



STS: Maine's Economy & Climate Change

Jonathan Rubin

MCS Policy Center & School of Economics,
University of Maine

Adam Daigneault

School of Forest Resources, University of Maine

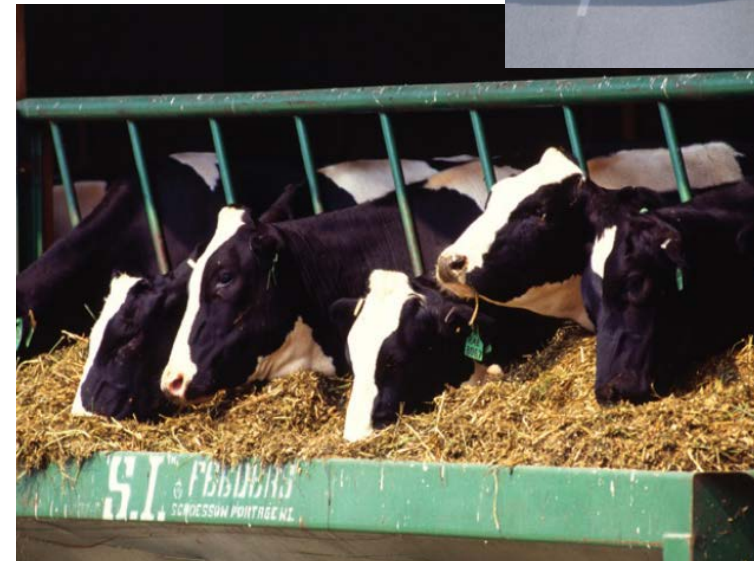


Overview

Climate change expected to impact all sectors of Maine's economy

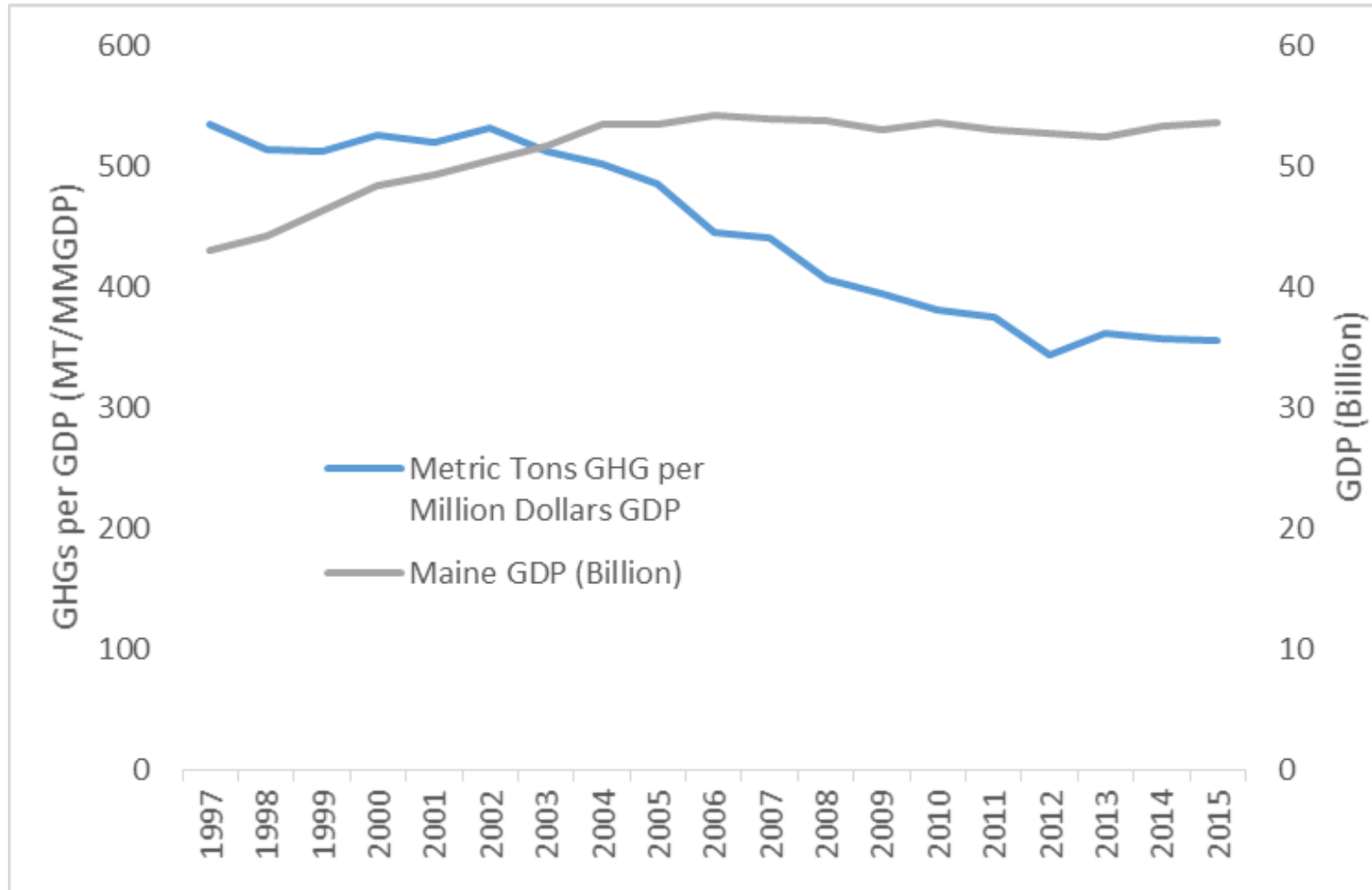
Sectors of particular concern

- Energy
- Transportation
