- Membership of international benchmarking groups allows Sydney Trains to compare its performance to international peers and, through sharing best practices, identify opportunities for improvement.

- Sydney Trains belongs to the International Suburban Railway Benchmarking Group (ISBeRG), which comprises 14 suburban railways. Typically, these railways link the suburbs to the CBD, with longer lines and larger networks than metros, but with fewer, longer, passenger journeys. Sydney Trains joined this group in 2011.

- Sydney Trains is also a member of the 'Nova' group, which is part of the wider 'Community of Metros'. The Community of Metros consists of:
  o 'CoMET', a group of 20 of the world's largest metros. Its constituents typically have more than 500 million passenger journeys per annum.
  o 'Nova' is a group of 22 small to medium-sized metros, typically with fewer than 500 million passenger journeys per annum. Sydney Trains joined the Nova benchmarking group in September 2007.

- Benchmarking between the members of the various groups is undertaken annually. This document provides a provisional update of selected charts from Sydney Trains' previously published report and shows results for the calendar years 2014 to 2018. To preserve confidentiality of other members' data, Sydney Trains' performance is compared to the:
  o average of all ISBeRG Members
  o average of all CoMET Members
  o average of all Nova Members
  o individual ISBeRG members, on an anonymised basis

- In some cases there are changes to previously published figures due to revision of data. Comparison to averages may disguise some significant 'highs' and 'lows' in performance: individual results within each group may vary significantly.

- Sydney Trains is a typical (ISBeRG) suburban railway. Compared to metros, such railways typically have predominantly one-way commuting passenger flows in peak periods, higher average distances between stations, and longer average passenger journeys lengths. Like most other ISBeRG members, Sydney Trains operates a complex network of interconnected lines, partly shared with longer distance passenger and freight trains. Sydney Trains has a larger network than nearly all of the CoMET/Nova group members, but comparatively lower patronage.

- In 2018, a small part of the network with more 'metro' characteristics was handed over to the new Sydney Metro.

- For these reasons, Sydney Trains' performance is generally more comparable with that of other ISBeRG members, hence greater prominence is given within this report to performance relative to these railways.
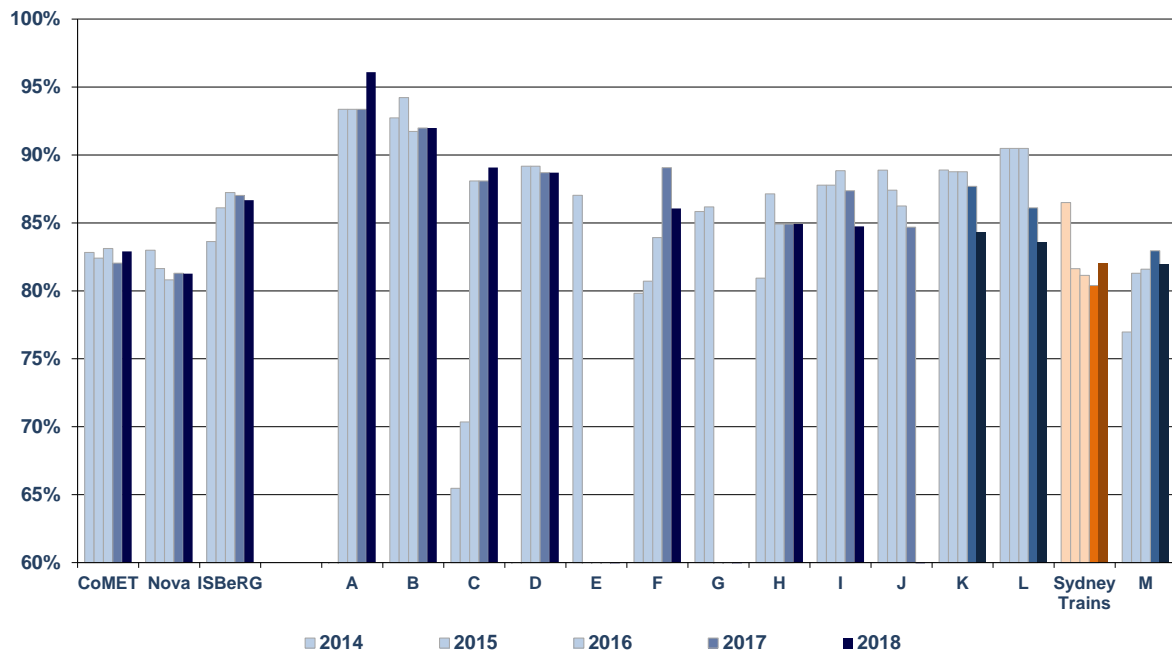
Legend: 2014 · 2015 · 2016 · 2017 · 2018
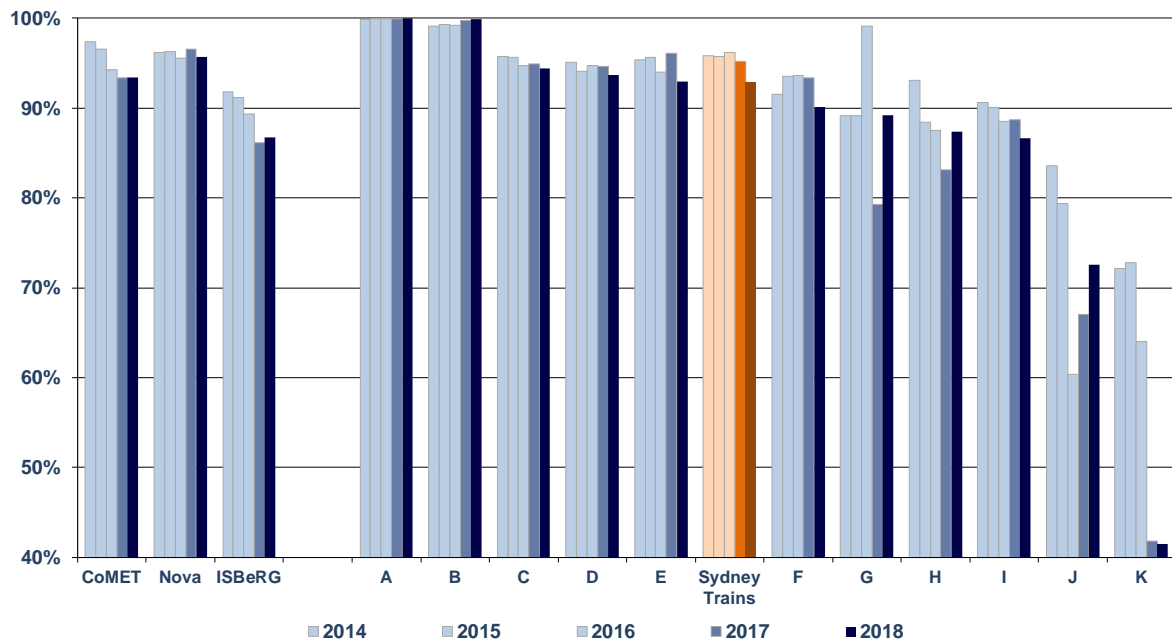
- Trains on time are defined as scheduled services that arrive at their destination within five minutes of the advertised time.
- Although Sydney Trains has experienced slight declines in 2017 and 2018, on-time performance remains favourable relative to international suburban railway peers (sixth out of 12). Punctuality is above the ISBeRG average, comparable to CoMET, but slightly below the Nova average.
- The highest performing railways have achieved such levels of punctuality through a combination of reliability centred maintenance, a culture of continuous improvement, efficient operations and management and the age and design of their systems. In some cases, simpler networks and no shared track with other operators also contribute to the high performance.
- The significant deterioration in performance for Railway K is as a result of a number of challenges including ageing rolling stock, vandalism and trespassing. In 2017, Railway G had a significant number of infrastructure related delays. Several railways have a high proportion of passenger and staff related delays.

