



# UFE Focus Group Meeting #1

12 November, 2021

# Agenda

NO	AGENDA ITEM	RESPONSIBLE
1	Welcome	Blaine Miner
2	May 2022 Program	Greg Minney
3	Global Settlements 101	Blaine Miner
4	How AEMO Calculates UFE and UFEF	Paul Lyttle
5	RM Reports	Paul Lyttle
6	UFE in Settlements	Darren Gatty
7	UFE Management	Blaine Miner
8	Next Steps and General Business	Blaine Miner

# May 2022 Program

Greg Minney

# Approach

- AEMO is proposing to provide a coordinated approach for all key initiatives scheduled to commence in May 2022
- Consolidated milestones, transition and industry go-live plans to be developed (subject to confirmation of individual initiative timing and scope)
- Issues and risks will be developed and managed across all initiatives
- AEMO does not propose a formal readiness reporting regime for this Go-live as was the case with 5MS, but will consult further with RWG to confirm approach to readiness management
- Readiness for Rule Commencement for GS is a key priority, with impacts of other initiatives to be managed at RWG as implementation risks

# Governance Structure



- May 2022 RWG will be the equivalent of a consolidated 5MS PCF and RWG
- An Executive Forum is not proposed given the scope and impact of the changes. Participants will be responsible for briefing their Executives
- Focus Groups will be established and closed as required, in consultation with RWG

# UFE Focus Group

- Purpose :
  - To consider and provide advice to the RWG/TFG regarding key concepts and mechanisms associated to:
    - UFE settlement
    - UFE reporting
    - UFE management
  - Provide a forum to support participant implementation of key concepts and mechanisms
- Membership: Open to all participants, with a focus on those areas directly impacted by UFE from a delivery and utilisation perspective
- The expectation is that members will be familiar with the concepts and requirements of Global Settlements
- Frequency of meetings
  - As required – based on the jointly agreed program of work
- Key responsibilities
  - To provide specialist knowledge on key elements associated to Rule implementation and UFE activities

# Global Settlements 101

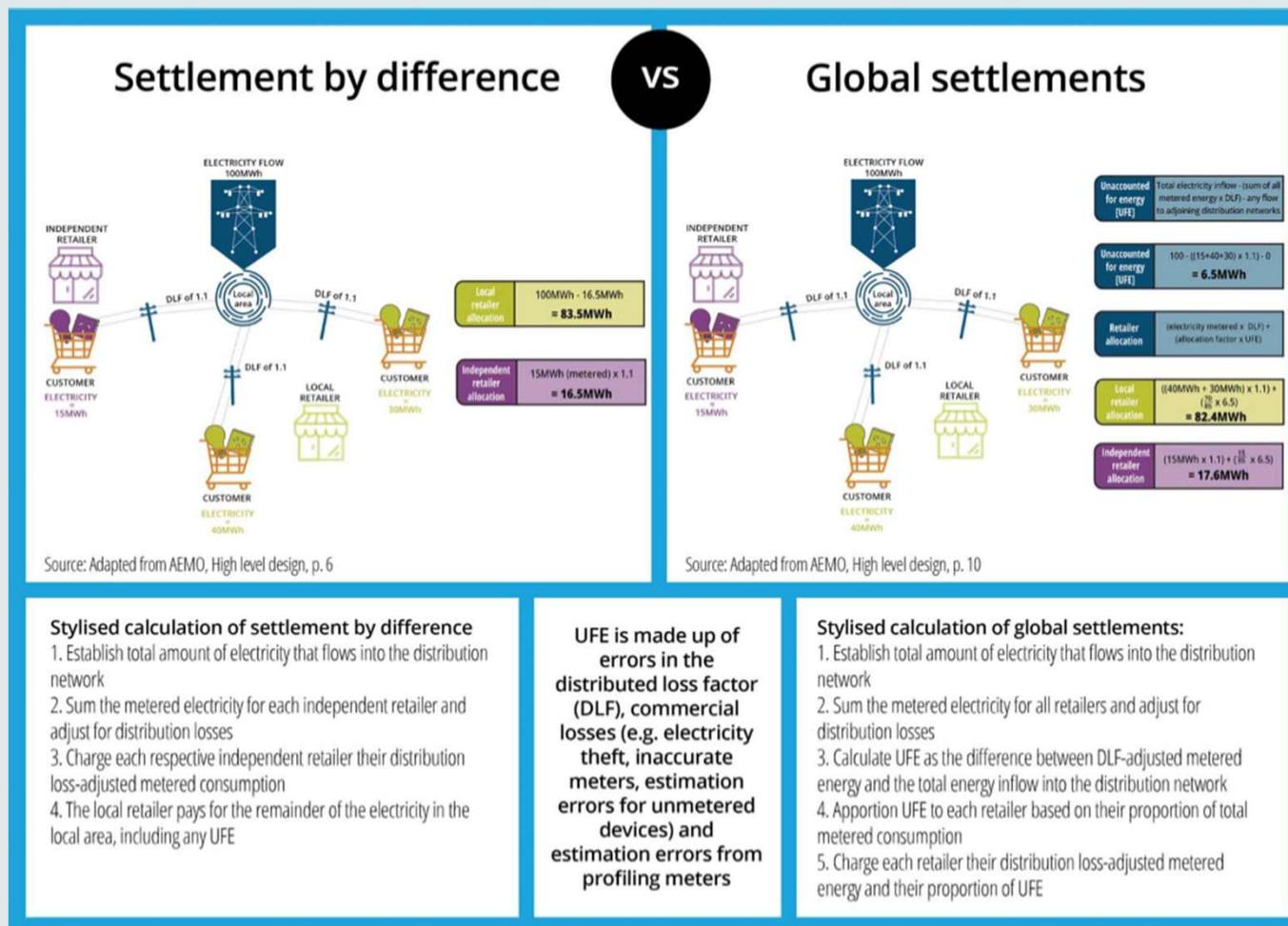
Blaine Miner

# Settlements by Difference vs Global Settlements

Under Global Settlements, the reconciliation process becomes a 'bottom up' process from datastream to meter to NMI to TNI to Local Area.

