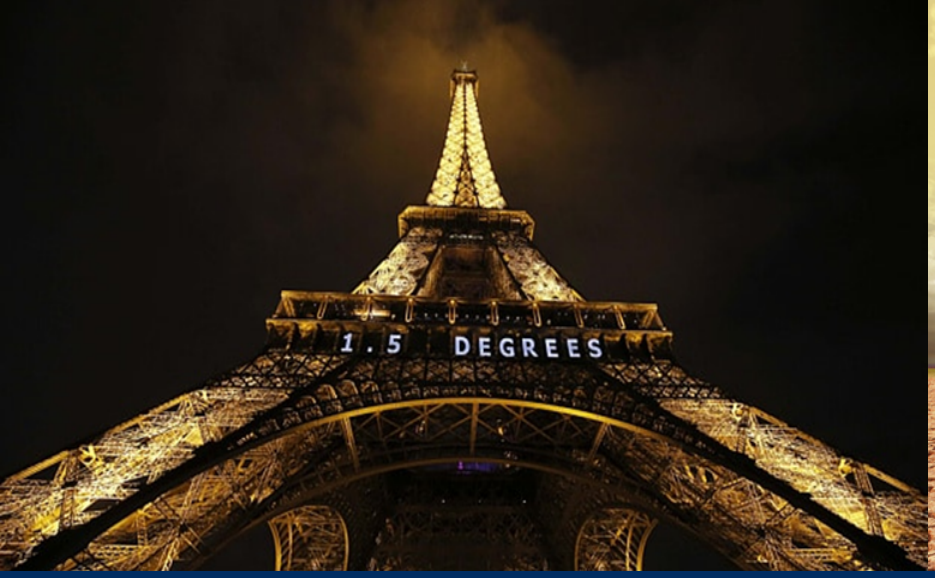


The Use of Scenarios for Climate-Related Financial Risk Assessment

Sergey Paltsev

Massachusetts Institute of Technology

Rapid System Transitions Towards Low GHG Futures Workshop

Snowmass, CO
July 24, 2019

Selected Scenario Activities

Projecting Energy and Climate for the 21st Century

Sergey Paltsev

Massachusetts Institute of Technology

CERAWEEK by IHS Markit

Houston, TX
March 13, 2019

MOBILITY OF THE FUTURE

Global Economic and Policy Modeling

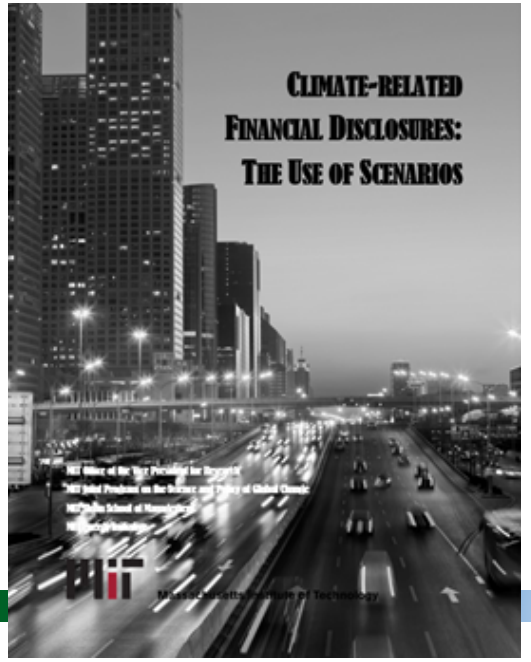
PI: Sergey Paltsev
Team: Abbas Ghandi, Jennifer Morris, Henry Chen
May 22, 2019

