FNBC / FHBM Update

FIJI NATIONAL BUILDING CODE
Build Green: Fiji Home Building Manual

Northern Division
Public Engagement

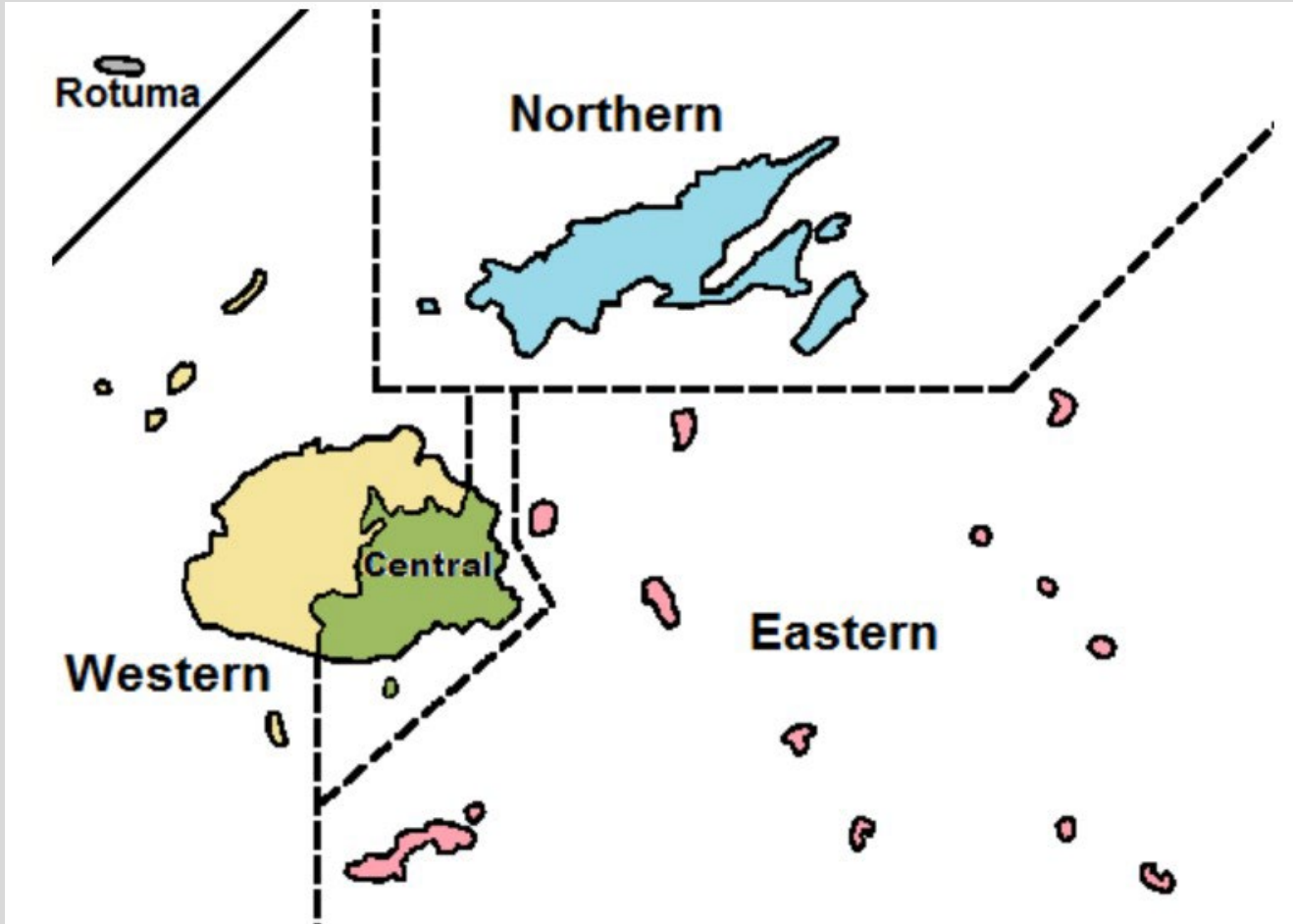
May 19, 2023

Welcome !

Fiji National Building Code
Build Green: Fiji Home Building Manual

Labasa
Savusavu
Taveuni

and
everything in
between



Build **Strong**

Build **Safe**

Build **Green**

Purpose of this Meeting

1) Introduce the Fiji Building Code **update**
2) Introduce the **new** Build Green: Fiji Home Building Manual
3) Listen and discuss your **ideas, concerns** and **answer questions**

Important Questions

How many people here own a house, apartment, shop, warehouse?

How many people here would like to have a stronger building more resilient to cyclones?

How many people are concerned about climate change …

sea level rising

more and worse flooding and storms

hotter air temperatures

loss of fisheries and habitat?

How many people are concerned about the rising cost of building a new home or other building type?

