A Submission to the ACCC Consultation on the NBN Co. SAU

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NBN Pricing Should be Rejected

The NBN pricing model does not meet the statutory criteria for accepting the Special Access Undertaking (SAU). This submission argues that NBN pricing will not promote the long-term interests of end users because it will lead to the under-utilisation of a national asset. Also, it will neither promote competition nor respect the interests of those with rights to use the access services because it discriminates against smaller ISPs. Both deficiencies can be remedied with a simpler "Traffic Model" which delivers greater benefits.

The NBN pricing model has a fixed monthly component (the AVC) tied to speed and a second component linking usage revenues to the growth in data through a backhaul (the CVC) component. Both components bear scant relationship with the architecture of the NBN. They impose scarcity where none exists. It is as if a motorway has been built but only one lane is used. It will be argued that this is not only unreasonable but also not in the long term interests of end users.

A simpler pricing model, the Traffic Model, is reasonable, provides more benefits to end users and is more likely to unleash the potential of the NBN.

Summary

The NBN is only as good as what users do with it. Wholesale pricing must not only cover costs but also increase adoption and utilisation of the NBN or the expected benefits will not be realised. Efficient recovery of fixed costs must be judged by how these objectives and the statutory criteria are met. The statutory criteria by which the ACCC must accept or reject the SAU rest on whether its terms are "reasonable"[1] in with respect to:

- promoting the long-term interests of end-users
- respecting the legitimate business interests of (NBN Co.)
- respecting the interests of those with rights to use the services under the SAU
- covering the direct costs of providing access
- safe and reliable operation and
- economically efficient operation of the (NBN)

However, the ACCC must not reject the SAU for a reason concerning price-related terms and conditions if those terms and conditions are reasonably necessary to achieve uniform national pricing of eligible NBN services[2].

The Consultation Paper on the SAU poses 13 questions. The first two are addressed at length in this paper, but in summary:

1. *Do NBN Co.'s proposed price structures promote efficient use of and investment in infrastructure, and do they promote competition in downstream markets? In your response, please have regard to:*
    - *the nature of NBN Co's costs, which are largely fixed and shared costs;*

[1] Paraphrasing Section 152AH of the Competition and Consumer Act 2010
[2] Competition and Consumer Act 2010 - Section 152CBD(5A)

- *the initial under-recovery and subsequent over-recovery of costs; and*
- *the effect of the proposed price structures on NBN Co's ability to recover its efficient costs.*

Response: What is "efficient use" in the context of a network with capacity abundance? The sponsor of the investment, the Australian Government, has provided only coverage targets to NBN Co. but its vision is for the NBN to transform economic and social relations nationally. To do that requires high adoption and high utilisation.

Two-part pricing (a fixed fee plus a usage fee) is on the right track to recover fixed costs efficiently. It is better than the flat rates we have seen with unbundled loop (ULLS) and line-sharing (LSS) wholesale access. NBN Co. must think that with no competition to the NBN, the price elasticity of demand for access to the NBN will be very low while usage will be price elastic because it squeezes as much revenue as it can from access (AVC) charges in order to keep usage (CVC) charges low. But the retail market seems to suggest that customers are not prepared to migrate to higher-priced AVCs in the way NBN Co. hopes – access is more price elastic than it thinks. Rather, retail plans are priced around data-caps and consumers are increasing their consumption of data quickly.

Rationing speed is a redundant concept in the NBN so AVC pricing leads to under-utilisation of capacity, which is not an efficient allocation of abundant network resources. And, CVC pricing fails to promote competition in downstream markets because it discriminates against smaller ISPs. Such discrimination is not consistent with the ACCC's pricing principle that access prices should not discriminate in a way which reduces efficient competition[3].

2. *Do the initial set of reference offers in Module 1[4] represent the products required to allow access seekers to provide entry-level residential and business grade services to end-users?*

Response: No - the concept of "entry level" is based on the 12/1 service that NBN Co. proposes to offer across its three platforms. But, as argued below, users on fibre should not be speed restricted.

The key issues discussed further below are that:

- the NBN pricing model imposes scarcity where none exists.
- the AVC pricing tiers deprive end users of the benefits of a massive investment in a high speed network in the misconceived notion that users will pay for speed. The Traffic Model provides unconstricted speed to all users which will unleash innovation without compromising the financial or engineering integrity of the NBN.
- the CVC is an artificial construct introducing contention where none exists. Step changes in cost discriminate against smaller ISPs – but the Traffic Model charges only for what is used.

NBN pricing is not a game changer to exploit the NBN. It is applying scarcity pricing to abundance.

[3] ACCC, Access Pricing Principles –Telecommunications: a guide, 1997. They say:
1. Access prices should be cost-based.
2. Access prices should not discriminate in a way which reduces efficient competition.
3. Access prices should not be inflated to reduce competition in dependent markets.
4. Access prices should not be predatory.

[4] Module 1 is the part of the SAU that defines pricing for the period to June 2023.

