CPE Elective Pay Model: Codebook

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Introduction

The CPE Elective Pay Model ("the model") allows users to model the financial parameters of renewable energy project development, customize for different project specifications, and judge the impact of different elective pay credit and bonus credit scenarios. In September, CPE published a report detailing how the model works—its assumptions, inputs, formulas, and outputs, alongside its capabilities and limits. The report also provides users with CPE's takeaways, particularly that the IRA's elective pay provisions substantially level the playing field between public and private renewable energy developers.

To make the model easier to use, CPE has built this Codebook, which allows users to quickly understand how the model's many input variables map to its many outputs. This Codebook is divided into three sections: model inputs, project inputs, and project outputs.

Section I, model inputs, focuses on the various tax credit and capital stack inputs and assumptions found primarily on the model's "Inputs" tab. Section II, project inputs, focuses on project specifications including but not limited to the type of energy project, its efficiency, its base cost, and how a developer would use elective payments, found primarily in the top-left of the model's "Wind" and "Solar" tabs. Section III, project outputs, focuses on the project's projected balance sheet and the summary statistics calculated from it, found on the right-side balance sheet table and bottom-left "model results" table on the model's "Wind" and "Solar" tabs.

Section I: Model Inputs

This Codebook separates model inputs into those for elective pay assumptions, price assumptions, and capital stack assumptions.

Note that inputs labeled "**Decision**" require the user to select between a fixed set of input options, and inputs labeled "**Calculated**" are the result of a function applied to previous inputs and, while they do not call for user customization, will be relevant in calculating model outputs.

Elective Pay and Tax Credit Assumptions

Default Credit (Decision)

Location: Inputs B1.

Definition: Users can choose between the Investment Tax Credit (ITC) and Production Tax Credit (PTC), the workings of which are explained in the report. The user's choice here will impact how bonus credits below are calculated and, if the user chooses ITC, the options they have to direct ITC

elective payments toward debt service or free cash. There are certain inputs in Section II that are factored into the model only if the user chooses ITC.

Base Elective Pay (Calculated)

Location: Inputs C2.

Definition: If a user chooses ITC as the Default Credit above, base elective pay is a percentage reflecting the sum of the ITC credit percentage and the percentage point additions from applicable bonus credit decision variables listed below. If a user chooses PTC for Default Credit above, base elective pay is a value, measured in dollars per kilowatt-hour of energy generated, reflecting the product of the PTC credit amount and the percent increases from applicable bonus credit decision variables listed below. Note that, either way, the Prevailing Wage decision variable substantially alters the base ITC credit percentage and base PTC credit amount.

Prevailing Wage (Decision)

Location: Inputs B3.

Definition: Choosing YES sets the base ITC credit percentage at 30% and the base PTC credit amount at $0.0275/kWh. Choosing NO sets the base ITC credit percentage at 6% and the base PTC credit amount at $0.005/kWh.

Note: These PTC values apply for the 2023 tax year and will need to be adjusted annually in line with IRS judgment and inflation.

Energy Community Bonus (Decision)

Location: Inputs B4.

Definition: Choosing YES adds the energy community bonus to a project developer's base elective pay credit, measured in percentage points for the ITC and percent for the PTC. Choosing NO does not add this bonus. The Departments of Energy and Treasury have identified which census tracts qualify as energy communities for the purpose of determining eligibility for this bonus credit.

Energy Justice Bonuses (Decision)

Location: Inputs B5.

Definition: Choosing LIC/TRIBAL applies that bonus to a project developer's base elective pay credits, measured in percentage points for the ITC and *not applicable to the PTC*. Choosing RESIDENTIAL/ECON BENEFIT applies that bonus to a project developer's base elective pay credits, measured in percentage points for the ITC and *not applicable to the PTC*. Choosing NO does

not add this bonus. The Department of Energy has identified which census tracts and project types can qualify for this bonus credit. To receive this bonus credit, a project must be under 5 MW in nameplate capacity.

Note: There is a 1.8 GW annual limitation on the aggregate capacity of projects applying for this set of bonus credits.

