PROPOSED PROCEDURE CHANGE (PPC) – SUMMARY SECTION
(For Proponent or AEMO to complete. Template focuses on solution identification)

Issue Number	**IN007/18**		
Impacted Jurisdiction(s)	NSW & ACT Gas Retail Markets.		
Proponent	Tim Sheridan	Company	Jemena
Proponent e-mail	tim.sheridan@jemena.com.au	Proponent phone	0418 820 369
Affected Gas Market(s) ▪ Retail ▪ Wholesale ▪ Bulletin Board ▪ STTM	Retail	Date proposal sent to AEMO	01/08/2018
Short Title	Proposal to amend the Hot Water Estimation and Substitution Methodology as described in the NSW/ACT Retail Market Procedure.		
Other key contact information	grcf@aemo.com.au		

PROPOSED PROCEDURE CHANGE (PPC) – DETAILED REPORT SECTION

1. Description of change(s) and reasons for change(s)	**Description of change:** Jemena has completed a review of the existing hot water estimation and substitution methodology in the NSW/ACT gas retail market and identified potential changes to the seasonality factors specified in Method W2 of the Retail Market Procedures (RMP). <u>Current RMP Definition</u> Section A2.2 of Attachment 2 of the RMP details the Approved Estimation Methodology for Hot Water Meters and Section A3.3 of Attachment 3 details the Approved Substitution Methodology for Hot Water Meters. In summary, there are 3 estimation and substitution method types currently used to estimate and substitute hot water meter readings. • **Method W1**: at least 365 days consumption history – calculates estimates based on the corresponding same quarter for last year's consumption. e.g: Q2 in 2016 will be used to calculate Q2 in 2017. • **Method W2**: <365 days consumption history – calculates estimates based on immediately preceding period of consumption with weighted seasonality factors. E.g: Q2 in 2017 relates to Q1 in 2017. • **Method W3**: W1 and W2 cannot be applied – calculates estimates by applying the lowest consumption value calculated from these 2 methods: a) using an average consumption for the grouped sub-meters; or b) using the current consumption of plausible reads from the grouped sub-meters and the master water meter. The outcomes from the above calculations are provided to Retailers and AEMO via the MeterDataNotification (MDN) transaction. <u>Proposed Changes</u> Amend the seasonality factors for **Method W2** as follows:

	(A) Multiply Lest by ~~0.5~~0.7 if the last bill was read in Aug/Sep/Oct. (B) Divide Lest by ~~1.5~~1.25 if the last bill was in Jun/Jul/Nov/Dec. (C) Multiply Lest by ~~2~~1.4 if the month of the estimate-to is Aug/Sep/Oct. (D) Multiply Lest by ~~1.5~~1.3 if the month of the estimate-to is Jun/Jul/Nov/Dec. **Reasons for change(s)** These changes are expected to reduce estimation and substitution volatility which can lead to higher bills for consumers, especially for winter months where estimated consumption may have doubled from previous consumption.
2. Reference documentation ▪ Procedure Reference ▪ GIP/Specification Pack Reference ▪ Other Reference	Retail Market Procedures (NSW/ACT) – V18
3. The high level details of the change to the existing Procedures This includes: ▪ A comparison of the existing operation of the Procedures to the proposed change to the operation of the Procedures. ▪ A marked up version of the Procedure change (see Attachment A).	Update the Method W2 seasonality factors prescribed in the RMP for the hot water estimation and substitution. See Attachment A for further details.
4. Consequences for making or not making the change(s)	If the proposed changes are not adopted consumers will not benefit from these updated seasonality factors which are expected to reduce estimation and substitution volatility and reduce bill shock during winter months.
5. Explanation regarding the order of magnitude of the change(s) (eg: material,	AEMO will need to make minor amends to RMP. The format of the MDN transaction sent to Retailers and AEMO remains unchanged therefore there are no retail market process or system impacts for Market Participants. Jemena will need to make a non-material system changes.

