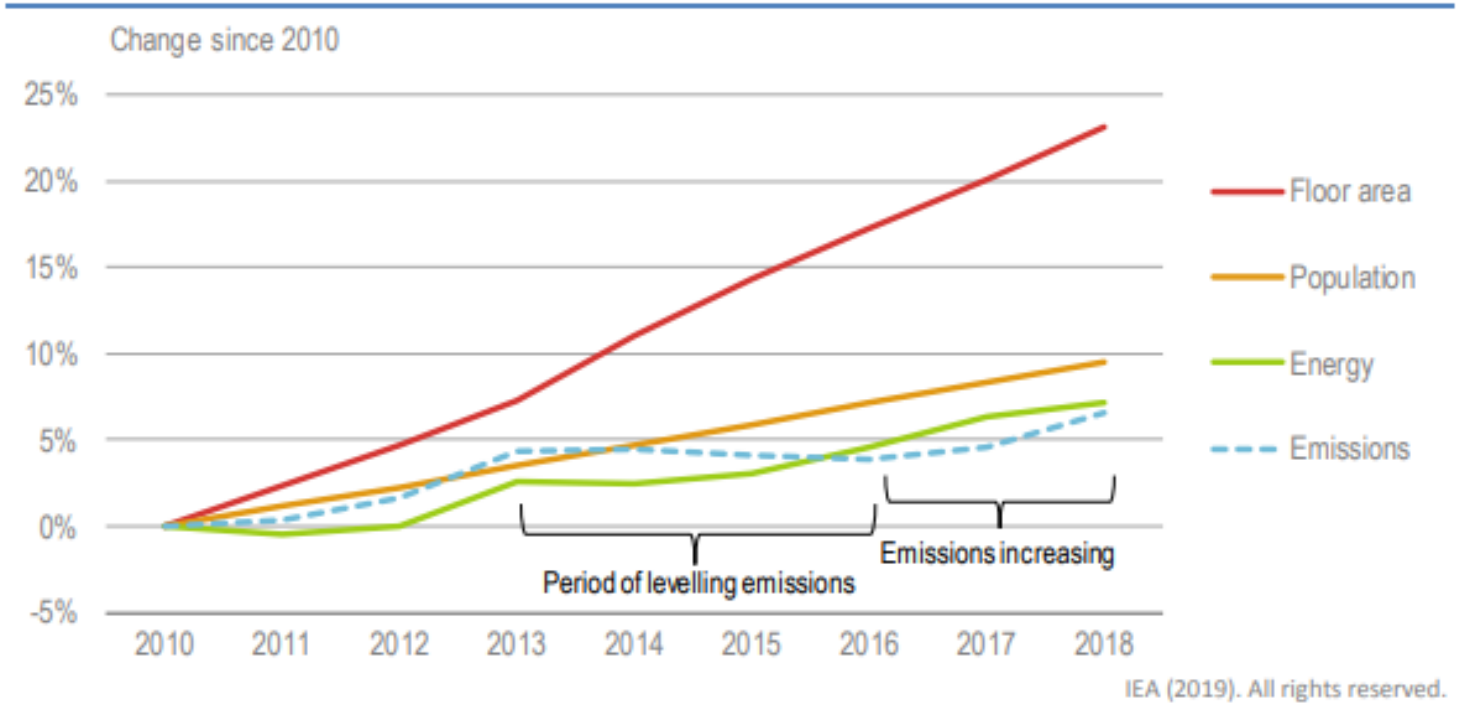
Green Buildings-Indoor Environmental Quality Role Post Covid

Juanita Lourdes

Changes in floor area, population, buildings sector energy use & energy-related emissions globally, 2010-2018



Source: Derived from IEA (2019a), *World Energy Statistics and Balances 2019*, www.iea.org/statistics and IEA (2019b) *Energy Technology Perspectives*, buildings model, www.iea.org/buildings.

CLIMATE CHANGE

- Buildings are responsible for almost **40% of energy** related global carbon emissions
- Energy demand will increase by **50% by 2050**

RESOURCE EFFICIENCY

- Buildings are responsible for **50% of global material use**
- 42.4bn tonnes of materials consumed annually

HEALTH & WELLBEING

- 91% of people live where air pollution levels exceed WHO limits
- We spend 90% of time time indoors, -IAQ is critical for fighting infectious disease transmission