Pathways to Paris: ASEAN and Latin America

Technology and Policy Options to Reduce GHG Emissions

Massachusetts Institute of Technology
2018

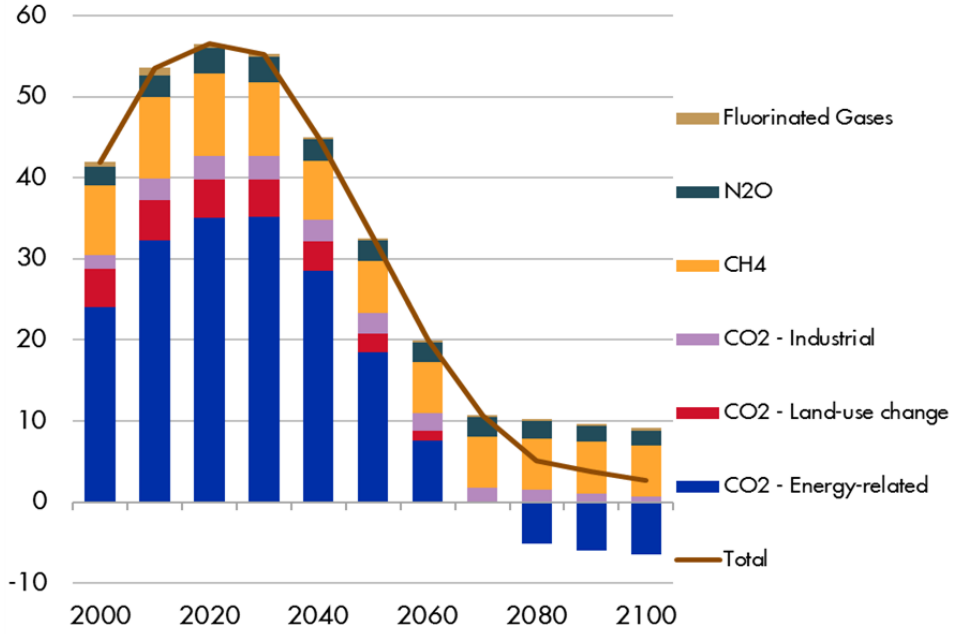
https://globalchange.mit.edu/research/research-projects/pathways-paris



MIT Joint Program Outlooks

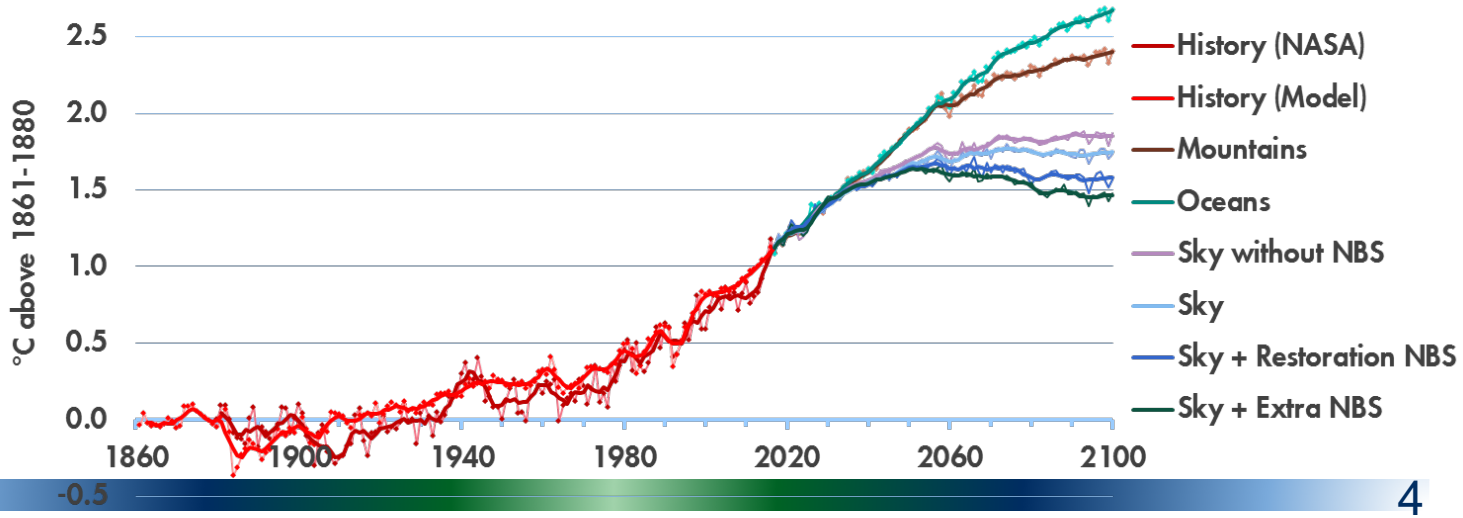
Signature publication:
2012-2015 Energy and Climate Outlook, annual;
From 2016 expanded to food and water, every two years.

Major energy companies (Shell, BP, Total…) realize the need for a different energy mix



Shell Sky Scenario: Drastic changes in GHG emissions ($GtCO_2$/year)

Temperature Implications of Sky are analyzed by MIT Joint Program (MIT JP Report 330)
https://globalchange.mit.edu/publication/16995



Connecting to Financial Community

MIT Workshop on use of scenarios for oil and gas company financial disclosures (November 2018)

Scenario providers, oil and gas companies, investors, credit rating agencies, and NGOs.

Financial community is extremely diverse.

