

Interactive comment on “The “Business-As-Usual” growth of global primary energy use and carbon dioxide emissions – historical trends and near-term forecasts” by A. Jarvis and C. N. Hewitt

Anonymous Referee #2

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General comment: This paper is interesting in bringing back the focus on the long term trajectory of growth in energy use, and how difficult it may be to change that, but lacking in several respects:

• the conflation of the method and its results with the functioning of reality,

• the lack of consideration of other parameters (population and GDP),

• considering energy use itself as the ultimate parameter of interest. This is far from being obvious (or evidenced statistically, see David Stern's recent papers on this),

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• assuming that past trends are unbreakable, despite the fact that these trends are not long term (in terms of human history), but represent a specific era. This means that transitions, which have occurred in the past, are not possible to “predict” with this type of analysis. That doesn't invalidate the analysis or BAU projections, but it does invalidate any discussion of possible future changes.

More specifically:

Top of page 3: Cite Peters et al 2012 NCC: 2008 crisis did not modify long term trajectories.

Page 3 line 8: Can cite Jevons Coal Question and Ayres, Turton and Casten 2007 for more insights as to the mechanisms for energy use and demand.

Page 3 line 10: Well if methane hydrates become recoverable, we can use enough fossils to remove all the oxygen from the atmosphere (sky's the limit!) so dynamics could keep going a long time.

Page 4 line 10: Why not other source, IEA, EIA, or others?

Page 4 line 13: Would want to know more about the systematics here: is the difference systematic during that time? is there a constant offset, or constant fraction missing? This is why might be useful to use other datasets as well to calibrate, for instance IEA or EIA.

Line 14: what is the time span for the CO2 data?

Line 16: Why include land use change in energy centred analysis? Isn't land use change driven mainly by food/fibre demand?

Page 5 line 3: Need a summary of the main features of this method in article itself, not just reference.

Page 5 line 13: How does this compare with just doing a Fourier transform?

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Page 6 line 5: say energy & co2 rather than x & y, throughout.

Page 6 line 24: I'd like to see a Fourier transform analysis as well (maybe on residuals from long term exp fit?). Also what is human population/GDP doing during this time, is long term periodicity visible at all there?

Page 7 line 16: What about time scales for technology cluster/infrastructure replacement? Pretty sure Grubler, Nakicenovic, and back in the day Marchetti had something to say about this.

Page 7 line 23: Isn't that just an artefact of the methodology used, rather than a compelling understanding and analysis of the ways economies function? Would be better to be a lot more modest about implications of findings.

Page 8 line 4: There is a causal implication here which is cannot be justified by the analysis. in fact, as suggested, the analysis should be replicated with other long term growth variables (population, GDP) and those results discussed together.

Line 6: Need more than this : what does "nonlinear" mean in this context?

Page 8 line 17: Or is your method merely picking up the world wars within its periodicity spectrum, but not the shocks? at least worth discussing.

Page 8 line 23: The causality assumptions here are if anything backwards. Your method is picking up (some) historical events and you are looking for patterns. History is not acting in order for your method to be vindicated.

Page 8 line 29: Cite Peters et al 2012?

Page 9 line 7: very short given time span of data analysed - why not go further?

Line 19: wasn't 2010 a deviation year?

Page 10 last sentence unclear

Page 11: But that doesn't mean that transition or collapse are not possible: the time

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frame of study corresponds in very stable period of technological advance and growth in human societies, not a truly long term phenomenon.

Line 21 line 10: Could argue this is already happening in many places, but not perceived or communicated clearly enough as related to climate change. Authors oversimplify social (and economic) processes, and the power of vested interests within a technological and economic system to maintain the control over debate and decision making.

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