

# ECOLABS CENTRE OF INNOVATION FOR ENERGY

Fostering Deeptech Energy Champions

A Joint Initiative



SCHOOLS/COLLEGES AT  
NANYANG TECHNOLOGICAL  
UNIVERSITY (NTU)

ENERGY RESEARCH INSTITUTE  
AT NTU

ECOLABS  
CENTRE OF INNOVATION  
FOR ENERGY

## MEASURE YOUR TECHNOLOGY READINESS LEVELS - TRL

How technology ready is your service/product?



Technology Readiness Levels as adapted by the CloudWATCH2 project



# OFFICIAL LAUNCH April, 2019

One Stop Hub for  
Deeptech Energy  
Innovation

SPH Websites

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THE STRAITS TIMES

SINGAPORE

SINGAPORE > Courts & Crime Education Housing Transport Health Manpower Environment

## First centre of innovation for energy sector will support SMEs and start-ups in clean energy projects



Senior Minister of State for Trade and Industry and Education Chee Hong Tat, who unveiled the centre in NTU on Tuesday (April 16), noted that the rising prevalence of digital technology and data science has unlocked new solutions and business models in the energy sector. ST PHOTO: TIMOTHY DAVID

PUBLISHED APR 16, 2019, 8:51 PM SGT



Shabana Begum

SINGAPORE - Small and medium-sized enterprises (SMEs) and start-ups working on clean energy projects can tap test beds, research and funding offered by the first centre of innovation for the energy sector.

The EcoLabs Centre of Innovation for Energy will help participating companies accelerate their green innovations and commercialise them for the market.

The country's ninth centre of innovation will work with corporate partners and investors to provide member companies with up to 30 public and private-sector test-bedding sites.



### ST VIDEOS



Recommended by Outbrain

### BRANDED CONTENT



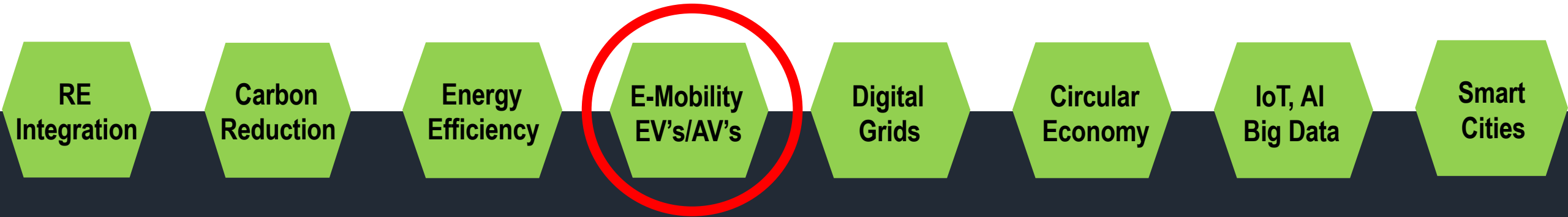


AIM

To accelerate adoption of sustainable  
energy solutions developed  
by SMEs & Start-ups



