

NSPL Scaling Allocation Methods

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- D'Hondt Allocation Method
- Alternate allocation method based on rounding differences

- D'Hondt Allocation method is a highest averages method using the formula: $quot = \frac{V}{S+1}$
- Used to allocate government seats in various countries over the world. V = number of votes for a particular party, S = seats already allocated. Highest quot is awarded next seat.

- Take an NSPL upload per LSE that does not match the desired zonal total

ORGID	XMISSZONEID	UPLOADED	ZONE_TOTAL	DESIRED	SCALED	SCALED_ROUNDED	ROUNDED_TOTAL
A3	ALPHA	185.7	7149.7	7152.7	185.7779194	185.8	7152.3
B10	ALPHA	62.5	7149.7	7152.7	62.52622488	62.5	7152.3
B19	ALPHA	1419.6	7149.7	7152.7	1420.195661	1420.2	7152.3
B17	ALPHA	189	7149.7	7152.7	189.079304	189.1	7152.3
A7	ALPHA	66.1	7149.7	7152.7	66.12773543	66.1	7152.3
B7	ALPHA	67.9	7149.7	7152.7	67.92849071	67.9	7152.3
A8	ALPHA	69.7	7149.7	7152.7	69.72924598	69.7	7152.3
A18	ALPHA	72.3	7149.7	7152.7	72.33033694	72.3	7152.3
A1	ALPHA	199.5	7149.7	7152.7	199.5837098	199.6	7152.3
B18	ALPHA	692.6	7149.7	7152.7	692.8906136	692.9	7152.3
A12	ALPHA	78	7149.7	7152.7	78.03272865	78	7152.3
A2	ALPHA	82.8	7149.7	7152.7	82.83474272	82.8	7152.3
A14	ALPHA	212.5	7149.7	7152.7	212.5891646	212.6	7152.3
A13	ALPHA	349.3	7149.7	7152.7	349.4465656	349.4	7152.3
B13	ALPHA	1337	7149.7	7152.7	1337.561003	1337.6	7152.3
B12	ALPHA	105.9	7149.7	7152.7	105.9444354	105.9	7152.3
B11	ALPHA	107.5	7149.7	7152.7	107.5451068	107.5	7152.3
B9	ALPHA	234.5	7149.7	7152.7	234.5983957	234.6	7152.3
A10	ALPHA	115.8	7149.7	7152.7	115.8485895	115.8	7152.3
B15	ALPHA	117	7149.7	7152.7	117.049093	117	7152.3
B5	ALPHA	0.1	7149.7	7152.7	0.10004196	0.1	7152.3
A11	ALPHA	0.2	7149.7	7152.7	0.20008392	0.2	7152.3
B6	ALPHA	0.3	7149.7	7152.7	0.300125879	0.3	7152.3
A15	ALPHA	0.5	7149.7	7152.7	0.500209799	0.5	7152.3
A16	ALPHA	0.8	7149.7	7152.7	0.800335678	0.8	7152.3
B2	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3
B14	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3
B8	ALPHA	247.7	7149.7	7152.7	247.8039344	247.8	7152.3
B4	ALPHA	1.2	7149.7	7152.7	1.200503518	1.2	7152.3
A4	ALPHA	1.6	7149.7	7152.7	1.600671357	1.6	7152.3
A6	ALPHA	2.8	7149.7	7152.7	2.801174874	2.8	7152.3
B3	ALPHA	3.1	7149.7	7152.7	3.101300754	3.1	7152.3
B1	ALPHA	3.2	7149.7	7152.7	3.201342714	3.2	7152.3
A9	ALPHA	3.3	7149.7	7152.7	3.301384673	3.3	7152.3
A17	ALPHA	257	7149.7	7152.7	257.1078367	257.1	7152.3
A19	ALPHA	259.3	7149.7	7152.7	259.4088018	259.4	7152.3
A5	ALPHA	300.4	7149.7	7152.7	300.5260472	300.5	7152.3
B16	ALPHA	300.8	7149.7	7152.7	300.9262151	300.9	7152.3

