

Modelling Results – Large NDM

Demand Estimation Sub Committee

Technical Workgroup

24/05/2021

The logo for xserve, featuring the word "xserve" in a light blue, sans-serif font. The "x" is stylized with a dark blue outline and a light blue fill.

Provided by:

The logo for correla, featuring two overlapping circles, one blue and one yellow, with a green circle in the center. The word "correla" is written in a bold, dark blue, sans-serif font to the right of the circles.

correla

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Section 6:

Results: Large NDM – Summary

Proposed EUC Bands / Consumption Ranges for Large NDM (>2,196 MWh pa)

- Band 5: 2,196 to 5,860 MWh
 - Band 6: 5,860 to 14,650 MWh
 - Band 7: 14,650 to 29,300 MWh
 - Band 8: 29,300 to 58,600 MWh
 - Band 9: >58,600 MWh (1 Contingency Band for sites which should be DM)
- Each with:
- 1 Consumption Band
 - x4 Winter Annual Ratio (WAR) Bands

- Note:
Underlying demand modelling can be done on basis of more broadly aggregated bands
- DESC agreed in Spring 2014, as part of the adhoc analysis of EUC Definitions, that the bands 14,650 to 29,300 (Band 7) and 29,300 to 58,600 (Band 8) could be merged for modelling purposes if necessary

- Large NDM remains very much a minority component of overall NDM
 - Bands 5 to 9 (>2,196 MWh pa) constitutes approx. 1/10 of overall NDM (on an AQ basis)

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%

Results – Large NDM R² Summary

- Prior to reviewing individual EUC results, the table opposite provides a summary of the R² movement when comparing to the average of the previous 3 years analysis
- Majority of LDZ and EUC combinations have significantly deteriorated
- Summary supports rejection of Large NDM I&C models this year
- Individual results on following slides

Large NDM – R-Squared Movement Analysis Year '20/21 vs Average of '17/18 to '19/20				
LDZ	05B	06B	07B/ 08B	09B
SC	-1.9% ▼	-2.5% ▼	3.3% ▲	-6.3% ▼
NO	-1.8% ▼	-8.1% ▼	-2.7% ▼	-6.7% ▼
NW	-2.8% ▼	-5.4% ▼	-17.0% ▼	-17.6% ▼
NE	-2.7% ▼	-4.9% ▼	-8.1% ▼	-3.8% ▼
EM	-0.8% ▼	-1.4% ▼	-1.3% ▼	-3.4% ▼
WM	-4.6% ▼	-5.0% ▼	-19.3% ▼	-3.1% ▼
WN	-2.7% ▼	-2.9% ▼	-17.3% ▼	-3.9% ▼
WS	0.4% ▲	-2.9% ▼	-6.1% ▼	-0.2% ▼
EA	-3.0% ▼	0.8% ▲	5.4% ▲	-1.9% ▼
NT	-2.5% ▼	-2.7% ▼	-2.3% ▼	-2.3% ▼
SE	-3.2% ▼	-1.1% ▼	-9.6% ▼	-1.7% ▼
SO	-2.0% ▼	-4.7% ▼	-9.5% ▼	-2.2% ▼
SW	-1.8% ▼	-3.3% ▼	-1.2% ▼	-0.9% ▼

Results – Large 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
- ILFs have moved significantly for majority of EUC and LDZ combinations, particularly band 09B (which is known to be more volatile)
- Individual results on following slides

Large NDM – ILF Movement Analysis Year '20/21 vs Average of '17/18 to '19/20				
LDZ	05B	06B	07B/ 08B	09B
SC	-1.7 ▼	-3.4 ▼	-5.7 ▼	-5.9 ▼
NO	-1.2 ▼	-4.8 ▼	1.4 ▲	-6.1 ▼
NW	2.1 ▲	-4.5 ▼	-3.3 ▼	-8.5 ▼
NE	-3.2 ▼	-1.6 ▼	-5.8 ▼	-6.8 ▼
EM	-2.2 ▼	-2.8 ▼	-4.3 ▼	-6.9 ▼
WM	-2.0 ▼	-5.0 ▼	-1.6 ▼	-7.4 ▼
WN	2.1 ▲	-2.6 ▼	-3.9 ▼	-7.3 ▼
WS	-1.9 ▼	-1.4 ▼	-1.9 ▼	-7.5 ▼
EA	1.1 ▲	-3.6 ▼	-5.9 ▼	-6.7 ▼
NT	-1.4 ▼	-7.7 ▼	2.5 ▲	-6.6 ▼
SE	-1.5 ▼	-3.1 ▼	-0.5 ▼	-6.7 ▼
SO	-4.2 ▼	-5.9 ▼	-1.2 ▼	-7.5 ▼
SW	2.2 ▲	-2.3 ▼	-0.4 ▼	-7.6 ▼

Results – Large NDM: Agreed Modelling Runs

Description	Range	EUC	Run
Band 5	2,196 to 5,860 MWh pa	05B	Individual LDZ Analysis except: NW and WN combined
Band 6	5,860 to 14,650 MWh pa	06B	Individual LDZ analysis except: WN (using WN and NW) WS (using WS and SW)
Bands 7 and 8 combined	14,650 to 58,600 MWh pa	07B 08B	Individual LDZ analysis except: WS and SW combined EA and NT combined SE and SO combined NW and WN combined
Band 9	>58,600 MWh pa	09B	National Analysis

Section 6:

Results: Large NDM – Consumption
Band EUCs

Results – Large NDM – 05B Summary

Indicative Load Factor:

- Significant movement across the LDZs

R² Results:

- Range from 92.9% – 96.5% compared to the average of the previous 3 years of 95.7% to 97%
- This is an average deterioration of 2.3%

It is recommended that due to the impacts of the COVID-19 pandemic, this year's data for EUC 05B is not used to produce EUC Gas Demand models for Gas Year 2021/22

The following slides show a comparison of LDZ WM to the previous years results.

LDZ	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
	'17/18 – '19/20	'20/21		'17/18 – '19/20	'20/21		'19/20	'20/21
SC	44.0	42.3	-1.7 ▼	98.0%	96.1%	-1.9% ▼	216	240
NO	41.6	40.4	-1.2 ▼	97.3%	95.5%	-1.8% ▼	110	105
NW	41.9	44.0	2.1 ▲	97.6%	94.8%	-2.8% ▼	122	117
NE	42.7	39.5	-3.2 ▼	97.2%	94.5%	-2.7% ▼	147	121
EM	39.9	37.7	-2.2 ▼	97.3%	96.5%	-0.8% ▼	88	96
WM	38.1	36.1	-2.0 ▼	97.5%	92.9%	-4.6% ▼	128	120
WN	42.4	44.4	2.1 ▲	97.6%	94.9%	-2.7% ▼	141	130
WS	39.2	37.4	-1.9 ▼	95.8%	96.2%	0.4% ▲	38	30
EA	40.1	41.1	1.1 ▲	97.1%	94.1%	-3.0% ▼	87	67
NT	40.9	39.5	-1.4 ▼	97.5%	95.0%	-2.5% ▼	140	122
SE	41.3	39.8	-1.5 ▼	97.3%	94.1%	-3.2% ▼	162	121
SO	36.6	32.4	-4.2 ▼	97.7%	95.7%	-2.0% ▼	117	107
SW	41.2	43.4	2.2 ▲	95.7%	93.9%	-1.8% ▼	64	60