Domestic Content Requirement (Decision)

Location: Inputs B6.

Definition: Choosing YES applies the domestic content bonus to a project developer's base elective pay credits, measured in percentage points for the ITC and percent for the PTC. Choosing EXEMPTION does not add this bonus, but still allows the user to qualify for base elective payments and/or other bonuses. Choosing NO, however, eliminates any and all elective pay bonuses this project could earn.

Note: The Department of Treasury and the Internal Revenue Service (IRS) have not yet defined what counts as meeting domestic content requirements for the purpose of remaining eligible for elective payments, or what safe harbor exemptions from domestic content requirements will look like for project developers. For projects that do not meet domestic content requirements, existing law suggests that there is a penalty to the elective pay credit amount that increases each year until 2026, at which point it becomes a 100 percent penalty, zeroing out any potential elective pay credit revenue.

Base + Bonuses (Calculated)

Location: Inputs C7.

Definition: This input is the result of taking the value of Base Elective Pay and adding the above four bonus credits to it. Base + Bonuses is measured as a percent for the ITC and as a dollars per kilowatt-hour value for the PTC.

Tax-Exempt Financing Penalty (Calculated)

Location: Inputs B8:C8.

Definition: If Tax-Exempt "Muni" Debt (see the Capital Stack and Financing subsection below) has a share/weight of greater than 0, cell B8 will show YES, and cell C8 will output the minimum value between between 15% and the share/weight of Tax-Exempt "Muni" Debt in the capital stack. This value is a financial penalty to a project developer's base elective pay, measured as a percent of the Base + Bonus value above for both ITC and PTC, as per the Inflation Reduction Act and related tax credit laws. If the share/weight of Tax-Exempt "Muni" Debt in the capital stack is 0, cell B7 will show NO

and cell C7 will output 0%, applying no percent penalty to a project developer's base elective pay. Neither result alters Base Elective Pay or Base + Bonus above, but a YES in B7 will alter the result of Total Elective Pay below.

Total Elective Pay (Calculated)

Location: Inputs C9.

Definition: This input is the result of multiplying the value of Base + Bonus—which represents the transformation of the Base Elective Pay input by user decisions concerning bonus credits—with the penalty rate from that Tax-Exempt Financing Penalty input above. Total Elective Pay is measured as a percent for the ITC and a dollars per kilowatt-hour value for the PTC.

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Price, Inflation, and Cost

Energy Price Escalator

Location: Inputs B10.

Definition: Fixed annual rate of increase of energy sale price (which is a project input, found in Section II), usually determined in a power purchase agreement (PPA) contract between the project developer and an offtaker.

O&M Growth Rate

Location: Inputs B11.

Definition: Fixed annual rate of increase in both fixed and variable operation and maintenance costs (O&M) of a project (which is a project input, found in Section II).

Inflation Adjustment (PTC)

Location: Inputs B12.

Definition: Fixed annual rate of increase in PTC payment, applies only to projects using PTC (Section I, Default Credit).

Inflation Adjustment (RECs)

Location: Inputs B13.

Definition: Fixed annual rate of increase in renewable energy credit (REC) price, defined below, and applies only to projects using REC revenues (a decision variable in Section II).

Derat

Location: Inputs B14.

Definition: Fixed annual rate of deterioration, or "derate," of the project's energy output.

REC Price

Location: Inputs B15.

Definition: Price of renewable energy credits (RECs) on voluntary or compliance markets, calculated as the average REC price over the entire project, measured as dollars per megawatt-hour of energy generated adjustable over time with the Inflation Adjustment (RECs) input above.

% of REC Revenue to Developer

Location: Inputs B16.

Definition: Percent of revenue from renewable energy credit (REC) sales that accrues to the project developer. Because this model assumes that projects are primarily contracted through PPAs, which generally allocate a project's RECs to the power purchaser and not the project developer, the default value is assumed to be 0%.

Interconnection Costs

Location: Inputs B17.

Definition: Price of connecting a project to a wider energy grid, measured in dollars per kilowatt-hour of energy generated.