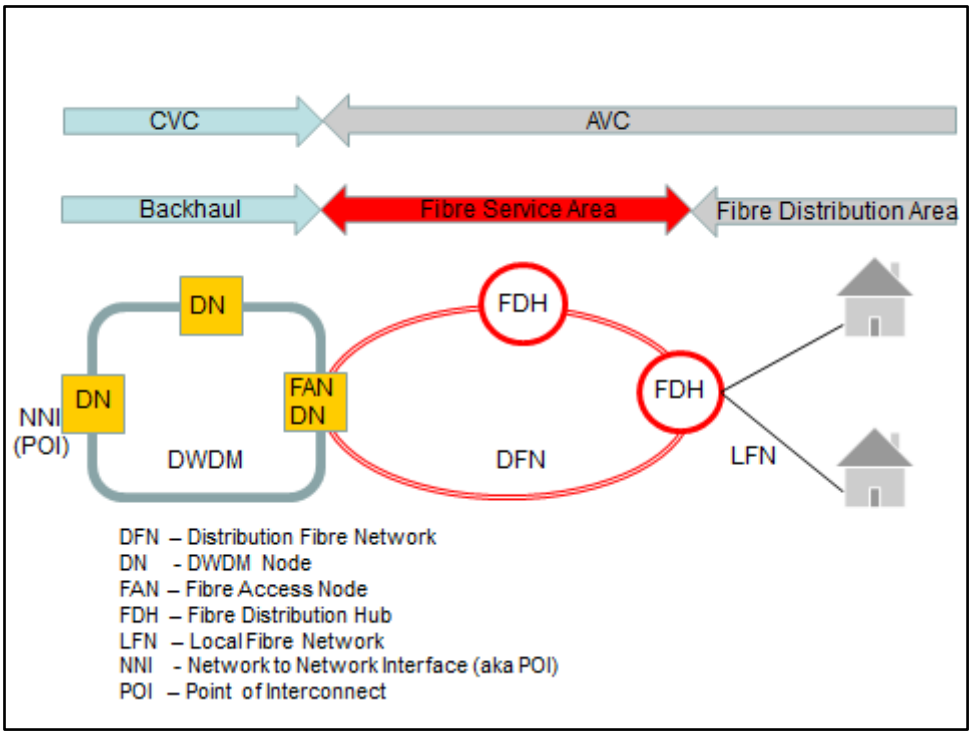
1 - The NBN Network and Pricing Model

The fibre to the premise (FTTP) access network being built by NBN Co. has enormous capacity to meet future demand. It is not due to profligate spending but reflects the nature of costs. Most of the cost is in civil works - digging the ditch and making the drop to the premise; not in the size of the cable that is dropped in it or the electronics at either end. Once built, capacity is abundant. NBN Co. seems to agree:

"What if take-up and usage of the broadband network are far greater than we expect? Because NBN Co.'s fibre to the premise infrastructure can handle increased volumes with little increase in costs, NBN Co.'s profits would rise". [5]

Figure 1 shows the NBN pricing concepts overlayed on the architecture of the NBN.

Figure 1: The NBN: Network and Pricing



Source: Author

There are three main components in the network:

1.1 The local fibre network (LFN) connecting up to 200 premises in a fibre distribution area (FDA) to its fibre distribution hub (FDH).

1.2 The distribution fibre network (DFN) provides two diverse fibre pathways linking up to 16 FDAs (maximum 3,200 premises each) in a fibre service area (FSA) to the fibre access node (FAN), which is also a Dense Wave Division Mode (DWDM) node (DN).

1.3 The backhaul DWDM (a dark[6] fibre pair leased from Telstra with 96 wavelengths per fibre, each carrying 40Gbps initially) network linking DNs to a point of interconnect.

[5] Chairman Harrison Young to a CEDA on 10th September 2012.
[6] Section 2.3.1, NBN Co. Corporate Plan 2012-2015, August 2012

As depicted in Figure 1, the AVC pricing construct relates to the first two network components above. The CVC pricing is for backhaul to POIs. But note that at all metropolitan FAN sites are also POIs so that no backhaul is used.

1.1 The Local Fibre Network

The only physical contention is in the LFN where a fibre is shared between up to 32 premises:

"The Fibre Distribution Hub (FDH) is an environmentally secure passive device installed on street frontages and serves as a centralized splitter location. The splitter modules housed within the FDH provide a one-to-many relationship between the in-coming Distribution Fibre Network (DFN) fibres and the out-going Local Fibre Network) LFN fibres. In keeping with the requirements of the GPON equipment the splitters used are a 1:32 passive split". [7]

Unless all the customers on the shared connection belong to the same ISP, there is neither the incentive nor the ability for the ISP to manage congestion over this part of the network. But, there is no reason for concern as over 100 Mbps uncontended is available at each connected premise. The current Alcatel GPON used in the LFN has a downstream transmission rate of 2,500Mbps (and 1,250 Mbps upstream) per 32 premises. But, NBN Co. expects only 70% of premises will be connected to the NBN so only 22 (rather than 32) premises share a fibre.

The biggest cost of the NBN is civil works in the LFN. Since it costs no more to lay one fibre than many with the ribbon fibre technology (with fibre counts ranging from 12 to 864 fibres) that NBN Co. uses, it is no surprise that NBN Co. has surplus capacity in the LFN:

"*In the LFN, extra fibres shall be allocated to provide future capacity. In total the effective allocation on average is three fibres per single dwelling unit*." (p12) … (which also allows for migration to point-to-point services in the future).. "*There is no defined solution for point to point based customer services, but fibre has been deployed to support this in the future…. The LFN is designed to support both GPON and point to point services.*" (p19)[8]

This means if demand at a premise grows beyond 100 Mbps, the shared fibre connection can be swapped remotely at the FAN for a unique fibre; i.e. at little cost.[9]

The conclusion is that the design of the LFN would not preclude the offer of an unconstrained speed service providing up to 100 Mbps initially with the prospect of unique P2P (premise to FAN) fibre connections at marginal cost in the future. If unconstrained speed is offered at the wholesale level, no ISP would offer speed tiers. This would unleash a storm of innovation.

Restricting access speed is like building a motorway and then using only one lane.

1.2 The Distribution Fibre Network

Up to 16 FDAs (comprising up to 3,200 premises) comprise a Fibre Serving Area (FSA) comprising linked together by a two (diverse) pathway Distribution Fibre Network (DFN). Multiple FSAs are collected at a Fibre Access Node (FAN). This is depicted in Figure 2 below.

