

Fuel Generation Efficiency Columbia Water and Light

BACKGROUND

Columbia Water and Light is required by the Energy Policy Act of 2005 to address Standard 13 in regard to fossil fuel generation efficiency for facilities owned by the City of Columbia. The utility is to propose a plan to generate more electricity by using less fossil fuels by improving the efficiency of the plant.

COLUMBIA MUNICIPAL POWER PLANT OVERVIEW

The Columbia Municipal Power Plant is owned by the citizens of Columbia and has the capability to burn coal, gas and oil. Due to the cost-effectiveness of coal it is the primary fuel source at this time. Low sulfur coal from Kentucky is used to reduce emissions. The coal also has a high BTU content which means that more electricity can be created per ton used. The power plant is in full compliance with air quality standards set forth by the Missouri Air Conservation Commission (MACC) and approved by the Federal Environmental Protection Agency (EPA).

- The local plant produces 7.6% of Columbia's electric load.
- The plant consists of two coal-fired steam turbo-generators, one oil/gas fired turbo-generator and one oil/gas fired combustion turbine.
- The plant is operational only during times when it is cost effective. This means the plant's units are mainly operated during the summer months when demand and wholesale costs are high.

FUTURE PROJECTS:

The two coal-fired generating units at the Columbia Municipal Power Plant are of the age that they need to either be retired or upgraded within the next seven years. Columbia Water and Light staff has been researching the alternatives for these units and is expecting to have more detailed information on alternatives as more research is completed. The other units at the power plant are in good working order and are compliant with all environmental regulations. Efficiency upgrades for these units are not cost effective at this time.

Columbia Water and Light needs to secure a long-term reliable, economically sound source of power. As part of this research, Stanley Consultants furnished a Power Plant Rehabilitation and/or Expansion Study to the City of Columbia in 2005. The scope of the study was to prepare a technical analysis on upgrading or replacing the generating units that needed to be retired. Both coal and alternative fuels were considered as fuel sources.

New technology enables more electricity to be produced with lower emissions. Fluidized beds were considered because they allow for alternative fuels to be burned in addition to coal.

Three alternatives were studied.

- Alternative 1: Construction of a 108.5 megawatt (MW) circulating fluidized bed (CFB) coal fired unit to be located at the City's Municipal Power Plant site.
- Alternative 2: Phase 1 would consist of a new 70 MW CFB plant at the City's site to be operational by 2011, followed in Phase 2 by a CFB boiler to repower existing steam turbine generators 5, 7, and 8 (73.5 MW).
- Alternative 3: Phase 1 would consist of a new 70 MW CFB to be operational in 2011, followed in Phase 2 by the refurbishment of stoker fired boilers 6 and 7, natural gasfired boiler 8, and a refurbishment of the steam turbine generators if needed.

In September 2005, Black and Veatch was retained to determine the most cost-effective and reliable power options. The first alternative from the Stanley Consultants report, to construct a 108.5 MW CFB at the local plant was brought forward, along with a 250 MW option. The other two options from the Stanley Consultants study were determined to not be economically feasible. The local plant options were compared to buying energy wholesale or power purchase agreements with new plants being constructed.

ESTIMATED COSTS

Adding new generating units locally would require a large capital investment up front for construction. However, there would be no transmission costs and Columbia would have equity for the money invested.

EVALUATION OF NEW GENERATING UNITS

Columbia Water and Light has requested proposals to develop an Integrated Resource Plan (IRP) for the utility. This plan will build off the Black and Veatch report on how to meet future power supply needs. The IRP will include an updated load forecast and assess the constraints and considerations that determine or impact the potential power generation options available to Columbia. These constraints and impacts include environmental compliance issues, transmission system constraints, renewable energy requirements and fuel supply considerations. The impact of conservation measures or demand-side management programs to reduce future electric needs will also be included. The IRP will be a valuable tool in determining the most feasible future power supply because price, reliability, conservation and environmental impact will all be evaluated.

Once the IRP is complete it will be reviewed by city staff, the Water and Light Advisory Board and the City Council. Decisions regarding the future power supply would be made by the City Council after a public input process.