- Tourism & Recreation
- Agriculture
- Forest Products
- Marine Fisheries & Aquaculture





Maine's GDP and GHG Emissions



Source: Maine DEP, 7th Biennial Report (2018) and BEA 2019

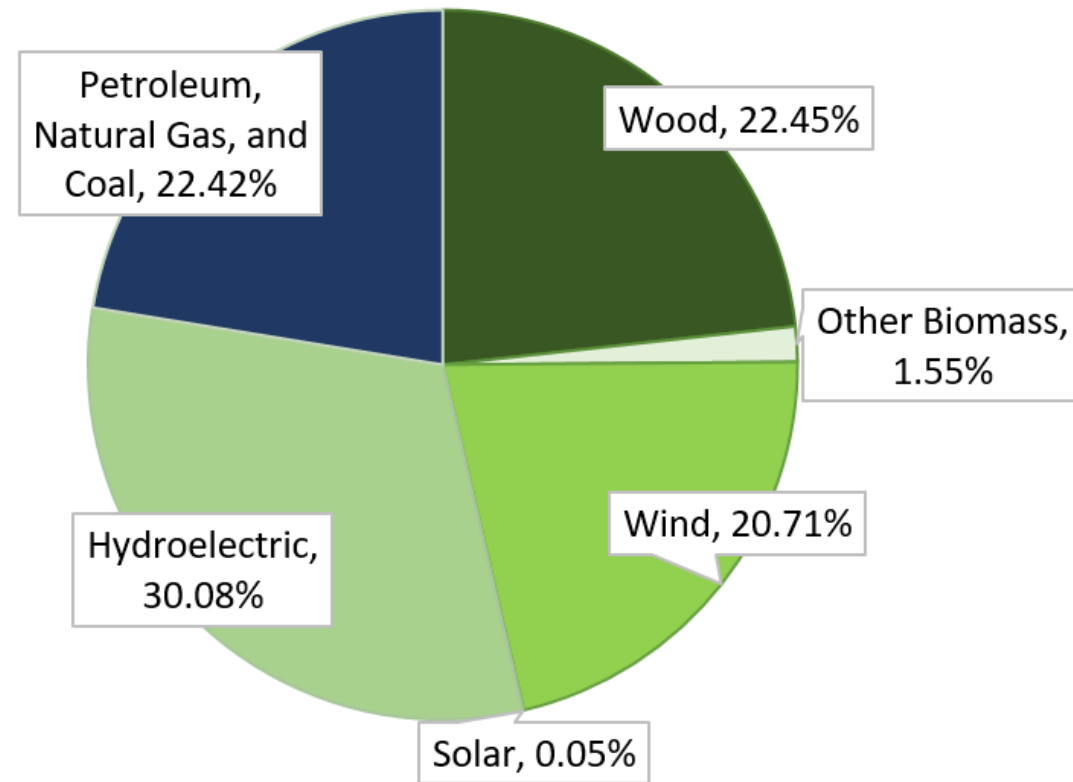
Maine's real **GDP** has been relatively constant since 2004, while **GHGs** have been declining. Maine's economy is transitioning to lower GHGs per dollar of output.



