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8 March 2017

Mr Chris Pattas
General Manager – Networks
GPO Box 520
Melbourne VIC 3001

Dear Mr Pattas
(via email: VicGAAR2018-22@aer.gov.au)

**Re: APA Victorian Transmission System - Access Arrangement 2018-22**

Lochard Energy welcomes the opportunity to respond to the proposed Access Arrangement (**AA**) by APA for the Victorian Transmission System (**VTS**), which is to take effect from 1 January 2018 to 31 December 2022.

Lochard Energy is an Australian midstream energy infrastructure business that owns and operates the Iona Gas Plant and the associated facilities located near Port Campbell (**PC**) in the state of Victoria. As the largest independent provider of storage services to the East Coast gas market and provider of natural gas processing and compression services, Lochard has a significant strategic role in the provision of gas security in Victoria (**VIC**), South Australia (**SA**) and the broader Eastern Australian Gas market.

Our customers typically use the Iona Underground Gas Storage facility (**Iona UGS**) facility to store natural gas during low demand periods to enable withdrawals to cover high demand periods. We have recently received significant interest from both our existing and new customers for incremental increased capacity at the Iona UGS facility. This will support their ability to manage their interests in a tight market where gas is becoming increasingly expensive and difficult to source.

Iona UGS expansion is the easiest and most economic option to increase the gas swing capacity to market. Lochard Energy intends to increase Iona UGS storage withdrawal capacity from 390 TJ/day to 570 TJ/day and storage injection from 153 TJ/day to 250 TJ/day through the workovers of two existing reservoir wells and addition of 1 or 2 new wells. Current plant capacity will be utilised to bring the expanded reservoir deliverability to market. However, for the effective utilisation of this new Iona capacity it is vital that the South West Pipeline (**SWP**) is expanded to increase flow capacity in both directions.

The VTS AA proposed only a modest enhancement to SWP which includes, Brooklyn compressor reconfiguration, making Winchelsea compressor bi-directional and acquisition of land for the Western Outer Ring Main (**WORM**) Easement. While Lochard Energy supports these proposed enhancements, we strongly believe further expansion of the SWP in both directions for the 2018- 2022 VTS AA is critical to provide gas supply security across South Eastern Australia.

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There is a significant market requirement for this broader expansion to the SWP than is currently envisaged in the VTS AA. This paper sets out Lochard Energy's response to the VTS AA.

## 1. SWP expansion to Port Campbell

During periods of low gas demand, the SWP is used to transport gas produced from Longford to refill Iona UGS. This requirement to fill storage during periods of low gas demand is critical to ensure that there is sufficient gas to supply peak winter gas demand. The SWP is also used to flow gas to SA via the SEA Gas pipeline to support SA gas demand.

### 1.1. Current constraint on SWP to Port Campbell

According to the 2016 Victorian Gas Planning Report (**VGPR**), the SWP capacity to PC is 102 TJ/d on a 300 TJ system demand day, which typically occurs during December to February. This capacity reduces as demand on the VTS is above 300 TJ/day.

Australian Energy Market Operator (**AEMO**) also indicated in the VGPR that the SWP transport capacity from Melbourne to PC is forecasted to be insufficient to meet future market requirements without augmentation of the Declared Transmission System (**DTS**).

In 2016, the Iona UGS was unable to be refilled due to flow constraints on SWP to PC with 114 net flow transportation constraints applied[1]. In 2017 to end of February, flows on the SWP to PC was unconstrained for **only 10 days**.

This clearly shows that the current SWP to PC capacity is inadequate to service the market.

### 1.2. Minimum requirement to refill Iona UGS for peak winter gas demand

Currently the total Iona UGS storage capacity is 26 PJ. The storage injection capacity of up to 153 TJ/d is limited by SWP transportation capacity. In order to refill storage, the average SWP flow to Iona UGS required is approximately 110 TJ/d, which is more than the current SWP to PC capacity.

Declining production from the Otway, Minerva, and Casino gas developments at PC is a contributing factor for the need for increased SWP capacity to PC. Historical data supports that as production from the PC region is reduced, SWP flows to PC have increased to fill Iona UGS and to support SA gas demand, as shown in Figures 1 and 2.

