

Integrated Distribution System Planning Components

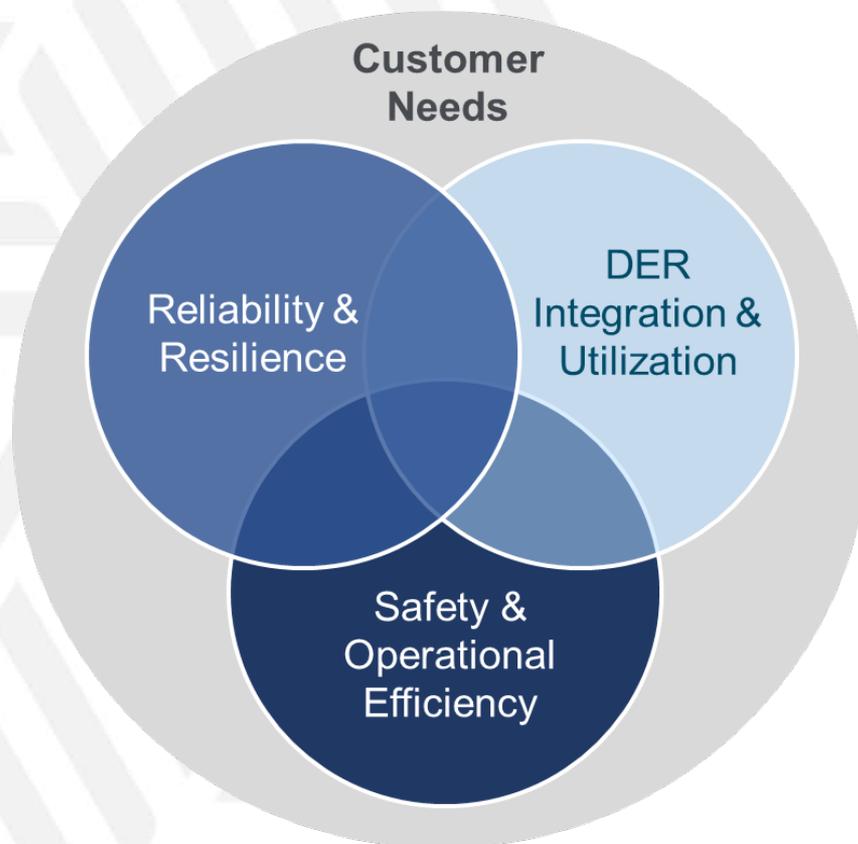
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Newport Consulting

