

# Predicting and responding to the effects of climate change on your assets and infrastructure



**Ben Hanley**

Asset Management &  
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Weather & Climate  
Services Leader

**Sustainability, Climate, & Energy Transition ...**

**...a matter of economics and survival**



1. IBM and Sustainability
2. Climate Risk
3. TCFD Reporting
4. Climate Risk Analytics
5. Climate Adaptation



# IBM Track Record

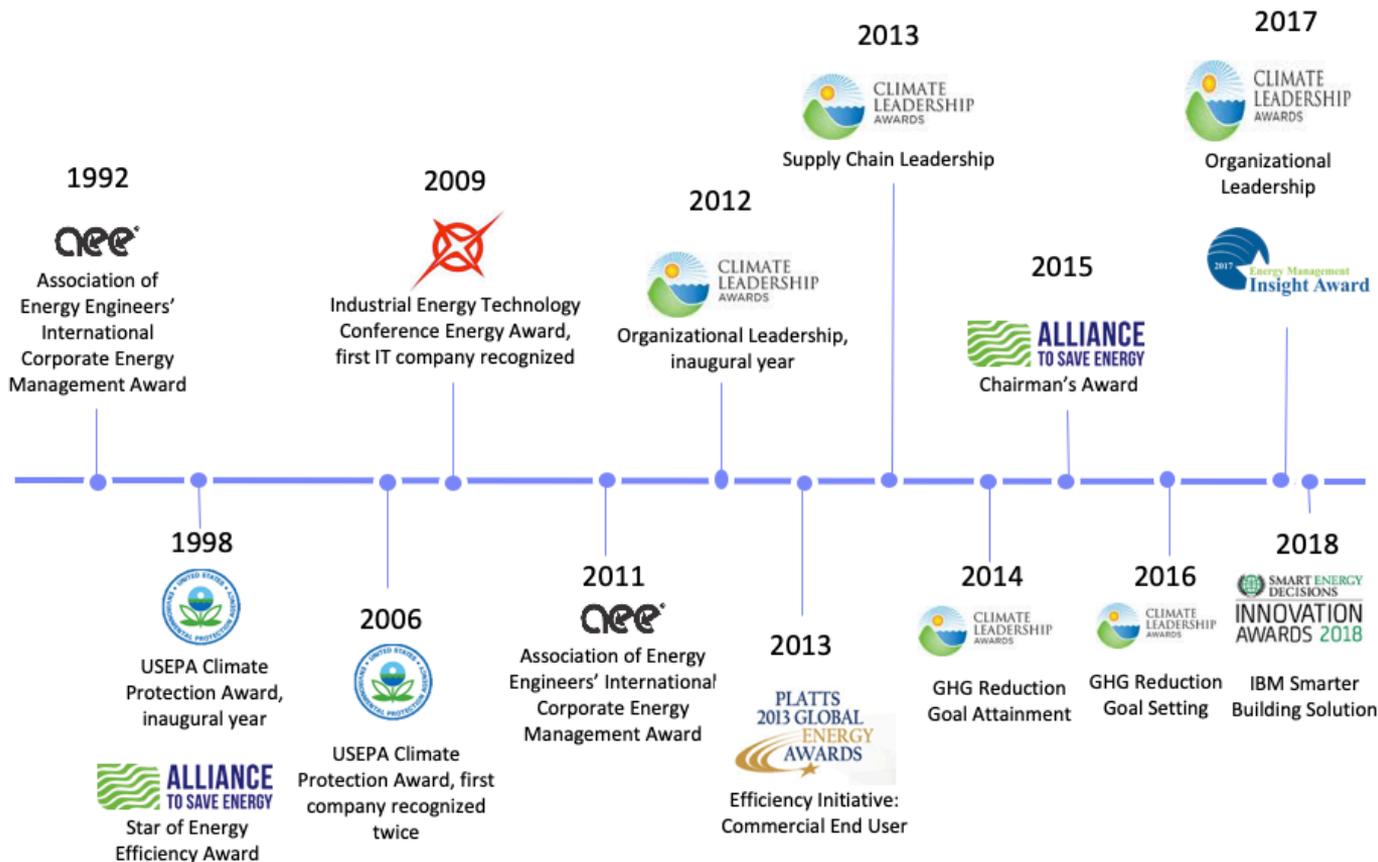
**1971** - issued its first corporate environmental policy

**1997** - the first major multinational company to earn global registration of its EMS to the ISO 14001 environmental management systems standard.

