

## ORAL COMMENTS TO EPA SCIENCE ADVISORY BOARD

### PANEL ON BIOGENIC CARBON EMISSIONS

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**January 27, 2012**

I would like to focus my comments on the part of the draft report that suggests bioenergy should be judged only by whether it has reduced total emissions 100 years from now, and my comments also bear on the Cherubini analysis as well.

According to this 100-year line of thinking, measures that reduce emissions in 2112, even such measures that increase global warming for decades, are as valuable as measures that reduce emissions the same amount in 2012.

For this thinking to be valid, the following propositions must all be true.

One, we place zero value on the damages from global warming between now and 100 years from now, such as agricultural damages, rising sea levels, diseases, harm to ecosystems or even the abatement costs we must pay. There is a robust academic debate about how much more we should value short-term than long-term damages, but no one suggests it is less, let alone that short-term damages count for nothing.

Two, this thinking means we must place zero value on avoiding the risk of feedback warming effects in the first 100 years. These are effects such as higher rates of carbon loss from soils, forest die-back, melting of permafrost etc.

Three, we must place zero value on avoiding potentially disastrous tipping points in the next 100 years. Tipping points might be kinds of feedback effects but may also include damage thresholds such as changes in ice sheets that lead inevitably to their break up down the road.

As these effects have been a major focus of climate policy, a focus only on emissions reductions 100 years from now would turn much of climate policy on its head.

Economic factors also come into play. So long as we want even some emissions reductions to occur early, the economic value of early reductions is higher than later reductions because achieving the same reductions early is more expensive due to three factors.

One is simply the cost of capital.

Two is the expectation of declining costs of mitigation for the same level of emissions reduction, e.g., solar and wind power become cheaper over time.

Three, is the option value, which is that other factors being equal, we would rather maintain our option to reduce emissions in the future in whatever ways are cheapest at the time rather than commit to a specific technology today.

All three factors can be expressed mathematically as contributions to one aggregate discount rate. I will show in written comments that if these three discount rates add up to 5%, then the economic value of emissions reductions from bioenergy go to 0 if it will take 20 years to pay back its original carbon debt.

You can think about this challenge intuitively by thinking of an emissions trading system. You then ask how much money a company would pay for a measure that in year 1 creates a surge of emissions, and thereby requires the immediate purchase of a large number of offsetting credits, in order to generate a steady, small stream of emissions credits each year thereafter. With even moderate discount and payback rates, the answer is not much or zero.

The Cherubini analysis discussed in the report, although better than almost ignoring time altogether, also fails to take proper account of these factors.

The bioenergy question under the Clean Air Act is not whether to invest in bioenergy or to do nothing. It is to compare the value of another measure that reduces emissions immediately with a bioenergy measure that increases emissions in the short-term while promising the same reductions only after decades. If it were really true that later reductions were as good as early reductions, EPA should abandon its Clean Air Act program at this time because postponing the exact same reductions until later will always be cheaper. But EPA should in fact continue its efforts based on the correct view that time matters.

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