Misc Capex Adder

Location: Inputs B18.

Definition: Percent adjustment of project base costs (Section II) reflecting potential/unforeseen extra costs that a project developer may want to budget for. Inputting a percentage value here will increase project capital costs by that amount.

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Capital Stack and Financing

Use Default Capital Stack? (Decision)

Location: Inputs B19.

Definition: YES or NO choice determining project capital stack. If YES, the project uses Default WACC. If NO, the project uses Alternative WACC. Both defined and calculated below.

Green Bank Debt

Location: Inputs B21:C21.

Definition: Debt owed to a green bank, which, by virtue of public ownership and/or the bank's higher risk tolerance, is implied to offer loans at interest rates lower than private alternatives. B21 is the rate of interest on the debt, C21 is the weight/share of that debt in the project's overall capital stack.

Tax-Exempt "Muni" Debt

Location: Inputs B22:C22.

Definition: Debt financed by the issuance of a municipal bond, which, by virtue of being public debt, is implied to have lower interest rates than private alternatives. However, because bondholders' income from municipal debt is tax-exempt, the Inflation Reduction Act imposes a penalty on potential elective payments earned by projects which have secured this type of financing. B22 is the rate of interest on the debt, and C22 is the weight/share of that debt in the project's overall capital stack, which determines the scale of the Tax-Exempt Financing Penalty, calculated above.

Market (Taxable) Debt A

Location: Inputs B23:C23.

Definition: Debt owed to a private financial institution, which, by virtue of private sector actors' lower risk-tolerance and/or higher collateral requirements, is implied to have higher interest rates than the above public alternatives. B23 is the rate of interest on the debt, C23 is the weight/share of that debt in the project's overall capital stack.

Market (Taxable) Debt B

Location: Inputs B24:C24.

Definition: Same as above. This option is provided to users in case they wish to simulate a project developer that takes out loans from different private financial institutions to finance its project. B24 is the rate of interest on the debt, C24 is the weight/share of that debt in the project's overall capital stack.

Investor Equity (partially Calculated)

Location: Inputs B25:C25.

Definition: Return on equity expected by any equity investors in the project. Equity investments are usually highest-risk given that equity investors have no contractual right to consistent repayment the way debt investors do; this financial hierarchy is reflected in the high expected returns on equity / high cost of equity demanded by equity investors, paid out as equity dividends. B25 is the expected rate of return on an equity investment in the project, C25 is the weight/share of that equity investment in the project's overall capital stack. Note that C25 is a calculated input—its value depends on the difference between 100% and the sum total of the shares of the different types of debt investments above.

Default WACC (Calculated)

Location: Inputs B26.

Definition: Weighted average cost of capital (WACC), reflecting the average interest rate (percentage) on the financing sources secured by the project developer, calculated as the weighted average of the above rates and their weights in the capital stack.

Alternative WACC

Location: Inputs B27.

Definition: Weighted average cost of capital, customizable by the user, with the same technical attributes as above. If the user chooses NO on "Use Default Capital Stack?", the value inputted here is what the project uses as its WACC *regardless* of the capital stack inputs above.

% of Cash Equity Finance

Location: Inputs B28.

Definition: Percent of the project's total capital cost financed by cash already held by the project developer. Analogous to a down payment on a mortgage. Because this portion of the capital stack is contributed by the project developer and is not owed to any external financier, the developer does not need to take out debt on this portion of the capital stack, thereby lowering the total cost of financing the project.

Bridge Loan Rate

Location: Inputs B29.

Definition: Interest rate on debt incurred to finance the construction of the project, a period during which the project earns no revenues. Because construction is the riskiest phase of a project, bridge loan interest rates are usually higher than interest rates on debt in the project's capital stack. CPE's report outlines how project developers use bridge financing and refinance it into debt reflected in the capital stack, and explains how the model reflects this transition.

Cash Reserve Rate

Location: Inputs B30.

Definition: Banks may offer corporate depositors an interest rate for cash saved in their cash reserve accounts, analogous to the interest rate on a personal savings account. For a project developer that has positive cash flow (profits greater than zero) in a given year, model users can select a cash reserve rate for positive cash buffer balances.

