Power NI Energy Limited
Power Procurement Business (PPB)

SEM

Balancing Market and Capacity Market Options

Consultation Paper
SEM-19-024

Response by Power NI Energy (PPB)

11 July 2019.

Introduction

PPB welcomes the opportunity to respond to the SEM Committee (SEMC) consultation on options for changes to price formation in the Balancing Market (BM) and for settlement in the BM.

General Comments

Timeliness & Governance

PPB's primary concern with the consultation is that it seeks to radically change the design of the balancing market price formation with undue haste, primarily driven by exceptional pricing events on 9 October 2018 and 24 January 2019, that were caused by very specific circumstances, for which modifications have already been implemented that should remove the scope for reoccurrence.

The design of the BM was determined following extensive discussion and consultation with market participants over a long period of time. The small size of the SEM and the prevalence of significant system constraints that impinge upon its operation were recognised as key issues and concerns that led to the contemporaneous operation of the Intraday and Balancing markets, and the decision to require both Simple and Complex bids for the balancing market to facilitate early system actions by the TSOs to manage the system constraints.

Having taken such care, consideration and reflection in the initial design of the BM, it is perverse for the SEMC to issue a "minded" decision[1] to radically change the BM to adopt Simple NIV Tagging suddenly abandoning all previous governance practices and considered appraisal of the options, and without any substantive input from industry.

It is even more concerning that all the analysis completed as part of the purported impact assessment is fatally flawed. It is extensively acknowledged that the market prices since the commencement of the market are wrong, containing manifest errors such that they have not been properly determined in accordance with the Trading and Settlement Code (TSC).

This means there is no baseline against which to compare any change to the TSC and indeed provides no scope to assess whether there is indeed a problem with BM pricing that needs to be addressed, and if there is, to enable the issue to be properly defined, which all needs to be completed before any thought could be given to the range of solutions that might be considered to address any concerns identified.

Further, such a baseline should comprise both BM pricing fully in accordance with the TSC rules that were effective on 1 October 2018, as well as updated to reflect the TSC

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[1] Section 2.4 states the SEMC is "*proposing to remove*" all System Operator Flags and non-Marginal Flags from the imbalance pricing algorithm"

modifications approved and implemented since Go-Live. This would provide the correct baseline that would enable an appropriate and accurate assessment of the market performance as defined by the TSC and which, if issues were identified that require resolution, would also enable any refinements or modifications to be assessed against, to ensure they produce the outcomes desired and expected.

This approach is not new but merely reflects the governance practices that have been previously employed and which is required to provide confidence in the stability of markets and to minimise the regulatory risk that would be created where such governance practices are ignored. Decisions to make changes, and particularly radical ones, must be "evidence based" but this "evidence" is severely lacking in relation to the proposals in the consultation paper.

Simple NIV Tagging

Even if the pricing baseline were fully reflective of the current TSC requirements and subsequent assessment were still to identify a clear issue with the price formation, it is not obvious that Simple NIV Tagging would be a suitable approach. It was clearly identified during the High Level and Detailed design of the BM that system actions should not distort the Imbalance price. The constrained nature of the SEM and the likelihood of a high number of system actions, which are even more extensive than occurs in GB, added to the need to distinguish between system and energy balancing actions in the SEM to avoid distorting the BM price, as otherwise that distortion would impinge on the efficiency of the DAM and Intraday markets that are not affected by "system" actions.

In a small, poorly interconnected and highly constrained power system, the ability to differentiate between energy and non-energy actions in the balancing market is a pre requisite for sending accurate price signals that reflect the real time value of energy imbalances and enable the equitable enforcement of balance responsibility. The current balancing market design performs this distinction through the flagging and tagging process. Moving to Simple NIV tagging removes system operator and non-marginal flags from the pricing algorithm and therefore removes the distinction between true energy balancing and non-energy/system actions. Allowing only the size of the NIV and the price of each action in the stack to determine each action's classification marks a significant departure from the current market design and espouses an overly simplistic view on what market fundamentals are.

in Appendix 1 We include our initial analysis that illustrates how Simple NIV Tagging results in prices that do not reflect the true cost of the marginal action to meet energy imbalances. As it removes the distinction between "energy" and "system" actions, it means that the BM price would be distorted by "system" actions if Simple NIV Tagging were to be adopted. This would have consequences for the overall coherency between the Day-Ahead, Intraday

and Balancing markets, and potentially creating different incentives for participation in each of the markets. This interaction would require careful consideration.

In addition, Simple NIV Tagging would be further distorted in the SEM by the mixture of Simple and Complex Bids that would be parsed together into a single price stack[2]. In relation to the Complex bids that relate to "system" actions, these would not reflect the "full cost" of the actions and therefore the price stack, with a mixture of Simple and Complex bids, would not comprise prices on the same basis and would be distorted. This would require some form of "Uplift" to be applied to the Complex bids to convert those into a "full energy cost" basis to be comparable with other Simple bids in the price stack. This is unlikely to be a simple process.

We also show analysis in Appendix 2 that compares the monthly price deltas between the currently available BM prices[3] (from October 2018 to June 2019 – which includes the more recent pricing data from March to June that is not included in the consultation paper) and the prices that would be determined using the Simple NIV tagging methodology. This shows that the monthly average price differentials under the two methodologies change very differently across the period (see Appendix 2, Table 2).

Firstly this highlights the dangers of considering any averages and that the movements in each individual settlement period must be considered. Secondly, in addition to the fact the current prices are known to be manifestly wrong, there were also extenuating circumstances prevailing in the early months of the market, given it was a new market commencing operation in the winter months, and that there were a significant number of coincident generator outages on generating units that would normally have been in merit. Finally, the 5 months of analysis included in the consultation paper spanned a period of winter demand. These combine to create a period that we would consider to be unrepresentative of enduring market conditions and hence confirms the need for caution and considered reflection.

Our assessment only reflects a quick initial review made in the limited time available and much more extensive analysis would be required to determine the drivers of the price differentials. For example, these will likely include the exceptional outage events, seasonal changes in demand, participant trading behaviour (given rational response was difficult / impossible in the early months of the market given the prices were known to be wrong, making it impossible to identify if a different trading strategy would be better or worse), etc.

Our responses to the detailed questions are set out below.

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[2] although we estimate the majority of order types used in imbalance pricing are Simple, we cannot discount the impact the proposed change will have the on BM prices and hence generation units' cost recovery where Complex orders are used for a significant number of bids in the pricing stack.

