Consultation Paper No. 99/6

TELECOM REGULATORY AUTHORITY OF INDIA

CONSULTATION PAPER ON ISSUES RELATING TO CELLULAR MOBILE SERVICE

DECEMBER 14, 1999

PREFACE

1. The business of telecom is emerging as a key determinant in the quest for a better world. The evolution of Cellular Mobile Services (CMS) has brought about far reaching changes in the way people communicate. The increasing penetration of these services, which are growing at a rate faster than fixed line services in many parts of the world, underlines the importance of a proper policy and regulatory framework in harnessing these for the benefit of society.

2. The National Telecom Policy 1994 was formulated in order to impart a vision to the development and growth of a ubiquitous telecom network. There have been many changes in the Telecom Sector in India from the time CMS was introduced in metro cities in 1994, followed by its introduction in the territorial circles in 1995-96. The New Telecom Policy 1999 (NTP 99) is a policy response to the dynamic situation, and is intended to spur development of telecom. It both identifies the issues that arose from the operationalisation of the National Telecom Policy 1994 and sets out the roadmap for the future.

3. NTP 99 specifically notes that most of the cellular mobile projects were facing problems. It has provided for many policy changes to address the situation. The salient features of the New Policy Framework for Cellular Mobile Service Providers (CMSP's) under NTP 99 are:

- CMSP's permitted to carry their own long distance traffic within their service area without seeking an additional licence
- Direct interconnectivity between licensed CMSP and any other type of service provider in their area of operation
- Direct interconnectivity with VSNL after opening of national long distance from January 1, 2000
- CMSP's permitted to provide voice, non-voice messages, data services and PCOs in their service area
- License period to be twenty years initially, extendible by additional periods of ten years thereafter
- DoT/MTNL to be the third operator in each service area in conditions of a level playing field between all providers of these services
- Entry of more operators, level of entry fee and percentage of revenue share to be recommended by TRAI

4. The Government also subsequently approved a 'Migration Package' for the existing Cellular (and Basic) Service Providers which articulated the conditions under which the existing operators could migrate to the NTP 99 regime. In this context, TRAI was required to provide recommendations to the Government regarding, *inter alia,* the license fee arrangement (revenue share) for the existing Cellular Metros and Cellular Circles to be made applicable to them on migration

with effect from August 1, 1999. The same percentage of revenue share will be made applicable to the new licensees as well.

5. The Ministry of Communications made three references to TRAI, on October 7, 1998, April 23, 1999, and July 12, 1999, seeking its recommendations on these and other matters in relation to CMSP's. These references covered the following aspects:

- The appropriate level of entry fee
- The percentage of revenue to be shared with the licensor
- Definition of revenue for the purpose
- Basis of selection of new operators
- Any other issue considered relevant

6. The objectives of ensuring affordable and effective communications for the citizens, and of encouraging provision of high-level services to meet the needs of the country's economy make it necessary that the Government has the benefit of sound and informed recommendations on these highly complex techno-economic issues. Towards this end, TRAI presents this Consultation Paper with the objective of soliciting views of all the stakeholders including consumers, service providers, and any other party interested in the subject.

7. The study had necessarily to incorporate the changing policy concerns as they emerged over the past year. The Paper presents almost all the issues at one place for consideration. We would now like to move forward quickly in formulating our recommendations based on the feedback received. Comments and views may therefore be forwarded to us by January 4, 2000, after which public consultations through Open House Discussions would be held. The opinions of all the stakeholders so gathered would form the basis on which TRAI's recommendations would be formulated. For clarifications, Mrs Anita Soni, Joint Secretary (F&A), or Mr Maruthi P. Tangirala, Director (F&A), TRAI may be contacted on New Delhi Telephone numbers 371 9381 and 373 6515 respectively. Fax numbers are 373 8708, 335 6083; e-mail is trai@del2.vsnl.net.in. This Paper is also available on TRAI's website www.trai.gov.in.

December 14, 1999

(JusticeS. S. Sodhi)
Chairperson

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CONSULTATION PAPER FOR LICENSE FEE FOR CELLULAR MOBILE SERVICE IN CIRCLES AND METROS

INTRODUCTION

1. Cellular Mobile Service (CMS) was introduced in India on a commercial basis in the four metro cities in 1994. This was followed by opening of 20 circles (generally coterminus with state boundaries) to private CMS providers in 1995-96. While both Metro and Circle CMS licenses were awarded on the basis of tenders, the terms of the two types of tenders and licenses were different in some respects, notably the major parameter for selection in Metros was the lowest rental quoted whereas for Circles, it was the highest levy (license fee) quoted by bidders.
2. Two licenses were issued in each of the Metros and in most of the Circles. Currently there are 8 Cellular Mobile Service Providers (CMSPs) in the four metros and 34 CMSPs in 18 circles. In case of two circles, West Bengal and Assam, only one bid was received, while no bids were received for Andaman & Nicobar and Jammu & Kashmir Circles. The licenses were for an initial period of 10 years. As the cellular projects started, certain problems emerged and to address these, some changes have been introduced in the licensing regime.
3. In this connection, **three references** were received from the Ministry of Communications with regard to Cellular Mobile Services. These references sought TRAI's recommendations on the following :

i. **Quantum and structure of license fee** payable by Circle CMS providers in the extended period of license from 11th to 15th years. (Ref. Min. of Comm. *No. 842-153/98-VAS dt. 7.10.98*)

ii. Pursuant to National Telecom Policy 99, the appropriate level of **entry fee, percentage of revenue** to be shared with the licensor, definition of revenue for the purpose and the basis of selection of new operators and any other issue considered relevant. (Ref. Min. of Comm. *No. 842-153/99-VAS (Vol. IV) dt. 23.4.99*)

iii. **License fee arrangement for migration of the existing operators** of Cellular Metro and Cellular Circles to the new NTP'99 regime. (Ref. Min. of Comm. *No. 842-153/99-VAS (Vol.V) dt. 12.7.99*)

1. This study was initially taken up for the first reference and data collected for the 15 year extended period for Circle Cellular Mobile Service projects. At that time, Metro data was also collected to provide depth to the analysis as cellular projects in Metros have been in existence longer. This analysis was completed by 31.3.99 and the results indicated the improvement in viability by extending the project period. Before public consultations could be initiated, the New Telecom Policy 1999 (NTP '99) was announced on 31.3.1999 wherein, *inter alia,* entry of new CMSPs was also allowed.

2. The second reference, received in April 1999, sought recommendations on terms for entry of new CMSPs, in accordance with the NTP ‘99. This was being examined when the third reference on license fee arrangement for migration of existing operators to the revenue sharing arrangement was received in July 1999, after Government’s decision on the matter.
3. Accordingly this paper analyses both Circle and Metro Cellular Mobile Service projects for the 20 year license tenure to examine options for revenue sharing percentage as license fee, entry fee and license fee arrangements for new CMSPs and for migration of existing CMS Providers (CMSPs) to the NTP’99 regime. It also examines the basis for selection of new operators, other than DoT and MTNL.
4. As the NTP ’99 has brought in many changes in the licensing regime, it is necessary to understand the thrust and the relevant features of the NTP ’99.

THE NEW TELECOM POLICY ’1999

5. **Access** to telecommunications is an important factor in achieving the country's social and economic goals. Availability of **affordable and effective communications** for the citizens is the main goal of the telecom policy. It is intended to create a **modern and efficient telecommunications** infrastructure taking into account the **convergence of IT, media, telecom and consumer electronics** and thereby propel India into becoming an IT superpower. There is also emphasis on **research and development** efforts in the country as also on building **world-class manufacturing capabilities**. This requires the creation of an environment to enable generation of resources in the telecom sector as well as attract continued inflow of investment.
6. The **key targets** that the NTP 1999 seeks to achieve are:

- Make **telephone on available demand** by the year 2002 and sustain it thereafter so as to achieve a teledensity of 7 by the year 2005 and 15 by the year 2010
- **Increase rural teledensity** from the current level of 0.4 to 4 by the year 2010 and provide reliable transmission media in all rural areas
- The **resources** for meeting the Universal Service Obligation (USO) would be raised through a universal access levy, which would be a percentage of revenue earned by all operators under various licenses.
- Provide **Internet access to all district head quarters by the year 2000**
- Provide **high-speed data and multimedia** capability using technologies including ISDN to all towns with a population greater than 2 lakh by the year 2002.

1. The New **Policy Framework for Cellular Mobile Service Providers(CMPSs)** is as follows:

- CMSPs would be granted separate license, for each service area. Licenses would be awarded for an **initial period of twenty years and would be extendible by additional periods of ten years thereafter.**
- Apart from the two private operators already licensed, **DOT/MTNL would be licensed to be the third operator** in each service area in case they want to enter, in a time bound manner.
- The **entry of more operators** in a service area shall be based on the recommendation of the TRAI who will review this as required and no later than every two years.
- CMSPs would be required to pay a **one-time entry fee.**
- Apart from the one time entry fee, CMSPs would also be required to pay **license fee based on a revenue share**. The appropriate level of entry fee and percentage of revenue share arrangement for different service areas would be recommended by TRAI.
- The **basis for determining the entry fee and the basis for selection of additional operators (other than DoT/MTNL) would be recommended by the TRAI.**
- The CMSP shall be free to provide, in its service area of operation, all types of mobile services including voice and non-voice messages, data services and PCOs utilizing any type of network equipment, including circuit and/or packet switches, that meet the relevant International Telecommunication Union (ITU)/Telecommunication Engineering Center (TEC) standards.
- **Direct interconnectivity between licensed CMSPs and any other type of service provider** (including another CMSP) in their area of operation including sharing of infrastructure with any other type of service provider shall be permitted.
- Interconnectivity between service providers in different service areas shall be reviewed in consultation with TRAI.
- The CMSP shall be allowed to **directly interconnect with VSNL** after opening of national long distance from January 1, 2000.
- The Cellular Mobile Service Providers (CMSP) shall be permitted to provide mobile telephony services including permission **to carry its own long distance traffic within their service area** without seeking an additional licence.

RATIONALE FOR ENTRY FEE AND LICENSE FEE STRUCTURE

1. License fee structure is expected to reflect the policy objectives of the licensing system and the objectives sought to be achieved under NTP-99, which has ushered in the shift from fixed license fee to a revenue sharing arrangement. The NTP-99 has not indicated any guideline for determining the Entry Fee or revenue sharing percentage. The matter has therefore, to be considered carefully and all relevant aspects have to be examined and debated in a consultation process.
2. License fee may be levied for any one or a combination of the following reasons:

- For recovering the cost of administering the license from the service providers

- As an entry barrier to eliminate non-serious players or as a method of selection of limited number of players
- For augmenting government revenues for national development effort. This can be realised in the form of license fee charged from operators or service tax, which may be different for different services. In the case of license fee from operators, it could be some consideration for the revenue expected to accrue to operator, especially in a limited competition scenario.
- Entry of one or two players to be decided by the limited availability of the frequency spectrum which is a scarce national resource. Private sector should contribute a reasonable sum as license fee after ensuring reasonable IRR for themselves. This contribution should not be merely limited to regulatory expenses, R&D cess, etc.

1. The basis for determination of license fee structure has to be linked to the policy objectives and competition strategy. The license fee structure has a direct bearing on the viability of the project and has implications for cost to customer. It is therefore necessary that the licence fee for any service should be reasonable and fair. An important consideration would be to arrive at a license fee structure which facilitates **affordable and effective communications and helps to create a modern and efficient telecommunications infrastructure,** which are core objectives of the NTP ’99. The basis for examining the various possible revenue sharing options for license fee may range from an assessment of the cost of administering the license to analysis of impact of different revenue sharing percentages on the viability of the projects. While it is easier to assess the former, the analysis of overall viability of projects over 20-year period provides a comprehensive overview though it has its own limitations including assumptions required to be made which, over a long period, may be different from the actual developments as time progresses. The trends which are foreseen can be built into the analysis.
2. Internationally, license fee for cellular mobile services is generally fixed at a low level and close to the cost of administering the license and sometimes with an element for keeping out the non-serious players. However, in some developing countries like Thailand, China, Brazil as well as a number of developed countries, such as Belgium and Singapore a relatively high percentage of revenue is charged based on competitive bidding. Even in USA and UK, competitive bidding for award of license and frequency spectrum has been resorted to. Apart from being considered a transparent selection process it has resulted in mopping up of considerable resources for the general revenues of these countries. In this connection some information available for other countries is mentioned in Table II.1.18 in Part II of this paper. Selection process based on auctions has occasionally resulted in higher license fees due to competitive pressures. This can have implications for the ability of project to generate resources required for expansion.
3. Entry Fee is usually treated as a threshold for enabling suitable operators to be selected and for ensuring that serious players come into the arena. It can be derived through an auction process and is a tool for selection. This has been

envisaged for new bidders in the NTP'99 too. For existing operators NTP'99 envisages license fee paid(payable) upto July 31, 1999 as the entry fee.

DEFINITION OF REVENUE

4. Another important question that needs to be addressed is the definition of revenue for the purpose of revenue share. The options vary between gross revenue and net revenue, with the inclusion or exclusion of different revenue streams. While there is a need to ensure that **not retained by the operator is not subject to revenue sharing percentage, the matter of implementation has also to be kept in view. It is possible to arrive at percentage of revenue share relating to a revenue base derived after adjusting elements like pass thru charges payable to the service providers and translate this into a smaller percentage applied over gross revenue.** Generally, it is expected that the requirements of transparency, fair play, encouraging voluntary compliance, avoidance of double taxation', and ease of implementation need to be kept in mind before a final determination is made.

Universal Service Obligation(USO) Contribution

5. The issue of **contribution to USO** fund also needs to be examined. Since the level of contribution to USO fund is yet to be finalised, it is necessary to consider whether it will be met out of revenue share for license fee or will be an additionality.

TERMS AND CONDITIONS OF LICENSING

6. The NTP 1999 and the consequential Government decision permitting migration of existing licensees to the revenue sharing regime require a wider discussion of the terms and conditions of License Agreement for existing licensees and new entrants. A critical factor in the success of private sector participation is the need for not only a *de jure*, but also a *de facto*, level-playing field under which the incumbent monopoly is prevented from using its market power to stifle competition. In this regard, all three aspects of interconnection, namely physical, technical and commercial, are particularly important in order to ensure access to bottleneck facilities, use of scarce resources and common facilities. Other significant matters include right of way, transparency regarding technical information, and unbundling.
7. As per NTP 1999, Cellular Mobile Service Providers (CMSP) would be granted separate license for each service area with no limitation on obtaining licenses for any number of service areas. DOT/MTNL, which would be licensed to be the third operator in each service area in case they wish to enter, are major suppliers of telecommunications services with dominant infrastructure and market

advantage in supplying more than one service. They have the ability to materially affect the terms of participation of other market entrants in terms of price, supply, and conditions of interconnection. This offers a potential for anti-competitive practices and thus needs to be addressed.

8. Government's policy announcement mentions the need for establishing a level-playing field between service providers in similar situations. This would require evolving adequate ground rules to safeguard against anti-competitive practices. Relevant questions in this regard include whether licensing conditions (i.e. ex-ante conditions with respect to entry) will suffice to achieve this objective or whether a pro-competitive regulatory framework would also be required (i.e. conditions ex-post to entry), and what should be the nature of such conditions.
9. One measure to prevent anti-competitive practices of a dominant operator is by means of accounting separation, where the operator separates services within its internal structure though the provision of distinct company accounts or differentiates between the provision of networks and the provision of services by setting up separate accounts. Accounting Manuals are prescribed to enforce implementation of accounting practices that result in revenue and cost separation of different service segments.
10. While Accounting Separation which disaggregates the costing and revenue information of the major physical components of a network, can help to provide information to avoid cross subsidization, it may be possible for common owner to influence prices charged to different subsidiaries.
11. Perhaps a transparent solution would be to ensure that cellular mobile telephone service in any service area provided by a basic service incumbent service provider is provided through a subsidiary, or if corporatization has not taken place, through an independent outfit. The solution of structural separation of incumbent to enable provision of Cellular Mobile Service through a subsidiary, therefore, needs to be considered.

COMMONALITY OF ISSUES FOR OTHER LICENSES

12. The above are some of the major issues applicable to the determination of license fee for all types of telecom services in general and are not limited to cellular services. A **consistent general approach for levy of licence fee needs to be adopted**, and it is the endeavor of the TRAI to facilitate such consistency by presenting the issues involved at one place for consultation and comprehensive discussion by all the stakeholders. A detailed listing of issues arising in this consultation paper is presented in **Part I** that follows this Introduction. These issues are being thrown open for consultation in this Paper, and **would form the basis for the TRAI's approach to licence fee determination in future also**.

STRUCTURE OF THE PAPER

13. As mentioned above, the NTP'99 does not lay down any guidelines for determining percentage of revenue as license fee. Hence various alternative approaches can be considered. As these alternatives range from cost of administering the license to examining the viability of the projects under different percentages of revenue sharing, a comprehensive consultation paper has been prepared, covering alternative approaches and issues. The relevant issues which require consideration, are listed in Part I of this paper. This is followed by a detailed study of the cellular industry in the country and an assessment of the viability of the various CMS projects has been attempted to provide indicators for determination of license fee. The study is data-led, wherein the CMSPs have provided inputs with regard to their operations for the license period, both actual data for the past and projections for the future. Interaction with the CMSPs, industry associations, industry experts, financial institutions, banks and telecom equipment vendors yielded useful insight that has informed the analysis. Certain assumptions have been made for the purpose of the detailed analysis and basis for the same has been indicated at the appropriate places, to the extent possible. The results of the analysis can be treated as indicative of future trends and may be useful for arriving at a suitable revenue sharing percentage if the viability approach is adopted for determining revenue share. As the license conditions play an important role in implementation of the projects, these are also examined in detail.
14. The paper is divided into three parts, which follow this Introduction :

- ***PART I : Issues for Consultation***

  This part identifies various issues for consultation with regard to license fee arrangement and license terms and conditons. The general issues applicable across various telecom services in respect of license fee arrangement have been included here. These issues are also relevant for determination of the quantum and structure of the licence fee for CMSPs.

- ***PART II : Cellular Mobile Service – Viability Analysis***

  This part begins with a background on the existing state of the cellular mobile service in the country, which acts as the backdrop for the viability analysis of the industry. The approach and methodology for conducting the viability analysis has been detailed which is followed by the results of the data analysis. The sensitivity of the projects to variation in key parameters is examined under sensitivity analysis.

- ***PART III : Terms and Conditions of the License***

This part contains a draft of the proposed terms and conditions of the new license. Issues relating to the terms and conditions that would require further discussion are also included.

- This consultation paper is expected to provide useful inputs for the consultation process. The main issues for consultation which follow in Part I are relevant not only for Cellular Mobile Service licenses but also for other services where license fee structure is based on revenue sharing.

PART I

ISSUES FOR CONSULTATION

Issues For License Fee Determination

General Issues

1. As telecom sector is liberalised, many issues including those relating to licensing have emerged in the transition period. Many issues of licence fee determination are common to the different telecommunications services. The issues indicated below would also be applicable to other services like fixed services, and the present process of consultation is expected to provide the TRAI with valuable inputs that would enable the TRAI to formulate consistent and pragmatic recommendation in future as well.
2. The issues raised for discussion in this connection are:

APPROACH FOR DETERMINING REVISED LICENSE FEE

- What should be the basis for determining a revenue share as license fee for telecom services since NTP'99 does not lay down any guidelines in this regard?

  Under NTP-99, the move from fixed license fee towards revenue sharing as license fee is itself an indicator that the intention is to rationalise the license fee structure to achieve NTP-99 objectives which include wider access and affordability. License fee constitutes an outflow from the project and its incidence may have impact on the affordability and cost of provision of service as also resources available for expansion. This may also need to be kept in view in the determination of license fee.

- Should the license fee only cover the costs of issuing telecom licenses and administering and regulating the sector?

  This approach takes into account the likely cost of administering the licence for a particular service, and would seek to recover the total cost from all the service providers in the form of percentage of revenue share. The license fee and the cost to customer is expected to be minimum in this approach; the revenue share percentage so derived would also not be perceived as a high threshold for market entry.

- Should there be an element of rent in the license fee in return for the revenue earning opportunity provided to selected service providers in a limited competition scenario?

  The issues arises in the context of limited number of players for certain telecom services and the markets available to them. While this may provide a basis for arriving at revenue share higher than that based on cost of administering the license, the main objective of telecom growth and the resources required for it, also need to be kept in mind while examining this issue.

- In addition, should the sector also be called upon to meet the costs of the universal service obligation as defined by the Government from time to time? R&D effort is part of NTP-99. Should this also form part of license fee?

  One of the objectives of the NTP ’99 is to "strive to provide a balance between the provision of universal service to all uncovered areas, including the rural areas, and the provision of high-level services capable of meeting the needs of the country’s economy". The issue is whether license fee should be the instrument of ensuring universal service by adding on the costs of providing such service to the revenue share, and transferring it to a separate ‘universal service fund’ that is administered separately. Another alternative could be to collect USO contribution through a separate levy. In that case, the outflow on account of such a levy would need to be taken into account while determining the revenue share for license fee.

  R&D cess forms part of the Basic Service license, and is part of an additional percentage to cover cost of administrating the license and R&D effort.

- Above and beyond the above elements, should the revenue-sharing regime also raise resources for the union budget?

- If so, what impact will this approach have on the main objectives of NTP'99 in regard to development of a world-class competitive telecom infrastructure as an essential element in India's social and economic development and its global competitiveness in trade & industry?

  This has also to be viewed in the context of multipoly & much greater competition in the supply of these services under NTP'99.

- If resources have to be raised for the budget from this sector, what is the most appropriate vehicle for the purpose - is it the revenue-sharing license fee regime or a service tax, which is transparent and competitively neutral and has the possibility of levying differential service tax on various telecom services?

- In case revenue-sharing regime is to be treated as a vehicle for raising budgetary resources, what parameters should be addressed in order to arrive at an equitable share for the Government?

  The experience of trying to augment government revenues through levy of licence fee has not always been without problems. It may result in increasing the price of service, and of creating distortions that are not conducive to providing a level playing field for all players. As an expenditure that does not create telecom network assets, it may be a disincentive for ubiquitous service roll out. Whether it would be better to keep license fee low and encourage cheaper access and usage and utilise service tax as the preferred instrument for resource generation needs to be discussed. The parameters, which may need to be kept in view under this approach, would include assessment of viability of the projects.

BASIS FOR DETERMINING REVENUE SHARE PERCENTAGE

- Based on the approach adopted what should be the basis for working out a reasonable revenue share?

  Whatever the approach adopted, it would be necessary to consider the factors which need to be taken into account for determining the percentage of revenue share. Each of the approaches, i.e. cost of administering the license, with or without USO contribution and/or R&D cess, or providing resources for the Government, need to be linked to calculations derived from relevant parameters. Costs have to be established on the basis of data, past and future projections, where required. Analysis of data would enable a study of the viability of the projects, which would be useful for determining the revenue share particularly under the approach relating to rent or raising resources for the Budget.

- Should viability be the sole consideration for deciding the revenue share?

  The issue of viability arose as one of the major reasons for change in the license fee regime when there was protest from most operators that two of the important reasons why their projects were becoming unviable were high license fees payable and short duration of the license period. Therefore viability needs to be examined for arriving at the new license fee arrangement but it needs to be discussed whether this can be treated as the sole parameter for the purpose. It requires to be kept in view that examining a project over a 20 year time horizon may produce results which are probably indicative of trends and not exact. Fast moving sectors like telecom are prone to technology changes and there are significant regional variations in the projects. Even two projects in the same service area may exhibit different degrees of viability.

- What should be treated as appropriate parameters for attracting investment, both domestic and foreign, into this sector generally and in particular for the CMS?

  Financial institution tend to look at returns of the project in terms of Internal Rate of Return, Return of Capital Employed and Debt Service Coverage Ratio and/or payback period for the purpose of providing financing to a project. These parameters are indicators of viability and their analysis provides an input into the determination process.

  The consideration of viability based determination of licence fee will be requied according to the approach adopted. Any revenue share however must not have an adverse effect on a reasonable viability of the service providers, in the long-term interest of the customers and the sector. Opinion is bound to vary on the appropriate level of viability parameters that would encourage investment in the sector. International and cross-sectoral experience would also need to be brought to bear on the issue.

- Given the limitations of a viability study with a 20-year profile in a fast changing sector, is it possible to arrive at a fairly dependable and accurate estimates of revenues to decide on a revenue-share, if licensee fee is to provide for obligations other than the administrative cost of regulating the sector and the USO contribution?

  One of the reasons that extension of license period was initially proposed was that viability of the projects improved with longer time available to achieve better returns from the projects and repay the debt. This was a general trend arising from internal studies and Financial Institution’s response to financing proposals. Hence trends may be gauged from long term viability analysis. The results may however be subject to variation

due to a number of factors, which can come into play over the duration of the license period. This aspect requires to be considered carefully.

- What are the consequences of fixing the revenue share as license fee for shorter intervals on security and predictability, and, therefore, on investor confidence?

  If, arising from the above, the possibilities of determining the revenue share for a shorter period is considered, its implications for future investment has to be taken into account, investment being wary of unpredictable change.

- Is it not necessary to establish a link between the most economic cost to the customer and the share of revenue as license fee in any viability exercise?

  While the viability exercise may indicate the limit to license fee for maximisation of the revenue for the government, there may be implications for the expansion of the project and the cost to the customer, especially in the long run when prices are likely to be influenced by limited availability and competition.

- Is there a case for distinguishing metro from circle operators in the matter of levy of revenue-share?

  This issue has surfaced on account of the perception of different potential of Circle and Metro projects. This may not be as relevant in an approach based on cost of administering the license. It also has to be recognised that the potential of some circles may be better than a few metros.

- Do territorial circles that have less than two CMSPs in the market require to be treated differently in the matter of license fee for that reason? Similarly, in the case of J&K and A&N Islands, should there be a special dispensation so that there is an adequate incentive for provision of service in these circles where cellular mobile services do not exist at all?

  This needs to be considered in terms of attracting some service providers to these circles rather than continue with a situation where potential operators have shown lack of interest in operating in these circles.

ENTRY FEE AND ENTRY OF FOURTH OPERATOR

1. The Government's third reference of July '99 for TRAI's recommendations conveys the stipulation that the licence fee dues payable up to 31.7.1999 would be treated as the Entry Fee for the existing (cellular and basic) operators, and that the potential bidder will bid for the Entry Fee. Hence

the market forces at the time of the bidding are expected to influence the entry fee.

- Bidding procedure: If entry fee has to be bid, rather than determined in advance, what is the procedure to be adopted? Should the highest bidder pay the amount bid or pay an amount just above the amount bid by the second highest bidder in a sealed bid auction process?

  The alternative mentioned above may guard against "winner's curse" where the highest bidder bids a much higher amount as compared to the second highest bidder. Theoretically, the highest bidder could still have won if he had quoted just above the second highest bid. This approach has been sometimes used internationally but the implications have to be examined carefully. It is possible for some bidder to bid recklessly in the belief that by quoting the highest amount, his bid would qualify for selection but he would have to pay much less based on a more realistic second highest bid.

- What conditions should be satisfied for entry of the Fourth Operator and subsequent operators?

  Market conditions may fluctuate and for healthy competition, reasonable market conditions may be necessary to ensure successful entry of the fourth operator. These require to be discussed. Under NTP-99, there is no bar on successive operators even after the fourth operator, but for the purpose of analysis, only fourth operator has been considered.

- How is the issue of different amounts due till 31.7.1999 from CMSP's in the same circle to be addressed?

The issue arises as a consequence of some cases, where the payment schedule of two operators in the same service area is different (though NPV is the same over the license period) up to 31.7.1999 due to different effective dates. This would result in different entry fee (which is the license fee payable up to 31.7.1999 in accordance with NTP 99) in the same service area.

DEFINITION OF REVENUE AND IMPLEMENTATION ISSUES:

- Definition of Revenue: Should this relate to Gross Revenue realized from licensed operations? Should elements like passthru revenue be excluded from Gross Revenue for the purpose of working out the license fee?

  It needs to be ensured that in effect there is no "double counting" of revenue whether for levy of licence fee or for service tax purposes. The definition of revenue for the purpose of revenue sharing needs to be evolved through wide consultation with all concerned, including service providers and consumers. For implementation, revenue base may be

simplified to enable dispute free calculation. Hence it may be possible to translate a desirable "adjusted gross revenue share" as a smaller percentage on "Gross Revenue".

- As Revenue for an accounting period will be known at the end of the period, how is license fee based on Revenue Share to be realised?

  This issue has important financial implications. If any component of license fee has to be realised during the accounting period, then it is necessary to discuss the methodology of calculation and frequency of realisation.

- Would it be necessary to allow greater flexibility in terms of differential tariffs within the service area/cities and/or zones within cities?

  In order to address the issue of revenue growth it may be worth considering the proposal for differential tariffs based on differential cost structures relating to:

  i. zonal cellular service in the city
  ii. city specific service in the circles
  iii. differential tariffs to be charged for the various cities in the circles
  iv. tariff packages which can cover part of the service area coverage i.e., between any cities or in a zone.

ISSUES RELATED TO LICENSE CONDITIONS

1. The proposed terms and conditions of licence have been indicated in Part III of this Paper. Certain issues that arise for consultation therein are indicated below:

- Should the license conditions be reviewed for enabling the operators' greater flexibility, ability to compete and to ensure smoother implementation of licenses?

- Under the migration package, there shall be lock-in of the present shareholding for a period of 5 years from the effective date of license agreement. Should this condition be applicable to the new entrants also?

