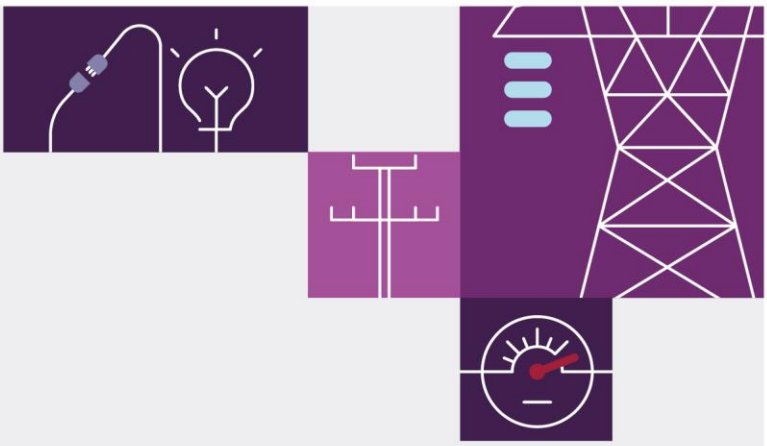
Unaccounted For Energy (UFE) Trends Report

June 2022

Information and analysis of UFE for the National Electricity Market



Important notice

Purpose

AEMO publishes the Unaccounted for Energy (UFE) Trends Report, under clause 3.15.5B of the National Electricity Rules (NER), to provide information and analysis of unaccounted for energy (UFE) in each local area to facilitate efficient decreases in UFE over time.

This publication has been prepared by AEMO using information for the period 1 October 2021 to 1 April 2022. Information made available after this date may have been included in this publication where practical.

Disclaimer

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Version control

Version	Release date	Changes
1	1/06/2022	

Executive summary

The Unaccounted For Energy (UFE) Trends Report provides information about UFE in each *local area* for the period 1 October 2021 to 1 April 2022. The content of the report addresses the requirements under NEM 3.15.5B for AEMO to:

- Report on the total UFE for each *local area,*
- Identify sources of UFE in each *local area,*
- Determine UFE benchmarks upon which future reports would be based, and
- Recommend actions to reduce UFE for each *local area*.

Total UFE for each *local area* was calculated in accordance with formulations prescribed in NER 3.15.5, however the absence of *metering data* for some of the UFE calculation components has meant that conclusive actions to reduce UFE cannot be recommended at this time.

The report identifies sources of UFE that will be analysed in future reports.

Contents

Figures

1 Introduction

1.1 Purpose and scope

The purpose of the Unaccounted for Energy (UFE) Trend Report is to provide information and analysis of UFE in each *local area* to facilitate efficient decreases in UFE over time.

The National Electricity Amendment (Global Settlements and Market Reconciliation) Rule 2018 requires AEMO to publish, at least once a year, a report on UFE. AEMO is required, under NER 3.15.5B(d) and (e), to produce and consult on *UFE reporting guidelines* that set out AEMO's approach to preparing and publishing the report.

In accordance with transitional provision 11.112.3(b), AEMO is not required to comply with the *UFE reporting guidelines* when preparing the report on UFE trends for the first time. This first UFE Trend Report is based on the high level guidance, regarding the purpose and minimum content to be included in the report, prescribed in NER 3.15.5B(a).

In accordance with the Rule Final Determination, the reporting period for this report is for the first six months of the global settlements "soft start", i.e. 1 October 2021 to 1 April 2022.

Subsequent UFE Trend Reports will be prepared in accordance with *UFE reporting guidelines*.

The content of this report includes:

1. Reporting on total UFE by *local area* over the reporting period.
2. Analysis of UFE in each *local area* against expectations and benchmarks.
3. Analysis of the sources of UFE in each *local area*,
4. Recommended actions to gain further visibility of UFE.
5. Recommended actions to reduce UFE.

1.2 Definitions and interpretation

Terms defined in the National Electricity Law and the NER have the same meanings in this report unless otherwise specified in this report.

Terms defined in the NER are intended to be identified in this report by italicising them, but failure to italicise a defined term does not affect its meaning.

1.3 Key definitions

1.3.1 UFE calculation

In accordance with NER 3.15.5, for each *local area*, the UFE amount for each *trading interval* is determined by the following formula:

UFE = TME – DDME – ADME

Where:

UFE is total unaccounted for energy for a *local area*,

TME is total *energy* inflows into a *local area* from *transmission connection points*,

DDME is cross boundary *energy* flow between adjacent *distribution networks*. DDME is a positive value for the supplying distribution *local area* and a negative value for the receiving distribution *local area*, and

ADME is the aggregate of *energy* flows for each *connection point* in a *local area*.

UFE, TME, DDME and ADME information is available from the RM 46 Report for *financially responsible Market Participants* (FRMPs) and *Local Network Service Provides* (LNSPs).

1.3.2 UFE allocation

The allocation of UFE for every *distribution network connection point* in a *local area* is determined by the following formula:

UFEA = UFE x (DME/ADMELA)

Where:

UFEA is the allocation of *local area* unaccounted for *energy* for a *connection point*,

DME is the load component (ME- x DLF) at a *connection point* in the *local area*,

ME- is load component as recorded in the *metering data* at a *connection point* in the *local area*,

DLF is the *distribution loss factor* applicable at a *connection point* in the *local area*, and

ADMELA is the aggregate of all DME amounts in a *local area* for which a *Market Customer* is *financially responsible*.

1.3.3 UFE Factor (UFEF)

The UFE Factor (UFEF) is used to facilitate the allocation of UFE to individual *connection points*.

UFEF = UFE/ADMELA

Where:

UFE is total unaccounted for *energy* for a *local area*, and

ADMELA is the aggregate of all DME amounts in a *local area* for which a *Market Customer* is *financially responsible*

UFEA = UFE x (DME/ADMELA), or can be expressed as:

UFEA = DME x (UFE/ADMELA), therefore

UFEA = DME x UFEF

UFEF and ADMELA are available from the RM 46 Report. UFEF is also available from the RM 43 Report.

2 Summary and analysis of UFE

2.1 Trend interpretation

The following charts provide a summary of the UFE calculation variables, identified in Section 1.3, for each *local area* over the reporting period. The underlying data for each chart comes from values that are available in MSATS RM46 Reports. As this data is sourced from AEMO's Metering Data Management system, load values are positive and generation values are negative.

Additional charts that support observations presented in this section are provided in Appendix 1. These charts are:

- UFE for the *local area*
- UFE as a percentage of *local area* ADME

Information presented in the charts is the total of each component for a Settlement Day and are displayed as kWh values. The left vertical axis scale is related to TME and ADME values and the right vertical axis is related to UFE values and, where applicable, DDME values.

Cross boundary *energy* flow *metering data* was not available for all cross boundary *connection points* from 1 October 2021 (Global Settlements soft start). *Metering data* for 21 cross boundary *connection points* was not available for the reporting period.

2.1.1 ACTEWAGL

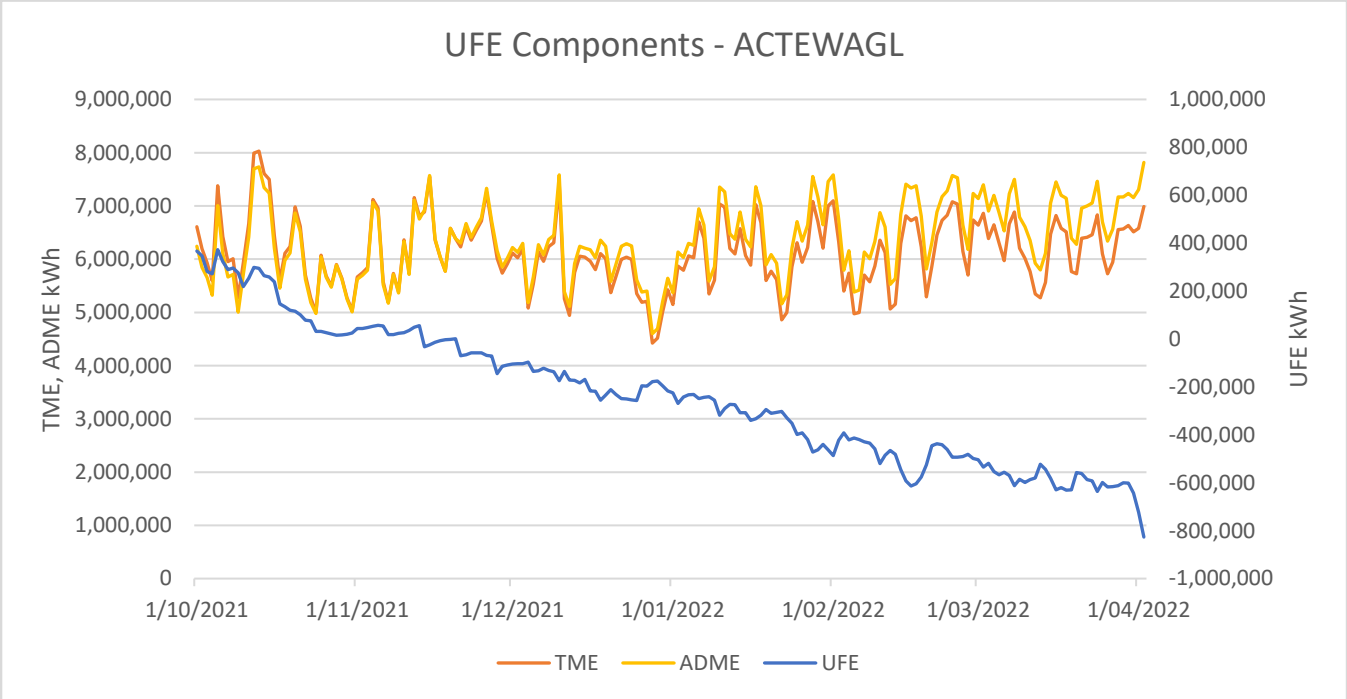

Figure 1 UFE Components – ACTEWAGL

Local Area Observations

ADME progressively increased with respect to TME over the reporting period resulting in UFE declining to zero then increasing negatively. This represents an increase in the aggregate of *load* at end user *connection points* compared to the *local area energy* inflows.

2.1.2 Ausgrid

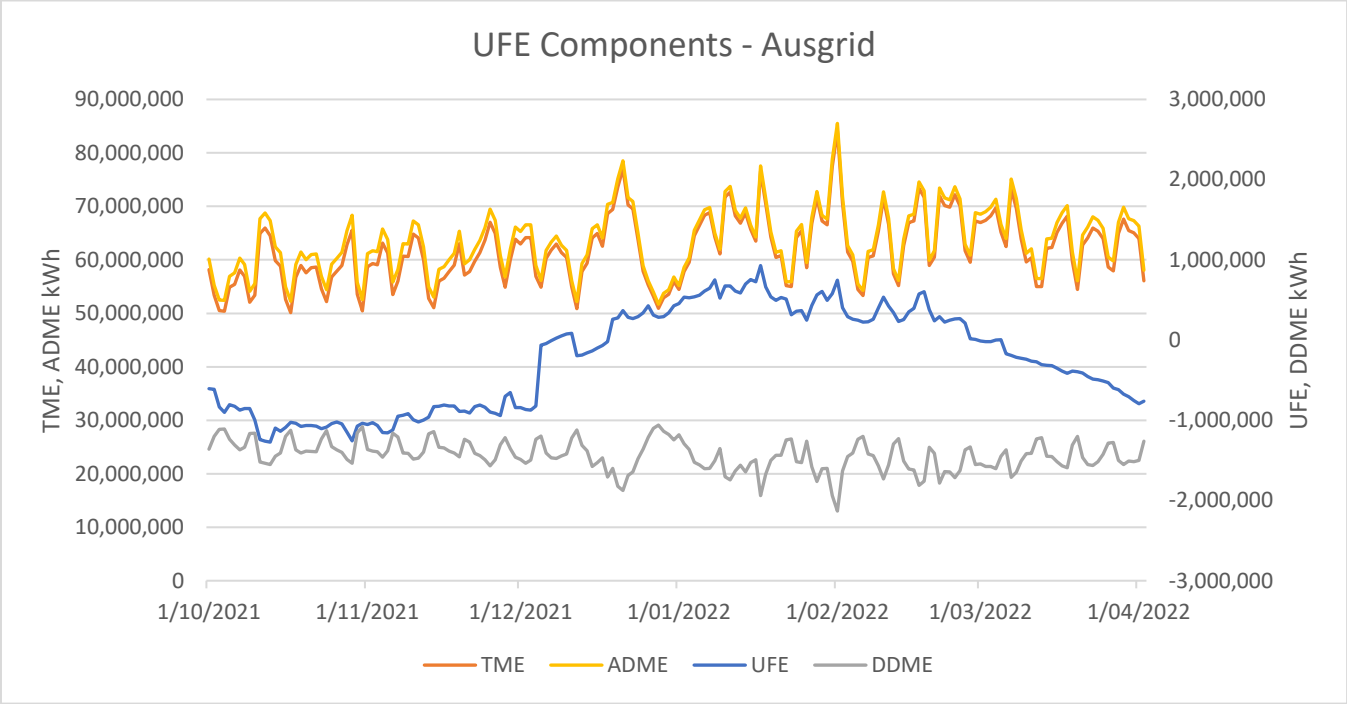

Figure 2 UFE Components – Ausgrid

Local Area Observations

Initially ADME was greater than TME and cross boundary *energy* inflow was small – resulting in negative UFE. In December, cross boundary *energy* inflow increased, effectively increasing the *local area energy* inflows, thereby increasing UFE.

2.1.3 AusNet Services

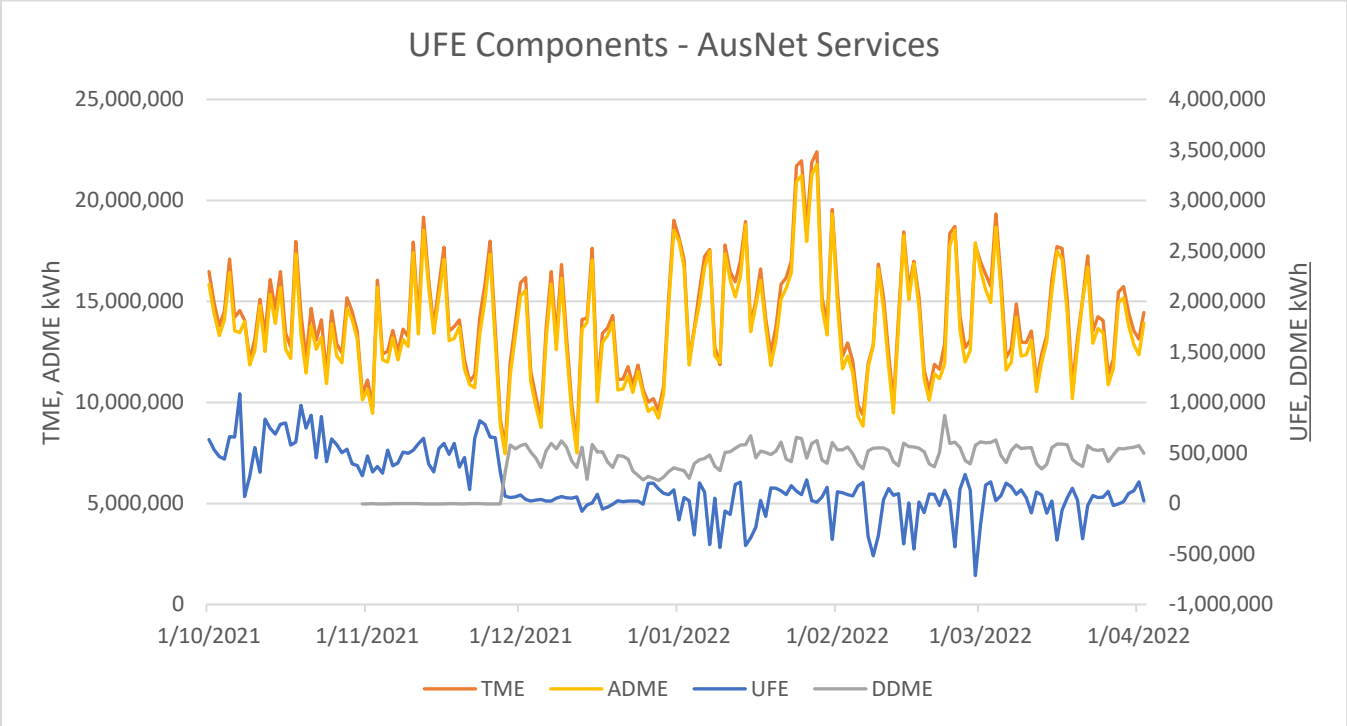

Figure 3 UFE Components – AusNet Services

Local Area Observations

TME is generally greater than ADME for the reporting period. When cross boundary *energy* outflows were included in UFE calculations from November 2021, UFE decreased.

