

# Carbon Tax: Economic, Climate, and Demographic Implications

Dr. Fred Treyz – Chief Economist, CEO

David Casazza – Economic Associate

Ethan Ackerman – Economic Assistant

Tomas Bentley – Economic Assistant

August 9, 2023

Regional Economic Models, Inc.

## Introduction

What is the issue?

Regulation and Tax Incentives

Carbon Tax Overview

E3+ Description

Live Model Demonstration

Q&A

# What is the issue?



- Carbon emissions

Fossil fuel combustion emits carbon dioxide in the atmosphere.

- Greenhouse effect

Carbon dioxide traps heat and contributes to global warming.

- Extreme weather events

Rising temperatures lead to more droughts, heat waves, storms. Rising sea levels can create flooding in coastal cities.

- Slow moving crisis

The severity of recent weather events will become more pronounced in the future.

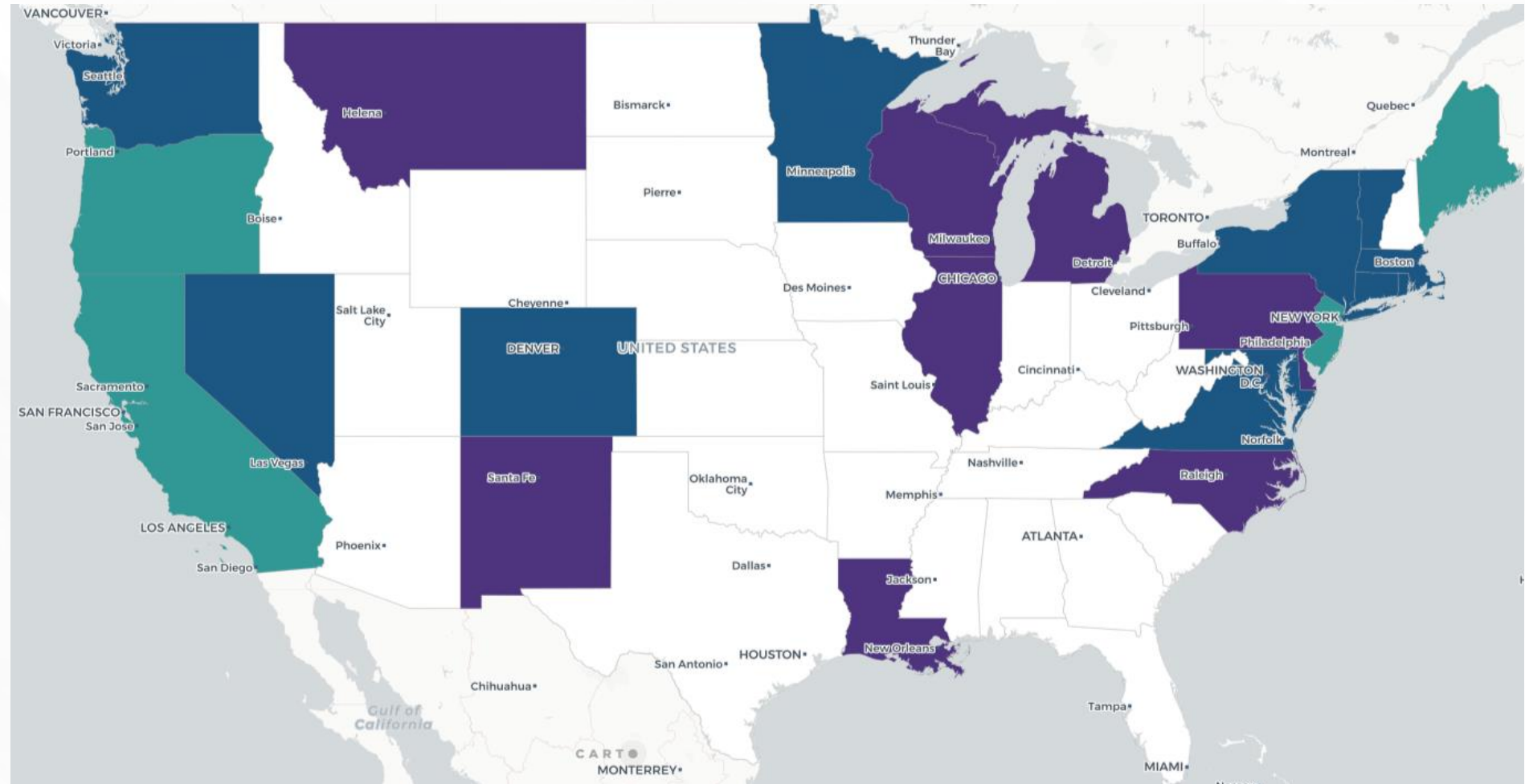
- Emissions targets

Each state has a target to reduce emissions but it's challenging.

