Modelling Results – Small NDM

Demand Estimation Sub Committee

Technical Workgroup

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Provided by:

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Section 5:

Results: Small NDM - Summary

Total NDM Population Counts: AQ & Supply Point

- Small NDM is the main component of the overall NDM:
    - Band 1 (0-73.2 MWh pa) constitutes nearly 3/4 of overall NDM (on an AQ basis)
    - Bands 1 to 2 (0-293 MWh pa) constitutes nearly 4/5 of overall NDM
    - Bands 1 to 4 (0-2196 MWh pa) constitutes nearly 9/10 of overall NDM
- Large NDM is very much a minority component of overall NDM
- Note:
  Due to the impacts of COVID-19 and subsequent reductions in AQ there has been an increase in the number of supply points in Bands 1 to 2 (AQ and SP Count)

EUC Bands: Range	**% of Total NDM**	
	Total AQ	Total SP Count
Band 1: 0 to 73.2 MWh pa	74.00%	98.95%
Bands 1 to 2: 0 to 293 MWh pa	79.80%	99.74%
Bands 1 to 4: 0 to 2,196 MWh pa	88.59%	99.97%
Bands 5 to 9: >2,196 MWh pa	11.41%	0.03%

Proposed EUC Bands / Consumption Ranges for Small NDM (<2,196 MWh pa)

- EUC consumption ranges not prescribed in Uniform Network Code

- Band 1: 0 – 73.2 MWh pa
  - Prepayment Domestic
  - Non Prepayment Domestic
  - Prepayment I&C
  - Non Prepayment I&C

- Band 2: 73.2 – 293 MWh pa
  - Prepayment Domestic
  - Non Prepayment Domestic
  - Prepayment I&C
  - Non Prepayment I&C

- Band 3: 293 – 732 MWh pa

- Band 4: 732 – 2,196 MWh pa

Results - Small NDM - ILF Summary

- The ILF provides an indication of the EUC's weather sensitivity which would not normally be expected to move significantly year on year
- The table opposite provides a summary of the ILF movement when comparing to the average of the previous 3 years analysis
- The I&C EUCs and Band 2 Domestic EUC ("02BND") are all showing large variations
- The only exception is Band 1 Domestic ("01BND") where movements are minimal
- Summary supports rejection of Small NDM I&C models this year

Small NDM - ILF Movement Analysis Year '20/21 vs Average of '17/18 to '19/20						
LDZ	01BND	01BNI	02BND	02BNI	03B	04B
SC	0.4 ▲	0.8 ▲	-2.3 ▼	-2.1 ▼	0.1 ▲	-1.5 ▼
NO	0.5 ▲	-0.7 ▼	-2.8 ▼	1.1 ▲	-3.0 ▼	0.0 ▼
NW	0.2 ▲	1.9 ▲	-3.4 ▼	0.0 ▲	-5.0 ▼	-1.2 ▼
NE	1.1 ▲	2.7 ▲	-3.1 ▼	3.9 ▲	-2.9 ▼	-1.1 ▼
EM	0.0 ▼	1.5 ▲	-3.0 ▼	2.7 ▲	-3.2 ▼	-0.5 ▼
WM	0.7 ▲	1.9 ▲	-3.1 ▼	2.1 ▲	-3.8 ▼	-1.0 ▼
WN	-0.3 ▼	1.7 ▲	-3.4 ▼	2.7 ▲	-2.5 ▼	2.6 ▲
WS	0.7 ▲	3.5 ▲	-2.4 ▼	-0.4 ▼	-4.2 ▼	0.7 ▲
EA	-0.2 ▼	3.1 ▲	-2.0 ▼	0.9 ▲	-1.2 ▼	0.3 ▲
NT	0.6 ▲	-1.3 ▼	-2.1 ▼	-4.1 ▼	-5.5 ▼	0.1 ▲
SE	0.7 ▲	1.1 ▲	-1.8 ▼	-0.5 ▼	-2.5 ▼	-0.2 ▼
SO	0.4 ▲	1.3 ▲	-1.9 ▼	0.7 ▲	-2.1 ▼	-0.3 ▼
SW	0.6 ▲	0.1 ▲	-2.3 ▼	-0.4 ▼	-2.8 ▼	0.1 ▲

Results - Small NDM - R^2 Summary

- Prior to reviewing individual EUC results, the table opposite provides a summary of the R^2 movement when comparing to the average of the previous 3 years analysis
- All Industrial & Commercial (I&C) EUCs ("01BNI", "02BNI", "03B" and "04B") have significantly deteriorated across all LDZs
- The Band 1 Domestic EUC ("01BND") exhibit minimal changes, in both directions (as observed in any year). Band 2 Domestic EUC ("02BND") results are more variable
- Summary supports rejection of Small NDM I&C models this year
- Individual results on following slides

Small NDM - R-Squared Movement Analysis Year '20/21 vs Average of '17/18 to '19/20						
LDZ	**01BND**	**01BNI**	**02BND**	**02BNI**	**03B**	**04B**
SC	0.3% ▲	-1.4% ▼	-1.1% ▼	-6.5% ▼	-1.1% ▼	-1.9% ▼
NO	-0.1% ▼	-1.5% ▼	-0.9% ▼	-8.3% ▼	-2.9% ▼	-2.4% ▼
NW	0.0% ◀	-3.8% ▼	0.3% ▲	-9.4% ▼	-0.8% ▼	-1.6% ▼
NE	0.3% ▲	-1.2% ▼	0.4% ▲	-6.6% ▼	-0.6% ▼	-0.8% ▼
EM	0.2% ▲	-1.3% ▼	0.3% ▲	-7.7% ▼	-2.3% ▼	-1.5% ▼
WM	0.0% ◀	-1.9% ▼	0.4% ▲	-8.3% ▼	-1.5% ▼	-1.5% ▼
WN	-0.1% ▼	-3.1% ▼	0.3% ▲	-18.3% ▼	-5.4% ▼	-2.6% ▼
WS	0.1% ▲	-7.6% ▼	-1.5% ▼	-9.0% ▼	-1.0% ▼	-2.1% ▼
EA	-0.2% ▼	-1.6% ▼	-2.5% ▼	-3.8% ▼	-1.2% ▼	-1.9% ▼
NT	-0.2% ▼	-5.7% ▼	-2.6% ▼	-7.7% ▼	-2.2% ▼	-2.9% ▼
SE	-0.3% ▼	-1.6% ▼	-2.7% ▼	-6.2% ▼	-2.6% ▼	-3.5% ▼
SO	-0.2% ▼	-3.5% ▼	-2.6% ▼	-13.4% ▼	-3.3% ▼	-1.9% ▼
SW	0.2% ▲	-2.1% ▼	-1.9% ▼	-12.1% ▼	-3.2% ▼	-2.8% ▼

Results - Small NDM – Pre-payment Models

- There has been insufficient sample data received to derive any new models for Band 1 or Band 2 pre-payment EUCs
- This will mean the Domestic EUCs will revert back to the latest available data from gas year 2012/13 sourced as part of Mod451

Description	Range	EUC	Run (Single Option)
Band 1 PPM Domestic	0 to 73.2 MWh pa	01BPD	n/a No Model Available due to lack of data
Band 1 PPM I&C	0 to 73.2 MWh pa	01BPI	n/a No Model Available due to lack of data
Band 2 PPM Domestic	73.2 to 293 MWh pa	02BPD	n/a No Model Available due to lack of data
Band 2 PPM I&C	73.2 to 293 MWh pa	02BPI	n/a No Model Available due to lack of data

Section 5:

Results: Small NDM – Domestic EUCs

Results - Small NDM – Agreed Domestic EUC Modelling runs

- Agreed modelling runs for Small Domestic EUC's (01BND and 02BND) are as follows:

Description	Range	EUC	Option 1	Option 2
Band 1 Non-PPM Domestic	0 to 73.2 MWh pa	01BND	Individual LDZ Analysis	n/a
Band 2 Non-PPM Domestic	73.2 to 293 MWh pa	02BND	2 LDZ Groups SC/ NO/ NW/ NE / EM/ WM and EA/ NT/ SE/ WS/ SO/ SW	National Analysis

Results - Small NDM - 01BND Summary

Indicative Load Factor:
- There has been small movements across all LDZs ranging from -0.31 in LDZ WN to +1.06 in LDZ NE

R^2 Results:
- R^2 values for Analysis year '20/21 range between 97.5% (WN) and 99.0% (EM/ WM) compared to the average of the previous 3 years which ranged between 97.6% (WN) and 99.1% (NT/ SE)

- R^2 values for all LDZs are within ± 0.3% of their respective averages for the previous 3 analysis periods

Sample Size:
- Target number of sample supply points met this year

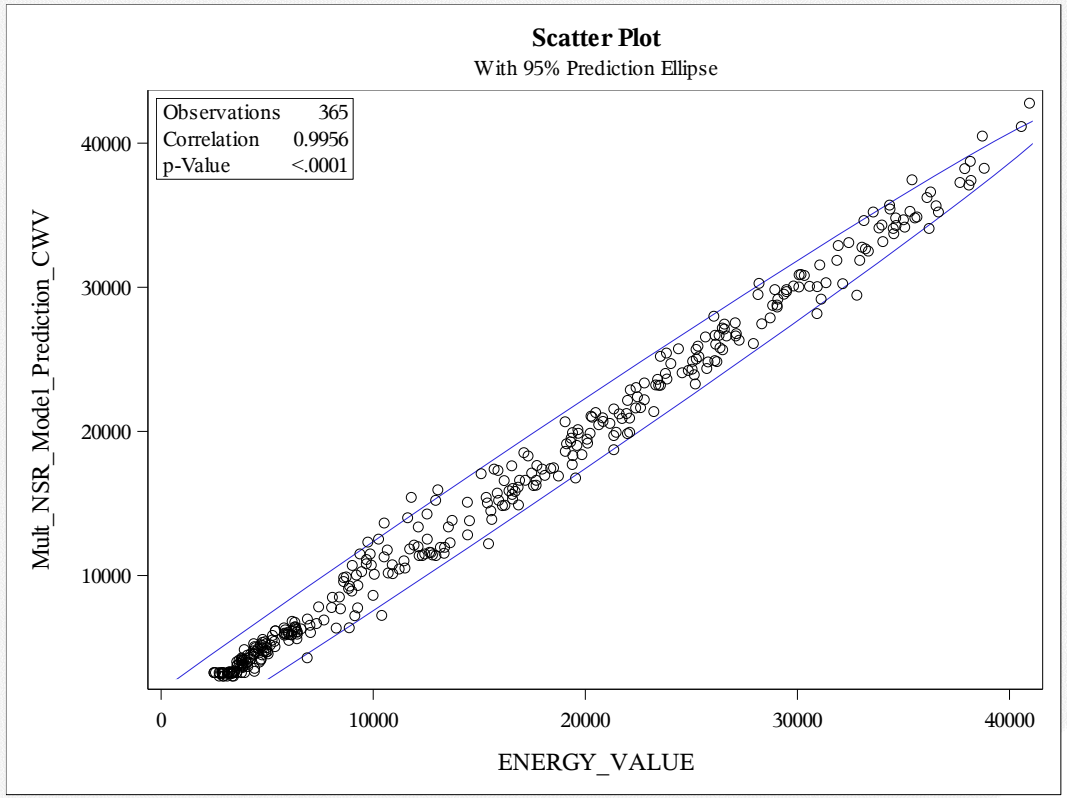
The following slides show a comparison of LDZ SE to the previous years results, as well as view of this years model for LDZs EM and WN

	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)			Analysis Year(s)			Analysis Year	
LDZ	'17/18 - '19/20	'20/21	Movement	'17/18 - '19/20	'20/21	Movement	'19/20	'20/21
SC	34.8	35.2	0.4 ▲	98.6%	98.9%	0.3% ▲	274	385
NO	35.2	35.6	0.5 ▲	98.4%	98.3%	-0.1% ▼	176	385
NW	32.2	32.3	0.2 ▲	98.3%	98.3%	0.0% ◀	267	385
NE	33.3	34.4	1.1 ▲	98.1%	98.4%	0.3% ▲	275	385
EM	31.7	31.6	0.0 ▼	98.8%	99.0%	0.2% ▲	222	385
WM	30.1	30.9	0.7 ▲	99.0%	99.0%	0.0% ◀	247	385
WN	32.1	31.8	-0.3 ▼	97.6%	97.5%	-0.1% ▼	130	274
WS	30.4	31.1	0.7 ▲	98.4%	98.5%	0.1% ▲	257	385
EA	31.7	31.5	-0.2 ▼	98.7%	98.5%	-0.2% ▼	241	385
NT	31.5	32.2	0.6 ▲	99.1%	98.9%	-0.2% ▼	207	385
SE	30.1	30.8	0.7 ▲	99.1%	98.8%	-0.3% ▼	263	385
SO	27.9	28.3	0.4 ▲	98.8%	98.6%	-0.2% ▼	218	385
SW	29.0	29.6	0.6 ▲	98.2%	98.4%	0.2% ▲	295	385

Comparison of Analysis 01BND- LDZ SE

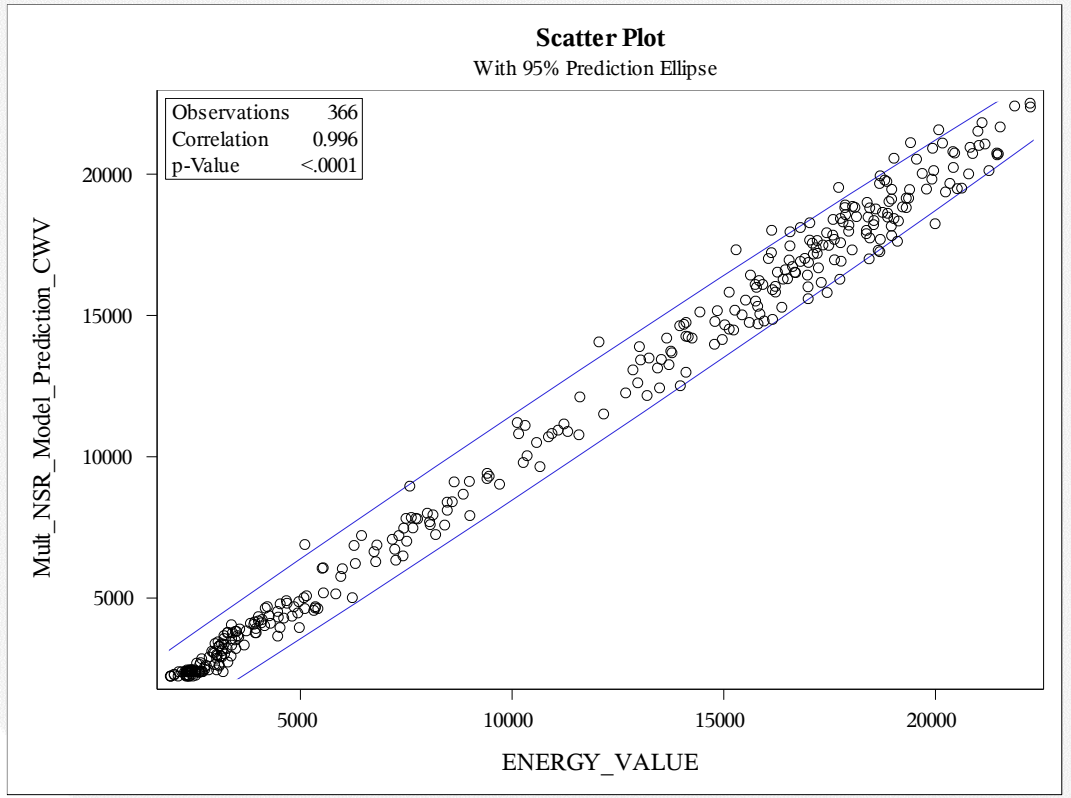
Current Analysis Period '20/21

Model: No Summer Reduction
EUC: 01BND
LDZ: SE
Demand: SE
R^2 = 98.8%
ILF = 30.8
Sample Points = 385



Previous Analysis Period '19/20

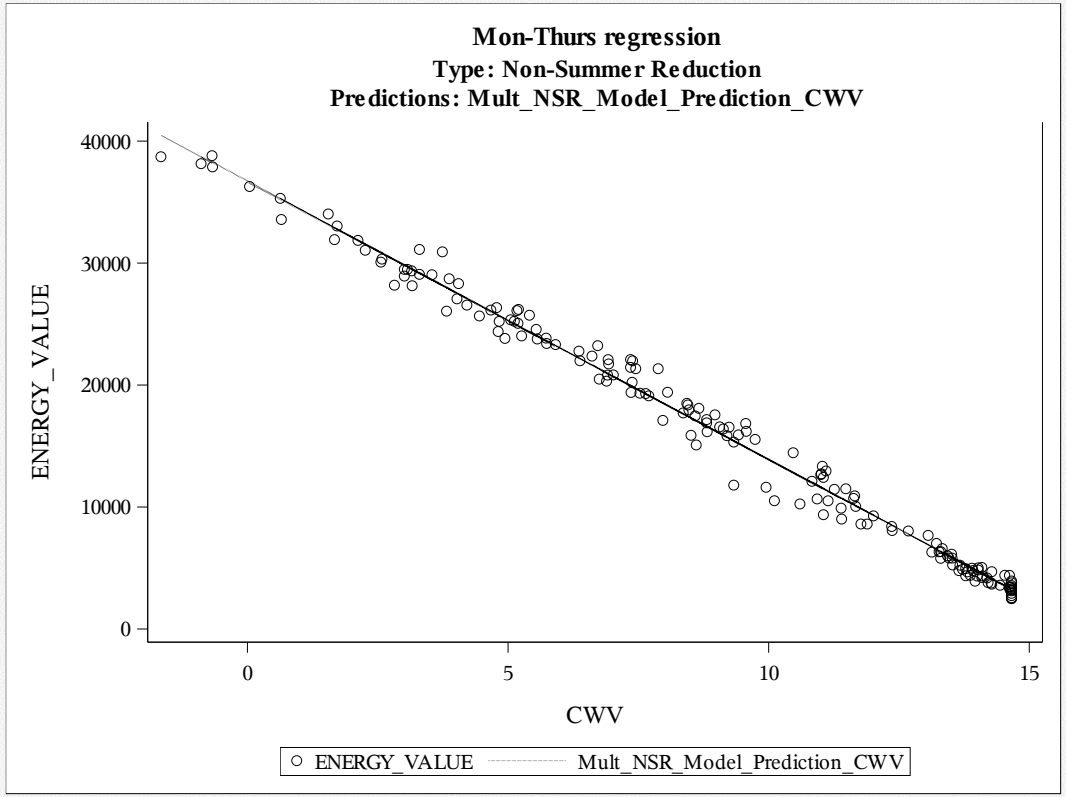
Model: No Summer Reduction
EUC: 01BND
LDZ: SE
Demand: SE
R^2 = 99.1%
ILF = 29.2
Sample Points = 263



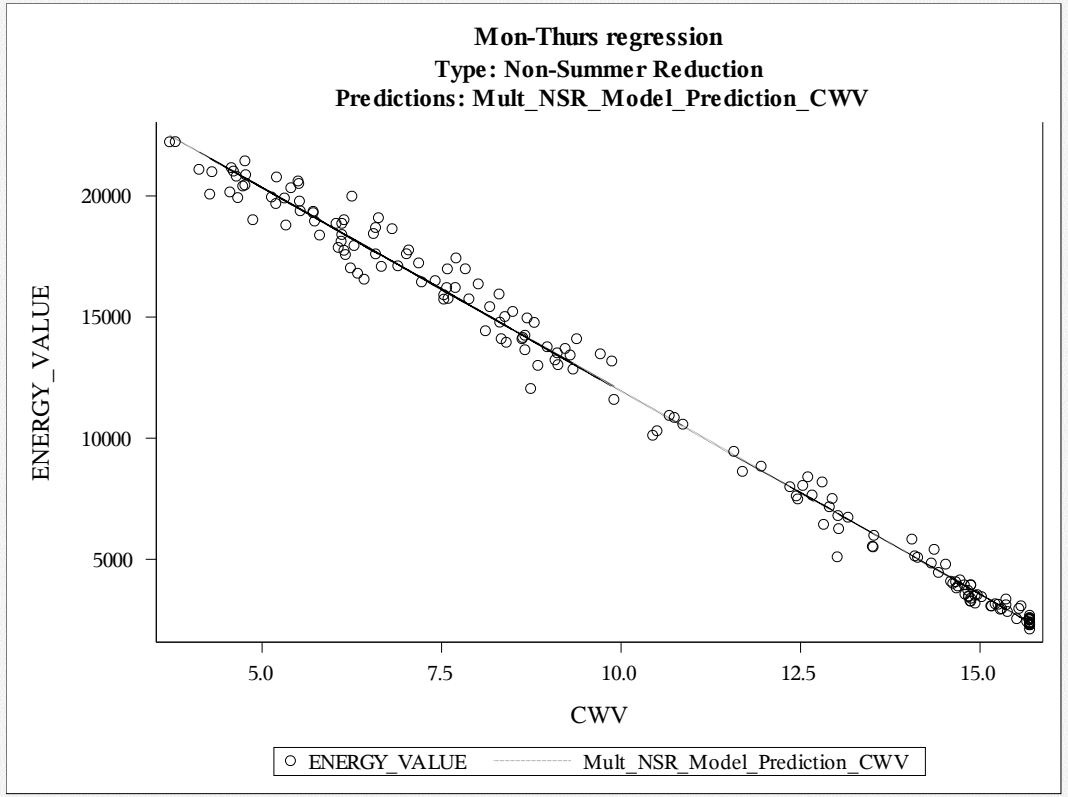
Spread is comparable to last year.

