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A Beginner's Guide to Energy Modeling

Presentation Overview

I. **Introduction to Energy Modeling**

   What, Why, and How?

II. **Energy Model Sample Scenario**

   Anacostia High School Modernization Project

III. **Q&A**

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Introduction to Energy Modeling

What is energy modeling?

A computer program that predicts building energy use based upon the materials and systems that are to be included with construction.

Why is energy modeling used?

- Meeting project sustainability goals

- Capital cost/benefit analysis

- Lifecycle cost analysis

How is energy modeling best used?

- In an integrated fashion throughout the design process

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Energy Model Sample Scenario

Anacostia High School Modernization Project

➢ Value Engineering Exercise

➢ Question: should we accept $88,000 add-alternate for high-efficiency chiller?

➢ Data shows additional 2% annual energy savings

➢ Client priority is LEED Gold, add-alternate accepted

➢ Sample model

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Energy Cost Budget / PRM Summary

By Allen & Shariff Corporation

Project Name: Anacostia Senior High School	Date: June 09, 2010
City: Washington DC	Weather Data: Washington, D.C.

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

* Denotes the base alternative for the ECB study.

		* Alt-1 WSC W/ VFD			Alt-2 Baseline			Alt-3 WMC			Alt-4 Existing Chillers		
		Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh
Lighting - Conditioned	Electricity	1,192.7	12	563	1,230.2	103	581	1,192.7	100	563	1,192.7	100	563
Space Heating	Electricity	134.9	1	17	66.7	49	11	134.9	100	17	135.0	100	17
	Gas	4,623.4	47	3,803	6,471.8	140	12,400	4,623.4	100	3,803	4,624.5	100	3,806
Space Cooling	Electricity	471.2	5	989	952.3	202	1,643	370.1	79	950	535.0	114	1,260
Pumps	Electricity	312.6	3	176	2,381.5	762	417	311.0	100	176	1,093.7	350	297
Heat Rejection	Electricity	178.1	2	94	267.1	150	219	176.3	99	94	93.2	52	47
Fans - Conditioned	Electricity	987.9	10	1,088	274.7	28	225	987.9	100	1,088	989.0	100	1,091
Receptacles - Conditioned	Electricity	1,912.5	19	636	1,912.5	100	629	1,912.5	100	636	1,912.5	100	636
Stand-alone Base Utilities	Electricity	24.3	0	5	48.6	200	10	24.3	100	5	24.3	100	5
Total Building Consumption		9,837.6			13,605.4			9,733.0			10,599.9		

		* Alt-1 WSC W/ VFD	Alt-2 Baseline	Alt-3 WMC	Alt-4 Existing Chillers
Total	Number of hours heating load not met	637	728	637	637
	Number of hours cooling load not met	124	0	124	120

	* Alt-1 WSC W/ VFD		Alt-2 Baseline		Alt-3 WMC		Alt-4 Existing Chillers	
	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr
Electricity	5,214.2	294,358	7,133.6	373,148	5,109.6	289,134	5,975.4	332,260
Gas	4,623.4	76,286	6,471.8	106,785	4,623.4	76,286	4,624.5	76,304
Total	9,838	370,644	13,605	479,933	9,733	365,420	10,600	408,564

Questions?

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