Sustainable Public Architecture Directive

The LEED/2030 Challenge

Current Situation

General Sustainable Standards

Sustainable Material Examples

Our Experience:

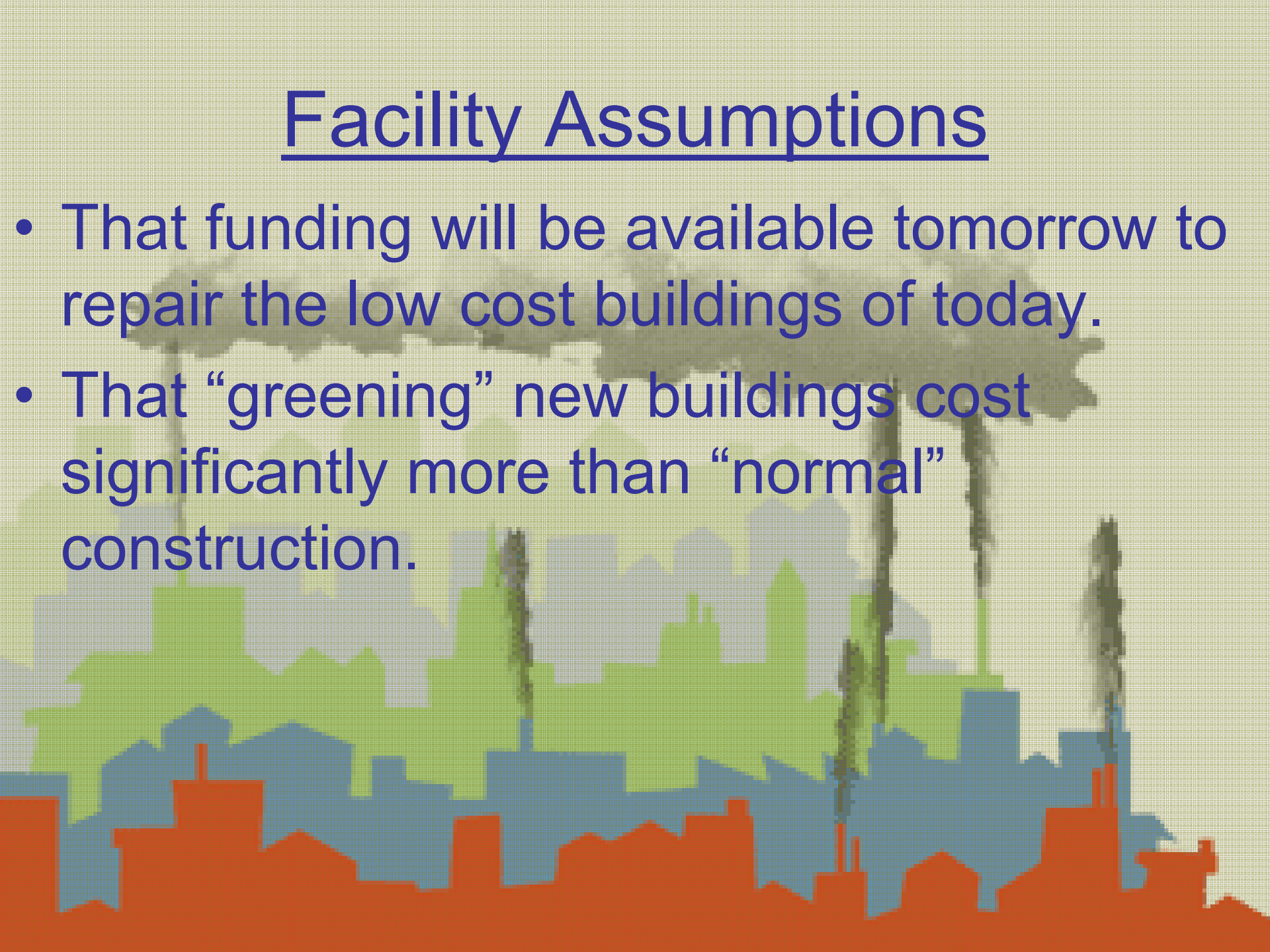
Lompoc Wellness, Casa Nueva and Public Works-SM

Current Situation

- Continue to add square footage with no off-set of energy consumption or building emissions.
- First-Cost driven rather than a balance of Life-Cycle Cost and First-Costs.
- Benchmarking (commissioning) of building performance does not happen.

Facility Assumptions

- That funding will be available tomorrow to repair the low cost buildings of today.
- That “greening” new buildings cost significantly more than “normal” construction.



