Market Clarity

Australia's Source for Telecommunications Intelligence

Broadband Download Behaviour in Australia
The Disconnect Between Allowance and Usage

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Contents

Executive Summary 4
Key Findings 4
1 Introduction 5
1.1 About this Report 5
1.2 Data Sources 5
1.2.1 Subscriber Services in Operation (SIO) Data 6
1.3 Methodological Notes 6
1.3.1 ARPU and Download Estimates 6
1.3.2 Estimating Downloads Allowances Sold 7
1.3.3 Limitations of This Study 8
1.3.4 ABS Data 8
1.3.4.1 Reporting Cycle 8
1.3.4.2 Downloads 9
1.3.4.3 Mobile Broadband 9
2 Australia's Growing Broadband Appetite 10
2.1 Broadband Download and Subscriber Growth 10
2.2 Residential Plan Restructuring 2006-2010 11
2.3 Download Cost and Download Growth 13
3 User Download Consumption 16
3.1 Distributing Users to Residential Plans 16
3.2 Allowances Purchased vs. Used 17
3.2.1 Accuracy 19
3.3 The Heavy User 19
4 Implications for the NBN 20
4.1 Downloads in Context 20
4.2 Speed vs. Downloads 20
4.3 Further Research 22

Tables

Table 1. — Hypothetical Example: Subscriber Distribution Across Plans 7
Table 2. — Hypothetical Example: Estimate of Subscriber Downloads 7

Figures

Figure 1. — Australian Residential Fixed Broadband: Downloads vs. Subscribers (2006-2010) 11
Figure 2. — Changing ISP Residential Fixed Broadband Plan Allowances: 12
Sample Providers (2006-2010) 12
Figure 3. — Changing ISP Residential Fixed Broadband Plan Price Points: 13
Sample Providers (2006-2010) 13
Figure 4. — Australian Residential Fixed Broadband: Residential Downloads vs. Price per GB (2006-2010) 14
Figure 5. — Australian Residential Fixed Broadband: Residential Downloads vs. Weighted and Unweighted Price per GB (2006-2010) 15

Figure 6. — Estimated SIO Distribution by Residential Fixed Broadband Plan Allowance: Sample Providers (2006-2010) 16
Figure 7. — Australian Residential Fixed Broadband Downloads Sold vs. Downloads Used (2006 - 2010) 17
Figure 8. — Growth in Residential Downloads Sold vs. Downloads Used, 2006-2010 18
Figure 9. — Residential Fixed Broadband Distribution by Plan Speed (2006-2010) 21

Executive Summary

In this report, Market Clarity provides an analysis of residential fixed broadband user download behaviour from 2006 to 2010, and compares this to the level of downloads reported by the Australian Bureau of Statistics in its *Internet Activity, Australia* publication, catalogue 8153.

Market Clarity's analysis of residential user download behaviour is based on a sample of top ISPs where information was available (or could be derived) pertaining to residential fixed broadband plans, ARPU and subscriber base (services in operation) from 2006 to 2010.

Key Findings

- Australian fixed broadband customers have progressively moved upwards to plans with higher download allowances.
- This migration can usually be regarded as automatic — that is, it is substantially driven by ISPs upgrading the data download allowances available in their product portfolio. By remaining on the plans with the same price point, customers receive the upgrade without having to act.
- The migration to higher data allowances is **not** accompanied by rising prices. Provider ARPUs have not changed dramatically in the period 2006-2010, and product price points remain relatively stable throughout the study period.
- The result of this migration is that the data allowances available to users are far in excess of actual usage, in most cases. This benefits users, since they are less likely to reach their "cap" and find themselves with a throttled connection, or in prior years subject to excess data usage fees. The corresponding benefit to the ISP is greater customer satisfaction.
- However, the gap between data allowance and usage has implications for the NBN. While this study is of insufficient scope to serve as an input to whether or not the NBN is "necessary", Market Clarity believes more detailed profiling of the behaviour patterns of today's users would be form a valuable input into the NBN debate and the planning of the network.

1 Introduction

1.1 About this Report

Over several years, Australia's ISPs have increasingly used download allowances as a key product differentiator. Whereas plans offering less than a gigabyte of monthly downloads were common as recently as 2008, major ISPs now consider 2 GB and beyond to represent "entry level" services; and during 2010, the maximum download allowances on offer have swelled to 1 TB per month.

In some part, it's likely that an increasingly-strict attitude to speed-based service descriptions from the ACCC has led ISPs to redirect users' attention to other aspects of their plans. Further, lower international connectivity costs (due to the increasing number of international cables connecting Australia to the rest of the world, along with increasing capacity on these cables) make it feasible for an ISP to expand data allowances in their plan offerings.

At the same time, broadband speeds are becoming less differentiated, and users are becoming better educated about which characteristics of a plan appear to represent value.

This report, authored by Shara Evans (CEO) and Richard Chirgwin (Associate Consultant) of Market Clarity, sets out to examine the growth in download allowances, and to identify the relationship between growing residential fixed broadband data allowances and growth in the quantity of data downloaded by Australians. We also discuss the relationship between the data allowances typically purchased by users and usage as reported by the Australian Bureau of Statistics.

1.2 Data Sources

Since 2006, Market Clarity has regularly analysed residential broadband plan prices and inclusions for various client projects. As a result, Market Clarity holds a large amount of data on broadband plans from 2006 to 2010, including copies of ISPs' residential fixed broadband plans on offer for each study year

Where necessary, extra historical data was obtained from ISPs' Websites as captured by the "Wayback Machine" operated by Archive.org (http://www.archive.org). Where this is the source of plan data, Market Clarity has sought to capture plans as close as possible to 30 June of each of the years 2006 to 2010.

To support this analysis, Market Clarity concentrated on sampling providers for which published residential ARPU (Average Revenue per User) and subscriber (services in operation) data is available (or could be derived).

Market Clarity has also made use of data published by the Australian Bureau of Statistics, in particular its *Internet Activity, Australia* reports (catalogue number 8153), which provides the Bureau's assessment of residential broadband services,

and broadband downloads in the quarter for which each edition of *Internet Activity, Australia* is published.

1.2.1 Subscriber Services in Operation (SIO) Data

For this study, Market Clarity has used customer data for a sample of major ISPs, as reported in our *Internet Market Tracker* report for 2006-2010. These providers represent between 75-92% of the residential fixed broadband SIOs in the Australian market in each sampled year (2006-2010)[1]. We have only used ISPs for which fixed broadband ARPU data was also available.

Where Market Clarity was able to distinguish between residential and business SIOs and ARPU for an individual provider, we have used only residential data in this study (the vast majority of this data set).