Comparison of Analysis 01BND - LDZ SE

Current Analysis Period '20/21



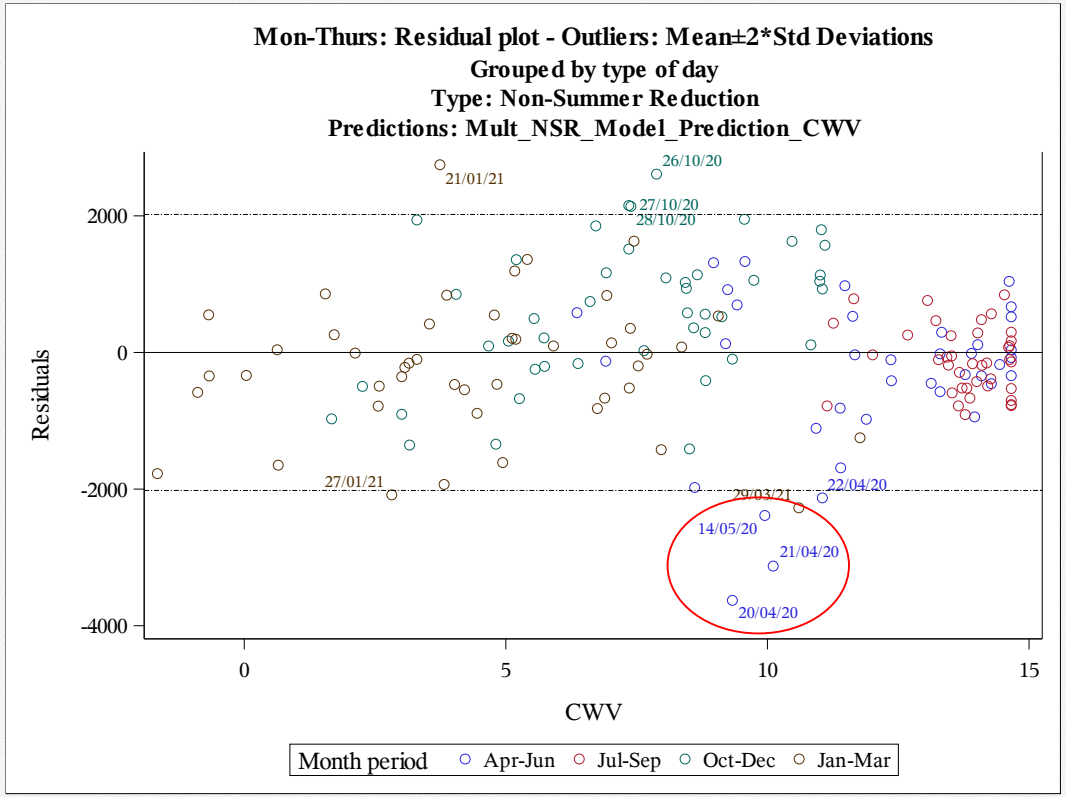
Previous Analysis Period '19/20



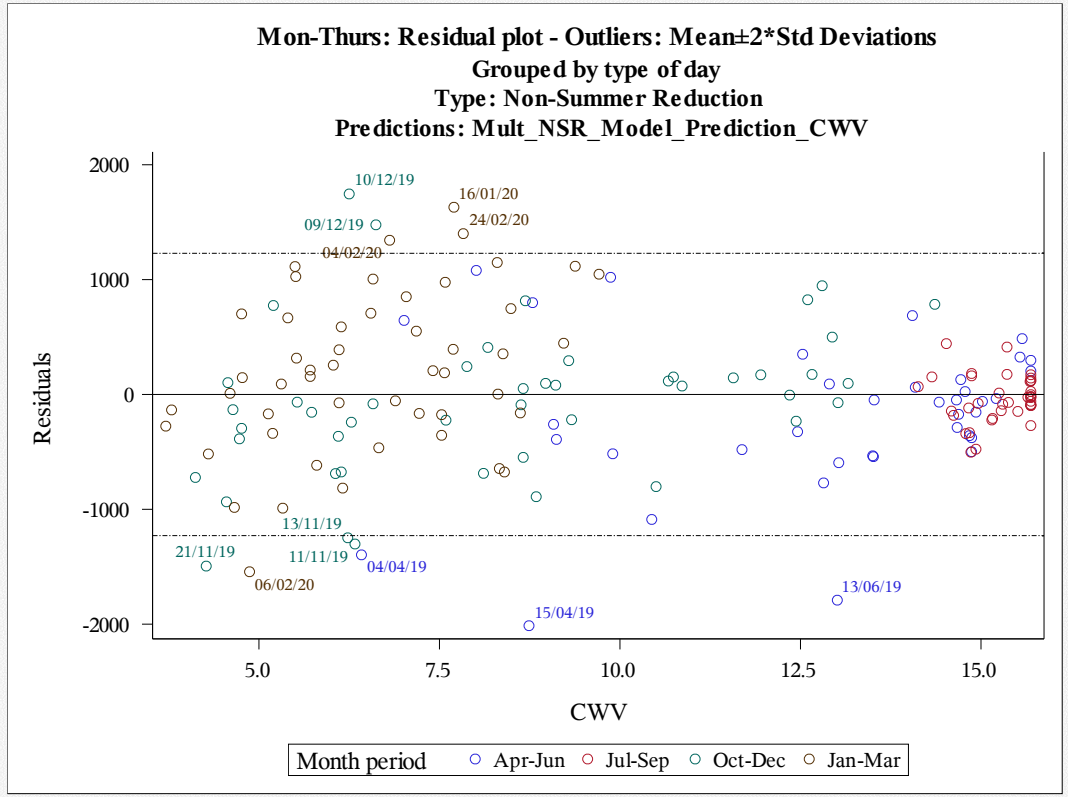
Models appear robust and comparable to last year.

Comparison of Analysis 01BND- LDZ SE

Current Analysis Period '20/21



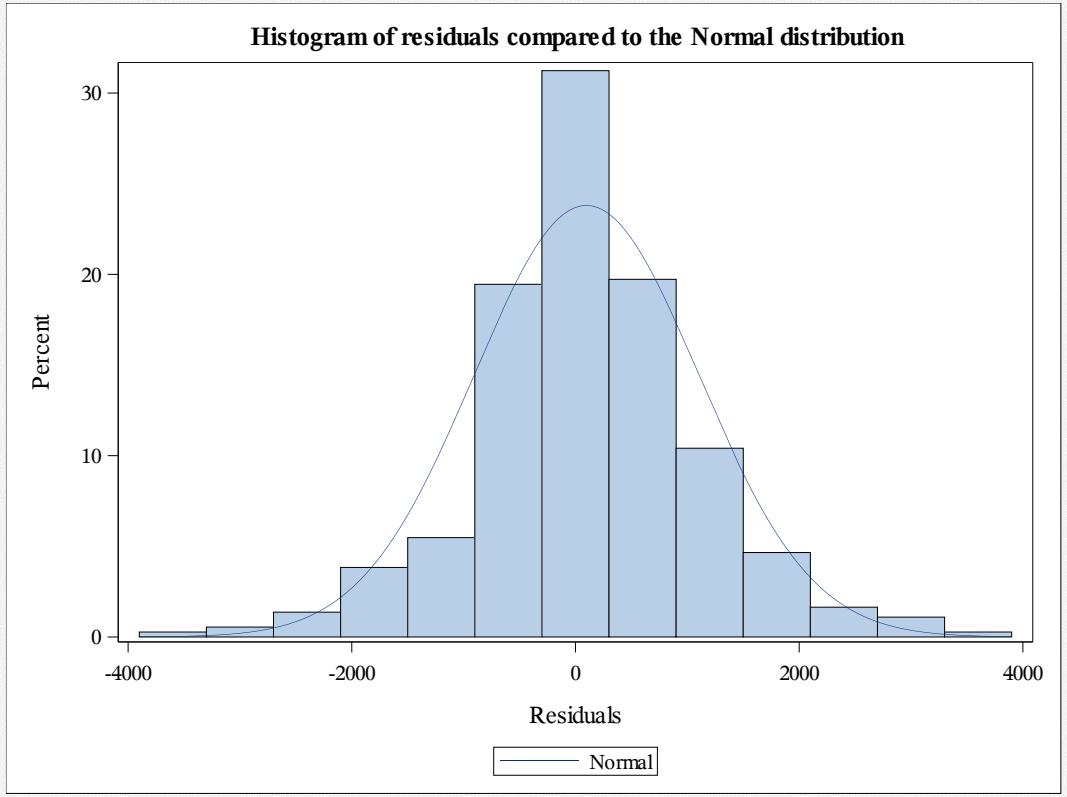
Previous Analysis Period '19/20



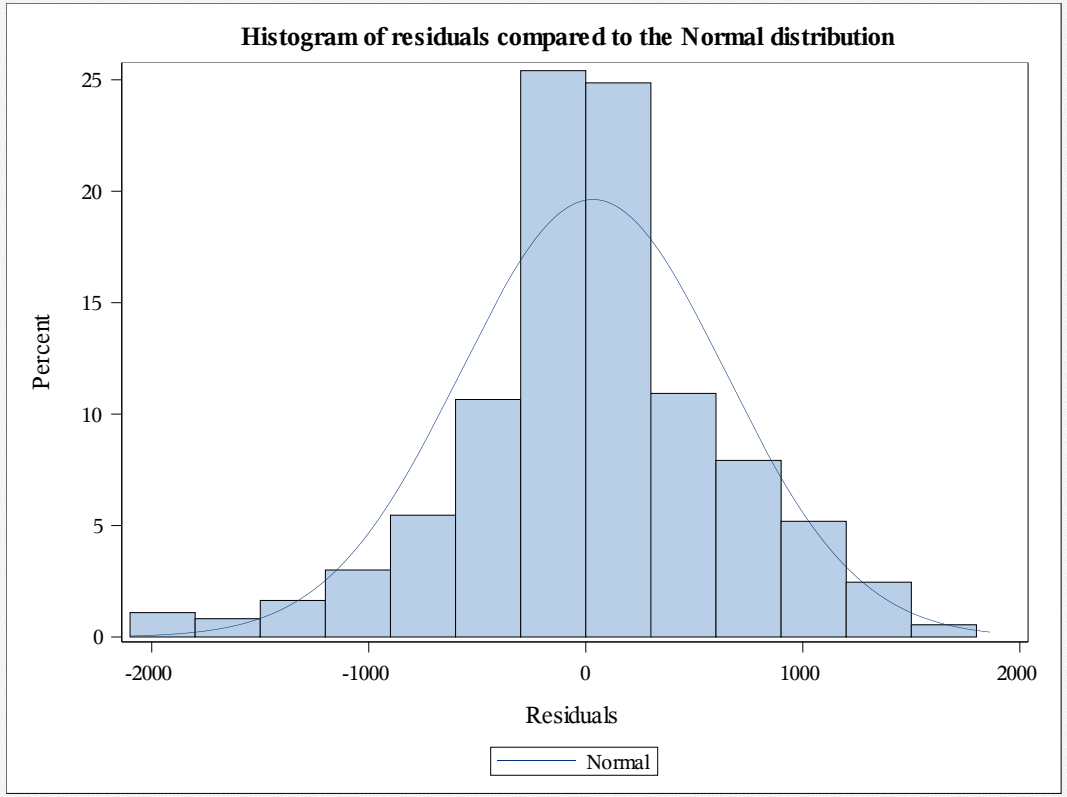
Outliers generally random, however some exceptions can be seen in April 2020 which may be related to Covid Lockdowns and restrictions

Comparison of Analysis 01BND - LDZ SE

Current Analysis Period '20/21



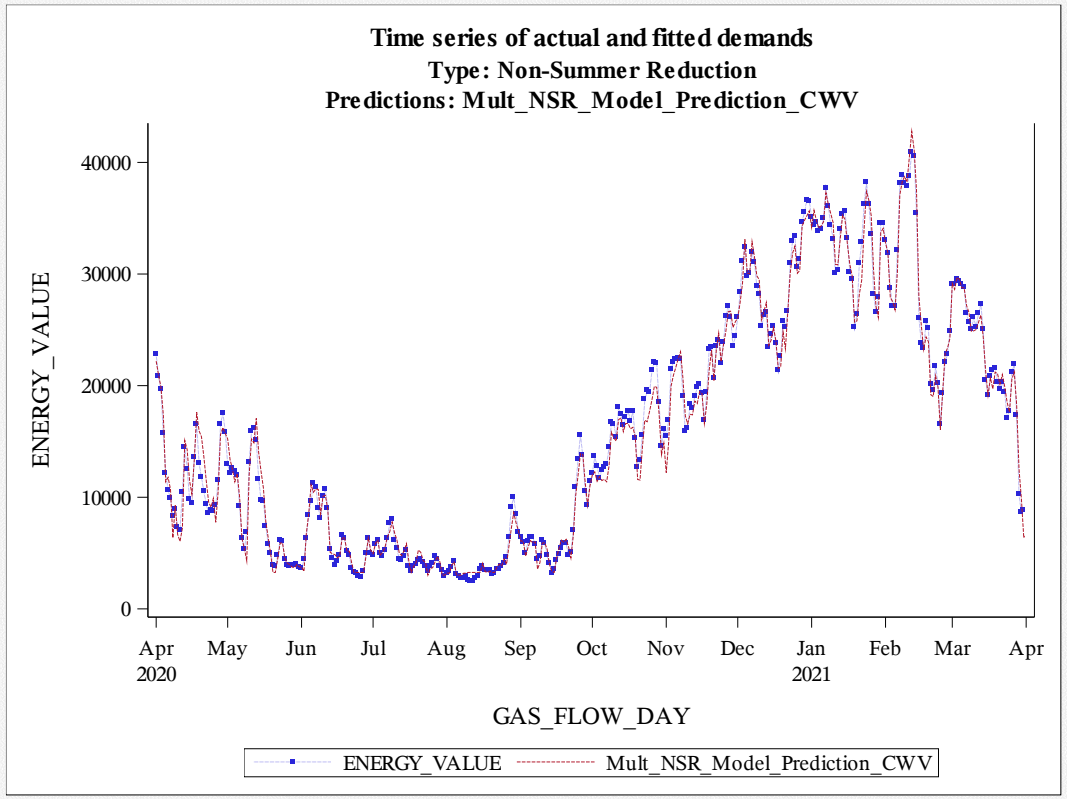
Previous Analysis Period '19/20



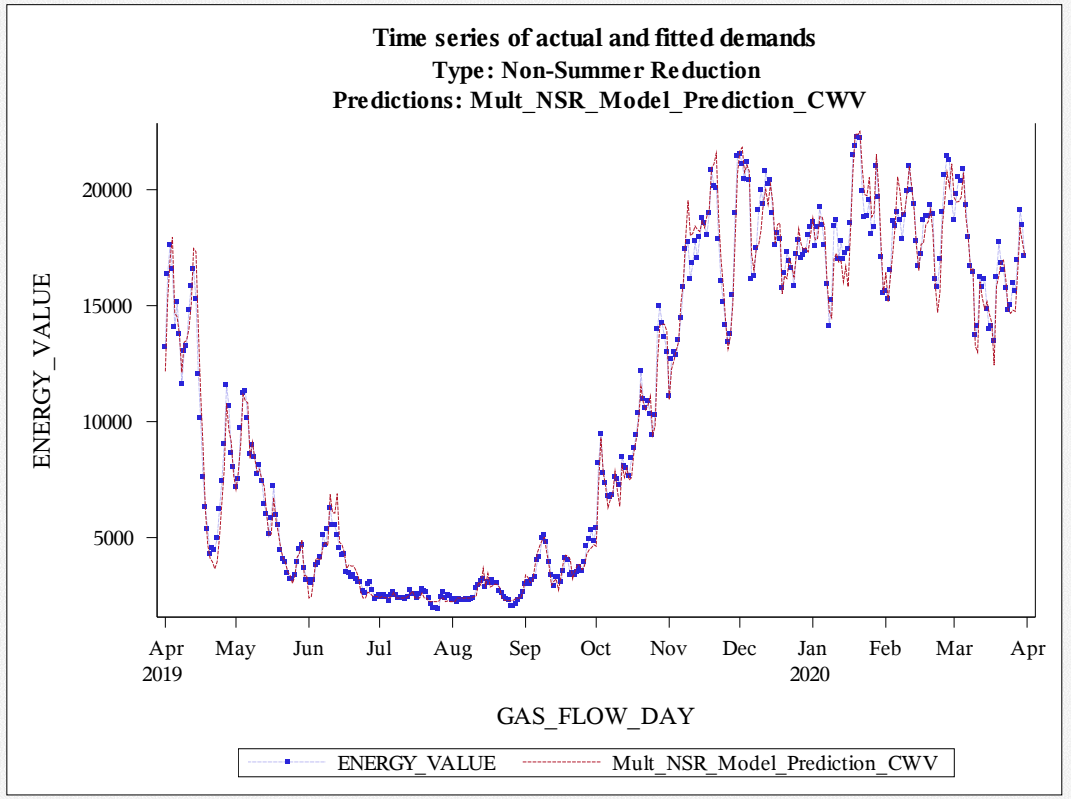
Residuals appear normally distributed and comparable to last year.

Comparison of Analysis 01BND – LDZ SE

Current Analysis Period '20/21



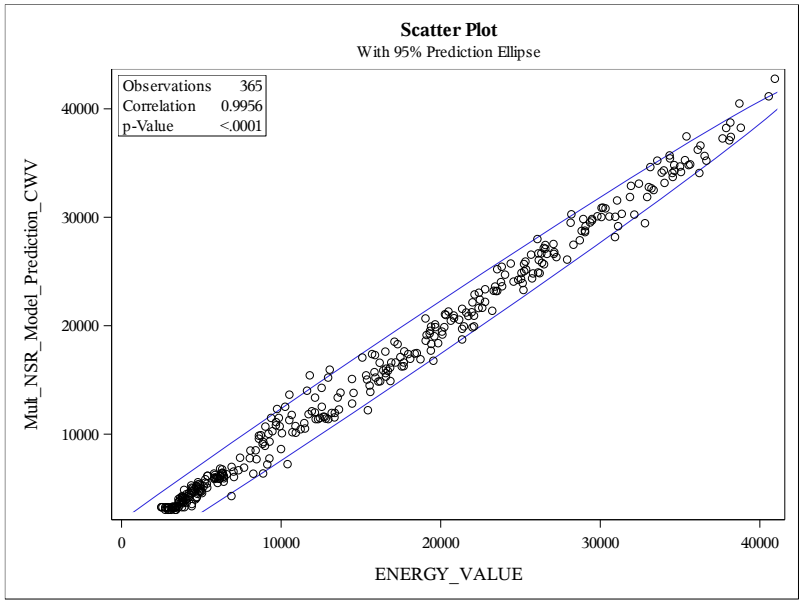
Previous Analysis Period '19/20

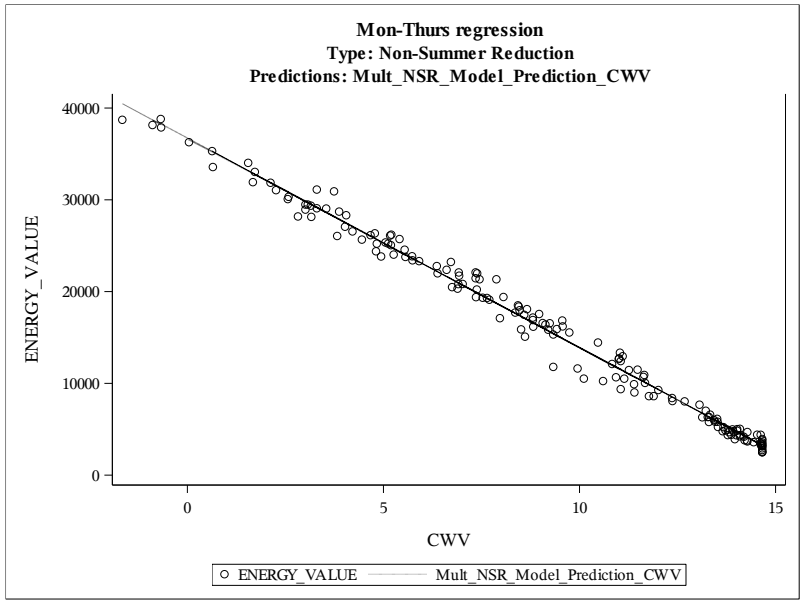


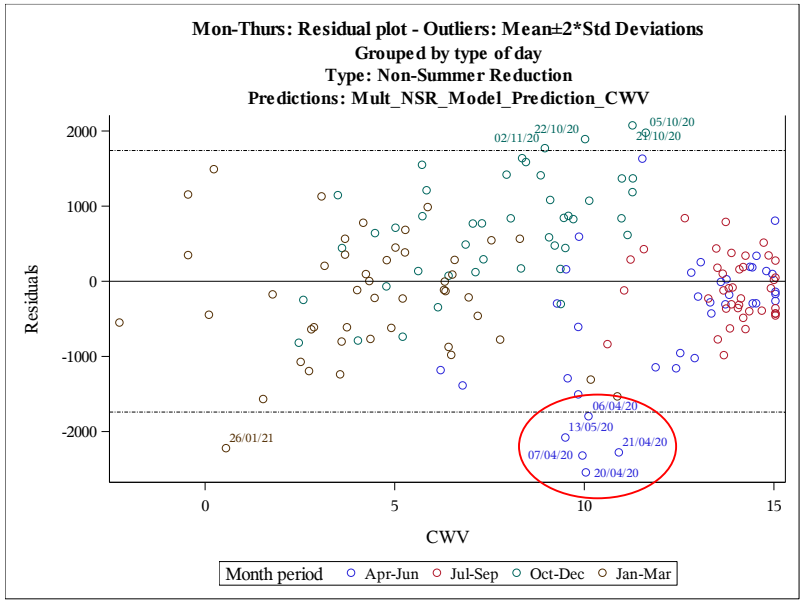
Time series view shows a consistently close relationship between actual and fitted demands.

