

FOREWORD

The Independent Consumer and Competition Commission (“the Commission”) is a statutory body, established under the provisions of the *Independent Consumer and Competition Commission Act 2002* (“the ICCA Act”). The Commission has been given responsibility for the promotion of competition and fair trading, the regulation of prices for certain goods and services, and the protection of consumers’ interests, and other related purposes.

In its role regulating prices for certain goods and services, the Commission also has responsibility to regulate the prices and associated service standards of Regulated Entities. These Regulated Entities include public utility service providers such as electricity, telecommunications and ports. The regulatory arrangements that apply to these Regulated Entities are set out in detail in the Regulatory Contracts that have been prepared for, and apply to, each of the Regulated Entities. These Contracts specify the minimum service standard requirements of the Regulated Entities, the price path that will apply over an agreed period and the Pricing Principles that are to be applied in reviewing that price path at some future date. Each contract further specifies the capital expenditure requirements on the Regulated Entities, and the penalties that the Regulated Entities will incur if they fail to meet the service standards and the capital expenditure requirements built into the price path and forming the basis of the Regulatory Contract.

These entities that are now subject to Regulatory Contracts were previously regulated under the provisions of the Prices Regulation Act. The Regulatory Contracts however are constituted under the provisions of the ICCA Act and offer a number of advantages to consumers, the Regulated Entities, and to the wider PNG economy over the previous form of economic regulation. Importantly, the advantages offered to the Regulated Entities in that the Regulatory Contract provides a degree of certainty as to the way in which maximum prices and minimum service standards are to be set and therefore the price path that will apply over a period of time. Provided the price path has been set in such a way as to encourage greater efficiency from the Regulated Entities, the greater certainty allows the Regulated Entities to plan their investment and efficiency improvements in such a way that they achieve over time a higher level of efficiency and standard of service delivery than under one-off price setting as was pursued under the old pricing arrangements of the Prices Regulation Act.

A Regulatory Contract currently exists for Telikom PNG Ltd and Pacific Mobile Communications Ltd (“jointly referred to as Telikom”). This Regulatory Contract came into effect in July 2002 and expires on 31 December 2011. The Commission and Telikom agreed in 2003 to review the Regulatory Contract in light of the previous Government’s decision to offer for sale part of Telikom’s shares to private parties. This review was put on hold when the current government decided not to proceed with the sale. However, in the context of more recent Government decisions affecting the overall operations of Telikom and the opening up of competition in the mobile network, there is a need to re-examine certain aspects of the Telecommunications Regulatory Contract and make adjustments where necessary. As such the Commission has reopened the review of Telikom in accordance the provision of the regulatory contract. This Draft Report and consequential Draft Regulatory Contract are now open to public comment and scrutiny.

Under the provisions of Clause 11.1 of the Regulatory Contract, the ICCA and Telikom can jointly agree to the re-opening of the Regulatory Contract with a view to making

amendments to the Contract. The provisions of this clause of the Contract require that the Commission undertake a process that *inter alia* involves no variation being made to the Contract unless:

- At least 40 business days prior to any such variation taking effect
 - the Commission has published a notice describing the proposed variation in both the National Gazette and a daily nationally circulating newspaper inviting public submissions and allowing 20 business days for receipt of those submissions
 - the Commission has provided notice to the relevant Minister describing the proposed variations, and
 - the Commission has made available for public inspection or purchase copies of the precise form of the proposed variation
- The Commission has considered such submissions in relation to the proposed variation as it receives.

Clause 11.1 of the Contract also requires that any variation to the Contract must not be inconsistent with the Regulatory Principles outlined in the Contract or the requirements of the *Independent Consumer and Competition Act 2002*. These requirements and provisions of the Regulatory Contract are designed to protect Telikom against any changes being made to the Contract that lessen the regulatory certainty that the Contract is intended to give, while at the same time providing opportunity for all interested parties to be informed of the review itself and to make a contribution to that review process.

Telikom and the Commission have agreed that the Regulatory Contract should be varied and have exchanged correspondence confirming that agreement. An issues paper was released on 8th of September 2003, and interested parties invited to make submissions to the ICCC. Further to their letter of 8 September 2003, Telikom has written to the Commission on 17 February 2006 to confirm the review process described above proceeds.

A revised Draft Report has now been prepared to which has been attached a Draft of the Revised Regulatory Contract. Submissions are now invited on this revised Draft Report.

The timetable for the remainder of the current review is as follows:

Release of revised Draft Report	14 March 2006
Receipt of submissions on revised Draft Report	13 April 2006
Release of Final Report	31 May 2006

Submissions to the Commission will be available for public inspection unless the Commission agrees that all or part of a submission received should remain confidential. However, in accordance with the provisions of the ICCC Act, it is intended to make the review process as transparent as possible, and to this end, submissions would normally be available for public inspection unless there are exceptional commercial-in-confidence reasons why submissions should be held confidential.

Submissions to this inquiry should be received by 13 April, 2006 and should be directed to:

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CONTENTS

FOREWORD	2
CONTENTS	5
EXECUTIVE SUMMARY	6
Consultation	6
The Draft Report	6
1. INTRODUCTION.....	9
1.1 Background to the review	9
1.2 Legislative Requirements	9
1.3 Format of the review process	11
2. BUILDING BLOCK COMPONENTS.....	14
2.1 Projected Demand	14
2.2 Operating Expenditure	16
2.3 Capital Expenditure	18
2.4 Rate of return	21
2.5 Regulatory Asset Base	26
3. REGULATORY PRICE PATH.....	28
3.1 Form of Regulation	28
3.2 Length of regulatory Period	29
3.3 Regulatory Price Path Adjustment	30
3.4 Service Standards Requirements	32
3.5 Applicable Rebate Proportions	33
4. ACCESS.....	34
4.2 Principle of Interconnection	34
4.2 Access Issues	35
4.4 The Commission's proposed approach to Access charging	37
5. AMMENDMENTS TO REGULATORY CONTRACT	39
5.1 Overview	39
5.2 Legal Status of the Existing Regulatory Contract	39
5.3 Treatment of Internet Dial Up Services	40
5.4 Variations to Clauses in the Contract	41

EXECUTIVE SUMMARY

The existing Regulatory Contract came into effect in July 2002 and has a term that will expire in 31 December 2011. The Commission and Telikom have agreed conduct this review process to update all regulatory settings to reflect the changed operating circumstances of the business.

The current review is in accordance with the provisions of clause 11.1 of the existing regulatory contract. In undertaking this review, the Commission has taken into account the Regulatory Principles outlined in the Regulatory Contract and the requirements of the *Independent Consumer and Competition Commission Act 2002*.

Consultation

The Commission envisages publishing a public notice describing the review process and the release of the revised Draft Report in the daily newspapers and inviting public submissions which will allow for 20 business days for receipt of those submissions.

The timetable for remaining process prior to the release of the Final Report is as follows:

- | | |
|---|---------------|
| ▪ Release of revised Draft Report | 14 March 2006 |
| ▪ Receipt of submissions on revised Draft Report by | 13 April 2006 |
| ▪ Release of Final Report | 31 May 2006 |

The Draft Report

The Report lays down the Commission's preliminary views prior to the release of the final report in relation to the price path that will apply over the next 5 years. This price path will offer a number of advantages to consumers, Telikom and to the wider PNG economy. It will be set in such a way that will encourage greater efficiency of operations and more certainty to Telikom to plan its investment and efficiency improvements in such a way that it achieves over time a higher level of efficiency.

The report further highlights the minimum service standards and capital expenditure required of Telikom and the penalties that it will incur if it fails to meet these requirements.

The Commission's consideration of Telikom's proposed total costs and revenue is contained in its separate assessment of the principles and individual components of the cost of service methodology discussed above. The Commission's consideration of these costs included:

- The determination of the initial Regulatory Asset Base ('RAB');
- The roll forward of the RAB on the basis of indexation, capital expenditure, regulatory depreciation, and any asset disposals;
- The WACC to be applied to the RAB to determine the return on capital in the cost building blocks;
- The depreciation of the RAB to determine the return of capital to be included in the cost building blocks;

- The prudent and efficient operating costs which have been included in the cost building block methodology; and
- The cost allocation methodology used to determine the appropriate level of costs to be set against the regulated service baskets.

The Commission's separate consideration and determination of the above components within the building block methodology has provided the Commission's determination of the efficient cost (or anticipated efficient cost) of providing regulated services over the period of the Regulatory Contract. Tables ES.1 and ES.2 below shows the efficient cost of providing regulated fixed network and mobile network services and subsequently the total revenue requirement for Telikom's regulated services as defined in the Regulatory Contract.

Table ES.1 Commission proposed total revenue for Fixed Network Services

Year ending 31 December nominal Kina	2007	2008	2009	2010	2011
Return on asset	83,622,942	67,775,289	36,917,628	31,961,482	26,954,277
Return of asset	47,659,684	62,409,684	69,666,548	77,499,837	85,949,769
O&M Expenditure Fixed	29,879,869	31,672,661	33,573,021	35,587,402	37,722,646
O&M Expenditure Variable	85,585,553	90,720,686	96,163,927	101,933,763	108,049,789
Total cost of service	246,748,048	252,578,321	236,321,125	246,982,484	258,676,482

Table ES.2 Commission proposed total revenue for Mobile Network Services

Year ending 31 December nominal Kina	2007	2008	2009	2010	2011
Return on asset	20,201,091	22,534,252	22,886,680	23,729,274	24,919,584
Return of asset	12,633,720	15,583,720	16,726,793	18,174,590	19,928,185
O&M Expenditure Fixed	18,631,330	19,749,209	20,934,162	22,190,212	23,521,624
O&M Expenditure Variable	13,955,995	14,793,355	15,680,956	16,621,814	17,619,122
Total cost of service	65,422,136	72,660,536	76,228,590	80,715,889	85,988,516

These total revenue requirements for Telikom's fixed network and mobile network services has been determined by the Commission under the regulatory principles set out in the current Regulatory Contract.

To determine the price path, the Commission has determined the costs of service and the likely demand (i.e. the number of subscribers and Minutes of Use ('MoU')) over the regulatory period. Given these demand, the Commission has been able to spread the cost of service for both mobile and fixed network over each unit of production.

Having analysed the cost of services provided by Telikom, the Commission has determined a revenue path for these services such that the net present value of revenues over the regulatory period is equal to the net present value of the associated costs. Therefore, the Commission has been able to determine the appropriate revenues for regulated services given their associated costs. Table ES.3 and ES.4 sets out the changes in prices over the period covered by the new Regulatory Contract for the fixed network and mobile network services respectively.

Table ES.3 Price changes for Fixed Network Services

Year ending 31 December	2007	2008	2009	2010	2011
X factor on Rentals	0.00%	0.00%	0.00%	0.00%	0.00%
Price for rental	CPI + 0%	CPI + 0%	CPI + 0%	CPI + 0%	CPI + 0%
X factor on MoU	-2.44%	-2.44%	-2.44%	-2.44%	-2.44%
Price on MoU	CPI - 2.8%	CPI - 2.44%	CPI - 2.44%	CPI - 2.44%	CPI - 2.44%

Table ES.4 Price changes for Mobile Network Services

Year ending 31 December	2007	2008	2009	2010	2011
X factor on Flagfall	-6.28%	-6.28%	-6.28%	-6.28%	-6.28%
Price on Flagfall	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%
X factor on MoU	-6.28%	-6.28%	-6.28%	-6.28%	-6.28%
Price on MoU	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%	CPI - 6.28%

1. INTRODUCTION

1.1 Background to the review

In July 2002 the Independent Consumer and Competition Commission ('the Commission') entered into a Regulatory Contract with Telikom. This Regulatory Contract includes, among other things:

- The definition of regulated mobile and fixed network services;
- The initial prices for these regulated service baskets;
- An adjustment mechanism for prices over the length of the Regulatory Contract;
- The length of the Regulatory Contract;
- The definition of force majeure and other regulatory pass through events which would result in a change within the Regulatory Contract;
- The minimum services standards and customer rebates applicable over the regulatory period; and
- The review process associated with the subsequent regulatory period.

