Offsetting High Rise Booster Pump Systems' Energy Consumption with the Implementation of Hydropower Turbines

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High rise buildings waste the energy generated from millions of liters of falling water every day. They typically use a booster pump system, which requires substantial amounts of energy for pumping water to the highest floors for residents or equipment in the building. Once the water falls down the drainage pipe system and out of the building, the potential energy remains essentially wasted. Turbines installed in these drainage pipes in high rise buildings could capture this wasted energy and use it to offset the energy consumption of the booster pump system itself. In the following experiment, a small-scale hydropower impulse turbine system was tested to demonstrate the turbine's ability to capture energy from falling water in high rise buildings. Data from this model was then extrapolated to estimate the results if implemented in the 25-story multi-use business facility called the Stephens Building located in Little Rock, Arkansas. In addition, the data from the model was used to estimate energy savings for modern high rise buildings. Energy savings for those buildings was predicted to be 6%.

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