In broad terms, UFE is made up of errors in distribution loss factors and commercial losses, e.g.:

- Electricity theft
- Inaccurate/faulty meters
- Estimation errors associated to unmetered devices and profiling



For more information please refer to the AEMC's website:  
<https://www.aemc.gov.au/rule-changes/global-settlement-and-market-reconciliation>

# Some Initial FAQs

- What level is UFE allocated?
  - UFE is calculated and allocated at the local area level (i.e. distribution network)
- Who and how is UFE allocated?
  - UFE will be allocated across all market customers (i.e. FRMPs) in each local area, pro-rated based on their accounted-for energy for each Trading Interval, associated to:
    - Distribution Connection Points
    - Embedded Network Parent connection points
    - Embedded Network On-Market Child connection points
- In what instances is UFE not allocated?
  - UFE will not be allocated:
    - To Transmission Connection Points
    - To market and distribution-connected generators i.e. NMs with a classification of GENERATR or NREG
    - To Embedded Network Off-Market Child connection points
    - Where the Net Energy is negative for a trading interval on a distribution network connection point, the ME- (metered energy) quantity is set to 0
- How is UFE calculated?
  - $UFE = TME - DDME - ADME$ 
    - TME is the amount of energy flowing at each of the transmission network connection points in the local area
    - DDME is the amount of energy flowing at each of the distribution network connection points in the local area which are connected to an adjacent local area i.e. cross boundary supplies
    - ADME is the aggregate metered energy (ME) x DLF

# Some Initial FAQs

- What can Participants do to ensure UFE is as representative as possible?
  - Ensure all connection points have been created, and are being actively managed in a timely manner, in MSATS
    - This includes Tier 1 basic meters, non-contestable unmetered loads and cross boundary supplies
  - Ensure all required metering data is being provided to AEMO so energy can be allocated as much as possible
- What is AEMO's obligations under the NER re UFE reporting?
  - At least once each year AEMO must in accordance with the UFE reporting guidelines (guidelines to be consulted on in late 2022, published by 1 March 2023), prepare and publish on its website a report (first report due 1 June 2022) setting out:
    - AEMO's summary and analysis of the total unaccounted for energy amounts in each local area over the reporting period
    - AEMO's analysis of the unaccounted-for energy amounts in each local area in the reporting period against benchmarks determined by AEMO acting reasonably
    - AEMO's analysis of the sources of unaccounted for energy in each local area
    - AEMO's recommendations to improve visibility of unaccounted for energy in each local area
    - AEMO's recommended actions to reduce the amounts of unaccounted for energy in each local area, including without limitation any actions that AEMO recommends ought to be taken by Market Participants, Network Service Providers, the AER or AEMO
- What are Participant's obligations under the NER re UFE reporting?
  - Network Service Providers, Market Participants, Metering Data Providers, Metering Providers, Embedded Network Managers and large customers must provide to AEMO such information and assistance as AEMO reasonably requires to prepare the report

# How AEMO Calculates UFE and UFEF

Paul Lyttle

# UFE Acronyms Relevant to this Agenda Item

Term	Description
UFE	The total unaccounted for <i>energy</i> for each <i>trading interval</i> i.e. residual energy associated to a local area after all metered energy has been allocated ( $UFE = TME - DDME - ADME$ )
TME	The amount of electrical energy flowing at each of the transmission network connection points in the local area i.e. sum of all TNI energy into and out of a local area
DDME	The amount of electrical energy flowing at each of the distribution network connection points in the local area which are connected to an adjacent local area i.e. sum of all Cross Boundary metered energy into and out of a local area
ADME	The aggregate of the amounts represented by (Metered Energy (ME) x DLF) for that trading interval for each connection point assigned to the transmission network connection point or virtual transmission node i.e. sum of all NMI energy flows within a local area adjusted by DLF
UFE Allocated	$UFEA = UFE \times (DME/ADMELA)$
DME	DME is the amount represented by (ME- x DLF) for the relevant connection point and trading interval. The ME- quantity is the Net Energy quantity for a distribution network connection point for a TI but only when it is negative (i.e. has load). So, ME- is subject to the 'Floored Load' and is zero for: (a) GENERATR or NREG NMI classification codes and (b) NMIs where local generation (e.g. from solar panels) exceeds the load.
ADMELA	The aggregate of the amounts represented by $-ME \times DLF$ for that trading interval for each market connection point in that local area i.e. sum of all net NMI energy loads within a local area, net generation is set to 0 for the trading interval
UFEF	A factor to determine the allocation of UFE to each (or group of) <i>energy</i> loads at each <i>market connection point</i> (adjusted by DLF) for each <i>trading interval</i> i.e. factor that can be applied to applicable loads within the local area to determine its allocation of UFE ( $UFEF = UFE / ADMELA$ )

# AEMO's Calculation of UFE and UFEF - EasyLand (TI 1)

Local Area 1 = EasyLand (TI 1)