The period covered by the Regulatory Contract is for ten years, commencing July 2002 and expiring 31 December 2011. The Commission is undertaking this review of the regulatory arrangement that apply to Telikom so that the terms of the revised Regulatory Contract are reflective of the current operating circumstances of the business. The release of this revised Draft Report is the Commission's second phase in the public consultation process which has included the release of an Issues Paper in September 2003 and will conclude with the release of the Final Report. The Commission invites interested parties to make submissions on any aspect of this draft decision. These submissions will be used by the Commission in its assessment of the final terms of the revised Regulatory Contract.

1.2 Legislative Requirements

This review is being undertaken in accordance with the provisions of clause 11.1 of the Telecommunications Regulatory Contract, which provides for agreed variation to the regulatory contract during the duration of the Regulatory Contract. In undertaking this review, the Commission is to have regard to the Regulatory Principles outlined in schedule 1 in the Regulatory Contract and to the requirements of the *Independent Consumer and Competition Commission Act 2002* ("the ICCC Act").

In relation to the ICCC Act, the Commission notes its functional responsibility is to:

- enhance the welfare of the people of Papua New Guinea;
- to promote economic efficiency; and
- to protect the long term interests of the people of Papua New Guinea (Section 5(1)).

Further, it shall not exercise any power in a manner that is inconsistent with the requirements of a Regulatory Contract that is in effect noting that the exercise of any power in a manner that is inconsistent with a Regulatory Contract that is in effect will be of no effect to the extent of the inconsistency (Section 7(4)), and is not to be subject to direction (Section 23).

The Regulatory Principles are to be found in Schedule 1 to the Regulatory Contract and require the Commission to have regard to *inter alia*:

- Telikom's ability to recover an appropriate rate of return through the pricing and supply of its telecommunications services
- The long term interests of the end users of the telecommunications services by considering the objectives of
 - Promoting competition in the markets for telecommunications services
 - Achieving any-to-any connectivity
 - Encouraging economically efficient usage of, and economically efficient investment in the infrastructure by which telecommunications services are supplied
- The level of future capital expenditure and operating expenditure required to maintain service levels, including an efficiency factor to be applied to operating expenditure
- The timing for the introduction of competition in the market for the provision of Fixed Network Services, Mobile Network Services or Excluded Services
- The nature and type of access to be made available to competitors and the time within which such access is to be provided
- Service and capacity availability
- The need to provide an allowance for accelerated depreciation of any assets identified by Telikom as being stranded or potentially being stranded by the introduction of competition in the provision of any Fixed Network Services, Mobile Network Services, or Excluded Services.

The Commission is also to use an incentive regulation approach in the regulation of prices charged by Telikom. In addition, the Commission in giving consideration to the pricing and supply of regulated telecommunication services by Telikom either at the wholesale or retail level, will have regard to the recovery of the following costs and will apply a building block approach consisting of the following components:

- Initial capital stock;
- Return on capital (WACC);
- New capital expenditure;
- Return of capital (economic depreciation);
- Operating expenses;
- Required contribution to common shared overheads; and
- The extent to which costs can be avoided through the supply of services through wholesale channels.

The Commission must also give consideration to establishing a glide path adjustment with a sharing of efficiency gains between Telikom and its customers.

The Regulatory Principles also require that the extent of regulation of prices will have regard to the degree of actual and potential competition in the supply of those services such that increasing competition will result in reduced regulation. The Commission expects that both PMC and Telikom will face significant competitive pressure over the next five year period. Primarily this competition will come from the Mobile network but it will represent interesting challenges regarding the access of competing networks on other networks. The Commission expects that this will be especially relevant where prices are charged for access between the fixed and mobile network. This increased competition, and the expiration of the monopoly period for Telikom may eventually result in the Commission reducing the regulatory burdens on both PMC and Telikom. However, the Commission acknowledges that there will be a need of regulatory oversight particularly as it relates to disputes between the various networks regarding access to each others networks, this point is discussed in some detail in section 4. In addition, the Commission expects that there will continue to be a need for oversight over minimum service levels and the minimum capital expenditure on the fixed line network.

The principles and legislative requirements are mandatory for the Commission to consider and abide by as part of this review of the Regulatory Contract. They form the guiding principles for the process of review that is currently been undertaken.

In undertaking this review, the Commission is mindful of the need to allow a transparent and public process whereby all interested parties may contribute to the review by way of written submissions to the Commission. This process involves the receipt of submissions on the Draft Report. As the review is of the Regulatory Contract, the Commission has released a draft of the Regulatory Contract as part of its release of the Draft Report.

Since the original Regulatory Contract was prepared, the government has made a number of decisions relating to aspects of the future operation of the telecommunications sector in PNG. These include decisions not to proceed with the partial sale of Telikom shares as proposed by the previous government and to bring forward the end of Telikom's mobile monopoly to end in March 2007 with two new public mobile licences to be issued to two new telephone companies in March 2007 to compete with Telikom. These Government decisions are not part of this inquiry. Rather, the Government decisions are treated as given, and are built into the Regulatory Contract. Thus, issues to do with the length of the monopoly period and competition that should apply to Telikom, are fixed and the only consideration of these issues in terms of this review are as to how they should be incorporated in the Regulatory Contract to ensure level playing field for all carriers.

1.3 Format of the review process

In undertaking this review, the Commission needs to have regard not only to the legislative requirements as outlined above, but also the requirements for due process allowing adequate time for submissions to the Commission, and adequate time for proper consideration of the data and information provided to the Commission and gathered independently by the Commission.

The timetable for the inquiry has been outlined in the Forward to this Paper. All interested parties are invited to formally make submissions to the Commission within the context of this revised timetable. Notwithstanding the fact that the process has been delayed for more than eighteen months from the receipt of submission on the Issues Paper to the release of this revised Draft Report due to the change in overall government policy for the telecommunications industry in PNG, the Commission will consider these submissions as they are received.

The Commission has also undertaken discussions with Telikom with a view to updating the data that was previously provided for the current Regulatory Contract. There has been some re-assessment of Telikom's future level of activities and demand for Telikom's services in view of the current operating circumstances of the business. There has been noticeable increase in demand experienced since the commencement of the digital Mobile Network Service. This in turn has implications for the level of efficient use that Telikom can obtain from its existing Fixed and Mobile Network infrastructure, and opens the opportunity for the potential introduction of a wider range of additional add-on services that can be offered either by Telikom or potentially by other service providers who are able to compete in those areas not specifically designated for Telikom's sole use or where competition exists.

The Commission has reviewed all the financial and market information that it has obtained from Telikom to date and incorporated this into the modelling of the forward price path for Telikom's services. As is required under the Regulatory Principles, the Commission has used the building blocks approach to develop the forward revenue requirements for Telikom, and for its particular regulated services. This forward revenue requirement is modelled against anticipated capital expenditure requirements, and the financial viability of the regulated business has been assessed in the context of possible future revenue flows. Prices for categories of services have been developed against the future revenue requirements and forward adjustments in prices designed to achieve these revenue outcomes have been developed using appropriate formulae which take into account underlying rates of inflation and cost imposts that Telikom can not of itself control.

The Commission has used as the starting point for its financial modelling the financial model that has been used in the present Regulatory Contract. However, this has been updated and altered to meet the current changed operating circumstances and expectations for Telikom going forward. This modelling also includes provision for appropriate penalties to be applied to Telikom if it fails to meet agreed minimum service standards and new capital expenditure requirements. Again, these are arrangements that existed in the previous Regulatory Contract and therefore are carried over, albeit updated to reflect the current expectations and requirements on Telikom.

Under the regulated price path and other requirements that apply to Telikom under the Regulatory Contract, Telikom will have the opportunity to meet or better these requirements. For example, if it is able to be curtail its operating costs to levels lower than that allowed under the regulatory price path through efficient operations while still meeting the minimum service standards requirements, then Telikom will be able to retain the financial benefit achieved. In this way Telikom will be provided with an incentive to improve and achieve overall operational and performance efficiency over the regulatory period. Under the glide path requirements of the Regulatory Principles, it is envisaged that those efficiency benefits gained by Telikom will ultimately be shared with consumers either through a reduction of prices or improvement in service quality, and the Commission will be examining ways to ensure that this objective is realised over time. On the contrary, if Telikom is not able to

operate within the overall cost structure set in the Regulatory Contract modelling to realise at least some level of efficiency, it will bear the financial cost itself. If minimum service quality levels are compromised as a means of countering this financial cost, then the penalty provisions of the Contract will be applied. Thus, the Regulatory Contract endeavours to provide both an incentive and a penalty structure for Telikom's future operations.

In undertaking this review, the Commission is conscious that the review is occurring at a time when a closed tender process is being undertaken for the issuance of two new public mobile telecommunications licences in accordance with the government's decision to introduce competition in the mobile telecommunications market. It is acknowledged that Telikom will require some degree of certainty as to what the future regulatory requirements for Telikom will be for the mobile segment of its business post competition and how these should be expressed and presented in the Regulatory Contract. The Commission recognises the importance of informing Telikom and interested parties in advance the form of regulation that would apply if any for the mobile telecommunication services after the introduction of competition.

It should also be noted, that under the terms of the Regulatory Principles and the provisions of Clause 11.1 of the Regulatory Contract, the current inquiry is to be seen as a review, mainly designed to update the Regulatory Contract and incorporate more recent policy decisions of the government which impact on the regulatory arrangements and the price path. Thus, the Commission has not undertaken a complete rewriting of the Regulatory Contract, although the Commission will be mindful of submissions that will be received on this matter. Rather, the Commission has updated relevant parts of the Contract, and most importantly the regulatory price path and the way the price path is to apply over the regulatory period.

The remaining sections of this Draft Report comment on matters that have been considered by the Commission in preparing the Draft Report and revisions to the Regulatory Contract.

2. BUILDING BLOCK COMPONENTS

2.1 Projected Demand

The Regulatory Principles require the Commission to use a building block approach to determine of the future revenue requirements of Telikom. This requires the Commission to consider what is likely to be the efficient operating costs, return on capital and return of capital of Telikom for the regulatory period. For this purpose, the Commission has sought from Telikom an update of the projected operating and capital costs of the business over the period to 2011. The Commission also had to give consideration to the question of an opening regulatory asset value, and an appropriate rate of return in the PNG context.

In considering what might be appropriate estimates of Telikom's forward operating and capital costs, the Commission has also considered the future demand projections provided by Telikom. Future operating and capital costs will to some extent be driven by the anticipated change in demand for regulated services, and the projections of this demand can have a significant impact on the final price path prepared for Telikom.

The demand for Fixed Network Services and Mobile Network Services was considered from two main perspectives, namely the number of subscribers and the minutes of use ('MoU'). The Commission also undertook a detailed comparison of the estimates provided by Telikom as part of the current inquiry and those provided as part of the preparation of the original Regulatory Contract. The Commission noted the stronger growth now being experienced for mobile services which is projected to continue high growth over the next two years and then remain steady thereafter towards the end of the regulatory period with the introduction of competition. The Commission has also noted that fixed network services is projected to grow at a constant rate of three percent over the regulatory period which is attributable to the improvement work on core infrastructure although average growth in this segment of the business has been one percent over the last four years. The Commission is currently using an average price cap in the current regulatory contract and proposes to use a similar device as part of the revised Regulatory Contract. The advantage of this approach is that it provides added incentive for Telikom to grow the business beyond the growth projections included in the Regulatory Contract. In this way, Telikom is able to retain any additional revenue earned as a result of achieving higher demand than originally anticipated.

