

# SUCCESS STORY | White River Electric Association & Miller Creek Ditch Small Hydro Project

## The Project

Small hydropower electric generation projects rely on stakeholder relationships and partnerships for success. A Rural Electric Cooperative (REC or Co-op) is well suited to lead an initiative to develop distributed, renewable generation projects which benefit local communities. A Co-op is able to finance and own projects due to its financial resources, borrowing power, long term vision of investments and member-owned structure. A water supply organization's main purpose is the delivery of water and not the generation of electricity. Forming a partnership between these two organizations to develop a small hydropower project has proved successful in Northwest Colorado.

Developed in partnership by White River Electric Association (WREA) with the Miller Creek Ditch Company, (Ditch Company), the Miller Creek Ditch Small Hydro Project is located about four miles south of the Town of Meeker, Colorado. Using a Canyon Hydro Cross Flow Turbine and induction generator, the project will be operational during irrigation seasons. The project will utilize water from the Miller Creek Ditch to generate 160 kW and about 500,000 kWh annually, which will provide electricity to the equivalent of 60 homes (based on WREA's per home average of 700 kWh per month).





## A Partnership Approach

The Miller Creek Ditch Company investigated the opportunity for hydropower at the Flag Creek Drop (the location of Miller Creek Ditch Hydro) most recently in 2011. Although a preliminary study showed the project was technically and financially feasible, the Ditch Company was not in a financial position to fund or finance the cost of the project. Meanwhile, WREA was actively pursuing opportunities to self-generate cost-effective, local renewable energy.

The WREA Board of Directors (Board) established a goal to identify and develop local renewable generation projects that make electrical and financial sense as well as benefit WREA and its membership. WREA is engaged in an ongoing process of studying the feasibility of local renewable projects including hydroelectric facilities within its service territory. The Flag Creek Drop was one of the first sites WREA considered for small hydropower generation; it met the Board's criteria, and it assists WREA in its compliance with Colorado's renewable generation mandates.

Before approaching the Ditch Company regarding the project, the WREA Board developed a procedure that outlined how renewable hydroelectric generation sites would be evaluated and considered for development. The procedure outlines a phased approach:

1. **Preliminary Assessment:** Potential hydroelectric generation projects, identified internally or by WREA members, are subject to a preliminary cursory site assessment through a WREA independent consultant. If an initial site assessment indicates the site is financially and electrically feasible, it moves on to the second phase. Proposed projects are reviewed on a first come, first reviewed basis and are subject to WREA's resource availability.
2. **Feasibility Assessment:** If a site advances beyond the initial assessment, WREA will conduct an in-depth feasibility assessment. Since WREA incurs the cost of the feasibility assessment, WREA requires that the site owner enter into an option agreement with WREA. The agreement protects WREA's initial investment by reserving the right to develop the project pending the results of the feasibility assessment. The detailed terms of the option agreement are site- and project-dependent.
3. **Agreements:** If WREA determines to move forward with a specific project based on the results of the feasibility assessment, the terms of the agreement with the site owner are finalized and negotiations are made with impacted landowners.

- Final Engineering & Construction:** Once the necessary agreements and contracts are in place, the project goes to final engineering design and construction.

WREA approached the Miller Creek Ditch Company with interest in developing the Flag Creek Drop. The Ditch Company was in favor of the partnership and signed an option agreement with WREA. After the in-depth assessment proved the technical and economic feasibility, final agreements were signed. The agreement with the Miller Creek Ditch Company includes a production fee that is paid to the Ditch Company based on the kWh produced by the generator. A percentage of the production credit is required to be applied to ongoing ditch maintenance. In addition, separate easement agreements were made with two impacted property owners.

## Cost & Financing

The total cost of the Miller Creek Ditch Small Hydro Project was approximately \$800,000 including design, permitting, easements and construction. WREA was awarded a grant from the United States Department of Agriculture (USDA) through the Renewable Energy Assistance Program (REAP) for \$177,725. The Colorado Energy Office and Colorado Department of Agriculture contributed \$40,000 toward the development of the project. The resulting net cost to WREA is approximately \$3,600/kW.

