



Ministério da Indústria,
Comércio e Energia

Direção Nacional de Indústria, Comércio e Energia



Projecto Eficiência Energética
em Edifícios e Equipamentos

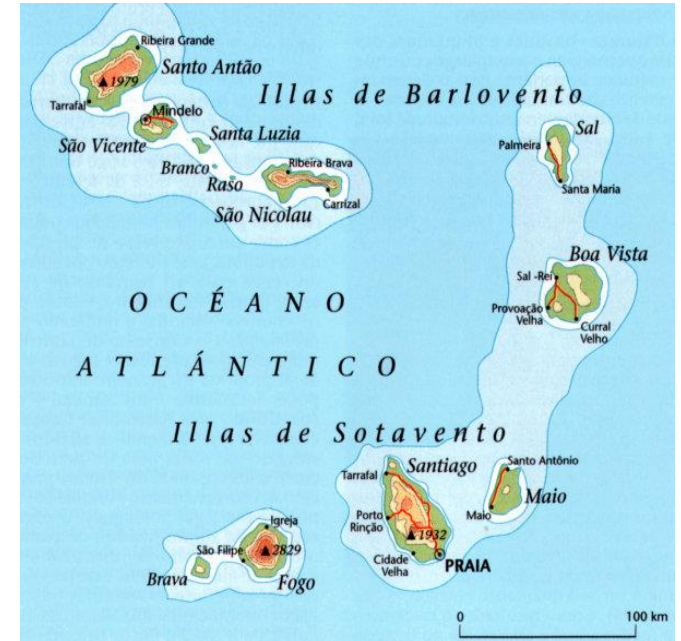
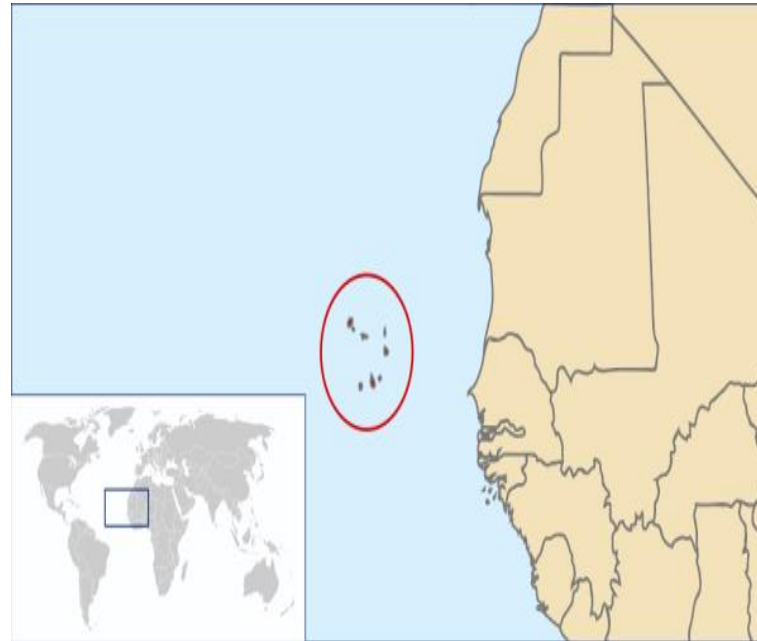
Removing Barriers for Energy Efficiency in Cabo Verde Building Sector

October 2019

*ECOWAS Sustainable
Energy Forum 2019
(ESEF 2019)
22 – 24 October
Accra, Ghana*



Cabo Verde in numbers (1)

