aimag and Sum		
	fault location	within 15 minutes
	repair	within 8 hours in office hour
Telex, Fax		
	repair	within 1 hour and 30 minutes
Analog SW in UB and Aimag center		
	SW	within 30 minutes
	Subscriber Circuits	within 25 minutes
Digital SW in UB and Aimag center		
	Host processor	within 20 to 30 minutes
	Subscriber Circuits	within 25 minutes
	Alarm fault	within 10 to 25 minutes
	Billing system	within 10 to 25 minutes

Annex 12-4: Cable Fault in Aimags

No	Aimag	Cable fault(channel.hour)				
		1997	1998	1999	2000	2001
1	Arkhangai	615	850	420	155.28	509.33
2	Bayankhongor	480	579	305	302.11	301.5
3	Bayan-Ulgii	540	658	520	415.1	510.75
4	Bulgan	549	480	350	194.13	228.83
5	Govi-Altai	840	564	459	466.99	186.42
6	Govisumber	250	84	0	0	0
7	Darkhan-Uul	531	492	160	103.69	121.41
8	Dornogovi	459	356	320	171.47	111.62
9	Dornod	2313	1325	386	224.05	223.57
10	Dundgovi	472	532	361	344.09	196.08
11	Zavkhan	603	562	450	342.17	243.73
12	Orkhon	103	56	24	14.8	7.5
13	Uvurkhangai	536	860	762	682.24	507.57
14	Umnugovi	235	210	154	97.11	247.83
15	Sukhbaatar	606	543	426	343.11	247.35
16	Selenge	939	756	580	448.56	450
17	Tuv	3175	1242	762	524.23	346.11
18	Uvs	1298	984	543	358.79	647.46
19	Khovd	699	723	516	467.13	383.08
20	Khuvsgul	365	341	324	175.55	246.86
21	Khentii	428	530	413	357.84	406.41
22	Baganuur	28	19	2	3	0
23	Nalaikh	222	132	94	98	33
24	Transmission Divis	1612	456	84	76	0
Total		17898	13334	8415	6365.44	6156.41



Note: The lines show Fault time of each Aimag.

Annex 12. 4 (Figure) : Cable fault time in Aimags

Annex 12-5: Achievement of Cable Fault Repairing in Aimags

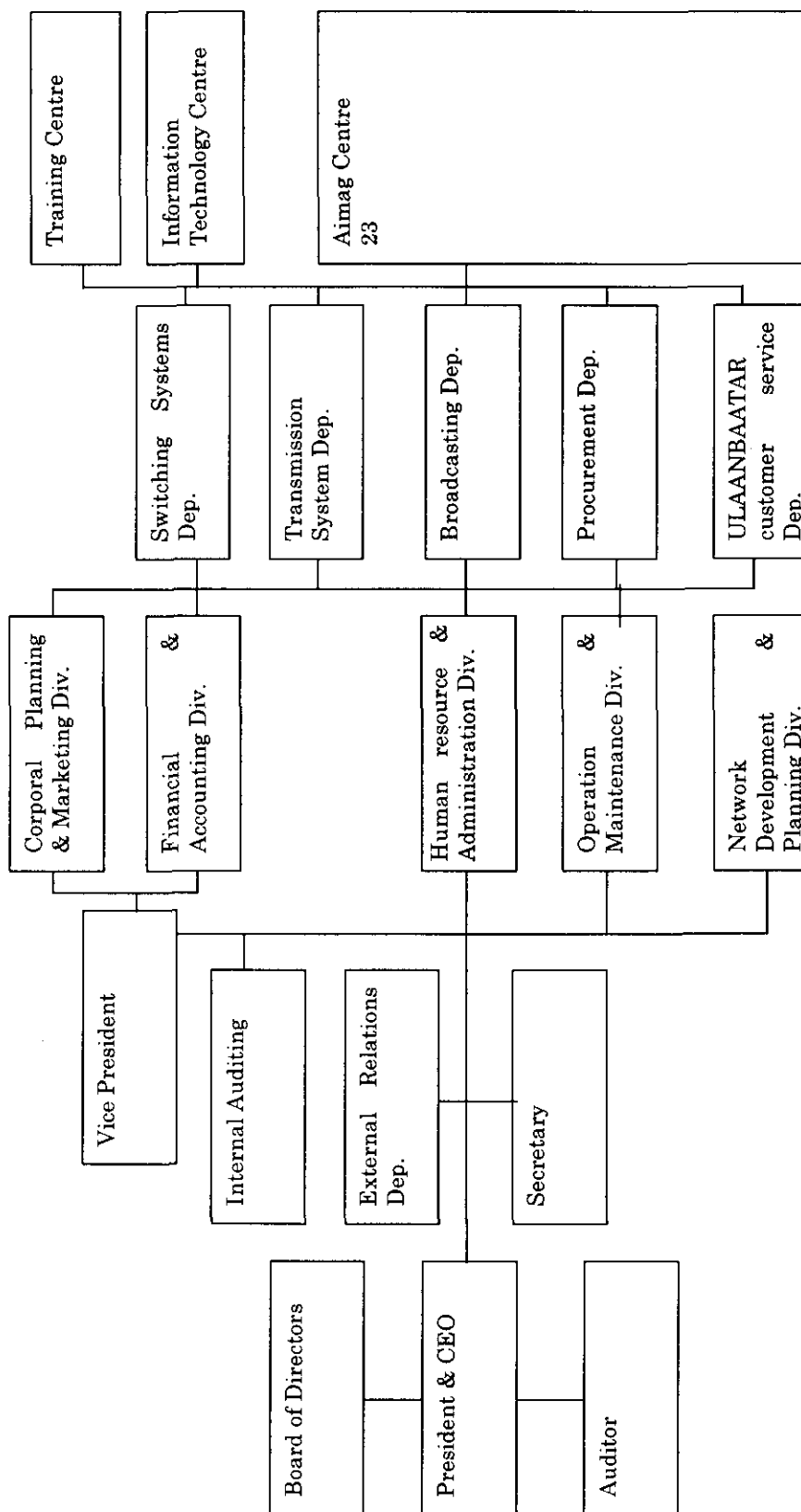
No	Aimag	2000			2001		
		target	achievement	%	target	achievement	%
1	Arkhangai	600	155.28	74.12	500	509.33	-1.87
2	Bayankhongor	600	302.11	49.65	500	301.5	39.7
3	Bayan-Ulgii	300	415.1	-38.37	550	510.75	70.14
4	Bulgan	300	194.13	35.29	350	228.83	34.62
5	Govi-Altai	500	466.99	6.6	550	186.42	66.11
6	Govisumber	100	0	100	100	0	100
7	Darkhan-Uul	300	103.69	65.44	300	121.41	59.53
8	Dornogovi	300	171.47	42.84	400	111.62	72.1
9	Dornod	400	224.05	43.99	450	223.57	50.32
10	Dundgovi	500	344.09	31.18	300	196.08	34.64
11	Zavkhan	800	342.17	57.23	750	243.73	67.5
12	Orkhon	100	14.8	85.2	100	7.5	92.5
13	Uvurkhangai	800	682.24	14.72	700	507.57	27.49
14	Umnugovi	300	97.11	67.63	350	247.83	29.19
15	Sukhbaatar	300	343.11	-14.37	300	247.35	17.55
16	Selenge	400	448.56	-12.14	450	450	0
17	Tuv	400	524.23	-31.06	600	346.11	42.32
18	Uvs	500	358.79	28.24	650	647.46	0.39
19	Khovd	400	467.13	-16.78	500	383.08	23.38
20	Khuvsgul	500	175.55	64.89	600	246.86	58.86
21	Khentii	500	357.84	28.43	450	406.41	9.69
22	Baganuur	100	3	97	150	0	100
23	Nalaikh	100	98	2	100	33	67
24	Transmission Di	200	76	62	150	0	100
Total		9300	6365.44	31.55	9850	6156.41	37.5

