

SDAC report on the ‘partial decoupling’ incident of January 13th 2021 – External version

08/02/2021

Version: 1.0

Executive summary

On Wednesday, January the 13th of 2021, an incident took place in the Day Ahead Market Coupling process that led to a partial decoupling of GME, BSP, EXAA, HEnEx and CROPEX, affecting the day ahead trades with delivery day Thursday, January the 14th in the Multi-Regional Coupling (MRC). More specifically, due to GME's partial decoupling, also BSP and the HEnEx, and the EXAA markets were decoupled from the MRC process. The CROPEX market was run together with the market coupling session, but with no capacity with MRC markets, due to the impacted interconnector SI-HR, which is currently the only link to MRC. The following five interconnectors were decoupled: IT-FR, IT-AT, SI-AT, SI-HR and IT-GR.

The cause was an unexpected technical issue triggered by a hidden parameter of GME's Local Trading System that prevented GME to create the order books. The problem was solved at around 13:00, when the partial decoupling had already been declared.

Following the partial decoupling of GME, BSP, EXAA, and HEnEx from MRC, Shadow Auctions for Cross-Zonal Capacity were run for five interconnectors by JAO. Following the declaration of the partial decoupling by the Incident Committee, the shadow auction results were sent to market participants. For the impacted interconnectors, shadow auctions were triggered in line with the fallback procedures.

Local auctions were successfully completed shortly after 14:00 for the concerned local markets (GME, BSP, EXAA, and HEnEx).

Although this partial decoupling did not lead to any grid security issues anywhere in Europe, this incident caused a disruption of the Day Ahead Market within the Multi-Regional Coupling. More specifically, processes on market parties' and TSOs' side were impacted; Italy, Slovenia, and Greece were decoupled from the MRC process. Croatia remained part of the MRC process, although without capacity to be allocated, meaning that it was decoupled from a market perspective.

Preliminary findings

The MRC procedures in place to manage a partial decoupling, have been properly applied and proved successful in retaining the coupling among the bidding zones not involved in the issue.

The decoupling event did not affect 4M MC (4M Market Coupling), which is not yet coupled with MRC, and did not induce major impacts on market prices or security of operations in 4M MC.

Lessons learnt and recommended follow up actions

Due the growing number of coupled parties, the very large number of involved systems and the increasing complexity of operations, the possibility of incidents increases.

Procedures were followed in the correct way bringing to the expected outcome the process in case of such negative situation.

In addition, NEMOs and TSOs are currently investigating the generic robustness of the operational processes and procedures at different levels (European, regional, and local) and their consistency for specific types of incidents. This generic investigation is not specifically related to this incident.

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List of abbreviations

4M MC	4M Market Coupling
ANDOA	All NEMO Day ahead Operational Agreement
CACM	EU Regulation establishing a guideline on capacity allocation and congestion management
CZC	Cross-Zonal Capacities
EUPHEMIA Algorithm	EU + Pan-European Hybrid Electricity Market Integration
GCT	Gate Closure Time
GPC	Global Preliminary Confirmation
GFC	Global Final Confirmation
IBWT	Italian Borders Working Table
IC	Incident Committee
JAO	Joint Allocation Office
MRC	Multi-Regional Coupling
NEMO	Nominated Electricity Market Operator
PCR	Price Coupling of Regions
PMB	PCR Matcher Broker
SDAC	Single Day Ahead Coupling
TSO	Transmission System Operator
VB	Virtual Broker

1 Introduction

On Wednesday, January the 13th of 2021, an incident took place in the Day Ahead Market Coupling process that led to a partial decoupling of GME Virtual Brooker (Italian and Slovenian order books), affecting the day ahead trades for delivery day Thursday, January the 14th in the Multi-Regional Coupling (MRC). More specifically, due to GME's partial decoupling, also BSP, EXAA, and HEnEx were decoupled from the MRC process. CROPEX was run in isolated mode without any interconnectors with MRC. The cause was an unexpected technical issue involving a hidden default parameter in the Local Trading System of GME.

Since the Go-Live of the NWE Market Coupling on February the 4th of 2014, after more than 2500 successfully completed market coupling sessions, this is the third incident that has led to a partial decoupling.

Although this did not lead to any grid security issues anywhere in Europe, the incident caused a disruption of the European Day Ahead Market within the Multi-Regional Coupling and impacted processes on market parties' and TSOs' side. The common coupling system worked as expected and ensured the coupling of the remaining European market areas within SDAC.