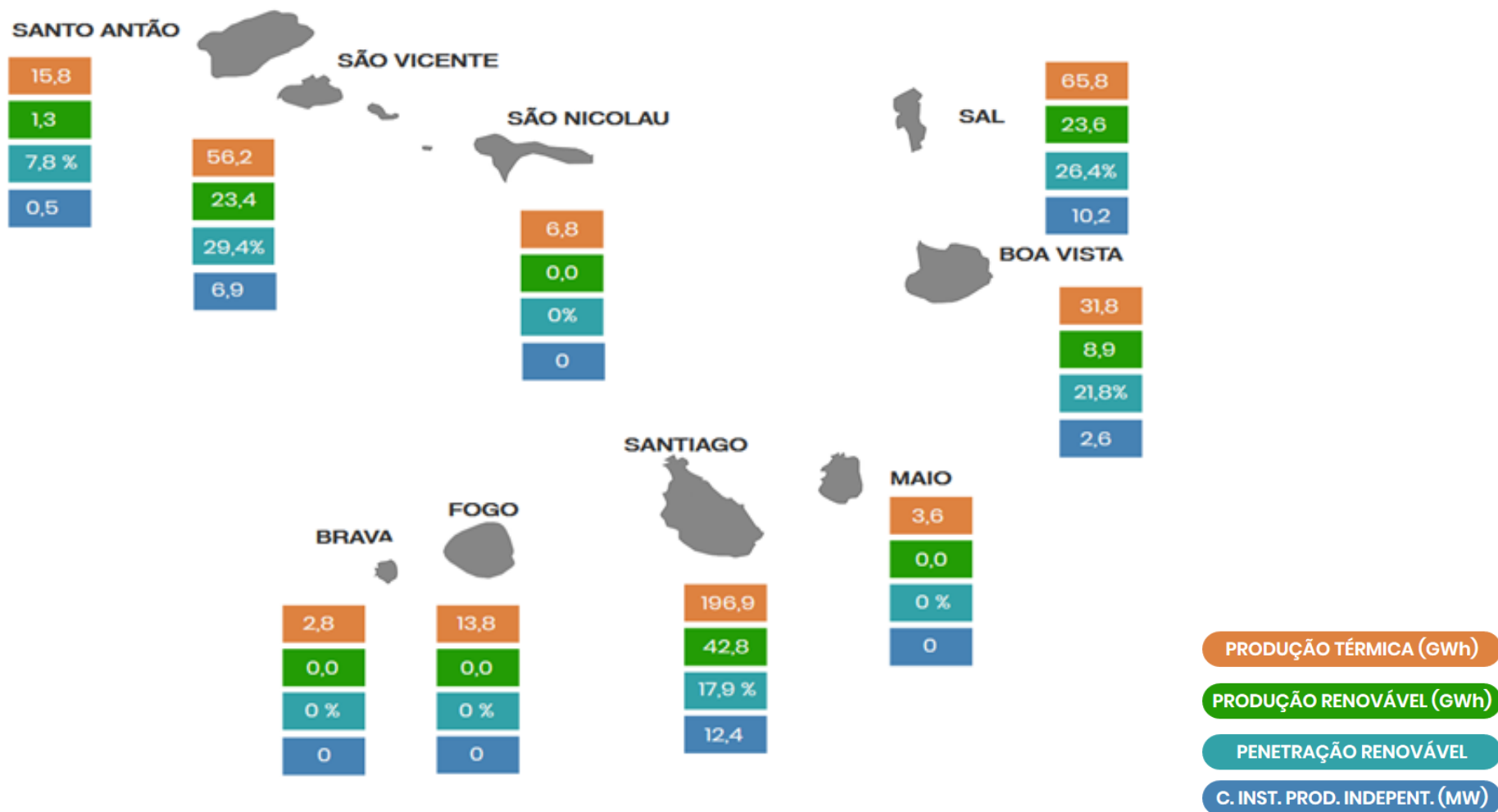


Quick Information

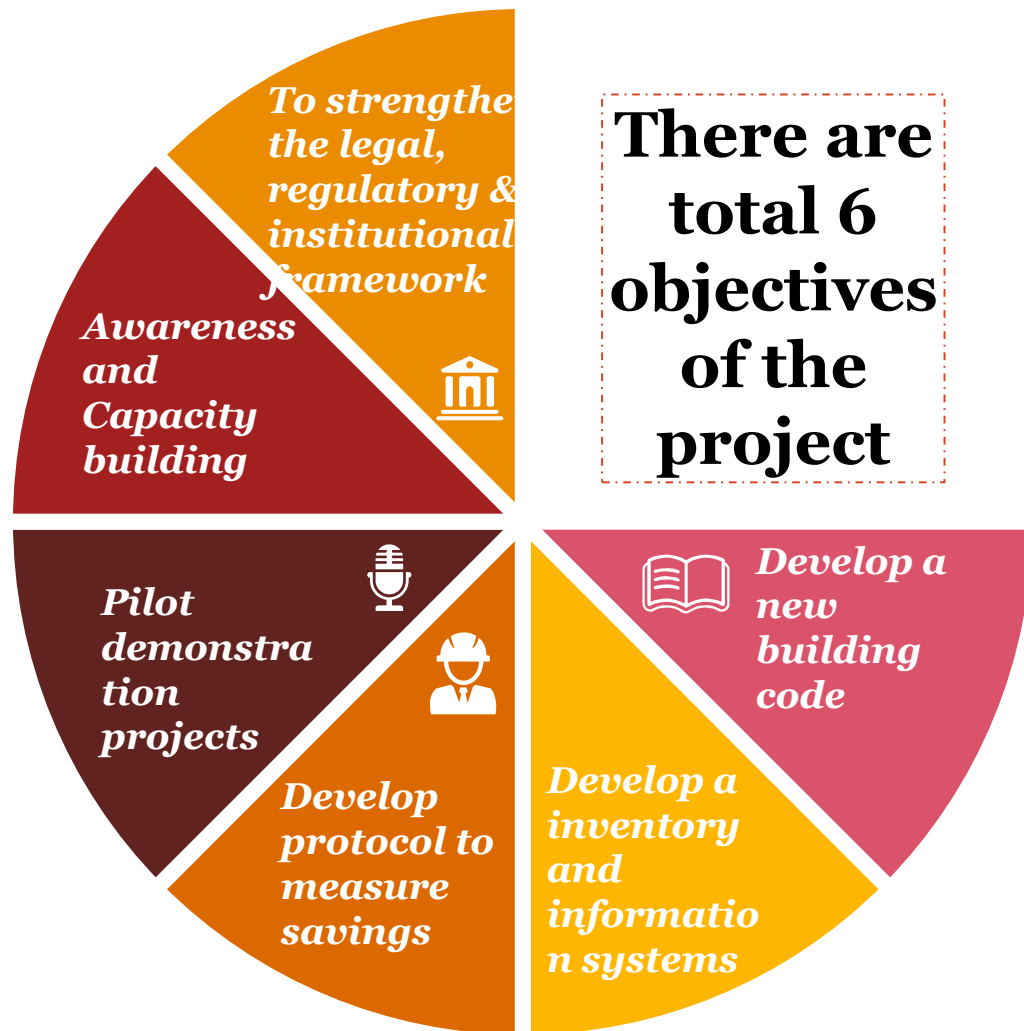
- 400 km off the coast of West Africa.
- It has a total area of 4,033 square kilometres.
- Population of 542,000 inhabitants

Map source (accessed as of 10 June 2019):
<https://antoniocv.wordpress.com/tag/localizacao-geografica-cabo-verde/>

Cabo Verde in numbers (2)



Project Objective



- **Start** – December 2016
- **End** – November 2020

Project Components (1)

Component 1

Energy Efficiency Building Code

- Legal Document of the code
- New building code including stringency analysis, compliance mechanisms
- Implementation framework

EMS

- Protocol to measure energy savings, water usage, and emission reduction.
- Inventory and information system for national energy balance

Component 2

Pilot Project

- Pilot demonstration of EEBC implementation in 4 public buildings
- Development of best practices guide for energy efficient building design

Component 3

Awareness Program

- Brochures
- Newsletters
- Workshops
- Dissemination through demonstration projects
- Engagement of Government for adaptation of EEBC

Capacity development

- Training for Architects
- Training for Engineers
- Training for Govt. Officials
- Training for students
- Capacity building of LEC for testing of building materials

Train the Trainers

- Capacity development of trainers and skilled human force

Project Components (2)

Component 4

Labelling programme for appliances

- Design of informative labels for appliances
- Selection of appropriate testing procedure
- Setting labelling threshold and range

Import regulations

- Developing an implementation plan for mandatory S&L program.
- Incorporating labelling requirements in import and sales regulations
- Requirement for MRV of sales and actual performance

Testing mechanism

- Engagement of national and regional facilities for appliance and feasibility of setting National test lab in CV
- Periodic testing and reporting of labelled appliances

National certification procedures

- Design of a national certification program for selected appliances

Public awareness programme

- Design of comprehensive awareness programs for key stakeholders – importers, retailers, consumers, enforcement agencies etc.

Demand side management program

- Developing an incentive mechanism for phasing out existing inefficient appliances through DSM program

Energy Efficiency Building Code

Purpose of the Code

- The purpose of the Energy Efficiency Building Code (EEBC) is to provide minimum requirements for the energy efficient design and construction of buildings.
- It provides guidelines for existing buildings to achieve **minimum** requirements for energy efficiency.