Integrated Distribution System Planning Training
for Midwest/MISO region
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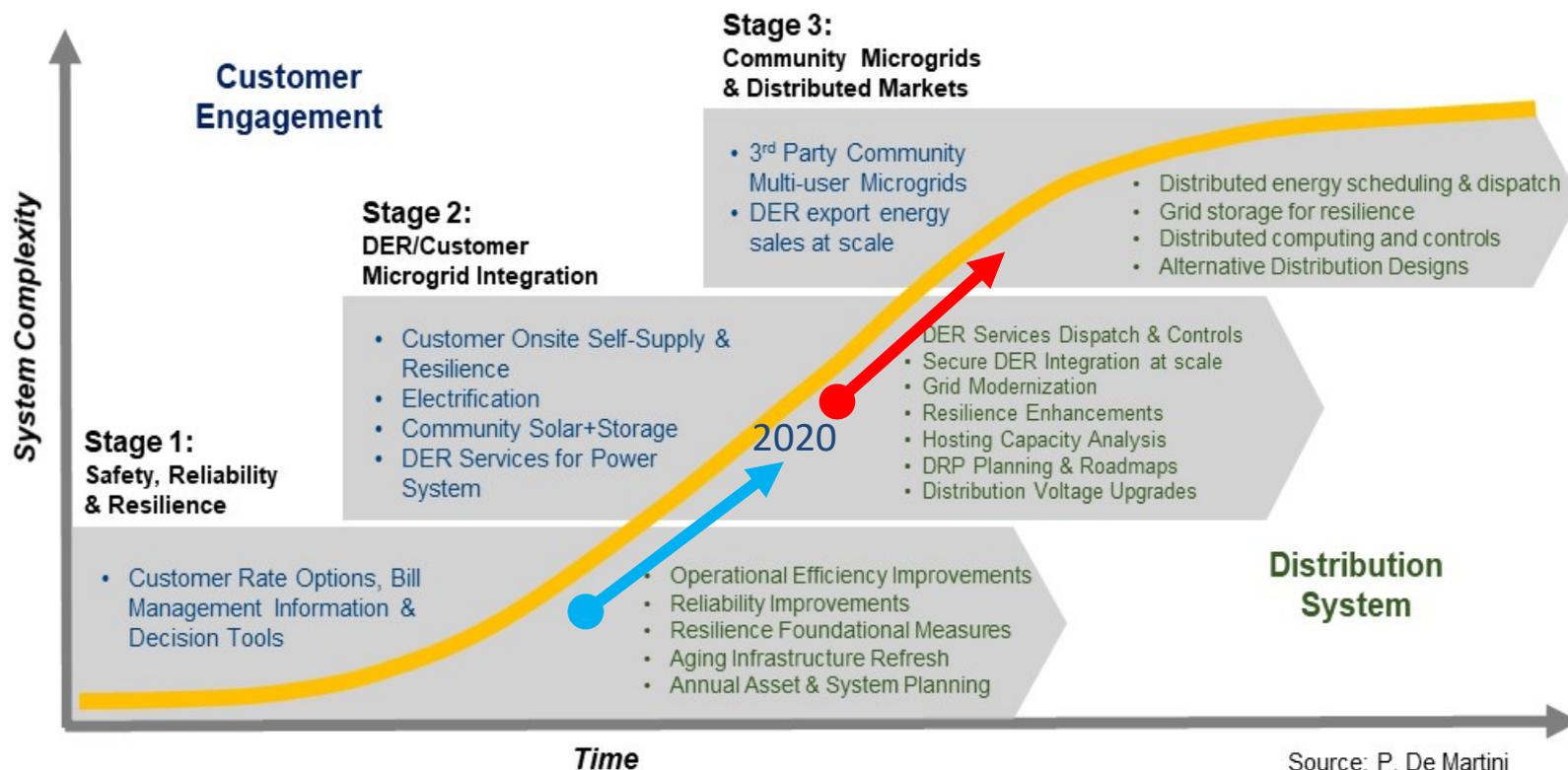
Electric Distribution Grid Planning

Distribution planning across the U.S. addresses 3 key overlapping areas of focus to meet customer needs



Distribution Evolution Revisited

What is the structure & composition of the grid needed today vs 2030+?
How do we need to plan differently?