Building Code Objectives

Build Strong

Build Safe

Build Green

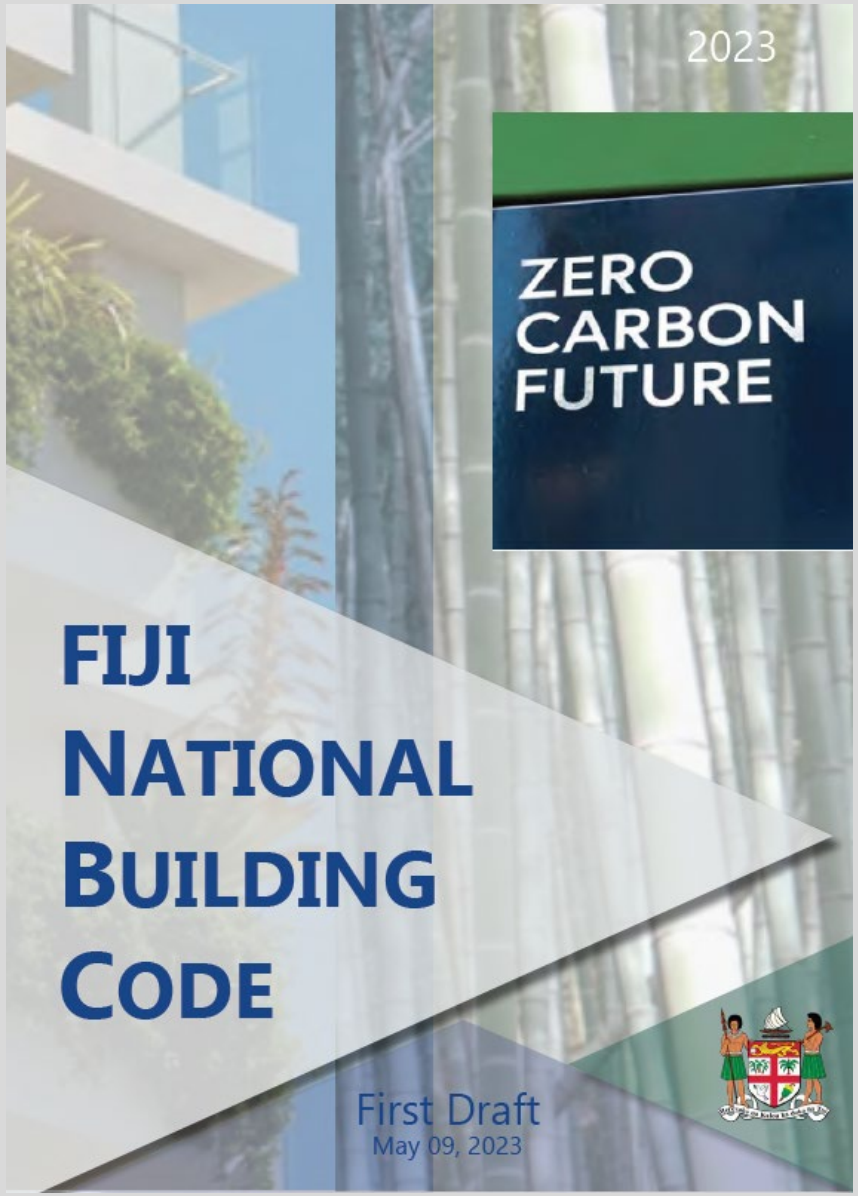
Save Money

Cyclone, earthquake, flooding resilience
Siteworks

Fire Safety, Electrical, Health + Amenity

Energy Savings, Cooling, Reduce carbon footprint

Importance of a Building Code



Ensures buildings can withstand forces exerted during **earthquakes, cyclones and flooding**, minimizie damage and promoting post-disaster recovery.

Ensures buildings are designed for **fire safety, electrical safety** and **plumbing safety**

Ensures buildings are **low in energy consumption** and are resilient to climate change

Ensures buildings will be of sufficient quality for **insurance and financing** by lenders

Importance of Home Building Manual

Builders will have **examples** of acceptable green building standards

Homeowners will learn how green building standards are **applied**

Builders and Homeowners can together choose a **green building strategy**

Plan reviewers and building inspectors can use it as a **reference**

Build STRONG

- Key Points

Cyclone Resilience specific to Fiji

- Current wind load requirements are based on Australian standards which **does not receive wind speeds** as intense as Fiji
- New wind load and earthquake standards were **developed by the Fiji Institute of Engineers** … known as FS 1170.2
- New wind load standards ensure that **buildings of importance** are protected from a Category 5 storm (wind speed of 74 m/s

Buildings of Importance are ….

