

AGC in Solar Park

SRPC, SECRETARIAT

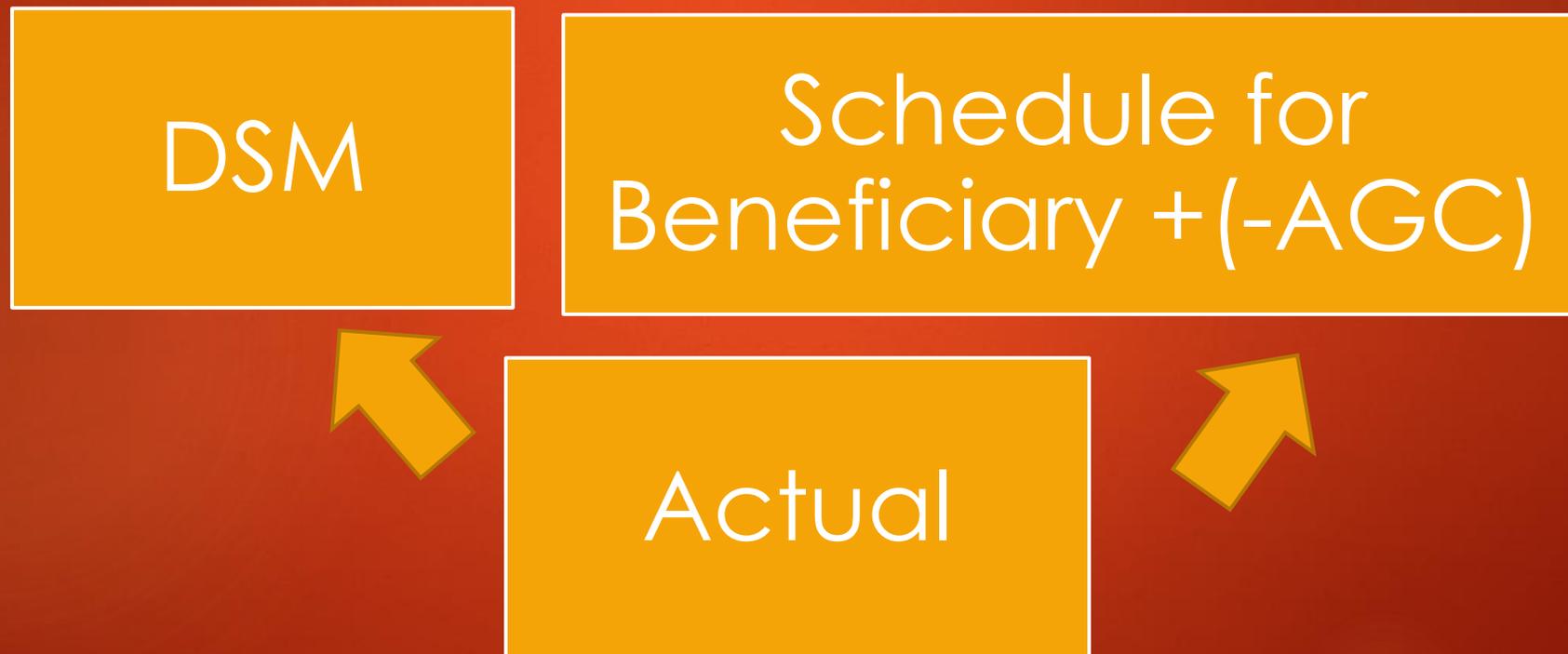
AGC in Solar Park

- ▶ Active Power Supplied by Inverter to the grid can be controlled by using external set points in inverter setting.
- ▶ In case regulation up is intended through AGC then at all point Actual Set point in inverter should be below MPPT.
- ▶ This would lead to sub optimal usage of PV to the extend of margin kept between MMPT and actual operating point.
- ▶ Solar Power Developer may need to be compensated for the margin not utilised as it won't be able to recover its fixed charge under the present regime of tariff of Solar.
- ▶ The tariff is adopted by State Regulator but the park would be a regional entity correcting regional ACE.
- ▶ In that case who would be compensating the Solar park for keeping the set points below MPPT?
- ▶ What would be the margin kept for regulation up?

