

A panoramic view of the Singapore skyline at dusk, featuring the Marina Bay Sands hotel with its iconic SkyPark, the Esplanade - Theatres on the Bay, and a dense cluster of modern skyscrapers along the waterfront. The city lights are reflected in the water.

# Arch 3551

## Sustainability: History and Practice

### The City of Singapore

Name: Ariandy Gomez

Prof: Azaroff



# Geography and General Information





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Location Question  
Where in the world is Singapore ?

?

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?

-South Eastern Asia

-At the edge of  
Malay Peninsula

-Singapore territory  
is define by one  
island at the edge of  
the Malaysian  
country

-The island is 50 sq  
miles long from edge  
to edge.

- Area of island mass  
278.6 sq mi



In Between the land masses of Malaysia and Indonesia, the location known as the republic of Singapore a City state.

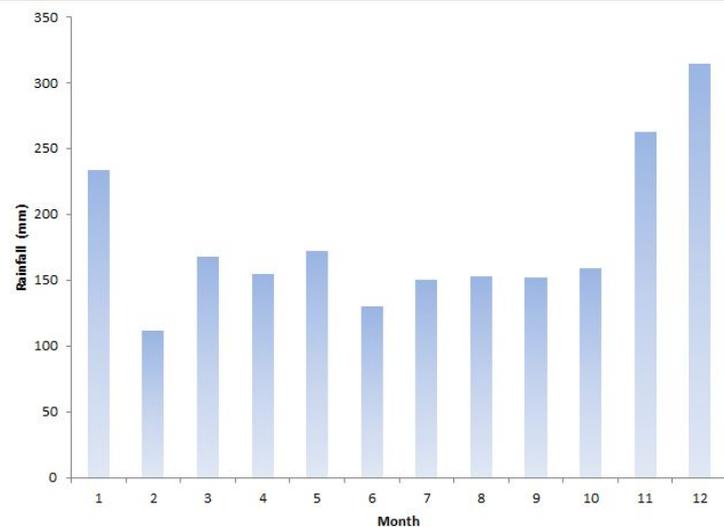
The Coordinations to this location

1° 17' 0" N, 103° 50' 0" E.



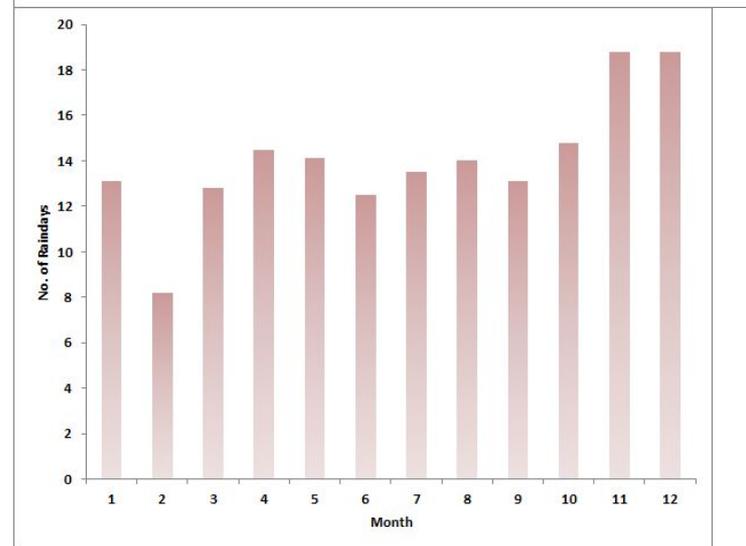
# Climate

- Singapore is 23.9 to 32.3 celsius all year
- That is 73 to 90 fahrenheit due to city being near the equator
- Lots of rainfall befall the city all year.
- 8 days of rain per month is the min and 18 day is the max
- This area is hit by monsoons many times per year.



Records of Climate Station Means (Climatological Reference Period: 1981-2010)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	Mean Monthly/ Annual Total (mm)	234.6	112.8	170.3	154.8	171.2	130.7	154.4	148.9	156.5	154.6	258.5	318.6
	Mean Raindays	13	8	13	14	14	12	14	14	13	15	18	18
Temperature (°C)	Mean Daily Maximum	30.4	31.7	32.0	32.3	32.2	32.0	31.3	31.4	31.4	31.7	31.1	30.2
	Mean Daily Minimum	23.9	24.3	24.6	25.0	25.4	25.4	25.0	25.0	24.8	24.7	24.3	24.0
	24-hr Mean	26.5	27.1	27.5	28.0	28.3	28.3	27.9	27.9	27.6	27.6	27.0	26.4
Relative Humidity (%)	Mean Daily Maximum	95.3	94.6	95.9	96.6	96.0	94.8	94.6	94.3	95.5	96.1	96.9	96.3
	Mean Daily Minimum	66.7	61.7	62.5	63.3	64.5	63.6	65.0	64.5	63.7	62.6	66.2	69.5
	24-hr Mean	84.4	82.0	83.4	84.1	83.5	81.9	82.3	82.2	82.7	83.1	85.7	86.5
Wind Speed (m/s)	Mean Monthly/Annual	2.9	3.0	2.3	1.6	1.6	2	2.4	2.5	2.1	1.6	1.5	2.2
Thunderstorm and Lightning	Mean Thunderstorm Days	5	6	12	19	19	15	13	13	15	18	18	12
	Mean Lightning Days	6	5	14	23	22	17	14	13	13	19	23	15



