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Current infrastructure developments

The decade to 30 June 2019

November 2019

CURRENT INFRASTRUCTURE DEVELOPMENT: THE DECADE TO 30 June 2019
Author: Andre Kaspura

Engineers Australia
11 National Circuit, Barton ACT 2600
Tel: 02 6270 6555
Email: publicaffairs@engineersaustralia.org.au

www.engineersaustralia.org.au

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Executive Summary

This is a report on trends in nine classes of economic infrastructure for the period 2008-09 until the financial year ending 30 June 2019. The focus is on infrastructure completed on the ground collectively by the three levels of government and the private sector. Financial and political announcements are not considered. The statistics reviewed have been deflated to remove the effects of inflation.

From an aggregate national perspective public sector, private sector and overall engineering construction on infrastructure display negative trends. In the case of the private sector this is hardly surprising because the trend includes the post-GFC component of the resources boom, in other words, the trend reflects the transition away from the large burst of infrastructure built to support the resources boom.

In the public sector where almost all engineering construction is infrastructure, engineering construction on infrastructure has trended downwards between 2008-09 and 2018-19 despite strong increases in Australia's population. This result emphasizes the importance of examining constant price statistics and the importance of context when evaluating large dollar denominated projects. Although a decade is a relatively short time period for infrastructure, it is sufficiently long to put into context claims about recent high infrastructure growth. The only way the statistics can be used to support such claims is to calculate growth from the bottom of the trough in 2015-16 instead of looking at the trend. This measures the most recent growth spurt while disregarding the slump that led to the trough.

Transport infrastructure is the largest area of construction; its share in the private sector has fallen and was 32.7% in 2018-19; in the public sector, proportionally road construction has increased and was 66.1% of infrastructure construction in 2017-18, falling back to 61.9% in 2018-19. In recent years, private sector road construction has been increasing modestly but the main driver in the sector has been construction of railways by the public sector which has turned a flat road construction trend into a solidly growing one. Construction of bridges and harbours contributed minor amounts. In 2018-19, transport infrastructure valued at $27,975.4 million ($28 billion) in 2016-17 prices was built.

Last year about 6% of private infrastructure construction was on water and sewerage assets compared to 13.4% in the public sector. From 2008-09 through to 2015-16 the construction trend was solidly downwards. Since then modest increases have occurred but nowhere near sufficient to recover construction levels earlier in the decade. In 2018-19 water and sewerage construction valued at $5,772.7 million ($5.8 billion) in 2016-17 prices was completed, down 5.7% on the previous year.

Energy infrastructure construction comprises pipelines construction, almost all by the private sector, and construction in the electricity sector. Public sector construction in electricity shows a strong downwards trend, flattening somewhat in recent years. The private sector equivalent is in two parts; an early burst of construction up to 2013-14 related to the transmission and distribution system and since 2015-16 an even stronger upwards surge associated with the construction of renewable energy facilities. In 2018-19, private sector construction was valued at $11,717.2 million ($11.8 billion) in 2016-17 prices, about 14% of which was pipeline construction. In comparison, public sector construction was $2,727.3 million ($2.7 billion) in 2016-17 prices with over 99% on electricity.

Telecommunications infrastructure is about 16% of each sector's infrastructure construction and trended strongly upwards in both sectors until 2016-17. Since then public sector construction has plateaued while private sector construction has fallen. In 2018-19 construction by the two sectors combined was $9,157.8 million ($9.2 billion) in 2016-17 prices, down 11% on 2017-18 and down 18.6% since the 2016-17 peak.

In 2018-19, overall engineering construction on infrastructure decreased by 5.2% and fell in both sectors; in the private sector by 0.4% and in the public sector by 8.7%. In the private sector, construction increased in five of the nine asset classes. About 87% of new commencements in the private sector were on roads electricity assets. In the public sector, infrastructure construction increased in three of the nine asset classes. About 70% of new commencements were in roads, railways and telecommunications. There was a substantial amount of unfinished construction in the system focused on roads in both sectors, public sector railways and private sector electricity assets. The amounts involved suggest the scope for construction pressure points in coming years.

1. Infrastructure and information

The adequacy of infrastructure has been a perennial topic in economic discussions for at least the past 15 years. Infrastructure is an enabler of productivity growth which is the main source of improvements in Australia's standard of living. Despite periods of strong growth in infrastructure development, there are frequent accounts of unacceptable transport congestion, problems with digital communications, weaknesses in the national electricity system and, more recently, towns in danger of running out of water.

There have been many improvements in how infrastructure projects are handled through decision making processes. No doubt further improvements are desirable and possible. Two continuing weaknesses stand out: first, too many infrastructure decisions are political and have not been subjected to business case appraisals, and second, decisions continue to be made without reliable information about the status of existing infrastructure assets and what they were designed to do.

More information about infrastructure and its status is essential. A number of approaches are possible without calling for additional resources to be spent on data gathering. The ABS in both the national accounts and in its work on productivity compiles estimates of capital stocks using the perpetual inventory method[1]. The value of this method is that it reminds us that the stock of capital, from which infrastructure services are derived, only grows when new investment exceeds depreciation. This simple rule is often neglected in public discussions where most of the emphasis is on the size of announcements; the implicit assumption is that the capital stock increases accordingly.

Although the ABS has compiled estimates of capital stocks and new investment for several important areas of interest such as research and development, non-dwelling buildings and machinery and equipment, these categories are too broad for meaningful analyses of economic infrastructure. However, with continuous improvements in their statistics and methodology, this approach holds considerable promise for the future.

Another approach relies on consolidation of information from Commonwealth, State and Territory budget papers as undertaken by Infrastructure Partnerships[2]. This approach provides useful and important historical and contemporary budget information in broad categories. The categories used are unfortunately too broad and do not include off-budget infrastructure development by government owned corporations covering electricity, water and sewerage and telecommunications or infrastructure developments undertaken by the private sector.

Over the years Engineers Australia has used a third approach which monitors trends in engineering construction on infrastructure because ultimately it is assets completed on the ground that matter not announcements of prospective projects. The ABS has published engineering construction statistics for over thirty years. These statistics are the basis for ABS estimates of capital stocks and new capital investment, but structurally are not estimates of the stocks themselves. This is a weakness in the approach. However, the strength of the statistics is that they report the value of work actually completed on the ground, which is superior to budget financial allocations, and the statistics are available for all common categories of infrastructure undertaken by both the public and the private sectors and for states and territories. An additional advantage is that the ABS reports on new commencement and work yet to finish in each infrastructure category.

This report is the latest in a series produced by Engineers Australia that analyses national trends in engineering construction nine categories of economic infrastructure. Statistics analysed are deflated using an implicit deflator derived from chain volume and current prices statistical series so that the trends discussed are expressed in 2016-17 prices. The time period for the report is financial years from 2008-09 to 2018-19 which required reconstruction of ABS quarterly statistics into financial year equivalents.

The ABS classifies statistics to economic sectors according to ownership of the asset under construction at the conclusion of construction. Thus, the private sector includes assets constructed by and owned by the private sector when the asset has been built but construction by the private sector under contract to the public sector is not

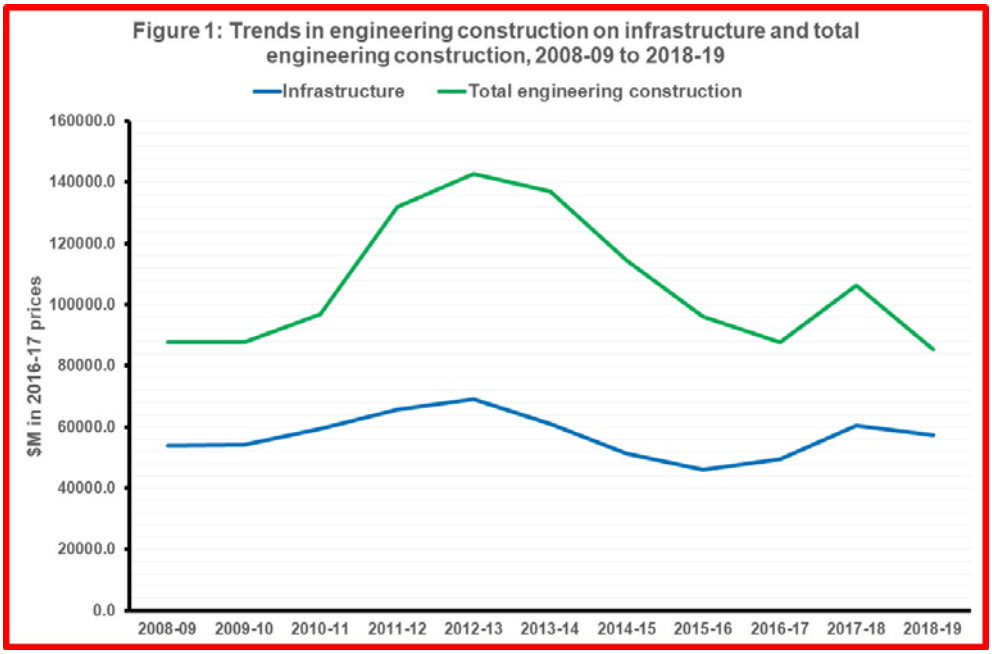
[1] See ABS, Australian System of National Accounts, Cat No 5204.0, various years and Experimental Estimates of Industry Multifactor Productivity, Australia, Cat No 5260.0.55.002, December 2018, www.abs.gov.au
[2] Infrastructure Partnerships Australia, Australian Infrastructure Budget Monitor 2018-19, https://infrastructure.org.au

treated as private sector but as public sector because the asset remains under public ownership. Construction undertaken directly by public sector agencies is the second element of public sector. Finally, the public sector covers all three levels of government. Some statistics are available about the contribution of each level of government, but these are limited.

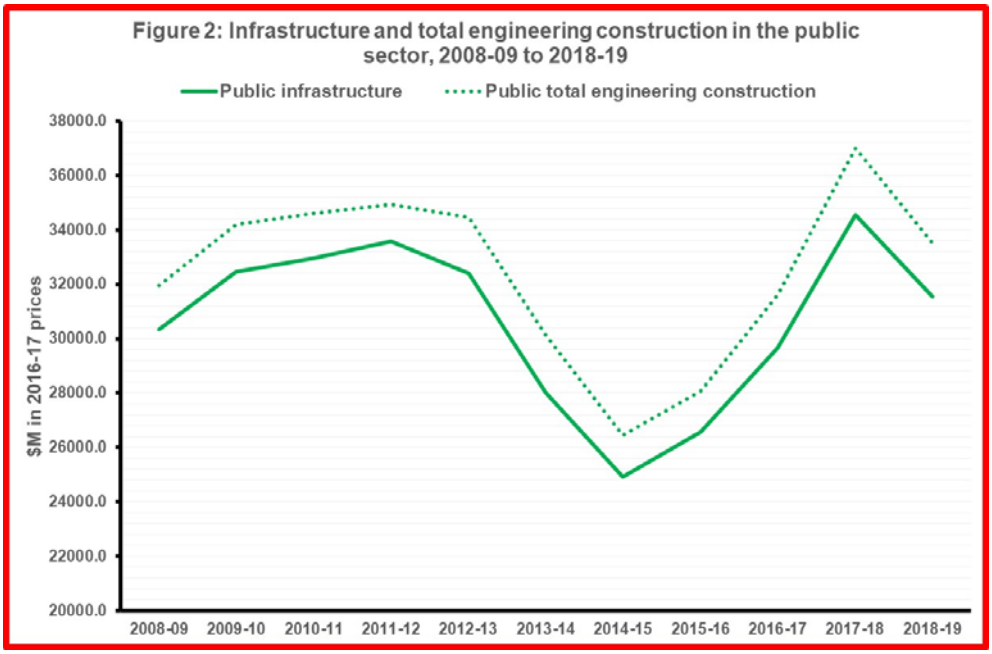
2. Infrastructure and engineering construction

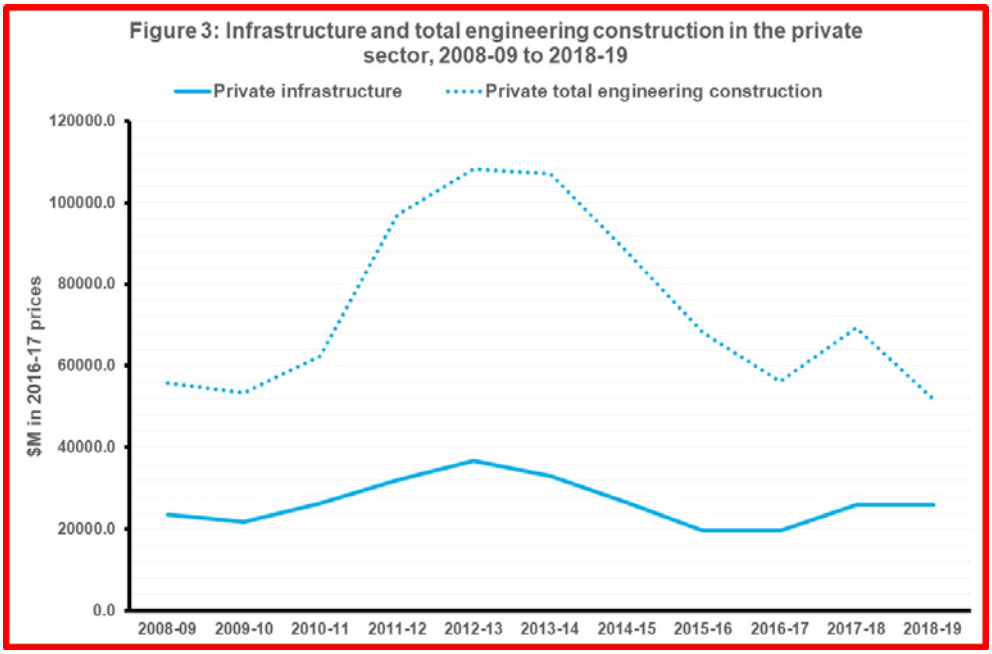
The technique used throughout the report is graphical illustration of trends. The supporting statistics are presented in the appendix. Appendix Table 1 provides statistics on engineering construction work completed, Appendix Table 2 provides statistics on engineering construction commenced and Appendix Table 3 provides statistics on engineering construction under way but yet to be complete.

