

Strengths:

- DCF analysis reflects how market participants think about the time value of money.
- The method has been used by appraisers for commercial properties and has proven to be reliable if applied with good data.
- Present value is easily developed with current online software for homeowners and other real estate professionals. For example, PV Value is a free online software tool used for developing the DCF of energy produced for solar PV systems (available from Sandia National Laboratories at <http://energy.sandia.gov> and discussed in depth in Chapter 6 of this book). Also, a number of solar calculators that provide energy production estimates, payback, and costs are available online for use in California. However, they may not be a true reflection of the payback or costs for a new system.* The California tools should be reviewed for credibility and understood before being relied on for developing market value opinions, as should be done with all tools.
- The present value of energy savings was used in the Fannie Mae/Freddie Mac Energy Addendum form. Therefore, it is a method that has been used by the secondary market for many years.

Weaknesses:

- If the input data is not market driven, the result may not be credible.
- Not all buyers and sellers understand the time value of money and may not be able to use an HP-12C, although that does not render this method inappropriate.

Reasons Underwriters May Reject This Method:

- Inputs have either no support or support that is not credible.
- DCF analysis is used without a secondary method to provide a test of reasonableness.
- The underwriter does not understand the concept because the analysis is not clearly communicated in the appraisal report.

* California Energy Commission and California Public Utilities Commission, www.gosolarcalifornia.org/tools/calculators.php.

Exhibit 4.5 Determining Energy Savings with a Financial Calculator

HP-12C Calculations for DCF of Energy Savings	Sample Support for Input
<input type="button" value="f"/> <input type="button" value="clear"/> <input type="button" value="FIN"/> (using payment at the beginning or <input type="button" value="g"/> 8 keys)	Clears the calculator
20 years <input type="button" value="g"/> <input type="button" value="n"/> (payments are based on monthly savings; therefore, pressing the blue <input type="button" value="g"/> key prior to pressing <input type="button" value="n"/> shows 240 (20 × 12))	Based on the estimate of life of energy-efficient items from the Marshall & Swift <i>Residential Cost Handbook</i>
5% <input type="button" value="g"/> <input type="button" value="i"/>	<ul style="list-style-type: none"> · Based on the current equity loan rate · This is higher than the first mortgage rate to allow for a shorter period · This rate more closely resembles the residential buyer's thinking
\$100 monthly utility savings - <input type="button" value="CHS"/> <input type="button" value="PMT"/>	Energy savings based on HERS Rater Report included in Addenda of the appraisal report
<input type="button" value="PV"/> - results in \$15,153	
Present value of energy savings: \$15,200 (rounded)	
Test of reasonableness is energy-efficient item cost: \$18,000	

including the estimated monthly energy savings, should be attached to the addendum form. The estimated monthly energy savings can be used in developing the energy adjustment.

The date the property was certified by ES is important because the program is continually updating the rating system as building codes upgrade. Appraisers may be required to use ES home sales that have different versions of the ES criteria. The certificate shown in Exhibit 6.18 refers to a certification under Version 2 of the ES standard. Appraisers should identify this version number on the addendum. Analyzing the possible effect that the rating version has on the property requires knowledge of the differences between the rating standard's versions. However, this information may be difficult to obtain in some areas.

If a home is rated by ES, a paper trail should support the rating. If the owner has lost the paperwork, verification of the information may be possible through a local ES rater. A database for public use is crucial for buyers, agents, and appraisers to gather the necessary information to make informed decisions. RESNET implemented their database to document HERS-rated homes beginning in July 2012, but only raters and builders are allowed to access this data. Houses rated prior to this date would not be identified in this database.

Notice that in Exhibit 6.19 the house is rated 5+ stars, which is the best rating possible. All ES rating certificates show the HERS Index and the number of stars based on the index.

Based on this energy estimate and the Fannie Mae/Freddie Mac Energy Addendum (Form 1004A) from 1989, the energy savings of \$629 annually or \$50 rounded ($\$629/12 = \52.41) monthly at today's current interest rate of 3.6% for seven years results in the calculations shown in Exhibit 6.20.