Uploaded Total	Desired Zonal Total	Rounded Total
7149.7	7152.7	7152.3

- Trying to allocate the difference between the rounded zonal total and the desired zonal total

Desired Zonal Total - Rounded Total
$7152.7 - 7152.3 = 0.4$

- Because the lowest amount of MW that can be allocated is 0.1MW, a whole number of allocations can be determined by taking the difference / 0.1

$N \text{ allocations} = \text{abs}((\text{Desired Zonal Total} - \text{Rounded Total}) / 0.1)$
$\text{abs}(0.4/0.1) = 4$

- Take all of the uploaded NSPL values for the zone and order them based on Scaled Rounded value:

Because there are 4 allocations, take the top 4 results from the ordered values:

ORGID	UPLOADED	SCALED	SCALED_ROUNDED
B19	1419.6	1420.19566	1420.2
B13	1337	1337.561	1337.6
B18	692.6	692.890614	692.9
A13	349.3	349.446566	349.4

ORGID	UPLOADED	SCALED	SCALED_ROUNDED
B19	1419.6	1420.19566	1420.2
B13	1337	1337.561	1337.6
B18	692.6	692.890614	692.9
A13	349.3	349.446566	349.4
B16	300.8	300.926215	300.9
A5	300.4	300.526047	300.5
A19	259.3	259.408802	259.4
A17	257	257.107837	257.1
B8	247.7	247.803934	247.8
B9	234.5	234.598396	234.6
A14	212.5	212.589165	212.6
A1	199.5	199.58371	199.6
B17	189	189.079304	189.1
A3	185.7	185.777919	185.8
B15	117	117.049093	117
A10	115.8	115.848589	115.8
B11	107.5	107.545107	107.5
B12	105.9	105.944435	105.9
A2	82.8	82.8347427	82.8
A12	78	78.0327286	78
A18	72.3	72.3303369	72.3
A8	69.7	69.729246	69.7
B7	67.9	67.9284907	67.9
A7	66.1	66.1277354	66.1
B10	62.5	62.5262249	62.5
A9	3.3	3.30138467	3.3
B1	3.2	3.20134271	3.2
B3	3.1	3.10130075	3.1
A6	2.8	2.80117487	2.8
A4	1.6	1.60067136	1.6
B4	1.2	1.20050352	1.2
B2	1.1	1.10046156	1.1
B14	1.1	1.10046156	1.1
A16	0.8	0.80033568	0.8
A15	0.5	0.5002098	0.5
B6	0.3	0.30012588	0.3
A11	0.2	0.20008392	0.2
B5	0.1	0.10004196	0.1

- Divide each of the top 4 values by numbers 1-4 successively

ORGID	UPLOADED	SCALED	SCALED_ROUNDED	1	2	3	4
B19	1419.6	1420.19566	1420.2	1420.2	710.1	473.4	355.05
B13	1337	1337.561	1337.6	1337.6	668.8	445.867	334.4
B18	692.6	692.890614	692.9	692.9	346.45	230.967	173.225
A13	349.3	349.446566	349.4	349.4	174.7	116.467	87.35

- Take the top 4 results as 1 allocation of 0.1 MW each

ORGID	UPLOADED	SCALED	SCALED_ROUNDED	1	2	3	4
B19	1419.6	1420.19566	1420.2	1420.2	710.1	473.4	355.05
B13	1337	1337.561	1337.6	1337.6	668.8	445.867	334.4
B18	692.6	692.890614	692.9	692.9	346.45	230.967	173.225
A13	349.3	349.446566	349.4	349.4	174.7	116.467	87.35

- Remove excess MW or allocate needed MW to orgs based on results

ORGID	Column	Result	Adjustment
B19	1	1420	0.1
B13	1	1338	0.1
B19	2	710.1	0.1
B18	1	692.9	0.1

Final Adjustment					
ORGID	Uploaded	Scaled	Scaled Rounded	Adjustment	Final
B19	1419.6	1420.195661	1420.2	0.2	1420.4
B13	1337	1337.561003	1337.6	0.1	1337.7
B18	692.6	692.8906136	692.9	0.1	693

- An alternate method for allocation works by taking the difference of the scaled rounded value and scaled value and determining which values were rounded up or down by the greatest magnitude.
- Each value is then adjusted by 0.1 MW maximum to meet the difference in desired and uploaded values.



