

# Legacy SEM Market Operator Monthly Report May 2019

# **Table of Contents**

EXECUTIVE SUMMARY	3
MONTHLY STATISTICS	4
TRADING AND SETTLEMENT CODE BREACHES	4
FINANCIAL STATISTICS	5
Total Currency Costs  Financial Changes between Initial Settlement and Subsequent Reruns	7
HELPDESK CALL STATISTICS	12
DISPUTES AND QUERIES	13
5.1.2 Data Queries5.1.3 Settlement Queries	
CENTRAL SYSTEMS	14
6.1 LIST OF SYSTEM ERRORS AND RE-RUNS	14
OCCASIONAL COMPONENTS	15
7.1 DISASTER RECOVERY/BUSINESS CONTINUITY TESTS	15
APPENDIX A: DETAIL OF TRADING AND SETTLEMENT CODE BREACHES	16
DATA PROVIDER	16 16 16 16
APPENDIX B: LIST OF QUERIES BY TYPE	17
APPENDIX C: LIST OF ALL SYSTEM ERRORS AND FAILURES	18
APPENDIX D: DETAILS OF OPERATIONAL TIMINGS	19
APPENDIX E: IMPERFECTIONS CHARGE	
APPENDIX F: DEFAULT COMMERCIAL OFFER DATA USED	
APPENDIX G: TOTAL CHARGES AND PAYMENTS DATA	
APPENDIX H: FULL BALANCING COSTS	
APPENDIX I: MSP ALGORITHMS	25

#### **Executive Summary**

The Legacy Single Electricity Market was in operation under its previous arrangements from the 1st November 2007 until the 30th September 2018. On 1 October 2018 the Integrated Single Electricity Market (I-SEM) went live and is now the enduring operational electricity market in Ireland and Northern Ireland.

This Single Electricity Market Operator's (SEMO) report covers the month of operation of May 2019 regarding the Legacy Single Electricity Market and is published in accordance with the Single Electricity Market (SEM) Committee decision and Clause 2.144 of the Trading and Settlement Code.

During the month of May 2019, there was no late Credit Report publication as per the Trading and Settlement Code timelines.

There were 5 defaults by Participants during May 2019. The largest of these was a Capacity March 2018 M+13 invoice for €339.33 which was remedied on the same day.

There were no Credit Cover Increase defaults during May 2019 as per the Trading and Settlement code timelines.

49 general queries were received in May 2019. During the same period 54 general queries were resolved.

Formal queries continue to be answered well within the timelines stipulated in the Trading and Settlement Code.

# **Monthly Statistics**

#### **Trading and Settlement Code Breaches**

Breaches of the Trading and Settlement Code were noted in the following areas.

Trading and Settlement Code Breaches					
	Major	Minor			
Data Providers	-	-			
Market Participants	Pricing & Scheduling	-	-		
	Settlement	-	-		
	Funds Transfer	5	-		
	Credit Risk Management	-	-		
SEMO	-	-			
	Settlement	-	-		
	Funds Transfer	-	-		
	Credit Risk Management	-	-		
	Other	-	-		
Total		5	-		

Table 1 – Trading and Settlement Code Breaches

Further details of each of the Trading and Settlement code breaches noted above are set out in <u>Appendix A</u>

#### Key:

- Major Breach late publishing of invoices, default notices issued for non-payment or similar.
- Minor Breach deadlines not met, but no financial implication to Participants. This includes late posting of pricing and settlement runs.