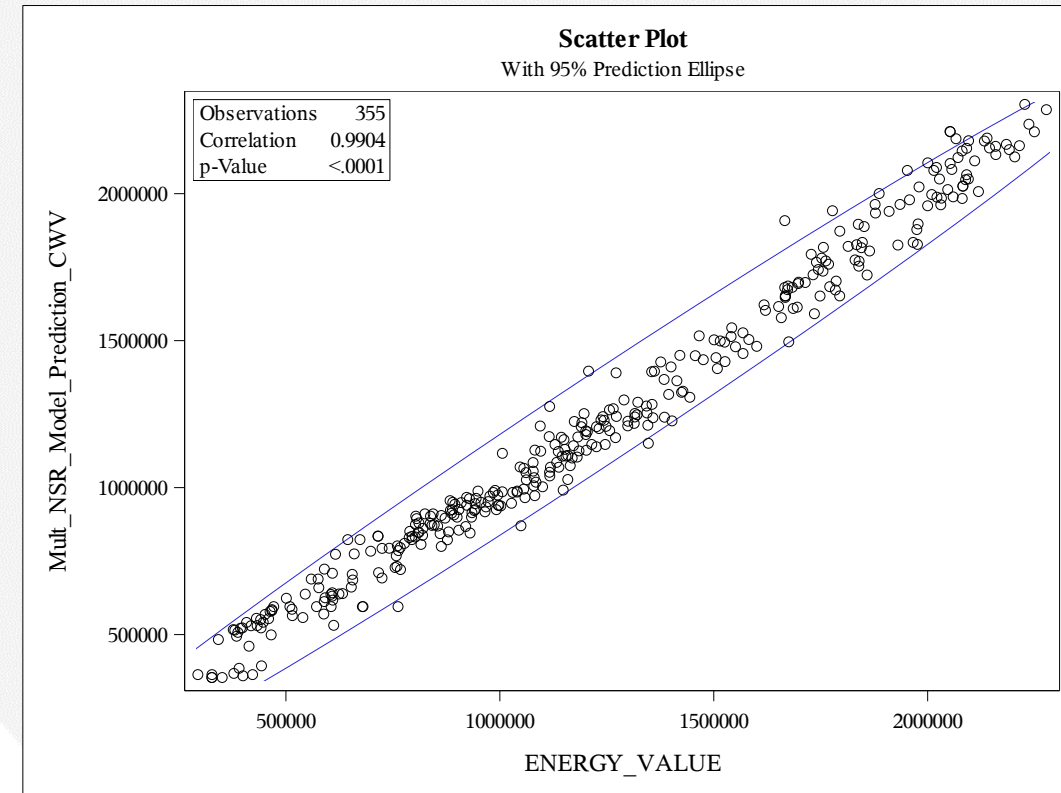
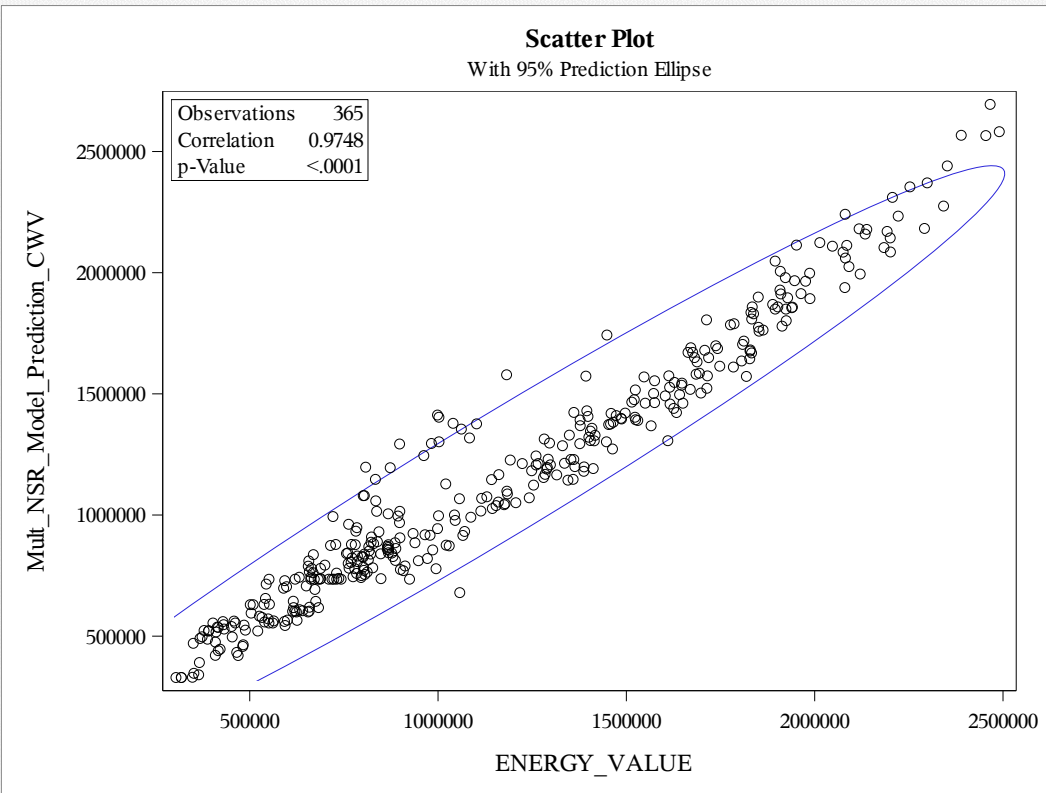
Comparison of Analysis 05B – LDZ WM

Current Analysis Period '20/21

Previous Analysis Period '19/20

Model: No Summer Reduction
EUC: 05B
LDZ: WM
Demand: WM
 $R^2 = 94.9\%$
ILF = 44.4
Sample Points = 130

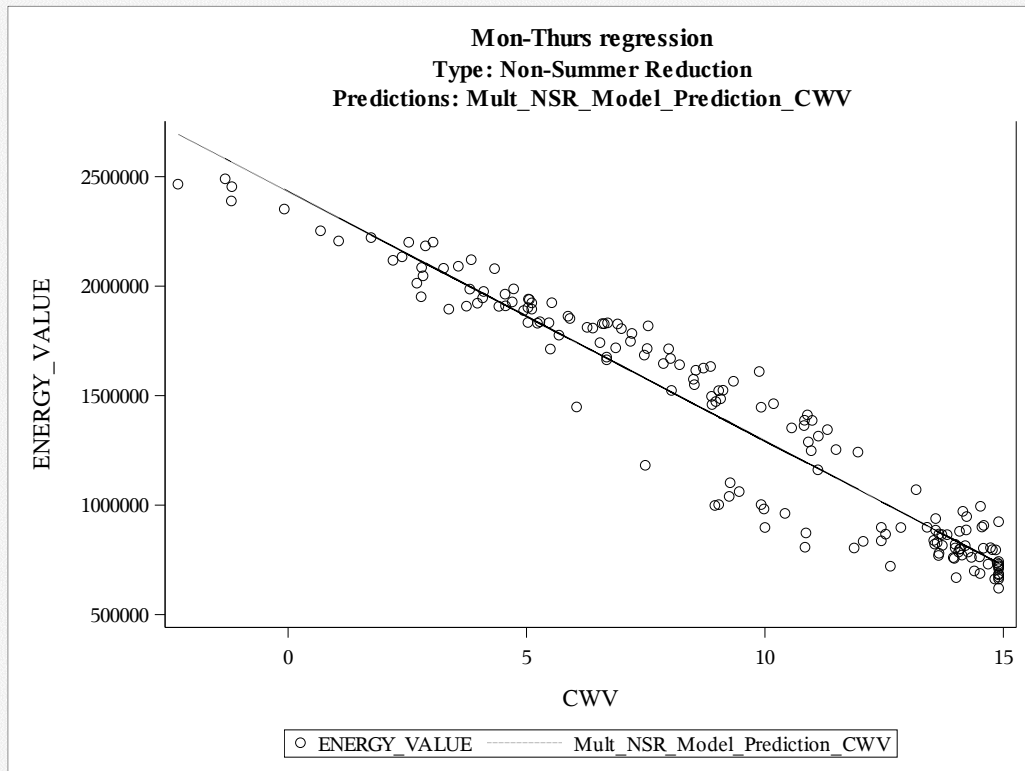
Model: No Summer Reduction
EUC: 05B
LDZ: WM
Demand: WM
 $R^2 = 97.8\%$
ILF = 38.6
Sample Points = 128



