**How to Use the Rate Calculator**

The spreadsheet calculates indicative rate impacts for the utility as a whole and for non-DER customers, based on alternative rate structures, user-specified characteristics for the utility (e.g., load, sales, fixed and variable costs), and levels of DER penetration. The spreadsheet allows you to conduct what-if analyses for cost recovery and rate impacts under varying assumptions for utility characteristics and alternative rate designs. Below is a more detailed description of the inputs and results, and instructions on how to navigate the model.

A video tutorial on how to use the calculator is available at [https://youtu.be/rEBnBBORlPM](https://youtu.be/rEBnBBORlPM).

**General Instructions**

1. There are two tabs in the spreadsheet: Inputs and Results and Calculations. Input values only on the Inputs and Results tab. No user inputs are required on the Calculations tab.
2. Spreadsheet protection is enabled and users cannot alter formulas or values in locked cells, unless the protection is turned off.
3. The Inputs and Results tab contains one table with results and five brief input tables.
4. Input values only for non-shaded line items. Line items highlighted in grey are calculated by the spreadsheet.
5. The inputs in Table VI (Post DER Rate Design), allow one to evaluate the rate and revenue impacts shown on Table I (Results) across different rate design scenarios.
6. The inputs and calculations on Tables II – V yield the reference cases for the rate design scenarios described in Table VI. By adjusting the inputs in Tables II through V, users can assess the rate design scenarios across different reference cases.

**Rate Design Scenarios and Results**

The variables contained on tables II through V, which produce alternative reference cases are described in the next section. In this section, the results shown on Table I and the inputs for the post-DER rate design scenarios shown on Table VI are described.

1. **Table I – Results. Cells B3 through G9. Results Table (All Calculated)**
   - Column C shows average utility-wide rates
   - Column D shows average utility-wide volumetric rates
   - Column F shows average rates for non-DER customers
   - Column G shows total bills for non-DER customers
   - The pre-DER values are shown in row 5, the post-DER values in row 7, and the percent change from pre to post in row 9

2. **Table VI – Post DER Rate Design. Cells H12 through I22**
   - Cell I13 – Customer Charge $/month (input)
   - Cell I14 - Demand Charge $/kW/month (input)
   - Cell I15 - Volumetric charge $/kWh (calculated)
   - Cell I17 – Customer Benefit Options $/kWh (input)
By changing the inputs in Table VI, the results shown on Table I will change. For example, in a scenario where the Customer Charge (Cell I13), the Demand Charge (Cell I14), the DER Surcharge (Cell I19) are all set to zero, and the Customer Benefit Option (Cell I17) is set to “rate,” the results displayed on Table I show that the percent changes in utility-wide average rates, from pre-DER to post-DER, (Cell C9), utility-wide volumetric rates (Cell D9), non-DER average rates (Cell F9) and non-DER total bills (Cell G9) are all equal to 5.52%. But, if the Customer Benefit Option (Cell I17) is changed to “solve,” then the respective percent changes in utility-wide average rates and volumetric rates remain at 5.52%, while the percent changes in non-DER rates and bills both fall to zero. That is just one example of a variety of outcomes that are possible by altering the rate design parameters on Table VI.

On Table VI, the volumetric charge (Cell I15) is calculated by dividing the post-DER COS (less revenues from customer charges, demand charges and DER surcharges) by post-DER kWh sales. The Customer Benefit Option (Cell I17) sets the payment made to the DER customer from the utility for the DER output. Users input a specific $/kWh value or input “Rate,” “Solve,” or “VC.” If “Rate” is selected, the value in Cell C18 Customer Benefit is set equal to the pre-DER average retail rate. If “VC” is selected, the value in Cell I18 is set to the pre-DER volumetric charge. If “Solve” is selected, the Customer Benefit in Cell I18 is set to a $/kWh value that will leave the non-DER customers unharmed by the DER project. That is, the increase in average rates for non-DER customers (Cell F9, Table I) and total bills for non-DER customers (Cell G9 Table I), will be equal zero at that level of compensation for DER output. The DER Surcharge (Cell I19) captures payments, if any, from the DER customer to the utility associated with the DER project.

The inputs and calculations on Tables II – V are used to construct alternative reference cases for running the rate design scenarios in Table VI. The combination of rate design scenarios and alternative reference cases yields a wide range of possible outcomes that can be considered.

Reference Case Tables

1. Table II - General Utility Characteristics. Cells B12 through C17
   - Cell C13 – Peak Load (input)
     i. Model treats utility as single rate class, this input can be thought of as utility load or load for a particular rate class.
   - Cell C14 – Load Factor (calculated)
   - Cell C15 – Annual kWh output and sales (input)
   - Cell C16 – Customer Count (input). Number of customers before DER
- Cell C17 - Diversified Demand factor (input). Ratio of sum of individual customer non-coincident peaks (NCP) to coincident peak (CP)

2. Table III – Pre-DER Cost Profile. Cells B21 through C39
   - Cell C23 - Energy Cost $/kWh (input)
     i. Annual weighted average across all hours
   - Cell C24 - Capacity Cost $/kW/year (input)
     i. Conceptually a value like Cost of New Entry (CONE) or auction clearing price in organized capacity markets
   - Cell C25 – Variable T&D cost $/kW/year (input)
   - Cell C26 - Marginal Line Losses % (input)
   - Cell C27 – C02 Adder ($/kWh) (input)
     i. For jurisdictions where C02 emissions are priced
   - Cell C28 - Total Variable Cost $/kWh (calculated)
     i. Needs to be considered in conjunction with Cell F31 on Table V, “Change in T&D Fixed Cost
   - Cell C31 - Fixed Generation Cost, total annual expenditures (input)
   - Cell C32 - Fixed T&D Cost, total annual expenditure (input)
   - Cell C33 - Fixed Customer Cost, total annual expenditure (input)
   - Cells C34 through C39 - Various cost summaries (calculated)

3. Table IV – DER Project Characteristics. Cells E12 through F19
   - Cell F13 - Customer Charge ($/month) (input)
   - Cell F14 - Demand Charge ($/kW/month) (input)
   - Cell F15 - Volumetric Charge ($/kWh) (calculated)
   - Cells F17 and F19 – Revenue/rate summaries (calculated)

4. Table V – Pre-DER Rate Design. Cells E21 through F36
   - Cell F22 - Avoided kWh (% of Sales) (input)
   - Cell F23 - Avoided Energy (kWh) (calculated)
   - Cell F24 - Avoided kW, (% of Peak) (input)
   - Cell F25 - Avoided Customer of NCP (kW) (calculated)
     i. Diversified demand factor (Cell C17) times avoided peak kW (Cell F24)
   - Cell F26 - NCP Ratchet % of Change (input)
     i. Percent of avoided NCP capacity (Cell F25) that is retained for billing purposes
   - Cell F27 - Avoided/Deferred Variable T&D (kW) (input)
   - Cell F28 - DER Customer Count (input)
     i. Number of DER customers, whether retained or lost
   - Cell F29 - Change in Customer Count (input)
     i. Number of customers, if any, lost due to DER. Entered as a negative value
   - Cell F30 - Change in Generation Fixed Cost (Annual $) (input)
     i. By definition should be zero, but user has opportunity to input value if system configuration changes as a result of DER project
• Cell F31 - Change in T&D Fixed Cost (Annual $) (input)
  i. By definition should be zero, but user has opportunity to input value if system configuration changes as a result of DER project
• Cell F32 - Change in Customer Cost (Annual $) (input)
  i. Might be materialize if customer count changes
• Cells F35, F36 – Cost summaries (calculated)