



Praia, 09-12 Juin 2012 – Hôtel Praia Mar

# GHANA

Lessons learned and examples of energy efficiency in buildings:  
an Architect's perspective

by

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**orthner orthner & associates OOA**

# orthner orthner & associates



## OOA

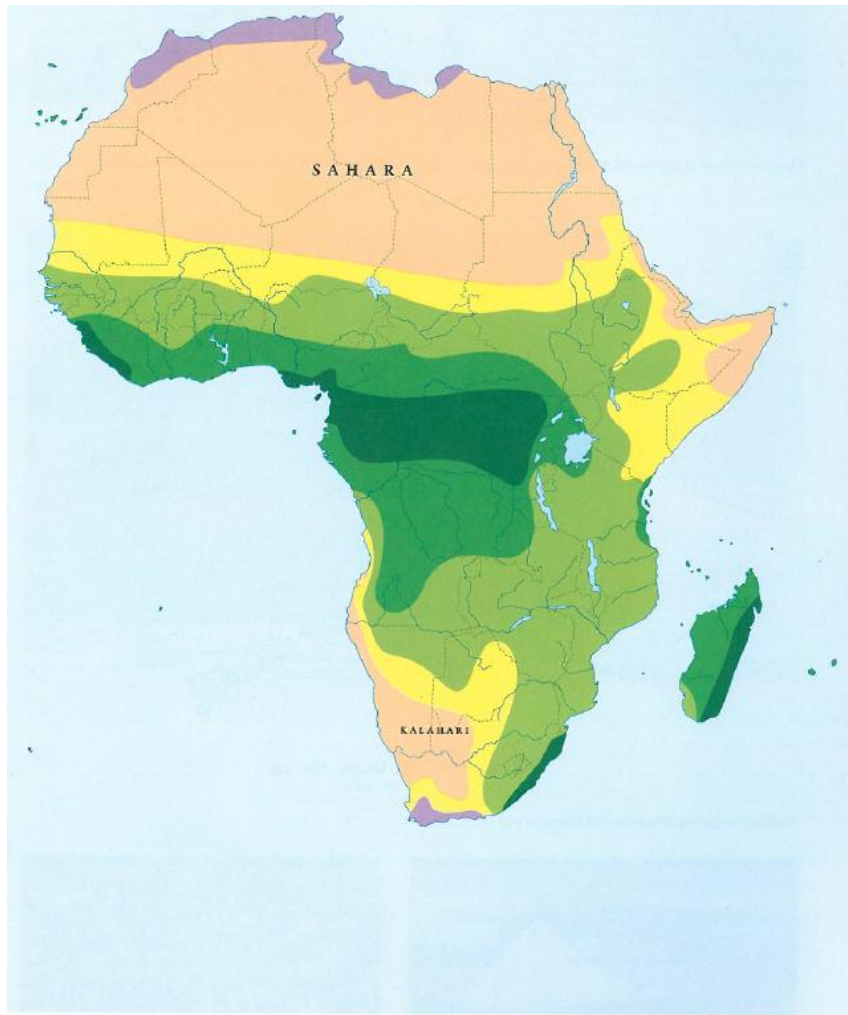
is a unique architectural practice located in Accra, Ghana, founded by Austrian trained Martin and Rosemary Orthner in 2006.

Arch. Rosemary Orthner



Arch. Martin Orthner





- Mediterranean
- desert
- semi-desert (Sahel)
- savannah
- deciduous forest
- non-deciduous forest



Ghana, "Compound House"





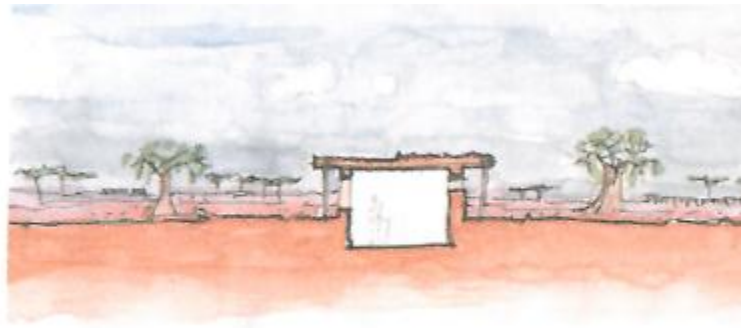
Northern Ghana Region



Source: Antoni Folkers, "Modern Architecture in Africa"



Traditional desert- and steppe-zone building types.



Traditional building type for savannah zones.



Traditional building type for rain-forest zones.

