

Smart Energy Design Assistance Program

Michael Stanch
Energy Solutions Manager
360 Energy Group- SEDAC
(312) 264-8568

Overview

- Why do an Energy Audit with the Smart Energy Design Assistance Program?
- How Does It Work?
- What are the Results You Can Expect?
- How Do You Use The Program?

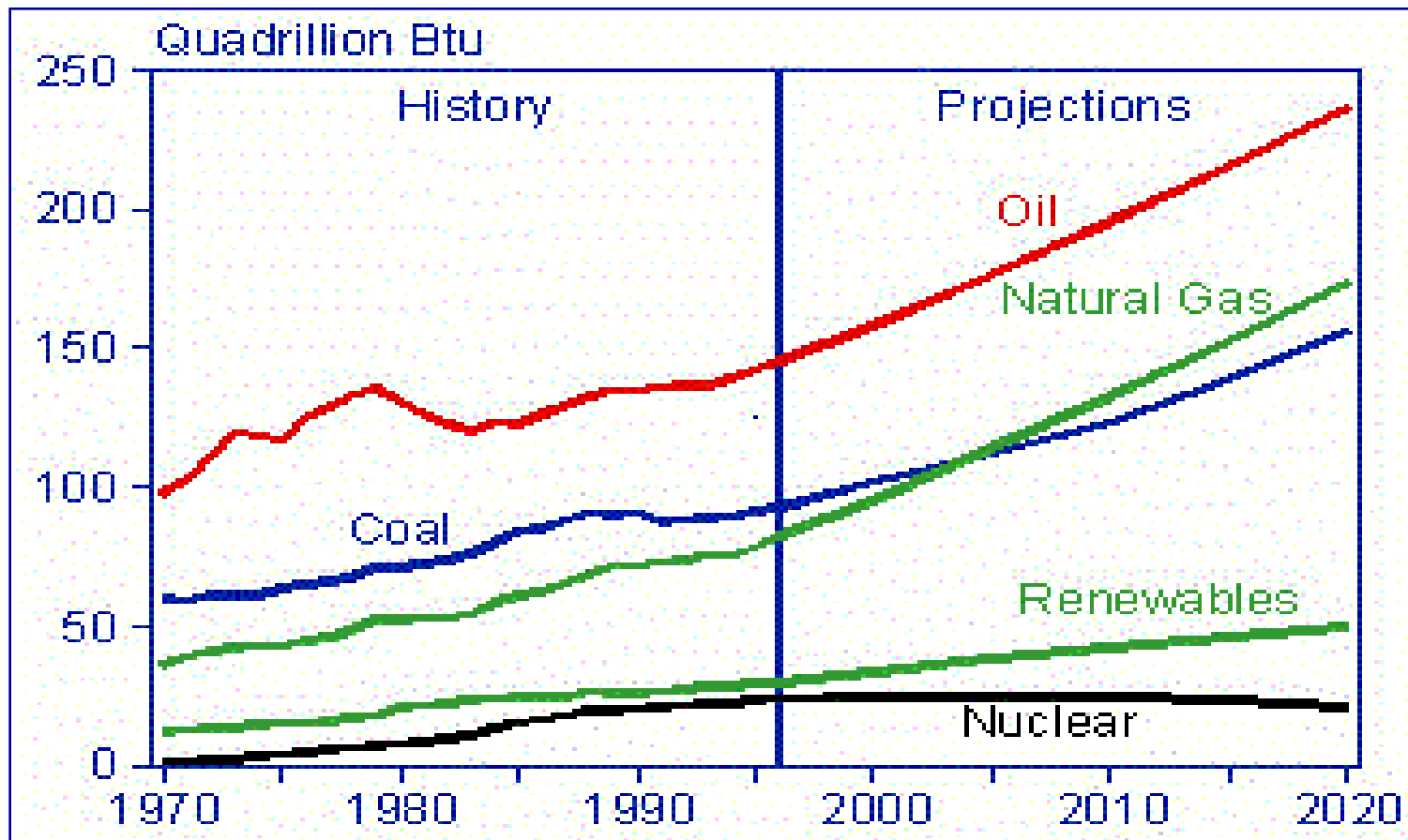
Why?- Preliminary Considerations

- Why? Are you actually going to do a project or are you just curious?
- Does the auditor just do audits or do they help implement actual projects?
- Main interest- \$, energy, environmental, work place comfort and productivity?
- Maintenance issues- breakdowns, increased maintenance costs?
- New or retrofit- what is necessary and cost effective?
- End result- implement project or gather dust?

