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SOLUTIONS FOR BUSINESS AND THE PLANET

Critical Data & Resilience

Attribution Science. Foreseeability of Loss, Adaptive Design & Cost Benefit Analysis

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Attribution Science:

Impacts to Design Criteria & Cost / Benefit Analysis

1. What is attribution science and does it Design Standards ?
2. Current States of Economic Modeling, Science & Impacts; Data & Analytics Tools
3. Initiating & Scoping an Economic Impact Assessment
4. Leveraging Public/Commercial Tools & Understanding Data Gaps
5. Contemplating the Business Case for Climate Preparedness and GHG Reduction Efforts
6. Flexible & Adaptive Design Criteria: a bridge for statistical and economic uncertainty

No information in this course on tools or data resources should be viewed as an endorsement of any individual tool or analysis (public or private). Information is provided for illustrative learning purposes only.

ATTRIBUTION SCIENCE

- 'Probabilistic event attribution' is the science of seeking to determine the extent to which anthropogenic climate change has altered the probability or intensity of a particular weather event or class of weather events, with an assignment of statistical confidence.

Foreseeability

Study of the impact of climate change on civil engineering standards:

- See work of Prof. Costa Samaras at https://www.cmu.edu/cee/adaptation/
- https://www.cmu.edu/cee/prospective/graduate-degree/masters/ms-concentrations/climate-change-adaptation-for-infrastructure.html

American Society for Civil Engineers (ASCE)

- See https://www.asce.org/climate-change/committee-on-adaptation-to-a-changing-climate/

American Institute for Chemical Engineers (AIChE) -

see https://www.aiche.org/chenected/2017/11/paic-climate-task-force-attribution-observed-climate-change

Cost / benefit analysis

- Integration of attribution science forecasts;
- Increased expected physical forces over the useful life of the structure;
- Changes structural requirements to meet same performance / reliability criteria;
- Balance uncertainty of forecasts with risks –

- Adaptive Design …

Adaptation: how much?

- The magic question … how much additional resilience is required to meet performance and reliability standards ?
- Cost benefit analyses must be modified to reflect science, including attribution science
- Must set outer bounds on statistical variability tolerance in engineering calculations basis
- Use ADAPATIVE DESIGN to 'manage' uncertainty in the future ******
- Basic design approach starts at the same place – but changes in science cause changes in design… analytic process is the same … but inputs and outputs are different !

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Attribution Science & Adaptive Design

Real Data

Real Decisions

Real Resilience SM