non-material or non-substantial)	
6. Likely benefits for industry as a whole	As noted in Section 1, the proposed changes to these seasonality factors are expected to reduce estimation and substitution volatility that can lead to higher bills for consumers, especially for winter months where estimated consumption may have doubled from previous consumption. If the proposed amendments are adopted, an opportunity exists to improve customer experience and the accuracy of hot water estimations and substitutions by updating these seasonality factors prescribed in the RMP. Retailers and Jemena may experience a decrease in customer enquiries relating to variations in customer bills due estimated or substituted hot water consumption readings. Attachment B details Jemena's impact analysis on the benefits customers are expected to receive via the adoption of these new seasonality factors.
7. The likely implementation effect of the proposal on Industry in general and/or any identified parties (e.g. end-users)	The proposed changes are minor drafting amendments to the RMP. Jemena will need to make non-material system changes to be consistent with these proposed seasonality factors. There are no changes to the MDN transaction fields or formats therefore there are no system or process changes for AEMO or the Retailers because of this change.
8. Testing requirements	No industry testing is required.
9. Supporting Documentation (attach if necessary)	Refer to Attachment A (Proposed RMP Amendments) Refer to Attachment B (Customer Impact Analysis) Refer to Attachment C (Jemena's Seasonal Factor Analysis Approach) Refer to Attachment D (Master water meter consumption data)

10. If applicable, a proposed effective date for the proposed changed Procedures to take effect and justification for that timeline	Subject to all necessary approval's AEMO is targeting to implement this initiative 14 December 2018. To achieve this AEMO proposes the following timeline. • Issue PPC Monday 17th September 2018. • Submission on PPC close Monday 1st October 2018. • Issue IIR on Monday 8th October 2018. • Submission on IIR close Friday 2nd November 2018. • AEMO decision on Monday 19th November 2018. • Effective date Friday 14th December 2018.

ATTACHMENT A – DOCUMENTATION CHANGES (SEE SECTION 3)
Proposed changes: Retail Market Procedures – NSW/ACT
Blue represents additions Red and strikeout represents deletions – Marked up changes

A2.2 Hot Water Meters

(a) Application

The estimation of *hot water meter readings* and consumption utilises the existing methodology applicable in NSW and the ACT for buildings with centralised hot water systems (CHWS). If the scheduled *reading* of *meters* (master *meters* and sub-*hot water meters*) in a CHWS has been completed with one or more resulting "missed" *readings* (*readings* that cannot be obtained due to blocked access, safety hazards, *meter* fault or other factors), or *readings* that fail validation, an estimate for each missed or failed *reading* will be calculated as follows.

(b) Method W1: Hot Water Estimation Based on Corresponding Past Year Period

If the *meter* whose consumption is to be estimated has at least 365 calendar days of *validated meter reading* history with the same *Customer*, calculate MJest and Rest, the *meter*'s estimated *consumed energy* and *meter reading* index respectively, as follows:

(i) Examine the *meter*'s *reading* history for a qualifying corresponding past year period, determined as follows:

(A) Calculate Dest, the number of billing days in the period to be estimated, from the date of the last *validated meter reading* to the end date of the estimation period.

(B) Subtract 365 days from the last *validated meter reading* (Rprev) and the estimation period's end date to obtain the corresponding past year period's start and end dates (Dp_start and Dp_end),

(C) Examine the *meter*'s *reading* history for a qualifying corresponding past year period meeting the following criteria:

- Its start and end dates exactly or closely match Dp_start and Dp_end to within 10 calendar days on either side of Dp_start and Dp_end.
- The number of billing days Dcpyp in the corresponding past year period must be within plus or minus 10 calendar days of Dest.
- The *meter readings* in the corresponding past year period must be *validated meter readings*.

(ii) If a qualifying corresponding past year period is found:

(A) Calculate the raw metered units (MUraw) from the qualifying corresponding past period standardised to the number of days to be estimated (Dest).

(B) Convert MUraw to standard litres (L) by:

- Multiplying MUraw by the *meter* model's multiplier number.
- Multiplying the result in (a) by 4.546 to convert from imperial gallons to litres, if the hot water *meter* is read in imperial units.

