# Hybrid DC Microgrid Building

Propelled by an open forum offered by FortZED, the Hybrid DC Microgrid Building project kicked off to demonstrate a transformational and innovative electrical system.

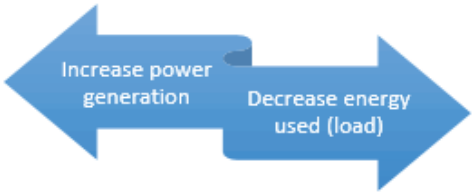
Specifically, this project attempted to demonstrate how a hybrid DC microgrid could be utilized to improve efficiency, increase renewable energy production and transform how buildings interact with the electric distribution system.

This DC Hybrid system also increased resiliency by enabling the utility to continue providing services to residents in the event of disasters such as floods.

## *Project description:*

This project designed a building energy system that combined local solar production, battery storage and DC power distribution to a majority of native DC end uses.

80 percent of electricity loads in the building are native DC in addition to solar PV and batteries. By using DC instead of AC technology, the building would be able to eliminate the losses associated with converting from AC to DC for many end-uses. In addition, production from the solar system increased because it would not require conversion from DC to AC.




## *Lessons learned:*

This project designed a building energy system that combined local solar production, battery storage and DC power distribution to a majority of native DC end uses.

- **Start Early.** This project started halfway into the buildings design, making changes difficult and new ideas hard to incorporate.
- **Prepare the design team.** The design team needs to be willing and able to incorporate new and emerging solutions.
- **Communicate.** Agreement might not exist on all activities of the project. Opposition can often be mitigated through an understanding between partners.
- **Identify Barriers.** Barriers may be systematic, technological, or financial in nature. In this case systematic barriers proved difficult to change. Understanding barriers before implementing project goals could improve project success.

This project has shown that innovative energy projects can face challenges for implementation. The team evaluated the risks in terms of technology, engineering and project delivery. The delivery of a first-of-its-kind solution in the context of standard design and construction practices proved to be the final hurdle. Also, this project did not start until later in the design process, making the switch from AC to DC and adjustments to management and construction processes difficult.

## *Aspirations and accomplishments:*

- Increase capability of building to function in the event of loss of grid power
- Increase efficiency by reducing conversion losses from AC to DC
- Increase solar energy production by eliminating conversion losses from DC to AC
- Demonstrate how battery storage integrated into the building changes the interaction with the electric distribution system

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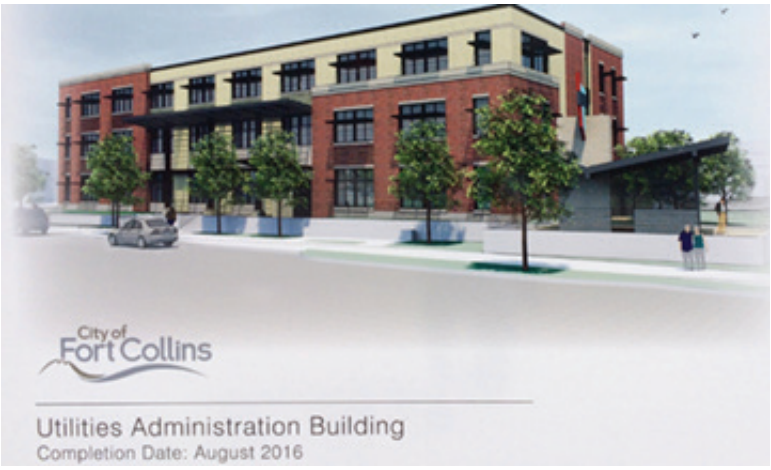
### *Ongoing and Related Work:*

Colorado State University has a National Science Foundation (NSF) grant to further study the disruptive approach to renewable energy integration.

While this FortZED project may have ended, the city of Fort Collins, as well as other partners, are committed to implementing the technology and strategies found from this project at another time and place.




**Project Partners**

The City of Fort Collins
Positive Energies
Exponential Engineering
RNL Design
Adolfson and Peterson