Green Standards/Guides

- LEED (**L**eadership in **E**nergy and **E**nvironmental **D**esign)
- Architecture 2030--CO_2 Building Emissions
- Federal GSA-LEED--Cost based LEED

What is LEED?

*"**L**eadership in **E**nergy and **E**nvironmental **D**esign"*

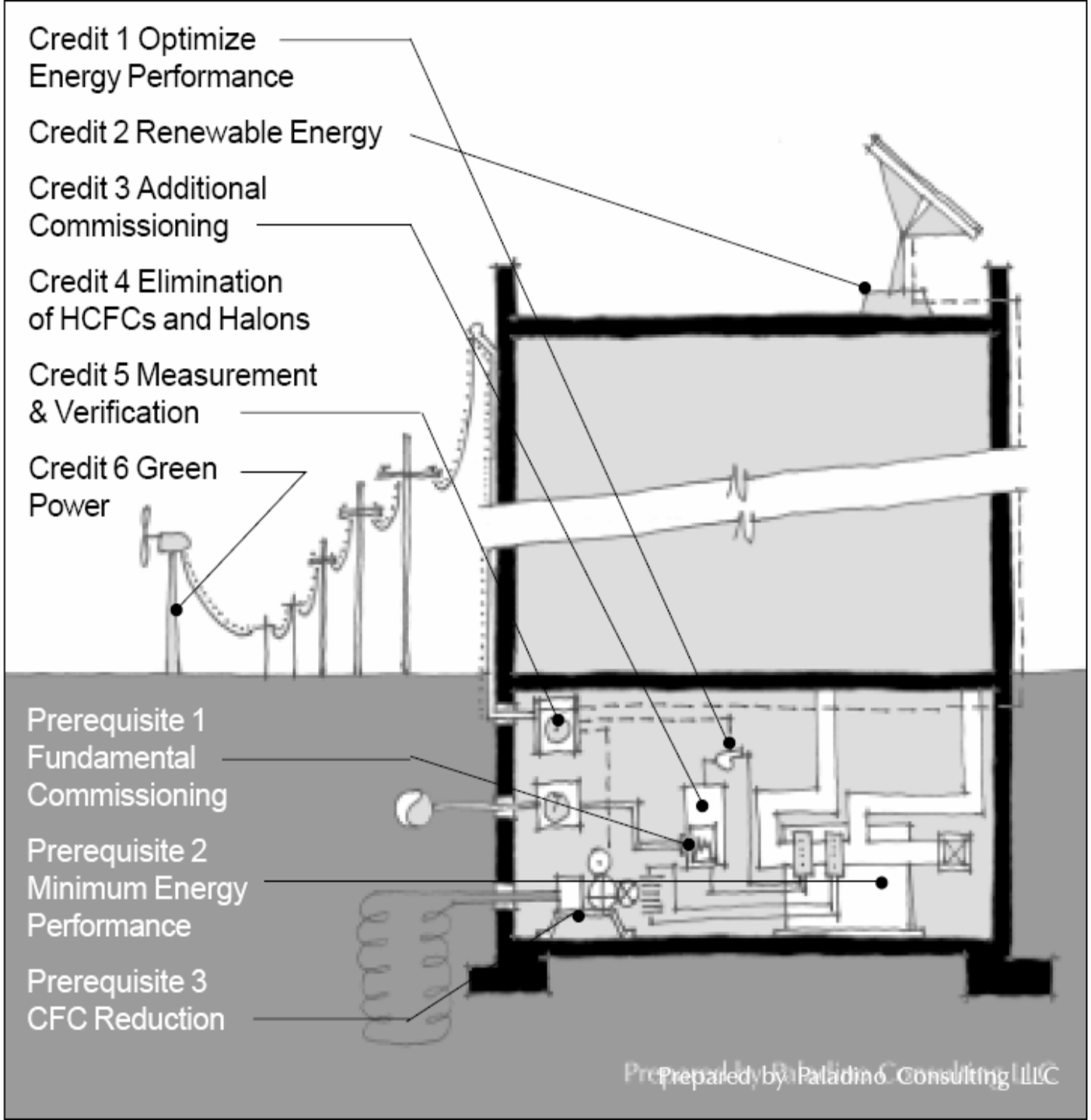
- National consensus based rating system.
- Widely adopted by local, state and federal agencies.
- Systematic criteria—measurable results.
- Recognized and supported by all major utility companies.

