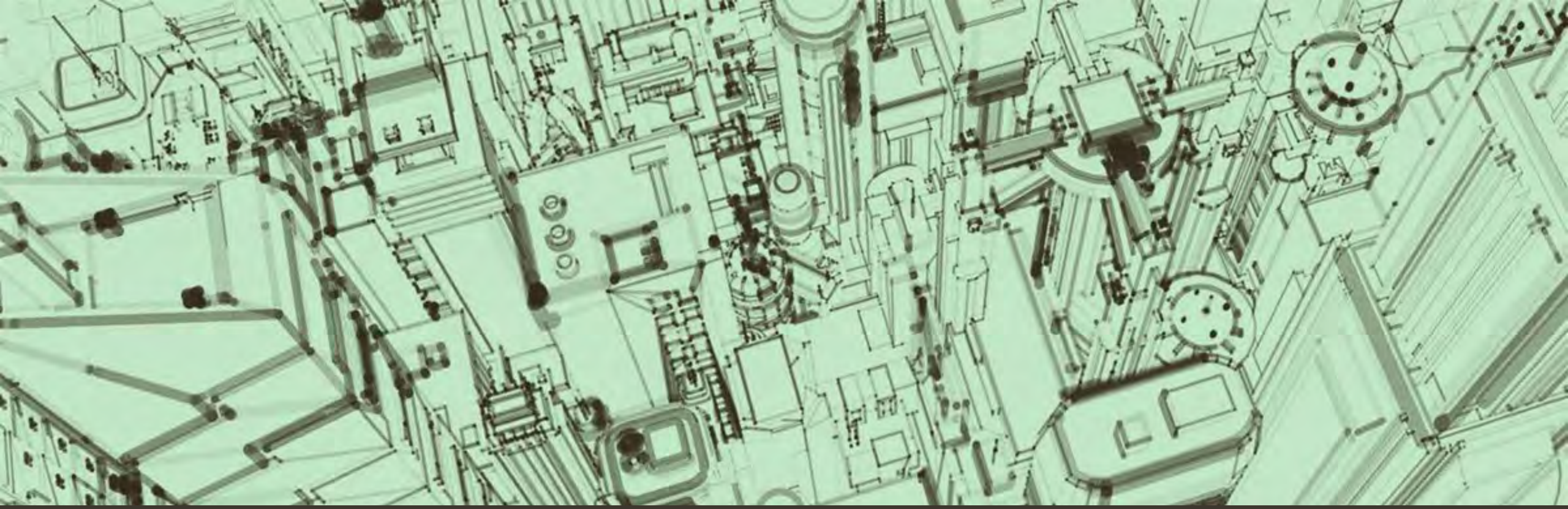


AABC Integrated Clean Energy System

A DOLA Funded Collaboration between Holy Cross Energy, RFTA, the Aspen/Pitkin County Airport and Pitkin County

Project Overview

Vision Create a regionally resilient and 100% clean energy system that balances production, storage and distribution across four distinct public facilities, generates additional clean energy to the community and create a model for net-zero, resilient public facilities across the state.

Why Lake Christine Fire exposed significant vulnerabilities in our public infrastructure This project seeks to build resiliency for these core services, while simultaneously building a clean energy system for some of highest energy consumers in the County.

Who

(1) Aspen Pitkin County Airport
(2) RFTA Aspen Maintenance Facility
(3) Pitkin County Public Works
(4) (4) Holy Cross Energy electric system operations from Brush Creek Park n' Ride to the Aspen Substation.

Feasibility Study (2019-2022)

Award

$200,000 - DOLA RNEW Program in 2019.

Goals

(1) Make all four public facilities resilient and net-zero emissions by allowing optimized load distribution of renewable energy, provide a distribution point to the surrounding community for stored renewable energy, and significantly improve the resiliency of the regional grid and of the facilities themselves during catastrophic events.

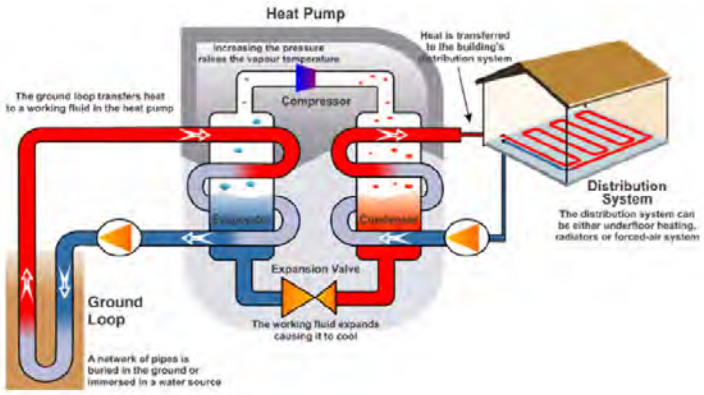
(2) Create structure with multiple public entities that serves as an example for replication

Completion of White Paper includes.

- Site assessment of existing infrastructure and energy usage
- Evaluation of potential conservation measures for each facility
- Establish an "energy box" based on current energy load and energy load after conservation measures
- Engineering analysis of integrated clean energy systems
- Economic, ownership, and administrative framework for the integrated clean energy systems.

