



CASE STUDY

SHARC Sewage Heat Recovery System

Installed in Seven35 Building - North Vancouver, BC, Canada

The purpose of this case study is to review the collected data from the Sewage SHARC system operating for the past 2 years at the Seven35 Building in North Vancouver, BC. The SHARC system is used to preheat the domestic hot water for the 65 suites and common usage. This study will re-confirm the information provided by Stantec Engineering outlined in the case study done on September 20, 2012. The system has now collected 2 complete years of operational data. For the purpose of this study we have randomly selected 20 days for analysis.

Operating System

The Sewage SHARC system utilizes 2 FHP water-to-water heat pumps to extract heat from the wastewater leaving the Seven35 building. The 2-5 ton FHP heat pumps preheat incoming domestic hot water to 52°C(125°F) and store 480 gallons of preheated domestic hot water in the mechanical room storage tanks. The 52°C-preheated water is then flowed into 2 booster tanks that are heated to 60°C (140°F) by a natural gas boiler. Flow meters, temperature sensors and electrical meters were installed throughout the sewage heat recovery system in order to monitor and log the system operation and the amount of energy used and recovered.

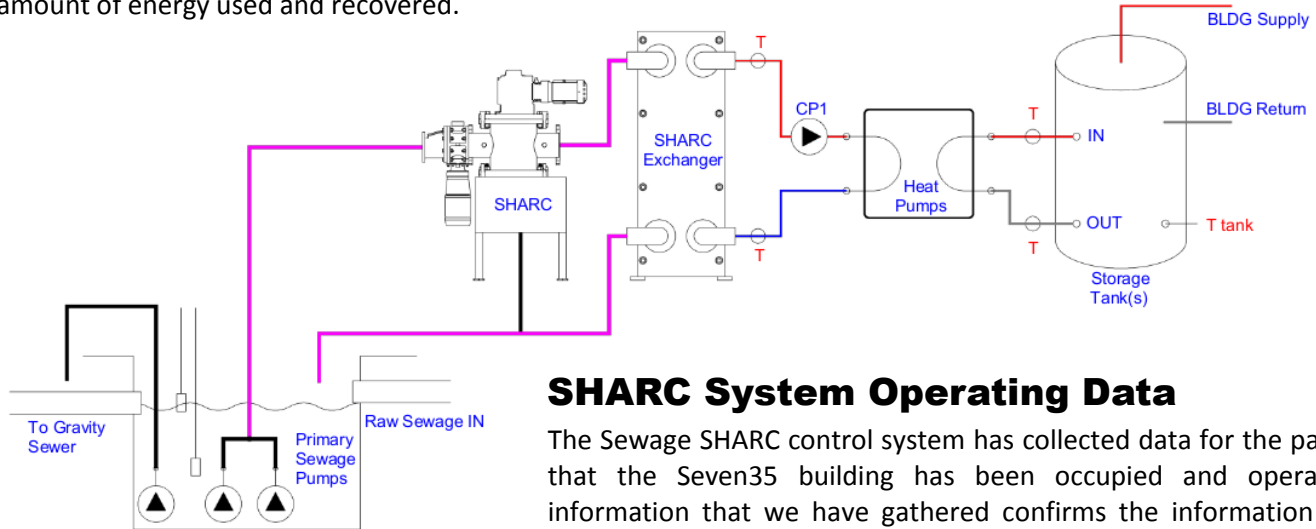


Fig 1.1 – Basic System Schematic

SHARC System Operating Data

The Sewage SHARC control system has collected data for the past 2 years that the Seven35 building has been occupied and operating. The information that we have gathered confirms the information originally collected and used by Stantec Engineering for their report in September 2012. The original data used showed that a total of 829.86 kWh was the average usage per day of domestic hot water heating if a conventional 90% efficient equipment had been used.

Analysis of the data collected shows that the heat pumps used 81.03 kWh per day, pumps used 10.08 kWh per day and the top up by the boiler used 114.64 kWh of energy. The original data confirmed a 75.2% reduction in energy usage as a result of using the Sewage SHARC system at Seven35.

The data collected over the past 2 years actually shows slightly better performance overall than the previous study. The 2-year average energy usage as logged by the SHARC system shows the daily energy usage by the heat pumps and the other pumps to be 85.68 kWh per day. The energy used to top up the domestic hot water with the natural gas boilers remained consistent to the first report at 114.64 kWh per day. There was a slight increase in system operating efficiency to 75.9% energy savings.