TNIs

- MPET = +100
- MPEB = +150

TME = +250

Cross Boundary

E2WNW2E1 = +62

DDME = +62

NMIs (DLF adjusted)

- MPET ELCP0001 = +30
- MPET ELCP0002 = +20
- MPET ELCP0003 = +40
- MPEB ELCP0004 = +25
- MPEB ELCP0005 = +35
- MPEB ELCP0006 = +30

ADME = +180

NMIs with Net Load

ADMELA = +180

Rules Clause 3.15.5(a)

$$UFE = TME - DDME - ADME$$

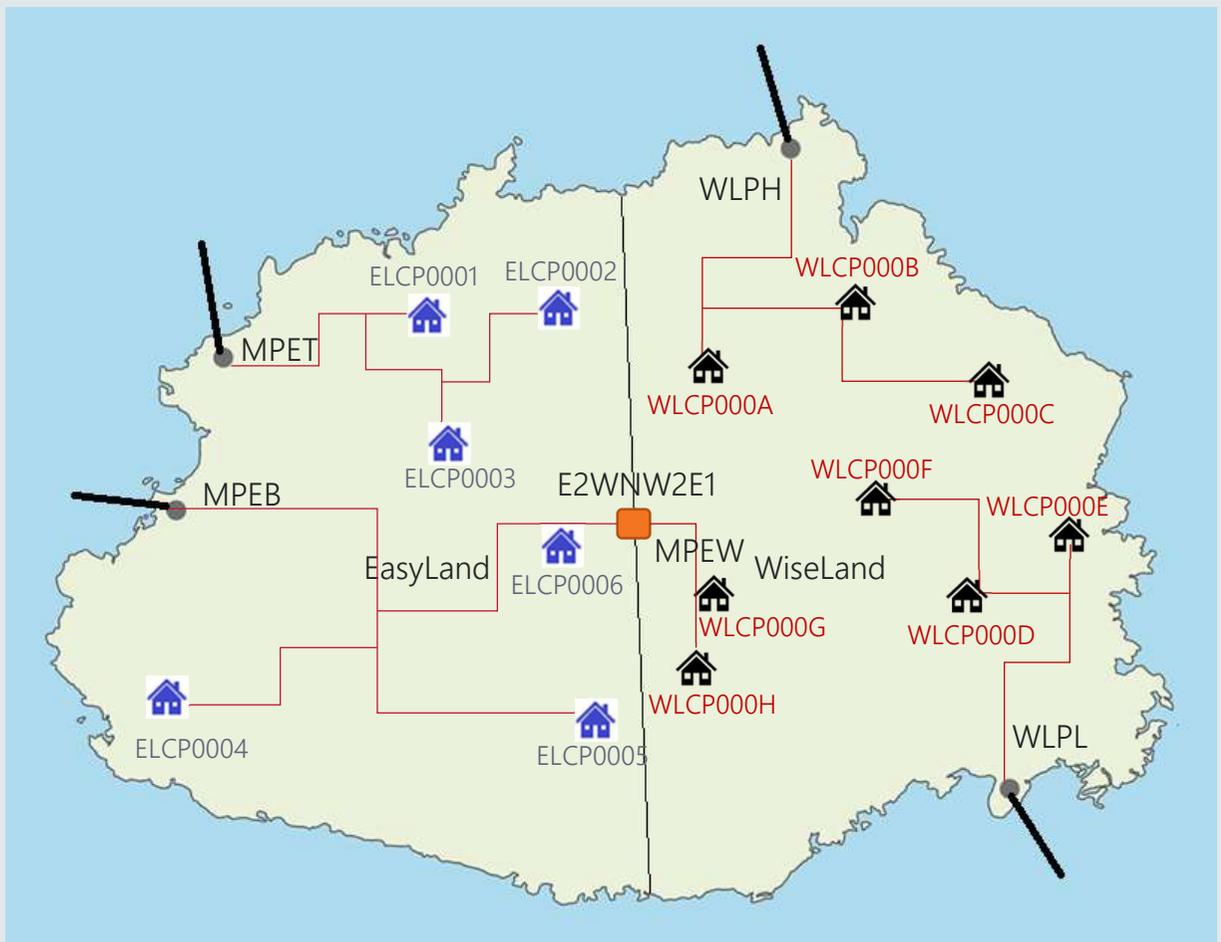
$$UFE = 250 - 62 - 180$$

$$UFE = +8$$

$$UFE \text{ Factor (UFEF)} = UFE / ADMELA$$

$$UFEF = 8 / 180$$

$$UFEF = 0.0444444444$$



# AEMO's Calculation of UFE and UFEF - EasyLand (TI 2)

Local Area 1 = EasyLand (TI 2)

TNIs

MPET = +110

MPEB = +180

TME = +290

Cross Boundary

E2WNW2E1 = +58

DDME = +58

NMIs (DLF adjusted)

