



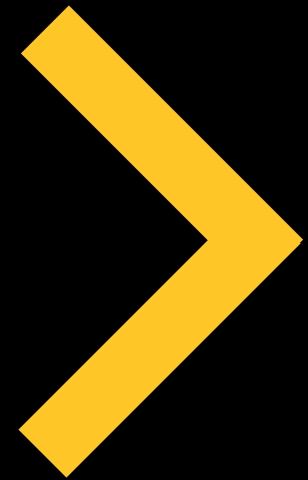
Analytical Capabilities to Support Comprehensive Electricity Planning

National Council on Electricity Policy Annual Meeting

Samir Succar



09/15/2021



There are some commonalities in the cohort visions

Analytical capabilities can support their realization

Improved planning can enable better outcomes

I like Venn diagrams. A lot.

→ **Key Takeaways**

Task Force Resources

All Task Force materials are now available: www.naruc.org/taskforce

Task Force members, NARUC and NASEO staff, technical and subject matter experts, and others developed a robust set of resources to support state decision makers in advancing aligned electricity system planning processes.

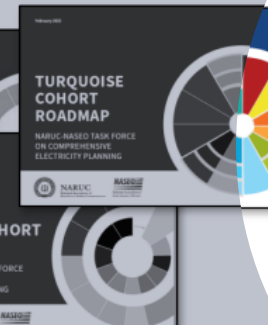
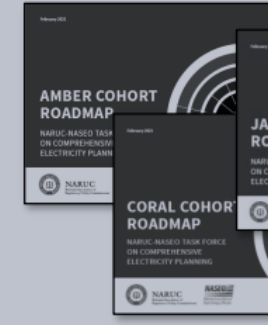
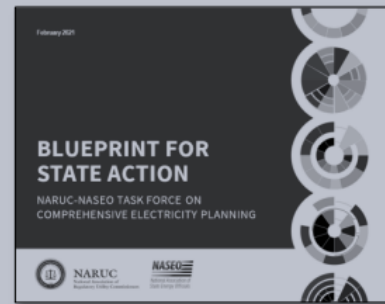
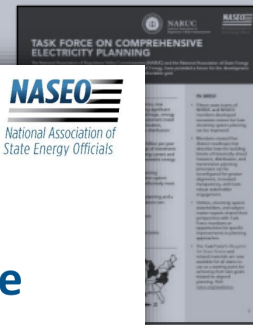
NARUC-NASEO Task Force on Comprehensive Electricity Planning

National Council on Electricity Policy 2021 Annual Meeting
September 13, 2021

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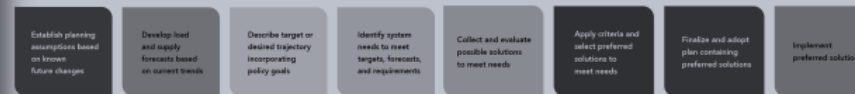
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Opportunities to Improve Analytical Capabilities towards Comprehensive Electricity System Planning
Briefing Paper | February 2021

Opportunities to Improve Analytical Capabilities towards Comprehensive Electricity System Planning

Task Force Briefing Paper: *Standard Building Blocks of Electricity System Planning Processes*



Comprehensive Planning Library: resources across 15 topical areas

Topic Area	Description
1. Overview	Customer bills, rates and transparency, timing, communication and ability of the distribution grid.
2. Reliability	Approaches to risk design, state approaches to performance-based regulation, technical and financial, etc.
3. Distribution System Planning	The fundamentals of distribution system plan and planning approaches, including the role of geographic, technical and financial information, and the role of the distribution system plan in the overall system plan.
4. Emerging Distribution System Planning (EDSP) Processes	Emerging EDSP methods and tools for identifying system needs, identifying potential and alternative, conducting feasibility studies, and assessing distribution system needs and costs for the future.
5. Forecasting	Tools and methods for forecasting load and DER uptake.
6. Load Modeling	Methods and tools for modeling a more advanced distribution grid.
7. Planning Contribution	Processes on reliability, distribution, and modeling resources to plan and coordinate planning processes.
8. Planning Criteria	Processes regarding how planning criteria matter and considerations.
9. Process and Strategy	EDSP, integration tools, and other generation procurement changes, better financial and operational performance, and other considerations.
10. Resilience	Approaches to enhance the resiliency of DER in real time.
11. Asset DER Integration	Analysis, modeling and tool sets for environmental changes, higher DER penetration, regional coordination, and other considerations.
12. Sources and Data Analysis	Analysis, modeling and tool sets for environmental changes, higher DER penetration, regional coordination, and other considerations.
13. Solution Evaluation	Identification and sequencing of distribution grid investments, methods for assessing the impact of DER on system performance and other considerations.
14. Stakeholder Engagement	Best practices for increasing efficient and effective stakeholder engagement in utility planning.
15. Utility Best Practices for Integrated Planning	Utility best practices that align with integrated planning, including, but not limited to, the following:

