



FGBC



FLORIDA GREEN
BUILDING COALITION

A Green Florida for a Blue Planet



FGBC Green Commercial Standard v2

Dr. Jennifer Languell

www.trifectaconstruction.com





- Non-profit organization formed in 2000
- Consensus based Standards development process
- Breadth of Expertise includes people from:
 - Construction & Development
 - Design & Analysis
 - Academic & Research
 - Product Development
 - Real Estate & Finance
 - Government & Public Advocates

FGBC's Success Story

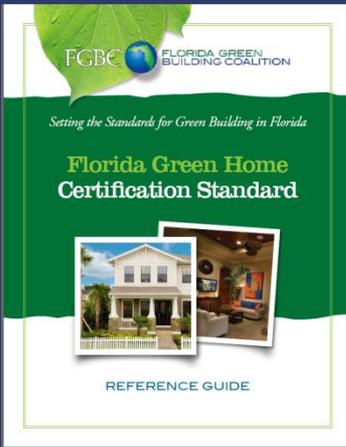
FGBC Standards are endorsed by:

- The Florida Legislature
- The Florida League of Cities
- Florida League of Mayors
- The Florida Home Builders Association



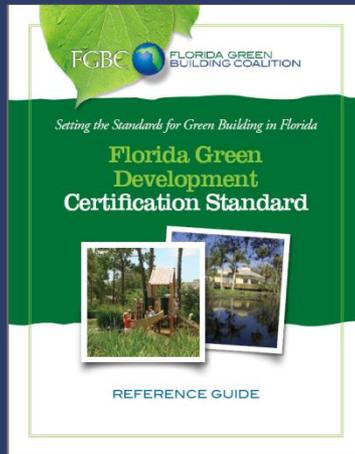
Florida Green Building Coalition

Floridagreenbuilding.org



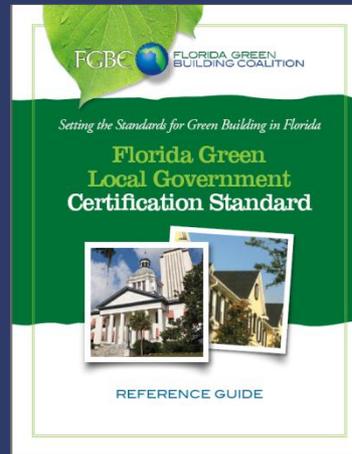
Homes

3,401



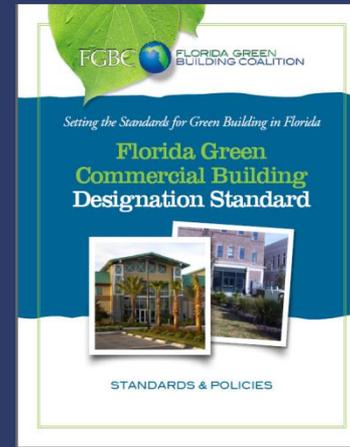
Developments

11
59



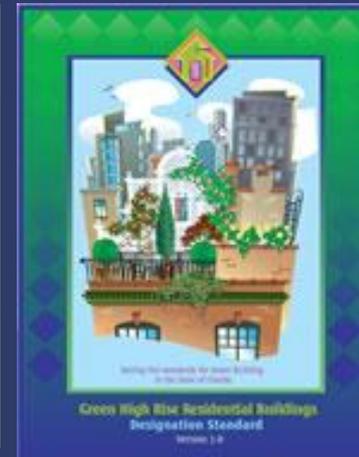
Local
Governments
(for Cities
and Counties)

29
54



Commercial

3
12



High-Rise
Residential

May 2011

**New Revision
2011**



Simple Conservation



53,000 Barrels/day lost



2,000,000 Barrels/day lost

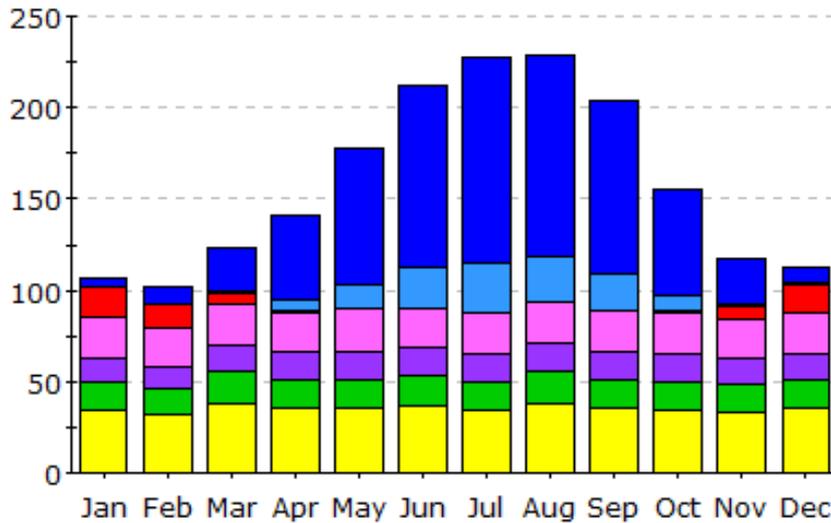
- Several years ago Fermi Award winning physicist and former California Energy Commissioner Dr. Art Rosenfeld, stated that the energy lost through our inefficient windows alone represents about 2 million barrels per day

