**NANYANG POLYTECHNIC**

**IT1394 VISUAL ANALYTICS (PROJECT PROPOSAL)**

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# 1. Introduction to Green Plan 2030exp

The Singapore Green Plan 2030 (Green Plan) is essentially a set of goals to be achieved by 2030 aligned with the 17 Sustainable Development Goals (SDGs) set by the United Nations, hoping to propel Singapore towards a sustainable country. This Green Plan is spearheaded by five key ministries: Ministry of Education, Ministry of National Development, Ministry of Sustainability and the Environment, Ministry of Trade and Industry, and Ministry of Transport.

The Green Plan is split into five distinct pillars, with each encompassing targets that impact every aspect of our lives:

1. City in Nature
2. Energy Reset
3. Sustainable Living
4. Green Economy
5. Resilient Future

In this study conducted by our group, we selectively focused on the 4 pillars: City in Nature, Energy Reset, Resilient Living, and Sustainable Future.

# 2. Target Audience

In alignment with the goals of Singapore Green Plan 2030, which seeks to unite the nation towards a sustainable future, we have focused our target audiences on citizens who have lived in Singapore for more than 10 years. We believe individuals in this demographic can incorporate their valued experiences into their responses. This can help further provide stronger opinions on the efforts of the government in building a sustainable future.

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| Quotes | News Article Link |
| "It will influence all aspects of our lives, from how we live to how we work and play, as we work together as a nation to make Singapore a greener and more liveable home."  *Quoted from the five ministers involved in Green Plan 2030* | <https://www.straitstimes.com/singapore/environment/singapore-green-plan-2030-to-change-the-way-people-live-work-study-and-play> |
| "I hope the Green Plan will catalyse a broader national movement to take action to secure a sustainable future for Singapore. With each of us playing our part, I have every confidence that we will be able to build a more vibrant and greener home for future generations,"  *Quoted from Deputy Prime Minister Heng Swee Keat* | [Singapore unveils Green Plan 2030, outlines green targets for next 10 years - CNA (channelnewsasia.com)](https://www.channelnewsasia.com/singapore/singapore-green-plan-2030-targets-10-years-1883021) |

# 3. Stakeholders

The Singapore Green Plan 2030 aims to develop Singapore as a sustainable country. Moreover, the goals set in the Singapore Green Plan 2030 are solutions to combat the climate change issue at hand. Consequently, this will affect the daily lifestyle of citizens.

Therefore, the stakeholders will be citizens residing in Singapore.

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| Quotes | News Article Link |
| “Circumstances will change, new opportunities will emerge, and new ideas and initiatives will present themselves as we work with our citizens, businesses and communities”  *Quoted by the Minister for Sustainability and the Environment, Ms. Fu.* | <https://www.channelnewsasia.com/singapore/singapore-green-plan-climate-change-sustainability-goals-1882961> |

# 4.1 Interview Questions

A total of 8 interviewees were interviewed for our project, the interviewees are Singaporeans and represent different age groups and socio-economic statuses.

The questions are as follows:

|  |  |  |  |
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| **List of Interview Questions** | |  |  |
| **S/N** | **Question** | **User** | **Type of Question** |
|  | What are your experiences with Singapore's current nature reserve, parks, or gardens? | Citizens | Open-ended |
|  | How would you describe your vision of a city surrounded by nature? | Citizens | Open-ended |
|  | In your opinion, what are some improvements you would like to see to make Singapore a greenery and vibrant city? | Citizens | Open-ended |
|  | What practices have you cultivated to lead an energy-efficient lifestyle? | Citizens | Open-ended |
|  | In your opinion, what improvements the government or Singaporeans should do to support sustainable energy usage goals | Citizens | Open-ended |
|  | How do you actively promote recycling initiatives to people around you, can you share specific examples of your efforts? | Citizens | Open-ended |
|  | How do you ensure proper sorting of recyclables in your household to maximise the effectiveness of recycling bins?   * Were there any challenges you faced in encouraging recycling, and how did you address them? | Citizens | Open-ended |
|  | In what ways have you encouraged the reuse of materials or resources in your experience?   * In promoting the reuse of materials, have you encountered any notable challenges, and how did you overcome them? | Citizens | Open-ended |
|  | How did you approach minimising waste in your daily life, particularly regarding packaging and disposables?   * In your daily routine, do you find certain situations or products lead to more waste and how do you navigate those instances? | Citizens | Open-ended |
|  | Do you see a lot of food wastage around your environment? | Citizens | Open-ended |
|  | Do you purchase vegetables with the SG Fresh Produce logo at supermarkets?   * What are the drawbacks/incentives? | Citizens | Open-ended |
|  | Do you think Singapore’s small land mass will set us back on food security pertaining to our heavy reliance on food imports?   * In your opinion, do you think Singapore investing towards locally produced vegetables is a sufficient move in the long run? | Citizens | Open-ended |

# 4.2 Proof of Interviews and Personas

Below are the interview clips captured in video and audio formats.

