Introducing **Living Buildings** to Trinidad & Tobago

Lydia Singh **BSc. Eng., PMP, LFA**
Living Building Challenge Ambassador

TRINIDAD + TOBAGO COLLABORATIVE
www.livingbuildingchallenge.org

"Trinidad and Tobago pioneering Living Buildings, Sustainability (and beyond) in the Caribbean."

INTERNATIONAL LIVING FUTURE INSTITUTE

LOGIN

PROGRAMS EDUCATION + EVENTS ABOUT US GET INVOLVED

OUR COMMUNITIES ARE LONG OVERDUE FOR A REDESIGN

THE LIVING FUTURE NETWORK COLLABORATIVES

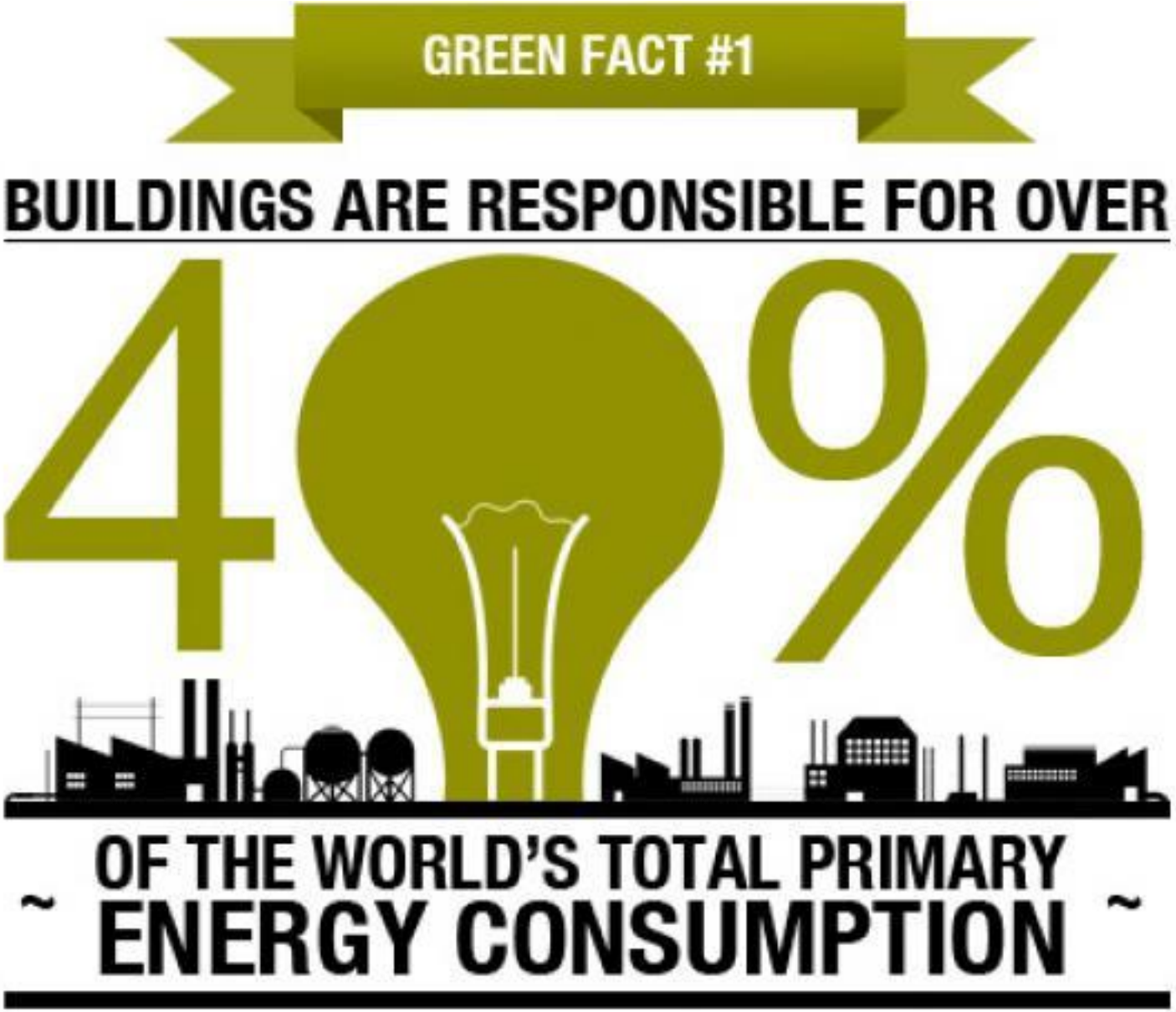
