

# Stepping up R&D efforts in Green Building for the Tropics

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9 Jan 2013

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- GMIS Design Prototype
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- Technology Roadmap on Building Energy Efficiency

# 2<sup>nd</sup> Green Building Masterplan



*6 Strategic Thrusts*

*3 Development Areas*

*(New Buildings, **Existing Buildings**, Beyond Buildings)*

# Pushing Green Building through R&D

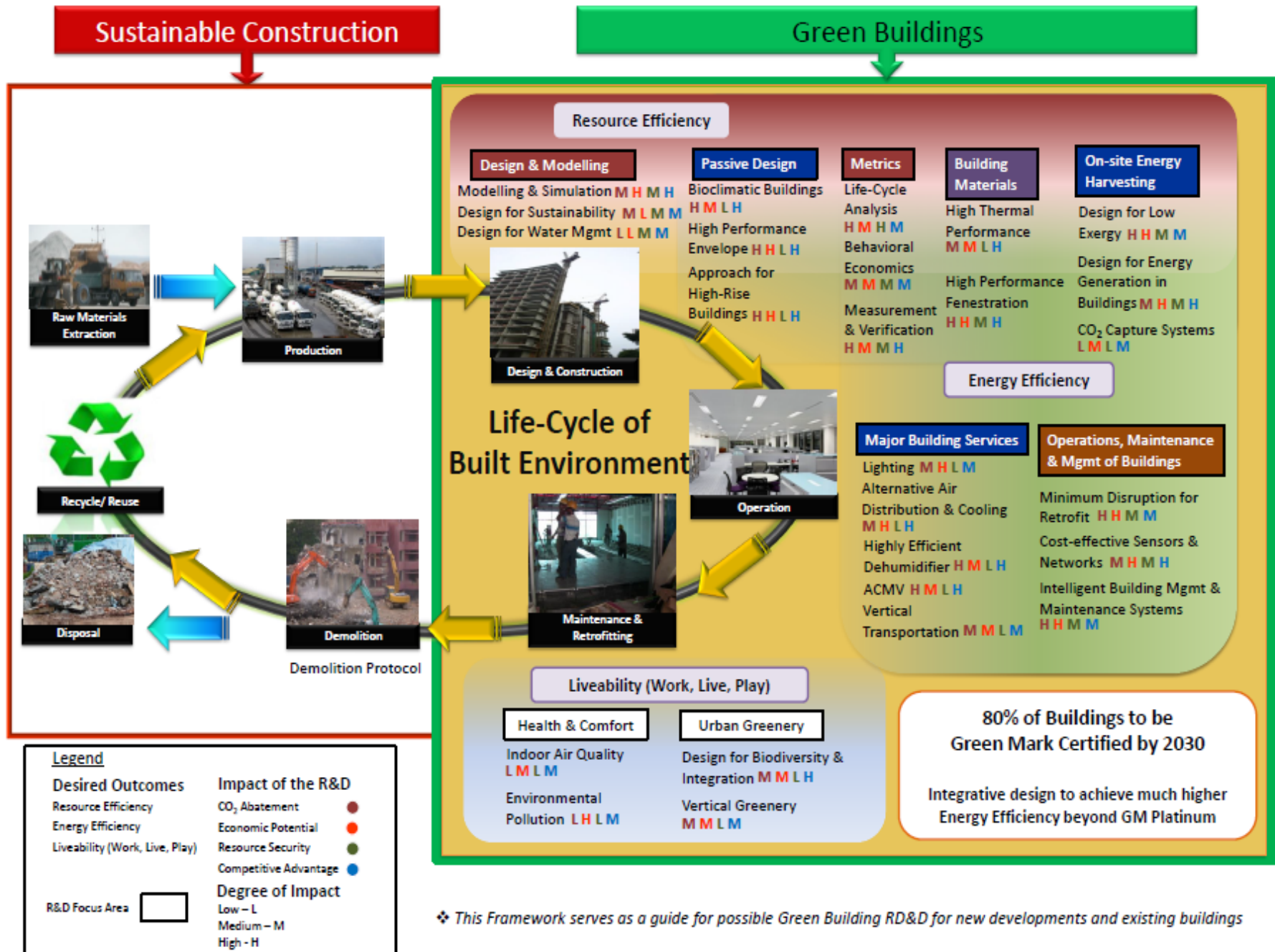


- Funding schemes
- R&D platform
- Roadmap to the future

## Overall Energy Efficiency Target

**35%** reduction in Energy Intensity by 2030 from 2005 levels

# Green Building R&D Framework (over the next 5 years)



# 1<sup>st</sup> A\*STAR-MND Joint Grant Call

- Broad base, focusing on **Energy Efficiency** and **Building Materials**

- **9** proposals awarded out of **53** joint proposals from industry and Public Research Institutions

**Awarded**

Research Institutes



Industry



# 2<sup>nd</sup> A\*STAR-MND Joint Grant Call

Objective: To develop high performance building facade materials that are cost-effective, durable and can be adopted by industry in 5 years time.

