

NARUC: Challenges of Transmission Planning and Renewables Integration

July 20, 2010



Integrated Resource
Planning (IRP) and
Transmission Expansion

Southern Balancing Area (SBA)

A big footprint



SBA Statistics

Service Area 122,500 sq. mi.

Peak Demand 48,008* MWs

+27,000 miles transmission

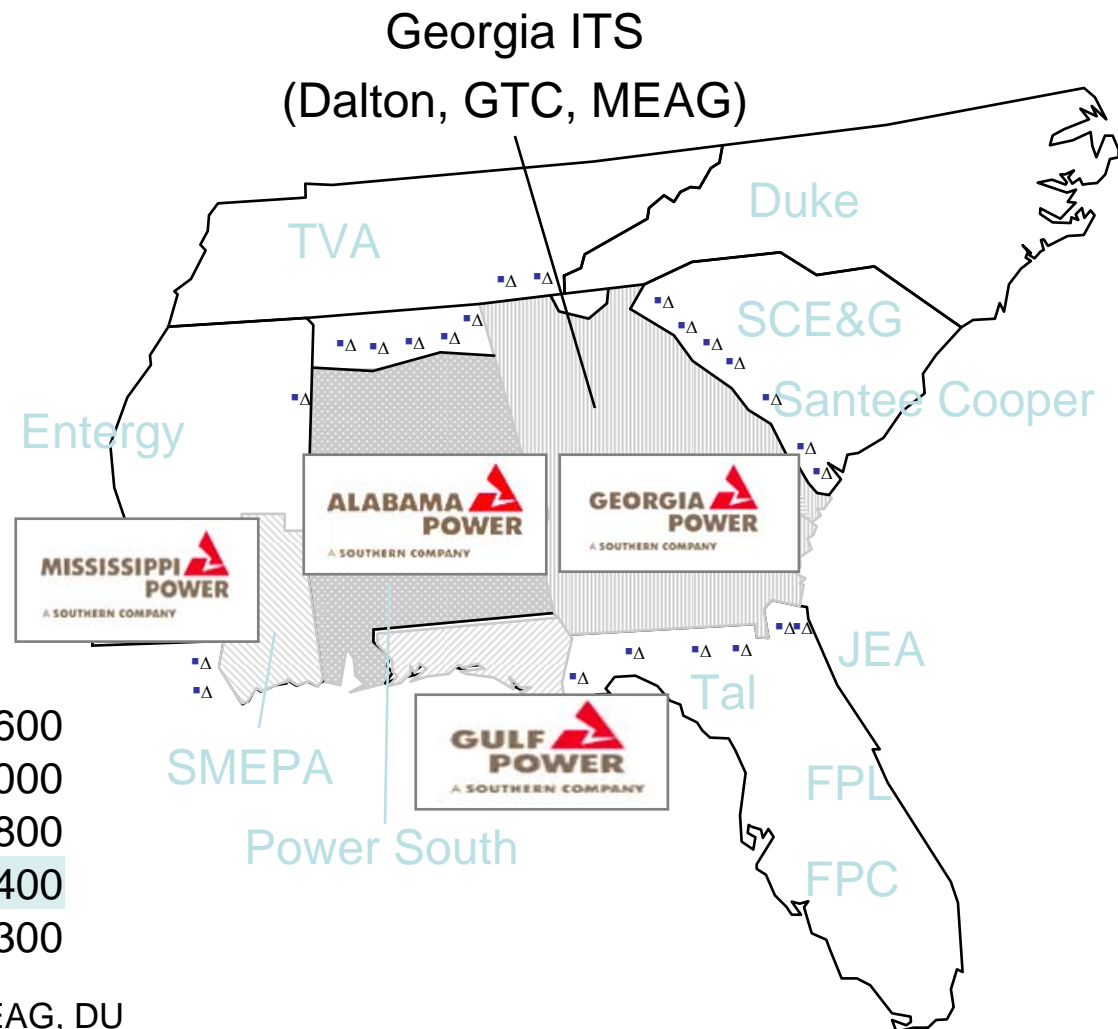
53 Tie Lines to neighboring systems

*2008 SBA Peak including AMEA, OPC, MEAG and Dalton load.