- I. Reserve Reliability in case of RE. Even during AGC up there may be fall in Solar irradiation/insolation or fall in Wind and therefore keeping the margin throughout and not getting the desired results in time of requirement needs to be examined.
- II. Even during AGC down there may be increase in solar/wind generation and thereby there may not be the desired results as per the AGC Signal.
- III. Presently the scheme relies on the AGC Signal and not on the actual performance.
- IV. In case of RE it is to be ascertained whether the actual performance is due to change in the parameters or due to the AGC Signal.
- V. The practice of measuring of actual performance due to AGC Signal – National/International experience.
- VI. Whether the actual performance could be measured with AGC Signals in alternate blocks. The actual without AGC in the N & N+2 block could give us the idea of actual generation in N+1 block and it could be measured with actual performance in the N+1 block with respect to the AGC command.
- VII. The mark-up for conventional generator was due to deterioration in parameters, ramps, other technical constraints etc. Whether a separate mark-up for RE is required?
- VIII. Whether the schemes like RRAS, AGC etc are planned through the pool, the inflow in the pool has reduced considerably and the outflow from the pool is significant and on the rising trend for Grid related activities.
- IX. Whether the AGC signal in case of RE would be on similar lines as in case of conventional generators- output is determined considering the local parameters in case of conventional generators.
- X. In case of AGC down – what happens to the RE attributes, whether they are to be procured through REC mechanism.
- XI. Procedure for monitoring actual performance with respect to AGC signal

AGC in Solar Park

- ▶ For Regulation down how the Solar power developed would be compensated as its fixed charges are recovered through actual meter reading.
- ▶ Is the payment for AGC down would be made from Regional Pool at PPA rate?



Total Cost received by Conventional Generator

$$= FC + SE \times VC + (Act - SE - AGC) \times DSM + VC \times AGC + \text{Mark up}$$

$$= FC + SE \times VC + (Act - SE) \times DSM + AGC (VC - DSM) + \text{Mark up}$$

Total Cost received by RE Generator

$$= \cancel{FC} + SE \times PPAR + (Act - SE - AGC) \times DSM + \cancel{PPAR} \times \cancel{AGC} + \text{Mark up}$$

$$= \cancel{FC} + SE \times PPAR + (Act - SE) \times DSM - AGC \times DSM + \text{Mark up}$$

$$= \cancel{FC} + SE \times PPAR + (Act - SE) \times PPAR - AGC \times PPAR + \text{Mark up}$$

RE Generator

$SE = 100, AGC = -5, \text{ Actual } 100$

- $= 100 \times PPAR + (100-100) \times PPAR + 5 \times PPAR$

$SE = 100, AGC = 0, \text{ Actual } 100$

- $= 100 \times PPAR + (100-100) \times PPAR$

RE Generator

$SE = 100, AGC = -5, \text{ Actual } 90$

- $= 100 \times PPAR + (90 - 100) \times PPAR + 5 \times PPAR$

$SE = 100, AGC = 0, \text{ Actual } 100$

- $= 100 \times PPAR + (100 - 100) \times PPAR$

RE Generator

$SE = 100, AGC = -5, \text{ Actual } 110$

- $= 100 \times PPAR + (110 - 100) \times DSM + 5 \times DSM$

$SE = 100, AGC = 0, \text{ Actual } 110$

- $= 100 \times PPAR + (110 - 100) \times DSM$

RE Generator

- ▶ For commercial accounting AGC schedule is mathematical number as Variable Cost of RE is Nil .
- ▶ Generator needs to be compensated on actual generation reduction due to AGC signal rather than on AGC generation reduction schedule.
- ▶ Actual Generation depends on two component intensity of solar radiation and External Set Points of Inverter.
- ▶ The Set point of inverter for different radiation is adjusted based on algorithm.
- ▶ It could be difficult to ascertain that reduction in Generation is achieved via AGC or Solar Radiation.

