

Minimize Sand Use

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University of Peradeniya



Green Building
Council of Sri Lanka

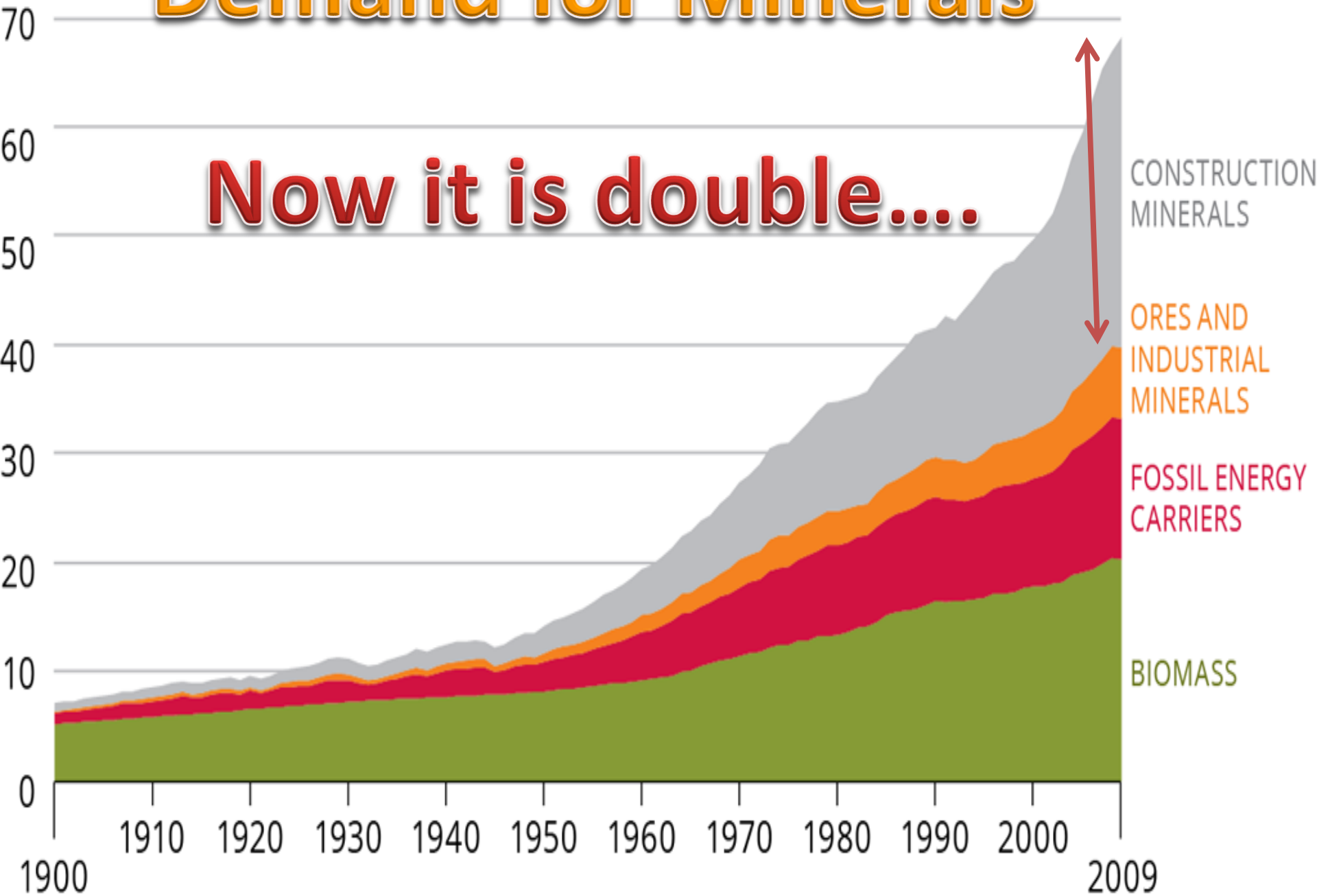


Chamber of Construction Industry
Sri Lanka

Billion tonnes

Demand for Minerals

Now it is double....



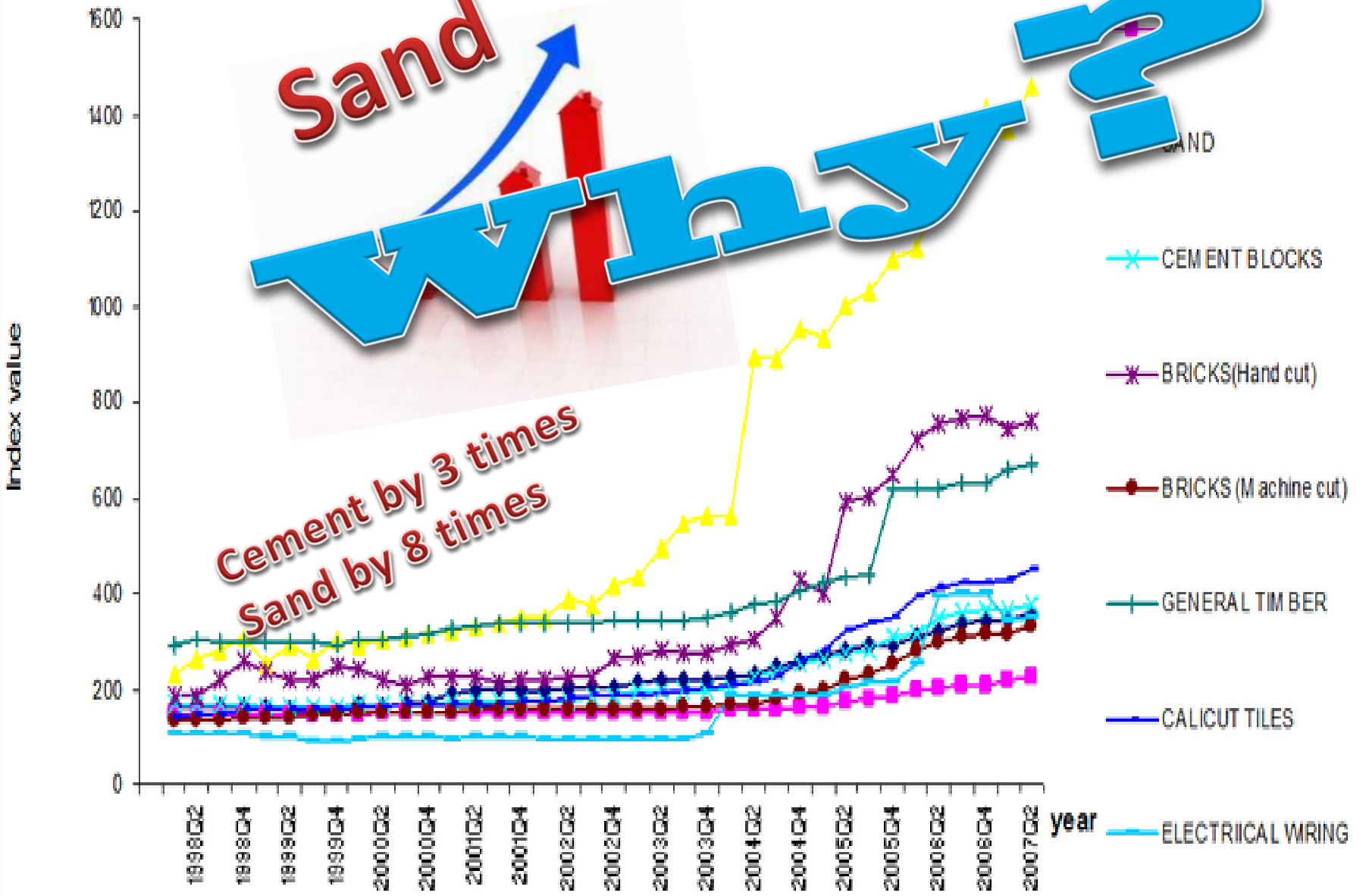


In Sri Lanka



Construction material price indices

◆ CEM ENNT Local market prices



Are we there?

No



Increased Construction

1



Increased Pressure on Resources

2



Resource Scarcity

3



Need for Alternatives

4



Secondary Material Use

5



4. Alternative Materials



Light Steel Frame House



Timber Housing



Bamboo Housing









But



Sand/Brick ...

