

2 Price Carbon—I Will If You Will*

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Negotiations at the United Nations (UN) climate summit in Paris in December 2015 adopted a “pledge-and-review” approach to cutting global carbon emissions. Countries promised to reduce their emissions by amounts that will be revised later. The narrative is that this will “enable an upward spiral of ambition over time” (Ad Hoc Working Group on the Durban Platform, 2014). History and the science of cooperation predict that quite the opposite will happen.

Climate change is a serious challenge because the atmosphere gives a free ride to countries that emit. If some nations sit back and rely on others’ efforts, the incentives for anyone to act are weakened. Review of the first phase of the Kyoto Protocol at the 2012 UN climate meeting in Doha, for instance, resulted in Japan, Russia, Canada, and New Zealand leaving the agreement, frustrating those who kept their promises.

Success requires a common commitment not a patchwork of individual ones. Negotiations need to be designed to realign self-interests and promote cooperation. A common commitment can assure participants that others will match their efforts and not free-ride. A strategy of “I will if you will” stabilizes higher levels of cooperation. It is the most robust pattern of cooperation seen in laboratory and field studies of situations open to free-riding (Kraft-Todd et al., 2015).

A global carbon price—so far excluded from consideration in international negotiations—would be the ideal basis for a common commitment in our view. A price is easy to agree and handle, relatively fair, less vulnerable to gaming than global cap-and-trade systems, and consistent

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with climate policies already in place, such as fossil-fuel taxes and emissions cap-and-trade.

Only a common commitment can lead to a strong treaty. Forty years of empirical and theoretical literature on cooperation confirms that individual commitments do not deliver strong collective action. Cooperators find that defectors take advantage of them. Ambition declines when others are revealed to be free-riding (Ledyard, 1995). Dishes often stack up in the sinks of shared apartments. But in the Alps, villagers have successfully managed shared land for hundreds of years with a common commitment governing grasslands (Ostrom, 1990).

Common Commitment

Imagine that you and nine other self-interested players (representing countries) take part in a game. Each player has \$10, some or all of which the players may simultaneously pledge to a common pot. A referee makes sure that they honor their pledges. Every dollar (for carbon dioxide abatement) placed in the pot will be doubled (by climate benefits) and distributed evenly to all players. So putting \$1 in the pot will return 20 cents to each player.

Consider two variants of the game. First, in the “individual commitment” version, pledges are made independently. This is the classic public-goods game, in which the rational selfish strategy is to contribute nothing because this makes a player better off no matter what the others do. The result is the famous tragedy of the commons. Cooperation does not occur, even though everyone would gain from it.

Second, in the “common commitment” version, players condition their contributions on others’ pledges: a referee ensures that all contribute the amount of the lowest pledge. After enforcing this common commitment, the money is doubled and distributed evenly, exactly as before.

This changes everything. Pledging \$0 will mean simply keeping your \$10, whereas pledging \$10 could result in ending up with anything between \$10 and \$20 depending on what others pledge. If you cannot lose and could gain by pledging \$10, then that is what you would do, even if you are completely selfish. Because all parties would pledge \$10, the group’s \$100 is doubled, and all players end up with the maximum amount of \$20.

Selfish behavior has been changed from “contribute nothing” to “contribute everything” because the common commitment protects against free-riding.

In 1997, the Kyoto negotiators initially tried to agree on a common commitment, expressed as a formula for national emissions caps, but they failed. In the end, each nation was simply asked to submit their final numbers for insertion into the draft annex (Depledge, 2000). The result was a patchwork of weak and unstable commitments. Similarly, in response to the 2009 Copenhagen Accord, China pledged emissions equal to those considered “business as usual” before the accord, and India pledged even less.

Enforcement is widely thought to be the missing ingredient in the Kyoto Protocol and crucial for the success of the Paris agreement. This is only half right—both enforcement and a common commitment are required. For example, if drivers chose their own speed limits, there would be no use enforcing them because everyone would drive at their desired speed. Instead, because it limits others as well, people agree to a common speed limit that is lower than almost everyone’s individual limit. In other words, with individual commitments, there is nothing meaningful to enforce, whereas enforcement strengthens a common commitment.

