MASTER THESIS

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Thermodynamic efficiency measurements at Smeland power plant

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Background

In a water turbine hydraulic energy is converted into mechanical energy. However, not all of the energy is converted, i.e. there are losses through the turbine. The thermodynamic method builds on the principle that all of the losses turns into heat in the flow itself, and by measuring the change of temperature one can with little other data find the turbine's hydraulic efficiency.

The objective of this master thesis is to perform such a thermodynamic efficiency measurement at power plant in Vest-Agder, on a 30 year old Francis turbine, currently experiencing pressure pulsations at full load. In the picture below is a drawing of the measurement set-up that will be used.