2.1.4 CitiPower

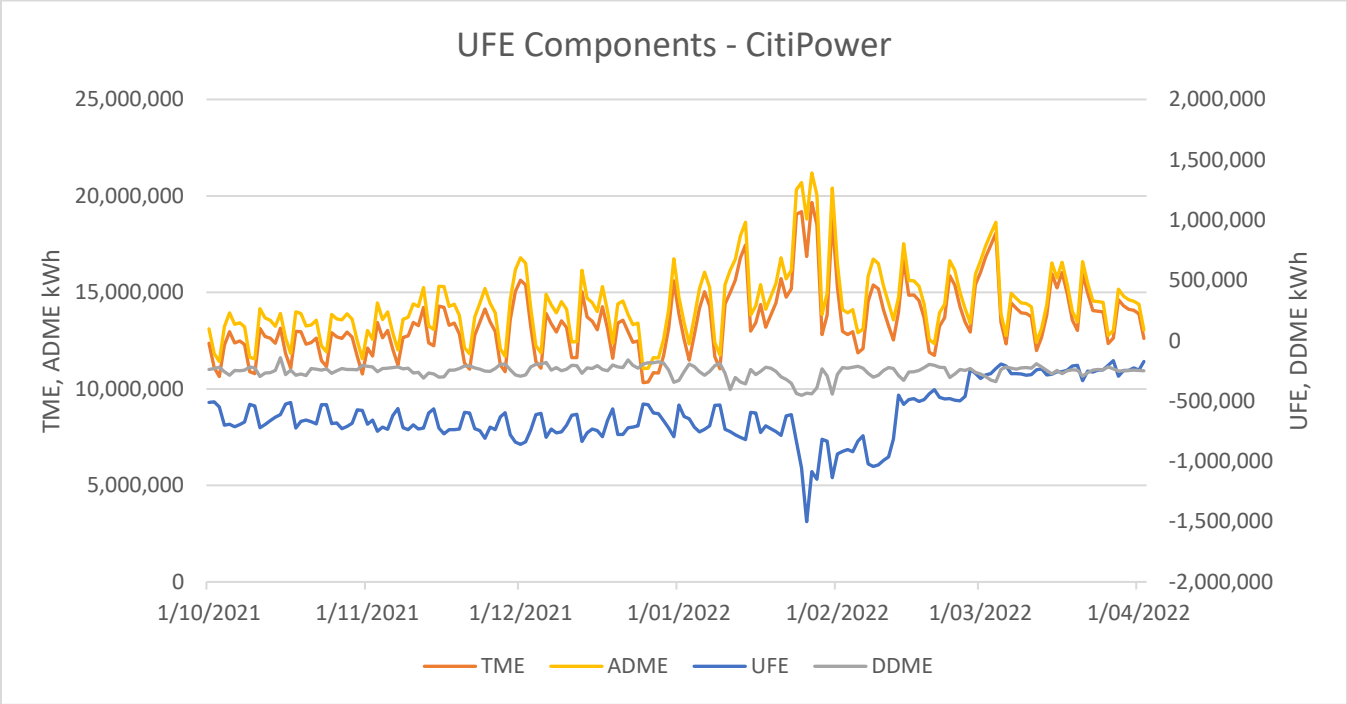

Figure 4 UFE Components – CitiPower

Local Area Observations

ADME is greater than TME across the reporting period, resulting in negative UFE values. From late January to early February 2022 the difference between ADME and TME increased and UFE became more negative. Following that period UFE returned to earlier levels.

2.1.5 Endeavour Energy

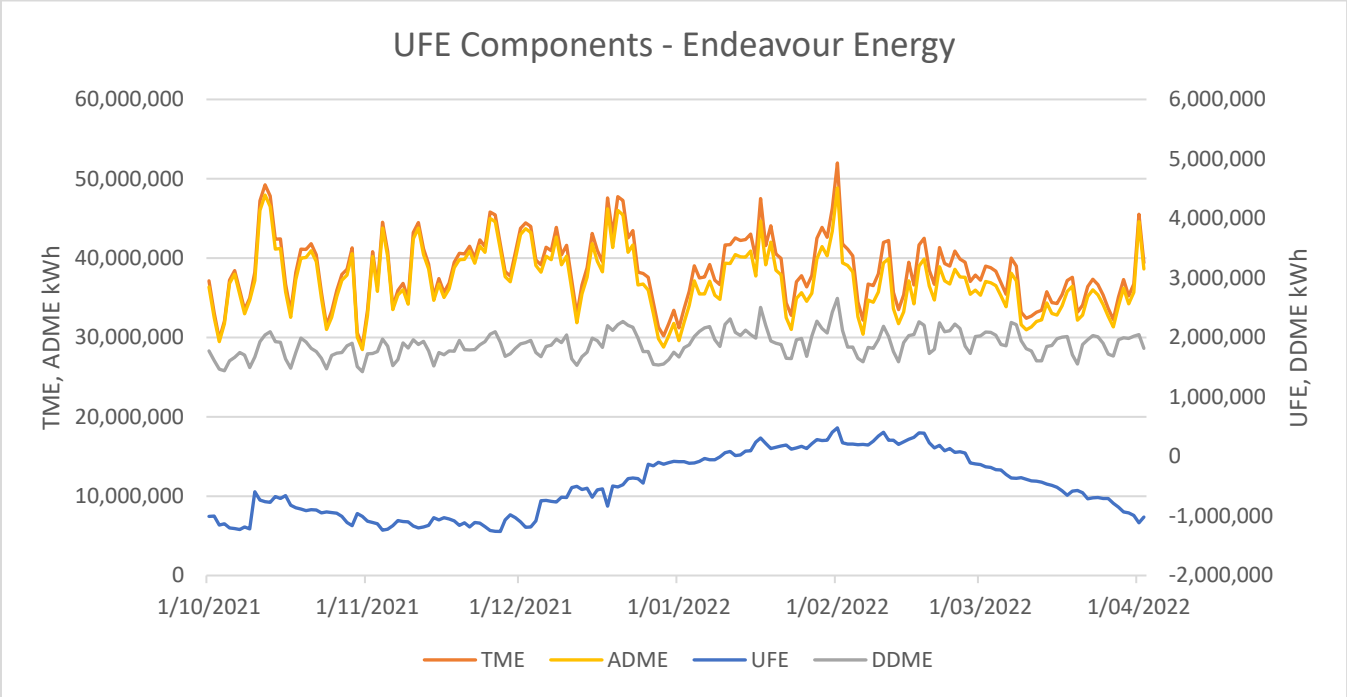

Figure 5 UFE Components – Endeavour Energy

Local Area Observations

The gap between TME and ADME widened from early December 2021 resulting in an increase in UFE values. As the gap between TME and ADME reduced from early February 2022, UFE returned to earlier low (negative) levels.

2.1.6 Energex

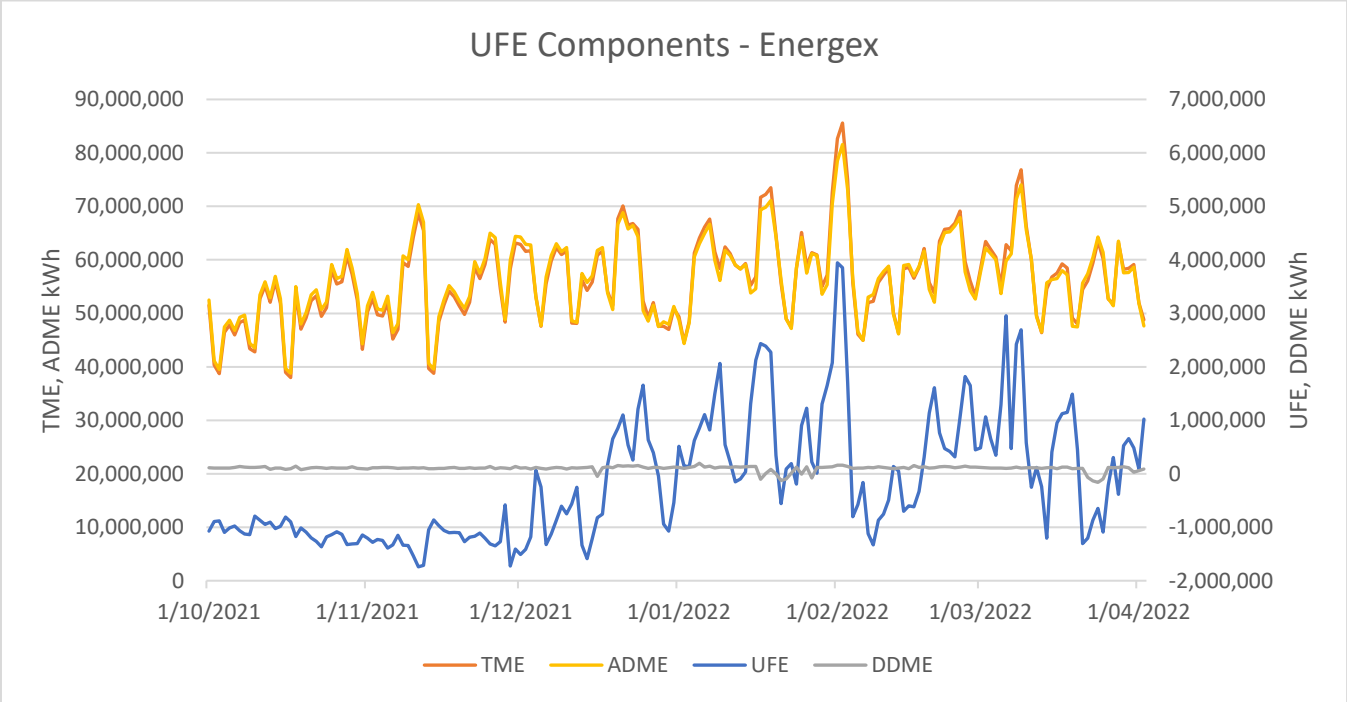

Figure 6 UFE Components – Energex

Local Area Observations

UFE increased as TME increased with respect to ADME.

2.1.7 Ergon

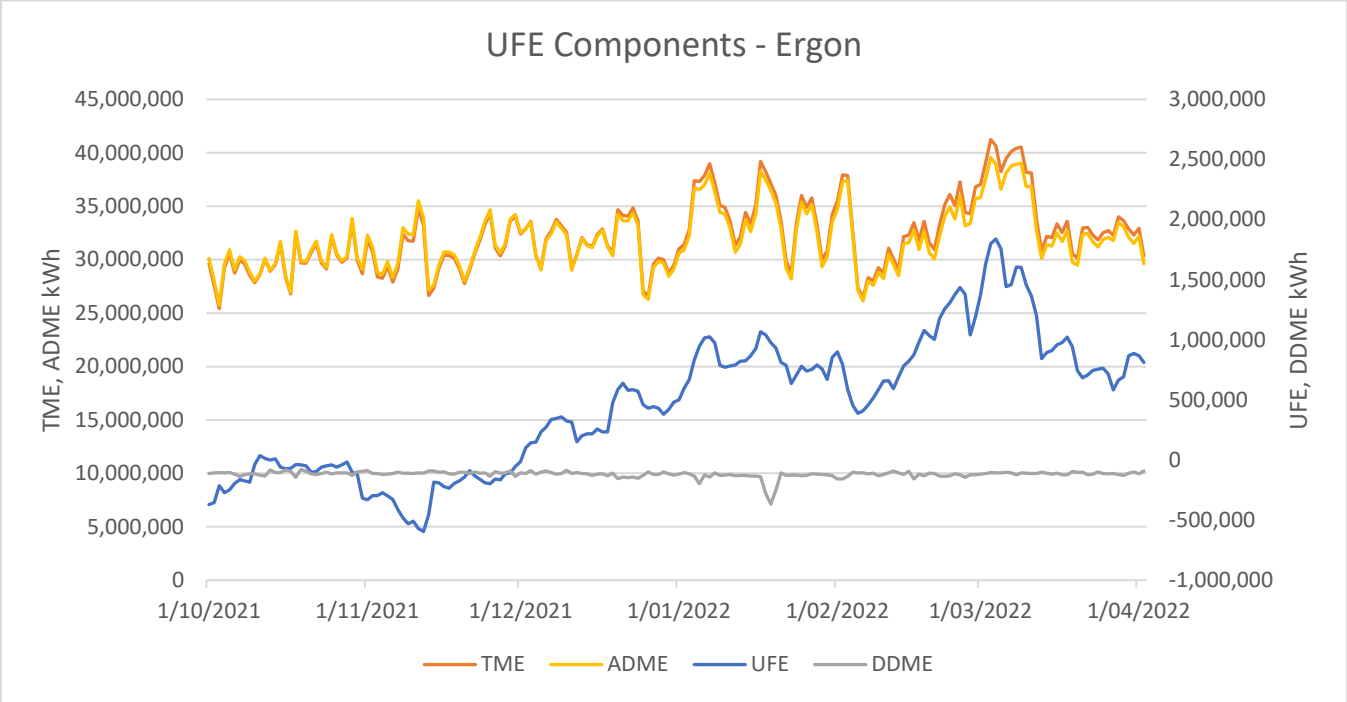

Figure 7 UFE Components – Ergon

Local Area Observations

UFE increased as TME increased with respect to ADME.

2.1.8 Essential Energy

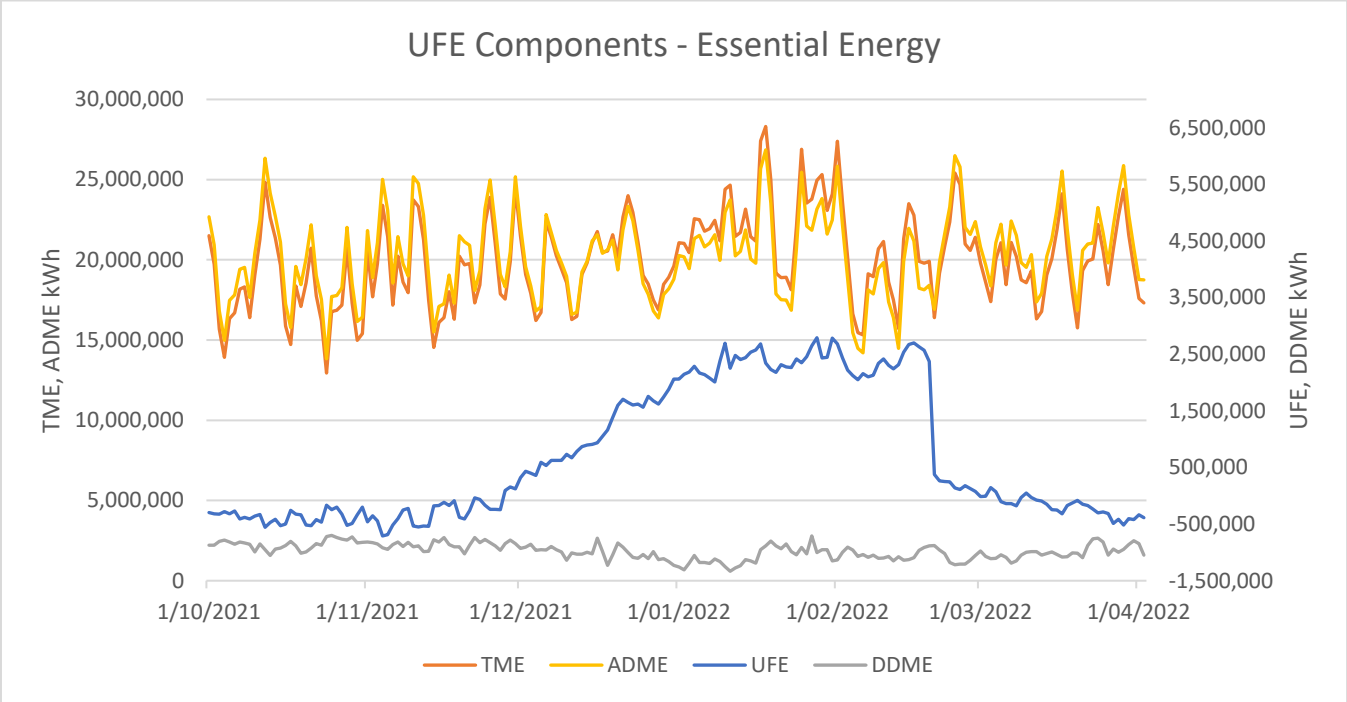

Figure 8 UFE Components – Essential Energy

Local Area Observations

ADME was greater than TME at the beginning of the reporting period and UFE was negative. As the gap between ADME and TME reduced, UFE increased (decreased negatively). TME continued to increase with respect to ADME, cross boundary *energy* inflows increased and UFE values became positive. From late February 2022 TME values fell with respect to ADME, cross boundary *energy* inflows were maintained and UFE fell to levels similar to the beginning of the reporting period.