# OUR FOCUS AREAS

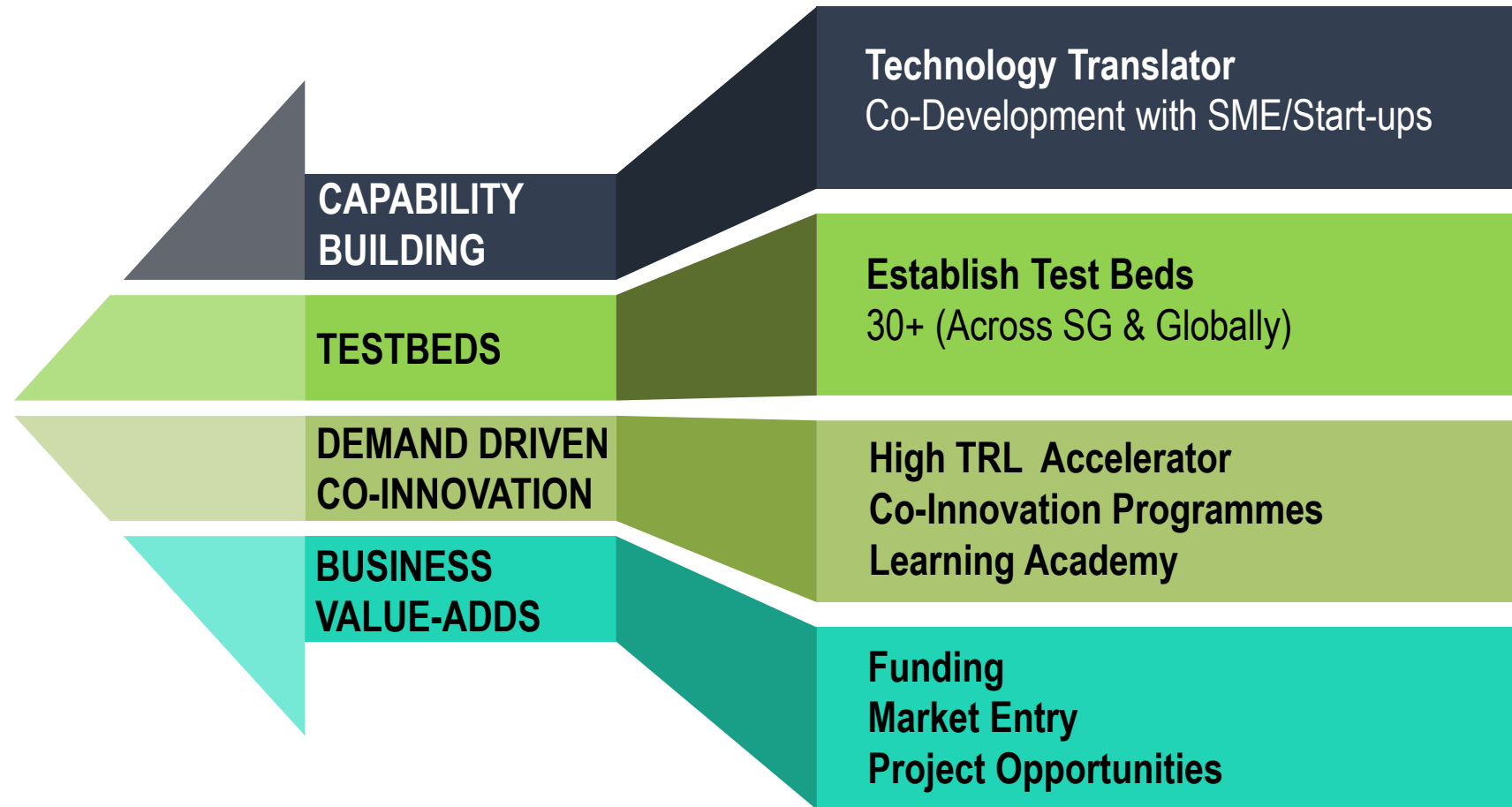


## Technology Roadmaps

Translation Challenge | Establish Test Beds | Call for Collaboration |

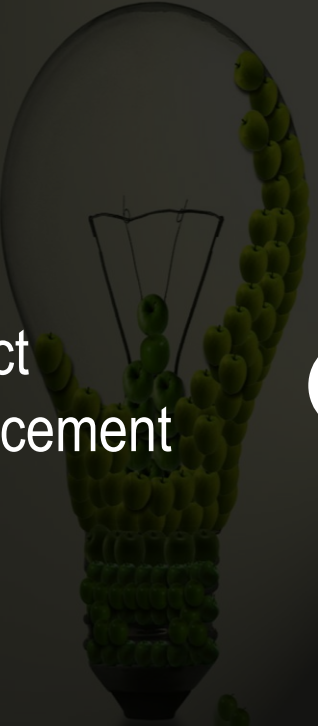
# WHAT WE DO

Our Value Proposition



# TECHNOLOGY TRANSLATOR

Driving innovation productivity for SME/Start-ups



Product  
Enhancement



Field Testing  
Reliability  
& Standardization



Commercial  
Deployment



## 70:30

EcoLabs Enhanced COI  
Project Funding Support  
Upto SGD 500K  
(By ESG)

To develop deep-tech  
energy innovation  
capabilities

# TRANSLATOR RESOURCES

Providing SME/Start-ups with translation facilities such as co-development manpower, lab infrastructure and testbed sites.