This report is structured as follows. In Chapter 2, the Single Day-ahead Coupling (SDAC) is described. In Chapter 3, the normal operational process as covered in the operational procedures, and the fallback measures in place are described together with their timings. In Chapter 4, a description of the partial decoupling event, including the chronological course of events, and the root cause are presented. In Chapter 5, the actual handling of the incident is evaluated. Finally, in Chapter 6, the lessons learnt and recommendations are presented.

2 Single Day-ahead Coupling

The aim of Single Day-ahead Coupling is to create a single pan European cross-zonal day-ahead electricity market. An integrated day-ahead market increases the overall efficiency of trading by promoting effective competition, increasing liquidity, and enabling a more efficient utilisation of the generation resources across Europe.

SDAC allocates scarce cross-border transmission capacity in the most efficient way by coupling wholesale electricity markets from different regions through a common algorithm, simultaneously taking into account cross-border transmission constraints thereby maximising social welfare.

SDAC is an initiative between the Nominated Electricity Market Operators (NEMOs) and Transmission System Operators (TSOs) which – in the framework of CACM implementation – enables cross-border trading across Europe via implicit auctions for delivery of power for the following day.

Significant progress has been achieved in the establishment of a pan-European Single Day-Ahead Coupling in recent years, thanks to early implementation initiatives and pilot projects. SDAC relies on the Price Coupling of Regions (PCR) solution developed by a group of power exchanges. At this stage, the SDAC is in an interim phase during which two parallel market couplings co-exist, i.e., the Multi-Regional Coupling (MRC) and the 4M Market Coupling (4M MC). These couplings are considered on an equal basis as jointly forming, for this interim period, the Single Day-Ahead Coupling in implementation of CACM. In the enduring stage MRC and 4M MC shall be coupled.

See for more information the following websites:

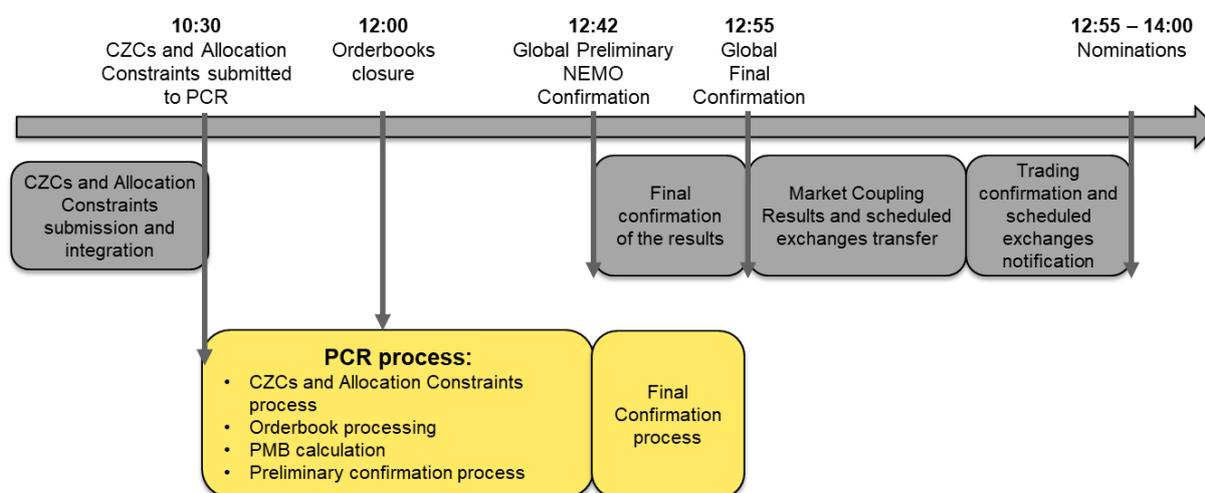
- ENTSO-E: https://www.entsoe.eu/network_codes/cacm/implementation/sadc/
- NEMO Committee: <http://www.nemo-committee.eu/sdac>

3 Operational process and timings as described in the operational procedures

To understand the effect of the issue that triggered the chain of events that finally led to a partial decoupling of GME, EXAA, BSP, HEnEx and CROPEX from MRC, in this chapter the normal process is briefly described together with the timings. Subsequently, the measures in place to handle a partial decoupling are described.

