

Savings Calculations for Savings By Design using EnergyPro + LabPro

Energy Savings Estimation Using EnergyPro+LabPro

See EnergyPro overview and Lab-Pro overview for additional information.

See Appendix A for Methodology.

The modeled results are displayed on the various LabPro and EnergyPro reports, as well as summary spreadsheets used to combine the energy savings. Samples included in Appendix B.

Demand (kW) savings using EnergyPro

The modeled results are displayed on the Demand Savings Worksheet. Sample included in Appendix B.

Appendix A

Methodology for Fume Hood Modeling using EnergyPro and LabPro (Simplified description)

Background

LabPro 1.2 is a proprietary software program designed by the Phoenix Controls Company. This program simulates the interactive effects of fume hoods, labs, corridors and office spaces. LabPro is currently the best tool we have found to determine annual consumption and savings when modeling fume hoods.

EnergyPro is a building energy simulation tool using the DOE 2.1 E engine for determining annual building consumption and savings. We have found that EnergyPro is excellent for modeling buildings; however it may not be suitable for modeling annual fume hood consumption and savings.

By using both software programs together, we can provide reasonably accurate energy simulations for buildings with fume hoods.

Methodology

EnergyPro

Remove the spaces (square footage) that contain the fume hoods and run a simulation using EnergyPro. Determine the annual savings for the building without the spaces that contain the fume hoods. This will be listed on a Util-1 sheet normally titled “without fume hood spaces”.

LabPro 1.2

Model the spaces that contain the fume hoods using LabPro 1.2 to determine fume hood annual savings. Note that the output for LabPro 1.2 is displayed in annual dollars saved per year.

Spreadsheet

Several worksheets are used to account for the savings and incentive when combining the results of EnergyPro and LabPro. The worksheets are described below.

Demand Savings Worksheet. This sheet converts the results of LabPro’s Fan System Summary Sheet displayed as fan hp and central plant kW/ton to kW.

LabPro Annual Savings Worksheet. This sheet converts the results of LabPro’s Project Cost Comparison Sheet from annual dollars saved to annual kWh and therms saved. This sheet also displays the Systems Approach incentive rate and incentive resulting from the LabPro results.

Summary of Energy Savings Worksheet. This sheet combines the results of the

spreadsheets above along with the results from two separate EnergyPro Util-1 sheets.

Add the savings and incentive from Labpro 1.2 and EnergyPro to the Summary of Energy Savings Worksheet to determine the total annual savings and incentive.

Appendix B

Project Name

SDG&E Contract No.

Summary of Energy Savings

LAB PRO ANNUAL SAVINGS WORKSHEET

UTIL-1 WITHOUT FUME HOOD SPACES

LabPro 1.2 Results			
YAV Fume Hood System (Process)			
Electricity (kWh)	Natural Gas (therms)	Demand kW	
130,580	52,963		
458,010			
Space heating			
Space cooling			
Indoor fans			
Heat rejection			
Pumps			
Domestic hot water			
Lighting			
Receptacle			
Process			
Total	588,590	52,963	55.9

* DEMAND SAVINGS WORKSHEET *

See fume hood spreadsheet calculation analysis for derivation of these savings

EnergyPro 3.1 Results w/o Fume Hoods			
Non-Fume Hood Areas (No Process)			
Electricity (kWh)	Natural Gas (therms)	Demand kW	
0	160		
147,436			
(41,195)			
(13,185)			
43,774			
170,319			
307,149			
160			
(96.9)			

See UTIL-1 sheet "No Fume Hood Labs" for derivation of these savings

Total Savings			
Total Savings			
Electricity (kWh)	Natural Gas (therms)	Demand kW	
0	53,123		
278,016	0		
416,815	0		
(13,185)	0		
43,774	0		
0	0		
170,319	0		
0	0		
0	0		
895,739	53,123		-41.0

Summary of Incentives (STEP 2)

EP w FH	
EP Results w/o Fume Hoods	
Non-Fume Hood Areas (No Process)	Natural Gas (therms)
Electricity (kWh)	
307,149	160

Total Incentives

	\$72,922
	\$24,029
	\$96,951

% Below Title 24 for EnergyPro Simulation that contains entire building including Fume Hood Space

SYSTEM'S INCENTIVE RATES

Owner Incentive =	
Design Team Incentive =	
Total Incentive =	

@ \$.03 /kWh saved	@ \$.34 /therm saved
\$17,658	\$18,007
@ \$.01 /kWh saved	@ \$.11 /therm saved
\$5,886	\$5,826
	\$47,377

20.1%

TYPICALLY 1/3 OF OWNER INCENTIVE

UTIL-1 WITH FUME HOOD SPACES (STEP 1)

BASED ON UTIL-1 RATE

03/09/2007

LabPro EnergyPro Master Summary Sheet example.xls

Project Name
SDG&E Contract No.