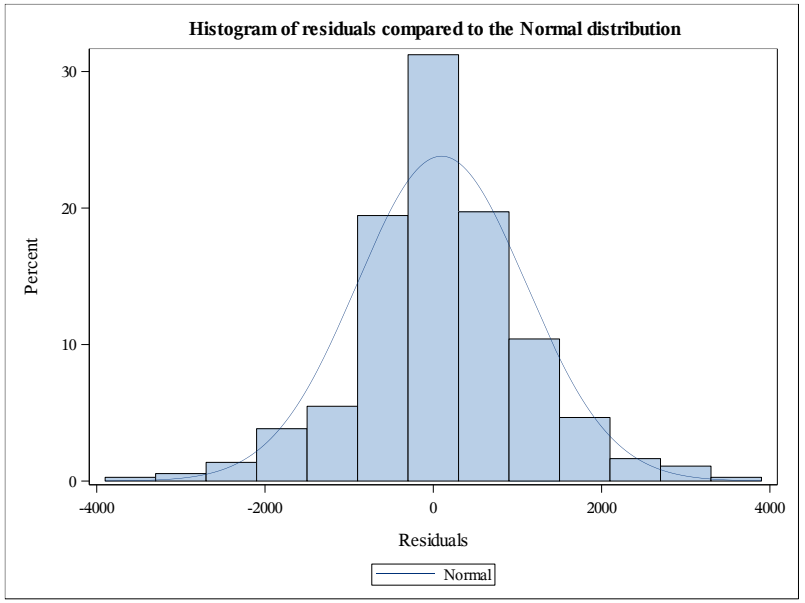
Results – Small NDM 01BND – Charts for LDZ EM

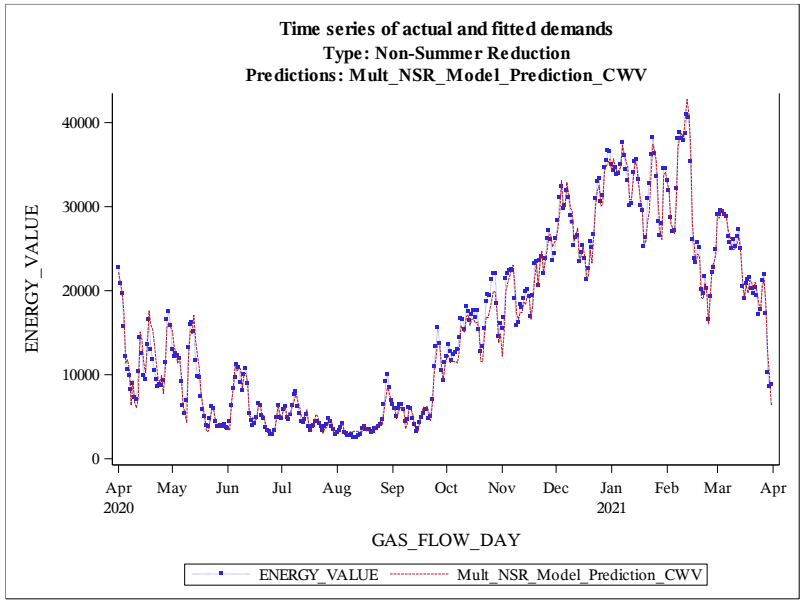
Model:
No Summer Reduction
EUC: 01BND
LDZ: EM
Demand: EM
R2 = 99.0%
ILF = 31.62
Sample Points = 385





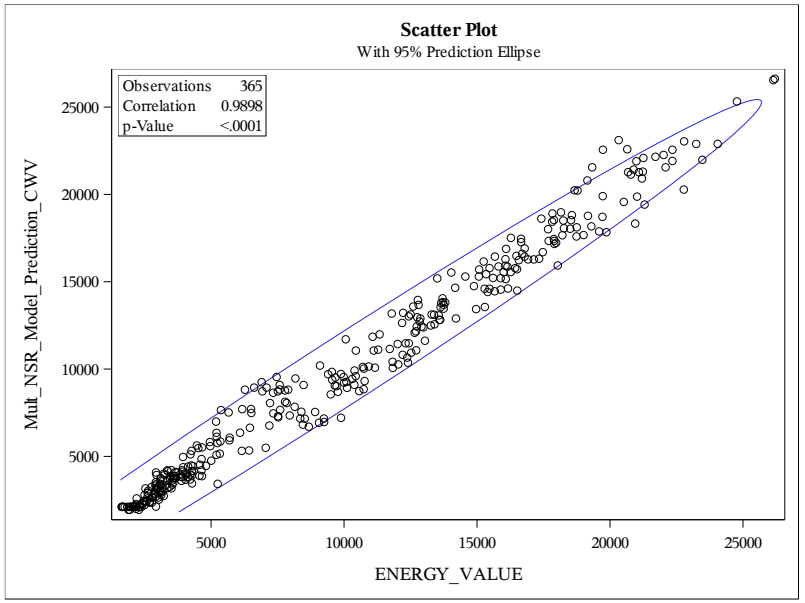


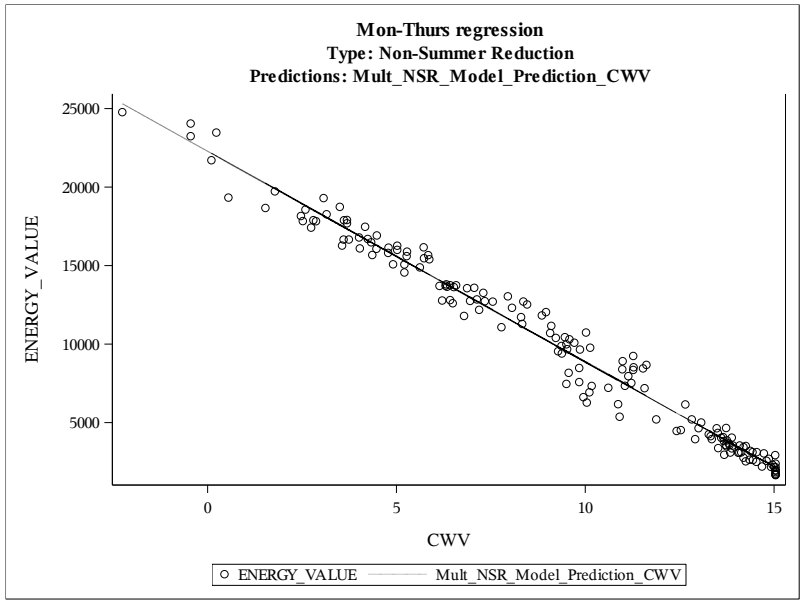


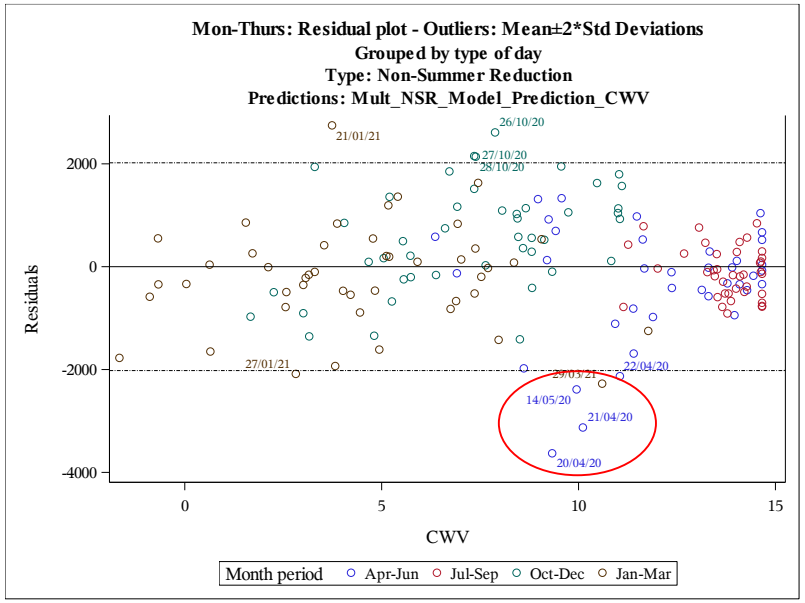


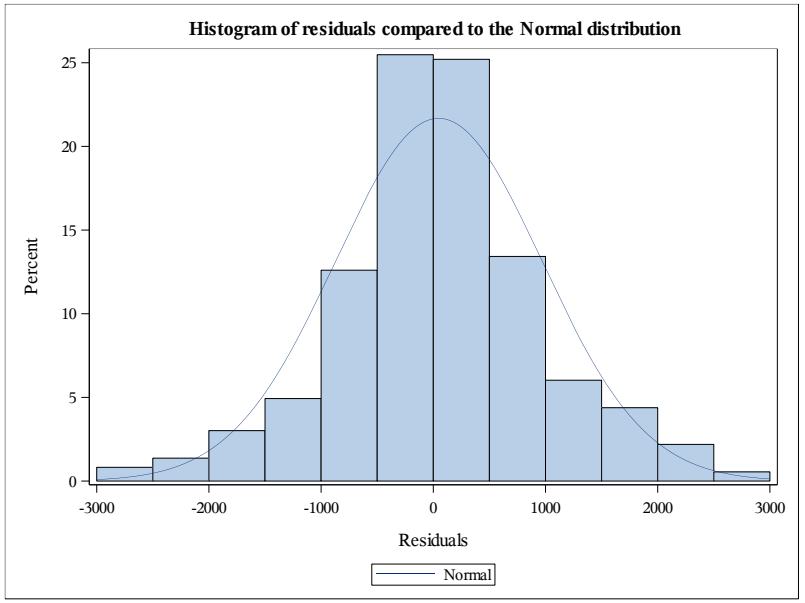
Results – Small NDM 01BND – Charts for LDZ WN

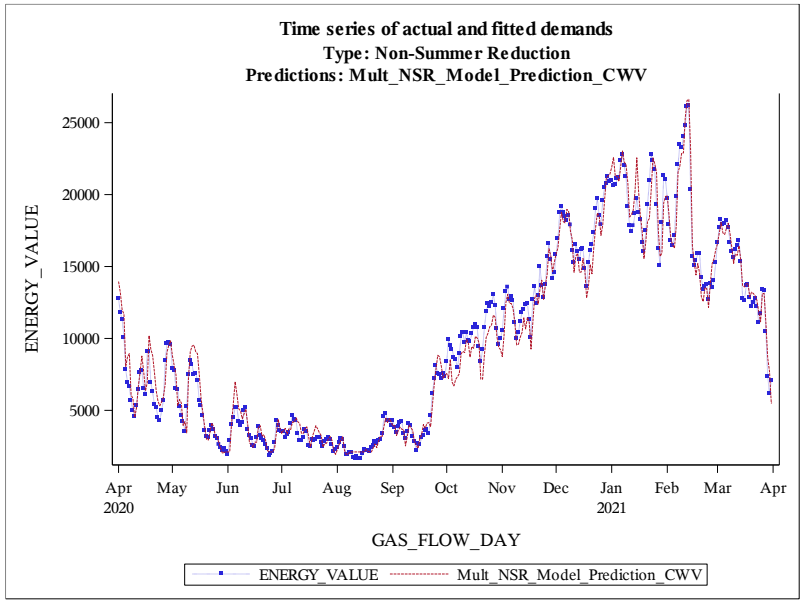
Model: No Summer Reduction
EUC: 01BND
LDZ: WN
Demand: WN
R2 = 97.5%
ILF = 31.77
Sample Points = 274





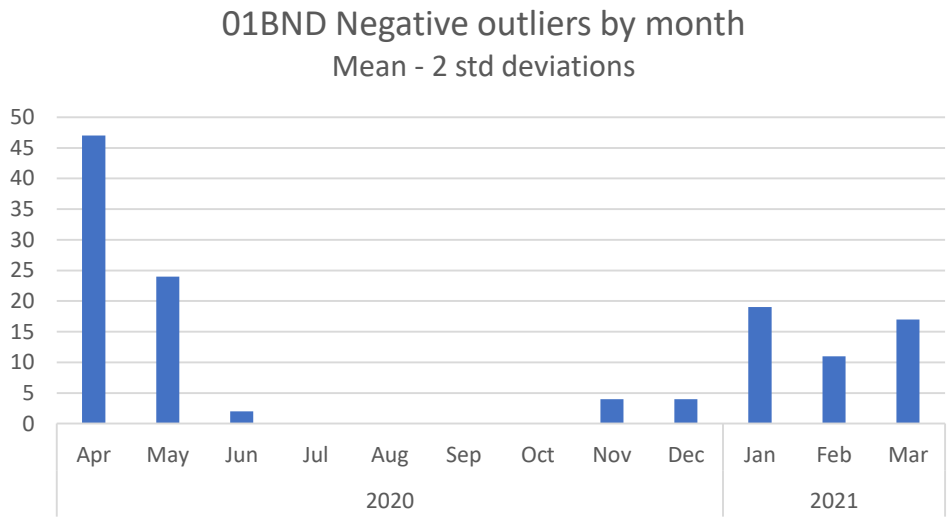






Results – Small NDM 01BND Conclusions

- ILF and R^2 results for Band 1 Domestic EUCs are in line with previous years with minimal COVID-19 impacts visible
- As highlighted on some of the LDZ results, there is a potential impact during April/May 2020 where we see an increase in the number of model outliers (see chart) which could point towards effects of the COVID-19 lockdowns and restrictions on the 01BND data collected for Analysis period 2020/21
- Outlier days in April vary across LDZs and so no specific days to remove can be easily identified



- Options available to DESC TWG:
  - Option 1 – Use the 20/21 model data in this year's process for deriving smoothed demand models, along with 18/19 and 19/20
  - Option 2 – Use the 20/21 model data but remove specific days where majority of LDZs report negative outliers in April (15th and 20th April - TBC)
  - Option 3 – Do not use 20/21 model data and refer back to last years smoothed demand models – this used data from 17/18, 18/19 and 19/20

Results - Small NDM – Band 02BND

- There are minimal differences between ILF values for Option 1 and Option 2
- The Average R^2 value of Option 1 across all LDZs is 96.3%, compared to an average of 96.2% for option 2.
- There are limited number of sample points within EUC 02BND however sample sizes are large enough when aggregated into two groups of LDZs (>30 supply points)
- Without a clear benefit for selecting option 2, and proceeding with a National aggregation for all LDZs, option 1 is recommended.

02BND (Band 2 - 73.2 to 293 MWh pa)						
	Indicative load Factor (ILF)		R2 Multiple Correlation Coefficient		Sample Size (Supply Points)	
LDZ	Option 1	Option 2	Option 1	Option 2	Option 1	Option 2
SC	36.5	35.7	96.3%	95.2%	77	140
NO	37.6	36.9	96.8%	95.5%	77	140
NW	34.4	33.6	97.5%	97.2%	77	140
NE	36.4	35.6	97.8%	97.3%	77	140
EM	35.8	35.1	97.3%	96.8%	77	140
WM	34.5	33.7	97.0%	97.1%	77	140
WN	35.0	34.2	97.2%	96.8%	77	140
WS	32.8	33.8	95.7%	96.3%	63	140
EA	33.9	34.9	95.6%	96.2%	63	140
NT	33.8	34.9	95.7%	96.3%	63	140
SE	33.0	34.1	95.3%	95.8%	63	140
SO	30.7	31.5	94.9%	95.1%	63	140
SW	31.8	32.9	95.1%	95.3%	63	140

Results - Small NDM - Band 02BND Summary

Note – Analysis Year '20/21 is based on Option 1 (North/ South split) for 02BND, as discussed on previous slide

Indicative Load Factors

- ILF values across all LDZs have significantly reduced when compared to the average of the previous 3 Analysis years

R^2 Results

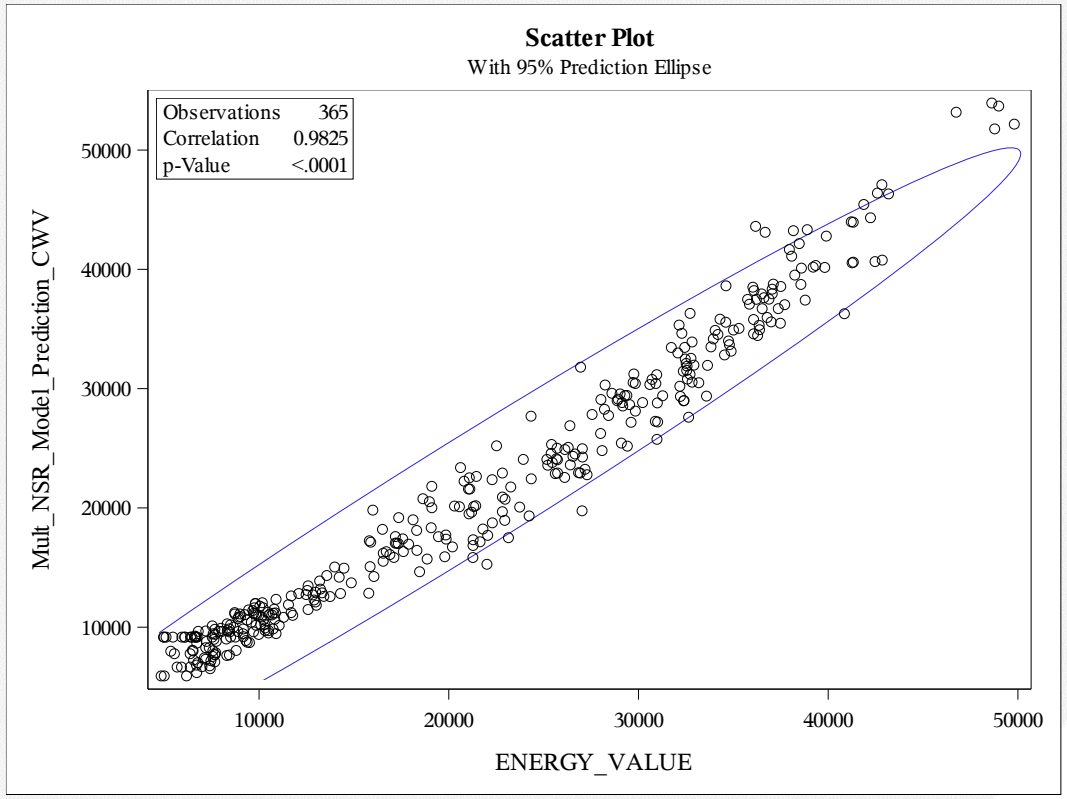
- Movements are small and generally showing a slight improvement in the North.

