

Part	Comment #	Comment	Authors' response
2	20	<p>Start to explain figure 2 in a paragraph that comes immediately after line 200. "We can show these effects, and those we are about to set out, in a diagram that measures direct energy use on the horizontal axis and indirect use (or rather, all energy use except by the device itself) on the vertical [and so on]". Then the numbers for substitution effects, and how they appear on the diagram, then income, then macro. The explanation will help any reader who's coming to the paper too long after reading part I (or never having read it), and will all be close to the diagram it's explaining, making referring back and forth easy.</p> <p>After that, you can give the expenditure changes and explain how they are presented in figure 3, again, keeping the references to the diagram close to where it is in the paper.</p> <p>Then explain the consumption changes and figure 4.</p> <p>I think this would be easier for the reader than explaining how all dimensions of the emplacement effect are portrayed in three separate diagrams, and then giving the substitution effect, and so on – that way, the reader has to keep switching between three different figures and some of the text is inevitably going to be further away from what it's describing. If you really prefer that approach, I'd suggest writing both versions and giving them to someone who's unfamiliar with your work to get their feedback. On the other hand, for the lamp example, once the diagrams have been properly introduced, I think combining the different aspects in your text, as you do now, makes sense. The diagrams aren't too far from any of the text, as the text is fairly short.</p>	<p>Thanks for this helpful comment.</p> <p>We have made the suggested changes, and we agree that the paper is more readable now.</p> <p>We left a short (and mostly generic) description of the rebound planes in the methods section, because the planes are a novel way to visualize rebound. But detailed descriptions of the planes is now much closer to the associated figures.</p>

2	21	<p>In line 137, I think you should probably point out that you are defining emplacement in a way that doesn't alter consumption patterns (this might also be a point for part I). This is not the only way it might be defined. Emplacement requires me to spend more on the new device (always if completely new; usually if a replacement) and that is going to mean that I have less money for everything else. That could be thought of as an indirect emplacement effect. You do capture this effect, but as part of "income effects". Doing so makes sense, but I strongly suspect some economists would be conditioned to think that "income and substitution effects" both relate solely to the change in the "price" of the energy service, because those effects are inevitably taught in the context of a price change.</p>	<p>Thanks for this comment. In response, we have improved the sentence in Part II to which you referred as follows:</p> <p>Emplacement (by itself) does not alter consumption patterns, so ... --> As defined in this framework, emplacement (by itself) does not alter consumption patterns, so ...</p> <p>Your comment caused us to review Part I for clear indications that we define the emplacement effect to NOT include altered consumption patterns. We changed this sentence in Section 2.5.1 as follows:</p> <p>The emplacement effect accounts for performance changes of the device due to the fact that a higher-efficiency device has been put in service (and will need to be decommissioned at a later date); behavior changes are addressed later, in the substitution and income effects.</p> <p>The emplacement effect accounts for performance changes of the device due to the fact that a higher-efficiency device has been put in service (and will need to be decommissioned at a later date); consumptions patterns are assumed unchanged. Behavior adjustments are addressed later, in the substitution and income effects. Any (positive or negative) adjustment in income due to emplacement (measured as net income, N_{dot_star}) is added to the freed cash (G_{dot}) spent in the income effect.</p>
2	22	<p>For table 8, make the reader's life easier, and add a column to the left which reminds us what each parameter stands for – there's space! I wondered about using dots or dashes to show when parameters (or choice variables, such as distance driven) take the same value as in the previous (leftward) column – it becomes more obvious when a changing parameter is leading to a change in energy use (etc), and the sparser table concentrates the reader's attention on the things that are changing rather than those that are not. The same comment applies to table 10, of course.</p>	<p>Thanks for this comment. In response, we changed Tables 8 and 10 to have blanks where no parameter changes occur. In addition, we added a column at the left to provide descriptions of the parameter in each row. We agree that the tables are more readable with these changes.</p>

2	23	<p>I'm doubtful about your calculations for the lamp, however. You suggest that the lighting demand would rise from 0.6 million lm.hr per year to 1.4 million lm.hr per year, so more than doubling. But that's from an unchanged number of lights. Are people with more efficient lights leaving them on twice as long? I doubt it. Fouquet is looking at long-run changes, where I expect houses were being built with more lighting points in each room, consumers were perhaps putting in brighter (e.g. 100 Watt rather than 60 Watt) incandescent bulbs, and perhaps people were adding corner and table lamps. You could incorporate such changes, but of course they'd have their own embedded energy and cost...</p>	<p>Thank you for your comment and pointing out the very large increase in lamp running time. We actually use an elasticity on the least-negative end of Borenstein's (2015) elasticity range of -0.4 to -0.8 (as discussed in Table 6. Effectively, our results indicate that a lamp is being used 7 instead of 3 hours per day. This may mean that a lamp isn't turned off when device users leave a room or the house for short times - something that we find anecdotal evidence for in our daily lives. However, we agree that it is important to distinguish this rebound effect from one where the additional or more powerful lamps would be added.</p> <p>To that end, we now call out the Schleich (2014) reference, because it estimates "burn time" rebound. However, Schleich's methodology relies upon respondent self-reporting of additional burn time for lamps. In-home measurements would have been better. Regardless, an elasticity value can be back-calculated from their burn time rebound value: -0.13.</p> <p>We also note that Fouquet (2011) finds economy-wide elasticity to be -0.6. The single-device rebound elasticity is expected to be less negative, another reason why we choose -0.4 for our preferred value.</p> <p>We pull all of this together in a new section 4.4 investigating the sensitivity of total rebound on the uncompensated own price elasticity of energy service consumption. In that section, we use the three elasticity values to calculate total rebound and find total rebound for the lamp example is 55% with elasticity = -0.13, 67% with elasticity = -0.4 (our preferred value), and 81.7% with elasticity = -0.6. We also pull the elasticity sensitivity graph for the lamp forward from the appendix to illustrate the sensitivities involved for each component of rebound.</p> <p>Thank you again for this helpful comment.</p>
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2	24	<p>On page 24, I think the returns to money spent on industrial policy are a very different concept to the kind of multiplier you're looking for. You're wanting to know how a dollar saving on energy cost is going to affect output; the study you cite sounds as if each dollar spent by the government gives benefits of five dollars, but those aren't split between the saving from the technology and the benefit of greater output. What if all the benefits were due to lower costs with no greater output? I think this is the most speculative part of the paper – particularly as some of the argument seems to suggest that changes in the efficiency of using consumer goods is going to have supply-side impacts on the wider economy, beyond the standard Keynesian expansion of aggregate demand. I've re-read your comments in Part I and remain unconvinced; I'd suggest looking for estimates for standard Keynesian multipliers.</p>	<p>Thank you very much for this good comment and exhorting us to be precise about what we are depicting. In response, we deleted the reference to the Buera and Trachter paper and industrial policy and instead focused on the data in the more relevant Foerster et al. paper, which looks squarely at the long-run effects of sectoral output shocks on aggregate output, including specifically of durable goods, from which we derive the value of 3 for our multiplier. We continue to believe that this is a better approach than using Keynesian multipliers as it is faithful to our sector-specific technology shock, rather than starting with aggregate shocks.</p>
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