The interests of each financial actor is shaped by institutional role, strategic planning/investment horizon, analytical capability, business scope, and investment philosophy.

Time scales are very different.

Financial community: next 5 years. Scenarios: next 30-50-80 years.

Data Requests by Financial Community

Everything.

Mostly interested in inflation, unemployment, housing prices, profitability…

GDP and energy prices…

Physical risk vs Transition Risk.

Focus on transition.

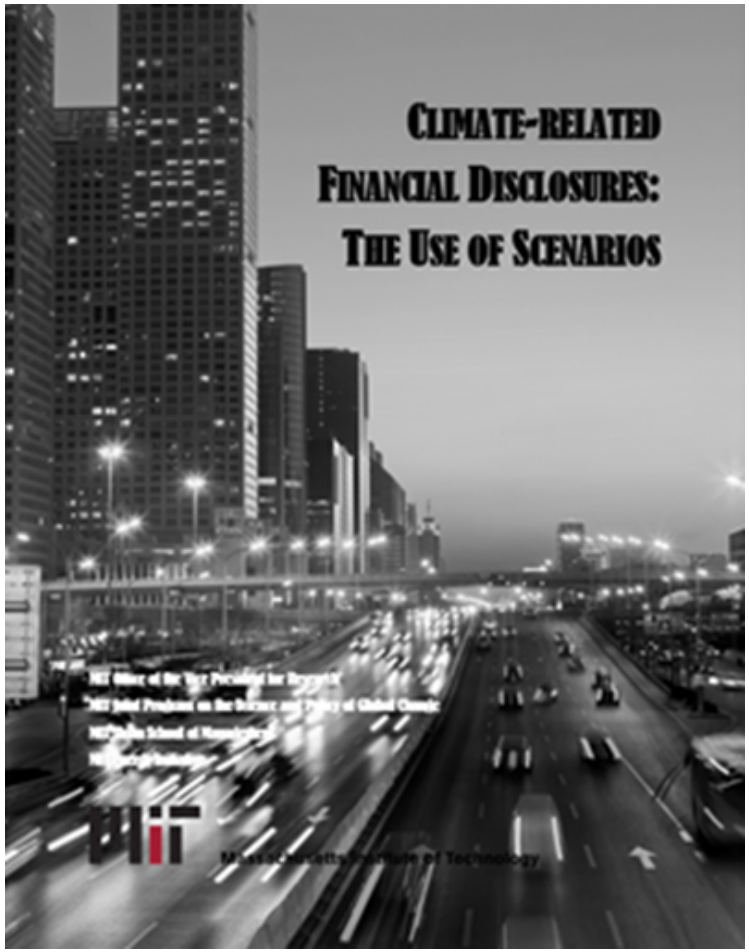
Not one scenario.

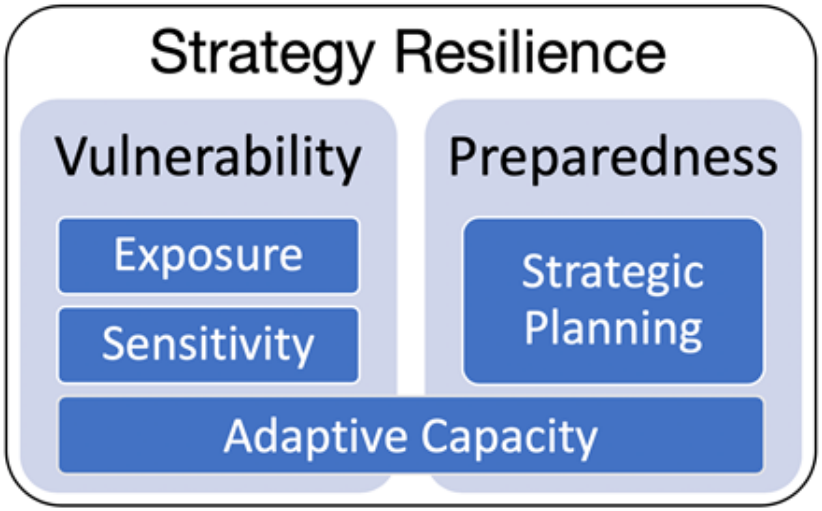
But how many scenarios are enough?

Desire for a standardized scenario (e.g., IEA).

Purpose: "Consistent with 2C" or "stress testing"?

Creating Strategy Resiliency





Elements of Strategy Resilience

Exposure. Exposure is a measure of a company's assets that are at risk, or value at risk, to a particular risk driver or scenario. This measure can provide insight into how a specific scenario might affect the financial position of a company without any change in strategy.

