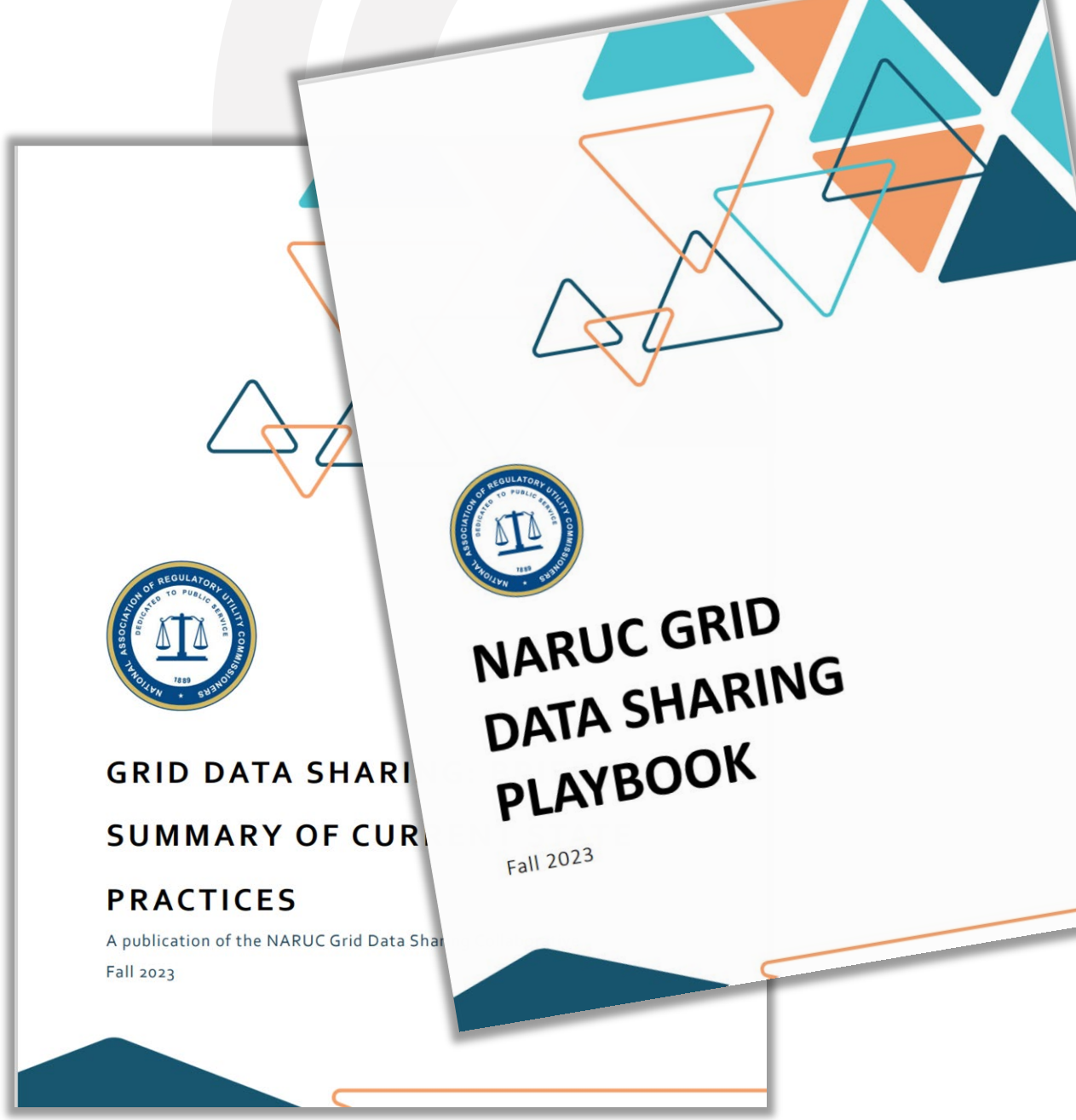
NARUC GRID DATA SHARING FRAMEWORK

December 6, 2023

www.naruc.org/cpi-1/energy-distribution/der-integration-compensation/grid-data-sharing/

NARUC GRID DATA SHARING RESOURCES

FRAMEWORK



NARUC TEAM

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TODAY'S OUTLINE

1. Grid Data Sharing Framework Development Process & Scope
2. Resources
   - Summary of State Practices
   - Framework
   - Playbook
   - Use Cases
3. Framework Categories
   - Questions, Examples
4. Next Steps
5. Q & A

GRID DATA SHARING COLLABORATIVE PURPOSE & GOALS

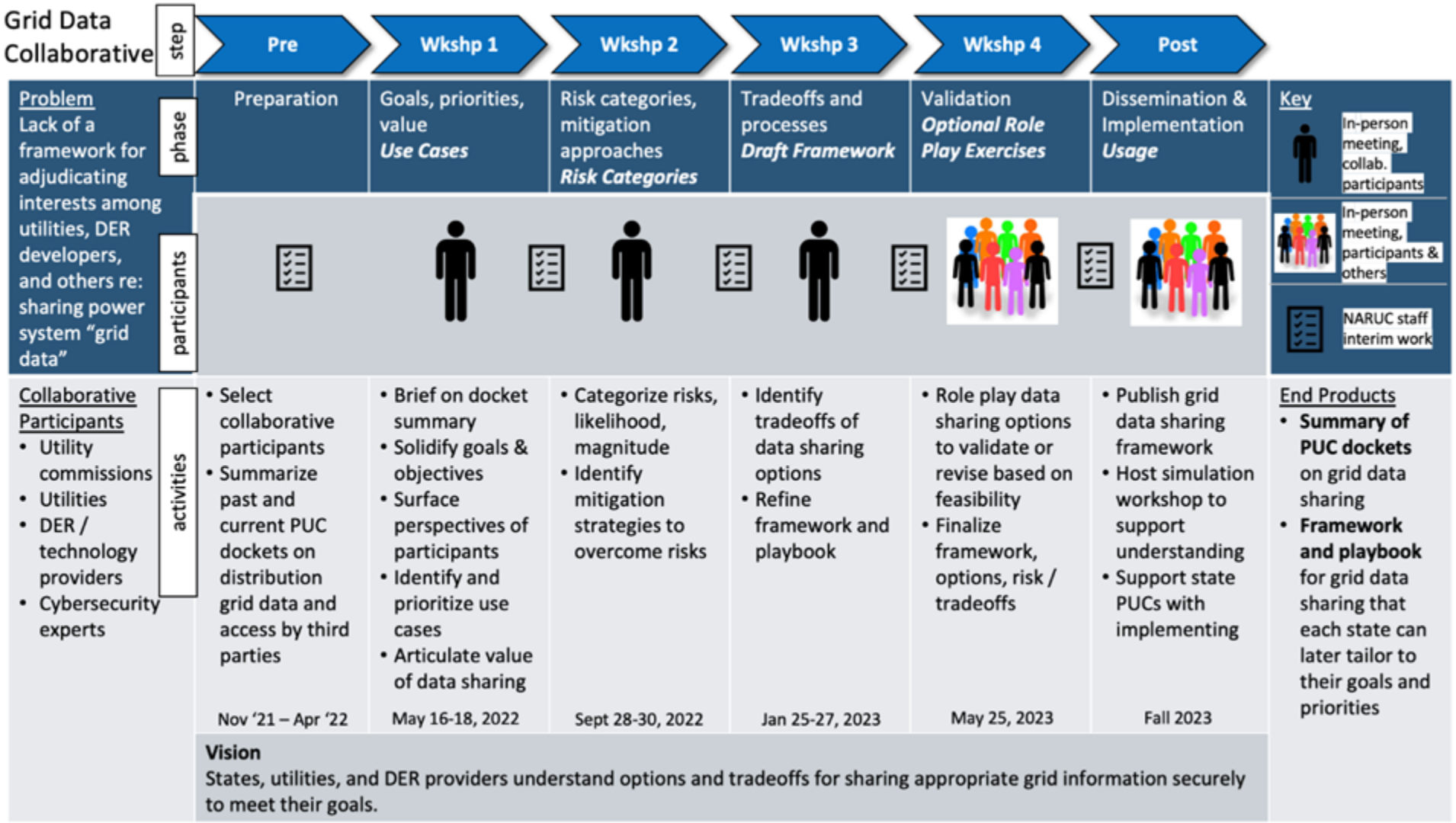
Support states, utilities, and stakeholders in identifying areas of agreement / disagreement about grid data sharing to devise a framework that each state can later tailor to their goals and priorities.

