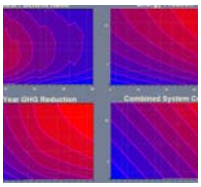


<<Andy Bardwell, December 1, 2008>>

Product Background / Overview

OptiMiser is a PC-based program that creates and evaluates a full range of near-optimal solutions for energy retrofits. It offers a flexible and efficient tool for the home energy analyst, minimizing required data entry and fully integrating renewable energy technologies. The Colorado Governor's Energy Office provided a New Energy Economy Development grant which was used to complete and launch the distributable version of OptiMiser.

OptiMiser will provide market incentives to the three principal participants in the home energy retrofit market by:

(1) enabling *home energy raters* to effectively market renewable energy and conduct better audits more efficiently;
(2) increasing sales of renewable energy products and enabling *suppliers* to cross-market solar thermal and photovoltaics; and
(3) Providing *owners* with near-optimal energy retrofit solutions.

These benefits will result in more widespread implementation of energy efficiency and renewable energy systems.

Requirements Scenario

During the development of OM Builder, we realized that no current energy auditing program provides a reporting function. As a result, auditors typically have to maintain Word documents with boiler plate text for their reports. Report generation is a process of hand editing this document to prepare reports for customers. From our experience in the construction and real estate development industries, we were aware that software for the home inspection industry focuses primarily on generating well designed reports for customers. Benchmarking our work on the best software from the home inspection industry, we have developed a module that allows auditors to construct full-featured reports efficiently. Our design criteria for the Report Module included:

- The ability to select narrative from a database of text sections;
- Add photos, tabular reports, and charts;
- Produce a word document will allow the auditor to do any final editing in a familiar environment.

Solution Implementation

Aspose Editor provided an elegant and seamless solution for multiple steps in this process:

- Aspose is used in the Report Library Editor to provide the user full featured editing of the narrative sections:
- Aspose converts the formatted narratives to HTML which can be stored in our text only database;
- Aspose provides the integrated WYSIWYG viewing environment during maintenance of the Report Library, and during selection of narrative sections in the Report Generator; and finally
- Aspose provides a powerful method of assembling the narrative sections, photographs and charts applying a word template and producing the final Word document.

The result is a report generation modules then improves on the best of the home inspection software by providing a powerful and efficient tool to maintain a data base of report content and compile detailed reports.

OptiMiser Partners have provided all their narrative content that they have developed over their decades of experience producing auditing reports. Our Partners are using the OptiMiser Report Module powered by Aspose to integrate that narrative into the final Report Module.

Benefits

In our survey of available products Aspose is one of the few programs that provide the ability to create Word Documents. In addition Aspose's ability to deal with multiple file formats allowed us to use the Aspose Editing environment to create HTML text-based storage system to manage formatted document material. Aspose provides the power to integrate templates and all the required formatting features. Finally Aspose allowed us to integrate all of these futures into our program and no idiosyncrasies for which we had to compensate.

Future Implementations

We are meeting with the Governor's Office of Energy next week to discuss ongoing partnerships. Our partners include the City of Boulder, Boulder County and the largest Energy Auditing Firms in Colorado, all these partners are anxious to expand distribution of OptiMiser.

Conclusion

As you can tell from the description above, our experience with Aspose has been very positive our only disappointment is that we worked on the product during the trial period under the understanding that the cost would be considerably less. Since our project is funding entirely by contributions of our partners, the State of Colorado and our own firm, cost is *an issue* so we sincerely hope you will reduce the price by the maximum amount possible.

