Traditions of Resource Planning: Stability as an Afterthought – What Are We Missing?

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Integrated Planning: Assuring Stability in Modern Systems

Day 1: Session 1

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Resource Planning: Power & Energy are King

- Is there enough MW “capacity” to serve load?
  - Historically, resources were generally assumed available (with a known, fixed outage rate)
  - 1 day outage in 10 years guides targets like Planning Reserve Margin (PRM)
- With increase in weather dependent Time & weather dependence...finally
  - Much more informative resource adequacy metrics, that take into account severity, duration and other factors are entering practice.
- Stability as an afterthought:
  - “make sure it ‘works’” is asked later, after a generation (and maybe transmission) plan that meets power and energy needs is identified (‘finalized?’)

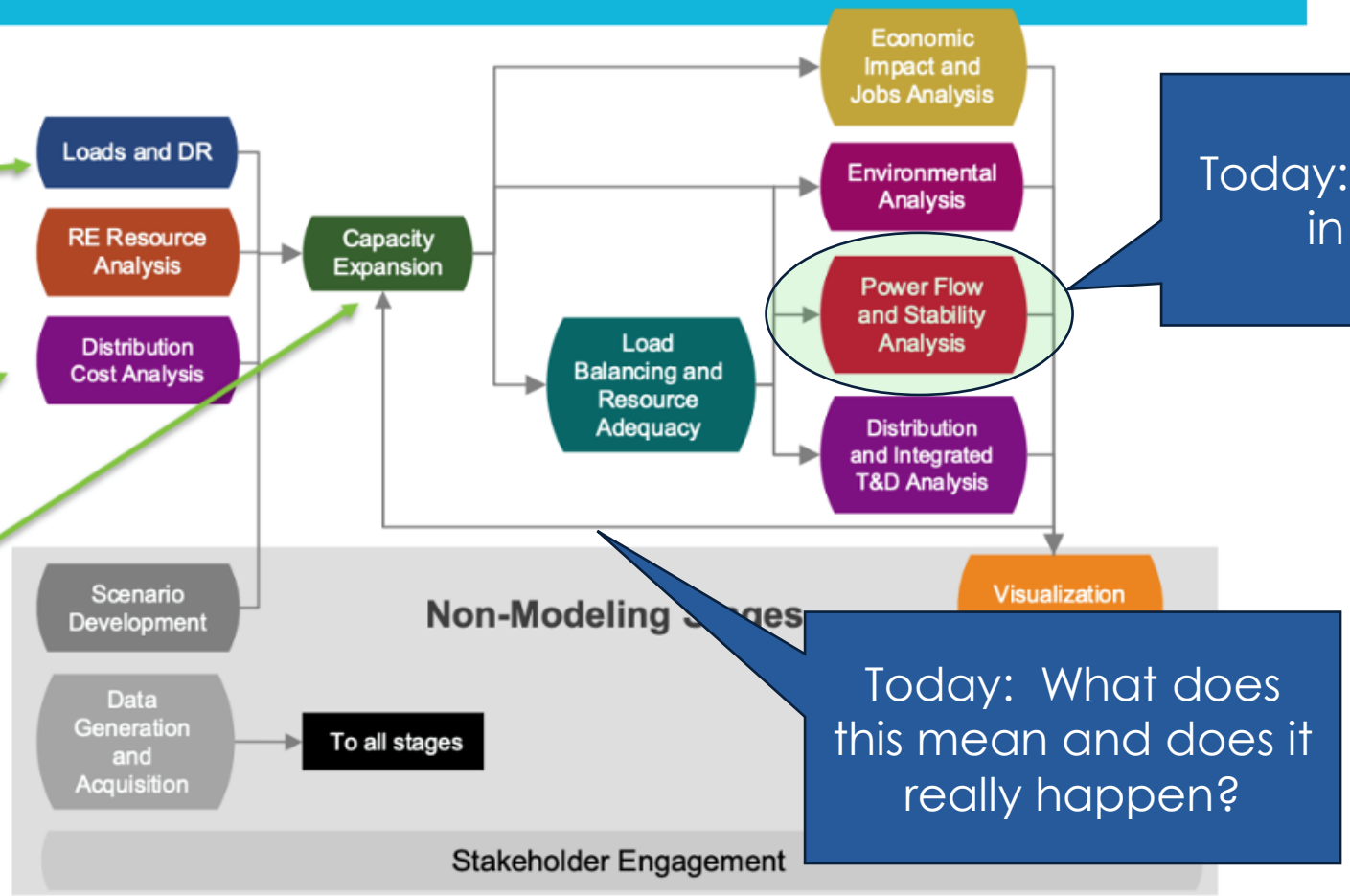
An illustrative flowchart for Integrated Planning

Steps of the LA 100% Renewable Energy Study – Highlighting the "D" Parts…

Estimate load growth and demand profiles, including potential for load flexibility

Estimate distribution system hosting capacity and upgrade costs

Include DERs in Capacity Expansion



Today: What's really in this box?

