



## **Alternative to Non-Modeled Generator definition**

December 2017

## Background

- **This presentation discusses concepts ERCOT has been working on to address the issues that were originally the focus of ERCOT-sponsored NPRR190, Clarification of Resource Definitions and Resource Registration of Self-Serve Generators for Reliability Purposes.**
  - ERCOT staff withdrew NPRR190 on August 17, 2015 and provided notice that we were working on a subsequent NPRR.
- **This concept is intended to:**
  - Provide context for the RTF on discussions ERCOT has had in replacing the Non-Modeled Generator term.
  - Provide ERCOT with the technical information and capabilities needed to assess and maintain the reliability of the power system, and yet;
    - Avoid imposing unnecessary requirements on generators that do not participate in the ERCOT markets.

## Reason for the modification

- RTF has the task of considering how to replace and improve Resource terms used today.
- ERCOT has been discussing how generators that are electrically connected to the power system have similar physical effects on that system regardless of the:
  - ownership of the generator;
  - ownership of the interconnecting facilities;
  - metering arrangements or;
  - participation (or not) in the wholesale power market.

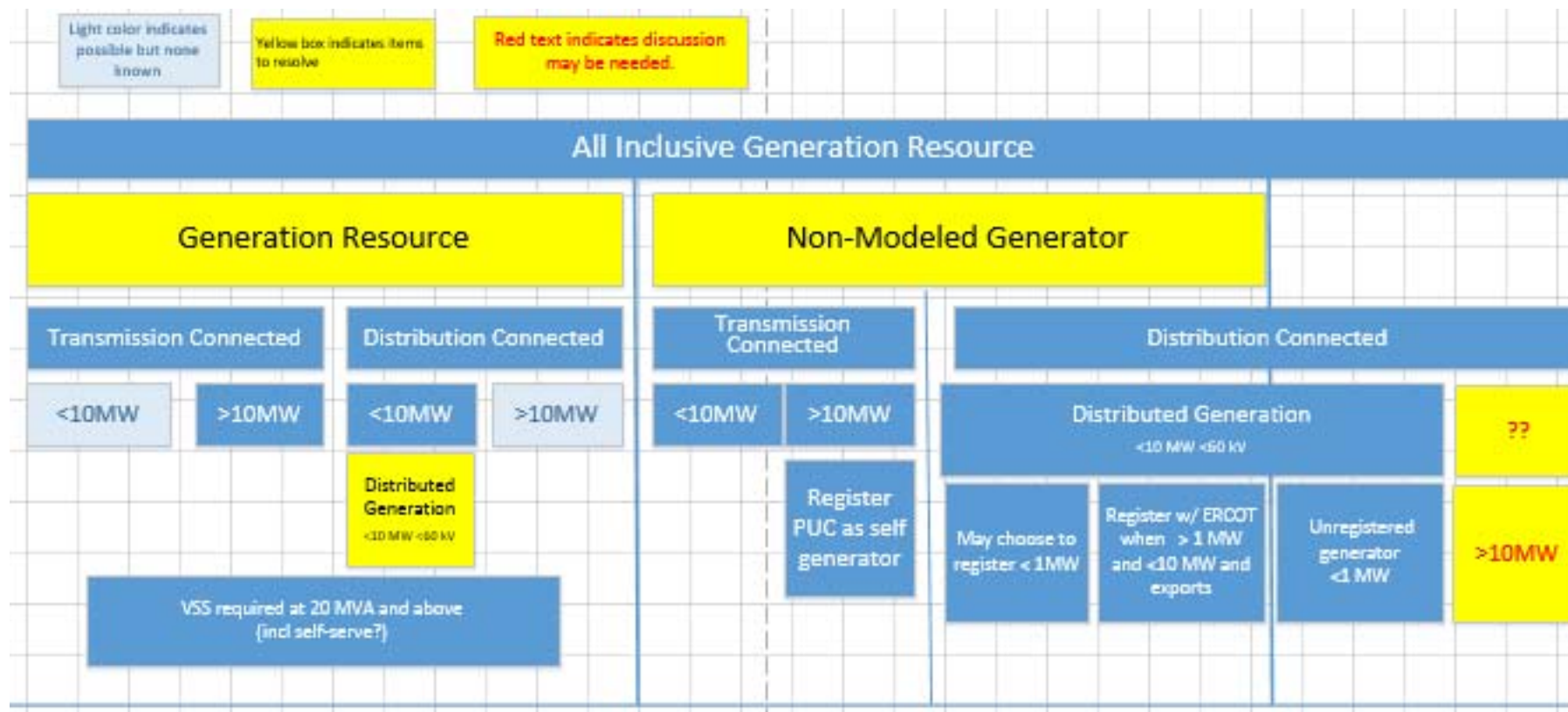
## Current definition (Protocol Section 2.1)

