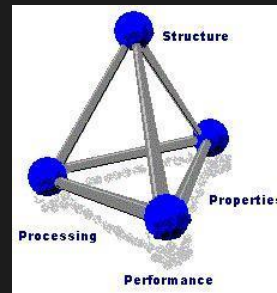
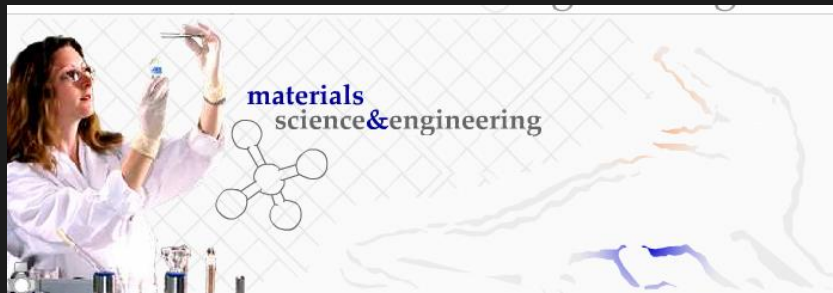
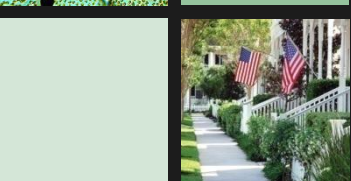
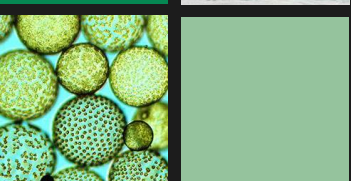
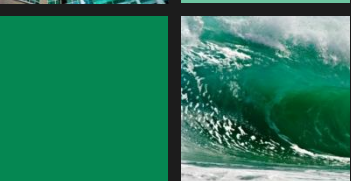
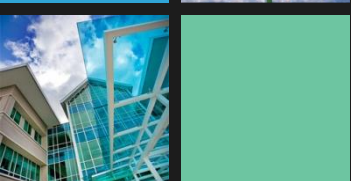
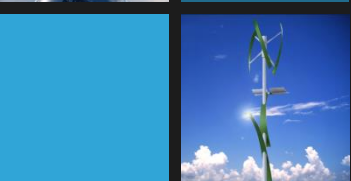
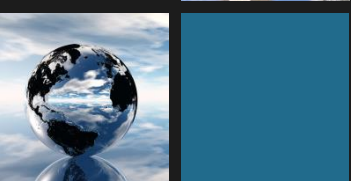
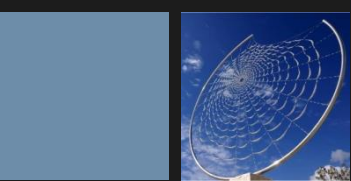
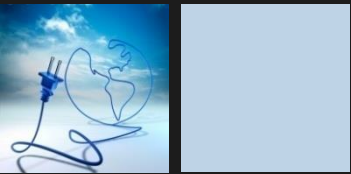


Southeast Resiliency Academy

Session #6

Your New Construction Portfolio





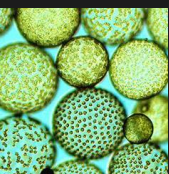
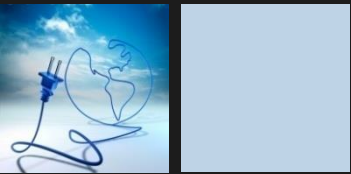
UNIVERSITY OF
FLORIDA
CIVIL ENGINEERING

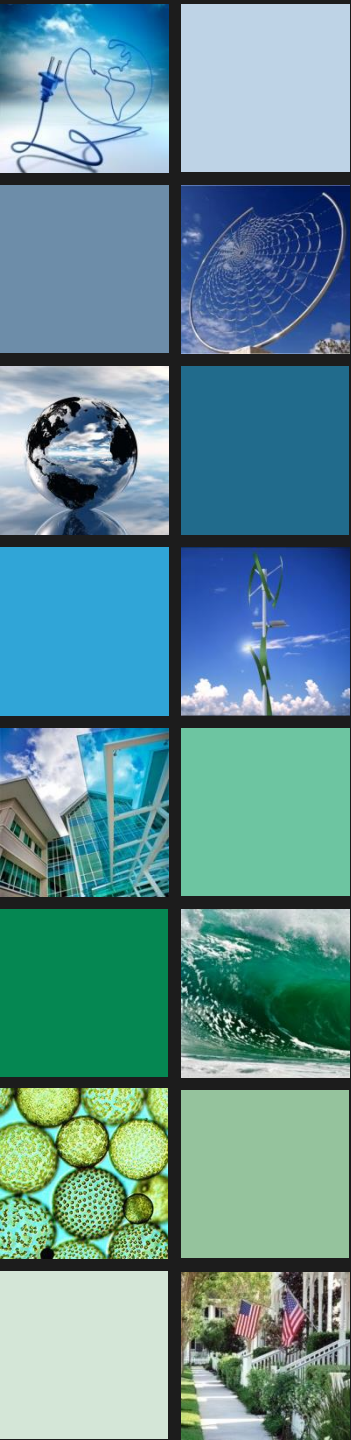


Trifecta, since 2003

- Certified over 5 Million Square Feet of 3rd party certified single and multi-family residential
- Over 2 Million Square Feet of certified LEED Projects
- Over 4 Million Square Feet of Green Globes or FGBC Commercial
- Over 30,000 acres of certified Green Developments
- Active Board and Standard Committees
 - USGBC, FGBC, NAHB, Green Globes
- Host Discovery Channel's PROJECT EARTH
- Florida Contractor #1330049



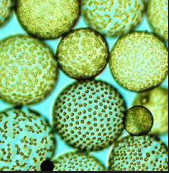
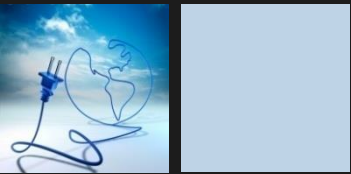


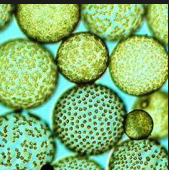
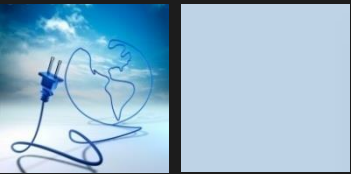


Before & After

Opa Locka FL







Sustainability



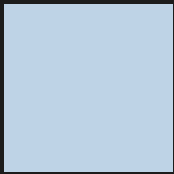
Sustainability versus Resilience

Sustainability

- Energy Use Reduction (Efficiency)
- Water Use Reduction
- Renewable Energy Production
 - Solar, Wind, Hydro
- Rapidly Renewable
- Recycled & Local Materials
- Community Responsibility
- Transportation Access
- Indoor Environmental Quality
- Infill, Density, Redevelopment

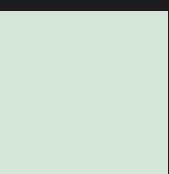
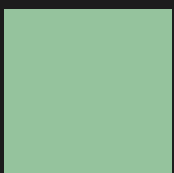
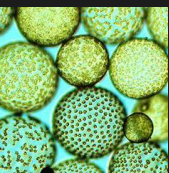
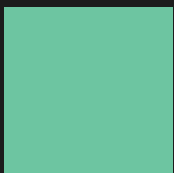
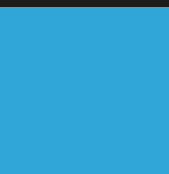
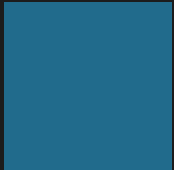
Resilience

- ✓ Energy Independence
 - ✓ Water Independence
 - ✓ Renewable Resources
 - ✓ Long Term Environmental Effects
 - ✓ Community Support
 - ✓ Resource Storage
- Multiple Diverse Energy Sources
 - Multiple Water Sources
 - Rainwater Harvesting, Wells, Desalinization
 - Disaster Mitigation
 - Elevated FFE above Flood Plain
 - Non Coastal Construction
 - Passive Systems
 - Redundant Systems



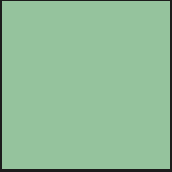
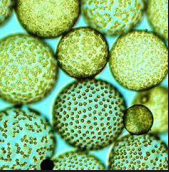
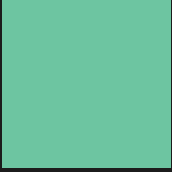
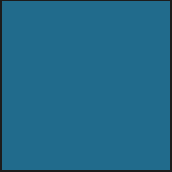
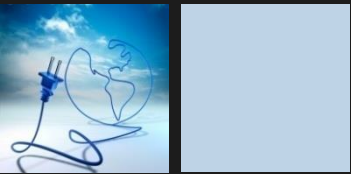
A "Noun"

What is Green Building?



