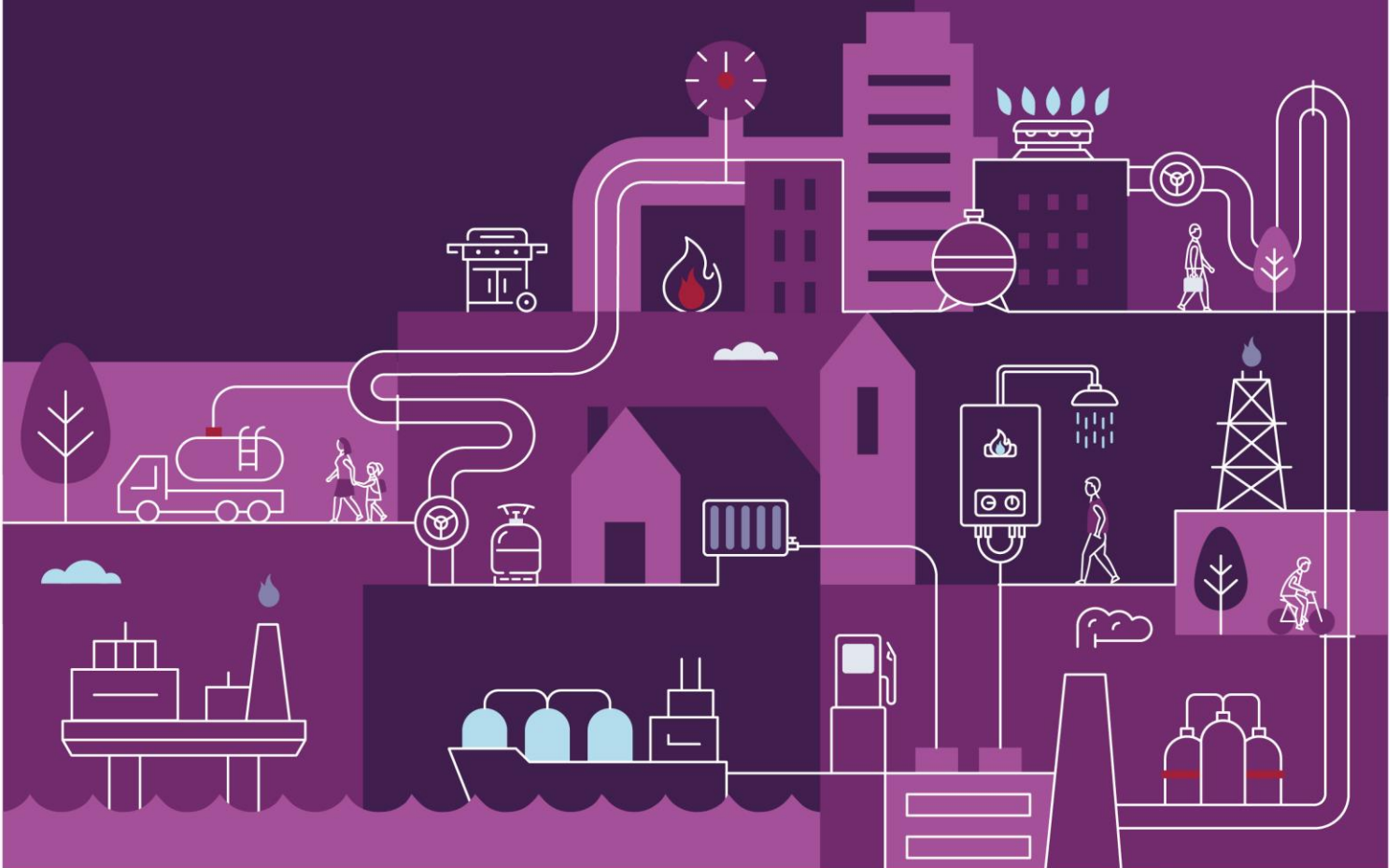# Impact & implementation report (IIR) ASX Wallumbilla Futures Product

May 2022

GSH Exchange Agreement changes to facilitate the ASX Wallumbilla Futures being physically delivered on the GSH.

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Impact & implementation report (IIR)

Issue number	24		
Impacted jurisdiction(s)	Queensland, New South Wales, South Australia		
Proponent	AEMO	**Company**	AEMO
Affected gas market(s)	Gas Supply Hub	**Consultation process (ordinary or expedited)**	Ordinary
Industry consultative forum(s) used	Gas Supply Hub Reference Group (May 2020,January 2021,May 2021, November 2021, February 2022)		Click or tap to enter a date.
Short description of change(s)	Amendments to the Exchange Agreement changes to facilitate the ASX Wallumbilla Futures being physically delivered on the GSH. Change in format of the Schedules in the Exchange Agreement to enable ease of use. Allowing email and electronic signatures for membership applications for the Exchange Agreement		
Procedure(s) or documentation impacted	Gas Supply Hub Exchange Agreement GSH Settlements and Prudential Methodology		
Summary of the change(s)			

- A new section 13.4Exchange for Physical (EFP) Trades in the Exchange Agreement to facilitate the new way to forms trades on the GSH.

- Amended Schedules in the Exchange Agreement to reflect reduced Minimum Transaction Quantity of 100GJ for all GSH Commodity products.

- Allowing email and electronic signatures for membership applications for the Exchange Agreement

IIR prepared by	Chris Warren	**Approved by**	Kevin Ly
Date IIR published	6th May 2022	**Date consultation concludes**	17th June 2022
Email address for responses	gas_supplyhub@aemo.com.au		

IMPACT & IMPLEMENTATION REPORT – DETAILED REPORT SECTION

CRITICAL EXAMINATION OF PROPOSAL

1 Description of Issue

The current ASX gas futures contract is cash settled based on the Wallumbilla day-ahead benchmark price. To date there is no trading activity in the existing product, with participants concerned about basis risk associated with hedging using the product.

It is proposed that the existing Wallumbilla futures product is replaced by a new physical futures product on the ASX. This new physical product definition would result in any open positions at the expiry of trading being delivered through the AEMO Gas Supply Hub. This proposed approach to a physical gas futures product would eliminate the basis risk issue associated with the current ASX product. The proposal has been supported by the Commonwealth Government through the Wallumbilla review work. The development of the proposal has been industry-led and provides an opportunity to develop a liquid, transparent forward market for the trading of natural gas at Wallumbilla.

The Proposed changes to the GSH Exchange Agreement (and related methodologies) are to facilitate the delivery of the ASX Wallumbilla Gas Futures Product on the GSH. These Changes will include

- A new section 13.4 Exchange for Physical (EFP) Trades in the Exchange Agreement to facilitate the new way to forms trades on the GSH.

- Amended Schedules in the Exchange agreement to reflect reduced Minimum Transaction Quantity of 100GJ for all GSH Commodity products, to align with the ASX Futures lot size. The Schedules have also been updated to be easier to read, this is the same format used for capacity products and compressions products. This would replace all of the current gas product schedules in the Exchange Agreement.

- Allowing email and electronic signatures for membership applications for the Exchange Agreement in Schedule 1 of the Exchange Agreement.

