Distributed Generators as SCRs

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Overview

- In this presentation, the NYISO proposes a comprehensive approach to modeling the baseline, UCAP and performance of SCRs using distributed generators, either alone or in combination with load reduction.
- Metering of resources is a key ingredient to the proposed rules.
- The proposal is in keeping with requiring actual and verifiable change in behavior (e.g., load reduction) of an SCR in response to the NYISO's call of an event or test.

Model for SCR as Interruptible Load (Type C in DRIS)

ACL_{n-1} = avg[load ∈ (top 20/40 NYCA hours for year n-1)] (1)

$CMD_n = ACL_{n-1} - LDV_n$ (2)

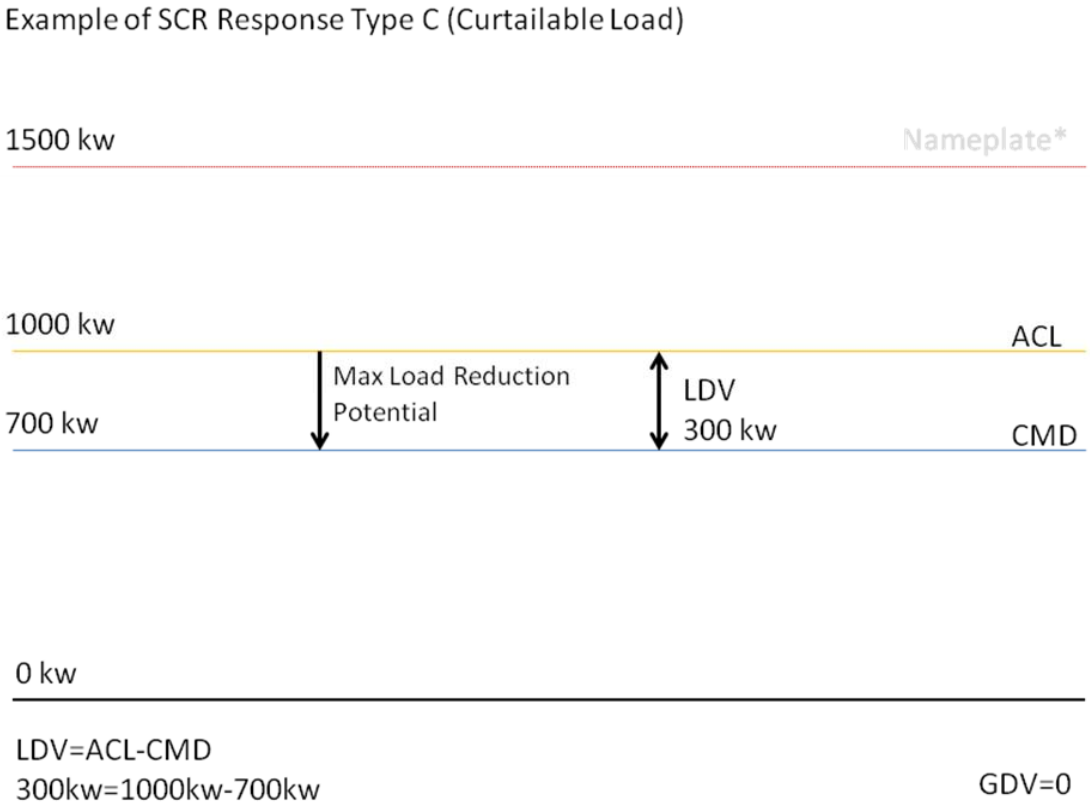
$UCAP = (ACL_{n-1} - CMD_n) * pf * lf$ (3)

$Performance = (ACL_{n-1} - AMD_n) * lf$ (4)

Where ACL_{n-1} = Average Coincident Load baseline for year n based on year n-1 top 20/40 data per the changes approved at BIC.

LDV_n = the declared value of load reduction identified by the RIP
UCAP = Unforced Capacity able to be offered by the SCR
CMD_n = Contract Minimum Demand for the SCR each month in year n (cannot be lower than zero)
pf = SCR performance factor
lf = (1 + transmission loss factor) for SCR
AMD_n = Actual Metered Demand for the SCR in events occurring in year n

Example of SCR Response Type C (Curtailable Load)



ACL_{n-1} = 1000 kW,

LDV_n = 300 kW,

CMD_n = 700 kW,

UCAP = (1000 – 700) * 0.9 * 1.05

= 283.5 kW

Assume performance factor = 0.9, loss factor = 5% for all examples

Equivalent Representation of an SCR Generator (Type G in DRIS)

ACG_{n-1} = avg[generation ∈ (top 20/40 NYCA hours for year n-1)] (5)

$CMG_n = ACG_{n-1} + GDV_n$ (6)