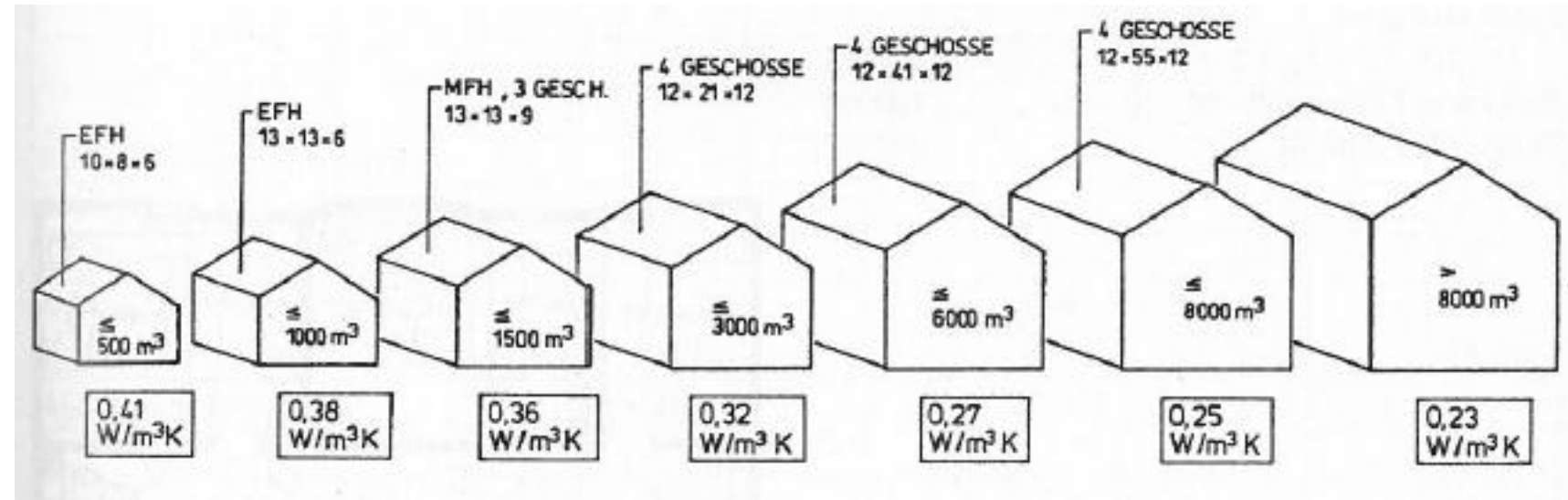


Examples of desert zone buildings





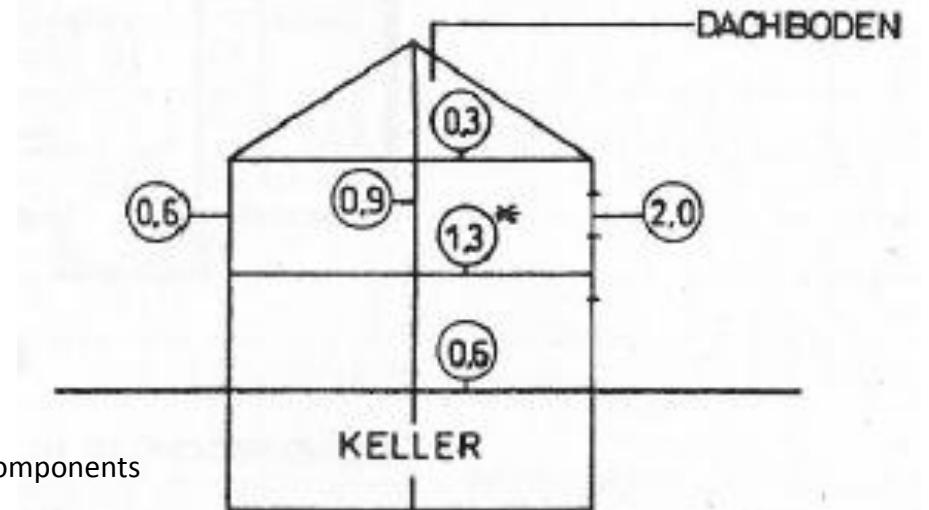
Sachsenhof Germany  
1200 years old



**7 categories of building types:**  
Smaller volumes can have higher U-Values – more cost efficient

Example Austria:  
Energy Standards for Buildings Vienna 1995

Max. U-Values for components





Energy consumption for Heating

Oil consumption per year  
Single Family House

Kategorien A++ bis G, Heizwärmebedarf (HWB) von Gebäuden

| HWB in kWh/(m <sup>2</sup> a) <sup>(a)</sup> | Kategorie |                             | HWB (l Heizöläquivalent) <sup>(b)</sup> |
|--|-----------|-----------------------------|---|
| ≤ 10   | A++       | Passivhaus                  | 200–300                                 |
| ≤ 15   | A+        | Niedrigstenergiehaus        | 400–700                                 |
| ≤ 25   | A         |                             |   |
| ≤ 50   | B         | Niedrigenergiehaus          | 1000–1500                               |
| ≤ 100  | C         | Zielwert nach Bauvorschrift | 1500–2500 <sup>(a)</sup>                |
| ≤ 150  | D         | alte, unsanierte Gebäude    | > 3000 <sup>(a)</sup>                   |
| ≤ 200  | E         |                             |   |
| ≤ 250  | F         |                             |   |
| ≤ 300  | G         |                             |   |