A "Verb"

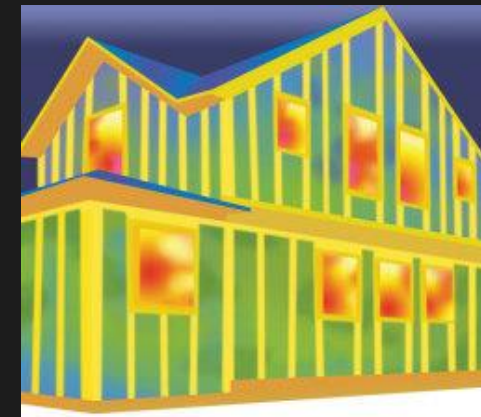
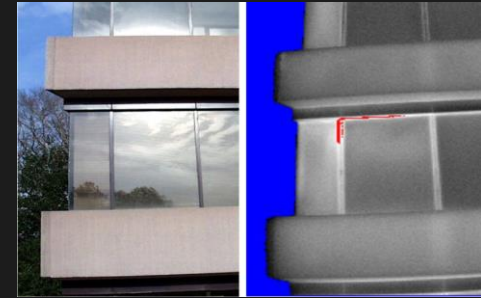
What is Green Building?



Buildings have 3 Systems

1. Non – energized (envelope)

- Windows
- Doors
- Roofs
- Walls



Buildings have 3 Systems

2. Energized

- HVAC
- Lighting
- Water Heating
- Plug Loads
- Process Loads



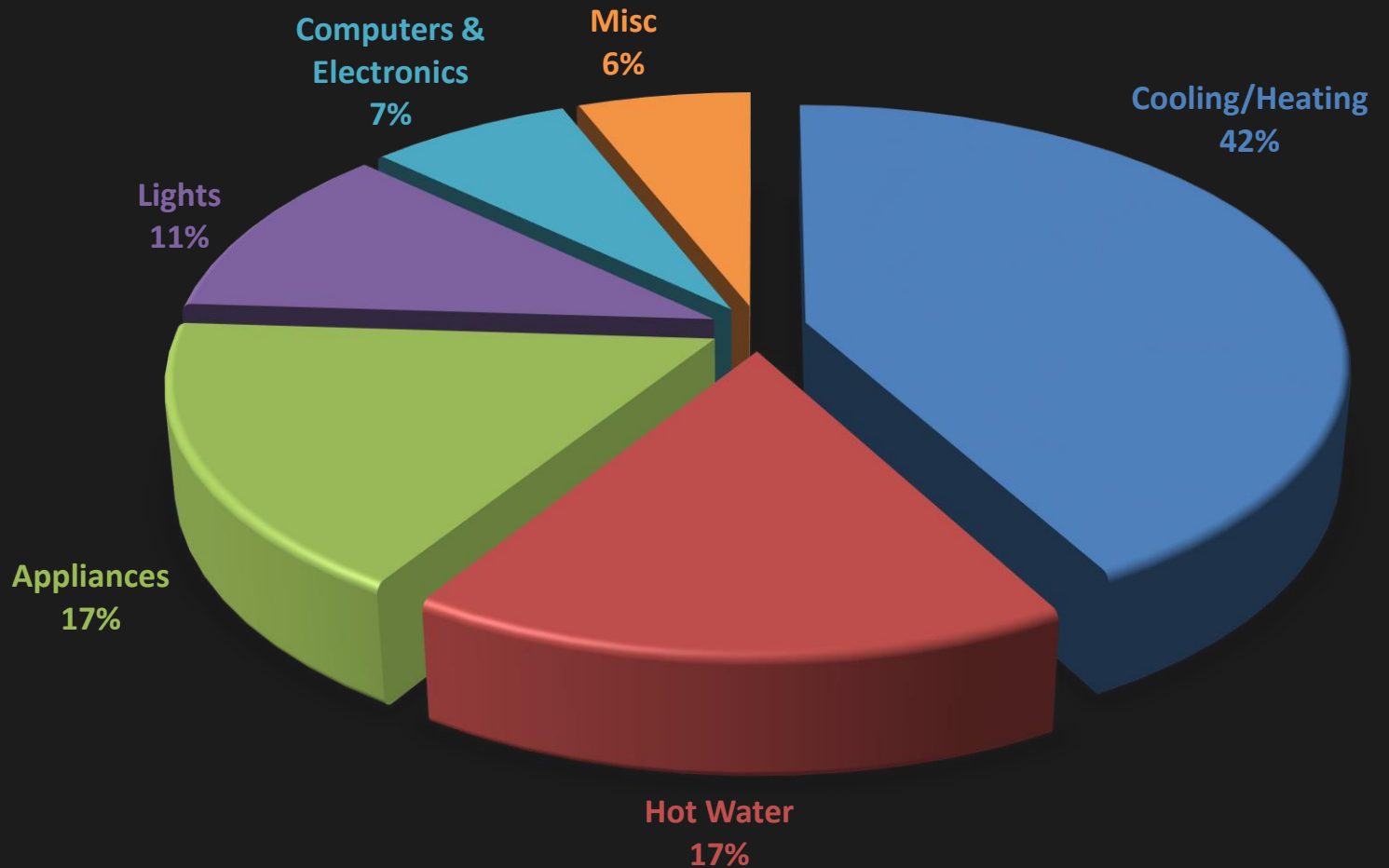
Buildings have 3 Systems

3. Human

- Come in building, turn things on
- And sometimes off
- Leave door and windows open
- Require heat, light, air...



Residential Energy Use – Florida



What is a HERS Index?

Confirmed Rating
RESNET Registration No.: 791674037

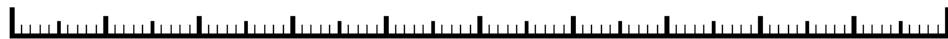
Lennar Homes - SW Florida
13520 Saw Palm Creek Trail
Bradenton, FL 34211

Design: Sarasota, FL
TMY: SARASOTA_BRADENTON, FL

Title: Savanna at Lakewood Ranch Lot 109

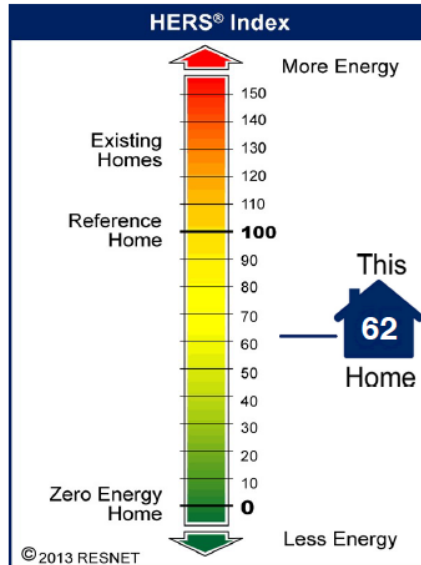
HOME ENERGY RATING GUIDE

\$0 **\$1190** Reference \$1790



Annual Energy Cost:	This Home	Savings
Electricity	\$ 975	\$ 502
Natural Gas	\$ 215	\$ 98
LPG	\$ 0	\$ 0
Fuel Oil	\$ 0	\$ 0
On-Site Power	\$ 0	\$ 0
Totals:	\$ 1190	\$ 600

Annual Energy Use:	This Home	Savings
Electricity (kWh/y)	8516	4388
Natural Gas (therms/y)	120	54
LPG (gal/y)	0	0
Fuel Oil (gal/y)	0	0
On-Site Power (kWh/y)	0	0
Annual Emissions:	This Home	Savings
CO2 (tons/y)	6	3
SO2 (lb/y)	19	10
NOx (lb/y)	1120	511



Ryan McCracken 4281370
Certified Rater I.D. Number
Ryan McCracken 6/28/2017
Signature Date

The Home Energy Rating Standard Disclosure for this home is available from the Rating Provider. Questions or complaints regarding this Rating may be directed to:
SkyeTec Energy Rating Services
1679 Clearlake Road
Cocoa, FL 32922-5703
phone: (321)638-1492
e-mail: engauge@fsec.ucf.edu
www.energygauge.com/usares/

NOTES:
HERS and RESNET are Trademarks of Residential Energy Services Network, Inc. (www.resnet.us)
EnergyGauge is a Trademark of the Florida Solar Energy Center (www.fsec.ucf.edu)



U.S. Government Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Refrigerator-Freezer
• Automatic Defrost
• Side-Mounted Freezer
• Through-the-Door Ice

XYZ Corporation
Model ABC-L
Capacity: 23 Cubic Feet

Estimated Yearly Operating Cost

\$67

Cost Range of Similar Models: \$57 to \$74

630 kWh
Estimated Yearly Electricity Use

Your cost will depend on your utility rates and use.

