

By Matt Mushalik (MEng)
2/12/2020

This submission refers to this website:

<https://www.sydneymetro.info/article/have-your-say-western-sydney-airport-metro-project>

A) Western Sydney Airport (WSA) not viable

The WSA metro makes no sense if the WSA airport fails. As a standalone project it has no other function. Therefore, it is absolutely vital to revisit the commercial and climate change viability of the airport. If this is not done, not only \$5.3 bn for the airport will go down the drain but also \$11 bn for the metro will disappear in a small-diameter tunnel unusable by any other Sydney train.

The world has changed as a result of the Corona virus, for good. The impacts are similar, if not worse, than earlier predictions for the peak in global oil production (which may be happening right now, covered up by an oil demand peak – see Annex):

- i. Reduced mobility and demand for air-travel
- ii. End of globalisation
- iii. Increased debt and budget deficits
- iv. Low or negative GDP growth in many countries
- v. Growing strategic competition
- vi. Emerging military threats and conflicts over resources

Airlines are struggling to survive. Virgin, for example, hadn't even solved its debt problem after the 2008 oil price shock:

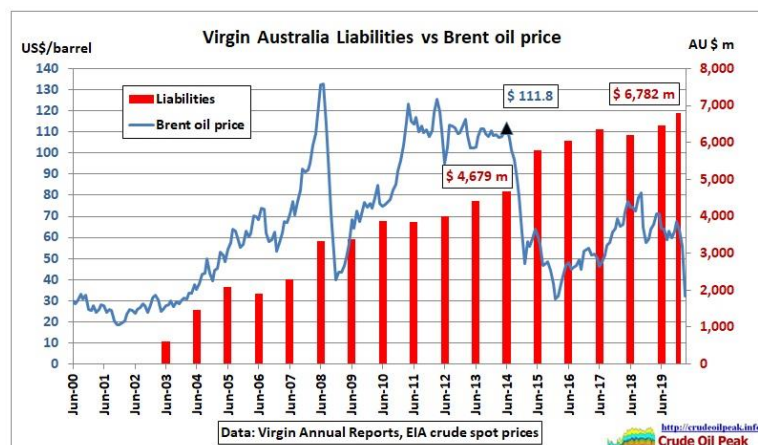


Fig 1: Virgin's liabilities doubled after 2008

3 May 2020 How the first phase of peak oil brought Virgin Australia into minus after 2008

<http://crudeoilpeak.info/how-the-first-phase-of-peak-oil-brought-virgin-australia-into-minus-after-2008>

The WSA business case done in 2016 assumed for 2039 annual passenger numbers of:

Kingsford Smith Airport.....65.6 million
 Western Sydney Airport.....18 million (1st stage)
 Total83.6 million

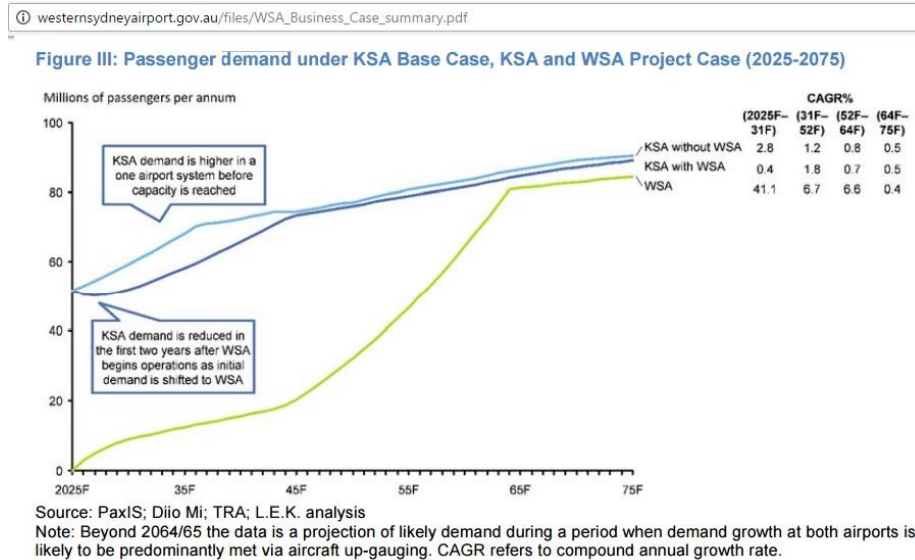


Fig 2: Fantasy projections in the WSA business case

https://www.westernsydneyairport.gov.au/sites/default/files/WSA_Business_Case_summary.pdf

That's more than Heathrow in 2018 (80.1 m). Clearly, the above estimates are unrealistic projections even before Covid hit. It's a case of over-reach. By 2039, the world and especially Asia will be in a deep oil crisis, with China fighting for its ever increasing oil imports (explains its growing belligerence). That fight is in its early stages right now.