1.3 Methodological Notes

1.3.1 ARPU and Download Estimates

Since the purpose of this study is to match broadband users' buying behaviour to the download patterns observed by the ABS, Market Clarity needed to devise a metric which would serve to help assess which plans were favoured by users in each year.

Beyond the ABS's *Internet Activity, Australia* series of publications, only limited statistical information is available for the usage behaviours of Australian broadband customers. Much of what is available focuses on data of value to advertisers, such as time spent online, popular Websites, and most-used applications.

For this study, Market Clarity determined that residential fixed broadband ARPU provided an indication of user distribution across plans. For example, if an ISP reports broadband user ARPU of $42.65 per month, its users must be spread across plans both below and above this price point.

From this, and with as comprehensive a capture of broadband plans as is available, Market Clarity constructed a model in which we hypothesised the spread of an ISP's customers which would yield an ARPU which most closely matched the actual ARPU reported for that year. A hypothetical example of this process is shown in Table 1, below.

[1] Market Clarity notes that some of today's major ISPs were much smaller in scale in the 2006-2007 periods.

Table 1. — Hypothetical Example: Subscriber Distribution Across Plans

Plan Price	Subscribers (%)
$19.95	3%
$29.95	16%
$39.95	16%
$49.95	25%
$59.95	18%
$69.95	10%
$79.95	12%
Total:	**100%**
Reported ARPU:	**$42.65**
Calculated ARPU:	**$42.35**

In the time period covered by this study, the practise of charging excess fees for downloads above the plan allowance has been falling out of favour. It has been replaced, instead, by rate-limiting users who exceed their plan allowance. This has simplified the task of estimating customer distribution by ARPU, since for providers in the sample, all plans were rate-limited at the plan allowance.

We would emphasise that in this study, ARPU therefore stands as a proxy for the "real" distribution of customers within any provider's portfolio. This information is proprietary to the providers themselves, and would be unlikely to be made available for a published study.

To convert ABS download data (which covers a single quarter) into annualised estimates, Market Clarity applied a trend series between each sampling period.

1.3.2 Estimating Downloads Allowances Sold

Market Clarity then calculated an estimate of downloads sold, based on our distribution of customers across the plans captured at each year. A hypothetical example is given in Table 2, below.

Table 2. — Hypothetical Example: Estimate of Subscriber Downloads

Plan Price	Customers (%)	Download Allowance	Plan Downloads Sold Annually, in TB, for 100,000 Subscribers
$19.95	3%	200 MB	7
$29.95	16%	900 MB	173
$39.95	16%	6,000 MB	1,152
$49.95	25%	12,000 MB	3,600
$59.95	18%	21,000 MB	4,536
$69.95	10%	40,000 MB	4,800
$79.95	12%	60,000 MB	8,640
Total:	**100%**		**22,908**

1.3.3 Limitations of This Study

Market Clarity acknowledges that this study is based on estimates rather than data provided by ISPs. In particular, we acknowledge the following limitations:

- **Customer Distribution —** If Market Clarity had been able to access ISPs' internal data, our estimate of downloads sold would be more accurate.
- **Plan Capture —** While every effort has been made to capture all broadband plans for each year, from each ISP in the study sample, any omission on Market Clarity's part would correspondingly reduce the accuracy of our estimate of downloads sold.
- **Plan Duration —** In any given year, a proportion of customers would have remained on contract under plans no longer available to new subscribers. Furthermore, in this study, Market Clarity sought to capture plans as close as possible to 30 June in each year from 2006 to 2010. As a result, Market Clarity's analysis is based on the residential broadband plans available at a fixed point in time for each study year.
- **Plan Changes —** Market Clarity notes that it has become increasingly common for ISPs to upgrade existing plan price points to higher download levels when they announce new retail plans. (In some cases, customers may be automatically upgraded to the new download allowances, and in other cases, a customer would need to request a plan change.) Market Clarity has not attempted to account for plan changes during any given year in this analysis.
- **Segmentation of Residential and Business data —** To the fullest extent possible Market Clarity has based its estimates solely on fixed broadband residential subscribers (SIOs), ARPU and downloads. Nonetheless, Market Clarity notes that there are gaps in the availability of information pertaining solely to the residential fixed broadband market for the sampled ISPs during the 5-year study period.

While the limitations described above most certainly affects the accuracy of our specific estimates, Market Clarity is confident that the overall trends observed in this analysis provide a valid reflection of the Australian Residential Fixed Broadband market during the study period.

1.3.4 ABS Data

1.3.4.1 Reporting Cycle

The Australian Bureau of Statistics *Internet Activity, Australia* (catalogue 8153) is now released on a June and December cycle. However, this was not the case in earlier series, with releases made in September 2006 and March 2007. Market Clarity has calculated growth trends to provide June data so as to align these years with the other data used in this study.

1.3.4.2 Downloads

The ABS's reported download volumes capture a snapshot of the three months preceding the report date. Market Clarity has used these download volumes as the basis of an estimate of annualised downloads.

In addition, in December 2009, the ABS ceased separately reporting business and household downloads. Following a discussion with the ABS, Market Clarity has formulated an estimate of the business/residential breakdown for the purpose of this study. Only residential downloads are included in this study.

For this study, Market Clarity has used the download data reported by the ABS for fixed broadband only. In earlier years, where the ABS did not distinguish between fixed and mobile downloads, Market Clarity has estimated the proportion of downloads attributed to the fixed broadband market.

In all cases, Market Clarity considered only those downloads attributed to the residential fixed broadband market.

1.3.4.3 Mobile Broadband

Recent years have seen an explosion in the adoption of 3G-based mobile broadband products. While mobile broadband services are already having an impact on Australia's download appetite, Market Clarity has not included mobile broadband download trends in this study.