DECEMBER 2016

Total Collaboratives

93

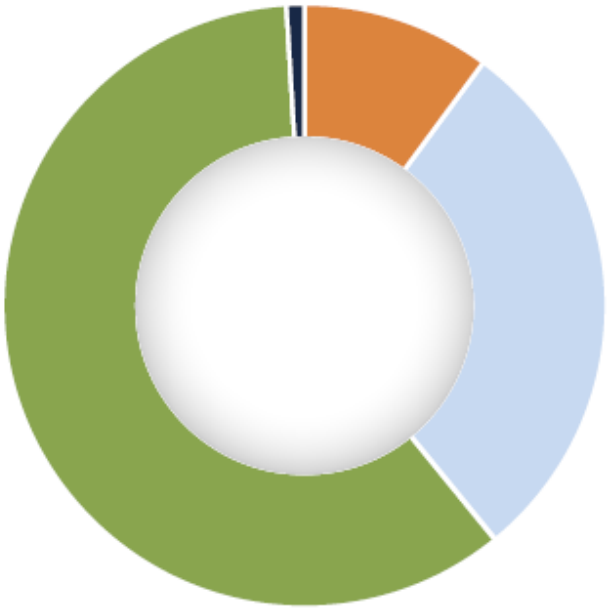
in 45

A GLOBAL MOVEMENT



World Green Building Council

Figure 9 Trinidad and Tobago Electricity Consumption by Sector, 2011

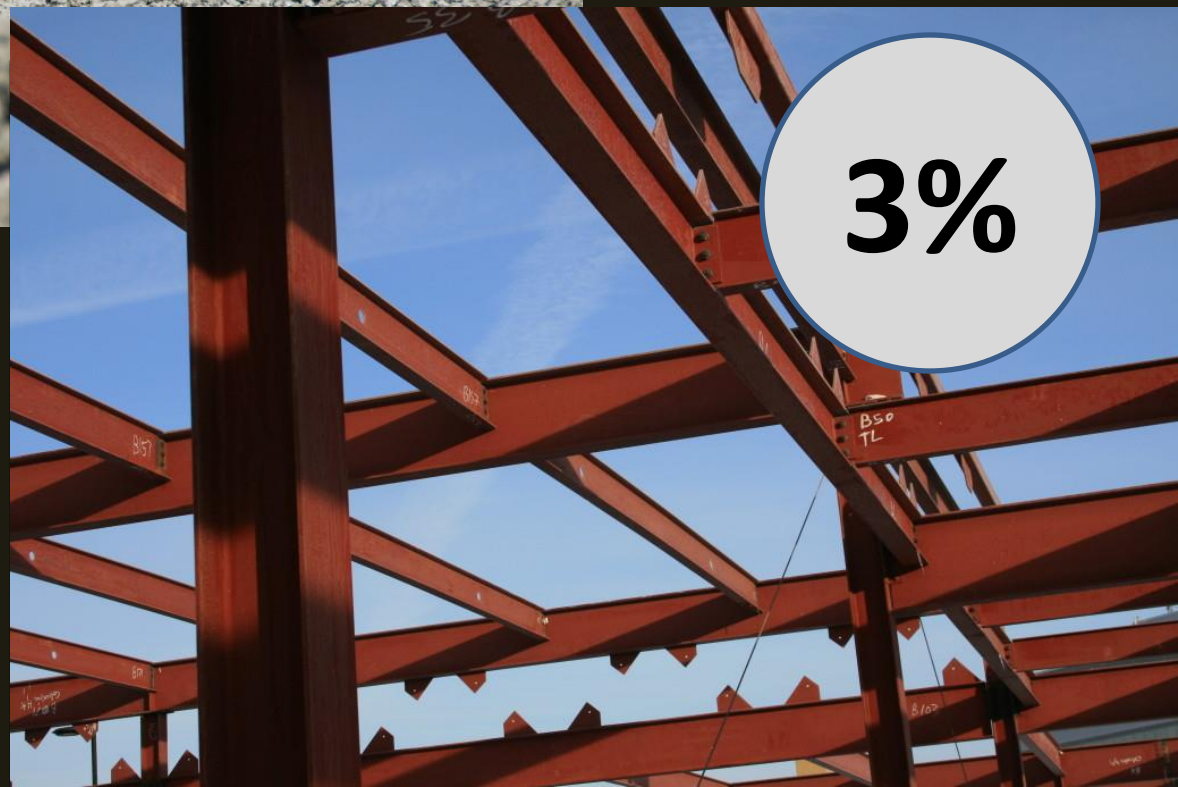


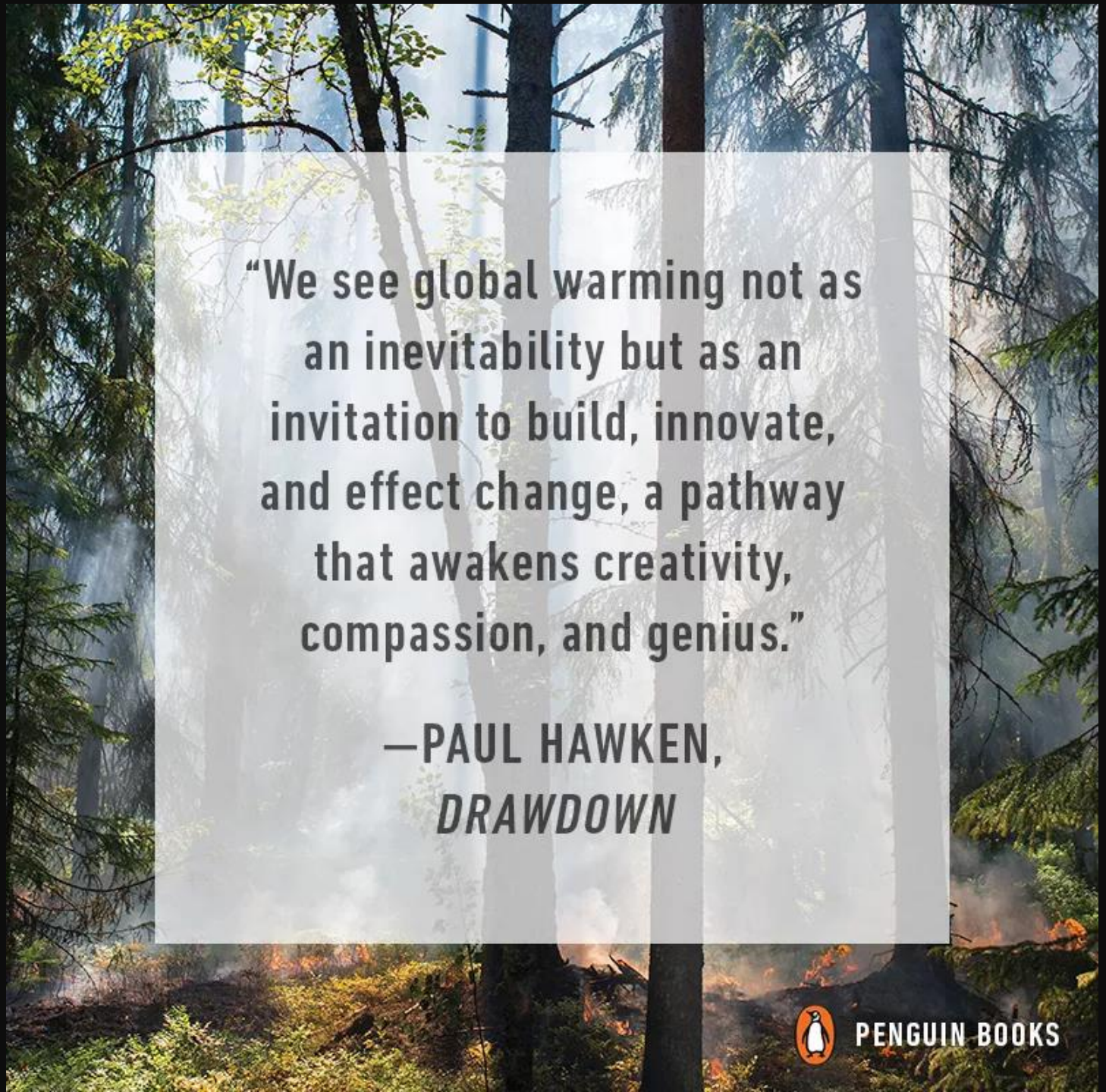
10% Commercial
60% Industrial
29% Residential
1% Other

Source: Inkim, 2013


5%


CO2


3%


"We see global warming not as an inevitability but as an invitation to build, innovate, and effect change, a pathway that awakens creativity, compassion, and genius."
—PAUL HAWKEN,
DRAWDOWN
PENGUIN BOOKS

LIVING BUILDING CHALLENGE℠ 3.1

A Visionary Path to a Regenerative Future

INTERNATIONAL LIVING FUTURE INSTITUTE™

LIVING BUILDING CHALLENGE

What if every single act of design and construction made the world a better place?

"The Living Building Challenge is the most rigorous benchmark of sustainability in the built environment. It is the gold standard against which all others are measured."

-Project Team Member

WHAT DOES GOOD LOOK LIKE?

