

Most Distortionary Energy Subsidies

1. **Absence of Charges on Greenhouse Gas (GHG) Emissions**

Growing consensus regarding potentially severe impacts from rising atmospheric carbon make unfettered GHG emissions untenable. Skewed price signals, especially for fossil fuels, along with poorly structured political subsidies to alternatives, squander needed time for economic transition and impede broad-based responses. Despite recent growth in carbon markets, controls remain concentrated in the European Union. A broad review of mitigation scenarios overseen by Stanford's Energy Modeling Forum indicates that carbon markets need to be tens to hundreds of billions of dollars per year larger than they are today.

2. **Oil Security**

Pipelines, water transit chokepoints, and long supply lines all make global oil supplies vulnerable to disruption. Government investments in stockpiling and defense of infrastructure and shipping may be justified, but too often are paid by taxpayers rather than recovered through oil prices. Subsidies of at least tens of billions of dollars per year mean the loss of important price differentiation across fuels and suppliers based on security conditions.

3. **Liability Caps on Nuclear Fuel Cycle Facilities**

Either through domestic legislation such as the Price-Anderson Act or international agreements such as the 1997 Convention on Supplementary Compensation for Nuclear Damage, government-stipulated coverage levels on nuclear power are too low throughout the world. Payouts in natural disasters regularly exceed available nuclear coverage even in the countries with the highest mandated limits. Companies insure their own nuclear plant and operations for amounts more than 10 times what they are required to purchase for offsite liability. Globally, the annual subsidy likely exceeds \$10 billion, and could be higher.

4. **Purchase Mandates, Tax Credits, and Exemptions for Ethanol and Biodiesel**

Ethanol and biodiesel have been showered with subsidies around the world, compounding preexisting distortions from subsidized crops and irrigation. Well over 200 subsidy policies just in the United States resulted in a cost for ethanol of more than \$500 per metric ton of CO₂ equivalent displaced. Purchase mandates in key U.S. and European markets continue to prop up demand despite expiration of some tax breaks. These continue to feed land conversion and associated habitat loss, erosion, water depletion and pollution, and food vs. fuel competition. Biofuels production has been identified as a main driver of land dispossession, as investors buy up subsistence cropland and use it for fuel production.

5. **Cross-Subsidies in Electricity Markets**

Though by no means simple to address, electricity markets around the world continue to price retail power in ways that average costs across time, service nodes, and customer classes. Because total revenues often cover costs, these problems constitute cross-subsidies rather than direct subsidies. However, they mask important variation in the cost to produce and deliver electricity to particular customers at particular times. Work by Lawrence Berkeley National Laboratory suggests that these pricing problems may impede demand response by electricity consumers. Correcting these problems could spur decentralized power generation, improved capital efficiency, and increased end-use conservation.

6. Domestic Subsidies to Energy Consumption

Political efforts to keep domestic fuel prices low are common in energy-rich nations (to co-opt opposition) and in developing consuming nations (ostensibly to reduce the hardships to poor citizens). These policies dampen fuel substitution and conservation, and are mostly captured by wealthier residents. The World Bank notes these policies also introduce high levels of domestic scarcity and corruption as people divert cheap domestic supplies to foreigners on the black market. International Energy Agency data indicates consumption subsidies in non-OECD countries have grown from roughly \$250 billion per year in 2005 to \$409 billion in 2010. Subsidies are largest in Iran, though they also exceed \$20 billion/year in Saudi Arabia, Russia, India, China, and Egypt as well. Targeted subsidies for specific energy-intensive uses (such as irrigation pumping in India and Yemen or basic chemical production in Saudi Arabia) trigger ancillary problems with depletion and competitiveness.

7. Government Absorption of Disposal Risks for High-Level Nuclear Waste

Though light on carbon emissions, the nuclear fuel cycle leaves behind radioactive residuals that are extremely difficult to deal with; there is still no permanent repository anywhere in the world. In many countries, the complex and high-risk responsibility for handling those wastes is taken over by the government in return for a small fee that is well below the full costs of management. Were private operators responsible for managing their wastes until they were no longer hazardous—the norm for all other energy resources—the elevated risk to investors would result in much higher interest and insurance costs. Under plausible scenarios, the increased operating costs from proper pricing of this service would eliminate the current operating cost advantage that nuclear has over coal-fired electricity.

8. Tax Exemptions for Petroleum Used in International Air and Water Transport

Special exemptions to baseline tax rates on oil distort intersectoral competition as well as reduce the incentive for improved efficiency. The European Environment Agency estimated that in 2005, tax exemptions on international waterborne shipping and aviation are worth \$50 billion to \$80 billion per year in the EU alone.

9. Free Use of Cooling Water in the Thermal Power Sector

Electricity producers use prodigious amounts of water for plant cooling—49% of total withdrawals in the United States, more than 50% in many European countries, and on par or even larger than irrigation use. While much of this usage is nonconsumptive, the withdrawal of billions of gallons per day, as well as the return of higher temperature flows that often contain trace contaminants, harms ecosystems. Withdrawals are usually permitted, but the use of the water itself is generally free, even when the plant has senior rights to other users. Appropriate water charges would improve the competitiveness of nonthermal generation technologies such as wind and increase efficiency, encourage much better water management in the power sector, and align plant locations more closely with water availability.

10. Feed-in Tariffs and Purchase Mandates for Renewable Energy

Government policies to buy renewable energy at a premium have scaled dramatically over the past 5 years, reaching \$44 billion annually in 2010 according to the IEA. Feed-in tariffs predominate in Europe, and renewable portfolio standards dominate in the United States. Price premiums are sometimes extremely high—in excess of 50 eurocents/kWh for some photovoltaic installations. Though aggregate subsidies may still lag conventional fuels, spending is high enough that more rigorous competition for the available support among eligible sources would be appropriate. A narrowing of eligibility to cull out resources that have more environmental downside, such as biomass and landfill gas, is also needed.

—Doug Koplou, *Earth Track, Inc., Cambridge, Massachusetts*

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