[3] Again – extreme caution must be exercised given it is accepted that the current prices are incorrect and hence all analysis would need to be updated to reflect prices properly determined in accordance with the TSC rules.

Conclusions

We have highlighted above our concerns over the fact the analysis presented in the consultation paper to support the minded decision to change to Simple NIV tagging is based on a very limited dataset (spanning 5 months that were the initial months of a new market and coinciding with a period of substantial co-incident forced generator outages) that uses BM prices that have nearly all been validly disputed. This provides no basis or evidence upon which to base any decision. We suggest that the following approach needs to be followed :

(i)   A baselined price track must be established, preferably over a full annual cycle, to enable proper assessment of market operation to identify if there really are matters to address; and

(ii)   If such assessment identifies issues, the range of possible solution needs to be generated to enable widespread consideration, including quantitative appraisal vs the baseline. This may best be facilitated through a working group established under the auspices of the Balancing Market Modifications Committee

Even if a problem is identified, based on our conceptual and analytical investigations, we do not believe Simple NIV Tagging will provide the answer – system actions would distort prices and the complexity of dealing with the subset of Complex bids in the price stack that do not reflect the true full cost of the action is likely to be difficult (and would likely require significant system development).

We do believe that Option 2 (removal of difference charges where operational constraints are binding) should be progressed. Further. a working group should also be established to investigate extending this to address all scenarios where RO holders face difference payments in situations over which they have no control or influence (including TSO actions and inactions).

Comments on the Consultation Paper Questions

Simple NIV Tagging

2.1) Do you support this Simple NIV tagging option and its implementation in the SEM?

No.

As we have outlined in our general comments above, the lack of a correct set of BM prices derived in accordance with the TSC makes it impossible to identify if there is a failing with the BM pricing, and if there is, what the precise nature of the issue is. This makes it impossible to consider both the nature of the problem (if there is one) and the range of solutions from which to identify the most appropriate.

2.2) Do you have any concerns regarding moving to Simple NIV tagging in the Balancing Market, including the risk of unintended consequences? If so, please explain these concerns.

As noted above, the lack of robust and accurate BM pricing data means the scale of the problem, or indeed if there is a problem, is unknown.

However, we doubt that Simple NIV Tagging is the simple solution to any problem given that it ignores "system" actions which means the BM price derived will be distorted. This is further supported by the analysis we set out in Appendix 1.

Further, the unique feature of the SEM, that would result in a combination of Simple and Complex bids in the price stack, means the bids is the stack are on different bases, with the complex bids not being reflective of the true cost. This is not sustainable and either complex bids would need to be removed from the SEM (leaving only simple bids) or else a mechanism derived to convert the Complex Bids into a similar "full price" basis as the Simple bids to ensure cost reflective pricing in the BM. This is unlikely to be a simple process but would be required to ensure BM prices reflect all the costs incurred to meet the demand imbalance, since otherwise that would introduce a distortion relative to other market timeframes (DAM, IDM) and introduce the potential for distorted and inefficient incentives.

2.3) Do you agree or disagree that Simple NIV tagging meets the I-SEM High Level Design, the I-SEM Detailed Design and the I-SEM market power mitigation decision? If you disagree, please explain why.

As already outlined above, we do not consider Simple NIV Tagging meets the High or Detailed designs of the BM that were determined after extensive consideration and consultation over a long period of time.

BM prices should not be contaminated by system actions and this was the clear intent through all the design phases. It was recognised that this was even more vital in the SEM given the constrained nature of the system with high levels of "system" actions, which led to the Tagging & Flagging approach adopted. As we noted earlier, Simple NIV Tagging removes the distinction between "energy" and "system" actions, which means that the BM price would be distorted by "system" actions, were Simple NIV Tagging to be adopted.

This is further compounded by the fact that "system" actions taken by the TSOs are priced on the basis of Complex Bids which do not reflect the total cost of the actions and therefore will also distort the BM pricing derived through Simple NIV Tagging unless a separate process is adopted to uplift these prices to their full cost. It is not clear that determining such an uplift is even feasible but at best it would be extremely complex and, in any event, will always be an administered approach that will always be incorrect and inefficient, and will distort the BM prices.

2.4) Do you agree or disagree with SEM Committee's assessment that the pricing outcomes under Simple NIV tagging are preferable, given market fundamentals? If you disagree, please explain why.

The SEMC's assessment is flawed by the fact the counterfactual baseline is known to be wrong and the prices are not correctly determined in accordance with the TSC (including as amended). Further, we have also highlighted prices determined on the basis of Simple NIV Tagging will be distorted by system actions and the use of Complex bids that are not fully cost reflective of the total cost. Hence even if the prices do tend to follow the pricing trends that would be anticipated under certain market conditions, that is of little benefit when the prices are distorted and not truly reflective of the cost of the marginal energy action and which may lead to distortion and dysfunction across the wider energy markets.

The definition of the marginal energy action is crucial for sending correct price signals, as the action's price is a key component in imbalance price formation. With Simple NIV tagging, the marginal energy action is no longer the most expensive unflagged energy action in the stack, but the last action taken to meet the NIV regardless of its energy or non-energy nature. Overreliance on the NIV for marginal energy action identification is the key limitation of Simple NIV Tagging and is shown in Appendix 1 to produce inefficient pricing outcomes which do not accurately value real time energy balancing actions. Furthermore, analysis of a more recent dataset (up to June 2019) in Appendix 2 shows significant changes to the trend in average Simple NIV tagging price outcomes that is presented in the consultation paper. This further emphasises the premature nature of the SEMC's proposed

change which is based on a limited and inaccurate dataset, as well as highlighting the need to fully understand and evaluate the underlying change in the proposed price dynamics.

It is for these reasons that PPB do not believe that Simple NIV tagging produces preferable prices as they do not reflect market fundamentals and are distorted by the resulting combination of Simple and Complex bids on the pricing stack.

Again, as previously stated, the first imperative must be to determine a proper baseline dataset of accurate BM prices which will them enable a true assessment of the outcomes and whether there are issues to be addressed. It is only at that stage that the range of potential solutions can be generated and fully considered, which would include an appraisal of whether the results do generate outcomes consistent with the market fundamentals.

Removal of Difference Charges where Operational Constraints are Binding

3.1) Do you support this Capacity Market option and its implementation in the SEM?

Yes. In addition, generators who could have met their obligations but for other TSO Actions or Inactions should be similarly flagged such that their payment obligation is removed in settlement.