- Cost range based only on models of similar capacity with automatic defrost, side-mounted freezer, and through-the-door ice.
- Estimated operating cost based on a 2007 national average electricity cost of 10.65 cents per kWh.
- For more information, visit www.ftc.gov/appliances.

ENERGY STAR

EPA DOT Fuel Economy and Environment Gasoline Vehicles

Fuel Economy

26 MPG
combined city/hwy

22 city 32 highway

3.8 gallons per 100 miles

Small SUVs range from 18 to 22 MPG. The best combine rates 30 MPG.

You save **\$1,850** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **\$2,150**

Fuel Economy & Greenhouse Gas Rating

1 7 10 11 12

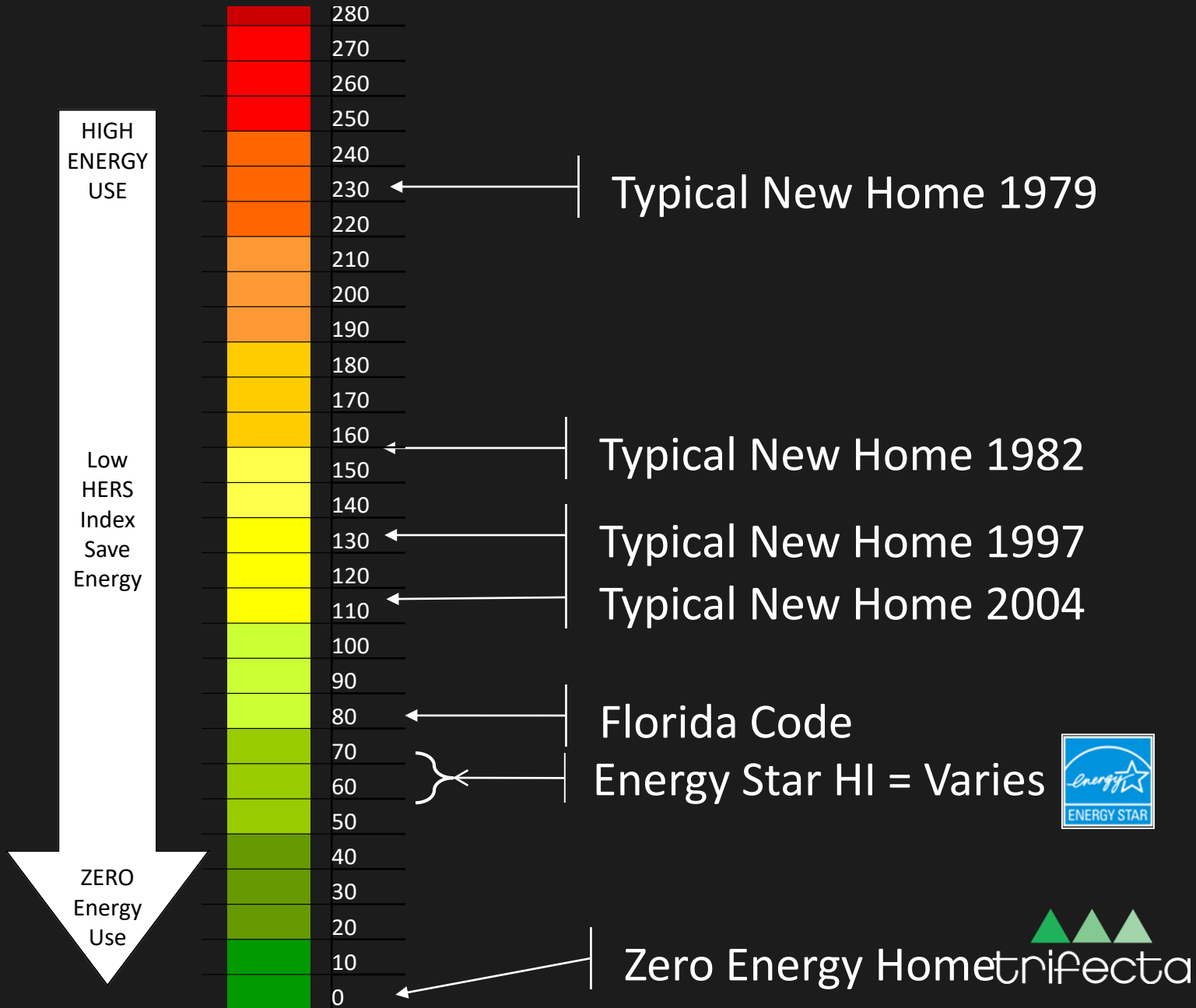
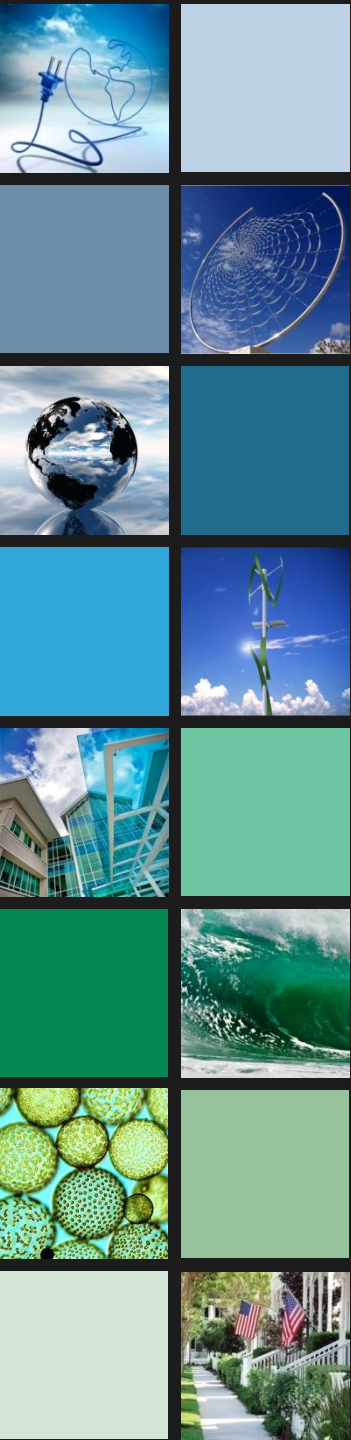
Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and costs \$22,400 to fuel over 5 years. Cost estimates are based on 18,000 miles per year at 25.2¢ per gallon. MPGe is only a guide. Actual results may vary. Fuel economy and greenhouse gas emissions are a significant cause of climate change and smog.

fuelconomy.gov

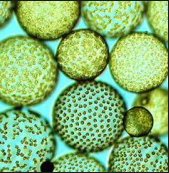
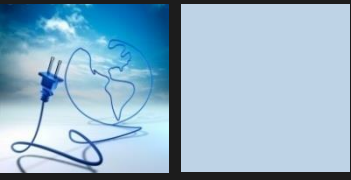
Calculate personalized estimates and compare vehicles.



