

Easy being Green

A PRESENTATION BY DENNIS J. KOWAL AIA

and DENNIS KOWAL ARCHITECTS 908-231-0201

Green Advantage Certified for overseeing Green Construction

LEED Accredited Professional for Green Design



Dennis J. Kowal of Dennis Kowal Architects, Somerville New Jersey is an accredited LEED professional who teaches other architects the principals of sustainable design. This presentation reflects his expertise of how to cut through the market inundation of data and myths. Look at this beautiful Victorian Home. We will return to this photo later as a summary of Easy Being Green.

It's Easy Being Green and Understanding why it's Important!



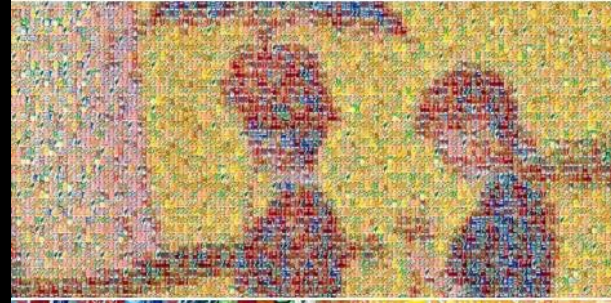
No one has to be convinced why Green is important. Would the author, shown flying above the rainforest canopy, in Guatemala have wanted to fly with the seagulls over this garbage dump?



REDUCE REUSE RECYCLE

One way to understand the basics of the Green Movement is to apply the same three concepts with which we are familiar.

RECYCLE



www.madaboutshoes.org

We all understand how recycling works and that an old can may become a pair of high heels, or art, or just another can.



How effective are we at recycling, and is it really worth the effort and cost of transportation? This ad admits the struggle of conscience over patience.

Demand for recycling up but prices are down

By Karen Dillon and Finn Bullers | The Kansas City Star

Now that you're finally an enthusiastic recycler, putting out your bins each week and congratulating yourself on your Earth-consciousness, it may be about to get much harder.

Some recycling centers have closed, others are endangered, and weekly curbside recycling is threatened in several cities. Fees you pay could be going up, too.

"It's extremely difficult now," said Phelps Murdock, president of Bridging the Gap, which manages recycling centers in the area. "We don't know what is going to happen."

The problem: As the economy nosedived last fall, the global recycling markets went into a free fall, too.

The China recycling markets that take a large portion of the United States' recyclables closed their doors. Fewer people were buying televisions, electronics and other goods, and that meant a sharp decrease in the need for packaging materials, said Ed Skernolis, acting executive director of the National Recycling Coalition.

As a result, prices for recyclables sank like a lead balloon. Take cardboard, for example. In August, it was running as high as \$140 a ton, but now it's as low as \$20 a ton.

"When the economy goes south, commodity markets go south," Skernolis said. "It's all tied together."

"There is almost no value to any recycled materials right now."



To make matters worse, while the demand for recycled materials was once high and competitive, now many localities cannot find buyers for their reusable waste and must pay for removal.



- Making an aluminum can from used cans uses 95% less energy than all-new

- Tossing away an aluminum can is like wasting a half a can of gas

- One recycled aluminum can saves enough energy to keep a 100 watt bulb burning for four hours



- A recycled can is back on the shelf, refilled in as little as 60 days. The US uses 106,000 cans every 30 seconds and recycles half.



To answer the question “Is it worth it?”, consider that the energy used to make a new aluminum can including mining the bauxite, smelting the aluminum, and forming the can is 9.5 times more energy consuming than just recycling an old can back into a new can.



38 billion water bottles go to landfills in America every year

www.earth911.com

However, Americans only recycle about 23% of their plastic bottles.

REUSE



www.thegreenergreen.com



www.reusablebags.com



Of course, Reuse is better than Recycling because it uses even less energy and makes less waste. There are ways to avoid adding plastic to the waste stream. One of these is reusable bags, reusable sandwich holders, and even bottle made from corn resin (PLA) which decompose in a short time.



Reuse can start with reusing our existing building stock, especially our historic structures. Buildings account for more energy use than transportation. If a building can't be saved, some of its components may be reused.

REDUCE



www.sustainabledave.com

The best strategy is always reducing what you use in the first place. "Sustainable Dave" reduced what he bought to the point that he stored all of his garbage collected over one year in his basement and then displayed it on his lawn.



The New York Times
Sunday, October 19, 2008 Last Update: 2:32 PM ET

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SUNDAY STYLES
Completely Unplugged, Fully Green

Jonathan Alcorn for The New York Times

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via MSNBC)
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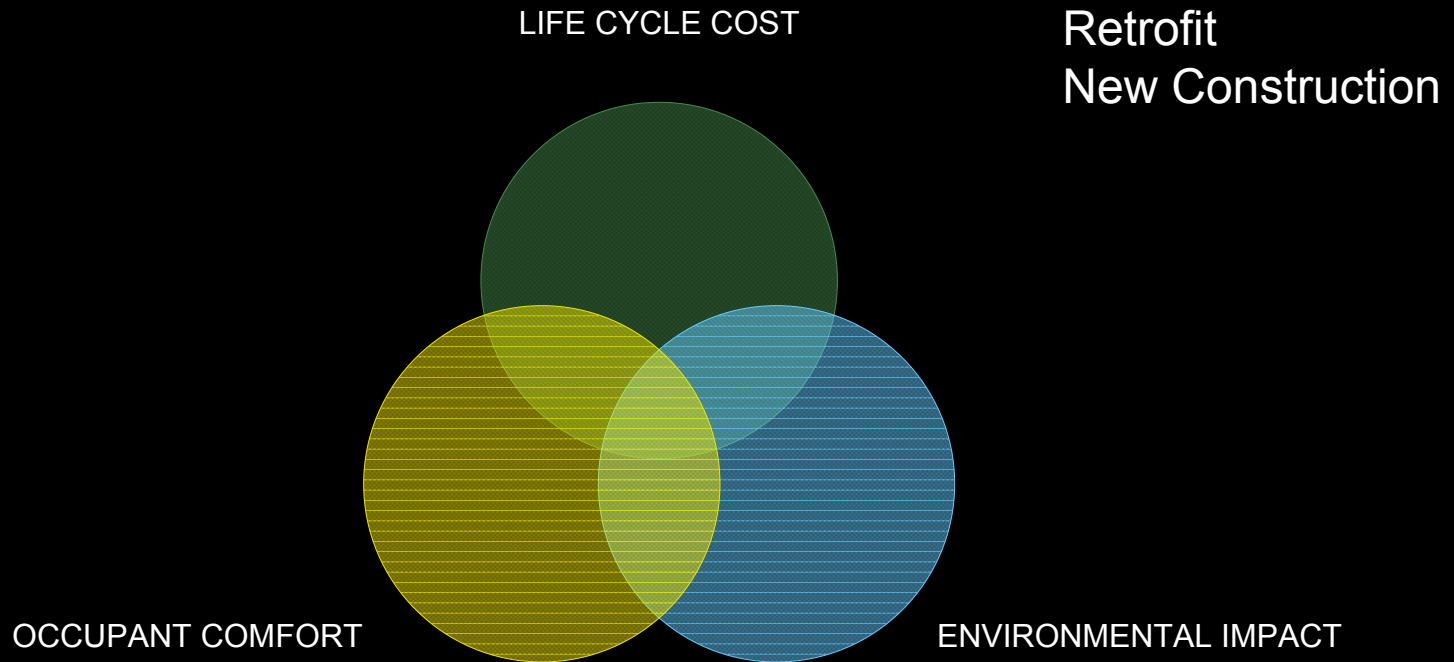
Decisions W
Emulating?
George Vecsey