LEED Categories & Rating

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

SS | WE | EA | MR | EQ | ID

Overview



View Worksheet

LEED Criteria

Yes	?	No			
8		3	**Energy & Atmosphere**		**17** Points
Y			Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Fundamental Refrigerant Management	Required
6			Credit 1	Optimize Energy Performance	1 to 10
		1	Credit 2	On-Site Renewable Energy	1 to 3
		1	Credit 3	Enhanced Commissioning	1
		1	Credit 4	Enhanced Refrigerant Management	1
1			Credit 5	Measurement & Verification	1
1			Credit 6	Green Power	1

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

LEED Criteria (cont.)

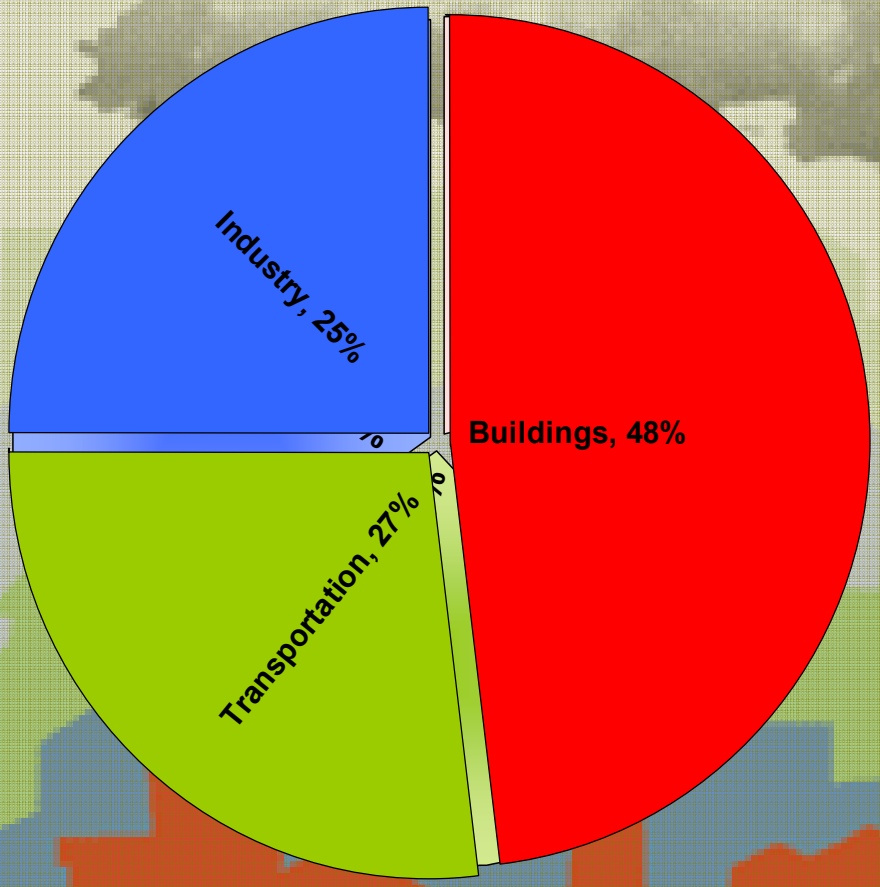
			Indoor Environmental Quality	**15** Points
Y			Prereq 1 **Minimum IAQ Performance**	Required
Y			Prereq 2 **Environmental Tobacco Smoke** (ETS) **Control**	Required
			Credit 1 **Outdoor Air Delivery Monitoring**	1
			Credit 2 **Increased Ventilation**	1
			Credit 3.1 **Construction IAQ Management Plan**, During Construction	1
			Credit 3.2 **Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1 **Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2 **Low-Emitting Materials**, Paints & Coatings	1
			Credit 4.3 **Low-Emitting Materials**, Carpet Systems	1
			Credit 4.4 **Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
			Credit 5 **Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1 **Controllability of Systems**, Lighting	1
			Credit 6.2 **Controllability of Systems**, Thermal Comfort	1
			Credit 7.1 **Thermal Comfort**, Design	1
			Credit 7.2 **Thermal Comfort**, Verification	1
			Credit 8.1 **Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2 **Daylight & Views**, Views for 90% of Spaces	1
Yes	?	No		

