

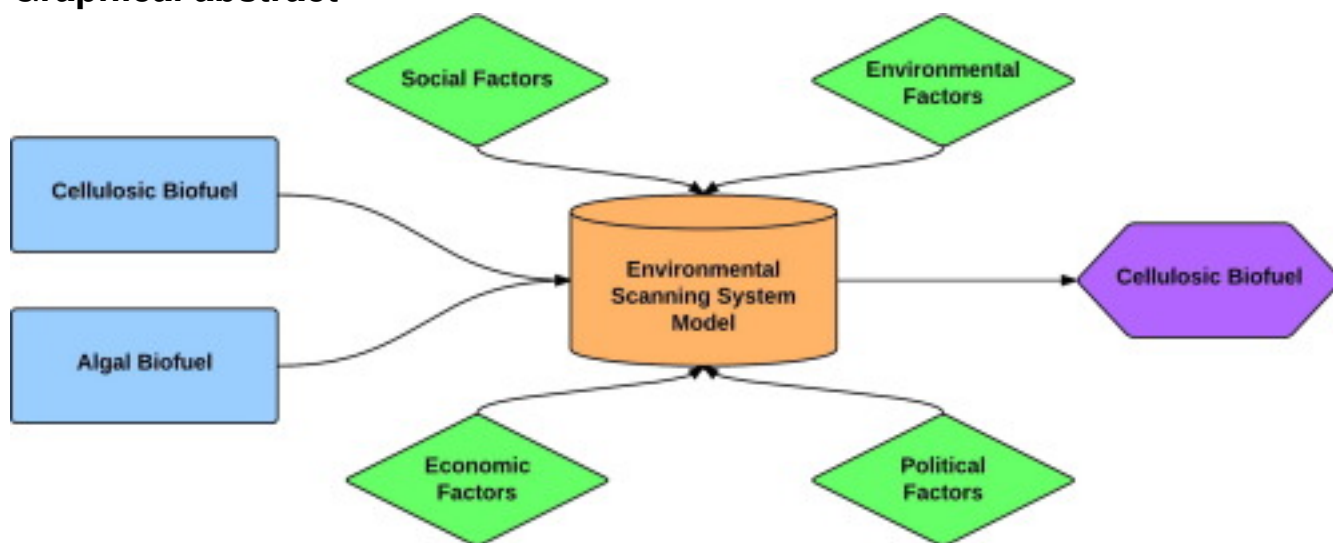
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In the United States and elsewhere, climate change, peak oil, and other political and socioeconomic factors have spurred the development of alternate energy sources. Biofuels, derived from living organisms rather than petroleum-laden rock, are the focus of current energy research. To better understand the future composition and sustainability of biofuels within the U.S. energy portfolio the authors conducted an environmental scanning methodology and futures analysis. The authors developed a model representing the relationships between many important economic, environmental, political, and social factors to illuminate potential future trends in cellulosic and algal biofuel over the next twenty years. This innovative, flexible approach compared the sustainability of biofuel sources in many areas over time. The resulting analysis identifies environmental degradation as the most influential adverse factor. The environmental scanning exercise suggests that cellulosic biofuel may be a more sustainable option than algal biofuel under the model's assumptions. This analysis yields insightful trends that predict the sustainability of two biofuel sources over the next twenty years in relation to other important socio-politico-economic factors. In the future, this methodology can be applied to other biofuel sources and energy problems.

Graphical abstract



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