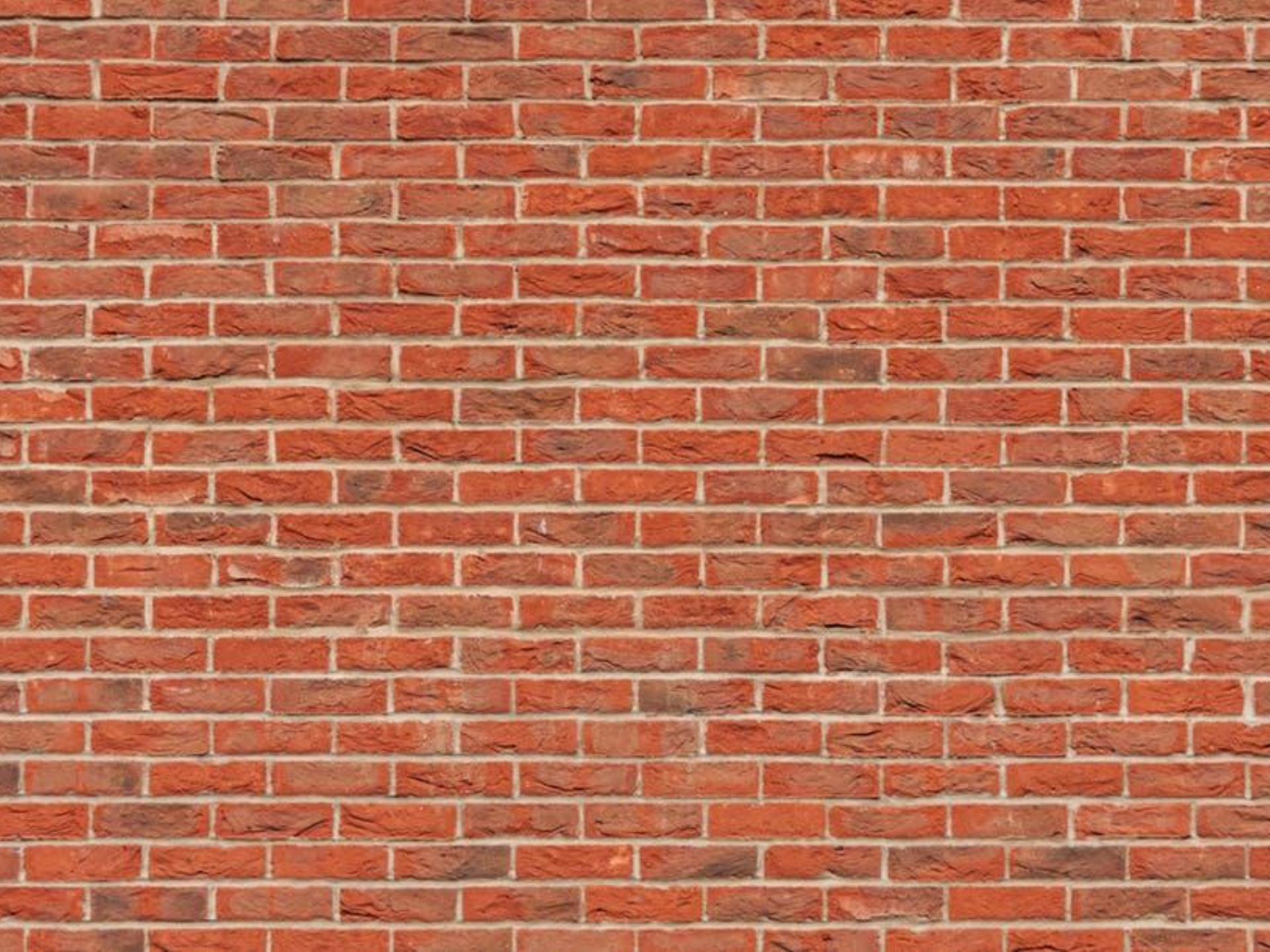
ST10



RIVER SAND



















ICC-ACOTEC

Precast Wall Panels

SAVES

Material

Labour

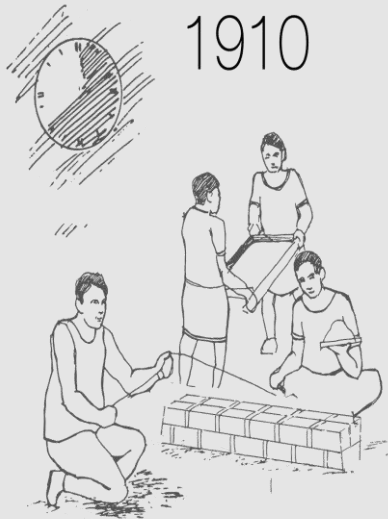
Time

BRICK TO BLOCK – BLOCK

TO PANEL

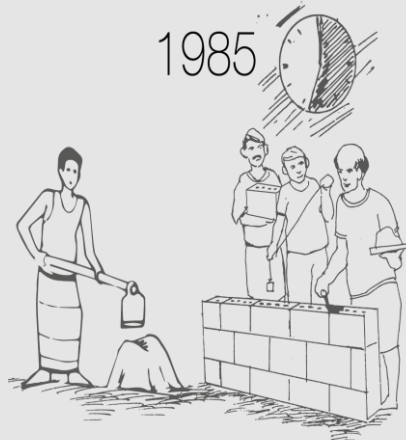


Properties &
Raw material
remain same



1910

CLAY BRICK
65x215x10
2.5



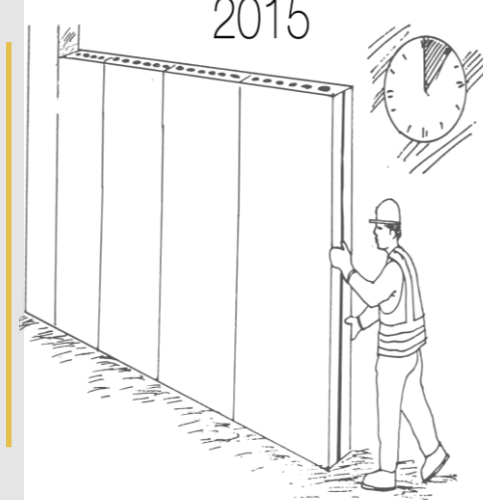
1985

CELLULAR
BLOCK
190x390x100



2010

AAC BLOCK
200x600x100



2015

ICC-ACOTEC PANEL
600x3000x100



Changing ART &
TECHNOLOGY







5 Secondary Material



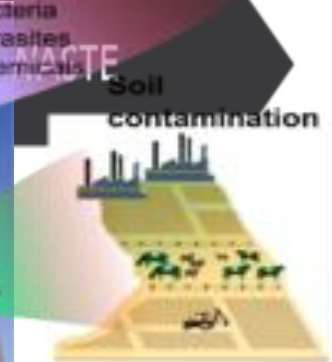
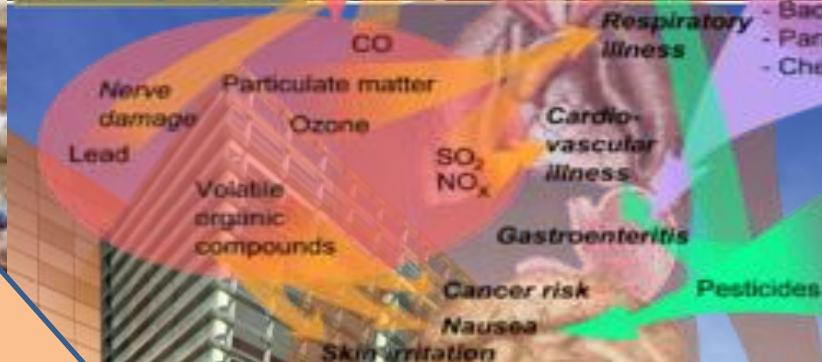
Secondary Material Use?

NO





Water pollution





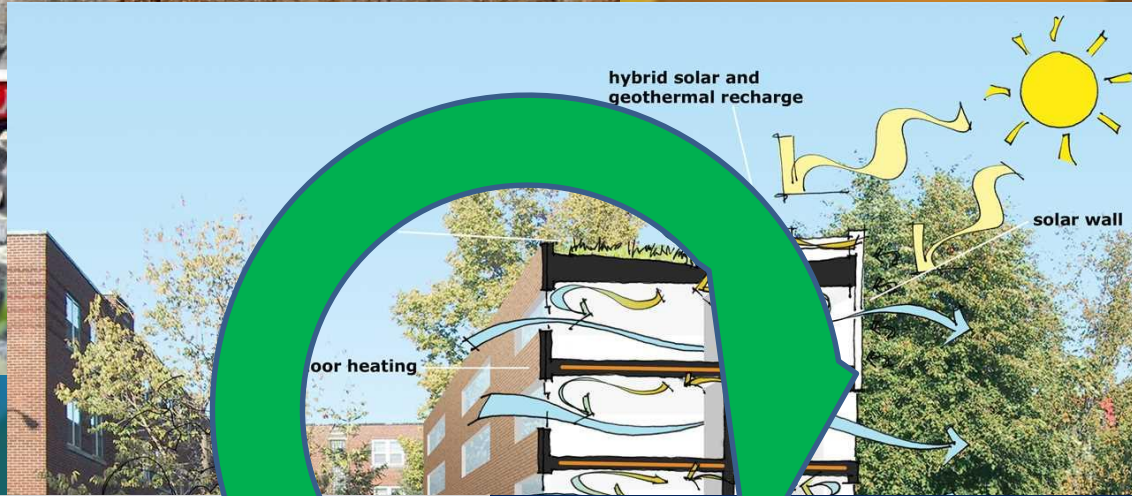
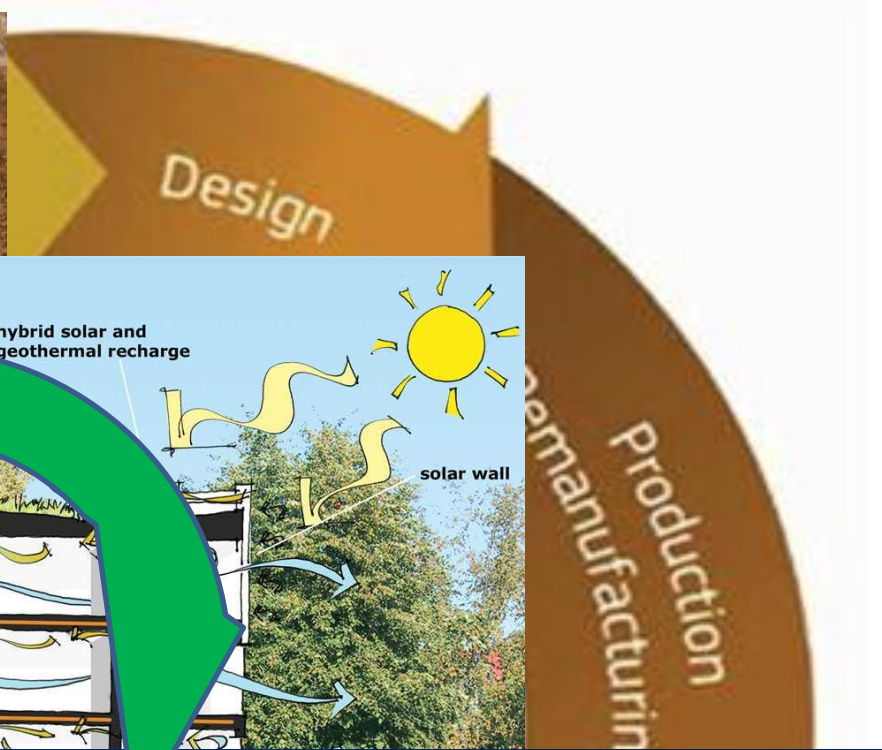
Results of the Linear Economy

