Alaska Department of Environmental Conservation
Division of Water, Facility Programs

The Alaska Water and Sewer Challenge Project

Summary

The Alaska Department of Environmental Conservation (ADEC) has initiated a project to spur worldwide research to develop innovative and cost effective water and sewer systems for homes in remote Alaska villages. The project focuses on decentralized water and wastewater treatment, recycling, and water minimization. These approaches have a high potential for use in individual homes and housing clusters. Our goal is to significantly reduce the capital and operating costs of in-home running water and sewer in rural Alaska homes.

Background

There are currently approximately 3,300 year-round occupied rural Alaska homes that lack running water and a flush toilet (2,300 homes in 35 "unserved" communities and 1,000 homes in served communities). In addition, over 700 homes are served by operation-intensive haul systems. Keeping existing systems operational is a challenge for most villages, and there are approximately 4,500 rural homes that are connected to community-wide piped systems that have surpassed or are nearing the end of their design life.

In 2012, the State began a multi-year research and development project with the goal to significantly reduce the capital and operating costs of in-home running water and sewer in rural Alaska homes. The first two phases were funded with a 2012 state appropriation. The third phase is being funded jointly by the state and the U.S. Environmental Protection Agency.

Project Schedule

Phase		Approximate Timeframe	Duration (months)	Comment
1	Team Formation	Fall 2013 – Spring 2014	9	International effort to encourage the formation of joint venture teams. The agency assessed team qualifications.
2	Proposal Development and Presentation	Fall 2014 – Summer 2015	9	Top six teams were funded for written proposal development.
3	**Prototype Development and Pilot Testing**	**Fall 2015 – Summer 2017**	**21**	**Top three selected proposals were funded for prototype development and pilot testing in lab.**
4	Field System Development and Testing	Fall 2017 – Summer 2019	21	Fund field testing in rural homes for prototypes with demonstrated success.
5	Technology Refinement and Improvement	Fall 2017 – Summer 2018	12+	Address inadequacies or failures identified during testing of field systems with demonstrated success.

Project Steering Committee

The Steering Committee includes individuals from various tribal, state and federal agencies with knowledge relevant to the technical aspects of this project. The group meets regularly to review the status of work and to make decisions regarding the progression of the project. Key responsibilities include evaluation of Statements of Qualifications, project proposals, prototypes, and the results of field testing. Participating agencies are listed below.

- Drinking Water Compliance and Monitoring, ADEC
- United States Arctic Research Commission
- Indian Health Service – Alaska Area Native Health Service
- Tanana Chiefs Conference – Environmental Health Program
- U.S. Environmental Protection Agency – Alaska Infrastructure Programs
- U.S. Dept. of Agriculture/Rural Development – Rural Alaska Village Grant Program
- Alaska Dept. of Health and Social Services – Epidemiology Program
- Alaska Dept. of Commerce, Community, and Economic Development – Rural Utility Business Advisor & Local Government Assistance programs,

Performance Targets

At a minimum, household service will consist of a kitchen sink, a bathroom sink, a toilet, a shower, and a tap & drain for a clothes washing machine. The following performance targets have been established for this project. An ideal system would be capable of meeting all these targets, but there may be suitable systems that meet most of these targets but not all, and exceed some targets.

- Acceptance and use by end users
- Water use for health benefits - Systems should be capable of providing a minimum of 15 gallons of useable water per persons per day, comprised of water for drinking and cooking, washing and flushing.
- Operation and maintenance cost - Projected monthly operating costs should not exceed $135, which is 5% of the Median Household of unserved rural Alaska communities.
- Capital cost
- Constructability and durability
- Feasibility
- Parts availability
- Freeze/thaw recovery capability
- Modularity of household system
- Compliance with plumbing code, wastewater discharge requirements, and other regulations