Project Cash Buffer (PCB) Overdraft Rate

Location: Inputs B31.

Definition: Banks may penalize depositors for having negative account balances by charging them an overdraft rate. For a public project that has negative cash flow (profits less than zero) in a given year and must borrow to remain liquid, model users can set an overdraft rate to reflect how much borrowing to cover that cash flow deficit would cost annually. This input could also be interpreted as a concessional rate on borrowing directly from the state or from the rest of the public developer's balance sheet. If the rate is set to 0 percent, it can be interpreted as the state or public developer simply covering losses on an individual project.

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Section II: Project Inputs

This Codebook separates project inputs into those for wind and solar technologies, financing choices, project specs, and some constants.

Note that inputs labeled "**Decision**" require the user to select between a fixed set of input options, and inputs labeled "**Calculated**" are the result of a function applied to previous inputs and, while they do not call for user customization, will be relevant in calculating model outputs.

Many of the inputs in the Project Specs subsection are auto-populated with default data sourced from the "Costs and Performance" and "ATB CFs" tabs of the spreadsheet. The "Costs and Performance" tab provides default values for certain project specifications, sourced from EIA, The "ATB CFs" tab provides capacity factor estimations of the various technologies, sourced from NREL.

The Use Default? decision variable, the last input in the Financing Choices subsection, is of paramount importance in this section—what the user chooses here will determine if the model uses auto-populated default data in the Project Specs subsection or user-inputted specifications instead.

Wind Resources

Resource (Decision)

Location: Wind C1.

Definition: The user can choose between onshore wind ("Wind") and offshore wind ("Offshore"). The user's choice will alter most of the default project specification inputs based on data in the "Costs and Performance" and "ATB CFs" tabs of the model spreadsheet, given that onshore and offshore wind technologies have widely varying costs, efficiencies, and power generation capabilities.

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Solar Resources

Resource (Decision)

Input: Solar C1.

Definition: The user can choose between utility-scale solar PV ("Solar"), a solar and battery system ("Hybrid"), distributed non-peak solar energy generation ("DG"), and a battery ("Battery"). The user's choice will alter most of the default project specification inputs based on data in the "Costs and Performance" and "ATB CFs" tabs of the model spreadsheet, given that these solar and battery technologies have widely varying costs, efficiencies, power generation capabilities, and system designs.

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Financing Choices

RECs? (Decision)

Location: Wind/Solar C2.

Definition: The user can choose if the project earns revenue from the sale of renewable energy credits (RECs). If YES, revenue from RECs is added to the model's balance sheet output subject to REC financing assumptions selected on the "Inputs" tab (see Section I, subsection on Price, Inflation, and Cost inputs.) If NO, the model's balance sheet output displays $0 in revenue from RECs.

Reduce Project Debt with ITC Elective Pay? (Decision)

Location: Wind/Solar C3.

Definition: The user can choose if the elective pay disbursement that a project receives is used to immediately pay down the project developer's debt. Choosing YES on this decision variable only affects the project's financing if the user chose ITC instead of PTC in the "Inputs" tab (see Section I, subsection on Elective Pay and Tax Credit Assumptions inputs). If YES, some or all of elective pay disbursement, measured in dollar terms, is subtracted from the model's outstanding debt at the beginning of the year that the project begins operation. The amount of elective pay disbursement subtracted depends on the Percentage of ITC Elective Pay Used to Reduce Project Debt, an input the user can toggle in the Project Specs subsection,. If NO, the total elective pay disbursement is added to the project's cash flow for the year that the project begins operation. Both these outcomes will be explained in Section III.

Energy Price

Location: Wind/Solar B4:C4.

Definition: Power purchase agreement (PPA) price, measured in dollars per megawatt-hour of energy generated.

Discount Rate (Calculated)

Location: Wind/Solar C7.