2 Reference documentation

See Appendix A – Overview of the Approach for the changes

See Appendix B – Excerpt of GSH Exchange Agreement Changes related to the forming of EFP Trades

See Appendix C - GSH Settlements and Prudential Methodology amendment.

See draft *Gas Supply Hub Exchange Agreement version 16,* published with this impact and implementation report.

See Draft GSH Settlements and Prudential Methodology version 15.3, published with this impact and implementation report.

3 Overview of Approach

See Appendix A for the overview of the approach

4 Exchange Agreement Changes

To enable trades to be formed through and Exchange for Physical (EFP) process there will need to be amendments to the GSH Exchange Agreement in section 13 Forming Transactions. Currently trades are able to be formed in 3 ways; On screen, Off market and Broker pre matched all via the Trayport platform. The amendments to the EA will include a new way to form transaction via EFP that will be done outside the Trayport platform utilising the Markets Portal (existing System) and will allow for both manual entry, csv upload and API functionality.

Overview of Trade Creation in GSH
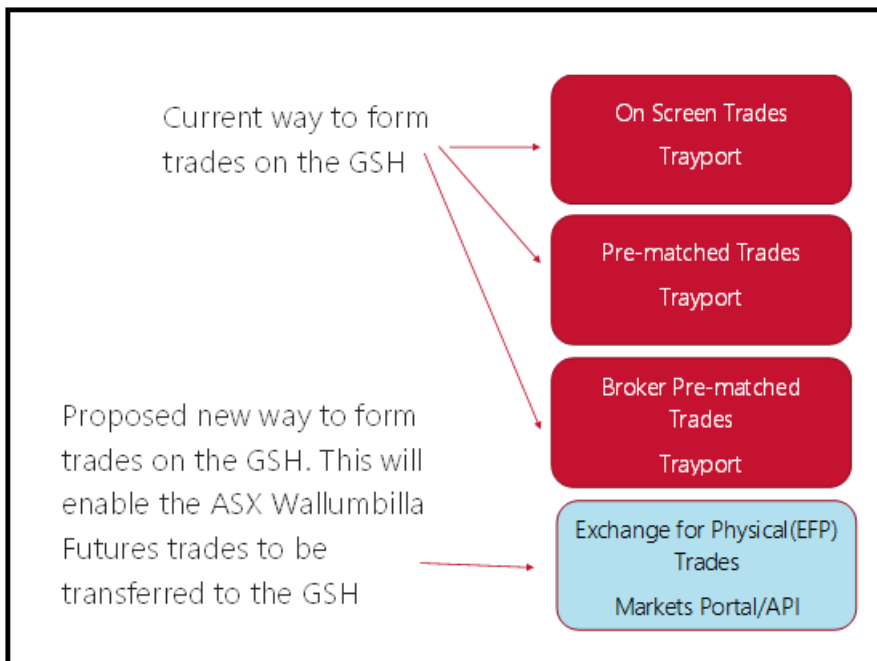
Amended Schedules in the Exchange agreement to reflect reduced Minimum Transaction Quantity of 100GJ for all GSH Commodity products, to align with the ASX Futures lot size. The Schedules have also been updated to be

easier to read, this is the same format used for capacity products and compressions products. This would replace all of the current gas product schedules in the Exchange Agreement.

Allowing email and electronic signatures for membership applications for the Exchange Agreement in Schedule 1 of the Exchange Agreement.

See Appendix B for excerpt of the proposed new EA drafting regarding EFP Trade creation.

See draft *Gas Supply Hub Exchange Agreement version 16.0 Draft,* published with this impact and implementation report.

5 Likely implementation effects and requirements

AEMO System Changes
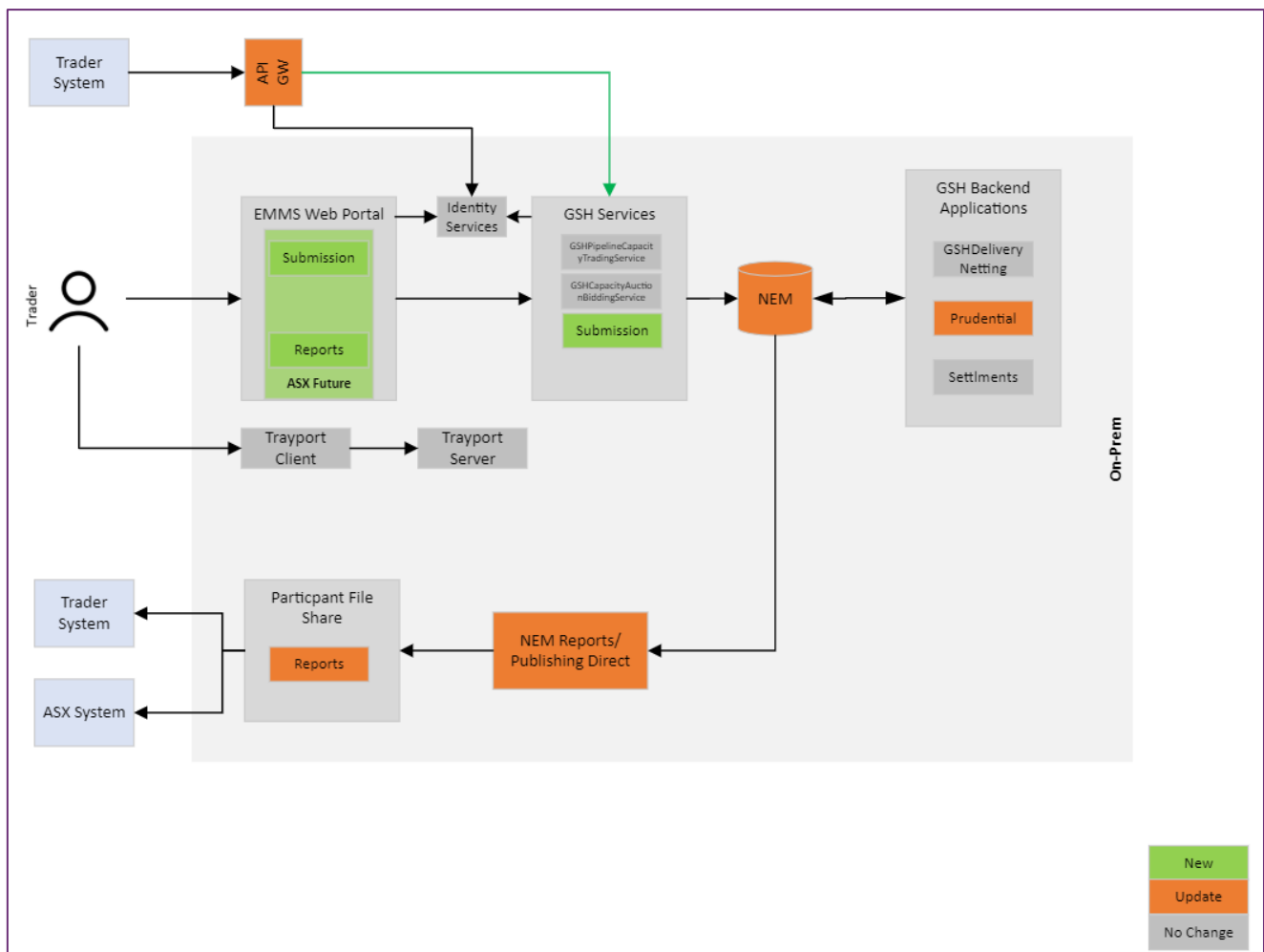
The changes to AEMO systems include a new web interface on Markets Portal, which will allow both manual entry and csv upload for the trade information that will be transferred from the ASX. An API option to upload will also be available.

