

# VT House Committee on Judiciary and the House Committee on Environment and Energy Testimony for S.259

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DARTMOUTH | CLIMATE MODELING  
& IMPACTS GROUP



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four takeaways:

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3. this can be done for historical and future damages and emissions
4. all of these damage assessments are under-inclusive and conservative

can scientists attribute the damages  
from climate change to particular  
emitters?

yes, we now can.

# THE COSTS OF EMISSIONS

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1.

$$\begin{array}{l} \text{TOTAL LOSS} \\ \text{FROM EMISSIONS} \end{array} = \begin{array}{l} \text{DAMAGE FROM} \\ \text{HISTORICAL EMISSIONS} \end{array}$$



# THE COSTS OF EMISSIONS

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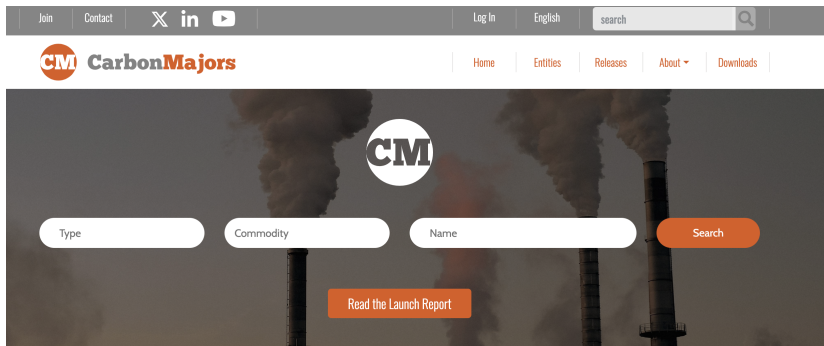
$$\begin{array}{rcccl} & & 1. & & 2. \\ \text{TOTAL LOSS} & & \text{DAMAGE FROM} & & \text{FUTURE DAMAGE FROM} \\ \text{FROM EMISSIONS} & = & \text{HISTORICAL EMISSIONS} & + & \text{HISTORICAL EMISSIONS} \end{array}$$

# THE COSTS OF EMISSIONS

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$$\begin{array}{ccccccc} & & 1. & & 2. & & 3. \\ \text{TOTAL LOSS} & & \text{DAMAGE FROM} & & \text{FUTURE DAMAGE FROM} & & \text{FUTURE DAMAGE FROM} \\ \text{FROM EMISSIONS} & = & \text{HISTORICAL EMISSIONS} & + & \text{HISTORICAL EMISSIONS} & + & \text{FUTURE EMISSIONS} \\ & & & & & & \end{array}$$

# IT REQUIRES EMISSIONS DATA



## About Carbon Majors

Carbon Majors is a database of historical production data from 122 of the world's largest oil, gas, coal, and cement producers. This data is used to quantify the direct operational emissions and emissions from the combustion of marketed products that can be attributed to these entities. These entities include:

**75** Investor-owned Companies, **36** State-owned Companies, **11** Nation States,  
**82** Oil Producing Entities, **81** Gas Entities, **49** Coal Entities, **6** Cement Entities

The data spans back to 1854 and contains over 1.42 trillion tonnes of CO<sub>2</sub>e covering 72% of global fossil fuel and cement emissions since the start of the Industrial Revolution in 1751.