**2019** - received its 7<sup>th</sup> Climate Leadership Award

**2020** – released 30<sup>th</sup> Annual Environmental Report

# IBM Selected Energy Management and Climate Protection Awards



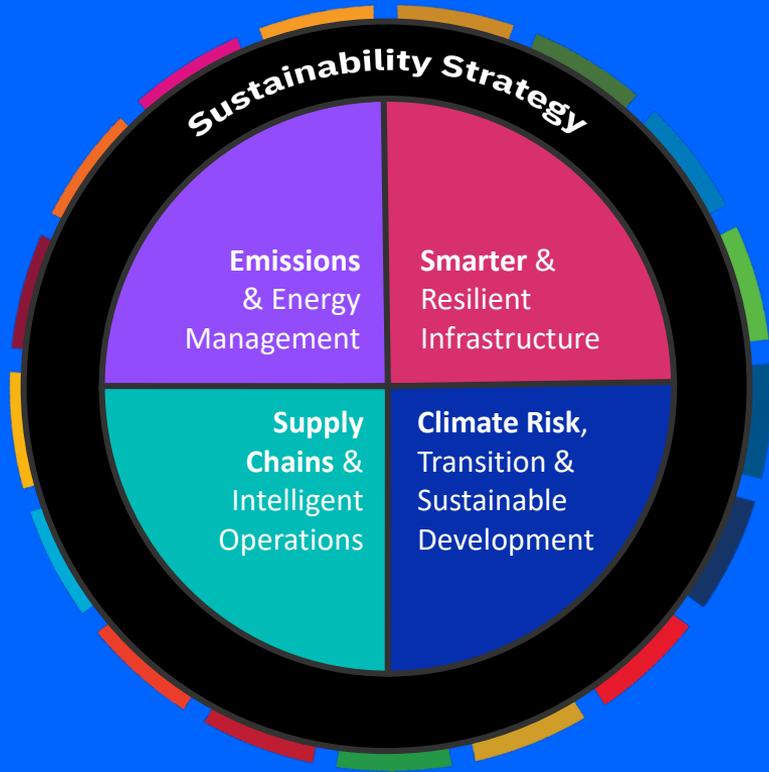
# IBM Joins World Business Council for Sustainable Development to Help Accelerate the Transition to a Sustainable World



*“IBM is proud of our long-standing record for sustainable practices in developing our products and managing our company in ways that conserve resources and limit our impact on the environment,” said **Mark Foster**, senior vice president, IBM Services. “We have a shared vision with WBCSD that purpose-led companies can be the driving force for societal innovation that addresses the world’s most pressing sustainability issues at scale, from feeding the world’s growing population to renewable energy production.”*

On September 11, 2020, the announcement was launched by both [IBM](#) and the [WBCSD](#)

# Sustainability & Climate Services – Client Focused



## SUSTAINABILITY STRATEGY

- Decarbonisation Strategy & Roadmap
- Ecosystem Development & Innovation
- Dynamic Operating Models



## EMISSIONS & ENERGY MANAGEMENT

- Energy Efficiency & Conservation
- Climate & Energy Management Services
- Carbon Accounting, Markets & Carbon Trading



## CLIMATE, TRANSITION & SUSTAINABLE DEVELOPMENT

- Climate Risk Analytics & Resilience
- Transition to Net Zero Carbon
- Climate & Sustainability Policy & Regulation
- Sustainable Development Goal Alignment



## SMARTER & RESILIENT INFRASTRUCTURE

- Smarter Homes, Buildings, Cities, Energy & Grids
- Smarter Transport (including eMobility)
- Smarter Waste, Water & Recycling



## SUPPLY CHAINS & INTELLIGENT OPS

- Sustainable Consumption & Supply Chain
- Dynamic Operating Model
- Circular Economy



## SUSTAINABILITY GARAGE

- ✓ EMPLOYEE ENGAGEMENT (NPS)
- ✓ ENVIRONMENT (CO2)
- ✓ ECONOMICS (ROI)



# Climate-related Risk & the Energy Transition: Physical, Transition and Liability Risks

## Physical Risk

### Arising from acute and chronic events:

- Heatwaves / Floods / Wildfires / Storms
- Sea level rise / Storm surge / Extreme variabilities

### Impacting:

- Asset Value / Operations / Credit / Insurance / Economies

## Transition Risk

### Arising from process of:

- Move from high- to low-carbon asset base / society & investments / Supply Chain / operations
- Energy and carbon pricing / regulation / policy / technology / business models

### Impacting:

- Investors / Revenue / Shareholders / Value

## Liability Risk

### Arising from organisations:

- Having suffered loss or damage from physical or transition risk factors seeking to recover losses

### Impacting:

- The Board / Directors / Insurers / Companies / Value / Governments



“...material climate risk is inherent in business operations...”

