



# **Comment on TDB Advisory's analysis of beta comparators**

**A REPORT PREPARED FOR TRANSPower NEW ZEALAND**

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# Comment on TDB Advisory's analysis of beta comparators

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# 1 Introduction

On 12 August 2016 the New Zealand Commerce Commission (the Commission) published submissions from various stakeholders on its *Input methodologies review draft decisions* (the Draft IM decision). Frontier Economics (Frontier) has been asked by Transpower New Zealand (Transpower) to provide our views on a report for Contact Energy by TDB Advisory (TDB) entitled *Submission to the Commerce Commission on the Input Methodologies Review Draft Decisions: Comparative Company Analysis* (the TDB report).

In that report, TDB argues that the Commission should exclude several companies used at present when estimating asset betas for regulated energy suppliers in New Zealand. Specifically, TDB suggests that the Commission should reduce the sample of comparators from 74 to as low as just eight companies.

## 1.1 Structure of this report

This report is organised as follows:

- Section 2 provides a brief overview of TDB's analysis and key conclusions as a means of setting the scene.
- Section 3 explains in some detail why we consider TDB's conclusions to be erroneous.
- Section 4 sets out our recommendations to the Commission.

## 1.2 Our key findings

In our view, there are three main shortcomings with TDB's analysis, which invalidate its conclusions and recommendations to the Commission:

1. *Sensitivity to time periods.* TDB's analysis of the distribution of beta estimates and outliers was restricted to just the most recent five-year estimation period considered by the Commission (i.e., 2011-2016), and TDB's conclusions are driven entirely by the time period analysed. As the Commission's own analysis shows, its beta estimates are highly volatile over time. The recommendations that come from a TDB-style analysis change materially from time period to time period. For example, the firms that TDB identifies as 'outliers' in the current time period were not outliers in previous periods. Moreover, firms that were outliers in previous time periods are not outliers in the most recent period. TDB has simply shown that in *any* time period *some* firms will appear to be outliers. But there is nothing systematic about this over time. This simply reinforces the Commission's current approach of considering a large sample of comparators so that this sort of random variation cancels out over time.

2. *Subjective and opaque judgments.* When implementing its three-step filtering process, TDB appears to have applied a series of qualitative judgments about the companies that should be excluded at each step. Whilst these judgments are critical to which companies are included or excluded from the sample, none of the judgments that TDB has made are articulated transparently. As such, there is no way for any other stakeholder to replicate independently the choices made by TDB when constructing the subsamples it proposes, or to verify that TDB's judgments have been applied in a consistent manner to all companies, or to analyse how the TDB approach would have affected beta estimates in previous periods.
3. *Spurious identification of outliers.* TDB seems to have concluded that certain companies are outliers simply on the basis that their estimated betas are 'high' in a particular period. TDB suggests that these companies share common characteristics that lead them to be outliers. However, by way of example, TC Pipelines, which TDB flags as an outlier, does not share these characteristics and thus fails to fit TDB's narrative about the inclusion of companies that would distort the Commission's beta estimate. TDB then argues that 20 companies that are involved in similar activities to the 'outliers' it has identified should be excluded on the basis that they are likely to skew the overall beta estimate. In fact, that contention is not supported by the empirical evidence. The result is that firms are removed from the sample simply because their beta estimates happened to turn out to be relatively high in the most recent period.

The Commission's existing approach to beta estimation is free of these problems because:

- It does not exclude individual comparators on the basis of beta estimation outcomes in particular periods. In our view, it is better to employ the largest possible sample (as the Commission has done historically) and avoid discarding potentially useful information that would assist in producing the most reliable estimate possible.
- It uses systematic and transparent selection criteria, which produces a relatively large sample of comparators. It thereby avoids the need for the Commission to make *ad hoc* judgements about which companies should be included or excluded from the estimation process.
- It maintains a consistent sample over time, rather than removing firms in one sample period when they are identified subjectively as 'outliers' and then reinstating them in subsequent periods when their estimates are not classified as outliers. Even worse, if firms are removed permanently in the event that their estimate is classified as an 'outlier' in *any* period, the Commission would soon be left with a null set.

## 1.3 Recommendation

We recommend that the Commission retain its current sample of 74 comparators for the purposes of estimating betas for regulated energy suppliers.

We also recommend that the Commission estimate a single asset beta for all regulated energy suppliers rather than separate betas for electricity and gas suppliers.

Finally, we recommend that if the Commission considers revising its comparator set, it would need to:

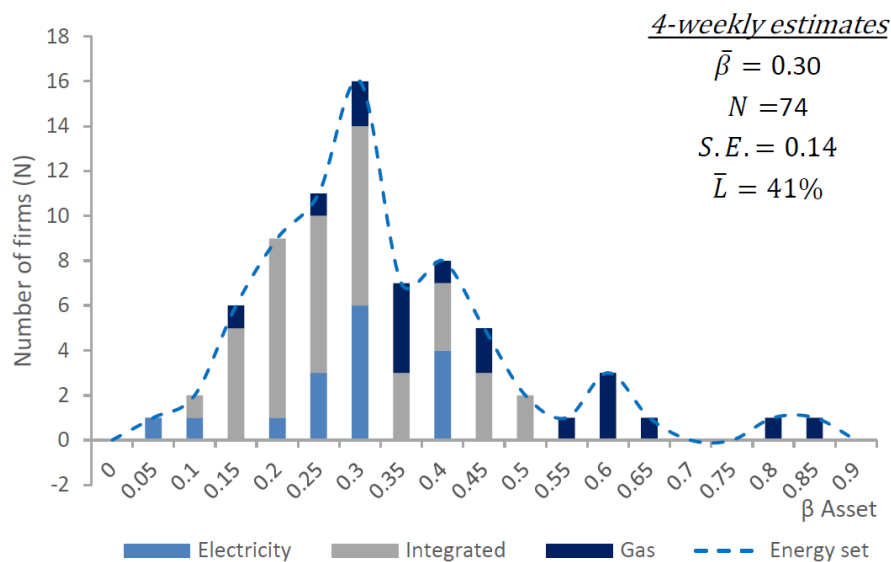
1. Develop an objective, transparent and replicable basis for excluding firms from the sample; and
2. Determine whether excluded firms were to be removed permanently or whether they could re-emerge back into the sample in future periods and, if so, on what basis; and
3. Demonstrate that the approach, when applied to previous five-year sample periods, would have produced sensible estimates:
  - a. That it would not have resulted in a sample that dwindled over time to a small set of firms; and
  - b. That it would not produce a roundabout of firms randomly leaving and re-joining the comparator set over time.