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

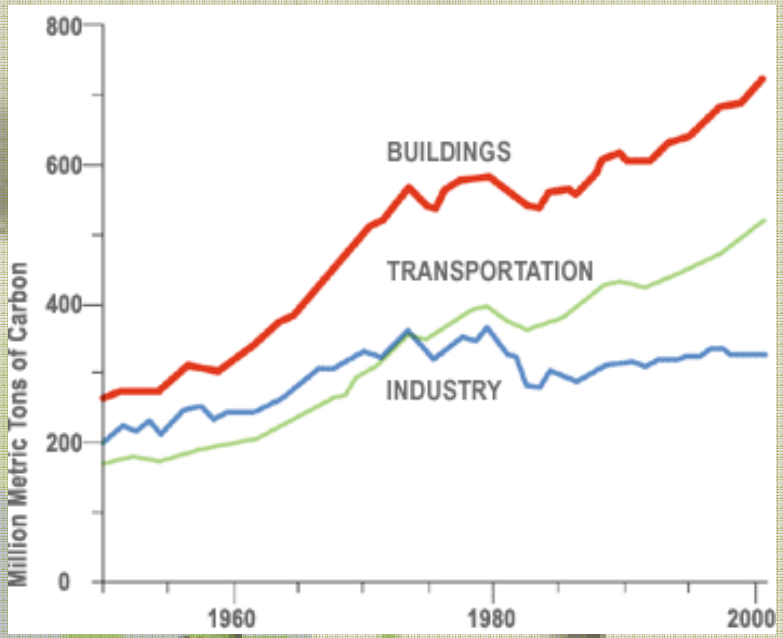
What is the Architecture2030 Challenge?

- Driven by the architectural community
- Adopted by the American Institute of Architects (AIA) and many Contractor Associations.
- The challenge is based upon data available from the US Department of Energy.
- That the construction and operation of buildings, contributes more CO_2 emissions to the environment than Industry and Transportation combined.

US Department of Energy *Emissions Data*



2030 Realignment of data.



Building Emissions include:

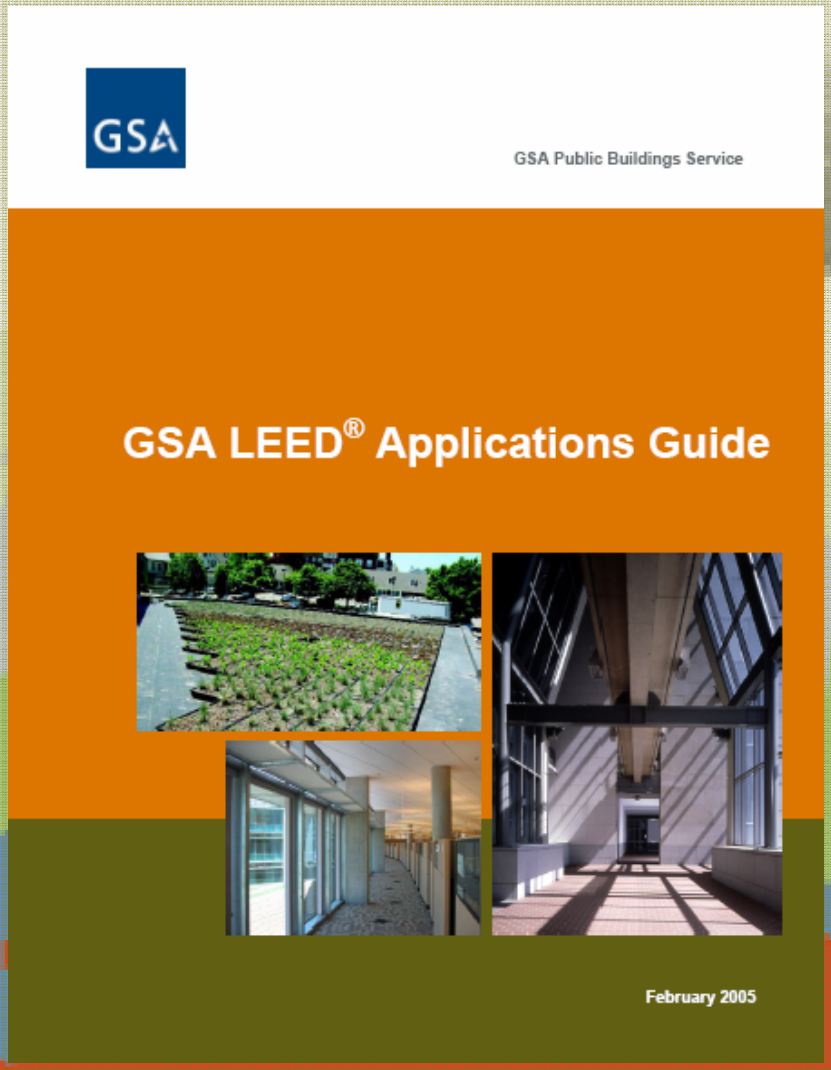
- Heating & Cooling Equipment
- People
- Lighting
- Hot Water Generation

