

STUDY OF WASTE HEAT RECOVERY SYSTEM FOR DRAIN WATER

A Drain Water Heat Recovery System (DWHRS) employs a heat exchanger to capture and utilize heat from flowing shower water, thereby heating or preheating cold water and conserving energy. Various types of heat exchangers are employed in these systems, with numerous studies exploring the impact of different parameters on their effectiveness. These investigations underscore the interest in deploying DWHRS to curb energy consumption.

According to [1], Canadians allocate approximately 17% of their total energy consumption to water heating (Figure 1). This statistic underscores the significance of finding alternative solutions for heating water tanks, motivating homeowners to explore options like solar domestic hot water systems.



Figure 1. Distribution of residential energy use in Canada 2019, Natural Resources Canada

Traditional methods of heating water using fossil fuel gas such as propane or natural gas have adverse effects on the environment. The combustion of these fuels releases greenhouse gases and contributes to climate change. Therefore, it is crucial to seek environmentally friendly alternatives. Utilizing a DWHRS like our design (Figure 2), which incorporates a helical tube-in-tube heat exchanger, allows for the recovery of waste energy from drain water, mitigating the need for reliance on fossil fuels and reducing environmental harm.

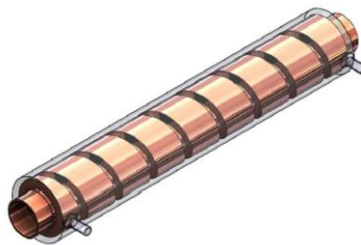


Figure 2. Helical tube-in-tube heat exchanger

Moreover, the design boasts an efficiency rating of 85%, ensuring optimal energy recovery. Its compact design eliminates the need for a pump, as it harnesses the natural buoyancy circulation of water, further enhancing its efficiency and reducing operational costs.

REFERENCE:

1: EFFICIENCY, E. (2024, JANUARY 30). WATER HEATERS. RETRIEVED JANUARY 30, 2024, FROM [HTTPS://NATURAL-RESOURCES.CANADA.CA/ENERGY-EFFICIENCY/PRODUCTS/WATER-HEATERS/13735](https://natural-resources.canada.ca/energy-efficiency/products/water-heaters/13735)