

ISWA-WMRAS-NEA Seminar on Waste-to-Energy 2015

A TAP Centre Programme

**12-14 August 2015
(Wednesday - Friday)**

Venue:

**Singapore Environment Institute (SEI)
Training Room 2
1 Kay Siang Road
#09-01,
Singapore 248922**



Programme

In its 2nd run after a successful launch in 2014, the **ISWA-WMRAS-NEA Seminar on Waste-to-Energy** is a unique programme that combines the technical and policy expertise of senior experts from Europe and Singapore with extensive waste-to-energy (WTE) projects development and implementation experience. It is designed for industry and policy practitioners seeking to address waste management challenges in the context of fast growing cities in Asia.

Scope

WTE technology plays a key role in sustainable waste management. Modern WTE incinerators can reduce the volume of the original waste by as much as 95%, depending on waste composition and degree of material recovery. Deploying advanced WTE solutions achieves goals of waste reduction, recycling, recovery, treatment, eliminates the need for intermediate waste storage and can keep the disposal of organic wastes from exceeding 5% of total organic carbon in landfills.

Objectives

The training programme is structured to cover the technical, economic and environmental aspects of developing WTE facilities. This includes studying the characteristics of high performance energy efficient plants, learning the best available techniques for plant operations and visiting state-of-the-art WTE facilities. Participants will also gain a better appreciation of environmental policies conducive for WTE developments, viable business models for WTE projects as well as insights into market opportunities for waste management projects in Asia.

TAP Centre

The Training, Advisory & Promotion (TAP) Centre was established under a tripartite agreement among the International Solid Waste Association (ISWA), Waste Management and Recycling Association of Singapore (WMRAS), and National Environment Agency (NEA) on 28 June 2010. ISWA's first-of-its kind training centre outside Europe, where the association is based, the TAP Centre organises regional and international waste management training workshops, forums and tradeshow to promulgate an efficient waste management environment in Asia. The TAP Centre will be a key hub for sustainable waste management in Asia, where it will serve as a depository of knowledge and data, and catalyst for regional collaboration and public-private partnerships in the region.



Programme Organisers

ISWA

ISWA – the International Solid Waste Association is a global, independent and non-profit making association, working in the public interest to promote and develop sustainable waste management. ISWA has currently members in 80 countries and is the only worldwide association promoting sustainable, comprehensive and professional waste management. ISWA is open to individuals and organisations from the scientific community, public institutions and public and private companies from all over the world working in the field of and interested in waste management. Being part of ISWA gives you an unparalleled access to international organisations. Through its Working Groups, ISWA helps these international organisations form policy by supplying technical papers and opinions regarding waste practices. ISWA is the only worldwide waste organisation, which allows members to network with professionals, companies and institutional representatives.

WMRAS

The Waste Management and Recycling Association of Singapore (WMRAS) is the national trade association representing the interests of the waste management and recycling industry in Singapore. WMRAS promotes business networking opportunities and best practices amongst members through organised activities such as courses, conferences, exhibitions, networking sessions, and overseas missions. Being an approved WSQ Public Training Organisation by the Singapore Government, WMRAS conducts training to professionalise the industry. WMRAS also coordinates regular dialogue sessions to keep members updated on policy and regulatory developments, as part of its mission to facilitate knowledge exchange and foster closer ties with the public sector. WMRAS' strong ties with local government agencies and international associations provide members with a broad platform to expand business opportunities and address the growing challenges and demands of the industry.

NEA

Formed on 1 July 2002, the National Environment Agency (NEA) is the leading public organisation responsible for improving and sustaining a clean and green environment in Singapore. NEA develops and spearheads environmental initiatives and programmes through its partnership with the People, Public and Private Sectors. It is committed to motivating every individual to take up environmental ownership and to care for the environment as a way of life. By protecting Singapore's environment from pollution, maintaining a high level of public health and providing timely meteorological information, NEA endeavours to ensure sustainable development and a quality living environment for present and future generations.

