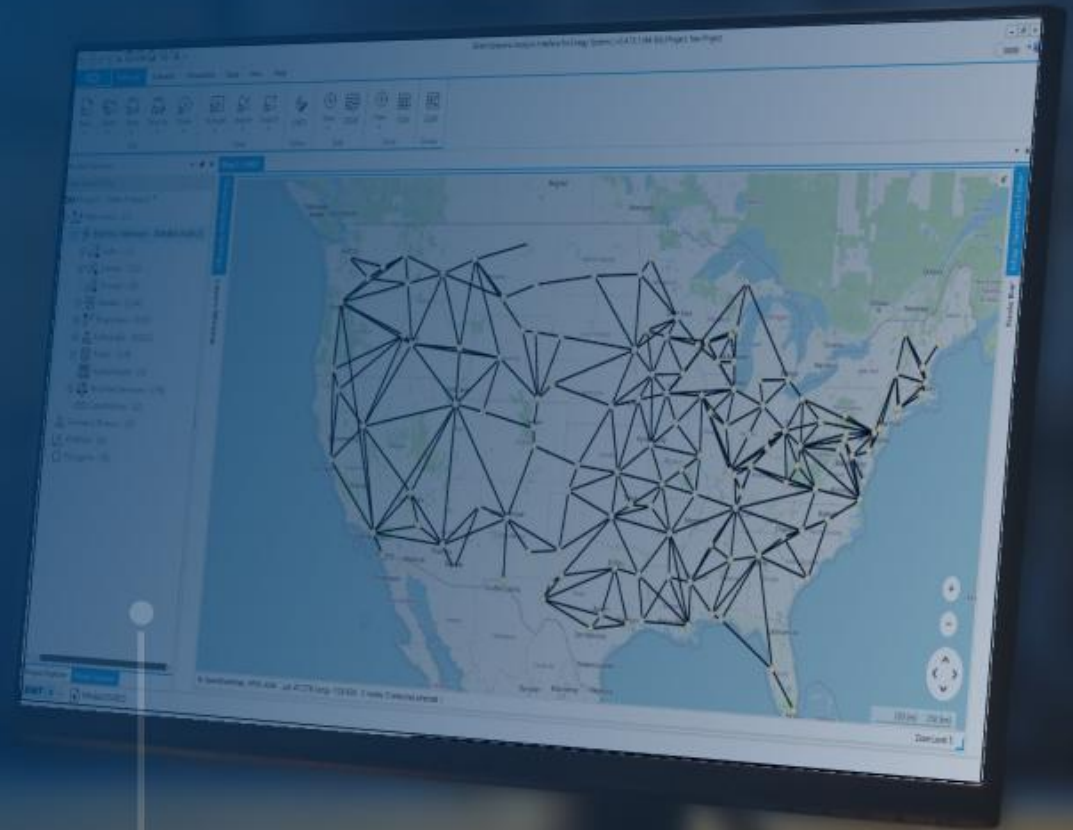




Integrated Planning Guidebook

March 18, 2025



What does it mean to *do* integrated planning, in practice?

Introducing: Integrated Planning Guidebook



- Practical entry point for any planner, in any planning area, at any stage of integration.
- Single reference for integration.
- Industry-wide task force of planning experts from utilities, system operators, national labs, software vendors, and consulting shops.

Overview of Power System Planning: Dimensions



Scope

Objectives/boundaries



Scale

Detail



Horizon

Duration



Action

Decisions

Applying Dimensions to Planning Areas



Scope



Scale



Horizon



Action

 GENERATION	 TRANSMISSION	 DISTRIBUTION	 CUSTOMER
Supply	Reliability of high voltage system	Reliability of low voltage system	Behavior of end user
Local-National	Trend from larger to smaller scales 		
	Regional-interconnection	Local	Residential-commercial
10-30 years	Trend from longer to shorter horizons 		
	5-15 years	3-10 years	2-5 years
Generation Investment	New lines and substation upgrades	Substation and service device upgrades	Program development

Intention: Allow planners to understand other planning areas.

