

Demand-Side Framework and Opportunities

Presented by:

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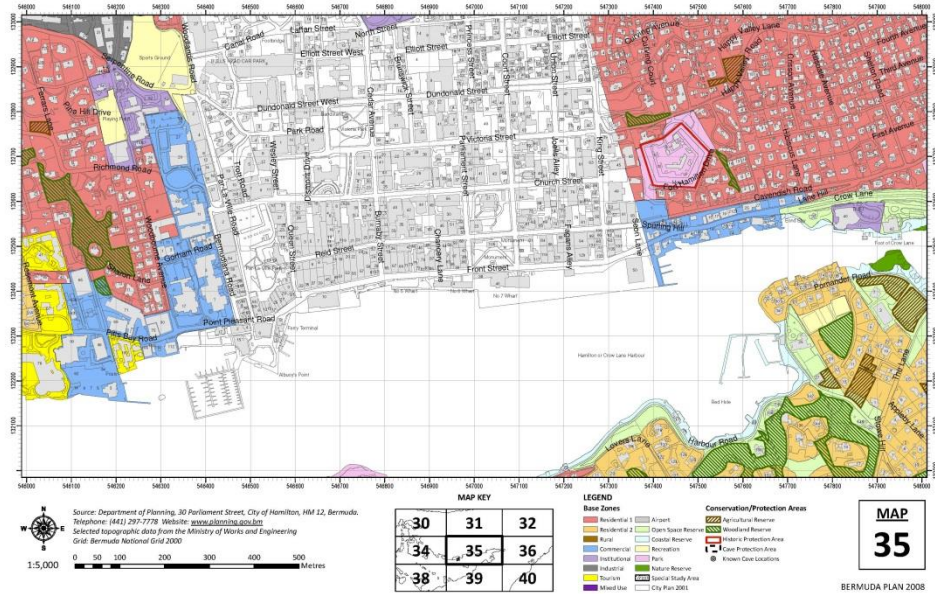
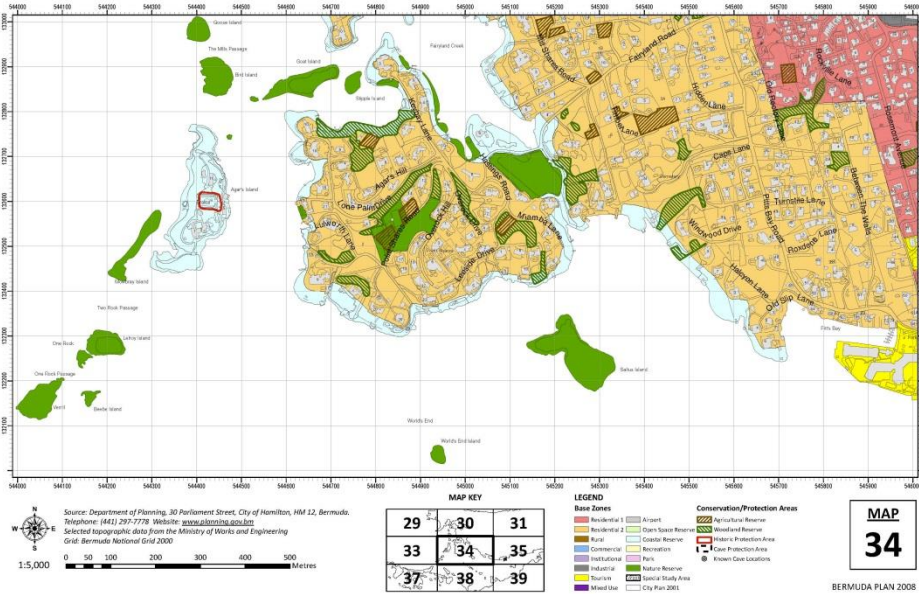