Energy Efficiency



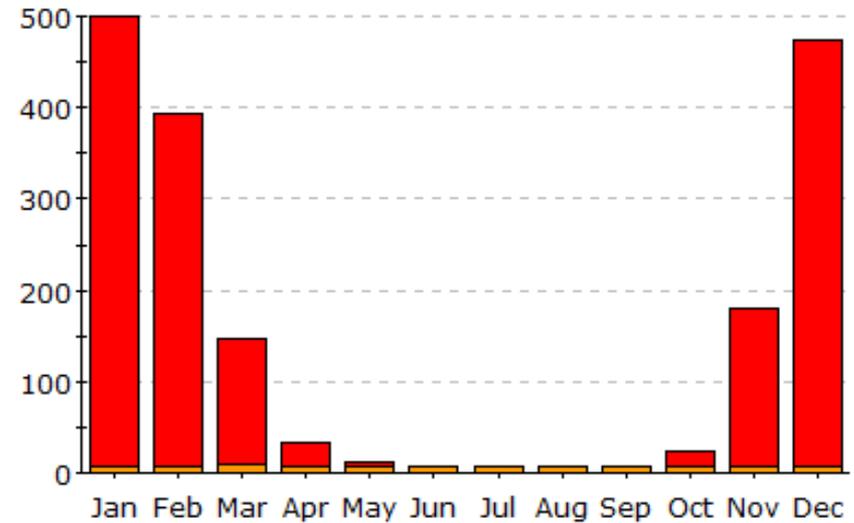
Electric Consumption (kWh)

(x000)



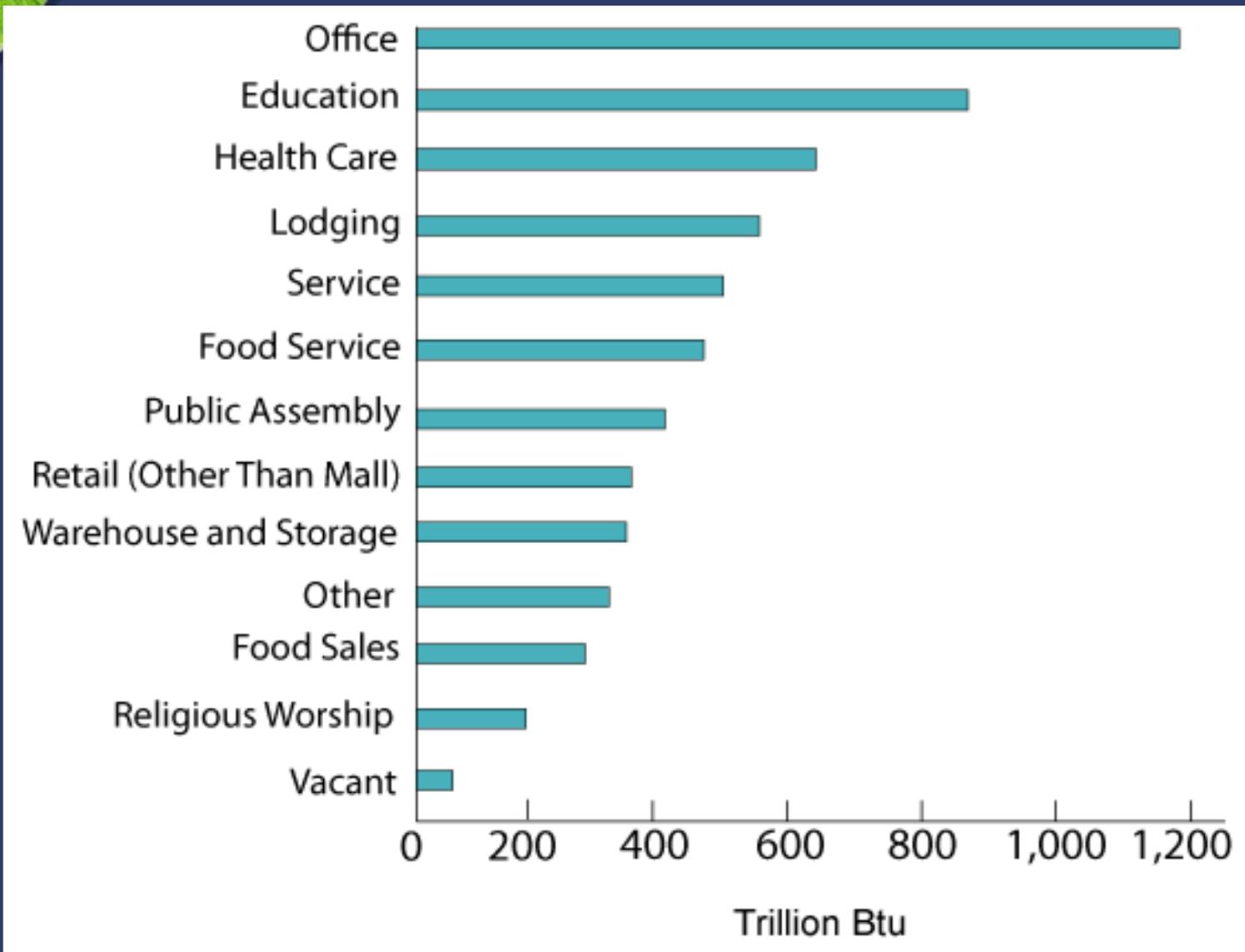
Gas Consumption (Btu)

(x000,000)