Living Buildings are:

- Regenerative buildings that connect occupants to light, air, food, nature, and community.
- Self-sufficient and remain within the resource limits of their site.
- Create a positive impact on the human and natural systems that interact with them.

SEATTLE, WASHINGTON

Visiting the world's Greenest Commercial Building

The Bullitt Center, Seattle, Washington.

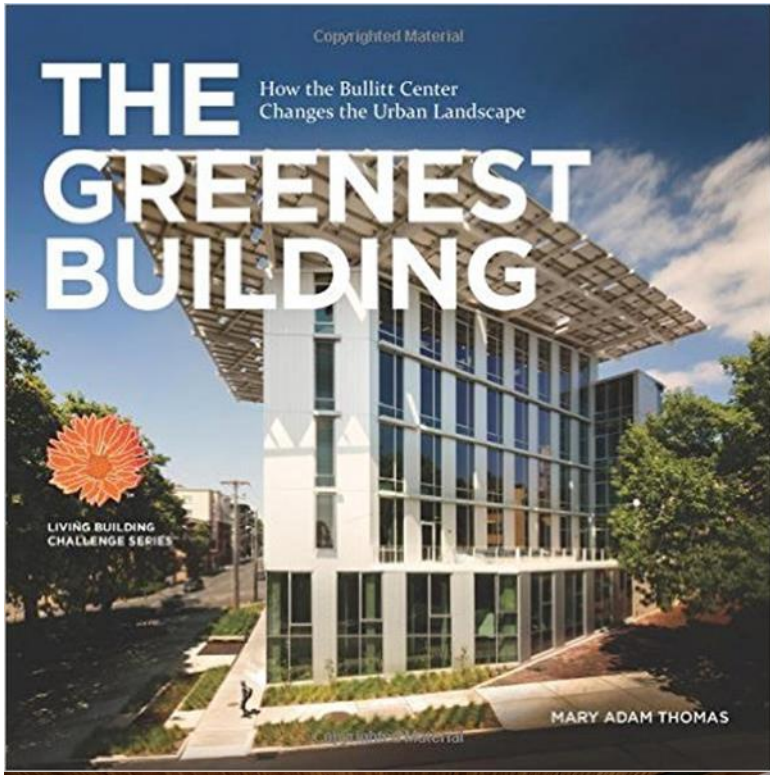
www.bullittcenter.org

Denis Hayes,

President, CEO Bullitt Center

Founder of Earth Day

www.bullittcenter.org



Why can’t everyday be Earth Day?


Powered by Hybrid-Electric
2675


Build something
to change the world

THE BLUEDOLPHIN SMART LIVING HOME

LIVING BUILDING CHALLENGE™

LIVING CERTIFICATION

A project achieves Living Certification or Living Building Certification by attaining all Imperatives assigned to its Typology. All twenty Imperatives are required for Buildings, sixteen for Renovations, and seventeen for Landscape + Infrastructure projects.

PETAL CERTIFICATION

While achieving Living Certification is the ultimate goal, meeting the Imperatives of multiple Petals is a significant achievement in and of itself. Petal Certification requires the achievement of at least three of the seven Petals, one of which must be the Water, Energy, or Materials Petal.

Imperatives 01, Limits to Growth, and 20, Inspiration + Education, are also required.

NET ZERO ENERGY BUILDING CERTIFICATION

NET ZERO ENERGY CERTIFICATION

The marketplace has characterized net zero energy in many different ways. The Institute has a simple definition:

One hundred percent of the building's energy needs on a net annual basis must be supplied by on-site renewable energy. No combustion is allowed.

The Net Zero Energy Building Certification® program uses the structure of the Living Building Challenge 3.1 to document compliance and requires four of the Imperatives to be achieved: 01, Limits to Growth, 06, Net Positive Energy (reduced to one hundred percent), 19, Beauty + Spirit, and 20, Inspiration + Education.

The requirement for Imperative 06, Net Positive Energy, is reduced to one hundred percent and does not require storage for resilience. One hundred and five percent energy production and storage for resilience are required for Petal Certifications targeting I-06 Net Positive Energy, and for all Living Building Certifications.

As with Living Building and Petal Certification, NZEB certification is based on actual performance rather than modeled outcomes.