## 2 TDB's analysis and key conclusions

TDB's analysis proceeds essentially in three stages, which we summarise below:

1. *High level assessment of the distribution of estimated betas within the Commission's sample.* TDB plots the distribution of asset betas estimated by the Commission (see Figure 1) and concludes that:<sup>1</sup>
  - a. The highest seven asset beta estimates belong to the gas industry;
  - b. The electricity firm beta estimates appear to be skewed towards the lower end of the distribution; while
  - c. The integrated firms seem to be fairly evenly spread across the distribution.

Figure 1: Distribution of the Commission's (4-weekly beta) energy comparator set with industry breakdowns



Source: TDB report, Figure 2

2. *Firm-specific analysis.* TDB then investigates (using information gathered from company annual reports and 10-K reports<sup>2</sup>) the activities of those companies with the highest and the lowest estimated betas within each of

<sup>1</sup> TDB report, p.13.

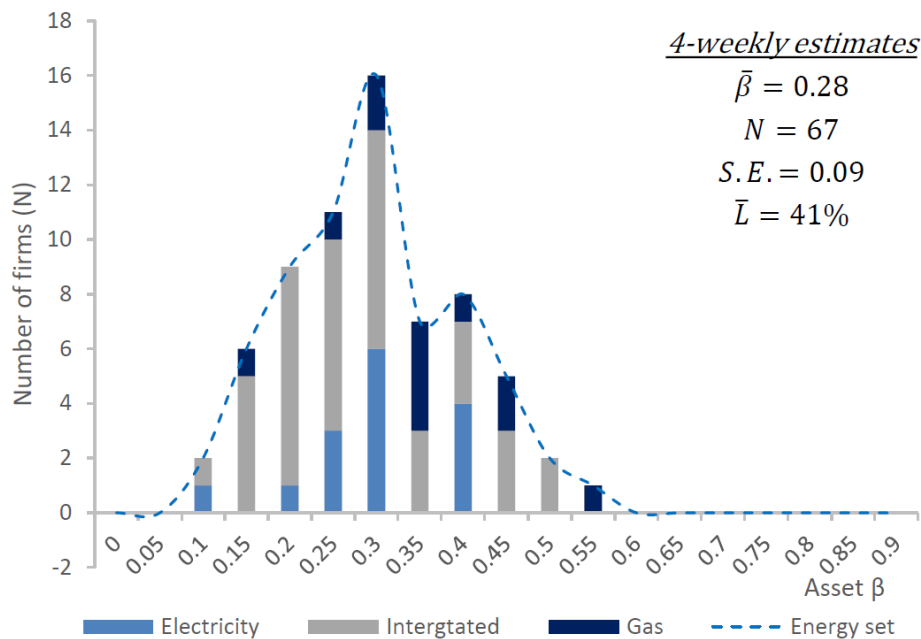
<sup>2</sup> 10-K reports are statutory reports that publicly traded companies in the US must file annually with the Securities and Exchange Commission.



the three categories: ‘gas’; ‘electricity’; and ‘integrated’. TDB concludes that:<sup>3</sup>

- Within the integrated and gas subsets of the Commission’s sample, there may be firms that are subject to different systematic risk than would be typical for electricity and gas suppliers regulated by the Commission.
- There are six gas firms that are likely to be outliers because their estimated betas seem to be “outside the expected distribution” and also “appear to be subject to different systematic risks” than the suppliers regulated by the Commission. In addition, one electricity comparator appears to be an outlier on the basis that its stock is illiquid.
- Removing these seven outliers improves the symmetry of the distribution of estimated asset betas (see Figure 2) and reduces the estimated weekly asset betas (from 0.34 to 0.31) and estimated four-weekly asset betas (from 0.30 to 0.28).

Figure 2: Distribution of the Commission’s energy comparator set without outliers



Source: TDB report, Figure 9

<sup>3</sup> TDB report, pp.29-31.

3. *Further filtering and refinement of the comparator sample.* Finally, TDB proposes and implements a three-step process to filter the comparators in the Commission's sample:<sup>4</sup>

- Step 1. Remove all “firms with unregulated gathering, processing, liquids and commodity exposures.”
- Step 2. Remove all “firms with other large unrelated/unregulated business segments.”
- Step 3. Remove “firms with significant business segments that are not related to transmission or distribution.”

As Table 1 below shows, implementing all three of these steps results in a significant reduction in estimated weekly asset beta (from 0.34 to 0.24) and the estimated four-weekly asset beta (from 0.30 to 0.21), an increase in the average gearing for the sample (from 41% to 49%) and a very material reduction in the sample size (from 74 comparators to just eight comparators).

Table 1: TDB's proposed filtering process and resulting sample sets

	Sample set	Weekly asset beta		4-Weekly asset beta		Average leverage	Number of firms in sample (N)
		Average	S.E.	Average	S.E.		
	Commission's energy set	0.34	0.14	0.30	0.14	41%	74
Step 1	Remove firms with unregulated gathering, processing, liquids and commodity exposures	0.29	0.09	0.26	0.10	42%	54
Step 2	Remove firms with other large unrelated/unregulated business segments	0.28	0.08	0.24	0.07	44%	39
Step 3	Remove firms with significant business segments that are not related to transmission or distribution	0.24	0.11	0.21	0.07	49%	8

Source: TDB report, Table 6

<sup>4</sup> TDB report, pp.34-36.