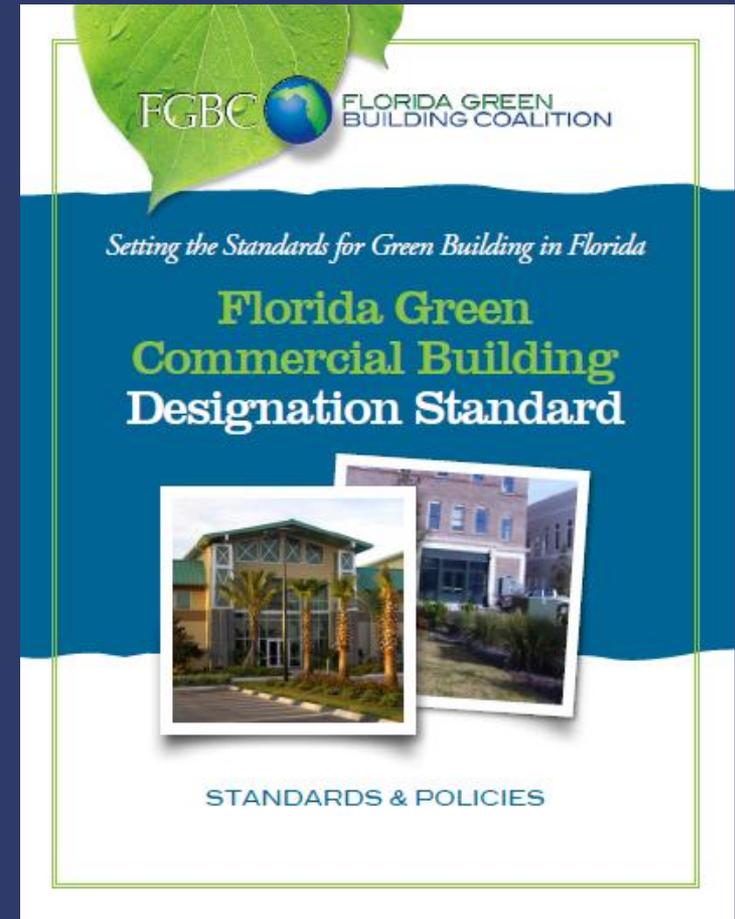


- | | | |
|---|--|--|
|  Area Lighting |  Pumps & Aux. |  Space Heating |
|  Task Lighting |  Ventilation Fans |  Refrigeration |
|  Misc. Equipment |  Water Heating |  Heat Rejection |
|  Exterior Usage |  Ht Pump Supp. |  Space Cooling |

Commercial Building Energy Users



- Category 1 Project Management
- Category 2 Energy
- Category 3 Water
- Category 4 Site
- Category 5 Health
- Category 6 Materials
- Category 7 Disaster Mitigation
- Category 8 Environmental Innovation



Point Totals and Certification



Bronze 100-150
Silver 151 - 200
Gold 201 - 250
Platinum 251+

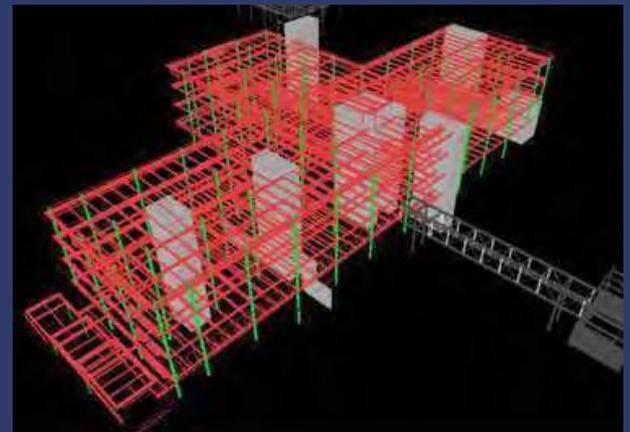
Points for Certification 100
Maximum Available Points 386

Category	Name	Points
Category 1	Project Management	9
Category 2	Energy	144
Category 3	Water	76
Category 4	Site	74
Category 5	Health	42
Category 6	Materials	36
Category 7	Disaster Mitigation	35

Category 1: Project Management

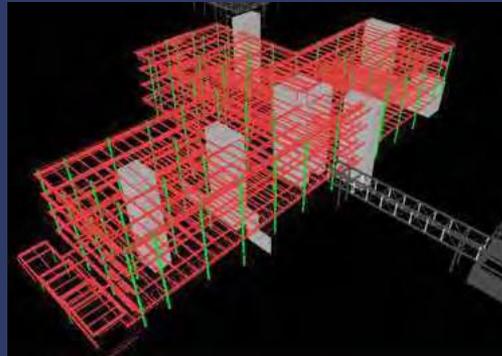
Required Category Minimum Points 0
Maximum Available Points 11

Credit	Name	Points
Prerequisite 1	Green Project Meeting	Required
PM1	Building Information Modeling	3
PM2	Cost Benefit Analysis	5
PM3	Green Education	1



Category 1: Project Management

- **PM1** Building Information Modeling (3)
 - Project team – design and contractor
- **PM3** Cost Benefit Analysis (5)
 - Energy and Water credits
- **PM4** Green Education (1)



Category 2: Energy

Required Category Minimum Points 30

Maximum Available Points 144

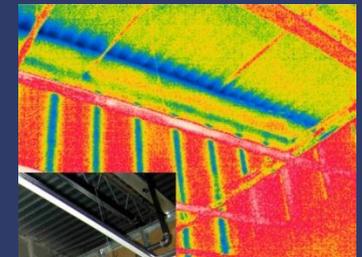
Credit	Name	Points
Prerequisite 1	Owner Project Requirements (OPR)	Required
Prerequisite 2	Basis of Design	Required
Prerequisite 3	Testing and verification of installed equipment	Required
Prerequisite 4	Minimum Energy Performance	Required
Prerequisite 5	Ozone Depletion Potential Management	Required