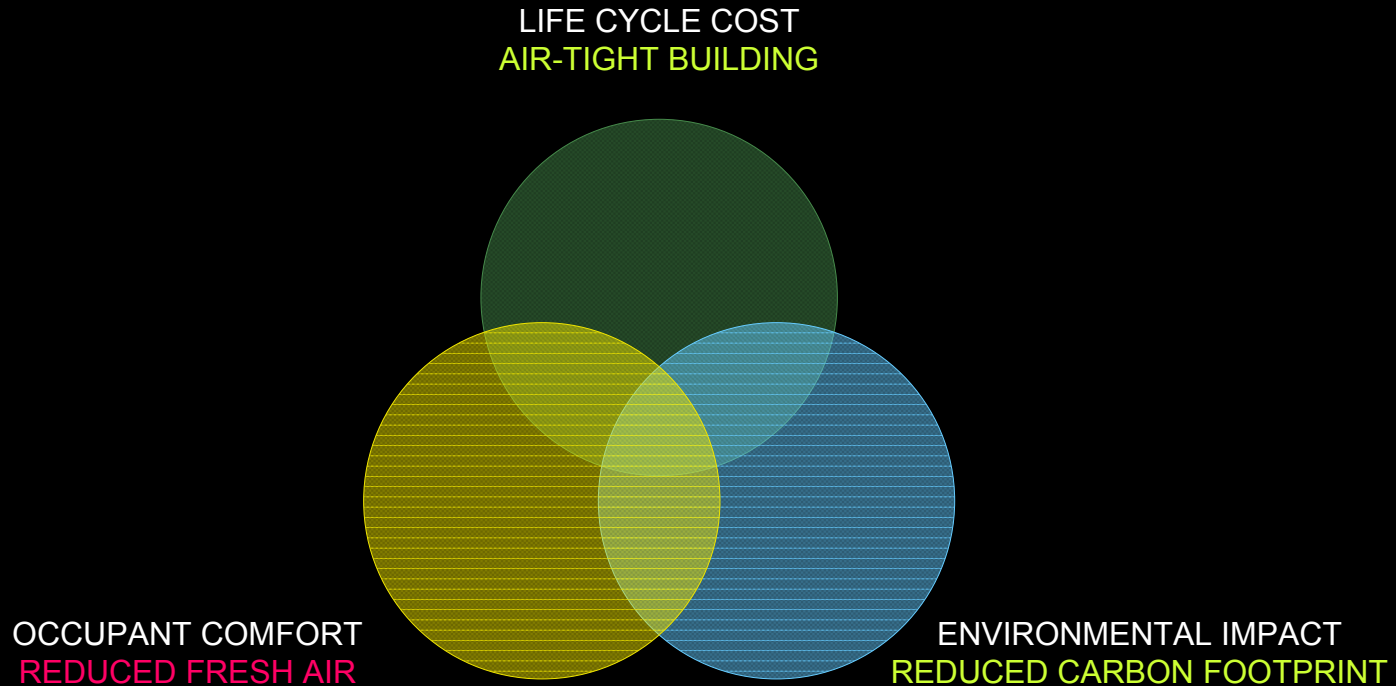
It's Easy Being Green if it is a WIN ▪ WIN ▪ WIN!

COST ■ COMFORT ■ IMPACT



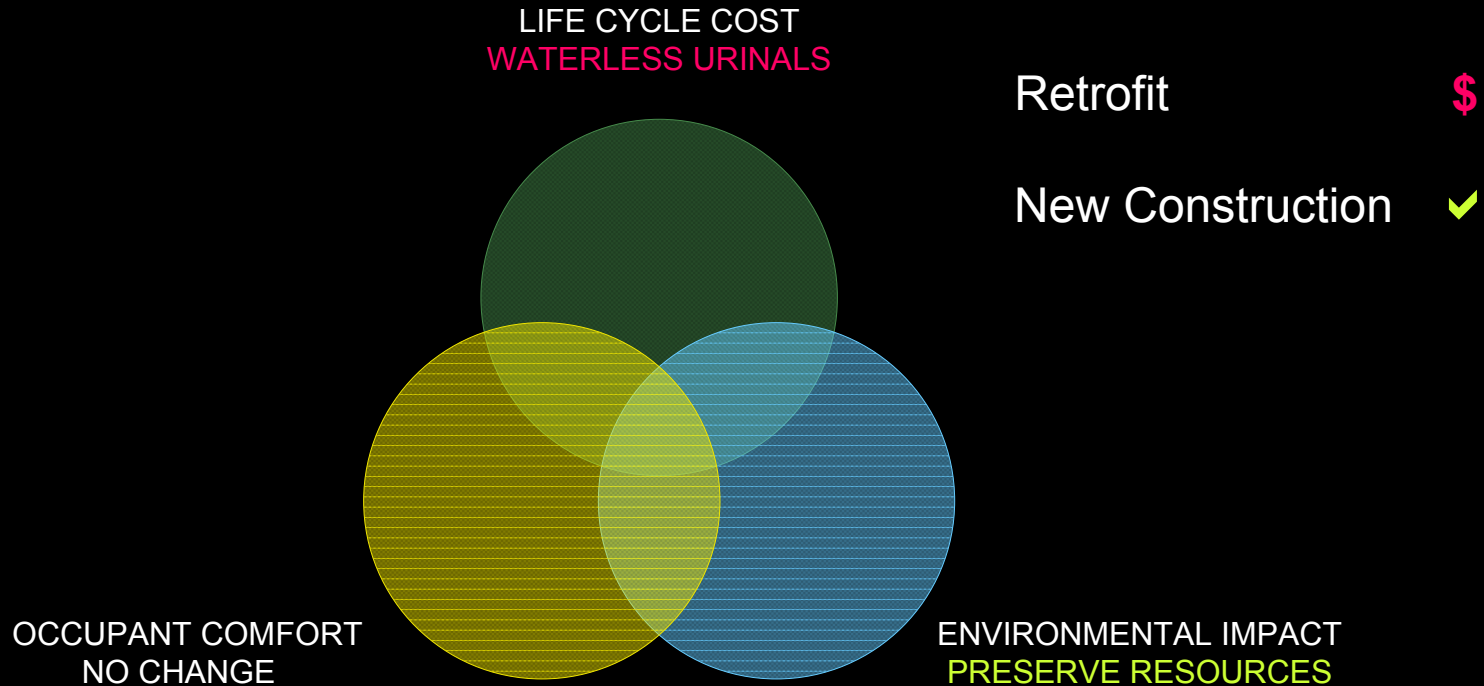
Cost, Comfort, and Measurable Impact should all be addressed to be a winning strategy.

Air-Tight Building



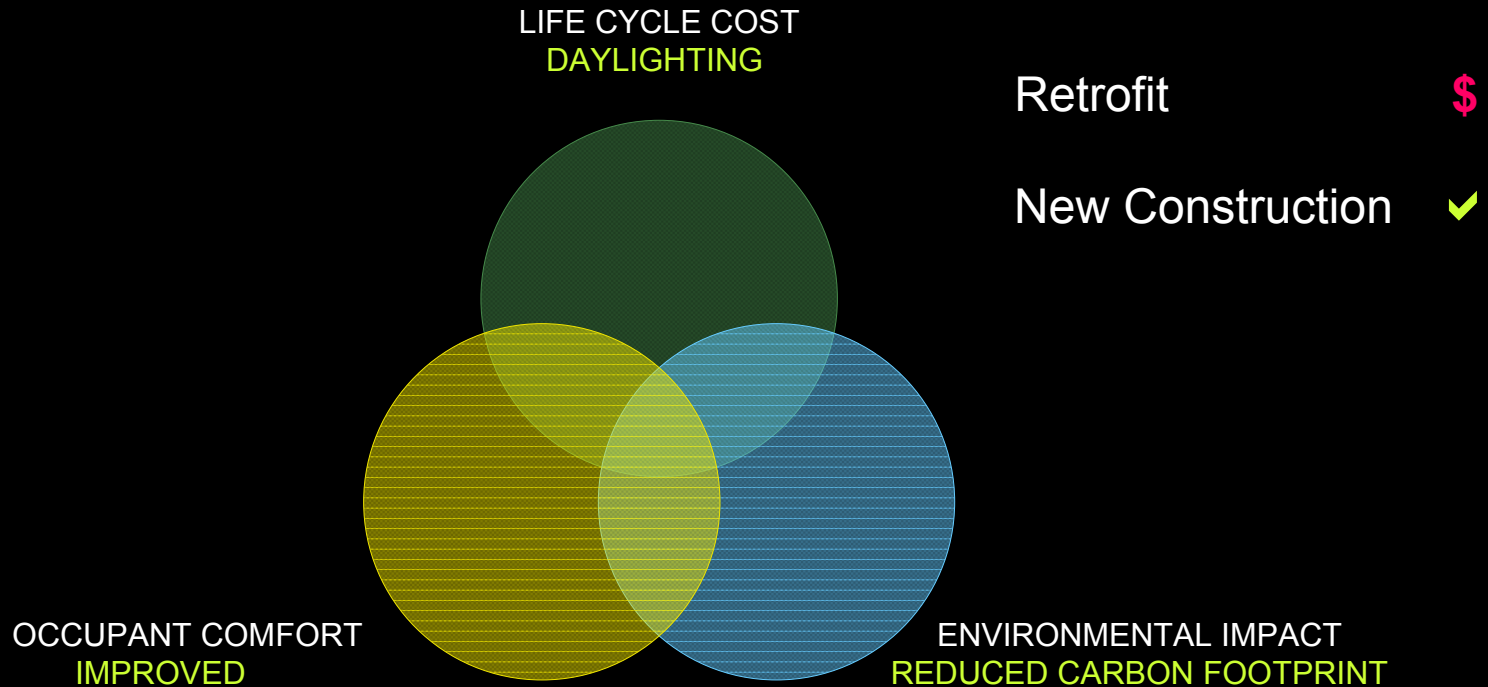
For example, the air-tight buildings of the last decade did reduce energy use and costs; and therefore, carbon emissions. However, the occupants suffered -- not a winning strategy!