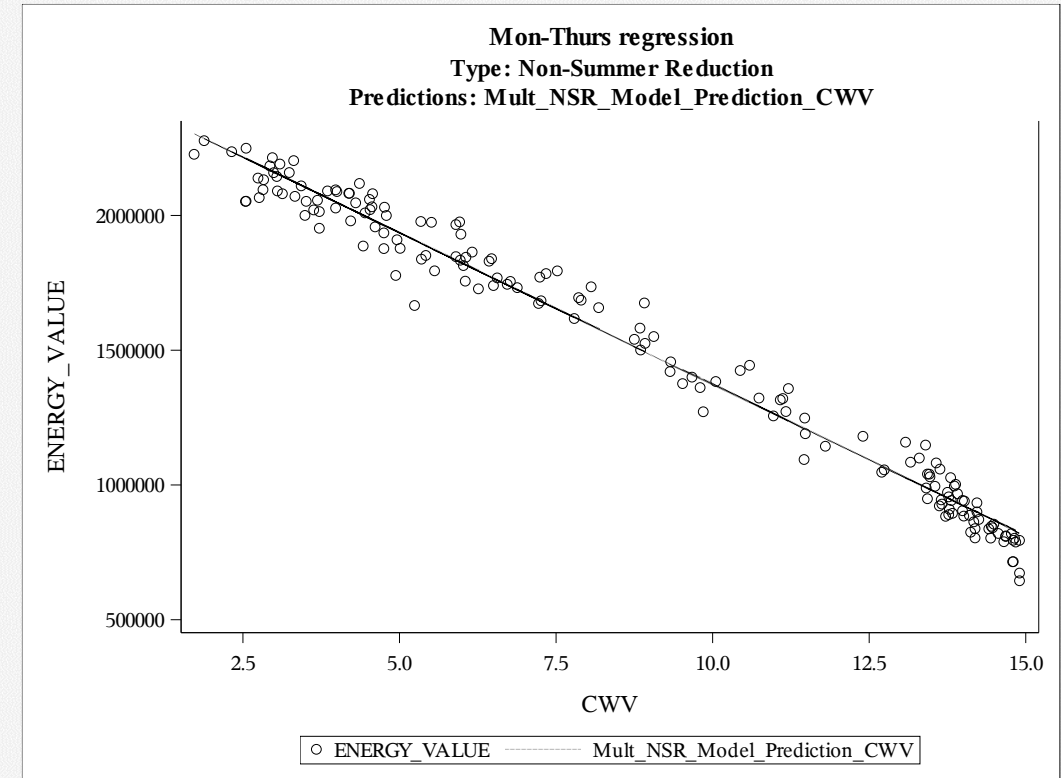
Scatter Plot reveals deterioration in model compared with last year.

Comparison of Analysis 05B – LDZ WM

Current Analysis Period '20/21



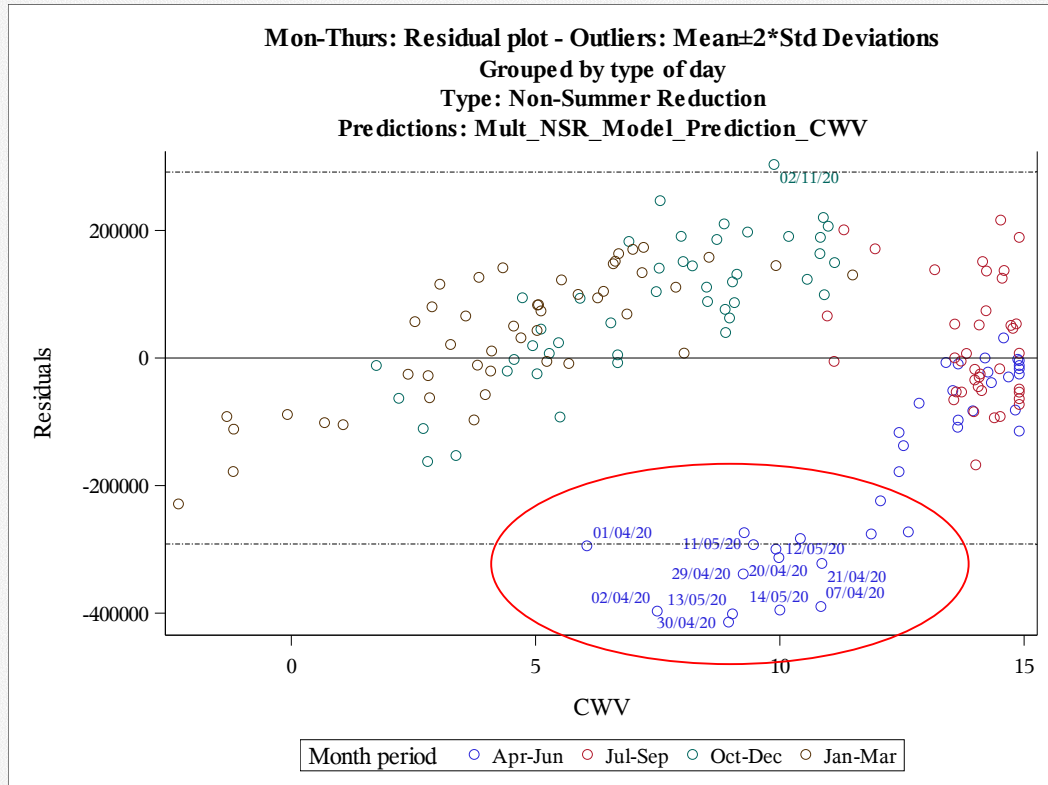
Previous Analysis Period '19/20



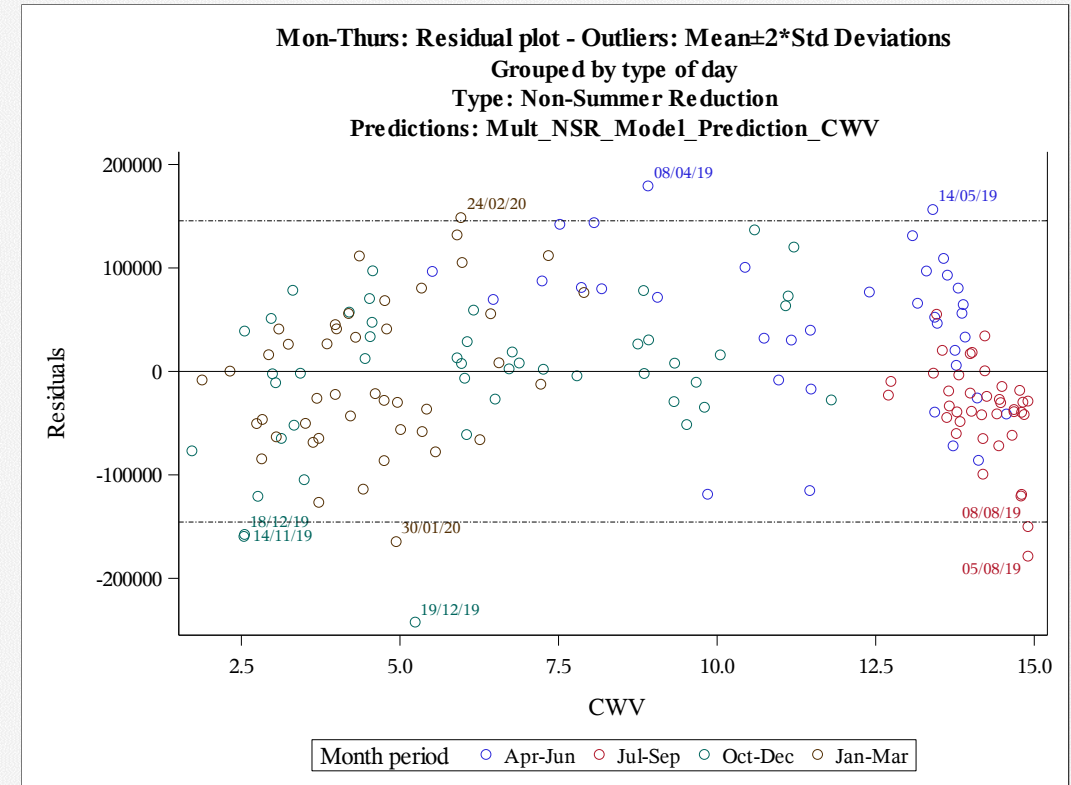
There is clear evidence that the model is not a good fit for actual Demand.