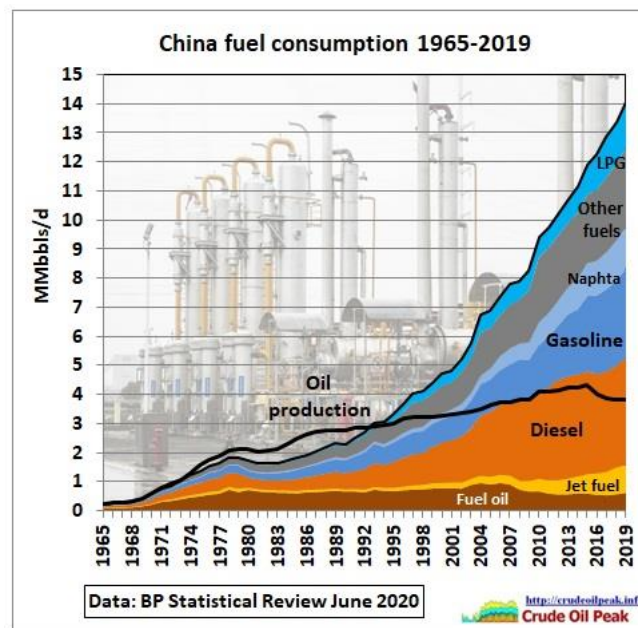
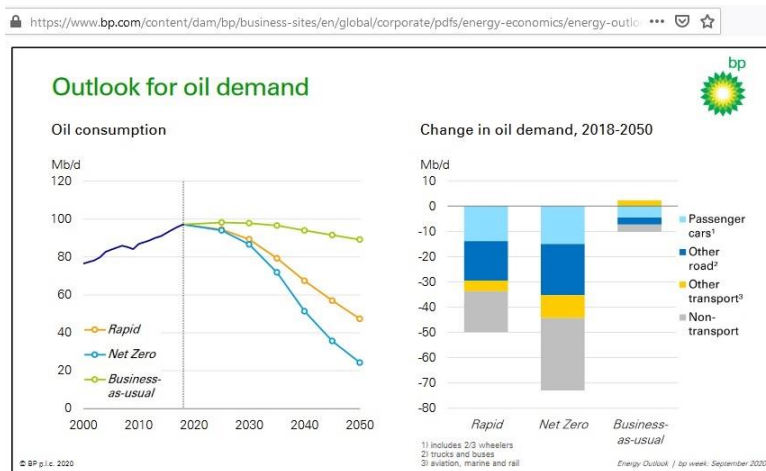


Fig 3: China's oil production peaked 2015 while consumption skyrockets

The Wuhan virus was allowed to escape to level the geopolitical playing field (Gordon Chang). China can now import the oil other countries are not consuming because of the Corona induced recession

The growing passenger numbers in Fig 2 are also incompatible with the 2015 Paris Agreement. In September 2020, BP published its annual Energy Outlook with estimates by how much oil demand has to be reduced to meet climate targets (blue curve in following graph):



Oil demand falls over the Outlook in all three scenarios.

This decline is most pronounced in *Rapid* and *Net Zero* – in which after peaking in 2019 at close to 100 Mb/d – oil demand by 2050 falls to a little below 50 Mb/d in *Rapid* and to around 25 Mb/d in *Net Zero*.

Fig 4: The Net Zero demand curve is a reduction target to bring down emissions

<https://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html>

<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2020-presentation-with-script.pdf>

While land transport can be electrified (running on renewables plus pumped hydro – also a challenge) there is no easy, low carbon replacement for jet fuel.

BP writes in the above document what has to be done for future aviation fuels (p 49):

"Biofuels play a critical role in decarbonizing the aviation sector, since neither batteries nor hydrogen are able to deliver the necessary energy density required for aviation. The share of biofuels in jet-fuel increases from less than 1% in 2018 to around 30% by 2050 in Rapid and to nearly 60% in Net Zero [scenarios]"

We have seen it before: 16/4/2012 Fry and Fly - the new era of sustainable aviation



Fig 5: Ask Alan Joyce how far he has come with biofuels in 8 years

<https://crudeoilpeak.info/fry-and-fly-the-new-era-of-sustainable-aviation>

B) Metromania

When Gladys became Transport Minister following the State election in March 2011, there were big hopes she would do a better job than her predecessor Costa who cancelled the Parramatta – Epping Rail Link (PERL). In July 2011, a happy and smiling Gladys appeared in a brochure showing double deckers for the North West Rail Link (NWRL)



Fig 6: NWRL double deckers and Gladys

But a year later, in June 2012 we had to read:

20/6/2012

Parts of Sydney's rail network will be converted to a high-frequency, metro-style, single deck system, the state government announced today, while also committing to an eventual second harbour train crossing.

But the government performed an about-face on the North West Rail Link, declaring it would be a privately run shuttle between Rouse Hill and Chatswood, reversing an earlier pledge to run trains from the north-west all the way into the city.

<https://www.smh.com.au/national/nsw/sydney-transport-shake-up-plan-for-single-deck-metro-style-trains-and-second-harbour-crossing-20120620-20ngm.html>

The North West Metro would be privately operated. What was initially not said was that the single deck trains – although running on overhead catenary -would be narrow body and therefore not compatible with Sydney's ubiquitous, 3.04 m wide double deckers, thereby limiting operational flexibility. The public also had to find out that the new tunnel would have a smaller diameter so that double deckers could not use it, a deliberate kick in the guts of Sydney Trains, a fundamental political and ideological change locking-in this limited infrastructure for good.

So Metromania started in June 2012. Over time, more problems emerged:

30/12/2014 Sydney plans to dismantle rail infrastructure built just 6 years ago (part 1)

<http://crudeoilpeak.info/sydney-plans-to-dismantle-rail-infrastructure-built-just-6-years-ago-part-1>

4/1/2015 Sydney mismanages transition to driver-less single deck trains (part 2)

<http://crudeoilpeak.info/sydney-mismanages-transition-to-driver-less-single-deck-trains-part-2>

There were flow-on consequences right to Parramatta because the downgraded Epping – Chatswood tunnel (plus a short section of smaller NW metro tunnel) could no longer be used for a PERL – which was replaced by light rail, but only half way to Carlingford.

20/7/2017

Sydney planning chaos: New Planning Review makes no provision for light rail at Epping station (part 1)

<http://crudeoilpeak.info/sydney-planning-chaos-epr-part1>

20/7/2017

Sydney planning chaos: New Planning Review makes no provision for light rail at Epping station (part 2)

<http://crudeoilpeak.info/sydney-planning-chaos-epr-part2>

In conclusion, we have metros which interfere with the planning and operation of heavy rail instead of serving as a complementary rail connection as is usual in Europe. That is what Metromania is all about. Why was that all done and who is responsible?

