HSI

Lecture 9:

- Loss of biodiversity- 1900s, 90% of primeval forest cleared for agriculture.
- 1959, rapid urbanisation
- 1990, 99% of original forest is lost

Evolution of Green Singapore

- Vision 1: Garden City
- Vision 2: City in a garden
- Vision 3: Biophilic City in a garden
- Vision 4: City in Nature

Buffer parks

- Used to protect Nature reserves
- Parks with a history of harsh use, requirement enhancement to catch up

17 reservoirs in Singapore

SGP 2030
Biodiversity is a focal point in the new integrated approach
Pillar 1: City in nature

- Conserve and restore natural ecosystems
- Strengthen ecological and recreational connectivity
- Inspire communities to co-create and be stewards of nature

2026 targets:

- Develop over 130 ha of new parks, and enhance around 170 ha of existing parks with more lush vegetation and natural landscapes

2030 targets:

- Double our annual tree planting rate between 2020 and 2030, to plant 1 million more trees across Singapore
- Increase nature parks' land area by over 50% from 2020 baseline
- Every household will be within a 10-minute walk from a park

2035 targets:

- Add 1000 ha of green spaces

Pillar 2 Energy reset

Green Energy:

Play active and important roles in contributing towards two international goals

- The International Civil Aviation Organization's long-term global aspirational goal (LTAG) for international aviation to reach net zero carbon emissions by 2050
- The International Maritime Organization's target to reduce greenhouse gas (GHG) emissions from international shipping by at least 50% by 2050 compared to 2008 levels, and to phase out such GHG emissions in this century

2025 targets:

- 1.5 gigawatt-peak (GWp) of solar energy deployment, which can meet around 2% of our 2025 projected electricity demands, and generate enough electricity to meet the annual electricity needs of around 260,000 households
- Deploy 200 megawatt-hour of Energy Storage Systems to enhance grid resilience and support clean energy transitions [Achieved in December 2022]

2030 targets:

- Increase solar energy deployment to at least 2 GWp, which can meet around 3% of our 2030 projected electricity demand and generate enough electricity to meet the annual electricity needs of around 350,000 households
- Best-in-class power generation technology that meets emission standards and reduces carbon emissions

Greener Infrastructure and Buildings:

2025 targets:

- Reduce energy consumption of desalination process from current 3.5kWh/m3 to 2kWh/m3
- Singapore's first integrated waste and used water treatment facility to be 100% energy self-sufficient (Tuas Nexus)

2030 targets:

- Green 80% of Singapore's buildings (by Gross Floor Area) by 2030
- 80% of new buildings (by Gross Floor Area) to be Super Low Energy buildings from 2030
- Best-in-class green buildings to see an 80% improvement in energy efficiency (over 2005 levels) by 2030 Long-term target: Reduce desalination energy further to 1kWh/m3

Sustainable Towns and Districts

2030 targets:

- Reduce energy consumption in existing HDB towns by 15%

Cleaner-energy Vehicles

2025 targets:

- New registrations of diesel cars and taxis to cease from 2025
- All HDB towns to be Electric Vehicle (EV) ready with chargers at all HDB carparks by 2025

2030 targets:

- All new car and taxi registrations to be of cleaner-energy models from 2030
- Deploy 60,000 EV charging points nationwide by 2030

2040 targets:

- All vehicles to run on cleaner energy by 2040

Sustainable Aviation

2025 targets:

- All new airside light vehicles, forklifts and tractors at Changi Airport to be electric from 2025

2040 targets:

- All airside vehicles at Changi Airport to run on cleaner energy by 2040

Sustainable Maritime

2030 targets:

- All new harbour craft operating in our port waters to be fully electric, be capable of using B100 biofuels, or be compatible with net zero fuels from 2030

Pillar 3 Sustainable living

A Green Citizenry that Consumes and Wastes Less

2026 targets:

- Reduce the amount of waste to landfill per capita per day by 20%

2030 targets:

- Reduce household water consumption to 130 litres per capita per day
- Reduce the amount of waste to landfill per capita per day by 30%

Pillar 4 Green Economy

New Investments to be Among the Best-in-Class

Seek new investments to be among the best-in-class in energy/ carbon efficiency

Sustainability as a New Engine for Jobs and Growth
2030 targets:

- Jurong Island to be a sustainable energy and chemicals park
- Singapore as a sustainable tourism destination
- Singapore as a leading centre for green finance and services to facilitate Asia's transition to a low-carbon and sustainable future
- Singapore as a carbon services hub in Asia
- Singapore as a leading regional centre for developing new sustainability solutions
- Groom a strong pool of local enterprises to capture sustainability opportunities

Pillar 5 Resilient Future
Adapt to Sea-level Rise and Enhance Flood Resilience
2030 targets:

- Complete formulation of coastal protection plans for City-East Coast, North-West Coast (Lim Chu Kang and Sungei Kadut) and Jurong Island

Grow Local
2030 targets:

- Build the capability and capacity of our agri-food industry to produce 30% of Singapore's nutritional needs locally and sustainably

Key points:
- Holistic approach
Inconvenience entire nation in sustainable practices and development initiatives

- Sectoral involvement

Different sectors contribute to the plan's objective

- National agenda

Aligns with SG's national agenda for sustainable development

Ecological Profiling exercise
Helps development sites be evaluated holistically, how is it linked to a source habitat, does it contribute to a nature corridor?

Why young forests can't be left to mature naturally

- Formerly cleared and cultivated land

- No seed bank, cannot mature
- Will be stuck in current phase for centuries
- Assisted planting is required

2024 Update (Most Goals by 2030)

Resilient Future
- Provide 30% of nutritional needs by 2030

City in Nature
- 1 million trees
- Every household within 10 min walk from a park

Sustainable Living
- Reduce waste sent to landfill per capity per day by 30%
- Circular economy (Converting waste -> Incinerated ash -> NEWSand)
- Extended producer responsibliity for e-waste and packaged waste
- 8 in 10 households within 10 mins walking distance from MRT
- 1300km cycling path network

Energy Reset
- Electric buses to make up half of fleet
- 60000 EV charging points
- New harbour craft to be electric or net zero fuel compatible from 2030
- Green 80% of buildings
- Import up to 4GW low carbon electricity by 2035

Green Economy
- Carbon tax up to $50-80 by 2030 (2026: $45, 2024: $25, 2019 $5)
- Jurong island as a sustainable and chemical park
- Agreements on green economy and climate change with various countries

L10

Connectivity of nature

Fragmentation and roadkill, who can adapt?

Bukit Timah nature reserve, closure because of fragmentation

Greenhouse gases, largest sector is energy, industrial sector

Economical inequities
The hinterland

Singapore's hinterland, replying on various nations for food (Imports over 90% of food supply)

Fallacies

Ad Hominen

- Attacking the person rather than his or her argument

Example: Person A: "I believe that we should invest more in renewable energy sources to reduce our dependence on fossil fuels and mitigate the impact of climate change."

Person B: "Well, you're just saying that because you work for a solar energy company. Your argument is biased and can't be trusted."

Questionable arguments by elimination

- Arguments that eliminate possible options without sufficient evidence or reasoning, leading to questionable or unwarranted conclusions.
- Not providing any positive evidence
- "Since there is no alternative explanation to prove that there is no ghost, therefore there is a ghost"

Example:

Situation:

A detective is investigating a crime with three suspects: Alice, Bob, and Carol.

Questionable Argument by Elimination:

"We have investigated Alice and Bob, and there is no evidence pointing to them as the perpetrator. Therefore, Carol must be the one who committed the crime."

Usually I can think of logical explanations, but this really touched me….

False anomaly

- Leaving out or omitting information.

Example: The basketball went into the hoop but I did not do anything to it! (Omitted the fact that someone else shot the ball)

Eisenhower and Washington…. Listing out similarities but not mentioning their many differences

Scientists and mathematicians liking music, leaving out other great scientists who may not like music

Illicit Causal inferences

- occurs when a person makes a causal connection between two events or variables without sufficient evidence or when the evidence provided is flawed or insufficient (Confusing correlation with causation)
- drawing a conclusion about cause and effect without proper justification or logical support.

Example:

The sales of ice cream increase during the summer.

Illicit Causal Inference: Therefore, the increase in ice cream sales causes an increase in the number of drownings.

Symptoms of mercury poisoning… all because you experience one of them doesn't mean its poisoning!