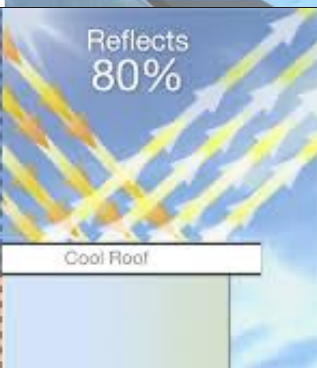
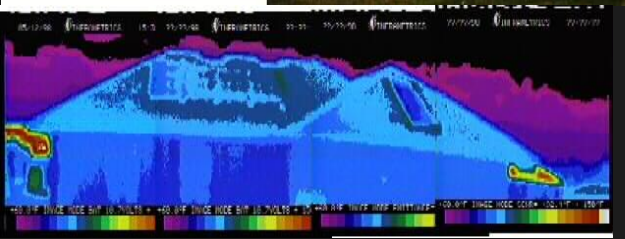
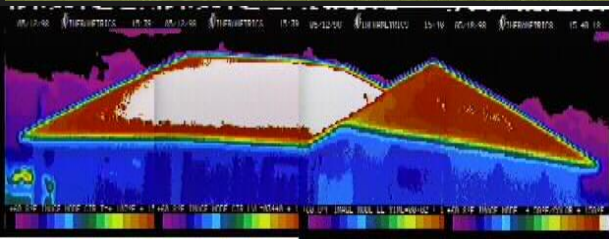
HERS – Home Energy Rating System



Improve Insulation

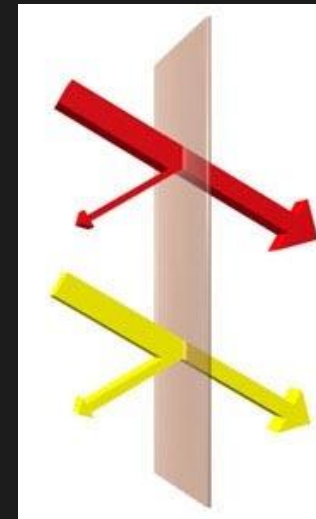


Roof Color Matters

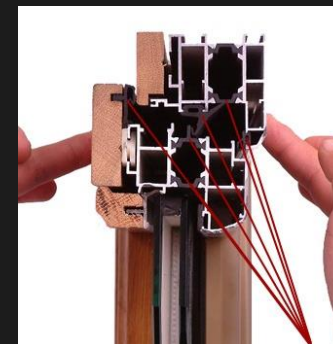


Windows

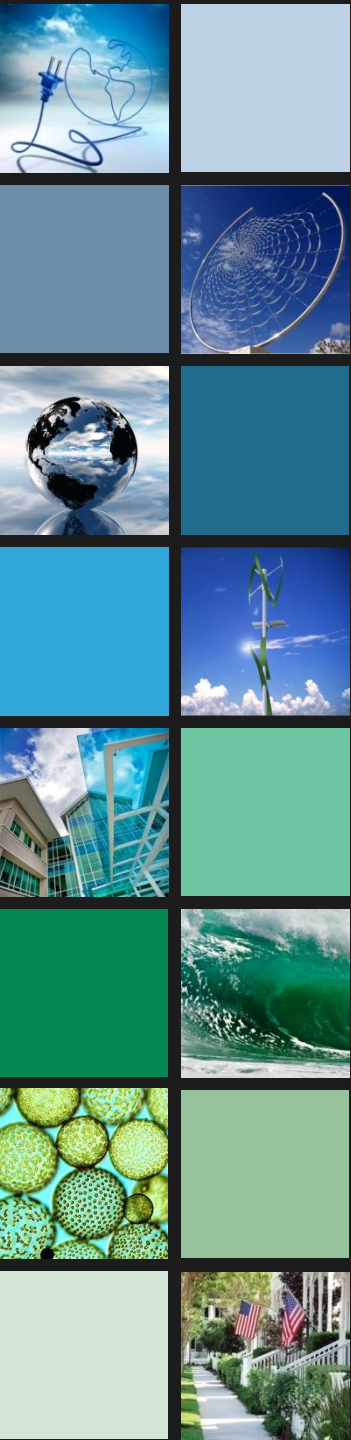
- U- Factor
- Solar Heat Gain Coefficient
- Tint (SHGC)
- Frame and glazing options – aesthetics (U)
- Insulated glass – climate or sound (U)
- Low-E glass – “window radiant barrier” (U)
- Low-conductance gas fillings (U)
- Composite spacers – thermal breaks



WINDOWS			
CLIMATE ZONE	U- FACTOR ¹	SHGC ²	
Northern	≤0.27	Any	Prescriptive
	=0.28	≥0.32	Equivalent Energy Performance
	=0.29	≥0.37	
	=0.30	≥0.42	
North Central	≤ 0.30	≤ 0.40	
South Central	≤ 0.30	≤ 0.25	
Southern	≤ 0.40	≤ 0.25	



Appliances and Controls



**UPGRADE your WATER HEATER now
and soak up the SAVINGS!**

**Protect your hot water supply!
Don't get stuck in the cold.**

If your water heater is more than **10 YEARS OLD**, upgrade to an **ENERGY STAR®** certified model!



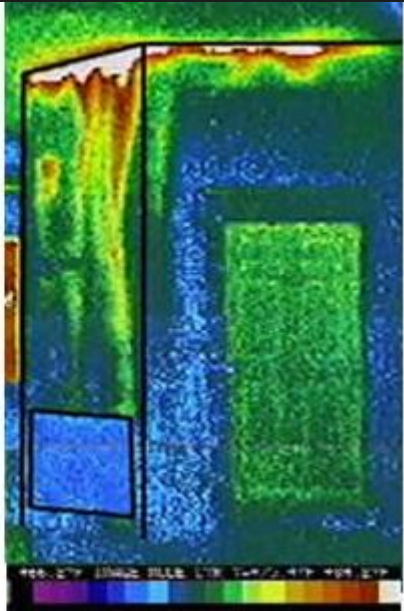
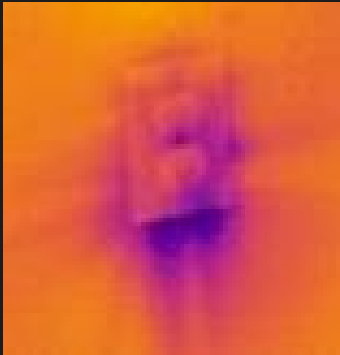
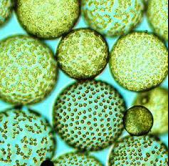
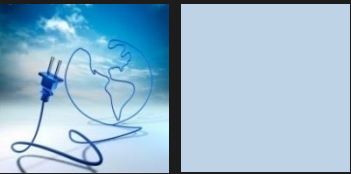
Proper Pressure Balance



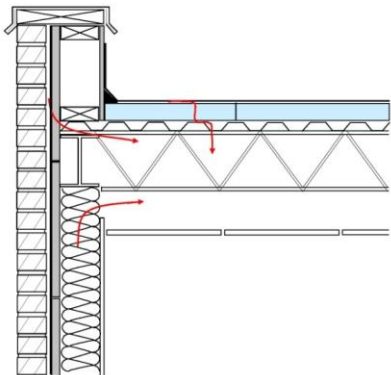
Small Air Leaks Add Up

Example:

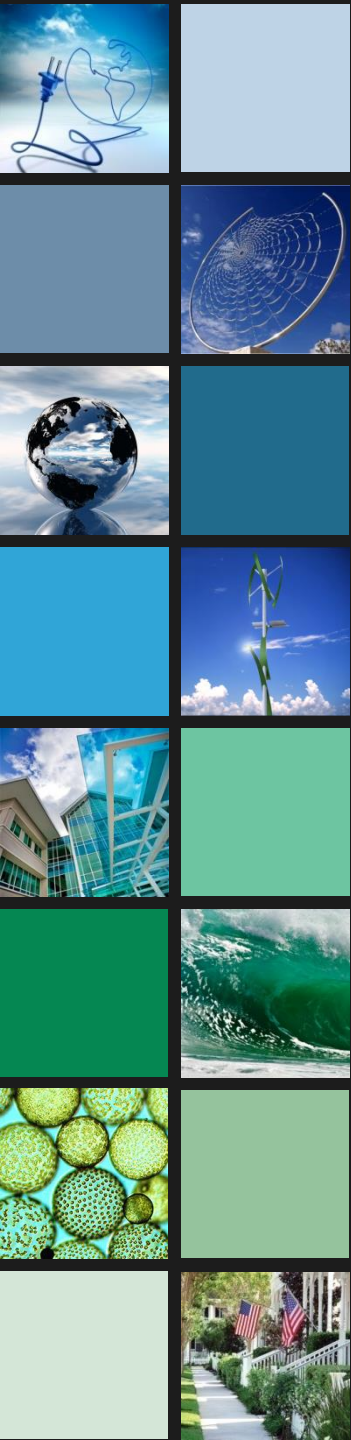
- Negative pressure from bath fan



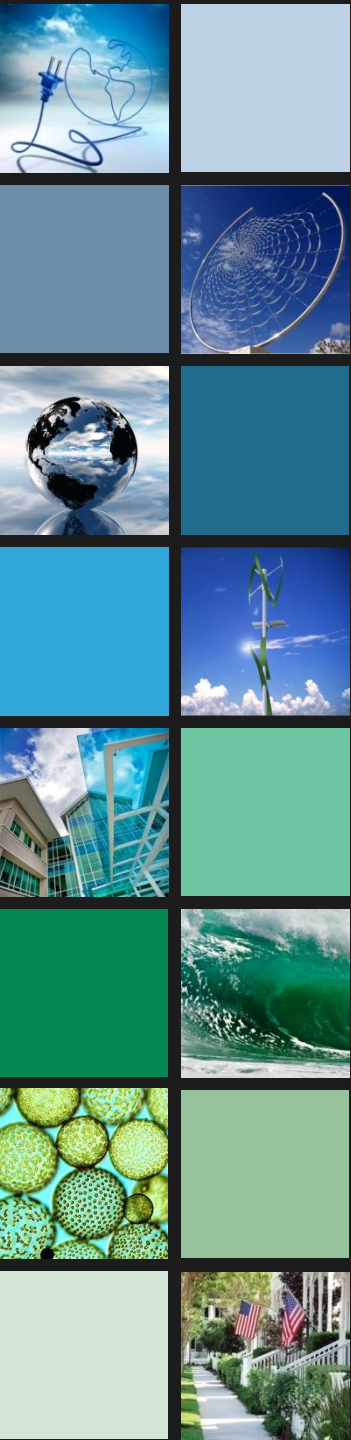
Infiltration Path – Roof/Wall Junction



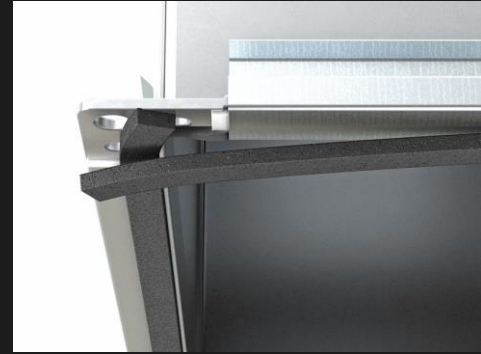
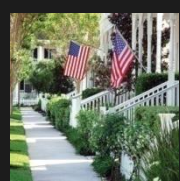
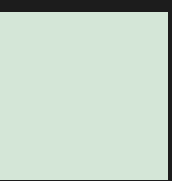
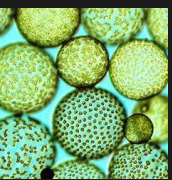
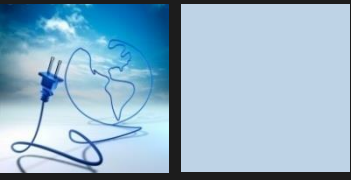
And We Have Holes...Airflow Holes



Infiltration



Building Envelope



Air ALSO Carries Moisture

- Air holds moisture
- Air moves due to pressure differences
- Air carries moisture into building

1" x 1" hole

ONE CUBIC FOOT OF AIR PER MINUTE



OVER 18 Gallons of Water
During cooling season

Moisture Movement

Diffusion

4' x 8' sheet of gypsum board

MOISTURE

Interior at 70°F and 40% Relative Humidity



Air Leakage

4' x 8' sheet of gypsum board with a 1 in² hole

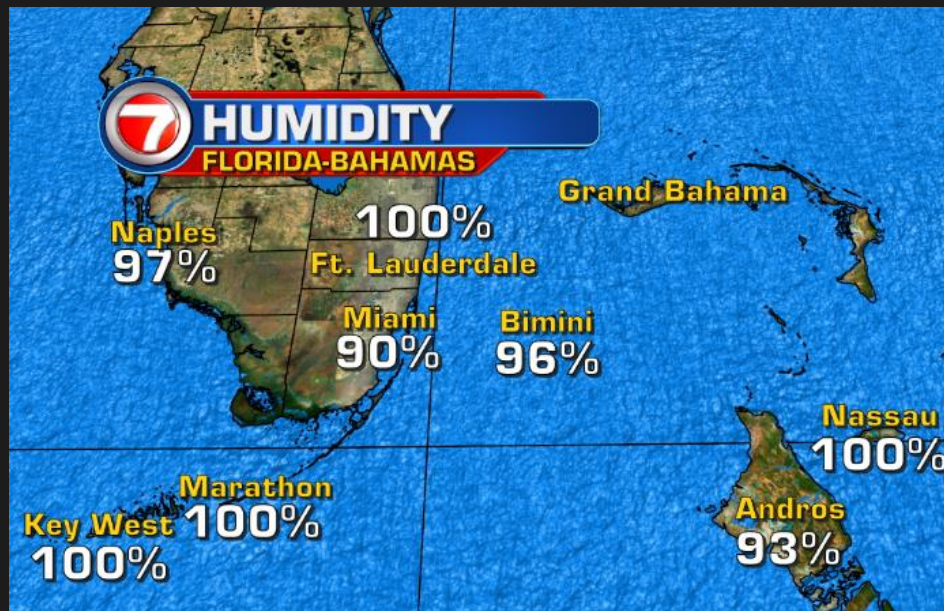
MOISTURE IN AIR

Interior at 70°F and 40% Relative Humidity



Our Biggest Issue - Moisture

- Bulk Moisture
- Ambient Moistures
 - Deflect, Drain, Dry
 - Durability, Doability



Biggest Impact On Energy Efficiency

- Insulation
- Infiltration
- Window Efficiency
- Appliances
- Lighting
- Controls

LED **COMPACT FLUORESCENT**

best value



cost to purchase and operate
3 hours per day for one year:

\$2.81 **\$5.04**



U.S. Government. Failure to provide removal of this label before consumer purchase.

ENERGYGUIDE

Room Air Conditioner
Without Reverse Cycle
With Louvered Sides

Model: ESA10K
Capacity: 14,500 BTU/h

Estimated Yearly Operating Cost

\$108

Cost Range of Similar Models

10.7
Energy Efficiency Ratio

Your cost will depend on your utility rates and other factors.

* Cost range based only on models of similar capacity without reverse cycle and with louvered sides.
* Estimated operating cost based on a 2007 national average electricity cost of 10.85 cents per kWh.
* For more information, visit www.nrc.gov/appliances.

U.S. Government. Failure to provide removal of this label before consumer purchase.

ENERGYGUIDE

Room Air Conditioner
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ENERGY STAR

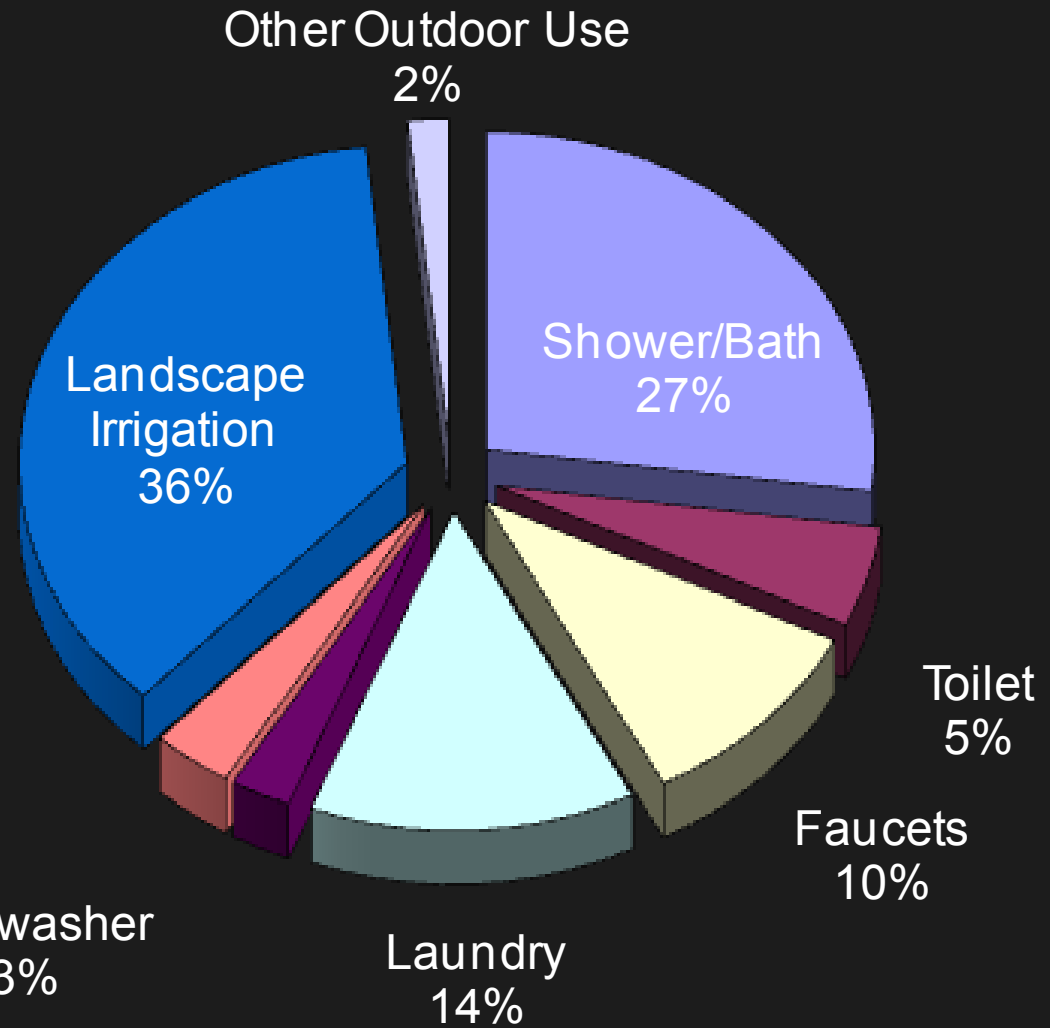


Blue is the New Green

Water Conservation



Water Consumption



Flow Rates



EPA Policy 1991

Showers: 2.5 gpm

Toilets 1.6 gpf

Faucets: 2.5

2.0 gpm

1.28 gpf (350 **MaP**)

