



Carbon Pricing Options

November 13, 2018

From Pope Francis:

“There is an urgent need to develop policies so that, in the next few years, the emission of carbon dioxide and other highly polluting gases can be drastically reduced, for example, substituting for fossil fuels and developing sources of renewable energy.”

-- *Laudato Si'* ¶ 26



Two Main Approaches

- Carbon tax or fee
 - Could be applied at federal or state level, e.g.,
 - MARKET CHOICE Act, introduced in July by GOP Reps. Carlos Cubelo (FL) and Brian Fitzpatrick (PA)
 - Washington state Initiative 1631, defeated 56%-44% on Nov. 6
 - Could also be adopted by individuals as voluntary measure
- Cap-and-trade system
 - Also could be applied at federal or state level, e.g.,
 - Waxman-Markey Bill, passed by House in 2009 but not voted on by Senate
 - California's Cap-and-Trade Program
 - Regional Greenhouse Gas Initiative (RGGI), which currently covers the six New England states, plus New York, Delaware, and Maryland

I. Carbon tax/fee

- Goal is to increase price of carbon enough to drive significant reductions in GHG emissions.
- Latest IPCC report says emissions must be reduced 100%—eliminated—by 2050 to keep global warming to 1.5°C.
- The tax should increase over time to cause markets to shift to cleaner energy. IPCC report says that, to be effective, price would have to range from \$135 to \$5,500 per ton of CO₂ in 2030.
- Border adjustment measures are necessary to prevent “leakage”—moving operations and emissions overseas. (But these can get very complicated.)

I. Carbon tax or fee (cont.)

- Big issue is how to allocate revenue from carbon tax. Three models:
 - Use it to make up for existing funding gaps for essential programs with a focus on climate change
 - Distribute it to citizens, via a dividend or tax credit (revenue-neutral approach)
 - Invest in climate-friendly and/or redistributive projects, like clean energy and a just transition for workers in carbon-intensive sectors

I. Carbon tax or fee (cont.)

- Citizens' Climate Lobby's Carbon Fee and Dividend proposal
 - Would put a rising fee on fossil fuels—\$15/metric ton the first year, and an additional \$10/metric ton each year thereafter.
 - CCL says a fee is more effective and less costly than a regulatory approach.
 - Would return all the net revenue to households as a monthly dividend.
 - Full dividend for each adult; half dividend each for up to two children.
 - CCL says two-thirds of households would break even or receive more than they would pay in higher prices.
 - CCL says revenue neutrality is better than spending the money on clean energy, efficiency upgrades, and green jobs.
 - Would use border adjustment to discourage business relocation.
 - CCL says it would reduce CO₂ emissions 52% below 1990 levels in 20 years and would add 2.8 million jobs to economy.

I. Carbon tax or fee (cont.)

- Pros of carbon tax/fee:
 - Covers all fossil fuels and emitters, unlike cap-and-trade systems
 - Provides high level of certainty about (increasing) price of future emissions
 - Can generate revenue for energy conservation, clean energy, job training, and rebates to low-income households
 - Supported by economists, some conservatives, and some industry leaders
- Cons of carbon tax/fee:
 - Unlikely to pass, and if it did, would likely be too low and too full of gifts to industry, like regulatory relief and immunity from lawsuits
 - Environmental benefits are uncertain
- Could be helpful as *part* of overall effort to reduce GHG emissions

II. Cap-and-trade system

- Government imposes a cap on the amount of CO₂ that entities such as utilities can emit, and then gives or auctions off allowances for every ton of CO₂ allowed under the cap.
 - Cap decreases each year, reducing total amount of emission allowances.
 - Entities must have an allowance for each ton of CO₂ they emit. As cap decreases, they must either reduce their own emissions or purchase allowances from other entities that have more allowances than they need.
 - Cost of allowances is set by supply and demand in the trading market.
- Trading provides an incentive for entities to save money by cutting emissions in the most cost-effective ways.
- Big issue is how to provide allowances and allocate revenue, if any.