[1] 2016 System Wide Notices from AEMO published constraints notices on SWP

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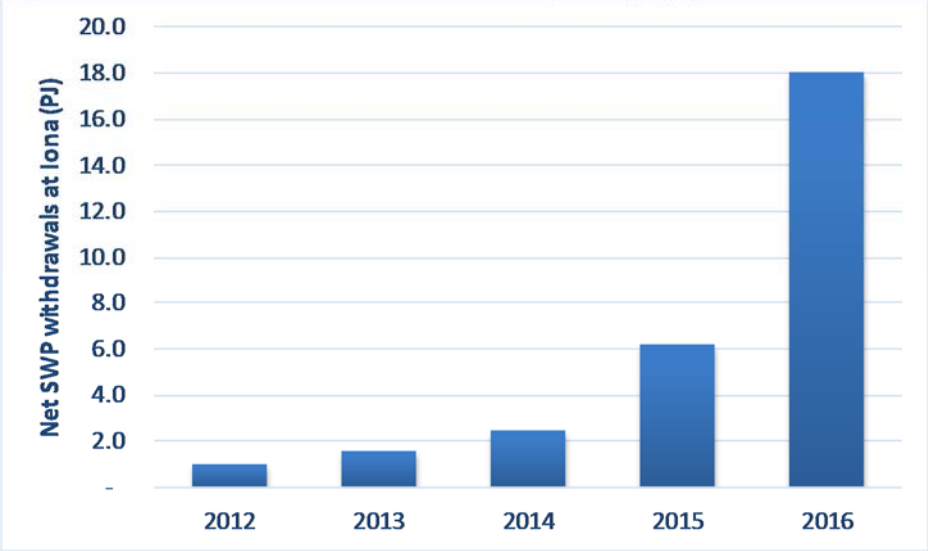
**Figure 1: Port Campbell production (PJ)[2], 2012–16**


**Figure 2: Iona UGS net SWP withdrawal quantity (PJ), 2012–16**




Assuming that sufficient gas is supplied into the DTS and gas demand during winter maintains at the same level, Lochard projects that SWP flows to PC are required to ***increase to 235 TJ/d in 2022,*** shown in figure 3. This analysis assumes that the current rate of approximately 70TJ/day from Iona UGS to SA is maintained in future years to support SA gas demand.

[2] AEMO Natural Gas Bulletin Board (GasBB) and Lochard Energy

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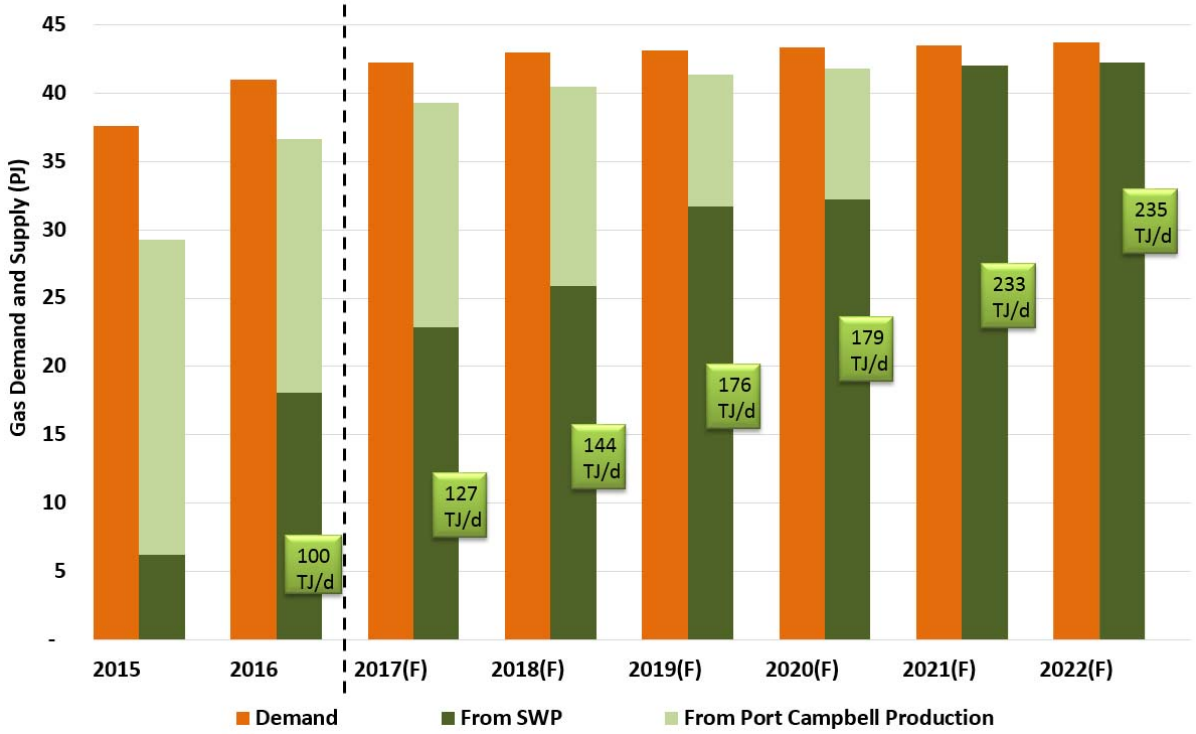
**Figure 3: Iona UGS Demand and Supply Balance (PJ), 2015–22**




