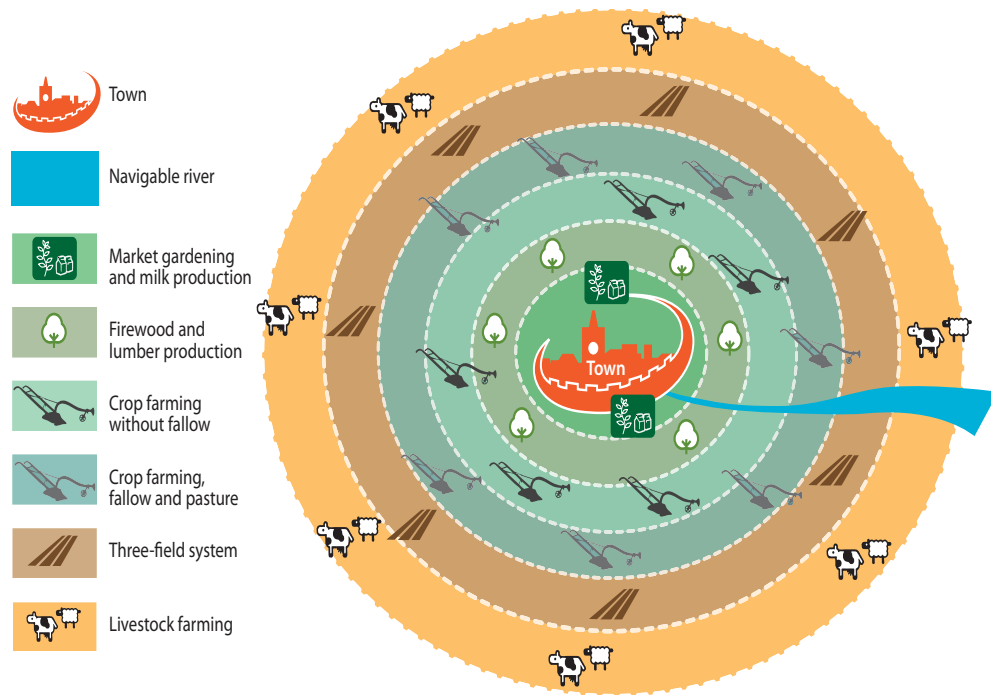


Adaptive Building Design \ Using low and high-tech Solutions

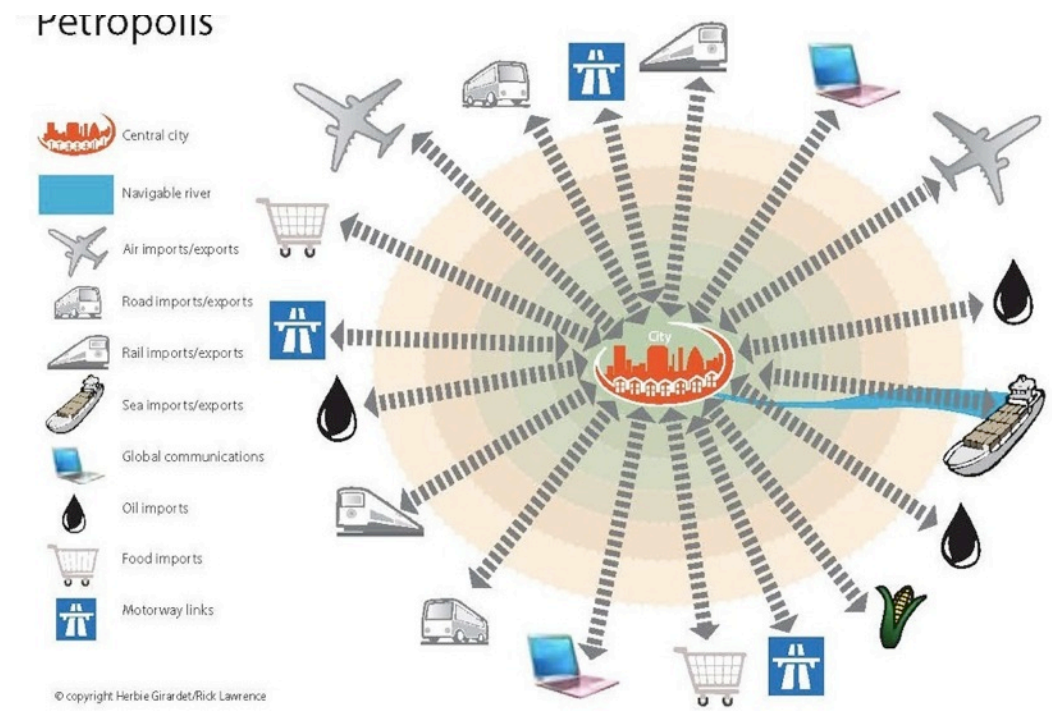
Prof. Dr. Uta Pottgiesser, Detmold School of Architecture and Interior Architecture