While it might be argued that once Telikom has recovered its efficient costs from consumers, the inclusion of additional users requiring no major increase in the investment in the network and at a very small marginal costs per new subscriber, should mean that average prices can fall. However, at this time where the need for infrastructure development and expansion is high given the very low penetration rate for telecommunication services in Papua New Guinea, the Commission is keen to encourage Telikom to grow the network. The Commission recognises that improved telecommunications services are an essential means of spurring economic growth and development in PNG. They provide a means for the areas outside of the main cities and towns to participate in the market economy, gain access to improved government, learning and health facilities including knowledge of current events, and provide access to other complimentary services such as banking and other communications based services.

The inclusion of over optimistic demand projections, if not achieved, could result in Telikom being unable to collect sufficient revenue necessary to meet its revenue requirements. Thus, the Commission is mindful of the need to ensure that the demand projections are realistic in light of the current and anticipated operating circumstances of the business and overall growth in the PNG economy. To this end, the Commission has accepted the subscriber demand and MOU projections of Telikom in terms of its fixed and mobile networks respectively. The revised estimates of subscribers and minutes of use for both the fixed and mobile networks under this draft decision are provided in Figures 2.1(a), 2.1(b), 2.1(c), and 2.1(d).

Figure 2.1(a) Forecast Subscribers Fixed Network

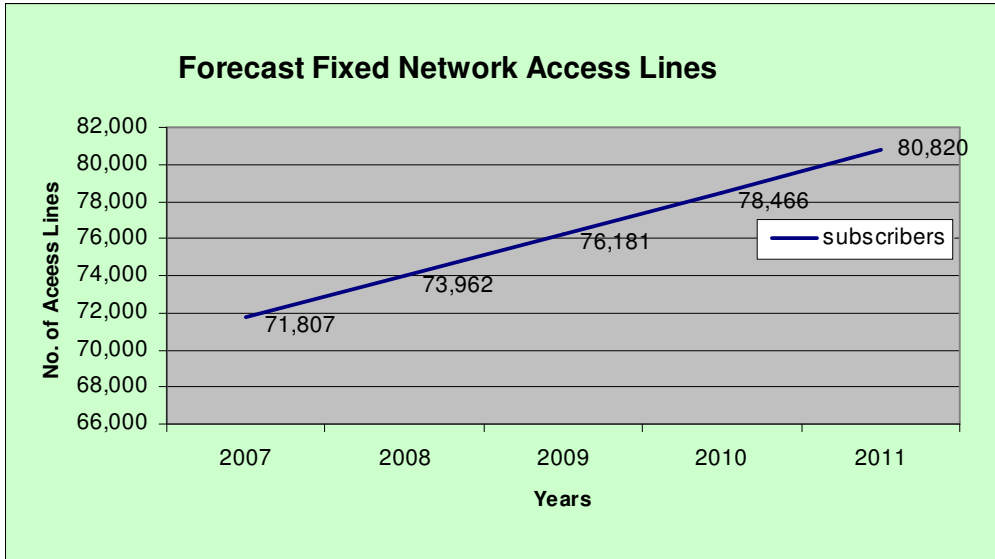


Figure 2.1(b) Forecast Subscribers Mobile Network

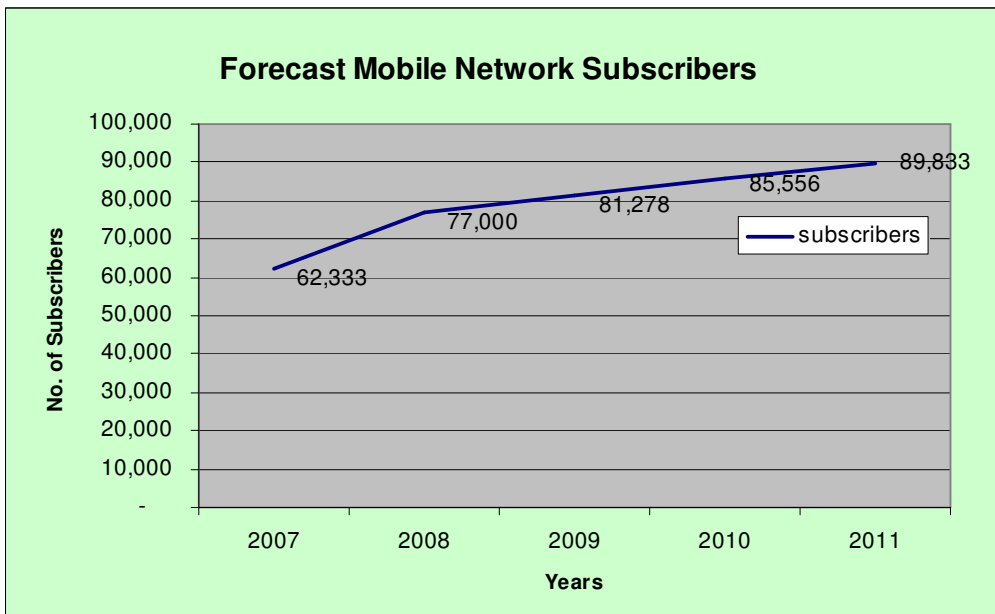


Figure 2.1(c) Minutes of Use Fixed Network

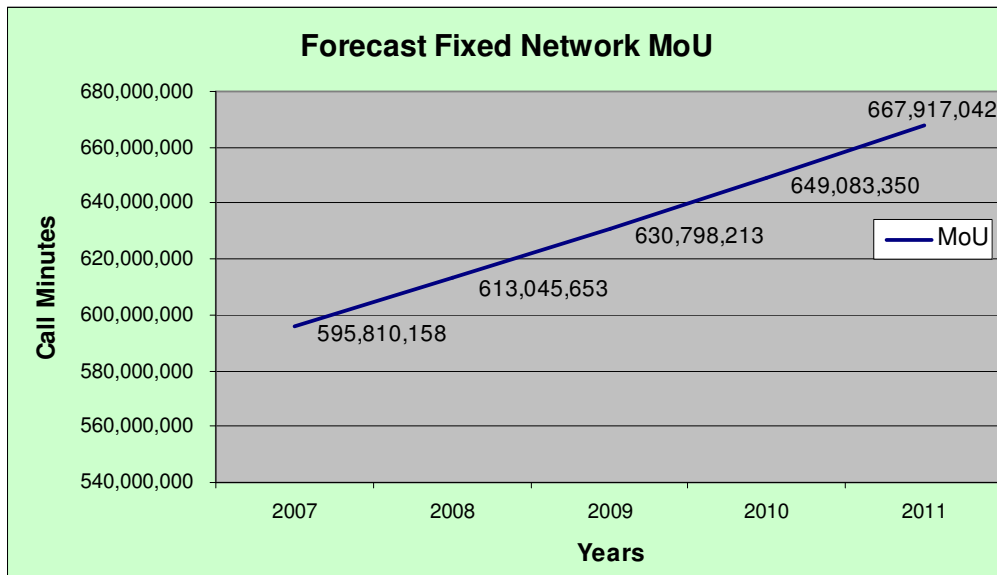
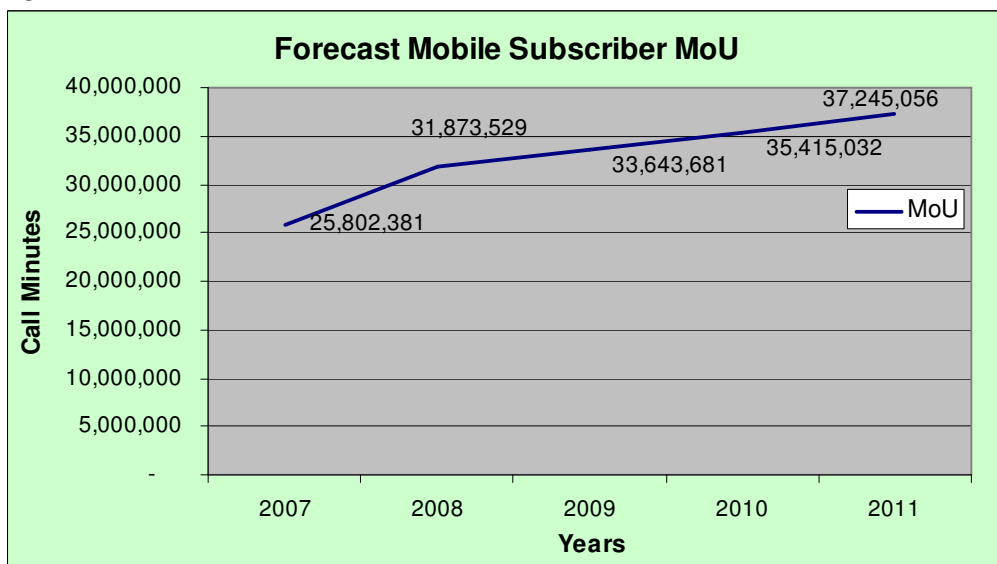


Figure 2.1(d) Minutes of Use Mobile Network



2.2 Operating Expenditure

Telikom has provided projections of its operating expenses for the period to 2011. The Commission has analysed these estimates using the projections provided for the original Regulatory Contract, the revised demand estimates outlined above, and the expected expansion of the network as part of new capital expenditure projected over the period.

In this process, the Commission has undertaken a number of comparisons and matrices on the basis of the type of calls projected, the average length of these calls, the existing network capital infrastructure, and the likely efficiencies that might be achieved over the next five years. Efficiency improvements are one of the key objectives of the Regulatory Contract and

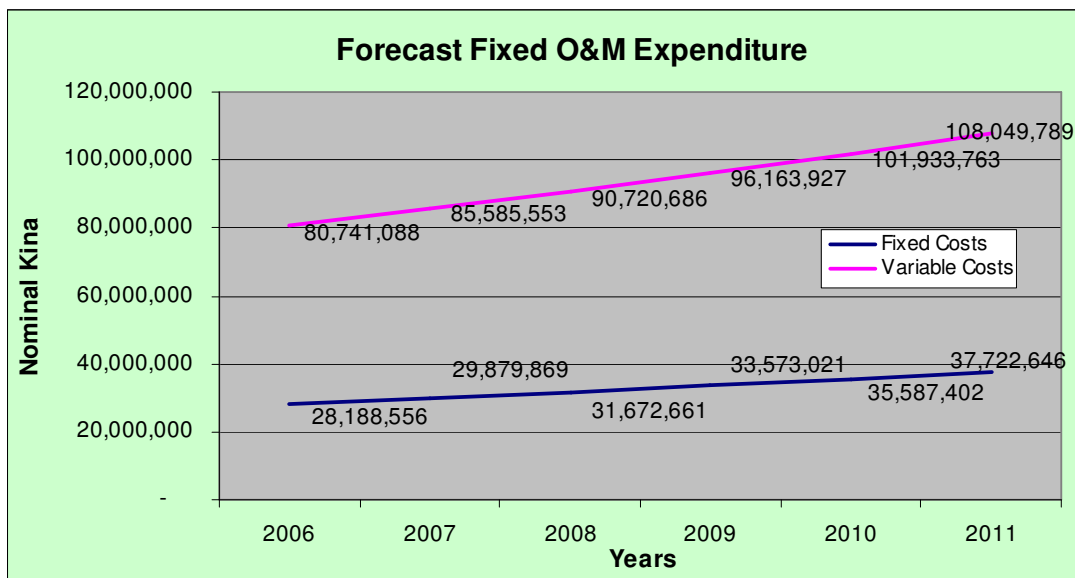
the use of an incentive based price path to achieve this result. For this purpose, the Commission has used broad average cost comparisons per connection for different types of calls, the likely length of these calls, the expansion of the network, particularly the likely uptake of mobile phones, and consideration of the assumptions regarding efficiency improvements that were incorporated in the original Regulatory Contract. The Commission has broadly anticipated general average efficiency savings of one percent per annum over the length of the regulatory price path although higher efficiencies may be expected in some areas.