Energy

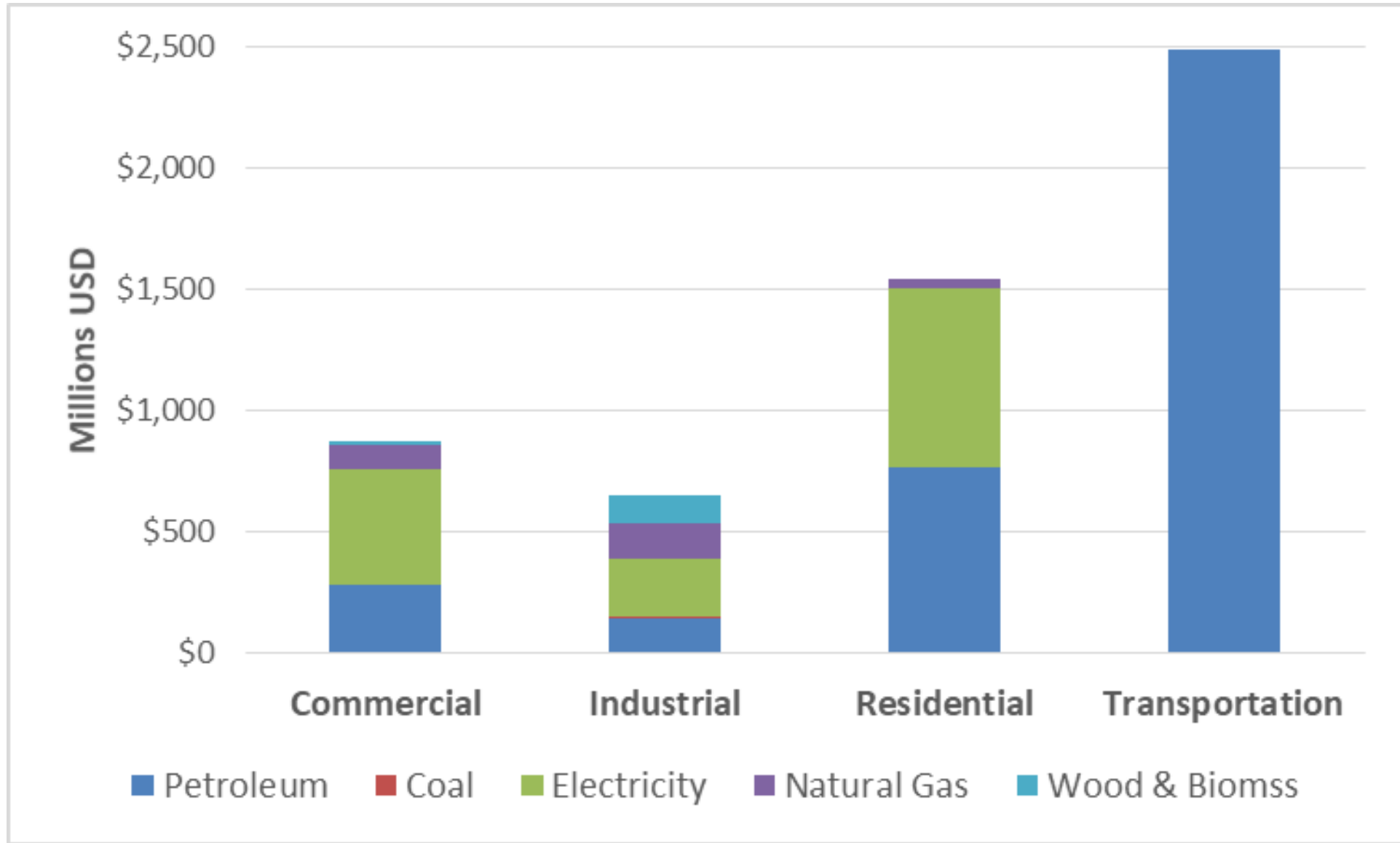
- Nearly 2/3 of Maine households use fuel oil for home heating
- Petroleum products ~50% all energy used in state
- **Net Electricity ~75% renewable**
 - Hydro, wood & wind
- Opportunities:
 - Fuel switching: heating and transport
 - Renewable energy generation