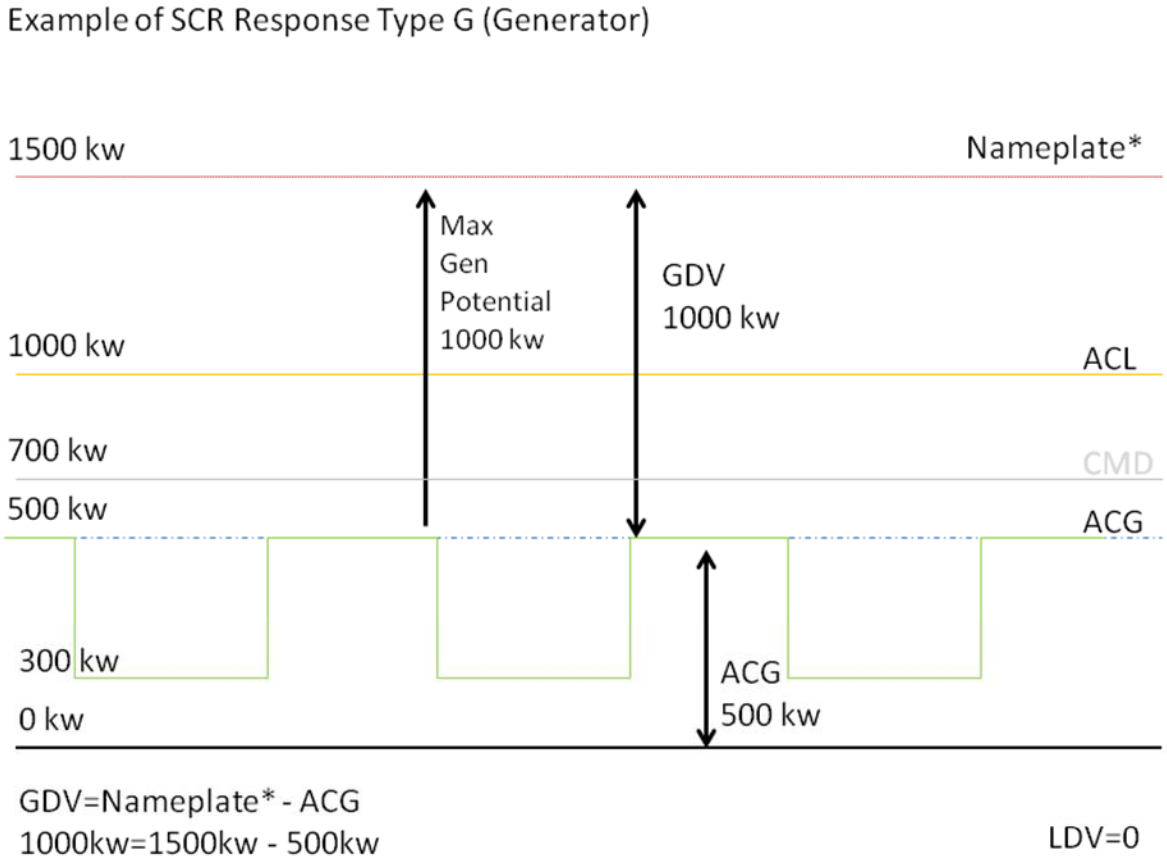
$UCAP = (\min(CMG_n, \text{Nameplate}) - ACG_{n-1}) * pf * lf$ (7)

$\text{Performance} = (AMG_n - ACG_{n-1}) * lf$ (8)

Where ACG_{n-1} = Average Coincident Generation baseline for year n based on year n-1 top 20/40 data.

GDV_n = the declared value of distributed generation identified by the RIP
UCAP = Unforced Capacity able to be offered by the SCR
CMG_n = Contract Maximum Generation for the SCR each month in year n (cannot be greater than the physical MW capability of the distributed generator)
pf = SCR performance factor
lf = (1 + transmission loss factor) for SCR
AMG_n = Actual Metered Generation for the SCR in events occurring in year n

Example of SCR Response Type G (Generator)



