

# CREATING A MARINE CLAY MATRIX WITH INCINERATION BOTTOM ASH (IBA) FOR LAND RECLAMATION

## Project Scope

### Objectives

To develop a novel integrated engineered system using IBA-marine clay formulations for land reclamation

### Value Proposition

- Use of IBA and marine clay to significantly substitute imported sand as the primary fill in land reclamation
- Practical solutions with time-, energy- and cost-savings
- Provide a platform for further R&D works on the transforming Incineration Fly Ash (IFA) for reuse

### Description

|                   |   |
|-------------------|---|
| <b>Module 1</b>   | • Develop chemical additives to stabilise the IBA   |
| <b>Module 2</b>   | • Study the use of marine clay to encapsulate the stabilised IBA<br>• Study the pozzolanic and other properties in the IBA-marine clay mixture            |
| <b>Module 3</b>   | • Develop a 3D non-linear finite strain (NFS) consolidation model of the mixture<br>• Predict leaching potential and consolidation process of the mixture |
| <b>Module 4</b>   | • Investigate the use of marine clay and liner thickness as additional liner to prevent potential leaching  |
| <b>Module 5</b>   | • Study the long-term stability of the mixture  |
| <b>Completion</b> | • Integration of above into a complete engineering system for land reclamation using IBA and marine clay  |