Passive House

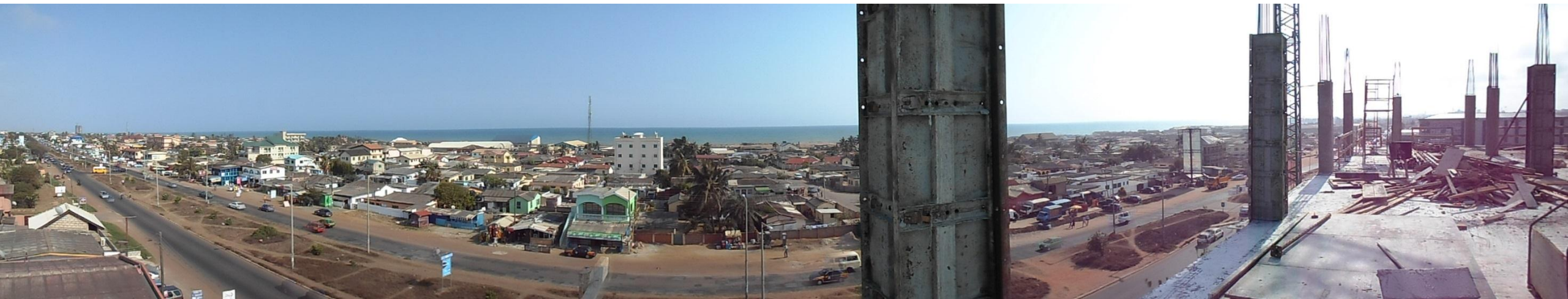
Energy Efficient House

Low Energy House

Min. Aim

Old Buildings

Example Austria:  
Energy Standards Certificate for Buildings 2005



Skyline of Accra, Ghana

# THE WAY FORWARD

Energy Efficient building improve the Thermal Comfort in Buildings

**Air temperature**

**Air movement**

**Humidity**

**Temperature of surrounding surfaces max. difference <3 degrees**

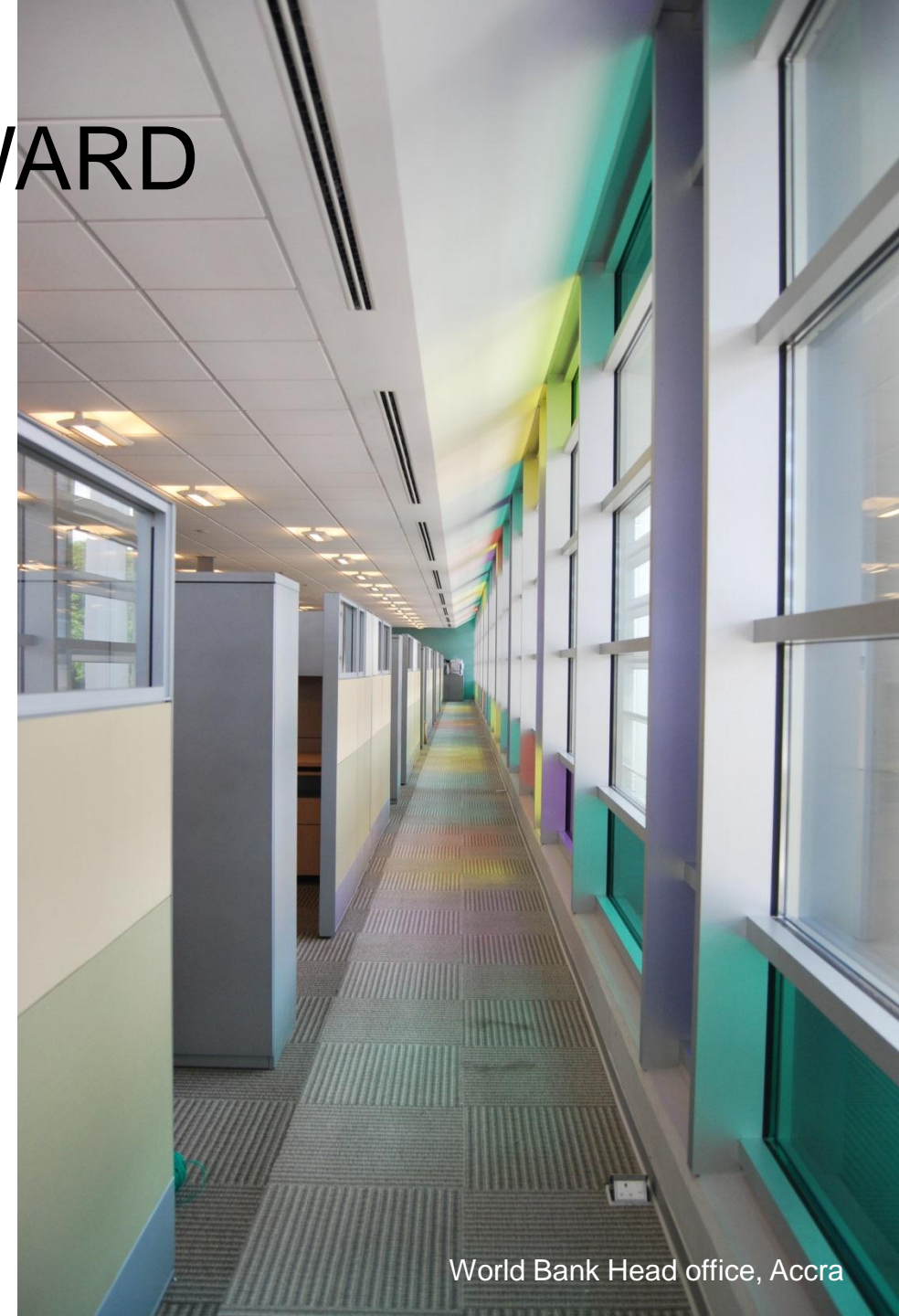
And improve the quality in the building itself through the