- Buildings that serve as an **emergency evacuation shelter during a disaster** e.g. school, church, community centre, gymnasium
- Buildings that contain a **large number of people** at any given point e.g. hospital, university classroom, stadium, theatre, shopping mall

Varying Resilience based on Building Type

- **Buildings of high importance** will be required to be constructed to protect against CAT 5 storms (e.g. Cyclone Winston)
- **Other buildings** are required to comply with a lesser standard based on the degree of occupancy and harm caused if the building should fail
- **Single homes and accessory buildings** (sheds, shelters, etc.) will only be required to be protected for a slightly higher wind speed

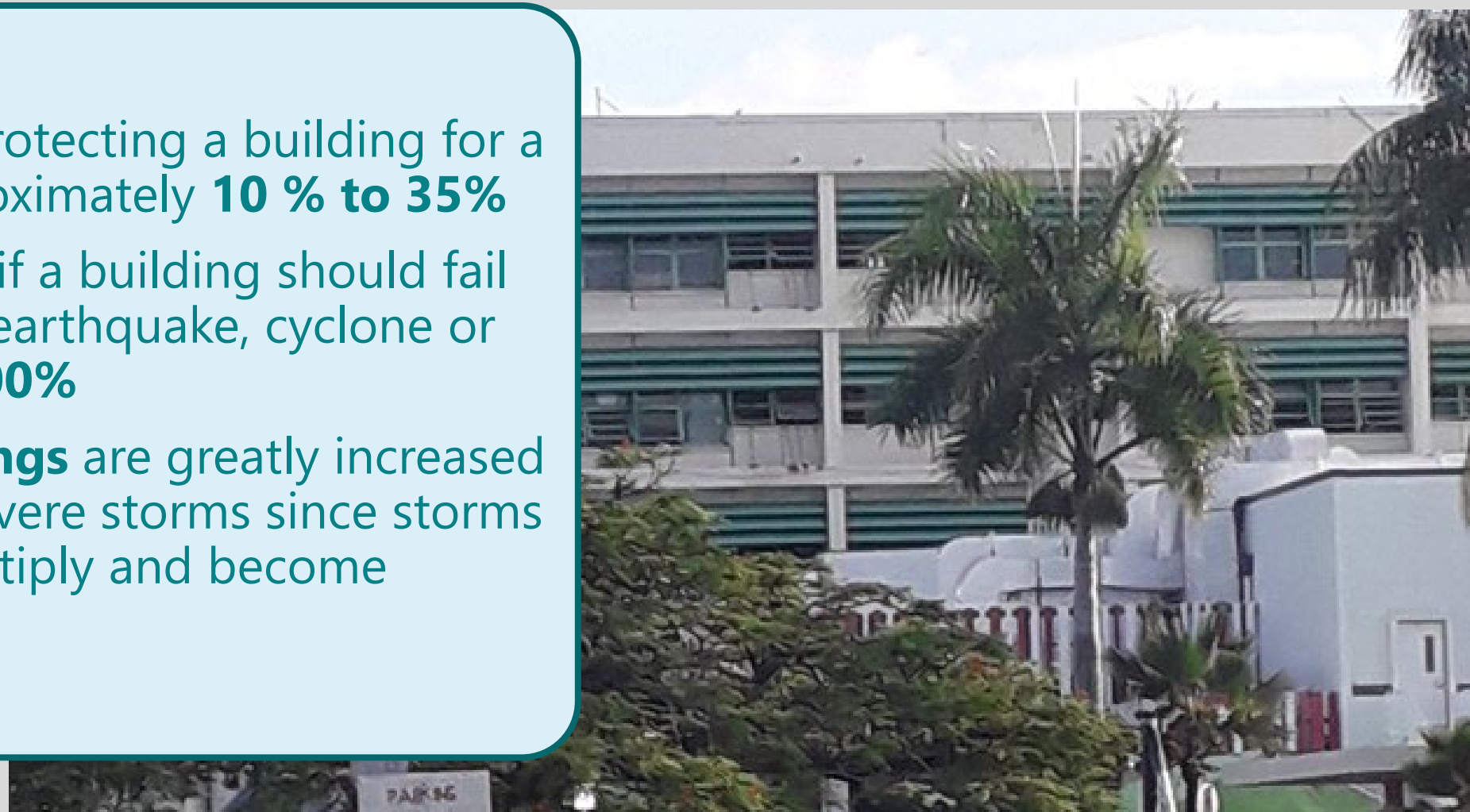
Rationale for a varying scale:

- Any building used as an **evacuation centre** should be protected to at least a CAT 5 storm
- **Less important buildings** such as houses and sheds will **not be required to bear the financial burden** of designing for a CAT 5 storm because people will be able to be sheltered in an evacuation centre which is suitably protected

Build STRONG

Financial reason for all buildings to be protected for CAT 5 storms

- **Cost increase** for protecting a building for a CAT 5 storm – approximately **10 % to 35%**
- **Cost of rebuilding** if a building should fail as the results of an earthquake, cyclone or flooding – **75% - 100%**
- Therefore **cost savings** are greatly increased by protecting for severe storms since storms are expected to multiply and become stronger in future.