Planning for the Next 10+ Years

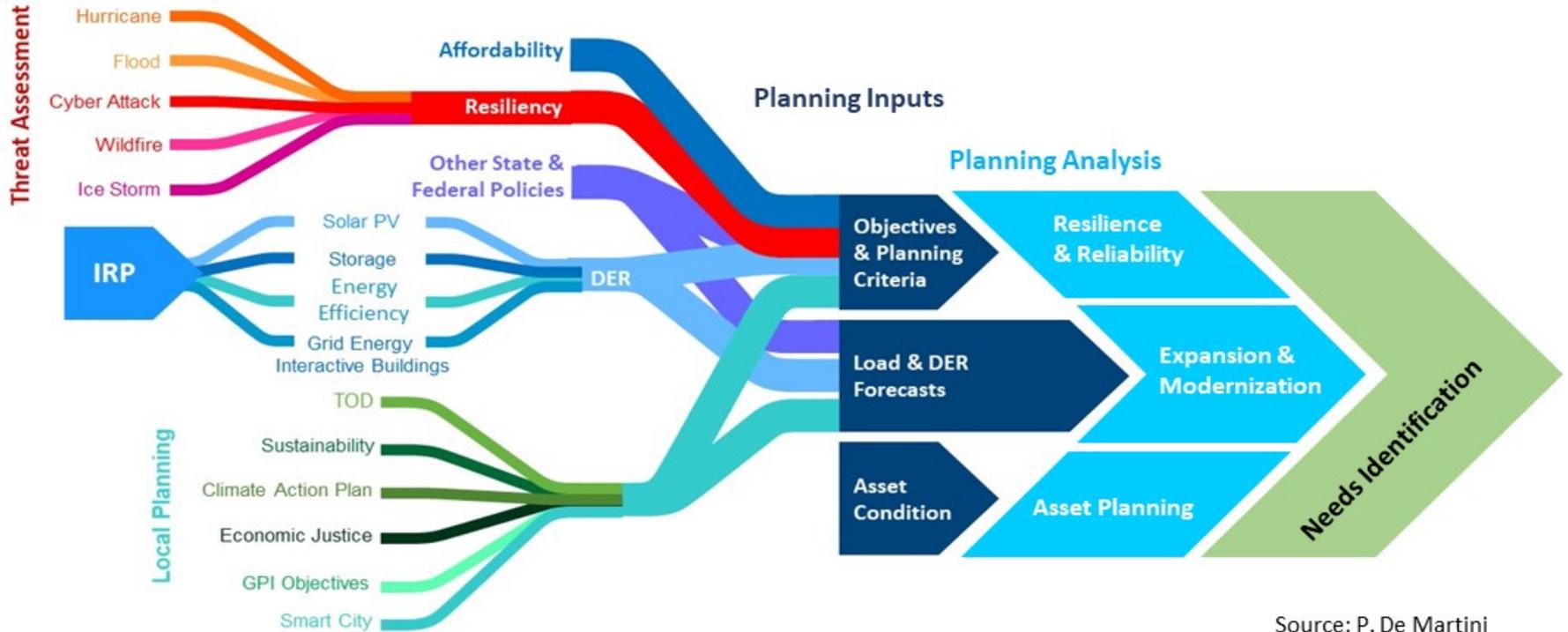


Distribution systems are becoming exceedingly complex

	Yesterday	Today	Tomorrow
Power Flow	One-way	Inadvertent 2-way	Scheduled reverse flow
Solar+Storage	Load modifying resource	Grid Services	Exported energy for resource adequacy
Electrification	Load growth	Managed load	Grid storage
Microgrids	Customer BTM back-up generation	Customer BTM microgrids	Community microgrids (“minigrids”) by design
DSM	Energy efficiency & peak load management	Grid services	Grid interactive buildings (thermal & electrical storage)
Grid edge	Customer meter	BTM DER	BTM DER & Building Technologies (incl. Alexa?)
Ecosystem	LSE, DistCo & Customer	LSE, DistCo, Aggregator, DER provider & Customer	LSE, DistCo, Aggregator, DER provider, MG Operator, EV Charging/Vehicle mfg, Building automation provider & Customer