## Principal Investigator (PI), Co-PI & Advisor:

### Dr Wu Dong Qing

Principal Investigator  
Managing Director / CEO,  
Chemilink Technologies Group

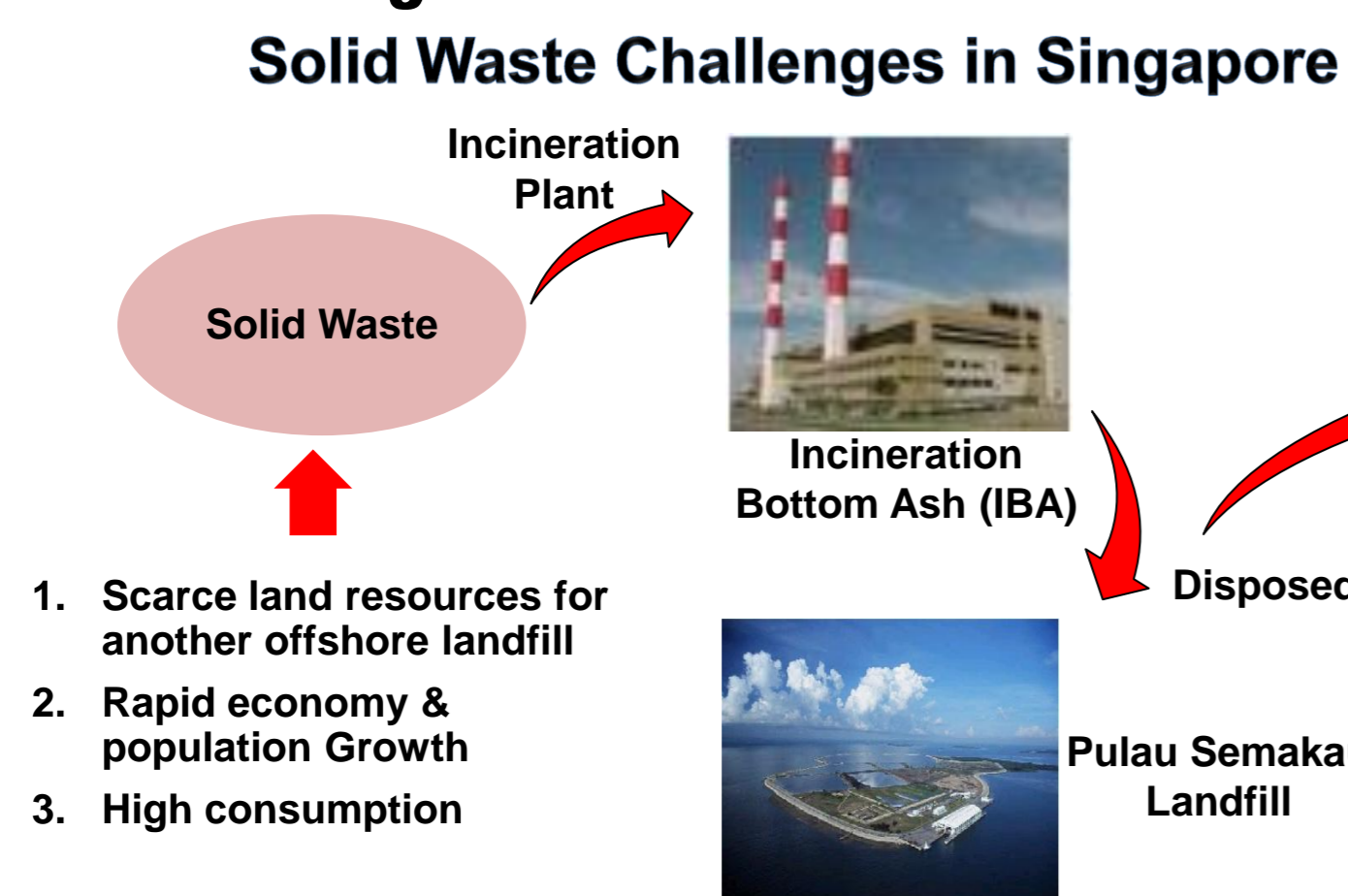
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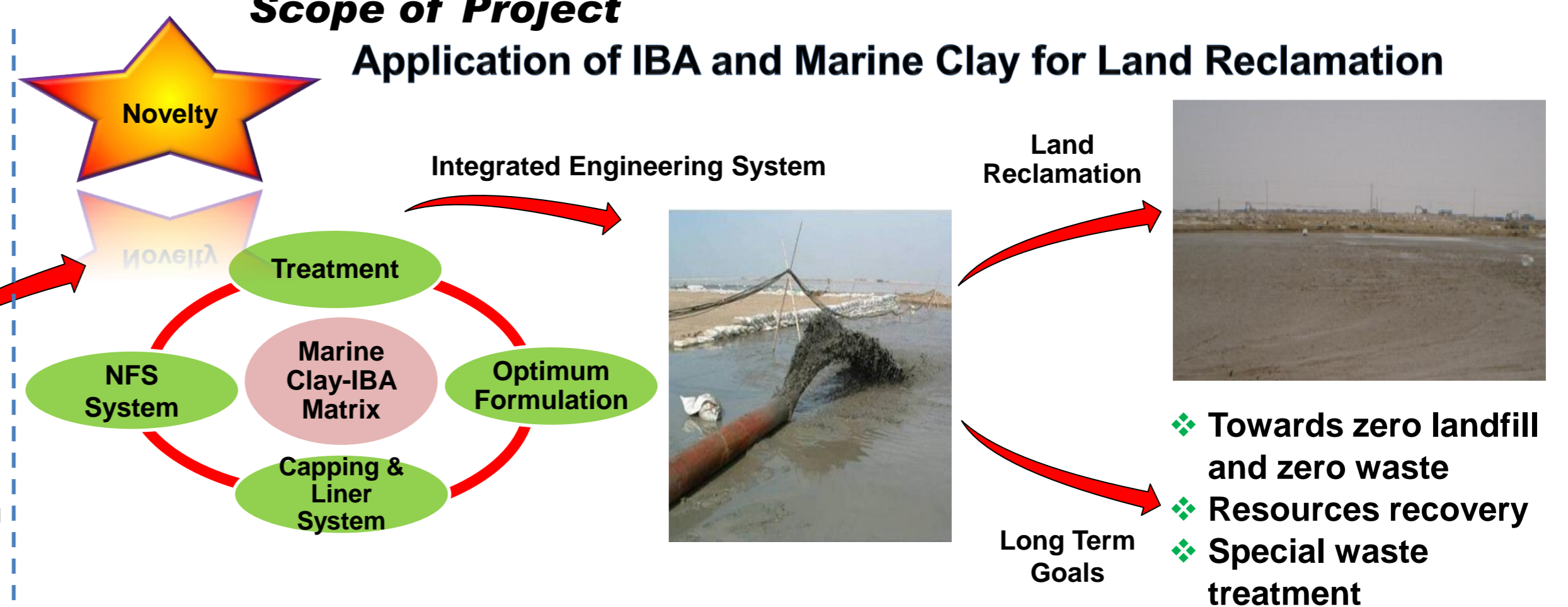
### Prof Ng Wun Jern