Property Inventory H1 2019

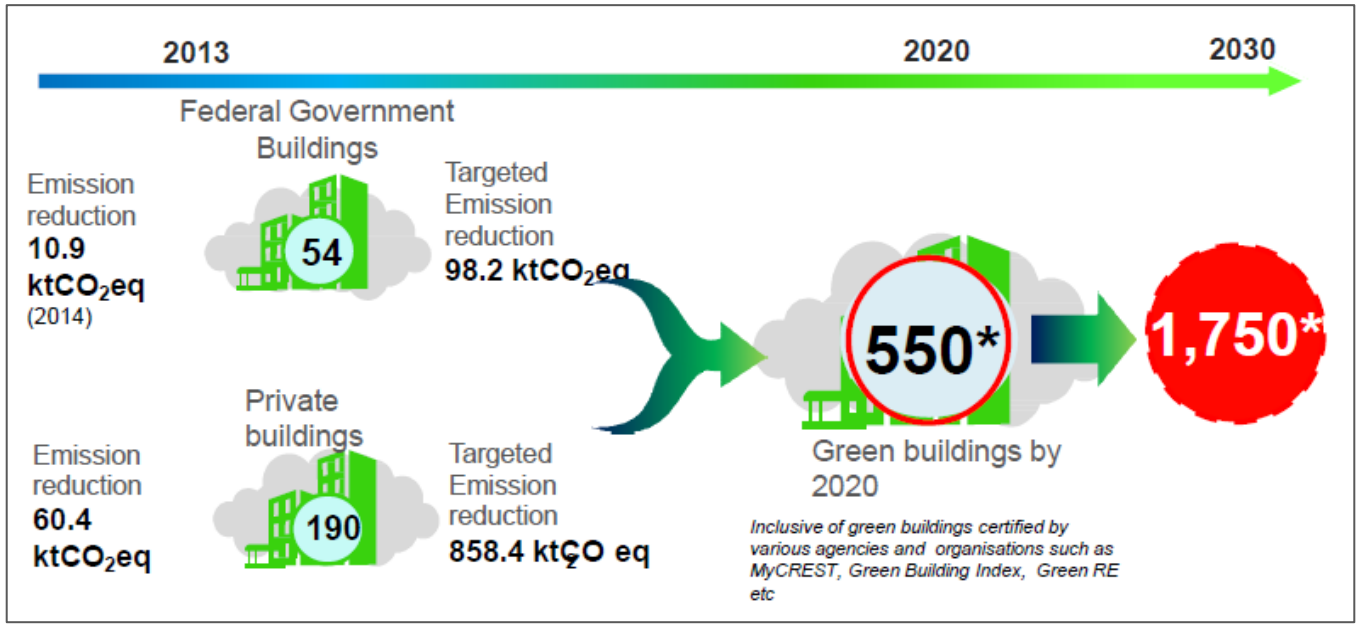
	RESIDENTIAL	SHOP	SOHO	SERVICED APARTMENTS	INDUSTRY
EXISTING STOCK	5.63 M	521,574	33,396	228,242	116,066
FUTURE SUPPLY	916,080	75,474	48,953	293,446	11,764
H1 2019 VS H1 2018	-0.9%	-5.6%	12.1%	7.9%	-5.9%

FUTURE SUPPLY = INCOMING SUPPLY + PLANNED SUPPLY

NAPIC Data

The Malaysian Scenario…

Green Technology Master Plan



Green Buildings for Occupants Wellbeing

- ✓Indoor Ventilation
- ✓Indoor Lighting
- ✓Allocation of Greenery

Future Proofing for the New Normal?

Green Building Certification Standards have Environment, Economic and Health Benefits

In a recently published research paper in the journal of ***Environmental Research & Public Health, COVID-19 Lockdown: Housing Built Environment's Effects on Mental Health (Amerio et al):***

'Strong association between poor housing and moderate–severe depressive symptoms, with particular reference to living in apartments which are small and have a poor-quality view and indoor area'

'Built environment is a key determinant of health- availability of resources, site location planning & green spaces'

'Urban planning, public mental health, environmental health, epidemiology, and sociology is needed to investigate the effects of the built environment on mental health outcome'

