Benefits and Costs of Integration in Transmission/Transportation Networks

An Application to Eastern Australia Gas Markets

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This report was prepared for APA Group. All results and any errors are the responsibility of the authors and do not represent the opinion of The Brattle Group or its clients.

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Executive Summary

APA Group has asked The Brattle Group to review integration in APA's pipeline operations in Eastern Australia since the acquisition of Epic Energy in December 2012, and to identify the economic costs and benefits associated with integration.

By combining the ownership of previously separate assets, integration (commonly through mergers and acquisitions) can give rise to benefits from economies of scale and scope, but can also give rise to costs if the integration increases market power. Costs could come from bundling and foreclosure, but we are not aware of any evidence that this is occurring for pipeline transportation in Eastern Australia.[1] Costs could also come from monopoly pricing of pipeline transportation, but APA's pipeline integration since 2012 described in this report has not increased the risk of monopoly pricing.

Since APA's acquisition of Epic Energy, APA has been able to operate its pipeline assets in Eastern Australia as an integrated grid, allowing shippers to move gas across key routes in Eastern Australia using only APA's pipelines, whereas previously it would have been necessary to contract with at least two pipeline owners. This provides benefits to shippers in terms of reduced transaction costs and improved service quality (for example, lower imbalance charges and more efficient scheduling). Additionally, integrated ownership allows APA to operate the grid more efficiently than multiple independent owners—ie, at lower overall economic cost. Integration also allows APA to offer services across several assets—services which could not be provided by independent owners.

In this report, we have quantified some of the economic value associated with the increased efficiency and the new services that have been achieved through integrated pipeline ownership in Eastern Australia. Since APA operates its interconnected pipelines on an integrated basis, it can use compressors and other key infrastructure to support transportation services on more than one pipeline, according to market needs. If these pipelines were independently owned, more infrastructure, such as compressors, would be required to provide the same level of service. As a result, we find that integrated ownership has resulted in cost savings of over $110m as the otherwise wasteful duplication of facilities has been

[1] The ACCC's recent inquiry (*Inquiry into the east coast gas market* (ACCC, April 2016)) looked for but did not find evidence of foreclosure or anti-competitive price discrimination.

avoided, as well as a further $40m of savings that will be realized if expectations of demand increases are borne out. In addition, operating APA's pipelines centrally saves around $7m per annum in operating costs relative to independent operation of APA's main Eastern Australia pipelines.

Besides the above operating and capital cost savings, integration has allowed APA to provide park-and-loan services (akin to storage services) that could not have been provided by independently owned pipelines. We estimate that park-and-loan services provide an economic benefit of between $7.5m and $25m annually. Park-and-loan was used extensively during the commissioning phase of the LNG facilities in Queensland, creating an economic benefit of at least $10.5m and more likely around $35m in avoided costs in 2015.

In addition to these quantified benefits, integration has brought important service quality improvements. For example, APA offers a single standard-form transportation agreement that covers access to all of its Eastern Australia pipelines, reducing transaction costs associated with obtaining access to multiple pipelines. Under this new transportation agreement, imbalance charges are significantly lower than those traditionally charged on a single-asset basis because shippers can access park-and-loan services, for which charges are only 25% of the typical imbalance charges paid under traditional single-asset GTAs. In 2013 and 2014, before APA introduced its multi-asset GTA, shippers paid around $3.3m per annum in imbalance charges. Had these imbalances been charged at the lower park-and-loan rate instead, shippers would have saved about $2.6m. Force Majeure (FM) arrangements are also more favourable, in that if FM is called on one asset it would excuse shipper reservation payments on all up- and down-stream assets. Central operation of APA's pipelines has also resulted in a system that can more quickly and effectively respond to shipper needs, for example through park-and-loan services at a fraction of the cost of imbalance charges.

I. Introduction

APA has built a portfolio of pipeline assets in Eastern Australia over the past 15 years which now form APA's "east coast grid".[2] A significant step in developing and integrating APA's portfolio was the acquisition of Epic Energy in December 2012, which "fulfil[led] APA's vision of creating an east coast pipeline grid".[3] As part of that transaction, APA acquired the SWQP (including the QSN link), which is the major pipeline linking the Queensland coal seam gas fields to the pipelines serving the southern markets.

APA has asked The Brattle Group to review its experience in integrating its pipeline operations in Eastern Australia since acquiring Epic Energy, and to identify the economic costs and benefits associated with integration.

An integrated pipeline grid in the Eastern Australia gas market enables APA to offer new services, realize operational efficiencies and support demand for services on its existing pipelines which had traditionally served the declining fields at Moomba. The commercial rationale for the acquisition was thus a combination of efficiency savings and developing new services that would utilize both Epic Energy's assets and APA's existing assets.

Nonetheless, as a general matter, the integration of previously independent assets through mergers or acquisitions also raises the possibility that competition could be harmed by creating or strengthening a position of market power, giving rise to economic costs. For that reason, transactions that bring together previously-independent assets are subject to careful scrutiny by competition authorities.[4] The risk of such costs, and the balance between benefits and costs, depends on the nature of the network and whether the links to be integrated are complements or substitutes.

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2 See https://www.apa.com.au/our-services/gas-transmission/east-coast-grid/

3 See *APA's gas transmission portfolio*, presented at the UBS Resources, Energy and Utilities Conference, 14 June 2013 at pages 4-6, available at www.apa.com.au.

4 The ACCC reviewed APA's proposed acquisition of the Epic Energy and cleared it subject to APA's undertaking to divest APA's Moomba-to-Adelaide pipeline (see *Public Competition Assessment: APA Group - proposed acquisition of Hastings Diversified Utilities Fund*, ACCC 14 February 2013).

Network links are complements if the value of using both links together exceeds the value of using them both separately. Sequential links in a transportation route are complements, whereas alternative parallel routes are not. Network externalities exist where expansions to the network increase the value of existing network links. When links are complementary to one another, and/or network externalities exist, integrating previously independently-owned links may produce lower prices, promote more efficient utilization of existing pipeline capacity, and lead to socially beneficial development of future network investment.[5] Integration of complementary links and the presence of network externalities do not increase the risk of monopoly pricing,[6] but can give rise to concerns over the potential for foreclosure or anti-competitive price discrimination. However, we are not aware of any evidence of foreclosure or anti-competitive price discrimination for pipeline transportation in Eastern Australia.[7]

This report identifies and, where possible, quantifies examples of economic benefits that have resulted from integration in the Eastern Australia gas network from 2013 to 2015. During this period APA expanded its networks by acquiring complementary links and by investing in existing assets to deliver new services.[8]

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5 For example, "In the presence of network externalities, it is evident that *perfect competition is inefficient*. The marginal social benefit of network expansion is larger than the benefit that accrues to a particular firm under perfect competition. Thus perfect competition provides a smaller network than is socially optimal…" [emphasis in original], Nicholas Economides "Public Policy in Network Industries" in Paolo Buccirossi, ed., *Handbook of Antitrust Economics*, 2008, Cambridge, MA, The MIT Press, p. 479. See also pp. 484-486.

6 The ACCC inquiry suggested that, consistent with the design of relevant regulatory and legal frameworks, pipelines are able to and are charging "monopoly" prices in some circumstances. The risk of monopoly prices is not increased by the integration of complementary links that we describe in this report.

7 *Inquiry into the east coast gas market* (ACCC, April 2016). Table 6.1 of the ACCC's report summarises findings on the exercise of market power, and concludes "no" to the question of restricted access or denial of access. The report also says "While some concerns were raised about foreclosure, the Inquiry has not seen any evidence of this behaviour to date." (p. 103). The ACCC's report also asks whether any pipelines are "engaging in anti-competitive price discrimination (for example, by pricing in a manner that favours affiliates, raises barriers to entry or amounts to predatory pricing)" and answers that "There is no clear evidence that pipelines are engaging in anticompetitive price discrimination." (p. 102).

8 *Inquiry into the east coast gas market* (ACCC, April 2016) acknowledges some examples of complementarity across network links (pp. 98–99): "On some of these new routes, pipelines that have traditionally competed with each other for supply into Adelaide, Sydney and the ACT (for

Continued on next page

II. Examples of Integration Benefits

APA owns a number of the pipelines that make up the network in Eastern Australia. Of particular significance is that APA both owns several pipelines that meet at the Wallumbilla hub, and it owns pipelines corresponding to key transportation routes. For example, gas can be transported from Longford to Wallumbilla or from Wallumbilla to Sydney on APA pipelines. The significance of the Wallumbilla hub has increased with the commencement of the Queensland LNG projects, and the integration of the pipeline between Moomba and Wallumbilla with the rest of APA's assets is also relatively recent.[9]

A schematic diagram of the East Australia pipeline network is shown in Figure 1, while Table 1 lists 18 major pipelines that serve Eastern Australia. Figure 1 also indicates the major sources of gas production, with the figures on the map showing production in the year to March 2015.