Economic infrastructure is defined to include transport related assets, water and sewerage assets, energy related assets and telecommunications assets. Engineering construction statistics are available for each. But engineering construction statistics are also collected for other economic activities. The statistics also cover construction of recreational facilities, construction of assets in heavy industries and construction of assets in the oil, gas, coal and other minerals industries, collectively described in the report as the resources sector. The difference between engineering construction on infrastructure and total engineering construction is illustrated in Figure 1.

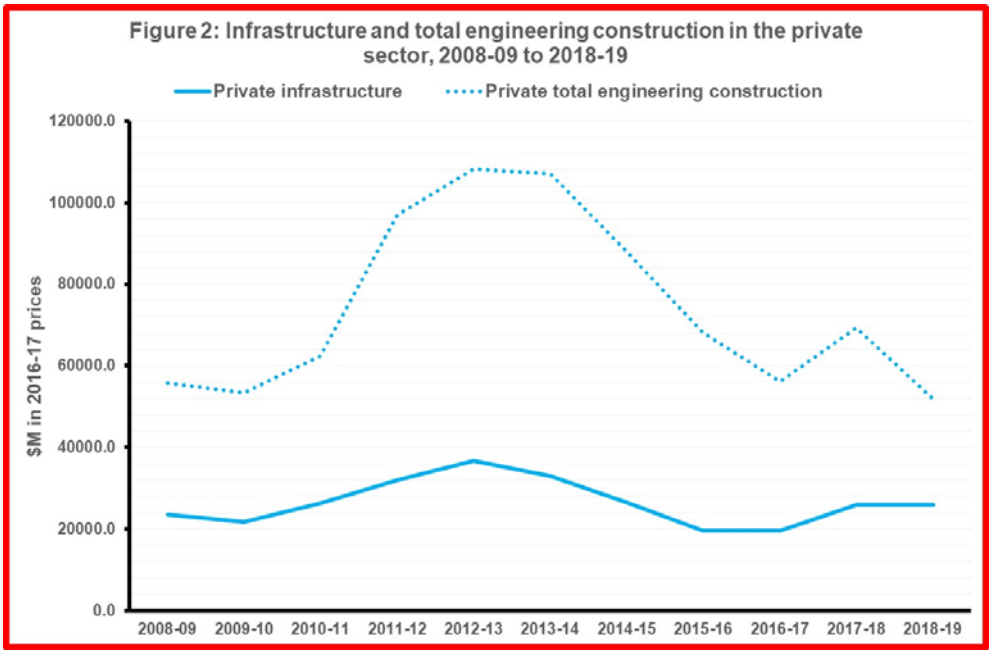


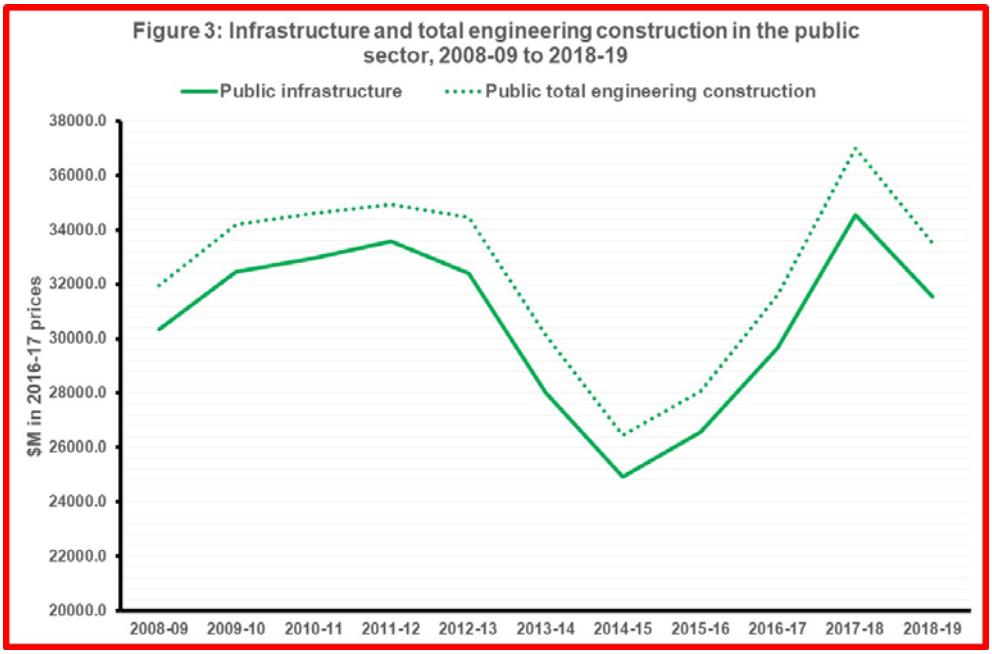
Public sector engineering construction is almost exclusively on economic infrastructure (see Figure 2). But this is not the case for the private sector which is involved in both building economic infrastructure indistinguishable from public sector infrastructure and economic infrastructure in support of private sector corporate undertakings where the infrastructure is not available for general use although third party access agreements under ACCC arrangements are possible. The latter was particularly high during the construction phase of the resources boom, but it has been falling since about 2013. This complication should be borne in mind whenever evaluating private sector engineering construction on infrastructure.





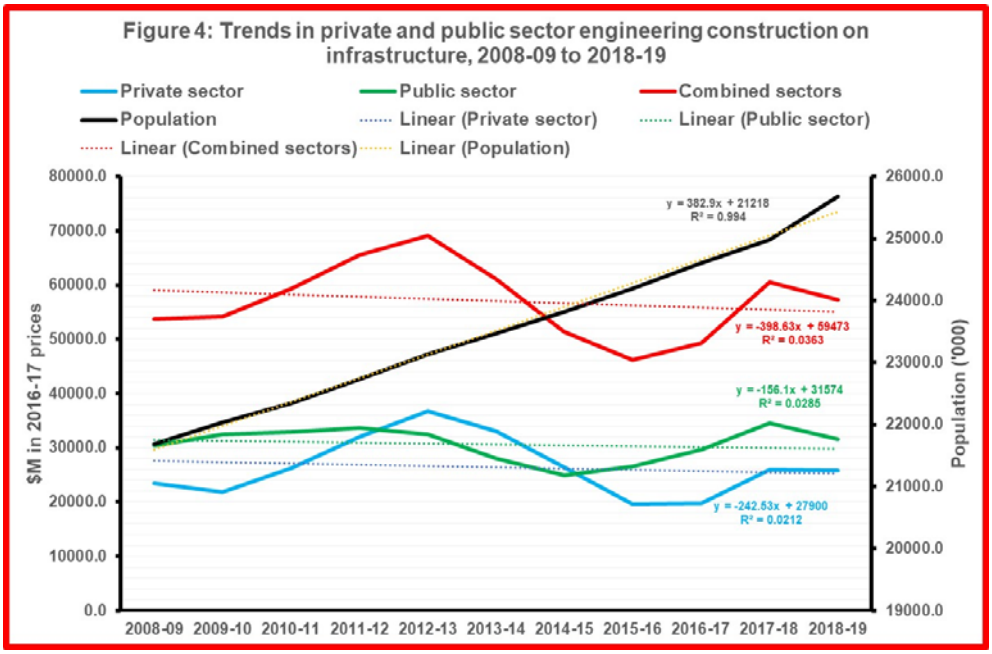
The private sector situation is illustrated in Figure 3. It closely resembles Figure 1 which showed the same trends for the two sectors together with a large gap between total engineering construction and engineering construction on infrastructure. At its peak in 2012-13, total private sector engineering construction was $108,197.0 million in real terms which included infrastructure of $36,764.2 million, about 34%. At the peak $64,677.6 million or 59.8% of total engineering construction could be directly attributed to the construction of resources sector facilities suggesting that a substantial portion of the peak in infrastructure construction was related to this activity. Between the peak and 2018-19, private sector total engineering construction fell by $56,424.3 million in real terms. This is a substantial reduction in aggregate demand in the economy and its scale exceeds the current value of public sector infrastructure construction of $31,535.8 million.





3. National overview

Infrastructure has figured strongly in recent discussions of Australia's economic prospects, but as the trends in Figure 4 show, not much has changed over the past 11 years. Private sector engineering construction on infrastructure is shown in blue, public sector construction is shown in green and overall construction on infrastructure is shown in red. For comparison, the trend in the Australian population is shown in black measured against the secondary vertical axis.



Engineering construction on infrastructure is characterised by large fluctuations which are even larger when individual assets are considered. Public sector, private sector and overall engineering construction on infrastructure display negative trends. In the case of the private sector this is hardly surprising because the trend includes the post-GFC component of the resources boom, in other words, the trend reflects the transition away from the resources boom.

The public sector trend, however, shows that in constant prices terms, engineering construction on infrastructure trended downwards between 2008-09 and 2018-19 despite strong increases in Australia's population. This result emphasizes the importance of examining constant price statistics and the importance of context when evaluating large dollar denominated projects. Although a decade is a relatively short time period for infrastructure, it is sufficiently long to put into context claims about recent high infrastructure growth. The only way the figures in Figure 4 could support such claims would be to calculate growth from the bottom of the trough in 2015-16. When this is done, we can show that annual private sector engineering construction on infrastructure increased by 31.5% and annual public sector engineering construction on infrastructure increased by 38.7% to 2017-18 but fell by 8.7% in 2018-19.

Looking at the full period, private sector engineering construction on infrastructure peaked in 2012-13 and although it has increased in each of the past three years, it remains well below this peak, indeed it was just 70% of the peak in 2018-19. It is important to note that engineering construction in resources in 2018-19 was $21,853.5 million, well down on its peak but still substantial suggesting that some private sector infrastructure construction continues to be limited access infrastructure supporting resources projects.

In the public sector, engineering construction on infrastructure first peaked at $33,580.4 million in constant price terms in 2011-12. Annual construction fell to a low of $24,908.6 million in 2014-15 and then increased to establish a new peak of $34,554.0 million in constant price terms in 2017-18 before falling back to $31,535.8 million last year. The later result was exceeded in five of the eleven years since 2008-09 and cannot be seen as especially large.

Although perhaps exaggerated by the difficulty of comparing scales in millions of dollars to population measured in thousands, we note in Figure 4 that Australia's population has been growing strongly. Although engineering construction on infrastructure contracted in 2018-19, population growth accelerated. In a modern economy, all economic infrastructure is important to growth and any one type of infrastructure could become a barrier to growth. Within the broad aggregates just discussed there are important differences which are now considered.

Before moving on to that discussion, it is important to note that the figures analysed are annual additions to the stock of infrastructure and not stocks of infrastructure as such. They take no account of depreciation of infrastructure assets through wear and tear. In other words, the trends in Figure 4 should be evaluated in this light; after all, if new infrastructure development does not exceed the loss through wear and tear, the stock of infrastructure assets, and the services provided by that stock, falls.

4. Transport infrastructure

Engineering construction on transport infrastructure includes roads, highways and subdivisions, bridges, including road, railway and elevated sections of them, railways and harbours. Construction in these areas totalled $2633.6 million in constant price terms in 2008-09 and $36,577.5 million in 2012-13. Construction fell from this peak to $21,330.9 million in 2015-16, increased to a new peak of $29,832.1 million in 2017-18 and fell to $27,975.4 million last year. These fluctuations were influenced by a number of factors, including in the private sector, construction to support resources projects. The best way to interpret the results is to examine each component separately.

Transport infrastructure is by far the largest component of infrastructure accounting for about half of the combined private and public sector engineering construction on infrastructure. In the private sector transport infrastructure was as high as 51.4% of infrastructure construction in 2011-12 but its share has steadily fallen over time. In 2018-19 it was 32.7%. In contrast, the share of transport infrastructure in public sector construction has increased. In 2008-09, it was 53.7% and rose to a peak of 66.1% in 2017-18. In 2018-19 it was 61.9%.