There will also be a new reports created from NEM Reports/Publishing direct called the "GSH Transfer Information Report"

The Gas Supply Hub − RULES METHODOLOGY − SETTLEMENTS AND PRUDENTIAL METHODOLOGY will also need to be updated as outlined in this paper.

GSH Members will be able to retrieve the reports using the following methods:

- GSH Publishing Direct
- Participant File Server
- Data Interchange

More Technical information can be found in the GSH - Technical Specification - July 2022

It must be noted that the AEMO Data Model changes will not be released immediately but combined with the GBB changes which are due out later in the year.

6 Overall cost and benefits

The estimated cost of implementation of this project by AEMO is expected to be less than $300,000.

The tangible benefits include

- Having a forward curve for the price of gas at Wallumbilla from the ASX Wallumbilla Gas Futures
- More Trades on the GSH from the EFP from the Wallumbilla Futures

7 Magnitude of the changes

The proposed amendment is a material change to current market operations with minimal impact on existing products, which leverage existing AEMO systems.

All commodity products on the GSH will move to a Minimum Transaction Quantity of 100GJ.

Markets Portal will be upgraded to incorporate the capture of the EFP from the ASX Wallumbilla Futures, which will also be available to participants via API.

The Trade execution report will be updated to include the "Gas Future ID" and a new report "GSH Transfer Information Report" will be created.

8 AEMO's preliminary assessment of the proposal's compliance with section 135EB:

In accordance with NGR rule 540 and clause 3 of the Exchange Agreement, AEMO is satisfied that the proposed changes will contribute to the National Gas Objective as they:

- Improve the transparency and accuracy of the Exchange Agreement.
- Align the Exchange Agreement with the electronic trading system and consultation outcomes.
- Are not costly to implement.

9 Consultation Forum Outcomes

AEMO has consulted the GSHRG through the joint ASX/AEMO working group across 2021 and 2022 regarding the changes to the ASX Wallumbilla Futures product and the changes needed to the GSH Exchange Agreement. The package of changes was supported by the GSHRG.

AEMO Published a Discussion Paper in February regarding the changes to the Exchange agreement asking GSHRG members the following questions

1. Should AEMO keep producing the Wallumbilla Benchmark price? If so, please explain how this information is useful to your business.
2. Is there any reason not to move all gas commodity products to have a minimum parcel size of 100GJ?
3. Other feedback to AEMO on the proposed changes to the Exchange Agreement and Prudential calculation regarding the changes to enable EFP transfer from the ASX Futures?

Question	Member Response	AEMO Response
Should AEMO keep producing the Wallumbilla Benchmark price? If so, please explain how this information is useful to your business.	Senex No feedback, the benchmark is not used by our business.	The Wallumbilla Benchmark price will still need to be published as it is used as the price to split trades for spread products if there are no corresponding bids and offers on screen.

Is there any reason not to move all gas commodity products to have a minimum parcel size of 100GJ?	Senex Very strong preference to see all products move to 100GJ parcel size as mismatches in would be a detriment to liquidity, especially with respect to location spreads.	This IIR proposes to move all commodity products to have a 100GJ minimum parcel size for both on screen and off screen trading
	Origin We Support moving all gas commodity products to have a minimum parcel size of 100GJ as this may improve liquidity	
Other feedback to AEMO on the proposed changes to the Exchange Agreement and Prudential calculation regarding the changes to enable EFP transfer from the ASX Futures?	Senex No feedback	
	Origin GSH participants need to have the capacity to cover their Exchange for Physical (EFP) deliverable for the product to work. The proposed changes to AEMO's systems would be enhanced by incorporating a mechanism to enable traders to validate this ahead of delivery windows. As proposed, the process runs the risk of participants only being made aware that a particular trader cannot cover their EFP deliverable at expiry, which would undermine physical delivery of the product.	As outlined in this paper participants will be able to do a preliminary submission from D-14 to check for eligibility for transfer to the GSH with AEMO. AEMO will then produce a GSH Transfer Information report which will confirm eligibility. From this submission the Futures position will be incorporated into the AEMO prudential position.
	Origin	AEMO has looked into the option where the ASX could directly transfer

As currently proposed, gas market participants would be responsible for meeting the obligation to transfer a product into physical delivery on the GSH. We consider this should instead be a clearing obligation on the ASX, or via AEMO, which could be done on an automated basis. This would be more efficient than a process whereby market participants would do so on a manual basis.	AEMO the trade information. Unfortunately, the relationship between the parties(ASX-CP-AEMO-Trader) and options for transfers went through multiple iterations and it was not possible from an ASX framework point of view to be able to transfer the data directly to AEMO as the ASX could not be part of the trade creation due to their ASIC obligations. There will be an option of using an API which will provide an automated option for submission to AEMO.
Origin It is not clear how the proposed process will ensure that an anonymous financial product will be turned into a deliverable product. For example, would AEMO be the central party to facilitate delivery (given that trading on the exchange is anonymous)?	
Origin Some market participants may use different entities to participate on the Exchange and on the GSH. The design should allow for cross entity transfers of the product, i.e., a company operating under one entity on the exchange should be able to novate its exchange position to its GSH participant entity when its exchange entity does not trade on the hub. This will promote participation.	AEMO understands that participants may use different entities on the ASX and the GSH. Using different entities on the ASX and GSH for the EFP will not be an issue from an AEMO perspective. The ASX will confirm with Industry at the next working group how this process will work from an ASX perspective and how they will need to be notified regarding the information of the different entities.

10 Should the proposed Procedures be made?

AEMO recommends that the proposed amendments to the Gas Supply Hub Exchange Agreement and associated procedures are made.

11 Proposed timelines

AEMO intends to release the new market system interfaces into the pre-production environment for industry testing in May 2022. The release into production, and the effective date for the Exchange Agreement changes, will be some time in Q3 2022 to be confirmed in the decision document.

A1. Appendix A
Overview of the Changes

The ASX will amend the structure of the Wallumbilla Gas Futures to a physically delivered gas futures product. Physical delivery will be facilitated through AEMO's Gas Supply Hub (GSH) market as a monthly netted trade at the Wallumbilla High Pressure Trade point.

AEMO understands that the ASX will list gas futures contracts with a trading window of up to 36 months. The futures trading arrangements will be consistent with current arrangements for the ASX electricity (NEM) and gas futures (Victoria) products with the determination of daily settlement prices and margining of positions (through the ASX clearing house). Futures products traded on the ASX will expire 5 business days prior to the first day of the relevant delivery month.

