



# The Institution of Engineers, Singapore

## Waste Resource Sub-Committee of The Environment and Water Engineering Technical Committee

*present*

### Integrated Waste Management: Singapore's Waste Management Strategy

Date	: Wednesday, 25 April 2018
Time	: 6.00 PM to 9.00 PM <i>Registration start at 6.00 PM sharp).</i>
Venue	: IES Auditorium 70 Bukit Tinggi Road, S(289758)
Fees	: IES Members = \$32.10/- per pax Non-members = \$64.20/- per pax <i>Fees includes prevailing GST , buffet dinner</i>
CPD/PDU	: <b>2 PDU for PEB PE (Approved)</b> <b>2 PDU for IES C.Eng (Approved for all Engineering branches/disciplines listed in <a href="http://charteredengineers.sg/branches/">http://charteredengineers.sg/branches/</a>).</b>

## Synopsis of the Talk

# **Integrated Waste Management: Singapore's Waste Management Strategy**

## **Background**

Singapore generated 7.81 million tonnes of waste in 2016. This is enough to fill more than 14,800 Olympic-sized swimming pools and is an increase from 7.67 million tonnes generated in 2015. While about 61 per cent of waste generated is recycled, our four Waste-to-Energy (WTE) plants would still have to incinerate about 7,750 tonnes of waste per day. To meet Singapore's long-term demand for solid waste management, NEA is currently constructing its 6<sup>th</sup> WTE plant and is planning to build an Integrated Waste Management Facility (IWMF) which will be co-located with the PUB's Tuas Water Reclamation Plant (TWRP).

## **Strategy Overview**

2 NEA which oversees Singapore's solid waste management system, has therefore adopted the following strategies to minimise waste generation as well as the land used for waste disposal:-

- a) **promoting waste minimisation through the 3Rs (Reduce, Reuse, Recycle)** in the community and industries; and
- b) **disposing of all incinerable waste at Waste-To-Energy (WTE) plants** so as to reduce waste volume by ~90%, while at the same time recovering useful energy.

## **Solid Waste Disposal Facilities**

3 NEA's solid waste disposal facilities include two Government-owned WTE plants viz. Tuas Incineration Plant and Tuas South Incineration Plant, Semakau Landfill, and the Tuas Marine Transfer Station. Two other WTE plants, (i.e. Senoko Waste-to-Energy Plant and Keppel Seghers Tuas Waste-to-Energy Plant), are owned by Keppel Infrastructure Trust and operated by Keppel Infrastructure.

## **New Projects**

### 6th Waste-to-Energy Plant

4 NEA awarded the contract for the development of the 6th WTE Plant to TuasOne Pte Ltd (TuasOne) under the Public-Private-Partnership (PPP) scheme, using the design-build-own-operate (DBOO) model. TuasOne would develop the 6th WTE Plant and provide a contracted incineration capacity of 3,600 tonnes per day exclusively to NEA for a period of 25 years from 2019 to 2044. The plant would be capable of producing electricity for the plant's operation and export an excess electricity of 2,880 MWh daily to the grid. The plant construction has commenced since early 2016 and scheduled to be completed by May 2019.

### Integrated Waste Management Facility (IWMF)

5 NEA is planning the development of an Integrated Waste Management Facility (IWMF) to meet Singapore's long term waste management needs. The IWMF will be co-located with PUB's Tuas Water Reclamation Plant (TWRP) at the 68ha Tuas View Basin site, to maximise process and non-process synergies as well as optimise land use footprint. The IWMF will be equipped with several state-of-the-art solid waste treatment technologies that will enable it to effectively handle multiple waste streams and optimise resource and energy recovery. The waste streams that IWMF will be handling include incinerable waste, recyclables collected under the National Recycling Programme, source segregated food waste and dewatered sewerage sludge from the TWRP. The IWMF is planned to be constructed in phases with the first phase scheduled to be completed by end 2022/early 2023.

### Semakau Landfill

6 Semakau Landfill opened on 1 April 1999 and is currently Singapore's only landfill facility. Covering an area of 350 hectares, it is expected to meet the country's solid waste disposal needs up to 2035. An additional 16.7 million cubic metres of landfill capacity was added after its Phase II development was completed in Jul 2015.

### REMEX Metal Recovery Facility

7 In June 2014, NEA awarded a tender to M/s REMEX Mineralstoff GmbH (REMEX) to develop and operate a metal recovery facility, to recover ferrous and non-ferrous metals from incineration bottom ash (IBA) generated by the incineration plants. The 1.4-hectare facility can process up to 1,800 tonnes of IBA per day and has started operations since July 2015.

### Profile of the Speaker



**Mr Joseph Boey**  
Project Director  
Integrated Waste Management  
Facility (IWMF)  
Waste and Resource Management  
Department  
National Environment Agency (NEA)

Joseph Boey is the Project Director of the IWMF in NEA's Waste and Resource Management Department (WRMD). WRMD is responsible for the operation and maintenance of Tuas Incineration Plant, Tuas South Incineration Plant and Semakau Landfill. It also regulates the Public-Private Partnerships (PPP) incineration plants as well as formulates policies to promote waste minimisation and recycling in Singapore.

