2024 IECC Residential Cost Effectiveness Analysis Proposal

This proposal is similar to the 2015 DOE cOCt 12 7Mro -1.3.1 (An)1 (aly)-1 ((al im(h)1 (o)3 (t). (cO)3 dilar t)1 l t

interest rate in nominal terms. Because mortgage prepayment is an investment available to consumers who purchase homes using financing, the mortgage interest rate is a reasonable estimate of a consumer's alternative investment rate.

The calculator tool therefore provides results at the 3% and 7% real OMB discount rates, as well as the 3% nominal discount rate used in the National Cost Effectiveness of the Residential Provisions of the 2021 IECC[6], which is based on the 2015 DOE cost analysis methodology.

Given the high standard deductible for federal income taxes ($25,900 for joint filers), it is assumed that the increase in mortgage payments does not result in a change in income taxes. It is also assumed that proposed measures have a minimal impact on property assessments for local taxes, so changes in property taxes are assumed to be zero. Property tax assessments tend to be based on high-level data points, such as floor area, general condition, location, number of bedrooms and bathrooms, presence of air conditioning, and types of wall and floor finishes. It is not clear that the cost of efficiency-related features will result in an identical increase in property-tax valuation, and the DOE methodology document provides no supporting evidence for the assumption that it will.

Estimates of measure costs should be clearly documented and adhere to accepted practices. Potential sources include recent published studies, surveys of retailer prices, RS Means residential cost data, and expert judgement. Cost estimates should be regionalized when appropriate. For measures that have an expected life of less than the 30-year analysis period, a cost for replacement should be assigned to the expected year this will occur.

For savings, the reduced or increased energy consumption produced by building energy modeling or other calculations are used to calculate annual changes in energy costs based on forecasted energy prices. Energy consumption calculations should be documented and reflect standard accepted practices. Change in energy consumption should be calculated for each climate zone unless it can be demonstrated that climate does not substantially impact savings. Cost-effectiveness can then be calculated for each climate zone. If needed, an overall cost effectiveness can then be calculated by weighting the results appropriately for each climate zone. The social cost of avoided carbon emissions can be included in the savings. It is calculated using EIA emissions factors and the cost data from the Interagency Working Group on Social Cost of Greenhouse Gases.

Electricity and natural gas, and optionally propane, should be represented proportionately to their expected use as a heating fuel in the area under study. For measures that have an expected life of less than the 30-year analysis period, the residual value of the replacement measure is assigned as a positive cashflow in year 30 based on a straight-line depreciation. Changes in non-energy operating costs, such as increased or decreased maintenance associated with a measure are not included unless they are deemed significant for a particular measure.

---

[6] Salcedo et al, National Cost Effectiveness of the Residential Provisions of the 2021 IECC https://www.energycodes.gov/sites/default/files/2021-07/2021IECC_CostEffectiveness_Final_Residential.pdf

Energy prices used to calculate savings are based on national averages of projected prices. The use of regional prices was investigated, but overlaying EIA regional prices onto IECC climate zones, which have substantially different borders, adds a significant increase in difficulty.

The following table summarizes the parameters needed for the LCC modeling and their sources:

Parameter	**Value**	**Source**
Mortgage Interest Rate	3.0% nominal	DOE 2021 Cost Effectiveness A
Loan Term	30 years	DOE 2021 Cost Effectiveness A
Down Payment Rate	12%	DOE 2021 Cost Effectiveness A
Points and Loan Fees	1%	DOE 2021 Cost Effectiveness A
Discount Rate	3.0% nominal	DOE 2021 Cost Effectiveness A
Period of Analysis	30 years	
Property Tax Rate	Not used	

First cost for measures		Sources must be documented. (Potential sources include recent published studies, surveys of retailer prices, RS Means residential cost data, expert judgement.)
Change in energy consumption as compared to baseline		Sources must be documented. Building energy modeling or other calculations that use standard accepted practices. Calculated for each climate zone unless it does not substantially impact savings.
Changes in non-energy operating expenses	Assumed to be zero unless warranted for a specific measure	
Social cost of carbon	$51 per metric ton in 2020 (@3% real discount rate)	Interagency Working Group on Social Cost of Greenhouse Gases[13]