**#12**  
**State-of-the-Art**  
**Labs/Test Sites**



**Access to**  
**Corporate**  
**Labs**  
**& Learning**  
**Academy**



**Co-Working | Co-Development Space**  
**At CleanTech One**  
**(Jurong Innovation District)**



**Learn from**  
**Industry Veterans**  
**& Business**  
**Advisors**



**Access to**  
**IHLs/ RIs**  
**IPs / Know-How**



**Leverage**  
**Best-in-Class**  
**Tech Experts**





# LARGE SCALE TEST BEDS

Start-ups/SMEs can deploy their solutions and validate real-time



**Supply Chain City**



**Automotive Trade Hub**



**University Campus**

**1923**



**Carpark**

**INDIA**



**Airport City**

**THAILAND**



**Energy Systems Labs**

10+ Test Beds (Till date) → Establish 30+ Test Beds (Across SG & Globally)



# DEMAND DRIVEN CO-INNOVATION

Translation deeptech energy innovation to markets



HIGH TRL  
ACCELERATOR  
(> TRL 5)



CORPORATE  
CO-INNOVATION  
PROGRAMME



JOINT  
LEARNING  
ACADEMY



# A PLATFORM DRIVEN INITIATIVE

Unifying Energy Stakeholders

## + Innovation Programmes Directory

We bring demand driven innovation programmes for Start-ups/SMEs to collaborate with industry, accelerators and channel partners.

ecolabs.sg



**OPEN PROGRAMMES** **GRANT CALLS**

Search Programme Title or Keyword Search By Category Deadline

**Mistletoe Startup City**

will be to create and build a smaller startup city with startup hotels and explore potential to expand into a start-up community with sustainable materials where individuals can live, work, play and exchange ideas. City showcases the potential of decentralized communities using off-grid technologies, sustainable materials and the concept of self-sustaining community through experimental plug-in-play solutions.

Open Date: Sept 2018 Duration: 3-4 months

[Apply To The Program](#)

**Application Deadline**  
Dec 2018

**Technology Translation Program**

Ecolabs Energy & Sustainability accelerator is a joint program with NTU and GCRG designed to bring innovation to the energy sector. Twice a year, we run 3-month programs for early stage startups to boost their growth and derive their innovation efforts to markets. This is done through targeted and relevant introductions of incubation resources (workspace, labs, and testbeds), access to corporate decision makers, VCs and expert advisors.

Open Date: Sept 2018 Duration: 3-4 months

[Apply To The Program](#)

**Application Deadline**  
Feb 2019

**YCH Test Bed calls for Technology Solution**

YCH Group will work with NTU on the Ecolabs programme and provide Supply Chain City as a testbed for new solutions for logistics issues such as ambient cooling solution for better warehouse cooling, productivity improvement with AI & big data, optimally changing solutions and optimization of fleet management.

Open Date: Sept 2018 Duration: 12-24 months

[Apply To The Program](#)

