

Climate change and energy security policies: Are they really two sides of the same coin?

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Introduction

- ❖ One of the most discussed policy issues in energy economics is whether concern about climate change requires policies aimed at reducing fossil fuel use
- ❖ I will discuss general economic principles relevant to answering this question
- ❖ But the talk is organized around the more specific question:
 - ❖ “What is the relationship between climate policy and another policy goal – energy security?”

“We must treat energy security and climate security as two sides of the same coin.”

Tony Blair, October 20, 2006

Blair's argument in a nutshell

- ❖ The industrialized world would not be so concerned about Middle East politics if it were not so dependent on Middle East oil supplies
- ❖ For ensuring energy security, reducing oil consumption is a substitute for a military presence and military action in the Middle East
- ❖ Fossil fuel combustion also adds carbon dioxide (CO₂) to the atmosphere
- ❖ Since CO₂ is a greenhouse gas, increasing its concentration in the atmosphere should raise global surface temperatures which could then have direct, and, by triggering other changes in climate, indirect harmful effects
- ❖ Reducing these possibly harmful effects from climate change is the goal of climate policy

Possible meanings of energy security

- ❖ National security dimensions:
 - ❖ Energy commodities sourced from unstable or hostile countries
 - ❖ Military forces require oil products (e.g. US military 130 million barrels of oil products per year)
- ❖ Economic dimensions:
 - ❖ Energy price rises have preceded most post-WWII recessions with several pathways for the effects (save non-energy costs, productivity declines)
 - ❖ Large international financial flows can be destabilizing
 - ❖ Price uncertainty can retard investments in alternative supply sources

Policies to deal with energy insecurity

- ❖ Strategic petroleum reserves for short term emergencies
- ❖ Diversification of energy sources and the regions they come from
- ❖ Increasing supply from more stable countries
- ❖ Increased substitutability between energy sources
- ❖ Raise *national* energy security by relying more on *domestic* energy sources

Climate policy

- * CO₂ emissions from fossil fuel combustion will change climate, but the size, nature, and geographic distribution of the effects are very uncertain
- * Policies to respond to this threat can be placed into five categories:
 1. Reducing emissions of greenhouse gases, especially CO₂
 2. Sequestration of CO₂ preferably via methods that yield other benefits
 3. Geo-engineering projects to offset the warming effects of CO₂
 4. Limiting the chance or magnitude of harmful effects from climate change
 5. Taking measures to cope better with damaging weather events
- * Economic approach: implement policies based on expected costs (including any foregone benefits) versus expected benefits

Are the policies complementary?

- ❖ Necessary precondition:
 - ❖ Reducing fossil fuel use is part of the efficient response to energy insecurity; or
 - ❖ Reducing CO₂ emissions is part of the efficient climate policy
 - ❖ By efficient we mean lowest cost per unit of benefit delivered
- ❖ Low cost opportunities to raise energy efficiency could be one efficient option for furthering both goals
 - ❖ But note the distinction between energy efficiency and economic efficiency

Switching energy sources?

- * Currently a very high cost option:
 - * Large amounts of capital would have to be replaced
 - * Problems with alternative energy sources including: frequent unavailability, extreme short term variability, inability to schedule time of supply, remoteness from markets, low energy density, and non-CO₂ environmental effects, but R&D might ameliorate some of these disadvantages
- * How costly would it be to allow continuing emissions in the meantime?
 - * The energy system is in any case shifting to use more natural gas while keeping costs low
 - * CO₂ accumulation has a declining marginal effect on temperature
 - * CO₂ is non-toxic and in fact yields direct benefits as a fertilizer
 - * Not all the effects on climate will be harmful and certainly not in all places

CO₂ is only one source of climate change

- ❖ Climate is always changing as a result of many natural and other anthropogenic forces
- ❖ Non-CO₂ climate change, and geographic variability of the effects, increase uncertainty about the benefits of controlling CO₂ and raise the benefits of actions that protect against climate change *regardless* of its source, namely:
 - ❖ Limit the chance or magnitude of harmful effects from climate change or
 - ❖ Enable us to cope better with damaging weather events
 - ❖ The benefits of the latter are increased if they help us cope better with other events such as earthquakes or terrorist attacks

Partial emission controls

- ❖ Developing countries will not forgo economic growth by avoiding low cost fossil fuels
 - ❖ For example, CO₂ emissions from energy consumption in China increased by more than 167% over 1999–2009, while the absolute *increase* in India over the same period was around two and a half times the *decrease* in the United States
- ❖ This reduces the benefits of controls where they can be implemented
- ❖ Reductions elsewhere might raise world-wide emissions as industries relocate

Costs are higher for North America and Australia

- ❖ US estimated to have around 30% of the world's known coal resources
- ❖ Canada estimated to have more than 70% of the world's known bituminous oil resources
- ❖ US estimated to have more than 70% of the world's known oil shale resources
- ❖ US and Canada now also known to have huge shale gas and shale oil resources
- ❖ Australia also has very large per capita endowments of fossil fuels, relatively low energy prices as a significant comparative advantage, and close competitors that would not impose restrictions on fossil fuel use
- ❖ "Cheap Resources into Expensive Energy Revisited"

Conclusion

- ❖ Attempting to control CO₂ emissions by changing from current energy sources is very expensive
 - ❖ For the US and Canada in particular a significant part of the cost is *reduced* energy security
- ❖ The attempt to get countries, especially large population developing countries, to constrain CO₂ emissions in a meaningful way will fail
- ❖ For all countries, but especially Canada, US and Australia, the cost/benefit trade-off of reduced fossil fuel use is very unfavorable compared to other policies to address climate change