



Funding non-commercial NBN services

A REPORT PREPARED FOR OPTICOMM

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1 Introduction

1.1 The BCR's costing and funding consultation

The Australian Government has asked the Bureau of Communications Research (BCR) to consider economically sound ways to fund the rollout of the National Broadband Network (NBN) to regional Australia.

In addressing these requirements, the BCR has assessed the non-commercial losses expected from building and operating satellite and fixed wireless services and considered options for funding these losses via industry contributions. The BCR's Consultation Paper sets out the BCR's preliminary findings ahead of providing a final report to Government later this year.¹

The BCR has proposed that the levy should take the form of a charge applying to suppliers of fixed line, high speed broadband networks. The definition of high speed is those networks that can deliver download speeds of greater than 25 mbps.

1.2 The task

Opticomm has asked Frontier Economics for its opinion of the proposed levy, focusing on the economic principles that should apply to the funding of non-commercial services.

1.3 Overview of findings

Our finding in this report are that:

- The BCR has been restricted in its Terms of Reference from considering broader options than industry levies. This is disappointing, because superior alternatives to industry levies are available. There is no particular reason to link the provision of non-commercial services with funding sources, and to tax users of fixed line services to support the provision of these services.
- The funding arrangements proposed, which only levy suppliers of fixed line high-speed networks only (a 'narrow levy'), have a higher risk of market distortion but offer no specific advantages over broader funding arrangements. The BCR and the Government should consider broader funding arrangements given these risks to efficiency and competition.

¹ Bureau of Communications Research, *NBN non-commercial services funding options*, Final Consultation Paper, October 2015. (BCR)

2 The objectives of subsidy funding

2.1 Funding options

It is axiomatic that funding for non-commercial services is not tied to the provision of these services. Under cross-subsidy arrangements like those applying initially to NBN Co, the provision-funding link exists because consumers in profitable areas are charged more to recover the losses in the non-commercial areas. However, as recognised in the Vertigan review of the NBN arrangements, this is not an efficient, pro-competitive or sustainable way to fund the non-commercial services.²

If the Government wishes to provide non-commercial services, it is apparent that the two most direct ways to do this would be:

1. To fund the losses from the budget, so that NBN Co could make a normal commercial return on those services
2. Accept a lower rate of return on its investment in NBN Co, reflecting the subsidy being provided to customers in loss-making areas.

The first of these is strongly favoured by the Vertigan Review:

By far the best option for funding any ongoing subsidy would be through consolidated revenue.³

However, neither of these options are considered by the BCR, as they are considered outside of the Terms of Reference, which cover: 'direct funding arrangements based on industry contributions'.⁴

These terms of reference also seem to rule out two other options:

1. A consumer levy
2. Other telecommunications revenue sources, such as spectrum fees

Ultimately, and while we respectfully note the limitations of the BCR's terms of reference, it is disappointing that the Government is not also seeking advice on the costs and benefits of these alternative forms of funding. As far as we are aware, there has been so specific cost-benefit analysis of these alternatives.

The BCR's analysis focuses on two options: a funding arrangement applying only to the operators of high-speed broadband fixed line access networks, and funding arrangements applying more broadly across the telecommunications industry. While the BCR notes that a broader base could be defined in a number of ways,

² Vertigan Review, *NBN Market and Regulatory Report*, 2014, p. 21

³ *ibid.*

⁴ BCR, *op.cit.*, p. 50.

for the purpose of its analysis the BCR has focused on the funding base captured by the TIL (as per the current USO arrangements).

We note that the Vertigan Review panel specifically recommends a broad-based levy:

...the panel recommends that, if an ongoing subsidy is required and its minimum amount can be reliably determined, a single, annual, broad-based industry levy, covering both voice and broadband services, be imposed to fund that subsidy. This would be similar to the current arrangements for the Universal Service Obligation (USO)...⁵

Further, the Vertigan Review specifically warns against the use of narrow levies on NBN Co's competitors:

A premature decision [to tax competitors] would create a real risk of the tax being set incorrectly, distorting both NBN Co's network decisions and those of actual and potential entrants.⁶

In our view, this should be the presumed 'default' for the BCR's funding analysis.

2.2 Objectives or principles

The BCR develops a number of principles to assist with the design of funding arrangements. The principles that the BCR settles on include:

- Transparency
- Contestability
- Competitive neutrality
- Sustainability
- Economic efficiency
- Equity

The BCR then assesses the two different funding options against how well they promote these principles. Because the principles proposed are broad – and largely unobjectionable – the key to applying them is understanding how the particular trade offs are made between different approaches.