On 12th August 2020 SBS released a film on metro tunnelling (Sydney's Super Tunnel)

<https://www.sbs.com.au/ondemand/video/1772620355957/sydneys-super-tunnel-s1-ep2-what-lies-beneath>

Film 1 at 15:25, Transcript:

"Rod is determined to realize what Bradfield could not.

Rod's biggest problem was convincing the Premier that a driverless metro was the best way forward for Sydney's future after she had promised the community a more traditional railway

Gladys: "That kind of shook me a little and some bits were confronting like driverless trains. Was this the right way to go? Is it the way of the future?"

Rod was convinced the metro was the way of the future. Convincing others was harder. Transport officials including Rod said we don't think it is sensible building the same kind of old rail line. We got to go for a metro"

"Old rail line"? What a twisted, unprofessional view. In an urban rail hierarchy we have different functions, using different technologies, in that order of capacity:

- a) Heavy rail (both all stoppers and express services)
- b) Metros (in high density areas, many stops)
- c) Light rail (many applications)
- d) Trams (classical, in road corridor)

Hybrid solutions between (b) and (c) as well as (c) and (d) are extensively used in Europe. Metros usually serve high density residential and office areas with walkable catchments and frequent stops (each km or so). That's why their rolling stock is light and accelerates fast. The only area where Sydney would actually require a metro is the CBD, the Inner West and the Eastern suburbs. That's why it was wrong to convert the original NWRL into a metro. As a result of the limited number of stations and catchments the government has to continuously approve new apartment towers (mostly for recent immigrants) around all stations, with the aim to fill the high frequency metro trains. The actual job, however, is to replace car traffic, not to accommodate newcomers. It is not Australia's task to house millions of Asians in already crowded cities with vulnerable water, fuel and power supplies. Covid 19 has of course exposed this unsustainable approach.

It is also wrong to use a metro as an express service to connect the CBD with Parramatta. The objectives to provide a fast rail link Central-Parramatta and to maximise catchment areas for new residential developments are incompatible.

Now an originally planned rail link to the WSA (Fig 7) is also to be a metro although the distance between stations is 5 km. Clearly, the Government has abandoned Sydney Trains and promotes metros at all cost, for ideological and/or other unknown reasons.

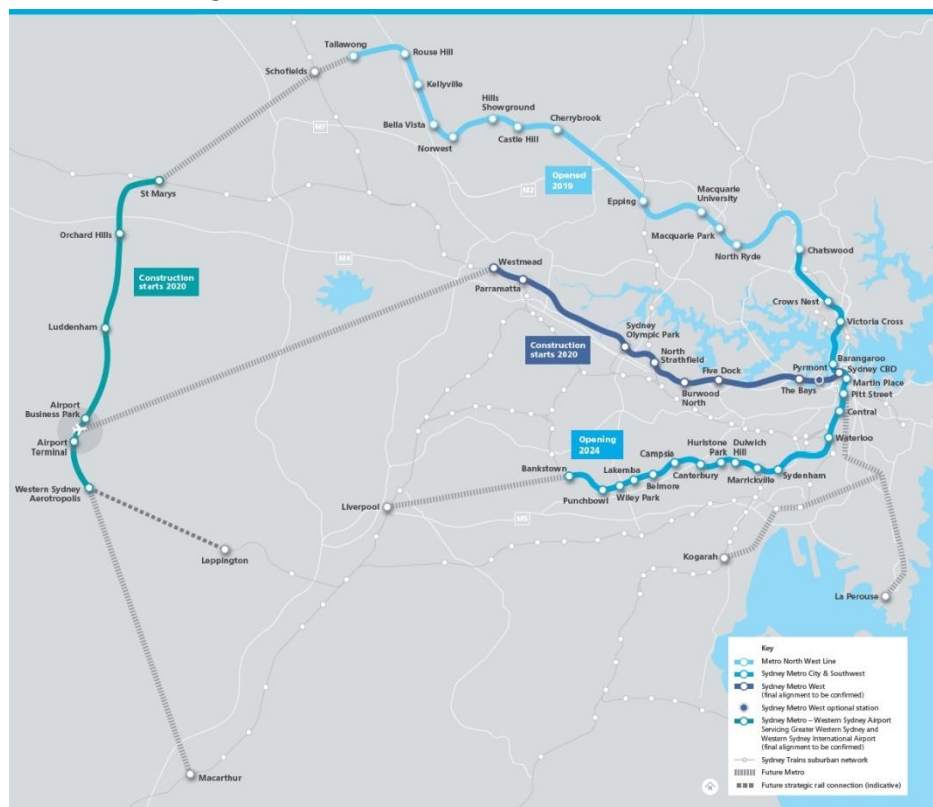


Fig 7: Dotted lines on a map (2020, p 10) show the next phases of Metromania

https://www.sydneymetro.info/sites/default/files/document-library/Sydney_Metro_Western_Sydney_Airport_Environmental_Impact_Statement_Summary.pdf

This summary looks more like a promotional brochure than an EIS. There could be no better map showing the ad-hoc planning of rail in Sydney with a bias on metros, whether suitable or not. It is a step backward from a March 2018 investigation of corridors ("Passenger rail corridors identification: Consultation on recommended corridors of land for the North South Rail Line and the South West Rail Link Extension" by Transport for NSW)