Waterless Urinals

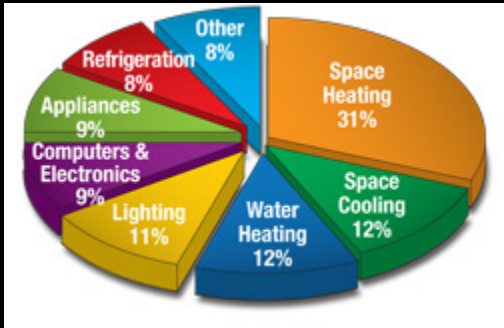


Also, while we will continue to recommend Waterless Urinals in some of our buildings for other reasons, our studies have shown that while waterless urinals save water, they increase energy use because of the manufacture, installation and disposal of the cartridges (which continues for the life of the building).

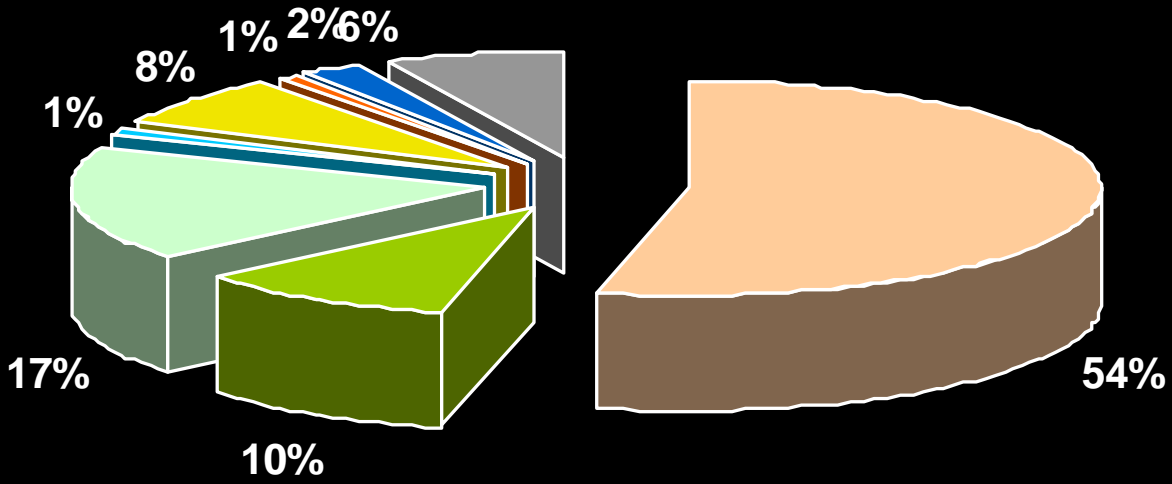
Daylighting



Now daylighting is a winning strategy! Notice that all three categories are met making this an “easy green” choice. Daylighting is simply using natural light when it is available.



- Space Heating
- Cooling
- Ventilation
- Water Heating
- Lighting
- Cooking
- Refrigeration
- Other



It is difficult to know where your energy is going because orientation, age, use, and other factors change the percentages. However, in a commercial building on the North East Coast, most of your energy goes to heating.





Therefore, it makes sense to reduce the loss of heat from the envelope of your building. This strategy applies to both new and existing projects. Your architect or engineer can analyze the performance of your envelope.

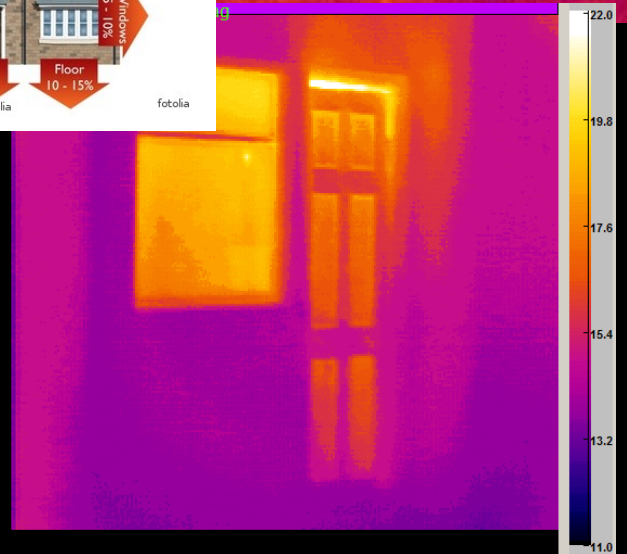
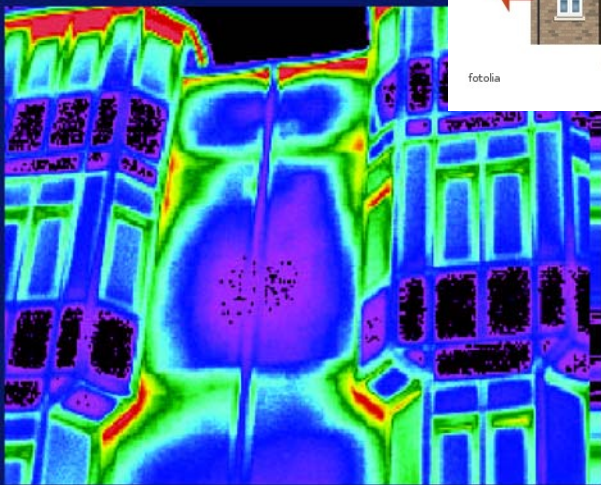
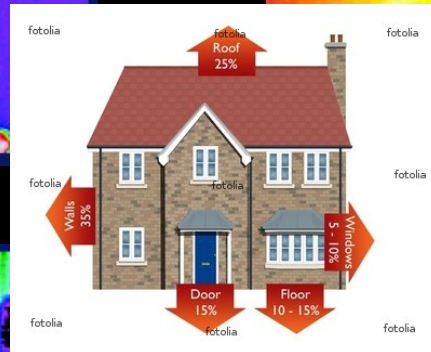
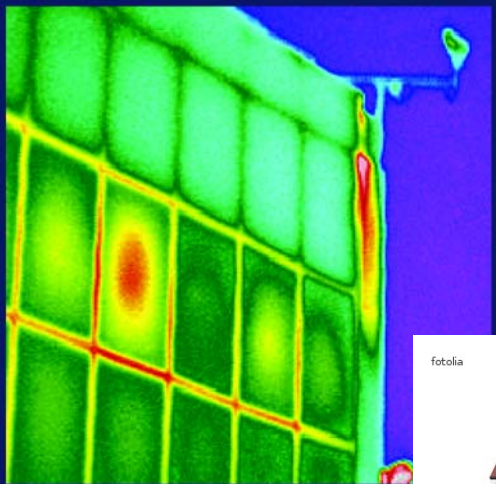
Oak Ridge National Laboratories ZIP INSULATION PROGRAM www.ornl.gov



Zone	Gas	Heat Pump	Fuel Oil	Electric Furnace	Attic	Cathedral Ceiling	Wall		Floor
							Cavity	Insulation Sheathing	
1	✓	✓	✓	✓	R30 to R49	R22 to R38	R13 to R15	None	R13
2	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R13
2				✓	R30 to R60	R22 to R38	R13 to R15	None	R19 - R25
3	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R25
3				✓	R30 to R60	R22 to R38	R13 to R15	R2.5 to R5	R25
4	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
4				✓	R38 to R60	R30 to R38	R13 to R15	R5 to R6	R25 - R30
5	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
5				✓	R38 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
6	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
7	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
8	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30

D.O.E. Department of Energy Efficiency and Renewable Energy www1.eere.energy.gov

The D.O.E. has a great calculator to tell you how thick your insulation should be depending on your region. However, your architect can analyze how to maximize the return on your investment for envelope improvements.



Buildings also lose energy (either heating or cooling) through thermal bridges, unbroken links between the inside and outside. Thermal photography can spot the locations of the thermal short-circuits.