2.1.9 Jemena

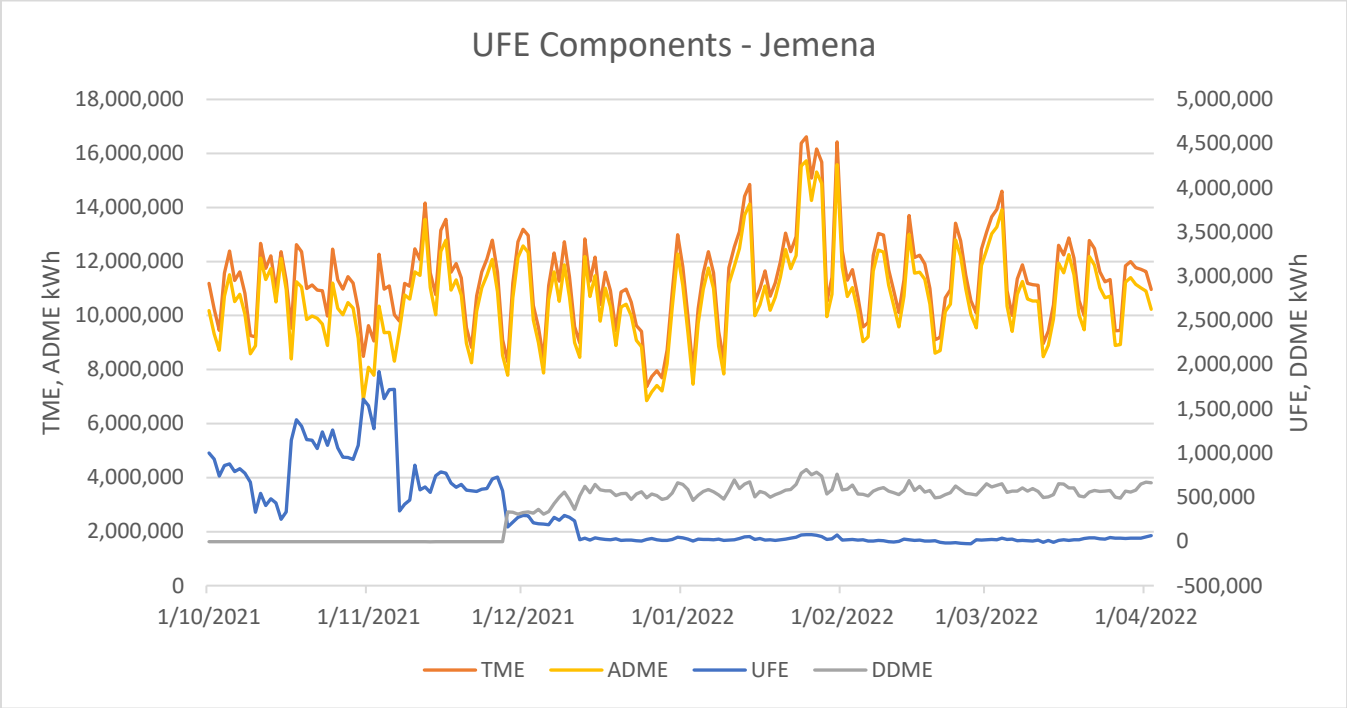

Figure 9 UFE Components – Jemena

Local Area Observations

TME was greater than ADME and cross boundary supplies were not classified correctly before December 2021 resulting in higher UFE values. Correct classification of cross boundary supplies from December 2021 resulted in increased DDME and the consequential reduction in UFE.

2.1.10 Powercor

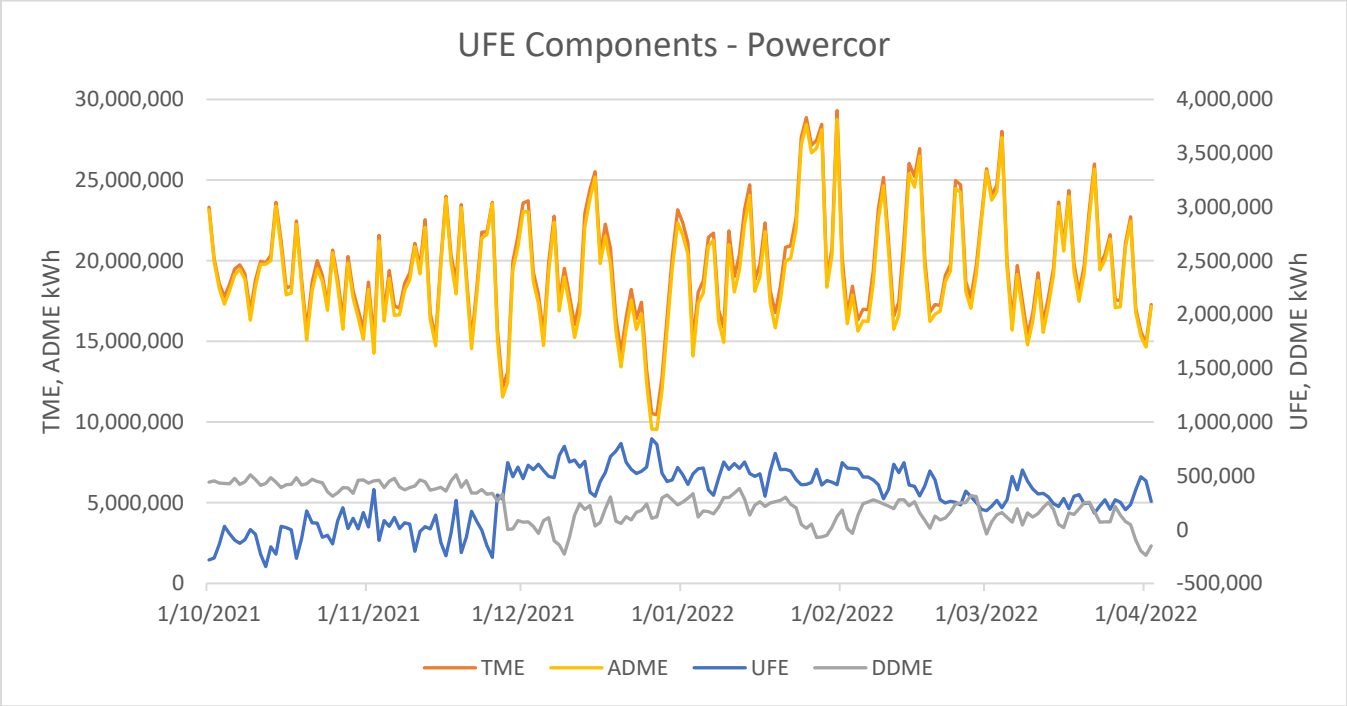

Figure 10 UFE Components – Powercor

Local Area Observations

From late November 2021 cross boundary *energy* outflows reduced which resulted in the increase to UFE values.

2.1.11 SA Power Networks

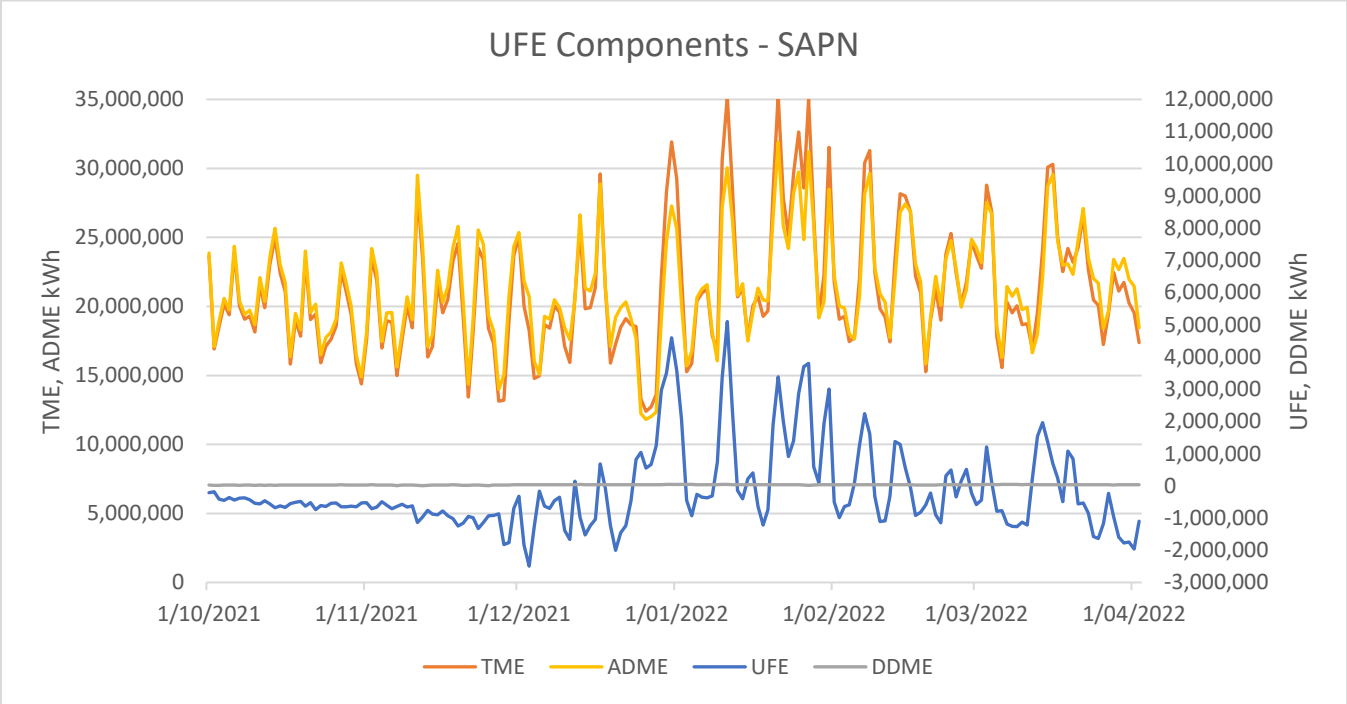

Figure 11 UFE Components – SA Power Networks

Local Area Observations

TME and ADME fluctuations throughout the reporting period result in periods where TME is greater than ADME, producing positive UFE values, and periods where ADME is greater that TME, producing negative UFE values.

2.1.12 TasNetworks

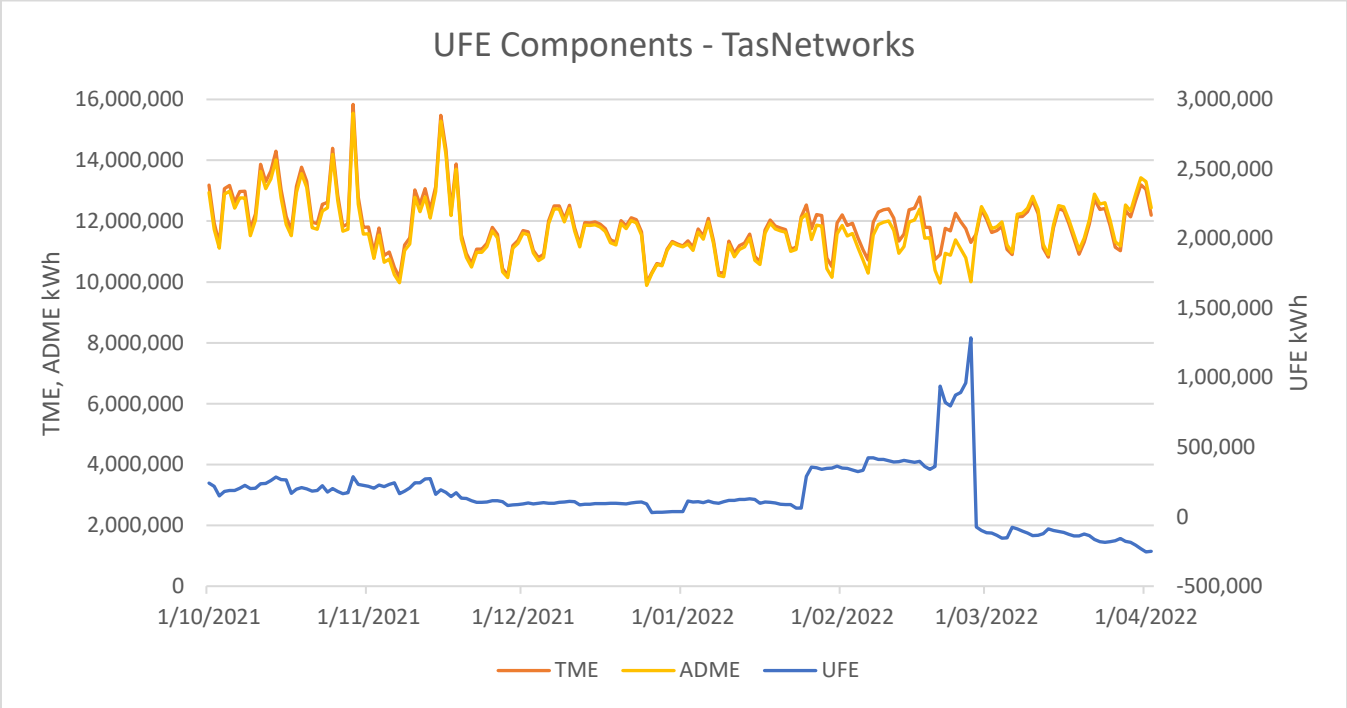

Figure 12 UFE Components – TasNetworks

Local Area Observations

TME was greater than ADME from the beginning of the reporting period until late February 2022 and UFE values were positive. From late January 2022, the gap between TME and ADME widened and produced large positive UFE values.

From late February 2022 ADME was greater than TME and UFE values became negative.

2.1.13 United Energy

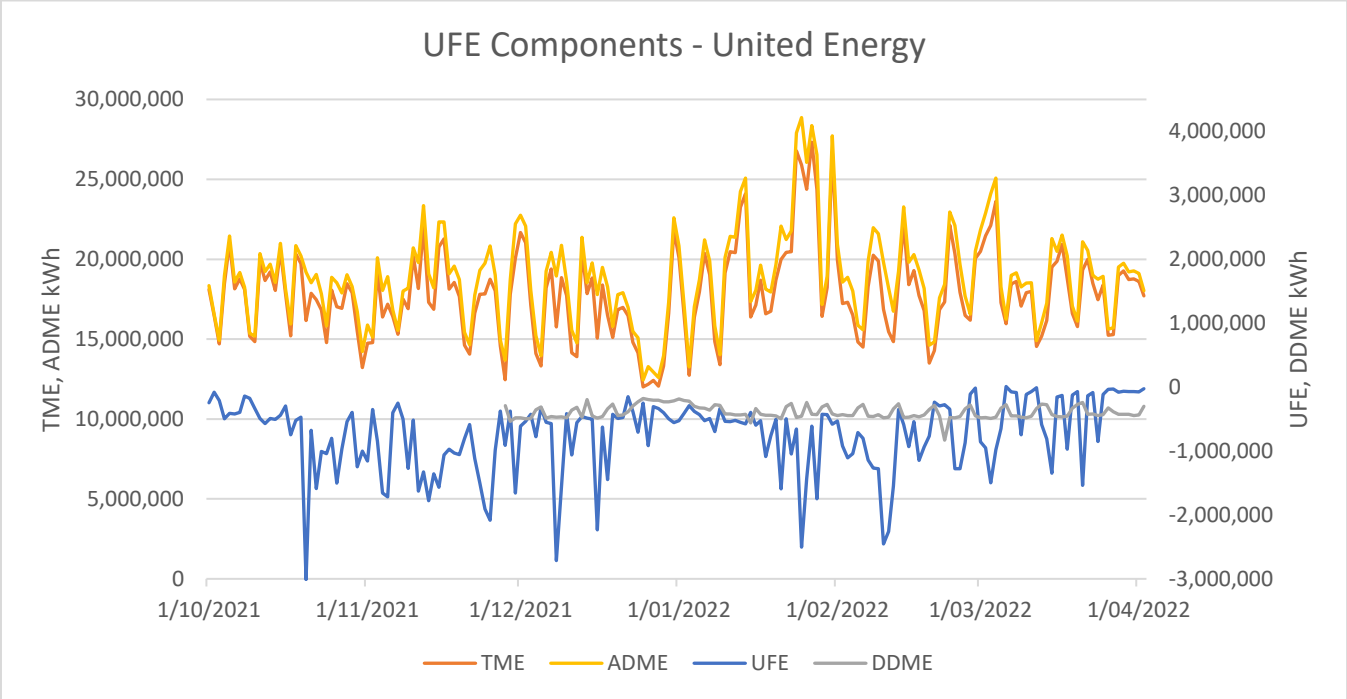

Figure 13 UFE Components – United Energy

Local Area Observations

ADME was greater than TME for the entire reporting period, consequently UFE values were negative for the period. Cross boundary *energy* inflows were included in UFE calculations from late November 2021. The magnitude of fluctuations in cross boundary *energy* inflows reduced from late December 2021 to mid-January 2022 which resulted in a flattening of UFE values. From late January 2022 cross boundary *energy* inflow fluctuations increased with corresponding fluctuations in UFE values.