# Languages/Demographics

## Languages

- English
- Malay
- Mandarin
- Tamil

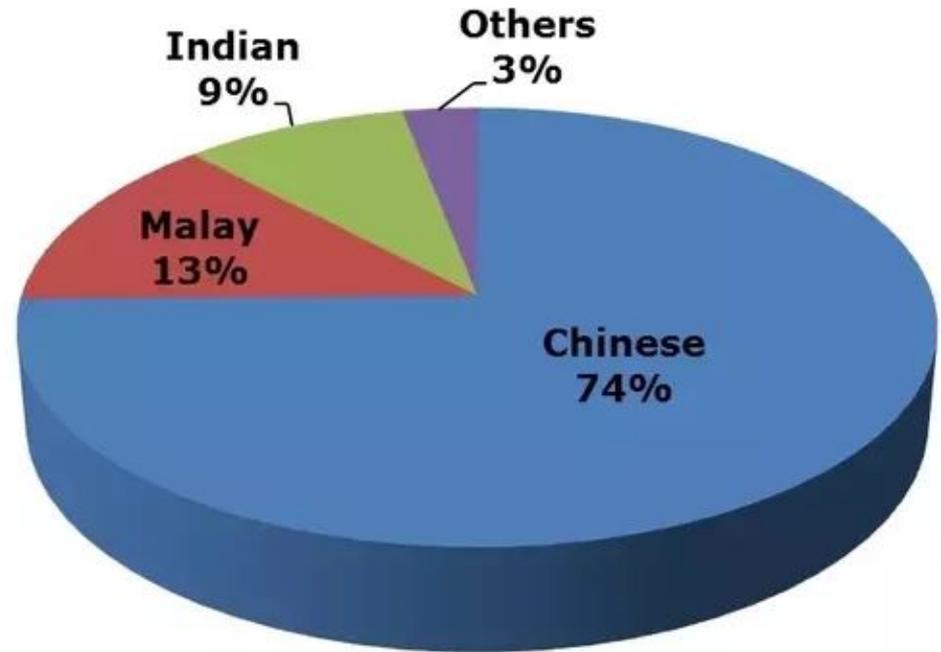
## Ethnic groups

- 74.3% Chinese
- 13.3% Malay
- 9.1% Indian
- 3.3% Others

## Religions

- 33.2% Buddhism
- 18.8% Christianity
- 18.5% No religion
- 14.0% Islam
- 10.0% Taoism and folk religion
- 5.0% Hinduism
- 0.6% Others

## Singapore Ethnic Profile (2012 Census)



# Population

Total population of the city of Singapore 5,612,300

Total population of Singapore Citizens 3,965,800

Density of population in Singapore 7,796/km<sup>2</sup> (20,191.5/sq mi)

SINGAPORE POPULATION



# Government

**-Government type**

-Unitary dominant-party parliamentary republic

**-President**

-Halimah Yacob

**-Prime Minister**

-Lee Hsien Loong

**-Legislature**

-Parliament



# Transportation

- The airport of Singapore is named Singapore Changi Airport
- Train stops are systemically near taxi stands or a bus stop to better get people around the city
- There are two types of train systems in Singapore
- MRT(Mass Rapid Transport) Express service
- LRT (Light Rail Transit) Local service use to get to the express service if required
- Buses are widely available all over the city.



A historical black and white photograph showing a dense waterfront area in Singapore. The foreground and middle ground are filled with numerous small, traditional wooden boats, many of which have thatched roofs. The boats are packed closely together, extending from the shore into the water. In the background, a large, multi-story building complex with a grid-like facade is visible, likely a government or military installation. The overall scene depicts a busy maritime hub from a past era.

History  
of  
Singapore

?

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## History Question

Do you know anything about the  
history of Singapore ?

?

?