From Agropolis to Petropolis

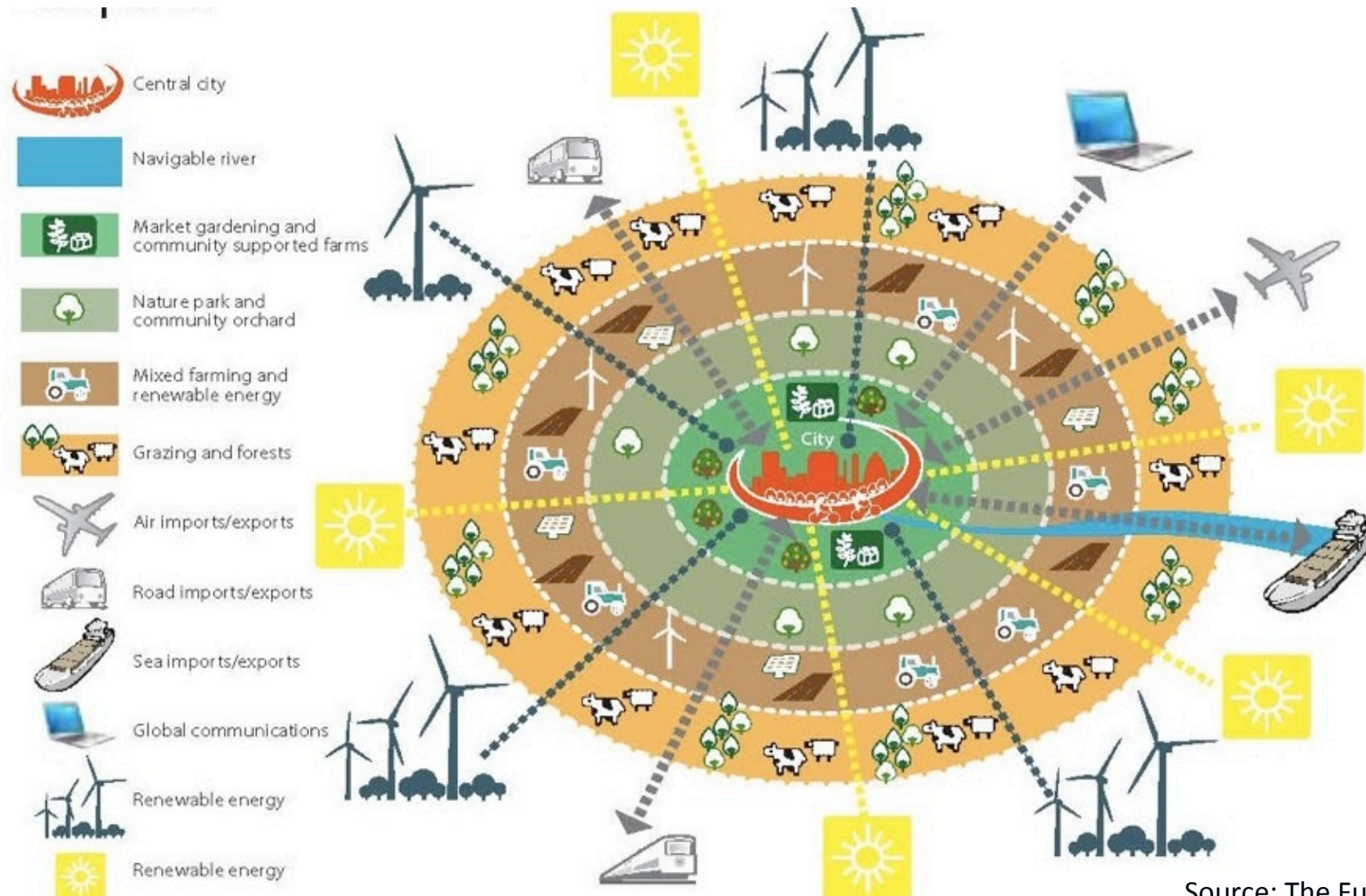


© copyright Herbie Girardet/Rick Lawrence



© copyright Herbie Girardet/Rick Lawrence

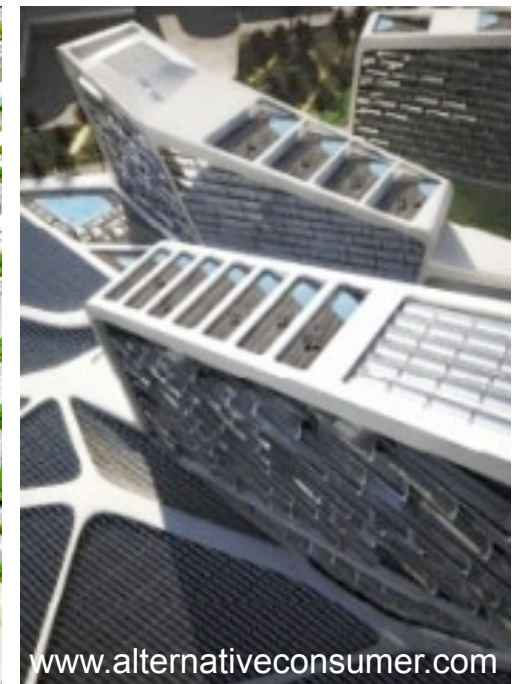
Towards Ecopolis



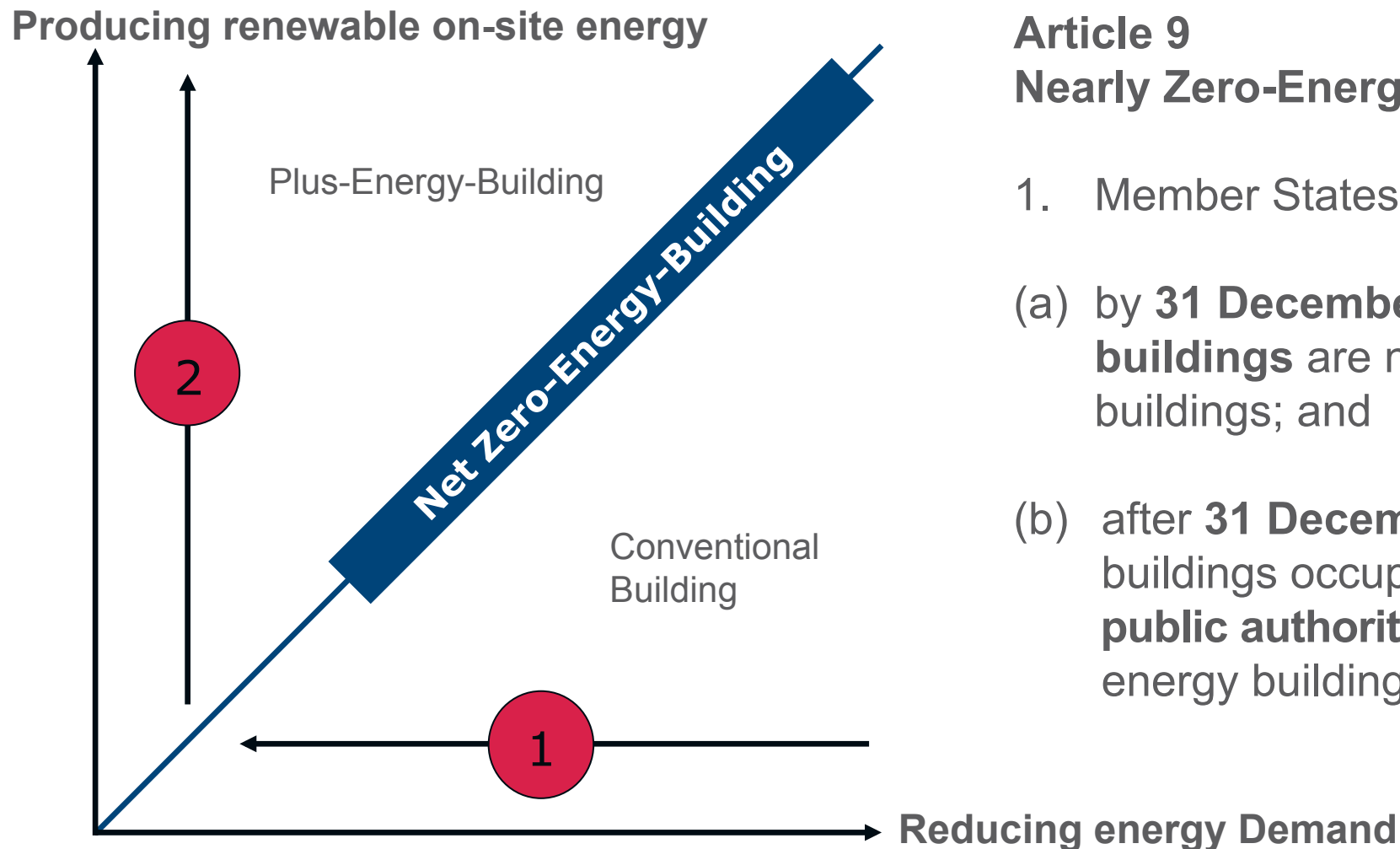
Source: The Future of Cities Forum 2013

Urban Development and Planning

- Efficient use of energy, solar city development,
- Sustainable transport and water security,
- Local food and materials,
- Nature in the city, green businesses,
- A culture of restorative urbanization.



Energy Performance of Buildings Directive 2010/31/EU (EPBD)



Article 9

Nearly Zero-Energy Buildings

1. Member States shall ensure that:
 - (a) by **31 December 2020**, all new buildings are nearly zero-energy buildings; and
 - (b) after **31 December 2018**, new buildings occupied and **owned by public authorities** are nearly zero-energy buildings.

Low Carbon Building Culture

Common Sense for the World 2009 Manifest of BDA*

* Bund Deutscher Architekten

We must

- place the planning and layout of our cities and buildings on a new ecological footing,

We want

- sustainable cities,
- resource-saving architecture and civil engineering,
- a heightened awareness of sustainable development,

We will

- lend credibility to our commitment through personal involvement.



Eduardo Alfonso Reilly, Residence, Brazil 1950

Certification Systems and Rating Tools



BCA-IDA GREEN MARK



GREENSHIP

source.: www.dgnb.de



Category: [Reference](#)
Updated: 08 October 2014
Version: 3.1
Size: 16.9 MB
Language: English
Developer: Building And Construction Authority - Singapore
© BCA Green Mark
Rated 4+

Compatibility: Requires iOS 7.1 or later. Compatible with iPhone, iPad, and iPod touch. This app is optimised for iPhone 5.

Customer Ratings

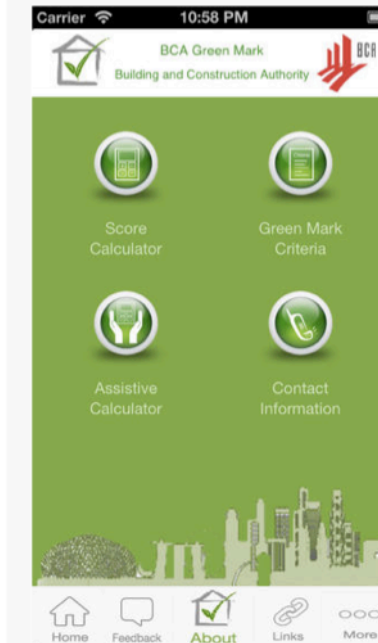
We have not received enough ratings to display an average for the current version of this application.

More iPhone Apps by Building & Construction Authority

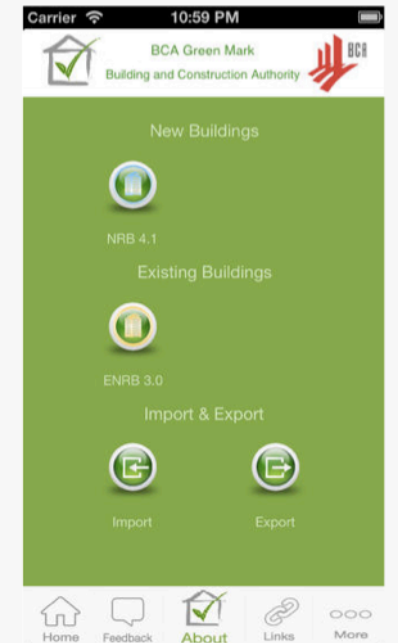


CONQUAS.
[View in iTunes >](#)

iPhone Screenshot



source.: www.greenmark.sg/



Low-threshold Information



BCA Green Mark

Together We Build Our Green Future

About Green Mark | Green Ideas | Knowledge and Resources | News and Events | Competitions | Greco and Beco

ECO-FRIENDLY GREEN BUILDINGS
give positive impact on the environment

MARKET

BCA GREEN MARK

News & Events

5 - 7 September 2014
BCA Green Building Exhibition

1 - 3 September 2014
International Green

What Exactly Is Green Mark?

