Wholesale Market Interfaces for DER

OEB Framework for Energy Innovation Working Group

Jake Berlin
Senior Manager, Distributed Grid Strategy

07/29/2021

Agenda

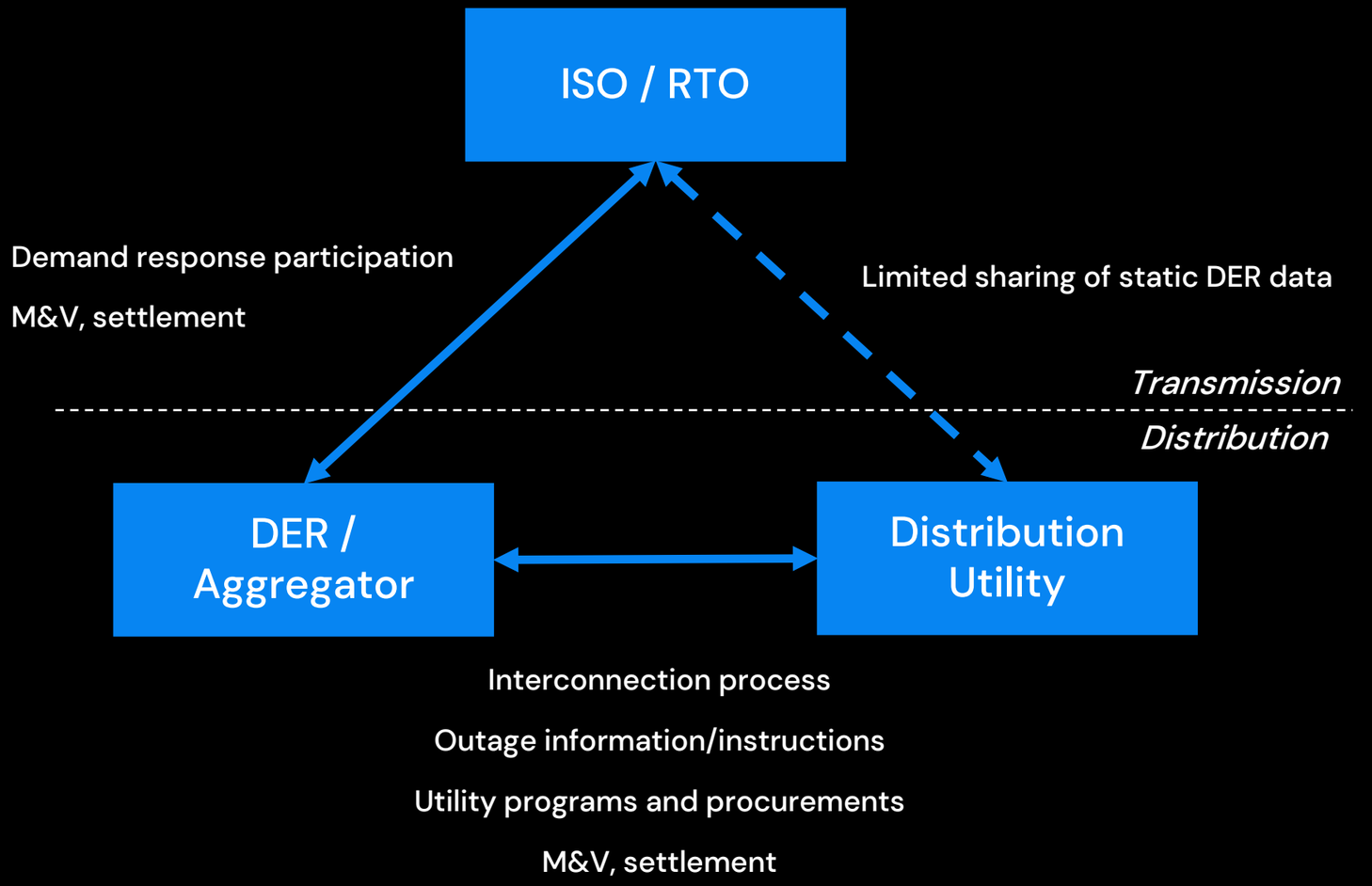
How and why is DER wholesale market coordination changing?