Why the Smart Energy Design Assistance Program?

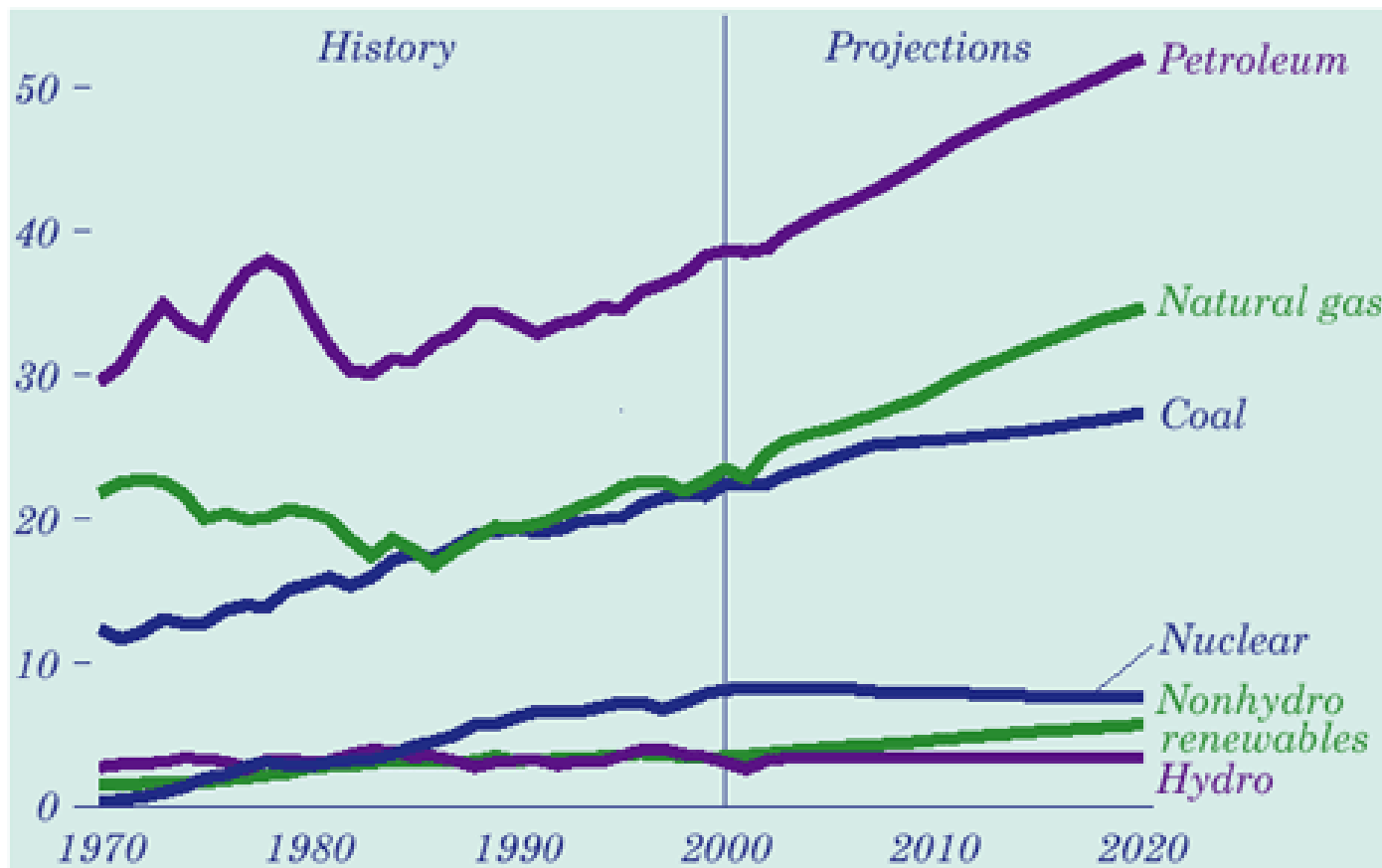
The State of Illinois decided to respond to the reality of the energy markets and transform the market for energy efficiency and renewable alternatives