Category 2: Energy

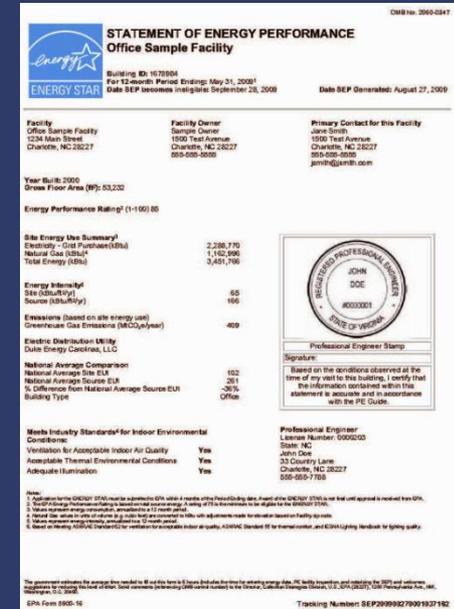
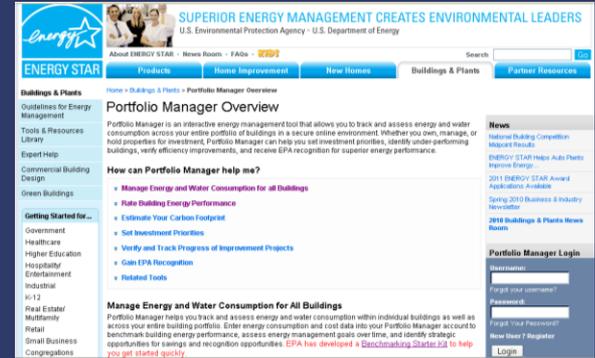
Required Category Minimum Points 30
Maximum Available Points 143

Credit	Name	Points
E1	EPA Target Finder	2
E2	Portfolio Manager	2
E3	Commissioning	10
E4	Energy Performance Improvement	70
E5	Envelope Performance Test	2
E6	Renewable Energy Production	28
E7	Green Power	4



Category 2: Energy

- **E1 EPA Target Finder (2)**
 - 1 point for using Target Finder
 - 2 points for achieving a Target Finder score > 75
- **E2 Portfolio Manager (1-2)**
 - **E2.1 Use EPA Portfolio Manager (1)**
 - **E2.2 Grant FGBC access (1)**



http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

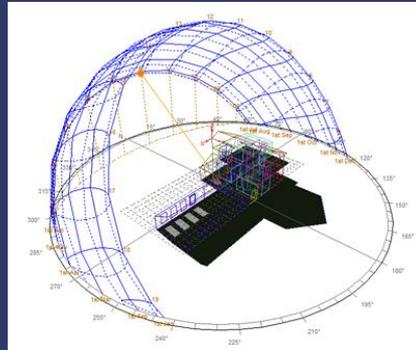
- **E4** Energy Performance Improvement (1-70)
 - FLA/COM software – or FL energy code approved
- **E5** Envelope Testing
- **E6** Renewable Energy Production (1-28)
 - Can not claim until 20% reduction in E4 achieved



Category 2: Energy

Required Category Minimum Points 30
Maximum Available Points 143

Credit	Name	Points
E8	Daylight Sensors	4
E9	Occupancy Sensors	4
E10	Interior Lighting	1
E11	Lighting Power Density (<0.8 W/SF)	5
E12	Solar Study of Building	2
E13	Energy Monitoring Interface	10



Category 3: Water

Required Category Minimum Points 30
Maximum Available Points 76

Credit	Name	Points
Prerequisite 1	Water Use Reduction	Required
Prerequisite 2	No Invasive Plants	Required
Prerequisite 3	Irrigation zones for turf and landscape beds are separate	Required
Prerequisite 4	Rain shut off device installed CORRECTLY and operable	Required
Prerequisite 5	Drought Tolerant Landscape, 25%	Required



Category 3: Water

Required Category Minimum Points 30
Maximum Available Points 66

Credit	Name	Points
W1	Interior Water Use	15
W2	Greywater Reuse	4
W3	Rainwater Harvesting	10
W4	Installed Landscape	25
W5	Water Conservation Certifications	7
W6	Installed Irrigation	15



- **W1 Interior Water Use (15)**

- **W1.1 Toilets**

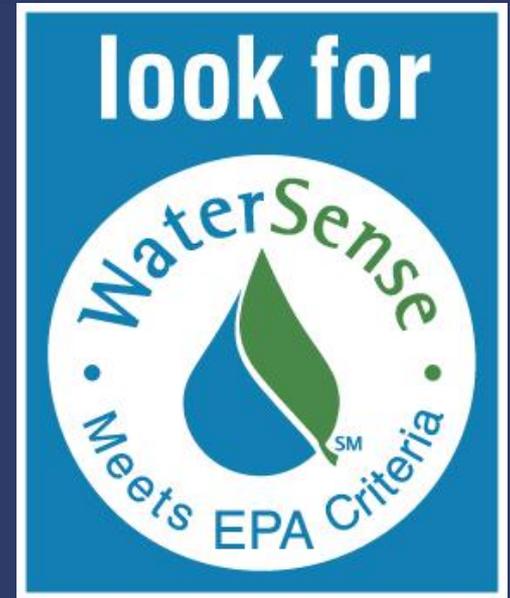
- ≤ 1.28 gpf (1)
- Dual Flush (2)
- ≤ 0.5 gpf (3)

- **W1.2 Urinals**

- ≤ 0.5 gpf (1)
- Waterless (2)

- **W1.3 Lavatory Faucets**

- ≤ 2.0 gpm (1)
- ≤ 1.5 gpm (2)
- WaterSense Certified (2)
- Motion Sensor self closing faucet (0.25 gal/metering)



- **W2 Greywater Reuse (4)**
 - **W2.1** AC condensate collected and use to reduce potable water (1)
 - **W2.2** Greywater System dual piping system installed throughout building (3)
- **W3 Rainwater Harvesting (10)**
 - Simple collection (1)
 - Dedicated use for irrigation (3)
 - Used in lieu of potable water for flushing toilets and urinals (5)
 - Collect and treated to potable standards (10)



