Annex: About the Sembcorp-NUS Corporate Laboratory

The Corporate Laboratory will focus on the following three core research areas:

1) Energy

This will include the following projects related to power generation:

- **Integrated condition monitoring and advanced predictive maintenance of power plants**

  Researchers will look into integrated condition monitoring and predictive maintenance technology that improves the resilience of critical systems through identifying the root causes of issues, evaluating risks and supporting planning of maintenance activities. Such technology would help to save costs and improve energy efficiency.

- **Development of an advanced platform for boilers to improve energy efficiency and lower emissions**

  This involves development of an advanced platform aimed at providing an advanced tool for optimisation and risk assessment for existing power plants, so as to improve plant performance and reduce emissions. In addition, the platform would promote design and development of new boilers with lower emissions to achieve energy-efficient and green power generation.

2) Water

This will include projects applicable to industrial wastewater treatment and water reuse, like:

- **Development of a cost-effective system to achieve low chemical oxygen demand (COD) in industrial treated effluent**

  This involves the use of advanced oxidation processes and filtration techniques to treat industrial wastewater and produce high-quality water. Researchers hope to develop a cost-effective solution for industrial wastewater treatment capable of meeting stringent COD discharge standards. Such a solution would reduce the impact that discharging industrial wastewater and industrial effluent would otherwise have had on the environment, and also help to conserve precious water resources through water reuse.

- **Industrial wastewater treatment process design and optimisation**

  Comprehensive biological models will be used to ensure that existing and future wastewater treatment plants are equipped to adapt to variations in wastewater concentration and composition. Researchers will also look into optimisation of current and upcoming wastewater treatment plants to ensure that industrial wastewater is treated effectively to minimise environmental impact.

- **Reduction of liquid discharge for industrial wastewater treatment**

  Researchers will work towards developing technologies to reduce liquid discharge from industrial wastewater treatment. Currently, such technology is expensive and energy-intensive. Hence, researchers hope to develop technologies that can help reduce energy consumption and cost for such processes, while maintaining their effectiveness in reducing the amount of effluent discharged.

3) Waste-to-resource

This would include projects such as:

- **Upcycling of ash and soot into high-value products**

  Researchers will look into converting solid residues from thermal power plants and incineration plants into high-value products, such as ultra-light composites for modular construction, or catalysts, zeolites and/or absorbent materials. This would extract value from waste, and mitigate environmental and health issues associated with the disposal of such residues.