respect › commitment › teamwork

Demand Estimation Sub-Committee

February 2012

0-73.2 MWh pa Range Sub-Band Analyses

Representing 0 - 73.2 MWh pa: Previous Analysis

- Spring 2007 NDM analysis and Spring 2011 NDM analysis:
  - Investigated splitting 0-73.2 consumption band (4 sub-bands: 0-10,10-20,20-30,30-73.2 MWh pa) (national analysis)
- Autumn 2007 analysis
  - Investigated splitting 0-73.2 consumption band at 20 MWh pa and 30 MWh pa
    - i.e. 0-20 and 20-73.2 and 0-30 and 30-73.2 (LDZ / 5 LDZ group analysis)
- Autumn 2008 analysis
  - Investigated splits of the 0-293 MWh pa range at 30 and 60 MWh pa
    - i.e. 0-30 and 30-293 and 0-60 and 60-293 (individual LDZ analysis)
- January 2009 analysis
  - Applying band 01 profiles to domestics in band 02 and applying band 02 profiles to non domestics in band 01 (individual LDZ analysis)
- In all cases there were no compelling statistical grounds to change current arrangements for 0-73.2 band.
- All results available on Joint Office website

February 2012 0-73.2 MWh pa Sub-Band Analysis: Background

- February 2011 DESC meeting requested a repetition of the analysis looking at splitting the 0-73.2 MWh pa Band.
- June 2011 DESC confirmed that this analysis should be added to the Work Plan and clarified that analysis will look at splitting the 0-73.2 MWh pa band into three sub bands, namely 0-10, 10-20 and 20-73.2 MWh pa.
- Sample sizes sufficient in the three sub-bands to carry out analysis at individual LDZ level (with NW and WN combined).
- Analysis carried out using most recent (2010/11) data set from Spring 2011 (17/03/10 – 16/03/11).
- 2 analyses carried out:
  - Domestic only in whole band and in all sub-bands
  - Alternative analysis using 4 additional non-domestic supply points in upper sub-band
- RMSE values calculated to see if goodness of fit improved by splitting 0-73.2 MWh pa band into three sub-bands.

0 – 73.2 MWh pa Population Disposition

Consumption Range	% of 0 – 73.2 MWh pa	
	AQ Basis	Number Basis
0 - 10 MWh pa	10.9%	27.6%
10 - 20 MWh pa	44.8%	48.0%
20 - 73.2 MWh pa	44.3%	24.4%
0 - 73.2 MWh pa	100.0%	100.0%

On an AQ basis:

The range 0-73.2 MWh pa constitutes nearly 3/4 of overall NDM

The lowest sub-band (0-10 MWh pa) constitutes ~11% of Band 01B on AQ basis, ~1/4 of size of other two sub-bands.

(Population percentages based on population distribution as at early April 2011)

0-10, 10-20 and 20-73.2 MWh pa split sample sizes (individual LDZs) – domestic only

LDZ	0-10 MWh pa	10-20 MWh pa	20-73.2 MWh pa	0-73.2 MWh pa
SC	44	89	71	204
NO	38	120	65	223
NW/WN	59	98	69	226
NE	48	127	73	248
EM	47	136	61	244
WM	54	110	63	227
WS	64	110	72	246
EA	53	130	69	252
NT	38	102	73	213
SE	53	101	59	213
SO	65	128	66	259
SW	71	127	56	254
Total	**634**	**1378**	**797**	**2809**

Note: Alternative analysis - extra 4 non-domestics per LDZ in 20-73.2 MWh pa

0-10, 10-20 and 20-73.2 MWh pa split sample sizes (individual LDZs) – domestic only

	0 – 10 MWh pa		10 – 20 MWh pa		20 – 73.2 MWh pa		0 – 73.2 MWh pa	
	ILF	R^2	ILF	R^2	ILF	R^2	ILF	R^2
SC	**35%**	96%	37%	99%	38%	99%	37%	99%
NO	32%	96%	33%	98%	34%	98%	33%	98%
NW / WN	33%	96%	34%	99%	35%	99%	34%	99%
NE	35%	94%	34%	98%	36%	98%	35%	98%
EM	**31%**	96%	33%	99%	34%	98%	34%	99%
WM	**28%**	97%	31%	99%	32%	99%	31%	99%
WS	**29%**	95%	31%	98%	**34%**	98%	32%	98%
EA	**30%**	96%	31%	99%	32%	99%	32%	99%
NT	**28%**	92%	31%	99%	33%	99%	32%	99%
SE	**27%**	95%	31%	99%	31%	99%	31%	99%
SO	**25%**	97%	28%	99%	**31%**	98%	29%	99%
SW	**26%**	97%	29%	99%	**33%**	99%	30%	99%

Note: ILF: Indicative Load Factor & R^2: R^2 Multiple Correlation Coefficient

Differences (>=2%) in ILFs from whole band values highlighted

xoserve

respect › commitment › teamwork

0-10, 10-20 and 20-73.2 MWh pa split ILFs - alternative analysis (4 non-doms in 20-73.2)