Annex 12-6: Contents of Monthly Report in MT

(1) Monthly report of Aimag Centre

Trouble in Aimag Center		
	Micro wave	Number and Duration of Noise, Number and duration of Faults
	Toll Cable (Coaxial, Optical fiber cable)	Number and duration of faults
	Toll multiplexer	Number and Duration of Noise, Number and duration of Faults
	Switching	Number and duration of SW Faults, Equipment fault, Power supply fault, Cooling system trouble, Writing and reading
	Telephone cable in city	Number of faults, cleared fault in one day, cleared fault in 1-3 days, cleared fault in 3-8 days, fault ratio per 100 subscriber
		Number of trunk cable fault,
		Subscriber cable fault,
	IT	Fault of E-Mail, fault at computer network, Software trouble, hardware trouble, Fax trouble, Internet trouble
Trouble in Sum Center		
	Sum telecommunication	Open wire fault, wire multiplexer trouble, Power supply trouble,
	Sum Switch	Number of SW out of order
Trouble in Bag		Number of bags not operating due to equipment and line fault

Annex 12-7: MT Organization chart in 1996



Annex 12-8: Fault Ratio**(1) Detailed related data and Fault ratio in MT**

Details of Fault ratio

1. Subscriber Fault (Total)

Item	1998	1999	2000	2001
Whole MT	115270	78650	59200	53382
Ulaanbaatar	75510	49500	35000	30814
Whole Aimag area	39760	29100	29200	22568

2. Exsiting Subscriber

	1998	1999	2000	2001
Whole MT	96033	105796	113337	119903
Ulaanbaatar	53899	61467	66856	70485
Whole Aimag area	42134	44329	46481	49418

3. Fault Ratio

	1998	1999	2000	2001
Whole MT	120.0	74.3	52.2	44.5
Ulaanbaatar	140.1	80.5	52.4	43.7
Whole Aimag area	94.4	65.6	62.8	45.7

(2) Faults/month/100 subs. in the world

Country	Telephone line per 100 inhabitants 1999	Faults per 100 main lines per year 1999
High Income	58.50	10.6
Upper Middle Income	19.95	19.8
Lower Middle Income	11.99	31.9
Low Income	4.32	141.8

Annex 12-9: Fault clearance in MT**(1) Fault clearance in MT report**

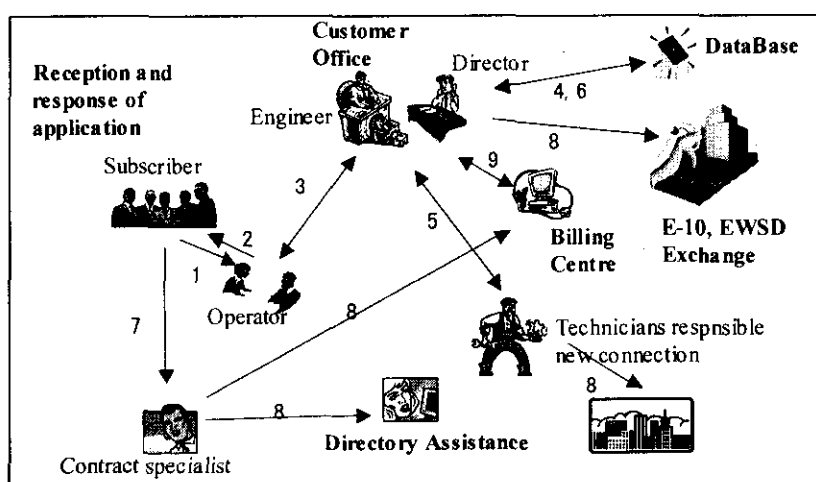
	1998	1999	2000	2001
Cleared within target period (maximum 48	97	97.2	98.1	98.3
Cleared with more than 2 days	3	3.2	1.9	1.7

(2) Result of Fault Clearance in Ulaanbaatar (ATC-32) in May 2002

	Fault occurrence	Repaired in 24 hours	Clearance rate in 24 hours
MT facility	238		
Suscriber faicility	234		
Total	472	234	49.6%

Annex 12-10: New Subscriber Connection in MT

No.		1997	1998	1999	2000	2001	Total
1	Arhangai	38	50	8	20	5	121
2	Bayanulgi	59	0	4	115	240	418
3	Bayabhongor	67	44	47	36	58	252
4	Bulgan	101	89	132	124	152	598
5	Covialtai	13	23	5	0	133	174
6	Govisumber	19	176	156	101	94	546
7	Darhanuul	276	803	1204	990	1143	4416
8	Domogovi	83	13	93	102	56	347
9	Dornod	26	66	18	21	64	195
10	Dundgovi	71	16	12	14	31	144
11	Zavhan	9	33	0	0	84	126
12	Orhon	1199	1073	1123	721	877	4993
13	Uvurhangai	35	75	244	210	235	799
14	Umnogovi	60	70	72	20	44	266
15	Suhbaatar	29	36	29	258	21	373
16	Selenge	143	254	139	135	116	787
17	Tuv	134	113	69	47	73	436
18	Uvs	36	73	38	110	65	322
19	Hovd	53	145	109	40	126	473
20	Huvsgul	36	31	14	75	28	184
21	Hentii	23	30	28	61	113	255
22	Baganuul	161	225	228	312	197	1123
23	Nalaih	135	160	147	71	133	646
24	Aimags	2806	3598	3919	3583	4088	17994
25	Ulaanbaatar	3435	4677	8652	6249	5089	28102
	Total	6241	8275	12571	9832	9177	46096