Sensitivity. Sensitivity analyses demonstrate how much the financial condition or operations of a company are likely to be affected by specified levels of change to isolated drivers — e.g., the price of a particular fuel, energy demand, carbon price, etc.

Elements of Strategy Resilience (cont.)

Adaptive capacity. Adaptive capacity is a system's ability to monitor, learn, and transform in an unstable environment; this capacity allows systems to handle identified and unidentified challenges. For oil and gas companies, this can include evidence of capital discipline to control costs and risks, capital flexibility, lifetime of reserves, and intellectual property.

Strategic planning. Strategic planning is a method for preparing to address a known risk. It requires adaptive capacity to both prepare specific plans as well as to carry out those plans should the correct conditions develop. Examples include plans to reduce exposure, reduce sensitivity to certain risks drivers, or increase adaptive capacity.

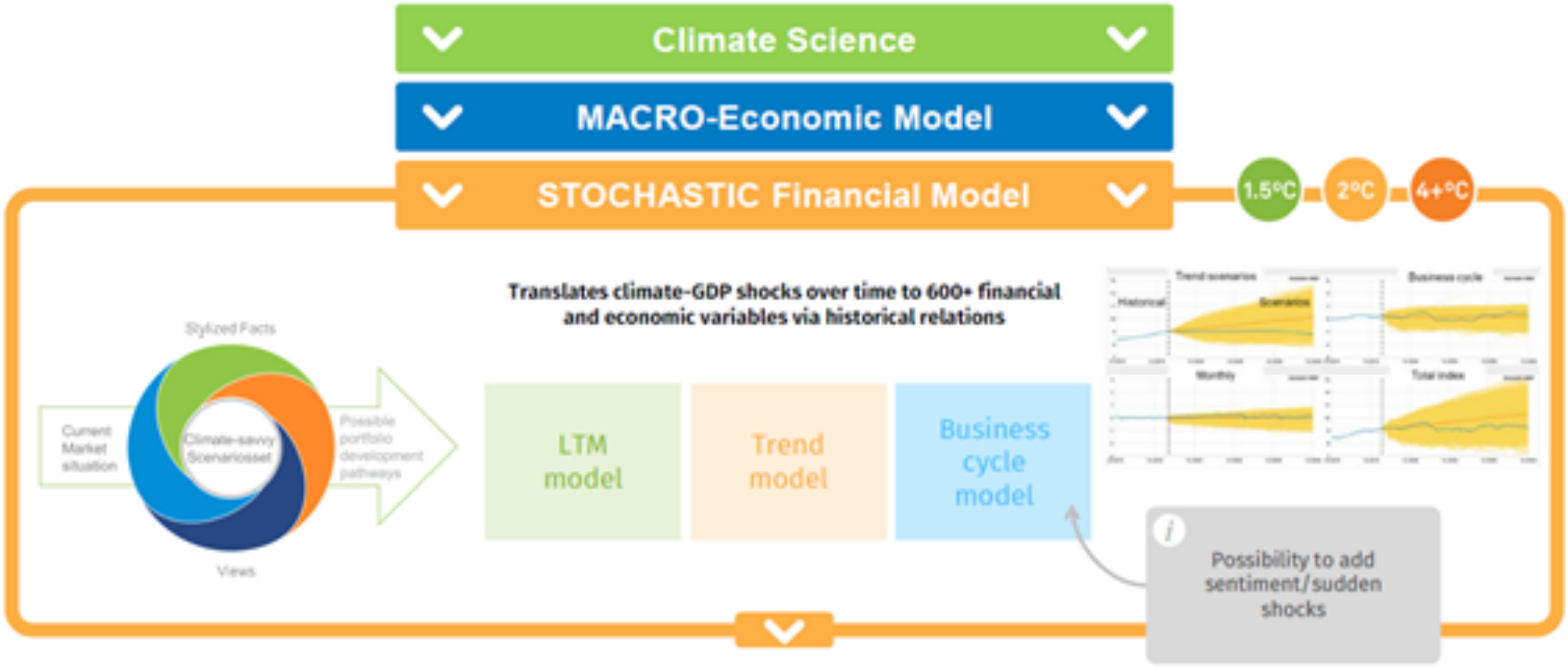
Issues with Scenarios and Disclosures

Oil and gas companies routinely use scenario analysis for strategic decisions.

