CURRENT ADAPTATION ACTIVITIES, CHALLENGES, AND OPPORTUNITIES: AN OVERVIEW

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Climate Change and Extreme Weather: Vulnerability Assessment of the US Energy Sector

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What's Happening with Climate Change Adaptation? (I):

- **In climate change science and policy discussions, we are seeing a shift from *whether* and *why* toward *so what* and *what should we do*…**
  - **Related to a growing body of observations of emerging climate change**
  - **Driven by the unusual concentration of weather extremes and extreme events in 2011 and 2012**
- **As this shift gets stronger, we are also seeing another kind of shift in assessments of *so what* and *what should we do*: away from relying on (or waiting for…) quantitative projections of impacts decades from now toward risk management approaches that make sense now given vulnerabilities to an uncertain future – if many of the climate projection uncertainties cannot be reduced very much, finding ways to make adaptation decisions under uncertainty**

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What's Happening with Climate Change Adaptation? (II):

- **What do we know about climate change adaptation? – 3 developments in 2010:**
  - **NAS/NRC, *Adapting to the Impacts of Climate Change*, 2010 – tables of adaptation options for key sectors**
  - **A federal government Interagency Climate Change Adaptation Task Force, charged with developing and implementing a national adaptation strategy: progress report to the President, October 2010 – attention in government <u>from the top down</u>**
  - **A National Climate Adaptation Summit in Washington, DC, May 25-27, 2010…. – attention beyond the federal government <u>from the bottom up</u>: http://joss.ucar.edu/events/2010/ncas/summit_report.html**

(findings of all three very similar)

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What's Happening with Climate Change Adaptation? (III):

- **What do we know about climate change adaptation? – a number of important assessment reports, e.g.:**
  - **NAS/NRC adaptation report, 2010**
  - **Arctic Climate Impact Assessment, 2008**
  - **Northeast Climate Impacts Assessment, Union of Concerned Scientists, 2007**
  - **Climate Change Impacts in the US Southeast, EPA/Stratus Consulting, 2010**
  - **Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, IPCC, 2012**
  - **In the pipeline: US National Climate Assessment 2013; IPCC Fifth Assessment Report, 2014 (Working Group II includes four adaptation chapters)**

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What's Happening with Climate Change Adaptation? (IV):

- **What's going on with climate change adaptation?**
  - **Most of the adaptation planning and practice so far has occurred at scales below the federal government, both public and private**
    - **States: 3 states have adaptation plans, 10 other states doing adaptation plans, 8 others mention needs for adaptation planning in their climate action plans**
    - **Municipalities: Active interest at the city/community level, e.g.: New York City Climate Change Adaptation Task Force (PlaNYC) , Chicago, Boston, King County WA, ICLEI's Climate-Resilient Communities Program, US Conference of Mayors**
    - **Private sector: Active interest and some actions, especially in sectors that are especially climate-sensitive, e.g., agriculture, forestry, tourism, insurance – often hard to get information about what is actually going on… (DuPont example)**

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What's Happening with Climate Change Adaptation? (V):

- **What's going on with climate change adaptation?**
  - **Adaptation planning and practice are still at an early stage in the federal government – but gradually on the move:**
    - **An Adaptation Task Force, led by OSTP, CEQ, and NOAA**
    - **The third National Climate Assessment (NCA), due to the U.S. Congress in 2013**
    - **A Presidential Executive Order (October 2009) directing federal agencies to evaluate climate change vulnerabilities and risks for their missions and operations: initial assessments and plans due to be submitted in 2012**
    - **The 2012-2021 strategic plan of the US Global Change Research Program, which includes a commitment to advance climate change adaptation and mitigation science**

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What's Happening with Climate Change Adaptation? (VI):

- **What's going on with climate change adaptation?**
  - **Other parts of the world are farther along with developing adaptation programs than the US:**
    - **Significant programs in Australia and the UK: Australian "Adaptation Flagship" and National Climate Change Adaptation Research Facility, UK Climate Impacts Programme (UKCIP)**
    - **Emerging programs in countries ranging from Germany to Bangladesh, e.g.: German "Northwest 2050" Plan; Bangladesh Centre for Advanced Studies and International Centre for Climate Change and Development**

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Adapting to the Impacts of Climate Change

SO: WHAT CAN WE DO?

