

Draft Submission

Response to TSO Discussion Paper

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Executive Summary

Universal service obligations are used in competitive network industries of many countries. Their basic role is to protect consumers from the outcomes that are considered to be unacceptable by policy makers, such as higher prices or no coverage for some customers, typically in rural areas. There has been a universal service obligation in the NZ telecommunications industry since the privatisation of Telecom. The current incarnation of that obligation, known as the Telecommunications Service Obligation (TSO) is currently under review by the Ministry of Economic Development (MED).

There are broadly two ways of analysing the TSO, distinguished by the assumed starting point for analysis. The MED paper starts from the status quo, and poses a series of questions about each of the components of this multi-dimensional instrument. The alternative is to start with first principles and consider how best to achieve the desired policy goals without reference to the existing institutional arrangements.

These approaches are complementary: one needs to start with a coherent first principles analysis in order to comment usefully on the details of the current instrument. Our analysis therefore begins by considering the twin objectives underlying the TSO: the social policy objective of ensuring all consumers have access to basic telecommunications services (consumer protection); and a means of sharing the cost of achieving that objective. We note that the consumer protection objective is only required for relatively low-income people living in relatively high-cost locations.

We then describe the main options available for addressing these objectives. For consumer protection, we identify price caps and income supplements as the basic options. The costs and benefits of these options are then compared. We find that the resource cost of achieving the objectives is likely to be lowest when targeted income supplements are the chosen instrument: the price cap option in the existing TSO is a relatively high-cost instrument.

We note that the issue of funding this consumer protection is separate from the issue of which approach should be used to achieve it. Irrespective of the consumer protection mechanism used, the feasible options for financing these objectives are to raise funds from the industry, or from general taxation. Our analysis concludes that for any given resource cost, it is more expensive to fund the instrument via industry taxes (the current method) than via general taxation.

In both dimensions therefore, the status quo imposes unnecessarily high costs. Consequently, we conclude that the TSO should be abandoned in its current form. The welfare of society as a whole is likely to be improved if prices were allowed to adjust in line with commercial pressures, and any low-income consumers who were adversely affected by the outcomes were to receive an income supplement via the tax/welfare system.

If these conclusions were accepted by government, no further analysis would be required. Recognising that political judgements may differ from our economic and

social analysis, we therefore consider less extensive reforms to the TSO. The two key issues that arise in this context are:

- Should the provision of TSO requirements be contestable? and
- Should broadband services be included in a revised TSO?

We believe that a contestable TSO system would be feasible for the majority of customers provided it is arranged carefully and not rushed. Contestability would be desirable because it is likely to provide greater certainty and efficiency than the current system for calculating the TSO subsidy. It is also likely to foster innovation as a result of the competitive bidding process.

Regarding broadband, our analysis shows that it is not a suitable candidate for inclusion in a revised TSO. A broadband TSO would be fraught with difficulties, including the need to define an appropriate service bundle and the difficulty of contriving competition in the presence of legacy assets. Possible alternative approaches to increasing investment in broadband include government-assisted demand aggregation and direct investment incentives; these policies would be complementary. A more radical approach, which would not be compatible with using investment incentives, is for the government to buy Telecom's ANS unit and require it to invest in broadband on a break even basis.

1. Introduction

There are broadly two ways of analysing the TSO, distinguished by the assumed starting point for analysis. The MED paper starts from the status quo, and poses a series of questions about each of the components of this multi-dimensional instrument. The alternative is to start with first principles and consider how best to achieve the desired policy goals without reference to the existing institutional arrangements.

These approaches are complementary: one needs a coherent first principles analysis in order to comment usefully on the details of the current instrument.

We start with first principles:

- Section 2 discusses the policy objectives/goals;
- Section 3 outlines the main options; and
- Section 4 evaluates the options against each other.

If the conclusions from this analysis were accepted by government, no further analysis would be required. Recognising that political judgements may differ from our economic and social analysis, however, we consider less extensive reforms to the TSO. The two key issues that arise in this context are:

- Contestability, which is considered in section 5; and
- Broadband, which is discussed in section 6.

2. Historical Objectives

The initial step in the first principles analysis is to identify the objectives that the TSO was originally intended to serve. This is needed to analyse how best to achieve these goals in today's environment.

The objectives of the TSO appear to be twofold:

- the social policy objective of ensuring all consumers have access to basic telecommunications services and capped prices; and
- the pragmatic objective of finding a way to pay for that social policy.

2.1. Social Objectives

The TSO evolved out of the Kiwi Share Obligation (KSO)¹ which was introduced immediately prior to the privatisation of Telecom. The apparent purpose of the KSO was to protect residential consumers from excessive pricing and/or service retrenchments following privatisation.

There are broadly two ways to protect consumers from these outcomes: competition; and regulation. Interventions such as the KSO/TSO are regulatory ones. They are only required if the intensity of competition in telecommunications markets is expected to be too weak to constrain service providers.

As Telecom passed into private hands, there was a risk that competition would be insufficient to adequately provide for the combination of service delivery and pricing that people had come to expect. The KSO was a relatively passive regulatory instrument that covered off that risk.

As competition intensifies, the need for regulatory intervention should decrease because competing providers constrain the incumbent's ability to impose high prices and/or to retrench services or their quality.