3 UFE benchmark analysis

Analysis of the unaccounted for *energy* amounts in each *local area* in the reporting period is to be performed against benchmarks that have been determined by AEMO.

This form of analysis has proved to be difficult for this first report as AEMO needs to become familiar with UFE within each *local area*. It is acknowledged that without this analysis UFE numbers may be inconsistent and there could be little basis and direction for both the analysis of UFE and recommendations for action set out below.

As complete *metering data* sets have only become available from the late April 2022, the UFE results related to this reporting period cannot be used as a benchmark for future reports. AEMO intends to use the UFE positions for each *local area* for the first weeks of May 2022 as the “benchmarks” for the second UFE Trends Report.

4 UFE source analysis

AEMO is required to undertake an analysis of the sources of UFE in each *local area* in order to recommend actions to reduce UFE. The areas of UFE source analysis would include:

- Time factors (e.g. season, day, time of day) that produce patterns of UFE that are occurring are likely to be important in identifying causes and solutions to reduce UFE.
- The sources of UFE and their respective solutions are diverse, therefore identifying the likely sources of UFE will be crucial to identifying actions to reduce UFE. This analysis will include the following variables that modify metering data:
  - DLF value changes – historical analysis of DLFs
  - Review of profiling methodologies
  - Accumulation (BASIC) *meter* replacement with interval *meters*
  - 15 and 30-minute *metering data* transition to 5-minute *metering data*
  - Type 7 *loads* transitioned to Minor Energy Flow metering
  - Non-contestable unmetered loads (NCONUML) transitioned to metered arrangements
  - NCONUML loads transitioned to alternative calculation methodologies
  - Review changes to UFE values for manually read *meters* related to *metering data* changes from forward *estimates* to actual meter readings
  - Review impact of unmetered temporary emergency cross boundary *energy* volumes

As complete *metering data* sets have only become available from the late April 2022, UFE source analysis could not be completed for this reporting period. UFE source analysis will be included in the next UFE Trends Report.

5 Recommendations – UFE visibility improvements

AEMO is required to make recommendations to improve visibility of unaccounted for *energy* in each *local area.*

With UFE being aggregated to the *local area* level a key function of the reporting framework will be to identify when and how more granular information should be gathered to identify UFE.

Analysis of *local areas* to determine whether more granular geographic UFE information is likely to be valuable will be an on-going undertaking by AEMO provide additional UFE visibility.

As complete *metering data* sets have only become available from the late April 2022, UFE visibility improvements could not be completed for this reporting period. UFE visibility improvement recommendations will be included in the next UFE Trends Report.

6 Recommendations – UFE reduction actions

AEMO is required to recommend actions to reduce the amounts of unaccounted for *energy* in each *local area*, including without limitation any actions AEMO recommends ought to be taken by *Market Participants*, *Network Service Providers*, the AER and AEMO.

While global settlements will improve the information provided regarding UFE and the incentives on retailers to minimise UFE, there are a number of possible actions that are the responsibilities of either DNSPs (e.g. accuracy of DLF calculations) or AEMO (e.g. unmetered load profiling procedures) to resolve and the reporting framework will make recommendations for these to occur. Furthermore, there may be cases over time where the global settlements arrangements can be improved and AEMO will recommend such actions.

The absence of *metering data* for 21 cross boundary connection points for the reporting period has meant that conclusive actions to reduce UFE cannot be recommended at this time.

A1. UFE analysis supporting information

A1.1 Chart interpretation

The charts provided in this Appendix provide additional information to support UFE analysis in each *local area*. These charts are:

- UFE for the *local area*
- UFE as a percentage of *local area* ADME

UFE for a local area charts the aggregate of UFE values for each *day* over the reporting period. The UFE values are determined by the UFE calculation that is detailed in section 1.3.1.

UFE as a percentage of ADME charts the aggregate of UFE values as a percentage of the aggregate of ADME values for each *day* over the reporting period. This shows the variability of UFE with respect to the aggregate of *energy* flows for each *connection point* in a *local area*.