Unsupported Similarities and Analogies

- Occurs when a person draws comparisons between two things without providing sufficient evidence or justification for the comparison
- Involves asserting a similarity between two situations or objects without demonstrating that the similarities are relevant or significant.

Example: Much as the moon influences the tides and sun spot activity can disturb radio transmissions, so do the positions of the planets have an important influence on formation of the human personality. Modern science is constantly confirming the interconnectedness of all things. Is it any surprise that distant events, like the movement of the planets and the decisions people make, should be connected?
A=B, THEREFORE C=D

Untestable Explanations and Predictions

- Statements or hypotheses that cannot be empirically tested or verified through observation or experimentation
- Conspiracy theories

Example: Invisible, undetectable dragon…
Handwriting example (from your writing I see that you are ……)
Biocosmic energy??? (or anything of the sort)
Nostradamus

Empty Jargon

- Use of technical or specialized language that sounds impressive or authoritative but lacks substantive meaning or content

Example: “Such patients apparently jump to a new level of consciousness that prohibits the existence of cancer ... that is a quantum jump from one level of functioning to a higher level.”
IF IT SOUNDS LIKE NONSENSE ITS EMPTY JARGON/USING WORDS THAT MAKE NO SENSE.

Ad Hoc Rescues (Shifting the goalposts)

- Manoeuvres or additions made to an argument in response to challenges or criticisms, often in an attempt to salvage the argument rather than addressing the issues directly.

Example:
Person A: I think Taylor Swift likes me
Person B: But she’s clearly not interested in you
Person A: Yes, but that’s her way of showing affection

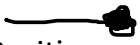
Person B: But she's dating Travis Kelce!
Person A: She's doing it just to make me jealous! Classic Tsundere move
Biorhythm theory… the most convincing studies of biorhythm are those you can do yourself (until A…. until B….. until C…)

Exploiting Uncertainty

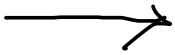
- Taking advantage of uncertainty or lack of information to support a particular position or viewpoint
- Banking on uncertainty in experiments (+/- 5% vibes) to disprove something.

Example: "There is no evidence disproving the existence of extraterrestrial life. Therefore, aliens must be among us, and the government is hiding the truth.

Extra stuff:
Scientific evidence must be empirical (hard evidence, mesasurable)
Negative couplings (odd no. = negative feedback loop, even no. = positive feedback)



Positive coupling



Albedo is the amount of energy being reflected by the earth before entering the atmosphere

Transmittance is the amount of energy that passes through the atmosphere

Largest areas of native ecosystems in SG are the mature forests of Bukit Timah and central catchment, as well as mangrove forests of sungei buloh nature park network and pulau ubin

Scientific Explanations

Causes

To explain one thing or event by reference to another that precedes it. Examples: "Debris from last night's windstorm caused the power outage." "Excessive alcohol consumption can damage the liver."

If you think it's a stretch to assume that A=B (Jump in logic is too big)

Causal Mechanisms

To explain by citing intervening causal factors, factors that explain the effects of a more distant

cause. Example: “Debris from the storm severed power lines, thus causing last night’s power outage.”

If its very sequential (A leads to B, leads to C etc…)

Look at conjunctions (Hence, firstly, secondly…)

Laws

To explain an event by referring to a general law or principle of which the event is an instance.

Example: “The fuel efficiency of a vehicle is determined in part by size and weight. This is because acceleration is directly proportional to force but inversely proportional to mass. Thus, the larger the object you want to move, the greater the force you need to apply, and so the more energy you need to expend.”

Keywords: Tendency, likely, majority…. Large possibility question

Underlying Processes

To explain something by reference to the workings of its component parts. Example: “The chest pain and breathing difficulty symptomatic of pneumonia result from an infection of the lung tissue. The tiny air sacs of which the lungs are composed—called alveoli—fill with inflammatory fluid caused by the infection. As a result, the flow of oxygen through the alveolar walls is greatly impaired.”

Microscopic analysis

Function

To explain something by reference to the role it fulfills in some larger enterprise. Examples: “Many species of birds build their nests in high places—trees, cliffs, etc.—to protect their young from predators.” “The lungs serve both as a means of introducing oxygen into and removing carbon dioxide from the blood stream.”

Polar bear camouflage example…… (the function of their grey fur)