(iii) Calculate the average daily litres (Ld_avg) for the qualifying corresponding past year period by dividing L by Dcpyp.

(iv) Multiply Ld_avg by Dest to obtain the estimated number of litres Lest for the estimation period.

(v) Multiply Lest by CF, the CHWS's *common factor* (in MJ per litre) in the current *reading period*, to obtain MJest, the *meter*'s estimation *consumed energy*.

(vi) Add Lest to Rprev to obtain Rest, the *estimated meter reading* index.

(vii) Populate MJest and Rest into the MDN (MeterDataNotification) to be provided to the *delivery point*'s current *FRO* and AEMO.

(c) Method W2: Hot Water Estimation Based on Immediately Preceding Period

If the *meter* whose *reading* is to be estimated has less than 365 days of validated *meter reading* history, or a qualifying corresponding past year period is not found, examine the *meter*'s *reading* history for an immediately preceding period with a *validated meter reading* that is an *actual meter reading*. If such a *reading* is found:

(i) Retrieve the preceding period's *meter reading* (Rprev), raw *metered* units (MUraw) and number of billing days (Dprev).

(ii) Convert MUraw to standard *metered* units (L) by:

(A) Multiplying MUraw by the *meter* model's multiplier number.

(B) Multiplying the result in (a) by 4.546 to convert from imperial gallons to litres, if the *meter* is a *hot water meter reading* in imperial units.

(iii) Calculate the litres (Ld_avg) by dividing L by Dprev.

(iv) Calculate the estimated litres (Lest) by multiplying Ld_avg by Dest.

(v) Adjust Lest to reflect seasonality (higher gas usage in cold months, lower in warm months):

(A) Multiply Lest by ~~0.50~~ 0.70 if the last bill was Aug/Sep/Oct.

(B) Divide Lest by ~~1.50~~ 1.25 if the last bill was in Jun/Jul/Nov/Dec.

(C) Multiply Lest by ~~2.00~~ 1.40 if the month of the estimate-to is Aug/Sep/Oct.

(D) Multiply Lest by ~~1.50~~ 1.30 if the month of the estimate to is Jun/Jul/Nov/Dec.

(vi) Multiply Lest by CF, the CHWS's *common factor* (in MJ per litre) in the current *reading period*, to obtain MJest, the *meter*'s estimated *consumed energy*.

(vii) Add Lest to Rprev to obtain Rest, the *estimated meter reading* index.

(viii) Populate MJest and Rest into the MeterDataNotification to be provided to the *delivery point*'s current *FRO* and AEMO.

(d) Method W3: Where Methods W1 and W2 cannot be applied

If the *meter* whose consumption is to be estimated has (a) less than 365 calendar days of validated *meter reading* history with the same customer, or (b) its *reading* in the immediately preceding period is not validated, AND (c) the scheduled *read* of all

meters in the CHWS has been completed (whether *readings* have been successfully obtained or otherwise for all *meters* in the CHWS), for any *meter* whose *reading* was not successfully obtained or failed validation, calculate MJest and Rest, the *meter*'s estimated *consumed energy* and *meter reading* index, using the following steps:

(i) Calculate Li_est, *meter* i's estimated litres, as:

Li_est = min (Average litres of sub-*meters* with *validated meter readings*, Average "residual" litres of sub-*meters* without *validated meter readings*)
Li_est = min ((ΣLj_validated / Nvalidated), ((LHW_master - Σ Lj_validated) / Nest))
Where:

- Ri_est is the *meter reading* to be estimated for sub-*hot water meter* i,
- Ri_prev is *meter* i's previous *validated meter reading*,
- Li_est is the metered units in litres to be estimated for *meter* i,
- Lj_validated is the *validated* metered units in litres of sub-hot water *meter* j,
- LHW_master is the number of *metered* units in litres measured by the CHWS's master *hot water meter* for the period to be estimated,
- N is the total number of sub-*hot water meters* in the CHWS,
- Nest is the number of sub-*hot water meters* in the CHWS that failed validation and require estimation in the current *reading period*.
- Nvalidated is the number of sub-*meters* in the CHWS with validated *readings* in the current *reading period*,
- N = Nvalidated + Nest and 0<= Nvalidated , Nest <= N.

