



DER Near-term Modeling Proposal

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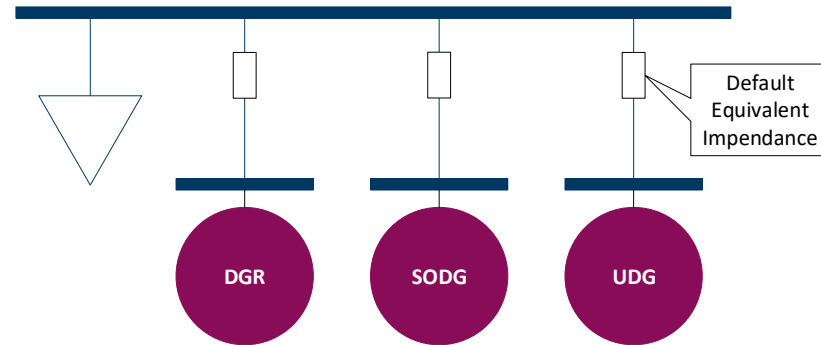
August 5, 2020

Agenda

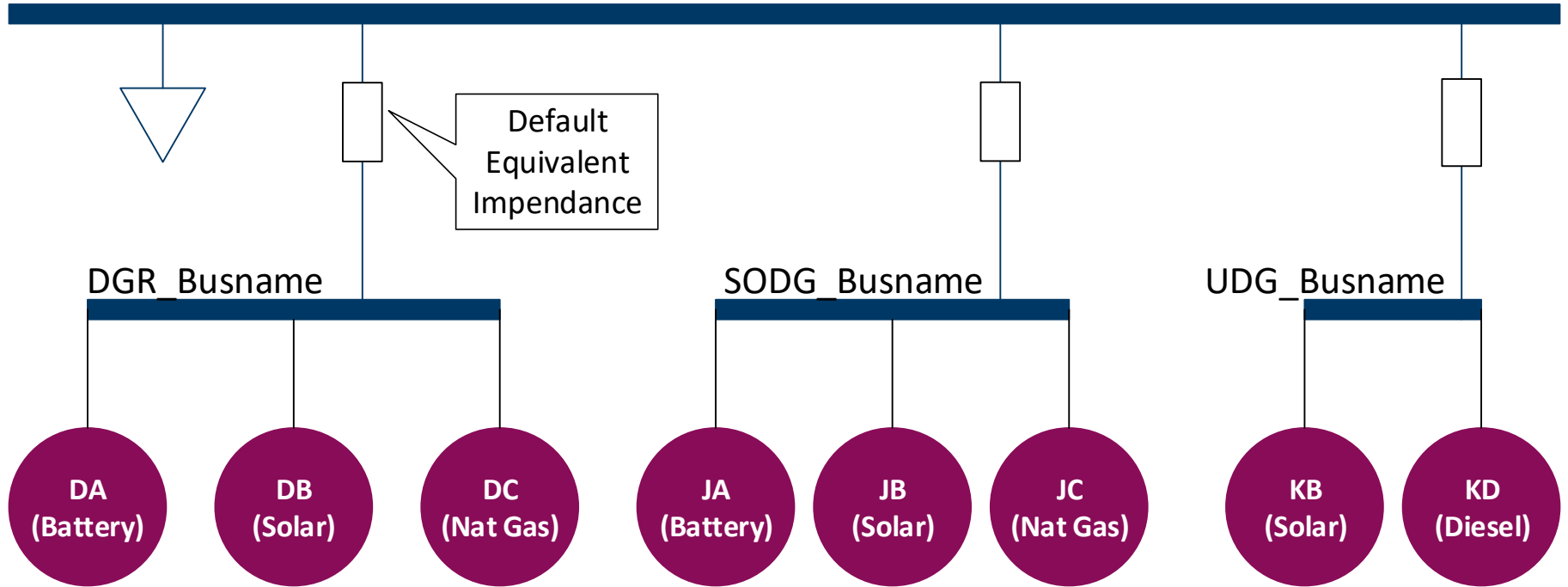
- Recap of the ERCOT DER long-term proposal presented at the July SSWG meeting
- Preview of ERCOT's near-term DER proposal
- Next steps

Long-Term Proposal: Overview

- Distribution Generation Resource (DGR)/ Distribution Energy Storage Resource (DESR), Settlement Only Distribution Generator (SODG), and Unregistered Distributed Generation (DG) modeled as separate aggregations by transmission bus
- Aggregation rules based on fuel type and technical specifications
- Generator buses have the same nominal kV as the transmission-level POI
- ERCOT and TSPs will determine default equivalent impedance to be used
- Impedance for specific models may be changed by individual TSPs