1.5 gpm



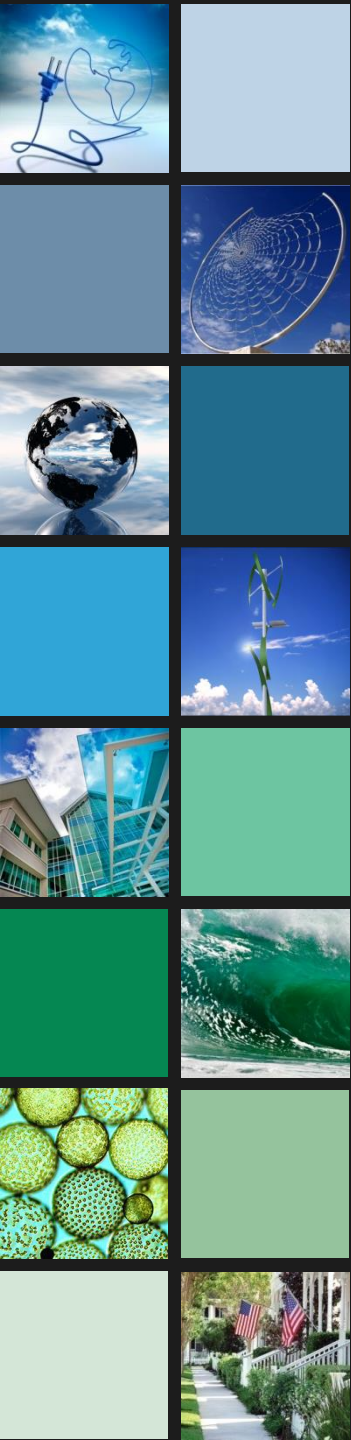
Shower: As low as 1.5gpm

WC: Dual Flush

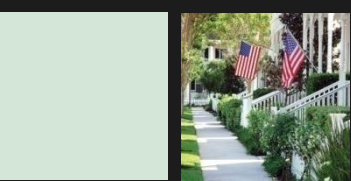
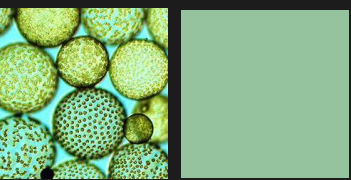
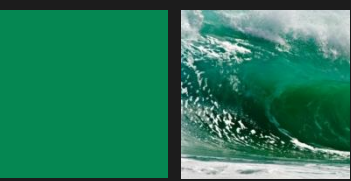
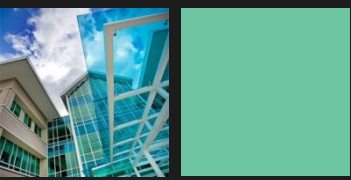
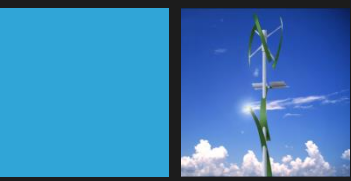
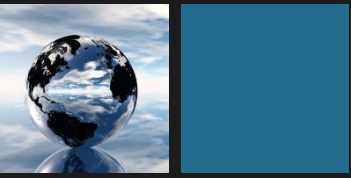
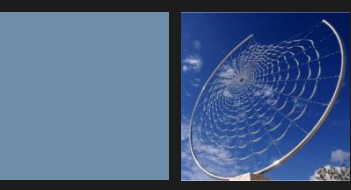
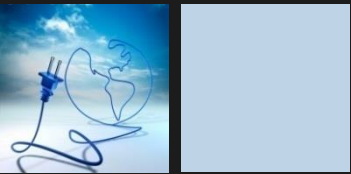
Lav: 0.5 gpm

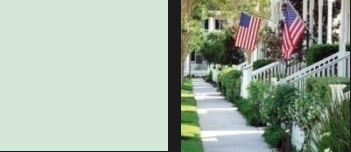
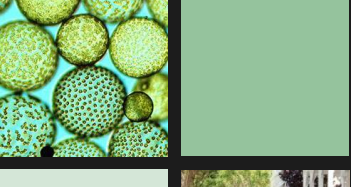
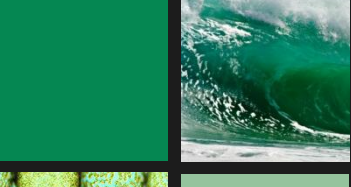
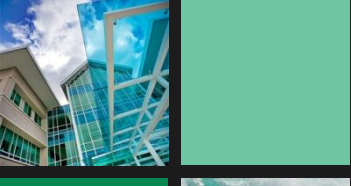
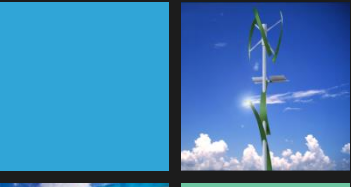
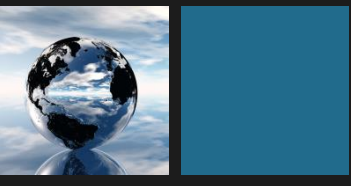
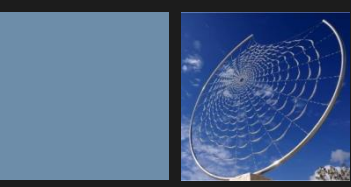
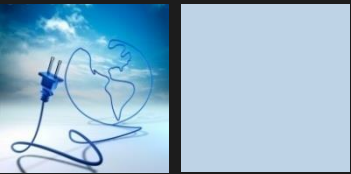


Next Generation



Dual Flush

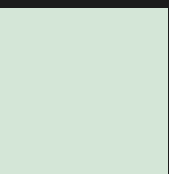
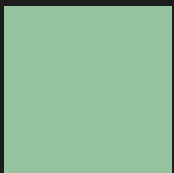
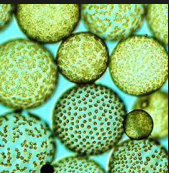
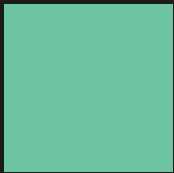
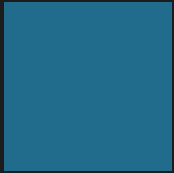
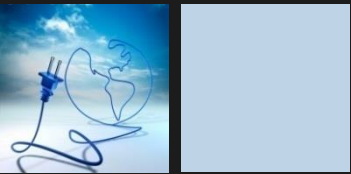