If a master hot water *meter* does not exist in the CHWS, then
Li_est = Average litres of sub-*meters* with validated *readings*
= ΣLj_validated / Nvalidated.

(ii) Calculate Ri_est the *estimated meter reading* index, as:

Ri_est = Li_est + Ri_prev

(iii) Multiply Li_est by CF, the CHWS's common factor (in MJ per litre) in the current *reading period*, to obtain MJi_est, the *meter*'s estimated *consumed energy*.

(iv) Populate MJi_est and Ri_est into the MeterDataNotification to be provided to the *FRO* and AEMO.

A3.3 Hot Water Meters

(a) Application

The substitution of *hot water meter readings* and consumption utilises the existing methodology applicable in NSW and the ACT for buildings with centralised hot water systems (CHWS). If the scheduled *reading* of *meters* (master *meters* and sub-*hot water meters*) in a CHWS has been completed with one or more resulting "missed" *readings* (*readings* that cannot be obtained due to blocked access, safety hazards, *meter* fault or other factors), or *readings* that fail validation, an estimate for each missed or failed *reading* will be calculated as follows.

(b) Method W1: Hot Water Substitution Based on Corresponding Past Year Period

If the *meter* whose consumption is to be substituted has at least 365 calendar days of *validated meter reading* history with the same *Customer*, calculate MJest and Rest, the *meter*'s substituted *consumed energy* and *meter reading* index respectively, as follows:

(i) Examine the *meter*'s *reading* history for a qualifying corresponding past year period, determined as follows:

(A) Calculate Dest, the number of billing days in the period to be substituted, from the date of the last *validated meter reading* to the end date of the substitution period.

(B) Subtract 365 days from the last *validated meter reading* (Rprev) and the substitution period's end date to obtain the corresponding past year period's start and end dates (Dp_start and Dp_end),

(C) Examine the *meter*'s *reading* history for a qualifying corresponding past year period meeting the following criteria:

- Its start and end dates exactly or closely match Dp_start and Dp_end to within 10 calendar days on either side of Dp_start and Dp_end.
- The number of billing days Dcpyp in the corresponding past year period must be within plus or minus 10 calendar days of Dest.
- The *meter readings* in the corresponding past year period must be *validated meter readings*.

(ii) If a qualifying corresponding past year period is found:

(A) Calculate the raw metered units (MUraw) from the qualifying corresponding past period standardised to the number of days to be substituted (Dest).

(B) Convert MUraw to standard litres (L) by:

- Multiplying MUraw by the *meter* model's multiplier number.
- Multiplying the result in (a) by 4.546 to convert from imperial gallons to litres, if the hot water *meter* is read in imperial units.

(iii) Calculate the average daily litres (Ld_avg) for the qualifying corresponding past year period by dividing L by Dcpyp.

(iv) Multiply Ld_avg by Dest to obtain the substituted number of litres Lest for the substitution period.

(v) Multiply Lest by CF, the CHWS's *common factor* (in MJ per litre) in the current *reading period*, to obtain MJest, the *meter*'s substituted *consumed energy*.

(vi) Add Lest to Rprev to obtain Rest, the *substituted meter reading* index.

(vii) Populate MJest and Rest into the MDN (MeterDataNotification) to be provided to the *delivery point*'s current *FRO* and AEMO.

(c) Method W2: Hot Water Substitution Based on Immediately Preceding Period

If the *meter* whose *reading* is to be substituted has less than 365 days of validated *meter reading* history, or a qualifying corresponding past year period is not found, examine the *meter*'s *reading* history for an immediately preceding period with a *validated meter reading* that is an *actual meter reading*. If such a *reading* is found:

(iii) Retrieve the preceding period's *meter reading* (Rprev), raw *metered* units (MUraw) and number of billing days (Dprev).