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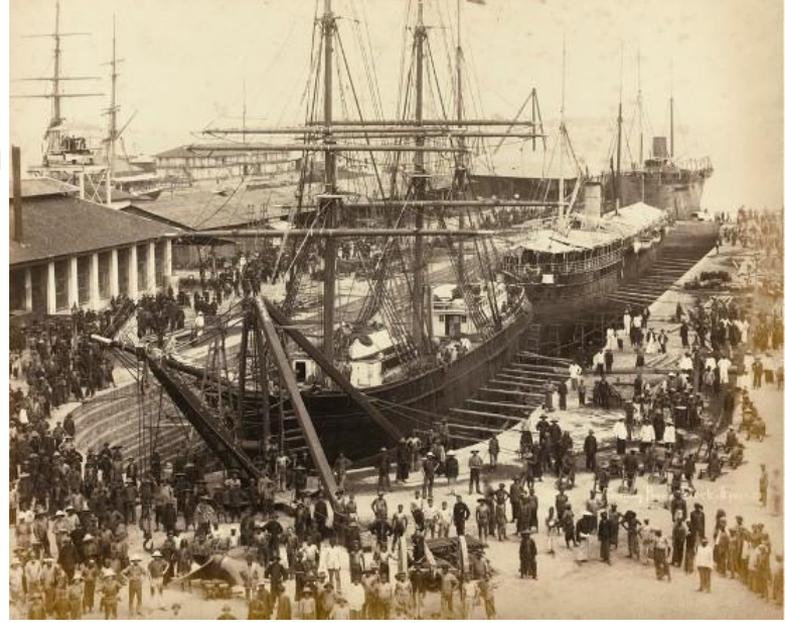
# Ancient Singapore (Pre-1819)

- The written history of Singapore dates back to the 3rd century
- Singapore was a location of significant trading during the 14th Century
- During this time the government was ruled under a parameswara(King)
- The Portuguese, the Dutch, controlled the region during the 17th century. AS the archipelago was an extremely important to trade in the area.



# British Colonisation (1819-1942)

- This archipelago had the attention of Great Britain in 1818.
- The Portuguese and Dutch lost control and a superpower grabbed it.
- Singapore became a perfect location to export and support the Opium trade.
- East India Company was also interested in the port town.
- With British empire support the city of Singapore was on a path for true growth in economy, population and power.
- Migration of Malay/Chinese/Indian began.





# War World II/Post (1942-1962)

- Singapore was renamed Syonan-to “Which means Bright Southern Island in Japanese”
- The Japanese were brutal to the civilians
- All Syonan “Singapore” Citizens were screened to look for Anti-Japanese ideals
- Any (Man Women or Child) who failed or seem unsure in any way, shape or form were executed, by the Japanese.
- 25,000 to 50,000 Civilians were executed in the between 1942-1945.
- Civilians were also force to construct the Death Railway a railway between Ban Pong to Burma, which was 258 miles. “Work to you die” Was the motto of the Japanese.



# War World II/Post (1942-1962)

- August/15/1945 marked the Japanese defeat

- The Japanese surrendered

-Singapore had its city infrastructure was destroyed

-food leading to malnutrition, disease, and rampant crime and violence. High food prices, unemployment, and workers' discontent

-Singapore fell into a brief state of violence and disorder; looting and revenge-killing were widespread

-Due to Britain's failure to protect Singapore in during World War II, a political awakening occurred in the civilians of the city.



# Singapore + Malaysia (1963-1965)

-Malaysia was formed on 16 September 1963

-Federation of Malaya with former British colonies of North Borneo, Sarawak and Singapore.

-These were former countries under the order of Great Britain

-The relationship of these countries were unstable due to distrust and ideological differences

-Riots, racial tensions and bombings led to Singapore separating into a city state.



# Republic of Singapore (1965-present)

-In August 9 1965 Singapore was expelled from Malaysia

-Singapore was a part of the Malaysia alliance to break its ties to Great Britain.

-This was an abrupt independence that had positives and negatives

-Independence was a double edge sword and the first issue the city state had to face.

**RE-PO**  
AUTO POLISH and REPAIR

**The Straits Times**  
ESTD 1845 TUESDAY, AUGUST 10, 1965 13 CENTS KDN 1380 1000

**National Newspaper**

**What it means—at a glance**

- ALL Singapore citizens cease to be Malaysian citizens.
- ALL civil servants, including police and armed forces personnel, courts and judiciary, who become employees of the Malaysian Government on Malaysia Day, come under the Singapore Government once again.
- ALL civil servants employed by Federal departments in Singapore after Malaysia Day become forthwith employees of the Singapore Government.
- ALL properties taken over by the Malaysian Government on Malaysia Day are now properties of the Singapore Government.
- NO lay-over tax.
- BANK of China reverts to other gov.
- NO more Common Market arrangements as provided by Annex J of Malaysian Constitution.
- FULL control by Singapore Government over broadcasting and television.
- Unchanged are Singapore's water supply from Selat and maintenance by Central Government of military bases in Singapore.

**Now look to the future**

**T**HE first reaction to the outcome of the Malaysian and Singapore Governments to an immediate step in case of total shock and profound regret.

There had been talk of "mutual constitutional arrangements" earlier on in the "Malaysia Malaysia" controversy, but it had a distinctly speculative character.