MPET ELCP0001 = +17

MPET ELCP0002 = +37

MPET ELCP0003 = +42

MPEB ELCP0004 = +7

MPEB ELCP0005 = +77

MPEB ELCP0006 = +42

ADME = +222

NMIs with Net Load

ADMELA = +222

Rules Clause 3.15.5(a)

$$UFE = TME - DDME - ADME$$

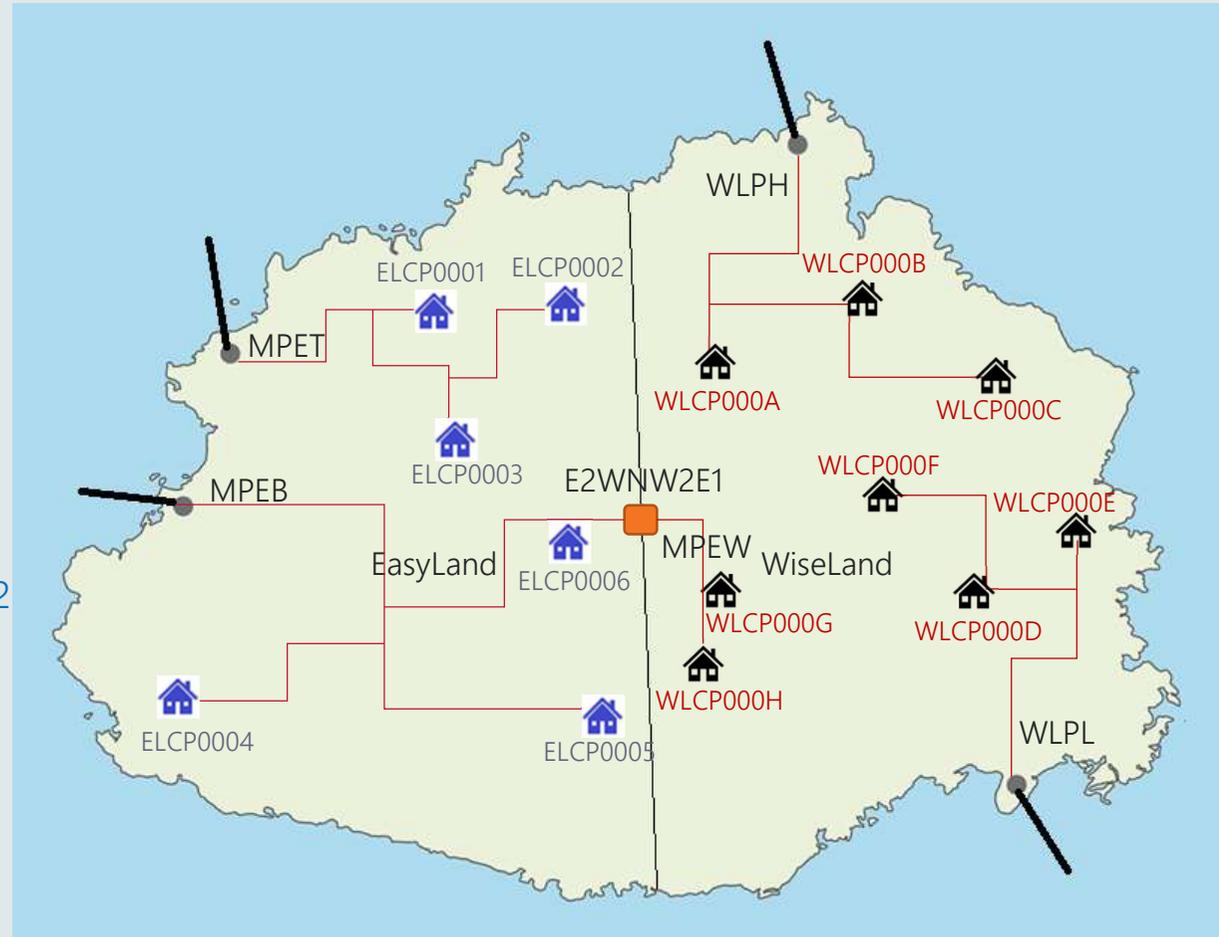
$$UFE = 290 - 58 - 222$$

$$UFE = +10$$

$$UFE \text{ Factor (UFEF)} = UFE / ADMELA$$

$$UFEF = 10 / 222$$

$$UFEF = 0.0450450505$$



# AEMO's Calculation of UFE and UFEF - WiseLand (TI 1)

Local Area 1 = WiseLand (TI 1)

TNIs

WLPH = +100

WLPL = +100

TME = +200

Cross Boundary

E2WNW2E1 = -62

DDME = -62

NMIs (DLF adjusted)

WLPH WLCP000A = +10

WLPH WLCP000B = +20

WLPH WLCP000C = +40

WLPL WLCP000D = +50

WLPL WLCP000E = +15

WLPL WLCP000F = +45

MPEW WLCP000G = +10

MPEW WLCP000H = +50

ADME = +240

NMIs with Net Load

ADMELA = +240

Rules Clause 3.15.5(a)