(iv) Convert MUraw to standard *metered* units (L) by:

(A) Multiplying MUraw by the *meter* model's multiplier number.

(B) Multiplying the result in (a) by 4.546 to convert from imperial gallons to litres, if the *meter* is a *hot water meter reading* in imperial units.

(iii) Calculate the litres (Ld_avg) by dividing L by Dprev. (iv) Calculate the substituted litres (Lest) by multiplying Ld_avg by Dest.

(v) Adjust Lest to reflect seasonality (higher gas usage in cold months, lower in warm months):

(A) Multiply Lest by ~~0.50~~ 0.70 if the last bill was Aug/Sep/Oct.

(B) Divide Lest by ~~1.50~~ 1.25 if the last bill was in Jun/Jul/Nov/Dec.

(C) Multiply Lest by ~~2.00~~ 1.40 if the month of the estimate-to is Aug/Sep/Oct. .

(D) Multiply Lest by ~~1.50~~ 1.30 if the month of the estimate to is Jun/Jul/Nov/Dec.

.

(vi) Multiply Lest by CF, the CHWS's *common factor* (in MJ per litre) in the current *reading period*, to obtain MJest, the *meter*'s substituted *consumed energy*.

(vii) Add Lest to Rprev to obtain Rest, the *substituted meter reading* index.

(viii) Populate MJest and Rest into the MeterDataNotification to be provided to the *delivery point*'s current *FRO* and AEMO.

(d) Method W3: Where Methods W1 and W2 cannot be applied

If the *meter* whose consumption is to be substituted has (a) less than 365 calendar days of validated *meter reading* history with the same customer, or (b) its *reading* in the immediately preceding period is not validated, AND (c) the scheduled *read* of all *meters* in the CHWS has been completed (whether *readings* have been successfully obtained or otherwise for all *meters* in the CHWS), for any *meter* whose *reading* was not successfully obtained or failed validation, calculate MJest and Rest, the *meter*'s substituted *consumed energy* and *meter reading* index, using the following steps:

(v) Calculate Li_est, *meter* i's substituted litres, as:

Li_est = min (Average litres of sub-*meters* with *validated meter readings*, Average "residual" litres of sub-*meters* without *validated meter readings*)
Li_est = min ((ΣLj_validated / Nvalidated), ((LHW_master - Σ Lj_validated) / Nest))
Where:

- Ri_est is the *meter reading* to be substituted for sub-*hot water meter* i,
- Ri_prev is *meter* i's previous *validated meter reading*,
- Li_est is the metered units in litres to be substituted for *meter* i,
- Lj_validated is the *validated* metered units in litres of sub-hot water *meter* j,
- LHW_master is the number of *metered* units in litres measured by the CHWS's master *hot water meter* for the period to be substituted,
- N is the total number of sub-*hot water meters* in the CHWS,
- Nest is the number of sub-*hot water meters* in the CHWS that failed validation and require substitution in the current *reading period*.
- Nvalidated is the number of sub-*meters* in the CHWS with validated *readings* in the current *reading period*,
- N = Nvalidated + Nest and 0<= Nvalidated , Nest <= N.

If a master hot water *meter* does not exist in the CHWS, then
Li_est = Average litres of sub-*meters* with validated *readings*
= ΣLj_validated / Nvalidated.

(vi) Calculate Ri_est the *substituted meter reading* index, as:

Ri_est = Li_est + Ri_prev

(vii) Multiply Li_est by CF, the CHWS's common factor (in MJ per litre) in the current *reading period*, to obtain MJi_est, the *meter*'s substituted *consumed energy*.

(viii) Populate MJi_est and Ri_est into the MeterDataNotification to be provided to the *FRO* and AEMO.

ATTACHMENT B – Customer Impact Analysis

Jemena's analysis of actual water meter reading data has identified an opportunity to update Method W2 seasonality factors and improve customer experience through more accurate hot water readings for instances where estimations or substitutions are required.