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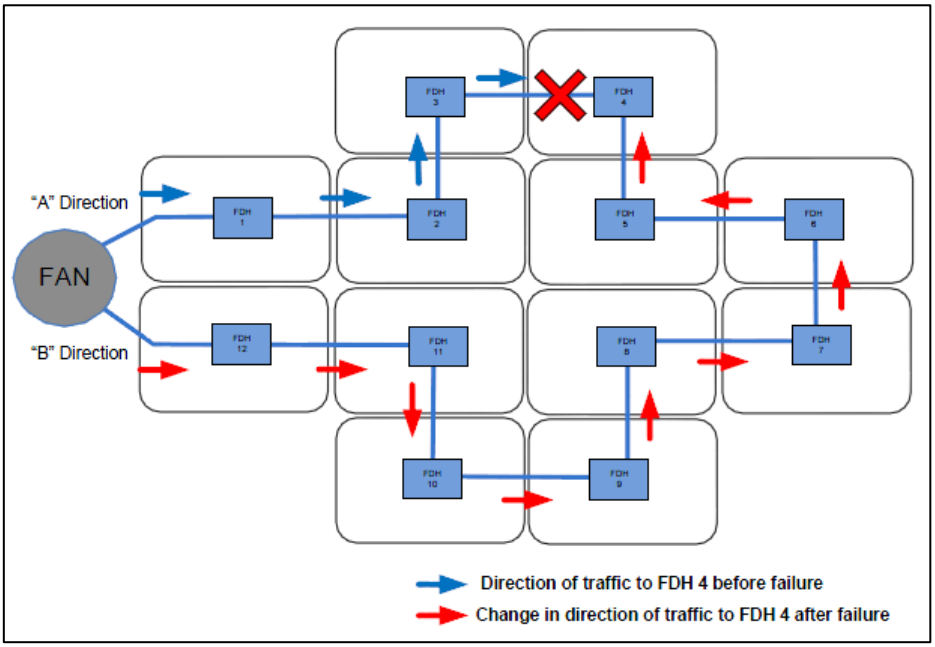
[7] Page 11, NBN Co Network Design Rules, September 2012.
[8] NBN Co. Network Design Rules, 18 September 2012
[9] Figure 13 from NBN Co. Network Design Rules. Note that the fibres "allocated" to the premise are very likely to be attached to the premise; or the cost of upgrading to a P2P connection involves an expensive truck roll.

Figure 2: The Distribution Fibre Network



Source: Figure 5 in NBN Co. Network Design Rules

The ribbon cable on each path will have at least 288 fibres.[10] This means that abundant capacity has been built into this part of the network too (one path):

96	wavelengths per fibre
288	fibres minimum (for up to 8 FDHs per FAN)
40	Gbps (going to 100) per wavelength
1,106	Tbps capacity to FAN/DN

So, there is no scarcity in this component of the network and no need to ration either speed or utilisation.

1.3 The Backhaul Network

This component does not apply to metropolitan FAN sites:

"*For the Fibre Access Service, the majority of metropolitan Fibre Access Node (FAN) sites will also be POI sites, where Access Seekers can connect their network equipment into the NBN Co – via the External Network-to-Network Interface (E-NNI).*"[11]

This means that requiring ISPs to purchase backhaul capacity (CVCs) in such sites is a fiction for pricing. This is not an issue of itself, but CVC pricing does have issues.

With only 121 POIs[12] nationally, there is still a lot of backhaul in the NBN – over 57,000 Km of it[13].

[10] "*The DFN cables are typically higher fibre counts, with fibre core counts needed between 288 to 864 fibres*." P8 NBN Co. Network Design Rules, September 2012
[11] NBN Co. Network Design Rules, 18 September 2012
[12] ACCC, Listed Points of Interconnection – NBN Corporation, 2 November 2012
[13] Section 10.3.2 NBN Corporate Plan 2011-2013, December 2010

The backhaul network consists of a:

"*Dense Wavelength Division Multiplexing (DWDM) fibre optic transport network* (which) *is made up of a number of DWDM Nodes (DNs) situated mainly at Point of Interconnect (POI) and Fibre Access Node (FAN) sites, all interconnected by Optical Multiplex Section (OMS) links. A DN may also be used within a link for amplification. The DWDM network will predominantly provide physical connectivity and transit backhaul capacity between POI and FAN sites*".[14]

Again, there is no scarcity in the transmission in the backhaul transmission network. But, what are the cost drivers for the DNs? There are two types of DWDM Nodes[15]: Reconfigurable Optical Add-Drop Multiplexers (ROADMs) and Optical Line Repeaters (OLRs). Each of these two types of DN comprises:

- Baseline elements: elements that have a fixed quantity per degree (equals number of interfaces with other DNs) and do not expand with traffic growth unless that growth involves an increase in degrees. Such elements include amplifiers, add/drop filters and wavelength selective switches.
- Growth elements: these are elements within a degree that can be added to as growth requires. Such elements include channel cards, controller and chassis.

The "traffic growth" referred to in the baseline elements is part of the roll-out of the NBN (i.e. DNs added). And, the "growth elements" seem to involve only small costs.

So, across all three network components, there appears to be a very large amount of capacity built into the NBN which does not require the imposition of artificial scarcity; which is done only to prop-up the NBN pricing model.

2 – NBN Pricing

Just because there is abundant capacity in the NBN does not mean it can be given away. Costs still have to be recovered. NBN Co. has to do that with affordable entry level prices and still recover costs efficiently. It tries to do these things with access (AVC) and usage (CVC) pricing.

2.1 AVC Pricing

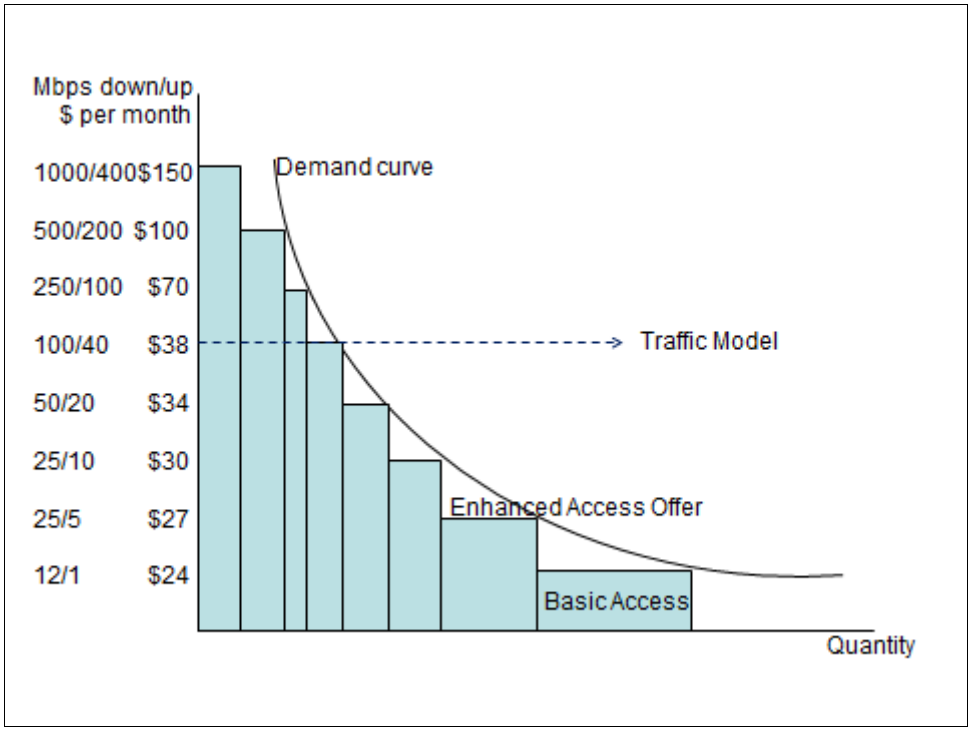
The AVC is the fixed monthly price per end user connection in NBN Co.'s two tier pricing model. There a number of down/up speed tiers in the Initial Offer for AVCs because:

"NBN Co considers that willingness to pay for its higher speed and functionality services will grow over time (supported by new applications and patterns of use) and NBN Co.'s Corporate Plan is based on this assumption"[16]

The tiers are shown in Figure 3 below. The dotted line for the Traffic Model will be discussed later.

Figure 3: AVC Pricing[17]

[14] P31, NBN Co. Network Design Rules, 18 September 2012
[15] P31, NBN Co. Network Design Rules, 18 September 2012
[16] P100, NBN Co. Supporting Submission on the SAU, 28th September 2012
[17] These prices are the maximum until June 2017, then any increase for the remainder of the initial period is constrained to CPI-1.5%



Sources: Sections 1C.3.1 and 1D.3.1 of the BNB SAU, 28th September, 2012

The assumption that users will spend more for speed is a big bet as end users so far have not been inclined to pay for extra speed. Currently, some mobile operators are giving away speed[18] and charging for usage. Charging for use is a global trend – and not just for mobiles. If NBN Co. is wrong, prices will have to increase.

As demonstrated in Sections 1.1 and 1.2, AVC pricing is inconsistent with the economics of the NBN and wastes expensive capacity. It will not unleash innovation.

Retail markets have not differentiated yet in terms of speed claims (e.g. ADSL2+ as best offer with caveats). With the proposed AVC pricing, another marketing dimension (speed) seems to be available to ISPs although the ACCC has already issued a stern warning:

"*FTTP and HFC services are capable of delivering much higher data transfer rates than other current-generation fixed line internet technologies…ISPs are likely to want to market this performance advantage by referring to the maximum data transfer rates on the plans offered to consumers—describing plans as '100/40 Mbps', '50/20 Mbps' or '25/5 Mbps' for example…..* (but because of the issues listed in Table 1) …. *ISPs currently using or intending to use such headline data transfer rates may therefore wish to consider other ways to advertise and/or differentiate their services."*[19]

[18] e.g. Optus free upgrade to 4G with new phones in September 2012

[19] Section 2, ACCC information paper in relation to HFC and optical fibre (FTTP) broadband internet "speed" claims and the *Competition and Consumer Act 2010*, released July 2011

The end user speed experience depends on user equipment, ISP backhaul and global internet bottlenecks, as indicated by the ACCC in Table 1[20].

Table 1: Speed Barriers

Known to ISP	Outside the control of the ISP
limits on data transfer based on the broadband plan purchased by the consumer	the number of individual end-users at a residence using the service at the same time
the number of customers sharing the local fibre or coax (the 'split ratio' determined by NBN Co.)	the end-user's hardware, software and software configuration
the 'contention ratio' adopted by the ISP when ordering CVC capacity	the connection method within the premises (wireless or fixed);
the backhaul (transmission) capacity available from the POI	the type of content being downloaded by the end-user
	the source of the content being downloaded (including any content server limitations)

These issues are avoided if the taps are turned on full; up to 120Mbps is achievable on each AVC. There would be no market differentiation in speed claims (except for a Point to Point connection): why would any ISP constrain speed if others do not?

2.2 CVC Pricing

The CVC construct is a sleight-of-hand that robs end users of the benefits of the enormous investment in the NBN. NBN Co.'s product pricing says:

"*A Connectivity Virtual Circuit can support up to 4,000 Access Virtual Circuits that are connected to a User Network Interface - Data, after which point an additional Connectivity Virtual Circuit will be required. The same Connectivity Virtual Circuit can be shared across fibre, wireless and long term satellite End Users in each Connectivity Serving Area*." [21]

That sounds reasonable. But the CVC is a pricing fiction. A CVC does not physically "support" any AVCs, as might be implied by the quote above. The CVC is an arbitrary construct that unreasonably imposes unnecessary road-blocks on use of the NBN and discriminates against smaller ISPs. The discrimination arises from step purchases in CVC capacity as shown in Table 2 below, taken from NBN Co. for Traffic Class 4 (used for data download and upload applications; the focus of this paper).

[20] Source: ACCC information paper in relation to HFC and optical fibre (FTTP) broadband internet "speed" claims and the Competition and Consumer Act 2010, released July 2011. The last point may include the configuration of the content delivery network (CDN); again outside the NBN.
[21] P17, NBN Co. Product and Pricing Overview, Dec 2011

Table 2: CVC Pricing Schedule for Traffic Class 4

Speed (Mbps)		$20/Mbps per month
100	Minimum	$2,000
150		$3,000
200		$4,000
250		$5,000
300		$6,000
400		$8,000
500		$10,000
600		$12,000
700		$14,000
800		$16,000
900		$18,000
1000		$20,000
Per 1,000 Mbps up to 10,000 Mbps		$20,000

The $20 per 1Mbps price is not expected to change until the average download increases from the current 30GB per month to 100GB per month[22].