FNBC compliance for urban areas

FNBC applies to:

All building types in:

- **Urban areas**
- **Semi-urban areas**

Does NOT apply to rural areas

Build STRONG

Siteworks

Important to consider the **building site** at the same time as **designing the building** because:

- The resilience of the site impacts the resilience of the building

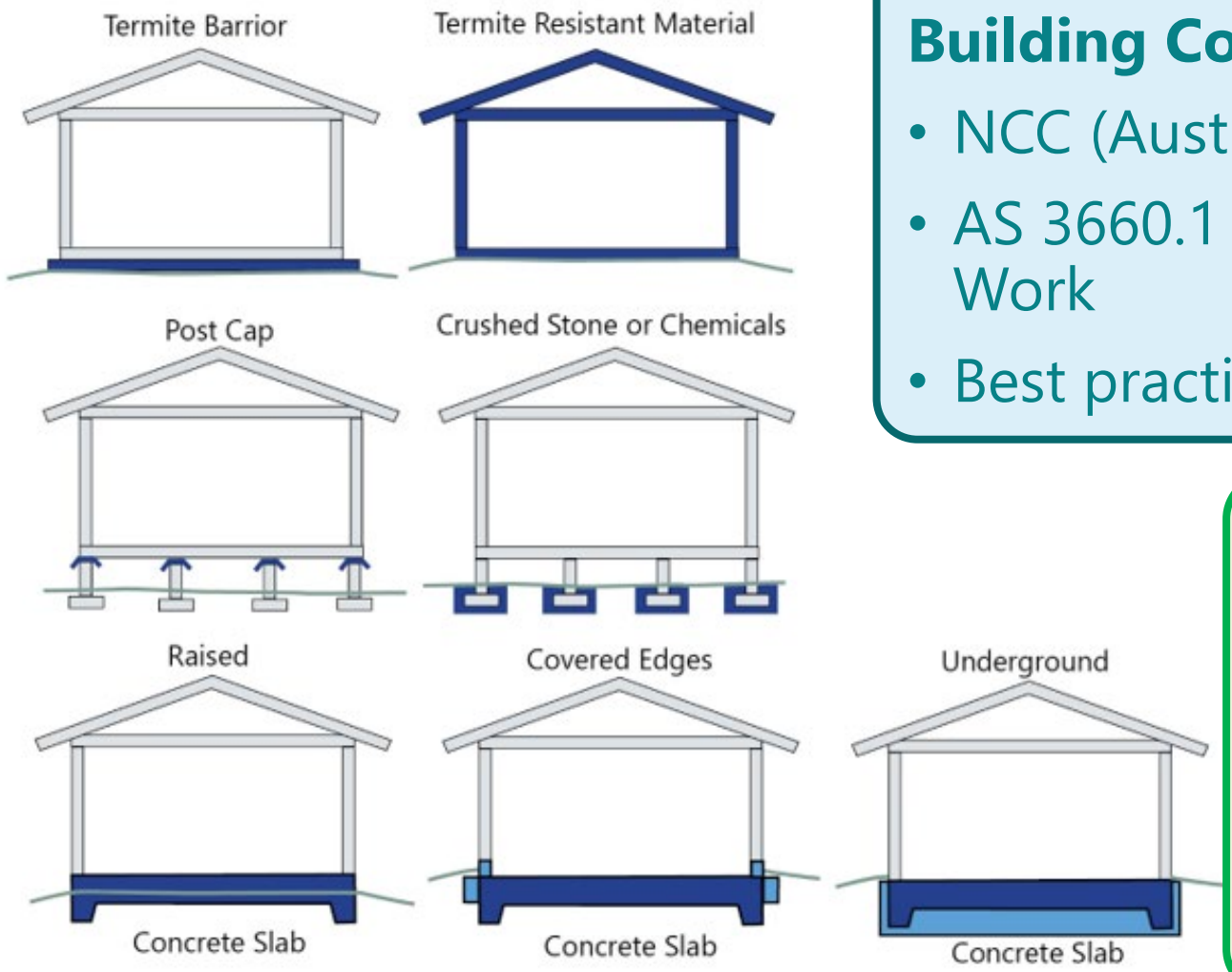
New standards for Siteworks in the Building Code to protect against

- Landslips
- Flooding

- Proper siting
- Strong foundations
- Storm surge protection
- Retaining walls

Build STRONG

Termites



Likely the **largest threat in the Western Division**

Building Code provides new standards based on:

- NCC (Australian Building Code)
- AS 3660.1 Termite Management – New Building Work
- Best practices