	0 – 10 MWh pa		10 – 20 MWh pa		20 – 73.2 MWh pa		0 – 73.2 MWh pa	
	ILF	R^2	ILF	R^2	ILF	R^2	ILF	R^2
SC	**35%**	96%	37%	99%	37%	99%	37%	99%
NO	32%	96%	33%	98%	34%	98%	33%	98%
NW / WN	33%	96%	34%	99%	35%	99%	34%	99%
NE	35%	94%	34%	98%	36%	98%	35%	98%
EM	**31%**	96%	33%	99%	33%	98%	34%	99%
WM	**28%**	97%	31%	99%	**33%**	99%	31%	99%
WS	**29%**	95%	31%	98%	**35%**	98%	32%	98%
EA	**30%**	96%	31%	99%	33%	99%	32%	99%
NT	**28%**	92%	31%	99%	**34%**	99%	32%	99%
SE	**27%**	95%	31%	99%	30%	99%	31%	99%
SO	**25%**	97%	28%	99%	**31%**	98%	29%	99%
SW	**26%**	97%	29%	99%	**32%**	99%	30%	99%

Note: ILF: Indicative Load Factor & R^2: R^2 Multiple Correlation Coefficient

Differences (>=2%) in ILFs from whole band values highlighted

0-10, 10-20 and 20-73.2 MWh pa split: RMSE analysis – domestic only

LDZ	Population AQ Weighted "RMSE" Values Models Based on 2010/11 Data Set		
	One Band	Three Sub-Bands	Improvement(+) or Degradation(-) Using Three Sub-Bands
SC	5233457.0	5854671.6	-11.9%
NO	3908779.7	4376652.5	-12.0%
NW/WN	8869387.3	9886183.4	-11.5%
NE	4978695.2	5392134.4	-8.3%
EM	7858728.0	8525267.0	-8.5%
WM	5731628.1	6446333.5	-12.5%
EA	3277511.6	3636729.5	-11.0%
NT	5561101.4	6130159.0	-10.2%
SE	6912751.3	8332684.6	-20.5%
WS	7227241.3	8139574.3	-12.6%
SO	4325052.9	5535985.5	-28.0%
SW	3723262.5	4532812.3	-21.7%
Overall	5783642.5	6632300.8	-14.7%

0-10, 10-20 and 20-73.2 MWh pa split: RMSE analysis – domestic only

LDZ	Population AQ Weighted "RMSE" Values Models Based on 2010/11 Data Set		
	One Band	Three Sub-Bands	Improvement(+) or Degradation(-) Using Three Sub-Bands
SC	5233457.0	5843001.0	-11.6%
NO	3908779.7	4370087.6	-11.8%
NW/WN	8869387.3	9515515.1	-7.3%
NE	4978695.2	5366800.8	-7.8%
EM	7858728.0	8398651.3	-6.9%
WM	5731628.1	6544993.6	-14.2%
EA	3277511.6	3569652.7	-8.9%
NT	5561101.4	5993186.1	-7.8%
SE	6912751.3	8163922.4	-18.1%
WS	7227241.3	8079136.4	-11.8%
SO	4325052.9	5367008.5	-24.1%
SW	3723262.5	4568349.1	-22.7%
Overall	5783642.5	6546931.8	-13.2%

Summary Of Results

- Model fits are good (R^2 is 92% or greater)
- In majority of cases, sub-band ILFs are close to whole band ILFs (one percentage point difference or less). Exceptions are listed below
  - In lower (0-10 MWh pa) sub-band, some small differences: 9 LDZs have ILFs that are 2 to 4 percentage points less than whole band ILFs
    (Note lower sub-band 1/4 size of other two sub-bands on AQ basis)
  - For all LDZs in middle sub-band (10-20 MWh pa), ILFs are close to whole band ILFs (differences of one percentage point or less)
  - For upper (20-73.2 MWh pa) sub-band, 3 LDZs (5 LDZs in alternative analysis) have ILFs that are 2 or 3 percentage points higher than whole band ILFs
- In more northerly LDZs, ILFs for sub-bands very similar to whole band. Some small differences across sub-bands in more southerly LDZs
- Across all LDZs RMSE analysis shows degradation in fit when three sub-bands are applied: fit 14.7% worse overall (13.2% worse overall in alternative analysis)

Conclusions

- While ILF analysis indicates some small differences between sub-bands and whole band (particularly in more southerly LDZs and in the lowest sub-band), RMSE analysis shows degradation in fit for all LDZs when three sub-bands are applied
- On this basis there does not appear to be compelling evidence for dividing the 0-73.2 MWh pa consumption band into three sub-bands: 0-10, 10-20 and 20-73.2 MWh pa
- Therefore, proposal is to retain current practice of representing the 0-73.2 MWh pa consumption range as a single EUC in each LDZ
- However, merit in repeating sub-band analysis in future work plans