Table 3 below is based on an NBN Co. Case Study[23], excluding the small UNI and NNI components at each end of the NBN access service. The "Transitional Connectivity Virtual Circuit pricing" is a credit for the greater of $1/customer or $3,000 until 30,000 Premises have been passed in each Connectivity Serving Area[24]. Transitory credits are just a band aid to appease those who complained about the lumpy nature of CVC purchases. Once over the threshold 30,000 premises, NBN Co.'s "statement of pricing intent" says only:

"*NBN Co will annually review the Maximum Regulated Price of the Connectivity Virtual Circuit Offer (TC-4) with a view to reduce the Price as aggregate demand for that Reference Offer increases. In its review, NBN Co will consider the level of aggregate demand for CVC (TC-4) capacity and the information in the most recently published NBN Co Corporate Plan*".[25]

Table 3 follows the NBN Co. example for 2,100 customers wanting broadband and telephony with a 100:1 contention rate for data and shows three different AVC options assumed to apply to all these customers in each column[26].

[22] Exhibit 8.16, NBN Co. Corporate Plan, 2011-2013
[23] P24, NBN Co. Product & Pricing Overview, December 2011
[24] P 17 and 18, NBN Co. Product and Pricing Overview, December 2011. It is not entirely clear what that means. The CSA is defined (p97) as an: "*NBN Co defined logical grouping of End Users Premises that are addressable using at least one Connectivity Virtual Circuit".* More logically, a CSA might be a collection of FAN sites.
[25] P69, NBN Co SAU, 28 September 2012
[26] P24, NBN Co. Product & Pricing Overview, December 2011

Table 3: CVC Pricing

		Speeds:	12/1	25/5	100/40
A	Customers		2100	2100	2100
B	x speed		25200	52500	210000
B/100=C	Req'd CVC		252	525	2100
Table 2->D	Purchased CVC capacity		300	600	3000
E	plus telephony		350	650	3050
F	Transitional credits:		$0	$0	$0
$20*E-F=G	CVC fees at $20/Mbps		$7,000	$13,000	$61,000
H	plus AVC fees		$50,400	$56,700	$79,800
G+H=I	AVC+CVC		$57,400	$69,700	$140,800
I/A=J	Per customer pm		$27.33	$33.19	$67.05
I/A=K	Per customer with max credit		$25.90	$31.76	$65.62
L	Avg GB/month (Dec 2012 est.)		30	30	30
A*L=M	Traffic		63,000	63,000	63,000
G/M=N	CVC fees as $/GB		$0.11	$0.21	$0.97

Source: Author following NBN Co. Case Studies

NBN Co. says that:

"*The CVC is dimensioned by the Access Seeker according to their End User capacity requirements and the degree of contention consistent with their overall retail value proposition, including the QoS they wish to provide….Like the AVC, the CVC consists of four Class of Service traffic classes. Access Seekers dimension the CVC based on the capacity requirements of each traffic class being aggregated i.e. TC-4 on an AVC can only be mapped into TC-4 on the CVC*".[27]

That means that in the middle column (25/5 AVC) the 525Mbps required for data cannot be combined with the 50Mbps required for voice to then order a 600Mbps CVC. Separate CVCs for data and voice at 600Mbps and 50Mbps respectively have to be purchased. Also, 100Mbps increments in CVC capacity are available only up to 1,000Mbps after which increments are in lots of 1,000Mbps (see Table 2). That explains why the final column (100/40 CVC) shows a 3,000Mbps CVC has to be ordered for data.

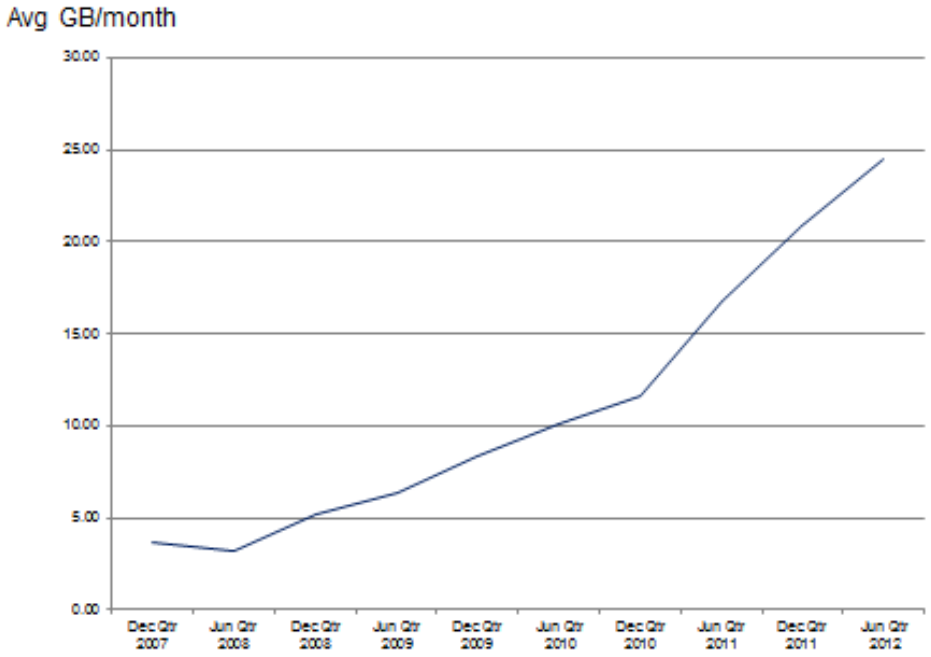
As average downloads grow, ISPs have to order more CVCs to maintain the 100:1 contention ratio. In its 2010 case study NBN Co. said:

"*My current customer base on average, 15GB per month therefore internet contention ratio can easily be 100:1 for a 12/1 service".*[28]

That is because each 12/1 service is provisioned for an average 39GB per month at a contention ratio of 100:1. Only 15GB per month is certainly comfortable but the current average is around 30GB per month[29] and growing at over 40% p.a. - see Figure 4.

[27] P68, NBN Co SAU – Supporting Submission, 28 September 2012
[28] P32, NBN Co. Product & Pricing Overview, December 2010
[29] June Quarter 2012, the average download for fixed users was 23GB/month. On fibre, it is probably more.

Figure 4: Growth In Downloads



Source: ABS Cat 8153.0

In order to maintain contention ratios at the same time as average downloads increase, extra CVCs have to be purchased. Table 4 shows the wholesale cost per customer (including both AVC and CVC charges) growing with increased provisioning limits to accommodate increasing average downloads.