Maine Net Electricity Generation by Source (2017)





Maine Energy Expenditures (2017)



Source: EIA SEDS 2017



Transportation Sector

- Maine's GHG emissions, **50+ %**
- Maine transport energy, ~ **94%** oil
- ***Per-capita***, Maine's transportation GHGs ~ average nationally
- Climate impacts on infrastructure
 - Pavement life
 - Bridge fatigue & culvert washouts
 - Coastal roads & infrastructure – severe weather
- Opportunities
 - Electric Vehicles
 - Locally-produced biofuels
 - Better public health: air quality, mobility, etc.



Source: Maine Climate Future, 2009



Transportation - Opportunities

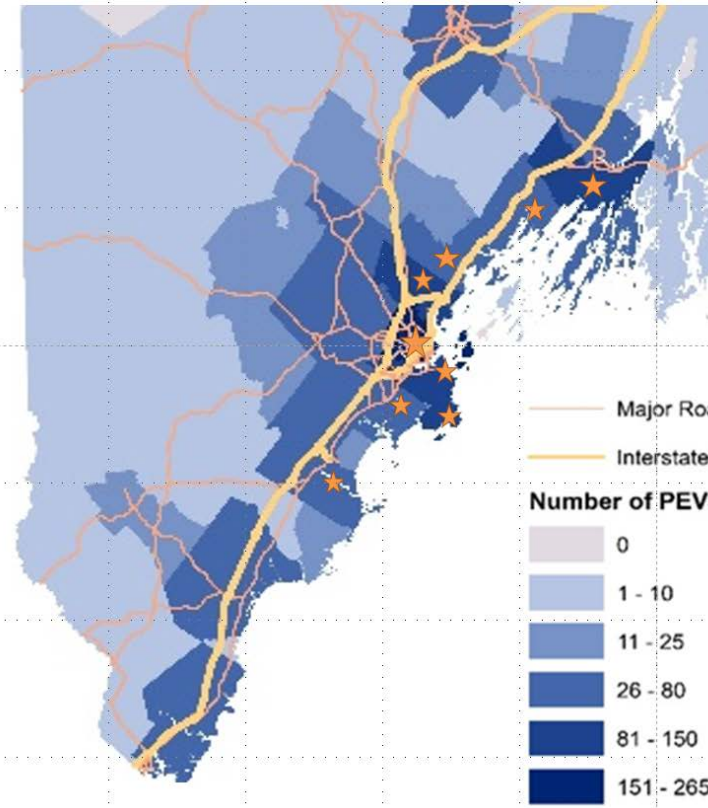
Benefits

- Active transportation
- Better air quality
- Less congestion
- More access & mobility
- Economic development