Project / Client: Bardwell/LaPlaca | 4801 W. Yale | Denver, CO | 303-934-3851

Integrated Home Energy OptiMiser - RET Optimization

☑ Location ☑ Warranty ☑ Array ☑ Cost ☐ Help

Solar PV - Electricity Generation
Roof Dimensions and Orientation

Denver, CO	Latitude	39.78
N-S dimension	ft.	25
E-W dimension	ft.	40
Roof slope	deg.	0
Collector slope	deg.	30
Min. sun altitude	deg.	27
Roof azimuth	deg.	0
Array azimuth	deg.	0
N-S proj. panel on roof	ft.	9.51
Possible rows		2
Possible panels/row		15
Max. # panels		30
Max array watts	kW	6.45

Solar ST - Electricity Generation
Roof Dimensions and Orientation

Denver, CO	Latitude	39.78
N-S dimension	ft.	44
E-W dimension	ft.	40
Roof slope	deg.	0
Collector slope	deg.	45
Min. sun altitude	deg.	27
Roof azimuth	deg.	0
Array azimuth	deg.	0
N-S proj. panel on roof	ft.	21.51
Possible rows		2
Possible panels/row		9
Max. # panels		18
Max array capacity	kWth	43.47

System Design

Contractor	
Independent Power Systems	
Panel manufact./model	
Sunpower SPR-215-BLK	
	100%

System Design

Contractor	
Capitol Solar	
Panel manufact./model	
Generic	
	70%

RE Energy - Fraction of	Total Usage	92%
Array Watts	W	4,730
Annual Energy	kWhr/yr	5,067
Array	Rows	2
	# / Row	11
	Total	22
	Width (ft.)	28.80
Area	ft²	295

RE Energy - Fraction of	Total Usage	96%
Array Power	Wth	19,320
Annual Energy Produced	Therms	400
Array	Rows	1
	# / Row	8
	Total	8
	Width (ft.)	34.25
Area	ft²	326.5

Cost Estimate

Panels - $/W	$8.25	$	39,023
Adjustment - %		$	-
System subotal			$39,023
Rebate	Per Watt		-$4.50
	Total		-$21,285
Est. Taxes	5.5%		$2,146
Net Cost			$19,884
Tax Credit			-$2,000
Net Cost Less Rebates + Tax Credit			**$17,884**

Cost Estimate

Base system		$	6,000
Storage - gals.	2200	$	3,200
Panels - $/Wth	$0.40	$	7,692
Heat equip.	None	$	-
Adjustment - %		$	-
System subotal			$16,892
Est. Taxes	5.5%		$929
Net Cost			$17,821
Tax Credit			-$2,000
Net Cost Less Rebates + Tax Credit			**$15,821**

Savings: Costs and Environmental

CO_2 reduction - Annual	Tons	5.2
Project life =30 years	Tons	155
Annual Savings with tax	$/kWh = $0.075	$636
Periodic inverter replace - yrs.	12	$2,429
Project life	yrs.	30
Debt ratio	%	0%
Pre-tax IRR and ROI	%	6.7%
Pre-tax year-to-positive cash	yrs.	16.5
Benefit-Cost (B-C) ratio w/ tax		**1.1**

Savings: Costs and Environmental

CO_2 reduction - Annual	Tons	#DIV/0!
Project life =30 years	Tons	#DIV/0!
Annual Savings with tax	$/Therm = $1.201	#DIV/0!
Periodic pump replacemnt - yrs.	12	$500
Project life	yrs.	30
Debt ratio	%	0%
Pre-tax IRR and ROI	%	8.0%
Pre-tax year-to-positive cash	yrs.	14.4
Benefit-Cost (B-C) ratio w/ tax		**1.3**

Program Data Entry Screen

Project / Client: Bardwell/LaPlaca | 4801 W. Yale | Denver, CO | **Phone:** 303-934-3851

Integrated Home Energy OptiMiser

☑ Detail data ☑ Help ☑ Other loads ☑ GHG & financial

User input - used in design calculations
User selection - sets design parameters
User input - for reference only
Model output - for reference only unless bordered

Utility Entry

2,900	Building square feet
	Heating System
Natural gas - mmBtu	Fuel type
160,000	Rated input capacity (Btu)
132,000	Rated output capacity (Btu)
65%	Seasonal efficiency
82,118	Derated capacity for Denver, CO altitude. 5,260 feet.
65%	Water heating system seasonal efficiency