BlackRock

“...climate finance and climate risk management have moved mainstream...”

Bloomberg

“...\$42 trillion of assets at risk...”

Economist Intelligence Unit & LSE

“...significant risks to a company’s long term value...”

Vanguard

“A question for every company, every financial institution, every asset manager, pension fund or insurer: **what’s your plan?**”

Mark Carney

Former Governor Bank of England



“... there is a need for consistent and comparable climate-related financial disclosure, board-level scrutiny and governance...” HSBC

# TCFD

Task Force for Climate-Related  
Financial Disclosure

Established by the G20 Financial Stability  
Board (FSB)

FSB Chair, Mark Carney, former Governor  
of Bank of England

TCFD Chair, Michael Bloomberg

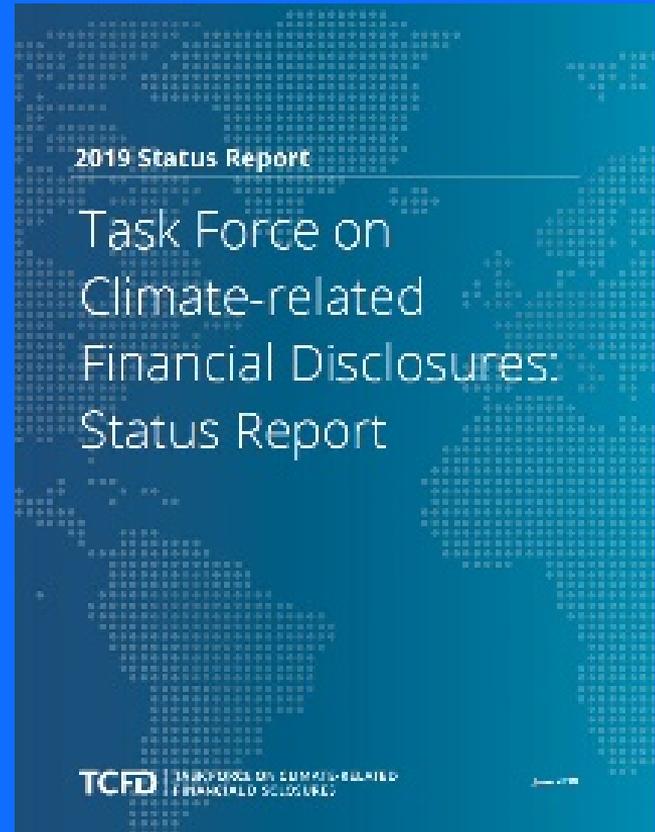
“Increasing **transparency** makes  
**markets more efficient**, and  
**economies more stable and  
resilient**”

# 900+

International Companies, Financial  
Institutions, Regulatory Bodies &  
Government Entities

# \$120+ trillion

...worth of assets



## Climate-Related Risks, Opportunities, and Financial Impact



Task Force on Climate-related Financial Disclosures (TCFD)

# Climanomics® Analytics

**Software as a Service (SaaS)** climate risk analytics platform.

Big climate data coupled with econometric functions.



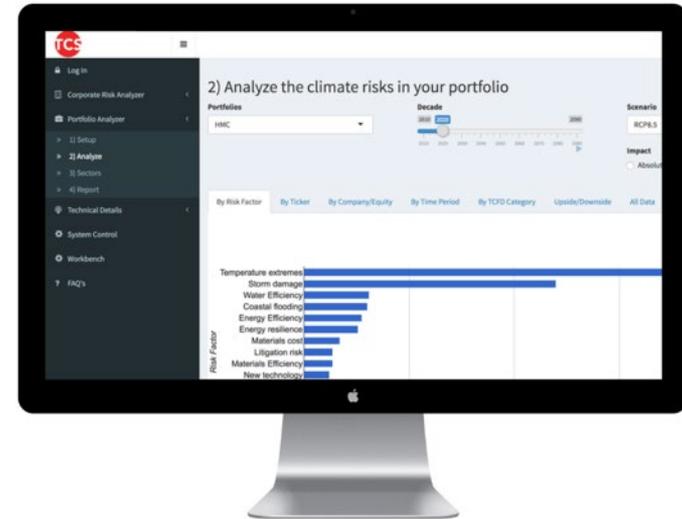
Quantified Financial Impact



Point & Click Scenario Analysis



Asset-Level to Portfolio-Level Insights



# Climate-related Hazards, Vulnerabilities, Risks



## Hazard

- **Physical**
  - Coastal flooding
  - River flooding
  - Hurricanes, storms
  - Drought
  - Wildfires
  - Heat waves
- **Transition**
  - Carbon Pricing
  - Litigation
  - Reputation