This concept of rolling back regulation is widely appreciated. The European Union's Regulatory Framework for Electronic Communications Services provides an example. It requires national regulatory authorities to assess whether there is 'effective competition' in a market (and provides formal guidelines for doing so) before a decision is made to impose *ex ante* regulation on industry participants. If a regulatory authority concludes that a market is effectively competitive, the Framework prohibits the imposition of specific regulatory obligations in the relevant market and directs that any existing regulations be withdrawn.²

¹ There is very little difference between the service and pricing specified in the KSO and the TSO. The main difference is an updating of the definition of the extent of service provision to reflect the situation at the time the conversion was made.

² See Directive 2002/21/EC of the European Parliament, dated 7 March 2002 at p. 108/36 and pp. 108/44-45.

In the following sections, we assess the available options for achieving the TSO goals in light of the changing competitive environment in the New Zealand telecommunications industry.

2.2. Paying for the Social Policy

The second principal function of the TSO is to define a means of paying for the social policy objectives identified above. The existing TSO funding mechanism differs from the original KSO system. The purchasers of Telecom assumed responsibility for the cost burden of the Kiwi Share when they bought the company. It was funded by way of internal cross-subsidies from urban to rural areas.

The system of cross-subsidies was eliminated in 2001 by the passage of the Telecommunications Act. As a result, the TSO policy is now funded through an industry levy, which is calculated according to the relative shares of industry (net) revenues held by liable telecommunications service providers.

In the sections that follow, we consider alternative methods for paying for the fulfilment of the social objectives of the TSO. At this point, we note that it is entirely reasonable to separate analyse of the appropriate social policy from analysis of the best way to pay for that policy.

3. Available Options

Below we describe the principal options available to address the social objectives and the need for a cost-sharing mechanism described above.

3.1. Social Objectives

Until relatively recently, nationwide intervention was arguably necessary to achieve the social objectives of the TSO, given the lack of a serious threat to Telecom's dominance. However, the last 5 to 10 years have seen a material increase in competing supply, particularly in urban locations. TelstraClear competes directly with Telecom's fixed line residential services in Wellington and Christchurch. CityLink and others offer fibre-based broadband services in Auckland's and Wellington's CBDs. And NZ Communications is expected to join Telecom and Vodafone as nationwide mobile network operators by the end of the next year. In addition, we expect to see a significant increase in competition in fixed line telecommunications services in urban areas as a result of the anticipated widespread uptake of Local Loop Unbundling (LLU)³ in these areas.

Applying the principles observed in the European Union to the New Zealand context, there is at least a case for reconsidering the existing policy in light of the recent and expected improvements in competition in telecommunications access and calling markets. An obvious question is whether these changes are sufficient to ensure the social objectives of the TSO are already locked in for customers living in urban areas, which is the majority of the population.

It is arguable that the only social policy risk with abandoning the TSO is for relatively low-income people living in locations where the cost of providing telecommunications services is relatively high. These are the only people who may end up not being able to afford basic telephone service. Intervention might therefore be reasonably confined to these particular cases.

On the other hand, it may be that the existing price cap policy is indeed the least costly way of achieving the desired social policy outcome.

In summary, feasible instruments for achieving the TSO's social objectives could operate from either side of the market. The two principal options appear to be:

1. A price cap on the amount that can be charged for the provision of residential telecommunications services (the status quo); or
2. An income supplement targeted at in-need customers, delivered through the welfare system.

Both options are explored in the section 4.

³ Alternatively referred to as the Unbundled Copper Local Loop (UCLL).

3.2. Paying for the Social Policy

The principal options for paying for the social objectives of the TSO are:

1. Through general taxation; or
2. By taxing the industry (status quo).

We have considered and rejected the option of internal cross subsidy by the TSO provider. As things have turned out, this probably would have been a viable option over the last six years. However, competition in the industry appears to be at a watershed, with the advent of LLU and of three mobile networks competing with the same technology. As a result, we consider that a cross-subsidy system would no longer be feasible.

The question of what is the best system for achieving the social objectives of the TSO is separate to the question of how this system should be funded. Accordingly, the decision as to the appropriate funding mechanism is not determined by the choice of delivery mechanism.

4. Evaluation of Options

The main options that could be implemented to achieve the consumer protection and/or social policy objectives are:

- maintain the existing TSO price cap, or
- remove price cap and provide targeted assistance to low-income households.

We evaluate these options relative to one another. We then address the separate issue of how either of these options could be funded.

4.1. Status Quo

The current TSO price cap system has two negative effects: it distorts investment decisions, and it misdirects welfare assistance.

Skewed Investment Incentives

Line rentals are typically well above cost in urban areas and well below cost in rural areas. This outcome distorts investment incentives in two ways. First, 'artificially' high prices in urban areas encourage inefficient entry in these areas. Second, in rural areas the artificially low price deters efficient entrance and investment by other potential providers as well as potentially deterring investment in improved technology and services by the incumbent provider. These distortions to investment incentives are likely to be detrimental to consumers.

To the extent that the TSO permits Telecom to lower its line rental prices in low-cost areas, high prices in these areas would arise predominately because of Telecom's market power in these areas, rather than because of the TSO. Regarding line rentals in these areas, if the price of the regulated unbundled copper local loop (UCLL) service ends up being estimated using the final pricing principle (TSLRIC), the magnitude of the true cost gap will be revealed.⁴ We expect that this gap will be substantial.

The TSO is likely to have a greater investment incentive distortion in high-cost rural locations. If prices in those locations were cost-reflective, alternative mobile and satellite options would be more attractive than they are. Consumers would have more choice, albeit at higher prices.