- What should be the form and content of the new clause regarding entry fee that needs to be incorporated for the existing as well as new CMS licensees?

- What should be the terms and conditions related to the schedule of payment of the new license fee for existing as well as new CMS licensees?

- What should be the penalty for default in observance of terms and conditions by the licensee, especially with regard to provision of service in the period prescribed for commissioning?

- What should be the notice period that the Licensee shall give to the Licensor and subscribers if the licensee intends to surrender the license? If the service is in operation, what should be the notice period that the Licensee should serve on its subscribers, in case the Licensee intends to terminate its operation?

- What should be the terms and conditions for long distance connectivity outside the service area?

- What should be the Quality of Services standards applicable to the various technologies that may be used by the licensees for provision of CMS?

- What should be the conditions for bank guarantee and the financial guarantee proforma in view of the new license fee regime?

- What should be the conditions for settlement of disputes between service providers?

- How can it be ensured that there is a level playing field between private and public sector operators?

  Is the *de jure* application of the same terms and conditions sufficient to provide such a level playing field?

  If not, what conditions have to obtain in order to have both a *de jure* and *de facto* level playing field?

PART II

CHAPTER 1

LIBERALISATION OF CELLULAR MOBILE SERVICES – A BACKGROUND

1. **Introduction**

1. On 31.3.1992 the country had 5.81 million basic telephone connections. About 80% of the network was operated by Department of Telecommunications (DOT)

and 20% of the network was controlled by MTNL (in Delhi and Mumbai). There was considerable demand which was to be met and the resources of DOT were engaged in providing basic telephony on priority. World over an increasing trend in privatization had appeared and greater liberalization was proposed to be introduced in India too. Cellular Mobile Service (CMS) had already spread in many other countries through private sector efforts. It was considered appropriate at that stage to initially open up CMS in India to private sector participation.

2. CMS was introduced in India on a commercial basis in the four metro cities in 1994. This was followed by opening of 20 circles (generally coterminus with state boundaries) to private CMS operators in 1995-96. Though both Metro and Circle CMS licenses were awarded on the basis of tenders, the terms of the two types of tenders and licenses were different in some respects. The most important difference is in the license fee structure (and schedule of payments) which is heavier for circles.
3. Two licenses were to be issued in each of the Metros and the Circles. Currently there are 8 CMSPs in the four metros and 34 CMSPs in 18 circles. In case of two circles, West Bengal and Assam, only one bid was received and subsequently only one license has been issued. No bids were received for Andaman & Nicobar Islands and Jammu & Kashmir.

1. **Changes in License Conditions**

1. In many cases of circle CMS projects financial closure has not taken place due to lack of viability of many of these projects. With a view to enable such projects to take off, Govt. of India decided to extend the license period and put license fee for cellular projects under a revenue sharing regime. TRAI's recommendations have been sought with regard to percentage of revenue share as license fee for new and existing operators who wish to migrate to revenue sharing regime. Recommendations have also been sought on definition of revenue, entry fee and other issues considered relevant.

1. **Process of Award of Licenses for CMS**

1. In order to understand the background, it is necessary to trace the process of licensing. This was initiated through Request for Proposals (RFPs) from companies registered in India. The selection parameters were different for the 4 metros as compared to circles as explained below.

i. **The RFPs for four Metros** were released in July 1992, followed by bidder's conference and clarifications. The selection among technically qualified bidders was made by a High Powered Committee, on the basis of low rental proposed to be charged from subscribers (with license fee and call charges as given parameters). The license agreements were issued from November 1994 for the Metros.

ii. **The Circle CMS RFPs** were released in January 1995 and were followed by bidders' conference and clarifications. The selection among technically qualified

bidders was on the basis of highest levy (later converted to license fee) which was measured over 10 years of license period after discounting @ 16% p.a. to arrive at the Net Present Value (NPV). Rental and call charges were derived from the metro licenses already in place and were treated as given parameters.

1. Details regarding time schedule for (i) and (ii) above are provided in Table II.1.1.

Table II.1.1

	Metros	**Circles**
RFPs	July 92	Jan 95
Issue of licenses	From Nov 94	From Dec 95

1. **Award of license for Metro CMS**

1. In the open tenders for award of Metro CMS licenses, license fee for the first three years was a given parameter, while the license fee from fourth year onwards was fixed at Rs. 5000 per subscriber (based on unit call rate of Rs. 1.10) subject to a minimum as detailed in table II.1.2 below. The per subscriber figure was later revised to Rs. 6023 based on the revision in the unit call rate. For the purpose of calculation of license fee from the fourth year onwards, the number of subscribers at the end of each month would be added for all months of the year and divided by number of completed months.

Table II.1.2: License fee schedule for Metros

S. No	**Service Area**	**1st Year**	**2nd Year**	**3rd Year**	**4th to 6th year (for each year) #**	**7th yr. Onwards (for each year) #**
1.	Mumbai	3	6	12	18	24
2.	Delhi	2	4	8	12	16
3.	Calcutta	1.5	3	6	9	12
4.	Chennai	1	2	4	6	8

Minimum license fee payable annually (in Rs. crore)

2. Call charges were also a given parameter. The bidding was for the lowest rental to be charged from customers. The evaluation was on the basis of financial strength, experience of the partners, committed rollout and lowest rental. The evaluated value of lowest rental was determined at Rs. 156 per month. Two operators per metro were expected to compete with each other and provide choice to the consumers. The selected operators were as follows:

Table II.1.3: Selected Operators in Metros

Metros	Operator 1	Operator 2
Mumbai	BPL Telecom	Maxtouch
Delhi	Bharti Cellular	Sterling
Calcutta	Usha Martin	Modi Telstra
Chennai	SkyCell	RPG Cellular

1. **Award of Licenses for Circle CMS**

1. Rental and call charges as applicable to Metros were given parameters and the bidding was for the levy (to be converted into license fee after selection). The bidders selected for each circle were asked to match the highest levy (license fee) quoted by the highest bidder. In some instances the highest bidder could not accept the license for a particular circle due to restriction on the number of circles which could be allotted to one bidder. However, in such cases the levy bid by such highest bidder was the benchmark for award of license. The Table II.1.4 below contains the details.

Table II.1.4: Licenses for Circle CMSPs

S.N.	Circle	Name of Operator	Total levy quoted for 10yrs.	PV of quoted levy	License fee accepted	PV of license fee
1	A.P.	J.T.Mobile	1001.00	502.76	1001.00	502.76

2	A.P.	Tata Cellular	858.00	430.94	1001.00	502.76
3	Gujarat	Birla AT&T	1794.10	901.11	1794.10	901.11
4	Gujarat	Fascel	1229.25	617.41	1794.10	901.11
5	Karnataka	Modicom	1393.00	699.65	1393.00	699.65
6	Karnataka	J.T.Mobile	1320.00	662.99	1393.00	699.65
7	Maharashtra	Birla AT&T	1657.70	832.60	1657.70	832.60
8	Maharashtra	BPL Cellular	1463.00	734.81	1657.70	832.60
9	Tamil Nadu	BPL Cellular	836.00	419.89	836.00	419.89
10	Tamil Nadu	Srinivas Cellcom	450.00	252.57	836.00	419.89
11	Haryana	AirCel Digilink	240.00	134.71	240.00	134.71
12	Haryana	Escotel	245.86	123.49	240.00	134.71
13	Kerala	BPL Cellular	517.00	259.67	517.00	259.67
14	Kerala	Escotel	384.83	193.29	517.00	259.67
15	M.P	RPG Cellcom	51.00	25.62	51.00	25.62
16	M.P	Reliance Telecom	5.61	2.82	51.00	25.62
17	Punjab	Modicom	1266.00	635.86	1266.00	635.86
18	Punjab	JT Mobile	914.50	459.25	1266.00	635.86
19	Rajasthan	Aircel Digilink	210.00	117.87	382.00	191.86
20	Rajasthan	Hexacom	161.00	99.26	382.00	191.86
21	Rajasthan	Modicom	382.00	191.86	Not eligible	Not eligible
22	U.P (E)	Koshika Telecom	210.88	146.00	210.88	146.00
23	U.P.(E)	Aircel Digilink	210.00	117.87	210.88	146.00
24	U.P.(W)	Escotel	406.21	204.02	406.21	204.02
25	U.P.(W)	Koshika Telecom	258.21	178.75	406.21	204.02
26	W.B.	Reliance Telecom	42.00	21.26	42.00	21.26

27	Assam	Reliance Telecom	1.32	0.67	1.32	0.67
28	Bihar	Koshika Telecom	136.53	94.52	136.53	94.52
29	Bihar	Reliance Telecom	2.64	1.33	136.53	94.52
30	H.P	Bharti Telenet	14.96	8.14	14.96	8.14
31	H.P	Reliance Telecom	1.32	0.67	14.96	8.14
32	Orissa	Koshika Telecom	89.22	61.77	89.22	61.77
33	Orissa	Reliance Telecom	2.64	1.33	89.22	61.77
34	North East	Hexacom	1.90	1.25	1.90	1.25
35	North East	Reliance Telecom	1.32	0.67	1.90	1.25

2. In the case of two circles, viz. Andaman & Nicobar Islands and Jammu & Kashmir, no bid for cellular services was made. Some of the probable reasons that no bids were received for these two circles are as follows:

- The two circles are characterized by distinct geographical topologies that make it difficult to plan and implement a cellular network. While J&K has a hilly and mountainous terrain, Andaman & Nicobar Islands are a cluster of islands spread out at sea.

- The socio-economic profile of the regions indicat>

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phony as compared to other circles (Refer tables below).

Table II.1.5: DELs Projections (as per Telecom Perspective Plan)

DELs	1996 (Actuals)	1997	1998	1999	2000	2005	2007
Andaman & Nicobar Islands	5,077	6,689	7,792	9,077	10,574	22,688	30,792
J&K	52,598	88,408	101,392	116,422	133,840	273,414	366,636

Table II.1.6: Some Socio-Economic Indicators

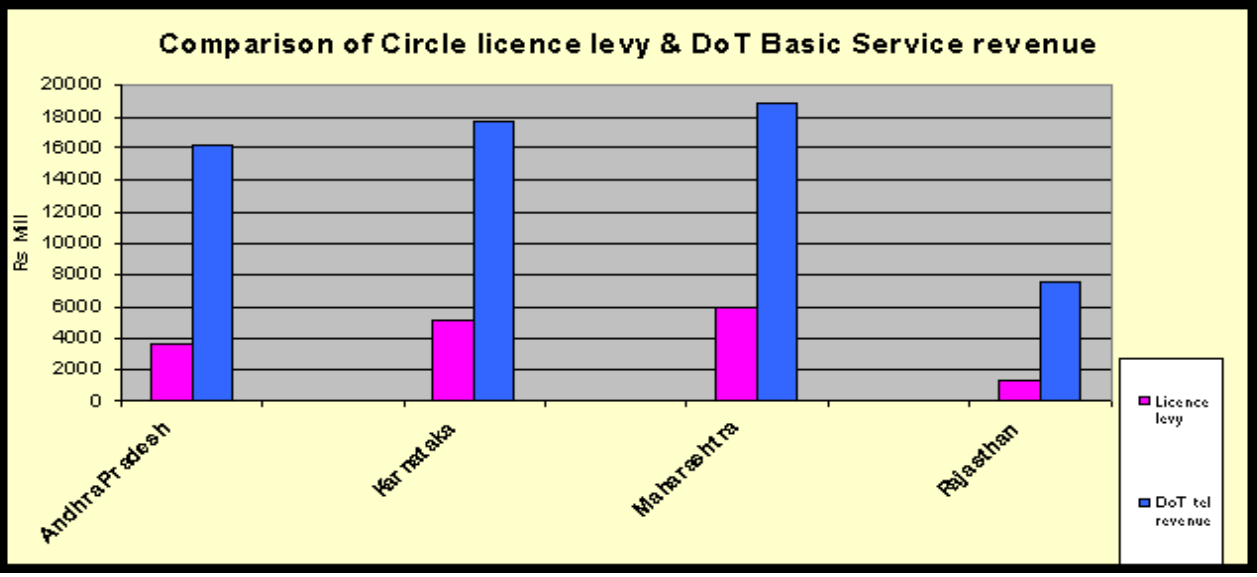
	1996	1997
Population in mn		
Andaman & Nicobar Islands	0.3	0.4
J&K	9	9.3
Teledensity (DELs per pop)		
Andaman & Nicobar Islands	1.7	1.7
J&K	0.6	1.0
	1993	**1995**
4-Wheelers		
Andaman & Nicobar Islands	1232	1721
J&K	30979	38381
2-Wheelers		
Andaman & Nicobar Islands	8919	9949
J&K	88841	101164

1. **High Quotes of Levy (License Fee)**

1. A comparison of the highest levy quoted for some of the circles for the first two years and the revenue actually earned for basic telephony by DOT in those years is very revealing (Table II.1.7). It is seen that levy quoted for cellular service in the circles was about 18%-32% of the total basic service revenues for those circles.

Table II.1.7: Circle CMS Levy Vs Basic Service Revenue

1	Andhra Pradesh	3640	16227	**22.43%**
3	Maharashtra	6028	18895	**31.90%**



2. As CMS subscribers were expected to be a small percentage of basic service subscribers in the initial years, such high quotes for levy either presumed very high revenue per subscriber and/or a very large subscriber base at the very outset. These were very optimistic assumptions. In the absence of adequate data relating to CMS in the circles, the business plans of bidders were based on many assumptions and estimation. A glance at the DPR's prepared at the bid stage should therefore be revealing.

1. **Analysis of DPRs**

1. In order to understand the projections, which were the basis for the bid amounts of levy, it is necessary to examine DPRs and compare them with actual performance. Accordingly, DPRs were requested from operators along with the data required for analysis. Most operators expressed difficulty in tracing their DPRs (and many considered the DPRs to be only of academic interest by now) and only few DPRs were received. Hence some limited comparison can be made. Tables II.1.8 and II.1.9 indicate some of the parameters as assessed in DPRs and

their current status.

Table II.1.8 and Table II.1.9

(Click on Table Nos. to access full table running into 19 columns)

2. From the tables it is clear that wide variance exists between the projections in business plans at the time of bids and the current status. For the Circles and some of the Metros, the achievements are below expectations due to optimistic estimation at bid stage and a number of problems that have constrained the CMS business in many service areas. The reasons for variance in achievements with earlier projections need to be examined to form an overall assessment of key internal and external issues affecting the performance. The performance of CMS projects may be viewed in terms of the physical roll out of network, investments made, the subscriber base built up so far, financial closure achieved, revenues and costs, license fee payments, cash flows and related ratios.

1. **Performance of CMSPs**
    1. ***Network status : Coverage and backbone***

1. After being awarded licenses during 1995-96, **Circle CMSPs** have achieved considerable progress in network rollout. As per the recent data made available to TRAI by 16 operators, more than 200 cities are covered by a network of 35 MSCs, 110 BSCs, and 1950 BTSs. The backbone network has spread over 12945 route kms. of microwave transmission and 2122 kms. of optical fiber transmission. The details of network rollout are contained in Appendix II.1A at the end of this chapter. Further, it appears that 30% of District Headquarters (DHQs), as existing at the bid stage, have been covered as on July'98. (Refer Table II.1.10 and Graph II.1.1). For **Metros**, the rollout did not involve any condition relating to DHQs. Their rollout, especially at Delhi and Mumbai has moved well.

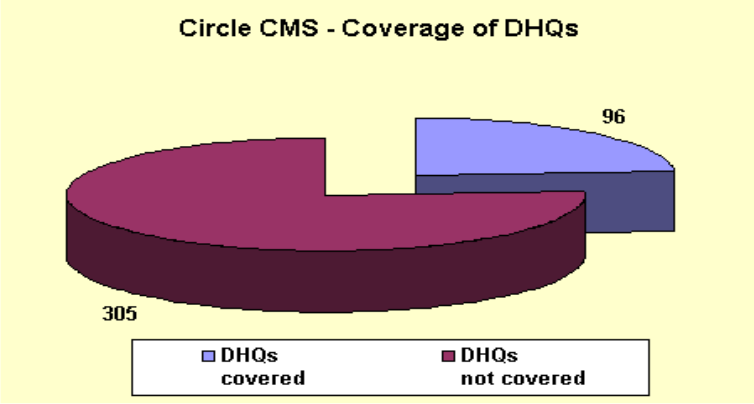
Table II.1.10: CMTS- Coverage of DHQs As in July '98

Category	DHQs at the time of tender	No. of DHQs as on date	DHQs Covered
Category A	108	129	31
Category B	164	187	56

Category C	55	85	9
Grand Total	**327**	**401**	**96**

(Source : COAI)

Graph II.1.1: CMTS - Coverage of DHQs-July '98



2. The **network capacity utilization** level and performance of operators vary from circle to circle and for Metros, some relevant information is being indicated in Table II.1.11**.**

Table II.1.11: Network Capacity Utilization Level (as on 31.12.98)

Operators	Installed Switch Capacity	Utilization Level (%)
A 4	*50000*	*91%*
A 3	*50000*	*81%*
A 5	*215250*	*23%*
A 2	*15990*	*21%*
M 3	*155600*	*72%*

M 4	*206215*	*64%*
M 6	*50000*	*37%*

(Source : Operators Data)

(Note: A4, A3, A5, A2 are Category 'A' Circle CMSPs and M3, M4, M6 are Metro CMSPs whose data is available)

1. ***Investments***

1. The investment made in achieving the CMS coverage in the country, including Metros, is to the tune of Rs. 7863 crore as on February, 1998 which has been funded by amounts equally distributed between debt and equity. The summary of investment pattern is given in Table II.1.12 below while the details are given in Appendix II.1B at the end of this chapter. The investment covers capital expenditure, the initial set up costs and accumulated losses.

Table II.1.12: Pattern of Investment Till February '98

(In Rs. crore)

Service Provider	Equity	Debt	Total
Metros	853.95	1154.17	2008.66
Circles	3076.27	2778.86	5855.13
Total	**3930.22**	**3933.03**	**7863.79**

(Source : COAI)

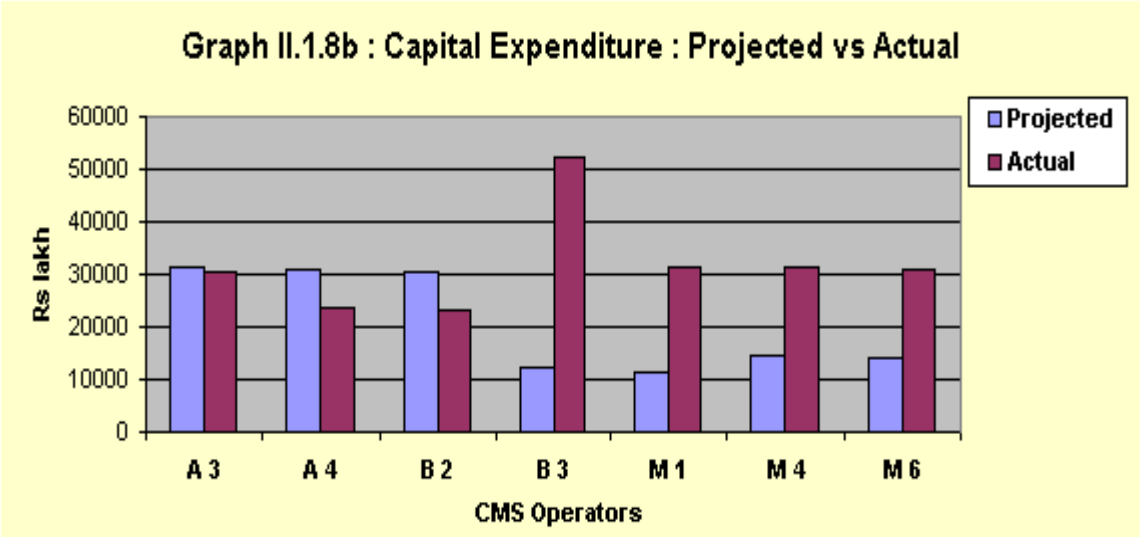
2. The capital expenditure projected initially and the actual capital expenditure of select operators whose data is available is indicated in Table II.1.13 and Graph II.1.2.

Table II.1.13: Capital Expenditure - Projected vs Actual (upto FY1998-99)
Select cases **(In Rs. crore)**

Service Providers	Projected Amount	Actual Amount
A 3	315.00	302.96
A 4	308.04	238.42
B 2	303.87	233.01
B 3	124.34	520.50
M 1	115.24	432.80
M 4	144.85	311.93
M 6	142.17	307.97

Source: DPR & financial data from the operators.

Graph II.1.2: Capital Expenditure-Projected Vs Actual



1. ***Subscriber base***

- The CMS subscriber base built up to 1998-99 is close to 11.36 lakh subscribers, out of which 516,888 are in the Circles, and the rest in Metros. The summary of details for 1998-99 is provided in Table II.1.14.

Table II.1.14: Average Number of Subscribers (FY1998-99

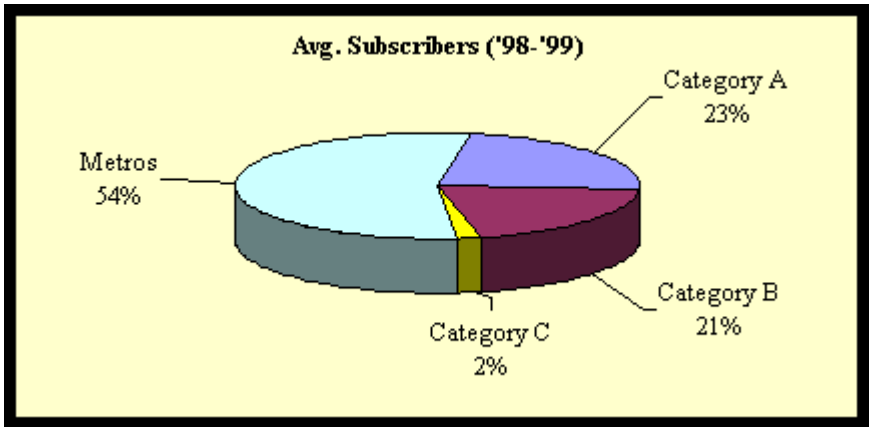
Category	Avg. Subscribers	%

Category A	260,409	45.9%
Category B	234,797	
Category C	21,682	
Metros	615,245	54.1%
Grand Total	**1,136,679**	**100%**

(Source : COAI and Operator Data)

- The distribution across different categories of Circles (A, B, C) and Metros is shown in the Graph II.1.3.

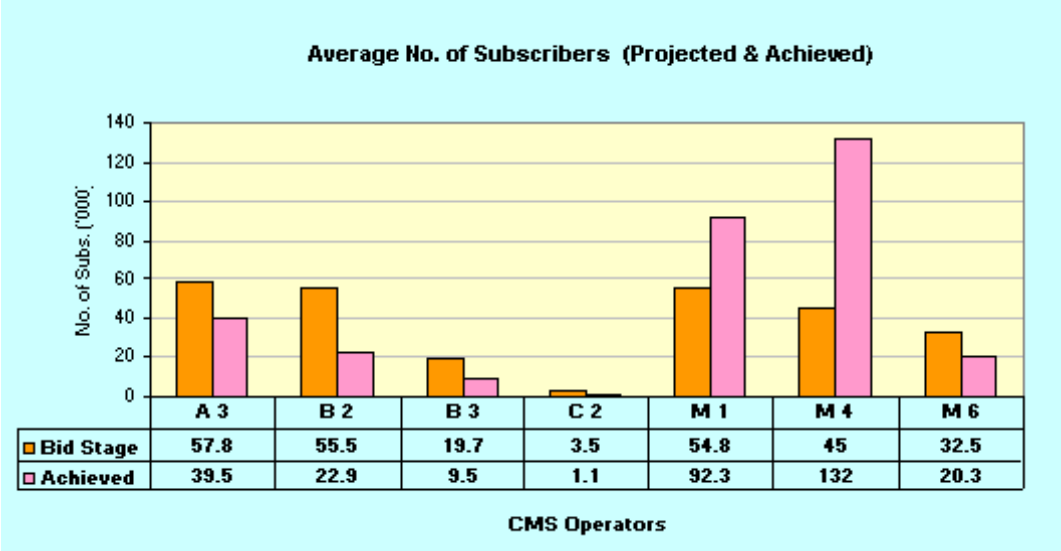
Graph II.1.3: Distribution of Subscribers (FY 1998-99)



(Source : COAI and Operators Data)

- Growth in subscriber base has not followed the pattern projected initially by the CMSPs. The following Graph II.1.4 is illustrative.

Graph II.1.4: Subscriber Base : Actual vs. Projected (Select Cases)



(Source : Operator Data)

- The actual subscriber base achieved by **Circle CMSPs** has turned out to be lower than the base projected by the CMS operators in their respective bids, as indicated in Graph II.1.4. As cellular operations in the Circles are being attempted for the first time, with little experience of Indian conditions to estimate the demand, some degree of over-estimation may have occurred. Also, the growth of economy had slackened after the original projections were made. This is also likely to have depressed the demand. The case is however different in the case of **Metro CMSPs** where some operators have been able to achieve a subscriber base higher than projected, particularly in Mumbai and Delhi, while others have not been able to meet projections.

1. ***Usage Patterns***

- Usage in terms of minutes per subscriber per month has averaged at approximately **146 minutes** for **Circle CMSPs**. Category-wise information is given in Table II.1.15. While the average number of subscribers in Category A circles is more than that of Category B circles, the minutes of usage is higher in some of the Category B circles.

Table II.1. 15: Minutes of Usage (FY 1998-99) (in mn minutes p.a.)

Category	Mobile to PSTN	PSTN to Mobile	Mobile to Mobile	Total
Category A	75.28	104.82	26.67	**206.77**
%	*36.4%*	*50.7%*	*12.9%*	***100%***

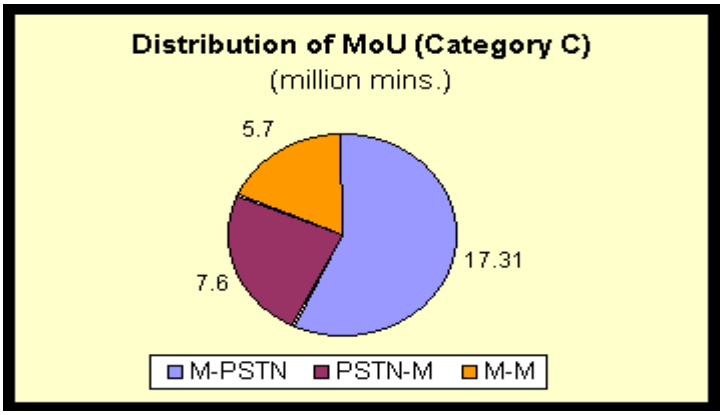
Category B	209.3	145.55	51.18	**406.03**
%	*51.5%*	*35.9%*	*12.6%*	***100%***
Category C	17.31	7.6	5.7	**30.61**
%	*56.6%*	*24.8%*	*18.6%*	***100%***

(Source: Operator data)

- The distribution of minutes of use between Mobile to Mobile, Mobile to PSTN, and PSTN to Mobile is shown in Graph II.1.5 below.

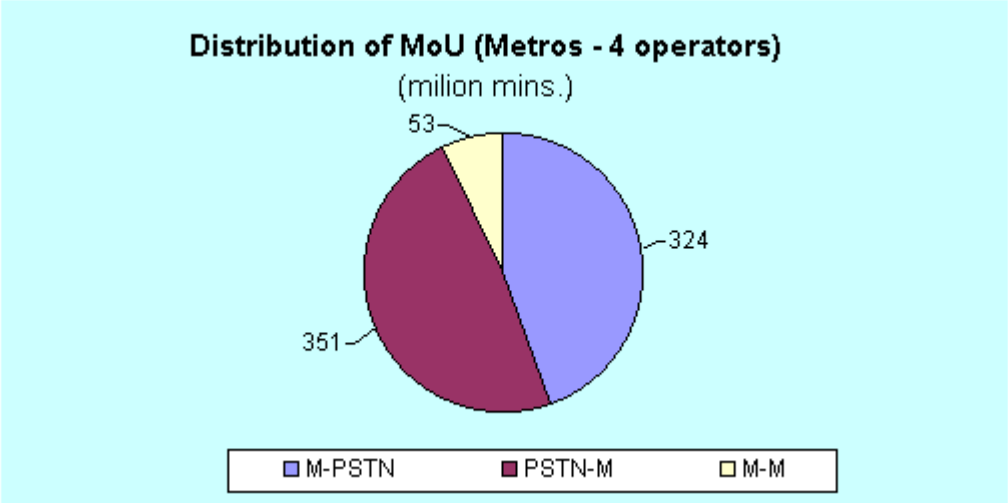
Graph II.1.5: Distribution of Minutes of Usage for Circles (FY 98-99)

(For access to graphical representation please click here)



- There appears to be a pattern whereby PSTN-Mobile calls constitute a larger segment of calls in 'A' category circles as compared to 'B' category circles and are the smallest for 'C' category circles.
- As far as Metros are concerned, the usage patterns have shown the trend exhibited in Graph II.1.6.