Table 4: Step Changes in NBN Pricing

	At 100:1 contention ratio			
No. CVCs	25/5		100/40	
	GB limit	$/service	GB limit	$/service
1	81	$33	324	$67
2	162	$38	648	$86
3	243	$43	972	$105
4	324	$56	1296	$124

Source: Author calculations

The CVC pricing construct requires ISPs to make step changes in purchased CVC capacity which disadvantages smaller ISPs. That is, there is a significant fixed component which adversely affects small ISPs that may have very few customers in some areas. This is illustrated in Table 5 for the 100/40 AVC and average download of 30GB per month (i.e. only 1 CVC required)[30].

[30] The telephony component is smaller for 1,050 customers. NBN Co. calculates the Traffic Class-1 (voice) CVC requirement as 1,050 customers x 150kbps x 0.1 (i.e. contention rate of 10:1). This equals 15.75Mbps but the nearest TC_1 CVC is 20Mbps.

Table 5: Size Effects of CVC Pricing

		Small ISP	Large ISP	
A	Customers	1050	2100	3100
B	x 100 Mbps each	105000	210000	310000
B/100=C	Req'd CVC speed for GB/pm	1050	2100	3100
Table 2->D	Purchased CVC capacity	2000	3000	4000
E	Plus telephony CVC	2020	3050	4050
F	Transitional credits:	$0	$0	$0
$20*E-F=G	CVC fees at $20/Mbps	$40,400	$61,000	$81,000
H	AVC fees	$39,900	$79,800	$117,800
G+H=I	AVC+CVC	$80,300	$140,800	$198,800
I/A=J	Per customer pm	$76.48	$67.05	$64.13
I/A=K	Per customer with max credit	$73.62		

Source: Author calculations

As the ACCC says:

"*A two-part tariff that contains a significant fixed component (and a small variable component) may advantage larger access seekers if they can spread this cost out over their customer base. Similarly, a two-part tariff with a significant fixed component may provide a barrier for smaller access seekers if they are unable to spread these costs*".[31]

The CVC is not determined by the architecture of the network because the cost of backhaul does not vary with capacity - once built it will not need expanding in response to ISP demands.

The ACCC is also right to be concerned that the CVC construct means that:

"*ISPs may also have an incentive to reduce costs by under-provisioning their network capacity to offer more aggressive prices and/or increase profit margins*."[32]

NBN Co. says that:

"*CVC revenues will be heavily dependent upon competition through quality of service, which will act as a catalyst for Access Seekers to purchase sufficient CVC capacity to enable End-Users to experience maximum actual speeds over the NBN.*"[33]

There is no need to put temptation their way. The Traffic Model avoids this with all ISPs paying only for the GBs they send and/or receive.

[31] P40, ACCC Supplementary Consultation on the NBN SAU, 10 February 2012
[32] Section 1.17, ACCC information paper in relation to HFC and optical fibre (FTTP) broadband internet "speed" claims and the *Competition and Consumer Act 2010*, released July 2011
[33] P110 NBN Co. Corporate Plan 2011-2013, December 2010

3 - The Traffic Pricing Model

Wholesale price discrimination is an efficient way to recover the fixed costs of building the NBN. But speed is not the best lever for price discrimination because it is not what people are willing to pay for. But, as noted earlier, that is what NBN Co. is betting on. A better bet is that unconstrained speed will generate much more traffic and usage revenues.

The Traffic Model is a two-part tariff but the fixed fee is for unconstrained speeds and the usage fee is simply for each GB handed over (one or both ways) at the NNI. We can already see price discrimination around monthly data caps at the retail level. So, it should not be such a stretch to do that at the wholesale level too; but in a continuous fashion (which is not the case with the CVC). This leaves retail ISPs free to continue what they are doing now - but at full speed without any discrimination against smaller ISPs.

Since $/GB pricing and unconstrained speed pricing is so simple[34], it should appeal to NBN Co. with its philosophy:

"*Apart from geographic uniformity and flexibility, NBN Co's underpinning philosophy for both product and pricing structure has been to deliver simplicity for Access Seekers and limit back-office complexity for NBN Co. Complex pricing introduces cost, hence, pricing simplicity supports NBN Co's objective to service our customers with a minimum of overhead costs*."[35]

Other countries are moving towards the retail broadband plans with constraints on data usage (i.e. data caps and speed throttling or charging) that have applied in Australia for many years. The days when customers enjoyed unlimited downloads on broadband overseas are numbered. Twenty OECD countries currently have no data caps at all among their broadband offers (OECD, 2011). But things are changing. One of the twenty is the USA where in June 2010 AT&T scrapped its $30 per month unlimited mobile data plan and offered new smartphone buyers a choice of 200MB monthly cap at $15 or a 2GB cap for $25 per month. Then in March 2011 it slapped 150GB and 250GB data caps on its broadband DSL and U-Verse customers.

Ultimately usage based pricing will also apply at the wholesale level. With NBN pricing (or the Traffic Model), Australia will get there first; although Canada almost did.

3.1 Canada

Canada recently made a choice between the NBN Pricing Model and the Traffic Model. The regulator (CRTC) noted that all parties supported a two part tariff. The issue was how usage should be charged: volume based versus capacity based models.

[34] While the Traffic Model is simple, traffic classes may be needed for prioritising voice in the ISPs backhaul and core. This needs to be flagged at the customer's premise and carried over the NBN, even though there is likely to be little or no grooming within the NBN. This might be handled by the Traffic Model charging a premium for classes 1-3 in terms of $/GB handed over at the NNI. Class one (voice) traffic will be small relative to data traffic.

[35] P5, NBN Pricing Overview, December 2010

The Bell Companies wanted to apply aggregated volume pricing to the fibre-to-the-node (FTTN) based on total traffic generated by an ISP's customers in a month. This is what is being proposed in the Traffic Model. The cable companies supported a similar approach[36].

MTS Allstream proposed a capacity model which is very close to that being proposed by NBN Co. It initially proposed to sell capacity at 100, 400 and 1,000 Mbps but the CRTC amended this to 100 Mbps increments - as NBN Co. does up to 1,000 Mbps.