**Reduction of defects**

**Reduction fungus and moulds**

**Reduction of expansion in structural members**

**Avoidance of condensation in elements and components**



World Bank / IFC Head office Accra





















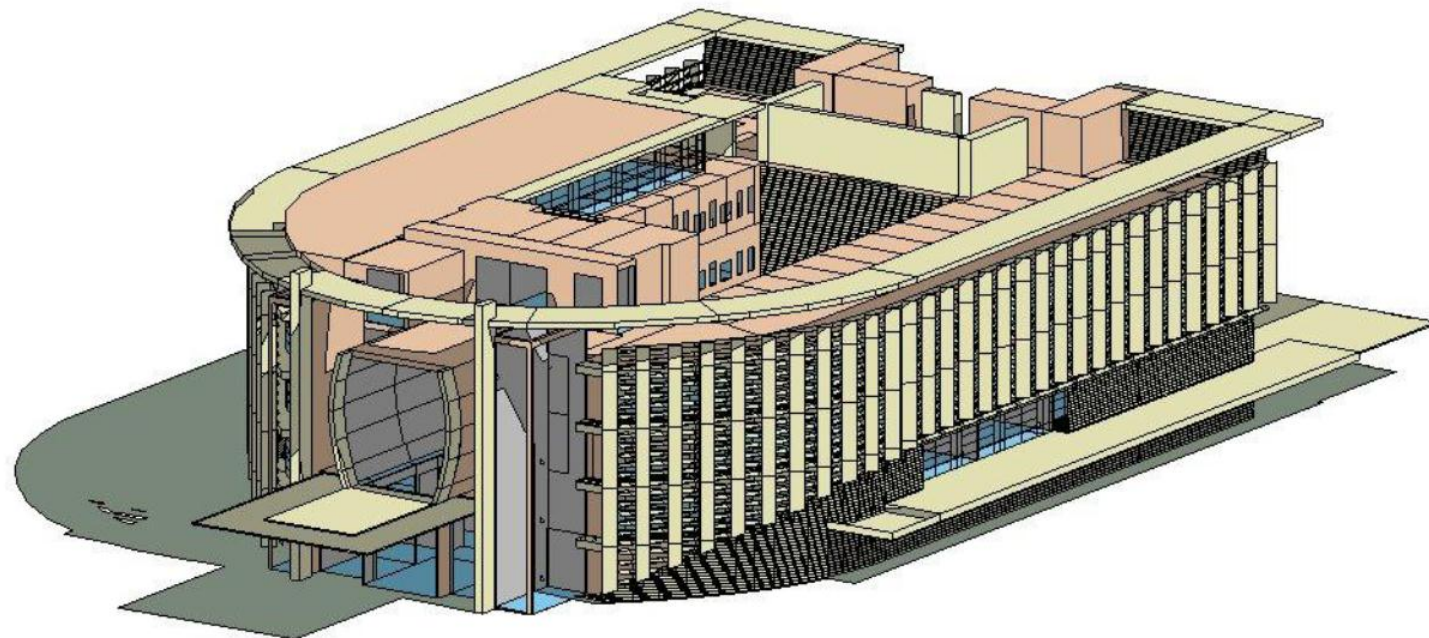
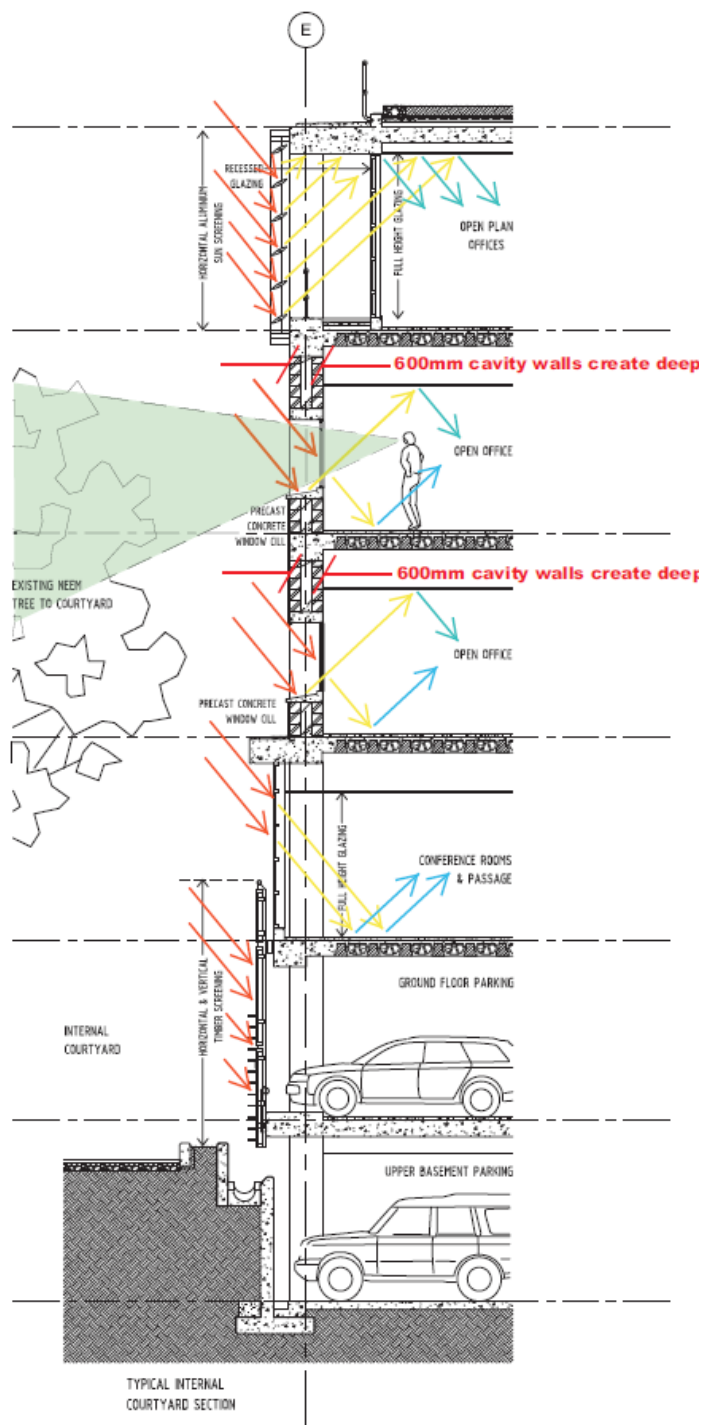