ACG_{n-1} = 500 kW,

GDV_n = 1000 kW,

CMG_n = 1500 kW,

UCAP = (1500 – 500) * 0.9 * 1.05

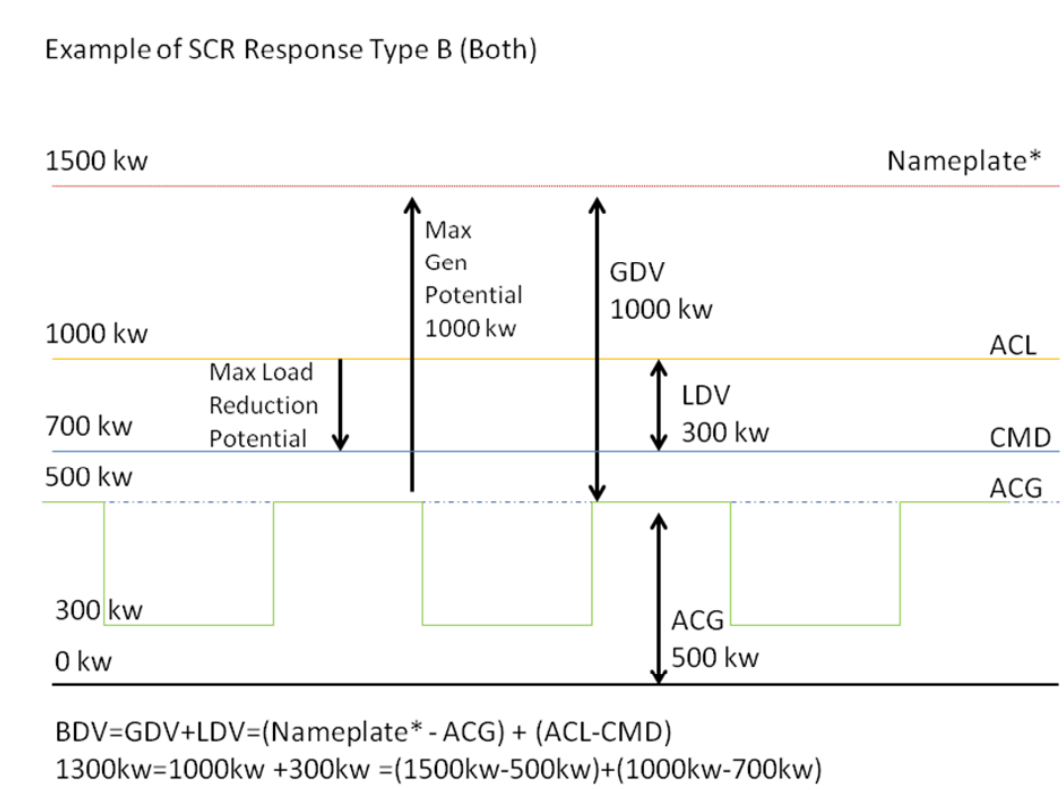
= 945 kW

Equivalent Representation of an SCR Using Both Generation and Load Reduction (Type B in DRIS)

$$UCAP = (ACL_{n-1} - CMD_n + \min(CMG_n, \text{Nameplate}) - ACG_{n-1}) * pf * lf \quad (9)$$

$$\text{Performance} = (ACL_{n-1} - AMD_n + AMG_n - ACG_{n-1}) * lf \quad (10)$$

Example of SCR Response Type B (Both)