In recent events, there had been nothing to prepare the public for yesterday's tragic loss.

Rather, it had been hoped that Tengku Abdul Rahman and Mr. Lee Kuan Yew would succeed in putting an end to public wrangling.

Separation was the last thing the public expected.

What has happened is not beyond words. It was plain from the first that making Malaysia work would be a challenge.

It was well planned—in 1961—that the process of partnership was to be preferred over the device that the realized intention of Singapore from Malaysia would involve for both territories.

**Tengku pledges support for admission to Commonwealth and United Nations**

**Singapore is out**

By FELIX ABISHEGANADEN; Kuala Lumpur, Monday

**S**INGAPORE today separated from Malaysia, following an amendment to the Constitution approved unanimously by both Houses of Parliament under a certificate of urgency.

**INSIDE**

PAGE 10: Tengku's speech to Parliament

PAGE 11: The debate in Parliament

PAGE 12: Mr. Lee Kuan Yew's press conference

PAGE 13:



Sustainability Question  
What makes Singapore sustainable ?

*pollution  
reduction*

*vibrant  
living*

# Sustainability

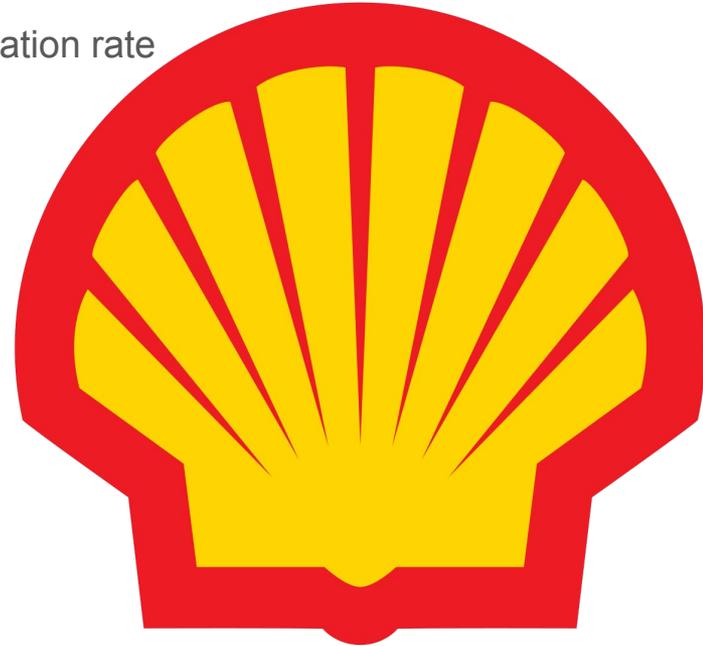
## Positives

- Independence
- Freedom?
- New Government

Shell established themselves in the 1970s.

## Negatives

- High Unemployment rate
- Lack of natural resources
- Low education rate
- No land



# Sustainability

-City filled with slums

-Choked with congestion

-Rivers became open sewers

-No decent jobs

*pollution  
reduction*

*vibrant  
living*



# Sustainability Question

How can one be sustainable with ?

-Limited land

-No natural resources

*pollution  
reduction*

*vibrant  
living*



Answer is

# Restrictive Creativity

**Creative limitation** is the concept of how purposely limiting oneself can actually drive creativity. At a 2013 TED conference, artist Phil Hansen made several remarks concerning the value of limitations, among them that "We need to first be limited in order to become limitless," and "If you treat the problems as possibilities, life will start to dance with you in the most amazing ways

# Singapore has a turning point

## The next green chapter

Singapore unveiled a new sustainable blueprint for the country up to 2030 yesterday. These are some of the targets and projects in the pipeline.

### Green and blue spaces

#### ■ Skyrise greenery

2013 **61 hectares**

2030 **200 hectares**

#### ■ Park connectors

2013 **216km**

2030 **400km**

#### ■ Nature ways

2013 **21km**

2030 **180km**

These are routes planted with specific trees and shrubs to help creatures such as birds and butterflies move between two green spaces