Capacity (approximate)

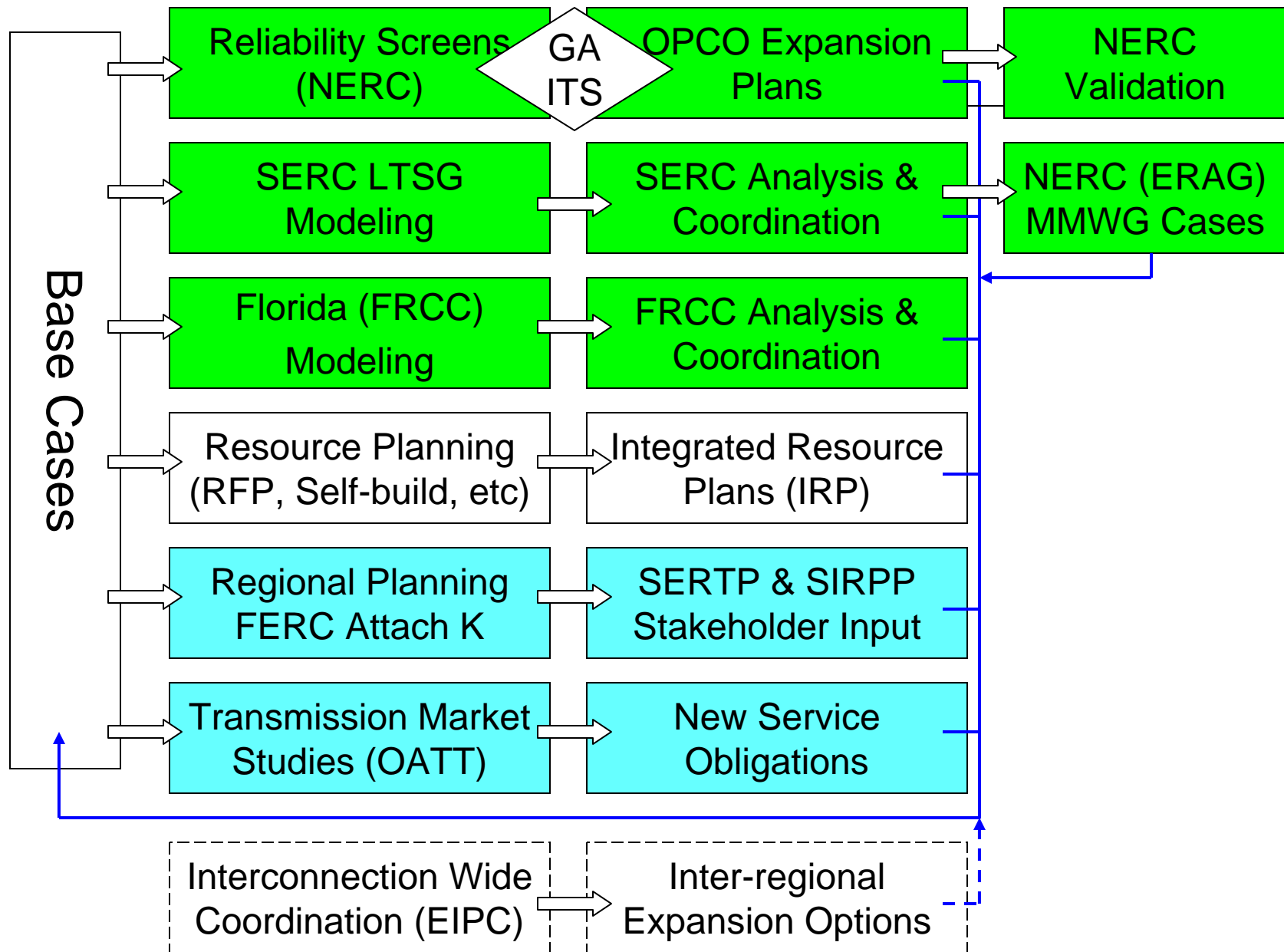
SOCO Retail**	40,600
SPP (Affiliate)	5,000
Non-Affiliate	15,800
Total	61,400
Capacity w/LTF Service	58,300

**Includes joint owned capacity of OPC, MEAG, DU



Transmission Planning Processes

Extensive Coordination! Multiple Concurrent Processes



“Plans are nothing; planning is everything”