4.1 Roads infrastructure

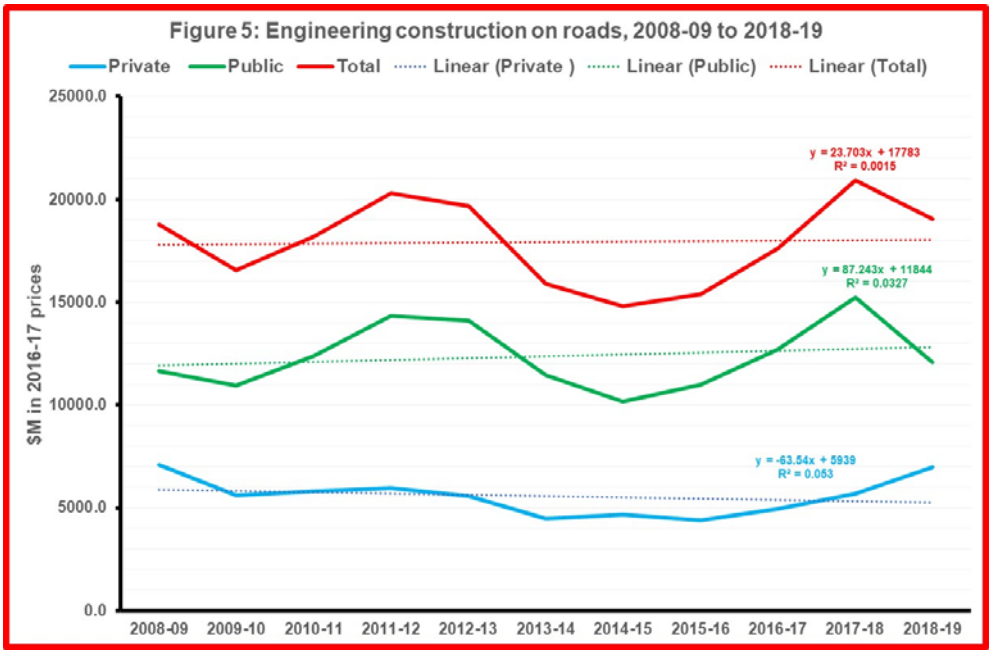
Building roads is the largest component of transport infrastructure in both sectors with the exception of a few years around 2012 when private sector construction on harbours peaked. Public sector construction has been much higher than that in the private sector, reflecting variability in timing of large projects such as toll roads.

In 2008-09, public sector road construction was $11,658.6 million in constant price terms. It fluctuated to a peak of $14,345.9 million in 2011-12, but then dropped off. It did not exceed that peak until 2017-18 when public sector road construction was $15,249.9 million in constant price terms. It was about 20% lower in 2018-19 at $12,070.6 million, just 3.5% higher than in 2008-09.

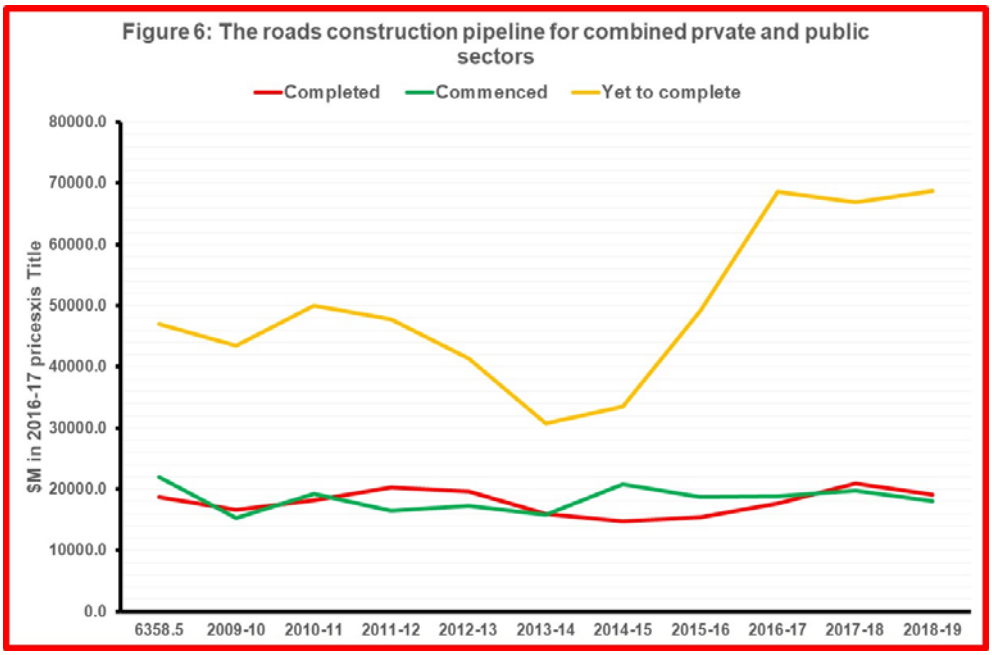
The trend in public sector road construction is shown in green in Figure 5. This shows a slow upwards trend of about 1.4% per year but characterised by very large fluctuations. The 2017-18 peak was above the trend line but 2018-19 was not.

Private sector engineering construction on roads was at its highest in 2008-09 at $7,103.5 million in constant price terms. It fell to a low of $4,456.2 million in 2013-14 and has steadily increased to be $6,972.1 million in 2018-19. Figure 5 shows a slight negative trend, again characterised by annual variability which was not as great as in the public sector.

Combined sector road construction reflects the combination of fluctuations in the individual trends. Peaks were recorded in 2011-12 ($20,282.8 million) and in 2017-18 (3.2% higher at $20,935.2 million). In 2018-19, combined sector road construction was $19,042.7 million in constant price terms, just 1.5$ higher than in 2008-09. The overall trend shown in red in Figure 5 was just rising.



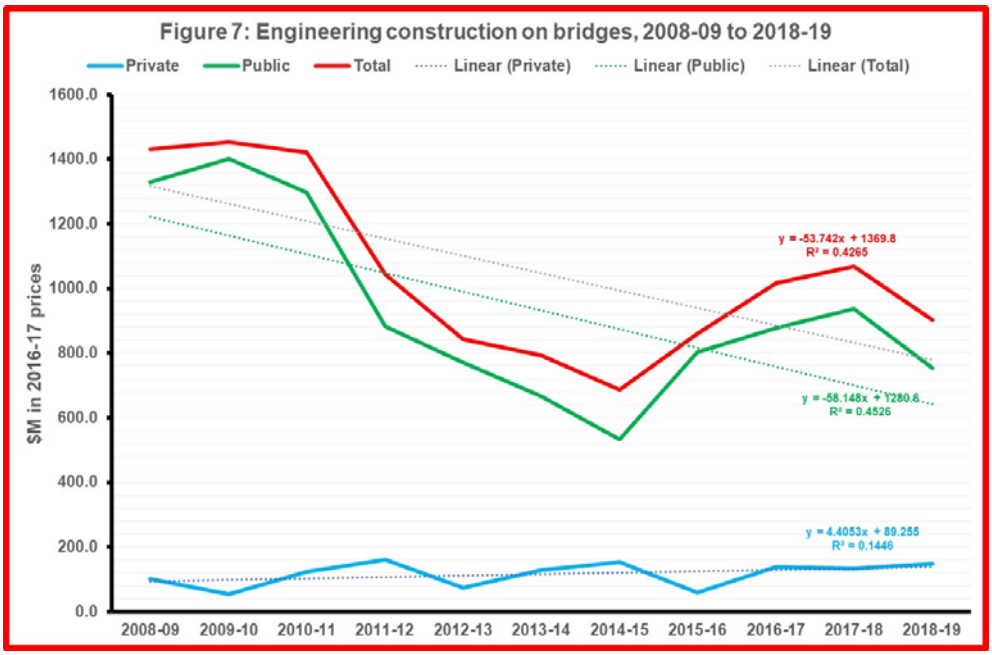
On average, about 21.8% of private sector engineering construction on infrastructure is on roads but almost twice as much is undertaken by the public sector for which the overage share is 40.4%. The two sectors combined account for 31.6% of engineering construction on infrastructure.

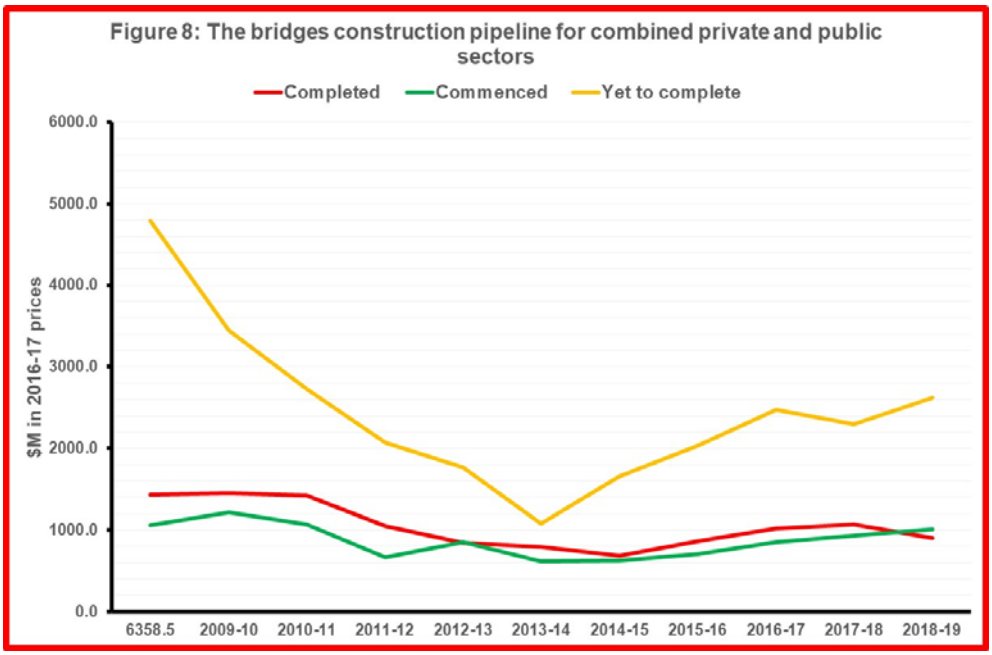


Insights into the future of road construction can be found in the trends illustrated in Figure 6 for the two sectors combined. The red lines in Figures 5 and 6 are the same with different scales, both show engineering construction completed on roads. The green line in Figure 6 shows the trend in new road construction commenced. In general, the commencement trend is similar to the completions trend. In 2018-19, both dipped downwards, but at the present rate of completions, new commencements represent about 0.9 years of work. There is a large amount of road construction underway that is yet to finish. At the present rate of completions this represents about 3.6 years of work. The rise in unfinished work reflects a number of large projects in the system, notably projects like WestConnex in Sydney. These figures suggest road construction is likely to continue at about the existing trend for the next 3 to 4 years unless there is a substantial increase in road construction during 2019-20 not yet reflected in current figures.

4.2 Bridge infrastructure

In 2018-19, private sector bridge construction was $148.9 million in constant price terms compared to $100.6 million in 2008-09 and a peak of $153.4 million in 2014-15. The result was the slightly increasing trend shown in blue in Figure 7.





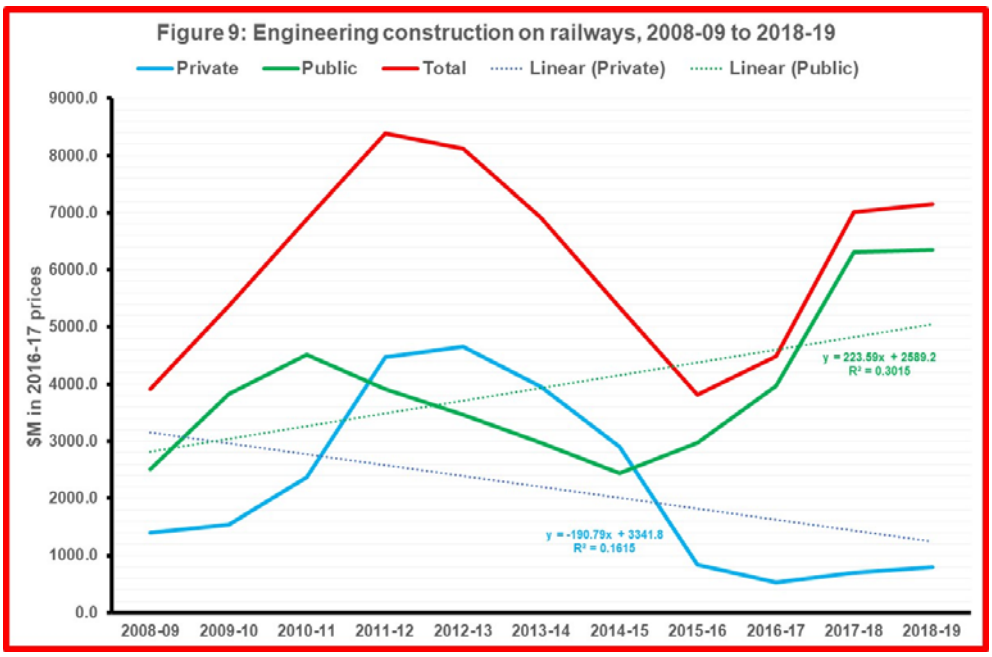
Public sector bridge construction has generally been higher. In 2008-09 it was $1,329.3 million in constant price terms falling to a low of $532.4 million in 2014-15. This low point never-the-less was almost 3½ times the highest construction level in the private sector. There followed a period of higher construction which reached $936.3 million in 2017-18 but fell back to $753.3 million in 2018-19. The resultant trend shown in green in Figure 7 is strongly downwards with similar large fluctuations to those observed in road construction.

The bridge construction pipeline is illustrated in Figure 8 again shows a close relationship between bridge construction completed and new commencements for the two sectors combined. In 2018-19, new commencements increased while completions fell but at the current level of completions, new commencements represent about 1.1 years of work. Unfinished bridge work in the system has been increasing since 2013-14 and increased in 2018-19

after a fall the previous year. At the present rate of completions, the current trend in bridge construction is likely to continue for the next three or so years.