A1.1.1 ACTEWAGL

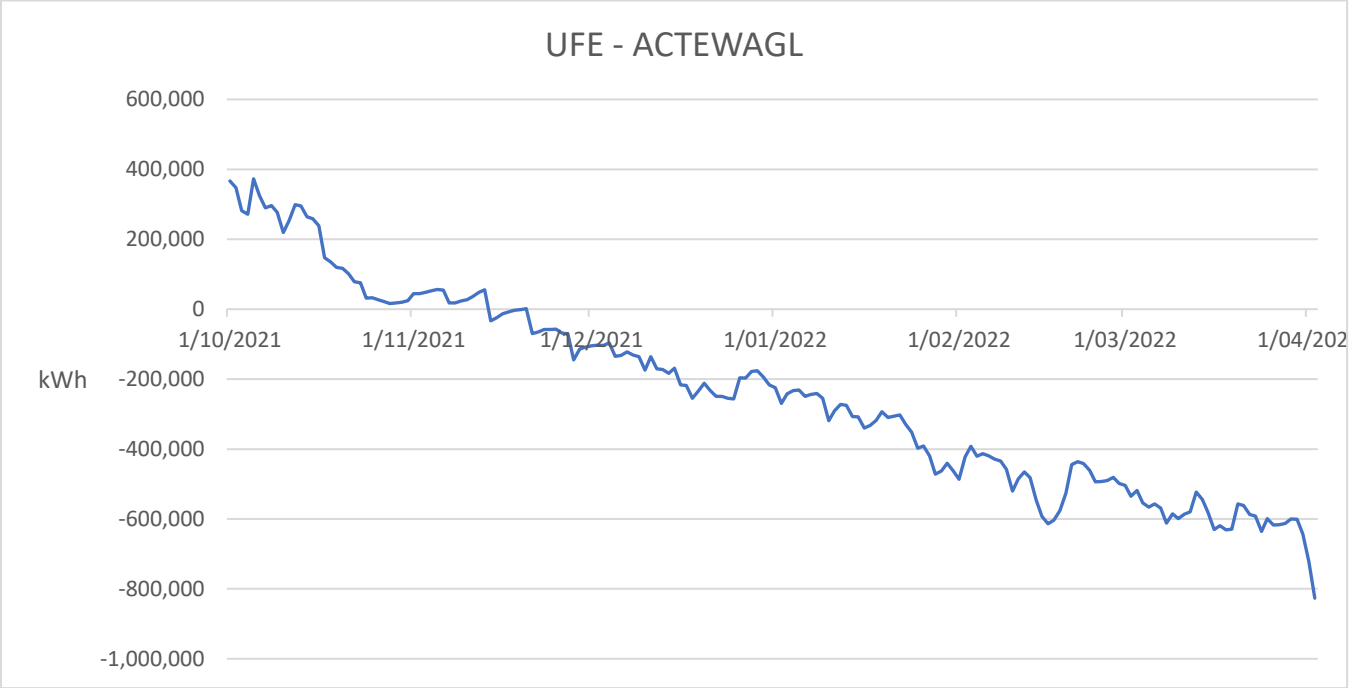

Figure 14 UFE – ACTEWAGL

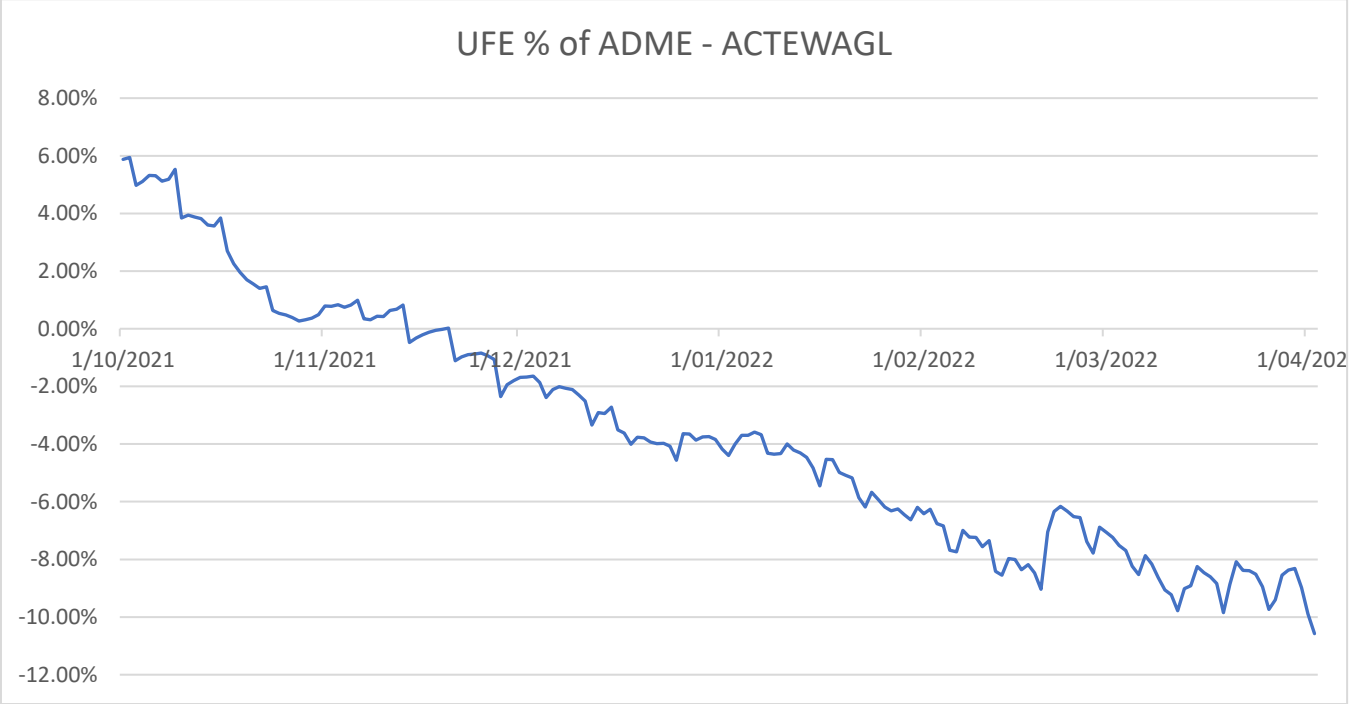

Figure 15 UFE % of ADME – ACTEWAGL

A1.1.2 Ausgrid

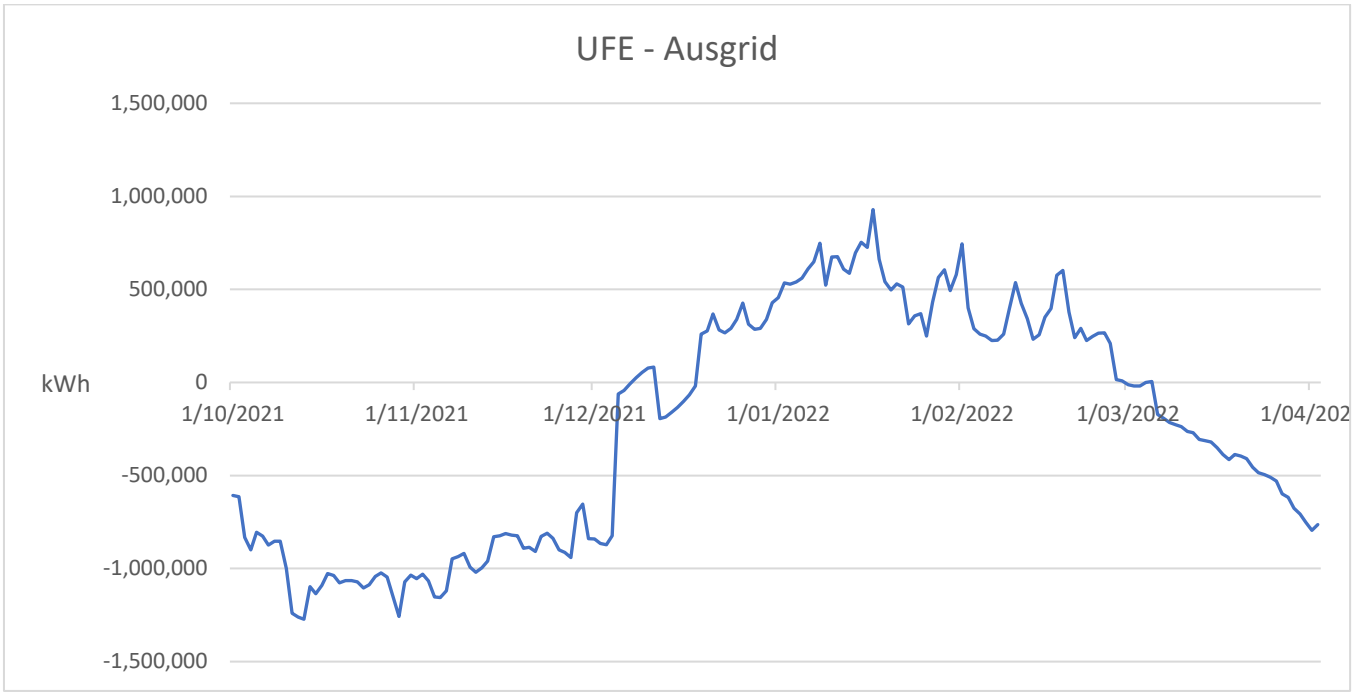

Figure 16 UFE – Ausgrid

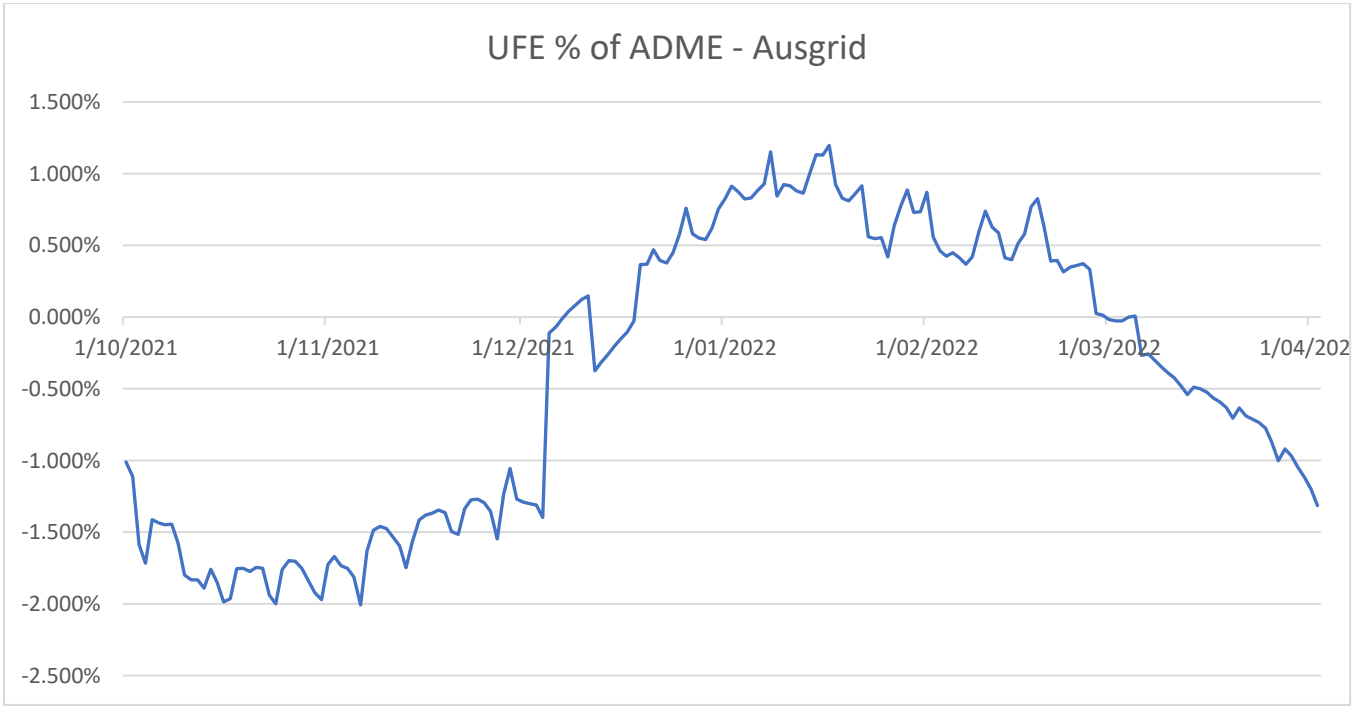

Figure 17 UFE % of ADME Ausgrid

A1.1.3 AusNet Services

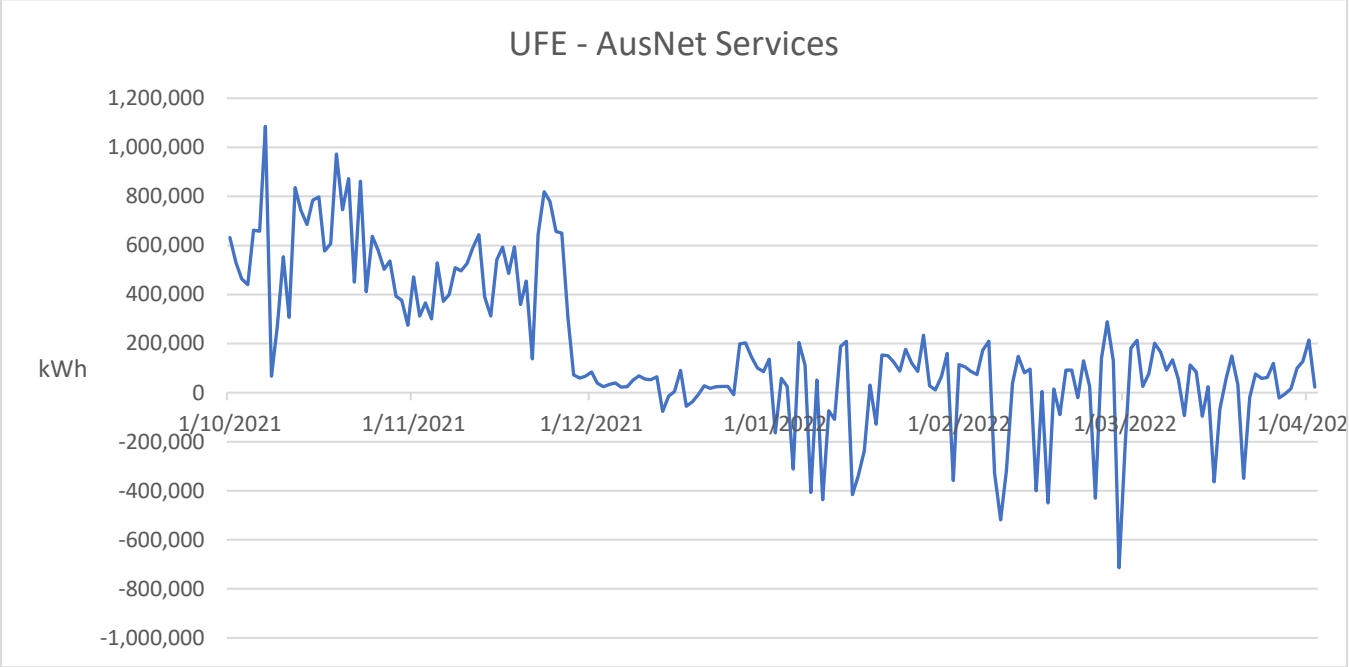

Figure 18 UFE – AusNet Services

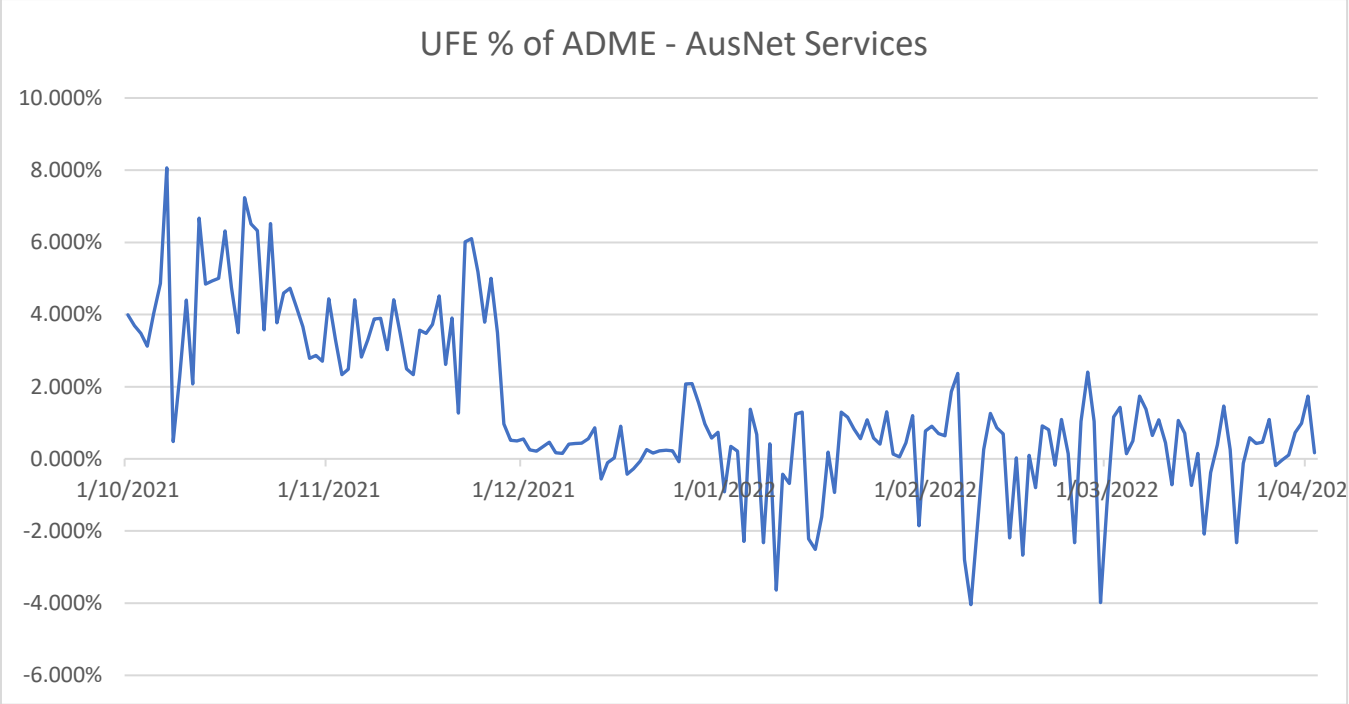

Figure 19 UFE % of ADME – AusNet Services

A1.1.4 CitiPower

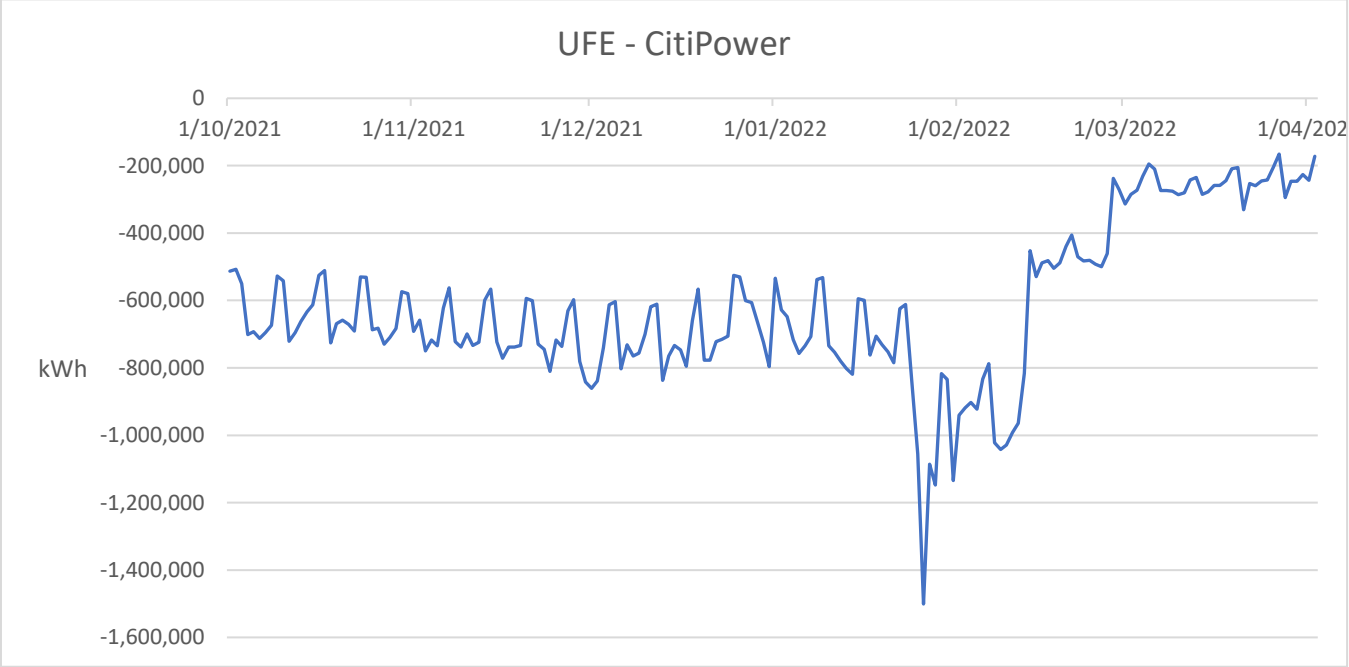