For example, if the TSO issues a desynchronization instruction to a generator and then prices spike before the generator can resynchronise due to their minimum off-time, then they would be unfairly penalised by acting fully in accordance with the TSO's dispatch instruction. Their inability to deliver the MW in this window is not due to their own actions but due to the TSO's action and hence they should not be penalised when their inability to respond is outside their control. This is no different to the circumstances being addressed by the modification and the generator should be similarly protected.

Similarly, if for some reason the TSO doesn't dispatch a generator when prices are high then again, the generator's RO payment obligations should be set aside. Under Grid Code the generator cannot self-dispatch and hence it is exposed to the TSO's decisions which is no less unfair than the circumstance where the generator cannot be dispatched due to a system constraint or limitation.

All circumstances whereby a generator, for reasons outside their control, cannot respond due to system constraints or due to TSO actions or inactions should be treated equally and should not be liable for RO payment obligations in such circumstances.

3.2) Do you have any concerns regarding the removal of Difference Charges where Operational Constraints are binding, including the risk of unintended consequences? If so, please explain these concerns.

No.

We do not agree with the concerns raised in relation to any impact on the socialisation fund. The analysis of the events on 9 October 2018 and 24 January 2019 shows that if the change were implemented, the socialisation fund would remain in surplus. It is also better to ensure that risk is only placed where it can be managed and if RO holders remain exposed to difference payment risks for reasons outwith their control, then customers will ultimately end up paying more under the capacity contracts as bidders would ultimately factor such uncontrollable risk into their capacity bids. Hence the bigger risk for consumers relates to not proceeding.

We also disagree with the concern raised in relation to creating a hidden locational element to the Capacity Market. New plant within the constrained area will be more protected as they will have greater certainty of the TSOs taking actions (including early actions) to ensure they are operating and hence would have financial coverage to meet any difference payments.

3.3) Do you consider this proposed change is in keeping with the broader CRM detailed design? Please explain your view.

We believe it is consistent with the CRM design. The desire is for capacity holders to respond to their obligations to deliver the capacity. However, where the reason that the capacity is not delivered is due to system constraints or TSO actions/inactions that they cannot control then they should not be penalised in such circumstances. Placing risk and costs on participants that they have no means of managing or controlling will only serve to increase the cost for all consumers and hence must be avoided.

3.4) Do you have any views on this option from a consumer perspective?

As noted above, placing payment risks on capacity providers that they have no scope to manage or control will ultimately result in higher prices in the capacity market and hence higher costs for consumers in the long run.

3.5) Do you have a strong view regarding an alternative option which could be implemented, i.e. preferably requiring only a configuration change rather than a system change?

No. As we have already noted in our response to question 3.1, we believe the RO payment obligation set-aside must be extended to cover all circumstances where a capacity provider could have met their obligations, but for any system reason or TSO action or inaction, that meant they were not dispatched to deliver the capacity.

Appendix 1: Evaluation of Simple NIV Tagging

The removal of the distinction between energy and non-energy actions is a key limitation of the Simple NIV tagging (SNT) approach. This manifests itself primarily through how the marginal energy action is defined. The Simple NIV tagging definition is no longer the most expensive unflagged energy action in the stack, but the last action taken to meet the NIV. This has significant consequences on setting the price, particularly the level at which PMEA is determined.

It is important to note that the existing imbalance pricing methodology enables non energy actions to contribute to setting the calculated imbalance price due to a non-marginal QPAR, but only if their volumes are in merit against PMEA. Out of merit non-energy actions can also have an influence, but their price is equal to PMEA as a result of the replacement price functionality. By defining the marginal energy action as the final action taken to meet the NIV regardless of its nature, the imbalance price no longer reflects the real time value of energy and could render Simple NIV tagging noncompliant with the Clean Energy Package.

A PMEA which is set by the true marginal action is crucial for an efficient pricing outcome and to avoid the under and over valuation of energy in the balancing market, the risk of which increases dramatically under a Simple NIV tagging regime. This is explored in more detail below using the same pricing stack as was used in the analysis presented in the consultation paper.

We must also highlight and caution that the analysis that follows is purely an evaluation of the Simple NIV tagging methodology as applied to the available data which is known to be incorrect. It is <u>not possible to evaluate the real impact of Simple NIV tagging on price formation</u>, only draw conclusions about the relative change the proposed pricing methodology has on the published imbalance prices.

In the current imbalance pricing process, the Residual Tagged Quantity (QRTAG) is a metric to determine how far away the initial tagging step is from meeting the NIV. If QRTAG and QNIV are different signs, there has been overtagging i.e. there are not enough energy actions in the stack to meet the NIV and some non-energy actions need to be untagged. Conversely, if QRTAG and QNIV are the same sign, there has been undertagging and some actions need to be tagged to meet the NIV.

The concept of over and undertagging no longer exists were Simple NIV tagging to be adopted, but considering both types of imbalance price is key to evaluating and understanding the proposed approach rather than relying on aggregate metrics. For brevity, the majority of the following analysis focuses on 5 minute prices where QNIV is positive due to the underlying distribution observed since go-live:
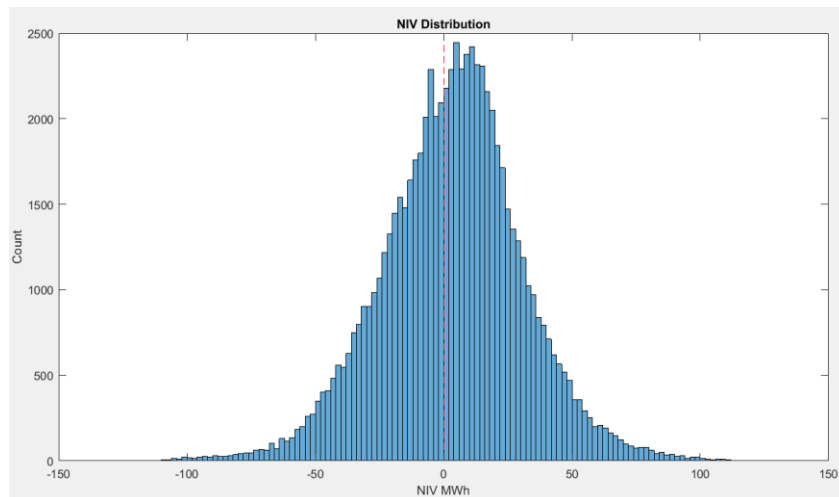
Figure 1