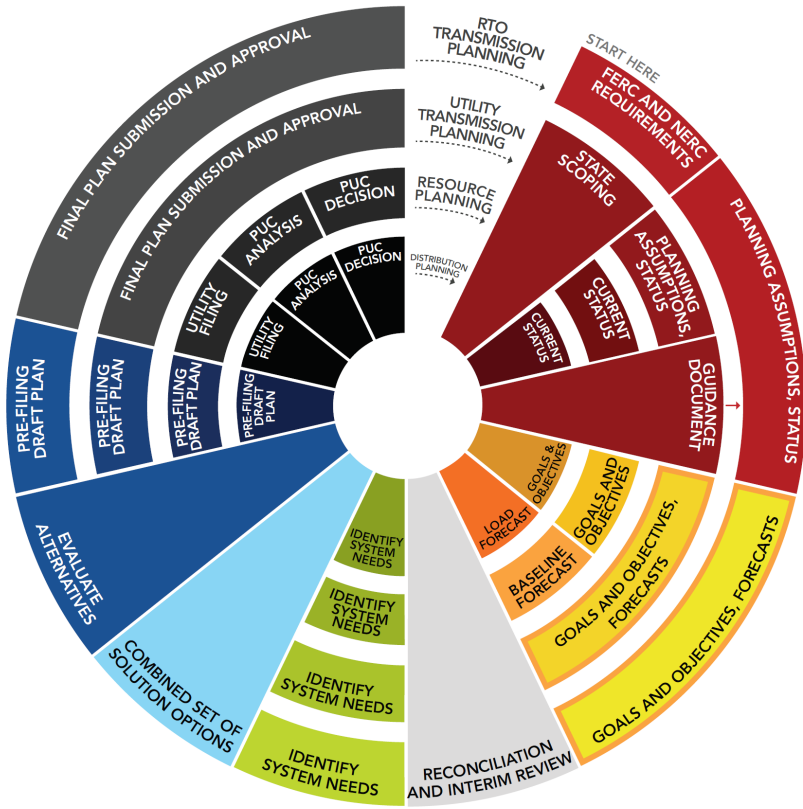


NARUC-NASEO TASK FORCE ON COMPREHENSIVE ELECTRICITY PLANNING



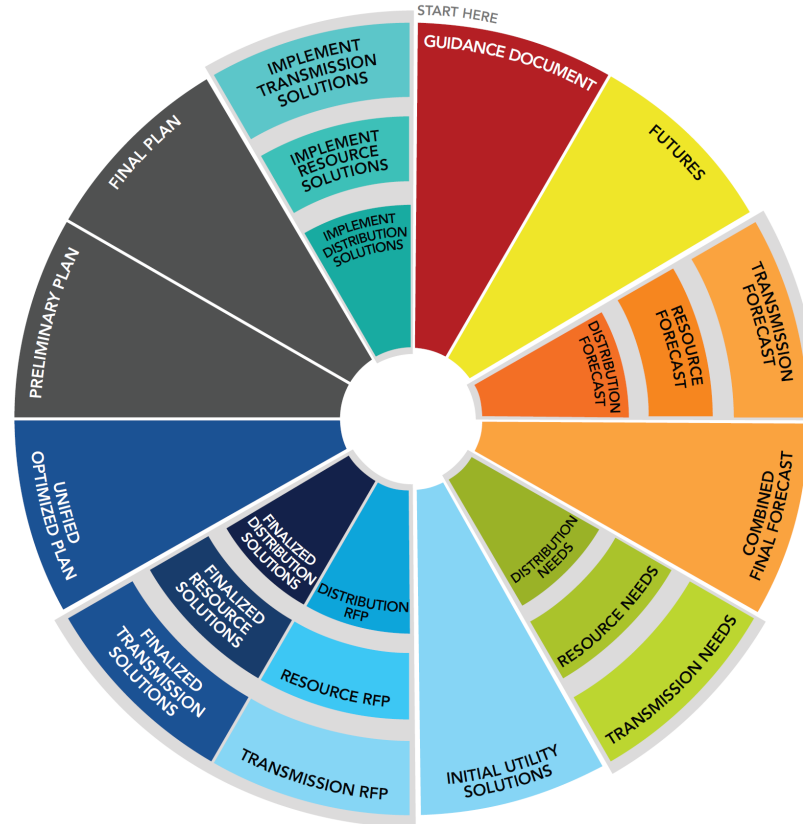
➔ “Opportunities to Improve Analytical Capabilities”