In general, the BCR's discussion of the different principles is useful and appropriate. However, the BCR notes that it has added the competitive neutrality principle to its initial list in the Consultation paper. This addition to the principles considered by the BCR is deserving of some comment.

⁵ Vertigan Review, *op.cit.*, p. 21.

⁶ Ibid., p. 105.

2.2.1 Competitive neutrality

The first point to make is that our understanding of the government's policy is that it is not designed to (and should not) stop or hinder competitive entry in commercial areas. Rather, the primary objective of the government policy is to provide NBN services at a subsidised cost to end users in non-commercial areas. A secondary objective is funding in a way that does not distort competition:

The intention of this reform is to ensure that the funding required to support non-commercial services is transparent and contributions are made to these costs in a competitively neutral manner.⁷

Competitive neutrality arises as a result of funding approaches that potentially seem to favour or disfavour certain kinds of networks or service providers. In particular, if we want to fund the losses by allowing NBN Co to make profits sufficient to recover those losses in lower cost fixed line areas, there is a concern that competitive entry which occurs only in those areas might eliminate these profits. While NBN Co is not hindered from competing in low cost areas, having to deliver a commercial return to Government will be more difficult if it has to bear a loss in non-commercial areas and compete in lower cost (commercial) areas. This is said to not be “competitively neutral”.

However, other dimensions of competitive neutrality are also relevant. For example, the Government has previously argued that the *broader* levies for USO funding are competitively neutral. That is, “eligible revenue” was chosen by the Government as the method for apportioning the universal service levy on the basis that it:

Broadly spreads the burden of USO contributions across the telecommunications industry, is transparent, makes use of readily accessible data, is administratively simple and competitively neutral, both between carriers and between carriers and non carriers with whom they compete.⁸

The Government here was concerned to not distort decision making in favour of access or network-based competition – a concern that still appears relevant today. In that light, it is difficult to argue that the narrow levy base ultimately favoured by the BCR in the draft report is superior on competitive neutrality grounds.

Two further points arise under the rubric of competitive neutrality, which do not appear to be considered by the BCR. The first of these points is whether NBN Co is likely to be able to make a commercial return even if it receives funding for non-commercial fixed wireless and satellite services. Competitors to NBN Co in low cost areas are facing a well-financed firm with a mandate for essentially universal

⁷ Australian Government, *Telecommunications Regulatory and Structural Reform*, December 2014

⁸ Department for Communications, Information Technology and the Arts, *Explanatory Statement to the Telecommunications Universal Service Obligation (Eligible Revenues) Regulations 1998*, 1998

service delivery, with objectives to make a commercial return but it is far from certain that such a return will ever be earned. NBN Co's latest corporate plan indicates that:

Using the same long range assumptions as applied in the Strategic Review, the long term financial outlook, based on the Operating Plan extrapolated to FY40, provides an IRR of 2.7% – 3.5%.⁹

On our rough calculations, an IRR consistent with NBN Co's WACC would take at least another 10 years to earn (i.e. until FY2050) and must be considered aspirational at this time.

In these circumstances, we consider that the BCR should be particularly cautious in seeking a narrow levy that is targeted at commercial firms that are already facing a reasonable probability of competing with a non-commercial entity.

A final point on competitive neutrality is that there seems to be no account taken of the *net* costs of the obligation to provide non-commercial services. The BCR does not appear to account for any benefits from the provision on non-commercial services. These benefits can take the form of economies of scope or spillovers which come from the funded provision of non-commercial services.

⁹ NBN Co 2016 Corporate Plan, August 2015, p. 70.

3 Should the levy be narrow or broad?

In this section, we analyse the BCR's report with respect to its preference for a narrow levy on high-speed fixed line networks against a broader levy.

3.1 The levy is a tax on end users in fixed line areas

The BCR's analysis in relation to the cost and revenue impacts presumes that the levy applies to firms, and that this may not be passed through to end users because NBN Co's charges already account for a levy, and other firms will not be able to pass the levy through to consumers:

The BCR expects that under an NBN equivalent funding arrangement, NBN Co pricing will either remain unchanged or fall slightly.