### *Non-Modeled Generator*

A generator that is:

- (a) Capable of providing net output of energy to the ERCOT System;
- (b) Ten MW or less in size; or greater than ten MW and registered with the PUCT according to P.U.C. SUBST. R. 25.109, Registration of Power Generation Companies and Self-Generators, as a self-generator; and
- (c) Registered with ERCOT as a Non-Modeled Generator, which means that the generator may not participate in the Ancillary Service or energy markets, RUC, or SCED.

# Resource Definition Framework



## Generation Resource Categories (technologies)

Gas Steam

Solar PhotoVoltaic (PVGR)

Reciprocating Engine

Simple Cycle

Combined Cycle

Wind-powered (WGR)

Coal and Lignite

Nuclear

Hydro Generation Resource

Other

Energy Storage?

## Services/Markets --- Attributes/Status

Energy Market

Reg-Up/Reg-Down -- (AS)

Switchable Generation Resource

Split Generation Resource

Dynamically Scheduled Resource

FRRS-Down/FRRS-Up -- (AS)

Intermittent Renewable Resource (IRR)

DC Tie Resource\*\*

Black Start Service -- (AS)

Non-Spin -- (AS)

Aggregate Generation Resource (AGR)

Mothballed Generation Resource

Reliability Must-Run -- (AS)

Emergency Response Service (ERS) Generator

Quick Start Generation Resource (QSGR)

Decommissioned Generation Resource

Responsive Reserve -- (AS)

Non-Market?

## Revise terminology for resources in the ERCOT systems:

### ➤ Old Nomenclature

- Generation Resource
- Non-modeled Generator
- Unregistered generator
- (Distribution connected Generation > 10MW)

### ➤ Revised nomenclature

- Generation Resource (no change)
- New term(s)
  - Transmission connected
  - Distribution connected
- Microgenerator? (see PUCT defs)
- Generation Resource?

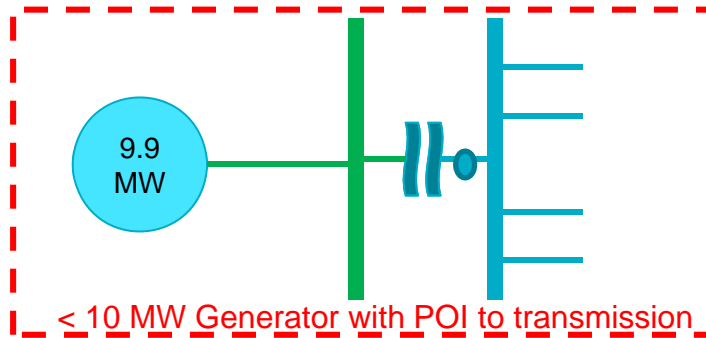
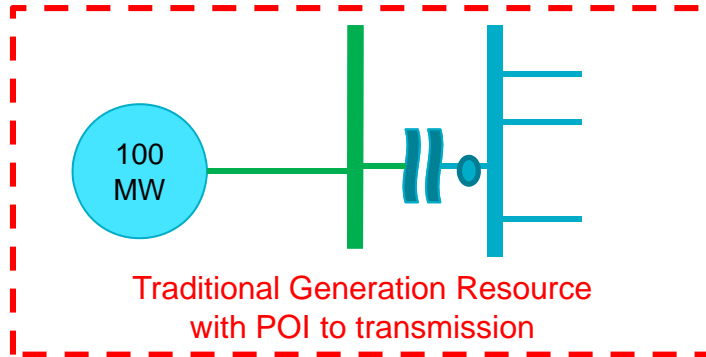


