Global Warming Systemically Caused Hurricane Sandy

by George Lakoff

Yes, global warming systemically caused Hurricane Sandy -- and the Midwest droughts and the fires in Colorado and Texas, as well as other extreme weather disasters around the world. Let's say it out loud, it was causation, *systemic* causation. Systemic causation is familiar. Smoking is a systemic cause of lung cancer. HIV is a systemic cause of AIDS. Working in coal mines is a systemic cause of black lung disease. Driving while drunk is a systemic cause of auto accidents. Sex without contraception is a systemic cause of unwanted pregnancies.

There is a difference between systemic and direct causation. Punching someone in the nose is direct causation. Throwing a rock through a window is direct causation. Picking up a glass of water and taking a drink is direct causation. Slicing bread is direct causation. Stealing your wallet is direct causation. Any application of force to something or someone that always produces an immediate change to that thing or person is direct causation. When causation is direct, the word *cause* is unproblematic. Systemic causation, because it is less obvious, is more important to understand. A systemic cause may be one of a number of multiple causes. It may require some special conditions. It may be indirect, working through a network of more direct causes. It may be probabilistic, occurring with a significantly high probability. It may require a feedback mechanism. In general, causation in ecosystems, biological systems, economic systems, and social systems tends not to be direct, but is no less causal. And because it is not direct causation, it requires all the greater attention if it is to be understood and its negative effects controlled.

Above all, it requires a name: *systemic causation*. Global warming systemically caused the huge and ferocious Hurricane Sandy. And consequently, it systemically caused all the loss of life, material damage, and economic loss of Hurricane Sandy. Global warming heated the water of the Gulf and Mexico and the Atlantic Ocean, resulting in greatly increased energy and water vapor in the air above the water. When that happens, extremely energetic and wet storms occur more frequently and ferociously. These systemic effects of global warming came together to produce the ferocity and magnitude of Hurricane Sandy.

The precise details of Hurricane Sandy cannot be predicted in advance, any more than when, or whether, a smoker develops lung cancer, or sex without contraception
yields an unwanted pregnancy, or a drunk driver has an accident. But systemic causation is nonetheless causal.

Semantics matters. Because the word cause is commonly taken to mean direct cause, climate scientists, trying to be precise, have too often shied away from attributing causation of a particular hurricane, drought, or fire to global warming. Lacking a concept and language for systemic causation, climate scientists have made the dreadful communicative mistake of retreating to weasel words. Consider this quote from "Perception of climate change," by James Hansen, Makiko Sato, and Reto Ruedy, Published in the Proceedings of the National Academy of Sciences:

...we can state, with a high degree of confidence, that extreme anomalies such as those in Texas and Oklahoma in 2011 and Moscow in 2010 were a consequence of global warming because their likelihood in the absence of global warming was exceedingly small.

The crucial words here are high degree of confidence, anomalies, consequence, likelihood, absence, and exceedingly small. Scientific weasel words! The power of the bald truth, namely causation, is lost. This is no small matter because the fate of the earth is at stake. The science is excellent. The scientists' ability to communicate is lacking. Without the words, the idea cannot even be expressed. And without an understanding of systemic causation, we cannot understand what is hitting us.

Global warming is real, and it is here. It is causing -- yes, causing -- death, destruction, and vast economic loss. And the causal effects are getting greater with time. We cannot merely adapt to it. The costs are incalculable. What we are facing is huge. Each day, the amount of extra energy accumulating via the heating of the earth is the equivalent of 400,000 Hiroshima atomic bombs. Each day! Because the earth itself is so huge, this energy is distributed over the earth in a way that is not immediately perceptible by our bodies -- only a fraction of a degree each day. But the accumulation of total heat energy over the earth is increasing at an astronomical rate, even though the temperature numbers look small locally -- 0.8 degrees Celsius so far. If we hit 2.0 degrees Celsius, as we may before long, the earth -- and the living things on it -- will not recover. Because of ice melt, the level of the oceans will rise 45 feet, while huge storms, fires, and droughts get worse each year.

The international consensus is that by 2.0 degrees Celsius, all civilization would be threatened if not destroyed.

What would it take to reach a 2.0 degrees Celsius increase over the whole earth? Much less than you might think. Consider the amount of oil already drilled and
stored by Exxon Mobil alone. If that oil were burned, the temperature of the earth would pass 2.0 degree Celsius, and those horrific disasters would come to pass.

The value of Exxon Mobil -- its stock price -- resides in its major asset, its stored oil. The weather disasters arising from burning that oil would be so great that we would have to stop burning. That's just Exxon Mobil's oil. The oil stored by all the oil companies everywhere would, if burned, destroy civilization many times over.

Another way to comprehend this, as Bill McKibben has observed, is that most of the oil stored all over the earth is worthless. The value of oil company stock, if Wall St. were rational, would drop precipitously. Moreover, there is no point in drilling for more oil. Most of what we have already stored cannot be burned. More drilling is pointless.

Are Bill McKibben's and James Hansen's numbers right? We had better have the science community double-check the numbers, and fast.

Where do we start? With language. Add systemic causation to your vocabulary. Communicate the concept. Explain to others why global warming systemically caused the enormous energy and size of Hurricane Sandy, as well as the major droughts and fires. Email your media whenever you see reporting on extreme weather that doesn't ask scientists if it was systemically caused by global warming.

Next, enact fee and dividend, originally proposed by Peter Barnes at Sky Trust and introduced as Senate legislation as the KLEAR Act by Maria Cantwell and Susan Collins. More recently, legislation called fee and dividend has been proposed by James Hansen and introduced in the House by representatives John B, Larson and Bob Inglis.

Next. Do all we can to move to alternative energy worldwide as soon as possible.