Through the 2022-2023 workshops, participants explored use cases, data sharing options for meeting identified needs, and articulated risks and tradeoffs of those options.

WHAT IS IN SCOPE FOR THIS INITIATIVE?

In Scope	Out of Scope
• Distribution system data • **Information about grid assets, system conditions and system constraints** (e.g., hosting capacity) • Data portals and other means to share system information • Locational and temporal information	• Customer data • **Customer privacy and personally identifiable information** (PII) • Data “ownership” questions • DER metering and telemetry requirements • Natural gas utility data

GRID DATA SHARING COLLABORATIVE PROCESS



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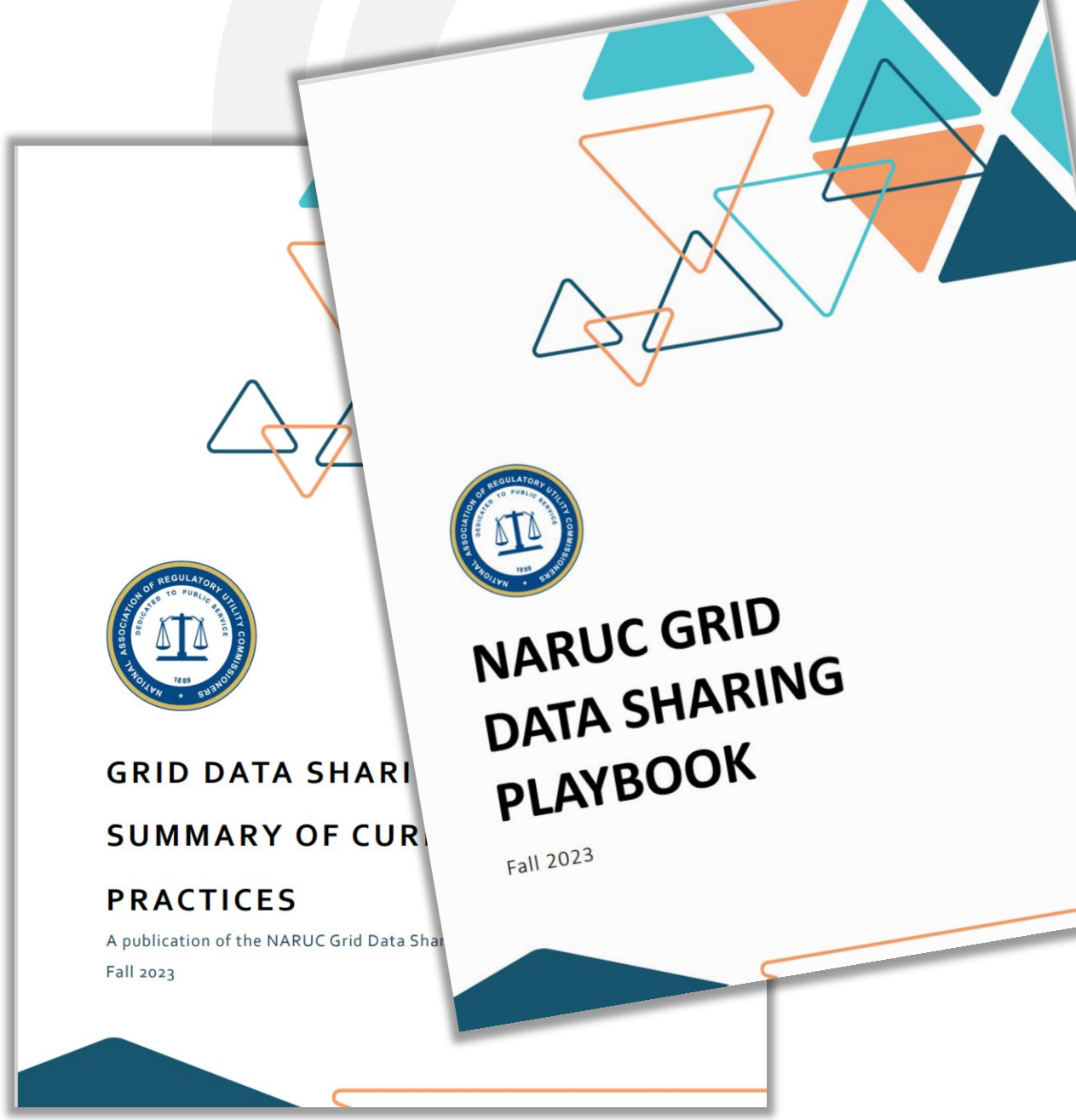
NARUC GRID DATA SHARING RESOURCES

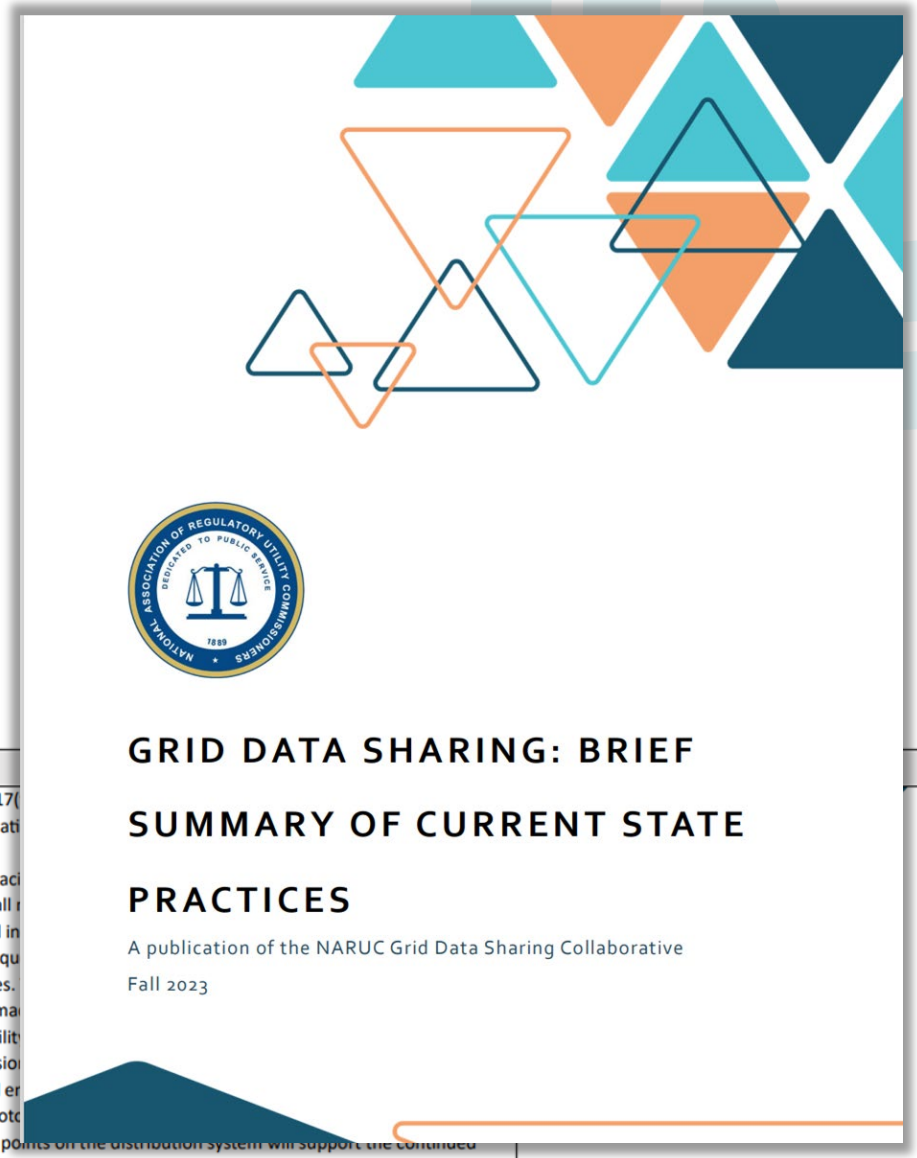
FRAMEWORK



SUMMARY OF STATE PRACTICES

Information from 20 states and >40 utilities

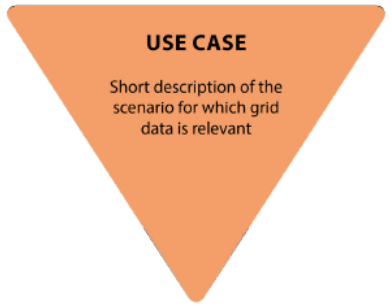
- Commission orders and utility-posted
- Hosting capacity information / maps
- Interconnection data
- Distribution grid asset information

