

# Renewables in Practice

## Federal Renewable Initiatives CASE REPORTS

### Renewables Provide Foundation for Zero Net Energy

Housing Authority of the  
City of El Paso –  
PAISANO GREEN  
COMMUNITY

Texas



**ACTIVITY TYPE** *Net Zero Project, Solar  
Photovoltaic  
Wind Turbine*

**PROJECT DETAILS** *NEW CONSTRUCTION*

*System Coverage:* Common areas and tenant units  
- 73 units  
185kW

*Size/Rating:* - 165 kW PV; 710 panels  
- 20 kW Wind Turbines (2)  
Over 330,000 kWh/yr (Solar  
PV); (@6.72kwh/kw/day)

*On Site Generation:*  
- Offset 4,190 kWh/unit/yr  
(HUD)

*Cost Savings:* \$43,245 (@\$0.13/kwh)  
- \$544 per unit

*Completion Date:* August, 2012

#### **SOLAR PROVIDER**

#### **GREEN BEENFITS**

14,000 tons  
CO<sub>2</sub> Emission  
Reduction over  
system life

#### **FINANCIAL DETAILS**

*Cost:* Solar: \$966,000  
Total Project Costs: \$ 10.9 million

*Project Financing:* - ARRA – HUD Grants (\$8.25 million)  
- Local Government Loan  
- PHA Capital Fund

Paisano Green Community is a newly constructed 73-unit senior housing facility located in central El Paso. What set Paisano Green Community apart from other energy efficient green buildings is that it is part of a vanguard of new developments defining what Zero Net Energy (ZNE) construction is and it will be carried out in the next generation.

Through innovative passive and active building systems the project will minimize its energy consumption. To get to ZNE, renewable energy systems must be used to offset the heating, cooling and plug loads demanded by occupants such that the energy produced on site will equal or exceed energy consumed on site. This requires a deep a comprehensive understanding of climate conditions, building science, the performance of building systems, and occupant behavior.

---

An early challenge in the renewable energy strategy for the Paisano Green Community was in the design of the water heating system. The project was originally designed to have a **solar thermal system** to provide hot water to the residences. However, energy models showed that for much of the year it was expected that large amounts of energy would need to be dumped into the earth to keep the system from overheating during periods of low demand. Another drawback to solar thermal systems was the need for a centralized gas-fired boiler back up system to provide hot water during those rare periods when the sun would not be shining and the demand for heated water would exceed the capacity of the solar thermal system's storage tanks. The boiler back up system had a high capital cost. Based on this analysis, a new technology was —air source heat pump water heaters— was identified. These water heaters are two to three times more efficient at creating hot water than a traditional electric resistance water heater and work by removing heat from the air surrounding the unit and transferring it to the water inside the tank. This change allowed the solar thermal system and its central boiler back up system to be eliminated. Because the boiler system was the only natural gas fired system on the project, its elimination resulted in the elimination of all gas distribution piping on the site. Elimination of the solar thermal system also freed up roof space to allow the solar photovoltaic system to be enlarged. The increased electrical generation from the enlarged PV system, offset the increased electrical consumption of the water heaters. This resulted in the project becoming energy neutral, or NetZero.

The Paisano Green Community uses both photovoltaic panels and wind turbines to achieve this.

Another challenge concerned net metering. For the renewable project to be financially feasible, the power generated above site needs needed to be Net Metered to fully offset utility consumption and costs billed by the utility. However, the publicly held utility company in El Paso recently eliminated its net meter rate in favor of a feed-in tariff. Under the feed-in tariff anyone who had energy going back into the grid was paid approximately 4 cents per kilowatt hour (kWh) instead of the 13 cents per kWh paid at the meter. Using this tariff structure, the project would have never truly become a net zero project.

To address this issue, to achieve a ZNE project, the project team needed to advance a tariff policy to effectively achieve grid parity. Ultimately this led to a joint collaboration with the utility company for a legislative remedy to permit an exemption for Paisano Green Community to receive a net meter rate for the project. While this effort had a successful result in this case, an important lesson for other housing developers considering ZNE project is to make sure that utility metering policies are aligned with the projects financial prerequisites.

---

ADDITIONAL INFORMATION: [www.hacep.org/](http://www.hacep.org/)

---