

## Session 2: New Perspectives on Resilience: Paper Presentations & Discussion

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#### *Perspectives on Improving Regional Resilience for Critical Infrastructures*

##### **Abstract:**

Presidential Proclamation 21 for Critical Infrastructure Security and Resilience (PPD-21) and the Critical Infrastructure Research and Development Advanced Act of 2014 (or the CIRDA Act of 2014) emphasize critical infrastructure security and resilience as a national R&D priority. This paper leverages research begun at Oak Ridge National Laboratory in 2008 which focused on community and regional resilience. This research is relevant to PPD-21 and CIRDA Act of 2014. From it we have identified what we consider to be three essential perspectives for improving regional resilience and enhancing critical infrastructure protection. These perspectives include describing resilience in the context of identifying risks and vulnerabilities, taking actions to reduce risks and vulnerabilities, and improving capacities to respond to disruptions as well as to rapidly and effectively recover from disruptions. This paper presents an R&D framework for these perspectives. It will also illustrate resilience challenges for built infrastructures and demonstrate how ORNL is utilizing situational awareness tools to analyze several key resilience issues relevant to extreme events, in particular extreme weather events. Such analyses, for example, include postulating an infrastructure change/investment that would presumably reduce impacts (e.g., modifying the “fragility curve”); running a simulation with this intervention to see how impacts are reduced and/or response times accelerated; and comparing benefits with the cost of interventions. In summary, this paper presents perspectives on addressing critical infrastructure security and resilience challenges by projecting exposures, simulating impacts, and examining strategies for enhancing resilience to impacts. As a result, these perspectives support the intent of PPD-21 and CIRDA Act of 2014 to improve the nation’s resilience against multiple existing and emerging catastrophic threats and hazards.