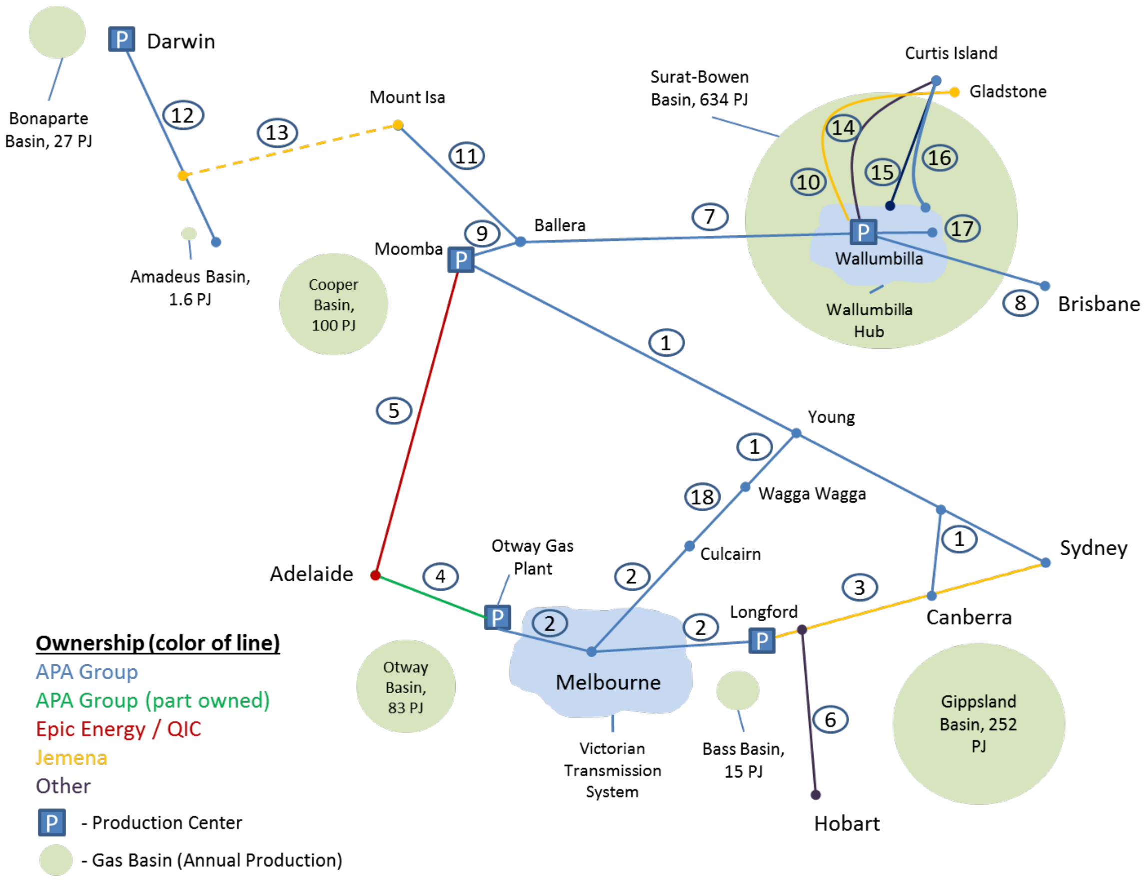
The nature of the pipeline network is such that some important nodes are served by more than one pipeline. Specifically, Sydney can be supplied with gas flowing from Moomba on the MSP or from Longford via the EGP. However, gas at Moomba must flow on the QSN Link / SWQP if it is to be exported at Gladstone.

Continued from previous page

example, MAPS and SEA Gas Pipeline, and the MSP and EGP) are starting to operate as complements, rather than substitutes, under some transactions."

9 APA purchased Epic Energy, which owned the SWQP and QSN Link pipelines, in 2013.

Figure 1: Major Gas Pipelines in Eastern Australia[10]



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10 Gas basin production figures are from the ACCC's *East Coast Gas Inquiry Report*, Figure 1 and Chart 2.3 (for Gippsland, Otway, Bass, Cooper, and Surat-Bowen basins, covering the 12 months ending in December 2015). Figures for the Amadeus and Bonaparte basins are from the AER's 2015 *State of the Energy Market* report, Table 3.1, and cover the 12 months ending in June 2015.

Table 1: Gas Pipelines in Eastern Australia (2015)

Map Number	Pipeline Name	Acronym	State	Operator	Ownership	First Gas Flow	Length (km)	Capacity (TJ per day)
1	Moomba to Sydney Pipeline System	MSP	NSW	APA Group	APA Group (100 percent)	1998	1,300 – Mainline 642 – Laterals	439
2	Victorian Transmission System	VTS/DTS	VIC	AEMO	APA Group		1,992	
3	Eastern Gas Pipeline	EGP	VIC / NSW	Jemena	Jemena Ltd - owned by Singapore Power International (100 percent)	2000	797	298
4	South East Australia Gas Pipeline	SGP	SA	SEA Gas (APA Group provides maintenance services for SEA Gas)	APA Group (50 percent), Retail Employees Superannuation Trust (50 percent)	2004	680	314
5	Moomba to Adelaide Pipeline System	MAP	SA	Epic Energy South Australia	Epic Energy South Australia	1969	1,185	241
6	Tasmania Gas Pipeline	TGP	VIC / TAS	OSD Asset Services Pty Ltd	Palisade Investment Partners (100 percent)	2002	740	130
7	South West Queensland Pipeline	SWQP	QLD	APA Group	APA Group	1996	755	385 - Western Haul 400 - Eastern Haul
8	Roma - Brisbane Pipeline	RBP	QLD	APA Group	APA Group	1969	438	233
9	QSN Link	QSN	QLD	APA Group	APA Group	2008	182	400
10	Queensland Gas Pipeline	QGP	QLD	Jemena	Jemena Ltd - owned by State Grid of China (60%) and Singapore Power International (40%).	1990	627	152
11	Carpentaria Gas Pipeline	CGP	QLD	APA Group	APA Group (100 percent)	1998	840	119
12	Amadeus Gas Pipeline	AGP	NT	APA Group	APA Group	1986	1,658	104
13	North East Gas Interconnector	NEGI	NT	Jemena	Jemena	2018	623	
14	GLNG Pipeline	GLNG	QLD	GLNG	GLNG	2014	420	1,400
15	APLNG Pipeline	APLNG	QLD	Origin Energy, on behalf of APLNG	APLNG	2015	362	1,560
16	Wallumbilla Gladstone Pipeline	WGP	QLD	APA Group	APA Group	2015	334	1,410
17	Berwyndale to Wallumbilla Pipeline	BWP	QLD	APA Group	APA Group	2009	112	150
18	NSW-Victoria Interconnect	NVI	VIC / NSW	APA Group - Bomen to Culcairn section AEMO - Culcairn to Barnawartha section	APA Group (100 percent)	1998	88 km – Bomen to Culcairn section 62.5 km – Culcairn to Barnawartha	86

Source: GSOO Gas Facilities, April 2015.
The GSOO considers the QSN link part of the SWQP, so data for the QSN link separately comes from the APA website. Information for the AGP and NEGI come from APA's and Jemena's websites, respectively.
The Wallumbilla Gladstone Pipeline, previously known as the QCLNG Pipeline, was acquired by APA in June 2015.

We have examined recent developments in the services offered by APA to shippers, and in how APA delivers those services. In doing so, we have identified a number of examples demonstrating how common ownership of multiple assets has delivered benefits that could not have been realized under independent ownership, or that would have been more expensive to realize without integration. We identify four potential sources of benefits:

i. **Incentives to improve quality or increase capacity:** Post integration, there are incentives to improve service quality or increase capacity, because increased throughput on one link will result in increased throughput on other, complementary links under the same ownership.

ii. **More efficient network utilization through reduced transaction costs**: Integration may reduce transaction costs for those purchasing the integrated product. For the purchaser (and possibly the seller), those transactions costs may include the time/cost involved in identifying available capacity or supply, arranging and scheduling the transaction, and having the transportation/transmission service take place close to the desired departure/injection and delivery/withdrawal times.

iii. **Productive efficiency gains:** Integration may result in improved scheduling/coordination of production, which allows efficient transactions to take place that would otherwise not. This is particularly true in the gas market, where near continuous flows coupled with production, network and storage capacity constraints, makes coordination across different owners of complementary links costly.

iv. **Incentives to lower costs so as to increase volumes:** Reducing the price on one link will increase volumes on all complementary links, raising the profits from operating these complementary links. Before integration, the owner of one link will not "internalize" profit increases on other links when deciding on the profit maximizing price for that link. After integration, the owner will internalize profits on other links and thus has an incentive to lower prices and increase volumes.