Misdirected Welfare

One of the primary objectives of the TSO is to enable all customers to be able to afford basic telecommunications services. However, not all customers need this kind of protection. The TSO price cap casts its net much wider than is justified on affordability grounds. It includes not only low-income CNVCs but also medium- to high-income

⁴ The Commerce Commission has released a draft determination regarding wholesale UCLL prices. These prices have been based upon international benchmarking, as required by legislation, and so are likely to provide a less accurate reflection of costs than a more detailed, cost-based approach, such as TSLRIC.

CNVCs who would be able to afford telephone services without the price cap. Thus (neglecting transactions costs for now) the cost of the TSO is considerably higher than is necessarily to achieve its social policy objectives.

4.2. Alternative: A Targeted Instrument

An alternative means of delivering universal service affordability is to remove the price cap and provide an income supplement to low-income rural households through the welfare system. This would enable recipients to access affordable telecommunications services while allowing prices to more accurately reflect the true costs of production in both urban and rural areas.

Alternatively, instead of direct assistance, qualifying low-income customers could receive a discount, or specific price. This could operate in a similar manner to the discounts available to community service card holders for GP visits or reduced medical/physiotherapy charges for those who are covered by ACC.

A specific household telecommunications subsidy (rather than simply an increase in welfare payments generally) may be desirable to ensure recipients spend the funds on telecommunications (on the assumption that universal access is desired). It would seem feasible to target subsidies based on place of residence (ie one subsidy per eligible household).

Irrespective of the precise mechanism for targeted assistance, this approach would address the problem of distorted investment incentives identified above. Depending on how beneficiaries were defined, a targeted income supplement would also address the problem of misdirected subsidies to medium- and high-income customers.

4.2.1. Impact of Switching to Income Supplement

If the existing price caps were removed, Telecom would be free to raise prices for fixed line access and local calling. It would obviously also remain free to reduce prices in low-cost areas, as it has done in some locations in response to competitive entry. Because of LLU, competition is likely to intensify in the near future in low-cost areas. This should impose pressure to reduce line rentals in these areas.

Regarding local call pricing, a free local call option is likely to be maintained in the absence of the TSO price cap, but the total number of free minutes may be capped and/or available only at off-peak times.⁵

For the minority of customers that are currently commercially non-viable, line rental prices would be likely to rise to more closely to reflect costs. There is some risk that these prices would rise above cost, but that risk is substantially mitigated by the

⁵ To the extent that Telecom were to respond to removal of the TSO by increasing prices for local calls significantly in excess of costs in some regions, there could be a benefit from maintaining some form of price cap for local calls, or at least to some fixed amount of local calls (eg 120 minutes per month and/or all off-peak local calls).

prospect of competitive entry and/or defection to existing services, such as mobile, where these services are available. This raises the questions: how many customers would face price rises and by how much?

Based upon figures from MED:⁶

- Around 20,000 CNVCs generate losses of up to \$300 each (ie up to \$25 loss per month). These are referred to as mildly unprofitable customers;
- A further 20,000 CNVCs generate losses of between \$300 to \$1,000 (ie up to \$83 loss per month). These are referred to as moderately unprofitable customers; and
- A further 20,000 CNVCs generate losses of over \$1,000 (average loss is around \$2,500, ie \$208 per month). These are referred to as severely unprofitable customers.

Given the potential social policy concerns regarding higher prices for these customers, a relevant question is: how many of those who would face increased prices would need to be provided with support to ensure that basic telephony service remained affordable?

The answer would depend upon the definition of what is affordable. If possession of a community services card were deemed necessary to be eligible for assistance, somewhere around 25% of the 60,000 CNVCs could potentially qualify.⁷

To investigate the social consequences of removing price caps, we tabulated income data against the locations provided in MED's Supporting Information. Table 1 shows the result. It is based on the median income of Census Area Units within the MED's locations, so there are distributions of income within each cell that are not shown in the table. However, it is clear that some CNVCs have above median household incomes, which illustrates the misdirected welfare point discussed previously.

Table 1 Income Distribution of CNVCs

Income Band (households)	% of CNVCs in each income band		
	Mild	Moderate	Severe
Above NZ median (\$51,400)	8%	5%	4%
Between \$0 - \$5k below median	11%	14%	12%
Between \$5k - \$10k below median	22%	21%	20%
Between \$10k - \$15k below median	30%	33%	31%
Between \$15k - \$20k below median	21%	21%	25%
Up to \$20k below median	9%	6%	9%
	100%	100%	100%

⁶ Telecommunications Service Obligations Review Supporting Information, August 2007.

⁷ It is not possible to accurately determine the proportion of households with Community Service Cards because of the 1,013,000 cards issued in the past year, many are issued to individuals within the same household. Cards are also issued for varying durations: six months (eg unemployed), one year (eg students) or two years (eg pensioners).

The precise design of any income supplement policy is beyond the scope of this report. However, as an illustration, we have estimated the cost of covering losses for customers:

- with household incomes at least \$5,000 below the median income; and
- who are moderately or severely unprofitable.

These can be thought of as represented by the shaded cells in Table 1. An upper bound on this cost is \$58m per annum, which is at least \$20m less than the current net cost of the TSO as estimated by the Commerce Commission.

Despite the high costs of some fixed-line customers, a large proportion of CNVCs are likely to be able to afford to pay the actual cost of their connections. Additionally, many of those that would not qualify for assistance but would not be prepared to pay higher connection costs may be able, and willing, to switch to mobile telephony.

4.2.2. Reduction in Distortionary Effects

A major advantage of removing the price cap is that investment and entry incentives faced by telecommunications providers would not be distorted. Inefficient entry would be less likely in low-cost areas and increased investment in high-cost areas would be more likely.