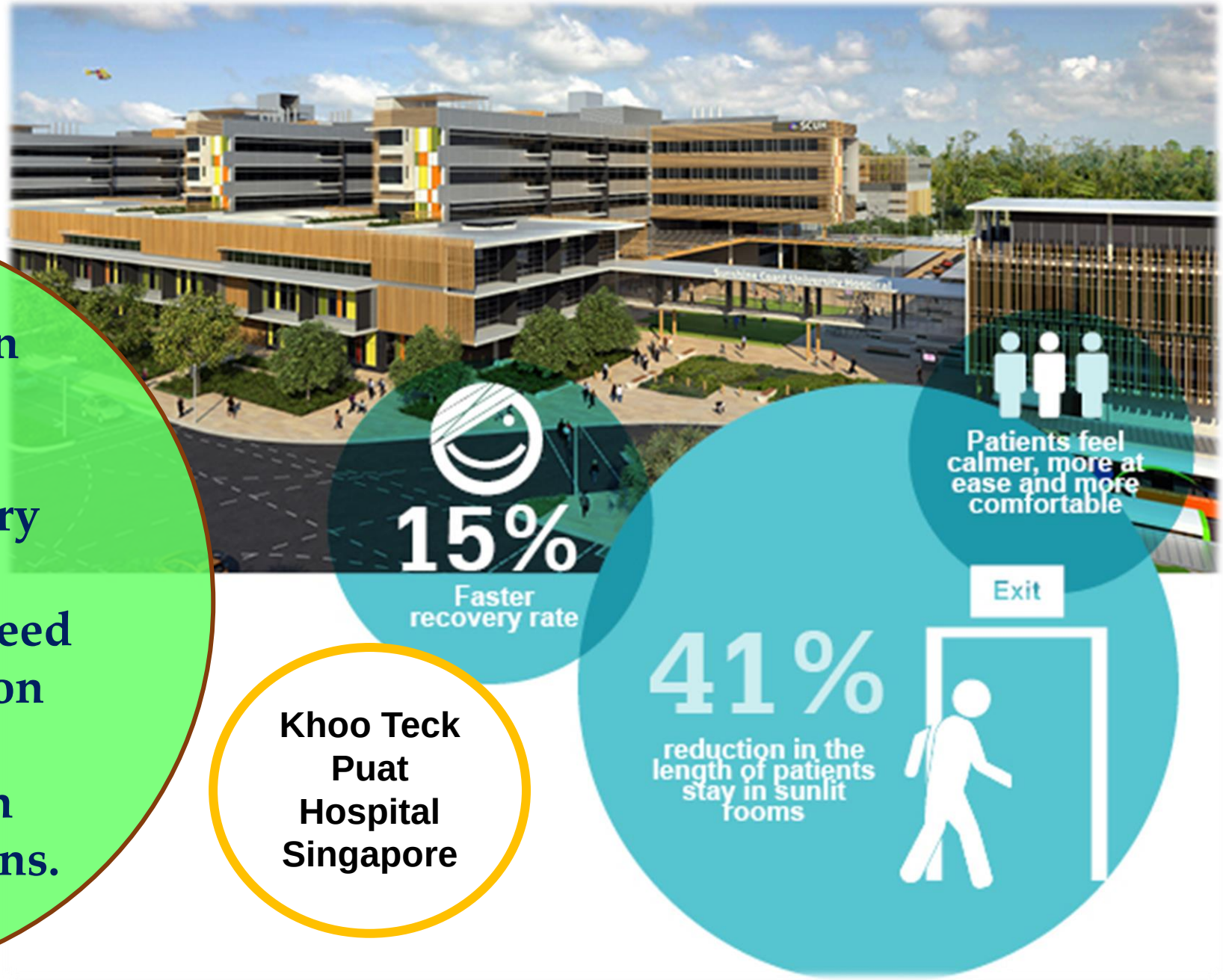
Occupants Health

8.5% reduction in hospital stays

15% faster recovery

22% reduction in need for pain medication

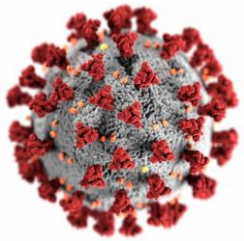
11% reduction in secondary infections.



Khoo Teck Puat Hospital Singapore

Indoor Ventilation

Airborne Transmission CAN occur:



- **Enclosed spaces** (direct /indirect contact between infectious and susceptible people)

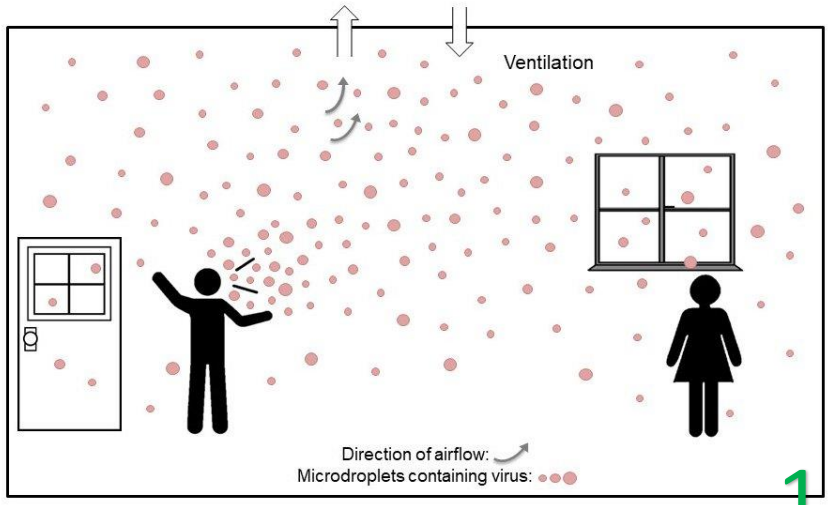
- **Prolonged exposure to respiratory particles**, often generated with expiratory that increased the concentration of suspended respiratory droplets in the air space.