Global perspectives

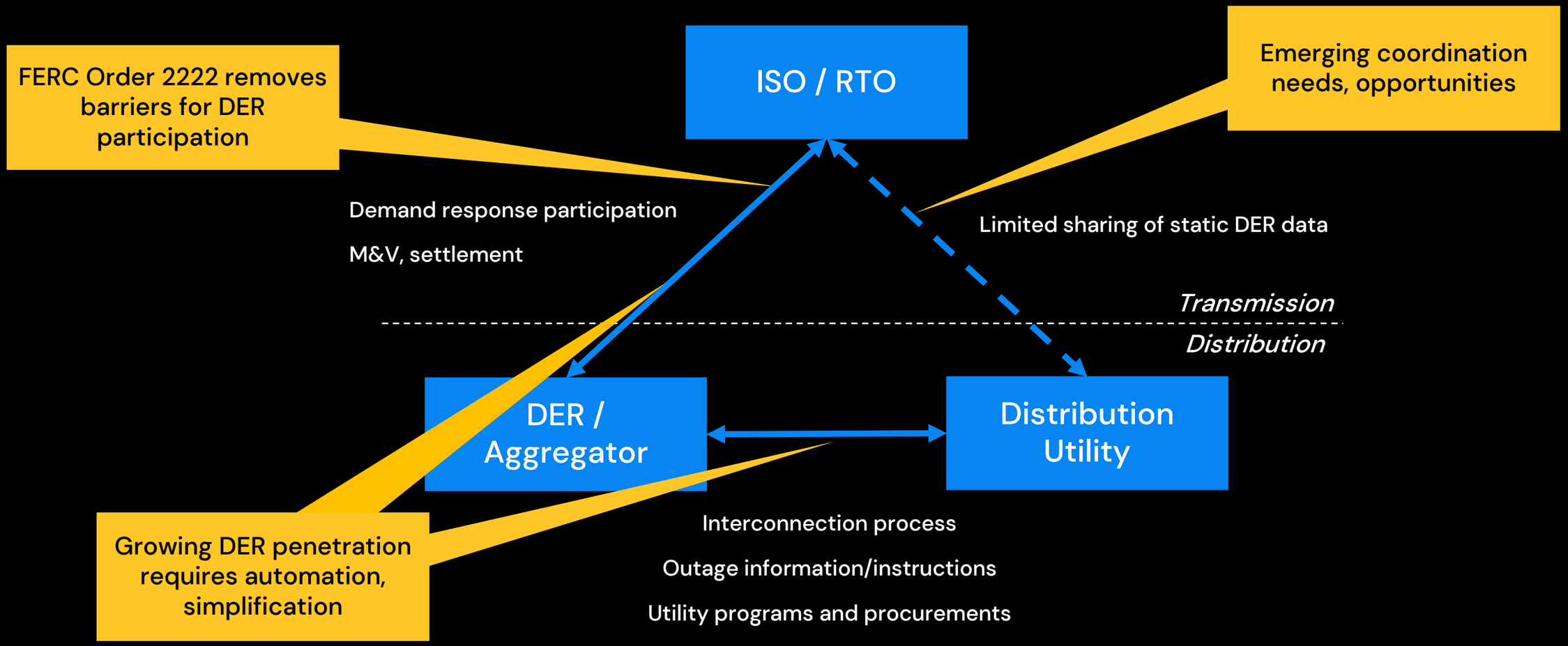
FERC Order 2222 (U.S.)

Lessons from New York

Emerging participation models in Ontario



What has DER coordination historically looked like?



Why might this change?