...Uniform national pricing by retailers, and the fact that other networks only serve six to 10 per cent of the market, make it more likely that higher costs for non-NBN networks will be reflected in lower network or retail margins or reduced product offerings in certain locations, rather than flowing through to retail prices commensurately.¹⁰

In our view, this part of the BCR's analysis focuses on the wrong question. Rather than addressing price impacts from a narrow levy, the BCR should have analysed the consequences and costs of a narrow levy against a broader levy.

As it stands, the BCR approach gives the impression that the current policy is costless for end users, when this is manifestly not the case.

Put another way, the BCR seems to assume that NBN Co would not respond to a *lower* levy by lowering its charges. At face value, this would not be consistent with economic theory relating to profit maximising behaviour. The simple economics suggests that a levy will be passed through to end users because (a) the levy increases marginal costs, and (b) all profit maximising firms set marginal cost equal to marginal revenue.

This pass through is clearly true for other (non-NBN) network operators, for whom the \$6 levy will be a major direct increase relative to current costs. But it is true even for NBN Co – for every additional customer it takes on in a commercial area, it takes on a \$6 per month obligation to fund non-commercial areas.

To think of this another way, imagine that the Government decided to fund the non-commercial services from the budget. It should then be clear that NBN Co would have a decision to make about what to do with the additional \$6 per customer per month profit it would earn relative to *existing* prices. Some of this

¹⁰ BCR, at 7.4.

may be passed through to end users, and so the narrow levy would impose a burden on end users.

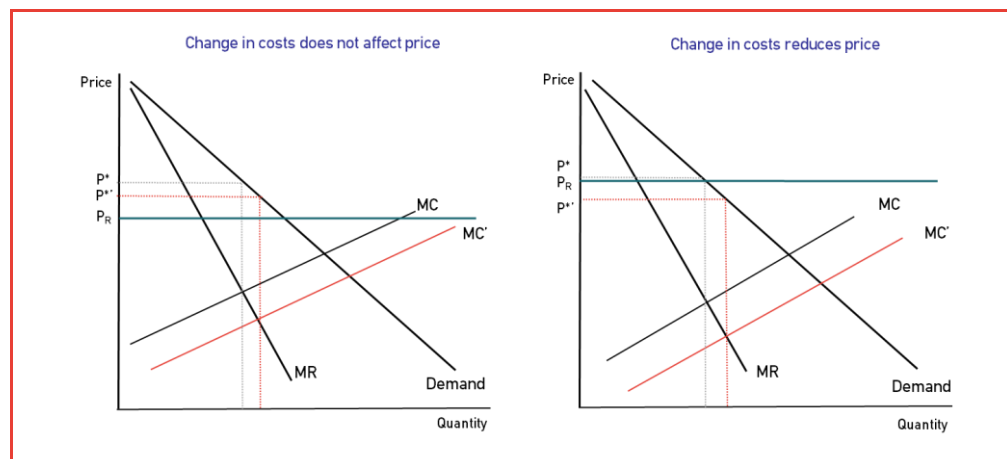
In the short run, the extent of ‘pass through’ of a lower levy in prices is conditional on two main things:

- whether existing prices are held below profit maximising prices by regulation
- the slopes of demand and supply curves (which measure the effectiveness of substitutes for fixed line high speed services).

To explain the first effect, if regulation does keep prices below profit maximising levels, as shown in Figure 1 below, it is possible that a fall in marginal costs implied by a broader levy (relative to a narrow levy) may not cause a reduction in prices. In that case, a monopoly facing a downward sloping demand curve would like to set prices at P^* initially, but is forced by regulation to charge P_R . The fall in levy would push the profit maximising price down to $P^{*'} -$ however this is still above P_R .

If regulation does not constrain profit maximising prices then the fall in levy *would* cause prices to fall. In the case on the right, $P^{*'}$ is below P_R and so prices would be expected to fall from P^* to $P^{*'}$.

Figure 1: Impact of the (removal) of a levy or tax



Source: Frontier Economics

Although this analysis is relevant to the short run, a further point to consider is what happens in the long run where NBN Co faces a long run revenue constraint under its Special Access Undertaking. This constraint may mean that even if NBN Co did not pass any reductions on (from a lower levy) immediately, this would imply its future prices would need to be lower to meet its long run constraint. The narrow levy therefore appears to create a future burden, even if it not immediately apparent.

We therefore find that prices for fixed line broadband services with a narrow levy are highly likely to be higher than they would be with a broader levy. This comes with an associated efficiency cost, as we discuss in section 3.3.