The water meter reading and consumption data used in Jemena's analysis is based on actual data for approx. 3,500 master water meters, covering around 108,000 sub-meters, for the period January 2017 to March 2018.

As detailed in Graph 1, the proposed seasonality factors result in less variability in colder months where typically the most gas consumption occurs. Under this proposal, the factor reduced from a maximum 2.0 to 1.4 during the cooler periods and during the warmer months the minimum the factor increased is from 0.5 to 0.7.

A month-by-month comparison of the proposed and current seasonality factors is detailed in Table 1.

Graph 1 - Proposed Change in Seasonality Factors

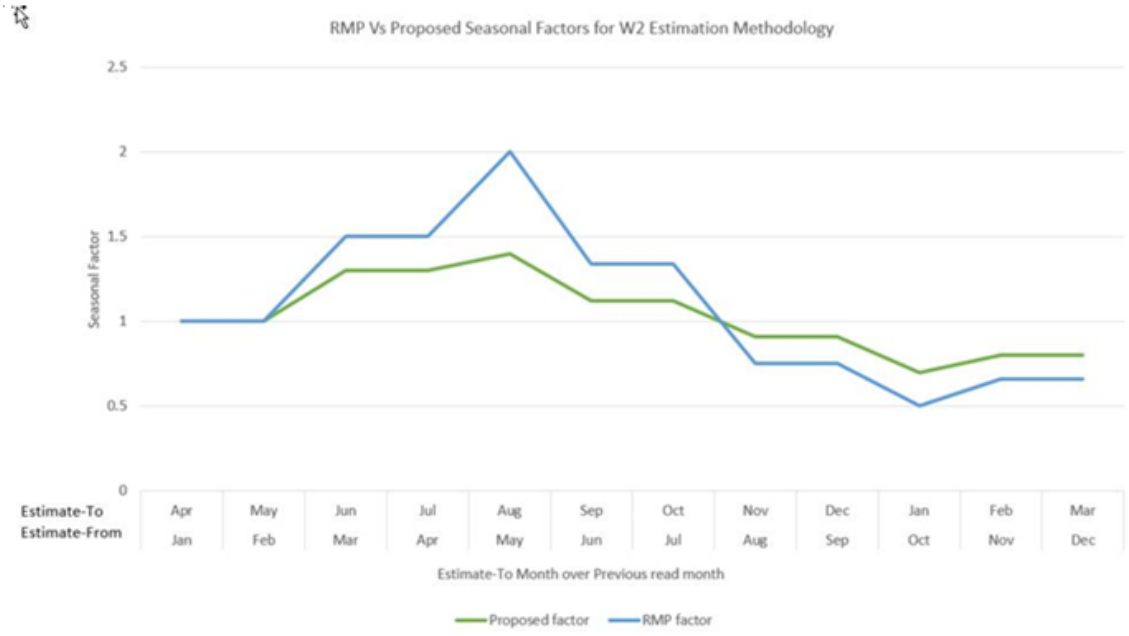


Table 1 - Month-by-Month Comparison of Proposed and Current Seasonality Factors

Estimate - From month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Estimate - To Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
RMP factor	1	1	1.5	1.5	2	1.34	1.34	0.75	0.75	0.5	0.66	0.66
Proposed factor	1	1	1.3	1.3	1.4	1.12	1.12	0.91	0.91	0.7	0.8	0.8