## Vulnerability

- **Operations**
  - Property damage/repair
  - Energy & water costs
  - Employee health/productivity
- **Supply chain**
  - Interruption
  - Costs
- **Strategy**
  - Brand value
  - Sustainability
  - New products

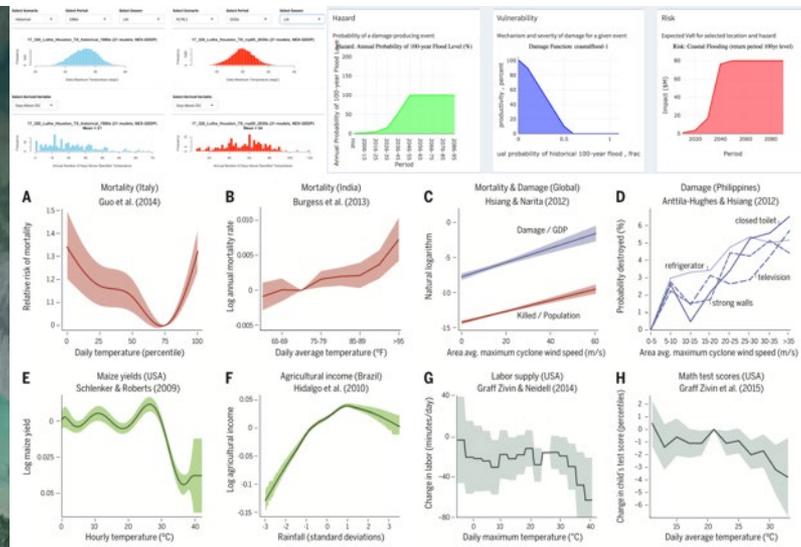


## Value at Risk

- **Balance Sheet**
  - Stranded or impaired assets
- **Income Statement**
  - Loss of revenue
  - Operating costs
  - Labor costs
  - Legal costs
  - Insurance costs
- **Cost of capital**
  - Credit/Bond rating

# Asset-level data plus econometric models

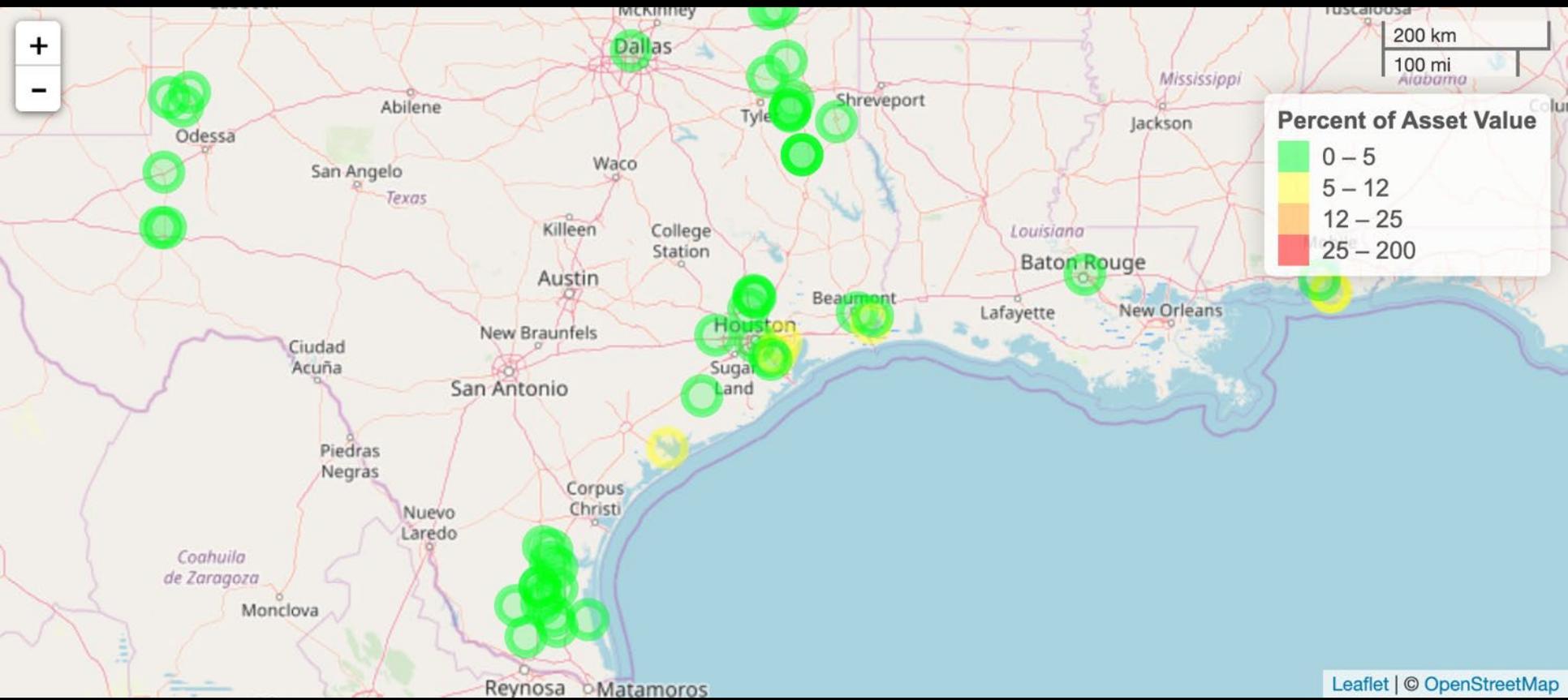
Climanomics<sup>®</sup> uses the latest science and most granular data to model risk and opportunity.