The percentage split between over/under tagging and the NIV for the periods analysed are shown below:

	Overtagging	Undertagging
Positive NIV	51.58%	5.15%
Negative NIV	35.59%	7.67%

The below table illustrates the following scenarios:

- Simple Initial NIV Tagging: Although there is no TINIV step with Simple NIV Tagging, it is assumed that it occurs in order to compare outcomes with the other scenarios.
- Scenario 1: Overtagging (Positive NIV, negative QRTAG) with a high priced energy action
- Scenario 2: Overtagging (Positive NIV, negative QRTAG) with a low priced energy action
- Scenario 3: Undertagging (Positive NIV, positive QRTAG)

Table 1

	TINIV	TINIV Existing Imbalance Pricing		
	SNT	Scenario 1 Overtagging	Scenario 2 Overtagging	Scenario 3 Undertagging
5 MWh 490 €/MWh	0	0	0	1
10 MWh 150 €/MWh	0	1	0	1
10 MWh 90 €/MWh	0	0	0	1
10 MWh 75 €/MWh	1	0	0	0
10 MWh 60 €/MWh	1	0	1	1
10 MWh 50 €/MWh	1	0	0	1
-10 MWh 40 €/MWh	0	0	0	0
-10 MWh 35 €/MWh	0	0	0	0
-5 MWh 30 €/MWh	0	0	0	0
Pricing				
PMEA	75	150	60	490
PIMB	75	150	60	90

The prices in each of scenarios 1 to 3 are changing, reflecting underlying conditions and the actions the TSO has taken to maintain power system security. Application of Simple NIV tagging produces the same price in all scenarios since it is driven only by the NIV. In a small, highly constrained power system with limited interconnection this simplistic approach to pricing is not suitable and distorts the BM pricing which will then also influence the ex-ante markets.

Scenarios 1 and 3 illustrate instances when NIV tagging significantly undervalues the real time provision of energy to meet energy imbalances and thus dilutes the imbalance price. This is due to the fact that the true marginal energy action is located beyond the simple sum of actions to meet the NIV.

Scenario 2 shows the opposite outcome, where Simple NIV tagging overvalues energy, artificially inflating the price. This occurs when the true marginal energy action is located below the simple sum of actions to meet the NIV, and illustrates the continued need for a mechanism to protect against out of merit non energy actions driving the imbalance price.

Instances of overtagging when QNIV is positive (scenarios 1 and 2) account for 52% of 5 minute periods in the analysed dataset spanning October 2018 to June 2018 (inclusive). Analysing the change in prices in these periods shows that there is a significant movement between both approaches. Data points above the red line have increased in price as a result of Simple NIV tagging, with data points below the line decreasing in price. In line with the illustrative examples above, when the NIV is large, the potential for price increases is high. However, there are a significant number of periods where it appears that the marginal energy action is above the NIV due to the concentration of data points below the red line when the NIV occurs around its most common level.
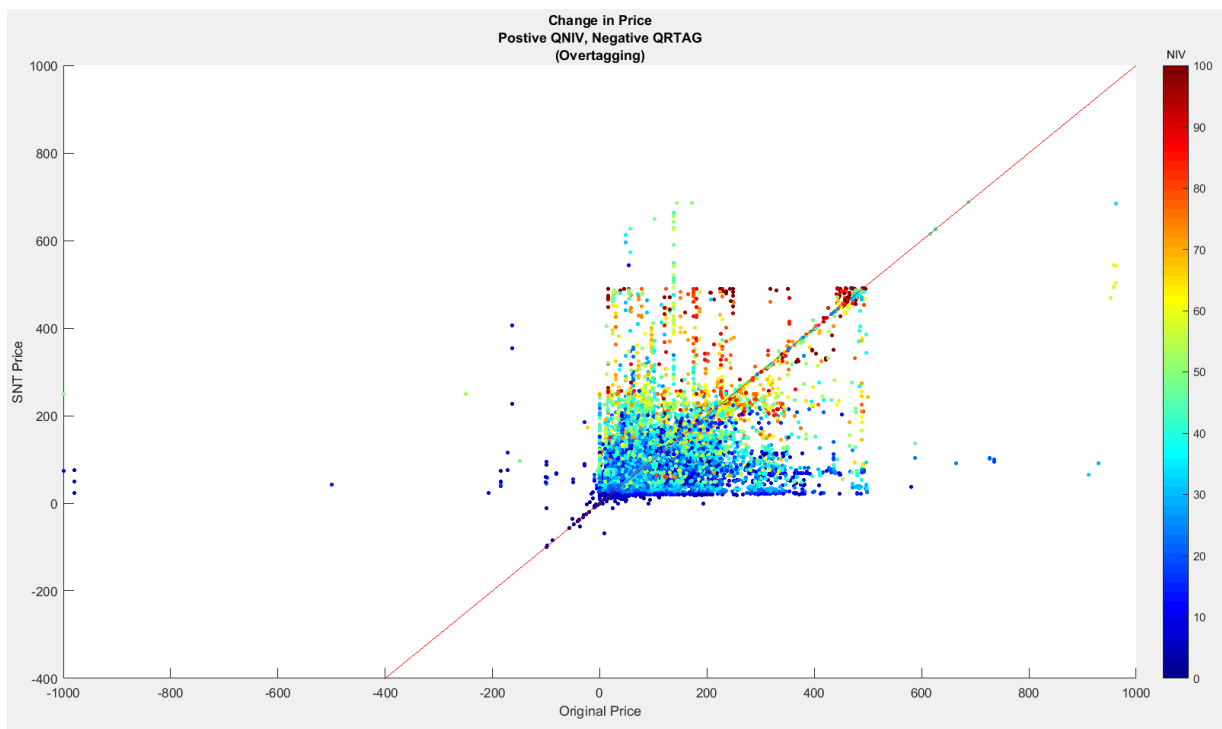
Figure 2

