U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Guidance on Utility Rate Estimations and Weather Normalization in Performance Contracts

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FEMP
Federal Energy Management Program

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Foreword

This guidance document explains how to use estimated energy and water rates and normalized weather data in determining payments under a federal energy savings performance contract (ESPC) or utility energy service contract (UESC). This is DOE's official guidance for agencies in determining energy and water escalation rates for ESPCs and UESCs.

Contacts

For questions related to this guidance:

Kurmit.Rockwell@EE.DOE.GOV

List of Abbreviations and Acronyms

DOE	Department of Energy
EIA	Energy Information Administration
ESCO	Energy service company
ESPC	Energy savings performance contract
FEMP	Federal Energy Management Program
IDIQ	Indefinite delivery, indefinite quantity (an umbrella ESPC issued by DOE)
NIST	National Institute of Standards and Technology
PNNL	Pacific Northwest National Laboratory
UESC	Utility energy service contract

1 Introduction

1.1 Purpose

The use of estimated energy rates[1] and normalized weather[2] data in determining energy service company (ESCO) payments under an energy savings performance contract (ESPC) is permitted under an ESPC. This document provides guidance for agencies and ESCOs in determining escalation rates[3] and addressing weather normalization. Agencies and utilities implementing performance contracts under a utility energy service contract (UESC) will find this guidance useful, as well.

1.2 Authority

The National Energy Conservation Policy Act (NECPA), as amended, establishes the authority for ESPCs (*see* 42 U.S.C. § 8287 *et seq.*). The regulations implementing the statutory authority are located at 10 C.F.R. Part 436, subpart B. Agencies have authority to enter into UESCs consistent with 42 U.S.C. § 8256 (civilian agencies) and 10 U.S.C. §§ 2913 (gas and electric) and 2866 (water) (defense agencies).

2 Guidance

2.1 Energy Escalation Rate Determination and Weather Normalization

Section 801(a)(2)(B) of NECPA states that an ESPC provide for a guarantee of savings to the agency and requires the establishment of payment schedules reflecting such guarantee. *See* 42 U.S.C. § 8287(a)(2)(B); 10 C.F.R. § 436.35(a)(4)-(5) (2018). The ESPC authority also requires that the contract specify the terms and conditions of any government payment and mandates annual energy audits to ensure that ESPC projects are achieving the established savings guarantee. *See id.* at 8287(a)(2)(A); 10 C.F.R. § 436.37. Given that ESPCs rely on estimates of future conditions, the statute allows for agencies to rely on utility rate estimates in ensuring that energy savings exceed aggregate annual payments in each year of the ESPC. *See* 42 U.S.C. § 8287(a)(2)(B).

To the extent that relevant utility rates have been established and are available to a federal agency upon entering a performance contract, these rates should be used to calculate performance period payments wherever possible. For example, if a site has entered into a power purchase agreement (PPA) for a period of

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[1] For the purpose of this guidance, "energy rates" includes rates for energy, energy-related costs, water, water-related costs, and wastewater treatment.

[2] "Weather normalization" is a method to enable a like-for-like comparison of energy consumption from different periods. Generally, weather normalization factors out variations in outside air temperature to allow for a fairer comparison of energy performance.

[3] The escalation rate is the rate of change in price for a particular good or service (as contrasted with the inflation rate, which is an average for all goods and services).

years within its ESPC's term, the PPA rates should be used to calculate savings under the ESPC during the period covered by the PPA.

To the extent that payments will rely on projected energy rates, FEMP recommends that agencies rely on the Energy Escalation Rate Calculator (EERC)[4] in establishing future energy rates for the purposes of determining the value of energy savings (and thus payments to ESCOs). EERC, a cost calculator for estimating escalation rates in ESPCs, has been developed under a FEMP contract with the National Institute of Standards and Technology (NIST) to develop life-cycle costing tools for the purposes of federal energy management. EERC incorporates the projections of DOE's Energy Information Administration (EIA) for changes in future energy prices in various regions of the country. It also incorporates a default long-term inflation rate that is annually developed by the President's Council of Economic Advisers and incorporated by NIST; this should not be altered, as it represents the government's best estimate of future inflation. To the extent that EERC allows for adjustment due to potential carbon pricing, calculation of contractor payments in ESPC and UESC projects may include such adjustments only to the extent that the applicable energy rates are influenced by an existing carbon pricing regime. Carbon pricing that is speculative must not be included in the contractor payment calculation. FEMP has determined that EERC provides a credible estimation of changes in future utility rates.