Figure 20 UFE – CitiPower

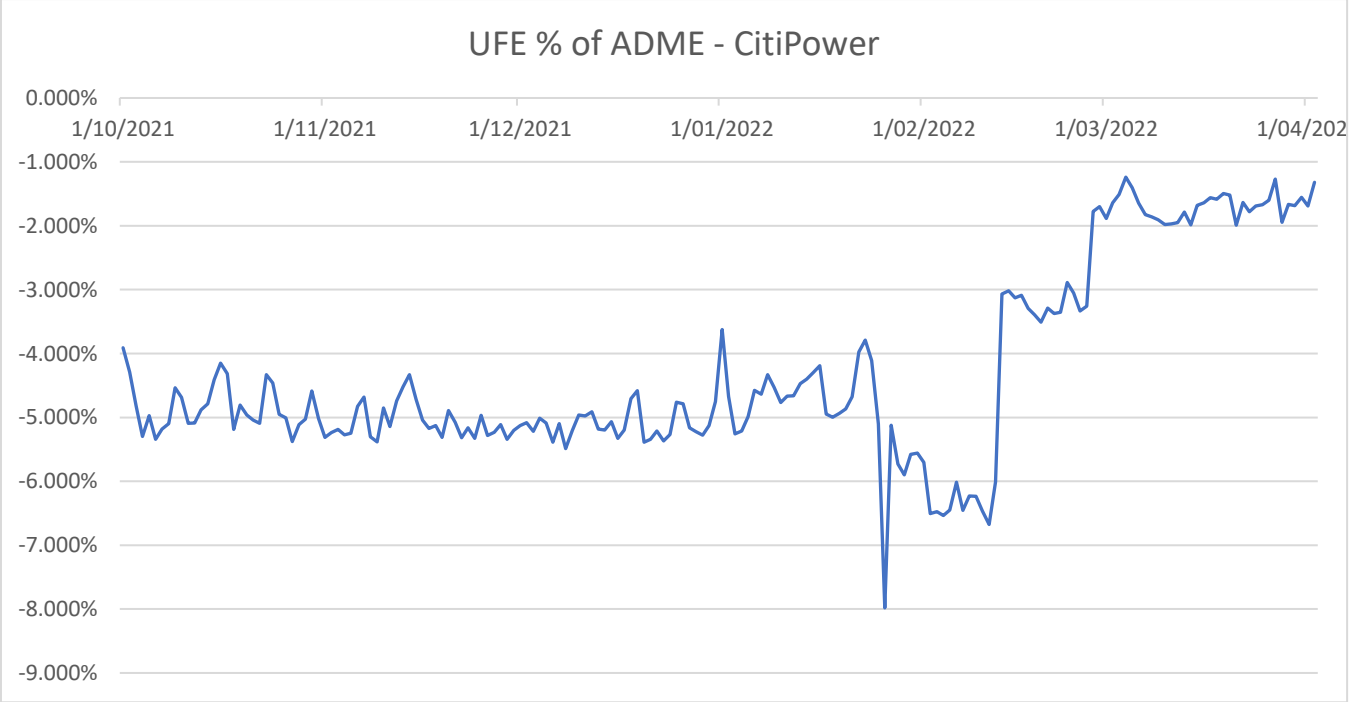

Figure 21 UFE % of ADME – CitiPower

A1.1.5 Endeavour Energy

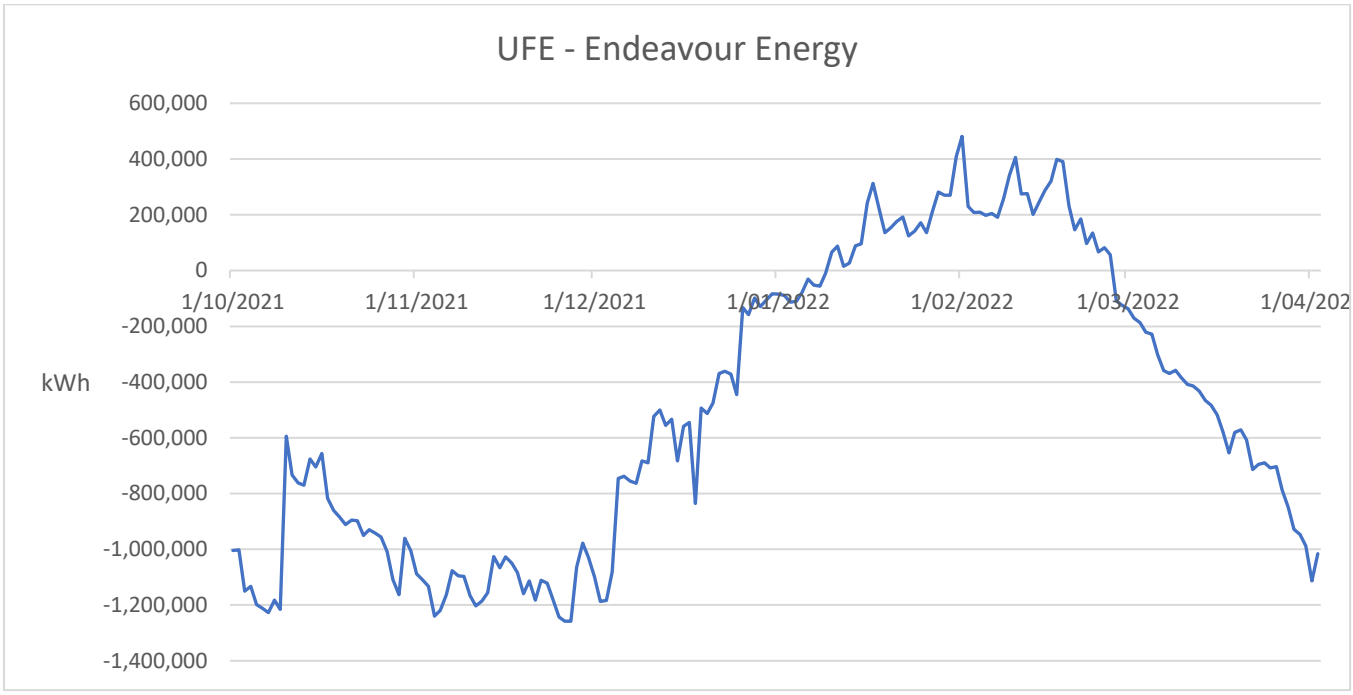

Figure 22 UFE – Endeavour Energy

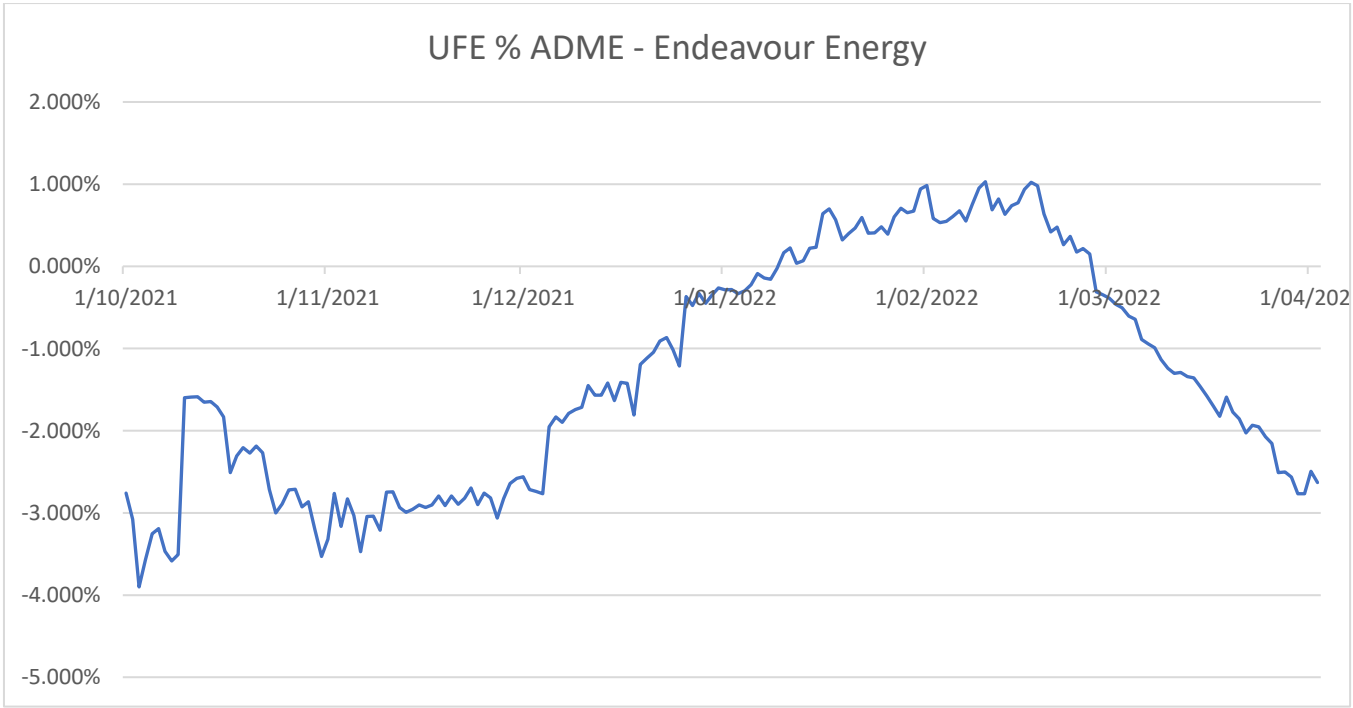

Figure 23 UFE % of ADME – Endeavour Energy

A1.1.6 Energex

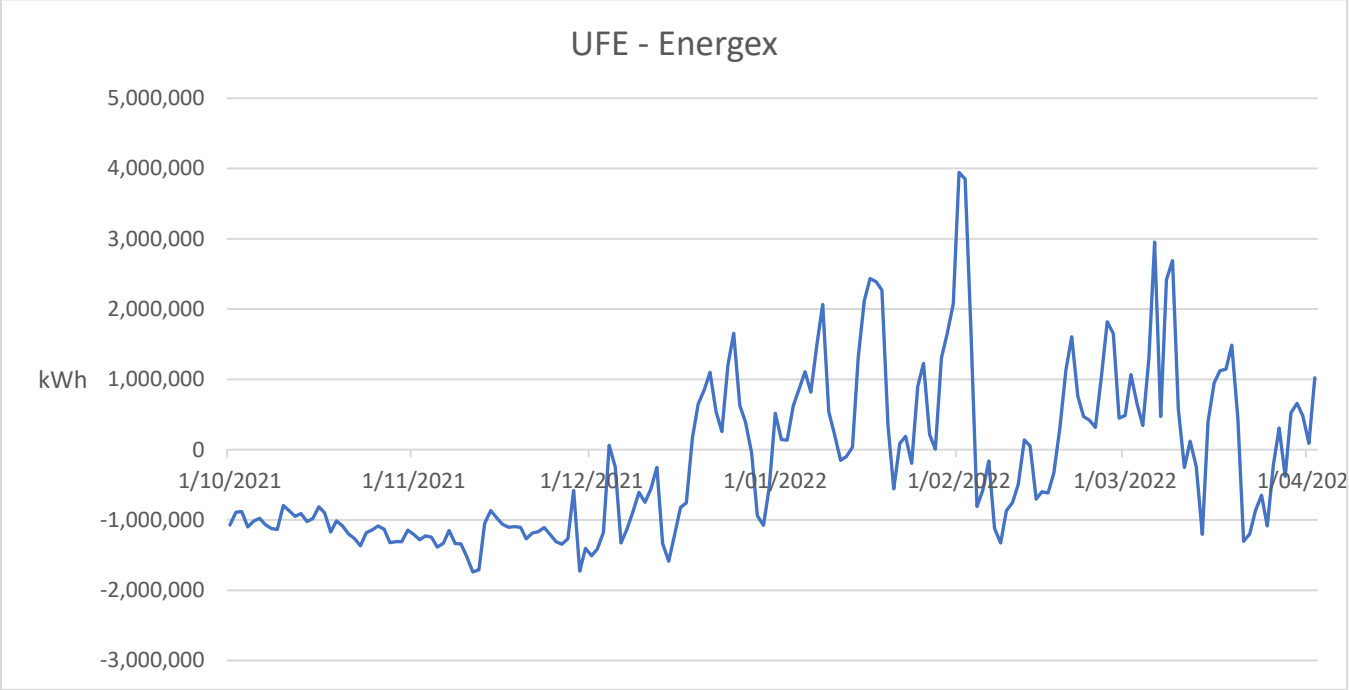

Figure 24 UFE – Energex

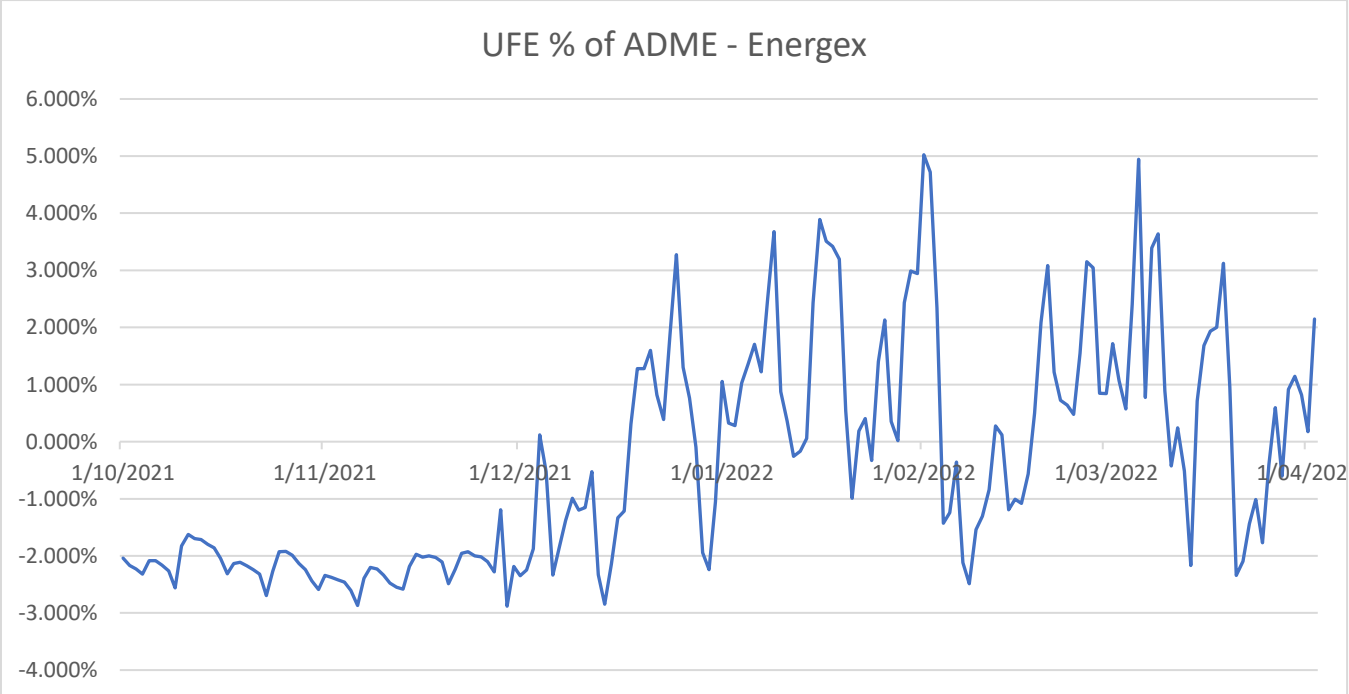

Figure 25 UFE % of ADME – Energex

A1.1.7 Ergon

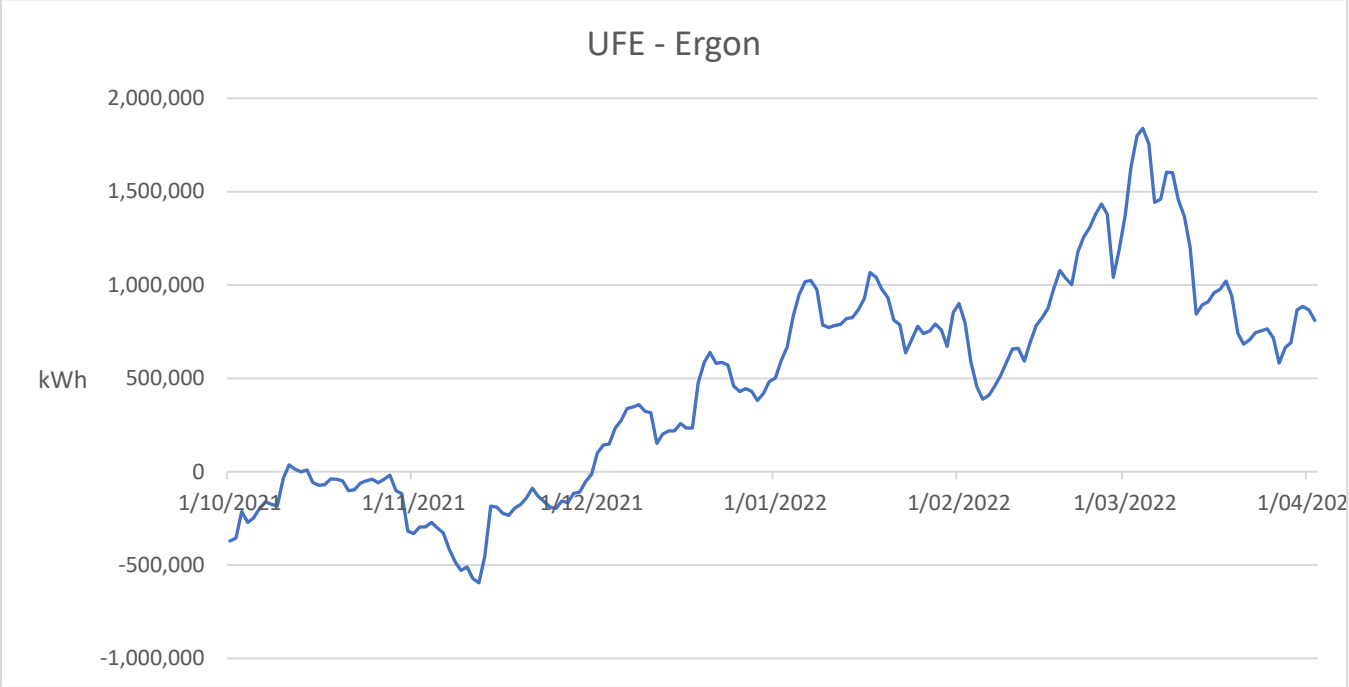

Figure 26 UFE – Ergon

