With lower costs relative to petroleum alternatives, residential wood heating appliances are common in rural Alaskan communities. Many of these applications employ steel woodstoves which have a number of shortcomings including low efficiencies, high particulate emissions, and safety concerns related to high external surface temperatures. This short presentation reviews an old heating technology, the masonry heater, redesigned for small dwellings as a possible solution to these shortcomings. The use of the masonry heater has been popular in Europe and Southeast Asia since the 12th century and can potentially address the failings of existing steel woodstoves common in rural Alaska. In their current form, there are challenges with masonry heaters including their large size and mass. Contemporary masonry heaters also require specialized installation skills using unique construction materials not common in rural Alaska. This paper describes the development, fabrication, and preliminary testing of a new masonry heater concept that addresses these challenges. Performance data from a seven hour test with the masonry heater is compared to a conventional woodstove.