Source: MT Decree (No. 156 of 1997)

Annex 12-10 (Figure) : Workflow of New Subscriber connection

Annex 12-11: Commencement period of New subscriber connection in MT

New connection period (Average days)

		1997	1998	1999	2000	2001
Total						
	Application up to replay	1-6	1-6	1-4.5	1-3	1-2.3
	Installation from SO issuance	2-11.5	2-11.5	1-7.5	1-5	1-4
	Total period	3-16.5	2-11.5	2-12	2-9	2-7.5
Ulaanbaatar						
	Application up to replay	1-10	1-10	1-7	1-5	1-4
	Installation from SO issuance	3-14	3-14	1-10	1-7	1-5
	Total period	4-24	4-24	2-17	2-12	2-11
Region (All Aimags)						
	Application up to replay	1-2	1-2	1-2	1	1
	Installation from SO issuance	1-7	1-7	1-5	1-3	1-3
	Total period	2-9	2-9	2-7	2-4	2-4

Annex 12-12: Call completion in Ulaanbaatar Exchanges in MT

Network performance indicators 1999-2002		1999		1999		2000		2000		2001		2001		2002		2002	
		ATC-3	ATC-45	ATC-6	ATC-3	ATC-45	ATC-6	ATC-3	ATC-45	ATC-6	ATC-3	ATC-45	ATC-6	ATC-3	ATC-45	ATC-6	ATC-3
Global effectiveness rate (Calls with answer)	47.07	50.2	48.3	51.83	54.5	52.93	55.49	56.9	55.05	55.1	53.8						
Outgoing ineffectiveness rate	53.27	50.9	54.17	48.37	46.3	48.47	48.46	43.7	46.7	44.36	44.3						
Incoming ineffectiveness rate	47.06	48	46.1	46.43	44.4	42.8	43.41	40.3	39.2	45.05	46.3						
Unsuccessful calls due to busy number	31.03	23.7	23.7	22.5	24.6	21.03	25.49	20.6	19.8	26.91	21.5						
Unsuccessful calls due to no answer	0.33	0.3	0.3	0.53	0.3	0.43	0.42	0.5	0.5	0.39	0.2						
Unsuccessful calls due to customer error	44.73	46.1	47.1	50.8	45.2	49.17	43.1	48	47.7	45.53	46.7						
Unsuccessful calls due to exchange	0	0	0	0	0	0	0.02	0	0	0.04	0						
Unsuccessful calls due to forward system	1.93	1.9	0.6	0.97	3.2	0.4	2.52	2.5	0.28	1.01	2.1						

Annex 12-13: Introducing of Digital Exchanges in Sum Centres

Aimags/District	Introducing of Digital Exchange in Sum Centres													2020	Total			
	Implementation year																	
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. ARKhangai	2	7		3	2	2			2									18
10. UVURKHANGAI	3	2	5		2	3	1						1		1			19
11. UMNUGOBI		1	2		3	4	3		1			1						15
12. SUKHBAATAR	2	3	1	1	1	1				2		1					1	13
13. SELENGE	5	3	2	2			1	1		1	2	1	2					20
14. TUV	7	3	3	1	3	4	1			1	1	2				1		27
15. UVS		1	6		2	1	1						1	3	1	1	2	19
16. KHOVD	1	1	1	1	3	5				1		1			1		1	16
17. KHUVSGUL	3	5	1	3	3			3	4	1						1		24
18. KHENTII	3	1	6	1	3	1	2	1		2	1							21
19. DARKHAN-UUL				1	1	1												3
2. BAYAN-ULGII			1	1	3	3		2		2	1	1						14
20. ORKHON	1																	1
21. GOBISUMBER	1						1											2
22. NALAIKH								1					2	1				4
3. BAYANKHONGOR	3	1		3	5	1	1	2	1	3								20
4. BULGAN	6	3	1	4	1	1												16
5. GOBI-ALTAI		3	2	1	2	2	1	2	2	1		1		1		1		19
6. DORNOGOVI	2	1	1	2		2	5	1			1					1	1	17
7. DORNOD		1	2			3	2						1		4	1		14
8. DUNDGOBI	1	1	3		1	3	1			1	2					1		14
9. ZAVKHAN	2	1	3	2	1	2	5		1				1	3	1	1		23
Total	42	38	40	26	36	39	25	13	11	15	8	8	8	8	8	8	6	339

Annex 12-14: Preventive Maintenance Method in NTT

(1) Work scope of preventive maintenance

Work scope of preventive maintenance in each organization level is shown in Table 13.3-13.

Table 13.3-13: Work scope of preventive maintenance

SECTION	ACTIVITY
HQ	Planning the preventive work / Schedule for the year in the whole country
Aimag Centre	Planning the preventive work / schedule for the year in the area (report to HQ)
Work site	Execution of preventive maintenance Execution of measure (report to Aimag Centre)

(2) Objective facility

Objective facility for each OSP, SW, TX and PW is shown in Table 13.3-14.

Table 13.3-14: Objective facility

SECTION	OBJECTIVE FACILITY
Outside Plant	Pole, guy, messenger wire, primary cable, secondary cable, cabinet etc.
Civil work	Man hole, duct, lifting duct
Switching	Switching system
Transmission	Multiplexer, optical terminal equipment, supervisory equipment
Radio	Radio equipment, circuit modify equipment, supervisory equipment, air dry equipment, antenna
Power equipment	Battery, generator

(3) Method of preventive maintenance

(a) Out Side Plant

In case of preventive maintenance for Out Side Plant, it is mainly done by patrol

check. Method is shown in Table 13.3-15. Period should be planned in Aimag Centre or HQ.

Table *13.3-15: Method of Preventive Maintenance (Outside plant)

METHOD	CONTENT	PERIOD
Patrol by order from Aimag Centre	E.g. cable characteristic go down	Un-routine
Patrol check by periodical schedule	Schedule by HQ, Aimag centre	Routine
Check together with installation work	In case of construction work, check at same time with supervision	Un-routine
Patrol check before and after disaster	In case of the disaster, go patrol check to the place that is considered damage	Un-routine

(b) Office plant (Switching, Transmission and Power equipment)

Method is shown in Table 13.3-16.

