

*“Hearing the public: How citizens can influence
standard setting and promote compliance through
complaints”*

BY

By DR MUHAMMAD BASHIR,
DIRECTOR GENERAL,
ENVIRONMENTAL ENVIRONMENTAL PROTECTION,
KPK, PAKISTAN

Legislative Framework in Pakistan

- Pakistan Environmental Protection Ordinance, 1983
- National Environmental Quality Standards of Pakistan (1994)
- Pakistan Environmental Protection Act, 1997.
- After 18th Amendment in the Constitution the subject of Environment was devolved to the Provinces.
- Pakistan Environmental protection Act (PEPA), 1997 is still relevant in the Provincial Laws and country has same NEQS.

Review of PEPA, 1997

- **Institutions created**

- Pakistan Environmental Protection Council (PEPC)
- Federal & Provincial EPA's
- Provincial Sustainable Development Fund
- Courts of Environmental Magistrate
- Environmental Tribunals
- EPA, Khyber Pakhtunkhwa was created in 1989.

Review of PEPA, 1997

- **Activities Regulated under the Act.**

- **Section 11: Prohibition of Certain Discharges:**

“No person shall discharge or emit any effluent or waste or air pollutant or noise in an amount , concentration or level which is in excess of the NEQS.

- **Section 12: Environmental Assessment.**

“No proponent of a project shall commence construction or operation of any development project unless he has filed with EPA an Environmental Assessment and has obtain from the Agency approval in respect thereof”.

- Section 13 related to hazardous waste, section 14 to hazardous substances and section 15 to vehicular emission

Overview of PEPA, 1997

● **Main Functions of EPA:**

- Implement this PEPA and the rules and regulations
- Prepare, national environmental policies & take necessary measures for its implementation.
- Ensure Enforcement of NEQS.
- Prepare and publish an annual state of the environment report;
- Integrate environment protection in planning & development.
- co-ordinate environmental policies and programmes nationally and internationally;

Section 12: Environmental Impact Assessment

Initial Environmental Examination and Environmental Impact Assessment

- (i) No proponent of a project shall commence construction or operation unless he has filed with EPA an IEE or EIA and EIS where the project is likely to cause adverse environmental effects, an EIA has obtain from the Agency approval in respect thereof.
- (2) The Agency shall---
 - (a) review the initial environmental examination and accord its approval or require submission of an environmental impact assessment by the proponent; or
 - (b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.
- (3) **Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to---**
 - trade, manufacturing or business activities, processes or techniques of a proprietary nature, International relations, national security etc etc.

Cont...

- (8) The Agency shall maintain separate Registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

Review of IEE and EIA Regulations, 2000

- **Section 10: public participation**
- (1) In the case of an EIA, EPA shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section (3) of section 12, be accessed

Conti...

- (2) The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.
- (3) The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.
- (4) Agency shall also ensure the circulation of the EIA to the concerned Government Agencies and solicit their comments thereon.
- (5) All comments received by the Federal Agency from the public or any Government Agency shall be collated, tabulated and duly considered by it before decision on the EIA.
- (6) The Federal Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

Techniques for public consultation

- | | |
|--|---|
| • Public hearings | Public meetings |
| • Small group meetings | |
| • Presentations to community organizations | |
| • Information seminars | Operating field offices |
| • Information brochures and pamphlets | |
| • Field trips and site visits | Public displays |
| • Material for mass media | Response to public inquiries |
| • Press releases inviting comments | Letter inviting comments |
| • Workshops | Advisory committees |
| • Employment of community residents | |
| • Community interest advocates | Public review of scope of Environmental Reports |

Effective public involvement

The development of a public involvement program typically involve consideration of the following issues:

- The objectives of the proposal, and the study;
- Identification of interested and affected parties (stakeholders);
- budgetary and time constraints and opportunities;
- Identification of appropriate techniques to involve or consult with the stakeholders;
- Traditional authority structures and decision-making processes;
- Identification of approaches to ensure feedback to the involved stakeholders; and
- Identification of mechanisms to ensure consideration of stakeholders' knowledge, opinions and suggestions

Stages of the environmental assessment process where public consultation should occur

Ideally, the public involvement program should commence at the screening stage of a proposal and then continue throughout the whole EIA process.