Impact on Network Charges

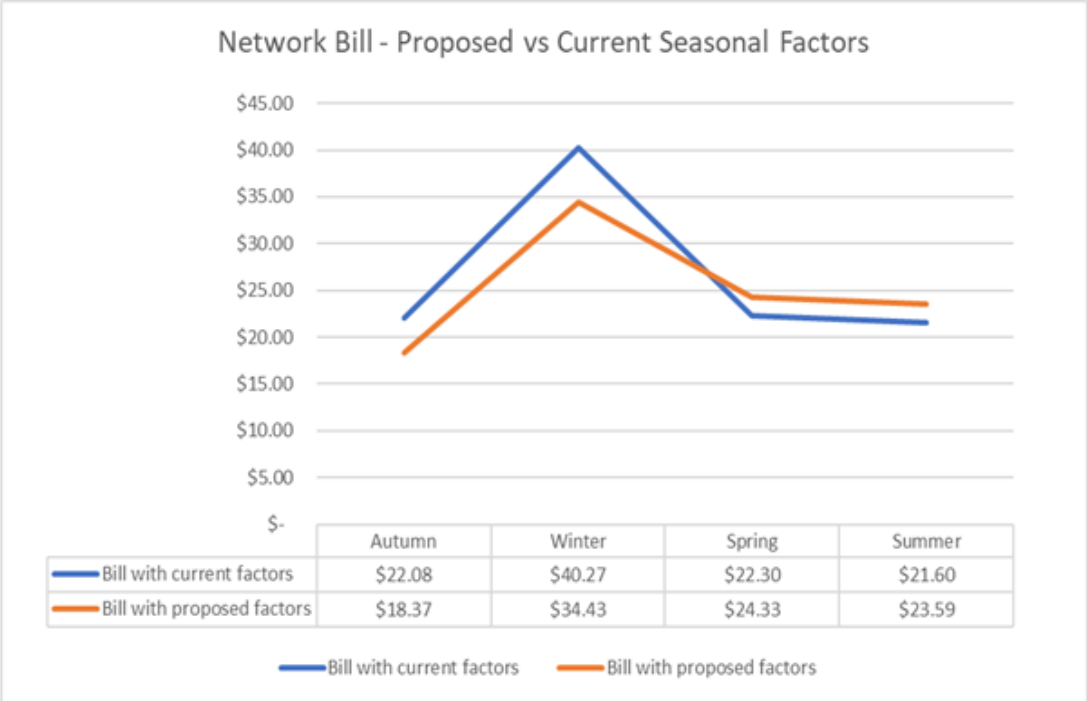
As shown below in Graphs 2 and 3, the proposed seasonality factors are expected to have a positive impact on the network charges for consumers via the consumption component of the network bill (excluding fixed charges).

Graph 2 Assumptions/basis for calculation:

- Winter/Summer is same customer, Autumn/ Spring is different customer
- JGN Coastal first block tariff of $21.920/GJ applied
- Fixed Charge of $0.14024384/day applied

Estimated Energy	Autumn	Winter	Spring	Summer
With current factors	425 MJ	1,249 MJ	435 MJ	403 MJ
With proposed factors	256 MJ	969 MJ	528 MJ	481 MJ

Graph 2 – Network Bill Comparison of Proposed and Current Seasonality Factors



When totaling the quarterly amounts over the year in Graph 2, the annual bill for the proposed factors is $100.72 compared to $106.25 for the current factors. Therefore, in this example the proposed changes will result in saving of $5.53, or 5.49% of network charges.

