

# A Microgrid Boot Camp for Rapid Workforce Development

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Demand for microgrids is increasing in military bases, islands and off-grid areas, mines, hospitals, and universities with an expected growth of 5x by 2025. This rapid growth will occur from technical innovation, increased need for reliable power, decreased cost of renewables, and objectives to improve electrical access around the world. Yet we need new technologies and a trained workforce to meet this product pull. Arizona State University (ASU) hosts an intensive one-week Microgrid Boot Camp that provides experience in designing, modeling, integrating, operating, and maintaining microgrids. The program couples simulation-based design with hands-on integration to provide an “all inclusive” approach to micro-grid education. Students learn principles of power system sizing, power flow analysis, contingency analysis, and real-time dispatch using simulation-based design and training programs such as HOMER, PVSyst, XENDEE/EPRI OpenDSS, IncSys/PowerData PowerSimulator, PowerWorld, and open-source tools developed at ASU. Hands-on activities start small and then grow encompassing basics of solar + storage in a portable workstation used for training leading to NABCEP certification, basics of generator integration and operation in a 6 kW micro-grid on a cart, advanced microgrid configurations and dispatch for 10 kW trailerized Mobile Microgrid Training Platform, and rapid deployment for austere locations using a 20 kW containerized microgrid. Advanced skills are developed in a “microgrid breadboard” that includes with six test bays that can be reconfigured to include any number of combinations of 25 kW assets in each bay, much like a circuit breadboard but larger. Over 50 US Service Veterans and another 20 researchers, defense, and industry personnel have completed training in the first year. The original intent of the training program was to better prepare Veteran military for advanced energy careers as they transition to the civilian sector and advance skills of Active military in energy logistics for forward operating bases and disaster response. The microgrid boot camp is growing rapidly to encompass more technologies, use cases, and participant groups after its inception. ASU has also “taken the show on the road” with the Mobile Microgrid Training Platform for hands-on training in Washington DC with plans underway for more on-site training for universities, indigenous populations, and military partners in the Southwest US. This work is funded in part by the Office of Naval Research NEPTUNE program.