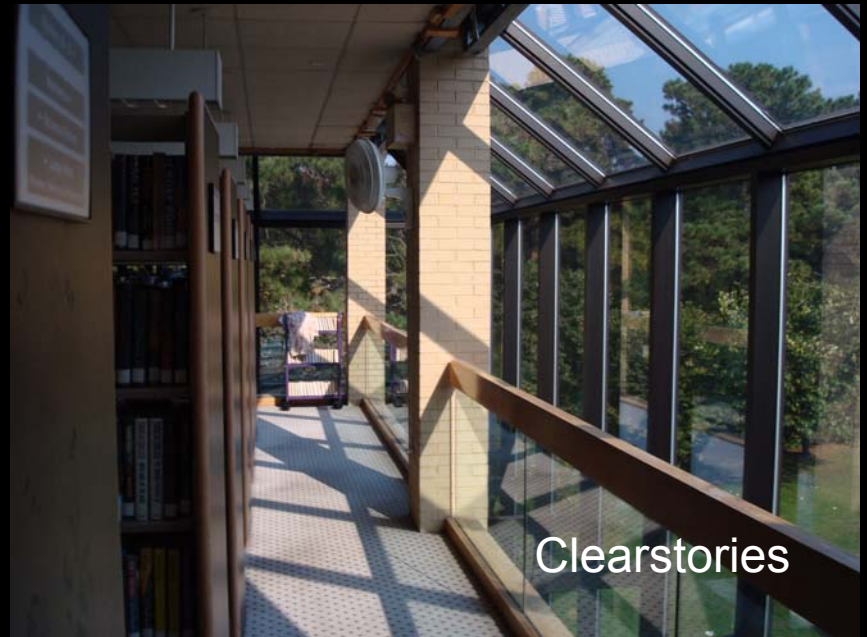
Windows



Doors

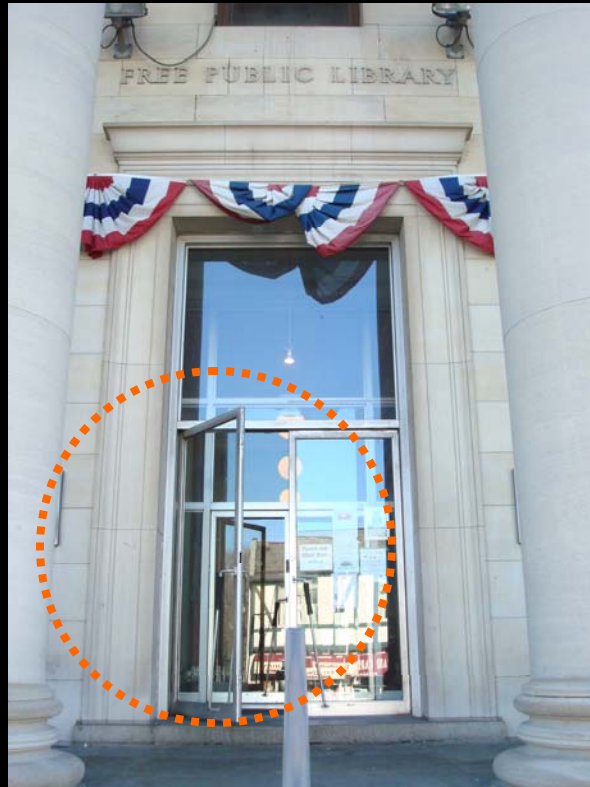


Skylights



Clearstories

Some breaches in the envelope are more obvious like actual openings, single glazing, or missing weatherstripping.



1. Weatherstrip doors and keep closed (Save 2%)



Even doors which stick open or are too closely spaced to act as a proper wind lock contribute to the problem. Note that by addressing these problems you can reduce your energy bill. The following are some areas in your envelope to consider and the savings you might expect.

2. Close window blinds to shade interior spaces from direct sunlight.
(Save 2%)



73.7-974.81



3. Insulating window covers closed at night
(Save 8%)

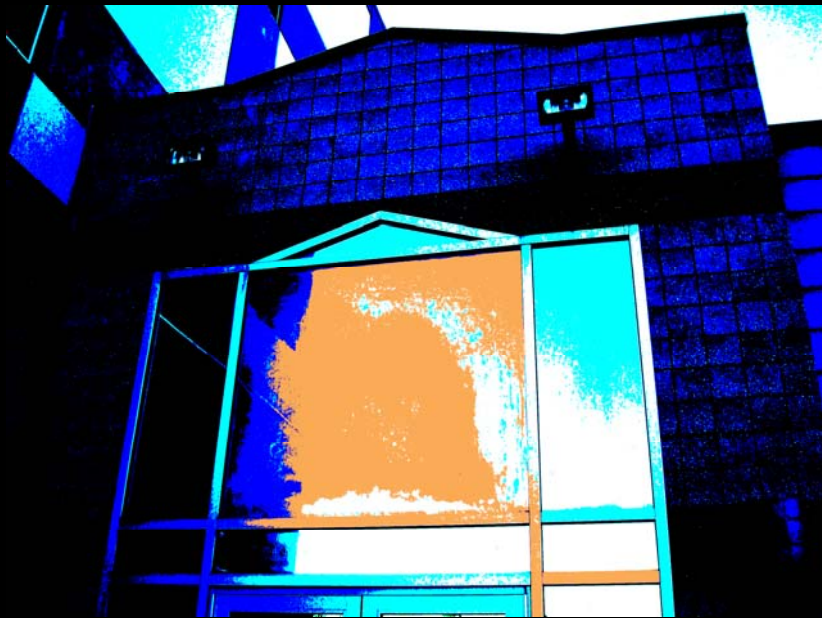


4. Adequate separation between doors in wind locks (Save 2%)



5. Replace broken seals or inefficient glazing

(savings vary)





6. Use translucent insulated panels and/or Low-e glazing (31% more efficient than plain insulated glass)

Low E glazing accounts for only 1% of the glass in the United States but is a proven winner to allow winter heat gain in and summer heat gain out.



7. Use bi-level lighting and task lights (Save up to 15%)



Or combine natural, indirect, and direct (task) lighting



Avoid extremes like the energy saving buildings of the 1970's



Avoid building fortresses. Good aesthetics and good stewardship are not opposites. The next slide shows how this building was transformed using daylighting. Notice the patron who had to bring her own flashlight to see in the old "daylight-less" facility.



Voila! Same building! Deep overhangs now protect the glass from summer sun angles and insulated, translucent, roof-panels light the interior.



At night, the same translucent panels act as diffusers and reflectors. Notice how all the glass goes “black” at night and does not contribute to diffusing the lighting, which is why the area of glass is maintained as relatively small.



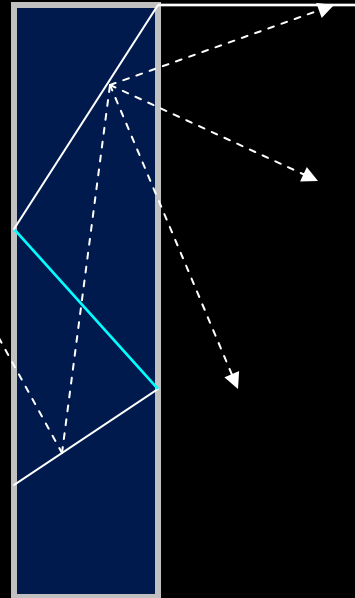
Daylight can be enjoyed more than once.



