ATLANTIC
ECONOMICS

Ryan and Sarah,

In response to your request for market participants to notify the ISO by Sept. 19 of any tariff changes they would like to propose that would affect the next set of ICAP demand curves, which would apply to capability years 2021-22 through 2024-25, the TOs have authorized me to inform you that:

- The TOs propose that the tariff be changed to extend the collar so that it would apply to the next set of ICAP demand curves. The collar limits year-to-year changes in the reference points used for the ICAP demand curves produced by the annual update, but Sec. 5.14.1.2.2.3 of the Services Tariff currently states that it would apply only to the reference points calculated for the 2018-19, 2019-20 and 2020-21 capability years.
- The TOs also propose that the tariff be changed to correct three technical issues in the procedures for calculating escalation rates that are used in the annual updates, as described in more detail in the attached memo.

--Mike Cadwalader

Michael D. Cadwalader

President

MEMORANDUM

DATE: September 17, 2019

TO: Ryan Patterson and Sarah Carkner

FROM: Mike Cadwalader

RE: Proposed Changes in Escalation Rates Used in Annual Updates of ICAP Demand Curves

Late last month, Analysis Group kicked off the development of the next set of ICAP demand curves, which will apply to the 2021-22 through 2024-25 capability years. At the joint TPAS/ICAP WG meeting on September 5, the ISO asked market participants to identify by September 19 any proposed tariff changes that would affect the demand curves. This memo will use an illustrative example to demonstrate three flaws in the procedures the ISO currently uses to apply escalation rates when it conducts its annual updates of the ICAP demand curves, which would require tariff changes to correct.

While these flaws did not have a significant impact on the ICAP demand curves that are currently in effect, they could have a significant effect on demand curves in the future under certain conditions.

Gross CONE Escalation Rate

Assumptions for Illustrative Example

In each annual update, the ISO updates Gross CONE (i.e., the cost of constructing the proxy generator) by calculating an escalation rate, and multiplying one plus that escalation rate by the value for Gross CONE that was used to set the previous year's demand curve. Gross CONE consists of four components: construction labor cost, materials cost, turbine costs, and other costs. To simplify this example, assume that the cost index for each of these four components was set to a value of 100 when the 2017-18 ICAP demand curves were set. Then the indexed cost of building the proxy generator in a given capability year, relative to its cost in 2017-18, can be calculated by multiplying each of these cost indices by the weighting factor for that cost category. (Each weighting factor indicates the share of Gross CONE that consisted of costs in a given cost category when the 2017-18 demand curves were set.)

As Table 1 shows, for this example, assume that:

- The construction labor cost index rises from 100 in 2017-18 to 102 in 2018-19 and 104 in 2019-20;
- The materials cost index falls from 100 in 2017-18 to 90 in 2018-19 and then rises to 110 in 2019-20;
- The turbine cost index rises from 100 in 2017-18 to 120 in 2018-19 and then falls to 115 in 2019-20; and
- The GDP deflator (which is used for other costs) rises from 100 in 2017-18 to 102 in 2018-19 and 106 in 2019-20.

Then the overall indexed cost of building the proxy generator would have increased from 100 in 2017-18 to:

$$(28\% \times 102) + (37\% \times 90) + (20\% \times 120) + (15\% \times 102) = 101.2 \text{ in 2018-19,}$$

and:

$$(28\% \times 104) + (37\% \times 110) + (20\% \times 115) + (15\% \times 106) = 108.7 \text{ in 2019-20.}$$

Thus, the Gross CONE escalation rate for 2018-19 should be 1.2%, because the Gross CONE used to set the 2018-19 demand curve should be 101.2 / 100 = 1.012 times the Gross CONE used to set the 2017-18 demand curve. Similarly, the Gross CONE escalation rate for 2019-20 should be 7.5%, because the Gross CONE used to set the 2019-20 demand curve should be 108.7 / 101.2 = 1.075 times the Gross CONE used to set the 2018-19 demand curve.

Table 1: Indexed Cost of Constructing the Proxy Generator

Component of Gross CONE	Weighting Factor	2017-18	2018-19	% Incr. from 2017-18	2019-20	% Incr. from 2018-19
Construction Labor Cost	28%	100.0	102.0	2.0%	104.0	2.0%
Materials Costs	37%	100.0	90.0	-10.0%	110.0	22.2%
Turbine Cost	20%	100.0	120.0	20.0%	115.0	-4.2%
Other Costs (GDP Deflator)	15%	100.0	102.0	2.0%	106.0	3.9%
Gross CONE		**100.0**	**101.2**	**1.2%**	**108.7**	**7.5%**

There are two reasons why the current procedure may fail to produce the correct Gross CONE escalation rate: it uses the same weighting factors throughout each demand curve cycle, and it does not correctly account for revisions in published indices.

Changes in the Weighting Factors

The ISO uses the following procedure to determine the Gross CONE escalation rate:

- First, the ISO determines the percentage amount by which the cost index used for each of the four cost categories has increased over the past year.
- Then it multiplies that percentage increase for each of these cost indices by the weighting factor for that cost category.
- Finally, it sums those products over all of the cost categories.

