Drinking Water Solution

By Jennifer Beresford and Lars Willi

- **Client:** Aqua Infinitum Corporate Social Responsibility program in collaboration with the Indo-Canadian Village Improvement Trust.
- **Location - Saila Khurd, Punjab:** Saila Khurd is a rural Village in Garhshankar Mandal, Hoshiarpur District, Punjab State of India. Saila Khurd is 29.9 km distance from its District Main City Hoshiarpur, and 92 km distance from the City of Chandigarh.

Introduction

Access to safe drinking water across India is both a national priority and well documented. Many rural villages lack access to a basic drinking water supply. The systems typically installed to date are of marginal quality, require access to grid power supply, constant maintenance, and waste 50% or more of the raw water intake in the purification process. However, there are better ways to serve rural Indian villages while preserving scarce resources.

The Underlying Issues

- Every 80 seconds an Indian child dies of a water borne illness.
- One in 10 hospital beds in India are occupied by patients suffering from water related illness.
- In terms of economic loss, India loses 50.3 billion dollars annually due to bad sanitation. This amounts to 6.4% of GDP of India - source World Bank report 2011 based on 2006 statistics.

In November 2011, Aqua Infinitum GmbH, Authorized Trunz Water Systems Representative for India, installed a high volume, solar powered, water purification plant in Saila Khurd, Punjab - a typical rural village that lacks sanitation and access to a source of purified drinking water. Located centrally in the village, the water station delivers approximately 21,600 liters of purified drinking water per day to more than 3,500 villagers. The water station is part of Aqua Infinitum's corporate responsibility program and reflects the company's commitment to environmental sustainability and meeting the UN Millennium Goals of providing access to purified drinking for all. ☞ www.aquainfinitum.com

Project Description

The objective of the installation was to provide the villagers of Saila Khurd with a safe dependable source of purified drinking water, on-demand, 24 hours per day, and to do so using world leading sustainable technology that had not yet been installed in India. The combination of solar power, chemical free treatment and low water discharge makes this Village Water Station 100% carbon neutral. Aqua Infinitum selected a Trunz TWB 002 system to meet both the village volume requirements and the local water conditions. This system treats impure fresh water using an ultra-filtration process to remove biological contamination, and has an hourly production capacity of up to 1,200 liters per hour with virtually zero wastewater. Grid power is sporadic or unavailable in rural areas. Meanwhile, India is a country with one of the best solar radiation ratings on the planet making solar power not only a logical choice, but also an efficient and dependable source of power. A series of 6 solar panels was installed, along with inverters and a Power Center to run the equipment with sufficient stored power within its gel battery bank to provide 24-hour operation.

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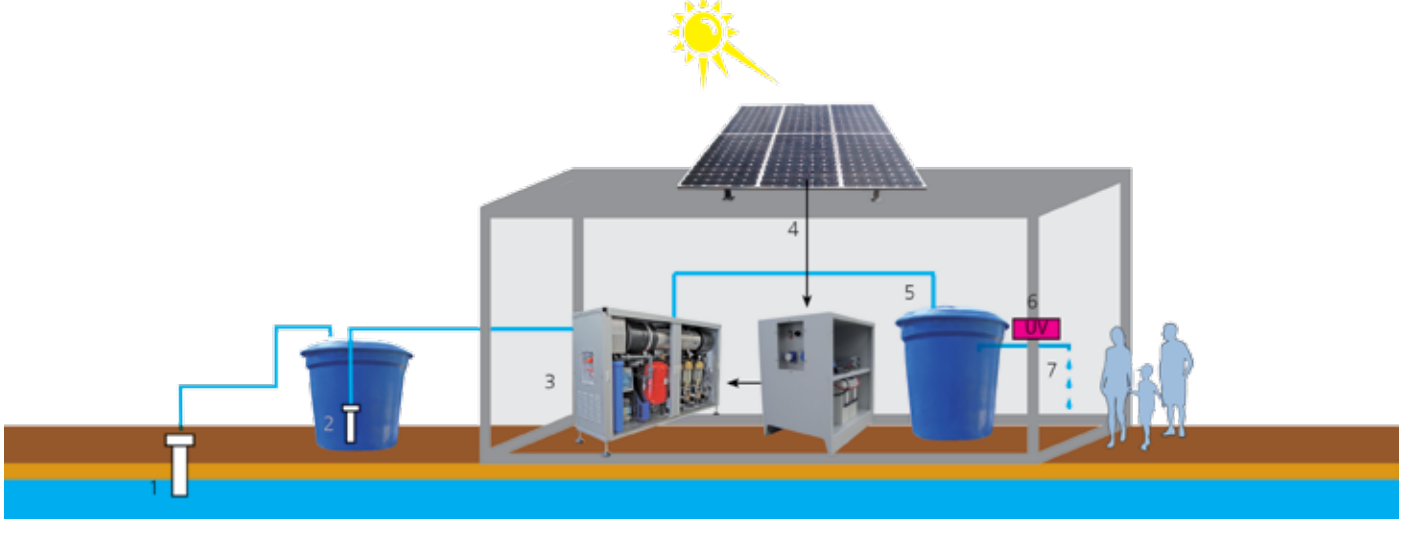
The Saila Khurd project was completed in collaboration with a local NGO, the Indo-Canadian Village Improvement Trust (ICVIT) who identified village for sanitation and water supply improvements. Initial logistics, including sourcing a local construction team and materials was also provided by the ICVIT.