### 3 Shortcomings of TDB's analysis

In our view, there are three main shortcomings with TDB's analysis:<sup>5</sup>

1. *Sensitivity to time periods.* TDB's analysis of the distribution of beta estimates and outliers was restricted to just the most recent five-year estimation period considered by the Commission (i.e., 2011-2016), and TDB's conclusions are driven entirely by the time period analysed.
2. *Subjective and opaque judgments.* When implementing its three-step filtering process, TDB appears to have applied a series of qualitative judgments about the companies that should be excluded at each step.
3. *Spurious identification of outliers.* TDB seems to have concluded that certain companies are outliers simply on the basis that their estimated betas are 'high' in a particular period. TDB suggests that these companies share common characteristics that lead them to be outliers, but in fact not all companies identified by TDB as outliers share these characteristics. Furthermore, TDB argues that 20 companies that are involved in similar activities to the 'outliers' it has identified should be excluded on the basis that they are likely to skew the overall beta estimate. That contention is not supported by the empirical evidence.

The Commission's existing approach to beta estimation is free of these problems because:

- It does not exclude individual comparators on the basis of beta estimation outcomes in particular periods. In our view, it is better to employ the largest possible sample (as the Commission has done historically) and avoid discarding potentially useful information that would assist in producing the most reliable estimate possible.
- It uses systematic and transparent selection criteria, which produces a relatively large sample of comparators. It thereby avoids the need for the Commission

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<sup>5</sup> We note that TDB's analysis relies on asset beta estimates that assume that the debt beta is zero. The debt beta measures the systematic risk associated with a firm's debt. The larger the debt beta, the larger will be the asset beta (all else remaining equal). It is unlikely that the debt betas of the companies within the Commission's comparator sample are in fact zero, and debt betas are likely to increase as leverage increases. Assuming that the debt betas of the comparators are zero is likely to understate the asset betas of those companies. Furthermore, in general, the gas companies analysed by TDB (in the 2011-2016 period) tend to have lower gearing than the electricity companies analysed and, on average, the companies dropped by TDB in Step 1 of its filtering process have lower gearing than those retained. TDB's analysis essentially relies on electricity asset betas that are likely to be understated more than the gas asset betas in the sample. In other words, one reason that the gas betas analysed by TDB appear to be outliers relative to the electricity betas analysed may be because those asset betas have been estimated without accounting properly for debt betas.

to make *ad hoc* judgements about which companies should be included or excluded from the estimation process.

- It maintains a consistent sample over time, rather than removing firms in one sample period when they are identified subjectively as ‘outliers’ and then reinstating them in subsequent periods when their estimates are not classified as outliers. Even worse, if firms are removed permanently in the event that their estimate is classified as an ‘outlier’ in *any* period, the Commission would soon be left with a null set.

In the sections below, we elaborate on each of the shortcomings in TDB’s approach identified above.

## 3.1 Sensitivity to time periods

### 3.1.1 Volatility of beta estimates

In our experience, beta estimates can be very volatile over time. The Commission’s analysis (cited by TDB in its report) confirms this. For instance, Figure 3, which reproduces the Commission’s Figure 7, shows that:

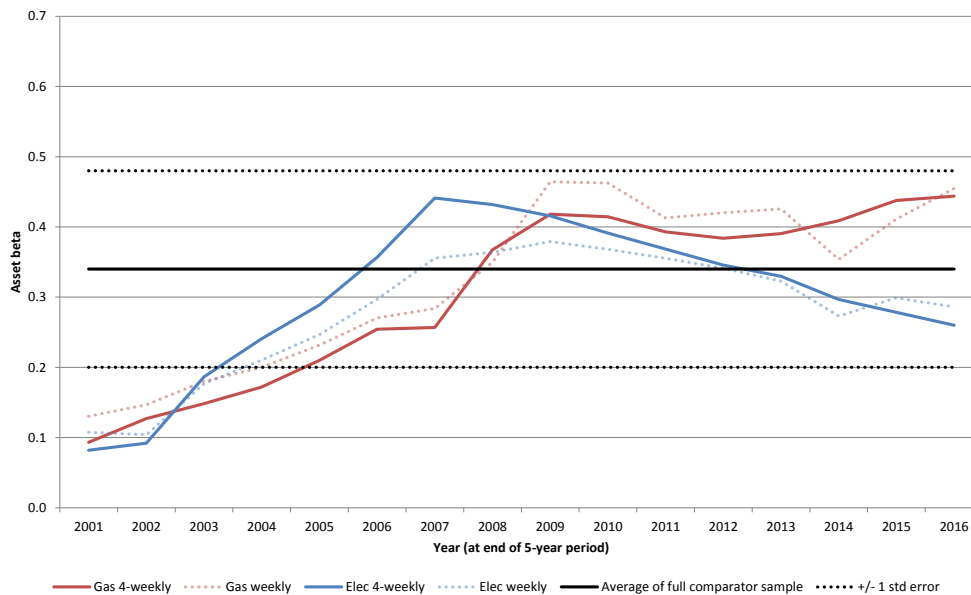
- In the case of the *electricity* subsample, the estimated average
  - Weekly asset beta was as low as 0.1 in 2002 and as high as 0.38 in 2009; and
  - Four-weekly asset beta was as low as 0.08 in 2001 and as high as 0.44 in 2007.
- In the case of the *gas* subsample, the estimated average
  - Weekly asset beta was as low as 0.13 in 2001 and as high as 0.46 in 2009 and 2010; and
  - Four-weekly asset beta was as low as 0.09 in 2001 and as high as 0.44 in 2015 and 2016.

