

Abstract Submitted  
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**Energy Security: From Deal Killers to Game Changers** RAYMOND L ORBACH, University of Texas at Austin — Five “deal killers” for achieving energy security will be addressed: 1) Global warming and CO<sub>2</sub> emissions from fossil fuel combustion, 2) Intermittent energy sources (wind, solar) and the presence and stability of the grid, 3) Penetration of plant defenses to produce transportation fuels from biomass, 4) Mimicking nature: artificial photosynthesis for solar energy-to-fuels, and 5) Spent fuel from nuclear power reactors. Basic research can lead to “game changers” for these five fields: 1) Carbon capture and storage through enhanced oil and gas recovery, 2) Electrical energy storage for base-load electricity through batteries and supercapacitors, 3) Genetic modification of the plant cell wall, and catalytic methods for conversion of plant sugars to fuels, 4) Separation of solar-induced electrons from holes, and catalysis to produce fuels, and 5) Closing the nuclear fuel cycle. The present state for each of these game changers will be summarized, and future research opportunities discussed.

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