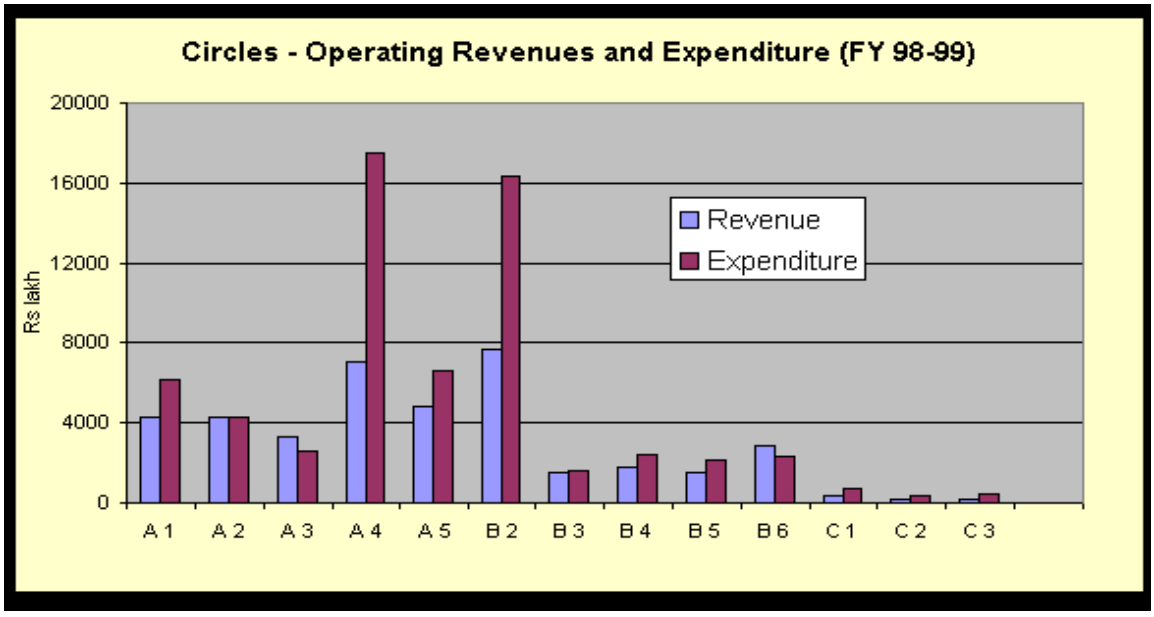
Graph II.1.6: Distribution of Minutes of Usage for Metros (FY 98-99)



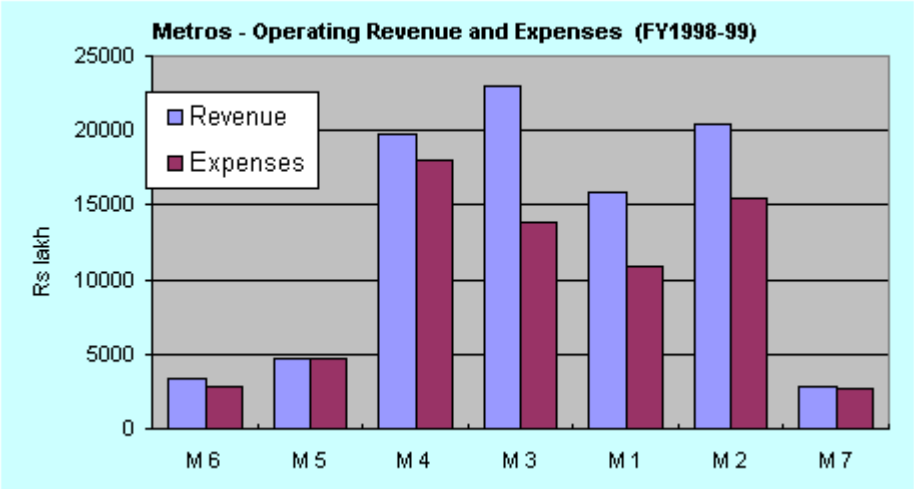
1. ***Financial Status of Operators***

1. The **operating revenues and expenditure** for the year 1998-99, based on actual data/estimates of Circles and Metros, are shown below as Graph II.1.7 and II.1.8 respectively.

Graph II.1.7: Circles - Operating Revenues & Expenditure (FY 1998-99)

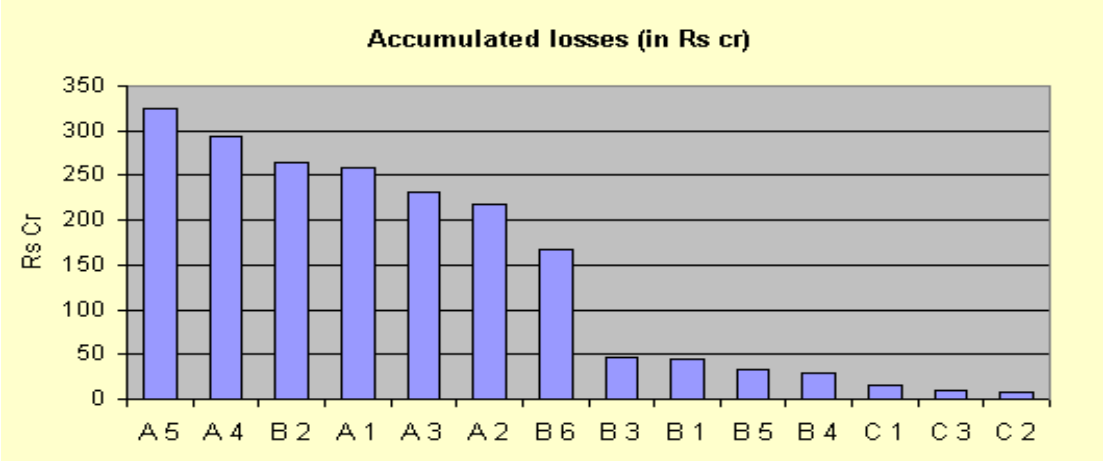


Graph II.1.8: Metros-Operating Revenues and Expenditure (FY 1998-99)



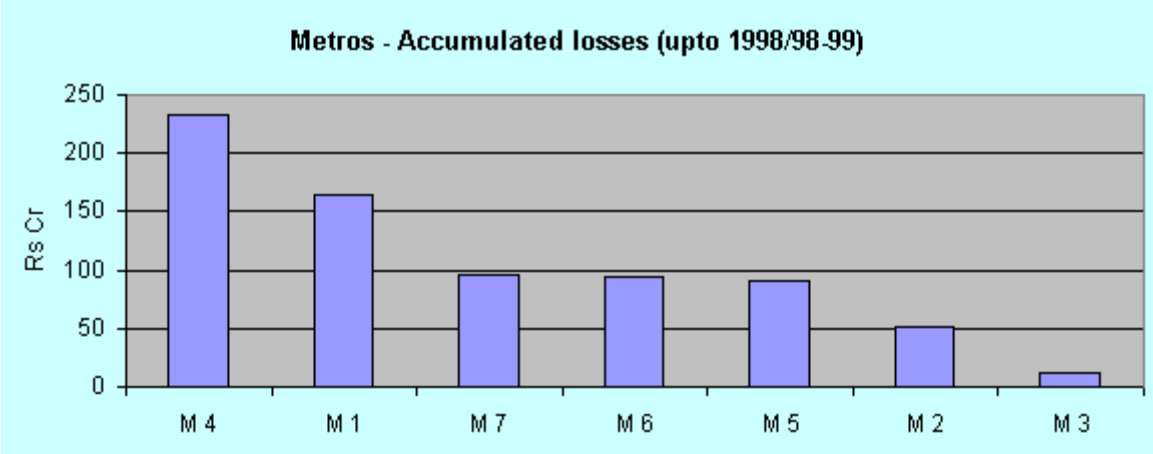
2. The **accumulated losses** of the Circle CMSPs, as shown in Graph II.1.9 below, indicate that all the operators have losses since commencement of operations.

Graph II.1.9: Circles - Accumulated Losses (FY 1996-99)



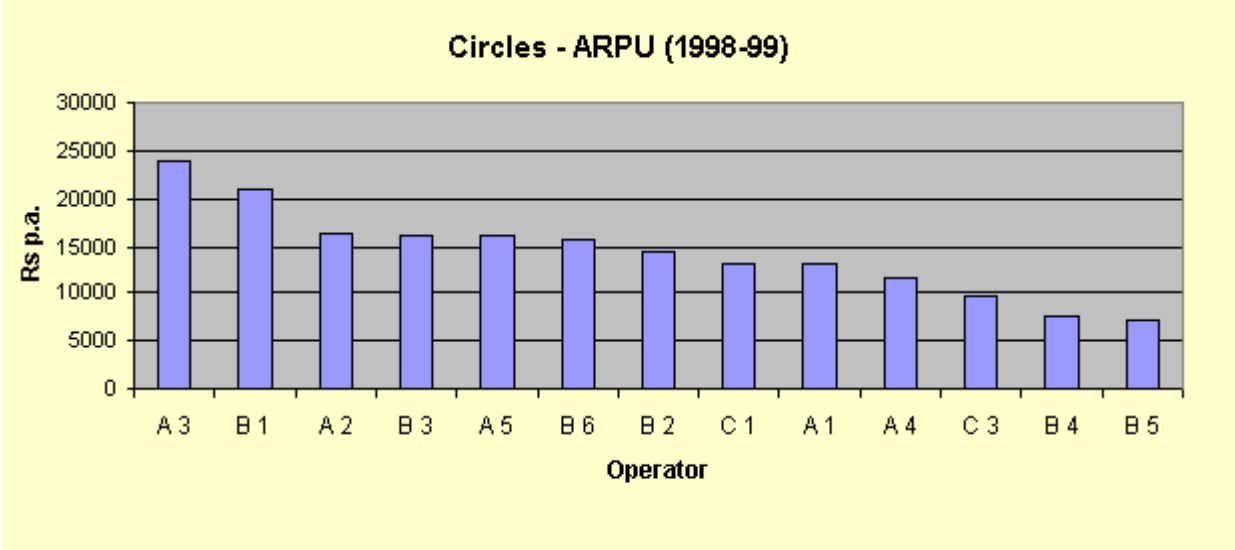
3. The accumulated losses of the Metro operators are indicated in Graph II.1.10.

Graph II.1.10: Metros - Accumulated losses

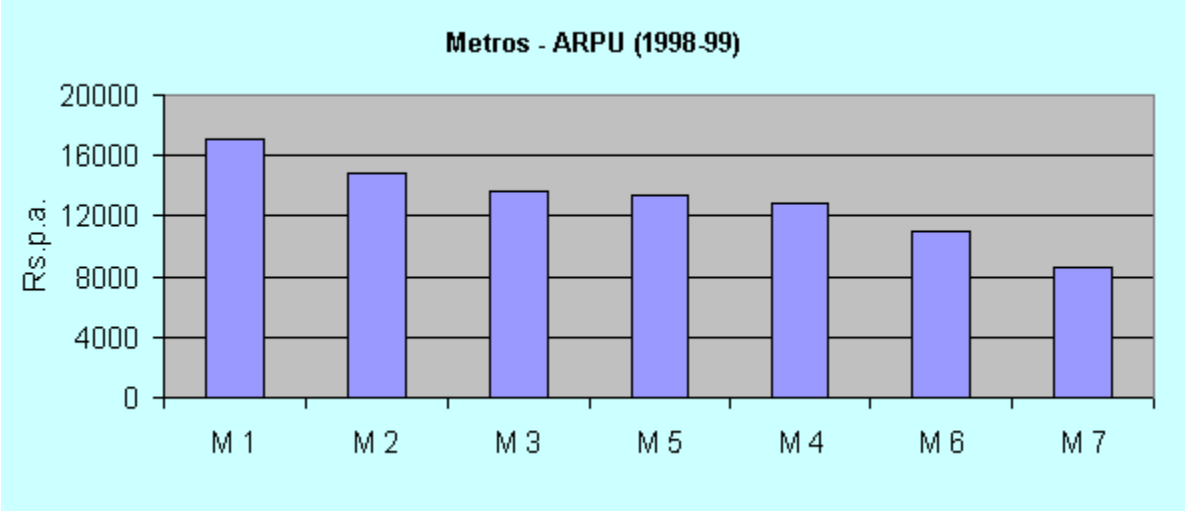


4. It is seen that Metro CMSPs accumulated losses are generally less than those of Circle CMSPs. Three factors can be relevant in this regard. Metro projects started earlier and have therefore progressed further in the initial gestation period. Growth of subscribers has been better in Metros and the investment required for spread of infrastructure is likely to be higher in Circles due to geographical spread. The license fee for Metros was also less as compared to circles.
5. **The Average Revenue Per User (ARPU)** achieved by various operators is indicated in Graph II.1.11 and Graph II.1.12 for Circle and Metro CMSPs respectively. The trend of year-wise ARPU shows growth in 1997-98 over 1996-97 for most operators, though only few operators have maintained growth of ARPUs in 1998-99 over the previous year.

Graph II.1.11: Circles - Average Revenue per User (1998-99)



Graph II.1.12: Metros – Average Revenue per User (1998-99)



1. ***Default in License Fee Payment***

1. License fee payments are currently in arrears for many Circles and Metros. The payment status is indicated in Appendix II.1C.
2. The revenue for the year 1998-99 and the license fee payable till this year highlights the difference between the two. (Table II.1.16).

Table II.1.16: Revenue and Payable License Fee (in Rs. Crore)

Circle	License Fee Payable till 31.7.99	Revenue ('98-'99) (excl. Passthru)
Category A		
A P	341.25	38.37
Gujarat	611.63	36.68
Gujarat	611.63	34.44
Karnataka	443.23	64.43
Maharashtra	569.13	46.88
Category B		
Haryana	91.79	5.00
M.P	17.78	20.68

Punjab	402.81	80.23
Rajasthan	130.23	
Rajasthan	121.54	13.49
U.P (E)	189.78	16.53
U.P.(W)	138.47	13.22
Category C		
Bihar	81.92	4.03
Himachal Pradesh	5.10	1.87
Metros		
Chennai	18.53	24.4
Chennai	17.05	37.3
Mumbai	84.33	154.9*(1999)*
Mumbai	91.54	186.6
Delhi	65.48	135.5
Delhi	82.29	173.6
Calcutta	21.53	23
Calcutta	27.62	NA

(Source : Operator data and Ministry of Communications)

1. ***Status on Financial Closure***

1. Only 6 or 7 Circles CMS Projects are reported to have achieved financial closure. In the case of Metros, two operators have reported financial closure while two others have indicated that it has been achieved for initial network rollout but not for capacity expansion.
2. Reasons for delay in financial closure have been examined and discussed with financial institutions, operators and other industry experts. Financial institutions/banks and other lenders are very sensitive to the viability/bankability of the project. While in the case of infrastructure projects lenders do expect

payback period to be spread over a number of years, heavy liabilities in the initial years tend to discourage them. The major hurdles in financial closure are:

- Projects' **viability** in question
- **Initial losses.** It is understood that most FIs now look for projects which among other desirable parameters, have promoters with adequate capacity to bear initial losses.
- **Accumulated losses** continue till 7-8 years for some projects and the projects continue to demand inflow of funds for some years.
- **Project period at 10 years considered too short** to ensure full repayment of debt (Ideally bankers prefer to recover the debt at least one year prior to end of project life). Now that license period stands extended **the bankability of the projects would be ascertained by FIs/banks after taking the revised terms of license fee in the remaining period into account**.
- **Uncertainties regarding some of the other relevant factors like** entry of other operators, tariffs, broad banding of licenses, impact of technology changes, opening of long distance etc. A greater clarity regarding these enables financing institutions/banks to take a long-term view of the projects. After declaration of NTP 99 some of these factors have been clarified.
- **Tripartite Agreement** between lender, licensee and licensor is not yet implemented for most projects.
- **Approvals** from SIA were reported pending in some cases.

1. **Reasons for Lower Achievements of Circle CMSPs as compared to Original projections**

1. From the current status outlined above, it is clear that the circle CMS projects are facing difficulties resulting in poor financial performance which is lower than anticipated. This may be due to following factors:

- Optimistic projections for demand in terms of number of subscribers and minutes of use, which could not be realized. Against an international benchmark of about 200 minutes of use per month, the projected minutes were, in some cases, as high as 375. The average achieved in most Circle CMTS projects in India is less than 200 minutes.
- The revenue per month per subscriber was projected at rates almost twice as much as is being realized now. While the international benchmarks are higher (the minimum ARPU internationally is Rs.1400 p.m. as compared to the maximum Rs.1200 p.m. being realized now and Rs.4000 p.m. which was projected), the per capita GDP in the addressable segments would not support such ARPUs as was projected. Consequently, the revenues realized are much less than projected. The ARPU projected and achieved is given below.

Table II.1.17: ARPU per month (Rs.)

International ARPU bench marks (Rs. p.m.)	Projected ARPU (Rs. p.m.)	Achieved ARPU (Rs. p.m.)
1400 to 6500	1000 to 4000	400 to 1200

- Excess buildup of network in many cases.
- Procurement costs, in many cases, were higher than anticipated. This was partly due to procurement practices followed in some cases. In some cases, similar equipment (including MSCs) was procured at different rates by different operators. **In many cases turnkey projects were awarded which are usually 10-15 % costlier.**
- Slow down in economic growth has not allowed demand to grow as anticipated.

- Cost overruns have occurred due to time taken for various clearances, some of them being related to -

    - SACFA clearances
    - Limited availability of spectrum
    - Road cutting, permission to erect towers
    - Allocation of points of interconnect and other interconnection resources
    - Commercial start up of service

  These have now been addressed by shifting effective date by six months.

- High incidence of interconnection charges/port charges and leased line charges. This has been addressed in TRAI's tariff revisions, implemented this year.
- Enhancement in cost of funds after sanctions imposed on India.
- Downgrading of credit rating by international agencies after Asian economic crisis. This depressed investor confidence and enhanced risk perception. This problem was accentuated due to sanctions imposed on our country after the nuclear test at Pokharan.

- Depreciation of rupee w.r.t. US$ has affected project and handset costs as much of the equipment is imported.

1. **Metro CMSPs achievements against projections**

1. Some Metro CMSPs have encountered a market much more favorable than had been projected initially by them. The growth rate of subscriber base especially in Delhi and Mumbai was higher than expected, while this was not the case with the other two Metros. The capital expenditure required was also higher in most cases than projected initially. This may have been due to higher rollout required to meet subscriber growth and also due to under-estimation initially. Operating revenues achieved by 1998-99 have been at least equal to the operating expenses, and in

most cases, higher than the expenses. Accumulated losses have shown a widely varying trend even for the CMSPs within the same city.

1. **Overall Assessment based on Current Status**

1. The picture that emerges indicates the following **trends** for the Circle CMS projects:

- **Heavy capital expenditure** has been incurred by CMSPs. In some projects, there appears to be over provision of capacity in the MSC. The backbone laid so far is currently underutilized.
- **Subscriber base is lower** than the initial estimations. However, the subscriber base is growing. The average growth recorded till now is 320% p.a. This is however on a limited base.
- **Revenue growth has been lower than expected**. The ARPUs range around Rs.1100/-, Rs.800/-, and Rs.600/- p.m. for A, B and C category circles. Metro ARPUs are much higher.
- **Operational expenditures** excluding WPC charges constitute 75% of revenues on an average. Most operators are making efforts to control operational expenses.
- **Fixed license fee has been a heavy burden** on the Circle projects. A significant quantum of the finances raised so far has been utilized to fund the license fees.
- **Time taken for clearances** and availability of interconnections, have contributed to cost and time overruns.
- The projects are currently incurring losses and payback is expected to start for some Circles in 7^{th} and 8^{th} year. However, network rollout is continuing apace, including **investment** in backbone infrastructure for projects in hand. This trends may show some changes after reduction in tariffs for leased lines and sharing of infrastructure among service providers.

- Financial closure has been achieved only for few Circle projects. Financiers are held back by considerations of **low returns and long payback period**. Return from projects were limited in a 10-year license tenor but this has been sought to be addressed by extending the license period initially by 5 years, to 15 years, and later to 20 years. The percentage of revenue share as license fee for the extended period is likely to have a critical bearing on project viability and achievement of financial closures.
- As far as **Metros** are concerned, growth has been weaker in Calcutta and Chennai as compared to Mumbai and Delhi. However due to initial grace period of one year and low license fee in the first three years, Metros have faced comparatively fewer problems. While revenues over the first three years have recorded CAGR of about 852% per annum in Mumbai and Delhi and 582% per annum in Chennai, financial closure is yet to take place for four out of eight Metro operators as reported. It is expected that project viability will improve with extension of license period and enable greater flexibility in investment decisions as also better terms to customers.

1. CMSPs have also provided inputs on certain aspects relating to operations and viability of the projects. These are summarised as **Annexure I** titled "**Points Made by Operators**" at the end of this paper.

1. **Need for study of CMSP Viability**

1. The above presentation brings out the fact that due to much lower achievements and problems being faced, the circle CMS projects' viability has not reached the levels anticipated. Financial closure has not taken place in many cases and the operators have sought relief from the Govt. of India, citing various problems currently afflicting their projects and the concessions required . The Govt. of India decided in Oct. 1998 to extend the license period for Circle CMS projects from 10 years to 15 year and made a reference to TRAI to recommend the license fee quantum and structure in the extended 5 year period. Thereafter, the New Telecom Policy 1999 was declared in March 1999 and this provided for a revenue sharing regime for license fee, in addition to entry fee for new entrants. The license period was also enhanced to 20 years. In April'99, the second reference for TRAI's recommendation on above terms were sought. This was followed in July'99 by third reference regarding migration of existing circle and metro operators to the revenue sharing regime envisioned in NTP-99. The viability analysis in this consultation paper undertakes to examine the Circle and Metro CMS projects and arrive at possible options that would be subjected to due consultation process before being recommendations are formulated.

1. **International Experience**

1. Information gathered from service providers on the different license fee regimes followed in different countries indicates expected divergence in practice. The following Table II.1.18 indicates sample data:

Table II.1.18: License Fee Regime : International data

Country	License tenure, fee and terms	Remarks	Cellular penetration (1996)*	
			Per 100 pop	% of total
UK	25 years, Entry fee + % of T/O, slightly different based on time of entry	Low, probably covering admin cost of license	12.23	18.8

Philippines	Indefinite, No license fee	Service Provider obliged to provide a certain number of fixed lines	1.33	34.9
South Africa	15 years, Entry fee (USD 20 mil.) + 5% of net revenue	Net revenue definition not known	2.25	18.3
Thailand	20 years, Share of net revenue rising from 15% in the initial 5 years to 33% in final 5 years	Stated to be under review	1.54	18.0
Italy	Tenure not known, 3.5% of gross profit		11.19	20.3
Nigeria	Tenure not known, Initial fee (USD 0.4 mil) + 2.5% of gross revenue	Gross revenue definition not known	0.01	3.1
Bangladesh	20 years for 1st operator, 15 for others, 1 crore taka p.a. (0.85 crore INR approx.)		NA	0.9
Spain	Tenure not known, 1% of turnover		3.33	7.8
Singapore	Tenure not known, 6-12% of turnover		14.12	21.6
Sri Lanka	20 years, Entry fee (1.2% of investment) + 0.36% of gross revenue		0.39	21.8

** Source : World Telecom Development Report, 1998, ITU*

2. In many countries like Italy, Austria, Korea, Germany and Brazil, the license fees have been levied at significant levels, running into millions of dollars. In many cases, frequency charges are fixed separately based on auctions. It is understood that in the USA, these amount to huge sums.
3. The differences across countries and regions indicate that there is no single ideal method that could be adopted, and the final decision is dependent to a large extent on local conditions and policy perceptions. A comparison with the levels of cellular penetration achieved in the countries indicated above is also instructive.

1. **Analysis**

- The analysis methodology, demand estimation, results of detailed viability analysis and sensitivity analysis have been detailed in Part II Chapter 2 of this consultation paper

Appendix II.1A : Coverage and Backbone

										No. of			
	Avg. subs	ARPU	Gr. Fixed Assets	9/1a	10/1a	11a/1a	11b/1a	No. of cities	Cell sites	MSCs	BSCs	BTSs	Network Ca
	(No.)	(Rs. p.a.)	(Rs. In lakhs)	(lakhs)	(lakhs)	(lakhs)	(lakhs)						Installed
As on :	31.3.98	31.3.98	31.3.98	31.12.98	31.12.98	31.12.98	31.12.98	31.12.98	1.12.98	31.12.98	31.12.98	31.12.98	31.12.98
A1	14252	12925	18696	500	2078	1370	440	7	57	2	2	57	135000
A2	32561	14487	101940	7904	39605	16168	11460	10	78	2	2	78	159900
A3	8347	32749	22438	471	11158	1072	2925	13	56	2	3	56	50000
A4	28100	13900	24157	2480	350	17600	580	9	72	1	8	72	50000
A5	50071	17047						16	129	2	2	129	215250
A6	13787					11300	**	9	79	1	8	79	82083
A7	25017					5500	**	15	55	1	6	55	125385
B1	3383	24117	7193	3640	510	1156	462	1	70	2	2	70	17000
B2	22900	17148	20669	1375	2910	16419	**	6	64	1	6	64	63000
B3	2797	28052	4981	534	340	4054	**	7	77	1	1	32	12000
B4	7500	8583	9862	3466	7828	1298	1032	16	108	1	6	40	90385
B5	5700	7215	10786	3397	5484	1417	1275	29	137	1	4	54	78108
B6	1163		55750			18810	**	4	14	1	1	14	na
B7	2250							4	25	1	7	25	na
B8	4693							4	34	1	0	34	na
B9	13748	6975	44080					12	72	2 rsm	3	25	30000
B10						4200	**	20	47	1	5	47	48834
B11	18108	7884						29	161	2	5	54	60000
B12	25206	7119						22	170	2 rsm	6	59	60000
C1	600	13267 (98-99)	4187	3280	4845	667	900	9	41	1	2	18	59887
C2	1493	8679	401958			3300	8400	9	9	1	1	9	10000
C3	2	9564 (98-99)	2855	1377	2655	245	171	5	30	1	1	11	26397

**11a includes 11b										
Data for GFA/capital expenditure by A2 includes 2 circles										
Data for GFA/capital expenditure by B6 includes 3 circles										
Data for GFA/capital expenditure by B8 includes 3 circles										
9/1A Investment in equipments procured indigenously										
10/1AInvestment in equipments for network										
11a/1AInvestment in Access Network										
11b/1AInvestment in Backbone										

Appendix II.1B : Pattern of Investments made upto February '98

Service providers	*Equity*	*Debt*	*Total*	*D/E ratio*
METROS				
M1	150.00	166.40	316.40	1.11
M2	105.00	169.12	274.12	1.60
M3	78.60	308.09	386.69	3.90
M4	215.25	268.82	484.34	1.25

M5	57.32	54.82	112.14	0.96
M6	62.13	85.64	147.77	1.40
M7	53.60	75.11	128.71	1.39
M8	132.05	26.17	158.22	0.20
Total (A)	***853.95***	***1154.17***	***2008.66***	

Service providers	***Equity***	***Debt***	***Total***	***D/E ratio***
CIRCLES				
A1	242.53	216.30	458.83	0.89
A2	534.30	663.53	1197.83	1.24
A3	350.00	42.41	392.41	0.12
A6	570.26	510.60	1080.86	0.90
B1	46.28	38.50	84.78	0.85
B2	367.42	448.07	815.49	1.20
B3	101.03	18.98	120.01	0.19
B4	107.00	318.15	425.15	3.00
B6	0.10	279.00	279.10	--

B7	336.05	100.02	436.07	0.30
B8	354.80	143.30	498.86	0.40
C2	16.50	--	16.50	--
C4	--	--	--	--
Total (B)	***3076.27***	***2778.86***	***5855.13***	
Grand Total (A+B)	***3930.22***	***3933.03***	***7863.79***	

Note : Funding mentioned above includes funding for more than one circles in some cases.

