

Earth Observations for Climate Resiliency in the Electricity Sector: A Capacity Building Approach

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Background/Objectives. Electric utilities must address environmental change to ensure that energy supplies are reliable and resilient. Earth observations (EOs) provide actionable data for monitoring change, but better collaboration between scientists and end users is needed. To address this challenge, the authors applied a capacity building approach to identify end user needs and identify solutions to meet those needs with the goal of reducing the burden of accessing and using EOs to support climate resiliency in the electricity sector.

Approach/Activities. Vulnerabilities due to climate change vary due to multiple factors, such as geography, service area size, infrastructure, and capacity; therefore, successful strategies for resilience planning must include engagement with decision makers. Further, connections between scientists and end users must be strengthened so products, tools, and data meet user needs. The authors' approach emphasized the following key actions: (1) understanding stakeholder needs relevant to climate resiliency; (2) developing capacity building strategies; (3) transferring knowledge; (4) co-developing solutions; (5) engaging with end users; and (6) evaluating the effectiveness and sustainability of the approach. The U.S. Department of Energy (DOE) Partnership for Energy Sector Climate Resilience and the Edison Electric Institute (EEI) were leveraged as key entry points to engaging with the end user community. Information gleaned from in-depth interviews with five U.S. electric utilities and industry experts was used to identify priorities for capacity building activities. Activities included development of a centralized repository of relevant NASA EO resources (Esri StoryMap® for Energy Management), training modules for energy management developed in collaboration with NASA's Applied Remote Sensing Training (ARSET), and outreach materials targeted to electricity sector stakeholders.

Results/Lessons Learned. Interviewed utilities identified the need to better understand environmental stressors at a near real-time temporal scale and city-level spatial scale, most notably wildfire, extreme weather, water availability, and vegetation health. Higher resolution data are most actionable, and utilities generally use data from a variety of fine resolution sources such as weather stations, drones, human patrols, and other ground-based sources. In order for EOs to be useful, satellite data should complement or fill gaps in existing data sources and be easily accessible, as utilities have varying degrees of comfort with satellite data. The Esri StoryMap® for Energy Management was disseminated through various communication channels that targeted the end user community and was well received as a useful and applicable centralized resource for accessing EOs relevant to climate resiliency in the electricity sector. Website statistics indicated notable spikes in usage around outreach activities, demonstrating the value in such activities. The NASA ARSET training was attended by more than 850 participants from 400 organizations across 96 countries, demonstrating a broad, global reach. However, challenges included overcoming bias about the viability and reliability of satellite data for decision making, as well as reaching the correct audience. Of the more than 850 ARSET training participants, about 50% were from academia (students and faculty), and not from the electricity sector. However, this presented an opportunity for further collaboration and expansion of potential stakeholders. The overall success of the capacity building approach demonstrates that understanding and engaging the user community and addressing their concerns with user-friendly and accessible solutions is an effective approach to bridging the gap between scientists and end users.