**Application Deadline**  
Mar 2020

# A PLATFORM DRIVEN INITIATIVE

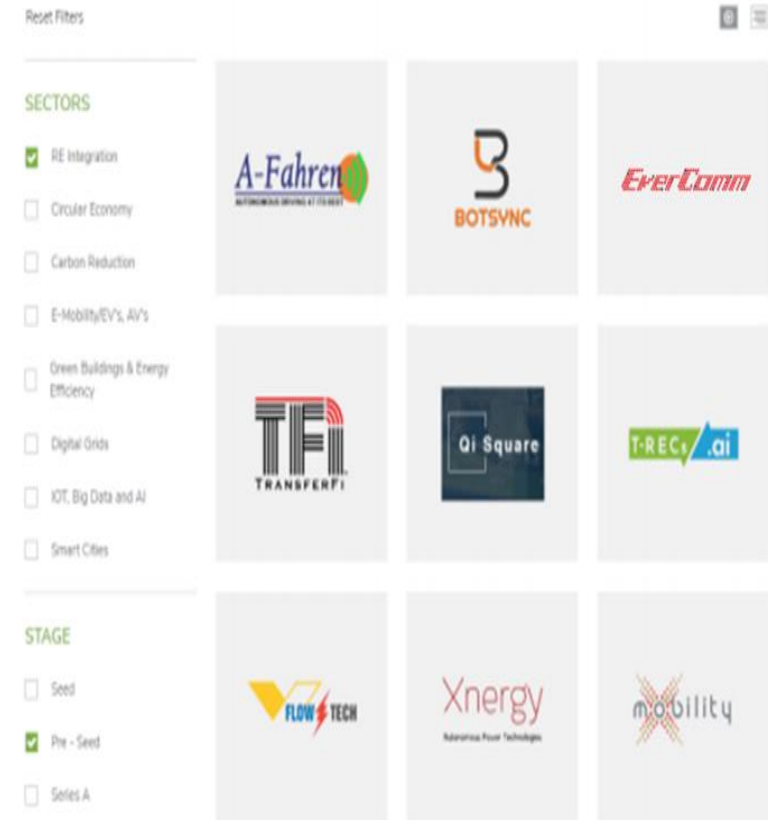
Unifying Energy Stakeholders

+

Start-Ups Directory  
~40 Start-ups Listed

Connect and Collaborate

ecolabs.sg





# BUSINESS VALUE- ADDS

## FUNDING SUPPORT



Multi-Stage | Multi-Agency  
Funding Support

01

### ECOLABS COI FUNDING

Product Development  
Upto SGD 500K

02

### START-UP INVESTMENTS

SGD 50K-SGD 8.0 Million

SEEDS  
Capital



### PROJECT FUNDING

Capability Demonstration



Enterprise  
Singapore

### PROJECT FINANCING

RE Projects/Smart Cities

ARC CAPITAL



03

04

# MARKET ENTRY

Enabling high-growth & deep-tech start-ups and SMEs with go-to-market programs and help them expand globally from Singapore.