AABC Integrated Clean Energy Micro-Grid

Central Ground Source Heat Pump (GSHP): The ground source heat pump is piped from the geo-thermal bed under part of the building into the mechanical room to the Climate Master GSHP. This unit is piped into the heat and cooling piping loops that run throughout the building and supply both heating and cooling for different operations of the central plant system. This unit also supplies the water loop to the indoor GSHP air handling units.



Example potential layout 1

AABC Energy Box Preliminary Design Report

DOLA GRANT FUNDING REPORT

JUNE 2020 | FINAL REPORT

Prepared By:

Kimley»Horn

ASPEN MAINTENANCE FACILITY SOLAR ARRAY FEASIBILITY ASSESSMENT

An analysis of the technical, structural, regulatory and economic considerations for constructing a solar array on the roof of the Aspen Maintenance Facility

Potential Panel Layouts and Economic Feasibility Assessment:

Design Option 1

In order to conduct a high-level economic feasibility study, a preliminary layout was produced using a ballast mount design on all three roofs. The resulting system size of 300 kW was priced based on current market conditions and costs for similar sized ballast mount systems on flat roofs.

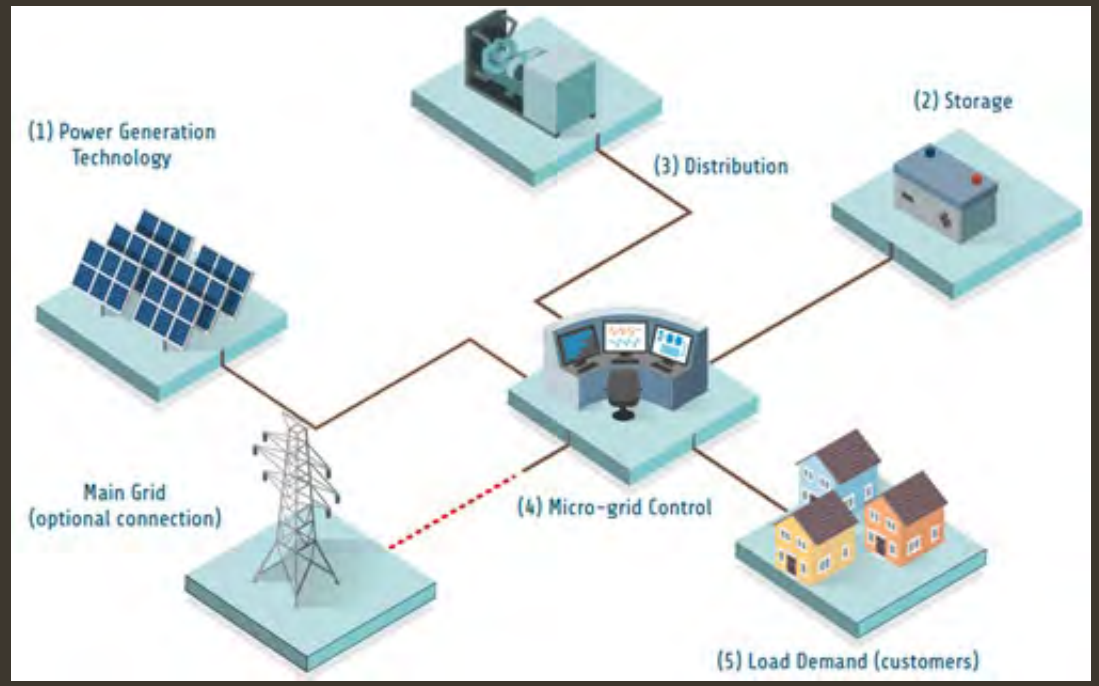
System Size	300 kW
Estimated annual energy production	393,909 kWh
Percentage of annual energy consumption	40%
Estimated construction cost	$600,000
Cost per Watt	$2.00/Watt

The Final Vision – Integrated Microgrid System

Integrate facilities in a micro-grid system that maximizes renewable energy use at the facilities and the surrounding community, and allows for optimized resiliency. Implement conservation measures and other technologies at later dates as funding opportunities become available and the redevelopment of facilities are complete.

Why?

- Microgrid is both the easiest aspect to design and implement and have the greatest impacts on meeting climate and resiliency goals;
- Microgrid is modularly expandable and allows for the surrounding community to directly benefit,;
- Conservation measures and heating district required complete facility redevelopments



Just What is a Microgrid Anyways?

A micro-grid is an integrated electricity grid that combines electrical generation, storage, a distribution system, a load management network, and end demand users in an a single linked and interconnected system.

(1) The first key component of a micro-grid is electricity generation, preferably a clean and renewable source. This is essential so the microgrid can continue to generate electricity independent of the regional grid and allow for continuation of services.

(2) The next is electrical storage, often in batteries. This is necessary so that renewable electricity, which can't generate when the sun is shining or the wind is still, can be stored during periods of generation decline. This allows for on-going electrical use regardless of what the weather or time of day.