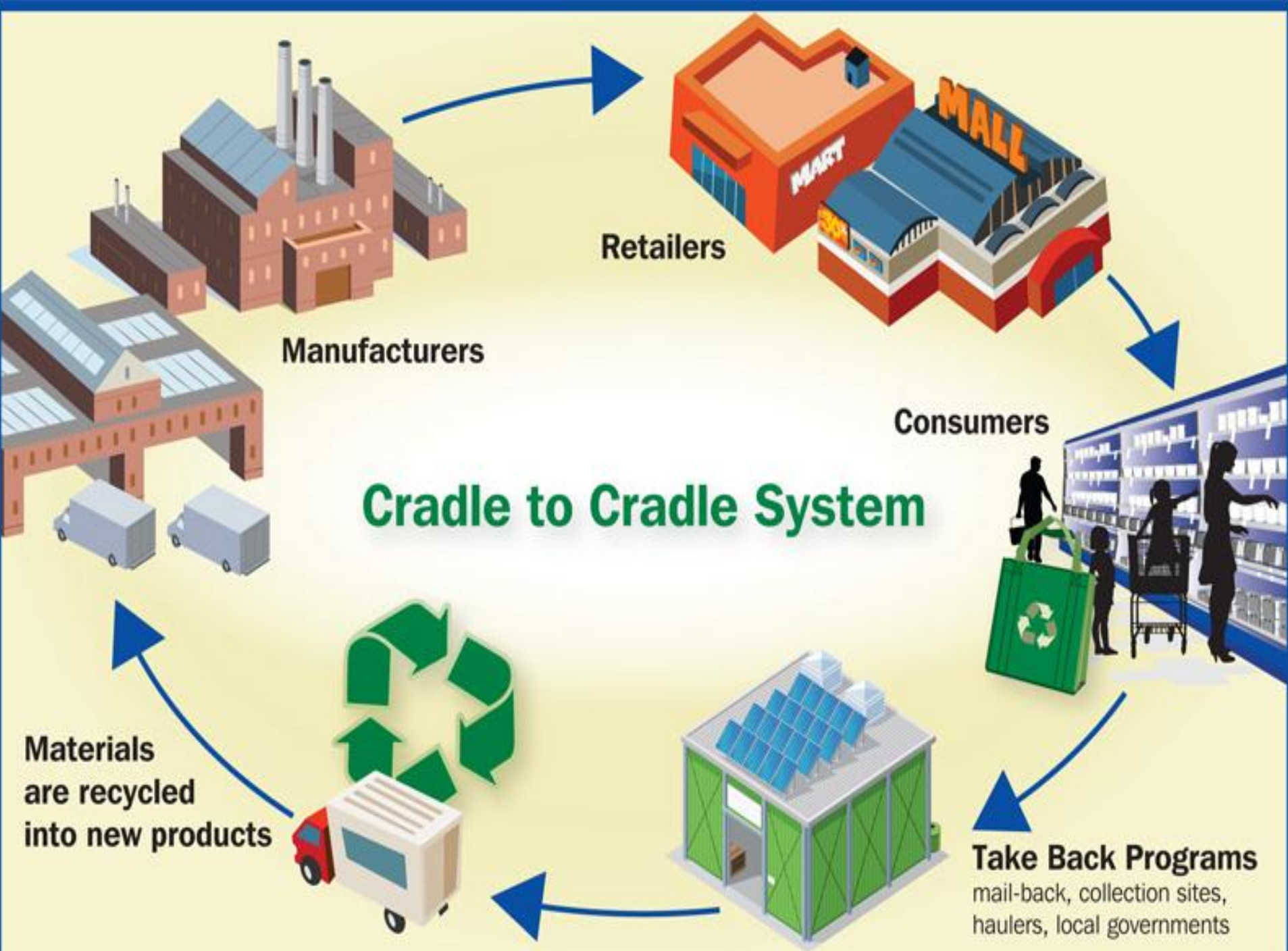






Circular Economy











RECYCLING PLANT

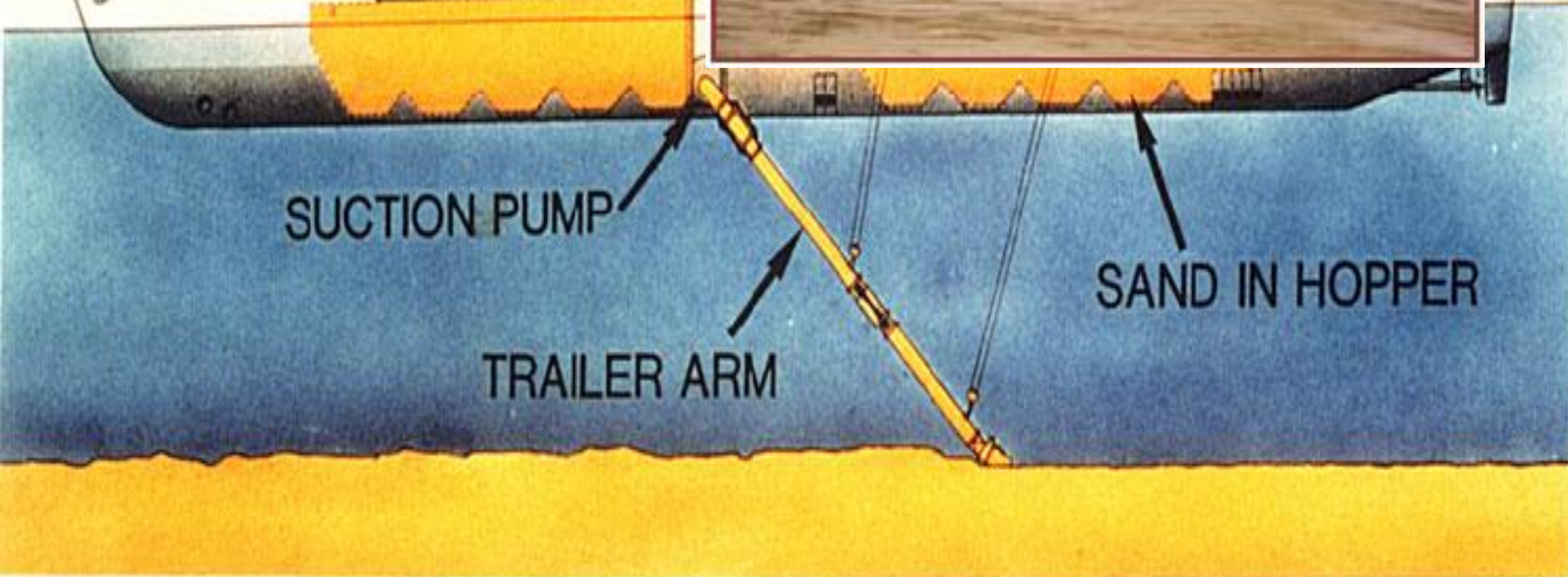




SUCTION PUMP

TRAILER ARM

SAND IN HOPPER



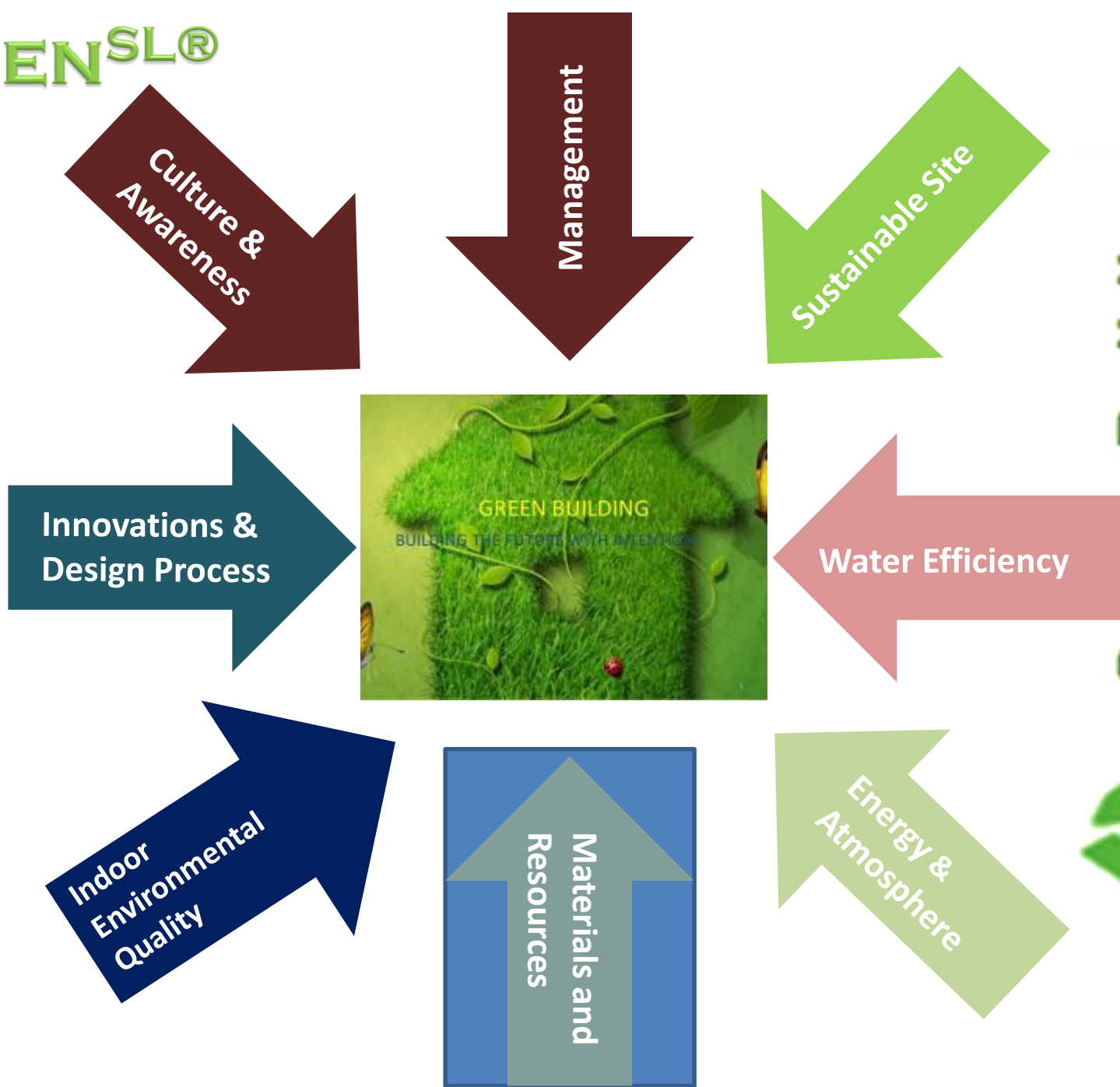
Green Building Concept