#### **Financial Statistics**

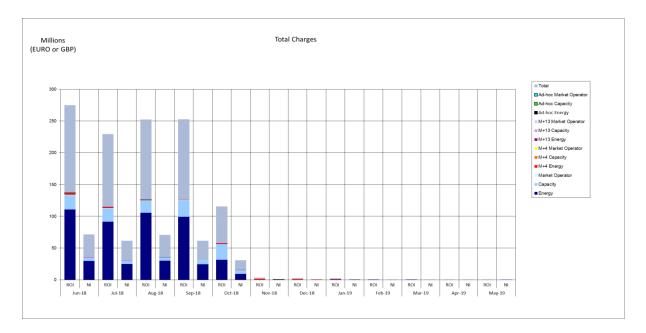


Figure 1 - Total Charges for Each Currency

Market	May	y-19
	ROI	NI
Energy	€0	£0
Capacity	€0	£0
Market Operator	€0	£0
M+4 Energy	€0	£0
M+4 Capacity	€0	£0
M+4 Market Operator	€0	£0
M+13 Energy	€146,653	£221,860
M+13 Capacity	€27,512	£58,563
M+13 Market Operator	€858	£1,289
Ad-hoc Energy	€0	£0
Ad-hoc Capacity	€0	£0
Ad-hoc Market Operator	€0	£0
Total	€175,023	£281,712

**Table 2 - Total Charges for Each Currency** 

Notes relating to Table 2 and 3:

• Month of inclusion based on Invoice Date.

- Amounts are after application of Settlement Reallocations.
- Previous month's data is available in Appendix G.

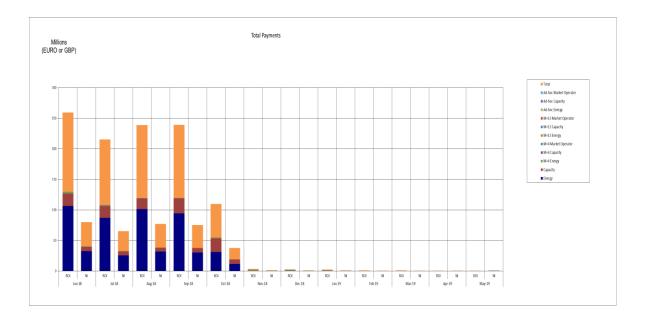


Figure 2 - Total Payments for Each Currency

Market	Ma	y-19
	ROI	NI
Energy	€0	£0
Capacity	€0	£0
Market Operator	€0	£0
M+4 Energy	€0	£0
M+4 Capacity	€0	£0
M+4 Market Operator	€0	£0
M+13 Energy	€146,830	£224,554
M+13 Capacity	€27,410	£58,483
M+13 Market Operator	€859	£1,287
Ad-hoc Energy	€0	£0
Ad-hoc Capacity	€0	£0
Ad-hoc Market Operator	€0	£0
Total	€175,099	£284,325

**Table 3 - Total Payments for Each Currency** 

#### **Total Currency Costs**

Currency Costs for Initial Invoicing are no longer calculated in the SEM since Week 39 2018.

#### **Financial Changes between Initial Settlement and Subsequent Reruns**

The following graphs provide a breakdown of resettlement amounts for the M+13 period of April 2018 for Energy and Capacity.

#### 3.1.1 Energy Market

Note: - For Figure 3, 4, net values are shown.

- Positive amounts indicate net additional payments by Participants (Charges).
- Negative amounts indicate net additional payment to be made <u>to</u> Participants (Payments).

The reverse is true for Figure 5

#### M+4 Resettlement

M+4 Energy Resettlement is no longer required as part of legacy SEM wind down.

#### M+13 Resettlement

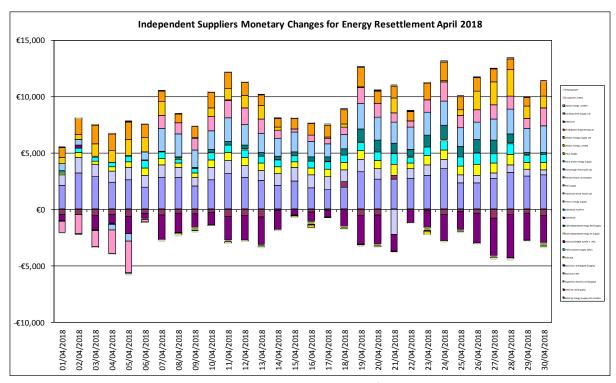


Figure 3 - Independent Suppliers Monetary Changes for Energy Resettlement – April 2018

