WORKSHOP

on

URBAN AND INDUSTRIAL ENVIRONMENTAL MANAGEMENT (CUM FIELD TRIPS): THE SINGAPORE MODEL

Seminar Room 4-3
Blk B, Level 4
Faculty of Law
National University of Singapore

8 -14 December 2010

Organised by

ASIA-PACIFIC CENTRE FOR ENVIRONMENTAL LAW (APCEL)

TENTATIVE PROGRAMME

Emeritus Prof KOH Kheng Lian: Workshop Director
Director, Asia-Pacific Centre for Environmental Law
Email: lawkohkl@nus.edu.sg

The programme is accurate at the time of printing, but APCEL reserves the right to amend the programme as it deems fit
Purpose

To build capacity in urban and industrial environmental management

Objectives

- To enable administrators and managers of urban and industrial environmental management to learn and exchange experiences and techniques in urban and industrial management with participants from various developing countries in the world
- To promote awareness and understanding of the issues in urban-industrial environmental management and to initiate a policy dialogue and formulate strategies on urban industrial environmental management, including issues in compliance and enforcement
- To enhance the capacity of participants to meet the challenges of continued growth and environment pressures, taking the experience of Singapore as a model in some areas such as land use planning, nature conservation, air pollution, waste management, wastewater, sewage and pollution management, and control of freshwater quality in an urban setting
- To develop networks and partnerships among participants
- To examine the ASEAN strategies and plans of action relating to urban and industrial environmental management as an example of sub-regional efforts

Participants

- The workshop is targeted at a defined group of participants with a proven need for such training
- Participants should be in a position to pass on their knowledge formally or informally after the course. In other words, there should be a multiplier effect to the course
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Singapore is unique in Southeast Asia in that it is the only fully urbanised country by virtue of its city-state status. Hence Singapore’s environmental management is simultaneously national and urban. The Singapore government, a product of the longest serving ruling party (People’s Action Party) since independence in 1965 has tackled urban issues and challenges over the decades through landscape modifications, maintenance of public hygiene, environmental adaptations and public civic behavioural programmes. The pillars of Singapore’s urban success story lies in urban planning, pragmatic policies, legal enforcements and the tackling of brown issues. My contention is that cities are human engineered, built environments and hence should be governed by the laws of human society and not left to the laws of nature.

Singapore’s Garden City or City in the Garden mandate is testimony to a human contrived, constructed and manicured landscape which bears strong anthropocentric influences. Secondly, my thesis is that Singapore needs to accept the reality of dual urban systems: the firm centre or formal economy and the bazaar and informal economy which operate simultaneously and undergird environmental outcomes. The secret of Singapore’s urban success story lies in its public housing programme that houses 83% of Singapore’s population and hence provides clean water, efficient garbage disposal and modern sewerage systems that ensures a clean, hygienic and liveable environment. When Singapore’s Ministry of the Environment was established in 1972 there were barely five countries in the world that had similar ministries, which demonstrates the far sighted vision of the government. However, unlike other environmental ministries that deal with green issues, Singapore’s Ministry of the Environment effectively deals with the “clean and brown issues” of Singapore. It is quite another story if we were to measure Singapore’s environmental success by looking at its green issues (preservation of biodiversity) and the ecological footprint. Given that the City-state has no natural resources and produces barely 5% of its food, it is understandable that the sustainability of Singapore’s 4.9 million population requires an ecological footprint possibly 30 to 40 times larger than its current 702 sq km of land area to maintain its current standards of living and quality of life. Hence the success of Singapore as an Eco-City...
lies in its effective and efficient intra-urban environmental management; but given its urban status, its affluent society, and export orientated economy, Singapore’s extra-urban tract record will continue pose challenges for its development and its ecological footprint is unlikely to be easily reduced.