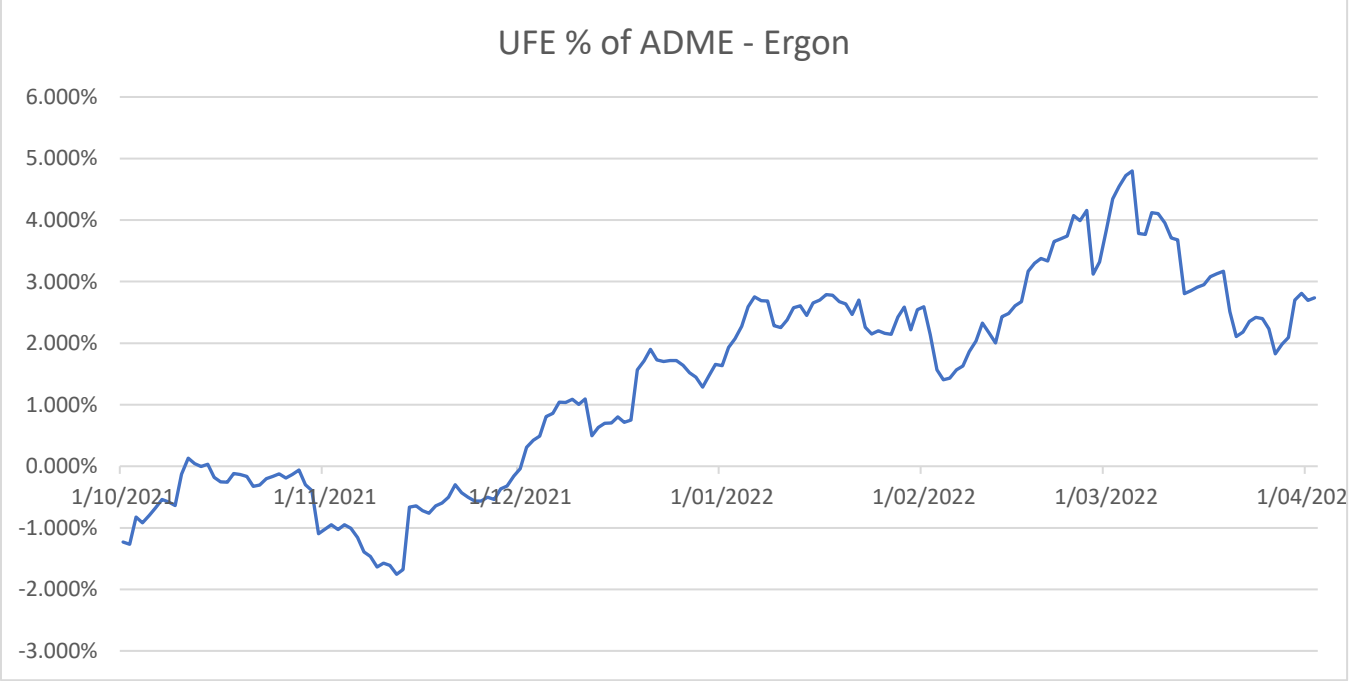

Figure 27 UFE % of ADME – Ergon

A1.1.8 Essential Energy

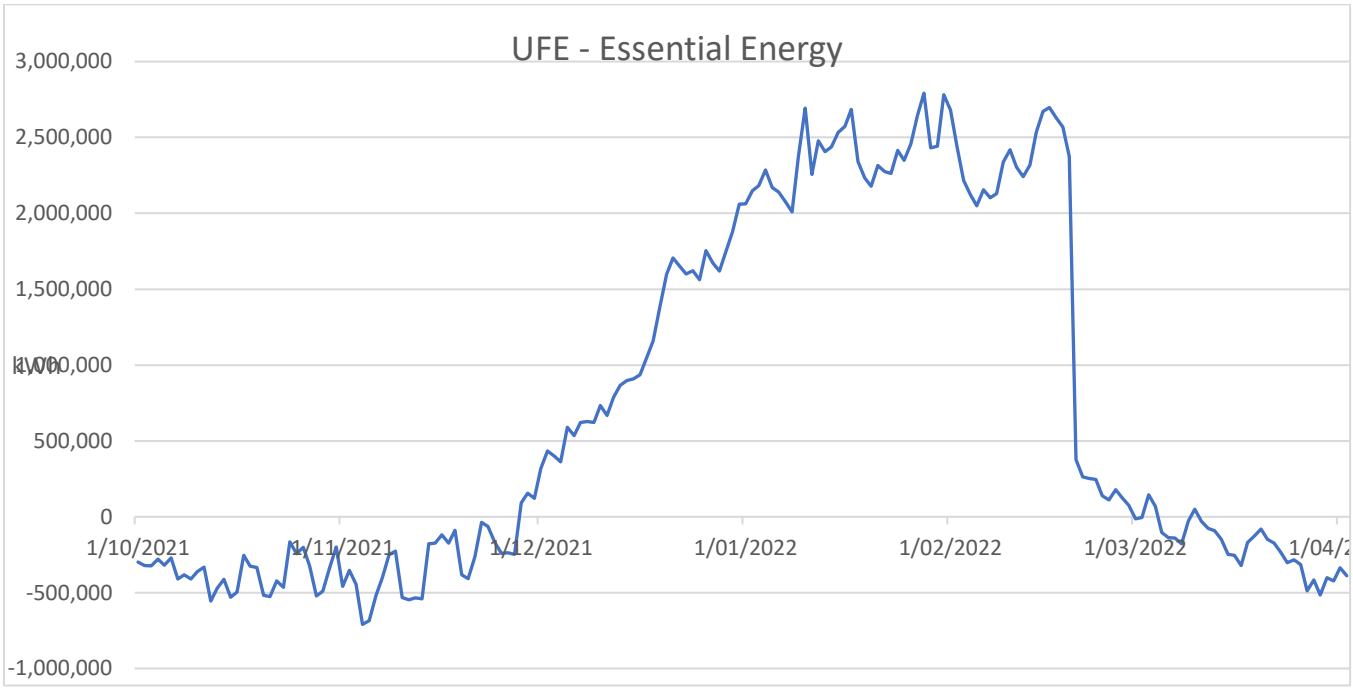

Figure 28 UFE – Essential Energy

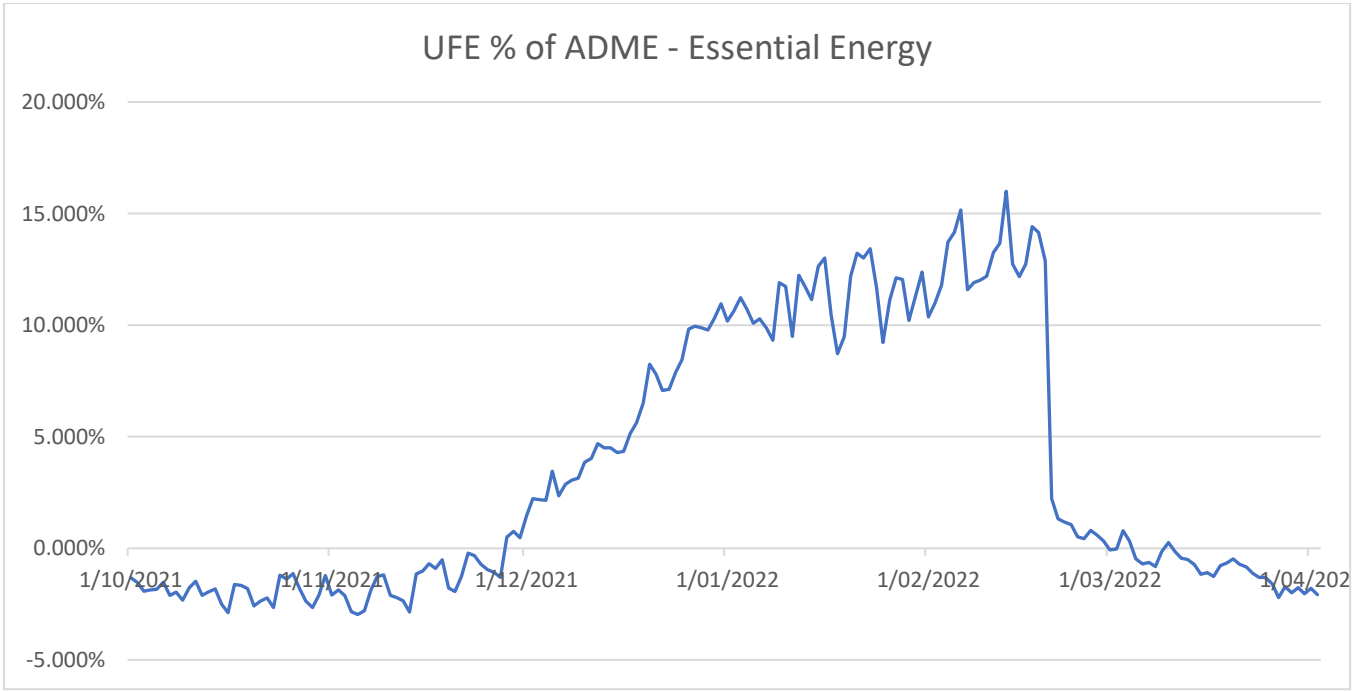

Figure 29 UFE % of ADME – Essential Energy

A1.1.9 Jemena

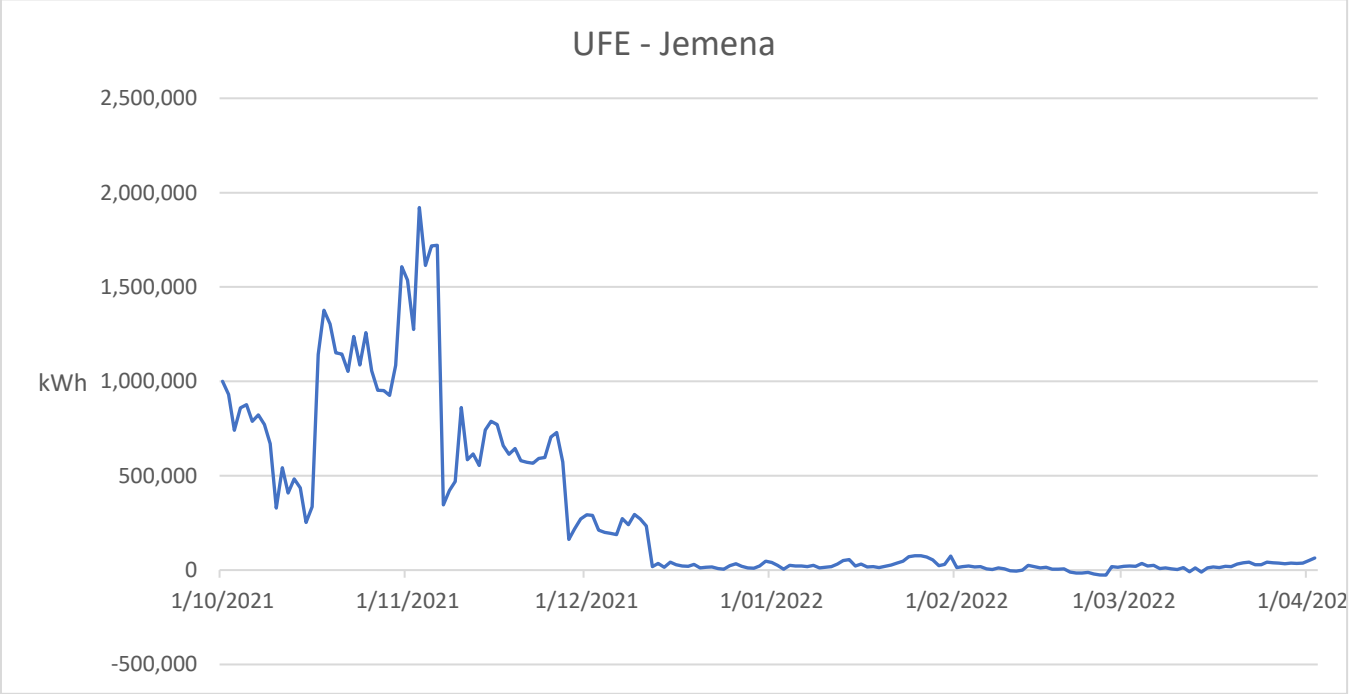

Figure 30 UFE – Jemena

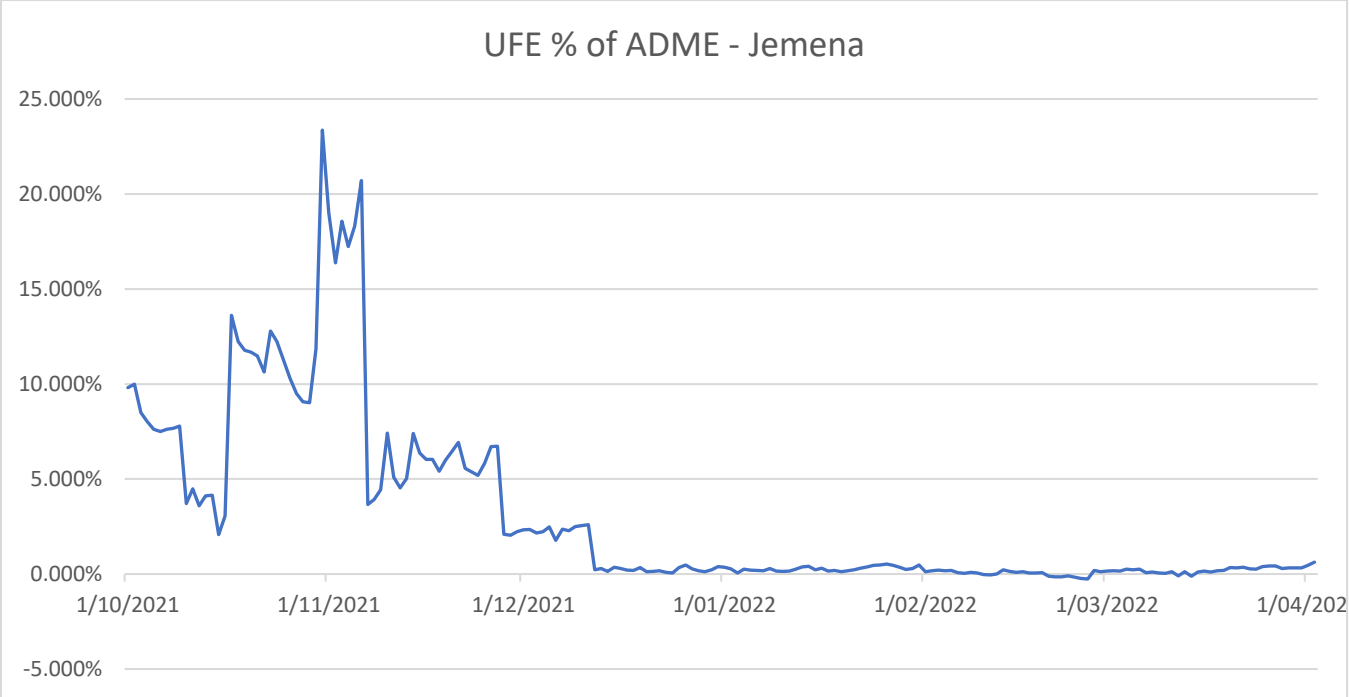

Figure 31 UFE % of ADME – Jemena

A1.1.10 Powercor

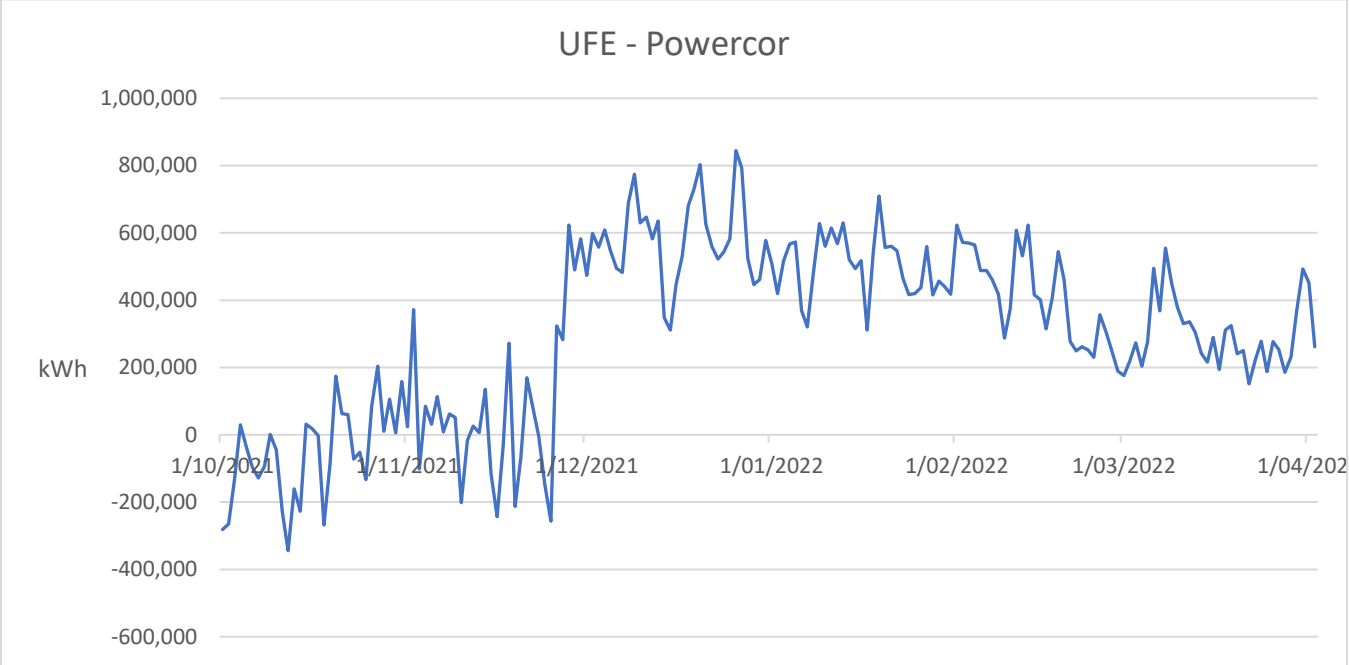

Figure 32 UFE – Powercor

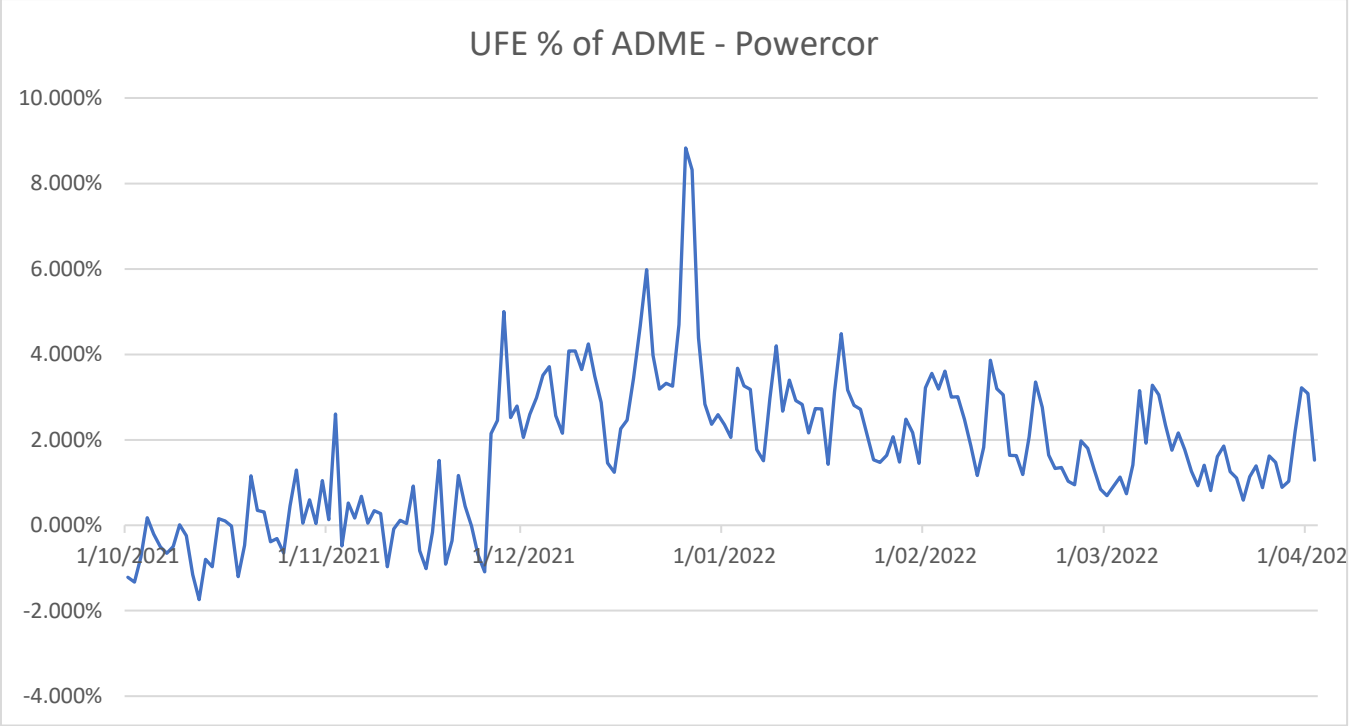

Figure 33 UFE % of ADME – Powercor

