Net-zero Emissions Energy Systems

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Stabilization of the Earth's climate will require that energy-related carbon dioxide (CO_2) emissions fall to very low levels and perhaps go negative if other greenhouse gas emissions continue. However, some energy services (e.g., long-distance freight transport, air travel, highly-reliable electricity, steel and cement manufacturing) will be difficult to provide without adding CO_2 to the atmosphere. Yet few climate mitigation scenarios address these difficult-to-decarbonize energy services in detail. Prof. Davis will present work analyzing the challenges associated with eliminating CO_2 emissions associated with some of these services, including possible or promising technological solutions and research and development priorities. Although there are still abundant options for incremental reductions of energy-related CO_2 emissions, if CO_2 emissions are to be eliminated, the more difficult-to-eliminate emissions will ultimately need to be addressed. Moreover, rapid growth of these difficult-to-eliminate emissions combined with the long lifetimes of energy infrastructure make the challenge both essential and urgent.