



December 24, 2013

Rethinking How to Split the Costs of Carbon

By **EDUARDO PORTER**

It is probably a safe bet that very few Americans unwrapping a brand-new iPhone left under their Christmas tree are thinking about its impact on the global climate.

I have some good news for them, and some bad.

No, Apple hasn't managed to produce the device without adding heat-trapping carbon to the air. [The company expects](#) an iPhone 5s to inject 70 kilograms — about 154 pounds — of carbon dioxide equivalent into the atmosphere over its lifetime, 11 pounds less than the iPhone 5 that Apple introduced last year.

The “good” news is that under the standard accounting of carbon emissions bandied about at climate talks, it's not, mostly, Americans' fault. About three-quarters of the carbon dioxide is considered the responsibility of other people — in places like China and Taiwan, South Korea and Inner Mongolia — where the phone and its parts were made.

The bad news is not just that the effort to curb global warming is as stuck as ever, but that, whether we like it or not, we're all in this together.

The obstacles remain significant. Countless summit conferences since the Kyoto Protocol on climate change was adopted more than 15 years ago have failed to budge the fundamental roadblocks standing in the way of collective action: How should the costs be divided? Who did what to whom?

Globalization — which in the process of “exporting” production and jobs from rich to poor countries also “exported” the carbon dioxide emitted to make the products consumed by the rich countries — adds another complex twist to allocating responsibility for the carbon in the air. The disquieting question is this: Are emissions the responsibility of the countries that made them or of the countries for whom the products were made?

Two years ago, some of the greenest constituencies in the country asked Elizabeth Stanton and colleagues at the Stockholm Environment Institute-U.S. Center to perform a set of calculations on their carbon emissions. Rather than tally the carbon they produced, they wanted an inventory of the emissions generated in making, transporting, using and disposing of what they consumed.

They were in for a surprise. [San Francisco](#), for example, generated only eight million metric tons of carbon dioxide equivalent in 2008. The city's consumption, by contrast, added nearly 22 million tons of carbon to the air. Using consumption-based measurements, [Oregon's emissions](#) in 2005 jumped to 78 million tons from 53 million.

"The people who hired us to do it saw themselves as so green and innovative," said Frank Ackerman, who led the Climate Economics Group at the center at the time and now works with Ms. Stanton at Synapse Energy Economics, a consulting firm in Cambridge, Mass. "They thought that because they had nice initiatives going on they would come out lower, never mind the fact that a lot of the manufactures they consumed were made abroad."

The focus on consumption makes sense. Understanding its impact on climate change is a necessary first step for families, and municipalities, to take concrete action to mitigate carbon emissions. This sort of recalculation, however, could have an unforeseen effect on the international politics of climate change by shifting responsibility on a global scale.

With the concentration of carbon dioxide in the air zooming last spring to its highest level since mastodons roamed the earth some three million years ago, the United Nations, against all odds, hopes 2014 will finally deliver the breakthroughs needed for the big carbon-spewing nations to agree on a plan by 2015.

"I challenge you to bring to the summit bold pledges," urged the United Nations secretary Ban Ki-moon, as he invited global leaders to a nuts-and-bolts horse-trading [meeting in New York](#) next September.

The diplomacy of climate change appears as stuck as ever. Poor carbon-spewers like China justify their opposition to tight carbon limits on the grounds that, on a per-person basis, their emissions are still very low. Moreover, most of the carbon in the atmosphere now, they argue, was put there by Americans and other wealthy carbon-spewers, who burned a lot of fossil fuels on the way to getting rich. Forbidding the Chinese from doing the same would be tantamount to condemning them to stagnation.

Policy makers in Washington retort that while all this may be true, a deal that only required rich countries to limit emissions would be pointless: their carbon savings would be negated by growing emissions elsewhere. Heavy emitters of greenhouse gases — like the agriculture and chemical industry — would decamp from rich nations to the less carbon-restricted shores of the developing world.

Indeed, [recent research](#) suggested that if rich countries were to cut emissions by 20 percent from 2004 levels without securing cooperation from developing countries, some 5 to 19 percent of the carbon savings would be lost to "leakage."

Even more troubling, there is nowhere near a consensus on who is responsible for historical emissions. Some studies have concluded that the rich world put [up to 80 percent](#) of the existing carbon dioxide in the air. But this year researchers in the Netherlands and at the European Commission [concluded](#) that by including the impact of changing land use, developing countries actually accounted for nearly half of all heat-trapping gases emitted between 1850 and 2010.

Throwing consumption-based accounting into this forest of pointed fingers might add ethical nuance to the debate, but it is unlikely to make it any easier.

[A study](#) published in the Proceedings of the National Academy of Sciences two years ago noted that globalization exported at least 1.2 billion tons' worth of annual carbon dioxide emissions from the developed to the developing world between 1990 and 2008.

Geographically based calculations make it look as if advanced industrial countries have managed to stabilize their carbon emissions. But they have just moved the growth outside their borders.

The carbon emissions created by Americans' consumption are about 8 percent more than the emissions produced in the United States alone, according to scientists at the [Global Carbon Project](#). Conversely, about a fifth of China's emissions are for products consumed outside its borders.

And the European Union, self-contentedly green under standard calculations based on where carbon is emitted, looks less virtuous through a consumption-based lens. In 2011 Europeans emitted only 3.6 billion metric tons of carbon dioxide, but 4.8 billion tons were spewed into the atmosphere to make the things Europeans consumed.

"Thinking of consumption emissions turns the responsibility issue on its head," Ms. Stanton said.

Here's the quandary, though. The standard approach being considered to account for the cost of "traded" carbon is to tax recorded emissions at the border. Big poor exporters like China, not surprisingly, don't like that approach. And they have some influential supporters.

"That may be a more efficient way to help the environment," said Glen Peters at the Center for International Climate and Environmental Research in Oslo. "I'm not sure it's beneficial from an ethical point of view."

The study on emissions leakage found that imposing a carbon tax on imports would reduce the leaks by about a third. But "China has everything to lose," Mr. Peters said. "If China brought this up in negotiations it would be allowing the United States and Europe to regulate Chinese exports."

Other research has [concluded](#) that imposing a border penalty would encourage China and other developing countries to tax their own carbon emissions — and keep the money — rather than have them taxed by others.

With colorful wrapping strewn across the floor and apps zipping from the old iPhone to the new, most Americans won't be worrying about any of this Christmas morning. Who cares, in the end, about whose fault it is?

But if the world is to prevent catastrophic climate change from eventually undermining civilization, somebody — somewhere — must pay the cost of consuming less carbon. And nobody is volunteering.

Email: eporter@nytimes.com; Twitter: [@portereduardo](https://twitter.com/portereduardo)

This article has been revised to reflect the following correction:

Correction: December 24, 2013

An earlier version of this article gave incorrect figures for some emissions data. A study said that at least 1.2 billion tons' worth of annual carbon dioxide emissions were exported from the developed to the developing world between 1990 and 2008, not 1.2 million tons' worth. And in 2011 Europeans emitted 3.6 billion metric tons of carbon dioxide, not 3.6 million, and 4.8 billion tons were emitted to make things Europeans consumed, not 4.8 million.

This article has been revised to reflect the following correction:

Correction: December 25, 2013

An earlier version of a caption with this article misstated the emissions of the iPhone 5S relative to the iPhone 5. The 5S will release 11 pounds less carbon dioxide equivalent into the atmosphere than the iPhone 5, not 11 pounds more.