(3) The final component is the distribution system and a load management software. Electricity generation and storage is not sufficient, it needs to be able to be transferred to where it is needed and when. This requires transmission line and transformers. However, each user on the grid will have different demands based on use an time of day, necessitating a management software to keep the whole micro-grid in balance and operating.

Phase 1(a) Implementation

DOLA RNEW Request – $2,500,000 + $855,000 cash match = $3,355,000

Due to the cost of implementing all three phases together, we have identified Phase 1(a) of implementation.

(1) the design and engineering for the 6 MW of battery storage, 1-2 million gallon thermal storage, and 400 kW of additional solar

(2) installation of 2 MW batteries at Public Works and Airport

(3) integration of the 5 MW solar facility

(4) Load Management Software Systems at each Node and Facility for grid islanding

Partnership

Holy Cross Energy, Pitkin County, Pitkin County Airport and RFTA (tentatively) to split match equally ~$213,750

Timeline

Phase 1(a) implementation to be completed by June 30, 2023.

Phase 1(b) – dependent on future funding

Easily scalable

(1) installation of 400 kW of additional solar

(2) installation of 4 MW of battery storage

Energy resilience in the Roaring Fork Valley

Home › News › Energy resilience in the Roaring Fork Valley

Energy resilience in the Roaring Fork Valley

Authors: **Emily Goldfield, Mark Dyson**

On the evening of July 3rd, 2018, a wildfire broke out a half mile from the Rocky Mountain Institute office in Basalt, Colorado. This fire—dubbed the **Lake Christine Fire**—spread to engulf more than 12,500 acres, and came within minutes of shutting down power to the upper Roaring Fork Valley. Three out of four transmission lines running into Aspen went down; had the fourth line gone down, it could have been days to weeks before power was restored. The fire started right in time for the peak of tourist season, as thousands of visitors filled the valley for Fourth of July week—a factor that would have exacerbated the impact of an extended power outage.

Solar farm begins generating clean electricity near Woody Creek

News FOLLOW NEWS | October 26, 2021

Jason Auslander FOLLOW
jauslander@aspentimes.com

A bird's eye view from Sept. 22 of the controversial 13,700 panel solar farm near Woody Creek. The project, which was approved in November 2019 and built this summer, has begun generating 5 megawatts of clean electricity.
David Krause / The Aspen Times

Microgrid feasibility study underway to connect Aspen airport, RFTA, public works

Group using $200K grant to review cluster of public facilities near airport

News FOLLOW NEWS | January 3, 2021

Curtis Wackerle
Aspen Journalism

Buses staging at RFTA's facility near the Aspen airport. Officials are evaluating the potential for harnessing heat put off by the facility's boilers and idling buses as part of a theoretical thermal transfer system for energy efficiency among neighboring public facilities. (Curtis Wackerle / Aspen Journalism)

MICROGRID KNOWLEDGE

1700 MICROGRID CUSTOMER SITES
PowerSecure

Markets & Policy | Players | Microgrids | Infrastructure | Distributed Energy | Resc

Microgrid Planned for Public Facilities Near Aspen, Colorado

January 6, 2021 By Brian Church

Share with your followers

About three miles outside of Aspen, Colorado, Holy Cross Energy, the Roaring Fork Transportation Authority, and Pitkin County representatives are conducting a feasibility study for a local, renewable energy microgrid.

The project would connect the Aspen-Pitkin County Airport with neighboring public facilities including Holy Cross Energy's Aspen office, pedestrian snowmelt systems, and the RFTA bus barn.

In addition to increased solar energy capacity and electricity storage, the study is looking into the feasibility of a thermal heat transfer system. The microgrid's electricity sharing will be incorporated into the existing infrastructure of Holy Cross Energy, an electric cooperative, while new components will be developed for thermal energy distribution between buildings.

Mountain imagery at Denver International Airport. By Arina P Habich/Shutterstock.com

BIG PIVOTS

About Big Pivots | Download Big Pivots | Pivotal Moments | Contact

How new solar farm has made Aspen more resilient

Nov 1, 2021

Photo/Greg Poschman

Subscribe to Big Pivots
First Name
Last Name
Email
Subscribe Now

Future Implementation

INSTALLATION OF CONSERVATION MEASURES

Installation of conservation measures at the Airport AOC building, the RFTA AMF and Holy Cross offices. As the Public Works Campus and Airport terminal are scheduled to be redesigned and rebuilt in the next 10 years, no conservation measures will be implemented at them. Total costs of this phase are being determined and will be dependent on economic conditions and ongoing development of new technologies. They will cover the needed infrastructure to take the facilities to fully electric.

NEW FACILITY DEVELOPMENT

The last phase includes the construction of the new airport terminal and Public Works Campus, both of which will be fully electrified.

As part of this phase, the construction and installation of the heating district linking all facilities will be incorporated. As new facilities will be constructed, this is the optimal time for the construction of the necessary infrastructure for the heating district to operate.

Lastly, as part of this phase, an additional 2 MW of solar is proposed for installation on airport property. This additional solar will create a more robust and resilient source of electricity for the facilities and guarantee that they are powered by renewable electricity.