3.1 Normal process and timings

In the below figure, the regular operational process is visualized.



To start with, the TSOs provide cross-border interconnector capacities to PCR through the PCR Matcher Broker (PMB) and Market Participants make bids for buying and selling through the Local Trading System of their NEMO(s).

At 12:00, the local order books are closed and submitted to the PMB, which subsequently starts the calculation with EUPHEMIA. The results of this calculation are subsequently shared and validated. After that, the results are confirmed by the NEMOs and TSOs.

After the global final confirmation of the results, the market coupling results, and scheduled exchanges are transferred, and the trading confirmations and the scheduled exchanges notifications are given.

3.2 Fallback process and timings

To handle issues in operations, there are backup procedures. These provide workarounds for issues that do not lead to exceeding the critical deadlines for the different process steps. When these backup procedures do not suffice, there are fallback measures in place to limit the negative impact on the market.

For the decoupled interconnectors potential fallback measures are shadow auctions or the capacity can be offered at intraday.

For the decoupled markets, the fallback measure is execution of local auctions that can be run by each decoupled NEMO.

In the below figure, the timings for the operational process are shown and the deadline for declaring a Partial Decoupling is shown.

Phase	Time	Event
Pre-Coupling	09:00	Start of the Market Coupling Session
	09:00	TSOs start computing and matching the CZC values
	09:15	Latest Time to start an IC for issues in the Configuration step
	09:45	Deadline to skip the Configuration Synchronization step
	10:30	Target Time for submitting the Network Data in the PMB
	11:00	Latest time to start an IC for missing Network Data
	11:15	Risk of Partial Decoupling for one or more interconnectors
	11:45	Deadline to declare the Partial Decoupling for an interconnector
Coupling	12:00	NEMO Order book Gate Closure Time
	12:10	PMB GCT/Reception of Order Data files → Start of Calculation
	12:10	Latest Time to start an IC for Order Data-related reasons
	12:20	Deadline to send the message for Risk of Partial Decoupling
	12:22	End of Calculation
	12:24	Reception of Results + Start of 12 min Confirmation process
	12:36	Deadline to send the Preliminary Conf → Generation of GPC
	12:38	Reception of Preliminary Final Confirmation in local PMBs
	12:40	Deadline to declare Partial Decoupling
	12:42	Publication of Preliminary Results and sending to the TSOs → Start of 10 min Final Confirmation process
	12:52	Deadline to send the Final Confirmations
	12:53	Reception of all Final Confirmations → Generation of GFC
	12:54	Reception of Global Final Confirmation in local PMBs
	12:55	Publication of Final Results → Start of Notification Process
	13:05	Latest time to Start an IC and invite TSOs
13:20	Deadline to send the message for Risk of Full Decoupling	
13:50	Deadline to declare the MRC Full Decoupling	

3.2.1 Fallback option 1: Shadow auction process

Shadow auctions are one of the fallback measures in place to handle a situation where the capacity of interconnectors cannot be allocated in the normal Market Coupling process. Market participants have the possibility to place default bids and provide (updates of) bids through dedicated platforms (e.g. JAO's website) to obtain capacity until 12:30. The results of this auction are published as soon as possible after the partial decoupling has been declared (normally at 12:40) and represents the allocated capacity. Once this phase is terminated, the market participants can adjust their power bids in the different markets normally between 12:50 and 13:00 considering the results of this shadow auction.

Once the market coupling process has been run, participants can nominate the capacity allocated through shadow auctions. These nominations done towards TSOs are then matched among the TSOs border by border.

3.2.2 Fallback option 2: Capacity goes to intraday auctions

Another fallback option is that the capacity is not allocated at all during the SDAC process and is given back to the owner that can then allocate it in the Intraday auction or in the XBID market (continuous trading). In this case no cross-border flows are allocated during the day ahead process.

3.2.3 Local auctions

In case the issues are so severe that a market is decoupled from the whole Multi-Regional Coupling, the fallback measure is to run the local auction by the decoupled NEMO(s) in its/their bidding zone(s).

4 Description of the incident

On Wednesday, January the 13th of 2021, GME experienced a technical issue due to a hidden default parameter in its Local Trading System causing a chain of events that finally led to a partial decoupling of GME, BSP, EXAA and HEnEx from MRC while CROPEX remained coupled with MRC with no capacity.