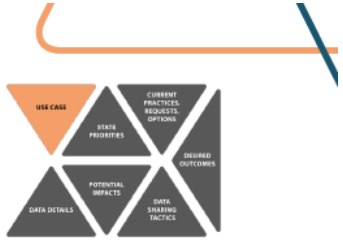


Jurisdiction	Utilities	Select Grid Data Proceedings	Description
Illinois	Commonwealth Edison Ameren	22-0486 Illinois Commerce Commission on Its Own Motion -Vs- Commonwealth Edison Company 22-0487 Illinois Commerce Commission on Its Own Motion -Vs- Ameren Illinois	Section 16-105.17(Required Informati "(E) Hosting Capaci (i) The utility shall results that shall in requirements requ Commission rules. results shall be ma the impact of utilit narrative discussio sited distributed er systems, and photo interconnection po development of distributed energy resources. (ii) Discussion of the utility's interconnection requirements and how they comply with the Commission's applicable regulations"

GRID DATA SHARING FRAMEWORK

- Divided into 7 categories
- Identifies considerations and questions to ask
- Matching colors identify categories that are closely related





Key Questions:

- What is the scenario being envisioned?
- Why are electricity grid data elements relevant to the actions in the use case?
- What types of entities would need access to additional electric utility grid data in this scenario?

Use Case Summary and Practices:

The use case description intends to outline the "what" of a request for grid data sharing. The use case description outlines the actor(s) and the motivation and/or goals for grid data sharing.

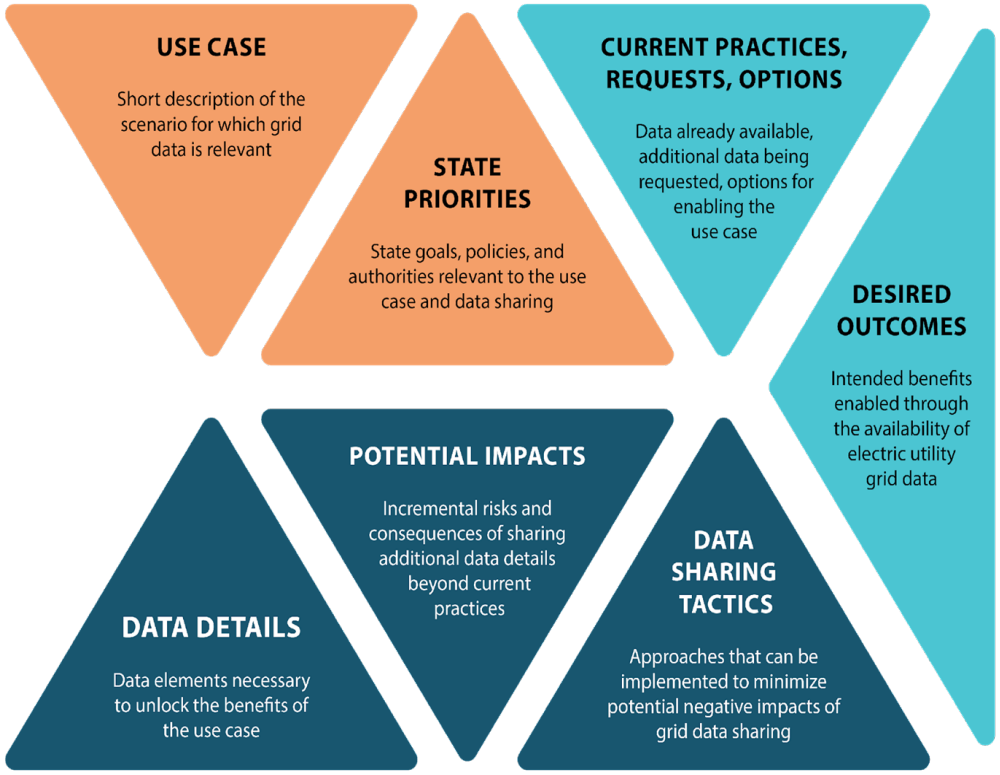
This Framework category is intended as a narrative description of a specific scenario and the potential importance of grid data sharing in that scenario. It also outlines the actor or actors and their relative motivations for grid data sharing. The use case may begin with a request to a commission from an interested party, such as utility, DER developer, or other intervenor or interested party.

The use case category can be thought of as documenting the "what" and "why" to show the relative context and points of view that help anchor in-depth examinations of grid data sharing issues. The Framework provides question prompts that may be helpful to guide narrative development.

In some cases, a use case provides a helpful starting place to think through issues related to grid data sharing policies and practices. For example, the New York Public Service Commission initiated an Integrated Energy Data Resource Program, which includes development and prioritization of stakeholder use cases (see Table 1). The prioritized use cases are guiding initial policies governing grid data sharing.

GRID DATA SHARING FRAMEWORK

- This is a framework, not a process. Each state will determine its own process.
- The framework aims to support decision making about whether and which data to share
  - Information might not be needed in each category before decision making
  - Not focused on how to implement grid data sharing.
- Results will vary by state.
  - Each state can take the same information and make a different decision based on their own jurisdiction, goals/policies, priorities.