World Energy Use



Source: DOE/EIA-0484(98) World Energy Consumption

US Energy Use

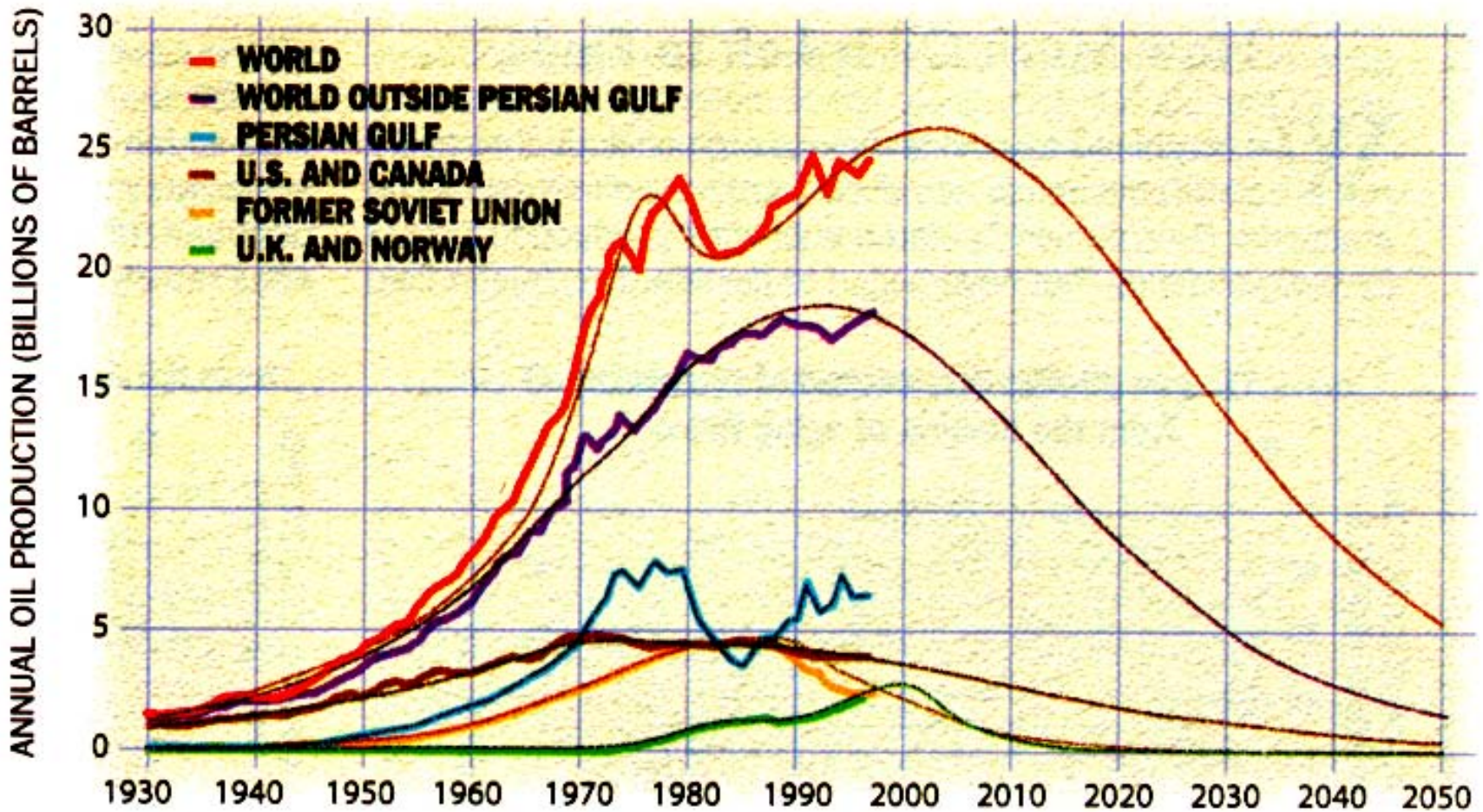


Energy Information Administration 2000



**SMART
ENERGY
DESIGN**
Assistance Center

World Oil Production



Small Business Concerns

- In Illinois, for example, annual energy expenditures
 - \$30.1 billion
- Commercial buildings
 - \$5.2 billion
- The vitality of small businesses is affected by these costs
- Smart Energy Design Assistance Program
 - Seeks to help Illinois businesses to identify opportunities to save energy and money
 - Create and save jobs

Public Facilities

- Loss of tax revenue equals less services
- Need to reduce energy costs
- Older, inefficient facilities
- Do as I say.....
- Lack of technical expertise
- No impetus for action- incentives help a lot
- Vendors selling unproven technology

How Does the Smart Energy Program Work?