About Green Mark
The BCA Green Mark Scheme was launched by the Building and Construction Authority

Green Mark Building Directory

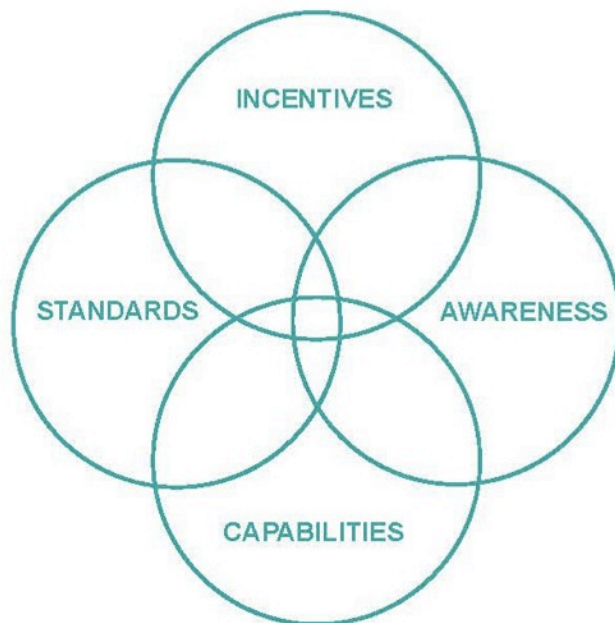
Please enter building name

Search All Project Listings

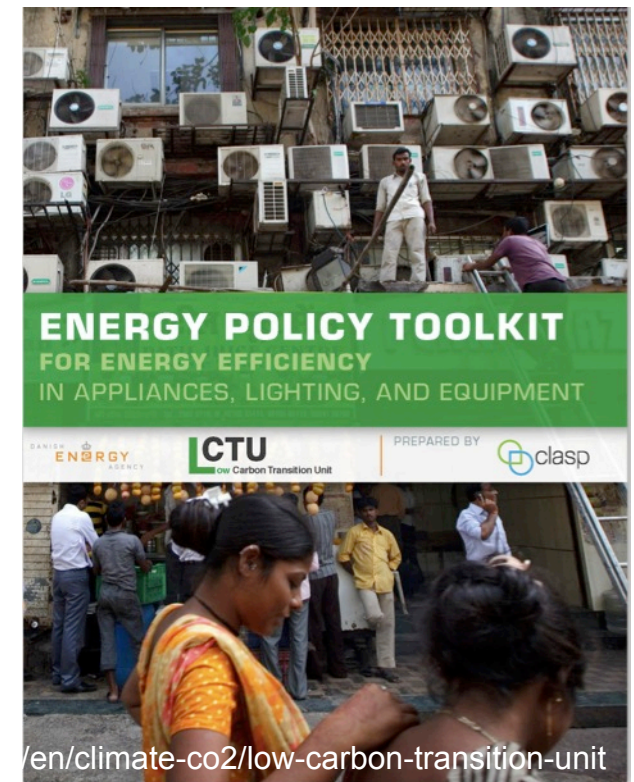
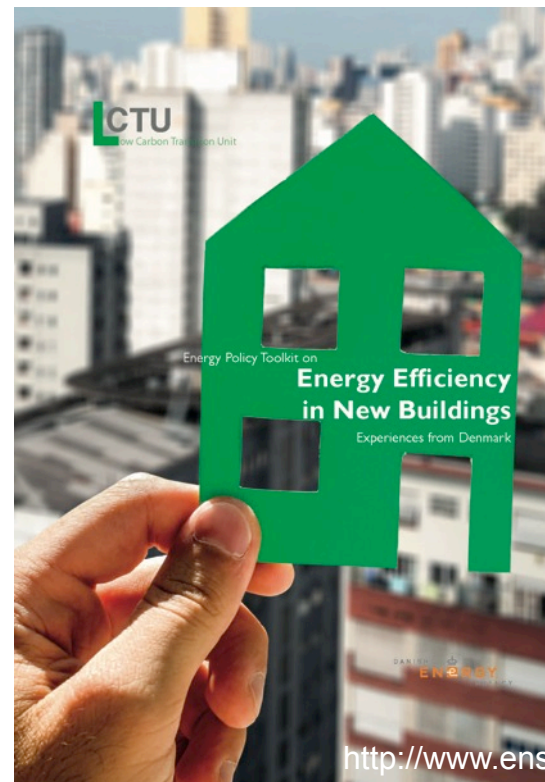
source.: www.greenmark.sg/

Implementation Process

- Regulations
- Financial drivers
- Information and awareness
- Key messages

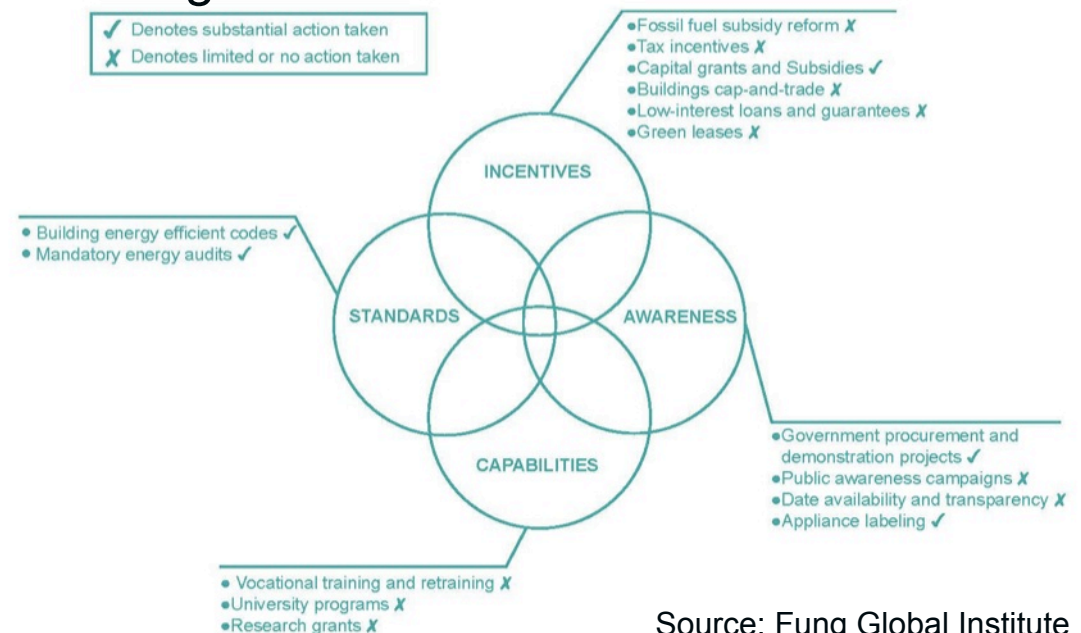


Source: Fung Global Institute



Barriers to scale and action

- Misalignment of costs and benefits between stakeholders
- Weakened financial incentives due to subsidized prices
- High costs of financing
- Insufficient awareness of costs and benefits
- Organizational inertia
- Lack of technical know-how and labour shortage