Applying Dimensions to Modeling Domains



GENERATION

- Capacity Expansion Modeling
- Probabilistic Resource Adequacy Assessment
- Production Cost Modeling



TRANSMISSION

- Balanced AC Power Flow Simulations
- Short-Circuit/Fault Modeling
- Phasor Domain Transient Simulations
- Electromagnetic Transient Simulations



DISTRIBUTION

- Unbalanced AC Power Flow Simulations
- Short-Circuit/Fault Modeling



CUSTOMER

- Load Forecasting Modeling
- Rate Design and Tariff Models
- Demand Response and Demand-Side Management Planning Models
- Cost-Effectiveness Tests
- Customer Behavior and Adoption Models

Intention: Allow planners to understand the models run by other planners.

New Challenges with Current Processes



GENERATION



TRANSMISSION



DISTRIBUTION



CUSTOMER

Rapidly Changing Policies

Managing IBRs and Grid Stability

Large/Uncertain Load Growth

Rapid Technological Improvement at Grid Edge

Complexity of Value Stacking

Infrastructure Resilience Under Uncertain Climate

Aging Infrastructure

Stages of Integration: Example Generation/Transmission

Walk: Communication and understanding

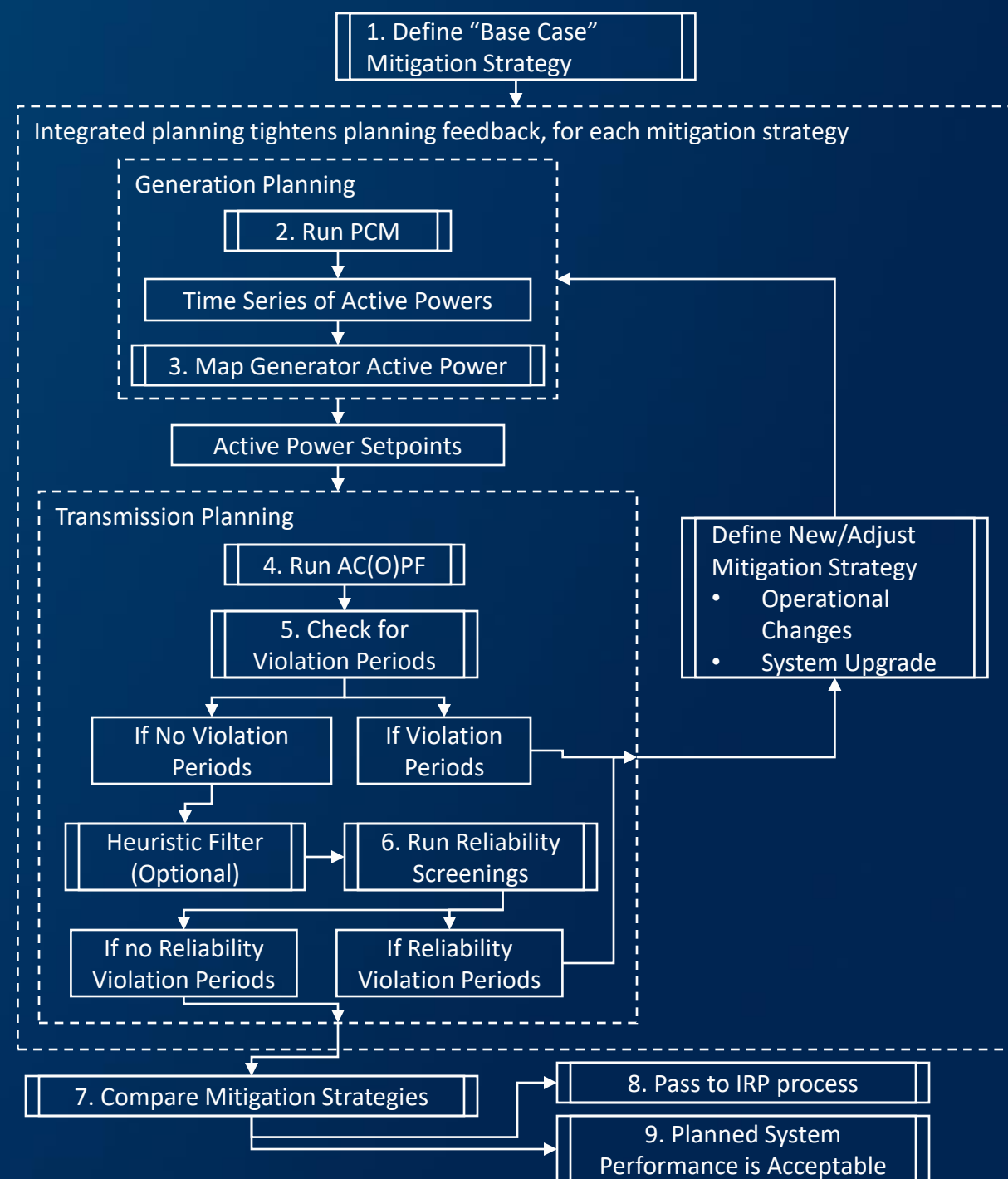
- What G needs to understand about T and vice versa
- Teams to discuss model abstractions, physical realities, etc.

