2013 ICMA Program Excellence Award Nomination - Community Sustainability

Deploying Geo-Thermal Energy in Historic Building in Clarkdale, AZ

Gayle Mabery, Town Manager

ICMA-CM

Town of Clarkdale, AZ

ICMA
Leaders at the Core of Better Communities

2013 Annual Awards Program

Program Excellence Awards Nomination Form

Deadline for Nominations: March 8, 2013

Complete this form (sections 1 and 2) and submit with your descriptive narrative.

SECTION 1: Information About the Nominated Program

Program Excellence Award Category *(select only one)*:

- ☐ Community Health and Safety
- ☐ Community Partnership
- X Community Sustainability
- ☐ Strategic Leadership and Governance

Name of program being nominated: Deploying Geo-Thermal Energy in Historic Building

Jurisdiction(s) where program originated: Town of Clarkdale, Arizona

Jurisdiction population(s): 4,097

Please indicate the month and year in which the program you are nominating was fully implemented. (Note: All Program Excellence Award nominations must have been fully implemented by or before January 31, 2012, to be eligible. The start date should not include the initial planning phase.)

Month: August Year: 2010

Name(s) and title(s) of individual(s) who should receive recognition for this award at the ICMA Annual Conference in Boston, Massachusetts, September 2013. (Each individual listed MUST be an ICMA member to be recognized.):

Name:	Gayle Mabery		
Title:	Town Manager	Jurisdiction:	Town of Clarkdale, AZ

SECTION 2: Information About the Nominator/Primary Contact

Name of contact:	Gayle Mabery		
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2013 ICMA Program Excellence Award Nomination – Community Sustainability

Town of Clarkdale, Arizona

Geo-Thermal Heating and Cooling in Historic Building

Relevant History - Listed on the National Register of Historic Places, the Clark Memorial Clubhouse ("The Clubhouse") was built in 1925 as a center for community recreation for the residents of Clarkdale, AZ. At the time, Clarkdale was a "company town", owned and operated by Montana Senator William Andrews Clark's United Verde Copper Company. Clarkdale incorporated as a Town in 1957, and much of the Town's original infrastructure, including The Clubhouse, was dedicated from the company to the municipality at that time.

Clarkdale's economy, which was built in reliance on the mining industry in the early 20th century, has always been fragile. When copper mining shut down in this area in the late 1950's, the Town's population dwindled. Later, cement manufacturing and injection molding of plastics brought some manufacturing industry back to Clarkdale, but retail and other industry have located in neighboring municipalities, leaving Clarkdale with an unbalanced revenue stream.

While Arizona's boom of new home construction was alive and well in Clarkdale in the mid-2000's, the Town Manager and Town Council recognized the signs of the impending recession early, and began discussing ways for Clarkdale to chart a new course for sustainability in the community. The Sustainable Clarkdale Initiative focused on all three pillars of sustainability: Social, Economic and Environmental.

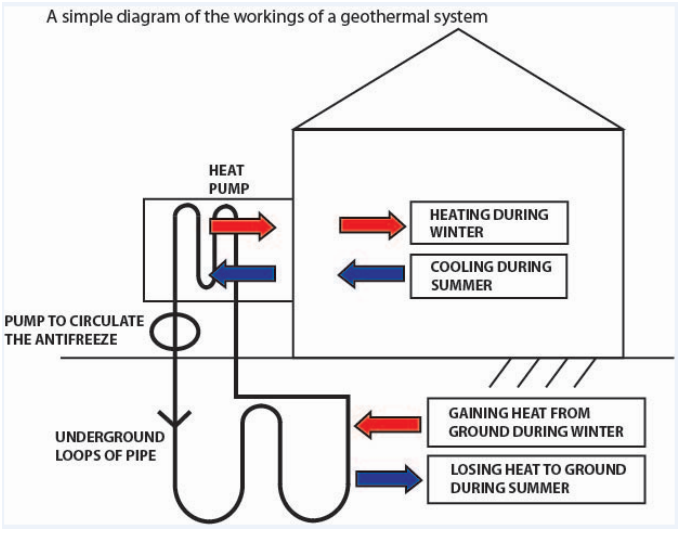
Problem Assessment - The first project undertaken as part of the Sustainable Clarkdale Initiative was the installation of a geo-thermal heating and cooling system in The Clubhouse. The project was developed to improve energy efficiency in 13,062 square foot Clubhouse and ensure The Clubhouse's year-round use to the residents of Clarkdale. In order to further the Town's goal to instill a culture of sustainability in our community, the project focused on all three pillars of sustainability.

> Economic Sustainability – The utility costs of operating 13,062 square foot Clark Memorial Clubhouse are significant. As this building was constructed almost 90 years ago, the construction methods that were in place were no match to today's energy efficiency standards. Although there have been heating and cooling additions/upgrades since the initial construction of the building, the furnaces were over 35 years old and were outdated and inefficient. In addition to the costs associated with inefficient technology, the furnaces did not effectively heat the facility in the coldest winter months, and the swamp coolers did little to cool the buildings in Arizona's hot summer months. Because of these shortcomings in the heating/cooling system, it was necessary for the Town to limit activities in The Clubhouse during the most extreme hot and cold times of the year, resulting in decreased usage and decreased revenues from rentals for approximately 4 months per year.

Social Sustainability - The Clubhouse, which was built in 1925, is a historic treasure of the Town and, through its listing on the National Register of Historic Places, has been recognized for its historic significance to the nation. Originally serving as a social gathering place and recreation center for the mining families of Clarkdale, the use of The Clubhouse has evolved to include not only community activities and celebrations, but as the central location for all the Town's Council, Board and Commission meetings. From dances, art shows, and weddings, to acting as the host for some of the Town's most important policy decisions, The Clubhouse takes center stage in the social and political life of the community. However, due to the lack of comfortable availability of the building for approximately 4 months per year, The Clubhouse's ability to retain its cultural role in the community for 1/3 of the year was compromised.