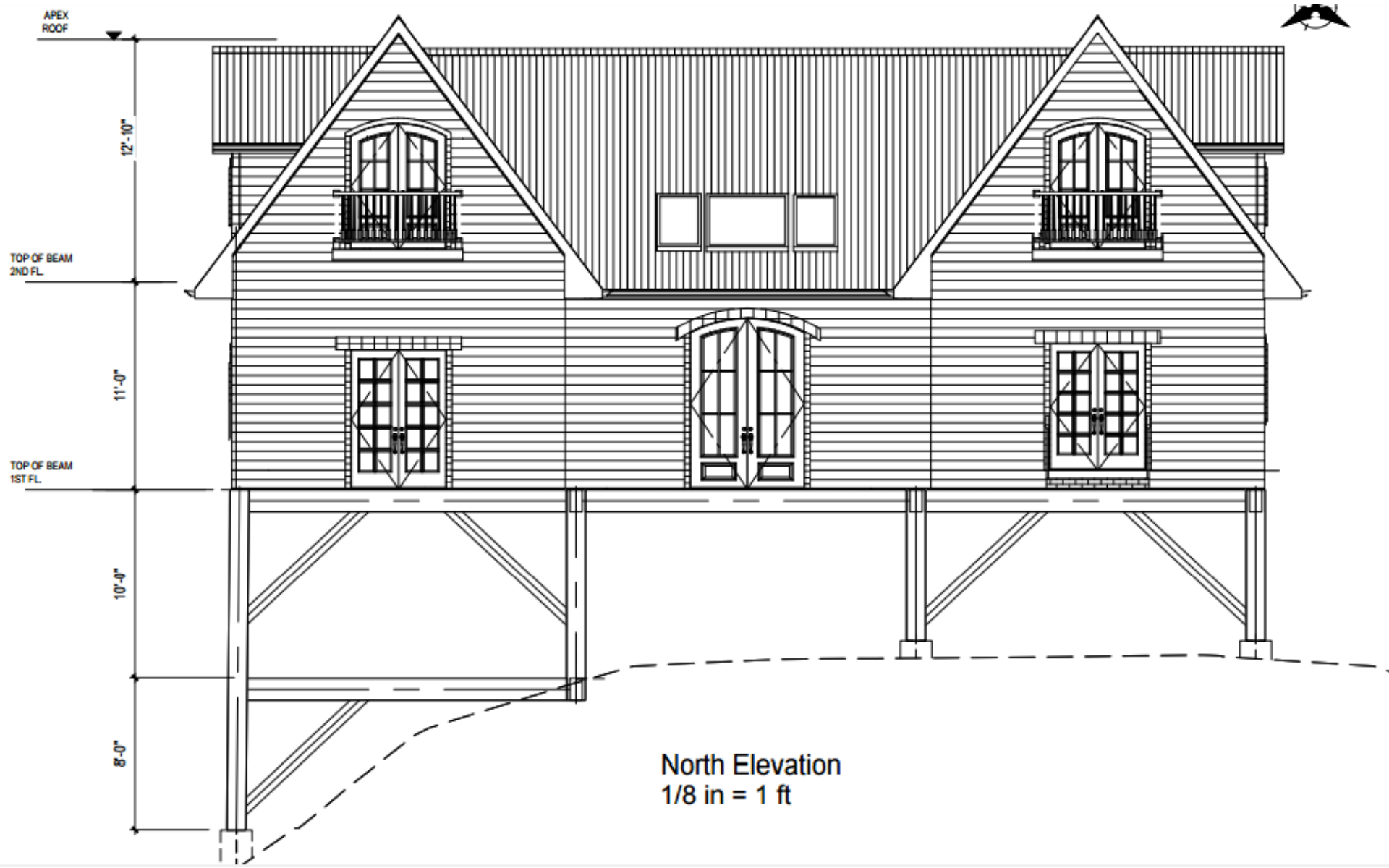
PETALS

© 2014 International Living Future Institute

THE BLUEDOLPHIN SMART LIVING HOME

SUMMARY :

- **A Single family residential home with one detached double carport**
- **Floor area = 3100 ft^2**
- **Area of land = 11,200 ft^2**
- **2 stories**
- **Open basement**
- **Greenhouse**



North Elevation
1/8 in = 1 ft

PLACE

01: LIMITS TO GROWTH

02: URBAN AGRICULTURE

03: HABITAT EXCHANGE

04: HUMAN POWERED LIVING

© 2014 International Living Future Institute

PETAL 1 : PLACE

PETAL 1 : PLACE

Acono Ridge- Maracas, St. Joseph

The **BlueDolphin Smart Living Home** is situated in a Gated Community called WOODRIDGE PARK nestled amongst the majestic, lush mountains of Trinidad's Northern Range in the ACONO, region of Maracas, St. Joseph.

PETAL 1 : PLACE

- **ACONO RIDGE, MARACAS-ST.JOSEPH**

A historical and nature loving community which was once inhabited by the indigenous Amerindian people. Today only a few descendants reside here.