- **All of us: adopt a risk management approach as a strategy for preparing ourselves for an uncertain future:**
  - **Consider a range of possible future climate conditions in order to assess vulnerabilities**
  - **Identify adaptation options to reduce vulnerabilities**
  - **Implement adaptations that make sense now**
  - **Become more adaptive in planning for the future**

Adapting to the Impacts of Climate Change

ADAPTING IN THE SHORT-TERM IS LIKELY TO EMPHASIZE OPTIONS THAT ARE:

- **Simple to do**
- **Focused on risks that we care about**
- **That offer co-benefits for other objectives**
- **That have broad constituency support**
- **(Consider maladaptive policies and practices)**

Source: http://www.rittenhouseastronomicalsociety.org/Pictures/Fels/Philadelphia1.jpg

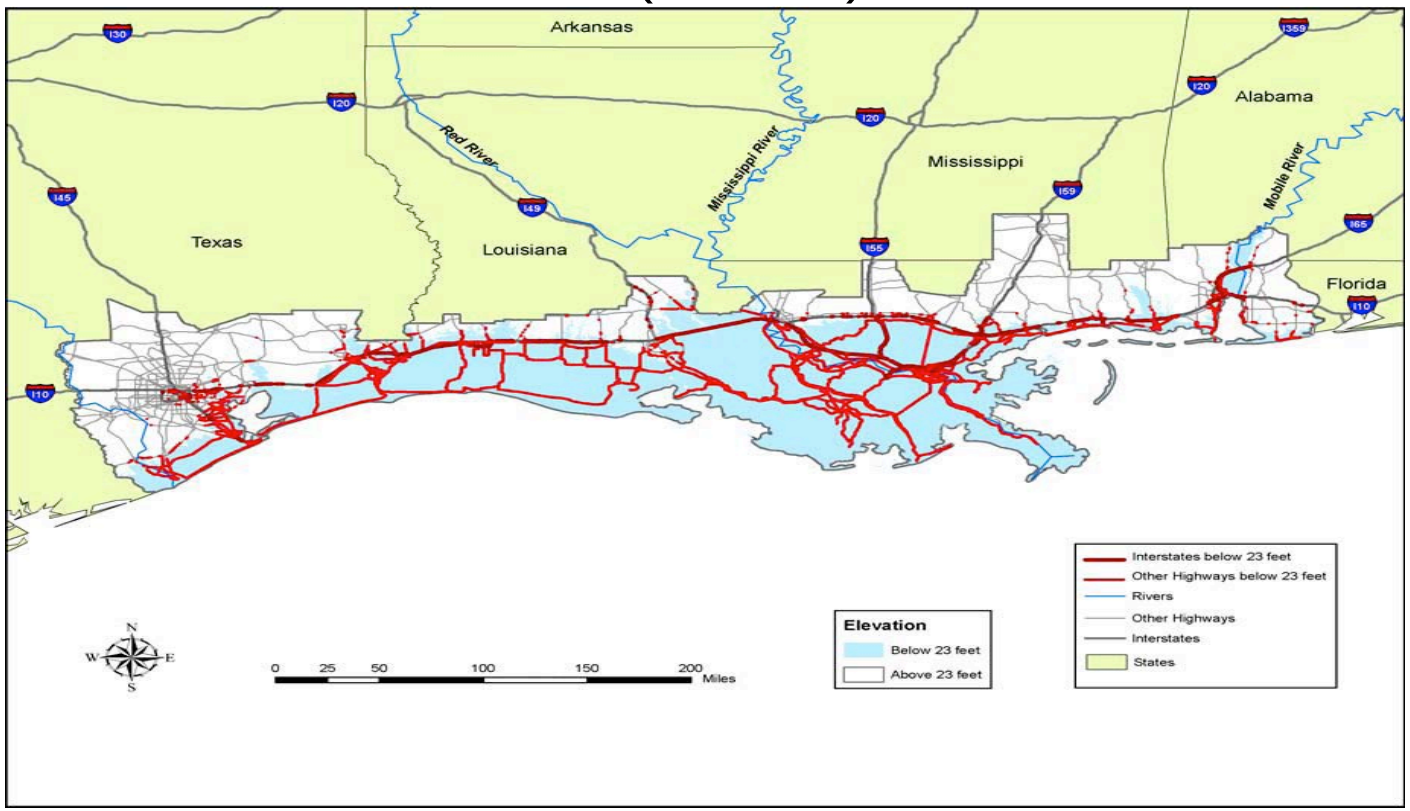
Adapting to the Impacts of Climate Change

ADAPTING IN THE LONGER-TERM IS LIKELY TO CONSIDER BIGGER CHALLENGES:

- **Some climate changes might require transformative adaptations, especially if climate change is relatively severe, such as:**
  - **Movements of people and facilities away from vulnerable areas**
  - **Changes in ecosystem and land management policies and practices**
- **Managing risks for the long term calls for contingency planning for relatively severe impacts, combined with monitoring and research strategies**

Adapting to the Impacts of Climate Change

HIGHWAYS CURRENTLY AT RISK FROM STORM SURGE AT ELEVATIONS CURRENTLY BELOW 7.0 M (23 FT.)