Scope of the code



INSTITUTIONAL



TOURISM



ASSEMBLY



COMMERCIAL



**HEALTH
CARE**



OFFICES

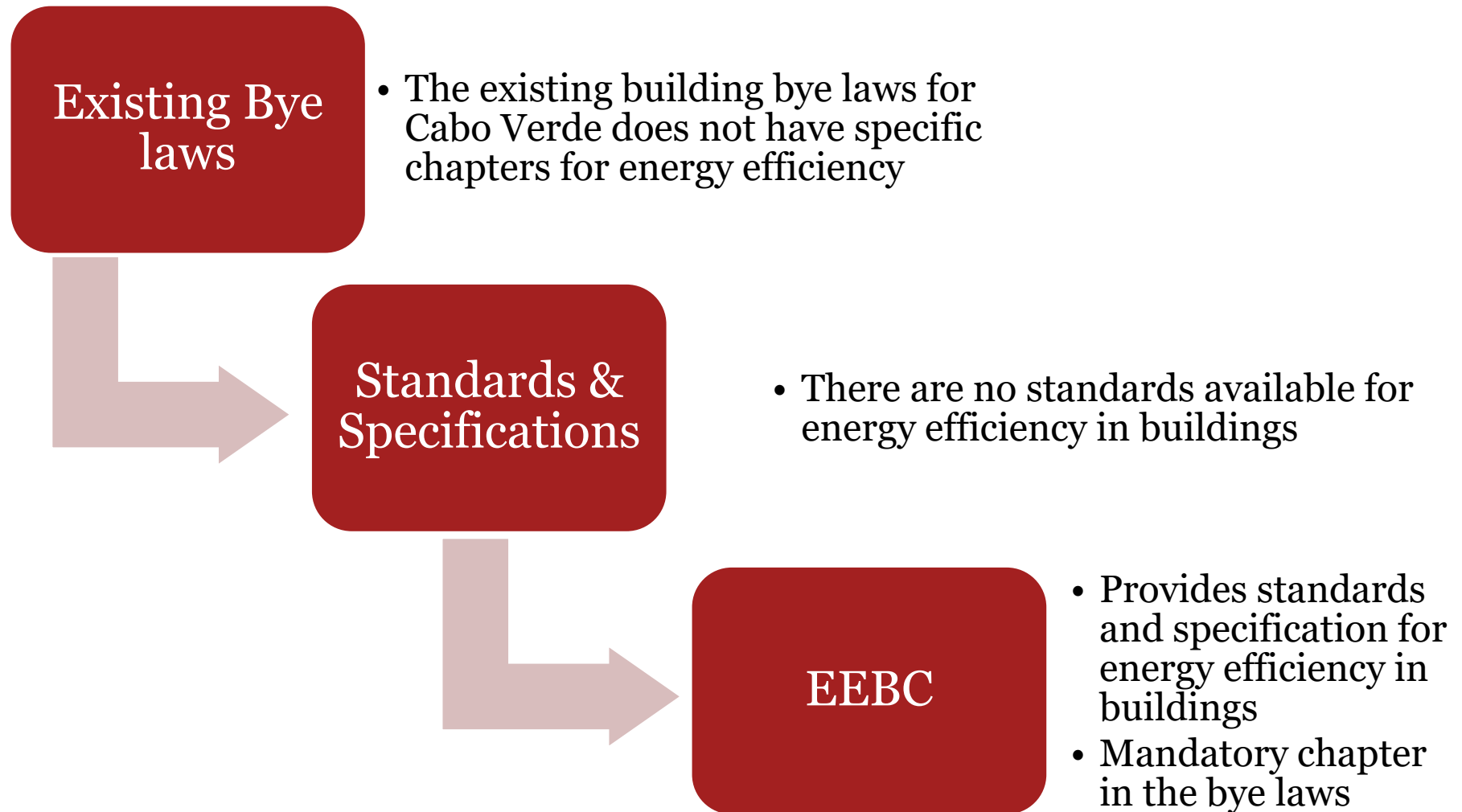
Applicable for all the **Commercial Buildings (New and Existing – major renovation)** with **BTE and MT** connections.