According to the MJA report[3], the cost of failure to have SWP capacity to fill Iona UGS can be valued in the range of **$21m pa to $76m pa**. The analysis also identified the need of SWP capacity from **Melbourne to Port Campbell to over 220 TJ/d.**

Lochard Energy intends to expand Iona UGS to increase the reservoir injection capacity from 153 TJ/d up to 250 TJ/d to support the changes in the gas market. Expansion of the SWP capacity to PC of above 200 TJ/day is also required within the next 5 years. An incremental expansion of the SWP is an immediate requirement to refill Iona UGS to prevent system security risk and provide coverage for Victorian future winter demand.

### 1.3. Market events impacting the refill of Iona UGS

Market events can reduce the number of days and the amount of gas available to refill storage. Events that require withdrawals from storage not only reduce the number of days to refill storage but also increases the volume of gas to be refilled. Following are some market events that will reduce the opportunity to refill storage and will require a higher flow rate from SWP to PC to fill storage and support SA gas demand.

[3] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022)", p.43

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### 1.3.1. Iona UGS planned/unplanned maintenance

Iona UGS is required to perform planned and unplanned maintenance activities each year. Typically, Iona is totally shutdown during these periods and cannot receive any gas to fill storage. This currently reduces the available days to fill the storage which **increases the required average SWP to PC flow rate by up to 15 TJ/day**.

### 1.3.2. Market incident – Longford outage/unplanned maintenance

Outages at production facilities (such as Longford) can also impact on the ability to fill storage. Iona UGS is required to support gas demand in Victoria if the capacity at other production facilities is reduced due to maintenance activities.

During September to December 2016, the Longford gas plant had planned and unplanned maintenance for total of 31 days. This not only reduced the number of days and the availability of gas to fill storage but also decreased Iona storage level by 1.9 PJ as storage withdrawals were required to support gas demand in Victoria.

Maintenance activities or unexpected outages at other production facilities at the similar levels to 2016 would **increase the average SWP flow rate to PC by up to 35 TJ/d**.

### 1.3.3. System maintenance – Brooklyn Compressor

Maintenance at the Brooklyn Compressor Station from December 2015 to the middle of February 2016 had the most impact on filling the Iona UGS storage prior to last winter. It restricted SWP flows from Melbourne to Iona from 100 TJ/d to 30 TJ/d. Consequently, Iona could not be filled and took 9 months to fill only 9 PJ.

Gas withdrawals from Iona UGS were required to flow to Melbourne to support the SWP pigging inspection program. This activity required approximately 400 TJs of gas withdrawn from Iona UGS and prevented injections into storage for 3 days.

The above events do not occur every year but illustrate further constraints to refill Iona UGS and require a further increase to the average SWP flow rate to PC.

### 1.3.4. Impacts of Gas Powered Generation (GPG)[4]

The closure of Hazelwood power station will increase demand for Gas Power Generation (GPG) during the summer months. This will reduce the availability of gas to fill storage.