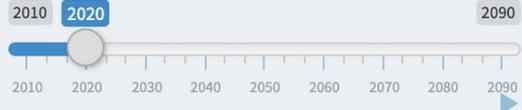


# Case Study: Oil and Gas



# Oil & Gas Assets Modeled





Impact

- Absolute
- Relative

By Risk Factor

By Company/Equity

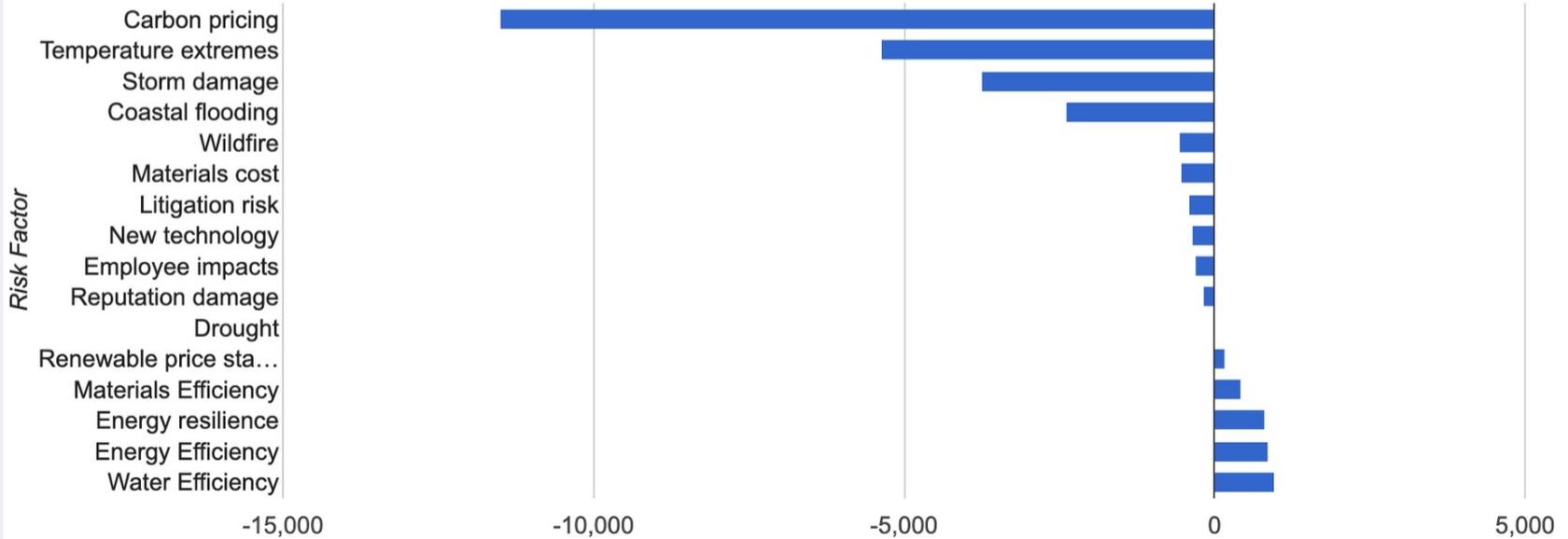
By Time Period

By TCFD Category

Upside/Downside

All Data

Earnings



Portfolios

OilGas(US)