The significance of this issue is that it raises the question of why the levy should just be on users of high speed fixed line networks. Why shouldn't it be all users of communications services? In our view, while the BCR has a discussion of the broader TIL arrangements as an alternative, it has not directly addressed the question of who should pay for the obligation imposed on NBN Co to deliver subsidised (wholesale) services. When put in this way, the choice is between taxpayers, users of communications services, users of fixed line services, or users of high speed fixed line services in low cost areas. Rather than consider this question, the BCR has tried to differentiate the narrow levy approach by suggesting that it would be more efficient for NBN Co to bear most of the subsidy on the grounds of cost containment. However, there appear to be clear alternatives to deliver the same objectives. We discuss this argument further in Section 3.4.

3.2 The narrow targeted levy could reduce affordability in low cost areas

An immediate follow on from the previous point is that a narrow levy decreases the affordability of the NBN in commercial areas. There seems to be a real prospect that prices will be higher than they otherwise would be compared to a broader levy.

In contrast, a broader levy would relatively increase NBN affordability in commercial areas (fixed line), and make no difference to prices in non-commercial areas. Of course, it would also reduce the affordability of *other* communications services that *were* subject to the broader levy, but with a broad levy it would only have a relatively small effect on the price of any one service.

3.3 The narrow levy will create distortions in low cost areas

Allocative efficiency refers to how well society allocates its resources between uses. Efficiency requires resources to be allocated to maximise the economic value created. Economic value is defined as the willingness to pay of the user less the opportunity costs of serving that user. For example, if service A and service B both use the same resources in production (\$5), but service A is worth \$9 to consumers while service B is worth \$10, then allocative efficiency demands that service B is produced as it creates \$5 rather than \$4 of value.

Distortions in relative prices of services caused by applying taxes to one service but not the other can reduce allocative efficiency if the two services are substitutes. That is because some users will react to the relative prices and choose a service that creates less economic value to society. For example, a tax of \$2 on service B would cause users to switch to service A even though this only creates \$4 of value.

The BCR notes in this context that broad-based funding arrangements are superior to narrow bases:

...a broader industry-based funding arrangement would spread costs more broadly, including to mobiles, and thereby lead to a smaller loss of allocative efficiency from funding non-commercial services. Economic theory shows that collecting a given amount of tax revenue from a broad base is less distortionary than collecting the same amount of revenue from a narrow base.¹¹

Distortions fundamentally come from taxing services which have close substitutes. Close substitutes have more elastic demand and so create larger ‘deadweight’ losses when prices are raised. In this context, the BCR notes:

...a funding arrangement limited to NBN equivalent services treats close substitutes equally. High-speed fixed line networks would face the same funding contribution as NBN Co.

Extending the funding base to include mobiles would improve the funding aspect of allocative efficiency simply because the costs are spread more broadly, but the BCR considers these would be moderate as mobile services are only partial substitutes for fixed line services at this time.¹²

A key issue for the BCR and the Government is therefore is how narrow the levy can be without creating material economic distortions.

The BCR points to data on mobile services which suggests that substitution is not viable even though 21 per cent (3.9 million) adult Australians used mobile-only services for internet usage. The BCR attempts to shore up this argument by suggesting that 92 percent of data was downloaded over fixed networks, although how this is distributed among users (and how this relates to the 21 per cent) is unclear.

The problem with the BCR’s analysis here is that substitution effects occur at the margin, and not for the ‘average customer’. It is almost certainly true that there will be a significant number of customers for whom mobile services are not a reasonable substitute, and so the levy will have no impact on their consumption decision. However, what should be the focus of attention is the effect of a price rise at the margin for users of fixed-line high-speed networks. If there are customers that use relatively little data, then the price rise on fixed networks may be sufficient to induce substitution to mobile networks with their ever increasing data allowances and speeds. The fact that 21 per cent appear to have already done so should be cause for concern rather than a point of support.

Indeed, the BCR’s paper omits to note that even in the last 12 months there has been growth of 11 per cent in the number of Australians who have no fixed internet connection:

¹¹ Ibid.

¹² Ibid.

A significant group of Australians does not have a fixed internet connection—instead using mobile devices or a mobile broadband connection to access the internet. At December 2014, there were 3.9 million adult Australians (21 per cent) who were mobile-only internet users. This is an increase of two percentage points from December 2013, when 19 per cent (3.5 million) adult Australians were mobile-only internet users.¹³

It is somewhat difficult to quantify the potential risks of the BCR approach. In Box 1, we examine the potential size of ‘deadweight losses’ created by a narrow levy and find these could be material.