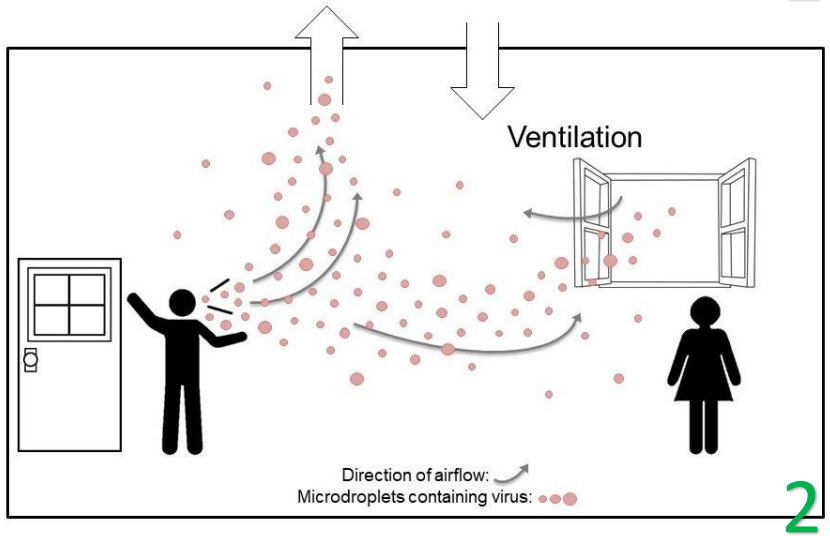
- **Inadequate ventilation or air handling** that allowed a build-up of suspended small respiratory droplets and particles.

CDC Scientific Brief

REHVA (the Federation of European Heating, Ventilation and Air Conditioning Associations) and **ASHRAE** (the American Society of Heating, Ventilating, and Air-Conditioning Engineers), have acknowledged the potential airborne hazard indoors and **recommended ventilation control measures accordingly**