LabPro Annual Savings Worksheet

LabPro 1.2 Results

LabPro Energy Cost Comparison (annual)

TAKEN FROM LABPRO "PROJECT COST COMPARISON"
USED IN LABPRO ANALYSIS "PROJECT DEFAULTS"

Constant Volume System (annual consumption)	Constant Volume	Electrical Energy Rate (\$/kWh)	Therm Rate (\$/therm)	kWh w/o correction	Fan Efficiency (%)	kWh w fan efficiency correction	Therms	Total
Annual Cooling Energy Cost	\$ 36,195	\$ 0.10		361,950		361,950		
Annual Heating Energy Cost	\$ 5,906		\$ 0.80			-	7,383	
Annual Reheating Energy Cost	\$ 65,041		\$ 0.80			-	81,301	
Annual Supply AHU Energy Cost	\$ 82,446	\$ 0.10		824,460	65%	535,899		
Annual Exhaust Fan Energy Cost	\$ 41,725	\$ 0.10		417,250	65%	271,213		
Total						1,169,062	88,684	

VAV System (annual consumption)	VAV	Electrical Energy Rate (\$/kWh)	Therm Rate (\$/therm)	kWh w/o correction	Fan Efficiency (%)	kWh w fan efficiency correction	Therms
Annual Cooling Energy Cost	\$ 23,137	\$ 0.10		231,370		231,370	
Annual Heating Energy Cost	\$ 3,333	-	\$ 0.80			-	4,166
Annual Reheating Energy Cost	\$ 25,244	-	\$ 0.80			-	31,555
Annual Supply AHU Energy Cost	\$ 28,203	\$ 0.10		282,030	65%	183,320	
Annual Exhaust Fan Energy Cost	\$ 25,505	\$ 0.10		255,050	65%	165,783	
Total						580,472	35,721

VAV System (annual savings)	VAV	Electrical Energy Rate (\$/kWh)	Therm Rate (\$/therm)	kWh w/o correction	Fan Efficiency (%)	kWh w fan efficiency correction *	Therms
Annual Cooling Energy Cost	\$ 13,058	\$ 0.10		130,580		130,580	
Annual Heating Energy Cost	\$ 2,573	-	\$ 0.80			-	3,216
Annual Reheating Energy Cost	\$ 39,797	-	\$ 0.80			-	49,746
Annual Supply AHU Energy Cost	\$ 54,243	\$ 0.10		542,430	65%	352,580	
Annual Exhaust Fan Energy Cost	\$ 16,220	\$ 0.10		162,200	65%	105,430	
Savings						588,590	52,963
Savings per hood	48		Hoods			12,262	1,103

Systems Approach Incentive

	Systems Approach Incentive Rate		Systems Approach Incentive Amount		
	Electrical (\$/kWh)	Gas (\$/therm)	Electrical	Gas	Systems Approach Total
Incentive (Owner)	\$ 0.03	\$ 0.34	\$ 17,658	\$ 18,007	\$ 35,665
Incentive (Designer)	\$ 0.01	\$ 0.11	\$ 5,886	\$ 5,826	\$ 11,712
Total					\$ 47,377
Incentive per hood					\$ 987

* kWh correction factor is the annual kWh fan energy x fan efficiency
this factor is used because equations 9.1 and 9.11 and 9.12 on page A-18 of the LabPro manual divide by the fan efficiency twice
multiplying by the fan efficiency, the additional fan efficiency in the denominator is eliminated.