Strategy is to provide **physical barriers (least expensive option)** such as:

- use **termite resistant** building materials
- install termite resistant barriers **below, on top and surrounding** foundation, posts and floors

Build STRONG

Termites

Termite resistant building materials:

- Concrete
- Steel and other metals
- Brick and Stone

Although considered termite-resistant, more research is needed on:

- Pressure-treated wood
- Fibre cement board

- Chemical treatment (most expensive) is also an option

Build SAFE

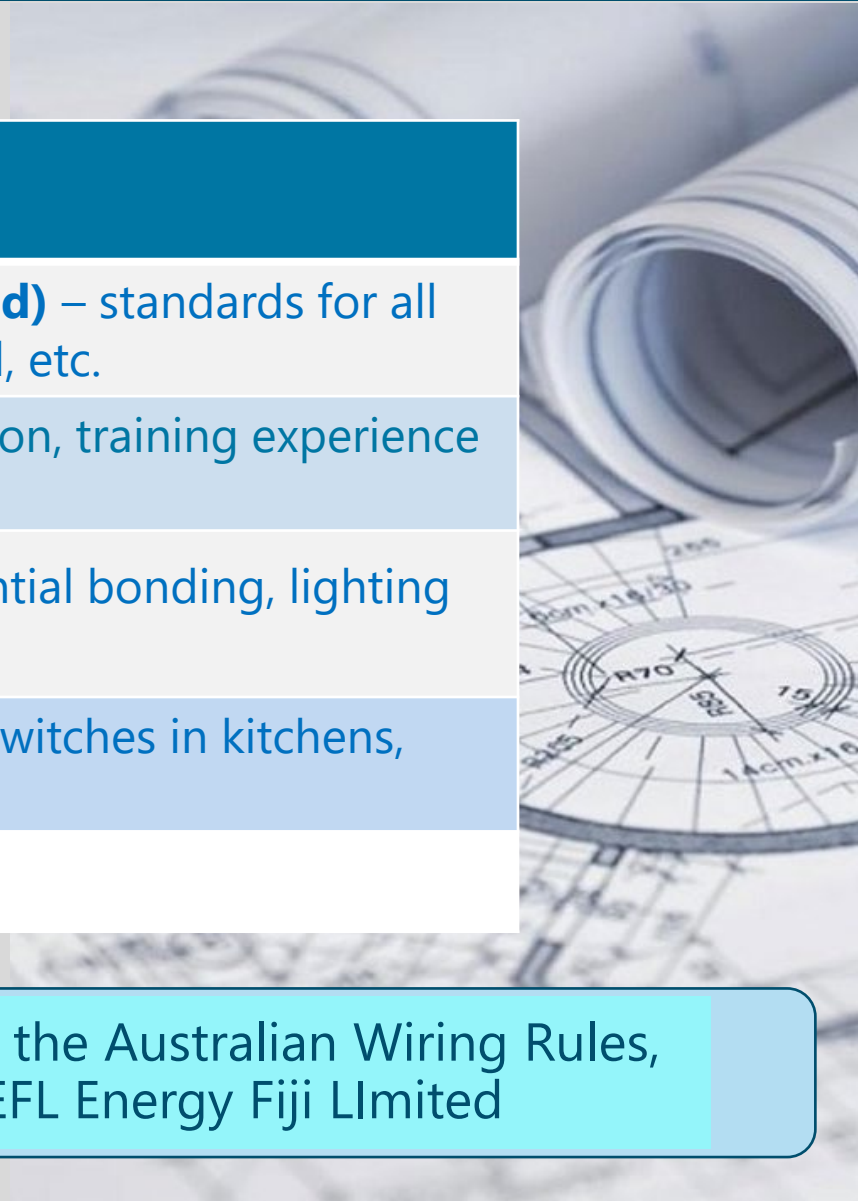
- Key Points

Fire Protection - Highlights

Single Homes	Large Buildings
Updated standards for **smoke alarm placement**	**Firefighting Equipment and Operations** – new section … required equipment per building type
New standard requiring 2 access points that are suitably separated	**Place of Safety –** new definition and standards
	Smoke Detection – new charts … required smoke detection devices per building class for small and tall buildings
	Fire Isolation – new chart … requirements for passageways, stairs, ramps, air pressurisation systems, fire doors

Electrical - Highlights

Existing FNBC	FNBC Update
	Electrical System Design (supplied by grid) – standards for all components - voltage, circuits, switchboard, etc.
	Electrical Installer Credentials – certification, training experience required
	Grounding – earthing, electrode equipotential bonding, lighting protection
	Wet Area Protection – IPX rated sockets, switches in kitchens, bathrooms, swimming pools, spa
None provided	**Wiring** – type, protection, layout



All standards are the same as the Australian Wiring Rules, the standard used by EFL Energy Fiji LImited

