

Consumer Surplus for Calls from Public Organizations in Enclaves and Important Offices in Ulaanbaatar

The following proportions are derived as the portion of consumer surplus to the financial revenue.

Local call/long distance call/international call : 77% of financial revenue
 Installation charge : 48% of financial revenue

A detail of deriving these proportions are given in Chapter 7 "Financial, Economic and Social Analyses" of Volume IV "Supporting Document".

7.3.3 Result of Economic Analysis

Based on the costs and benefits estimated as above, EIRRs (economic internal rate of return) are calculated. Table 3-7-4 presents a flow of costs and benefits. The following EIRRs are derived.

1) normal case :	5.42%
2) cost 10% up :	3.23%
3) revenue 10% down :	3.00%
4) 2) plus 3) :	0.88%

The normal case EIRR is derived at 5.42%. A higher EIRR would be derived once various socio-economic benefits that could be realized, but not quantified such as those mentioned in the following sub-section, are successfully taken into EIRR calculation.

An EIRR for the DRCS project and the ATC-6 project combined is derived at 22.7% as shown in Table 3-7-5.

7.4 Social Analysis

The national development policy sets forth the necessity for protecting poorer and vulnerable segment of the population from adverse effects of transition into a market economy as presented in Chapter 3 of Volume II Main Report "Basic Plan". Equally high attention should be paid to equity aspect of development as well as to growth aspect. Translating this concept into telecommunications planning, consideration should be given to improving access to the telecommunications services for ger

area population, who are on average poorer and living in a low standard living environment. The importance of the Digital Radio Subscriber project hinges upon this point. An appropriate approach for improving the access to telecommunications services in ger areas would be to provide public phone or equivalent especially targeting poorer population who are not able to afford private phone, but strongly need better access to telecommunications services. As explained in Chapter 3 of Volume II, the lack of telephone is cited as the second serious problem facing the ger area residents. The implementation of the Digital Radio Subscriber project representing this concept would benefit a population of about 142,000, accounting for nearly 57% of all the ger population in Ulaanbaatar.

The Socio-Economic Survey results provide an insightful view into the way in which the life of ger population would be improved by the implementation of the Digital Radio Subscriber project. The interview survey revealed the problems of inadequate telecommunications system and actual and expected improvement in the daily life of ger population. Broadly speaking, the improvement in access to telecommunications network is expected to generate positive impacts on the life of ger people in the following aspects.

- daily life in general
- emergency cases

The most interviewees who have recently installed a phone point out that the life became much easier for them, especially through avoiding spending plentiful time and money for communicating with others by traveling to see them in the absence of telephone. The other important point made by interviewees is the need for telephone in emergencies in which they need to contact hospitals for calling an ambulance or police for coping with burglary or breaking in of strangers into their ger plot. In response to the question on the problems they had in the past because of having no phone, most interviewees cited the difficulty in calling an ambulance. Problems in these aspects would be especially serious in ger area where access to public transportation is poorer and people are economically more handicapped. These problems are expected to be significantly lessened by the improved access to public phones by the implementation of the Digital Radio Subscriber project, which would make a population of about 142,000 able to reach a public phone within 300 meters.

Table 3-7-1 Financial Internal Rate of Return of Digital Radio Concentration System (DRCS) Project