Furthermore, whilst the average estimated asset beta in 2016 for the gas subsample is higher than the estimated average asset beta for the electricity subsample (consistent with TDB’s conclusions), the opposite is true in some earlier years. Specifically:

- Between 2003 and 2008 the average estimated four-weekly gas beta was lower than the average estimated four-weekly electricity beta; and
- Between 2004 and 2008 the average estimated weekly gas beta was lower than the average estimated weekly electricity beta.

## Shortcomings of TDB’s analysis

Figure 3: Five-year rolling asset betas for gas and electricity sub-samples



Source: Commerce Commission, *Input methodologies review draft decisions – Asset beta spreadsheet – 11 July 2016, Figure 7*

As the Commission has itself noted:<sup>6</sup>

384 In some periods the gas beta is higher than the electricity beta, but in other periods the electricity beta is higher than the gas beta. In our view, this suggests that:

384.1 observed differences in asset betas between electricity and gas are more likely to reflect measurement error than a systematic difference over time; and therefore

384.2 the empirical evidence in support of using a higher asset beta for GPBs is relatively weak.

### 3.1.2 TDB's findings an artefact of the time period analysed

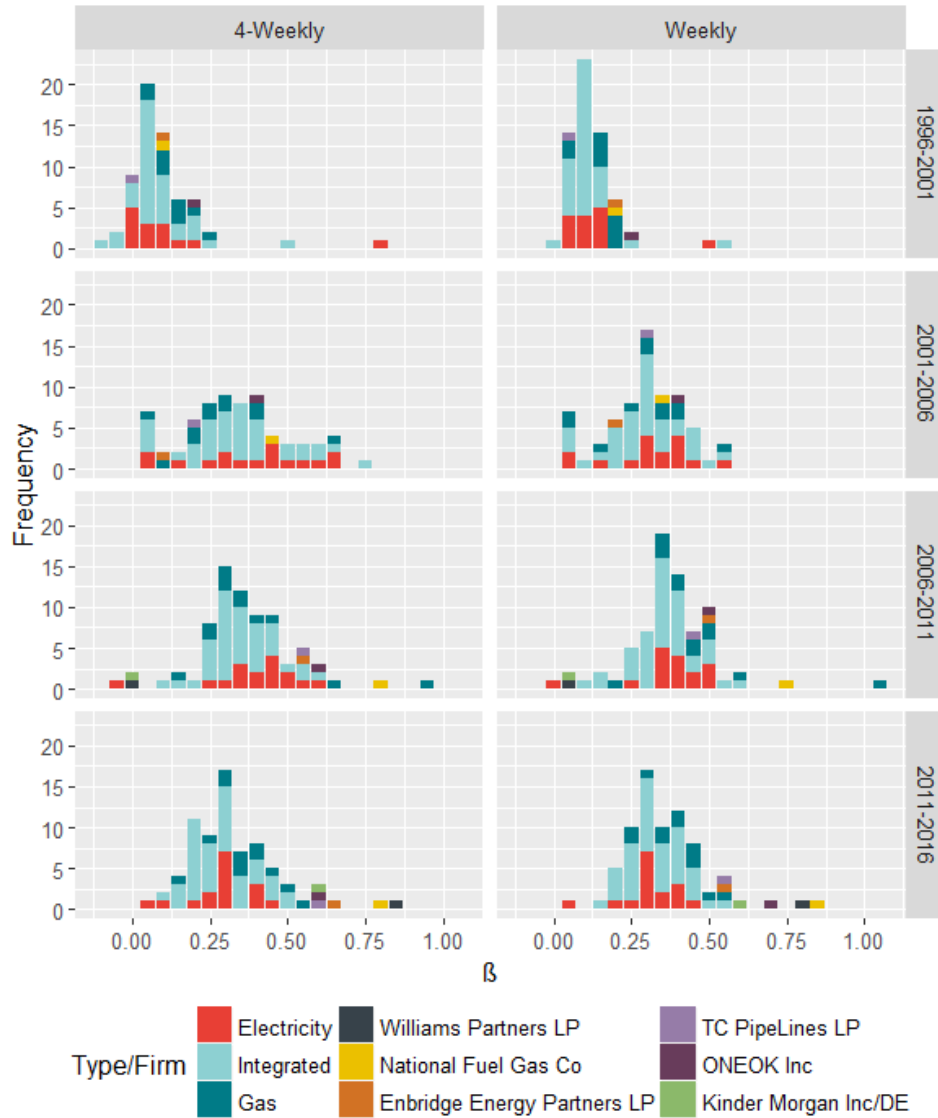
In order to illustrate how sensitive TDB's conclusions are to the estimation period it has analysed, Figure 4 below plots the distributions of the Commission's estimated four-weekly and weekly asset betas for each of the four historical estimation periods considered by the Commission.<sup>7</sup> Each distribution plot identifies separately the position of the six outlier gas companies identified by TDB (for the periods in which those companies were included in the Commission's

<sup>6</sup> Draft IM decision, p.97.

<sup>7</sup> The data used in these plots were obtained from the Excel file published by the Commission entitled *Input methodologies review draft decisions – Asset beta spreadsheet – 11 July 2016*.

sample). All of the remaining comparators are identified as electricity (red bars), gas (dark blue bars) or integrated (light blue bars) companies.

Figure 4: Distributions of estimated asset betas for each time period evaluated by the Commission



Source: Commission's beta estimates; Frontier analysis

The distribution plot at the bottom left of Figure 4 corresponds closely to Figure 2 in TDB's report, which plots the distribution of estimated four-weekly betas for

## Shortcomings of TDB's analysis

the 2011-2016 period.<sup>8</sup> It is clear from this plot that the six gas companies identified by TDB all lie in the right-hand tail of the distribution.<sup>9</sup>

If one examines the distribution plot for the previous period (i.e., 2006-2011) two of the gas companies identified by TDB as outliers (Williams Partners and Kinder Morgan) move dramatically to the left-hand tail of the distribution. Three companies (ONEOK, TC Pipelines and Enbridge Energy Partners) move much closer to the median of the distribution. Only one company (National Fuel Gas) remains in the right-hand tail of the distribution.