**Focus**



**Made in SG**  
Going Global



**CHINA & HK**



**EU & US**



**KOREA**



**EU**

# HOW WE COLLABORATE

For Partners

## Co-Innovation Partners

Corporates share open innovation opportunities

## Test Site Partner(s)

- Across SG
- Globally

## Investors

Co-Invest In Our Deeptech Energy Start-ups

## Channel Partners

Provide Value - Added Services

01 CO-INNOVATION PROGRAMMES

02 TEST BEDDING

03 HIGH TRL ACCELERATOR

04 VALUE ADD PARTNERS

For Start-ups/SMEs

## Apply Online

- Co-Innovation Calls
- Technology Translation Projects

## Apply Online

For Market Ready Deployment Projects

## Apply Online

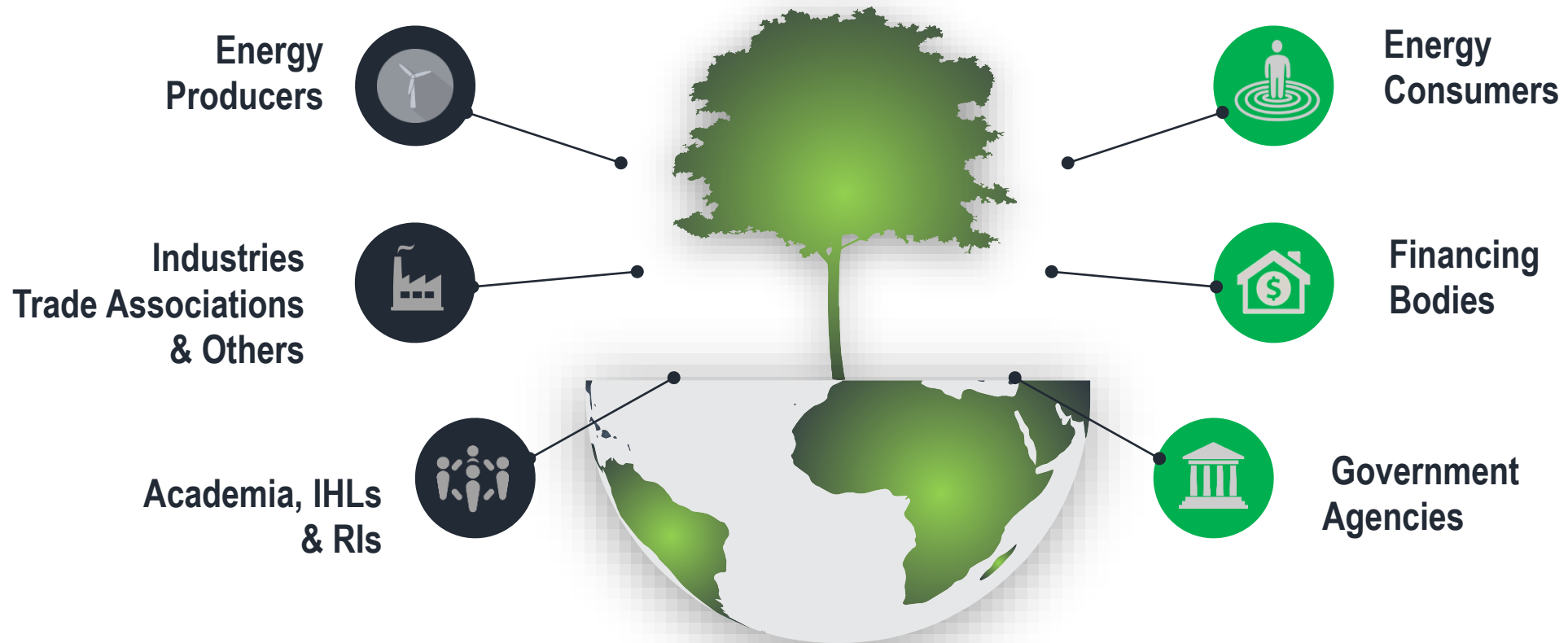
For Accelerator Program

## Join

Learning | Training Programs  
Market Entry Programs  
Advisory Clinics, Events & others

# ECOLABS

## CENTRE OF INNOVATION FOR ENERGY



A unified platform where energy stakeholders collaborate to co-create, co-develop and co-promote.



40+ Partners To Date

**JOIN US!**

**ECOLABS  
CENTRE OF  
INNOVATION  
FOR ENERGY**

“ In Developing  
Singapore’s Vibrant  
Deeptech Energy  
Ecosystem ”

Contact:

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[Min.hogun@ntu.edu.sg](mailto:Min.hogun@ntu.edu.sg)

Innovation Manager

EcoLabs – Centre of Innovation for Energy  
Energy Research Institute @ NTU (ERI@N)





**NANYANG  
TECHNOLOGICAL  
UNIVERSITY**  
SINGAPORE

Energy Research Institute @ NTU



# Introduction of Energy Research Institute @ NTU (ERI@N)

Energy Smart, Research & Innovation

<https://erian.ntu.edu.sg/>

Energy Research Institute @ NTU (ERI@N)

1 CleanTech Loop, #06-04 CleanTech One, Singapore 637141

Phone: (65) 6592 1786 / 2468 Fax: (65) 6694 6217



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Technology Readiness Levels as adapted by the CloudWATCH2 project

# Energy Research Institute @ NTU (ERI@N)



Systems-level integration &  
research for tropical  
megacities.

## Living Labs



Energy Systems  
(Renewables,  
Storage)



Grid Systems  
(Grid 2.0 –  
Internet of Energy)

