CUNDALL

Green Buildings or Green Wash

Wojtek Stec
May 12

Steps to low carbon
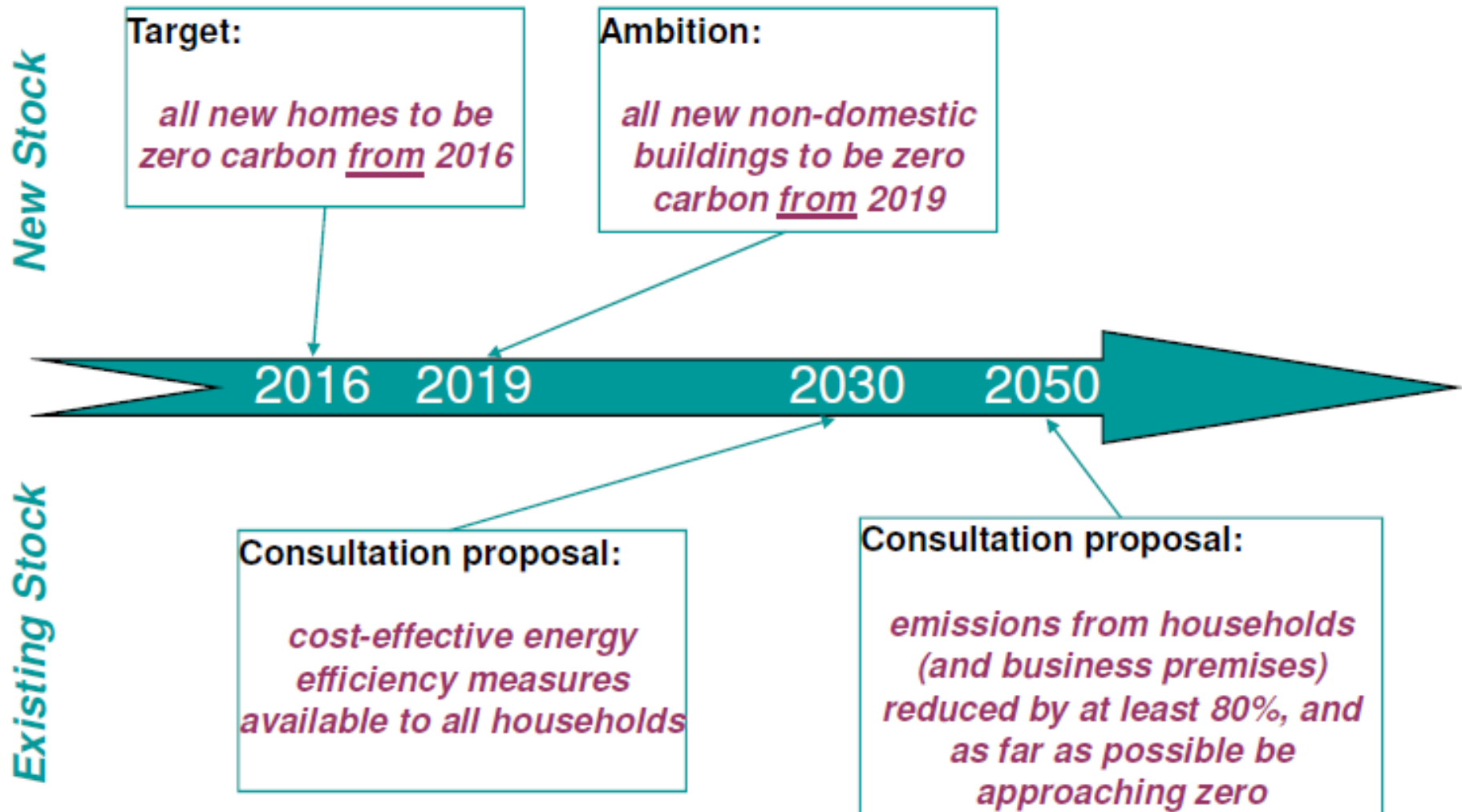
CUNDALL

Design Criteria	Comfort criteria, lighting levels, fresh air quantity, operating hours
Passive Design	Form: daylight & natural ventilation Fabric: insulation, facade, thermal mass
Internal Loads	Lighting & Equipment (W/m2) Controls – turn off
Energy Efficiency	Heating, cooling & ventilation systems Control strategy
Heat Recovery	Air to air, waste heat from chillers Aquifer Thermal Storage
On-site renewables	biomass, geothermal, solar, wind
Off-site	Green power Invest in off-site renewables?

Impact of Legislation / Technology / Human Factor

CUNDALL

Category	Details	Impact
Design Criteria	Comfort criteria, lighting levels, fresh air quantity, operating hours	**Human Factor**
Passive Design	Form: daylight & natural ventilation Fabric: insulation, facade, thermal mass	**Technology/ Human Factor**
Internal Loads	Lighting & Equipment (W/m2) Controls – turn off	**Technology/ Human Factor**
Energy Efficiency	Heating, cooling & ventilation systems Control strategy	**Technology**
Heat Recovery	Air to air, waste heat from chillers Aquifer Thermal Storage	**Technology**
On-site renewables	biomass, geothermal, solar, wind	**Technology**
Off-site	Green power Invest in off-site renewables?	**Technology**

Legislation

LEGISLATION - UK targets

CUNDALL

Legislation – Green Buildings

- EPC / DEC – Compares the energy performance of the buildings

- Carbon Reduction Commitment - Compares the energy performance of the corporations

- Part L – Sets Limits on CO2 emissions

- Planning - Impose the application of renewable technologies

- Feed-in tariffs & RHI - Pay for the generated energy

- BREEAM - Conservation of energy / water / materials etc.

CUNDALL

- EPC / DEC
  - Big differences between EPC and DEC

- Part-L