Telikom had submitted that its real operating expenditure on its fixed network is projected to grow at a constant rate of 6% per year throughout the five year regulatory period. The increase in expenditure projected in the latest estimates from Telikom is a constant increase with no efficiency factor proposed by the Commission on its variable operating expenditures. This is consistent with the estimates provided and used in the original Regulatory Contract. However, the original contract included a cumulative efficiency factor of one percent on its variable operating costs.

As noted above, the Commission expects that there will be some increases in demand across both the Mobile and Fixed networks. Given this growth the Commission expects that while Telikom will not achieve the one percent efficiency factor set out in the original regulatory contract, it will be able to achieve efficiencies in terms of the average costs of services to its consumers over the remainder of the regulatory period.

Figures 2.2(a) below provides an overview of the revised projected fixed and variable operating expenditures for the fixed network provided by Telikom.

Figure 2.2(a) Forecast Fixed Network Operating and Maintenance Expenditure



For the mobile network, the Commission has adopted the fixed and variable operating cost projections provided by Telikom. When compared to the various indicators used by the Commission and the matrices of average cost per subscriber, the estimates used by Telikom results in operating expenditure per subscriber decreasing by 14.2% in 2008 and thereafter increasing marginally by 1.0% to 2011 which is attributable to the higher anticipated demand

experienced over the last five years which is expected to continue to 2008. Figure 2.2(b) provides a summary of the forecast expenditure profile.

Figure 2.2(b) Forecast Mobile Network Operating and Maintenance Expenditure

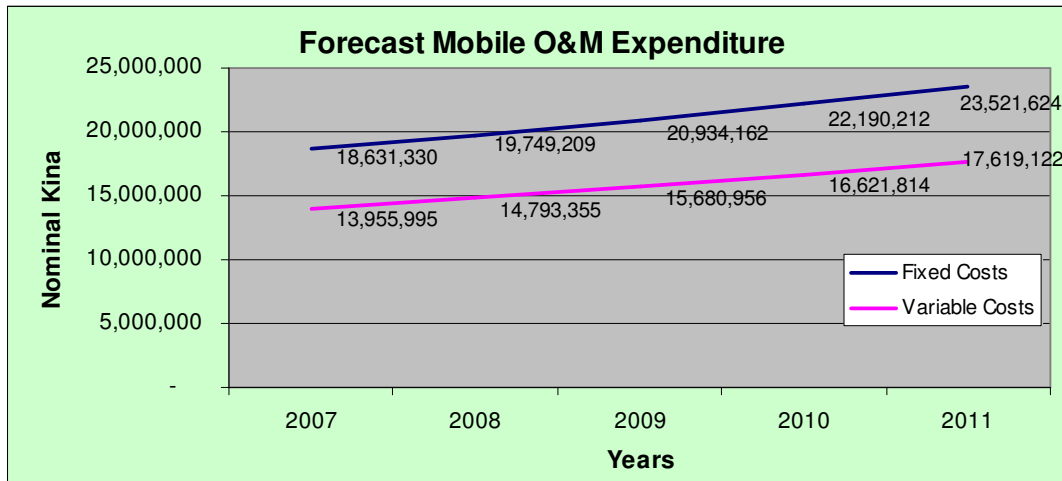
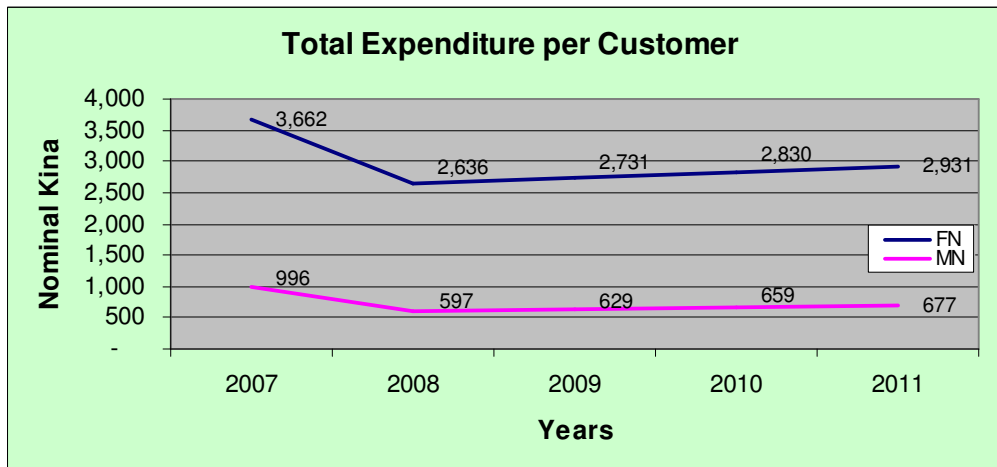


Figure 2.2(c) below shows the operating expenditure per customer/subscriber line for both the fixed and mobile networks. It is expected that operating expenditure per customer for the fixed network will decrease by about 28 per cent in 2008 and thereafter grow marginally by 3.6 per cent. Similarly for the mobile network, operating expenditure per customer is expected to decrease by about 40 per cent in the first year and then increase marginally by 5 per cent, 4 per cent and 3 per cent in the following years. The decrease in expenditure per customer in from 2007 to 2008 can be attributed to the capital expenditure planned for the years 2006-2007. This decrease is likely to impact the business’s ability to deliver its normal operating and maintenance program as resources are divert to the capital expenditure program.

Figure 2.2(c) Forecast Total Expenditure per Customer



2.3 Capital Expenditure

The capital expenditure estimates for the fixed and mobile networks should broadly be reflective of the anticipated growth in the networks and the upgrading of services that is

required. For the purposes of determining the regulatory price path, investment funded under any CSO program or by donor funding will not be treated as capital expenditure in determining the price path. The justification for this treatment is that any CSO capital expenditure program will be directly paid for by the government or donor therefore Telikom cannot claim any return for such expenditure. There is no CSO policy for Telikom currently however the Commission will be seeking confirmation from the government on any policy considerations related to CSOs for the telecommunications industry. Should there be any CSO for Telikom developed by the government during the regulatory period, the Commission will ensure pass through arrangements are set in place so that Telikom is able to recover the administrative costs of operating and maintaining the new CSO funded infrastructure.

To provide a return on and return of the capital expenditure involved in undertaking the CSO network would effectively be to pay twice for the same assets. However, to the extent that Telikom has of its own volition incurred additional capital expenditure to provide further services into a CSO area above and beyond the basic telephone service required under any CSO obligation, this capital expenditure (to the extent it is regarded as being prudent and efficient) would be included in the regulated asset base and the capital expenditure program of Telikom.

The original Regulatory Contract provided an arrangement whereby Telikom could seek to review and revise its capital expenditure program after the setting of the Regulatory Contract. This arrangement was set in place to take into account the governments efforts then to sell part of Telikom which would enable the new investor a chance to undertake a more detailed capital expenditure requirements assessment. However, now that the sale process has been stopped, the Commission has sought from Telikom a detailed capital expenditure plan for the next five years. This will provide ample time for the new management of Telikom to seek a revision to the Regulatory Contract on the basis that they can demonstrate that they can meet the overall service standard requirements with a revised capital expenditure program.

This is particularly relevant when considering the recent breakdown of the PNG-Australia link and Telikom's effort to divert all international traffic via satellite as a temporary measure while making efforts to link all traffic through the New Zealand-Guam cable. While an allowance has been made in the Regulatory Contract for such work, there is more than one technology that could be used to meet the service standard requirements of that link. It is not the intention of the Regulatory Contract to specify the technology or technical solution that may be used to meet a particular capital expenditure program. Rather, it is the intention of the Regulatory Contract to set the service delivery requirements, and ensure that these are met over the life of the contract. Thus, Schedule 7 to the Draft Regulatory Contract sets out the functionality requirements for the capital expenditure program that is to be undertaken by Telikom over the life of the Regulatory Contract.

The Regulatory Contract also makes provision for a review of the performance of Telikom in terms of the capital expenditure program. This current review has effectively serviced as an opportunity to undertake this review. The Commission understands that Telikom has employed KPMG International Projects Group and GDInnovation to undertake this review. While the Commission has received the first two years of this capital expenditure program it has yet to receive the remaining four years of the capital expenditure plan, i.e. the years 2008 through 2011. At the moment the Commission has made an assumption that expenditure in these years will be equal to 16% of revenue in line with benchmarks used throughout the

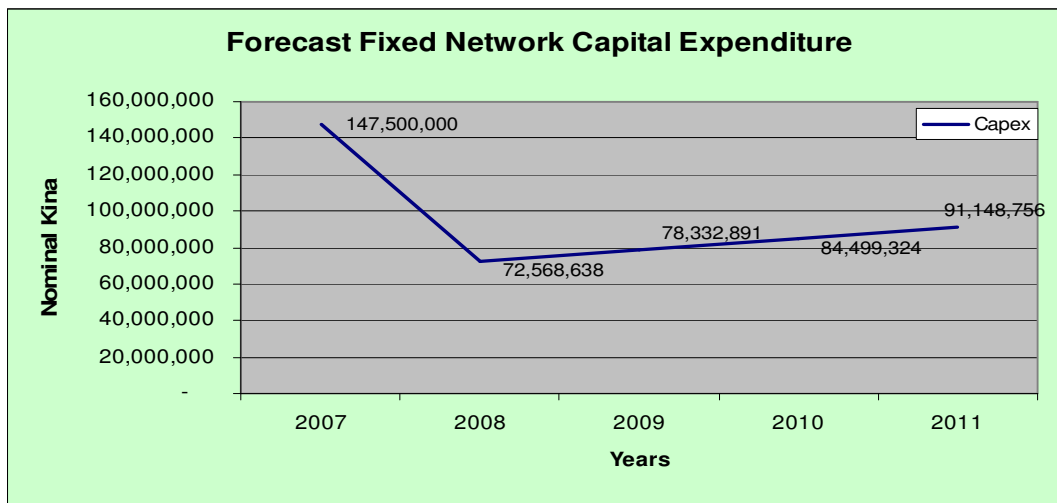
Asia Pacific region. Importantly, the Commission expects that as part of its submission to this draft report Telikom will provide a detailed capital expenditure plan for these years.

The Commission notes that a significant proportion of the capital expenditure program which was included in the original regulatory contract remains unspent. This has resulted in a situation where Telikom could have effectively generated returns on this investment without actually incurring any costs. The Commission notes that Telikom has not increased its prices in line with the entitlements set out in the original regulatory contract and therefore has not actually received any additional revenue associated with this unspent capital expenditure. The Commission has included various safeguards which apply to Telikom to provide it with the opportunity to demonstrate that it has met the intention of the Regulatory Contract in terms of the functionality of the capital expenditure program by the relevant deadline. However, failure to meet the requirements of the capital expenditure program will result in the implementation of a penalty arrangement which will effectively limit prices that can be charged by Telikom for the remainder of the regulatory period and ensure that customers are not required to meet the cost of capital works that are not undertaken.