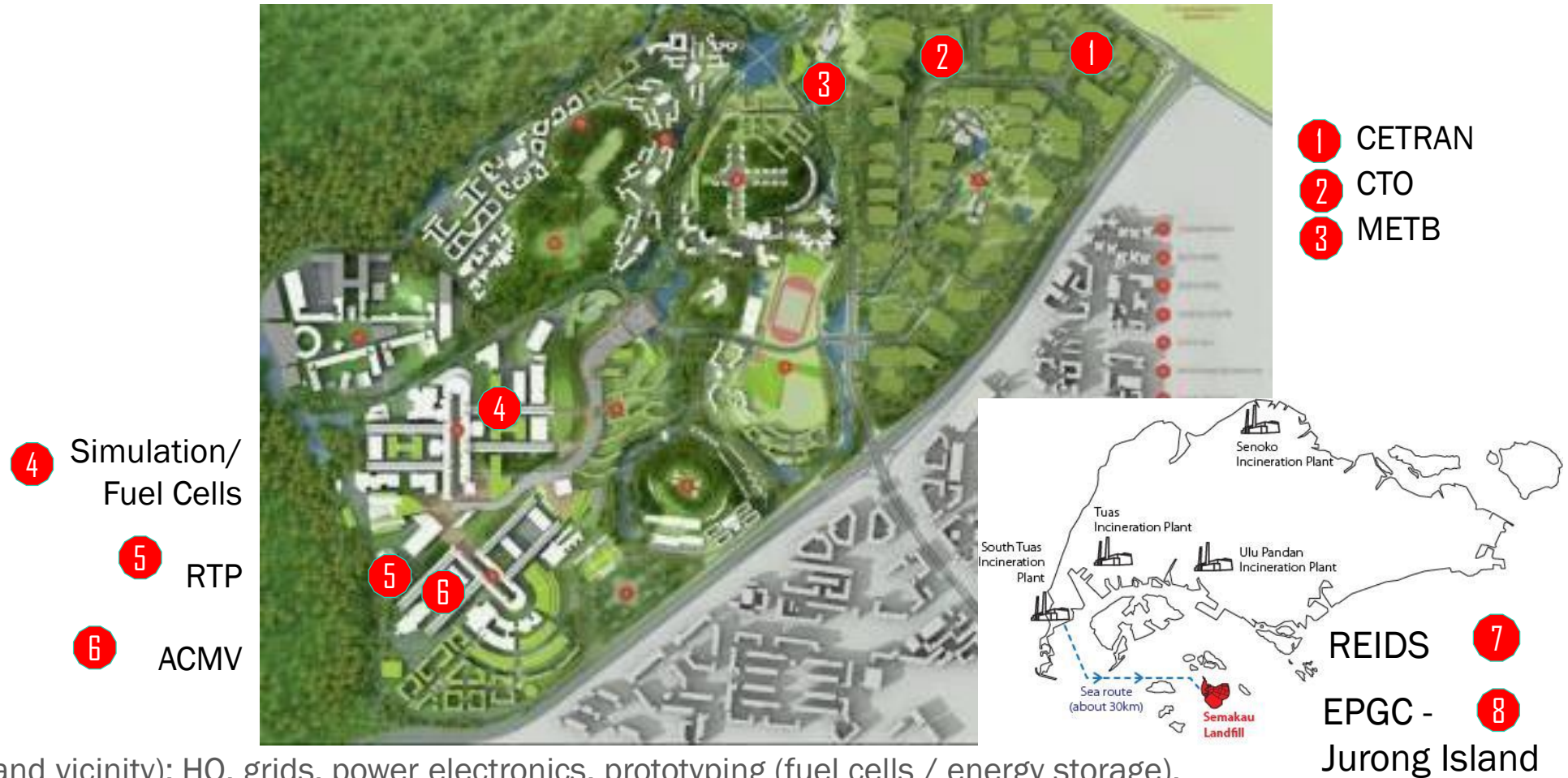


Urban Solutions  
(Smart Energy, Mobility,  
Energy Efficiency)





# ERI@N Laboratories



- CTO (and vicinity): HQ, grids, power electronics, prototyping (fuel cells / energy storage), marine engine test-bed, future mobility (CETRAN)
- North-spine: simulation, fuel cells
- South-spine/RTP: admin/finance, solar, air-conditioning, buildings
- Semakau Landfill: REIDS