Indoor Ventilation Scenarios





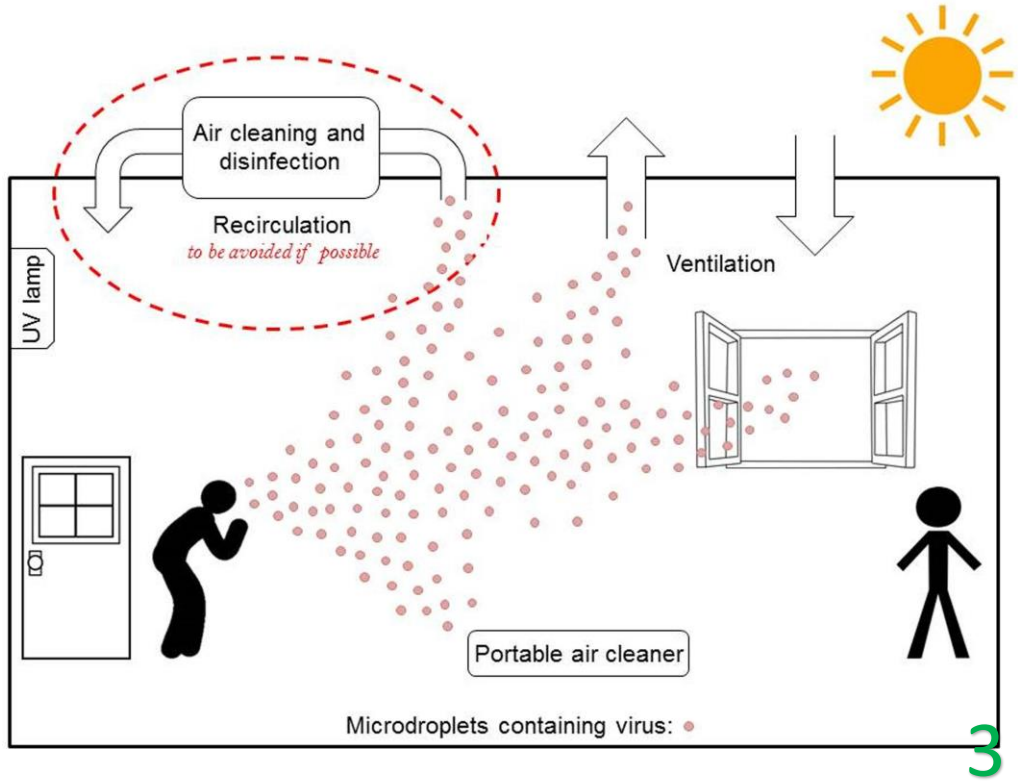


Image source: Morawska et al.; Clinical Infectious Diseases 2020

Green Building IAQ Criteria for a Healthy Building

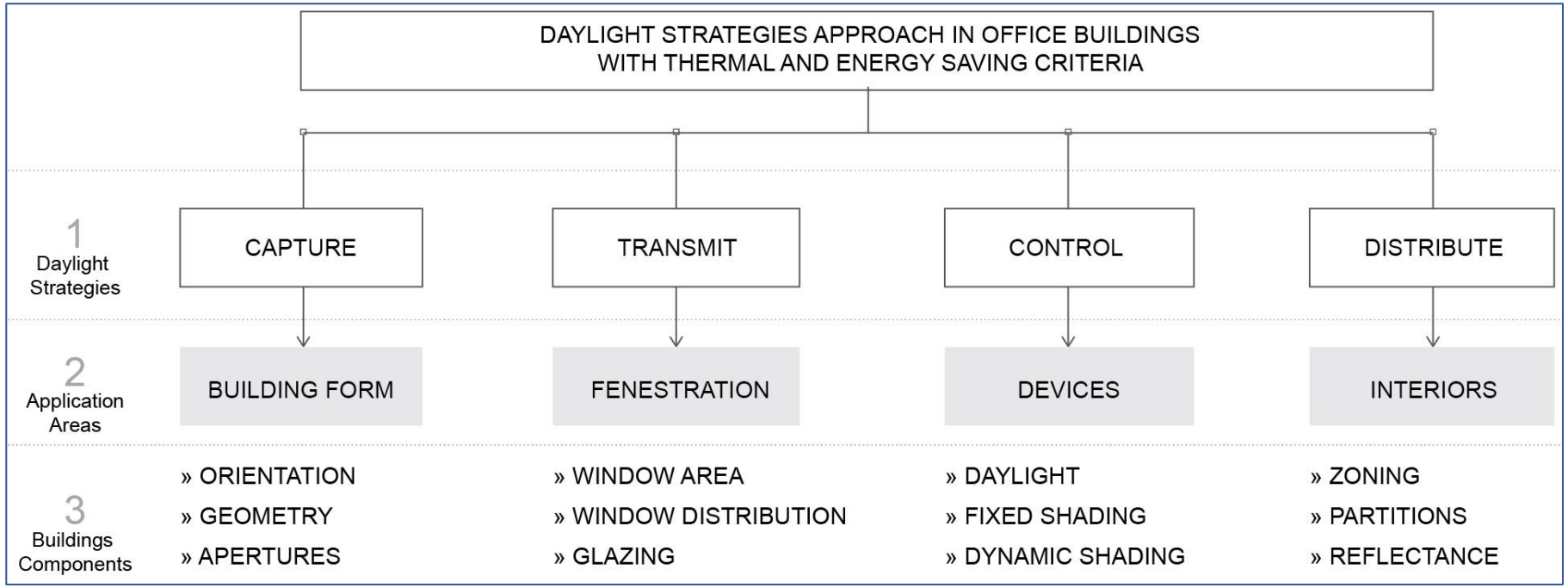
- **Ventilation Effectiveness** - Natural/ Mechanical
- **Enhanced Ventilation** - Implement advanced ventilation strategies such as increased outdoor air supply, demand-control ventilation, displacement ventilation and advanced air distribution that can enhance air quality.
- **Operable Windows** - Provide operable windows and encourage building users to open windows when outdoor air quality is acceptable.
- **Air Filtration** - Implement adequate air filtration and document a maintenance protocol for installed filters
- **Microbe and Mold Control**