Comparison of Analysis 05B - LDZ WM

Current Analysis Period '20/21



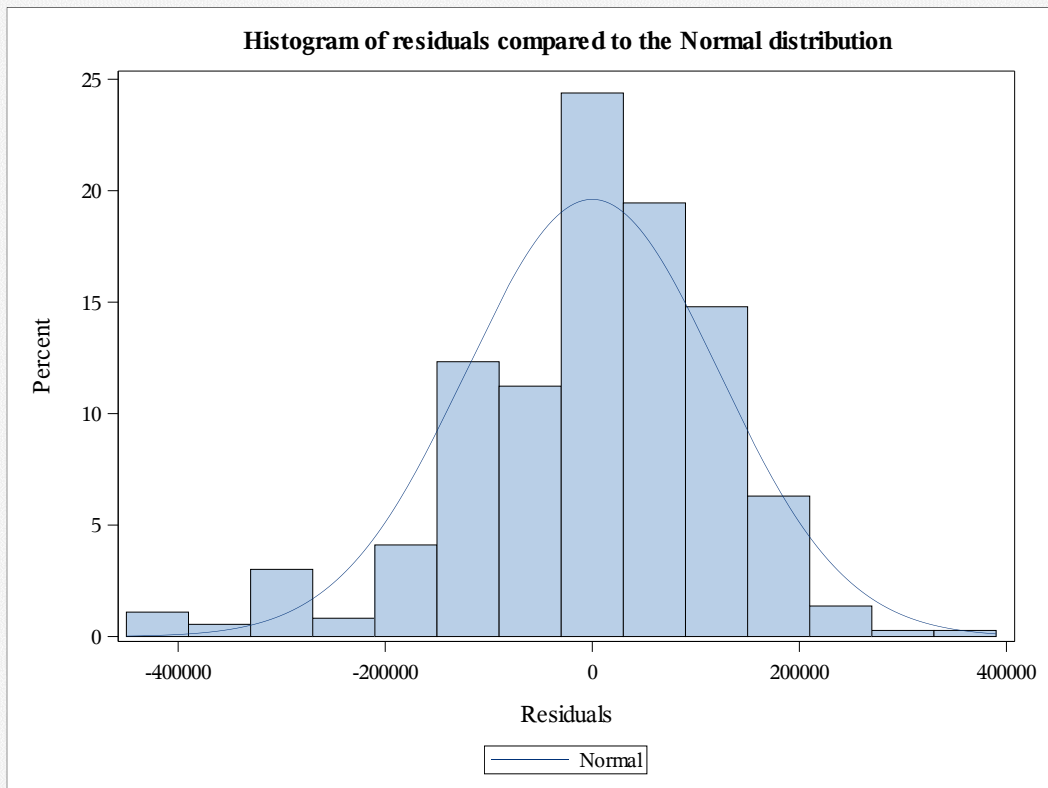
Previous Analysis Period '19/20



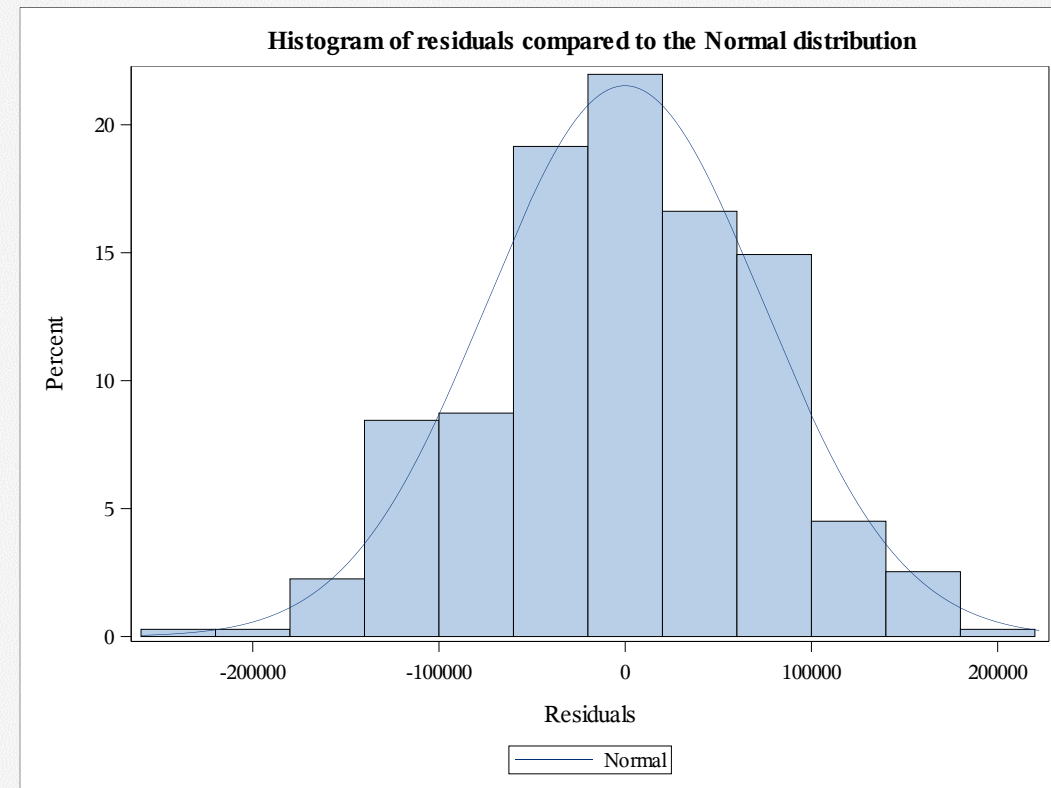
'20-21 outliers are grouped in the first Covid lockdown period, whilst the previous year's outliers are more random.