Agenda

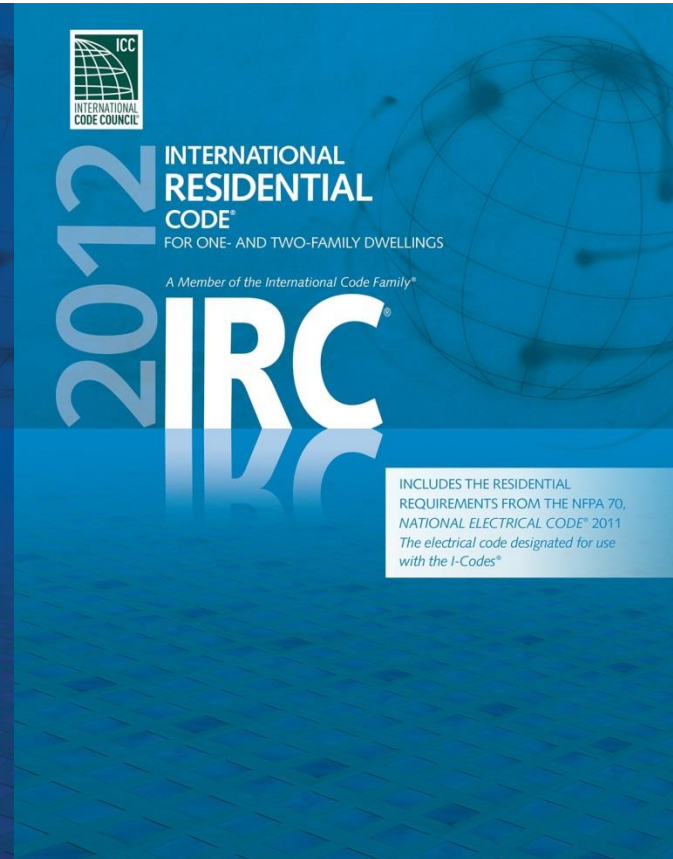
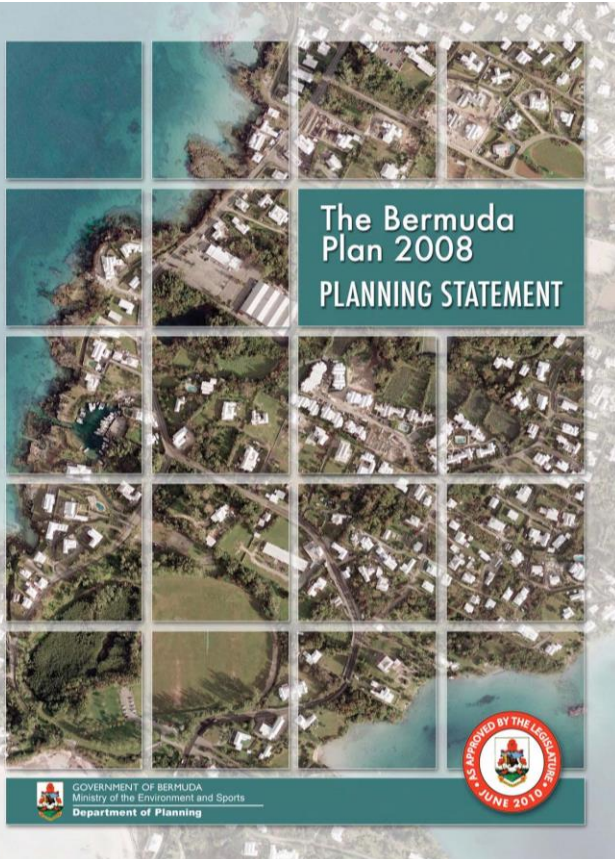
1. Designers Framework
2. Opportunities
3. Available tools
4. Monitoring tools
5. Green Building Certifications

Designers Framework

Land Use and Planning Integration



Building Codes



Import of Materials and Equipment

Limitation on Equipment Support



Opportunities

High and Best Use of Land



Cooper Gardner Architects - L. F. Wade International Airport Site

- Identifying the most common building types and uses
- Prioritize strategies based on current load demands (biggest contribution to improvements)
 - Residential
 - Commercial
 - Industrial
 - Transportation

New vs. Existing Building Stock

Differentiate Opportunities



- Existing Buildings
 - Passive
 - Active
- Vs
- New Buildings
 - Passive
 - Active