Source : COAI

Appendix II.1C : Default in Licence Fee payments(As on 31.7.1999)

Category	Licence Fee due	Licence Fee paid up to 30.6.999 23.2.99	Arrears	% of Arrears
A1	*341.25*	*224.70*	*116.55*	*34.15*
A2	*611.63*	*402.86*	*208.77*	*34.13*
A3	*611.63*	*448.59*	*163.04*	*26.65*

A4	*443.23*	*290.90*	*162.33*	*36.62*
A5	*565.13*	*372.23*	*192.90*	*34.13*
A6	*565.13*	*407.70*	*158.06*	*27.97*
A7	*285.00*	*205.33*	*79.67*	*27.95*
A8	*76.00*	*76.00*	*0.00*	*0.00*
A9	*443.22*	*284.94*	*158.28*	*35.71*
A10	*341.25*	*227.50*	*113.75*	*33.33*
B1	*17.38*	*12.35*	*5.03*	*28.94*
B2	*402.81*	*255.30*	*147.51*	*36.62*
B3	*121.54*	*63.87*	*57.67*	*47.45*
B4	*189.78*	*22.38*	*167.40*	*88.21*
B5	*138.47*	*39.22*	*99.25*	*23.87*
B6	*81.79*	*40.17*	*41.62*	*50.89*
B7	*130.23*	*54.59*	*75.64*	*58.08*
B8	*189.81*	*38.91*	*150.90*	*79.50*
B9	*81.81*	*62.28*	*19.53*	*23.87*
B10	*176.25*	*127.10*	*49.15*	*27.89*
B11	*176.25*	*134.18*	*42.07*	*23.87*
B12	*138.48*	*105.42*	*33.06*	*3.87*
B13	*431.58*	*120.09*	*311.49*	*72.17*
B14	*14.63*	*10.38*	*4.25*	*29.05*
B15	*17.38*	*12.34*	*5.04*	*29.00*

C1	*81.92*	*14.50*	*67.42*	*82.30*
C2	*5.10*	*5.10*	*0.00*	*0.00*
C3	*80.29*	*9.47*	*70.82*	*88.21*
C4	*0.45*	*0.32*	*0.13*	*28.89*
C5	*122.86*	*63.39*	*59.47*	*48.40*
C6	*5.10*	*3.62*	*1.48*	*29.02*
C7	*1.28*	*1.25*	*0.03*	*2.34*
C8	*1.28*	*1.21*	*0.07*	*5.79*
C9	*80.29*	*41.42*	*38.87*	*48.41*
M1	*66.21*	*32.89*	*33.32*	*50.33*
M2	*82.29*	*38.00*	*44.29*	*53.82*
M3	*91.54*	*40.20*	*51.34*	*56.09*
M4	*84.33*	*46.89*	*37.44*	*44.40*
M5	*17.05*	*9.62*	*7.43*	*43.58*
M6	*18.53*	*9.77*	*8.76*	*47.28*
M7	*21.51*	*17.57*	*3.94*	*18.32*
M8	*27.62*	*13.18*	*14.44*	*52.28*

(Source : Ministry of Communications)

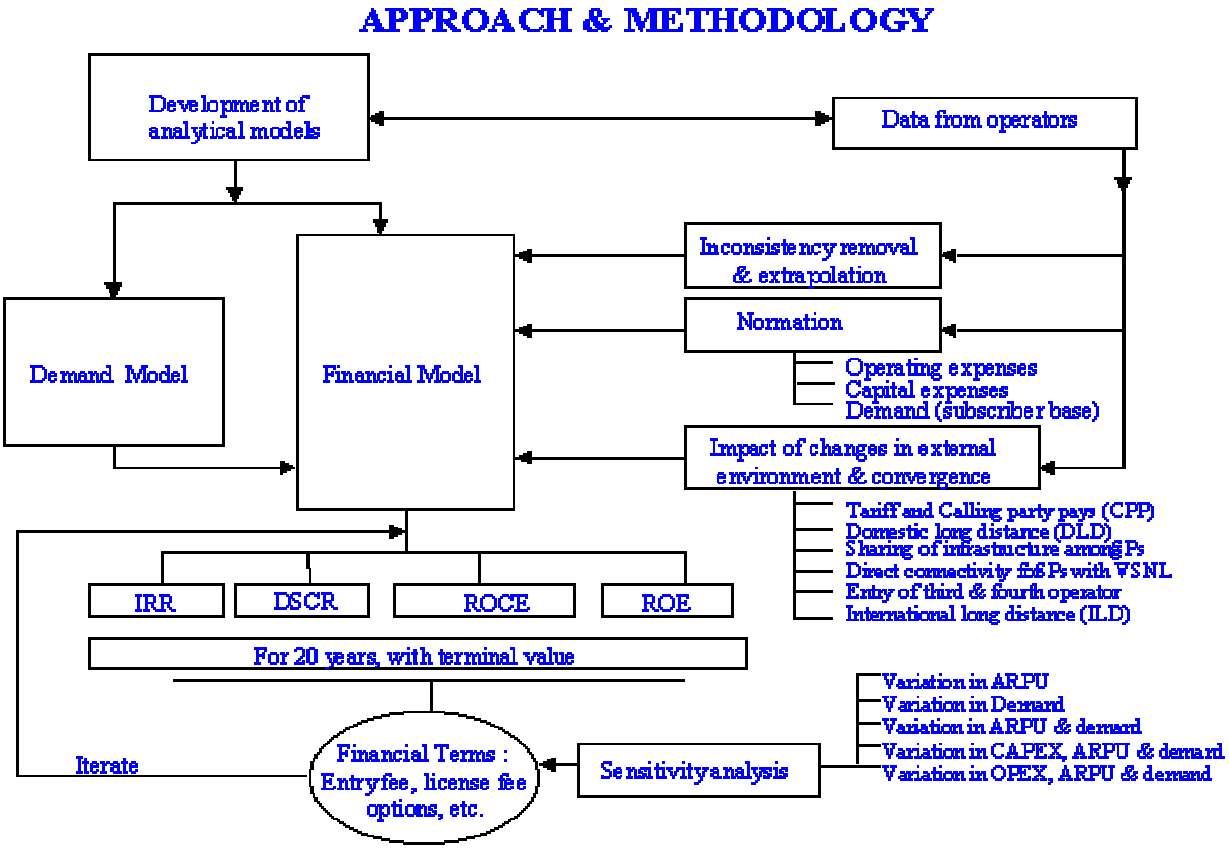
PART II

CHAPTER 2

APPROACH AND METHODOLOGY

1. Introduction

1. The study started with the aim of analyzing the viability of cellular projects in the circles to assess the quantum and structure of license fee for the extended license period of five years from 10 to 15 years. After declaration of the New Telecom Policy on March 31st 1999, a further reference was received from the Ministry of Communications requesting for recommendations on fresh licenses. This had a bearing on the study methodology. With the announcement of the Government's decision to offer the migration package for migration of existing CMSPs to the new regime with a 20 year license tenor and revenue sharing arrangement for license fee, the approach and methodology underwent some further modifications.
2. The approach and methodology adopted for arriving at the revenue share as license fee is presented in the schematic below.



3. As the study relates to CMS projects in India, it is essentially based on information and future projections provided by the operators who have set up

CMS projects in India. While data for initial years is based on audited accounts, future projections obviously cannot be subject to that treatment. Based on inputs from equipment vendors, bankers, industry experts, identification of inconsistencies and best practices observed across operators, it was necessary to moderate future projections. Based on inputs from equipment vendors, bankers and industry experts, identification of inconsistencies and best practices observed across operators – it was considered necessary to normate projections. Future projections have been normated as explained in section II.2.3. At the stage when the questionnaire was circulated to the service providers, projections were sought for a project period of 15 years. Subsequently, the changes that occurred in the New Telecom Policy 1999 and its implementation resulted in changes in the analytical framework by adjusting the projections for a project period of 20 years and incorporating other aspects.

4. Market and demand being critical to the viability of the cellular operators, an independent demand estimation model and a financial model were generated. The demand model has been used only as a floor level and operators assessment of demand, if higher, was retained. The demand model and financial model have been detailed in Appendix II.2A & II.2B respectively.

1. **Analysis based on 20-year period**

1. The study aims at assessing the impact of various license fee options on the viability of CMSPs. It was therefore considered appropriate to base the analysis on the entire 20-year period as project viability is not dependent only on the short term and an analysis based on a 3-5 year period would not provide a complete picture of the viability of the projects. This is especially relevant in view of costs being much higher in the initial years of the project without commensurate revenue streams. It is only in later years that revenue streams mature and the projects start generating returns. Also a long term analysis of the project is important for assessing the bankability of these projects, as one of the guiding factors for extending the tenor of the licenses has been to increase the period available for debt servicing. It is however recognised that 20 years is a long period and the trends forecast at this stage may undergo many changes. Also many new events may occur in this duration. This position prevails for most long term projects and analysis is still resorted to, especially for investment and financial decisions. Hence as far as possible, a comprehensive approach has been adopted to analyse the future projections provided by operators.
2. The data provided by operators for a 15 year license period was extrapolated for arriving at 20-year projections as extension of the license period may very likely extend the trends applicable for the data already provided for 11^{th} to 15^{th} years. No significant changes in data forecasted for initial years is expected because of extension of the license tenor. The changes currently on the anvil, including opening up of Domestic Long Distance (DLD) and International Long Distance (ILD), sharing of infrastructure, Calling Party Pays (CPP) regime etc. are built into the financial model.

3. Since it is recognized that projections for such long periods may not reflect the future accurately, an extensive sensitivity analysis has been built into the analysis. This covers variations in key parameters including changes like reductions in CAPEX accompanied by corresponding reduction in tariffs and ARPUs etc. This is expected to provide additional insights and place the result in perspective.

1. **Quantitative Framework**

1. The quantitative framework deployed for the viability analysis is based on the Discounted Cash Flow (DCF) technique. The model calculates the free cash flows, Internal Rate of Return (IRR), Return on Equity (ROE) and other ratios (Refer section II.2B.12 of Appendix II.2B for definition of terms and ratios) for 20 year license period assuming various license fee options for the period from the date of migration (i.e. August 1, 1999). The analysis examines the impact of the changes in external environment e.g. convergence, tariff changes, opening up of DLD, entry of multiple operators, opening up of ILD etc. The comparison between the license fee options is examined for sensitivity of project performance to variations in key parameters. This would enable selection of suitable option of revenue share as the license fee. The process is explained below:

i. Data Treatment and Extrapolation : The operator data was examined and inconsistencies, missing parameters and other anomalies were eliminated on the basis of interaction with the operators and/or reasonable assumptions. In this process, due to the broadbasing of the study period from the initial 15 years to 20 years, operator data was extrapolated for the last 5 years. The demand estimates for years 16 to 20 were extrapolated on the basis of CAGR for demand as projected by the operator for years 11 to 15. Reality check was introduced to ensure that the demand projections are in line with the teledensity objectives for Direct Exchange Lines (DELs) spelt out in NTP ’99 and projections as per Telecom Perspective Plan. Projections for incremental capital expenditure (capex) per additional subscriber, operational expenditure (Opex) per subscriber and other expenses like WPC charges per subscriber have been assumed at a constant equal to that projected for the 15^{th} year. Projections over such long periods need to be revisited periodically to adjust for changes during such a time span. However in DCF analysis, the weightage of later periods is comparatively less significant than the earlier years of analysis and since the changes in the earlier years can be foreseen more readily, the results are likely to be reasonably close to trends.

The revenue projections of operators for the first 15 years of the study period were retained, as it was expected that the revenue generating potential of each circle in a growing business may be different even for two operators in the same circle. For the last five years of the 20 year period, constant ARPUs as projected for year 15 were assumed, as ARPUs may be expected to plateau with maturing of the project when demand and supply stabilize.

ii. Data Normation : The operator data exhibits large operator-to-operator variations in certain parameters for data pertaining to operations in the previous years (for which audited results were made available) as well as for future projections. The various expenses for the previous years have already been booked to the projects and therefore audited data for previous years was not normated. However, future projections were normated to moderate major variances in CAPEX, OPEX and demand. For the purpose of normation of future projections, it was necessary to distinguish between different categories of circles as well as Metros since conditions governing rollout, service provision etc. are different. Hence norms for each category were derived from data relating to that category. Future projections are based on norms deployed by averaging across data from different operators. As far as OPEX is concerned, normation involved category-wise averaging of OPEX per subscriber and further adjusting these averages for industry practice in terms of OPEX as a percentage of net revenues. Normation of demand, involving estimation of floor levels, aims at ensuring that the demand projections of operators are not below a reasonable floor level. The estimation of floor levels is based on surrogate analysis and results have been compared with operators' estimates. In the cases where the operators' projections are lower than the estimated floor levels, the floor levels have been used for analysis. I most cases operators' demand projections were better.

Some of the variables like ARPUs assessed by CMSPs for their service areas were not normated on the assumption that each service area has its own propensity to generate revenue and in this respect it is not necessary to normate this variable. Also since convergence, voice and data particularly, is expected to enhance revenue-earning potential of projects, it was considered advisable to let the ARPUs reflect this at varying rates for different projects as assessed by operators.

The normated data was analyzed to assess the cash flows that the business can generate over 20 years of the project life assuming various license fee options. The cash flows so generated were used to calculate the Internal Rate of Return (IRR), Return on Equity (RoE) and other relevant ratios.

iii. Changes in External Environment : The cash flows were then adjusted for changes in the external environment which are as follows :

- Changes in tariff and introduction of Calling Party Pays (CPP)
- Opening up of Domestic Long Distance (DLD)
- Sharing of Infrastructure among Service Providers (SPs) in the same service area
- Entry of other operators
- Opening up of International Long Distance (ILD) and direct connectivity with VSNL

As changes mentioned above are expected to occur during the project life, the cash flows adjusted for the impact of these changes have been utilized for assessing the impact of license fee outflow under various license fee options.

It was noted that **convergence** related issues are relevant and multimedia applications are expected to contribute significantly to the traffic (especially data traffic) and revenues. The impact is expected to be positive, though difficult to assess in financial terms at this stage. Also, the period in which this impact may become more significant cannot be readily assessed. As already mentioned above, ARPUs are expected to exhibit some of the impact of convergence over the life of the projects. However, it was felt that the valuation of business is likely to improve with the impact of convergence and hence the license fee options that are worked out without segregating the financial impact of convergence will also be valid.

Entry of other operators has been mentioned in NTP '99 and the Government's decision to offer migration under the new policy regime of multipoly and revenue sharing. For the purpose of analysis, in addition to DoT/MTNL, one more new operator has been assumed. It has also been assumed that the service providers included in the study would all migrate to the new regime. Specifically, third and fourth operator entry has been assumed to result in significant impact in the 6^{th} and 8^{th} year of the project (even though actual entry may take place earlier or later), with equal distribution of market share being achieved within 3-4 years of entry. The time frame for entry of fourth operator is only to facilitate analysis and does not reflect any firm views of the Authority regarding timing of entry of fourth operator. That would be examined separately.

i. License fee Options : License fees paid and outstanding as on 31.7.1999 have been worked into the analysis in accordance with the migration package which stipulates that 35% of the outstanding dues as on July 31, 1999 shall be paid by August 15 and the balance before January 31, 1999. In accordance with the decision of Government, the effective date has been assumed six months after the signing of the license for existing circle CMSPs. The analysis was then carried out for different revenue share options ranging from 0 to 25% of Gross Revenue (the definition of Gross Revenue used for this purpose is discussed in section II.2.6) and corresponding IRRs arrived at accordingly. If a concept of Adjusted Gross Revenue is used, the amount of license fee would work out to a lower amount and returns of the projects would improve. License fee options have been examined for revenue share percentages upto 25% so as to arrive at a comprehensive assessment of their impact on the projects.

ii. Assessment of License fee: Thereafter the license fee payable under various options have been converted to per subscriber basis to give an estimate of the payouts in comparison to the ARPUs for the various projects. These have been presented in Part II Chapter 3.

iii. Sensitivity Analysis: Many variables may undergo changes over the project period under analysis. It is therefore necessary to examine the sensitivity of the

projects to some of the changes that may occur. Hence major parameters like capex, opex, ARPU and demand have been varied individually and in relevant combinations to assess the impact on the projects. This has been done for each of the license fee options. Hence viability of the projects with different license fee options has been examined under conditions of variations in major parameters relating to costs, revenues and demand.

1. **Study Limitations**

- Rapid obsolescence and changing market conditions makes extrapolation on the basis of existing data difficult.

- The analysis is based on information provided by the operators. While the data for initial 3 years or so is based on audited figures, future projections are only estimates. Under the circumstances, a trend of industry averages can be derived through a normation process that takes into account additional industry inputs.. The normation process is expected to improve the analysis but may not fully address inherent limitations.
- It is not possible to accurately predict feature, applications and cost trends in an obsolescence prone industry.
- While DCF technique is most suited to analyze projects spread over long tenors, it is necessary to recognize that the results are indicative of the likely trends rather than accurate to the last decimal.

1. **Risk Factors**

- ***Impact of Macro-economic Variables :***All market and revenue projections are primarily based on underlying assumptions on the health of the economy. Any macro-economic changes would impact the interest rates, forex rates, ability to raise/service foreign funds and the consumer's propensity to pay.

- ***Frequency Availability:*** Limitations on frequency availability at a given stage of technology constitute an entry barrier. This may change as technology improves to permit greater exploitation of frequency. Besides the issue of availability is the related issue of cost. At this stage, it has been assumed that requisite frequencies would be available – an assumption which may not be borne out at the considered frequency cost level. On the other hand, efficient utilization of frequency through newer technologies which are now being permitted, may reduce the criticality of frequency availability.
- ***Bundling:*** Liberalization of the sector could lead to a free market situation wherein cellular companies would need to benchmark themselves on price and cost with other "bundled" service providers (e.g.: combined provider of Basic/cellular/GMPCS sharing the same infrastructure) or other technologies (e.g.: microcellular with LMDS or PHS or CDMA). This effect would be further accentuated by opportunities emerging from convergence and resulting in redefinition and restructuring of several parts of the telecom services industry.

- ***Declining Capital Costs:*** Rapid technological progress is likely to lead to a gradual and continuous reduction in access capital costs. New network architectures/elements may lead to a quantum reduction in overall capital cost per channel/subscriber. These may impact new entrants, who do not have legacy systems, more positively than the established operators (who have already made bulk of their investments). Further, the older operators would need to revamp their network to remain contemporary. The window of time available to an operator to recover capital cost is likely to shrink continuously. Further, timing and scale of capital investment constitute a critical business decision and a real business risk.

1. **Definition of Gross Revenue**

- Gross revenue has been defined as the revenue derived from licensed activities, including revenue on account of value-added services and supplementary services. It will not include revenue on account of sale of handsets. In case a service provider subsidizes the sale of handsets by giving rebate on the rental tariff or other rebates, the revenue thus forgone will be added to the gross revenue. Service tax is excluded from the above definition of Gross Revenue.
- For the purpose of calculation of license fee in the analysis, Passthru Revenue has not been excluded. If this is done, the license fee amount in each case will be lower and returns to the project will show an improvement. Analysis reveals that this will improve the IRRs for the projects in the range of 0.5% to 2.5%. This is further dealt with in Chapters 3, 4 and Annexure II of this paper.
- While this definition of Gross Revenue is expected to be comprehensive, it does not necessarily take into account the ability of the business to allow some portion of the revenue from the licensed business to accrue to franchisees and other sister concerns who may conduct either part of the business as a franchisee or collect, say advertisements at higher rates and place them for display in the cell phones at lower rates. Such steps would artificially deflate the revenues accruing directly to the licensed business. Also, in such a situation, the CMSP may be able to offer the service to the customers at a rebate. Such foregone revenues may also be treated on the same footing as rebates related to handsets. Hence the term "or other rebates" has been added in the above definition.
- As far as franchises are concerned, clause 9 of the License Agreement specifies that the licensee will not assign or transfer its rights in any manner under the license to a third party or enter into any agreement for sub-licensee and/or partnership relating to the subject matter of the license, i.e., no sub-leasing/partnership/third party interest shall be created. It is not clear if such a provision will take care of a situation where the licensed party becomes its own franchisee by floating a new company with different pattern (in terms of equity holding) of ownership among the partners.

Appendix II.2A

DEMAND ESTIMATION MODEL FOR CMTS

1. Introduction

1. The objective of an independent demand assessment was to make an estimate of the cellular subscriber base and to use the same as a minimum reality check on the subscriber base projections provided by the operators. A Demand Estimation Model using multi-variate regression technique was developed to project the demand for cellular telephones in various circles. *The model estimates the circle-wise demand for cellular subscribers as a subset of the demand for total tele-terminals in a given year over the period under study.* Since it is expected that the proportion of mobile phones will increase over the years, an increasing percentage of tele-terminals is assumed. It may be possible that mobile phones may even overtake fixed phones and this may happen earlier than anticipated. This is examined in the sensitivity analysis where variations in demand have been considered. The superset i.e. the tele-terminal population in the circle for a given year was estimated based on affordability as gauged from the surrogate variables like number of cars, household income etc.
2. There is a view that after some years, cellular subscribers may form an increasingly larger proportion of total tele-terminals This may indeed enhance demand. However as tele-terminals proliferate and while ARPUs may show a decline under competitive conditions, overall revenue trends may not be affected adversely in all cases due to increased demand and data traffic. As explained in the Appendix IIB, in some cases, revenue projections have shown an increasing trend.

1. Coverage

1. The key considerations in development of the demand model were its ability to take cognizance of the following:

A. Capture circle characteristics in terms of

- Population
- Degree of evolution of industrial and services sector
- Penetration of DOT/MTNL

A. Factor in the demographic variables such as

- Household income classification
- Ownership of consumer durable such as refrigerators, two wheelers etc.
- Motor vehicle population
- Deposits and credits

- Propensity/ability to spend/afford.

1. **Surrogate Analysis**

1. In absence of any reliable published data indicating correlation between acquisition of a cell phone and income statistics, surrogate analysis was carried out. The surrogate variables exhibiting high correlation with increase in tele-terminals and aspects related to affordability were identified. The surrogate used to capture affordability were identified as incremental number of cars in the circle, incremental households above income levels of Rs. 50000 p.a. but not owning a car and State Domestic produce (SDP) per population. Increase in tele-terminals was used as a surrogate to capture the effect of network pull.

1. **Data generation**

1. In line with the above considerations the requisite circle specific data was collected for the last 10 years in respect of the following:

   i. DOT lines (DELs)
   ii. Average Revenue Per User (ARPU)
   iii. Population in the circle
   iv. Classification of households by income levels
   v. State domestic produce (SDP)
   vi. Vehicle population (Cars + Jeeps) etc.

1. The data sources are stated in the Table II.2A.3 at the end of this chapter. Data gaps, where necessary, were bridged through extrapolation using CAGR as basis.

1. **Regression Model**

   A multi-variate regression model was developed for estimation of the growth in total tele-terminals (both basic and cellular). The regression equation used for the demand model is as follows:

   $$\boldsymbol{Y = k + m_1 * X_1 + m_2 * X_2 + m_3 * X_3}$$

   where,

   Y = Growth in the number of total tele-terminals,

   X_1 = Growth in number of 4-wheelers,

   X_2 = Growth in number of households with annual income above Rs. 50,000/- but not owning 4-wheelers,

   X_3 = State Domestic Product per capita (in Rs.),

k is a constant in the regression analysis, and

m_1, m_2 and m_3 are the coefficients of X_1, X_2 and X_3 respectively in the regression analysis.

Using the above regression model, the potential for total incremental tele-terminals was estimated for all years upto 2015. Subsequently the cumulative number of tele-terminals in the circles in each year was estimated. The floor cellular demand in a circle has been determined by assuming certain minimum rates of penetration for cellular as a percentage of the total tele-terminals in the service area. The minimum cellular penetration was estimated to reach at 20% of the total tele-terminals by year 2010 and 33% of total tele-terminals by the year 2015 and CAGR trend was used to project the cellular population from current year (actuals) till the year 2015.

2. **Results of the Demand Model**

The model indicates an estimate of 103.5 million basic DELs and 51 million cellular connections in the country in the year 2015 (total tele-terminals = 154.5 million). This corresponds to:

- Overall tele-terminal density of 11.5 per 100 population (Population in 2015 = 1346 million)
- Cellular penetration of 3.8 per 100 population

1. **Reality Checks**

1. The cellular penetration levels assumed for the demand estimation were compared with those in other countries to assess the reasonableness of the same. Some international indicators related to estimates of cellular mobile terminals as a percentage of total tele-terminals have been provided in Table II.2A.1. The cellular penetration as percentage of total tele-terminals in groups of countries which are in different stages of telecom development varied between 7.9% and 18.6% for the year 1996 and the corresponding figure for the world stood at 16%. In comparison, India's existing cellular penetration as percentage of total tele-terminals stands at about 6%. It is thus reasonable to expect the floor-level cellular penetration in India to be at least 20% by the year 2010 and 33% by the year 2015.

Table II.2A.1 : Growth of Cellular Subscribers : International Experiences

	Cellular Subscribers (in '000)			CAGR (%)		Cellular Density (per 100 population)		Cellular as % of Total Tele-terminals	
	1990	1994	1996	1990-94	1990-96	1994	1996	1994	1996
Asia	*1510.7*	*10017.6*	*46276.4*	*60.2*	*76.9*	*0.3*	*1.35*	*6*	*18.3*
Africa	*14.2*	*394.8*	*1145.6*	*129.6*	*107.9*	*0.06*	*0.16*	*3.5*	*7.9*
Americas	*5993.5*	*28010.9*	*54077.9*	*47.2*	*44.3*	*3.67*	*6.92*	*11.6*	*18.6*
Europe	*3425*	*14874.7*	*36192*	*44.3*	*48.1*	*1.89*	*4.57*	*5.6*	*11.7*
WORLD	*11182.4*	*54783.8*	*142016*	*48.8*	*52.7*	*0.99*	*2.46*	*7.8*	*16*
India	**-**	**-**	**328**	**-**	**-**	**-**	**0.03**	**-**	**2.2**

Source : World Telecommunication Development Report 1995 and 1998, ITU

2. Reality checks were conducted by comparing the model estimates for tele-terminals with projections made by DoT for DELs in various circles. The estimation of demand for tele-terminals on circle basis and aggregated on national basis and the corresponding year-wise figure of demand as projected under the 'Telecom Prospective Plan 2007', are mentioned in Table II.2A.2.

Table II.2A.2 : Model Estimates Vs Telecom Perspective Plan Projections

Year	Tele-terminals (Model Estimates)	DELs (Telecom Perspective Plan)
1995	11,978,000*	14,258,856
1996	14,543,000	16,559,831
1997	17,002,816	19,107,693
1998	20,914,500	22,084,099
1999	24,747,310	25,566,660
2000	28,997,730	29,647,904
2001	33,681,032	34,438,324
2002	38,812,997	40,070,040
2003	44,409,932	46,701,218
2004	50,488,677	54,521,484
2005	57,066,624	63,758,514
2006	64,161,720	74,685,950
CAGR%	**16.4%**	**16.2%**

** Note – Actuals as per Annual Report of DoT, 1997-98 (Part I)*

3. The independent demand estimation has yielded results that are in reasonable agreement in the projections of DoT's Perspective Plan 2007, with some divergence towards the later years as evident from Graph II.2A.1.

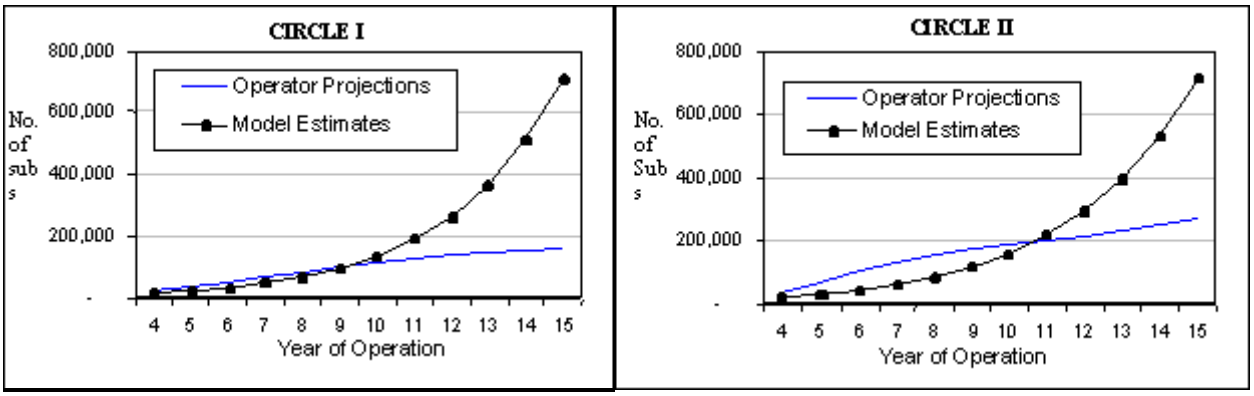
Graph II.2A.1 : Model Estimates Vs Telecom Perspective Plan Projections

4. Further, the demand estimates for years 16 to 20 were based on extrapolation of the operator demand data for years 11 to 15. To ensure that the demand estimates for the years 15 to 20 are realistic and reflect the likely picture at that point in time, a reality check was introduced. This check ensures that the CAGRs (for yrs 11-15) that have been used for projecting demand for years 16 to 20 were below a range of 15-16%, and that the demand projections are in line with the objectives spelt out in NTP'99 and total tele-density projections.

1. **Integration with Financial Model**

1. The demand figures from the estimation model have been considered further for gauging the demand trends for CMS projects by assuming a conservative proportion of total tele-terminals demand to be allocated to cellular telecom service, as has been explained above. This is expected to serve as a floor level check to ensure that demand projections of operators do not exhibit any worse trend. The circle-wise demand for cellular telecom service has been distributed amongst the operators in a service area, assuming the operator's market share equal to the existing market share as indicated by the operator in its service area. If the circle and metro operators have estimated higher demand figures for their service areas, their assessment is expected to represent operator specific estimation of the impact of their marketing strategies, expansion plans and anticipated future trends and hence has been used as the basis for analysis. If however, CMSPs have projected much lower demand for their service area, then this has been moderated in accordance with the results of demand estimated in above model. This has turned out to be the case in two circles, as depicted in Graph II.2A.2.

Graph II.2A.2 : Comparison of Model Estimates with Operator Estimates



2. To maintain consistency in input data for financial analysis, the resultant figures from demand estimation model for these two circles were used instead of directly using the figures arising from demand projections given for the circle by the operator. The market share given by operator was applied on the circle demand estimate to get the normated demand estimate applicable to the operator. The demand figures have been subjected to the changes in tariff (including introduction of CPP) and entry of multiple operators while analyzing the financial impact.

1. **Conclusions**

1. Hence the demand estimation has been a floor level check on the operators' projections for subscriber base. The estimation of total tele-terminals has been subjected to reality checks and the floor levels have been derived assuming cellular penetration (as percentage of total tele-terminals) of 20% in year 2010 and 33% in year 2015. Normation of demand has been done only in two cases where the operator's projections for demand were found to be below the floor levels.