Comparison of Analysis 05B – LDZ WM

Current Analysis Period '20/21



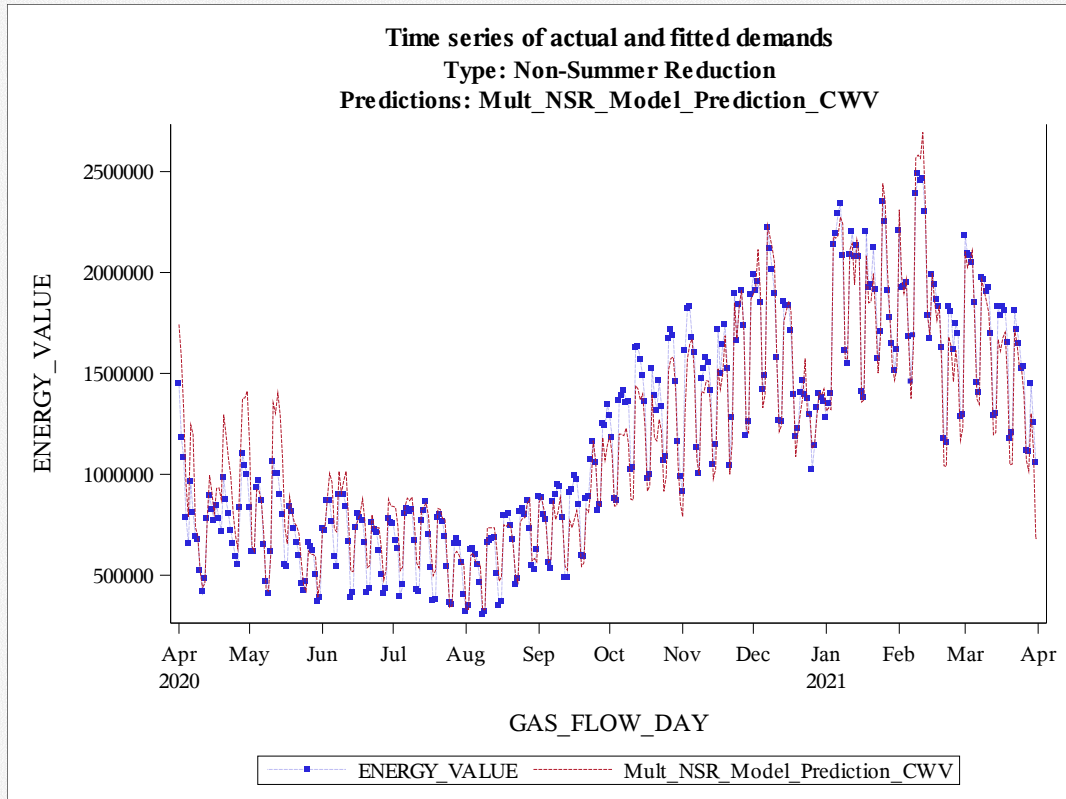
Previous Analysis Period '19/20



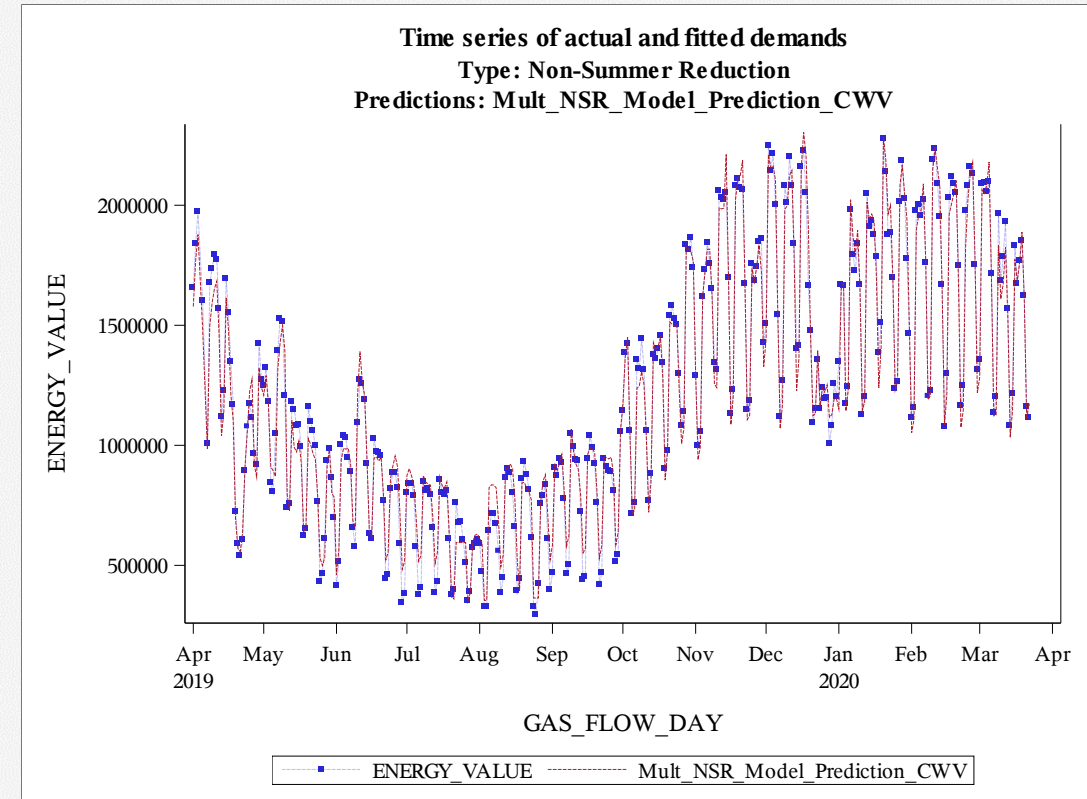
Residuals for '20–21 are showing an abnormal distribution compared to the previous years analysis.

Comparison of Analysis 05B – LDZ WM

Current Analysis Period '20/21



Current Analysis Period '19/20



Time series view shows there is clear evidence that the model is not a good fit for actual Demand.

Results – Large NDM – 06B Summary

Indicative Load Factor:

- Significant movement across all LDZs

R² Results:

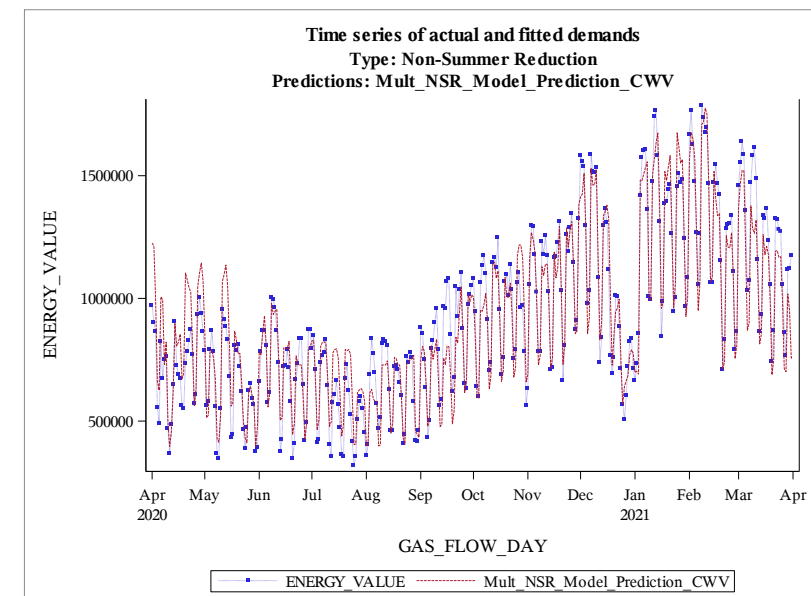
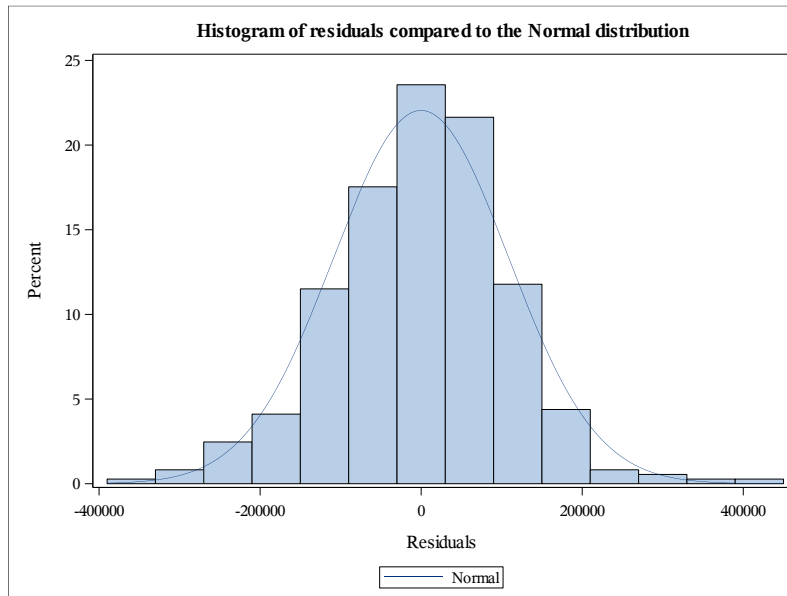
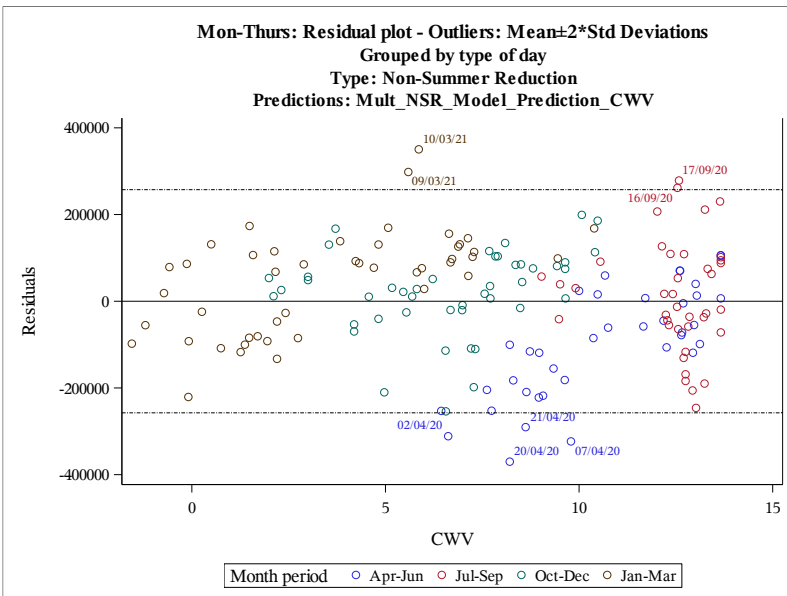
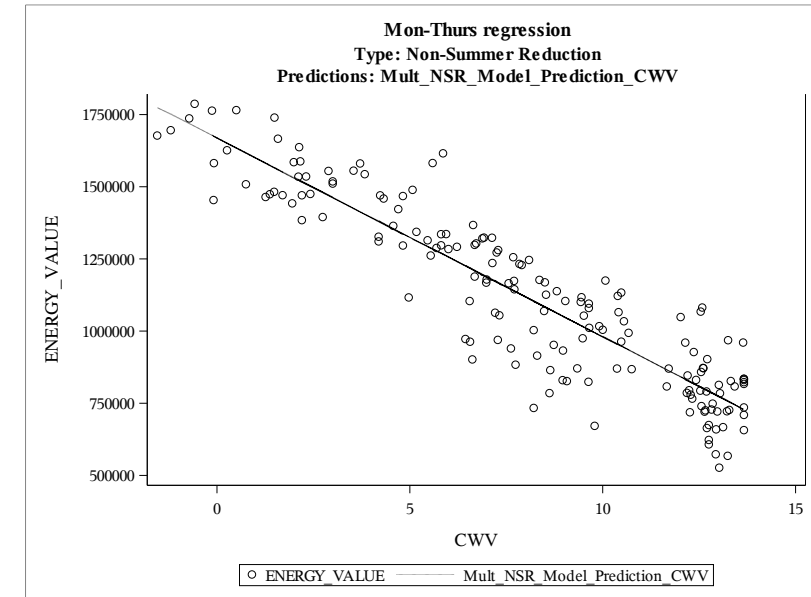
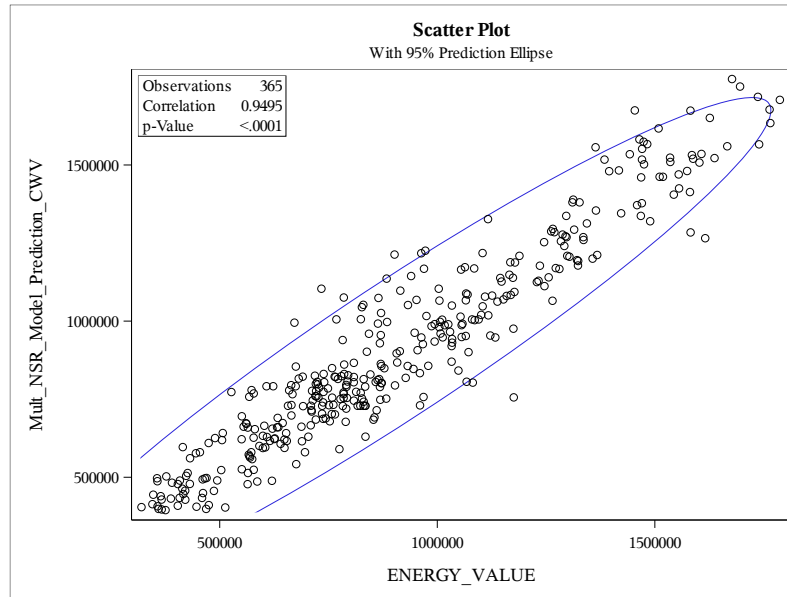
- Range from 87.5% – 95.3% compared to the average of the previous 3 years of 94.1% – 96.9%
- This is an average deterioration of 3.4%