The requirement and increased dependency on Laverton North Power Station and Newport Power Station will increase as a result of this event. Laverton and Newport generations reduce the capacity of the SWP by a ratio of one-to-one and one-to-ten respectively which will further reduce the availability of SWP capacity to PC. In 2016, Laverton North and Newport consumed gas approximately of 155 TJ and 2,180 TJ

[4] 2015 Gas Wholesale Consultative Forum

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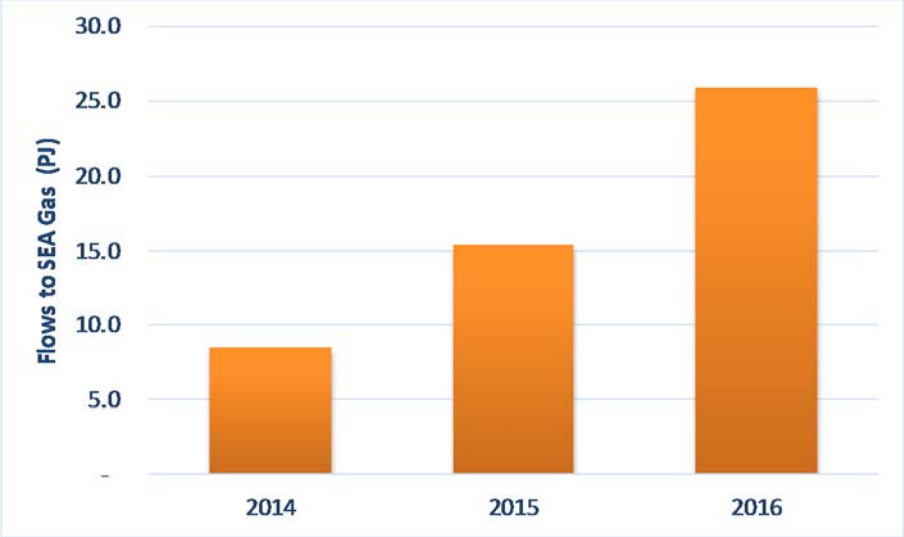
respectively, impacting the availability of gas to fill storage for the high winter demand by 0.4 PJ. This is likely to be much higher with the closure of Hazelwood power station.

### 1.4. Support of South Australian gas demand

The transportation of Longford gas across the VTS via Iona to support South Australian gas demand via the SEA Gas pipeline is already a normal daily operational requirement. Figure 4 shows the increase in SWP flows to SEA Gas (via Iona UGS) to support SA gas demand over the last three years. The capacity of SWP to PC would need to be further increased to support SA gas demand as gas production in the Otway basin continues to decline.

**Figure 4: Gas flows to South Australia (PJ), 2014–16**




## 2. SWP expansion to Melbourne

During high demand periods, the SWP is used to supply gas from the gas plants at Port Campbell including the Iona UGS facility to Melbourne.

The Iona UGS facility plays an essential role in supplying gas into Victoria during the winter peak demand period. This role is becoming even more important as gas supply from Gippsland to Melbourne declines.

### 2.1) Market requirement for SWP capacity increase to Melbourne

Lochard has received significant interest from existing and new customers for incremental storage capacity due to the changing conditions of the Eastern Australian gas market. The interest has come from major retailers, tier 2 retailers, major gas users, gas producers and new market entrants. All of these customers are actively seeking flexible options and gas swing capability to limit their exposure to escalating gas costs, availability of gas volumes and volatility.

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Demand for swing services is in high demand as new gas supply agreements have less offtake flexibility. The current transformation of the Australian gas market towards LNG exports has also created a tighter gas market which makes it more difficult and cost ineffective to move gas to high demand centres at short notice.

Input from market participants into the MJA report[5] (shown in Table 1) clearly shows a requirement to increase the capacity of the SWP from Port Campbell to Melbourne to above 500 TJ/day by 2020 and to 603 TJ/day by 2021.

**Table 1: Market Participants SWP requirements from Port Campbell to Melbourne**

| Year | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| **MDQ Required (TJ/d)** | 374 | 428 | 468 | 528 | 603 |
| **Shortfall unless expanded** | - | - | 39 | 99 | 174 |

The current SWP capacity from Iona to Melbourne is 429 TJ/d on an 800 TJ system demand day during winter. Currently, Iona UGS reservoir withdrawal capacity for injection to the SWP is 390 TJ/d with the potential to increase to 570 TJ/d. Utilisation of this new capacity will require South West Pipeline (SWP) expansion from Port Campbell to Melbourne.

## 2.2) Risk of greater gas price volatility

Gas storage services enable market participants to store gas at times of low demand and supply at times of peak demand, which acts to limit the spot market price volatility. Ensuring stored gas has sufficient path to peak demand centre, assists with energy affordability for consumers, industrial parties and GPG.