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| **Description** | **Links** |
| Interview Clips | <https://drive.google.com/drive/folders/1dbbXojzV37dkvb0tyaVMrzEbG67LTv04?usp=drive_link> |
| Personas | <https://www.figma.com/file/uiFp1KjOwXXnM3mXyn33B1/Persona?type=whiteboard&node-id=0%3A1&t=ggtJx4i4gTwygQei-1> |

Below are 8 screen captures taken from Figma of the personas of each interviewee.

|  |  |
| --- | --- |
| Interview 1 |  |
| Interview 2 |  |
| Interview 3 |  |
| Interview 4 |  |
| Interview 5 |  |
| Interview 6 |  |
| Interview 7 |  |
| Interview 8 |  |

# 4.3 User Story

With the interviews conducted, a total of 16 user stories were created.

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| **S/N** | **Use Case** | **User Story** |
| 1. | Desire to have more accessible parks within residential areas | **As a** citizen, **I want to** have access to nearby parks within my residential area, **so that I can** easily incorporate short walks into my daily routine. |
| 2. | Have abandoned spaces transform into green spaces | **As a** citizen, **I want to** immerse in more green spaces, **so that I can** see abandoned spaces within the city being repurposed meaningfully. |
| 3. | Underutilised areas to plant more flora and fauna to improve air quality | **As a** citizen, **I want to** seeunderutilised areas have more flora and fauna, **so that I can** live in an environment with better air quality. |
| 4. | Prevent wildlife animals from extinction | **As a** citizen, **I want to** see actions taken to prevent the extinction of animals in our city, **so that I can** interact with a variety of animal species in the future. |
| 5. | Public Transportation | **As a** citizen, **I want to encourage the usage of public transportation instead of private transportation, so that I can do my part in increasing ridership of public transportation.** |
| 6. | Solar Panels | **As a** citizen, **I want to encourage more landed residents to install solar panels, so that I can help others play their part in using renewable energy at home.** |
| 7. | More Electric cars | **As a citizen, I want to encourage my friends to switch to electric vehicles by telling them that electric cars are more sustainable for the environment, so that I can do my part in helping my circle of friends travel more sustainable by using electric cars instead of diesel cars.** |
| 8. | Energy Consumption | **As a** citizen, **I want to use less electricity by turning off appliances after usage so that I can reduce my carbon footprint at home.** |
| 9. | Green initiatives in a local community | **As an** eco-advocate**, I want to** lead by example in promoting recycling, using reusable items, and proper waste disposal, **so that I can** inspire others about sustainable living. |
| 10. | Sustainable shopping | **As an** eco-conscious shopper, **I want to** promote the use of recyclable bags during my shopping and gift them to friends and family, **so that I can** encourage a wider community to embrace sustainable practices. |
| 11. | School-wide recycling | **As an** educator, **I want to** organize educational workshops and initiate school-wide recycling programs, **so that I can** promote recycling among students. |
| 12. | Paper recycling at the office | **As an** office worker, **I want to** have designated bins to dispose of used paper, **so that I can** foster a sustainable environment in the office. |
| 13. | Cheaper home-made dish with locally grown produce | **As a** culinary hobbyist, **I want to** purchase locally grown produce at a lower price **so that I can** support local farms in the long run. |
| 14. | Not worry about food scarcity when external conflicts arise | **As a** citizen, **I want to** secure locally grown produce on a large scale, **so that I can** still maintain my diet when food imports are blocked due to external conflicts. |
| 15. | Reduce food wastage around my environment | **As a** citizen, **I want to** partake in national-level campaigns encouraging minimal food wastage, **so that I can** contribute to building a country with minimal food wastage. |
| 16. | Cheaper eggs in the market | **As a** citizen, **I want to** see increased production of eggs, **so that I can** purchase eggs at a cheaper price. |

# 4.4 Online Survey Questions and Analysis

In addition to the interviews, we decided to gather the public’s opinions on Singapore’s efforts to build a sustainable future via online surveys (a total of **15** close-ended questions). Our survey has reached out to 72 respondents, and after filtering out audiences to only residents who had lived in Singapore for more than 10 years (aligned with our target audience), there was a finalised total of **60 responses**.

