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March 6, 2018

DECISION MEMORANDUM

TO: Council Members

FROM: John Fazio, Senior Systems Analyst
Tina Jayaweera, Senior Analyst

SUBJECT: White Paper on the Power-System Value of Conserved Irrigation
Diversions

PROPOSED ACTION: Council decision to release this paper for public comment
(for a 30-day period ending on Friday April 13, 2018)

SIGNIFICANCE:

- This work is in response to the Council's Seventh Power Plan Action item ANLYS-9, which is to conduct research to improve understanding of electric savings in water and wastewater facilities from reduction in water use.
- The added power-system value for conserved water that stays in the system could be used by the Council, the RTF and others to more fully quantify the impacts of these conservation measures.

BUDGETARY/ECONOMIC IMPACTS:

There are no effects on the Council's budget. Analysis supporting the assessment of the power-system value of conserved water was performed by Council staff, using data from the Bonneville Power Administration's "2000 Level Modified Streamflow" report. There is no anticipated contract work to complete this task.

BACKGROUND:

Irrigation withdrawals in the Columbia River Basin result in a net annual reduction in streamflow volume of about 14.4 million acre-feet (Maf) at McNary of which about 8.4 Maf is due to withdrawals in the Snake River Basin. For perspective, the annual average streamflow volume for the Columbia River is about 135 Maf (as measured at The Dalles Dam). Most irrigation withdrawals are made in late spring and summer, with

a portion of withdrawn water returning to the river at downstream locations and at later dates. Conserving irrigation water and keeping it in the hydroelectric system increases both energy production and electric system revenue.

The Regional Technical Forum has developed savings estimates for measures to reduce water usage for irrigation. This reduction of water use not only saves electricity through reduced pumping requirements, but it also means that in many cases the saved water will stay in the river and produce additional hydroelectric generation. The added power system value of water that stays in the hydroelectric system could be used by the Council, the RTF, and others to more fully capture the benefits of these conservation measures. The attached report describes the methods used to assess the added power system benefit and provides results for various locations in the basin both in terms of both energy and revenue.

ANALYSIS:

For conserved irrigation diversions that stay in the system, every one-thousand acre-foot of water that passes through Grand Coulee and all downstream dams generates 1026 megawatt-hours of energy over the irrigation season. The same volume of water left in the system in the upper Salmon, the Walla Walla and the Deschutes areas generates 216, 147 and 46 megawatt-hours, respectively. Average power system revenues gained from conserved irrigation diversions at the sites listed above are roughly \$57, \$12, \$8 and \$3 per acre-foot, respectively (based on an average electricity price of \$55 per megawatt-hour). These savings are considered to be approximate because of simplifying assumptions used in the calculations. For example, irrigation water return rates were averaged over the general area of withdrawal. A more precise estimate would involve determining the return rate for a specific irrigation withdrawal site.

ALTERNATIVES:

- An alternative is to postpone the release of the paper and to have staff perform a more detailed analysis, focusing on specific irrigation withdrawal sites. However, this alternative would consume a significant amount of staff time and delay the release of these data by many months. In staff's opinion, the information provided in this paper is sufficient to allow the RTF and others to move forward with proposed measures.

ATTACHMENTS:

The Council's paper entitled, "White Paper on the Power-System Value of Conserved Irrigation Diversions" was sent to Council Members separately.