

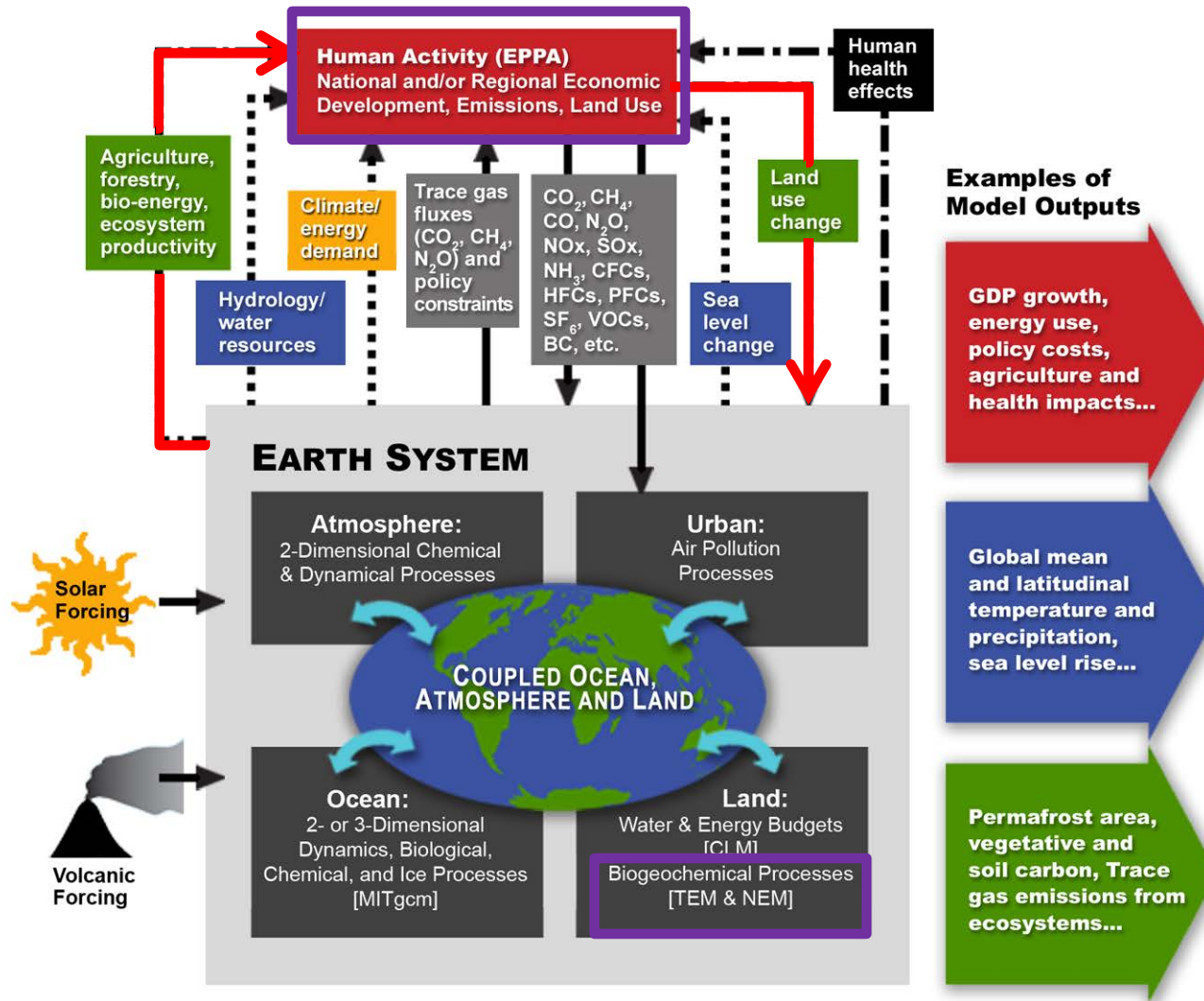
Using Land to Mitigate Climate Change: Results from Dynamically Linked Economic and Terrestrial Ecosystems Models

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MIT Joint Program on the Science and Policy of Global Change

