Climate Change:
Some Basic Economics

Steve Colt

Institute of Social and Economic Research

University of Alaska Anchorage

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Overview

- The mother of all externalities
- How (some) economists think about climate change
- National climate policy – likely effects on Alaska
- What municipal gov’ts can do
  - – and what they (probably) can’t

Greenhouse gas emissions...

The “mother of all externalities”

GHG emissions impose external costs

- When I drive, or use my furnace, or take the plane to Hawaii,
- I get the benefit
- Everyone else shares the cost
  - CO_2 emissions are global
  - CO_2 emissions are “forever” – from 50-100 years
  - Today’s and tomorrow’s impacts come from the rich-country baby-boomers’ emissions

Reducing GHG emissions creates external benefits

- When I walk, or turn down my furnace, or skip the trip to Hawaii,
- I suffer the cost
- Everyone else shares the benefit

What to do?

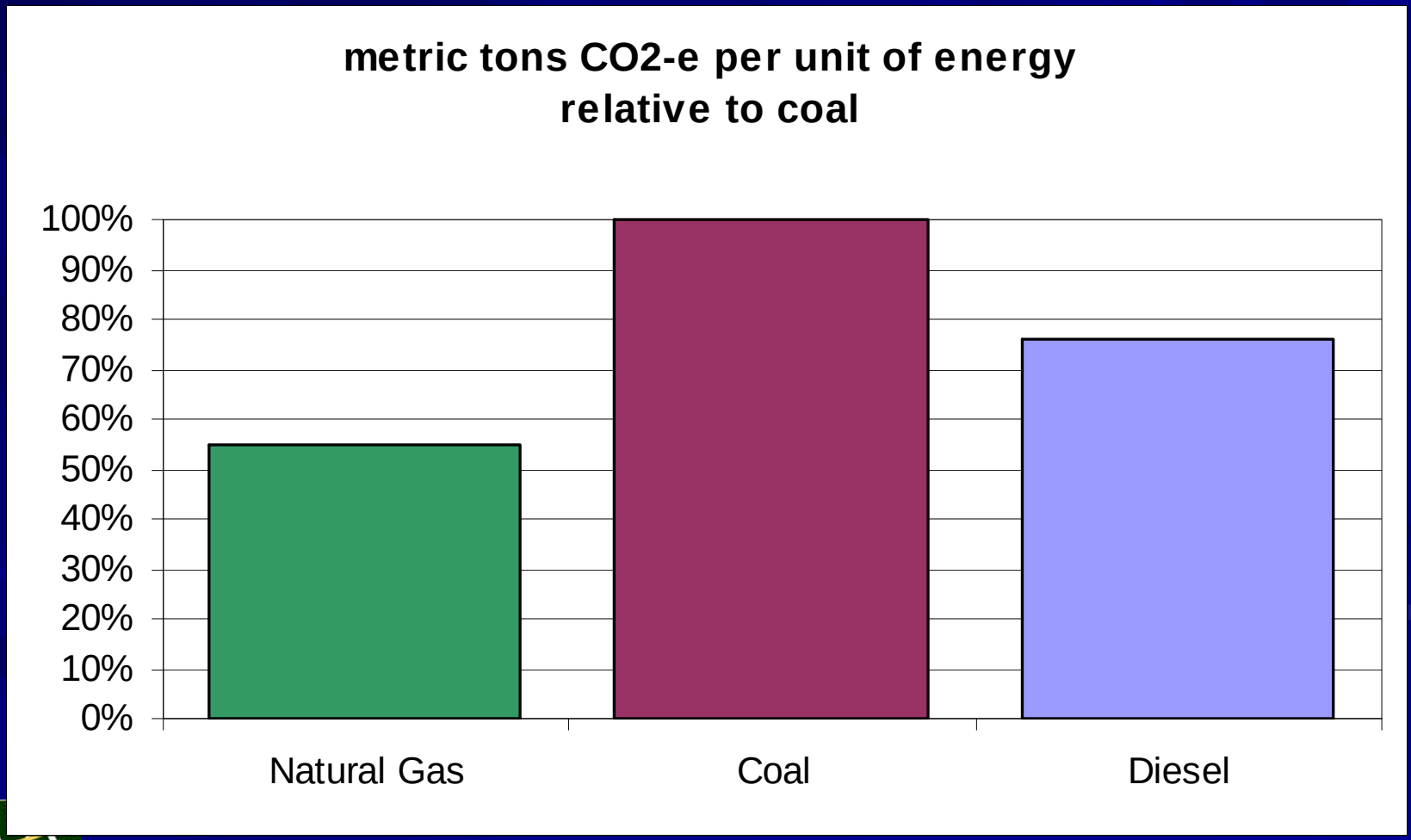
- "Internalize the externality"
- Somehow, make the cost-causer be the cost-payer
  - Carbon tax
  - Emissions allowances
- This only works if we all agree to do it together
  - (think about the likely success of voluntary property taxes...)