- The percentage of cars used in the peak hour is a key measure of rolling stock utilisation, as well as the performance of the rolling stock maintenance function. This KPI also reflects operational strategy regarding operators' use of spare trains, as well as investment strategy in terms of fleet size. This measure can be affected by the ability to maintain all trains outside of peak periods (for example, if night working is not permitted, a lower level of utilisation is usually attained).

- This KPI can be influenced in particular years by fleet changes, including the retirement and/or refurbishment of existing trains, or the procurement of trains (either for new lines and extensions or to increase service on existing lines).

- The ISBeRG average is higher as its suburban railway members have a greater focus on the peak period. This usually means that demand is less evenly distributed throughout the day, with a higher percentage of fleet required during the morning/evening peaks.

- The challenge is to achieve an efficient level of utilisation within the context of operational requirements, service standards, patronage levels, demands of maintenance, overhaul and rebuild programs and extended procurement cycles.

- Between 2014 and 2017, the percentage of Sydney Trains' fleet used during the peak period declined significantly, from around 87%, to 80%. This was likely because the old 'S' set trains that were being replaced by a newer fleet were being retained for occasional use. The utilisation of the newer fleet is approximately 92%. The percentage of cars used has since recovered somewhat to 82%. Similarly, Railway C was also phasing out old rolling stock in 2014 and 2015.

