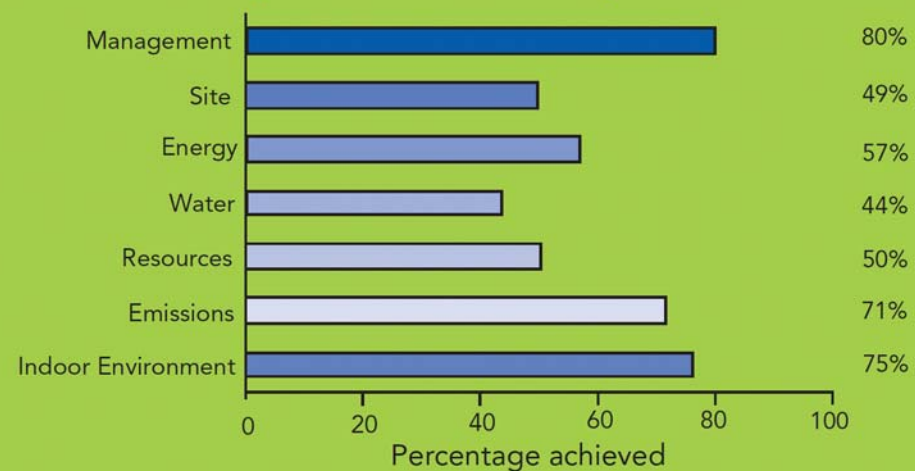


Percentage of points achieved by Summit County Material Recovery Facility for each category:

### Green Globes Rating – Summit County MRF



SUMMIT COUNTY MATERIAL RECOVERY FACILITY ACHIEVED AN OVERALL RATING OF 60%. RATING: TWO GREEN GLOBES



<b>BUILDING NAME</b>	Summit County Material Recovery Facility
<b>LOCATION</b>	Summit County, Colorado, located in the central Colorado mountains, approximately 75 miles west of Denver.
<b>SIZE</b>	11,560-square feet
<b>DESIGN STARTED</b>	Fall 2004
<b>COMPLETED</b>	September 2006
<b>USE</b>	Recycling facility
<b>DISTINCTIONS</b>	First facility of its kind to be certified as green

## CASE STUDY



Green Globes™ for Continual Improvement of Existing Buildings Assesses -

## Summit County Material Recovery Facility

Can a Recycling Center be Green?

<b>OWNER</b>	Summit County, Colorado Government
<b>TENANT</b>	Summit Recycling Project
<b>ARCHITECT</b>	Matthew Stais, Matthew Stais Architects
<b>DESIGN/BUILDER</b>	TCD, Inc.
<b>MECHANICAL ENGINEER</b>	Architectural Engineering Consultants, Inc. (AEC)
<b>ELECTRICAL ENGINEER</b>	Mike Rogers, ABS Consultants, Inc.
<b>STRUCTURAL ENGINEER</b>	Carl Warnke, Engineering Designworks

# An Aggressive Recycler

The Material Recovery Facility (MRF) is known as the first green facility of its kind. Since its opening, it is leading the way with other recycling initiatives.

The MRF can accept commingled tin and aluminum and does not require residents of the county to separate the two. It also accepts cardboard and other types of plastics, which people don't have to sort.

The MRF also collects old appliances and is pioneering a composting program.



To quote Sesame Street's Kermit the Frog, "It isn't easy being green." That's especially true if the entity is a Material Recovery Facility (MRF) or more simply stated, a recycling center, devoted to sorting recyclable plastic, glass, aluminum, tin, newspaper and the like from other garbage at a landfill. It is ironic that the very facility that is the cornerstone in the nation's green movement has a difficult time of being green itself.

## Can a Recycling Center be Green?

The problem is in "the general nature of the building," said Megan November, spokesperson for Matthew Stais Architects of Breckenridge, Colorado. "We are talking about a metal industrial building with heated garage bays and storage that would be open to the outdoors much of the time. That makes it hard to improve on its energy efficiency. A material recovery facility is not an energy efficient building by nature, so making it more efficient is quite a challenge."

Nevertheless, when Summit County, Colorado, extended a request for proposals to construct a new recycling facility and a garage on its landfill, Matthew Stais Architects and TCD, Inc., a design/build firm also based in Breckenridge, thought they were up to the challenge. They won the bid and Matthew Stais, the lead architect, started designing the two buildings in fall of 2004: a maintenance garage, which would house county equipment, and the Summit County MRF, a one-story, 11,560-square foot building.

## How Green Could it Be?

Stais' goal was to make the MRF as green as it possibly could be, but to what extent? Initially, Summit County and the project team wanted to pursue the Leadership in Energy and Environmental Design (LEED) standards as adopted by the United States Green Building Council [USGBC]. "But due to size of this project and budget restrictions, LEED did not fit the program. LEED would have been costly and our budget was limited. We were faced with the decision to go for LEED certification or make the MRF more energy efficient. It was a no-brainer," recalled November.

"The entire project team decided that it was more important to make the building energy efficient," she continued. "The costs we were facing to achieve LEED

certification were more, or equal to, the cost to put in the mechanical equipment to make the building energy efficient."

Shortly after deciding not to pursue LEED certification, the team learned of the Green Globes program offered by the Green Building Initiative (GBI) which would allow them to achieve a third-party green certification and still have the money to make the building as energy-efficient as the team wanted it to be.