At expiry of the ASX gas futures product, open interest will be transferred into GSH Wallumbilla monthly transactions. Once open interest is transferred into the GSH, the trades will be treated like all other GSH Wallumbilla trades for the purpose of gas delivery, settlement (including fees) and prudential.

The total settlement of the product will in effect be across both the ASX via daily margining and on the GSH as per current arrangements for the settlement of transactions. For Trading Participants holding positions through to delivery, the net settlement across the markets will be equal to the original ASX Wallumbilla Futures trade price.

Settlement Examples
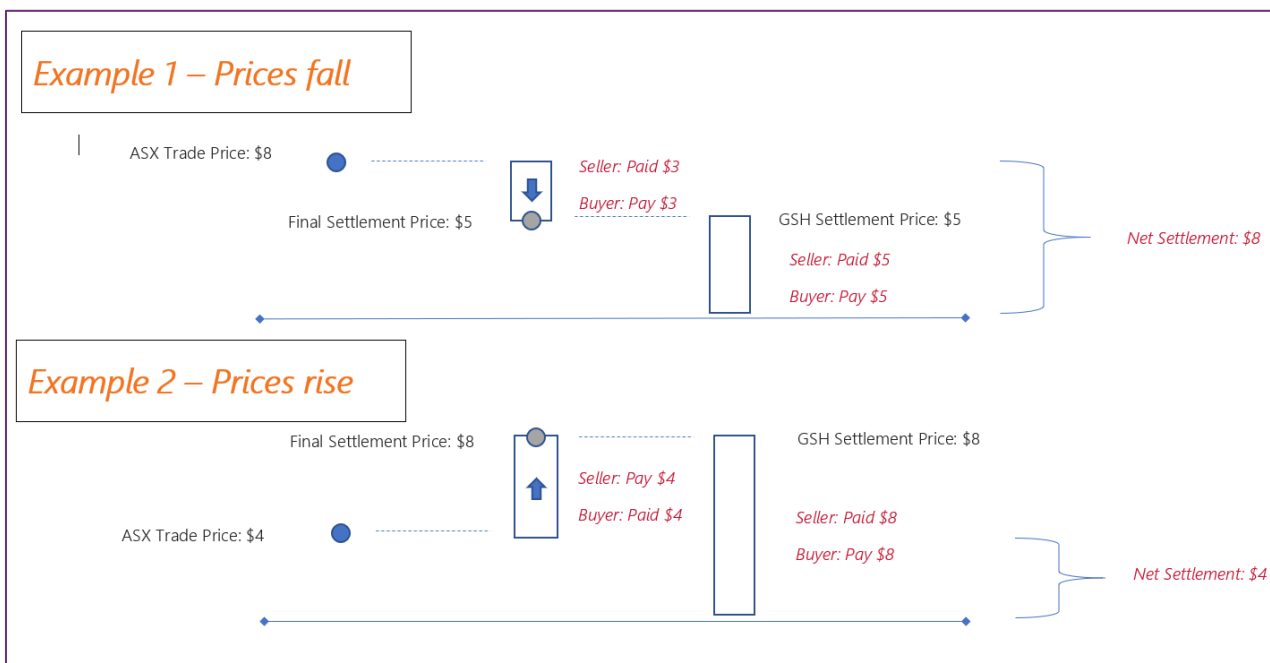
Preliminary transfer (optional)

Prior to the expiry of a futures contract, Trading Participants may provide AEMO with preliminary transfer information from 14 days prior to the delivery month (D-14), allowing time for registration and credit status to be checked if required by the ASX or clearing parties.

The preliminary transfer allows Trading Participants to show their clearing party that they are able to make the transfer to AEMO. This will provide time to either close out their open position or take steps to ensure the position is deliverable by posting more prudential with AEMO.

AEMO will use the preliminary transfer information in prudential calculations (see prudential calculation changes section in this paper for more detail).

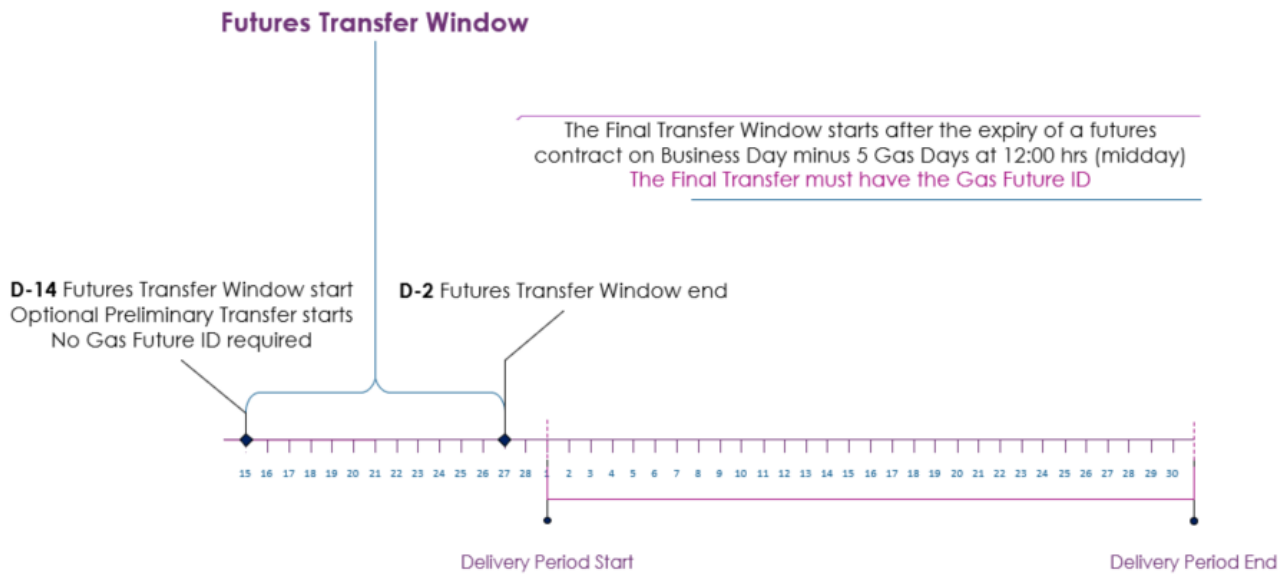## Futures transfer process from ASX to AEMO
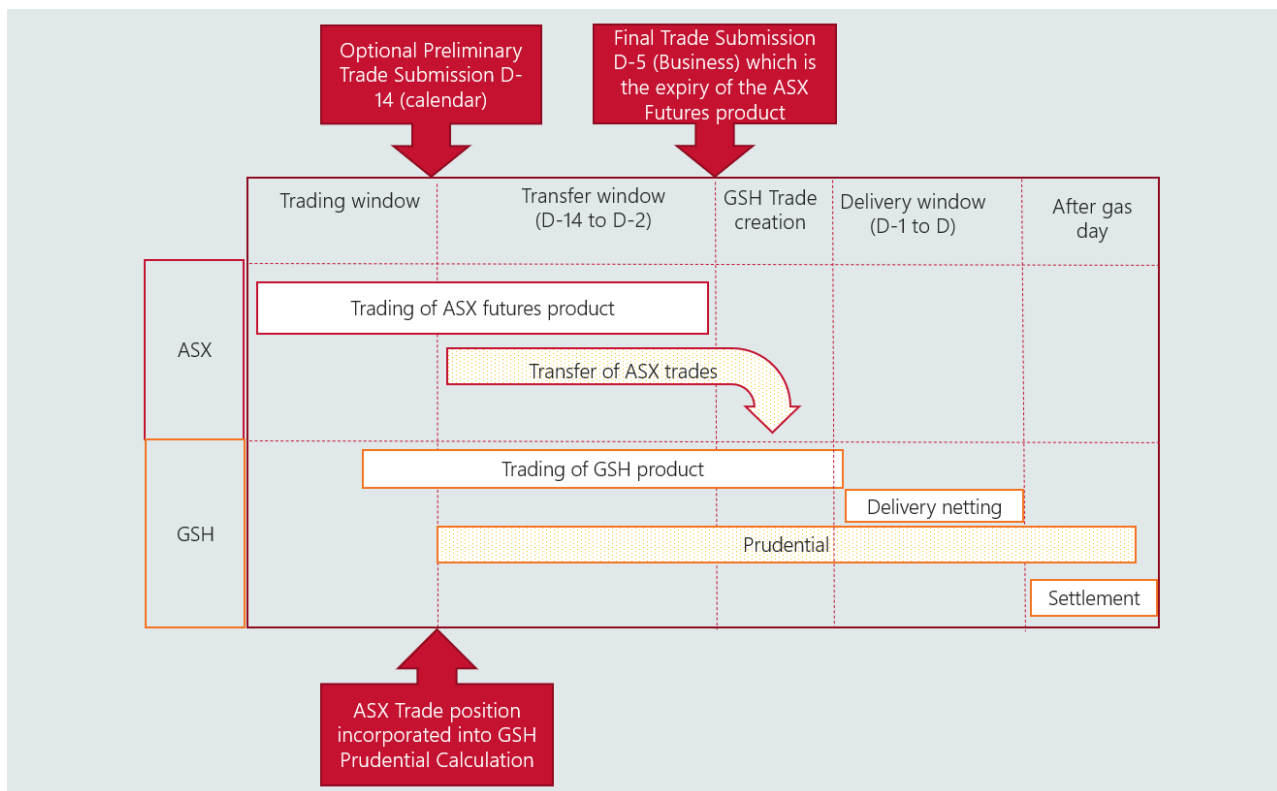
Final transfer