Definition: The rate at which the project's future earnings over its useful life are discounted to judge their present value, which the model sets as exactly equal to the project developer's weighted average cost of capital (WACC), a model input chosen by the user in Section I. Users wishing to change the discount rate should adjust the capital stack inputs and/or the Alternative WACC input in Section I.

DSCR Viability Condition

Location: Wind/Solar C27.

Definition: Users can set the project developer's minimum debt service coverage ratio (DSCR), the minimum ratio of a project's net income to its debt payments that a project could achieve to be considered financially viable, measured as a numeric value set to 1 as a default. The value users input for DSCR will be compared against the model's Average DSCR output to determine whether a project is financially viable in the eyes of its developer. This output calculation will be explained in Section III.

Note: A value of 1 means that the project, to be considered as financially viable, needs to bring in exactly the amount necessary to cover costs and debt service. A DSCR less than 1 implies that the project receives external subsidy or that the developer draws on other revenues to break even. A DSCR greater than 1 implies that the project will earn more than it needs to meet its survival constraint.

Use Default? (Decision)

Location: Wind/Solar A9:A14.

Definition: The user can choose between a DEFAULT and ALTERNATE value for every single one of the inputs in the Project Specs subsection. If DEFAULT, then the project's specifications are set as defaults based on data in the "Costs and Performance" and "ATB CFs" tabs of the model spreadsheet, reflected in the "Model Value" column (C9:C14). If ALTERNATE, then the project's specifications are set as whatever values the user inputs in the "Alternate" column (D9:D14).

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Project Specs

The values for every single one of these project specs inputs depend on what the user chooses for the "Use Default?" decision variables above. Choosing DEFAULT for a selected row will set that row's project spec input variable to a default value based on data in the "Costs and Performance" and "ATB CFs" tabs of the model spreadsheet, reflected in the "Model Value" column (C9:C14). Choosing ALTERNATE for a selected row allows the user to set that row's project spec input variable themselves in the "Alternate" column (D9:D14).

Capacity Factor

Location: Wind/Solar C9:D9.

Definition: The project's actual energy output over a given time period divided by the project's theoretical maximum energy output over that time period, measured as a percent, proxying for its efficiency. Definition adapted from NREL.

Base OCC

Location: Wind/Solar C10:D10.

Definition: Overnight cost of capital (OCC) is a measurement of the project's cost as if it were built entirely in a night, without accruing interest, measured in dollars per kilowatt-hour. The "base" OCC data pulled from EIA does not include adjustments to the capital cost for technological viability or for region.

Base System Size

Location: Wind/Solar C11:D11.

Definition: The energy capacity of the project, measured in megawatts. This is analogous to the project's "nameplate capacity."

Fixed O&M

Location: Wind/Solar C12:D12.

Definition: Fixed operation and maintenance costs (O&M) for all energy projects include staffing, annual maintenance, telecommunication and sewer connections, maintenance, decommissioning, other forms of overhead and (for private entities) property taxation; these costs will be incurred even if the facility does not produce power. This input is measured in dollars per kilowatt-*year*. Definition adapted from NREL.

Variable O&M

Location: Wind/Solar C13:D13.

Definition: Variable O&M costs for all energy projects vary with operation and capacity factor but often include costs from starting and stopping a project's energy generation, disposing waste, and acquiring inputs and catalysts for chemical processes. However, these costs are generally zero for solar and wind systems. This input is measured in dollars per *megawatt*-hour. Definition adapted from NREL.

Percentage of ITC Elective Pay Used to Reduce Project Debt

Location: Wind/Solar C14:D14.

Definition: Regardless of whether the user has chosen DEFAULT or ALTERNATE for this percentage, this input only matters to a project if a user has chosen to use the ITC and has then chosen YES to Reduce Project Debt with ITC Elective Pay, a decision variable in the Financing Choices subsection. If both these conditions are met, the model multiplies this input's percentage value with the total ITC elective pay disbursement to calculate the amount of elective payment subtracted from the project's cash flow and used to immediately pay down the project's outstanding debt. These outcomes will be explained in Section III.