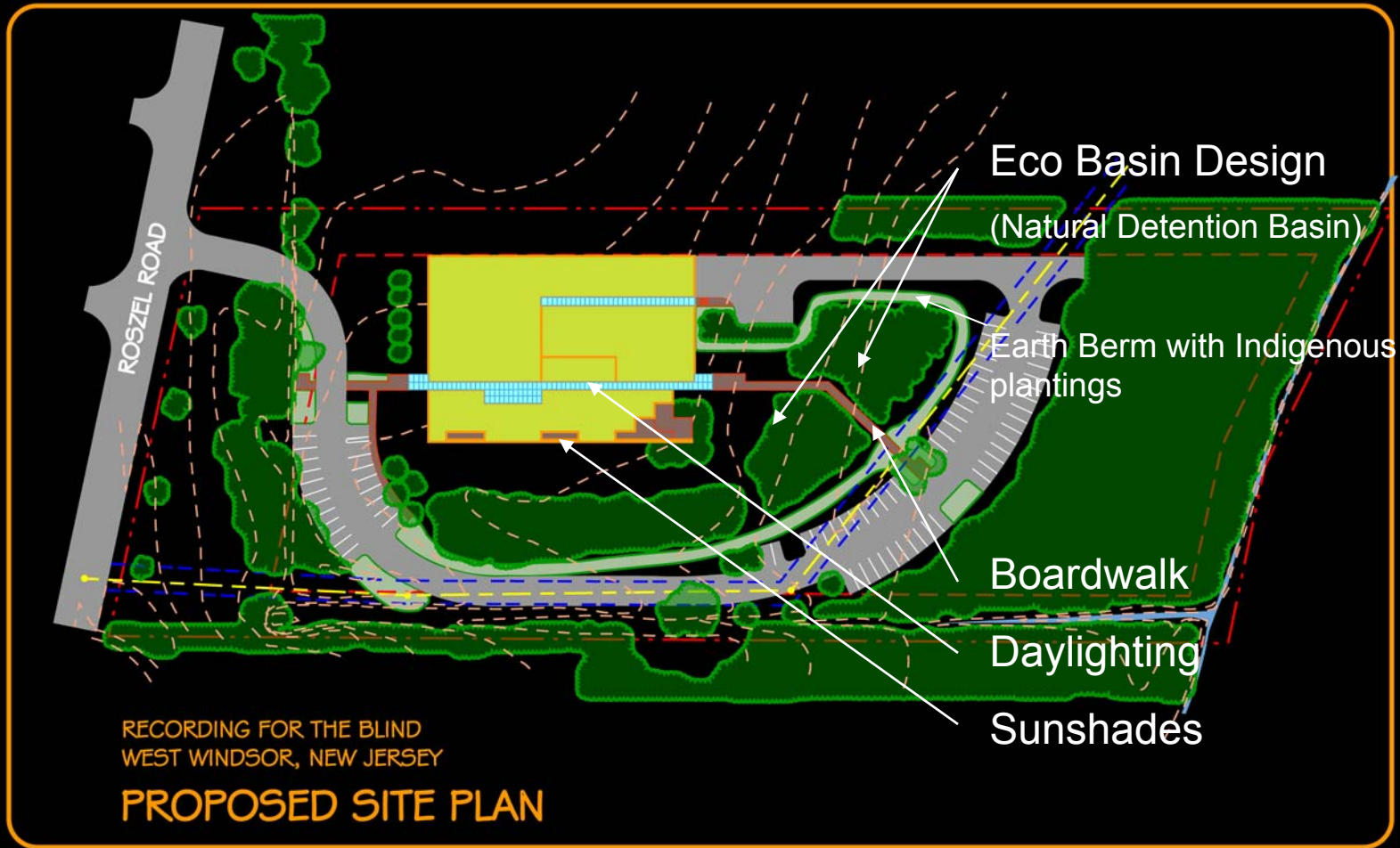
At the Livingston Public Library, light let in from the first floor is allowed to filter to the lower level through a glass floor.



Incidentally, building Green is not a new idea. Dennis designed an extremely energy efficient building 25 years ago for the Exxon Energy Division. This 100,000 square foot building practiced minimal site disturbance using mature trees to shade the parking lot, super-insulated wall panels, and incremental heat pumps that drew heat out of the passive solar collector at the center of the building.



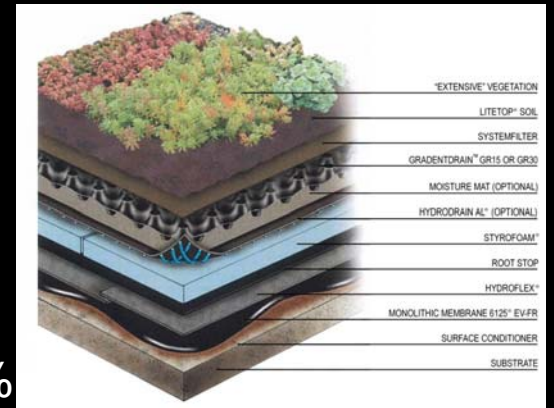
A special thickened wall design employed tipped glazing to shy away from the summer sun angle but bounced in the light to naturally brighten the perimeter offices.



Also 25 years ago, this electronic library for RFB incorporated sustainable site design principals which are now part of the LEED reference guide for Green Building.



Dennis never let new technology, high energy efficiency or low budgets reduce the beauty, comfort and appropriateness of the design.



8. Use lighter color roofing or green roofs (Save 3-5% of summer electric)

Another consideration of the envelope is the roof. Green Roofs (which contain drought resistant plants) and white roofs reduce the summer cooling load.



9. Put your computer, monitor and printer on sleep mode (Save .5%)



Moving inside the building, Green technologies can show up in a variety of ways. Again, starting with the easiest: Just turn it off!



10. Install waterless urinals, dual flush toilets and metered faucets (reduce water 30%)



Install pervious (porous) pavers to absorb rainfall (reduce run-off)





Consider polished (and unsealed) concrete floors (Save carpet, VOC's, and replacement).





Use FSC wood and renewable wood products such as sunflower seed board





11. Turn off lights in unoccupied rooms. (Save: 1-2%)



12. Perform scheduled maintenance on air-conditioning units including cleaning condenser coils, replacing air filters, and checking ducts and pipe insulation for damage. (Save: 2-5%)



13. Hire a third party to test (commission) your HVAC system to determine if it is performing to peak. This is different from maintenance which you still need to do regularly. (5-10% efficiency increase)



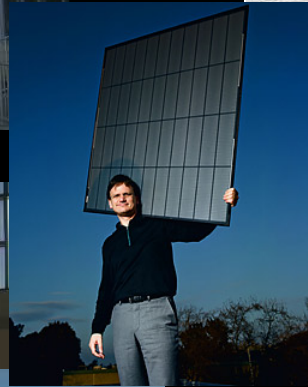
14. Green roofs increase roof life and reduce loads (Save 5-8%)



Green screening allows winter sun but shades summer sun.



Green screens reduce solar gain and heat island effect.