2 Australia's Growing Broadband Appetite

2.1 Broadband Download and Subscriber Growth

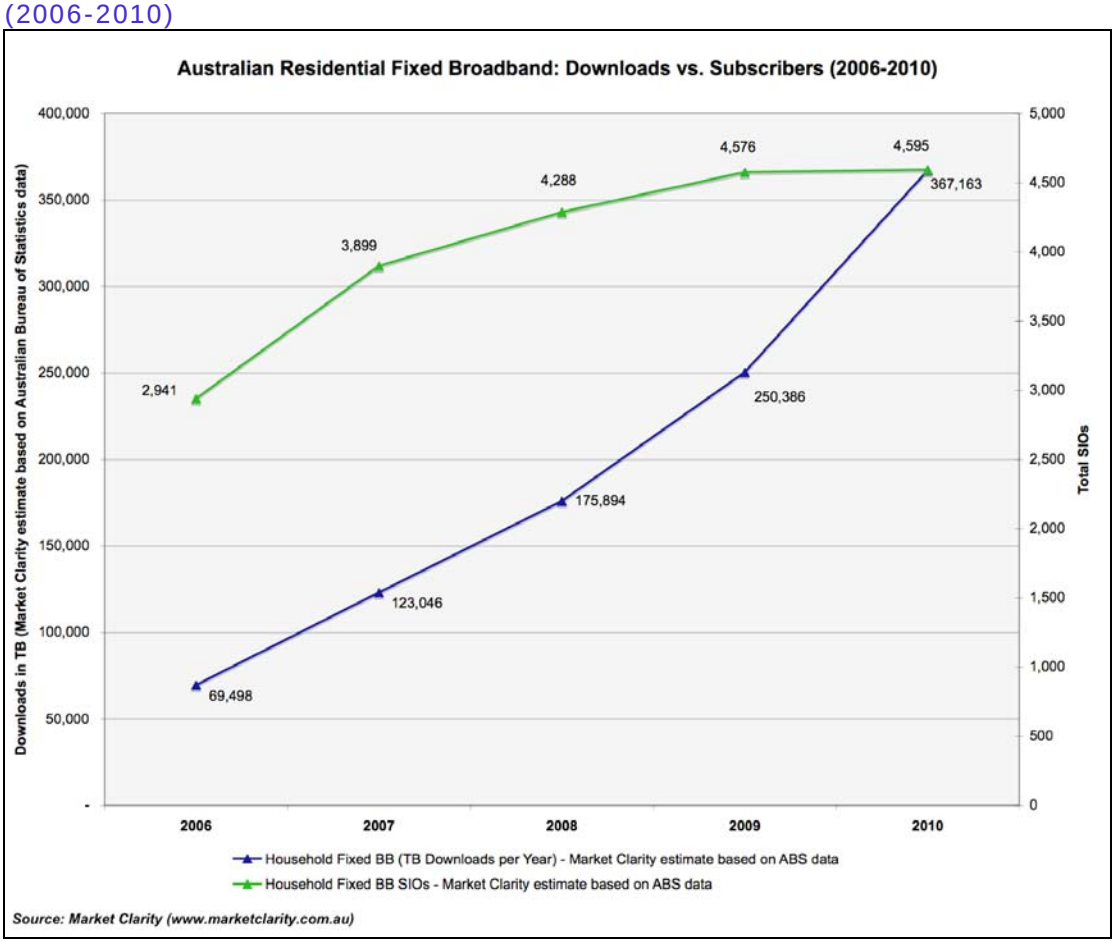
When Australian ISPs began launching broadband plans with Terabyte-per-month download limits, a common response in the media was to ask whether such generous allowances would be useful to any user. While there is a small community of users with extremely heavy download patterns, the average per-SIO monthly residential usage is about 7 GB per month, even after a decade of strong broadband growth.

To date, however, few attempts have been made to assess how closely users' download consumption matches the allowances they purchase. This report seeks to model the difference between data allowances purchased and data allowances consumed.

Although the rate of growth has levelled off in recent years, Australia's adoption of fixed broadband showed strong growth for most of the first decade of the 21st Century. In fact, if we take into account the number of customers for which fixed broadband services cannot be delivered (usually because a household is either behind a RIM, too distant from an exchange to make a connection, or living in an area where fixed broadband infrastructure is not available), the fixed broadband market may be considered as approaching saturation.

If users on the fixed broadband network had a consistent behavioural profile, we would expect growth in downloads to match growth in SIOs (services in operation), but this has not happened. Instead, as shown in Figure 1 below, the two are not synchronised.

Figure 1. — Australian Residential Fixed Broadband: Downloads vs. Subscribers (2006-2010)



This Figure clearly shows that residential fixed broadband downloads and SIOs have followed a different growth trajectory.

Since 2008, new fixed broadband SIOs stopped driving download growth. Instead, rising allowances, growing reliance on Internet connectivity, media rich content (video) and new applications have driven greater utilisation of existing services.

2.2 Residential Plan Restructuring 2006-2010

Figure 2, below, shows the change in the portfolios of providers in this study, by various residential plan categories. Specifically, Figure 2 shows the movement in the number of plans with various GB download allowances in each year.

Figure 2. — Changing ISP Residential Fixed Broadband Plan Allowances: Sample Providers (2006-2010)