122 Entities



1.42 Trillion Tonnes of CO<sub>2</sub>e



72% of Global Fossil Fuel & Cement CO<sub>2</sub> Emissions

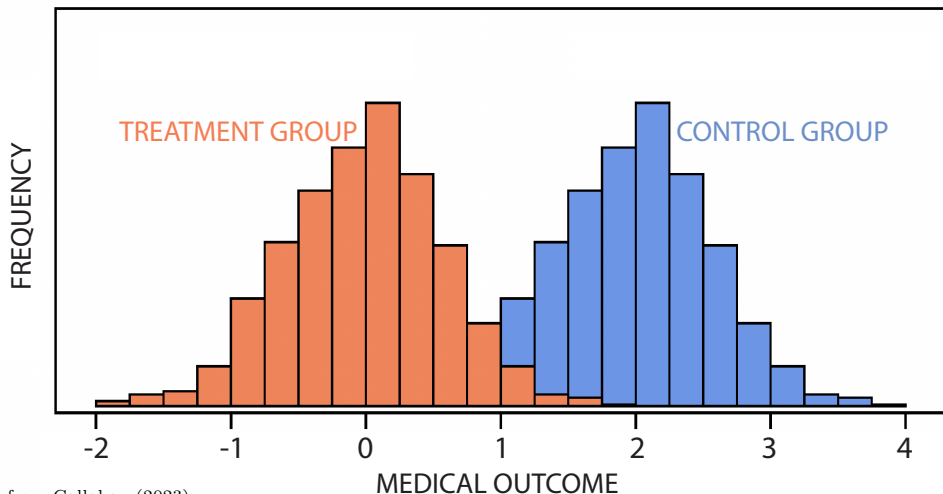
two general approaches to estimate costs attributable to emitters with a rational basis:

1. use the social cost of carbon (SCC)
2. use “end-to-end” attribution

# CLIMATE ATTRIBUTION

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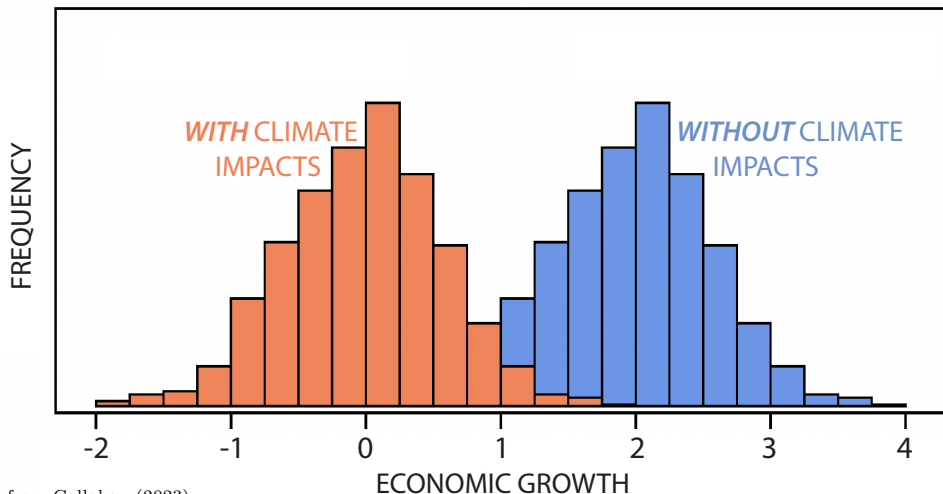
EXAMPLE MEDICAL TRIAL FOR DRUG EFFICACY



# IT REQUIRES CLIMATE ATTRIBUTION

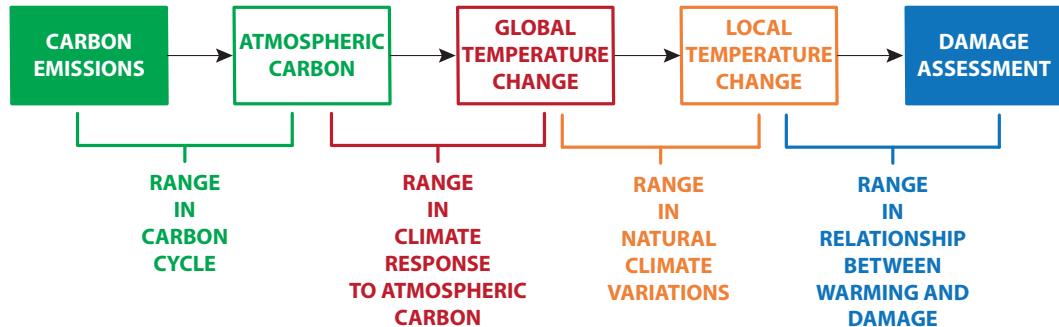
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ECONOMIC GROWTH *WITH* VERSUS *WITHOUT* CLIMATE IMPACTS



# END-TO-END ATTRIBUTION

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**EACH LINK HAS CONSENSUS METHODS**

can scientists attribute the damages  
from climate change to particular  
emitters?

yes, we now can via several approaches.  
and our cost estimates are conservative.