Choice of location for the village water station was one of the most important considerations. Convenient access for the villagers was critical, however so too was security and maintenance since this was to be a showcase facility. Ultimately, the selected location was collaboratively agreed between the village Panchayat, ICVIT and the neighboring paper manufacturer Kuantum Paper who generously offered to support the project with security, as well as post installation operational support and maintenance, since the site is conveniently located close to their plant.

Land for the water purification station was supplied by the Village Panchayat (Council) and is gifted for indefinite use. Approval was also required from the Panchayat for access to the local water source. Initially, water was supplied from a standpipe that supplied one end of the Village with low-pressure water for approximately 4 hours per day, direct from a local aquifer. The lack of high volume source water supply necessitated installation of a raw water tank, although this was also insufficient to meet the purification speed of the Trunz equipment and the demands of the Villagers. Shortly after commissioning,

the Village completed a high pressure pumping system drawing water from an aquifer 3 km away. Source water is now piped directly to Aqua Infinitum's water station, and the original raw water tank has been redeployed within the system to provide additional purified water storage. Architecture was provided by a young freelance female architect, Kirat Dhillon, and construction provided by local labor. Building design considerations were tailored for the local climate and realities of rural village life, including; grated window vents for air circulation and natural cooling of equipment, sealed ground level doors and apertures to keep out animal life, water run-off provisions in contemplation of monsoon season, and a tiled water dispensing area to allow for easy access and cleaning. Many of the design considerations included input from the village community. Construction followed local building methods but of sufficient quality to withstand the rigors of rural village life and the environment including; brick walls finished with painted plaster, a reinforced concrete floor to support interior water tanks and a reinforced roof to support the solar panels. Signage is manufactured from shatterproof Plexiglas. Traditional bamboo scaffold was used during construction of the roof. The entire construction project spanned 12 weeks from commencement of site preparation to completion.

On November 9, 2011 the official commissioning ceremony was held. Over 150 dignitaries, officials and selected guests were invited to attend a formal inauguration ceremony followed by lunch, hosted by Kuantum Paper. Villagers were all welcomed at the ribbon cutting by the Honorable Captain Balbir Singh Bath, Cabinet Minister of Defense Services, Welfare, Legal and Legislative Affairs, and NIR's Affairs.



Technical Layout

Who Gets the Water?

All villagers have access to free purified drinking water. Production of drinking water still exceeds demand for this village so no restrictions on volume have been implemented.

Access to Location	All villagers have access from 5am till midnight, 7 days per week.
Number of People Served	More than 3,500 villagers
Water Source	Aquifer located 3km distance from the village and piped to a central location in the village
Common Contamination in Raw Water	Biological
Distance from Source Water to Unit	5 meters to village water source
Air Temperature	Summer high 45°C Winter low 0°C
Site Preparation Work	Construction of brick and concrete building. Building includes recessed external channel to receive any water spillage from dispensing area and a nominal quantity of discharge water. This channel is planted with grasses to absorb discharged water and ensure that zero water flows back into the ground. Roof is of reinforced concrete to withstand the weight of solar panels. The roof is cantilevered over the front of the building to provide shelter from sun and rain while villagers dispense water. It has a raised perimeter edge with a water downpipe at the rear that directs monsoon water and water from cleaning of solar panels away from the building. Installation of permanent connection to new water pumping system to ensure a continuous supply of raw bore hole water. Erection of solar panels on the roof.

Table 1: On-Site Condition

Operating Status

As a direct result of this installation, a local micro-economy has emerged around the water station, including a variety of business such as food stands and general stores. It has become a central hub of village activity. Further employment opportunities have been created - primarily delivering drinking water to local homes, water station security, along with building and equipment maintenance and cleaning of solar panels.

The plant produces water 24 hours per day, on demand and automatically recharges the supply as water is dispensed. Since commissioning zero maintenance or filter changes have been required.

Installed Unit

- Trunz fresh water treatment system - TWB 002 with pump protection filter. ☞ www.trunzwatersystems.com
- Power center TSPC 700 4/6 with inverter, battery charger and UV post treatment system.

Technical Layout

- Bore Well input submersible pump
- Raw water holding tank with input submersible pump 2,000 liters
- Water purification system TWB 002
- Power source - solar power center - 6 panels, 4 batteries, inverter
- Product water holding tank 2,000 liters
- UV post production treatment for water on demand
- Manual tap dispensing system

About the Authors

Jennifer Beresford is the founder of Aqua Infinitum and a business strategist with over 25 years' experience in finance, property development, and international business spanning India, Canada, the United States and Mexico. Jennifer has worked extensively with the property development community, private industry and provincial and civic governments with portfolios exceeding $600 million.

Lars Willi is responsible for the sales organization in Asia, Eastern Africa and Pacific and takes care of the Administration within Trunz Water Systems. With his background in Economics he is also very active in the development of new business models and ideas to support the distribution partners better in their daily operations.

Aqua Infinitum's commercial water systems produce high volumes of low-cost pure water - anywhere.

Trunz Water Systems AG is located in Steinach/Switzerland. The company develops, manufactures and distributes independent water treatment and desalination systems worldwide.

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