Programme Partner - SEI

The Singapore Environment Institute (SEI) is the training and knowledge division of the NEA. The Institute helps to promote Singapore as an environment hub by providing thought leadership in environmental sustainability and management for high-density, compact cities. Its work also includes developing and managing a variety of learning programmes to enhance the competency of environmental professionals and share Singapore's environmental experiences. SEI distils and documents the Agency's capabilities and expertise as well as knowledge from other sources relevant to NEA's operations. The sharing of this knowledge is critical to the development of thought leadership and planning for the sustainability challenges in the years ahead.

PEEL by SEI

PEEL is an "out-of-the-classroom" learning programme that **expands your knowledge of environmental management** through a series of site tours and visits to environmental facilities around Singapore. Facilitated by **experienced guides**, each **PEEL** trail gives you a **behind-the-scenes** look at how Singapore manages and maintains a clean environment to achieve its environmental objectives of **Clean Land, Clean Air, Clean Water and a good standard of Public Health. A customised Clean Land trail focusing on waste management is offered on this programme.**

Speakers' Biodata

Bettina Kamuk is Board Member and Chair of ISWA's Working Group on Energy Recovery, and is Head of one of Ramboll's WTE Departments in Denmark. Ramboll is a worldwide leading WTE consultant. Ramboll has been responsible for more than 130 WTE unit (green-field and upgrades) in more than 40 countries and is involved in projects in North America, the Middle East, South East Asia as well as Europe. Bettina is involved in several of these projects including WTE projects in Singapore, Malaysia and Thailand. She has extensive knowledge of WTE technologies and has authored books and several comparative studies.

Jorgen Haukohl is Vice-Chair of ISWA's Working Group on Energy Recovery, and is Project Director at Ramboll. Jorgen has worked within the WTE sector for 40 years and has been responsible for numerous of Ramboll's projects. Jorgen has followed Europe's transition from almost 100% landfilling to today's landfill ban and the high degree of recycling and energy recovery. Jorgen has an in-depth knowledge of all aspects of WTE, and has been the main driver in preparing ISWA's State-of-the-Art Report on WTE now the 6th edition.

Edmund Fleck is member of ISWA's working group on Energy Recovery and is Managing Director of the German WTE plant supplier Martin GmbH, who owns several grate technologies. Martin and its partners have supplied WTE grates worldwide and has three reference facilities in Singapore, one of which will be visited during the study tour. Edmund Fleck has an extensive experience from carrying through numerous WTE projects

Jens Moller is consultant in the Waste-to-Energy Division in Ramboll. He is one of Ramboll's experts on flue gas cleaning and more than 10 years of consultancy experience serving a wide-range of WTE public and private clients in Europe. Jens is living in Singapore and is intensively involved in NEA's planning of new WTE capacity in Singapore.

Maria Chiara Metallo is an air quality specialist and project manager with more than 20 years of experience providing services for industries and local and national governments. Chiara has led complex long-term national and regional air quality projects. She began her career in Europe working as a scientific coordinator and air quality modeler, leading numerous research and planning projects for governments and research institutes. Since relocating to Singapore, she has worked on air quality projects across the region. Particular areas of expertise include air quality monitoring and modelling, development of emission inventories.

NEA trainers

Vaneeta Bhowani is the Deputy Project Director (IWMF), of the Waste and Resource Management Department at the National Environment Agency, Singapore. She oversees the planning and development of the Integrated Waste Management Facility which will be the largest waste management facility to be built in Singapore. She is also involved in the review of Singapore's waste management system and policies. Her work at the Agency has included raising the productivity, standards and the capabilities of the waste management industry. She has also been involved in the development and management of a recycling park in Singapore.

Pang Fook Chong is the General Manager of the Tuas Incineration Plant. He was the Deputy General Manager of the Tuas South Incineration Plant, the largest incineration plant in Singapore. He was involved with the design, construction and commissioning of Tuas South Incineration Plant. Fook Chong has extensive experience in the operation and maintenance of incineration plants in Singapore.