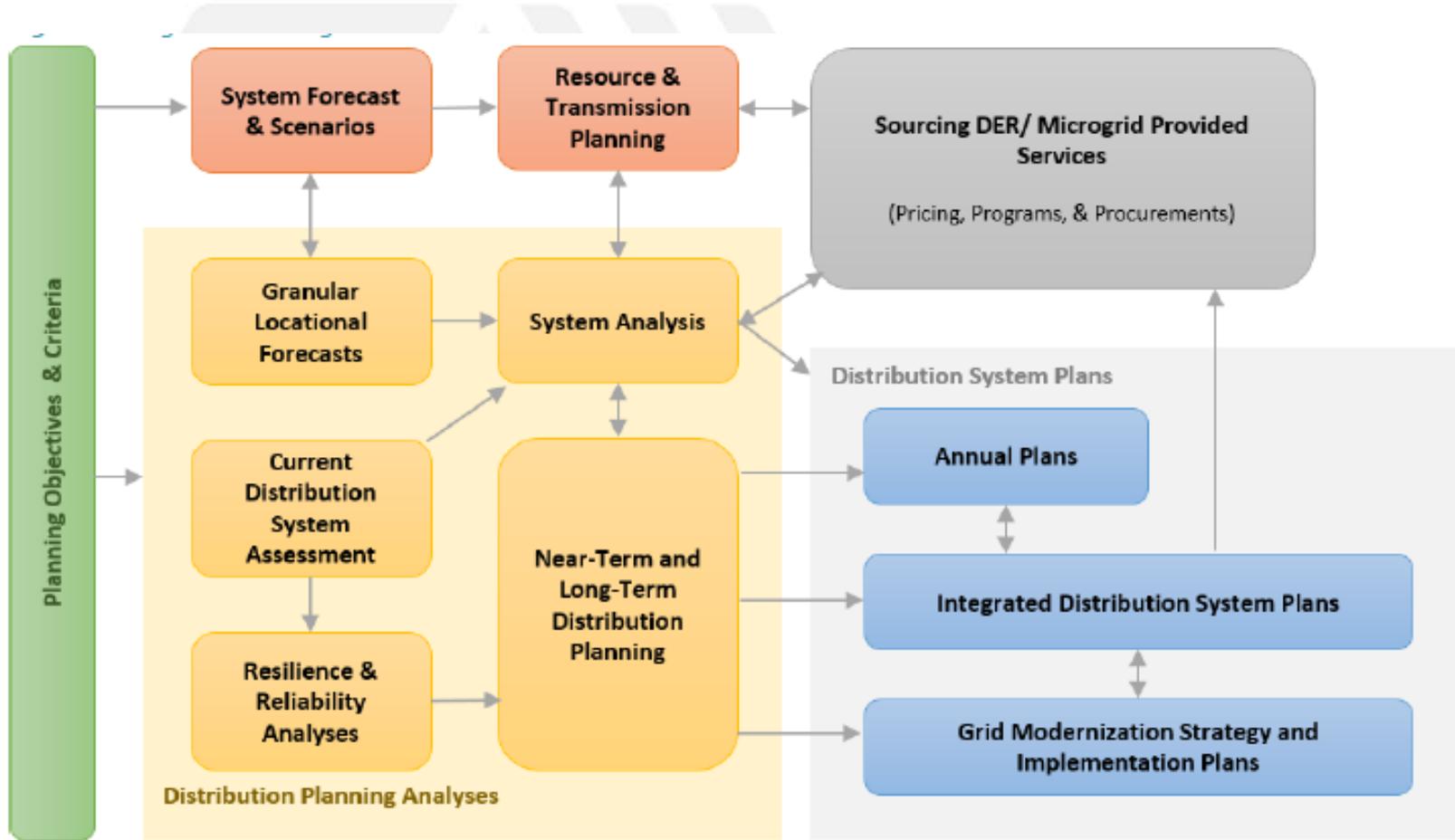
Distribution System Planning Inputs

Distribution Planning Increasingly Dependent Upon IRP/Bulk Power Use of DER and Local Sustainability & Resilience Planning



Source: P. De Martini

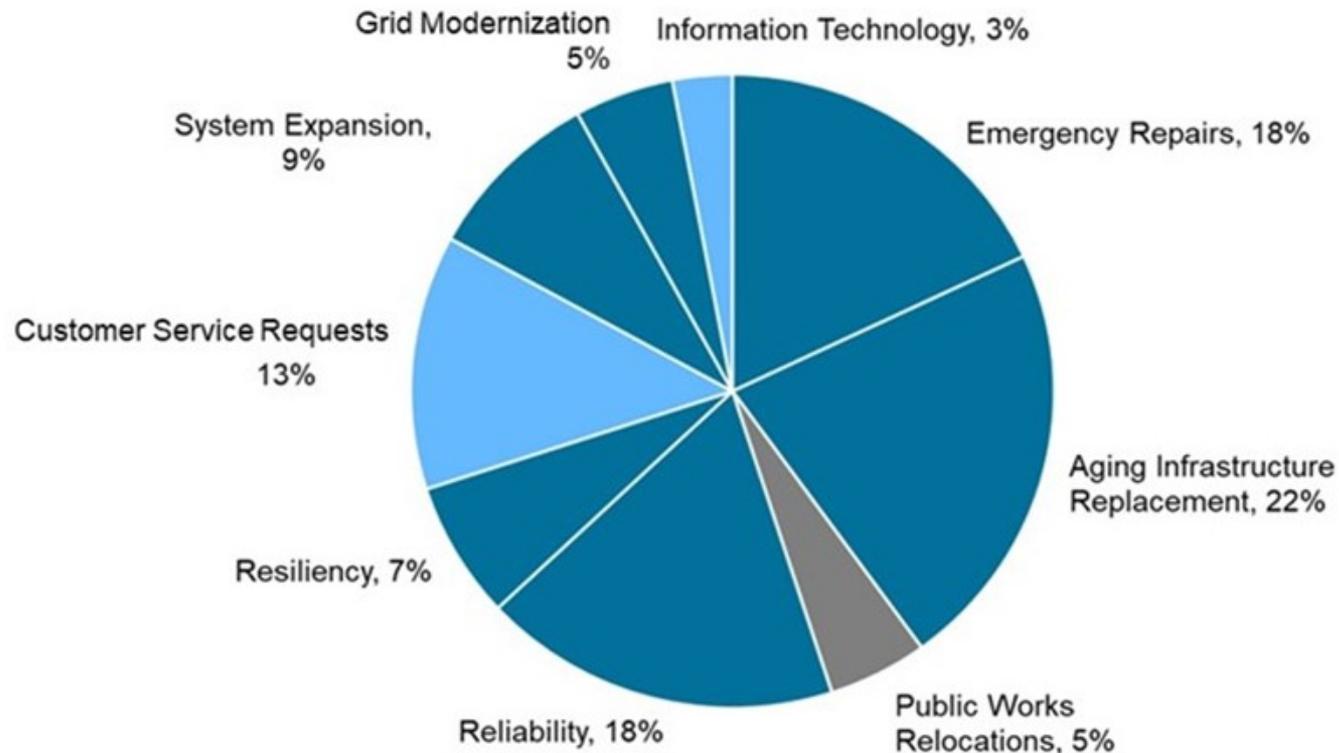
Integrated Distribution System Planning



Source: DSPx Guidebook, Vol. 4 (final draft), 2020

Distribution Investments Are Interdependent

Most distribution capital investments contribute to achieving multiple objectives