AMBER



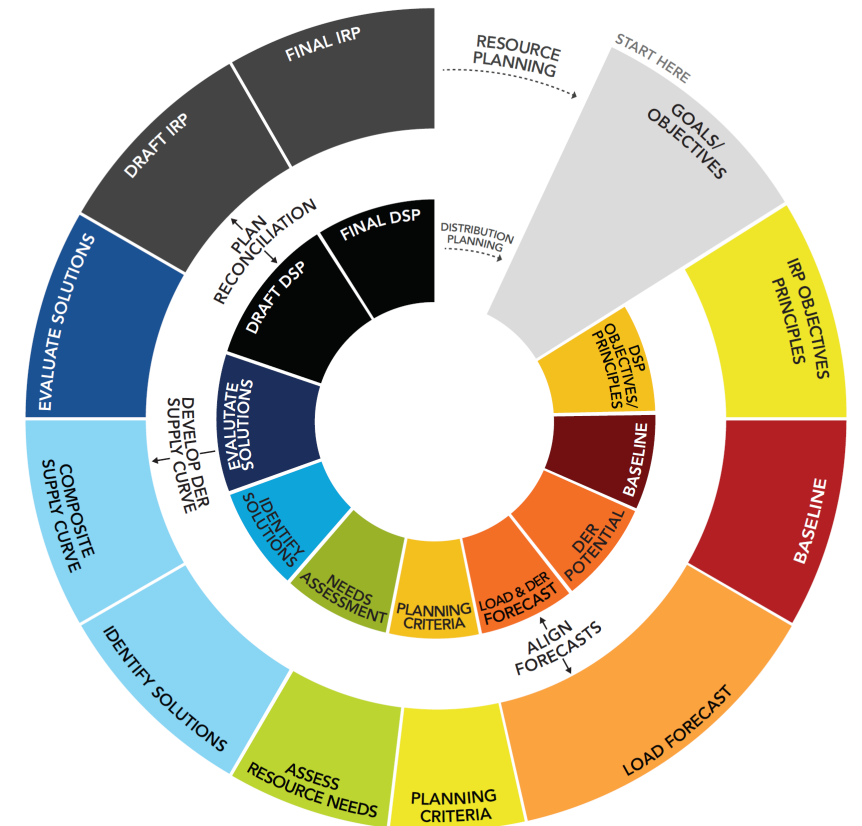
- Establish Planning Assumptions
- Develop Forecasts
- Describe the Future Trajectory
- Identify System Needs
- Identify Solutions to Address Needs
- Evaluate and Apply Criteria to Determine Preferred Solutions
- Finalize Solutions, Approve and Publish Plan
- Integrated Process Steps

TURQUOISE



- Establish Planning Assumptions
- Describe the Future Trajectory
- Develop Forecasts
- Identify System Needs
- Identify Solutions to Address Needs
- Evaluate and Apply Criteria to Determine Preferred Solutions
- Finalize Solutions, Approve and Publish Plan
- Implement