Kan Kok Wah is the Chief Engineer of Waste Reclamation Section of Waste and Resource Management Department in National Environment Agency. He oversees the provision of refuse disposal service including the operation and maintenance of Tuas Incineration Plant, Tuas South Incineration Plant, Tuas Marine Transfer Station and Semakau Landfill in Singapore.

ISWA-WMRAS-NEA Seminar on Waste-to-Energy 2015

12-14 Aug 2015 (Wed-Fri)

Day One – 12 Aug 2015, Wednesday			
0900 – 0910	Welcome & Admin	SEI	SEI TR 2, 1 Kay Siang Road, #09-01
0910 – 0940	Singapore's Integrated Waste Management - Sustainable Waste Management - Resource Recovery/Efficiency - Towards Zero-Waste/Landfill	Ms Vaneeta Bhojwani NEA	SEI TR 2
0940 – 1000	Waste Management Developments in Asia - Market Outlook Including Opportunities for WTE projects - Advanced Systems/Low Cost Solution - Challenges	Mr Jorgen Haukohl ISWA	
1000 - 1020	Waste Characterisation - Waste Characteristics - Capacity Diagrams	Mr Jens Moller ISWA	
1020 – 1040	Tea break		
1040 - 1115	Fundamentals of Waste Incineration - Combustion Process - Capacity Diagram - Energy Recovery	Mr Edmund Fleck ISWA	SEI TR 2
1115 – 1200	Waste Incineration according to state-of-the-art grate firing systems - Grate/Furnace Technologies - Steam boilers/Energy recovery/Co-generation Systems in WTE	Mr Jorgen Haukohl ISWA	
1200 – 1245	Lunch		
1300 – 1400	Travel to CGNPC Solar Biofuel Power (Singapore) Plant	PEEL Guide	
1400 – 1530	Conducted Tour of CGNPC Solar Biofuel Power Plant	Site Presenter	45 Shipyard Road Singapore 628136
1530 – 1615	Travel to Ecowise's Gardens by the Bay WTE Facility		
1615 – 1730	Conducted Tour of Ecowise's Gardens by the Bay WTE Plant		18 Marina Gardens Drive Singapore 018953
1730	Depart from Gardens by the Bay WTE Plant		
	End of Day 1		

Day Two – 13 August 2015, Thursday

0900 – 0945	Travel to Tuas South Incineration Plant (TSIP)	PEEL Guide	No. 98 Tuas South Ave 3, Singapore 637821
0945 – 1145	Conducted Tour of Tuas South Incineration Plant	GM/TSIP	
1145 – 1230	Travel back to Kay Siang Venue		
1230 – 1330	Lunch		
1330 - 1400	Characteristics of High Energy Efficiency Plants <ul style="list-style-type: none"> - Correlation between Heat Value and Energy Output - Corrosion Risk and other Challenges - Performance Data of Plants 	Ms Bettina Kamuk ISWA	SEI TR 2
1400 – 1425	Bottom Ash Treatment <ul style="list-style-type: none"> - Characteristics of Bottom Ash - Recovery of Metals from Bottom - Usage of Bottom Ash 	Ms Bettina Kamuk ISWA	
1425 – 1445	Pollution control technologies <ul style="list-style-type: none"> - Assess effectiveness of various technologies in complying with emission standards for WTE plants 	Mr Jens Moller ISWA	
1445 – 1510	Flue Gas Treatment Residues <ul style="list-style-type: none"> - Characteristics of Residues - Recovery of Metals - Disposal of Residues 	Mr Jens Moller ISWA	
1510 - 1540	Case Study: <ul style="list-style-type: none"> - Pollution Control System of Singapore's IPs 	Mr Kan Kok Wah NEA	
1540 – 1600	Tea break		
1600 – 1630	Air Quality Assessment in Singapore <ul style="list-style-type: none"> - Air Pollution Mechanisms - Air Dispersion Modelling - Guidelines and Code of Practice - Health Risk Assessment 	Ms. Maria Chiara Metallo, ISWA	SEI TR 2
1630 - 1700	New Development <ul style="list-style-type: none"> - Ideas for the future 	Mr Edmund Fleck ISWA	
	End of Day 2		