Transport Sydney Trains
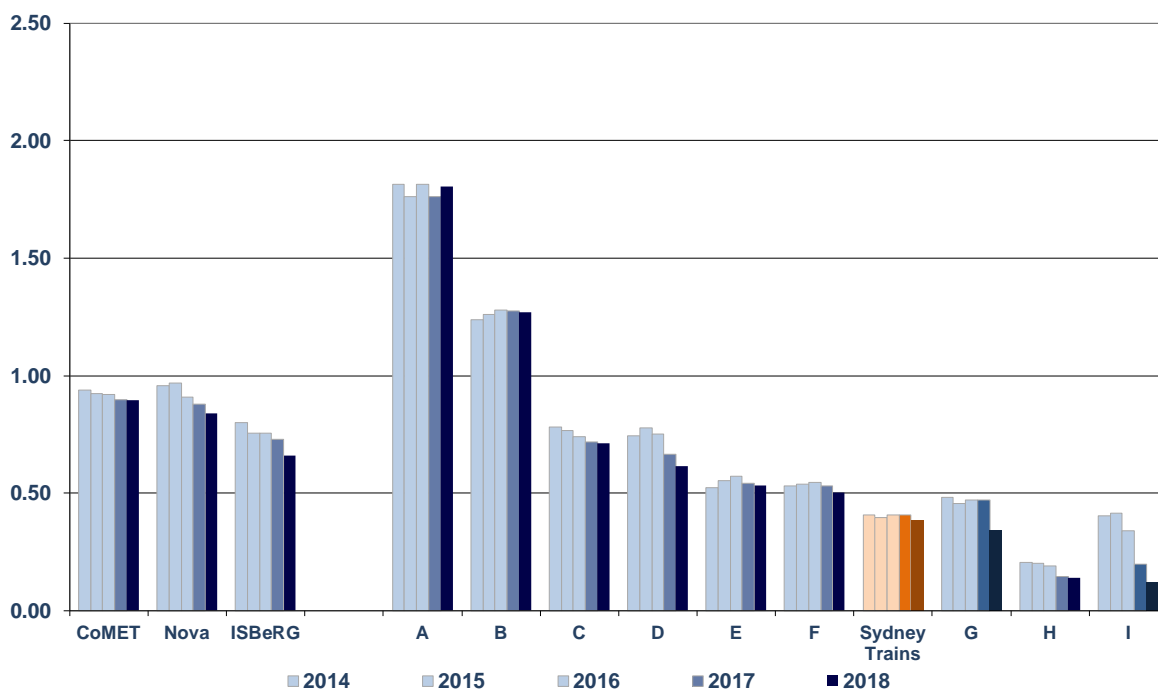
Efficiency
Train Hours/Driver Hour
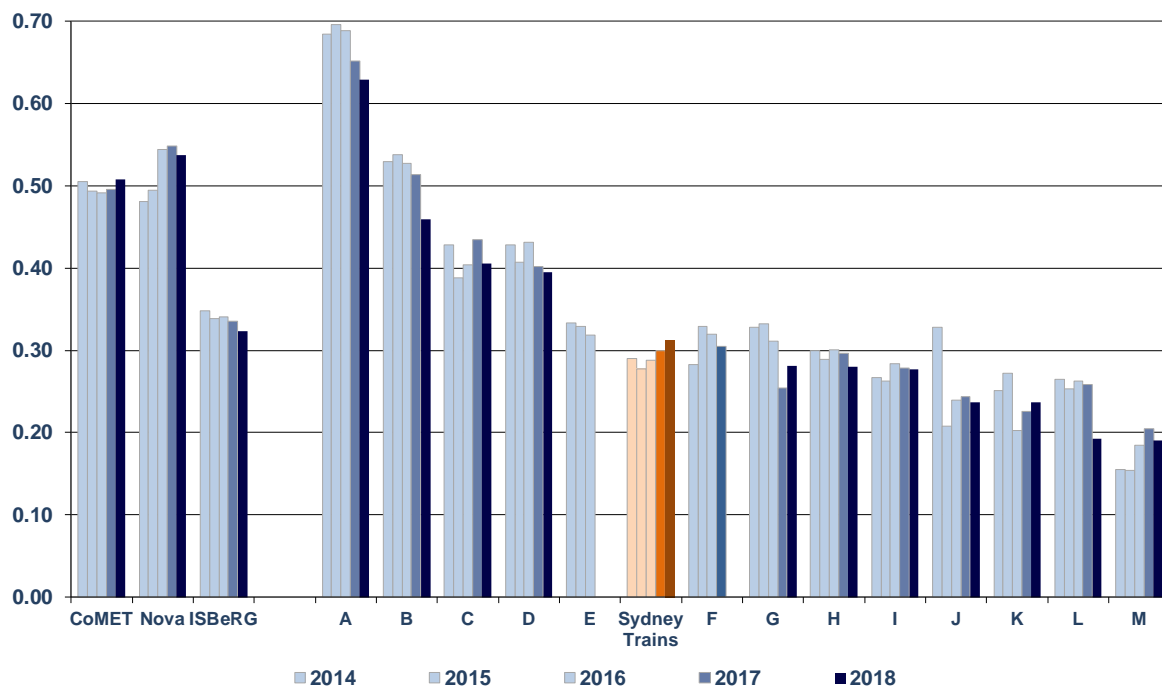
- This KPI is a measure of 'net' driver productivity, measuring the amount of time spent driving trains as a proportion of total hours worked.

- Driver productivity is normally lower on suburban railways than on metros. Longer lines, more complex networks and less frequent trains make rosters less efficient.

- Railway A achieves high productivity by enabling station staff to also drive trains, improving the efficiency of driver scheduling.

- Sydney Trains demonstrates low driver productivity relative to CoMET and Nova metros, but similar to the mean of ISBeRG railways. When compared against individual ISBeRG railways, it can be classed as 'mid-ranked' (6th out of 14).

- Through the period 2014-2018, Sydney Trains has experienced improvements in driver efficiency, a trend not observed for the other ISBeRG railways, in general.

- Low driver productivity and two-person operation (driver and guard) are seen as the greatest cost drivers for Sydney Trains when compared to international peers, many of which have driver-only operation. Furthermore, their guards play a solely operational role, with no customer service or revenue protection responsibilities. (Note: data represents only drivers, meaning guards' hours are not included.)

- Some operators have successfully negotiated improved productivity and increased driver flexibility through measures such as: remote sign-on, split shifts, part time drivers, and variable shift lengths.

