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Christopher Joyce
National Public Radio
635 Massachusetts Ave., NW
Washington, D.C. 20001

Dear Mr. Joyce,

Thank you for airing the January 26 *All Things Considered* story about our ethanol study, “Ethanol can contribute to energy and environmental goals”, which appeared in *Science*. We appreciate in particular that you noted the fact that cellulosic ethanol is widely agreed as the feedstock of the future, and that our calculations are available on the web for “anyone who wants to check their math” (<http://rael.berkeley.edu/EBAMM>).

We were concerned, however, that the story seems to miss a main point of our article, which was to resolve decades of confusion about the magnitude of the “net energy” required to produce ethanol and the usefulness of this metric. Instead of focusing on the clarifications we present, the story repeats the very confusion we dispel.

Although “net energy” is easy to understand, it is misleading because it sums different types of energy, each with different environmental, economic, political, and functional qualities. We isolated the petroleum energy used in ethanol production, as this is of primary concern in both farm and foreign policy when analyzing ethanol as a petroleum substitute. The *All Things Considered* coverage, we feel, misses this point completely, conflating petroleum and other fossil fuels. Several statements you made illustrate this issue:

"But there's an unresolved problem with ethanol: Does it really reduce dependence on other forms of energy, such as oil or coal?"

"The question is, did that switch reduce America's consumption of oil and other polluting fossil fuels?"

"Since much of that energy comes from oil or coal, he [Pimentel] says it's not a good alternative."

Ethanol is a transportation fuel that displaces petroleum, not coal or natural gas. And while producing corn ethanol requires more coal and natural gas than does producing gasoline, ethanol production requires far less petroleum—and less overall non-renewable energy.

In addition, you quote Professor Pimentel as saying: "They also deleted another major input, that is the farm machinery." This is factually incorrect and could have been easily been checked. Endnote 19 of our paper states:

19. Factors eliminated were labor transportation, labor food energy, and process water energy. The first two were deemed outside the system boundaries. Process water energy was included in one study, but was insufficiently documented. *Factors added were farm machinery energy* [emphasis added], inputs packaging and effluent processing energy. The metric for petroleum use included crude oil used as a feedstock for gasoline and the metric for GHGs includes end-use (tailpipe) emissions. Details are given in the Supporting Online Material.

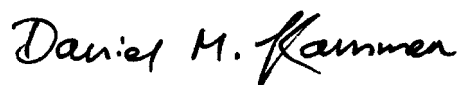
We used the best-documented value for farm machinery energy and cross-checked these values with our own calculations, as discussed on pages 6 and 7 of the Supporting Online Material. This approach is implemented in row 13, worksheet "NetEnergy" of EBAMM_1_0.xls (see especially columns C, G, I, K, and M), which is available at <http://rael.berkeley.edu/ebamm>.

Most importantly, however, we regret the framing of the story as some sort of conflict between us and Professors Pimentel and Patzek. We hold both of these scientists in high regard, and we admire their long-standing attention to ethanol energetics. Professors Pimentel and Patzek have asked the crucial question, "Can biofuels be made in ways that are environmentally acceptable?" We are sure both would agree that all of us are trying to get at the various important truths about this important issue, not trying to score points in a debate.

Scientists routinely accuse the press of 'looking for conflict' when developing stories, such as in the case of news outlets identifying a single 'climate skeptic' irrespective of their scientific qualifications to 'counter' the vast scientific consensus on climate change. The *All Things Considered* story creates the appearance of conflict, when little or none exists. Our study examined the positive and negative aspects of not one but six prior efforts. We carefully built and presented all of the studies in a transparent, side-by-side set of models, and documented how various assumptions and choices of data explain the divergent results observed across this sample of the literature. This was at the very heart of our work. We have no fundamental conflict with Professors Pimentel or Patzek about methodology, nor, more importantly, the scientific process of subsequent research efforts standing on each others' shoulders in order to see even farther.

We appreciate that you found our research interesting enough to report on and will continue to look to National Public Radio for accurate, informed reporting of key issues, scientific and otherwise. And, of course, if you would like to discuss ethanol or other energy-related issues further, we would be more than happy to talk with you.

Sincerely Yours,



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cc: Prof. David Pimentel, Prof. Tad Patzek