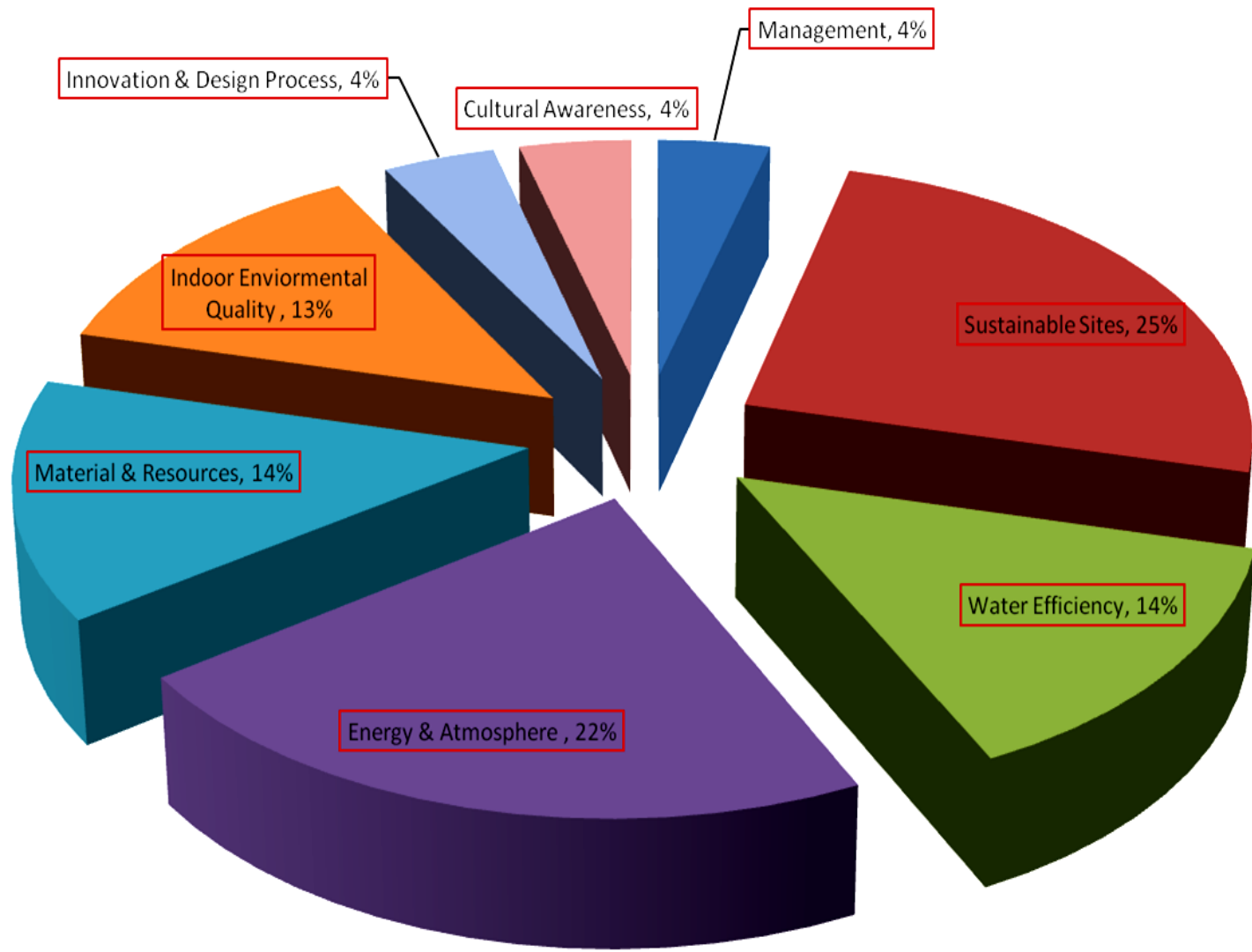


What is a “Green Building”

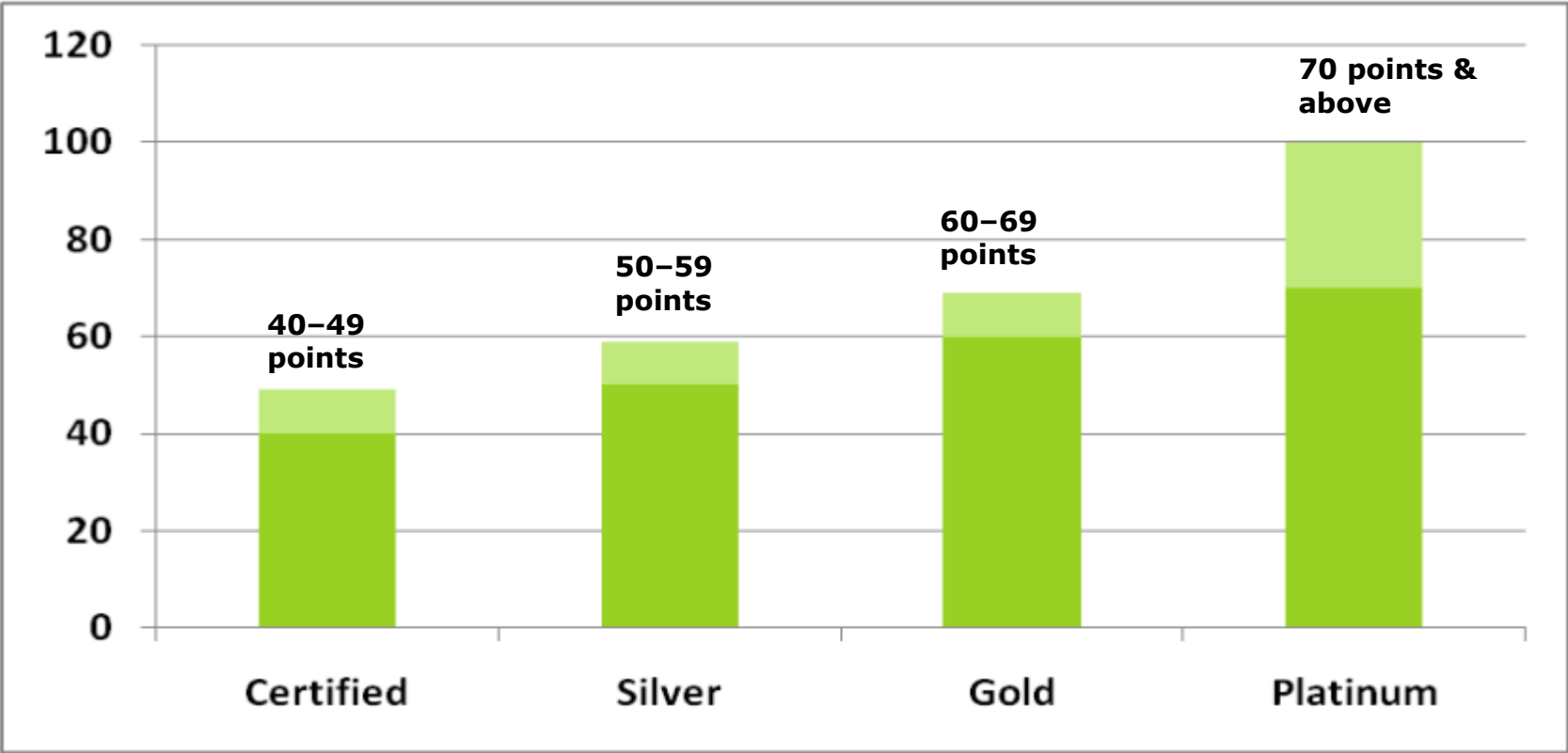
“Green Buildings” are high performance structures that also meet certain standards for **reducing natural resource consumption.**