## ERI@N FLAGSHIP PROGRAMMES



# Flagship Programme 1: EcoCampus

► 35% reduction: Energy Water Waste, CO<sub>2</sub>, Intensity

## 2 Tropical Airconditioning



## 1 Building Envelopes/Facades



## 9 User Behaviour



## 8 Renewable Energy



## 3 Smart Lighting Technologies



## 4 Energy Data Analytics



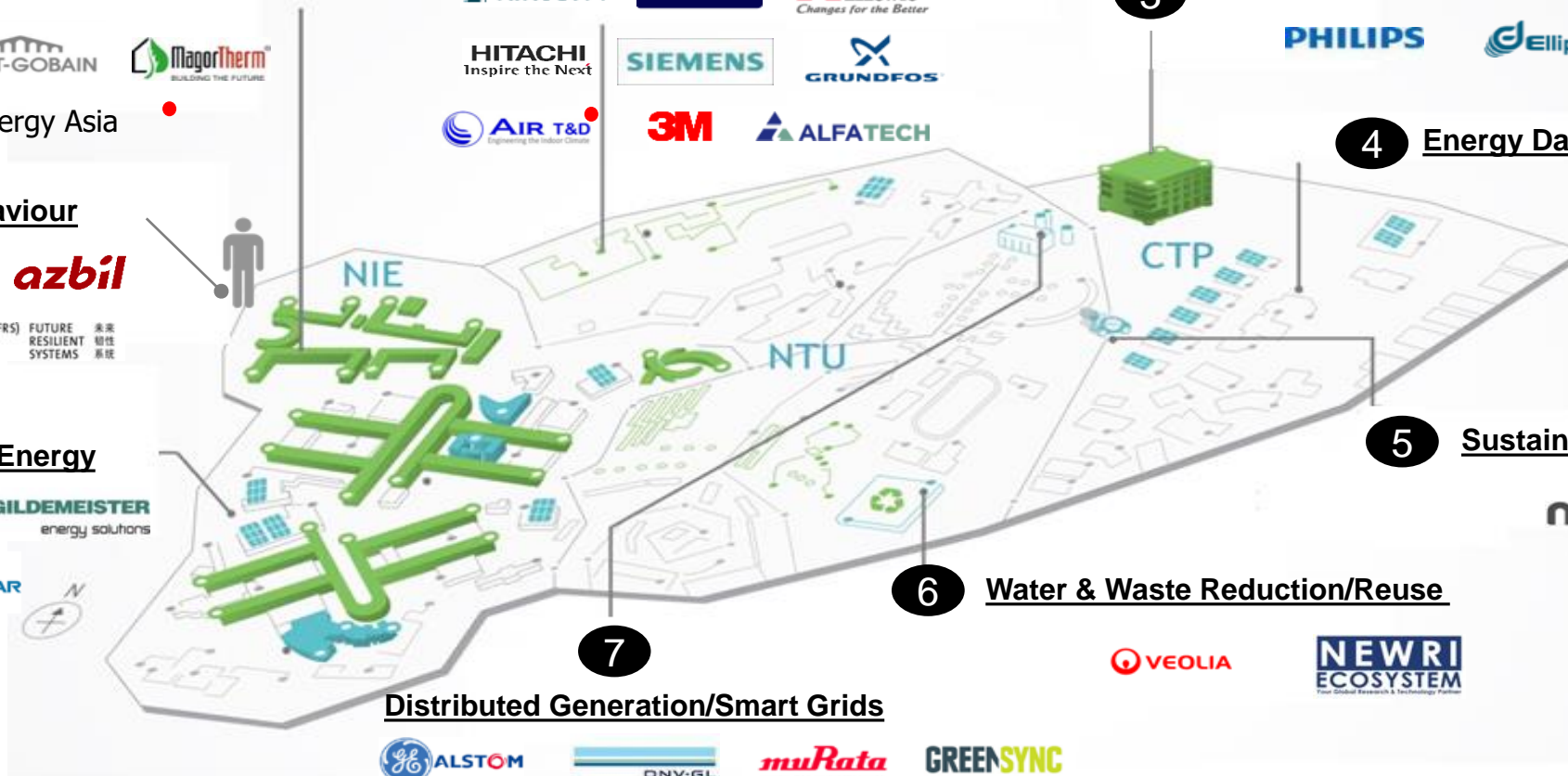
## 5 Sustainable Urban Mobility



## 6 Water & Waste Reduction/Reuse



## 7 Distributed Generation/Smart Grids





**NTU PV:** 5 MW–6 GWh, 3.1kT CO<sub>2</sub> offset





# Flagship Programme 2: Renewable Energy Integration Demonstrator – Singapore (REIDS)



**RD&D** at a **large-scale** - proper **integration** of a broad range of **renewable energy** production - onshore and offshore, **energy storage** and **rational energy end-use** technologies

# REIDS Technologies

## 1 Renewables:

Solar, Wind (onshore /offshore) & Tidal

IDSUD ENERGIES

REC

Trinasolar

XANT  
WIND POWER MADE EASY

SUNSEAP

## 2 Energy Storage/H<sub>2</sub>

Batteries, Supercaps, CAES, Flywheels, Power-to-fuels and H<sub>2</sub>

SONY

dp  
durapower

muRata  
INNOVATOR IN ELECTRONICS

ENGIE

DLRE

zinium

Schneider  
Electric

SAMSUNG

## 3 DERs:

Diesel, Bio-mass, Bio-fuels, Fuel Cells

Rolls-Royce

ENGIE

mtu onsite energy

## 4 Multi-microgrid Systems:

Interconnection, Urban Mesogrids, Block Chain Energy Trading, Resilience and Security