A1.1.11 SA Power Networks

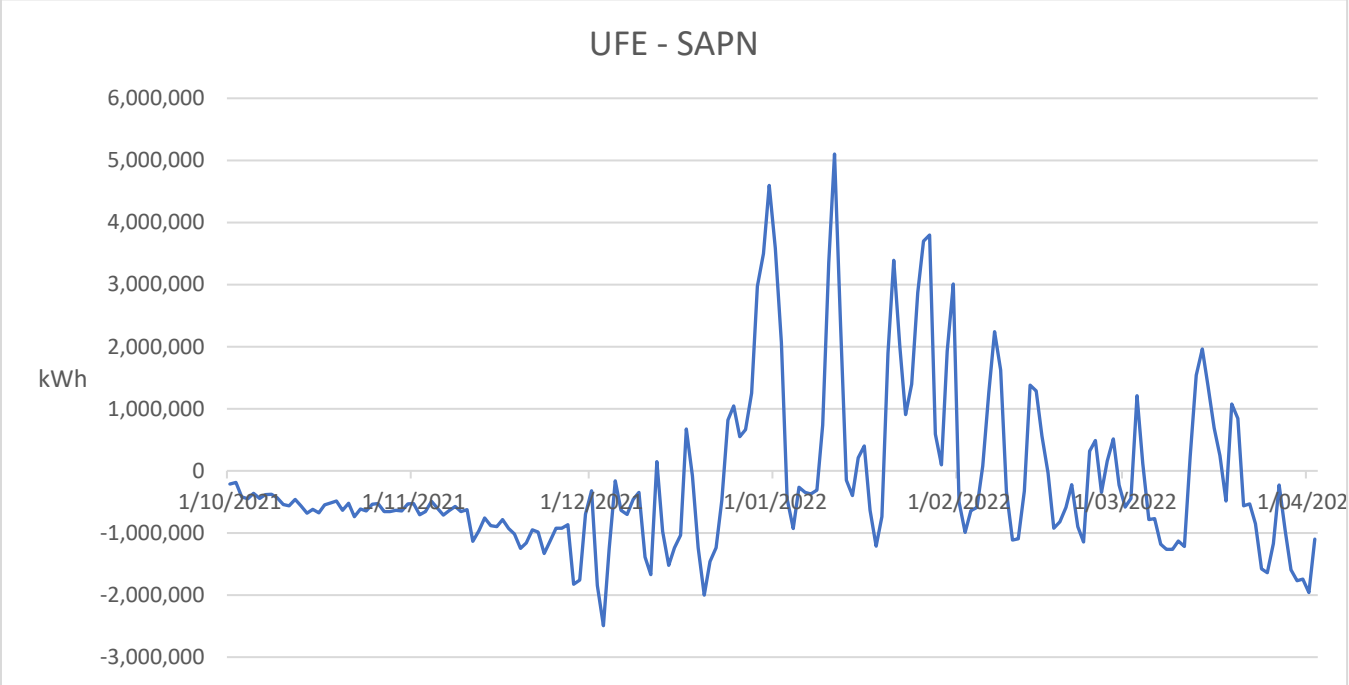

Figure 34 UFE – SA Power Networks

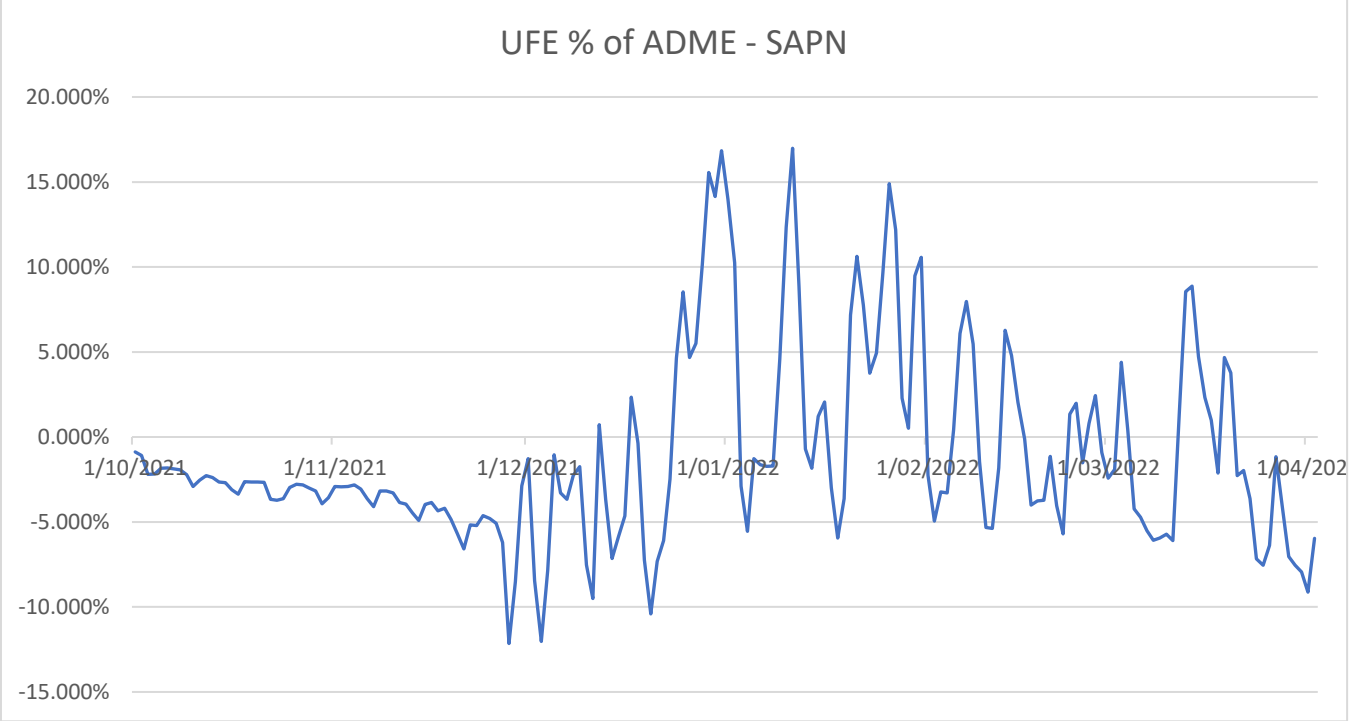

Figure 35 UFE % of ADME – SA Power Networks

A1.1.12 TasNetworks

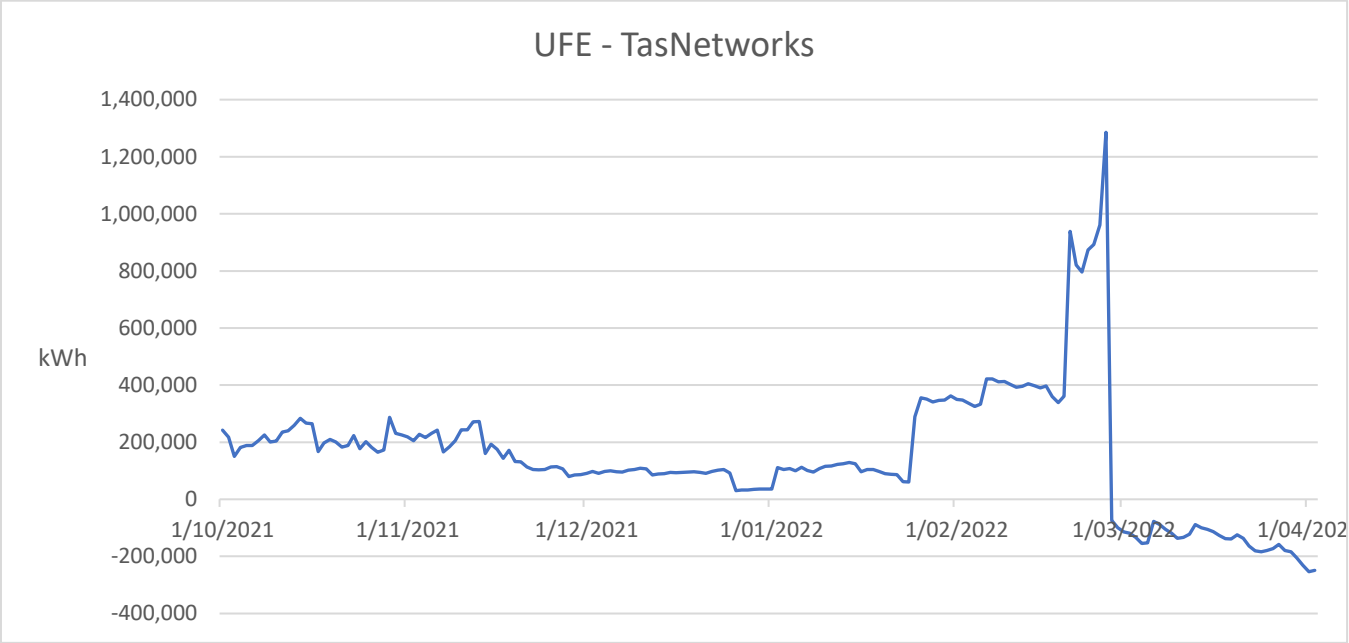

Figure 36 UFE – TasNetworks

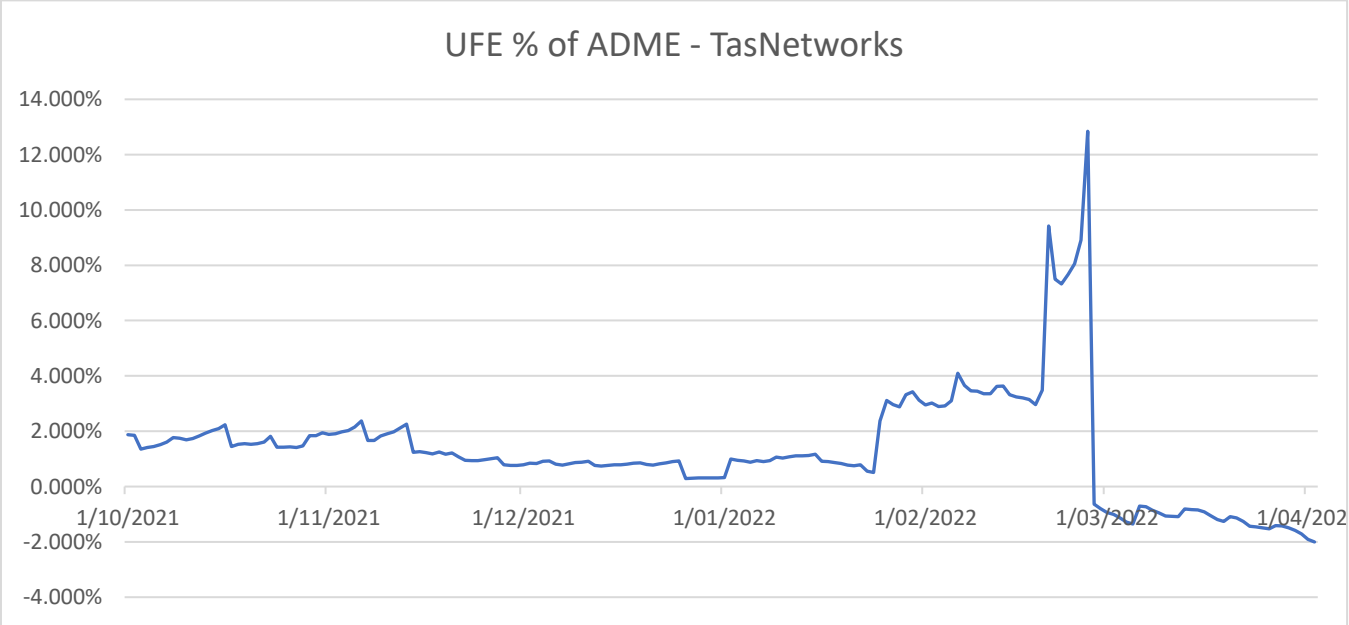

Figure 37 UFE % of ADME – TasNetworks

A1.1.13 United Energy

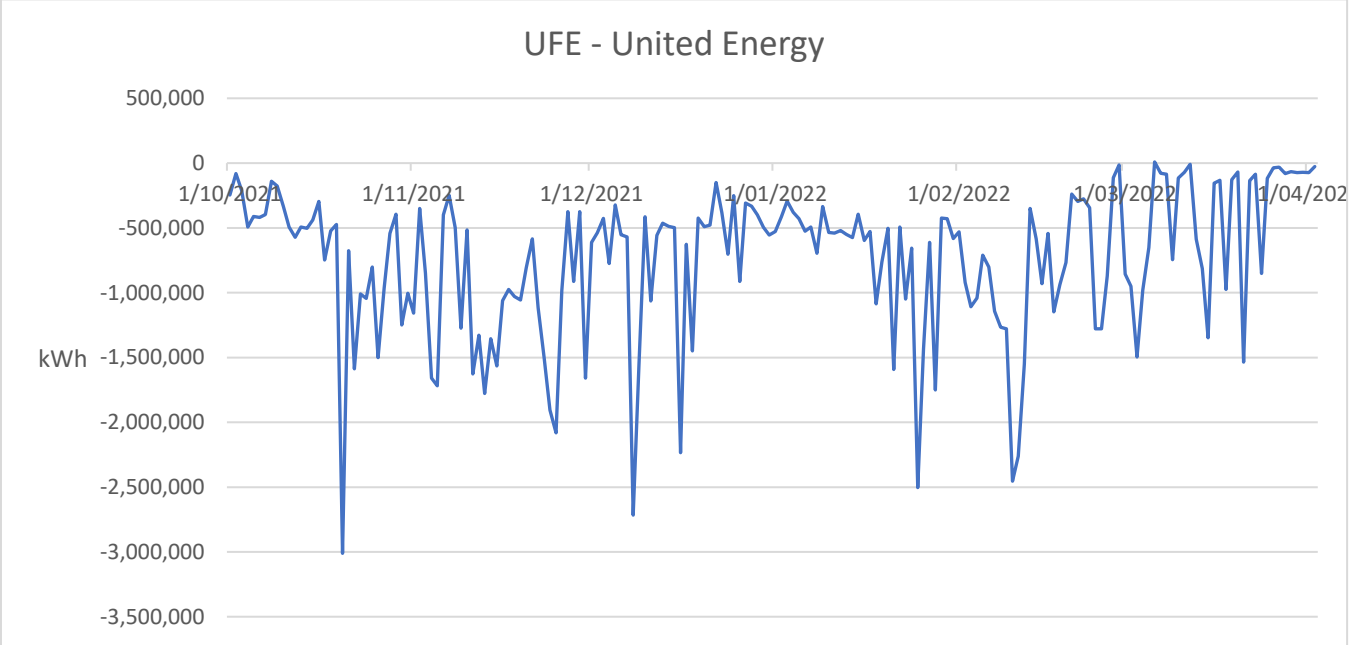

Figure 38 UFE – United Energy

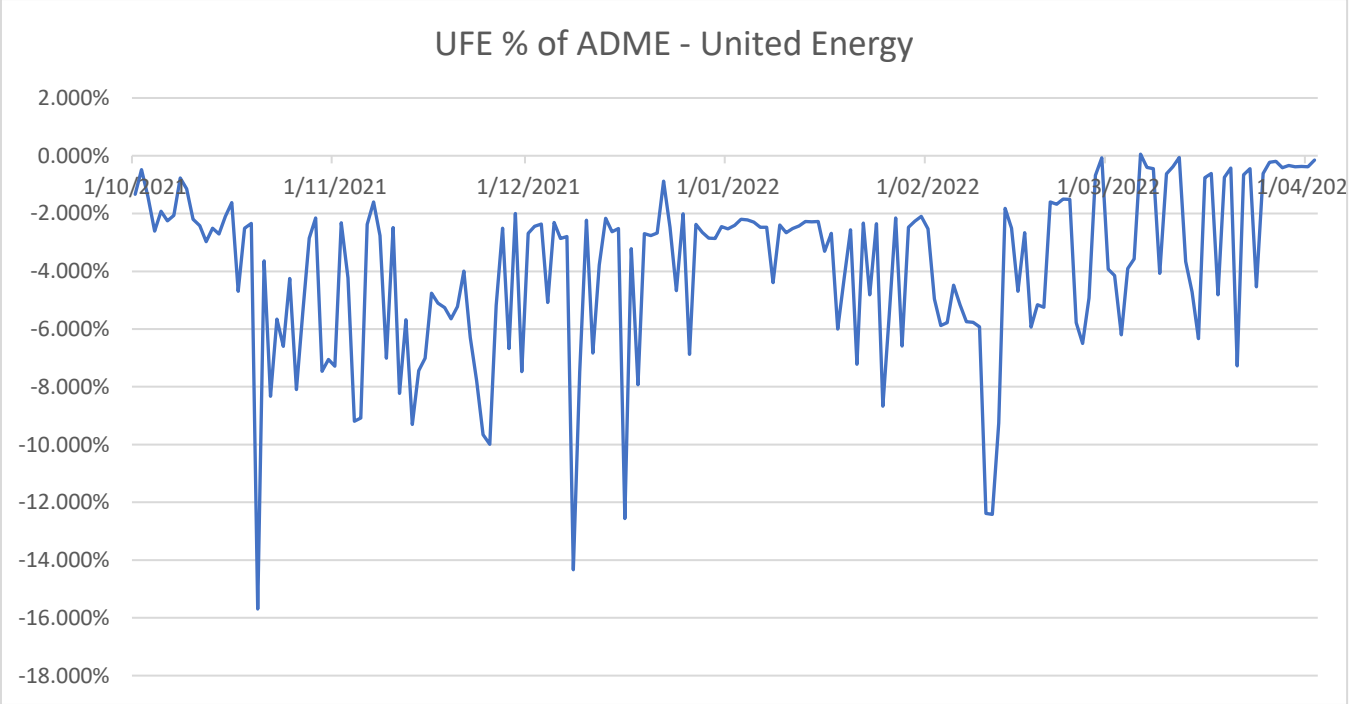

Figure 39 UFE % of ADME – United Energy