Wholesale spot gas prices have risen significantly and become more volatile in the last 12 months. Figure 6 shows the Victorian winter spot gas price comparison between 2015 and 2016 which has more than doubled from an average of $4.70/GJ in 2015 compared to $10.90 in 2016. This was in part contributed by constraints on the SWP capacity to PC which prevented customers from being able to fully refill Iona UGS prior to winter 2016.

[5] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022)", p.21

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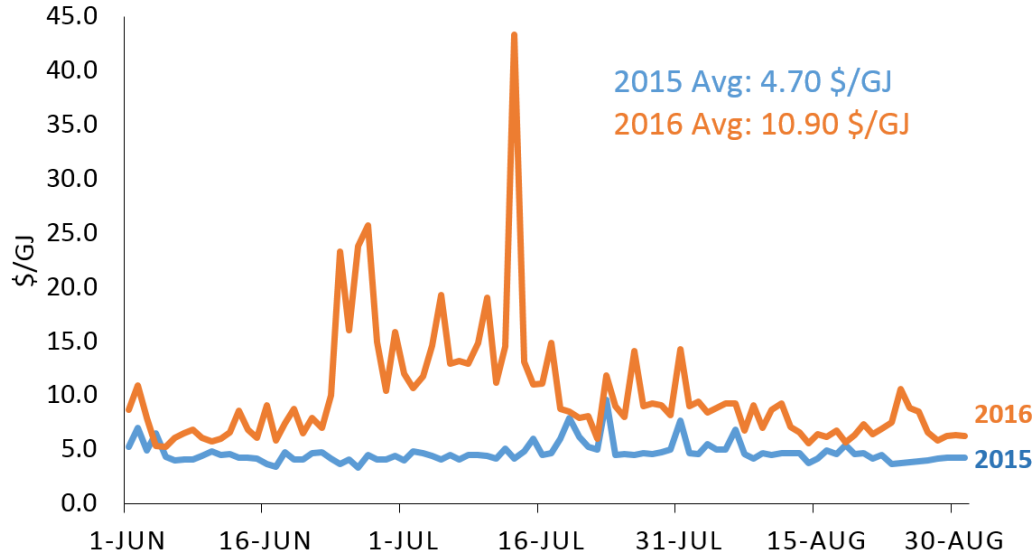
**Figure 6: Victorian gas price during winter[6]**




Electricity market transition away from coal generation has increased demand for GPG which has also escalated gas prices in the summer periods. The average gas price in summer 2017 (to the end of February) was **$9.20/GJ** compared to **$4.11/GJ** during the equivalent period in 2016.

Increasing SWP capacity to Melbourne would help consumers, industrial parties and GPG to manage their exposure to peak demand winter market gas prices.

## 2.3) Decline of Longford production

The MJA report[7] and other gas market publications suggest that Longford gas production is in decline, as the original high producing major fields begin to move to their end of life. The South Eastern Australian gas market is heavily reliant on gas supply from Longford. Reduction in Longford production will have a significant impact on the supply/demand balance of the market.

Expansion of SWP capacity to Melbourne will improve system security which might otherwise face risks of curtailment during unplanned market events. It will also provide flexibility to manage peak winter demand as Gippsland Basin production continues declines.

## 2.4) Uncertainty in Victorian gas reserves and sourcing gas from Moomba and Qld CSG

All six trains for Liquefied Natural Gas (LNG) exports in Queensland (Qld) are now in production. Most of the production of these trains are committed to export contracts.

[6] AEMO Market Information Bulletin Board (MIBB) report

[7] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022)", p.13

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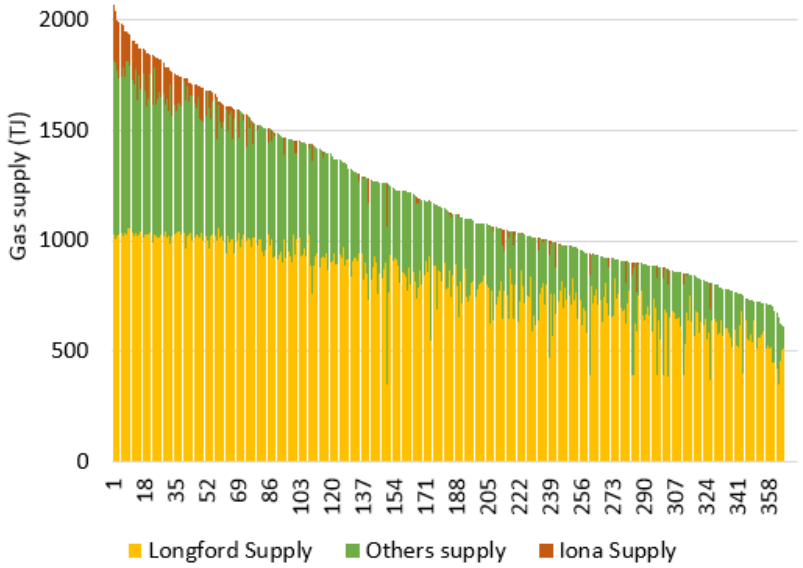
According to the MJA report[8], the Coal Seam Gas (CSG) production is currently not sufficient to supply the LNG trains and gas production from Moomba and Victoria is required to make up the shortfall. Moomba gas supply is also in decline.

