Queen's researchers propose rethinking renewable energy strategy

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Researchers at Queen's University suggest that policy makers examine greenhouse gas (GHG) emissions implications for energy infrastructure as fossil fuel sources must be rapidly replaced by windmills, solar panels and other sources of renewable energy.

Their recommendations could be used to help policy makers restructure renewable energy production in a way that will optimize greenhouse gas emission reductions.

"The energy industry is expanding so rapidly that the dynamic nature of greenhouse gas emissions could pass a tipping point in the climate system if we're not careful," says Mechanical and Materials Engineering Professor Joshua Pearce, lead researcher on the study.

Pearce, Colin Law and Renee Kenny propose using dynamic life-cycle analyses for determining carbon-neutral growth rates that will not dramatically increase the level of GHG emissions as the energy industry expands.

This means, for example, weighing the benefits of dramatically increasing wind power against the increase in GHG emissions when the materials used to build the windmill are mined and when it is manufactured - not just after it's been erected.

It also means decreasing production in some of the most polluted areas of the world, including China.

Using the carbon-neutral growth rate, the carbon mitigation potential for a solar electricity plant would be higher if it was commissioned in China and the solar cells were manufactured in Canada. But that is the exact opposite of the current trend, which is manufacturing in China and deploying in Europe or North America.

"When the growth of an industry is fast, the greenhouse gas emissions prevented by a given technology are negated to fabricate the next wave of technology deployment," Mr. Law. "We live in an era where there are physical constraints to the carbon emissions the climate can sustain in the short term, so this may be unacceptable."

The researchers' findings were recently published in the journal *Energy Policy*.

Provided by Queen's University