SILVER

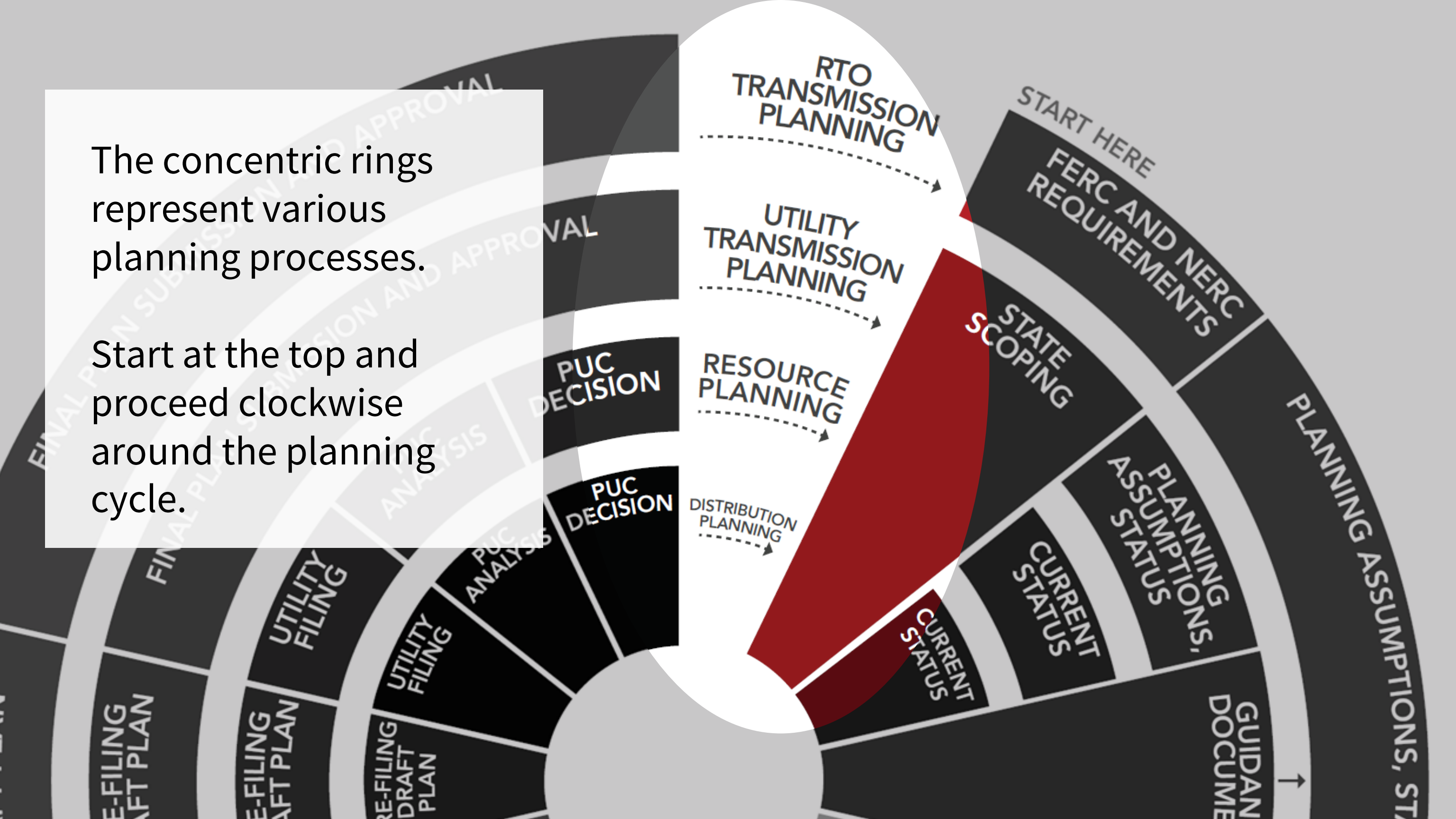


- Describe the Future Trajectory
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- Integrated Process Steps

