Asia-Pacific
Economic Cooperation

Evaluation of Access to Domestic and International Leased Lines in the APEC Region

APEC Telecommunications and Information Working Group Meeting
APEC TEL 34

Auckland, New Zealand
October 23 - 28, 2006

Telecommunications and Information Working Group

November 2006

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APEC Publication Number APEC#206-TC-01.2

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Executive Summary

In order to ensure that the Asia Pacific Economic Cooperation (APEC) member economies can achieve competitive telecommunications markets in their regions, leased lines have been identified as one of the keys to advancing the development of policies to promote competition. Given that leased lines serve as the basis for the current telecommunications infrastructure, and additionally serve as the underpinning of the Internet, the ability to provide equitable access to leased lines accompanied by reasonable terms and conditions is integral to the development of competitive markets.

This report provides a review of the directives and policy statements issued by APEC to date which have identified and articulated the need for competition and in particular have noted the importance to promote and achieve competitive markets for telecommunications. In the Program of Action approved at TELMIN6 in June 2005, APEC TEL Ministers instructed TEL to undertake the "Evaluation of Access to Domestic and International Leased Lines in the APEC region" project as follows:

> *II. Enabling Digital Opportunities through Effective Policy and Regulation*
> *"l) Undertake the proposed project on Evaluation of Access to Domestic and International Leased Lines in the APEC Region"*

The role of leased lines in the promotion of competitive markets has been established by a number of international entities including the Organization for Economic Cooperation and Development (OECD), the European Union (EU), and the International Telecommunication Users Group (INTUG). These groups have focused on the correlation of pricing and competitive growth for leased lines and in some cases have also looked at provisioning of leased line services among member economies.

As a starting point to assess and analyze the levels of access to and use of leased lines in member economies, a survey research design was developed to collect and analyze pertinent data to assess a range of deployment and provisioning issues concerning leased lines as well as pricing and service quality issues. This survey was disseminated to all APEC member economies with ample time provided to submit results.

It is unfortunate that the majority of member economies did not submit a response. As such, the analyses included in this report and the accompanying graphs representing results submitted does not accurately reflect the status of leased lines in the region. In order for APEC to fully address the issue of leased lines it is critically important that member economies provide responses to the survey distributed.

1.0 Introduction

The ability to achieve a sustainable competitive marketplace for telecommunications services is a goal held by many countries. The means by which competition can be achieved is through the development and implementation of sound policies and regulations that strive to ensure that all entities seeking to enter a market to offer service can do so in an equitable and efficient manner.

Important for the growth of competitive telecommunications markets is the availability of accessible and affordable leased lines. A leased line is a dedicated private connection that can be used for the transmission of voice and data or Internet access. The growth and development of a vibrant and vigorous Internet marketplace and the proliferation of Internet Service Providers (ISPs) will be predicated on the establishment of competitive policies that support competition.

The Asia Pacific Economic Cooperation Telecommunications and Information Working Group (APEC TEL) has recognized the important role that leased lines will play in the evolution of competition in the telecommunications sector and the future growth of the industry. As such, it has commenced the *"Evaluation of Access to Domestic and International Leased Lines in the APEC Region"* project as a way to begin to survey the landscape of leased line policies currently implemented in the region and to review the current data available to assess the status of the level of competitive leased line markets across member economies. By attempting to take a comprehensive view of access to and use of leased lines in member economies, APEC TEL can continue with its efforts to promote and secure the development of leased line policies that will support economic growth.

2.0 Project Background

There has been a clear recognition within the APEC leadership of the need to develop competitive policies that will foster future developments and growth within member economies. It is helpful to review some of the major policy statements from the APEC leadership that outline and encourage the development of policies that support competition, especially with respect to leased lines. This is best evidenced by several actions taken by the APEC leaders over the last several years.

What this project seeks to do is provide a greater understanding of where leased line policies and regulations currently stand across member economies and enable APEC members to assess how these policies are evolving and provide them a basis for deliberation on what action, if any, may be necessary.

Action Agenda for the New Economy

Recognizing the importance of competition throughout the region with respect to telecommunications services, in 2000, the APEC Economic Leaders issued a declaration as part of its Action Agenda for the New Economy.[1] Prioritizing the creation of an environment to strengthen market structures and institutions, the leadership directed the APEC economies to "work towards pro-competitive and market based policy frameworks for liberalization in trade in telecommunications and IT services."[2]

Even beyond the recognition of the need for competitive policies, the Action Agenda noted the need to create an environment conducive to infrastructure investment, technology development, and entrepreneurship, highlighting specifically the value and role to be played by the information and communications technology (ICT) sector. Indeed, the very essence of the ICT marketplace centers around leased lines supporting the promulgation of Internet-based service offerings. All matters of electronic commerce and electronic government start at the very root of a leased line connection to sustain and foster development of these intricate systems.

Gold Coast Declaration

The critical role of the telecommunications infrastructure within the Asia-Pacific region was recognized, and made as part of the second APEC Ministerial Meeting on Telecommunications and Information Industry.[3] This action, referred to as the Gold Coast Declaration, notes several instances where liberalization is necessary and should result in the creation of competitive policies.

The Gold Coast Declaration also directed APEC TEL to facilitate business in the region through the promotion of electronic commerce and enhancing the use of the Internet as a means to expand electronic commerce. Without adequate policies for leased lines, the growth and expansion of the Internet is compromised and more importantly the potential for electronic commerce applications is significantly stalled.

Stocktake of Progress

In the 2004 "Stocktake of Progress Towards the Key Elements of a Fully Liberalised Telecommunications Sector in the APEC Region," the focus on leased lines was clear and specifically acknowledged as pivotal to the development of new services. In particular, the report notes in its discussion of Voice over Internet Protocol that "leased lines are an even more important dimension for Internet policy in all markets. Flat rate

[1] APEC Economic Leaders Declaration: Delivering to the Community, Bandar Seri Begawan, Brunei Darussalam, 16 November 2000, Annex 1 Action Agenda for the New Economy.
[2] Ibid.
[3] Second APEC Ministerial Meeting on Telecommunications & Information Industry, Gold Coast, Australia, September 5-6, 1996, "Gold Coast Declaration."

interconnection is about the end-user access to an Internet Service Provider (ISP). Leased Lines are how ISPs connect to Internet backbones and are usually provided by the incumbent. Leased line pricing is also important for business users in every market."[4]

The Stocktake also made a specific recommendation concerning leased lines noting that "APEC economies could consider monitoring and publishing leased line prices and provisioning as was done by the EU."[5] This project undertakes the first steps towards achieving the objectives laid out by establishing a base understanding of the current prices and provisioning of leased lines in APEC member economies and providing those results across the economies.

Lima Declaration

In June 2005, APEC telecommunications Ministers issued a Program of Action, which detailed an agenda for APEC TEL pursuant to the Ministers' Lima Declaration. The Program of Action sets forth the mandate for this project and specifically endorsed work on leased lines

> "Recognizing the challenges and opportunities posed by the rapid technological advancement and the convergence of telecommunications services, as well as the importance of responding to the constantly changing environment by promoting effective policy and regulatory frameworks within APEC economies, Ministers instruct the TEL to undertake the proposed project on Evaluation of Access to Domestic and International Leased Lines in the APEC region."[6]

Thus, the priorities established by the APEC Ministers clearly call for an examination of leased line policies and regulations, along with an examination of pricing approaches because these are critical to ensuring that new players can enter the market as well as maintain their presence resulting in a truly competitive market.

3.0 Key Objectives

While we have noted the dependence of the telecommunications marketplace, particularly the Internet backbone, on the use of leased lines, the overarching goal of this project is to contribute to the efforts undertaken by APEC thus far to build competitive markets in the region by focusing solely on how accessible leased lines are within member economies. This notion of accessibility captures many aspects surrounding the provisioning of leased lines. Accessibility covers matters pertaining to provisioning of services, but also includes pricing, and service quality as well as the types of leased lines made available to support a range of transmission capabilities.

[4] *Stocktake of Progress Toward the Key Elements of a Fully Liberalised Telecommunications Sector in the APEC Region*, 2004, pp46-47
[5] Ibid., p47
[6] APEC Telecommunications and Information Working Group Program of Action, June 2005, Annex A, pp2-3.

The ability to access and use leased lines on reasonable terms is an essential condition for the development of vibrant telecommunications markets. Leased lines facilitate competition as they allow companies to utilize existing infrastructure to enter the market and avoid investing in building new facilities which could be prohibitive for many telecommunication suppliers.

This report will provide a comprehensive review of the current state of terms and conditions of access to and use of leased lines in the member economies, as well as an overview of the relevant regulatory environments. The data produced herein can serve as a guide to commence further APEC TEL discussion as to what changes may be necessary to existing leased line policies and regulations or in some cases, how to craft a sound leased line policy for economies that have yet to address this matter. These findings can also facilitate further review and discussion as to how approaches to pricing may warrant some changes and the establishment of reasonable rate design and pricing methodologies to encourage market growth.

4.0 Leased Lines

4.1 Nature of Leased Lines

Thus far we have noted the importance of leased lines for growth of the telecommunications marketplace, their role in supporting development of Internet-based offerings and the potential to promote competition. It may be useful before proceeding further to focus on the nature of leased lines and the associated advantages and disadvantages for their use.

A leased line is, simply put, a high-performance, permanently available connection capable of carrying voice, data, and Internet traffic over the same line offered by telecommunications providers. Unlike a dial-up connection, a leased line is always active and delivers uninterrupted, dedicated, guaranteed bandwidth. Leased lines can be referred to as a private line, E1, T1, E3, T3, dedicated access, point to point, or frame relay and are often supported by Service Level Agreements (SLA) detailing specifics of the arrangement.

Leased lines generally consist of the actual physical portion – fiber or copper cables – as well as routing equipment that can determine the speed at which the network runs. Bandwidth can be tailored to the specific requirements of a subscriber and can range from 64 kbps to 155 Mbps or more. The required speed may depend on what a company will use the line for, and also potentially on the number of employees that will use the line and the types of applications that will be used.

There are significant advantages to leased lines. Because they are dedicated to a specific customer, they are secure and private. Access to the line is continuous, which can also ensure that there is no delay in sending information. Leased lines are reliable and provide guaranteed bandwidth critical for business usage. As such, leased lines can serve

hundreds of users simultaneously. Leased lines ensure that businesses can operate efficiently and react quickly to crucial information.

The disadvantage to leased lines has historically been the price charged, as they have been the most expensive of broadband applications to date. The other disadvantage is that leased line prices are largely dependent on the customer's distance to the nearest point of presence of the service provider.

4.2 Role of Deployment

The deployment of leased lines can serve to support a variety of service offerings. A leased line is most commonly used to connect a network to the Internet, facilitating network users' outgoing access to the Internet. Leased lines are also used to connect internal or external services to the Internet. A leased line is used, for example, if an entity wishes to publish information either externally through a web or file transfer protocol (FTP) server, or internally through an intranet or extranet server.

Leased lines are also used to connect offices together supporting a local area network (LAN) to LAN connection. For example, a T1 or E1 can connect a location to an operator's frame relay network, Internet backbone and voice network. They can also connect the local area networks of one or more of a business's remote offices through a dedicated leased line. This will facilitate access to file servers at both offices and enable a business to use other applications to create fast communications between the two locations. Sites can also be linked with leased lines, and there is generally no limit on the number of links. However, these leased lines do not automatically provide a connection to the Internet. A leased line must be utilized to connect these offices to the Internet even after they are connected to each other. This is often referred to as private line or point-to-point service. These services are traditionally more expensive than other approaches such as frame relay and virtual private network (VPN) connections.

4.3 Pricing

Pricing for leased lines can be based on a variety of rate designs, including fixed monthly, quarterly, or annual rates. The primary factors affecting rates are the distance between end points and the speed of the circuit, or stated simply, transport and capacity. As such, prices will vary based on location and the type of equipment needed or the speed of the circuits.

Pricing models can generally fall under one of three categories:

- *Flat-rate pricing*: This is most common model. Here, a user pays a fee to purchase a leased line, such as a T1 or E1 for an Internet connection, and are not billed for each bit sent or received
- *Usage-sensitive pricing:* Under this model, a user pays a portion of their bill for a connection and a portion for each bit sent and/or received. It is possible, for example,

to have usage-sensitive pricing during peak hours and flat rate during off-peak, but for purposes of this report, we define this system as usage-sensitive pricing.

- *Transaction-based pricing*: Like usage-sensitive pricing, the marginal monetary cost of sending and/or receiving another bit is non-zero. However, the prices are determined by the characteristics of the transaction and not by the number of bits.

Whatever rate design is used, rates should be aligned as close to cost as possible in order to establish a framework for competition and to encourage infrastructure investment.

