Mid-Columbia PUDs Meeting with Mekong River Commission
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**Load Following by Hydroelectric Plants**
**on the Mid-Columbia River**
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Hydroelectric generation plays a unique role in the NW

Load Following

Wind Integration

Load Following – Hydroelectric generaton has both baseload and load-following characteristics. "Run-of-river" generation is produced by unimpeded river flow and can meet baseload needs, while the controlled portion of the river flow can be held in reservoirs and released as needed to provide load-following services. The amount of each portion of the river varies seasonally with rain- and snowfall, and across years due to "wet" and "dry" hydrology conditions. However, some hydroelectric plants are mandated to operate as run-of-the-river generation during parts or all of the year to maintain river flows below the dam.

On the Mid-Columbia, there is a portion of the flow that is characterized by unimpeded flow (meets baseload) and also a portion of the flow that is the controlled portion, which can be held in the individual hydroelectric plant's reservoir and released as needed and can provide load-following. Operational flexibility allows the hydroelectric generators to respond to unexpected or variable load conditions. On the Mid-Columbia, a new generation request is sent to the individual hydroelectric plants every four seconds. In the NW, most of the thermal units are base load units with the hydroelectric generation providing the large majority of the load following and regulation for variable load and wind generation.

Wind Integration – The intermittent and unpredictable nature of wind generation requires other generating resources to be available which can increase or decrease generation on short notice in order to keep the interconnected power system balanced. While hydroelectric power plants are well suited for performing this function, there are operational impacts and costs associated with operating the Mid Columbia hydroelectric plants in a manner that maintains reliability and facilitates integration of energy from wind generation facilities.

Role Of Turbine Design in Load Following – When designing new installations there should be careful consideration to how all dams in a system would respond to historic and future load and resource variation. Careful studies can determine if the extra costs for such things as variable pitch turbine blades and other design considerations to withstand the extra demands on units that have hightly variable run schedules. Units that have a large number of starts and stops will likely have higher stresses on key components compared with those that are base-loaded.