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Dynamic Energy-Water-Land hotspots at variable spatial scales across the United States

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Energy, water, and land (EWL) resource planning at regional (e.g. large river basins, states and provinces, balancing authorities) and sub-regional (e.g. sub-basins, counties, Agro-Ecological Zones (AEZ)) scales has commonly been conducted in relative isolation by institutions focused on individual sectors, such as water supply or electricity. The effectiveness of this traditional approach is increasingly being strained by rapid integration among sectors as well as by a range of regional and global forces, such as climate, technological and socioeconomic change. In this study we explore regional and sub-regional implications of these changes across the United States for a suite of scenarios representing a range of socio-economic and climate pathways. We couple a global integrated assessment model with a suite of sectoral downscaling tools to analyze the evolution of EWL hotspots at variable spatial scales. The ability to flexibly telescope into regions to identify the evolution of dynamic EWL hotspots allows planners to capitalize on synergistic opportunities as well as avoid potential conflicts across sectors at stakeholder specific jurisdictional boundaries as well as in the context of the larger region.