The following is the link for our survey questions and responses conducted over Google Forms:

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| **Description** | **Link** |
| Google Spreadsheet | <https://docs.google.com/spreadsheets/d/1yIoBdQy-ZLVoh0CcqG9KEgqetzXlUp56NpPk43jN80k/edit?usp=sharing> |

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| **Results of Survey** | **Interpretation** |
|  | We managed to get responses from various age groups, providing a concise snapshot of demographic distribution.  There were respondents from various age groups, allowing for varying responses from different backgrounds. |
|  | The pie chart illustrates the distribution of survey respondents based on their years of residence in Singapore.  The responses have been filtered out according to our target audience group. |
|  | Among the respondents, **6 (10%)** of the respondents expressed being **very satisfied**, and **27** (**45%)** of them were **satisfied** with the diversity of green spaces in Singapore.  On the contrary, **22 (~36.7%)** of them expressed **dissatisfaction**, suggesting a perception that the current green spaces are limited.  A small percentage of **5 (8%)** of them had **neutral** feelings, indicating neither satisfied nor dissatisfied with the varieties of green spaces in Singapore. |
|  | Based on the survey results, **31 (~51.7%)** respondents reside **within a 10-minute walking distance** to reach the nearest park from their house.  Within this group, **5 (~8.3%)** of them took **less than 5 minutes**, while **26 (~43.3%)** of them took **5 to 10 minutes** to reach.  However, the survey also reveals that **29 (48.3%)** of the respondents **took over 10 minutes** to get to their nearest park.  Within this group, **9 (15%)** of them took around **11 to 15 minutes**, **17 (~28.3%)** of them took around **16 to 20 minutes**, and **3 (5%)** of them took **more than 20 minutes** to reach. |
|  | Among the respondents, **17 (~28.3%) of them expressed a strong agreement**, and **34 (56.7%)** of them **agreed** that the city’s green infrastructure has improved air quality.  A smaller portion, consisting of **7 (~11.7%) respondents held neutral** views, while a minority of **2 (~3.3%)** of our respondents **disagreed** with the notion that the city’s green infrastructure has positively impacted air quality. |

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|  | **53(~89%)** respondents feel that the government is **putting effort** (scale >5) totransition to green energy.  This could be due to Singaporeans being knowledgeable about government efforts. |
|  | **24 (40%)** of respondents feel that the electricity tariff rates are **too expensive**.  This might be due to Singapore Citizens using a lot of electricity or that tariffs are expensive. |
|  | 21 (35%) of Singaporeans do not have a car. This might be because of the recent increase in Certification of Entitlement (COE). 4 (6.7%) and 14 (23.3%) have an electric car and a hybrid car respectively. This might be because they are aware that hybrid or electric cars are more sustainable. |
|  | In our survey, **36 (60%)** of respondents expressed the view that Singapore’s efforts in promoting sustainable living are **sufficient**.  Conversely, **11 (18.3%)** of the respondents believe these efforts are **insufficient**.  The remaining **13 (21.7%)** maintain a **neutral** stance on the efforts of Singapore to foster sustainable living. |

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|  | Most of the respondents **38 (~63.3%)** take **less than a 5-minute** walk to reach the nearest recycling bin in their neighbourhoods, while some of the respondents **17 (~28.3%)** take **5 to 10 minutes**, and the minority of the respondents **5 (~8.3%)** take **more than 10 minutes**. |
|  | According to our survey, **28** (**46.7%)** of the respondents think the **area to focus on the most** to further enhance the commitment to sustainable living and environmental conservation is **waste reduction initiatives**. |
|  | **21 (35%)** of respondents feel that rising **food prices in neighbouring countries affect** Singapore's food security the most.  This could be due to Singapore’s **over-reliance on food imports**, making its food prices **volatile to the global market’s price indicators**. |
|  | **51 (85%)** of respondents are in households whose diets contain **more than 50%** meat, with **9 (15%)** within this group having **more than 80%** of meat.  This shows that meat makes up a **significant portion of diets** in Singaporean households. |

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|  | **38 (~63.3%)** of the respondents are **confident** that Singapore can sustain its meat demand for its ever-growing population.  This could be due to Singapore’s constant public showcase of commitment **to providing a food-secure nation** where it heavily invests in agricultural-food technology. |
|  | **35 (~58.3%)** of the respondents **have never bought** locally grown produce.  This could be due to the large difference in **price points** between **locally grown produce** and **imported produce**. |

# 4.5 Further Insights and Analysis

We expanded our horizons by engaging with other domains and interviewed a professor from the National University of Singapore (NUS), who is affiliated with the School of Design and Environment and specialises in researching solutions to assess Singapore's commitment to implementing a sustainable future.