## Partnership



## Features

- More focused and thematic approach
- Direct towards solving challenges faced by industry
- Public-Private Partnership Model
- Industry to partner Research Community
- Commitment from industry : Matching contributions for the funding awarded

**On-going**

# Possible Subsequent RFPs

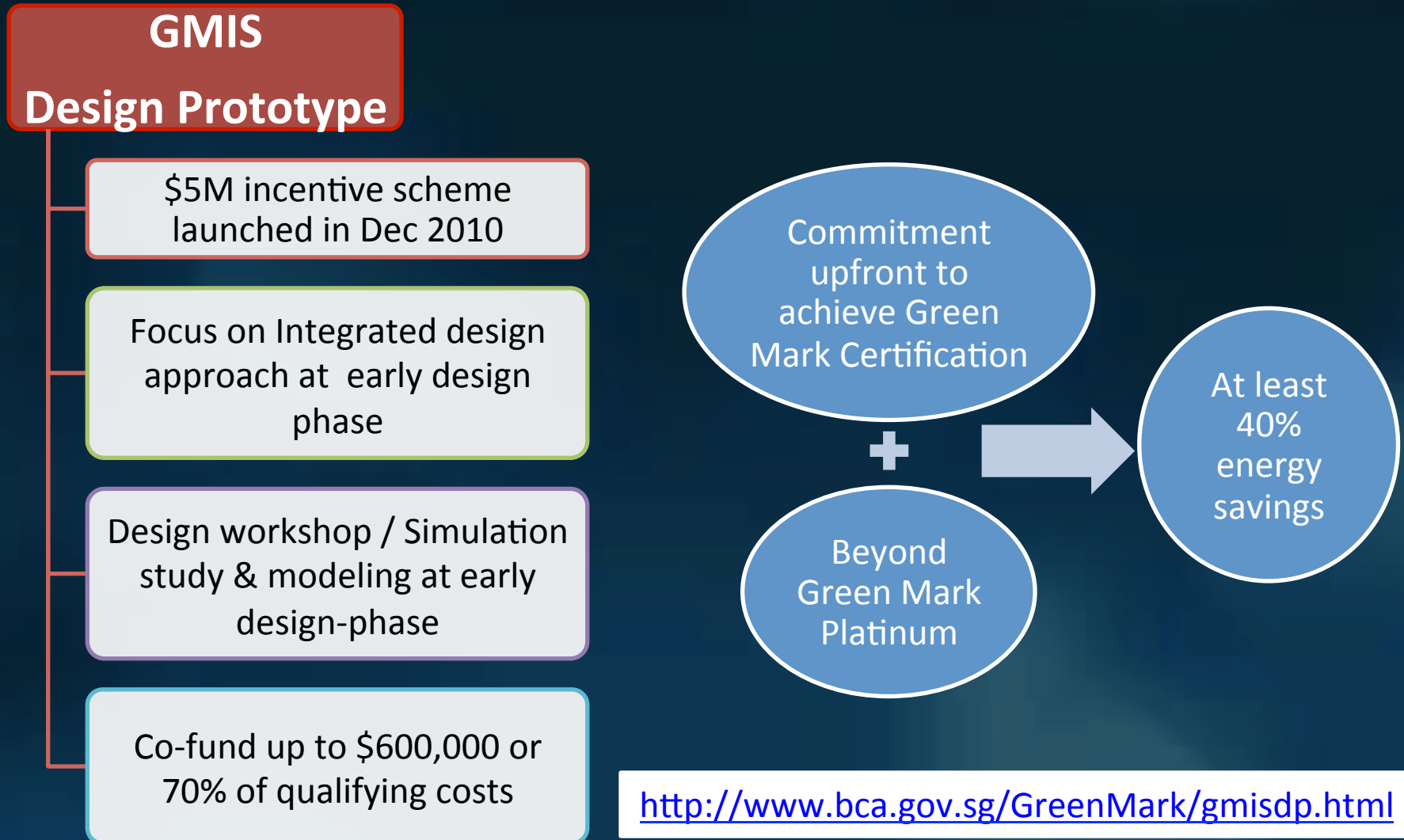
Year		
2011	Building Materials/ Energy Efficient Solutions (A*STAR-MND Joint Grant Call) (Awarded Jan 2012)	
2012 - 2013	Building Façade Materials (A*STAR-MND Joint Grant Call) (On-going)	Energy Efficient Solutions for Building Retrofits
2013 - 2014	Design Simulation/ Metrics	Energy Efficient Solutions for Building Retrofits
2015 - 2016	Energy Efficient Solutions for Building Retrofits	Research Areas (Focus to be defined)