Table II.2A.3 : Data Sources

Data Head	Units	Years	Source
Cellular subscriber base	Nos.	1998	COAI report : Nov 1998
		1996, 1997	CMIE Infrastructure Dec 1998
Direct Exchange Lines	Nos.	1988-95	CMIE Profile of States March 1997

Tele-density	Lines per 100	1988-95	CMIE Profile of States March 1997
No. of Cars +jeeps +tractors	Nos.	1988	CMIE Infrastructure
		1989	CMIE Infrastructure Sept 93
		1990	CMIE Infrastructure Sep 1994
		1991	CMIE Infrastructure Aug 95
		1993-95	ACMA
Deposits (Saving Bank +Current +Time Deposits)	Rs. cr.	1988-94	CMIE Banking and Fin, Dec 1998
Credit	Rs. cr.	1992,93, 97,98	RBI Report on Currency and Fin 1997-98
SDP	Rs. cr. (at constant prices)	1988-96	Central Statistics Organization
Households classification by income levels	No.	1989, 92-95	Indian Market Demographics 1998 NCAER
ARPL	Rs. p.a.	1988-93	CMIE Infrastructure Aug 1995
		1994-96	CMIE Infrastructure Dec 1998
Population	Millions	1988-97	Socio-economic Statistics, CSO, 1996-97
Population below poverty line	%	1993	Socio-economic Statistics, CSO, 1996-97

Appendix II.2B

FINANCIAL ANALYSIS MODEL

1. Introduction

1. The following paragraphs of this section outline the approach and methodology in greater detail as per the following:

    - Data sources and requirement
    - Data receipt and validation
    - Circle visits and presentations
    - Assumptions made for analysis
    - Data Analysis
    - Viability Analysis
    - Impact of Changes in External Environment
    - License fee options
    - Other Parameters impacting Viability of CMSPs
    - Sensitivity Analysis

1. Data Sources and Requirement

1. Data formats were developed in line with the information required for evaluation of the cellular service providers business. A copy of the data format is included in the Schedule 1 of this Appendix**.** The information was requested under following categories.

- *Operator related information on operations:* to assess the trends related to network rollout, details on international collaboration, license obligations, investments planned and made, subscriber base, traffic indicators as well as license fee payment and treatment of the same.

- *Financial information:* to assess financial statements in terms of capital structure, capital expenditure incurred, operating expenses incurred under various heads, revenue generated, profit/loss statements, cash flows, and balance sheet items.

- *Qualitative aspects:* seeking the operators' assessment of the impact on their projects on entry of additional operators, introduction of WLL, impact of opening up of domestic as well as international long distance telephony and other related matters.

1. The operators were requested to provide the actual data on the above aspects for the period since commencement of operations till Dec 1998 and projected figures for the balance duration of the 15 years license period. The request was sent on Jan 8th, 1999 and data was expected in specified formats by Jan 25th, 1999.
2. The data sources utilized for each of the modules are presented in Table II.2B.1.

Table II.2B.1 : Data sources utilized in various modules

Module	Information Source	Details		
License background study	DoT	Tender, license agreement, bid copies, license fee payment status (yearly payment schedule, fee due, paid & unpaid) –reasons for non-payment, where ever applicable.		
	Operators	Initial business plan and bid basis. Ownership pattern with holding company details,		
	BICP	Data received for cost study, Cost report		
	Meetings with operators	Qualitative information, Listing of operator expectations		
Current status of cellular operators	DoT	DoT/MTNL to operator billing Latest position regarding license fee due and paid as on Aug 9th, 1999 was obtained		
		Circle level annual reports- 3 yrs.		
	FI's	Funding status & qualitative aspects.		
	Operators	Actual financial statements-Profit & Loss, Balance Sheet and cash flow separately ever since inception. Project cost and funding (sources and application of funds incl. supplier credit) equity structure, debt structure and repayment schedules. Details on collaboration. Disaggregated subscriber info at SSA/city level giving nos., minutes and ARPU/year	License regime migration	MoC, COAI
	Market/revenue projections	NCAER	Macro-economic circle level data	
DoT		SBP and telecom mission reports		
ACMA		Automobile surrogates		
ORG		Durable ownership data		
CEA		Electricity connections		

Operators ABTO /COAI		Business plan and forecasts-Basic/cellular services
ITU		World Telecom Development Report, Market estimation formulae
Financial projections	Operator	Business plan, revised business plan, demand / revenue projections for 15 years. Projected cash flows for 15 years.
	Data source	Information memoranda for funding
	Oftel	Contribution of value added services, License terms
	TRAI	Projections for 16 to 20 years
Listing and analysis of options	TRAI	Options for consideration
	Income Tax Department	Taxation aspects of options

1. **Data Receipt and Validation**

1. The data inflow commenced from Jan 25th, 1999 and continued till March 11th, 1999. The data received from the operators were checked for adherence to the desired data formats and categories. The gaps as well as inconsistencies in the data were identified and the request for clarifications and missing data was sent to the respective operators. Clarifications, which enabled utilization of the data, have been taken into account for the purpose of analysis.
2. A consideration set of circles, metros and operators for detailed analysis of the business was arrived at after the preliminary analysis of the data was completed. The operators, who did not send the data or furnished inadequate information, had to be excluded from the consideration set. The number of Circles in each category and Metros that could be analyzed has been indicated below in Table 11.2B.2.

Table II.2B.2 : Number of CMSP Circles/Metros Analyzed

	Category A	Category B	Category C	Metros
Analyzed	2	5	2	3
Total Circles/Metros	5	8	5	4

3. The sample finally considered for the Circle analysis represented about 45% of the total cellular subscriber base in the circles (excluding metros). Out of 18 circles, 9 operator projects in nine different circles have been analyzed. Six out of the eight Metro operators have been analyzed which constitute 92% of the total Metro cellular subscriber base.

1. **Circle Visits and Presentations**

1. The TRAI team visited two circles (one each in category 'A' and category 'B' in order to understand the ground realities of operations and their present status. Project teams of some category 'C' circle operators also made detailed presentations. Presentations made by the operators provided insight to their areas of concern, practical difficulties faced by them, funding arrangements, the management outlook and business management practices specific to CMSPs.
2. In addition, presentations from equipment manufacturers/vendors were organized to understand technology trends and future developments. Discussions were held with leading Financial Institutions to understand lenders' perspective.

1. **Assumptions Made for Analysis**

1. The assumptions used for the financial model are listed below:

i. As per prevalent tax regime, a five-year 100% tax holiday and subsequent five-year 30% tax holiday within the first 15 years of the project has been assumed in accordance with current tax regime. Corporate tax rate at 25% has been assumed. From the 16th year onwards, no tax holiday will be available.

ii. Interest on loans has been calculated at the rate of 16% on average of total debt, i.e., the average of opening and closing balances of short-term and long-term loans.

iii. Depreciation has been assumed at 12% on written down value of fixed assets. This has been taken for the purpose of tax calculations and is based on the industry practice for calculation of income tax.

iv. Capitalized expenses have been treated as part of capital expenditure and write-off of capitalized expenses has been taken as part of depreciation.

v. License fees have been treated separately from capital expenditure/capitalized expenses. As specified in Section 35ABB of the Income Tax Act, amortization of license fee has been taken over the extended period of the license, i.e., 20 years.
vi. No interest payment has been assumed on customer deposits, in accordance with the Telecommunication Tariff Order, 1999.
vii. Current liabilities (excluding customer deposits) and current assets (excluding cash and bank balances) have been treated under Net Current Assets.
viii. Provision for bad debts has been treated as revenue expenditure and therefore does not appear as a balance sheet item.
ix. Net Current Assets have been calculated on the following basis :

- Receivables as well as payables have been assumed at 45 days
- Handset inventories have been assumed on monthly basis at 50% of additional subscribers
- SIM card inventories have been assumed at 25% of additional subscribers

i. No dividend payout has been assumed. It has been assumed that all surplus cash from operations would be reinvested into the business for repaying debt, expansion etc. It is assumed that dividends would be adjusted out of value of the business available to the equity holders after debt servicing.
ii. Surplus cash balances have been treated as idle assets with the projects and no return-generating investments have been assumed from the available surplus cash. However surplus cash has been assumed to be utilised for loan repayments.

1. The data related inconsistencies, which emerged during the financial analysis, were removed by making certain assumptions. An attempt was made to make the assumptions realistic and close to the business decision requirement. Indicative cases where the assumptions were made are:

- *The cash flows provided* by the operators in most cases did not tally with fund flows and sometimes with balance sheet items provided by them. Reasonable adjustments in respect of entries booked under various heads were made. For example, in certain cases significant amounts were entered as promoter loans inspite of sufficient cash balance. Subsequent to this the loans were not shown as repaid and further promoter loans were taken although large amounts were being shown as interest outflow. In such cases the assumption was made that the surplus cash balance would be used to repay the loans.
- *Relevant conditions* as specified under the Income Tax Act, 1961 were taken as guiding principles for assumptions in case of tax holidays, payment and amortization of the license fee, if not already taken by the operator.

1. **Data Analysis**

1. The data obtained was analyzed as follows:

- The revenue, expenses and other financial information were utilized to project Profit and Loss as well as Balance Sheet for each year of the remaining license period. This, combined with the actual accounts since start of the project was utilized to yield free cash flows and related cash balances for each year. The terminal value of the business is usually assessed in terms of a multiple of Earnings Before Interest Taxes Depreciation & Amortisation (EBITDA) in the terminal year. For the purpose of the analysis, an estimate at 5 times EBITDA was assumed as the terminal value in accordance with industry practice and in view of the high degree of obsolescence to which the cellular industry is prone. The free cash flows were discounted to derive Internal Rate of Return (IRR), Return on Equity (ROE), Debt Service Coverage Ratio (DSCR), Return and Capital Employed (ROCE) and operating ratios for the **Operator Case**. The IRR and ROE related to cash flows worked out as above have been used for further analysis. Different license fee payouts, as a revenue share from August 31st, 1999 onwards, were introduced into the analysis to assess the impact on Operator Case.

- The cash flows have been adjusted to normate some of the parameters for which operators' figures were at wide variance with the other operators in the same category. Normated values were used to evaluate the business under achievable management practices. Norms in respect of various expenses (amount per subscriber as well as in terms of percentage of revenue) were developed, considering the variation in expenses made by each operator against various heads of operating expenditure as well as capital expenditure. The norms were based on average values of the expense booked by various circle operators in the same category. The basic principle adopted in using the normated values was to use the average norm for the category. This has yielded the **Normated Case**. The parameters subjected to normation were :

    - Operational expenditure (excluding WPC and pass through expenses)
    - Capital Expenditure
    - Demand projections (i.e. subscriber base) were subject to floor level check

1. ***Operational expenditure*** showed widely varying trends and had to be normated. Since WPC charges are calculated based on given formula uniformly applicable to all operators, this was not required to be included in the normated values. Similarly, payout for passthru traffic cannot be normated as they are based on passthru traffic for which revenues are collected and passed on to other operators. For the balance operational expenses, category-wise averages of total expenses (excluding WPC & passthru expenses) as a percentage of net revenues (net of passthru revenues) were used as the basis for normation. While the actuals in the first two-three years were higher, projections from fourth year onwards were moderated in a graduated manner at 60%, 50%, 40%, 40%, 35%, and 35% for each succeeding year and thereafter at 30% of the net revenue. This was done to reach in a pragmatic manner, a reasonably efficient standard from current level. In case of the operating expenses, the normation was applied on aggregate basis and not for each individual expense sub-head to avoid normating the expenses which

the operator may have allocated between two or more sub-heads. The projections above the normated values were moderated while those below the normated values were retained as projected.

2. The ***incremental capital expenditure (Capex) per line*** was normated based on category wise averages. As world market equipment prices per line do not vary widely within the same time frame and are expected to follow a downward trend, category average were used for the normated analysis. If the operator figure was lower, it was used.
3. Adjustment was made for ***demand projections*** in the business cases where unduly depressed demand was projected. The estimated demand figures used were derived for each circle on the basis of detailed analysis as explained in Appendix II.2A. Circle operator's demand projections were compared with estimates and were accepted if they were close to or higher than estimates. In two cases, the demand projections had to be adjusted upward over the analysis period due to unusually low demand shown.
4. Normation was not carried out in respect of the past data provided on actual basis for the first 3 years in the case of Circles and first 4 years in the case of Metros; the expense heads were normated only for the projected data.

1. **Viability Analysis**

1. Viability of the projects was assessed using Discounted Cash Flow (DCF) technique assuming terminal value. Terminal value has been calculated using a multiplier of 5 for the EBIDTA in 20th year. The IRR, ROE, DSCR, ROCE and other ratios were calculated in each case. Their description is attached in the Definition of Terms at Section II.2B.12.

1. **Impact of Changes in External Environment**

1. In order to analyze the impact of some of the major changes expected in the external environment during the project life, the following changes were incorporated into the analysis to arrive at the Base Case. The Base Case thus reflects normated data at zero license fee, which has been subjected to the following changes.

Introduction of Calling Party Pays (CPP) and Tariff Changes

2. The impact of introduction of CPP has been assumed with effect from April 2000. The normated cases have been subjected to impact of CPP assuming dip in the projected revenues in the year 2000-01 for Circle operators and Metro operators. The revenues are expected to rise back to the operator projected levels by the end of succeeding year on account of positive impact of revised tariff proposals on

usage. The monthly subscription revenues have been assumed to dip from 2000-01 onwards on account of downward revision in rentals and subscriber base is expected to increase by 10% from year 2000-01 onwards on account of reduced tariffs. Higher increases in subscriber base are examined in sensitivity analysis.

Opening of Domestic Long Distance (DLD)

3. The normated cases have been treated for impact of opening of DLD, beginning year 2000–01, assuming a 20% decrease in passthru expenses both on account of reduction in intra-circle and inter-circle passthru expenses. This reduction in passthru expenses would be gradual with expansion of the CMSPs own networks and has therefore been phased over 3 years, with 8% reduction expected in 2000-01, 15% reduction in 2001-02 and 20% reduction from 2002-03 onwards. No further increase or decrease in revenues is envisaged because of the introduction of DLD liberalization, insofar as the results of competition in the sector would enable volumes to go up even as tariffs are likely to come down and it is difficult to quantify the net effect. The existing low capacity utilization of the backbone for the operator's business and therefore its availability for leasing out to long distance carriers, the increase in traffic on the operator's network due to opening up of DLD, and retention of part of the passthru revenue for the use of operator's network for long distance traffic have been considered as factors at least compensating the loss of revenue from reduction of long distance tariffs.

Entry of Additional Operators

4. For the purpose of analysis, the impact of third operator has been followed by entry of fourth operator. The actual impact is assumed to result after at least 9-12 months of the entry of the new operator. While the entry of fourth operator is assumed for the sake of analysis, it does not reflect any final view of the TRAI in the matter. Also, while more operators have not been assumed for this analysis, the issues relating to addition of more operators would be examined at the appropriate stage.
5. The normated case has been sensitized to the impact of entry of third operator in year 6 of the project by considering 10%, 20%, and 30% drop in subscriber base in the years 6, 7 and 8 respectively and 33% there after. The entry of the fourth operator has been included into the analysis by considering a further 8%, 15%, 20%, 22%, and 24% drop in subscriber base in the years 8, 9, 10, 11 and 12 respectively, and 25% thereafter. This assumption of movement towards equal distribution of market share is expected to take into account the impact of market share loss by current operators after considering the market growth because of entry of additional operators.

Opening of International Long Distance (ILD) and Direct Connectivity to VSNL

6. Direct connectivity to VSNL is expected to happen in 2000-01 while ILD is expected to be opened to competition in the year 2004. The normated cases have been subjected to impact of direct connectivity to VSNL starting from year 2000-01 and opening up of ILD in year 2004–05. This assumes an increase in revenues for the CMSPs on account of revenue sharing with VSNL for incoming ISD calls terminating on the CMSP's network. Simultaneously, a reduction in total passthru expenses from 2000-01 onwards has been assumed as the impact of direct connectivity to VSNL (as is envisaged in the NTP 99) which would enable the service providers to retain an element of passthru expenses on outgoing ISD calls.

Sharing of Infrastructure among SPs

7. With the NTP'99 permitting sharing of infrastructure among SPs within the same service area, the existing Circle CMSPs are expected to lease out their backbones and other infrastructure like towers etc. to other SPs leading to increase in projected revenues. This increase has been assumed at 2% for Circle CMSPs from year 2000-01 onwards. In the case of Metros, the infrastructure that can be shared would predominantly be real estate, towers etc., and the increase in projected revenues are expected to be 1%.
8. Further, with the rationalization of leased line charges under the new tariff scheme and sharing of infrastructure among the SPs, it is expected that there will be a reduction of 10% in the projected CAPEX from year 1999-2000 onwards. This is also expected to lead to a 10% reduction in OPEX (excluding WPC, passthru expenses) from year 2000-01 onwards.

1. **License fee options**

1. The license fee options are based on different revenue sharing percentages in pursuance of the NTP'99. IRRs, ROEs and other ratios have been worked out for each of the options to assess possible optimization of adequate return to the investor/promoter as well as the license fee payout.

1. **Other Parameters Impacting Viability of CMSPs**

1. Convergence of both, technologies and markets is also expected to play a significant role in the way the cellular business will evolve. While broad indicators as to the worldwide trend towards convergence are becoming available, hard data on the exact nature of its impact on individual businesses is unlikely to emerge until after some time. As such, convergence could not be factored directly into the sensitivity analysis except to the extent it may reflect in ARPUs. It may however be noted that convergence is expected to have a beneficial impact on the cellular businesses in terms of expanding the size of the market. The likelihood that the license fee structure that emerges from the present study would become sub optimal upon the introduction of convergence is thus very small.

1. **Sensitivity Analysis**

1. Each of the license fee options was sensitized to the following to study the impact on the viability of the projects:

    - Drop in demand by 10%
    - Drop in ARPU by 20%
    - Drop in ARPU by 10% and increase in demand by 20%
    - Drop in ARPU by 30% and increase in demand by 15%
    - Drop in ARPU by 30%, increase in demand by 45% and increase in Capex by 10%
    - Drop in CAPEX by 10%, ARPU by 5% and increase in demand by 10%
    - Drop in CAPEX by 25%, ARPU by 12.5% and increase in demand by 25%
    - Drop in CAPEX by 25%, ARPU by 25% and increase in demand by 40%

    - Drop in OPEX (excl. WPC, passthru) by 10%, ARPU by 3% and increase in demand by 6%

1. These variations were identified as some of the possible scenarios that may emerge and have an impact on project viability. While decline in capex is a likely trend due to falling equipment prices, competition is expected to exert downward pressure on tariffs. This may result in decline in ARPUs over the long term.
2. All the license fee options were evaluated in terms of the impact on cash flows of the operators in accordance with each option. The options that were found suitable for largest number of operators in terms of ROE and IRR after payment of the license fee may be considered more suitable.

1. **Definition of Terms / Ratios**

- Average Revenue Per User (ARPU): Total revenue divided by average no. of subscribers in the year
- Debt Equity Ratio: Debt Equity Ratio has been calculated as ratio of total debt (short term and long term) to equity. Short term debt has been included as there was no clear distinction between the long term and short term debt in the data provided by some of the operators.
- Debt Servicing Coverage Ratio (DSCR): Free cash flows from operations divided by sum of interest on loans and loan repayment in the year
- EBIDTA: Earnings Before Interest, Depreciation, Tax and Amortisation.
- EBIT: Earnings Before Interest and Tax
- Incremental capex per additional subscriber: Capex incurred in the current year divided by the increase in number of subscribe between current and next year
- Internal Rate of Return (IRR): Discount rate at which the NPV of the free cash flows from operations before debt servicing is zero.
- Operating Ratio: Ratio of Total Operating Expenses (including passthru and WPC expenses) to Total Revenues (excluding deposits) during the year.

- Return on Capital Employed (ROCE): Calculated as the post-tax EBIT (PAT + Interest) divided by the sum of Net Fixed Assets, Net Current Assets (adjusted for cash balance and customer deposits) and capitalized license fees.
- Return on Equity (ROE): Discount rate at which the net present value (NPV) of the free cash flows available for promoters is zero.

PART II

CHAPTER 3
DATA ANALYSIS

1. This chapter contains analysis of data as projected by operators and as normated, wherever it was considered necessary. This chapter provides the quantitative framework for evaluating various license fee options.

1. **Overview**

1. The analysis in this chapter is based on actual data received from operators for the period upto December'98 and projections thereafter, rectified for inconsistencies, as explained in Part II Chapter 2. Since data was originally obtained for 15-year license period, projections have been extrapolated to cover 20-year time span (refer Part II, Chapter 2). The data has been normated and analysis has been conducted on the normated data as outlined below.
2. This chapter is divided into the following sections:

- Key parameters and normation
- Analysis of project viability
- Impact of changes in external environment
- License fee options and their impact
- Assessment of license fee
- Entry fee

1. Results of sensitivity analysis to gauge the impact of variations in key parameters have been presented in Part II, Chapter 4.

1. **Key Parameters**

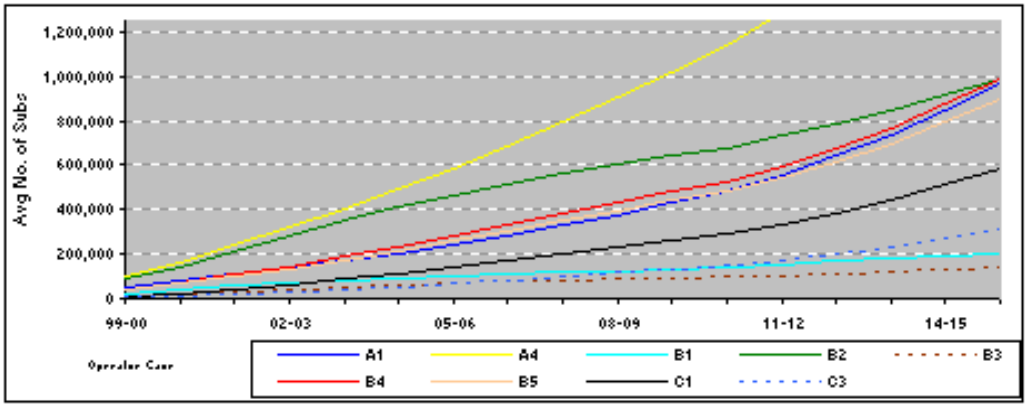
Subscriber base

- Demand for cellular services is a function of need, cost, ability to pay and availability of services (as in the case of many technology driven services – manifestation of demand may sometimes follow supply). Some of the factors that have a bearing on demand are summarized below.

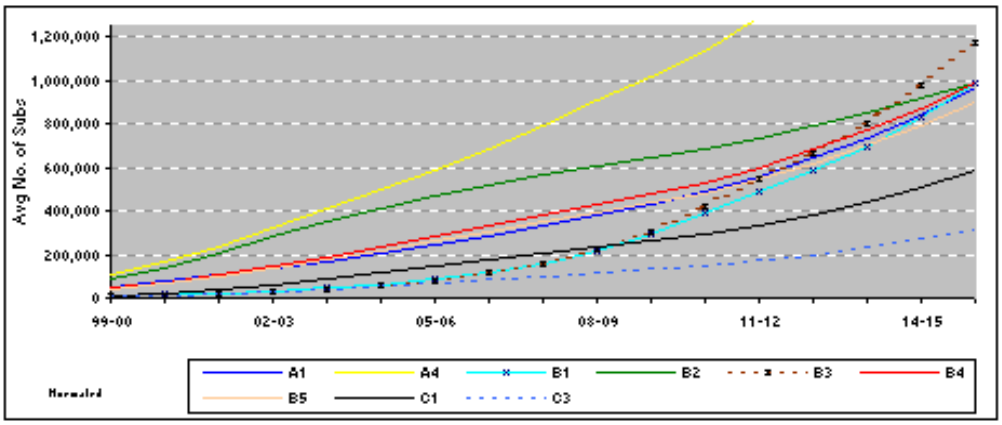
Positive drivers for demand	*Negative drivers for demand*
GDP growth (influences need & ability to pay)	**Rentals (increases fixed costs)**
Geographical coverage (enables increase in demand)	**Perceptions regarding various issues like need to provide income tax PAN etc.**
Tariff (basis for cost to customer), CPP	**Competing services (WLL, PMRTS etc)**
Handset subsidy (lowering of entry barriers)	**Handset costs (entry barriers)**
Competition (leads to strategies for customer incentives/promotion)	**Service quality (including billing problems and pressure for payments)**

- The subscriber base of a particular operator is a portion of the total market for CMS in the service area and would typically reflect a market share between 40% and 60% in a matured duopoly. In a multipoly environment, say with four operators, the market share may become reasonably close to 25% for each operator over a period of time. The actual market share would be determined by the relative strengths of the operators as well as their marketing strategies.
- The subscriber base assumed for this analysis is based on projections provided by the operator and subject to floor level as derived from the demand model explained in Part II Chapter 2. In some cases, demand has been corrected based on comparison with the demand model. Normation of demand has been necessary only in case of two operators who had projected very low future demand. The following graphs indicate the operator and normated projections of subscriber base for circles and metros.

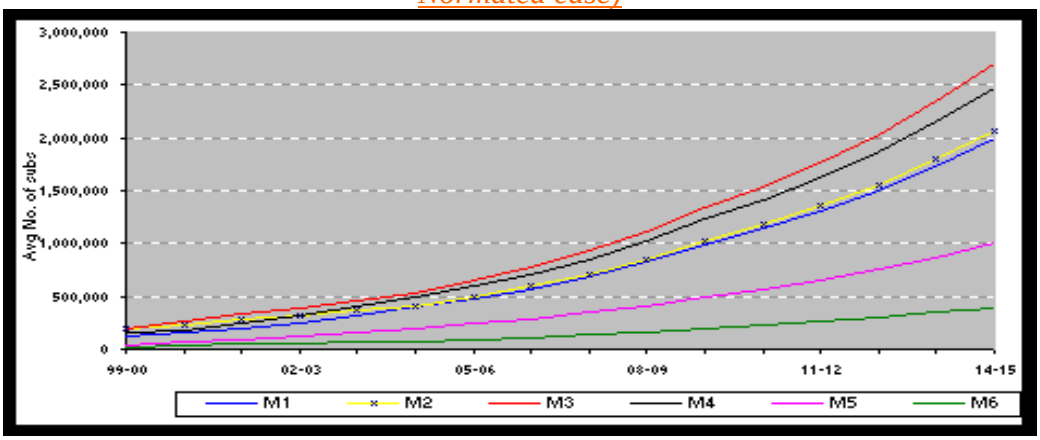
Graph II.3.1 : Circles : Average Number of Subscribers-Operator case



Graph II.3.2 : Circles : Average number of Subscribers- Normated case



Graph II.3.3 : Metros : Average Number of Subscribers-Operator case (same as Normated case)



- The above graphs show overall optimism regarding future growth in subscriber base. The normated demand estimates are based on the demand model developed for the study as explained in Part II Chapter 2 and are floor level checks on the operators projections for subscriber base. These are considered long term trends. In the short term, there may be changes caused by various factors impacting subscriber growth. For long term analysis, projected trends are likely to be adequate for determining the viability of the projects.

Average Revenue Per Subscriber (ARPU)

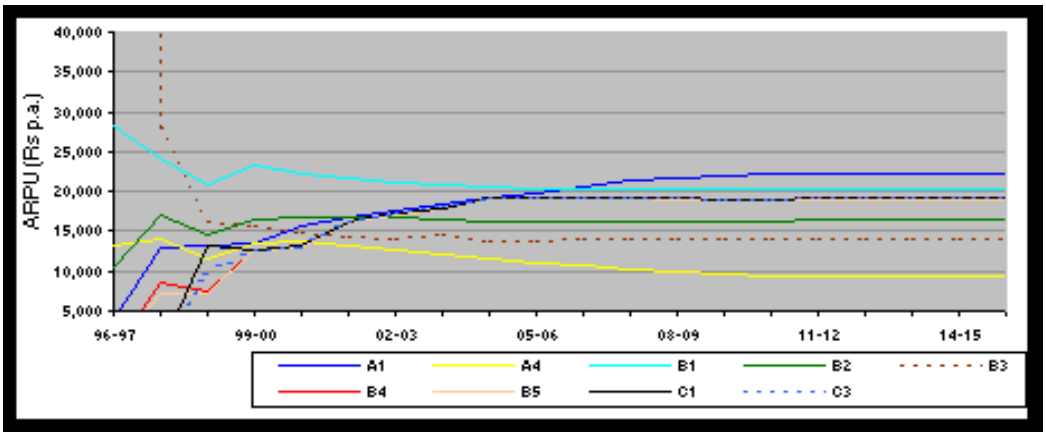
- The average revenue per subscriber used for the analysis represents the amount billed per subscriber (excluding deposits and service tax). As cellular networks expand to include marginal subscribers, the ARPUs are not expected to increase significantly. However, ARPUs are linked to a number of factors, some of which are summarized below.