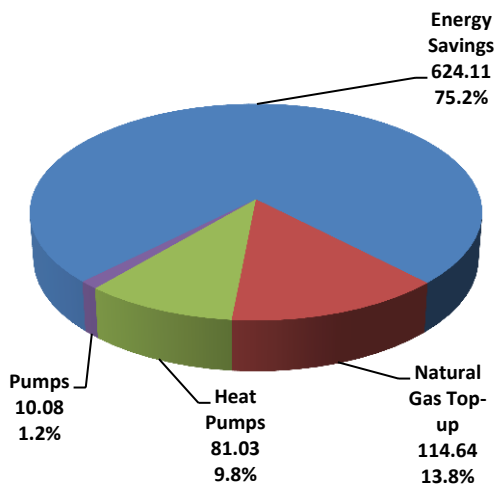


Fig 1.2 – Energy Breakdown (Sept, 2012)

Other General System Operation Notes

The SHARC system also has some other critical components that we examined and analyzed over the 2-year operational study, during which regular scheduled maintenance was performed.

The sewage-holding tank was closely monitored and it was found that there was no buildup of solids and surface coatings in or on the tank. The bottom of the tank was completely clear and free of all materials.

The plate and frame heat exchanger was checked for corrosion and blockages and nothing was found to be affecting the operational capacity after 2 years of continuous operation.



Benefits

The Sewage SHARC system has proven over the past 2 years of operation that the system is very durable and dependable with almost no down time. The energy savings that can be expected from the operation of the Sewage SHARC unit is in the range of 76% on the production of domestic hot water and would be even higher when the heat is used for space conditioning.

The graphs below show the considerable savings in energy, operating cost and CO₂ production that has occurred at the Seven35 building in North Vancouver.

- Energy savings of 76%
- Operating cost reduction 76%
- GHG production reduced 90%
- Lifecycle costs reduced greatly as 25-40 years life cycle is expected.

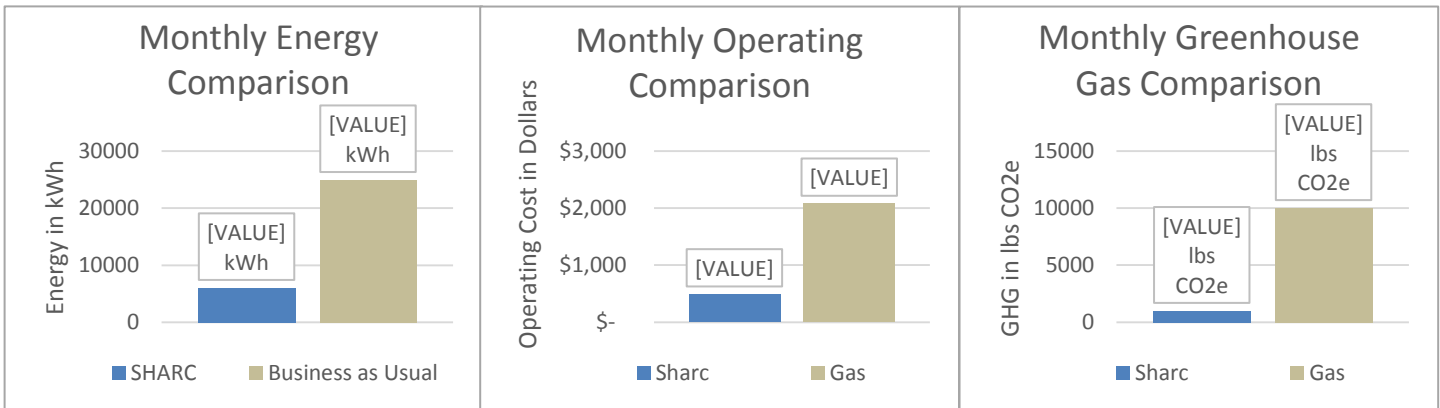


Fig 1.3 – Savings Comparison Charts

Summary of the Sewage SHARC System at Seven35

The International Wastewater Systems sewage heat recovery system “SHARC” has demonstrated consistent energy saving performance of 76% with very few operational problems. The savings are very predictable, reliable and can be expected on any SHARC system. The heat exchanger and sewage storage tank have performed as expected with no operational or maintenance issues. The Sewage SHARC is operationally sound and will have no issues with long term operation at this or any other site.



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About Us

International Wastewater Systems is a team of professionals dedicated to the widespread implementation of Sewage SHARC systems as an alternate energy source.

With over 100 years of combined experience in alternative energy projects we are positioned to achieve this goal.