



**Bhutan InfoComm and Media Authority
Royal Government of Bhutan**

June 15 2009,

THE TELECOMMUNICATION TARIFF ORDER, 2009

Section – I

Title, Extent and Commencement

This Order shall be called **“The Telecommunication Tariff Order, 2009”**.

This Order shall cover tariffs for leasing of Dark Fiber, Domestic Leased Circuits, International Private Leased Circuits and Internet Leased Lines throughout the territory of Bhutan as also those originating in Bhutan and terminating outside Bhutan. The Order shall come into force on the date of its notification in the Official Gazette.

Section – II

Definitions

2. In this Order, unless the context otherwise requires
 - a) “Act” means the Bhutan Information, Communication and Media Act, 2006.

- b) “Authority” means The Bhutan Infocomm and Media Authority (BICMA) as envisaged in Bhutan Information, Communications and Media Act, 2006.
- c) "Ceiling(s)" mean(s) the upper limit(s) for tariff for telecommunication services as specified by the Authority from time to time.
- d) "Leased Circuits" means telecommunication facilities leased to subscribers or service providers to provide for transmission capacity between network termination points which the user can control as part of the leased circuit provision and which may also include systems allowing flexible use of leased circuit bandwidth.
- e) "Non-discrimination" means that service providers shall not, in the matter of application of tariffs, discriminate between subscribers of the same class and such classification of subscribers shall not be arbitrary.
- f) "Reporting Requirement" means the obligation of a service provider to report to the Authority within **seven (7) working days** before implementing any new tariff for telecommunication services under this Order and any changes thereafter.
- g) "Tariff(s)" mean(s) rates and related conditions at which telecommunication services (covered in this Order viz. dark fiber, domestic leased circuits, international private leased circuits and internet leased lines) within Bhutan and outside Bhutan may be provided including rates and related conditions like deposits, installation fees, rentals, usage charges and any other related fees or service charges.
- h) “Forbearance” denotes that the Authority has not for the time being notified any tariff for a particular telecommunication service and the Service Provider is free to fix any tariff for such tariff.

Section – III

Tariffs for Telecommunication Services

Forbearance

Where the Authority has, for the time being, forbore from fixing tariff for any telecommunication service or part thereof, the service providers shall be at liberty to fix any tariff for such telecommunication services;

Provided that the service providers shall comply with the reporting requirements in respect of such tariff.

Flexibility

Where a tariff has been specified as a ceiling, the service providers are free to offer services at tariffs below the ceiling fixed by the Authority.

Reporting Requirement

- i) All service providers shall comply with the Reporting Requirement in respect of tariffs specified for the first time under this Order and also all subsequent changes.
- ii) No service provider shall alter any tariff of any telecommunication service or any part thereof without complying with the Reporting Requirement.
- iii) Any tariff package / plan / scheme pertaining to dark fiber / Domestic Leased Circuits / International Private Leased Circuits / Internet Leased Lines offered by the Licensed Service Providers in Bhutan shall be reported to BICMA within seven (7) working days of the launch of the said offer in the market.
- iv) All service providers shall report to the Authority the commercial and economic basis of their terms and conditions with respect to

Special Construction basis schemes wherever offered, under the provisions of Telecommunication Tariff Order (TTO) relating to reporting requirement.

Review of Tariffs

- i) The Authority may, from time to time, review and modify a tariff for any telecommunication service or a part thereof.
- ii) The Authority may also at any time, on reference from any affected party, and for good and sufficient reasons, review and modify any tariff.

Section – IV

Transparency and Consumer Protection

Publication of Tariffs

- (i) Tariffs to be charged by service providers from subscribers for telecommunication services along with the conditions thereof shall be published in such manner as the Authority may from time to time direct.
- (ii) Service Providers are required to publish in their web sites all tariffs, discounts, basis of discounts and key conditions of service in a transparent manner.
- (iii) Charging principles including the commercial and economic basis of the terms and conditions applicable to special construction schemes with respect to any of the services for which tariff is stipulated in this order shall be transparently published in the website of the service providers.
- (iv) Publication of tariffs applicable for International Private Leased Circuits and Internet Leased lines shall contain the lease rental payable/paid to the International carriers outside Bhutan who provide these services to the service providers in Bhutan.

Non-discrimination

No service provider shall, in any manner, discriminate between subscribers of the same class and such classification of subscribers shall not be arbitrary.

Terms and Conditions of Service

Service providers shall clearly indicate the terms and conditions of the provision of telecommunication services to subscribers, which shall not in any manner, be inconsistent with the provisions of this Order. Such terms and conditions shall *inter-alia* include the following:

- a. Terms and conditions under which such services may be obtained, utilized and terminated;
- b. Terms and conditions relating to the use of service, billing, repair, fault rectification and the like;

Section V

Explanatory Memorandum

This order contains at Annexure A an Explanatory Memorandum to provide clarity and transparency to the tariffs specified in this order.

Section – VI

Interpretation

In case of dispute regarding interpretation of any of the provisions of this Order, the decision of the Authority shall be final and binding.

By Order

Director, BICMA

Schedule - I

Dark Fiber –Optical Ground Wire- (OPGW) and Domestic Leased Circuits (DLC)

ITEM	TARIFF
(1) Date of implementation	01.07.2009
(2) Coverage	<p>(a) It is mandatory for Dark Fiber and Domestic Leased Circuits to be provided when such capacity is available with the licensed service providers.</p> <p>(b) All tariffs specified as ceilings</p>
(3) Ready reckoner for Dark Fiber	As specified in Annexure - 1 to this Schedule
(4) Ready reckoner for DLC	
a) 64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps and 960 Kbps	As specified in Annexure 2 to this Schedule
(b) 2 Mbps (E-1)	As specified in Annexure 3 to this Schedule
(c) 45 Mbps (DS-3)	As specified in Annexure 4 to this Schedule
(d) 155 Mbps (STM-1)	As specified in Annexure 5 to this Schedule
(e) For Speed / Capacities above 960 kbps and below 2 Mbps	Forbearance
(f) Tariff for intermediate distances	For distances lying in between the distances specified in Annexure 1 to 5 of this Schedule, the tariffs shall be charged on pro-rata basis.

(4) Local leads or end links	<p>Tariff for local lead (or end links) to be charged as follows:</p> <ul style="list-style-type: none"> (i) Charge for leasing these local leads shall be as per the ceilings specified in Annexure 1 to 5 of this Order, or (ii) If such leasing is technically not feasible then on Special Construction basis.
(5) Other matters relevant to Dark Fiber and Domestic Leased Circuits not specified in this Schedule	Forbearance

Schedule - II

**International Private Leased Circuits (IPLC) and
Internet Leased Lines (ILL)**

ITEM	TARIFF
(1) Date of implementation	01.07.2009
(2) Mark-up over the Tariffs payable to International carriers outside Bhutan in respect of IPLC & ILL.	Not exceeding 2.5 %
(3) Coverage	(a) Ceiling on mark-up will be applicable for all destinations and all type of cable system used for carrying either voice or data or both. (b) Service Provider may offer discount on the ceiling mark-up. Discounts, if offered, shall be transparent and non-discriminatory based on laid down criteria and subject to reporting requirement.
(5) Other matters relevant to International Private Leased Circuits (IPLC) and Internet Leased Lines (ILL) not specified in this Schedule	Forbearance

Annexure 1
READY-RECKONER CEILING TARIFF in Nu/Annum) for Dark
Fibre - OPGW

Distance	Tariff for Dark Fiber	Distance	Tariff for Dark Fiber	Distance	Tariff for Dark Fiber
1	10220				
5	41656	180	1416968	355	2792281
10	80950	185	1456263	360	2831575
15	120245	190	1495558	365	2870870
20	159540	195	1534852	370	2910165
25	198834	200	1574147	375	2949459
30	238129	205	1613441	380	2988754
35	277424	210	1652736	385	3028049
40	316718	215	1692031	390	3067343
45	356013	220	1731325	395	3106638
50	395308	225	1770620	400	3145933
55	434602	230	1809915	405	3185227
60	473897	235	1849209	410	3224522
65	513191	240	1888504	415	3263816
70	552486	245	1927799	420	3303111
75	591781	250	1967093	425	3342406
80	631075	255	2006388	430	3381700
85	670370	260	2045683	435	3420995
90	709665	265	2084977	440	3460290
95	748959	270	2124272	445	3499584
100	788254	275	2163566	450	3538879
105	827549	280	2202861	455	3578174
110	866843	285	2242156	460	3617468
115	906138	290	2281450	465	3656763
120	945433	295	2320745	470	3696058
125	984727	300	2360040	475	3735352
130	1024022	305	2399334	480	3774647
135	1063316	310	2438629	485	3813941
140	1102611	315	2477924	490	3853236
145	1141906	320	2517218	495	3892531
150	1181200	325	2556513	500	3931825
155	1220495	330	2595808		
160	1259790	335	2635102		
165	1299084	340	2674397		
170	1338379	345	2713691		
175	1377674	350	2752986		

Annexure - 2

READY-RECKONER CEILING TARIFF (in Nu/Annum)
FOR 64 Kbps, 128 Kbps and 256 Kbps, 512 Kbps & 960 Kbps
DOMESTIC LEASED CIRCUITS