Eligibility

- Apply to SEDAC for technical assistance
- Level 1: Anyone
- Levels 2, 3, and 4:
 - For Profit Business or Public Building- no non-profits
 - Usually greater than 8,000 square feet and/or \$50,000 annual utility cost
 - Multiple locations larger than 5,000 square feet

Level 1: Initial Consultation

- Answer basic energy related questions.
- Provide list of energy cost reduction measures (ECRMs).
- Provide sources for literature, web resources and other information.
- Determine if additional level of service is appropriate.

Level 2: Energy Audits

- Review Architectural Plans
- Visit Site and Inspect
- Estimate the Breakdown of Energy Usage
- Provide list of ECRMs with preliminary suggestions for consideration.
- Determine if additional level of service is appropriate.
- Lighting Level 2- look only at lighting opportunities- best paybacks and easiest to do

Level 3: Design Assistance

- Design Review and/or Site Inspection
- Computer Modeling of Base Case and Alternatives with ECRMs
- Energy Savings Analysis
- Life Cycle Cost Analysis
- Final Report with Recommendations

Level 4: Implementation

- Meeting with client to review report
- Finding a service provider
- Technical information and design support
- Locating funding sources
- Assuring customer satisfaction
- Apply for IL EEPS incentives

What Are the Results of a SEDAC Design Study?

Energy Modeling Results

Energy Cost Reduction Measure (ECRM) or Package of ECRMs	Electricity					Natural Gas	
	Annual kWh	kWh Cost	Peak kW	kW Cost	Total Electricity Cost	Annual Therms	Therm Cost
Base Building	1,425,452	\$85,875	472	\$31,034	\$116,909	142,872	\$109,440
ECRM1 - Cogeneration	306,751	\$30,140	293	\$19,202	\$49,342	191,263	\$146,507
ECRM2 – Ventilation Heat Recovery	1,448,954	\$87,281	512	\$32,848	\$120,129	114,214	\$87,488
ECRM3 – High Efficiency Electric Motors	1,388,264	\$83,650	444	\$29,172	\$112,822	143,285	\$109,756
ECRM4 –Boiler Tune-Up	1,425,452	\$85,875	472	\$31,034	\$116,909	138,273	\$105,917
ECRM5 – Pump Impeller Trim or Replace	1,395,292	\$84,071	463	\$30,388	\$114,459	143,120	\$109,630
PKG1 – Vent. + Motors + Tune Up + Pumps	1,381,606	\$83,252	474	\$30,340	\$113,592	109,749	\$84,068