Smaller operators represented by the Canadian Network Operators Consortium (CANOC) objected to the volume based model on the basis that peak network capacity drives network investment decisions whereas a volume based model would charge for both peak and off-peak traffic.

The CRTC accepted CANOC's argument and noted that the correlation between volume and peak traffic can change so that a total traffic might over or under-estimate costs. It also believed that volume-based billing would lead to disputes regarding billing reconciliation. It concluded that since it is impractical to link peak traffic to investment decisions at all points in the network, a capacity based model is:

"*more consistent than a volume-based model with respect to how network providers plan and build their own networks and estimate their own usage costs*"[37].

Neither of these objections applies to the Traffic Model in the context of the NBN. The NBN was not built to peak capacity but by filling trenches with cable once and for all. And, measuring traffic passed across the NNI should not be a problem.

3.2 Other Wholesale Services

The Traffic Model does not depend on artificial pricing constructs (the CVC) and works for any technology platform. It is also relevant to,

- the current inquiry on WDSL pricing where Telstra is arguing for RMAC to control congestion (FAD for the wholesale ADSL service until 13 February 2013) and
- the 3rd October 2012 Final Access Determination (FAD) on the local bitstream access service (LIBAS)[38] where the price of the 25/5 access service is set at the same price as the NBN AVC fee for the 25/5 service ($27)[39]

[36] In 2000 the cable companies were granted permission to charge wholesale per GB fees provided that they also charged their retail customers the same way. When the Bell Companies tried to follow, the CRTC launched an inquiry.

[37] Para 48, www.crtc.gc.ca/eng/archive/2011/2011-703.htm Capacity charging applied from February 2012

[38] The ACCC is required to regulate non-NBN superfast networks that are capable of delivering the same service outcomes as the National Broadband Network (NBN). Accordingly, the ACCC issued the mandatory declaration for the LBAS on 22 February 2012.

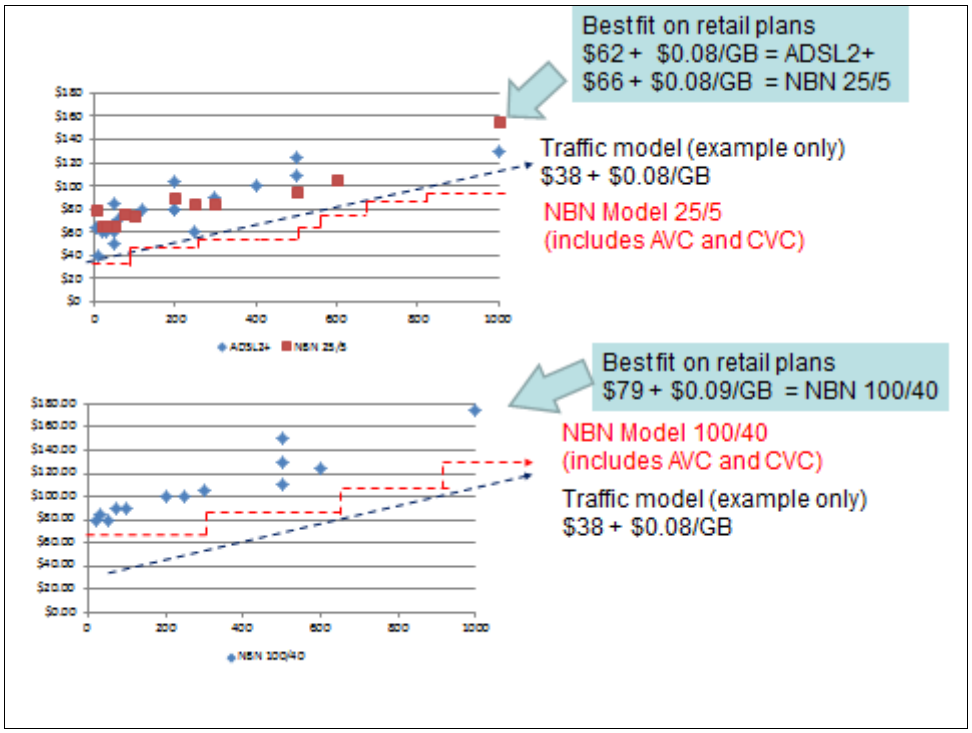
[39] Schedule 1, Final Access Determination No. 2 of 2012 (LBAS). Note that there is no backhaul charge in LIBAS as the access seeker may collect its traffic at the point of interconnection in the housing estate or may separately purchase backhaul from the LBAS provider or a third party to allow collection of traffic at a more centralised location. In this way it differs from the NBN Co products where an access seeker can only collect its traffic at an NBN Co point of interconnection.

3.3 Derivation of the Traffic Pricing Model

The Traffic Model starts from the proposition that wholesale pricing should be consistent with high speed (ADSL2+) broadband pricing at the retail level. This is identified by collecting broadband prices (including telephony) and peak data caps and then fitting a best-fit (regression) line through the collected data to establish a typical retail plan. Then the wholesale pricing model is derived as a line below and parallel to the best fit line.

This is illustrated in Figure 5 below. The upper graph shows that retail ADSL2+ (copper) and 25/4 (NBN) plans are very similar. The best fit lines have not been drawn in but they are reported top right showing the same slope (8 cents/GB) and a $4 premium for NBN. As discussed above, the indicative Traffic Model wholesale price has the same slope as the retail plans and a lower fixed monthly fee. For comparison, the NBN wholesale pricing (AVC+CVC fees per customer) for the 25/5 service is shown too as the red dotted line. Remember that the current average download is around 30GB per month.

Figure 5: Retail Broadband Plans at September 2012



The lower graph in Figure 5 shows how ISPs are selling the Enhanced (100/40) Service on the NBN[40]. Again the best fit line is reported in the blue box with the two wholesale pricing models added as dotted lines.