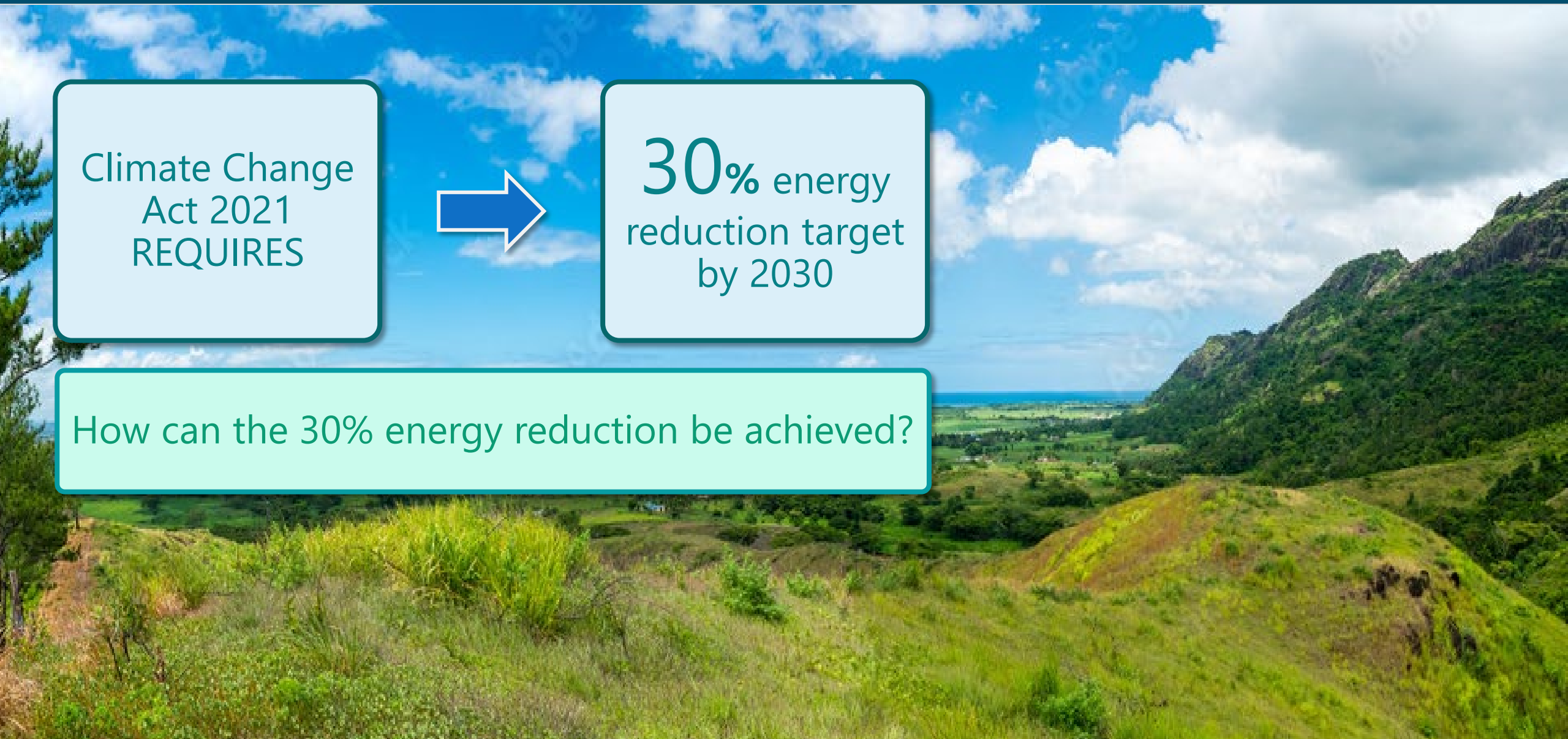
Health and Amenity - Highlights

Existing FNBC	FNBC Update
None provided	**Damp and Weatherproofing** – underside of ground floor must be 1.0m above expected flood level or typical storm surge, water resistant building materials for floors, walls, roof, equipment, finishes
None provided	**Cooking –** safety in commercial and domestic kitchens
None provided	**Accessible Sanitary Compartment –** drawing and standards
None provided	**Room Height –** chart showing max. permitted height per building class
None provided	**Water Plumbing** – requirement for water for firefighting Class 2 to 9
	Efficient Water Use – maximum flow rates for sinks, toilets and other water sources

Build GREEN

- Key Points

Build GREEN


Climate Change Act 2021 REQUIRES
30% energy reduction target by 2030
How can the 30% energy reduction be achieved?