Action Framework for Hongkong

Source: Fung Global Institute

Hochschule Ostwestfalen-Lippe
University of Applied Sciences

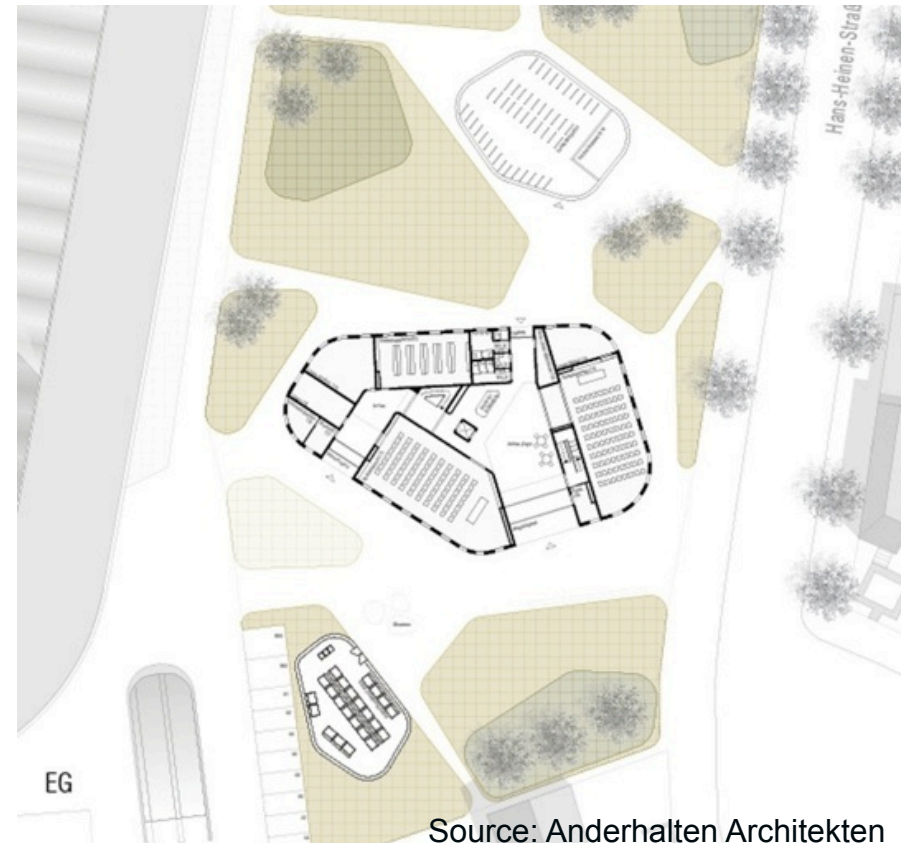
Case Studies from West and East



Headquarter Federal Environmental Agency (UBA)

Sauerbruch-Hutton Architects \ Berlin \ 2006 + Anderhalten Architects \ Berlin \ 2015

Headquarter and plus-energy-extension in Dessau, Germany 2006 / 2012



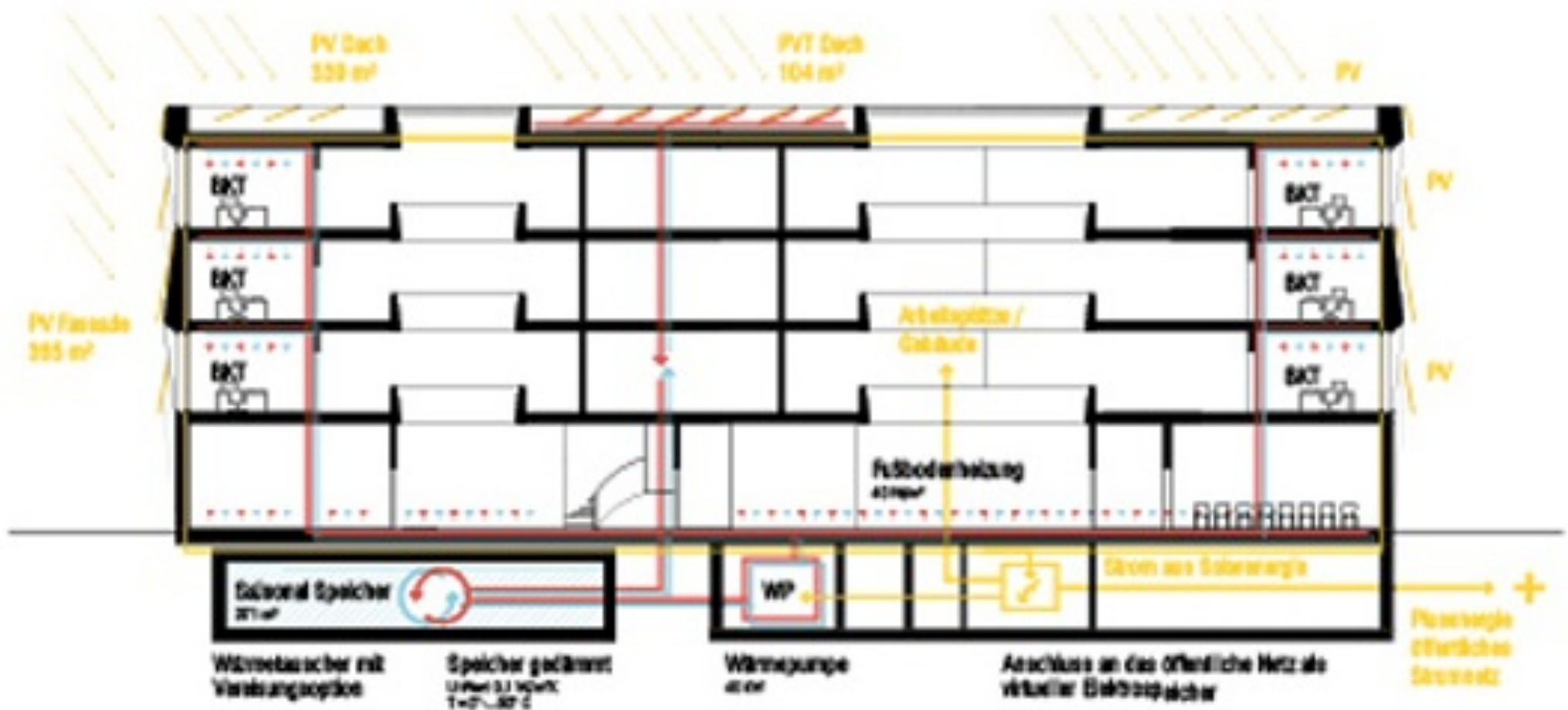
Source: Anderhalten Architekten



www.anderhalten.com

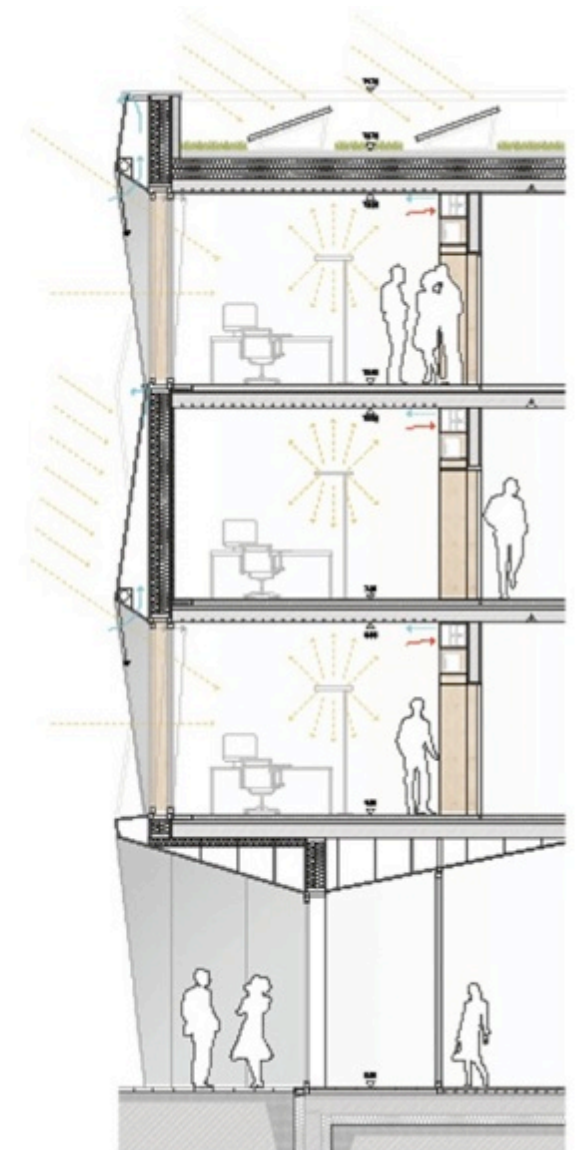
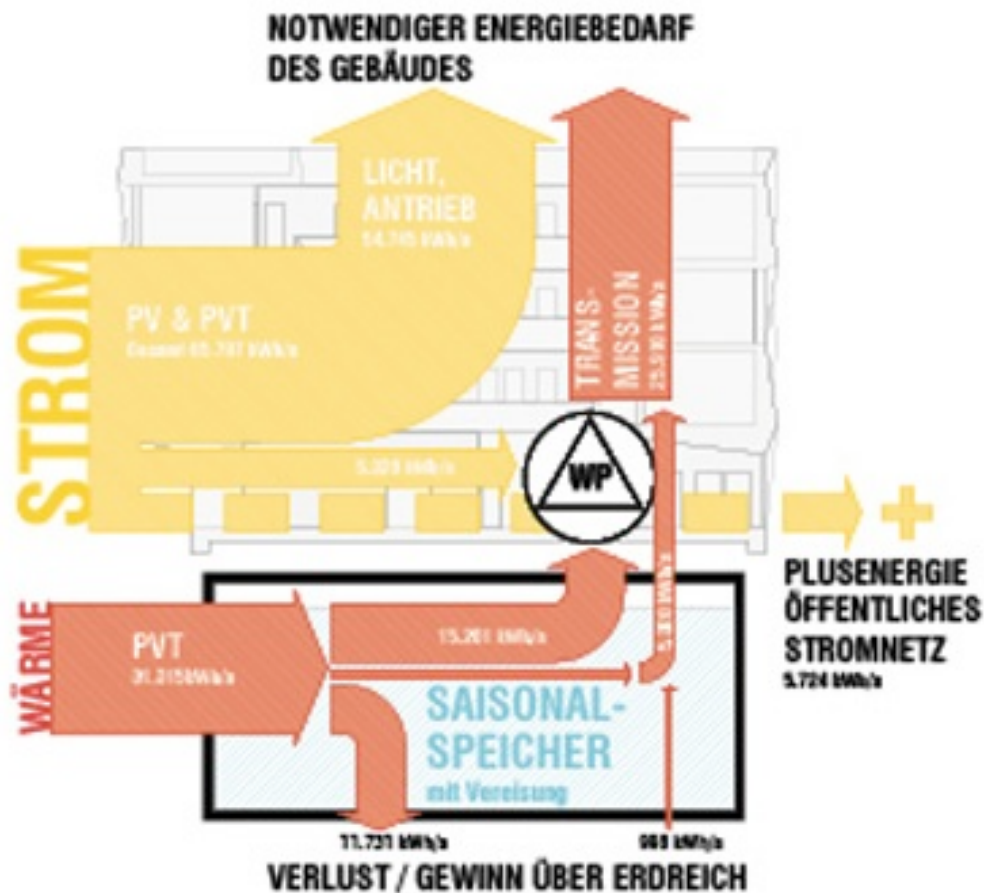
Source: Anderhalten Architekten

