Current frameworks to monitor, control, and optimize large-scale energy systems are becoming increasingly inadequate because of higher levels of distributed energy resources—including variable generation, energy storage, and controllable loads—being deployed into power systems; the data deluge from pervasive metering of energy grids; and the shaping of multi-level ancillary-service markets.

NREL is therefore working to develop autonomous energy grids that are optimized for secure, resilient, and economic operations through advanced science in controls, optimization, big-data analytics, and complex systems.

Our vision is to develop **Autonomous Energy Grids** that are optimized for secure, resilient, and economic operations through advanced science in controls, optimization, big-data analytics, and complex systems.