Distance (Km)	64 Kbps	128 Kbps	256 Kbps	512 Kbps	960 Kbps
5	7960	8261	8562	9165	10219
10	8132	8790	9447	10762	13064
15	8305	9318	10332	12360	15909
20	8477	9847	11218	13958	18754
25	8649	10376	12103	15556	21599
30	8822	10905	12988	17154	24444
35	8994	11434	13873	18752	27289
40	9167	11962	14758	20350	30135
45	9339	12491	15643	21947	32980
50	9564	13209	16855	24145	36903
55	9737	13738	17740	25743	39748
60	9909	14267	18625	27340	42593
65	10082	14796	19510	28938	45438
70	10254	15325	20395	30536	48283
75	10427	15853	21280	32134	51128
80	10599	16382	22165	33732	53973
85	10771	16911	23051	35330	56818
90	10944	17440	23936	36928	59663
95	11116	17969	24821	38525	62508
100	11342	18687	26032	40723	66431
105	11514	19216	26917	42321	69276
110	11686	19744	27802	43919	72122
115	11859	20273	28688	45516	74967
120	12031	20802	29573	47114	77812
125	12204	21331	30458	48712	80657
130	12376	21860	31343	50310	83502
135	12549	22388	32228	51908	86347
140	12721	22917	33113	53506	89192
145	12893	23446	33998	55104	92037
150	13119	24164	35210	57301	95960
155	13291	24693	36095	58899	98805
160	13464	25222	36980	60497	101650
165	13636	25751	37865	62094	104496
170	13808	26279	38750	63692	107341
175	13981	26808	39636	65290	110186

Distance (Km)	64 Kbps	128 Kbps	256 Kbps	512 Kbps	960 Kbps
180	14153	27337	40521	66888	113031
185	14326	27866	41406	68486	115876
190	14498	28395	42291	70084	118721
195	14671	28923	43176	71682	121566
200	14896	29642	44387	73879	125489
205	15068	30170	45273	75477	128334
210	15241	30699	46158	77075	131179
215	15413	31228	47043	78673	134024
220	15586	31757	47928	80270	136870
225	15758	32286	48813	81868	139715
230	15930	32814	49698	83466	142560
235	16103	33343	50583	85064	145405
240	16275	33872	51469	86662	148250
245	16448	34401	52354	88260	151095
250	16673	35119	53565	90457	155018
255	16846	35648	54450	92055	157863
260	17018	36177	55335	93653	160708
265	17190	36705	56220	95251	163553
270	17363	37234	57106	96848	166398
275	17535	37763	57991	98446	169243
280	17708	38292	58876	100044	172089
285	17880	38821	59761	101642	174934
290	18053	39349	60646	103240	177779
295	18225	39878	61531	104838	180624
300	18450	40596	62743	107035	184547
305	18623	41125	63628	108633	187392
310	18795	41654	64513	110231	190237
315	18968	42183	65398	111829	193082
320	19140	42712	66283	113427	195927
325	19312	43240	67168	115024	198772
330	19485	43769	68054	116622	201617
335	19657	44298	68939	118220	204463
340	19830	44827	69824	119818	207308
345	20002	45356	70709	121416	210153
350	20227	46074	71920	123613	214076

Distance (Km)	64 Kbps	128 Kbps	256 Kbps	512 Kbps	960 Kbps
355	20400	46603	72805	125211	216921
360	20572	47131	73691	126809	219766
365	20745	47660	74576	128407	222611
370	20917	48189	75461	130005	225456
375	21090	48718	76346	131602	228301
380	21262	49247	77231	133200	231146
385	21434	49775	78116	134798	233991
390	21607	50304	79001	136396	236837
395	21779	50833	79887	137994	239682
400	22005	51551	81098	140191	243605
405	22177	52080	81983	141789	246450
410	22349	52609	82868	143387	249295
415	22522	53138	83753	144985	252140
420	22694	53666	84638	146583	254985
425	22867	54195	85524	148181	257830
430	23039	54724	86409	149778	260675
435	23212	55253	87294	151376	263520
440	23384	55782	88179	152974	266365
445	23556	56310	89064	154572	269210
450	23728	57029	90276	156769	273133
455	23954	57557	91161	158367	275978
460	24127	58086	92046	159965	278824
465	24299	58615	92931	161563	281669
470	24471	59144	93816	163161	284514
475	24644	59673	94701	164759	287359
480	24816	60201	95586	166356	290204
485	24989	60730	96472	167954	293049
490	25161	61259	97357	169552	295894
495	25334	61788	98242	171150	298739
500	25559	62506	99453	173347	302662

Annexure 3
READY-RECKONER CEILING TARIFF (in Nu./Annum)
for 2 Mbps (E-1) DOMESTIC LEASED CIRCUITS

Distance	Tariff for 2 Mbps	Distance	Tariff for 2 Mbps	Distance	Tariff for 2 Mbps
5	12478	180	211908	355	413442
10	17996	185	217426	360	418959
15	23513	190	222944	365	424477
20	29031	195	228462	370	429995
25	34549	200	236082	375	435513
30	40067	205	241600	380	441031
35	45585	210	247118	385	446548
40	51102	215	252636	390	452066
45	56620	220	258153	395	457584
50	64241	225	263671	400	465204
55	69758	230	269189	405	470722
60	75276	235	274707	410	476240
65	80794	240	280225	415	481758
70	86312	245	285742	420	487276
75	91830	250	293363	425	492793
80	97347	255	298881	430	498311
85	102865	260	304398	435	503829
90	108383	265	309916	440	509347
95	113901	270	315434	445	514865
100	121521	275	320952	450	522485
105	127039	280	326470	455	528003
110	132557	285	331987	460	533521
115	138075	290	337505	465	539038
120	143592	295	343023	470	544556
125	149110	300	350643	475	550074
130	154628	305	356161	480	555592
135	160146	310	361679	485	561109
140	165663	315	367197	490	566627
145	171181	320	372715	495	572145
150	178802	325	378232	500	579766
155	184320	330	383750		
160	189837	335	389268		
165	195355	340	394786		
170	200873	345	400303		
175	206391	350	407924		

Annexure 4
READY-RECKONER CEILING TARIFF (in Nu./Annum) for
45 Mbps (DS-3) DOMESTIC LEASED CIRCUITS

Distance	Tariff for 45 Mbps Circuit	Distance	Tariff for 45 Mbps Circuit	Distance	Tariff for 45 Mbps Circuit
5	120451	180	2025323	355	3950673
10	173120	185	2077993	360	4003343
15	225790	190	2130663	365	4056013
20	278460	195	2183333	370	4108682
25	331130	200	2256479	375	4161352
30	383799	205	2309149	380	4214022
35	436469	210	2361819	385	4266692
40	489139	215	2414489	390	4319362
45	541809	220	2467158	395	4372031
50	614955	225	2519828	400	4445178
55	667625	230	2572498	405	4497848
60	720295	235	2625168	410	4550518
65	772965	240	2677838	415	4603187
70	825635	245	2730507	420	4655857
75	878304	250	2803654	425	4708527
80	930974	255	2856324	430	4761197
85	983644	260	2908994	435	4813866
90	1036314	265	2961663	440	4866536
95	1088983	270	3014333	445	4919206
100	1162130	275	3067003	450	4992353
105	1214800	280	3119673	455	5045023
110	1267470	285	3172342	460	5097692
115	1320139	290	3225012	465	5150362
120	1372809	295	3277682	470	5203032
125	1425479	300	3350829	475	5255702
130	1478149	305	3403499	480	5308371
135	1530818	310	3456168	485	5361041
140	1583488	315	3508838	490	5413711
145	1636158	320	3561508	495	5466381
150	1709305	325	3614178	500	5539527
155	1761975	330	3666847		
160	1814644	335	3719517		
165	1867314	340	3772187		
170	1919984	345	3824857		
175	1972654	350	3898003		

Annexure 5
READY-RECKONER CEILING TARIFF (in Nu./Annum) for
155 Mbps (STM-1) DOMESTIC LEASED CIRCUITS

Distance	Tariff for 155 Mbps Circuit	Distance	Tariff for 155 Mbps Circuit	Distance	Tariff for 155 Mbps Circuit
5	341125	180	5729577	355	11176076
10	490105	185	5878557	360	11325057
15	639086	190	6027537	365	11474037
20	788066	195	6176517	370	11623017
25	937046	200	6383546	375	11771997
30	1086026	205	6532526	380	11920977
35	1235006	210	6681506	385	12069957
40	1383986	215	6830486	390	12218938
45	1532967	220	6979466	395	12367918
50	1739995	225	7128447	400	12574946
55	1888975	230	7277427	405	12723927
60	2037956	235	7426407	410	12872907
65	2186936	240	7575387	415	13021887
70	2335916	245	7724367	420	13170867
75	2484896	250	7931396	425	13319847
80	2633876	255	8080376	430	13468827
85	2782856	260	8229356	435	13617808
90	2931837	265	8378336	440	13766788
95	3080817	270	8527317	445	13915768
100	3287845	275	8676297	450	14122797
105	3436826	280	8825277	455	14271777
110	3585806	285	8974257	460	14420757
115	3734786	290	9123237	465	14569737
120	3883766	295	9272217	470	14718717
125	4032746	300	9479246	475	14867697
130	4181726	305	9628226	480	15016678
135	4330707	310	9777206	485	15165658
140	4479687	315	9926187	490	15314638
145	4628667	320	10075167	495	15463618
150	4835696	325	10224147	500	15670647
155	4984676	330	10373127		
160	5133656	335	10522107		
165	5282636	340	10671087		
170	5431616	345	10820068		
175	5580596	350	11027096		

Explanatory Memorandum

Introduction and Background

1. Royal Government of Bhutan (RGOB) is committed to make ICT and media services universally accessible at affordable prices to all areas of the country particularly in rural and remote areas. In realizing the policy objectives of the Government, backbone connectivity both national and international is identified to be a key bottleneck. Optical ground wire (OPGW) on electricity transmission infrastructure is the only viable option to provide backbone connectivity in Bhutan. Being a land locked country, serious disadvantages arise in directly accessing the international capacity of submarine cable systems. The present tele density of 30% in Bhutan is an indication of the potential for future growth. High backbone prices contribute significantly to the high retail tariffs of broadband and leased line services.