03/09/2007

LabPro & EnergyPro Master Summary Sheet example 1.xls

Project Cost Comparison

Generic Building -

March 9, 2007

LabPro Flow Summary	Unit	CV	CV-PHX	VAV	VAV-PHX	CV-UBC	VAV-UBC
Design Exhaust System Flow	CFM	27,000	27,000	20,283	20,283	21,627	17,598
Average Exhaust System Flow	CFM	27,000	27,000	14,067	14,067	16,654	8,893

LabPro HVAC Initial Cost Comparison

Cooling Tons Required	Tons	114	114	73	73	81	57
Cooling System Cost	USD	228,000	228,000	146,000	146,000	162,000	114,000
Heating System Cost	USD	54,000	54,000	34,598	34,598	38,478	26,838
Reheat System Cost	USD	0	0	0	0	0	0
Supply AHU Cost	USD	81,270	81,270	54,315	54,315	59,706	43,534
Exhaust Fan Cost	USD	20,250	20,250	15,212	15,212	16,220	13,199
VFD Cost	USD	0	0	4,922	4,922	5,411	3,945
Duct Cost	USD	51,300	51,300	38,538	38,538	41,091	33,436
Filter Cost	USD	6,750	6,750	4,511	4,511	4,959	3,616
Balancing Cost	USD	750	300	750	300	300	300
ATC Cost	USD	2,700	2,700	2,700	2,700	2,700	2,700
ATC Interface Cost	USD	1,500	1,500	1,500	1,500	1,500	1,500
Lab Controls Cost	USD	27,000	36,000	100,000	100,000	72,000	115,000
Hood Certification Cost	USD	900	450	900	450	450	450
Total HVAC Initial Cost	USD	474,420	482,520	403,947	403,047	404,816	358,517
HVAC Initial Cost per Avg Flow	USD/CFM	17.57	17.87	28.72	28.65	24.31	40.31
HVAC Initial Cost per Fume Hood	USD	26,356.67	26,806.67	22,441.50	22,391.50	22,489.76	19,917.63
HVAC Initial Cost per Unit Area	USD/Sq. Ft	316.28	321.68	269.30	268.70	269.88	239.01

LabPro Energy Cost Comparison (annual)

Annual Cooling Energy Cost	USD	49,274	49,274	26,043	26,043	30,689	16,751
Annual Heating Energy Cost	USD	5,241	5,241	2,659	2,659	3,175	1,626
Annual Reheat Energy Cost	USD	88,098	88,098	44,583	44,583	53,286	27,177
Annual Supply AHU Energy Cost	USD	50,891	50,891	12,748	12,748	18,702	4,426
Annual Exhaust Fan Energy Cost	USD	49,364	49,364	25,718	25,718	30,447	16,260
Total Annual Energy Cost	USD	242,868	242,868	111,751	111,751	136,300	66,240
Annual Energy Cost per Average Flow	USD/CFM	9.00	9.00	7.94	7.94	8.18	7.45
Annual Energy Cost per Fume Hood	USD	13,492.65	13,492.65	6,208.38	6,208.38	7,572.20	3,679.99
Annual Energy Cost per Unit Area	USD/Sq. Ft	161.91	161.91	74.50	74.50	90.87	44.16

LabPro Operation and Maintenance Cost Comparison (annual)

Annual Energy Cost	USD	242,868	242,868	111,751	111,751	136,300	66,240
Annual Balancing Cost	USD	750	300	750	300	300	300
Annual Hood Certification Cost	USD	900	450	900	450	450	450
Annual Lab Controls Maintenance	USD	5,400	0	13,500	0	0	0
Annual ATC Maintenance Cost	USD	1,500	1,500	1,500	1,500	1,500	1,500
Annual Filter Cost	USD	6,750	6,750	4,511	4,511	4,959	3,616
Annual Downtime Cost	USD	1,080	0	2,700	0	0	0
Total Annual O&M Costs	USD	259,248	251,868	135,612	118,512	143,509	72,106
Annual O&M Cost per Average Flow	USD/CFM	9.60	9.33	9.64	8.42	8.62	8.11
Annual O&M Cost per Fume Hood	USD	14,402.65	13,992.65	7,534.00	6,584.00	7,972.70	4,005.87
Annual O&M Cost per Unit Area	USD/Sq. Ft	172.83	167.91	90.41	79.01	95.67	48.07

Phoenix Controls Corporation

LabPro Software

Project Defaults

Project Name Generic Building March 9, 2007
Project Description Page 1
Company Name
Contact
Address
Phone