4.4 Leased Lines as Examined by Other International Entities

The following section presents an overview of the evolution of the leased lines market from the perspectives of three international entities - the Organization for Economic Co-operation and Development (OECD), the European Union (EU), and the International Telecommunication Users Group (INTUG). The OECD and the EU focus their overviews on how competition and regulation have affected pricing and provisioning among member countries over the years, while INTUG provides its view of the issues that need to be dealt with in order to have a more competitive and cost-effective leased lines market in the future.

OECD

Through the *OECD Communications Outlook* report published each year, the OECD monitors and analyzes the leased lines market among its 30 member states. Through an analysis of revenues, penetration and usage, and pricing, the *OECD Communications Outlook* report published in 2005 considered how the use and demand for leased lines in OECD-member countries has changed.

Revenues

The report mentions that from the mid 1990s onwards, the introduction of the Internet resulted in a significant increase for leased lines. In countries where competition had already reduced the price of leased lines the demand for additional capacity increased revenues from US$18.8 billion in 1997 to US$38 billion in 2002. However, despite the fact that local leased line revenue continued to grow during 2002, competition led margins for sales of capacity on backbone networks to decrease.

According to the OECD report, in countries where there has been a decrease in revenue, it is usually not due to a decrease in volume. Instead, it implies increasing competition in markets with lower prices. The *Communications Outlook 2005* report indicates that certain forms of xDSL may be substituting for local access leased lines. As these services are less expensive that the usual pricing of local leased lines, they may be a factor in the shift of revenue from one segment to another.[7]

[7] OECD Communications Outlook 2005, pgs. 74-75.

Penetration and Usage

There is limited comparable data on the penetration and usage of leased lines to access the Internet as telecommunications operators and regulators usually report the number of leased lines by company or country, but rarely indicate the proportion of these lines that are used for providing permanent local access connections to the Internet.

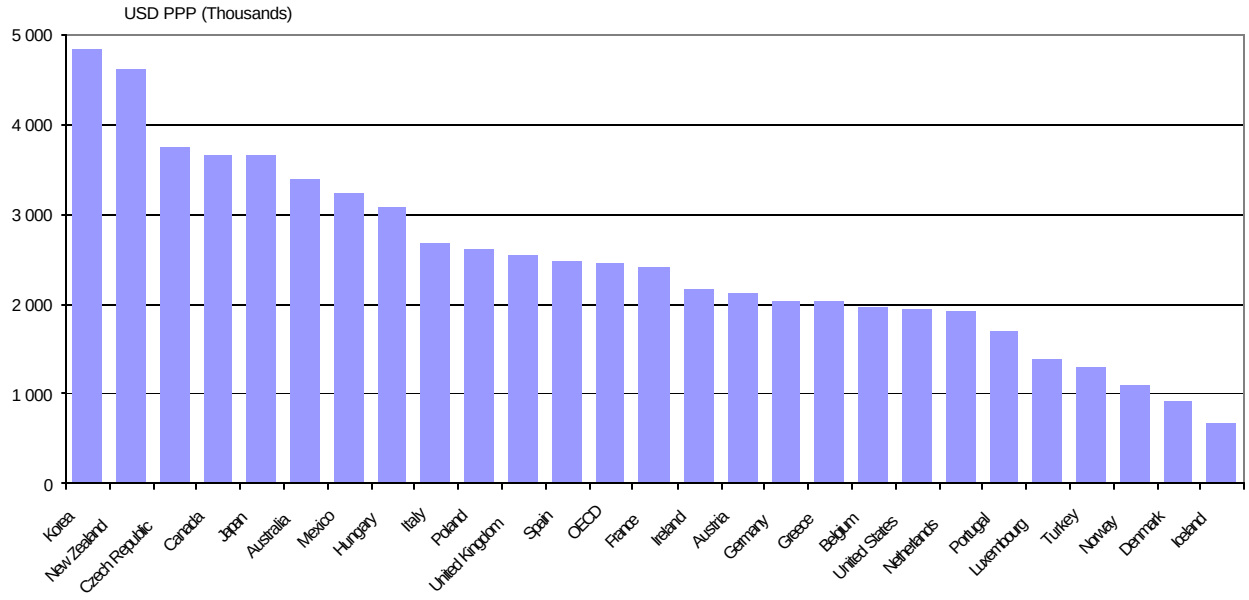
The *Communications Outlook 2005* report points out that as data is usually available for those countries where leased lines are used significantly, data is not available for all OECD countries. It indicates that for the seventeen OECD countries for which data is available, the total number of leased line connections to the Internet increased from 266,791 at the end of 2000 to 333,283 by the end of 2001. As a comparison, worldwide leased line connections to the Internet grew from 295,962 to 374,124 over the same period of time. Nevertheless, since other broadband access alternatives have become available (*i.e.*, cable and DSL) the leased line connections in the previously mentioned seventeen OECD countries has decreased. Some of these countries, including APEC members Japan and Korea, have experienced a considerable decline in the number of leased line Internet connections since the end of 2001.

Pricing

According to the *Communications Outlook 2005* report, leased lines provide the most important means by which telecommunications operators can provide broadband services to business users. Moreover, leased lines allow users that need to transport high volumes of traffic to take advantage of lower prices than PSTN pricing, as well as to have control over their telecommunications facilities and traffic. The report adds that leased lines are also used by some companies to provide value-added services, while ISPs use leased lines in order to build backbone networks for the Internet and large customers use them to access ISP facilities.

In the OECD area, the Scandinavian countries have the least expensive leased lines with prices about 70 percent below the OECD average for 2 Mbps leased lines (*see Table 1*) followed by Luxembourg, Ireland, the Netherlands, and Belgium. Aside from 2 Mbps, the OECD basket of national leased lines also includes whenever possible data on analog circuits for up to 9.6 kbps data transmission and 64 kbps digital leased lines as these circuits are used less frequently now, but are still relied upon by many businesses for local connections.

Table 1 – OECD Basket of National Leased Line Charges for 2 Mbps lines, August 2004 *(excluding tax)*

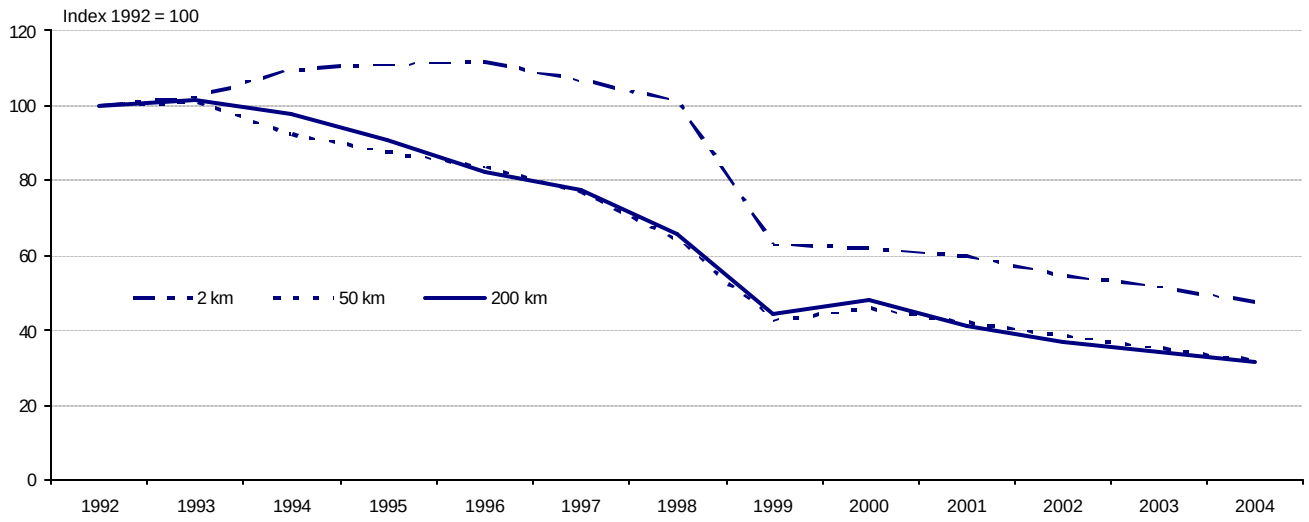


Source: OECD Communications Outlook 2005

The report indicates that OECD countries began to allow competitive provision of leased lines in the mid-1990s, prior to full liberalization and while some of these countries still had telecommunications monopolies. Competition in leased line prices began to emerge, but only for long distances as it takes time to roll out alternative networks. For that reason, the average price for short distance leased lines (as represented by the prices at 2 km) increased. The report points out that local leased line prices, therefore, are a concern wherever there is insufficient competition. For users it means that incumbent operators can charge prices that are not regimented by competition and for new entrants it denotes that incumbent operators may set the prices of local leased lines in an uncompetitive manner.

The OECD report comments that pricing of leased lines changed drastically in 1998 when a large number of European countries liberalized their telecommunications markets. As can be seen in Table 2, at 50 km and 200 km, the leased lines (2 Mbps) index dropped from 77 in 1997 to 32 and 31 by 2004.

Table 2 – Trends in leased line pricing over different distances, 1992-2004
(2Mbps)



Source: OECD Communications Outlook 2005

The decrease in pricing is more obvious over long distances as there is more competition in the provision of long distance infrastructure than in the provision of local infrastructure. However, prices at 2 km have also decreased since 1998, reflecting the competition brought about by new entrants. The *Communications Outlook 2005* report indicates that symmetrical DSL services will increasingly become a substitute for local leased line connections as these services can provide less expensive options for business users needing to connect to backbone networks.

The OECD report also recommends that when examining list prices of capacity and prices available at bandwidth exchanges, regulators should consider quality of service when monitoring the provision of leased lines in areas where there is less competition, such as on thin routes and for local connections outside major cities.[8]

European Union

As has been mentioned previously in this report, leased line pricing in EU member countries began to decrease in 1998, when many of these countries liberalized their telecommunications sectors. Even so, in 1999 the European Commission launched an inquiry into the leased line pricing due to the "high prices and diverging pricing policies across Member States, which could not be justified by differences in cost."[9] In 2002 the Commission closed the sector inquiry, as the price for international telecommunications leased lines across the EU had decreased, on average, by 30 to 40 percent. The inquiry had contributed significantly to this decrease, as it had "led to a pro-active stance of the

[8] OECD Communications Outlook 2005, pgs. 175-177.
[9] "Commission closes telecom leased line inquiry", EurActiv.com, Sunday, 15 August 2004.

national regulatory authorities (NRAs) with respect to both pricing and providing of leased lines."[10]

In addition, the European Commission released the Leased Lines Directive (92/44/EC) which required that Member States ensure that leased line tariffs provided by incumbent network operators follow the principles of transparency, non-discrimination, and cost orientation. The Interconnection Directive (97/33/EC) also addressed these issues by requiring that Member States ensure that incumbent operators interconnect their leased line part circuits to the circuits of other operators under conditions of transparency, non-discrimination and cost orientation.[11]

During the first quarter of 2005, the European Commission published a recommendation on the provision of leased lines in the European Union. In Part 1 of the recommendation (published on 21 January 2005), the Commission made recommendations as to the major supply conditions for wholesale leased lines, while in Part 2 the Commission made its recommendations on the pricing aspects of wholesale leased line part circuits.

Major Supply Conditions

With regards to major supply conditions for wholesale leased lines, the European Commission recommended to Member States that when imposing or maintaining an obligation for non-discrimination under Article 10 of the Access Directive or Article 18 of and Annex VII to Directive 2002/22/EC (the Universal Service Directive) with regard to operators providing leased line services (hereinafter referred to as designated operators), national regulatory authorities should:

> "(a) ensure that contracts include enforceable agreements (hereinafter referred to as service level agreements) which cover all relevant aspects of the wholesale leased line services provided such as ordering, migration, delivery, quality, repair time, reporting and dissuasive financial penalties.
>
> (b) ensure that the contractual delivery times for wholesale leased lines in these service level agreements are as short as possible for each category of lines. Contractual delivery times at the wholesale level should be in any case shorter than best current practice delivery times of designated operators in retail markets. Best current practice delivery times of designated operators in the retail markets for 64 kbit/s, 2 Mbit/s unstructured, 2 Mbit/s structured and 34Mbit/s unstructured are given in the Annex.
>
> (c) ensure in particular that financial penalties included into the contracts as referred to in paragraph (a) apply in cases of delayed delivery of lines and consist of a specified amount for each day of delay for each line ordered; the contract shall provide also that the amount shall not be due where and insofar as the designated operator provides proof that the reason for the delay does not lie on him.

[10] "Price decreases of up to 40% lead Commission to close telecom leased line inquiry", EUROPA Press Release, 11 December 2002.
[11] "Leased Lines: Commission Acts to Bring Down Cost of Communication in Europe", EUROPA Press, 24 November 1999.