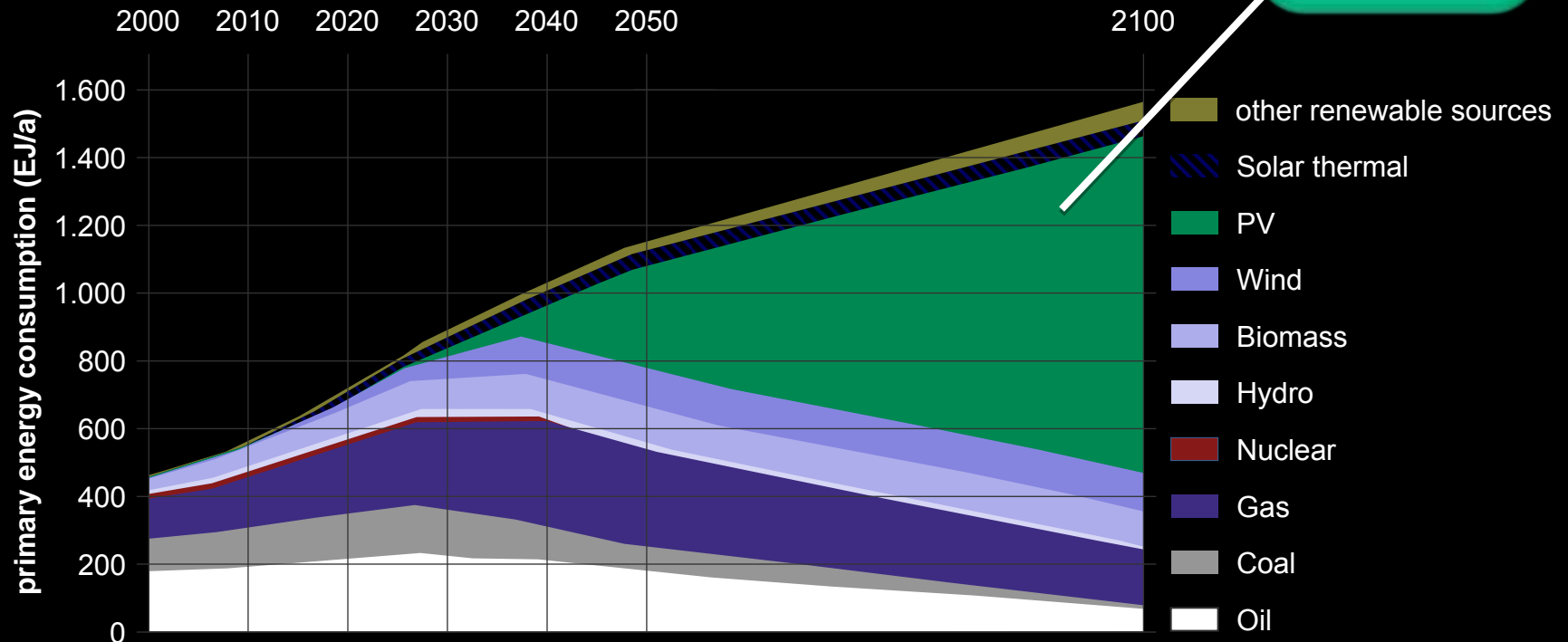


PV arrays using new thin film technology are lightweight and transparent

Solar Century

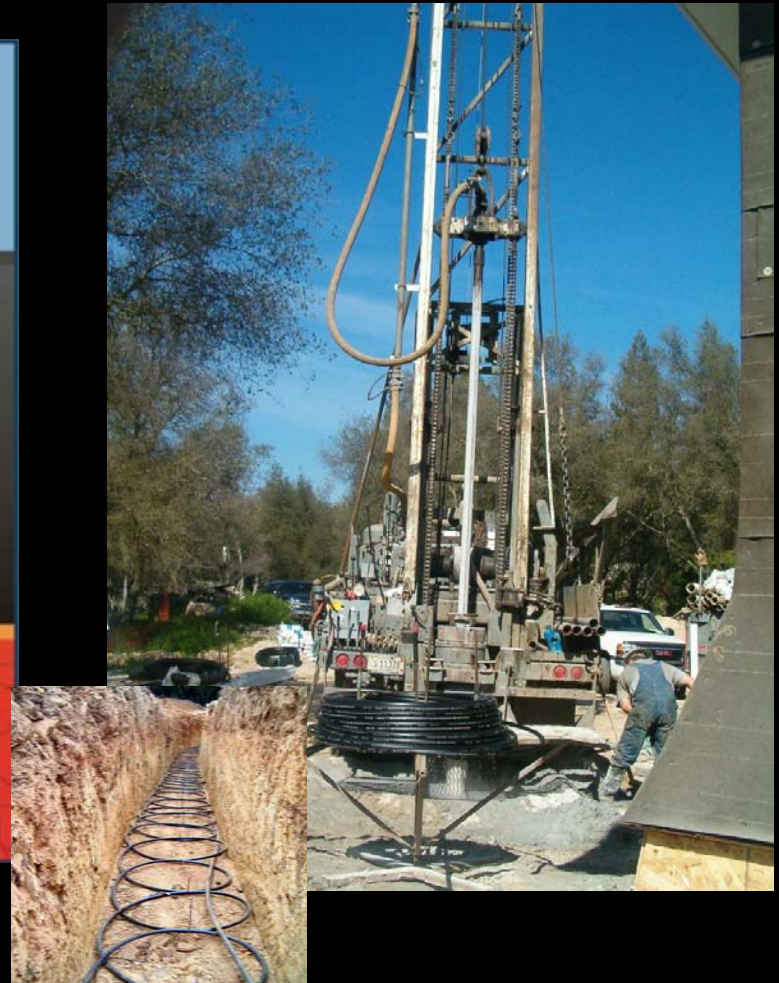
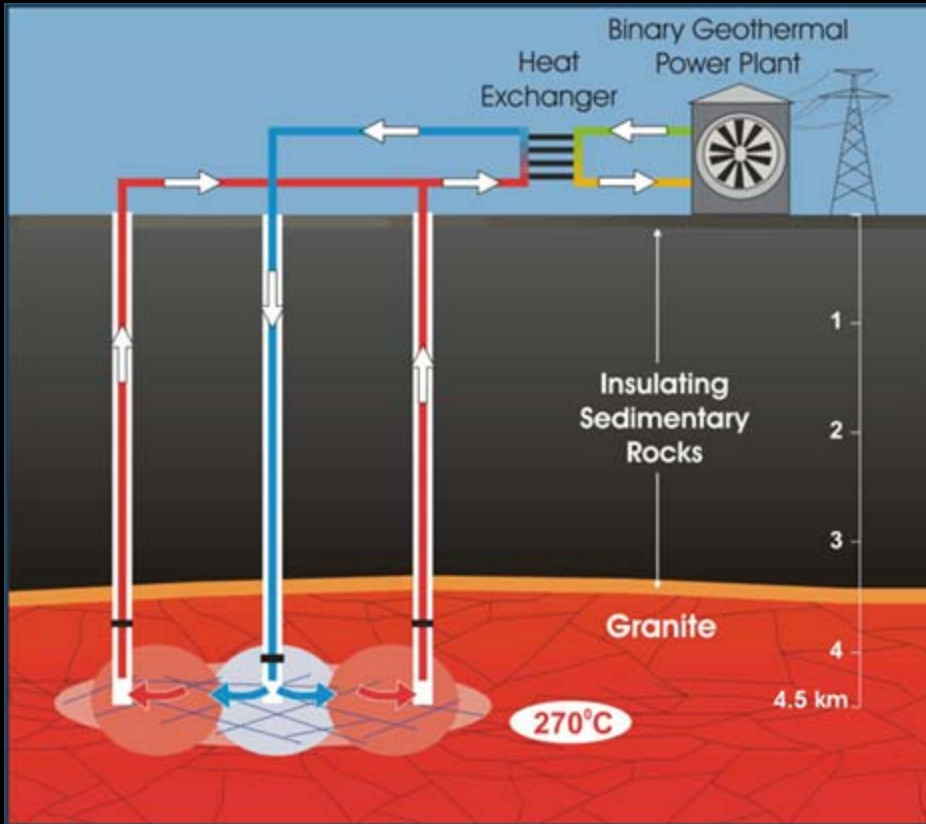
Conservative view: faster cost depression
in PV power not included

second half
of century:
wind/solar
50%



source: German Advisory Council for Global Change (www.wbgu.de), 2003

Keep your eye on emerging technologies, but have your architect weigh the options.



Geothermal and other heat sources sound great, but other factors may mitigate the rewards.

Evaluation

	Life Cycle	Physical	Comfort	Green		Total Points
Base System	12	26	14	10		62
Split System	13	22	13	9		57
Chilled Water / Hot Water	15	22	21	21		79
Geothermal	17	20	15	25		77
Water Source Heat Pumps	15	19	14	17		65

A proper evaluation needs to be performed for your specific building, results do not uniformly apply to all sites.

Alternative	Installation Cost	Estimated Smart Start Rebates	Utility Cost		Maintenance Cost		Life Cycle Cost
			First Yr	Final Yr	First Yr	Final Yr	
Packaged RTU	\$720,000	\$12,915	\$88,026	\$362,329	\$9,000	\$37,045	\$7,166,328
Split System	\$1,044,000	\$12,765	\$78,553	\$323,336	\$12,000	\$49,394	\$7,060,261
Chilled Water / Hot Water	\$1,260,000	\$17,745	\$61,720	\$254,049	\$15,000	\$61,742	\$6,357,200
Geothermal	\$1,340,000	\$52,350	\$53,301	\$219,395	\$12,000	\$49,394	\$5,678,539
Water Source Heat Pump	\$1,148,000	\$12,035	\$60,931	\$250,799	\$15,000	\$61,742	\$6,192,743

Geothermal Test Borings



In one specific case we analyzed for a library client, Geothermal had one of the lowest utility costs but resulted in the most destruction of natural forest surrounding the site.

Easy Green for an Existing Building

Education (remember cooperation Lesson?)

Appoint a Green Monitor responsible for education & follow thru

Provide (sell) Reusable products to encourage Reuse

Provide good filtered water and refillable polylactic bottles

Provide signage to encourage green habits (reduce, reuse, recycle)

Conservation

Commission the HVAC system and follow recommendations

Inspect your envelope and repair, draftstop, and insulate

Upgrade to electronic ballasts as well as lamps (fluorescent)

Watch for LED

Conversion

Consider low-e glazing

Consider dual lighting levels on sensors, provide task lighting

Consider thermal screens/drapes on windows



Many libraries are loaning Personal Energy Monitors such as the “Kill A Watt” device www.ecomitted.com

Easy Green for an Existing Building part 2

Cleaning

Appoint a Green Monitor responsible for monitoring compliance

Request Greenseal paper products, strippers, soaps, cleaners

Provide entry walk-off mats and keep clean

Greening

Buy FSC certified or renewable wood furniture

Buy Carpet & Rug Institute or Floorscore green rated carpets (recycle old)

Buy Energy Star equipment and lamps

Go for a solar power grant or one unique accomplishment

Screening

Plant deciduous trees on the South

Screen winter winds

Trap suspended solids in bioswales at parking lots

Easy Green for a New Building

Restore historic buildings and reuse existing buildings when possible

Use bio-swales to re-infiltrate stormwater

Commission the HVAC system and follow recommendations

Install Low-e glazing and/or translucent panels

Increase daylighting by using roof monitors and/or clearestory window

Install LED lighting (exit signs, emergency, and as available)

Install light sensors or dual level lighting

Provide many zones of HVAC control and turn down rooms not in use

Install high performance water fixtures (dual flush, waterless, etc.)