Table 13.3-16: Method of preventive maintenance (Inside plant)

METHOD		CONTENTS
Direct work	Patrol, check, automatic test	Level check Power voltage check Alarm test Observation check
Indirect work	(Desk work)	Statistical study for ever kind of message on display Collection of fault example and study Recording fault and analysis

(4) Objective item of preventive maintenance

Necessary preventive items for each plant are as follows:

(a) Out Side Plant

Table 13.3-17: Subscriber's Line Plant

FACILITY	CONTENTS OF PATROL CHECK	ACTION AFTER PATROL CHECK
Pole	Corrosion, damage, ramp	Replacement, amend ramp pole
Guy	Corrosion, damage, loose	Replacement, tension adjust
Messenger wire	Corrosion	Replacement
Aerial cable	Cable crack	Replacement
	Distance from ground to cable	Replace, route modification
	Contact to tree	Cut of tree, rout modification
	Deformation of drop point	Replacement
Ground cable	Congestion of cable in M/H	Cable arrangement
	Cable crack damage	Repair of sleeve
	Cable creep in duct	Installation of Cable stopper

Table 13.3-18: Civil Plant

FACILITY	CONTENTS OF PLANT CHECK	ACTION AFTER PATROL CHECK
Man hole	Damage of M/H cover, shaky of M/H	Replacement, insert of packing
	Height between M/H cover and ground	Adjust of M/H cover
Duct	Damage,	Replacement
Lifting duct	Corrosion, damage	Replacement, change paint
Cabinet	Water leak	Replace, water leak prevention
	Corrosion, damage	Replace, change paint

(b) Switching

- Check of system back up copy
- Check system clock
- Check function of test desk
- Check of alarms and indicator lamps
- Refill printer paper
- Clean all the tape drive heads
- Check of printer ribbon or printer head
- Replace filter in CP-Fan
- Clean floors in the control room
- Temperature and humidity in exchange premises

(c) Transmission

- Alarm test
- Replacement the lithium battery
- Refill print paper
- Clean floor in the control room
- Temperature and humidity in exchange premises

(d) Power equipment

Table 13.3-18: Power equipment

FACILITY	CHECK ITEMS
Site	Clean
Low voltage	Check and test
Batteries voltage	Voltage control
Air conditioner	Check temperature and humidity
	Cleaning and greasing
Power supply	Test voltage
Inverter	Check
Generator	Inspection
	Test of starting and check voltage
	Complete inspection
Rectifier	Inspection and test
	Test of main-power cut-off
	Complete inspection

ANNEX 13

HUMAN RESOURCE DEVELOPMENT PLAN

ANNEX 13

Human Resource Development Plan

Annex 13-1

Relation between Fixed telephone density and.....2
Fixed telephone/Employee (World)

Annex 13-2

Relation between Fixed telephone density and.....4
Fixed telephone/Employee(Asia)

Annex 13-1 Relation between Fixed telephone density and Fixed telephone/Employee(World ITU 1999 Data(139 countries data)

	Country Name	Population (million)	Fixed telephone	Fixed telephone density (/100)	Employee (thousands)	Fixed TEL/Employee
1	State of Bahrain	0.67	165.40	24.87	2.10	78.78
2	People's Republic of Bangladesh	126.95	433.00	0.34	18.60	23.28
3	Kingdom of Bhutan	0.68	11.80	1.80	0.40	29.50
4	Kingdom of Cambodia	10.95	27.70	0.25	0.70	39.57
5	People's Republic of China	1266.84	108718.00	8.58	685.00	158.71
6	Republic of Cyprus	0.67	424.10	63.01	2.40	178.71
7	Hong Kong Special Administrative Region	6.72	3869.00	57.57	36.50	106.00
8	India	998.06	26511.00	2.66	421.00	62.97
9	Republic of Indonesia	209.26	6080.20	2.91	45.00	135.12
10	Islamic Republic of Iran	66.80	8371.00	12.53	47.40	176.60
11	State of Israel	6.10	2877.00	47.13	6.80	423.09
12	Japan	126.51	70530.00	55.75	180.00	391.83
13	Hashemite Kingdom of Jordan	6.48	565.30	8.72	5.80	97.47
14	Republic of Korea	46.86	20518.00	43.79	69.00	297.36
15	State of Kuwait	1.90	456.00	24.02	7.60	60.00
16	Lao People's Democratic Republic	5.30	34.50	0.65	1.10	31.36
17	Malaysia	21.83	4431.00	20.30	25.40	174.45
18	Republic of Maldives	0.28	22.20	7.97	0.60	37.00
19	Mongolia	2.41	119.36	4.95	4.51	26.48
20	Union of Myanmar	45.06	249.10	0.55	7.80	31.94
21	Kingdom of Nepal	22.37	253.00	1.13	4.70	53.83
22	Sultanate of Oman	2.46	220.40	8.96	2.10	104.95
23	Islamic Republic of Pakistan	134.51	2986.00	2.22	59.00	50.61
24	Republic of the Philippines	74.45	2892.00	3.88	13.20	219.09
25	State of Qatar	0.59	154.90	26.29	1.70	91.12
26	Kingdom of Saudi Arabia	20.90	2706.00	12.95	23.20	116.64
27	Republic of Singapore	3.89	1877.00	48.20	8.40	223.45
28	Democratic Socialist Republic of Sri Lanka	18.64	679.20	3.64	11.20	60.64
29	Syrian Arab Republic	16.11	1600.00	9.93	20.40	78.43
30	Taiwan	22.09	12044.00	54.52	41.70	288.82
31	Kingdom of Thailand	60.86	5218.00	8.57	34.00	153.41
32	Republic of Turkey	64.85	18054.00	27.84	72.50	249.02
33	United Arab Emirates	2.94	975.20	33.19	8.20	118.93
34	Republic of Yemen	17.49	291.40	1.67	4.70	62.00
35	Republic of Kazakhstan	4.67	356.00	7.62	7.20	49.44
36	Kyrgyz Republic	16.27	1760.00	10.82	33.30	52.85
37	Republic of Tajikistan	6.10	212.50	3.48	5.00	42.50
38	Turkmenistan	4.38	359.00	8.19	7.40	48.51
39	Republic of Uzbekistan	24.31	1599.00	6.58	28.50	56.11
40	Australia	18.97	9857.00	51.97	85.10	115.83
41	Republic of the Fiji Islands	0.81	81.50	10.11	1.20	67.92
42	New Zealand	3.81	1889.00	49.57	6.80	277.79
43	Solomon Islands	0.43	8.10	1.89	0.30	27.00
44	Democratic People's Republic of Algeria	30.77	1600.00	5.20	17.80	89.89
45	Republic of Angola	12.48	96.40	0.77	2.10	45.90
46	Republic of Botswana	1.61	123.80	7.69	1.80	68.78
47	Burkina Faso	11.62	47.30	0.41	1.30	36.38
48	Republic of Burundi	6.57	19.00	0.29	0.60	31.67
49	Republic of Cameroon	14.69	94.60	0.64	2.20	43.00
50	Republic of Cape Verde	0.42	46.90	11.21	0.40	117.25
51	Central African Republic	3.55	9.90	0.28	0.40	24.75
52	Republic of Chad	7.46	9.70	0.13	0.30	32.33
53	Republic of Cote d'Ivoire	14.53	219.30	1.51	3.70	59.27
54	Republic of Djibouti	0.83	8.80	1.40	0.40	22.00
55	Arab Republic of Egypt	62.43	4686.00	7.51	55.60	84.28
56	State of Eritrea	3.72	27.40	0.74	0.50	54.80
57	Federal Democratic Republic of Ethiopia	61.10	194.50	0.32	6.60	29.47
58	Gabonese Republic	1.20	38.00	3.17	1.10	34.55
59	Republic of The Gambia	1.27	29.20	2.30	0.90	32.44
60	Republic of Ghana	19.68	158.60	0.81	3.60	44.06
61	Republic of Guinea	7.81	46.20	0.59	0.80	57.75
62	Republic of Madagascar	15.50	50.20	0.32	2.90	17.31
63	Republic of Malawi	10.64	41.40	0.39	5.00	8.28
64	Islamic Republic of Mauritania	2.57	18.50	0.64	0.50	33.00
65	Republic of Mauritius	1.15	257.10	22.36	1.80	142.83
66	Kingdom of Morocco	27.87	1487.00	5.26	14.10	104.04
67	Republic of Mozambique	19.29	78.10	0.40	2.20	35.50
68	Republic of Namibia	1.70	108.20	6.38	1.70	63.65