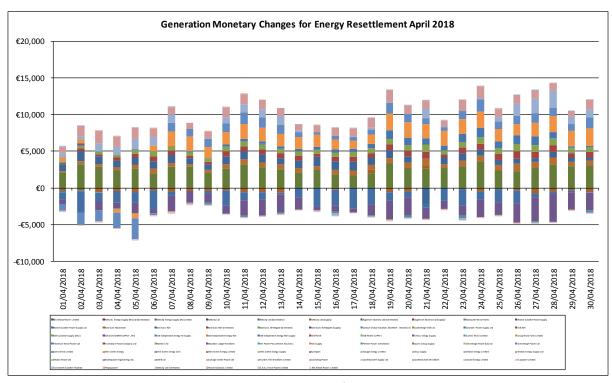


Figure 4 - Generation Monetary Changes for Energy Resettlement – April 2018

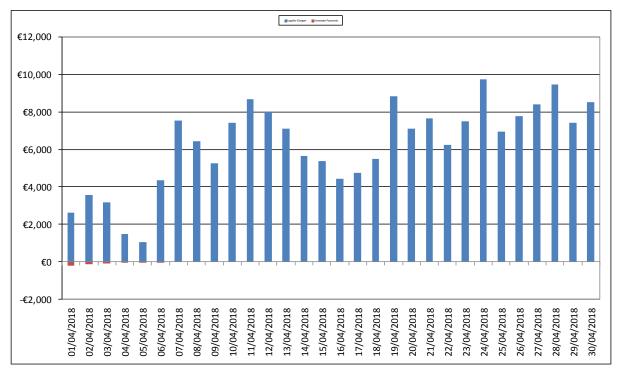


Figure 5 - Total Monetary Changes for Energy Resettlement -April 2018

#### 3.1.2 Capacity Market

Note: - For Figure 8 net values are shown.

- Positive amounts indicate net additional payments by Participants (Charges).
- Negative amounts indicate net additional payment to be made <u>to</u> Participants (Payments)

The reverse is true for Figure 6.

The changes in Capacity are graphed below showing the variance in monetary terms as opposed to percentage terms. As the Jurisdictional Error Supply Units can be significantly affected by resettlement, this is more reflective of the monetary redistribution in M+4 and M+13. Please also note that as of June 2011 the Jurisdictional Error Supply Unit (ROI) is now a Retail Supply unit. The Jurisdictional Error Supply Unit (NI) is unchanged.

#### M+4 Resettlement

M+4 Capacity Resettlement is no longer required as part of legacy SEM wind down.

#### M+13 Resettlement

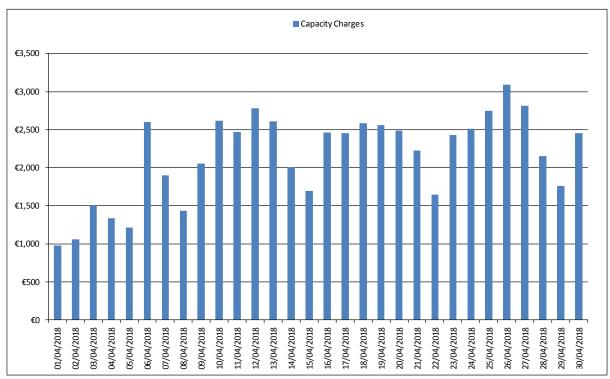


Figure 6 - Independent Suppliers Monetary Changes for Capacity Resettlement - April 2018