Energy Efficiency

- Design Strategies

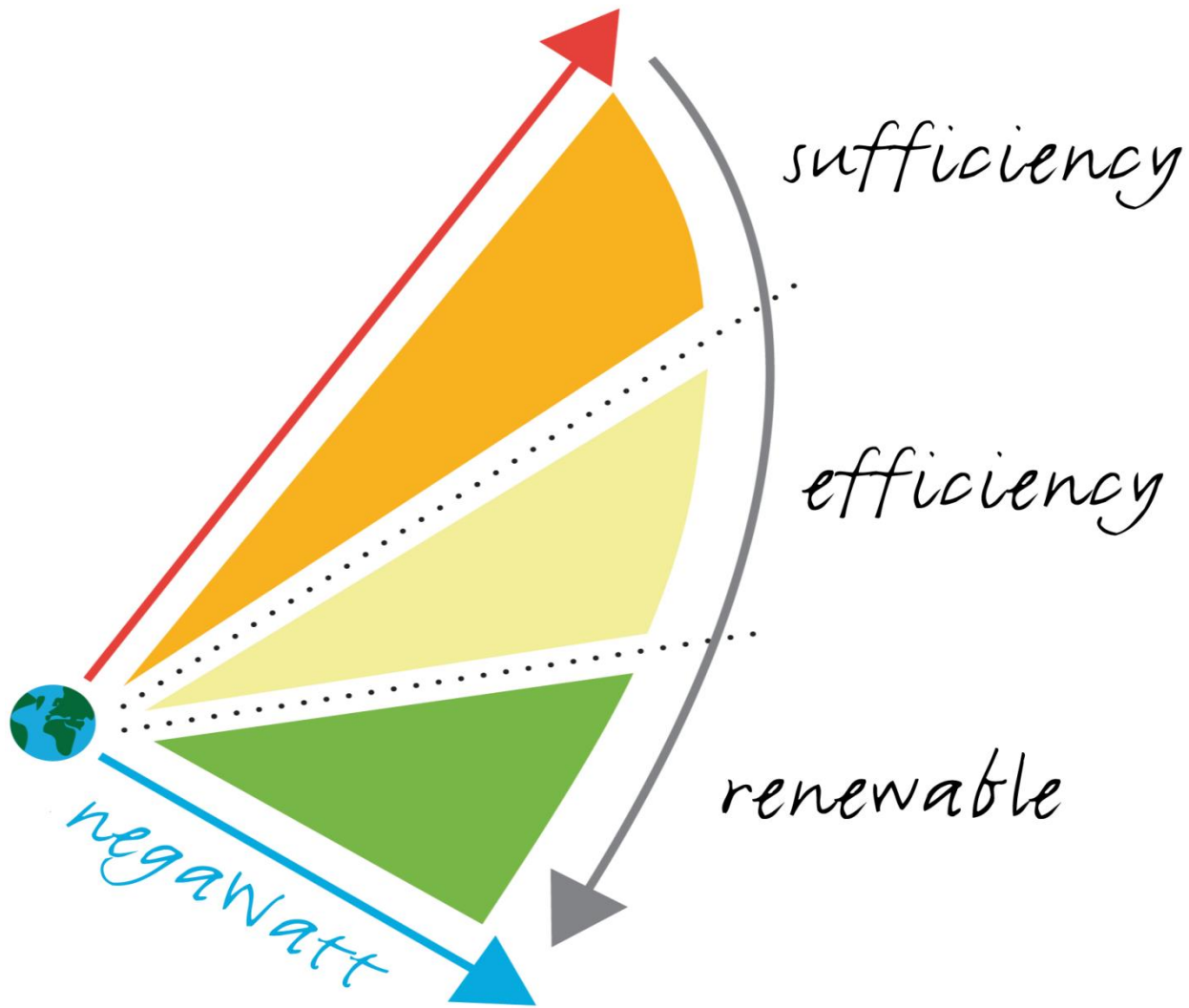
- Passive:

- Site Selection Priority Based on Existing Infrastructure
 - Preference Towards Mixed Use Buildings
 - Building Orientation, Form and Proportions
 - Building Mass and Materials
 - Building Orientation
 - Proportions
 - Window to Wall Ratio
 - Opening placement Orientation
 - Roof Color
 - Natural Ventilation