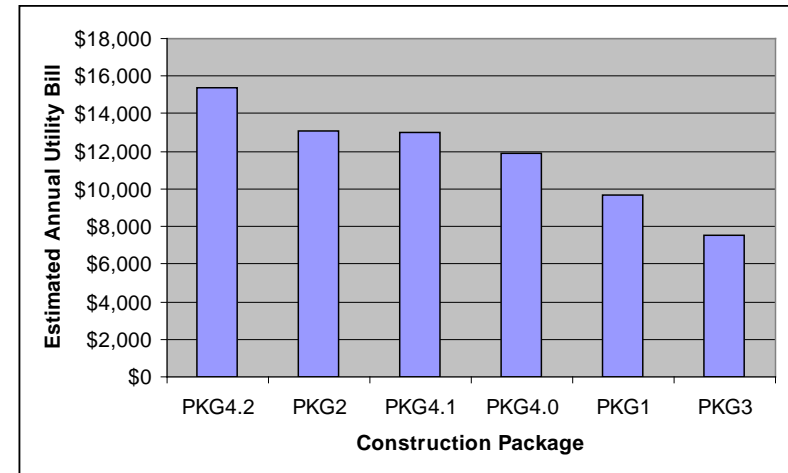
First Costs, Savings, and Cash Flow

Energy Cost Reduction Measure (ECM) or Package of ECMs	ID	Additional First Cost	Annual Savings	Monthly Savings	Monthly Loan Payment	Net Monthly Cash Flow
Cogeneration	ECRM 1	\$179,000	\$30,500	\$2,542	(\$2,055)	\$486
Ventilation Heat Recovery	ECRM 2	\$75,000	\$18,732	\$1,561	(\$861)	\$700
High Efficiency Electric Motors	ECRM 3	\$10,700	\$3,771	\$314	(\$123)	\$191
Boiler Tune-Up	ECRM 4	\$1,500	\$3,523	\$294	(\$17)	\$276
Pump Impeller Trim or Replace	ECRM 5	\$7,000	\$2,260	\$188	(\$80)	\$108
Vent. + Motors + Tune Up + Pumps	PKG1	\$94,200	\$28,689	\$2,391	(\$1,082)	\$1,309