(d) ensure that the information necessary to prepare any review of this Recommendation is provided in accordance with Article 5(1) of Directive 2002/21/EC (the Framework Directive) and report this information to the Commission in accordance with Article 5(2) of the Framework Directive."[12]

Pricing of Wholesale Leased Line Part Circuits

With regards to the pricing aspects of wholesale leased line part circuits – Part 2 – the European Commission recommended to Member States that when imposing or maintaining an obligation for cost orientation of prices under Article 13(1) of Directive 2002/19/EC (the Access Directive) with regard to operators providing leased line part circuits, national regulatory authorities should:

(a) ensure that the prices associated with the provision of a leased line part circuit reflect only the costs of the underlying network elements and the services being requested including a reasonable rate of return. In particular, the tariff structure may include one-off connection prices covering the justified initial implementation costs of the service being requested (e.g. specific equipment, line conditioning, testing and human resources), and monthly prices covering the on-going cost for maintenance and use of equipment and resources provided.

(b) ensure that any of the price ceilings listed in Table 3 for leased line part circuits based on the price data and methodology given in the Commission services working document are respected unless there is reliable evidence from cost accounting analysis as approved by the national regulatory authority that the recommended ceiling would result in a price level below the efficient costs of the underlying network elements and the services being requested including a reasonable rate of return.

The methodology used to calculate recommended price ceilings (*see Table 3*) is considered to be appropriate to cover recognized cost differences between different operators in different Member States.

(c) use their rights under Article 13 of the access Directive to request full justification of the proposed charges, and if appropriate, to require these charges to be adjusted.[13]

[12] Commission Recommendation of 21 January 2005 on the Provision of Leased Lines in the European Union, Part 1 – Major Supply Conditions for Wholesale Leased Lines, pgs. 4-5.
[13] Commission Recommendation of 29 March 2005 on the Provision of Leased Lines in the European Union, Part 2 – Pricing Aspects of Wholesale Leased Line Part Circuits, pgs. 4-5.

Table 3 – Recommended Price Ceilings

Capacity	Ceiling for the sum of the **monthly price and 1/24 of the one-off connection price** for a circuit length of up to **2km** (€)	Ceiling for the sum of the **monthly price and 1/24 of the one-off connection price** for a circuit length of up to **5km** (€)	Ceiling for the sum of the **monthly price and 1/24 of the one-off connection price** for a circuit length of up to **15 km** (€)	Ceiling for the sum of the **monthly price and 1/24 of the one-off connection price** for a circuit length of up to **50 km** (€)	Ceiling for the **One-off** connection price
64 kbps	61	78	82	99	542
2 Mbps	186	248	333	539	1112
34 Mbps	892	963	1597	2539	2831
155 Mbps	1206	1332	1991	4144	3144

Source: Commission Recommendation of 29 March 2005 on the Provision of Leased Lines in the European Union, Part 2 – Pricing Aspects of Wholesale Leased Line Part Circuits

The Commission also establishes that the following definitions will apply for the previously-mentioned recommendation:

> (a) a 'leased line part circuit' (LLPC) means the dedicated link between the customer premises and the point of interconnection of the other authorised operator at (or close to) the network node of the notified operator, and should be regarded as a particular type of a wholesale leased line which can be used by the other authorised operator to provide services to retail users, other operators or for its own use such as, but not limited to, leased lines, connections to the switched telephone network, data services or broadband access.
>
> (b) 'line length' means the radial distance between the locations of the two ends of the line, i.e. from the point of interconnection to the customer premises.
>
> (c) 'customer' means customer of the other authorised operator.[14]

Furthermore, in the Annex to the European Electronic Communications Regulation and Markets 2005 report (11th Report) published in February 2006, the European Commission provides an overview and examines data on the prices charged by incumbent operators to end users for national leased lines and international leased line services.

[14] Commission Recommendation of 29 March 2005 on the Provision of Leased Lines in the European Union, Part 2 – Pricing Aspects of Wholesale Leased Line Part Circuits, pg. 4.

For national leased lines, the data is presented for years 2004 and 2005 and the distances covered are 2 km (circuits within a major city, usually the capital) and 200 km (circuits between a major city and a "minor" city). The tariff rates are those provided by the incumbent operator in each country – other operators may offer other prices.

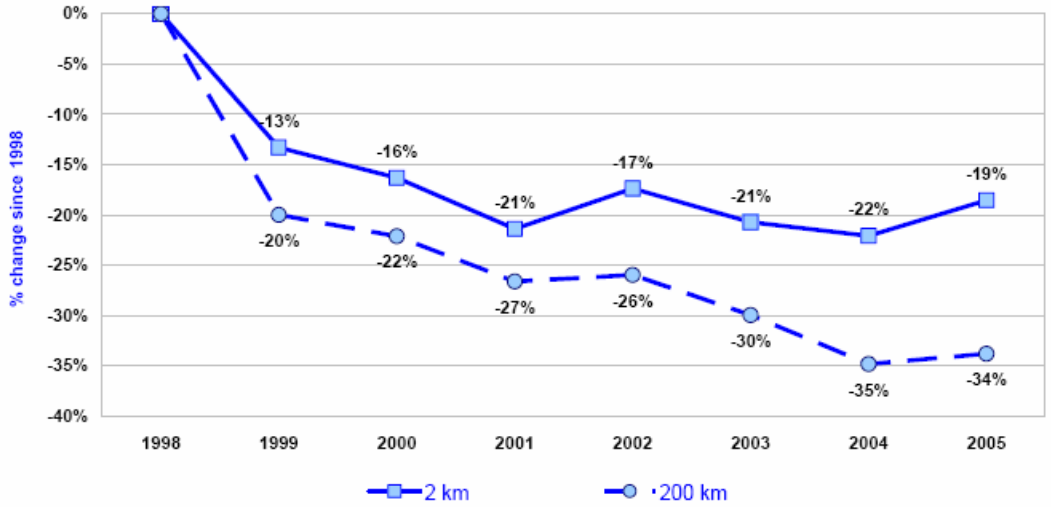
The analysis indicates that circuits need to be considered in one of two different ways, depending on the tariff structure, in order to accurately reflect the tariff structure of countries. As the options to apply will differ from operator to operator, the European Commission applied the following principles in order to calculate the price of a full circuit in each country[15]:

	1: When tariff specifies local tail prices separately, in addition to main circuit		2: When tariff specifies a single price for the circuit, end to end, including local tails	
	Local tail length	Main circuit length	Local tail length	Main circuit length
2 km circuit	1 km	0	0	2 km
200 km circuit	2 km	196 km	0	200 km

Source: European Electronic Communications Regulation and Markets 2005 (11th Report), Volume II

Based on the data collected, the 11th Report provides a comparative analysis of tariff rates, for 2 km and 200 km circuits, for three speeds (2 Mbps, 34 Mbps, and 155 Mbps). In addition, the report also provides an analysis of EU average price variations, for 2 km and 200 km circuits, from 1998 to 2005. Table 4 below illustrates the price variation for 64 Kbps for this time period:

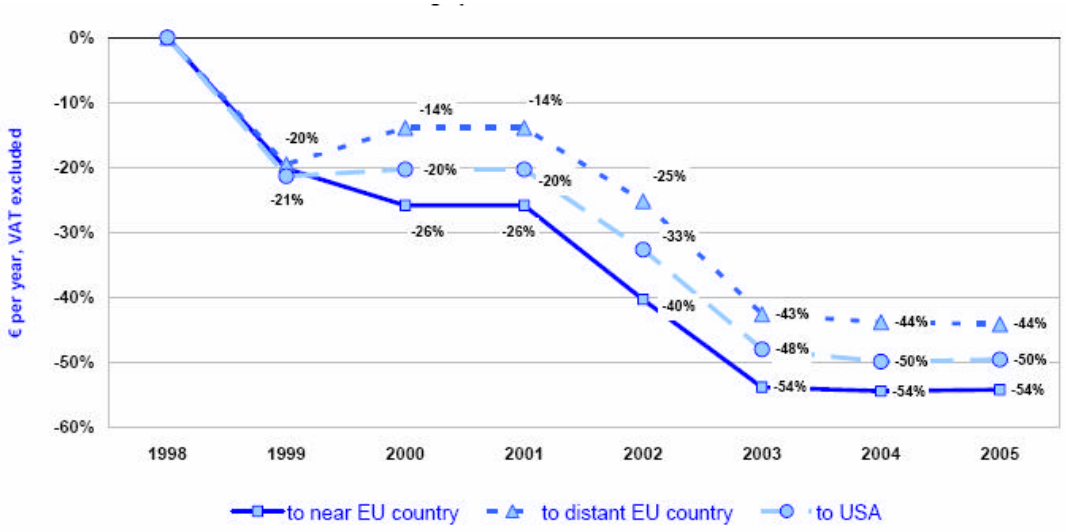
Table 4 – EU Average Price Variation since 1998, 64 Kbps



[15] European Electronic Communications Regulation and Markets 2005 (11th Report), Volume II, pg. 91.

For international leased line prices, the data is presented showing standard retail prices (annual prices) for international leased lines (half-circuits in each country) charged by the incumbent operators in each Member State. The circuits considered in the report include digital 64 kbps, 2 Mbps, and 34 Mbps. The distance used to carry out the comparative retail price analysis for these speeds are near EU country, distant EU country, and to the United States. The report also presents average price variations (*see Table 5*) for the different speeds and distances providing trends for international leased lines prices from 1998 and 2005 in Europe:

Table 5 – Average Price Variation, 64 kbps



INTUG

The International Telecommunication Users Group (INTUG) has spent over 25 years presenting its concerns on the issue of leased lines to a variety of international entities and organizations including the OECD, the EU, the Inter-American Telecommunications Commission (CITEL), and APEC.

In particular, INTUG has expressed concern about leased lines with regards to:

- Availability
- Delivery time
- Lack of competitive supply
- Price
- Quality of service[16]

[16] Leased Lines: an INTUG submission to the ITU-T Study Group 3, November 2003.

In a submission to the ITU-T Study Group 3 in November 2003 concerning the implementation of Recommendation D.1 on leased lines, INTUG offered its concerns and views on the issue. While the association recognized that steps have been taken to liberalize leased lines markets around the world, it also pointed out that the progress made by countries on the issue of leased lines had been slow and, at times, uneven.[17]

According to INTUG, leased lines are a key factor in a country's economic competitiveness and to provide adequate prices and quality of service, countries need to open telecommunications markets to competition and introduce appropriate regulatory measures. In the submission document, the association stated that lower leased line and broadband access costs could result in additional sales of telecommunications services and could also promote e-commerce and inward investment growth.[18]

INTUG further pointed out that specific policy measures such as local loop unbundling, collocation in ducts and on poles, and provision of dark fiber could "encourage competition between dominant operators and new entrants"[19] thus lowering prices for end users. It indicated that the provision of short distance leased lines and broadband services on a cost-oriented basis were essential to the accessibility and affordability of the Internet and to the development of e-commerce.

The association felt that infrastructure competition should be the main target, but that provision of domestic and international leased lines should be guaranteed in the short term to facilitate service competition. Monopolies and/or incumbent operators should be monitored through enforcement of non-discrimination between operators and its own retail operators, as well as through the obligation for cost-oriented prices.[20]

As can be seen from the perspectives and views of these three international entities, strides have been made to improve the pricing and provisioning of leased lines. However, competition and regulation of the market – two factors that can clearly encourage better pricing and provisioning of leased lines – need to be further enhanced in order to guarantee the successful development of this market sector.

The information provided by these entities shows that lack of market competition and absence of appropriate regulation create unfavorable conditions for both users and new entrants as they allow incumbent operators to charge users unregulated prices and establish uncompetitive prices of leased lines for new entrants.

[17] Ibid.
[18] Ibid.
[19] Ibid.
[20] Ibid.

5.0 Regulatory Environment

In considering a comprehensive review of leased lines, it is important to examine the regulatory environment under which leased lines are offered in APEC member economies. It is often the case that leased lines are treated as a competitive service and thus are not subject to rigorous regulatory requirements.

In an attempt to assess the regulatory environment, the APEC economies were surveyed as to the level of specific regulatory requirements pertaining to the provision of leased lines, including cost orientation for leased lines services; whether costing requirements and approaches to rate setting were explicitly outlined by the regulator; tariffing requirements covering leased lines services; levels of transparency; and policies with respect to non-discrimination, supporting an equal access approach to leased lines.

While not all the economies responded, several did and the following represents a brief synopsis of the survey results.

5.1 Cost Orientation

With respect to cost orientation, Peru has noted that while it does not have laws/regulations that specify that leased lines' tariffs have to be based on cost orientation, in those laws/regulations – established by the Organismo Supervisor de Inversión Privada en Telecomunicaciones (OSIPTEL, or the Supervisory Authority for Private Investment in Telecommunications) – where a maximum tariff must be established, these maximum tariff has been determined based on cost orientation.