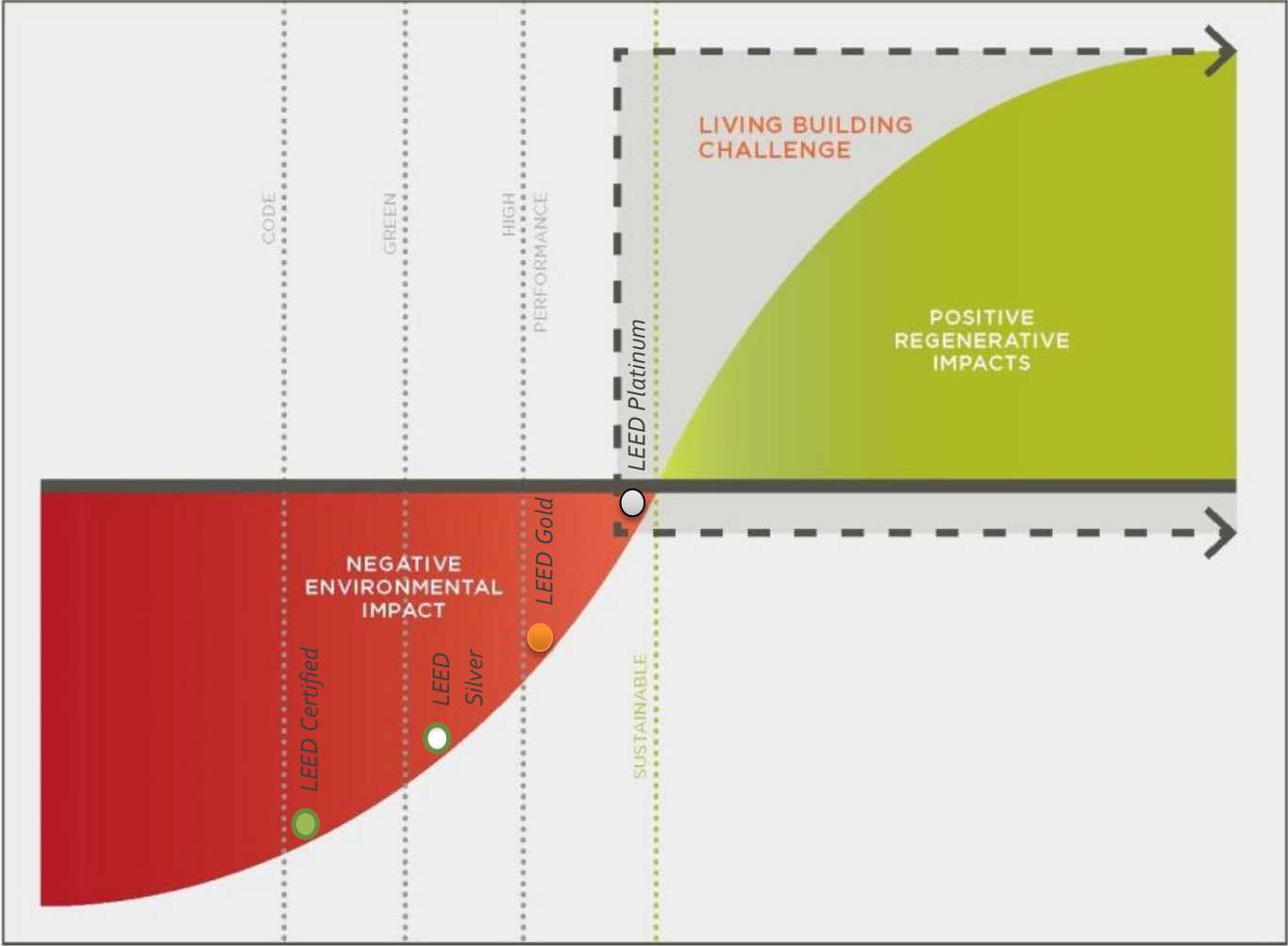
- Active

- Climate Monitoring and Controls
 - High Efficiency Systems (HVAC, Lighting, Etc.)
 - Smart Grid Technology Integration
 - Smart Building Controls
 - Performance Monitoring
 - Renewable Energy Generation
 - Energy Storage
 - Maintenance Plan
 - Occupant Education
 - Public Information on Building Performance