Using Green Building R&D Framework as guide



Develop incentive scheme to support adoption of innovative technologies to push boundary..

## GMIS (Design Prototype) Scheme





Jem™

Developer :



ESD Consultants:



# Design Workshop



Energy Retail - Word Map



Developer :



ESD Consultants:



# Clean Tech Two (CTT)



**Developer:**



**ESD Consultants:**



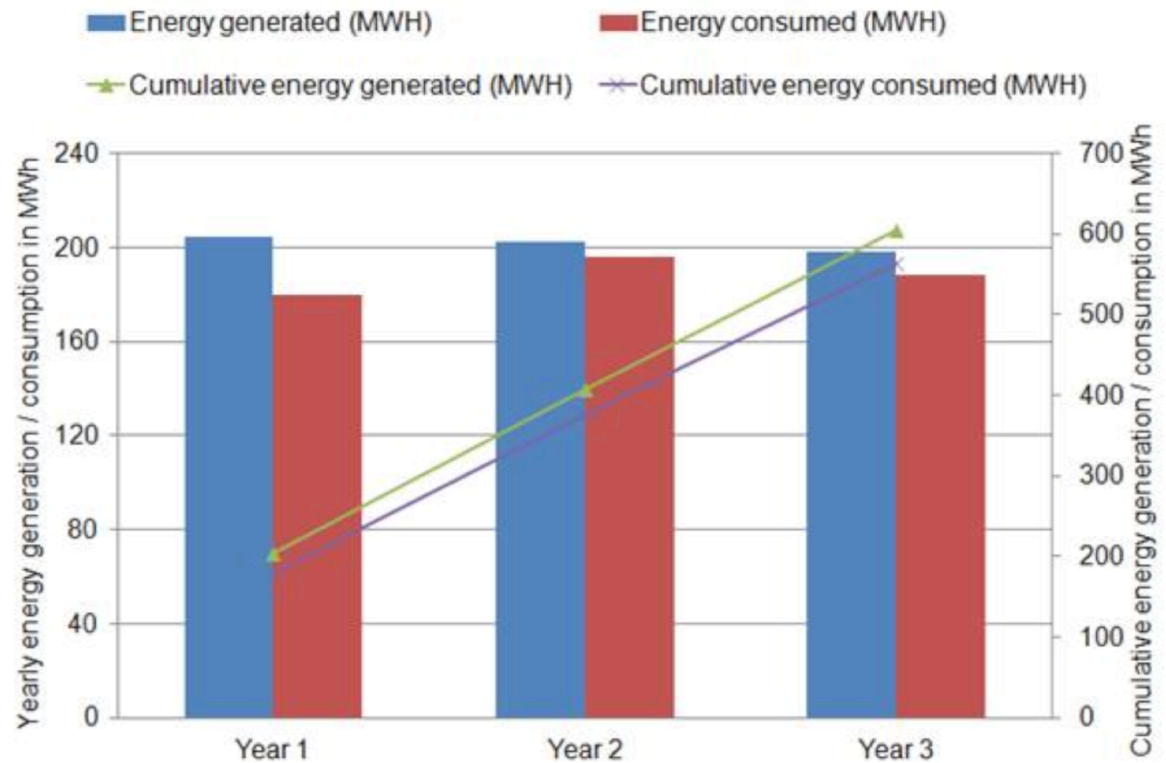
# Zero Energy Building

at BCA Academy

Net positive since October 2009



### Energy Performance of ZEB



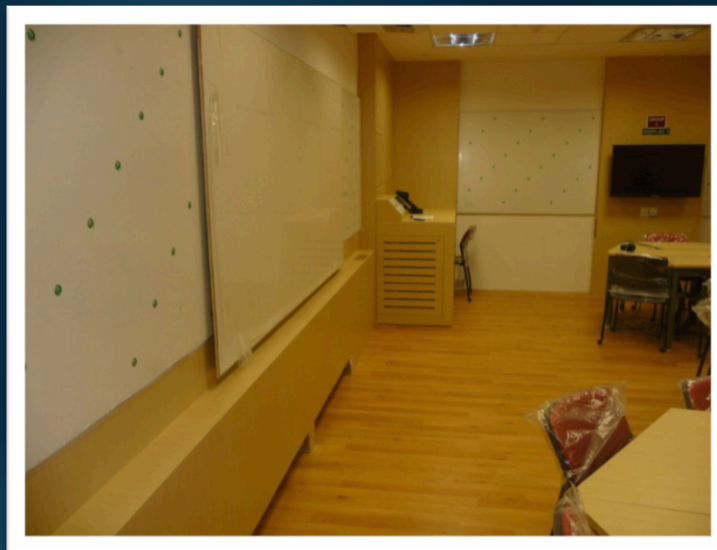
# ZEB - a living lab for green building technology



PDV installation at ZEB