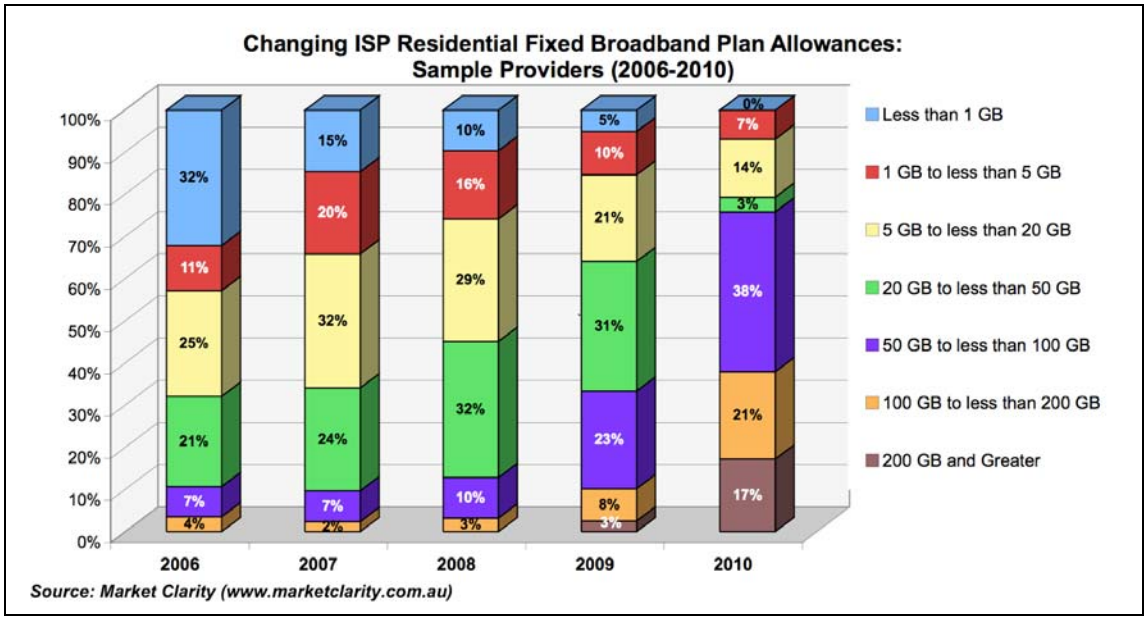
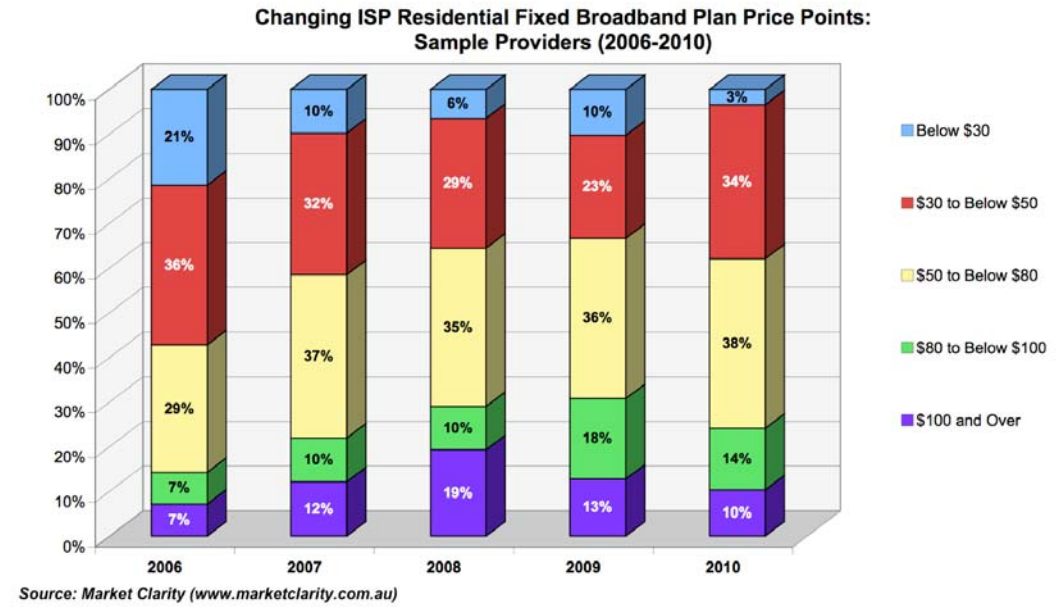


Figure 2 clearly illustrates what's behind Australia's willingness to consume more downloads online. Plans below even 20 GB have become relatively uncommon among the sampled providers; plans offering less than 1 GB of monthly downloads have disappeared entirely.

It should be noted that the upgraded plan allowances available earlier in 2010 — even before the "Terabyte wars" broke out in the second half of the year — squeezed the availability of residential plans even in the moderate 20-50 GB segment. Instead, many of these plans (by price point) were upgraded to an allowance greater than 50 GB. This was followed, later in the year, with an upgrade of lower priced plans; plans with price points allowing for 5 GB to 20 GB data allowances were upgraded to more than 20 GB. Hence, as of the end of June 2010, the vast majority of plans available from major ISPs had data allowances of at least 50 GB.

In general, ISPs have focussed on adjusting their plan allowances rather than their price points. Figure 3, below, shows the movement in the number of plans in each price point.

Figure 3. — Changing ISP Residential Fixed Broadband Plan Price Points: Sample Providers (2006-2010)



In spite of the ongoing uplift in plan allowances, there has been relatively little change to the make-up of the sampled ISPs' price points. During the period 2007-2008, some providers abandoned the "entry level" low-cost market, while after 2006, the heaviest users have been rewarded with lower prices as some providers withdrew plans over $100.

2.3 Download Cost and Download Growth

Figures 4 and 5, below, track the growth in downloads in the Australian residential fixed broadband market against the falling "effective" price of downloads since 2006.

Figure 4 represents the cost of downloads as a simple average price (unweighted price) per gigabyte (GB) across all plans, and does not take into account the distribution of users among different plans.

Figure 4. — Australian Residential Fixed Broadband: Residential Downloads vs. Price per GB (2006-2010)