GRID DATA SHARING PLAYBOOK

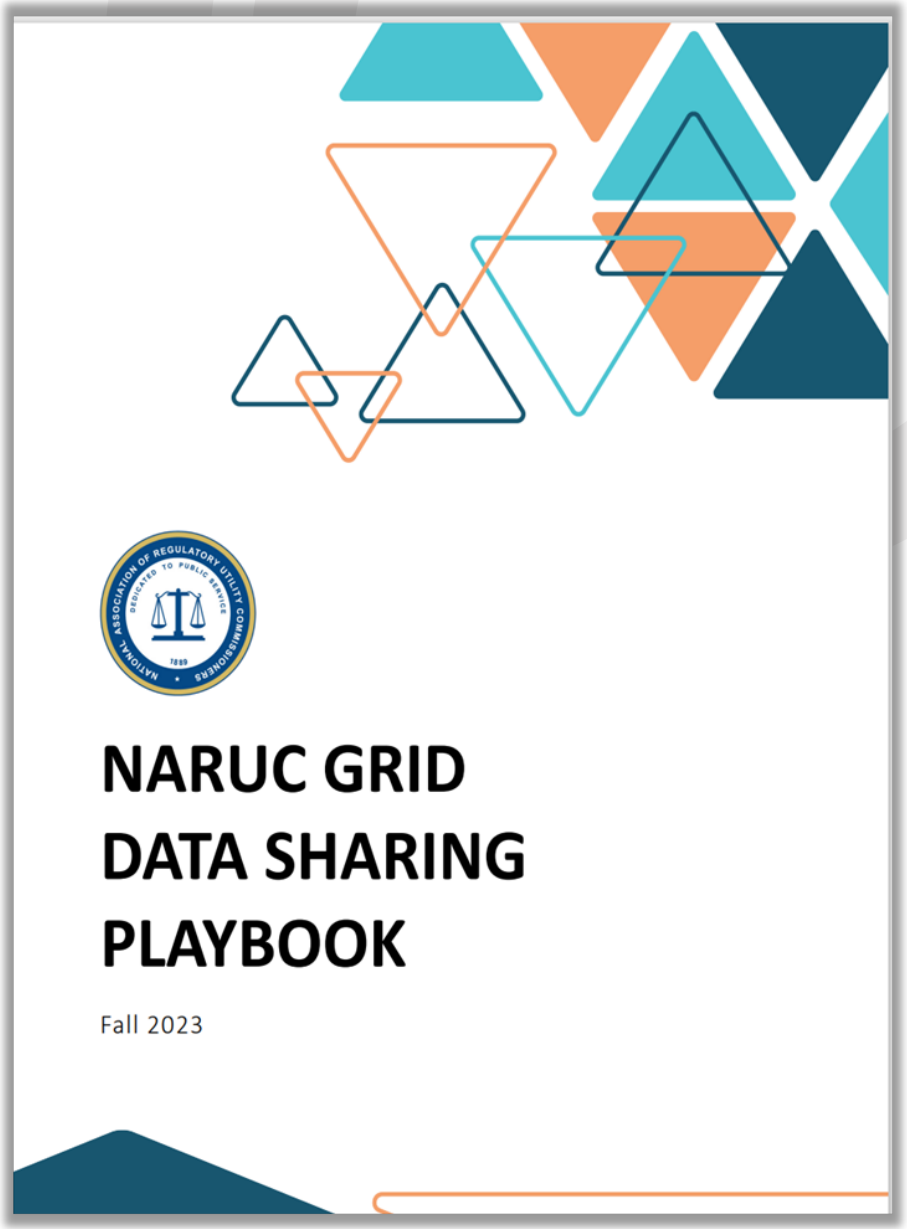
The Grid Data Sharing Framework

- Use Case
- State Priorities
- Current Practices, Requests, Options
- Desired Outcomes
- Data Details
- Potential Impacts
- Data Sharing Tactics

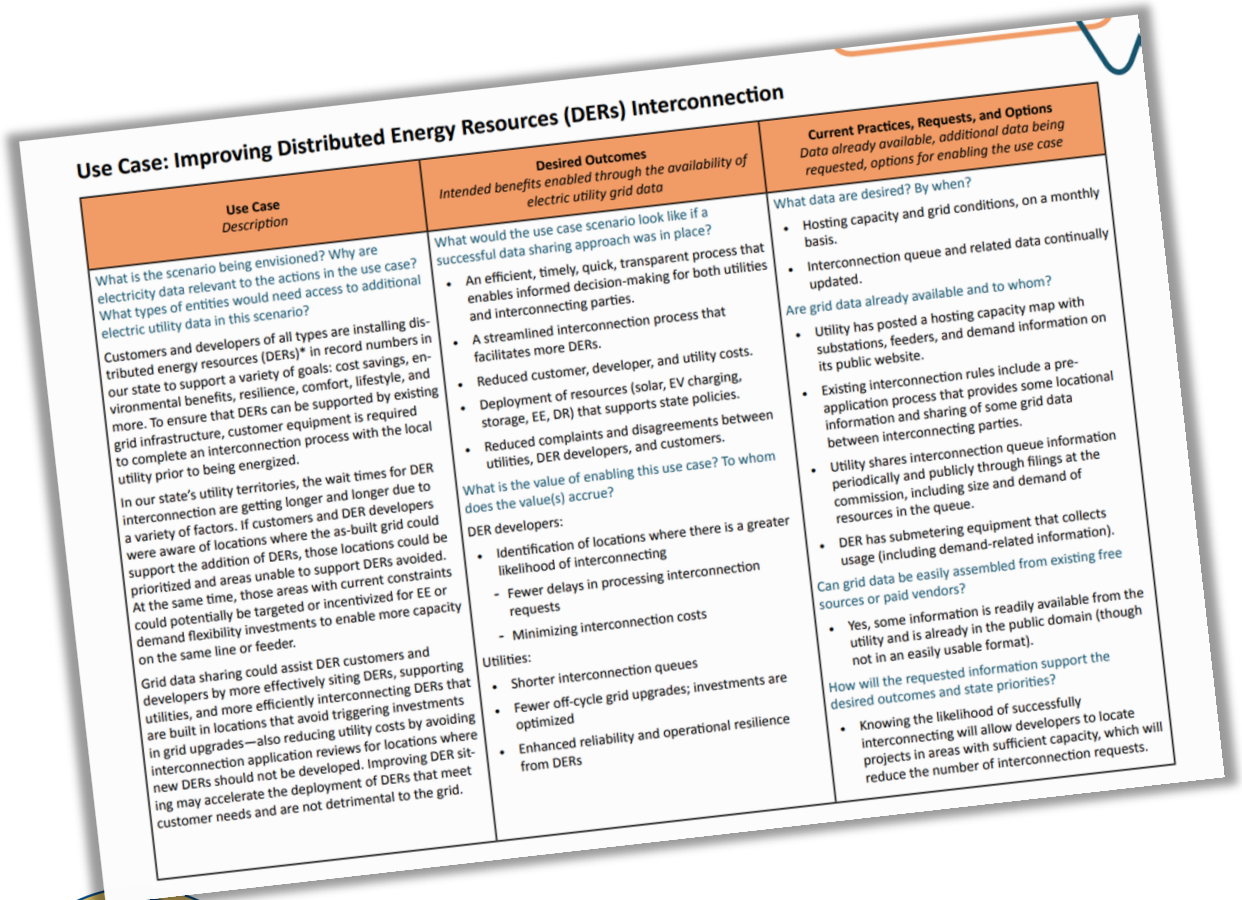
Using the Grid Data Sharing Framework

- Ideas for Decision-Making
- Regulatory Process Challenges
- Data Sharing Implementation Challenges

Grid Data Sharing Collaborative Use Cases



GRID DATA SHARING PLAYBOOK



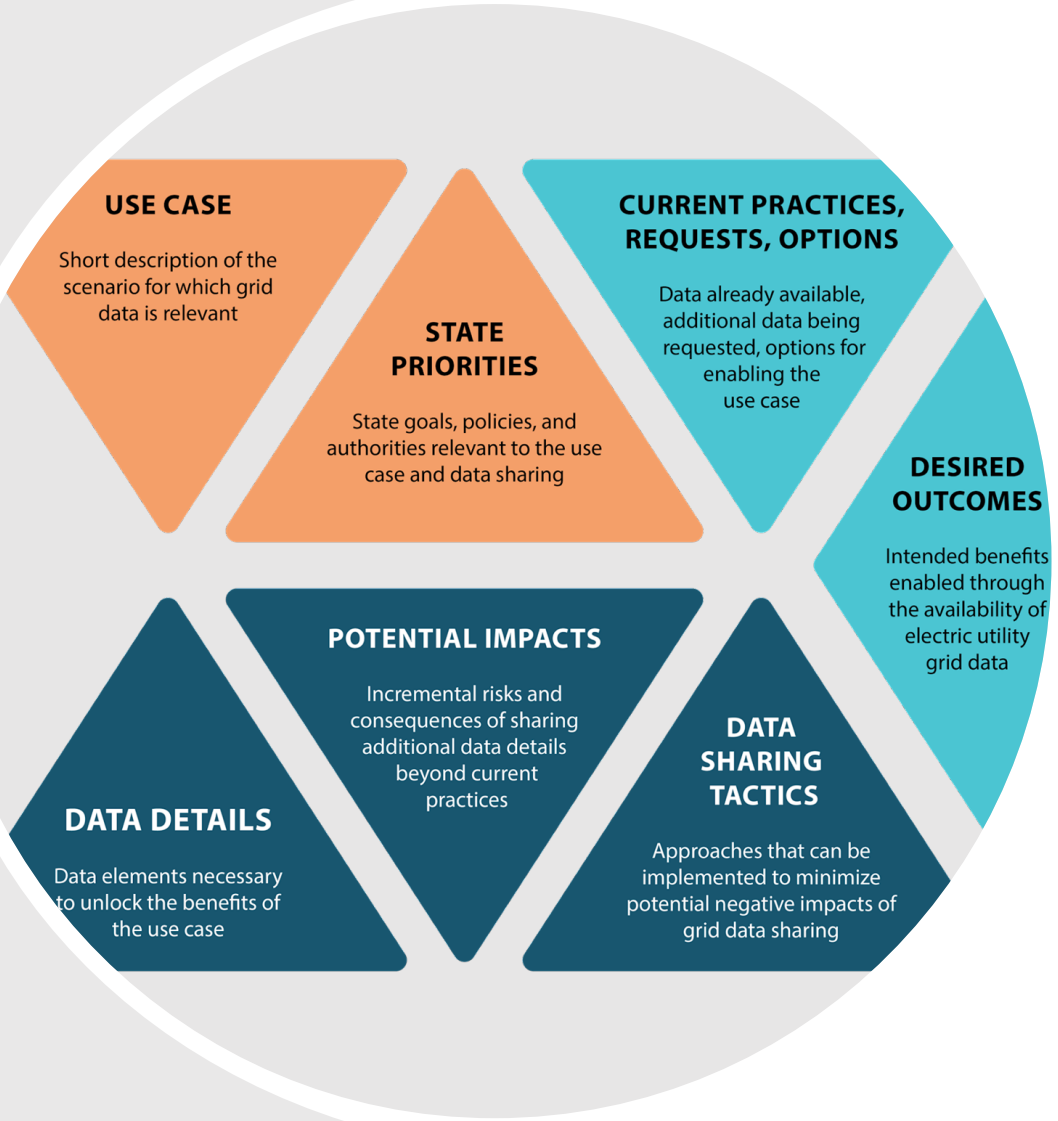
Use Case: Improving Distributed Energy Resources (DERs) Interconnection