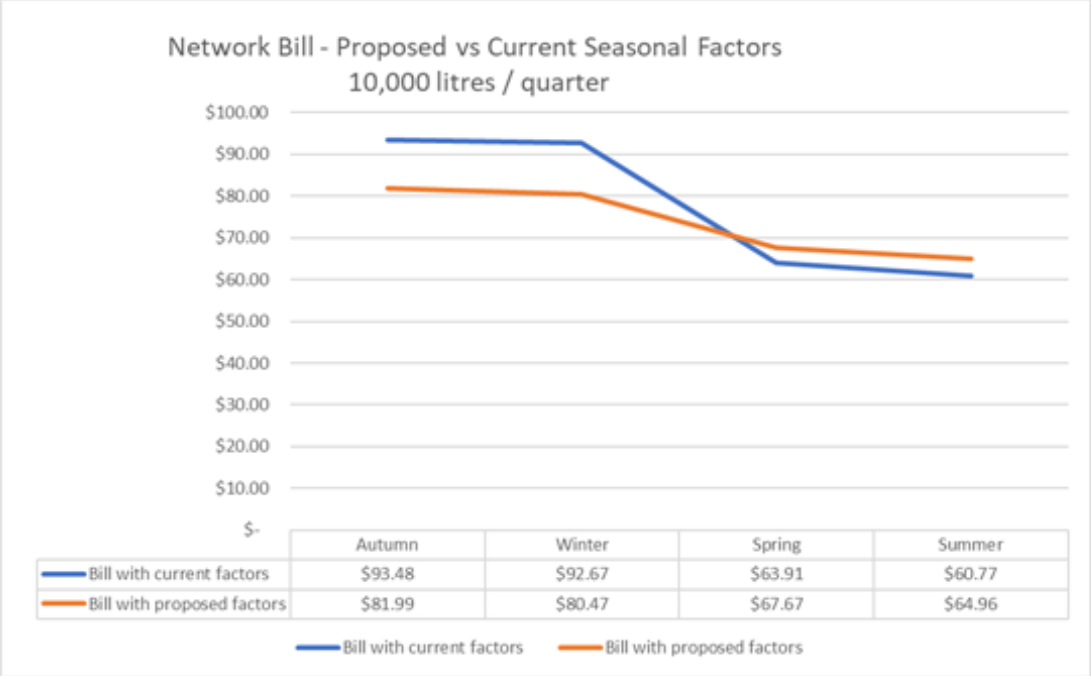
From an energy perspective, the comparison is 2512 MJ versus 2234 MJ. The reduction of 278MJ would at a retail rate of $30/GJ translate to a reduction of $8.34 for the consumer.

Graph 3 Assumptions/basis for calculation:

- Baseline actual reads hot water consumption of 10000 litres per quarter
- Invoicing cycle: March, June, September, December
- JGN Coastal first block tariff of $21.920/GJ applied to first 1890 MJ
- JGN Coastal second block tariff of $7.185/GJ applied to next 1860 MJ
- JGN Coastal third block tariff of $6.807/GJ applied to next 4500 MJ
- Fixed Charge of $0.14024384/day applied

Estimated Energy	Autumn	Winter	Spring	Summer
With current factors	7,558 MJ	7,419 MJ	3,243 MJ	2,805 MJ
With proposed factors	5,870 MJ	5,585 MJ	3,766 MJ	3,350 MJ

Graph 3 – Network Bill Comparison of Proposed and Current Seasonality Factors



When totaling the quarterly amounts over the year in Graph 3, the annual bill for the proposed factors is $295.08 compared to $310.83 for the current factors. Therefore, in this example the proposed changes will result in saving of $15.75 or 5.07% in network charges.

From an energy perspective, the comparison is 21,026 MJ versus 18,571 MJ. The reduction of 2,455 MJ would at a retail rate of $30/GJ translate to a reduction of $73.65 for the consumer.

ATTACHMENT C – Jemena's Seasonal Factor Analysis Approach

Jemena's Seasonal Factor Analysis Approach

Jemena's analysis of actual water meter reading data has identified an opportunity to update Method W2 seasonality factors and improve estimation accuracy to bring it closer to actuals, minimising any potential billing issues.

Jemena took the following approach in analysing the seasonal factors to review the historical pre-B2B factors:

- The water meter reading and consumption data was based on actual meter read data for approx. 3,500 master water meters, covering around 108,000 sub-meters, for the period January 2017 to March 2018. This covers a significant installation population, for statistical validity.
- Consumption data in litres was separated into calendar months and assigned to one of the four seasons based on the consumption period (more than half of the period are in one of the seasons).
- The trend of consumption movement was reviewed between different seasons for quarter to quarter and monthly averages of the consumption variance.
- Values were compared to the seasonal factors defined in the current Retail Market Procedures to understand the impact and comparison was made of estimations calculated from new factors with actuals to evaluate the accuracy.
- Jemena's finding is that with the revised seasonality factors, the estimation of hot water consumption for W2 methodology will be more accurate, and better reflects on average, seasonal usage behaviours.

1

Jemena
bringing energy to life

ATTACHMENT D – Master water meter consumption data

Seasonal Factor Data to market.xlsx