Decade



Scenario

RCP8.5

Impact

Absolute  Relative

By Risk Factor

By Company/Equity

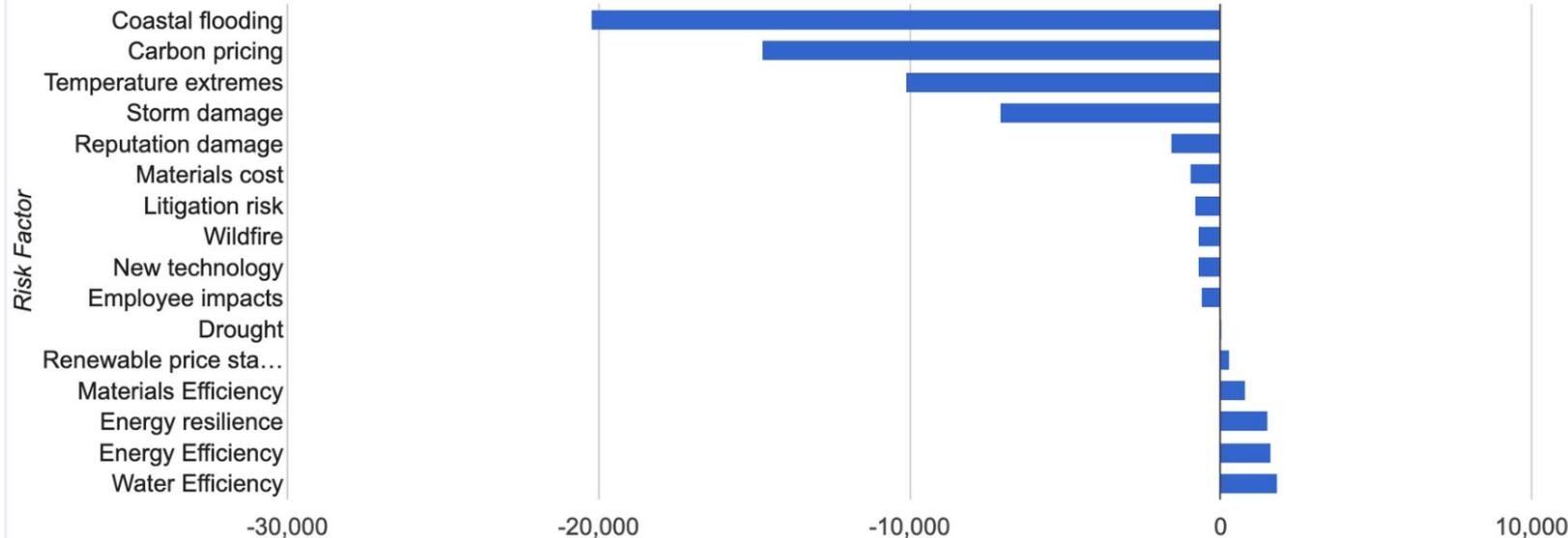
By Time Period

By TCFD Category

Upside/Downside

All Data

Earnings



# Hazard, vulnerability, and risk details underlying the financial risk assessment

DRILLDOWN

## Select Category

All categories

## Select Location

ExxonMobil\_Refining\_Supply\_Co\_2

## Select Scenario

RCP8.5

## Causal Variable (Hazard)

Coastal Flooding (return period 100yr level)

## Damage Function

Selected Location and Hazard

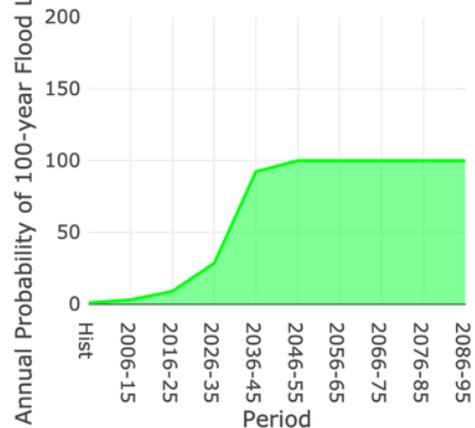
## Time Period

All Periods

## Hazard

Probability of a damage-producing event

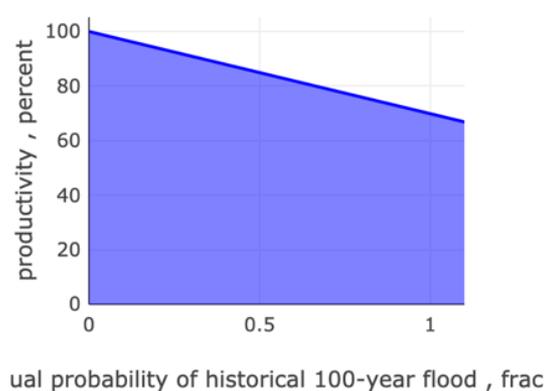
Hazard: Annual Probability of 100-year Flood Level (%)