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Constants

There are some inputs that are not alterable without customizing the structure of the model's balance sheet output table. As such, they are described as constants for the purpose of the model version that CPE has published. While these are not true user inputs, they are relevant values in the formulas used

to generate model outputs described in Section III. Users should modify these constants and alter the balance sheet output table correspondingly if they believe these are unrealistic for their purposes.

Project Years

Location: Wind/Solar C5.

Definition: The project's assumed effective/useful life, measured in years, set by default to 30. This may not be a constant in future model iterations due to project heterogeneity.

Construction Years

Location: Wind/Solar C6.

Definition: The amount of years that the project is under construction and is not generating any revenue, set by default to 2 for solar or 3 for wind.

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Section III: Model Outputs

This Codebook separates model outputs into those for the model's balance sheet output table and the model's calculated summary statistics, both found on the "Wind" and "Solar" tabs of the spreadsheet. The balance sheet output table comprises cells E1:AM26. The summary statistics table comprises cells B16:C25.

Balance Sheet

Period

Location: Wind/Solar F1:AM1.

Definition: The life of the project measured in periods, not years, starting at 0. Maps to years and is used to calculate various other outputs below.

Stage

Location: Wind/Solar E2:AM2.

Definition: Status of the project, from planning ("Entry") to construction ("Construction") to operation ("Operation"). The project earns no revenue in the first two stages and receives elective pay disbursements only after it begins operation.

Year

Location: Wind/Solar E3:AM3.

Definition: The life of the project measured in present-day years, not periods. Maps to periods but is not used to calculate other outputs. Useful as an identifier for users simulating project development in real time.

Capex

Location: Wind/Solar E4:AM4.

Definition: Capital expenditure on the project, measured in dollars, calculated as the product of Base OCC, Base System Size, and Misc Capex Adder. The first two are project inputs described in Section II, and the third is a model input from Section I.

Cash

Location: Wind/Solar E5:AM5.

Definition: Portion of capital expenditure financed by cash equity (cash that a project developer has on hand to finance part of a project, analogous to a down payment), calculated as the capex above multiplied by the percentage of the project financed by cash equity (% of Cash Equity Finance).

Elective Pay

Location: Wind/Solar E6:AM6.

Definition: Elective payment from the IRS to the project developer. If the user has chosen ITC, the elective payment is a lump sum disbursed in the project's first year of operation and is dependent on the project's capital expenditure amount. If the user has chosen PTC, the elective payment is disbursed over the project's first ten years of operation and is dependent on the project's output.

Bridge Loan

Location: Wind/Solar E7:AM7.

Definition: The amount that project developers borrow to finance their project's construction and interconnection, before the project is placed in operation and can earn revenues. Accrues interest. Developers will refinance these loans during the first year of the project's operation, after which repayment is subject not to the Bridge Loan Rate, but to the WACC (see Section I).

Fixed O&M

Location: Wind/Solar E8:AM8.

Definition: Fixed annual O&M costs over the life of the project, subject to the O&M Growth Rate model input.

Interconnection

Location: Wind/Solar E9:AM9.

Definition: Costs of connecting energy project to the wider energy grid, if applicable. The model assumes that interconnection costs are only incurred over the two years of the project's construction.

Total Costs

Location: Wind/Solar E10:AM10.

Definition: This row aggregates the above expenditures and revenues—Capex minus Cash, minus Elective Pay, minus Bridge Loans, plus Fixed O&M, plus Interconnection—to produce an annual cost projection over each year of the project's assumed 30-year useful life. Costs are represented here as positive values, rather than negative values. Until the project begins operation, this output should usually read as $0 due to the fact that the Bridge Loan and Cash amounts should perfectly offset Capex, Fixed O&M, and Interconnection.

Output

Location: Wind/Solar E11:AM11.

Definition: The project's annual output, calculated by multiplying the project's capacity factor with the project's base system size and the number of hours in a year (8760), measured in megawatt-hours, subject to adjustment by the annual Derat model input.

Energy Price

Location: Wind/Solar E13:AM13.

Definition: The price of energy sold as per the PPA signed between the project developer and the offtaker, measured in dollars per megawatt-hour, subject to adjustment by the annual Energy Price Escalator model input.