Long-Term Proposal: Overview Example



Long-Term Proposal: DGR/DESR

- Modeled by ERCOT based on data in RIOO
- Unit IDs used to identify fuel type and technical specifications
- Generator bus names are “DGR_” + transmission-level POI bus name
- Not embedded in ERCOT load forecasts
- No ERCOT DGR forecast
- Added to models once individual DGR meets milestone for inclusion

Unit ID	Fuel Type	Technical Specs
D0	Battery	NOGRR212
D1	Solar	NOGRR212
D2	Natural Gas	NOGRR212
D3	Diesel	NOGRR212
D4	Wind	NOGRR212
D5	Landfill Gas	NOGRR212
D6	Hydro	NOGRR212
D7	Other Inverter	NOGRR212
D8	Other Sync	NOGRR212
DA	Battery	PUCT 25.212
DB	Solar	PUCT 25.212
DC	Natural Gas	PUCT 25.212
DD	Diesel	PUCT 25.212
DE	Wind	PUCT 25.212
DF	Landfill Gas	PUCT 25.212
DG	Hydro	PUCT 25.212
DH	Other Inverter	PUCT 25.212
DI	Other Sync	PUCT 25.212

Long-Term Proposal: SODG

- Modeled by ERCOT based on data in RIOO
- Unit IDs used to identify fuel type and technical specifications
- Generator bus names are “SODG_” + transmission-level POI bus name
- Not embedded in ERCOT load forecasts
 - Resource telemetry will be needed
- No ERCOT SODG forecast
- Added to models once individual SODG meets milestone for inclusion

Unit ID	Fuel Type	Technical Specs
J0	Battery	IEEE 1547-2018
J1	Solar	IEEE 1547-2018
J2	Natural Gas	IEEE 1547-2018
J3	Diesel	IEEE 1547-2018
J4	Wind	IEEE 1547-2018
J5	Landfill Gas	IEEE 1547-2018
J6	Hydro	IEEE 1547-2018
J7	Other Inverter	IEEE 1547-2018
J8	Other Sync	IEEE 1547-2018
JA	Battery	PUCT 25.212
JB	Solar	PUCT 25.212
JC	Natural Gas	PUCT 25.212
JD	Diesel	PUCT 25.212
JE	Wind	PUCT 25.212
JF	Landfill Gas	PUCT 25.212
JG	Hydro	PUCT 25.212
JH	Other Inverter	PUCT 25.212
JI	Other Sync	PUCT 25.212

Long-Term Proposal: Unregistered DG

- ERCOT to model aggregate as a generator if the capacity for a given fuel type and technical specification at a transmission-level POI exceeds 1 MW
- Unit IDs used to identify fuel type and technical specifications
- Generator bus names are “UDG_” + transmission-level POI bus name
- Embedded in ERCOT load forecasts
- ERCOT will forecast rooftop solar growth

Unit ID	Fuel Type	Technical Specs
K0	Battery	IEEE 1547-2018
K1	Solar	IEEE 1547-2018
K2	Natural Gas	IEEE 1547-2018
K3	Diesel	IEEE 1547-2018
K4	Wind	IEEE 1547-2018
K5	Landfill Gas	IEEE 1547-2018
K6	Hydro	IEEE 1547-2018
K7	Other Inverter	IEEE 1547-2018
K8	Other Sync	IEEE 1547-2018
KA	Battery	PUCT 25.212
KB	Solar	PUCT 25.212
KC	Natural Gas	PUCT 25.212
KD	Diesel	PUCT 25.212
KE	Wind	PUCT 25.212
KF	Landfill Gas	PUCT 25.212
KG	Hydro	PUCT 25.212
KH	Other Inverter	PUCT 25.212
KI	Other Sync	PUCT 25.212

Near-Term Proposal

- Long-term proposal planned to be included in the Passport Program (complete implementation targeted for 2024)
- Near-term DER modeling proposal is provided to achieve consistencies in modeling, provide visibility of DERs, and avoid double counting of the DER impacts, prior to the completion of the Passport project.
 - In-line with long-term proposal, where possible
 - Aggregation rules are not incorporated in the near-term proposal due to tool limitations
 - Unregistered DGs are not modeled as generators in the near-term proposal due to data limitations

Near-term Proposal: DGR

- TSPs:
 - DGRs should not be modelled as negative load nor embedded in TSP load forecasts
- ERCOT:
 - Each DGR will come through topology processor from NMMS and be modeled as a generator
 - DGR IDs will follow the current SSWG convention
 - DGRs will be committed and dispatched based on current SSWG methodology