In Macao, the government has granted a 20-year exclusive contract ("The Concession Contract") to a joint venture company, CTM, to operate all public telecommunications services including domestic and international leased lines until 2011. In addition, Macao has the Basic Telecommunications Law No. 14/2001 in place to govern the establishment, management and exploration of telecommunications networks and the telecommunications services rendered. Clause 24 of the Concession Contract stipulates with regards to tariffs that service fees shall be fixed and as close to the cost of service as possible (taken as a whole), taking into consideration the need to obtain a return on investments.[21]

In New Zealand, leased line services offered by the incumbent are regulated at the wholesale level, as are other telecommunications services that are not subject to price caps and are offered by the incumbent over its own network to retail customers. In particular, wholesale leased line prices must be priced at average or best retail pricing minus a discount that takes into account avoided or actual costs saved, depending on the level of competition with the incumbent in a particular market.[22] The discount is

[21] Concession Agreement for Public Telecommunications Services 1999, Chapter IV, Bureau of Telecommunications Regulation (DSRT), available at: http://www.dsrt.gov.mo/eng/laws/concession/ctm_chap4.htm

[22] Telecommunications Act 2001 (New Zealand), Schedule 1, Part 2.

generally determined by benchmarking against comparable foreign markets. Thus, while leased line prices are not specifically cost-based, the discount applied is based upon the cost differential between provision of retail and wholesale services by the incumbent. An in-depth example of a similar determination by the New Zealand Commerce Commission regarding wholesale pricing is the TelstraClear Wholesale Determination, though it does not include domestic leased line services.[23]

In Hong Kong, the government may enact regulations that set price controls for services offered by dominant service providers.[24] Such price controls are determined on the advice of the Telecommunications Authority. In theory, such regulations can be employed to ensure the use of cost-based pricing by dominant operators.

In Singapore, treatment of leased circuit services depends on whether it is provided on a retail or wholesale basis and whether it is local or international services, and if these services are provided by a Dominant Licensee. The Telecom Competition Code (TCC) adopts a "licensed entity" approach, that is, if a Licensee is classified as Dominant, it must comply with the special requirements applicable to Dominant Licensees (DL) when providing any telecommunications service pursuant to its license. Price regulation is imposed only on dominant operators that have the potential to abuse their market power and engage in anti-competitive practices. Additionally, DLs have to file their tariffs with the Infocomm Development Authority (IDA) for approval, and they are bound by requirements such as non-discriminatory and transparency.[25] Furthermore, there are elements of leased circuit services that are designated as an Interconnection-Related Service (IRS)[26], and based on current provisions, the DL is required to provide IRS-designated Tail Local Leased Circuits (TLLC) at cost-based rates to requesting Facilities-Based Operators.

Finally the Australian regulatory framework is based on market based solutions and commercial negotiations when the market is regarded as effectively competitive. This is also the case for other wholesale leased lines services. In Australia, it is the case that if a market is competitive, market forces will ultimately ensure that prices fall and quality is aligned to buyer's needs.

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[23] Commerce Commission, "Determination on the TelstraClear Application for Determination for "Wholesale Designated Access Services," Decision 497, March 2003.

[24] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7G.

[25] Telecom Competition Code (TCC) 2005, Section 4, available at: http://www.ida.gov.sg/idaweb/doc/download/I488/TCC_2005.pdf

[26] List of IRS and applicable requirements governing DL's offer of these services are specified in the TCC Schedule (RIO Requirements) available at: http://www.ida.gov.sg/idaweb/pnr/infopage.jsp?infopagecategory=consultpapers:pnr&versionid=4&infopageid=I488); the amendments to the list of IRS, dated 28 October 2005, ca be found at: http://www.ida.gov.sg/idaweb/doc/download/I488/053113_IRS_Amendment.pdf.

5.2 Tariffing

In Chinese Taipei operators that offer leased-line services have to comply with the Directorate General Telecommunications (DGT)'s Administrative Regulation Governing Tariffs of Type I Telecommunications Enterprises.[27] The regulation is "enacted in accordance with Article 26, Paragraph 3, of the Telecommunications Law." Article 26 of Chinese Taipei's Telecommunications Law establishes that:

> The tariff regulation of Type I telecommunications enterprises shall adopt the price cap method.
>
> The aforementioned method means the percentage of adjustment of controlled tariffs of the regulated telecommunications enterprises shall not exceed the annual increase rate of consumers' price index of Chinese Taipei area announced by the Directorate General of Budget, Accounting and Statistics of the Executive Yuan, minus index.
>
> The [Ministry of Transportation and Communications] shall enact administrative rules governing the tariffs of Type I telecommunications enterprise including administration and examination of tariffs, initial offer of each tariff, the entities to which the price adjustment cap shall be applied, the services to which the tariffs shall be applied, tariff items, the adjustment coefficient and other compulsory rules.[28]

In Peru, OSIPTEL has approved Tariff Regulations through which it established the tariffing guidelines/principles that companies have to abide by with regards to public telecommunications services, including leased lines.[29] In addition, OSIPTEL has established maximum tariffs for the provision of leased lines.[30] At this time, these maximum tariffs are being revised through public consultation and it has been proposed that a maximum tariff, based on cost orientation, be established.[31]

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[27] Administrative Regulation Governing Tariffs of Type I Telecommunications Enterprises (Unofficial Translation), Directorate General of Telecommunications (DGT), January 2006, available at: http://www.ncc.tw/English/Regulations/Regulations_ncc.htm

[28] Telecommunications Act (Chinese Taipei), Article 26, revised February 2005.

[29] Reglamento General de Tarifas de OSIPTEL 2000, Resolucion No. 060-2000-CD/OSIPTEL, available at: http://www.osiptel.gob.pe/Index.ASP?T=T&IDBase=0&P=%2FOsiptelDocs%2FGCC%2Fel%5Fsector%2Fnormas%5Fosiptel%2Fres%5Fcdirectivo%2Ffiles%2F2000%2Fres0602000CDOSIPTELregtar%2Epdf

[30] Resolucion de Presidencia No. 063-96-PD/OSIPTEL, Aprueban Regimen de Tarifas que se Aplicara al Servicio de Arrendamiento de Circuitos, December 1996, available at: http://www.osiptel.gob.pe/Index.ASP?T=T&IDBase=0&P=%2FOsiptelDocs%2FGCC%2Fel%5Fsector%2Fnormas%5Fosiptel%2Fost%5F03%5F06%5F62%2Ehtm

[31] Resolucion del Consejo Directivo No. 043-2006-CD/OSIPTEL, Revision de Tarifas Tope del Servicio de Alquiler de Circuitos de Larga Distancia Nacional, provisto por Telefonica del Peru S.A.A., June 2006, available at: http://www.osiptel.gob.pe/Index.ASP?T=T&IDBase=2731&P=%2FOsiptelDocs%2FGCC%2FEL%5FSECTOR%2FNORMAS%5FOSIPTEL%2Fres%5Fcdirectivo%2Ffiles%2F2006%2Fres0432006CDOSIPTEL%2Epdf

In Thailand, the Telecommunications Act 2001 of the Post and Telegraph Department establishes under Sections 55-57 of Chapter VII on Fee and Tariff in Telecommunications Services that:

> The Commission shall prescribe in notification the categories and maximum rate of fee and tariff that the licensee can charge the user according to the nature and categories of telecommunications service.
>
> The setting of the maximum rate of fee and tariff under Section 55 shall: (1) be expressed by clear calculating method; (2) be fair to both the licensee and the user; (3) not cause a discrimination, preference or obstacle to the user or any person.
>
> Each licensee shall not charge fee or tariff other than or in excess of the maximum rate prescribed by the Commission under Section 55, and shall not set the rate of fee or tariff in such a way that cause an anti-competitive behavior which restricts a fair competition. In this regard, the licensee shall charge the user the same rate for similar nature or categories of telecommunications service.[32]

With regards to tariffing, Macao's Concession Contract for CTM establishes under Clause 24 that any revision of charges regarding the provision of services should be approved by the Governor and published in the relevant by-law.[33]

With respect to cost, New Zealand's Telecommunications Act 2001 does affect wholesale leased line tariffs by requiring that they be priced at a discount below average or best retail pricing.

In Hong Kong, the Telecommunications Ordinance requires licensees to publish tariffs in accordance with the requirements of their license or directions issued by the Telecommunications Authority. [34] The requirement is further addressed in the terms of the Fixed Carrier and Fixed Telecommunication Network Services licenses.[35] In such published tariffs, the Telecommunications Ordinance states that the licensee must include the terms on which the service is offered, including a description of the service; discounts, allowances, rebates or credits given or allowed on the supply of the service; the supply of goods or other services related to the service; payment for goods or other services related to the service; and any other relevant information that the

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[32] Telecommunications Business Act 2001 (Unofficial Translation), Post and Telegraph Department of Thailand, November 2001, available at: http://www.ptd.go.th/law_ptd/Radiocom_Act1.pdf#search=%22Thailand%20Chapter%20VII%20Fee%20and%20Tariff%20in%20Telecommunication%20Service%22

[33] Concession Agreement for Public Telecommunications Services, Chapter IV, Bureau of Telecommunications Regulation (DSRT), December 1999, available at: http://www.dsrt.gov.mo/eng/laws/concession/ctm_chap4.htm

[34] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7F.

[35] See Special Condition 7 of PCCW-HKT Telephone Limited's Fixed Carrier License (http://www.ofta.gov.hk/en/tele-lic/ftns-cwhktt.pdf) or General Condition 20 of Hutchison Global Communications Limited's Fixed Telecommunication Network Services License (http://www.ofta.gov.hk/en/tele-lic/ftns-hutchison.pdf).

Telecommunications Authority considers necessary. In addition, licensees require permission to offer bundles of service without also offering each service individually, and the Authority may also require a carrier to offer a particular component of a bundle of services at a specified single tariff. Furthermore, in the case of a dominant carrier, the Government may require that the carrier charge exactly the tariffs that it has published.[36] Finally, Hong Kong's Telecommunications Ordinance also has provisions on anti-competitive practices which may affect tariffing.[37]

5.3 Transparency

In Chinese Taipei, Article 9 of the DGT's Administrative Regulation Governing Tariffs of Type I Telecommunications Enterprises specifies that the adjustment and promotional scheme of tariffs of Type I Telecommunications Enterprises shall be announced in the media, on websites, and at all business premises, as well as reported to the National Communication Commission (NCC) for the record at least 7 days prior to the effective date of said adjustment. Furthermore, the adjustment and promotional scheme of primary tariffs of dominant Type I Telecommunications Enterprises shall be submitted to the NCC for approval 14 days prior to the scheduled effective date of said adjustment. Following approval, the adjustment and promotional scheme shall be announced in the locations mentioned above, and shall go into effect 7 days after the announcement is made.[38]

In Macao, Article 2 of the Direcção dos Serviços de Regulação de Telecomunicações's (DSRT, or Bureau of Telecommunications Regulation) Basic Telecommunications Law No. 14/2001 establishes that telecommunication policy has to ensure the equality and transparency of competition conditions and promote diversified services, in order to increase offers and qualified standards corresponding to the demands of users.[39]

New Zealand does not currently have laws or regulations in place that affect transparency in the leased lines market. However, legislation has been introduced to Parliament; it would require:

- accounting separation and information disclosure by the major fixed network telecommunications carrier; and
- application of a new standard access principle for regulated services which mandates the availability of information about regulated access services by the access provider.[40]

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[36] Telecommunications Ordinance, Cap.106 (Hong Kong, China), Section 7G.
[37] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7K.
[38] Adminstrative Regulation Governing Tariffs of Type I Telecommunications Enterprises (Unofficial Translation), Directorate General of Telecommunications (DGT), January 2006, available at: http://www.ncc.tw/English/Regulations/Regulations_ncc.htm
[39] Basic Telecommunications Law No. 14/2001, Chapter I, Bureau of Telecommunications Regulations (DSRT), August 2001, available at: http://www.dsrt.gov.mo/eng/laws/14_2001.html
[40] Telecommunications Amendment Bill 2006, Part A1 and Schedule 1, (Part 1, Clause 5)

Hong Kong's Telecommunications Ordinance requires that providers of public telecommunications services supply the Telecommunications Authority with any information relating to its business that the Authority may reasonably require. Furthermore, service providers cannot refuse to supply such information based on confidentiality, though the service provider will be given the opportunity to make a case to the Authority regarding confidentiality if the Authority determines that the release of such information could negatively impact the service provider or their business.[41] In addition, Fixed Carrier and Fixed Telecommunication Network Services licenses indicate specific methods by which service tariffs are to be published by carriers.[42]

In Singapore, Section 1.5 of the TCC establishes that the IDA will take resolute, but proportionate, measures to promote and sustain competition. It further states that where markets are competitive, the IDA will rely on market forces and industry self-regulation and where markets are not effectively competitive, and especially where there are bottleneck essential facilities, regulation will continue. In addition, the TCC indicates that the IDA will strive to make decisions in a transparent, reasoned, non-discriminatory, timely and technology-neutral manner.[43]

5.4 Non-Discrimination

According to Article 21 of the DGT's Telecommunications Act for Chinese Taipei, "a telecommunications enterprise shall provide services in a fair and non-discriminatory manner."[44]

In Peru, Article 5 of OSIPTEL's Tariff Regulations establishes that tariffs, tariff schemes, as well as offers, discounts and promotions, will abide by the following tariffing principles: (1) Principle of equal accessibility: companies providing operator services shall offer leasing and use of the public telecommunications services they offer applying general conditions; (2) Principle of non-discrimination: when applying this principle, a company providing operator services shall not deny service to any person or business if he/she/it complies with the conditions for leasing established by said company.[45]

Article 2 of Macao's Basic Telecommunications Law No. 14/2001 cites that an objective of the country's telecommunications policy is to guarantee, to the entire population and to

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[41] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7I.