Given the thin evidence, and with a five year forward-looking timeframe, it seems an extremely brave decision to conclude that substitution to mobile networks is not likely as a result of the levy.

Similarly, the BCR’s analysis of the exclusion of other fixed line networks seems to focus on the wrong trade-offs. The question should be whether it is distortionary or equitable to levy users of networks serving residential and small business and not levy users of networks serving medium, large and government businesses. It is not relevant whether NBN Co competes in the different market segments, remembering that provision is separated from funding. Further, arguments about difficulties in using SIOs as a determinant of contribution could readily be addressed by using eligible revenues rather than eligible SIOs.

The BCR also seeks to rely on competitive neutrality to support its position:

...the BCR notes that the purpose of the funding arrangement is to provide a competitively neutral way of funding fixed wireless and satellite services, given the Government’s December 2014 decision to liberalise infrastructure-based competition. A funding arrangement limited to NBN equivalent services achieves this objective, while minimising broader impacts on cost disciplines, NBN regulatory settings, and the telecommunications industry.

In our view, competitive neutrality cannot be used to support a narrow levy. As the BCR earlier notes, any approach which allows for NBN Co to recover its costs in non-commercial areas can be considered competitively neutral. The real question is which is the most efficient and equitable way to raise the necessary funds, and whether this should be *all* users of telecommunications services (however that is defined) or *just* users of high-speed networks in commercial (low cost) areas.

We now turn to the question of cost disciplines with a narrow levy.

¹³ <http://www.acma.gov.au/theACMA/engage-blogs/engage-blogs/Research-snapshots/Australians-get-mobile>

Box 1: Quantifying efficiency losses from a narrow levy

Taxes levied on narrow revenue bases are liable to cause losses in economic efficiency, called deadweight losses or excess burdens. We have estimated the size of such losses from using a narrow levy compared to no levy (budget funding) and to a broader levy. While this exercise is largely illustrative given the lack of key input data, it demonstrates that the risks of the narrow levy approach are material.

As discussed in Section 3.1, for there to be an efficiency difference between the two levies (at least in the short term), it must affect prices. While we consider this is likely, it is not certain, because:

- regulation may already be holding the profit maximising price below current levels of \$40 per SIO per month and
- the fall in marginal costs may not reduce profit maximising prices below that level.

This scenario would form the lower end of potential efficiency losses.

At the upper end of loss estimates, large efficiency losses might be expected if:

- The lower broader levy would be passed through as lower fixed line prices (as prices are currently at profit maximising levels and so the fall in costs is passed through, and because of longer run revenue constraints due to regulation)
- The demand for services in the lower cost fixed line areas is very elastic

In that case, the effect of the narrow levy would be to cause substitution to other kinds of broadband and telephony services not subject to the levy.

To compare the potential costs at the upper end, we use the \$6 per SIO per month for the narrow levy, based on the BCR real levy figure.

The loss of welfare is then measured by the deadweight loss triangle caused by higher price (which will be the pass through rate multiplied by the \$6 levy). For simplicity of calculation we use a flat long run supply curve and linear demand.

The following table shows the potential deadweight loss depending on the pass through rate and the elasticity of demand. This is estimated using eight million SIOs in fixed line areas, as for FY22.

		Pass through rate			
Excess burden or DWL (\$ millions)		25%	50%	75%	100%
Elasticity	-0.2	-0.5	-2.2	-4.9	-8.6
	-0.4	-1.1	-4.3	-9.7	-17.3
	-0.6	-1.6	-6.5	-14.6	-25.9
	-0.8	-2.2	-8.6	-19.4	-34.6
	-1	-2.7	-10.8	-24.3	-43.2

This illustrates that while the deadweight losses may be small in a scenario with little pass through and inelastic demand (weak substitutes), if the pass through rate is higher and substitution is more feasible, the deadweight loss could be as high as \$43 million per year.

This may be compared against the loss from the broader levy, which might in the range of \$1 per SIO for high speed broadband services.¹⁴ Because of the well known rule that deadweight loss is a function of the square of the tax rate, the deadweight loss is on $1/36^{\text{th}}$

¹⁴ On the basis that high speed fixed line broadband networks would recover around $1/7^{\text{th}}$ of the current revenue funding amount, as per table 15 in the BCR's consultation draft.

of the narrow levy (six squared). Even with full pass through and unit elastic demand the efficiency loss would only be around \$1 million per year.