Annex 13-1 Relation between Fixed telephone density and Fixed telephone/Employee(Wor)ITU 1999 Data(139 countries data)

	Country Name	Population (million)	Fixed telephone	Fixed telephone density (/100)	Employee (thousands)	Fixed TEL/Employee
69	Republic of Senegal	9.28	165.90	1.79	1.40	118.50
70	Republic of Seychelles	0.08	19.60	24.42	0.30	65.33
71	Republic of South Africa	43.85	5493.00	12.53	49.10	111.87
72	Republic of Sudan	28.88	251.40	0.87	2.70	93.11
73	Kingdom of Swaziland	0.98	30.60	3.12	0.50	61.20
74	Republic of Togo	4.51	38.20	0.85	0.90	42.44
75	Republic of Tunisia	9.48	850.40	8.99	6.60	128.85
76	Republic of Uganda	21.62	57.20	0.26	1.70	33.65
77	United Republic of Tanzania	32.79	149.60	0.46	3.70	40.43
78	Republic of Zambia	8.98	83.08	0.93	3.40	24.44
79	Republic of Albania	3.85	140.40	3.65	4.40	31.91
80	Republic of Austria	8.18	3863.00	47.24	24.10	160.29
81	Republic of Bulgaria	8.28	2933.00	35.43	26.50	110.88
82	Republic of Croatia	4.48	1634.00	36.49	10.80	151.30
83	Czech Republic	10.26	3806.00	37.09	23.70	160.59
84	Kingdom of Denmark	5.31	3638.00	68.47	18.90	192.49
85	Republic of Estonia	1.44	515.50	35.74	2.70	190.93
86	Republic of Finland	5.17	2850.00	55.18	21.80	131.94
87	French Republic	58.62	34100.00	58.17	170.50	200.00
88	Federal Republic of Germany	82.16	48500.00	59.03	226.00	214.80
89	Hellenic Republic	10.63	5611.00	52.81	21.60	259.77
90	Republic of Hungary	10.04	3726.00	37.09	17.30	215.38
91	Republic of Iceland	0.28	188.80	67.74	1.30	145.23
92	Ireland	3.71	1770.00	47.77	15.00	118.00
93	Republic of Italy	57.34	26506.00	46.22	79.00	335.52
94	Republic of Latvia	2.44	731.50	29.99	4.60	159.02
95	Republic of Lithuania	3.70	1153.00	31.16	7.00	164.71
96	Grand Duchy of Luxembourg	0.43	310.90	72.44	0.90	345.44
97	Republic of Malta	0.39	197.80	51.23	1.50	131.87
98	Kingdom of the Netherlands	15.84	9610.00	60.67	47.90	200.63
99	Kingdom of Norway	4.48	3176.00	70.92	23.90	132.89
100	Portuguese Republic	9.96	4230.00	42.31	19.60	215.82
101	Romania	22.40	3740.00	16.70	44.90	83.30
102	Slovak Republic	5.40	1655.00	30.67	14.20	116.55
103	Spain	40.20	16480.00	40.99	46.60	353.85
104	Kingdom of Sweden	8.86	5889.00	66.46	28.70	205.19
105	Swiss Confederation	7.15	4992.00	69.87	24.60	202.93
106	Former Yugoslav Republic of Macedonia	2.01	471.00	23.42	3.70	127.30
107	United Kingdom of Great Britain and Northern Ireland	59.50	33750.00	56.72	202.40	166.75
108	Federal Republic of Yugoslavia	10.64	2281.00	21.44	14.70	155.17
109	Republic of Armenia	3.53	547.00	15.53	8.90	61.46
110	Azerbaijan Republic	7.70	730.00	9.48	11.20	65.18
111	Republic of Belarus	10.27	2638.00	25.68	26.80	98.43
112	Republic of Moldova	4.38	555.00	12.68	7.60	73.03
113	Russian Federation	147.20	30949.00	21.03	432.90	71.49
114	Ukraine	50.66	10074.00	19.89	126.00	79.95
115	Barbados	0.27	115.00	42.71	1.10	104.55
116	Belize	0.24	36.60	15.57	0.40	91.50
117	Canada	30.49	19957.00	65.45	84.00	237.56
118	Republic of Costa Rica	3.93	802.60	20.41	4.50	178.36
119	Republic of Cuba	11.16	434.00	3.89	15.00	28.93
120	Republic of El Salvador	6.15	468.10	7.61	9.50	49.27
121	Republic of Guatemala	11.09	610.70	5.51	4.70	129.94
122	Republic of Honduras	6.32	279.20	4.42	3.90	71.59
123	Jamaica	2.56	509.60	19.91	3.20	159.25
124	United Mexican States	97.37	10927.00	11.22	83.90	130.24
125	Republic of Nicaragua	4.94	150.30	3.04	2.30	65.35
126	Republic of Panama	2.81	462.50	16.45	4.40	105.11
127	Republic of Trinidad and Tobago	1.29	279.00	21.58	2.80	99.64
128	United States of America	276.22	183521.00	66.44	1070.00	171.51
129	Argentine Republic	36.58	7357.00	20.11	19.80	371.57
130	Federative Republic of Brazil	167.99	24985.00	14.87	142.30	175.58
131	Republic of Chile	15.02	3109.00	20.70	14.00	222.07
132	Republic of Colombia	41.59	6665.00	16.03	44.10	151.13
133	Republic of Ecuador	12.41	1129.50	9.10	6.90	163.70
134	Co-operative Republic of Guyana	0.86	64.00	7.49	0.70	91.43
135	Republic of Paraguay	5.36	297.00	5.54	5.90	50.34
136	Republic of Peru	25.23	1688.60	6.69	5.70	296.25
137	Republic of Suriname	0.42	70.80	17.05	1.10	64.36
138	Oriental Republic of Uruguay	3.31	896.80	27.07	5.80	154.62
139	Bolivarian Republic of Venezuela	23.71	2586.00	10.91	11.90	217.31

