RENTRICITY CASE STUDY
Halifax, Nova Scotia

INTRODUCTION

Rentricity is the leading developer of in-pipe hydropower solutions that provide clean electricity from existing gravity-fed water pipeline infrastructure. Rentricity's Flow-to Wire™ equipment as well as design and installation of custom turnkey systems, inclusive of all requisite monitoring, controls and protective relays. Systems are stand alone or integrated into a client's existing SCADA system, and can be fitted with sensors or treatment technology. Energy can be recovered throughout a water distribution system, typically at mandated releases, pressure reduction valves (PRV), inlets to water treatment plant and industrial facilities and water transfer stations. Rentricity works with clients to comply with all electrical utility intertie and safety requirements, as well as government permitting and licensing procedures.

The Halifax Water project is the Commission's first in-pipe hydroelectric project and the first such project in Canada. Planning and initial site assessments for the project began in 2011. In December 2012, Rentricity and Halifax Water commenced design of a pressure-release facility near Bedford, Nova Scotia, which was the most viable site that met no serious challenges.

THE CHALLENGES

The underground vault space limitations required the Rentricity team to design its first commercial vertical pump as turbine (PAT) installation, requiring a unique support structure for optimal piping and equipment layout.

Further, an NSF-61 (safe water certification) for the PAT was required mid-project which required Rentricity to fast track component review by A US-based standards organization.

The operation of the vault also required new design improvements as part of shutdown and water surge relief sequences for mechanical protection of the system. All challenges were handled in order to minimize cost and time delays to the project.

RENTRICITY'S SOLUTION

The system's mechanical integrity was assured by a passive overpressure protection relief system. Pressure management was assured by providing a close-coupled system between the PAT inlet control valve and the control system. The electrical/control system interfaces with existing SCADA controls so that the utility has complete control of the operation of the system at all times, both in remote/automatic and local mode. The site is integrated with Nova Scotia Power grid to provide clean energy to nearby residents through the Province's Community Feed-In Tariff (COMFIT) Program. Major long-term benefits for Halifax Water and their customers include a reduction of electricity costs and the creation of sustainable and resilient infrastructure. Halifax Water is considering several other sites for similar pumps as turbines.

RENTRICITY'S RESULTS

The Halifax Water energy recovery system operates as designed and delivers approximately 31 kilowatts of clean electricity to Nova Scotia Power's grid. The system operates for 19 hours per day and passes 1,650 gallons per minute, use a differential head of 56 pounds per square inch, which would otherwise be dissipated with a pressure reduction valve. The system is expected to generate approximately 225,000-kilowatt hours per year. Rentricity expects the Halifax energy recovery systems to operate for 40-years with minimal maintenance.

FINANCIAL REVIEW

Halifax Water spent approximately $500,000, 25% below budget Halifax Regional Water Commission, the Water Research Foundation and the Department of the Environment teamed up to fun the system, which will produce 225,000 kilowatt hours of energy per year from its Bedford location. Halifax Water expects to generate approximately $30,000 of revenue per year from the sale of the power.