The 2030 Challenge

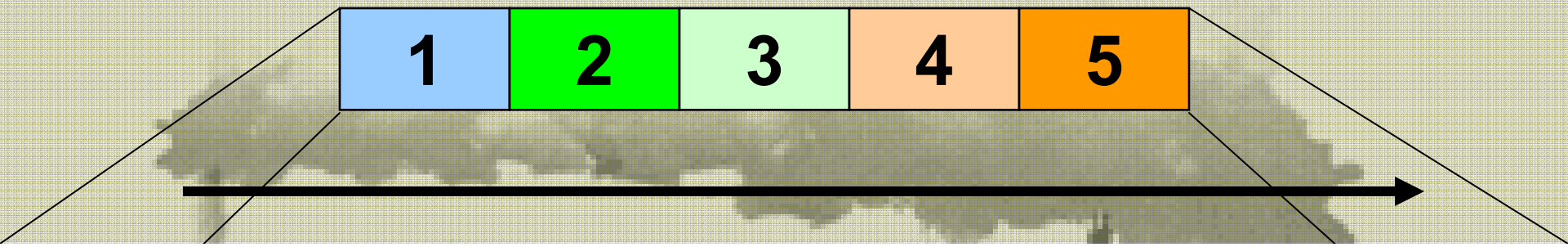
1. That all new buildings and major renovation projects be designed to reduce the use of fossil fuels to construct and operate by 50%.
2. Increase this initial reduction over time, to:
   - 60% by 2010
   - 70% by 2015
   - 80% by 2020
   - 90% by 2025
   - Carbon-Neutral* by 2030

Carbon-Neutral does not mean carbon-free.

Federal GSA-LEED Guide



GSA-LEED Cost Scale



GSA Standard (no cost)	No Premium psble svgs	Low Premium (<50K)	Moderate Premium (50-150K)	High Premium (>150K)

Measure with variable cost premiums, depending on project conditions

Measure unlikely to be pursued on typical projects

Measure not applicable on project

Measure not pursued, although technically viable


Contract No. GS-11P-99-MAD-0565
Order No. P-00-02-CY-0065

GSA LEED® Cost Study

Final Report

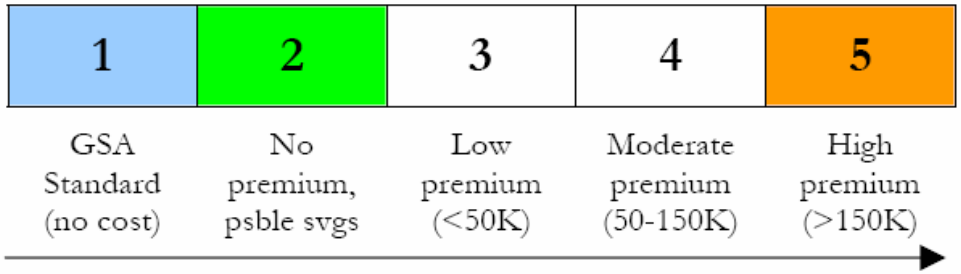
Submitted to:
U.S. General Services Administration

Submitted by:
Steven Winter Associates, Inc

Date:
October 2004

		COURTHOUSE		MODERN FIN.			BUILDINGS		
ID#	LEED Prerequisite or Credit	Low	High	Min Fac	Full Fac		New	Mod	
EA	**ENERGY AND ATMOSPHERE** (17 Possible Points)								
EA-P1	Fundamental Building Systems Commissioning	PRE.	PRE.	PRE.	PRE.		PRE.	PRE.	
EA-P2	Minimum Energy Performance	PRE.	PRE.	PRE.	PRE.		PRE.	PRE.	
EA-P3	CFC Reduction in HVAC&R Equipment	PRE.	PRE.	PRE.	PRE.		PRE.	PRE.	
EA-1	Optimize Energy Performance	1-2	3 or more	1-4	5 or more		1-10	1-10	GSA's required energy efficiency targets will typically earn 1-3 points.
EA-2	Renewable Energy		1	1	1		1	1	
EA-3	Additional Commissioning	1	1	1	1		1	1	
EA-4	Ozone Protection								GSA defines acceptable HVAC refrigerants through the EPA's Significant New Alternatives Policy, which includes HCFC-22.
EA-5	Measurement and Verification	1	1	1	1		1	1	
EA-6	Green Power								This credit is considered an Owner's operating issue, rather than a design team issue.
	MATERIALS AND RESOURCES (13 Possible Points)								

