Resilience is the Common Thread Across Sectors that Enables Sustainable Change

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Enterprises tend to organize themselves according to sectors, such as buildings, energy, industrial, transport, water, healthcare, waste management, etc. They do this to appeal to specific market segments, attract talent in these segments, and bid on sector-specific projects.

Traditional professions align with siloed sectors as well. Architects design buildings. Transportation engineers design transportation systems. Similarly, trade associations are organized this way. We have building codes, energy institutes, water agencies, and transportation associations.

Extreme weather motivates resilience

Today, these traditional lines of business are blurring. New business and societal drivers are motivating projects around the world that cut across these sectors. A common thread in these projects is enhancing the resilience of energy, water, and other resources against the increasing frequency and intensity of various extreme weather and other threats. Enhancing resilience using this cross-sector approach leads to myriad benefits—including sustainable change—for enterprises, energy and water providers, and communities. In fact, some of the most beneficial projects today adopt a more holistic view of these traditional sectors.

This transformation is due in part to innovative new technologies, including the following, that integrate traditionally separate sectors:

- Electric vehicles are essentially mobile energy storage devices, linking the energy and transportation sectors.
- Microgrids are miniature versions of power grids that enable groups of energy users to operate independent of the main grid, tying together power production, power delivery, and power use.
- Cloud computing, cryptocurrency, and artificial intelligence need vast data centers with hyper-efficient building, water, and energy systems.

The thorny problem of how to optimally enhance energy and water resilience against extreme weather calls for imaginative applications of these technologies, often in unique combinations. The most forward-thinking organizations are now doing just this.

Cross-sector resilience in action

The Electric Power Research Institute (EPRI) conducts extensive cross-sector and resilience efforts. For example, its 2024 Research Program Index lists electricity end-use work relevant to several other sectors, including

electric transportation, advanced buildings and communities, electrification, grid edge customer technologies, net-zero industrial clusters, water management technologies, and others [1]. Its Low-Carbon Resources Initiative (LCRI) targets "advances in the production, distribution, and application of low-carbon, alternative energy carriers and the cross-cutting technologies that enable their integration at scale" [2].

Schneider Electric is also a major player in the cross-sector resilience area. In one of many successful microgrid projects, for example, Schneider Electric and the U.S. Air Force recently announced successful implementation of a cross-sector project at the Yokota Air Base in Japan. This $406 million endeavor features integrated building, energy, and water efficiency to enhance resilience. In addition to a microgrid, the project consists of enhanced building energy management control systems, a combined heat and power plant, and central HVAC plant improvements to reduce water consumption. The project is expected to reduce the base's energy and water costs by almost 30% in an environmentally-responsible manner [3].

Data centers present cross-sector opportunities involving building, energy, water, and community resilience. These centers consume large amounts of energy and water for server cooling, and require energy-efficient and water-efficient buildings and equipment. Data centers also generate significant waste heat—an aspect that Ramboll has leveraged in Denmark. As the owner's engineer of a heat pump system at the Meta data center in Odense, Denmark, Ramboll has demonstrated the ability to efficiently supply this heat to a city's district heating network. The largest such system in Denmark, it recovers 175,000 MWH of energy and redistributes the surplus heat to over 12,000 homes [4]. Ramboll is also a leader in the "resilient cities" space, integrating decarbonization, circularity and resource management, and biodiversity and ecosystems into the resilience equation for urban infrastructure in communities [5].

Are "industrial clusters" another example of this cross-cutting theme? An industrial park planned in Ordos, Inner Mongolia will put a new twist on the concept of circularity in such a cluster. The Envision project aims to integrate the actual manufacture of energy-related equipment (e.g., electric vehicles and batteries) with production of hydrogen from electricity (aka "power-to-X") and clean energy (wind and solar) to power this equipment. Adding another sector to the mix, a fully-electric truck transportation system will serve the resulting system [6].

The common thread

The common thread I see in these projects is interdisciplinary teams collaborating across sectors to the mutual resilience benefit of all. I believe this is an excellent way to facilitate change that is sustainable over time. I'd like to hear about your cross-sector resilience projects, and your overall take on this transformative process. Reach out to me at steve@hoffmanpowerconsulting.com.

References

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