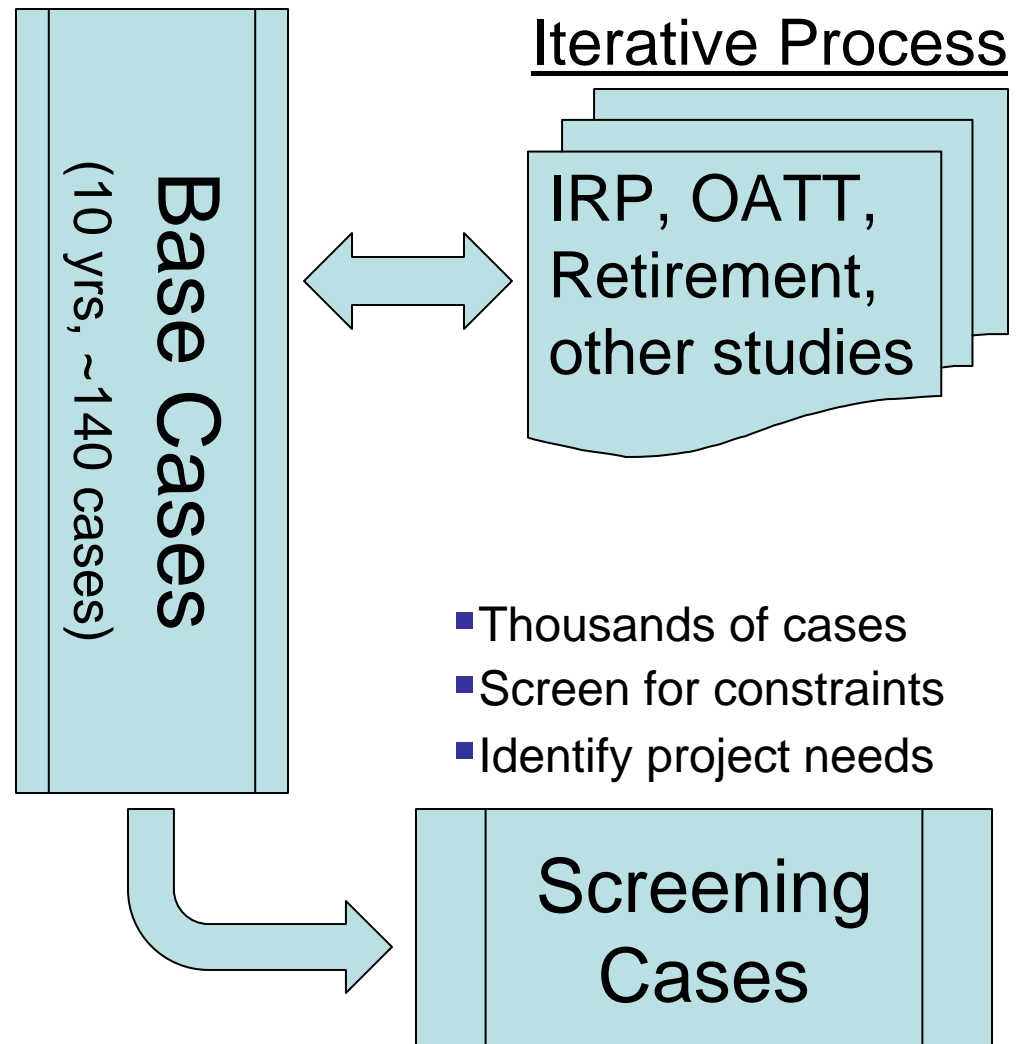
Dwight D. Eisenhower



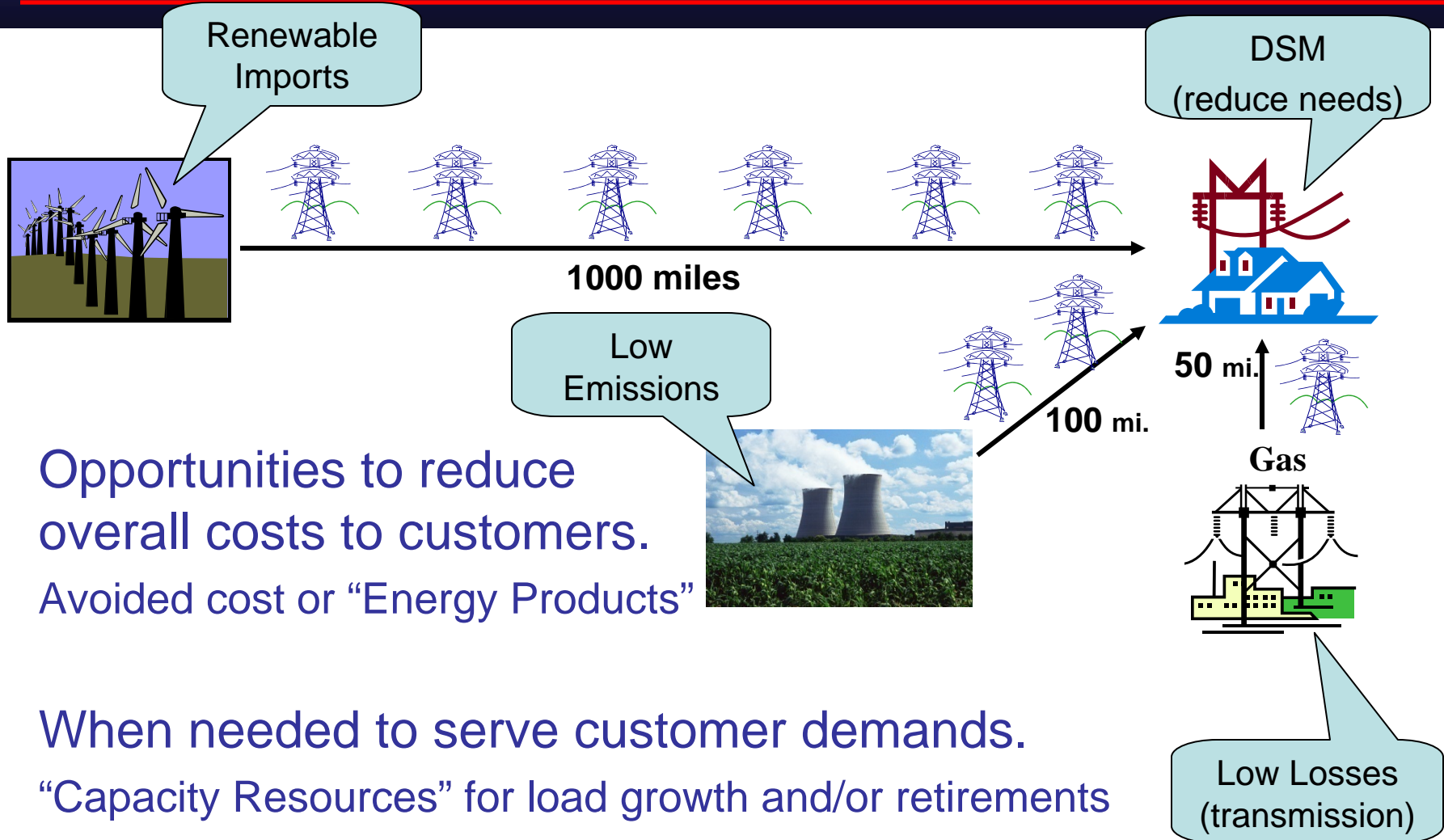
Iterative processes constantly evolving

Inputs

- Prior plans' ratings, topology, etc.
- New Load Forecasts
- New Resources
(w/dispatch assumptions, retirements)
- Neighbors modeling & assumptions
- Market Commitments (TSRs)
- Economic Development.
(New (large) retail loads)



When do LSEs seek additional resources?



1. Opportunities to reduce overall costs to customers.
 - Avoided cost or "Energy Products"
2. When needed to serve customer demands.
 - "Capacity Resources" for load growth and/or retirements

HAPs/MACT Scenario

It's 2015. 5000 MWs of generation in your state must meet the new rules or shut down.

- Have generators installed compliant controls on critical units?
- Have LSEs acquired replacement resources where needed?
- Are transmission reliability upgrades in place?
- Do you have desired resource diversity?
- Were rate impacts handled as desired?
- Do you need more time?

Integrated Resource Planning (IRP)



IRP balances reliability, economic, and environmental needs. IRP is holistic, assessing overall benefits, impacts, and risks of resource options. Transmission is one key input (among many) in IRP assessments.

What resource options should be considered?

Biomass Wind IGCC Imports DSM/EE
PPAs Nuke Coal Gas Local renewables

What benefits and impacts should be considered?