It is recommended that due to the impacts of the COVID-19 pandemic, this year's data for EUC 06B is not used to produce EUC Gas Demand models for Gas Year 2021/22

LDZ	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
	'17/18 – '19/20	'20/21		'17/18 – '19/20	'20/21		'19/20	'20/21
SC	49.8	46.3	-3.4 ▼	96.9%	94.4%	-2.5% ▼	102	90
NO	49.9	45.1	-4.8 ▼	95.6%	87.5%	-8.1% ▼	48	39
NW	50.5	46.0	-4.5 ▼	96.7%	91.3%	-5.4% ▼	63	68
NE	56.6	55.0	-1.6 ▼	94.9%	90.0%	-4.9% ▼	69	71
EM	49.5	46.7	-2.8 ▼	96.7%	95.3%	-1.4% ▼	63	62
WM	45.0	40.0	-5.0 ▼	96.5%	91.5%	-5.0% ▼	56	51
WN	51.1	48.5	-2.6 ▼	96.8%	93.9%	-2.9% ▼	68	76
WS	44.0	42.6	-1.4 ▼	96.2%	93.3%	-2.9% ▼	55	49
EA	49.4	45.8	-3.6 ▼	94.1%	94.9%	0.8% ▲	36	32
NT	48.6	41.0	-7.7 ▼	96.6%	93.9%	-2.7% ▼	34	36
SE	46.5	43.4	-3.1 ▼	96.0%	94.9%	-1.1% ▼	43	37
SO	42.1	36.2	-5.9 ▼	95.6%	90.9%	-4.7% ▼	51	41
SW	43.3	41.1	-2.3 ▼	95.9%	92.6%	-3.3% ▼	35	31

Results – Large NDM 06B – Charts for LDZ NO

Model: No Summer Reduction
EUC: 06B
LDZ: NO
Demand: NO
R² = 87.5%
ILF = 45.12
Sample Points = 39



Results – Large NDM – 07B and 08B Summary

Indicative Load Factor:

- Significant movement across all LDZs

R² Results

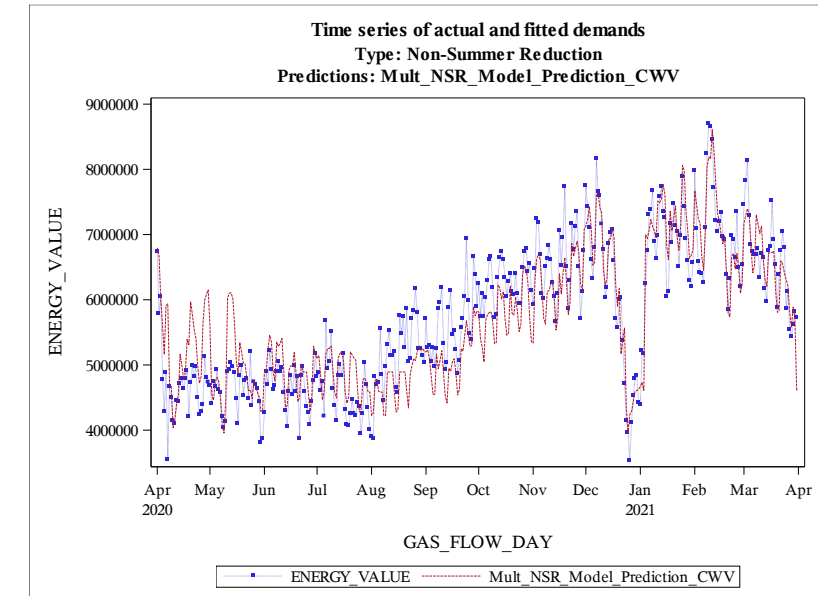
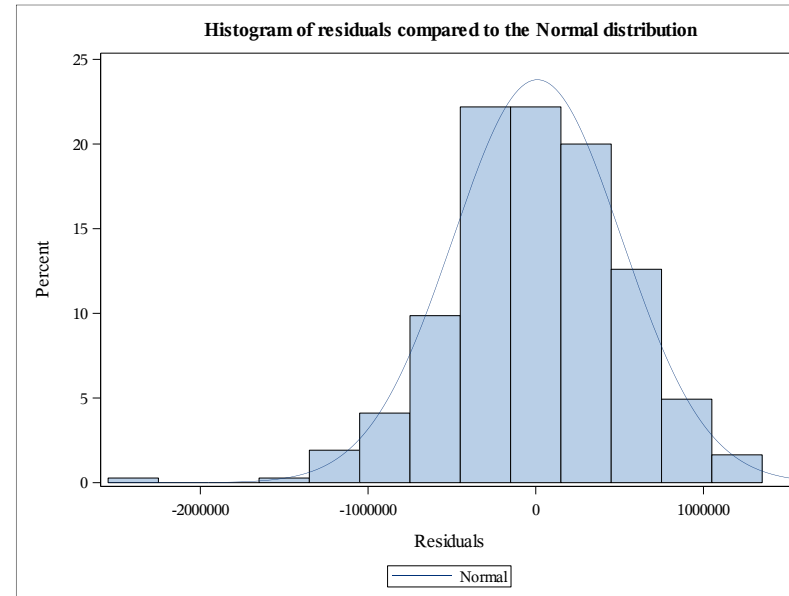
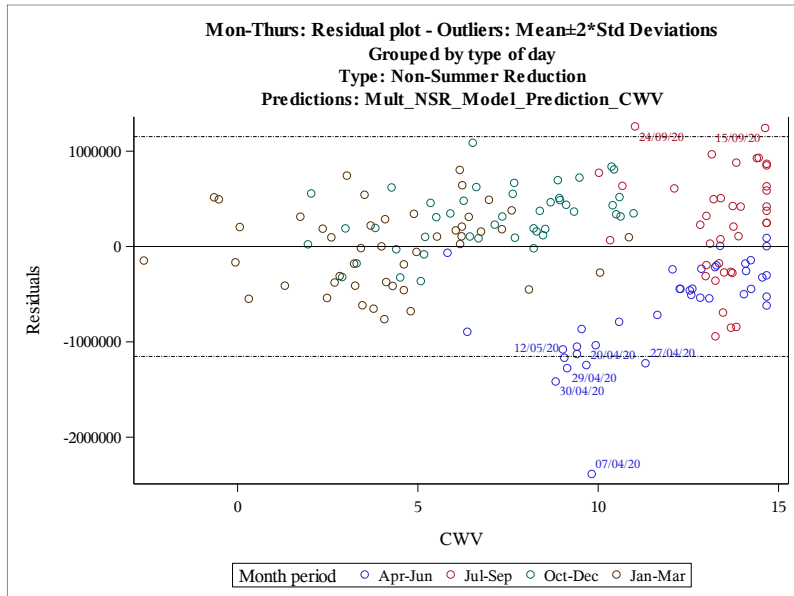
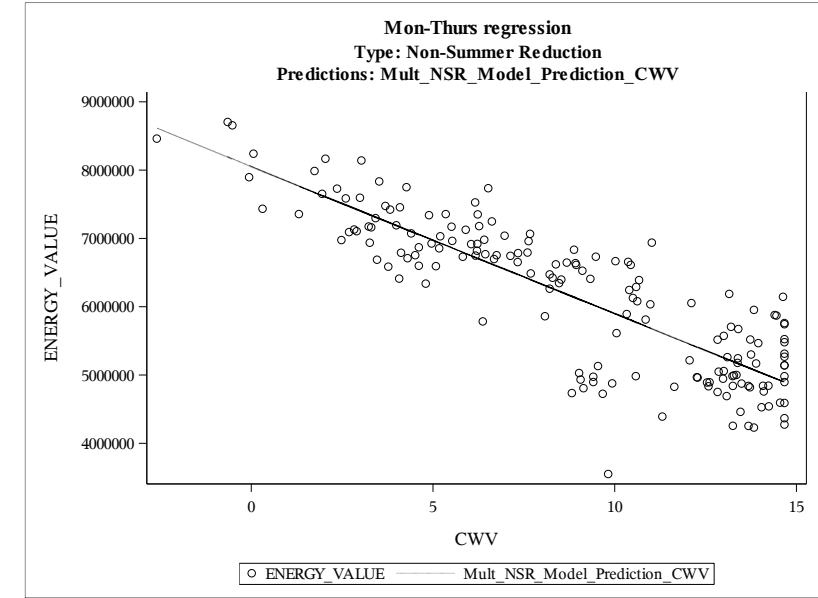
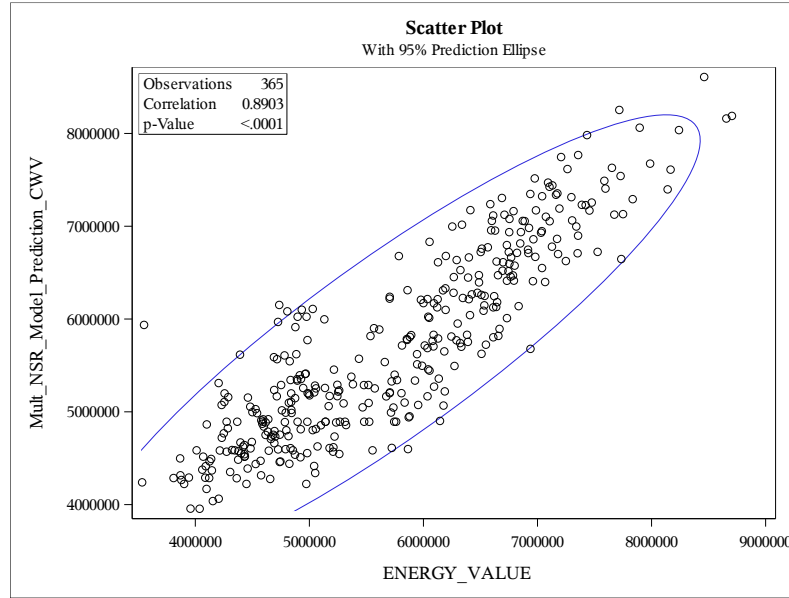
- Range from 74.0% – 90.0% compared to the average of the previous 3 years of 84.1% – 95.3%
- This is an average deterioration of 6.6%

It is recommended that due to the impacts of the COVID-19 pandemic, this year's data for EUC 07B and 08B are not used to produce EUC Gas Demand models for Gas Year 2021/22

LDZ	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
	'17/18 – '19/20	'20/21		'17/18 – '19/20	'20/21		'19/20	'20/21
SC	66.0	60.3	-5.7 ▼	85.4%	88.7%	3.3% ▲	46	57
NO	64.9	66.3	1.4 ▲	88.6%	85.9%	-2.7% ▼	37	37
NW	63.3	60.0	-3.3 ▼	91.9%	74.9%	-17.0% ▼	53	61
NE	68.5	62.7	-5.7 ▼	88.6%	80.5%	-8.1% ▼	58	53
EM	63.6	59.3	-4.3 ▼	92.2%	90.9%	-1.3% ▼	71	73
WM	52.8	51.2	-1.6 ▼	93.5%	74.2%	-19.3% ▼	48	51
WN	64.6	60.7	-3.9 ▼	91.3%	74.0%	-17.3% ▼	58	61
WS	60.6	58.7	-1.9 ▼	84.8%	78.7%	-6.1% ▼	39	39
EA	62.6	56.7	-5.8 ▼	84.1%	89.5%	5.4% ▲	31	43
NT	54.3	56.7	2.5 ▲	91.8%	89.5%	-2.3% ▼	50	43
SE	53.5	53.0	-0.5 ▼	92.2%	82.6%	-9.6% ▼	46	52
SO	51.3	50.1	-1.2 ▼	92.3%	82.8%	-9.5% ▼	46	52
SW	59.5	59.1	-0.4 ▼	85.4%	84.2%	-1.2% ▼	39	39

Results – Large NDM 07B and 08B – Charts for LDZ NW

Model: No Summer Reduction
EUC: 07B, 08B
LDZ: NW
Demand: NW / WN
 $R^2 = 74.9\%$
ILF = 60.0
Sample Points = 61



Results – Large NDM – 09B Summary

Indicative Load Factor:

- Significant movement across all LDZs

R² Results:

- Range from 66.4% – 81.8% compared to the average of the previous 3 years of 81.4% – 84.2%
- This is an average deterioration of 4.2%
- Band 9 results typically volatile due to variability in sample composition each year

It is recommended that due to the impacts of the COVID-19 pandemic, this year's data for EUC 09B is not used to produce EUC Gas Demand models for Gas Year 2021/22