FIRR = negative

Year	Costs		Ger Area (mln. us\$)	Revenue						Total (mln. us\$)	Income before tax (mln. us\$)	Income tax (mln. us\$)	Income after tax + depreciation (mln. us\$)	
	Investment (mln. us\$)	OM (mln. us\$)		Enclaves			Public phone (thband US\$)	Total (thband US\$)	Impor- tant organi- zations (thband US\$)					
				Government etc.		Insta- llation (thband US\$)								
				local call (thband US\$)	Inter- national (thband US\$)									Rental (thband US\$)
1997	1.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-1.130	0.000	-1.076
1998	2.510	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-2.689	0.000	-2.510
1999	0.000	0.108	0.142	0.961	2.748	1.567	3.056	2.145	12.404	7.694	0.162	-0.125	0.000	0.055
2000	0.000	0.108	0.144	1.970	2.849	0.000	3.056	2.177	11.073	6.672	0.162	-0.125	0.000	0.054
2001	0.000	0.108	0.146	2.013	2.957	0.000	3.056	2.210	11.323	6.835	0.164	-0.123	0.000	0.057
2002	0.000	0.108	0.148	2.056	3.103	0.000	3.056	2.243	11.626	7.037	0.167	-0.120	0.000	0.059
2003	0.000	0.108	0.151	2.127	3.228	0.000	3.056	2.277	11.934	7.243	0.170	-0.117	0.000	0.063
2004	0.000	0.108	0.153	2.170	3.332	0.000	3.056	2.311	12.257	7.460	0.173	-0.114	0.000	0.065
2005	0.000	0.108	0.155	2.213	3.499	0.000	3.056	2.345	12.532	7.640	0.175	-0.112	0.000	0.068
2006	0.000	0.108	0.157	2.256	3.662	0.000	3.056	2.381	12.877	7.872	0.178	-0.109	0.000	0.070
2007	0.000	0.108	0.160	2.320	3.798	0.000	3.056	2.416	13.207	8.093	0.181	-0.106	0.000	0.074
2008	0.000	0.108	0.162	2.363	3.965	0.000	3.056	2.453	13.567	8.336	0.184	-0.103	0.000	0.076
Total	3.586	1.076	1.518	21.415	33.191	1.567	30.560	22.957	122.799	74.832	1.716	-4.972	0.000	-2.946

Note :

- 1) OM cost : 3% of investment cost annually
 - 2) Annual growth rate : 1.5% per year assumed. (equivalent to population growth rate)
 - 3) Income tax : 50% of pre-tax income
- * Depreciation is calculated in order to derive income tax. Depreciation is added to income after tax to derive FIRR to investment.

Table 3-7-2 FIRRs for DRCS Project under Different Charge Levels

Charge (Tg/minute)	FIRR (%)
3.0	negative
6.0	negative
9.0	negative
12.0	negative
13.1	0.03
15.0	2.10
18.0	5.09

Table 3-7-3 FIRR of DRCS Project Combined with ATC-6 Project

FIRR = 12.70%

(Unit million US\$)

Year	Net Cashflow*		
	Radio Project	ATC-6 Project	Total
1997	-1.076	-1.509	-2.585
1998	-2.510	-3.520	-6.030
1999	0.055	-5.475	-5.420
2000	0.054	-0.179	-0.125
2001	0.057	1.483	1.540
2002	0.059	1.664	1.723
2003	0.063	1.741	1.804
2004	0.065	1.810	1.875
2005	0.068	1.867	1.935
2006	0.070	1.946	2.016
2007	0.074	2.013	2.087
2008	0.076	2.096	2.172
2009	0.000	2.183	2.183
2010	0.000	2.251	2.251
2011	0.000	2.253	2.253
2012	0.000	2.253	2.253
2013	0.000	2.253	2.253
2014	0.000	2.253	2.253
2015	0.000	2.253	2.253
2016	0.000	2.253	2.253
2017	0.000	2.253	2.253
2018	0.000	2.253	2.253
2019	0.000	2.253	2.253
Total	-2.945	28.648	25.703

Note : *income after tax plus depreciation

Table 3-7-4 Economic Internal Rate of Return of Digital Radio Concentration System (DRCS) Project

EIRR = 1) normal case: 5.42% 3) benefit 10% down 3.00%
 2) cost 10% up: 3.23% 4) 2) plus 3) 0.88%