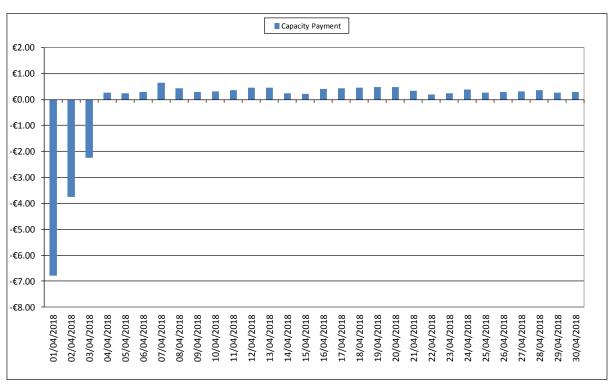


Figure 7 - All Generation Monetary Change for Capacity Resettlement - April 2018

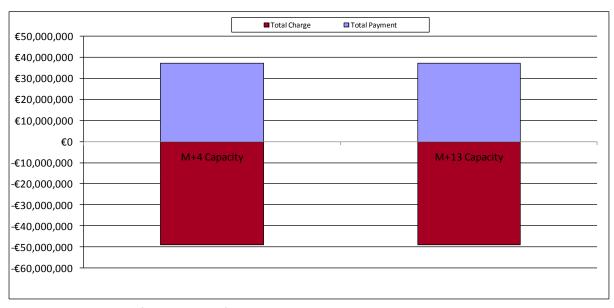


Figure 8 - Comparison of Distribution of Monetary Amounts between M+4 Capacity Resettlement and M+13 Capacity Resettlement –April 2018.

#### **Helpdesk Call Statistics**

The statistics presented in Table 4 - Helpdesk Call Statistics covers the month of May 2019

# Market Helpdesk Report: 01/05/19 to 31/05/19

	Received	Resolved	Not	Resolved	Resolution	Resolved
		within the	Resolved	in the	Time	On Time
		period		period	(Working Days)	
Normal	49	45	4	54	2.48	47
Important	0	0	0	0	0.00	0
Urgent	0	0	0	0	0.00	0
Settlement	0	0	0	0	0.00	0
Credit	0	0	0	0	0.00	0
Dispute	0	0	0	0	0.00	0
Data	0	0	0	0	0.00	0
Total/Average	49	45	4	54	0.50	47

Table 4 - Helpdesk Statistics

#### **Definitions:**

- Resolved within the Period refers to queries raised and resolved within the calendar month of May 2019.
- Resolved in the Period refers to queries resolved within May 2019, and includes queries raised before this time.
- Resolution Time (Working Days) refers to average time to resolve, in working days, for this category of query. It is calculated based on all queries for the category, not just May 2019.
- Not Resolved refers to queries raised but not resolved within May 2019.
- Urgent are general queries which may have an impact on market operations. SEMO has an internal objective to resolve these within 3 working days; however, this is not a mandated service level under the Trading and Settlement Code.
- Disputes are where a dispute has been raised over the outcome of a data or settlement query.

The average resolution time for General Queries has increased by 0.91 working days from 1.57 in April 2019 to 2.48 in May 2019. SEMO has a metric to resolve General Queries within 20 Working Days. These include queries received over the phone and e-mail.

Data and Settlement Queries generally continue to be responded to within the timelines required by the Trading and Settlement Code, i.e. one calendar month. No Formal Query timeline extensions were required during May 2019 with regard to formal Settlement Queries.

#### **Disputes and Queries**

#### 5.1.1 Disputes

No Settlement Disputes were raised during the month of May 2019.

Topic	Number Of Queries

Table 5– Upheld Dispute Queries by Topic

#### 5.1.2 Data Queries

There were no formal data queries received during the month of May 2019.

Topic	Number Of Queries

Table 6- Upheld Data Queries by Topic

#### **5.1.3 Settlement Queries**

There were no formal queries received during the month of May 2019.

Topic	Number Of Queries

Table 7 – Upheld Settlement Queries by Topic

#### Unresolved Queries

There are no unresolved SEM Settlement Queries as of the 18<sup>th</sup> June 2019.

# **Central Systems**

#### 6.1 List of System Errors and Re-runs

Details are provided in <u>Appendix C</u>: List of All Systems Errors and Failures

### **6.1.1 Re-Pricing / Resettlement Runs**

There were no Ad hoc Re-Settlement run carried out in May 2019.

#### **6.1.2 System Errors**

There were no Market Application defects found in May 2019.