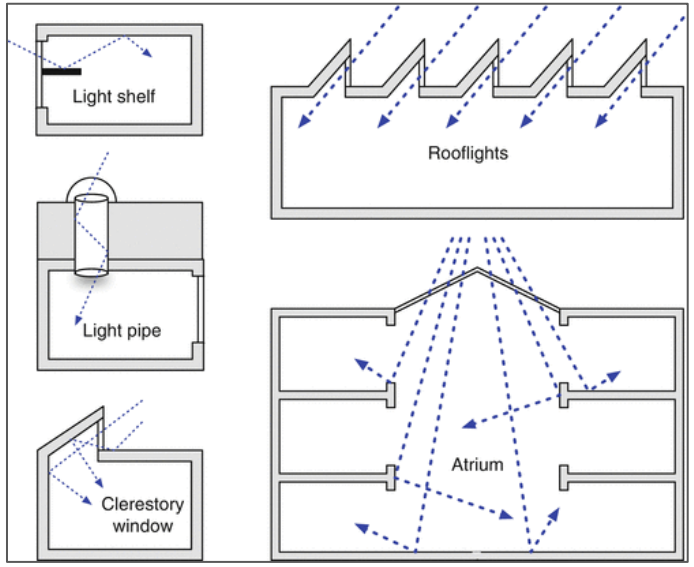
Natural Ventilation

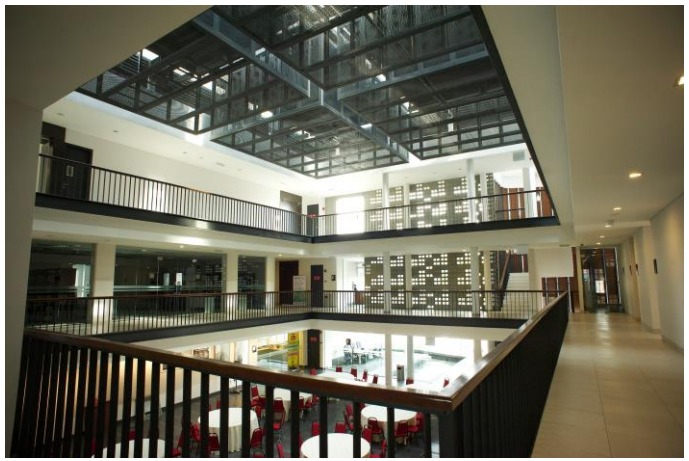
Mechanical Ventilation

Energy Efficient Systems

Green Building Indoor Lighting: Daylighting Strategies





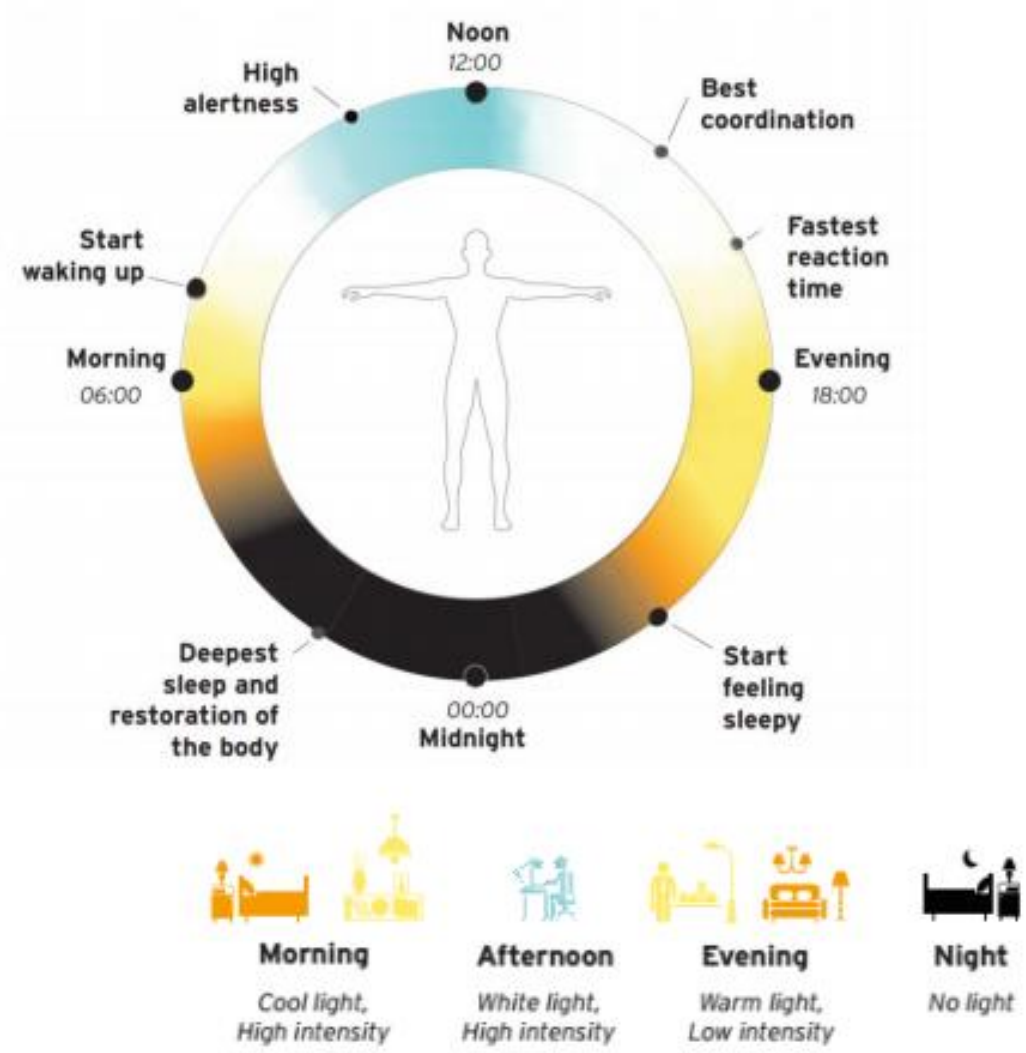


Source: Palarino & Piderit (2020) Journal of Daylighting

Human Centric Lighting (HCL)

Benefits of HCL include:

- Visual: good visibility, visual comfort, safety, orientation
- Biological: alertness, concentration, cognitive performance, stable sleep-wake cycle
- Emotional: improved mood, energise, relaxation, impulse control



Relationship between lighting and our circadian rhythm

Source: LightingEurope and the International Association of Lighting.

Green Spaces

Value of Greenery:

- ✓ Environmental (Ecosystem Services)
- ✓ Ecological (Enhance Urban Biodiversity)
- ✓ Social (Aesthetic & Psychological benefits)

Incorporating Sensory Connection with Nature

Water Features (ie ponds, aquarium)
Green Walls
Landscaping

Biophilic Design

About Us: GreenRE (Green Real Estate)

REHDA

GreenRE

Green Building Certification

Training Programmes

GreenRE Managers Courses (GREMC)

Technical Seminars (GRETS)