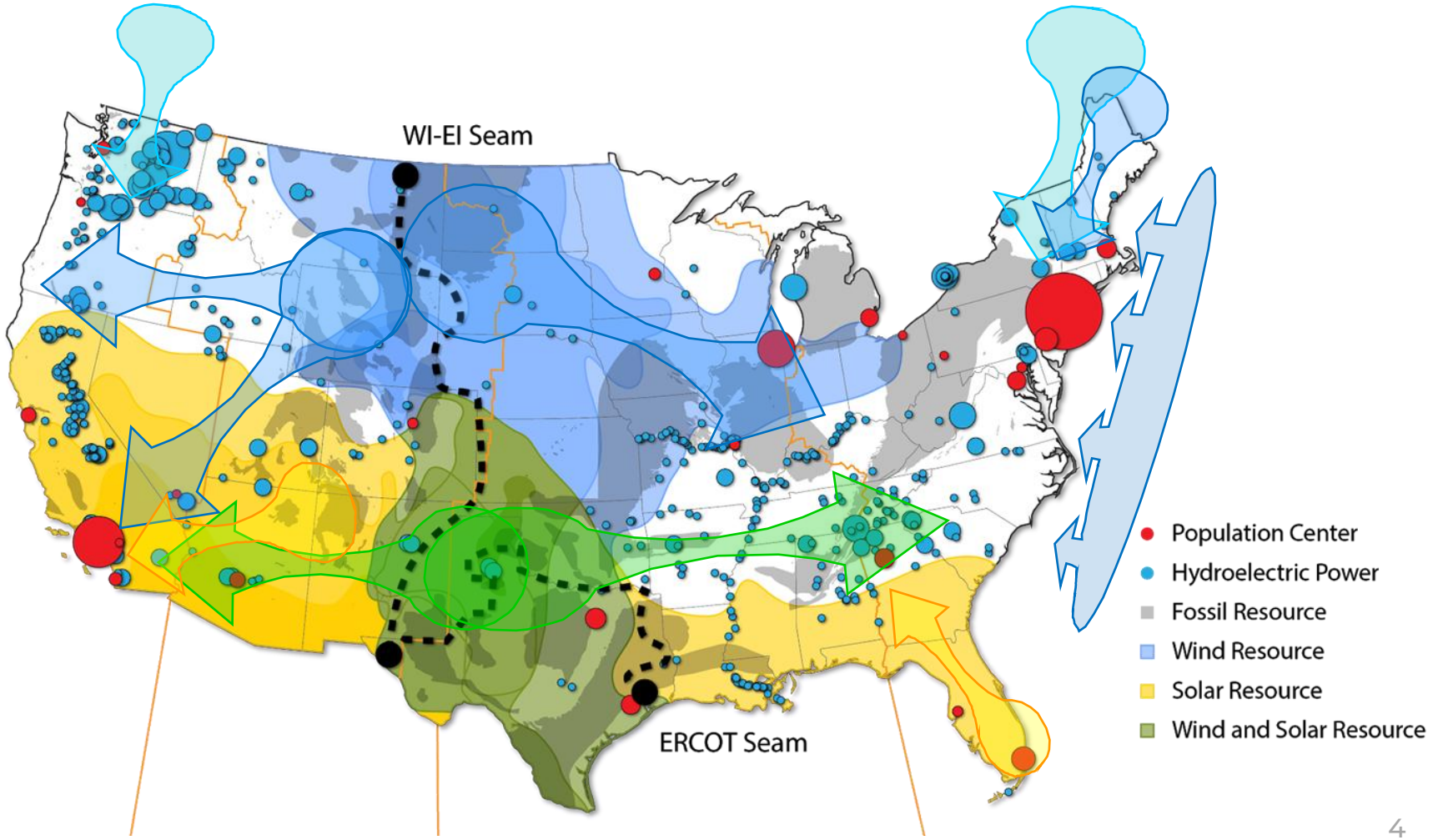
Today: What does this mean and does it really happen?

Source: NREL LA100 study

Moving Power and Stability Limits

Export from resource rich US regions is critical

- Stability issues are the 1st line of challenges
- Transmission is and will be a critical resource
- We must use it to the utmost efficacy:
- That means “pay attention to stability limits”



What are we losing

- Stability issues constrain:
  - Power egress from individual power plants
  - Power exchange within regions
  - Power exchange between regions
  - Dispatch (and curtailment) of generation
  - Requirements for, and supply of essential reliability (aka “ancillary”) services

- Different resources (especially inverter-based resource like solar PV, wind and batteries) behave differently – so limits (for the same topology) change with resource mix
  - Economics change; and should affect decision process
  - With “checking” so far downstream in the process, options are unnecessarily limited
  - Further, new technologies that can relieve stability limits are often ignored

Thanks

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