GREENSL[®] Building Certification

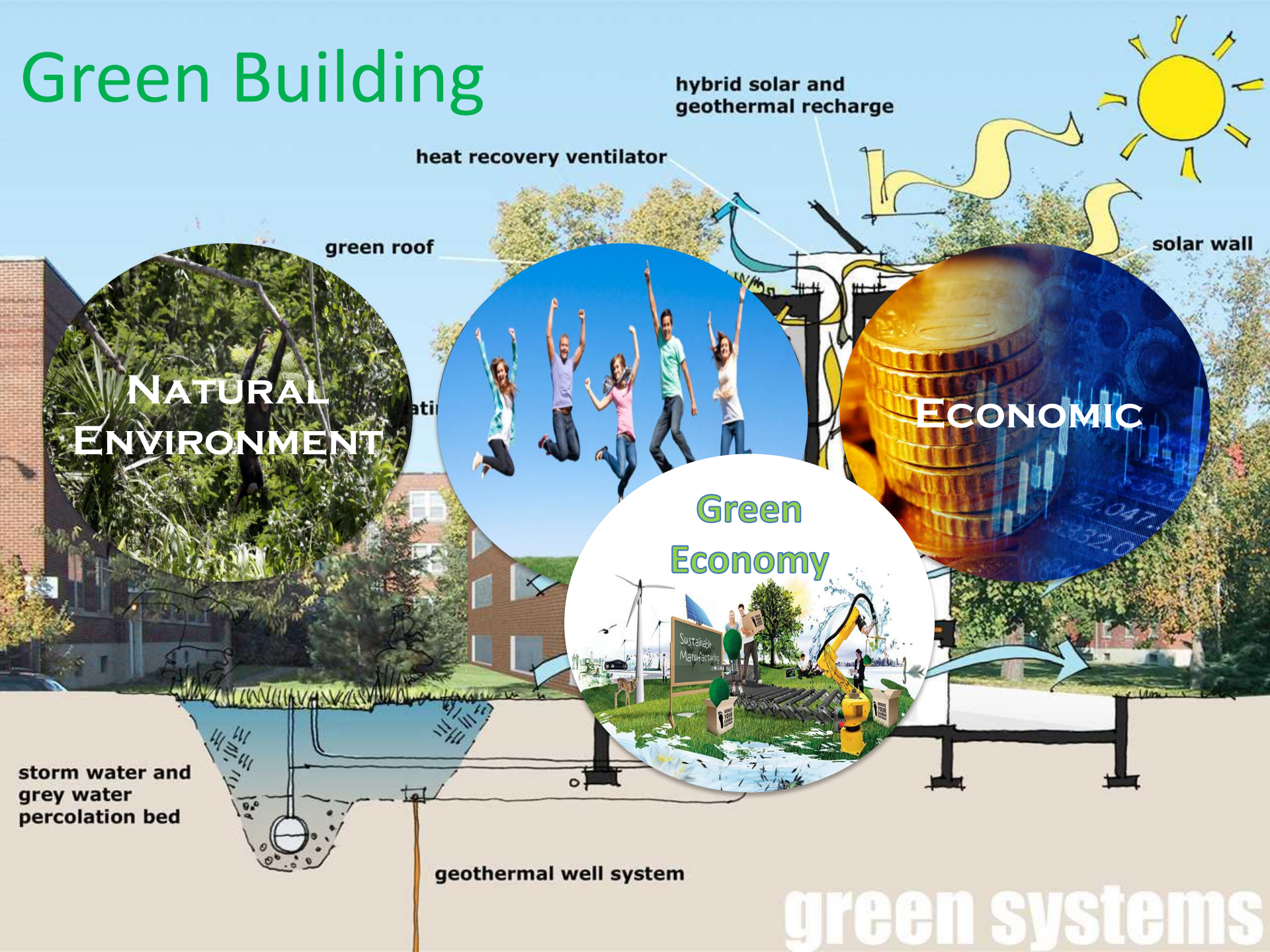




GREENSL® Project Certification



Green Building



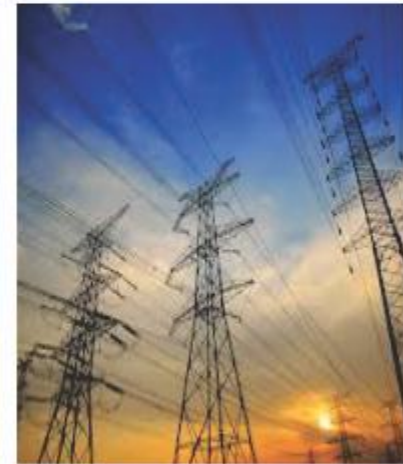
SUSTAINABLE SITES



WATER EFFICIENCY



ENERGY & ATMOSPHERE



MATERIAL & RESOURCE



Material &
Resources

14%





Green Innovation

Green Building



**REDUCE
REUSE
RECYCLE**



err REDUCE
err REUSE
err RECYCLE
err RETHINK

Are we there? **No**



Increased Construction



Increased Pressure on Resources



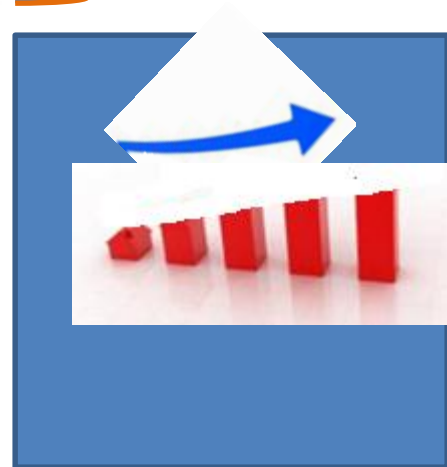
Resource Scarcity



Need for Alternatives



Secondary Material Use

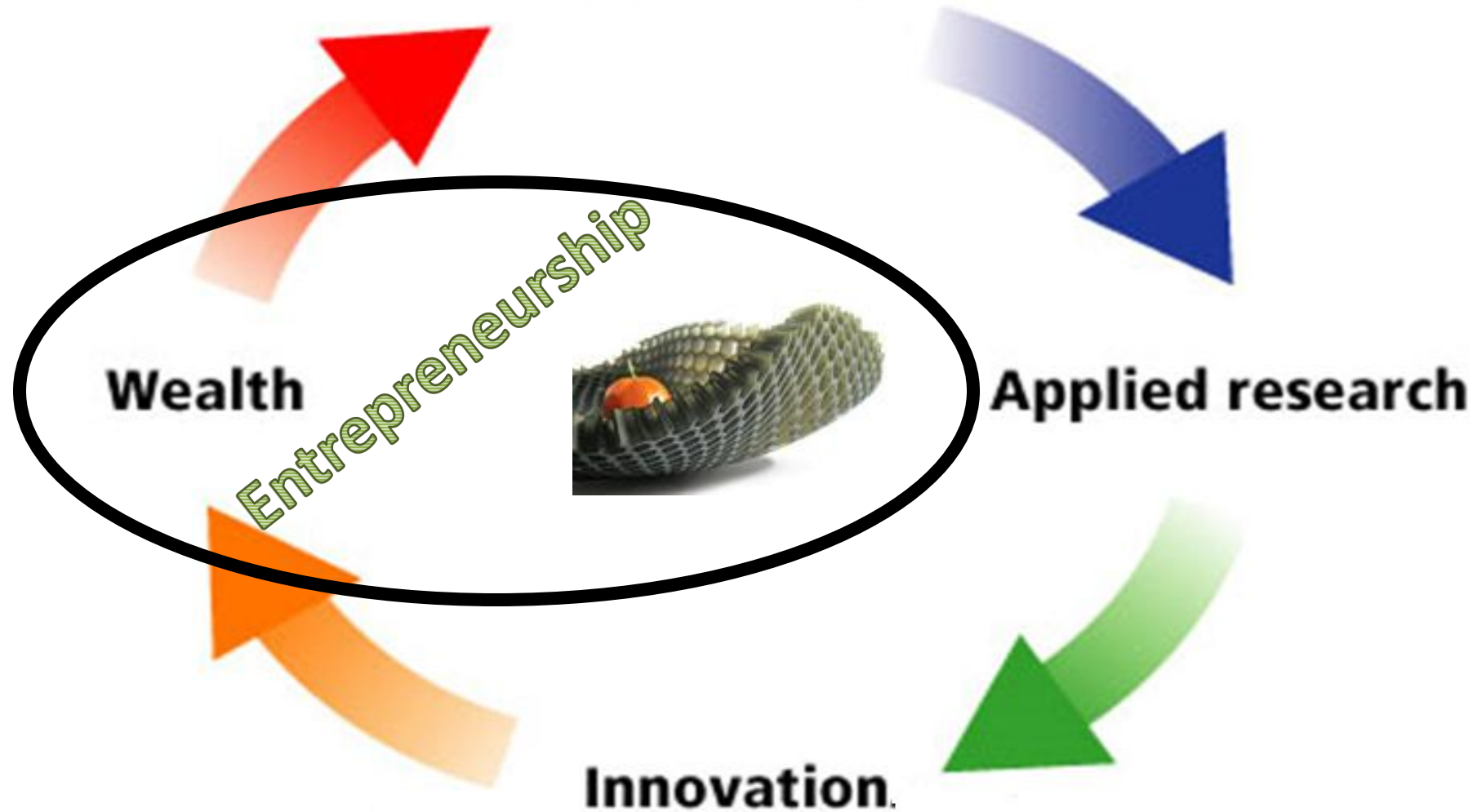




Innovation
Drives
Change?

Green Innovation & Entrepreneurship

Basic research



Exports, Imports & Trade Balance





Sri Lanka - Ground Reality !

- Product Import for industry

Expenditure

US \$ 12.5 mn

5000 Mt/y

Titanium Dioxide (TiO₂)

For Paint industry



- Raw Material Exports

Income

US \$ 8 mn

80,000 Mt/y

illmenite

Potential Revenue

US \$ 100 mn

(40,000 Mt - TiO₂)