Ontario

ICF developed a T-D Interoperability Framework for the IESO under its Innovation and Sector Evolution White Paper Series, as well as explored market implications of DER under the OEB's DER Impact Study

United Kingdom

Significant work done on T-D coordination, DSO evolution, and defining distribution grid services

Australia

Similar work as the UK and developed a detailed set of specifications for a potential shared (i.e., TSO-DSO-Aggregator) market and operational coordination platform

California

Despite having the first FERC-approved DER aggregation participation model (DERP), barriers associated with its design has resulted in no aggregations participating to date

New York

NYISO developed only the second DER aggregation participation model that FERC has approved, and which ultimately informed the bounds of Order 2222

Other U.S. ISOs/RTOs

Tariff filings and discussions in advance of them are happening right now with SPP, MISO, PJM, etc.

→ Early conversations & experiments, but few tangible results yet

FERC Order 2222

- Order 2222 issued on September 17, 2020 (here; Docket No. RM18-9-000)
  - Two-page fact sheet from FERC here
- Requires that ISOs/RTOs allow DERs to provide wholesale services that they are technically capable of providing through an aggregation of resources
- Tariff revisions due within 270 days and each ISO/RTO must propose a reasonable implementation date
  - Most ISOs/RTOs requested and were granted extensions
- Order 2222B was issued on June 17, 2021 (here; Docket No. RM18-9-003), revising rules on demand response aggregations

FERC definitions

DER: Any resource located on the distribution system, any subsystem thereof or behind a customer meter; ISOs/RTOs can also propose their own definitions, so long as they are consistent with FERC's definitional intent

Aggregator: The entity that aggregates one or more distributed energy resources for purposes of participation in the capacity, energy, and/or ancillary service markets of the ISOs/RTOs

Lessons from an early mover

Since 2016, ICF has provided technical, regulatory, and stakeholder support to the Joint Utilities of New York — a consortium of the state's six investor-owned utilities — on implementation efforts to enable DER aggregation participation in NYISO's wholesale market

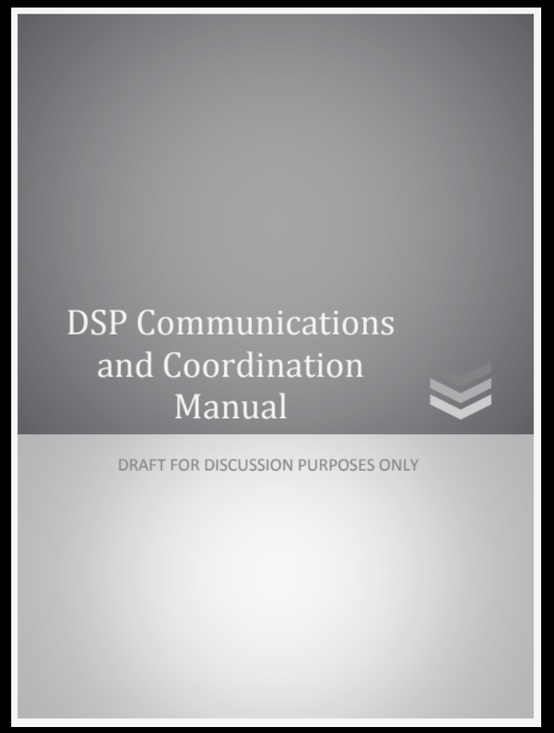
NYSEG · conEdison · nationalgrid

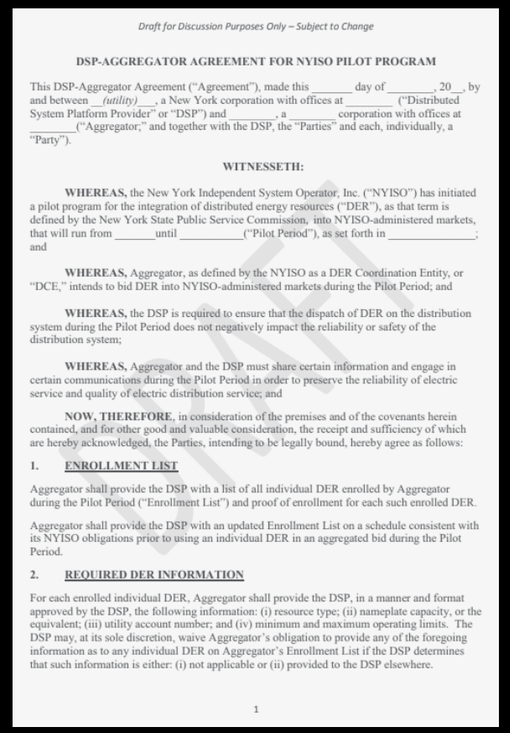
JOINT UTILITIES OF NEW YORK

RG&E · Orange & Rockland · Central Hudson (People. Power. Possibilities. A FORTIS COMPANY)