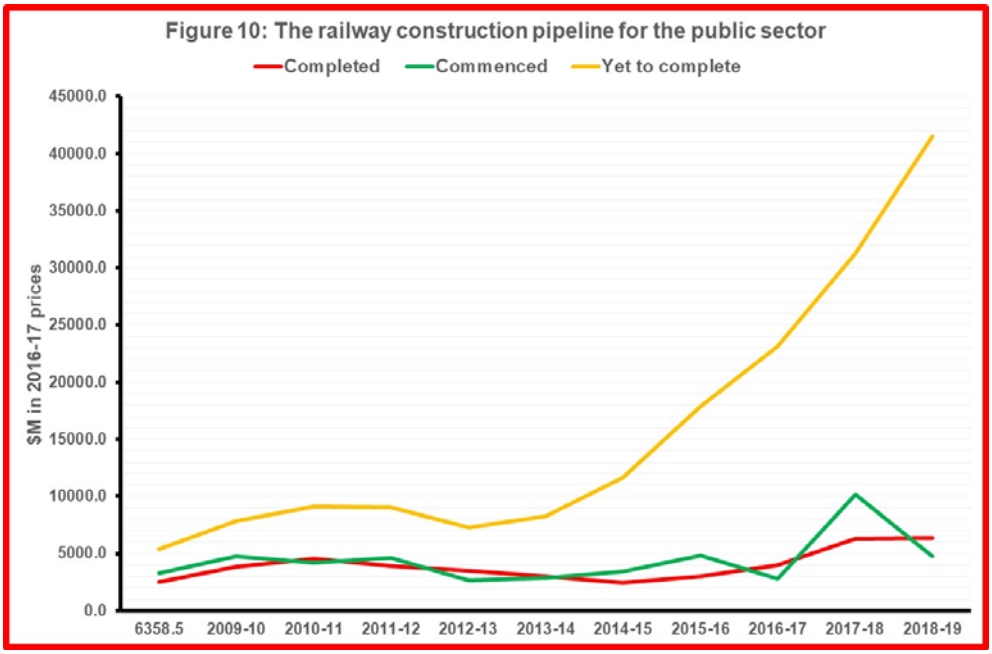
4.3 Railway infrastructure

Engineering construction statistics for private sector railways are complicated by the influence of the resource sector construction boom. In Figure 9 this is represented by the bulge in construction (blue line) between 2009-10 and 2015-16. In 2009-10, private sector railway construction was $1,540.0 million and at its peak in 2012-13 it was $4,658.7 million, about three times higher. At the conclusion of this period, private sector railway construction fell to levels well below 2008-09 values with a slowly increasing trend. In 2018-19 private sector railway construction was $794.3 million in constant price terms.



For this component of transport infrastructure, the better indicator of what has been happening in population areas is public sector engineering construction on railways. Broadly, there has been a solid upwards trend in public sector construction but again characterised by very large variability as illustrated in green in Figure 9. Public sector construction first peaked at $4,515.2 million in 2010-11 before falling fairly rapidly to a low of $2,435.5 million in 2014-15. Since then public sector railway construction has reversed the downwards plunge and increased to a new peak of $6,358.5 million in 2018-19, less than one percent higher than the previous year.

Inspection of the appendix Tables shows that the switch in construction between the private and public sectors continues to be evident in new construction commencements and unfinished work in the system both of which are dominated by the public sector. Therefore, in Figure 10 rather than consider the combined sectors construction pipeline, we look at the public sector alone.



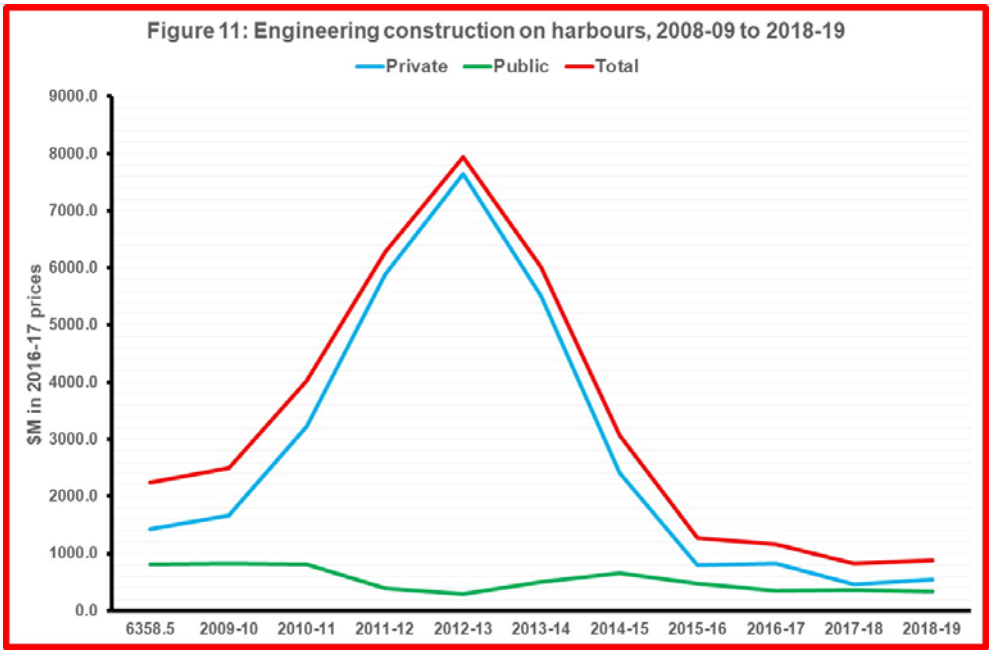
The red completions trend in Figure 10 corresponds to the public sector completions trend in Figure 9. New railway construction commencements once again are very similar to completions but with more decisive departures from the trend in recent years. New commencements fell in 2018-19 to $4,732.7 million which at the present level of public sector completions is about 0.7 years of work. The rapid increase in construction under way but yet to be completed shows that the projects that commenced were large. Indeed, in 2018-19 unfinished construction was $41,540.4 million in constant price terms, representing about 6.5 years of work at the present rate of completions.

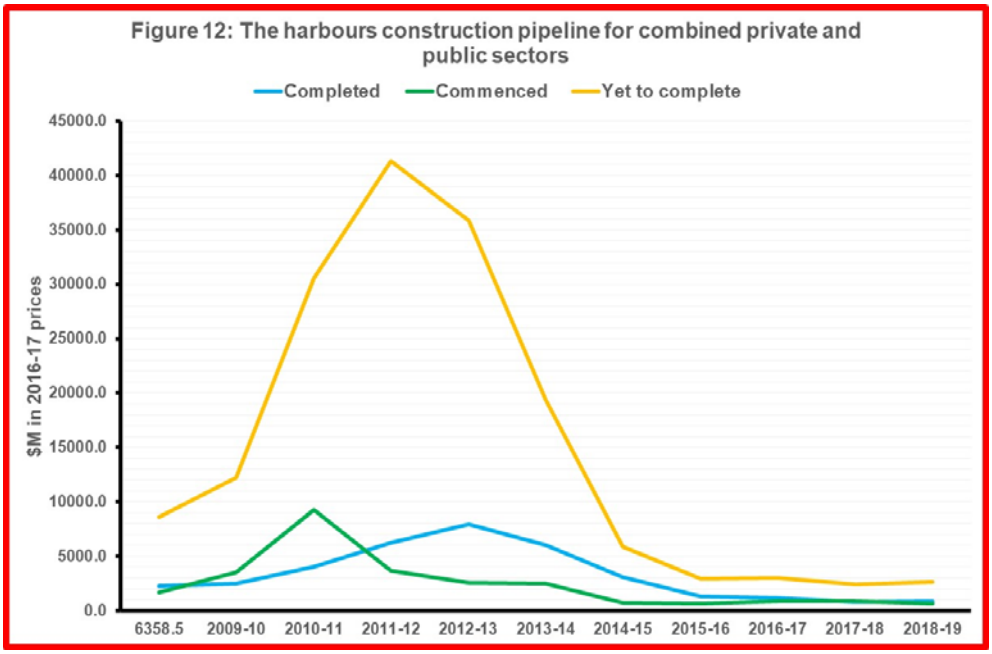
4.4 Harbour infrastructure

Construction of harbour infrastructure by the private sector is also dominated by the requirements of the resources boom. This is evident in Figure 11. From 2008-09 to 2012-13 there was a rapid increase in engineering construction on harbours to a peak of $7,648.4 million in constant price terms, followed by a similar falling trend as projects were completed. By 2015-16, private sector construction on harbours had fallen to $795.7 million and by 2018-19 had fallen even further to $537.3 million.

The sharp rise and fall of the private sector trend distorts the scale for the trend line for public sector engineering construction on harbours. For the first three years of the period examined annual public sector construction was over $800 million in constant price terms. However, in 2011-12 the level of construction halved and while there have been annual fluctuations, construction has not come close to recovering the scale in those first years. The best recorded was $657.4 million in 2014-15. In 2018-19, public sector engineering construction on harbours was $340.4 million.

These patterns are reflected in the combined private and public sectors harbours engineering construction pipeline which is illustrated in Figure 12. Once we moved past 2015-16, all three trends in the pipeline assumed fairly low level values. New commencements in 2018-19 were $666.4 million which at the current rate of completions of $877.7 million represents about 0.8 years of work. There was a comparatively large amount of construction underway yet to finish of $2,651.4 million which at the present rate of completions represents about three years work.

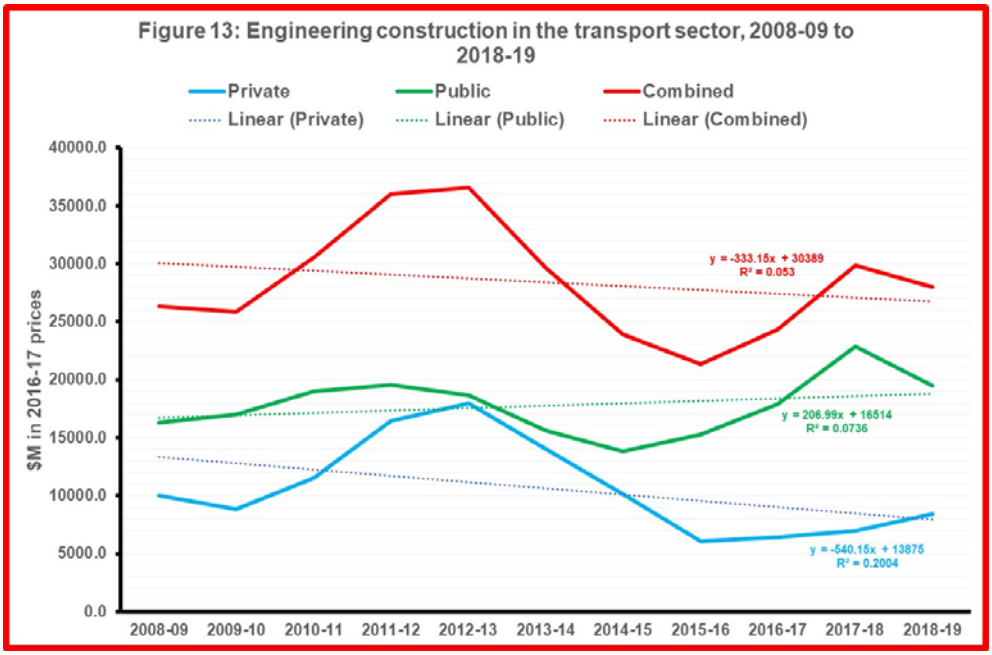




4.5 Transport infrastructure summary

When the four components of transport infrastructure are combined the trends illustrated in Figure 13 emerge. The dominant feature of transport engineering construction is road construction, but while in current price terms the volumes of construction completed may well show substantial increases, in constant price terms, construction volumes have increased more modestly. In the public sector, a slowly rising road construction trend has combined with a more vigorous upsurge in railway construction to produce the more decisive upwards trend illustrated in green in Figure 13. Construction on bridges and harbours have had only a minor influence on this trend.

In the private sector, the influence of the construction boom in the resources sector are clearly evident in figure 13 but were well and truly over by 2015-16. Although the overall trend is falling since 2015-16 it has been increasing mainly due to increased roads construction. Private sector construction on harbours, railways and bridges makes just a small contribution. The main issue here is the large reduction in construction from the peak in 2012-13 and its impact on overall demand in the economy.



We need to bear in mind that the way that the statistics are compiled means that private sector construction on contracts issued by the public sector is actually included as part of the public sector statistics. In other words, part of the construction capacity freed up when the resources boom hump passed is included in the rising public sector trend. Overall not all the freed capacity has been utilised and may have been diverted into other areas.

The construction pipelines for the components of transport infrastructure show in particular large amounts of unfinished construction on roads and railways. Compared to past levels these are comparatively large and whether they result in construction pressures depends upon planned work schedules. For road construction there was 3.6 years of work outstanding and for railways 6.5 years at the present rate of completions in the respective sectors. For roads this is not exceptional but perhaps for railways there may be pressure to complete sooner. In other words, future increases in transport infrastructure completed could increase as a result of any pressure. Future allocations of infrastructure funds will also have an impact but until something from new projects hits the ground, cannot be assessed.