  - Not all energy saving solutions included

- Planning requirements
  - Not always driven by practicality

No Guidance on less restrictive Comfort criteria

Impact of Legislation / Technology / Human Factors

CUNDALL

Category	Description		Impact
Design Criteria	Comfort criteria, lighting levels, fresh air quantity, operating hours	Legislation	**Human Factor**
Passive Design	Form: daylight & natural ventilation Fabric: insulation, facade, thermal mass		**Technology/** Human Factor
Internal Loads	Lighting & Equipment (W/m2) Controls – turn off		**Technology/** Human Factor
Energy Efficiency	Heating, cooling & ventilation systems Control strategy		**Technology**
Heat Recovery	Air to air, waste heat from chillers Aquifer Thermal Storage		**Technology**
On-site renewables	biomass, geothermal, solar, wind		**Technology**
Off-site	Green power Invest in off-site renewables?		**Technology**

CUNDALL

- **Simplifications in applications**
  - **Wind turbines in urban environment**

  - **Natural Ventilation (Schools)**

Impact of Legislation / Technology / Social awarness

CUNDALL

Design Criteria	Comfort criteria, lighting levels, fresh air quantity, operating hours	**Human Factor**
Passive Design	Form: daylight & natural ventilation Fabric: insulation, facade, thermal mass	**Technology/** Human Factor
Internal Loads	Lighting & Equipment (W/m2) Controls – turn off	**Technology/** Human Factor
Energy Efficiency	Heating, cooling & ventilation systems Control strategy	**Technology**
Heat Recovery	Air to air, waste heat from chillers Aquifer Thermal Storage	**Technology**
On-site renewables	biomass, geothermal, solar, wind	**Technology**
Off-site	Green power Invest in off-site renewables?	**Technology**

Legislation

CUNDALL

Passive measures

CUNDALL

Control system

Exposed heavy mass

Passive stack

High level (motorised)

Windows openings

Low level (manual)