ARB APEX BANK LTD.

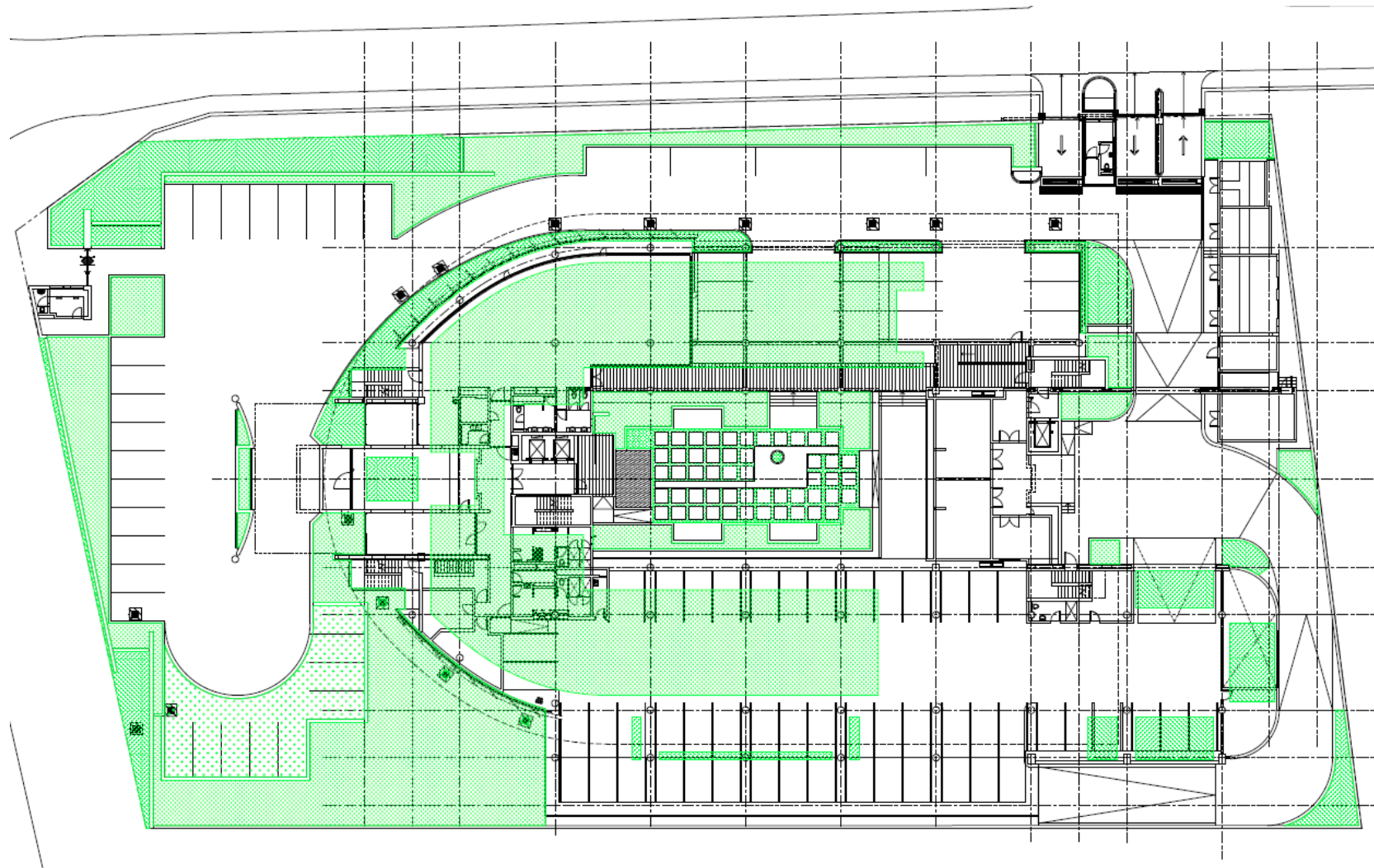
## INNOVATION IN DESIGN



The above rendering shows a shading study using vertical fins to minimise direct sunlight on the SW façade in the late afternoon.