Following the expiry of a futures contract, Trading Participants must submit the final transfer information to AEMO (containing a 'gas future id'). The gas future id is provided by the ASX to Clearing Participants. Any transfer is deemed to be a final transfer if it includes a gas future id. The transfer submission window ends at the end of D-2.
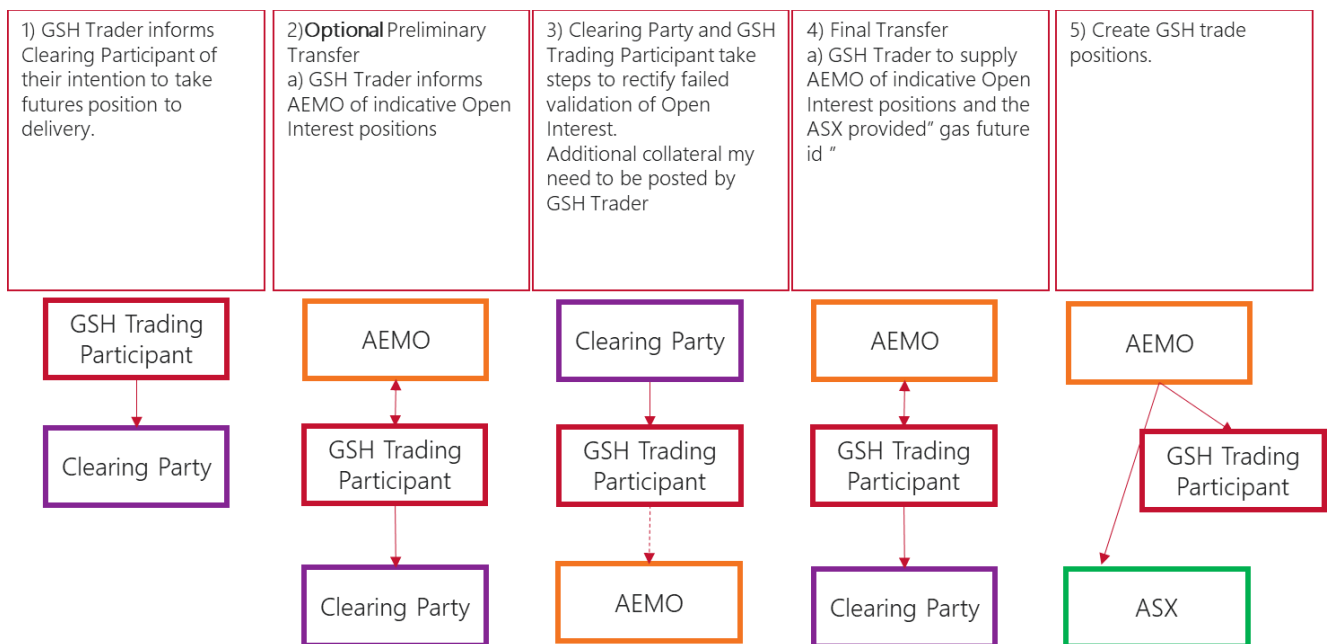
Futures Transfer Window

Futures Transfer Window

The Final Transfer Window starts after the expiry of a futures contract on Business Day minus 5 Gas Days at 12:00 hrs (midday)
The Final Transfer must have the Gas Future ID

D-14 Futures Transfer Window start
Optional Preliminary Transfer starts
No Gas Future ID required

D-2 Futures Transfer Window end

15 16 17 18 19 20 21 22 23 24 25 26 27 28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Delivery Period Start

Delivery Period End

Facilitating the delivery of ASX Gas Futures

Futures Transfer Process

1) GSH Trader informs Clearing Participant of their intention to take futures position to delivery.	2) **Optional** Preliminary Transfer a) GSH Trader informs AEMO of indicative Open Interest positions	3) Clearing Party and GSH Trading Participant take steps to rectify failed validation of Open Interest. Additional collateral my need to be posted by GSH Trader	4) Final Transfer a) GSH Trader to supply AEMO of indicative Open Interest positions and the ASX provided" gas future id "	5) Create GSH trade positions.
GSH Trading Participant → Clearing Party	AEMO ↕ GSH Trading Participant → Clearing Party	Clearing Party → GSH Trading Participant ⇢ AEMO	AEMO ↕ GSH Trading Participant → Clearing Party	AEMO → GSH Trading Participant / ASX

End-to-end process for Information exchange and GSH Monthly Trade creation.