ACL_{n-1} = 1000 kW,

LDV_n = 300 kW,

CMD_n = 700 kW,

ACG_{n-1} = 500 kW,

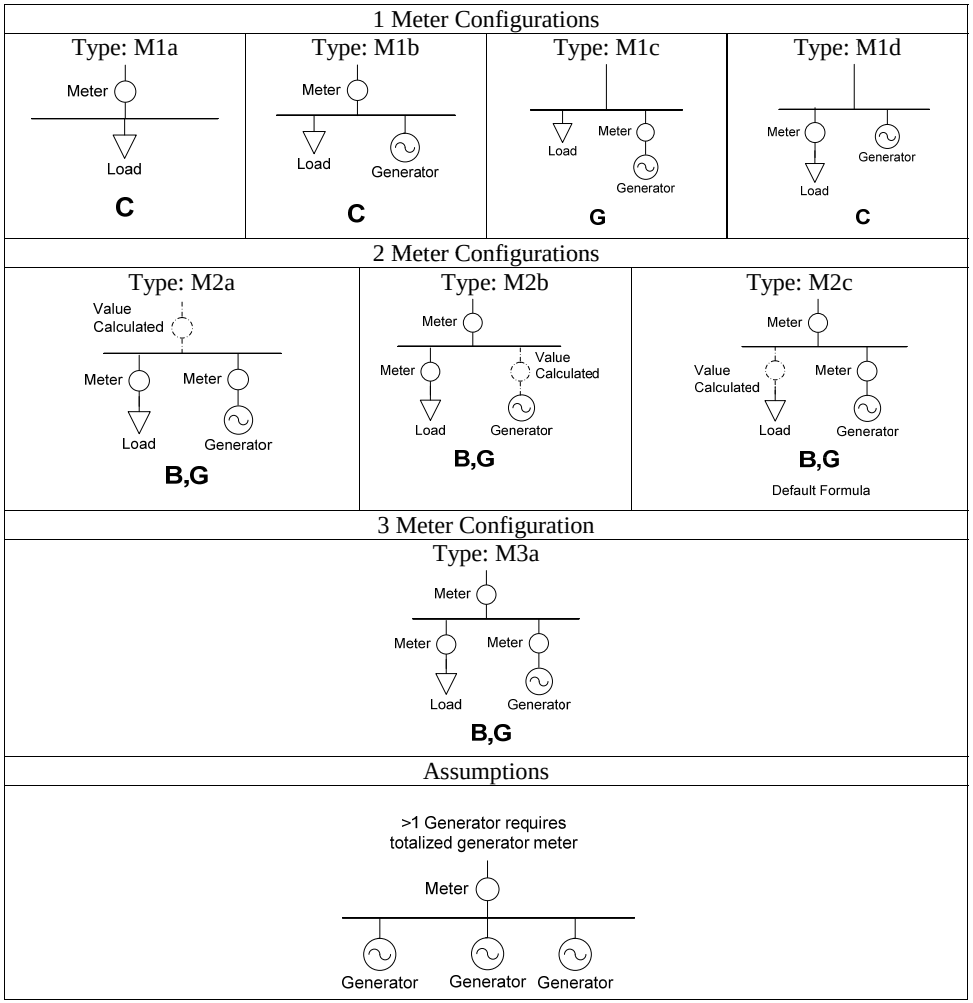
GDV_n = 1000 kW,

CMG_n = 1500 kW,

UCAP = (1000 – 700 + 1500 – 500) *

0.9 * 1.05 = 1228.5 kW

Metering Configurations and Their Relationship to Response Type



SCR Response Type	C	G	B
Number of Meters	**1**	**1, 2, 3**	**2, 3**
Meter Config. Type	**M1a, M1b, M1d**	**M1c, M2a, M2b, M2c, M3a**	**M2a, M2b, M2c, M3a**

Proposed Participation Rules for Distributed Generators as SCRs

- **What's allowed**: declared value in excess of host load if that declared value is achievable through a real-time increase in distributed generator output, subject to size thresholds described below.
- **What's not allowed**: baseload portion of distributed generation, per the ACG calculation.

Proposed Participation Rules for Distributed Generators as SCRs (cont'd)

- A resource using interruptible load only, or using a distributed generator operating for emergency purposes only, would follow the current process for qualifying as an SCR.
- A resource using a distributed generator (non-emergency) with a nonzero ACG can only be considered as an SCR if:
  - *the ACG < threshold$_1$, and*
  - *the (CMG-ACG) < threshold$_2$*
  - *The NYISO proposes that threshold$_1$ and threshold$_2$ be set to five (5) MW.*

Examples

- Example #1
  - *A distributed generator with a DEC Facility Registration certificate could participate as an SCR as either a G or B response type subject to eqns. (5) through (10) (hereinafter termed an emergency generator).*
- Example #2
  - *A distributed generator that is not an emergency generator and operates over the top 20/40 hours at 4500 kW and has a nameplate rating of 8000 kW would be able to participate as an SCR for up to the difference between the CMG (no greater than nameplate) and the ACG, in this case 8000 – 4500 = 3500 kW as a declared value.*
- Example #3
  - *A distributed generator that is not an emergency generator and operates over the top 20/40 hours at 5300 kW would not be eligible to participate as an SCR.*

Examples (Cont'd)

- Example #4
  - *A distributed generator that is not an emergency generator and operates over the top 20/40 hours at 2500 kW and has a nameplate rating of 8000 kW would not be able to participate as an SCR, since the difference between the CMG (no greater than nameplate) and the ACG, in this case 8000 – 2500 = 5500 kW, which is greater than the 5 MW limit on generation above baseload level.*
- Example #5
  - *A distributed generator that is not an emergency generator and operates over the top 20/40 hours at 6500 kW and has a nameplate rating of 15000 kW would not be able to participate as an SCR, since both the baseload component ACG > 5 MW and the difference between the CMG (no greater than nameplate) and the ACG, in this case 15000 – 6500 = 9500 kW is > 5 MW.*

Additional Considerations

- Definition of Generator Nameplate Rating.
  - *This can be done by using either a static rating based upon unit characteristics at established environmental conditions, or developed through a test of the unit.*
- Identification of Emergency Generators.
  - *As noted previously, the DEC Facility Registration certificate may serve to distinguish between generators used only for emergency purposes and other distributed generators. Other options to consider include inputting annual run hours be input to DRIS on a monthly basis, or providing check-box capability in DRIS for various ranges of operating hours.*
- Treatment of Load behind Baseload Generator operation.
  - *One possibility is to use the sum of the ACGs of all SCR generators to track the MW of load being served by baseload generation so that the load can be included in the load forecast.*

Timetable

- The NYISO plans to continue this discussion at the June ICAPWG, followed by presentation at the July BIC and MC.
- Written comments on this presentation and should be submitted by COB May 26th.
- Comments should be sent to Deb Eckels at deckels@nyiso.com
- Clearly indicate whether the comments can be posted or whether they should be treated as confidential.

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