## PDV test-bedding at ZEB

- Thermal comfort measurement
- Smoke test
- Occupant survey
- *Showcase platform*



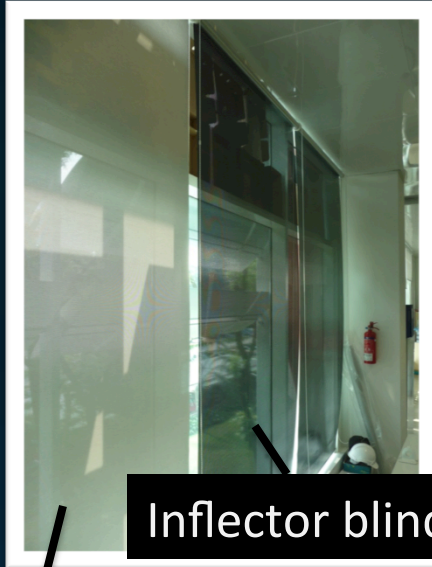
PDV trial at NTU



PDV to be installed in NTU Learning Hub

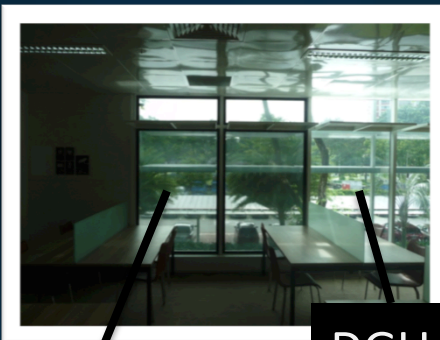
# ZEB - a living lab for green building technology

## Inflector window blind & screen *Under testing*



Inflector blind

Normal blind



Inflector screen

DGU



Inflector screen installed on single glass panes

# ZEB - a living lab for green building technology

## 3M daylight redirecting film

*Under installation*



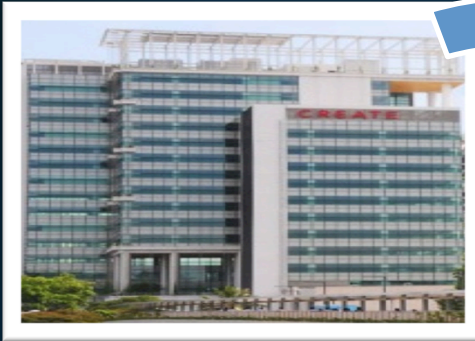
Classroom where 3M film is going to be installed