Cost Impact = 1, 2 or 5



Higher Energy Measures

Table EA1-1

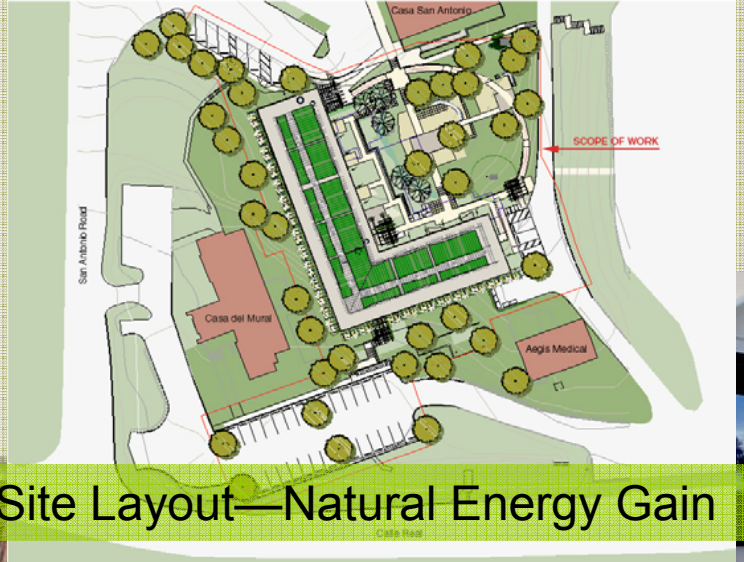
Additional Energy Efficiency Measures (EEMs) to Earn Three and Five Energy Points (Courthouse)

Case	LEED Rating	LEED Points	Imprvmnt over ASHRAE	Energy Efficiency Measures Included (Marked 'X')								
				1.0 watts/SF lighting	Daylight dimming	Occ Sensors	Prem Eff Motors	Mod Cond Boiler	0.49 kw/ton Chiller w/VFD	VFD Cooling Tower Fans	Energy Recovery	CO2 Sensor Control of O.A.
1A Low Cost	Certified	1	16.9%									
2A High Cost	Certified	3	25.4%	X	X	X	X					
3A Low Cost	Silver	3	25.4%	X	X	X	X					
4A High Cost	Silver	5	35.2%	X	X	X	X	X	X	X	X	X
5A Low Cost	Gold	5	35.2%	X	X	X	X	X	X	X	X	X
6A High Cost	Gold	5	35.2%	X	X	X	X	X	X	X	X	X

How are we doing?

- Casa Nueva
- Lompoc Wellness
- Public Works-SM

Casa Nueva Green Features



Site Layout—Natural Energy Gain

Recycled Carpet Tiles

Natural Lighting

Lighting Controls

Recycled Flooring

No VOC Paints

Low Maintenance Landscaping

Casa Nueva Green Features

Materials

•Steel Framing comes from highly recyclable materials and is fully recyclable.

•Wood use was minimized, emphasizing decorative, rather than structural use.

•All interior finish wood (window sills, guardrails, and accents) and exterior trellises are maple or certified

•Self-adhesive modular carpeting does not off-gas, is made from recycled materials, and allows for replacement of individual tiles when necessary, reducing both waste and the use of new materials.

•Exposed ceilings and steel columns reduce the use of gypsum.

exterior painting.

•Shade panels and restroom stalls are made out of #2 recyclable plastic. Panels have a finite life and will become redundant when the wisteria vines mature.

•Pressure treated wood (required for ground contact) is treated to eliminate potential chrome and arsenic groundwater contamination.

Water & Recycling

•The courtyard landscape (excluding wisteria) is native and drought tolerant, reducing water use.

•Waterless urinals in men's restrooms save about a gallon per flush.

•Receptacles for recycling paper, glass, and aluminum are provided in the kitchen.

Energy - Lights

•The shape of the building is narrow and long to provide more workstations with natural

the interior of

t to penetrate

west facing

•Exposed

enhance re

•Lighting s

based on i

control of lights in most work areas.

Energy - Climate Control

•The shape of the building is narrow and long to provide more workstations with access to

•Waterless urinals in men's restrooms save about a gallon per flush.

•Trellis an

replaced b

shade the

the buildin

from the w

•High perfo

south and

reduce the

windows.