The chain of events can be divided into two parts: one concerning the decoupling incident and the subsequent processes on MRC level (covered in Sections 4.1 until 4.4), the other concerning the local auctions (covered in Section 4.5). Finally, in Section 4.6, the solution for the issue that triggered the chain of events is presented.

4.1 Incident

The issue encountered by GME was triggered by an unexpected technical issue in GME's Local Trading System and resulted in not being able to successfully create the order data and send the order book to the PMB.

The root cause of the unexpected technical issue encountered, was a hidden parameter that did not allow GME's file, with a spiking (significantly higher than normal) number of raw offers, to be transferred to the IT server link that creates the file for the PMB.

This prevented GME from submitting the aggregated order book for the market of GME and BSP to the central market coupling process.

4.2 Timeline

In the below overview, the course of events is shown. Please note that the information in the timeline is focused on the incident at hand. Other issues that were encountered not related to/important for the decoupling incident are shaded grey.

Time	Event
12:10	An IC was triggered because OBK missing from GME. Reason: GME had technical problems with sending OBK from their system to PMB.
12:18	Risk of Partial Decoupling message (ExC_03a) was sent out for the following VB: GME
12:26	GME confirmed that problem was in generating order book.
12:30	JAO confirms the end of the bid submission in the IC and in parallel runs the shadow auctions for IT<>FR, IT<>AT, SI<>AT, SI<>HR, IT<>GR, SI<>IT.
12:35	EMCO, as CWE MO, forwarded the ExC_03a Message to JAO and CWE TSOs, including the corresponding interconnectors at risk of decoupling.

	In the IC, it was decided to have a reopening of the orderbook at 12:50.
12:40	All NEMOs and TSOs agreed to give 5 additional minutes to GME to generate OBK. New reopening time was decided to be 12:54.
12:42	(ExC_02) Message Delay in Market Coupling Results was sent out.
12:45	Partial decoupling was declared and everybody confirmed to be in manual mode in line with the procedures.
12:47	(ExC_04a) Partial Decoupling message was received by JAO and JAO started sending out the Shadow Auction results and publishing the Offered Capacities. Additionally, JAO notifies the parties within the IC.
12:50	(ExC_04a) Partial Decoupling message was sent out for the Market Participants. JAO started sending out the Programming Authorizations. In case negative acknowledgements are received, JAO sends out the PAs via backup mode.
12:54	Reopening of order books was done and procedure of partial decoupling of the 3 VBs (GME, EXAA, and HEnEx) was done.
13:00	CWE and Nordic Markets informed with UMM_01a about the delay in final Market Coupling results publication.
13:04	All NEMOs could upload the new version of their order books.
13:13	Calculation started.
13:18	(ExC_03b) Message was sent out Further Delay of the Market Coupling by EMCO as PCR Coordinator (risk of full decoupling).
13:26	Calculation finished.
13:38	Global preliminary confirmation was distributed and results were preliminary confirmed and published
13:49	Both EPEX and EMCO received negative final confirmation for CWE and ALEGrO (DE-BE interconnector). In the IC it has been decided to overrule the negative final confirmation. (This incident was not related to the partial decoupling incident).
13:54	Market Coupling Session was finalized and IC closed. EMCO as PCR Coordinator confirmed to trigger an Ad-hoc ANDOA OPSCOM.

4.3 Communication to the market

As part of the MRC process, the following joint communication towards the market was made:

Time	Message to the market [Message name]
12:20	Risk of partial decoupling [ExC_03a]
12:30	Shadow auction gate closure time at 12:30
12:45 - 12:53	Partial Decoupling - Reopening of the order books 12:54 – 13:04 [ExC_04a]
12:45 - 12:50	Shadow auction results publication [Website]
13:00	Delay in final Market Coupling results publication [UMM_01a]
13:20	Further Delay in market coupling results publication [ExC_03b]

4.4 Impacted borders

The impacted borders concern the borders related to GME's order book (covering the market of Italy and Slovenia).

For the impacted interconnectors,

- Italy – France
- Italy – Austria
- Slovenia – Austria
- Slovenia – Croatia
- Italy - Greece

shadow auctions were triggered in line with the fallback procedures.

In the below Figure a visualization is given of the impacted borders.



