

## Annex C

### Minister for National Development's R&D Awards 2019

The biennial Minister for National Development's R&D Awards was launched in 2011 and seeks to recognise and encourage outstanding R&D efforts from the MND Family and partners which contribute towards MND's vision of making Singapore "An Endearing Home, A Distinctive Global City".

2 This year, 25 nominations from MND Family agencies, partner agencies and Institutes of Higher Learning (IHLs) were received. Projects were evaluated by an evaluation panel, chaired by Er. Lee Chuan Seng, MND's Scientific Advisor. The evaluation criteria were:

- a) **Significance** in addressing key national challenges relating to sustainable urban development and liveability.
- b) **Extent of Impact** on our population and/or industry in Singapore, which include strong support for national strategies or policies on sustainable urban development and liveability.
- c) **Practicality and Resilience** with emphasis on the ease and sustainability of implementation, deployment and adoption on a large scale in Singapore.
- d) **Comparative improvement** over existing technology, and the corresponding improvements to cost and/or manpower productivity.
- e) **Breakthrough** in terms of creativity, novelty and how game-changing the innovation is in the associated field.

3 Details of the winning projects of the Minister for National Development's R&D Awards 2019 are:

a) **Distinguished Award: HDB's Smart Hub project – Transforming Singapore's Public Housing into Estates that Learn**

HDB developed the Smart Hub, a platform to integrate data across 10,000 public housing blocks in 24 towns. This includes the establishment of a centralised data repository, the collection of data from various smart estate services, and the development of business intelligence tools for real-time performance monitoring and data analytics. The Smart Hub helps HDB to create more liveable, efficient, sustainable, and safe living environments for our residents.

**b) Distinguished Award: NEA's Project Wolbachia**

NEA developed the male Wolbachia-Aedes technology to suppress the population of dengue mosquitoes in our urban environment and the community, and to complement existing vector control strategies. The successful results have shown up to 90% suppression of the *Aedes* mosquito population at the study sites in Yishun and Tampines.

High density urban tropical cities, such as Singapore, are most vulnerable to dengue and zika outbreaks, and the threats will worsen with increased globalisation, urbanisation and climate change. The project will contribute to sustained liveability of Singapore. With strong support from stakeholders and the community, the project has attracted both local and international partners, and resulted in novel and proprietary technologies. Such collaborations will ensure scalability and contribute to economic activity, whilst serving the primary outcome of improving public health in Singapore.

**c) Merit Award: EMA's Self-Regulating Integrated Electricity-Cooling Networks (IE-CN)**

The district cooling system in the Marina Bay area lowers the energy requirement for air-conditioning of buildings by centralising chilled water production to reap economies of scale. However, sudden fluctuations in electricity demand to meet cooling needs may affect the stability of the power grid supply.

Funded by the Energy Market Authority (EMA), this project by the Institute for Infocomm Research (I<sup>2</sup>R) and Singapore District Cooling (SDC) attempted to address this challenge through a novel hybrid energy storage system. By coupling a 400kW / 400kWh Lithium-ion battery with thermal energy storage (i.e. ice tanks), the resulting integrated electricity-cooling network is able to lower the electricity costs of producing chilled water by up to 38%, and mitigate fluctuations in electricity demand to maintain grid stability.

SDC is the first in the world to test and deploy this IE-CN technology in a live, operational setting, in support of Singapore's evolution into a cool and liveable city of the future.

**d) Merit Award: A\*STAR's project on an Integrated Environmental Modeller (IEM)**

The Integrated Environmental Modeller (IEM) developed by A\*STAR's Institute of High Performance Computing, Institute for Infocomm Research and Housing & Development Board, is a modelling tool that uses high-resolution 3D city models to simulate the interaction of environmental conditions with the urban landscape.

The project involves the development of both in-house and open-source codes that are able to model how various environmental factors such as wind, temperature, and solar radiation impact each other individually, as well as their effects on buildings, water bodies and vegetation etc. With IEM, town planners, architects and engineers can visualise and analyse the effects of microclimatic conditions such as wind flow, solar irradiance and shaded areas within a town. This will help determine how best our new flats can be designed and sited to provide maximum thermal comfort and a more conducive living environment for our residents.

The IEM was used in the urban design plan for Tengah. It can be scaled up for the whole island to provide a preliminary assessment for any new developments in the future.

**e) Merit Award: HDB's Biophilic Town Framework (in collaboration with NUS, NParks and URA)**

To promote a greater sense of place, better well-being and enhanced quality of life for residents, HDB collaborated with NUS, NParks & URA to develop a Biophilic Town Framework to guide the enhancement of existing natural assets and the development of neighbourhood landscapes.

The project studied the optimisation of urban ecosystem services and socio-ecological systems, where limited research has been performed in a high-density, rapidly urbanising environment in Asia. This project adopted a transdisciplinary approach and enabled the development of policies which are supported by strong theoretical and scientific evidence.