An Application of Life-Cycle Cost Analysis at UC Davis

Veterinary Medicine Instructional Facility

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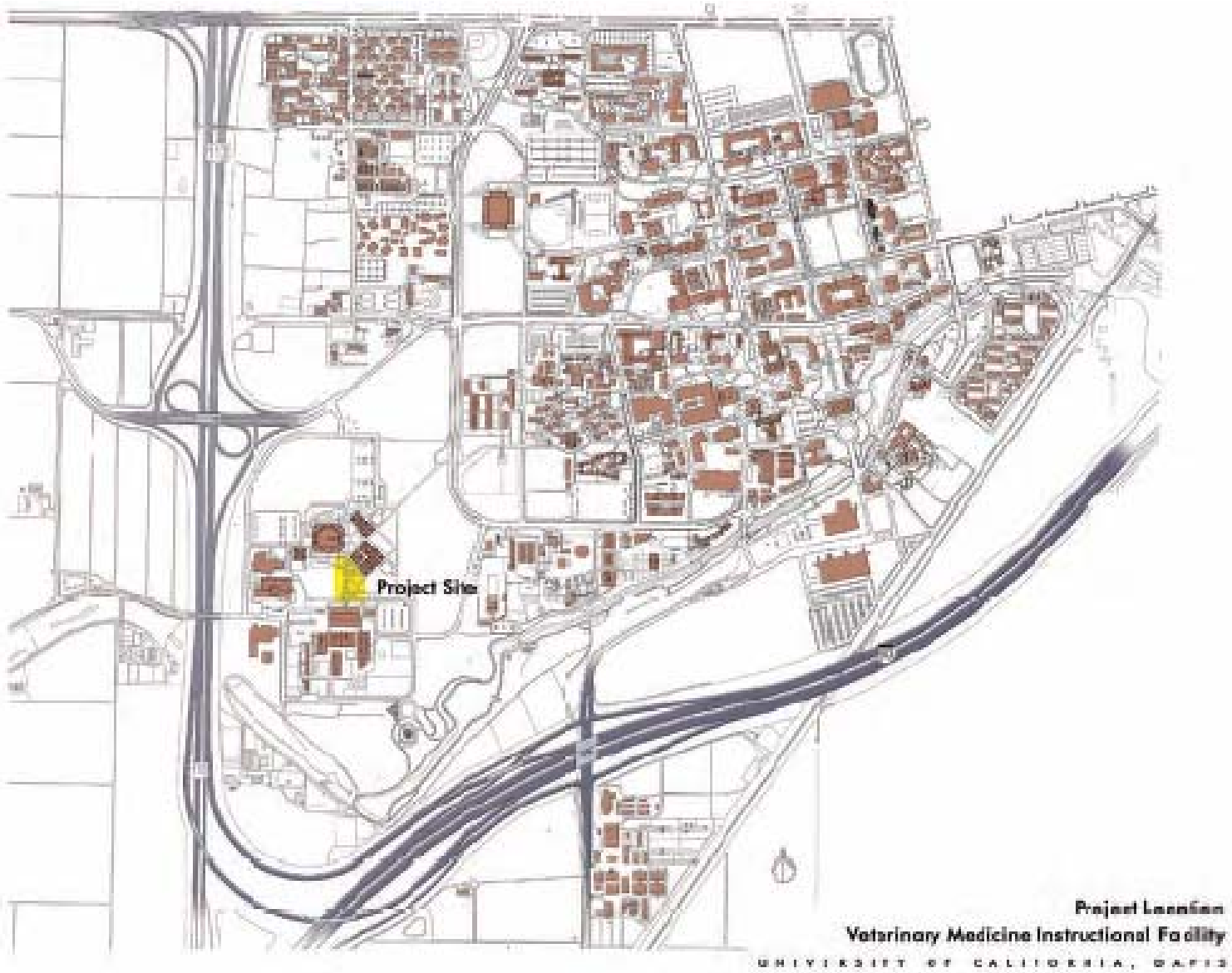
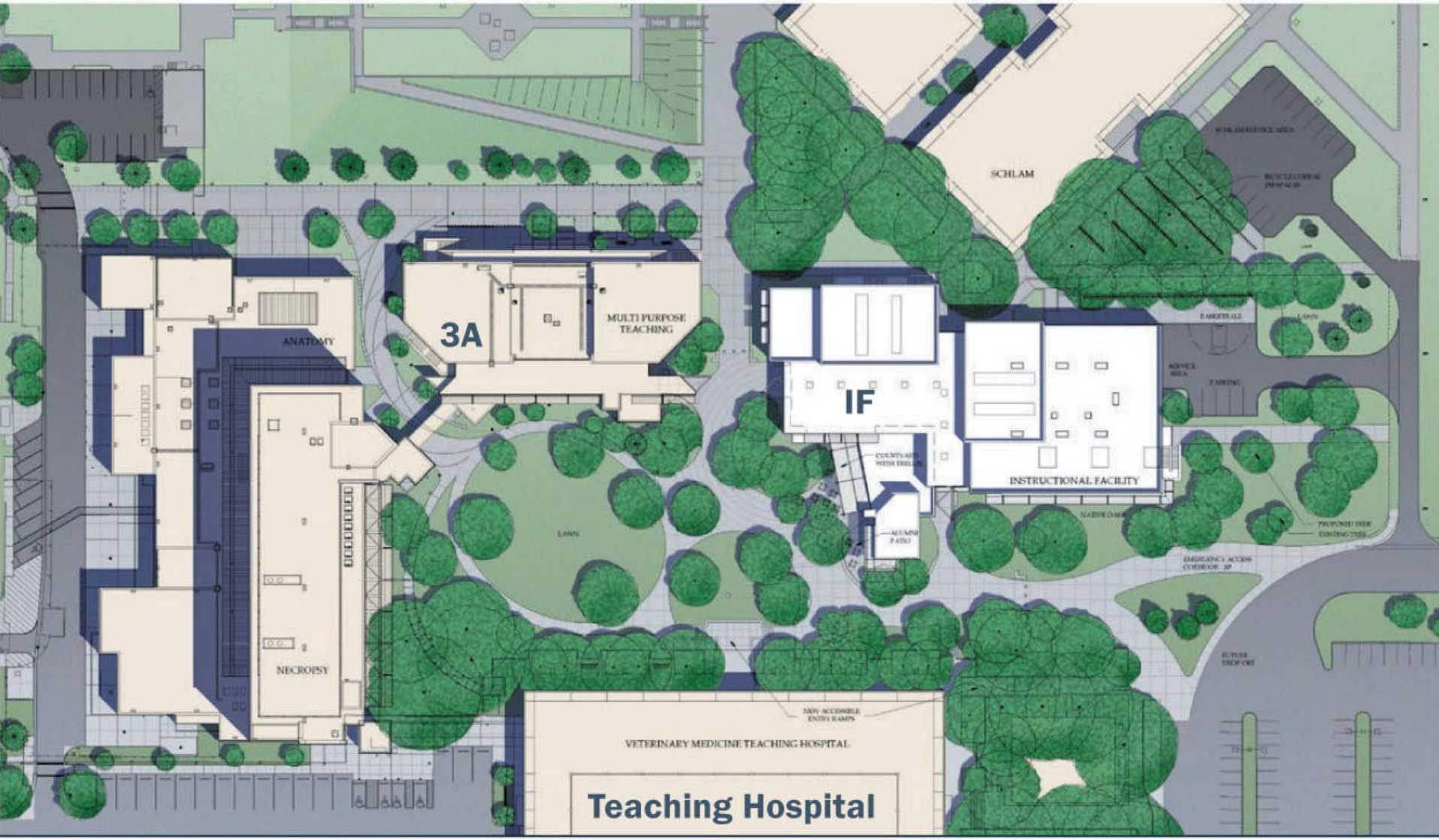
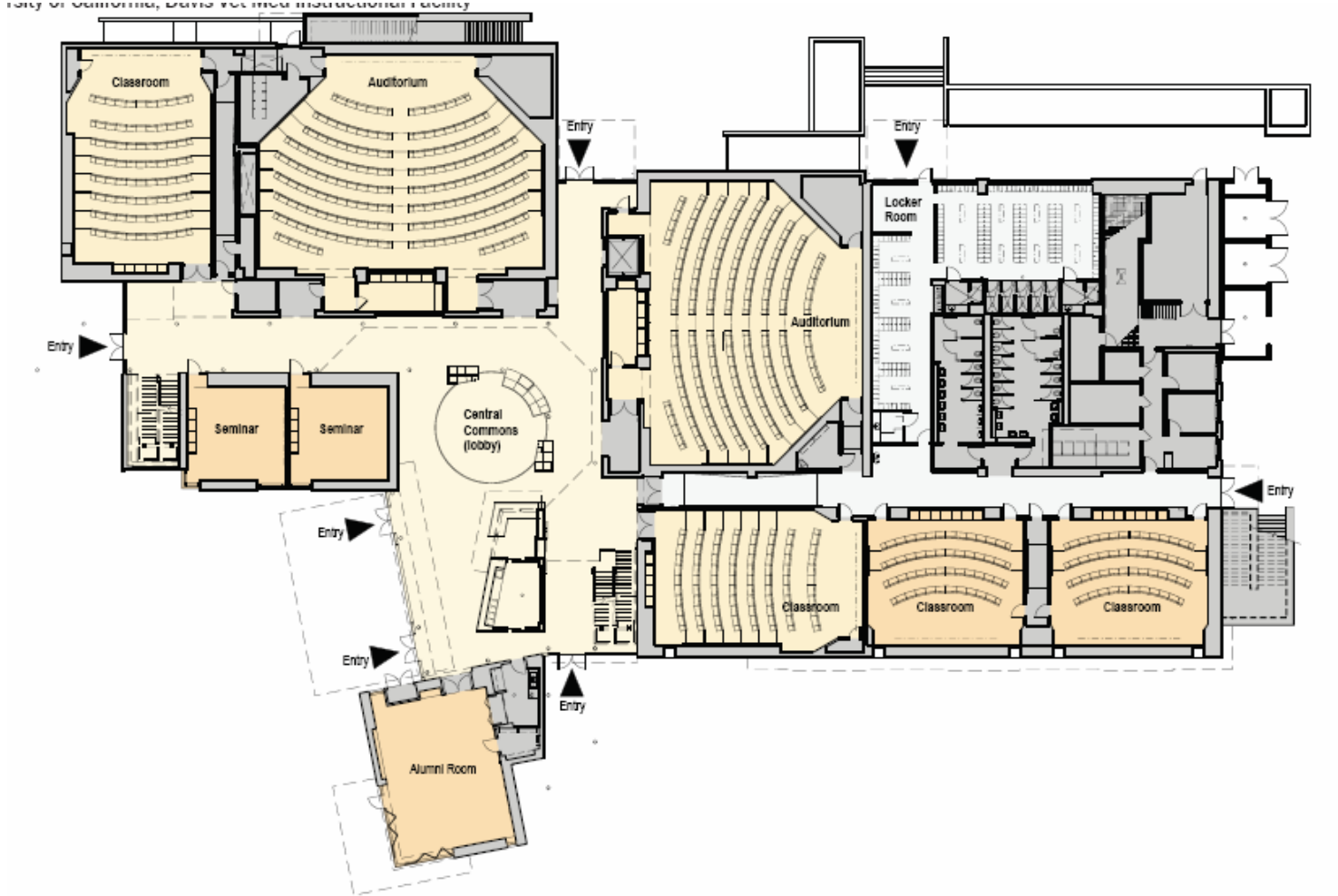
UC Sustainability Conference, June 2005