Month	Days	kWh	Cost	Therms	Cost	Avg. Temp.	Deg. Days @ 65	Heat Smooth
Oct-05	29	333	$33.09	40	$53.46	57	232	
Nov-05	27	397	$42.21	76	$100.96	49	432	116
Dec-05	34	562	$60.75	232	$273.86	31	1,156	144
Jan-06	33	471	$49.50	124	$161.15	42	759	161
Feb-06	30	396	$41.75	127	$146.96	33	960	114
Mar-06	29	253	$29.08	91	$91.25	39	754	86
Apr-06	29	390	$41.45	40	$43.19	51	406	61
May-06	31	548	$51.79	51	$48.94	57	248	41
Jun-06	29	541	$50.91	31	$32.25	73	-	37
Jul-06	31	569	$44.29	29	$30.31	74	-	28
Aug-06	28	547	$52.06	25	$27.66	78	-	27
Sep-06	35	485	$45.95	27	$34.12	66	-	
Annual		5,492	$542.83	893	$1,044.11		4,947	324
Monthly		458	$45.24		$87.01		412	27
Cost/Unit		Base cost	$10.99	Base cost	-$2.37			
		$ / kWh	$0.075	$ / Therm	$1.20			

Other gas loads:	Use/day/wk.			Pilot Light	kWhrs/Yr	Therms/Yr
Gas range	1	Hours/day	x 0.09 Therms/hr.+	0		33
Gas oven	1	Hours/wk.	x 0.11 Therms/hr.+	0		6
Gas dryer	1	Loads/wk.	x 0.22 Therms/ld.		12	11
					Total other gas load =	50

Estimated annual adjusted to average temperature

Heat utility usage =	697	Total other gas load % of adj. heat + hot water =	8%
Heat load (energy delivered) =	453	Estimated hot water utility usage =	274
Heat + hot water load (energy delivered) =	631	Estimated hot water load (energy delivered) =	178
		Est. hot water load % of adj. heat + hot water =	28%

Base Case Electricity System (Baseline)

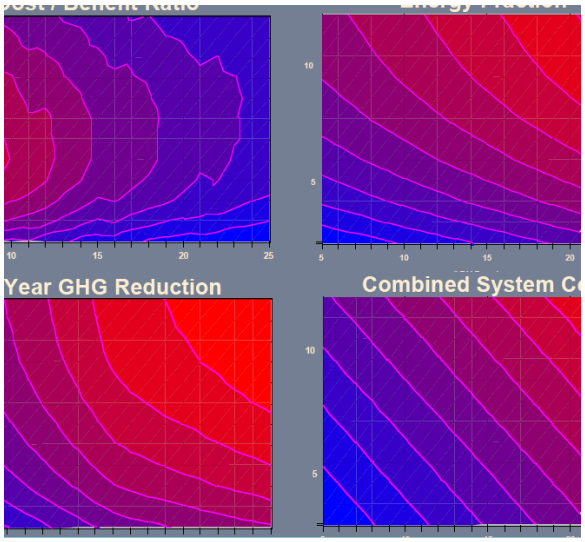
Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	GHG emission factor (tCO2/MWh)	Fuel conversion efficiency (%)	GHG emission factor with efficiency (tCO2/MWh)
Natural Gas	30.0%	56.1	0.0030	0.0010	0.2226	45.0%	0.4911
Coal	70.0%	94.6	0.0020	0.0030	0.3754	35.0%	0.9830
Electric generation							0.8354

Financial parameters

General

Fuel cost escalation rate	6.0%	Project life heat system	30	Debt ratio heat system	0.0%
Inflation rate	2.5%	Project life PV	30	Debt ratio PV	0.0%
Discount rate	6.0%	Project life solar thermal	30	Debt ratio solar thermal	0.0%
State + Federal tax rate	0.0%				

Program Data Entry Screen



Icon for OptiMiser