For energy- or water-*related* expenses – such as those for expected operations and maintenance labor or repair and replacement parts – escalation of prices over the term of a performance contract may also be warranted. In these cases, in the absence of compelling evidence to the contrary, the long-term general inflation rate as forecast by the President's Council of Economic Advisers (CEA), as found in NIST's current EERC software[5], is a logical escalator.

On the separate but similar issue of weather forecasting, use of normalized weather data is permissible when determining savings (and thus payments) under an ESPC or UESC. Under the ESPC regulations (10 C.F.R. § 436.37(b)(6)), when estimating energy savings, energy usage can be adjusted to account for weather. This is also allowable for UESCs. There are several tools available for executing this normalization, such as NREL's "Typical Meteorological Year" data[6].

If a performance contract relies on projected energy costs or normalized weather data in determining contractor payments, the projected energy costs and normalized weather data must be included in the terms of the ESPC or UESC.

2.2 Water and Sewer Escalation Rate Estimation Methods

Determining appropriate forecasts of water and sewer price rates is necessary for performance contracts that include water conservation measures, but this can be more difficult than ascertaining comparable rates for various forms of energy. While the EIA forecasts changes in energy prices (see above), no governmental

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[4] https://energy.gov/eere/femp/energy-escalation-rate-calculator-download

[5] This inflation forecast is derived by NIST from the current year's *Analytical Perspectives: Budget of the U.S. Government*, which includes CEA's year-by-year inflation forecasts in its "Economic Assumptions" table. It is the default inflation rate provided annually in NIST's EERC software tool.

[6] https://nsrdb.nrel.gov/tmy

organization projects changes in water and sewer prices. Delivered energy prices are primarily governed by underlying commodity prices, whereas infrastructure projects typically drive the variances in prices across water and sewer service providers. FEMP has worked with Pacific Northwest National Laboratory (PNNL) to provide guidance on three viable options to forecast water and sewer price escalation rates (listed in the order to be considered, and of expected accuracy):

1) **Direct forecast from serving utility:** The preferred source for price projections is the serving water/sewer utility. Contact the serving utility to determine if there are any forecasts of future water and sewer rate changes, whether published or via a written statement or other documentation from the utility. If possible, obtain year-specific price escalation rates, rather than a multi-year average. Where only a portion of the project term is covered by the utility's projections, apply to those years of the term only and then address the remainder of the term using method 2 or 3, below.

2) **Historical rate data, with cap:** Absent a forecast from the serving water/sewer utility, the next best method with which to forecast water and sewer prices is to look to past local rate changes as a general prediction for future ones. To determine historical annual rates of change, collect the most recent eight years of billing statements or rate data from the local utility and use this general formula to calculate an annual average escalation rate:

$$Annual\ Average\ Escalation\ Rate = \left(\frac{Final\ Year\ Rate}{First\ Year\ Rate}\right)^{\frac{1}{(Final\ Year - First\ Year)}} - 1$$

Example calculation:

- 2010 water rate = $3.40 per thousand gallons (kgal)
- 2018 water rate = $4.40/kgal
- Annual average escalation rate = ($4.40 / $3.40) ^ (1 / (2018 – 2010)) – 1 = 3.28%.

Using this method, maximum annual average escalation rates should be capped at 4.1% for water supply and 3.3% for wastewater. These represent average price increases from a 2017 FEMP report based on a study by PNNL of U.S. water and sewer utility rates from 2008 to 2016.[7] For example, if the calculated annual average rates for water and sewer are 3.15% and 3.5%, respectively, use 3.15% for water, and 3.3% for sewer, or develop a weighted average using the respective water and sewer volumes. These caps have been instituted to avoid potential overestimation of price escalations when employing historical rate data to predict future rates.

Other key requirements of this option:

- Use *marginal* rates (typically $/kgal or $/hundred cubic feet (CCF)), rather than *average* rates. Do not simply take a bill total and divide it by total usage to obtain an average rate. Rather, obtain the *volumetric* charge for water (and sewer, as relevant), which should be derived from the bill or provided by the serving utility in its rate schedule. In some cases average and marginal rates can differ tremendously, and water efficiency projects avoid costs at the marginal rates; the sometimes large fixed components of water and sewer bills remain unaffected.

[7] FEMP. 2017. Water and Wastewater Annual Price Escalation Rates for Selected Cities across the United States. DOE/EE1670.

- If monthly rates differ within a calendar year, make sure the beginning and ending month are identical. For example, if the most recent month available is January, 2018, the starting rate should be that of January, 2010.
- Calculate water and sewer price escalation rates separately (though the two can be combined into an average for water conservation measures where the volumetric water savings is the same for each bill).

3) **Historical Consumer Price Index data:** If projections via the first two options are not possible, projects should default to using the current long-term general inflation rate forecast of the President's Council of Economic Advisers.

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