## Some Examples

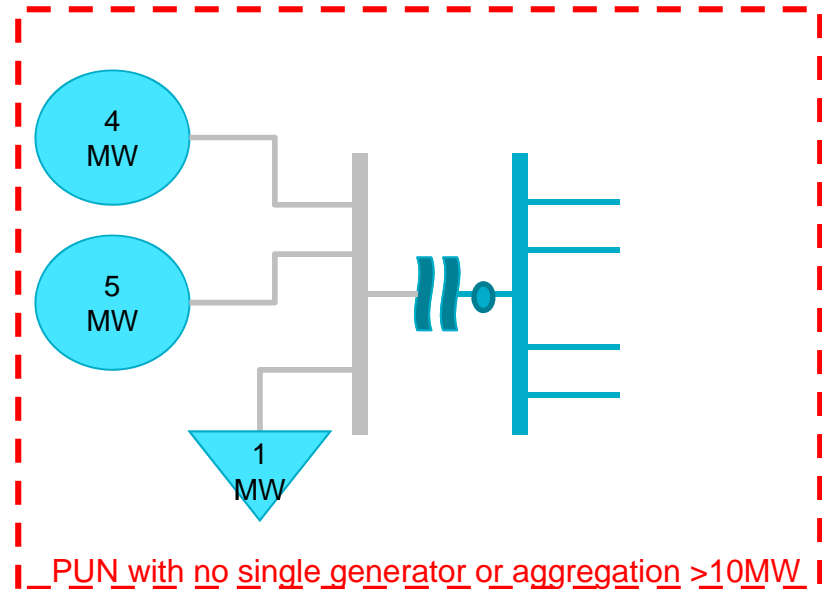
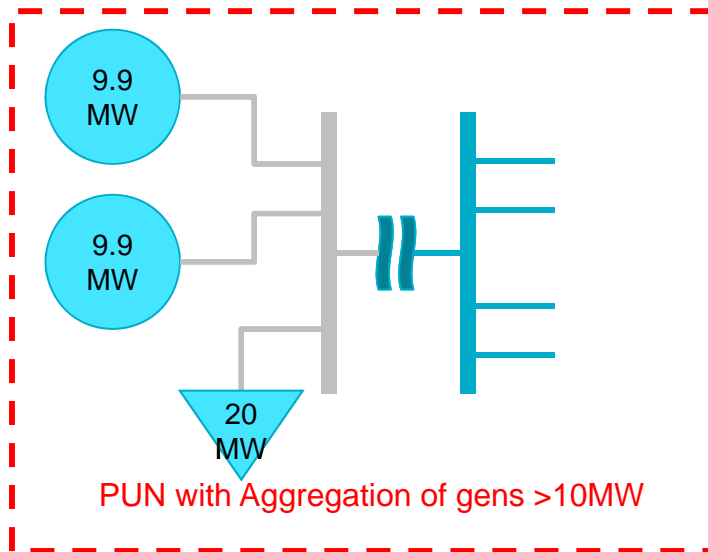
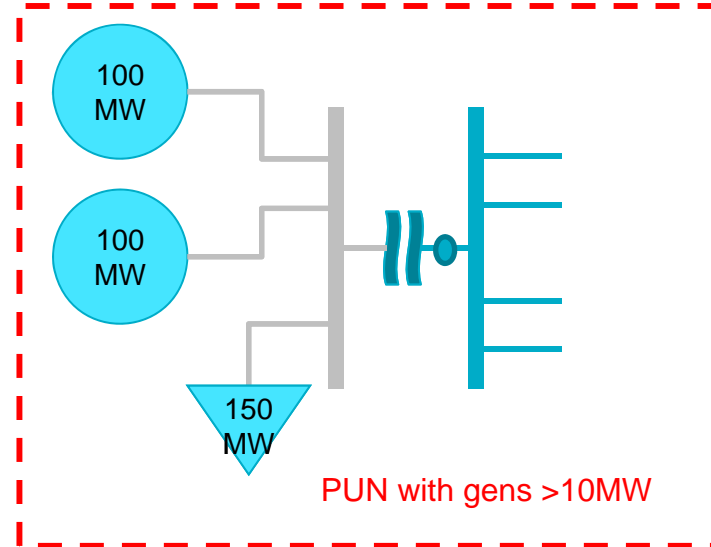
- The following pages illustrate a few simplistic examples of Generators.
- In each example, Generators that are owned by different companies are shown in different colors.
- Transmission voltage elements are shown in green and blue; distribution voltage elements and/or PUN-owned transmission are shown in gray.



