The Frontier Project Foundation is a non-profit organization dedicated to meeting the environmental challenges facing Southern California. The Foundation's goal is to inspire a market transformation that promotes sustainable building practices, specifically addressing areas of design, energy efficiency, water quality, air quality, and resource management. The Frontier Project is a two-story, 14,000 square foot multi-use building developed by the Foundation and it's founding partner, the Cucamonga Valley Water District (CVWD) to demonstrate how sustainable design can be economical, efficient, and inviting by demonstrating innovations for Southern California living and working environments.

The Frontier Project multi-use facility is designed and will be constructed to LEED® (Leadership in Energy and Environmental Design) Platinum standards. The building will serve the community and region as a demonstration facility showcasing sustainable materials and a multitude of resource efficient systems in use and included in its design. The facility will feature a public meeting and conference area with an 80-person capacity, an office area, ENERGY STAR demonstration kitchen, demonstration garden and activity space, sustainable interiors demonstration living room/library/meeting space and water efficient restrooms. In addition, a dedicated display gallery will include on-going installations of cutting-edge and other technologies not necessarily included in the buildings structure but available for use in residences and businesses.

Every aspect of the Frontier Project will be presented in a way that encourages interaction and the flow of knowledge. Visitors will not only see the building, they will experience the building. By demonstrating to visitors the reasons for choices of systems and materials used throughout the project, visitors will be able to trace the paths of water, energy, people, and resources. For example, storm water runoff from the parking lot will be captured in a water cistern and eventually used for irrigating the site, and placing visible solar panels and strategically shading the site are among the design strategies employed to inform visitors on green systems. Everything from material and plant selection, the layout of space, and the maintenance regime will have a purpose, demonstrating the principle of green design for homeowners, consumers, contractors, design professionals, sustainability advocates, and the general public.

- **Instruct -** Visitors will see the processes related to green systems and will have the opportunity to participate in them. Instructing community members how to install, maintain, and plan green systems will embed these principles into the community, and create a symbiotic relationship between the community and the Frontier Project. By harnessing volunteer power and providing a welcoming community space, the Frontier Project will become a thriving oasis for recreation, relaxation and on-going public discussion and education on sustainability methods and technologies.

- **Inspire -** Inspiration is contagious. The Frontier Project will use an innovative combination of materials, layout, and maintenance to practice green design. The beauty and creativity of this project will inspire people to bring these practices into their own homes and businesses. Inspiration will spread green principles through the neighborhood by drawing the community into the Frontier Project and becoming a cherished part of the neighborhood.

Sustainable Technologies, Approaches, and Components of the Frontier Project facility include:

- **ICF's and Building Orientation** -The building structure is a combination of a spread footing foundation and slab on grade with concrete walls, metal beams and decking. The structure itself demonstrates sustainable design approaches. All south and west facing walls that face the greatest sun exposure use a ICF (Insulated Concrete Form) system with an insulating value of R50 (compared to the normal exterior wall insulation of R19) and have only small window openings.

- **Energy Efficient Roofing Strategies** - The Project's roof, which is the main source of heat gain in typical buildings, uses a cool roof (light color roofing material with a low reflective index) to reflect the sun's rays. Other features include a photovoltaic (solar) array and a green roof that also helps to shade and insulate the building, will also be featured.

- **Daylighting and Natural Light** - Facing north and east, a two-story window wall system provides ample light to the large exhibit room and interior spaces to eliminate the need for artificial lighting of installation, display, and interior areas of the building.

- **Thermal Comfort/Cool Tower/Solar Chimney** - The mechanical systems are designed to take advantage of the climate and most of the year, passive cooling will be applied. A cool tower and two solar chimneys provide the necessary thermodynamics to move the air through the building naturally without the use of fans. The innovative use of the metal paneled solar chimneys is the main driving force that helps evacuate the inside air. The solar chimneys "powered" by the sun will generate a stack effect to pull the inside air out of the building while a highly efficient evaporative cooling system will filter and temper the incoming air entering through the cool tower. A backup mechanical system provides heating and cooling through an under-floor duct system using the very energy effective displacement ventilation concept. A large exterior shade structure and trellis constructed from recycled wood from a local winery will protect the window wall system from direct sun exposure and prevent glare.