This can be seen more clearly in the below histogram, which shows that during periods of positive NIV overtagging in the original imbalance pricing methodology, Simple NIV tagging overwhelmingly results in a dilution of the imbalance price. The highest occurrences of price dilution occur in the 0 to -10 €/MWh range. Note that in the first positive bin from 0 to 10 €/MWh there are 972 periods where there is no change in price between the two methodologies.
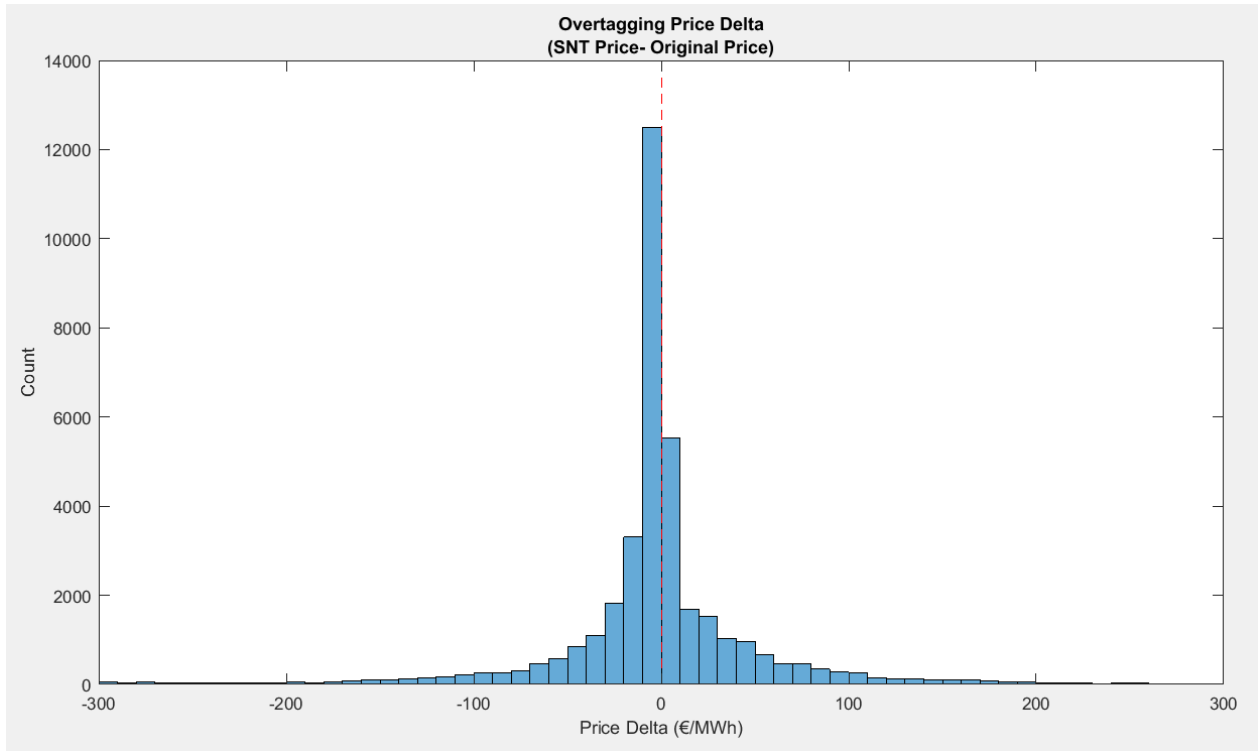
Figure 3

For periods where the NIV is positive and undertagging occurs, price dilution is the predominant result of Simple NIV tagging. Note that the positive delta bin is driven mainly by 217 unchanged prices and contains only 79 price increases.
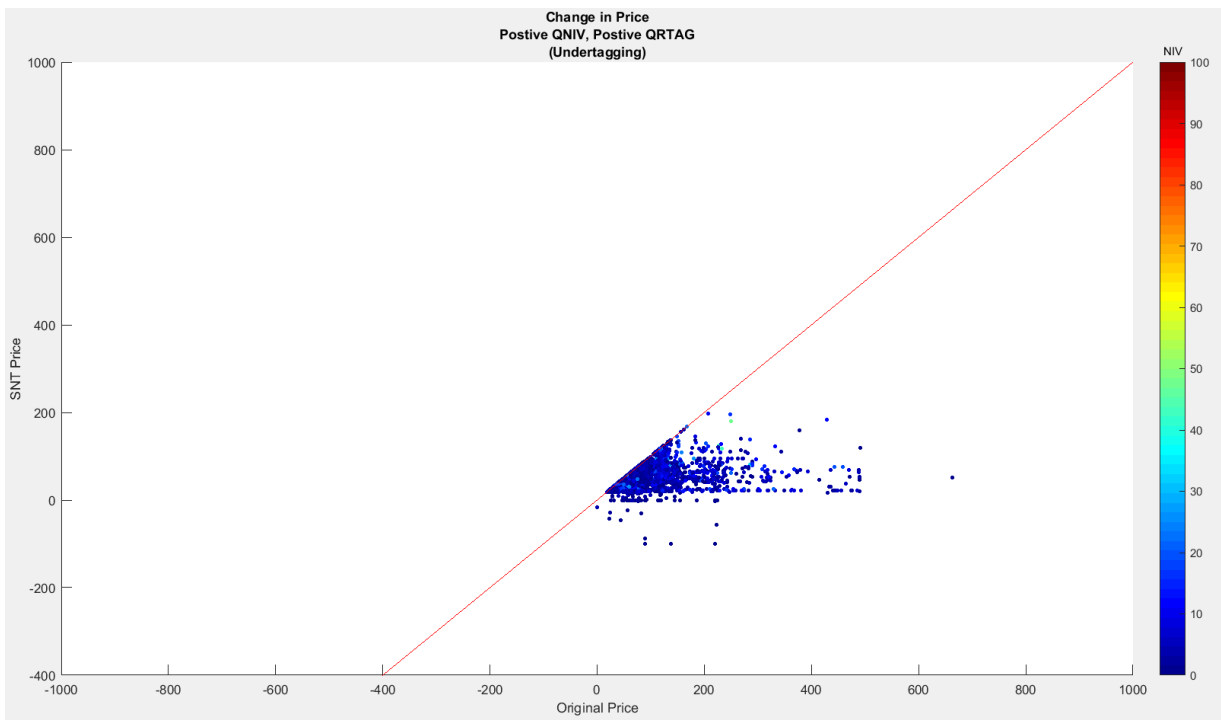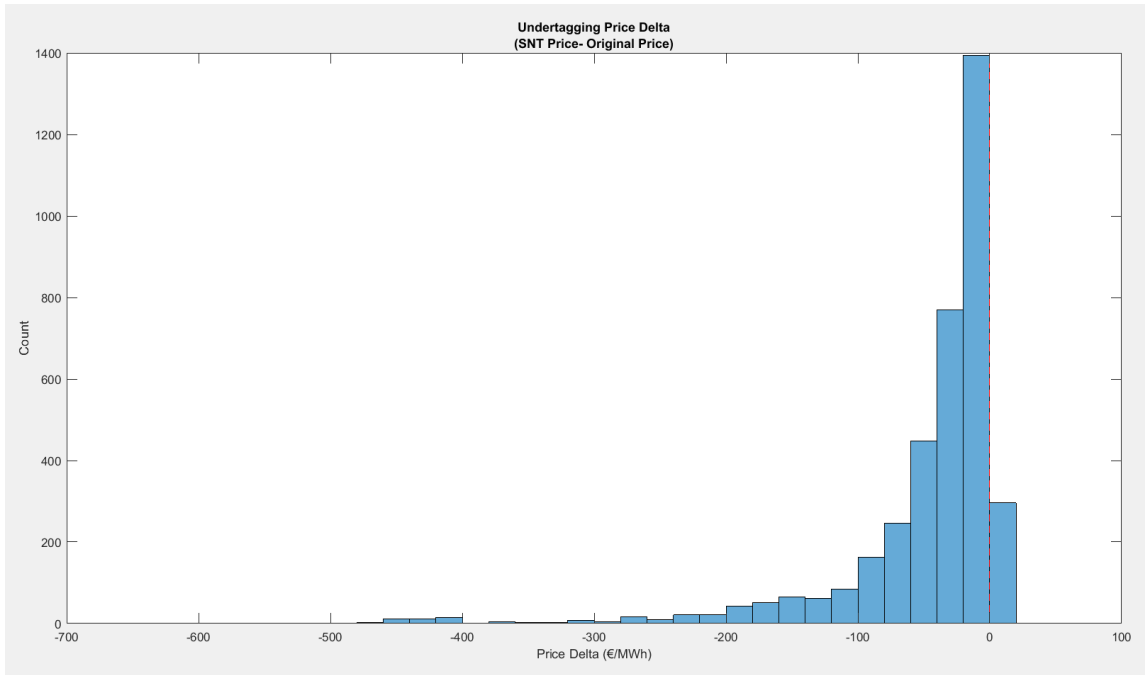