These data were first collected in September 2008 and have been updated every September. The five ISPs for ADSL2+ retail price plans (including telephony) were Optus, Big Pond, iiNet, TPG and Internode. In 2008, the implicit usage fee was nearly $1/GB and was less than half of that a year later. The following year, the usage fee dropped to just 5 cents/GB; but that is unrealistic because

[40] The NBN Corporate Plan assumed 18% of users would take-up the 100/40 plans but the take-up is 44% in the early release sites (Jim Hassell speaking to October CommsDay Melbourne Congress). However, this surprise is due to early adopters and is unlikely to be sustained.

the best-fit line was affected by the introduction of Terabyte data caps which were more marketing claims than plans that were used. So, the best-fit results for the Big Two (Big Pond and Optus) are more reliable for 2010. The differences between the Five ISPs and the Big Two were small in 2011 and 2012.

The results of these annual collections of retail broadband plans are shown below in Table 6.

Table 6: Retail Broadband Plans

Retail ADSL2+ Pricing Plans				
	Five ISPs		**Big Two**	
	Fixed fee	$/GB	Fixed fee	$/GB
2008	53.97	0.95	57.02	1.75
2009	54.40	0.49	49.34	1.72
2010	57.31	0.05	41.01	0.36
2011	51.43	0.09	51.45	0.09
2012	61.67	0.08	66.65	0.10
Retail NBN Plans in 2012				
	Four ISPs		**Big Two**	
25/5	66.13	0.08	71.60	0.06
100/40	79.49	0.09	74.88	0.13

Source: Author using company web sites

The Traffic Model gives away speed – there is no speed restriction placed on the ISP (and no ISP is going to place a restriction on speeds for end users because no other ISP will under this wholesale model). Higher speeds generate higher downloads, permitting the fee per GB to drop in order to keep within the revenues allowed to NBN Co.

4 Uniform National Pricing

Wholesale pricing is constrained to be not only affordable but also universally available at the same price for the basic service:

"The Government expects NBN Co.'s approach to pricing will recognise the importance of maintaining affordability to drive take-up rates"[41]*……."In support of the Government's objective of enabling uniform national wholesale prices, NBN Co. will be required to charge access seekers uniformly for services across its network for all technologies and for the basic service offering."*[42]

The basic service is 12/1 AVC product available across fibre, wireless and satellite platforms for the same price (initially $24) nationally. After that, the prices and capabilities can differ between platforms so long as the prices available on each platform are geographically uniform:

[41] P10, Statement of Expectations, 17 December 2010
[42] P7, Statement of Expectations, 17 December 2010

"*Uniform wholesale access pricing across all geographic areas is specifically supported by an entry-level product tier with pricing and specifications independent of the technology platform over which it is delivered*"[43]

There is nothing about the proposed NBN pricing that is reasonably required to support uniform national pricing. The support comes from the removal of competition from other fixed broadband networks:

"the only way you can (deliver uniform prices across the country) *is to ensure you have a government monopoly"* (Senator Conroy, 11th April 2011)

However, uniform national pricing is still possible with competition[44]:

"As the Government has already indicated, it will consider the introduction of a levy, if necessary, to prevent opportunistic cherry picking"[45].

As with NBN pricing, Traffic Model pricing is not necessary to achieve national uniform pricing. But there are a couple of aspects in the Traffic Model which need to be addressed:

- The fixed wholesale fee of $38 (includes telephony) may lead to retail prices too high for some end users. The Implementation Study suggested an entry level price of $30 to $35 (excluding telephony and as a flat fee)[46]. To encourage adoption, an entry level product could be set at, say, $20 plus $0.5/GB - with full speed still provided. This would break-even with the main offer ($38 + $0.08/GB) at around 40GB per month and at the current usage (estimated to be 30GB per month) the Implementation Study price point of $35 is met.

- Since the Traffic Model can and should be applied to the NBN fixed wireless and satellite platforms, the same entry level plan ($20 + $0.5/GB) could be applied across all platforms. Of course, end users on other plans will not get the same speeds as users on the fixed network (unconstrained speed) basic service. Rather than restrict users on the fixed network to 12/1, an option might be to let users on other platforms have the entry level plan at, say, $20 + $0.08/GB.

5 Conclusion

Australia has a one-time opportunity to be a world leader in having not only a ubiquitous broadband network but also in having a network that is used to its full potential to transform economic and social relations. The current NBN tiered speed service and pricing offer will not do that. It will also tilt the playing field against smaller ISPs because of CVC pricing.

[43] P5, NBN Pricing December 2010
[44] See J de Ridder, Submission to the Senate Select Committee on the NBN, March 2010 (on my site)
[45] P5, P7, Statement of Expectations, 17 December 2010
[46] P356, Implementation Study, May 2010

The Traffic Model would set world's best practice in wholesale broadband access pricing[47]. Full speed would usher in the innovation and transformation of the economy hoped for in the Government's vision for the NBN. And pricing per GB downloaded is pro-competitive for ISPs.

Paradigm shifts always involve change – significant change. Making the future emulate the past just entrenches the past – or at best creates only a stepping stone to the new. The NBN isn't primarily about making high speed networks available under the same paradigm – they have been available for decades to those who could afford them. More money, more speed is the old paradigm. The paradigm shift is making speed universally available, universally affordable, and universally used – to give away speed.

We need to start thinking about the NBN as a utility service. More attention could be given to how other utilities price their services, noting that the NBN is not constrained by peak/off-peak considerations or having to supply "content" (e.g. water or electricity) through it. This is what the Traffic Model does. It is:

- well aligned with users' perceptions of value and global trends,
- supports existing retail models (i.e. data caps),
- promotes efficient use of available resources (exploits potential of the NBN),
- reduces NBN Co.'s costs of dealing with ISPs with simple services and pricing,
- does not discriminate against smaller ISPs (only charged for what they use),
- obviates need for any "transitory credits" and
- should see nominal reductions in unit prices (not just real price reductions)

We can turn the tap full on and unleash a storm of innovation without compromising competition with the Traffic Model.

[47] There is an analogy. Just before the start of call competition in Australia, long distance calls were charged on "pulses". New entrants in the USA and New Zealand charged on 6 second blocks. Telstra decided to move to per second pricing; which was achieved only days before the launch of Optus fixed services. Why stop at lumpy CVC pricing when smooth per GB pricing will be world's best practice?