➔ Different visions for comprehensive planning

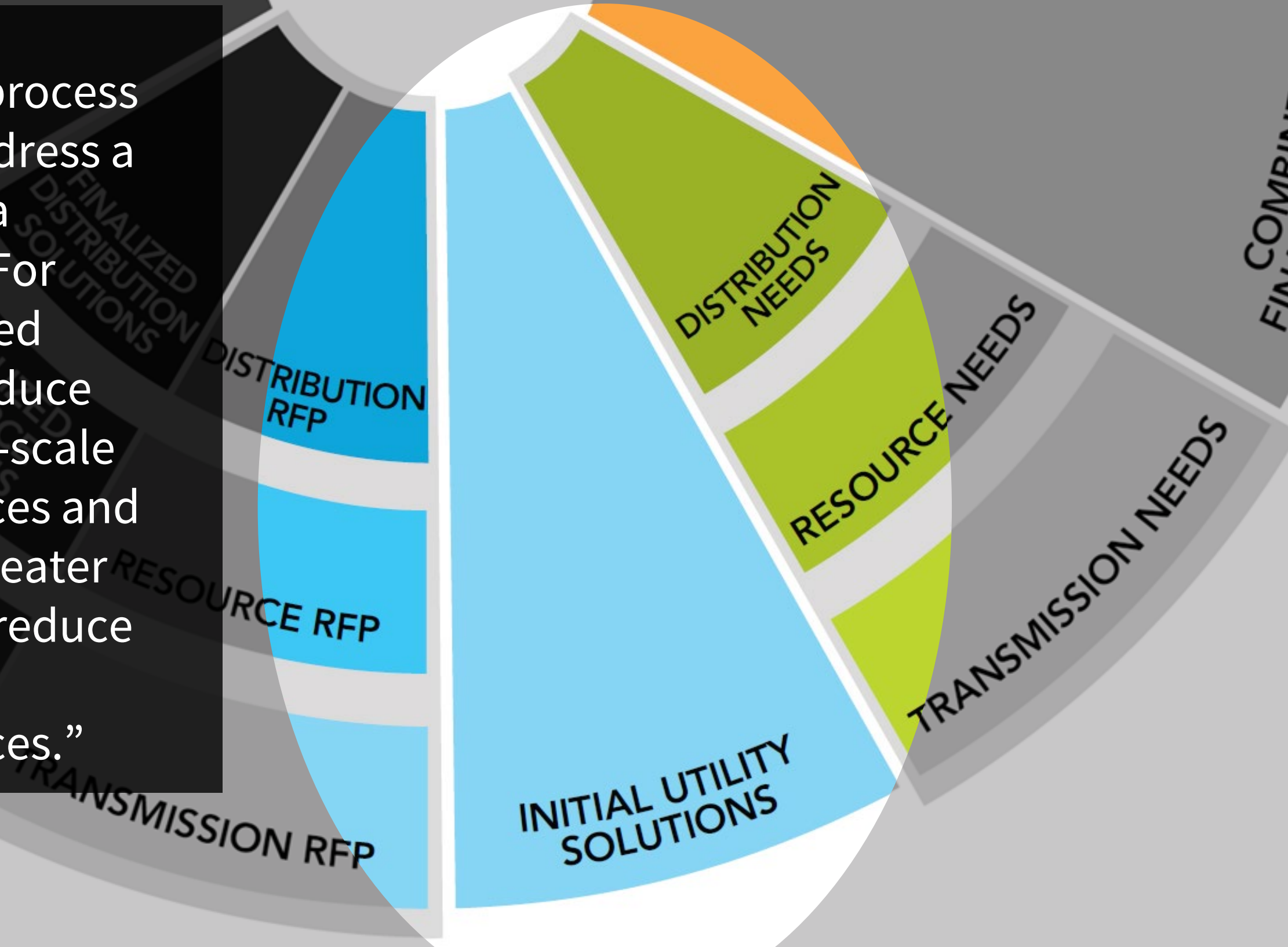
The concentric rings represent various planning processes.

Start at the top and proceed clockwise around the planning cycle.