Investigating transport corridors

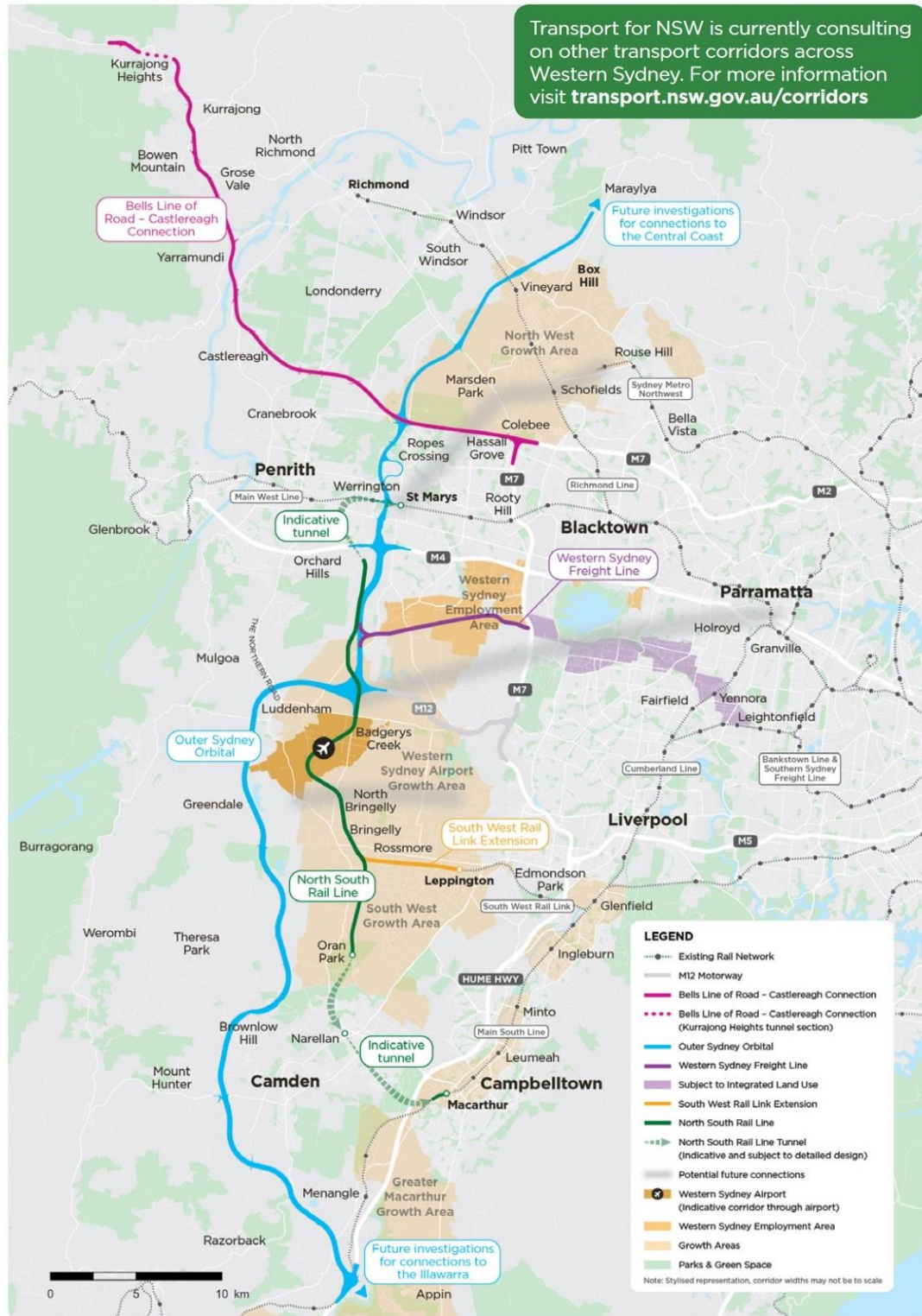


Fig 8: The Leppington extension merges into the North South Rail Line

Note the Western Sydney freight line (along Warragamba water pipeline), another big project.

Its intermodal terminal is shown in Fig 11

https://corridors.ucapp.com.au/docs/28/CP0035A_NSRL-SWRL_Brochure_WCAG_0.pdf

In the same month March 2018 a joint "Western Sydney Rail Needs Scoping Study Outcomes Report" was published by the Australian and NSW governments.

