thermoflu.flutrans Fluid transducers

1 Although thermal systems often exchange energy with other energy domains, it is much more common to consider those systems that interact with thermal systems to be generating or sinking heat (often modeled as a dependent source) than to see a proper transducer.

2 Fluid systems, on the other hand, very naturally interact with mechanical systems. For instance, piston-cylinder mechanisms, propellers, turbines, and impellers (backward turbines) are just a few energy transducing elements.

3 These systems are often driven by motors (e.g. a pump's impeller) or drive generators (e.g. a dam's turbine). Therefore, it is common to require a fluid-electromechanical dynamic model.

Example thermoflu.flutrans–1 re: microhydroelectric power generation

Dams, even small, "micro" dams, generate hydroelectric power by directing water through turbines, which rotate, creating mechanical power, and drive electric generators, generating electric power. For large-scale dams, the flowrate is regulated such that an AC generator produces a nice 60 Hz. However, a microhydroelectric generator typically cannot expect well-regulated flowrates, so sometimes they use a brushed DC generator (brush replacement being the primary drawback). Assuming a microhydroelectric dam can be set up in a manner similar to a large-scale dam, draw a linear graph model from the schematic of Fig. flutrans.1.

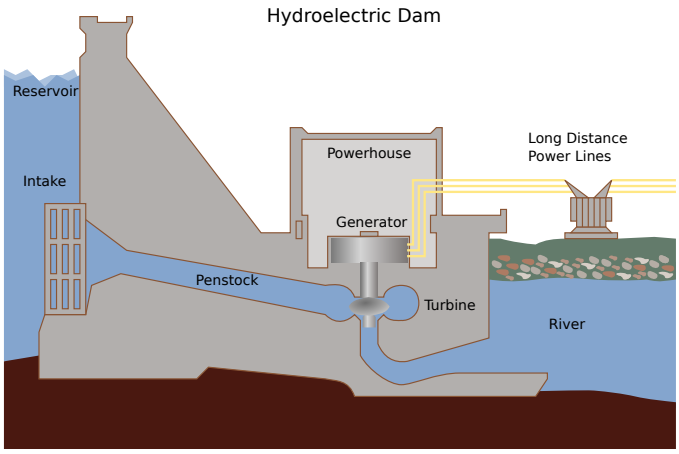

Figure flutrans.1: chematic of a hydroelectric dam (Authority and Tomia, Hydroelectric dam — Wikipedia, The Free Encyclopedia).