Additionally, welfare would not be misdirected towards medium- and high-income customers. This would have the effect of reducing the cost of the TSO, as well as reducing the efficiency costs of raising revenue to fund the TSO, a matter to which we now turn.

4.3. Funding the TSO or Any TSO Alternative

Irrespective of whether the status quo is maintained or an alternative mechanism is employed to ensure widespread fixed-line phone affordability, there are different methods by which this objective can be funded. These options include:

- Cross subsidisation by individual firm/s;
- Targeted industry taxation; or
- General taxation.

4.3.1. Cross-subsidisation

Cross-subsidisation is not likely to provide a stable source of funding over time. This is because increased competition in profitable areas, which is increasingly likely because of LLU, would remove the ability of the incumbent fixed-line operator to obtain 'monopoly profits' which could be used to fund the losses from servicing CNVCs.

We note that this approach would probably have worked well over the recent past because there has, so far, been an absence of large-scale competitive entry. This has meant that there has been little pressure on Telecom to reduce prices to low-cost customers.

4.3.2. Industry-Specific Taxation

Applying a specific tax upon the industry, such as the TSO levy, brings with it significant 'efficiency costs'. These arise because some proportion of this charge is ultimately passed onto customers in the form of higher prices, regardless of whether the tax is levied upon telecommunications providers.⁸ As many telecommunications services are relatively responsive to changes in price (ie they are relatively price elastic), an industry levy distorts the consumption patterns for these services. Thus, an industry-based tax, such as the TSO levy, leads to a reduction in the use of services in the very industry that, according to the Minister of Communications, is "critical for enabling economic growth and the development of a knowledge-based economy". To the extent that a telecommunications service provider is unable to pass the cost of the TSO levy onto its customers, that provider faces a reduced incentive to enter and/or expand within the telecommunications sector and compete with the incumbent.

The TSO levy may also generate distortions by creating incentives for service providers to alter their business structures to avoid liabilities. Furthermore, an industry-specific approach imposes entirely new administrative and compliance tasks upon the public sector (ie regulator) and industry participants. This generates costs in addition to those created by the existing tax system. The range of economic impacts which can arise from taxes such as the TSO levy are described in more detail by the Tax Review 2001.⁹

The method by which the TSO is applied also raises concerns regarding transparency. This becomes more obvious if the TSO levy is compared with GST, which is applied in much the same manner. Both are effectively levied as fixed percentages of retail revenue streams (ie purchase prices) and, although tax revenue is collected from those selling the goods or services in services, much of the incidence, or financial burden, of these taxes are passed onto customers. However, unlike GST or ACC, there is a lack of transparency regarding the burden of the TSO levy. Typically, there is no indication to consumers that the levy is applied to retail revenues relating to the many telecommunications services which they purchase. This is relevant because the range of services to which this levy applies is much broader than the services which are subject to the TSO price caps. For example, retail revenue from mobile telephony services are subject to the TSO levy, regardless of whether these mobile customers purchase fixed-line services covered by the TSO.

Because of the retrospective nature of the TSO calculation, indicating the exact percentage of retail prices which contribute towards the levy is not possible. However, prices for telecommunications services typically do not provide any indication that such a levy is being applied. Because many customers are unaware that the potential impact of the levy, whether it applies to fixed-line connection prices in low-cost areas or mobile phone services, this levy could be described as a form of 'stealth tax'. This raises issues concerning transparency and leads to the question of whether the application of the TSO

⁸ This process is similar to that of GST. Although paid by sellers, the incidence of this tax is passed onto buyers in the form of higher prices.

⁹ See the Tax Review's Issues Paper and Final Report at: <http://www.treasury.govt.nz/taxreview2001/>

levy contradicts the Commerce Commission's general approach of promoting transparency in pricing.

4.3.3. General Taxation

Because the system of general taxation is designed to be consistent with the principle of collecting revenue at the least possible cost, whilst incorporating equity and fairness concerns, general taxation revenue is likely to be the most efficient method of funding TSO-type social policy objectives. General taxation revenue could then be allocated to cover the costs of providing telecommunications services to those high-cost customers who are not required to pay the full costs of service. This would operate in much the same way as funds are provided for meeting a range of other social objectives, such as healthcare, education, etc.

This funding approach could be applied regardless of whether the TSO continued in its current form, were amended (eg made contestable) or were replaced by another mechanism, such as income supplement.

4.4. Conclusions

The analysis above points towards two preliminary conclusions regarding whether the TSO should continue to be used to meet social policy objectives and how the cost of these policy objectives should be funded.

4.4.1. Should the TSO be Replaced or Amended?

The fact that consumer protection and/or social policy objectives could be met by other mechanisms that do not have the same negative, distortionary impacts of the TSO suggests that replacing or, at least, amending the TSO could be beneficial for society as a whole.

Specifically, social policy objectives could be achieved at a lower overall costs, and without misdirecting welfare towards those who do not require it, by targeted financial assistance for customers deemed to be in need.

4.4.2. How Should Social Policy Objectives be Funded?

Because Telecom should be less able to cross-subsidise CNVCs as LLU increases the potential for competitive areas, and because of the efficiency costs of industry specific taxation, general taxation is likely to be a more efficient method of funding any consumer protection measure, regardless of which measure is used.

5. Contestability

MED raises the possibility of making the provision of TSO services contestable by way of a competitive process such as an auction for determining who will provide the TSO service and receive compensation for doing so. If the TSO remains in some form, contestability presents a means of avoiding the lengthy and potentially unreliable modelling process currently employed to calculate the TSO subsidy. Contestability also provides an opportunity to harness any innovations that might flow from a competitive bidding process.