Cisterns



Cistern







- **W4** Installed Landscape (25)
 - **W4.1** Florida Friendly Low Water Usage
 - 60%, 80%, 100%
 - **W4.2** Turf/Sod Percentage (1-5)
 - < 50%, 40%, 30%, 20%, 10%
 - **W4.3** NO turf/sod and NO installed Irrigation (10)
 - **W4.4** All plants/trees compatible with local environment (2)
 - **W4.5** Evenly shaped turf, no turf on berms (2)
 - **W4.6** Plants with similar maintenance requirements grouped together (2)
 - **W4.7** Mulch (non-cypress) applied 3-4 in. deep around plants (1)

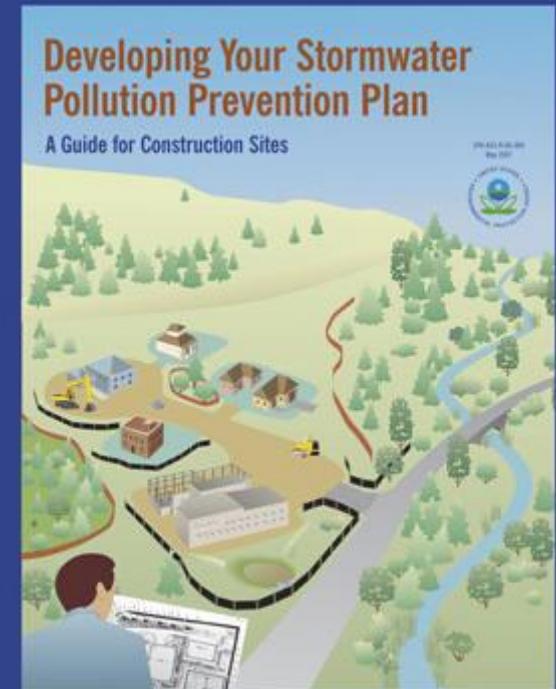
Category 4: Site

Required Category Minimum Points 10

Maximum Available Points 74

Credit	Name	Points
Prerequisite 1	Copy of SWPPP and FDEP notice of intent onsite	required
S1	FDEP Professional	3
S2	Site Selection	22
S3	Site Enhancement	7
S4	Reduce Heat Islands – Hardscapes	9
S5	Reduce Heat Islands – Roof	4
S6	Reduce Heat Islands – Building	4
S7	Stormwater	18
S8	Vehicular Transportation Alternatives	4
S9	Exterior Lighting (not attached to building)	1

- **S Prereq. 1** Copy of Stormwater Pollution Prevention Plan (SWPPP) & FL Department of Environmental Protection (FDEP) Notice of Intent onsite (required)
- **S1** FDEP Professional (3)





- **S7 Stormwater (18)**
 - **S7.1** Less than 10 acres, less than 2 acres of impact
 - 50%, 100%, 150%
 - **S7.2** Standard General (1-3)
 - 50% increased quality, max. 85%, 75%, 65% predevelopment discharge
 - **S7.3** Treat Stormwater from adjacent sites (1-3)
 - 10%, 20%, 30%
 - **S7.4** Littoral Vegetation of Manmade Stormwater Detention (1-3)
 - 50%, 75%, 100%
 - **S7.5** Pervious Hardscape (1-3)
 - 25%, 50%, 75%
 - **S7.6** Alternative Stormwater Detention (1-3)
 - 50%, 75%, 100%

Category 5: Health

Required Category Minimum Points 10

Maximum Available Points 42

Credit	Name	Points
Prerequisite 1	Environmental Tobacco Smoke (ETS) Control	Required
Prerequisite 2	Indoor Air Quality (IAQ) Management Plan, During Construction	Required
H1	Protect, Monitor, & Remediate Poor IAQ	14
H2	Low Emitting Materials	7
H3	System Controls	8
H4	Productive Work Environment	13

- H2 Low Emitting Materials (7)
 - H2.1 Adhesives and Sealants (1)
 - H2.2 Paints and Coatings (1)
 - H2.3 Carpet Systems (1)
 - H2.4 Healthy Flooring (1)
 - H2.5 Composite Wood and Agrifiber (1)
 - H2.6 Insulation (1)
 - H2.7 Cleaning Products (1)





- **H1** Protect, Monitor and Remediate Poor IAQ (14)
 - **H1.1** Carbon Dioxide (1)
 - **H1.2** Humidity Monitoring & Control (5)
 - **H1.3** Building Entrance – Outdoor Pollutants (1)
 - **H1.4** Building Entrance – Covered Entrance (1-2)
 - Main entrance covered with no less than 50sf roof
 - Covered path from parking to entrance
 - **H1.5** High Efficiency Air Filtration System (2)
 - MERV 13
 - **H1.6** Chemical and Cleaning Product Storage (1)
 - **H1.7** Radon Mitigation (1)
 - **H1.8** Pre Occupancy IAQ Testing





- **H4 Productive Work Environment (13)**

- **H4.1 Daylighting (1-4)**

- 25%, 50%, 75%, 100%

- **H4.2 Acoustics (1-4)**

- Exterior wall and roof assembly have STC rating ≥ 50
- Fenestration STC rating ≥ 30
- Interior spaces: private adjacent to private STC ≥ 30
- Interior spaces: Private adjacent to public/common space STC ≥ 55

- **H4.3 Views (1-4)**

- 25%, 50%, 75%, 100%,

- **H4.4 Outdoor space provided for employees (1)**



Category 6: Materials

Required Category Minimum Points 5
Maximum Available Points 36

Credit	Name	Points
Prerequisite 1	Storage & Collection of Recyclables	Required
M1	Material Efficiency and Global Responsibility	21
M2	Waste Management	13
M3	Local/Regional Materials	9