Our examples of integration benefits are summarized in Table 2. Where possible, we have quantified the magnitude of the economic benefits associated with these examples. The benefits from integration come from services that, as a result of integration, can be delivered at lower overall cost (for example, by sharing a compressor between adjacent pipelines rather than building a second independent compressor). From a broad societal perspective, the magnitude of the benefit is equal to the avoided cost. In some cases there may be a benefit to shippers, for example from the improved Force-Majeure (FM) regime, for which we have not quantified a direct societal benefit.

The remainder of Section II explains these benefits in more detail.

Table 2: Examples of integration benefits

Example	Description	Source of benefit	Magnitude of benefits
Incentives to improve quality or increase capacity			
The Integrated Operations Centre	All relevant functions are in one place and available 24/7, facilitating new and more flexible service offerings.	Permits assets to be operated in an integrated fashion.	Necessary for delivering the benefits from multi-asset GTAs and park-and-loan listed below .
Multi-asset GTAs	APA offers uniform contractual terms for access to any of its assets.	Only possible with multiple assets (no evidence of secondary-market solutions not involving integrated ownership)	Reduced costs for shippers in negotiating and operating new GTAs since terms and conditions, and nomination procedures, are common.
Force-Majeure	If FM is called under a multi-asset GTA, no reservation charges are due during FM on any pipeline. Under single-asset GTAs reservation charges are due even if capacity cannot be used because of FM on another pipeline.	Shippers using more than one pipeline are protected from the risk of paying for capacity that they cannot use due to FM called on an up- or down-stream pipeline.	FM regime is improved from a shipper perspective. Effectively an element of insurance is provided that covers up- and down-stream reservation charges for the duration of the FM event.
Developing the NEGI concept	APA invested effort in originating and developing the NEGI concept prior to the formal government-led process.	APA has a greater opportunity to benefit from additional flows on existing assets caused by connecting a new pipeline.	APA invested $2m in developing the NEGI concept ahead of the formal government-led process.
Sizing of NEGI	APA was prepared to build a larger pipeline than would have been supported by shipper commitments at the time.		No "oversizing" benefits were realized since APA was not selected to build NEGI.
More efficient network utilisation through reduced transaction costs			
Storage services using linepack	APA provides storage (park-and-loan) to customers to cover large short-term swings in supply/offtake.	Service provided using linepack across a number of APA assets, operated in an integrated fashion.	Value to the LNG operators during commissioning phase in 2015 the range of $10.5m-$35m. Ongoing value to all customers in the range $7.5m-$25m per year.
Lower imbalance charges	APA provides a bundled park-and-loan service with new transportation agreements.	Integrated operation of multiple assets reduces the cost of managing imbalance and offering storage.	Park-and-loan service is priced at about $0.50/GJ/day, while imbalance is priced at about $2.00/GJ/day. In 2013 and 2014 this would have saved shippers approximately $2.6m per year in imbalance charges if shippers had been on multi-asset GTAs.
Net imbalance	Imbalance charges are now calculated on net imbalance volumes across all assets under the multi-asset GTAs, reducing shipper charges under some circumstances.		Further reduction in imbalance charges due to netting of imbalance volumes across pipelines.
Productive efficiency gains			
The Integrated Operations Centre	APA's assets are now operated from an integrated control room whereas previously there were five individual control rooms.	Economies of scale across assets resulting in efficiency savings (reduced internal costs).	Efficiency savings of about $1.1m per year from the creation of the IOC. Relative to independent operation of APA's major Eastern Australia pipelines, a saving of about $7m per year.
Optimizing assets at Wallumbilla	APA can develop new redirection services at Wallumbilla without significant investment.	Through owning multiple assets at Wallumbilla APA is able to add optionality to allow existing compressors to provide multiple services. Because APA retains custody of gas that moves between its assets at Wallumbilla, APA does not need the metering assets that would be required at the interface between independent pipelines.	Avoided investment of around $40m to create additional capacity to meet future demand. Avoided investment of around $55m to meet demand for reversal on the RBP. Avoided investment of around $2-$3m to meet demand for reversal on BWP.
Moomba redirection service	APA offers an interruptible service to move gas out of the MSP and flow the gas east from Moomba (via the Moomba gas processing plant).	Service on the MSP provided using a backup compressor on the QSN Link.	Avoided investment of around $55m.
Incentives to lower price so as to increase volumes			
Discounted transportation tariffs for NEGI shippers	As part of its offer to build the NEGI pipeline, APA offered NEGI shippers reduced tariffs on parts of its existing network.	APA benefits from any increased flows on complementary network links induced by discounted tariffs.	No benefits were realized since APA was not selected to build NEGI.

A. Incentives to improve quality or increase capacity

In this section we discuss several examples where service quality or capacity has increased as a result of integration. We quantify the benefit of these improvements where possible.

1. The Integrated Operations Centre

APA's main pipeline assets are currently operated from the Integrated Operations Centre (IOC) in Brisbane. Established in 2015, the IOC allows APA to take a "grid" rather than an "asset" perspective on its operations, and also brings together operational staff and commercial staff in one location. Prior to opening this new control room, APA's pipeline assets were operated from a group of five separate control rooms in Western Australia, Queensland, New South Wales, Victoria and the Northern Territory. The IOC brings several benefits; most obvious to shippers is that new services are being offered that require real-time integrated operations across several assets, and that require close collaboration between operations and commercial staff.

We discuss several of these new services below. An example is short term park-and-loan services for the LNG terminal operators. These services are provided on an interruptible basis,[11] pursuant to multi-year contracts that the operators have negotiated with APA. If, for example, one of the LNG operators wished to store a large volume of gas for a few days, the decision over whether it is possible to accept the request could involve checking the status of several pipelines to determine whether the volume could be accommodated without prejudicing APA's ability to maintain safe operations and deliver firm transportation service commitments. This process would be more difficult and time consuming if the IOC did not exist and the pipelines were operated from separate centres. We explain below that it is unlikely that this service could have been offered if the pipelines were not under common ownership (because of transaction costs).

We understand that one of the benefits of the IOC is that personnel with all of the required skills can be available in the IOC 24/7. Prior to creating the IOC, the individual control centres did not have all of the corresponding personnel on site 24/7. Some control centres

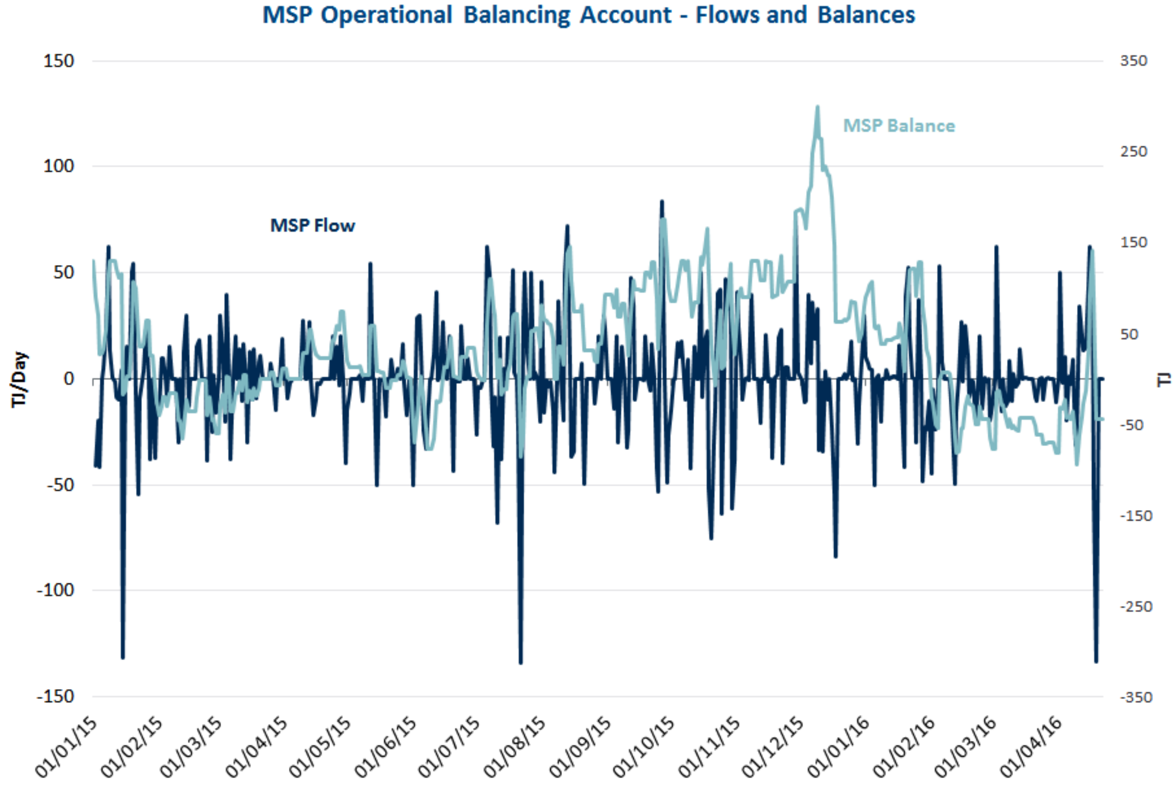
[11] Usual practice in the industry is for interruptible services to be offered on a pay-per-use basis, whereas firm services require a capacity payment that is independent of usage (plus a small additional usage fee).

were not staffed at all times, with control passing to another centre and local staff available on an on-call basis.