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| **Description** | **Link** |
| Interview audio | <https://drive.google.com/drive/folders/1hNMojnMPF0LoeBCJMogeiEWEaHscIkcJ?usp=sharing> |

Questions we had asked and his insights:

1. What are your thoughts on the government taking initiatives to integrate more greenery into our urban and residential areas?

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| Mentioned Key Points |
| Important to have more green spaces for Singapore to be a sustainable city |
| Incorporating greenery in workspaces contributes to a healthier and productive work environment |
| Enhancing biodiversity results in a healthier ecosystem, improving the quality of life for citizens |
| Requires effective budgeting by the government for landscaping, irrigation, and plant care |
| Community engagement is crucial to maintaining sustainable green spaces |

1. Do you think having incentives and penalties on electricity bills is a feasible solution to encourage Singaporeans to adopt energy conservation habits?

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| --- |
| Mentioned Key Points |
| More aware of the amount of electricity they use. |
| Take action to reduce the electricity usage. |
| Applying a threshold on electricity usage based on data to make it fair and realistic with the help of AI |

1. “Do you think Singapore’s effort in recycling used water contributes significantly to our water conservation?”

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| --- |
| Mentioned Key Points |
| Significant contribution to water conservation |
| Transformative impact of reusing water |
| Substantial contribution to NEWater production |
| Perceived marginality in overall water consumption |
| Key technologies in water recycling |
| Cornerstone for a sustainable water |
| Importance of public perception |
| Ongoing importance of conservation |

1. Do you think Singapore is able to ramp up local food production by investing in its Research and Development?

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| --- |
| Mentioned Key Points |
| Agri-food Cluster Transformation fund spearheads transformation of the agri-food sector |
| Promising results from early research |
| Adoption of new agri-food technology is important |
| Local produce to be sold cheaply to increase demand |

# 5. Proposed Workplan (Individual Pillars)

# City in Nature |Choo Tze Hsuen| 220926F

## 5.1 Area of Concern of Target Audience

Based on the survey findings and insights from the two interviewees, it is evident that the primary area of concern revolves around the **insufficient availability of green spaces in Singapore**. The identified pain points through the interviews and survey include:

1. Requires over 10 minutes to reach the nearest park from a household.
2. Abandoned or not utilised spaces have the potential to create more green areas.
3. Expressed concern for animal welfare, reduce the extinction of species and loss of their habitats.

## 5.2 Defining Sub-Hypothesis Statement

The City in Nature pillar of the Green Plan **is committed** to expanding urban greenery, aligning with Singapore’s goal of sustainable living.

## 5.3 Features and Benefits

The government has introduced 5 solutions with benefits to address the limited green spaces in Singapore, the solutions are as follows:

1. **Expanding Nature Parks Network:** The existing 350 hectares (ha) of the nature park network will be extended by an additional 200ha over the next six years. These nature parks will serve to safeguard nature reserves against the impact of urbanisation and human activities. In terms of progression, Rifle Range Nature Park (66ha) was officially opened to the public in November 2022. Furthermore, various parks such as Lim Chu Kang Nature Park, Mandai Mangrove and Mudflat Nature Park, and Khatib Bongsu Nature Park were developed.
2. **Intensifying Nature in Gardens and Parks:** Over 300ha will be allocated to enhance nature in both new and existing gardens and parks. This effort includes focusing on more native plants and animal conservation. By 2030, species recovery plans will be carried out for 100 plant and 60 animal species. In terms of progression, species recovery plans have been implemented for over 120 plants and animal species, and there are an additional 10 Therapeutic Gardens developed in Singapore as of 28 February 2023.
3. **Restoring nature into the built environment:** The government aims to establish 200ha of skyrise greenery island-wide and plant at least 170,000 trees in industrial areas, resulting in cooler temperatures and improved air quality. Currently, there are over 90,000 trees planted within industrial estates.
4. **Connectivity Enhancement:** Involves strengthening connectivity between Singapore’s green spaces by establishing a network of ecological corridors. By 2030, there will be 500 km of park connectors, ensuring every household is within a 10-minute walk from a park. In terms of progression, there are already 375 km more of existing park connectors.
5. **Improve Veterinary Care and Animal Management**: Animals play a crucial role in enriching the biodiversity of the city’s urban ecosystem. The Animal and Veterinary Service (AVS) collaborates closely with partners to improve areas in animal health, welfare, and management.

