ANNEX B: SUPPORT FOR BUILDING A SMART, GREEN AND LIVEABLE CITY

(A) Building a Smart Nation

To give our Smart Nation journey a greater push, the Government will take the lead to lay the foundation infrastructure and drive pervasive adoption of digital and smart technologies throughout the economy and society. As announced on 20 August 2017 after the National Day Rally, the Government is focusing on the following strategic national projects:

a) **Smart Nation Sensor Platform**, to accelerate the deployment of sensors and other Internet of Things (IoT) devices that will make our city more liveable and secure;

b) **National Digital Identity system**, for citizens and businesses to transact digitally in a convenient and secure manner;

c) **e-Payments** drive, to allow everyone to make simple, swift, seamless, and safe payments;

d) **Smart Urban Mobility**, to leverage data and digital technologies, including artificial intelligence and autonomous vehicles, to further enhance the public transport commute; and

e) **Moments of Life**, which bundles relevant government services from different agencies, to citizens at key moments of life. This reduces the need for citizens to transact with multiple government agencies, for a more seamless and convenient experience.

For these national projects to be successful, the Government will continue to engage citizens and businesses and respond to their feedback and needs.

More Information

Please visit https://www.smartnation.sg or contact the Smart Nation and Digital Government Office (SNDGO) at smartnation@pmo.gov.sg.

(B) Research and Development (R&D) in Urban Liveability and Environmental Sustainability

Cities of Tomorrow (Led by Ministry of National Development (MND))

Cities of Tomorrow is a Research and Development (R&D) programme that was announced at the Urban Sustainability R&D Congress 2017. It will focus R&D efforts to establish Singapore as a highly liveable, sustainable, and resilient city of the future through the development of technologies and solutions across six key research thrusts: (i) Advanced construction; (ii) Resilient infrastructure; (iii) New spaces; (iv) Greater sustainability; (v) Urban environment analytics; and (vi) Complexity science for urban solutions. These efforts involve collaborations between Government agencies, Institutes of Higher Learning (IHLs), research institutes and industry.

More information

Please visit https://www.mnd.gov.sg/citiesoftomorrow, or contact the respective officers in Table 1 below:

Table 1: Contact Person for Cities of Tomorrow

Research Thrust	Contact Person	Email
Advanced Construction, Resilient Infrastructure, and Greater Sustainability	Matilda Kenanga	Matilda_KENANGA@bca.gov.sg
	Alvin Oh	Alvin_SC_OH@hdb.gov.sg
New Spaces	Mindy Ong	Mindy_ONG@ura.gov.sg
Urban Environment Analytics	Matilda Kenanga	Matilda_KENANGA@bca.gov.sg
	Alvin Oh	Alvin_SC_OH@hdb.gov.sg
	Chan Sing Eu	CHAN_Sing_Eu@ura.gov.sg
Complexity Science for Urban Solutions	Zhou Yimin	ZHOU_Yimin@mnd.gov.sg
	Chan Sing Eu	CHAN_Sing_Eu@ura.gov.sg
	Alvin Oh	Alvin_SC_OH@hdb.gov.sg

Note: Contact information accurate as at 19 Feb 2018

Closing the Waste Loop (Led by National Environment Agency (NEA))

The Closing the Waste Loop initiative is an R&D programme that was announced at the launch of the Environmental Services Industry Transformation Map (ITM). It will support Singapore's efforts in working towards the Sustainable Singapore Blueprint's vision of a zero waste nation through the development of technologies and solutions to tackle challenges to waste management posed by increasing waste generation, scarcity of resources and land constraints. The initiative encourages collaborations among IHLs, research institutes and firms in the areas of: (i) Resource and value recovery from key waste streams, such as plastics, food, electrical and electronic products, (ii) Diversion of ash and residues to conserve landfill space, (iii) Environmental remediation of closed landfill, and (iv) Digital and data-driven waste management systems[1].

More information

Please contact Ms Chia Hong Ling at chia_hong_ling@nea.gov.sg or Mr Bai Yihao at bai_yihao@nea.gov.sg. *Contact information accurate as at 19 Feb 2018.*

Energy Grid 2.0 (Co-led by National Research Foundation (NRF) and Energy Market Authority (EMA))

Energy Grid 2.0 is an R&D programme that aims to develop next-generation energy grid architectures that are robust, flexible and responsive, to cope with energy demand and supply variability. These grid architectures will integrate and optimise multiple energy sources (including renewables) into a single intelligent system. A key feature of the programme will be a series of large-scale test-beds to drive greater energy efficiency and clean energy adoption, while maintaining high levels of grid reliability. Energy Grid 2.0 will provide a platform for collaboration between companies, IHLs and research institutes to test-bed and build innovative capabilities.