5. Water and sewerage infrastructure

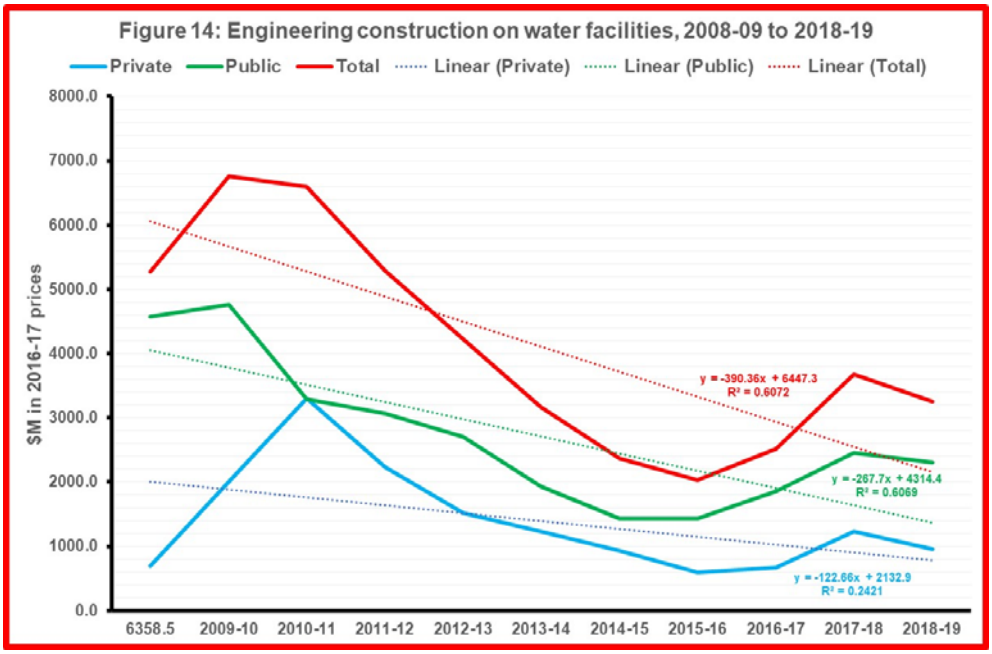
This group of infrastructure includes all aspects of water storage and supply intended for residential, commercial and industrial use. It also includes sewerage systems and treatment plants and stormwater systems, including recycling systems. On average it has accounted for 7.8% of private sector engineering construction on infrastructure, 15.9% of public sector construction and 12.2% overall.

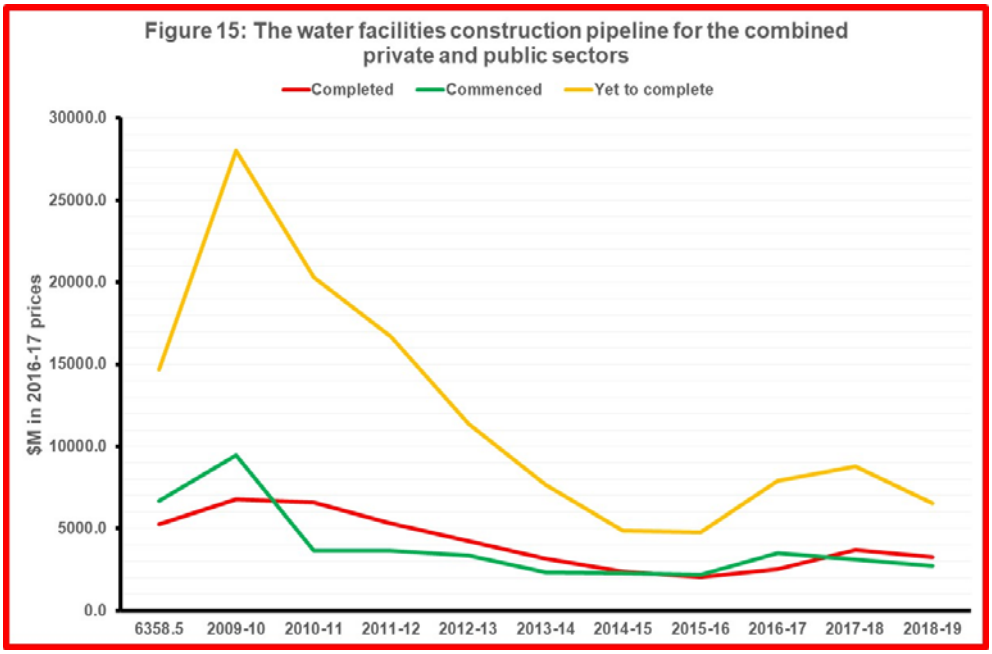
5.1 Water infrastructure

Trends in engineering construction on water infrastructure are illustrated in Figure 14. Each of the three trends illustrated are falling solidly. Private sector construction was strong between 2009 and 2012 and has not returned to these values since. In 2018-19 private sector engineering construction on water infrastructure was $957.0 million in constant price terms.

Generally public sector engineering construction on water infrastructure was much higher. During the first few years of the period examined the large amounts involved reflected the construction of water desalination plants in several capital cities as responses to the millennium drought. There was a prolonged period of falling construction which came to an end in 2015-16 when construction was $1,433.7 million. Since then there were two years of

increased construction to $2,451.5 million in 2017-18 before falling to $2,302.0 in 2018-19. The increase in construction since 2014-15 has not been sufficient to offset the earlier falls.

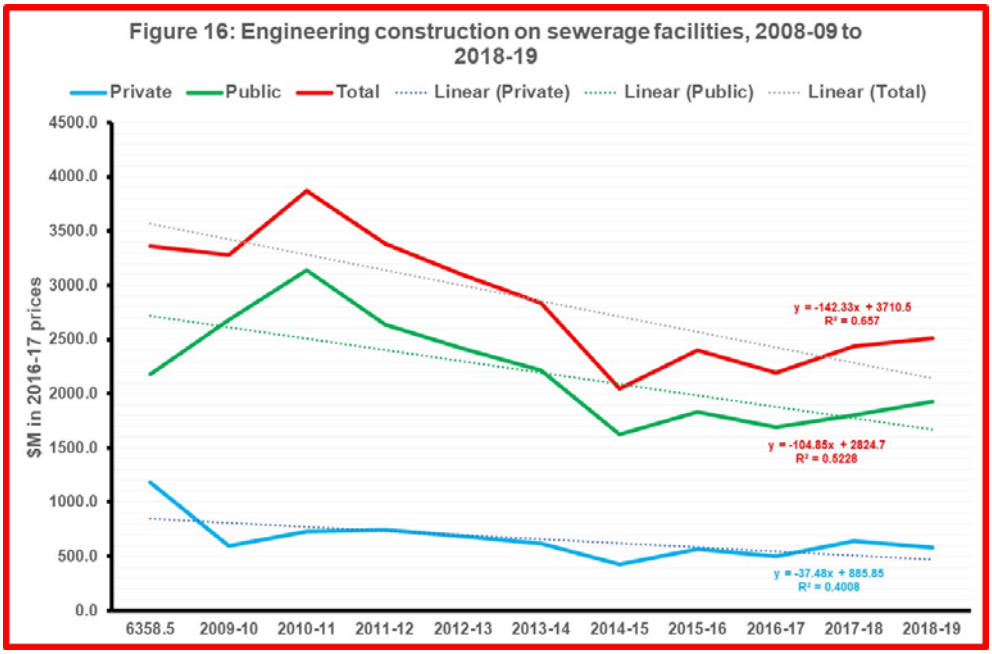


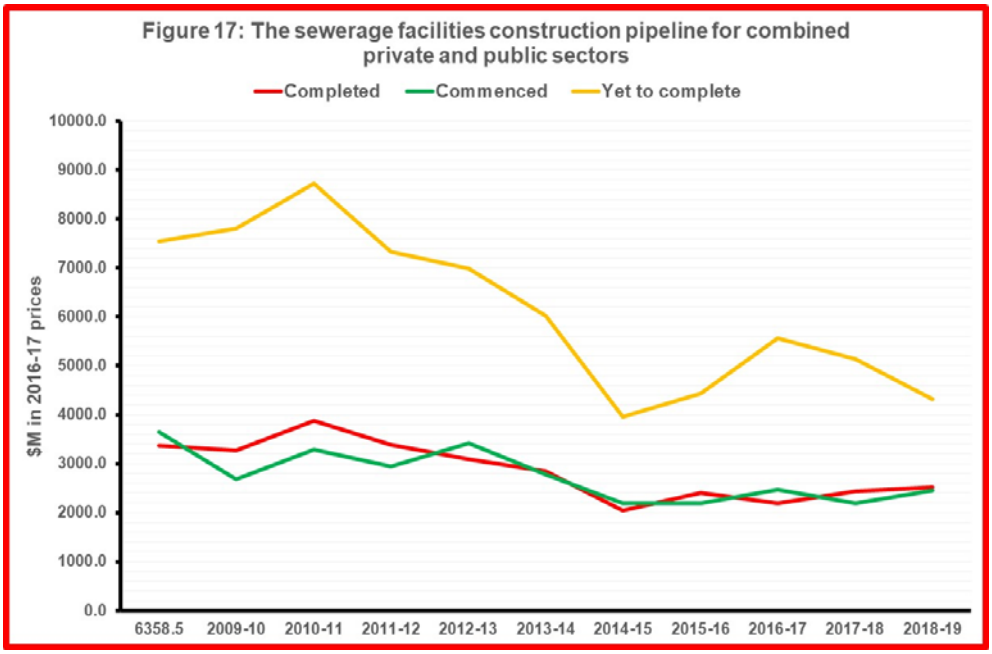


The water infrastructure engineering construction pipeline for the two sectors combined does not suggest that change is on the way. In 2018-19, new construction commencements were $2,700.5 million which at the current level of completions was about 0.8 years of work. There was $6,512.7 million in unfinished work in the system and the level has been falling. This amount of work represents 2 years of work at the present level of completions. These results suggest that the present downwards trend is likely to continue with some fluctuations possible.

5.2 Sewerage infrastructure

Both the private and public sector trends in engineering construction on sewerage and drainage systems are downwards. As Figure 16 shows, both trends were mainly determined by a sharp reduction in annual construction between 2008-09 and 2014-15. Thereafter both trends moved moderately upwards but only sufficiently to increase back to their values around 2015-16. As was the case with water infrastructure, public sector construction was over twice as large as that in the private sector.

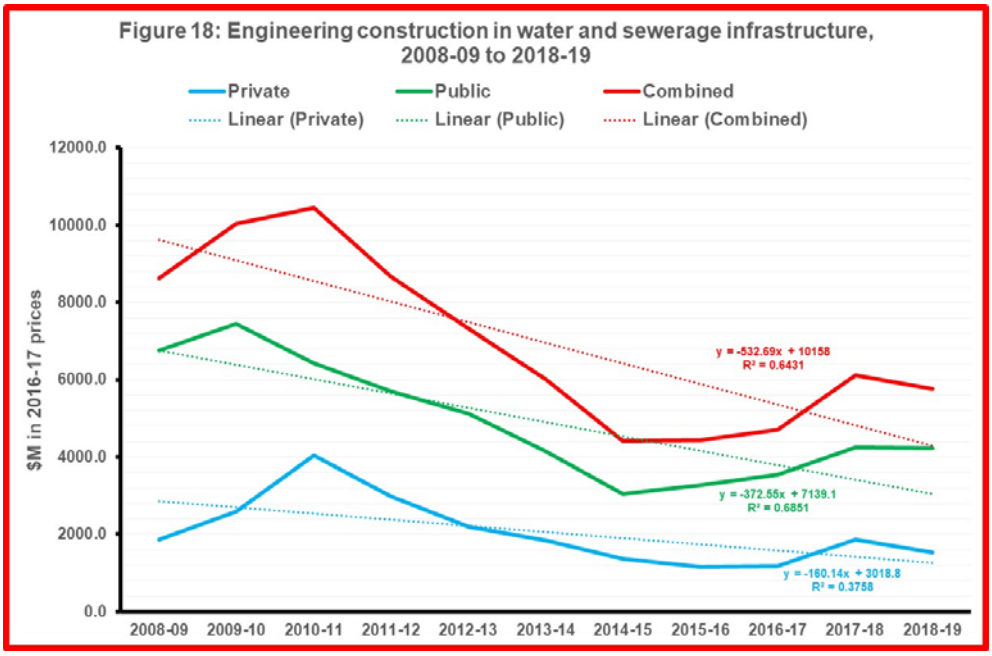




The sewerage engineering construction pipeline for combined private and public sectors is illustrated in Figure 17 with the completions trend corresponding to that in Figure 16. Since 2014-15 sewerage commencements have been relatively steady in the low to mid $2,000 million. In 2018-19 they were $2,445.4 million which corresponds to about one year's work at the present rate of completions. Unfinished construction in the system has been falling and only 2014-15 has been lower. In 2018-19 it was $4,322.1 million in constant price terms, representing about 1.7 years work.

5.3 Water and sewerage summary

Engineering construction on water and sewerage infrastructure has been trending downwards for both sectors. In both cases there was a recovery from about 2015-15. For water infrastructure this recovery stalled in 2017-18 with falls the following year. For sewerage, the recovery in public sector construction continues but that in the private sector has stalled.



When taken together as in Figure 18 we observe that the downward influences on private sector construction is sufficient to offset the upward influences in the public sector. Considering the two pipelines, these results suggest that water and sewerage engineering construction is likely to continue to contract.