Figure 4

Figure 5

The reverse is also true for all instances of periods where the NIV is negative, where the prices tend to increase under Simple NIV tagging. The analysis of negative QNIV is complicated by the fact that there are both positive and negative priced decremental actions in the stack.
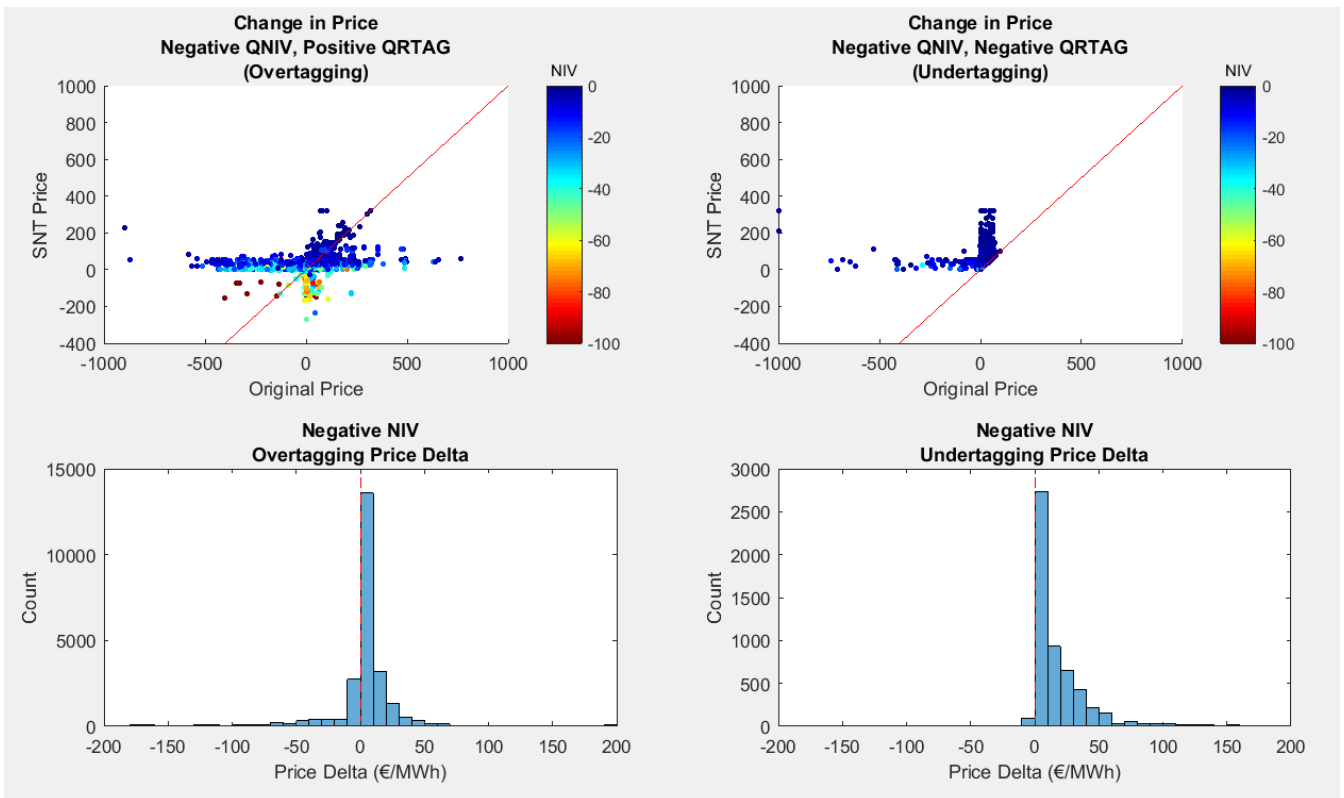

Figure 6

Conclusions

Comparing the current imbalance pricing methodology using prices that are known to be wrong to prices derived from the proposed Simple NIV tagging approach does not provide any sound basis to make an informed and evidence based decision for what would be a fundamental change. Further, completing any such analysis on an aggregate average, and on a limited dataset further negates the validity of any analysis.

Simple NIV tagging delivers a pricing outcome that on the surface of the published dataset looks similar to the original. As can be seen from the above analysis, the proposed method is inefficient at valuing the real time energy requirement in a highly constrained system and is not primarily driven by underlying system conditions. Ultimately, Simple NIV tagging scarifies accurate balancing market pricing for convenience and simplicity.