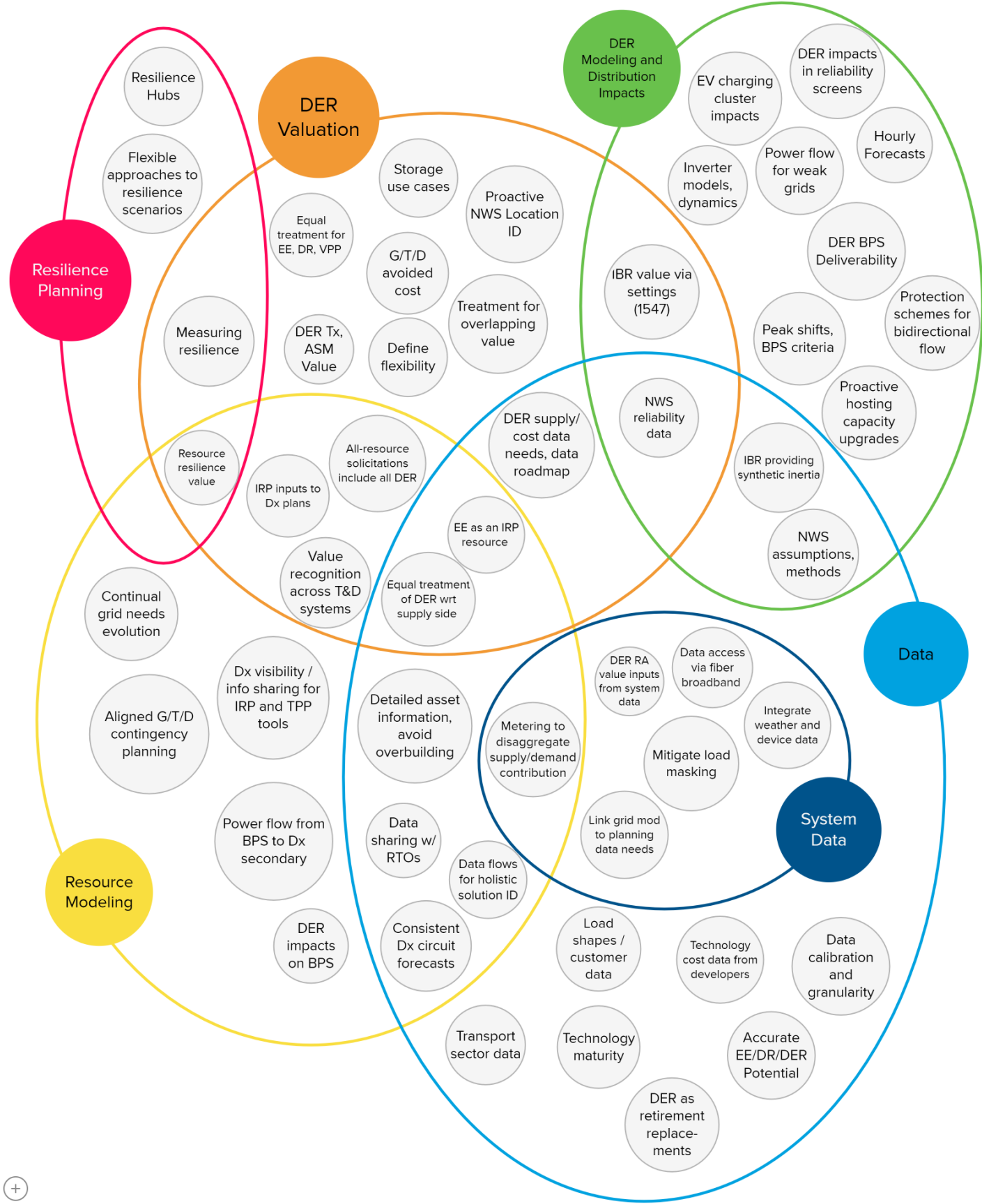
“The Combined Set of Solution Options represents the idea of assembling a complete set of potential solution options for review in a holistic manner for meeting the needs identified in each of the planning processes.”

“Solutions in one process may be used to address a need identified in a separate process. For example, distributed generation may reduce the need for utility-scale generation resources and transmission, or greater transmission may reduce the need for local generation resources.”





“This DER Supply Curve will be combined with traditional supply-side central station supply options to provide a composite supply curve that reflects all of the supply-side and demand-side resources available to meet system needs.”



“What data, modeling, tools, or research could help fill gaps between the vision and what’s currently feasible? If a Genie gave you three wishes to spend on improving planning processes, what would you wish for?”

Resilience Planning

Measuring resilience

Resource resilience value

IRP input
Dx pla

Some of the feedback we received:

How do you measure the resiliency of the system and how is that reflected in planning tools?

Important to recognize the contribution of resources to advancing resilience and how much

We need to integrate microgrids into the planning more broadly

The risk reduction benefits of grid mod and microgrid deployment are not being quantified

Incorporation of risk assessment and resilience into distribution planning is needed

DER
Planning and
Distribution
Impacts

EV charging
cluster
impacts

DER impacts
in reliability
screens

Inverter
models,
dynamics

Power flow
for weak
grids

Hourly
Forecast

DER BPS
Deliverability

BR value via
settings
(1547)