General		HVAC Initial Costs	
Occupied Hour	8:00:00 AM	Cooling System Cost	2,000.00 USD/Ton
Unoccupied Hour	6:00:00 PM	Heating System Cost	2.00 USD/CFM
		Reheat System Cost	0.00 USD/CFM
Exhaust System Design Percentile	99.00 %	Duct Cost	1.90 USD/CFM
Supply System Design Percentile	95.00 %	Supply AHU Cost	3.01 USD/CFM
Central Plant Design Percentile	99.00 %	Exhaust Fan Cost	0.75 USD/CFM
Weather Station	San Diego	VFD Cost	225.00 USD/Hp
		Filter Cost	0.25 USD/CFM
		ATC Cost	900.00 USD/CFM
		ATC Interface Cost	500.00 USD/CFM
Room and Corridor		VAV-UBC Controls Cost	115,000.00 USD
Corridor Floor Area	600.00 Sq. Ft	VAV-Phoenix Controls Cost	100,000.00 USD
Corridor Heat Gain	2.00 Watts/Sq. Ft	VAV-Other Controls Cost	100,000.00 USD
Corridor ACH	4.00	CV-UBC Controls Cost	4,000.00 USD
Room Ceiling Height	9.50 Ft	CV-Phoenix Controls Cost	2,000.00 USD
Room Floor Area	300 Sq. Ft	CV-Other Controls Cost	1,500.00 USD
Room Temperature	74 Deg F		
Room Heat Gain	10.00 Watts/Sq. Ft		
Room ACH Occupied	6.00		
Room ACH Unoccupied	6.00		
VAV GEX Quantity	1		
VAV Supply Quantity	1		
Offset Percentage	10%		
Hood Usage			
UBC Flow Normal Mode	100 %		
UBC Flow Standby Mode	60 %		
Sash Position with User Present	100 %		
Sash Position with User Absent	50 %		
Fan and Central Plant			
Cooling Efficiency	1.40 kW/Ton		
Heating Efficiency	80 %		
Supply Air Temperature (Cooling)	72 Deg F		
Supply Air Temperature (Heating)	72 Deg F		
Supply AHU Static Pressure	5.00 "w.c.		
Supply AHU Efficiency	65 %		
Supply AHU Control Type	Variable Frequency Drive		
Exhaust Fan Static Pressure	5.00 "w.c.		
Exhaust Fan Efficiency	65 %		
Exhaust Fan Control Type	Constant Air Volume		
Operating Costs			
		Interest Rate	5 %
		Hurdle Rate	3 %
		Analysis Period	5 Years
		Balancing Cost-Phoenix	100.00 USD
		Balancing Cost-Other	250.00 USD
		Certification Cost-Phoenix	25.00 USD
		Certification Cost-Other	50.00 USD
		Lab Downtime Cost	20.00 USD
		CV Maint. Cost-Other	300.00 USD
		VAV Maint. Cost-Other	750.00 USD
		CV, CV-UBC Maint. Cost-Phoenix	0.00 USD
		VAV, VAV-UBC Maint. Cost-Phoenix	0.00 USD
		ATC Maintenance Cost per Room	500.00 USD
Energy Costs			
		Cooling Fuel Type	Electricity (kWh)
		Cooling Fuel Cost	0.150 USD
		Cooling Fuel BTU's	3,413
		Heating Fuel Type	Natural Gas (therm)
		Heating Fuel Cost	1.500 USD
		Heating Fuel BTU's	100,000
		Reheat Fuel Type	Natural Gas (therm)
		Reheat Fuel Cost	1.500 USD
		Reheat Fuel BTU's	100,000
		Electricity Cost per kWh	0.150 USD

USED FOR
 RATES IN
 LABPRO
 ANNUAL
 SAVINGS
 WORKSHEET

Phoenix Controls Corporation

LabPro Software

Project Name

SDG&E Contract No.

Demand Savings Worksheet (Labpro results)**LabPro 1.2 Results****Constant Volume System**

Fan No	CFM	SP	Fan Efficiency (%)	hp	Drive Efficiency	VFD Efficiency (%)	kW
SF1	57,054	5.75	65%	79.42	97%	100%	61.08
EF1	57,054	3.00	65%	41.44	97%	100%	31.87

Chiller No	Tons Cooling	Efficiency (kW/ton)
CH1	241	0.73

Total

kW
175.93

268.88

VAV System

Fan No	CFM	SP	Fan Efficiency (%)	hp	Drive Efficiency	VFD Efficiency (%)	kW
SF1	44,829	5.75	65%	62.40	97%	96%	49.99
EF1	44,829	3.00	65%	32.56	97%	100%	25.04

Chiller No	Tons Cooling	Efficiency (kW/ton)
CH1	189	0.73

Total

kW
137.97

213.00

Savings (kW)