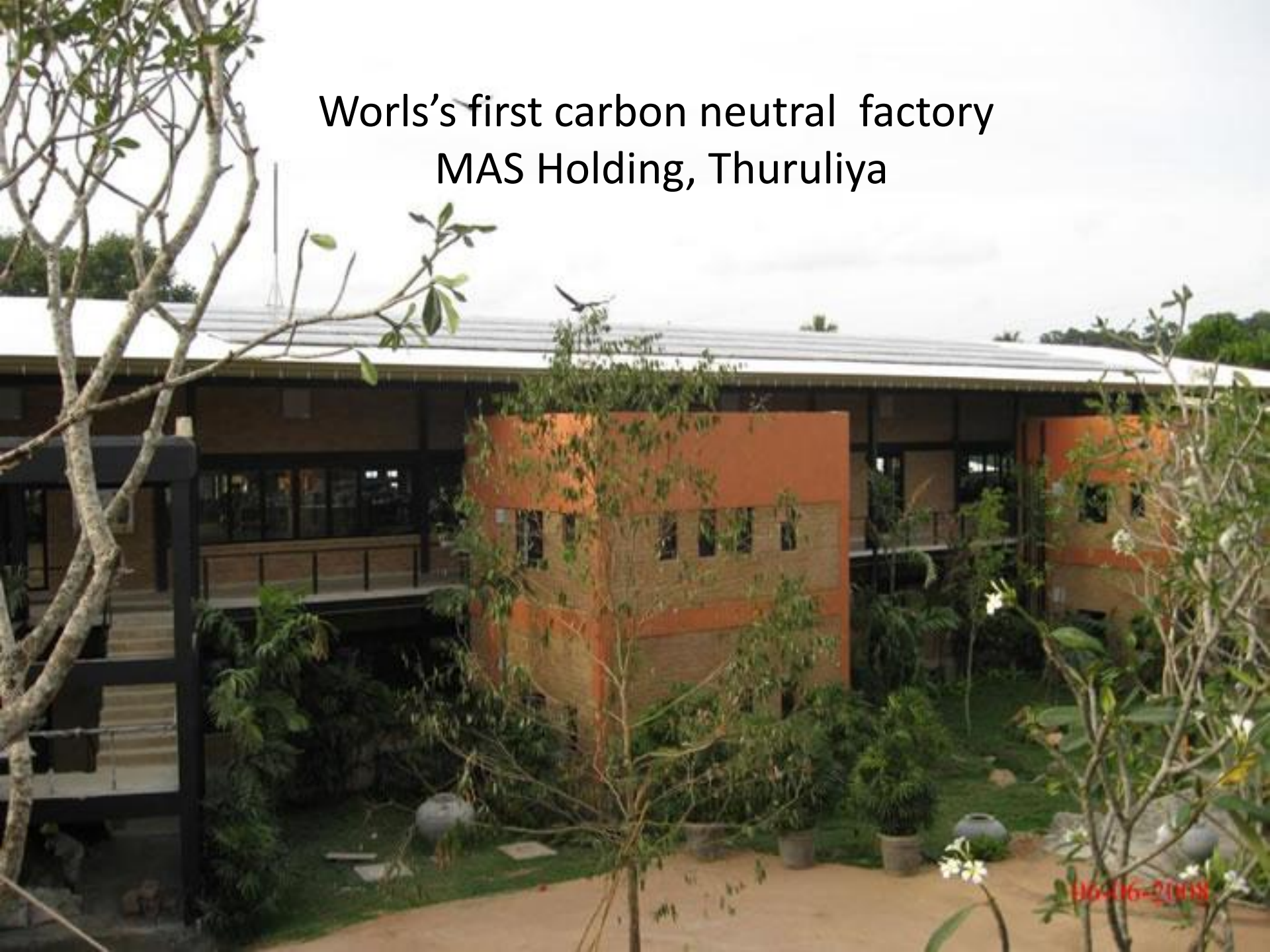
walk



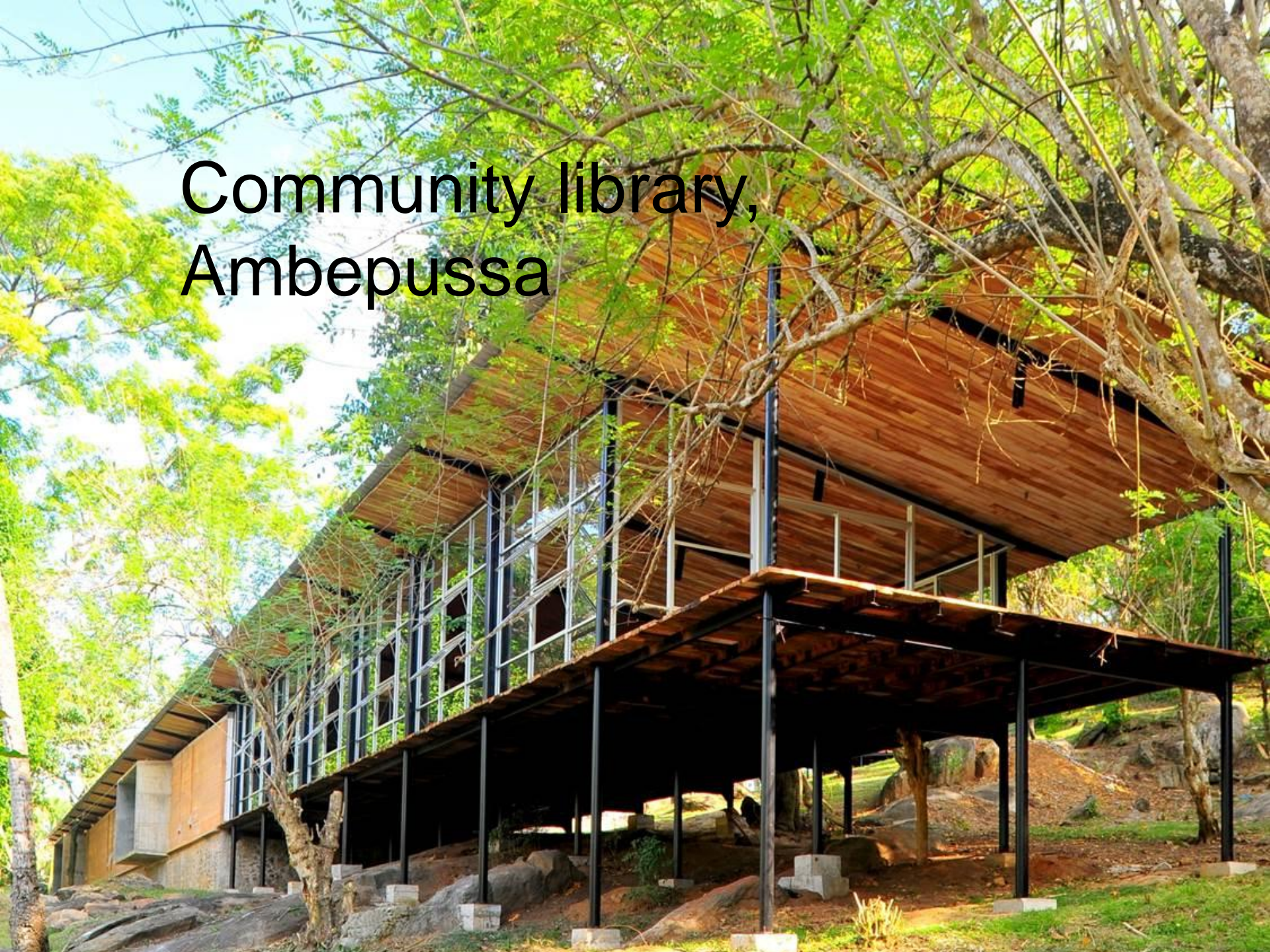
the

talk

World's first carbon neutral factory
MAS Holding, Thuruliya



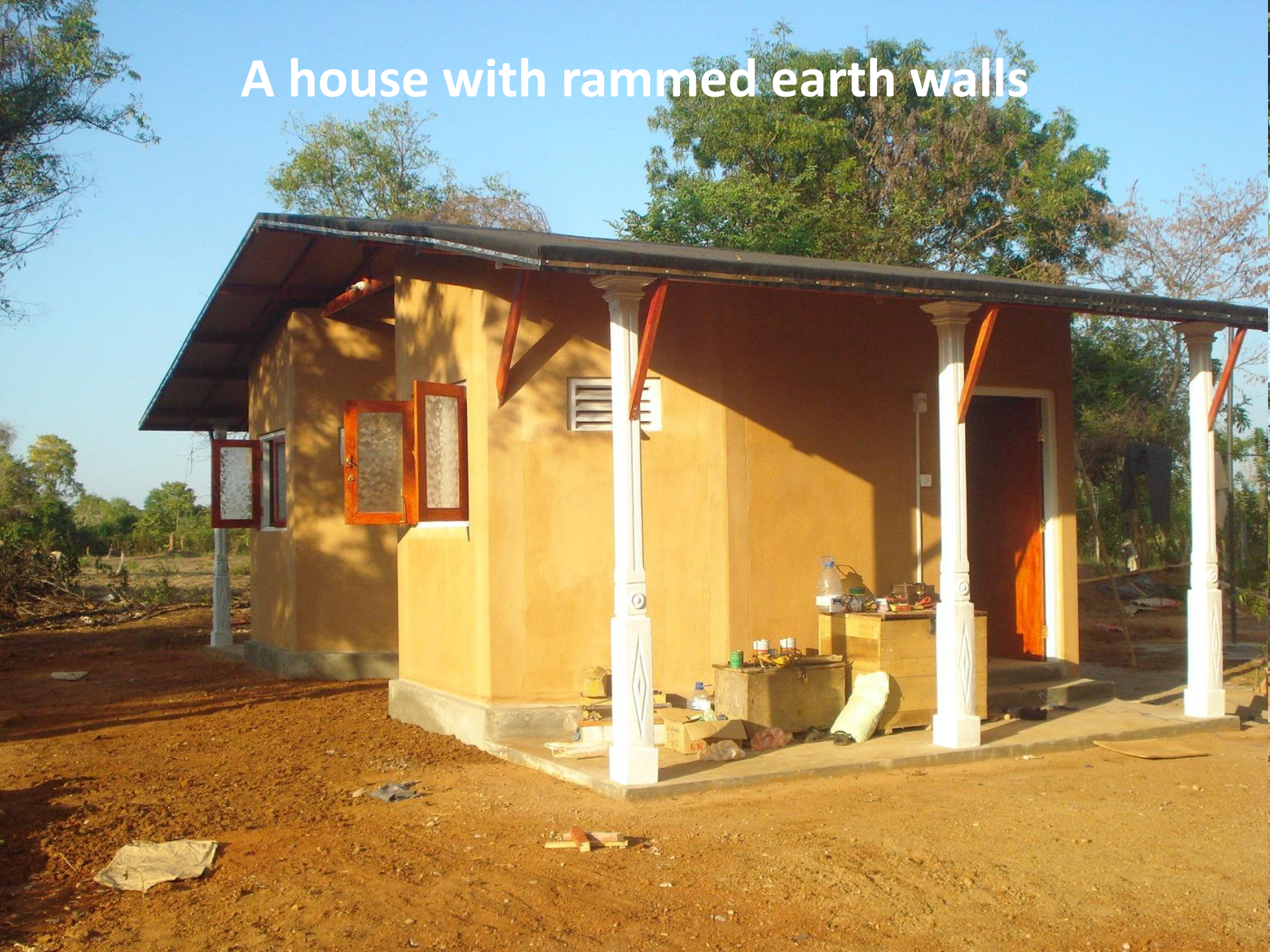
Community library, Ambepussa



Construction of rammed earth



A house with rammed earth walls



The Use Of Fly Ash As A Replacement Of Cement and Sand In Concrete Masonry Bricks

UoP & RMIT



Zero Sand product





**Norochcholai power plant
has already paid back
its investment**









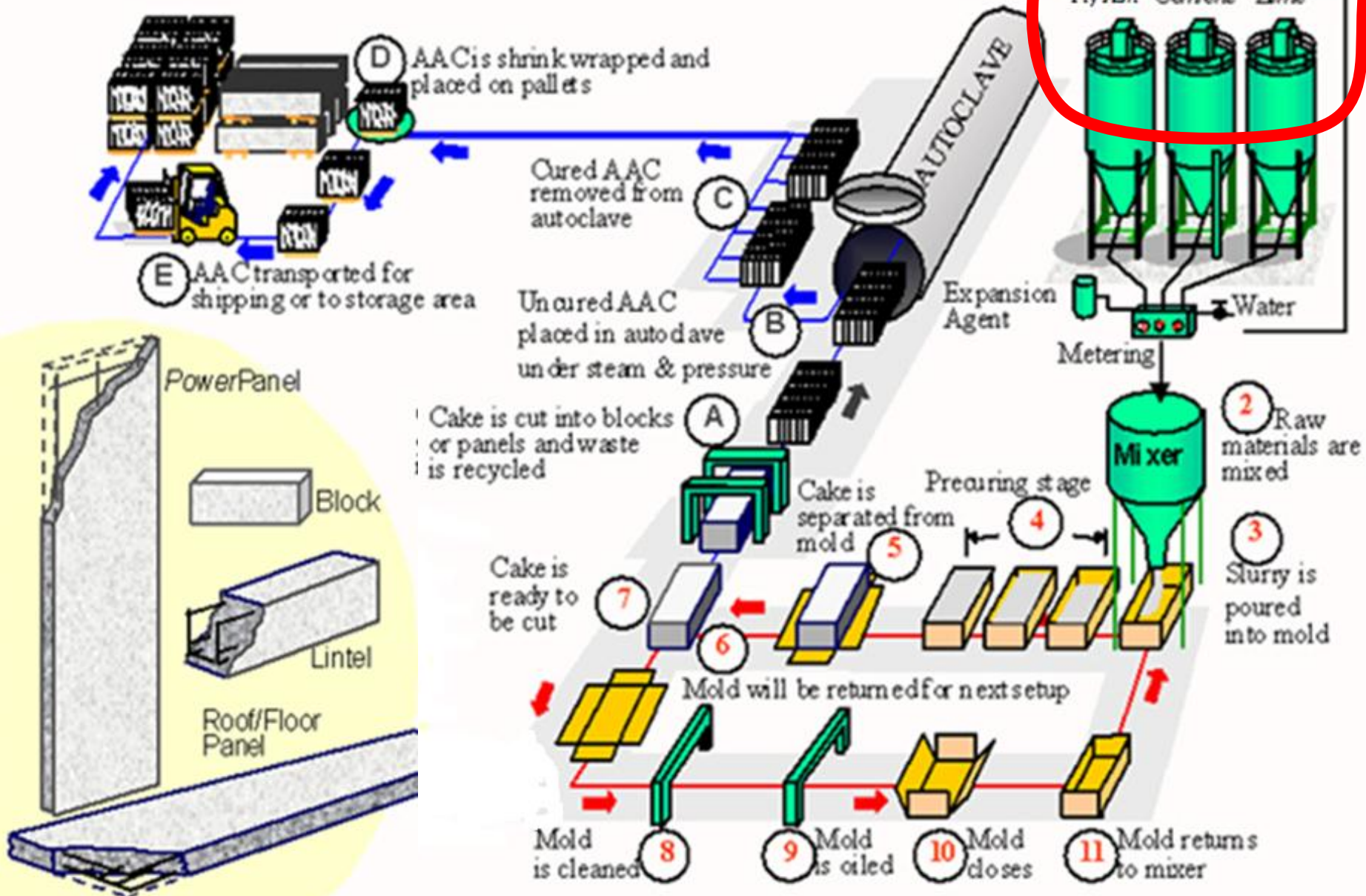
Lighter & Greener

Lanka AAC (Pvt) Ltd.



