Environmental Research Group

2014 Fall Seminar Series

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Considering time in water-energy nexus analyses

Water and energy supplies are inextricably linked: providing one resource requires a substantial amount of the other. This interrelationship is commonly referred to as “water-energy nexus”. In the U.S., treating and pumping water alone represents an average of 4% of the total electricity consumption with vast variance among regions (e.g., >20% of total electricity use in California). Additionally, energy flows associated with providing chemicals and services for the operation and maintenance of water systems ranges from 25% to 200% of the direct energy demands depending on the source of water. While the significance of energy use in water supply has started to be widely recognized, current studies on this particular research niche are mainly focused on answering the question of “how much”, e.g., “How much life cycle energy is used during water supply”. On the other hand, the energy use in water systems is dynamic. It changes over time driven by engineering, social, and environmental stressors. In response to drivers such as climate change and population growth, water stresses will eventually be transformed into energy stresses. In this case, water and/or energy conservations alone may not be sufficient to relieve these stresses, and implementations of new technologies or new policies are required. Lead time for such implementations is usually long and uncertain. Hence, further questions to be asked are related to “when”, e.g., “When will water stresses be transformed into significant energy stresses that require immediate management actions”. Through this talk, we will explore the time sensitive variables in water-energy nexus as well as approaches to improve the traditional life cycle assessment method.