•Roof sails

and the intake air,

e energy needed for

ghting system reduces

ds for cooling, because

large source of interior

Self-adhesive modular carpeting does not off-gas, is made from recycled materials, and allows for replacement of individual tiles when necessary, reducing both waste and the use of new materials.

Savings By Design and The American Institute of Architects, California Council present the

2005 SAVINGS BY DESIGN

ENERGY EFFICIENCY INTEGRATION AWARDS

AWARD OF HIGH HONOR

SANTA BARBARA COUNTY

"CASA NUEVA" SANTA BARBARA COUNTY OFFICE BUILDING

FOR CREATING A BUILDING THAT EPITOMIZES THE INTEGRATION OF OUTSTANDING DESIGN AND ENERGY EFFICIENCY, AND SETTING THE STANDARD FOR HONESTY IN ENVIRONMENTAL DESIGN

SAVINGS BY DESIGN

AIA California Council
The American Institute of Architects

Stephan Castellanos, FAIA
President, AIA California Council

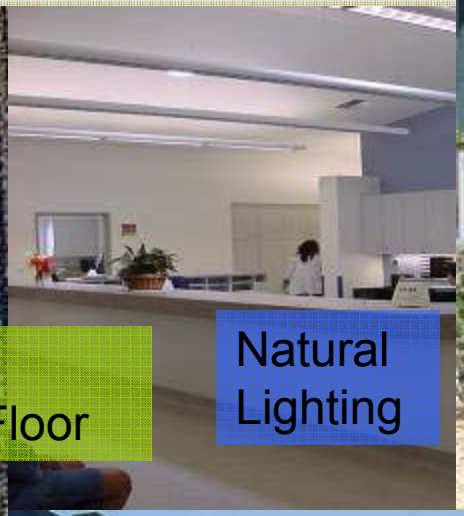
Pacific Gas and Electric Company

SDGE
A Sempra Energy utility

Southern California Edison

Southern California Gas Company
A Sempra Energy utility

Lompoc Wellness Center (score of 39-Gold)

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Public Works-SM Green Features

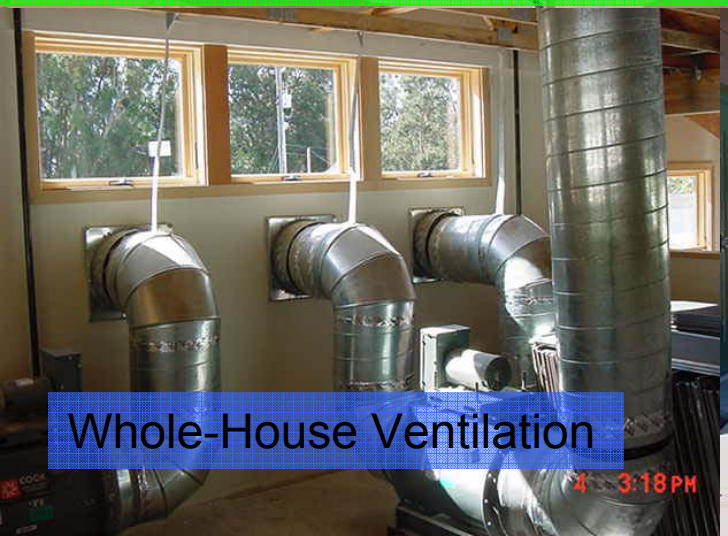
Radiant Floor Heating

(can be retrofitted to use excess energy from Juvenile Hall HVAC system)

Photovoltaic Panels (10 kW)

Pre-Engineered Components

Exceeds T-24 Energy Standards



Whole-House Ventilation

Low Maintenance Landscaping (recycled water used)