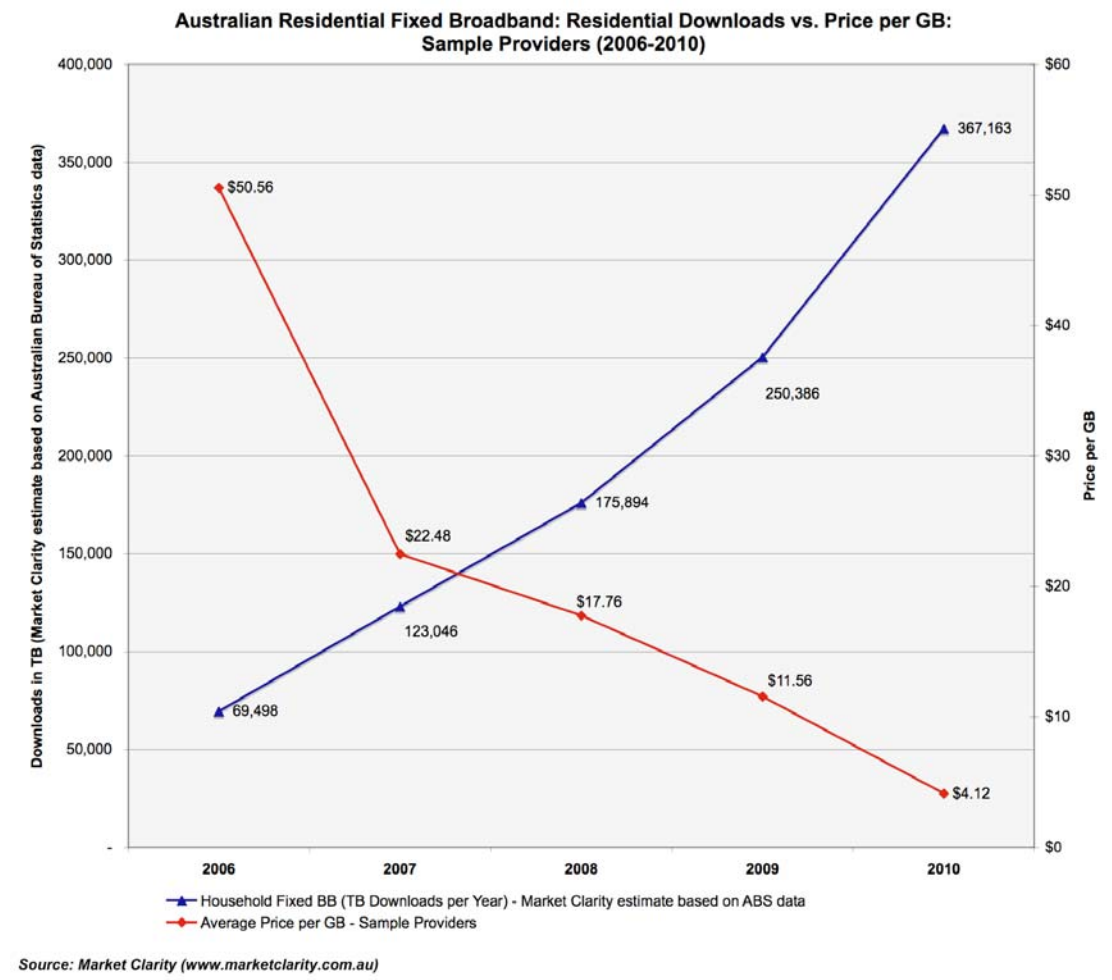


Figure 4 shows a strong correlation between the falling cost of broadband downloads (across all price plans) and rising usage. It should also be noted that since 2006, ISPs have progressively abandoned offering plans with sub-GB monthly allowances.

The impact of this is that users no longer have the option of buying services with very small allowances. As the capacity available to even the entry-level user rises, so has the residential user's consumption of download allowances.

Figure 5 represents the cost of downloads taking into account the distribution of users among different plans, yielding an average effective price of data usage (weighted price).

Figure 5. — Australian Residential Fixed Broadband: Residential Downloads vs. Weighted and Unweighted Price per GB (2006-2010)

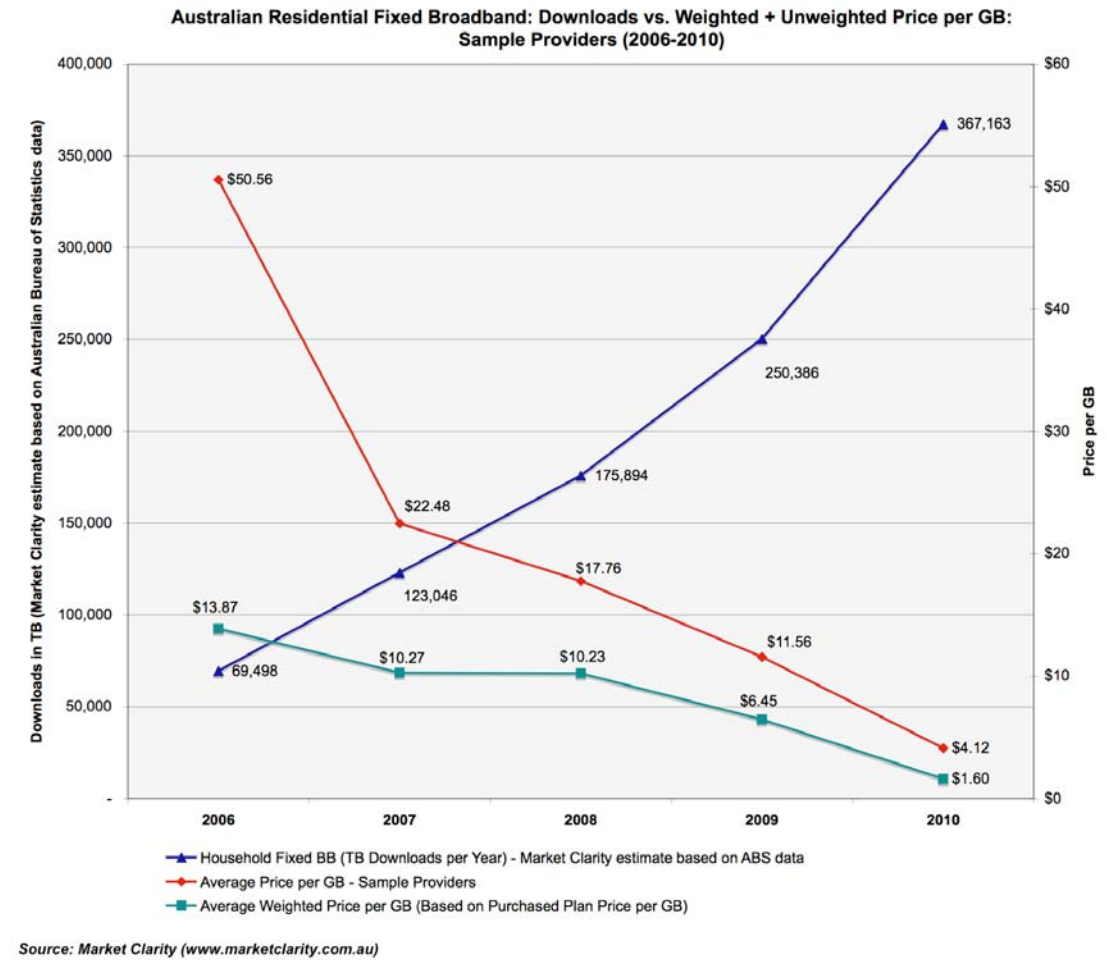


Figure 5 clearly demonstrates the amount by which both weighted and unweighted prices have fallen during the 2006-2010 period:

- From an unweighted price (simple average) of $50.56 per GB when averaged across all of the plans in the study sample, to $4.12 per GB.
- From a weighted price (accounting for the distribution of users subscribing to different plans) of $13.87 per GB when averaged across all of the plans in the study sample, to $1.60 per GB.

Downloads cost less, and higher download allowances are available to residential users: this potent combination has driven the explosion in downloads consumed in the Australian market.