II. Cap-and-trade system (cont.)

- RGGI is a multistate cap-and-trade system
 - Expected to help member states reduce annual power-sector CO₂ emissions 45% below 2005 levels by 2020 and an additional 30% by 2030.
 - By auctioning the allowances, RGGI says its states have seen more than \$3 billion in economic benefits from the program.
- Virginia DEQ has completed work on a rule that would align the state with RGGI.
 - If rule is adopted by Air Pollution Control Board, VA would participate in RGGI cap-and-trade system.
 - But because the program is being implemented by regulation and not legislation, the state could not auction off emission allowances to raise revenue.
 - DEQ says ratepayers may see “a little over 1%” increase in their utility bills by 2030.

II. Cap-and-trade system (cont.)

- Pros of cap-and-trade system:
 - Provides high level of certainty about the amount of future emissions
 - At least in Virginia, appears to be only viable option
 - If done through legislation, can generate revenue for energy conservation, clean energy, job training, and rebates to low-income households
 - Supported by economists
- Cons of cap-and-trade system:
 - Cost of allowances has been too low to be effective
 - Covers too limited a portion of the economy (utilities)
 - Has mainly pushed electricity generation from coal to natural gas, not to wind and solar

III. Voluntary approaches

- Individuals, households, companies, churches, etc. can use voluntary carbon pricing to counteract GHG emissions for which they are responsible.
 - This is obviously no substitute for effective regulatory, tax, and/or cap-and-trade measures to address GHG emissions across the board; but they can complement one's own efforts to live more sustainably.
- Goal is to reduce one's carbon footprint as much as possible, and then offset or pay a voluntary tax on any remaining GHG emissions.
 - Additional cost of offsets or tax will provide incentive for further lifestyle/operational changes to reduce emissions.

III. Voluntary approaches (cont.)

- From TerraPass: Think of it in terms of getting a diagnosis of high cholesterol when you visit your doctor.
 - Your doctor does a blood test to measure your cholesterol levels. (Carbon Footprint Calculator)
 - If your cholesterol is high, the first thing you might do is try to lower it by changing your lifestyle, with things like exercising more or eating healthier. (Recycling, walking, using less electricity, etc.)
 - If that's not enough, you might also need to take medicine to help control your high cholesterol. (Carbon Offsets)

III. Voluntary approaches (cont.)

- Sample offset programs:
 - Arcadia Power – can subscribe to have either 50% or 100% of monthly energy use offset. The 50% plan is free, while the 100% plan costs an additional 1.2 cents per kWh. Arcadia buys wind energy Renewable Energy Certificates (RECs) equal to either 50% or 100% of one's energy use to offset one's energy consumption. Cost of 100% plan works out to \$30.44 per metric ton of CO₂.
 - NativeEnergy – its Help Build carbon offsets fund new projects that reduce greenhouse gas pollution. Cost is \$15.50 per metric ton of CO₂.
 - TerraPass – purchases carbon offset from emission reduction projects like dairy farms and wind turbines. Cost is \$4.99 per 1,000 pounds of CO₂ (= \$9.05 per metric ton).
 - The Nature Conservancy – contributions fund forest conservation, improved forest management, or reforestation projects. Cost is \$15 per metric ton of CO₂.

III. Voluntary approaches (cont.)

- Voluntary carbon tax – members of congregation or group make donations to a fund in proportion to their carbon emissions.

Carbon Tax Calculations						
Fuel	Unit of Meas.	Total Units	Factor	Total lbs CO ₂	Rate	Total Tax
A	B	C	D	E (= C x D)	F	G (= E x F)
Gasoline	Gallon		18.9		\$0.01	
Electricity	KWH		0.9		\$0.01	
Natural gas	Therm		11.7		\$0.01	

- Rate works out to \$20 per ton of CO₂, or \$18.13 per metric ton.
- Funds are then expended on CO₂ reduction projects such as home insulation, LED light bulbs, purchase of carbon offsets, planting trees, etc.

Questions?

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