Annex 13-2 Relation between Fixed telephone density and Fixed telephone/Employee(Asia ITU 1999 Data(39 countries data)

	Country Name	Population (million)	Fixed telephone	Fixed telephone density (/100)	Employee (thousands)	Fixed TEL/Employee
1	State of Bahrain	0.67	165.40	24.87	2.10	78.76
2	People's Republic of Bangladesh	126.95	433.00	0.34	18.60	23.28
3	Kingdom of Bhutan	0.66	11.80	1.80	0.40	29.50
4	Kingdom of Cambodia	10.95	27.70	0.25	0.70	39.57
5	People's Republic of China	1266.84	108716.00	8.58	685.00	158.71
6	Republic of Cyprus	0.67	424.10	63.01	2.40	178.71
7	Hong Kong Special Administrative Region	6.72	3889.00	57.57	36.50	106.00
8	India	998.06	26511.00	2.66	421.00	62.97
9	Republic of Indonesia	209.26	6080.20	2.91	45.00	135.12
10	Islamic Republic of Iran	66.80	8371.00	12.53	47.40	176.80
11	State of Israel	6.10	2877.00	47.13	6.80	423.09
12	Japan	126.51	70530.00	55.75	180.00	391.83
13	Hashemite Kingdom of Jordan	6.48	565.30	8.72	5.80	97.47
14	Republic of Korea	46.86	20518.00	43.79	69.00	297.36
15	State of Kuwait	1.90	456.00	24.02	7.60	60.00
16	Lao People's Democratic Republic	5.30	34.50	0.65	1.10	31.36
17	Malaysia	21.83	4431.00	20.30	25.40	174.45
18	Republic of Maldives	0.28	22.20	7.97	0.60	37.00
19	Mongolia	2.41	119.38	4.95	4.51	26.48
20	Union of Myanmar	45.06	249.10	0.55	7.80	31.94
21	Kingdom of Nepal	22.37	253.00	1.13	4.70	53.83
22	Sultanate of Oman	2.46	220.40	8.96	2.10	104.95
23	Islamic Republic of Pakistan	134.51	2986.00	2.22	59.00	50.81
24	Republic of the Philippines	74.45	2892.00	3.88	13.20	219.09
25	State of Qatar	0.59	154.90	26.29	1.70	91.12
26	Kingdom of Saudi Arabia	20.90	2706.00	12.95	23.20	118.64
27	Republic of Singapore	3.89	1877.00	48.20	8.40	223.45
28	Democratic Socialist Republic of Sri Lanka	18.64	679.20	3.64	11.20	60.64
29	Syrian Arab Republic	16.11	1600.00	9.93	20.40	78.43
30	Taiwan	22.09	12044.00	54.52	41.70	288.82
31	Kingdom of Thailand	60.86	5216.00	8.57	34.00	153.41
32	Republic of Turkey	64.85	18054.00	27.84	72.50	249.02
33	United Arab Emirates	2.94	975.20	33.19	8.20	118.93
34	Republic of Yemen	17.49	291.40	1.67	4.70	62.00
35	Republic of Kazakhstan	4.67	356.00	7.62	7.20	49.44
36	Kyrgyz Republic	16.27	1780.00	10.82	33.30	52.85
37	Republic of Tajikistan	6.10	212.50	3.48	5.00	42.50
38	Turkmenistan	4.38	358.00	8.19	7.40	48.51
39	Republic of Uzbekistan	24.31	1599.00	6.58	29.50	56.11

ANNEX 14

SPECTRUM MANAGEMENT PLAN

Annex 14

Spectrum Management Plan

(Non-official translation)

State info magazine No 28

June 23 1999

Mongolia Radio Wave Law

Chapter one

Article 1 Purpose of this Law

1.1. Purpose of this Law consists in regulation of relation, concerning allocation, operation, protection, ownership, and possession of radio wave.

Article 2 Legislation relevant radio waves.

2.1. Legislation radio waves consists of the Constitution of Mongolia, Communication Law, radio wave Law and other legislation acts in conformity with aforementioned Laws.

2.2. In case of un-correspondence between this Law and international treaty of Mongolia, to comply the international treaty.

Article 3 Juridical terms.

3.1. To comprehend the next terms used in Law, as mentioned below.

3.1.1. "*Radio wave*" means electro-magnetic fluctuation unit, up to 3000 GHz, dispersing in aerospace.

3.1.2. "*Radio wave bandwidth*" means the cluster of radio frequency.

3.1.3. "*Radio communication*" means to transmit or receive the different kind of information by signs, signals, sounds, images and other forms, using radio equipment.

3.1.4. "*National table of radio wave allocation*" means the allocation dividing up by sorts, radio communication service types in whole radio frequency bandwidth.

Article 4 Radio wave ownership.

- 4.1. The radio wave, caused within territory of Mongolia, or radio wave included in the “*national table of radio wave allocation*”, is the State property of Mongolian Republic.
- 4.2. The State as the owner of radio wave, able lease exploitation rights to others, under conditions required in this Law.

Article 5 Plenipotentiary of State Organizations concerning radio wave.