Solutions

- Electric Vehicles
 - Available/affordable
 - Across Maine
- Biofuels
- Vehicle fuel efficiency
- System efficiency, multimodal
- Reduced carbon intense travel activity
- Reduce GHGs from construction maintenance
- Mobility options: ride hailing & pooling

Top 10 EV Towns in Maine

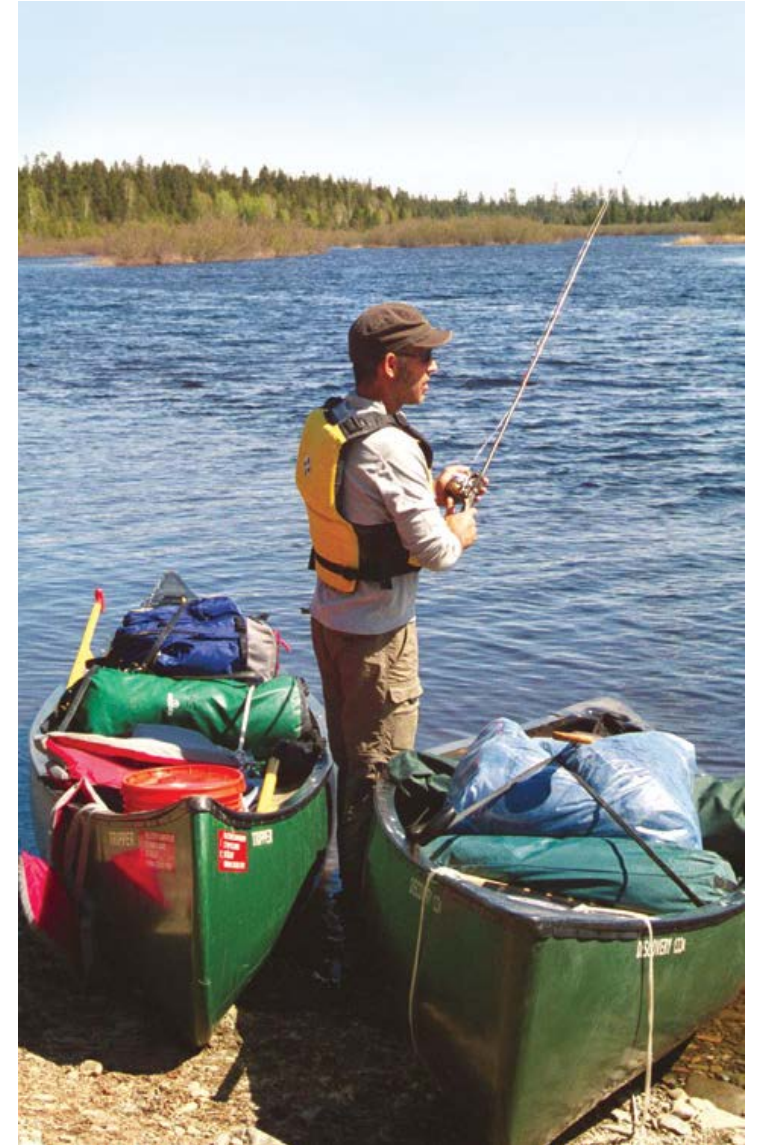


1. Portland
2. Brunswick
3. Falmouth
4. South Portland
5. Bangor
6. Cape Elizabeth
7. Scarborough
8. Cumberland
9. Freeport
10. Saco



Tourism & Recreation

- \$6 billion/year direct expenditure
- Primarily outdoor and recreational activities
- Climate change will likely:
 - Increase time for summer activities
 - Decrease availability for winter activities
 - Directly impact spending by activity
- Opportunities:
 - Tourists push/pull northward
 - New recreation ventures





Forest Products

- \$8 billion/year industry
- Diverse species and product mix
- Climate change likely to:
 - Shift species mix towards hardwoods
 - Affect forest productivity
 - Increase risk of pest and disease
 - Have more variable & costly harvests
- Opportunities:
 - Mitigation via improved forest management
 - Emerging wood products and C storage



