



Exploring Alternative Technologies to Meet Small Town Infrastructure Needs

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Richmond, Vermont is located in the western foothills of the Green Mountains on the eastern edge of the Lake Champlain Valley. The Winooski River bisects the town of 4,090 residents from east to west, as does Interstate 89, the New England Central Railway and US Route 2.

In close proximity to metropolitan Burlington, Richmond's tight-knit community has seen its share of growth over time. The municipal government consists of 16 full-time and 10 part-time employees providing police, volunteer fire, library, highway, water, wastewater, and administrative services. There is a separate school district for Richmond students in grades K-4, and a union district with five other towns for grades 5 – 12.

Like many small communities, parts of Richmond's infrastructure are nearly a hundred years old, requiring costly improvements in the near future. Richmond's town offices were built in 1907 and portions of its water and sewer infrastructure date back to the 1800s. The demand for amenities like sidewalks, parks, improved public safety, residential development, and recreational services is growing. While faced with numerous priorities for infrastructure repair and replacement, resources available for these improvements are limited, as is the capacity to consider alternative options.

Alternative technologies offer towns like Richmond new choices that may save money over time, help avoid future costs, contribute to local employment, and better protect the environment. However, few alternative technology providers market to rural communities, and few rural communities have the staff, time, or expertise to explore the viability of often rapidly changing technology solutions to their needs. Further, hardly any of the firms that do provide services to rural towns are themselves familiar with alternative approaches. And federal programs promoting alternative technologies are often focused on urban areas, with limited resources to address rural differences in scale, capacity and financial resources.

Green Community Technologies

Yellow Wood Associates (YWA), a consulting firm providing specialized services in rural community and economic development since 1985, has been working with Richmond, Vermont since 2001, creating a service, called Green Community Technologies, designed specifically to overcome these obstacles. The service begins with an inventory and assessment of all municipal infrastructure including everything from underground pipes to town-owned vehicles to town forests.

The inventory is designed to meet the new General Accounting Standards Board Statement No. 34 (GASB 34). GASB 34 requires communities to report municipal infrastructure within their financial statements as an asset. GASB identifies infrastructure as a long-lived asset that includes physical structures such as roads, bridges, drainage systems and lighting systems.

These types of infrastructure are now considered to be assets subject to cost depreciation in municipal financing. Estimating infrastructure cost depreciations requires extensive historical data collection and inventories that can be an expensive and labor-intensive task for small local governments. Communities must meet GASB standards if they want to be in the best position to finance municipal projects through bonds.

YWA worked with Richmond's municipal employees to prepare a comprehensive inventory and assessment of Richmond's infrastructure that satisfies GASB 34 requirements. YWA did not complete any work for the school system. The inventory database can be continually updated with new information about the condition of Richmond's current or new infrastructure.

The town's capital assets had never been completely inventoried. Therefore, local leaders took advantage of this effort to GPS all infrastructure locations and to create a capital asset overlay in its GIS system. Richmond's auditors commended the town on completing the fixed asset requirement.

Targets for Alternative Technology Applications

The results of the inventory were shared with the Richmond Planning Commission. Richmond's leaders also received recommendations regarding six areas in which alternative technologies may provide superior overall economic and/or environmental performance, when compared to conventional approaches.

Richmond chose to focus on the following areas: alternative fuels for town vehicles; stormwater source reduction options such as alternative paving regimes; a retrofit of its town building for increased energy efficiency; more efficient pumps and motors for a planned upgrade to the wastewater treatment plant; and repair and replacement technologies for water and wastewater pipes. For each of these areas, YWA researched the differences in cost, performance, capacity and impact between the conventional and alternative technologies.

Since municipalities can afford to take a long-term view of their infrastructure investments, a life-cycle costing approach was used wherever possible to compare the total costs of alternative versus conventional approaches. Life-cycle costing is the process of considering alternatives which satisfy all performance requirements (e.g. code, safety, comfort, reliability) based on all costs spent over the life of the longest lived alternative. These costs include purchase price, operation and maintenance, replacement costs for shorter lived alternatives, and disposal cost. Methods and information used in calculating life cycle costs are yet to be standardized.

Project Results

The pilot project in Richmond has been educational for all parties involved. In some cases, there are well-established alternatives, such as for the retrofit of the town building with energy efficient components, where insulation, windows, lighting and better air sealing will provide demonstrable savings on fuel costs. In others, the alternatives are there, but they may not be commercially available or easy to find as of yet (e.g., using biodiesel fuel for town-owned vehicles).

With the approval from its town officials, Richmond will implement certain of these alternatives. YWA will assist Richmond in this process by identifying grants, technology providers, financing alternatives and addressing regulatory hurdles, if any. Town Administrator Ron Rodjenski explains: "Every construction or rehabilitation project, no matter what size, should be evaluated for long-term cost benefits, even if more effort and funding must be expended in the selection process. The benefits of a thorough technology assessment are significant when the right technology is chosen for public investments."

Through the Green Community Technologies service, Yellow Wood Associates will continue to assist rural communities in identifying and implementing appropriate alternative options to infrastructure investment that can save money and provide other benefits, such as creating new jobs and promoting environmental protection.

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