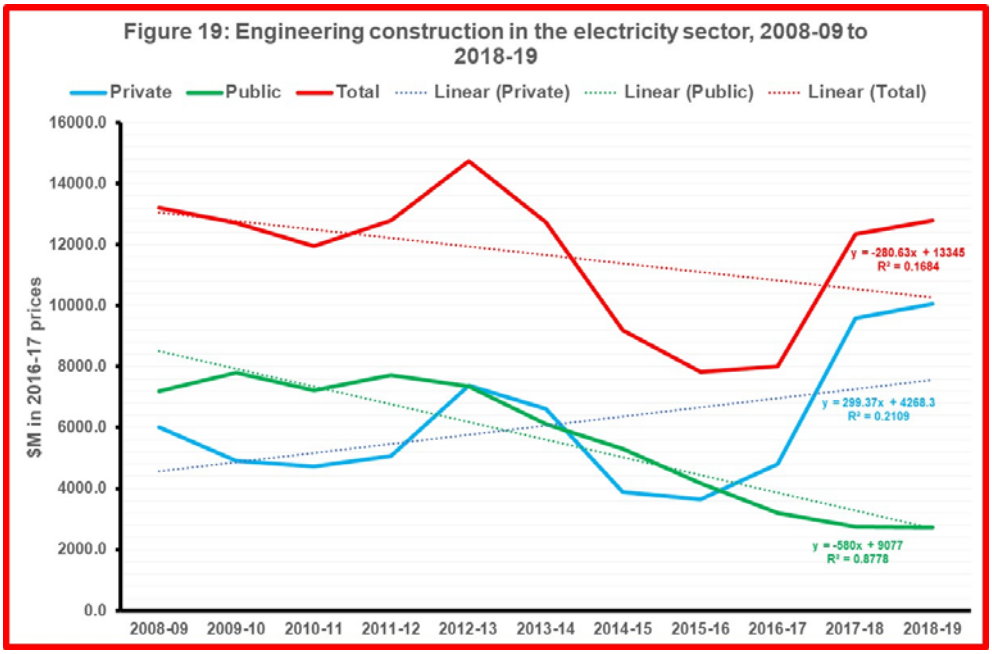
6. Energy infrastructure

Energy infrastructure comprises all assets related to electricity generation, transmission and distribution and pipelines carrying oil, gas and refined petrol. Pipelines also includes some chemical and foodstuffs pipelines mainly in manufacturing industries. Construction in the electricity sector is shared between private and public sectors but almost all pipelines construction is by the private sector. Overall energy infrastructure has averaged one quarter of engineering construction on infrastructure made up of two countervailing trends; the energy share of private sector construction has averaged 33.8% and is rising so that in 2018-19 it was 45.4%; however, the average public sector share of 18.4% has been falling with just 8.6% in 2018-19.

6.1 Electricity infrastructure

Private sector engineering construction in the electricity sector experienced a surge in construction between 2011-12 and 2013-14 relate to construction of transmission facilities. For the next two years construction contracted but from 2015-16 it began to increase strongly, and this trend has continued through to 2018-19. The resultant overall trend has been increasing and is illustrated in Figure 19. The upsurge reflects the increased interest of the private sector in renewables.

In contrast the public sector construction trend has been solidly downwards with a hump in construction coinciding with public sector involvement in transmission line upgrades. This trend reflects public sector movement out of historical roles in the electricity sector.



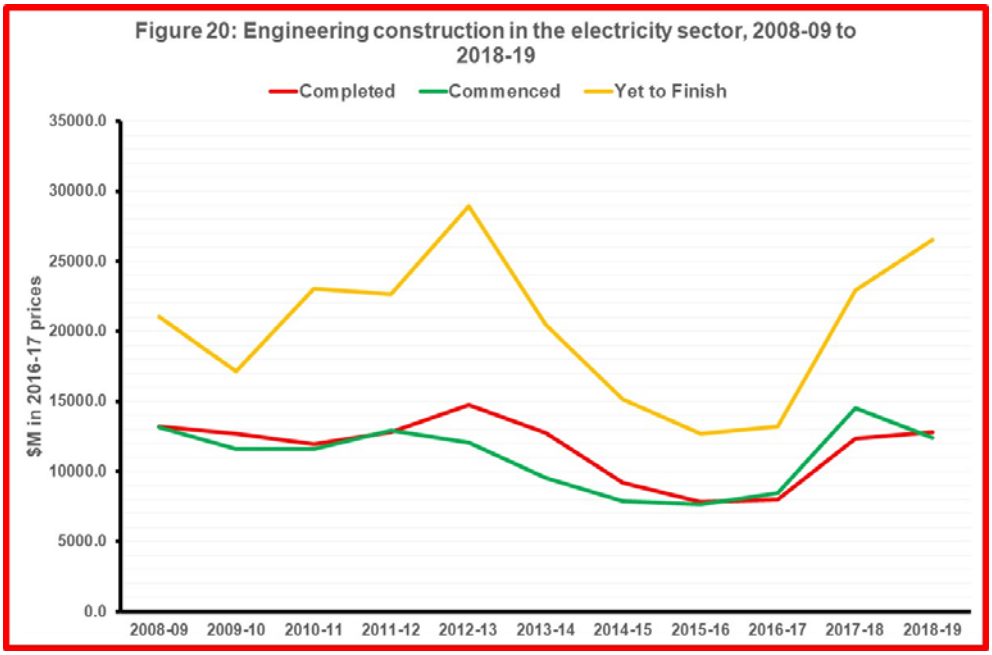
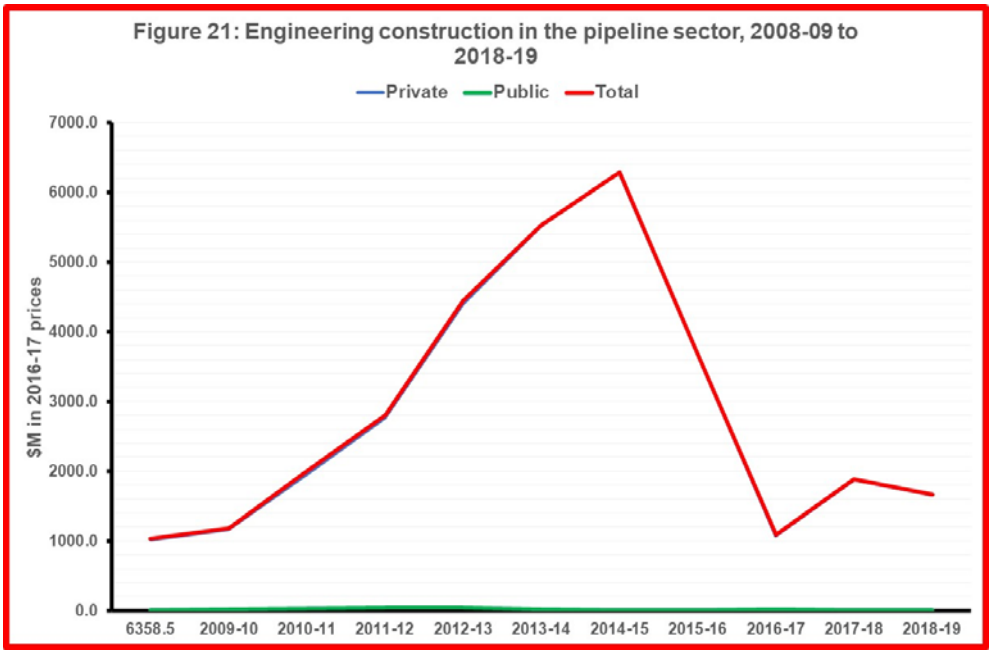


Figure 20 shows that electricity sector new construction commencements increased until 2017-18 with a fall in 2018-19. Commencements that year were $12,416.0 million in constant prices terms, representing about one year's work. The amount of unfinished work in the system has been increasing and in 2018-19 was $26,560.7 million, about 2.1 years of work.

6.2 Pipeline infrastructure

Figure 21 demonstrates the point made earlier that practically all pipeline construction has been by the private sector. We can go further and say that nearly all the work carried out was related to Australia's natural gas reticulation system between gas basins, ports and consumer destinations. This work was mainly carried out during the resources boom and is now behind us. In 2018-19, however, engineering construction valued at $1,658.0 million in constant price terms was undertaken on pipelines.

In 2018-19 new construction commenced on pipelines was $1,298.5 million in constant price terms, representing about 0.8 years of work. Unfinished construction was a little higher at $1,709.5 million in constant price terms which was a little over one year's work.



6.3 Energy summary

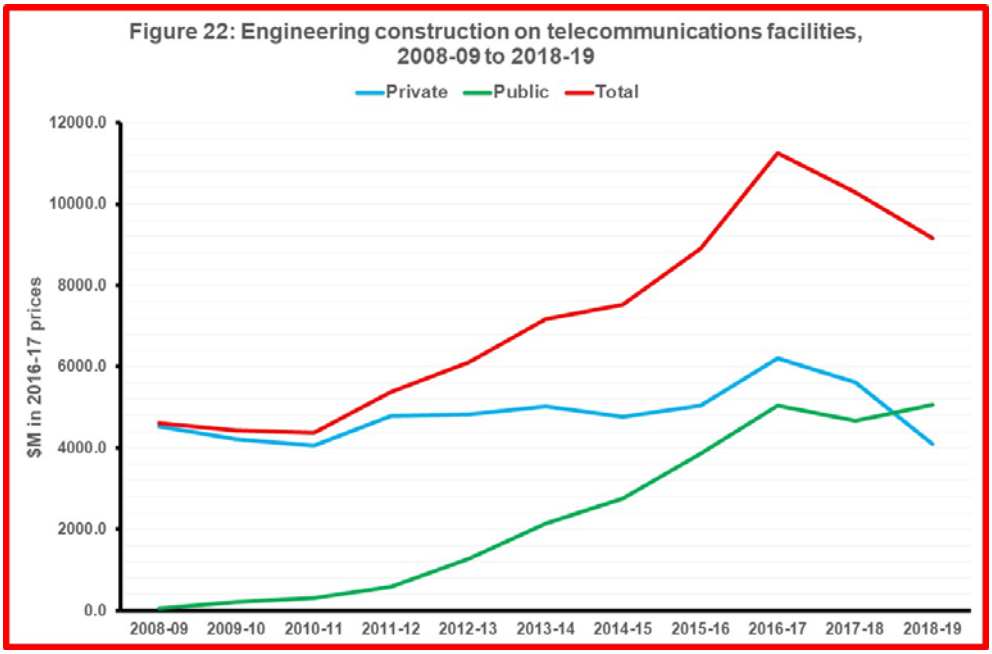
Little is likely to change in respect to pipeline construction and the current trend is likely to continue. This suggests that construction in the electricity sector is likely to be more important. Although commentators indicate that investment is stifled by confusion in respect to electricity policy, Figure 20 suggests that engineering construction is likely to continue growing for at least another two or so years.

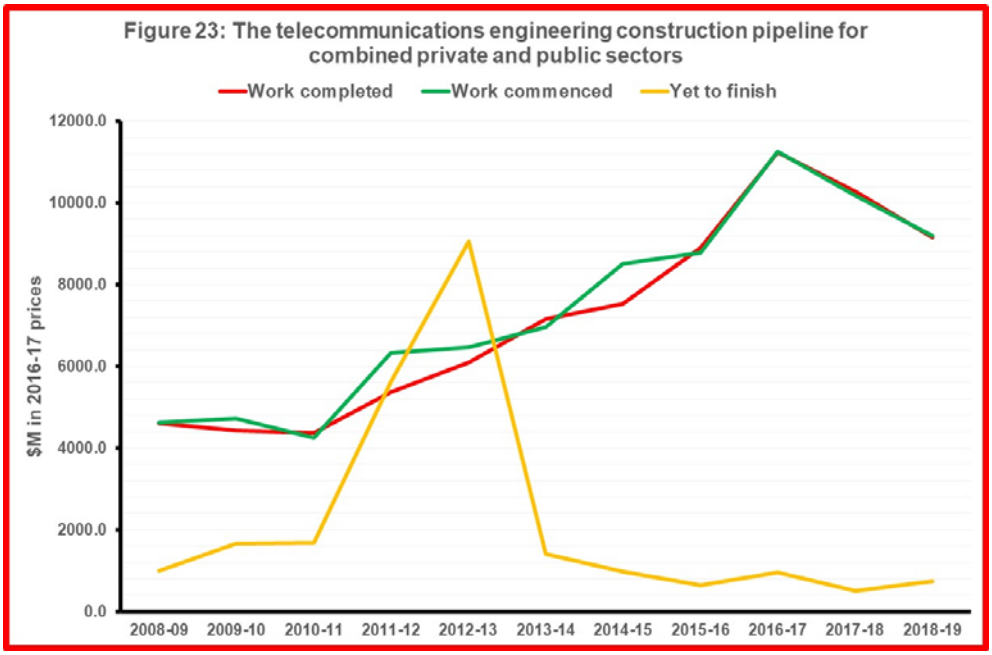
7. Telecommunications infrastructure

In Figure 22 the low base for public sector engineering construction on telecommunications reflects the privatisation of Telstra several years earlier and the start-up of the NBN Company. The subsequent construction trend was strongly upwards until 2016-17 at $5,033.5 million in constant price terms when it plateaued. In 2018-19 engineering construction completed was $5,053.3 million.

Private sector construction reflects continuation of the (now) privatised Telstra on fixed line and mobile facilities together with the corresponding construction activities of other Telcos. Construction completed was relatively high in 2008-09 at $4,536.1 million and fluctuated upwards to peak at $6,210.2 million in 2016-17 and has since fallen. In 2018-19 the construction completed had fallen to $4,104.5 million.

Like other categories of engineering construction, the trends for work completed and new work commenced are very similar in telecommunications. This is illustrated in the combined sectors pipeline diagram Figure 23. New commencement steadily increased over time to peak at $11,261.8 million in constant price terms in 2016-17 but has fallen in each of the two years since to be $9,200.3 million in 2018-19. An unusual feature is the comparatively low levels of unfinished construction in the system in recent years. This suggests that new work is started largely on the basis that it can be completed within a year.