- 5.1. The Government exercises next plenipotentiary concerning radio wave:
 - 5.1.1. To make decisions concerning utilization of space communication satellite location, assigned to Mongolia.
 - 5.1.2. Elaborate issues on involvement of frequency allocation into the State confidentiality and determine the confidentiality levels.
- 5.2. The Central Organization of State Administration, in charge of communication affairs, exercises the following plenipotentiary on wave.
 - 5.2.1. To process the State Policy concerning utilization of radio frequency bandwidth.
 - 5.2.2. In case of un-reflection, in international treaties of Mongolia, issues concerning radio wave affairs with neighboring countries, regulate as required by directives of International Telecommunication Organization.
 - 5.2.3. To issue the integrated registration of radio frequency allocation, and settle on procedures on exploitation of radio frequency bandwidth, planning, allocation, exploitation of radio frequency and set up regulation for service valuation.
 - 5.2.4. To settle and approve the financing amount of expenditure and acquisition of technique equipments for The Regulation Committee.
 - 5.2.5. To represent Mongolian Republic in International Radio Organization.

Chapter two

Exploitation of radio frequency

Article 6 Classifications of radio frequency bandwidth.

- 6.1. To classify the radio frequency bandwidth in the followings by purposes of its exploitation:
 - 6.1.1. Special consumption.
 - 6.1.2. Public consumption.
- 6.2. The radio frequency bandwidth, assigned for the purpose to defend and ensure safety of country and promote social order, has classified as the frequency bandwidth for the special consumption.

6.3. The radio frequency bandwidth, assigned for the purpose of business entities, organizations and citizens has classified as the frequency bandwidth for the public consumption.

Article 7 A legal person competent to possess frequency bandwidth.

7.1. A legal person, establishing radio frequency bandwidth and carrying out activities under the legislation of Mongolia, have to exploit frequency bandwidth in accordance with this Law by special permission, license and registration from The Regulation Committee.

7.2. A radio frequency bandwidth for a special consumption should be exploited by registration at Regulation Committee.

7.3. In case of un-reflection otherwise in the international treaties of Mongolia, diplomatic or consulate missions and international representative offices in Mongolia should exploit the frequency bandwidths as required with the article 7.1 of this Law.

7.4. In case of exploitation of public consumption radio frequency by defense, security and public safety organizations, the article 7.1. should complied by these authorities.

Article 8 Prohibition for exploitation of radio frequency and radio frequency bandwidths.

8.1. A legal person, without special permission and license is prohibited to exploit radio frequency and radio frequency bandwidth.

Article 9 Special permission to license

9.1. Special permission to license is a document, which allows from state competent organization to exploit radio frequency and radio frequency bandwidth by radio equipment, with purpose to organize radio communication, to carry on services by radio communication and for public services.

9.2. In the special permission to license should be indicated location of radio equipment, coverage area, radio frequency, capacity, term of activity and purpose of exploitation.

Article 10 Application for a special permission.

10.1. In the application for special permission, apart with documents referred in the article 9.2. of The Communication Law, should be attached following documents:

10.1.1. A photocopy of certification.

- 10.1.2. Radio equipment facility mapping, geographic location, coverage area, radio frequency bandwidth, radio frequency and technology.
- 10.1.3. Document issued by competent organization, confirming radio equipment.
- 10.1.4. Recommendation from Head of aimag, city, sum or district administration.
- 10.2. In the application for permission should be referred name of applicant, permanent address, numbers of telephone and fax, name and occupation title of person competent to make decisions.

Article 11 Grant of permission.

- 11.1. After reception of application, The Regulation Committee should verify the application with attachments by requirements in the article 10.1 of this Law.
- 11.2. The Regulation Committee should make one of following decisions and inform to applicant within 30 days after receiving application for exploitation of radio frequency and radio frequency bandwidth:
 - 11.2.1. To issue special permission for exploitation of radio frequency and radio frequency bandwidth.
 - 11.2.2. To refuse issuance of permission in the case if requested frequency and frequency bandwidth coinciding with or causing an interference to radio frequency which being exploiting under a valid license or permission, or a part of the radio frequency for special purposes.
- 11.3. If exploitation of relevant radio frequency coordinating by International Organization, this radio frequency will be exploited under suggestion from International Organization in accordance with article 11 of this Law.

Article 12 Term of special permission, its extension.

- 12.1. The Regulation Committee should issue a special permission with a term up to 15 years within 5 business days after the first year fee has paid in by applicant.
- 12.2. An owner of special permission should apply for extension to The Regulation Committee 60 days or more before deadline of special permission.
- 12.3. The Regulation Committee should check observance of duties by applicant, stipulated in this law and agreement within 10 business days, in case of positive conclusion to extend the term of permission, to register and return to applicant.

Article 13 Certificate

- 13.1. To grant for citizen or a legal person a document (further license) confirming one's rights, to organize radio communication, for science, experiments or other non-public purposes, in private or internal consumption communication.
- 13.2. In the application for license should be referred name of applicant, official address, numbers of telephone and fax, geographical location, coverage area and technical data of radio equipment.
- 13.3. The Regulation Committee shall coordinate matters concerning transference of licenses, extensions of term and voidances, in accordance with directions from central organization of state administration, charged on communication affairs.
- 13.4. In the certificate should indicated location of radio equipment, coverage area, radio frequency, call sign, capacity, term of activity and purpose of exploitation.
- 13.5. In case if interesting parties shall apply for certificate with similar radio frequency, priority will given to whom applied and registered earliest.

Article 14 To operate devoid of special permission and license for radio frequency exploitation.

- 14.1. The following types of radio equipments are excused from obtaining of special permission and license for exploitation:
 - 14.1.1. All kinds of TV-sets, radio receivers.
 - 14.1.2. Radio equipments for treatment and diagnosis.
 - 14.1.3. Radiotelephones, radio equipments, housekeeping electrical appliances, satisfied technical requirements and with output capacity not more than 0.01 W.

Article 15 Registration.

- 15.1 In the unified registration should be indicated in the administrative and territorial units separately categorization of radio frequency, purpose, name of user, address, radio frequency bandwidth permitted to exploit, its width, servicing area, geographical location, term of operation, capacity, payment condition.
- 15.2. The Regulation Committee will keep registration record and report to central authority of state administration charge in communication affairs.

Article 16 Service fee.

16.1. According to requirements in the article 5.2.3. applicant should make payments for following services; obtain a license, transference, obtain a special permission, to extend its term, to register, to get decision on mutual influence.

Chapter three

Conclude a term of special permission or license.

Article 17 Basis to conclude the term of special permission or license.