# GHG Emission Targets



- No Target
- Statutory Target
- Executive Target
- Statutory and Executive Targets



Center for Climate and Energy Solutions - <https://www.c2es.org/document/greenhouse-gas-emissions-targets/>

what does **REMI** say? <sup>sm</sup>

## McKinsey & Company – The US Low Carbon Economics Tool

[https://www.mckinsey.com/~media/mckinsey/dotcom/client\\_service/sustainability/pdfs/us\\_lowcarbonecon\\_tool.ashx](https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/sustainability/pdfs/us_lowcarbonecon_tool.ashx)

## Committee for a Green Economy – Carbon Tax Modeling

<https://www.remi.com/wp-content/uploads/2017/12/20-Modeling-the-Economic-Demographic-and-Climate-Impact-of-a-Carbon-Tax-in-Massachusetts.pdf>

## Citizens' Climate Lobby – National Fee-and-Dividend Carbon Tax Modeling

<https://citizensclimatelobby.org/wp-content/uploads/2018/05/The-Economic-Climate-Fiscal-Power-and-Demographic-Impact-of-a-National-Fee-and-Dividend-Carbon-Tax-5.25.18.pdf>

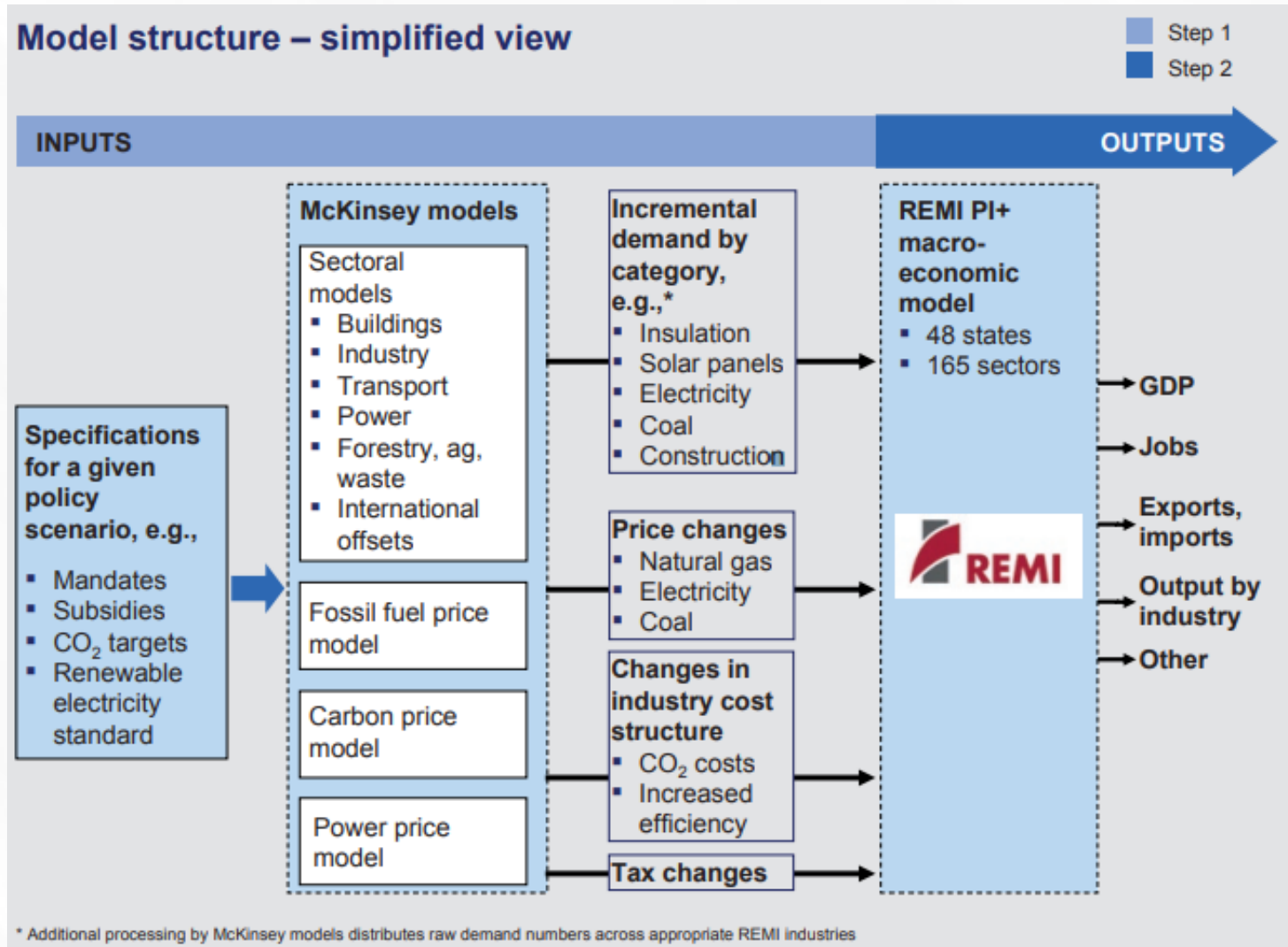
## FTI Consulting – Revenue-Neutral Carbon Tax Modeling

