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# Insurance, Hedges, Markets, and Adapting to Climate Change



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# How Market Mechanisms Can Add Resilience

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# Environmental Markets Generally

- Advantages:
  - Can be more efficient
  - Self-correcting or easier to correct
- Disadvantages:
  - May be more costly to monitor and enforce
  - Often more complex
  - “Messaging” Issues



# Ability to Adapt and Change Makes them a preferred tool in climate changed world

- World is changing faster
- Legal preference for settlement and repose is mal-adaptive
- Market mechanisms generally have better self-correcting mechanisms
- Markets recognize locality differences



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# Examples:

- Water Pollution – re-examining TMDLs; contracts can be bought out, adjusted, flexibility mechanisms
- Wetlands and ESA habitat mitigation and banking – one size doesn't fit all – need to address climate change impacts
- Right pricing of risk promotes adaptive behavior
- Hedging mechanisms
- Biological Offsets – North Carolina example



# Our Grid is Vulnerable to Disruptions Due to Climate

- Grid at increasing risk from climactic disruptions
  - Sea level rise and storm surge
  - Flooding
  - Droughts
  - Hotter temperatures
  - Wildfires
- State governments and the DOE are starting to recognize the need and adapt



# Grid Adaptation Can Promote Resilience

- Microgrids
  - Critical facilities
  - Isolated communities
  - Islands
  - Vision for the future: able to power all facilities a community needs to recover from a disaster
  - NC example: Duke Energy and Duke University



# Energy Markets Can Promote Resilience

- Carbon Markets
  - Regional Greenhouse Gas Initiative
  - California Air Resources Board
- RECs
- Both set a price on carbon
  - Decreases the amount of warming potential from the electricity sector
  - Provides a mechanism for funding other projects, including energy efficiency





# Other Energy Market Decisions Can Promote Resilience

- Demand Response
  - Lowers the need for peaking power plants, which are often the most carbon-intensive
- Locational Marginal Pricing
  - Provides a better indication of what power is worth to the entire system in a particular geographic location
  - Can be used to decrease need for new T&D infrastructure



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