- The Initial Environmental Examination
- Assessing impacts, mitigation and impact management
- **Reviewing and decision-making**
- **Monitoring and auditing**

Stakeholders

- People who may be directly or indirectly affected by a proposal are clearly the focus for public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders,
- Local people
- Other affected communities
- Proponents
- Government agencies and local councils
- Non Government Organizations (NGO's)
- Influential people

GUIDELINES FOR PUBLIC CONSULTATION

- (a) Consultation, Involvement and Participation
- One common view of the levels of public involvement is summarized below
- **Informing**
 - one way flow of information from the proponent to the public
- **Consulting**
 - two way flow of information between the proponent and the public, providing opportunities for the public to express views on the proposal
- **Participating**
 - proponent and the public involved in shared analysis, agenda setting and decision making, through reaching consensus on the main elements.

Public participation in EIA - Advantages

- The aim of EIA is that potential problems are anticipated and addressed at an early stage in the project's planning and design;
- This aim cannot be realistically achieved without first consulting those people who are most likely to be affected by a particular proposal;
- Incorporating this importance into EIA should ensure that full knowledge of all environmental effects is gained and the public views are taken into account in the decision-making process;
- Therefore, EIA must have access to local environmental knowledge; understand local resource use and nuances, and use local value sets to interpret and evaluate predicted impacts

PICTURES (Public hearing Royal Chemical)



(Public Hearing Kigah Dam)



(Public Hearing Wak Cement)



(Public Hearing Nashpa & Gulgrot)



(Public Hearing haripur Bypass Road)



Joint Stakeholders Meeting on Mercury Dental Amalgam use in Khyber Pakhtunkhwa Environmental and Health Impacts at Wildlife Department (25th February, 2015)



Hazardous elements

Dentists urged to curb use of mercury-based dental amalgams

As signatory of Minamata Convention, Pakistan should devise regulations on use of mercury, say experts

By HIDAYAT KHAN
PESHAWAR

Students of dentistry should be taught the environmental impact of using mercury-based dental amalgams as part of their curriculum, experts at a conference said on Wednesday.

The conference was organised at the Wildlife Office Hall by the Khyber-Pakhtunkhwa Environment Protection Agency (EPA) and Sustainable Development and Policy Institute (SDPI). It was aimed at devising a set of rules to curb the use of such dental amalgams.

According to participants, dental amalgams contain over 30% of mercury, posing a direct threat to human health and the environment when not properly disposed of.

"Mercury is considered to be a dangerous metal," EPA K-P Director General Dr Muhammad Bashir Khan

said. "As a signatory of the Minamata Convention on Mercury signed in 2013, Pakistan must devise regulations in this regard."

The province is not in a position to impose a ban on mercury-based dental amalgams as dentists have very few alternatives available

According to Khan, Pakistan has signed this convention as it is a matter of grave concern. "The purpose is to protect the natural environment by 2020," he said.

However, the province is not in a position to impose a ban on mercury-based dental amalgams as dentists have very few alternatives available.

During the conference, SDPI senior adviser on chemicals Dr Mahmood A Khwaja presented his research conducted on dental clinics and hospitals around the world.

"The highest mercury levels have been recorded at general hospitals and private clinics," he said. "However, only 33% of medical professionals in the country have any awareness about this issue."

Khwaja emphasised the need to teach students of dentistry the risk of using mercury-based dental amalgams to raise awareness. "We need to take an initiative to devise a policy to tackle this environmental problem even though there is a strong likelihood it will not be implemented," he added.

"As a country, we are not enthusiastic about environmental issues," said Dr Muhammad Nisar, an organic chemist and lecturer at the University of Peshawar. "However, this issue should be prioritised as dentists do not take necessary precautions when using mercury-based dental amalgams."

Setting climate Change indicators



Matthew Baird
Environmental Counsel
MEIANZ, Cert. Env. Pract.