Resource Person: Assoc Prof Victor SAVAGE, Department of Geography, Faculty of Arts & Social Sciences, NUS

Chairperson: E/Prof KOH Kheng Lian

1245 hrs – 1345 hrs Lunch

1345 hrs – 1500 hrs Session 2: The Road from UNFCCC, Copenhagen and Mexico

Currently there are over 200 international environmental agreements and an uncountable number of bilateral agreements on the subject of environment. However, the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol of 1997 provides the only multilateral framework to address climate change, the biggest environmental threat faced by mankind. This framework is not permanent as the Kyoto Protocol has a limited life span (2008-2012). Although the Bali Action Plan, a decision made at the UNFCCC meeting in 2007 was expected to provide the foundation to achieve a legally binding long term climate agreement acceptable to both developed and developing nations, the UNFCCC climate negotiations in Copenhagen in 2009 were fraught with disagreement. As a result, the participating countries failed to reach consensus on issues such as global initiatives for mitigation of climate change, international cooperation for adaptation to climate change, and making adequate funds available to support developing countries’ efforts to reduce emissions and adapt to the impacts of climate change. A better outcome is expected when the next UNFCCC Conference of the Parties (COP 16) is held in Cancun, Mexico, from 29 November to 10th December 2010. Thus this session will provide an overview of the international climate change negotiations from the perspective of both developed countries and developing countries. The key reasons for the failure to reach consensus will be analyzed.

Resource Person: Asst Prof Asanga GUNAWANSA, School of Design & Environment, NUS, Associate Member, APCEL, NUS

Chairperson: E/Prof KOH Kheng Lian

1500 hrs – 1515 hrs Tea Break
Session 3: Addressing Environmental Issues through Land Use Planning

Urban Planning, as an activity of purposeful anticipation of and provision for the future, presents the best opportunity to address critical environmental concerns at the early stages of development programming. This presentation traces the principles and philosophies governing the key planning instruments in Singapore, namely, the strategic Concept Plan, and the statutory Master Plan, and considers how environmental concerns are addressed, in tandem with concerns such as economic growth and social development. Apart from examining spatial strategies, the presentation will include a discussion of major regulatory approaches to pre-empt incompatible, sub-optimal and environmentally harmful land uses, and as well as an exploration of supportive mechanisms that facilitate plan implementation in a market-driven economy.

Resource Person: Dr MALONE-LEE Lai Choo, Director, Centre for Sustainable Asian Cities, School of Design & Environment, NUS

Chairperson: E/Prof KOH Kheng Lian

Session 4: Integrated Water Resources Management in Singapore and the Deep Tunnel Sewerage System

Singapore has come a long way in terms of water management and since the turn of the century PUB, the national water agency has implemented a new strategy in managing water resources in an integrated manner. With this integrated approach, Singapore is able to source, purify and supply water to meet its need for the future in a more sustainable manner. The Deep Tunnel Sewerage System is a major initiative by Singapore in this integrated approach to also meet the nation's need for treatment, disposal and reclamation of its used water.

Guest Speaker: Mr YONG Wei Hin, Asst Director, Water Reclamation Department Public Utilities Board (PUB)

Q & A

Chairperson: E/Prof KOH Kheng Lian
Day 2, Thursday, 9 December 2010

0900 hrs – 1045 hrs  

**Session 5: Waste Management**

- Integrated waste management planning
- Waste management infrastructure
- Waste management policy, institutional aspects, and regulations

This session provides an overview of the solid waste management system in Singapore. Principles of sustainable urban waste management planning are defined, including the waste management hierarchy, integration of institutional matters and infrastructure, costs, and the importance of systems that are appropriate to the unique local situations. The key waste management facilities and infrastructure in Singapore are presented, including collection systems, incinerators, landfills, and recycling facilities, including issues such as capacity and cost. The latter half of the presentation is devoted to the institutional issues that are essential for a workable, cost effective waste management system. These include methods of private sector participation, regulations and enforcement, tariffs and charging, arrangements between the regulator and operator, and other issues.

Resource Person: Mr Richard C. REIDINGER, Regional Director - Business Development, AECOM Environment in Asia

**Participants' Presentation on Waste Management**

**Q & A**

Chairperson: E/Prof KOH Kheng Lian

1045 hrs – 1115 hrs  
Tea Break

1115 hrs – 1300 hrs  

**Session 6: Hazardous Waste Management (including Bio-Hazardous Waste)**

Hazardous waste is a by-product of industrial processes (solvents, wastewater sludge, etchants, etc), commercial activities (vehicle oil changes), institutions (medical waste, R&D waste), and even households. A comprehensive regulatory, institutional, and infrastructure framework is required to strictly manage these diverse and dangerous materials. Improper management of hazardous waste has resulted in serious environmental pollution, land contamination, and population health problems in many countries around Asia.
Singapore has one of the most advanced hazardous waste management systems in Asia. The government controls hazardous waste through a combination of regulation (Toxic Industrial Waste Regulations), administrative control, and strict enforcement. The entire value chain, including generation, transport, treatment, and final disposal, is managed. All hazardous waste infrastructure in the country is privately owned and operated, and a private market for hazardous waste services prevails which ensures efficient prices and services. Hazardous waste methods used in Singapore include incineration, solvent recycling, stabilization, oil recycling, and physical-chemical treatment.