$UFE = TME - DDME - ADME$

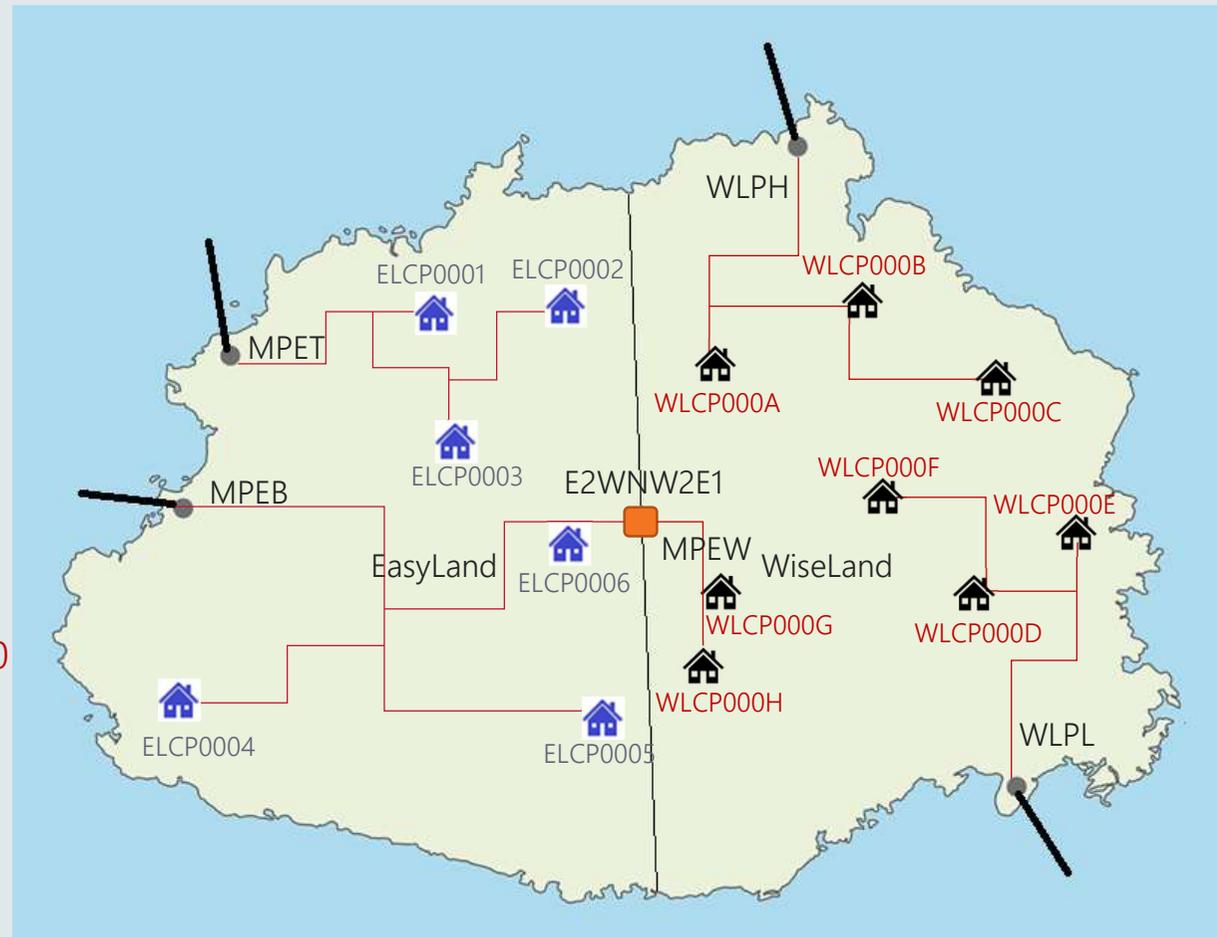
$UFE = 200 - (-62) - 240$

$UFE = +22$

$UFE\ Factor\ (UFEF) = UFE / ADMELA$

$UFEF = 22 / 240$

$UFEF = 0.0916666667$



# AEMO's Calculation of UFE and UFEF - WiseLand (TI 2)

Local Area 1 = WiseLand (TI 2)

TNIs

WLPH = +120

WLPL = +130

TME = +250

Cross Boundary

E2WNW2E1 = -58

DDME = -58

NMIs (DLF adjusted)

WLPH WLCP000A = +47

WLPH WLCP000B = +17

WLPH WLCP000C = +37

WLPL WLCP000D = +67

WLPL WLCP000E = +57

WLPL WLCP000F = +52

MPEW WLCP000G = +52

**MPEW WLCP000H = -40**

NMIs with Net Load

ADME = +289

ADMELA = +329

Rules Clause 3.15.5(a)