Use Case *Description*	**Desired Outcomes** *Intended benefits enabled through the availability of electric utility grid data*	**Current Practices, Requests, and Options** *Data already available, additional data being requested, options for enabling the use case*
What is the scenario being envisioned? Why are electricity data relevant to the actions in the use case? What types of entities would need access to additional electric utility data in this scenario? Customers and developers of all types are installing distributed energy resources (DERs)* in record numbers in our state to support a variety of goals: cost savings, environmental benefits, resilience, comfort, lifestyle, and more. To ensure that DERs can be supported by existing grid infrastructure, customer equipment is required to complete an interconnection process with the local utility prior to being energized. In our state's utility territories, the wait times for DER interconnection are getting longer and longer due to a variety of factors. If customers and DER developers were aware of locations where the as-built grid could support the addition of DERs, those locations could be prioritized and areas unable to support DERs avoided. At the same time, those areas with current constraints could potentially be targeted or incentivized for EE or demand flexibility investments to enable more capacity on the same line or feeder. Grid data sharing could assist DER customers and developers by more effectively siting DERs, supporting utilities, and more efficiently interconnecting DERs that are built in locations that avoid triggering investments in grid upgrades—also reducing utility costs by avoiding interconnection application reviews for locations where new DERs should not be developed. Improving DER siting may accelerate the deployment of DERs that meet customer needs and are not detrimental to the grid.	What would the use case scenario look like if a successful data sharing approach was in place? • An efficient, timely, quick, transparent process that enables informed decision-making for both utilities and interconnecting parties. • A streamlined interconnection process that facilitates more DERs. • Reduced customer, developer, and utility costs. • Deployment of resources (solar, EV charging, storage, EE, DR) that supports state policies. • Reduced complaints and disagreements between utilities, DER developers, and customers. What is the value of enabling this use case? To whom does the value(s) accrue? DER developers: • Identification of locations where there is a greater likelihood of interconnecting - Fewer delays in processing interconnection requests - Minimizing interconnection costs Utilities: • Shorter interconnection queues • Fewer off-cycle grid upgrades; investments are optimized • Enhanced reliability and operational resilience from DERs	What data are desired? By when? • Hosting capacity and grid conditions, on a monthly basis. • Interconnection queue and related data continually updated. Are grid data already available and to whom? • Utility has posted a hosting capacity map with substations, feeders, and demand information on its public website. • Existing interconnection rules include a pre-application process that provides some locational information and sharing of some grid data between interconnecting parties. • Utility shares interconnection queue information periodically and publicly through filings at the commission, including size and demand of resources in the queue. • DER has submetering equipment that collects usage (including demand-related information). Can grid data be easily assembled from existing free sources or paid vendors? • Yes, some information is readily available from the utility and is already in the public domain (though not in an easily usable format). How will the requested information support the desired outcomes and state priorities? • Knowing the likelihood of successfully interconnecting will allow developers to locate projects in areas with sufficient capacity, which will reduce the number of interconnection requests.

SAMPLE USE CASES

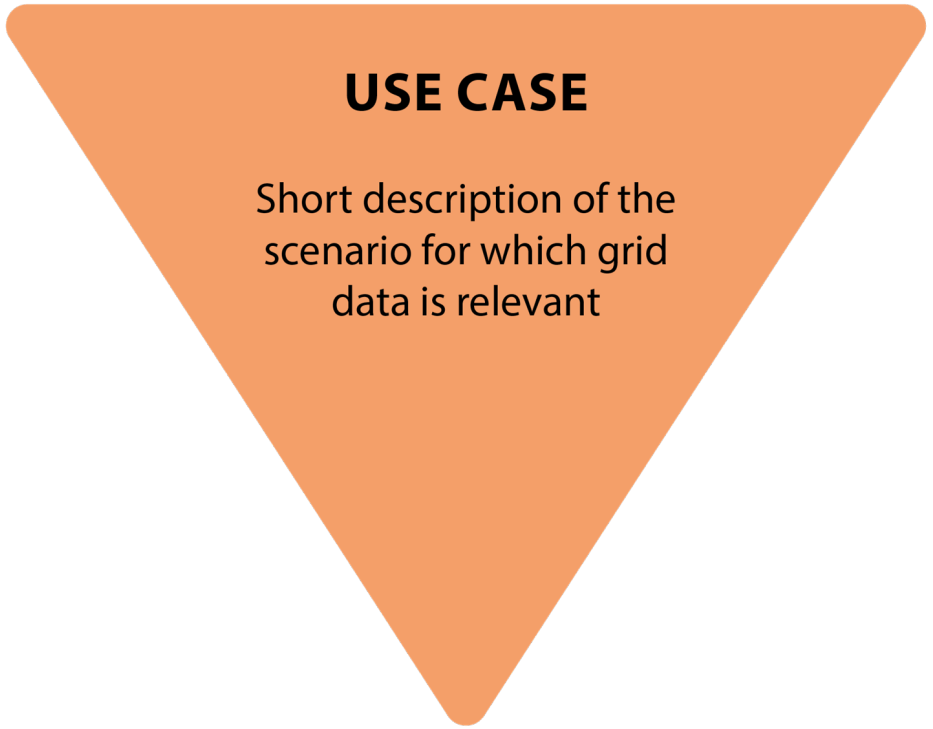
- Improving DER Interconnection
- Enabling Fleet Vehicle Electrification
- Enabling Distribution Non-Wires Solutions

This is a framework, not a process. Process will vary by state



GRID DATA SHARING FRAMEWORK, PLAYBOOK, USE CASES

GRID DATA SHARING FRAMEWORK



USE CASE

Short description of the scenario for which grid data is relevant

- What is the scenario being envisioned?
- Why are electricity data relevant to the actions in the use case?
- What types of entities would need access to additional electric utility data in this scenario?

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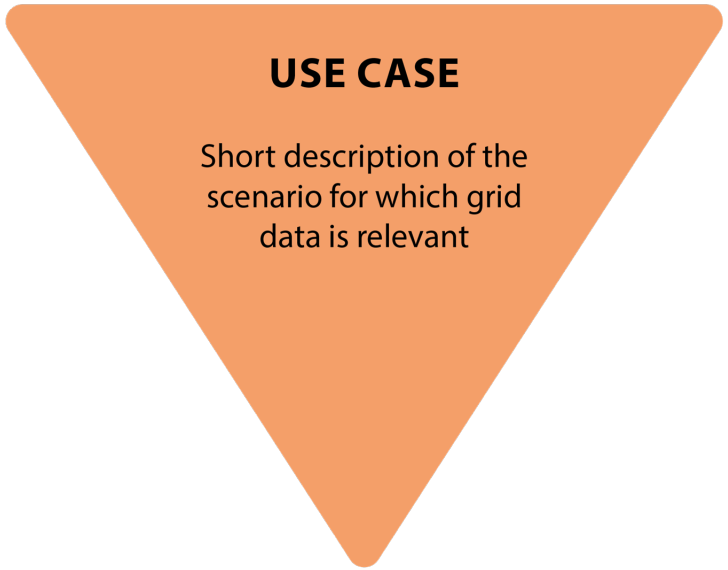
GRID DATA SHARING PLAYBOOK



Use Case Description

What is the scenario being envisioned? Why are electricity data relevant to the actions in the use case? What types of entities would need access to additional electric utility data in this scenario?

