Hello Editors!

Apologies for the incomplete initial revision. I have revised the work in the following way:

> \* The response letter seems to address only Reviewer 1's comments. Note that Reviewer 2 had comments in the body of the decision letter email.

**I have read through Reviewer 2’s comments and made revisions TBD**  
  
> \* Separate figure files (separate from text and tables) are required for production purposes. Currently, only Fig. 4 is provided as a separate file. Submit a separate figure file for each figure cited in the manuscript, not just one file containing all figures. See [https://www.aapt.org/Publications/tpt\_figure\_guidelines.cfm](https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.aapt.org%2FPublications%2Ftpt_figure_guidelines.cfm&data=05%7C02%7Cnmoore%40winona.edu%7Ce4ef234bfdae480e400508dc751e22cb%7C5011c7c60ab446ab9ef4fae74a921a7f%7C0%7C0%7C638514019527163872%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=BmcP%2F5B%2B39lHI7RCzwfma73u0fv%2FmEbEFIxtgKVm1xU%3D&reserved=0) for figure guidelines.

**Image files are attached TBD**  
  
\* You cite an online appendix but then say "(attached, or could be online [https://arxiv.org/abs/2301.06637](https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Farxiv.org%2Fabs%2F2301.06637&data=05%7C02%7Cnmoore%40winona.edu%7Ce4ef234bfdae480e400508dc751e22cb%7C5011c7c60ab446ab9ef4fae74a921a7f%7C0%7C0%7C638514019527174539%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=Z3ZwelK8gsed8SWmxubskwGk9IWrmbSPMr4YNmSTM40%3D&reserved=0))". It appears that it was included in your original submission but the file is no longer included in this submission. Please choose whether you want it to be an online appendix for this article or whether you want to cite it as an external online article.

**A reference pointing to the archive paper will be fine – good suggestion. Correction made TBD**

---

Hello Reviewer 1! Thanks for your thoughtful reading of my paper. I’m glad to hear you enjoyed reading it. I appreciate your suggestions have incorporated them in the attached revision. My actions and comments in response to your suggestions are in bold.

Review of “How many acres of potatoes does a society need? Using food and historical claims in an energy context”

I have reviewed this paper and greatly enjoyed reading it. I think that it provides some good examples of back-of-envelope type calculations on some relevant historical problems and provides a sound pedagogical framework. I recommend that it should be published with some fairly minor revisions.

Minor Revisions Noted:

Lines 15 and 20: Inconsistency in use “a degree Celsius” but “1 oF” **revised**

Inconsistency: space between a number and kcal – I recommend “3000 kcal” rather than 3000kcal”. **revised**

Line 23: use semicolon “; it will cost you…” **revised**

Line 29: “There are a frustratingly large number of different units in play for energy”. **revised**

Line 71: For clarity “Data is given in bushels per acre (1 bushel = 56 pounds)” **revised**

Line 76 – I’m not sure if this paragraph is meant to be in the text or in the figure caption. I think the text should be in the body of the paper. **I like descriptive figure captions and prefer that this to be a caption. If the editor prefers it to be in the body of the paper that’s fine.**

Line 158: “Few, if any, Native American cultures made use of...” – commas around the “if any” is my preference. **revised**

Figure 4: I find this confusing. If color is being used in figure 2, then I would suggest using it in figure 4 to delineate the regions under discussion. I would suggest just using the inset map and colorizing it. For international readers, it would probably be helpful to include a km scale as well as the miles. **The figure caption is revised for clarity – thanks for pointing this out. I added a 10km scale bar and highlighted the chinampas area included in the estimate. I think two map sections are useful to 1. show the geographic location of the area (which I needed to find remnant chinampas areas on Google Earth), and 2. To illustrate both areas used in the calculation.**

Line 186 I would write out “P, the corn productivity in bushels per acre” for clarity. **revised**

Calculation on line 187 - I assume that the equation label 4 will be on the same line as the relevant calculation when not in proof form. **Sounds great to me. I’m not sure how to do that in Word**

Calculations starting on line 237. There needs to be consistency in the number of significant figures used. I would suggest 2 sf. Significant figures are an important thing in calculations such as these, where we are doing rough estimates, and students should be able to spot unnecessary precision – a very common issue in many estimates! A short comment to this effect somewhere in the text is recommended. **Thanks for this comment. I added the following line:** Note the varying number of significant figures in the setup to this problem. I really don’t believe the estimate beyond about 2sf, although there isn’t harm in including the better-quality area and crop productivity data in the estimate.

Line 257. A complete failure of the *laissez-faire* economic policy of the Whig administration governing in London at the time. [BBC - History - British History in depth: The Irish Famine](https://www.bbc.co.uk/history/british/victorians/famine_01.shtml) (extra reference for you) **Interesting reference, added. Thanks! I noticed they said grain exports don’t match the claims I make in the paper. However, they don’t give numerical figures or even estimated to the amount of Oats exported. I suppose that could be an interesting follow-up activity.**

Other Recommendations:

Fix figure 4 **done**

Add a sentence or two after line 113 making the point that these estimates assume that there is sufficient labor to work the fields, and that you can efficiently distribute food to the population. This is not just a logistics system, but also economics and sociological factors – can people afford the food, or are they socially excluded from obtaining the food. **I appreciate this point and added the following:** These estimates assume that there is sufficient labor to work in the fields, and that you can efficiently distribute food to the population. Beyond simple logistics – can people afford the food, or are they economically or socially excluded?

**There is a meaningful connection between your comment and the BBC article you mentioned. Again, thanks!**

Conclusions. I would rewrite this to be more positive about encouraging students to perform numerical estimates when studying problems. Ditch the word “arrogant” and the phrase “these students”. **Good point, thanks. Revised.**

**---**

**Hello Reviewer 2! Thanks for reading my paper. I’ve made the following revisions in response to your comments.**

This paper makes a number of very useful points for teaching introductory physics, but I think that the introduction needs significant improvement. Minor quibble on line 48-51: the author discusses three examples.   
  
The introduction focuses on the bewildering multiplicity of energy units, before changing focus to food energy. Many readers might lose interest before getting to the interesting examples. I suggest focusing the introduction on food and energy, leaving most of the discussion of energy units and the "Science and Social Policy" course to the end of the paper. Alternatively, starting with an abstract like the one in the linked arxiv article would also orient the reader well.   
  
The example of growing your own food is fascinating to me, as it includes a lot of non-physics considerations. I particularly liked the discussion of whether New Jersey could grow enough potatoes to feed itself (spoiler alert: it can't using traditional methods). I also really appreciated the discussion of organic agriculture.   
  
The Tenochtitlan population estimate is also interesting. It would help to add a sentence or two about the use of ImageJ (whatever that is) for estimating the crop area of the city. It would also be useful to point out the uncertainties of the technique as applied to population estimation (i.e., while the central estimate is about 100,000 people, what are the reasonable limits on the estimate).   
  
The Irish discussion is also useful. I do not see any evidence in Fig 5 for a famine in 1740. Wikipedia mentions food shortages in other years.   
  
However, I would remove the emotional content of the conclusions in lines 255-257. While the numbers suggest that Ireland grew enough oats to feed itself if the potato harvest failed, the political and economic situation was far more complicated than would be appropriate to discuss here.   
  
I assume that the class covers more than just food energy. I would like to see a paragraph or two at the end on the other topics covered in the class.   
  
Overall, I think that this article discusses an often-overlooked but critically important aspect of energy use. It carries thru straight-forward calculations to reach interesting conclusions.   
  
It should be published after some minor revision.