Source: Maine Climate Future, 2009



Agriculture

- Largest and most diverse agricultural economy in New England (\$1+ billion)
- Climate change is likely to:
 - Lengthen growing season
 - Increase need for irrigation and other infrastructure
 - Affect confined livestock due to higher temps
- Opportunities:
 - Mitigation via soil health and manure management
 - New crops and products

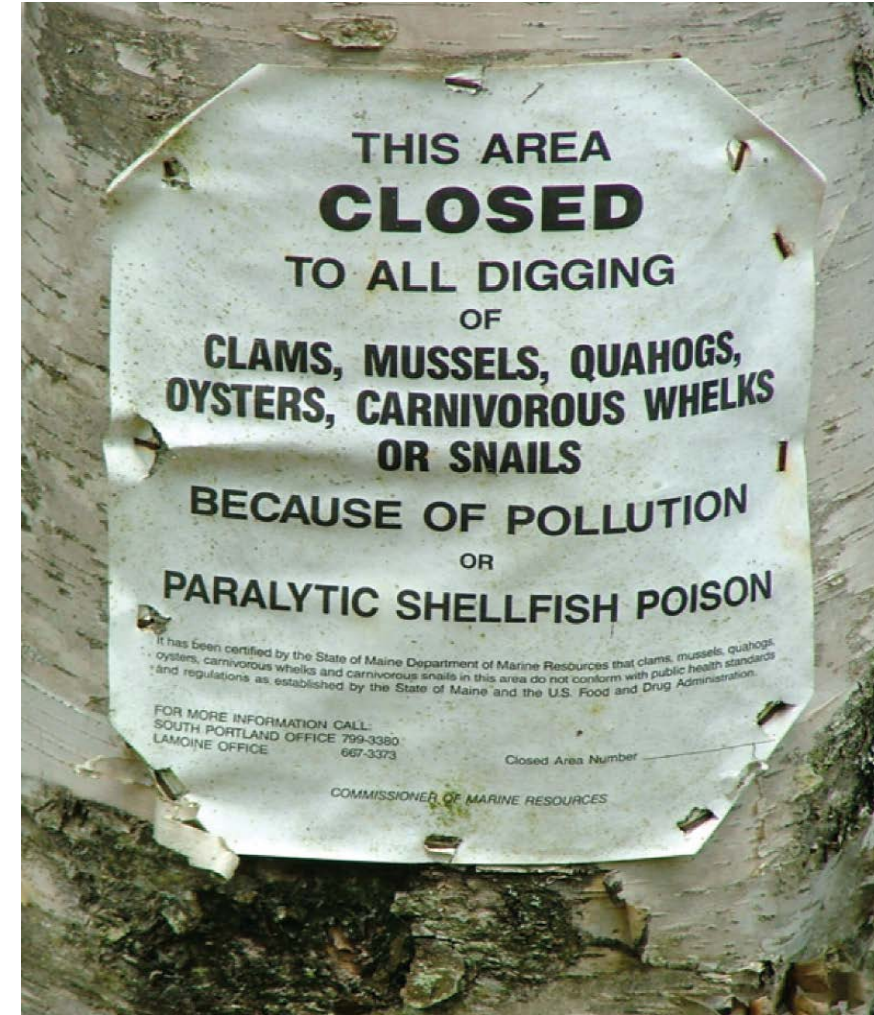


Source: Bauer, S., Maine Climate Future, 2009



Marine Fisheries & Aquaculture

- \$600+ million in commercial harvests/year
 - 2/3 attributed to lobster fishery
- Climate variability & warming waters likely to have a negative impact on landings and sector-level employment
- Opportunities
 - New aquaculture ventures
 - Capitalize on new markets



Source: Lilieholm, Maine Climate Future, 2009



Critical Issues

- Maine's economy not just affected by climate change impacts, but climate mitigation policy as well – *our choices matter*.
 - Performance standards v. technology winner
 - Build in flexibility, update as science and data evolves
- Need to *consistently* assess sources of mitigation and potential tradeoffs/impacts for major sectors of the economy across all working groups
- Where can *Maine* have the most impact?
- Who is entering the workforce? What industries are growing? Who will be most affected by policy?