Build GREEN

ALL

Siting
Building Orientation
Natural Ventilation
Daylighting
Reflective Roof and Walls
Air tight construction
Efficient lighting, timers
Efficient appliances, fans

Low cost – 30% energy savings

1+

Solar water heating
Solar energy for lighting, appliances
Bio energy, water-based energy
Efficient air conditioning
Insulation of roof, walls, floor
Efficient windows
Green Roof

Higher cost – up to 100% energy savings

Energy Efficiency

Typical Energy Consumption for a Home in a Hot Tropical Climate

Appliance/Device	Approximate Percentage of Annual Energy Consumption	
Air conditioning	50-60%	Siting, building orientation, reflective / insulated roof, walls, floors, daylighting, efficient AC, solar energy
Water heating	15-25%	Solar water heater, solar energy
Lighting	5-10%	Daylighting, reflective interior walls, efficient lighting, timers and occupancy sensors
Refrigeration	5-10%	Solar energy, efficient appliances
Cooking	3-5%	Solar energy, efficient appliances
Other appliances	5-10%	Solar energy, efficient appliances

Build GREEN examples

1st story shaded
Reduced windows on north and south facades
Light colour
North-south orientation

Generous overhangs
More shading needed on east and west facades

Solar panels
White colour
Tinted windows
Overhang

Build GREEN examples

North-south alignment
Limited windows on north and south
Overhang insufficient, should be extended

Generous overhang and window fins provide good protection from solar energy
Tinted windows
Covered entrance

Build Green:
Fiji Home Building Manual

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Green Building Guidelines

Siting

Shape and Layout

Cooling

Building Materials

Energy

Other Guidelines

Water

Electrical

Building Permits

Who is the FHBM for?

Building Permit NOT Required

Homeowners in Rural Area

Builders in the Rural Area

Building Permit Required

Homeowners in Urban Areas

Builders in Urban Areas

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Water

.1 **Rainwater Tank and Efficient Fixtures** – installation of rainwater tanks
+ max. flow rates for showers, faucets, toilets, irrigation

.2 **Solar Hot Water Heater** – rooftop installation

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Electrical

.1 **Power Source** – power supply options (grid, off-grid, solar, bio-energy)

.2 **Layout** – location of active and grounding wires, positioning of sockets, switches, lights and appliances, circuit safety, switchboard components, overall layout diagram example

.3 **Wiring** – type, voltage, installation, junction boxes

.4 **Devices** – setbacks, positioning, wet area IPX ratings, RCD requirements for sockets, switches, lighting, appliances

.5 **Grounding** – layout, earth electrode

Fiji Home Building Manual Update

Building Permit

.1 **Overview** – benefits of getting a building permit, approval types

.2 **Development Consent** – description, when it is required, items needed for submission, procedures

.3 **Building Permit** – description, when it is required, items needed for submission, procedures

.4 **Site Inspections** – description, number, type, procedures

.5 **Occupancy Permit** – description, procedures,

Next Steps

Status

85% complete

- Need YOUR ideas, suggestions, comments
- 2nd Drafts will be completed in 1 month
- Final Draft in 2 months

Ways to Reach Out

Ask questions, tell us your ideas today at this session

Send an email to Director Andrew Pene by June 10, 2023

Fill in the online survey on the Fiji Building Code website

THANK YOU!

Questions, Ideas Comments

Energy Efficiency

30% energy reduction target can be achieved by **any one** of the following techniques:

- Install **solar PV panels** to produce at least 30% of energy needs
  - (Note that 90% reduction can be achieved if a full 85% of energy needs are supplied by solar)
- Install a **solar hot water heater** to supply 100% of heated water energy needs

OR

According to the Fiji Sun *Oct. 20, 2018*

- 40 companies are installing solar systems in Fiji
- 10,000 homes have solar PV systems

Gov. of Fiji along with funding partners

- Built 1.55MW solar in Taveuni
- Providing 10,000 homes in Lomi-Nausauri with solar panels

Energy Efficiency

30% energy reduction target can be achieved by **any 5** of the following techniques