Jog: Aligning data inputs

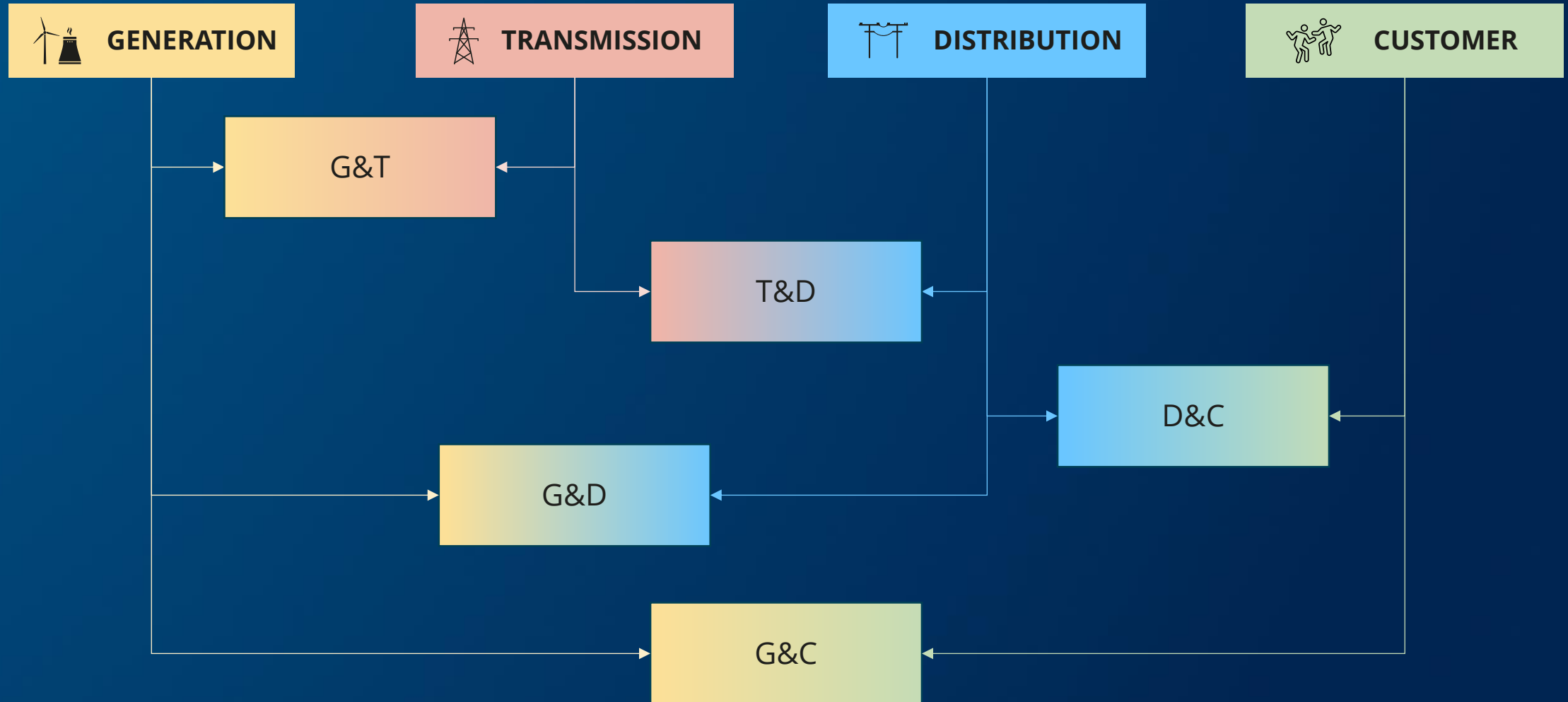
- Mapping G assets to T assets
- Time-series approach for transmission studies

