



# Northeastern University

## Global Resilience Institute

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The Global Resilience Institute is a major university-wide initiative that involves all nine of Northeastern's colleges. We are a leader in applied interdisciplinary research, providing resilience-related solutions for individuals, communities, and industries. We work in close partnership with business leaders, NGOs, and public officials to develop and deploy state-of-the-art tools that directly contribute to societal resilience so that we can thrive in an increasingly turbulent world.

Energy resilience requires us to plan for catastrophes that will impact other interdependent systems like water, wastewater, gas, fuel delivery, and communications, each of which can knock down the electric power system if they fail. In addition, we have critical national defense missions that are tied to uninterrupted access to electric power in the United States that are at risk as they are tied to the same civil electric power grid as our homes and businesses.

French Development Enterprises, LLC (FDE) is advancing modular civil water infrastructure industries in the United States and Canada by developing innovative technologies for the next-generation hydro-electric dams, modular power house facilities, pump storage civil structures, reservoir and water control systems, retrofit of existing high hazard dams and modular aquatic animal passage systems.

There are approximately 90,000 dams in the United States but only 2,200 generate energy. There are approximately 15,000 dams that are rated "high hazard" and need to be replaced. Many of these could be converted to modular, rapidly deployable, highly efficient (90% mechanical), hydro powered micro grids, impervious to cyber, EMP and physical attacks, creating secure energy outposts. Thousands could be built quickly, generating 24/7 secure, military grade, renewable energy. Use of modular precast elements to build hydropower facilities and dams can reduce the cost of construction by half. Most importantly, this resilient hydroelectric based solution is the only system that has the capability to be back on-line quickly after a disruptive event with unique black start capabilities.

Distributed Energy Resources (DER) like the French Dam can contribute to a more resilient and secure electric grid. DER investments and these choices are good for the bottom line, good for shareholders, good for our country's resilience and they go a long way toward mitigating our country's energy security challenges.

Sincerely,

Philip Anderson, PhD