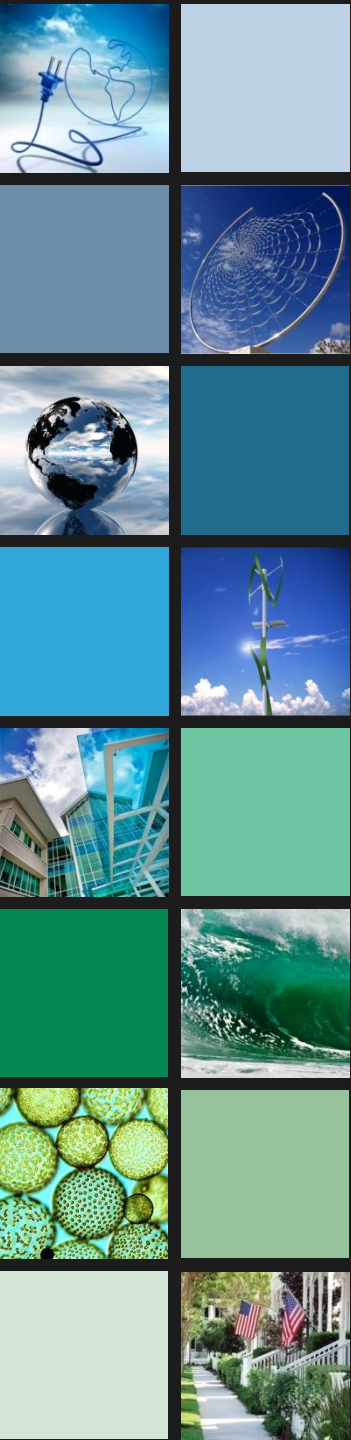
Install Water Saving Toilets



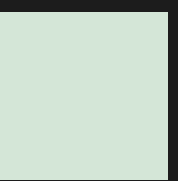
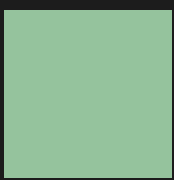
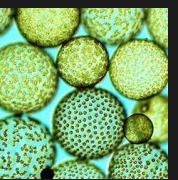
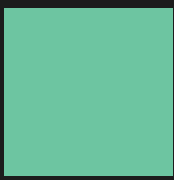
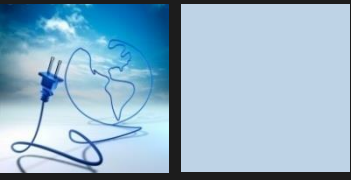
Drought Tolerant Vegetation



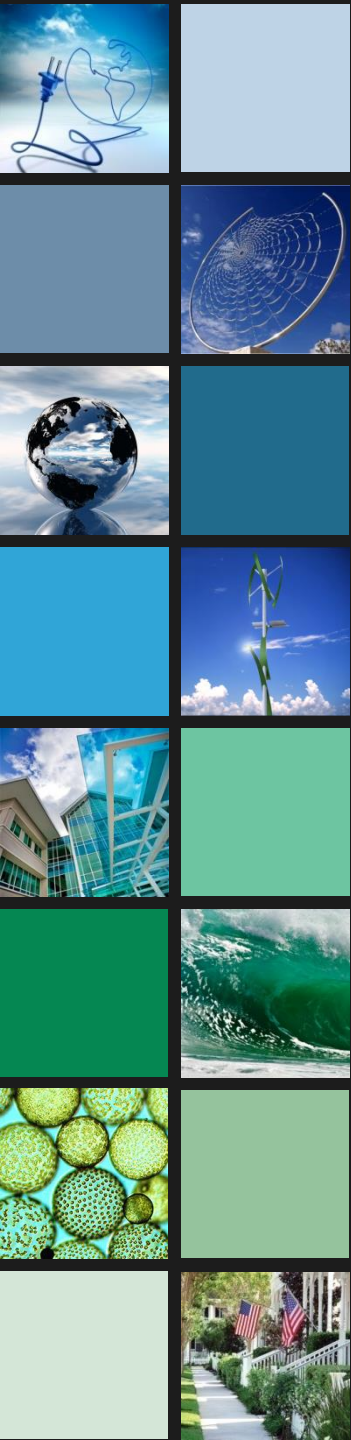
Cisterns



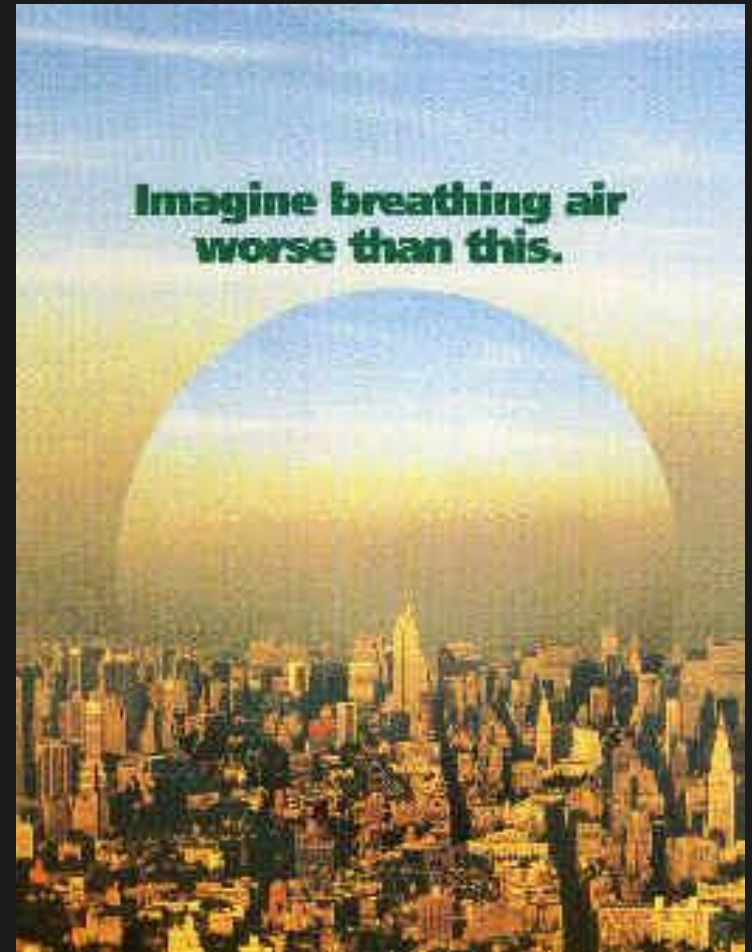
Cistern - Rainwater Harvesting



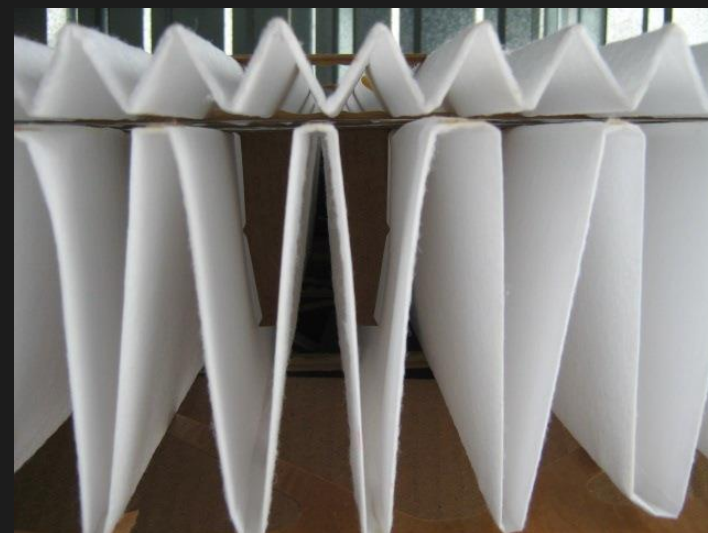
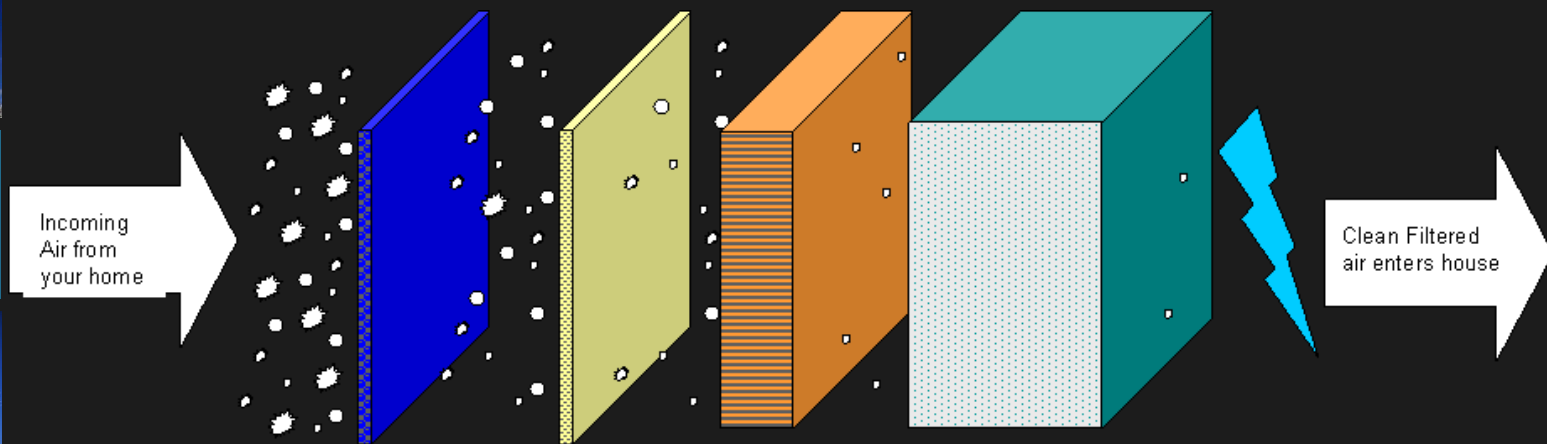
Indoor Environmental Quality