*Progression of City in Nature efforts was found through this report by the National Parks Board (NParks):* [*city-in-nature-efforts.pdf (mnd.gov.sg)*](https://www.mnd.gov.sg/docs/default-source/default-document-library/city-in-nature-efforts.pdf)

## 5.4 Resources (URL for potential and valid datasets)

|  |  |  |
| --- | --- | --- |
| **City in Nature** | | |
| * Environmental Impacts * Green Spaces * Animal Welfare & Health Services | | |
| **S/N** | **Dataset** | **Description** |
| 1 | **Tree Cover Lost in Singapore**  Dataset is from Global Forest Watch:  [Singapore Deforestation Rates & Statistics | GFW (globalforestwatch.org)](https://www.globalforestwatch.org/dashboards/country/SGP/) | Evidence for: **Environmental Impacts**  Data is from 2001 to 2022 |
| 2 | **Annual Carbon Dioxide (CO2) Emission**  Dataset is from Our World in Data:  <https://ourworldindata.org/co2/country/singapore> | Evidence for: **Environmental Impacts**  Data is from 1950 to 2022 |
| 3 | **Total Land Area**  Dataset is from Statistics of Singapore:  [(DOS) | SingStat Table Builder – Land Area (As At December)](https://tablebuilder.singstat.gov.sg/table/TS/M890151) | Evidence for: **Environmental Impact**  Data is from 1960 to 2022 |
| 4 | **Total Area of Green Spaces**  Dataset is from National Parks Annual Reports:  [NParks Annual Report – Archives - Annual Reports - Who We Are - National Parks Board (NParks)](https://www.nparks.gov.sg/about-us/annual-reports/nparks-annual-report-archives) | Evidence for: **Green Spaces**  Example: 2020 green spaces can be found on page 30 labelled “Facts & Figures FY 2020” under Regional Parks Maintained by NParks |
| 5 | **Number of Regional and Neighbourhood Parks**  Dataset is from National Parks Annual Reports:  [NParks Annual Report – Archives - Annual Reports - Who We Are - National Parks Board (NParks)](https://www.nparks.gov.sg/about-us/annual-reports/nparks-annual-report-archives) | Evidence for: **Green Spaces**  Example: 2020 regional and neighbourhood parks can be found on page 30 labelled “Facts & Figures FY 2020” under Regional Parks Maintained by NParks |
| 6 | **Number of Parks per Region**  Dataset is from National Parks Annual Reports:  [NParks Annual Report – Archives - Annual Reports - Who We Are - National Parks Board (NParks)](https://www.nparks.gov.sg/about-us/annual-reports/nparks-annual-report-archives) | Evidence for: **Green Spaces**  Example: 2020 parks at different locations can be found on page 30 labelled “Facts & Figures FY 2020” under Regional Parks Maintained by NParks |
| 7 | **Licensed Veterinarians and Veterinary Centres**  Dataset is from National Parks Annual Reports:  [NParks Annual Report – Archives - Annual Reports - Who We Are - National Parks Board (NParks)](https://www.nparks.gov.sg/about-us/annual-reports/nparks-annual-report-archives) | Evidence for: **Animal Welfare & Health Services**  Example: 2020 veterinarians and veterinary centres can be found on page 30 labelled “Facts & Figures FY 2020” under Animal Health and Welfare |

# Energy Reset | Teagan Tham | 232142G

## 5.1 Area of Concern of Target Audience

From the responses of both the interview and survey, one area of concern is **the lack of commitment to a sustainable country in terms of energy by both government and citizens**, the 4 pain points are:

1. Unsustainable form of transportation
2. Large energy consumption by Singaporeans
3. High Electricity Tariff Rates
4. Converting to renewable energy sources

## 5.2 Defining Sub-Hypothesis Statement

The Energy Reset pillar of the Green Plan **is committed** to making energy consumption and production better holistically.

## 5.3 Features and Benefits

The government has proposed 4 solutions for cleaner transportation:

1. **Green Transportation**: All diesel buses will be replaced with cleaner energy buses by 2040.
2. **EV Charger Deployment**: We aim to deploy 60,000 EV charging points across Singapore by 2030, comprising 40,000 in public car parks and 20,000 in private premises.
3. **Tax Incentives for Electronic Cars**: EV Early Adoption Incentive (EEAI), Enhanced Vehicular Emissions Scheme (VES), Additional Registration Fee (ARF) floor reduction; and Revision of road tax framework for electric cars.
4. **Banning of Petrol and Gas vehicles**: New registrations of diesel cars and taxis will be banned from 2025, and all new registrations of cars and taxis will be of cleaner energy models from 2030.