$UFE = TME - DDME - ADME$

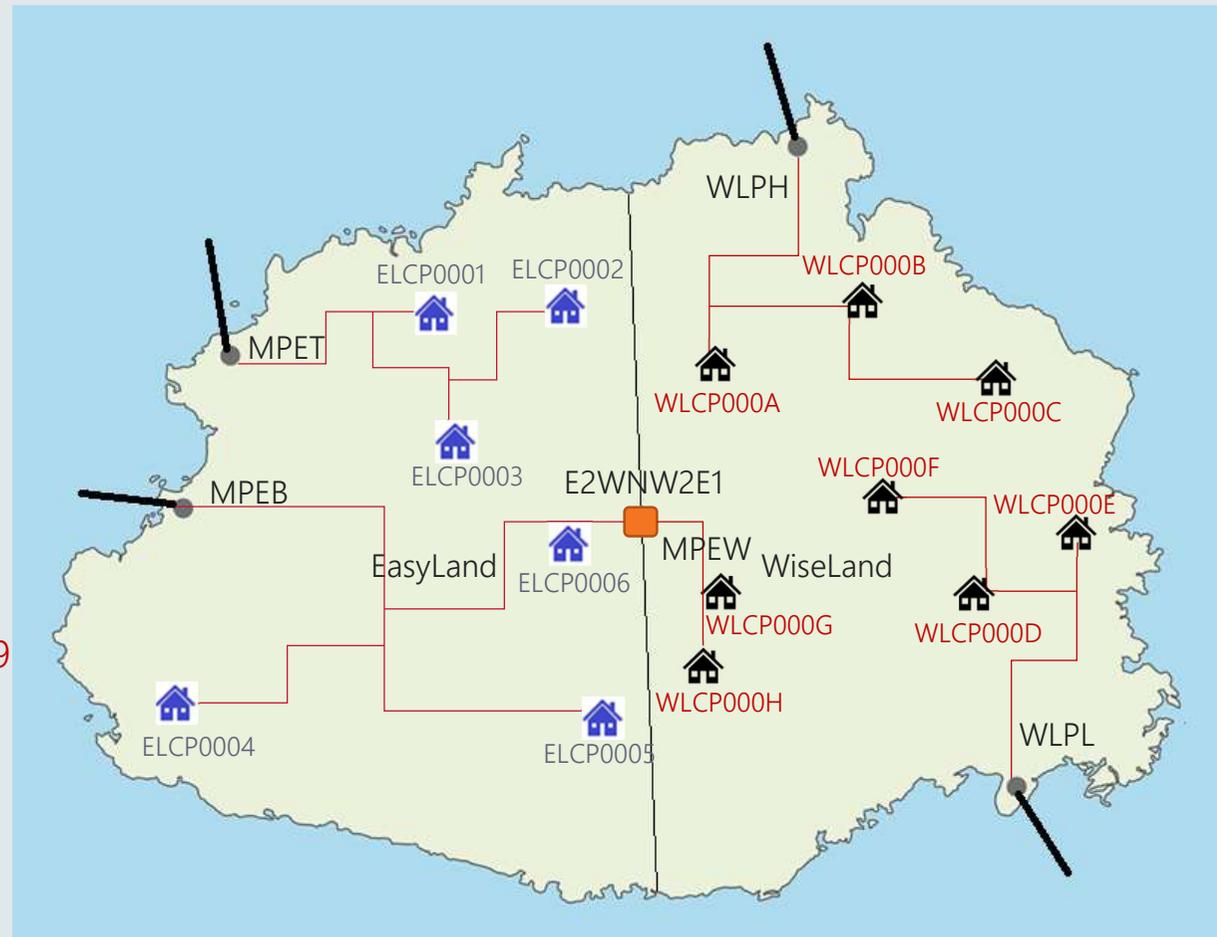
$UFE = 250 - (-58) - 289$

**UFE = +19**

$UFE\ Factor\ (UFEF) = UFE / ADMELA$

$UFEF = 19 / 329$

**UFEF = 0.0577507598**



# RM reports

Paul Lyttle

# RM43 - UFE Factor Values By Local Area

RM43 UFE Factor Value by Local Area:

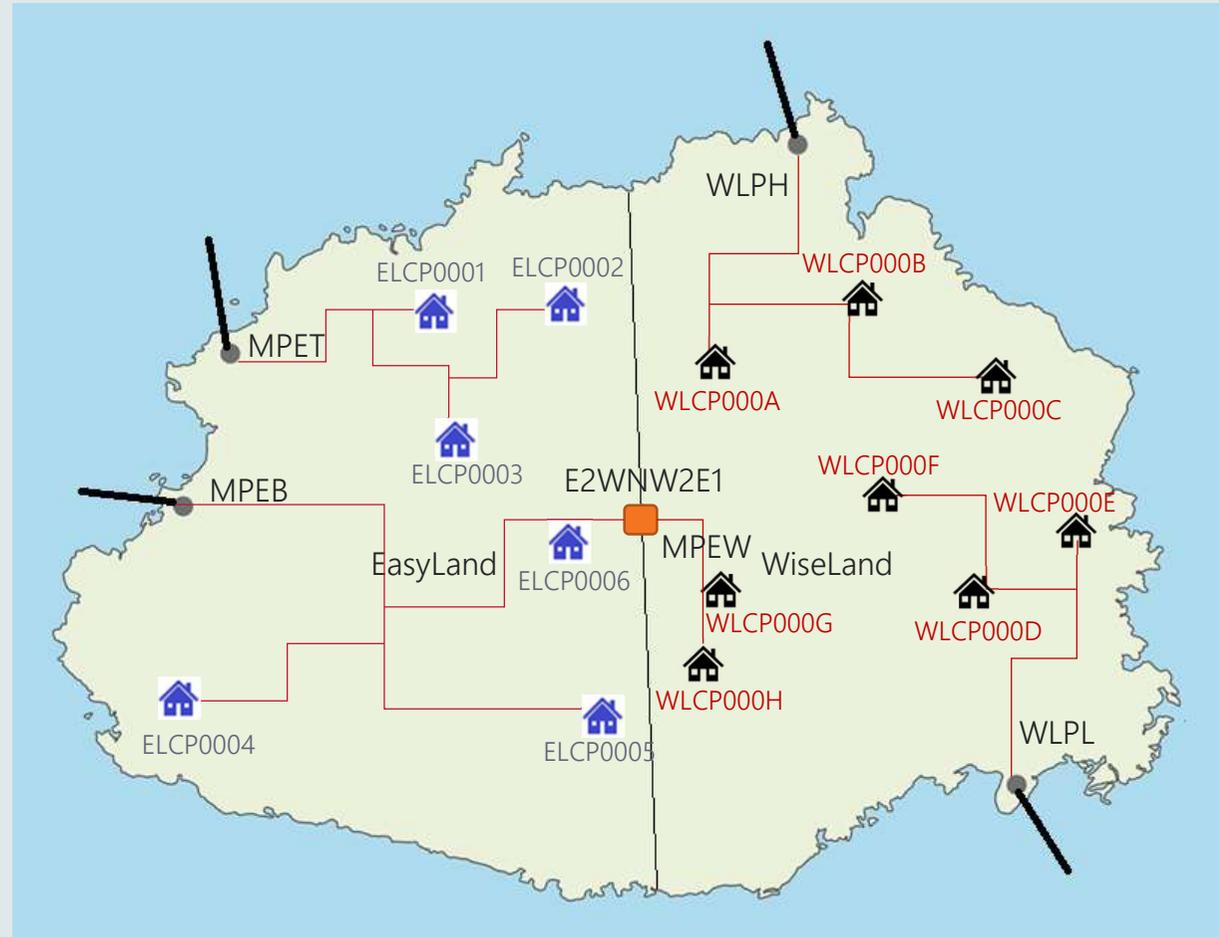
EasyLand (TI 1)	UFEF = 0.044444444
EasyLand (TI 2)	UFEF = 0.04504505
WiseLand (TI 1)	UFEF = 0.09166667
WiseLand (TI 2)	UFEF = 0.05775076