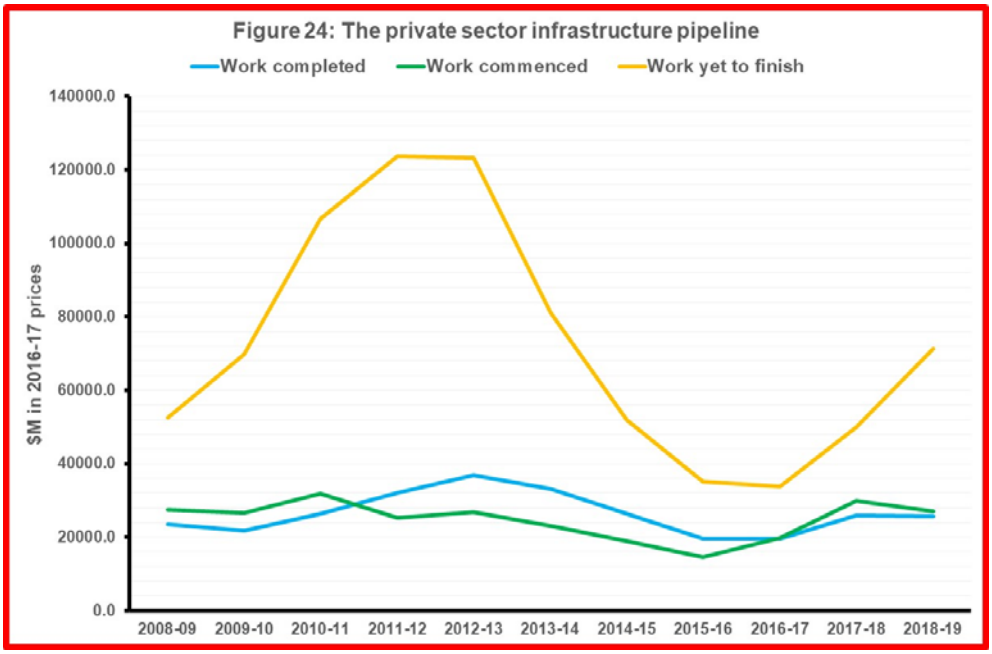
Given the congruence between completions and new commencements and the falling trend in the latter, it is likely that engineering construction on telecommunications will fall in line with commencements over coming years.

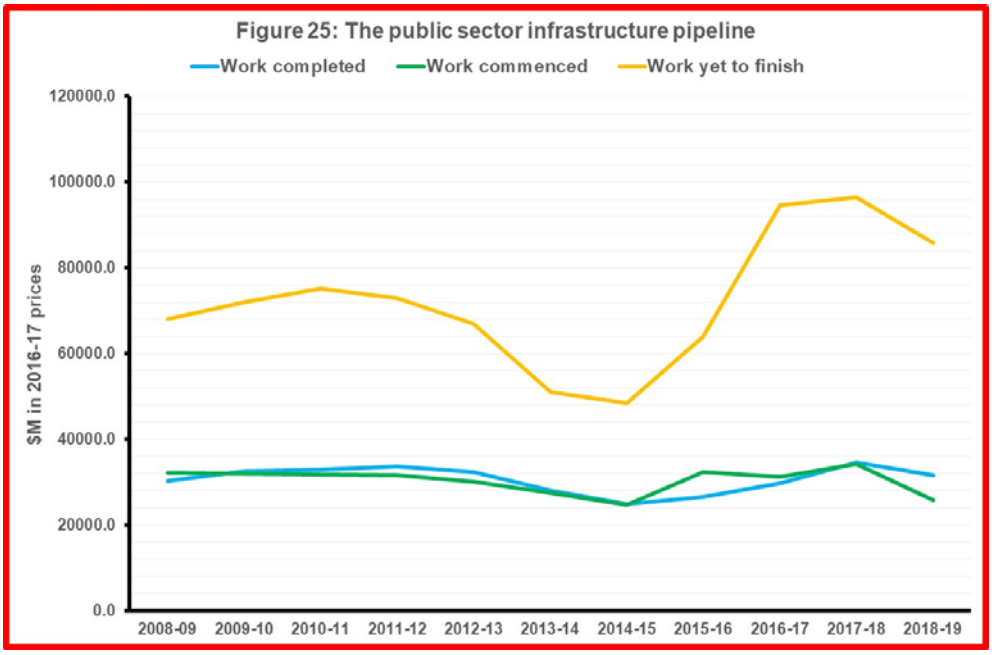
8. Implications for future infrastructure construction

Figure 24 is the composite engineering construction pipeline for private sector infrastructure. Work completed in 2018-19 was $25,814.6 million, about 0.4% lower than in 2017-18. New commencements were $27,103.5 million, down about 9.3% on the previous year. About 87% of the new commencements were in roads ($9,754.7 million or 36%), electricity ($9,830.0 million or 36.3%) and telecommunications ($4,077.1 million or 15.0%).

In contrast, there was a 43% increase in unfinished work in the system, up from $49,865.5 million in 2017-18 to $71,411.6 million in 2018-19. Over 88% of the unfinished work is concentrated in roads ($39,477.4 million or 55%) and electricity ($24,181.0 million or 33.9%).

Based on these figures it is highly likely than engineering construction on roads and electricity by the private sector will increase in the next two years and the increase is likely to be large enough to increase private sector engineering construction on infrastructure overall.





In the public sector, engineering construction completed on infrastructure in 2018-19 fell by 8.7% to $31,535.8 million in constant price terms easing some pressure on construction systems. New commencements fell by 24.6% to $25,710.2 million, also suggesting some easing. Just over 70% of new commencements were from three areas; roads ($8,297.7 million or 32.3%), railways ($4,732.7 million or 18.4%) and telecommunications ($5,123.3 million or 19.9%).

However, despite a fall of 11% in unfinished work in the system, the amount outstanding was a whopping $85,821.4 million concentrated on roads ($29,303.1 million or 34.1%) and railways ($41,540.4 million or 48.4%).

Overall these figures suggest that public sector engineering construction on infrastructure could rise in the next two years at least.

These figures suggest that there are likely to be pressures in road and railway construction in the coming years with substantial new commencements and very large amounts of unfinished work. Construction in electricity is also looming as another pressure area with substantial new commencements and unfinished work in the private sector.

Table 1: Engineering construction on infrastructure completed, 2008-09 to 2018-19, $M in 2016-17 prices

Year	Roads	Bridges	Railways	Harbours	Water	Sewerage	Electricity	Pipelines	Telecomm's	Infrastructure	Recreation	Resources	Heavy industry	Other	Bal. Construction	Total construction
Private sector																
2008-09	7103.5	100.6	1403.1	1431.4	690.5	1181.7	6009.6	1016.7	4536.1	23473.2	1418.1	28043.1	1329.1	1444.0	32234.2	55707.4
2009-10	5608.9	53.3	1540.0	1670.2	1999.5	595.6	4911.7	1164.1	4214.0	21757.3	1749.0	27911.6	569.3	1474.9	31704.9	53462.2
2010-11	5817.8	123.2	2375.2	3221.5	3303.5	731.0	4718.3	1956.1	4064.6	26311.3	1785.0	32425.1	958.5	879.0	36047.6	62359.0
2011-12	5936.9	161.1	4474.8	5892.2	2229.4	744.3	5060.2	2761.6	4792.8	32053.3	2076.8	60411.7	987.5	1524.9	65000.9	97054.2
2012-13	5567.1	72.7	4658.7	7648.4	1520.4	683.3	7388.5	4401.6	4823.4	36764.2	2566.8	64677.6	1480.8	2707.4	71432.7	108197.0
2013-14	4456.2	127.9	3954.0	5505.5	1232.6	619.3	6617.0	5517.3	5015.3	33045.1	2652.5	68269.3	1266.2	1753.8	73941.8	106986.9
2014-15	4652.9	153.4	2906.7	2414.2	937.1	426.4	3893.3	6277.0	4770.2	26431.2	2477.3	57076.1	877.4	1185.0	61615.7	88046.9
2015-16	4400.2	59.4	837.8	795.7	595.5	565.4	3650.2	3674.0	5050.2	19628.6	2777.1	44340.4	594.6	798.2	48510.3	68138.9
2016-17	4934.5	139.2	523.8	823.0	670.7	501.9	4808.9	1078.3	6210.2	19690.3	2408.9	32515.4	659.0	832.7	36416.1	56106.4
2017-18	5685.2	132.8	699.2	462.6	1230.6	638.5	9593.2	1872.5	5607.8	25922.4	2773.6	39140.3	731.9	687.3	43333.1	69255.4
2018-19	6972.1	148.9	794.3	537.3	957.0	583.2	10059.3	1658.0	4104.5	25814.6	2701.8	21853.5	709.8	693.1	25958.2	51772.7
Public sector																
2008-09	11658.6	1329.3	2505.9	807.1	4578.8	2181.5	7202.8	12.3	63.8	30340.2	1044.0	273.1	3.8	296.5	1617.4	31957.6
2009-10	10942.1	1400.6	3834.5	822.1	4759.5	2683.5	7796.3	17.0	208.1	32463.7	1254.1	191.7	10.3	276.4	1732.4	34196.1
2010-11	12370.0	1297.5	4515.2	805.5	3287.4	3138.3	7223.3	36.7	303.9	32977.9	1431.2	63.5	8.7	123.4	1626.7	34604.7
2011-12	14345.9	883.2	3912.8	386.2	3061.5	2639.3	7733.9	38.9	578.7	33580.4	1188.4	36.7	3.4	117.1	1345.6	34926.0
2012-13	14109.9	770.3	3465.1	285.2	2700.1	2412.3	7343.9	46.1	1279.6	32412.5	1576.3	191.2	51.2	222.9	2041.6	34454.1
2013-14	11447.8	665.9	2966.3	506.0	1932.4	2219.3	6120.5	14.6	2147.1	28019.9	1776.2	153.5	55.7	118.0	2103.3	30123.3
2014-15	10162.7	532.4	2435.5	657.4	1430.9	1621.4	5296.4	10.1	2761.9	24908.6	1264.6	141.5	24.5	104.0	1534.7	26443.4
2015-16	10985.4	802.0	2969.8	480.4	1433.7	1835.3	4174.1	12.8	3858.9	26552.4	1223.9	190.4	28.5	68.6	1511.4	28063.8
2016-17	12694.6	877.9	3965.6	340.6	1852.0	1690.7	3189.1	17.2	5033.5	29661.2	1412.9	225.6	30.7	283.4	1952.6	31613.8
2017-18	15249.9	936.3	6308.6	357.5	2451.5	1799.4	2763.8	10.6	4676.4	34554.0	1739.7	209.9	33.7	453.0	2436.3	36990.3
2018-19	12070.6	753.3	6358.5	340.4	2302.0	1930.5	2722.9	4.4	5053.3	31535.8	1497.7	163.1	73.8	246.4	1980.9	33516.7
Combined sectors																
2008-09	18762.1	1430.0	3909.0	2238.5	5269.3	3363.2	13212.4	1029.0	4600.0	53813.5	2462.0	28316.2	1332.9	1740.4	33851.6	87665.0
2009-10	16551.1	1453.9	5374.5	2492.3	6759.0	3279.1	12708.0	1181.0	4422.1	54221.0	3003.1	28103.3	579.6	1751.2	33437.3	87658.3
2010-11	18187.9	1420.7	6890.4	4027.0	6590.9	3869.3	11941.7	1992.9	4368.6	59289.3	3216.2	32488.6	967.1	1002.4	37674.4	96963.6
2011-12	20282.8	1044.3	8387.6	6278.4	5290.9	3383.6	12794.0	2800.5	5371.5	65633.7	3265.2	60448.4	990.9	1642.1	66346.5	131980.2
2012-13	19677.0	843.1	8123.8	7933.6	4220.5	3095.6	14732.4	4447.7	6103.1	69176.8	4143.1	64868.8	1532.1	2930.3	73474.3	142651.1
2013-14	15904.0	793.8	6920.3	6011.5	3165.1	2838.7	12737.5	5531.9	7162.3	61065.1	4428.7	68422.7	1321.8	1871.9	76045.1	137110.2
2014-15	14815.6	685.7	5342.2	3071.6	2368.0	2047.8	9189.6	6287.1	7532.2	51339.8	3741.9	57217.6	901.9	1289.0	63150.4	114490.3
2015-16	15385.7	861.4	3807.6	1276.2	2029.2	2400.7	7824.3	3686.8	8909.1	46181.0	4001.0	44530.8	623.0	866.9	50021.7	96202.7
2016-17	17629.1	1017.1	4489.4	1163.5	2522.7	2192.6	7997.9	1095.5	11243.7	49351.5	3821.8	32741.0	689.7	1116.1	38368.7	87720.2
2017-18	20935.2	1069.1	7007.8	820.1	3682.1	2437.9	12357.0	1883.1	10284.1	60476.3	4513.3	39350.2	765.6	1140.3	45769.4	106245.7
2018-19	19042.7	902.2	7152.9	877.7	3259.0	2513.7	12782.1	1662.4	9157.8	57350.4	4199.4	22016.6	783.5	939.5	27939.1	85289.4

Table 2: Engineering construction on infrastructure commenced, 2008-09 to 2018-19, $M in 2016-17 prices