Notable accomplishments

- Developed a communications and coordination manual to define operational coordination processes between the utility, Aggregator/DER, and NYISO *(bottom left)*
- Developed a Distributed System Platform (DSP)-Aggregator Agreement to define Aggregator requirements in order to have aggregations participate in the NYISO's market *(bottom right)*
- Supported NYISO's development of the second DER aggregation participation model that FERC has approved (after CA), and which ultimately informed Order 2222




Draft for Discussion Purposes Only – Subject to Change

DSP-AGGREGATOR AGREEMENT FOR NYISO PILOT PROGRAM

This DSP-Aggregator Agreement ("Agreement"), made this _____ day of _____, 20__, by and between __*(utility)*___, a New York corporation with offices at _____ ("Distributed System Platform Provider" or "DSP") and _____, a _____ corporation with offices at _____ ("Aggregator," and together with the DSP, the "Parties" and each, individually, a "Party").

WITNESSETH:

WHEREAS, the New York Independent System Operator, Inc. ("NYISO") has initiated a pilot program for the integration of distributed energy resources ("DER"), as that term is defined by the New York State Public Service Commission, into NYISO-administered markets, that will run from _____ until _____ ("Pilot Period"), as set forth in _____; and

WHEREAS, Aggregator, as defined by the NYISO as a DER Coordination Entity, or "DCE," intends to bid DER into NYISO-administered markets during the Pilot Period; and

WHEREAS, the DSP is required to ensure that the dispatch of DER on the distribution system during the Pilot Period does not negatively impact the reliability or safety of the distribution system;

WHEREAS, Aggregator and the DSP must share certain information and engage in certain communications during the Pilot Period in order to preserve the reliability of electric service and quality of electric distribution service; and

NOW, THEREFORE, in consideration of the premises and of the covenants herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties, intending to be legally bound, hereby agree as follows:

1. **ENROLLMENT LIST**

Aggregator shall provide the DSP with a list of all individual DER enrolled by Aggregator during the Pilot Period ("Enrollment List") and proof of enrollment for each such enrolled DER.

Aggregator shall provide the DSP with an updated Enrollment List on a schedule consistent with its NYISO obligations prior to using an individual DER in an aggregated bid during the Pilot Period.

2. **REQUIRED DER INFORMATION**

For each enrolled individual DER, Aggregator shall provide the DSP, in a manner and format approved by the DSP, the following information: (i) resource type; (ii) nameplate capacity, or the equivalent; (iii) utility account number; and (iv) minimum and maximum operating limits. The DSP may, at its sole discretion, waive Aggregator's obligation to provide any of the foregoing information as to any individual DER on Aggregator's Enrollment List if the DSP determines that such information is either: (i) not applicable or (ii) provided to the DSP elsewhere.

1

Observability

The level of operational visibility of the distribution network and DERs to support reliable grid management

Scalability

Ability for processes and technologies to function effectively with very large DER quantities

Cybersecurity

Role of industry structure in increasing or decreasing cyber vulnerability from information and data exchanges

Tier bypassing

Information flows or instructions (e.g., dispatch) that skip a tier of the physical power system hierarchy

Hidden coupling

Two or more entities controlling the same resource while having incomplete views of the grid state and operating without effective coordination

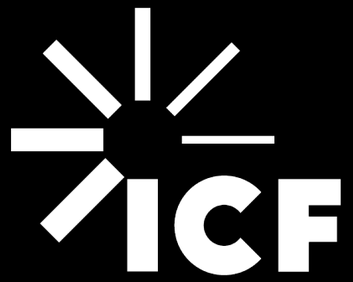
Latency

Potential for excessive information flow latencies due to cascading nature of systems and entities data must flow through