Near-term Proposal: SODG

- TSPs:
 - SODGs should not be modelled as negative load nor embedded in TSP load forecasts
- ERCOT:
 - Each SODG will be incorporated into the model as a generator using simple model based on their Resource Registration data
 - SODGs will be assumed to have unity power factor without automatic voltage control
 - SODG IDs will align with the long-term proposal IDs to differentiate fuel types
 - SODGs dispatch will be consistent with CDR methodology

Near-term Proposal: SODG Dispatch

ID Code	Resource Category	Dispatch Level
JA	Battery	Offline
JB	Solar	CDR dispatch level (consistent with CDR transmission connected solar)
JC	Natural Gas	Offline
JD	Diesel	Offline
JE	Wind	CDR dispatch level (consistent with CDR transmission connected wind)
JF	Landfill Gas	CDR dispatch level (full capacity)
JG	Hydro	CDR dispatch level (consistent with CDR transmission connected hydro)
JH	Other Inverter	Offline
JI	Other Sync	Offline

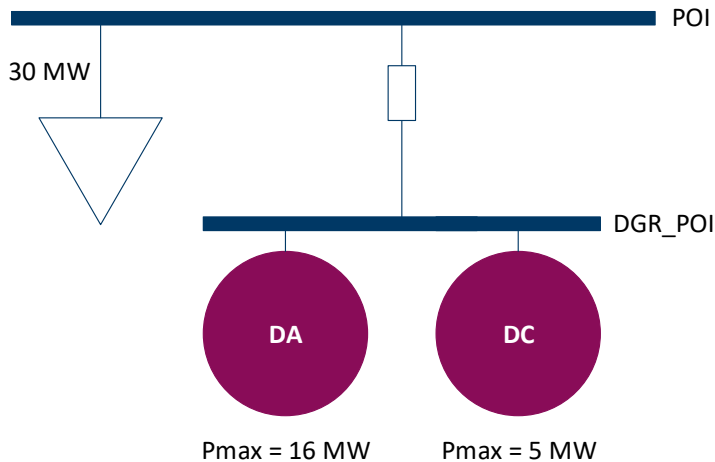
Near-term Proposal: Unregistered DG

- TSPs:
 - The unregistered DGs should be embedded in TSP load forecasts
- ERCOT:
 - No change in current process

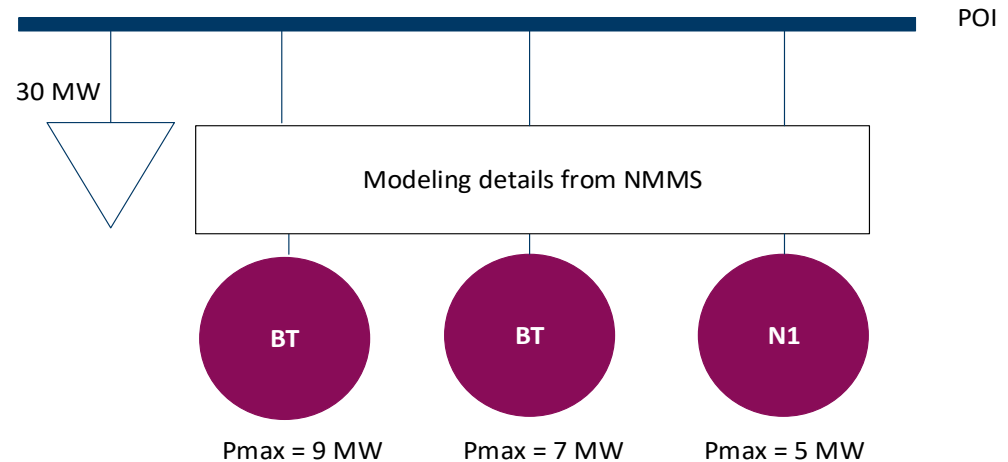
Near-Term vs. Long-Term Proposal: Example 1

Fuel Type	Technical Specs	Pmax (MW)	Registration
Battery	PUCT 25.212	9	DESR
Battery	PUCT 25.212	7	DESR
Natural Gas	PUCT 25.212	5	DGR
Native Load	-	30	-