Plus-Energy-Building for UBA Dessau



Source: Anderhalten Architekten

Plus-Energy-Extension to UBA



Source: Anderhalten Architekten

2226 \ Lochau \ be baumschlager eberle

No cooling, no heating, outer cavity wall 2 x 36 cm bricks



2226 \ Lochau \ be baumschlager eberle

The human being is the only disruptive factor in the energy balance from an ideal world.



© Eduard Hueber

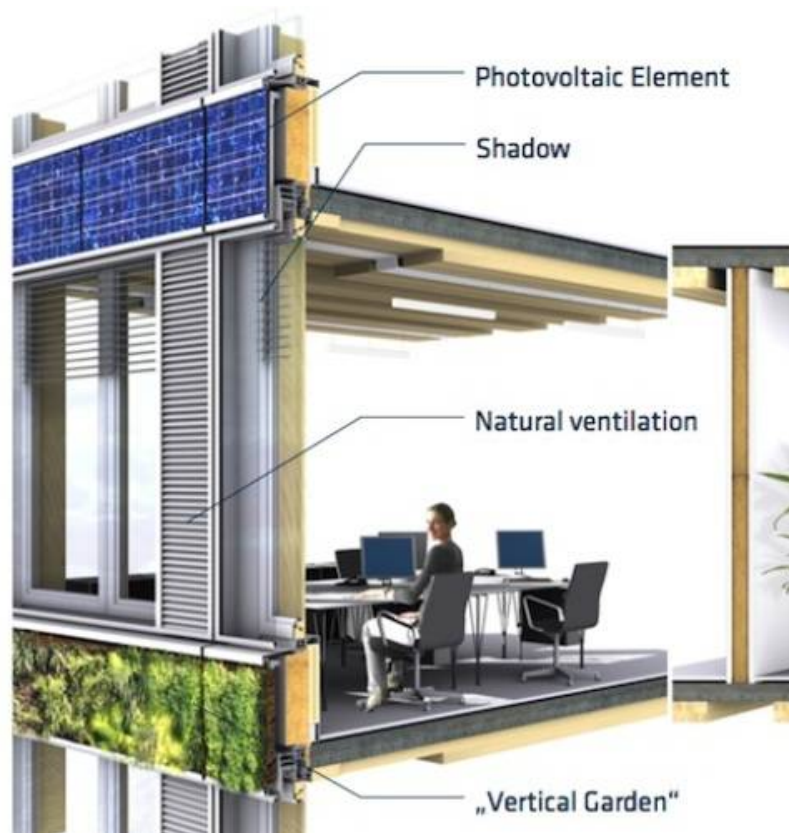
Life Cycle Tower One \ Dornbirn \ Herm. Kaufmann

First Hybrid Sky-Skraper with reduced glass-wall-ratio out of prefabricated elements



Life Cycle Tower One \ Dornbirn \ Herm. Kaufmann

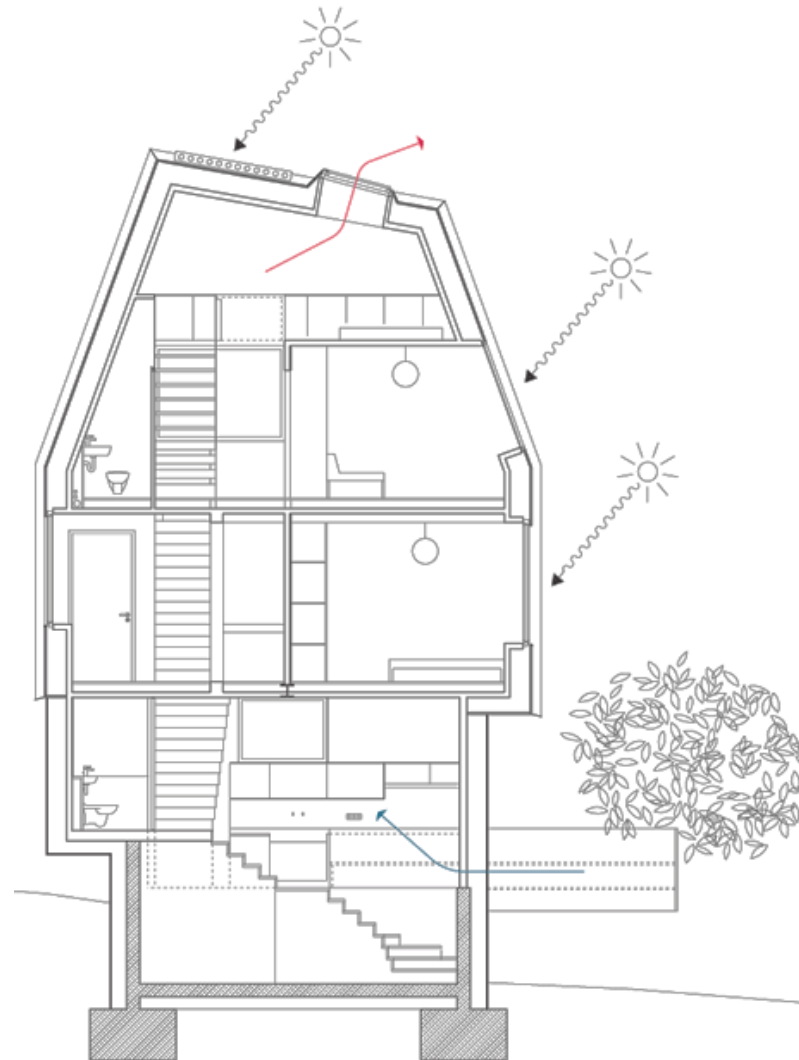
Wooden Construction from local materials and energy production.