#### ■ Park space

2013: **4,040 hectares**

2030: **0.8 hectare for every 1,000 people**

#### ■ Water bodies

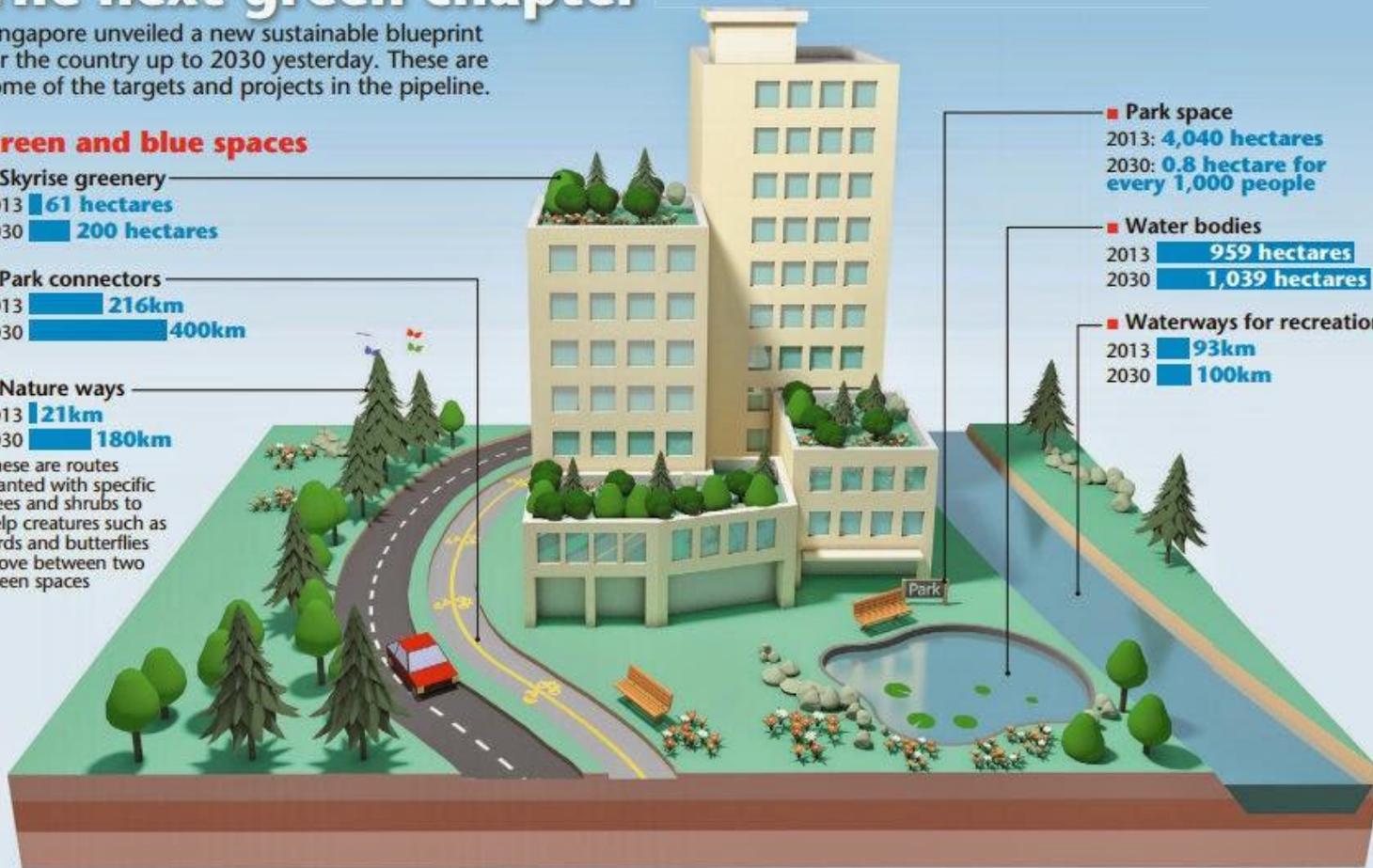
2013 **959 hectares**

2030 **1,039 hectares**

#### ■ Waterways for recreation

2013 **93km**

2030 **100km**



# Turning Point

Singapore sustainability began 35 years ago, when the city began developing three pillars.

- Economic
- Social
- Environment
- Sustainability
- Land and Sea

Must work together in order to achieve  
Social and economic well being.



The 3 Pillars of Sustainable Development:  
Promoting Social and Economic Well-Being while  
Protecting the Environment

# Turning Point

## A sustainable economy

Before Singapore became the sustainable city it is today, Singapore had to create a economy that is sustainable as economic growth generates a new resource a generation of thinkers.