Details are provided in <u>Appendix C</u>: List of All Systems Errors and Failures

# **Occasional Components**

# 7.1 Disaster Recovery/Business Continuity Tests

There were no scheduled Business Continuity tests performed during May 2019.

#### 7.2 Communications or Systems Failures

There were on communication failures during May 2019.

# 7.3 Denial of Service Attacks

There was no Denial of Service Attacks during May 2019.

# **Appendix A: Detail of Trading and Settlement Code Breaches**

#### Data Provider

There were no breaches to report in May 2019.

#### **Market Participant**

Ops Date Identified	Run Type	Quality or Timing	Party	Issue Type	Description	Cause	Resolution	T and SC Breach
30/05/2019	Money In	Timing	Participant	Payment Default	Just Energy (Ireland) Ltd (PT_400211) defaulted on an Energy Week 16 M+13 2018	Participant Error	A default letter was issued to the Participant.	Major
09/05/2019	Money In	Timing	Participant	Payment Default	Just Energy (Ireland) Ltd (PT_400211) defaulted on an Energy Week 13 M+13 2018	Participant Error	A default letter was issued to the Participant.	Major
02/05/2019	Money In	Timing	Participant	Payment Default	AC Automation Ltd (PT_500064) defaulted on an Capacity March M+13 2018	Participant Error	A default letter was issued to the Participant.	Major
02/05/2019	Money In	Timing	Participant	Payment Default	Activation Energy DSU Ltd (PT_500098) defaulted on an Capacity March M+13 2018	Participant Error	A default letter was issued to the Participant.	Major
02/05/2019	Money In	Timing	Participant	Payment Default	Just Energy (Ireland) Ltd (PT_400211) defaulted on an Capacity March M+13 2018	Participant Error	A default letter was issued to the Participant.	Major

Table 8 – Trading and Settlement Code Breaches – Market Participants

#### SEMO - Settlements

There were no breaches to report in May 2019.

#### SEMO - Pricing and Scheduling

There were no breaches to report in May 2019.

#### SEMO - Funds Transfer

There were no breaches to report in May 2019.

#### SEMO - Credit Management

There were no breaches to report in May 2019.

#### SEMO - Other

There were no breaches to report in May 2019.

Appendix B: List of Queries by Type

# **Appendix C: List of All System Errors and Failures**

The definitions of the statuses used for the List of All System Errors and Failures are:

- In Progress: Fix being identified and implemented.
- Resolved: Fix has been implemented, but reruns have not been performed.
- Closed: Required reruns have been performed and error-failure has been completely rectified.

Note: Items in the List of All System Errors and Failures that have status 'Closed' in this month's report will not appear in subsequent Monthly Market Operator Reports as they are no longer open issues.

There were no Market Application defects found in May 2019.

Issue No.	Description	Effect	Fixed from	Re-Pricing	Resettlement	Status
-	-	-	-	-	-	-

**Table 9 - List of System Errors and Failures** 

# **Appendix D: Details of Operational Timings**

<b>Appendix E: Imperfections Charge</b>	<b>Appendix</b>	E: Im	perfection	ons (	harge
---	-----------------	-------	------------	-------	-------

<b>Appendix F: Default Commercial Offer Data Use</b>	þ
--	---

# **Appendix G: Total Charges and Payments Data**

The tables below list historical values for Total Charges and Total Payments in the SEM by month and currency since start of the SEM.

- Month of inclusion based on invoice date.
- Amounts are after application of Settlement Reallocation.