The capital expenditure program for the fixed network incorporates an allowance for the replacement of the PNG-Australia link either through restoring the severed link or by re-diverting the New Zealand-Guam cable through PNG. On the basis of the latest estimates available to the Commission, expenditure on this project is estimated to be in the vicinity of US\$36m over a two year period. For purposes of the regulatory model, the Commission has assumed that this expenditure will occur over the years 2006 and 2007. The undertaking and completion of the under sea telecommunications cable link is a required deliverable under the capital expenditure program review arrangements discussed above. Failure to deliver on this capital expenditure program will activate the penalty provisions discussed above.

Under the terms of the Draft Regulatory Contract, Telikom has an opportunity to bring forward a revised capital expenditure program to that used in the regulatory model. The Commission can adopt that revised capital expenditure program if Telikom can be demonstrated that the expenditure estimates are prudent and efficient in terms of the likely demand and growth in the network over the regulatory period. The Commission would prefer to use Telikom’s proposed capital plan, as constructed by its international expert, than the assumed capital expenditure plan currently used in the regulatory model.

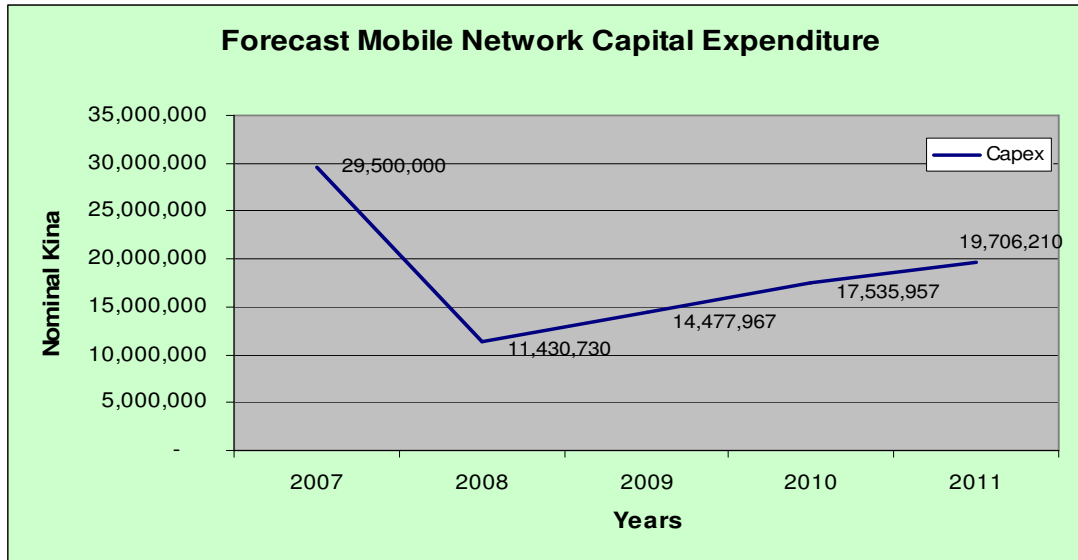
Figure 2.3(a) Forecast Fixed Network Capital Expenditure



As can be seen from Figure 2.3(a), other than the spike in expenditure in the years 2007 which reflects significant investment, the expenditure of the latter years of the regulatory period are relatively stable.

As with the fixed network, the Commission has assumed that after 2006 and 2007 capital expenditure is equivalent to 16 percent of revenue. For the 2006 and 2007 years the Commission has assumed that the mobile network represents one sixth of the total capital expenditure set out by Telikom.

Figure 2.3(b) Forecast Mobile Network Capital Expenditure



As can be seen from Figure 2.3(b), other than the spike in expenditure in the years 2007 which reflects significant investment the expenditure of the latter years of the regulatory period are relatively stable.

For the mobile network there is also a levelling off of expenditure per subscriber. However, this reflects a strong uptake in the number of subscribers and the opportunity for Telikom to achieve greater efficiencies in terms of better use of its infrastructure as the number of subscribers increase and Telikom completes its early new investment program in this network.

The Commission calls for submissions from interested parties, in particular Telikom to bring forward its capital plan for the five year period commencing 1 January 2007.

2.4 Rate of return

The cost of capital for a particular project is the minimum expected rate of return on investment required by providers of debt or equity for that particular project. The Commission is required by the regulatory principles to use the Capital Asset Pricing Model (CAPM) to derive the Weighted Average Cost of Capital (WACC) which is the weighting of the cost of debt payable to creditors and the cost of equity payable to shareholders weighted by the relevant gearing ratio.

For equity investors, the cost of equity capital has two components:

- An explicit opportunity cost such as dividend payments; and
- An implicit opportunity cost in the form of an expected cash equivalent gain in share price.

The expected return to debt investors (the cost of debt) is in the form of interest payments and the amortisation of any difference between the market value of debt and its face value

2.4.1 Calculating the WACC

The simplest formula for the WACC calculation is presented in equation (1) below:

$$WACC = R_e \times \frac{E}{V} + R_d \times \frac{D}{V} \quad (1)$$

Where, R_e is the nominal post-tax cost of equity, R_d is the nominal post-tax cost of debt, E is the total equity, D is the total debt and V is debt plus equity. The WACC is therefore the sum of the returns to debt and equity, weighted by the share of debt and equity in the total value of the business.

The WACC calculation is affected by taxation, which requires equation (1) to be modified as follows:

$$Post-tax WACC = \frac{R_e \times (1-t)}{1-t} \times \frac{E}{V} + R_d \times (1-t) \times \frac{D}{V} \quad (2)$$

Where t is the tax rate.

The return to debt (R_d) is normally calculated by adding a debt margin to the risk free market rate. Usually the debt margin is based on industry norms and the risk free rate has been based on the international risk free rate defined below. The return to equity (R_e) is normally calculated by application of the capital asset pricing model (CAPM). This approach is widely used by commercial businesses and regulators throughout the world.

The CAPM formula is presented in equation (3) below:

$$R_e = Rf_{International} + \beta \times (R_m - R_f) \quad (3)$$

Where, $Rf_{international}$ is the risk free rate, β is a measure of the correlation between an asset's risk and that of the overall market, R_m is the market rate of return, and R_f is the risk free rate in PNG.

The $Rf_{international}$ is determined as follows:

$$Rf_{international} = [(1 + R_f) / (1 + USA_{CPI}) \times (1 + PNG_{CPI}) \times (1 + CRP) - 1]$$

R_f is the risk free rate in the USA, USA_{CPI} is the inflation rate in the USA, PNG_{CPI} is the inflation rate in PNG, and CRP is the country risk premium assigned to PNG. The Rf

international is used due to the lack of an appropriately traded government bond in PNG, that is a 10 year government bond. The Commission has used the 10 year USA bond rate plus an allowance for country risk premium and an adjustment which removes the implied USA inflation and adds back the PNG inflation. This approach has been used by the Commission to imply a risk free rate of 12.39 per cent.

In effect, the CAPM formula says that the return on equity for a particular business is the difference between the market return and the risk free rate. The margin (and hence the equity beta (β_e)) reflects how risky the business is, compared with the rest of the market.

While the risk free rate is generally observable in the market, the difference between the market return and the risk free rate (also known as the market risk premium) generally reflects the long-term returns on equity in the market. The equity beta (β_e or the relative degree of risk of the business compared to the market as a whole) can itself be calculated in various ways. The Commission prefers to use the Monkhouse formula, which is presented in equation (4) below.

$$\beta_e = \beta_a + (\beta_a - \beta_d) \times \left(1 - \frac{R_d}{(1 + R_d) \times t} \right) \times \frac{D}{E} \quad (4)$$

Where β_a is the correlation between return to assets of the business and the market (known as the asset beta), and β_d is the correlation between return to debt and debt generally in the market (known as the debt beta).

Decisions about the underlying parameters within the Monkhouse formula will result in the calculation of an equity beta range for the investigation. The calculated equity beta range will form the basis of the calculation for the WACC range.

Given these equations for the calculation of the WACC, the Commission has to make choices about a range of parameters used in the calculation. These include:

- Taxation
- CPI
- Debt margins
- Market risk premium
- Equity beta
- Gearing ratio.

The other variables in the equations are either calculated, such as the risk free rate, or known with some certainty from the business.

2.4.2 Taxation

Traditionally, the Commission has adopted a statutory tax rate in the calculation of the WACC. In the past the Commission considered that this provided the business with the appropriate incentive to minimise taxes. Furthermore, given the relative cost and the level of intrusion associated with the calculation of an effective tax rate the Commission has been reluctant to alter its position from using the statutory tax rate.

The Commission preference is to use of a statutory tax rate of 30 per cent.

2.4.3 Debt margins

The debt margin represents the percentage margin above the risk free interest rate associated with debt. It reflects the risks in the regulated business's ability to pay back debt. The debt margin is related to current market interest rates on corporate bonds, the maturity of the debt on issue, the assumed capital structure and the credit rating. All other things being equal, higher credit ratings should result in a business having a lower required debt margin.

Regulated utilities can be generally characterised as low risk, with strong steady cash flows. This makes them relatively low risk compared with other non-regulated businesses. Internationally regulators have used debt margins between 0.8 and 1.65 per cent. The Commission has decided to apply a debt margin of 1.7 per cent for Telikom.

2.4.4 Market risk premium

The MRP is an estimate of the additional return needed by investors to invest in a diversified equity portfolio relative to the risk-free rate.

The Commission notes that traditionally Australian regulators have adopted a MRP of 6 per cent. The Commission has decided for the purposes of this draft decision that using a market risk premium of 6 per cent is appropriate to balance the risks of investing in equities relative to the risk-free rate. A market risk premium of 6 per cent is also consistent with Australian regulatory decisions.

2.4.5 Equity beta

Estimating the equity, asset and debt betas for a particular firm which is not publicly traded is somewhat problematic given the CAPM's reliance on market data to assess the implied risk associated with an individual company. However, these issues can be addressed through the use of benchmark firms which provide a comparison of the risk associated with similar investments in the market place.

The CAPM uses the portfolio theory of finance which classifies risks into two types of risk:

- *Systematic risk*: non-diversifiable risk applicable to the market and the economy as a whole such as inflation, levels of economic growth, taxation rate increases and rises in interest rates. Systematic risk is often caused by socio-economic and political events and in CAPM is measured by the equity beta.
- *Specific risk*: the residual risk unique to the entity or to a small group of companies that forms a subset of the market. Specific risks are not considered in estimating WACC as they can be minimised by holding a diversified portfolio.

Under the CAPM, the only component of risk that is priced by investors into returns (via the equity beta) is systematic risk. This is because the CAPM assumes that investors will hold diversified portfolios of assets rather than single asset because diversification reduces risk and it assumes that there are no transactions costs. Systematic risk is the only risk that matters since it cannot be eliminated through diversification. The equity beta is a measure of an asset's systematic risk relative to a market portfolio of assets such as the All Ordinaries Index on the Australian stock market. In this context, risk is defined by the extent to which returns of a particular listed stock co-vary with the returns of the market overall.

While the equity beta is the market's expectation of risks, as expectations cannot be observed, conventional practice is to estimate the future from historical equity beta values. The equity beta is generally measured by statistical regression of the observed historical returns of a company against returns on a market index. The market portfolio has an equity beta of 1.0. An equity beta greater than 1.0 implies that the returns on a stock are, on average, more volatile, and hence the stock is more risky, than the market, whilst an equity beta of less than 1.0 implies the reverse.