- Healthy indoor environmental
- Air
- Lighting
- Thermal comfort
- Moisture control



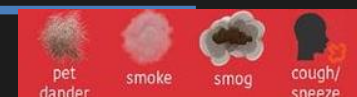
Filters



Minimum Efficiency Rating Value

MERV Rating Chart

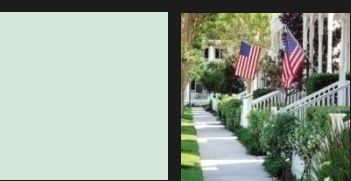
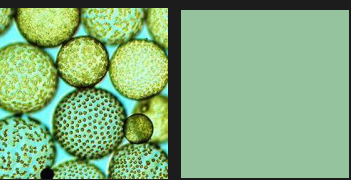
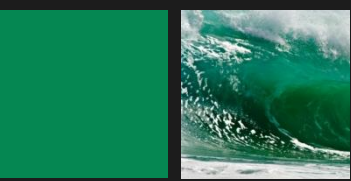
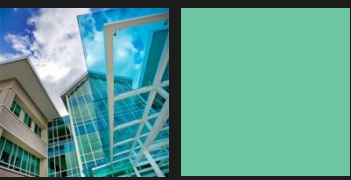
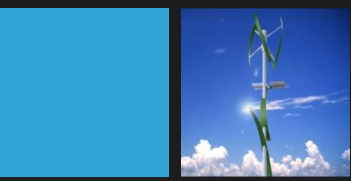
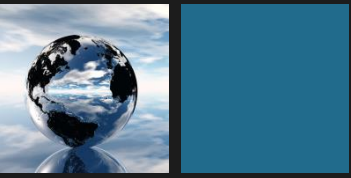
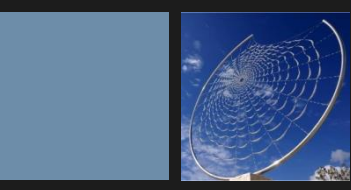
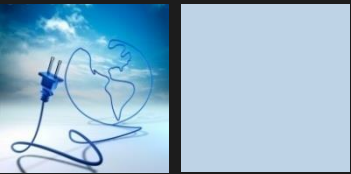
MERV Rating:	0.3-1.0 μm	1.0-3.0 μm	3.0-10.0 μm
MERV 1	Under 20%	Under 20%	Under 20%
MERV 2	Under 20%	Under 20%	Under 20%
MERV 3	Under 20%	Under 20%	Under 20%
MERV 4	Under 20%	Under 20%	Under 20%
MERV 5	Under 20%	Under 20%	20% - 34%
MERV 6	Under 20%	Under 20%	35% - 49%
MERV 7	Under 20%	Under 20%	50% - 69%
MERV 8	Under 20%	Under 20%	70% - 85%
MERV 9	Under 20%	Under 50%	Above 85%
MERV 10	Under 20%	50% - 64%	Above 85%
MERV 11	Under 20%	65% - 79%	Above 85%
MERV 12	Under 20%	80% - 90%	Above 90%
MERV 13	Under 75%	Above 90%	Above 90%
MERV 14	75% - 84%	Above 90%	Above 90%
MERV 15	85% - 94%	Above 95%	Above 90%
MERV 16	Above 95%	Above 95%	Above 90%
MERV 17	99.97%	Above 99%	Above 99%
MERV 18	99.997%	Above 99%	Above 99%
MERV 19	99.9997%	Above 99%	Above 99%
MERV 20	99.99997%	Above 99%	Above 99%



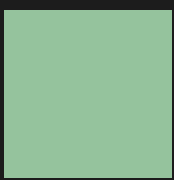
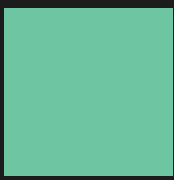
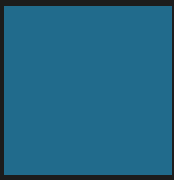
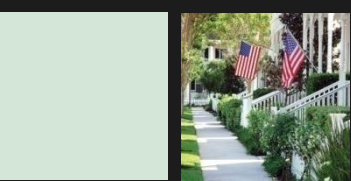
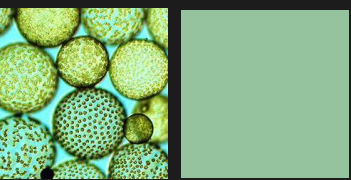
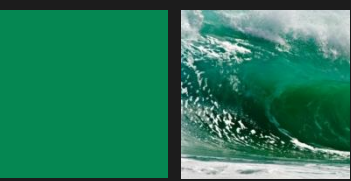
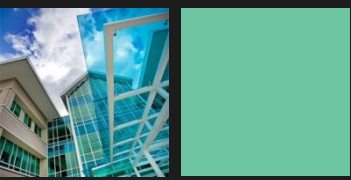
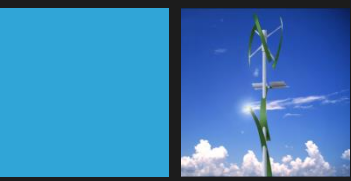
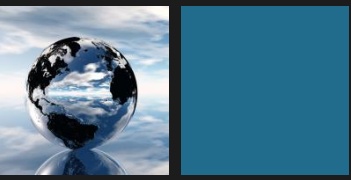
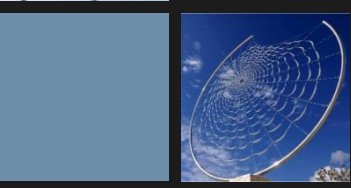
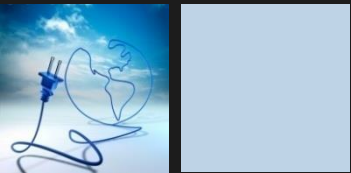
Materials Selection

- Select materials with lowest possible environmental impact
- Renewable
- Sustainable
- Durability
- Recyclability
- Recycled content materials
- Purchase local materials
- Engineered products

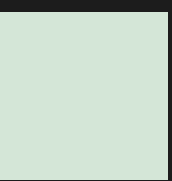
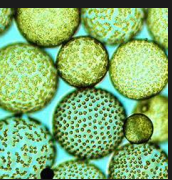
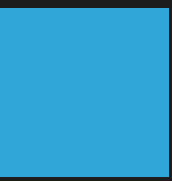
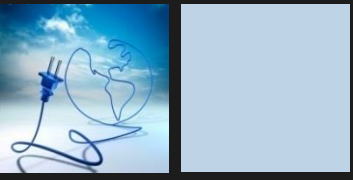


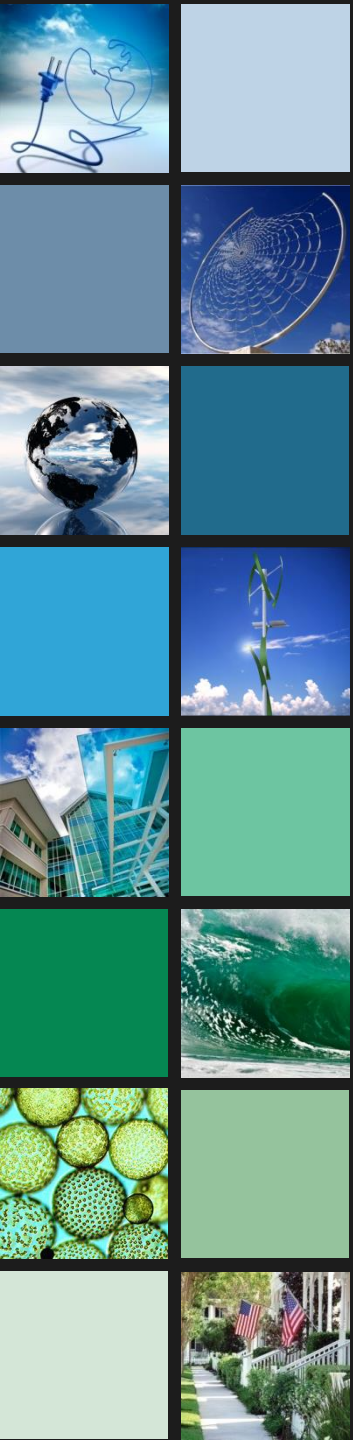


Natural Disasters



Hurricane





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Dr. Jennifer Languell