	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
LDZ	'17/18 - '19/20	'20/21		'17/18 - '19/20	'20/21		'19/20	'20/21
SC	38.7	36.5	-2.3 ▼	97.4%	96.3%	-1.1% ▼	62	77
NO	40.4	37.6	-2.8 ▼	97.7%	96.8%	-0.9% ▼	62	77
NW	37.8	34.4	-3.4 ▼	97.2%	97.5%	0.3% ▲	62	77
NE	39.4	36.4	-3.1 ▼	97.4%	97.8%	0.4% ▲	62	77
EM	38.8	35.8	-3.0 ▼	97.0%	97.3%	0.3% ▲	62	77
WM	37.6	34.5	-3.1 ▼	96.6%	97.0%	0.4% ▲	62	77
WN	38.4	35.0	-3.4 ▼	96.9%	97.2%	0.3% ▲	62	77
WS	35.1	32.8	-2.4 ▼	97.2%	95.7%	-1.5% ▼	47	63
EA	35.9	33.9	-2.0 ▼	98.1%	95.6%	-2.5% ▼	47	63
NT	35.9	33.8	-2.1 ▼	98.3%	95.7%	-2.6% ▼	47	63
SE	34.8	33.0	-1.8 ▼	98.0%	95.3%	-2.7% ▼	47	63
SO	32.6	30.7	-1.9 ▼	97.5%	94.9%	-2.6% ▼	47	63
SW	34.0	31.8	-2.3 ▼	97.0%	95.1%	-1.9% ▼	47	63

Comparison of Analysis 02BND - LDZ SO - Option 1

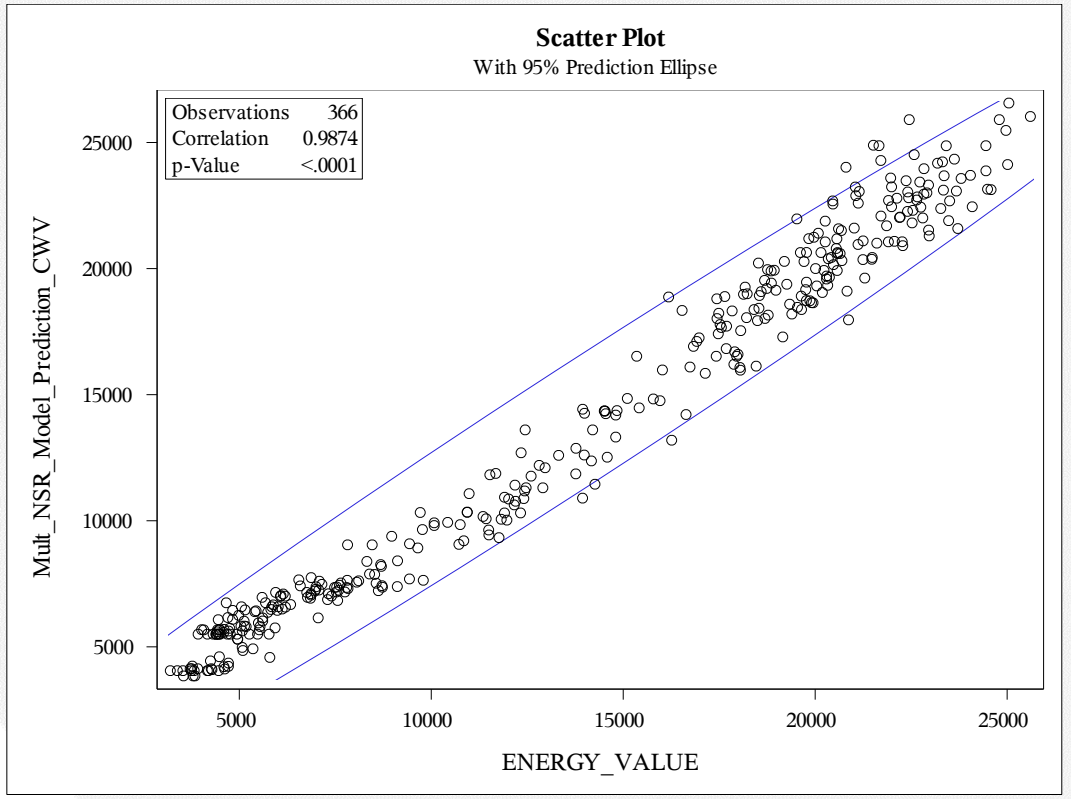
Current Analysis Period '20/21

Model: No Summer Reduction
EUC: 02BND
LDZ: SO
Demand: Option 1
R^2 = 94.9%
ILF = 30.7
Sample Points = 63



Previous Analysis Period '19/20

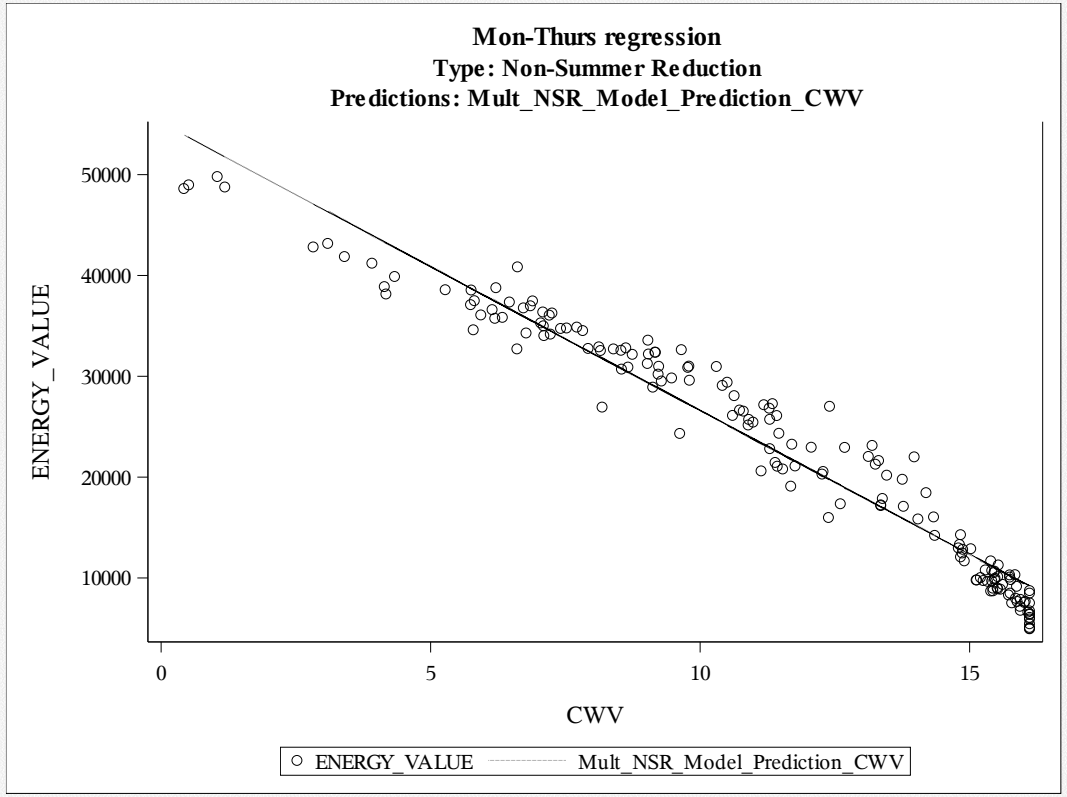
Model: No Summer Reduction
EUC: 02BND
LDZ: SO
Demand: Option 1
R^2 = 97.1%
ILF = 32.2
Sample Points = 47



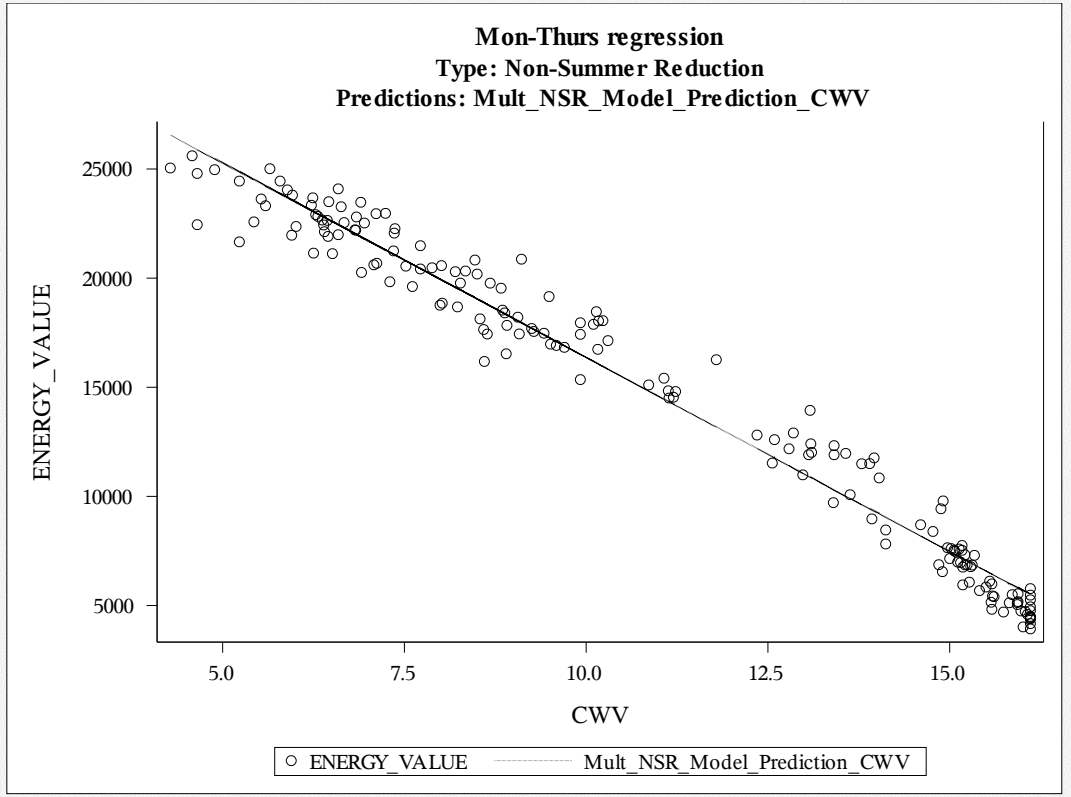
Spread is comparable to previous year.

Comparison of Analysis 02BND - LDZ SO - Option 1

Current Analysis Period '20/21



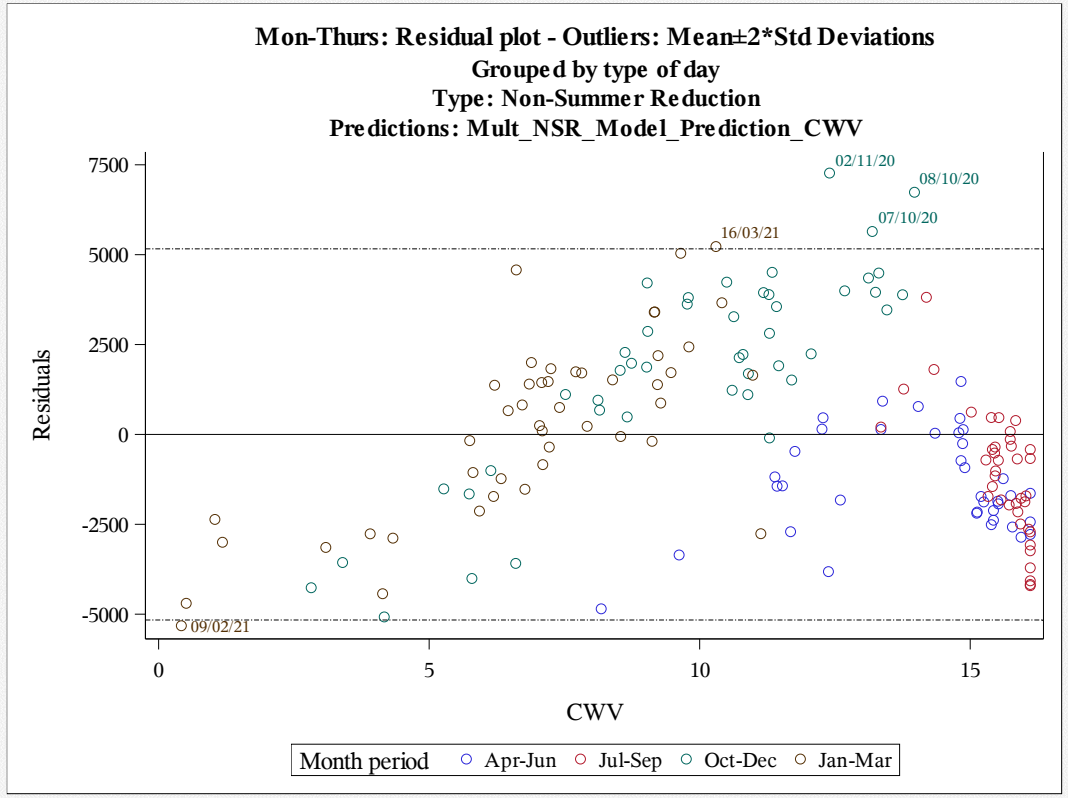
Previous Analysis Period '19/20



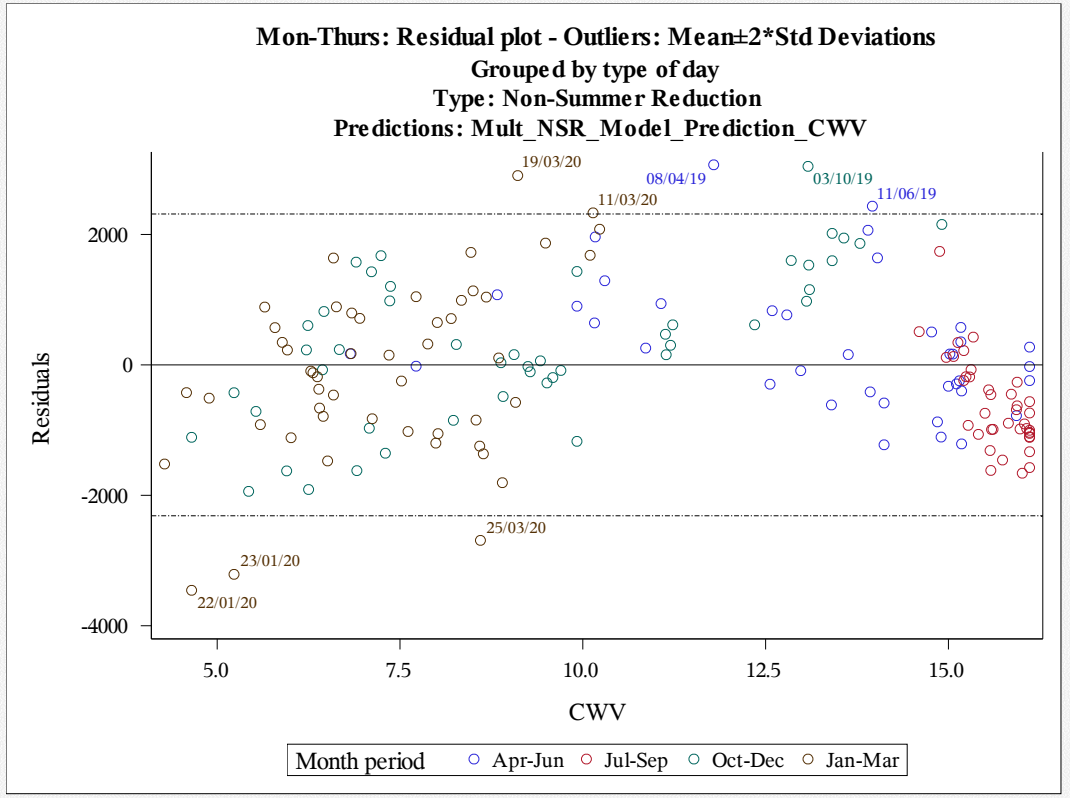
A slight seasonal bias can be observed in the line of best fit, model does not appear as robust as previous year.

Comparison of Analysis 02BND – LDZ SO – Option 1

Current Analysis Period '20/21



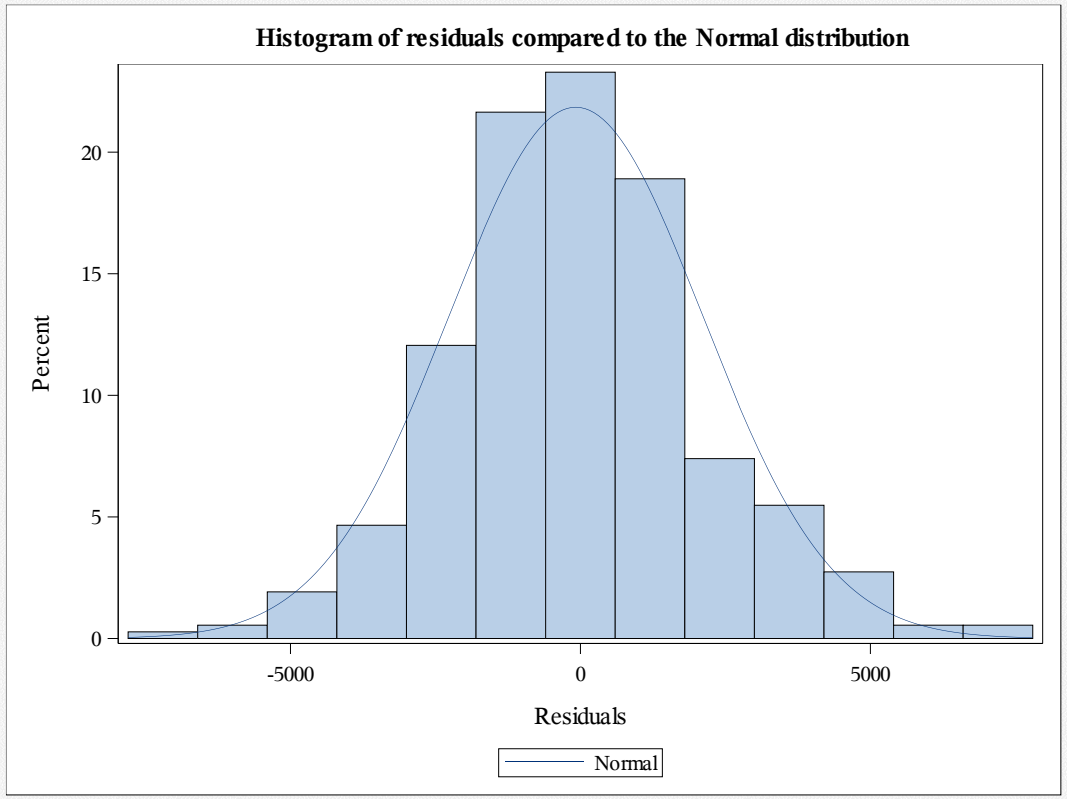
Previous Analysis Period '19/20



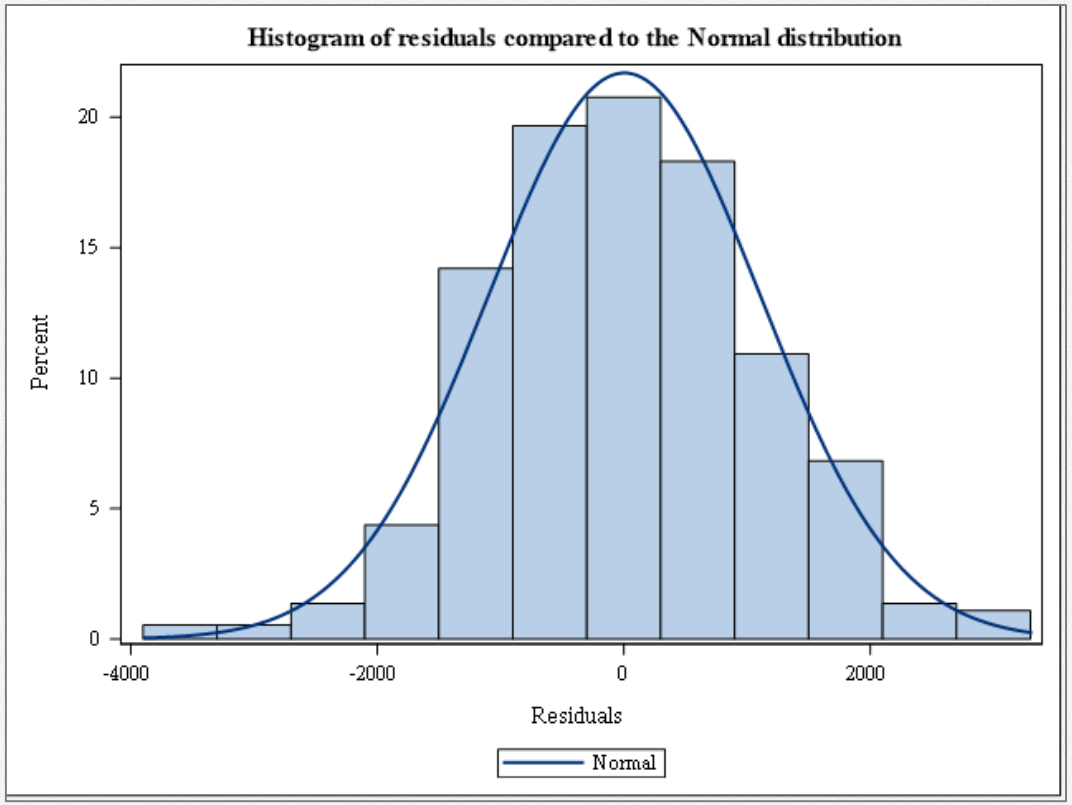
Some Seasonal bias can be observed in the residuals of the Current Analysis period