Equity betas derived from stock market observations represent equity betas, which also reflect the degree of financial gearing of the company. The gearing level is a key determinant of financial risk and a higher level of gearing produces a higher equity beta. Consequently, it is not possible to compare the equity betas of different companies without having regard to the gearing levels of the different companies for which equity betas are being observed. In comparison, asset betas are not affected by the gearing of the entity under review. Accordingly, it is asset betas that should be compared for the purposes of benchmarking risk. However, as only the equity beta is directly observable, the asset beta must be derived from equity betas. Further, the observed equity beta implies an asset beta for a given gearing ratio. As such the equity beta must be de-leveraged to estimate an un-g geared asset beta.

A conventional approach to assigning a value to the business' equity beta is to look at market evidence in order to benchmark the firm's equity beta relative to similar companies. For the telecommunications industry in PNG, there are no competing fixed line and mobile telecommunications carriers against which Telikom can be compared. The Commission has considered some internationally listed telecommunications carriers to determine an appropriate asset beta. Given this analysis, the Commission has considered the appropriate asset beta for Telikom is 0.800. Having applied the Monkhouse formula described above the Commission has set the re-leveraged equity beta equal to 1.575.

2.4.6 Gearing ratio

The gearing ratio is defined as the ratio of debt to total capital. This ratio provides the necessary weightings used in the construction of the final WACC. It is standard regulatory practice in other jurisdictions to adopt a financial structure deemed to an efficient structure given the risks faced by the business rather than actual ratio faced by the regulated entity. This ensures that the business is not rewarded for inefficiency in its capital structure.

Given the Commission is attempting to provide Telikom with the appropriate incentives to become more efficient in its operations 60 percent debt to 40 percent equity has been used in the calculation of the WACC although noting that Telikom's existing gearing is lower.

Given the discussion of the parameters above the Commission has determined that the appropriate WACC for Telikom is 12.39 per cent pre tax real. Table 2.1 below provides a summary of the parameters used by the Commission in determining the WACC.

Table 2.9 Parameters used in the calculation of the WACC

Parameter	Value
Risk Free Rate (Real)	12.39%
Debt Margin	1.70%
Equity Premium	6.00%
Debt Beta	0.26

Equity Beta	1.57
Asset Beta	0.8
Starting Gearing Ratio (Debt/Assets)	60.00%
Forecast Inflation	6.00%
Effective Tax Rate	30.00%
Post Tax Cost of Equity (Nominal)	21.84%
Post Tax Cost of Equity (Real)	14.95%
Pre Tax Cost of Debt (Nominal)	14.09%
Pre Tax Cost of Debt (Real)	7.63%
	Pre Tax
WACC (Real)	14.09%
WACC (Nominal)	20.94%
USA Risk Free Rate	5.00%
Country Risk Premium	3.00%
USA Inflation Rate	2.00%
Bank Costs	0.10%

2.5 Regulatory Asset Base

The value of the asset base used in the original Regulatory Contract was determined using a valuation of Telikom prepared by Rushtons for the period to 31 December 2001. At the time of the preparation of the original price path, this provided the only available up-to-date assessment of the value of the assets of the business. For purposes of the regulatory model, this asset value was used as effectively a *'line in the sand'* valuation of the business at a particular point in time. It was not possible to undertake a full Replacement Cost evaluation, or an Optimised Depreciated Replacement Cost (ODRC) valuation at that time. However, in the context of the tariffs that Telikom was at that time able to charge, and the need for some upward adjustment in those tariff rates simply to ensure that Telikom was able to meet its ongoing operating and new capital expenditure requirements aside from its return on capital requirements, a *'line in the sand'* approach using the Rushtons valuation, was the most appropriate approach.

Use of a line in the sand approach of this type is not unusual in establishing a new regulatory price path, particularly when there is insufficient information to allow a detailed assessment of the economic justification of the past investment of an infrastructure business such as a telecommunications company. Also, in the context of a regulatory model which allows new capital expenditure to be added to the asset base as it is undertaken (and for modelling purposes is built into the asset base as it is projected to occur), and also allows for depreciation of asset lives ranging from five years for customer equipment to 15 and 20 years for switching and similar larger scale equipment, the total asset value is effectively valued at replacement cost by the end of the first ten year regulatory period. This is confirmed by an examination of the remaining economic lives of the Telikom asset base which indicates that most have remaining lives of less than 10 years. Thus, a line in the sand approach to setting the asset value for the commencement of the regulatory price path was not seen as disadvantaging the business, and removed the need for more detailed consideration of whether some assets should be optimised out of the assets base for regulatory purposes.

Based upon the Rushtons valuation, the regulatory asset base as at 31 December 2001 was set at K454million. However, the Commission has been told by Telikom that there has been no capital expenditure over this time which has resulted in the value of the asset actually falling to K427million.

For purposes of the revised price path presented in this report, the asset valuation used in the original price path will be used. However, it has been rolled forward to account for the impact of depreciation, which has been returned to the business by way of tariffs, and maintained the underlying value of the asset base and has calculated an asset value of K427million. The Commission notes that this is a real reduction in the value of the network and would like confirmation from Telikom that there has been no investment in capital expenditure on the network since 2002.

3. REGULATORY PRICE PATH

3.1 Form of Regulation

The Commission considers that the most effective form of regulation would be to adopt an incentive form of regulation. Effectively, this requires the Commission to consider the likely efficient operating costs and revenue requirements of Telikom over the regulatory period and to develop a price adjustment mechanism which, on the basis of the projected demand outcomes, will deliver the appropriate level of revenue that will allow Telikom to meet its efficient costs including an appropriate return on its investment.

In these circumstances it is usual for a regulator to adopt some form of incentive based regulation that allows the business to earn a regulated revenue over a period of time which is linked to an inflation based pricing mechanism. This form of regulation is normally defined as CPI+/-X, where the CPI is defined as the rate of inflation, based on the Consumer Price Index.

This has been the approach that has been used by the Commission in the original Regulatory Contract. The only significant difference is that instead of simply using a CPI measure of movements in inflation, the Regulatory Contract in its original form used a Cumulative Weighted Index which incorporated not only movements in the PNG CPI series,¹ but also movements in the inflation adjusted exchange rate between the US dollar and the PNG Kina. The inclusion of an exchange rate measure in the 'inflation adjustment' component of the standard CPI+/-X formula was made in recognition that Telikom must source most of its equipment from overseas, and must also service loans and other funding from overseas. Thus it was important to include in the price adjustment mechanism an indicator of movements in the relative exchange rates. Ultimately changes in the relative US dollar/PNG Kina exchange rate will flow through into the PNG CPI. However, the inclusion of an exchange rate measure in the inflation adjustment process ensures that any additional exchange rate based cost increases flowed quickly into the price path, whereas the CPI adjustment may take longer to reflect the flow through of the exchange rate effect.

The development of an incentive based regulatory environment will be based upon a consideration of the following drivers of both costs and revenues:

- The various operating and capital cost drivers applying to Telikom's mobile and fixed networks;
- The likely efficiency gains that can be achieved over the regulatory period;
- The anticipated growth in demand for the regulated service baskets; and

¹ In the PNG context, the CPI was obtained from the National Statistician, and was based on an adjusted series prepared by the National Statistician that effectively excluded the movement in betel nut, tobacco and alcohol prices from the series. The same Adjusted CPI series sourced from the National Statistician has been used in all the Regulatory Contracts administered by the Commission

- Consideration of whether the incentive formula should be applied to the individual product baskets for regulated services (through an average price cap) or to the projected revenues for Telikom (through a revenue cap).

At this important stage in the development of the PNG economy, the Commission is conscious of the particular benefits that can be brought to the economy by having a much greater penetration by the telecommunications network across the country. This penetration should not only be in the main urban areas, but across the whole nation, bringing greater access to the range of services available over through modern telecommunications networks to all parts of the economy. The Commission is of the view that the greater flexibility that the price basket approach combined with average price caps will provide, will help to contribute to the objective of achieving deeper penetration of the telecommunications network across PNG. However, this needs to be combined with appropriate minimum service level requirements and effective policing of these standards. This matter is discussed further below.

The Commission is proposing to continue to adopt an average price cap approach. The three 'baskets' of services that will be used are:

- **Fixed network access services**, being the services associated with connection to the fixed telecommunications network operated by Telikom;
- **Fixed network services**, being the services associated with the transmission of voice, facsimile and data over voice bandwidth on the PSTN using the fixed telecommunications network operated by Telikom; and
- **Mobile network services**, being the services associated with the transmission of voice using the cellular mobile telecommunications network operated by Telikom

For each of these 'baskets' of services, a price path will be established, and this price path will determine the overall average price cap that will apply to services within each of these service baskets. This means that provided the average price adjustment for each basket of services remains within (i.e. less than or equal to) the cap set by the price path, Telikom has the opportunity to vary prices of individual products within the basket at different rates to reflect market conditions and requirements. This can be particularly relevant should Telikom be seeking to encourage new entrants on to its network, and wish to use price as a means of encouraging new subscribers to the network. However, safety checks will remain within the Regulatory Contract including the requirement that Telikom does not discriminate between subscribers with similar characteristics seeking to access the same or similar services.

3.2 Length of regulatory Period

The length of the regulatory price path is also an issue that requires consideration. The original Regulatory Contract was based on a ten year price path, but with a number of safeguards that allowed the price path to be re-opened with the agreement of all relevant parties. The current review is an indication of the successful operation of this safety net arrangement.

The current Regulatory Contract allowed for a review of the price path after the first two years from the introduction of a new shareholder in Telikom to allow for the possibility that new management may find that there is a need to review critical aspects of the operating cost and capital cost estimates or other key components of the price path modelling. A further review of aspects of the price path, by way of the capital expenditure review in Year 5 (2006), was also built in to the Regulatory Contract as a means of ensuring that Telikom met its obligations.

This review was initially undertaken to reflect the government's decision to sell part of Telikom. Now that this decision has been rescinded, the Commission is continuing this review process nonetheless to amend the price path to reflect the prevailing operating circumstances of the business in view of the recent government's decision to licence two new mobile operators to compete against Telikom. The Commission also notes that the monopoly period held by Telikom on the fixed network will end in October 2007 with the potential for this period of market exclusivity to be extended further subject to Telikom meeting its CSO obligations as envisaged under the old arrangement no longer exists.

The Commission believes that with the inclusion of the various safeguards that are presently in the Regulatory Contract and that will be continued in the revised Regulatory Contract, a five year price path is justified on this occasion.

3.3 Regulatory Price Path Adjustment

The regulatory price paths have been calculated based upon the revenue requirements of Telikom across the three main service 'baskets' offered. In undertaking this revenue projection and price path determination, the Commission has been conscious of the need to ensure that Telikom has a sufficient cash flow to enable it to meet its future capital expenditure, debt servicing and operating cost requirements. As a test against the financial performance of the business over time, the Commission has run various financial performance scenarios and considered the overall financial outcomes for Telikom.

The revenue path adopted for purposes of setting the price adjustments will ensure that Telikom will meet all its financial obligations, and will retain at least a BB credit risk rating as measured using financial ratios adopted by the larger international credit assessment agencies. These credit risk outcomes will of course depend on Telikom meeting the operating cost, capital expenditure, demand, and general efficiency levels assumed in the regulatory model. However, under an incentive regulation mechanism, Telikom has the opportunity not only to achieve these performance outcomes, but also to better these results. Should Telikom better the results, it is able to keep the additional profits that it makes over the period of the price path. Under the terms of the original Regulatory Contract, and to be adopted as part of the revised Contract, Telikom will also have the opportunity to seek to amend the price path after an initial two year period from its introduction, and in this process to argue that the assumptions used in the present price path are not reasonable. Thus, Telikom has a number of means of protecting itself from adverse outcomes that could potentially affect its ability to deliver on its service obligations over the period of this regulatory price path.