Waterless Urinals

Cost of Greening County Buildings

Non-Green Building Utility Costs

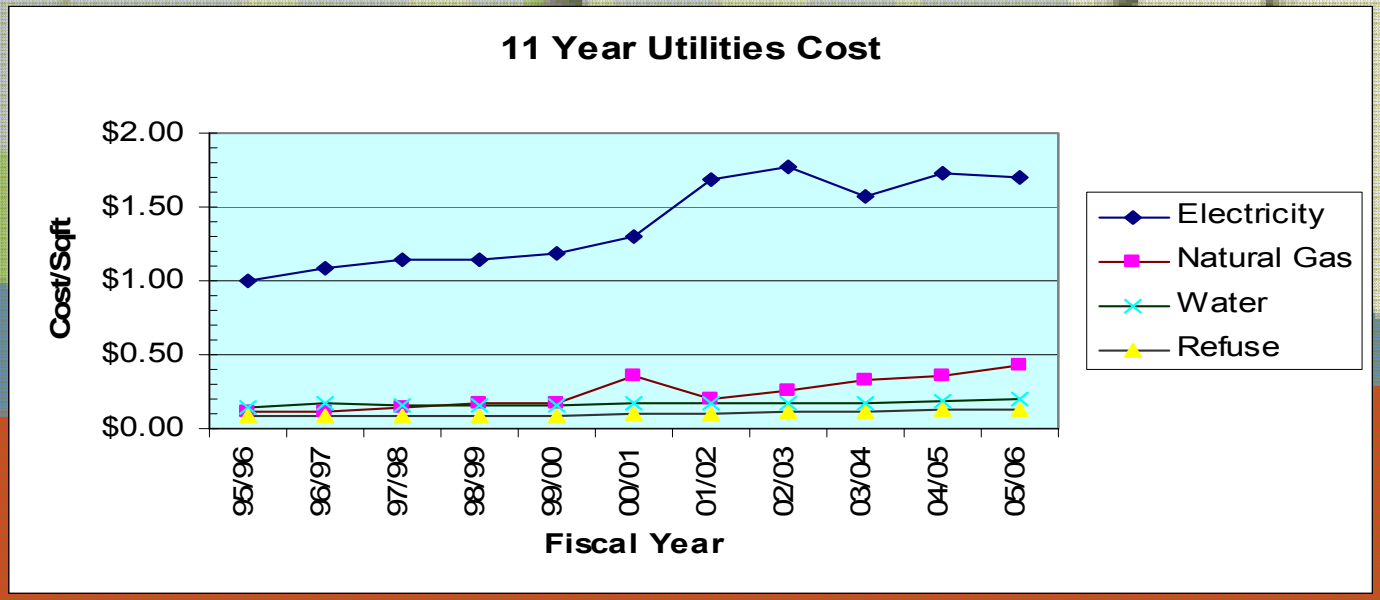
Utilities/SF/Year Electricity, Natural Gas	$2.13/sf E: $1.70/sf NG: 43¢/sf

Green-Building Utility Costs

	Lompoc Wellness (7,900 sf)	Public Works SM (11,000 sf)	Casa Nueva (28,000 sf)	Average of Projects (46,900 sf)
Utilities/SF/Year Electricity, Natural Gas	57¢/sf E: 57¢/sf NG: 0/sf	90¢/sf E: 65¢/sf NG: 25¢/sf	$2.29/sf E: $2.12/sf NG: 17¢/sf	$1.68/sf E: $1.52/sf NG: 16¢/sf

County Utility Usage

FY	Electricity	Natural Gas	Refuse	Water	Total Utilities
95/96	$1.01	$0.11	$0.09	$0.14	$1.35
96/97	$1.08	$0.12	$0.08	$0.18	$1.46
97/98	$1.14	$0.14	$0.09	$0.16	$1.53
98/99	$1.14	$0.17	$0.09	$0.15	$1.55
99/00	$1.18	$0.18	$0.08	$0.16	$1.60
00/01	$1.30	$0.35	$0.10	$0.18	$1.93
01/02	$1.68	$0.21	$0.10	$0.17	$2.16
02/03	$1.77	$0.25	$0.11	$0.17	$2.30
03/04	$1.57	$0.32	$0.11	$0.17	$2.18
04/05	$1.73	$0.36	$0.13	$0.18	$2.40
05/06	$1.70	$0.43	$0.13	$0.19	$2.46
Average	**$1.39**	**$0.24**	**$0.10**	**$0.17**	**$1.90**



Goal and Objective

- To articulate a clear directive in “greening” county facilities.
- Provide leadership in the construction of our own facilities with those requirements placed upon the private-sector development community.
- Reduce (over time) the CO_2 emissions of county facilities.
- Reduce (over time) the cost to operate and maintain new and major remodel projects.

Recommendation

- Direct Staff to draft a *Sustainable Public Architecture Directive* for consideration by your Board at a future date as outlined in this presentation.
  - The Directive would include
    - Cost-Matched LEED criteria included in all projects.
    - Reduction of CO_2 emissions in buildings with increasing targets going forward.
    - Formalize a process for evaluating those LEED criteria to be included in projects at the early feasibility phases.
- Direct Staff to draft an amendment to Chapter 12A, Article IV of the County Code and revise Ord. 4452, to include the Directive as part of the Facility Policy Framework.