Negawatts



Aspiration

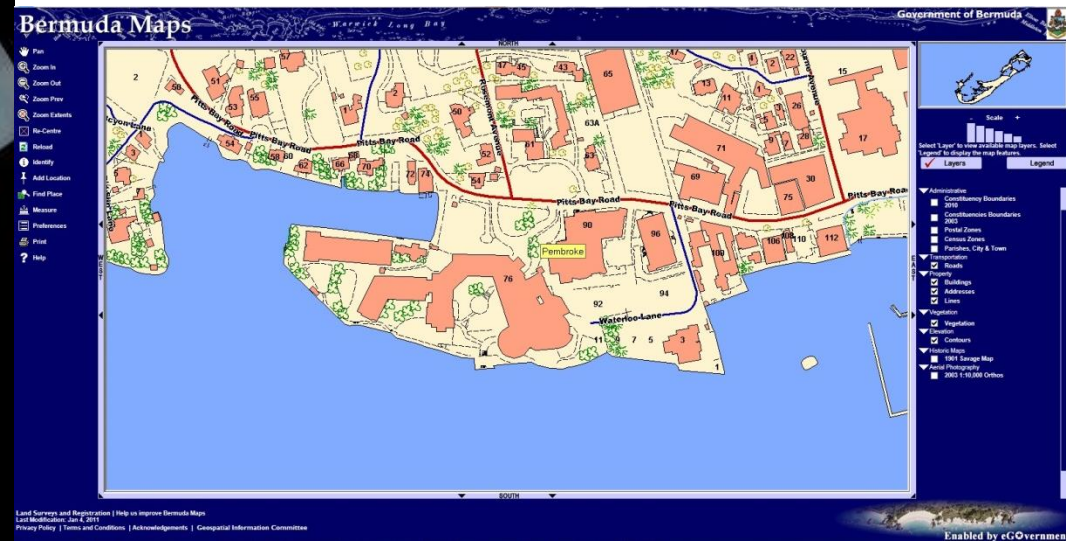


Living Building Challenge 3.1 Chart

Tools

Geographic Information Systems

GIS



Bermuda GIS Coral Reef Map

Energy Star

Target Finder



Results for Estimated Energy Use			
Energy	Design	Target	Median Building
Energy Performance Rating (1-100)	80	90	50
Energy Reduction (%)	32	45	0
Source Energy Use Intensity (kBtu/Sq. Ft./yr)	168	138	249
Site Energy Use Intensity (kBtu/Sq. Ft./yr)	50	41	75
Total Annual Source Energy (kBtu)	25,224,682	20,695,375	37,346,688
Total Annual Site Energy (kBtu)	7,552,300	6,196,220	11,181,643
Total Annual Energy Cost (\$)	\$ 202,326	\$ 165,997	\$ 299,556
Pollution Emissions			
CO2-eq Emissions (metric tons/year)	1,667	1,368	2,468
CO2-eq Emissions Reduction (%)	32%	45%	0%

TARGET FINDER

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[Return to ENERGY STAR Web site](#) > Target Finder

Target Finder

REQUIRED
Select a target rating and/or compare your Design Energy to the target.

1. Facility Information

* Zip Code Facility Name

City State

2. Facility Characteristics

* Select Space Type(s) for this project.

[Space Types]

3. The Target!

Target Rating Or Energy Reduction Target

* Choose the design target and select "View Results" to display associated energy use for the target.

4. Estimated Design Energy

Use results from energy analysis and enter total estimated energy for the design. Select "View Results" to compare Estimated Energy Use to your Target.

Energy Source	Units	Estimated Total Annual Energy Use ²	Energy Rate (\$/Unit)
Electricity <input type="text"/>	MWh <input type="text"/>	<input type="text"/>	\$ <input type="text"/> /MWh
[Select Energy Source] <input type="text"/>	<input type="text"/>	<input type="text"/>	\$ <input type="text"/> /