In the 2001-2006 period, ONEOK and National Fuel Gas move closer still to the median of the distribution, and TC Pipelines and Enbridge Energy Partners move left of the median.

This analysis demonstrates that the six gas companies identified by TDB as outliers that have significantly greater systematic risk than all other companies in the sample would not have been singled out as outliers had TDB conducted its analysis using estimates relating to a different time period. That is, a TDB-style analysis in previous periods would have identified a different set of outliers and a different problem to 'fix' – presumably by eliminating a different set of firms from the sample.

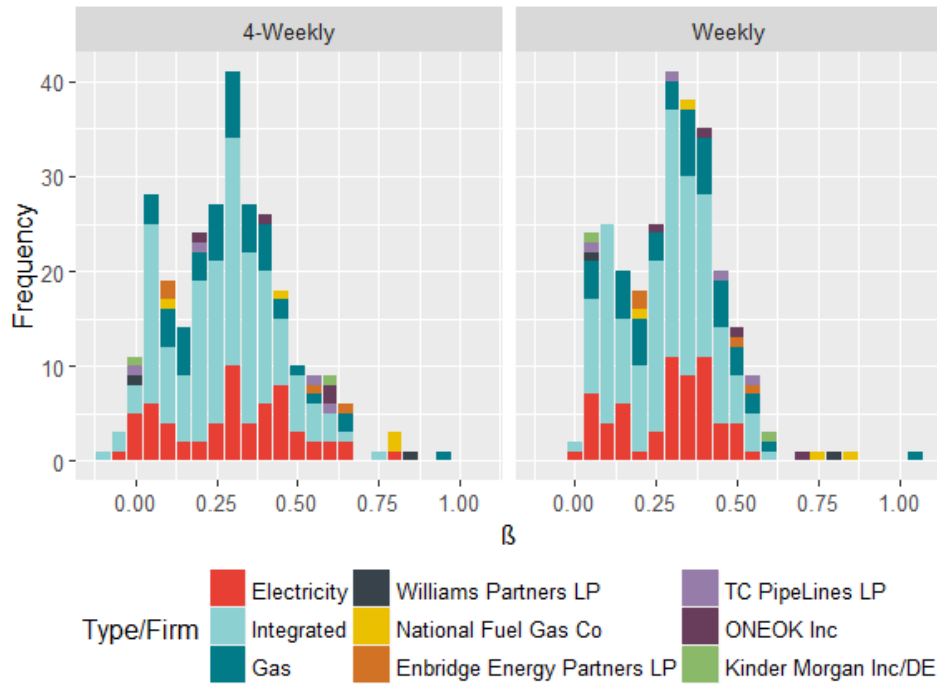
The 'mobility' of the so-called outliers identified by TDB is demonstrated even more clearly by the distribution plots in Figure 5 below, which pool together beta estimates from all four time periods. It is immediately clear that the companies identified by TDB as outliers are scattered throughout the distribution at different points in time. None of the companies identified by TDB remain consistently in the right-hand tail of the distribution in all periods (which is what we would expect if they truly are outliers with higher systematic risk). This suggests to us that TDB's identification of these six companies as outliers is a result of focussing on a single snapshot point in time.

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<sup>8</sup> Note that our distribution plot for the 2011-2016 four-weekly betas is not identical to TDB's because TDB appears to have rounded the asset betas before constructing its distribution plot. We have applied no rounding when constructing our distribution plots. The difference between our plot and TDB's is minor.

<sup>9</sup> The same is true of the weekly betas for the 2011-2016 estimation period, at the bottom right of Figure 4.

Figure 5: Pooled distributions of beta estimates from all periods



Source: Commission's beta estimates; Frontier analysis

Another striking feature of Figure 5 is that, when beta estimates from different time periods are pooled together, the estimates for electricity and gas companies are much more evenly spread through the distribution than is suggested by TDB's analysis. Therefore, provided that the Commission does not rely on a single estimation period when determining its overall beta estimate for regulated suppliers, there should be no concern that use of the Commission's full sample of comparators will produce a skewed beta estimate.

Figure 5 also reinforces the Commission's analysis that the difference between estimates of the gas and electricity betas:

- Is dependent on the time period being analysed; and
- Should not be overstated due to the difficulty associated with measuring the true betas of gas and electricity companies. In this regard, we note that in the 2011-2016 period, there are only 16 electricity companies (15 excluding Jersey Electric) and only 18 gas companies. These subsamples are too small to make any meaningful or reliable inferences about whether the electricity beta is statistically different from the gas beta.