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# RM46 - UFE Validation Report

- Purpose to provide values to support the calculation of UFE and UFEF.
- New report to Identify each Local Area for each TI

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## RM46 UFE Factor Value by Local Area

	(TI 1)	(TI 2)
EasyLand		
TME	250	290
DDME	62	58
ADME	180	222
UFE	8	10
ADMELA	180	222
UFEF	0.044444444	0.04504505

	(TI 1)	(TI 2)
WiseLand		
TME	200	250
DDME	-62	-58
ADME	240	289
UFE	22	19
ADMELA	240	329
UFEF	0.091666667	0.05775076

# How to calculate UFEA - Example 1

The RM17 is a:

- NMI level settlement data report
- Providing interval data

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Calculation of UFEA (ELCP0001 ti1)

UFEA = Net Energy ti x UFEF ti

= 30 x 0.0444444444

= 1.33333

The RM43 is a:

- UFE Factor report
- Providing a UFE factor for each time interval

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# How to calculate UFEA - Example 2

The RM17 is a:

- NMI level settlement data report
- Providing interval data

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Calculation of UFEA (WLCP000H ti1)

UFEA = Net Energy ti x UFEF ti

$$= 30 \times 0.0916666667$$

$$= 2.7500001$$

Calculation of UFEA (WLCP000H ti2)

UFEA = Net Energy ti x UFEF ti

$$= 0 \times 0.0577507599$$

$$= 0$$

Net Energy for period is "Floored" to 0  
therefore no UFE is allocated

The RM43 is a:

- UFE Factor report
- Providing a UFE factor for each time interval

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# Using the UFEF with one or many NMIs

## UFE Factors Value for EASYLAND

Applying UFEF to a single NMI Load

TNI	NMI	TI 1	TI 2
MPET	ELCP0001	+30	+17
	UFEF	0.0444444444	0.0450450505
	UFEA	1.33333	0.73577

Applying UFEF to a FRMP's Load

TNI	NMI	TI 1	TI 2
MPET	ELCP0001	+30	+17
MPET	ELCP0003	+40	+42
MPEB	ELCP0004	+25	+7
MPEB	ELCP0005	+35	+77
	Total	+130	+148
	UFEF	0.0444444444	0.0450450505
	UFEA	5.77777	6.66667

## UFE Factors Value for WISELAND

Applying UFEF to a single NMI Load

TNI	NMI	TI 1	TI 2
WLPH	WLCP000C	+40	+37
	UFEF	0.0916666667	0.0577507599
	UFEA	3.66666	2.13677

Applying UFEF to a FRMP's Load

TNI	NMI	TI 1	TI 2
WLPH	WLCP000C	+40	+37
WLPL	WLCP000E	+15	+57
WLPL	WLCP000F	+45	+52
MPEW	WLCP000H	+50	0 *
	Total	+150	+146
	UFEF	0.0916666667	0.0577507599
	UFEA	13.75	8.43161

WLCP000H has a Net Energy inflow (Generation) of -40  
 (UFE is only allocated where there is load (in a TI),  
 therefore WLCP000H is 'Floored' to 0 KWh)

# RM16 – Level 1 Settlement Reconciliation

# RM27 – Level 2 Settlement Reconciliation

The **RM16**:

- Is an aggregated TNI settlement data report
- Provides interval data for each FRMP, LR & MDP combination

```

<csv data>
TNI,DataType,FRMP,LR,MDP,CreationDT,SettlementDate,Period001,Period002,.....,SeqNo
WLPH,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/03,70,101,.....,1
WLPH,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/04,0nnnn,0nnnn,.....,2
WLPH,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/05,0nnnn,0nnnn,.....,3
WLPH,I,FRMP1,.....,7
WLPL,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/03,110,176,.....,8
WLPL,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/04,0nnnn,0nnnn,.....,9
WLPL,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/05,0nnnn,0nnnn,.....,10
WLPL,I,FRMP1,.....,14
MPEW,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/03,60,12,.....,15
MPEW,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/04,0nnnn,0nnnn,.....,16
MPEW,I,FRMP1,LR1,MDP123,2019/10/20,2019/10/05,0nnnn,0nnnn,.....,17
MPEW,I,FRMP1,.....,21
</csv data>

```

The **RM27**:

- Is a NMI Level daily settlement data report
- Provides total daily NMI data

```

<csv data>
TNI,LR,MDP,SettlementDate,NMI,DataType,MSATS_Est,Total_Energy,SeqNo
MPET,LR1,MDP123,2019/10/03, ELCP0001,I,N,47,1
MPET,LR1,MDP123,2019/10/04, ELCP0001,I,N,n0000,2
MPET,LR1,MDP123,2019/10/05, ELCP0001,I,N, n0000,3
MPET,LR1,MDP123,2019/10/06, ELCP0001,I,N, n0000,4
MPET,LR1,MDP123,2019/10/07, ELCP0001,I,N, n0000,5
MPET,LR1,MDP123,2019/10/08, ELCP0001,I,N, n0000,6
MPET,LR1,MDP123,2019/10/09, ELCP0001,I,N, n0000,7
</csv data>

```

Notes:

- RM16 and RM27 are used to reconcile Energy Sales and Purchases, however, they are unable to be used to calculate UFEA. This is because the data contained in these reports are aggregated to daily and participant combination levels respectively, which is not the necessary level of granularity to reconcile UFEA.
- RM17 and RM43 reports are to be used for UFEA purposes.