It is intended, with few exceptions, to use the formulae for adjusting the price path for each of the baskets of services as was used in the original Regulatory Contract. Those few exceptions where change has been made primiparity relate top errors in the formulae that

were inadvertently included in the original Contract, and are discussed in the following section.

The principle formula for adjusting the Maximum Average Price Cap (MAP) for each price basket is as follows

$$MAP_t = MAP_{t-1} * CWI_t (1-X_t) * (1-CEF_{tC}) * (1+OUR_t)$$

Where:

MAP_{t-1} is the maximum Average Price Cap for the Regulatory Year t-1

CWI_t is the change in the Cumulative Weighted Index over the 12 month period ending on 30 September in Regulatory Year t-1

X_t is the value as for each of the three baskets as set out below

CEF_{tC} is

- (a) where the Regulatory year t is a Regulatory Year preceding 2010-zero, and
- (b) where Regulatory Year t is 2010 or a subsequent Regulatory Year-the value of CEF_{tC} as calculated pursuant to paragraph A.2 of Schedule 3 of the revised Regulatory Contract

OUR_t is the Over/Under Recovery Adjustment as calculated in accordance with paragraph C of Schedule 2 of the Revised Regulatory Contract

The value of the X smoothing factor to be used in the revised price path is as set out in table 3.1 below.

Table 3.1 Smoothing Factor (X)

Regulatory Year t	2007	2008	2009	2010	2011
X _{t, FN}	-2.44%	-2.44%	-2.44%	-2.44%	-2.44%
X _{t, FA}	0.00%	0.00%	0.00%	0.00%	0.00%
X _{t, MN}	-6.28%	-6.28%	-6.28%	-6.28%	-6.28%

The X factors as outlined above will effectively drive the price outcomes over the period of the price path. The real reduction in prices of this five year period reflects the real decline in the value of the underlying network asset and the significant increase in customer numbers on the mobile phone network.

For mobiles, the outcome is somewhat different than had been included in the original Regulatory Contract. Real price reductions for mobile services are now projected over the full five year period, with initial reductions approximately equal to the Commission's inflation expectations. This results in situations where prices are broadly expected to remain unchanged over the next five year in nominal terms. However, the Commission notes that the introduction of two new mobile carriers will potentially drive prices down in real and nominal terms as competitive pressures result in benefits to consumers. Furthermore, the Commission expects that regulation of prices for mobile services will not be necessary under this competitive regime.

3.4 Service Standards Requirements

Service standards and the policing of service standards is an important part of any form of incentive regulation and price path monitoring. As noted in a submission from Mr Tom Kekeao:

Under a CPI-X revenue cap regulatory approach, there is a risk that a monopoly service provider may try to reduce costs and hence increase profits by reducing the quality of services offered. Quality of service monitoring by a regulator, assisted by penalties for non-performance, can ensure those service providers maintain service quality.'

The original Regulatory Contract had included in Schedule 5 a summary of the service standards that would apply to Telikom, and a rebate arrangement that would apply for failure to meet these service standards. It has been suggested to the Commission in submissions received that the service standards set are both too high and too low. There is a concern held by some that the service standards can not be met in the PNG context, and that some form of lower standards should be set. However, others, commenting on what they see as low standards currently adopted by Telikom, have argued for an extension of the standards specified in the original Contract to cover other aspects of the services provided by Telikom (see comments by Daltron on the internet dial up calls discussed in section 5.3 below).

The Commission is seeking to set minimum service standards that Telikom can reasonably be expected to achieve, and that will improve the overall level of service provided by the business. The standards set out in Schedule 5 of the original Contract effectively sought to specify some delivery requirements that were achievable by Telikom. The standards seek to recognise the differences in time required to restore services in more remote areas, and the need to meet higher standards in the main urban areas.

The Commission is conscious of the need to achieve service standards at a rate even higher than those specified in Schedule 5. For example, the required service restoration times effectively represent a maximum period that a subscriber would expect to have been disconnected from the network. Mobile services are now beginning to provide an alternate means of phone communication, and in effect a form of 'competition' for the fixed line network. The Commission is proposing to reduce the real price of mobile phone call rates over the life of this Regulatory Contract, and in this context, if Telikom is unable to provide a high level of service on its fixed line network, it may find that the growth in subscribers that it has assumed in its revenue forecasts used in the price modelling process will not be achieved. In these circumstances Telikom could find that it is unable to meet its revenue requirements on its fixed network system, and thus suffer a financial penalty from loss of profits for this part of its business.

In terms of applying the minimum service standard requirements, the Commission notes that it has not to date applied the requirements of Clause 7 of the Regulatory Contract relating to the penalty provisions. This clause had been deliberately drafted to allow a period of 18 months after the original Regulatory Contract came into effect and the Commission was established before the penalty provisions would apply. It is intended to allow a further period for the new management of Telikom, in consultation with the Commission to develop reporting procedures and other administrative arrangements that will allow the provisions of Clause 7 in conjunction with Schedule 5 to be implemented. This will provide a further

period of grace for Telikom under new management to arrange its maintenance, repair and new connection service teams in such a way as to achieve the standards that have been set. This should be sufficient time under new management to get into place the required procedures and processes within Telikom to meet the standards.

Thus, in considering the various options and alternatives available, the Commission has formed the view that the existing performance standards as set out in Schedule 5 of the original Regulatory Contract should continue to be applied in conjunction with the provisions of Clause 7 of the Contract. The Commission notes that there is an obligation on the Commission itself to ensure that the service standards are met, and accordingly will put into place arrangements with the new management of Telikom to bring into effect these service standard requirements to take effect from June 2006.

3.5 Applicable Rebate Proportions

The service standard arrangements will only prove to be effective if there are appropriate penalties that can be applied. The provisions of clause 7.2 of the Regulatory Contract envisage such penalties, and the rate and method by which these penalties are to be applied are specified in Schedule 5 to the Contract. These penalties will be in the form of customer rebates, and are designed not only to give an incentive to Telikom to meet the minimum service standard requirements, but to compensate in part subscribers for the inconvenience caused as a result of the failure of Telikom to meet its obligations under the Contract.

The rebate proportions that will be included in Schedule 5 are set out in Table 3.2 below.

Table 3.2 Applicable Rebate Proportions (ARP)

	2006	2007	2008	2009	2010	2011
ARP	0.70	0.75	0.80	0.85	0.90	0.95

4. ACCESS

The introduction of new mobile carriers into the market will bring with it important considerations in regard to access of these new carriers to existing infrastructure. That is, access to each others networks for call termination and access to the fixed line network operated by Telikom. The Commission expects to see a situation whereby PMC is not unfairly advantaged due to its position as a subsidy of Telikom. This section provides a commentary on the various issues which potentially give rise to inefficient access pricing and provides the Commission's view on the type of pricing methodology it is likely to approve under any access dispute between the market players. Importantly, the Commission expects that its role as the arbitrator of access disputes will be one which it will not be called on to use and that all parties will be able to reach meaningful commercial arrangements without regulatory oversight.

4.2 Principle of Interconnection

Interconnection is the physical and logical linking of public electronic communications networks used by the same or a different undertaking in order to allow the users of one undertaking to communicate with the users of the same or another undertaking, or to access services provided by another undertaking.

When a call is made between consumers (or end-users), it involves two essential elements, origination and termination. *Origination* refers to the carriage of a call from the end-user who makes, or originates, the call over the network to which this end-user is connected. *Termination* refers to the carriage of the call to the person receiving the call over the network on which the person receiving the call is connected.

Where the person making the call and the person receiving the call are on different networks, a point of interconnection between these two networks will exist. Interconnection of networks enables customers of a particular service on one network interconnect with customers of the same service on another network, i.e. any-to-any connectivity. Interconnection also allows access to a range of networks and connected users independent of services supported e.g. retail ISP-to-backbone. The various types of interconnection on a telecommunications network include:

- One fixed network to another fixed network;
- Mobile to mobile networks
- Mobile to fixed networks
- Fixed to Mobile networks
- Internet service provider to backbone.

There are two types of interconnection charges available, namely fixed interconnection and variable interconnection. Fixed interconnection is basically access to other carriers' facilities with a fixed cost payment. Variable interconnection is termination of calls on other carriers' networks. In this instance, the interconnection cost is dependent upon the volume of calls.

Examples of instances where fixed and variable interconnection charges are applied include:

Fixed Interconnection	Variable Interconnection
Transmission Capacity Rentals	Local calls
Data Access Radial	National Calls
Duct Access Rental	Fixed – mobile
Point of interconnection space rental	Mobile – fixed

In terms of developing a framework and procedural issues to ensure that interconnection between networks is facilitated there are a number of conditions from a regulatory, commercial and operation perspective which need to be addressed, including:

- Adequacy of regulatory guidance for interconnection negotiations, which the Commission has addressed to some extent in the mobile tender application process
- Availability of interconnection with incumbent operators for various types of services
- Access to standard interconnection terms with incumbent operator
- Independent and timely dispute resolution
- Non-discriminatory access to interconnection facilities and services
- Access to PSTN network specifications (including planned network changes)
- Level and structure of interconnection charges; basis for calculation (i.e. type of costs used to calculate charges, revenue sharing, bill and keep, etc)
- Unbundling of interconnection charges for different network components and related services
- Resale of network facilities and services
- Payment for network modifications to facilitate interconnection
- Confidential treatment of competitive and customer information
- Open network standards and technical compatibility
- Location of Points of Interconnection (POI)
- Access to billing system, operation support systems, call-related databases and other software to provide advanced services
- Access to unbundled network components
- Access to numbers and implementation of number portability
- Collocation and sharing of infrastructure (e.g. buildings, poles, conduits, ducts, towers)
- Quality of interconnection.

4.2 Access Issues

A regulatory concern arises because of a potential lack of competition on either end of this service. First, fixed line networks – particularly on the local loop – are still effective monopolies in many jurisdictions. Hence, those networks have the potential to exercise considerable market power in the pricing of all their services.

There are essentially five key characteristics of terminating services that drive their value and use. These are:

- (1) market power over access to a consumer;
- (2) consumer ignorance regarding the network called (inability to differentiate products)
- (3) horizontal separation (similar to a free rider problem one person puts up there access charge and they aren't penalised);
- (4) vertical separation;
- (5) tariff-mediated network externalities.

(1) Market power over access to a consumer;

Once a person has decided to join a specific mobile network, that network has a degree of monopoly power over the price that it charges any other party wishing to call that specific person.

(2) Consumer ignorance regarding the network called (inability to differentiate products and carriers);

Customers will not know the cost of their call in advance but can only use an estimated price based on market shares. If customers join a mobile network with high termination charges then they will receive fewer calls and less business. A mobile network with higher termination charges will have fewer members and competition will tend to moderate termination charges.

Then the caller only responds to average call prices implying that each mobile network does not bear the full competitive consequences from raising their termination charges and, consequently, will have considerable discretion to raise these charges. When one network raises its termination charges, this raises the average price that the A-party pays. But the A-party only knows this average and because they cannot distinguish between mobile networks, they will make their calling decisions on the basis of this average, not the network specific charges. This, in turn, breaks the indirect link between termination charges and call frequency to a specific mobile customer.