LDZ	Indicative Load Factor			R Squared Value			Sample Size (Supply Points)	
	Analysis Year(s)		Movement	Analysis Year(s)		Movement	Analysis Year	
	'17/18 – '19/20	'20/21		'17/18 – '19/20	'20/21		'19/20	'20/21
SC	68.4	62.5	-5.9 ▼	83.7%	77.4%	-6.3% ▼	225	211
NO	69.1	63.1	-6.1 ▼	84.2%	77.5%	-6.7% ▼	225	211
NW	67.4	59.0	-8.5 ▼	84.0%	66.4%	-17.6% ▼	225	211
NE	68.7	61.9	-6.8 ▼	83.7%	79.9%	-3.8% ▼	225	211
EM	68.2	61.3	-6.9 ▼	83.5%	80.1%	-3.4% ▼	225	211
WM	67.2	59.8	-7.4 ▼	83.3%	80.2%	-3.1% ▼	225	211
WN	68.0	60.8	-7.3 ▼	83.3%	79.4%	-3.9% ▼	225	211
WS	67.1	59.6	-7.5 ▼	82.0%	81.8%	-0.2% ▼	225	211
EA	67.7	61.1	-6.7 ▼	82.2%	80.3%	-1.9% ▼	225	211
NT	67.7	61.1	-6.6 ▼	82.1%	79.8%	-2.3% ▼	225	211
SE	66.9	60.2	-6.7 ▼	81.8%	80.1%	-1.7% ▼	225	211
SO	64.9	57.4	-7.5 ▼	81.7%	79.5%	-2.2% ▼	225	211
SW	66.3	58.7	-7.6 ▼	81.4%	80.5%	-0.9% ▼	225	211

Section 6:

Results: Large NDM – WAR Band EUCs

Results – Large NDM WAR Bands – Agreed Modelling Runs

Band	Range	EUC	Run (Single Option)
Band 5	2,196 to 5,860 MWh pa	05W01 to 05W04	5 LDZ Groups: SC NO/NW/WN NE/EM/WM EA/NT/SE WS/SO/SW Agreed WAR Ratios: 0.392, 0.480, 0.564
Band 6	5,860 to 14,650 MWh pa	06W01 to 06W04	3 LDZ Groups: SC/NO/NW/WN NE/EM/WM EA/NT/SE/WS/SO/SW Agreed WAR Ratios: 0.355, 0.441, 0.537
Band 7 and Band 8	14,650 to 58,600 MWh pa	07W01 to 07W04, 08W01 to 08W04	2 LDZ Groups: SC / NO / NW / WN / NE / EM / WM EA / NT / SE / WS / SO / SW Agreed WAR Ratios: 0.339, 0.383, 0.465
Band 9	>58,600 MWh pa	09B	No WAR Band Requirement

Results – Large NDM – 05WAR Band Summary

LDZ	WAR Band 01 0 – 0.392			WAR Band 01 0.393 – 0.480			WAR Band 03 0.481 – 0.564			WAR Band 04 0.565 – 1.000		
	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample
SC	78.7	83.1%	39	49.1	97.0%	72	38.0	96.5%	93	25.7	92.1%	36
NO	75.6	91.6%	61	49.3	89.7%	81	39.1	95.5%	48	26.1	90.5%	45
NW	74.5	91.7%	61	46.3	91.5%	81	36.0	96.4%	48	23.3	92.4%	45
NE	65.2	90.8%	76	47.4	91.4%	88	35.8	95.4%	91	24.3	93.7%	82
EM	64.9	90.8%	76	46.9	91.3%	88	35.3	95.0%	91	24.2	93.3%	82
WM	64.2	90.8%	76	45.5	91.8%	88	34.0	95.6%	91	23.1	93.5%	82
WN	75.0	91.6%	61	47.0	90.5%	81	36.6	96.5%	48	23.9	92.8%	45
WS	67.6	86.6%	45	45.2	93.2%	44	35.4	96.7%	61	25.6	93.3%	47
EA	72.4	77.4%	42	47.8	91.9%	111	37.6	95.1%	103	26.5	96.3%	54
NT	72.4	77.4%	42	47.8	92.0%	111	37.6	95.2%	103	26.5	96.1%	54
SE	72.0	77.3%	42	46.9	91.4%	111	36.7	94.7%	103	25.7	96.1%	54
SO	66.4	85.8%	45	43.1	92.0%	44	33.2	95.9%	61	23.1	95.6%	47
SW	67.2	86.0%	45	44.2	92.7%	44	34.3	96.3%	61	24.1	96.5%	47

Results – Large NDM – 06WAR Band Summary

LDZ	WAR Band 01 0 – 0.355			WAR Band 01 0.356 – 0.441			WAR Band 03 0.442 – 0.537			WAR Band 04 0.538 – 1.000		
	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample
SC	79.9	78.0%	34	56.6	86.8%	72	42.1	95.0%	69	28.1	92.9%	30
NO	79.6	78.2%	34	57.1	86.0%	72	43.3	93.6%	69	29.4	91.9%	30
NW	79.2	78.0%	34	54.4	87.3%	72	40.3	94.1%	69	26.6	92.8%	30
NE	79.3	90.1%	54	55.9	87.1%	52	39.8	94.5%	42	27.2	90.5%	36
EM	79.2	90.1%	54	55.7	86.9%	52	39.3	94.3%	42	27.3	94.8%	36
WM	78.7	90.1%	54	54.0	87.5%	52	38.0	94.4%	42	25.9	90.9%	36
WN	79.5	77.9%	34	55.4	86.7%	72	40.9	94.2%	69	27.1	93.4%	30
WS	86.0	83.6%	29	53.9	86.1%	52	39.8	95.6%	65	27.6	96.1%	49
EA	86.0	83.6%	29	55.3	85.4%	52	41.2	96.0%	65	28.7	95.7%	49
NT	86.0	83.6%	29	55.4	85.2%	52	41.2	96.0%	65	28.7	95.7%	49
SE	86.0	83.6%	29	54.5	85.4%	52	40.2	95.5%	65	27.9	95.3%	49
SO	86.0	83.6%	29	52.2	85.6%	52	37.7	95.1%	65	25.6	95.4%	49
SW	86.2	83.6%	29	53.2	85.7%	52	38.8	95.5%	65	26.7	96.3%	49

Results – Large NDM – 07WAR and 08WAR Band Summary

LDZ	WAR Band 01 0 – 0.339			WAR Band 01 0.340 – 0.383			WAR Band 03 0.384 – 0.465			WAR Band 04 0.466 – 1.000		
	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample	ILF	R Squared	Sample
SC	89.1	81.6%	65	73.5	79.2%	110	56.3	89.4%	101	35.9	83.3%	56
NO	88.9	80.9%	65	73.5	80.2%	110	57.1	88.5%	101	37.1	82.1%	56
NW	89.0	81.0%	65	71.5	81.5%	110	54.2	90.7%	101	33.8	84.9%	56
NE	88.9	80.8%	65	72.8	81.0%	110	56.1	89.6%	101	35.9	83.7%	56
EM	88.9	80.7%	65	72.4	81.2%	110	55.7	89.3%	101	35.5	83.3%	56
WM	88.9	80.6%	65	71.4	81.5%	110	54.1	90.0%	101	34.0	84.5%	56
WN	89.2	81.1%	65	72.1	81.0%	110	54.8	90.7%	101	34.5	84.4%	56
WS	95.5	38.1%	27	69.3	75.6%	30	55.9	87.5%	39	34.6	94.8%	38
EA	95.2	38.3%	27	70.5	74.6%	30	57.5	87.3%	39	35.8	94.7%	38
NT	95.1	38.3%	27	70.5	74.5%	30	57.5	87.5%	39	35.8	94.5%	38
SE	95.3	38.5%	27	69.8	74.9%	30	56.6	87.3%	39	35.0	94.4%	38
SO	95.6	38.4%	27	68.1	74.7%	30	53.6	87.0%	39	32.3	94.6%	38
SW	95.4	38.6%	27	68.9	75.0%	30	54.9	87.7%	39	33.6	95.1%	38

Section 6:

Results: Large NDM – Conclusions
and Recommendations

Results – Large NDM – Conclusions and Recommendations

- Results for Consumption Band Models 5 to 9 AND WAR Band Models 5 to 8 have clearly been impacted by COVID-19 and so we advise the models based on analysis period 2020-21 are NOT taken forward
 - This will mean 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 Large NDM models based on the above approach ?

Section 7:

Meeting Summary and Next Steps

Meeting Summary

- Summary of decisions reached
- Recap on agreed actions, owners and timescales
- Any further questions about this stage ?



Next Steps

1) Demand Estimation Team to prepare draft profiles for Gas Year 2021/22

25/05 to 04/06

2) DESC TWG review draft profiles for Gas Year 2021/22

07/06 to 25/06

3) Demand Estimation Team prepare response to DESC TWG queries

28/06 to 02/07

4) DESC Meeting to review response to queries and agree release to wider industry

07/07

Thank you