[42] See Special Condition 7 of PCCW-HKT Telephone Limited's Fixed Carrier License (http://www.ofta.gov.hk/en/tele-lic/ftns-cwhktt.pdf) or General Condition 20 of Hutchison Global Communications Limited's Fixed Telecommunication Network Services License (http://www.ofta.gov.hk/en/tele-lic/ftns-hutchison.pdf).

[43] Telecommunications Act (Chapter 23), Code of Practice for Competition in the Provision of Telecommunication Services 2005 (Singapore) available at: http://www.ida.gov.sg/idaweb/doc/download/I488/TCC_2005.pdf

[44] Telecommunications Act, Directorate General of Telecommunications (DGT), February 2005, available at: http://www.ncc.tw/English/Regulations/Regulations_ncc.htm

[45] Reglamento General de Tarifas de OSIPTEL 2000, Resolucion No. 060-2000-CD/OSIPTEL, available at: http://www.osiptel.gob.pe/Index.ASP?T=T&IDBase=0&P=%2FOsiptelDocs%2FGCC%2Fel%5Fsector%2Fnormas%5Fosiptel%2Fres%5Fcdirectivo%2Ffiles%2F2000%2Fres0602000CDOSIPTELregtar%2Epdf

social and economic activities, access to the telecommunications network, under reasonable tariffs and prices, in an indiscriminate matter, as well as provide all parties with qualified and efficient services according to their necessity.[46]

New Zealand's Telecommunications Act 2001 mandates that access providers must provide service on terms and conditions (excluding price) that are consistent to those under which it provides service to itself.[47]

Hong Kong's Telecommunications Ordinance states that, subject to a determination by the Telecommunications Authority that such discrimination restricts competition; dominant operators shall not discriminate among customers, or between service providers and others.[48] The Ordinance notes that discrimination includes discrimination relating to charges (except for reasonable allowances for the cost of supplying service), performance characteristics, and other terms of condition or supply. In addition, the Ordinance may take discrimination into account with respect to abuse of position by dominant operators.[49]

As indicated previously, in Singapore the TCC indicates that the IDA will strive to make decisions in a transparent, reasoned, non-discriminatory, timely and technology-neutral manner.[50]

The Australian telecommunications access regime is applicable to wholesale services "declared" by the Australian Competition and Consumer Commission (ACCC) and assists telecommunications companies in obtaining fair access to key telecommunications services. Declarations of services are based on assessments against the long term interests of end users which are defined to be the combined objectives of promoting competition, achieving any-to-any connectivity and encouraging the economically efficient use of and efficient investment in infrastructure.

Australia's access regime does not mandate access to all leased line services. The ACCC has only declared a small number of leased line services that should provide access. These include transmission capacity between different local call areas, transmission capacity between exchanges in the same local call area, and tail end transmission capacity – except all inter-capital routes, specified capital-regional routes, and transmission between transmission points belonging to the same customer or the same access seeker;[51] and the Digital Data Access (DDAS) and leased line version ISDN data carriage services – except in capital cities.[52]

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[46] Basic Telecommunications Law No. 14/2001, Chapter I, Bureau of Telecommunications Regulations (DSRT), August 2001, available at: http://www.dsrt.gov.mo/eng/laws/14_2001.html
[47] Telecommunications Act 2001 (New Zealand), Schedule 1, Part 1, clause 5, Principle 3.
[48] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7N.
[49] Telecommunications Ordinance, Cap. 106 (Hong Kong, China), Section 7L.
[50] Telecommunications Act (Chapter 23), Code of Practice for Competition in the Provision of Telecommunication Services 2005 (Singapore) available at: http://www.ida.gov.sg/idaweb/doc/download/I488/TCC_2005.pdf
[51] Australian Competition and Consumer Commission's Transmission Capacity Declaration, April 2004
[52] Australian Competition and Consumer Commission's DDAS and ISDN Declaration, June 2005

6.0 Project Structure

In order to provide a comprehensive picture of the status of leased line services across APEC member economies, data must be collected and analyzed to provide an actual understanding of what kind of policies are in place in member economies and most importantly the result of these policies. It is these results that will enable APEC TEL to move forward and continue its work towards promoting competitive markets by providing an overview of where there may be provisioning delays or limitations placed on availability. In addition, if prices are significantly high, it may prompt regulators to take a closer look at how prices for leased lines are established and develop policies aimed at moving prices closer to cost.

A research methodology predicated on a survey design approach is best suited to identify and gather the pertinent data, and most importantly conduct a detailed analysis of the findings to assess and evaluate the current scenario with respect to leased line policies.

6.1 Development of Survey Approach

The first step in TMG's approach to developing the survey methodology was to review the key data points that would be relevant to developing a robust study of leased line pricing in APEC TEL member economies. The initial list of indicators included a set of representative bandwidths and distances, as well as information on fault repair times and additional data requested of wholesale service providers. TMG discussed the original list of data points with the project sponsors and recommended additional data points to be added to the list.

After developing a comprehensive list of indicators, TMG evaluated different survey methods, seeking a balance of the following factors:

- Ability of respondents to provide complete information
- Ability to set guidelines to encourage uniform response formats when appropriate
- Centralization of responses into a single data set
- Ability of respondents to submit data directly into the combined data set

Initial survey method options considered included direct email to each of the APEC TEL member economy points of contact in either MS Word or MS Excel formats. Draft survey instruments were developed, though there was concern about the time necessary to compile the responses into a single data set. Upon further review, TMG concluded that a web-based survey instrument would be the best option for balancing the factors listed above. In particular, the web-based survey would automatically compile responses into a data set and would avoid both the lag time and potential for error that would be possible if survey responses had to be manually compiled (and checked for data integrity) by TMG staff.

TMG identified a service provider that specializes in hosting customized web survey instruments and developed a survey that could accommodate all of the necessary

questions to collect the data points previously identified. A draft survey instrument was developed and circulated among the project sponsors. The draft survey instrument automatically compiles the responses into a format that is easily read in MS Excel, which allows for easy manipulation of data so as to develop averages and other calculations using various cross-sections of respondent data.

Taking into account sponsor feedback, TMG finalized the survey and distributed it to APEC TEL member economy points of contact on January 6, 2006, asking the points of contact to either complete the survey on behalf of their operators, or pass along the survey link to the operators directly. A response deadline of February 3 was set to receive all respondent information.

The initial feedback, suggesting further data points, was received from a project sponsor on January 10. Rather than stop and re-start the survey (potentially disrupting respondents who had already begun to complete it), it was determined that a follow-up questionnaire would be sent to respondents who complete the survey to obtain the further data points.

A further survey on the regulatory environment governing leased lines in each economy was distributed on August 10-11, 2006, incorporating feedback received from a project sponsor.

6.2 Survey Responses

The initial survey was designed to capture pertinent data applicable to the provisioning and pricing of leased lines. The survey covered a range of bit rates for over a five-year period. Included were questions pertaining to prices associated with specific speeds for leased lines over a variety of distances. In addition, the survey sought to capture fault repair times, provisioning for both wholesale and retail circuits, bandwidth restrictions, and the availability of Service Level Agreements. A copy of the survey is attached to this report as Annex A.

TMG began receiving survey responses almost immediately, as well as requests for permission to submit responses beyond the survey deadline. In order to obtain the most complete information possible so as to develop a useful report for APEC TEL, TMG provided respondents with the flexibility to submit late responses upon request. The survey instrument worked exactly as planned, providing a central repository for survey responses which was easily convertible by TMG into spreadsheet format.

As of mid-March, TMG had received a very limited set of complete survey responses on pricing and provisioning of leased lines. However, working with the available data, a preliminary analysis was conducted in order to develop sample data formats to be presented to APEC TEL in preparation for TEL 33. In addition, TMG received nine responses to the regulatory survey distributed in August.

7.0 Findings and Conclusions

In reviewing the data gathered during the survey process, it became clear that the limited number of preliminary responses would make comprehensive analysis difficult. TMG received 16 complete or partial responses to the pricing survey, though four of those responses presented information on operators in a single economy and a further four responses represented another economy. In short, responses were received from ten member economies: Chinese Taipei, Hong Kong, China, Indonesia, Japan, the Republic of Korea, Macau, Malaysia, New Zealand, Singapore, and Thailand.

Most operators did not answer the questions regarding provisioning times and fault repair times. However, a lack of data cannot be equated with answers indicating zero provisioning time or instant fault repair. Instead, it is more likely that operators were unwilling to provide such information.

Similarly, it is unclear if those operators that did not provide connection fee information simply did not provide the data or if they do not charge a connection fee. This analysis makes the assumption that a lack of data is not equivalent to a lack of a connection fee.

Furthermore, some respondents provided data on bandwidth and distance combinations other than those requested in the survey. In order to develop a uniform analysis, only bandwidth and distance combinations requested in the survey were included in the results.

For the regulatory environment survey, responses were received from eight economies. The primary conclusion that can be drawn from the responses is that each economy approaches cost orientation, tariffing, transparency and non-discrimination in a unique manner. These distinct regulatory environments likely factor into the pricing variations demonstrated in the analysis of pricing data presented in Section 7.1.

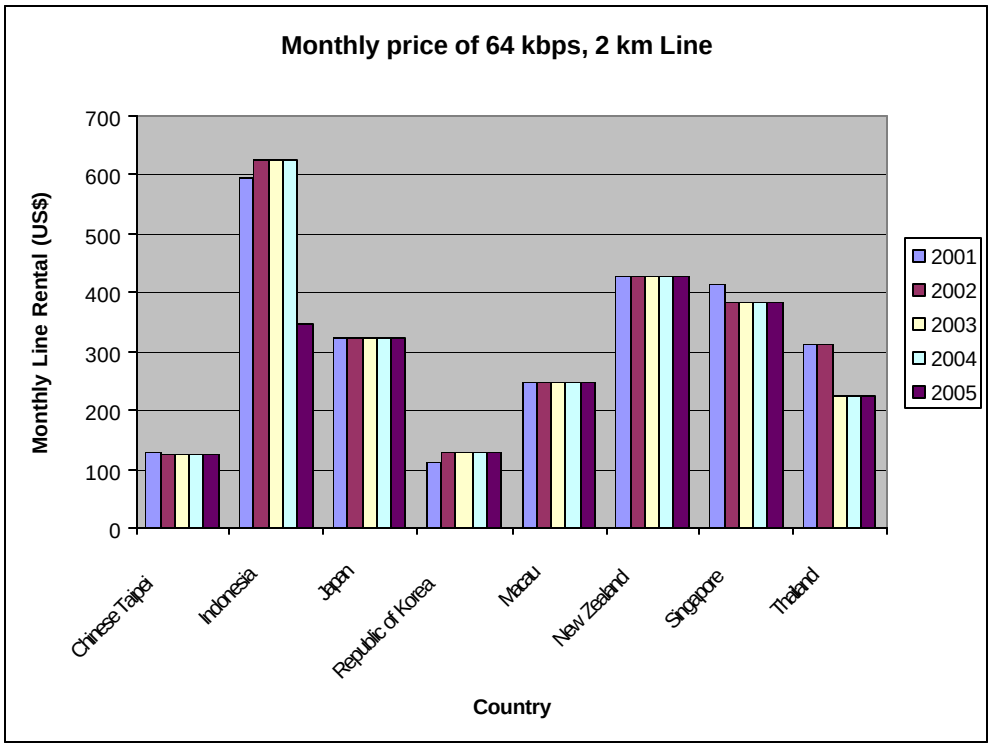
The following analysis should be read with the knowledge that with less than 50 percent of member economies represented and only a single operator representing most economies, as well as the absence of some of APEC's largest member economies, there are significant data points that are not represented. TMG is hopeful that circulation of this draft report will encourage member economies that are underrepresented to submit additional data on leased line pricing within their borders in order to present a stronger data set upon which to base further analysis and those economies who are yet to submit responses from their operators.