Appendix 2: Comparison of November and June

The average prices by month for each pricing method are shown below. The data from October to February (inclusive) is based on the published consultation data, the remainder is PPB's own analysis.

Table 2

	Original Price	Simple NIV Tagging Price	SNT Premium
2018_10	65.34	81.00	15.67
2018_11	70.07	83.68	13.61
2018_12	59.38	59.69	0.32
2019_1	86.78	86.17	- 0.62
2019_2	44.58	46.47	1.89
2019_3	*56.65*	*56.19*	*- 0.47*
2019_4	*52.13*	*47.59*	*- 4.54*
2019_5	*43.74*	*34.73*	*- 9.01*
2019_6	*37.90*	*28.85*	*- 9.05*

Analysing more recent data than the consultation paper shows that the SNT premium has narrowed and flipped to delivering a price that is heavily discounted from the original price.

Comparing both November 2018 and June 2019 shows the underlying drivers for this change. Both months normalised NIV distributions are shown below and compared to the total dataset distribution:
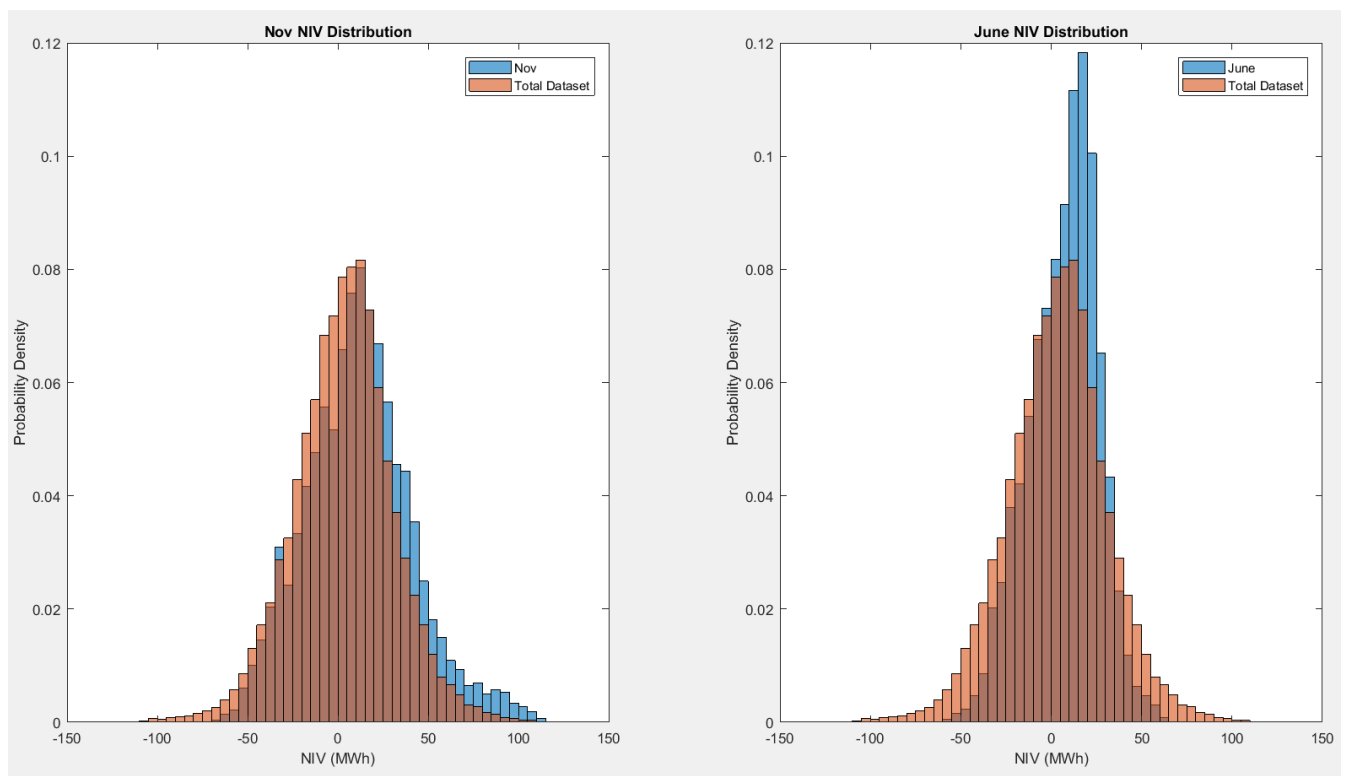

Figure 7

The November distribution is similar to the shape of the total dataset, but with a noticeable increase in the number of periods exhibiting high positive NIV's. The June dataset shows a high concentration of moderately positive NIV periods around the 10 to 25 MWh range.

As Simple NIV tagging is driven purely by the magnitude of the NIV, the change in distribution for both months is key to understanding the impact of the proposed change to imbalance price formation.