Fuel costs/Diversity Transmission Reliability Reserves
Capitalization Land/ROW Emissions CWIP CO2

Firm Transmission Address Congestion! Integrate Resources to meet NERC reliability criteria and enable economic dispatch. (non-affiliates too)

■ Environmental

- Allows efficient units to serve loads
- Reduces congestion and losses
- Supports local renewables and renewables imports

■ Reliability

- Dispatch flexibility
- High operating reserves & margins
 - Accommodating of outages
 - Few constraints (TLRs)
 - Better voltage support

■ Cost

- Long-term costs optimized/hedged
- Enables opportunity purchases
- Supports resource diversity

*“SERC region has a unique philosophy with respect to electric system planning and construction” in that “[t]he transmission system within SERC has been planned, designed and is operated such that the utilities’ generating resources with firm contracts to serve load are not constrained....’ Because the southeastern utilities build aggressively in advance of load, **there is little economic or reliability congestion within the region.**”*

DOE 2009 Congestion Study

Resource Additions & Expansion

- **Gas CC generation in Atlanta**
 - Replace 540 MWs coal with 2520 MWs CC
 - Emissions reduced more than 90%
 - Excellent voltage support for Atlanta, 7 mi 230 kV line
- **New Nuclear in Georgia**
 - 2200 MWs approx 150 mi from Atlanta
 - >90% capacity factor, emission-free energy
 - Uncongested service, 50 mi 500 kV line
- **Coal Gasification w/Carbon Capture**
 - Converts low-grade coal to syngas
 - CO2 reduced 65%, Enhanced Oil Recovery
 - Uncongested service, 57 mi 230 kV lines

2011/12



2016/17



2014



Immediate Challenges

- EPA HAPS/MACT rules scheduled for 2015
 - Uncertainty in rules, retirements, & replacement resources
 - Georgia RFP initiated [GA PSC Independent Evaluator]
- Carbon, Ash, other Uncertainties
 - Complicate resource decisions. Generators delaying controls decisions
- Renewable Resources (Southeast view)
 - Landfill gas “in the money now”
 - Industrial Boiler HAPs/MACT uncertainty impacting Biomass projects
 - Minimal on-shore Wind.
 - Solar (Feed-inTariff)



Wind Resources

- Potentially large and attractive source of renewable energy with minimal operating costs and emissions.

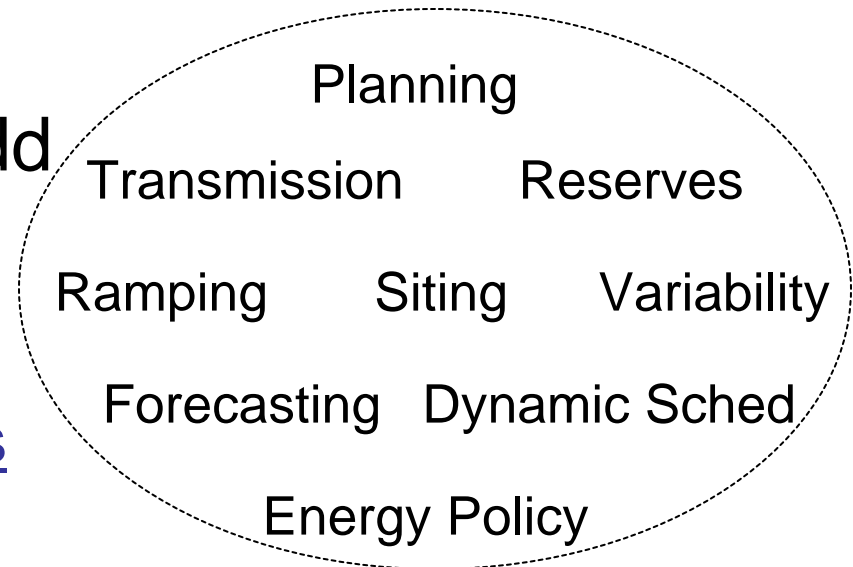
- Southern would like to add wind to its mix!

- Biggest Challenge?

Managing costs to customers

Capital recovery of:

- Wind Farm assets
- Interconnection/integration infrastructure
- Generation or Storage for peaking/regulating
- Inter-regional transmission infrastructure



Long Distance Imports

- Modest import levels: Do-able under existing OATT
 - External congestion risk/cost an issue
- High import levels: Major cost & operating challenges
 - Too much off-peak energy diminishes revenues
 - Economical Storage a Game Changer!
- Southern is actively assessing wind opportunities through renewable RFPs, direct interactions with developers, and regional studies with neighbors
 - Off-peak tariff products
 - Conventional OATT requests
 - Long-distance tie-lines
 - Off-peak ratings
 - Operating reserves
 - Storage approaches

No Silver Bullets

Consider a holistic approach such as Integrated Resource Planning

- Assess the inter-dependencies of resource and transmission expansion decisions

Consider all available options in maintaining a diverse portfolio of resources

- Utilize resources in applications that best leverage their economic and reliability contributions.