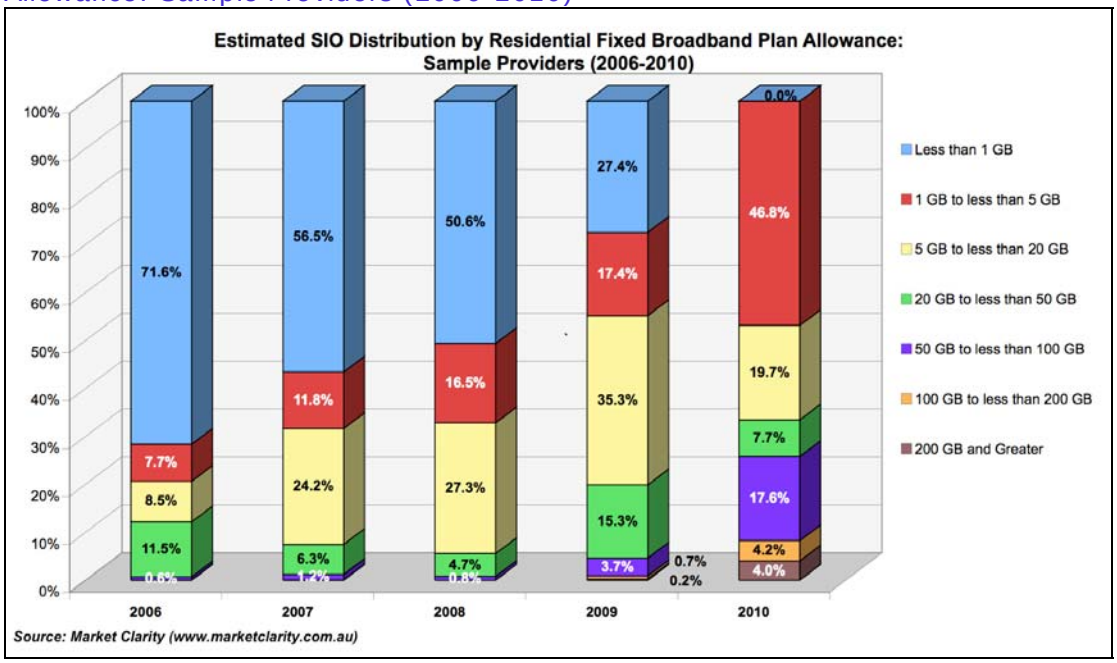
3 User Download Consumption

3.1 Distributing Users to Residential Plans

Figure 6, below, presents a more detailed mapping of user behaviour.

Drawing on the ARPU analysis described in Section 1, Figure 6 shows Market Clarity's estimate of the proportion of users subscribing to plans with various download allowances, by year.

Figure 6. — Estimated SIO Distribution by Residential Fixed Broadband Plan Allowance: Sample Providers (2006-2010)



Market Clarity believes much of the movement between different data allowance increments is due to the plan changes (over time) discussed in Section 2, as well as consumers actively seeking out plans with higher allowances, as they become more familiar with family Internet usage patterns.

It is interesting to note that the abandonment of low-value sub-1 GB plans in 2010 has created a large growth in the 1 GB to 5 GB segment, as new users find this to be today's "entry level" plan and as users at the bottom of the market found larger data allowances are now included in the lowest priced plans.

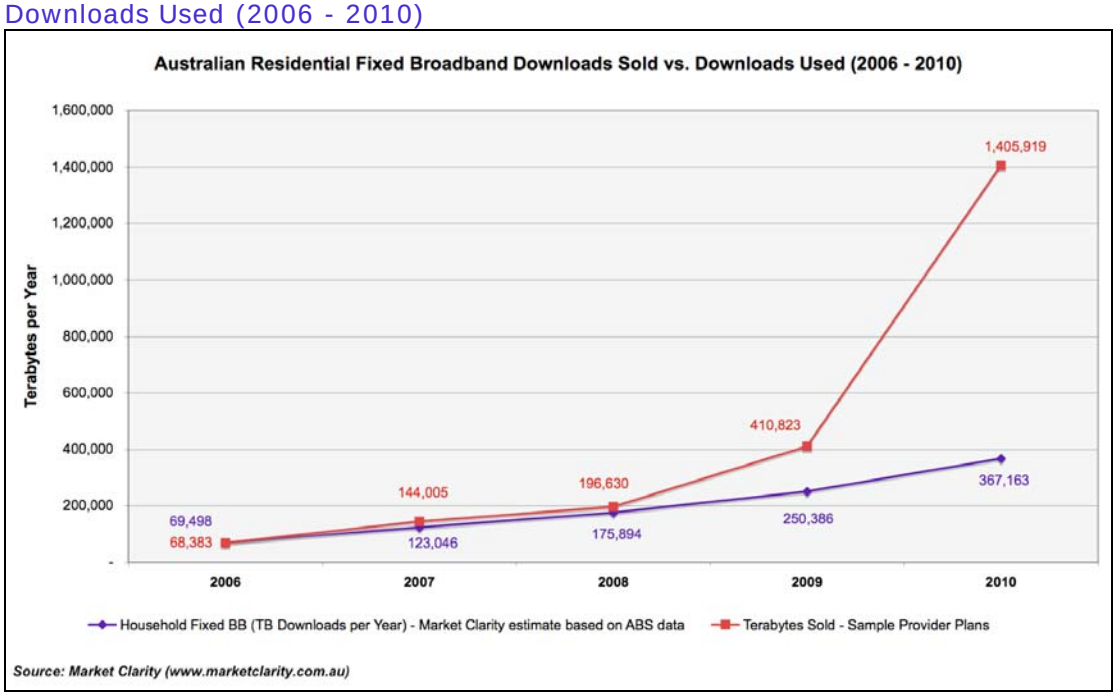
In the meantime, the growth in the above-20 GB segment has driven down the number of users on 5 GB to 20 GB plans.

The calculations behind Figure 6 are the basis for the next Section, which discusses the relationship between what users are buying and their actual usage, as reported by ISPs to the ABS.

3.2 Allowances Purchased vs. Used

Figure 7, below, compares the download allowances "as purchased" to downloads as measured by the ABS.

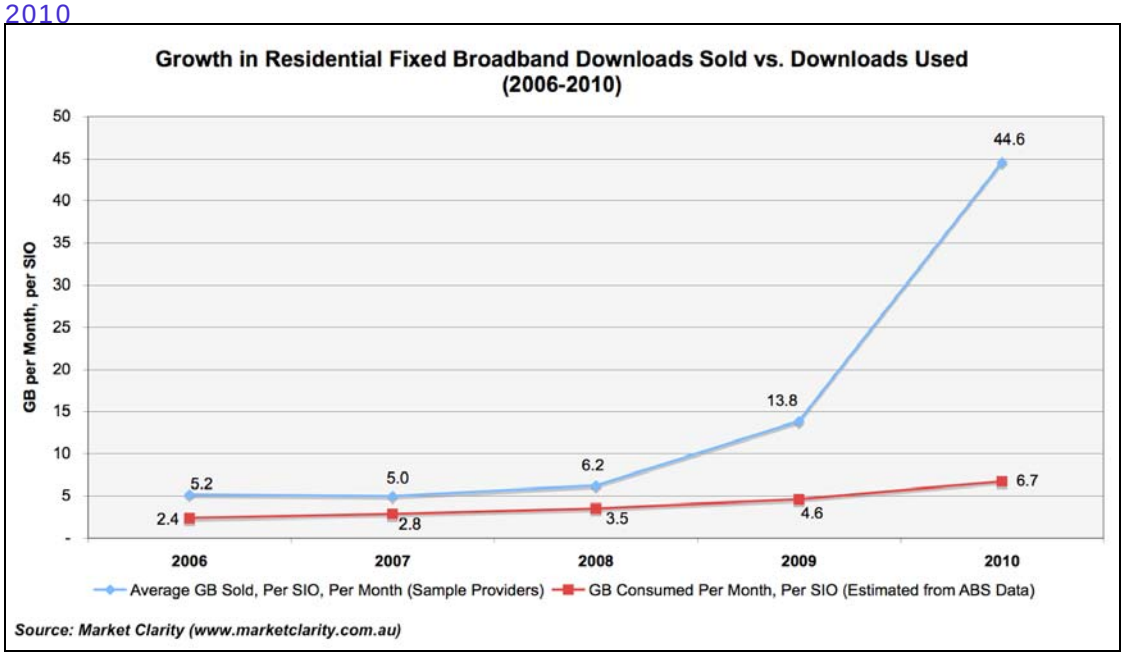
Figure 7. — Australian Residential Fixed Broadband Downloads Sold vs. Downloads Used (2006 - 2010)



