Karen's original questions: Focus on the economics of BPS resilience

- **Definition and value of R (and how it differs from reliability)**
  - What's the value of keeping the lights on, minimum service requirements, most important threats.
- **Identifying the market failures that are not supporting resources**
  - look at it at the conceptual and concrete levels.
- **Identifying priorities by region.**
  - How can economic thinking help us changes that are needed (if any)
- **Identifying important research questions:**
  - effective and efficient market designs, with research that is relevant

The landscape of a resilient electric system

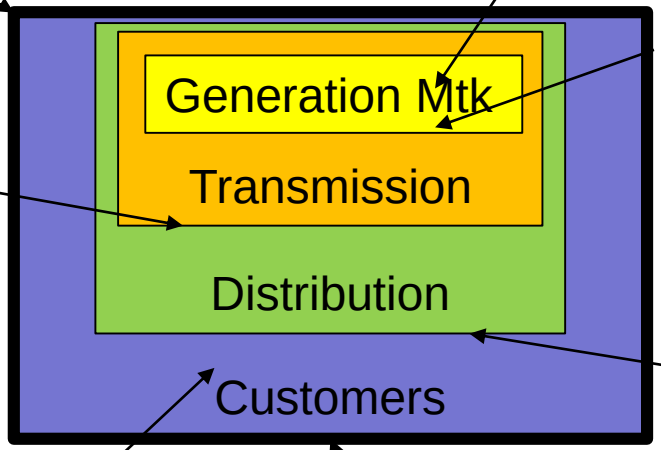
Lots of systems and processes
- planning & analysis
- outage management
- restoration

It's pretty resilient!

Energy: focus on getting it right
- Scarcity prices
- (LOLE in energy)

A/S
- Other products needed

Co-optimize



Other RA (capacity)
- New RA products (by capability to provide capacity)

Few G ~~outages~~
T&D
- Most of outages
- Few metrics for reliability
- No resource adequacy construct

More attention of reliability and resilience on demand side
- Retail prices need to reflect wholesale prices
- More information between DERs and BPS and Distribution System

Critical social services as customers

Not Heterogeneous – Equity issues

Other issues

- Resilience isn't just an issue in the organized markets
- First principle: try to find a market solution first; focus on market failures
- Resilience should be technology neutral
- Institutionally and legally: is resilience part of reliability or different?
- Gas/electric interface issues: very big deal
- Role of the regulator – FERC, NERC, state PUCs, legislators
- Policy and customer relevance of these market-design approaches
- Implications of these discussions in a low-marginal cost world
- Tolerance of customers and the economy of big, long outages
- Lots more research, analysis on all of this…. It's a journey