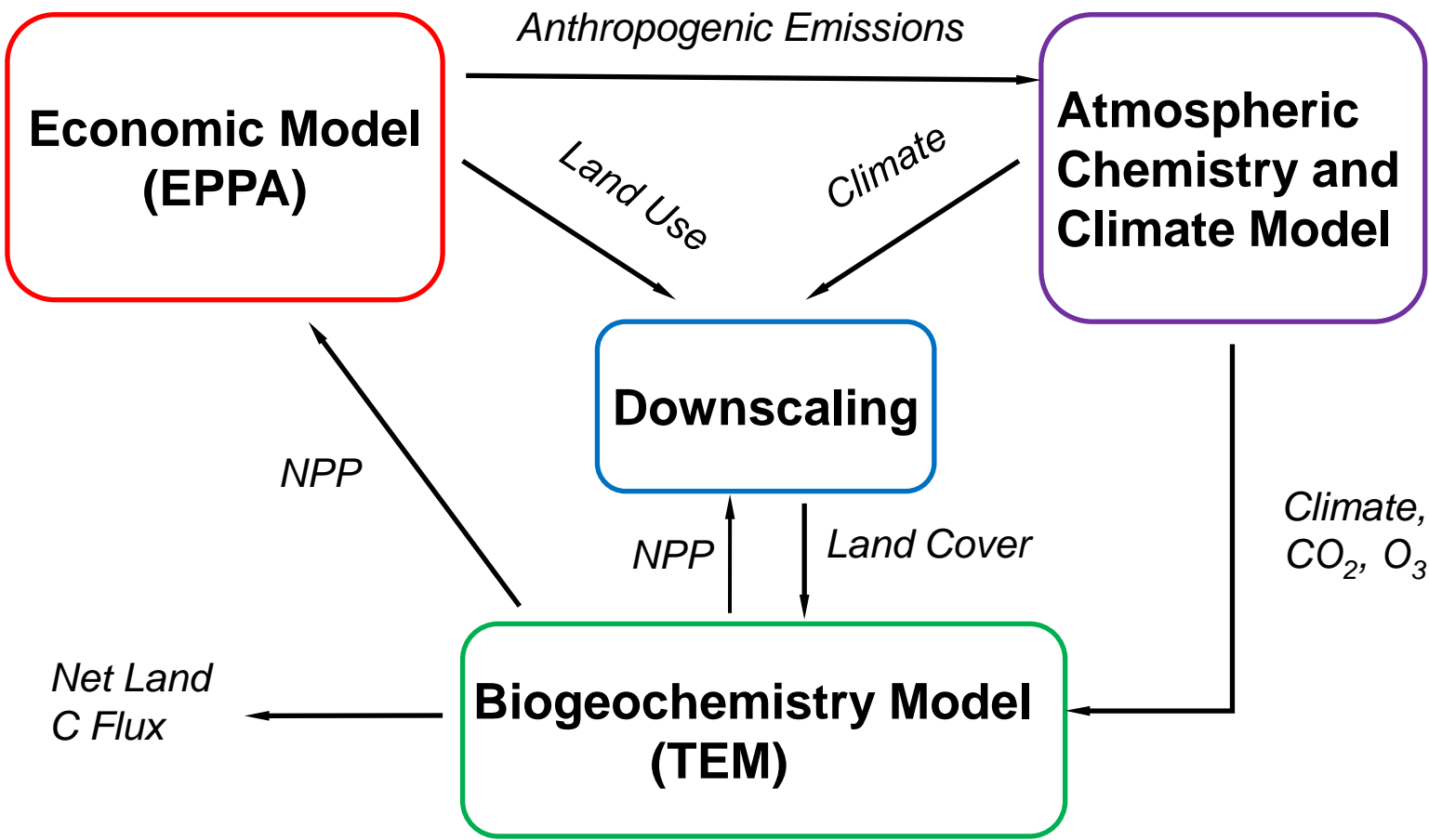


IGSM

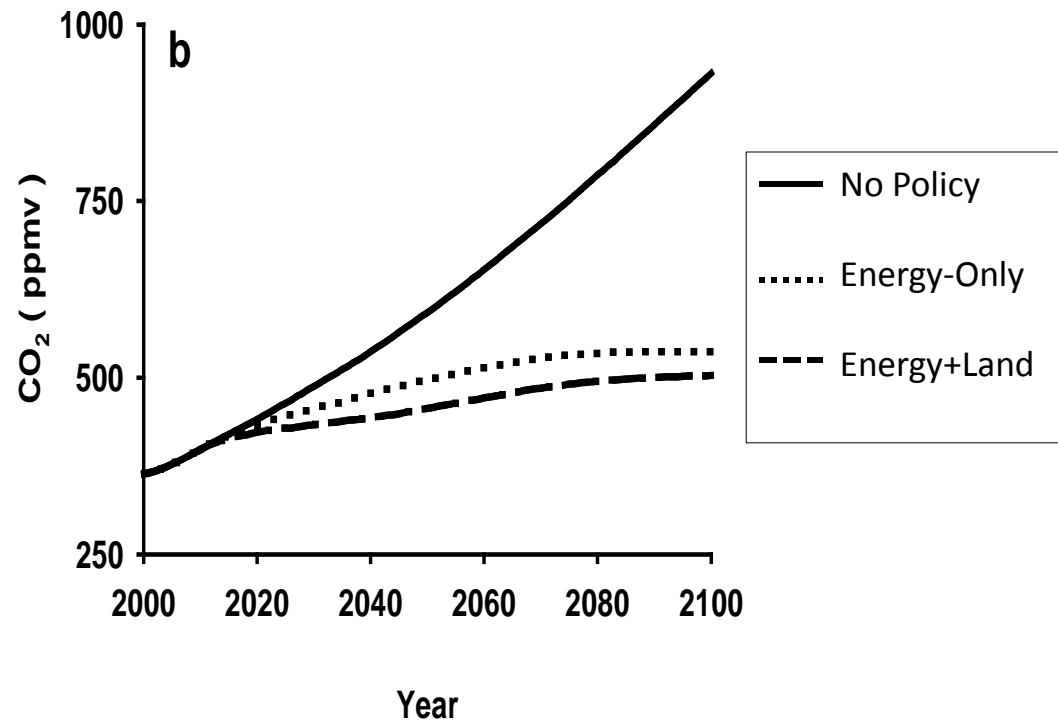
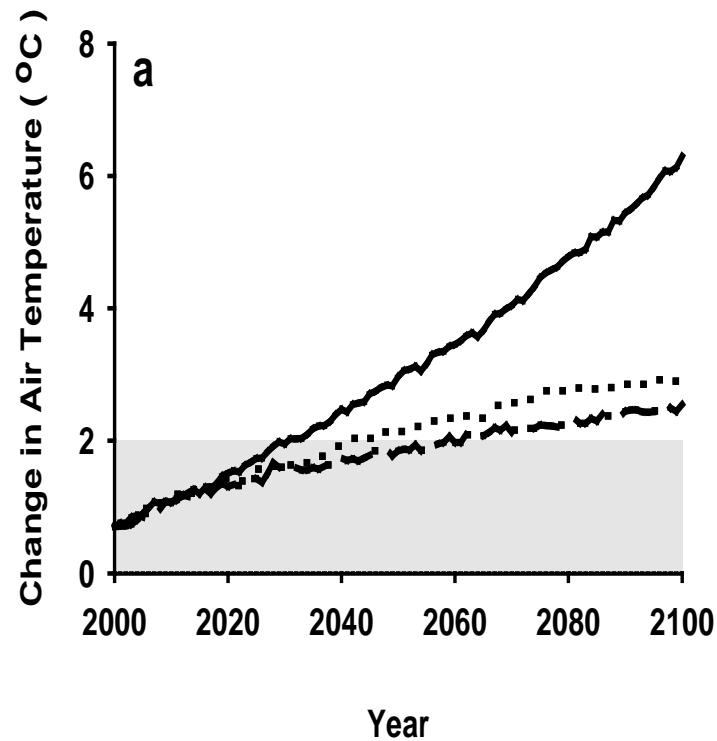


The schematic depicts the current framework and processes of the MIT Integrated Global System Model Version 2 (IGSM2). Solid lines between model components indicate exchanges represented in standard runs of the system; dash-dotted lines indicate model connections that exist and have been utilized in targeted studies; dotted lines indicate areas where implementation of feedbacks is under development.