Manufacturing Process

NOTE! Follow steps 1-11, then steps A-E





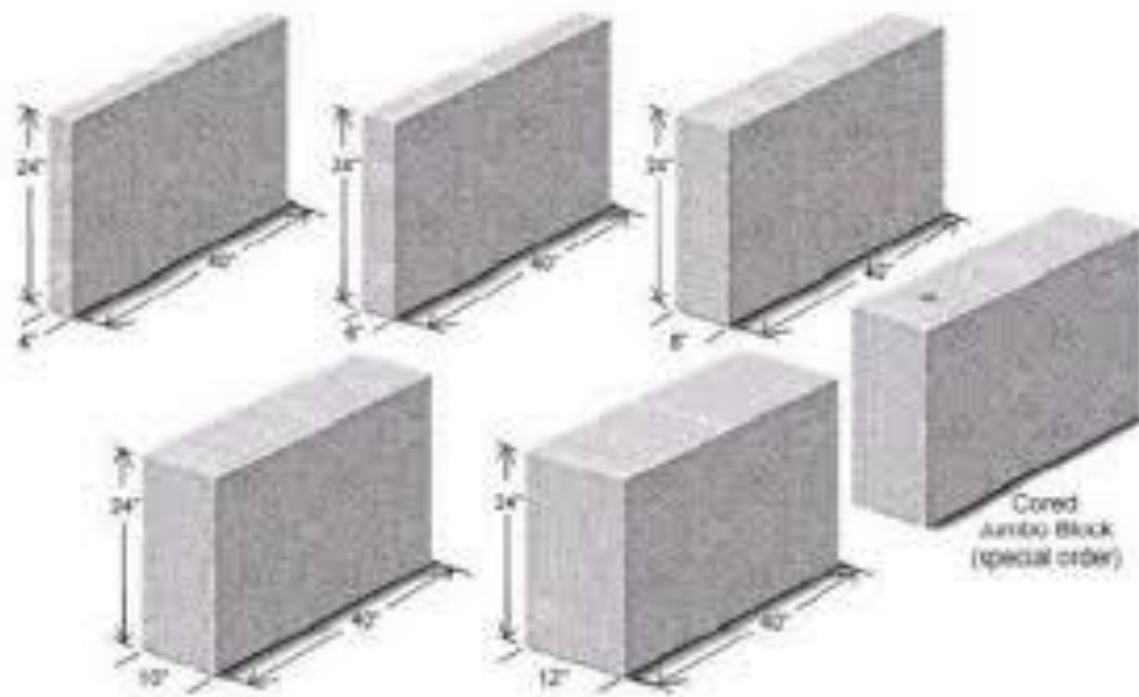
Zero Sand product



COMPOSITION

1. Fly- ash – 65%~70%
2. Cement – 10~15%
3. Lime – 15%~20%
4. Gypsum – 3%~5%
5. Aluminum powder – 0.07%





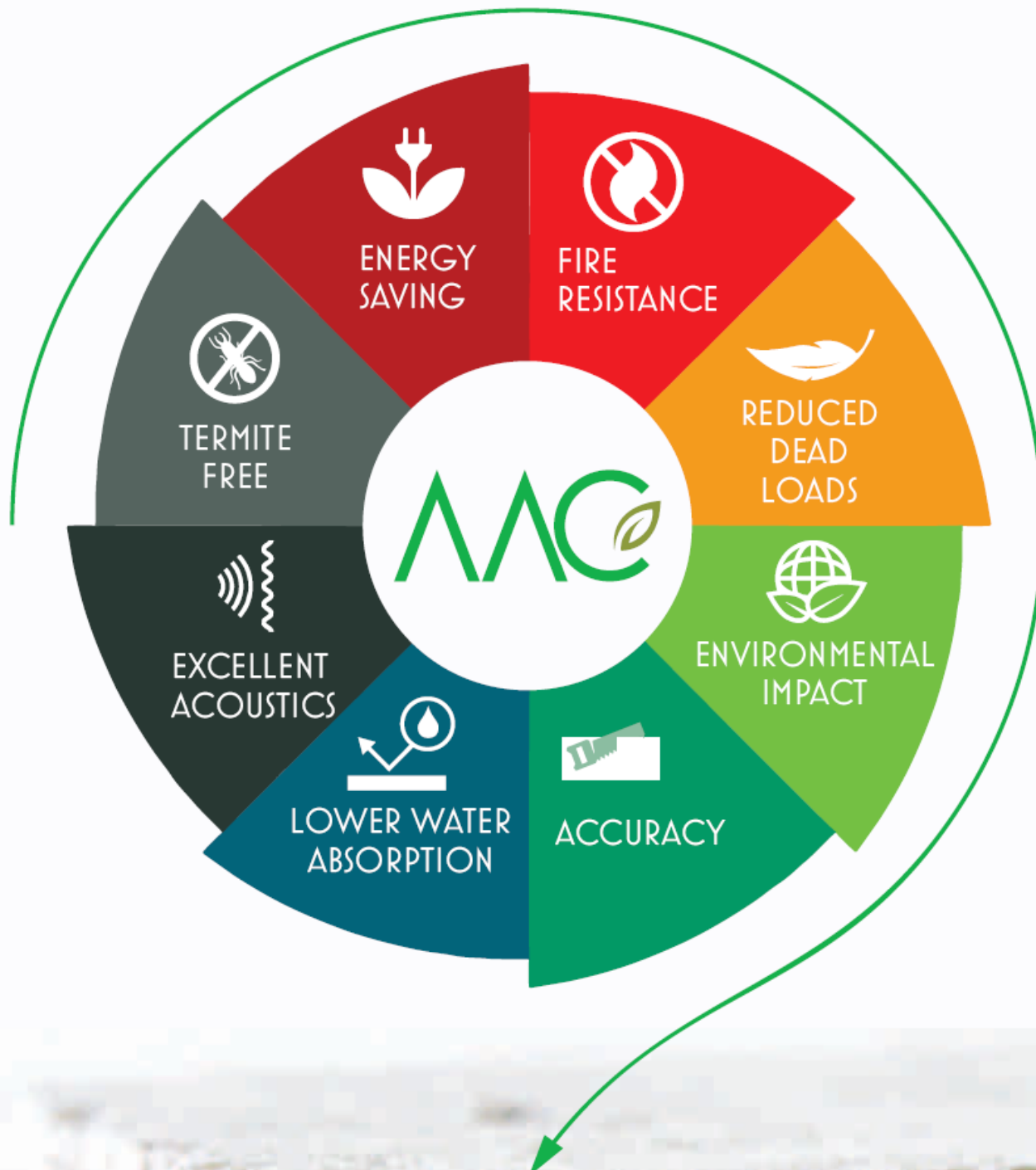


Zero Sand Construction





Greener Material





err REDUCE
err REUSE
err RECYCLE
err RETHINK



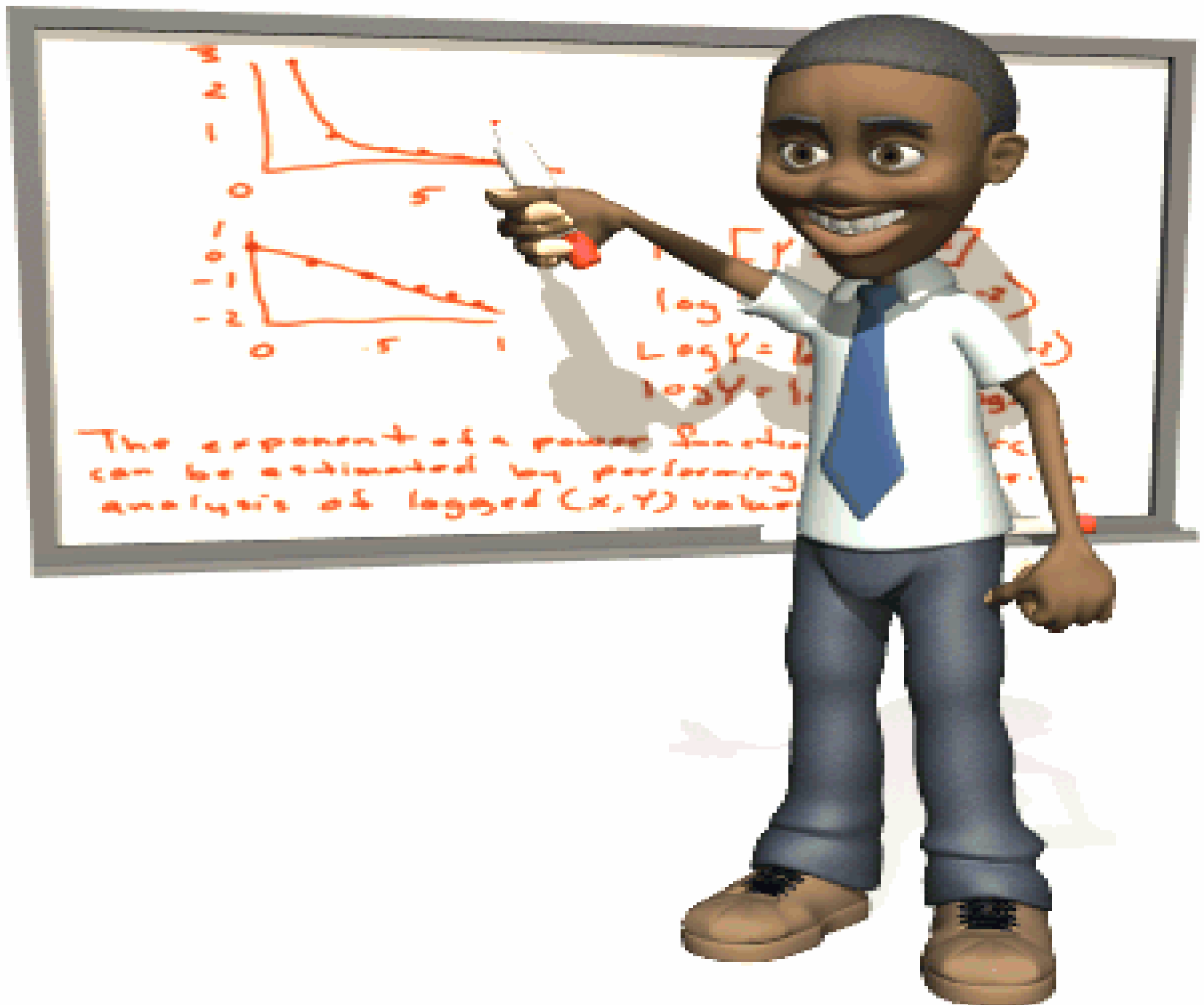
Bridge Replacement Project



New

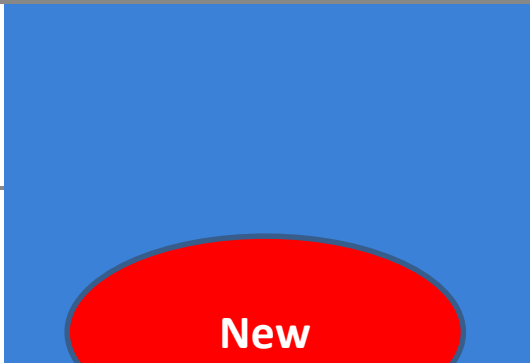
Repair





The exponent of a power function can be estimated by performing analysis of logged (X, Y) values

