UN Project: Climate, Land, Energy and Water (CLEWs)
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Overall outline for the technical report

**Further resources/documents needed, and questions that need to be explored:

- Who is currently using the data and the visual model?
- Are there people "in the field" who may be able to tell us more about the model and the use of it for their work?
- Why are they using (or not using) it?
- What are the potential areas (from the field) that are not currently considered by the models? (e.g. socio-economic factors, country-by-country policy, regional concerns, etc.)
- What is the gap between the current policy work and the current visual data?

**(questions for us) what are the main problems of the existing models trying to understand?
How can we reframe the problem based on new approach to the problem?
What new insights can we bring from an 'outside' perspective?

1. Introduction: review of literature and the existing models in climate modeling.

2. CLEWs Computational Models

- Parameters, Equations, Visualization
- Overall analysis and evaluation
- Emerging considerations
- The Rationale of Integrating Human Factors into the model

3. Suggestions for the white paper

Pfenninger, Hawkes, and Keirstead (2014) pointed out the challenges in energy systems modeling: (1) resolving details in time and space; (2) balancing uncertainty and transparency; (3) addressing the growing complexity across scales; and (4) integrating human behavior and social risks and opportunities. Among which, we are specifically interested in incorporating human factors into energy modeling. Current methods are focusing heavily on technical and economic

aspects while relatively neglecting the human dimension, which may be of equal importance. A lack of understanding in the human aspect may also increase model uncertainty.

4. Challenges for Integrating Human Factors into CLEWs Computational Models

- A need for a large-scale survey data about human activities in various arenas (e.g., economy, politics, social movement, energy usage)
- Potential indicators and datasets which can serve as proxies for human activities, especially the data collected by advanced ICTs (e.g., nighlight luminosity for economic productivity, daytime satellite photos, mobile phone data) (see Blumstock, 2016)
- Open access to more complete, reliable datasets owned by governments, organizations, and individuals

5. Socio-cultural and economic factors which affect policy decisions related to energy models.

Depending on the country or region, the social, cultural and religious outlook of the people, certain alternate sources of energy are not feasible. What sort of impact does that have on the climate?

6. Improving quality of life through study of various indexes

By looking at various indexes like Better Life Index and Happy Planet Index from a macro-level perspective, we are trying to find out how climate sustainability can be achieved without disrupting the daily life of the people.

References:

Blumenstock, J. E. (2016). Fighting poverty with data. Science, 353(6301), 753-754.

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Pfenninger, S., Hawkes, A., & Keirstead, J. (2014). Energy systems modeling for twenty-first century energy challenges. *Renewable and Sustainable Energy Reviews*, *33*, 74-86.