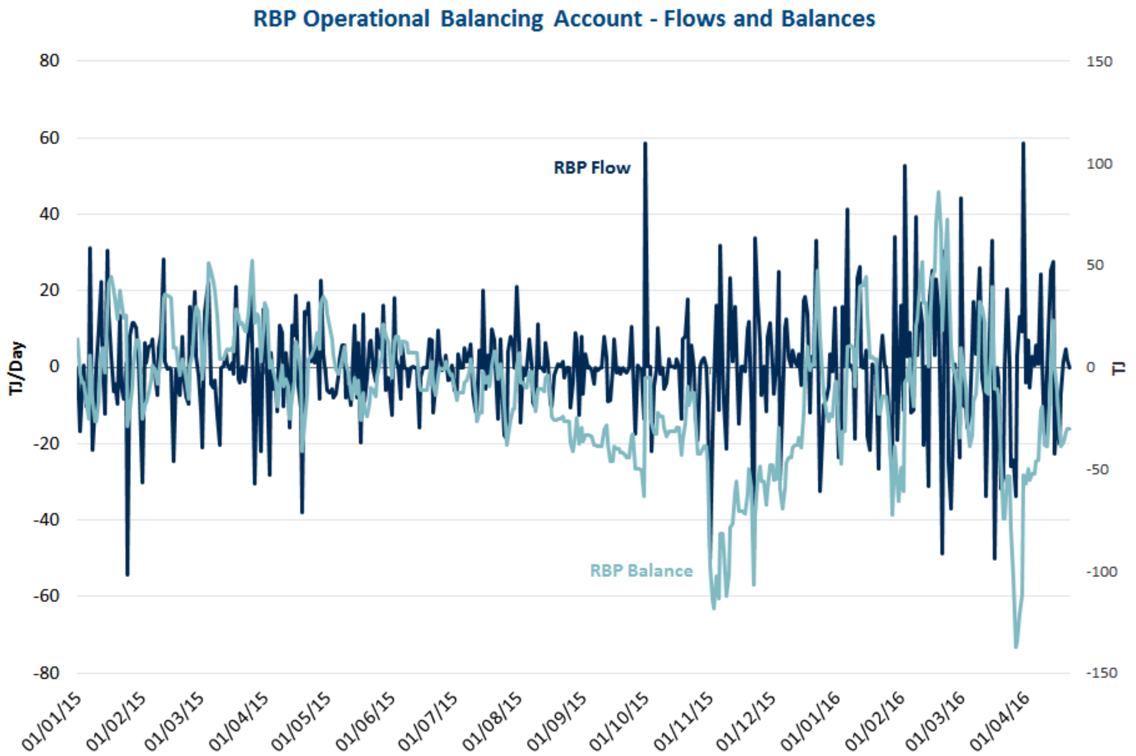
By bringing a number of operational and commercial functions into one room, the IOC permits APA to provide more services by using its existing assets more extensively than would be possible on a stand-alone basis. For example, APA is able to move linepack (stored gas) between its interconnected pipelines so that the network is well-positioned to meet anticipated future demand peaks, and is able to provide both storage services (park-and-loan) and transportation services. The ability of a pipeline to move gas is a function of the pressure differential between the two ends of the pipeline, whereas the ability to store gas is a function of pressure (and the quantity of gas already in the pipeline). For example, storing additional gas in the pipeline tends to raise the pressure. Given a maximum operating pressure, storing gas reduces the pressure differential that drives transport from one end of the pipeline to the other. APA is able to optimize across multiple pipelines, and achieve a more efficient outcome than would be obtained by operating each pipeline individually. This optimisation involves moving linepack between pipelines (if pipelines are being operated individually, gas would only enter or leave the pipeline in response to shipper nominations; integrated operation involves APA moving gas between pipelines, for example in order to optimise between storage capacity on one pipeline and transportation capacity on another). APA tracks movement of gas on its own account (rather than resulting from shipper nominations) in an "Operational Balancing Account" (OBA).

We illustrate the extent to which APA actively manages linepack using OBA data for the MSP, the RBP and the SWQP. Figure 2 shows, for each pipeline, the OBA balance on each day (right scale) as well as the change from one day to the next (left scale). Figure 2 shows that there can be significant movements of gas across these pipelines on a daily basis, as well as large cumulative movements on longer timescales.

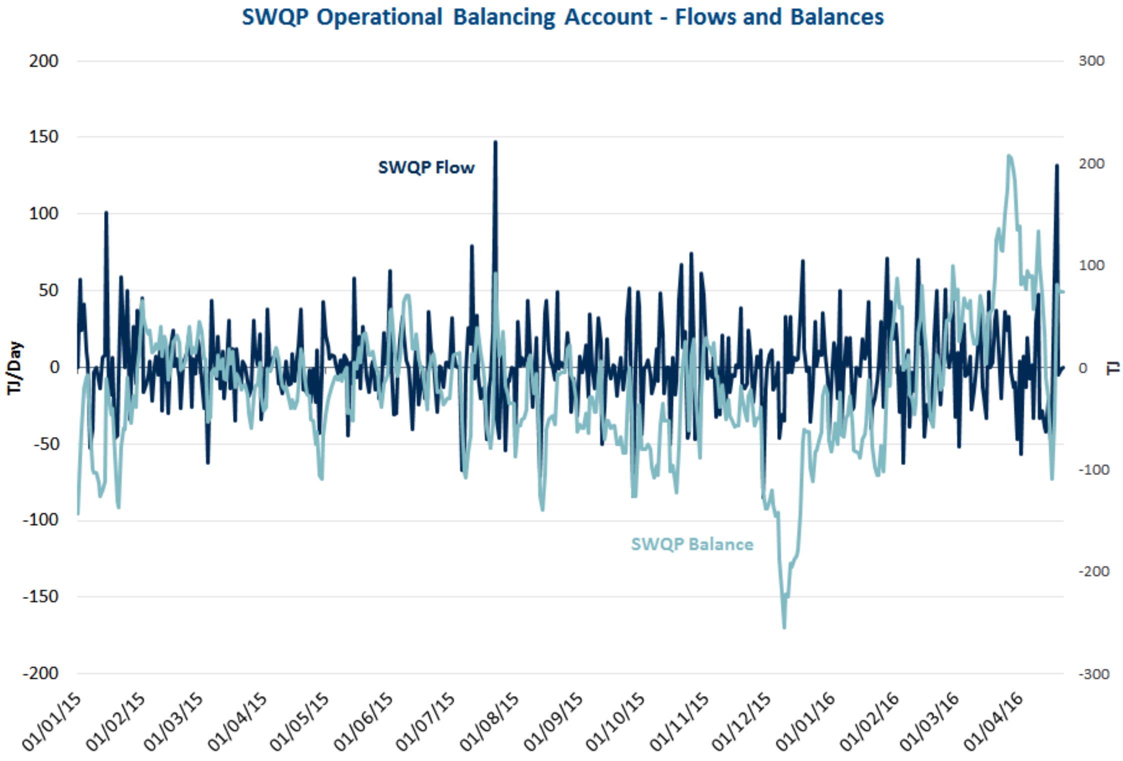
Figure 2: Daily OBA Flows and Balances for MSP, RBP and SWQP



Source: APA Shipper Contract Inventory.



Source: APA Shipper Contract Inventory.