# UFE in Settlements

Darren Gatty

# UFE in Settlements

- The calculation of the RM reports is based on Metering data provided to AEMO's Retail solution
  - From 1 October 2021, the vast majority of Tier 1 meters have been activated in MSATS and the Retail solution has been receiving associated metering data. These reads are then used in the creation of RM reports, irrespective of whether they are for Tier 1 or Tier 2 NMLs/meters.
- AEMO's Settlements system calculates the settlement of the market and receives a mixture of individual and aggregated reads from the Retail solution to support this process
  - As the market is currently settled using the 'settlements by difference' approach, the aggregated reads for Tier 1 meters are not received from AEMO's Retail solution, as these are not currently required for settlements.
- During the soft start period Settlements instead uses a settlement by difference approach to calculate the Tier 1 DME values required for the allocation of the UFE
  - This means the DME values calculated by Settlements for Tier 1 retailers will already include a portion of UFE and so differ from the RM calculation
  - This is visible in the ADMELA (the sum of DME values) published in the RM46 report, being different than the ADMELA published in the MMS Data Model table SETLOCALAREAENERGY
- The difference also means the UFEF published in the RM43 report (where  $UFEF = UFE / ADMELA$ ) will not be able to be used to reconcile to the UFE allocation from Settlements, due to the difference in ADMELA between the two systems
  - The RM43 published UFEF could be used to calculate the UFE allocation under the more correct Retail solution methodology of calculating the ADMELA, should this be desired
- The impact of Settlements not having access to the Retail solution Tier 1 meter data will generally be:
  - Tier 1 Retailer to be over-allocated the UFE
  - The remaining retailers will be under-allocated
- This difference between the calculations of the two systems will stop at the start of full Global Settlements (1 May 2022)
  - When Settlements starts receiving and settling Tier 1 metering data, at which point the ADMELA calculations are expected to align between both systems

# Settlements GS Outputs

- The MMS Data Model now includes the below new and changed tables to publish the GS data from the Settlements System
  - **SETLOCALAREATNI** (new table)
    - Contains the TNIs being included in each Local Area for each settlement date and run number
  - **SETLOCALAREAENERGY** (new table)
    - Contains the Local Area level data for each trading interval and each settlement run
    - Includes fields for the UFE, TME, DDME and ADME calculated by the Retail Solution
    - A defect is present in the population of the ADME field meaning it currently only shows NULL values, which is planned for resolution in a future AEMO system release
    - The ADMELA included is the value calculated by the Settlements System
  - **SETCPDATA** (altered table)
    - New fields UFEA and DME are being populated with the Settlements System calculated values
    - New field AFE is the Accounted For Energy so excludes the UFEA and so will remain the same after full GS go-live on 1 May 2022, as during the soft start period
    - New field AGE is the Adjusted Gross Energy and will only include the calculated UFEA after full GS go-live, during the soft start period  $AGE = AFE$
    - At GS go-live other fields in this table (INENERGY, XNENERGY, TA, EP, etc) will see the UFEA included in the calculations

# UFE Management

Blaine Miner

# UFE Management

- The AEMC introduced Global Settlements for 3 main reasons:
  - Improved transparency, leading to fewer settlement disputes between retailers and lower levels of UFE over time
  - Competition on equal terms
  - Improved risk allocation driving enhanced incentives
- The Commission stated that increased transparency of UFE would allow for analysis and investigation of UFE to take place to reduce UFE
  - The final rule puts in place a reporting framework for AEMO to publish information and analysis of UFE
    - This will allow for actions to be taken by relevant parties to reduce UFE, where it is efficient to do so
- The Commission also stated that generally, risks should be allocated to those parties that are best placed to manage them
  - Under the Commission's global settlements design, UFE is allocated to all retailers in the local area, pro-rated based on their 'accounted-for' energy.
  - By allocating the risk of UFE to retailers they would be provided with incentives to, where possible, reduce UFE, because reductions in UFE results in reductions in the risks borne by them
  - Through this process, it is expected that UFE levels will be lower under global settlement
    - Such an outcome was observed over time in the New Zealand electricity market after global settlement was introduced in 2008

# For Discussion

- What do you believe our priorities should be as an Industry during the 'soft start' period, e.g.:
  - For LNSPs, MPs and MDPs to finalise/create and maintain required standing data in MSATS
  - For MDPs to deliver required metering data, in a timely and accurate manner, to ensure the maximum amount of energy is allocated
  - For AEMO to ensure that their systems and reports are fully tested to ensure they are fit for purpose, accurate and reliable
  - For AEMO and Industry to develop analytic capability to allow for the analysis of UFE values
  - For AEMO and Industry to consider how UFE mgt may occur in the short to medium-term
- What are Industry's expectations regarding UFE management prior to 1 May 2022?
- Will FRMPs be actively seeking to reduce UFE prior to 1 May 2022?

# Next Steps and General Business

Greg Minney

# Next Steps

- Next meeting scheduled for Friday 3 Dec 2021
- Proposed agenda items:
  - Updates on action items
  - Updates on May release implementation approach
  - ?