If Market Clarity's distribution of users is broadly correct, then for each year after 2007, Australian broadband users have purchased a substantial amount of notional capacity that they have not consumed.

The same is apparent when download allowances are distributed on a per-user basis. This is illustrated in Figure 8, below.

Figure 8. — Growth in Residential Downloads Sold vs. Downloads Used, 2006-2010



In Figure 8, Market Clarity's estimate of downloads sold per user is based on our distribution of SIOs to plans within the sample providers' user base. Market Clarity's estimate of downloads consumed per user is based on ABS quarterly download data, averaged across a given year.

Both when aggregated across all users, and distributed on a per-SIO basis, the gap between downloads sold and consumed widened in 2009 and 2010 as plan offerings became more generous.

Were this shift being accompanied by higher prices for consumers, ISPs would be subject to criticism: it would, in that instance, appear that ISPs were deceiving users into paying higher prices for large amounts of unused capacity.

This, however, is not the case. Residential broadband plan data inclusions have been upgraded with no corresponding change to the plan cost — unless a consumer voluntarily moves to a higher-allowance plan. Consumers who make the decision to upgrade their plans are in a different category to the majority of residential users, since they are upgrading either because they have repeatedly exceeded their plan allowance, or because they believe they are likely to do so.

What appears to exist is a means of product differentiation. If users' actual downloads are growing more slowly than their plan allowance — as appears to be the case — then the ISP has successfully used the new allowance as a market differentiator, but has not incurred the full cost it would incur if user behaviour adjusted to utilise their new allowance.

Market Clarity believes the generous expansion of ISP plan allowances has served an important customer service role. By greatly reducing the risk that customers will find themselves "speed throttled" at the end of the month, ISPs have moved to eliminate a source of customer dissatisfaction, at no extra cost to the customer.

However, the scale of the gap between purchase and consumption suggests relatively low awareness, among household broadband subscribers, of their own requirements. In some cases (depending on the plans offered by a particular ISP), users could take advantage of plan growth by downgrading their subscriptions, probably without loss of download allowance, but do not do so.

3.2.1 Accuracy

As noted in Section 1, Market Clarity cannot test the accuracy of its distribution of users without access to confidential ISP data. It is therefore unlikely that our distribution of the user base matches any given ISPs' real user distribution.

However, all of the ISPs in the study sample offer a larger number of plans whose price is above their reported ARPU than below it. As a result, all of the ISPs studied must have a "bottom-heavy" user distribution, with most of their users subscribing to plans with lower download allowances, or at any point in time are subscribed to "legacy" plans which are no longer offered to new customers.

Market Clarity therefore believes that errors in this study are likely to under-estimate rather than over-estimate the notional download allowances purchased by customers in the study sample, at any point in time. The gap between reported downloads and purchased allowances is probably larger than reported in this study, rather than smaller.

3.3 The Heavy User

While Market Clarity has not analysed the effect of extremely heavy users (such as customers running BitTorrent) on the overall market, it is accepted that most ISPs have a small population of users who generate a disproportional amount of traffic.

Were these users to be excluded from the ABS data, it would increase the gap between download allowances "as sold" and the usage reported to the ABS.

4 Implications for the NBN

4.1 Downloads in Context

At first glance, the analysis reported in this study could be construed as an argument against the NBN.

As an anti-NBN argument, this study would suggest that if the ordinary home user consumes far less than the download allowance offered by ISPs, then there is little need for a new, faster, and nearly ubiquitous government-owned network expected to have an estimated capex cost of $35.7 billion, plus an estimated $13.8 billion decommissioning and infrastructure payment to Telstra; with a planned $27.1 billion equity contribution from the government.[2]

However, to construe this study as an argument against the NBN overlooks the complex relationship between user behaviour, the volume of data downloaded, and the speed of the connection.

The introduction of higher-allowance services has tracked the rollout of higher-speed services (in particular, growing availability of ADSL2+ services, alongside the upgrade of HFC infrastructure to support 100 Mbps peak downloads).

We have already seen that download behaviour among the sample population in general tracks the rising downloads among the entire population. Although SIO growth among the sample providers slowed from 2009-2010 (in line with the growing saturation of the Australian fixed broadband market), download growth continued ahead of SIO growth.

The shift from 2007 to 2008 is interesting to note: this period saw the beginning of the ISPs' abandonment of the lowest-value sub-500 MB and sub-1 GB plans.

This suggests to Market Clarity that the advent of new applications — among them streaming video, social media and IPTV — is already becoming the new driver of user downloads. Although the user today appears to be purchasing "unused capacity", increasing penetration of new applications is likely to close this gap.