Source: Frontier Economics

3.4 A targeted narrow levy is unnecessary to encourage efficient service delivery

In relation to economic efficiency, the BCR states that:

The BCR considers that an NBN equivalent funding arrangement performs better on the criteria of economic efficiency because it maintains incentives for cost control and market responsiveness for NBN Co.¹⁵

In contrast, under a broad levy:

...the BCR estimates that NBN Co bears about 13 per cent of fixed wireless and satellite losses by FY2022 (see Table 15 below), with the broader telecommunications industry bearing the balance. In the BCR's view, this materially reduces NBN Co's accountability and incentives to control costs.¹⁶

Our understanding of the BCR's approach is that NBN should largely bear the costs of the subsidy (given its high market share in fixed line high speed broadband), and that this will give it a strong incentive to minimise costs. At the same time, the BCR proposes that at each review point (every five years), adjustments should be made to reflect any cost over- or under-recovery from previous periods.

The BCR is right to focus on incentives for efficient service delivery. The BCR's approach to the levy is one way to achieve this – by making NBN Co bear most of the costs of overruns itself, NBN Co should have incentives to minimise these costs.

That being said, the BCR's support for the narrow levy as encouraging cost containment are undermined by:

- The proposal to allow cost over- or under-recovery from previous periods to be rolled into future periods.
- The fact that NBN Co is subject to regulation which requires it to invest prudently, otherwise cost claims may be disallowed.

Suppose, however, that we accept regulation is imperfect and may not prevent all cases of imprudent spending. But even if we accept that proposition, it does not necessarily establish that the narrow levy is the only or the best way to achieve cost containment. There is an alternative approach to incentives for cost containment

¹⁵ BCR, p. 53.

¹⁶ Ibid.

that would seem to be superior in its incentive properties and more consistent with existing regulatory practice.

A widely used tool in economic regulation is to fix the allowable revenue (or prices) based on forecasts of efficiently-incurred costs over the (regulatory) period. During the period, firms incur actual costs which may be different from those forecast costs. This provides very strong incentives for cost containment. For example, if the forecast costs and associated levy were \$5 per subscriber per month, then that is what NBN Co would receive, regardless of whether actual costs were \$6 or \$4.

We find that the BCR's approach to incentivising NBN Co is not necessarily the only or best way to achieve the objective of cost control, and that the BCR consequently overstates the benefits of a narrow targeted levy. A broader levy could achieve these goals equally well.

4 Conclusion – a broader levy would better achieve the objectives

The Government's policy approach of relying on 'industry contributions' for the funding of non-commercial services is unfortunate in two respects.

The first issue is that it gives some pretence that consumers do not ultimately bear the impact of any taxes or levies imposed on industry, when clearly this is the case (at least in the long run).

The second issue is that it removes better sources of funds which would be less distortionary than industry levies, including broader tax funding or spectrum fees. Alternatively, the government could instruct NBN Co to simply target a lower rate of return – calculated using the same figures prepared by the BCR – that is more consistent with running losses in non-commercial areas.

The BCR's analysis is therefore necessarily a second best approach that makes compromises and creates risks of distortions in incentives. Standard economic theory suggests the way to minimise these distortions is to levy over as broad a base as possible. Further, there appears to be no strong case for any particular set of consumers of communications services to (not) bear the levy. In our opinion, this suggests there is a strong *a priori* case for levying all users of communications services, perhaps defined as per the existing USO (TIL) arrangements. This indeed was the finding of the Vertigan Review panel.

The BCR's analysis of funding arrangements suggests that it has found enough evidence and principles to support an alternative narrow levy approach. It follows from our analysis in the previous sections that we are not convinced that the BCR has made the case for a narrow levy. In fact, we consider that its approach will deliver inferior outcomes compared to a model that has the following elements:

- A broad-based levy on all users of communications services, funded via contributions from networks and service providers serving those users
- A fixed forecast 5 year subsidy required to meet the efficient costs of delivering the non-commercial services, with NBN Co to bear the cost of overspending and benefit from underspending.

Such a model will perform better on the grounds of allocative and productive efficiency, support competitive neutrality and be more consistent with the existing USO (TIL) funding approach which delivers funding from a broader range of communications users and does not distort between different networks, service providers or technologies.

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