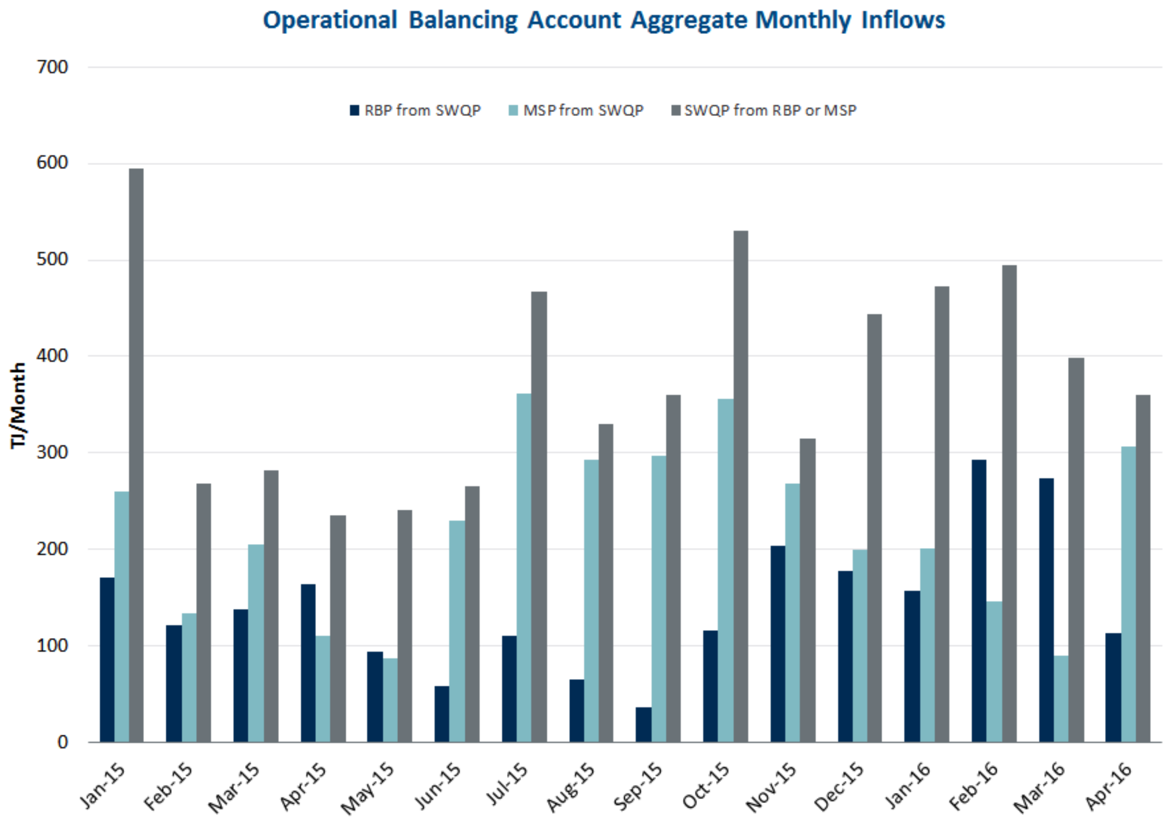


Source: APA Shipper Contract Inventory.

To illustrate further the extent to which APA is actively optimising the operating characteristics of the pipelines, we have also constructed a monthly series that represents the sum of inflows to and outflows from each pipeline's OBA. Figure 3 shows, for each pipeline, the sum of the OBA increases across the month.[12]

[12] The MSP data represents the sum of all increases in OBA balance from one day to the next, representing the total volume that was moved from the SWQP to the MSP during the month (ignoring flows in the other direction); the RBP data similarly represents the total volume moved from the SWQP to the RBP during the month, and the SWQP data represents the total volume moved from the RBP and the MSP to the SWQP during the month.

Figure 3: Monthly Aggregate OBA Flows into MSP, RBP and SWQP



Source: APA Shipper Contract Inventory.

Figure 2 and Figure 3 show significant quantities of gas that APA is moving between pipelines on its own account rather than in response to shipper nominations. These flows would not occur if APA was not optimising across its pipelines in order to deliver the combination of transportation and storage services that shippers are demanding. If, for example, shippers wanted to store gas in the SWQP (ie, deliver more gas into the pipeline at Wallumbilla than was being withdrawn at Moomba), the linepack on the SWQP would increase. Since there is a maximum pressure that cannot be exceeded, and since transportation requires a pressure differential, increasing linepack reduces APA's ability to move gas between Moomba and Wallumbilla. By storing gas, the transportation capacity of the SWQP is effectively reduced.

Similarly, since reducing the quantity of linepack reduces the pressure in the pipeline, and since there is a minimum pressure and pressure differential required to maintain transportation capacity, loaning gas from linepack also reduces transportation capacity. If APA moves gas between the RBP and the SWQP, the ability to transport gas on the SWQP is maintained (at the expense of capacity on the RBP). APA is thus able to optimise which pipeline's capacity is reduced in providing storage services, taking into account expected future demands on the integrated system.

Moving gas from one pipeline to another in this way does not happen between independently-owned pipelines. If the pipelines were independently-owned, delivering the same quantities of storage and transportation services on each asset individually would require additional capital investment in increased pipeline capacity or storage assets.

APA was able to develop the IOC and associated multi-asset services as a result of integrating these complementary assets.

2. Multi-asset Gas Transportation Agreements (GTAs)

Many shippers have long-term GTAs that were signed some time ago. The terms and conditions of access would differ from one pipe to another, and some of the pipelines did not belong to APA at the time the current GTAs were signed. Furthermore a shipper holding capacity on adjacent pipelines—for example, the SWQP and the MSP—would operate those contracts separately to effect an end-to-end transport for example from Wallumbilla to Sydney. Separate nominations would be required for Wallumbilla to Moomba, and again from Moomba to Sydney.

APA's current practice is to offer all new and existing customers a "multi-asset GTA". The same standard GTA covers all APA assets, with the same terms and conditions applying to transport across any of APA's assets. Each multi-asset GTA will differ in the list of receipt and delivery points to which the shipper has access, and the list of services to which the shipper has access. All transportation paths are identified on the multi-asset GTA and priced individually. The GTA is otherwise standard. This has the following benefits:

- billing, nominations and other administrative procedures are simplified—for example, only one nomination is required to move gas across any assets to which the shipper has access;
- in case of imbalance, a single imbalance volume is calculated across all of the shipper's receipt and delivery points, and imbalance is calculated on a net basis; and
- once the GTA is in place, it is straightforward to add new receipt or delivery points, and new services, since the underlying GTA remains the same.

Multi-asset GTAs lower the transaction costs for shipping gas across multiple assets since only one GTA and one set of nominations is needed. This, in combination with the additional flexibility provided by new services (such as park-and-loan), may encourage new shippers to enter the market and/or encourage some customers to purchase their gas at the well head rather than on a delivered basis. For example, one relatively small industrial customer has started sourcing gas directly and self-shipping using a multi-asset GTA which allows for multiple sources of gas, permitting the customer to take advantage of cheap gas and interruptible transportation when available. Without the multi-asset GTA it would have been necessary to operate several individual GTAs, which would probably only have been economic as part of a larger aggregator portfolio. The multi-asset GTA is more valuable to the shipper because it permits additional flexibility.

These multi-asset contracts have only been offered for the last two years, following rationalization and integration of various businesses and operating practices that APA acquired. Although during the past two years few existing long-term GTAs have expired, eleven customers have already signed up for the new multi-asset GTAs. Nearly half of these are with new customers and all are for new services that were not previously offered. The median new GTA uses three pipelines, and access to as many as five pipelines may be provided under a single GTA. Many of the current single-asset GTAs will expire in the next 5–7 years and it is anticipated that the majority of these will be replaced with multi-asset contracts. Although only three multi-asset GTAs commenced before 2016, eight more are commencing in 2016 and beyond.

In principle it could be possible to realize the direct shipper benefits of multi-asset GTAs, in terms of reduced transactions costs, without common ownership of the underlying assets. A pipeline owner, a shipper, or an independent party could hold capacity on multiple pipelines, perhaps through a combination of ownership and contracting. That entity could then "re-package" the capacity via a multi-asset GTA. In APA's case, it is able to offer multi-asset GTAs because it owns the underlying assets, but ownership of the underlying assets is not necessary in principle. In practice, we are not aware of any such arrangements in the Eastern Australian market. While there is limited trading of capacity, we are not aware of any "re-packaging" of this nature. It may be that the transaction costs associated with managing the underlying assets preclude offering a multi-asset GTA without owning the assets.

3. Force-Majeure in multi-asset GTAs

If a pipeline operator is unable to provide contracted-for transportation services, it may under some circumstances be able to declare a "force-majeure" event (FM). FM ordinarily excuses the shipper from paying reservation charges and the pipeline from paying damages. FM is very rare (we are not aware of any examples of FM being declared on APA's Eastern Australia pipelines). Nevertheless, we understand that shippers typically invest significant effort in negotiating the details of FM provisions in their transportation contracts. Where a shipper is using more than one pipeline (complementary links) to reach the ultimate destination market, in addition to the FM risk itself (the risk of non-delivery) the shipper also faces the additional cost of having to pay for transportation that it cannot use on one pipeline due to FM being declared on the other one. Ordinarily, FM on one pipeline would not excuse the shipper from paying reservation charges for which it had (separately) contracted on another pipeline. This additional cost is removed for shippers using APA's new multi-asset GTAs because these have a unified FM regime: FM on any one asset would excuse the shipper from paying reservation charges on up- or down-stream assets covered by the same GTA. This benefit is in some ways equivalent to an insurance policy which, if FM occurs on one pipeline, covers the reservation charges that the shipper would otherwise have to pay on other pipelines. This more generous FM regime is one of the ways in which shippers benefit from APA's multi-asset approach.