## 5.4 Resources (URL for potential and valid datasets)

|  |  |  |
| --- | --- | --- |
| **Energy Reset** | | |
| * Public Transportation * Electric Cars * Tarif Prices * Energy Consumption | | |
| **S/N** | **Dataset** | **Description** |
| 1 | **Public Transportation Operation and Ridership**  Dataset is from SingStat:  <https://tablebuilder.singstat.gov.sg/table/TS/M651351> | Evidence for: **Public Transportation and Ridership** |
| 2 | **New Registration of Cars by Make in 2023 2nd Half**  Dataset is from LTA:  https://www.lta.gov.sg/content/dam/ltagov/who\_we\_are/statistics\_and\_publications/statistics/pdf/M03-Car\_Regn\_by\_make.pdf | Evidence for: **Registration of Different Fuel Cars for 2023** |
| 3 | **Energy Prices**  Dataset is from Singapore-energy-statistic:  https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter5 | Evidence for: **Electric and Town Gas Tarif** |
| 4 | **Energy Consumption**  Dataset is from Singapore-energy-statistic:  https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter3 | Evidence for: **Energy and Natural Gas Consumption by Sector** |
| 5 | **Solar**  Dataset is from Singapore-energy-statistic:  https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter6 | Evidence for: **Solar Capacity and Installation** |
| 6 | **Total Car Population**  Dataset is from LTA:  https://www.lta.gov.sg/content/dam/ltagov/who\_we\_are/statistics\_and\_publications/statistics/pdf/MVP01-6\_Cars\_by\_make.pdf | Evidence for: **Car population of Different Fuel Cars for 2022** |

# Sustainable Living | Cheng Sheh Nee | 234745J

## 5.1 Area of Concern of Target Audience

Considering the survey results and the perspectives shared by the two interviewees, the area of concern emerges as **limited awareness in eco-friendly practices**. This is reflected in the pain points mentioned in the interview:

1. Confused on which products can be recycled
2. People tend to overweight the inconvenient of reusing materials rather than considering the benefits
3. The need for continuous education to clarify recycling guidelines
4. Awareness gap in upcycling projects

Addressing these challenges will be vital for building a more sustainable and environmentally conscious community.

## 5.2 Defining Sub-Hypothesis Statement

The Sustainable Living pillar of the Green Plan **is committed** to building an eco-friendly country.

5.3 Features and Benefits

The government has proposed 4 solutions to foster sustainable living:

1. **A Zero Waste Nation**: Programs like responsible e-waste disposal and beverage container return schemes are driving recycling efforts. Promoting sustainable living by minimizing waste and encouraging proper recycling practices for everyone.
2. **A Circular Economy:** Close the water loop by recycling used water to create NEWater. Making a strong push to turn waste into treasure with a circular approach.
3. **Eco Stewardship Programme**: All MOE schools, from Primary to Pre-University, will focus on sustainability by enhancing the curriculum and school programs. The goal is a two-third reduction in net carbon emissions by 2030, with at least 20% of schools aiming to be carbon neutral by then.
4. **Green Commutes**: On track to make 8 in 10 households within a 10-minute walk of a train station by 2030. The rail network will be 360km long, and cycling paths will expand to 1300km by 2030. Furthermore, the government aim to repurpose roads and make areas pedestrian-friendly where possible.