This procedure yields a Gross CONE escalation rate for 2018-19 of:

$$(28\% \times 2\%) + (37\% \times -10\%) + (20\% \times 20\%) + (15\% \times 2\%) = 1.2\%,$$

which is the same value calculated above using Table 1. But for 2019-20, this procedure yields the following Gross CONE escalation rate:

$$(28\% \times 2\%) + (37\% \times 22.2\%) + (20\% \times -4.2\%) + (15\% \times 3.9\%) = 8.5\%,$$

As Table 1 showed, the cost of constructing the proxy generator in 2019-20 was only 7.5 percent larger than the cost of constructing that generator in 2018-19, in this example.

This shows how the ISO's procedure can produce erroneous Gross CONE escalation rates for the third and fourth years of each four-year demand curve cycle. It occurs because the ISO multiplies the percentage change in each index from the second year to the third year of the cycle, or from the third year to the fourth year of the cycle, by weighting factors that are fixed, based on the first year of the cycle. This disregards the fact that the relative contributions of the cost categories to Gross CONE changes over time. For example, the increase in turbine costs from 2017-18 to 2018-19 in this example means that turbines are a larger proportion of the overall cost of constructing this generator in 2018-19 than in 2017-18, and the decrease in materials costs from 2017-18 to 2018-19 in this example means that materials are a smaller proportion of the overall cost of constructing this generator in 2018-19 than they were in 2017-18. The ISO's procedure does not account for this, and as a result, it assigned too small a weight to turbine costs and too large a weight to materials costs when calculating the Gross CONE escalation factor for 2019-20. This caused the current procedure to overstate the increase in Gross CONE, because the category whose costs fell from 2018-19 to 2019-20 (turbines) in this example was assigned too small a weight, while the category whose costs rose by a large amount from 2018-19 to 2019-20 (materials) was assigned too large a weight.

Revisions in Cost Indices

The second problem may arise if revisions in the calculation of these cost indices are posted after they have been used in an annual update. Continuing with the example above, suppose that after the ICAP demand curves for 2017-18 are set, the Bureau of Labor Statistics was to revise the value of the turbine cost index for that year that was used when setting those demand curves, setting it equal to 110 instead of 100. Under the current procedures, the ISO would base its calculation of the percentage increase in turbine costs from 2017-18 to 2018-19 on the *revised* value of this index for 2017-18, not the initially published value, even though the demand curves for 2017-18 were based on the initially published value. Consequently, the ISO would calculate the Gross CONE escalation rate for 2018-19 under the assumption that turbine costs grew by only 120 / 110 – 1 = 9.1% from 2017-18, while those costs are actually 20 percent higher than the value that was used when calculating Gross CONE for 2017-18. This produces a Gross CONE escalation rate for 2018-19 of:

$$(28\% \times 2\%) + (37\% \times -10\%) + (20\% \times 9.1\%) + (15\% \times 2\%) = -0.8\%,$$

so the Gross CONE that is used to set the 2018-19 demand curves would be below the Gross CONE that was used to set the 2017-18 demand curves, even though the cost of constructing the proxy generator is actually 1.2 percent higher in 2018-19 than the cost that was used to develop the demand curves used for 2017-18, in this example.

Table 2: Impact of Revision in Turbine Cost Index

Component of Gross CONE	Weighting Factor	2017-18 Initial	2017-18 Revised	2018-19	% Incr. from 2017-18 Initial	% Incr. from 2017-18 Revised
Construction Labor Cost	28%	100.0	100.0	102.0	2.0%	2.0%
Materials Costs	37%	100.0	100.0	90.0	-10.0%	-10.0%
Turbine Cost	20%	100.0	**110.0**	**120.0**	20.0%	9.1%
Other Costs (GDP Deflator)	15%	100.0	100.0	102.0	2.0%	2.0%
Gross CONE		**100.0**	**102.0**	**101.2**	**1.2%**	**-0.8%**

This problem (and the problem described in the preceding section) can be addressed easily, by basing the Gross CONE escalation rate for each year on the ratio of (1) the indexed cost for the proxy generator in that year to (2) the indexed cost for the generator in proxy generator that was used to set the demand curve for the preceding year, with each of the cost indices normalized to a value of 100 for the first year in the four-year demand curve cycle.

Net Energy and Ancillary Services Revenue Escalation Rate

The third problem applies to the escalation rate that is applied to net energy and ancillary services (EAS) revenue, which is another input into the calculation of Net CONE that is updated in each annual update. The ISO takes the net EAS revenue that it calculates for the historical three-year period and applies the most recent annual change in the GDP deflator twice. Consequently, in the preceding example, since the GDP deflator used for 2019-20 was 3.9 percent higher than the GDP deflator used for 2018-19, it would multiply net EAS for the historical three-year period by $1.039^2 = 1.08$ to account for inflation over two years. However, the correct escalation rate to convert 2017-18 revenue into 2019-20 revenue is the GDP deflator for 2019-20 divided by the GDP deflator for 2017-18, which in this example is 106/100 = 1.06. Because the rate of growth in the GDP deflator from 2017-18 to 2018-19 was smaller than the rate of growth in the GDP deflator from 2018-19 to 2019-20, the ISO's procedure makes too large an adjustment to account for inflation in this example. If the rate of growth in the GDP deflator from 2017-18 to 2018-19 had been larger than the rate of growth in the GDP deflator from 2018-19 to 2019-20, the ISO's procedure would have made too small an adjustment to account for inflation.