Solar protection

Building insulation

Dimensions
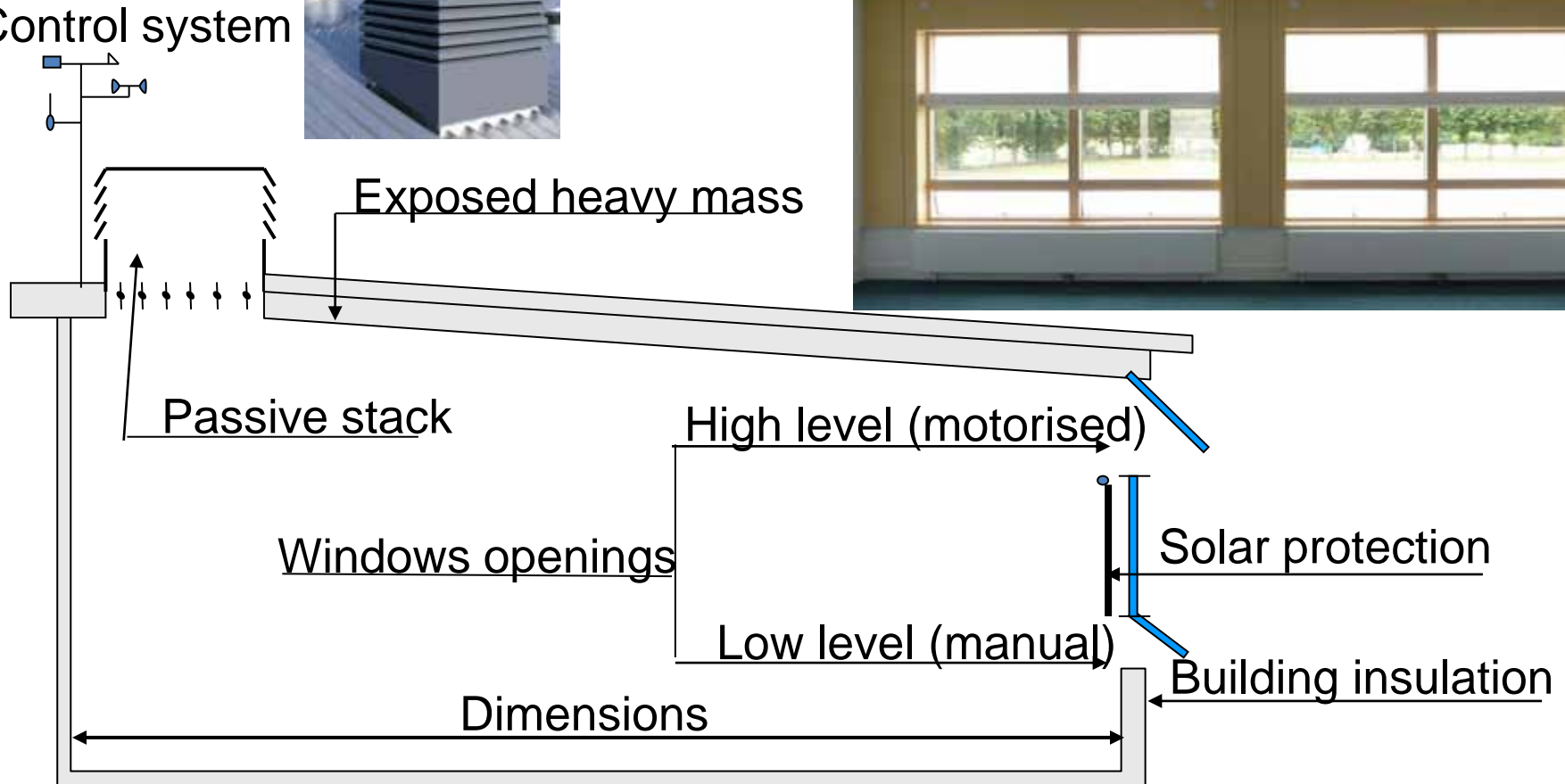