Consequently, the Croatian market was decoupled, but it remained part of the MRC process with no capacity, while Greece and EXAA were running local auctions for their markets.

4.5 Decoupled market Local auctions

4.5.1 GME and BSP market

Following the partial decoupling of GME, GME and BSP remain coupled in line with Italy North TSOs fallback procedures.

The issue was fixed by GME at around 13:00. Therefore, GME and BSP reopened their order book from 13:05 to 13:20. Final results were published at 14:01.

4.5.2 HEnEx market

Following the partial decoupling of GME, HEnEx became isolated and decoupled from the MRC coupling process, following the rules. They reopened the order book from 13:10 to 13:25; results were published at 13:33 (before the MRC results).

4.5.3 EXAA market

Due to the decoupling of GME, EXAA was decoupled from the MRC coupling process, consistently with its service arrangements with GME. EXAA reopened the local market from 12:54 to 13:04.

Threshold was reached in the execution of the local market and therefore the market was reopened a second time from 13:40 to 13:50. An Emergency Committee was then triggered in CWE for this second auction; the EXAA local auction ended at 14:04 and the CWE Emergency Committee was closed.

4.5.4 CROPEX market

The CROPEX order book was reopened after the publication of partial decoupling for approximately 10 minutes allowing market participants to adjust their orders to the new situation, following the MRC timings.

4.6 Solution for the issue that triggered the chain of events

The hidden parameter of GME's Local Trading System that prevented GME from being able to create its order book was identified at around 13:00, after the partial decoupling deadline (12:40). This parameter was immediately changed and this enabled the creation of the order book for the GME-BSP (Italy and Slovenia market) local auction.

The GME Local Trading System has been working fine since then.

5 Handling of the incident – Evaluation

In this chapter, the evaluation is presented of the way that the incident was handled.

5.1 Detecting the issue

The hidden parameter issue lying at the root of this incident was detected by GME when trying to send the order book to the PMB and reported directly to the Market Coupling Coordinator in line with the procedures.

5.2 Communication between the Market Coupling Coordinator, NEMOs, TSOs, and third parties prior to declaring a partial decoupling

All messages to MPs were consistently sent with the procedures.

5.3 Incident Committee

In line with the operational procedures¹, an Incident Committee call was triggered. At 12:40 (the deadline for declaring the partial decoupling), the Incident Committee jointly agreed to wait a few minutes more for the missing order book trying to avoid a partial decoupling. At 12:45 the partial decoupling was declared and the relevant message ExC_04 was sent.

5.4 Shadow auctions

The shadow auction processes were run successfully in line with the operational procedures with the timings shown in the table below.

Border / Interconnector	Shadow auction process		
	Bid submission closed (auction ran)	Auction results sent	Results published on JAO website
AT-IT	12:31	12:49	12:50
IT-AT	12:31	12:49	12:50
AT-SI	12:31	12:49	12:50
SI-AT	12:31	12:49	12:50
FR-IT	12:33	12:50	12:52
IT-FR	12:33	12:51	12:51
GR-IT	12:30	12:48	12:49
IT-GR	12:31	12:48	12:49

¹ Please note that in principle all operational MRC parties are invited to incident committees through the NEMOs, unless agreed otherwise between the parties and their associated NEMO(s).

HR-SI	12:32	12:49	12:50
SI-HR	12:32	12:49	12:50

5.5 Update of bids based on shadow auction result

After declaration of the partial decoupling in the Incident Committee, there are 10 minutes for informing the market participants, 10 minutes for keeping the markets reopened, and 10 minutes for the preparation and sending of new files.

Few minutes before the reopening of the markets at 12:54, the shadow auction results were there.

The order books for the areas that remained coupled, reopened for exactly 10 minutes and closed at 13:04.

See for an overview of the results of the shadow auctions per border and what was finally nominated the table in Annex 1.

The shadow auction process and the subsequent update of the bids were executed in line with the procedures.

6 Lessons learnt and recommended follow-up actions

Although the SDAC parties regret that this incident occurred, the issue was managed well.

Procedures were followed correctly and the communication was performed correctly, using the agreed messages.

Moreover, the common coupling system worked as expected and ensured the coupling of the remaining European market areas within SDAC.

6.1 Probability that it will happen again

This particular incident will not happen again at GME, because the particular hidden parameter of its Local Trading System has been adapted.