Converting this \$3,900 (calculated in Exhibit 6.20) into a percentage of the overall cost or sale price of the subject property provides a comparative unit of measure. For example, if the property being

Exhibit 6.20 Energy Savings Calculations

HP-12C Calculations for DCF of Energy Savings	Sample Support for Input
<input type="button" value="f"/> <input type="button" value="clear"/> <input type="button" value="FIN"/>	This clears the calculator
7 <input type="button" value="g"/> <input type="button" value="n"/> Payments are based on monthly savings. Therefore, pressing the blue <input type="button" value="g"/> key prior to pressing <input type="button" value="n"/> shows 84 months or payments (7 years × 12 months per year).	7 years is based on Fannie Mae/Freddie Mac instructions from the old Energy Addendum (Form 1004A)
3.6% <input type="button" value="g"/> <input type="button" value="i"/>	Based on the current mortgage rate as per Fannie Mae/Freddie Mac Form 1004A
\$52.14 in monthly utility savings - <input type="button" value="CHS"/> <input type="button" value="PMT"/>	Energy savings based on HERS Rater Report (Exhibit 6.19)
<input type="button" value="PV"/>	Results in \$3,866, rounded to \$3,900
Present value of energy savings: \$3,900	

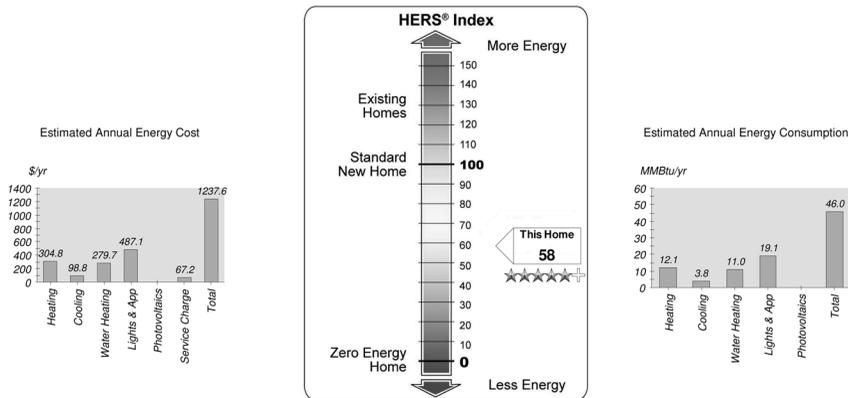
appraised is under contract at \$150,000, the adjustment is only 3% of the overall sale price (\$3,900/\$150,000). This is a minor adjustment and well within the line-item guidelines of the secondary mortgage market. However, an across-the-board adjustment is not appropriate. Each sale must be measured against the subject property in order to develop an appropriate adjustment with support and explanation. The biggest challenge for appraisers is finding sufficient details about the comparable sales to understand how their energy efficiency compares to the appraisal property. Improving the accuracy of the MLS and opening the RESNET HERS database would greatly improve this process and result in more credible value opinions.

As a test of reasonableness for this example, a comparison of this indication to a paired sale or cost difference provides three sources to lend credibility to the adjustment. If credible paired sales reveal that the market does not pay more, the mathematical calculations are fruitless.

The HERS Index scale shown in Exhibit 6.21 reveals that a standard new home has an index rating of 100 and the subject property, located in southern New Mexico, has an index rating of 58. The subject is 42% more energy efficient than the standard new home based on this scale (standard new code-built home HERS Index less subject's HERS Index). The energy costs of the 1,800-sq.-ft. conditioned space are estimated at approximately \$1,237.60 per year, or \$103.13 per month based on the following report.

Exhibit 6.21 Comparison of HERS Index Ratings

**HOME PERFORMANCE WITH ENERGY STAR
ENERGY RATING CERTIFICATE**



Address: 1 XXXX
XXX, ST

House Type: Single-family detached
Cond. Area: 1800 sq. ft.
Rating No.: 3XXX
Issue Date: May 10, 20XX

Annual Estimates*:
Electric(kWh): 13490
CO2 emissions(Tons): 13

*Based on standard operating conditions

This home meets ENERGY STAR v 2

- Rater
Inspection
PO Box XXX

Certified Rater: XXX
Certification No: SSXX
Rating Date: 5/04/XX

Signature:
RES/Rate - Residential Energy Analysis and Rating Software v12.93
This information does not constitute any warranty of energy cost or savings. © 1995-2011 Architectural Energy Corporation, Boulder, Colorado.
The Home Energy Rating Standard Disclosure for this home is available from the rating provider.