Alternate Allocation Method Example

- Take the same NSPL upload as used in D'Hondt method

ORGID	XMISSZONEID	UPLOADED	ZONE_TOTAL	DESIRED	SCALED	SCALED_ROUNDED	ROUNDED_TOTAL
A3	ALPHA	185.7	7149.7	7152.7	185.7779194	185.8	7152.3
B10	ALPHA	62.5	7149.7	7152.7	62.52622488	62.5	7152.3
B19	ALPHA	1419.6	7149.7	7152.7	1420.195661	1420.2	7152.3
B17	ALPHA	189	7149.7	7152.7	189.079304	189.1	7152.3
A7	ALPHA	66.1	7149.7	7152.7	66.12773543	66.1	7152.3
B7	ALPHA	67.9	7149.7	7152.7	67.92849071	67.9	7152.3
A8	ALPHA	69.7	7149.7	7152.7	69.72924598	69.7	7152.3
A18	ALPHA	72.3	7149.7	7152.7	72.33033694	72.3	7152.3
A1	ALPHA	199.5	7149.7	7152.7	199.5837098	199.6	7152.3
B18	ALPHA	692.6	7149.7	7152.7	692.8906136	692.9	7152.3
A12	ALPHA	78	7149.7	7152.7	78.03272865	78	7152.3
A2	ALPHA	82.8	7149.7	7152.7	82.83474272	82.8	7152.3
A14	ALPHA	212.5	7149.7	7152.7	212.5891646	212.6	7152.3
A13	ALPHA	349.3	7149.7	7152.7	349.4465656	349.4	7152.3
B13	ALPHA	1337	7149.7	7152.7	1337.561003	1337.6	7152.3
B12	ALPHA	105.9	7149.7	7152.7	105.9444354	105.9	7152.3
B11	ALPHA	107.5	7149.7	7152.7	107.5451068	107.5	7152.3
B9	ALPHA	234.5	7149.7	7152.7	234.5983957	234.6	7152.3
A10	ALPHA	115.8	7149.7	7152.7	115.8485895	115.8	7152.3
B15	ALPHA	117	7149.7	7152.7	117.049093	117	7152.3
B5	ALPHA	0.1	7149.7	7152.7	0.10004196	0.1	7152.3
A11	ALPHA	0.2	7149.7	7152.7	0.20008392	0.2	7152.3
B6	ALPHA	0.3	7149.7	7152.7	0.300125879	0.3	7152.3
A15	ALPHA	0.5	7149.7	7152.7	0.500209799	0.5	7152.3
A16	ALPHA	0.8	7149.7	7152.7	0.800335678	0.8	7152.3
B2	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3
B14	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3
B8	ALPHA	247.7	7149.7	7152.7	247.8039344	247.8	7152.3
B4	ALPHA	1.2	7149.7	7152.7	1.200503518	1.2	7152.3
A4	ALPHA	1.6	7149.7	7152.7	1.600671357	1.6	7152.3
A6	ALPHA	2.8	7149.7	7152.7	2.801174874	2.8	7152.3
B3	ALPHA	3.1	7149.7	7152.7	3.101300754	3.1	7152.3
B1	ALPHA	3.2	7149.7	7152.7	3.201342714	3.2	7152.3
A9	ALPHA	3.3	7149.7	7152.7	3.301384673	3.3	7152.3
A17	ALPHA	257	7149.7	7152.7	257.1078367	257.1	7152.3
A19	ALPHA	259.3	7149.7	7152.7	259.4088018	259.4	7152.3
A5	ALPHA	300.4	7149.7	7152.7	300.5260472	300.5	7152.3
B16	ALPHA	300.8	7149.7	7152.7	300.9262151	300.9	7152.3