edf  
ØNDER  
EMERSON

## 5 VOI:

Visualization, Optimization AI, Energy/Power Management Platforms

METRON

Schneider  
Electric

GE

ADVANCED MICROGRID OPTIMIZATION

## 6 Microgrid Controller:

SW, HW, AC-DC Hybrid Grids, DERMS, SST & Power Electronics

METRON

ENGIE

Rolls-Royce

edf

EMERSON

IDSUD ENERGIES

socomec  
Innovative Power Solutions

Schneider  
Electric

## 9 Rational End-use:

Utilities, Urban Residential, Industrial, Agri Loads, Desalination & EVs

METRON

EMERSON

ADVANCED MICROGRID OPTIMIZATION

## 8 Techno-enviro-socio Impact:

Techno-socio Economics, EIA, Certification

ClassNK

VDE  
RENEWABLES

National  
Environment  
Agency  
Safeguard - Nurture - Cherish

RENAULT

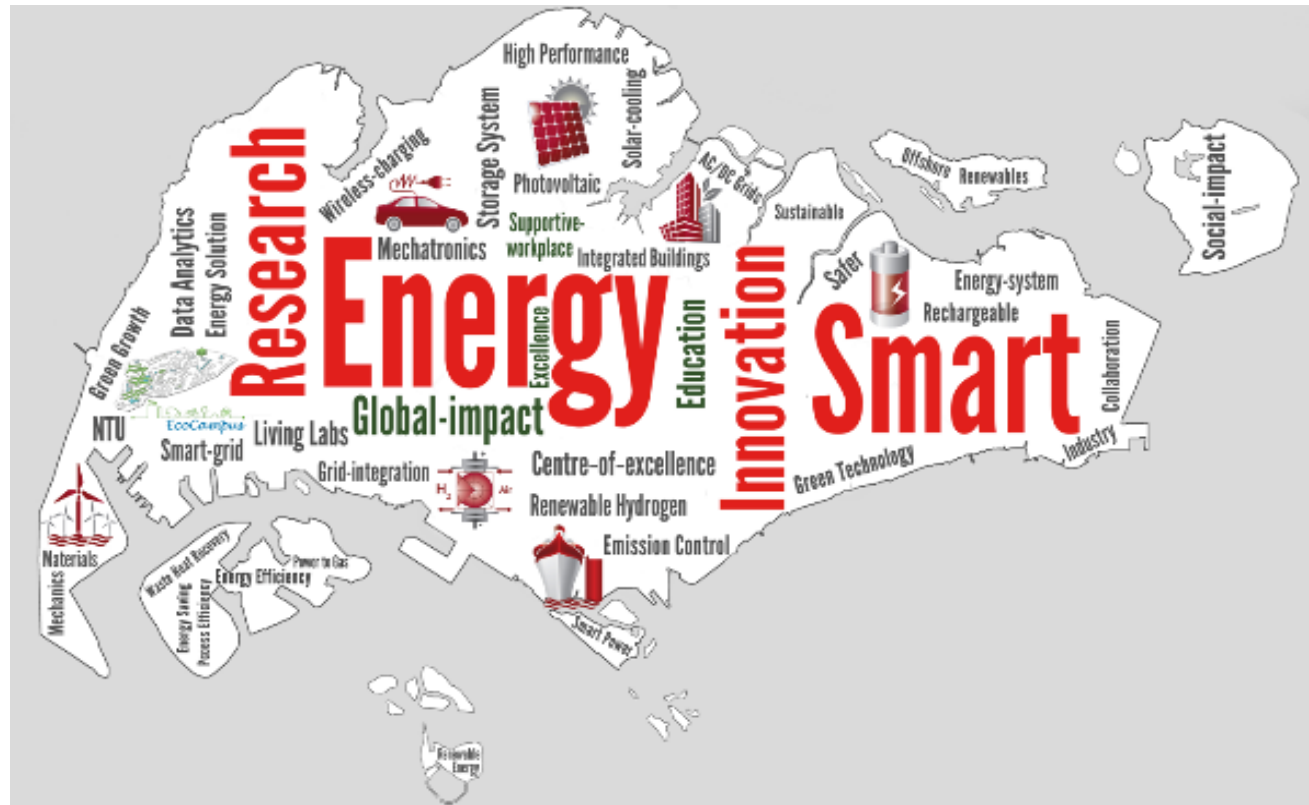
Kühlbarra

NISSAN

NUVVE







# Thank you!

<https://erian.ntu.edu.sg>

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