

## Declaration of Dr. Robert Howarth

1. My name is Robert W. Howarth, Ph.D. I am over the age of 18 and competent to make the following Declaration.
2. I have been a tenured faculty member at Cornell University, Ithaca, NY, since 1985. Since 1993, I have held an endowed position at Cornell as the *David R. Atkinson Professor of Ecology & Environmental Biology*.
3. I have extensive experience in academic publishing. I am the author or co-author of over 200 papers, and these have been cited by others in the peer-reviewed literature more than 65,000 times. I am the Founding Editor of the academic journal *Biogeochemistry* and served as Editor-in-Chief of that journal from 1983 to 2004. I was also the Editor-in-Chief of the academic journal *Limnology & Oceanography* from 2014 to 2019.
4. I served on the Committee on Ethics of the America Society for Limnology & Oceanography from 1992-1998. I served as President-Elect and then President of the Coastal & Estuarine Research Federation from 2005 to 2009, overseeing the publications and ethical issues of that professional society. And I have been a member of the Committee on Publication Ethics (COPE) since 2014. COPE “is a nonprofit organization whose mission is to define best practice in the ethics of scholarly publishing and to assist editors, publishers, etc. to achieve this.” ([https://en.wikipedia.org/wiki/Committee\\_on\\_Publication\\_Ethics](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics))
5. I am aware of the litigation filed by Dr. Mark Jacobson against Dr. Clack and others associated with writing and publishing the paper entitled “Evaluation of a proposal for reliable low-cost grid power with 100% wind, water and solar,” *PNAS*, doi:1073/pnas.1610381114, 2017 (the “Clack Paper”).
6. I am not a party to the litigation and have not participated in the litigation prior to filing this Declaration.
7. I was not associated with the publication of the Clack Paper nor of the 2015 paper by Dr. Jacobson and others, also published in *PNAS*, that was the subject of the Clack Paper.
8. I have previously collaborated with Dr. Jacobson and am a co-author of two papers with him published in 2013 and 2014 (Jacobson M.Z., R.W. Howarth, M.A. Delucchi, S.R. Scobies, J.M. Barth, M.J. Dvorak, M. Klevze, H. Katkhuda, B. Miranda, N.A. Chowdhury, R. Jones, L. Plano, and A.R. Ingraffea, 2013, “Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight,” *Energy Policy* 57: 585-601, doi.org/10.1016/j.enpol.2013.02.036i; and Jacobson, M.Z., M.A. Delucchi, A.R.

Ingraffea, R.W. Howarth, G. Bazouin, B. Bridgeland, K. Burkart, M. Change, N. Chowdhury, R. Cook, G. Escher, M. Galka, L. Han, C. Heavey, A. Hernandez, D.F. Jacobson, D.S. Jacobson, B. Miranda, G. Novotny, M. Pellat, P. Quach, A. Romano, D. Steward, L. Vogel, S. Wang, H. Wang, L. Willman, and T. Yeskoo, 2014, "A roadmap for repowering California for all purposes with wind, water, and sunlight," *Energy*, doi.org/10.1016/j.energy.2014.06.099).

9. I have carefully reviewed both the Jacobson et al. 2015 paper and the Clack Paper.
10. The Clack Paper claimed that Table 1 in the Jacobson paper presented maximum values, and they therefore concluded that the Jacobson et al. a discrepancy between the table and figures presented in the paper. The Clack Paper is wrong with regard to this claim. Table 1 presented average values. Consequently, the Clack Paper is also wrong to have concluded there was any discrepancy. There was not. It is not at all apparent how the Clack Paper reached this erroneous conclusion, which lies at the heart of their criticism of the paper by Jacobson and colleagues.
11. The Jacobson et al. 2015 paper includes hydro power from Canada. The Clack Paper failed to recognize this, and therefore mistakenly claimed that the annual average hydro-power values used by Jacobson et al. were too high: the Clack Paper was wrong in their assumption that the hydro values in Jacobson et al. were just for power produced within the United States.
12. The issues I address in points #10 and #11 above are questions of fact, and are examples where the Clack Paper failed to follow due diligence. In my professional judgement, these facts can be correctly determined from evidence in the Jacobson et al. paper and in the sources cited there. Beyond that, if Dr. Clack and his colleagues were confused, normal scientific practice would have been for them to directly contact Dr. Jacobson for clarification, rather than to publish the critique as they did in the Clack Paper.
13. As an expert on scientific publishing, I conclude that the Clack Paper should not have been published in the *Proceedings of the National Academy of Sciences* as a "Research Article." The Clack Paper is clearly not a research article, either as generally defined by the community of research scientists or as specified by the journal's own guidelines. These guidelines state that the journal only publishes research articles if they are based on "original scientific research of exceptional importance..." (<https://www.pnas.org/page/authors/purpose-scope>). There was no original research in the Clack Paper.
14. The Clack Paper was written specifically and exclusively as a comment on the Jacobson et al. paper. There were no new data presented. There were no hypotheses tested. This was not original research. As such, if it were to have been published at all, it should have been

published as a “Letter” or as a “Commentary.” This is true under either general science-publishing traditions or the specific rules and guidelines of the *Proceedings of the National Academy of Sciences* (<https://www.pnas.org/page/authors/purpose-scope>). Note that these journal guidelines specify that Letters be used to “point out potential flaws in studies published in the journal.” That is not the purpose of a Research Article.

15. In my professional opinion, the publication of the Clack Paper falls outside of the bounds of normal scientific debate. PNAS did not follow normal publication procedures, defined either in terms of general norms in our field or the specific guidelines of their own journal. I believe this caused harm to the reputation of Dr. Jacobson.

I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge. Executed on July 20, 2020 from my home in Trumansburg, NY.



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Robert W. Howarth, Ph.D.