<https://www.remi.com/wp-content/uploads/2019/12/549-Economic-Impacts-of-a-Revenue-Neutral-Carbon-Tax.pdf>

## Nescaum – Clean Transportation Fuels Economic Analysis

<https://www.nescaum.org/documents/nescaum-cfs-economic-analysis-final.pdf>

# Study Example



what does **REMI** say?<sup>sm</sup>

# Regulation, Carbon Tax, Tax Incentives



## Regulation

No more internal combustion engines in new vehicles sold in California starting in 2035



## Carbon Tax

Market-based approach that puts a price on each ton of carbon emissions



## Tax Incentives (subsidies)

Providing tax credits and rebates for electric vehicles and energy efficiency improvements in homes

A combination of regulation, carbon pricing, and incentives can help reduce carbon emissions and address climate change.



# Pros and Cons of Regulation



## Pros

- Forward-looking firms develop new technologies
- Policy makers can clearly define needs such as zero emissions vehicles and offshore wind
- Can achieve economies of scale with a command approach

## Cons

- Regulations can be a “blunt” instrument
- The regulator has a mandate that may not consider cost or economic implications
- Does not “leverage” decisions by firms or individuals based on price signals





# Pros and Cons of Subsidies



## Pros

- Allows for personal choice in the form of incentive rather than a prohibition
- May be more politically feasible

## Cons

- Still must be paid for through higher taxes, or reallocation of budgetary funds.
- Tends to benefit higher income households



## What is a Carbon Tax?

A carbon tax is a tax imposed by the government on emitters of greenhouse gases such as carbon dioxide.

# By The Numbers



## Existing Systems:

There are 68 Direct carbon pricing instruments globally. Including 36 carbon taxes and 32 emissions trading systems



## Potential Revenue

A \$25 tax per ton of co2 would lead to an estimated 125 billion dollars of revenue annually<sup>1</sup>

Carbon pricing is a popular and effective economic tool to reduce emissions globally.

<sup>1</sup><https://www.worldbank.org/en/news/press-release/2022/05/24/global-carbon-pricing-generates-record-84-billion-in-revenue>

# Pros of a Carbon Tax



## Reduces emissions

Puts a price on carbon emissions, incentivizing companies and individuals to reduce their carbon footprint.



## Shifts purchases

Consumers will shift purchases towards lower emission options as carbon intensive goods become more expensive.



## Produces revenue

Revenue generated can be used to support climate action plans or support those impacted by higher energy prices.

An effective carbon tax can help reduce emissions and shift consumer behavior while also producing revenue for climate action.

# Cons of a Carbon Tax



## Can Be Regressive

Lower income households spend a larger portion of their income on energy and transportation so carbon tax burdens them more.



## Decreases Industry Competitiveness

Industries may face higher production costs compared to countries without a carbon tax.



## Politically Unpopular

Carbon taxes can be viewed negatively by the public as they can directly increase costs for consumers