Table 10 - Total Charges by Month

Market		Energy	Capacity	Market Operator	M+4 Energy	M+4 Capacity	M+4 Market Operator	M+13 Energy	M+13 Capacity	M+13 Market Operator	Ad-hoc Energy	Ad-hoc Capacity	Ad-hoc Market Operator	Total
Dec-17	ROI	£108,724,596.96	£30,213,314.37	£1,032,089.87	£386,043.20	£61,761.35	£2,747.14	£91,579.26	£20,859.90	£558.92	£354,184.96	£196,828.99	£196,828.99	141,281,393.91
	NI	£35,009,530.01	£7,435,318.60	£270,080.16	£180,156.15	£72,189.79	£1,323.93	£45,368.58	£11,660.54	£288.42	£58,353.41	£11,091.72	£11,091.72	43,106,453.03
Jan-18	ROI	£66,824,387.64	£31,236,649.01	£796,356.35	£272,646.34	£136,640.90	£1,965.48	£56,253.29	£18,996.49	£347.05	£320.44	£2,955.28	£2,955.28	99,350,473.55
	NI	£21,801,403.00	£8,153,351.60	£211,139.18	£105,764.72	£76,139.37	£734.71	£22,938.26	£7,983.39	£150.76	£275,137.08	£85,908.52	£85,908.52	30,826,559.11
Feb-18	ROI	£73,894,145.46	£29,049,213.63	£821,611.24	£239,608.70	£442,118.67	£1,727.82	£34,763.85	£73,083.63	£225.56	£0.00	£0.00	£0.00	104,556,498.56
	NI	£23,559,299.88	£8,534,268.31	£214,366.57	£214,152.33	£80,930.26	£1,369.32	£27,935.49	£69,821.89	£160.29	£0.00	£0.00	£0.00	32,702,304.34
Mar-18	ROI	£83,664,309	£0	£194,992	£674,215	£284,390	£3,439		£158,339	£583	£0	£0	£0	£85,075,447
	NI	£32,334,060	£0	£50,052	£163,160	£102,559	£899	£50,645	£71,098	£380	£0	£0	£0	£32,772,854
Apr-18	ROI	£69,317,323	£23,231,814	£783,294	£970,456	£256,503	£5,627	£71,337	£267,758	£516	£0	£0	£0	£94,904,628
	NI	£23,659,859	£7,429,700	£190,874	£151,575	£33,802	£816		£115,446	£533	£0	£0	£0	£31,655,427
May-18	ROI	£77,304,833	£22,485,464	£739,608	£1,395,991	£384,788	£8,896		£221,592	£645	£0	£0	£0	£102,631,308
	NI	£21,411,034	£6,005,961	£181,189	£109,484	£23,056	£674	£114,249		£823	£0	£0	£0	£27,909,222
Jun-18	ROI	£110,729,885	£22,412,350	£892,166	£2,294,801	£444,742	£12,880	£101,002	£74,247	£805	£417,974	£0	£0	£137,380,852