55.88

*TAKEN FROM PLANT
"EFFICIENCY SPREADSHEET"**TAKEN FROM
LAB PRO
"FAN SYSTEM SUMMARY"**TAKEN FROM LAB PRO
"PROJECT COST COMPARISON"**THIS VALUE ENTERED INTO
"SUMMARY OF ENERGY SAVINGS" WORKSHEET*

Fan Systems Summary

Generic Building -

March 9, 2007

Page 1

Exhaust Fan System							
Name	Area Served	Control Type	Design Flow	Design Power	Static Pressure	Fan Efficiency	Speed Control
EFan 1	Main Exhaust	CV	9,000 CFM	10.9 Hp	5.00 "w.c.	65 %	Constant Air Volume
		VAV	6,761 CFM	8.2 Hp			
		CV-UBC	7,209 CFM	8.7 Hp			
		VAV-UBC	5,866 CFM	7.1 Hp			
EFan 2	Main Exhaust	CV	9,000 CFM	10.9 Hp	5.00 "w.c.	65 %	Constant Air Volume
		VAV	6,761 CFM	8.2 Hp			
		CV-UBC	7,209 CFM	8.7 Hp			
		VAV-UBC	5,866 CFM	7.1 Hp			
EFan 3	Main Exhaust	CV	9,000 CFM	10.9 Hp	5.00 "w.c.	65 %	Constant Air Volume
		VAV	6,761 CFM	8.2 Hp			
		CV-UBC	7,209 CFM	8.7 Hp			
		VAV-UBC	5,866 CFM	7.1 Hp			
Total		CV	27,000 CFM	32.7 Hp			
		VAV	20,283 CFM	24.6 Hp			
		CV-UBC	21,627 CFM	26.2 Hp			
		VAV-UBC	17,598 CFM	21.3 Hp			

Project Name

SDG&E Contract No.

Plant Efficiency (used for LabPro 1.2 input)

Unit No.	Device	Units	Quantity	Amount	kw/ton	Conversion	kW
CH-1	Chiller	tons	1	410.0	0.55		225.5
CT-1	Cooling Tower	tons	1	410.0			
		fan hp	1	30.0		0.746	22.38
CHWP-1	CHW pump primary	gpm	1	710.0			-
		hp	1	12.0		0.746	8.95
CHWP-2	CHW pump secondary	gpm	1	800.0			-
		hp	1	20.0		0.746	14.92
CWP-1	CW pump	gpm	1	1,230.0			-
		hp	1	35.0		0.746	26.11
B-1	Boiler	bth/hr	1	3,900,000.0			
	pump	gpm	1	250			
		hp	1	8			
Total					0.73		297.862

03/09/2007

LabPro & EnergyPro Master Summary Sheet example 1.xls

Project Name
SDG&E Contract No.

EnergyPro Worksheet

EnergyPro Cooling/Heating Load Summary Entire Building including Fume Hoods

System	Heat Load	Heat Output	Sensible Load	(tons)	Sensible Output	(tons)	Latent Load	Latent Output
Central	4,854,010	6,240,000	7,371,230	-614.3	9,840,000	-820	0	0
AH-1 1st Flr South	733,805	0	1,042,564	-86.9	1,519,000	-126.6	779,520	729,000
AH-2 2nd Flr South	723,725	0	1,106,861	-92.2	1,557,000	-129.8	717,144	749,000
AH-3 1st Flr North	1,627,445	0	1,448,083	-120.7	1,909,000	-159.1	1,464,043	852,000
AH-4 2nd Flr North	1,769,035	0	1,640,006	-136.7	1,910,000	-159.2	1,452,203	908,000

Total 4,854,010 0 5,237,514 -437 6,895,000 -575 4,412,910 3,238,000

EnergyPro Cooling/Heating Load Summary Fume Hood Zones Eliminated

System	Heat Load	Heat Output	Sensible Load	(tons)	Sensible Output	(tons)	Latent Load	Latent Output
Central	4,338,694	5,732,704	6,709,170	-559.1	8,928,000	-744	0	0
AH-1 1st Flr South	622,059	0	981,312	-81.8	1,519,000	-126.6	719,891	729,000
AH-2 2nd Flr South	431,029	0	918,360	-76.5	1,557,000	-129.8	512,439	749,000
AH-3 1st Flr North	1,599,445	0	1,325,155	-110.4	1,909,000	-159.1	1,464,017	852,000
AH-4 2nd Flr North	1,686,162	0	1,256,337	-104.7	1,910,000	-159.2	1,452,131	908,000