Year	Roads	Bridges	Railways	Harbours	Water	Sewerage	Electricity	Pipelines	Telecomm's	Infrastructure	Recreation	Resources	Heavy industry	Other	Bal. Construction	Total construction
Private sector																
2008-09	9941.3	65.0	2166.9	1411.2	1298.3	900.4	5754.9	1281.0	4557.7	27376.8	1622.6	18597.1	1811.2	2693.0	24723.8	52100.6
2009-10	4224.2	53.7	706.8	3137.0	5228.0	599.5	4013.9	4497.1	4199.7	26659.9	1960.8	61581.8	737.6	1189.6	65469.8	92129.7
2010-11	5500.0	177.2	4303.6	8737.9	1660.3	686.8	4020.8	2603.2	4207.0	31896.9	2090.2	54788.0	669.8	840.2	58388.2	90285.1
2011-12	5469.3	100.9	2575.1	3401.7	832.0	706.9	4423.4	2846.0	4927.5	25282.8	2345.8	60717.1	970.0	2710.6	66743.6	92026.4
2012-13	5613.8	64.5	1271.5	2014.6	697.3	695.1	4902.2	6937.7	4628.5	26825.1	2611.5	61752.7	1495.7	1651.6	67511.4	94336.5
2013-14	4505.3	124.5	3956.5	1348.9	712.3	494.3	3911.2	3199.0	4870.3	23122.2	2591.8	23877.2	924.6	1851.5	29245.0	52367.2
2014-15	8242.4	199.8	628.2	365.3	582.0	353.0	2809.0	1170.3	4663.9	19013.8	2495.9	12369.7	633.1	460.6	15959.3	34973.1
2015-16	3348.3	113.2	419.4	346.7	451.7	578.2	3574.7	878.0	4926.7	14636.7	2945.6	14050.0	497.7	674.2	18167.5	32804.2
2016-17	3859.6	118.7	952.5	666.7	862.0	518.6	5486.6	1196.9	6257.5	19919.0	2565.5	12634.9	981.9	830.9	17013.2	36932.2
2017-18	8901.2	150.3	401.7	262.3	891.7	458.4	11458.9	1852.1	5510.4	29887.1	2970.4	30166.4	552.2	593.4	34282.4	64169.6
2018-19	9754.7	224.6	296.2	464.3	654.5	509.0	9830.0	1293.1	4077.1	27103.5	2798.4	21515.6	426.3	589.3	25329.6	52433.1
Public sector																
2008-09	12048.2	991.0	3269.6	272.1	5361.9	2754.5	7418.1	13.0	76.7	32205.3	997.5	221.9	11.7	420.3	1651.4	33856.6
2009-10	11117.4	1160.7	4781.2	358.5	4238.6	2085.7	7614.2	17.7	529.8	31903.8	1102.0	85.2	11.0	283.1	1481.4	33385.2
2010-11	13780.4	887.6	4221.0	559.7	2014.6	2594.0	7605.9	33.9	54.8	31752.0	1334.4	72.1	7.3	134.5	1548.3	33300.3
2011-12	11066.3	565.6	4624.9	287.3	2796.1	2239.3	8498.4	20.2	1406.8	31505.0	1057.8	91.4	0.7	179.1	1328.9	32833.9
2012-13	11694.3	787.3	2633.9	525.0	2639.5	2724.5	7156.2	35.3	1841.0	30036.9	1607.7	108.7	56.3	119.6	1892.3	31929.2
2013-14	11323.4	487.5	2852.9	1112.2	1607.9	2289.7	5635.2	30.6	2096.8	27436.2	1865.3	134.8	54.6	137.8	2192.3	29628.5
2014-15	9017.2	818.9	3442.4	243.8	1656.8	1849.7	4922.9	28.7	2710.5	24691.0	1452.3	157.2	17.2	83.8	1710.6	26401.6
2015-16	15348.7	592.1	4810.7	293.4	1718.9	1617.5	4087.0	13.1	3865.1	32346.6	1271.0	188.3	55.5	534.5	2049.2	34395.8
2016-17	14937.7	734.4	2764.8	230.7	2662.2	1957.0	2979.1	27.3	5004.3	31297.5	1610.3	216.1	14.4	143.6	1984.4	33281.9
2017-18	10845.0	781.9	10143.8	599.3	2243.5	1731.3	3088.7	6.5	4676.2	34116.0	1745.0	202.2	54.4	35.7	2037.3	36153.3
2018-19	8289.7	788.8	4732.7	202.1	2046.1	1936.3	2586.0	5.4	5123.3	25710.2	1479.3	160.0	165.4	76.9	1881.5	27591.8
Combined sectors																
2008-09	21989.6	1056.1	5436.5	1683.3	6660.3	3654.9	13173.0	1294.0	4634.4	59582.0	2620.1	18819.0	1822.9	3113.2	26375.2	85957.2
2009-10	15341.6	1214.4	5488.0	3495.5	9466.6	2685.3	11628.2	4514.8	4729.5	58563.7	3062.8	61667.0	748.7	1472.7	66951.2	125514.9
2010-11	19280.4	1064.8	8524.6	9297.6	3675.0	3280.9	11626.7	2637.1	4261.9	63649.0	3424.6	54860.0	677.1	974.8	59936.4	123585.4
2011-12	16535.6	666.5	7200.0	3688.9	3628.0	2946.2	12921.9	2866.2	6334.3	56787.7	3403.5	60808.6	970.7	2889.7	68072.5	124860.3
2012-13	17308.1	851.8	3905.4	2539.6	3336.8	3419.5	12058.4	6973.0	6469.4	56861.9	4219.2	61861.4	1551.9	1771.2	69403.7	126265.7
2013-14	15828.7	612.0	6809.4	2461.1	2320.2	2783.9	9546.5	3229.6	6967.0	50558.4	4457.0	24011.9	979.1	1989.2	31437.3	81995.7
2014-15	20753.7	629.2	3898.1	738.5	2305.8	2191.6	7873.8	1010.1	8502.8	47903.6	3989.4	14045.0	601.5	725.5	19361.5	67265.1
2015-16	18697.0	705.4	5230.1	640.1	2170.6	2195.6	7661.7	891.0	8791.8	46983.3	4216.6	14238.3	553.2	1208.7	20216.7	67200.0
2016-17	18797.2	853.1	3717.2	897.4	3524.2	2475.7	8465.7	1224.2	11261.8	51216.5	4175.7	12851.0	996.3	974.5	18997.6	70214.1
2017-18	19746.2	932.1	10545.5	861.6	3135.2	2189.7	14547.6	1858.7	10186.6	64003.1	4715.4	30368.6	606.6	629.0	36319.7	100322.9
2018-19	18044.4	1013.4	5028.9	666.4	2700.5	2445.4	12416.0	1298.5	9200.3	52813.7	4277.6	21675.6	591.7	666.2	27211.1	80024.8

Table 3: Engineering construction on infrastructure yet to be completed, 2008-09 to 2018-19, $M in 2016-17 prices

Year	Roads	Bridges	Railways	Harbours	Water	Sewerage	Electricity	Pipelines	Telecomm's	Infrastructure	Recreation	Resources	Heavy industry	Other	Bal. Construction	Total construction
Private sector																
2008-09	20890.1	94.6	7892.8	3282.8	1842.7	1178.2	14022.0	2491.0	829.0	52523.0	397.2	107677.4	2728.8	2936.6	113739.9	166262.9
2009-10	13079.5	54.1	6694.8	9311.0	13763.9	864.9	12118.0	13499.1	410.9	69796.3	776.6	200539.5	1898.1	3396.4	206610.5	276406.8
2010-11	11495.0	191.0	17065.4	29016.4	11785.4	865.3	17023.5	18424.0	768.5	106634.6	739.5	304334.9	2098.9	1588.3	308761.5	415396.1
2011-12	11481.5	423.8	22189.4	40663.1	8420.4	1186.3	15547.9	21851.2	2037.3	123801.0	908.5	416663.0	3223.0	3568.4	424362.9	548163.9
2012-13	10919.4	93.7	13143.1	34587.0	4464.8	1172.2	22420.8	34567.3	2031.5	123399.8	3268.9	452731.0	3908.1	4230.0	464138.0	587537.8
2013-14	5116.1	151.2	8753.5	17036.0	3242.6	631.3	16864.8	28365.7	1105.8	81267.1	1928.9	329771.4	2764.0	1877.2	336341.5	417608.5
2014-15	9491.9	310.2	3879.1	3980.0	1695.7	360.9	12700.7	18759.7	751.4	51929.5	2170.4	252124.8	1504.3	1403.9	257203.4	309133.0
2015-16	15831.5	227.0	1967.1	2010.7	1119.7	448.2	10415.9	2598.0	576.1	35194.2	1124.5	184460.0	845.6	391.4	186821.5	222015.7
2016-17	14162.1	370.2	1785.3	2453.4	1594.2	688.3	10051.1	1695.3	943.8	33743.6	1181.4	123566.0	1440.9	632.8	126821.1	160564.8
2017-18	19738.9	287.7	2737.1	1452.1	1716.8	832.7	19252.2	3341.2	506.8	49865.5	992.5	61586.5	2531.9	482.7	65593.6	115459.1
2018-19	39477.4	478.1	1784.4	1284.5	1325.2	600.0	24181.0	1701.6	579.2	71411.6	906.1	91926.0	1557.4	510.5	94900.1	166311.6
Public sector																
2008-09	26169.6	4694.9	5396.8	5336.3	12837.3	6364.2	7000.4	5.1	174.7	67979.3	1326.5	118.9	12.7	142.5	1600.7	69580.0
2009-10	30378.0	3394.3	7872.4	2868.5	14248.7	6946.0	5037.3	3.6	1252.0	72000.8	1361.3	152.4	17.3	162.3	1693.3	73694.1
2010-11	38483.8	2533.8	9115.1	1544.6	8531.6	7863.5	6050.8	83.5	905.6	75112.3	1623.3	63.7	10.5	134.6	1832.2	76944.5
2011-12	36361.4	1645.6	9057.0	636.5	8274.1	6139.4	7123.3	47.9	3590.4	72875.6	1250.5	181.5	4.2	280.9	1717.1	74592.7
2012-13	30512.4	1674.8	7289.6	1252.6	6905.5	5815.2	6494.2	36.9	7037.7	67019.0	2123.3	400.1	64.0	370.6	2958.0	69977.1
2013-14	25698.7	931.6	8288.9	2346.1	4411.4	5392.0	3624.0	32.9	308.9	51034.5	2501.0	132.6	23.3	92.0	2749.0	53783.5
2014-15	24078.4	1353.0	11638.8	1876.1	3165.4	3595.8	2442.1	23.9	221.7	48395.2	1852.0	85.0	7.1	70.0	2014.0	50409.2
2015-16	33389.2	1808.9	17901.5	898.4	3668.6	3990.8	2301.8	6.3	67.6	64033.2	1259.3	124.1	31.3	981.4	2396.1	66429.3
2016-17	54502.5	2101.5	23123.9	526.2	6304.0	4869.6	3170.2	11.3	19.0	94628.3	1543.7	56.2	9.6	1743.9	3353.5	97981.8
2017-18	47181.2	2011.2	31273.2	998.1	7072.7	4302.0	3663.2	3.8	2.0	96507.3	1677.1	29.8	38.5	805.8	2551.1	99058.4
2018-19	29303.1	2143.0	41540.4	1366.9	5187.5	3722.0	2379.7	7.6	171.1	85821.4	1522.2	25.2	140.9	354.9	2043.2	87864.6
Combined sectors																
2008-09	47059.7	4789.5	13289.6	8619.1	14679.9	7542.3	21022.4	2496.1	1003.7	120502.3	1723.7	107796.3	2741.5	3079.1	115340.6	235842.9
2009-10	43457.5	3448.4	14567.2	12179.5	28012.6	7810.9	17155.3	13502.7	1662.9	141797.1	2137.9	200691.9	1915.4	3558.7	208303.8	350100.9
2010-11	49978.8	2724.8	26180.6	30561.0	20317.0	8728.8	23074.3	18507.5	1674.1	181746.9	2362.8	304398.6	2109.4	1722.9	310593.7	492340.6
2011-12	47842.9	2069.5	31246.4	41299.6	16694.5	7325.7	22671.3	21899.1	5627.7	196676.6	2159.0	416844.5	3227.2	3849.3	426080.0	622756.6
2012-13	41431.8	1768.5	20432.7	35839.6	11370.4	6987.4	28915.0	34604.2	9069.2	190418.8	5392.2	453131.1	3972.1	4600.6	467096.1	657514.8
2013-14	30814.8	1082.8	17042.4	19382.1	7654.0	6023.3	20488.8	28398.6	1414.7	132301.6	4429.9	329904.0	2787.4	1969.2	339090.5	471392.1
2014-15	33570.2	1663.1	15517.9	5856.1	4861.1	3956.7	15142.8	18783.6	973.1	100324.7	4022.4	252209.8	1511.3	1473.9	259217.4	359542.1
2015-16	49220.7	2035.9	19868.6	2909.1	4788.2	4439.0	12717.7	2604.3	643.6	99227.3	2383.8	184584.1	876.9	1372.8	189217.6	288444.9
2016-17	68664.6	2471.7	24909.2	2979.6	7898.2	5557.9	13221.3	1706.5	962.8	128371.9	2725.1	123622.2	1450.6	2376.7	130174.6	258546.5
2017-18	66920.1	2298.9	34010.3	2450.1	8789.5	5134.6	22915.4	3345.0	508.8	146372.7	2669.5	61616.3	2570.4	1288.5	68144.7	214517.4
2018-19	68780.5	2621.1	43324.9	2651.4	6512.7	4322.1	26560.7	1709.2	750.3	157233.0	2428.2	91951.2	1698.4	865.5	96943.3	254176.3

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