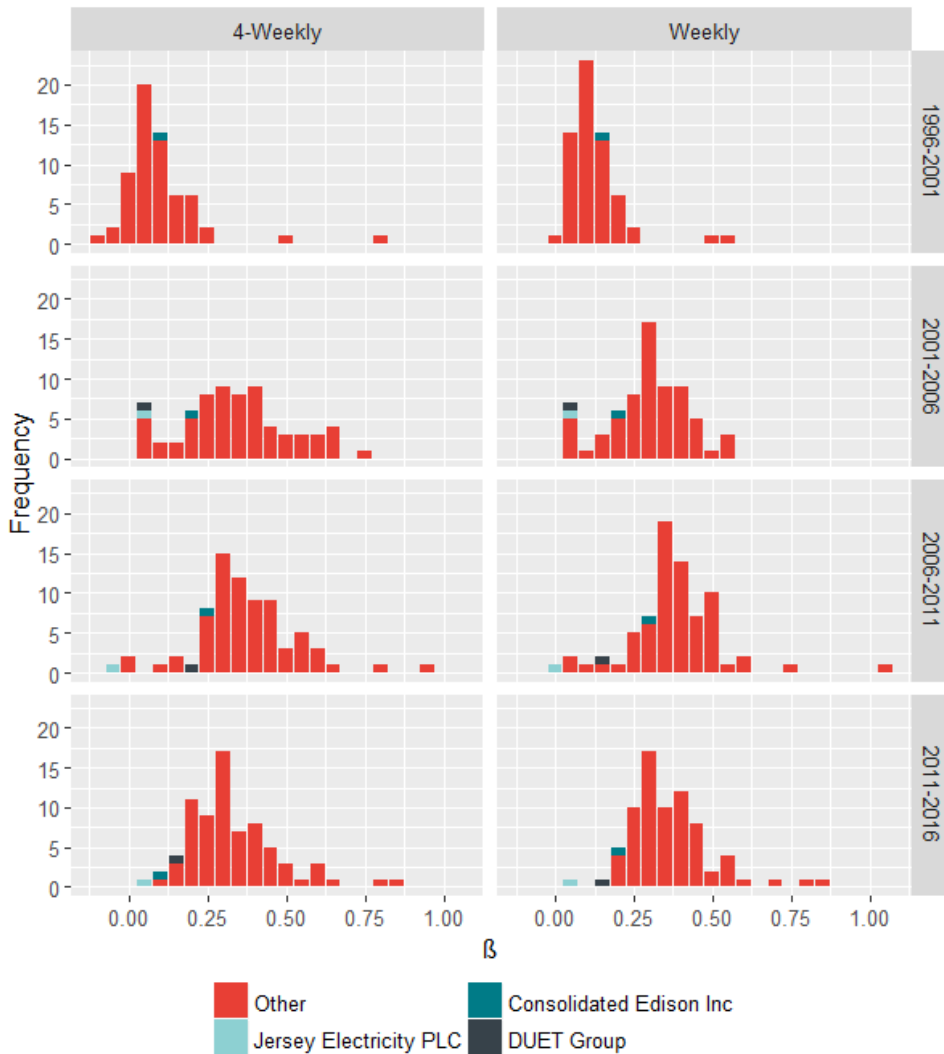
As such, in our view the Commission was correct to conclude in the Draft IM decision that it should not determine different betas for electricity suppliers and gas suppliers but, rather, should determine a single energy network beta.

## Shortcomings of TDB's analysis



The tendency for beta estimates to display movement is not restricted to just those companies found in the right-hand tail of the distribution. In order to demonstrate this point, we identified three companies located in the left-hand tail of the beta distribution in the period 2011-2016 and investigate where the estimates for those same companies are located in earlier periods.

Figure 6: Movement of estimates in the left-hand tail of the distribution – individual estimation periods



Source: Commission's beta estimates; Frontier analysis

Figure 6 shows that the beta estimates for two of these three companies (Consolidated Edison and DUET Group) display considerable movement over time. For instance, Consolidated Edison begins to the right of the median of the distribution in the earliest estimation period and migrates gradually to the left-hand tail of the distribution in later periods. DUET Group's estimate also displays some

movement. Only Jersey Electric remains consistently at the outer edge of the distribution. As TDB suggests, this could be because Jersey Electric's stock is illiquid.

The analysis above underscores the pitfalls of drawing strong conclusions about beta estimates (e.g., in an attempt to identify individual outliers) based on a single (relatively short) estimation period. The analysis also supports the Commission's conclusions in the Draft IM decision that the apparent differences between groups of comparators (e.g., electricity and gas companies) is "more likely to reflect measurement error than a systematic difference over time."

## 3.2 Judgment-driven outcomes

As described in section 2, TDB proposes a three-step filtering process to reduce the number of companies in the Commission's sample to what it considers to be a more suitable set of comparators. The filtering process suggested by TDB is not transparent, is reliant on a number of subjective judgments, and rules out a very large number of companies that could contribute useful information to the estimation process.

Underpinning each step in the filtering process is a series of qualitative judgments made by TDB.<sup>10</sup> For instance:

- In *Step 1*, when TDB "removes all firms with unregulated [gas] gathering, processing, liquids and commodity exposure" it is unclear whether TDB has assessed the extent of the companies' involvement in different activities simply on the basis of broad, qualitative descriptions provided in 10-K and/or annual reports, or whether TDB has applied some kind of objective, quantitative criteria when filtering comparators:
  - We regard broad, qualitative descriptions of firms' activities (found in 10-K and/or annual reports) an unreliable basis to include or exclude companies because these descriptions are often not detailed, and are not standardised or consistent across companies or over time. This means a consistent and systematic filtering of companies using this information is not possible and that the application of the filtering is not transparent or replicable.
  - If TDB has used some objective, quantitative criteria for selecting comparators (e.g., thresholds for EBITDA contributions of segments above which a company would be considered to have significant involvement in gas gathering, processing or liquids and commodity

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<sup>10</sup> We note that whilst TDB has submitted to the Commission a spreadsheet underpinning its analysis, which the Commission has published, that file sheds no further light on the detailed information that was used by TDB when filtering comparators.

exposure), those criteria have not been specified transparently by TDB. There is no way for any stakeholder to know if TDB has applied those criteria consistently, and there is no way for any stakeholder to replicate independently TDB's filtering process to check whether it is reasonable.

- More generally, it is unclear whether TDB has in fact excluded “all” companies with *any* unregulated gas gathering, processing, liquids and commodity exposure — irrespective of whether those activities contribute a large or only very small proportion of total revenues. If that is the case, it is possible that some comparators have been dropped even if the activities involving gas gathering, processing, liquids and commodity exposure represent only a very small proportion of the company's overall operations.
- In *Step 2*, when TDB “removes all firms which have large unrelated or unregulated revenues”, TDB's judgment about what it considers to be:
  - “unrelated” revenues is unspecified and therefore ambiguous; and
  - “large” revenues is ambiguous as no cut-off revenue threshold is specified by TDB.