Step	Action	State	Who	Where	When
1.	Inform the Clearing Party of intent to make a Physical Delivery	Required	Trading Participants	Participant systems	Prior to the Preliminary Transfer Window
2.	Submit Preliminary Transfer Information (**without** gas future id)	Optional	Trading Participants	One of the submission interfaces(Markets Portal using webform or uploading CSV ,API)	During the Preliminary Transfer Window
3.	Validate Preliminary Futures Trade information	Required	AEMO	AEMO systems	
4.	Rectify any failed validation	If submission rejected	Trading Parties	Participant systems	
5.	Send reports	Valid submission	AEMO	For details, see reports	
6.	Utilise the Preliminary Transfer Information	If validated	AEMO	Prudential Calculations	
7.	Rectify any breaches	Close out unrectified positions	Trading Parties	Participant systems	
8.	Submit Final Transfer Information **with** gas future id	Required	Trading Participants	One of the submission interfaces(Markets Portal using webform or uploading CSV ,API)	During the Final Transfer Window
9.	Validate Final Futures Trade information	Required	AEMO	AEMO systems	
10.	Create GSH trade position	If validated	AEMO	AEMO systems	
11.	Send reports	GSH trade created	Trading Parties and ASX	For details, see reports	

Validations

Once the data transaction is processed, AEMO responds with a report to the ASX and Traders that will confirm the validation/rejection.
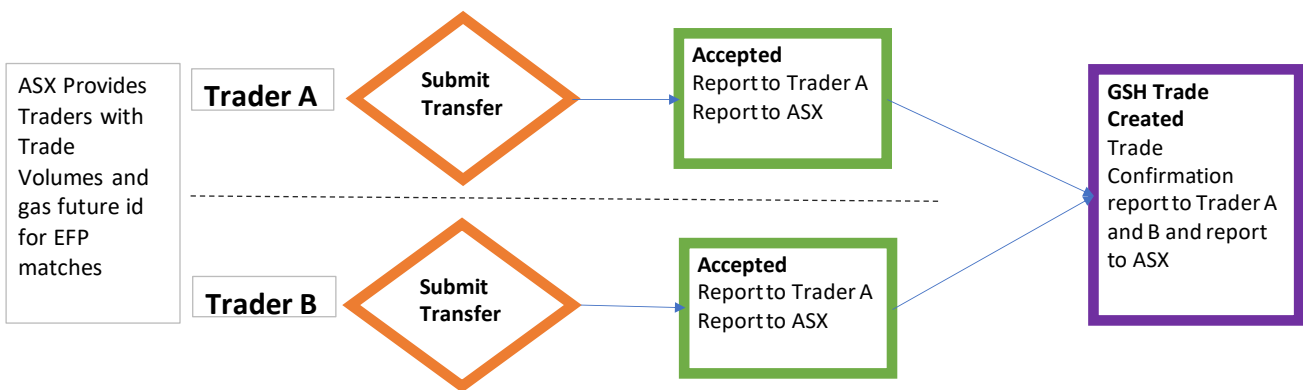
Unregistered GSH Trading Participants or those without sufficient Trading Margin in the GSH cannot transfer open interest into GSH trading positions.

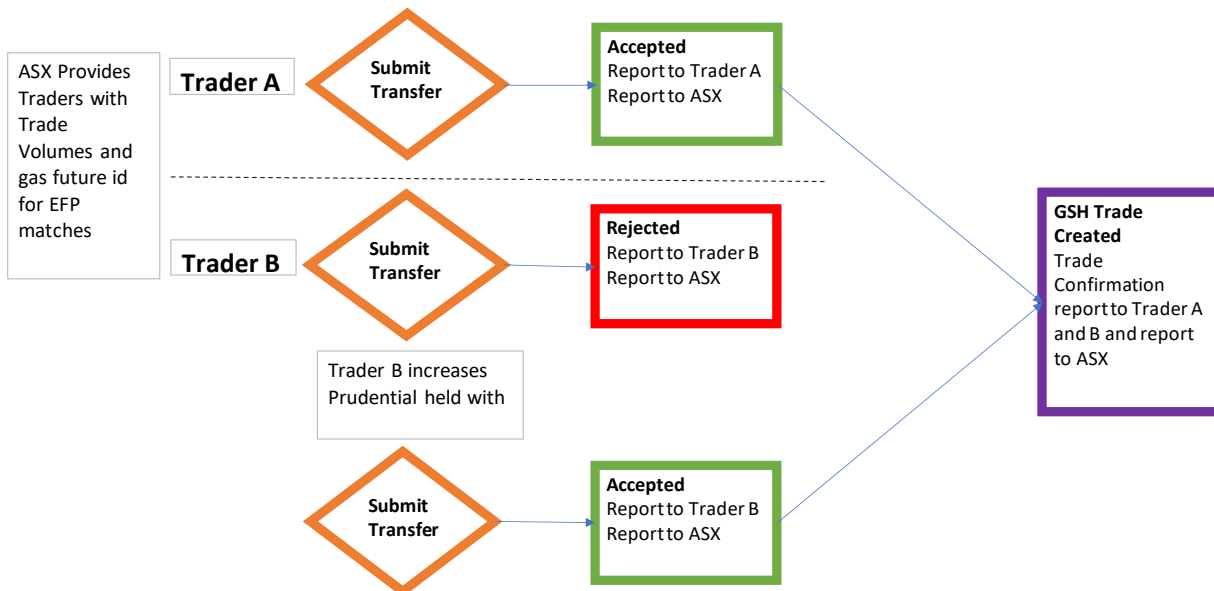The validations that will be performed include:

- Registration status in the GSH
- Prudential sufficient to cover transfer
- Gas future id
- Contract Period
- Price
- Volume

Buy/sell position

Information Transfer Process

Information Transfer Process rejection work flow

```
ASX Provides
Traders with
Trade
Volumes and          Trader A     [Submit      [Accepted
gas future id                      Transfer]    Report to Trader A
for EFP                                         Report to ASX]
matches
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                     Trader B     [Submit      [Rejected        GSH Trade
                                   Transfer]    Report to Trader B   Created
                                                Report to ASX]   Trade
                                                                 Confirmation
             Trader B increases                                  report to Trader A
             Prudential held with                                and B and report
                                                                 to ASX
                                   [Submit      [Accepted
                                   Transfer]    Report to Trader B
                                                Report to ASX]
```

Matching and GSH Trade creation

Following the final transfer and validation, when a matching (gas futures id) contract period, price, volume and position) validated trade is entered AEMO generates a GSH monthly netted trade.

Gas Delivery

Once transferred into the GSH, the gas futures positions would be treated like all other GSH trades for the purpose of gas delivery. A trader can adjust, or trade out of, a position in the GSH ahead of the daily delivery netting run.

As with all Wallumbilla trades, delivery netting would be performed at 1pm on the day prior to each gas delivery day. The delivery netting run considers all Monthly (including ASX transferred positions), Weekly and Daily trades for a specific gas day.

No change to the delivery netting process or systems are proposed.

Settlement

Financial settlement of positions transferred from the ASX would be in accordance with the regular settlement arrangements for Monthly products on the GSH. The final settlement price determined by the ASX would be used as the trade price for the purpose of GSH settlement.