4. Developing the North Eastern Gas Interconnect (NEGI)

Adding a new link to an existing network can increase demand on the rest of the network if the new link is complementary to existing links, as we explained above. If the links in the network are independently owned, the benefits provided by the new link to the existing links are "external" from the perspective of the owner of the new link, and only a fraction of the external benefits accrue to the owner of any one of the existing links. As a result, any one owner has a limited incentive to develop a new link.

The North Eastern Gas Interconnect (NEGI) is a proposed new pipeline that would connect the Amadeus pipeline to the Carpentaria pipeline. It would provide additional connections that do not currently exist, for example between gas producers in the Bonaparte basin in the Northern Territory and customers in Queensland.

NEGI was originally proposed by APA. By increasing the size of the network, NEGI creates value for all network participants, regardless of whether they are directly connected to NEGI or not. Turning the NEGI concept into a viable business proposition required investment: APA invested approximately $2m on feasibility studies to develop and refine the NEGI concept, including detailed route planning, ahead of the formal government tender process.

During the formal tender process to select a design and builder of NEGI, APA invested further in detailed design work (about $4m).

We cannot say what would have happened if APA had not invested the initial $2m in developing the NEGI concept. However, as with other potential network expansions, APA had a stronger incentive to develop the concept than other market participants because, while NEGI has the potential to add to the volume of gas transported on existing pipelines, this potential benefit is larger for APA than for other pipeline owners because APA has a more extensive pipeline network. Although no single developer will take into account the network benefits external to their organization, APA's scale means that it is closer than any other pipeline owner to internalizing these network externalities. In APA's case, integration has strengthened its incentive to increase capacity on the network.

5. Size of the NEGI pipeline

The network benefits of network expansion (discussed above) are not contingent on which organization owns the NEGI pipeline (ultimately APA was not the successful bidder in the tender to build NEGI). However, the magnitude of such network benefits does depend on NEGI's transport capacity. A relatively small pipe cannot add much to existing network flows, whereas a larger pipe could have a more significant impact.

We understand that Jemena intends to build a 12-inch pipeline. In contrast, if APA had been selected, APA would have built a 14-inch pipeline. The larger pipeline would provide approximately twenty-five percent more transportation capacity than a 12-inch pipeline and would therefore provide additional benefits to market participants. We understand that the additional capacity would have been built in anticipation of demand, ie, without firm transportation contracts in place at the time.[13]

Even if both APA and Jemena had the same forecasts of anticipated demand for services across NEGI, APA would have been in a better position to capture potential network benefits from these increased flows than Jemena due to the scale of its network. While in principle it would be possible for a shipper, APA and Jemena together to negotiate such a service (across both Jemena and APA assets), the additional complexity of negotiating between three rather than two parties may preclude successful outcomes. Further, if APA had developed NEGI it would have been able to offer "end to end" transportation from anywhere on the Amadeus pipeline to anywhere on its existing network in Eastern Australia.

13 While some of Jemena's proposed capacity was in excess of contracted capacity at the time, APA was prepared to make this a larger percentage of the total.

B. More efficient network utilization through reducing coordination costs and other supplier-side transaction costs

Below we discuss and quantify how reductions in transaction costs have allowed APA to offer both new services and discounts on existing services.

1. Using APA's pipelines to offer storage services

Integrated control over the multiple pipelines owned by APA allows linepack to be optimized across the pipelines and increases APA's ability to offer storage services ("park-and-loan"). This enhanced ability to store gas is valuable to all customers, but has been particularly valuable to the new LNG facilities.

Each of the three LNG operators has a multi-asset GTA with APA that includes a short-term interruptible park-and-loan service. This service has been used extensively during the commissioning phase of these projects and continues to be available, for example in case of planned or unplanned interruption. We understand that such services are particularly valuable to the LNG operators for a number of reasons: it is technically difficult to "turn down" production from the coal-seam gas production wells that principally supply the LNG projects; and there are otherwise limited alternatives for managing rapid swings in the supply-demand balance, given the large size of the LNG projects relative to the market as a whole in Queensland.

The park-and-loan service permits (on an interruptible basis) the LNG operators to deliver large quantities of gas to APA over a short period of time, or to "borrow" gas from APA, and to maintain that position for a period of time, before receiving back the excess "parked" gas or returning the "loaned" gas. This allows the operators to cover short periods when the LNG liquefaction trains are not running, or when there is a production shortfall. During 2015, when the LNG plants were being commissioned, up to 30% of the revenue that APA received from the LNG operators was for park-and-loan, demonstrating the value these shippers place on the service. In total in 2015, APA received about $10.5m of park-and-loan revenues from the LNG exporters.

Since APA does not own dedicated storage assets at or near Wallumbilla and the LNG facilities,[14] APA is only able to offer the park-and-loan service using linepack. We understand

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[14] APA owns the Dandenong LNG facility in Victoria, which typically is used to provide additional gas supplies on a few of the coldest days each year.

that it is not the case that stored gas is "parked" as increased linepack on a single pipeline for a few days. Rather, depending on how the various pipelines are flowing at the time the parking request is received, the gas could be stored as additional linepack on a number of different pipelines (potentially any of the pipelines in APA's grid, other than the VTS). Once stored, the linepack might be moved from one pipeline to another as APA optimizes linepack across the network.[15]

Figure 4 below shows how operational balance account flows on the SWQP, MPS and RBP pipelines have increased since 2013.[16] The increased use of OBA since January 2015 is coincident with the LNG park-and-loan agreements and the start of the IOC. More detailed flow movements can be seen in Figure 2 and Figure 3 above.

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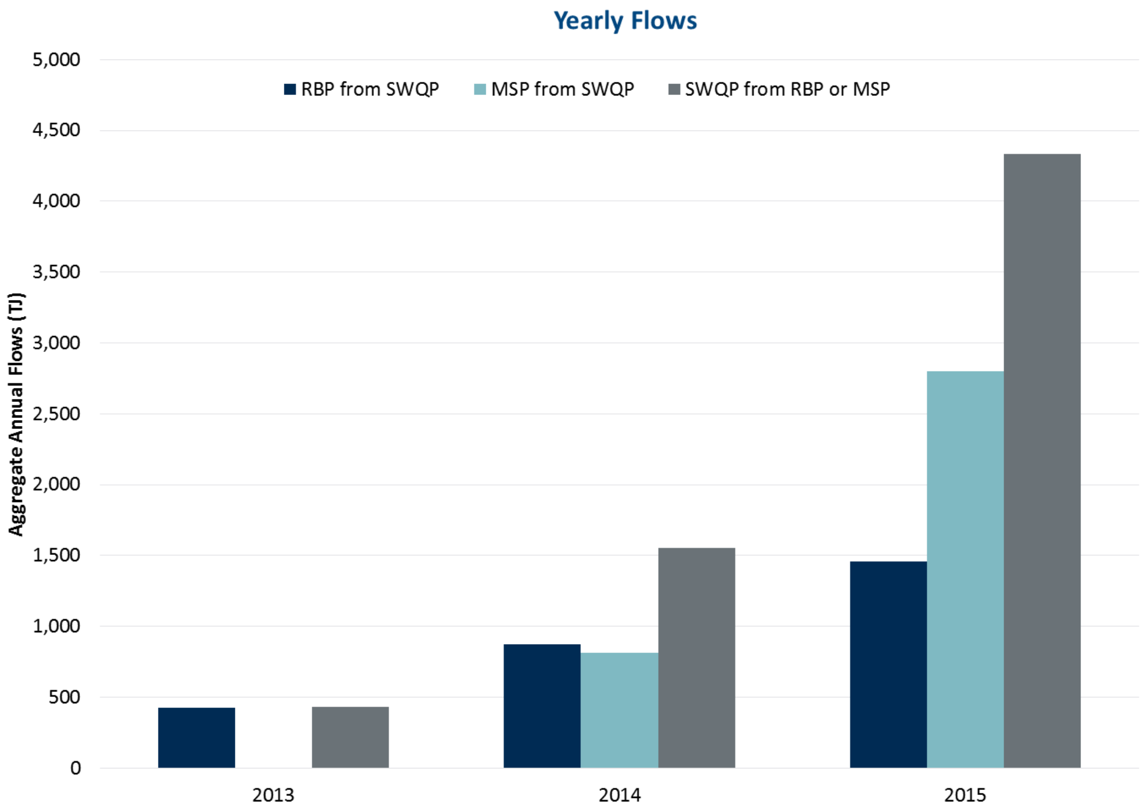
15 Stored gas would usually be placed initially on the SWQP but could be moved to the RBP, BWP, CGP and MSP.