Positive Drivers	***Negative Drivers***
Tariff and monopoly	Incidence of taxation (e.g.: service tax)

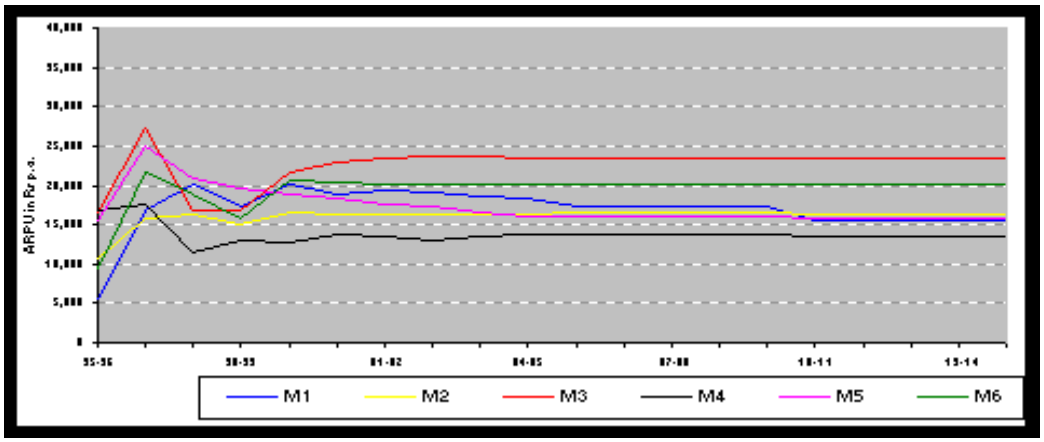
GDP growth and health of economy	Additional operators and competition
Opening up of DLD, direct connectivity with international gateways	Percentage of low revenue subscribers
Data and value added services	
Effect of CPP	

- ARPU estimates provided vary from operator to operator even within the same service area. Whilst an ARPU decline would make services affordable and increase teledensity, it may, beyond an optimum level, strain project finances. The normal expectation will be that decline in tariffs will be moderated to ensure that the corresponding enhancement in subscriber base/usage can be accommodated within such additional capital/operational expenditure, such that returns from the project do not affect reasonable viability. The decline in absolute cash inflows due to reducing ARPUs would be subject to the elasticity exhibited by subscriber demand, and different options for rise in demand for different reductions in ARPU have been worked into the analysis at the stage of Sensitivity Analysis. At the same time, any additional requirement of capital consequential to the likely increase in demand and subscriber base has also been factored in, at two stages. First, the normated case takes into account the capex requirements for the demand figures used in the analysis for each operator. Second, in executing the ARPU related sensitivities, capex requirements have been examined, and enhancements have been effected, wherever required, to ensure that cash flows are not distorted and the results adequately reflect the impact of the additional capex required for expansion of the networks.
- Most operators have indicated a declining trend in ARPUs after the initial stabilization period. However, the ARPU projections of some operators (Graph II.3.4 for Circles and Graph II.3.5 for Metros) show growth, though at a rate lower than the growth of average number of subscribers. This implies total revenues increase at a decreasing rate over the years of operation, even though there may be periods of higher growth rate occasionally.
- One of the reasons for growth projected by some operators in ARPUs may be that in a growing and rapidly changing market, greater liberalization may offer more opportunities to enhance ARPUs through supplementary usage, e.g. data traffic, which is expected to increase as convergence progresses.

Graph II.3.4 : Circles : ARPU (Excluding deposits)



Graph II.3.5 Metros : ARPU (Excluding deposits)



- As most ARPUs generally exhibit a declining trend over the long term, ARPU estimates given by the operators have not been normated, especially since the increase in ARPUs may largely be attributed to elements related to convergence.

Operating Expenditure (OPEX)

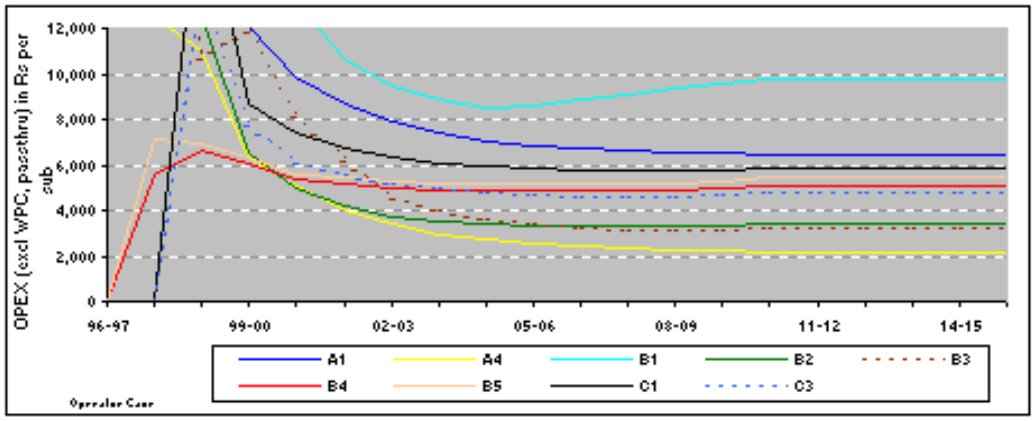
- Operating expenditure includes salaries, administrative expenses, sales and distribution costs including advertisement and promotional expenses, bad debts, handset subsidies, network operating costs etc. Pass through charges and WPC charges are not included in this category as these are accounted for separately. The operating expenditure per subscriber tend to decrease as network capacity utilization increases. Operating expenditure also reflects the efficiency of the operator in controlling the costs of operations as the elements included in OPEX are, to a significant extent, within the purview of the management. Some of the factors effecting OPEX are summarized in the table below.

Positive Drivers	*Negative Drivers*

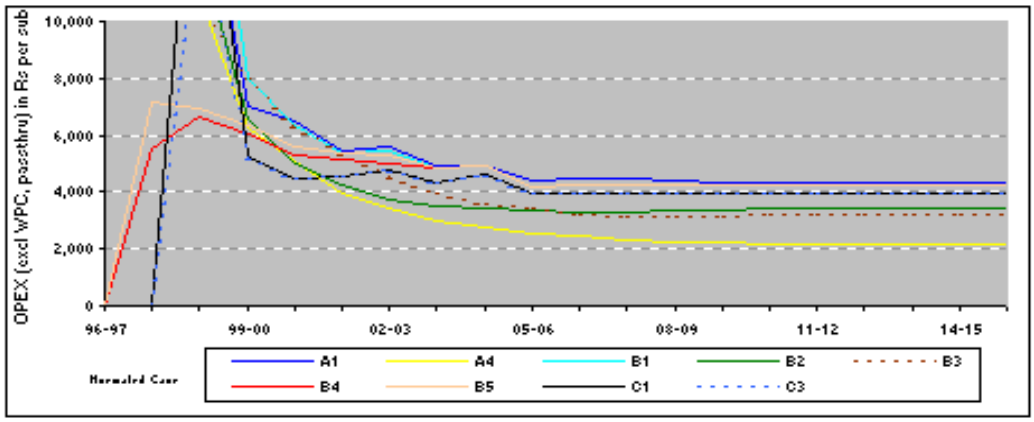
High start up expenses	Efficient network design
High marketing costs	Management control and efficiency
Low network utilization	Optimum network utilization
High maintenance/repair costs	Control on repairs/maintenance costs
High subsidies	Low/Nil subsidies
	Maturing of markets

- The following four graphs indicate the operating expenditure per subscriber as projected by various operators, and the normated opes, for circles and metros.

Graph II.3.6 : Circles : OPEX (excl. WPC, Passthru) Per Subscriber - Operator Case



Graph II.3.7 : Circles : OPEX (excl. WPC, Passthru) Per Subscriber – Normated case



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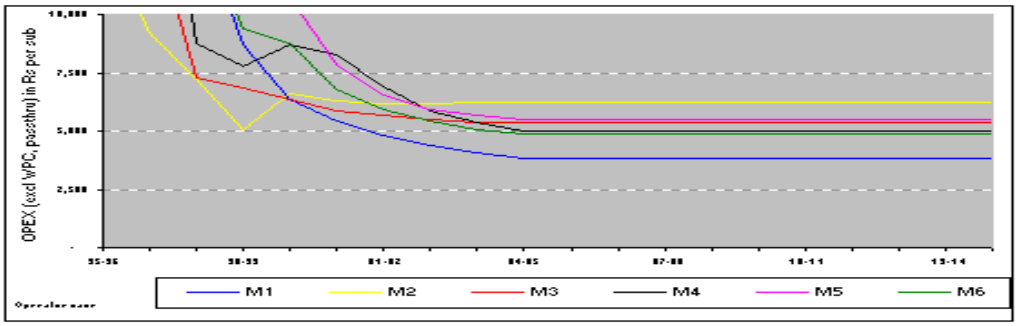
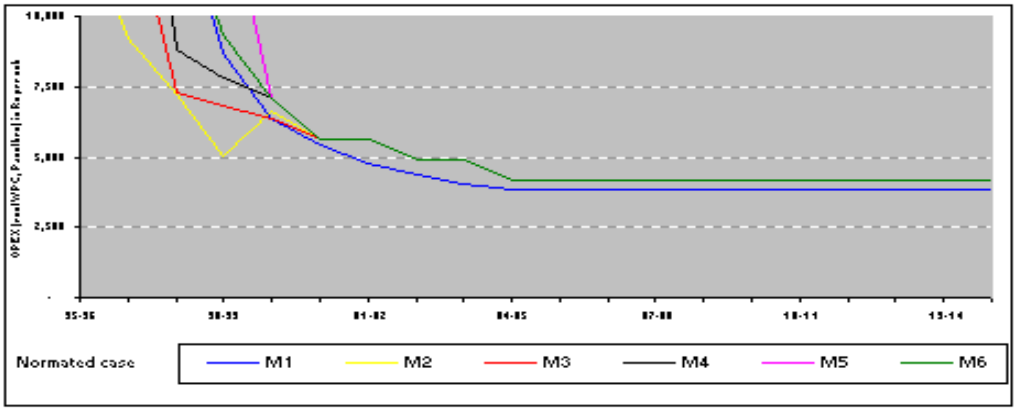
Graph II.3.8 : Metros : OPEX (excl. WPC, Passthru) Per Subscriber - Operator case



Graph II.3.9 : Metros : OPEX (excl. WPC, Passthru) Per Subscriber – Normated case



- Normation of Opex has been done according to average OPEX per subscriber within each category of circles assuming a trend for OPEX as percent of net revenues or, in other words, in terms of efficient operating ratio as per industry practice. The OPEX for the first 3 years for circles and first 4 years for Metros is on actuals and has not been normated. The details of normation are available in Appendix II.2B.

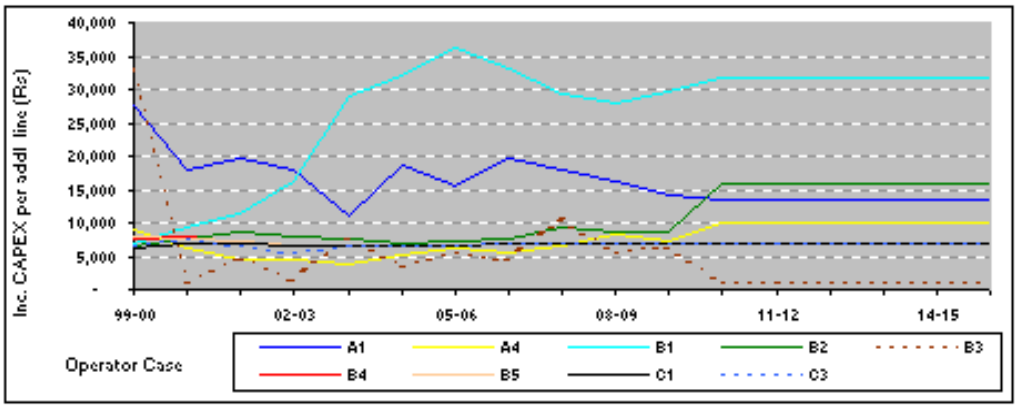
Capital Expenditure Per Additional Line

- This is a major component of the project cost and is found to vary widely among operators. The capital expenditure in the initial phase of the project determines the initial fund requirement that can burden a project sufficiently and affect its profitability significantly, especially in the first 5-6 years. After the network attains a certain degree of maturity (i.e. adequate MSCs/BSCs/BTSs, backbone etc.), the incremental cost of adding new capacity (i.e. lines) reduces. In addition, several other factors, some of which are listed below, have an impact on capital expenditure:

Positive Drivers	*Negative Drivers*
Turnkey contracts with financing	Optimal network planning
Currency value and import tariffs	Faster capacity utilization
Growth in low density areas	Low traffic per subscriber
Network spread in anticipation of future liberalization (e.g. DLD opening up)	Large manufacturing volumes
Feature upgradation and technological improvements	Local manufacture & indigenisation
Over provisioning	Competitive procurement process

- The following graph indicates the incremental capex per additional line as indicated by the Circle operators.

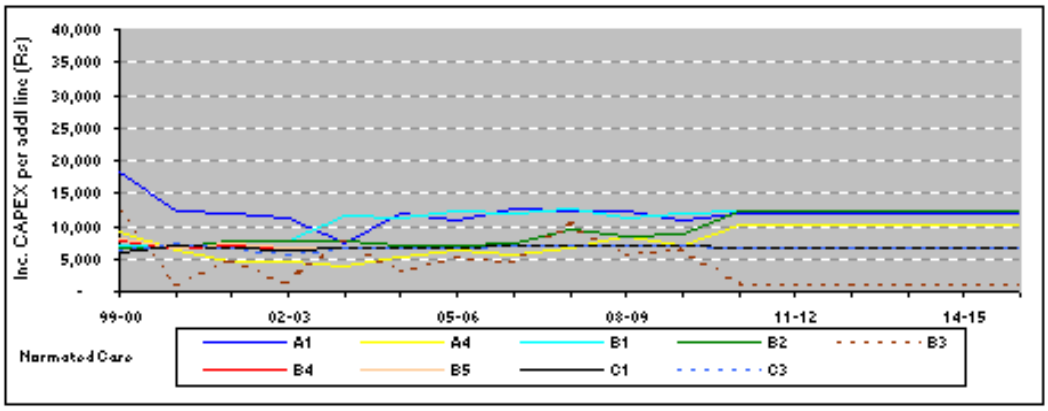
Graph II.3.10 : Circles :Incremental Capex Per Additional Line -Operator case



- The capex per additional line after the initial high levels shows a downward trend till about the 6th year of operation, and then there is an upward movement in some cases, possibly indicating investments in upgradation/expansion, reaching as high as Rs. 34,000 per line (Assuming 85% capacity utilization). This appears high, considering the declining trend in telecom equipment prices, combined with greater efficiency in performance and development of new technology like frequency hopping etc. Such a high level of capex per additional line may not be sustainable even if value addition is presumed instead of reduction in prices, considering technology trends and reduction in input costs.

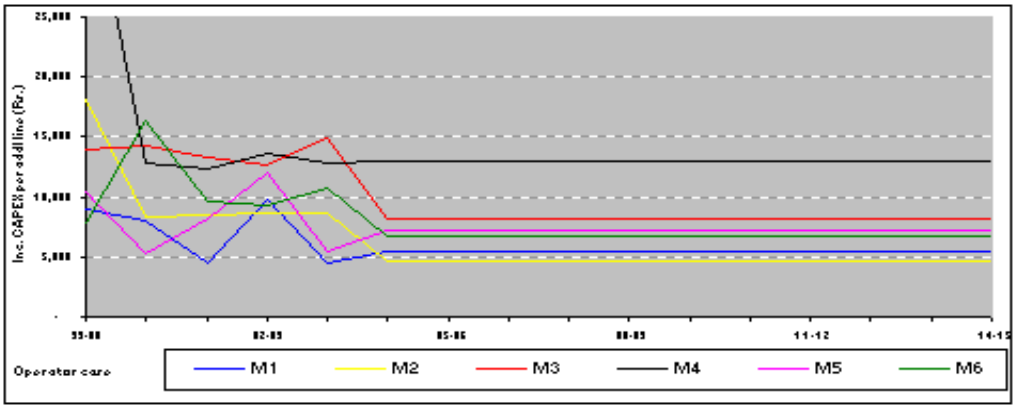
- The following graphs give the normated incremental capex per additional line. After the initial years, the incremental capital expenditure per additional line is not expected to rise above Rs. 20,000 and may be much lower in many cases. The normated incremental capex per additional line varies between about Rs. 20,000 in year 4 to about Rs. 12,000 in year 20. If due to broadbanding of licenses at some future date, hybrid exchange equipment (capable of handling both fixed and mobile telephony) is installed, it is presumed that the operators would do so at a juncture when it is economically viable. Since the present study examines the impact on cellular mobile business case, it is assumed that the applicable capex will not be more than the stand-alone CMS exchange.

Graph II.3.11 : Circles : Incremental Capex Per Additional Line – Normated case

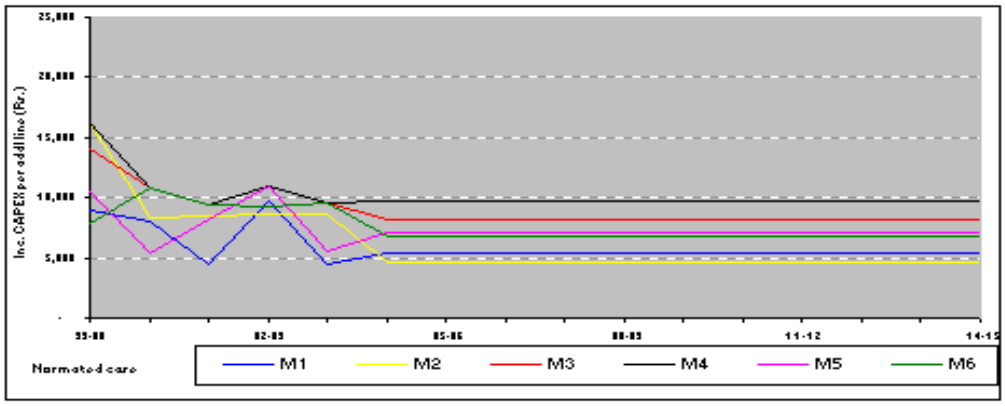


- As explained in Part II Chapter 2, the normation has been done category wise and from the fourth year of operation in case of circles and fifth year of operation in case of metros.
- The following graphs illustrate the normated capex for the metros.

Graph II.3.12 : Metros :Incremental Capex Per Additional Line -Operator case



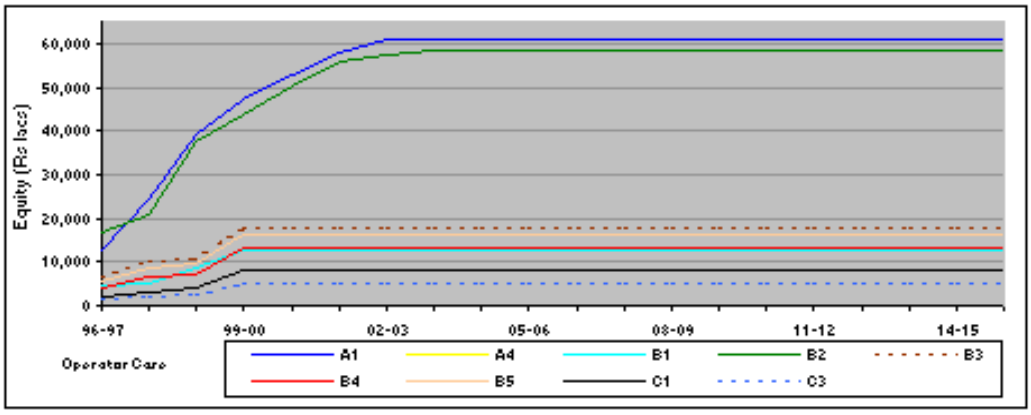
Graph II.3.13 : Metros : Incremental Capex Per Additional Line – Normated case



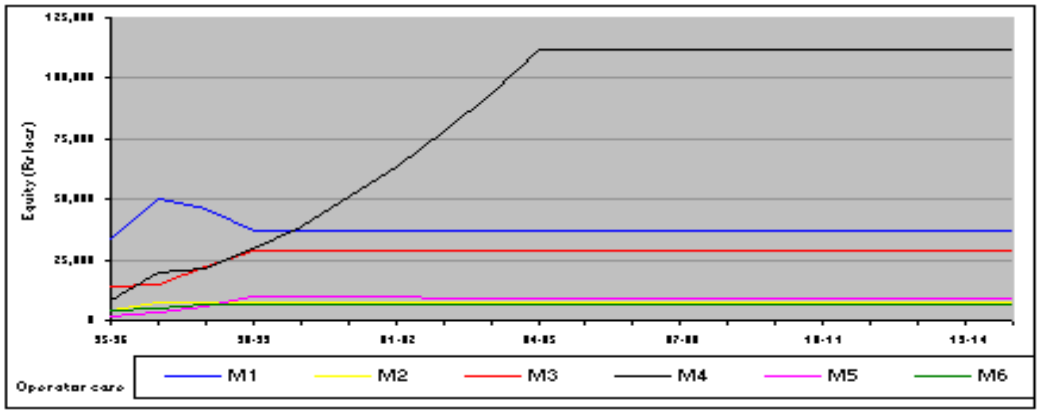
Project Funding Requirement

- Equity and debt would be required to meet the project funding requirement. The equity requirements have not been normated and taken as provided by the operators in the projections. Equity funding has not been extrapolated since most projects become self-sustaining well before the 10th year. However, in the normated cases, debt component in most cases can be significantly reduced on the basis of available surplus cash at the end of a year being used to repay, to the extent possible, some amount of the outstanding principal during that year. Further, though some of the circle operator cases have loans outstanding at the end of the 15-year license tenure, it is found that all debt can be retired during the 20-year tenure in the normated cases. The following graphs indicate the equity and debt requirements for sustaining the given business case. Generally a higher level of equity is seen in the Category 'A' circles. This corresponds to higher total capital expenditure projected for these circles.

Graph II.3.14 : Circles : Equity – Operator case

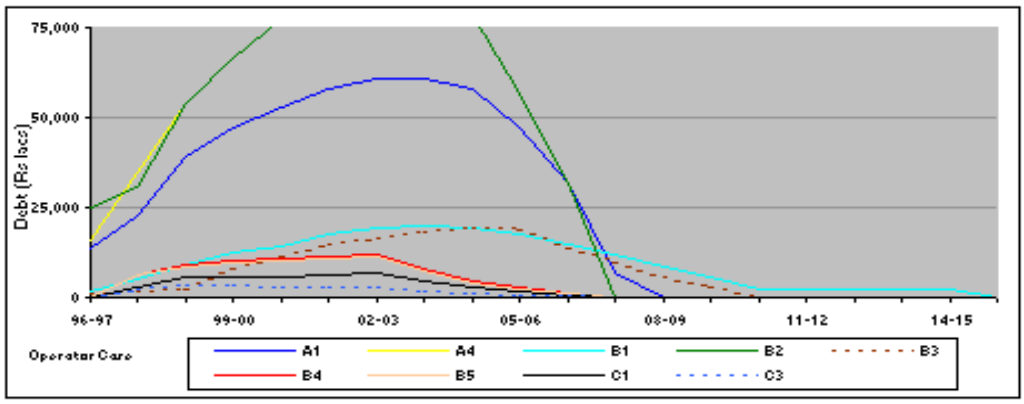


Graph II.3.15 : Metros : Equity – Operator case

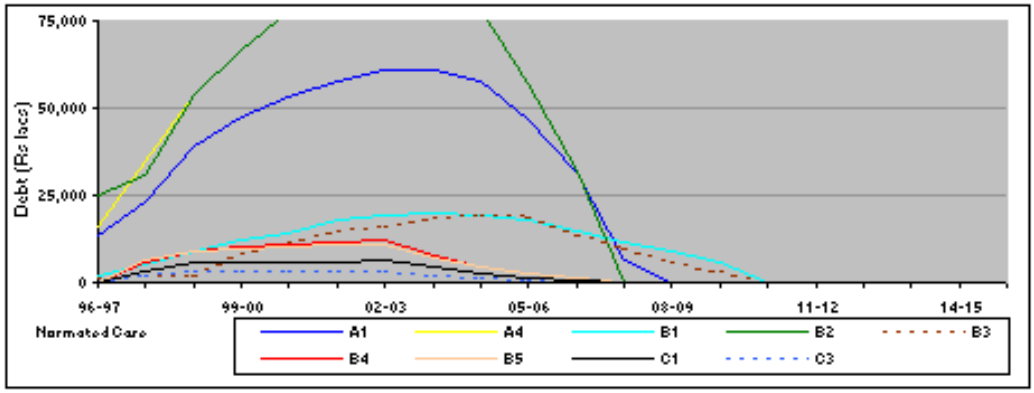


- Very high levels of debt have been projected by some operators, particularly as demand picks up. However most operators find it necessary to inject equity in the early phases of the project and then maintain it at a constant level as the project becomes self-supporting.
- As far as debt is concerned, the picture shows a trend of higher debt in the beginning and middle years which is retired as revenue streams improve and initial gestation period comes to an end.

Graph II.3.16 : Circles : Debt - Operator case

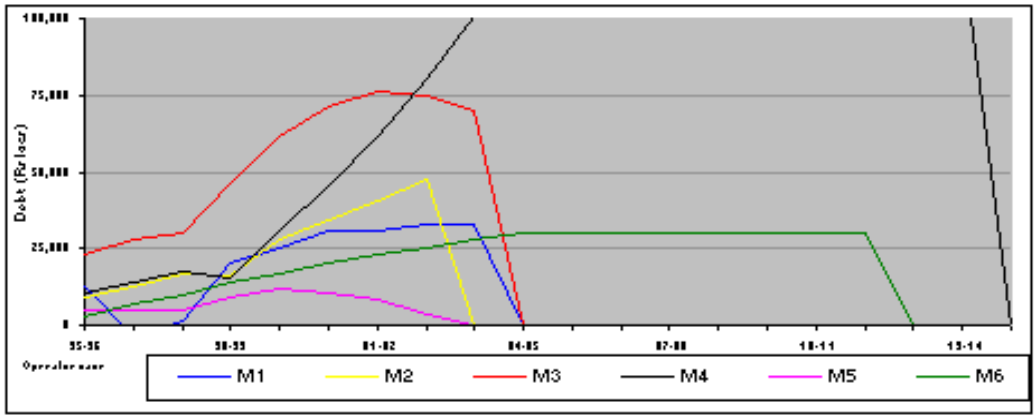


Graph II.3.17 : Circles :Debt - Normated case

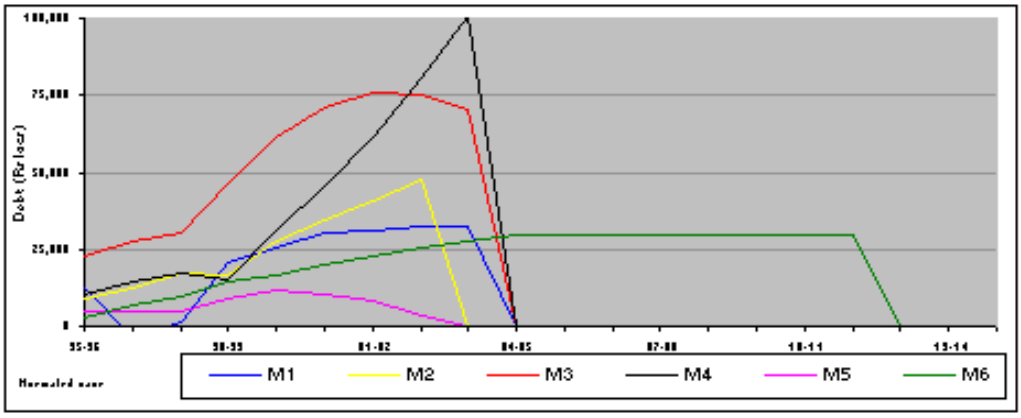


- Debt can be repaid in accordance with cash balance available and remains within the permissible level of debt-equity ratio of 2:1.
- The position of debt for Metros is presented below. Most Metro operators expect to reduce the debt burden significantly by the 10th year.

Graph II.3.18 : Metros : Debt - Operator case



Graph II.3.19 : Metros : Debt – Normated case



- It should be noted that once revenue sharing arrangement is in place, the projects are expected to show a considerable improvement in profitability, which would help reduce debt and enable these projects to raise equity resources from the market at a premium. These equity resources would replace debt and result in further reduction in the debt burden of the projects.

1. **Analysis of Project Viability**

1. This section presents an analysis of the projected financial statements as provided by the operators. They have been corrected by removal of inconsistencies and normation as has been detailed earlier. The analysis is based on DCF technique as explained in Part II Chapter 2. The major results of the analysis are discussed below.

Profit After Tax (PAT) and Accumulated Profit/Loss

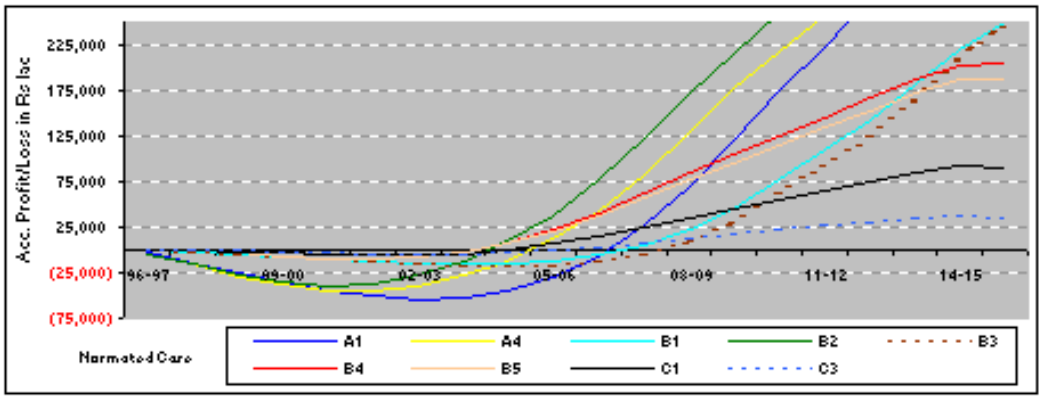
2. The trends in PAT show that none of the circle operators expect to have positive PAT till about the 6th year of operation. The following graphs give the trends in PAT.

