Energy Escalation Rate Calculator (EERC)
User Guide

Summary

The Energy Escalation Rate Calculator (EERC) computes a compound annual average rate of escalation for a specified time period, which can be used as an escalation rate for contract payments in Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs). These escalation rates are based on energy price projections from the Department of Energy (DOE) Energy Information Administration (EIA). While the underlying energy price projections vary from year to year, for calculating contract payments the single EERC-calculated uniform average rate is preferable. The rate is stated in real (excluding inflation) and nominal (including inflation) terms and weighted by the share of each of the energy types used in the project. Alternatively, an escalation rate for each energy type can be computed separately.

EERC was redeveloped in 2025 to match the Building Life Cycle Cost (BLCC) web application design and included two significant changes. First, an option for "Data Release Year" has been included, which allows a user to see compound annual average escalation rates from previous release years to validate analysis that used an older version of EERC. The current version includes data for 2024 and 2025. Second, the option to include an explicit economic cost for energy-related emissions was removed from EERC because the EIA projections used by EERC already internalize emissions market impacts on regions of the country for which emissions trading markets influence the energy markets.

EERC prompts the user for:

- data release year
- customer sector type
- project location (state)
- fuel type
- contract start date
- duration of contract
- annual inflation rate

Default values are provided for the inflation rate (based on annual supplement value). The discount rate is fixed based on the Annual Supplement.

Based on the user inputs, EERC retrieves the relevant energy price forecasts and computes the compound annual average escalation rate, as described above. Since the performance period generally begins a year or more later than the contract award date, the calculated compound annual average rate includes the price escalation for the intervening year(s). Escalation is assumed to take place during this period.

The calculated compound annual average escalation rate is reported in both real (excluding inflation) and nominal (including inflation) terms. The energy price projections for all scenarios exclude inflation and thus generate real rates. The default inflation rate used in the EERC is the long-term inflation rate calculated annually by NIT for DOE Federal Energy Management Program (FEMP) using the average annual inflation estimates for the next 10 years from the White House Council of Economic Advisors (CEA) Analytical Perspectives and the methodology described in 10 CFR 436 Subpart A, but without consideration of the 3.0 % floor for the real discount rate. The default inflation rate does not account for the discount rate floor to accommodate the need for market-based projections of future energy prices in contract negotiations. Otherwise, the default inflation rate would be artificially low in years when the 3.0 % floor applies.

Inputs and Outputs

Data and Fuel Rate Information:

- *Data Release Year*: Year of the Annual Supplement data used for the calculation.
- *Sector*: Selection of commercial or industrial sector determines the type of utility rate schedule applied to the energy cost calculation.
- *Project Location (state)*: Selection of the state in which the project is located allows the program to select the energy price escalation rates for the corresponding census division.
- *User must make a selection of all three inputs*

Percent of Energy Cost Savings:

- Percentage of energy cost savings in dollars that is attributable to one or more of the fuel types used in the project. This input is used to weight the escalation rate.
- Default values are zeros
- *Inputted values must sum to 100%*

Contract Term:

- *Contract Start Date*: Year of contract award/signing.
    - *User must select a start date year*
    - *Options are limited to the next 4 years*
- *Duration*: Number of years of the contract term.
    - *User must make a selection for the duration*
    - *The duration is limited between 10 years and 25 years*

Annual Inflation Rate:

The default rate of inflation is the long-term inflation rate calculated annually by DOE/FEMP using CEA data and the method described in 10 CFR 436 Subpart A, but without consideration of the 3.0 % floor for the real discount rate. The default inflation rate does not account for the discount rate floor to accommodate the need for market-based projections of future energy prices

in contract negotiations. Otherwise, the default inflation rate would be artificially low in years when the 3.0 % floor applies. The inflation rate may be edited.

- *The tool makes all the calculations using the default inflation rate*
- *If the user decides to change the inflation rate, the calculations should be re-created.*

Output - Annual Energy Escalation Rates:

- *Real and Nominal Escalation Rates*: The output of the program is the calculated average escalation rate, stated both in real terms (excluding the rate of inflation) and in nominal terms (including the rate of inflation).

Functions

To calculate the nominal escalation rate, which includes inflation, the calculator uses the following relationship:

$$r_{nominal} = (1 + r_{real}) * (1 + r_{inflation}) - 1$$

The calculated compound annual average escalation rate, e_{avg}, when applied to the base-year energy costs or savings of ESPC or UESC projects, results in approximately the same undiscounted total amounts over the performance period as do the EIA-projected, or adjusted EIA-projected, variable rates. If more than one fuel is used in the project, the EERC weights the average escalation rate according to the proportions stated by the user.

To compute a compound annual average escalation rate, base-year (i.e., award year) energy costs are escalated from year to year at rates projected by EIA to arrive at the total energy cost over a given performance period. The escalation rates, e, are projected by census division, energy type, and industrial sector and vary from year to year. The formula used EERC prompts the user for information on the share of cost savings attributable to each fuel type, project location, industry sector, and the beginning date and duration of the performance period. Then it retrieves the relevant energy price forecasts and computes the compound annual average escalation rate, as described above.

The formula to calculate total energy costs is:

$$C = (1 + e_1) * A + (1 + e_1) * (1 + e_2) * A + \cdots + (1 + e_1) * (1 + e_2) * \ldots * (1 + e_n) * A$$

where
C is the undiscounted total of future energy costs over the performance period
A is the base-year annual cost
e_i is the annual escalation rate, which varies from year to year over the performance period
n is the number of years in the performance period

When the escalation rate is the same in each year of the study period, the series can be simplified to a factor applied to the base-year annual cost, A:

$$C = \left[\frac{(1 + e_{avg})^{n+1} - (1 + e_{avg})}{e_{avg}}\right] * A$$

where e_{avg} is the compound annual average escalation rate

Since a uniform escalation rate is needed to compute the contract payments in ESPC and UESC projects, the EERC uses this equation to approximate *C*, as calculated with EIA rates or adjusted EIA rates, and iteratively solves for e_{avg}, the compound annual average escalation rate. The relationship between the factor calculated in the equation and the variable escalation rates in the series can be expressed as follows for a performance period of *n* years duration:

$$\left[\frac{(1+e_{avg})^{n+1}-(1+e_{avg})}{e_{avg}}\right] = (1+e_1)+(1+e_1)(1+e_2)+\cdots+(1+e_1)(1+e_2)\ldots(1+e_n)$$

Data Tables

The data tables include the Encost file published as part of the Annual Supplement to Handbook 135 that includes the EIA energy price projections for each fuel type over time. These data tables are called on by the code, will stay constant over time in term of format, but the data is updated annually.