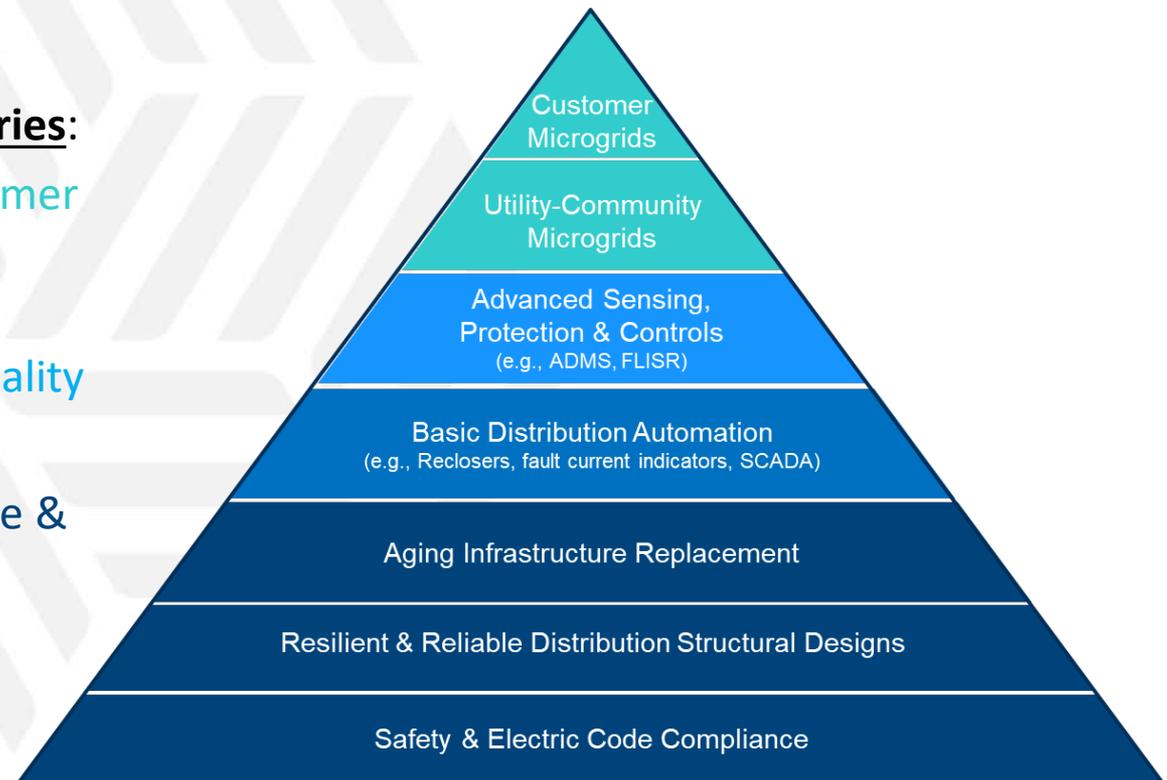
Conceptual Budget Allocation Example

Distribution Investment Pyramid

Modern Grids are comprised of several interdependent layers building upon each other to address customer & societal needs

Distribution investment categories:

- Enable community and customer resilience solutions
- Enhance reliability & provide additional resilience functionality
- Improve customer reliability
- Foundational safety, resilience & service quality requirements



Considerations

Multi-objective planning requirements & significantly different uses of the distribution system are driving an increasingly complex planning process

- ▶ What are the appropriate planning objectives and criteria for your grid of 2030?
- ▶ How should the uncertainty of the pace and scope of change be addressed?
- ▶ What is the appropriate investment prioritization model?
- ▶ What level of collaboration is required to ensure we can achieve the desired objectives with a resilient, safe electric grid?
- ▶ What level of oversight & transparency is required to ensure objectives are achieved and stakeholders buy-in?

Thank you

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