16 The MSP data represents the sum of all increases in OBA balance from one day to the next, representing the total volume that was moved from the SWQP to the MSP during the month (ignoring flows in the other direction); the RBP data similarly represents the total volume moved from the SWQP to the RBP during the month, and the SWQP data represents the total volume moved from the RBP and the MSP to the SWQP during the month.

Figure 4: Operational Balance Account Annual Flows



Source: APA Shipper Contract Inventory.

The park-and-loan service uses multiple APA assets as well as the Integrated Operations Centre (IOC). It would have been difficult or impossible to "construct" the service absent common ownership by contracting with multiple independent pipelines. In particular, while there is precedent for adjacent pipelines that are not commonly owned to provide mutual support by transferring linepack on occasion, we understand that in APA's experience this is never on a "commercial" basis—ie, no payment is exchanged. There are very limited flows of the kind shown above between the APA system and the Moomba to Adelaide pipeline (MAPS), for example. If, hypothetically, two independent pipeline operators wanted to collaborate to offer a similar service, it would be necessary to overcome the transaction costs associated with allocating revenues between the pipes, and determining which pipeline is better placed to hold the gas given the operating demands on each pipeline.[17]

[17] The ability of a pipeline to provide transportation services is, in part, a function of linepack. Providing storage on a pipeline therefore limits the pipeline's transportation capacity (and vice versa), as we explained above.

The economic benefit of a parking service is the value of the incremental storage that it offers. This in turn is determined by the cost to the shipper of the next best alternative to park-and-loan. For the LNG facilities, the total value of the service during commissioning of the LNG plants in 2015 depended on the cost of disposing of excess gas if APA had not been able to offer the service. The alternatives for disposing of excess gas might be a) to flare it, subject to environmental constraints; b) to sell it to generators; or c) to sell it to other users on the short-term market. Flaring the gas would result in the loss of the gas, and might have environmental costs. Selling to generators or other users could result in very low or even negative prices given the volume and short notice of the gas flows. Thus the value of the gas (as priced in market transactions under normal conditions) is a reasonable benchmark for the value of the gas that would be lost through flaring or sold at a negative price on the short term market. Assuming a $5/GJ gas price, the value of the parking service in 2015 was about $17.5m in terms of avoided flaring.[18] We think it reasonable to assume that the value of the loan service is approximately equal to the value of the parking service (ie, an additional $17.5m, or about $35m in total).[19]

In 2015 the value of park-and-loan services was at least $10.5m (the aggregate amount that shippers paid) and was more likely around $35m, which is our estimate of the avoided costs of the next best alternative had APA's park and loan service not been available. After the LNG facility commissioning was completed at the end 2015, LNG facilities and other customers continue to use the park-and-loan service, albeit at a slightly lower level. Revenues for the first quarter of 2016 averaged about $630k per month, corresponding to about $7.5m per year. On the same basis as described above, we estimate that this service has a corresponding economic value of around $25m per year.

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18 We value the parking service assuming that, on average, "parked" gas stays on APA's pipelines for three days. Thus each GJ parked costs shippers about $1.50 ($0.50 per GJ/day), but avoids flaring that would cost about $5.00.

19 In 2015 APA received approximately equal revenue from parking as from loans, and the quantities parked and loaned were also approximately equal. Since a park transaction is the reverse of a loan (in a park transaction, production exceeds demand for a time, the excess gas is stored, then demand exceeds production for a while as the parked gas is returned to the shipper; before being returned to the shipper; in a loan transaction the order of the steps is reversed), we think it reasonable to ascribe the same value to each.

2. Lower imbalance charges

Using the park-and-loan service is cheaper than the imbalance fees that would otherwise be incurred when shippers are out of balance on a day (ie, when they deliver more gas to a pipeline than they receive from that pipeline). Park-and-loan service is priced at about $0.50/GJ/day, while imbalance has traditionally been priced at about $2.00/GJ/day. As with all interruptible services offered by APA, there is no reservation fee for park-and-loan. The ability to offer this service is contingent on APA owning multiple assets, and controlling them jointly through the IOC, as we set out above. APA's capacity to offer this service increases with network size and the number of interconnected pipelines. Because of APA's ability, described above, to move linepack between pipelines, the opportunity cost of dealing with imbalance is reduced: rather than imbalance on one pipeline reducing potentially valuable transportation capacity on that same pipeline, APA is effectively able to move the imbalance to whichever pipeline has the lowest opportunity cost.

Shippers with new multi-asset GTAs (including LNG exporters) may use the park-and-loan service and are able to avoid imbalance charges. Park-and-loan charges are only 25% of the typical imbalance charges paid under traditional single-asset GTAs. In 2013 and 2014, before APA introduced its multi-asset GTA, shippers paid around $3.3m per annum in imbalance charges. Had these imbalances been charged at the lower park-and-loan rate instead, shippers would have saved about $2.6m.

3. Net imbalance

We explained above that whereas traditionally each pipeline had its own terms and conditions, and each GTA was specific to an individual pipeline, now APA offers a multi-asset GTA with common terms across many assets. One of the consequences of the multi-asset GTA is that imbalance charges are now harmonized across APA's assets (for those shippers with multi-asset GTAs). Single asset GTAs calculate imbalance charges based on the cumulative difference in gas received and gas delivered for the shipper on that pipeline on each day. A multi-asset GTA similarly charges on the cumulative imbalance between receipts and deliveries, but volumes are calculated across all of the shippers' receipt and delivery points, aggregating over the pipelines to which the shipper has access.

Pipelines use imbalance charges as a tool to encourage shippers to stay in balance, since it is otherwise more difficult for the pipeline to operate effectively. Under APA's multi-asset GTAs, the volume of gas that attracts imbalance charges (the cumulative difference between total receipts and total deliveries for each shipper) is calculated on an aggregated net basis across all of the pipelines to which the shipper has access under the multi-asset GTA. In circumstances where a shipper has a net positive imbalance on one pipeline and a net negative imbalance on another pipeline, the shipper will face lower imbalance charges than it would have done if it had contracted for exactly the same services under two individual GTAs. For example, suppose a shipper transports gas from Wallumbilla to Sydney over the SWQP and MSP, and expects to inject 100 TJ at Wallumbilla and receive 100 TJ at Sydney. If it happens that on a particular day a production problem means that only 90 TJ is delivered at Moomba, and, at the same time, unexpected plant failure at customer site means that only 90 TJ is withdrawn at Sydney, the shipper would be 10 TJ short on the SWQP and 10 TJ long on the MSP. With single asset GTAs those imbalances might result in charges of around $40,000,[20] whereas with a multi-asset GTA the imbalances would net to zero.

C. Productive efficiency gains

In this section we discuss economic benefits from costs that were avoided due to integration effectively increasing the capacity of existing assets through better coordination across the network.

1. The IOC and integrated control

The IOC permits APA to offer services that would be much more difficult to deliver if its assets were not operated from a common control room. If one of APA's assets were under separate ownership, it would be more expensive to provide that asset with a dedicated control room with the same capabilities as the IOC and coordination of activities would also be more difficult (because of economies of scale: some individuals in the IOC have responsibilities that extend across more than one asset).

APA has estimated that the ongoing running costs of the IOC would be approximately $1.1m per year less than the running costs of the five individual control centres it replaced, due to a combination of reduced staff, facilities and IT costs.[21] However, APA's control centres were already substantially integrated before the establishment of the IOC, with staff working across several control rooms after hours and backfilling in the event of sickness or leave. APA had effectively already achieved some integration savings (relative to operating its major pipelines independently) prior to the acquisition of Epic Energy. The cost of operating a fully independent control room is estimated by APA to be approximately $2.4m per year, whereas

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[20] $2.00/GJ/day times 10 TJ on each of the MSP and SWQP.

[21] This figure does not include any savings associated with the office space where the control centres were located.

the IOC costs about $5m per year. With the IOC replacing five control rooms, this yields integration benefits of $7m relative to the major pipelines being operated independently. We therefore estimate the annual savings from integrated operation as being in the range $1.1m to $7m. The bottom end of this range represents the operating cost savings APA anticipated when it set up the IOC, and is an underestimate since the IOC running costs include some quality upgrades over the individual control rooms. The top end of the range is an estimate of the difference between the costs of operating the IOC and what it would cost to operate five major pipelines independently.