The question of whether to make the provision of TSO services contestable can be separated from the question of funding. That is, the TSO under a contestable system could be funded through either an industry tax or general taxes.

5.1. How to Make the TSO Contestable

The following actions would likely be required in order to create a contestable bidding system for the TSO.

5.1.1. Adjust the TSO Service Definition

Competing technologies, such as wireless, mobile and satellite with VOIP, would need to be technically included as methods for delivering the TSO. In order to provide certainty to bidders on costs, a maximum number of free calling minutes per month could be specified at the outset, replacing the concept of unlimited local calling. The distinction between local and national calls could also be eliminated, so that “free local calling” would be redefined as “X free call minutes per month.”

5.1.2. Tender Out All Feasible Areas

The presence of competitive networks in some but not all of New Zealand makes it logical to award multiple contracts for TSO service provision according to geographical area. Each geographical area should be large enough to (1) minimise the transaction costs associated with a high number of auctions, (2) minimise the potential for tacit collusion which would be exacerbated by auctions being repeated many times, and (3) provide bidders with the economies of scale necessary to justify infrastructure investment. Multiple auction rounds (similar to the radio frequency spectrum auctions) may be required so as to enable economies of supply across geographical areas.

TSO service quality requirements would apply to each geographical area as opposed to nationally. This would address the problem of discrepancies in service quality between rural and urban areas resulting from the current system of nationally aggregated service measures.

Note that the timing of a contestable TSO process is important. It would be preferable to have Telecom’s mobile business, NZ Communications and Vodafone bidding against each other. This suggests that tendering out TSO obligations should not be expedited.

5.1.3. Set Optimum Contract Duration

The duration of the TSO contracts would need to be sufficiently long to allow a reasonable return on infrastructure investment but should be short enough to maximise the degree of competition so as to encourage the uptake of new technology. A reasonably short contract duration would also allow revisions to the service definition, where appropriate. Five years might be an appropriate starting point.

5.1.4. Acknowledge That Competition May be Infeasible in Some Locations

Given the difficulties that would be associated with attempts to transfer or license Telecom's network to non facilities-based bidders, contestability is probably only feasible in areas where legitimate, facilities-based competition exists. The industry engagement required for the design of tender areas would help to identify those areas where contestability is infeasible.

5.2. Alternative Where Telecom is Only Terrestrial Operator

The number of customers in areas where terrestrial competition is infeasible may be as low as 20,000 after the tendering process. In these areas, broadband can be delivered via satellite technology. A potential alternative to a contestable TSO system in these areas would be for basic telephone services to be provided over satellite broadband connections using VoIP at a price capped at the current standard line rental rate. Under this option, customers would receive the benefit of broadband as well as basic telephony.

The current pricing plans advertised by ICONZ¹⁰ for satellite broadband include an installation fee of approximately \$500 and an ongoing operation fee ranging from \$130 to \$252.50 per month, depending on the download speed, etc. Assuming a monthly fee of \$200, the satellite option would result in an additional monthly 'loss' (not including installation) of approximately \$160 per month, assuming that customers were to continue to contribute approximately \$40 per month as they currently do for line rental. This \$160 loss is less than the average monthly loss (\$208) for the 20,000 most costly customers.

Therefore, introducing a subsidised price cap on satellite VoIP services for the 20,000 most unprofitable CNVCs could save approximately \$12 million in annual TSO costs. This is the estimated difference between the present TSO bill for these 20,000 customers and the total bill for providing these customers with satellite VoIP services at the current standard line rental rate. An additional cost of approximately \$10 million in installation and set-up charges would also be required at the outset.

The feasibility of this alternative would obviously need to be looked at in more detail, including the question of whether VoIP technology is sufficiently advanced to provide adequate service quality.

¹⁰ See <http://www.iconz.net/satellite/>.

6. Broadband

The TSO currently encompasses only low-speed data service, which is capable of being delivered using dial-up internet access over fixed lines or via mobile networks. MED is canvassing the possibility of mandating that much faster data speeds be included in the TSO. This initiative is consistent with views expressed by politicians (national and local) that some form of intervention is warranted to accelerate the use of broadband.

Whatever politicians might want, adding broadband to the TSO is a major intervention and deserves a correspondingly rigorous analysis of costs and benefits. The starting point is to inquire into the existence and nature of any market failure. If such a failure can be identified, intervention options should then be identified and evaluated. We will proceed in this manner.

6.1. Is There a Market Failure?

There is a perception that New Zealanders do not use enough broadband; that the nation would be better off if we used more. That perception is not enough to establish a market failure. Precisely the same statements could be made about things that are currently infeasible, such as nuclear fusion and water-powered cars.

Market failure occurs when feasible trades are not made. Trades are feasible if buyers are willing to pay more than the cost of supply.

At first glance, this definition may appear to imply that market failures are always caused by supply side restrictions. That is certainly very common. Market power¹¹ and/or incomplete appropriability¹² account for most of the standard instances of market failure. However, there may also be demand side factors that are relevant in the case of broadband. We will therefore consider both sides of the market in what follows.

6.1.1. Supply Constraints

Supply constraints may be contributing to the relatively low rates of broadband uptake in New Zealand. At this point, there are four ways to deliver broadband service:

- Fixed line DSL;
- Fixed wireless broadband;
- Mobile broadband; and
- Satellite service.

Satellite provides complete coverage but it is very expensive. It also appears to be priced well above cost. Setting price above cost could easily be rational for a supplier of a new, high-value, risky and capital intensive business such as satellite broadband.

