In hearing Nora Bateson's perspective on the necessity of transcontextuality, I noticed the extreme differences between her approach and the approach Smil takes in his book *Energy: A Beginner's Guide* toward a transition to a more sustainable energy path. Smil uses models and facts to showcase the current issues we face whereas Bateson strongly believes in the ineffectiveness of models and matter-of-fact thinking. I myself waver between these two schools of thought often, unsure of whether to continue model-building and mapping out potential solutions or to entirely eliminate structured thinking in leu of an understanding of the vast complexity of systems. Generally speaking, I am analytical by nature and tend to piece things together like a puzzle to accomplish a goal, but I am also constantly hindered by the reality that I may not always have all of the pieces of the puzzle. I found Smil's discussion of transportation energy usage and electricity usage to be the most intriguing, and I think Bateson's concepts of transcontextuality and multiple perspectives can be applied to these topics.

When it comes to energy usage via forms of transportation, I think the issues are clear yet the solutions are difficult to produce. As Smil discusses, Europe and Japan made the first waves in car efficiency due to an external factor of high fuel taxes due to OPEC crude oil price increases. If these areas were able to attain this change due to high taxes, why doesn't the US artificially impose such taxes to create the same, desired effect? Using Bateson's concept of transcontextuality, this is certainly not just an economic debacle. American consumers demand larger, fuel-consuming vehicles like SUV's and vans. It is also largely the richer segments of Americans that are able to own such monstrous vehicles, thus, imposing fuel taxes in the US may not affect a consumer's ability to pay for gas. The elements of consumer behavior are not as concrete as prices and numbers, and these are often underlying elements that are not on display in the same way as fast facts. Smil's use of models and hard-and-fast number-based potential for solution creation is not effective when considering elements beyond the models, so Bateson's concept questions the validity of facts in understanding the system as a whole.

Bateson also argues that Western culture is plagued by the focus on reductionism and binaries, as systems are too complex for individuals to create "simple solutions." In the context of electricity usage, I disagree that models of energy usage and efficiency cannot lead to sustainable solutions. Smil outlines the history of electricity usage in the US, beginning in the 1880s and spanning to the present. It is interesting to me that although fluorescent lights are more than 3 times more efficient than incandescent lights and last about 25 times longer, they are still not the main source of lighting in the US. While I understand that there are other factors at play such as pricing and the need for a cultural shift, on the individual level there is a very simple solution to this issue. If people just made the switch to fluorescent lights, electricity usage would be bettered, and we would be on a path to more efficient use of electricity. Yes, transcontextuality reminds us that consumers think with a variety of factors in mind and the system of purchasing lightbulbs is by no means simple. However, Smil's use of numbers and a model for lightbulb efficiency itself convinces me that the solution is right before our eyes. Bateson's description of how people cannot focus on just one model or one subsystem to produce solutions is honestly somewhat ridiculous to me since the research Smil provides (as well as scientists and researchers worldwide) points to an attainable solution. I think it can be difficult to separate "reductionism" from focusing our attention on specific models, since I do not agree that all models miss vital information and that simpler models cannot aid in the creation of simple solutions. Some solutions, like the individual change in choice of lightbulb, is just not that difficult to see. Sure, the implementation of that solution may be more complex, but the use of a model to produce an effective solution at least in theory is not something that should be labeled as "reductionist" and scrapped as an incomplete idea.

Overall, I think that Smil and Bateson come from different backgrounds and thus offer different perspectives on how to transition to a more sustainable future. Applying Bateson's concept is a good practice as it puts models in perspective and forces us to consider other factors and the complexity of situations more clearly. It is true that many of the problems we face today are in fact the result of failed

solutions, as Bateson mentions, related to the difficulty we have with understanding complexity.

However, simple solutions do exist in my mind and there were many times throughout history, as Smil

discusses, in which solutions were offered and yet were not taken advantage of. The ability to see the

simplicity within complexity is what will allow us to forge a more sustainable path, and that ability

comes with the understanding of both Smil's and Bateson's perspectives in tackling systems thinking.