# ZEB - a living lab for green building technology

## SinBerBEST scaling smart spaces

*3 facilities interconnected*



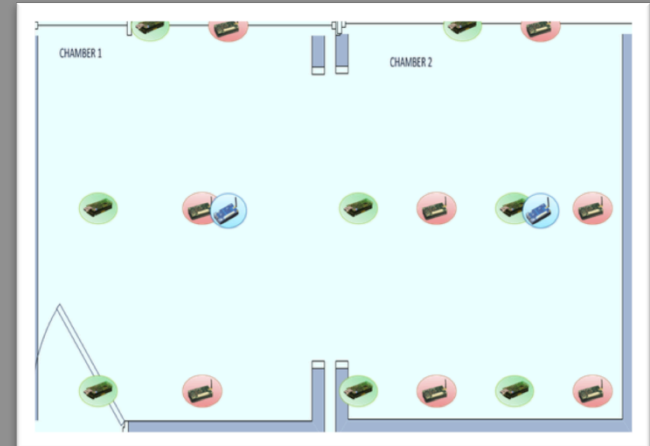
SinBerBEST



ZEB



BubbleZERO

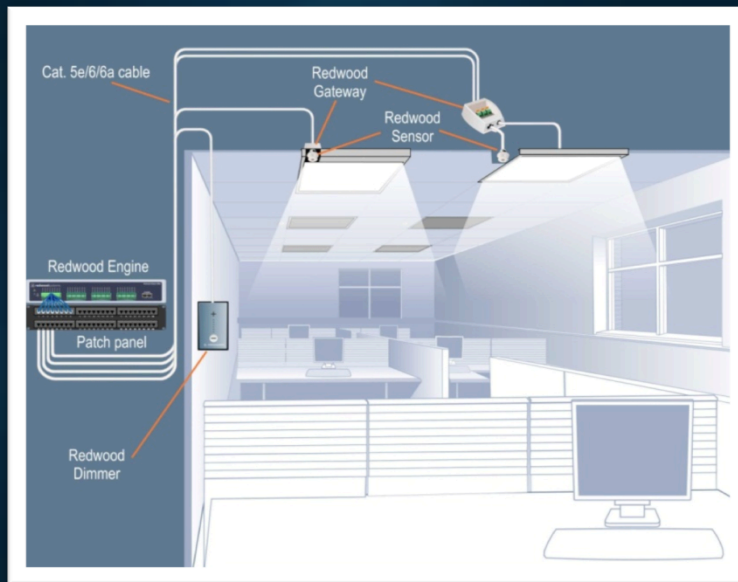


Sensor deployment in the test chambers at ZEB

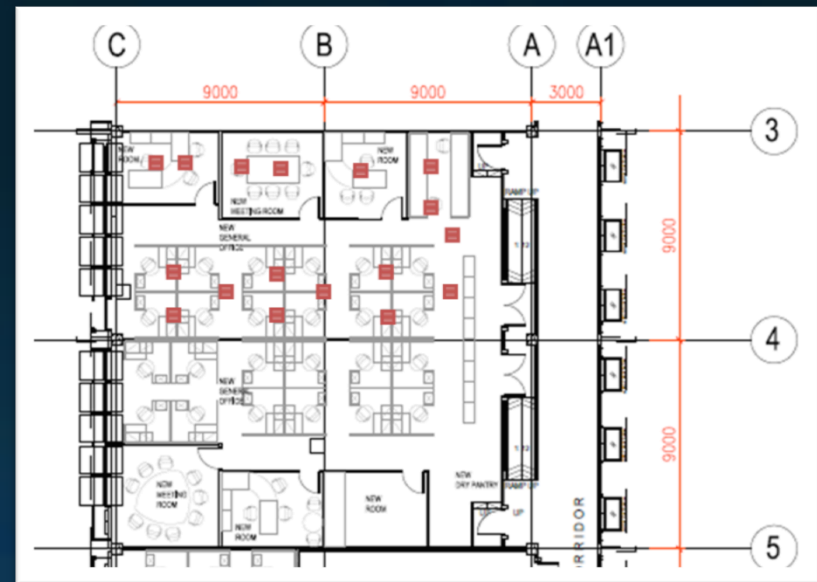
# ZEB - a living lab for green building technology