The net settlement of a trade across the ASX and GSH equals the transaction value of the trade executed on the ASX. The proposed arrangement would mean that there is no risk that settlement prices become misaligned between the ASX and AEMO (as is possible under the current product).

Prudential calculation changes

The GSH Prudential Calculation determines the potential credit exposure associated with the settlement of a Trading Participant's transactions in the GSH. This calculation is proposed to be amended to incorporate ASX positions, allowing:

A credit validation to occur when the Clearing Party transfers Open Interest information to AEMO.

Incorporation of likely exposures associated with ASX futures positions during the Futures Transfer Window, so a Trading Participant does not use up spare Trading Margin required for those trades.

A Trading Participant with offsetting buy and sell trades, like a Market Maker, to avoid unnecessary collateral requirements.

Inputs into the Prudential Calculation for Gas Futures Transfers are:

- Transaction price and volumes

- Order price and volumes

- *Futures trade price and volumes*

Gas Futures Transfers information is included in the Forward Exposure calculation between the Preliminary Transfer Window Start and End Dates.

See Appendix C for full details of the prudential changes.

See attached GSH Settlements and Prudential Methodology v15.3 draft
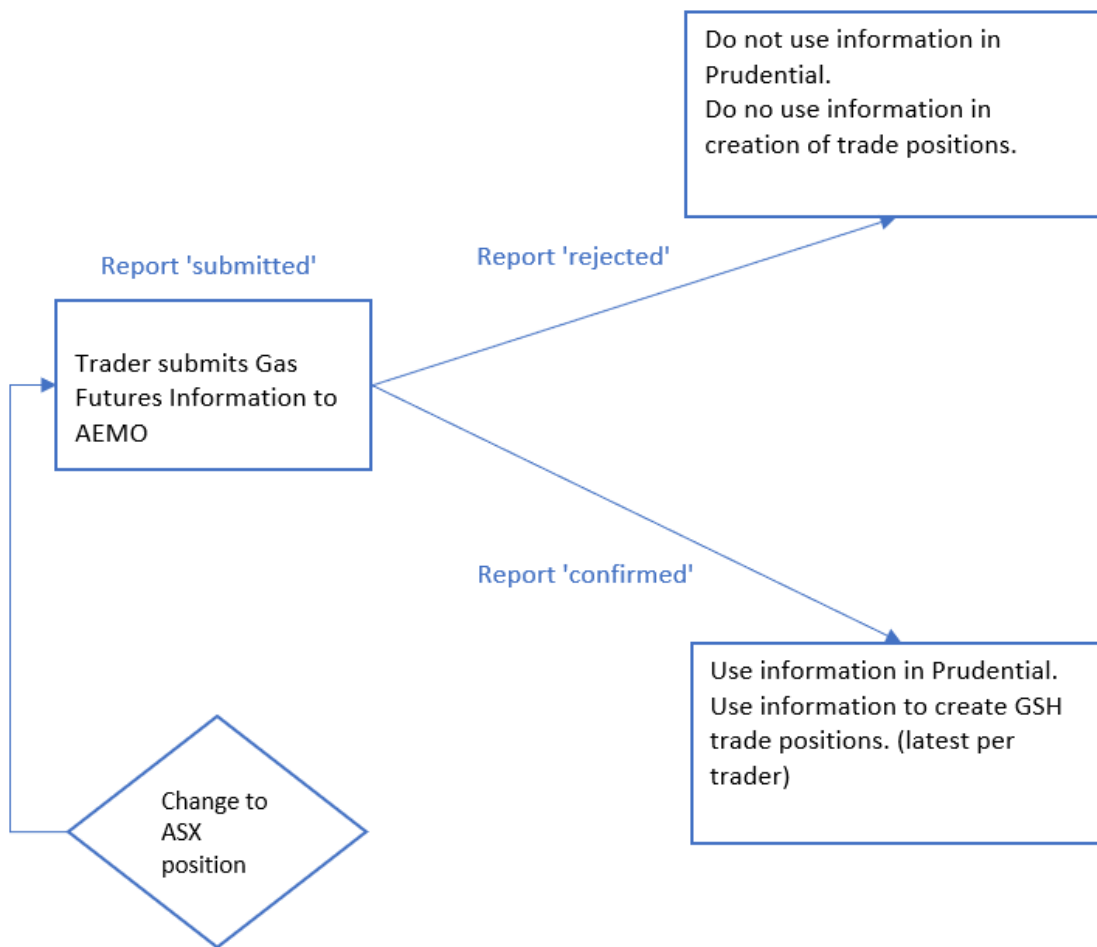
Reporting Workflow

Reporting

The ASX already receive report information from AEMO in relation to NEM, GSH and DWGM futures. Data will be shared with the ASX using the existing report set-up.

NEM Reports will be used for reporting information to ASX and Traders.

Reports will be event triggered: Produced each time there is a submission, matching and trade creation.

There will be a new report "GSH Transfer Information Report", which will be sent to both Trader and ASX every time there is a submission.

"GSH Transfer Information Report" includes the following information

Field	Description	Source
Record ID	Unique record generated by AEMO when storing information in database.	Information generated on submission
SUBMITTED_TIME	Date and time of submitting action taken	
STATUS	Pending , ,Override, Fail, Matched	

VALIDATION_MSG	If record fails validation, record the reason for the failure. 'ABC Trader does not have sufficient trading margin'	
GAS_FUTURE_ID	ASX identifier for the transaction	
PRODUCT_GROUP_CODE	GAS-WAL	Information provided by Trading Participant
PRODUCT_TYPE_CODE	Gas - NG Month	
DELIVERY_POINT	WAL HP Trade Point	
START_DATE	Start and end gas day of contract designate the contract. GSH uses gas day start and end date to specify the trade period.	
END_DATE	Start and end gas day of contract designate the contract. GSH uses gas day start and end date to specify the trade period.	
Trading Participant	GSH participant name as specified in the GSH participant register. Null for report to Exchange	
TRADE_TYPE	Buy or sell	
VOLUME	Open Interest. Measured in GJ per day as per GSH convention	
PRICE	Latest settlement price determined by the ASX.	

The current Trade Confirmation report on the GSH will have an additional field to include the "gas future id" this Trade Confirmation report will be sent to Trading Participants only.

A2. Appendix B

Excerpt of the **draft** changes to the GSH Exchange Agreement. Additions in Blue

13.4 Exchange for Physical (EFP) Trades

(a)   If permitted in the Product Specification for a particular Product;

    (i)   a Trading Participant for an EFP Trade for that Product may submit EFP Trade Information for the EFP Trade in the Trading System (First EFP Trading Participant); and

    (ii)   a Trading Participant that is the counterparty to that EFP Trade for that Product may submit EFP Trade Information for that EFP Trade in the Trading System (Second EFP Trading Participant),

    during the EFP Trading Window for the Product.

(b)   Clauses 12.4 and 12.5 apply to the submission of EFP Trade Information for an EFP Trade.