Efficiency
Total Energy Consumption (kilowatt hours)
/Passenger km
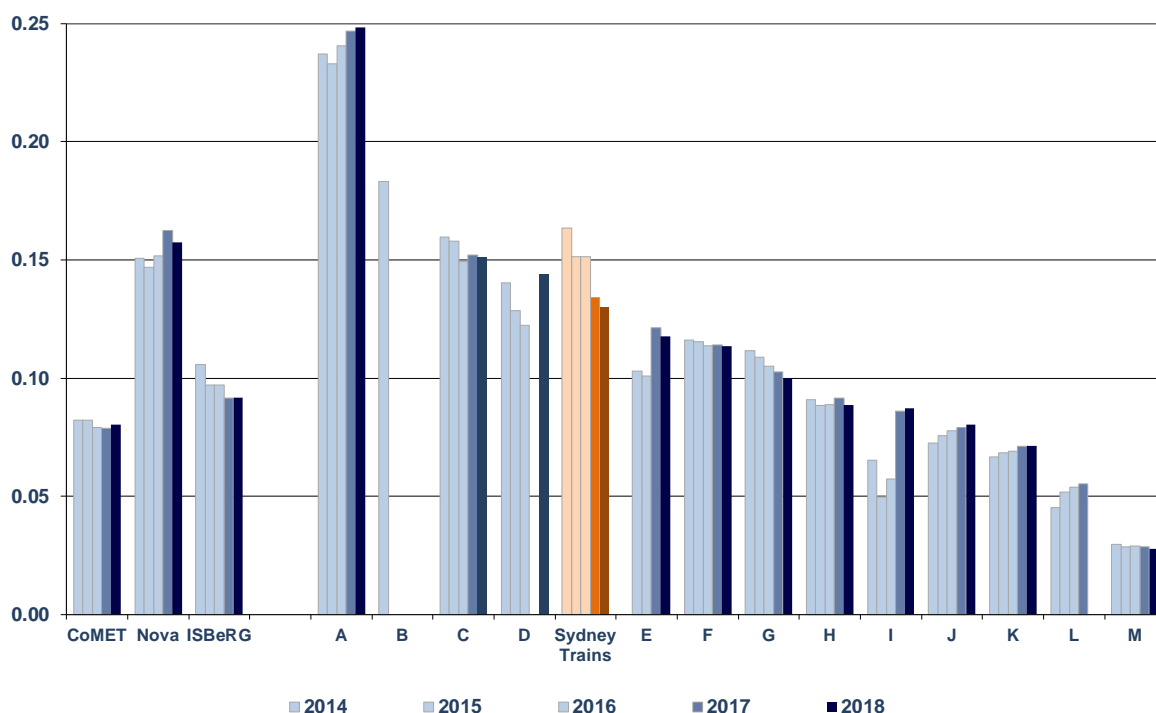
- Sydney Trains' total energy consumption per passenger kilometre is much higher than the CoMET and ISBeRG averages, but has dropped below the Nova average in 2017 and 2018. Sydney Trains' energy efficiency is improving in this metric due to the introduction of new rolling stock and increasing passenger demand.

- Many operators have reduced traction energy consumption through practices such as eco-driving (including better use of coasting) and the use of regenerative braking for at least part of their fleet. On the non-traction side, consumption has been reduced through new technologies such as LED lighting and lifts/escalators with 'sleep' modes.

- The reduction in operators' year-on-year energy consumption per passenger kilometre is also driven by passenger growth and population density, particularly in rapidly expanding Asian cities. The higher the passenger km, the more the marginal energy consumption will reduce. This also partially explains the growing disparity between the averages of CoMET (group of metros that serve larger cities, with a greater proportion of Asian members), and Nova (metros that serve small and medium-sized cities).

- This KPI shows whether operators generate enough revenue from passengers (fares) to 'break even', without consideration of capital expenditure or any subsidies (including subsidies to customers in the form of concessionary fares and contract fees paid to the operator).

- Sydney Trains' operating cost recovery from fares remains significantly below CoMET, Nova, and ISBeRG group averages (approximately half). This has been the case for each of the last five years. For example, whereas other ISBeRG members retrieve around 70% of their operating costs from fares, the proportion retrieved by Sydney Trains remains approximately 40%.[1]

- NSW Government policy requires Sydney Trains to provide extensive concession entitlements, and fares are generally low relative to distance travelled (page 8).

- High performance is driven by higher passenger densities, i.e. fare revenue concentration, due in part to the more urbanised characteristics of the cityscapes. Sydney Trains' comparatively poor performance in an ISBeRG context is attributable to its relatively very low fares and low capacity utilisation. Nonetheless, it should be noted that fare revenue per operating cost over the last five years has been largely stable in Sydney, whilst the ISBeRG, CoMET and Nova group averages have all declined.

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[1] Some ISBeRG members are not included in cost comparisons as they are not responsible for the cost of infrastructure maintenance (track, stations and other fixed installations) and hence do not have comparable cost structures. The four excluded members are Vy Oslo, S-Bahn Munich, DSB Copenhagen and London Overground.

Financial
Non-Fare Revenue/Operating Cost
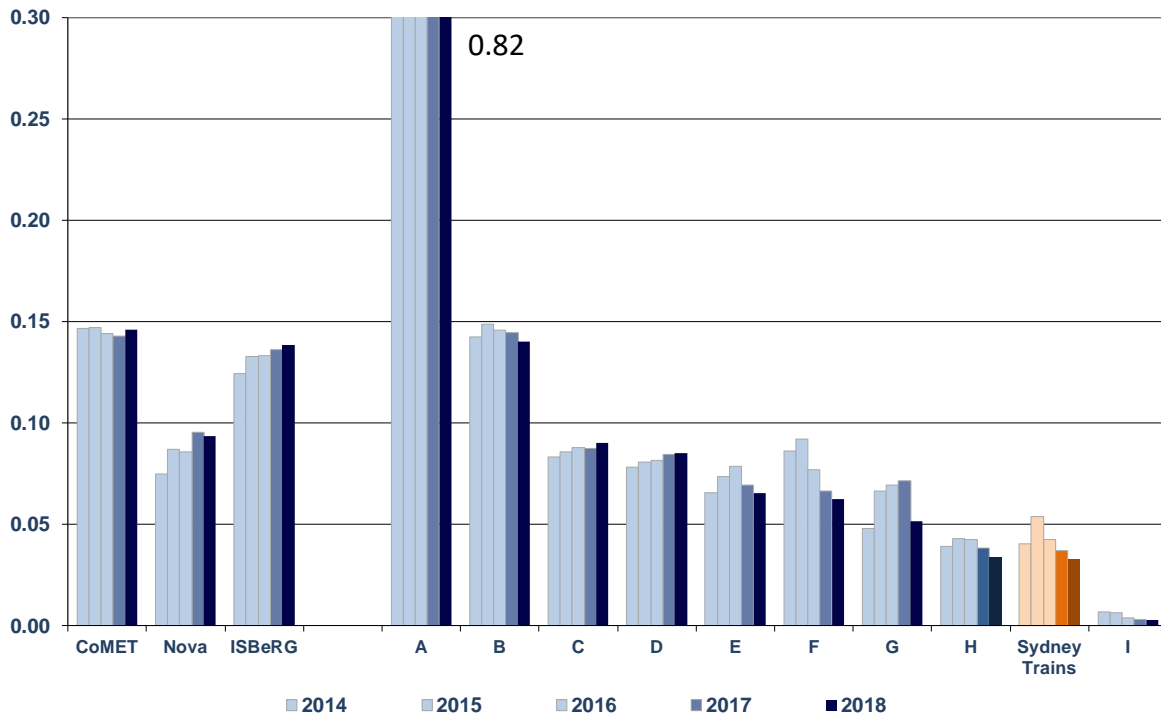
- This KPI shows the contribution secondary revenue (from sources such as advertising, retail, property and telecommunications) makes to cost recovery.