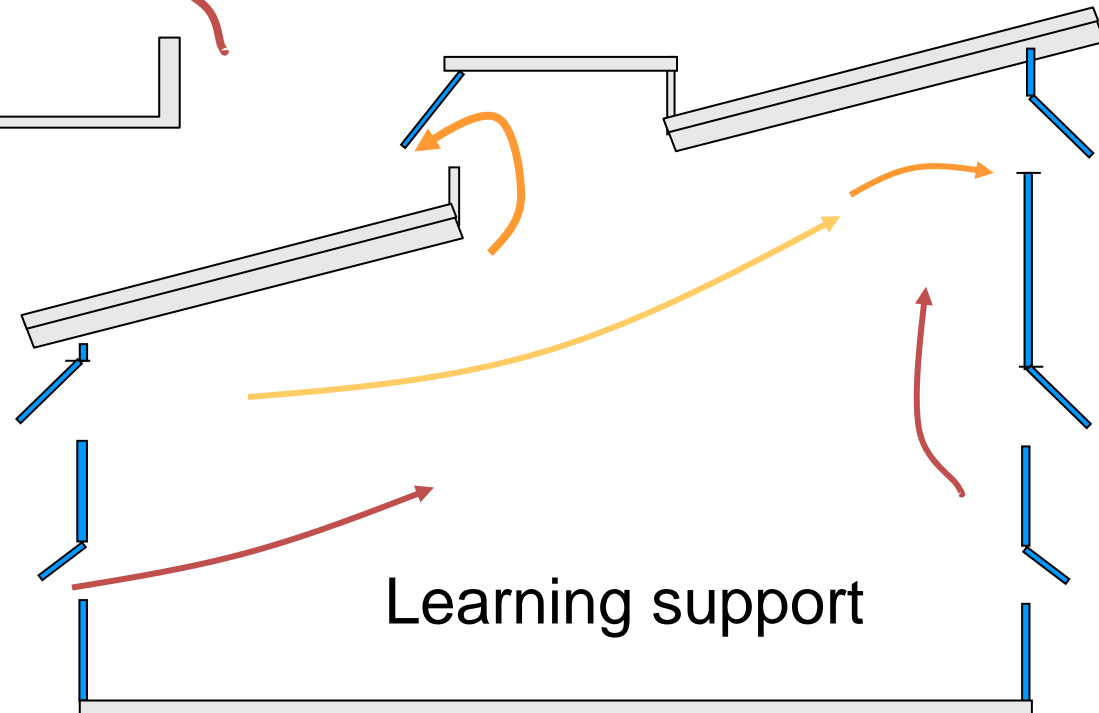
+ Biomass Boiler
+ Wind Turbine