- **M2 Waste Management (13)**
 - **M2.1 Construction Waste Recycling (1-4)**
 - 25%, 50%, 75%, 100%
 - **M2.2 Leased Floor Coverings (1)**
 - **M2.3 Recyclable Materials (1)**
 - **M2.4 Demountable / Adaptable Interiors**
 - **M2.5 Durable Materials, Exterior Finish Materials (1)**
 - **M2.6 Low Maintenance Finishes (1)**

Category 7: Disaster Mitigation

Required Category Minimum Points 10

Maximum Available Points 35

Credit	Name	Points
DM1	Hurricane Resistance	18
DM2	Pest Management	9
DM3	Flood	6
DM4	Wildfire	2

Category 7: Disaster Mitigation



- **DM1 Hurricane Resistance (18)**
 - **DM1.1 Impact Glazing (3)**
 - **DM1.2 Building Integrated Hurricane Shutters (3)**
 - **DM1.3 Building Hardening (2)**
 - **DM1.4 Envelope Testing (2)**
 - **DM1.5 Uninterrupted Operations (3)**
 - **DM1.6 Building is a Designated Hurricane Shelter (5)**

Category 7: Disaster Mitigation

- **DM2 Pest Management (9)**

- **DM2.1** Termite Prevention (3)
- **DM2.2** Physical Termite Barrier (3)
- **DM2.3** Integrated Pest Management (3)

- **DM3 Flood (6)**

- **DM3.1** Finished Floor Elevation (FFE) (2)
- **DM3.2** All mechanical equipment pads (2)
 - 12” above 100 year flood plain or grade
- **DM3.3** If building is within the 1 Coastal Mile Zone (2)
 - FFE and equipment 24” above 100 year flood plain

- **DM4 Wildfire, Fire Resistant Exterior Finishes**



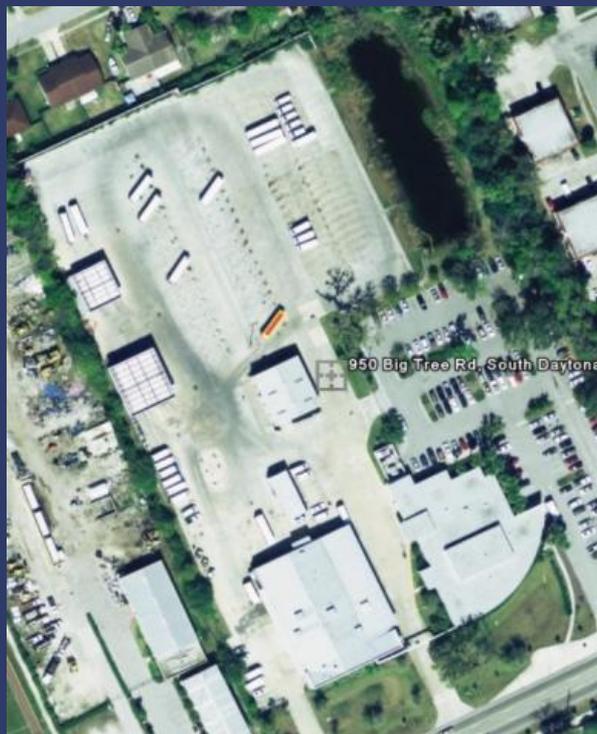
Category 8: Environmental Innovation

Required Category Minimum Points 0

Maximum Available Points 5

Credit	Name	Points
EI1	Environmental Innovation	1
EI2	Environmental Innovation	1
EI3	Environmental Innovation	1
EI4	Environmental Innovation	1
EI5	Environmental Innovation	1

What Else Can You Look For...



COMFORT



Building Pressurization



What is above those drop ceilings?



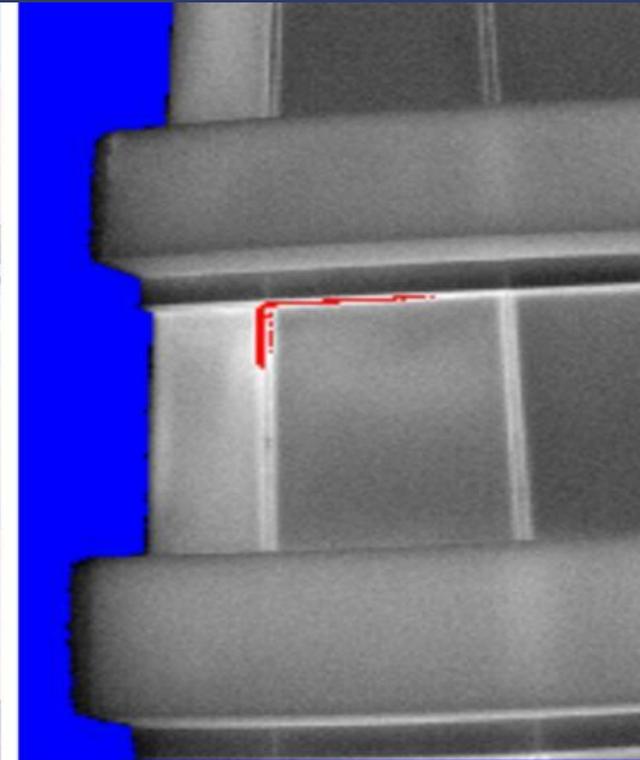




Buildings have 3 Systems

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...



FLASHY, DO YOU MIND IF I TURN UP THE THERMOSTAT A FEW DEGREES?



YES. IT'S BOILING IN HERE.

WOULD YOU MIND IF WE BUILT A DEVICE THAT WOULD REDIRECT THE RADIANT HEAT FROM YOUR BODY?



OKAY, FINE.



I SHOULD HAVE ASKED MORE QUESTIONS.