Peak shifts

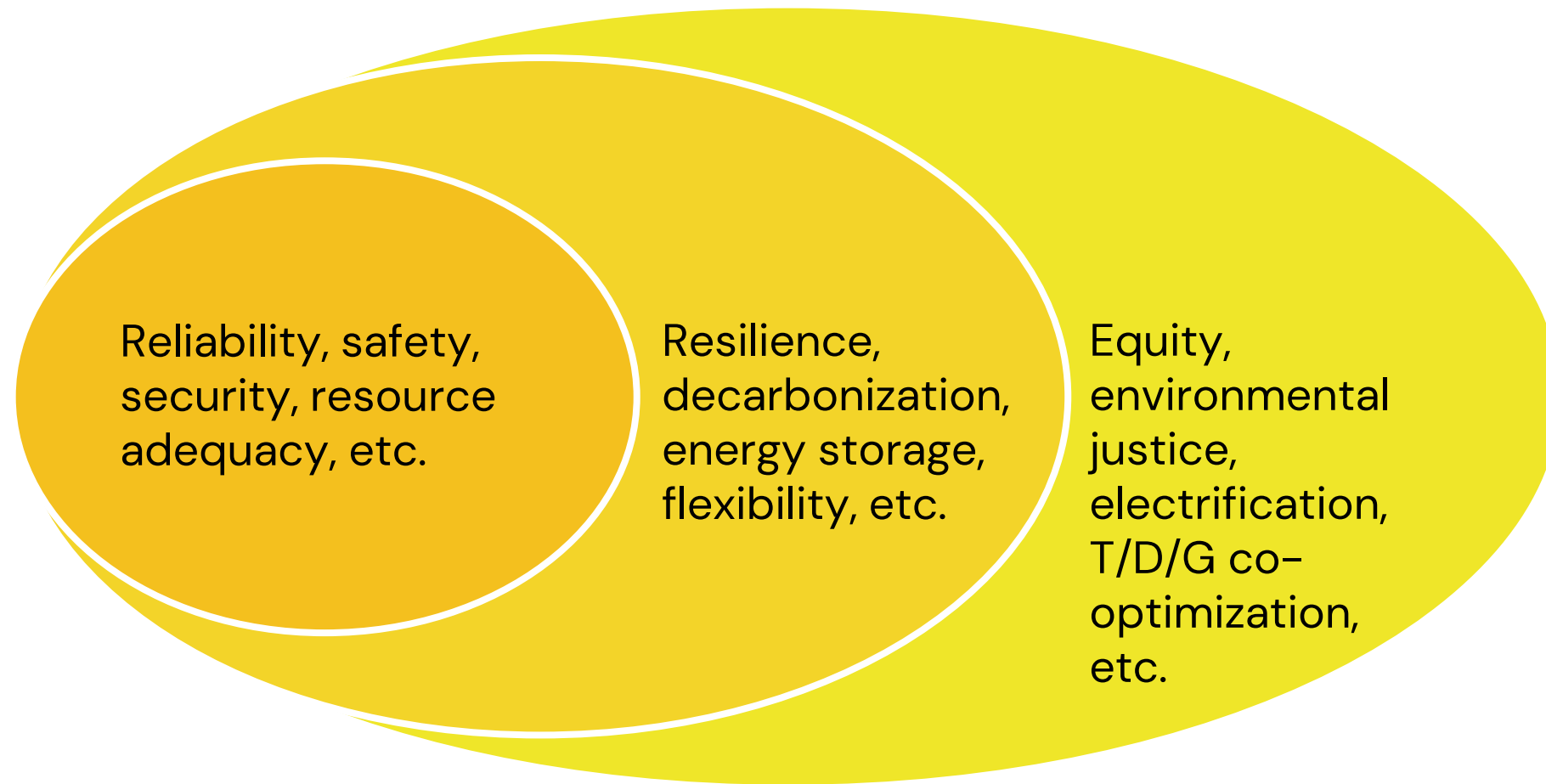
Some of the feedback we received:

Representation of inverter-based resources in system dynamics modelling is important, inverter models will inform planning criteria

Data quality: need to capture actual inverter data sheet vs "typical", reflect software updates that impact characteristics, harmonics

Impact of high penetrations of DER on bulk system reliability not-fully-understood/studied, hampers planning.

Managing high penetrations of inverter-based resources under weak grid conditions will require new approaches to power flow modeling



Traditional
Planning
Requirements

New Planning
Requirements

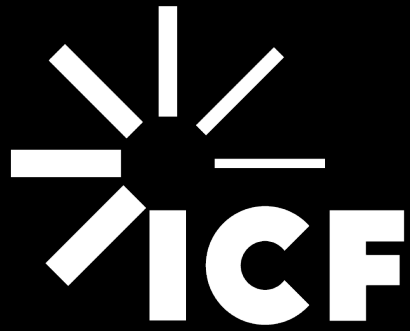
Emerging
Planning
Requirements

→ **What are we planning for?**



Next Steps

- Revised working paper
- Tool inventory
- Gap analysis and recommendations



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