[1]This will include analysis of waste generation and management across the value chain, modelling and simulation to inform planning and policy decisions, and use of behavioural science to influence human behaviour.

More information

Please contact NRF at USS_Secretariat@nrf.gov.sg or EMA at energy_transformation@ema.gov.sg.

(C) Measures to Encourage Reduction of Greenhouse Gas Emissions

Carbon Tax

To encourage companies to reduce greenhouse gas (GHG) emissions, a carbon tax will be applied on the total GHG emissions of facilities that produce 25,000 tonnes or more carbon dioxide-equivalent (tCO_2e) of emissions in a year. The carbon tax will apply uniformly to all sectors, without exemption.

The carbon tax will take the form of a fixed-price credits-based (FPCB) mechanism. Taxable facilities will pay the tax by purchasing and surrendering the number of carbon credits corresponding to their GHG emissions. These credits will be issued by NEA at the prevailing carbon tax rate.

The carbon tax rate will be set at $5 per tCO_2e of emissions in the first instance, from 2019 to 2023. The first payment of the carbon tax will be in 2020, based on emissions in calendar year 2019.

The Government will review the carbon tax rate by 2023, and intends to increase the carbon tax rate to $10-15 per tCO_2e of emissions by 2030. In doing so, the Government will take into account international climate change developments, the progress of Singapore's emissions mitigation efforts, and Singapore's economic competitiveness.

More details on the carbon tax framework will be announced by the Ministry of the Environment and Water Resources' (MEWR) Committee of Supply (COS). The Carbon Pricing Bill will be tabled in Parliament in March 2018.

More information

Please contact MEWR at MEWR_CPBill@mewr.gov.sg.

Improving Energy Efficiency

Starting from 2019, the Government will set aside funds to enhance support for companies, including Small and Medium Enterprises (SMEs) and power generation companies, to improve energy efficiency and reduce emissions. This will be done through schemes such as the Productivity Grant (Energy Efficiency) and the Energy Efficiency Fund.

Productivity Grant (Energy Efficiency)

The Productivity Grant (Energy Efficiency), or PG(EE), encourages owners and operators of new and existing industrial facilities to invest in energy efficient equipment or technologies. Qualifying costs include manpower, consultancy, equipment and materials costs.

Energy Efficiency Fund

The Energy Efficiency Fund (E2F) supports companies to undertake (i) Energy assessments; (ii) Energy efficient design of new facilities; and (iii) Energy efficiency investments. Qualifying costs include manpower, consultancy, equipment and materials costs, and other logistical overheads.

The Ministry of Trade and Industry (MTI) and MEWR will share more details of the enhancements later this year

More information

Productivity Grant (Energy Efficiency)

Please visit http://www.edb.gov.sg/en/how-we-help/incentives-and-schemes.html, or contact Desmond Li (Economic Development Board (EDB)) at 6832 6320 or email him at Desmond_LI@edb.gov.sg.

For power generation companies, please contact Phua Zhi Ling (EMA) at 6376 7869 or email her at PHUA_zhi_ling@ema.gov.sg.

Contact information accurate as at 19 Feb 2018.

Energy Efficiency Fund

Please visit www.e2singapore.gov.sg/Incentives/Energy_Efficiency_Fund.aspx, or contact Leow Beng Kwang (NEA) at LEOW_Beng_Kwang@nea.gov.sg or Eunice Koh (NEA) at Eunice_KOH@nea.gov.sg

Contact information accurate as at 19 Feb 2018

Support for Housing and Development Board (HDB) households – Goods and Services Tax Voucher (GSTV) – Utilities-Save (U-Save)

The estimated impact of the $5 per tCO2e carbon tax on households will be small, at about 1% of total electricity and gas expenses on average. We will provide additional U-Save of $20 per year for three years, from 2019 to 2021, to eligible HDB households. The increase in U-Save will cover the expected average increase in electricity and gas expenses for HDB households arising from the carbon tax. This will help households adjust to the carbon tax when this is first implemented, as they take efforts to reduce their electricity and gas consumption over time. This will cost an additional $54 million over three years and benefit about 900,000 households.

Table 2: GSTV U-Save

HDB Flat Type	Annual Impact of Carbon Tax on Average Electricity and Gas Expenses from 2019 ($)	Additional Annual U-Save from 2019-2021 ($)#	Annual U-Save from 2019-2021 (after $20 Increase) ($)
1-Room	3.6	20	400
2-Room	5.0		400
3-Room	7.2		360
4-Room	9.7		320
5-Room	11.2		280
Executive Flats/ Multi-Generation	13.7		240

Households whose members own more than one property are not eligible. The GSTV – U-Save is paid over four quarters, in January, April, July, October.

More Information

Please visit www.gstvoucher.gov.sg, or contact Singapore Power (SP) Services at customersupport@spgroup.com.sg or 6671 7117.