Linked Modeling System

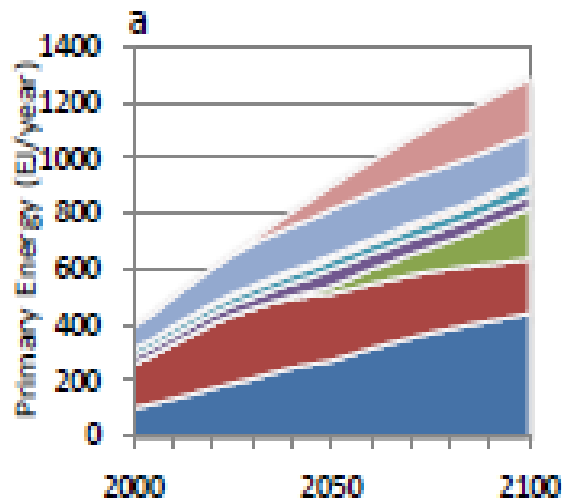


Temperature and CO₂ Concentration Projections

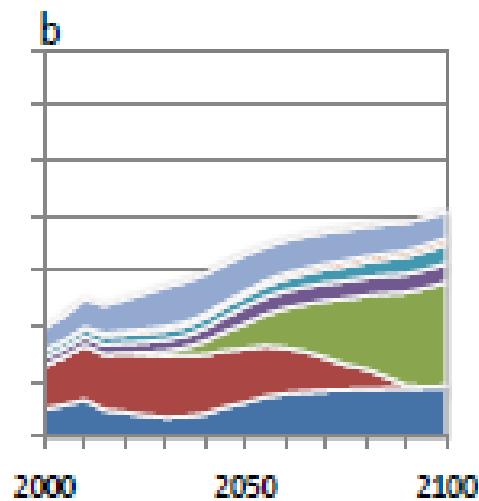


Energy and Land Use Change

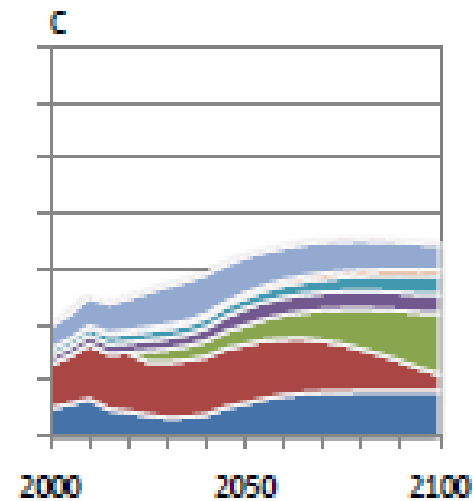
No-Policy



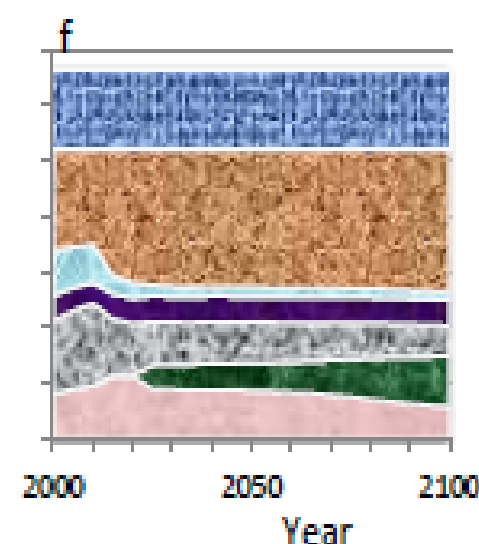
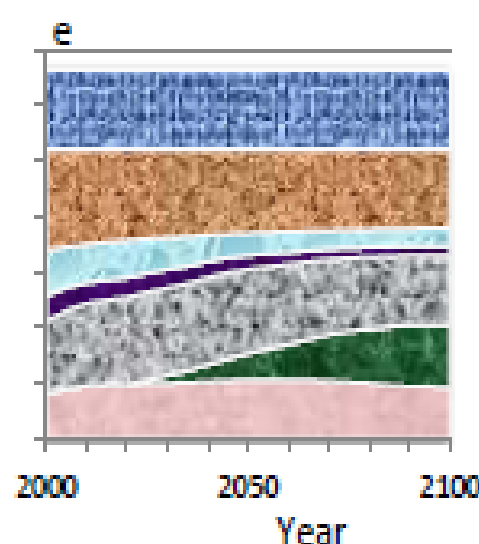
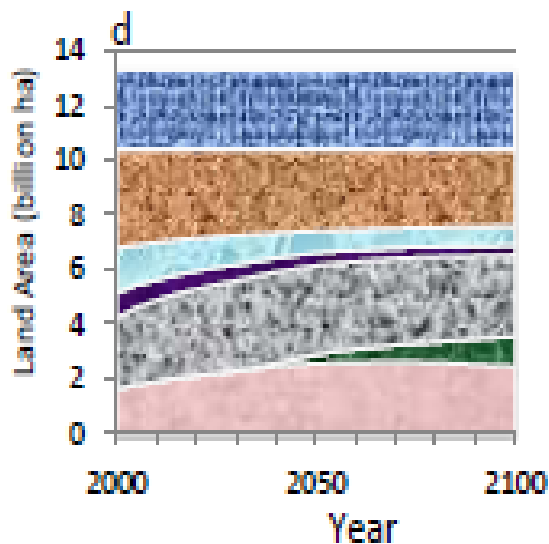
Energy-Only