Joseph started his career with the then Ministry of the Environment (ENV) in 1994, as an Operations Engineer in the Engineering Services Department (now known as WRMD). Prior to his involvement with the IWMF project as Project Director, he had taken on various roles and responsibilities within the department. These includes taking charge of the operations and maintenance of the various waste disposal facilities in NEA (i.e. Ulu Pandan Refuse Incineration Plant, Tuas Incineration Plant, Kim Chuan Transfer Station, Senoko Incineration Plant and Tuas South Incineration Plant). He was also the lead in various development projects such as the redevelopment of NEA's Integrated Waste Management System, SCADA System upgrading works in NEA incineration plants and etc. As a certified six-sigma black belt, he had also completed various studies on key plant processes within the Senoko Incineration Plant to help it to attain higher plant efficiencies and performances in 2005.

With more than 20 years of relevant waste management experience behind him, he is now leading the development of NEA's IWMF which will be co-located with PUB's Tuas Water Reclamation Plant (TWRP) at the Tuas View Basin site. The co-location of IWMF and TWRP will enable NEA and PUB to effectively harness various process synergies from used water and solid waste treatment as Singapore's first ever water-energy-waste nexus.

## Programme

1800 – 1900 hrs	<b>Registration and Dinner</b>
1900 – 2030 hrs	Integrated Waste Management: Singapore's Waste Management Strategy <b>By Mr Joseph Boey, Project Director, Integrated Waste Management Facility (IWMF), Waste and Resource Management Department, National Environment Agency (NEA)</b>
2030- 2100 hrs	<b><i>Questions and Answers</i></b> <b><i>Presentation of Token of Appreciation</i></b>

## TERMS & CONDITIONS

### Registration

- Online registration at <https://www.ies.org.sg/ccms.r?pageid=6011&tenid=IES&NavCMD=Nextpage|2&K1=&F1=&F2=&F3=&F4=&F5=&F6=Search&F7=&F8=&F9=IES&F10=&M1=All&Y1=&W1=&SearchLast=1&SearchCmd=Next&ROXY=0x000000001f405786>
- Registration will be on a first-come-first-served basis as seats/places are limited and will only be accepted upon the receipt of full payment or otherwise indicated.
- Please notify us in writing of any change in your registration 7-working days before the commencement date.
- We only accept online registration with full payment or otherwise indicated.

### Registration Closing Date/ Time & Payment

- Registration closing date/ time: before 1700 hours, 18 April 2018 (Thursday)
- Cheque or Cashier's Order should be **crossed A/C payee only, Payee: IES** and post to:  
The Institution of Engineers, Singapore  
70 Bukit Tinggi Road  
Singapore 289758  
Attention: Mr Yue Kok Sun  
(At the back of your Cheque, please indicate your Name and **IWM18**)

### Confirmation of Registration

- Confirmation of registration will be forwarded to your registered/ recorded email address within 7-working days prior to the commencement date.

### Withdrawals/ Refunds of Fees

- Notice of withdrawal must be given in writing to IES, policy on refund of fee is as follows:
- Within 7-working days before the commencement date: No refund.
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- Replacement is allowed but restricted to once only with written notice, it must be received by IES 7-working days before the commencement of the Seminar. However, when an IES member is replaced by a non-member, the participant has to pay the difference in the relevant fees.
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- For e-payment, a 4.5% (online transactional service charges) will be borne by the Registrant.
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## **Cancellation/ Postponement**

- Changes in Venue, Dates, Time and Speakers for the Seminar can occur due to unforeseen circumstances. IES and/ or the Organiser(s) reserves the full rights to cancel or postpone the Seminar under such circumstances without prior reasons. Every effort, however, will be made to inform the participants or contact persons of any cancellation or postponement.
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- Please download <https://www.ies.org.sg/axs/AXSprocedure.pdf> for more information.
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Course/ Event ID **IWM18**
- Please keep, retain and furnish your proof of payment(s), receipt(s) or e-receipt(s), if any, during registration.

## **Contact Person**

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# Fees are inclusive of GST with buffet dinner

# Should you require any "Vegetarian Bento Set", please indicate under the remarks column

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# For Non-members @ S\$64.20/- (include GST) per pax, please register online and transact payment via your VISA/ MasterCard or other appropriate modes, if any.

# Certificate of Attendance will NOT be issued, however, an email proofing your attendance will be forwarded to your recorded/ registered email address normally within 14 to 21 working days after the Seminar.

# Accreditation of CPD PDU for Professional Engineers Board Singapore (PEB) Professional Engineer/ Attendee; your Name and Reg. PE Registration Number will be electronically filed with or manually submitted to PEB, normally within 14 to 21-working days after the Seminar.

# Accreditation of CPD PDU for IES Chartered Engineer/ Attendee; your Name and Reg. C.Eng Registration Number will be electronically filed with or manually submitted to IES C.Eng Professional Registry, normally within 14 to 21-working days after the Seminar. **CPD PDU for IES C.Eng will be duly accredited/ awarded correspondingly/ similarly to those approved/ confirmed by PEB.**