¹¹ Unless it can price discriminate perfectly, a monopolist will choose not to serve some demand that would be willing to pay its full service cost.

¹² The reason that markets fail to provide efficient levels of public goods is that firms cannot capture the full valuation (willingness to pay) of potential customers because excludability is not feasible.

Fixed wireless broadband can be obtained from a number of operators, including Woosh off its network and a number of ISPs selling services off the Kordia Extend network. There are also WiFi initiatives in regional areas and the government is auctioning off additional spectrum for wireless broadband services later this year. This sector appears workably competitive.

Mobile broadband can be obtained from either of the two cellular networks. However, it does not offer complete nationwide coverage and it may also be priced above cost. This would be rational for the same reasons as those applying to satellite service. The prospects of workable competition in this area appear strong however, especially given Telecom's technology switch and the expected launch of a third network by NZ Communications.

Fixed line DSL service can be obtained from Telecom and from resellers of its network. Its service potential depends on loop lengths, which vary dramatically throughout the country. Regulation of UCLL and ancillary services should ensure that DSL *prices* are not a source of market failure, at least in locations that are attractive to potential buyers of the UCLL service. However availability will remain a challenge for DSL, at least until Telecom's cabinetisation programme is completed.

To conclude, while some forms of broadband supply may currently be priced in excess of cost, which would contribute to market failure, this situation looks to be temporary. Residual market power may still exist by the end of next year, but it should be confined to extremely remote locations.

6.1.2. Demand Constraints

Identifying an adequate pool of demand is a significant challenge for a broadband investor. Two constraints are relevant.

One constraint is simply that some people do not know what they are missing. This is partly a pure information problem. If one has never experienced broadband service, the uses to which it can be put will be largely unknown or underappreciated. Willingness to pay will then be correspondingly low. This effect is reinforced by a relative lack of complementary services, such as video streaming and even graphic-rich web pages. Experience in other platform markets¹³ suggests that if/when penetration rates for broadband accelerate, complementary services that require broadband will be supplied in greater quantities and presumably also in more innovative forms.

The other class of demand-side constraint is that individual demands are over-lapping. It is much cheaper (on a per-customer basis) to serve two customers in a cluster than to serve one. And unless enough demand exists to pay for a feeder into a cluster, it is not feasible to serve whatever demand might currently exist in that cluster.

¹³ Computer operating systems are platforms. As they become more widely used, there are greater incentives to write compatible software, and a virtuous circle can be established. The same occurs in the market for games consoles which also depend on software authoring.

6.1.3. Chickens, Eggs, and Platforms

There is a high degree of inter-relation between these problems. The supply side issues noted above (incomplete coverage and market power) are connected to each other, because market power would be reduced if there was more facilities-based competition. Moreover, if twin problems of consumer ignorance and isolation could be resolved, the resulting surge in demand would be a strong incentive for investment in competing facilities.

In summary, this is a “chicken-and-egg” problem of the type very familiar to anyone who has tried to start a platform business. Platforms are the most successful of all business models because they generate strong network effects, which are the source of real and lasting value. Well known examples of platform businesses include Trademe, Google, Visa, and Microsoft Windows. Platforms facilitate interaction between different types of users (eg buyers and sellers). Each type benefits from more of the “other” type (eg sellers on Trademe prefer lots of buyers, and vice versa), so existing users get even more value as more users join.

These platform generated network effects are the essence of what is envisaged by those who speak of economic transformation via broadband (though they tend not to use those terms). If broadband was widely available, people would use it to interact with others in ways we simply cannot predict, but which might include:¹⁴

- Direct export of services in a digital form;
- Development of innovative business models in New Zealand and subsequent international roll-out; and
- Telecommuting, with associated lifestyle and transport benefits.

Envisaging the network effect is the easy part of establishing a platform business, however, it is very much more difficult to actually make one work. Indeed, business history over the last decade is littered with failed attempts to create platforms.¹⁵

It is not difficult to identify major roadblocks to further investment in broadband. Investors are likely to be unwilling to commit (large quantities of) capital to a very extensive broadband roll-out because of two strategic uncertainties:

- The response of potential customers (ie, fear that uptake will be muted); and
- The response of rivals (fear of overlapping investment and/or regulation).

These risks are likely to be negatively correlated, which increases the probability that one of them will be realised. Suppose, for example, that Telecom was to massively expand its fibre network. If uptake was then very slow, regulators and commercial rivals would be inclined to stand back and allow Telecom to bear the consequences of

¹⁴ Recent work by the New Zealand Institute has estimated the value that could be created in specific industries. Their examples are also network effects because they involve local producers using the broadband platform to interact with their customers. Wealth creation of this type would accelerate as larger numbers of local producers joined and started interacting with a larger set of customers.

¹⁵ See, for example, <http://www.26econ.com/?cat=18>, referencing ‘graveyard’ of unsuccessful websites relying on social or network effects.

what turned out to have been a bad decision. Conversely, if uptake turned out to be extremely strong, some form of entry would be expected. The main options are via investment in competing facilities, or through regulated access.

6.1.4. Government Failure

The government itself is a barrier to private investment in broadband. A general impression has arisen that the central and local governments alike are very keen to secure broadband investment, to the point where they are willing to pay something towards the cost. Project Probe was the first hard evidence of this attitude. The Broadband Challenge is further evidence, as is the fact that MED has brought the issue into this TSO review.