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Category 1: Project Management

- PM Prereq. 1 Green Project Meeting (required)
 - Prior to DDs



Category 2: Energy

Prerequisites (Required)

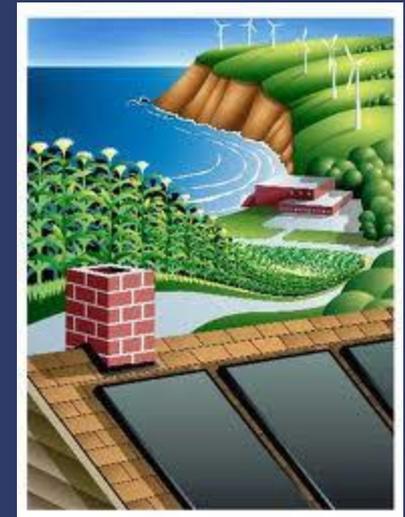
- E Prereq. 1 Owner Project Requirements
- E Prereq. 2 Basis of Design
- E Prereq. 3 Testing and balancing of installed equipment
 - Design Team
- E Prereq. 4 Minimum Energy Performance
 - 10% > current Florida Energy Code
- E Prereq. 5 Ozone Depletion Potential Management
 - No CFC's and Halons



- E3 Commissioning (10)
 - E3.1 Fundamental Building Systems Commissioning (4)
 - E3.2 Advanced Building Systems Commissioning (5)
 - E3.3 Additional Building Systems Commissioning (1)



- **E6 Green Power (1-4)**
 - Quantity purchased, length of contract (1-3)
 - Provided by renewable generation in Florida (1)
- **E7 Global Warming Potential Management (1)**
 - HCFC Free



- **E8** Daylight Sensors (1-4)
 - 25%, 50%, 75%, 100%
- **E9** Occupancy Sensors (1-4)
 - 25%, 50%, 75%, 100%
- **E10** Interior Lighting (1)
 - “All Off” Policy



- **W1 Interior Water Use (contd.)**

- **W1.4 Kitchen Faucets**

- ≤ 2.2 gpm (1)
- 1.5 gpm (2)

- **W1.5 Showerheads**

- ≤ 2.2 gpm (1)
- ≤ 1.75 gpm (2)
- ≤ 1.5 gpm (3)

- **W1.6 Dishwashers**

- Energy Star qualified with Water Factor (WF ≤ 7.0) (1)
- Energy Star qualified with Water Factor (WF ≤ 5.8) (2)





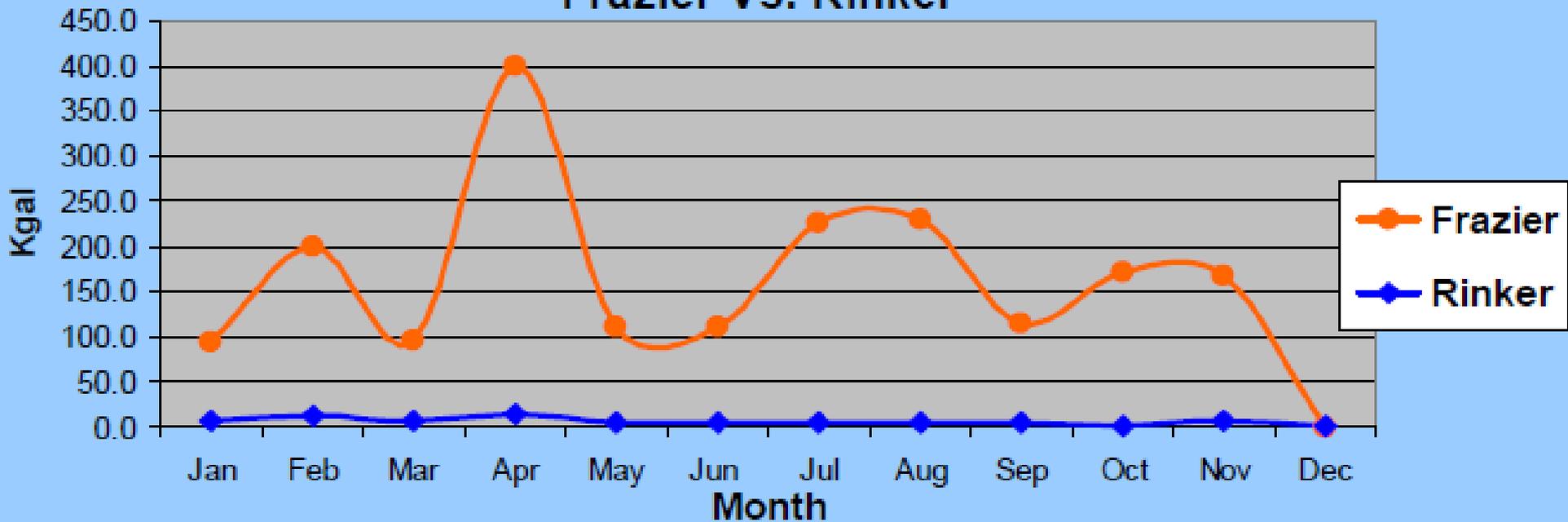
\$38,000

WATER EFFICIENCY





Frazier Vs. Rinker



Category 3: Water



- **W5** Water Conservation Certifications (7)

- **W5.1** Meet or exceed Florida WaterStar™ or WaterSense (5)
- **W5.2** Florida Friendly Landscaping™ Program Certification (2)

- **W6** Installed Irrigation(5)

- Separate zone - Multi program control
- High volume irrigation < 60% of landscape
- Head to head coverage
- Correctly installed micro irrigation
- Minimize overspray
- Provide Owner and FGBC with plan and instructions
- Heads have matched precipitation rates
- Pop up heads rise above grass



- S2 Site Selection (22)

- S2.1 Select Appropriate Site (1)
- S2.2 Urban Growth Boundary (1)
- S2.3 Permit Ready Site (1)
- S2.4 Greyfield / Redeployment of an existing site (3)
- S2.5 Brownfield Redevelopment (3)
- S2.6 Access to Public Transportation (2)
- S2.7 Adjacent to dense residential development (1)
- S2.8 Access Basic Services (1-10)
- Places of worship, grocery store, day care, fire station, school, park, etc.