Next Generation Compliance in Asia

Bangkok, Thailand
21-23 September 2015



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**Mekong Partnership
For the Environment**

Shared solutions for responsible development



Panel 3 Improving Effectiveness of our Compliance Programs

Comparative Analysis of EIA in the Lower Mekong Region

Future infrastructure spending

- ADB has estimated that Asia “needs to invest “about \$8 trillion in national infrastructure and \$290 billion in regional infrastructure between 2010 and 2020 to sustain its growth trajectory”.
- ADB – approx 80% of loans on infrastructure
- AIIB - \$40 billion planned start-up
- To achieve ASEAN vision of sustainable development, EIA can be used to promote social inclusion, environmental protection and economic growth.



- The aim of *Environmental Impact Assessment* is to promote “sustainable development”.
- *Sustainable development* is “development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends”.





Environmental Impact Assessment (EIA) is a **process** of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of **proposed** projects and physical activities **prior** to major decisions and commitments being made.

Statement on Building a Sustainable Future
for the Mekong 5 August 2015



- Foreign Ministers from Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam and the United States at the Friends of the Lower Mekong Initiative supported the use of EIA to increase protection and sustainability.
- This included regional cooperation and integration and increasing public participation.



Seven Key principles of EIA



- Effective EIA is achieved through the adoption of the following seven key principles
 - Proponent bears cost of application and assessment
 - Genuine and meaningful public participation at all stages of the process
 - Access to information by civil society and government
 - Legally established, clear and effective process
 - Best available scientific information
 - Open and evidence-based decision making
 - Effective monitoring, compliance and enforcement

Lower Mekong Countries

Common Issues and Common Needs

PACT 2015 Report – highlights the similarities with the EIA procedures in the Lower Mekong. Also identifies some key areas of difference.

ASEAN Economic Community requires regional integration and common approaches.



Mekong Partnership for the Environment

MEKONG EIA BRIEFING :
**Environmental Impact Assessment
Comparative Analysis
In Lower Mekong Countries**



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building
local
promise.

http://www.pactworld.org/sites/default/files/local-updates-files/MPE_Mekong_EIA_Briefing_Final.pdf

Kingdom of Cambodia



Less than 5% of projects fully comply with EIA Sub-decree 1999.

Updated EIA Law will be consistent with ADB Safeguards and international best practice

- New EIA Law drafting process with Vishnu Law Group and MOE since 2012. Seven public workshops already held.
- Finalising Draft.
- Working on Public Participation Guidelines.
- 2014 Prakhas on Registration of Experts.
- 2014 Prakhas on Establishment of Technical Working Group for Reviewing and Commenting on EIA Report.

Kingdom of Thailand



Thai Supreme Administrative Court has recently ruled that public participation rights are part of the natural law of Thailand.

- Environment Protection Law, EIA Notification 2009
- Constitutional provisions basis for access to information and right to participate. These have been abrogated from 22 May 2014 coup. (Art 67).
- Currently draft Review of Thai EIA Law.

Union of Myanmar



Environmental Protection Law 2012

Foreign Investment Law 2012 and Rules require ESIA

- Environmental Protection Rules 2014, in force 5 June 2014.
- Chapter VII – Environmental Quality Standards
- Chapter XI – EIA
- Environmental Impact Assessment Procedure (draft)
- Development of Draft Environmental Quality Standards.

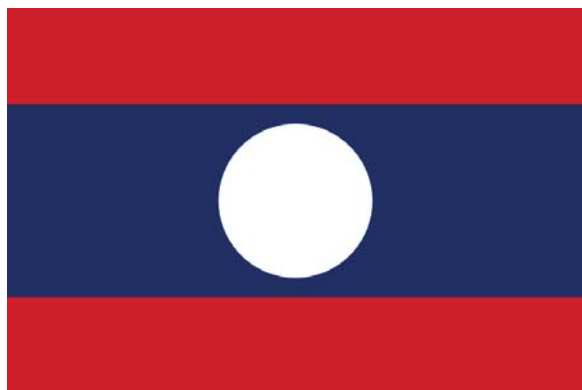
Viet Nam



Currently reviewing Criminal Code of VN to increasing penalties for environmental crimes and failure to comply with EIA approvals.

- EIA first introduced in Law on Environment Protection 1993 and in the Law of Environmental Protection 2005
- Consultation with commune level communities is compulsory in EIA.
- 2014 Major amendments to Environmental Protection Law and EIA and SEA. Increasing focus on environmental compliance and enforcement.