2. Bhutan InfoComm and Media Authority (BICMA) had made an initial assessment of competition in the domestic leased circuit market of Bhutan. Taking into account the existing market conditions, including its market structure, conditions prevalent elsewhere in the region and practices governing regulation of leased lines in other jurisdictions, BICMA (the Authority) considered it appropriate to initiate a formal consultation process for putting in place an appropriate regulatory framework in respect of leased line markets in Bhutan. Accordingly, the Authority issued a Consultation Paper entitled, ***“Issues Relating to National and International Backbone Connectivity in Bhutan”*** in the month of March 2009 after holding extensive pre-consultation meetings with the stakeholders. The said Consultation Paper was published in the website of BICMA for seeking comments of all

stakeholders on the issues raised in the Consultation Paper. The issues posed for consultation and the summary of written comments received from the stakeholders are given in Appendix I to this Explanatory Memorandum.

3. During the process of consultation, the Authority considered the existing market conditions in Bhutan for domestic leased circuit and international private leased circuit/international leased line (ILL). The state of competition and the factors that constrain competition in the leased line markets in Bhutan have been extensively discussed with evidence in the Consultation Paper which is available in BICMA's website. Briefly, the Authority arrived at the following conclusions with regard to the leased line markets in Bhutan on the culmination of the consultation process:-

- OPGW is the only viable option to provide domestic bandwidth to telecommunication service providers, corporates and other entities requiring bandwidth services.
- Despite dark fiber availability in the western part of Bhutan, prices for fiber based bandwidth are not competitively determined.
- Applicable tariffs in Bhutan for domestic bandwidth are much higher than those prevalent in the region.
- Not only that the internet leased lines are made available at prices that are considered high, the mark-up fixed by the incumbent telecommunications service provider (Bhutan Telecommunications Ltd.) is also considered to be high and having no rationale.
- Till the market becomes competitive enough, it is considered appropriate to put in place a framework of pricing regulation for both national and international leased lines.

- Specifically, the Authority considers it appropriate to introduce the following tariff regulation in Bhutan:-
 - Fixation of a cost based ceiling tariff for annual lease rental of dark fiber on a per kilometer basis and mandate provision of dark fiber on the OPGW/ADSS on a non-discriminatory basis.
 - Fixation of a cost based ceiling tariff for annual lease rental of domestic bandwidth and mandate its provision on a non-discriminatory basis.
 - Fixation of ceiling on mark-up over the international private leased circuits and internet leased line prices payable by the telecom service providers in Bhutan to International Carriers outside the country who are providing such services.
 - Mandating reporting requirement and publication requirement on the part of the service provider in Bhutan so as to promote competition by removing information asymmetry in the market.

Cost based ceiling tariff for Dark Fiber

4. The overwhelming opinion of stakeholders in Bhutan is for regulating the tariff for Dark fiber besides other products like Domestic and International bandwidth in different capacities. The Authority is of the view that fixing a cost based ceiling tariff for dark fiber is necessary as the fiber is carried by the electricity transmission company, Bhutan Power Corporation Limited (BPCL) through OPGW which is the only viable option. In the assessment of the Authority, BPCL will continue to play a dominant role in the provision of domestic backbone connectivity. In the early stages of the opening up of the market to competition, it is considered necessary to provide non-discriminatory and cost based

access to backbone. A recent review¹ of national fiber backbones in developing countries by ITU has concluded that,

“Providing network access at fair prices (usually some form of cost-based provision) allows for innovation by new entrants, particularly in service provision. Since essential facilities are the backbone of a telecommunication network, providing cheap access has immediate beneficial effects on the competitiveness of the sector and results in lowered pricing and increased penetration.”

Given the complexity of the commercial operations of BPCL involving both electricity transmission/distribution and OPGW based dark fiber, the Authority is of the view that a cost based tariff regulation of the dark fiber will promote competition and efficiency in the market.

5. Inherent advantages accrue to utility companies like BPCL, which offer dark fiber on their transmission infrastructure and these include Right of Way, part utilization of existing material assets like towers meant for providing the power transmission services and their capability to reach remote parts of the country. The Authority is of the view that these advantages are to be translated into sources of cost reductions to telecommunication service providers in order to promote competition and efficiency which will in turn act as catalyst for employment generation and overall growth of the economy.

6. Presently, besides BPCL, the incumbent telecom operator viz. BTL also owns dark fiber deployed by BPC in Bhutan. It has been argued by a private internet service provider that both BPC and BTL are owned by the same holding company viz. Druk Holdings and Investments Ltd. and thus competition between the two will be non-existent thereby limiting the scope for new entrants to invest in this sector.

¹Trends in Telecom Reform 2008 six degrees of sharing, International Telecommunication Union, Novemebr,2008, Geneva

7. Considering the fact that the coverage of OPGW and the bandwidth based on that is presently confined to western Bhutan, the cost based ceiling tariff for dark fiber is being made applicable only for the western part of the country. On completion of one year from the date of issue of this order, the Authority will review the market conditions for extending the tariff regulation applicable for dark fiber to the remaining parts of the country. As per the present indications, OPGW deployment in the eastern part of the country is likely to be completed by the end of 2010 and upon its completion, the Authority shall consider applying tariffs fixed vide this order to Eastern Bhutan as well after going through a consultation process.

Methodology of fixation of Cost based Ceiling tariff for Dark Fiber Approach

8. The pricing model for OPGW based dark fiber was discussed in section 6 of the Consultation Paper issued by BICMA. In that document, a normative telecom network model for OPGW was demonstrated. As proposed in the consultation document, a bottom-up cost model for arriving at annual lease rental of dark fiber has been adopted. Details of various aspects of the methodology adopted in arriving at the distance – based ceiling tariff for dark fiber are discussed in the paragraphs that follow.

9. There exists two broad categories of cost items in the provision of Dark fiber and these are fixed cost and Variable cost. On top of this, annual regulatory fee/USO fee needs to be added to arrive at the tariff applicable for the relevant service.

10. Fixed cost component arises on account of the entry fee paid by the ICT licensee at the time of acquiring the license which amounts to Nu 100000. Tenure of the ICT license being 15 years, the entry fee paid has been amortized over this period and a CAPEX recovery of 16.67% (10% as rate of return and 6.67% as recovery for future payment of entry fee) has been allowed on the entry cost. Detailed discussions on the rate of return to be provided are available in Para 6.6 and 6.7 of the Consultation Paper. More discussions including an analysis of submissions of stakeholders on this issue are given elsewhere in this Explanatory Memorandum. Rationale behind providing for this recovery is on the premise that after expiry of the existing tenure of the license, the renewal of the license would also entail payment of entry fee of the same amount.

11. The major component of variable cost in the provision of dark fiber arises from the CAPEX recovery on the cost of OPGW/ADSS deployed along the electricity transmission infrastructure in Bhutan. The other component of variable cost pertains to operating and maintenance cost for OPGW. These components of costs are discussed in the paragraphs that follow.

12. Table No.3.1 in Section 3 of the Consultation Paper provides information on section-wise, route-wise length of the fiber deployment and capital expenditure incurred thereof. These deployments of OPGW/ADSS have taken place over a period of time. However it is observed from the information given by the BPC that per unit cost of OPGW is varying widely from Nu 216000 per KM for Phuentsoling-Thimpu-Paro link to Nu 645000 per KM for Ruri- Tsiran Route. BPC's estimated cost for OPGW roll-out have been found to be much higher than the bench marks from other relevant markets like Mongolia and India. BICMA has noted this observation in the Consultation Paper on

the subject as well. Taking into account all these factors and considering the fact that the prices for the cable in general are showing a downward trend, it is considered appropriate to adopt **Nu 378000** as the cost of OPGW roll-out per kilometer for a pair in Bhutan. Average of the cost of roll-out of OPGW as given by BPC for various routes in Bhutan also works out to approximately the same estimate of cost. Separately, the Authority worked out the cost of deployment per fiber kilometer across all routes where the fiber is already deployed including the city based networks in Thimphu and Phuntsholing and the estimated cost of the deployment is very close to the one adopted here. Further, the Authority notes that the average cost of OPGW deployment at Nu 378000 per kilometer is higher than the cost estimates obtained elsewhere in the region. CAPEX recovery based on this cost i.e. Nu 378000 per km is provided to cover the variable cost in the provision of dark fiber services in Bhutan.

Mechanism of CAPEX recovery

13. There are two components of CAPEX recovery viz. rate of return and depreciation allowance. Rate of return is in the nature of return on capital invested and depreciation allowance is meant to provide for replacement of the assets at the end of the life of these assets. These aspects are discussed in detail in the following paragraphs.

14. Depreciation allowance is a function of the life of the assets assumed. Life of OPGW claimed by BPC in their submissions to BICMA is 20 years and for city based network of ADSS their claim of life is 10 years. Other stakeholders have suggested 30 years of useful life for OPGW. The theoretical maximum life of optical ground wire is 40 years. Considering the claims of the stakeholders and considering the estimated life as claimed by the technology vendors, it is appropriate to assume an

estimated life of 30 years for the city based network of ADSS as well as for OPGW link in the rest of the country. The Authority is of the view that 40 years being the accepted life span of OPGW, which forms a very large proportion of the total dark fiber capacity with the incumbent, assuming 30 years life for both OPGW and ADSS would be realistic and appropriate. Using the straight-line method of depreciation, for an estimated life of 30 years, annual depreciation at the rate of 3.17% is required to be provided. This factor, therefore, will be applied to the capital expenditure on a per km basis.