Owners and operators of large fleets of vehicles in this state are announcing plans to electrify for a variety of reasons: carbon reduction goals; total cost of ownership; simplicity of maintenance; corporate environmental, social, and governance principles; and others. These electrified fleets can include light duty vehicles (taxis, rideshare); medium duty vehicles (delivery trucks, cargo vans, service vehicles); heavy duty vehicles (long-haul trucks, electric school buses, transit vehicles); or some combination thereof. For many fleets, electrification will represent a significant increase in their site load needs, so utilities may need to add capacity in addition to "make ready" infrastructure such as line extensions. In some cases, fleet owners can buy and take delivery of electric vehicles faster than they are able to interconnect charging infrastructure to power them.

Fleet owners and utilities will be better able to collaborate and plan for transportation electrification if they can understand which locations are desirable and undesirable in terms of supporting charging infrastructure near-term vs. where investments will be needed to enable charging on a larger scale in the future.

From NARUC Grid Data Sharing Playbook
Use Case: Enabling Fleet Vehicle Electrification

GRID DATA SHARING FRAMEWORK

STATE PRIORITIES

State goals, policies, and authorities relevant to the use case and data sharing

- What existing state policies and goals are relevant to the use case?
- What authority and jurisdiction does the Commission have on this topic?
- What are existing precedents or requirements within the state or Commission regarding data openness, data privacy, and burden of proof? *(e.g., some states presume data openness so utility needs to explain risks, some states require DER to demonstrate need)*

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GRID DATA SHARING PLAYBOOK

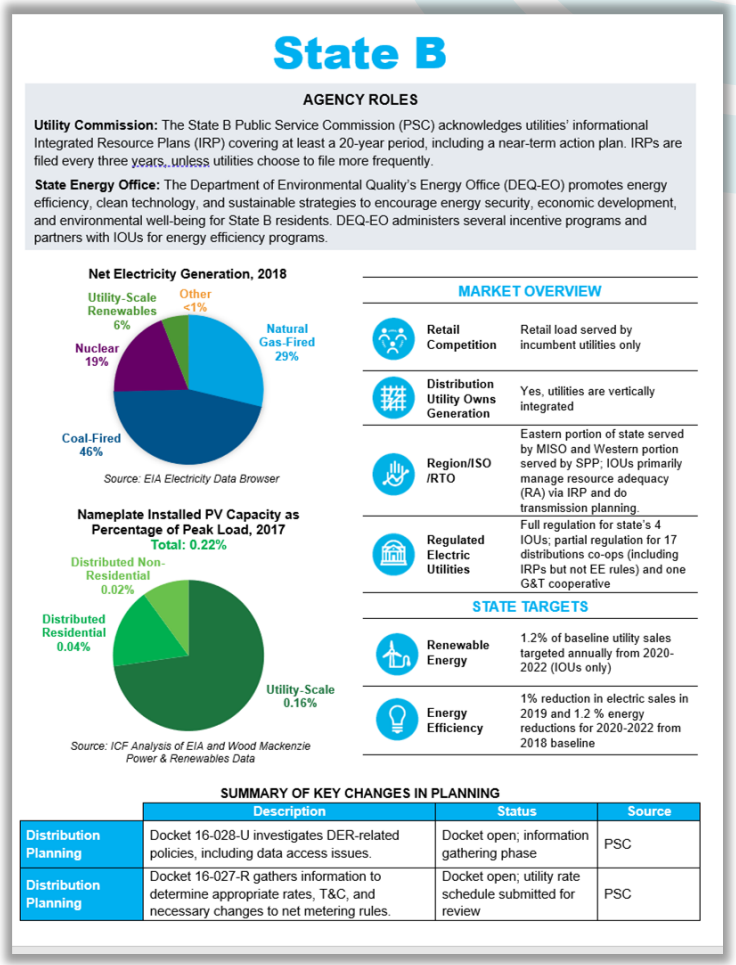
STATE PRIORITIES

State goals, policies, and authorities relevant to the use case and data sharing

Considerations:

- State goals and policies
- Jurisdiction and institutional alignments
- Existing data sharing practices, applicable “burden of proof”
- Related regulatory mechanisms, such as rate designs and utility programs
- Critical electric infrastructure information protections

STATE PROFILES (SAMPLE)



State B

AGENCY ROLES

Utility Commission: The State B Public Service Commission (PSC) acknowledges utilities’ informational Integrated Resource Plans (IRP) covering at least a 20-year period, including a near-term action plan. IRPs are filed every three years, unless utilities choose to file more frequently.

State Energy Office: The Department of Environmental Quality’s Energy Office (DEQ-EO) promotes energy efficiency, clean technology, and sustainable strategies to encourage energy security, economic development, and environmental well-being for State B residents. DEQ-EO administers several incentive programs and partners with IOUs for energy efficiency programs.

Net Electricity Generation, 2018

Utility-Scale Renewables 6%; Other ≤1%; Natural Gas-Fired 29%; Nuclear 19%; Coal-Fired 46%

Source: EIA Electricity Data Browser

Nameplate Installed PV Capacity as Percentage of Peak Load, 2017

Total: 0.22%

Distributed Non-Residential 0.02%; Distributed Residential 0.04%; Utility-Scale 0.16%

Source: ICF Analysis of EIA and Wood Mackenzie Power & Renewables Data

MARKET OVERVIEW

Retail Competition	Retail load served by incumbent utilities only
Distribution Utility Owns Generation	Yes, utilities are vertically integrated
Region/ISO /RTO	Eastern portion of state served by MISO and Western portion served by SPP; IOUs primarily manage resource adequacy (RA) via IRP and do transmission planning.
Regulated Electric Utilities	Full regulation for state’s 4 IOUs; partial regulation for 17 distributions co-ops (including IRPs but not EE rules) and one G&T cooperative

STATE TARGETS

Renewable Energy	1.2% of baseline utility sales targeted annually from 2020-2022 (IOUs only)
Energy Efficiency	1% reduction in electric sales in 2019 and 1.2 % energy reductions for 2020-2022 from 2018 baseline

SUMMARY OF KEY CHANGES IN PLANNING

	Description	Status	Source
Distribution Planning	Docket 16-028-U investigates DER-related policies, including data access issues.	Docket open; information gathering phase	PSC
Distribution Planning	Docket 16-027-R gathers information to determine appropriate rates, T&C, and necessary changes to net metering rules.	Docket open; utility rate schedule submitted for review	PSC

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GRID DATA SHARING FRAMEWORK

CURRENT PRACTICES, REQUESTS, OPTIONS

Data already available, additional data being requested, options for enabling the use case

- Which data are desired? By when?
- Are they already available? If so, to whom?
- Can they be easily assembled from existing free sources or paid vendors?
- How will the requested information support the desired outcomes and state priorities?
- Can the goal be achieved through means other than sharing these particular data?
- What would be the impacts of not sharing the data? What would be the impact of not sharing the grid data soon? Which grid data elements are desired, and by when?

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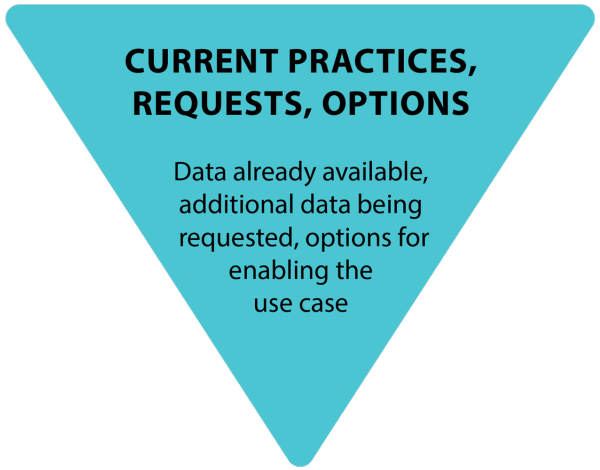
GRID DATA SHARING PLAYBOOK



Potential details about the status quo:

- Data availability
- Data quality
- Data accuracy
- Data location
- Data accessibility

Current Practices, Requests, and Options

Data already available, additional data being requested, options for enabling the use case

What data are desired? By when?