Lao PDR



Ministerial Instructions on EIA and IEE has been promulgated in 2013. Many changes to the EIA laws since 2010. EIA Guidelines now being updated to reflect new Instructions.

- Under the Constitution, Article 37, all Lao citizens have equal right to engage in politics, economics, and social-cultural family development.
- The Environmental Law, Article 8 (5) requires "participation from villagers likely to be effected by the development projects or operations."
- EIA Decree 2010 - repealed
- EIA Guideline 2012

ASEAN EIA Practices



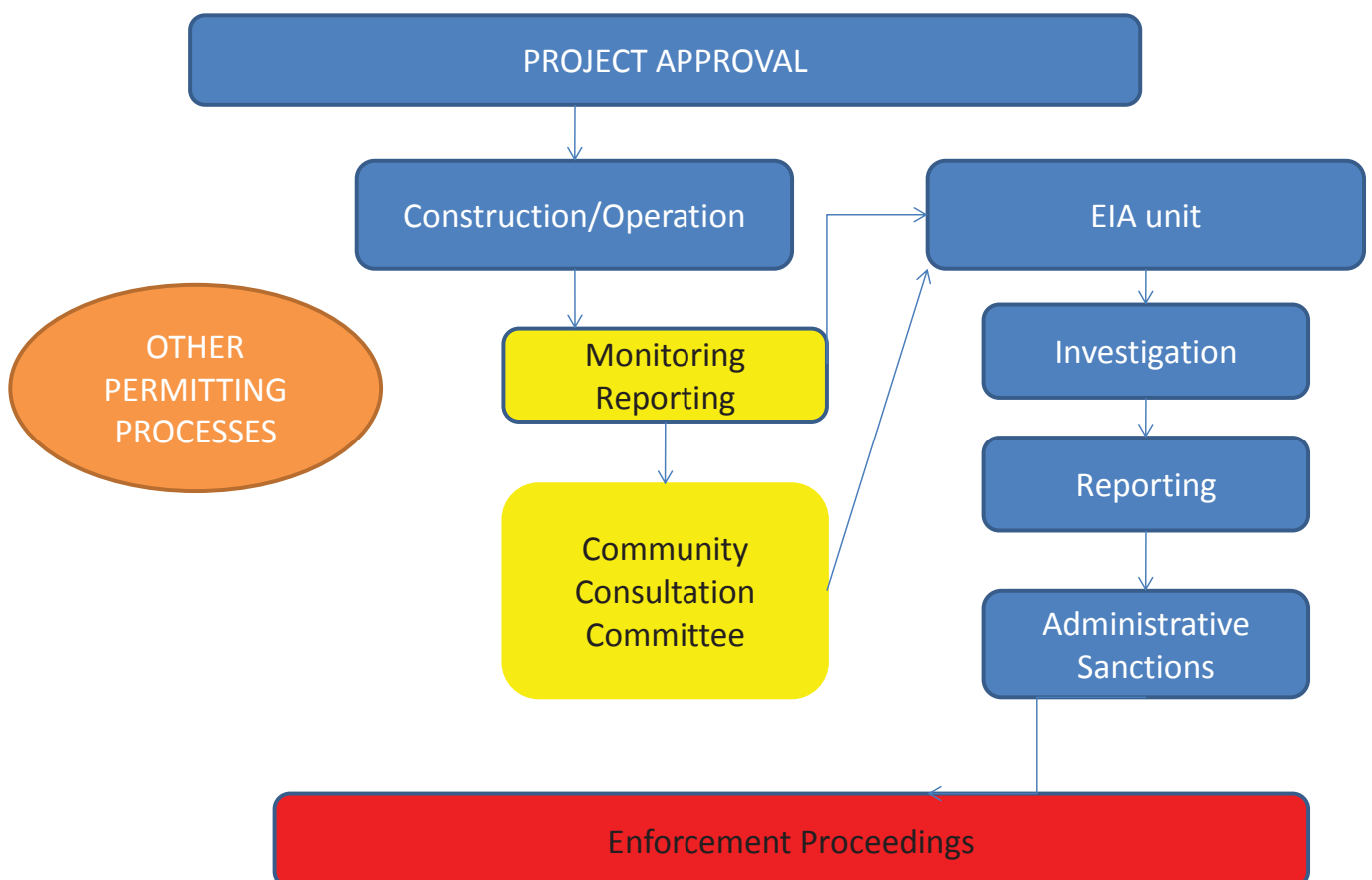
- EIA is becoming recognised in the Mekong for bringing better development.
- Lessons can be learned from other countries, especially Indonesia, Japan, Korea, China and the USA, adapted to local experience.