# SUSTAINABLE SITE



Samartex Apartments in  
Tesano, Accra



Samartex Apartments Accra



Samartex Apartments Accra









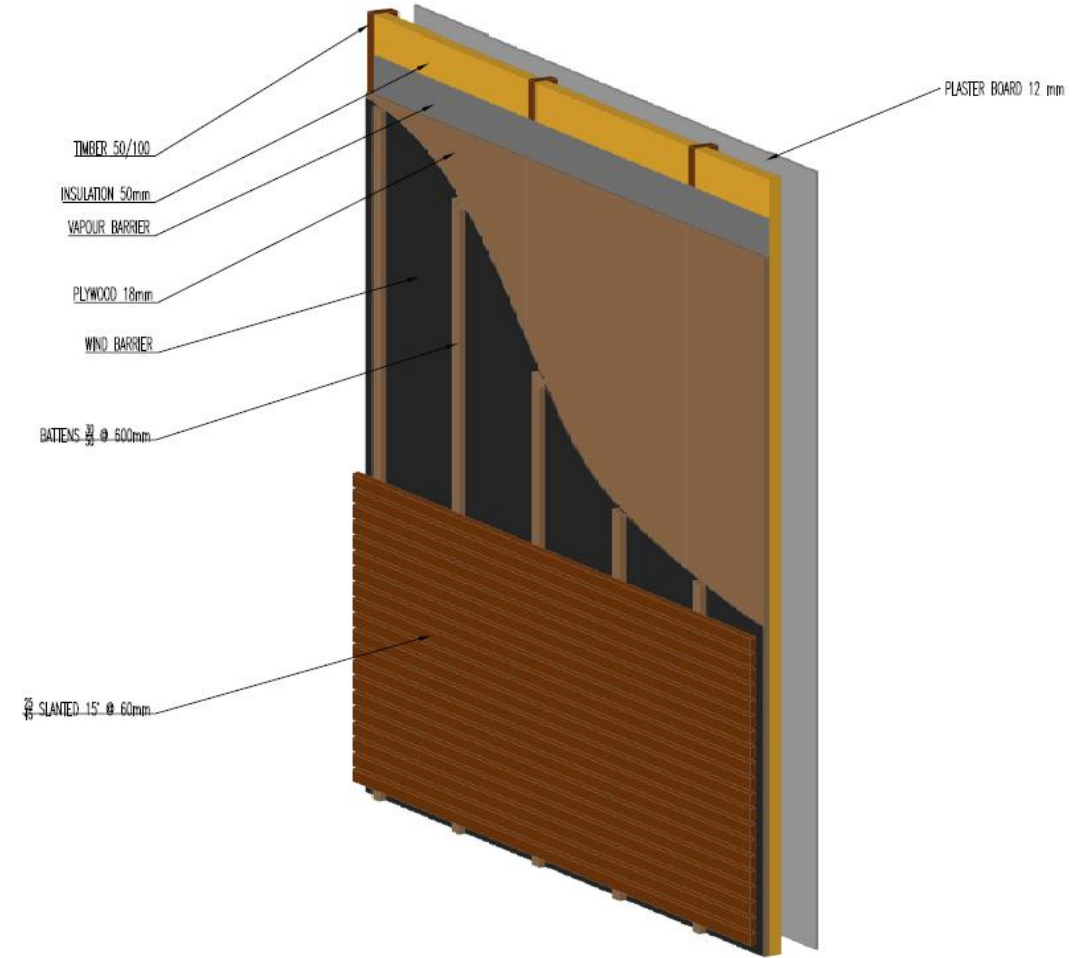
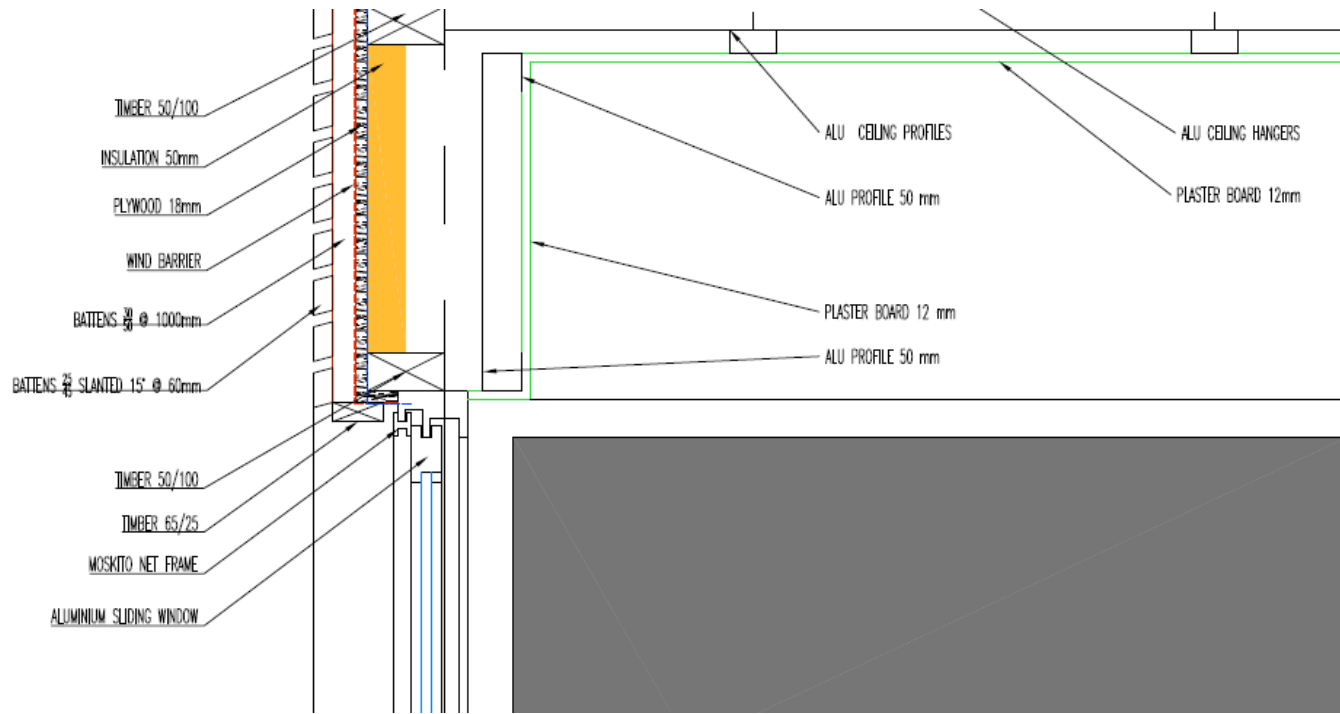