Exemption : Residential buildings and other buildings having BTN connection are not covered in this code

Precedence :

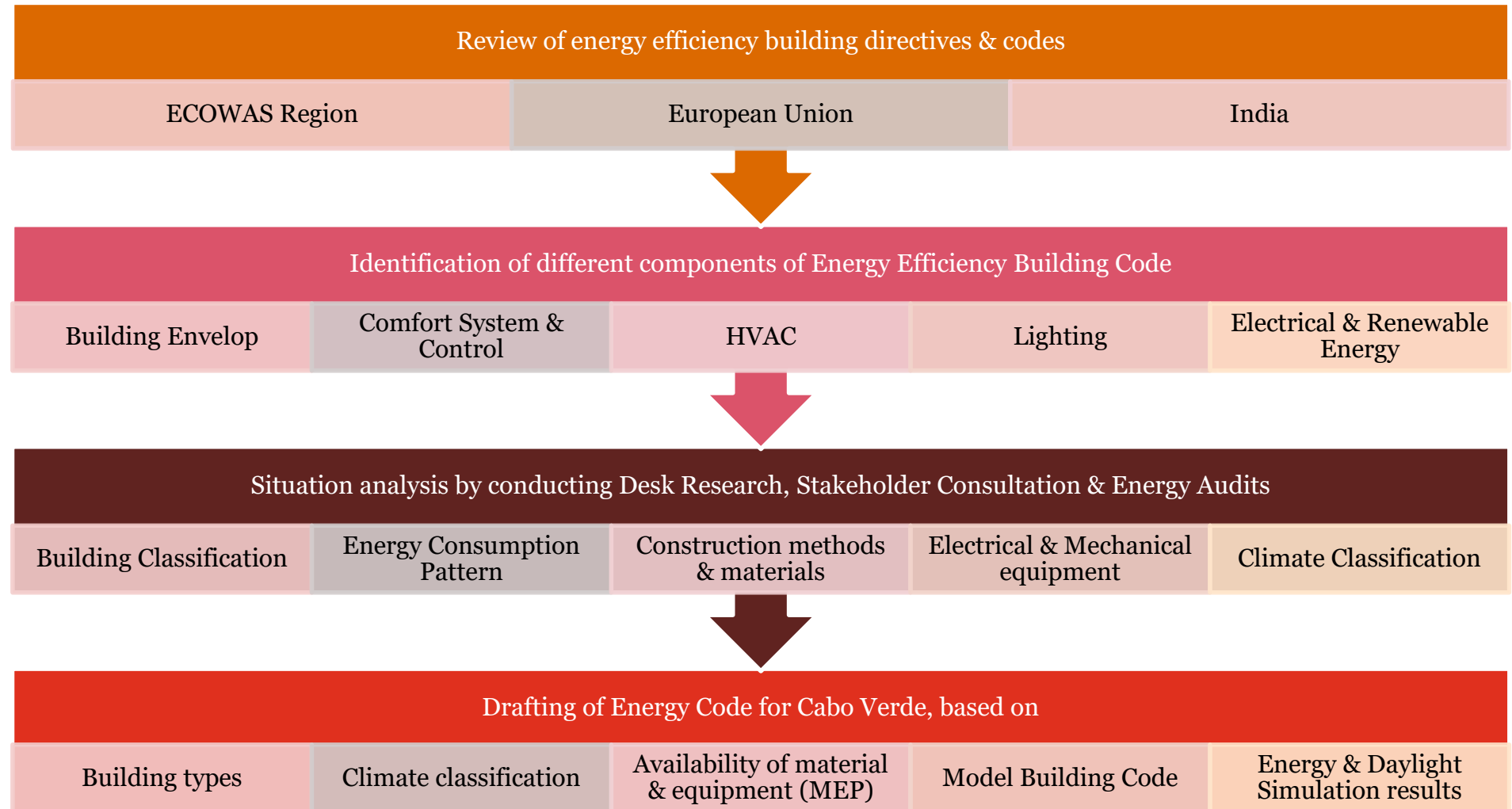
1. Any code(s) or bye-laws
2. Any rules on safety, security, health or environmental by government

Rationale for the code



Energy Efficiency Building Code (EEBC) for Cabo Verde

Our Approach towards development of EEBC



Applicability of the code on Building Components



Optimal bio-climatic design (1)