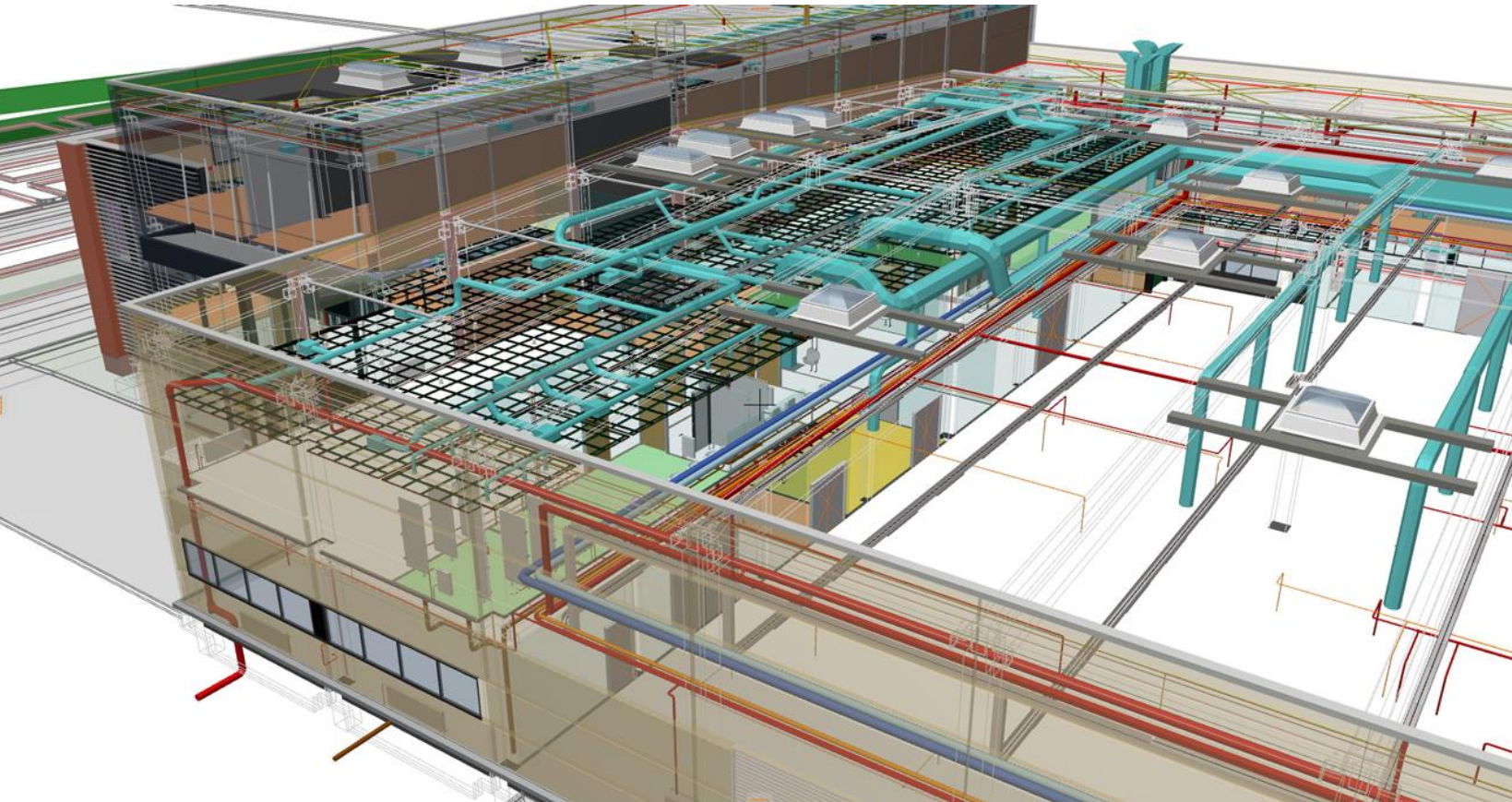
Clear Form

View Results

¹Target Rating¹ uses the EPA energy performance rating of 1-100. 75 or higher denotes ENERGY STAR. An "Energy Reduction Target" is the percent reduction from the average energy consumption of a similar building, or an equivalent EPA rating of 50. Selecting a 50% (or higher) reduction target is acceptable for setting Architecture 2030 and AIA Sustainable Practice goals.
²Annual Energy Use – the fuel mix percentage is determined from DOE-EIA. The Electric % is typical of the area designated by zip code. Natural gas is used as 2nd energy source. The defaults for percentage of energy use by fuel type will be displayed at top of Results page.

Building Information Modeling (BIM)