EIA Needs and Opportunities

Strengthening EIA in the Mekong

- Role of scoping and screening
- Public Participation
- Access to Information
- Enforcement and compliance
- Capacity of EIA Departments
- Regional Cooperation

Operation/Monitoring/Compliance



EIA Needs and Opportunities



Areas of need

- Capacity of EIA Experts and EIA Consulting Firms
- Environmental Assessment of Mega-Projects
- Standards and Guidelines on Best Available Technology
- Role of Sub-national EIA Units
- Compliance and Enforcement

The consequences of failing to protect the environment



Stream flowing in to Manila Bay.



Tianjin Chemical Explosion.





New Regulations on Water Pollution Control and Wastewater Reduction

By

Dr. Sanjaya Ratnayake

Actg. Deputy Director General
Environmental Pollution Control

Central Environmental Authority



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Contents



1. Introduction
2. Laws Related to Water Pollution Control
3. Implementation and Drawbacks
4. Proposed New Laws and Regulations
5. Conclusion

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1. Introduction

- Why Next Generation Compliance is Important?
- Current Water Environment in Sri Lanka
- Why Water Protection is Important?
 - Pollution, Scarcity

3



- Environment is a right of a 3rd generation
- Protect environment for next generation is important and essential
- Environmental compliance is a pathway to protect environment for future generation

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Democratic Socialist Republic of Sri Lanka



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- Total area – 65,610 km²
- The climate - tropical
- The population - 19 million (1.4 % growth rate)
- Literacy rate > 90%
- GDP (Per capita Gross Domestic Product) - about \$ 2000
- The Economic structure -composed of two major sectors
 1. agricultural sector (mostly in rural area)
 2. Industrial sector (mostly in Colombo and its vicinity and industrial areas).
- Agriculture accounts for 19.4% of GDP and industry 25%.



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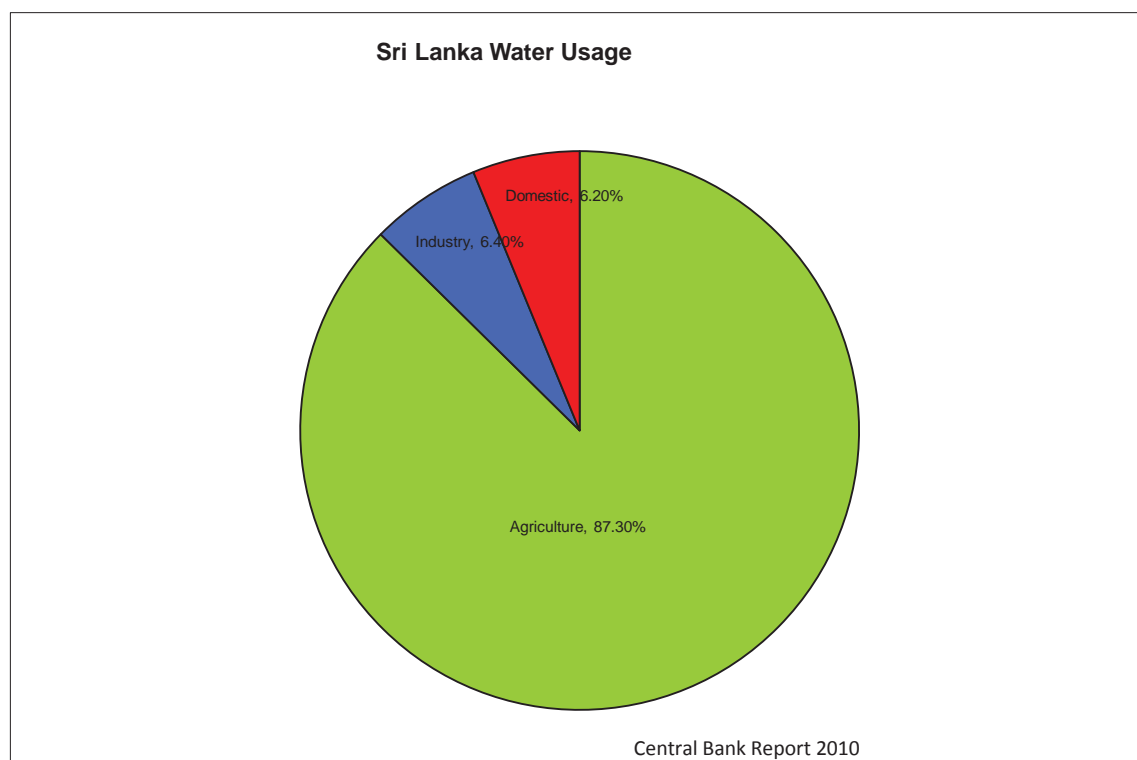
Status of water Resources in SL