Parameter	Current Scenario	Energy Consumption	Proposed in EEBC	Energy Savings	Actions to be taken
Bio-Climatic Design					
Orientation	No standard	NA	Longer side facing North-South direction	Reduction in solar heat gain	Train the Architects
Daylighting	No Standard	NA	Illuminance level in the indoor work areas as per BS EN 12464-1:2002, Part 1.		Train the Architects
Shading	No standard	196.6 kWh/m ² /year	Overhang of 600 mm	8%	Train the Architects Update building code

Optimal bio-climatic design (2)

Parameter	Current Scenario	Energy Consumption	Proposed in EEBC	Energy Savings	Actions to be taken
Bio-Climatic Design					
Window to wall ratio	40 %	196.6 kWh/m ² /year	30%	7%	Train the Architects
Ventilation	No specific guideline or standard	NA	Minimum ventilation rates as per EN standards	NA	Train Architects, Municipalities

Components of Building Envelope

Components of building envelop

Wall

Fenestration

Roof

Building Envelop Components	What Cabo Verde has	Proposal for the code
	U-Value (W/m ² K)	U-Value (W/m ² K)
Wall	NA	3.13
Roof	NA	0.28
Glass	NA	0.77
	NA	0.6 SHGC

Lighting system

Optimal lighting system

Parameter	Current Scenario	Energy Consumption	Proposed in EEBC	Energy Savings
Lighting	CFL lamps – Lighting power density of 1 W/ft ²	196.6 kWh/m ² /year	Lighting power density of 0.2 W/ft ² using LED lamps	20%



Lighting power densities is proposed to comply the minimum LPD requirements laid in the code (Adapted from EU GPP Criteria for Indoor Lighting)

And Lighting levels as per EN CIBSE Lighting levels.