Short Courses

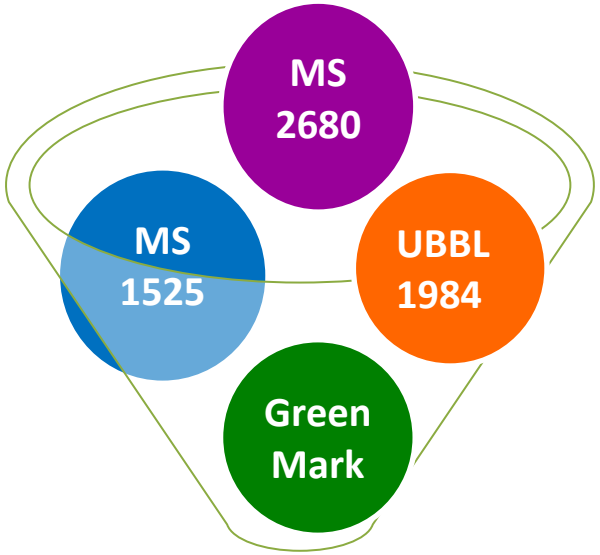
Collaborations (R&D & Awareness Drives)

Portfolio

- **Endorsed by the Federal Government for Tax Incentives (ie. MIDA, IRB etc)**
- **MGTC's MyHijau Mark**
- **Tax exemption incentives for the Iskandar Region under IRDA**
- **Recognised By Local Authorities in planning approvals e.g. DBKL, MBSA and MBPJ**

GreenRE Rating Tools

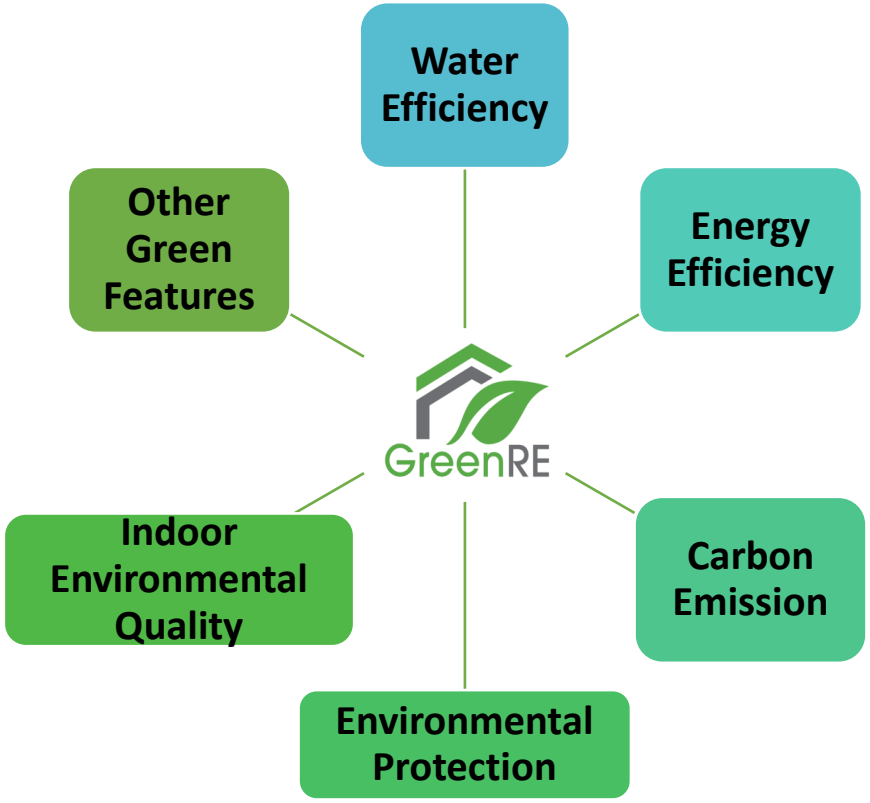
- ✓ **Established Based On Singapore BCA's GreenMark Tool**
- ✓ **Inclusive of Malaysian standards**



Locally Developed GreenRE Rating Tool

Building Tools	▪ Residential Building & Landed Home **(RES v3.1)** ▪ Non-Residential Building **(NRB v3.1)** ▪ Existing Non-Residential Building **(ENRB v3.1)** ▪ Healthcare **(HC 1.0)** ▪ Industrial Facilities **(IND 1.0)** ▪ Office Interior **(OI 1.0)** ▪ **Restaurant (PILOT)** ▪ **Data Centre (PILOT)**
Township Tools	Township **(TS 1.0)**
Infrastructure Tools	Infrastructure **(v1.0)**

Requirements for Green Certification



Elective Requirement for Energy Improvement (Combination of the following items to meet 30 credits)

Part 1 – Energy Efficiency

NRB 1-1 Thermal Performance of Building Envelope -OTTV
NRB 1-2 Air-Conditioning System
NRB 1-3 Building Envelope – Design/ Thermal Parameters
NRB 1-4 Natural Ventilation/Mechanical Ventilation
NRB 1-5 Daylighting
NRB 1-6 Artificial Lighting
NRB 1-7 Ventilation in Carparks
NRB 1-8 Ventilation in Common Areas
NRB 1-9 Lift and Escalators
NRB 1-10 Energy Efficient Practices & Features
NRB 1-11 Renewable Energy

Elective Requirement for Other Areas (Combination of the following items to meet 20 credits)