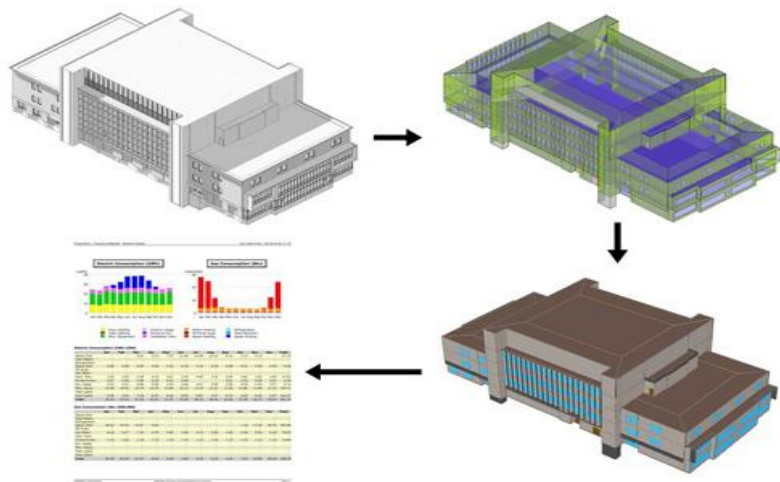
Sharing, Collaboration, Coordination



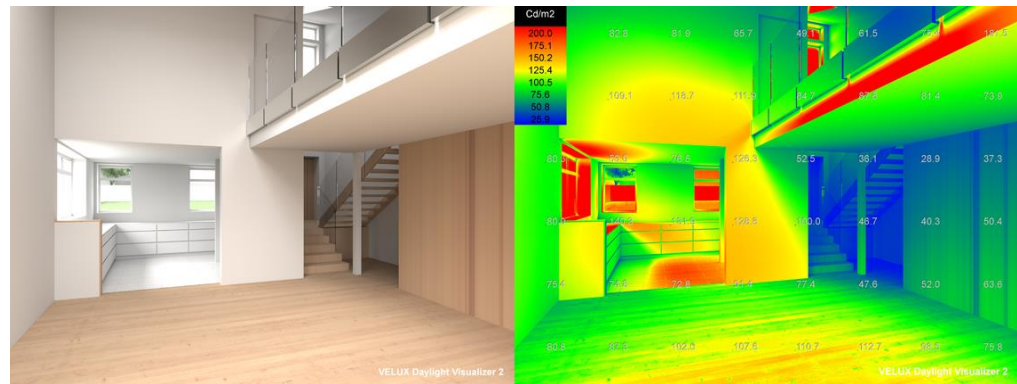
Simulations and Modeling



Virtual Reality



Energy Modeling



Daylight Modeling

References

Resources and Organizations

2030 PALETTE

2030 PALETTES MY SWATCHES MY PALETTES

ALL SCALES REGION CITY/TOWN DISTRICT SITE BUILDING

2030 Palette
By: Architecture 2030

Expand View Tags → View All Land Use Habitat/Natural Resources Mobility Lighting Heating Cooling Whole Building

FORM FOR COOLING SHADING DEVICES SOLAR SHADING FAÇADES ROOFS STACK HEAT EXCHANGE MOUNTS

English Español 中文 ABOUT TUTORIALS CONTACT BLOG Welcome, Luis

building

SOLAR SHADING
By Architecture 2030

RELATED SWATCHES

- Solar Access
- Form for Daylighting
- Side Daylighting
- Intermediate Light Shelves
- Direct Gain: Glazing
- Thermal Storage Wall
- Form for Cooling

IslandWood

Image Map 1-16 17-32 33-37

Suggest Your Images

During warm summer months, overhangs block unwanted direct sunlight from solar glazing, reducing cooling loads.

Locate an overhang above solar glazing (facing the equator – south in northern latitudes and north in southern latitudes) so it does not block the winter sun.

Block the summer sun by extending the overhang approximately:

- 1/4 the height of the opening at 28°L to 32°L
- 1/3 the height of the opening at 36°L to 40°L
- 1/2 the height of the opening at 44°L to 56°L

Exterior horizontal louvers can also be used to shade south glazing. Use the above guidelines to size the louver projection as a fraction of the distance between louvers.

In hot climates (28°L or less) that do not require any heating, extend overhangs, roof, or shading devices to cover the entire solar façade and adjacent outdoor living spaces.



Monitoring

Post Occupancy Monitoring

Portfolio Manager and LEED for Operations and Maintenance

The screenshot displays the ENERGY STAR Portfolio Manager interface. At the top, it says "Welcome LUISHUERTAS: Account Settings | Contacts | Help | Sign Out". The main navigation bar includes "MyPortfolio", "Sharing", "Planning", "Reporting", and "Recognition".

On the left, there are two trend charts:

- Source EUI Trend (kBtu/ft²):** A line graph showing a single data point at approximately 220 kBtu/ft² for the year 2012.
- Total GHG Emissions Trend (Metric Tons CO2e):** A line graph showing a single data point at approximately 1200 Metric Tons CO2e for the year 2012.

The main content area shows "Properties (2)" with an "Add a Property" button. Below this is a table with the following data:

Name	Action
Sample Office Building Training	I want to...
Sample Test	I want to...