Day Three – 14 August 2015, Friday

0900 – 0930	Case Studies: <ul style="list-style-type: none"> - ARC, Copenhagen - Turin, Italy 	Mr Jens Moller ISWA Mr Edmund Fleck ISWA Mr Jorgen Haukohl ISWA	SEI TR 2
0930 – 1000			
1000 – 1020			
1020 - 1040	Tea break		
1040 - 1130	Layout and Arrangement <ul style="list-style-type: none"> - General requirements - Case study: Vaasa, Finland 	Mr Jorgen Haukohl ISWA	SEI TR 2
1130 - 1200			
1200 – 1300	Lunch		
1300 – 1345	Alternative Treatment Systems <ul style="list-style-type: none"> - Treatment of Residual Municipal Wastes with Options for Energy Recovery 	Mrs Bettina Kamuk ISWA Mr Edmund Fleck ISWA Mr Jørgen Haukohl ISWA Mrs Bettina Kamuk ISWA	SEI TR 2
1345 – 1405			
1405 – 1435			
1435 - 1500			
1500 – 1515	Tea break		
1515 – 1600	Criteria for Site Selection for WTE plants & Public's Acceptance Case studies: <ul style="list-style-type: none"> - Roskilde, Denmark - Abu Dhabi, UAE 	Mrs Bettina Kamuk ISWA Mr Edmund Fleck ISWA Mr Jørgen Haukohl ISWA	
1600 -1630			
1630 - 1700			
1700 - 1715	Closing Summary -Key takeaways	Ms Bettina Kamuk ISWA	SEI TR 2
1715 – 1730	-Evaluation Form -Certificates of Participation	SEI	SEI TR 2
1730	End of Programme		

REGISTRATION

The deadline for registration is **29 July 2015**. Please register by using the **Registration Form**. Registration will only be accepted by email or fax and will be acknowledged by email within 7 days after submission.

Registration Fee

- 1 person, ISWA Member or WMRAS Member SGD2,400
- 1 person, Non-Member SGD2,900

Registration fees will be free of GST and will include training materials, meals during the programme (inclusive of refreshments) and site visits (to be confirmed). Registration fee does not cover air travel and accommodation in Singapore.

The Seminar programme may be subject to change.

Cancellation

Any cancellation of registration must be submitted in writing to WMRAS

- By email to secretariat@wmras.org.sg or
- By fax to +65 6222 5848

Cancellation and refund will be subject to the following conditions:

- Cancellation **until 8 July 2015** 50% Refund
- Cancellation **between 9 July and 28 July 2015** 10% Refund
- Cancellation **on 29 July 2015 or “no show”** no refund

Registration may be transferred to a nominated representative.

In case of cancellation of the event due to unforeseeable events, WMRAS will refund the registration fee but no other costs incurred prior to cancellation of the Seminar on Waste-to-Energy.

For organizational matters please contact WMRAS Secretariat, www.wmras.org.sg

Email: secretariat@wmras.org.sg; Phone: +65 6222 5328

10 Hoe Chiang Road #21-01 Keppel Towers Singapore 089315



Please register with WMRAS Secretariat

- By email to secretariat@wmras.org.sg or
- By fax to +65 6222 5848

I hereby register for the following event:

ISWA-WMRAS-NEA Seminar on Waste-to-Energy, 12-14 Aug 2015

Title, First-and Last Name

Company Name/Organisation

Address (Street/Number, ZIP Code, City, Country)

Address for invoice (if different from the company address)

Dietary Preference: Vegetarian Food / Halal Food / No Preference

Telephone/Fax: _____

Email: _____

ISWA / WMRAS Member: YES / NO

On payment of registration fee, following receipt of invoice, the bank transfer must clearly state the name of the participant and the name of the Seminar.

Date: _____ Signature: _____

**ISWA-WMRAS-NEA
Seminar on Waste-to-Energy 2015**