Easy Green for an New Building part 2

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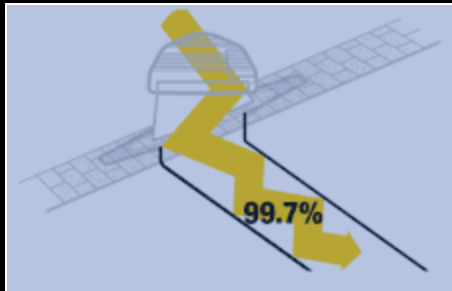
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Screening

Plant deciduous trees on the South

Screen winter winds

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REDEFINE HARVESTING

Reduce light harvesting loss by 99.7% with our innovative and patented Solar Harvesting™ technology. The result? 99.7% more light harvesting efficiency. Solatube's Solar Harvesting™ technology is a patented technology that allows Solatube's Solar Harvesting™ technology to harvest 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency.

Patented Solar Harvesting™
 Harvesting light from the sun's rays, the Solar Harvesting™ technology is a patented technology that allows Solatube's Solar Harvesting™ technology to harvest 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency.

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REDEFINE POSSIBILITIES

Lighting solutions designed to create unique, or even exotic, lighting effects. Solatube's Solar Harvesting™ technology is a patented technology that allows Solatube's Solar Harvesting™ technology to harvest 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency.



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REDEFINE ILLUMINATION

Lighting solutions designed to create unique, or even exotic, lighting effects. Solatube's Solar Harvesting™ technology is a patented technology that allows Solatube's Solar Harvesting™ technology to harvest 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency. The result? 99.7% more light harvesting efficiency.



Introducing
EARTHLED
EVOLUX™

13 Watts. No Compromises.
The World's Most Advanced Light Bulb.



A new generation of LED lights www.earthled.com

LEDs last five times longer than CFL and contains no mercury

FEATURES & CAPABILITIES	Incandescent	CFL	LED	Halogen	Vu1 ESL™
Energy Efficient		◆	◆		◆
Perfect Light Quality	◆			◆	◆
Instant On	◆		◆	◆	◆
Dimmable	◆			◆	◆
Mercury Free	◆		◆	◆	◆
Works with Timers & Photo Controls	◆		◆	◆	◆
Affordable	\$	\$\$	\$\$\$ \$\$\$	\$\$	\$\$
Safely Recyclable	◆			◆	◆
Not Susceptible to Heat	◆			◆	◆
Long Life		◆	◆		◆



ESL (Electron Stimulated Luminescence)

- No mercury
- \$12 a bulb
- perfect light color & quality
- low energy to manufacture
- long life

ESL may be the emerging solution for lighting: the efficiency of fluorescent, the install cost of incandescent, the mercury-free benefit of LED.



Old silicone based solar array



TFT is the latest in thin film transistor solar panels, uses far less harvested natural resources, is more efficient, and doesn't look like equipment.

www.dsireusa.org for renewable energy incentives in any state



Dancing with the Energy



Stars!

Sustainability is universally accepted and supported by all parties.

Dennis' Top Six **EASY GREEN** Picks:

DAYLIGHTING

Saves lighting energy and AC energy

ENVELOPE

Low-e glazing, green & white roofs, sun shelves, orientation, green & wind screens, thermal drapes, proper vestibules

NATURAL MATERIALS

Regional materials, renewable materials, reused materials, & materials that biodegrade

NEW ENERGY SOURCES

Photovoltaic systems, Green Power

INDIVIDUAL CONTROLS

Zone everything with individual Control of lighting, temperature, and ventilation

SUSTAINABLE EDUCATION

Patrons, Staff, Janitorial and Maintenance

Dennis' Top Six Picks:

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Saves light and AC energy

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SUSTAINABLE EDUCATION

Patrons, Staff, Janitorial and Maintenance

Notice the Six Win-Win-Win strategies spell my name!



Remember our house? 150 years ago, common sense resulted in Green Building. Fire wood took work to obtain and coal needed to be delivered, stored and then the ashes removed. Occupants naturally only heated the rooms they used. Oil lamps were dangerous and could cover the ceilings with soot in a moment of mis-fire, so windows were plentiful and people went to bed when it got dark. Air conditioning was not yet invented and so tall windows that could be opened at the top and the bottom provided natural circulation. Notice the canvas awnings, deep porches, and even “green screening” that keep out the summer angle sun.



One project under design by
DENNIS KOWAL ARCHITECTS.

Daylighting

Roof Windows

Envelope

Green Roof

Shading Devices

Green Screens

Natural Materials

Local Materials



Daylighting

Roof Windows

Envelope

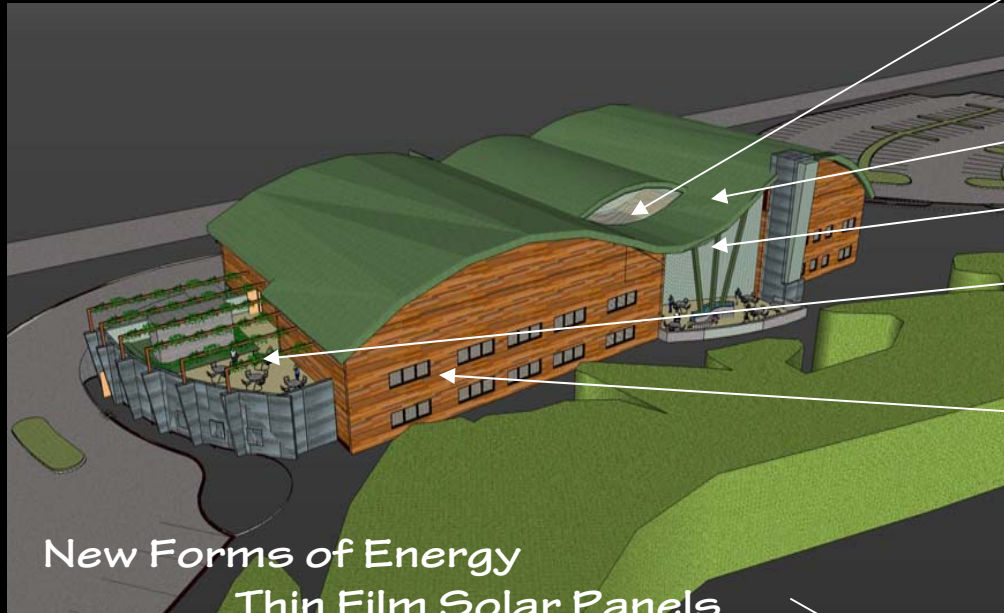
Green Roof

Shading Devices

Green Screens

Natural Materials

Local Materials



New Forms of Energy

Thin Film Solar Panels

Individual Controls

Occupancy Sensors

Dual-level lighting

Sustainable Education

Usage Meters

Compliance Monitors

GreenSeal Supplies GS-37



Daylighting

Roof Windows

Envelope

Green Roof

Shading Devices

Green Screens

Natural Materials

Local Materials

New Forms of Energy

Thin Film Solar Panels

Individual Controls

Occupancy Sensors

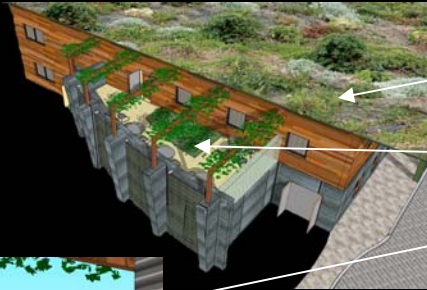
Dual-level lighting

Sustainable Education

Usage Meters

Compliance Monitors

GreenSeal Supplies GS-37





Daylighting

South Windows

Envelope

Shading Devices

Green Screens

Natural Materials

Local Materials

New Forms of Energy

Thin Film Solar Panels

Individual Controls

Occupancy Sensors

Dual-level lighting

Sustainable Education

“Shut the Door!”