Uploaded Total	Desired Zonal Total	Rounded Total
7149.7	7152.7	7152.3

- Determine difference between Scaled Rounded value and Scaled value

ORGID	XMSSNZONEID	UPLOADED	ZONE_TOTAL	DESIRED	SCALED	SCALED_ROUNDED	ROUNDED_TOTAL	ROUNDED_DIFF
A3	ALPHA	185.7	7149.7	7152.7	185.7779194	185.8	7152.3	0.022080647
B10	ALPHA	62.5	7149.7	7152.7	62.52622488	62.5	7152.3	-0.026224877
B19	ALPHA	1419.6	7149.7	7152.7	1420.195661	1420.2	7152.3	0.004338644
B17	ALPHA	189	7149.7	7152.7	189.079304	189.1	7152.3	0.020695973
A7	ALPHA	66.1	7149.7	7152.7	66.12773543	66.1	7152.3	-0.027735429
B7	ALPHA	67.9	7149.7	7152.7	67.92849071	67.9	7152.3	-0.028490706
A8	ALPHA	69.7	7149.7	7152.7	69.72924598	69.7	7152.3	-0.029245982
A18	ALPHA	72.3	7149.7	7152.7	72.33033694	72.3	7152.3	-0.030336937
A1	ALPHA	199.5	7149.7	7152.7	199.5837098	199.6	7152.3	0.016290194
B18	ALPHA	692.6	7149.7	7152.7	692.8906136	692.9	7152.3	0.009386408
A12	ALPHA	78	7149.7	7152.7	78.03272865	78	7152.3	-0.032728646
A2	ALPHA	82.8	7149.7	7152.7	82.83474272	82.8	7152.3	-0.034742716
A14	ALPHA	212.5	7149.7	7152.7	212.5891646	212.6	7152.3	0.01083542
A13	ALPHA	349.3	7149.7	7152.7	349.4465656	349.4	7152.3	-0.04656559
B13	ALPHA	1337	7149.7	7152.7	1337.561003	1337.6	7152.3	0.03899744
B12	ALPHA	105.9	7149.7	7152.7	105.9444354	105.9	7152.3	-0.044435431
B11	ALPHA	107.5	7149.7	7152.7	107.5451068	107.5	7152.3	-0.045106788
B9	ALPHA	234.5	7149.7	7152.7	234.5983957	234.6	7152.3	0.001604263
A10	ALPHA	115.8	7149.7	7152.7	115.8485895	115.8	7152.3	-0.048589451
B15	ALPHA	117	7149.7	7152.7	117.049093	117	7152.3	-0.049092969
B5	ALPHA	0.1	7149.7	7152.7	0.10004196	0.1	7152.3	-4.19598E-05
A11	ALPHA	0.2	7149.7	7152.7	0.20008392	0.2	7152.3	-8.39196E-05
B6	ALPHA	0.3	7149.7	7152.7	0.300125879	0.3	7152.3	-0.000125879
A15	ALPHA	0.5	7149.7	7152.7	0.500209799	0.5	7152.3	-0.000209799
A16	ALPHA	0.8	7149.7	7152.7	0.800335678	0.8	7152.3	-0.000335678
B2	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3	-0.000461558
B14	ALPHA	1.1	7149.7	7152.7	1.100461558	1.1	7152.3	-0.000461558
B8	ALPHA	247.7	7149.7	7152.7	247.8039344	247.8	7152.3	-0.003934431
B4	ALPHA	1.2	7149.7	7152.7	1.200503518	1.2	7152.3	-0.000503518
A4	ALPHA	1.6	7149.7	7152.7	1.600671357	1.6	7152.3	-0.000671357
A6	ALPHA	2.8	7149.7	7152.7	2.801174874	2.8	7152.3	-0.001174874
B3	ALPHA	3.1	7149.7	7152.7	3.101300754	3.1	7152.3	-0.001300754
B1	ALPHA	3.2	7149.7	7152.7	3.201342714	3.2	7152.3	-0.001342714
A9	ALPHA	3.3	7149.7	7152.7	3.301384673	3.3	7152.3	-0.001384673
A17	ALPHA	257	7149.7	7152.7	257.1078367	257.1	7152.3	-0.007836692
A19	ALPHA	259.3	7149.7	7152.7	259.4088018	259.4	7152.3	-0.008801768
A5	ALPHA	300.4	7149.7	7152.7	300.5260472	300.5	7152.3	-0.026047247
B16	ALPHA	300.8	7149.7	7152.7	300.9262151	300.9	7152.3	-0.026215086