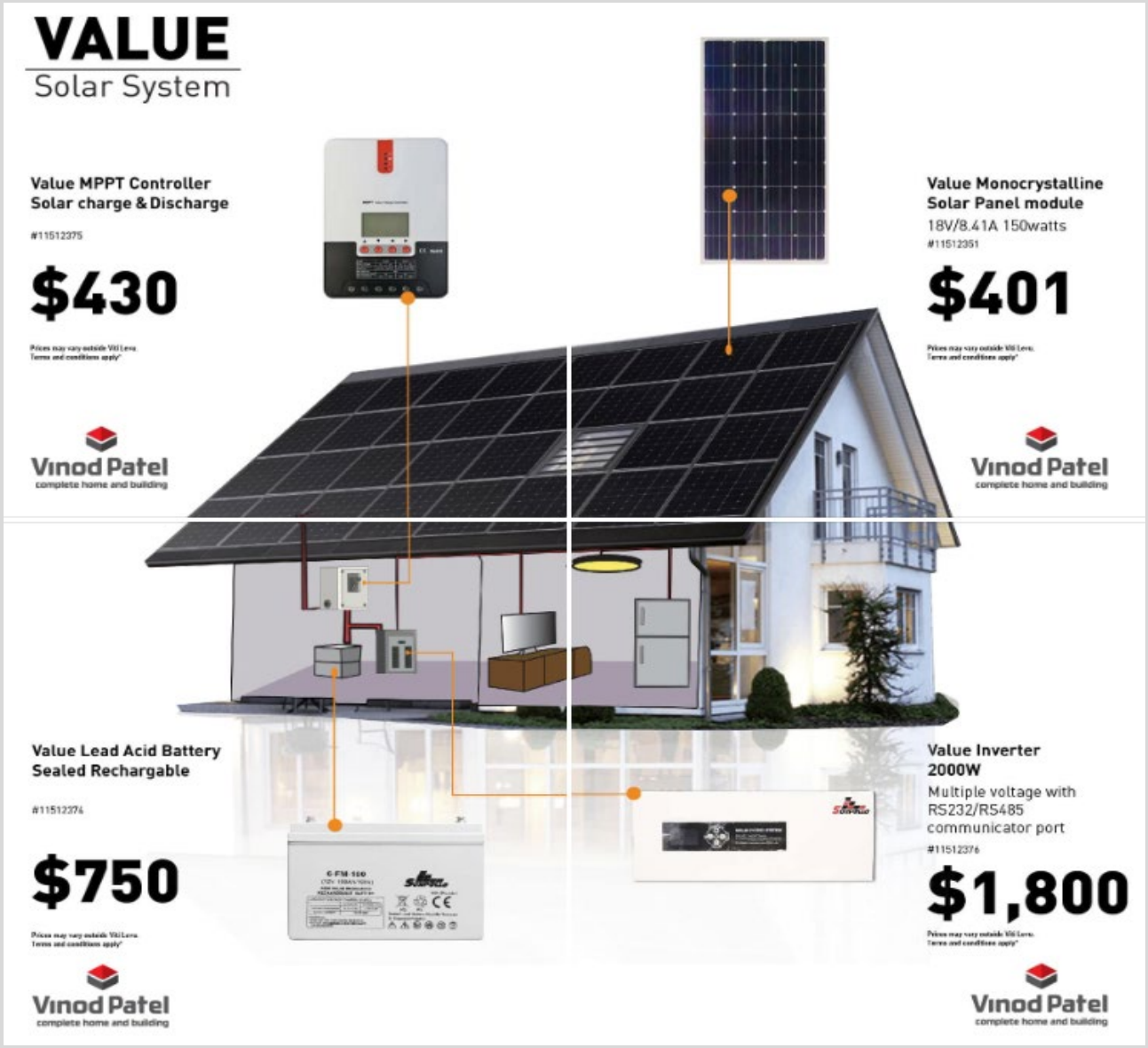
Passive Energy Reduction in EDGE Model

- **Roof insulation – 10% – 20%**
- **Voltage stabilizer- 10%**
- **Smart meter – 9%**
- **Efficient appliances – 7%**
- **Efficient lighting – 6.4%**
- **External shading – 4%**
- **Natural ventilation – 4%**
- **Green roof – 3%**
- **Insulation of walls 3%**
- **Insulation of floors 1%**

Other Passive Energy Techniques

- Building Orientation
- Efficiency of Ceiling Fans
- Efficiency of Air Conditioners
- Air Tight Construction
- Efficient water use
- Use of low embodied energy building materials

Energy Efficiency - Cost



Vinod Patel Facebook page *Oct 18, 2022*

Controller - $430

Battery - $750

Inverter - $1800

Solar PV Panel 18V 150W (each) - $400

Power Options

Refrigerator (5 PV panels) - $5,000

Appliances (4 panels) - $4,600

Lighting (2 panels) - $3800

Complete system (15 panels) - $10,500

Energy Efficiency

Scenario 1

- Install 2000 watt PV system for refrigerator or laundry - $5000
- Solar lighting - $250 per light x 10 = $2,500

Total = $7500

Energy Reduction – 50%

Scenario 2

- Install solar hot water heater - **$4000**

Energy Reduction – 30%

Scenario 3

- Install complete solar PV system, no/low utility bills- **$10,500**

Energy Reduction – 90%

Scenario 4

- Window-to-wall ratio (< 40%) - $0.00
- Building orientation - $0.00
- Dimmer switches (12) - $200
- Natural ventilation (increase wall ht. to 3.0m + wall vents under eaves) $1000
- Natural ventilation (roof vent) $200
- Window shading (east-west) $200

Total $1,600

Energy Reduction – 30%