Gross Revenue

Location: Wind/Solar E14:AM14.

Definition: The project's gross annual revenue, measured in dollars, calculated by multiplying the project's output in a given year with that year's energy price. The project only begins earning revenue in its first year of operation.

RECs

Location: Wind/Solar E15:AM15.

Definition: The project's annual revenue from REC sales, measured in dollars, calculated by multiplying the project's energy output with the REC Price model input and with the % of REC Revenue to Developer model input. This output is a nonzero value only if the project utilizes RECs in the first place, a decision variable described in Section II, on Project Inputs.

Variable O&M

Location: Wind/Solar E16:AM16.

Definition: The project's annual variable O&M, measured in dollars, calculated by multiplying the project's Variable O&M cost input with the project's energy output. This output will usually be zero given that renewable energy technologies incur little to no variable O&M costs.

Net Income

Location: Wind/Solar E17:AM17.

Definition: The project's annual income, measured in dollars, calculated as the following: Gross Revenue plus RECs minus Total Costs minus Variable O&M. Until the project begins operation, this output should usually read as $0 due to two factors: not only are Total Costs usually $0 until the project begins operation (see above), but Gross Revenue and REC revenue are also $0 until the project begins operation.

Debt Outstanding (Beginning of Year)

Location: Wind/Solar E18:AM18.

Definition: The project's outstanding debt at the beginning of the given year, measured in dollars. During a project's operating periods, this output is equal to Debt Outstanding (End of Year) *in the previous year*. During a project's entry period, this output is equal to the amount taken out as a Bridge Loan that year, and, during a project's construction periods, this output is equal to the sum of this output *in the previous year* and any amount taken out as a Bridge Loan that year—likely for interconnection purposes.

Interest

Location: Wind/Solar E19:AM19.

Definition: Interest accrued on a project's Debt Outstanding (Beginning of Year), measured in dollars. During a project's construction periods, this output is equal to the Debt Outstanding (Beginning of Year) in that year multiplied by the Bridge Loan Rate model input. During a project's operating periods, this output is the result of the Excel IPMT function, which uses the current Period of the project, the Discount Rate project input, the Debt Outstanding (Beginning of Year) in the current year, and the project's useful life to output the total interest a project developer pays to its creditors that year.

Principal

Location: Wind/Solar E20:AM20.

Definition: Principal payments on a project's Debt Outstanding (Beginning of Year), measured in dollars. During a project's construction periods, this output is usually $0 given that bridge loans do not require regular principal payments until maturity date. During a project's operating periods, this output is the result of the Excel PPMT function, which uses the current Period of the Project, the Discount Rate project input, the Debt Outstanding (Beginning of Year) in the current year, and the project's useful life to output the principal payments a project developer pays to its creditors that year. This principal payment reduces the total stock of debt remaining at the end of each year, reflected in Debt Outstanding (End of Year) below.

Debt Outstanding (End of Year)

Location: Wind/Solar E21:AM21.

Definition: The project's outstanding debt at the end of each year, measured in dollars, calculated as Debt Outstanding (Beginning of Year) minus Principal for each year of the project's assumed useful life (a term which corresponds to Project Years, a constant in Section II). This output is rolled over into the next year's Debt Outstanding (Beginning of Year).

Debt Service

Location: Wind/Solar E22:AM22.

Definition: The project's annual debt service costs, measured in dollars, calculated as the sum of Principal and Interest payments in each year of the project's assumed useful life (a term which corresponds to Project Years, a constant in Section II).

Debt Service Coverage Ratio

Location: Wind/Solar E23:AM23.

Definition: The Debt Service Coverage Ratio (DSCR) is the ratio of the project's annual net income to its annual debt service payments.

Net Cashflow

Location: Wind/Solar E24:AM24.

Definition: The project's net cash flow, measured in dollars, is calculated as the project's annual net income minus its annual debt service payment.

Project Cash Buffer

Location: Wind/Solar E25:AM25.