Comparison of Analysis (02BND - LDZ SO Option 1)

Current Analysis Period '20/21



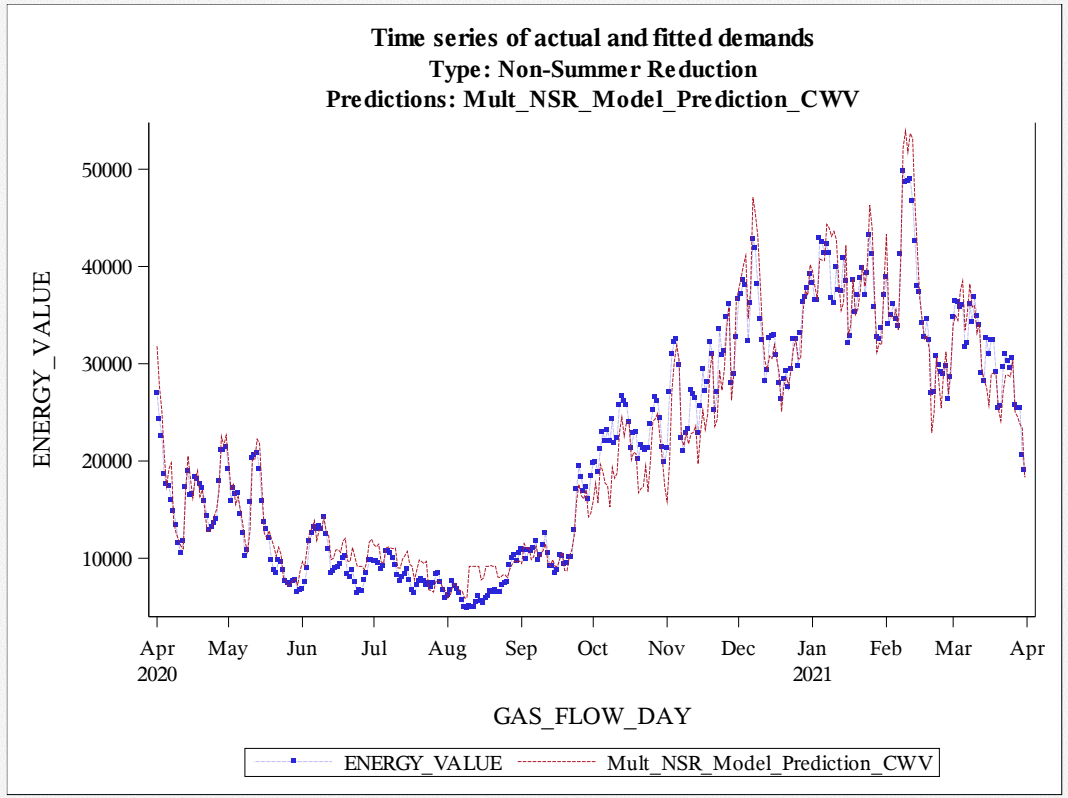
Previous Analysis Period '19/20



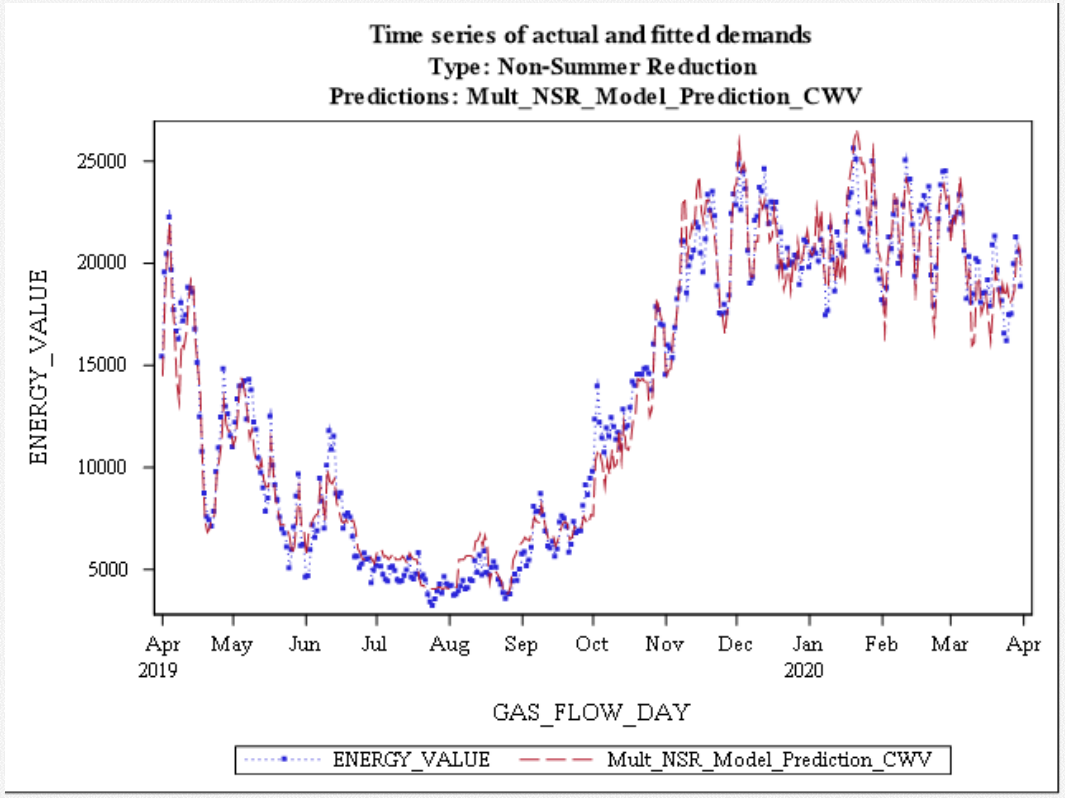
Residuals appear normally distributed and comparable to previous year.

Comparison of Analysis 02BND - LDZ SO - Option 1

Current Analysis Period '20/21



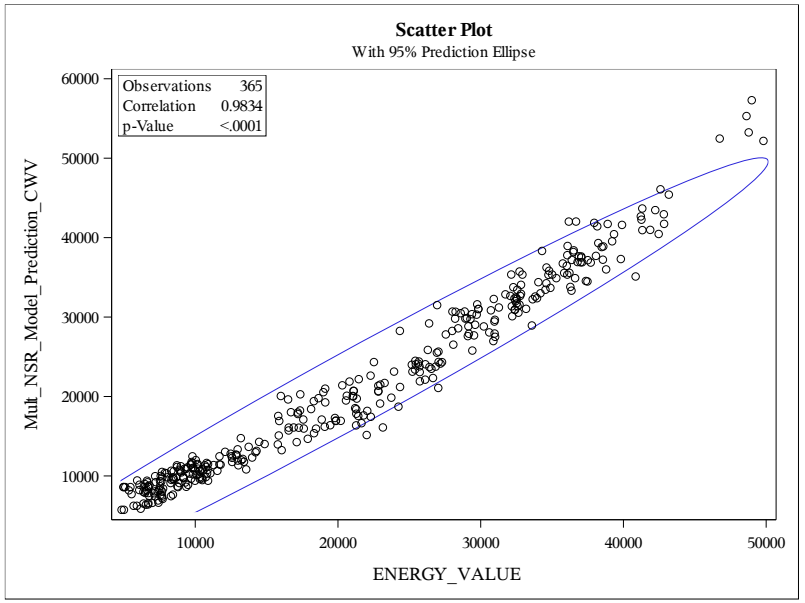
Previous Analysis Period '19/20

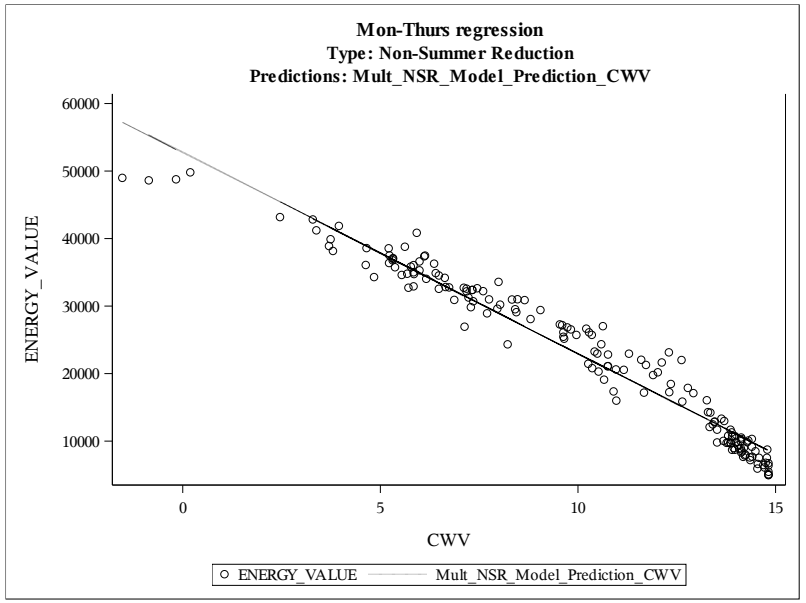


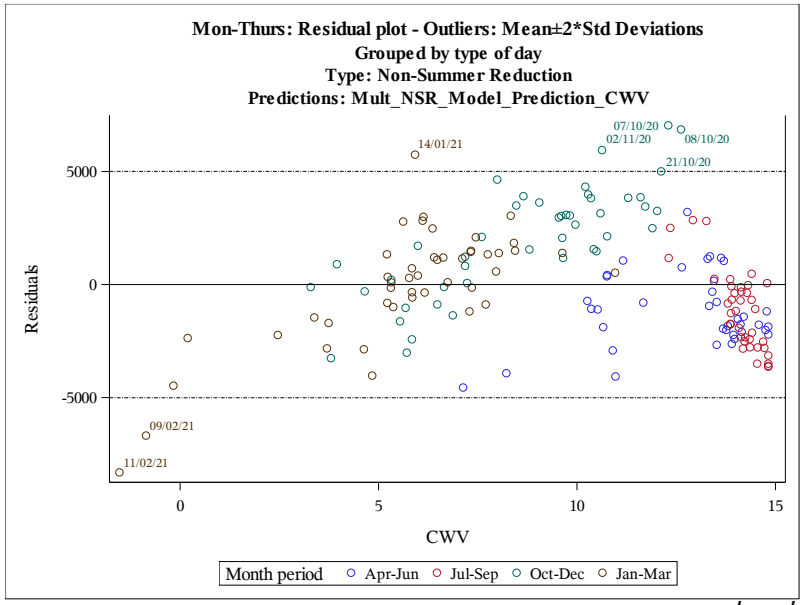
Time series view shows a reasonable fit, however some deviation can be observed between Aug-Sep and Oct-Nov.

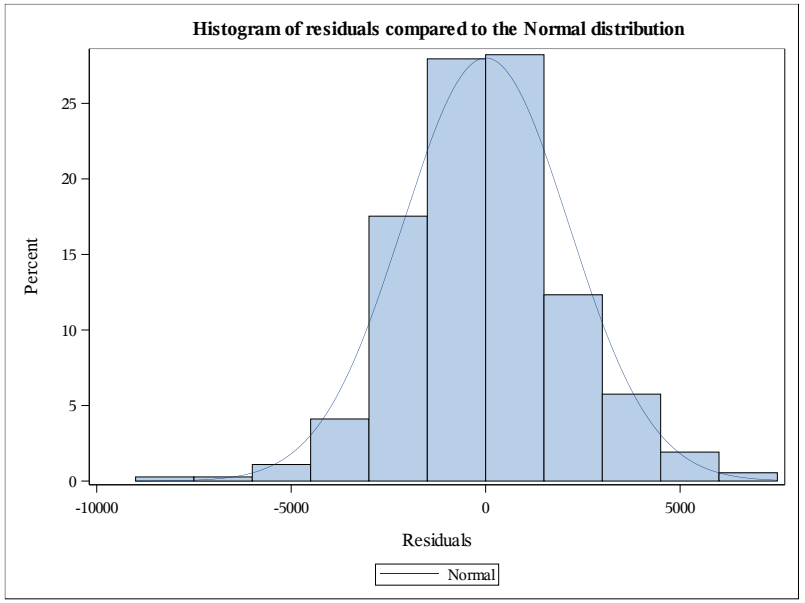
Results – Small NDM 02BND - Charts for SW

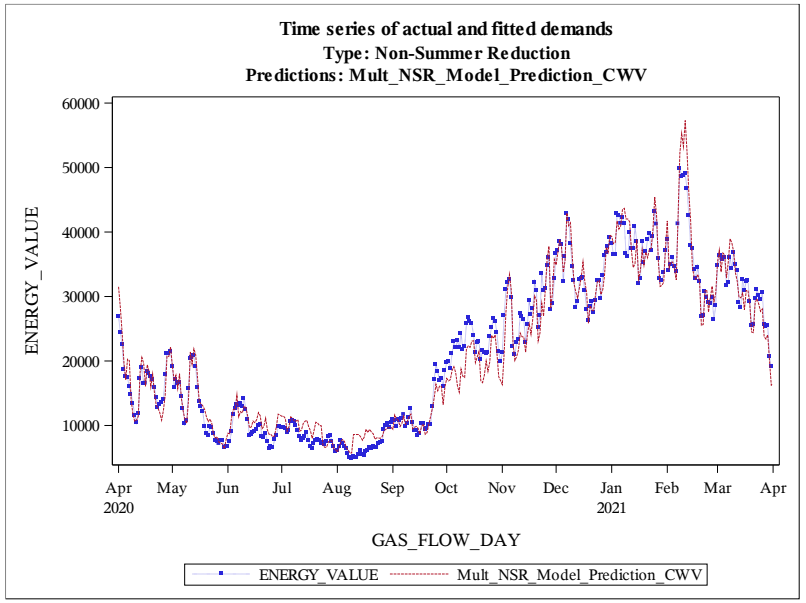
Model: No Summer Reduction
EUC: 02BND
LDZ: SW
Demand: Option 1
R^2 = 95.1%
ILF = 31.8
Sample Points = 63





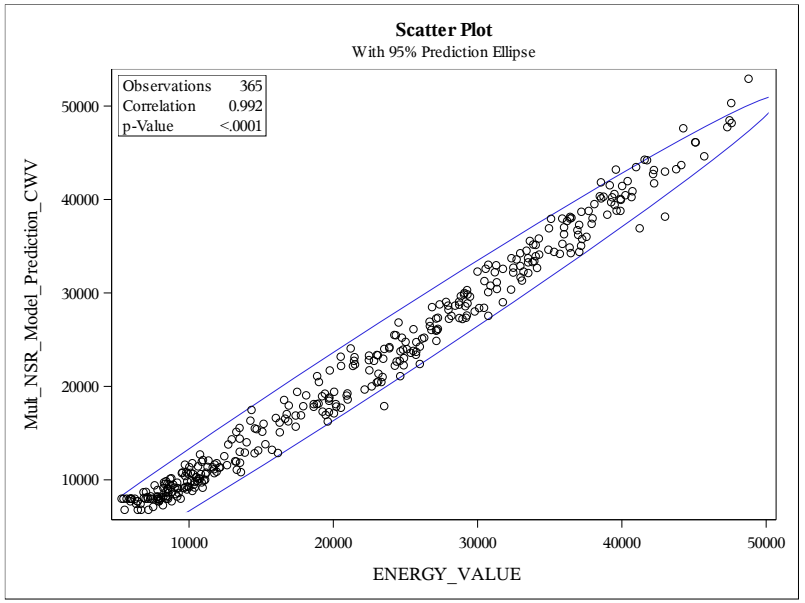


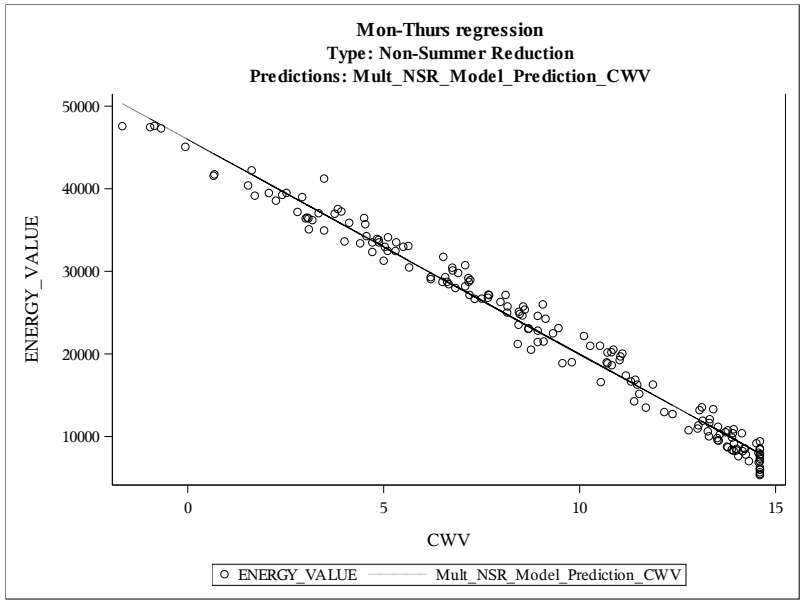


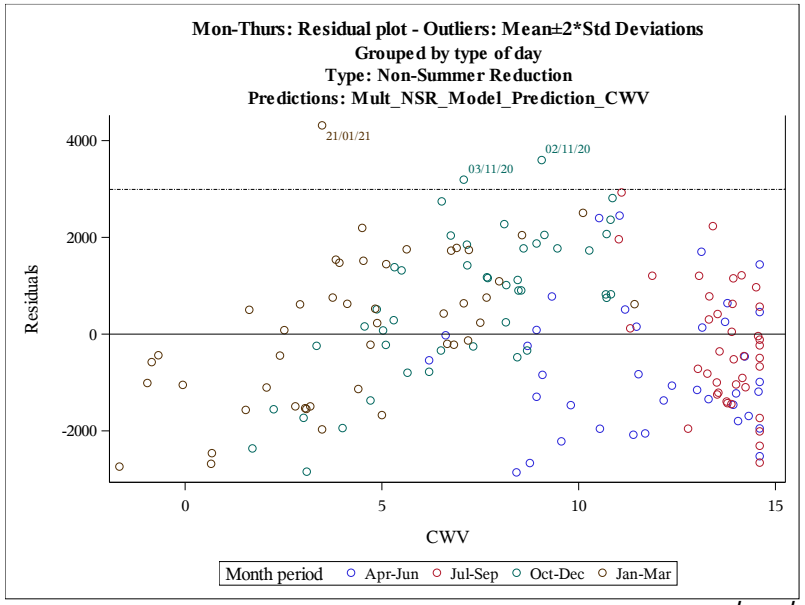


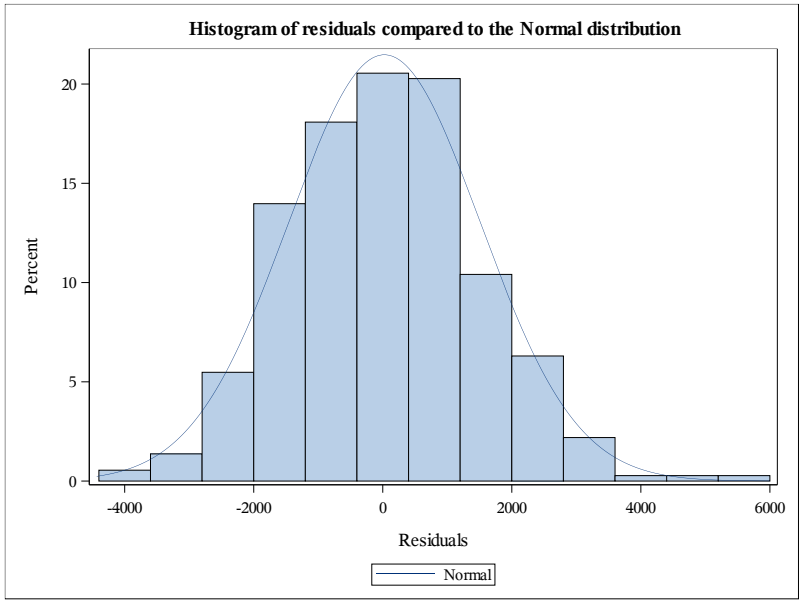
Results – Small NDM 02BND - Charts for NE