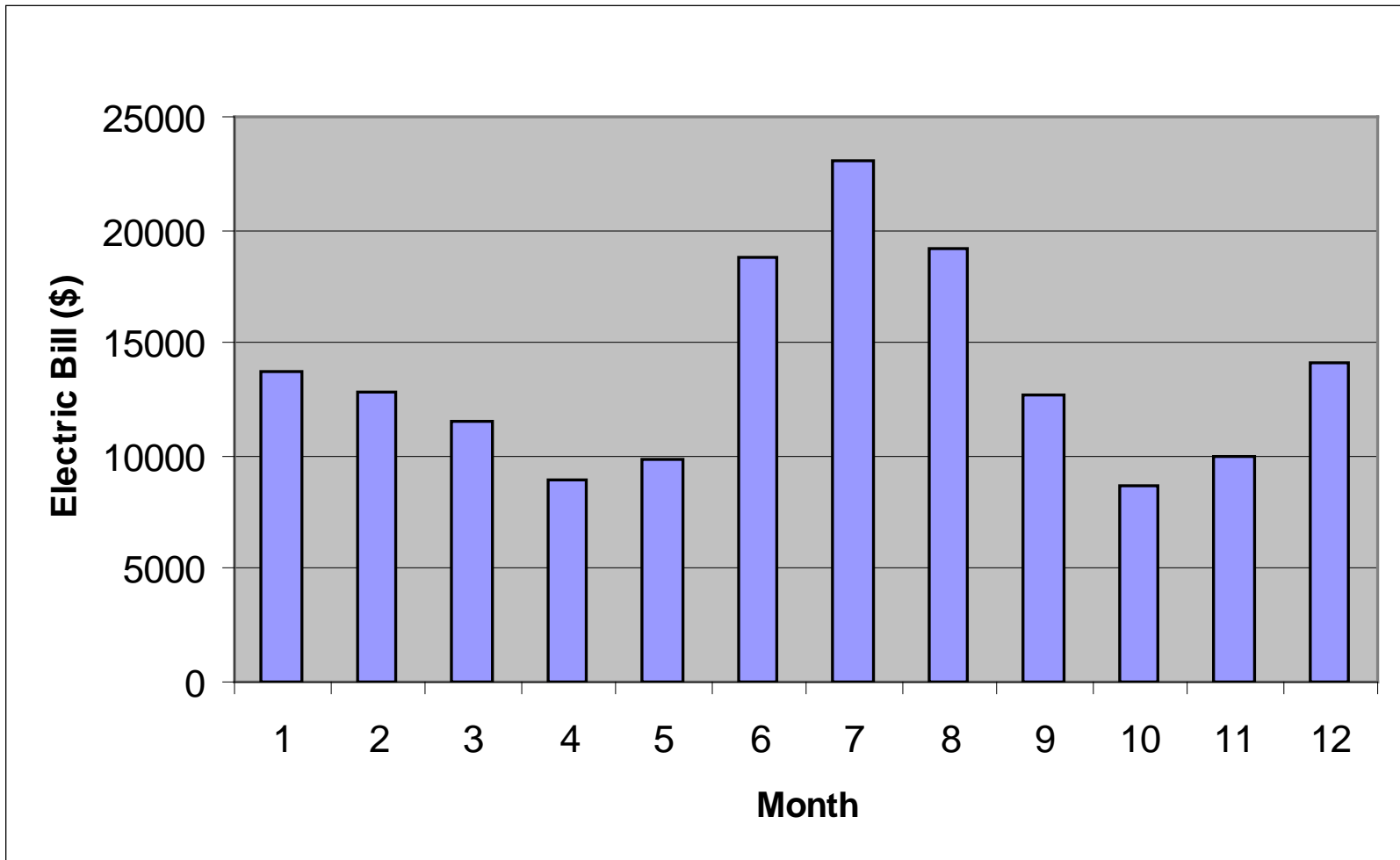
Life Cycle Costing for ECMs

Energy Conservation Measure (ECM) or Package of ECMs	ID	Internal Rate of Return (IRR)	Net Present Value (NPV)
Cogeneration	ECRM 1	18.3%	\$93,709
Ventilation Heat Recovery	ECRM 2	29.0%	\$90,667
High Efficiency Electric Motors	ECRM 3	44.2%	\$22,422
Boiler Tune-Up	ECRM 4	29.2%	\$29,001
Pump Impeller Trim or Replace	ECRM 5	39.6%	\$12,881
Vent. + Motors + Tune Up + Pumps	PKG1	36.8%	\$158,451

Reports also contain things like...



and...



Analysis



- Review the plans from the architect
- Energy modeling
 - EnergyPlus
 - determine heating/cooling loads (baseline)

Results

- Model several alternate designs to find ways to reduce these heating/cooling loads
 - Ground Source Heat Pump
 - Increased Insulation
 - Programmable Thermostats
 - Low Wattage Lighting Fixtures (T8 High Bays instead of Metal Halide)
- Make a site visit to deliver the report findings
- Assist the client in implementing the design alternatives as necessary



Savings



Life Cycle Cost Analysis	
20	Study Period [years]
5%	Discount Rate
1.75%	General Inflation Rate
4.2%	Electricity Inflation Rate
3.7%	Natural Gas Inflation Rate
Annual Savings	
\$4,218	Electricity
\$5,271	Natural Gas
\$921	Operation and Maintenance
\$10,410	Total Annual Savings
Present Value Annual Savings	
\$77,671	Electricity
\$92,306	Natural Gas
\$13,391	O&M
\$183,367	Total PV of Savings
Additional Capital Expense	
\$58,139	Additional Capital Expense
Results	
5.6	Simple Payback [years]
\$125,228	Net Present Value
2.15	Savings-to-Investment Ratio
9.1%	Adjusted Internal Rate of Return

- After performing a 20 year Life Cycle Cost Analysis
 - Client stands to save over \$10,000 annually
 - Initial expense is approximately \$58,000
 - A 9.1% Internal Rate of Return on Investment

Perils and Pitfalls- Lighting Example



- Apples and Oranges Proposals- use tight specifications
- Recycling of lamps and ballasts- put in contract
- Labor costs- prevailing wage?
- Contractor experience- 3 a.m. call
- KISS- use accepted technology
- New players in industry- follow incentives
- Procurement requirements- bidding?
- Unintended consequences- motion sensors v. ballasts v. lamps v. fixtures
- SEDAC can help you avoid these problems!

How You Can Use the Smart Energy Design Assistance Center (SEDAC)

To Apply for SEDAC Assistance

- Call 1-800-214-7954 or,
- Visit the SEDAC web site at www.sedac.org and download an application or apply on line
- Or fill out application today and fax to (312) 264-2379

Why Should A Municipality Use SEDAC?



- Flexible, Client-Centered, User-Friendly Support
- Unbiased
- Resource Rich
- It's FREE! Costs are absorbed by IL DCEO, Com Ed and Ameren

What SEDAC Needs From You

- A completed application
- Building Plans (paper, pdf, CAD, back of envelope)
- Utility Bills (for existing buildings)
- Your time during our site visit (as necessary), and follow-up meeting

Thank You for Your Interest

- Feel free to call Mike Stanch at (312) 264-8568
- SEDAC staff are available for public events, training and initial consultations
- Save energy, money and the environment!!!