Comparing the rank of the marginal energy action for both months provides further clarity on the average price trend. For positive QNIV periods, the lower the rank of the marginal energy action, the lower its price and the closer it is to the middle of the ranked set. The opposite is true for negative QNIV periods, where a higher rank is closer to the middle of the ranked set and thus more economic.
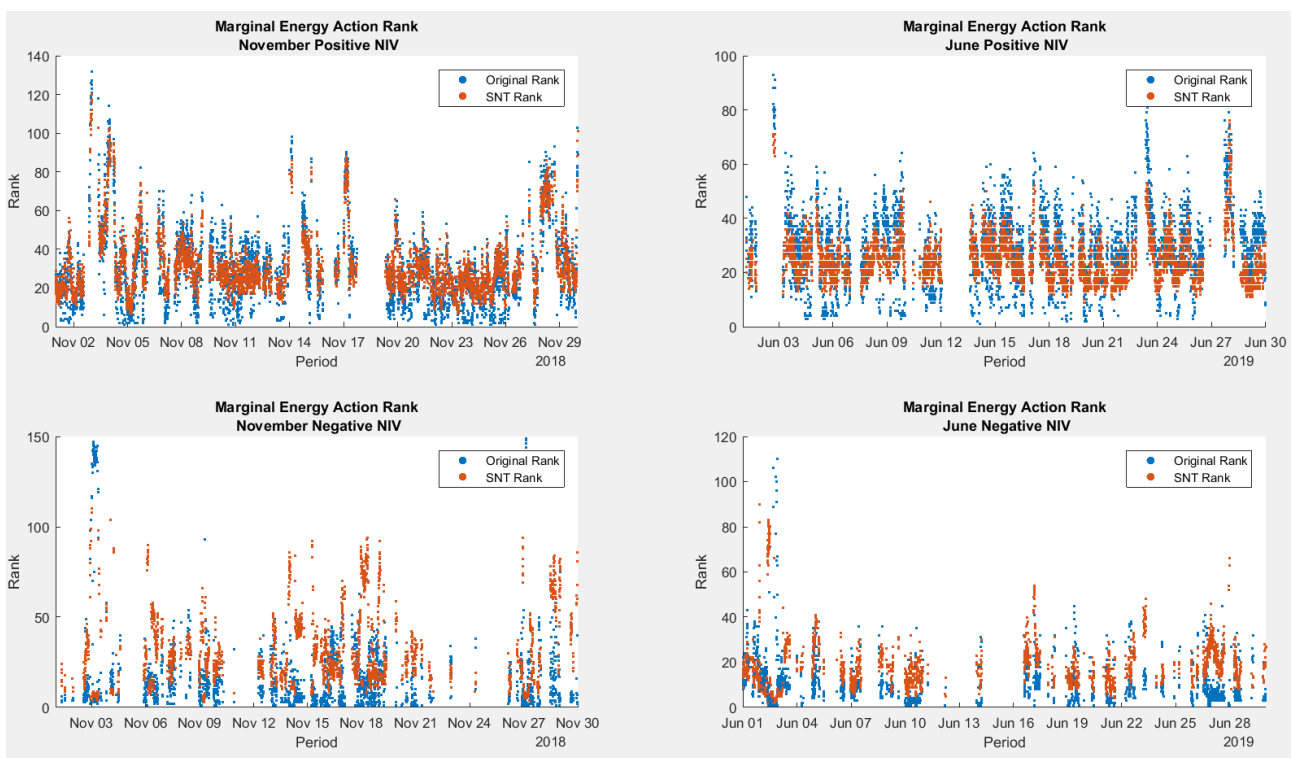

Figure 8

In November, Simple NIV tagging increased the rank of the marginal energy action for both positive and negative NIV periods. However, for positive periods the spread of ranks narrowed whilst the negative NIV ranks dispersed. November is a good illustration of when the NIV extends beyond the position of the true marginal energy action. This is the driver of the high SNT premium.

For June, positive NIV periods see a decrease in their rank as a result of Simple NIV tagging, with the energy action occurring closer to the middle of the set. This in turn produces a lower imbalance price since PMEA is now set below that of the true marginal

energy action for the majority of the month. Simple NIV tagging increases the marginal energy rank during negative NIV periods in June. However, due to the NIV distribution, the price increase on the negative NIV periods is not significant enough to counter the net downward reduction in prices.
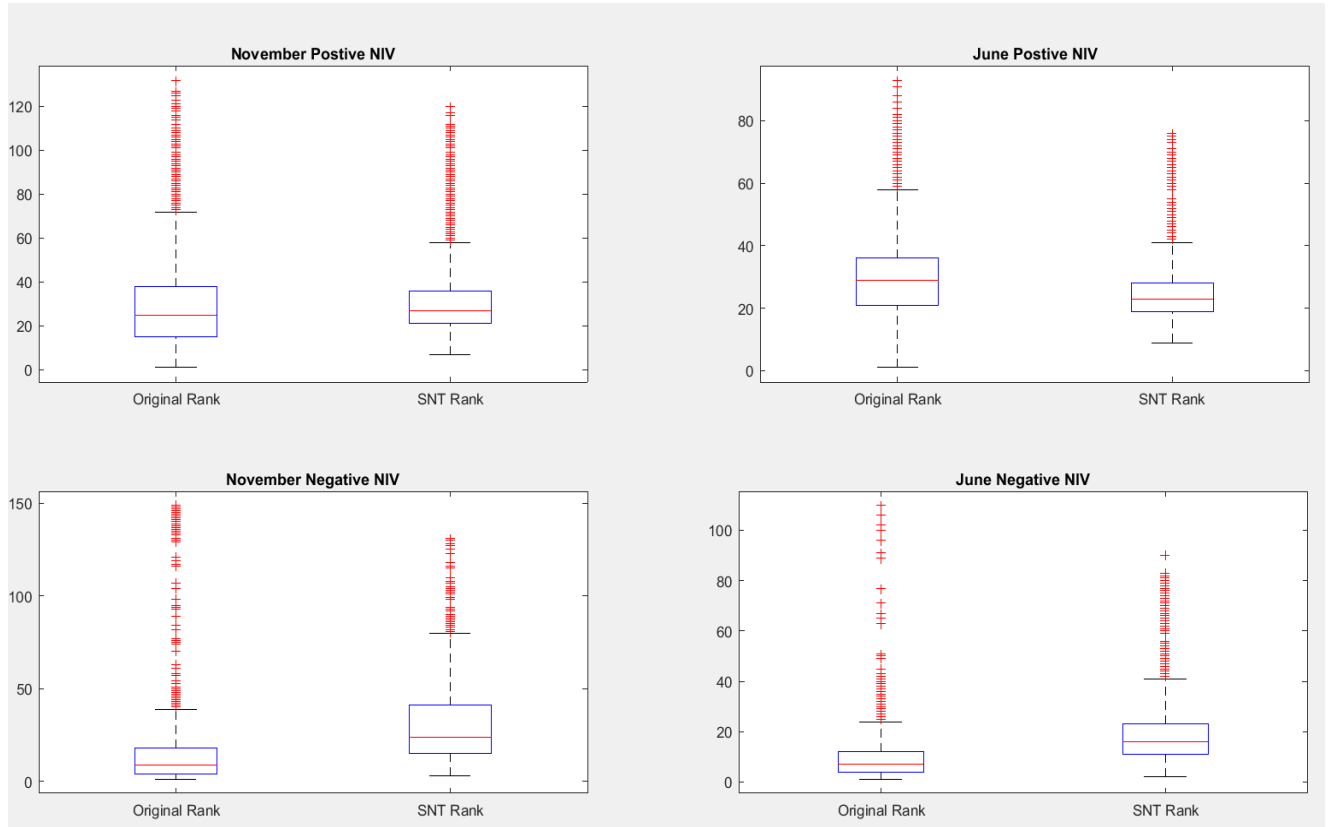

Figure 9