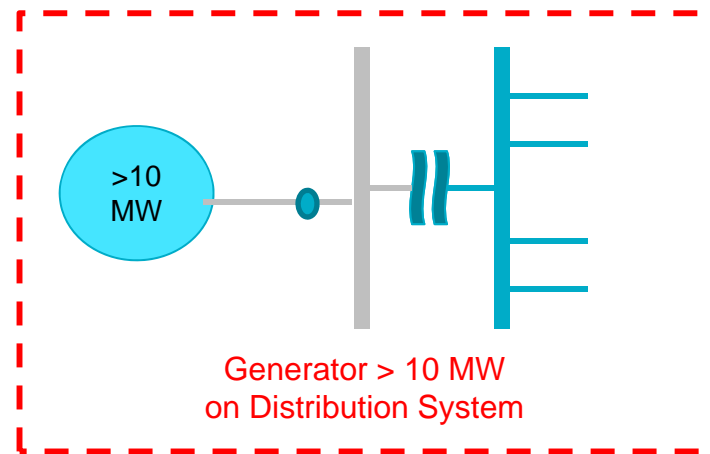
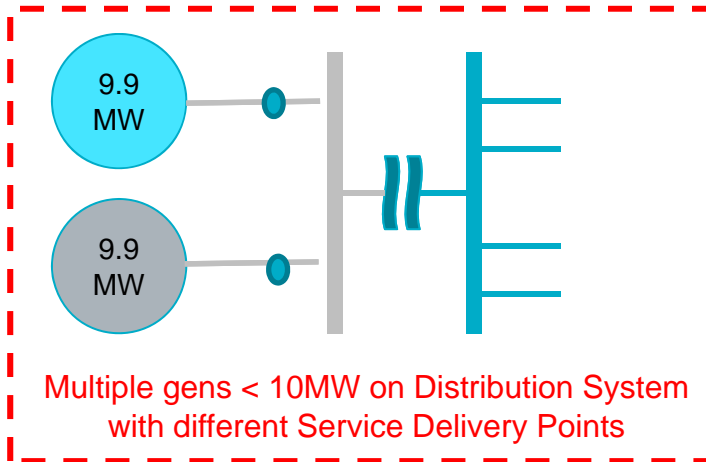
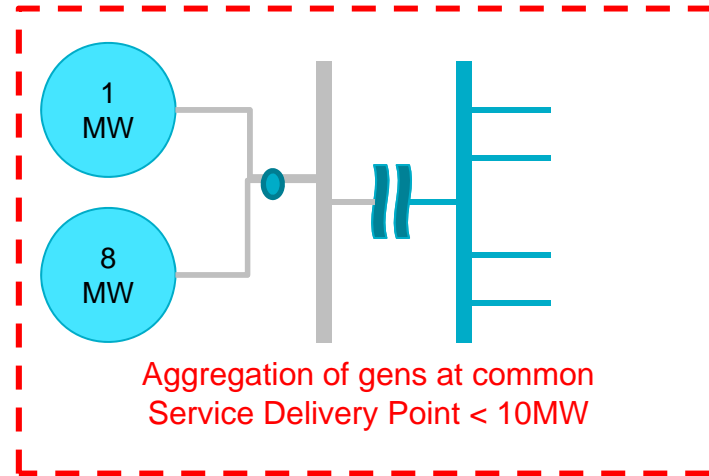
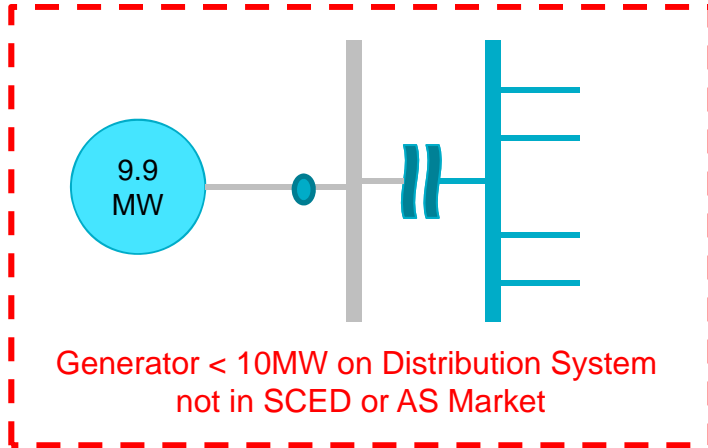
# Examples of Transmission Connected Resources