Market participants surveyed for the MJA report[9] were of the view "*... that it is most difficult to get gas from Queensland and that this situation was not likely to change in at least the medium term*".

Figure 7 shows the gas supply for load duration curve for Victoria, NSW and South Australia for 2016. Decreasing Victorian gas production and unreliability and high cost of supply from Moomba, CSG from Queensland and new prospective production means that increasing the SWP capacity to Melbourne is essential to maintain supply security for Melbourne's winter demand.

If Moomba and Queensland were to become available, it would attract a higher price to reflect netback of the global oil price linked export values and the additional cost of transportation. The cost of using Moomba and/or Queensland gas to supply to Melbourne would be in the order of **$13m to $46m pa**[10] with additional transportation costing up to $2.50GJ depending on where the gas is sourced. These costs are significant and would need to be passed through to the consumer.

**Figure 7: Southern Australia Gas Supply, 2016**




The economic and reputational benefit of preventing gas curtailment events in Victoria will be more than sufficient to pay for the cost of the expansion.

[8] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022)", p.19
[9] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022)", p.33
[10] A report by independent consultants, Marsden Jacob Associates, "Economics of SWP Expansion for the Access Arrangement Proposal (period 2018-2022"), p.40

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The market requirements, the decline of Longford's production, the uncertainty of Victorian gas reserves and the uncertainty and unreliability of alternative supply, makes the expansion of the SWP capacity to Melbourne essential to mitigate gas supply risk and provide coverage for Victorian future winter demand.

## 3. SWP Expansion Options

AEMO has provided a number of options to expand the SWP capacity through the 2016 VGPR and to the public gas forums. These include:

- Reconfiguration of BCS to allow direct compression of unit 11 and 12 into Brooklyn-Lara Pipeline (BLP);
- Operation with BCS unit 10, 11, and 12;
- Convert Winchelsea compressor to be bidirectional;
- Installation of a new bi-directional compressor(s) at either Lara or Stonehaven; and
- Development of the Western Outer Ring Main (WORM)

As highlighted in the above sections, Lochard Energy believes further expansion of the SWP above the proposed 2018 to 2022 VTS AA is required to meet the market requirements over the next 5 years. We propose that the SWP expansion options should be accelerated across the 5 year period to address the pressing issues of the gas market.

It is important to note that the above options do not provide adequate SWP capacity to Melbourne to bring all of Iona UGS expanded capacity of 570 TJ/day to the Victorian gas market. Further investigation should be conducted into other expansion options for the SWP to Melbourne such as installation of more compressors, installing 600mm piping for the WORM or possibly duplication of the SWP.

Lochard supports a combination of known system augmentations[11] that increase the SWP capacity as follows:

**Stage 1 – within 1 year period (immediately)**

- Reconfiguration of BCS to allow direct compression of unit 11 and 12 into Brooklyn-Lara Pipeline (BLP); and
- Operation with BCS unit 10 (compressor work required) , 11, and 12; and
- Convert Winchelsea compressor to be bidirectional

These options will cost approximately $8m and are expected to increase the SWP capacity as follows:

| Direction | Existing (TJ/d) | Stage 1 (TJ/d) | MDQ increase (TJ/d) | Capex Eff. ($m/TJ) |
|---|---|---|---|---|
| **PC to Melbourne** | 429 | 429 | - | |
| **Melbourne to PC** | 102 | 170 | 68 | 0.118 |

[11] AEMO – 2016 Victorian Gas Planning Report update

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Stage 1 options are very cost effective with a Capex Efficiency of $0.118M/TJ of MDQ increase.