## Redwood lighting system

*To be installed*

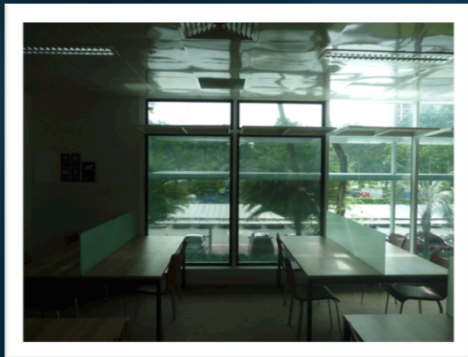


Redwood system for power, control and measurement



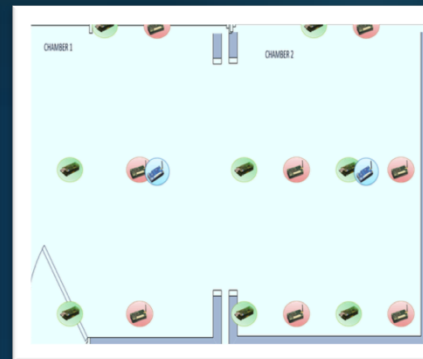
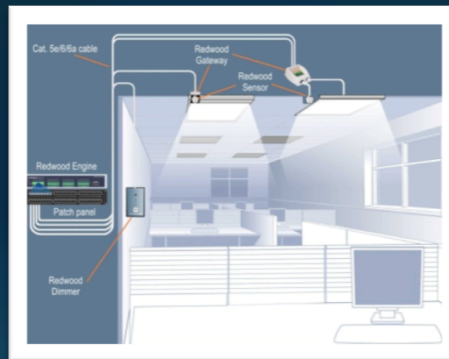
Installation on one side of the office for comparison

# ZEB - a living lab for green building technology



## To become the next

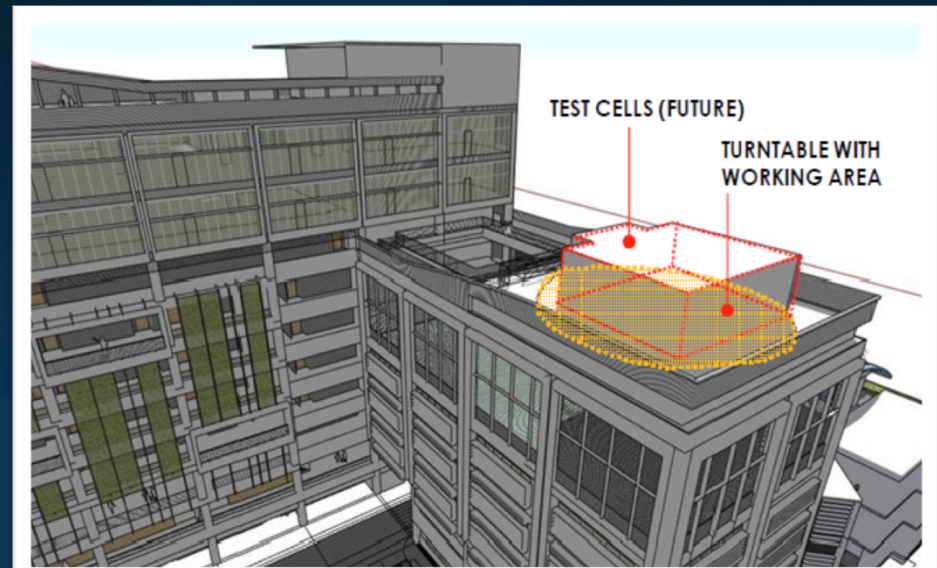
1. Proposal (technology, methodology, cost, timeline)
2. Procurement
3. Installation and testing
4. Report and knowledge share