Resource Person: Mr Richard C. REIDINGER

Participants' Presentation on Hazardous Waste Management

Q & A

Chairperson: E/Prof KOH Kheng Lian

1300 hrs – 1400 hrs Lunch

1400 hrs – 1530 hrs Session 7: Environmental Impact Assessment

(a) The Potential for Strategic Environmental Assessment in Asia

(b) The Effectiveness of EIA in Asia

Any major new development, infrastructure, or facility has the potential to impact the surrounding environment and community. EIA is the planning tool that allows the identification, quantification, evaluation, and mitigation of impacts on the environment. Other related project planning tools include Social Impact Assessment (SIA) and Quantitative Risk Assessment (QRA). Strategic Environmental Assessment (SEA) meanwhile allows for evaluation of new programs and policies, before any specific physical projects are planned.

EIA is a requirement in most Asian countries. However, EIA scope, methodology, and effectiveness varies dramatically across the region. Singapore, Malaysia, and Hong Kong are good examples of very different approaches to EIA. World Bank standard EIA is the most accepted approach internationally. The basic methodology generally includes: defining the baseline environment; describing the project; regulatory review; project alternatives; identifying emissions and releases; evaluating impacts; mitigation measures; and environmental management plan. Scope of such assessments usually include: air; water, ecology; cultural resources; waste management; contaminated land; chemical management; noise; landscape and aesthetic impact.
Day 3, Friday, 10 December 2010

0900 hrs – 1000 hrs  Session 9:  Air Pollution Management – The Singapore Experience

(a) Control of Air Pollution from Industrial Sources

(b) Control of Air Pollution from Mobile Sources

This session discusses Singapore’s management of air pollution – it gives an overview of the control of air pollution from industrial and mobile sources and the laws that apply.

Resource Person:  Assoc Prof LYE Lin Heng,
Deputy Director, APCEL; Chair, MSc (Env Mgt) program, NUS

Q & A

Chairperson:  E/Prof KOH Kheng Lian

1000 hrs – 1015 hrs  Tea Break

1015 hrs – 1115 hrs  Session 10:  Transport-Based Air Pollution Management

(a) Singapore’s Experience – Traffic Planning

(b) Experience of other Countries (Participants’ Inputs)

This session elaborates on Singapore’s management of air pollution control via controls on vehicular traffic. It looks at the implementation of the “polluter pays” principle in the system of control of car sales via the certificate of entitlement (COE); in the
imposition of charges for entry into the central business area, and for use of certain expressways during peak hours; and the imposition of taxation for use of the roads.

Resource Person: Assoc Prof LYE Lin Heng

Participants’ Presentation on Air Pollution Management

Q & A

Chairperson: E/Prof KOH Kheng Lian

1115 hrs – 1245 hrs

Session 11: (1) Adaptation to Climate Change in Cities: What Role Can ASEAN Play?

(2) Environmentally Sustainable Cities in ASEAN: ASEAN Working Group on Sustainable Cities (AWGSC)

As Singapore is a member of ASEAN, this session focuses on two aspects of the work of ASEAN of relevance to our Workshop. On topic (1), we will examine what role ASEAN can play in developing a framework for adaptation to climate change - recent torrential rains have caused floods in many cities in ASEAN eg Singapore, Cambodia, Indonesia Philippines, Malaysia and Vietnam. On topic (2) ASEAN is committed to developing “A clean and green ASEAN…” AWGSC has developed the Framework on Environmentally Sustainable Cities in ASEAN. Singapore chairs AWGSC.