Not all GHGs are equally potent

- CO_2 : GWP = 1 (by definition)
- unburned methane GWP =~ 25
- nitric oxide N_2O GWP =~ 300
  - exact numbers can be found at: http://www.eia.doe.gov/oiaf/1605/archive/vr03data/summary/special_topic.html

Not all fuels are created equal

natural gas CO2 = 55% of coal



National Policy: Lieberman - Warner

- Cap and trade with possible banking and borrowing
- The market would establish a going price for CO2
- Models project prices of between $20 and $250 per metric ton CO2e
  - Go figure!

When carbon is priced...

- Alaska North Slope gas looks really good!
- Under *American Council on Capital Formation / National Association of Manufacturers* scenario for Lieberman-Warner,
  - wellhead value of N Slope gas shipped @ 4 bcf/day increases by $4-9 billion per year
  - State of AK revenues increase by $1-2.2 billion per year

Infrastructure impacts

How Much Might Climate Change Add to Future Costs for Public Infrastructure?

By Peter Larsen and Scott Goldsmith

- *Damage from climate change could add $3.6 to $6.1 billion (10% to 20%) to future costs for public infrastructure from now to 2030* and $5.6 to $7.6 billion (10% to 12%) from now to 2080. These estimates take into account different possible levels of climate change and assume agencies adapt infrastructure to changing conditions.

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Climate Policy as Insurance

- Climate change impacts are largely unknown
- Risk vs. “true uncertainty”
- Both mitigation and adaptation may have the characteristics of insurance
  - meaning: certain cost, highly uncertain benefits

Uncertainty vs. Risk

- Risk is when you know the odds:
  - It will rain about 1 day in 10 in Anchorage, or about 1 day in 2 in Juneau
  - Asessing risk based on reams of data is what actuaries do
- Uncertainty is when we do not know the odds
  - we don’t know the range of outcomes
  - we don’t know the probabilities of the outcomes

Climate change effects are uncertain

- That's why you cannot insure against it in the insurance markets
- The uncertainty is deep – do not expect some scientist with some computer to resolve this problem any time soon

Adaptation vs. Mitigation

- Mitigation = changing the future trajectory of GHG emissions and/or concentrations
- Adaptation = coping with what is or what will be

Adaptation to Mitigation Policy

For Alaska,

- Adapting to higher energy prices will be a major challenge
  - direct use of energy
  - embodied energy in all goods
- The higher prices will come in large part from global mitigation policy

Special role of Municipalities

- Local communities are famous for taking the long view
  - Building codes save unknown "statistical" lives at some unknown future date
  - water and sewer lines, streets, and schools allow for growth and provide uncertain future benefits to society at large...especially education!

Choosing the Right Tools for the Job

- How national policies can filter down
  - ??Community-based emissions allowances
- Why wait: Local actions can be crucial
  - Fix the chasms on the Anchorage coastal trail
  - Offer a bus route to/from Girdwood
  - Pay attention to energy consumption in transportation and land use planning
- These are just examples – but of things that ONLY munis can do...

What municipalities can't do

- Munis cannot price carbon
  - But they can ask for national action
- Munis cannot change individual values and actions
  - But they can make low-carbon choices more viable and more attractive
- Munis cannot opt out and hide
  - We're all in this together, as you well know


Thank You
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