Part 2 - Water Efficiency

NRB 2-1 Water Efficient Fittings
NRB 2-2 Water Usage and Leak Detection
NRB 2-3 Irrigation System and Landscaping
NRB 2-4 Water Consumption of Cooling Tower

Part 3 – Environmental Protection

NRB 3-1 Sustainable Construction
NRB 3-2 Sustainable Products
NRB 3-3 Greenery Provision
NRB 3-4 Environmental Management Practice
NRB 3-5 Green Transport
NRB 3-6 Stormwater Management
NRB 3-7 Refrigerants

Part 4 - Indoor Environmental Quality

NRB 4-1 Thermal Comfort
NRB 4-2 Noise Level
NRB 4-3 Indoor Air Pollutants
NRB 4-4 Indoor Air Quality (IAQ) Management
NRB 4-5 High Frequency Ballasts

Part 5 – Other Green Features

NRB 5-1 Green Features & Innovations

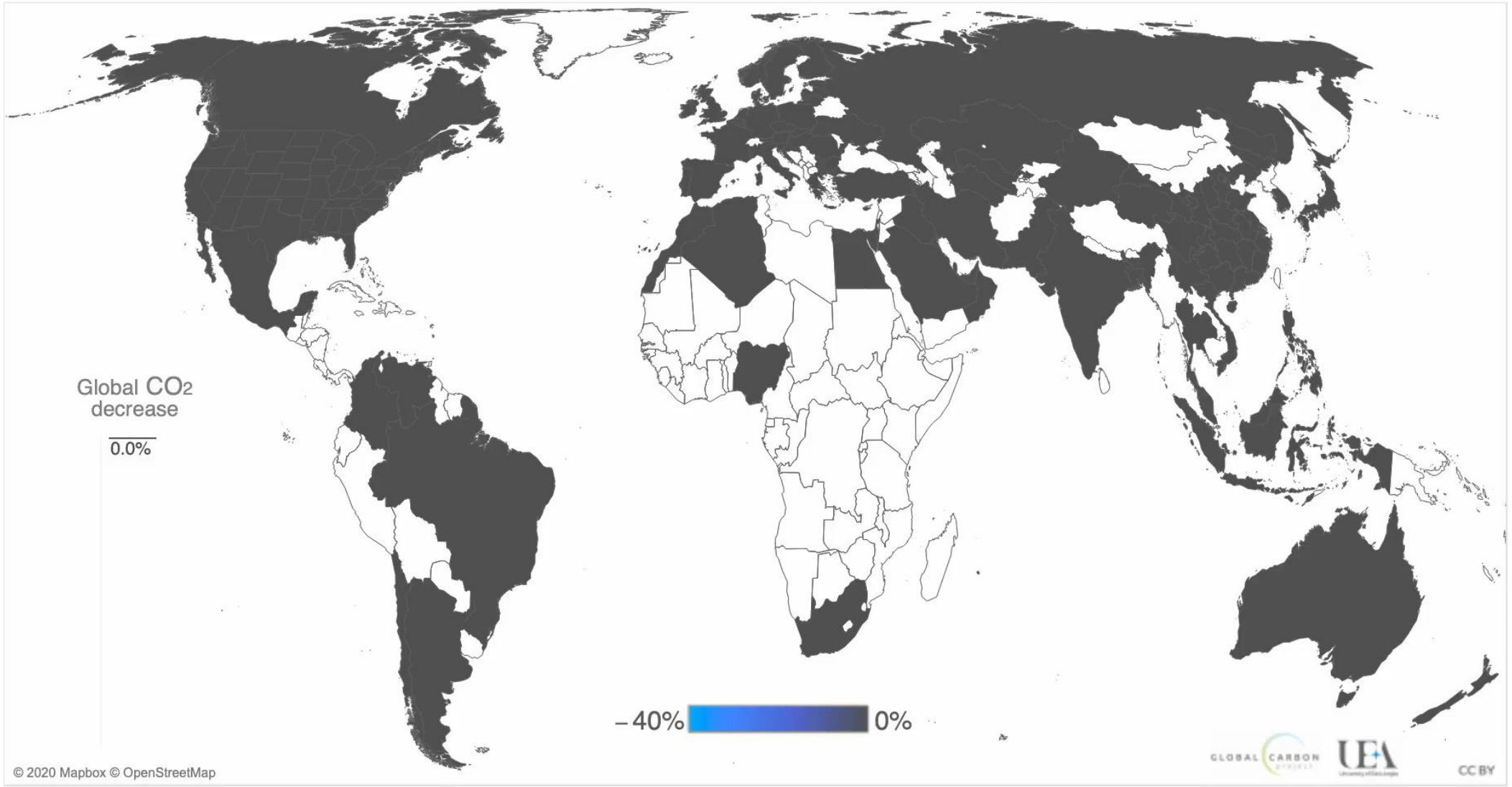
Part 6 – Carbon Emission of Development

NRB 6-1 Carbon Emission of Development

Changes in CO_2 emissions

during the COVID-19 forced confinement

1 January 2020



Thank You

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