GovHack Team **AUSR**

Problem Statement: Urban Design and Amenity towards zero emissions

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With the significant impact of climate change, our cities are reshaping, and the future is being refocused on **tech, transportation and open spaces**; stage by stage; we believe the classical image of cities with tall buildings is very resilient, and they cannot disappear anytime soon, but changes will take place.
We propose our **4-stage plan** to the state government to work towards realizing the vision of zero-emission cities

The 4-stage plan consists of:

- **RESPOND** - where the focus is on the creative use of pre-existing infrastructure; it is a responsible way that will take advantage of new economic opportunities while aiming to reduce energy and emissions
- **REACTIVATE** - where we are looking to re-configure urban layout in response to changes, with the help of technology
- **TRANSFORM** - where Australia as a nation looks at more creative ways of using renewable energy while reducing carbon footprint
- **GROW** - a long-term outlook at how cities might look like in the next 30 years

Australia has laid out its plan to reach net zero emissions by 2050, and the government will act in a practical and responsible way to contribute towards net zero emissions, while preserving Australian jobs and generating new opportunities for industries and regional Australia.

Australia's whole-of-economy Long-Term Emissions Reduction Plan outlines how we will:

- drive down the cost of low emissions technologies
- deploy these technologies at scale
- help our regional industries and communities seize economic opportunities in new and traditional markets
- work with other countries on the technologies needed to decarbonise the world's economy.

Over the next decade, Australia's existing $20 billion investment in low emissions technology is expected to unlock at least $80 billion of total private and public investment, including in clean hydrogen, carbon capture and storage and energy storage. The Technology Investment Roadmap outlined in the Australia's long-term emissions reduction plan will guide more than $20 billion of government investment in low emissions technology to 2030. We believe our 4-stage plan, with **Respond** and **Reactivate** phases as our selling point at the moment to win State Government tender, can share in this $20 billion budget and take a 5% of the total amount, which is equivalent to $1 billion dollar. The amount will be used in our proposal, especially for first 2 stages of Respond and Reactivate. Transform and Grow stages are longer-term plan proposal that needs further prototyping and planning to estimate an accurate budget amount; but it can share in the total funding of the $20 billion budget to 2030.

AUSR 4-stage plan of urban design towards zero emissions

With the significant impact of climate change, our cities are reshaping, and the future is being refocused on **tech**, **transportation** and **open spaces**; stage by stage; we believe the classical image of cities with tall buildings are very resilient, and they cannot disappear anytime soon, but changes will take place. AUSR will be part of the revolution, by proposing our 4-stage plan to the state government and provide our consultancy service throughout this process, we work towards realizing the vision of a future vibrant of zero-emisison cities

The inevitable trends contributing towards zero emissions	**Our 4-stage plan of urban design towards zero emissions**			
Australia's plan to reach net zero target by 2050 - It is a shared and contributed effort from all Australians. Therefore, their voices with regard to urban design towards zero emissions will be heard.	Create a UGC platform that enables the public to share feedback and co-design urban planning, as well as vote/downvote existing and future plans in their neighbourhood. This is a validation process that will be used throughout the 4-stage plan.			
Work from home will remain the new norm	Encourage and enable work from home; and encourage the creative use of space by having "ghost office". The empty spaces can be utilised for various other purposes.			
Flexible conversion between public and private spaces with the use of big data	Smart data provided by outdoor sensors and CCTV cameras to identify peak hours and thus enable trading/dining businesses to extend their footprint on public spaces			
Entertainment, musical and art events can be seen as an environment detriment	**Respond**	Reconfigure the use of public spaces to host events and digitalize these events for more coverage (such as the use of holograms and virtual platform to make live music events accessible for everyone). Virtual concerts can contribute to cutting waste and C02 emissions as the live concert/industry consumes an enormouse amount of energy and product tons of waste including single use plastic bottles.		
Less commuting, less use of car, localised community within walking or biking distance		Propose urban layout that fast-tracks bike lanes and expanding footpaths; and deploy more public bikes for use through a booking app and utilize underground bike sheds.		
Neo-walled gardens - Trend towards vertical gardens on city buildings		Utilizing advances in hydroponics, gardens and vegetables continued to be a feature of city buildings. Green walls are credited with reducing air pollution and improving air quality.		
Demand for more creative ideas for renewable energy		**Reactivate**	From integrating smart tiles that can capture kinetic energy from pedestrians' footsteps and convert them to energy to building Traffic Powered Wind Turbines in the middle or side of a roadway	
The need for safer use of public transportation, and the logistical pressure on 3PL shipping companies when online shopping is on the rise			Implement different models of electric self-driven vehicles as a means of public transport (transporting humans) and a means of goods transport (transporting supplies)	
A trend in localised economy and community for less travel			**Transform**	Build a self-sufficient neighbourhood, space out public amenities and essential shops to enable localised economy and community
A desire for greener urban cities and less CO2 footprint from urban activities				Stricter building codes favoring greener technologies and thus reduce the impact of carbon emission. Ultra efficient buildings using smart sensors to monitor their electricity usage, as well as heating and cooling electrification and passive design optimisation by utilising natural lighting, heating and cooling sources should become the new norm by then
				Grow

Closer view on the 4-stage plan proposed by AUSR in an Excel format can be accessed via: https://bit.ly/3Kb34oU