Ventilation schemes

Classroom / ICT

Study room

Learning support

Summary

CUNDALL
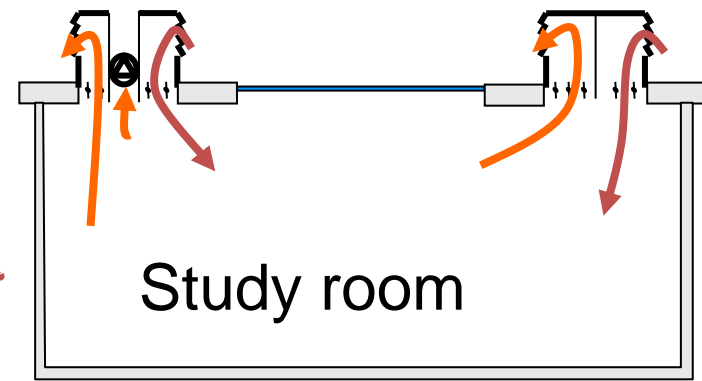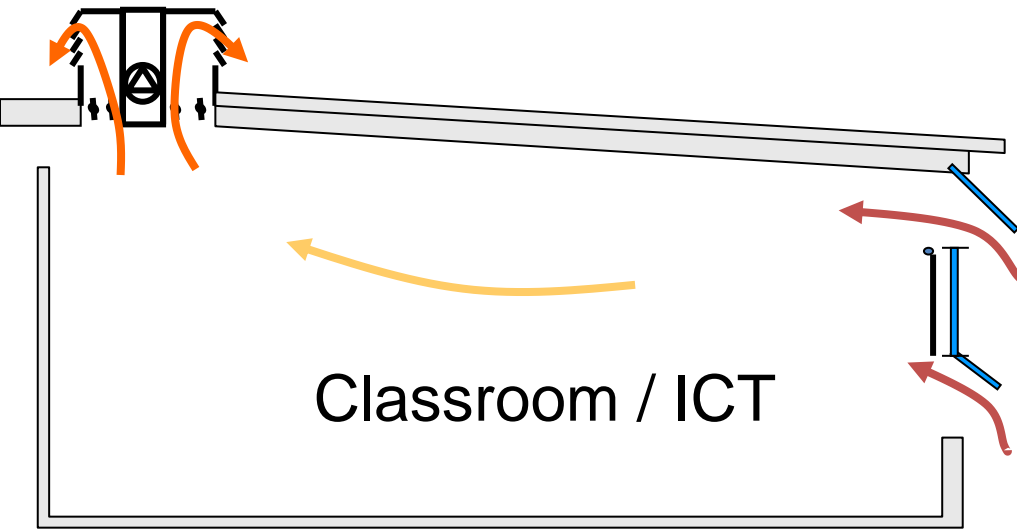
Iterative process to sustainability

Green Wash

Green Building
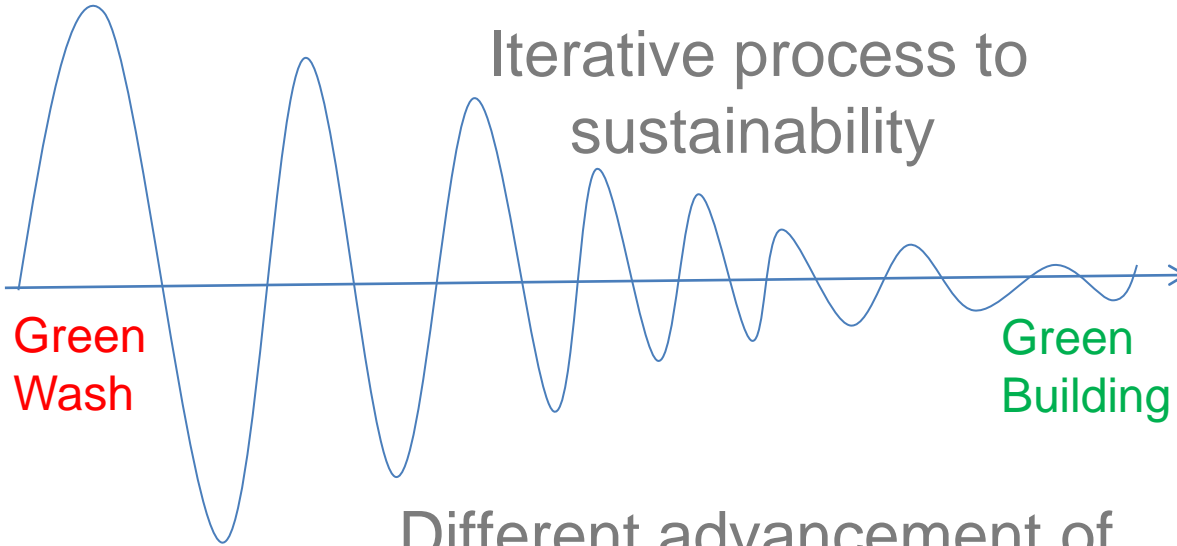
Different advancement of

Legislation

Technology

Human Factors

Green Wash

Green Building