However,

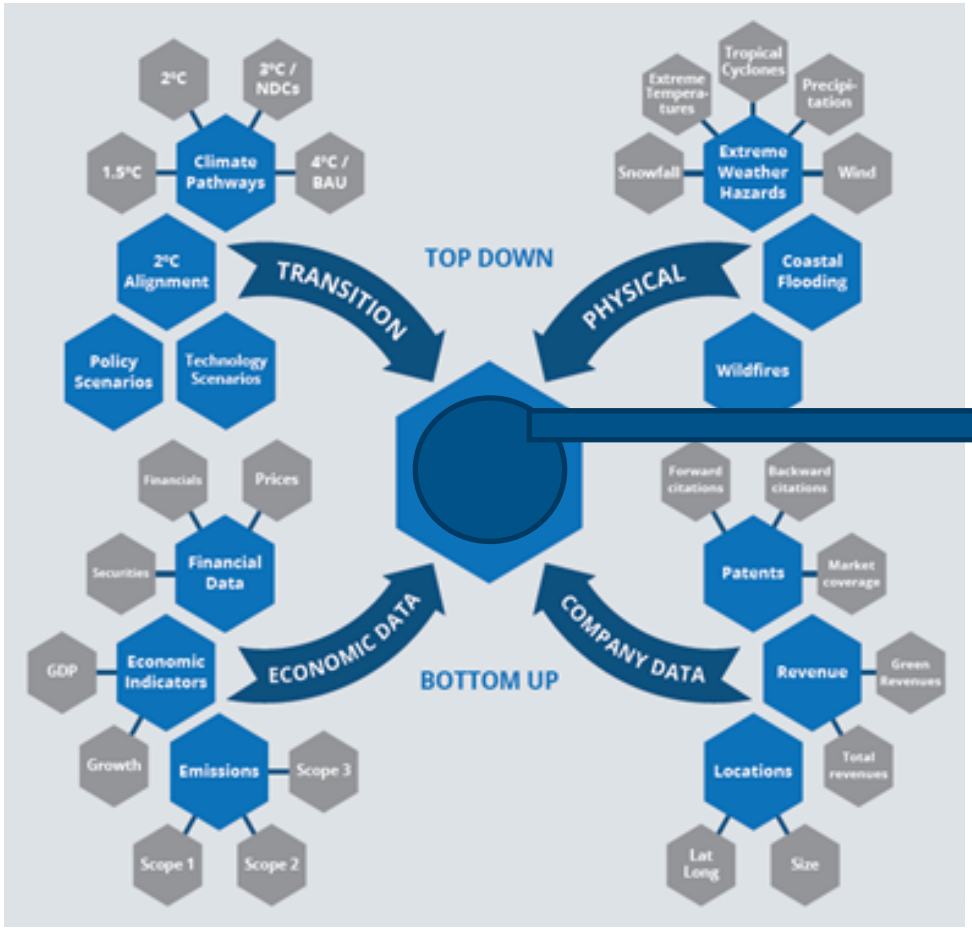
Proprietary risk. Complete transparency on custom scenarios and their financial impacts could reveal sensitive information about a company, damaging its competitive advantage.
Liability risk. In an effort to create transparency, companies might open themselves to the risk of liability, particularly related to what information they choose to include and how such choices might be construed.
Misinterpretation risk. Some oil and gas companies believe that less sophisticated investors might misinterpret a rigorous analysis centered around a particular scenario as evidence that such a future is more likely to unfold.

Needed Elements: Connections to Financial Models



Schematic from an "undisclosed" consulting company

Needed Elements: Connections to Financial Models (cont.)



Valuation of companies

(Dividend Discount Model, Credit Spread Model)

Schematic from an "undisclosed" consulting company

Recommendations/Opportunities

Industry

(A) Connect custom scenarios to reference scenarios from well-established sources (e.g., IEA).
(B) Incorporate and link each element of strategic resilience: exposure, sensitivity, strategic planning, and adaptive capacity.

Scenario producers

(C) Develop suites of distinct scenario pathways.
(D) Provide transparency about scenario sensitivities.
(E) Research a new generation of climate-related transition models.

Financial community

(F) Incorporate scenario-based disclosures into a holistic evaluation of corporate strategic resilience
(G) Engage

Recommendations from Jake Jacoby

*Create a **well-funded** model inter-comparison exercise on the use of scenarios for financial risk analysis.*

Engage with financial community for funding and the process of scenario assessment.

Budget substantial amount of time to be able to explore comprehensively the financial sector demands and industry views about the use of scenario analysis.

Thank you

Questions or comments?
Please contact Sergey Paltsev at paltsev@mit.edu

http://globalchange.mit.edu/