Project Site
Project Location
Veterinary Medicine Instructional Facility
UNIVERSITY OF CALIFORNIA, DAVIS



Site Plan

University of California, Davis
Veterinary Medicine Instructional Facility
June 20, 2005



First Floor Plan

Veterinary Medical Instructional Facility

UNIVERSITY OF CALIFORNIA, DAVIS

SRG PARTNERSHIP INC

Information Gathering

- Client Input
  - Study Period
  - Real Discount Rate
  - Utility Rates
  - Energy Price Escalation Rates??
  - Study Measures

Real Discount Rate

The rate of interest reflecting the portion of the time value of money attributable to the real earning power of money over time and not to general price inflation.

Information Gathering

- Design Team Input
  - Study Measures
  - Incremental Costs
  - O&M Costs
  - Replacement Costs

Information Gathering

- Energy Analyst Input
  - Energy Consumption Estimate (Energy Model)
  - Energy Cost Estimate
  - Savings Estimates for Study Measures
  - Rebates and Incentives (Savings by Design)

Calculations

- Simple Payback
- Life Cycle Costing
  - NIST Handbook 135

    Life-Cycle Costing Manual for the Federal Energy Management Program

LIFE CYCLE COSTING SUMMARY **LCC-1**

PROJECT NAME	DATE
UC Davis Vet Med Instructional Facility	12/18/2002

Annual Energy Use and Cost

Option	Description	Electricity			Natural Gas		Simple Payback (years)
		Consump-tion (kWh)	Demand (kW)	Cost ($)	Consump-tion (therms)	Cost ($)	
Base	Base Case (No Evap Cooling or Daylighting, 24" Stud)	1,003,492	352	$ 67,693	3,606	$ 2,074	N/A
1	Increase Roof Insulation to 4"	1,002,308	352	$ 67,595	3,668	$ 2,109	441.6
2	Decrease stud spacing from 24" to 16"	1,004,563	353	$ 67,786	4,200	$ 2,415	0.0
3	Daylighting Controls	971,867	346	$ 65,636	4,151	$ 2,387	9.5
4	Indirect Evaporative Cooling on AHU-1 & AHU-2	926,814	346	$ 62,142	3,826	$ 2,200	2.1
5	Indirect Evap on AHU-1/2 and Daylighting Controls	899,072	340	$ 60,319	4,169	$ 2,397	4.2
6	Skylighting Reduction	1,003,018	352	$ 67,652	3,627	$ 2,086	0.0
7	Bundle: ECM 3 + ECM 6	969,264	346	$ 65,463	4,169	$ 2,398	0.0
8	Bundle: ECM 3 + ECM 4 + ECM 6	893,195	339	$ 59,943	4,203	$ 2,417	0.0
9	Glazing changed to Solarban 60 Green	998,591	352	$ 67,317	3,749	$ 2,156	13.3