4.2 Speed vs. Downloads

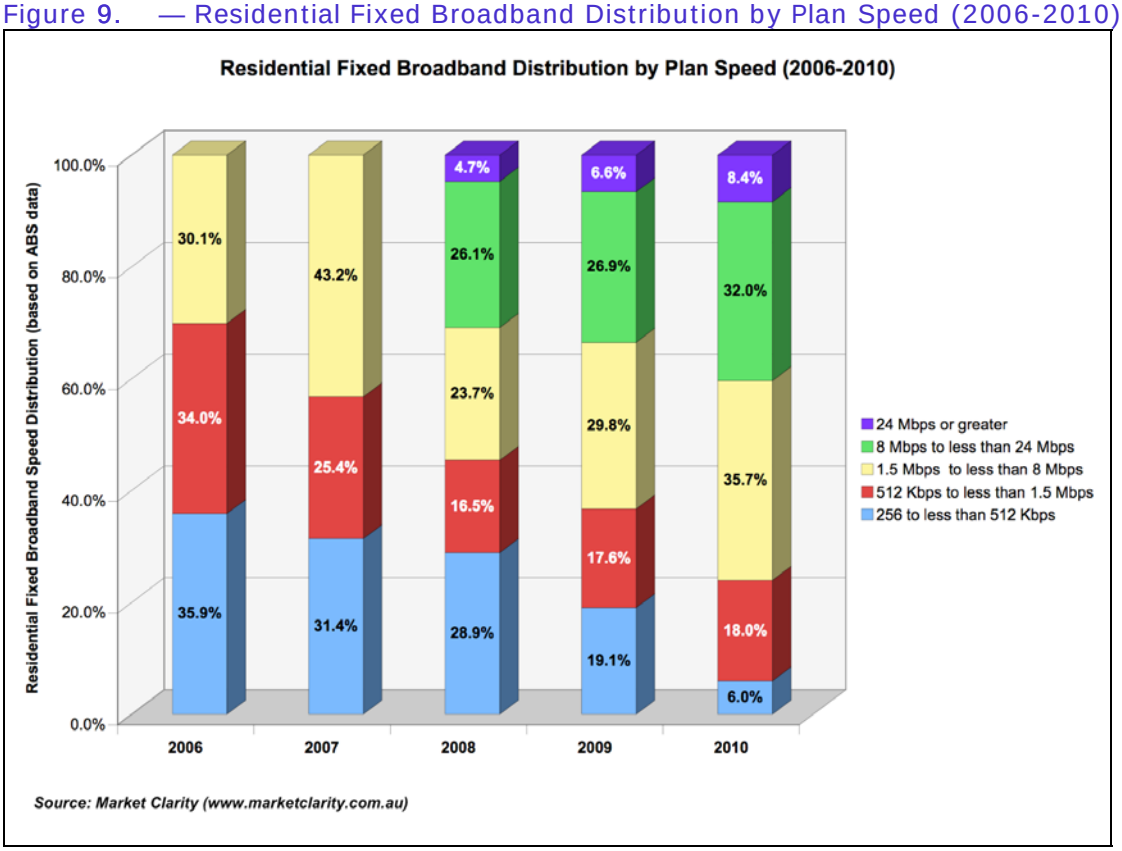
It's also important to note that the speed of the connection has only a partial relationship to the quantity of data downloaded for most users.

If data volume were the chief concern of the user, customers are already purchasing plans far in excess of their requirements. In the June 2010 ABS study, around 40% of household users were already subscribing to plans with 8 Mbps or greater rated speed — in other words, they were subscribing to the highest ADSL1 speeds available, or had migrated to ADSL2+ services.

[2] Source: NBN Co Business Case Summary (24 November 2010)

Figure 9, below, shows the migration of users towards higher-speed plans in the period 2006-2010.

Figure 9. — Residential Fixed Broadband Distribution by Plan Speed (2006-2010)



Although users consume less than their plan allowance, a growing number of Australian broadband subscribers place a premium on speed. While the average household may only use its broadband services for a few hours per day, when the user is online, he or she expects a responsive service.

Market Clarity believes the upward redistribution of plan speeds used would be reflected in NBN adoption as well. While more than 50% of users are on lower-speed plans today, this reflects more than merely the deliberate choice of consumers. Other factors that may come into play include:

- **Price** — Plan price is a key influencer of consumer service choices. While ADSL2+ plans are generally priced in accordance with data allowances, rather than speed, many plans that are based on ADSL1 or other technologies incur price premiums as broadband speed increases. Consumers utilising these services are often influenced by the combination of family budgets and perceived value.
- **Consumer "inertia"** — While some users pay close attention to their broadband plans, the discussion of plan allowances demonstrates a marked reluctance among most users to alter their broadband plans. This is likely to affect distribution of users among different plan speeds as well: users are more likely to migrate because of a "free" plan upgrade than to make a conscious decision to do so.
- **Installed equipment base** — Users may also be reluctant to move to ADSL2+ services if it also requires replacement of an older ADSL1 modem.

- **Distance from user to exchange —** Consumers with premises located more than 3 Km distant from an exchange are unlikely to receive ADSL2+ speeds, and would therefore not seek a plan upgrade (assuming that they are technically savvy, or have discussed the impact of a technology change with their ISP).
- **Competing technologies —** While the advent of 3G-based mobile broadband has not led to any evidence of mass-abandonment of fixed broadband services, if a consumer has to choose between a fixed broadband upgrade and a mobile service they may be more likely to choose the latter (especially if the broadband service is used by a single individual, as opposed to a family).

4.3 Further Research

As noted, Market Clarity does not believe the "gap" between downloads purchased by broadband subscribers and their consumption invalidates the Government's proposed NBN.

The NBN is designed to serve a wide range of policy objectives, including the restructure of the competitive landscape in Australian telecommunications, equalisation of telecommunications access across 93% of Australian households (the proposed FTTH footprint), the enablement of new and innovative applications within Australia, and the creation of a network which can reasonably be expected to remain in service for 30 years or more. None of these policy objectives are affected by a point-in-time "snapshot" of user behaviour.

However, Market Clarity believes that policy and planning would benefit from a more detailed understanding of user behaviour. Such research may include:

- **Detailed, accurate measurement of user download behaviour —** Direct measurement of user downloads, and classification of users by their download behaviours, would greatly refine our understanding of current user requirements. A study that correlates download behaviour with plan speed would assist NBN (and ISP) product planning.
- **User adoption of new services —** Near-term future user requirements would be more accurately predicted if research were to form an accurate understanding of the adoption of new services such as IPTV and streaming services, and an accurate profile of the user communities adopting these services.
- **The relationship between service price and download behaviour —** It is clear that ISPs adjust their service profiles by expanding plan inclusions rather than by adjusting prices. In addition, although beyond the scope of this study, ISPs appear to expand their income through the introduction of new services, such as product bundles, rather than by adjusting the price of existing services. A detailed study into how users respond to price, plan and service adjustments would provide valuable input into their likely future download behaviour.
- **Mapping subscribers to location and service availability —** Market Clarity believes service adoption is undeniably related to the geographic distribution of users relative to broadband infrastructure. There are still a large number of exchanges that are DSL-enabled, but utilise older ADSL1 technology. ADSL1 services typically have lower download allowances than ADSL2+ services, even when offered by the same provider. Users unable to obtain ADSL1 services, because of their distance from an exchange or because of the presence of RIMs, are likely to seek a wireless service, and in general,

wireless services (fixed wireless or mobile broadband) lag ADSL services in their download allowances. By quantifying the relationship between user location and download behaviour, we can better understand the value proposition the NBN offers to users.