## Vulnerability

Mechanism and severity of damage for a given event

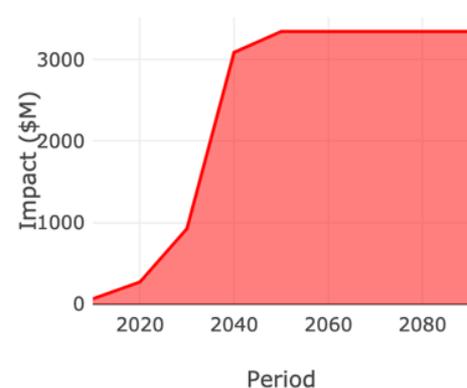
Damage Function: coastal\_flood-8



## Risk

Expected VaR for selected location and hazard

Risk: Coastal Flooding (return period 100yr level)





By Risk Factor

By Company/Equity

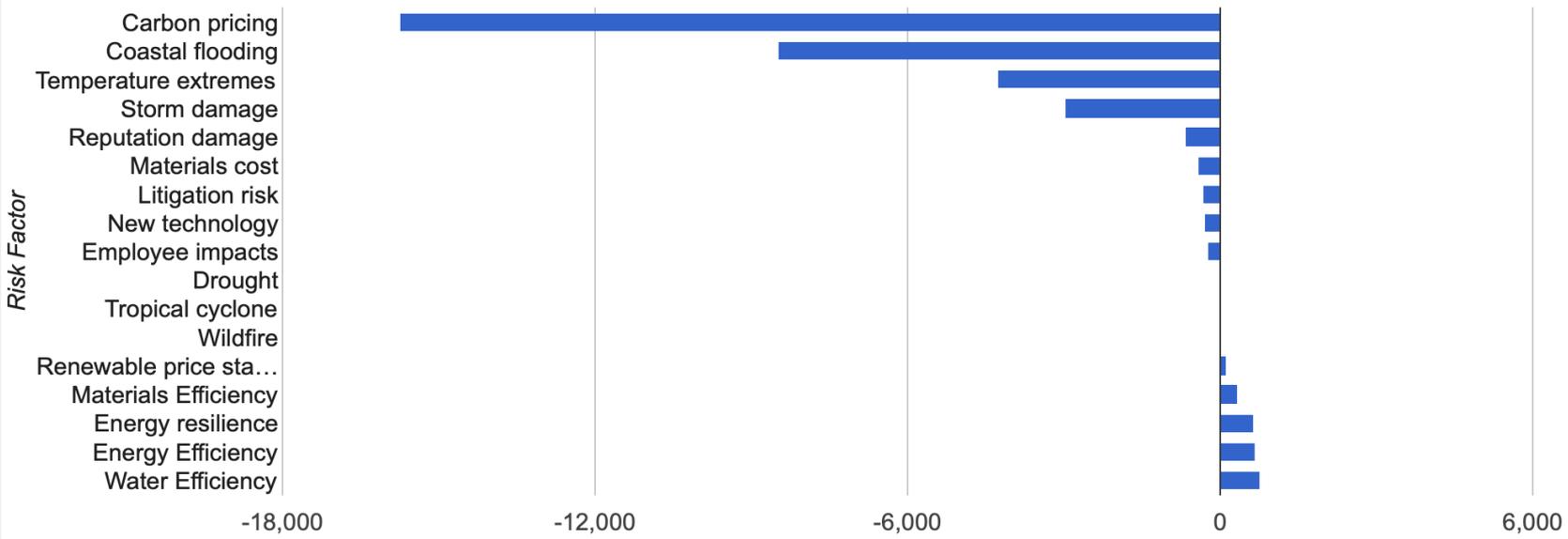
By Time Period

By TCFD Category

Upside/Downside

All Data

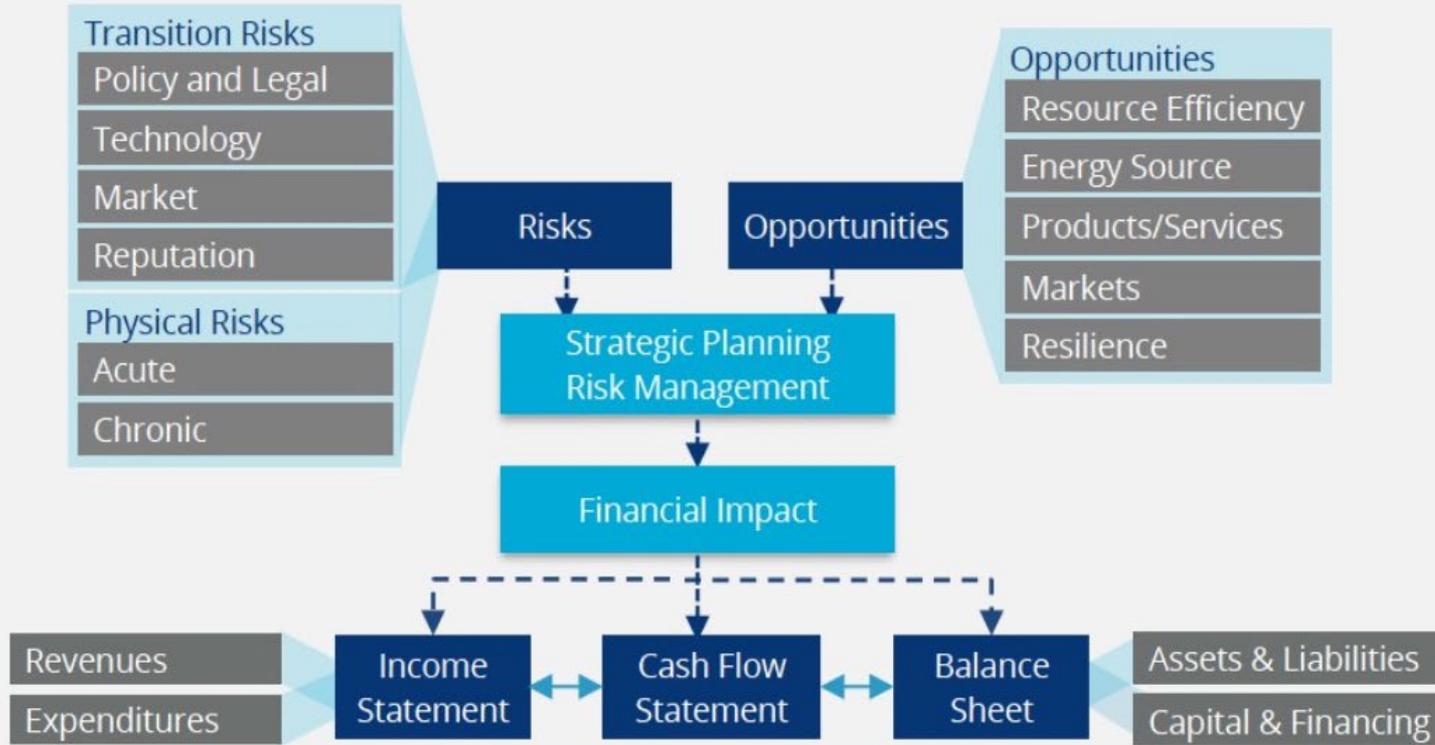
Earnings



DEMO

# TCFD: An International Framework

## Climate-Related Risks, Opportunities, and Financial Impact



Task Force on Climate-related Financial Disclosures (TCFD)

# Embedding Climate Resilience into your Processes



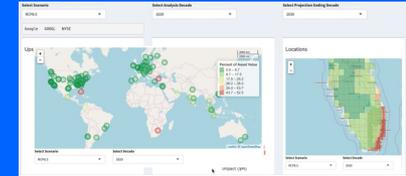
- Review data points
- Review climate scenarios
- Review strategic impact areas

**Learn**



**Plan**

- Define strategic purpose
- Assess climate risks and impacts
- Establish adaptation goals



**Monitor**

- Assess performance against stated objectives



**Act**

- Implement adaptation strategies and actions
- Define data collection and reporting approach
- TCFD Reporting



# Thank you



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**IBM:** a global leader and central player in climate,  
transition & sustainability



BACKUP – POSSIBLE  
USE IN Q&A

# Sustainability & Net Zero Platform

## Performance Management



KPI Change Dashboard



Global and local Emissions action reports



Emissions action plans



Climate Risk & Opp. Analytics



Reporting engine



UN SDGs Reporting



Economic Impact Assessment



ESG Analytics

## Carbon Monitoring



Spreadsheet import/export



UI data entry

### Carbon Accounting System



Modelling engine



Calculation engine

Data processing, normalisation and transformation layer

## Data Collection



Production management systems



Building management systems (BMS)



Waste management systems



End-to-end supply chain systems



Asset Data (Physical & Energy Transition)



Standards & benchmarks



KPIs

# You'll need to calculate, model and report on the Carbon Intensity of products and product portfolio mix