- Income from non-fare revenue has been fairly stable for CoMET metros since 2014 as a proportion of operating cost. Meanwhile, Nova members and ISBeRG railways have made significant steps to improve their non-fare revenue sources over the last five years.

- Following improvements in non-fare revenue relative to operating cost in 2015, Sydney Trains' performance has declined for three consecutive years, to a five-year low. These decreases are due to lower income received from the sale of assets, although the effect of this has been ameliorated by increased revenue from advertising.

Note: Some ISBeRG members are not included in cost comparisons as they are not responsible for the cost of infrastructure maintenance (track, stations and other fixed installations) and hence do not have comparable cost structures. The four excluded members are Vy Oslo, S-Bahn Munich, DSB Copenhagen and London Overground.
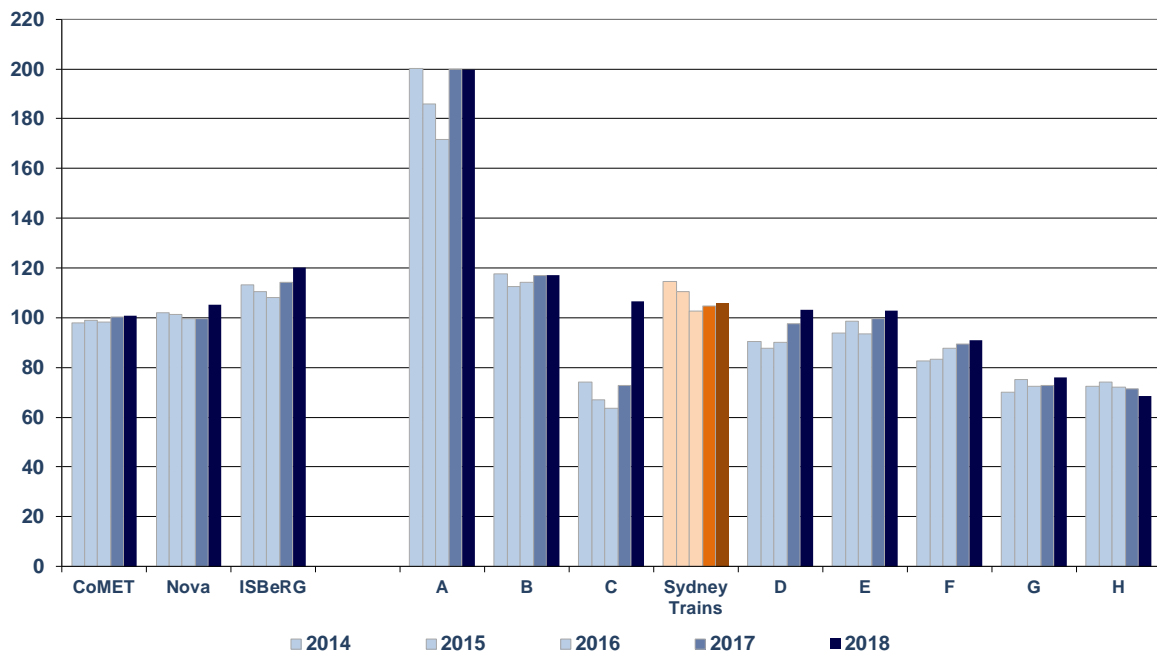
Financial
Fare Revenue/Passenger km
(2018 US Dollar PPP)
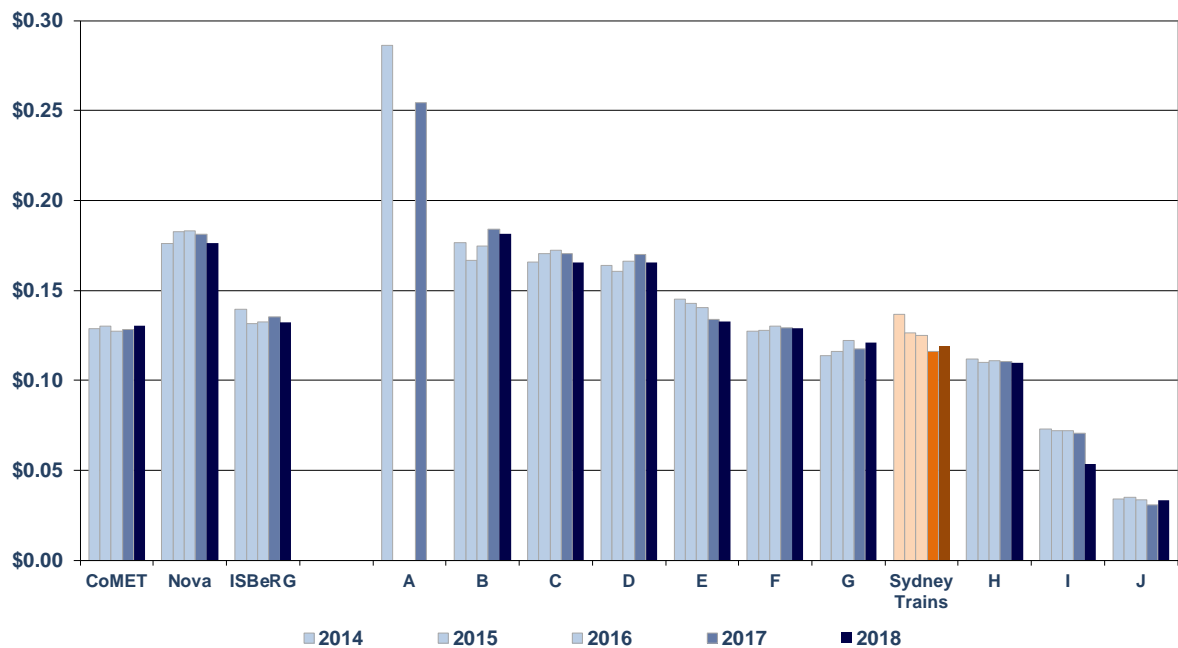
- The graph above shows the average fare revenue per passenger kilometre received by the participating operators (converted into US Dollar Purchasing Power Parity (PPP)). This measure is a good proxy for the average fare, but is not adjusted for the different levels of concessionary fare reductions charged by operators - and, as mentioned previously, Sydney Trains offers extensive concessionary fares.