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### Brief Background



### Scope of Project

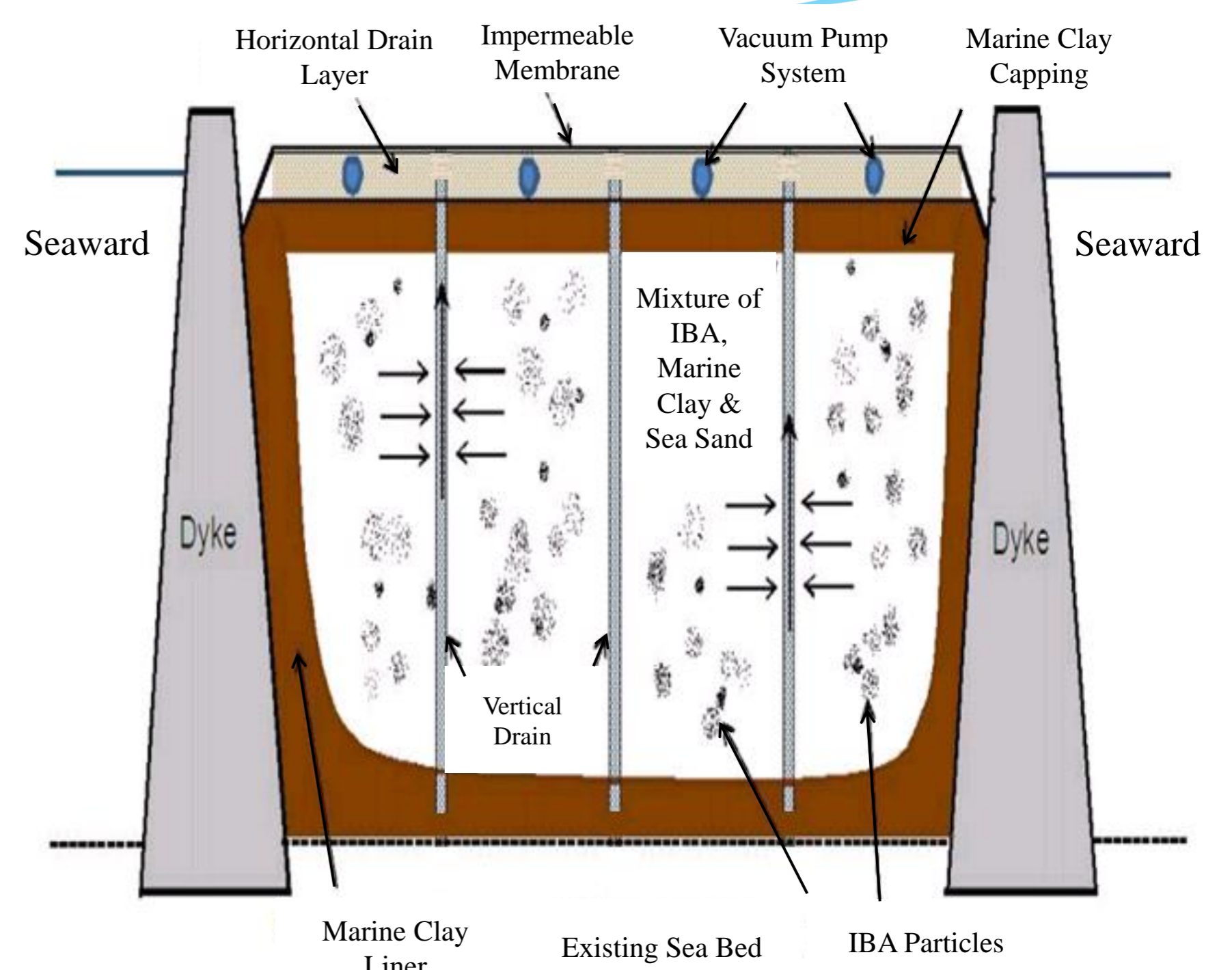


## Contributions to Singapore's Environmental Sustainability

- To transform IBA into "Singapore New Sand" which will reduce its dependence for importing raw materials for land reclamation.
- Assist NEA to achieve its vision of "Towards Zero Landfill & Zero Waste".
- To develop an engineering technology to transform two waste materials-IBA and marine clay into valuable civil construction resources for land reclamations in both Singapore and exportable to other coastal countries.

## Key Deliverables

|                                |   |
|--------------------------------|---|
| Treatment technologies for IBA | • Leachate compliance<br>• Enhancing the self weight consolidation of the IBA-marine clay |
| IBA-marine clay formulations   | • Appropriate chemical and physical properties  |
| NFS consolidation system       | • Higher accuracy of mechanical and chemical modeling                                     |
| Capping and liner system       | • Minimising leaching   |
| Integrated engineering system  | • Complete engineering system for land reclamation using IBA and marine clay              |



\* Drawing not to scale

Illustration Diagram of Land Reclamation

A research project supported by the Innovation for Environmental Sustainability (IES) Fund