# Examples of PUN Resources



# Examples of Distribution Connected Resources



Note: Unregistered Generator < 1 MW on Distribution System not shown

## Summary (continued)

- All-Inclusive Generation Resources (comprised of Generation Resources and **Non-Modeled** Resources) must meet existing designated technical and data provision requirements (“Technical Requirements”).
- Generation Resources must also meet additional qualification requirements depending on the “Services” they are providing:
  - Example – Additional requirements to be qualified for providing Black Start Services

# “Technical Requirements”

(Required for All-Inclusive Generation Resources, including LPGs\*)

Classification	Connected at >= 60 kV	Yes	Yes	Yes
	Generator Size (MW)	>= 1	1-10 MW	> 10 MW
	Participate in A/S Market	Yes	No	No
	Participate in Energy Market	n/a	Yes	Yes
	Registration Required	Generation Resource	Limited Participating Generator*	Limited Participating Generator*
	QSE Representation	Yes	no	Yes
Reliability Requirements	Modeling (EMS)	Yes	Yes	Yes
	Telemetry	Yes	Yes	Yes
	Outage Scheduling and Reporting	Yes	no	Yes
	Voltage Support Service	Yes	no	Yes* (>20 MW)
	Voltage Support/Dynamic response	Yes	Yes	Yes
	Voltage Ride Through	Yes	Yes	Yes
	Frequency Support	Yes	Yes	Yes
	Frequency Ride through	Yes	Yes	
	Testing: AVR/PSS	Yes	no	Yes* (>20 MW)
	Testing: Governor	Yes	no	Yes
	PDC Performance	Yes	Yes	Yes
	Testing: MW	Yes	no	Yes
	Following VDI	Yes	no	Yes
	RARF	Full	Light	Light
Market Requirements	COPs	Yes	No	No
	Offer Curve	Yes	No	No
	Following Base Point	Yes	No	No

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## “Market Requirements” (Required only for Generation Resources)

- COPs
- Offer curves
- Following Base Points
- Dispatch Instructions outside of Emergency conditions
- Etc.

This is not a comprehensive list of the Market Requirements for Generation Resources.

The rules should not change any requirements for Generation Resources, so sections of the Protocols related to requirements exclusively for Generation Resources should not change for this effort.

## Points brought up during discussions for consideration in future NPRRs

- All transmission connected resources would be required to be registered and modeled, regardless of size.
- A self-generator may be registered as a Non-modeled even though it might occasionally produce more than 10 MW net output for payment during an ERCOT-declared Emergency.
  - ERCOT would review output and determine if a generator is exceeding the threshold and should be subject to registering as a Generation Resource.
- Any resource that wants to participate in Ancillary service market or SCED is required to register as a Generation Resource.
- Existing resources that are not currently registered, but might be required to register under any proposed requirements and choose to register as **Non-modeled generators**, may be grandfathered if they cannot meet specific “Technical Requirements” (reactive, governor).