Energy+Land

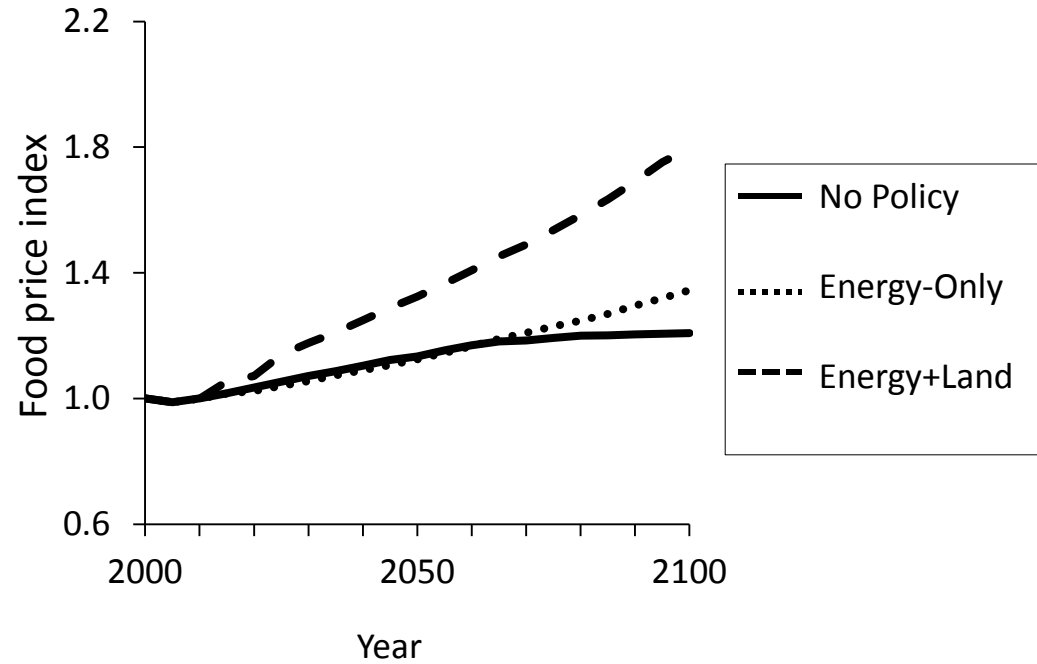
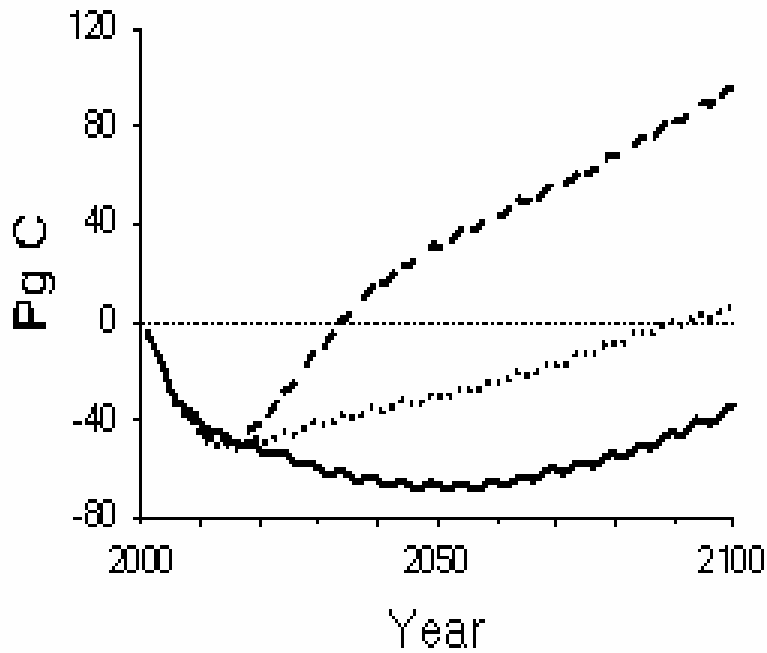


- Shale
- Gas
- Solar/Wind
- Hydro
- Nuclear
- Biofuels
- Oil
- Coal



- Other
- Natural Forest
- Managed Forest
- Grassland
- Pasture
- Biofuels
- Food

Carbon Storage and Food Price



Conclusion

- *Energy-Only* climate policy that includes biofuels would likely not achieve the 2°C target. *Energy+Land* policy gets much closer to the target.
- Land could become a large net carbon sink over the 21st century with price incentives. Absent such incentives land is either only a small net carbon sink or a large net source.
- The tradeoff is prices for agricultural products rise substantially.