Lessons learned: potential impacts to system reliability

Source: IESO Innovation and Sector Evolution White Paper Series: Exploring Expanded DER Participation in the IESO-Administered Markets; Part 1 – Conceptual Models for DER Participation

Existing & potential DER participation models in Ontario



Get in touch with us:

Jake Berlin

Senior Manager, Distributed Grid Strategy

jake.berlin@icf.com

401-261-7297

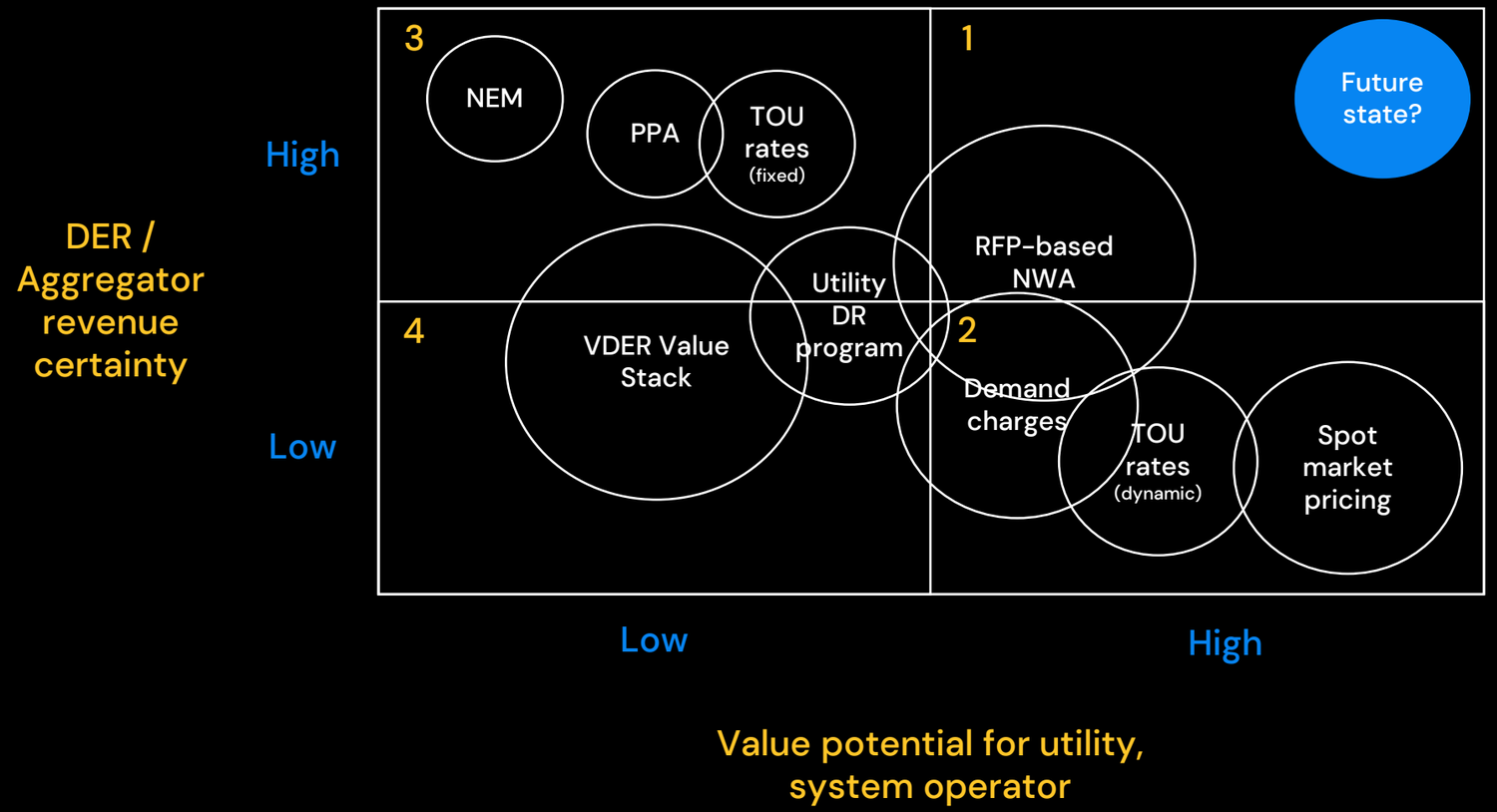
icf.com

linkedin.com/company/icf-international/

twitter.com/icf

https://www.facebook.com/ThisIsICF/

Appendix



1: DERs as a critical system resource

2: DERs provide system value, but more limited uptake

