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Global Energy Challenges: The Energy/Water/Food Nexus

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This talk will focus on some of the challenges we currently face in the efficient creation and use of energy and the link between energy and production of secure and sustainable sources of water and food, one of the most significant challenges of the 21st Century. We'll discuss these challenges, and the opportunities they present, in the context of the way life is changing in the western U.S. We recognize, however, that these problems and their solutions are common to many areas of the world currently experiencing "stress" to their supplies of clean water and food, while often being awash in under-utilized and under-appreciated supplies of renewable energy. The source of much of this overview comes from recent National Science Foundation and U.S. Department of Energy initiated workshops (the one held in Arizona can be found at: <http://energywaterfoodnexus.wordpress.com/>). Among the five themes that have emerged from these workshops (Situational Scarcity, New Materials and Technologies, Smart Data, Policy Responses and Test Beds) we see a need for development and integration of technology (demonstrated at scale), policy responses and public acceptance. Especially for the energy materials research communities we need to engage the end users of our new technologies at the earliest stages of research and development, and I will cite a few specific examples where energy conversion and energy storage, water purification and re-use, and food production may one day be integrated in ways that lead to more resilient communities.