Run Stage Example: Generation & Transmission

- Step 1: Define “Base Case” strategy
- At a high-level run stage means tighter traditional feedback loops
- Steps 2-3: Mapping PCM results to active power setpoints
- Steps 4-6: Checking for periods that violate physics, if these exist adjust mitigation strategies!
- Step 7: Compare strategies
- Step 8: If strategies require significant changes, may need to inform IRP process
- Step 9: Planned system performance is acceptable



Walk/jog/run stages of integration applied to:



The Value of Integrated Planning



Lower costs



Increased system resilience



Streamlined processes



Data integrity



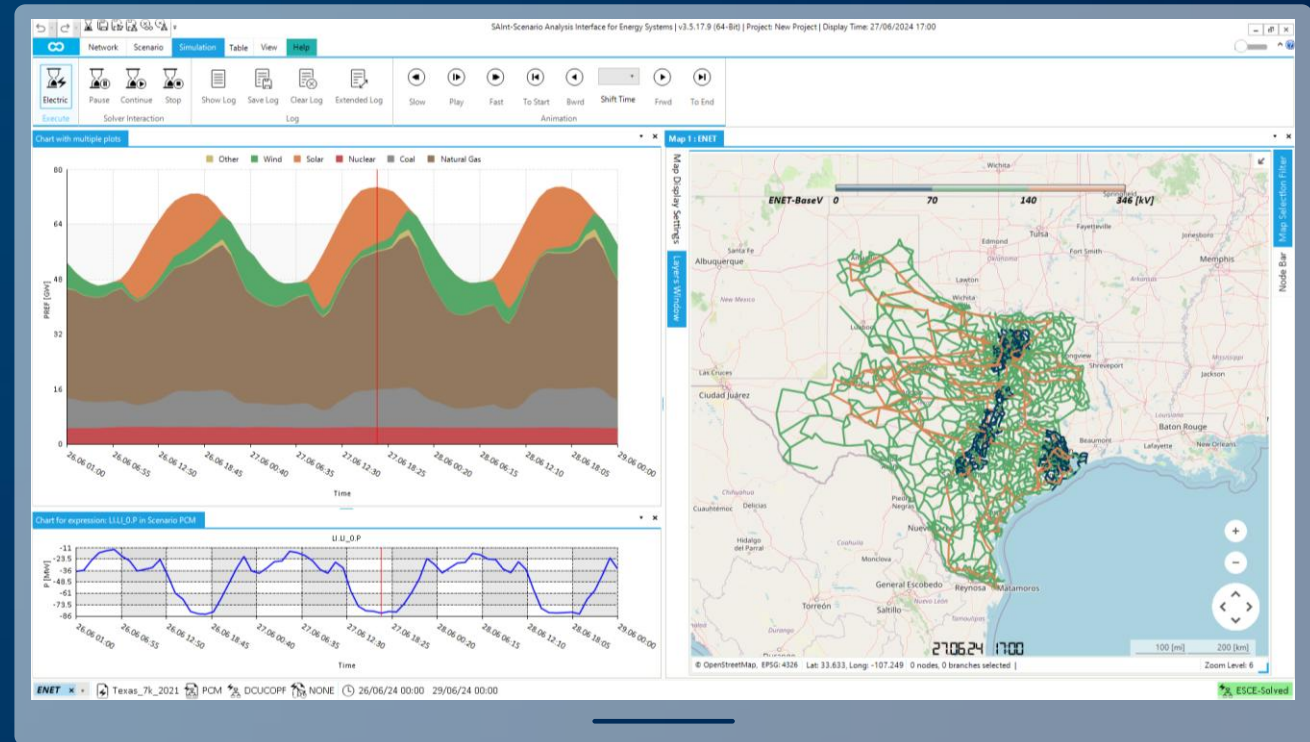
Synergistic outcomes



Balancing competing objectives

Technologies to Facilitate Integrated Planning

- Spatially Referenced Data
- Interoperability Across Modeling Domains
- High Dimension Data Processing
- Computational Performance
- Single Point of Interaction User Experience



Example: **SAInt** – encoord's integrated planning solution

encoord

Plan the Energy Future



encoord.com



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ESIG Integrated
Planning Guidebook
Coming **Summer 2025!**

Learn More