- **Photovoltaic (Solar) Collection Panels** – About one fifth of the building's power needs will be generated via photovoltaic panels located on the roof and an adjacent shade structure. The sun's heat is also utilized within the building for heating the domestic hot water system.

- **Recycled and Rapidly Renewable Materials** - The building will use components and finishes with very high levels of recycled content. The concrete utilized throughout the building is specified to include a minimum 25% fly ash (a high performance additive and coal-fueled power plant byproduct) which displaces cement in the mix, requires less water and reduces landfill waste. Rapidly renewable materials (resources that re-grow within ten years) are also used throughout the facility to further promote sustainability and stewardship of natural resources. Finish materials throughout the building were selected with the goal of resource conservation in mind.

- **Low VOC Materials** - Indoor air quality throughout the building is improved through the selection of materials including paints, carpets, adhesives and furniture, which do not include Volatile Organic Compounds (VOC's). VOC's are known to cause fatigue,

headaches and respiratory problems for building occupants. The use of low VOC's result in higher productivity and a healthier environment for building occupants and visitors.

- **Flexible Conference and Meeting Room** – The State-of-the-art conference room provides an interior meeting and workspace with seating for eighty (80) and will feature a sustainable modular interior with low VOC furniture that can be reconfigured to provide maximum flexibility of use.

- **Accessible Green Roof and Garden** - The roof will be accessible through a staircase that enables visitors to view the solar panel array and utilize the green roof garden. The roof top garden has a shallow planter system for smaller, low water need plants while the deeper planters are capable of sustaining trees with minimal water used for irrigation.

- **Water Conservation/Captured Rain Water** - Special attention was focused to demonstrate responsible water use in all aspects of the building. Irrigation is provided solely by captured rainwater throughout the year. The site will have pervious paving to allow the water to percolate into the ground and replenish the aquifer rather than dumping water into the storm drain system. A drainage swale will capture all excess surface water and direct it to an underground tank. The swale is designed to naturally cleanse the water so by the time it reaches the cistern it will need only minor treatment to precipitate sediments. Through this system, the building site and adjacent parking lot will have zero run off directed to the city storm drain system even during heavy rains lessening the burden on the public infrastructure.

- **Native Drought Tolerant Landscaping and Demonstration Garden** - The landscaping around the building and in the Rain Garden will display native, drought tolerant plants that require no or minimal irrigation. The irrigation system is also state-of-the-art using intelligent controllers that regulate the irrigation water volume depending on the moisture content and weather conditions.

- **Energy Star Demonstration Kitchen** - The multi-use facility will include a fully functional demonstration kitchen that will feature the latest in energy efficient refrigerators, gas ranges, hoods, dishwashers, faucets, lighting and typical kitchen appliances.

- **Water and Energy Efficient Restrooms** - Plumbing fixtures throughout the facility were chosen to demonstrate the new, available water saver features such as waterless urinals and dual flush toilets.

- **Sustainable Construction Practices** - To build a sustainable building the construction process itself needs to be different. The team committed to recycle more then 75% of the construction waste. Special care will be placed on moisture to prevent mold growth and indoor air quality even during construction. There is a storm water prevention plan in place to make sure that rainwater will not leave the site without proper filtration. To achieve all these goals the entire team, including all workers will be educated in sustainability principles to develop a green culture in the construction crews.

- **Evolving Technologies** – The modular design and focus on the exchangeability of sustainable elements throughout the building will enable easy replacement and upgrades of sustainable components as sustainable technologies evolve, ensuring the Project and buildings relevance as a demonstration and educational facility.

- **Design & Construction** - The planned LEED Platinum Frontier Project facility is designed by HMC Architects and will be constructed by Turner Construction.

The Frontier Project is located at 10440 Ashford Street, Building D, Rancho Cucamonga, CA 91730. The Foundation can be contacted at 909.483.7484 or via email: info@frontierproject.org.