5.4 Resources (URL for potential and valid dataset)

|  |  |  |
| --- | --- | --- |
| **Sustainable Living** | | |
| * Recycling * Waste Management * Sustainable Packaging * Eco-Friendly Transportation | | |
| **S/N** | **Dataset** | **Description** |
| 1 | **Recycling Waste by Waste Type**  The Government of Singapore (May 21, 2015)  Recycling Rate By Waste Type – data.gov.sg  <https://beta.data.gov.sg/datasets/d_9740df787da2b59a0b5bd76a6c33453d/view> | Evidence for: **Recycling** |
| 2 | **Frequency of recycling single-use plastic bottles in Singapore as of May 2023**  The government of Singapore (June 2023)  Frequency of recycling single-use plastic bottles in Singapore as of May 2023 – statista.com  <https://www.statista.com/statistics/1389977/singapore-frequency-of-recycling-plastic-bottles/> | Evidence for: **Recycling** |
| 3 | **Volume of Waste Recycled in Singapore from 2013 to 2022**  The government of Singapore (May 2023)  Volume of Waste Recycled in Singapore from 2013 to 2022 – statista.com  <https://www.statista.com/statistics/628048/waste-recycled-in-singapore/> | Evidence for:  **Waste Management** |
| 4 | **Volume of Waste Disposed in Singapore from 2013 to 2022**  The government of Singapore (May 2023)  Volume of Waste Disposed in Singapore from 2013 to 2022 – statista.com  <https://www.statista.com/statistics/628000/waste-disposed-in-singapore/> | Evidence for:  **Waste Management** |
| 5 | **The Total Volume of Waste Paper generated in Singapore from 2013 to 2022**  The government of Singapore (May 2023)  The total volume of waste paper generated in Singapore from 2013 to 2022 – statista.com  <https://www.statista.com/statistics/962178/waste-paper-generated-volume-singapore/> | Evidence for:  **Waste Management** |
| 6 | **Consumers’ Perception towards Food Packaging in Singapore in 2020**  The Government of Singapore (September 2020)  Consumers’ Perception towards Food Packaging in Singapore in 2020 – statista.com  <https://www.statista.com/statistics/1208386/singapore-perception-towards-food-packaging/> | Evidence for:  **Sustainable Packaging** |
| 7 | **Frequency of using Reusable Bags when shopping in Singapore as of June 2021**  The government of Singapore (August 2021)  Frequency of using reusable bags when shopping in Singapore as of June 2021 – statista.com  <https://www.statista.com/statistics/1312708/singapore-frequency-of-using-reusable-shopping-bags/> | Evidence for:  **Sustainable Packaging** |
| 8 | **Preference for reusable packaging among consumers in Singapore as of March 2022**  The Government of Singapore (April 2022)  Preference for reusable packaging among consumers in Singapore as of March 2022 – statista.com  <https://www.statista.com/statistics/1314610/singapore-preference-for-reusable-packaging-among-consumers/> | Evidence for:  **Sustainable Packaging** |
| 9 | **Average number of passengers per day using public transport in Singapore from 2015 to 2022**  The government of Singapore (February 2023)  The average number of passengers per day using public transport in Singapore from 2015 to 2022 – statista.com  <https://www.statista.com/statistics/1006174/singapore-daily-public-transport-ridership/> | Evidence for:  **Eco-Friendly Transportation** |

# Resilient Future | Chong Cheng Hock | 230643M

## 5.1 Area of Concern of Target Audience

From both the interviewees and survey analysis, one prominent area of concern is **Singapore will not be able to sustain its food demand in the future**.

The above highlights the concern of the target audience. Singapore is well-known for importing more than 90% of its food to meet its food demand. This over-reliance on other countries leaves us volatile to shocks in external countries. Singapore is a first-world country where there is an encroaching trend of food wastage, which further aggravates the shortage of locally grown produce. It also has a small land mass, consequently the food output of our agricultural-food sector would be minimal.

## 5.2 Defining Sub-Hypothesis Statement

The Resilient Future pillar of the Green Plan **is committed** to making its food supply resilient in the future.

## 5.3 Features and Benefits

The Singapore Green Plan 2030 has set goals to tackle the over-reliance on other countries for our food supply, increasing its food supply resilience mainly by ramping up local food production in multiple ways.

1. **Supporting the agri-food sector to transform** into one that is highly productive, climate-resilient and resource-efficient through the Agri-Cluster Transformation (ACT) fund;

* The ACT fund supports farms’ needs in different aspects, such as capability upgrade, innovation and test-bedding, as well as tech upscaling.
* Replaced Agriculture Productivity Fund (APF); APF was launched in 2014 and by the end of December 2020, had awarded a total of $43 million to 118 farms. The farms cumulatively achieved more than 280,868 man-hours saved (equivalent to 107 workers), increased production of leafy vegetables by ~1,680 tonnes (~13.2% of total production in 2020), increased production of food fish by more than 648 tonnes (~15.6% of total production in 2020), increased production of hen shell eggs by over 46 million pieces (~7.5% of total local production in 2020)
* Through the APF, Blue Ocean Aquaculture Technology (BOAT) Pte Ltd implemented a Recirculating Aquaculture System (RAS) which gave the fish farm the potential to achieve annual 18,340 man-hours and water savings of 17,000m2.
* [Annex A - Agriculture Productivity Fund](https://www.sfa.gov.sg/docs/default-source/default-document-library/sfa-media-release---new-60-million-fund-to-support-transformation-and-growth-of-local-agri-food-sector.pdf)

1. **Providing funding support** for innovative research projects in sustainable urban food production, future foods, and food safety science and innovation, through the Singapore Food Story R&D Programme which was allocated more than $309 million of funds.