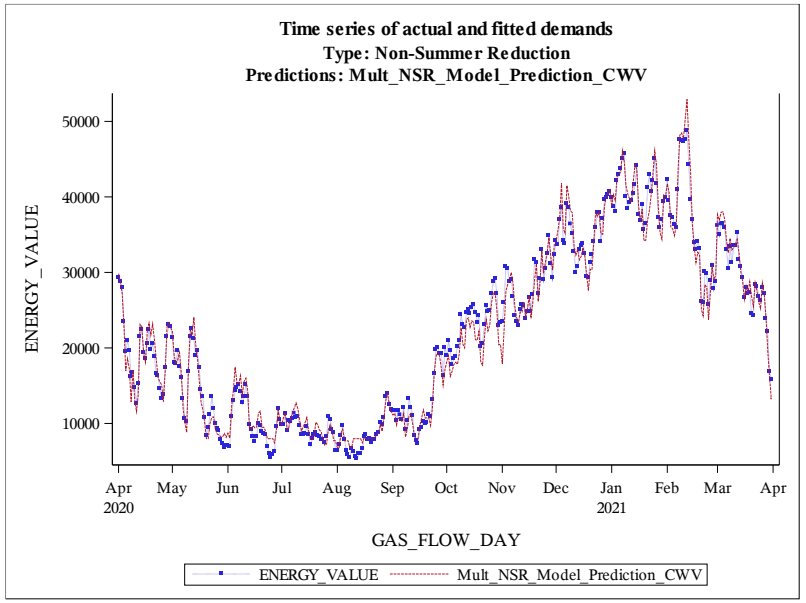
Model: No Summer Reduction
EUC: 02BND
LDZ: NE
Demand: Option 1
R^2 = 97.8%
ILF = 36.4
Sample Points = 77











Results – Small NDM 02BND Conclusions

- ILF and R^2 results for Band 2 Domestic EUCs are mixed with potential seasonal bias
- Due to low sample numbers available this EUC can be impacted more by Market Sector Code (MSC) errors
- Options available to DESC TWG:
  - Option 1 – Use the 20/21 model data (Option 1 North/South split) in this year's process for deriving smoothed demand models, along with 18/19 and 19/20
  - Option 2 – Do not use 20/21 model data and refer back to last years smoothed demand models – this used data from 17/18, 18/19 and 19/20
  - Option 3 – Use the Band 1 Domestic Model (whichever option is selected for "01BND")

Section 5:

Results: Small NDM – I&C Consumption Band EUCs

Small NDM – Agreed I&C EUC Modelling Runs

- Agreed modelling runs for Small I&C EUCs are as follows:

Description	Range	EUC	Run (Single Option)
Band 1 Non-PPM I&C	0 to 73.2 MWh pa	01BNI	Individual LDZ analysis
Band 2 Non-PPM I&C	73.2 to 293 MWh pa	02BNI	Individual LDZ analysis
Band 3	293 to 732 MWh pa	03B	Individual LDZ Analysis
Band 4	732 to 2,196 MWh pa	04B	Individual LDZ Analysis

Results - Small NDM - 01BNI Summary

Indicative Load Factor:

- There has been significant movement in the ILF, largest decrease in ILF -1.28 in LDZ NT, and largest Increase 3.51 in LDZ WS

R^2 Results:

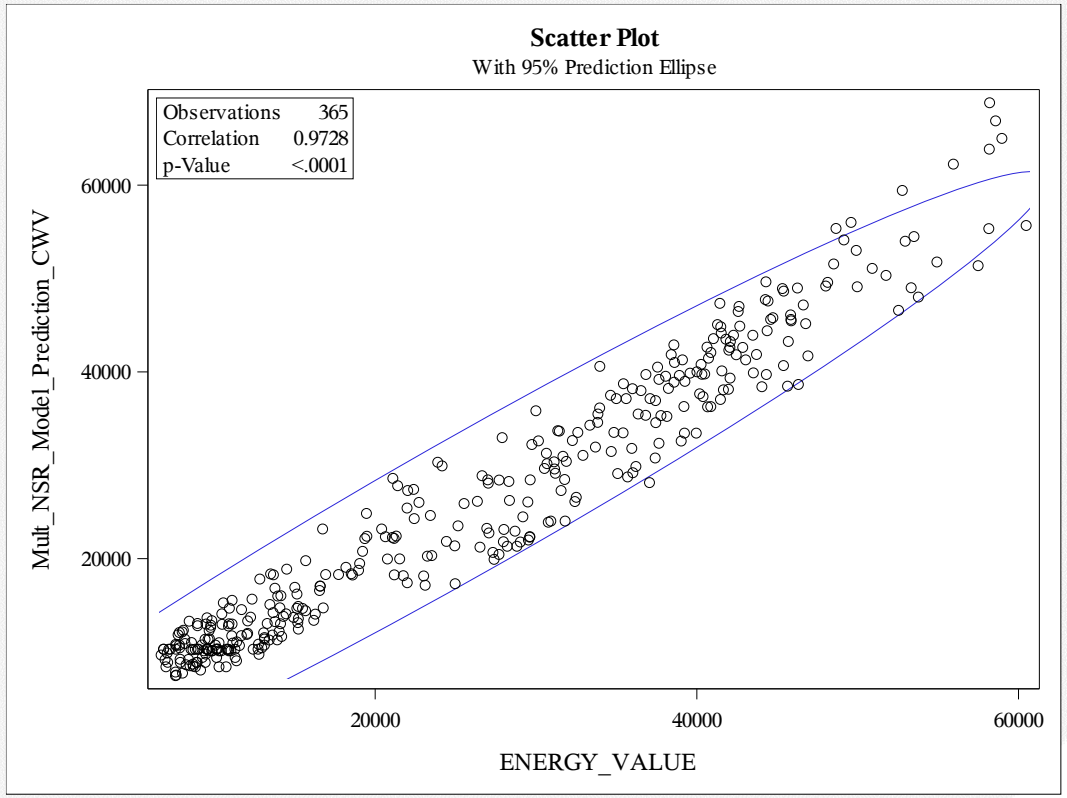
- R^2 values for Analysis year '20/21 range between 88.9% (WS) and 96.4% (SE)
- There has been a deterioration across all LDZs, with an average value of -2.8%
- It is recommended that due to the impacts of the COVID-19 pandemic, this year's data for EUC 01BNI is not used to produce EUC Gas Demand models for Gas Year 2021/22
- The following slides show a comparison of LDZ NT to the previous years results, as well as view of this years model for LDZ WS

	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
LDZ	'17/18 - '19/20	'20/21		'17/18 - '19/20	'20/21		'19/20	'20/21
SC	33.2	34.0	0.8 ▲	96.6%	95.2%	-1.4% ▼	380	276
NO	34.2	33.5	-0.7 ▼	96.8%	95.3%	-1.5% ▼	210	186
NW	32.1	34.0	1.9 ▲	97.7%	93.9%	-3.8% ▼	350	189
NE	31.0	33.7	2.7 ▲	96.9%	95.7%	-1.2% ▼	218	227
EM	29.4	30.9	1.5 ▲	96.6%	95.3%	-1.3% ▼	285	339
WM	29.0	30.9	1.9 ▲	97.3%	95.4%	-1.9% ▼	262	310
WN	31.5	33.3	1.7 ▲	95.7%	92.6%	-3.1% ▼	46	46
WS	31.6	35.1	3.5 ▲	96.5%	88.9%	-7.6% ▼	118	123
EA	30.0	33.2	3.1 ▲	95.9%	94.3%	-1.6% ▼	381	365
NT	34.1	32.8	-1.3 ▼	97.6%	91.9%	-5.7% ▼	268	255
SE	29.8	30.9	1.1 ▲	98.0%	96.4%	-1.6% ▼	356	351
SO	26.9	28.2	1.3 ▲	97.3%	93.8%	-3.5% ▼	197	244
SW	29.6	29.7	0.1 ▲	96.9%	94.8%	-2.1% ▼	196	216

Comparison of Analysis 01BNI - LDZ NT

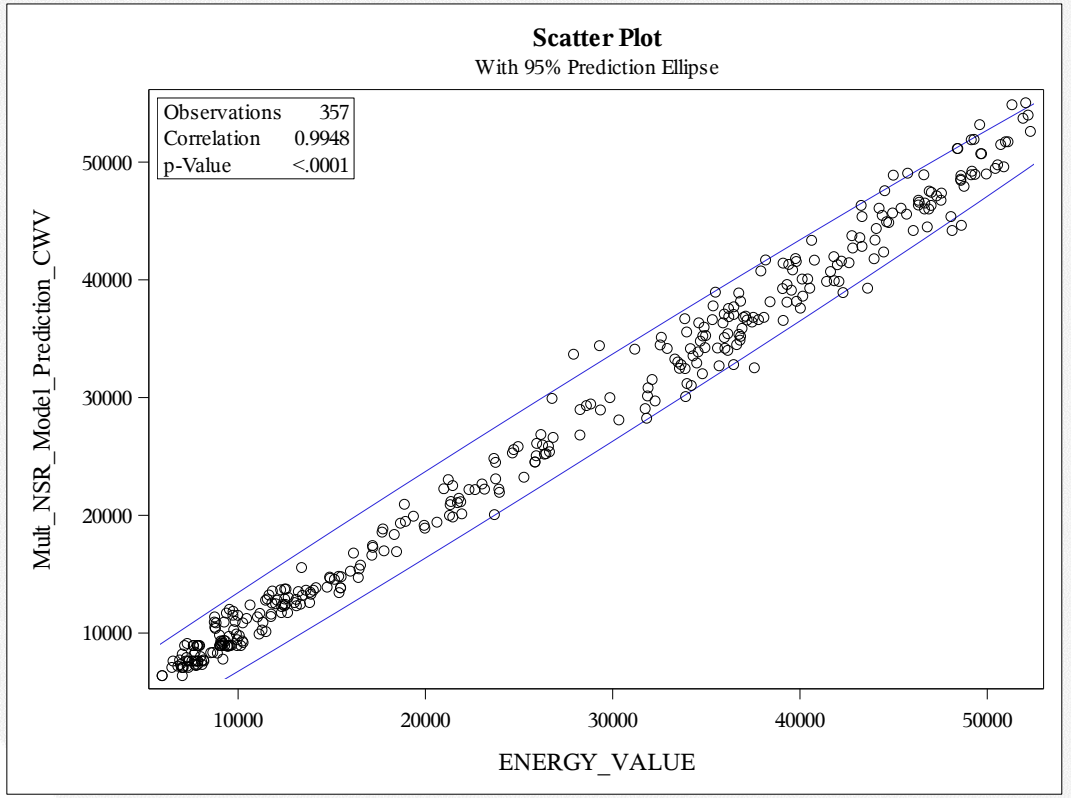
Current Analysis Period '20/21

Model: No Summer Reduction
EUC: 01BNI
LDZ: NT
Demand: NT
R^2 = 91.9%
ILF = 32.8
Sample Points = 255



Previous Analysis Period '19/20

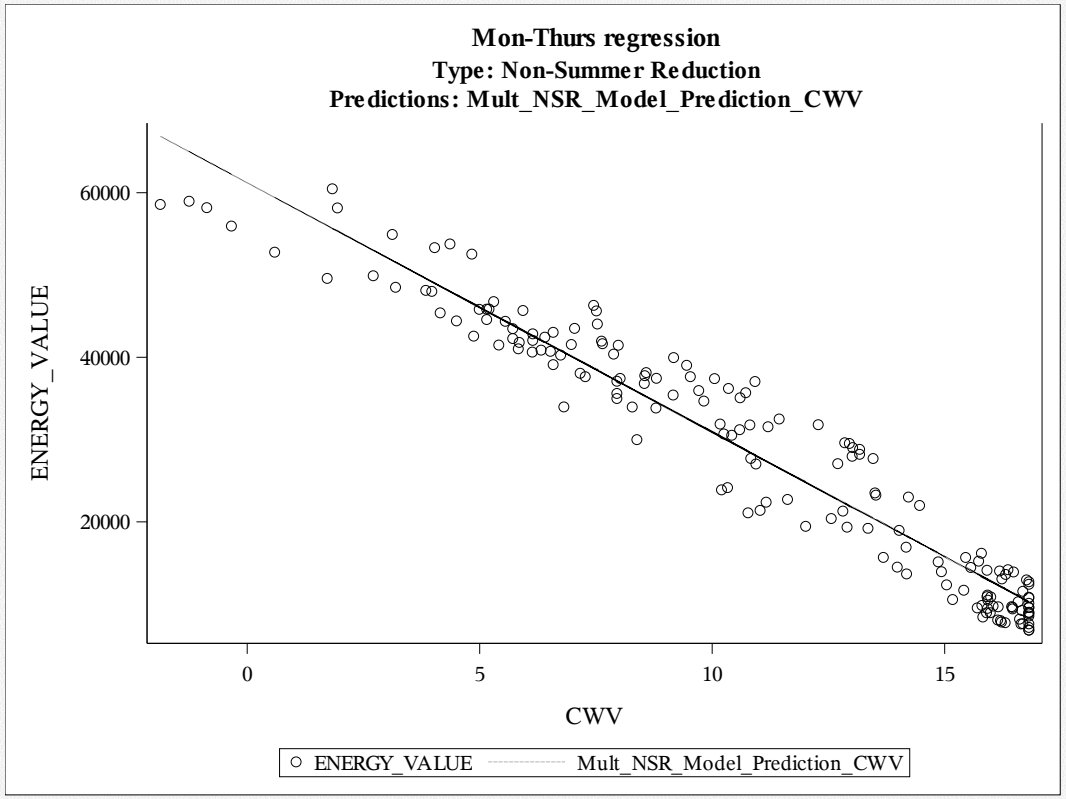
Model: No Summer Reduction
EUC: 01BNI
LDZ: NT
Demand: NT
R^2 = 98.1%
ILF = 31.2
Sample Points = 268



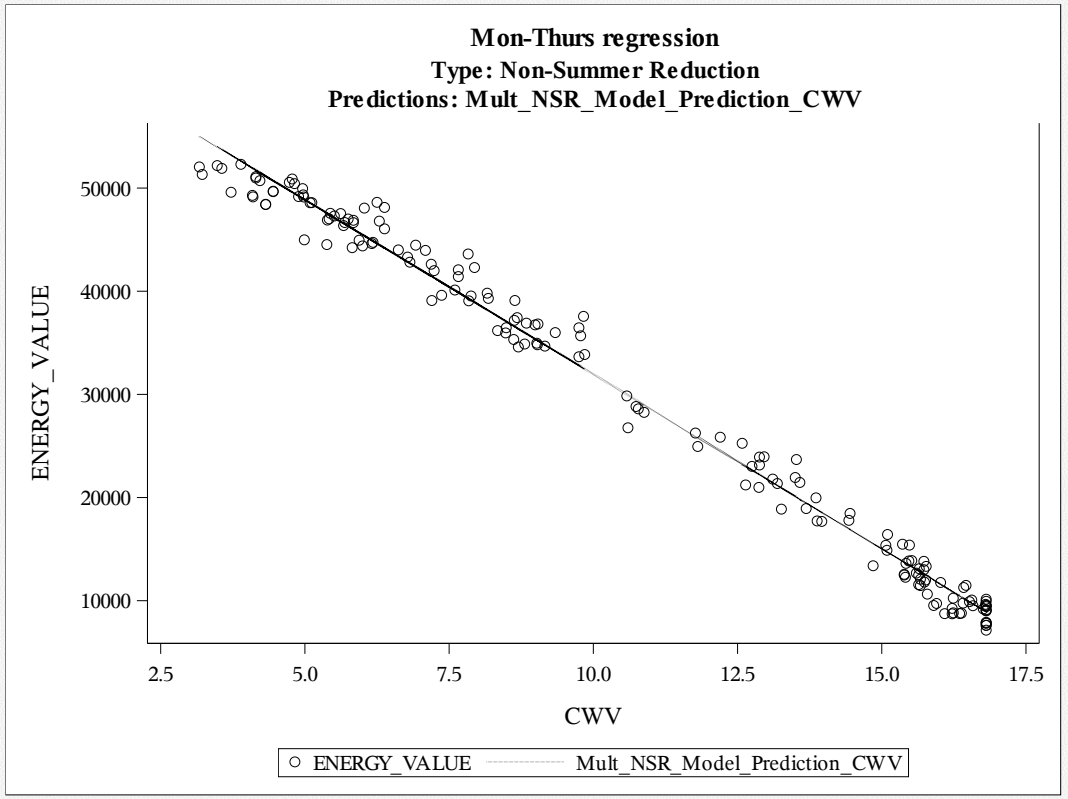
Scatter Plot reveals deterioration in model compared with last year.

Comparison of Analysis 01BNI - LDZ NT

Current Analysis Period '20/21



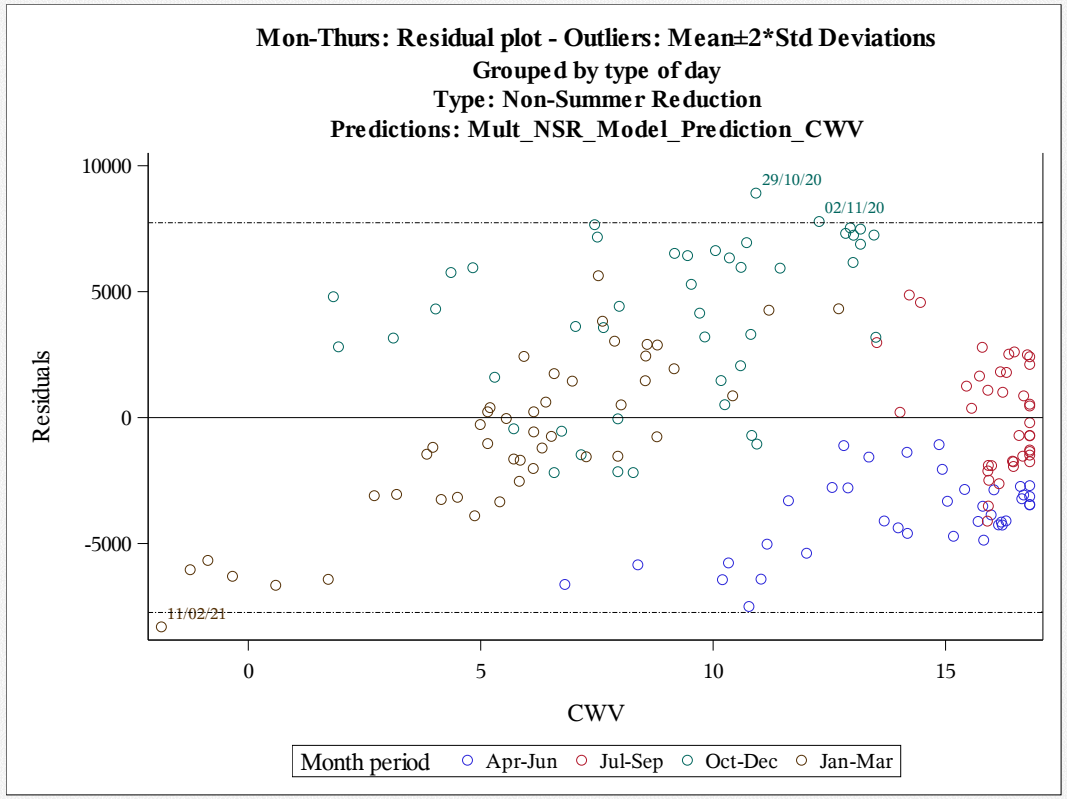
Previous Analysis Period '19/20



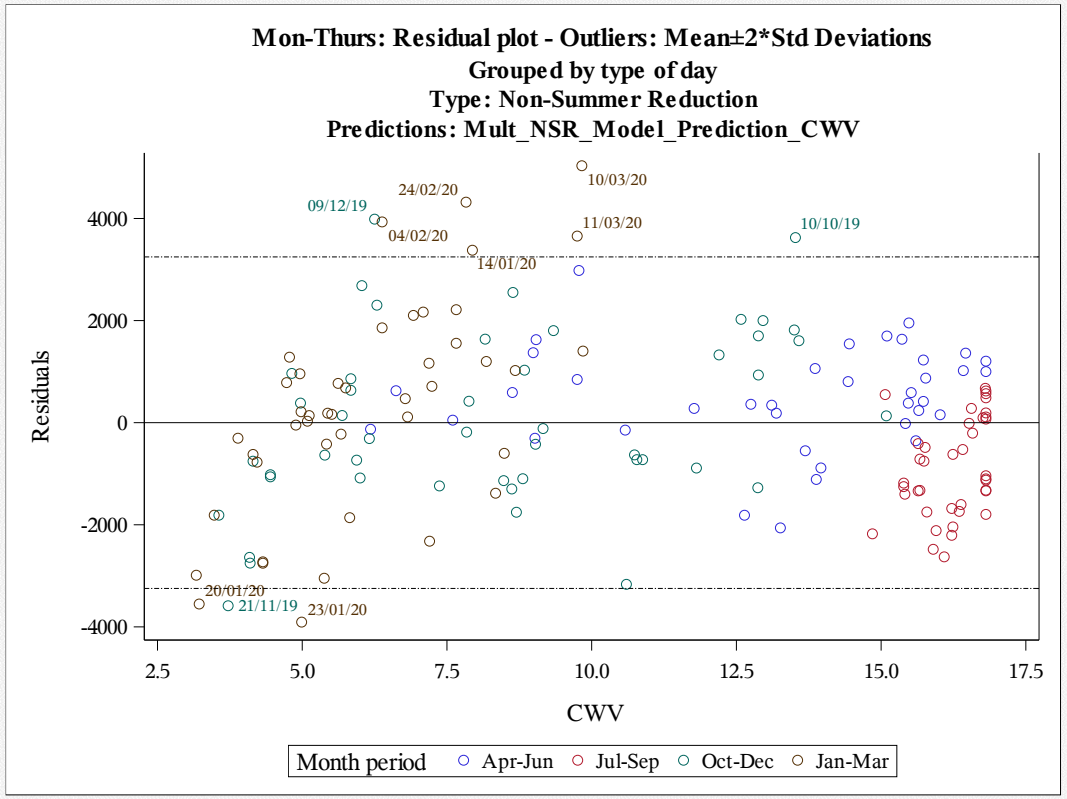
Clear impacts of COVID-19 restrictions where demand is below the fitted line.