15. The second part of CAPEX recovery involves fixing a value for return on capital employed, which would be applied to the CAPEX and would be treated as the required annual return on the capital invested and employed. The Consultation Paper of BICMA had suggested a flat 10% rate of return on capital to which there have been differences of opinion in the submissions of stakeholders. Bhutan Telecom Ltd. suggests a rate of return of 7% for dark fiber, while Tashi Infocomm Ltd. suggested that return on capital should not be more than 10% because Government companies such as BPC enjoy a lower and concessional rate of interest. However, BPC has proposed a rate of return of 14.29% and it has been sought to be justified on the ground that the Regulator for Electricity sector in Bhutan has allowed this level of return for the tariff determination of Electricity. During the Consultation phase, stakeholders other than BPC felt very strongly that OPGW being a national asset funded by Govt. grant, BICMA should in the tariff fixation exercise ensure recovery only to the extent required for replacement of assets at the end of the life period of the system. However, the Authority considered the need for incentivising investment in telecom infrastructure for future and those areas that are yet to be developed and decided to allow a reasonable rate of return on capital employed as proposed in the consultation paper at 10% flat. Therefore, CAPEX

recovery consisting of depreciation allowance and rate on return on capital would amount to 13.17%.

Operating and Maintenance Cost

16. The Consultation Paper proposed that the operating and maintenance cost be 2.5% of the CAPEX for dark fiber pricing. The Authority noted that there was no difference of opinion on the part of the stakeholders in allowing 2.5% O&M cost in the tariff fixation of dark fiber. Technological advancements in the field of fault detection and repair have also resulted in lower cost of maintenance and repair. Therefore, the proposed level of O&M cost is considered adequate to ensure appropriate maintenance of the system.

Capacity Utilization

17. Capacity utilization is another critical factor in the pricing exercise. Suggestions during the pre-consultation phase on this question of capacity utilization ranged from 50% to 100%. BPC in their written submissions to BICMA suggested 25-30% of capacity utilization as realistic. BPC argued for a realistic utilization factor to be adopted. Existing utilization level of dark fiber as submitted by BPC in their tariff proposals for dark fiber in the year 2008 is stated to be 39.68%. Tashi Infocomm Ltd. has suggested 80 to 90% of capacity utilization for determining the dark fiber price even if this much of capacity is not utilized at the beginning. The Authority, however, is quite optimistic in this regard particularly the scope for future development in the country which is evident from the following statement of Authority in the Consultation Paper:

“It is the unanimous opinion of a large majority of stakeholders that the country is in the cusp of seeing

significant change given the strong commitment of the Government for ICT development and for using ICT facilities to bridge the urban-rural divide. Further the present Tele density of 30 offers tremendous potential for further growth necessitating adequate backbone facilities. Service providers very strongly argued that in the case of telecom services, all projections made in the past have been surpassed not only in Bhutan but elsewhere in the region and thus we should not be guided by the present level of utilization. Cable TV services besides the telecom services and the potential for the growth of IT and IT-ES industries in Bhutan were cited as the basis for assuming capacity utilization for fiber and bandwidth infrastructure.”

18. Thus, taking into account the current level of utilization of dark fiber in Bhutan and considering the huge potential for growth and taking into account the growth experience of other countries in the region, the Authority places the capacity utilization in the near future to be 60%. Since the tariff to be fixed for dark fiber is in the nature of ceiling, higher utilization of capacity resulting in the lower level of cost for the provider can always be reflected by lowering the leased rentals from the ceiling fixed. BPC in their written submissions has also given similar reasoning in the matter of capacity utilization.

Right of Way

19. In the Consultation Paper, BICMA had raised a specific issue on whether Right of Way (RoW) charges be included in deriving the cost of dark fiber based on OPGW installation and payable to BPC. In response to this, two service providers have opposed inclusion of RoW charges and tower usage cost in deriving the cost estimates for fixation of tariff for

dark fiber. BTL has chosen not to comment on this issue. BPC has demanded that there should be a value for the RoW usage and that value should be equal to the cost of replacement of OPGW. The Authority examined these conflicting submissions of the stakeholders. It is noted that BPC has entered into agreements with BTL and subsequently with the Ministry of Information and Communication wherein BPC had agreed to provide RoW and the counterpart agencies had agreed to provide the funds for deployment of OPGW. First of all, the provisions of these agreements entered into in the past do not have bearing on the regulator who is engaged in putting in place a cost based tariff regulation for backbone connectivity in Bhutan. Secondly, one of the major advantages for the country going in for OPGW based bandwidth provision arises from the reduction in the cost on account of the possibility of using existing facilities of the electricity transmission infrastructure already installed. Inclusion of RoW and tower usage cost in the estimation of cost of dark fiber would therefore make the OPGW option unviable. Thirdly, some of the stakeholders have also opposed its inclusion on the ground that costs attributable for towers, civil works associated with its installation, etc. are already included in the pricing of electricity and therefore it would amount to double accounting of the same item of cost. Further, it has been argued that BPC itself did not pay any RoW charges to any agency in the country for installation of these towers. The Authority finds substantive merit in the submissions of the two operators in this regard. More importantly, higher costs for dark fiber will in all likelihood be reflected in the domestic bandwidth prices and thus may be a dampener for its usage thereby limiting the plethora of socio-economic benefits arising out of ICT sector. Inclusion of value for RoW/Tower usage in the cost calculation will result in additional benefit to BPC without any cost to be incurred on its part. On the contrary, this may get translated into an additional component of cost to be borne by the user industries and other competitors that is avoidable. The Authority does not find

substance in the argument of BPC that there should be a value for RoW usage and it should be equivalent to the cost of replacing ground wire particularly because CAPEX recovery for OPGW is anyway provided in the costing. The Authority is therefore of the view that any provision for RoW/tower usage in the costing of dark fiber is not only not justified but will also make the OPGW option unviable thereby hindering the progress of information and communication technology development in the country which is inconsistent with the laid down objectives of the government. Further, OPGW may be utilized to improve the efficiency of power system with deployment of 'Smart Grid'. This helps in lowering the electricity charges to the consumers and lowers the carbon emissions from power generating units.

Distance based Ceiling tariffs for leasing Dark Fiber

20. Based on the above discussions relating to assumptions on the life of dark fiber, capacity utilization, return on capital employed and O&M costs, the per kilometer cost per pair of fiber comes to Nu 10220 per annum including the annual license fee/USO fee payable by the ICT facility licensee. The Authority therefore fixes the ceiling tariff for leasing dark fiber at Nu 10220 per annum per pair per km. Distance based ceiling tariff for dark fiber is given in the Table 1.

Table 1 - Distance-based ceiling tariff for Dark Fiber

Distance (Km)	Fixed Cost contribution to rental Nu	Variable Cost contribution to rental Nu	Total Cost per pair per km. Nu	Tariff per pair per km Nu#
1	2314	7702	10016	10220
5	2314	38509	40823	41656
10	2314	77018	79331	80950
25	2314	192544	194858	198834
35	2314	269561	271875	277424
50	2314	385088	387401	395308
100	2314	770175	772489	788254
200	2314	1540350	1542664	1574147
500	2314	3850875	3853189	3931825

Inclusive of license fee @2%

21. While the annual tariff for per kilometer per pair of dark fiber is Nu 10220, ceiling tariffs applicable for distances beyond 1 km is not a simple multiplication of the respective distances with the per km tariff. As is evident from the above Table 1, tariff applicable for a particular distance is a function of both fixed cost contribution and variable cost contribution to lease rental. Note that variable cost is directly proportional to the distances involved whereas fixed cost contribution to lease rental is not. Therefore, the total cost per km per fiber needs to be worked out for each of the distances applicable and thereafter the regulatory and USO fee is added to derive the ceiling tariff. Accordingly, ceiling tariff for leasing dark fiber for distance slabs with an interval of 5 kms upto 500 kms is mandated and is given in Annexure-1 to Schedule-1 in the form of a Ready Reckoner. For distances lying in between distances specified in the ready reckoner, the tariffs shall be charged on pro-rata basis taking the tariff ceilings for the two distances of the ready reckoner between which the relevant distance lies.

Cost based ceiling tariff for Domestic Bandwidth

22. Considering the fact that dark fiber price is mandated only for western region of Bhutan, it would be appropriate to apply the cost based ceiling tariff for domestic bandwidth to the western Bhutan only. However, upon completion of one year from the date of issue of this order, BICMA will undertake a review of the market with a view to revise the same.

23. One other issue that was posed for consultation relates to applying the same ceiling tariff for bandwidth based on fiber as well as to radio. The Authority notes that BTL currently applies the same tariff of domestic leased circuit irrespective of technology. BTL in their written submissions have suggested that wherever there is an option for fiber or radio, fiber tariff should apply; wherever only radio link exists, its tariff should apply. Further, from the point of view of administration and enforcement, mandating different costs of bandwidth is likely to give rise to implementation problems. Transparency may also have to be compromised if there are multiple tariffs to different modes of delivery. Keeping these factors in view and to achieve simplicity, the Authority is in favour of applying the same tariff ceiling irrespective of technology. In any case, radio based bandwidth is predominant (or perhaps the only medium) in eastern Bhutan which is outside the scope of ceiling tariff. Therefore, the Authority mandates that in the western Bhutan to which the ceiling tariff regime is made applicable, there shall be only one ceiling tariff which would be common to both fiber based and radio based bandwidth services wherever there is an option for fiber or radio.

24. Since, leased circuits are considered to be an essential facility in the telecommunication sector, it is mandatory for domestic leased circuits to be provided through utilization of spare capacity when such

capacity is available. This mandate is equally applicable to local lead or local tail circuit. Tariffs applicable for local lead/end links will be the same as that which is applicable for domestic leased circuits in general excepting cases where the service operator does not have any spare capacity. When spare capacity is not available, the leased line provider may undertake to provide services for the local tail end by setting up fresh capacity. In such circumstances, the tariff fixed for domestic bandwidth will be based on the cost of providing the local lead services. This is what is termed as “Special Construction Scheme” in the order. The recovery of cost of local lead provision under such Special Construction scheme can be made by the service provider on accepted charging principles to be disclosed in advance to the customer. The Authority is of the view that the conditions governing these contracts need to be fair, just, reasonable and transparent. When capacity is sought to be provided under these schemes, the terms should be invariably based upon costs. Further, the economic and commercial basis of the charging principles applicable for the pricing of local lead in the event of setting up fresh capacity will have to be reported as per the reporting requirements of the Authority that may be decided from time to time.