7.1 Retail Leased Lines

When examining the data on low-bandwidth local leased lines, one of the more striking features is the relative stability of prices within each market over the past five years. As can be seen in Figure 1, six of the eight economies presented exhibit essentially stable

monthly rates for a 2 km 64 kbps line, with Indonesia and Thailand showing significant price reductions in 2005 and 2003, respectively.

Figure 1

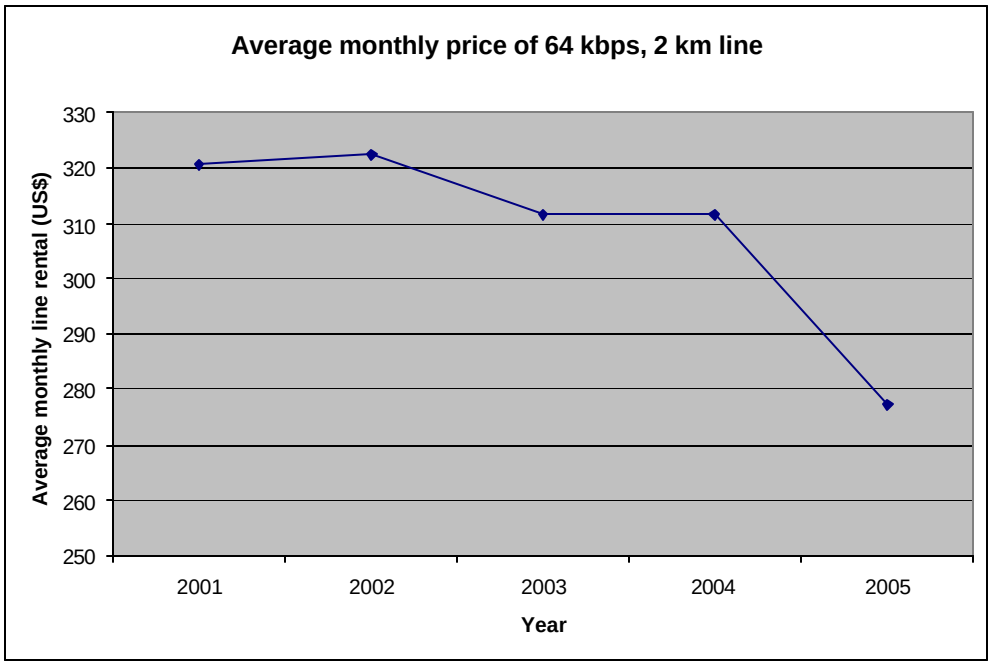


Note: In Singapore, rates for leased lines are not distance sensitive.

Also significant is the narrowed range of monthly costs in 2005 as compared to 2001. In 2001, there was a US$483/month difference between the highest and lowest rates, while in 2005, that difference had narrowed to US$299.

However, the magnitude of the price changes in the Indonesian and Thai markets have a significant effect on the average cost over the entire sample set, as shown in Figure 2. The reduction in Indonesia's rates between 2004 and 2005 is solely responsible for a decrease of approximately US$35 in the average monthly fee across the entire sample set.

Figure 2



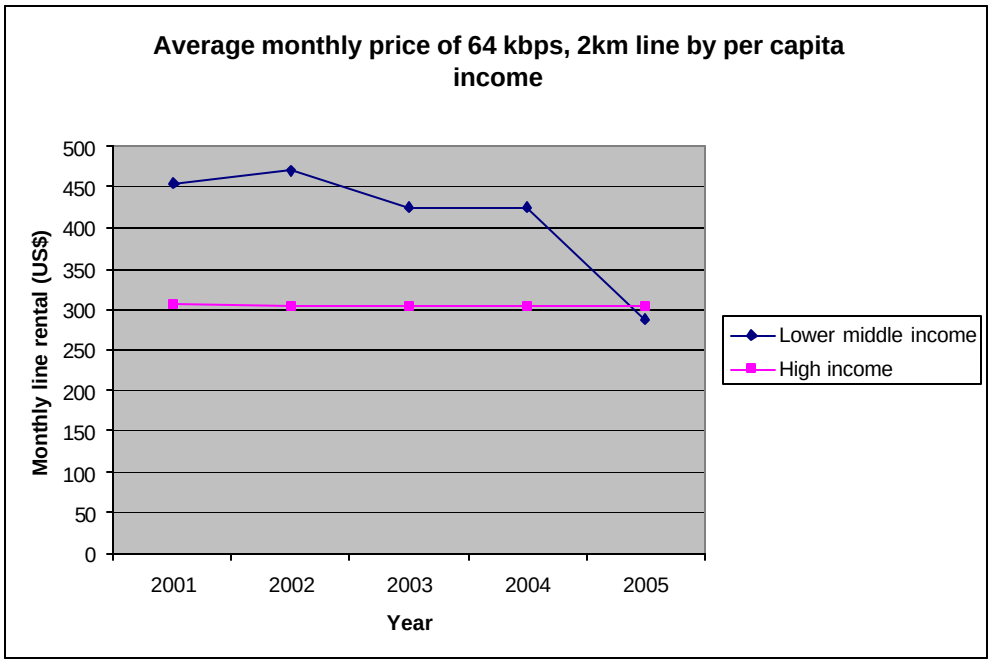
A similar distribution of price points and price stability is seen in 10 km 64 kbps lines, primarily due to the high degree of similarity between 2 km and 10 km lines.

Figure 3 presents Figure 2 data in terms of income levels, with Japan, the Republic of Korea, Macau, New Zealand and Singapore classified by the World Bank as high-income and Indonesia and Thailand classified as lower-middle-income.[53] Chinese Taipei is excluded due to its lack of World Bank classification.[54]

[53] The World Bank, "Country Groups," http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html.

[54] For more information, see http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20541394~menuPK:1277382~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html#taiwan.

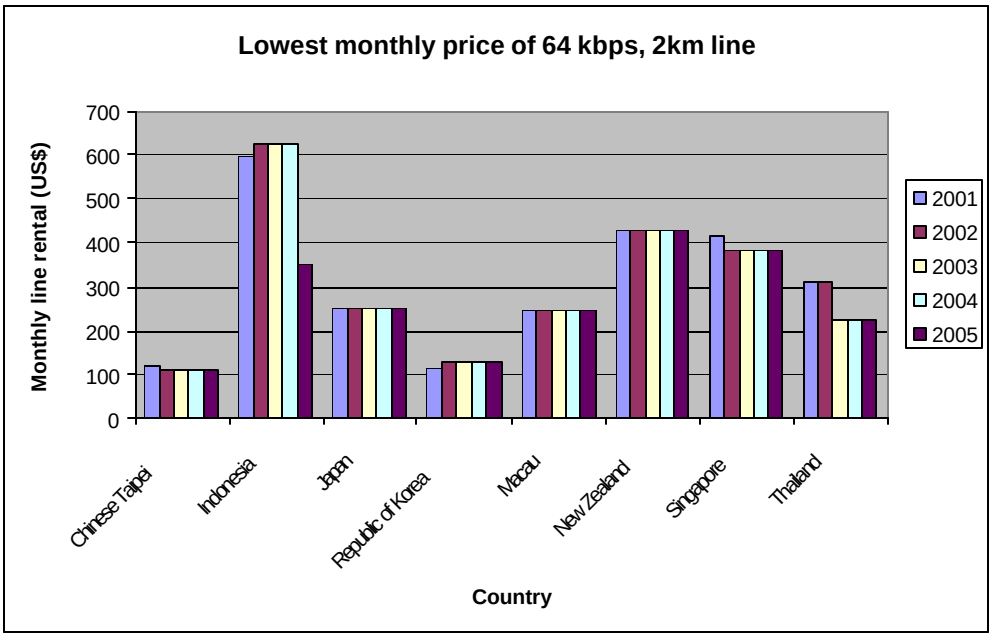
Figure 3



It is interesting to see that the lower-middle-income economies had higher prices than the high income economies for the majority of the study period, though prices converge by 2005. Again, given the small sample size, the significant price changes in Indonesia and Thailand cause the reduction in the average price in the lower-middle-income economies, whereas the price stability in the high income economies is evident.

Given the wide range of prices in some markets, it is also instructive to present the price points representing the lowest price in each market in order to provide greater insight into a particular economy's competitive marketplace. Figure 4 presents the lowest monthly price of a 64 kbps, 2 km line. Compared to Figure 1, we see that Japan's prices are lower, due to the fact that Figure 1 presents an average of Japanese prices. In other markets, the average and lowest prices are identical, due participation by only a single operator from such markets.

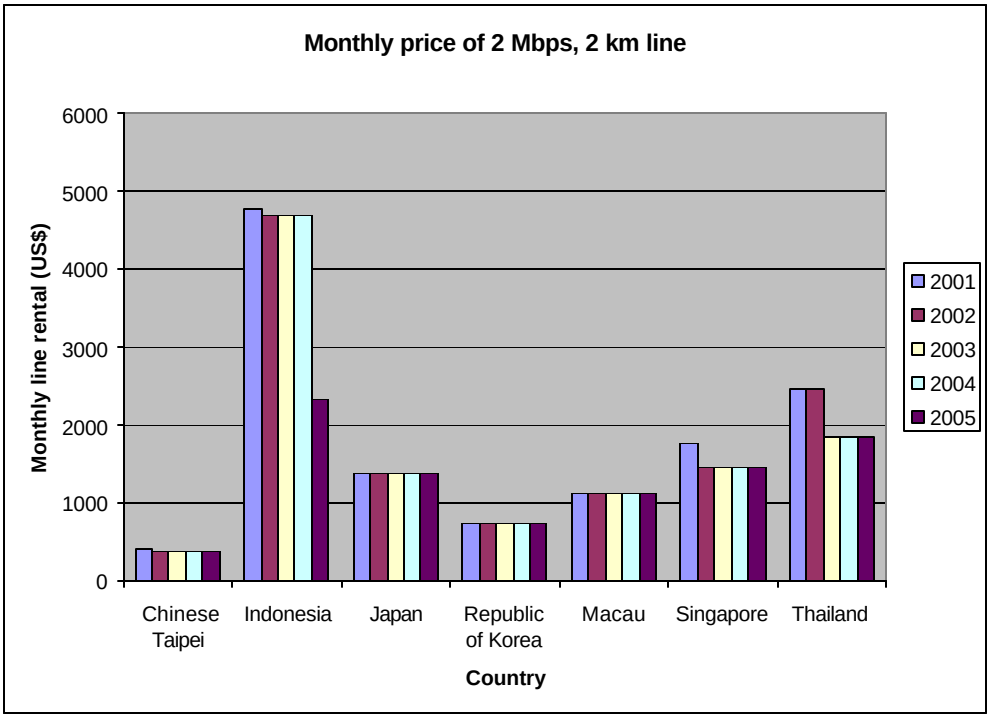
Figure 4



Note: In Singapore, rates for leased lines are not distance sensitive.

Looking at monthly pricing for 2 km 2 Mbps lines, the overall stability of prices within each economy is demonstrated with a wide range of prices between the two extremes, as seen in Figure 5.

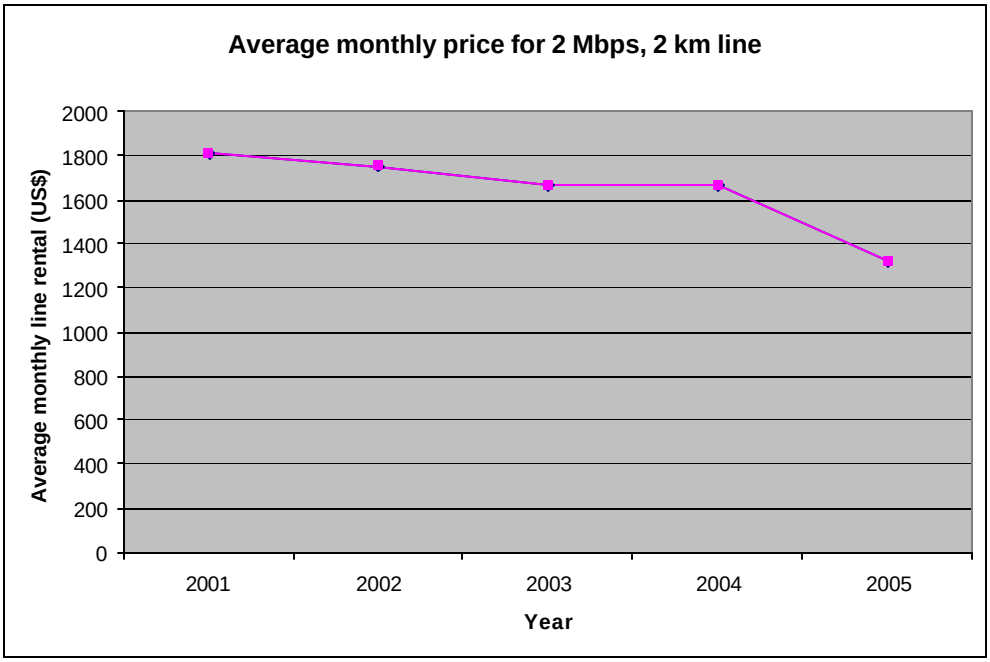
Figure 5



Note: In Singapore, rates for leased lines are not distance sensitive.