- Sydney Trains' fare revenue per passenger kilometre is low compared to other operators. Even though 2018 has seen Sydney Trains make a slight recovery on this measure, fare revenue per passenger km is still 13% lower than in 2014.

- In an ISBeRG context, only three members collect less fare revenue per passenger km.

Financial
Total Operating Cost/Car km
(Indexed to 2014 mean)

Chart: Total Operating Cost/Car km indexed to 2014 mean, with categories CoMET, Nova, ISBeRG, A, B, C, Sydney Trains, D, E, F, G, H. Legend: 2014, 2015, 2016, 2017, 2018.

- The ISBeRG, CoMET and Nova trends in operating cost per car kilometre show that the overall operating costs have been relatively stable over the past five years. However, rises have been noted for ISBeRG in 2017 and 2018, mainly due to rises for railways A and C.

- Many railways and metros achieve lower unit operating costs by increasing the number of car kilometres operated – such as through longer trains, more frequent services, or network extensions.

- Some ISBeRG members have seen pronounced drops in aspects of their operating costs, which can be attributed to factors such as the wider adoption of driver-only operation of trains.

- Sydney Trains' total operating costs have historically been relatively high compared to CoMET and Nova metros, and ISBeRG railways, though similar to other high-wage cities in the group. Their costs were higher in 2014/15 because Sydney Trains were investing in a two-year 'Customer Improvement Program' which included rolling stock renovations; the conclusion of this program explains the drop in 2016.

- It should also be noted that railway A's significantly higher 'score' on this graph is due to higher staffing levels.

Note: Some ISBeRG members are not included in cost comparisons as they are not responsible for the cost of infrastructure maintenance (track, stations and other fixed installations) and hence do not have comparable cost structures. The four excluded members are Vy Oslo, S-Bahn Munich, DSB Copenhagen, London Overground.

Financial
Service Operation Cost/Car km
(Indexed to 2014 mean)
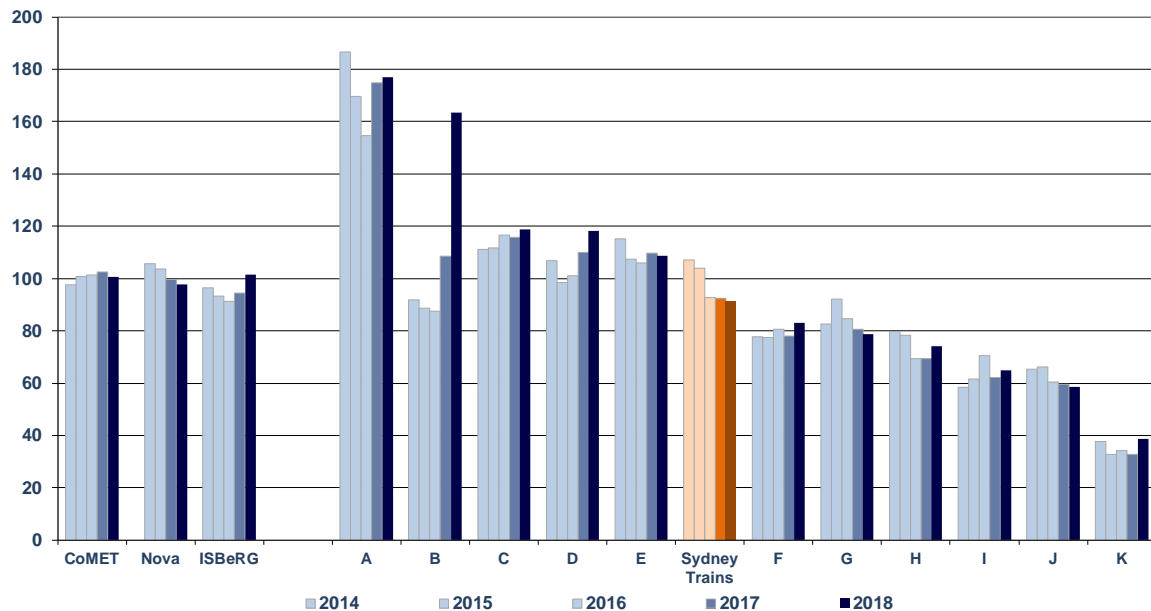
- This KPI shows the staff and contractor costs incurred in operating the train service and stations. The largest cost components in this area are staff wages (for both train drivers and station staff) and energy costs (both traction and non-traction electricity).
- Following-on from the graph on the previous page, Sydney Trains' reduction in 2016-18 operating costs follows the conclusion of the Customer Improvement Program, reflected within this performance indicator. Service operation costs are lower than the CoMET, Nova and ISBeRG group averages.
- Sydney Trains' train service costs are affected by high crewing costs (two person crewing, as opposed to driver-only for most metros and around half of ISBeRG railways). However, they are slightly offset by the relatively low cost of energy.
- Railway B increased greatly in 2018, due to significant service cancellations, which reduced the network's car km.