Alternate Allocation Method Example Cont'd

Order the results based on if uploaded total is too high or too low. If too high, order by which values were rounded up the most to determine which should be allocated down. If too low, order by which values were rounded down the most to determine which should be allocated up.

ORGID	UPLOADED	SCALED	SCALED_ROUNDED	ROUNDED_DIFF
B15	117	117.049093	117	-0.049092969
A10	115.8	115.8485895	115.8	-0.048589451
A13	349.3	349.4465656	349.4	-0.04656559
B11	107.5	107.5451068	107.5	-0.045106788
B12	105.9	105.9444354	105.9	-0.044435431
A2	82.8	82.83474272	82.8	-0.034742716
A12	78	78.03272865	78	-0.032728646
A18	72.3	72.33033694	72.3	-0.030336937
A8	69.7	69.72924598	69.7	-0.029245982
B7	67.9	67.92849071	67.9	-0.028490706
A7	66.1	66.12773543	66.1	-0.027735429
B10	62.5	62.52622488	62.5	-0.026224877
B16	300.8	300.9262151	300.9	-0.026215086
A5	300.4	300.5260472	300.5	-0.026047247
A19	259.3	259.4088018	259.4	-0.008801768
A17	257	257.1078367	257.1	-0.007836692
B8	247.7	247.8039344	247.8	-0.003934431
A9	3.3	3.301384673	3.3	-0.001384673
B1	3.2	3.201342714	3.2	-0.001342714
B3	3.1	3.101300754	3.1	-0.001300754
A6	2.8	2.801174874	2.8	-0.001174874
A4	1.6	1.600671357	1.6	-0.000671357
B4	1.2	1.200503518	1.2	-0.000503518
B2	1.1	1.100461558	1.1	-0.000461558
B14	1.1	1.100461558	1.1	-0.000461558
A16	0.8	0.800335678	0.8	-0.000335678
A15	0.5	0.500209799	0.5	-0.000209799
B6	0.3	0.300125879	0.3	-0.000125879
A11	0.2	0.20008392	0.2	-8.39196E-05
B5	0.1	0.10004196	0.1	-4.19598E-05
B9	234.5	234.5983957	234.6	0.001604263
B19	1419.6	1420.195661	1420.2	0.004338644
B18	692.6	692.8906136	692.9	0.009386408
A14	212.5	212.5891646	212.6	0.01083542
A1	199.5	199.5837098	199.6	0.016290194
B17	189	189.079304	189.1	0.020695973
A3	185.7	185.7779194	185.8	0.022080647
B13	1337	1337.561003	1337.6	0.03899744

- Take the top 4 results and allocate 0.1 MW to each.

Rank	ORGID	Uploaded	SCALED	SCALED_ROUNDED	ROUND_DIFF	Adjustment
1	B15	117	117.049093	117	-0.04909297	0.1
2	A10	115.8	115.8485895	115.8	-0.04858945	0.1
3	A13	349.3	349.4465656	349.4	-0.04656559	0.1
4	B11	107.5	107.5451068	107.5	-0.04510679	0.1

Final Adjustment					
ORG	Uploaded	SCALED	Scaled Rounded	Adjustment	Final
B15	117	117.049093	117	0.1	117.1
A10	115.8	115.848589	115.8	0.1	115.9
A13	349.3	349.446566	349.4	0.1	349.5
B11	107.5	107.545107	107.5	0.1	107.6