	NI	£29,772,183	£5,362,582	£213,124	£111,573	£27,385	£607	£183,273	£95,348	£1,350	£16	£0	£0	£35,767,439
Jul-18	ROI	£91,566,909	£20,553,253	£732,984	£1,335,293	£324,878	£6,367	£47,651	£89,704	£431	£0	£0	£0	£114,657,469
	NI	£24,824,845	£5,305,704	£169,676	£164,048	£26,544	£654	£124,634	£100,028	£1,063	£0	£0	£0	£30,717,196
Aug-18	ROI	£105,558,500	£18,695,229	£882,539	£559,068	£165,878	£3,317	£48,971	£87,850	£370	£206,636	£0	£0	£126,208,357
	NI	£29,846,140	£5,022,974	£217,086	£248,040	£37,238	£1,329		£31,064	£85	£5,825	£0	£0	£35,420,033
Sep-18	ROI	£99,146,293	£25,829,272	£731,194	£468,008	£88,260	£2,304	£34,658	£89,979	£269	£0	£0	£0	£126,390,237
	NI	£24,452,280	£5,983,336	£181,019	£68,235	£13,992	£365	£6,470	£18,637	£53	£0	£0	£0	£30,724,387
Oct-18	ROI	£31,530,401	£24,300,026	£595,030	£865,326	£183,408	£4,241	£148,617	£39,733	£1,136	£0	£0	£0	£57,667,916
	NI	£9,455,756	£5,693,202	£150,691	£108,258	£35,783	£1,126		£2,164	£108	£0	£0	£0	£15,455,699
Nov-18	ROI	£0	£0	£0	£1,160,011	£185,595	£6,269		£78,711	£1,598	£31	£0	£0	£1,745,196
	NI	£0	£0	£0	£333,889	£67,914	£1,675		£34,554	£589	£82,261	£0	£0	£607,304
Dec-18	ROI	£0	£0	£0	£806,243	£170,047	£6,269		£78,711	£1,598	£0	£0	£0	£1,375,850
	NI	£0	£0	£0	£248,530	£72,567	£1,675	£71,305	£21,025	£589	£0	£0	£0	£415,692
Jan-19	ROI	£0	£0	£0	£500,065	£75,786	£2,328	£400,377	£112,479	£2,266	£0	£0	£0	£1,093,300
	NI	£0	£0	£0	£192,903	£39,123	£858	£72,043	£22,307	£395	£0	£0	£0	£327,629
Feb-19	ROI	£0	£0	£0	£13,836	£0	£69		£81,327	£1,783	£0	£0	£0	£386,454
	NI	£0	£0	€0	£8,561	£0	£3		£15,274	£245	£0	£0	£0	£62,755
Mar-19	ROI	£0	£0	£0	£0	£0	£0		£71,255	£1,635	£0	£0	£0	£369,437
	NI	£0	£0	£0	£0	£0	£0		£23,689	£465	£0	£0	£0	£107,582
Apr-19	ROI	£0	£0	£0	£0	£0	£0	,	£18,280	£469	£0	£0	£0	£111,066
	NI	£0	£0	£0	£0	£0	£0		£39,070	£693	£0	£0	£0	£178,104
	ROI	€0	£0	£0	£0	£0	£0	£146,653	£27,512	£858	£0	£0	£0	£175,023
May-19	NI	£0	£0	£0	£0	£0	£0	£221,860	£58,563	£1,289	£0	£0	£0	£281,712