Comparison of Analysis 01BNI - LDZ NT

Current Analysis Period '20/21



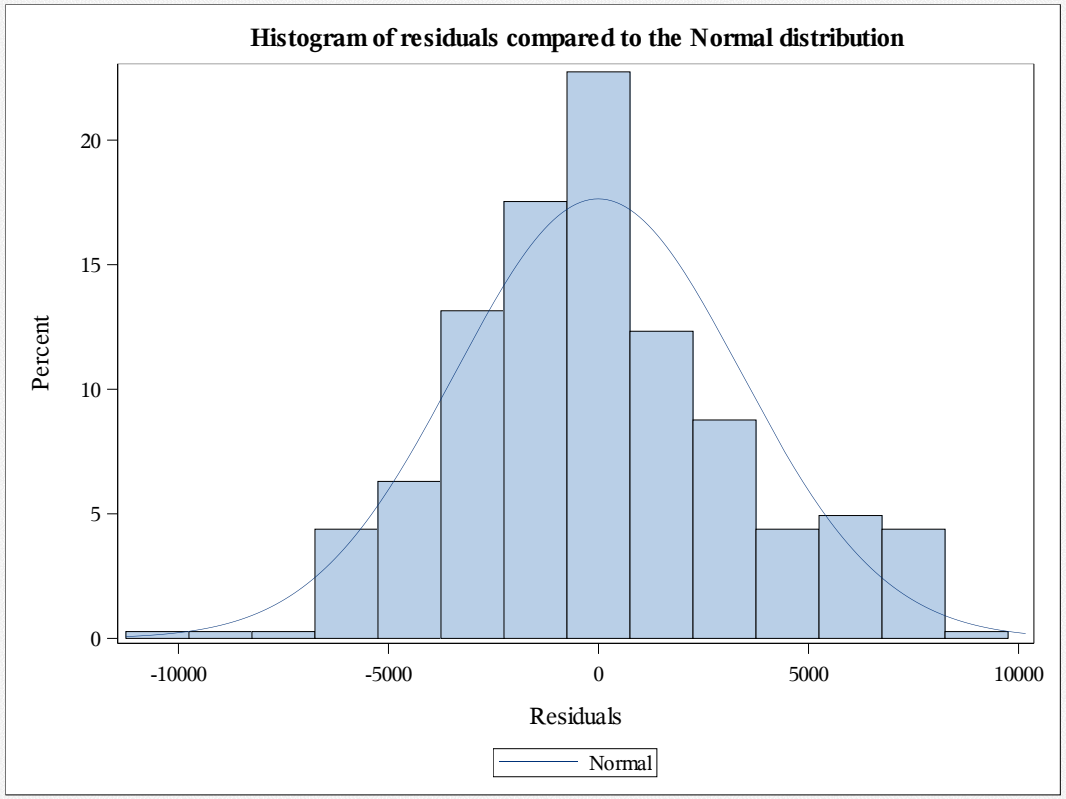
Previous Analysis Period '19/20



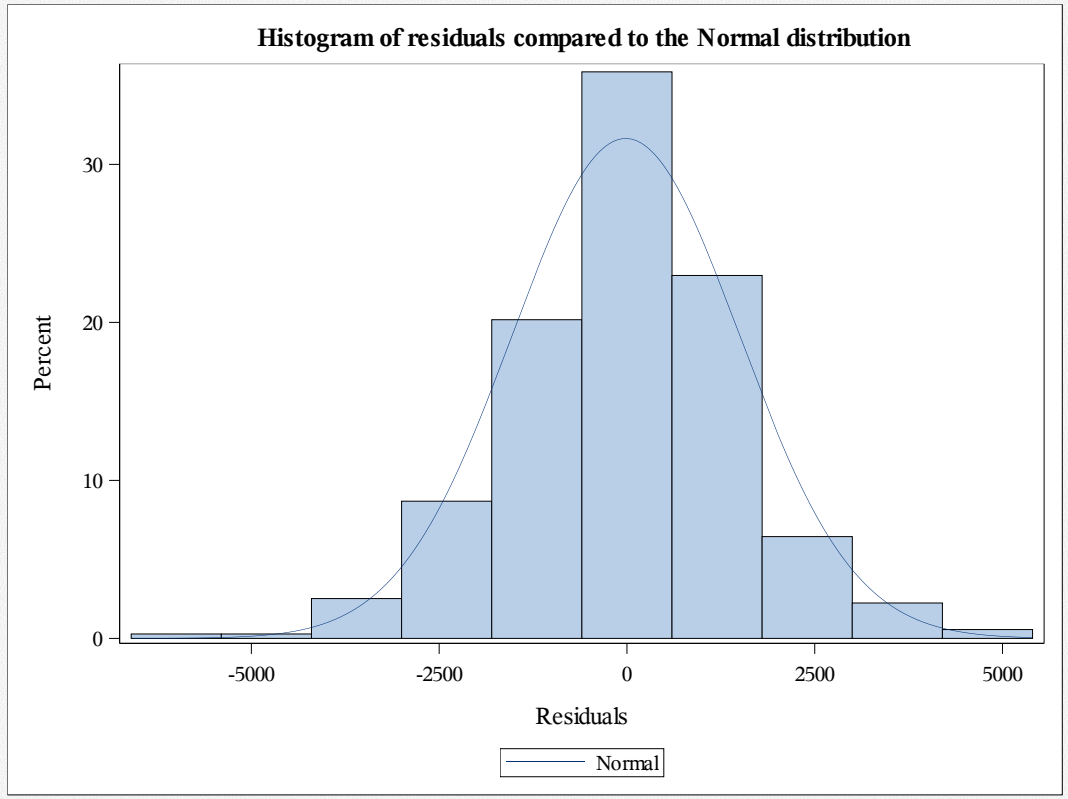
A seasonal Bias can be observed in the residuals of the Current analysis period.

Comparison of Analysis 01BNI - LDZ NT

Current Analysis Period '20/21



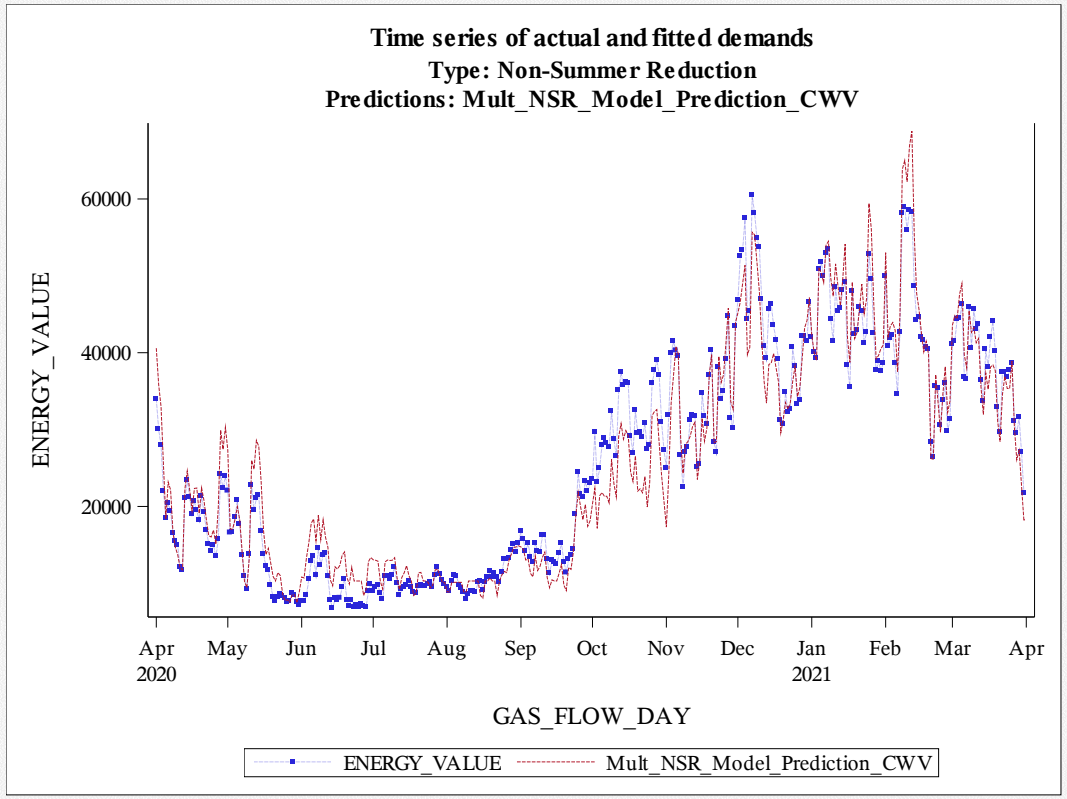
Previous Analysis Period '19/20



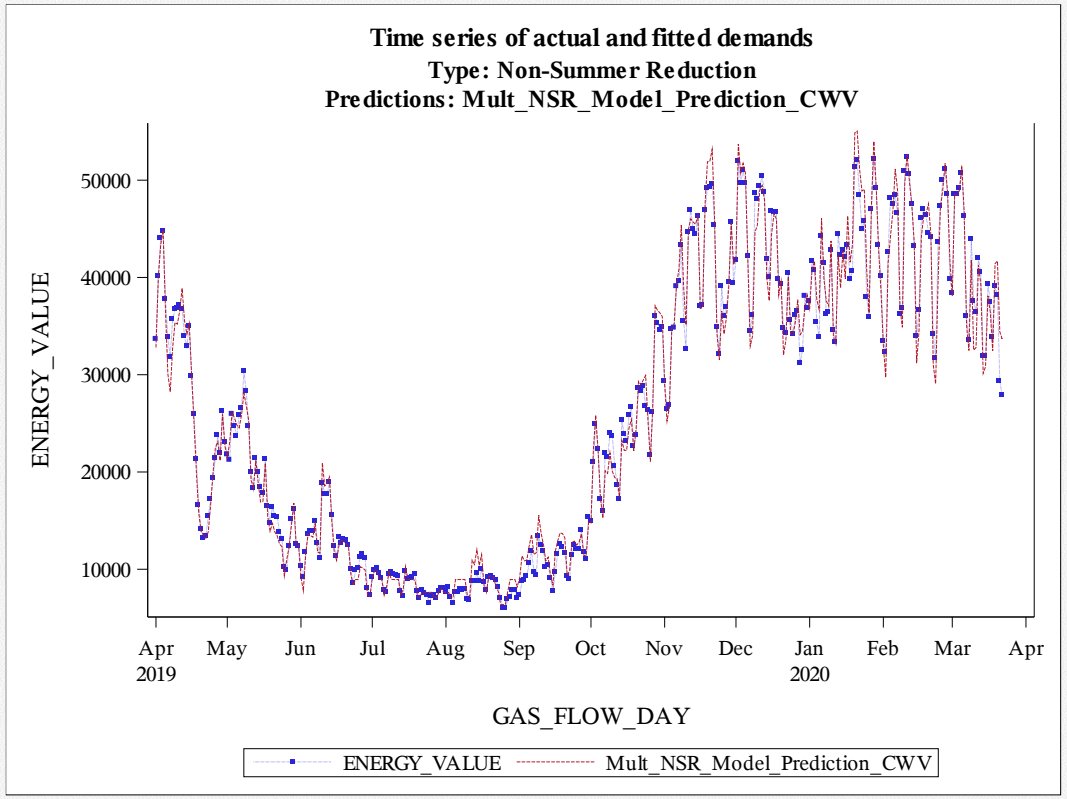
Residuals do not appear to display a Normal distribution in the latest analysis period.

Comparison of Analysis 01BNI - LDZ NT

Current Analysis Period '20/21



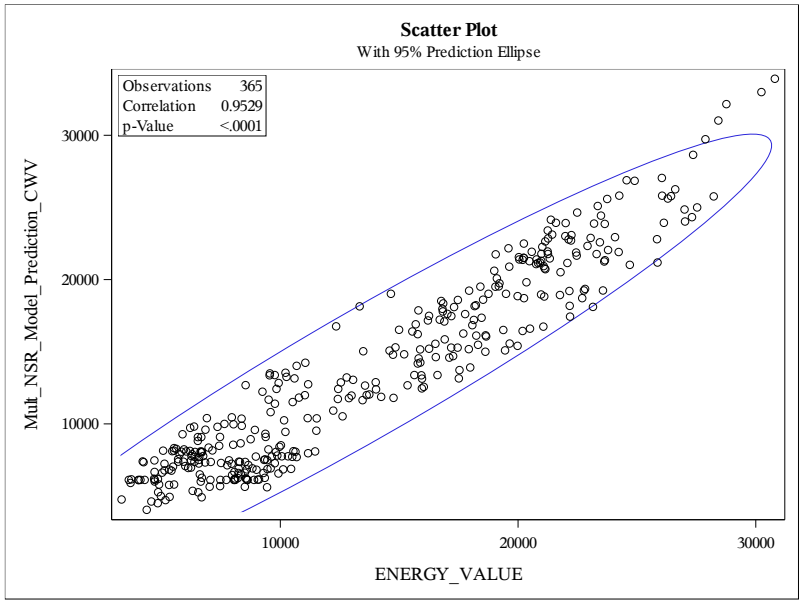
Previous Analysis Period '19/20

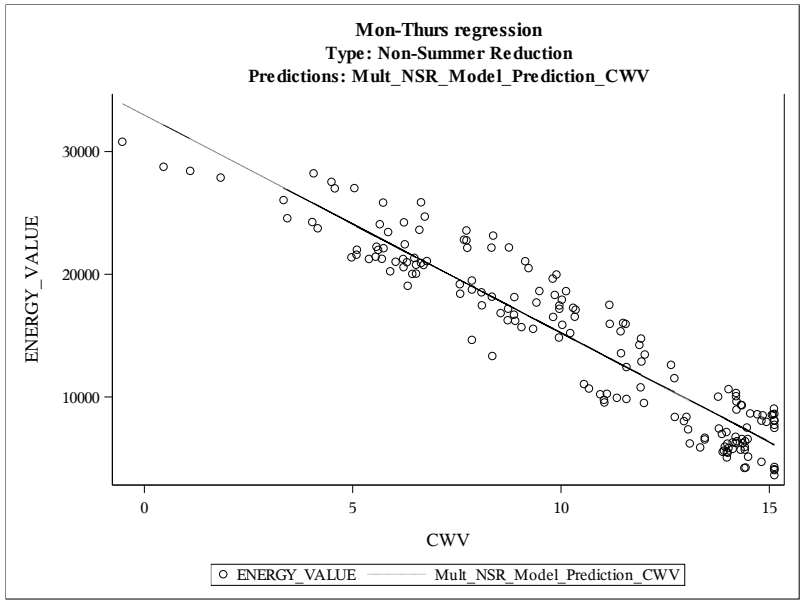


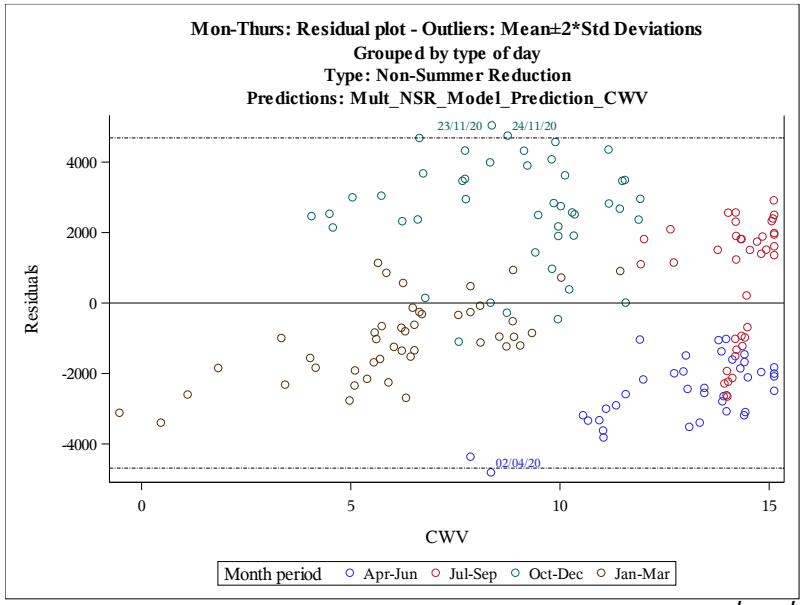
There is clear evidence that the model is not a good fit for actual Demand.

