Urban Environmental Management in Singapore

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Introduction

City state comprising a main island and some islets

Land area - 700 sq km

Population - 4.5 million
Introduction

• Many large-scale industries such as:
  oil refineries,
  petrochemical complexes,
  pharmaceutical plants,
  wafer fabrication plants,
  electronic industries.

• 750,000 motor vehicles
Introduction

High population density and a highly industrialised economy

Immense challenges to maintain a clean and healthy environment
State of the Environment

Environment quality compares well with best cities in the world

Major air pollutants within international standards

Inland and coastal waters support aquatic life

Financial District

Marina Bay
Environmental Management Strategy

- Prevention
- Enforcement
- Monitoring
- Education
Prevention

• **Environmental Planning Controls**
  – Land use planning
  – Judicious siting of industries

• **Environmental Infrastructure**
  – Comprehensive sewerage system
  – Efficient solid waste system

• **Regulatory Controls and Policies**
  – Controls and policies on air and water pollution and hazardous chemicals and hazardous industrial wastes
Environmental Controls In Land Use Planning

- Land zoned for specific uses such as residential, commercial, industrial, etc.
- Safeguarding land for drainage, and sewerage and solid waste collection, treatment and disposal facilities
- Protection of water catchments
Siting of Industries

To optimise land use and minimise impacts from pollution,

• site industrial estates for clean and light industries close to residential areas

• site general and special industries farther away from residential areas in Industrial estates, and out of water catchments
Land Use Zoning
Prevention

- Environmental Planning Controls
  - Land use planning
  - Judicious siting of industries
  - Development and building plans control

- Environmental Infrastructure
  - Comprehensive sewerage system
  - Efficient solid waste system

- Regulatory Controls
  - Controls on air and water pollution and hazardous chemicals and hazardous industrial wastes
Sewerage Infrastructure

- 6 water reclamation plants
- >3000 km sewers
- >100 pumping stations
- served all industrial estates and almost all residential premises except for isolated pockets of residential premises with on-site sewage treatment plants
Solid Waste Management

- Daily refuse collection service
- 90% of wastes incinerated at 4 incineration plants
- 10% of wastes disposed of at the off-shore Semakau sanitary landfill
Waste Management

Hierarchy – 3Rs

- **Reduce** - to avoid unnecessary waste generation.
- **Reuse** - to use again, Re-use and recycle recyclable in industrial and in the community.
- **Recycle** - to convert unwanted things into useful and marketable recycled products.

**Aim:**

*To prolong lifespan of incineration plants and landfill*
National Recycling Programme

- A recycling programme for households
- Residents given recycling bags/ recycling bins/crates
- Door-to-door collection every fortnight
National Recycling Programme

- Recyclables
  - Paper
  - Drink cans/ metal containers
  - Glass bottles/jars
  - Plastic bottles
  - Carton boxes
  - Clothing
Recycling Bins at Public Places

- Outside subway stations
- Shopping streets and malls
- Residential estates
Plastic Waste Recycling

Plastic scraps

Heating and Extrusion

Plastic Pellets

KK Asia
Plastic Recycling Plant
Prevention

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• Environmental Infrastructure
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• Regulatory Controls and Policies
  – Controls on air and water pollution and hazardous chemicals and hazardous industrial wastes
Air Pollution Control

• Licences required for pollutive industries
• Industries designed or provided with pollution control equipment to comply with allowable emission standards for air pollutants
• Fuel burning equipment to use fuel of specified quality
• Use of cleaner fuel
Vehicular Emission Control

- Stringent emission standards for registration of vehicles
- Use of Unleaded Petrol and Ultra Low Sulphur Diesel
- Mandatory periodic inspection of in-use vehicles
- Stringent enforcement action against smoky vehicles
- Promote education on proper vehicle maintenance to prevent smoke emission
Water Pollution Control

• Trade effluent pre-treated to allowable discharge limits for discharge into a public sewer or watercourse

• Licence required for discharge to trade effluent into watercourses

• Containment facilities provided for storage tanks of oil and chemicals
Environmental Management Strategy

• Prevention
• Enforcement
• Monitoring
• Education
Enforcement

- Conduct regular inspections and checks on industries
- Air pollutants to comply with emission standards
- Trade effluent to comply with standards for discharge into sewers/watercourses
- Checks and audits on management and disposal of hazardous substances and hazardous industrial wastes
Environmental Management Strategy

• Prevention
• Enforcement
• Monitoring
• Education
Monitoring

- Regular monitoring of ambient air quality, and inland and coastal waters via
  - Continuous telemetric air monitoring system
  - Sampling of water qualities of rivers, reservoirs, beaches, etc

- Monitoring data provides feedback on adequacy and effectiveness of control programmes
Education & Partnership

• NEA cannot succeed alone

• Work with industries as partners to move towards self-monitoring and co-regulation

• Regular dialogues with industries, professional institutions, etc

• Training courses for professionals, industries, etc

• Seminars, workshops, etc, for industries, businesses, etc
Thank you