Methodology of fixation of Cost based ceiling Tariff for Domestic Leased Circuits

Costing approach

25. There were a number of costing approaches/methodologies available to the Authority but it was decided to adopt that approach which would ensure a smooth transition to have competitive environment and which would reduce major shock to the incumbent operator. Presently, regulators internationally adopt various versions of Forward

Looking Long Run Incremental Cost (FLLRIC) approach that yields very low tariffs. This would inter alia involve estimation of costs based on most recent high capacity equipment and technology that in turn would imply major reduction in cost as compared to current cost based on equipment/technology presently in use. Such an approach if it is adopted to fix lease rentals for DLCs in Bhutan, the market would be unable to bear the rapid adjustment that it would necessitate. Adoption of FLLRIC model in the views of the Authority may not be appropriate at this juncture, as there is a need also to incentivise continued investments in infrastructure particularly in rural and remote areas. On the other hand, the Authority also evaluated the option of adopting the Fully Allocated Historical Cost approach to derive the lease rental value for the domestic bandwidth and came to the conclusion that such an approach would result in very high cost of the service which will not promote usage and thus defeat the very objective of the government to promote broadband/internet and other applications to which bandwidth is used. Therefore, the Authority chose to adopt a via media by resorting to the replacement cost methodology using bottom-up approach that captures the current market realities.

26. The methodology for determination of cost-based tariffs for various capacities of DLCs is the 'bottom-up approach' using costs of disaggregated network elements to derive annual rental value. This is similar to the methodology adopted by the Authority in dark fiber pricing discussed earlier. This methodology was also proposed in the Consultation Paper and except for minor variations has largely been retained for the purpose of specifying the tariffs. After considering the viewpoints emerged during the consultation process, the capacity of the network assumed for the purpose of cost calculations is STM4 and not STM16 as proposed in the consultation paper. STM16 capacity based network would result in a very low lease rental value which would be

highly unrealistic given the need for future deployment of networks in a large part of the country. Further, the existing networks installed by the incumbent operator are either STM4 or STM1.

Categories of Costs

27. Three categories of costs are involved in the provision of domestic bandwidth in Bhutan and these are fixed, semi-variable and variable costs. Fixed costs are those that are independent of distance, semi-variable are those costs which change after specified distances covered (50 kms in this case) but remain unchanged within the distance interval and variable cost items are directly linked to each km covered. The costs that have been considered include cost of the equipment, cost of cable i.e. dark fiber, cost on account of termination of cable, repeater stations, other supporting equipments including multiplexers and operating and maintenance costs besides the regulatory/USO fee payable annually.

Fixed Cost and Variable Cost

28. The equipment cost category is an element in fixed cost while the cost of dark fiber is a variable cost taken on per km basis. Since the dark fiber tariff has already been derived based on cost, the same is used here as part of the variable cost for deriving the lease rental value. The total cost of two units of STM4 system adopted for calculations is Nu 11.58 lakhs. The cost for a similar system as provided by the incumbent operator is much higher than not only the current market price but also the prices adopted for cost calculation by regulators elsewhere in the region. Besides BTL, the new entrant in wireless space Tashi Infocom has set up transmission network (STM1) to mainly cater to their internal consumption. Choosing any one operator's cost as the basis for tariff calculations is not justified because these operators are at various stages

of maturity and market penetration. Therefore, there is a need for normating the costs of equipments that impacts on the rental value to be derived. Normative process is generally aimed to smoothen the wide variation in the prices of key cost items with a view to obtain cost estimates that provide continued incentive to new entrants for achieving greater efficiency and cost reduction while also ensuring the feasibility of deploying such a system in the market. The purpose of normative process is to generally balance the twin objectives of creating incentive for investment and efficiency while promoting downstream competition. This would also ensure that the dominant operator does not have the opportunity to skew the market in his favour. It is also important to keep in view that the equipment cost continues to decline at a rapid pace.

Semi-Variable Cost

29. In the category of semi variable cost, the capex recovery and O&M costs have to be provided in respect of repeaters/ADM to be installed for every 50 Kms. This is in the nature of Semi-variable cost because it is both fixed as well as variable in nature. These costs change after a specified distance is covered but remain unchanged within the distance interval. Cost of repeater/ADM adopted for purpose of calculations here is at **Nu 350000** and on this, cost CAPEX recovery at 21.88% (rate of return on investment at 10% and depreciation allowance of 11.88%) and O&M cost at 2.5% have been applied.

CAPEX recovery

30. Two factors have been considered when calculating the required annual return to the operators providing leased line services. One, the recovery of depreciation on assets and two, return on capital employed.

The Authority has adopted 10% rate of return on capital for lease line providers also to maintain consistency and reasonableness because this level of rate of return has also been provided to dark fiber providers. Note, both the incumbent bandwidth service provider and the incumbent dark fiber provider are under one parent company and there was no strong reason for providing differential rate of return for these two entities. As regards the life of equipments including terminal equipments, repeater stations and other associated equipments, Druk Com suggested international standards must be applied in this regard whereas Tashi Infocom Ltd. suggested eight years for the terminal equipment. BPC recommended five years to be adopted as equipment life as the Income Tax Act of the country is allowing a depreciation rate of 20% based on the assumption of five years equipment life. Considering these submissions and also considering the obsolescence of technology in the telecommunication sector and taking into account the vendors claim, the Authority assumes a life span of eight years in its cost calculations pertaining to fiber based bandwidth. Thus, the CAPEX recovery upon the cost of equipments would be 21.88% (rate of return on investment at 10% and depreciation allowance of 11.88%).

31. Operating and maintenance cost of equipments at 2.5% has been provided as in the case of dark fiber pricing. Details of the Quality of Service promised by the service provider at/or below the ceiling tariff will have to be clearly spelt out in the terms and conditions of service contract.

Derivation of cost estimates of various capacities

32. As the incumbent operator has already installed STM4 equipments and a new entrant has STM1 equipment installed, the Authority considers it appropriate to derive the pricing of STM1, DS3, E1 and 64

kbps capacities based on the cost of STM4 equipment system. Based on the information provided by BTL, it is seen that a number of capacities are still in demand between E1 and 64 kbps and these are 128 kbps, 256 kbps, 512 kbps and 960 kbps. While the Authority is aware of the likelihood that in future higher capacities would be more in demand, it does not wish to discourage the existing usage of smaller capacities by certain customers particularly when the tariff is sought to be brought down by a cost based fixation for bandwidth services. Accordingly, ceiling tariff is fixed based on distances for the capacities of STM1, DS3, E1, 64,128,256,512 and 960 kbps.

33. To arrive at the cost of STM1 an STM4 system was considered as the base. The raw cost of setting up an STM4 system divided by a factor of 4 gives the raw cost estimates of an STM1 circuit. While BTL suggested 50% of capacity utilization, the new entrant in wireless access market suggested 90% for STM-1 and 100% for DS-3 and E-1. The private ISP recommends 65%, 70%, and 75% capacity utilization for STM-1, DS-3 and E-1 respectively. The Authority noted that high levels of capacity utilization suggested for cost calculations by some service providers may not be realized in the near future considering the high capacity equipments like STM-4 installed by the incumbent operator. The Authority applied weights to the different factors based on inputs from the industry and based on its judgment assigned capacity utilization value to the various factors affecting the final product. These factors include pattern of current demand for various capacities, the likely pattern of demand for various capacities in future, the existing market prices for various capacities, the prevailing architecture of the fiber systems in Bhutan and feedback of stakeholders in this regard. The Authority considered the available data on the sales of various capacities and it is found that a substantial proportion of the capacities sold are in the category of E1 and below E1 capacities. However, submissions of the

industry and other indications like the emerging demand from the cable television services suggest that higher capacities would be in great demand in the near future. The load factors applicable for various capacities for the purpose of deriving the cost estimates of those capacities are given below:-

Circuit Capacities	Capacity utilization
STM-1	35%
DS-3	33%
E-1	15%
64 kbps	20%

34. Since the load factor assumed for deriving the cost estimates has a direct and large influence on the ceiling tariff for leasing the bandwidth, it is important that the distance based ceiling tariffs are consistent with one another.

35. Similarly, the cost of DS-3, has been derived from the raw cost of STM-1. The raw cost of setting up an STM-1 system divided by a factor of 3 gives the raw cost estimates of DS-3 circuit. As indicated above, capacity utilization of 33% was applied as load factor to derive the cost per DS-3 stream.

36. The raw cost of setting up an STM-1 system, as calculated divided by a factor of 63 gives the raw cost estimates of an E-1 circuit. To this capacity utilization of 15% was applied to obtain the cost per 2Mbps stream. The Authority noted that for each E-1 capacity there are 63 circuits and therefore applying any load factor beyond the one assumed for calculation may not be realistic. For E-1 circuits, tariff ceilings have been specified by the Authority for distances in the interval of 5 kms starting with the first tariff at 5 km mark.

37. As an illustration, the distance-wise annual lease rental for E-1 capacity fixed, the existing tariff applicable in Bhutan and the extent of reduction obtained are given in the Table 2.

Table.2 – E-1 Ceiling Tariffs per annum for select distance slabs and comparison with existing market rates

Distance in Kms	E-1		% Reduction
	Existing(in Nu)	Ceiling fixed(in Nu)	
10	48000	17996	62.51%
50	180000	64241	64.31%
100	360000	121521	66.24%
200	706584	236082	66.59%
300	1023876	350643	65.75%

Note: Existing tariff pertains to the tariff offer of BTL

38. Overall, the reduction effected in the tariff for E1 capacity is in the range of 62-67%. The complete set of ceiling tariffs for E1 is available in Annexure-3 to Schedule- I.