Fast growing residential suburb in Northern Trinidad

All amenities can be found within a four (4) mile radius.

In close proximity to the Historical Ortinola Great House.

WATER

05: NET POSITIVE WATER

© 2014 International Living Future Institute

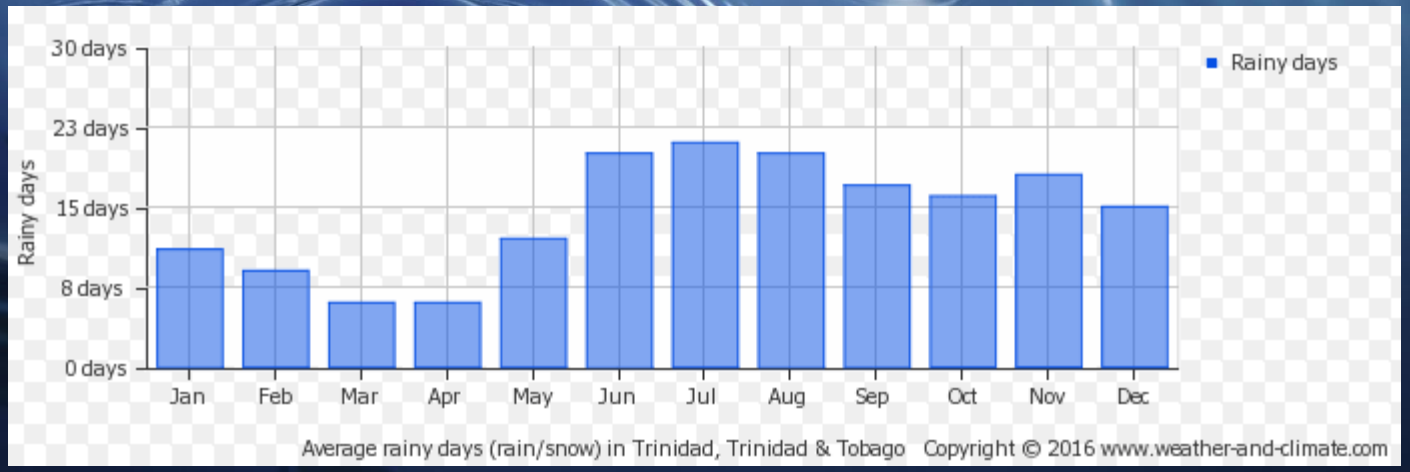
PETAL 2 : WATER

Estimated Annual Rainfall on the Northern Range is 100 inches.

Trinidad and Tobago experiences two (2) main seasons:

a. **Dry Season (Jan-May)**
b. **Rainy Season (Jun-Dec)**

RAINWATER HARVESTING VOLUME = 15,000 gallons



PETAL 2 : WATER

TARGET DAILY WATER CONSUMPTION PER PERSON = 30 gallons.

Estimated Daily Water consumption per person (gallons)		**Notes**
Shower	7.5	0.75gal/min (10 mins)
Teeth brushing	1	
Hands/face washing	1.2	
Toilet flush	0.2	Vacuum flush (0.2l per flush)
Dishwashing	3.2	3.2 gallons per load
Cooking	5	
Clothes washing	4.3	15 gallons per load (2 loads per week)
Watering plants & Lawn	7	
Drinking water	0.5	
TOTAL	**30**	**Gallons**

Water saving technology- These shower heads use 70% less water than typical shower heads..

These vacuum flush composting toilets use as little as 0.2litres of water as compared with 22litres needed by conventional toilets.

ENERGY

06: NET POSITIVE ENERGY

Rooftop Solar Array at The Bullitt Center
Seattle, WA
Photo: Ben Benschneider

© 2014 International Living Future Institute

PETAL 3 : ENERGY

The home will be powered by an OFF-GRID SOLAR POWER SYSTEM

TOTAL CAPACITY = 4.2 KWH (3 days autonomy)

ALL Energy Efficient Appliances including the world's most efficient ceiling fans (HAIKU)

- **Motion sensored and Dusk -to-Dawn lights ,**
- **Independent Solar powered gate openers**
- **Solar water heaters**
- **Natural Daylighting – combined use of Windows, Skylights, Solatubes**
- **Solar Tints (Windows to east)**
- **Use of cross ventilation – designed with at least 2 openings in each room.**
- **Radiant Heat Barriers – Roof**
- **Insulation on walls and some floors**