Long-Term



Near-Term

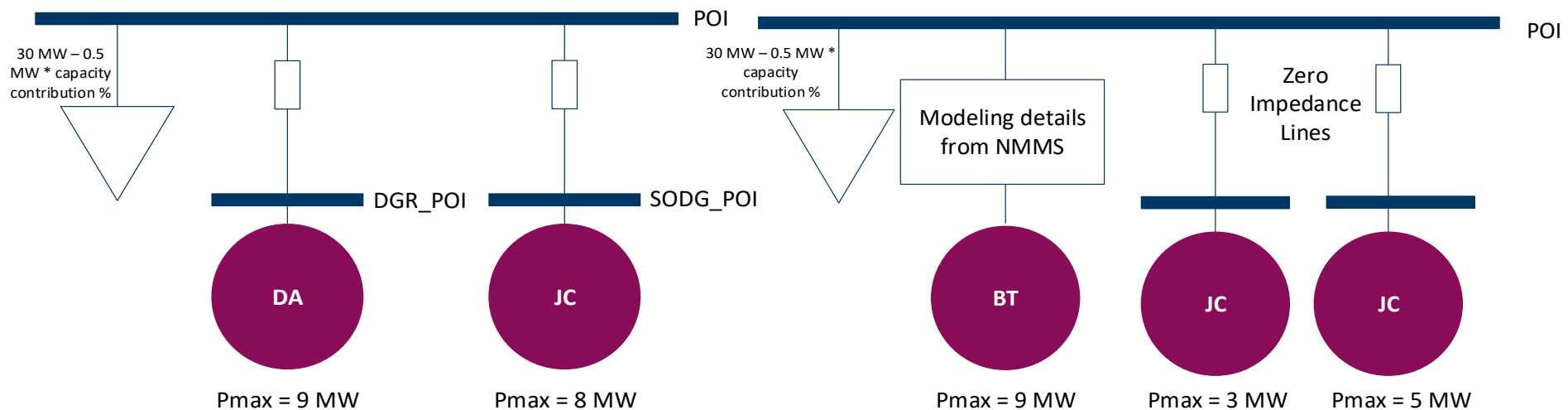


Near-Term vs. Long-Term Proposal : Example 2

Fuel Type	Technical Specs	Pmax (MW)	Registration
Battery	PUCT 25.212	9	DESR
Natural Gas	PUCT 25.212	3	SODG
Natural Gas	PUCT 25.212	5	SODG
Solar	PUCT 25.212	0.5	Unregistered
Native Load	-	30	-

Long-Term

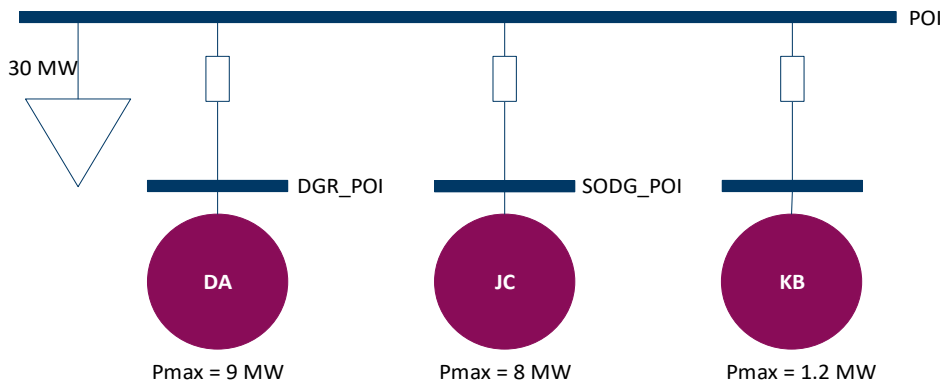
Near-Term



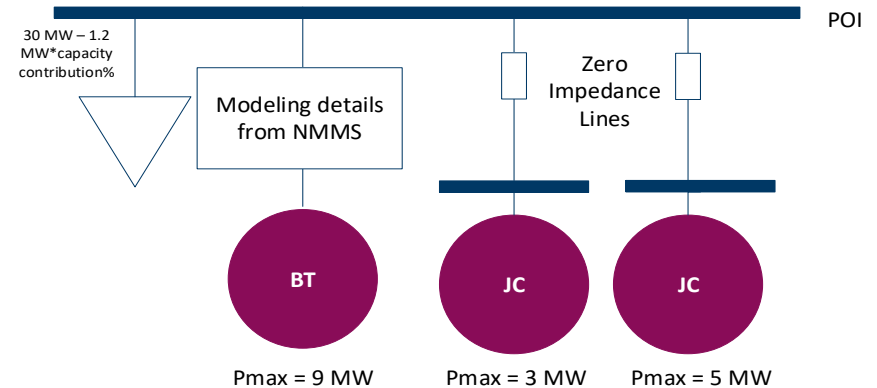
Near-Term vs. Long-Term Proposal : Example 3

Fuel Type	Technical Specs	Pmax (MW)	Registration
Battery	PUCT 25.212	9	DESR
Natural Gas	PUCT 25.212	3	SODG
Natural Gas	PUCT 25.212	5	SODG
Solar	PUCT 25.212	1.2	Unregistered
Native Load	-	30	-

Long-Term



Near-Term



Next Steps

- ERCOT is planning to present long-term and near-term proposals for RPG and PLWG in September
- Discuss SSWG procedure manual updates
- Please provide comments to Ping.Yan@ercot.com by August 21, 2020