

APPENDIX 1

NOTE: Throughout this document, the subscript *EWFKL(1-25)* is used to denote data / parameter pertaining to the 25 x 600 kW project activity turbines and the subscript *EWFKL* is used to denote data / parameter pertaining to the 29 x 600 kW turbines, which includes both the project activity turbines (25 x 600 kW) and non-project activity turbines (4 x 600 kW)

STEP 1: Calculation of power exported by 25 project activity (EWFKL) turbines at 33 kV point from export reading of 29 turbines connected to the metering point

The power exported by all 29 x 600 MW WECs at the 33 kV metering point is monitored and the data is available; also available are data of generation of each WEC through the controller meter installed for every WEC. The PP proposes to calculate the power exported by the 25 x 600 kW sub-project activity turbines by apportioning the export readings for all the 29 turbines in the proportion of their generation.

Thus, we have:

$$EG_{\text{exp ort ,EWFKL (1-25)}} = \frac{EG_{\text{JMR ,exp ort ,EWFKL}} * \sum_1^{25} EG_{\text{controller ,EWFKL}}}{\sum_1^{29} EG_{\text{controller ,EWFKL}}}$$

----- (Equation 1)

Where,

$EG_{\text{exp ort ,EWFKL (1-25)}}$ = Electricity exported by the 25 project WECs

$EG_{\text{JMR ,exp ort ,EWFKL}}$ = Electricity exported by 29 WECs, as recorded by the meter at the 33 kV metering point

$\sum_1^{25} EG_{\text{controller ,EWFKL}}$ = Sum of electricity exported by the project activity WEGs (25 WECs covered as measured at the controller meter of each of the WEGs.

$\sum_1^{29} EG_{\text{controller ,EWFKL}}$ = Sum of electricity exported by the all the 29 WEGs of EWFKL measured at the controller meter of each WEC.

STEP 2: Calculation of power imported by 25 project activity (EWFKL) turbines at 33 kV point from reading of import reading of 29 turbines connected to the metring point

As a conservative measure, the power imported by the 25 x 600 kW project activity turbines is considered as being equal to the power imported by the entire set of 29 x 600 kW turbines.

Thus, we have,

$$EG_{import,EWFKL(1-25)} = EG_{JMR\ import, EWFKL} \text{-----}(\text{Equation 2})$$

Where,

$EG_{JMR,import,EWFKL}$ = Electricity imported by all connected 29 WECs, as recorded by the meter at the 33 kV metering point, and,

$EG_{import,EWFKL(1-25)}$ = Electricity imported by 25 project WECs

STEP 3: Calculation of transmission loss for the quantity of electricity exported by 25 project activity (EWFKKL) turbines

As a conservative measure, the transmission loss for the export electricity of 25 x 600 kW project activity turbines is considered as being equal to the transmission loss for the export electricity which is calculated by the statutory authorities and recorded in the JMR.

Thus, we have,

$$TE_{EWFKL(1-25)} = TE_{JMR, EWFKL} \text{-----}(\text{Equation 3})$$

Where,

$TE_{JMR, EWFKL}$ = Transmission loss for export for 17.4 MW (29 WECs) as recorded in JMR, and

$TE_{EWFKL(1-25)}$ = Transmission losses for export due to 15 MW (25 WECs)

STEP 4: Calculation of transmission loss for imports for the quantity of electricity imported by 25 project activity (EWFKL) turbines

Once again, as a conservative measure, the transmission losses on account of import by 25 x 600 kW project activity turbines is assumed to be equivalent to the transmission loss of import by the all the 29 connected turbines, which is calculated as 15% of imported power by the statutory authorities.

Thus,

$$TI_{EWFKL(1-25)} = TI_{EWFKL},$$

Where,

$TI_{EWFKL(1-25)}$ = Transmission loss for imports of 25 x 600 kW (15 MW) turbines,

TI_{EWFKL} = Transmission losses for imports of 29 x 600 kW (17.4 MW) turbines, and,

TI_{EWFKL} is calculated as 15% * $EG_{JMR\ import, EWFKL}$ by the statutory authorities to compensate for the transmission loss of import electricity, where, $EG_{JMR\ import, EWFKL}$ = Electricity imported by 29 x 600 kW (17.4 MW) turbines as recorded by the meter at the 33 kV metering point.

Combining the two, we have,

$$TI_{EWFKL(1-25)} = 15\% * EG_{JMR\ import, EWFKL} \text{-----}(\text{Equation 4})$$

STEP 5: Calculation of net quantity of power exported to the grid at 66 kV point

Net Electricity supplied to grid at 66 kV
= Electricity Export at 66 kV – Electricity Import at 66 kV

Electricity Export at 66 kV
= $EG_{\text{export,EWFKL}(1-25)} - TE_{\text{EWFKL}(1-25)}$

Electricity Import at 66 kV
= $EG_{\text{JMR import, EWFKL}(1-25)} + 15\% * EG_{\text{JMR import, EWFKL}(1-25)} = 115\% * EG_{\text{import, EWFKL}(1-25)}$

Combining the three equations, we get,

Net Electricity supplied to grid at 66 kV

$$= EG_{\text{export,EWFKL}(1-25)} - TE_{\text{EWFKL}(1-25)} - 115\% * EG_{\text{import, EWFKL}(1-25)}$$

Substituting from equation 2 and 3, we get,

Net Electricity supplied to grid at 66 kV

$$= EG_{\text{export, EWFKL}(1-25)} - TE_{\text{JMR,EWFKL}} - 115\% EG_{\text{JMRimport, EWFKL}}$$

Thus, we have the final equation for net electricity supplied to grid at 66 kV by the 25 WEGs of sub-project activity EWFKL,

$EG_{y,\text{EWFKL}} = EG_{\text{export,EWFKL}(1-25)} - 115\% * EG_{\text{JMR import, EWFKL}} - TE_{\text{JMR, EWFKL}}$

The parameter $EG_{\text{export,EWFKL}(1-25)}$ is calculated using equation (1) above.

The parameter $EG_{\text{JMR import, EWFKL}}$ is the import recorded in the JMR.

The parameter $TE_{\text{JMR, EWFKL}}$ is the transmission loss recorded in the JMR.