RMISTF Executive Summary – A. F. Mensah (AFM) Package

December 8, 2016

A. F. Mensah is generally supportive of the PJM/IMM proposed changes and transition plan with one exception, the proposed method of settlements calculation. Thus, we propose a package identical to the PJM Package, but with one change reflecting our concern, described in detail below.

19 – Application of a substitution factor – *Pay all units the same per effective MW. Use the Average RTS as a multiplier to the whole RMCP,* **(ARTS*PerfScore*(RMCCP+RMPCP)).**

We believe that the proposed PJM/IMM Settlement calculation is inconsistent with the calculation of effective MW used in clearing. In clearing, the area under the RTS curve is used to calculate the effective MW contribution of RegD. This can be shown to be equivalent mathematically to using the average value of the RTS multiplied by the total actual MW of RegD.

- *RTS $(x) = \beta x + c$*

- The Effective MW of a MW of RegD is the integral of the RTS from 0 to a, which is equivalent to $a * (AverageRTS)$

- Effective MW cleared = $\int_0^a (\beta x + c)\, dx = \beta \frac{x^2}{2} + cx \Big|_0^a = \beta \frac{a^2}{2} + ca = a(\beta \frac{a}{2} + c) = a(\beta \frac{a}{2} + \frac{2}{2}c)$
  $= a\left(\frac{\beta a + 2*c}{2}\right) = a\left(\frac{(\beta a + c) + c}{2}\right) = a\left(\frac{RTS(a) + c}{2}\right) = a\left(\frac{RTS(a) + RTS(0)}{2}\right) = a(AverageRTS)$

- This can easily be expanded to show the same for a segmented curve

Because the calculation of effective MW in clearing is based on the Average RTS, it is consistent to settle based on the average as well. Since the RTS is a decreasing function, the MRTS is the lowest value of the RTS curve used in clearing. Settling based on the MRTS will always result in RegD being under paid relative to its effective contribution to system control. Visually, this is well represented as the difference between the area under the RTS curve and area under the line y= MRTS from 0 to the number of RegD MW cleared.

RTS curve

The yellow and orange areas together represent the effective MW contribution of RegD in clearing. The orange area alone represents the effective MW contribution used in settlement as proposed by PJM/IMM. For fairness, A. F. Mensah proposes using the whole area in settlement.

Y= MRTS