Total 4,338,695 0 4,481,164 -373 6,895,000 -575 4,148,478 3,238,000

Mechanical Equipment Load Reduction due to removal of 48 fume hoods and lab spaces

	With Labs	Without Labs	Reduction Factor
Cooling Load (tons)	614	559	91%
Heating Load (btu/hr)	4,854,010	4,338,694	89%

USED TO RANK & RANK PLANT SIZE IN STEP 2 OF ENERGY PRO

Energy Component	Quantity	With Labs (each unit)	Units	Reduction Factor	Without Labs *	Units
Chiller	1	410	tons	91%	373	tons
Primary CHW Pump	1	12.0	hp	91%	11	hp
Secondary CHW Pump	1	710	gpm	91%	646	gpm
	1	20.0	hp	91%	18	hp
	1	800	gpm	91%	728	gpm
Condenser Water Pump	1	35.0	hp	91%	32	hp
	1	1,230	gpm	91%	1,120	gpm
Cooling Tower	1	410	tons	91%	373	tons
Cooling Tower Fan	1	30.0	hp	91%	27	hp
Boiler	1	3,900,000	btu/hr	89%	3,485,965	btu/hr
HHW pump	1	8.0	hp	89%	7	hp
	1	250	gpm	89%	223	gpm

* Use the results in this column for the new inputs into the EnergyPro run without Fume Hoods

03/09/2007

LabPro & EnergyPro Master Summary Sheet example.xls

PROJECT NAME

With Fume Hood Spaces


DATE

03/09/2007

Step 1 ANNUAL TDV ENERGY USE (kBtu/sqft-yr)			
ENERGY COMPONENT	Standard	Proposed	Margin
Space Heating	49.61	17.52	32.10
Space Cooling	149.70	75.57	74.13
Indoor Fans	144.44	163.05	-18.61
Heat Rejection	0.00	0.00	0.00
Pumps	0.00	16.89	-16.89
Domestic Hot Water	5.54	5.54	0.00
Lighting	65.92	56.30	9.62
Receptacle	67.32	67.32	0.00
Process	331.27	331.27	0.00
TOTALS:	813.79	733.45	80.34

Step 2		PERCENT BELOW TITLE 24	
Adjusted TDV Energy Use (Excludes Process Energy)			
Standard Design		Proposed Design	Margin
482.52	-	402.18	= 80.34
Margin		Standard Design	% Below Title 24*
80.34	/	482.52	= 16.7%
* % Below Title 24 is limited to a maximum of 25% in the incentive rate calculation.			
Incentive Eligibility		Yes	No
Owner Incentive (>=10%):		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conditioned Floor Area =		65,027 sq. ft.	

Step 3 ANNUAL SITE ENERGY USE							
ENERGY COMPONENT	Standard		Proposed		Margin		
	Electricity (kWh)	Natural Gas (therms)	Electricity (kWh)	Natural Gas (therms)	Electricity (kWh)	Natural Gas (therms)	
Peak Demand (kW)	1,169.9		952.5		217.4		
Space Heating	0	30,548	0	10,801	0	19,748	
Space Cooling	358,242	0	185,867	0	172,375	0	
Indoor Fans	484,755	0	544,196	0	-59,441	0	
Heat Rejection	0	0	0	0	0	0	
Pumps	0	0	56,853	0	-56,853	0	
Domestic Hot Water	0	3,266	0	3,266	0	0	
Lighting	216,971	0	185,317	0	31,655	0	
Receptacle	229,653	0	229,653	0	0	0	
Process	1,130,095	0	1,130,095	0	0	0	
TOTALS:	2,419,716	33,814	2,331,880	14,067	87,736	19,748	

Step 4 POTENTIAL OWNER INCENTIVE CALCULATION							
 A Sempra Energy utility™		% Below Title 24* (from step 2)		Incentive Rate		Savings (from step 3)	
		Electricity 10.0¢/kWh [(16.7% - 10%)]		= 16.7¢/kWh		87,736 kWh	
		Natural Gas 34.0¢/therm [(16.7% - 10%) x 4.4]		= 63.5¢/therm		19,748 therm	
		Owner Incentive				Subtotal	
						= \$ 14,652	
						+ \$ 12,540	
						= \$ 27,192	

Potential incentives indicated on this report are available only through the Whole Building Approach element of the Savings By Design Program for new construction and are NOT GUARANTEED. Projects MUST receive prior, written approval from San Diego Gas & Electric Company during conceptual or early design development and must meet all other program requirements to qualify.