Graph II.3.20 : Circles : Profit after Tax –Operator case

Graph II.3.21: Circles : Profit after Tax – Normated case

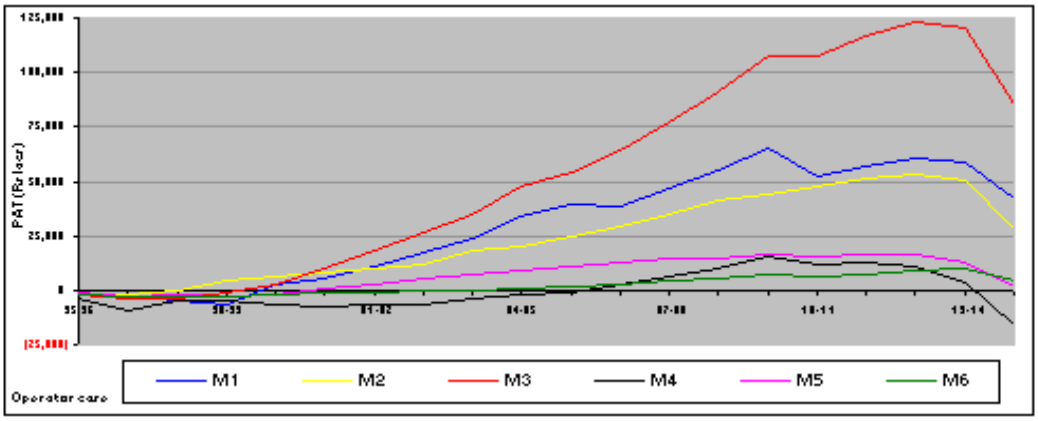
3. Most Circle operators become profitable by 7th-8th year of operation but continue to bear the burden of accumulated losses till around the 10th year of operation.

Graph II.3.22 : Circles : Accumulated Profit/Loss – Normated case

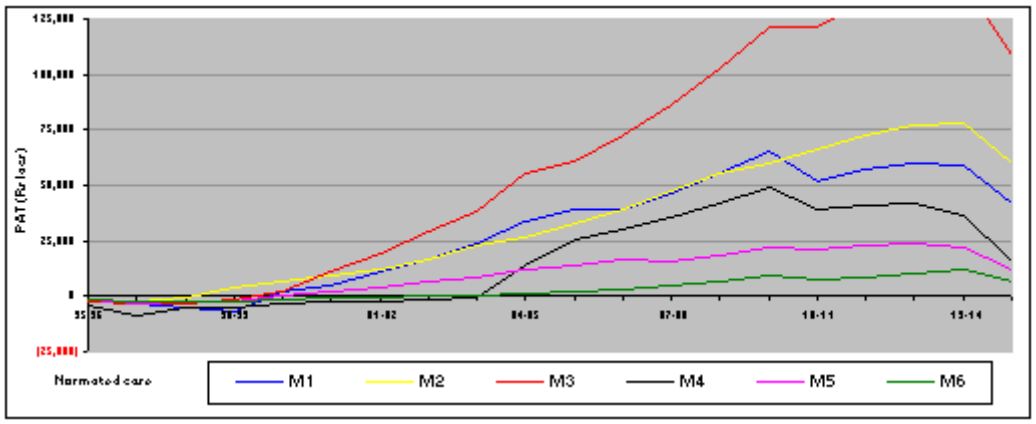


4. Most operators in Metros expect to become profitable before the 6th-7th year of operation but accumulated losses would be wiped out by the 8th-9th year. The status of PAT and accumulated profits/loss for Metros has been presented below.

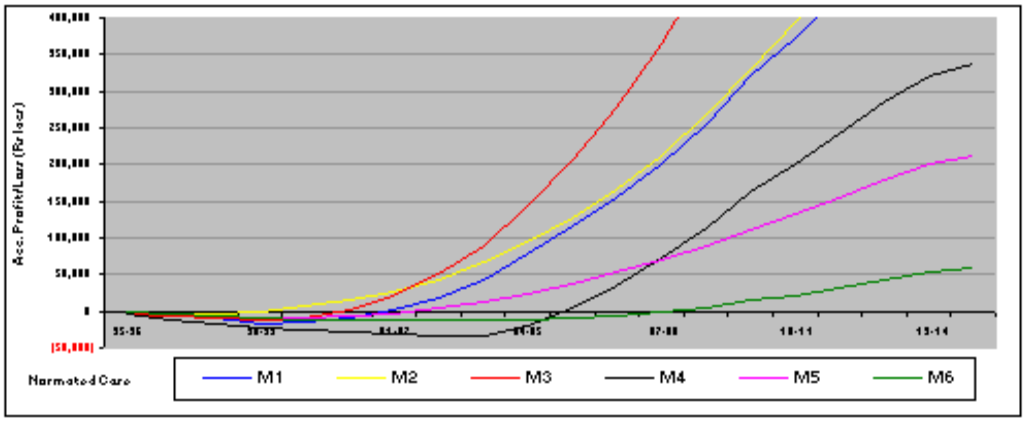
Graph II.3.23 : Metros : Profit after Tax – Operator case



Graph II.3.24 : Metros : Profit after Tax – Normated case



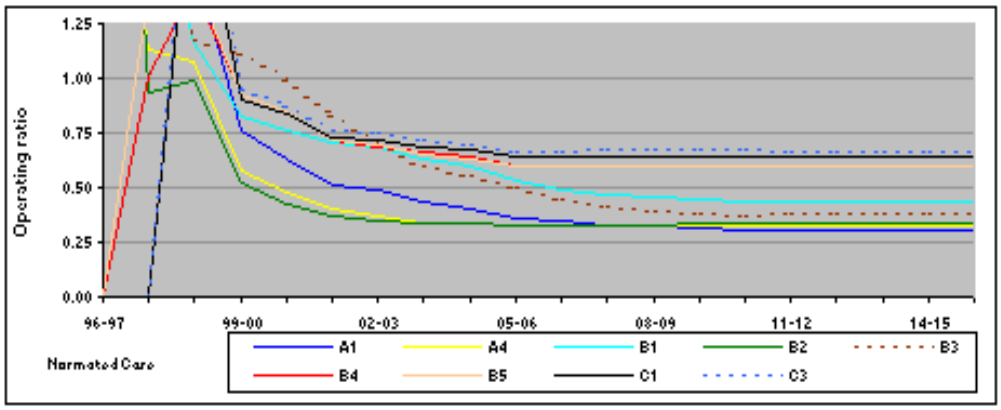
Graph II.3.25 : Metros : Accumulated Profit/Loss - Normated Case



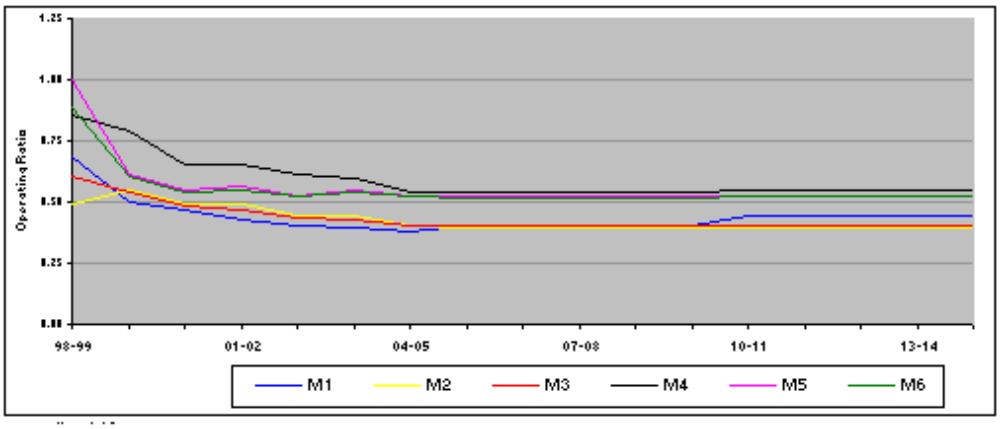
Operating Ratio

5. As the projects mature and attain stability, the operating ratio which measures the operating cost as a proportion of sales shows a downward trend and attains reasonable levels beyond 5th year of operation.

Graph II.3.26 : Circles : Operating Ratio - Normated Case



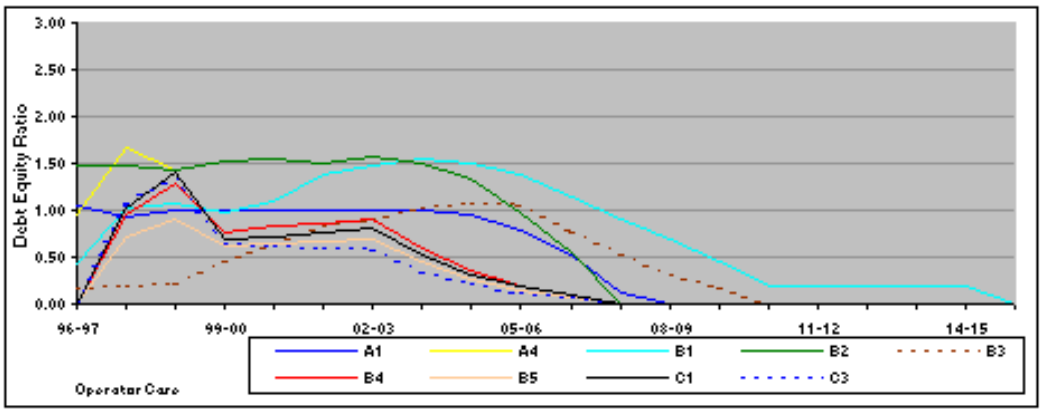
Graph II.3.27 : Metros: Operating Ratio - Normated Case



Debt-Equity Ratio

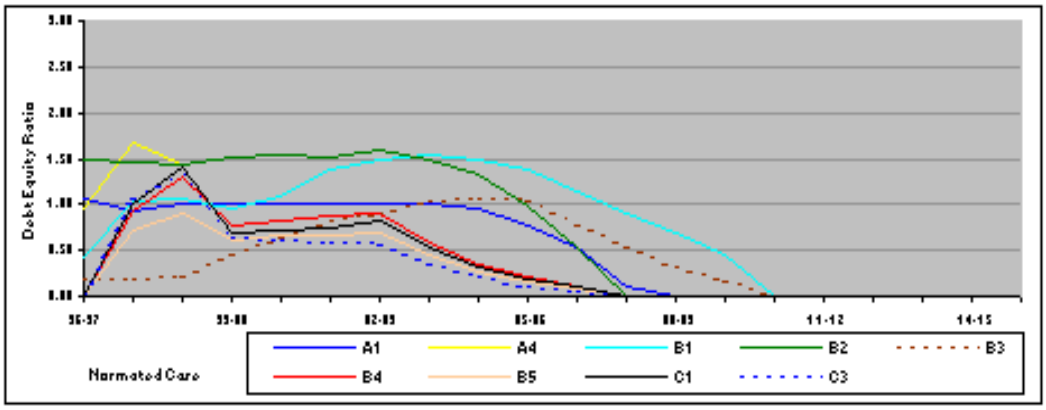
6. The trend of debt-equity ratio varies from project to project, depending upon the financing strategy adopted by operators in respective circles. The debt-equity ratio is typically calculated on the basis of long term debt but the debt profiles in the graphs below include working capital and short term debt as there was no clear distinction between the long term and short term debt in the data provided by some of the operators. Hence the debt-equity ratio may show a level higher than 2:1 in the graphs even if the licensee is complying with the license ceiling of 2:1 for debt-equity ratio. However, the ratio is within the norms (2:1) for most of the operators.

Graph II.3.28 : Circles : Debt-Equity Ratio - Operators Case

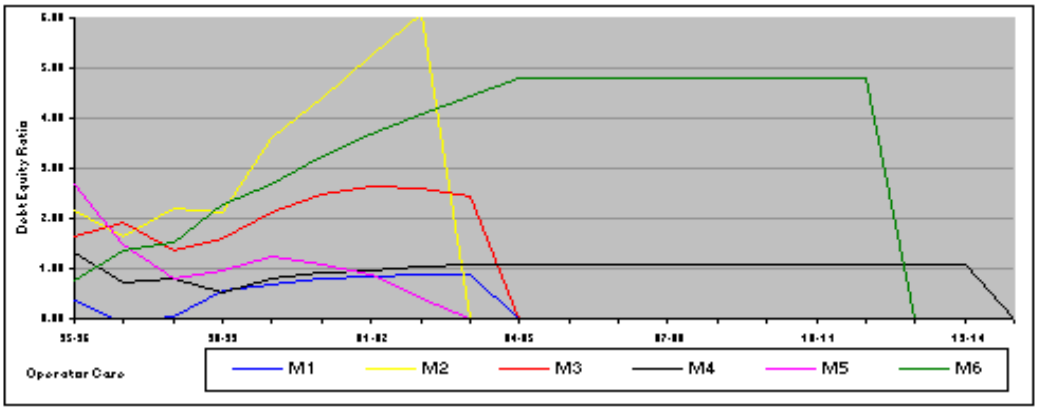


7. As the quantum of debt in the normated case stands moderated taking cash flows into account for servicing and retiring debt, the debt equity ratio is lower in the normated case. All operators are within the 2:1 ceiling.

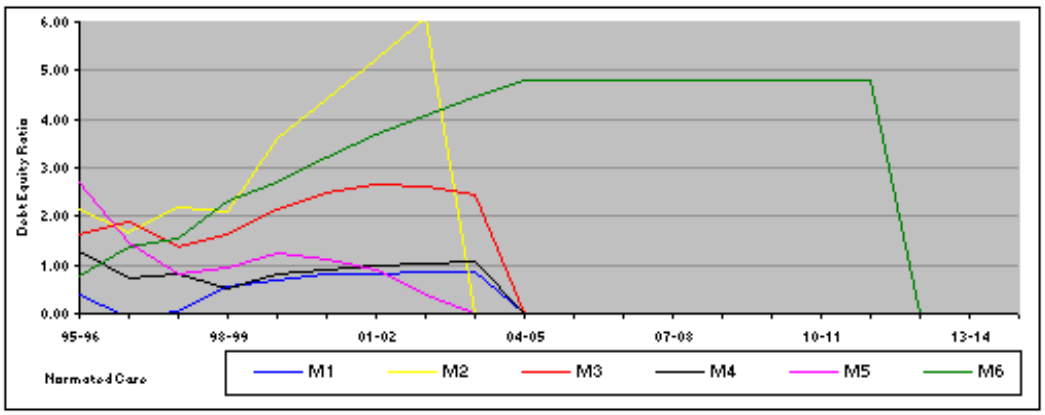
Graph I.2.29 : Circles : Debt-Equity Ratio – Normated Case



Graph II.3.30 : Metros : Debt-Equity Ratio – Operator Case



Graph II.3.31 : Metros : Debt-Equity Ratio – Normated Case



8. The sudden reduction in debt in some cases is due to working capital loans being reduced in the next year. It may be noted that higher debt generally appears in cases where equity levels are low.

1. **Internal Rate of Return (IRR) and Return on Equity (ROE)**

1. The Discounted Cash Flow technique has been applied to analyze the viability of the cellular projects. The free cash flows have been used to arrive at IRR, ROE and DSCR for the various projects. Also the ROCE based on accumulated profits has been calculated. This section presents the IRRs and ROEs for the various projects while other parameters have been discussed in further sections.
2. For infrastructure projects an IRR of 16% to 18% is usually taken as the threshold level. Most investors look for ROE that is at least greater than the rate of interest on deposits. In practice, investors try to maximize returns and may take a long-term view of investments. The ROE is also a function of the financing structure, i.e. the debt equity ratio, for the project.
3. A wide variation is seen among various projects based on the projections. The IRR and ROE for the projects based on a 10-year license period with the fixed license fee as under the old regime for the normated cases of the Circle and Metro CMSPs has been presented in table below.

Table II.3.1 : IRR/ROE for 10 year license period

Fixed license fee commitment - Normated Case

Operator Code	IRR	ROE
CIRCLES		
A1	5.0%	2.1%
A4	14.9%	17.4%
B1	22.8%	24.9%
B2	20.0%	22.9%
B3	-10.2%	-11.6%
B4	21.6%	23.1%
B5	14.7%	14.8%
C1	11.0%	10.2%
C3	5.2%	3.0%
METROS		
M1	23.3%	28.4%
M2	35.8%	51.7%
M3	32.8%	46.7%
M4	10.8%	23.3%
M5	25.1%	26.9%
M6	13.6%	24.5%

4. Further to the NTP'99 and the migration package wherein the operators have been allowed to move to revenue sharing arrangement, the data provided by operators has been extrapolated for 20 years and normation has been conducted to yield a ***20 year Normated Case*** **assuming 0% revenue share as license fee from August 1st, 1999 onwards as the starting point** (further analysis involves license fee at varying revenue share @ 5%, 10% etc). The IRR and ROE for the Operator Case and the Normated Case assuming 0% and 15% revenue share as license fee from August 1, 1999 onwards for a 20-year license period are presented in the table below. The IRRs for 5% and 10% revenue share would lie between the range of IRRs at 0% and 15%, while for revenue shares greater than 15%, the IRRs would be lower. As this analysis has to be further developed for the impact of changes in the external environment, IRR's/ROE's for the other options of revenue share have not been exhibited.

Table II.3.2: IRR/ROE for 20 year license period

Assuming Rev Share as lic. fee from Aug 1, 1999 onwards

	Operator Case				Normated Case			
Lic. Fee	**0%**		**15%**		**0%**		**15%**	
Op Code	**IRR**	**ROE**	**IRR**	**ROE**	**IRR**	**ROE**	**IRR**	**ROE**
Circles								
A1	20.3%	20.5%	17.7%	17.1%	24.1%	25.4%	21.6%	22.1%
A4	27.8%	37.7%	24.2%	30.0%	27.8%	37.7%	24.2%	30.0%
B1	12.3%	9.6%	3.4%	-2.2%	29.6%	33.9%	26.4%	29.4%
B2	27.1%	35.3%	23.7%	28.8%	27.3%	35.7%	23.9%	29.2%
B3	15.4%	14.4%	12.5%	10.5%	29.0%	30.8%	26.8%	28.3%
B4	28.0%	29.8%	21.6%	22.3%	29.1%	31.0%	23.1%	24.0%
B5	26.2%	27.8%	20.2%	20.7%	27.8%	29.6%	22.3%	23.1%
C1	23.5%	24.6%	16.5%	16.5%	28.1%	30.1%	22.3%	23.1%
C3	21.2%	21.9%	15.8%	15.8%	22.9%	23.7%	18.0%	18.2%
Metros								
M1	29.2%	33.4%	25.9%	29.6%	29.2%	33.8%	25.9%	29.6%
M2	40.9%	55.8%	34.7%	44.7%	43.7%	59.7%	38.2%	50.2%
M3	36.5%	47.5%	31.7%	39.0%	37.9%	49.7%	33.3%	41.7%
M4	21.6%	22.6%	16.5%	16.2%	26.7%	29.7%	22.1%	23.3%
M5	31.4%	34.1%	25.5%	26.5%	34.7%	38.6%	29.4%	31.4%

M6	24.3%	29.0%	20.6%	23.1%	25.4%	31.7%	21.9%	25.5%

5. The normated case had to be moderated for external environment changes to form the **Base Case** which is further analyzed for the impact of different percentages of revenue share as license fee.

1. **Impact of Changes in External Environment**

1. The normated business case in the above analysis has been subjected to variations that may arise due to changes in external environment. These changes, as discussed in Part II Chapter 2, relate to the impact of tariff changes including the "Calling Party Pays (CPP)" principle, opening up of Domestic Long Distance (DLD), entry of third and fourth operators, direct connectivity with VSNL, opening up of International Long Distance (ILD) and sharing of infrastructure.

Tariff Change and Implementation of Calling Party Pays (CPP) Principle

2. This is expected to be in force in the current financial year, i.e. 1999-2000 and the impact is likely to show up significantly w.e.f. the next financial year, i.e. 2000-01. The introduction of CPP would result in the incoming airtime realization of the CMSPs to be replaced by revenue sharing with the revenue collected by the originating network from the calling party. This is expected to cause a dip in the airtime revenues initially which are likely to be recovered and reach the levels projected earlier, as enhancement in subscriber base and traffic takes place. A conservative increase of 10% in airtime usage has been assumed for calculating the impact on airtime revenues. Further, an increase in the projected subscriber base due to impact of tariff changes has been assumed at a uniform 10% growth year upon year for the balance project period. The decrease in monthly subscriptions (due to proposed reduction in monthly rentals) in the case of Metro projects only has been similarly taken to be 15%. These changes are at moderate levels so as to present a conservative estimate of the overall impact of tariff changes on the project profiles. It should also be noted that for considering the impact of changes in the tariff, the analysis assumes certain average tariff packages as prevalent in Circles and not the standard package given by TRAI. This is consistent with the current experience where service providers operate alternative tariff packages that are different from the standard package of TRAI.

Opening of Domestic Long Distance (DLD)

3. Opening up of DLD to competition through licensing w.e.f. the year 2000, coupled with the expansion of CMSPs' networks, is likely to have a positive impact on the long distance traffic carried by the Circle CMSPs on their own network resulting in retention of increased share of passthru revenues by the CMSPs (This would imply a decrease in the passthru expenses of CMSPs). The share of passthru revenues collected on intra-circle DLD calls would grow, as the operator would carry the call on his network to long distance destinations within

the Circle. In the case of inter-circle DLD calls, the calls would have to be handed over to the DLD operator and to maximize its own share of revenue, the CMSP may carry the calls as far as possible on his network. Further, the CMSP may have revenue sharing arrangements with DLD Operators. However the share of passthru revenues from inter-circle DLD calls that can be retained by the CMSP may not be very large as the DLD operator would seek to be compensated adequately for use of his infrastructure to carry the calls to other circles and overall DLD tariffs are expected to come down.

4. In case of incoming DLD calls, no revenue has been assumed to accrue to the Circle CMSP as the existing interconnect regulation does not provide for a share of long distance calls to the terminating access provider. The revenue accruing due to revenue sharing on incoming calls has already been accounted for in the impact of CPP/tariff.
5. In the case of Metro CMSPs, the revenue which may be earned by Metros by allowing their infrastructure to be used for collecting DLD calls and passing them on to other operators on the borders of their service area, is being accounted for in "Sharing of Infrastructure" discussed below. To avoid any double counting, at this stage the opening of DLD has not been assumed to have a separate impact as no long distance calls are possible within the service areas of the Metro CMSPs.

Entry of Additional Operators

6. Some country studies (notably United Kingdom) demonstrate the effect of entry of third/fourth operators, which is depicted in the table below.

Positive Impact	Negative Impact
Increase in GSM teledensity because of promotional measures adopted leading to higher circle revenue.	Likelihood of "price war" and churn-inducing methods
Loyalty bonuses and quantity discounts encourage usage	Likely reduction in market share would restrict growth and may even lead to reduction in subscriber base for individual operators

7. In the current analysis, the **impact** of entry of third and fourth operators has been assumed in year 6 and 8 respectively as it takes time to set up a network and attract subscribers in the market. This will result in the reduction of market share of the existing CMSPs and an equal market share for all operators has been assumed in about 3 years from the entry of new operators. As the tariffs come down in response to revised license fee regime and competition, the total size of the market is expected to expand considerably. This assumption of market entry is the maximum that is envisaged at this point of time, and could be subject to review at a future date. For the purpose of viability analysis however, this would

adequately reflect the viabilities achievable as a conservative estimate. Further, the assumption of a new operator in addition to DoT/MTNL does not reflect the Authority's view on the timing of entry of the fourth operator and this issue would be dealt with separately.

Direct Connectivity to VSNL and Opening of International Long Distance

8. With the NTP'99 allowing direct connectivity to VSNL for all service providers (SPs), the impact of this has been taken from year 2000-01 onwards. This would result in the increase of the CMSPs overall revenues from both incoming and outgoing international calls, as there may be a revenue sharing arrangement with VSNL, which would be similar to the existing arrangement between VSNL and DoT.

Sharing of infrastructure among SPs

9. With the NTP'99 allowing sharing of infrastructure among SPs in the same service area, an increase in revenues of existing CMSPs is assumed on account of leasing out of the spare capacities on their backbone or local network to other SPs. Sharing of infrastructure coupled with the recent reduction in the leased line charges would also imply a reduction in the projected CAPEX. Correspondingly, a reduction in projected OPEX is also expected.

Overall Impact of Changes in External Environment

10. The impact of these anticipated changes on the normated case yields the ***Base Case*** for analysis of various license fee options. The table below gives a snapshot of the IRR and ROE for the Base Case assuming a 0% revenue share as license fee from August 1st, 1999 onwards. The IRR and ROE for normated cases for the 20-year license period have also been presented for comparison.

Table II.3.3 : Overall Impact of Changes in External Environment on 20 year Case

Assuming 0% rev. share as lic. fee from Aug 1, 1999 onwards

	Normated Case		Base Case	
Op Code	**IRR**	**ROE**	**IRR**	**ROE**
Circles				
A1	24.1%	25.4%	23.7%	25.0%
A4	27.8%	37.7%	27.6%	39.3%
B1	29.6%	33.9%	30.8%	36.2%

B2	27.3%	35.7%	26.9%	36.5%
B3	29.0%	30.8%	28.4%	30.3%
B4	29.1%	31.0%	31.7%	34.5%
B5	27.8%	29.6%	30.1%	32.5%
C1	28.1%	30.1%	30.0%	32.7%
C3	22.9%	23.7%	23.7%	24.8%
Metros				
M1	29.2%	33.8%	25.1%	29.0%
M2	43.7%	59.7%	42.5%	58.9%
M3	37.9%	49.7%	36.2%	48.0%
M4	26.7%	29.7%	26.4%	29.8%
M5	34.7%	38.6%	33.5%	37.4%
M6	25.4%	31.7%	22.3%	26.8%

11. The above analysis is conducted without assuming any license fee from August 1st, 1999 onwards. In the next section, various license fee options as percentage of revenue share are introduced in the analysis and the impact on IRR/ROE for the Base Case has been examined.

1. **License Fee Options**

1. The following options of license fee have been used for further analysis:

    - 5% of Gross Revenue
    - 10% of Gross Revenue
    - 15% of Gross Revenue
    - 20% of Gross Revenue
    - 25% of Gross Revenue

1. Gross revenue has been defined as the revenue derived from licensed activities, including revenue on account of value-added services and supplementary services. It will not include revenue on account of sale of handsets. In case a service provider subsidizes the sale of handsets by giving rebate on the rental tariff or other rebates, the revenue thus forgone will be added to the gross revenue. As already mentioned, service tax is excluded from data and analysis. Further details on the definition of the Gross Revenue have been provided in Part I.

1. **Analysis of License Fee Options**

1. The Base Case has been used to analyze the impact of the various license fee options. The impact of various license fee options on the IRR and ROE of various operators has been provided in the table below.