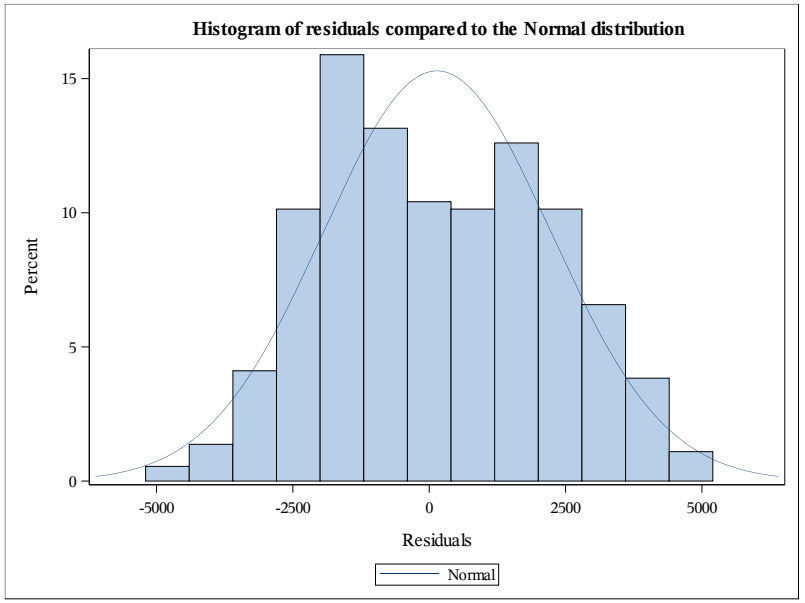
Results – Small NDM 01BNI – Charts for LDZ WS

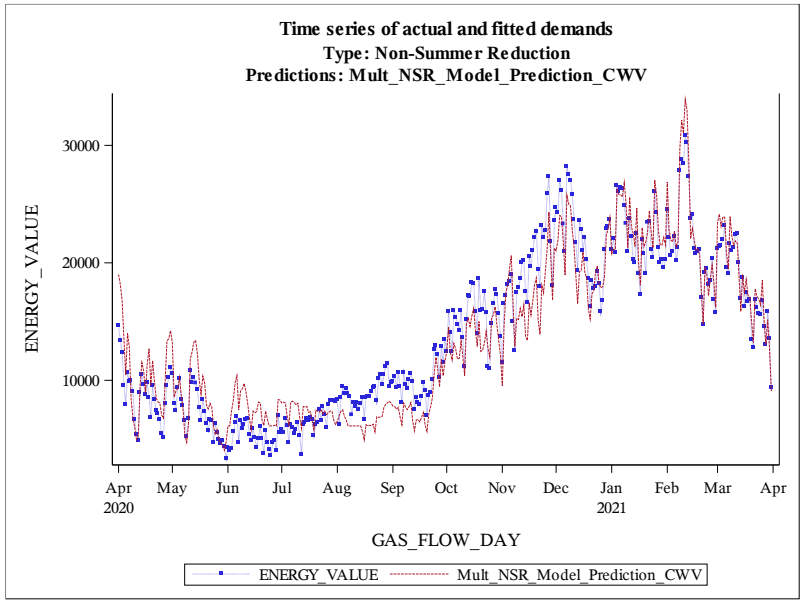
Model: No Summer Reduction
EUC: 01BNI
LDZ: WS
Demand: WS
R^2 = 88.9%
ILF = 35.09
Sample Points = 123











Results - Small NDM 02BNI – Summary

Indicative Load Factors

- Similar to previous years – no issues

R^2 results

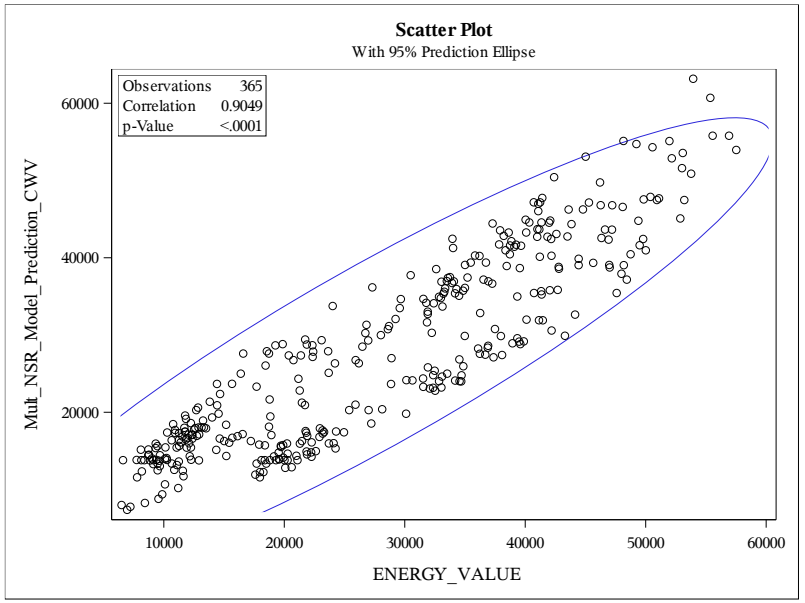
- R^2 values range from 77.1% to 91.4% compared to the average of the previous 3 years of 95.0% to 97.8%
- This is an average deterioration of 9.0%

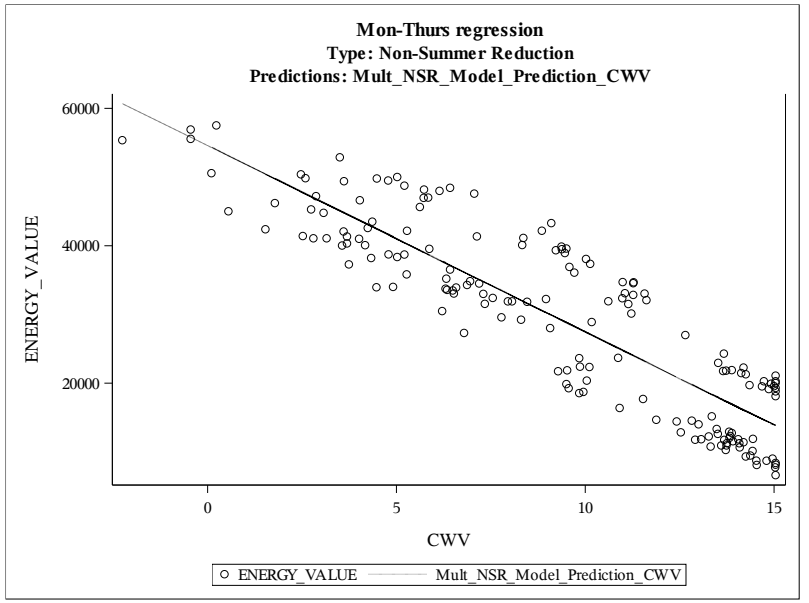
It is recommended that due to the impacts of the COVID-19 pandemic, this years data for EUC 02BNI is not used to produce EUC Gas Demand models for gas year 2012/22

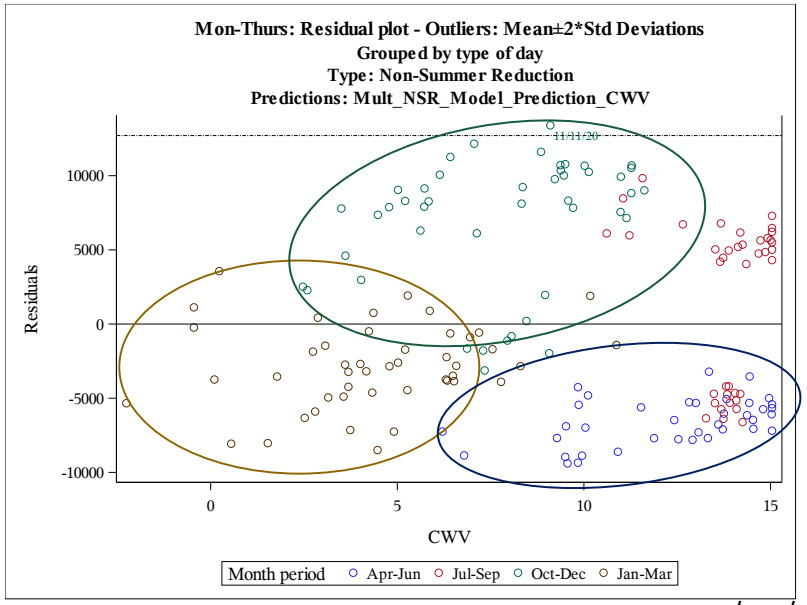
	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
LDZ	'17/18 - '19/20	'20/21		'17/18 - '19/20	'20/21		'19/20	'20/21
SC	35.8	33.7	-2.1 ▼	96.7%	90.2%	-6.5% ▼	319	373
NO	38.8	39.9	1.1 ▲	97.5%	89.2%	-8.3% ▼	175	258
NW	37.0	37.1	0.0 ▲	97.5%	88.1%	-9.4% ▼	270	334
NE	35.7	39.6	3.9 ▲	97.2%	90.6%	-6.6% ▼	152	353
EM	33.6	36.3	2.7 ▲	96.3%	88.6%	-7.7% ▼	336	375
WM	33.6	35.7	2.1 ▲	96.3%	88.0%	-8.3% ▼	313	374
WN	35.8	38.5	2.7 ▲	95.4%	77.1%	-18.3% ▼	291	63
WS	35.6	35.2	-0.3 ▼	96.4%	87.4%	-9.0% ▼	76	150
EA	31.1	32.0	0.9 ▲	95.0%	91.2%	-3.8% ▼	359	372
NT	38.9	34.8	-4.1 ▼	97.5%	89.8%	-7.7% ▼	336	330
SE	34.4	33.9	-0.5 ▼	97.6%	91.4%	-6.2% ▼	322	375
SO	33.0	33.7	0.7 ▲	97.8%	84.4%	-13.4% ▼	238	373
SW	34.1	33.7	-0.4 ▼	96.7%	84.6%	-12.1% ▼	248	370

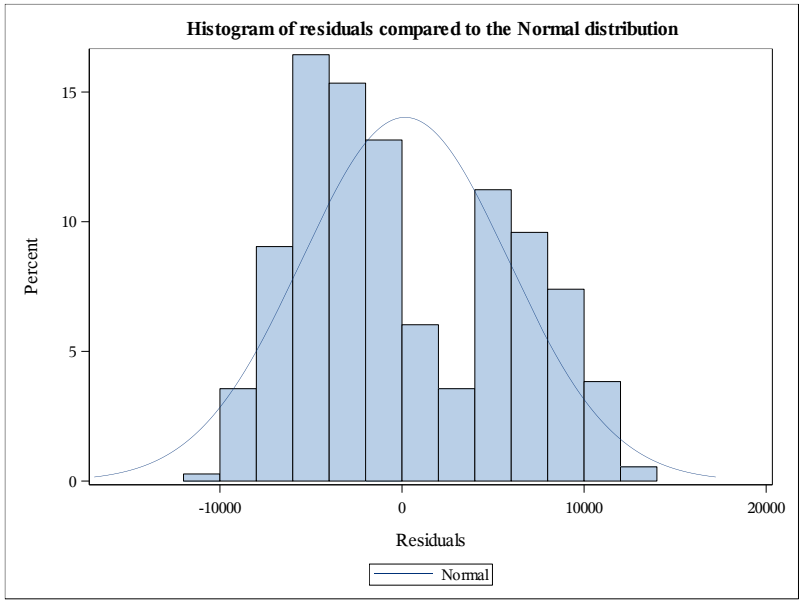
Results – Small NDM 02BNI - Charts for WN

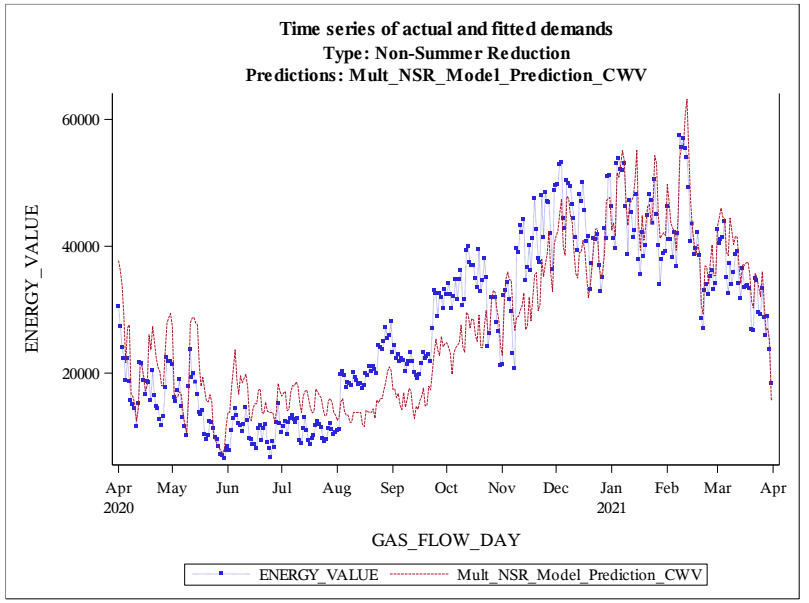
Model: No Summer Reduction
EUC: 02BND
LDZ: NE
Demand: Option 1
R^2 = 97.8%
ILF = 36.4
Sample Points = 77











Results - Small NDM 03B – Summary

Indicative Load Factor:

- Large variations compared with previous years

R^2 Results:

- 89.7% - 96.6% compared to the average of the previous 3 years of 95.1% to 97.5%
- This is an average deterioration of 2.2%

It is recommended that due to the impacts of the COVID-19 pandemic, this years data for EUC 03B is not used to produce EUC Gas Demand models for Gas Year 2021/22

	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
LDZ	'17/18 - '19/20	'20/21		'17/18 - '19/20	'20/21		'19/20	'20/21
SC	35.3	35.4	0.1 ▲	96.1%	95.0%	-1.1% ▼	355	352
NO	40.0	37.0	-3.0 ▼	97.5%	94.6%	-2.9% ▼	161	166
NW	37.9	32.9	-5.0 ▼	97.0%	96.2%	-0.8% ▼	239	221
NE	37.9	35.0	-2.9 ▼	97.2%	96.6%	-0.6% ▼	178	206
EM	35.9	32.7	-3.2 ▼	97.3%	95.0%	-2.3% ▼	241	228
WM	35.5	31.8	-3.8 ▼	97.3%	95.8%	-1.5% ▼	184	181
WN	37.4	34.9	-2.5 ▼	95.1%	89.7%	-5.4% ▼	37	40
WS	36.2	32.0	-4.2 ▼	96.5%	95.5%	-1.0% ▼	60	76
EA	33.3	32.1	-1.2 ▼	96.6%	95.4%	-1.2% ▼	219	217
NT	38.5	33.0	-5.5 ▼	97.5%	95.3%	-2.2% ▼	224	238
SE	35.1	32.6	-2.4 ▼	97.4%	94.8%	-2.6% ▼	288	323
SO	32.2	30.1	-2.1 ▼	97.3%	94.0%	-3.3% ▼	218	231
SW	35.3	32.5	-2.8 ▼	96.7%	93.5%	-3.2% ▼	179	174

Results – Small NDM 04B – Summary

Indicative Load Factor:

- Movement similar to previous years

R^2 Results:

- 93.1% - 96.4% compared to the average of the previous 3 years of 95.7% to 97.9%
- This is an average deterioration of 2.1%

It is recommended that due to the impacts of the COVID-19 pandemic, this years data for EUC 04B is not used to produce EUC Gas Demand models for gas year 2021/22

	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
LDZ	'17/18 - '19/20	'20/21		'17/18 - '19/20	'20/21		'19/20	'20/21
SC	37.0	35.5	-1.5 ▼	97.5%	95.6%	-1.9% ▼	325	319
NO	37.8	37.8	0.0 ▼	97.6%	95.2%	-2.4% ▼	213	219
NW	35.8	34.7	-1.1 ▼	97.4%	95.8%	-1.6% ▼	259	261
NE	36.6	35.6	-1.1 ▼	96.5%	95.7%	-0.8% ▼	287	275
EM	36.4	35.9	-0.5 ▼	97.9%	96.4%	-1.5% ▼	192	212
WM	34.0	33.1	-1.0 ▼	97.3%	95.8%	-1.5% ▼	203	214
WN	37.2	39.8	2.6 ▲	95.7%	93.1%	-2.6% ▼	37	34
WS	34.2	34.9	0.7 ▲	96.4%	94.3%	-2.1% ▼	92	103
EA	35.2	35.5	0.3 ▲	97.5%	95.6%	-1.9% ▼	223	242
NT	37.3	37.4	0.1 ▲	97.9%	95.0%	-2.9% ▼	240	264
SE	35.8	35.6	-0.2 ▼	97.9%	94.4%	-3.5% ▼	316	309
SO	31.3	31.0	-0.3 ▼	97.7%	95.8%	-1.9% ▼	303	288
SW	35.7	35.8	0.1 ▲	97.0%	94.2%	-2.8% ▼	177	182

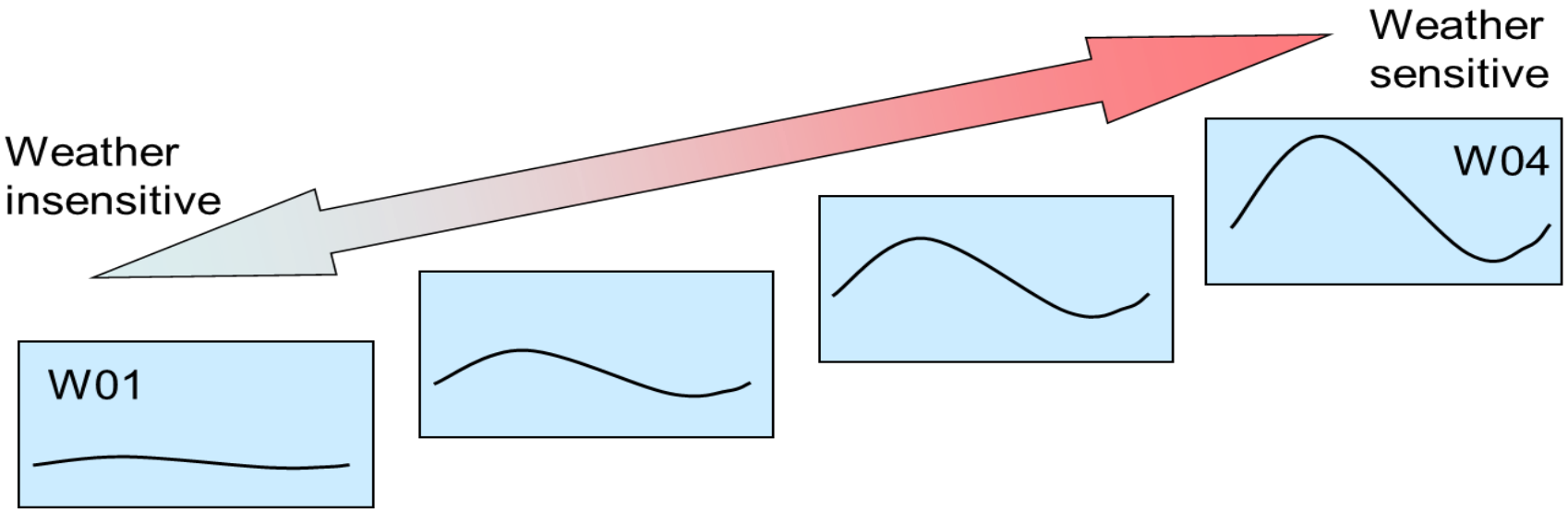
Section 5:

Results: Small NDM – I&C WAR Band EUCs

Winter Annual Ratio (WAR) Bands

- Higher AQ Bands where supply meter points are monthly read have a consumption band EUC plus 4 differential EUCs based on ratio of winter consumption to total annual consumption. Sites with adequate read history allocated automatically to a WAR Band based on system calculation during AQ review

- WAR Band limits for 2021 Gas Demand Modelling were discussed and agreed at TWG on 28th April 2021



Small NDM WAR Bands – Agreed Modelling Runs

- Agreed modelling runs for Small I&C WAR Band EUCs are as follows:

Description	Range	EUCs	Run (Single Option)
Band 1	0 to 73.2 MWh pa	01BPD, 01BND, 01BPI, 01BNI	No WAR Band Requirement (Not generally monthly read)
Band 2	73.2 to 293 MWh pa	02BPD, 02BND, 02BPI, 02BNI	No WAR Band Requirement (Not generally monthly read)
Band 3 and Band 4 (Combined)	293 to 2,196 MWh pa	03W01 to 04; 04W01 to 04	Individual LDZ for most LDZs except WN being combined with NW Agreed WAR Ratios: 0.442, 0.517, and 0.626

Results - Small NDM - WAR Band Summary

03W01 to 04 & 04W01 to 04 (Band 3 and 4 - 293 to 2196 MWh pa)												
LDZ	WAR Band 01 0 - 0.442			WAR Band 01 0.443 - 0.517			WAR Band 03 0.518 - 0.626			WAR Band 04 0.627 - 1.000		
	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample
EA	55.5	75.9%	72	42.7	94.9%	135	31.4	94.9%	147	23.4	93.0%	105
EM	55.1	86.9%	94	41.6	94.2%	126	31.7	96.4%	122	22.4	92.9%	98
NE	59.5	83.9%	90	44.2	94.1%	153	31.0	96.5%	139	22.9	92.7%	99
NO	59.4	67.7%	111	42.4	95.8%	118	30.2	95.3%	102	22.8	92.3%	54
NT	61.1	43.3%	92	42.3	95.3%	153	32.4	95.1%	148	23.6	91.6%	109
NW	55.6	84.3%	101	41.5	95.1%	142	30.4	96.2%	147	21.3	93.4%	92
SC	58.5	82.8%	127	43.2	96.7%	190	31.2	95.6%	248	23.3	90.7%	106
SE	60.3	47.4%	102	42.2	94.9%	208	30.5	93.7%	173	23.2	95.0%	149
SO	56.0	52.2%	95	38.7	92.2%	147	28.3	96.1%	162	20.8	93.6%	115
SW	57.1	62.6%	94	40.1	91.1%	106	29.6	95.6%	81	22.3	94.1%	75
WM	54.8	75.1%	72	39.5	94.2%	115	28.8	95.5%	139	21.6	94.0%	69
WN	57.5	78.7%	115	42.5	94.8%	173	31.0	95.7%	165	21.9	94.1%	103
WS	53.8	75.2%	41	40.3	94.8%	56	29.8	94.8%	49	22.3	90.5%	33

It is recommended that due to the impacts of the COVID-19 pandemic, this years data is not used to produce EUC Gas Demand models for Gas Year 2021/22

Results - Small NDM – Conclusions and Recommendations

- Results for Band 1 Domestic EUC are in line with previous years although with potential COVID-19 impacts evident for a handful of days
- Results for Band 2 Domestic EUC are mixed and not as robust as previous year
- Domestic Prepayment EUCs will use MOD451 data and I&C Prepayment EUCs will use equivalent Non-Prepayment EUC
- Results for ALL I&C EUCs have clearly been impacted by COVID-19 and so we advise the models based on analysis period 2020-21 are NOT taken forward to the Demand Model Smoothing phase
    - This will mean I&C EUC demand models produced last year based on Analysis Periods '17/18, '18/19 and '19/20 will be used in the Demand Model Smoothing phase
- Note: The WAR Band Ratios defined during the Model Definition phase and agreed at April TWG WILL be taken forward when updating UK Link later this year
- Are DESC TWG happy to move to the Demand Model Smoothing phase for the Small NDM models based on the above approach ?