Once again, it is impossible for any third party to implement independently TDB's filtering of firms in this step, or to assess whether TDB has exercised its judgment in a consistent way, using consistent information.

- In *Step 3*, when TDB removes “firms with significant business segments that are not related to transmission or distribution”, once again, it is ambiguous what TDB considers to be a “significant” business segment. This appears to be a judgement exercised by TDB that may not have been applied consistently across companies, may not have been based on consistent information, and cannot be tested or applied independently by any third party.

As an example of the problematic judgments made by TDB at Step 3, we note that National Grid has been excluded from the suggested sample.<sup>11</sup> National Grid is the Great Britain's only electricity transmission operator, and also operates gas transmission and distribution networks in the UK. In addition, National Grid operates an electricity transmission network, and electricity and gas distribution networks in the US. TDB does not explain in its report why it has excluded National Grid, but an Excel file submitted by TDB to the Commission containing its filtering analysis suggests that TDB was excluded because it is also involved in electricity generation in the US.<sup>12</sup> However, TDB has offered no analysis or evidence that suggests that those activities are so substantial as to warrant dropping National Grid altogether from the sample

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<sup>11</sup> TDB report, Appendix 3, p.44.

<sup>12</sup> TDB Excel file entitled: *TDB – underlying data of ComCom comparator companies – 18 August 2016*

used to estimate betas. The exclusion of National Grid is puzzling and arbitrary because most of its activities relate to the operation of energy networks.<sup>13</sup> We note that MEUG has argued previously that of the comparators considered by the Commission, National Grid is the closest comparator to Transpower.<sup>14</sup> In addition, Great Britain's energy sector regulator, Ofgem, uses National Grid as a comparator when determining its beta estimate for the transmission and distribution networks it regulates.<sup>15</sup> National Grid is clearly a relevant comparator (MEUG considers it to be the closest of all comparators, and Ofgem regulator considers it a relevant comparator to the energy networks it regulates) but TDB excludes National Grid at Step 3 of its filtering process. This reinforces our view that it would be unsafe for the Commission to embark on a process of trimming the sample in the way that TDB proposes.

TDB itself acknowledges that its three-step filtering process relies on judgment:<sup>16</sup>

It is important to note that through this process we have used our best judgment when classifying each firm. There are areas where the firms and the regulations they are subject to is unclear and where firms' business segments are highly complicated. For instance, in the U.S. most firms we looked at have rate-regulated generation functions under FERC. However, some firms declare unregulated generation functions. In these cases, it is unclear whether the revenue was generated by the firm outside the US or if some states have overridden FERC. Another point to note relates to the regulation surrounding gathering and production of natural gas and related NGLs. In most cases this is reported as unregulated revenue but this does not always appear to be the case.

TDB cautions further that:<sup>17</sup>

Our re-classification of the Commission's 74 company dataset is indicative and inevitably involves a degree of judgement based on the available information.

TDB attempts to reassure the Commission that misclassification of companies, based on incomplete information or erroneous judgment, would not have a material impact on the overall beta estimates at each step of the filtering process. It does this by assessing the impact on the estimated beta if 10% of the companies were misclassified at each of its three filtering steps.<sup>18</sup>

However, in our view, this is not a proper sensitivity test, and is not conservative as TDB claims. By assuming only 10% of comparators may be misclassified, TDB

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<sup>13</sup> By way of illustration, National Grid's 2015 annual report shows that more than 65% of its operating profit derived from the operation of energy networks.

<sup>14</sup> MEUG, Submission on Transpower Cost of Capital Input Methodology, 5 April 2012, para 74.

<sup>15</sup> See, for example: Ofgem, Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls, 17 February 2014, Chart 1.

<sup>16</sup> TDB report, p.35.

<sup>17</sup> TDB report, p.39.

<sup>18</sup> TDB report, Appendix 4.

restricts significantly the number of companies that is added to the sample at each step. Table 2 shows that the sensitivity test performed by TDB adds only:

- two new comparators to the sample at Step 1 (compared to TDB's preferred sample);
- one new comparator to the sample at Step 2; and
- three new comparators to the sample at Step 3.

With so few additional comparators permitted within the sample in TDB's sensitivity test, it is not surprising that the impact is found to be very limited. In our view, TDB has understated greatly the scope for potential misclassification of comparators arising from errors of judgment at each step.

Table 2: Number of companies added to the sample in TDB's sensitivity test

		Number of comparators		
		TDB 3-step filtering process	TDB sensitivity test	Difference
	Commission's energy sample	74	74	0
Step 1	Remove firms with unregulated gathering, processing, liquids and commodity exposures	54	56	2
Step 2	Remove firms with other large unrelated/unregulated business segments	39	40	1
Step 3	Remove firms with significant business segments that are not related to transmission or distribution	8	11	3

Source: Adapted from Tables 6 and 12, TDB report

Furthermore, TDB does not make clear *which* comparators it assumes in its sensitivity test are misclassified. As beta estimates can vary significantly between companies, it matters very much which individual companies are assumed to be misclassified. For the reasons above, the Commission should not take comfort from TDB's sensitivity analysis.

### 3.3 Spurious identification of outliers

As noted above, the companies that TDB has identified as outliers are those that have the highest estimated betas in the 2011-2016 period. TDB then analyses their characteristics using information found in 10-K reports, annual reports and other sources to develop a *post hoc* narrative to justify the companies as outliers (i.e., that these companies are involved in activities that are irrelevant to the activities that

the Commission is regulating). However, at least one of the companies identified by TDB as an outlier does not fit this narrative.