(c)   In addition to clauses 12.4 and 12.5, the Operator must reject an EFP Trade if the information in the EFP Trade Information submitted by the First EFP Trading Participant for a Gas Future ID does not match the information submitted by the Second EFP Trading Participant for the same Gas Future ID.

(d)   The Operator will inform the First EFP Trading Participant and the Second EFP Trading Participant in the event the EFP Trade entered by the First EFP Trading Participant and the Second EFP Trading Participant is accepted.

(e)   An EFP Trade is formed between the Buyer and the Seller under that trade when the EFP Trade Information for the EFP Trade entered by the First EFP Trading Participant is matched and validated against the EFP Trade Information for the EFP Trade entered by the Second EFP Trading Participant in the Trading System.

(f)   To the maximum extent permitted by law, AEMO is not liable to any Member for any loss, damage, debt, obligation, action, cost (including legal costs, deductibles or increased premiums), expense, compensation, charge or liability of any kind (including fines or penalties) whether actual, prospective or contingent or currently ascertainable or not in connection with EFP Trade Information (including but not limited to any delay or failure to provide EFP Trade Information to AEMO) whether arising in contract, tort (including negligence) breach of duty or any other ground.

13.5 Confirmations

(a)   As soon as reasonably practicable after each Transaction is formed, the Operator must send a Confirmation to each Trading Participant whose Order was accepted.

(b)   Each Confirmation must specify the Trading System's identification number for the Transaction, whether the Trading Participant is the Buyer or Seller, the time the Transaction was entered into, the Product the subject of the Transaction, the details for the Transaction required by the Product Specification and, where Delivery Netting does not apply, the identity of the other party to the Transaction.

(c)   Without limiting subclause (a) and (b), for an EFP Trade:

    (i)   a Confirmation must also specify Gas Future ID; and

(ii)   as soon as reasonably practicable after each EFP Trade is formed, the Operator must send a Confirmation to ASX and the Trading Participants for the EFP Trade are taken to consent to the disclosure of the Confirmation by the Operator to ASX.

A3. Appendix C

GSH Prudential equation amendment. Additions in Blue

Forward Prudential Exposure

Specification of Forward Exposure Calculation

EFP Trade: Is information provided to AEMO as part of a preliminary transfer submission as per Exchange agreement definition.

1. **Average Buy and Sell Price**
   a. Average Buy Price for Member m, Gas Day d and Trading Location l:
   $$ABP(m,d,l) = \Sigma_c\ \Sigma_{t'}\ (TP(t')\ x\ TQ(t',d,c,l))\ /\ \Sigma_c\ \Sigma_{t'}\ (TQ(t',d,c,l))$$
   Where t' is a Transaction, EFP Trade or Order where Member m is the Buyer.
   b. Average Sell Price for Member m, Gas Day d and Trading Location l:
   $$ASP(m,d,l) = \Sigma_c\ \Sigma_{t''}\ (TP(t'')\ x\ TQ(t'',d,c,l))\ /\ \Sigma_c\ \Sigma_{t^*}\ (TQ(t'',d,c,l))$$
   Where t'' is a Transaction or EFP Trade where the Member m is the Seller.

2. **Trading Position**
   a. Net Transaction Quantity for Member m for Gas Day d:
   $$NTQ(m,d,l) = \Sigma_c\ \Sigma_{t'}\ TQ(t',d,c,l)\ -\ \Sigma_c\ \Sigma_{t''}\ TQ(t'',d,c,l)$$
   Where:
   i. t' is a Transaction, EFP Trade or an Order where Member m is the Buyer.
   ii. t'' is a Transaction or EFP Trade where Member m is the Seller.
   b. Offset Quantity for Member m for Gas Day d:
   $$OFQ(m,d,l) = MIN(\Sigma_c\ \Sigma_{t'}\ (TQ(t',d,c,l)),\ \Sigma_c\ \Sigma_{t''}\ (TQ(t'',d,c,l)))$$
   Where:
   i. t' is a Transaction, EFP Trade or an Order where Member m is the Buyer.
   ii. t'' is a Transaction or EFP Trade where Member m is the Seller.

3. **Forward Trading Exposure**
   a. Forward Trading Exposure for Member m:
   $$FTE(m) = \Sigma_d\ \Sigma_l\ [If\{\ NTQ(m,d,l) > 0,$$
   $$Then\ NTQ(m,d,l)\ x\ ABP(m,d,l)\ x\ B(d),$$
   $$Else\ NTQ(m,d,l)\ x\ ASP(m,d,l)\ x\ S(d)\}$$
   $$+\ OFQ(m,d,l)\ x\ (ABP(m,d,l)\ -\ ASP(m,d,l))\ x\ (1+GST(d))]$$
   Where Gas Day d ≥ processing day.

Worked example 1 for Gas Day 1st February as at 22nd Jan (in the preliminary transfer period)

ABC Gas Trading enter into GSH and ASX forward transactions:
- GSH Feb Month – 5TJ at $4
- GSH Week 31/1 to 6/2 – 5TJ at $5
- GSH Day 1 Feb – 5TJ at $6
- ASX Feb Gas Futures – 5TJ at $7

1. Average Buy and Sell Price for 1 February (as at 22 January)

Average Buy Price

$$ABP(m,d,l) = \Sigma_c\, \Sigma_{t'}\, (TP(t') \times TQ(t',d,c,l)) / \Sigma_c\, \Sigma_{t'}\, (TQ(t',d,c,l))$$

= (20,000 + 25,000 + 30,000 + 35,000) / (5,000 + 5,000 + 5,000 + 5,000)

= 110,000 / 20,000

= $5.50 / GJ

    2.   Trading Position

Net Transaction Quantity

$$NTQ(m,d,l) = \Sigma_c\, \Sigma_{t'}\, TQ(t',d,c,l) - \Sigma_c\, \Sigma_{t''}\, TQ(t'',d,c,l)$$

= 5,000 + 5,000 + 5,000 + 5,000

= 20,000

Worked example 1 continued for GD 1st February as at 31st Jan (The trade has been matched in the staging table and the GSH trade created)

ABC Gas Trading enter into GSH and ASX forward transactions:
- GSH Feb Month – 10TJ at $5.5
- GSH Week 31/1 to 6/2 – 5TJ at $5
- GSH Day 1 Feb – 5TJ at $6

    2.   Average Buy and Sell Price for 1 February (as at 22 January)

Average Buy Price

$$ABP(m,d,l) = \Sigma_c\, \Sigma_{t'}\, (TP(t') \times TQ(t',d,c,l)) / \Sigma_c\, \Sigma_{t'}\, (TQ(t',d,c,l))$$

= (55,000 + 25,000 + 30,000) / (10000 + 5,000 + 5,000)

= 110,000 / 20,000

= $5.50 / GJ

    3.   Trading Position

Net Transaction Quantity

$$NTQ(m,d,l) = \Sigma_c\, \Sigma_{t'}\, TQ(t',d,c,l) - \Sigma_c\, \Sigma_{t''}\, TQ(t'',d,c,l)$$

= 10,000 + 5,000 + 5,000

= 20,000