At the bottom of the table area, there are pagination controls: "Page 1 of 1", "200", and "View 1 - 2 of 2". A "Download Entire Portfolio" link is also present.



LEED OPERATIONS AND MAINTENANCE

Green Building Certifications



BREEAM[®]



**LIVING
BUILDING
CHALLENGESM**

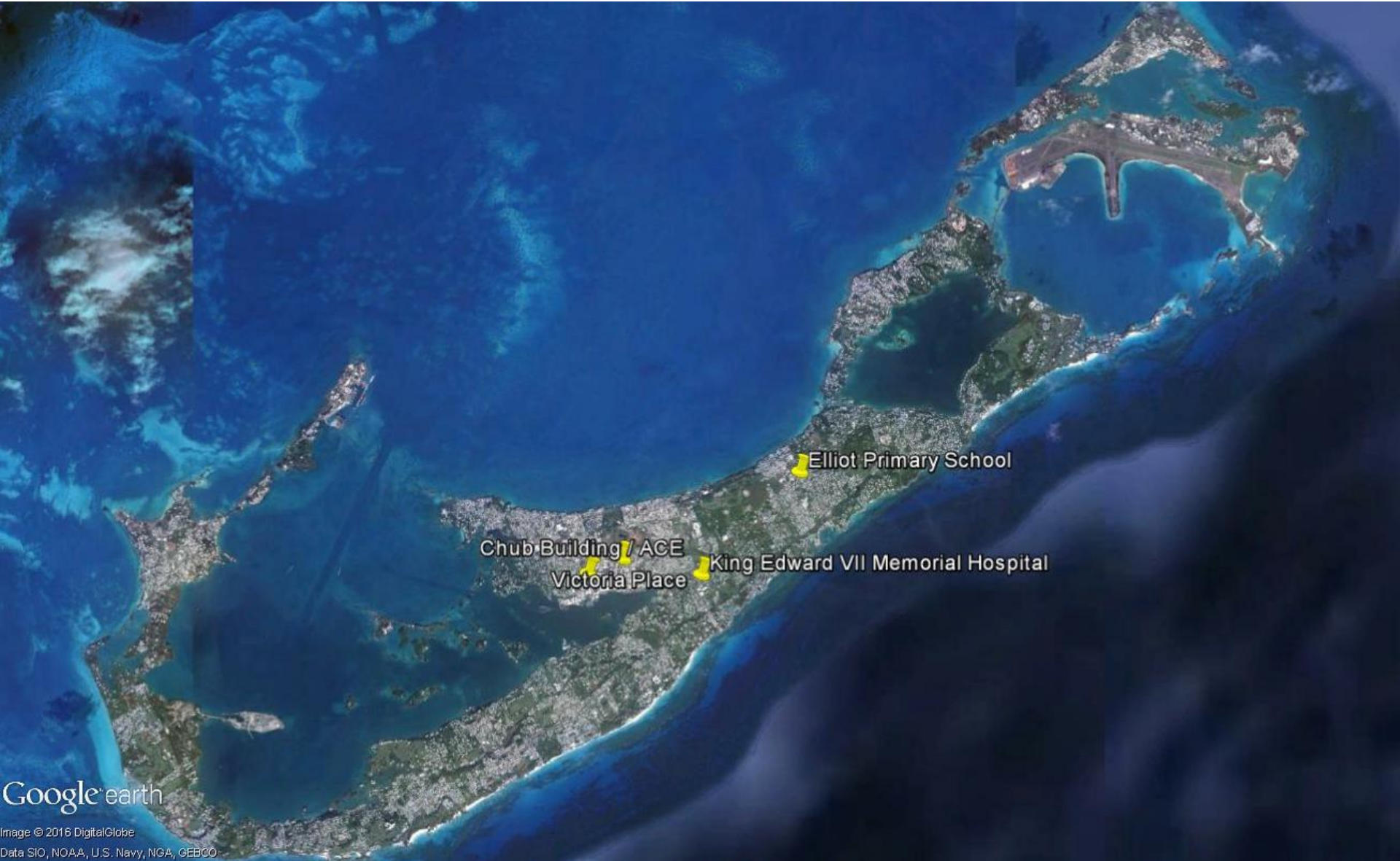


**GREEN
GLOBES[®]**



CURRENT LEED CERTIFIED PROJECTS

<http://www.usgbc.org/projects>





Questions

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