- Hosting capacity and grid conditions, on a monthly basis.
- Interconnection queue and related data continually updated.

Are grid data already available and to whom?

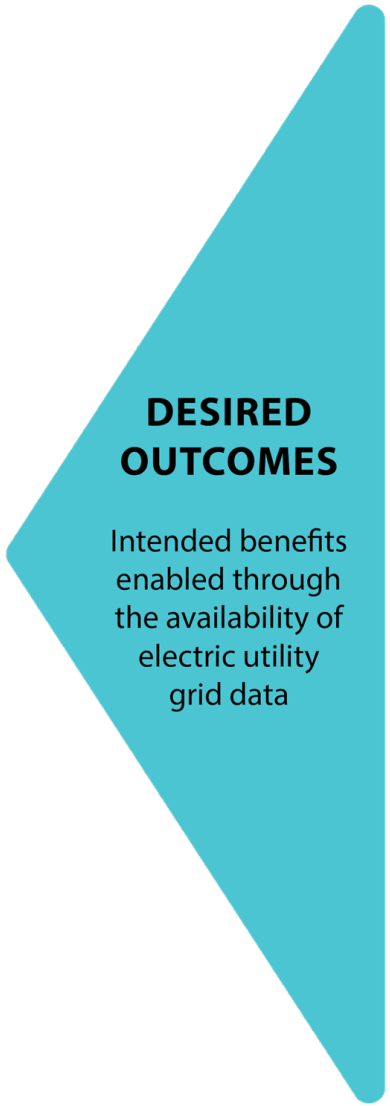
- Utility has posted a hosting capacity map with substations, feeders, and demand information on its public website.
- Existing interconnection rules include a preapplication process that provides some locational information and sharing of some grid data between interconnecting parties.
- Utility shares interconnection queue information periodically and publicly through filings at the commission, including size and demand of resources in the queue.
- DER has submetering equipment that collects usage (including demand-related information).

Can grid data be easily assembled from existing free sources or paid vendors?

- Yes, some information is readily available from the utility and is already in the public domain (though not in an easily usable format).

From NARUC Grid Data Sharing Playbook
Use Case: Improving Distributed Energy Resources (DERs) Interconnection

GRID DATA SHARING FRAMEWORK



DESIRED OUTCOMES

Intended benefits enabled through the availability of electric utility grid data

- What would the use case scenario look like if a successful data sharing approach were in place?
- What is the value of enabling this use case? To whom does the value(s) accrue?
- What would be the public interest motivation for data sharing to support this use case?

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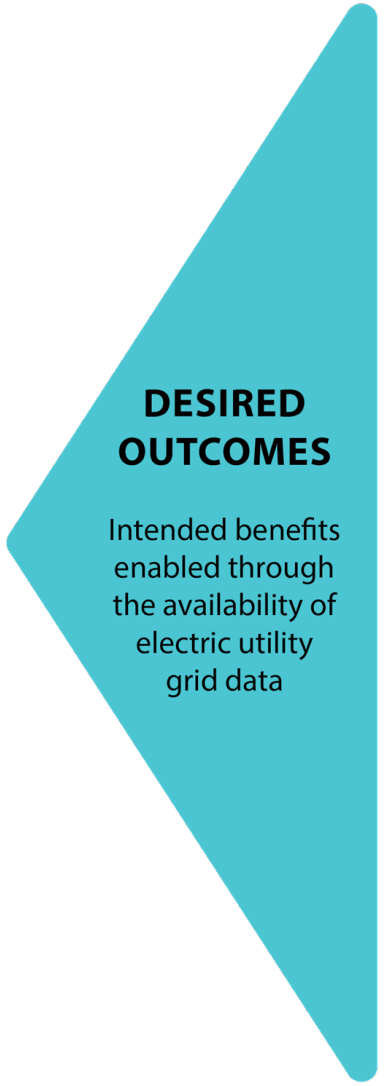
GRID DATA SHARING PLAYBOOK



Desired Outcomes

Intended benefits enabled through the availability of electric utility grid data

What would the use case scenario look like if a successful data sharing approach was in place?

• Better use of utility resources, assets, and energy; specifically, preventing grid constraints and increased use of currently available capacity
• Deferral of higher cost utility investments through utilization of non-wires solutions

What is the value of enabling this use case? To whom does the value(s) accrue?

• Utility – Avoids higher cost capital investment • Customer – Compensated for providing service to the utility
• Aggregator – Compensated for providing service to the utility
• Society – Overall costs to operate the grid are reduced by avoided capital investments

What would be the public interest motivation for data sharing to support this use case?

• Enhance the operational efficiency of the distribution grid • Assist with grid management
• Enable cost savings by avoiding or deferring grid upgrades, reducing consumer cost impacts, and delivering value to ratepayers. (Value will vary by the application of DER compensation mechanism[s].)
• DER can be dispatched in better alignment with system need

From NARUC Grid Data Sharing Playbook – Use Case: Enabling Non-Wires Solutions

GRID DATA SHARING FRAMEWORK

DATA DETAILS

Data elements necessary to unlock the benefits of the use case

- What level of data quality and granularity is necessary (e.g. temporal, locational)? How frequently should data be shared?
- Which grid data elements are required? Are some data “need to have” vs. “nice to have”?
- Who has the data?
- Who needs the data?
- What is the relative sensitivity and/or criticality of specific data details?

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GRID DATA SHARING PLAYBOOK

DATA DETAILS

Data elements necessary to unlock the benefits of the use case

Table 2: Sample Grid Data Elements

Interconnection Data Elements
(Source: Grid Data Sharing Collaborative)

Feeder (and substation in some cases)

- Feeder name or identification number
- Substation to which the feeder connects
- Feeder voltage
- Number of phases
- Substation transformer to which the feeder connects
- Feeder type (e.g., radial, network, spot, mesh)
- Feeder length
- Feeder conductor size and impedance
- Service transformer rating
- Service transformer daytime minimum load
- Existing generation
- Queued generation
- Total generation
- 8760 load profile
- Percentage of residential, commercial, and industrial customers
- Currently scheduled upgrades
- Federal or state jurisdiction
- Known transmission constraint
- Presence of reverse flow protection, automated voltage regulators, load tap changers, capacitor banks that would be impacted
- Other relevant information to guide interconnection applicants

Public Queue Data

- Queue number
- Nameplate rating and export capacity
- Fuel type
- City, ZIP code
- Substation
- Feeder
- Status (e.g., active, withdrawn, connected)

Dates for

- Application complete
- Screening results
- Supplemental review results
- System impact results
- Facilities study results
- Interconnection agreement provided
- Interconnection agreement signed
- Permission to operate

NOTE: This is an illustrative list for demonstration purposes only.

GRID DATA SHARING FRAMEWORK

POTENTIAL IMPACTS

Incremental risks and consequences of sharing additional data details beyond current practices

- To whom do the risks accrue? What grid data elements are associated with risks?
- Are the risks of sharing specific data elements related to privacy, consumer impact, security, or commercial risk?
- What are the consequences of these risks? Who would be harmed?
- Does sharing specific data elements realize the risk? What other things would need to occur to realize the consequence? How do specific data elements relate to other already-shared data?