-Investment in education

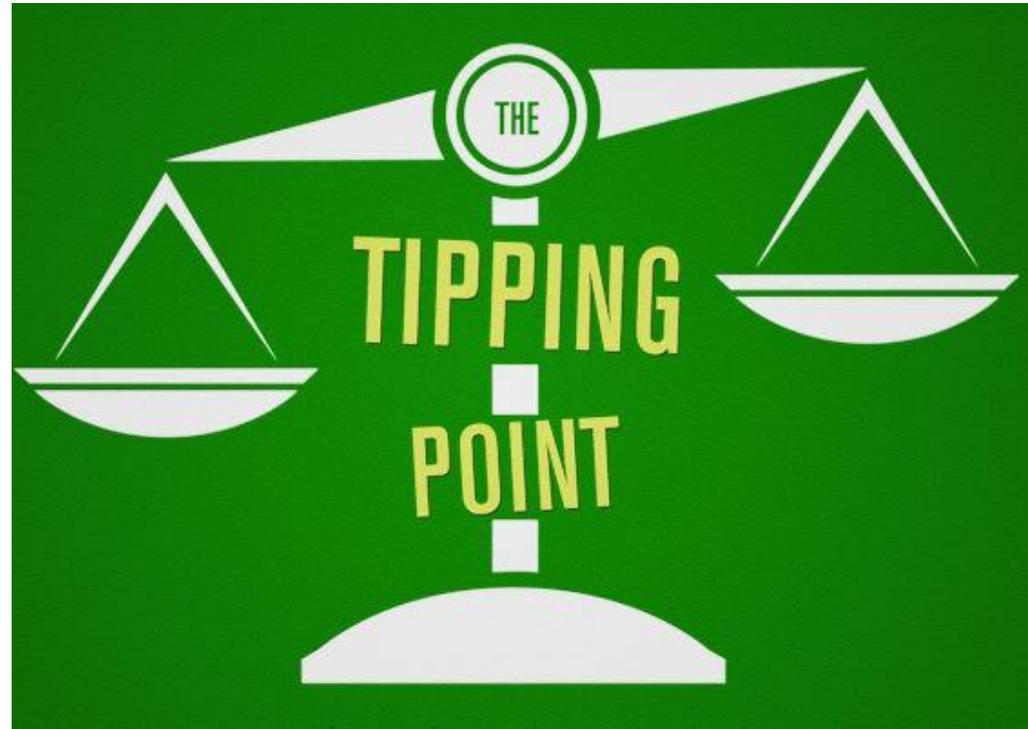
-Research

-Development

-Security

-Infrastructure

-Public services



# Turning Point

## Sustainable Singapore Blueprint 2015

- Less strain = Less is more fresh air
- Less me = Work together
- Less waste = Reduce, Reuse, Recycle
- Less today = Smart design reduce energy waste
- Less footprint = Green jobs + less carbon emission