Financial
## Maintenance Cost/Car km
(Indexed to 2014 mean)
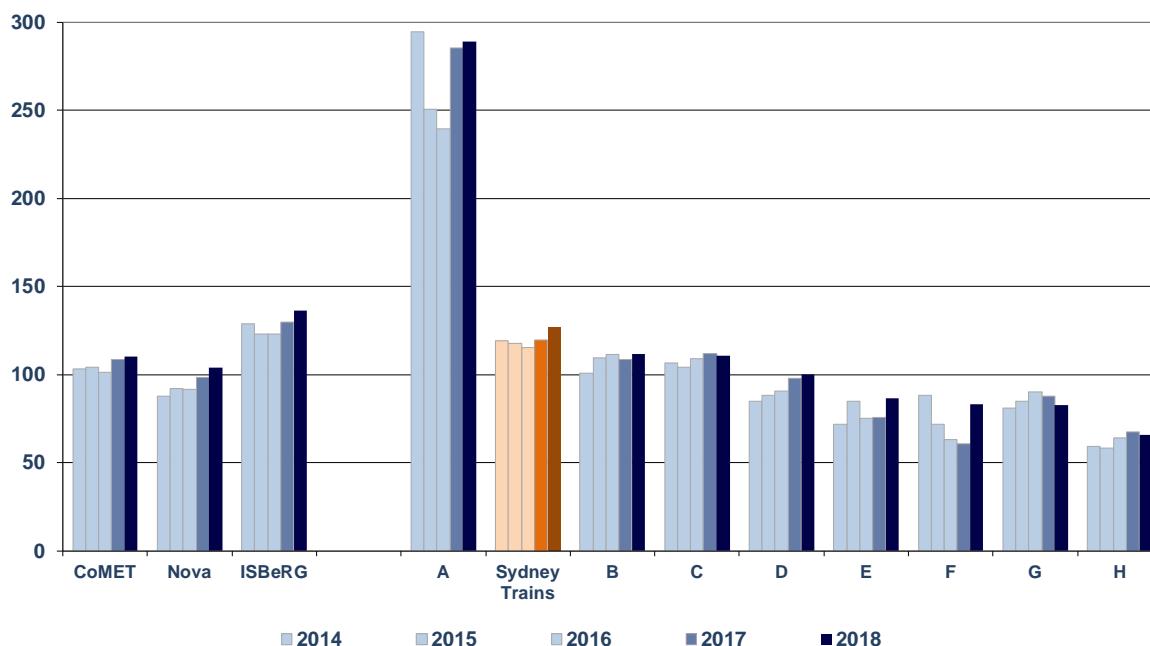
- Sydney Trains' maintenance costs per car kilometre are high, and have shown two consecutive increases in 2017 and 2018. Sydney Trains' costs are higher than the CoMET and Nova averages, but similar to the ISBeRG mean.

- The phased introduction of the new 'Waratah' fleet has helped to address the previous issue of an ageing fleet, leading to a reduction in rolling stock maintenance costs.

- Infrastructure maintenance costs are high, partly due to the additional pressures placed upon the network by the NSW Trainlink and freight services that use it. Nonetheless, cost reductions are expected in the medium-term.

- Metros and railways that have realised reductions in maintenance costs have done so through the renegotiation of outsourced maintenance contracts, reliability centred maintenance and procurement of new trains.

- Railway A's very high maintenance costs are due to factors such as higher labour costs, as well as a commitment to long hours of operation across its network.

- Railway F increased greatly in 2018 due to significant service cancellations, which reduced the network's car km.