Definition: The project's cash buffer is the amount of cash the project developer has on hand at the end of each year. Its calculation depends on the Cash Reserve and Overdraft Rate model inputs. If Project Cash Buffer output *in the previous year* is greater than zero, the project developer earns the Cash Reserve Rate on the cash buffer amount and calculates Project Cash Buffer output *in the current year* by adding the current year's Net Cashflow to the product of the Cash Reserve Rate and Project Cash Buffer *in the previous year*. If Project Cash Buffer output *in the previous year* is less than zero, the project developer incurs an Overdraft Rate on the cash buffer amount and calculates Project Cash Buffer output *in the current year* by adding the current year's Net Cashflow to the product of the Overdraft Rate and Project Cash Buffer *in the previous year*.

Project Cash Buffer (PCB) as % of Capital Expenditure

Location: Wind/Solar E26:AM26.

Definition: The project's cash buffer as a percentage of capital expenditure, measured as a percent, is calculated by dividing each year's Project Cash Buffer by the initial capital expenditure output in the project's entry stage. Note that this percent is approximate as the initial capital expenditure does not include interconnection costs.

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Summary Statistics

Lifetime Output

Location: Wind/Solar C17.

Definition: Total energy output of the project, measured in megawatt-hours, calculated as the sum of the project's energy output across all years of its assumed useful life.

Elective Pay NPV

Location: Wind/Solar C18.

Definition: Net present value of the total elective payment amount earned by the project, measured in dollars, calculated as the sum of all elective payments over all years of the project's assumed life discounted by the Discount Rate project input.

Unsubsidized Simple Levelized Cost of Electricity

Location: Wind/Solar C19.

Definition: The simple levelized cost of electricity (sLCOE), measured as dollars per megawatt-hour, represents the project's average lifetime cost of producing electricity. This output is labeled unsubsidized because, as opposed to the subsidized sLCOE below, it does not offset the project's Capex with elective payment earnings. The equation detailing how sLCOE is calculated can be found in the CPE report on the model.

Subsidized Simple Levelized Cost of Electricity

Location: Wind/Solar C20.

Definition: The simple levelized cost of electricity (sLCOE), measured as dollars per megawatt-hour, represents the project's average lifetime cost of producing electricity. This output is labeled subsidized because, as opposed to the unsubsidized sLCOE below, it offsets the project's Capex with elective payment earnings. The equation detailing how sLCOE is calculated can be found in the CPE report on the model.

Capital Recovery Factor

Location: Wind/Solar C21.

Definition: The project's capital recovery factor (CRF) is the ratio of loan payments over the lifetime of the project to the net present value of those payments. The equation detailing how CRF is calculated can be found in the CPE report on the model.

Subsidized OCC

Location: Wind/Solar C22.

Definition: The project's subsidized OCC, measured in dollars per kilowatt-hour, represents the project's overnight cost of capital as if it were offset by elective payments. The model calculates this output by subtracting the Elective Pay NPV output from Capex in the balance sheet output table and dividing that value by the project's size (Base System Size).

Minimum DSCR

Location: Wind/Solar C23.

Definition: The project's minimum debt service coverage ratio is the lowest annual Debt Service Coverage Ratio output found in the balance sheet output table (see the previous subsection) over the operating lifetime of the project.

Average DSCR

Location: Wind/Solar C24.

Definition: The project's average debt service coverage ratio is the average of its annual Debt Service Coverage Ratio output found in the balance sheet output table (see the previous subsection) over the operating lifetime of the project.

Note: A value of 1 means that the project, to be considered as financially viable, needs to bring in exactly the amount necessary to cover costs and debt service. A DSCR less than 1 implies that the project receives external subsidy or that the developer draws on other revenues to break even. A DSCR greater than 1 implies that the project will earn more than it needs to meet its survival constraint.

Project Viability

Location: Wind/Solar C25.

Definition: The model outputs YES if the project's Average DSCR output is greater than the DSCR Viability Condition project input (see the Financing Choices subsection of Section II) and NO if the project's Average DSCR output is less than the DSCR Viability Condition project input.