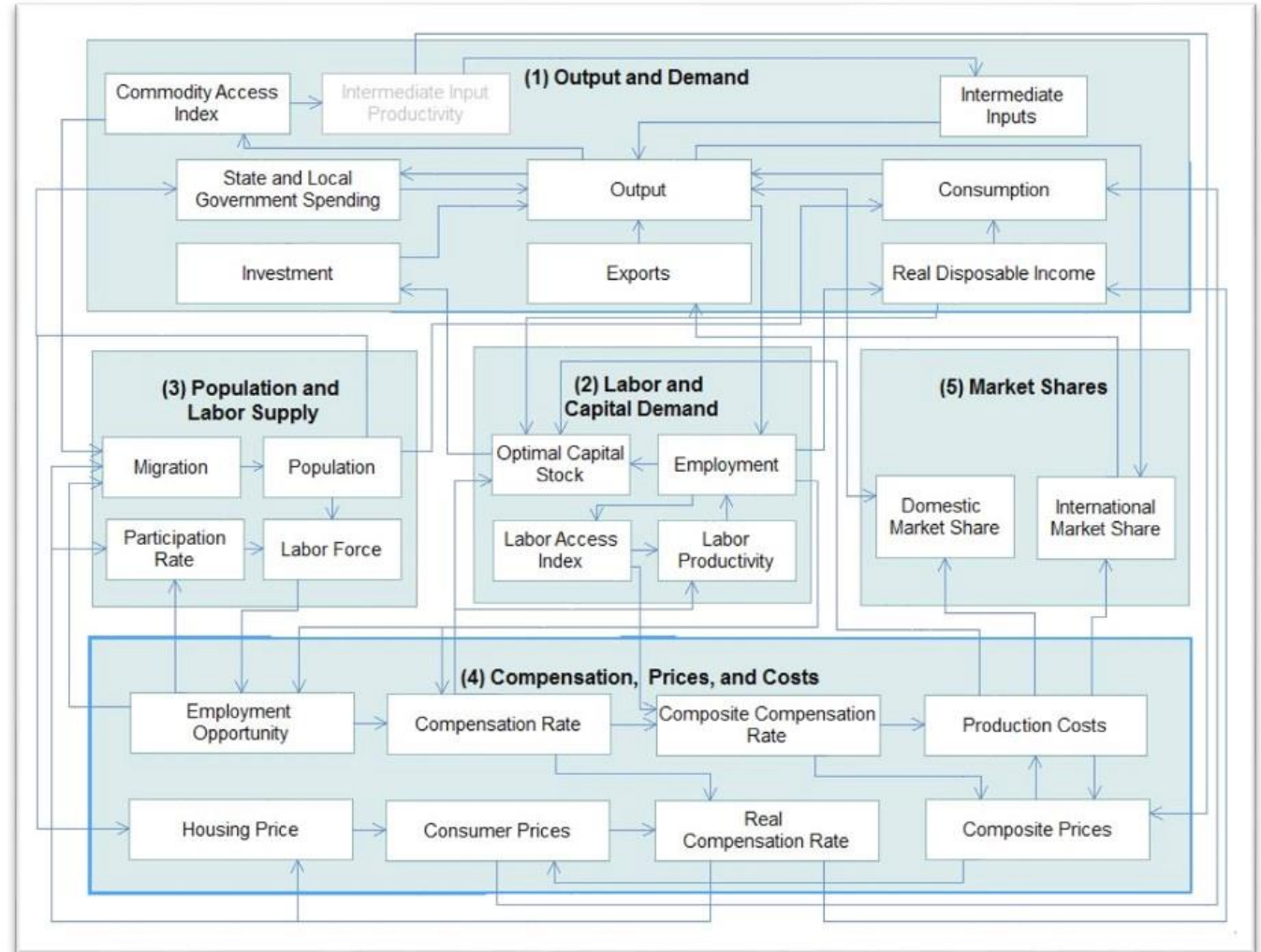
A carbon tax is regressive, disproportionately burdens low-income families, and is generally politically unpopular.

# Model Simulation: REMI E3<sup>+</sup>



E3<sup>+</sup> is the premier software solution for analyzing the macroeconomic and demographic impacts of any initiatives related to the energy and environmental sectors.

Decision-makers depend on E3<sup>+</sup> to provide comprehensive evaluations of the total economic impact of altering electric rates, introducing new power sources, investing in the production of energy, and other policy changes.



what does **REMI** say?<sup>sm</sup>

- **Carbon Dioxide Emissions**
  - See change in metric tons or percent difference
- **Social Cost of Carbon**
  - Evaluating this allows us to tax carbon emissions at a proper rate
- **Energy Consumption**
  - Offset by electricity use
- **Customizable Power Plant Construction**
- **Cost of Fuel and Electricity**

# Model Simulation 1: Carbon Tax & Dividend



## Model

- State of Washington E3+ Model

## Scenario

- Fuel cost increase, natural gas and residual (fuel oil)
- Government transfer of fuel tax revenues

## Timeline

- Permanent regulation, introduced in 2024
- Forecast: 2024-2040



# Model Simulation 2: Regulation Hypothetical



## Model

- 8-region Multiregional U.S. PI+ Model

## Scenario

- Increase in business costs for automotive industry
- Initial increase in business cost for automotive, declining over time; fuel savings

## Timeline

- Costs begin in 2024 to meet 2035 deadline
- Forecast: 2024-2040

# Model Simulation 3: Automobile Subsidy



## Model

- 9-Region California Bay Area PI+ model with Socioeconomic Indicators (SEI) Module

## Scenario

- Subsidy (negative tax) for new automobiles
- Offset by increase in sales tax

## Timeline

- Tax introduced in 2024
- Forecast: 2024-2040

Thank you for attending!

For more information, please contact  
[info@remi.com](mailto:info@remi.com)