Note: Some ISBeRG members are not included in cost comparisons as they are not responsible for the cost of infrastructure maintenance (track, stations and other fixed installations) and hence do not have comparable cost structures. The four excluded members are Vy Oslo, S-Bahn Munich, DSB Copenhagen, London Overground.
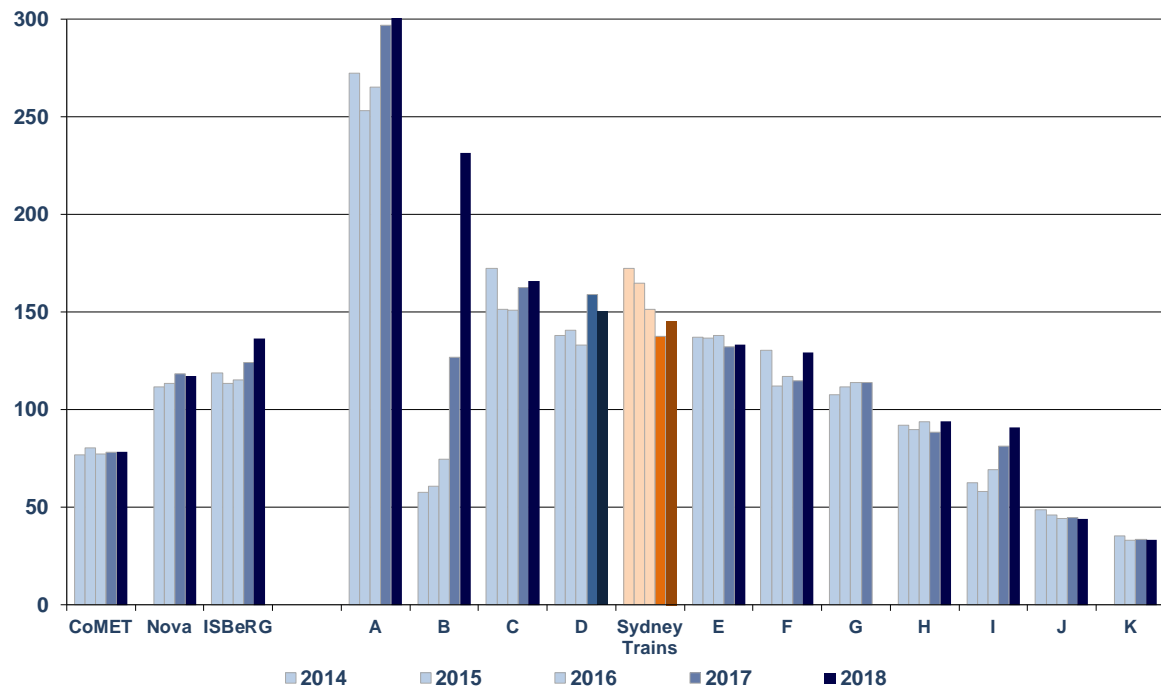
Financial
Total Operating Cost/Passenger km
(Indexed to 2014 mean)
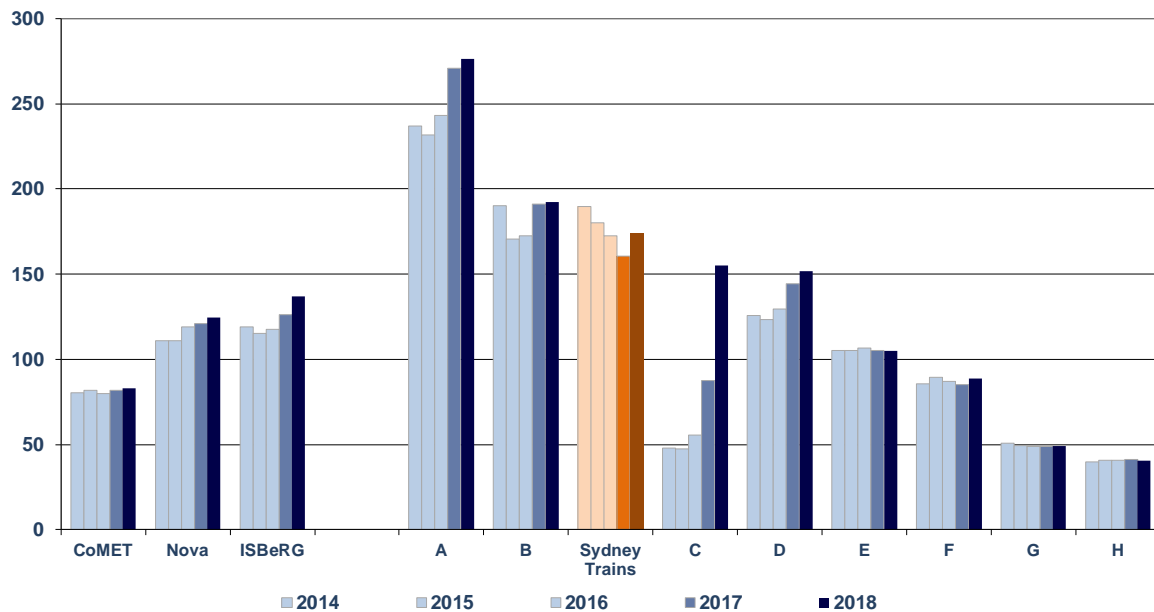
- The ISBeRG average for this measure is consistently higher than for the metro benchmarking groups because of lower average passenger density on suburban railways (low patronage in off-peak periods means that 'half-empty' trains must be moved long distances from the CBD to the network boundaries). In addition, different crowding standards exist between railways and metros: typically, a metro would plan for a higher number of standing passengers for the same floor area.

- Sydney Trains' operating cost per passenger kilometre is much greater than the averages for the CoMET, Nova and ISBeRG groups. However, the gap is generally closing, due to increased patronage on Sydney Trains' network, attributable to the rapid growth in the city's population. This year's increase is due to additional maintenance costs that have been brought forward.

- The large 2017/18 increases experienced by railway C were the result of a large decline in passenger numbers, whereas railway A had increases in additional maintenance, administration and service operation costs.

Note: Some ISBeRG members are not included in cost comparisons as they are not responsible for the cost of infrastructure maintenance (track, stations and other fixed installations) and hence do not have comparable cost structures. The four excluded members are Vy Oslo, S-Bahn Munich, DSB Copenhagen, London Overground.

- As per the total operating cost per passenger kilometre measure discussed on page 12, this measure is also heavily impacted by passenger density. Sydney Trains has a mid-ranking density, in terms of passenger km per route km, among the ISBeRG railways.

- Sydney Trains' service operation cost per passenger kilometre still exceeds all group averages, but has declined significantly since 2014, with 2018 being the only increase registered during the five-year period of interest.

- Sydney Trains has improved its performance by maintaining service operation costs at a near-constant level, at the same time as attracting steadily increasing passenger journeys (and therefore higher passenger km).

- Due to significant decreases in passenger numbers because of substantial reductions in the train service, Railway B's service operation cost per passenger km has increased significantly since 2016.