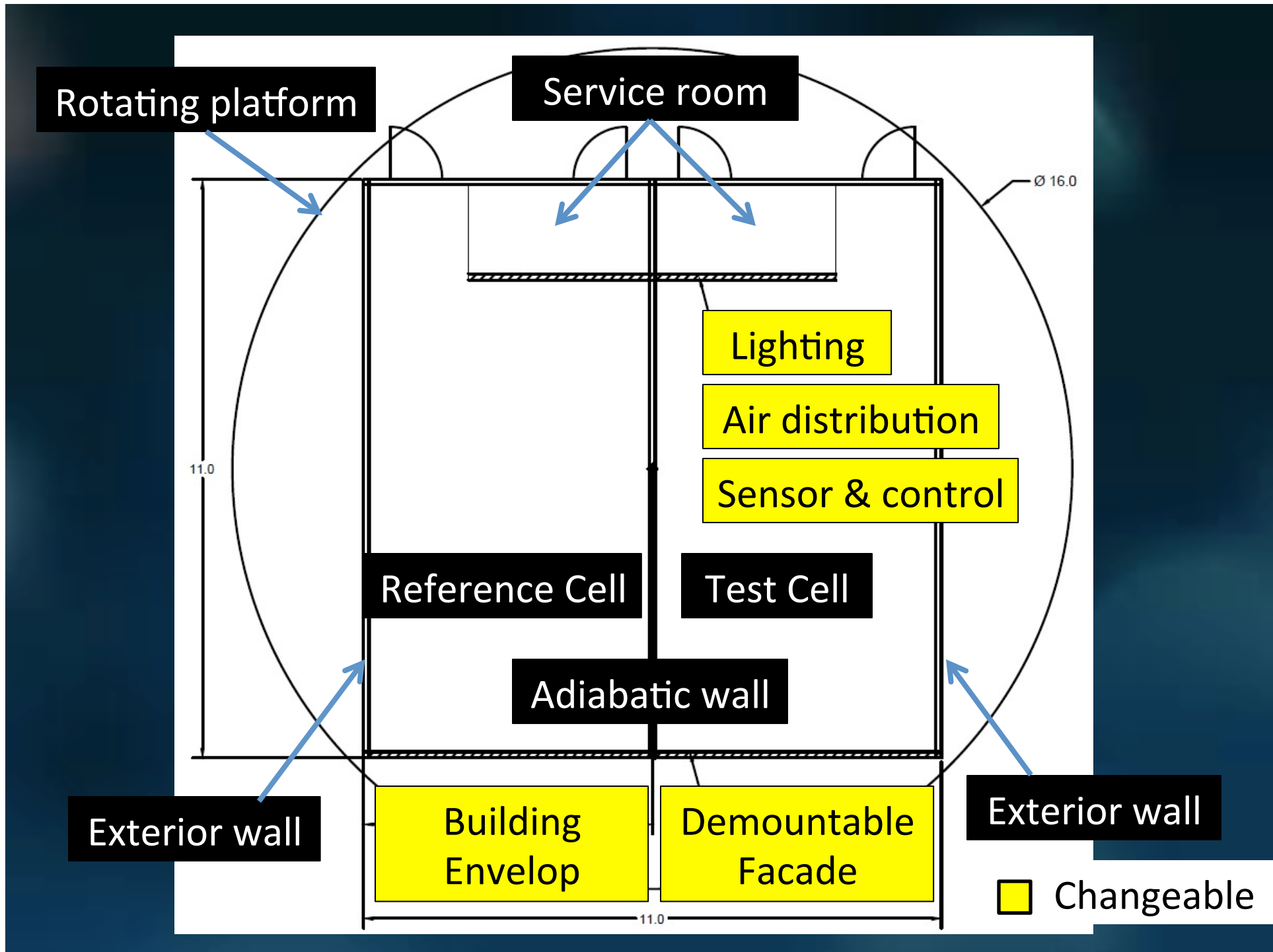
Next?

# BCA User Test Bed Facility (UTBF)

- First of its kind in South-East Asia
- Plug 'n' Play
- Rotating
- Demountable façade
- Office setting



Located on top of the new 6-storey building at BCA Academy



Rotating platform

Service room

$\varnothing 16.0$

Lighting

Air distribution

Sensor & control

11.0

Reference Cell

Test Cell

Adiabatic wall

Exterior wall

Building Envelop

Demountable Facade

Exterior wall

11.0

Changeable

Building  
Envelop

Lighting

Air distribution

Sensor & control


D

Any innovative technology in these areas to test-bed?

RFI (request for information) is open!

Information available on

<b>Activity</b>	<b>Date</b>
<b>Launch of RFI</b>	9 January 2013
<b>Submission of RFI</b>	1 February 2013
<b>Launch of RFP</b>	April 2013
<b>Evaluation and Award of RFP</b>	June 2013
<b>Vendors Support for UTBF</b>	Q3 2013 – Q3 2014
<b>Test-bedding and showcase</b>	Q4 2014 onwards



# Technology Roadmap For Building Energy Efficiency in Singapore

# Vision towards to low or zero energy high-rise buildings

- Chart technology development pathways in order to identify promising technologies best-suited for deployment in Singapore.
- Set challenging targets to spur innovation and R&D at the various milestones.
- Improve the energy efficiency in the current built environment by taking stock of prevailing and emerging green building design techniques and technologies.



First workshop: 4-5 Feb 2013



# Stepping up R&D efforts in Green Building for the Tropics

## R&D funding schemes

- A\*STAR-MND Grand Calls
- GMIS Design Prototype

## Test-bed facilities

- ZEB
- UTBF

## R&D pathway to 2030 and beyond

- Technology Roadmap on Building EE

## Other key dates

- 27-28 June
  - Urban Sustainability R&D Congress
- 9-13 Sep
  - Singapore Green Building Week  
/ World Engineers Summit