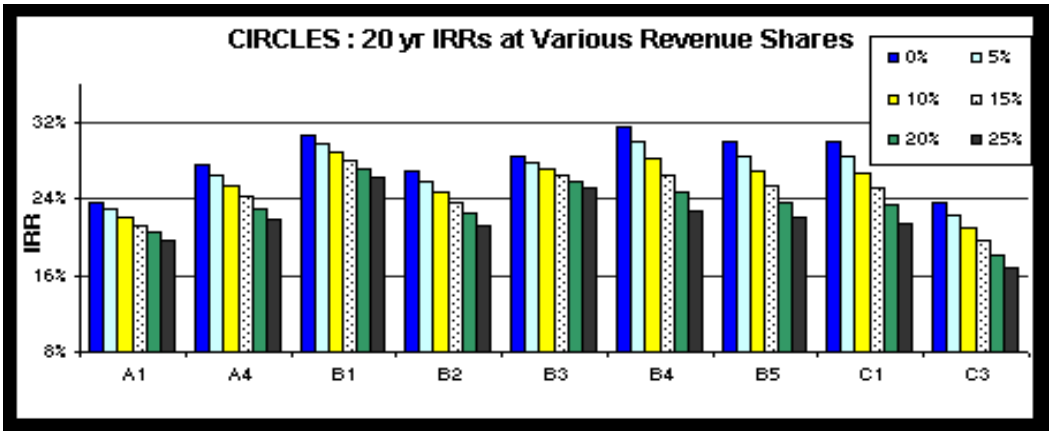
Table II.3.4 : Impact of License Fee Options on Base Case

Assuming Rev Share as lic. fee from Aug 1, 199 onwards

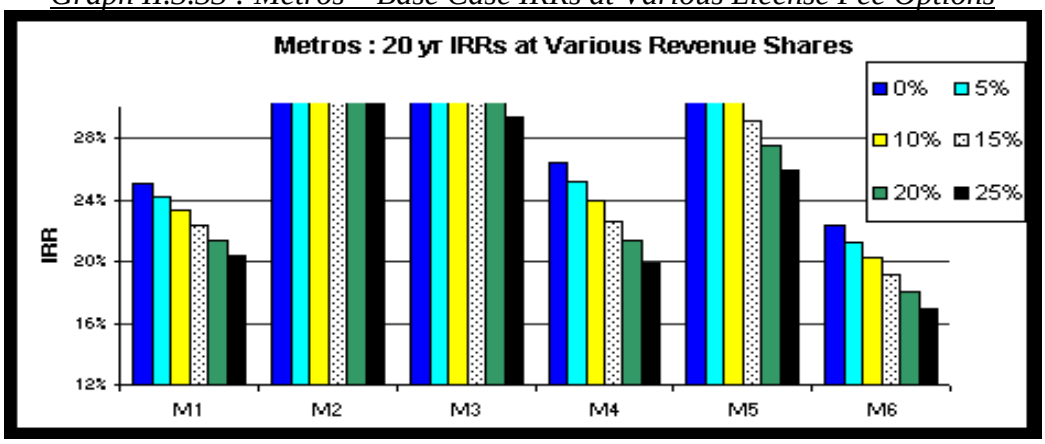
Rev Share	0%		5%		10%		15%		20%		25%	
Op Code	IRR	ROE	IRR	ROE	IRR	ROE	IRR	ROE	IRR	ROE	IRR	ROE
Circles												
A1	23.7%	25.0%	22.9%	23.9%	22.1%	22.8%	21.3%	21.8%	20.5%	20.7%	19.7%	19.6%
A4	27.6%	39.3%	26.5%	36.8%	25.4%	34.2%	24.3%	31.5%	23.1%	28.7%	21.9%	26.1%
B1	30.8%	36.2%	29.9%	34.9%	29.0%	33.5%	28.1%	32.2%	27.2%	30.8%	26.2%	29.4%
B2	26.9%	36.5%	25.8%	34.3%	24.7%	32.1%	23.6%	29.8%	22.5%	27.5%	21.3%	25.2%
B3	28.4%	30.3%	27.8%	29.6%	27.2%	28.8%	26.5%	28.0%	25.9%	27.3%	25.2%	26.5%
B4	31.7%	34.5%	30.0%	32.4%	28.2%	30.3%	26.5%	28.1%	24.7%	26.0%	22.9%	23.8%
B5	30.1%	32.5%	28.6%	30.6%	27.0%	28.7%	25.4%	26.8%	23.7%	24.8%	22.0%	22.8%
C1	30.0%	32.7%	28.4%	30.8%	26.8%	28.7%	25.1%	26.7%	23.4%	24.5%	21.6%	22.4%
C3	23.7%	24.8%	22.4%	23.3%	21.1%	21.7%	19.7%	20.1%	18.2%	18.5%	16.8%	16.8%
Metros												
M1	25.1%	29.0%	24.2%	27.9%	23.3%	26.7%	22.4%	25.5%	21.4%	24.4%	20.4%	23.1%
M2	42.5%	58.9%	41.0%	56.2%	39.4%	53.4%	37.7%	50.4%	36.0%	47.3%	34.2%	43.9%
M3	36.2%	48.0%	34.9%	45.7%	33.6%	43.3%	32.2%	40.8%	30.8%	38.2%	29.4%	35.6%
M4	26.4%	29.8%	25.2%	28.0%	23.9%	26.2%	22.6%	24.4%	21.3%	22.5%	19.9%	20.6%
M5	33.5%	37.4%	32.1%	35.4%	30.6%	33.3%	29.1%	31.2%	27.5%	29.2%	25.9%	27.0%
M6	22.3%	26.8%	21.3%	24.9%	20.3%	23.2%	19.2%	21.4%	18.1%	19.2%	16.9%	16.8%

2. The IRRs for the Base cases have been also been presented in the chart below.

Graph II.3.32 : Circle – Base Case IRRs at Various License fee Options



Graph II.3.33 : Metros – Base Case IRRs at Various License Fee Options



1. **Analysis based on Adjusted Gross Revenue**

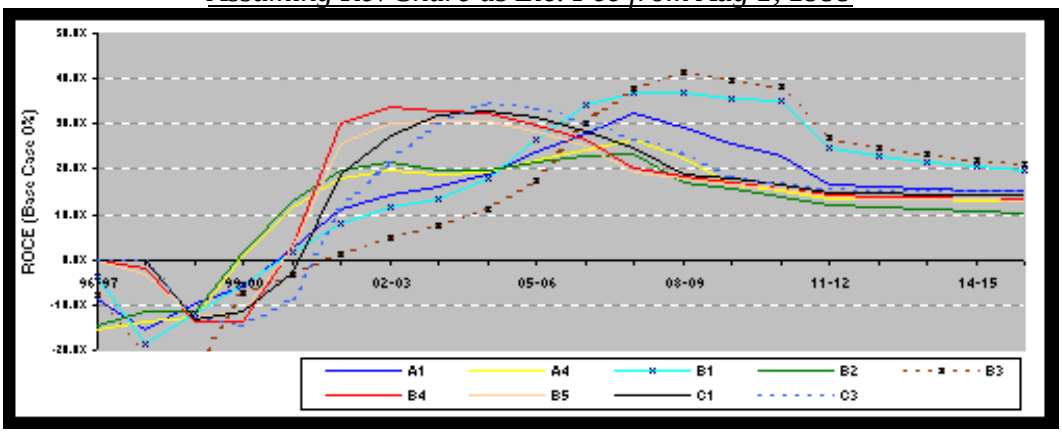
1. The above analysis on IRR/ROE relating to license fee options from 0% to 25% on Adjusted Gross Revenue which also excludes passthru' revenue, have been presented in **Annexure II** as an additional input.

1. **Impact on ROCE**

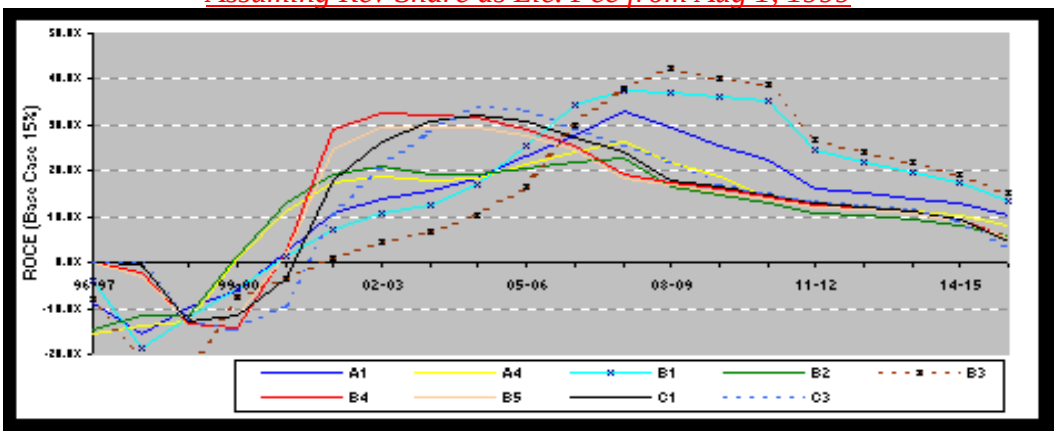
1. ROCE (Return on Capital Employed) has been calculated as the post-tax Earnings Before Interest and Tax (EBIT) (PAT + Interest) divided by the sum of Net Fixed Assets, Net Current Assets (adjusted for cash balance and customer deposits) and capitalized license fees. It must be noted that since no investments have been assumed to be made from the surplus cash balances which start accruing at a future point in the study period, the cash balances figure as idle assets and the ROCE calculated would, therefore, be lower than the actual ROCE (taking into account the return generated from surplus cash). The ROCE for the various

projects for the operator case, normated case and base case (at various license options) has been presented in the tables and graphs below. The ROCE calculated does not show improvements with normation of the operator case as the surplus cash increases on normation and since this has been treated as idle asset, the asset productivity shows a decline. The ROCE for the various projects for Base Case at 0% and 15% license fee options with Gross Revenue have been presented below.

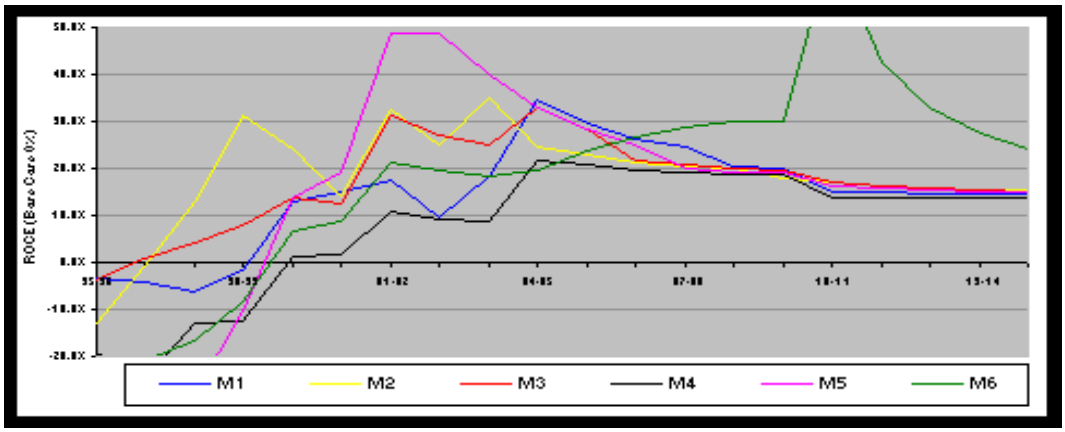
Graph II.3.34 : Circles : ROCE for Base Case at 0% Revenue Share Assuming Rev Share as Lic. Fee from Aug 1, 1999



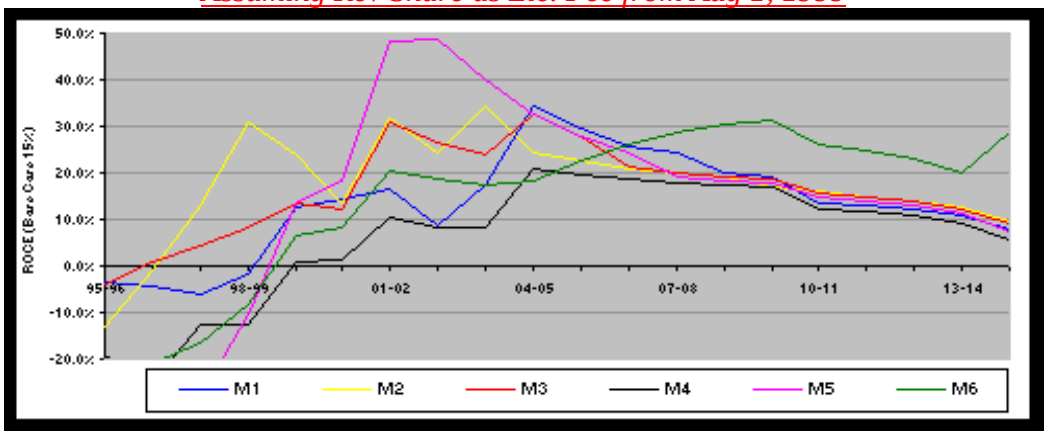
Graph II.3.35 : Circles : ROCE for Base Case at 15% Revenue Share Assuming Rev Share as Lic. Fee from Aug 1, 1999



\Graph II.3.36 : Metros : ROCE for Base Case at 0% Revenue Share Assuming Rev Share as Lic. Fee from Aug 1, 1999



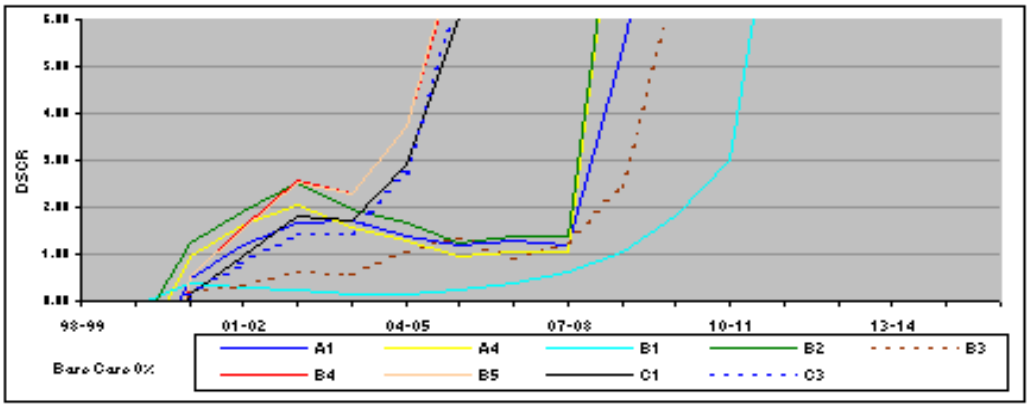
Graph II.3.37 : Metros : ROCE for Base Case at 15% Revenue Share Assuming Rev Share as Lic. Fee from Aug 1, 1999



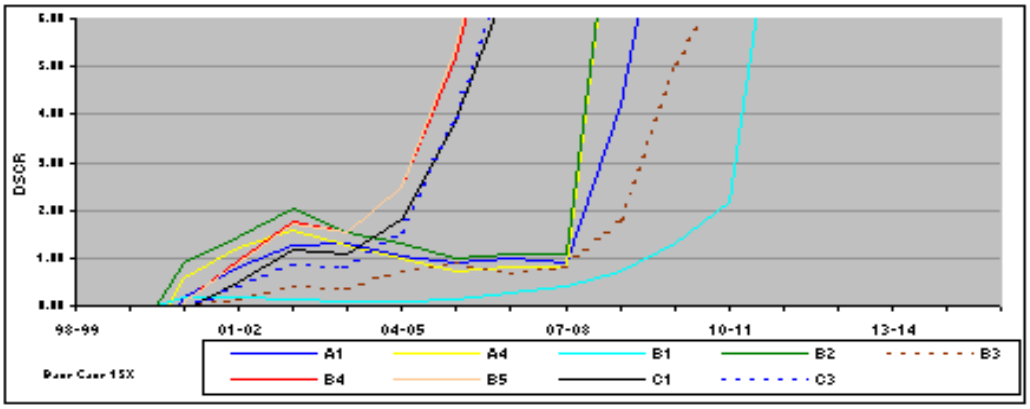
1. **Impact on DSCR**

1. DSCR (Debt Service Coverage Ratio) indicates the ability of the projects to make payments related to debt, i.e. interest and principal repayments. For the purpose of the current analysis, the DSCR has been calculated as the free operational cash flows available to the firm divided by the debt servicing (interest and principal repayment). The impact of various license fee options on the DSCR for the base case at 0% and 15% revenue shares has been presented in the graphs below. Most Circle projects achieve a reasonable level of DCSR by 7-8th year of operations.

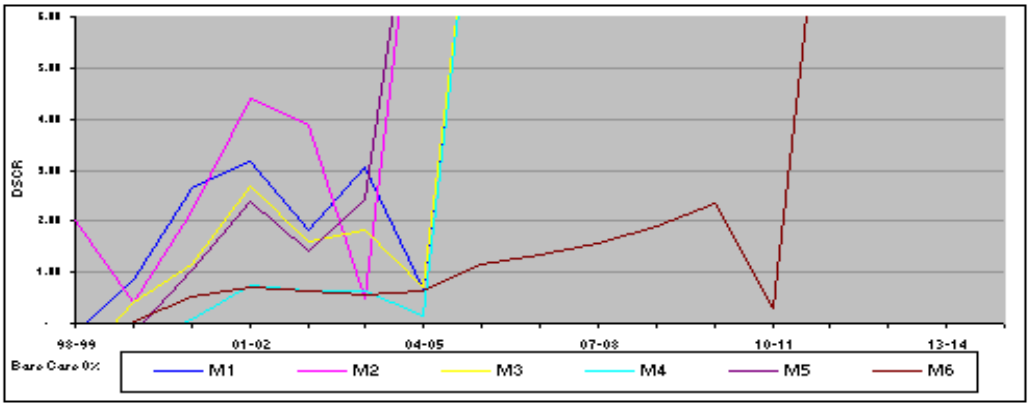
Graph II.3.38 : Circles : DSCR for Base Case at 0% Revenue Share Assuming Rev Share as Lic. Fee from Aug 1, 1999 onwards



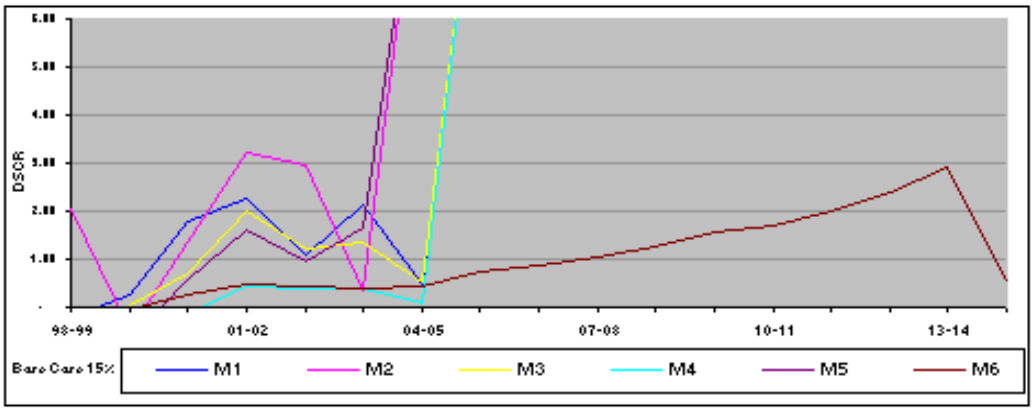
Graph II.3.39 : Circles : DSCR for Base Case at 15% Revenue Share
Assuming Rev Share as Lic. Fee from Aug 1, 1999 onwards



Graph II.3.40 : Metros : DSCR for Base Case at 0% Revenue Share
Assuming Rev Share as Lic. Fee from Aug 1, 1999 onwards



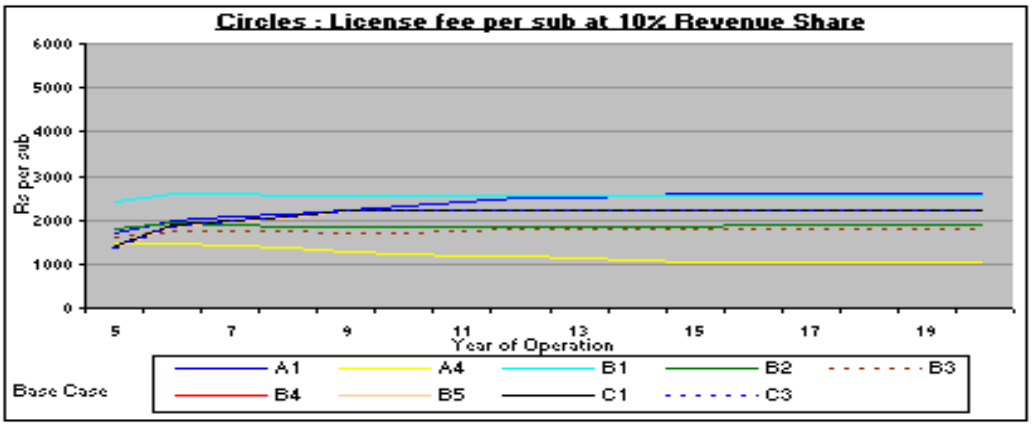
Graph II.3.41 : Metros : DSCR for Base Case at 15% Revenue Share
Assuming Rev Share as Lic. Fee from Aug 1, 1999 onwards



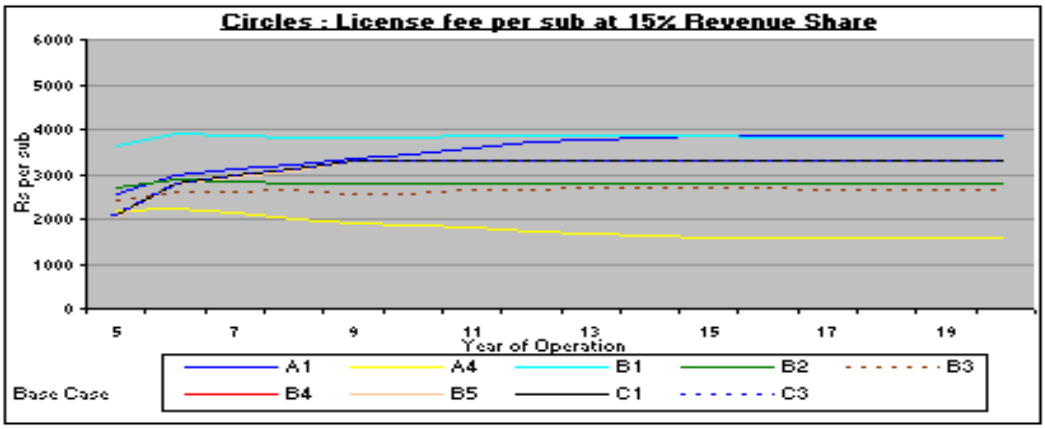
1. **Assessment of License fee**

1. To assess the likely amount of license fee payable for the 20 year license period under the revenue sharing arrangement, license fee in terms of amount per subscriber for year-on-year has been calculated and is presented in the graphs below. The license fee per subscriber for the projects at a revenue share of 15% lies in the range of Rs.1550 to Rs. 3950 p.a for circles and Rs.1600 to Rs.3950 p.a for metros.

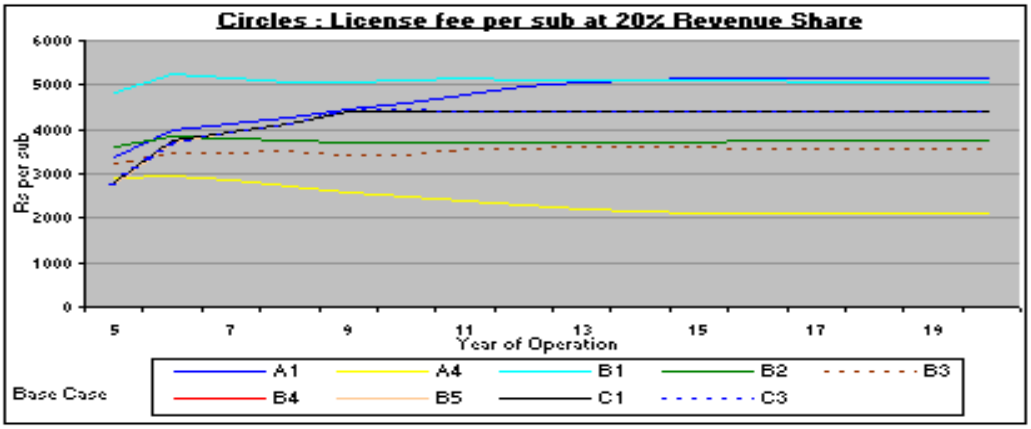
Graph II.3.42



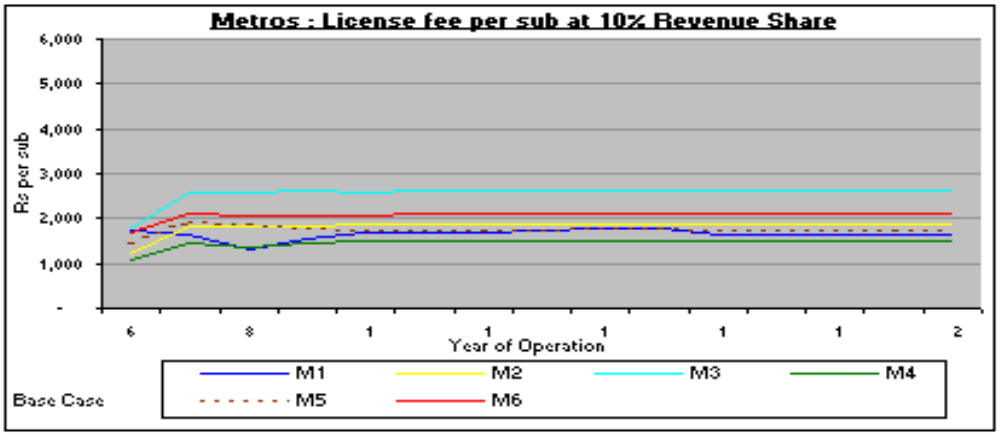
Graph II.3.43



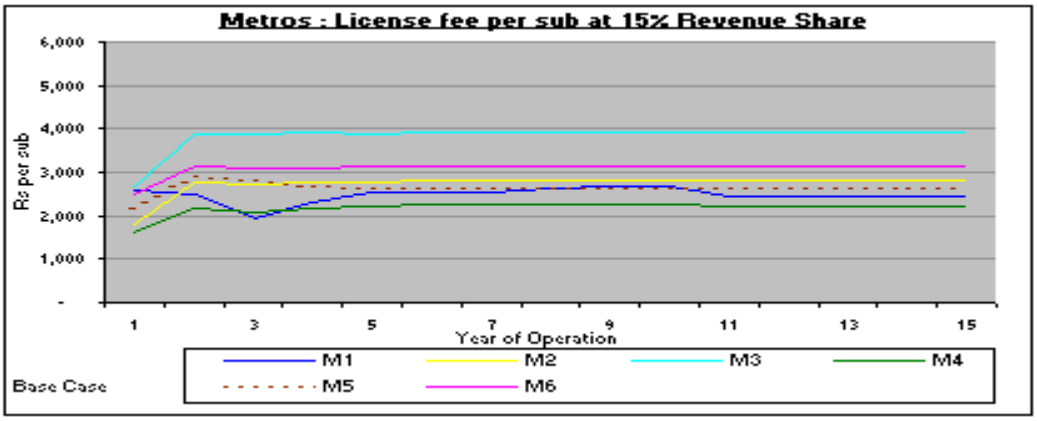
Graph II.3.44



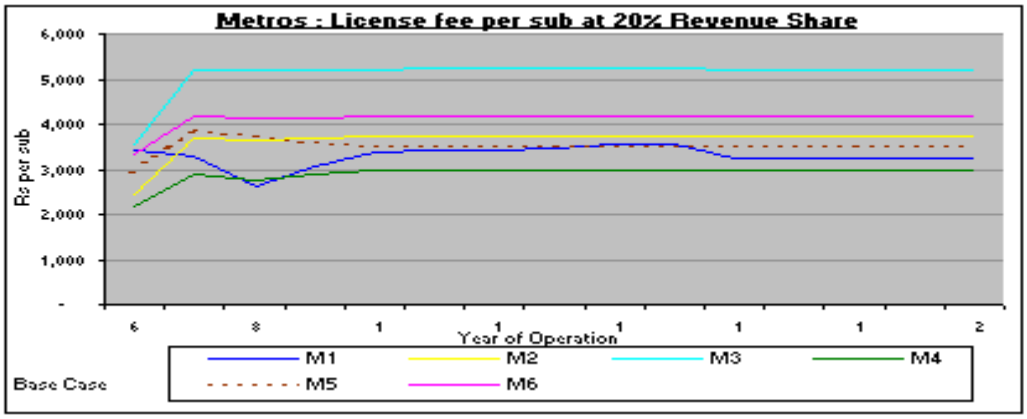
Graph II.3.45



Graph II.3.46



Graph II.3.47



2. The amounts of license fee payable at 15% revenue share for the 10-year period as compared with earlier fixed fee regime are presented in the table below.

Table II.3.5 : Comparison of Lic fee payable under Revenue Sharing and Fixed fee Regimes for Select CMSPs

All figures in Rs lacs

Lic fee committed for 10 year (A)	Lic fee payable till 31.7.99	License fee at 15% from 1.8.99 till 10th year	Total Lic. fee at 15% (B)	Ratio B as % of A
75,156	8,433	27,596	36,029	48%
139,300	44,323	29,966	74,289	53%
59,495	6,621	25,760	32,381	54%
13,655	1,853	7,104	8,957	66%

126,600	40,281	56,099	96,380	76%
8,922	8,029	3,370	11,399	128%
21,088	18,978	20,207	39,185	186%

1. **Entry fee**

1. It would be seen that the existing operators have already paid certain amounts (or these amounts are expected to be paid) with regard to license fees. The amount works out to Rs 6970 crore for Circles and Rs 409 crore for Metros. It would be seen that significant amounts have been paid / are payable by Circle CMSPs in the initial years and up to 31.7.1999. On migration, the amount of license fee of Circles up to 31.7.1999 is to be treated as an entry fee. It is also noted that in the case of Circles, the payment of license fee started from the effective date itself. Hence for operators in a service area who are committed to the same schedule of payments but payment starts later for one of them due to later effective date, the amount due till 31.7.1999 would be different.
2. As far as Metro operators are concerned, the fixed license fee they paid for the first three years, started about 12 months after the effective date of license (or from date of commissioning if it was earlier than 12 months). The actual payment for 3 years ranged from Rs 7 Crore (for Chennai) to Rs 24 Crore (for Mumbai). The Metro CMS projects have better subscriber base than most Circles. The entry fee for Metros is less than that for Circles and payment did not start at the time of effective date. On the other hand, Metro operators are not responsible for the high license fees bid/accepted by the Circles and therefore it may be difficult to suggest that the entry fee for Metros be correlated with that of the Circles.
3. The NTP 99 envisages DoT / MTNL as the third operator who will pay license fee for cellular operations (which will be reimbursed by the Finance Ministry). The percentage of revenue from such operations, which will form the license fee, would be as determined after finalization of TRAI's recommendations. The fourth operator who would be selected through bidding process would also pay the same percentage of revenue as license fee as determined for others. However, in the case of the fourth operator, the selection in the bidding process could itself be in terms of entry fee quoted. This would not only enable a transparent selection mechanism but also allow market forces to prevail for fixing the entry fee for the fourth operator, who may enter at a different point in time as compared to the earlier three operators.

1. **Sensitivity Analysis**

- In order to assess the different license fee options in the context of the analysis based on projections that may vary, the analysis for each option has been subjected to variations in the key parameters in the next chapter. This sensitivity analysis will enable a better appreciation of each license fee option under varying conditions affecting the project.

- Since the main analysis is based on certain assumptions, it is necessary to examine the impact of variation in the projected figures. This is done under sensitivity analysis in which the main analysis is subjected to variations in key parameters.