* % Below in this equation is limited to 25%

Run Initiation Time: 03/09/07 14:50:26

Run Code: 1173480626



UTILITY INCENTIVE WORKSHEET

UTIL-1

PROJECT NAME

Without Fume Hood Spaces

DATE

03/09/2007

Step 1 ANNUAL TDV ENERGY USE (kBtu/sqft-yr)			
ENERGY COMPONENT	Standard	Proposed	Margin
Space Heating	42.17	16.69	25.48
Space Cooling	166.87	80.08	86.79
Indoor Fans	152.43	152.47	-0.04
Heat Rejection	0.00	0.00	0.00
Pumps	0.00	20.64	-20.64
Domestic Hot Water	6.17	6.17	0.00
Lighting	68.38	56.30	12.08
Receptacle	71.31	71.31	0.00
Process	340.93	340.93	0.00
TOTALS:	848.25	744.58	103.67

Step 2 PERCENT BELOW TITLE 24

Adjusted TDV Energy Use
(Excludes Process Energy)

Standard Design	Proposed Design	Margin
507.32	403.65	103.67
Margin	Standard Design	% Below Title 24*
103.67	507.32	20.4%

* % Below Title 24 is limited to a maximum of 25% in the incentive rate calculation.

Incentive Eligibility

Owner Incentive ($\geq 10\%$):

Yes No

☒ ☐

Conditioned Floor Area = 33,842 sq. ft.

Step 3 ANNUAL SITE ENERGY USE

ENERGY COMPONENT	Standard		Proposed		Margin	
	Electricity (kWh)	Natural Gas (therms)	Electricity (kWh)	Natural Gas (therms)	Electricity (kWh)	Natural Gas (therms)
Space Heating	0	13,512	0	5,358	0	8,154
Space Cooling	210,748	0	105,123	0	105,625	0
Indoor Fans	266,232	0	264,918	0	1,314	0
Heat Rejection	0	0	0	0	0	0
Pumps	0	0	35,979	0	-35,979	0
Domestic Hot Water	0	1,893	0	1,893	0	0
Lighting	117,141	0	96,439	0	20,702	0
Receptacle	126,614	0	126,614	0	0	0
Process	605,286	0	605,286	0	0	0
TOTALS:	1,326,021	15,405	1,234,360	7,251	91,661	8,154

Step 4 POTENTIAL OWNER INCENTIVE CALCULATION

SDGE		% Below Title 24* (from step 2)	Incentive Rate	Savings (from step 3)	Subtotal
Electricity	10.0¢ [(20.4% - 10%)]	20.4%	20.4¢/kWh	21,851 kWh	\$ 18,699
Natural Gas	34.0¢ [(20.4% - 10%) x 4.41]	20.4%	79.8¢/therm	8,154 therm	\$ 6,507
Owner Incentive					\$ 25,206

Potential incentives indicated on this report are available only through the Whole Building Approach element of the Savings By Design Program for new construction and are NOT GUARANTEED. Projects MUST receive prior, written approval from San Diego Gas & Electric Company during conceptual or early design development and must meet all other program requirements to qualify.

* % Below in this equation is limited to 25%

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Run Code: 1173480768

EnergyPro 4.3 by EnergySoft

User Number: 2726

Job Number: 25211.00

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Fume Hood Summary

Generic Building -

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Room Name	Hood Name	Hood Type	Daily User Presence Hours	Sash Width	Sash Height	Maximum Flow	Minimum Flow
1	Hood 1		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
1	Hood 2		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
1	Hood 3		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
1	Hood 4		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
1	Hood 5	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
1	Hood 6	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
2	Hood 43		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
2	Hood 44		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
2	Hood 45		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
2	Hood 46		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
2	Hood 47	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
2	Hood 48	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
3	Hood 49	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
3	Hood 50	6' Walk-in	1.00	64 inches	56 inches	1,500 CFM	250 CFM
3	Hood 51		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
3	Hood 52		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
3	Hood 53		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM
3	Hood 54		1.00	<i>inches</i>	<i>inches</i>	1,500 CFM	450 CFM