Sunlighthouse \ Vienna \ Hein-Troy Architects



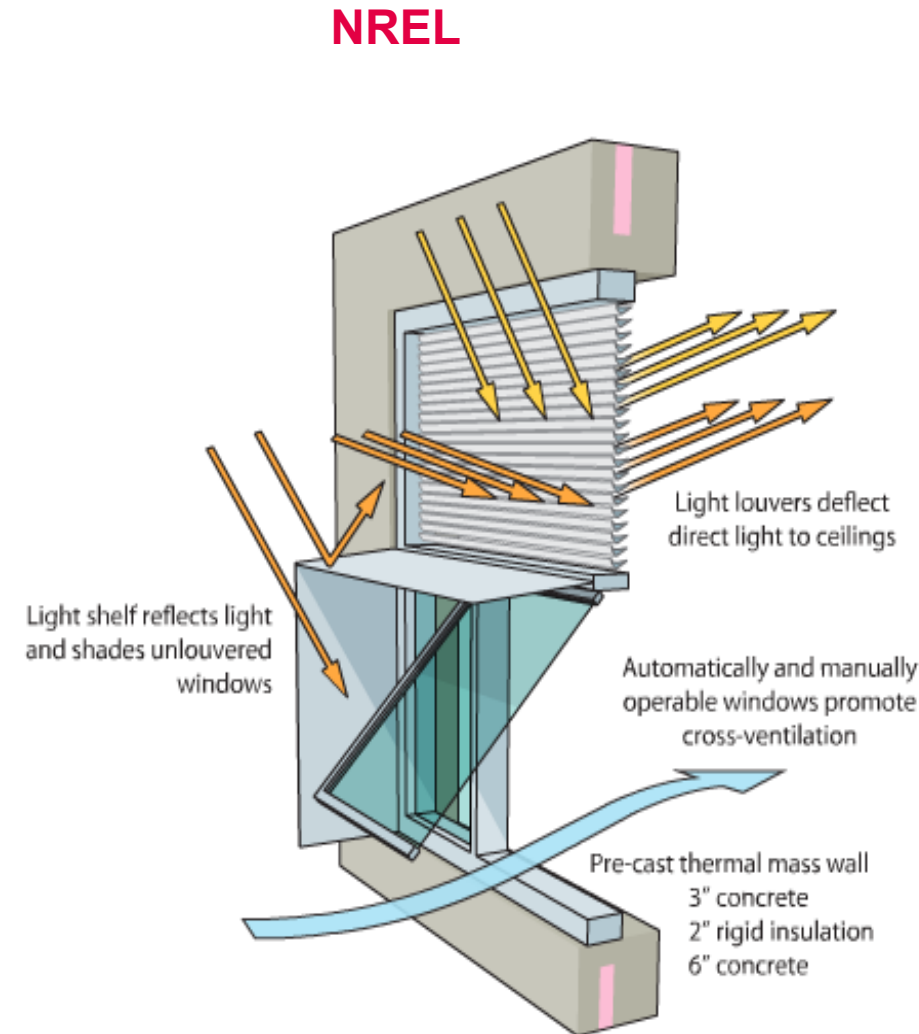
Just K \ Tübingen \ Martenson Nagel and Theissen



Source: www.dezeen.com

NREL – National Renewal Energy Laboratory \ Colorado

New Building Components: South Facing Windows



NZE: Monte Rosa Hut \ Zermatt \ ETH Zürich

- 120 beds, 90% general energy autarky,
- 70% cooking energy autarky,
- Aluminium envelope with PV production south,
- Solar thermal collectors for warm water,
- Melting water for toilets and showers



Farming Kindergarten \ Dong Nai \ Vo Trong Nghia

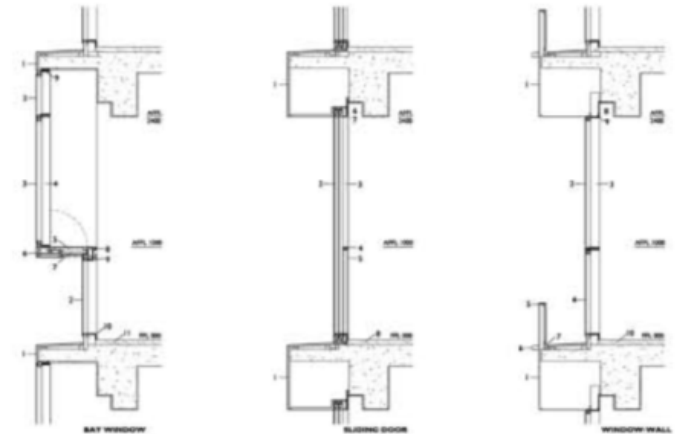


Source: www.archdaily.com

No 1 Moulmein Rise \ Singapore \ WOHA



Monsoon window as traditional feature



www.akdn.org

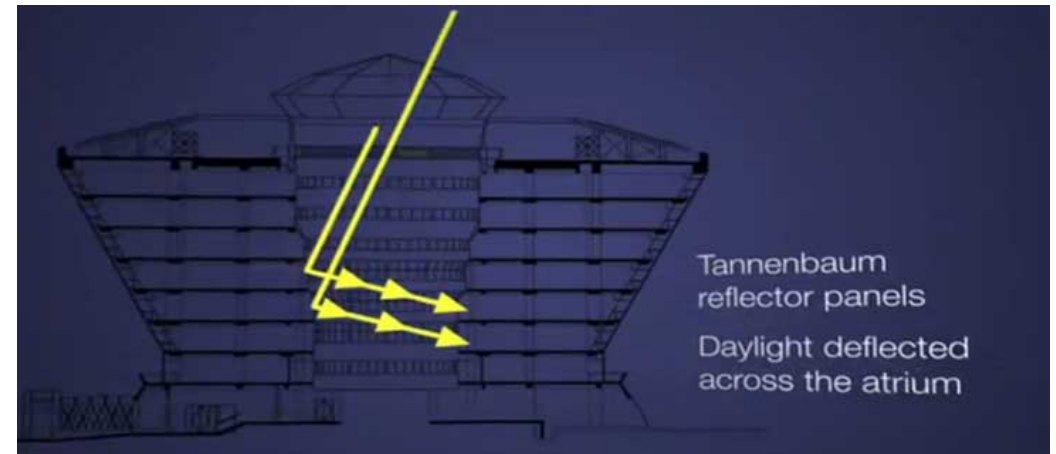
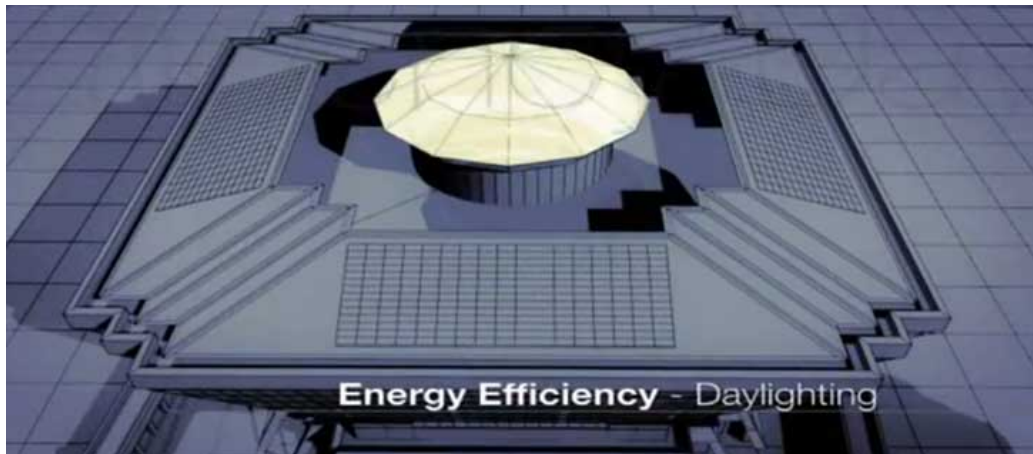
Diamond Building \ Kuala Lumpur \ NR Architects

ASEAN Energy Award 2012 – New Building



Credit: Energy Commission of Malaysia

Diamond Building \ Kuala Lumpur \ NR Architects



ASEAN Award \ Singapore \ Mall + Hotel

ASEAN Energy Award 2012 and 2013 – Refurbishment



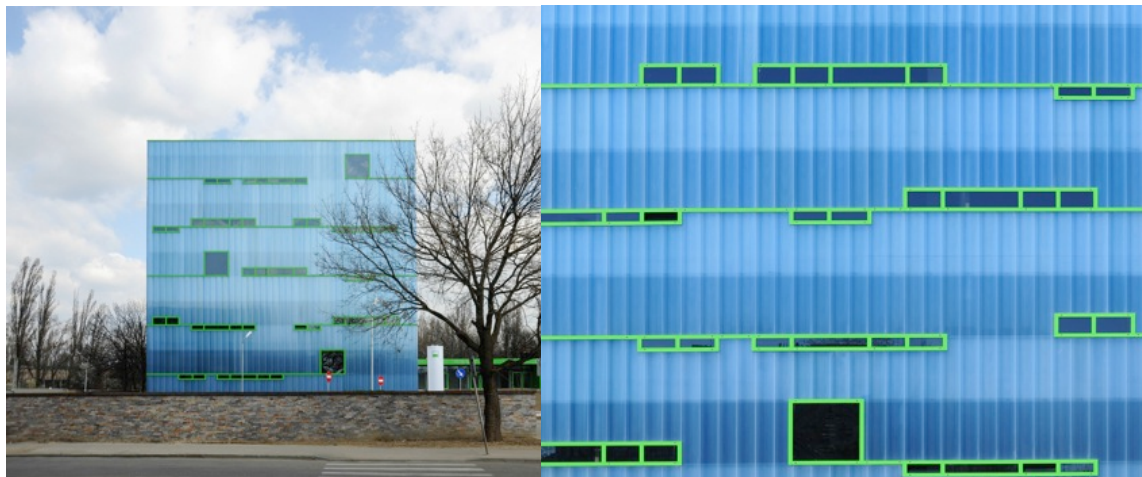
Close Cavity + Insulation \ material driven factors



Kinetic + 3D Shapeability \ function driven factors



Translucency + Textile \ design driven factors



Education. Information. Dissemination.