Resource Person: E/Prof KOH Kheng Lian

Q & A

Chairperson: E/Prof KOH Kheng Lian

1245 hrs – 1330 hrs

Lunch

1330 hrs – 1410 hrs

Session 12: Singapore’s Sustainable Energy Strategy

Guest Speaker: Mr Edwin Khew, CEO IUT Global Pte Ltd

1410 hrs – 1500 hrs

Participants’ Presentation

1500 hrs – 1515 hrs

Tea break

1515 hrs – 1645 hrs

Session 13: Compliance and Enforcement

This session discusses the challenges relating to compliance and enforcement, and how these may be resolved.
Day 4, Monday, 13 December 2010

0900 hrs – 0945 hrs  
**Session 14: Basel Convention on the Transboundary Movement of Toxic Wastes**

We will examine how the international community has addressed the problem of the transboundary movement of hazardous waste through and examination of the 1989 Basel Convention on the Transboundary Movement of Hazardous Waste. We will examine why the Convention was necessary and how it attempts to regulate the transboundary movement of hazardous waste through principles such as “prior informed consent”. We will also examine the mechanisms and provisions in the Convention which are designed to encourage developing countries to ratify and implement the convention, and the mechanisms established in the Convention to keep it updated and to encourage states to effectively implement its provisions. We will also examine the steps taken by Singapore to implement the Convention and make it part of Singapore’s national law. Finally, we will examine the role played by international NGOs such as Greenpeace and the Basel Action Network in promoting the international regulation of hazardous wastes.

Our study of the Basel Convention provides an example of the major provisions and schemes that are found in many of the major international treaties on the environment, which are often referred to as Multilateral Environmental Agreements (MEAs).

Resource Person:  Mr Richard C. REIDINGER

**Participants’ Presentation on Basel Convention**

Q & A

Chairperson:  E/Prof KOH Kheng Lian

0945 hrs – 1045 hrs  
**Session 15: Raw Water Quality Management - A Case Study in Singapore**
The quality of runoff in any water resources project is largely influenced by the activities within the catchment areas and the direct pollution load the reservoir is being subjected to. As catchment areas tend to get progressively more urbanized in terms of industrialisation, the runoff quality tends to deteriorate. When such raw water is treated, there will be additional costs incurred for infrastructure development for anti-pollution measures to be taken within the catchment area and the reservoir and also for treatment of water. These additional expenditures will lead to an increase in the production cost of treated water. The main objectives of this paper are to define the impact of urbanization and industrialization on water catchments leading to poorer runoff quality and higher treatment costs. These concepts are illustrated in a real-life case study in Singapore where the sources of pollution in an urbanizing catchment were identified and quantified.

The pollution problem was analysed thoroughly and well-defined anti pollution measures were taken over a period of time and the results monitored. It has thus been shown that it is possible to accommodate industrialisation and urbanization in large tracts of land provided an appropriate infrastructure is set up to identify the pollution problems and carry out extensive analysis. Anti-pollution measures should be recommended on the sound basis of analyses of field data clubbed with appropriate administrative support from all the relevant contributing sectors. Legislation should be promulgated or amended, if necessary and, most important of all, there should be the right political will to back the technical decision makers.

Participants’ Presentation on Water Quality Management

Resource Person: Dr A APPAN, Technical Adviser, LBW Consultants, Singapore; R J Crocker, Singapore

Q & A

Chairperson: E/Prof KOH Kheng Lian

1045 hrs – 1100 hrs Tea Break

1100 hrs – 1145 hrs Participants’ Presentation on Wastewater Management/ Management of Freshwater Resources

Resource Person: E/Prof KOH Kheng Lian

Q & A

Chairperson: E/Prof KOH Kheng Lian

1145 hrs – 1245 hrs Lunch

1245 hrs – 1330 hrs Departure for IUT Global Pte Ltd
Day 5, Tuesday, 14 December 2010


The construction industry is considered to be one of the major causes for air, water, and noise pollution. Further, it is said that the emission of GHG by the construction sectors is one of the main human-induced causes of climate change. Thus, with the ever increasing focus at all levels of policy and planning on climate change mitigation and adaptation, the construction sector has been identified as one of the key industries that should be pro-active in sustainable development. This presentation will provide an overview of the legislative and policy initiatives in Singapore to promote a sustainable construction industry.

Resource Person:  Asst Prof Asanga GUNAWANSA, School of Design & Environment, NUS, Associate Member, APCEL, NUS

Chairperson:  E/Prof KOH Kheng Lian

1030 hrs – 1100 hrs  Tea Break

1100 hrs – 1230 hrs  Session 17:  Urban Metabolism and Industrial Ecology

Resource Person:  Dr KUA Harn Wei

Participants’ Presentation on Urban Metabolism and Industrial Ecology

Q & A

Chairperson:  E/Prof KOH Kheng Lian
1215 hrs – 1245 hrs

Closing Ceremony

Closing Remarks

~End of Workshop~

E/Prof KOH Kheng Lian
Director, MFA/APCEL Workshop on Urban and Industrial Environmental Management