$$\log Y = b + \alpha \log X$$
$$\log Y = \alpha \log X + b$$



***COST
COMPARISON***

RETHINK



Sustainable Design & Construction

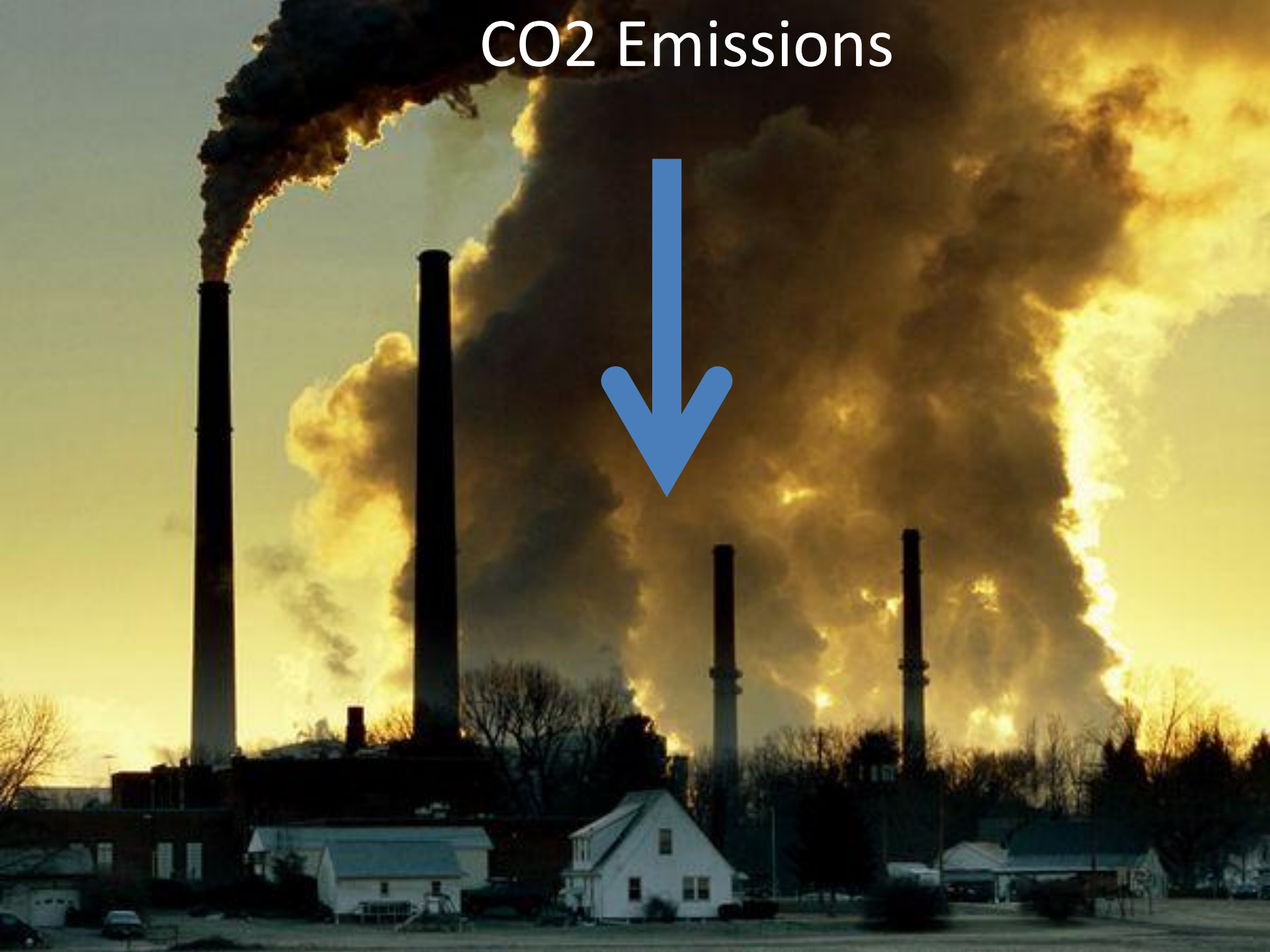


International Center for Sustainable Built Environment (Pvt) Ltd.



LEGO INTERNATIONAL (PVT) LIMITED

CO2 Emissions



**ENVIRONMENTAL IMPACT/
AS GREEN Construction & Design
Rethink/ Reuse/ Reduce/ Repair
Reduce import/ Labor shortage
Material shortage/
Energy saving**





Case Study

of Construction Materials

Ranjith Dissanayake

NEW

***Civil Dept. Office &
PG Common Room***





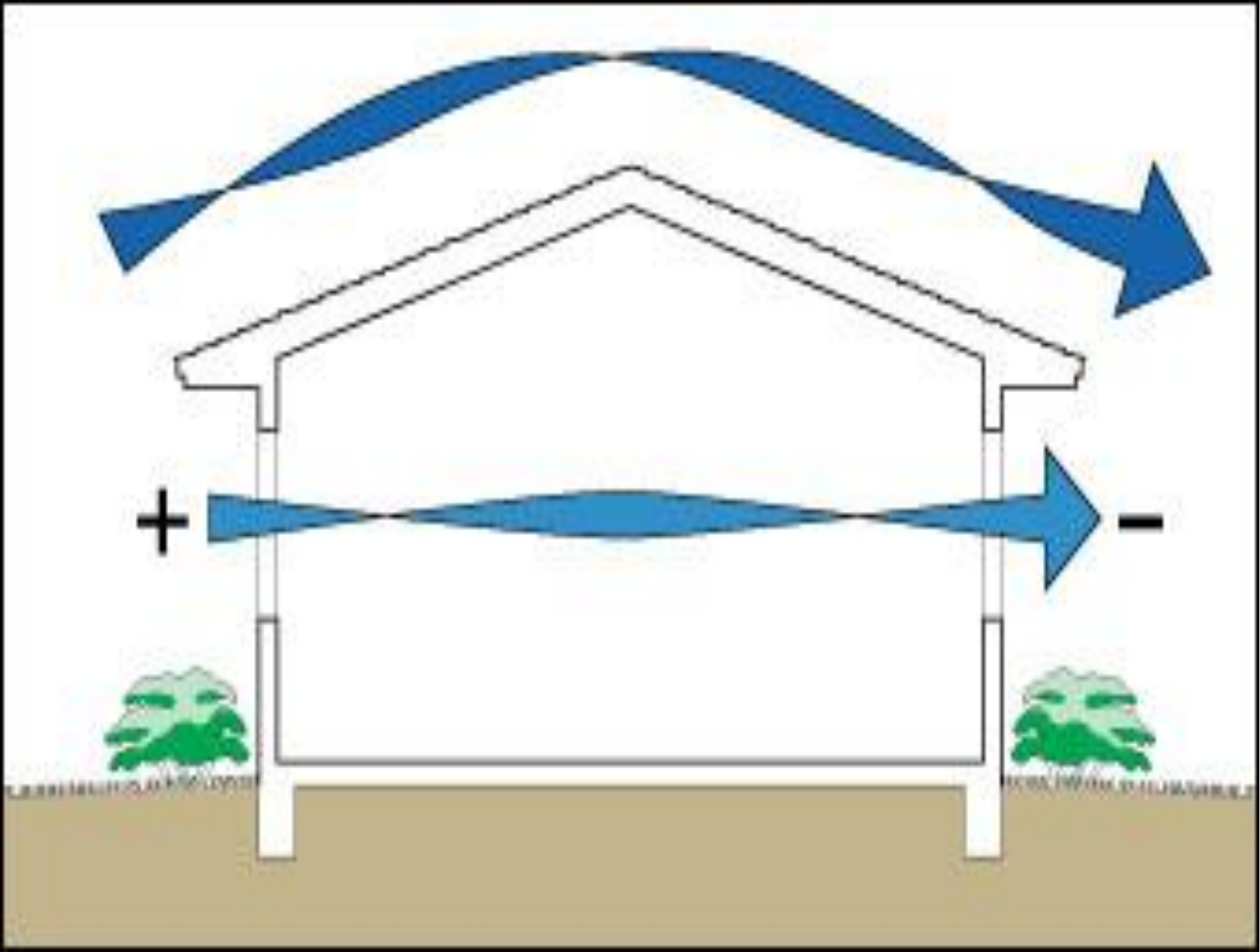


A photograph of a construction site. In the foreground, there is a large pile of wooden planks and beams on the left, and a concrete foundation strip on the right. In the middle ground, there is a long, low building with a corrugated metal roof and a white wall. A person in a white hard hat and a dark shirt is walking away from the camera on a concrete path to the right. Another person in a white hard hat and a striped shirt is standing near a tree in the background. A large blue rectangular box with the word "Before" in red text is overlaid on the center of the image.

Before















PE+
BLUE TECH

PE+
BLUE TECH
WATER TANK



14070412704873



Concluding Remarks

- Alternatives
- Secondary Materials Usage
- Build Green (4R concept)
- Local Materials
- Change attitude toward new materials...

A modern glass skyscraper with a lush green courtyard and a waterfall. The building features a curved glass facade and is surrounded by dense greenery, including trees and hanging plants. A waterfall flows into a pool in the courtyard. People are seen walking on a path in the foreground. The sky is blue with some clouds.

Final Remarks

Innovation &
Entrepreneurship
for new materials

Thank you!