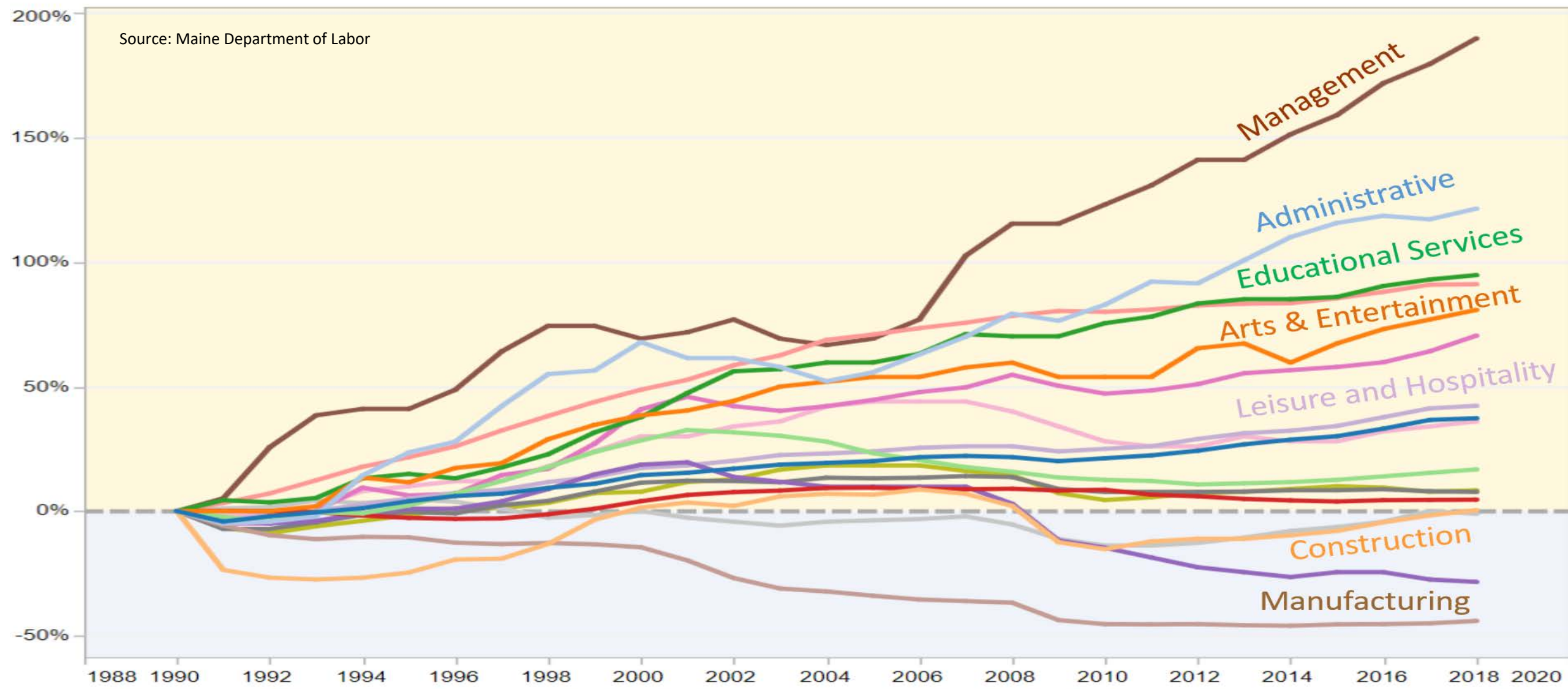


Photo by Joanna Kosinska on Unsplash



Context: Employment Change (%) Since 1990

Source: Maine Department of Labor



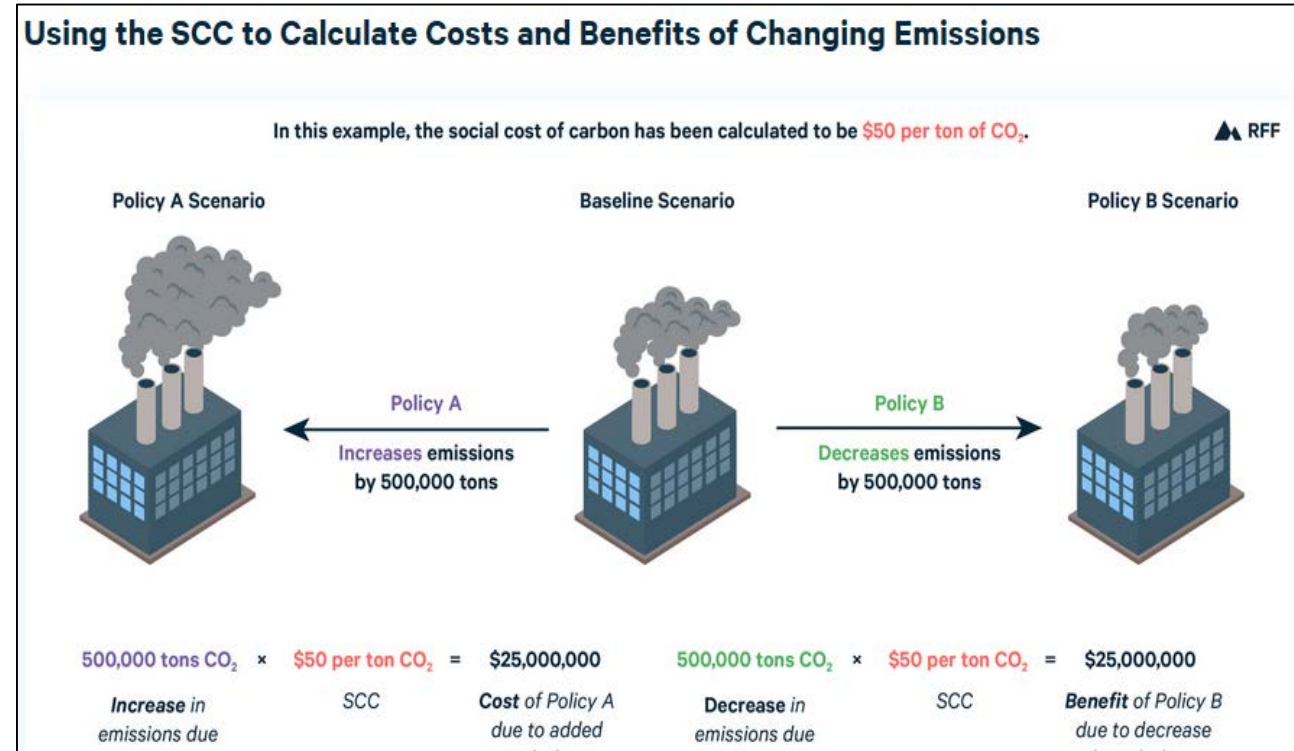


Recommendations for MCC and WGs

- All MCC analyses should use consistent **discount rates** to quantify costs and benefits of climate change impacts and mitigation
- Suggest using the US Government Social Cost of Carbon (SCC) analysis rates of **2.5%, 3% and 5%**, but...

Discount Rate **Global SCC**
 (\$ per ton CO₂)

2.5%	75
3%	50
5%	14



Source: RfF, Social Cost of Carbon 101



Summary & Conclusions

- Climate change impacts several sectors of Maine's economy, but not all equally
- Maine's GDP and GHG emissions diverging, in the 'right' way
- Mitigation and adaptation efforts can also create economic opportunities
- Economic assumptions for MCC policy analysis needs to be consistent across working groups