Life Cycle Cost Present Value

Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacement Costs	Residual Value	Total LCC
Base	$ 0	$ 32,429	$ 0	$ 1,325,149	$ 38,087	$ 0	$ 0	$ 0	$ 1,330,807
1	$ 27,000	$ 31,607	$ 0	$ 1,323,231	$ 38,730	$ 0	$ 0	$ 0	$ 1,357,353
2	$ 15,000	$ 29,687	$ 0	$ 1,326,970	$ 44,349	$ 0	$ 0	$ 0	$ 1,356,632
3	$ 22,900	$ 38,790	$ 0	$ 1,284,882	$ 43,835	$ 0	$ 0	$ 0	$ 1,312,826
4	$ 31,700	$ 52,717	$ 40,856	$ 1,216,483	$ 40,401	$ 1,245	$ 776	$ 0	$ 1,278,744
5	$ 54,600	$ 57,427	$ 40,856	$ 1,180,797	$ 44,018	$ 1,245	$ 776	$ 0	$ 1,264,865
6	$ -50,000	$ 32,398	$ 0	$ 1,324,346	$ 38,307	$ 0	$ 0	$ 0	$ 1,280,256
7	$ -27,100	$ 39,440	$ 40,856	$ 1,281,495	$ 44,037	$ 1,245	$ 0	$ 0	$ 1,301,094
8	$ 4,600	$ 58,460	$ 40,856	$ 1,173,436	$ 44,386	$ 1,245	$ 0	$ 0	$ 1,206,064
9	$ 5,000	$ 33,508	$ 0	$ 1,317,788	$ 39,593	$ 0	$ 0	$ 0	$ 1,328,873

Study Parameters

Study Period: 30 years

Real Discount Rate: 6.1%

☐ DOE/FEMP Escalation Rates

Region: N/A

Fuel Sector: N/A

☐ Uniform Escalation Rates

Electricity: 3.0%

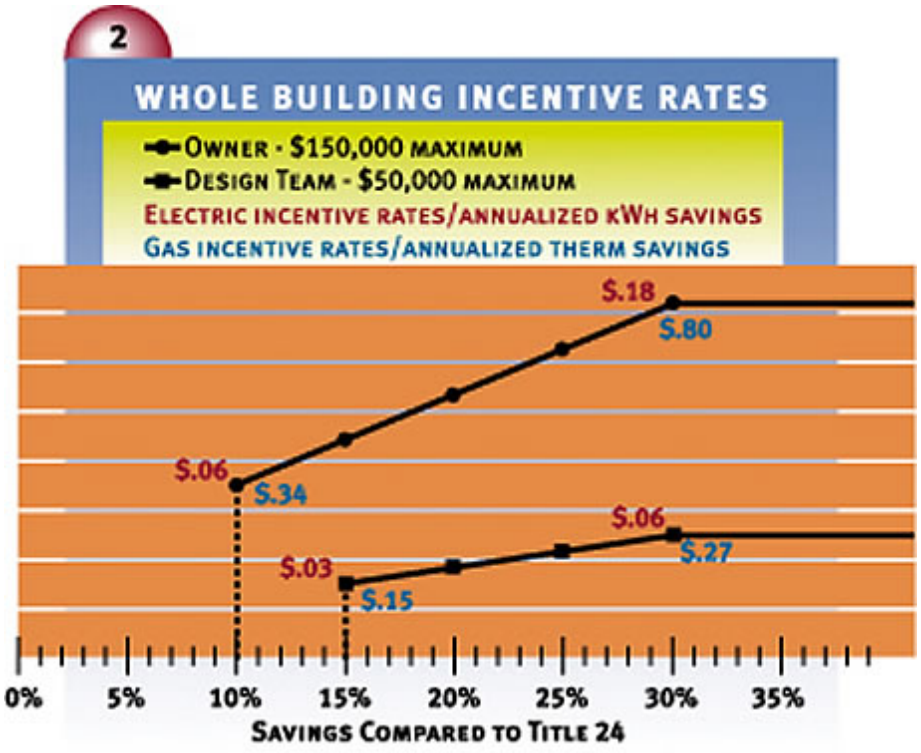
Natural Gas: 2.5%

Life Cycle Cost Savings

EnergyLCC 1.0 *By EnergySoft* *User Number:* 0000 *Page:* 1 of 1

Interpreting the Results

- Results are not always cumulative
  - Example – Better Chiller and Better Windows
- SBD Incentives are designed to Escalate as savings Increase



- Decide on Combined Measures
- Incentives escalate as packages of measures are created
- Create package of measures based upon client input