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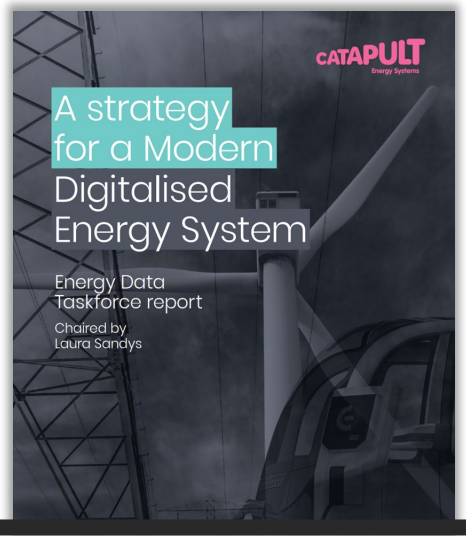
GRID DATA SHARING PLAYBOOK

POTENTIAL IMPACTS

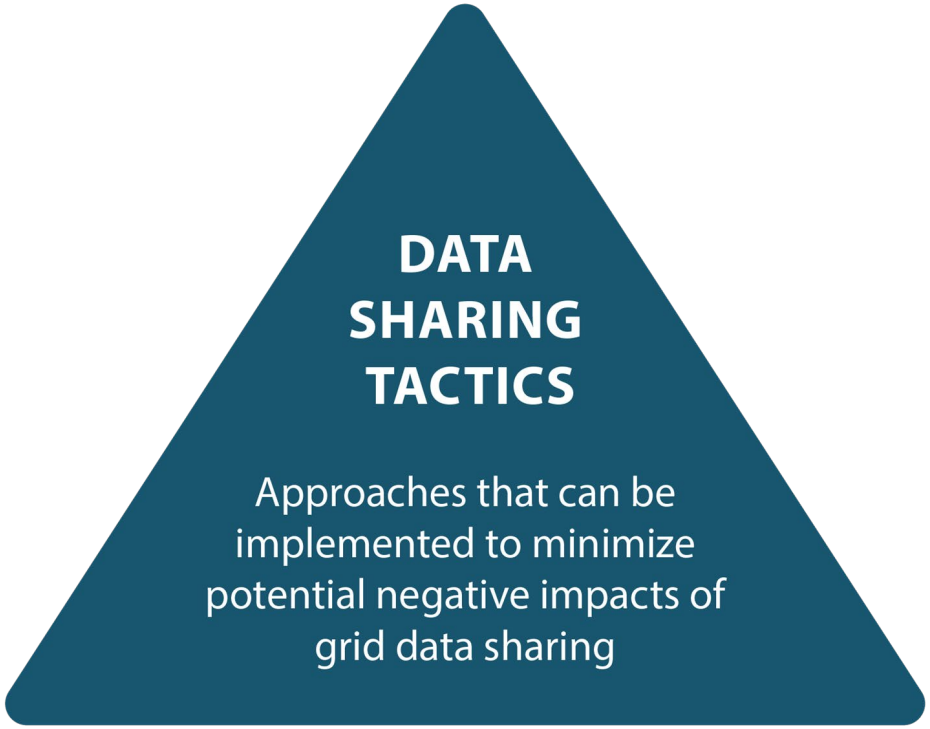
Incremental risks and consequences of sharing additional data details beyond current practices



4 Risk Categories

- **Consumer Privacy:** Data that relate to a person who can be identified directly from the information in question or who can be indirectly identified from the information in combination with other information. Because the focus of this effort is on grid data as opposed to energy consumption data, the likelihood of impact in this category is low.
- **Negative Consumer Impact:** Data that are likely to drive actions, intentional or otherwise, that will negatively impact the consumer. Similar to consumer privacy, this issue is relatively low risk in the grid data sharing context.
- **Security:** Data that create incremental security issues—or exacerbate existing security issues—that cannot be mitigated via security protocols such as physical site security, robust cybersecurity, or other means. Security professionals focus their efforts to address these risks.
- **Commercial:** Data that relate to the private administration of a business or data that were not collected as part of an obligation by a regulated monopoly and would not have been originated or captured without the activity of the organization.

GRID DATA SHARING FRAMEWORK



DATA SHARING TACTICS

Approaches that can be implemented to minimize potential negative impacts of grid data sharing

- Do relevant industry standards or standards of practice exist that would mitigate risks?
- What are the relative costs and levels of effort to implement specific risk mitigation options?
- Who would bear the costs of implementing different approaches?
- Would the mitigation approach eliminate the benefits (desired outcomes) of the use case?

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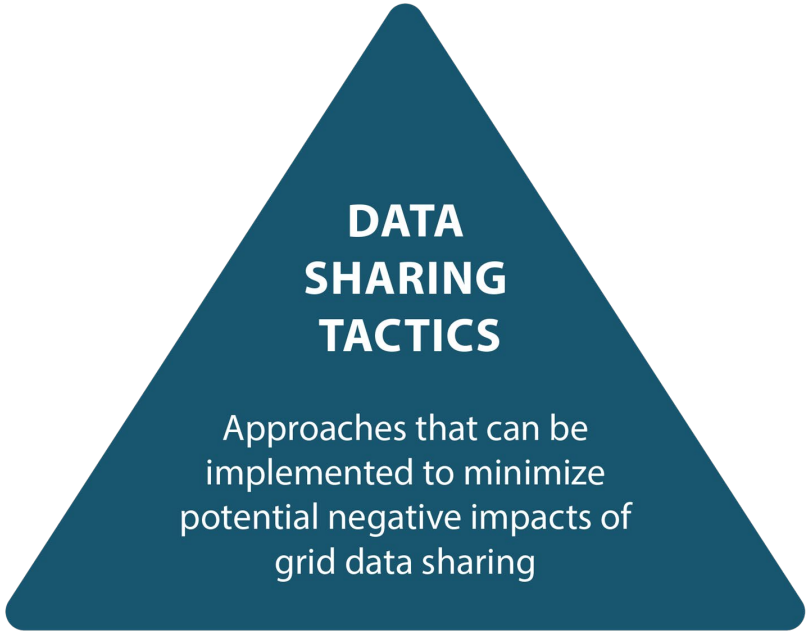
GRID DATA SHARING PLAYBOOK



Data Sharing Tactics

Approaches that can be implemented to minimize potential negative impacts of grid data sharing

Do relevant industry standards or standardized practices exist that would mitigate risks?

- Details about sensitive distribution facilities are covered by existing laws (e.g., state-level CEII).
- NERC CIP or other federal requirements may limit public disclosure of data on critical facilities.
- In prior decisions, the commission has affirmed that state-level security and commercial privacy standards and practices are in place for utility-held grid data

Possible Approaches:

The utility will seek commission approval prior to requiring any additional data protection requirements for third parties.

- Identify data that are already in the public domain; for non-public, sensitive data, develop NDAs or similar vehicles describing acceptable data use and reuse criteria.
- Provide secure login credentials to a cybersecure portal, which allows authorized access to sensitive, non-public data. This limits public exposure that may pose security risks. Access may be approved pending NDA or similar.
- On public sites, employ data aggregation or masking techniques so that sensitive facility, node, or network details are obscured

From NARUC Grid Data Sharing Playbook
Use Case: Improving Distributed Energy Resources (DERs) Interconnection

GRID DATA SHARING PLAYBOOK

USING THE GRID DATA SHARING FRAMEWORK

Ideas for Decision-Making

- Cost-benefit analysis
- Weighted decision options and rankings
- Focus on priority goals
- Benchmark options
- Leverage industry resources
- Address objections in the record

Table 6: NARUC Grid Data Sharing Collaborative Participant-Identified Implementation Challenges

Likely Challenges	Possible Solutions
Limits exist on some data sharing parties' ability to execute NDAs. Few mechanisms in place for data sharing parties to audit the effectiveness of data sharing tactics. Data reporting and time reporting (frequency) are not standardized. Commercial risk versus liability is a concern. Data quality improvements may be necessary. For example, the usefulness of data sharing relies on users' confidence that data accurately reflect grid conditions.	Commissions and stakeholders will need to continuously evaluate data and data practices. One such practice is data validation, which refers to procedural and technical practices intended to improve data and avoid common impediments. Utilities and other parties perform data validation independently. In some jurisdictions, regulators oversee data validation processes (e.g., by requiring regular filings, plans, and tracking metrics). The grid data serve as both critical inputs to use cases, and critical means of evaluating performance against desired outcomes.

NEXT STEPS

- Q&A
- Grid Data Sharing pilots coming soon

www.naruc.org/cpi-1/energy-distribution/der-integration-compensation/grid-data-sharing/

THANK YOU!

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