Market		Energy	Capacity	M+4 Energy	M+4 Capacity	M+4 Market Operator	M+13 Energy	M+13 Capacity	M+13 Market Operator	Ad-hoc Energy	Ad-hoc Capacity	Ad-hoc Market Operator	Total
Dec-17	ROI	£106,835,064.33	£27,957,453.42	£397,100.73	£98,040.58	£2,984.78	£91,151.49	£20,818.71	£556.31	£336,745.88	£173,793.95	£644.35	1135,914,354.53
	NI	£37,790,994.99	£9,466,911.04	£181,354.27	£40,293.46	£1,305.84	£45,734.51	£11,769.44	£290.16	£57,624.89	£31,404.66	£288.16	147,627,971.42
Jan-18	ROI	£66,556,846.79	£30,184,516.90	£264,692.47	£140,421.82	£600.74	£56,245.08	£18,749.58	£346.74	£37.23	£16,333.45	£0.00	197,238,790.80
, , , , , , , , , , , , , , , , , , ,	NI	£24,598,645.75	£9,075,819.96	£105,487.86	£72,782.55	£685.44	£22,940.69	£8,209.56	£150.74	£270,100.11	£74,414.80	£1,311.93	134,230,549.39
Feb-18	ROI	£73,649,373.32	£28,234,770.33	£241,672.56	£232,622.38	£1,496.49	£33,903.63	£90,769.95	£220.04	£0.00	£0.00	£0.00	1102,484,828.70
	NI	£26,522,258.99	£9,276,145.07	£211,340.35	£267,052.17	£1,368.55	£28,772.37	£54,122.68	£164.70	£0.00	£0.00	£0.00	136,361,224.88
Mar-18	ROI	£85,513,434	£0	£691,820	£303,976	£3,238	£94,253	£188,330	£578	£0	£0	£0	£86,795,628
	NI	£37,437,280	£0	£170,090	£85,702	£898	£51,265	£45,028	£384	£0	£0	£0	£37,790,647
Apr-18	ROI	£69,267,924	£20,860,692	£945,469	£237,063	£3,887	£193,101	£310,897	£516	£0	£0	£0	£91,819,549
	NI	£32,845,010	£9,450,019	£150,560	£50,635	£818	£72,832	£77,370	£533	£0	£0	£0	£42,647,777
May-18	ROI	£73,986,199	£21,003,133	£1,333,265	£344,914	£4,639	£89,323	£138,550	£645	£0	£0	£0	£96,900,668
	NI	£23,049,174	£7,260,826	£111,164	£58,347	£686	£114,206	£136,262	£823	£0	£0	£0	£30,731,488
Jun-18	ROI	£106,186,794	£20,271,690	£2,266,420	£404,741	£6,062	£101,282	£80,377	£791	£394,961	£0	£884	£129,714,001
	NI	£32,258,574	£7,261,868	£115,238	£62,628	£627	£183,374	£89,625	£1,350	£852	£0	£2	£39,974,138
Jul-18	ROI	£86,768,139	£19,045,125	£1,383,691	£307,142	£4,724	£47,761	£123,685	£431	£0	£0	£0	£107,680,698
	NI	£25,508,813	£6,579,825	£161,500	£42,347	£738	£124,667	£69,402	£1,063	£0	£0	£0	£32,488,356
Aug-18	ROI	£101,015,744	£17,337,990	£549,108	£161,828	£2,583	£49,204	£91,882	£311	£145,525	£0	£0	£119,354,176
	NI	£31,815,843	£6,244,149	£243,991	£41,050	£1,252	£10,283	£27,631	£85	£7,589	£0	£0	£38,391,874
Sep-18	ROI	£94,348,675	£24,483,726	£469,838	£87,398	£2,373	£34,655	£85,446	£269	£0	£0	£0	£119,512,381
	NI	£30,233,883	£7,164,947	£67,373	£14,752	£295	£6,469	£22,731	£53	£0	£0	£0	£37,510,502
Oct-18	ROI	£30,964,136	£22,562,931	£878,875	£189,837	£5,160	£148,618	£39,721	£1,133	£0	£0	£0	£54,790,411
	NI	£11,418,621	£7,231,162	£107,709	£30,084	£1,123	£8,612	£2,161	£110	£0	£0	£0	£18,799,581
Nov-18	ROI	£0	£0	£1,157,683	£185,071	£6,166	£320,379	£79,187	£2,118	£2,649	£0	£8	£1,753,261
	NI	£0	£0	£333,518	£67,787	£1,659	£86,279	£34,163	£589	£38,925	£0	£155	£563,074
Dec-18	ROI	£0	£0	£806,949	£170,134	£6,166	£328,215	£88,275	£1,873	£0	£0	£0	£1,401,613
5	NI	£0	£0	£248,726	£67,787	£1,659	£71,328	£21,036	£407	£0	£0	£0	£410,943
Jan-19	ROI	£0	£0	£496,510	£73,932	£2,088	£400,379	£112,477	£2,266	£0	£0	£0	£1,087,652
	NI	£0	£0	£192,014	£40,658	£870	£72,043	£22,306	£395	£0	£0	£0	£328,286
Feb-19	ROI	£0	£0	£13,361	£0	£69	£289,397	£81,399	£1,783	£0	£0	£0	£386,010
	NI	£0	£0	£6,884	£0	£27	£38,659	£15,295	£245	£0	£0	£0	£61,110
Mar-19	ROI	£0	£0	£0	£0	£0	£296,600	£71,163	£1,635	£0	£0	£0	£369,398
	NI	£0	£0	£0	£0	£0	£83,443	£23,663	£465	£0	£0	£0	£107,570
Apr-19	ROI	£0	£0	£0	£0	£0	£92,271	£18,188	£469	£0	£0	£0	£110,928
	NI	£0	£0	£0	£0	£0	£138,318	£38,999	£692	£0	£0	£O	£178,008
	ROI	£0	£0	£0	£0	£0	£146,830	£27,410	£859	£0	£0	£0	£175,099
May-19	NI	£0	£0	£0	£0	£0	£224,554	£58,483	£1,287	£0	£0	£0	£284,325

Table 11 - Total Payments by Month

# **Appendix H: Full Balancing Costs**

# Appendix I: MSP Algorithms