CONSIDER
REUSING GREY WATER



TURN OFF ALL
EQUIPMENTS WHEN
NOT IN USE



USE AIR CONDITIONERS
SPARINGLY

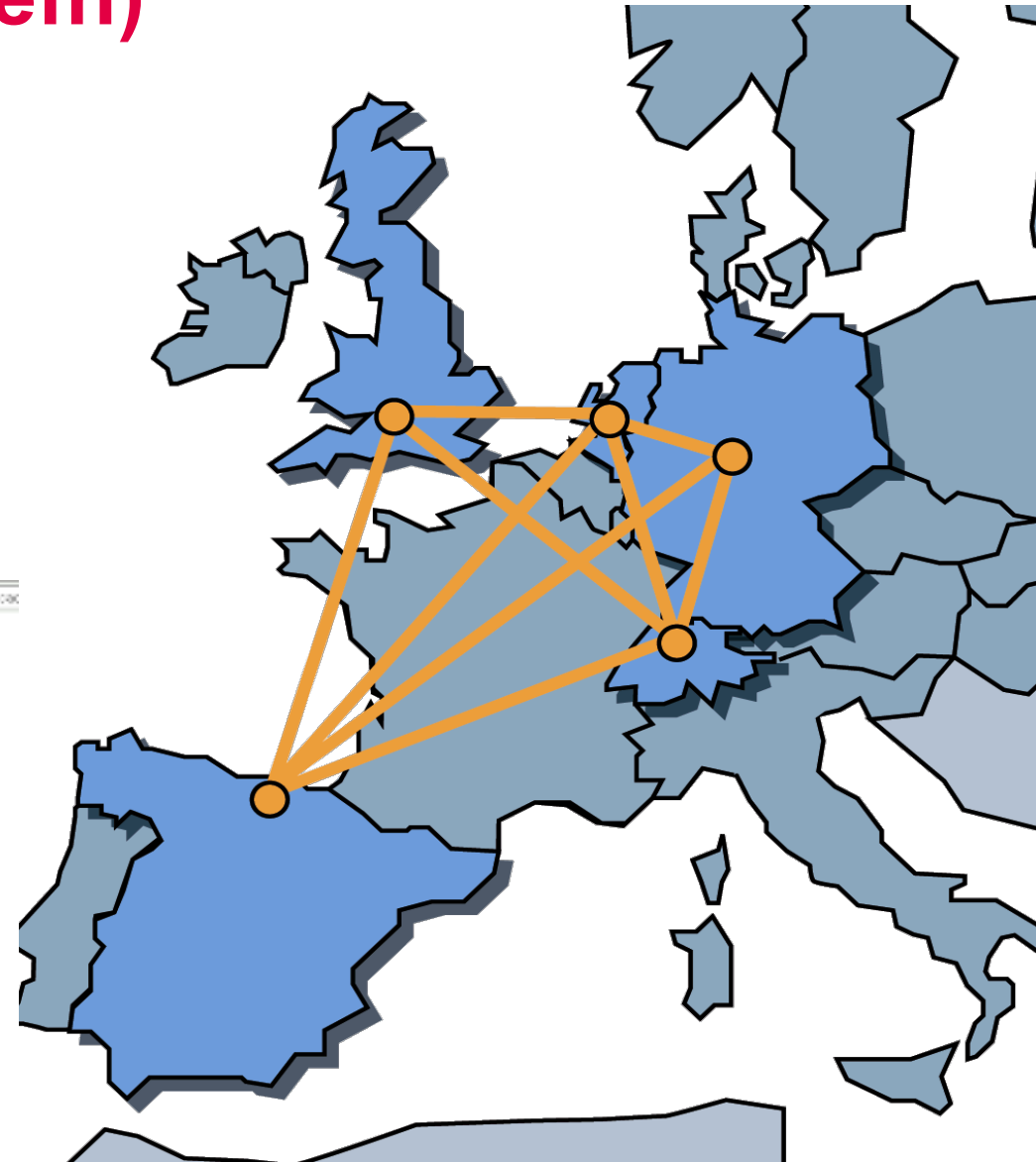


PLAN YOUR HOUSE
FOR VENTILATION
& NATURAL LIGHTING

European Facade Network (efn)

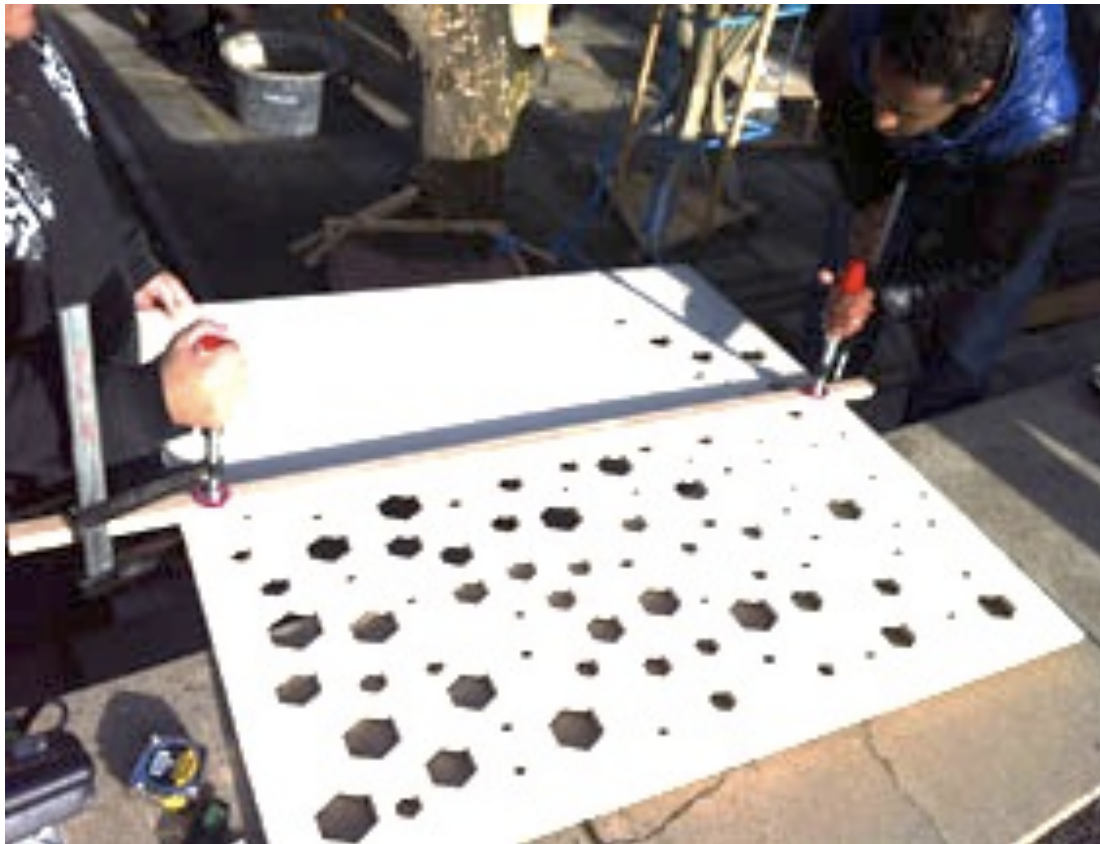
Hochschule OWL, Detmold
TU Delft
Hochschule Luzern
Universidad San Sebastian
University of Bath