6.2 Procedures

In the procedures, it needs to be clarified that for some Virtual Brokers there are dependencies with other Virtual Brokers in case of a decoupling. NEMOs and TSOs are recommended to clarify in the procedures the rules/mechanisms that determine which parties and/or countries stay coupled with each other (e.g. in case of serviced NEMOs, market rules, regional Fallback procedures/methodologies, etc.), rather than staying coupled with MRC.

6.3 Closing remarks

NEMOs and TSOs are currently investigating the generic robustness of the operational processes and procedures at different levels (European, regional, and local) and their consistency for specific types of incidents. This generic investigation is not specifically related to this incident.

Annex 1: Overview of the results of the shadow auctions per border

Table: Overview of the shadow auctions, per border.

Hour	Allocated / Nominated	Borders									
		IT-FR	FR-IT	IT-AT	AT-IT	SI-AT	AT-SI	SI-HR	HR-SI	IT-GR	GR-IT
1	Allocated	1205	3044	145	295	749	950	1094	1416	475	525
	Nominated	150	750	0	90	0	330	0	167	0	475
2	Allocated	1205	3044	145	295	749	949	1095	1416	475	525
	Nominated	150	750	0	125	0	338	0	128	0	472
3	Allocated	1205	3044	145	295	749	949	1091	1416	475	525
	Nominated	150	750	0	125	0	283	0	257	0	472
4	Allocated	1205	3044	145	295	749	949	1089	1441	475	525
	Nominated	150	750	0	159	0	283	0	307	0	470
5	Allocated	1205	3044	145	295	749	949	1087	1443	475	525
	Nominated	150	750	0	145	0	287	0	307	0	470
6	Allocated	1205	3044	145	295	827	873	1089	1441	475	525
	Nominated	150	750	0	100	0	255	0	291	0	525
7	Allocated	1205	3044	145	295	801	795	1092	1416	490	510
	Nominated	150	850	0	115	0	315	0	125	0	510
8	Allocated	1040	2981	100	305	801	797	1099	1396	490	510
	Nominated	150	850	0	155	0	301	0	175	0	465
9	Allocated	1040	2981	100	305	801	797	1098	1370	490	510
	Nominated	150	1000	0	150	0	301	0	80	145	318
10	Allocated	1040	2981	100	305	801	797	1100	1391	490	510
	Nominated	150	850	0	75	0	331	0	38	145	350
11	Allocated	1040	2981	100	304	801	797	1101	1391	490	510
	Nominated	150	750	0	30	0	341	0	150	170	365
12	Allocated	1040	2981	100	304	801	797	1100	1391	490	510
	Nominated	150	500	0	30	0	341	0	75	195	364
13	Allocated	1040	2981	100	304	801	797	1098	1391	490	510
	Nominated	150	500	0	30	0	341	0	93	195	288
14	Allocated	1040	2981	100	304	801	797	1090	1391	490	510
	Nominated	150	500	0	30	0	341	0	83	195	280
15	Allocated	1040	2981	100	304	801	797	1094	1391	490	510
	Nominated	150	500	0	48	0	341	0	199	195	65
16	Allocated	1040	2981	100	305	801	797	1094	1387	490	510
	Nominated	150	500	0	80	0	321	0	163	85	215
17	Allocated	1040	2981	100	306	801	797	1091	1426	490	510
	Nominated	150	750	0	105	0	301	0	117	35	215
18	Allocated	1040	2981	100	304	801	797	1094	1442	490	510
	Nominated	150	500	0	144	0	301	0	50	50	375
19	Allocated	1040	2981	100	302	801	797	1094	1426	490	510
	Nominated	150	500	0	117	0	301	0	73	50	325
20	Allocated	1040	2981	100	306	801	797	1092	1491	490	510
	Nominated	150	500	0	91	0	301	0	140	50	292
21	Allocated	1040	2981	100	306	801	797	1092	1491	490	510
	Nominated	150	500	0	141	0	301	0	140	0	326
22	Allocated	1040	2981	100	306	801	797	1093	1445	490	510
	Nominated	150	750	0	50	0	301	0	165	0	504
23	Allocated	1040	2981	100	306	727	873	1088	1441	490	510
	Nominated	150	750	0	50	0	320	0	199	0	469
24	Allocated	1205	2928	145	293	727	873	1092	1477	490	510
	Nominated	150	750	0	78	0	295	0	321	0	510