

Docket UE-110523  
Renewable Portfolio Standards Workgroup  
Consensus January 31, 2012

### **Incremental Hydro Electricity Calculation Methodologies**

Under certain circumstances, incremental electricity produced as a result of efficiency improvements completed after March 31, 1999 may qualify as an eligible renewable resource for purposes of compliance with Washington's Energy Independence Act, RCW 19.285.030(10)(b). There are a number of different methodologies that may be used to calculate the amount of incremental hydro electricity associated with efficiency improvements. This document summarizes these options.

#### **Considerations**

- Hydro modeling tools, requirements and methods may vary significantly across utilities and individual hydro projects due to, including but not limited to:
  - multi-jurisdictional requirements;
  - relative significance of hydro in each utility's portfolio;
  - plans for additional hydro improvements;
  - varying needs for hydro data and analysis tools; and
  - type of hydro project (storage vs. run of river).
- Renewable electricity generated by upgrades does not necessarily correlate with inflow
  - It may be possible to generate more renewable electricity in a poor water year than during a high water year
- Some methods for calculating incremental hydro provide more stable year-to-year renewable electricity quantities than others
  - Volatile quantities may lead utilities to acquire excess renewable electricity to ensure compliance in low years. This could lead to higher costs for customers.
  - Year-to-year stability is particularly important given the non-tradability of renewable electricity from hydro improvements. The inability to trade these attributes limits a utility's ability to use excess credits in surplus years to offset shortages in deficit years.
- The amount of renewable electricity from incremental hydro improvements will vary from year to year depending on the specific calculation method used. However, over time each of the methods outlined below can be expected to result in equal quantities.
- Given the differences in modeling tools, requirements and methods across utilities and between individual projects, each utility should select the method most appropriate to its projects, circumstances, and the improvements being quantified.

### Methods

- Each method considers the hydroelectric system configuration in two steady states
  - First, electricity produced by the system *without* incremental improvements is determined.
  - Second, electricity produced by the system *with* incremental improvements is determined.
  - The difference between the first and second state determines the incremental renewable electricity attributable to the improvements.
  
- Identified Method 1: Annual calculation using hydro model and actual inflows or generation
  - The difference between the two states determines the amount of renewable electricity available for that specific calendar year.
  - Requires an annual model run to determine amount of electricity that would have been produced without the improvements in each year.
  - Renewable electricity quantity may vary from year to year depending on inflow
  
- Identified Method 2: One-time calculation of renewable electricity *percentage* using an historical period of inflow or generation.
  - Historical inflow or generation based on minimum of 5-years, or up to the entire available inflow record or generation, as determined by the utility.
  - Electricity output in each state is calculated using a hydro model
  - The difference between the two states, as a percentage, is then applied to the actual generation in all future years to determine the available renewable electricity in each year
  - Renewable electricity quantity will vary from year to year depending on inflow
  
- Identified Method 3: One-time calculation of renewable electricity using an historical period of inflow or generation.
  - Historical inflow or generation based on minimum of 5-years or up to the entire available inflow record or generation, as determined by the utility.
  - Electricity output in each state is calculated using a hydro model
  - The difference between the two states, as a MWh value, is then used for future years as the available renewable electricity
  
- Other methods as determined by a utility and approved by the Commission
  
- Regardless of method chosen, for all projects completed after December 31, 2008, a utility or Commission Staff may request to update its studies after 5 years of actual operation.
  - Actual generation results can vary from modeling
    - Adjust updated results where the recent 5-year period does not reflect long-term inflow averages used in the modeling.

- Where study suggests a modification of renewable electricity quantities, such renewable electricity quantities shall be adjusted for future years; changes will not be retroactive into the past.
- Documentation
  - The increase in annual megawatt-hours of generation attributable to the qualified incremental hydropower efficiency improvements shall be documented by engineering studies or with before and after generation data. The documentation shall clearly explain where the facility is located, when the improvements were made, how the amount of incremental generation was calculated, what other factors might have caused an increase in electricity production and how the amount attributable to the qualified improvements was extracted from the total increase, how and why the qualified improvements increased hydropower production, and how the utility came to acquire the incremental output associated with the qualified improvements.