<http://facades.ning.com/>



EfnMOBILE 2013-15

Mockup 2013: Green + Generating Energy



Source: HS OWL

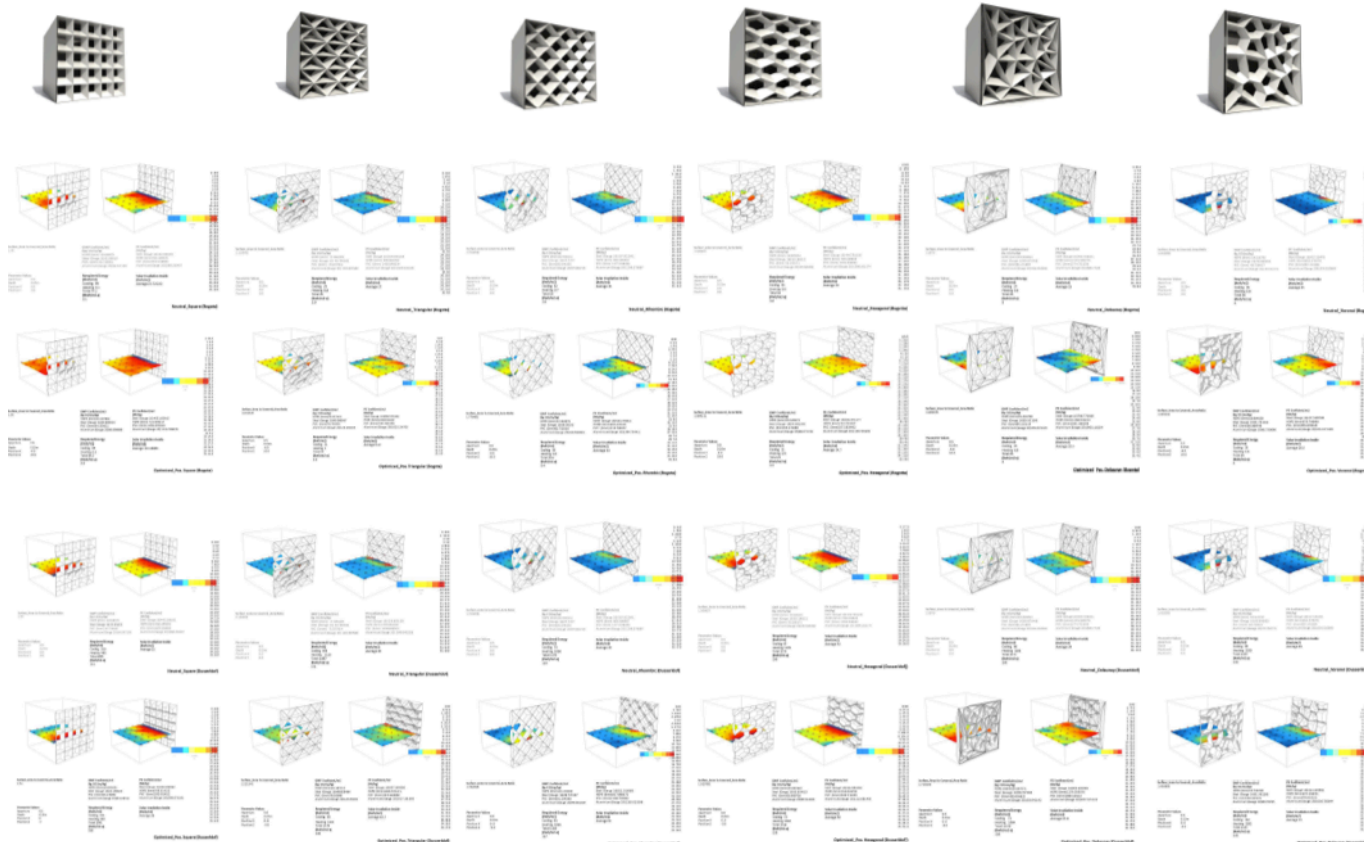
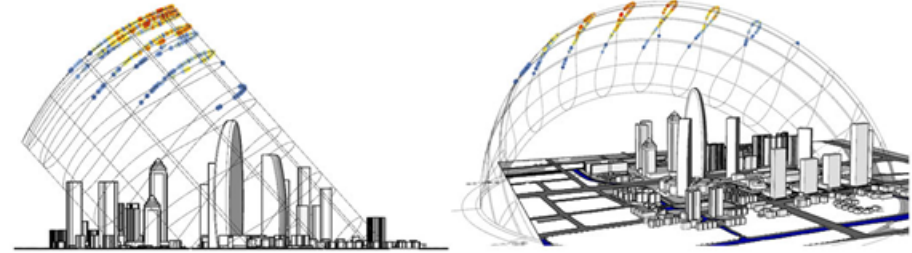
EfnMOBILE at Glasstec 2014



Source: HS OWL

Thinking Skins – PhD Jens Böke

Optimization towards Requirements: *Solar shading*



Source: Jens Böke

IGBC School Competition 2012: DCRUSTM - HSOWL

Viktoria Kauffeld, Hochschule OWL



Source: HS OWL

IGBC School Competition 2012: DCRUSTM - HSOWL

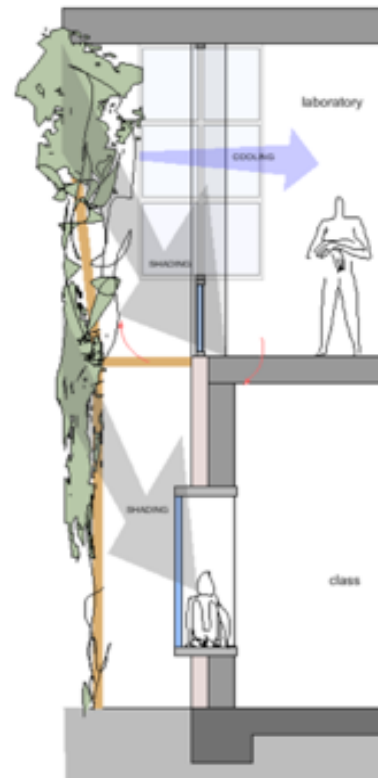
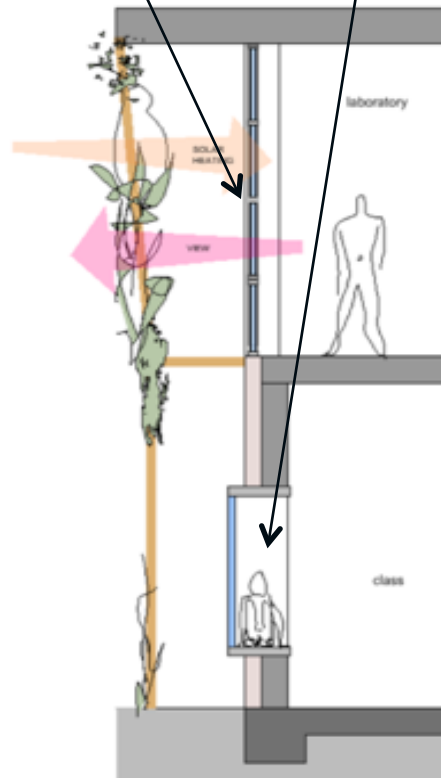
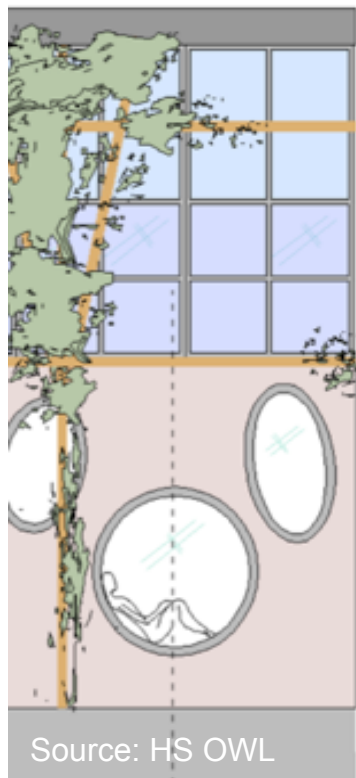
Double glazing,
rotatable

Plastic bottle facade
with lounge windows

Functional Principle

Winter

Summer



- 2nd floor: enveloping structure of twining plants provides a microclimate for the inhabitants through shading and evaporation
- 1st floor: facade made of bottles, packed with sand, placed on their side and stacked up, and bound together with cement



Source: HS OWL

Be a Smart User and Activist

Sources

<http://www.usgbc.org/leed>

<http://www.dgnb.de/de/>

<http://www.greenmark.sg/>

www.gbcindonesia.org

<http://www.greenshiphomes.org/>

<http://www.ens.dk/en/climate-co2/low-carbon-transition-unit>

<http://www.aseanenergy.org/index.php/publication/2013/03/28/aea-2012-02>

<http://www.hs-owl.de/creed/events/>

www.hs-owl.de/creed/events/investigation/



Source: HS OWL_NID Bangalore