2. Optimising assets at the Wallumbilla hub

APA owns several pipelines and associated compressors at Wallumbilla. The individual pipelines operate at different pressures, so that in order to transfer gas between pipelines, depending on the identity of the origin and destination pipelines, it may be necessary to use compression. Not all of the routings that might be offered are currently possible, because the necessary compression is not connected to the relevant pipelines.

If additional routings are to be offered, one solution would be to add dedicated compression. However, this is expensive. A cheaper alternative may be possible: by adding some interconnecting pipework, it may be possible to use existing compressors to provide new services (in a similar fashion to how an interruptible redirection service was developed at Moomba, discussed below).

APA's ability to reconfigure existing assets at Wallumbilla to deliver new services is based on its ownership of a number of pipelines and associated compression. It would be more difficult to "share" compressors across pipelines in separate ownership by means of a contract, because of transaction costs. Independently-owned pipelines would otherwise have to invest in duplicate compressors.

APA is currently undertaking incremental investment at Wallumbilla to increase flexibility by adding further re-routing options between existing compressors. This will create additional capacity that will be available to meet future demands for new/additional capacity at Wallumbilla. The incremental investment of around $10m in modified pipeline routing will create capacity that would otherwise require investing around $50m in compression. The net $40m efficiency saving will be realized if APA's expectation of additional demand for capacity at Wallumbilla is borne out.[22] Since this saving has not yet been realized, we have not included it in our estimates of overall integration benefits. However, similar savings have already been realized in in connection with specific new services at Wallumbilla, detailed below.

a. RBP flow reversal

In one case APA invested at Wallumbilla to allow a new routing in advance of shipper requests. When subsequently shippers requested this routing (involving flow reversal on the RBP), APA was able to offer the service straightaway because the necessary configurations were already in place. Furthermore, flow reversal on the RBP was accommodated using existing compressors at Wallumbilla that were originally built as part of the SWQP (for western haul service). APA had previously investigated RBP flow reversal when APA did not own the SWQP and had determined that new compression at Wallumbilla would have been needed. Once APA owned the SWQP, it was able to offer the new service using existing compressors. A new compressor costs around $55m. Since forecast revenue is greater than avoided costs, we can infer that this service would have still been offered, even in the absence of integration and the saving of $55 million is an efficiency gain for society.

b. BWP flow reversal

In another case, a shipper requested a new transportation service that required flow reversal on one of APA's pipelines to/from Wallumbilla (the BWP). At the relevant interface at Wallumbilla, there were no metering facilities capable of measuring flows in the reverse direction. If APA had not owned the RBP, an independent owner would have had to install metering assets in order to keep accurate account of gas flowing between its pipeline and APA's, since custody of the gas would be transferring at that point. However, because APA owned both pipelines and therefore retained custody of the gas, it was not necessary to install the metering. APA was able to derive the operational information it needed from existing measurement equipment, which would not have been sufficient to derive the more accurate data needed for custody transfer. With independent owners, the service would have been more expensive and would have taken longer to implement. We understand that the additional metering required for custody transfer would have cost $2–$3m, and would have

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22 We understand that APA has received indications of customer demand but that commercial arrangements have not yet been finalized.

added 3–6 months of lead time.[23] Common ownership therefore resulted in efficiency savings of at least $2m.

3. Redirection service at Moomba

The MSP was built to supply gas from Moomba to Sydney. However, on occasion a shipper may wish to nominate gas from the MSP into the SWQP/QSN Link for Eastern haul towards Wallumbilla. In order to move gas from the MSP into the SWQP, the pressure has to be increased significantly because the MSP operates at lower pressure than both the SWQP and the Moomba gas processing plant (which is the source of most gas flowing into the SWQP. There is no dedicated compressor associated with the MSP that could be used for this purpose (since the ordinary direction of flow is away from Moomba on the MSP).

In order to offer this redirection service, APA could have installed a new compressor. We understand that this would have cost of the order of $55m. However, physically close to the MSP at Moomba are three compressors used to push gas from the Moomba processing plant into the SWQP (which operates at a higher pressure). Since firm service is offered on the SWQP, a backup compressor has been installed. If either of the two duty compressors were to trip, the backup compressor would take over so that firm service from the Moomba processing plant to Wallumbilla is not interrupted. It would not be possible to bring gas direct from the MSP to the SWQP even using these compressors as originally configured, because the gas would have to flow first through the Moomba gas processing plant, which operates at a higher pressure than the MSP.

Since there is effectively a "spare" compressor at Moomba, rather than installing a new compressor to offer a redirection service out of the MSP, APA was able to use the existing backup compressor (by installing a small amount of additional pipework). When the third compressor is not required for providing service on the SWQP, it can be used to bring gas out of the MSP. If either of the other two compressors were to trip, the service out of the MSP would be interrupted.

It was relatively straightforward for APA to carry out the necessary reconfigurations to offer this service as APA owns both the MSP and the SWQP. In order for such a service to have been offered across two pipelines in independent ownership, it would have been necessary

[23] Since forecast revenue is greater than avoided costs, we can infer that this service could have been offered without pipeline integration, but at much greater economic cost.

for the compression services to have been provided by contracting between the two independent pipelines. This is likely to have been hindered by transaction costs.

The redirection service is valuable to shippers, but to have provided it without common ownership of the two pipelines would have required investing in a new compressor (a cost of about $55m). Revenues from the service are sufficient to have covered the cost of a new compressor, but APA was able to deliver the service without this investment. As a result, integrated ownership resulted in a corresponding efficiency saving of around $55m (assuming that transaction costs would have proscribed any potential contractual solution between independent pipelines). By integrating the pre-existing compressors, APA unlocked value for both APA and shippers.

D. Incentives to lower price so as to increase volumes

In this section we discuss how APA proposed discounted transportation tariffs for NEGI shippers—evidence of the incentive to lower prices arising from integration.

Most of the services that APA provides to shippers are at negotiated rates. Therefore in most cases we would not expect to be able to detect the impact of an incentive to reduce price (so as to increase volumes) resulting from integration. Tariffs result from bespoke negotiations so it would be difficult to isolate the impact of integration from other influences on price. However, the bidding process associated with the NEGI project offers one example.

APA's offer to build the NEGI pipeline included tariffs for transportation on the proposed NEGI pipeline, as well as "bundled" tariffs for shipping across both NEGI and other APA pipelines. The price for bundled transportation was lower than the sum of the tariffs on the individual pipelines concerned. This approach was designed to benefit APA by attracting additional volumes to its network, in line with the discussion in section IIB above of network benefits and incentive to reduce price.

III. Conclusion

By combining the ownership of previously separate assets, mergers and acquisitions can give rise to benefits from economies of scale and scope, but they also may raise competitive concerns that stem from the potential exercise of market power. Assets in a network can offer services that are complementary to or substitutes for the services provided by another element in the network. If integration combines ownership of network assets offering substitute services, competition may be harmed. If integration combines ownership of network assets offering complementary services, integration could bring economic benefits. We identified four major types of benefit.

1. Post integration, there are incentives to improve service quality or increase capacity, because increased throughput on one link will result in increased throughput on other, complementary links. Integration internalizes the benefits of increased throughput and therefore increases the incentive to make investments in improved quality or new capacity. Integration of APA's Eastern grid has improved service quality in several respects, for example through reduced transactions costs for shippers under the multi-asset GTA, access to interruptible storage through the IOC and an improved force-majeure regime.

2. Integration permits services that use multiple pipelines and which could not be provided by independently-owned pipelines because of the associated transactions costs. New park-and-loan services using APA assets across multiple pipelines are offered to shippers via a single contract. The new park-and-loan services are valuable: we estimate economic benefits in the range of $7.5m to $25m annually going forward, as well at least $10.5m and more likely around $35m in avoided costs in during the LNG facility commissioning phase.

3. Efficiency can be improved through integration. For example, APA now offers services on one pipeline using compression on an adjacent pipeline. With independent owners, wasteful duplication would have been required to deliver the same service. We estimate that over $110m of investment that would otherwise have been needed to deliver the services that APA provides has been avoided in this way, as well as a further $40m that will have been saved if expectations of demand increases are borne out. In addition, integrated operation saves up to $7m per annum of operating costs relative to APA's major pipelines being operated on a stand-alone basis.

4. Integration also provides an incentive to reduce the price of access to one part of the network, since increased throughput on one link tends to increase demand for complementary links, and the benefit of increased demand is internalized through integration. A benefit of this type could have been realized had APA been selected to build the new NEGI pipeline since APA offered discounted bundled transportation to NEGI shippers.

We are not aware of any evidence indicating foreclosure or other harm to competition resulting from this integration process. We therefore conclude that significant net economic benefits were created as a result of APA's purchase of Epic Energy, and the subsequent integration of pipelines to form an "Eastern grid".

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