## Starting with an End in Site

To that end, the project team focused on the site. Matthew Stais Architects was chartered with designing two buildings at the county's landfill. Only the MRF would go for certification. However, the team wanted to situate both buildings on the site for optimal energy usage.

"Because the landfill is in a place that sees a lot of weather extremes—high wind, cold and lots of snow in the winter and extreme sun in summer—it had to be sited to withstand all that. We located the MRF and oriented it to optimize solar gain and offset the negative impacts of the wind and snow. We used the sun to our advantage," explained November.

Once a site was chosen, changes to the landscape were minimal. There were few if any trees to clear and construction began with the main building axis running due east-west for optimal solar gain.

The building's location on the site also provided a source of natural day lighting, which was optimized even further with south facing clerestory windows that allow light in, but don't allow heat to escape. "Situating the building properly on the site can make a huge difference. There are times of the day when people do not need to turn on the lights because the windows let in enough light to naturally light the area," said November, who noted that the electrical lighting was integrated with day lighting to take into account daily and seasonal variations.

## Weighing the Mechanical Pros and Cons

The most important element in the greening of this project was its mechanical system. The building is projected to be 30% more energy efficient than the

Environmental Protection Agency's (EPA) reference Energy Star® Target Finder building.

The mechanical system for the MRF uses electric heating with energy recovery ventilators and ducted ventilation. There is a provision for a future hydronic radiant floor system and cooling is provided by a Lennox condensing unit (R-410A).

"I would consider the mechanical system the most important element in being green for this project," said November. "In the early stages, when the project team weighed the benefits of a LEED certification or using that money toward a more efficient mechanical system, we found that we could earn LEED certification and still dodge energy points, which would lose the whole point of going green. The project team valued energy efficiency more than the certification."

With everyone in agreement, the team focused on specifying high-efficiency lighting fixtures, lamps, lighting controls/occupancy sensors and heating ventilation and air conditioning (HVAC) equipment.

## The Merits of ERVs

Of the many green initiatives the design team implemented at the MRF, installing energy recovery ventilators (ERVs) has had the biggest impact, according to November. ERVs continuously bring fresh air into the building while simultaneously exhausting an equal amount of stale indoor air. The hot or cold energy (depending on the season) is extracted from the indoor air before it is exhausted and transferred to the incoming air, so that there is little energy lost.

A high efficiency ERV system was not in the plan from the outset. Also considered were gas-fired radiant heaters. However, in a thorough analysis, Stais found that an ERV that uses propane would be more energy efficient than the gas-fired radiant heater or ground source (geothermal) heating.

After analyzing the numbers, Stais recommended ERVs for both the MRF and the garage. Stais' analysis, which assumed a 10% increase in energy costs and did not include geothermal heating, found that the ERV system would cost nearly \$40,000 less to operate in the first year alone than a radiant system and would be paid-

back in about three years based on current energy costs. "That's pretty quick," he said. He also predicted a net return on investment of an astounding 33.6%.

## A Green Classroom

The project team continued to investigate other sustainable products, all the while keeping in mind that the facility would be used for more than simply sorting recyclable plastic, glass and newspaper; it would also be used as a classroom. "It was very important that we keep in mind the educational component of the facility," November commented.

The vision was that the MRF could be used to educate the community on earth-friendly practices. Schools could visit the landfill on their field trips and, at the same time, see a recycling facility at work. One part of building would be devoted to processing recyclables, while the other half would be office space. The latter provided the perfect opportunity to build-in a real-life educational showpiece on the renewable lifecycle of so-called garbage.

The project team worked to ensure that its purchases contained recycled content whenever possible. For example, the steel structure included recycled content. The entire metal structure, including the roof and the walls, included recycled content. Recycled rubber and recycled soda bottles were used for the flooring. Tiles in the bathroom were made from recycled glass.

"All of these things made it easy for kids to see how the recycling process works," said November. "On their tour of the facility, they would see how glass bottles come in and are processed in the sort line, and later, go in the bathroom and see recycled glass tiles."

## The Water Challenge

The facility also uses water-saving devices or proximity detectors on the urinals, low flow toilets and water-saving fixtures on faucets and showerheads. "Those things are pretty standard now, but we're limited under Colorado law. There are only so many things we can do to save water. We could not recapture water to use for landscaping, so we did what we could," said November, noting that the project team suggested other water-saving measures including using a dry method for cleaning up the line where the recyclables are sorted versus hosing down the area with water as is traditionally done.

Outside, the landscaping includes plants that are able to withstand extreme local weather conditions and require only minimal irrigation. "We brought in drought tolerant, native landscaping that would require only temporary watering for one to two years. After that, they wouldn't require any additional irrigation," she explained.

## The First of Its Kind

While at the outset, greening a recycling facility seemed an impossible task, the team accomplished their goal by focusing on the elements that were easiest to modify. "Energy recovery ventilators and lighting were two things we could improve upon since they were not affected by the doors being opened. In addition, we could increase efficiency with day lighting and using more efficient fixtures," said November.

"It is a great project. I think we did a great job and the community is really happy with it. Operationally it is working well."

In the end, the Summit County MRF, was awarded two Green Globes by the GBI for its energy efficiency and the building has the distinction of being known as the first facility of its kind to be certified as green. Since its completion in September 2006, it has served as a model of sustainable design, construction, and operation for the local community.