MATERIALS

10: RED LIST

11: EMBODIED CARBON FOOTPRINT

12: RESPONSIBLE INDUSTRY

13: LIVING ECONOMY SOURCING

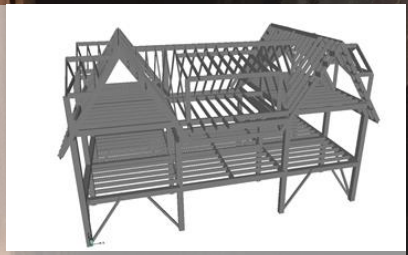
14: NET POSITIVE WASTE

UniverCity Childcare Centre, Burnaby, BC
Courtesy: space2place

© 2014 International Living Future Institute

PETAL 4 : MATERIALS

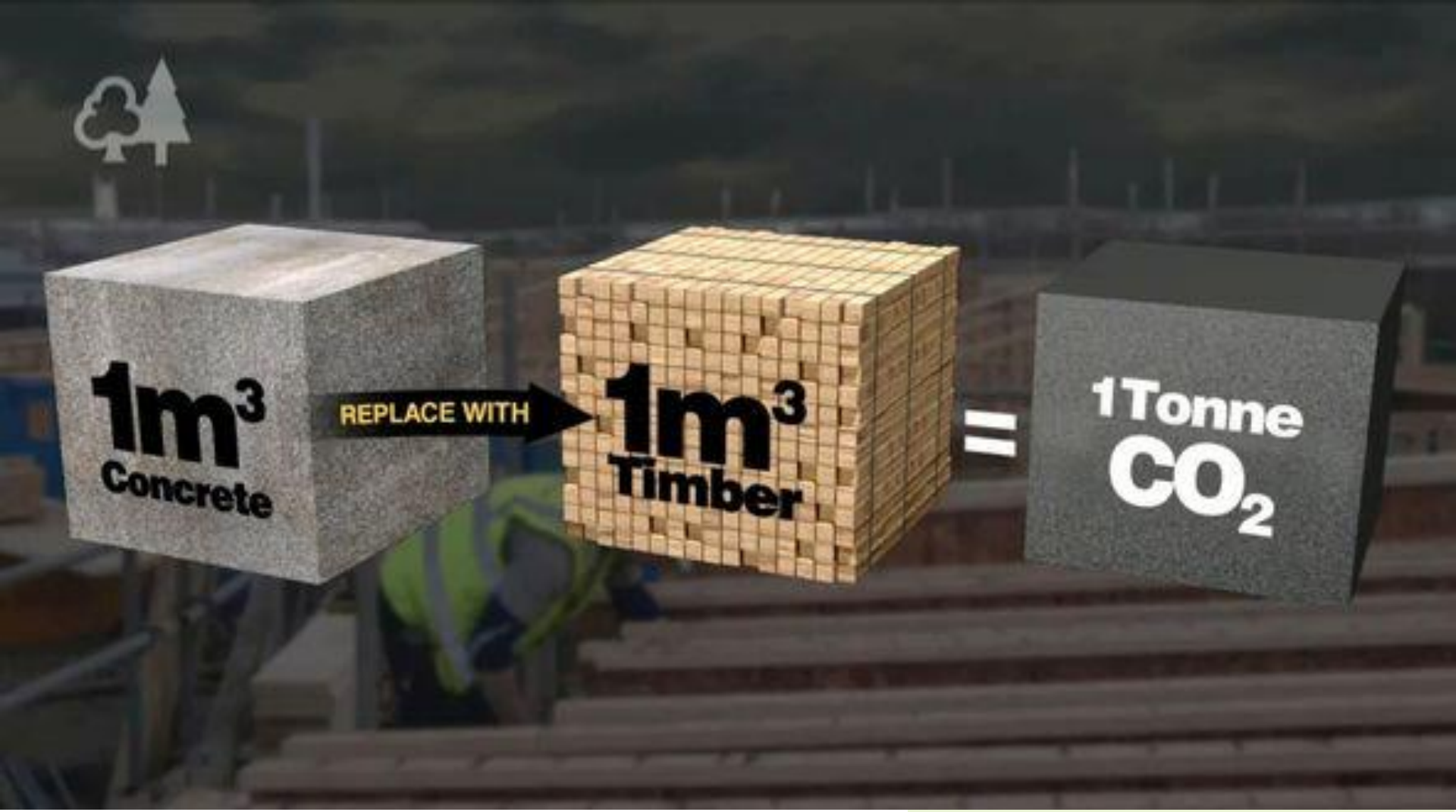
HYBRID STRUCTURE:



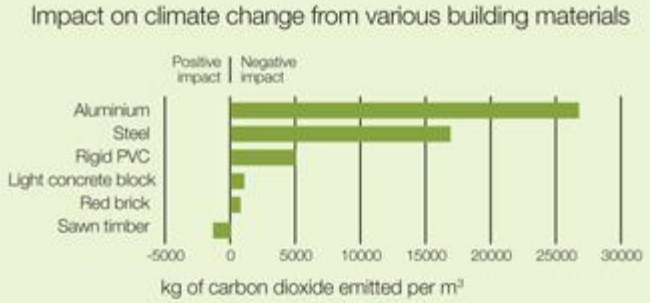
- Concrete Foundation - Auger piles
- Timber structure (Columns, Beams, Walls, Floors, Roof frame, Decks)
- certified timber from Guyana – Responsible forest management
- Metal sheet roof
- All REDLIST chemical free materials

Timber – a Sustainable, Natural, Non-toxic alternative building material which absorbs less heat keeping buildings natural cooler.

FSC certified timber from Guyana –
The Iwokrama Forest

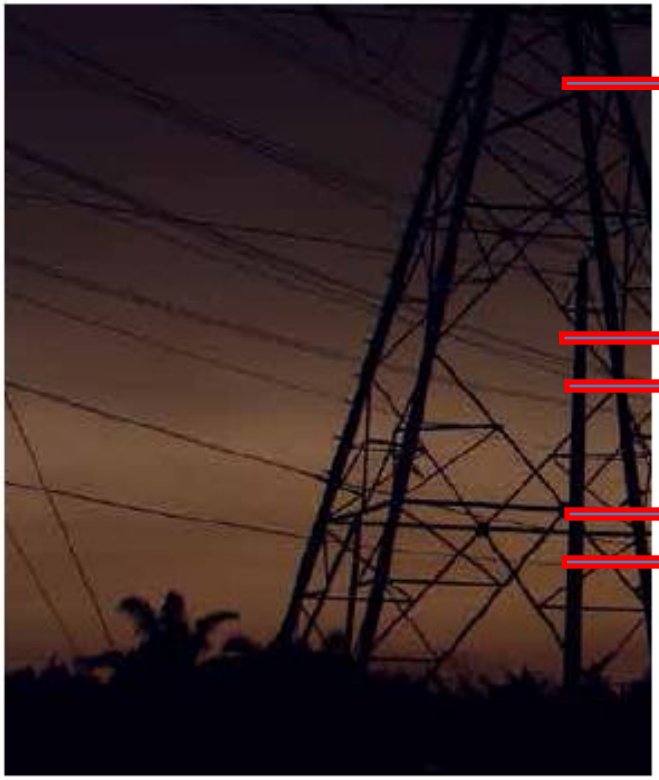


Using FSC certified timber to replace masonry blocks and to significantly reduce use of concrete and steel in buildings.



MATERIALS

RED LIST



There are temporary exceptions for numerous Red List items due to current limitations in the materials economy. Refer to the v3.1 Materials Petal Handbook for complete and up-to-date listings.

The project cannot contain any of the following Red List materials or chemicals:[23]

- Alkylphenols
- Asbestos
- Bisphenol A (BPA)
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorobenzenes
- Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs)
- Chloroprene (Neoprene)
- Chromium VI
- Chlorinated Polyvinyl Chloride (CPVC)
- Formaldehyde (added)
- Halogenated Flame Retardants (HFRs)
- Lead (added)
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Perfluorinated Compounds (PFCs)
- Phthalates
- Polyvinyl Chloride (PVC)
- Polyvinylidene Chloride (PVDC)
- Short Chain Chlorinated Paraffins
- Wood treatments containing Creosote, Arsenic or Pentachlorophenol
- Volatile Organic Compounds (VOCs) in wet-applied products [24]

23 A link to the list of CAS registry numbers that correspond with each Red List item is available in the v3.1 Materials Petal Handbook.

24 Wet-applied products (coatings, adhesives, sealants) must not exceed specific VOC levels. Refer to the v3.1 Materials Petal Handbook for details.

HIGH LEVEL GOALS (2017 to 2019)

1. To start construction of our first residential LIVING BUILDING model home by third quarter 2017.

2. To design and build a residential LIVING BUILDING at the same cost or no greater than 10% of that for a conventional home of similar size/typology; thereby creating a strong business case for its adoption in Trinidad and in the Caribbean.

3. To rapidly promote awareness of Living Buildings , LBC and educate/train Architects, Engineers, Contractors, Developers etc.

4. To help make Living Buildings the norm for NEW buildings in Trinidad and Tobago (and eventually in the Caribbean).

IT'S TIME TO IMAGINE A LIVING FUTURE AND A WORLD OF LIVING BUILDINGS

“It is our sacred duty to protect this earth and all inhabitants.”

“THE POWER IS YOURS!


Thank you.