Air conditioning system

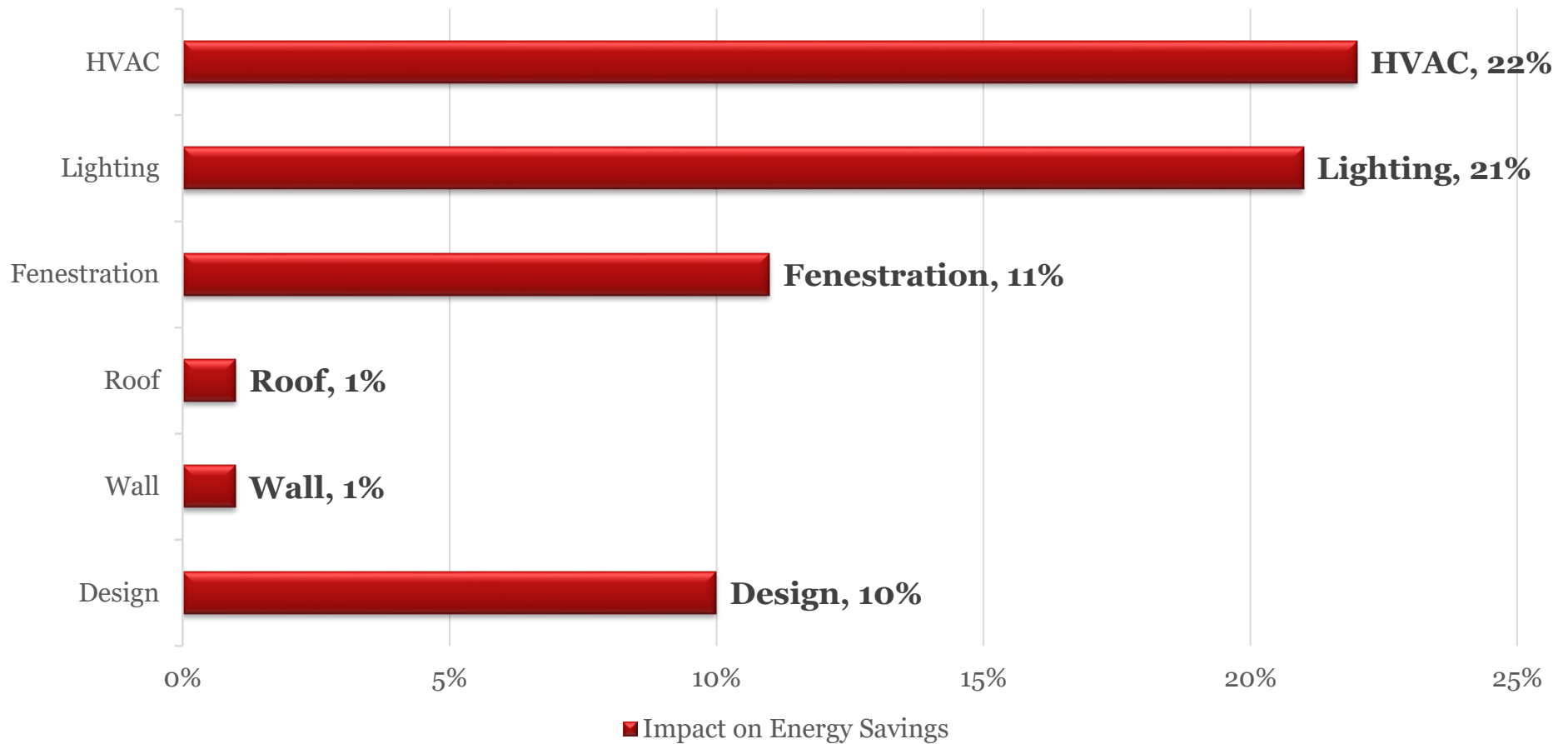
Optimal air-conditioning system

Parameter	Current Scenario	Energy Consumption	Proposed in EEBC	Energy Savings
Air Conditioning	Split ACs with no energy efficiency labelling	196.6 kWh/m ² /year	Inverter AC (based on market scenario)	22%

- Use of **centralized air-conditioning system** alone shows reduction of more than **40%** in the Energy Performance Index (EPI).
- However, based on the market scenario in Cabo Verde, use of **Inverter Split ACs** will reduce the energy consumption by **22%**.









Impact of individual component on Energy Savings of Building

Individual Impact on Energy Savings



Standard & Labelling Program for appliances



			Minimum requirement MEPS	Minimum requirement to get Seal Guarantee
	Air conditioning		$4,10 \leq \text{SEER}$ Classe C	$5,10 \leq \text{SEER}$ Classe A
			N/A	N/A
	TVs		$\text{EEI} < 0,80$ Classe D	$\text{EEI} < 0,30$ Classe A
	Refrigerators		$\text{EEI} < 75$ Classe B	$\text{EEI} < 55$ Classe A
	Lamps	<i>Directional</i>	$\text{EEI} \leq 1,20$ Classe C	$\text{EEI} \leq 0,40$ Classe A
		<i>Non-directional</i>	$\text{EEI} \leq 0,80$ Classe C	$\text{EEI} \leq 0,24$ Classe A
	Water electrical heaters		$*\eta_{wh} \geq 33$ Classe D	$*\eta_{wh} \geq 65$ Classe A
	Washing machine		$\text{EEI} < 68$ Classe A	$\text{EEI} < 68$ Classe A

* depends on use (M)

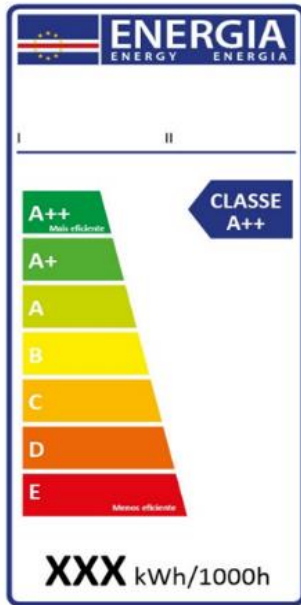
Cabo Verde Energy label layout



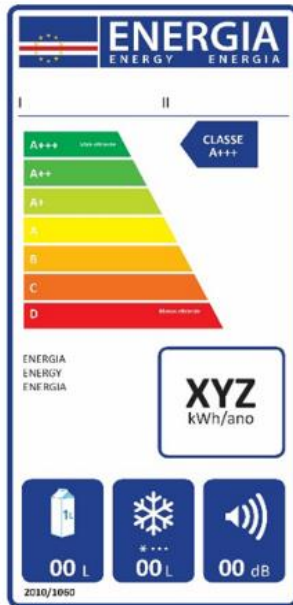
Seal Guarantee

comparative labels

Iluminação



Frigoríficos



Televisões



Ar Condicionado



Aquecedor de Água



Máquina de lavar Roupa



Obrigado!!

Thank you!

Edson.mendes@peee.cv

Edson.mendes@cdc3c.com