39. The raw cost of E-1 divided by a factor of 30 gives the raw cost of a 64 kbps circuit. To this a load factor of 20% is applied to take care of the expected utilization of such circuits during the first year of the implementation period. Discussions with the industry sources suggest that capacity utilization to be assumed for deriving cost estimates in respect of 64 kbps needs to be lower than the fill factor in respect of higher capacities like DS3 and STM1. In addition to this, provision for redundancy to the extent of 25% is also allowed in the cost estimates of 64 kbps circuit. Since 64 kbps circuits are generally offered in the intra city links, redundancy is required to be provisioned to take care of the non-availability of route diversity in the radial portion. Further to the

cost derived from this calculation, 64 kbps circuits require deployment of demultiplexers at both the ends of an end to end 64 kbps link. This additional cost component is included as part of the fixed cost category since it is applied once per circuit. Note that this cost is applied on a per E-1 basis since it is how 30 circuits are derived from the E-1. The complete set of ceiling tariffs for 64 kbps is available in Annexure-2 to Schedule- I.

40. Ceiling tariffs for capacities above 64Kbps and up to 960 Kbps are to be derived based on available information. A pro rata method has been adopted based on the price multiple ratios and capacity multiple ratios between 64 kbps and 2 mbps circuits to fix ceiling tariffs in respect of 128, 256, 512 and 960 kbps. For capacities higher than 960 Kbps and below 2Mbps, the Authority proposes to keep these under forbearance which implies that the service providers are given the flexibility to decide tariffs for these capacities. The complete set of ceiling tariffs for capacities of 64 kbps, 128 kbps, 256 kbps, 512 kbps and 960 kbps are given in Annexure-2 to Schedule- I.

41. Thereafter for each distance slab, Fixed cost contribution, Semi-variable cost contribution and variable cost contribution towards the annual lease rental for each of these capacities was worked out based on the assumptions discussed above. The accounting of costs when calculating distance based tariffs differs for various categories. For fixed cost, the cost is applied on a per circuit basis irrespective of the distance. The variable cost is applied on a per km basis and semi-variable cost is applied once every 50 kms. The semi-variable cost as explained earlier is associated with the cost of the repeater/ADM and therefore is required to be incurred when crossing distance marks in multiples of 50 kms.

42. The tariff ceilings are provided in the ready reckoner annexed to Schedule-I for distances in the interval of 5 kms. In as far as domestic bandwidth tariffs are concerned, the endeavour of the Authority has been to fix ceiling tariffs for all capacities that are in demand presently and also those capacities that would be in demand in future. As explained in this order, the Authority has adopted a cost based approach for fixing tariffs for leasing bandwidth in Bhutan. It is hoped that the cost based tariffs will ensure that competition is promoted and efficiency enhanced in the provision of not only telecommunication services but also in other related industries that use bandwidth as key input. By mandating this set of ceiling tariffs for domestic bandwidth, the reduction effected by the Authority from the existing tariff levels ranges from 32% to 79% across various capacities and across various distances. Appendix-2 to this Explanatory Memorandum gives a comparison of the ceiling tariffs for domestic leased circuits fixed by the Authority in respect of select capacities and distances. Appendix-3 to this Explanatory Memorandum provides a comparison of the ceiling tariffs for domestic leased circuits fixed by the Authority with the tariffs prevalent in select countries.

Mark-up over tariffs payable to international carriers for IPLC/ILL services

43. Bhutan like any other landlocked country suffers from inherent disadvantages in the matter of international backbone connectivity as they do not have direct access to submarine cable systems. Presently, India based international carriers provide connectivity to operators in Bhutan at Phuentsoling. A more liberal licensing regime and a series of regulatory initiatives in India have resulted in increased competition in the market for international capacity in the region. Extent of competition, international bandwidth usage and the trends in prices for capacities has been extensively discussed with evidence in the Consultation Paper issued by BICMA. In view of landlocked nature of the

country, Bhutan has been unable to reap the benefits of growth and competition in the region. Stakeholders are of the view that the incumbent operator in Bhutan also keeps a significant mark up to the international capacity prices while offering the same to operators in Bhutan and in their view the extent of the mark up is unreasonable. Submissions during the consultation process by stakeholders suggest that the Authority fix a ceiling for the mark up over the international prices.

44. The Authority consulted the stakeholders on the extent of mark up to be allowed and it emerged that a maximum of 2.5% over the lease rental payable for IPLC and ILL to international carriers would be just, fair and reasonable. This mark up should cover inter-alia handling charges, billing, annual negotiation, customer relationship management and other mediation between the international carriers outside Bhutan and operators within the country. Separately, the Authority has mandated detailed publication requirements on the tariffs applicable for each of the services covered in this order and in that the extent of mark up and the lease rentals being paid to international carriers by the operators in Bhutan have also been included.

Principle of Non-Discrimination

45. During the consultation process, there were suggestions from the stakeholders that the principle of non-discrimination should be enunciated by the Authority and enforced in the interests of promoting competition and efficiency in the Bhutan Telecommunications market. The Authority considered this suggestion and found to be a valid submission. The Authority also noted that almost in every telecom jurisdiction the principle of non-discrimination has been mandated to ensure level playing field between incumbent operators and new

entrants. This aspect of regulation has been supported by an ITU² study which suggests that,

“Policies to promote telecommunication development and competition require a comprehensive framework for preventing and managing anti-competitive conduct. Regulators must prevent any abuse of market power or dominance in cases where the infrastructure owner also competes downstream with other service providers in the same market.”

Non-discriminatory treatment is required to be mandated particularly in situations where the new entrants depend upon the incumbent operator or the dominant operator who has control over key inputs required by competitors in the downstream market. This principle is highly relevant in the context of leased circuits market in which the incumbent operator is most likely to be dominant and perhaps the only supplier during the initial years of competition and the new entrants in the access services market both voice and data requiring the leased line services. Therefore, it is necessary to ensure that instances of any differential tariff structure arising out of the pricing strategies of the incumbent operator does not become discriminatory and assume the nature of anti-competitive conduct. It is possible that the tariff offered by the incumbent operator for leased lines may be below the ceilings fixed but it can still be harmful to the new entrant thereby constraining the competition in the market if the price at which the incumbent operator is charging its own subsidiary or division providing the retail services like internet services is lower than the price at which it is supplying the leased line services to other players in the market. The Authority shall **not** permit such discriminatory tariffs being offered by the operators in Bhutan. This does not however mean that operators cannot charge differential tariffs for leased line services including dark fiber for different customers. It shall be permissible for

² Ibid,pp-54

operators to provide differential tariffs (within the ceiling prescribed) for services covered in this order but they shall not in any manner discriminate between subscribers of the same class and such classification of the subscribers shall not be arbitrary. Criteria for offering discounts if any on the ceiling tariffs shall be clearly laid down by the operators and published in a transparent manner besides reporting the same to the Authority.

Reporting Requirement

46. Any licensed service provider of telecommunication services in Bhutan who provides dark fiber, domestic leased circuits whether fiber based or radio based or both, international private leased circuits and internet leased line services shall report to the Authority tariffs applicable for these services along with the terms and conditions of service within five working days from the date of implementation of the said tariff. This requirement is applicable irrespective of the fact whether the services for which the ceiling tariff is mandated or not. In respect of the tariff leviable for links provided based on 'Special Construction Schemes', which is under forbearance, the concerned operator should report the commercial and economic basis of the charges applicable to such links to the Authority. Also, the lease rental payable to the international carriers on account capacities of IPLC/ILL by the operators in Bhutan shall also form part of the reporting requirement envisaged.

Publication requirement

47. Transparency in the tariff offers assumes more significance in a market which lacks effective competition. Publicly available information on prices particularly for services like leased lines which are inputs to an array of telecom services would ensure that consumers and other service

providers who are purchasing this service are aware of the market prices. Such information is crucial for promoting competition in the market. Therefore, the Authority has mandated certain publication requirements on the part of all the licensed service providers in Bhutan. To begin with, the Authority has required the operators to publish tariffs along with other terms and conditions if any in their websites. In the regime of ceiling tariffs, discounts are generally offered by service providers and in such cases criteria/basis for availing the discounts is also required to be published. In the views of the Authority, the criteria of discounts on the ceiling tariff should be known to consumers so that they make an informed choice.

48. In the case of local lead/end links, the Authority has provided for charging based on special construction scheme wherever new capacities are to be set up based on demand from a customer. In these cases of special construction, the provider is required to disclose the charging principles to the consumer besides publishing the economic and commercial principles behind the pricing formula for special construction scheme.

49. The publication of tariffs applicable for IPLC/ILL shall contain the lease rental payable to the international carriers outside Bhutan and the extent of mark up over that in a transparent manner and without any hidden cost.

Intervention by Authority

50. The Authority has the right to intervene the tariff offered by any operator in the market if in the views of the Authority such a tariff is found to be not consistent with the ceiling tariffs prescribed vide this order or is found to be violative of the principles laid down by the

Authority in this order. It is also clarified that the Authority may intervene even in respect of those aspects of the service or areas which in the present order have been kept under forbearance. However, the Authority shall intimate the service provider in writing giving the reasons for such intervention.

Review

51. The Authority has fixed tariffs applicable for dark fiber and domestic leased circuits mark-ups applicable for international private leased circuits and internet leased lines for the first time. Further, the Authority has mandated ceiling tariffs prescribed vide this order to be applicable only in respect of Western Bhutan where dark fiber and other capacities have already been deployed. In respect of services not covered in this order and in respect of services that are offered in the Eastern Bhutan, tariffs are kept under forbearance. Based on the feedback from the service providers and other stakeholders, the Authority shall review the tariff framework including the ceiling tariffs after one year from the date of implementation of this order. Such a review shall again be based on a consultation process, which the Authority has adopted in notifying this tariff order.