- S3 Site Enhancement (7)
 - S3.1 Wetland Protection and Enhancement (2)
 - S3.2 Minimize Site Disturbance (1)
 - S3.3 Site Open Space (2)
 - S3.4 Sidewalks (1)
 - S3.5 Connectivity (1)





- **S4 Reduce Heat Islands – Hardscape (9)**
 - **S4.1 Minimize Provided Parking (2)**
 - **S4.2 Under Building Parking (3)**
 - **S4.3 Shaded, covered or high reflectance hardscape**
 - 20%, 40%, 60%, 80%
- **S5 Reduce Heat Islands – Roof (1-4)**
 - 20%, 40%, 60%, 80%
- **S6 Reduce Heat Islands – Building (1-4)**
 - 20%, 40%, 60%, 80%



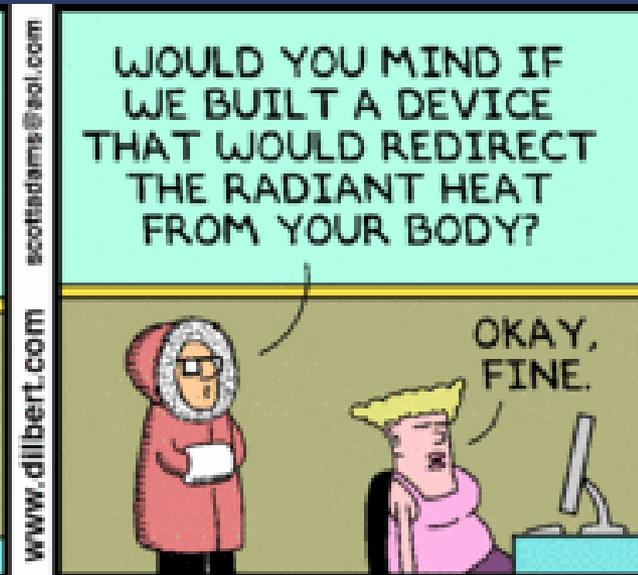
- **S8 Vehicular Transportation Alternatives (4)**
 - **S8.1 Bicycle Storage (1)**
 - 1 rack per 10,000sf of retail, 25,000sf of commercial
 - **S8.2 Changing Rooms (1)**
 - 1 per 15,000sf
 - **S8.3 Showering Facility (1)**
 - Located within 200yds or onsite 1 shower per .5% full time occupant
 - **S8.4 Low-Emitting, Fuel-Efficient and High Occupancy Vehicles (1)**
 - 3% of parking capacity



- S9 Exterior Lighting (not attached to building) (3)
 - S9.1 Meets Dark Sky Requirements (1)
 - 1 rack per 10,000sf of retail, 25,000sf of commercial
 - S9.2 Lights provide >95 lumens/watt (1)
 - S9.3 Lights are Solar Powered (1)



- H3 Systems Control (8)
 - H3.1 Lighting (1-4)
 - 25%, 50%, 75%, 100%
 - H3.2 Thermal Comfort (1-4)
 - 25%, 50%, 75%, 100%



Category 6: Materials



- **M1** Material Efficiency and Global Responsibility (14)
 - **M1.1** Remodel Existing Building (10)
 - **M1.2** Recycled Content (1-4)
 - 5%, 10%, 15%, 20%
 - **M1.3** Rapidly Renewable Materials (1-3)
 - 3%, 5%, 7%
 - **M1.4** Certified Wood (1-3)
 - 50%, 75%, 100%
 - **M1.5** Biobased Materials (1)



- **M3** Local/Regional Materials (9)
 - **M3.1** Local Manufacturing (1-4)
 - 25%, 50%, 75%, 100% - manufactured within 700 mile radius
 - **M3.2** Local Raw Material Extraction (1-3)
 - 10%, 20%, 30% - harvested, extracted or recovered within 700 mile radius
 - **M3.3** Resource Reuse (1-2)
 - 5%, 10% - salvaged, refurbished or reused

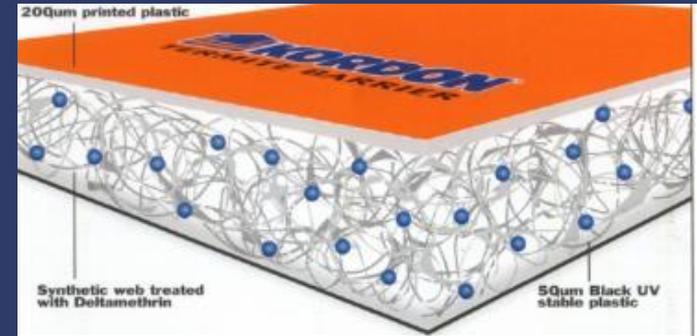
Category 7: Disaster Mitigation



- **DM1 Hurricane Resistance (18)**
 - **DM1.1 Impact Glazing (3)**
 - **DM1.2 Building Integrated Hurricane Shutters (3)**
 - **DM1.3 Building Hardening (2)**
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 - **DM1.6 Building is a Designated Hurricane Shelter (5)**

Category 7: Disaster Mitigation

- **DM2 Pest Management (9)**
 - **DM2.1 Termite Prevention (3)**
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- **DM4 Wildfire, Fire Resistant Exterior Finishes**



Category 8: Environmental Innovation

Required Category Minimum Points

0

Maximum Available Points

5

Credit	Name	Points
EI1	Environmental Innovation	1
EI2	Environmental Innovation	1
EI3	Environmental Innovation	1
EI4	Environmental Innovation	1
EI5	Environmental Innovation	1