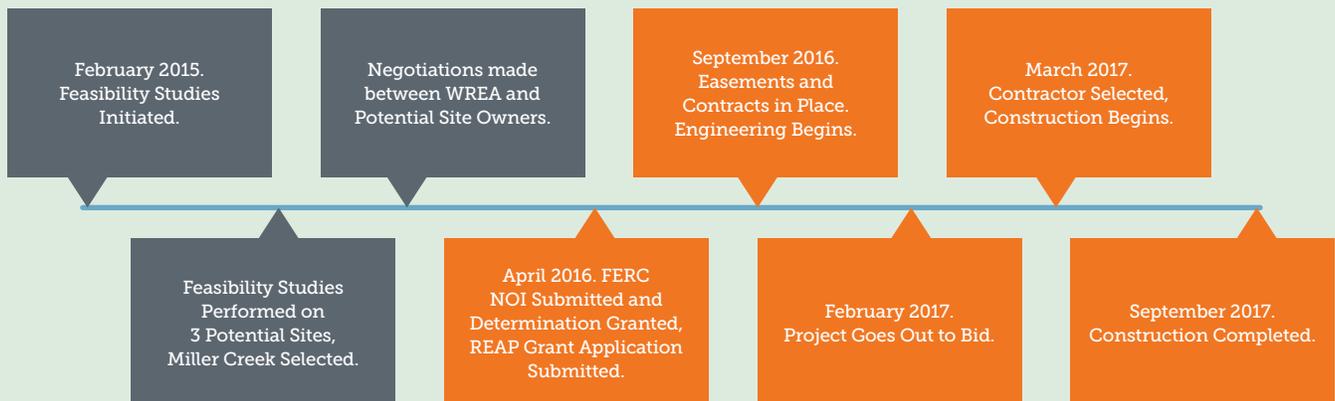
The capital cost of the project was financed through WREA’s financing agent, the National Rural Utilities Finance Corporation (CFC). Low

interest funding was available to the project through the Colorado Water Conservation Board, but WREA decided to maintain its 100% financing through the CFC at a slightly higher interest rate. Power will be sold to Tri-State Generation and Transmission (Tri-State) through Policy 115, “Member System Distributed Generation Policy.” This policy outlines the terms and conditions under which a member-owned generation project can sell electricity to Tri-State. The overall economics of the project yield a 30-year payback including the production fee. The Miller Creek Ditch Small Hydro Project has an expected lifetime of over 50–100 years with regular maintenance.

## The Development Process

A rough timeline is provided in the figure below showing a total development time of approximately two and a half years. While this project timeline may not impress some, it is a testament to the benefit of farmers and electric cooperatives partnering together with a common vision. Although WREA started investigating the project in February of 2015, it was not until April 2016 the project development timeline began in earnest. A FERC Notice of Intent was submitted and the determination was issued 60 days thereafter. After notifications from FERC and the USDA REAP Program, and the finalization of easements, the design began. Early and frequent communication with the landowners proved effective in relatively quick resolution of the terms of the easement. The negotiation process was led by WREA’s in-house council.

## Project Timeline



The majority of construction was completed prior to the commencement of irrigation season during March and April. The turbine was delivered in July. Installation of the turbine and final construction was completed in September and commissioning took place on September 15, 2017. The construction timeframe was constrained by the operation of the ditch and close coordination between the contractor and the Ditch Company was required.

The actual time of construction was much less than 6 months, which could have been accelerated if: 1) The contractor was selected in the summer; and 2) all construction occurred outside of irrigation season (November–March). Allowing for adequate time to begin construction after selection of the contractor would have allowed materials to be procured prior to construction starting.

Each step of the process contained a potential threat to the success of the project, but also allowed for an off-ramp if WREA wished to discontinue the development process. While the technical and financial feasibility of the project was proven early in the process, on-going feasibility was dependent upon the results of subsequent steps. The feasibility depended on a favorable FERC determination, award of the REAP grant, successful negotiation of the easements, and satisfactory bids from contractors. Off-ramps were available to the project until placing the order for the turbine with Canyon Hydro, which represented a significant investment. The order was placed in November 2016 in order to have the equipment ready for installation before the end of the 2017 irrigation season. This order was placed before the final design was completed and before obtaining construction bids from contractors. This was a balance between risking a delay in schedule, which could have jeopardized the power purchase agreement with Tri-State, and taking a risk in cost, if acceptable bids were not submitted. The team was confident that satisfactory bids would be submitted and an off-ramp was not needed.



## Conclusions

Successful development of this project depended on local, state and federal organizations coordinating closely to achieve a common goal. The Colorado Energy Office and Colorado Department of Agriculture both have promoted the effective use of Colorado's energy resources by supporting this project. The USDA REAP program was created to help increase American energy independence by increasing the private sector supply of renewable energy, which will in turn reduce the energy costs for rural areas.

WREA was well suited to lead the initiative to develop this distributed, renewable generation project to benefit community in Meeker. The Co-op was able to finance, own and operate this small hydropower project and almost all profits will remain in the community. This project met WREA's goals of developing cost-effective, local renewable energy that directly benefits WREA and its membership. WREA's collaboration with the Ditch Company and use of local materials and contractors emphasize WREA's commitment to its community and membership. Over the life of the generator, WREA will be able to generate electricity at or below existing wholesale costs, assist in its compliance with Colorado renewable energy mandates, and benefit the membership with the payment of the production fee to the Ditch Company.