Appendix 1 to Explanatory Memorandum

Issues raised in the Consultation Paper of BICMA and Summary views of Stakeholders

Issue No.1

Should BICMA consider tariff regulation of domestic and international leased lines as the first step towards promoting competition and efficiency in the Telecom services sector in Bhutan? Please justify your answer.

BPC

- We recommend tariff regulation for both domestic and international leased lines. However, the regulation will need to be fair and realistic to incentivize the few players to conduct this business efficiently and reliably.
- It might also be prudent setting a time line to review whether stringent regulation is still necessary in the future. The market may become efficient and require minimal regulatory intervention for better services and tariffs.

BTL

- BICMA can fix a ceiling, but service providers should be left to operate within it driven by the market forces.

Tashi InfoComm Ltd.

- Yes, BICMA should regulate the tariff for both domestic and international leased lines. There are only a few ICT players in Bhutan and it is very easy to be anti-competitive by either going for predatory pricing or by forming syndicate and increasing the prices of the services.

Drukcom Pvt. Ltd.

- Yes. We support tariff regulation of domestic and international leased lines as first step towards promoting competition and efficiency of ICT services in Bhutan.
- Without tariff regulation, the incumbents (example Bhutan Telecom & Bhutan Power Corporation) will monopolize the prices and indirectly deny services to competitors/new entrants through prohibitive pricing. Since Bhutan Telecom is also in the retail market, they will have unlimited scope to kill competition through predatory pricing of their retail services.
- Worst of all, both are under the parent company called Druk Holdings & Investments Ltd. And, competition between the two will be non-existent or limited in terms of service pricing. This will seriously limit the scope of competition and new entrants to invest in this sector.

Issue No.2

Suggest other methods of promoting competition in the domestic and international leased line markets in Bhutan:

BPC

- The entry barriers should be kept at a minimum. The entry barriers may be in terms of license fee and procedural requirements. This being done, if the market demand increases in the future, there may be parties interested in making investments into ICT facilities.
- The other means of encouraging investments into ICT infrastructure is through tax holidays and subsidy incentives.

BTL

- No comments.

Tashi InfoComm Ltd.

- Formation of an independent government entity that has no commercial mandate to take over all the OPGW and right of way that belongs to both BTL and BPC and nationalize it .If government has will to do it, it shouldn't be difficult as both these corporations are 100% owned by the government .If this is done, government through BICMA shall have control over the most critical infrastructure of ICT. This independent agency should be a government agency and it should not be allowed to get into retail business of competing with other ICT players who will depend upon this agency for their backbone network .At present both BPC and BTL are playing dual roles; that of government as well as commercial whichever best suits their interest.

Drukcom Pvt. Ltd

- One durable way to promote vibrant competition is to create or facilitate uniform, equal priced & fair access to the national asset, the FO and the Radio transmission assets. Break the monopoly.
- Nationalize the assets so that every licensed communications will have equal and fair access at equally priced service.
- Mandate the incumbents through Govt. Policy to give ROW of the Transmission Towers to competitors at the regulated rate fixed by BICMA so that competitors can build their own end-to-end transmission facilities.
- Unbundle the services. The standing policy of the Govt. is that as and when the private sector is sufficiently armed with capital &

capability, the public sector corporations in part or whole will be privatized. We feel that Private Sector has the capital & capability, which calls for privatization of Druknet and B-Mobile.

Issue No.3

Should BICMA resort to fixing ceiling tariffs for

- a) Dark Fiber alone?**
- b) Domestic leased circuit alone?**
- c) Both Dark fiber and Domestic leased circuit?**

Justify your answer.

BPC

- Assuming effective regulation, dark fiber leasing tariff alone can be regulated. Ceiling tariffs can be a deterrent to parties interested in investing into leasing bandwidth. Regulation on the dark fiber leasing alone is recommended.
- It is important to come out with a clear set of rules, guidelines and regulations on issues like tariff, usage, reporting requirements, information sharing, safety etc. Thereafter, implementation and monitoring of these will have to be done properly and stringently. This will give clarity to all the existing ICT service providers as well as parties interested in making new investments.

BTL

- Dark fiber alone.

Tashi InfoComm Ltd.

- Both dark fiber and domestic leased circuit (bandwidth). To introduce level playing field at both level of transport modes.

Drukcom Pvt. Ltd

- We prefer both dark fiber and domestic leased circuit tariff ceilings to be fixed.
- Small operators like us cannot afford dark fiber because of the volume of our business. At some point, business volume may grow and may need dark fiber in the future.

Issue No.4

What is the life span of the OPGW and equipments that should be considered for arriving at the depreciation meant for CAPEX recovery?

BPC

- The existing memorandum of understanding (MOU) between BPC and MoIC allows for 7.5% depreciation. However, considering a more realistic economic life of OPGW, BPC has proposed for a 5%depreciation of OPGW assets as allowed by the income tax act of the country.
- It is also important here to differentiate between the various types of optical fiber available. BPC has All Dielectric Self Supporting (ADSS) optical fibers too as part of the optical fiber network which are used over medium voltage lines. ADSS has much lower life than OPGW and is more susceptible to damage.
- OPGW, ADSS and other forms of ICT infrastructure are equipment and materials that are in use all over the world. A relevant standard can be used, however, it is also important to take into account the weather and other domestic conditions into account.

- Terminal equipment used for ICT services are like any other telecom equipment used by service provider. Setting a depreciation standard for terminal optical equipment is also setting precedence into depreciation for all telecom equipment. Besides the actual life of the telecom equipment, obsolescence of technology also needs to be taken into account, as technology also needs to be taken in to account as technology changes very rapidly in the telecom sector.
- A depreciation rate of 5% assuming an economic life of ADSS to be 20 years is recommended.
- A depreciation rate of 10% assuming an economic life of ADSS to be 10 year is recommended.
- A depreciation rate of 20% as allowed by the income tax act of the country for telecom equipment is recommended.

BTL

- 20 years for OPGW and 7 years for equipment.

Tashi InfoComm Ltd.

- I recommend we should refer to other operators in region .At least 30 years for OPGW and 8 years for the terminal equipment.

Drukcom Pvt. Ltd

- International standards and the OEM standards life span of the OPGW & equipment must apply for all calculations.

Issue No.5

What should be the return on capital that should be considered in the tariff fixation for dark fiber and domestic bandwidth? Justify your answer.

BPC

- The first OPGW project in Bhutan was undertaken on a partnership between Bhutan Telecom and Bhutan Power Corporation .BPC provided the Right of way and Bhutan Telecom provided the funds for the entire OPGW replacement project. The Installed fibers were divided equally.
- A Memorandum of Understanding (MOU) exists between BPC and the Ministry of Information and Communication (MoIC) for ICT infrastructural development. Here too, BPC provides the Right of Way and MoIC provides the funds for the entire OPGW replacement project. BPC gets a minimum of six (6) fibers for the different cores of fibers installed (12/24/48 cores).
- This clearly shows a market value of the BPC Right of Way and also clearly shows the Right Of Way being valued at equal to the cost of replacement of OPGW.
- BPC recommends that there should be a value for the Right of way usage and it should be valued at the same value as the cost of replacing the ground wires by OPGW.

BTL

- Return on capital on the domestic bandwidth should be at least 12% to 20% and dark fiber should be about 7%.

Tashi InfoComm Ltd.

- Return on the capital should be about 12% but it depends. For government corporations such as BTL and BPC, banks lend at much lower interest (7%). In such cases return on capital should not be more than 10%.

Drukcom Pvt. Ltd

- If it is intended for the growth of the ICT sector then return on capital must be treated insignificant. Instead, Govt. must concentrate on the immense indirect economic benefits that will come to the country at large as the ROI. The number of years on ROI is very subjective on what Govt. wants to achieve. It can spread anywhere from 20 years to 50 years.
- On the other hand, if it is purely commercial proposition then it can be fixed to 20 years minimum. But that defeats the aspirations and goals of the MoIC to promote ICT growth in the country.

Issue No.6

Should RoW charges be included in the cost of OPGW installation and payable to BPC? If yes, what those charges should be? If not, why?

BPC

- The first OPGW project in Bhutan was undertaken on a partnership between Bhutan Telecom and Bhutan Power Corporation .BPC provided the Right of way and Bhutan Telecom provided the funds for the entire OPGW replacement project. The Installed fibers were divided equally.
- A Memorandum of Understanding (MOU) exists between BPC and the Ministry of Information and Communication (MoIC) for ICT infrastructural development. Here too, BPC provides the Right of Way and MoIC provides the funds for the entire OPGW replacement project. BPC gets a minimum of six (6) fibers for the different cores of fibers installed (12/24/48 cores).

- This clearly shows a market value of the BPC Right of Way and also clearly shows the Right Of Way being valued at equal to the cost of replacement of OPGW.
- BPC recommends that there should be a value for the Right of way usage and it should be valued at the same value as the cost of replacing the ground wires by OPGW.

BTL

- No comment.

Tashi InfoComm Ltd.

- Not at all. BPC has neither paid for the towers nor for the land and civil works. Besides, these costs are included in determining the price of electricity. Please prevent BPC's double costing the cost of towers and civil works for determining rates of both the electricity and telecommunications and misguide the government.

Drukcom Pvt. Ltd

- RoW charges should not be included in the cost of OPGW installation.
- Firstly, the initial capital cost of the infrastructure is paid by the Government. Secondly, tower costs are already sunk and were primarily built for power transmission and I think the tower costs are already paid up by now through power revenues. Thirdly, it is also in Government's interest to promote ICT growth in the country. Only way to do is to have affordable and competitive pricing at par with our neighboring countries. One way to bring down bandwidth prices will be to exclude RoW charges in the cost of OPGW installation.