(3) Horizontal separation (similar to a free rider problem one person puts up there access charge and they aren't penalised);

As noted above, if a mobile carrier raises its termination charges under customer ignorance, this affects the average price that a customer pays for calling any mobile network. But it does not affect specific calls to any one mobile carrier relative to any other carrier because the customer cannot identify the carrier that they are calling. Thus, if one carrier raises its termination charges, and this raises the average fixed to mobile price, then customers may make fewer and shorter calls. But they will make this adjustment for *all* such calls as they cannot identify the carrier they are calling.

(4) Vertical separation;

Mobile termination charges are also likely to be inflated due to *vertical separation*. This effect is well known in economics. If the fixed network and the mobile carrier are two separate companies, and these companies cannot bargain perfectly over non-linear termination charges, then the vertical separation will lead to 'double marginalisation.' The mobile carrier will raise the price of termination above marginal cost so as to increase its own profits. But this raises the cost of mobile call termination as seen by the fixed network. To the degree that the fixed network has any market power, it will tend to set its fixed to mobile call prices by marking up this price over cost. However, the cost observed by this fixed carrier is not the true marginal cost of termination, but the higher termination price set by the mobile carrier. As a result, termination charges tend to be marked up over cost twice – once

by the GSM carrier and once by the fixed carrier. In the extreme, this can lead to pricing above the vertically integrated monopoly price.

(5) Tariff-mediated network externalities.

Finally, termination charges might not reflect competitive behaviour because of *network externalities* between mobile phone customers. These externalities exist if there are benefits to one consumer who buys a product when other consumers choose the same product.

For example, if a dominant mobile carrier wanted to stifle competition from a new entrant, it could set high call termination charges for that entrant. The dominant carrier's existing customers will be largely unaffected by these charges, but the new carrier's customers will face a high price when ringing the dominant mobile carrier.

Key principles recommended in the *WTO Agreement on Basic Telecommunications* in regard to interconnection principles include;

- Terms of interconnection should not discriminate unduly between operators or between a dominant firm's own operations and those of interconnecting competitors
- Interconnection should be permitted at any technically feasible point
- Interconnection charges should be cost-oriented
- Where reciprocal interconnection and costs can be expected to be reasonably balanced, bill and keep arrangements are an efficient alternative to cost-based interconnection
- Regulatory guidelines and procedures should be prescribed in advance
- Interconnection procedures and arrangements should be transparent
- Network elements should be unbundled and charged separately
- Charges related to USO (Universal Service Obligations) should be identified separately and not bundled with interconnection charges

4.4 The Commission's proposed approach to Access charging

The Commission is generally in favour of the Total Service Long-run Incremental Costs approach to access charging. The concept of TSLRIC can be understood by breaking it up into its components.

- 'Total service' refers to the cost of production of an entire service (or a production element) not to the cost of a particular unit.
- 'Long run' refers to a cost concept where all factors of production can be varied. In the short run the amount of at least one factor of production (usually capital equipment) is fixed.
- 'Incremental cost' is a form of marginal cost, although not the more familiar 'marginal cost' where the change in cost is incurred through a small change in the **amount** of output produced. Rather, incremental cost is the annual incremental or additional cost the firm incurs in the long run in providing the relevant service increment (or production element) as a whole, assuming all of its other production

activities remain unchanged. In the case of the total service incremental cost, the service increment is the cost of production of an entire service.

- It is also an attributable cost concept as it refers only to those costs that can be attributed to the production of the service. However, in the case of the PSTN and the ULLS, these services are produced using production elements shared with other services (leased lines and ISDN), and these costs are rolled-in and shared over all lines on a fully-distributed cost ('FDC') basis.
- In practice TSLRIC is usually defined to include a contribution to indirect or
- organisation-level costs ('TSLRIC+').

In a practical sense TSLRIC consists of the sum of the operating and maintenance costs, as well as the capital costs that the firm incurs in providing the service as a whole. *Operating costs* are the continuing operational costs of providing the service, including the labour and materials costs that are causally related to the provision of the service. *Capital costs* comprise the cost of capital (i.e. the opportunity cost of debt and equity used to finance the firm) and depreciation (i.e. the decline in economic value of assets) of capital that is specific to the production of the service.

It is likely that the following factors will be considered by the Commission in considering the quantum of access charges:

- routing factors;
- traffic and service volume estimates;
- network provisioning;
- asset prices and lives;
- operation and maintenance costs; and
- indirect (organisational level) costs.

In considering the appropriate access charge, the Commission would expect that parties also take account of the following factors:

- sharing within a network, e.g. within the feeder network ;
- sharing between feeder and distribution networks; and
- sharing between the customer access and conveyance networks.
- sharing with set up costs with other utilities in new areas; and
- sharing with other telecommunications carriers.

5. AMMENDMENTS TO REGULATORY CONTRACT

5.1 Overview

In the process of reviewing the Regulatory Contract to make adjustments for a number of changes in the financial assumptions and the arrangements to apply to CSOs, it has become apparent that there are some typographical errors or other errors of greater substance in the Contract in its present form that require correction. Some of the amendments that need to be made are a reflection of the changes in the timing for a partial sale of Telikom over what had been envisaged when the Contract was originally prepared. There have also been some policy changes which require recognition in the Regulatory Contract as they impact upon the way in which the Contract operates and the requirements on the Commission as well as Telikom. There is also a need to recognise in the Contract in a more formal way than had previously been presented, that the ‘contract’ is effectively a commitment by the Government through the relevant regulatory arms involved in supervising this sector, namely the ICCC and PANGTEL, that the regulatory arrangements and rules that will apply to Telikom will be applied in a consistent and predetermined manner. Thus, there are some amendments to the Contract that need to make some of these responsibilities more explicit.

This section describes briefly the changes that have been made to various sections and clauses of the Contract. A Draft Revised Regulatory Contract is appended to this report and will allow readers to compare the changes that have been made and that, subject to comments on this Draft Report, the Commission proposes to adopt as the Revised Regulatory Contract going forward.

5.2 Legal Status of the Existing Regulatory Contract

During the review process, there have been some suggestions that the existing Regulatory Contract was invalid or somehow did not bind the parties, because it had not been signed by Telikom, or because it had not been signed by PANGTEL, or because it had been signed by the Minister rather than by the Commission. Those assertions of invalidity are based on a fundamental misunderstanding of the nature and operation of regulatory contracts.

Regulatory contracts are not contracts in the sense generally used to describe a document that sets out the commercial arrangements agreed between two or more parties. Regulatory contracts are statutory instruments issued under either section 34(1) or 35(1) of the Independent Consumer and Competition Commission Act 2002, which set out pricing levels and price adjustment arrangements, service standards and other regulatory arrangements applying to what the Act calls “regulated entities”, in this case, Telikom. Regulatory contracts are thus more akin to ministerial pricing orders or other ministerial or statutory determinations.

Being statutory instruments, regulatory contracts are legally binding on the parties named in them because the Act makes them so, not because of the common law of contract. As Recital D to the Telikom regulatory contract states:

“This Contract is a regulatory contract that is binding on Telikom and the Commission pursuant to the provisions of the *Independent Consumer and Competition Commission Act 2002* and the *Telecommunications Act*.”

Section 37(2) of the *Independent Consumer and Competition Commission Act 2002* states: “A regulatory contract takes effect on the date on which notice is published in the National Gazette or a later date of commencement specified in the regulatory contract.” The Telecommunications Regulatory Contract was issued by the Minister in accordance with section 34(1) of the Act and was notified in the National Gazette on 16 July 2002, and thus legally came into effect on that date. Whether the Regulatory Contract had by then (or later) been signed by any or all of the parties named in the contract, is irrelevant – the parties are legally bound by statute, whether they agree with the terms of the contract or not.

This review is being conducted in accordance with clause 11.1 of the regulatory contract, which sets out a procedure by which the Regulatory Contract can be varied by agreement between the Commission and Telikom, through a public review process.

5.3 Treatment of Internet Dial Up Services

The Commission has had cause to re-examine some of the wording in the Regulatory Contract relating to the regulation of internet connections. In the original Contract, internet dial up calls are classified as Fixed Network Services in the definitions to the Contract. However, in Schedule 4 to the Contract, point 3, there is a suggestion in the wording that internet dial up calls are excluded services.

Daltron in its submission to the Commission has highlighted this apparent inconsistency. The Commission agrees that internet dial up services should not appear in both service definitions. Daltron had suggested that those services should be removed from Excluded Services so that prices could be controlled and strong service quality standards set. The Commission supports this view and has amended Schedule 4 to remove reference to internet services.

While acknowledging Daltron’s complaints about the quality of the dial-up internet access given by Telikom, setting detailed quality of service standards specifically for such services as part of Fixed Network Services presents some difficulties at present. The existing service quality standards are designed principally for voice services and are nowhere near as detailed as would be required by the Daltron proposal. However, the issue is a significant one, and it will be kept under review.

Daltron has also called for internet services to be opened up to competition by reclassification as value added services. In one sense this is already the case, since the various internet service providers in PNG are already in competition with each other. The internet gateway is still the province of Telikom (through its subsidiary) and it is not proposed to open that up to competition at this stage. The different regulatory model proposed by Daltron, with three tiers of international internet providers, PNG first tier licensed ISPs and PNG second tier internet service distributors, would be a very significant regulatory structure and is not considered appropriate for adoption as part of this review.

5.4 Variations to Clauses in the Contract

5.4.1 General

Time frames have been changed throughout the Regulatory Contract, in many cases to change the existing references to the Commencement Date (which was 16 July 2002) to 1 January 2004, and references to events which occur at some specified interval of time after the Commencement Date have also been altered accordingly. Time is now generally referred to in business days in line with the Interpretation Act.

5.4.2 Recital D-inclusion of PANGTEL

Corrects an oversight – the Regulatory Contract binds and has always bound PANGTEL as well as Telikom and the Commission.

5.4.3 Clause 1.1 Definitions

Capital expenditure has been changed to reflect that it will not include capital contributed by a third party.

Community Services Trust definition deleted – Community Service Obligations (CSOs) are dealt with differently.

Designated Operations Area date altered to 2006 and the way to precisely determine that area has been clarified.

Fixed Network Services the term has been change to reflect the previous of discussion on internet dialup.

5.4.4 Clause 1.2 Principle of interpretation

Has been changed to reflect that all figures throughout this document and the contract are represented exclusive of GST.

5.4.5 Clause 2.3

Correction of an error in the formula.

5.4.6 Clause 4

Heading has been changed to reflect that there this review is constituting the mid term review if capital expenditure program.

5.4.7 Clause 4.1

Clarification of what is included in capital expenditure.

5.4.8 Clause 6.1

Has been changed to include a penalty arrangement if Telikom does not provide the Commission with a statement of services and performance.

5.4.9 Clause 8.1

The cost of capital figure has been altered to reflect the recent increases in the rate of taxation and revisions o the US bond rates as discussed in Section 2 of this draft Report

5.4.10 Clause 10

10.1 has been amended to clarify that the Telikom monopoly applies to fixed network services in areas where Telikom's network currently exists and to mobile network services, (the prices for which are price capped), but does not apply where Telikom is unable to supply services, nor to excluded services (which are not price capped).

5.4.11 Clause 14

14.2 includes a review of the issuing of bulk spectrum licences as and when particular markets become contestable and reflects that Treasury will review once Telikom faces competition.

14.8 has been updated to incorporate current spectrum fees paid by Telikom.

5.4.12 Schedule 4

This has been amended at point 3 to remove any reference to internet access calls in order to remove any misunderstanding regarding the inclusion of these services in the Fixed Network Services

5.4.13 Schedule 7

This has been updated to the current level of technology and demand.