



Studies: Wind potentially could power the world

SETH BORENSTEIN, September 10, 2012

Earth has more than enough wind to power the entire world, at least technically, two new studies find.

But the research looks only at physics, not finances. Other experts note it would be too costly to put up all the necessary wind turbines and build a system that could transmit energy to all consumers.

The studies are by two different U.S. science teams and were published in separate journals on Sunday and Monday. They calculate that existing wind turbine technology could produce hundreds of trillions of watts of power. That's more than 10 times what the world now consumes.

Wind power doesn't emit heat-trapping gases like burning coal, oil and natural gas. But there have been questions, raised in earlier studies, about whether physical limits would prevent the world from being powered by wind.

The new studies, done independently, showed potential wind energy limits wouldn't be an issue.

Money would be.

"It's really a question about economics and engineering and not a question of fundamental resource availability," said Ken Caldeira, a climate scientist at the Palo Alto, Calif., campus of the Washington-based Carnegie Institution for Science. He is a co-author of one of the studies; that one appeared Sunday in the journal *Nature Climate Change*.

Caldeira's study finds wind has the potential to produce more than 20 times the amount of energy the world now consumes. Right now, wind accounts for just a tiny fraction of the energy the world consumes. So to get to the levels these studies say is possible, wind production would have to increase dramatically.

If there were 100 new wind turbines for every existing one, that could do the trick says, Mark Jacobson, a Stanford University professor of civil and environmental

engineering.

Jacobson wrote the other study, published in the Proceedings of the National Academy of Sciences. It shows a slightly lower potential in the amount of wind power than Caldeira's study. But he said it still would amount to far more power than the world now uses is or is likely to use in the near future.

Jacobson said startup costs and fossil fuel subsidies prevent wind from taking off. The cheap price of natural gas, for one thing, hurts wind development, he added.

Henry Lee, a Harvard University environment and energy professor who used to be energy chief for the state of Massachusetts, said there a few problems with the idea of wind powering the world. The first is the cost is too high.

Furthermore, all the necessary wind turbines would take up too much land and require dramatic increases in power transmission lines, he said.

Jerry Taylor, an energy and environmental analyst at the conservative Cato Institute, said the lack of economic reality in the studies made them "utterly irrelevant."

Caldeira acknowledged that the world would need to change dramatically to shift to wind.

"To power civilization with wind turbines, I think you're talking about a couple wind turbines every square mile," Caldeira said. "It's not a small undertaking."