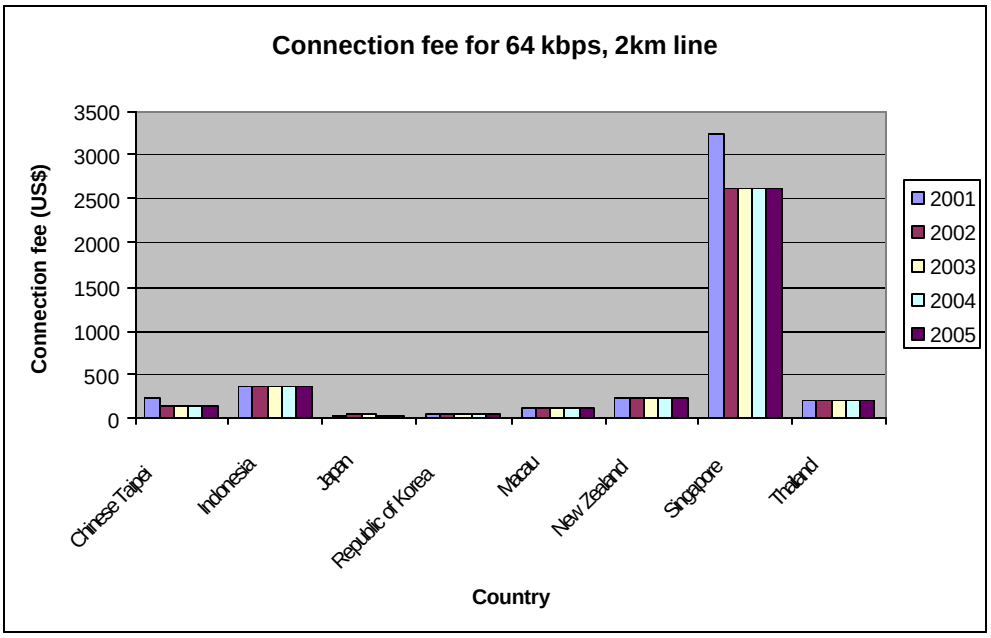
There has been little change in pricing over the five year period. However, it is interesting to note the significant decrease in prices from 2004 to 2005 in Indonesia as well as notable decreases in Thailand. While Singapore reported a price reduction from 2001 to 2002, the pricing for the last three years has leveled out and appears stable. As with 2 km 64 kbps lines, the average price remains relatively stable across the sample set (Figure 6), with the Indonesian and Thai price adjustments contributing to the decrease in 2005.

Figure 6



A closer examination of connection fees which are one-time charges indicates that for the bulk of respondents, connection fees are relatively low, as seen in Figure 7.

Figure 7



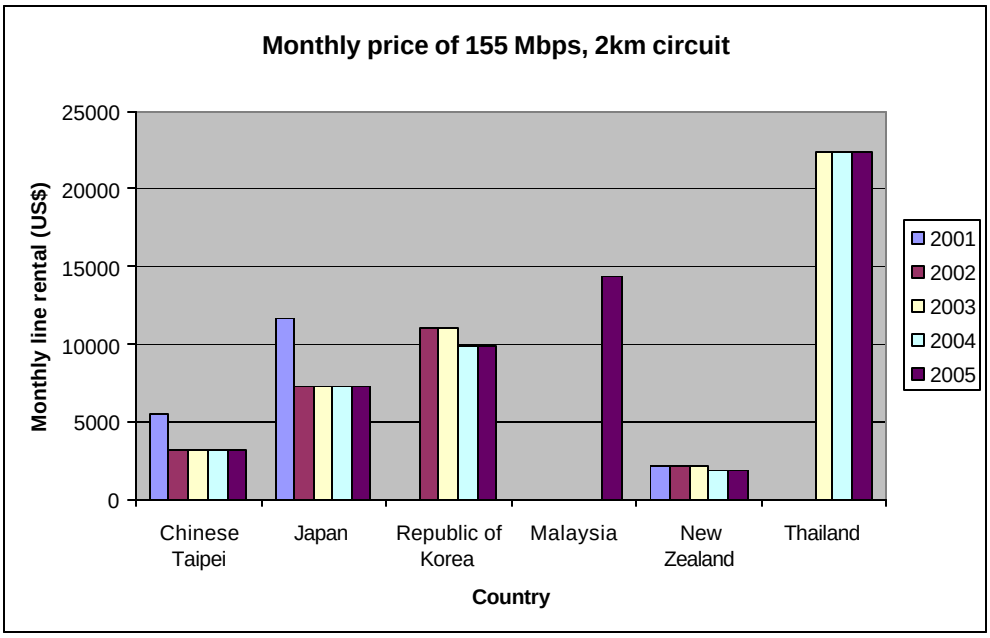
Note: In Singapore, rates for leased lines are not distance sensitive.

The exception here is Singapore which charges significant fees, despite the drop from 2001 to 2002, connection charges still remain high. It is important to note that one of the Japanese operators does not apply a connection fee at all, reducing the average Japanese connection fee reported in Figure 7.

7.2 Wholesale Leased Line Pricing

It is important to note that the data received is somewhat incomplete as operators did not uniformly respond to this question. Pricing of monthly line rental in Thailand is considerably higher than the other member economies included here, though prices have been stable over the last three years, Thailand's numbers are still substantially above those of the other economies included. Prices in Chinese Taipei and Japan have been consistent in the last three years and of note, a significant price drop occurred in both markets from 2001 to 2002 (Figure 8). Though not included in Figure 8, it is worth noting that Singapore currently requires Dominant Licensees to provide leased line services at cost-based rates to requesting Facilities Based Operators. Singapore's regulatory environment as it relates to pricing is discussed in greater detail in Section 5.1.

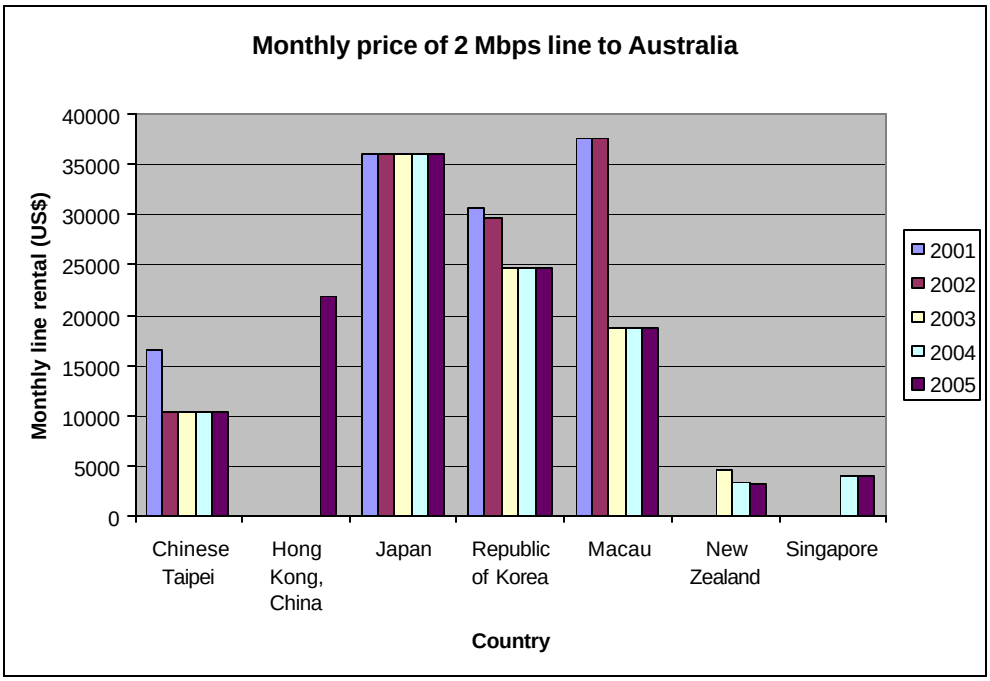
Figure 8



7.3 International Leased Line Pricing

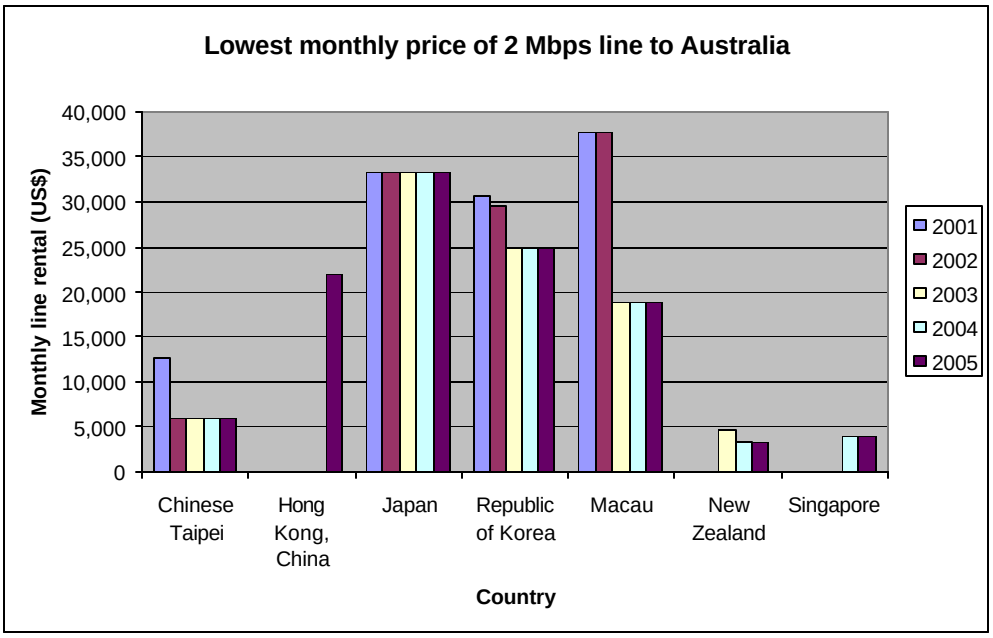
Although based on an incomplete data set, Figure 9 shows the monthly price of a 2 Mbps (E-1) line to Australia from six different economies, demonstrating a wide range of price variation. In 2005, the price ranged from US$3,186 to US$33,200. In examining the economies with multiple years of data, it appears that prices in Japan held steady, while prices in Korea, Macau and Chinese Taipei stepped down and stabilized over a five-year period, and prices in New Zealand steadily decreased over a three-year period.

Figure 9



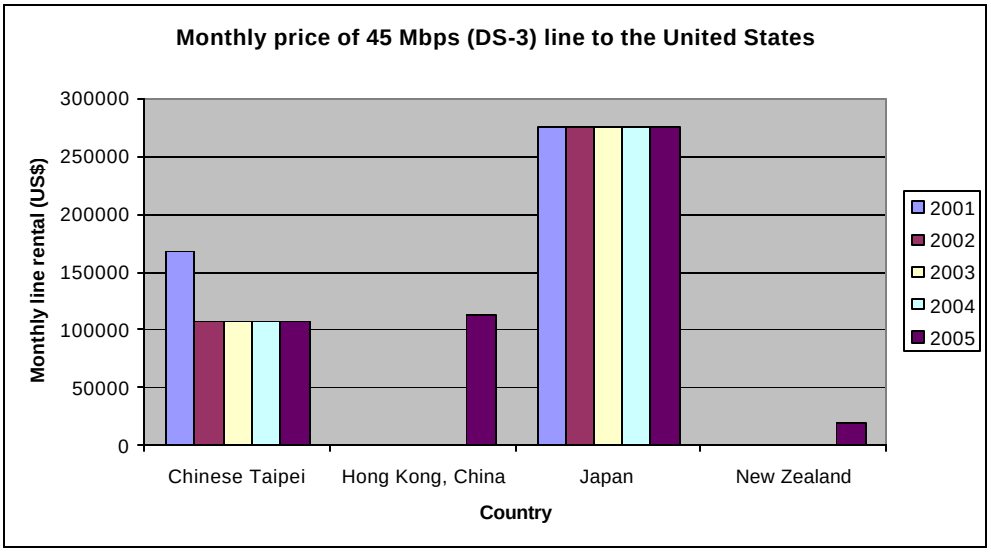
As noted earlier, the range of prices within a particular economy is masked by the presentation of average prices. Comparing the lowest prices within each economy for a 2 Mbps line to Australia (as presented in Figure 10), shows lower prices for Chinese Taipei and Japan, as compared to Figure 9.