3: Significant DER uptake, but limited system benefits

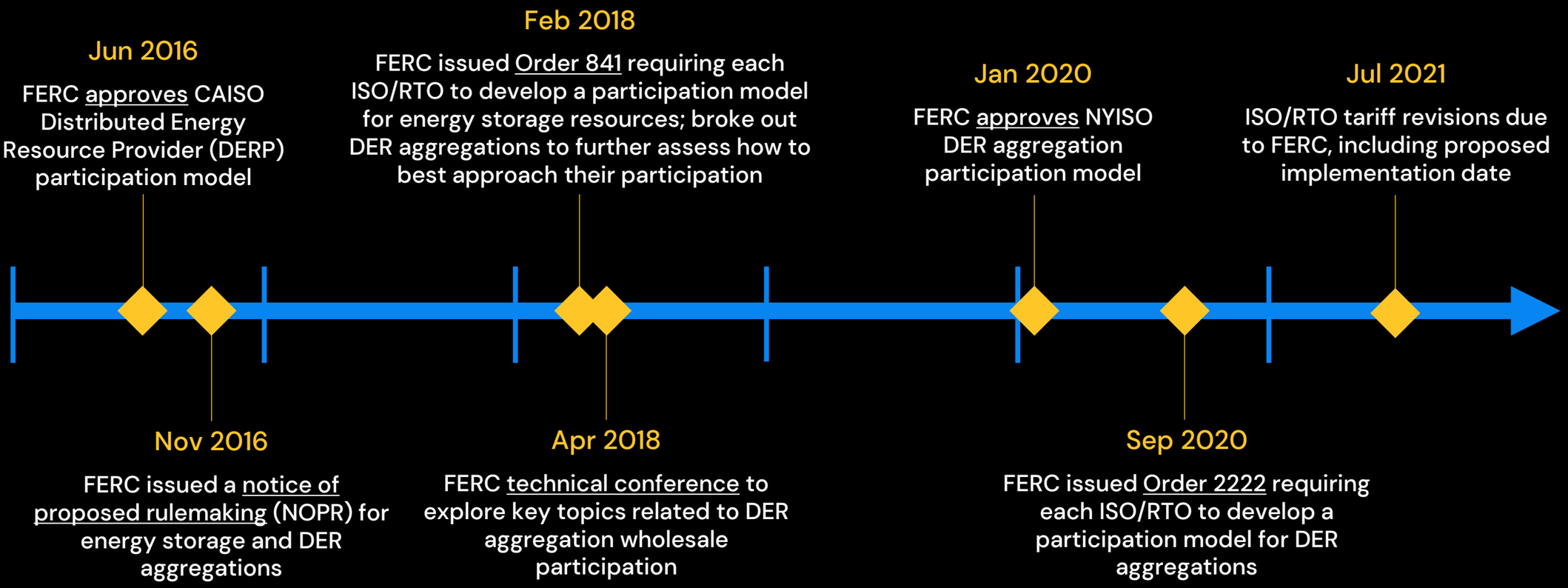
4: Limited DER adoption and system benefits

*Circle size depicts level of complexity associated with each market mechanism

How do market mechanisms drive possible outcomes?

FERC Order 2222: key takeaways

- One size does not necessarily fit all – significant deference given to each ISO/RTO
- There are more questions than answers
- Distribution utilities will play an important role in enabling DER wholesale participation
- Overwhelming majority of DER interconnections will remain state jurisdictional, reversing prior precedent



How did we get here?