# Sustainability

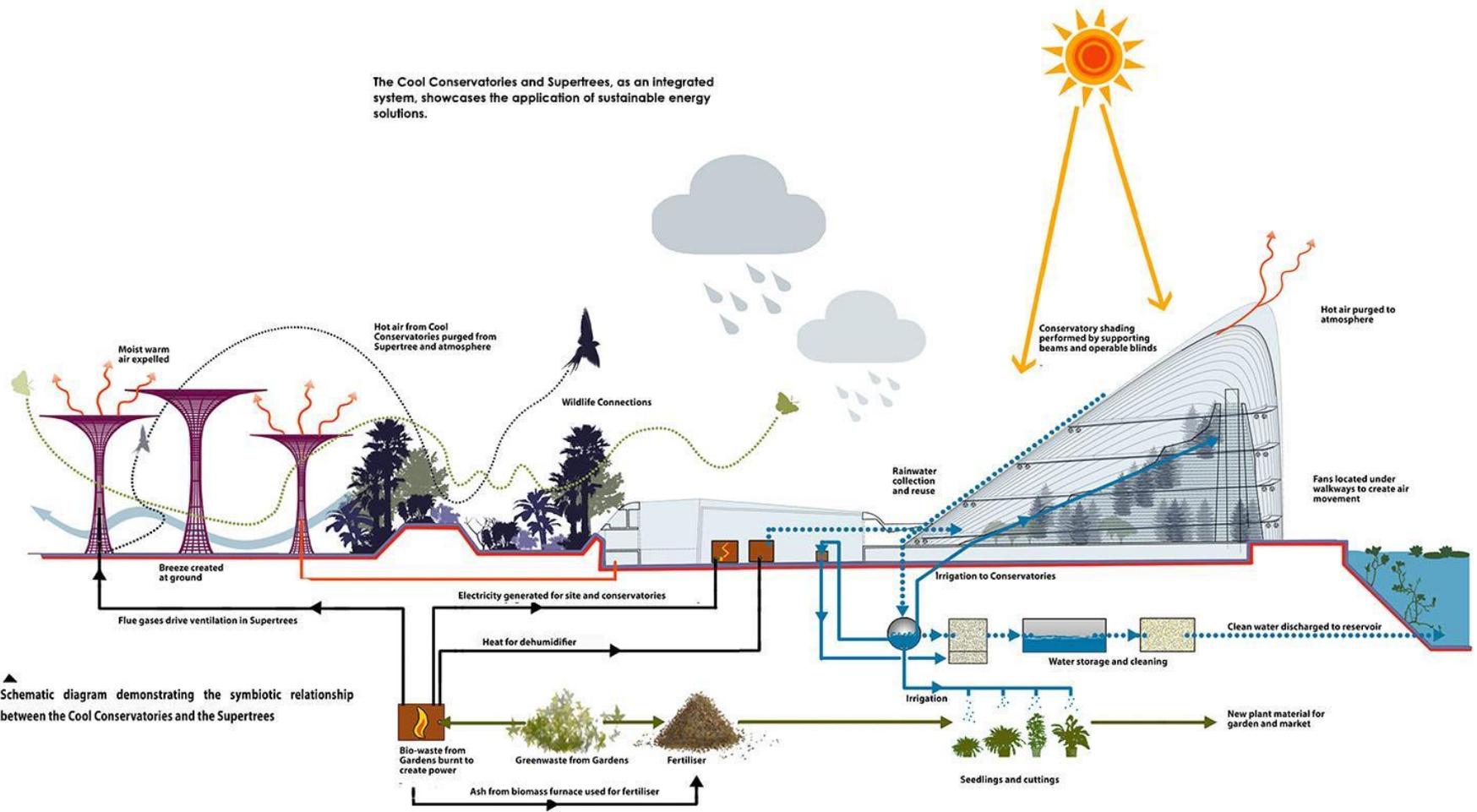
## Gardens by the Bay

Symbol of Singapore and its efforts to promote green space, these “Supertrees” belong to a display at the 250-acre Gardens by the Bay. The high-tech structures range from 80 to 160 feet and collect solar energy to power a nightly light show. They have a softer side too: their trunks are vertical gardens, laced with more than 150,000 living plants.



# Sustainability

The Cool Conservatories and Supertrees, as an integrated system, showcases the application of sustainable energy solutions.



Schematic diagram demonstrating the symbiotic relationship between the Cool Conservatories and the Supertrees





# Sustainability

## A FIRST-OF-ITS-KIND SUSTAINABLE BUILDING IN SINGAPORE

### Photovoltaic (PV) Panels

- About 3,200 square feet (sq ft) of PV panels extensively covering the 4,300 sq ft building
- Estimated to generate an annual energy yield of over 60,000 kilowatt hours (kWh)
- More than the building's estimated annual energy consumption of 50,000 kWh
- Helps to achieve zero energy for self-sufficiency



### Automation Control and Energy Monitoring System

- Monitors real-time energy generation and consumption
- Adapts lighting and air-conditioning to situations
- Provides maximum energy savings while maintaining full comfort

### Cross Laminated Timber and Glued Laminated Timber

- First in Singapore to be verified by the Nature's Barcode™ system as coming from responsible sources
- Light yet structurally robust
- A lightweight alternative to steel or concrete
- Provide a high level of thermal performance, which helps to reduce cooling costs
- Cleaner and safer worksite as pre-fabrication off-site improves efficacy in assembly and keeps on-site pollution to a minimum
- Increased productivity by more than 30% and saved around 130 man days

-The city of Singapore is a place of cultural and ethnic diversity, this has transferred over to the architecture of the city.

-Green architecture is built all over the city, the climate makes this possible

-This mind set of using vegetative landscapes onto high-rise buildings has transform the city into a nature hybrid.



The Hive, Nanyang  
Technological University



The Interlace, Bukit Merah



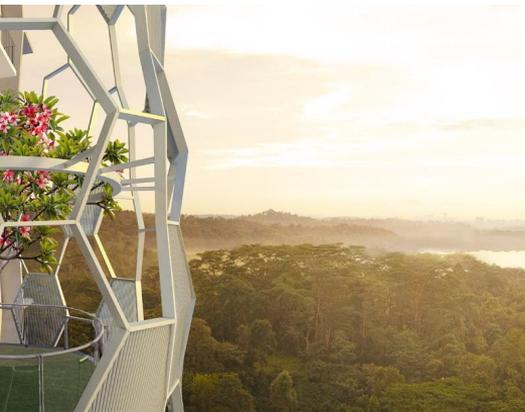
# Singapore and Architecture



Eco Sanctuary, Bukit Panjang



Skyville@Dawson, Queenstown



Singapore  
art  
Science  
Museum



# Singapore and Architecture



School of Art, Design and Media, Nanyang Technological University



# Singapore and Architecture



Ferrell Residences, Bukit Timah







compare to NYC

How does Singapore



# Singapore

- An intelligent City infrastructure
- Smart transport
- Green city
- Adaptability/Resilience are the first things to think about in all new designs and projects
- Warm environment
- Sustainable economy
- Sustainable environment

Vs.

# New York City

- Adaptation(Due to changing weather)
- Resilience and sustainable design is becoming common practice
- Cold environment
- Carbon challenge
- Varied environment

# Sustainability compared to NYC

-Singapore and New York City are two different cities, far away from each other on the globe

-Climate helps Singapore nature based design but in New York City the climate isn't really cooperative

-Both cities are sustainable in their own ways

-My opinion is swayed to the side of Singapore



# A question to ponder ?

What if the United states would put one fourth of its budget, not on war or military armaments but on sustainability and resilience in all the states across the countries.

How much military budget does this country approve every year ?



# Answer

- Singapore has a budget of only 8.945 Billion push towards Sustainability .