Western Sydney Rail Needs Scoping Study - Adobe Acrobat Reader DC

Figure 25 The Preferred Network for Western Sydney

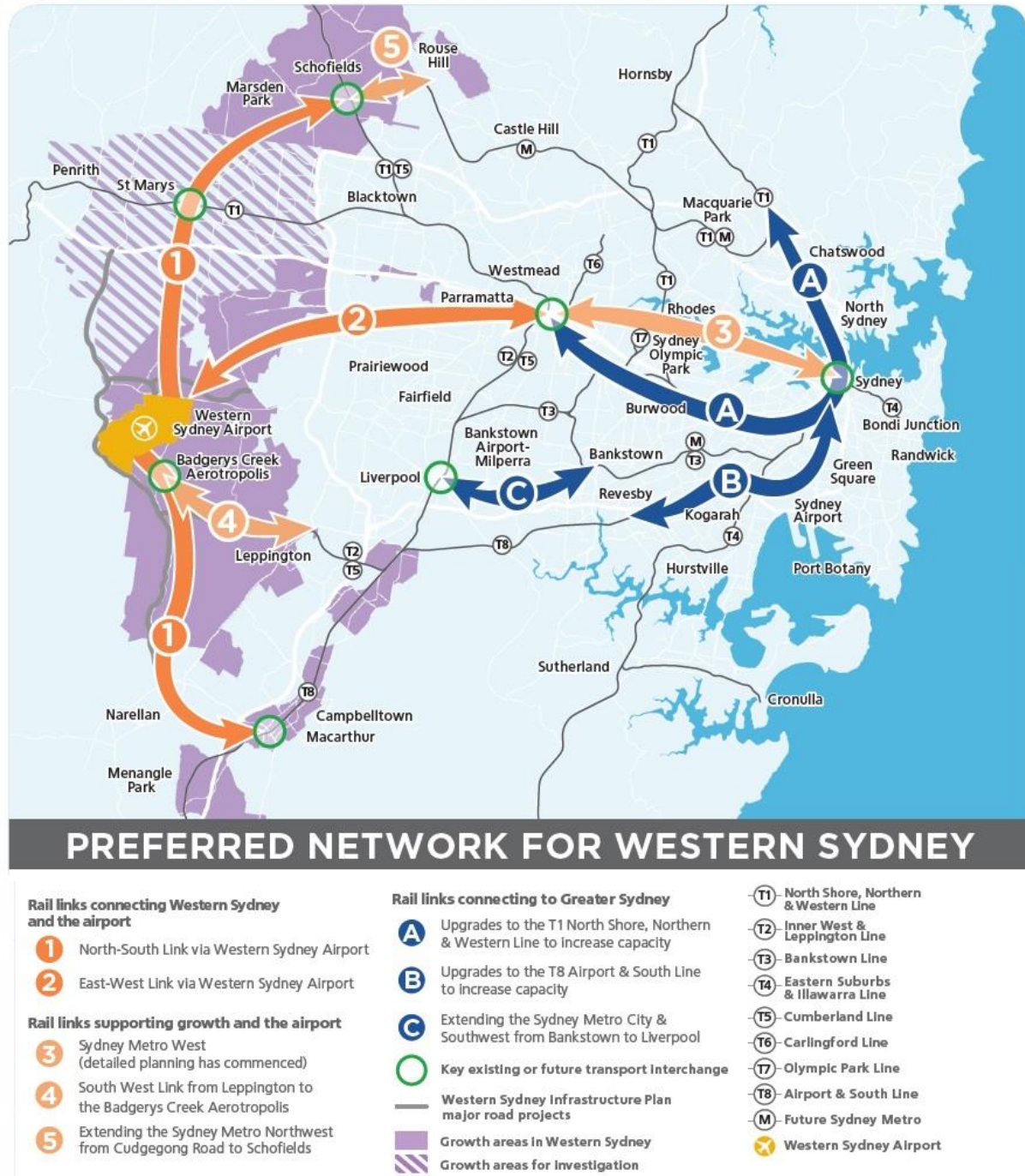


Fig 9: A metro is not mentioned in options 1, 2.

https://www.westernsydneyairport.gov.au/sites/default/files/WSRNSS_Outcomes_Report.pdf

This report includes the picture of a metro and mentions that "a metro would suit the North South Link". Strangely enough, there are different versions of findings in the same report. On p 12

(summary findings and recommendations) a metro is not mentioned, while on p 56 it talks about extending the North West Metro further south.

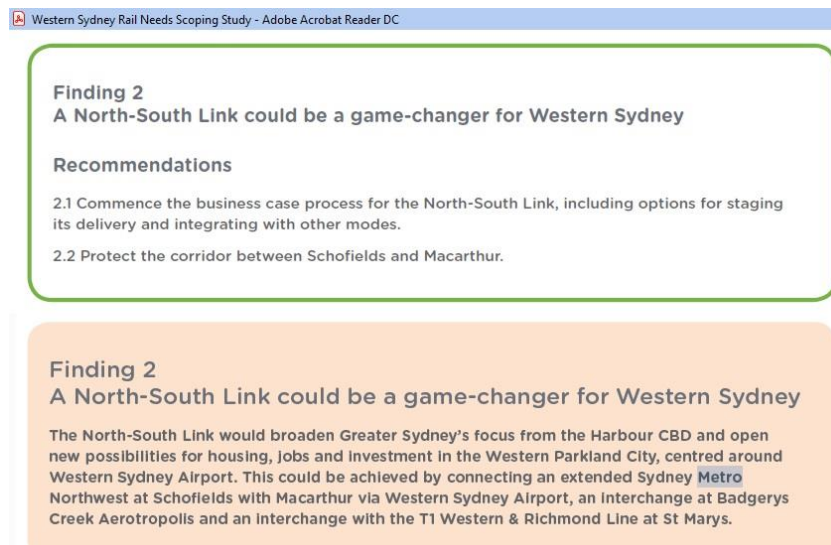


Fig 10: Different findings in relation to a metro on the North-South Link

Maybe this reflects different views of the Federal and NSW governments?

Table 5 gives following costings in 2017 dollars (sorted by cost)

Leppington–Badgerys Creek Aerotropolis, 7 kms\$2 bn

Leppington–Badgerys Creek Aerotropolis/Western Sydney Airport, 14 kms\$ 6bn

Schoefields–St Marys–Western Sydney Airport–

Badgerys Creek Aerotropolis–Macarthur, 60-70 kms\$ 15-20 bn

Table 6 “rail service offerings” quotes wrong speeds for metros. Metros are not designed for high maximum speeds because they usually stop frequently and hardly exceed 80 km/h with average speeds of course lower.

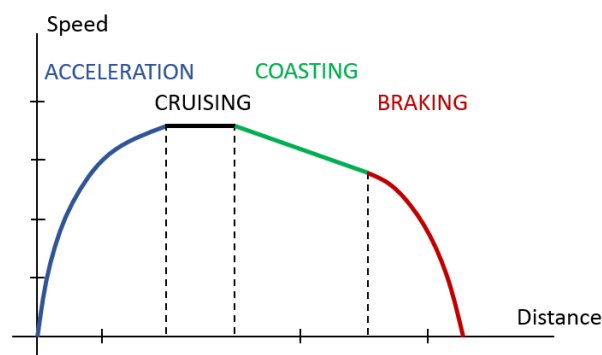


Fig 11: Metro vehicle optimized speed profile

https://www.researchgate.net/figure/Metro-vehicle-optimized-speed-profile_fig53_303629402

Most importantly:

Finding 5

Rail could play an important role in shaping Western Sydney, but it is not essential to the success of Western Sydney Airport at opening in 2026

Recommendations

5.1 Continue to plan for rapid bus and coach services to Western Sydney Airport from key Western Sydney centres.

5.2 Consider the findings of this report to inform the nature and timing of rail infrastructure enabling works on the Western Sydney Airport site.