In the face of this very evident enthusiasm, private investors will naturally prefer to hold back in the hope of securing a government contribution. We are, after all, envisaging a very risky and expensive investment, so there is already a strong incentive to delay.¹⁶ The possibility of costs being reduced through future government contributions will only enhance that delay incentive.

6.2. Solution Options

The following problems have been identified:

- Prices are probably above cost because competition is not strong enough; and
- Some services are not available because investors have not committed capital.

There are broadly three ways to respond. One is to regulate existing broadband prices to cost, which would eliminate the market power problem. The other is to promote investment in some way, so that competition can eliminate the market power currently enjoyed by all providers (albeit in different ways and places). The third is to retain the existing policy settings.

6.2.1. Price Regulation

Price regulation would resolve some of the market failure problems identified above. The beneficiaries would be those people who could use existing facilities, are currently deterred by market prices, but would be willing to pay at least the incremental cost of supply.

Since the whole country is already served by satellite, that technology would be an obvious starting point for price regulation. In some locations satellite service is the lowest cost broadband option. Even where that is not the case, satellite service regulation would have the advantage of placing a lower cap on other forms of supply (ie fixed and mobile). However the logic would extend naturally to regulating those other forms of supply as well.

¹⁶ Real option theory predicts that investment is more likely to be delayed when demand growth is low and/or volatile. Modest uptake growth is precisely the perceived problem with broadband in New Zealand. Additionally, at least not for fixed-line broadband, there seems to be no apparent risk of pre-emption by a competitor.

Once all prices were cost-oriented, this source of market failure would have been eliminated. Note that this would be retail price regulation, so it would require amendment to the Act.

The obvious problem with this approach is that it would further chill the already cool broadband investment climate. That would reduce the prospect of competing facilities (eg mobile vs fixed broadband), so there would appear to be an ongoing need for regulation.

On balance price regulation, at least as a stand-alone measure, seems a very poor response to the perceived problem. To prefer it as a solution, one would need to believe that further investment in broadband is not really needed. That is not how we read the views of governments in New Zealand.

6.2.2. Investment Promotion

There are four ways of promoting investment in broadband. They are

- Demand aggregation;
- Direct Incentives;
- Procurement;
- Obligations; and
- Government supply.

Demand aggregation involves direct attempts to educate potential end-users and pool the demand of those located near one another. It is already being pursued by MED, albeit on a very small scale. There are also examples of it occurring spontaneously. Activity of this type is complementary to the other three measures identified above.

A second option, which could be implemented fairly swiftly, is to develop a direct incentive package for broadband investors. This could involve a combination of instruments and be conducted through a tender process. Incentives could include accelerated depreciation allowances and similar tax concessions, public private partnerships, and/or clear regulatory holidays.¹⁷ The qualifying conditions for the tender should commit bidders to build an open access network in a particular location. There would need to be careful thought given to the tender documents, because they would bind the government to future regulatory treatment of the resulting investments.

Procurement involves the more traditional tendering out of the construction and possibly also the operation of broadband facilities. It is also occurring already (eg Project Probe). Most of the examples have been initiated by governments, but that need not always be the case. Under certain circumstances (eg removal of TSO price caps), one

¹⁷ A regulatory holiday is a commitment to not regulate for a specified period. This approach has been used with some success in Australia. It greatly improves regulatory certainty, which does seem to currently be a barrier to investment in broadband in New Zealand.

could readily imagine that rural communities in particular would take an interest in procuring facilities for their own needs.

Obligations are sometimes imposed on an industry to correct a market failure, and/or to give effect to government policy. Recent examples come mostly from the energy sector and include obligations to maintain reserves of oil, to sell biofuels, and to hold carbon emission rights. Obligations of this type tend to reside with all parties in an industry. They are also generally tradeable, or at least can be readily made so.

There would be some challenges in designing an efficient broadband TSO. They would arise from the need for cost minimisation, which implies a tender process for the obligation. The service specification would need to be carefully framed so that the potential roles of mobile broadband and satellite are clear. Since different technologies will be cost efficient in different places, the geographical areas that are tendered should be designed with these in mind. A sequential tender process would also be required because of the potential for cost economies across locations, in the same way as occurs for spectrum auctions. Finally, and rather obviously, it will be necessary to specify in advance the price of service. This is non-trivial because broadband service tends to exhibit non-linear pricing.

The final option is government provision. This would most effectively be achieved by the purchase by government of Telecom's ANS unit. It could be established as an SOE or a Crown Operating Company, and given a mandate to invest and to just recover its costs.

6.2.3. Status Quo

The third option is to persist with existing settings. There are major changes already working their way through the telecommunications industry in New Zealand. Telecom is currently developing a cabinetisation strategy and will soon forecast that roll-out (and become liable for penalties should it not proceed). The associated UCLL process is on track but it will take some time for it to reshape the industry, and it will probably only do so in urban locations. Two national mobile networks are under construction (Telecom's WCDMA overlay, and NZ Communications' new build) which are likely to compete vigorously for mobile broadband custom. The government is also auctioning spectrum later this year for WiMAX networks, with enough spectrum being auctioned for 6 national networks. These developments will definitely improve the supply of broadband service in its various forms. It would therefore be quite reasonable to defer a decision on a broadband TSO for at least 12 months.

6.3. Evaluation

We take as our starting point the widely held view that government wishes to promote investment in broadband facilities at a faster rate than the industry would ordinarily proceed. Under this assumption, price regulation and the existing policy settings need no further analysis; attention is focussed instead on the means of promoting investment. The options outlined in section 6.2.2 above can usefully be thought of as allocating the burden of investment promotion to either:

- Consumers;
- Industry; or
- Government.