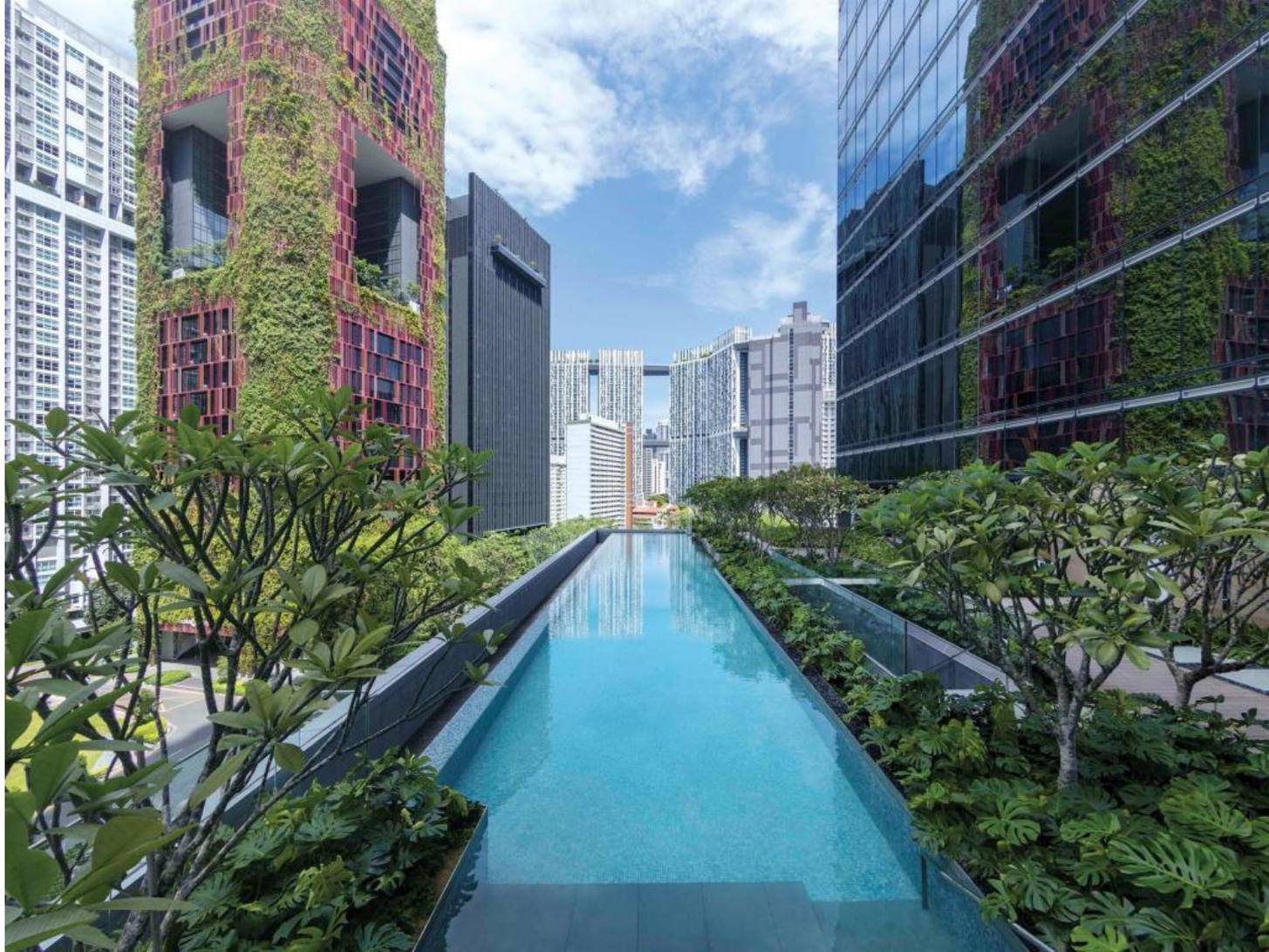
Would that be enough to have an entire  
sustainable country ?





# Video of Singapore

<https://www.youtube.com/watch?v=0Mlurw7VD58>





Singapore and Architecture

Marina Bay Sands Casino, Architect: Moshe Safdie

# Answer to questions

**-3 Things exported by Singapore?** Electrical/Computer machinery, Gems and organic chemicals/plastics.

**-Green space per person ?** 66 sq meters per person.

**-Per capita Vs. Income Vs. living cost?** Per capita Income: S\$ 85,050 PPP dollars or \$62,118.84 USD. Living cost: S\$ 8,846 dollars or \$ 6,461.21 USD per month.

**-Does it provide school/medical assistance?** Non-modified universal healthcare system.

Designed to ensure that no child is disadvantaged because of their financial background. There is no school fee for 6 years of compulsory education in primary school although students still need to pay standard miscellaneous fees of \$6.50 per month.

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