Figure 10



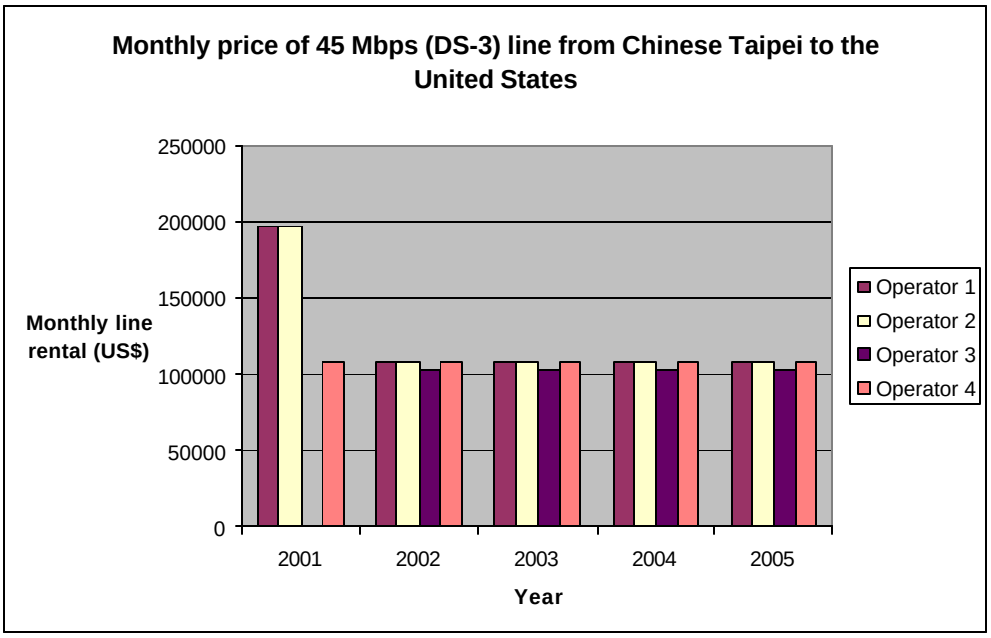
In looking at the monthly price for a 45 Mbps (DS-3) line to the United States from four APEC member economies (Figure 11), note that there is again a high degree of variability between the costs in each member economy represented, with a 2005 price range of US$18,923 to US$276,816.

Figure 11



It also is interesting to see that among the economies with more than one year of data available, Japan's average price remained stable, while Chinese Taipei's decreased in 2002. Figure 12 more closely examines Chinese Taipei's pricing structure.

Figure 12

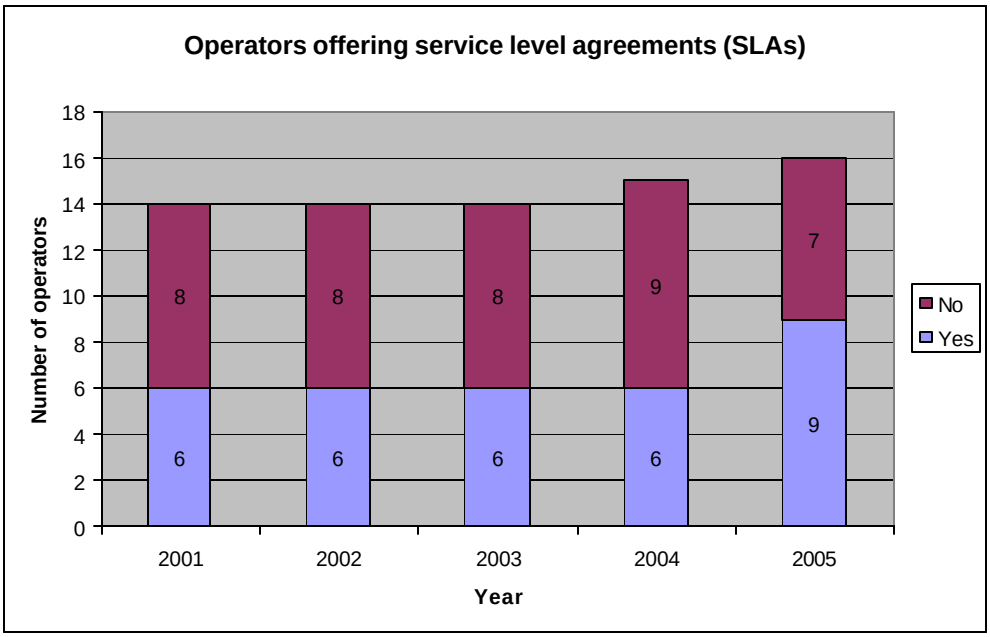


As can be seen, there is a high degree of stability among Chinese Taipei operators' pricing between 2002 and 2004, as well as a nearly 50 percent price reduction by two operators between 2001 and 2002.

7.4 Service Level Agreements

Over the course of the study period, responding economies showed a slight increase in the percentage of operators offering service level agreements (SLAs). The change between 2003 and 2004 represents the addition of an operator who did not offer SLAs and who did not report data in the prior years. The 2005 change represents two operators beginning to offer SLAs, plus the addition of another operator offering SLAs who did not report data for the prior years.

Figure 13



Conclusions

As we have noted, the data provided is significantly limited based on the few responses received to the survey. Therefore any conclusions should be viewed as preliminary in nature. We are hopeful that perhaps at a later date, this topic will be revisited and that additional data would be provided to enable further analysis and reveal a more comprehensive view of the status of leased lines across member economies.

Annex A – Leased Lines Survey

Respondent Information

Please answer the following questions so that we may identify the operator and record contact information in the event that any responses are unclear.

This information will not be shared with anyone, and data made available by APEC TEL will not identify specific operators.

In what country is the operator located?	
What is the operator name?	
Please enter your name	
Please enter your title	
Please enter your company/organization name (even if the same as the operator name above)	
Please enter your telephone number	
Please enter your email address	

Please answer all questions on this page.

2005 Retail Data

In 2005, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps (structured E-1)	2048 kbps (unstructured E-1)
2 km					
5 km					
10 km					

In 2005, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps (structured E-1)	2048 kbps (unstructured E-1)
2 km					
5 km					
10 km					

In 2005, what was your average fault repair time (number of hours) for retail service?

Please answer all questions or enter *N/A* if the question is not applicable.

2005 Wholesale Data

In 2005, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2005, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2				

km				
5 km				
10 km				

In 2005, did you offer Service Level Agreements (SLAs) to wholesale customers?

☐ Yes ☐ No

In 2005, what was your average lead time (number of days) for provisioning a wholesale circuit?

Please describe any bandwidth restrictions on wholesale customers applied in 2005.

Please describe any forecasting required of your wholesale customers in 2005.

Please answer all questions or enter *N/A* if the question is not applicable.

2005 International Data

In 2005, what was your monthly service charge for each of the following destination and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			

United Kingdom			
United States			

In 2005, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

Please describe any deviations from the above pricing structure for circuits supplied to global operators in 2005.

Please answer all questions or enter *N/A* if the question is not applicable.

2004 Retail Data

In 2004, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2					

km					
5 km					
10 km					

In 2004, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbsp	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2004, what was your average fault repair time (number of hours) for retail service?

Please answer all questions or enter *N/A* if the question is not applicable.

2004 Wholesale Data

In 2004, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2004, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2004, did you offer Service Level Agreements (SLAs) to wholesale customers?

☐ Yes ☐ No

In 2004, what was your average lead time (number of days) for provisioning a wholesale circuit?

Please describe any bandwidth restrictions on wholesale customers applied in 2004.

Please describe any forecasting required of your wholesale customers in 2004.

Please answer all questions or enter *N/A* if the question is not applicable.

2004 International Data

In 2004, what was your monthly service charge for each of the following destination and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			

China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

In 2004, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

Please describe any deviations from the above pricing structure for circuits supplied to global operators in 2004.

Please answer all questions or enter *N/A* if the question is not applicable.

2003 Retail Data

In 2003, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2003, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2003, what was your average fault repair time (number of hours) for retail service?

Please answer all questions or enter *N/A* if the question is not applicable.

2003 Wholesale Data

In 2003, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2003, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (DS-3)
2 km				
5 km				
10 km				

In 2003, did you offer Service Level Agreements (SLAs) to wholesale customers?

☐ Yes ☐ No

In 2003, what was your average lead time (number of days) for provisioning a wholesale circuit?

Please describe any bandwidth restrictions on wholesale customers applied in 2003.

Please describe any forecasting required of your wholesale customers in 2003.

Please answer all questions or enter *N/A* if the question is not applicable.

2003 International Data

In 2003, what was your monthly service charge for each of the following destination and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

In 2003, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

Please describe any deviations from the above pricing structure for circuits supplied to global operators in 2003.

Please answer all questions or enter *N/A* if the question is not applicable.

2002 Retail Data

In 2002, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2002, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2002, what was your average fault repair time (number of hours) for retail service?

Please answer all questions or enter *N/A* if the question is not applicable.

2002 Wholesale Data

In 2002, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2002, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2002, did you offer Service Level Agreements (SLAs) to wholesale customers?

☐ Yes ☐ No

In 2002, what was your average lead time (number of days) for provisioning a wholesale circuit?

Please describe any bandwidth restrictions on wholesale customers applied in 2002.

Please describe any forecasting required of your wholesale customers in 2002.

Please answer all questions or enter *N/A* if the question is not applicable.

2002 International Data

In 2002, what was your monthly service charge for each of the following destination and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

In 2002, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			

Singapore			
United Kingdom			
United States			

Please describe any deviations from the above pricing structure for circuits supplied to global operators in 2002.

Please answer all questions or enter *N/A* if the question is not applicable.

2001 Retail Data

In 2001, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10 km					

In 2001, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	64 kbps	256 kbps	512 kbps	1984 kbps	2048 kbps
2 km					
5 km					
10					

km

In 2001, what was your average fault repair time (number of hours) for retail service?

Please answer all questions or enter *N/A* if the question is not applicable.

2001 Wholesale Data

In 2001, what was your monthly service charge for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2001, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	34 Mbps	45 Mbps (DS-3)	140 Mbps	155 Mbps (STM-1)
2 km				
5 km				
10 km				

In 2001, did you offer Service Level Agreements (SLAs) to wholesale customers?

☐ Yes ☐ No

In 2001, what was your average lead time (number of days) for provisioning a wholesale circuit?

Please describe any bandwidth restrictions on wholesale customers applied in 2001.

Please describe any forecasting required of your wholesale customers in 2001.

Please answer all questions or enter *N/A* if the question is not applicable.

2001 International Data

In 2001, what was your monthly service charge for each of the following destination and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

In 2001, what were your connection fees for each of the following distance and bandwidth combinations?

Please express all charges in U.S. dollars.

	T-1	E-1	DS-3
Australia			
China			
Hong Kong, China			
Japan			
Singapore			
United Kingdom			
United States			

Please describe any deviations from the above pricing structure for circuits supplied to global operators in 2001.

Please answer all questions or enter *N/A* if the question is not applicable.

Annex B – Regulatory Environment Survey

APEC TEL Evaluation of Access to Domestic and International Leased Lines
Regulatory Environment Survey

Please send your responses, or any questions you may have, to Jeff Bernstein (jeff@tmgtelecom.com) no later than August 22 for incorporation into the final report. Thank you again for your assistance.

1. Cost Orientation
   a. Does your economy have laws/regulations in place that affect cost orientation of pricing in the leased lines market in your economy?
   b. If yes, please summarize (or quote) the provisions of the laws/regulations
   c. Please provide citations to the specific statutes (and links to Internet-accessible copies in English or Spanish) and indicate if they apply only to the telecommunications market

2. Tariffing
   a. Does your economy have laws/regulations in place that affect tariffs in the leased lines market in your economy?
   b. If yes, please summarize (or quote) the provisions of the laws/regulations
   c. Please provide citations to the specific statutes (and links to Internet-accessible copies in English or Spanish) and indicate if they apply only to the telecommunications market

3. Transparency
   a. Does your economy have laws/regulations in place that affect transparency in the leased lines market in your economy?
   b. If yes, please summarize (or quote) the provisions of the laws/regulations
   c. Please provide citations to the specific statutes (and links to Internet-accessible copies in English or Spanish) and indicate if they apply only to the telecommunications market

4. Non-discrimination
   a. Does your economy have laws/regulations in place that affect discrimination in the leased lines market in your economy?
   b. If yes, please summarize (or quote) the provisions of the laws/regulations
   c. Please provide citations to the specific statutes (and links to Internet-accessible copies in English or Spanish) and indicate if they apply only to the telecommunications market

APEC Publication Number APEC#206-TC-01.2

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