TC Pipelines is for all intents and purposes a pure-play gas transmission comparator that is regulated by the Federal Energy Regulatory Commission (FERC). As TDB itself acknowledges:<sup>19</sup>

The company appears to own/operate genuine fee-based transportation services only for natural gas. This is also highlighted in its statement of income that shows a majority of its revenues generated by natural gas transportation.

We have not seen any statutory reports filed by TC Pipelines, or in TDB's report, that suggests that it is involved in activities with unregulated gathering, processing, liquids and commodity exposures. It seems that the only reason that TC Pipelines has been flagged by TDB as an outlier is because it has a relatively high asset beta estimate for the 2011-2016 period. In earlier periods, TC Pipelines' estimated asset beta is lower, as demonstrated by Figure 4.

As TC Pipelines does not fit the constructed narrative for what makes a company an outlier, TDB proposes two alternative reasons why it might be considered ill-suited to the Commission's sample:<sup>20</sup>

1. *TC Pipelines owns but does not operate the pipelines that it invests in.* We see no reason why this should rule TC Pipelines out of contention as a reasonable comparator. TDB's reasoning is all the more puzzling because at least two companies that TDB recommends as to the Commission as pure-play (or near pure-play) comparators — DUET Group and Spark Infrastructure Group — have essentially the same business model.<sup>21</sup> DUET and Spark are infrastructure investment companies that own (but do not operate) energy network businesses.
2. *TC Pipelines' total assets have increased significantly over the period that its estimated asset beta has increased.* Once again, we fail to see the relevance of this argument. There is no reason to suppose that the asset beta of a company should vary according to its size in the way implied by TDB.

The identification of TC Pipelines as an outlier seems to us entirely spurious, explained only by the fact that its estimated beta happens to be high in the particular period examined by TDB. There is no neat theme common to all of companies identified by TDB that makes them true outliers.

TDB uses its analysis of the characteristics of the so-called outliers to argue that several other companies should be dropped altogether from the Commission's

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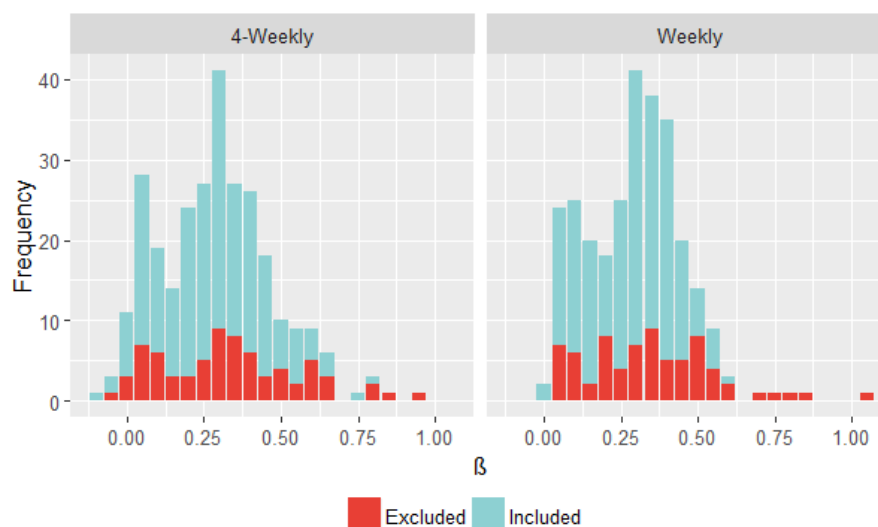
<sup>19</sup> TDB report, p.23.

<sup>20</sup> TDB report, p.24.

<sup>21</sup> TDB report, Appendix 3.

sample, on the basis that inclusion of companies with those characteristics would distort the Commission's beta estimate. However, that is not supported by the data available. Figure 7 below plots the distribution of betas estimated by the Commission, pooled across all four historical estimation periods, where the estimates belonging to the 20 companies dropped by TDB in Step 1 of its filtering process (red bars) are distinguished from the betas of those companies retained at Step 1 (blue bars).

Figure 7: Companies excluded and included at Step 1 by TDB – all estimation periods



Source: Commission's beta estimates; Frontier analysis

The Figure shows that the betas of those companies that TDB seeks to exclude (on the basis that they are involved in activities “with unregulated gathering, processing, liquids and commodity exposures”) are spread very evenly through the distribution. There is no evidence that the inclusion of those companies would skew the Commission's beta estimate up or down. The exclusion of those 20 companies identified by TDB would amount to information useful to the estimation process being discarded for no sound reason.

Indeed, the distributions of excluded and included firms is indistinguishable, but for the fact that the higher beta estimates are more likely to be excluded. This is, of course, inevitable from the TDB approach of *beginning* with the highest estimates and then finding a reason to exclude them. The same could be applied to the left

end of the distribution. Some common characteristic<sup>22</sup> could be identified and used as a basis for excluding all firms with that characteristic.

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<sup>22</sup> Or, as for the case of the TDB analysis, a characteristic that is common to some but not all of the firms might be identified.



## 4 Recommendations

We recommend that the Commission retain its current sample of 74 comparators for the purposes of estimating betas for regulated energy suppliers.

We also recommend that the Commission estimate a single asset beta for all regulated energy suppliers rather than separate betas for electricity and gas suppliers.

Finally, we recommend that if the Commission considers revising its comparator set, it would need to:

1. Develop an objective, transparent and replicable basis for excluding firms from the sample; and
2. Determine whether excluded firms were to be removed permanently or whether they could re-emerge back into the sample in future periods and, if so, on what basis; and
3. Demonstrate that the approach, when applied to previous five-year sample periods, would have produced sensible estimates:
  - a. That it would not have resulted in a sample that dwindled over time to a small set of firms; and
  - b. That it would not produce a roundabout of firms randomly leaving and re-joining the comparator set over time.



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