What could all countries commit to? National limits on the quantity of emissions will not work. Kyoto negotiators suggested at least 10 formulae to determine the reductions that each nation should make but could not agree on. When attention turned to reducing emissions by some percentage relative to 1990 levels, individual commitments ranged from an 8% decrease to a 10% increase. The United States and developing countries made no commitments at all.

Percentage pledges failed because countries differ; for instance, some economies declined after 1990, whereas some grew. Developing countries fear caps that curb their growth. Instead they see it as fair to allocate emission permits on an equal per capita basis. Because permit sales would result in huge wealth transfers to poor countries, rich countries find such proposals unacceptable (Stiglitz, 2006).

There is no longer any serious discussion of a common commitment to reduce the quantity of carbon emissions.

Global Carbon Price

We, and others, propose an alternative: a global carbon-price commitment (Cramton et al., 2015). Each country would commit to place charges on carbon emissions from fossil-fuel use (e.g., by taxes or cap-and-trade schemes) sufficient to match an agreed-on global price, which could be set by voting—by a super-majority rule that would produce a coalition of the willing.

A uniform carbon price is widely accepted as the most cost-effective way to curb emissions. Carbon pricing is flexible, allowing fossil taxes, cap-and-trade, hybrid schemes, and other national policies to be used (unlike a global carbon tax). All that is required of a country is that its average carbon price—cost per unit of greenhouse gas emitted—be at least as high as the agreed-on global carbon price.

Unlike global cap-and-trade, carbon pricing allows countries to keep all carbon revenues, eliminating the risk of needing to buy expensive credits from a rival country. Taxes need not rise if a nation performs a green tax shift—reducing taxes on good things such as employment by charging for pollution. Shifting taxes from good things to bad things could mean there is no net social cost to pricing carbon, even before counting climate benefits (Bovenberg, 1999).

A global price does not automatically result in acceptable burden sharing. A “Green Climate Fund” will be needed to transfer funds from rich to poor countries. To minimize disputes, the objective of climate-fund transfers should be to maximize the global price of carbon. This can be implemented in a way that encourages rich countries to be generous and poor countries to vote for a higher global carbon price (Cramton and Stoft, 2012), for example, by making all climate-fund payments proportional to the agreed-on carbon price.

After decades of failure, a fresh approach is needed—one that is guided by the science of cooperation. A common price commitment would harness self-interest by aligning it with the common good. Nothing could be more fundamental.

References

Ad Hoc Working Group on the Durban Platform. UNFCCC. 2014. Parties' Views and Proposals on the Elements for a Draft Negotiating Text ADP.2014.6 Available at <http://go.nature.com/x1fjcd>.

- Bovenberg, A. L. 1999. Green tax reforms and the double dividend: An updated reader's guide. *International Tax and Public Finance* 6:421–443.
- Cramton, P., A. Ockenfels, and S. Stoft. 2015. An international carbon-price commitment promotes cooperation. *Economics of Energy & Environmental Policy* 4:51–64.
- Cramton, P., and S. Stoft. 2012. Global climate games: How pricing and a green fund foster cooperation. *Economics of Energy & Environmental Policy* 1 (2).
- Depledge, J. 2000. *The Origins of the Kyoto Protocol*. Bonn, Germany: UN Framework Convention on Climate Change.
- Kraft-Todd, G., E. Yoeli, S. Bhanot, D. Rand, et al. 2015. Promoting cooperation in the field. *Current Opinion in Behavioral Sciences* 3:96–101.
- Ledyard, J. 1995. Public goods: A survey of experimental research. In *The Handbook of Experimental Economics*, ed. H. Kagel and A. E. Roth, 111–194. Princeton, NJ: Princeton University Press.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.
- Stiglitz, J. 2006. *Making Globalization Work*. New York: Norton.