Year	Costs		Economic Benefit										Net Benefit (mln us\$)			
	Investment (mln us\$)	OM (mln us\$)	Total (mln us\$)	Ger (mln us\$)	Enclaves					Public phone (thsd us\$)	Total (thsd us\$)	Important Organizations ³⁾ (thsd us\$)		Total (mln us\$)		
					Government etc.		Inter-national (thsd us\$)	Insta-llation (thsd us\$)	Rental (thsd us\$)							
					local call (thsd us\$)	long-dis-tance (thsd us\$)										
1997	0.970	0.000	0.970	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.970
1998	2.264	0.000	2.264	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-2.264
1999	0.000	0.097	0.097	0.469	3.411	1.701	4.864	0.752	3.056	7.079	20.862	10.338	0.500	0.403	0.500	0.403
2000	0.000	0.097	0.097	0.475	3.487	1.807	5.043	0.000	3.056	7.185	20.577	10.045	0.506	0.409	0.506	0.409
2001	0.000	0.097	0.097	0.482	3.563	1.924	5.234	0.000	3.056	7.292	21.069	10.333	0.513	0.416	0.513	0.416
2002	0.000	0.097	0.097	0.488	3.639	2.067	5.492	0.000	3.056	7.402	21.657	10.691	0.521	0.424	0.521	0.424
2003	0.000	0.097	0.097	0.498	3.765	2.205	5.714	0.000	3.056	7.513	22.253	11.055	0.532	0.435	0.532	0.435
2004	0.000	0.097	0.097	0.505	3.841	2.368	5.986	0.000	3.056	7.626	22.877	11.438	0.539	0.442	0.539	0.442
2005	0.000	0.097	0.097	0.512	3.917	2.512	6.193	0.000	3.056	7.740	23.418	11.758	0.547	0.450	0.547	0.450
2006	0.000	0.097	0.097	0.518	3.993	2.694	6.482	0.000	3.056	7.856	24.081	12.169	0.554	0.457	0.554	0.457
2007	0.000	0.097	0.097	0.528	4.106	2.862	6.722	0.000	3.056	7.974	24.721	12.560	0.565	0.468	0.565	0.468
2008	0.000	0.097	0.097	0.535	4.183	3.062	7.018	0.000	3.056	8.093	25.412	12.989	0.573	0.476	0.573	0.476
Total	3.234	0.970	4.204	5.009	37.905	23.203	58.748	0.752	30.560	75.759	226.927	113.376	5.350	1.146	5.350	1.146

Note:

- 1) OM cost: 3% of investment cost annually
- 2) Economic benefit: 3.3 times of financial revenue in ger area (Tg 10/minute vs. Tg 3/minute)
- 3) Consumer surplus: 77% of tariff level for government and business phones
- 4) Consumer surplus: 48% of tariff level for government and business phones

Table 3-7-5 EIRR of DRCS Project Combined with ATC-6 Project

FIRR = 22.67%

(Unit million US\$)

Year	Net benefit		
	ATC-6 Project	DRCS Project	Total
1997	-1.351	-0.970	-2.321
1998	-3.151	-2.264	-5.415
1999	-4.153	0.403	-3.750
2000	-0.300	0.409	0.109
2001	2.725	0.416	3.141
2002	3.182	0.424	3.606
2003	3.359	0.435	3.794
2004	3.521	0.442	3.963
2005	3.663	0.450	4.113
2006	3.854	0.457	4.311
2007	4.025	0.468	4.493
2008	4.226	0.476	4.702
2009	4.437	0.000	4.437
2010	4.607	0.000	4.607
2011	4.612	0.000	4.612
2012	4.612	0.000	4.612
2013	4.612	0.000	4.612
2014	4.612	0.000	4.612
2015	4.612	0.000	4.612
2016	4.612	0.000	4.612
2017	4.612	0.000	4.612
2018	4.612	0.000	4.612
Total	65.540	1.146	66.686

8. Conclusion and Recommendation

8.1 Technical Aspect

The DRCS project is aiming to provide new telephone services in non telephone area i.e. Ger area, and not to meet the telephone demand increased, so it is expected to be low value of FIRR.

The DRCS system is very flexible, when a new telephone cable will be installed, so it is easy to transfer the terminal equipment. And the equipment replacement will be done by Mongolian staff after factory and OJT training. This is technically very beneficial to MCAC/MTC.

8.2 Cost Estimate

Table 3-8-1 shows the project investment cost.

Table 3-8-1 Project Investment Cost

(US\$)

No	Item	Total	Foreign	Local
1	Man Power	318.0	318.0	-
2	Equipment	1,930.0	1,930.0	-
3	Construction	422.0	382.0	40.0
4	Tax & Duty	190.0	-	190.0
	Total	2,860.0	2,630.0	230.0

8.3 Project Evaluation

The project evaluation for the DRCS project revealed that the project shows high economic and social viability, while financially some mechanism for subsidizing the project is needed. It is recommended that the DRCS project be implemented in combination with other profitable projects to compensate for low financial profitability of the DRCS project. The analysis revealed that the FIRR for the DRCS project combined with the ATC-6 project is derived at 8.9%. The implementation of the DRCS project in combination with the ATC-6 project is recommended from the perspective of maintaining a balance between contributing to better social equity and maximizing profit for MCAC/MTC.