Respond – 6 months to 1 year where the focus is on the creative use of pre-existing infrastructure; it is a responsible way that will take advantage of new economic opportunities while aiming to reduce energy and emissions	**Reactivate – 1 to 3 years** where we are looking to re-configure urban layout in response to changes, with the help of technology
Create a UGC platform that enables the public to share feedback and co-design urban planning, as well as vote/downvote existing and future plans in their neighbourhood. This is a validation process that will be used throughout the 4-stage plan. A UGC platform costing around 16 000 - $20 000 can be built within 2 months. AUSR manages UGC platform and coordinates with the public & the government at an annual cost of $20 000. Public opinions will be shared and used to validate our 4-stage plan throughout the whole holistic process. **Encourage and enable work from home; and encourage the creative use of space by having "ghost office". The empty spaces can be utilised for various other purposes.** Most businesses are downsizing their office space. In our tender presented to the State Government, we encourage the government to promote the idea of “ghost office”, where businesses can use a booking app to easily lease offices within days or even hours for client or team meeting. A simple booking application can be outsourced at around $4000 - $15 000, depending on the features. The empty office space can also be used for other purposes such as for community indoor events. **Smart data provided by outdoor sensors and CCTV cameras to identify peak hours and thus enable trading/dining businesses to extend their footprint on public spaces** State Governments can also rapidly deploy outdoor low-cost sensors as a state-wide project. With the declining IoT sensors manufacturing, the cost can be as low as $0.38 per sensor. Data management will be the major cost in this project, with the cost estimated to be around $50 000 per year. By identifying busy/quiet periods, the open spaces will be better utilised and thus reduce space waste.	**Reconfigure the use of public spaces to host events and digitalize these events for more coverage (such as the use of holograms and virtual platform to make live music events accessible for everyone). Virtual concerts can contribute to cutting waste and C02 emissions as the live concert/industry consumes an enormous amount of energy and product tons of waste including single use plastic bottles.** By using optical equipment and powerful lasers, creative artists can explore new means to exhibit their illusionistic artworks. Cost can vary, with an average of 15 m2 can cost around $18 000 for equipment setup. Live performance might also have to adapt. From digitalizing channels of delivering musical performances, to hosting virtual shows at virtual venues. A collaboration with pre-existing virtual platforms such as the popular game title Fortnite can cost around $50 000 to $150 000 depending on the concept. **Propose urban layout that fast-tracks bike lanes and expanding footpaths; and deploy more public bikes for use through a booking app and utilize underground bike sheds.** A simple booking app can be outsourced at a cost of $4000 - $15 000; and AUSR can coordinate the logistics of deploying free-for-public-use bikes around different cities at a cost of around $150 per bike. The early trial stage might see 10 bikes at major CBD with around $1500 in deployment cost; and future roll-out might expand to other suburbs and with larger quantities. **Utilizing advances in hydroponics, gardens and vegetables continued to be a feature of city buildings. Green walls are credited with reducing air pollution and improving air quality.** Starting at $1,450 for custom design and installation of premium vertical garden made in Australia. For larger projects increased economies of scale will mean cost savings for building companies.

Transform – 3 to 5 years where Australia as a nation looks at more creative ways of using renewable energy while reducing carbon footprint	**Grow – 5 to 10 years** a long-term outlook at how cities might look like in the next 30 years
From integrating smart tiles that can capture kinetic energy from pedestrians' footsteps and convert them to energy to building Traffic Powered Wind Turbines in the middle or side of a roadway The creative use of renewable energy is encourage and state governments can tender various bids from building contractors that promote green energy solutions. **Implement different models of electric self-driven vehicles as a means of public transport (transporting humans) and a means of goods transport (transporting supplies)** Bus routes are very inconvenient, infrequent; it runs on an inaccurate timetable and does not reach many suburban points. Most of the bus fleets are also older than 2010 with high carbon emission. In our long-term plan of transforming cities, we propose the use environment-friendly electric self-driven vehicles, including a flexible booking system based on the existing Bus apps that allow people to book a trip as they desire, thus gather the most demand possible within a flexible planned route. Delivery to Australian addresses is also usually substantially delayed due to infrequent networks. Using self-driven vehicles to transport goods can help accelerate delivery time in the state. The whole process of validating the prototype and synchronizing vehicles with a digital platform will cost roughly $800,000 for the whole state; with the first pilot program estimated to be around $200 000 in one of the 4 major cities.	**Build a self-sufficient neighbourhood, space out public amenities and essential shops to enable localised economy and community** AUSR seek to understand the city residents and how they will evolve in the future. We modify our plan as we go, but currently, we estimate a trend of self-sufficient neighbourhoods, where people can have access to essential shops and services within walking distance, thus reducing the use of car and high emission vehicles. Our transform stage has laid out the building brick, but AUSR still need to work with the government at a deeper level to plan a more compact and self-sufficient neighbourhood. For compact CBD, vertical community where amenities are built into a high building complex is also encouraged to reduce traveling. **Stricter building codes favouring greener technologies and thus reduce the impact of carbon emission. Ultra-efficient buildings using smart sensors to monitor their electricity usage, as well as heating and cooling electrification and passive design optimisation by utilising natural lighting, heating and cooling sources should become the new norm by then** The first three stages of Response – Reactive – Transform establish the fundamentals for a city with less human footprint. AUSR also proposes stricter building codes to the government, favouring greener technologies and reduction of carbon emissions impact. The cost of permits and licenses can be increased by 15% for contractors proposing to construct buildings without adhering to green construction practices.

Reference and readings used to draw our conclusion on statistical figures

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