- 17.1. The transference of a special permission and rights indicated in, to others by an owner of a special permission, is prohibited without consent of organization granted a special permission.
- 17.2. The transference of a radio equipment, which has a special permission, sale it to others and change the owner of equipments in any other way should be registered newly at The Regulation Committee, charged in special permissions.
- 17.3. The term of special permission or license should conclude in accordance with directions in article 11 of Communication Law.
- 17.4. In case if term of special permission or license is concluded, in accordance with this Law, special permission or license might be granted to others.

Article 18 Voidance (annulment) of special permission or license.

- 18.1. A special permission or license might be voided in accordance with directions in article 12 of Communication Law and following reasons:
- 18.1.1. If owner of special permission or license becomes unable to realize rights required in this law.
- 18.1.2. If owner of special permission or license did not made full payments for special permission, radio frequency exploitation and service in time.
- 18.1.3. In case of exploitation, jamming or hearing with intention, the radio frequency categorized as for “special consumption”.
- 18.2. If The Regulation Committee shall find reasons for voidance, it should inform about it to owner of special permission or license by statement. The reasons for voidance of special permission and license with evidences should be indicated.

- 18.3. If owner of special permission or license will find that voidance is groundless, he may complain with own petition and evidences to The Regulation Committee within 30 business days after receiving of statement.
- 18.4. The Regulation Committee should verify the special permission or license with received in complain (petition) and respond to complainer.
- 18.5. If The Regulation Committee shall consider that complain, sent by owner of special permission or license is groundless, then Committee should inform the owner about conclusion and proceed for voidance of special permission or license.
- 18.6. The owner of special permission or license has right to appeal to court within 30 business days after receiving of statement of voidance.
- 18.7. In case if owner of special permission or license appealed to court, until declaration of judicial decision, the relevant radio frequency should not newly transferred to others.

Chapter four

Responsibilities, Rights of Special Permission or License owner.

Article 19 The responsibilities and rights of special permission or license owner.

- 19.1. The owner of special permission or license has following rights:
 - 19.1.1. To chose and operate with radio equipment, which providing and guaranteeing standards and technical requirements.
 - 19.1.2. To exploit the permitted radio frequency in accordance with conditions indicated in this law, to protect it and require for removing of mutual influences.
 - 19.1.3. In accordance with requirements indicated in this law to extend the term of special permission or license for exploitation of radio frequency, to transfer license to others.
 - 19.1.4. In case of un-reflection in law otherwise, to take interested information concerning operation of radio frequency from The Regulation Committee.
- 19.2. The owner of special permission or license has following responsibilities:
 - 19.2.1. Except of case indicated in article 14 of this law, the person interested in import, produce and sale of radio equipments should make preliminary agreement concerning radio frequency with The Regulation Committee.
 - 19.2.2. To operate radio equipment by conditions, term and purpose required in the special permission and license.
 - 19.2.3. The payment of coming year for special permission and license should be done annually in the same business day, obtained the special permission and license.

- 19.2.4. To make changes on technical and operation conditions, indicated in the special permission and license, by authority granted the permission.
- 19.2.5. Do not cause the mutual influence to other radio communications and radio equipments.
- 19.2.6. In case of receiving international emergency signs (SOS, MAYDAY etc) from other stations, inform about this to concerned authorities immediately.
- 19.2.7. To dismantle an antenna, when valid period of special permission and license is concluded, or when those permissions have voided.
- 19.2.8. To operate only within permitted radio frequency and radio frequency bandwidth, to check regularly the output capacity and frequency of own radio equipment.

Chapter five

Other items.

Article 20 Supervision.

- 20.1. The Regulation Committee and state inspector of communication should exercise the supervision concerning observance of radio wave Law within territory of Mongolia.
- 20.2. The Regulation Committee should organize activities on removing of mutual influences, to seek and expose offenders, without obstacles and harming to activities of radio frequency owner.
- 20.3. The Regulation Committee office may have a laboratory in accordance with the international standards.
- 20.4. To impose the penalty, to radio frequency user, for late payment, with rate 0.3% from total unpaid amount on every delayed day.
- 20.5. The Regulation Committee is competent to discontinue the activity, exploitation of radio equipments, to void the rights in case of break this law, in following cases:
 - 20.5.1. If radio equipment does not provide requirements on standard, quality and technical conditions.
 - 20.5.2. If operate devoid of special permission, license and registration.
 - 20.5.3. In case of un-payment, un-observance of stipulated responsibilities.
 - 20.5.4. If cause mutual influence, obstacles to normal operation of others.
 - 20.5.5. To change the data, frequency and operation hours of radio equipment, without preliminary notification to The Regulation Committee.
 - 20.5.6. In case of un-observance of state inspector requirements.
 - 20.5.7. In case of exploitation of radio equipments out of purpose.

Article 21 The responsibilities to be held in case of contravention the legislation.

21.1. To impose, by judge or state inspector of communication, the following penalties to offenders for contravention of Law Concerning Radio Wave:

21.1.1. To impose a fine of up to 20'000-50'000 Tug for citizens, 30'000-60'000 Tug for officials, 100'000-250'000 Tug for business units or organizations, for operation radio equipment devoid of special permission, license or registration.

21.1.2. To impose a fine of up to 10'000-40'000 Tug for citizens, 20'000-60'000 Tug for officials, 100'000-250'000 Tug for business units or organizations, for operation of radio equipment with purpose out of required in the special permission or license, for change devoid of permission the location, capacity, technical data, conditions and radio frequency.

21.1.3. To impose a fine of up to 10'000-40'000 Tug for citizens, 20'000-60'000 Tug for officials, 100'000-250'000 Tug for business units or organizations for obstacles made to owner of permission or license during realization of obtained rights in accordance with law.

21.1.4. To impose a fine of up to 10'000-50'000 Tug for citizens, 100'000-250'000 Tug for business units or organizations for operation in the radio frequency for special consumption and causing there a mutual influence.

21.1.5. To impose a fine of up to 10'000-50'000 Tug for citizens 20'000-60'000 Tug for officials and 100'000-250'000 Tug for business units or organizations for causing a mutual influence to other radio communications and radio equipment users, obstacles for normal operation and operating by equipment unsatisfied technical requirements.

21.1.6. To impose a fine of up to 10'000-50'000 Tug for citizens and 20'000-60'000 Tug for officials, who non-execute requirements from state inspector and make obstructions for control or examine.

21.1.7. To impose a fine of up to 20'000-50'000 Tug for officials violating the regulations for registration or granting special permission or license.