Daylighting

Many windows



Envelope

Many Shading Devices

Green Screens

Natural Materials

Local Materials

New Forms of Energy

City Gas replaced Coal

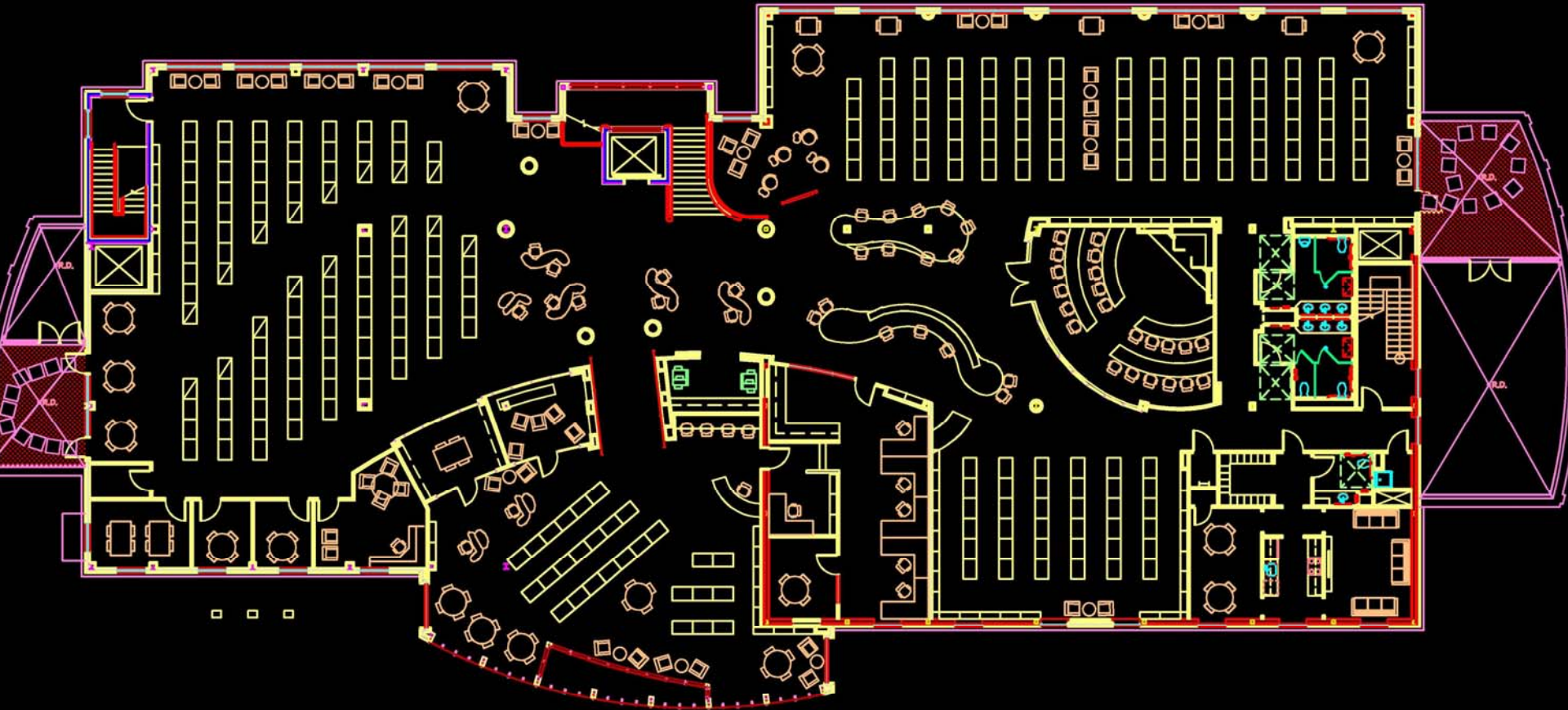
Individual Controls

Room Fireplaces

Operable Windows

Sustainable Education

“Shut the Door!”









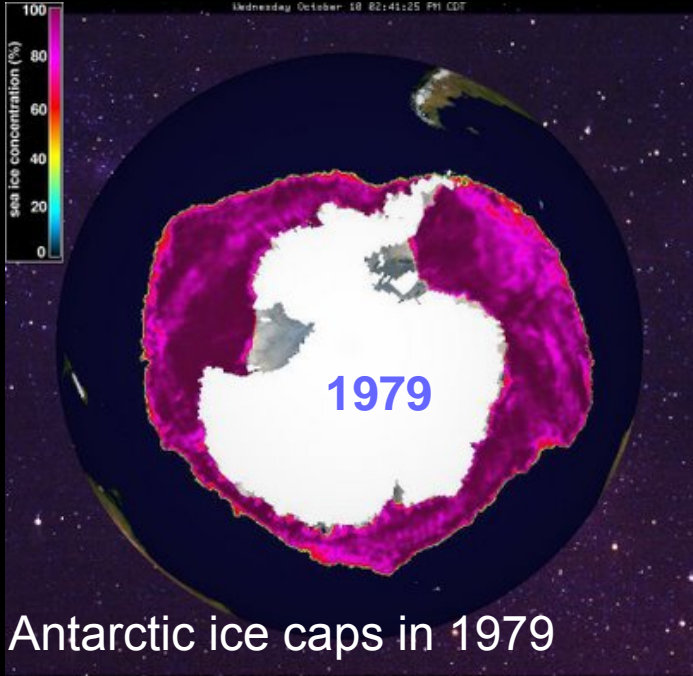
Easy being Green

A PRESENTATION BY DENNIS J. KOWAL AIA
and DENNIS KOWAL ARCHITECTS 908-231-0201
Green Advantage Certified for overseeing Green Construction
LEED Accredited Professional for Green Design

Remember, it's easy being Green! and your occupants will love it, too!

Three other concepts were presented in this seminar but require a little too much instruction for these short comments were:

1. THERE IS NO SUCH THING AS A FREE GREEN LUNCH
2. OCCUPATION (of a building) WITHOUT EDUCATION WILL NOT YIELD GREEN RESULTS
3. GREEN IS NOT A COLOR IT IS A RESULT (avoid greenwash)



Antarctic ice caps in 1979

University of Illinois - The Cryosphere Today

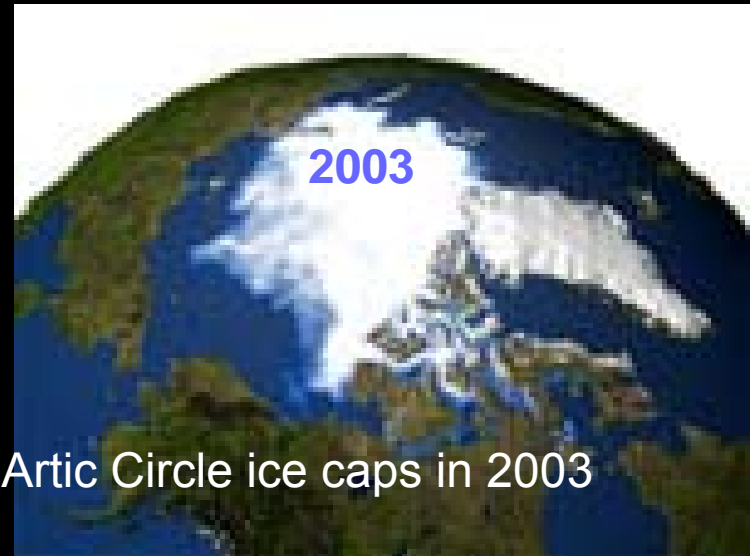


Arctic Circle ice caps in 1979

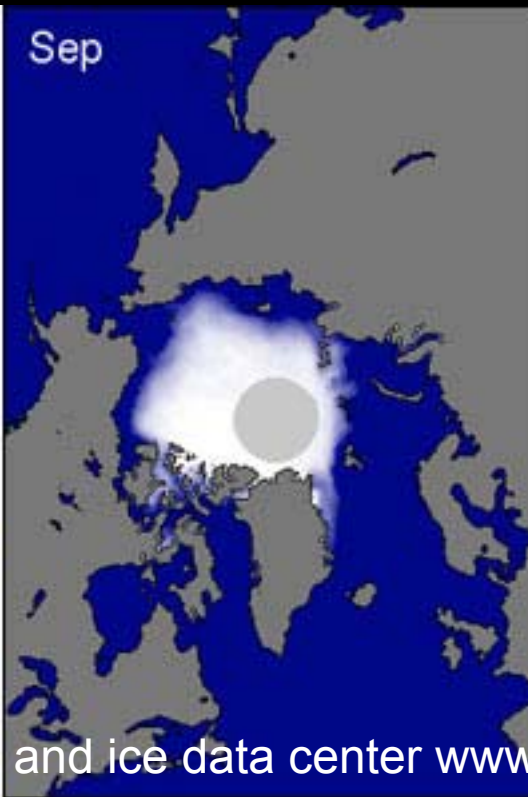


Antarctic ice caps in 2007

University of Illinois - The Cryosphere Today



Arctic Circle ice caps in 2003



National snow and ice data center www.nsidc.org