Fig 12: The scoping study does not see any urgency for an operational rail link by 2026

In contrast:

The Western Sydney Airport Metro EIS, in chapter 6.1 "Rail corridor planning" quotes from the above: "The Scoping Study identified that a separated metro or light metro style of train would suit a north–south rail link." Light metro? Is that light rail? That should be incorporated in road corridors (grade separated).

It seems the proposed fully fledged, tunnelled and elevated metro has entered the planning process horizontally.

C) Metromania and Aerotropolis

So Metromania took over after 2018. The problem with the WSA metro is that it is incompatible with the heavy rail network prevailing in Sydney's West. The planners are apparently in the belief that apart from passengers there will be a huge office world to be served. Here is an example:



Fig 13: Office world galore

[https://shared-drupal-s3fs.s3-ap-southeast-2.amazonaws.com/master-test/fapub_pdf/00+-+Planning+Portal+Exhibitions/Western+Syd+Aero+Planned+Precincts+/WSAPP+new/WesternSydneyAerotropolisPrecinctPlanningReportv9.pdf](https://shared-drupal-s3fs.s3-ap-southeast-2.amazonaws.com/master-test/fapub_pdf/00+-+Planning+Po+Planning+Portal+Exhibitions/Western+Syd+Aero+Planned+Precincts+/WSAPP+new/WesternSydneyAerotropolisPrecinctPlanningReportv9.pdf)

Moreover, the metro runs in a tunnel (boring machine bonanza) which is unnecessary in an area which is basically virgin land. A short tunnel to an underground station near the airport terminal would be normal.

The Aerotropolis EIS is still in the consultation phase. This should have come first. On the basis of a proper land use plan for different uses (commercial, industrial, residential-away from noise) with numbers attached to it (areas in hectares, job numbers, population projection with immigration targets etc.) you would then select a proper rail infrastructure, its alignment and technology to serve the different functions in the precincts. This should also include rail sidings and a 3rd freight track. This is because we do not know when or whether the Outer Sydney rail freight Orbital and the Western Sydney freight line will be built. For \$ 11 bn we should expect a multifunctional rail line.

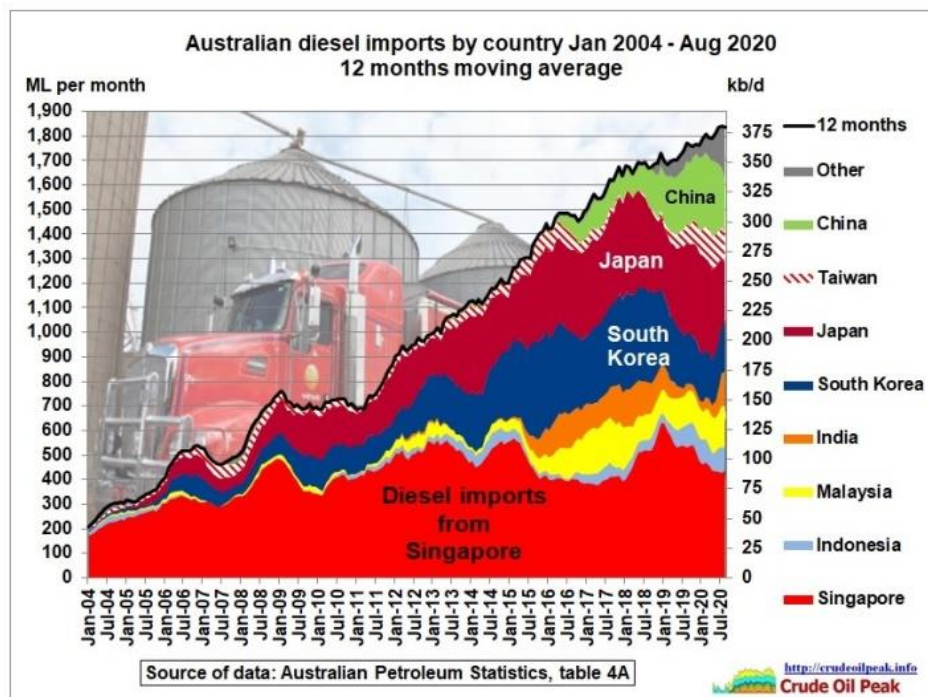


Fig 14: Australian diesel imports

The logistics of the WSA and the Aerotropolis will completely depend on road transport i.e. diesel imports. Good luck in case there is a military confrontation in the South China Sea or – heaven forbid – Iran acquires a nuclear weapon.

The latest on Australia's oil vulnerability is in this post:

14/11/2020 Australia's BP Kwinana refinery closure: peak oil context

<https://crudeoilpeak.info/australias-bp-kwinana-refinery-closure-peak-oil-context>

An electrification of freight trains like you have it in Europe is also overdue.

Let's have a look at the structure plan in the Aerotropolis EIS (p 17)

- "Intermodal Terminal" for imported containers coming from Port Botany at the end of a yet-to-be-built Western Sydney Freight line for which land is being protected.
<https://www.transport.nsw.gov.au/corridors/wsfl>
- "North South Rail Line Corridor" the colour overlaps with other colours so it's confusing and not mentioned in the text
- "Potential East-West Rail Link and Stabling " to be seen near the M12 (does that go to the West Metro ending in Westmead, Fig 7?)
- "Proposed Future Rail Links" a dotted line to Leppington and to the South

Are the planners mixing up "rail link" and "metro" - using the same tunnel? Maybe "rail link" was the original idea which somehow survived in the Metromania planning mill ?? And look at this website, dated 30 June 2020:

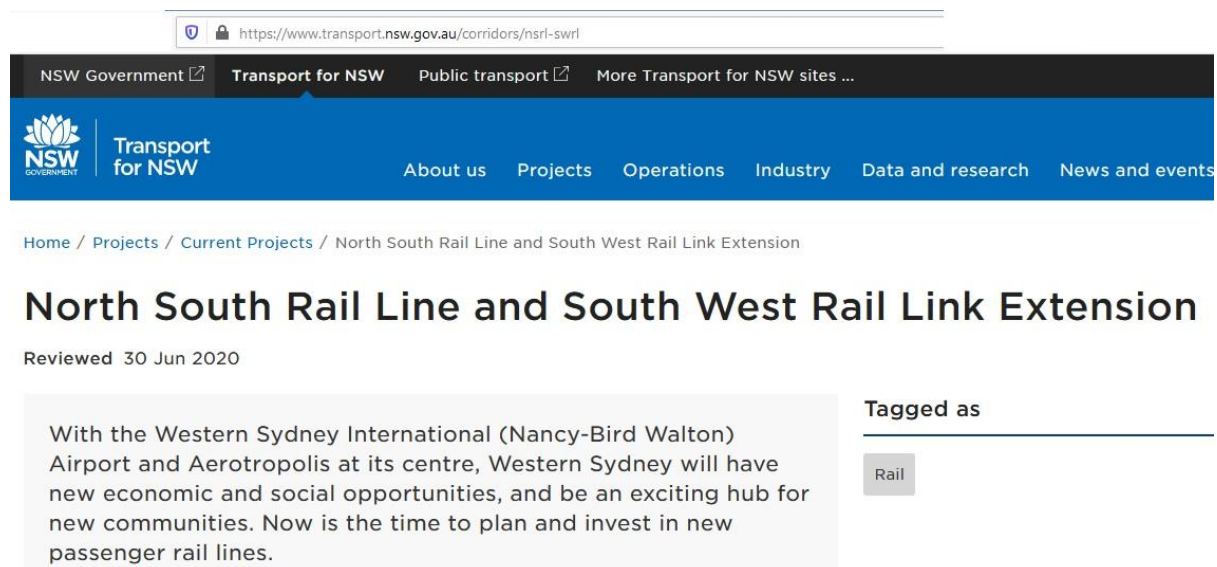


Fig 16: North South Rail Line and South West Rail Extension

<https://www.transport.nsw.gov.au/corridors/nsrl-swrl>

No mention of a metro, which seems to be an afterthought.

D) The minimum no-regrets solution

Let's consider this scenario:

- the RBA prints more money and the Federal government wastes \$5.3 bn for building the airport (stage 1).
- In 2026, the expected completion date, airlines still have not recovered from the combined financial shocks of 2008/09, Covid and weak economies around the world
- [Covid has become a recurring problem with multiple strains - even after vaccination campaigns](#) – resulting in low load factors, higher airfares and permanently reduced air traffic demand
- Airlines don't have the money to move to WSA.

What happens then? The metro estimated to cost a whopping \$11 bn (\$5.25 bn from the Federal Government) – DOUBLE THE COST OF THE AIRPORT - will never become commercial. A disaster for

governments who want to privatize everything including of course selling the new WSA itself – just in case astute investors are found.

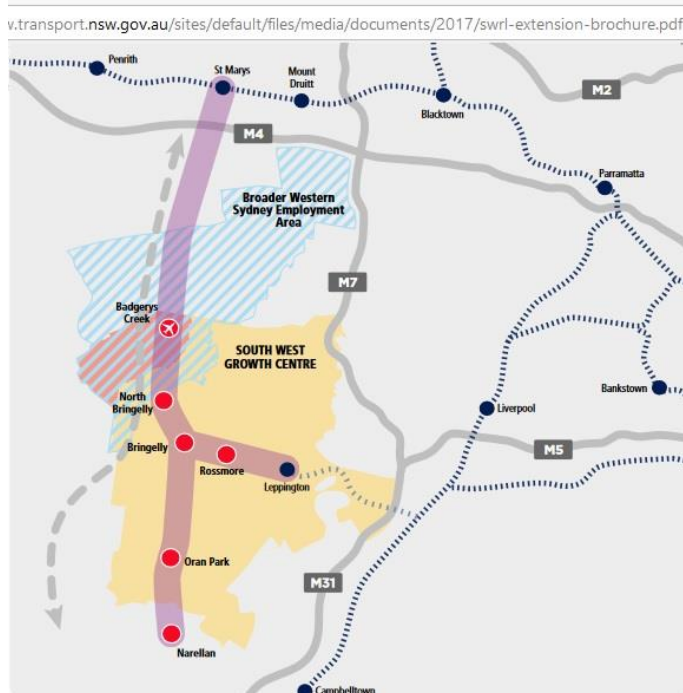


Fig 17: The low risk solution is the extension of the Leppington (heavy rail) line which was originally built to serve a Badgerys Creek airport until yes, Metromania took over every aspect of rail planning in Sydney.

<https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/swrl-extension-brochure.pdf>

<< this map is from 2017

The scoping study estimated that extending the South West Rail Link from Leppington to the Aerotropolis would cost up to \$ 2bn and to the Western Sydney airport \$ 6bn (2017 dollars)

If the WSA fails, industrial areas plus a technology park (import substitution to make Australia less dependent on foreign goods) can still be built and these would need rail sidings (especially in a low carbon world) for distribution to other parts of Australia along the trunk rail lines. The connection to the Moorebank intermodal terminal is also there via Leppington.

Moorebank has just opened a year ago, in December 2019:



Fig 18: Freight train from Botany arriving in Moorebank

<https://southwestvoice.com.au/moorebank-intermodal/>

Electric freight trains like in Europe will have to be introduced anyway. But that is still not in the government's mind. Their heads are full of driverless, imported metros, airports and other business-as-usual infrastructure like road tunnels.