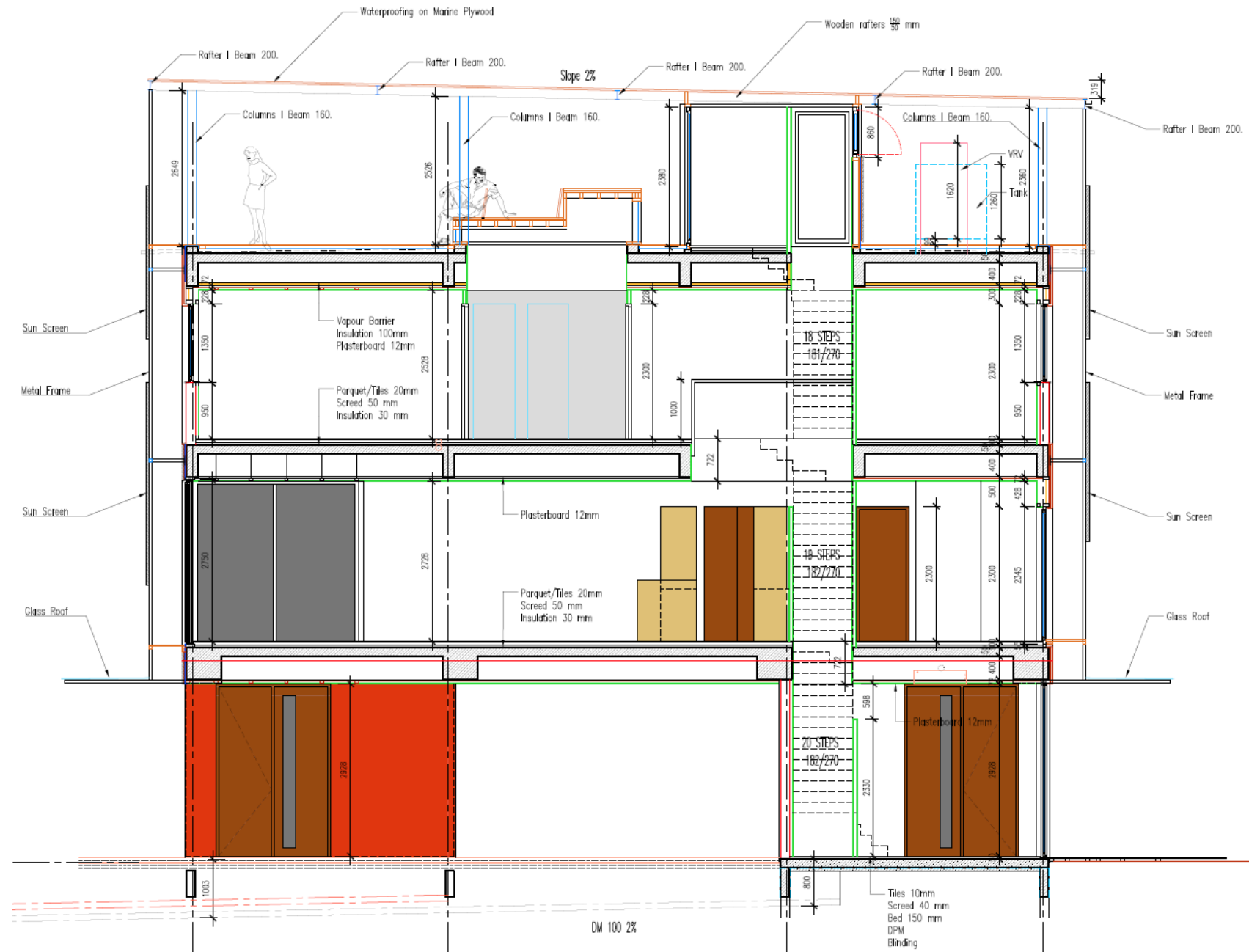












# Akosombo Retreat

















Akosombo Retreat 's Sustainable Design  
is published in the  
**Phaidon Atlas of Contemporary World Architecture**

# RAISING AWARENESS

- **The Austrian Report on Building Culture**
- **Chamber of Architects Awards**
- **Green Building Councils Certification**

## Example Austria: List of selected Architectural Awards

- ↳ [Staatspreis Architektur](#)
- ↳ [Österreichischer Staatspreis für Architektur und Nachhaltigkeit](#)
- ↳ [Landluft Baukultur-Gemeindepreis](#)
- ↳ [Aluminium-Architektur-Preis](#)
- ↳ [Das beste Haus](#)
- ↳ [Österreichischer Bauwettbewerb Landwirtschaftliches Bauen](#)
- ↳ [Architekturpreis des Landes Burgenland](#)
- ↳ [Burgenländischer Holzbaupreis](#)
- ↳ [Kärntner Landesbaupreis](#)
- ↳ [Holzbaupreis Kärnten](#)
- ↳ [Vorbildliches Bauen in Niederösterreich](#)
- ↳ [Holzbaupreis Niederösterreich](#)
- ↳ [Architekturpreis Oberösterreich "vis-à-vis"](#)
- ↳ [Holzbaupreis Oberösterreich](#)
- ↳ [Architekturpreis Land Salzburg](#)
- ↳ [Holzbaupreis Salzburg](#)
- ↳ [Architekturpreis des Landes Steiermark](#)
- ↳ [Bauherrenpreis der Zentralvereinigung der Architekten](#)
- ↳ [Geramb Rose - Dankzeichen für gutes Bauen](#)
- ↳ [Holzbaupreis Steiermark](#)
- ↳ [Auszeichnung des Landes Tirol für neues Bauen](#)
- ↳ [Holzbaupreis Tirol](#)
- ↳ [BTV-Bauherrenpreis für Tirol](#)
- ↳ [Vorarlberger Hypo-Bauherrenpreis](#)
- ↳ [Holzbaupreis Vorarlberg](#)
- ↳ [Schorsch \(Wiener Architekturpreis "Gebaut"\)](#)
- ↳ [Wiener Wohnbaupreis](#)
- ↳ [Österreichischer Friedrich Kiesler-Preis für Architektur und Kunst](#)
- ↳ [Preis der Stadt Wien für Architektur](#)
- ↳ [Wiener Ingenieurpreis](#)

# Thank You! Merci! Obrigado!

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