Environmental Sustainability – One of the primary environmental goals of the Sustainable Clarkdale Initiative was to focus on the development of renewable energy within the Town of Clarkdale. Arizona is recognized as a ripe environment for solar energy, and, in fact, the Town of Clarkdale was recognized in 2012 as an Arizona Solar Community after more than 5% of the owner-occupied homes in Clarkdale had implemented some sort of residential solar energy production. With this project, Clarkdale wanted to demonstrate the variety of renewable energy that could be utilized in Clarkdale. Geothermal heating and cooling uses the relatively constant temperatures of the earth's natural thermal energy, a renewable resource, to heat and cool homes and businesses with 30-70% less energy than conventional systems. Conventional furnaces and boilers burn a fuel to generate heat, and coolers force air through water or Freon to provide cooling. Alternatively, geothermal pumps utilize renewable sources to simply exchange heat or cold from the earth to buildings, allowing much higher efficiencies.

Program Implementation and Costs - In early 2010, the Arizona Department of Commerce Energy Office announced the availability of funding through the American Recovery and Reinvestment Act which were to be used for projects that focused on increasing energy efficiency, reducing energy use and reducing fossil fuel emissions. The Town of Clarkdale applied, and was ultimately selected to receive a $65,961 grant award on March 16, 2010. Clarkdale was the only local government applicant in the State to propose a geo-thermal project. Although Clarkdale currently remains Arizona's only municipality to deploy geo-thermal energy in a municipal building, both Clarkdale and the State Energy Office have received multiple inquiries from other local governments in Arizona who are interested in replicating our project.



On July 13, 2010, the Clarkdale Town Council awarded a contract to a local contractor, Verde Sol-Air Services, for the installation of a Geo-Thermal Heating and Air Conditioning System for the historic Clubhouse. Just seven weeks after awarding the contract, the Clarkdale Town Council, numerous citizens and staff were among the first to enjoy the results of the completed project, which provided crisp, cool air for the August 31, 2010 Council meeting.

In addition to the $65,962 from the ARRA grant, Clarkdale also qualified for renewable energy incentive funding from our local electrical utility (Arizona Public Service) through a program they established to help meet their own energy efficiency requirements. Participation in this program resulted in a $17,160 incentive for the project. The Town of Clarkdale provided $1,500 of in-kind contributions, which, combined with the grant and incentive funds, covered the total project cost of $84,622 that resulted in the deployment/use of geothermal energy in 62% of The Clubhouse.

Tangible Results/Measurable Outcomes – The Town's main goal in this project was to improve the heating and cooling system in a sustainable way, allowing for the year-round use of The Clubhouse. By increasing the viable use of The Clubhouse from 8 months per year to 12 months per year, we expected to see an increase in our annual operating costs, but felt that the benefit to providing The Clubhouse as a comfortable community space for an additional 4 months per year outweighed the increase in costs. Importantly, energy savings for the use of a geothermal system as compared to a conventional system that could have provided the same level of comfort was estimated at 12,000-17,000 kilowatts of energy per year, with an expected return on investment in 10-12 years. Additionally, geothermal systems have a 30-year life expectancy, as opposed to 15 years on conventional system, resulting in additional savings on replacement equipment for the municipality. Notably, because the project was completed primarily with grant funds and utility incentives, the 10-12 year standard payback became a moot point, as the total out-of-pocket cost to the Town was $1,500. The system payback was effectively achieved for the Town in the first few months of the project.

As expected, the use of The Clubhouse has indeed increased after installation of the geothermal system. From FY 11 to FY 12, building utilization increased 53%, from 231 uses in FY 11 to 355 uses (averaging one per day) in FY 12. Rental income increased an impressive 299% over the same time period. While overall utility costs are up due to the increase in usage (by 26.5%), the replacement of the inefficient furnaces allowed the town to see a decrease in our natural gas costs of 52% over a two year period, even with the increase in use of the building.

Another significant outcome of the project was the demonstration of geo-thermal energy as a viable renewable energy source in Clarkdale. Clarkdale residents, who were already beginning to embrace the use of solar energy, were able to observe the demonstrated benefits of geo-thermal energy in The Clubhouse, and two homes in Clarkdale have deployed geo-thermal systems as a result.

Lessons Learned – Although at the outset of this project, the Town had hoped to deploy geo-thermal energy through the entire 13,062 square feet of The Clubhouse, it quickly became apparent that we would have to scale the project due to the amount of funding we had available. As a result, approximately 62% of the space of The Clubhouse was addressed in this initial

project, leaving the largest single space in the building (the auditorium) to be converted in a later phase. Additionally, the project was initially estimated to require 7 vertical well bores at a depth of 300 feet each in the front of the building. During drilling, soil stability issues prevented the wells from being drilled as deep as they needed to be. As a result, we had to drill 11 wells at a shallower depth in order to make the project function properly. The need to increase the number of wells expanded the overall square footage of the well field. As there are limits to the use of the land after the well field is installed, the Town has had to re-evaluate the location for the additional wells that will be necessary in order to install geo-thermal heating and cooling in the remaining 38% of the building.

The need for tangible projects to demonstrate the importance of the Sustainable Clarkdale Initiative was clear from the beginning. Starting off with the geothermal project gave a very public face to the initiative and captured the public's attention with a successful project. Clarkdale citizens have embraced the Sustainable Clarkdale Initiative since the inception of the geothermal project, and demonstrated their support in a very tangible way by adopting the Town's 2012 General Plan (with a theme of "Instilling a Culture of Sustainability) by a wide margin in the Town's March, 2012 General Election.