* 12 awarded proposals to carry out ideas and solutions aligned with the grant’s objective to boost local food production. [SFA Awards over $23 Million to Grant Call Media Release](https://www.sfa.gov.sg/docs/default-source/default-document-library/260421_sfa-awards-over-23-million-to-grant-call-for-r-d-in-sustainable-urban-food-productiona58a092d264c4c91acf57099a12046eb.pdf)

1. **Rallying citizens** to play a part through branding and promotion of local produce, which enables local farms to grow their business sustainably.

* In February, an industry-led alliance supported by the Singapore Food Agency (SFA) was set up to boost local demand for local produce through consumer education. [Channel News Asia: Boosting Local Demand](https://www.channelnewsasia.com/singapore/local-imported-vegetables-produce-farms-price-demand-3517356)
* 44 businesses rewarded with [Farm-to-Table Recognition Programme logo](https://www.sfa.gov.sg/food-farming/sgfoodstory/supporting-local-produce) which utilise locally grown produce for more than 15% of total procurement value in at least 1 food category.

## 5.4 Resources (URL for potential and valid dataset)

|  |  |  |
| --- | --- | --- |
| **Resilient Future** | | |
| * Food imports * Local food production * Food waste | | |
| **S/N** | **Dataset** | **Description** |
| 1 | **Local Food Production Output Yearly**  Dataset is from Statistics of Singapore:  [(DOS) | SingStat Table Builder – Local Production](https://tablebuilder.singstat.gov.sg/table/TS/M890721#!) | Evidence for: **Local Food Production**  Data is from 1976 to 2022 |
| 2 | **Local Egg Production Quarterly**  Dataset is aggregated from Singapore Food Agency’s annual reports:  <https://www.sfa.gov.sg/docs/default-source/publication/sg-food-statistics/singapore-food-statistics-2022.pdf,> page 14 | Evidence for: **Local Food Production**  Data is from 2020 to 2022  Aggregated data from annual reports |
| 3 | **Licensed Local Food Farms Yearly**  Dataset is from Statistics of Singapore:  [(DOS) | SingStat Table Builder – Licensed Local Food Farms](https://tablebuilder.singstat.gov.sg/table/TS/M891471) | Evidence for: **Local Food Production**  Data is from 2019 to 2022 |
| 4 | **Merchandise Imports by Commodity Division Monthly**  Dataset is from Statistics of Singapore:  [(DOS) | SingStat Table Builder – Merchandise Imports By Commodity Division](https://tablebuilder.singstat.gov.sg/table/TS/M451021#!) | Evidence for: **Food Imports**  Data is from 1960 to 2022 |
| 5 | **Agricultural-orientation Index Yearly**  Dataset is from Key Indicators Database (KIDB):  [The Agriculture Orientation Index for Government Expenditure](https://kidb.adb.org/explore?filter%5Bindicator_id%5D=3020009&filter%5Beconomy_code%5D=AFG%2CARM%2CAUS%2CAZE%2CBAN%2CBHU%2CBRU%2CCAM%2CCOO%2CFIJ%2CFSM%2CGEO%2CHKG%2CIND%2CINO%2CJPN%2CKAZ%2CKGZ%2CKIR%2CKOR%2CLAO%2CMAL%2CMLD%2CMON%2CMYA%2CNAU%2CNEP%2CNIU%2CNZL%2CPAK%2CPHI%2CPLW%2CPNG%2CPRC%2CRMI%2CSAM%2CSIN%2CSOL%2CSRI%2CTAJ%2CTAP%2CTHA%2CTIM%2CTKM%2CTON%2CTUV%2CUZB%2CVAN%2CVIE&filter%5Byear%5D=2000%2C2001%2C2002%2C2003%2C2004%2C2005%2C2006%2C2007%2C2008%2C2009%2C2010%2C2011%2C2012%2C2013%2C2014%2C2015%2C2016%2C2017%2C2018%2C2019%2C2020%2C2021%2C2022%2C2023&grouping=indicators&showRegions=1) | Evidence for: **Local Food Production**  Data is from 2001 to 2021 |

|  |  |  |
| --- | --- | --- |
| 6 | **Food Wastage and Recycled Yearly**  Dataset is from the National Environment Agency (NEA):  [NEA | Food Waste Management](https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/food-waste-management) | Evidence for: **Food Waste**  Data is from 2018 to 2022 |

# 6.4 Approach & Timeline

Outline of the team’s approach and timeline to produce our analysis/solution utilising the “Visme” platform.

A poster of a timeline

Description automatically generated