E) The long term solution

In a 2nd stage, funds permitting, the above minimum rail line could continue north to St Marys, then connect to the Richmond line at Schoefields and on to Hornsby, providing a bypass to the congested freight corridor on the Northern line (where the provision of additional freight tracks has stalled). Unfortunately, an incompatible narrow body metro infrastructure has now been built in the Rouse Hill – Castle Hill corridor, which will be bitterly regretted. It is high time the Metromania is stopped before more irreparable damage is inflicted. Abandoning the Metromania has to be done right now, after Rod Staples was sacked. He was the one who pushed Premier Berejiklian to change the NWRL into a metro as mentioned above.

In a 3rd stage a southern extension could go up to MacArthur.

Summary

The WSA faces a triple whammy (in that sequence): Corona pandemic, peak oil, climate change. Its final use may be to serve as a base for tanker planes fighting fires in the Blue Mountains.

The WSA metro is

- Incompatible with the rest of Western Sydney's rail system
- The wrong technological choice (insufficient number of stations to justify fast accelerating, imported metros)
- Very expensive (long tunnel sections),
- Financially risky (linked to equally risky airport),
- Mono functional and inflexible (small diameter tunnels)

This project should be taken out of the hands of Sydney Metro and re-planned by Sydney Trains including a freight function.

Appendix

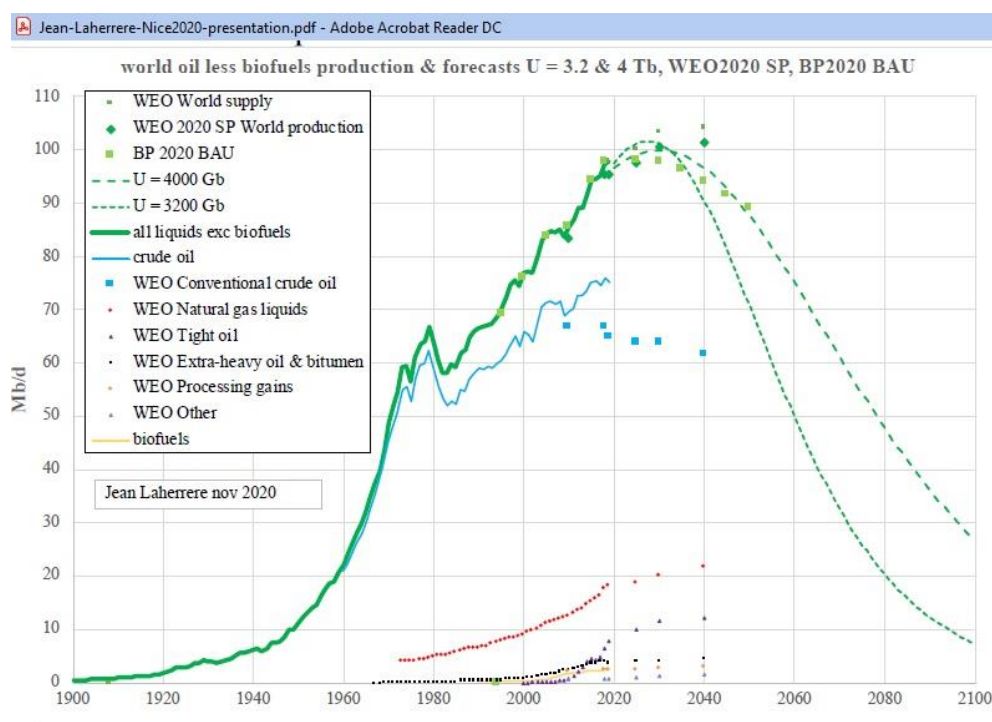


Fig 19: Global oil peak estimate excluding biofuels around 2025 by Jean Laherrere (Nov 2020)
<https://aspoFrance.org/2020/11/30/evolution-de-lenergie-pics-passes-presentes-et-futurs/>

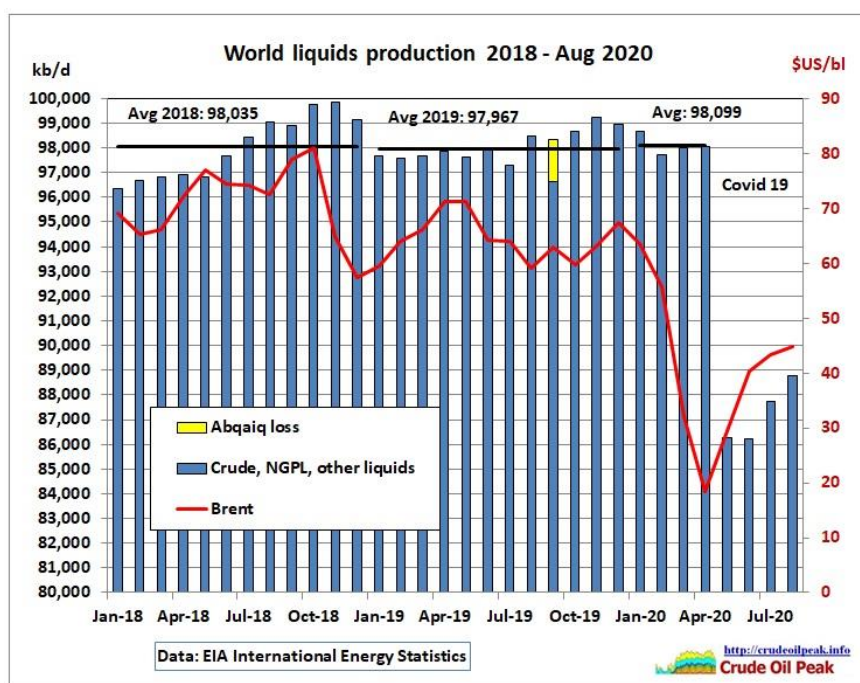


Fig 20: World liquids production

Prepared by Matt Mushalik (MEng)
 2/12/2020