6.3.1. Consumer Focus

Consumers can aggregate their own demand and procure required services through competitive tender. This could work reasonably well, especially in rural areas where communities are accustomed to collective action. This represents most of the country (physically) and these are also the places where a boost to investment is most needed. Some catalysts may be useful to kick-start the process, such as:

- Removing the TSO price cap;
- Advertising the potential value of broadband; and
- Assisting with co-ordination of demand and with procurement tenders.

A major advantage of this approach is that it obliges consumers to take notice of broadband and their telecommunications service more generally. That outcome simply has to occur if broadband is to transform our economy.

6.3.2. Broadband TSO

Provided it was implemented efficiently (see section 6.2.2), and funded efficiently (see section 4.3) a broadband TSO could work reasonably well. We have doubts over the feasibility of designing an efficient broadband TSO, however.

The first point is that it would need to be designed by MED. It would require a level of analytical detail hitherto unseen in that agency's analysis of this industry. A glance at the location of existing non-viable customers shows that a large number of fine-grained location decisions would be required for the tender process.

Secondly, logic and history both suggest that it is difficult to contrive competition in the presence of legacy assets. This is obvious when considering making the existing TSO contestable (see section 5), but it is also an issue for extensions of the service specification. Two scenarios need to be distinguished: either the tender admits competitive facilities or it does not. In the best case (ie with competition) scenario, the consequence of losing a tender may be the effective redundancy of one's network because another party is supplying the area. In that case, the incumbent will enter a very low bid to foreclose the competition, so the outcome is as if competition was excluded from the outset.

A policy decision would be required over whether to admit mobile broadband and other wireless technologies. While highly desirable on the grounds that these are the only feasible competitors to Telecom in many locations, this would also pose some problems. For example, one would need to decide whether to reframe the existing TSO so that a mobile operator could provide both services (a reframed local service TSO and the broadband TSO), or whether to allow two different firms to provide two different TSO services (local service and broadband) to the same "non-viable" customer.

Pricing is another issue altogether, but one that is closely related to the service definition. Logic would suggest that a broadband TSO would specify three things:

- Up- and down-load speeds;
- Data transmission volume over a time period; and
- Price.

Assume that the data volume is relatively modest, as would be consistent with the concept of a universal service obligation. One could then imagine that the winning tender would involve a very sharp price for the TSO bundle, but with punitive data volume charges in excess of the TSO specified amount. In other words, firms may seek to cross-subsidise their TSO bids by taxing data.

That strategy could be rational if one expected to be relatively immune from competition within the TSO area (which is presumably a reasonable expectation if there is indeed a need for a broadband TSO). It would be grossly inefficient however, because data is surely price elastic. Notice that this could lead to significant welfare losses within the telecommunications industry even if the nominal “cost” of the obligation was financed more efficiently such as through general taxation. There would be an additional hidden cost, financed directly by the firm through taxes on its own customers.

There are further pricing-related complications arising from the new structure for Telecom. The price cap commitment would need to be made by Telecom’s retail division, but ANS would be responsible for the investment programme. Moreover, to be true to the new model, ANS would need to be willing to partner with any other firm that wanted to bid to be the broadband TSP using fixed-line technology. That could mean that ANS is involved in more than one bid, which may require special confidentiality protocols within the unit.

Our conclusion is that a broadband TSO would be fraught with difficulty. Several major policy decisions would be required in advance, such as whether to admit mobile broadband, and how to define the service bundle. It also appears very difficult to contrive effective competition. None of these issues are analysed in the Discussion Document. At the very least, we would expect that if MED wished to pursue this option it would publish a new document containing a complete proposal and an evaluation of it, and invite comment.

6.3.3. Government Focus

We have analysed the very substantial difficulties associated with procuring competitive supply of broadband services. We have also noted that, whatever the cause, there is a perception that government is eager for broadband investment, and that this perception is itself deterring investment.

There are not many ways out of this predicament. One is for the government to credibly commit to not fund broadband for the foreseeable future. Realistically, that would need to be a bi-partisan view if it was to eliminate the deterrent effect. Another alternative is to provide a tendered direct incentives package to potential investors using a combination of instruments such as tax breaks, public-private partnerships and regulatory holidays as outlined in section 6.2.2.

The remaining options are more interventionist, involving either obligations (ie an expanded TSO as discussed above) or direct government investment. There are quite strong arguments for the government to buy the ANS unit from Telecom as outlined in section 6.2.2. One comes from the fact that it is likely to be cheaper to serve two adjacent locations jointly than separately. Cost minimisation considerations therefore point towards having an integrated supplier of fixed broadband services, rather than a fragmented patchwork of suppliers (even if that could be achieved, which is doubtful).

Additionally, there are likely to be substantial advantages in having an open access network operated on a cost-recovery basis. This structure would be a good fit with government ownership.

6.4. Conclusion

Our analysis suggests that adding broadband to the TSO would be a very poor response to the perceived problem of low broadband uptake. It would be fraught with difficulties to the extent that the alternatives appear superior. One is to help end-users directly to aggregate their own demand and procure their own services. This retains a strong element of competition and keeps the focus on those about whom we claim to care. Another is to provide direct incentives to potential broadband investors.

Alternatively, the government could purchase ANS and operate it as an SOE with a mandate to invest heavily in broadband facilities and to price on a cost-recovery basis. That approach would internalise the supply side externalities that make competitive tendering difficult, promote competition via an open access policy, and greatly reduce the regulatory costs currently being incurred through the Commerce Commission's processes.