This is the print version of the Skeptical Science article 'CO2 limits will make little difference', which can be found at http://sks.to/limits.

Meaningful climate action needs global cooperation

What The Science Says:
While it's true that any single country's CO2 emissions reductions will make little difference, only if every nation agrees to limit CO2 emissions can we achieve significant cuts on a global scale.

Climate Myth: CO2 limits will make little difference
"Cap and tax is as pointless as it is cruel. Australia accounts for 1.5 per cent of global carbon emissions. So if it cut its emissions, the warming forestalled would be infinitesimal." (Christopher Monckton)

Some skeptics have claimed that anything more than a modest greenhouse gas emissions reduction would shut a nation's economy down. However, as we previously explored, this claim is not even remotely true. In fact, we showed that the benefits of carbon pricing would outweigh the costs several times over, even in the legislation proposed in the USA which would have cut the country's emissions 80% by 2050.

Australian Example

If Australia were to cut its emissions at a constant rate to get to 80% lower emissions by 2050, then it would have emitted 40% less CO_2 by 2050 than it would have done at today's rates. In a business-as-usual scenario, the atmospheric CO2 concentration in 2050 will be approximately 550 parts per million by volume (ppmv). Australian CO2 emissions are approximately 1.5% of global emissions, so if the country were to maintain this percentage until 2050, Australia would be responsible for 1.5% of the 160 ppmv increase during that period, or 2.4 ppmv. If Australia were to cut its emissions by an average of 40% over that period, the difference in atmospheric CO2 concentration would be approximately 1 ppmv.

So the skeptics seemingly have a point here. CO2 emissions cuts from Australia, by itself, would have an insignificant effect on global CO2 concentrations and temperature. However, this is a perfect example of what's known as the Tragedy of the Commons.

Tragedy of the Commons

The Tragedy of the Commons was first described by Hardin (1968). It's "a dilemma arising from the situation in which multiple individuals, acting independently and rationally consulting their own self-interest, will ultimately deplete a shared limited resource even when it is clear that it is not in anyone's long-term interest for this to happen."

The global climate is effectively a shared natural resource. If every nation decides to continue emitting CO2 unabated in their own self-interest, the consequent climate change will be bad for almost everyone.

Game Theory

The concept of Nash equilibrium in game theory provides an analogous scenario. In our example we'll consider the USA and Australia, each with $10. Reducing carbon emissions will cost either country $3. The consequences of global warming will cost each country $7 if no

action is taken, and $4 if only one takes action. The potential resulting outcomes look like this (remaining funds for USA in blue, and for Australia in red):

		Australia	
	Emissions Reduced?	**Yes**	**No**
USA	**Yes**	**7, 7**	**3, 6**
	No	**6, 3**	**3, 3**

Either side can only tie or win if they don't reduce emissions, and they can only tie or lose if they do reduce emissions. Thus it seems to be in each country's best interest not to reduce emissions. But the best overall outcome is if both sides reduce their emissions, in which case the net economic impact is smallest. If each country looks out only for its own best interest, the overall economic impact is largest.

It's quite a good analogy to carbon pricing. A frequent argument used by politicians in most countries is "if our country introduces carbon pricing, businesses will just move to another country where they can emit carbon for free".

So how do you get both sides to reduce their emissions even though it seems to be in the best interest of neither? Collusion.

International Climate Conferences

This is the purpose of international climate conferences such as those held at Kyoto and Copenhagen. Every nation can make the argument that their emissions cuts alone will have an insignificant impact on global temperatures. We've heard the exact same argument in the USA, despite our much larger overall emissions than Australia.

But if all nations can come together and agree to reduce CO2 emissions in their own best interests, then the combined emissions reductions and impact on global temperatures can be significant. But to achieve the necessary global emissions reductions to avoid dangerous global warming, we need all countries on board.

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Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a college textbook on climate change and the book Climate Change Denial: Heads in the Sand. Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.

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