SINCE THE BOTTOM LINE FROM CLIMATE SCIENCE IS THAT WE FACE GROWING RISKS OF CLIMATE EXTREMES AND EXTREME EVENTS… (IPCC SREX, 2012):

- **We need to consider adaptive responses to reduce risks of disruptive impacts from relatively low-probability/high consequence weather-related events**
- **Some of the increased weather/climate risks are likely to make it difficult for some systems to adapt sustainably without *transformational* changes, especially if climate change is relatively severe**
- **Although uncertainties are too great for adaptation requirements to be defined precisely, a process of iterative monitoring, evaluation, learning, innovation, and contingency planning will reduce disaster risks and promote adaptive management**

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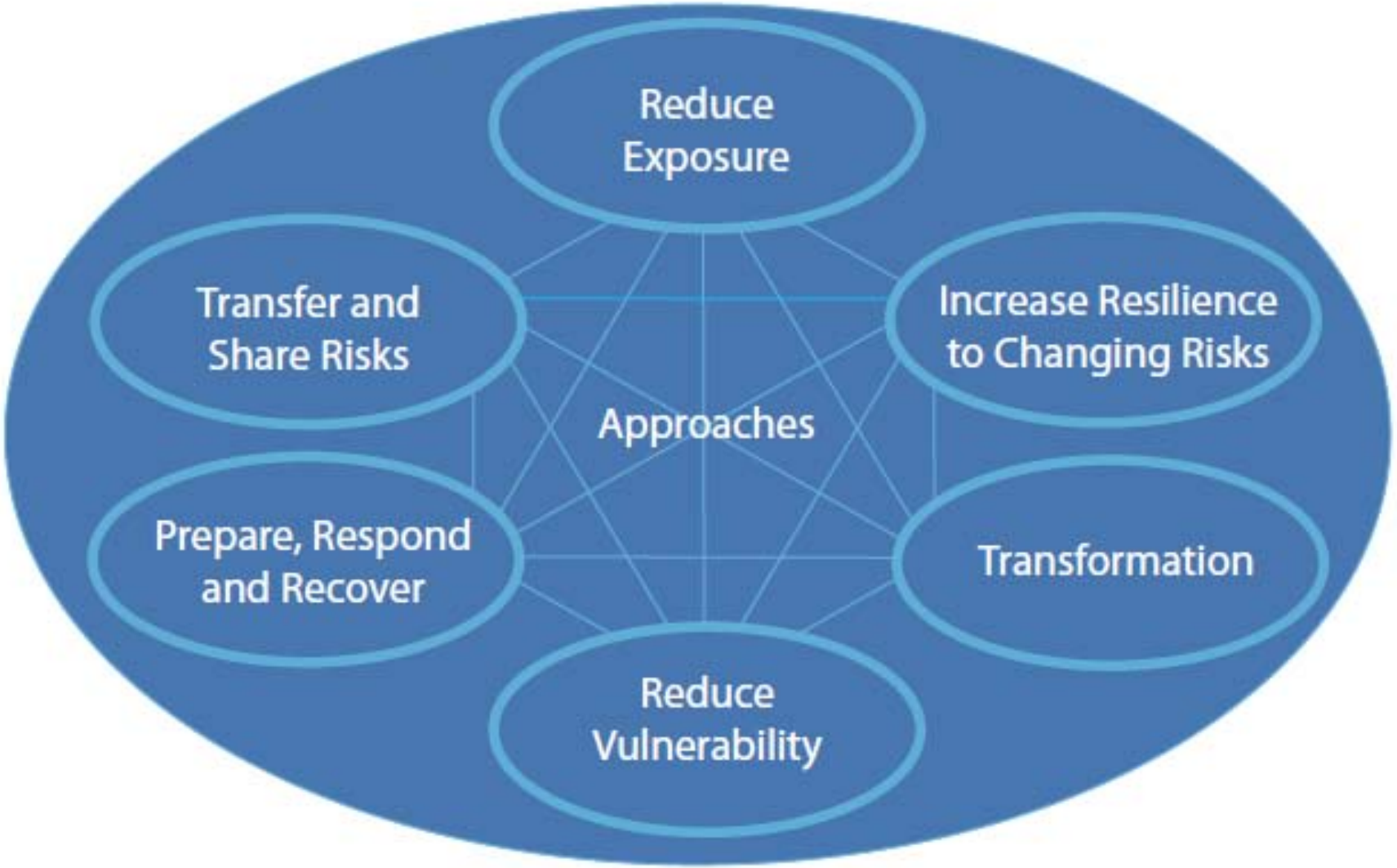
The Solution Space



How Is the Energy Sector Different from Other, More Obviously Climate-Sensitive Sectors?

- **Dominated by big-picture issues: large-scale events, large-scale decisions that cast long shadows, major institutions with large-scale financial and managerial resources – big potentials for action, big ramifications of approaches and actions**
- **In some cases, already under stress: policy conditions and user demands different from the assumptions that shaped historical experience and current system configurations – many reasons why changes in the sector are unavoidable (where does climate change adaptation fit in?)**
- **Especially complex relationships between adaptation actions and climate (and other) policy concerns for a highly regulated sector – the most important of all the uncertainties? – how does *policy* risk management relate to *climate* risk management?**
- **Vulnerabilities often regional rather than national, due to the size of the national energy economy – but dramatic short-term extreme events at a regional scale can have long-term effects on public concerns and attitudes at a national scale (e.g., Gulf oil spill) – industry-wide perspectives on risk management are involved as well as individual institution perspectives**

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