Issue No.7

What should be the Capacity Utilization to be assumed for

a) Dark fiber pricing

b) Domestic bandwidth pricing of

- **STM-1 capacity**
- **DS-3 capacity**
- **E-1 Capacity**

BPC

- The market in Bhutan is small. The Probable leasers of fiber are obvious and countable. In our informal talks with Bhutan Telecom they seem to be interested in 4 fibers in the main trunk lines and 2 fibers along spur routes.
- Tashi InfoComm limited has indicated that they wanted only 2 fibers along most routes. Some fibers are being used for BPC's internal communication purposes. This being the scenario, utilization of 25-30% would be most realistic.
- The major users of bandwidth being Bhutan Telecom (BT) and Tashi InfoComm Limited (TICL), terminal equipment installed by BPC are expected to have low utilization after the Phuntsholing drop point since both TICL and BT have dark fibers from Phuntsholing to Thimphu. Utilization of 25% to 30% is only expected.
- It is important to understand why BPC is proposing for the utilization factor. Besides trying to make cost recovery, it is also to provide flexibility to reduce prices when the demand increases and also to prevent fluctuating prices. As and when the demand increases for either dark fiber or Bandwidth, BPC will reduce tariffs, which would be in sync with the falling prices of bandwidth globally. Unrealistic utilization factor would not only make cost

recovery difficult for BPC, but it would also result in stagnant/fluctuating prices of both dark fiber and bandwidth for a long time.

- A utilization of 25-30% is recommended.

BTL

- BICMA should refer to regional standard issues since it is hard to estimate. Our best estimate is 50%

Tashi InfoComm Ltd.

- Dark fiber pricing: 80 to 90% capacity should be assumed to be utilized for determining the price of the dark fiber even if 80 to 90% of the capacity is not utilized at the beginning. It would not be fair to charge the entire cost of the fiber on few takers as this is expected initially. However, there must be a standard practice used by other operators in the region.
- Domestic bandwidth pricing (STM-1, 90%);(DS-3 and E1 100%)

Drukcom Pvt. Ltd

- We would like the capacity utilization to be assumed at 60% for dark fiber.
- STM-1 assumed to be 65%
- DS-3 assumed to be 70%
- E-1 assumed to be 75%

Issue No.8

Should domestic leased circuit ceiling tariff be same for both fiber and radio based bandwidth? If yes why and if not give reasons.

BPC

- It should be different. The level of reliability and service provided by radio based bandwidth is different. Importantly there may be areas where radio based bandwidth only exists. The cost of radio based bandwidth being distinctly different than that of laying optical fibers, having a single tariff for both radio based bandwidth and optical fiber based bandwidth may result in either bloating up the optical fiber based bandwidth or result in discouraging investments into radio based communication because of the probable lower ceiling of prices based on optical fiber costs.
- Separate ceilings for radio and optical fiber based leased circuit are recommended.

BTL

- Wherever there is an option for fiber or radio, fiber tariff should apply; wherever only radio link exists, its tariff should apply; thus a combination should apply wherever there is a mix .BTL currently applies same rate irrespective of the technology.

Tashi InfoComm Ltd.

- No. The cost of fiber based bandwidth and radio based bandwidth are very different.

Drukcom Pvt. Ltd

- In our opinion, the tariff should be same for both FO and radio.

- The method of delivery is not a concern to the customer but the content must reach the destination. How it is done is immaterial but we cannot have multiple costs of delivery of the same content. That will be confusing to the customer.

Issue No.9

Should ceiling tariff fixed for DLC be made applicable for Local lead, last mile link, Intra-city links also? Justify your answer.

BPC

- Local lead, Last mile link, Intra-City links can be provided by many options and by many service providers as it is not very capital intensive. Putting a ceiling on this would discourage investment, as it will be difficult to arrive at one single ceiling when there are many technologies available to provide this service.
- Ceiling tariff should not be made applicable for local lead, last mile link and intra city link.

BTL

- No.

Tashi InfoComm Ltd.

- Tariff ceiling shall be necessary at all levels of leased lines. As we have only a few players there may not be enough competition at all levels. ICT players will take advantage of situation wherever possible.

Drukcom Pvt. Ltd

- This is not necessary. But the pricing must be transparent and its services must be made available at the same rates to competitors if owned by Bhutan Telecom or Govt. owned company.

Issue No.10

Should BPC be mandated to create a separate subsidiary for providing telecom infrastructure, which is to be run by telecom executives, or should it be mandated to maintain separate accounts in the manner prescribed by BICMA to ensure transparency in the management and running of the telecom infrastructure?

BPC

- A proposal to form an independent ICT infrastructure company has already been rejected by the Cabinet with the directive to existing infrastructure companies like BPC and BT to manage the ICT infrastructure and expansion plans.
- BPC is a viable option for providing ICT facility services mainly because of the available power and associated infrastructure. Optical fibers are being laid over BPC power transmission infrastructure and terminated at BPC power substations. The optical terminal equipment will use existing BPC direct current supply from substations and other auxiliary services to cut on cost. In case of a subsidiary company, there will be additional cost as each company would have to cater to its own risks, operation and maintenance schedules based on individual priorities. Eg; power transmission department of BPC will prioritize power transmission maintenance over ICT services when a separate/Subsidiary company under separate management is concerned. Coordination for maintenance shutdown will be an issue when optical fiber lines need to be repaired while the power transmission is functioning fine.
- The business volume presently in Bhutan does not warrant a separate subsidiary company. Moreover, as an internal set up

within BPC, co-ordination issues relating to ICT facilities and power facilities are being amicably sorted out. This would be difficult if a subsidiary company or a third company is set up.

- BPC already has principle approval from our board for creating a subsidiary company. However, a phased approach is being taken by first establishing an independent division with adequate resources to cater to all ICT facility services that can be provided by BPC. Separate accounts for this division is being kept to ensure transparency of both cost and revenue as required by the BICMA and BEA license conditions.
- A separate subsidiary company would involve increased overhead because of which the allowed 2.5% operation and maintenance cost would probably not be sufficient. Instead, stringent accounting separation requirement can be set and proper reporting procedures mandated.
- BPC recommends that separate accounts be maintained as prescribed by BICMA. A subsidiary company can be considered once the business is established properly with all the nuances of the business clearly sorted out and if the volume of business is large enough.

BTL

- Separate accounts recommended for telecom services, but not create a separate subsidiary.

Tashi InfoComm Ltd.

- Ideal proposition shall be to have entirely independent entity as submitted above. In short of the independent agent under the government, BICMA and government should ensure that the

department /section running the ICT business for BPC is provided with separate mandate and accounts separation.

Drukcom Pvt. Ltd

- As long as BPC is mandated to be only facility provider, it is not necessary to create a separate subsidiary and can maintain separate accounts.
- But the moment they expand their mandate to become service provider as well then they must be fully delinked from BPC and must become a facility and service provider.

Issue No.11

What should be the extent of mark up that BICMA could allow over and above the price payable for the International Internet bandwidth/IPLC by BTL or any other operator in Bhutan?

BPC

- There are different costs involved in reaching bandwidth to domestic players from International Service Providers. There is a cost of optical fiber connectivity and associated equipment to bring in the international Internet bandwidth/IPLC from the border into the domestic distribution point.
- The other costs are the administrative costs involved with system coordination, billing, annual negotiation and customer relationship management for the International Connectivity. Discussions were held between the ICT stake holders on this topic. On the agreement of the ICT stakeholders, Tashi InfoComm Ltd on their behalf, made a study and proposed a handling (Administrative) charges varying from 2.5% to 5% depending on the volume .BPC finds the offer reasonable and recommends this figure.

- BPC recommends a variable 5% -2.5% handling charges depending on volume of business.

BTL

- A straight markup of 20-30% be applied. Others like domestic and interconnections should be charged separately.

Tashi InfoComm Ltd.

- 5 to 7 % and above the Internet bandwidth/IPLC paid by BTL.

Drukcom Pvt. Ltd

- The mark up should be the only 5%.

Appendix 2 to Explanatory Memorandum

Comparison of existing tariff with the ceiling tariff fixed for select distances and capacities

E-1			
Distance in Kms	Existing(in Nu)	Proposed(in Nu)	% Reduction
10	48000	17996	62.51%
50	180000	64241	64.31%
100	360000	121521	66.24%
200	706584	236082	66.59%
300	1023876	350643	65.75%

64 Kbps			
Distance in Kms	Existing(in Nu)	Proposed(in Nu)	% Reduction
10	12000	8132	32.23%
50	22560	9564	57.61%
100	35760	11342	68.28%
200	60840	14896	75.52%
300	72720	18450	74.63%

128 Kbps			
Distance in Kms	Existing(in Nu)	Proposed(in Nu)	% Reduction
10	14400	8790	38.96%
50	30408	13209	56.56%
100	60816	18687	69.27%
200	116184	29642	74.49%
300	163008	40596	75.10%

256 Kbps			
Distance in Kms	Existing(in Nu)	Proposed(in Nu)	% Reduction
10	18000	9447	47.52%
50	55284	16855	69.51%
100	110568	26032	76.46%
200	211260	44387	78.99%
300	296364	62743	78.83%

512 Kbps			
Distance in Kms	Existing(in Nu)	Proposed(in Nu)	% Reduction
10	24000	10762	55.16%
50	85056	24145	71.61%
100	170100	40723	76.06%
200	325008	73879	77.27%
300	455952	107035	76.52%

Note: Existing tariff refers to tariffs offered by BTL as on date.

Appendix - 3 to Explanatory Memorandum

Annual tariff for 2 Mbps Domestic Private Leased Circuit (100-kilometer distance)

Country	Feb. 2009
	In US \$
Nepal	-
Bangladesh	3826
Pakistan	2950
India	3569*
Sri Lanka	3236
Indonesia	7220
Bhutan (Existing)	7369
Bhutan – Fixed in present Order	2430

Source: Consultation paper on 'Issues relating to National and International Backbone Connectivity in Bhutan'- BICMA, March, 2009

*Pertains to ceiling tariff fixed by TRAI in 2005. Current market price is much below the ceiling