**Stage 2 – within 2-3 year period (2018-2020)**

- Installation of a new bi-directional compressor at either Lara or Stonehaven

This option costs approximately $40m and is expected to increase the SWP capacity as follows:

| Direction | Stage 1 (TJ/d) | Stage 2 (TJ/d) | MDQ increase (TJ/d) | Capex Eff. ($m/TJ) |
|---|---|---|---|---|
| **PC to Melbourne** | 429 | 459 | 30 | |
| **Melbourne to PC** | 170 | 200 | 30 | 0.667 |

Stage 2 option is reasonably cost effective as it provides MDQ increase in both directions, with a Capex efficiency of $0.667m/TJ of MDQ increase.

**Stage 3 – within 5 year period (2018-2022)**

- Development of the Western Outer Ring Main (WORM)

This option costs $100m and is expected to increase the SWP capacity as follows:

| Direction | Stage 2 (TJ/d) | Stage 3 (TJ/d) | MDQ increase (TJ/d) | Capex Eff. ($m/TJ) |
|---|---|---|---|---|
| **PC to Melbourne** | 459 | ~480 | 20 | |
| **Melbourne to PC** | 200 | ~300 | 100 | 0.833 |

The total cost for all of the above SWP expansion options is approximately $150m which can increase the SWP capacity to Iona from 102 TJ/d to ~300 TJ/d. An additional compressor and the WORM will also increase the SWP capacity to Melbourne from 429 TJ/d to ~480 TJ/d.

| Direction | Existing (TJ/d) | New (TJ/d) | MDQ increase (TJ/d) | Capex Eff. ($m/TJ) |
|---|---|---|---|---|
| **PC to Melbourne** | 429 | ~480 | 50 | |
| **Melbourne to PC** | 102 | ~300 | ~200 | 0.600 |

The WORM option is still cost effective as the Capex efficiency is less than 1.0. However, it is most cost effective to combine the WORM with stage 2 option to reduce the Capex efficiency to $0.6m/TJ.

Aside from the benefits of increasing the SWP capacity in both directions, the WORM also provides other market benefits. These are outlined by APA when it proposed to build the WORM for the 2013 to 2017 VTS AA:

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"*The Project is prudent, efficient, and superior to project alternatives (lowest sustainable cost) as it:*

- *Delivers required security of supply at a lower cost than alternatives that deliver similar security of supply;*
- *Avoids significant stay in business capital expenditure, effectively reducing the cost of the security of supply option to one that is net of that avoided work;*
- *Simplifies operation of the VTS, lowering operating costs and reducing the risk of operator error;*
- *Supports gas competition by providing greater scope for gas injected from the west to compete with Longford gas;*
- *Is consistent with the long term investment strategy for the VTS, laying the foundation for growth as envisioned by VENCorp in its 2030 Vision document54; and*
- *Delivers the lowest long run costs of project alternatives assessed, while also providing a basis for meeting the longer term development needs of the system.*"

Building the WORM does make the stage 1 options redundant. However, stage 1 are cost effective options to address the immediate constraints on the SWP to PC in order to prevent system security risks.

## 4. Accountability to spend approved capital expenditure on SWP expansion

Once the capital expenditure has been allocated by AER, there is no rule that specifically requires a regulated entity to allocate the approved capital expenditure to that specific project or how the capital expenditure will be spent.

Lochard Energy urges the AER to consider a change to the National Gas Rules or implementing a mechanism to ensure that the capital expenditure will be spent on the approved projects. APA should not be able to apply new tariffs approved by the AER until the approved projects are completed.

## 5. Conclusion

The East Coast gas market has changed dramatically in the past five years and accelerating trends for the next five years will see significantly reduced gas supply, increased peak demand, increased demand for GPG and require more gas to flow from Longford via Iona UGS to support South Australian demand.

Gas is required to respond quickly and provide flexible options to support daily changing circumstances and intra-day requirements in the supply/demand chain. Gas demand for GPG is now determined by how renewable energy is produced, or rather, not produced. The increase in the renewable energy target will increase the need for gas as a fuel for electricity generation and as the transition fuel. A significant increase in SWP capacity will support a more flexible and reliable system.

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Lochard Energy looks forward to continued engagement with the AER (and APA) through this VTS review process. Please contact Vuong Nguyen, Commercial Manager, on 03 8646 0509 to discuss any aspect of this submission.

Yours Sincerely,

Anthony Fowler
CEO
Lochard Energy