Trojan BATTERY COMPANY

# Case Study
City of Joy, Democratic Republic of the Congo

"Trojan Battery is honored to be part of such a worthwhile project that focuses on healing and bringing stability back into these women's lives. Battery-based renewable energy technologies have made it possible to establish reliable power in remote regions around the globe where access to electricity is unreliable or even nonexistent"

*- Bryan Godber,*
*Senior Vice President of Renewable Energy*
*Trojan Battery*

# *Off-Grid*
## AC-coupled Hybrid System

**System specifications:**:
- **Batteries: 40 Trojan 31-AGM 12V**
- **Inverters: 2 SMA SunnyBoy 3800 and 2 SMA SunnyIsland 5048**
- **Solar modules: 32 SunPower 225W**
- **Racking: Local materials**

It is rare to have the opportunity to participate in a project as meaningful and impactful as the City of Joy. Located in city of Bukavu in the Democratic Republic of the Congo, The City of Joy was established in 2012 by Eve Ensler's V-Day Foundation as a solar-powered refuge for female survivors of sexual violence perpetrated during the recent decades of war in the region. The community houses more than 180 women of all ages and offers programs designed to help empower the women to become leaders in their communities and learn skills to help them provide for their families.

This life-changing project will provide women with a place to heal emotionally as they rebuild their lives and learn new skills to take back to their communities. This City of Joy was conceived, created, and built in-part by the women themselves. Women spend six months at the City of Joy taking classes in group therapy, storytelling, dance, theatre, self-defense, sexual education including HIV/AIDS and family planning, ecology, horticulture and economic empowerment and then return home to their families.

The City of Joy is now powered by a 7.2kW solar electric system thanks to the support of organizations like Green Empowerment, SunPower Foundation, Global Green USA, V-Day, Solartechnik Stiens and Trojan Battery. The grid-tied with battery-backup hybrid system, allows the solar panels to convert sunlight into electricity during the day and any excess electricity that is produced by the solar panels, the national grid, or a diesel generator is stored in Trojan deep-cycle batteries so the community has reliable electricity 24 hours a day.

The solar panels were installed on the roof of an existing walkway and provide clean energy to all of the buildings at the site. By using an AC-coupled system design, the installation acts as a micro grid allowing the buildings share the electricity generated by the sun and the energy stored in the batteries.

Trojan Battery provided 40 31-AGM batteries to the City of Joy. These 12V deep-cycle maintenance-free batteries were chosen for this project due to their reputation for durability and reliability. Trojan batteries are designed to withstand the rugged conditions often found in developing regions of the world where renewable energy sources are the primary source of power. Trojan's 31-AGM batteries are maintenance-free, low temperature tolerant, shock and vibration resistant and have a low internal resistance for higher discharge current and higher charging efficiency.

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Two banks of 16 Trojan batteries were installed and wired in strings of four to match the inverter voltage (48V). The eight remaining batteries will be used with an AC battery charger for general use in the community.

Prior to the solar installation in 2012, the City of Joy was powered by the Congo's unstable national electric grid, which only provided electricity for a couple of hours a day, and a backup diesel generator. The generator was oversized for the community's needs and was loud, polluting, and expensive to operate. When operating at its full yearly capacity of 9,885 kWh, the solar system is estimated to save the City of Joy more than $6,000 per year by offsetting the cost of diesel.

The City of Joy's solar system was installed over 10 days in August 2012 by representatives from Green Empowerment, SunPower , Solartechnik Stiens and local installers and volunteers. The installation team faced some challenges while installing the solar system. Lack of basic electrical equipment and tools like conduit, electrical boxes and wood made it difficult to work efficiently. There were hammers without nails and drills without drill bits, but after 10 days of hard work the solar system installed and turned on. And when the power went out in the city that night, the City of Joy stood alone as a beacon of hope and a symbol of a sustainable future when the surrounding areas went dark.

*For more information contact:*

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**Green Empowerment:**
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**VDay:**
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We offer outstanding technical support, provided by full-time application engineers.

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