- Annual Rain fall –
 - wet zone – over 2000mm/year
 - Intermediate zone – between 1500- 2000 mm/year
 - Dry Zone – less than 1500 mm/year
- River basins – 103 Total length – 4,500km
- Total area of irrigation & multipurpose reservoirs – 169,941 hectares
- Ground water Resources – 7,800 million m³ about 72% of the rural population rely on ground water.
- Total Annual Fresh Water Withdrawals - 13 billion m³ (2005)
- Annual Fresh Water Withdrawals by sectors
 - Agriculture 87.3%
 - Industry 6.4%
 - Municipal (including domestic) 6.2 %

(Source : Central Bank Report 2010)

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Water Quality status in selected rivers Vs proposed ambient water quality standards by CEA



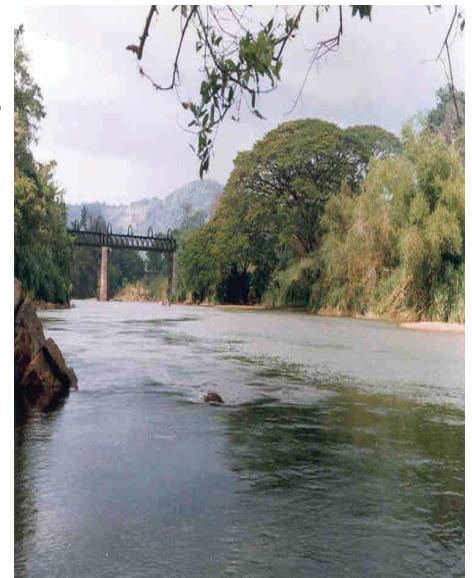
River	Kelani	Mahaweli	Maha Oya	Proposed ambient standards by CEA			
				Class 1 Drinking Simple treatment	Class 2 Drinking conventional treatment	Class 2 Bathing	Class 2 Fish & Aquatic life
Sampling location	Kaduwela	Peradeniya	Mawanella				
Month/Year	June 2010	January 2011 (four times)	November 2011 (four times)				
BOD (mg/L)	2.5	5-10	4-5	3	5	4	4
COD (mg/L)	12.6	15-20	10	15	20	20	15
Total Coli form (MPN/100mL)	13,000	-	170	5000	20000	20000	5000
NO ₃ ⁻ (mg/L)* ³	N/A	N/A	0.47	5	5	5	5
PO ₄ ⁻ (mg/L)* ⁴	N/A	N/A	<0.01	0.7	0.7	0.7	0.4

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Sources of water Pollution in SL



- Untreated wastewater discharge
 - » Domestic
 - » Industrial
- Haphazard dumping of solid waste.
- Agricultural run off
 - » Agro chemicals
 - » Fertilizers
- Sand mining activities
- Unplanned development activities
- Recreational activities



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Burning Water Pollution Issues in SL

- Kidney disease – Anuradapura, NC Province
 - Reason?
 - 3-5 deaths daily
 - 95% victims are male farmers
 - Effective age of patients 20- 50yrs
- Chunnakam Ground Water Pollution
 - Well water contaminated with oil
 - Improper discharge of waste oil
- Ratupaswala, Hanwella Water Pollution?
 - Public protest on industries
- Oil contamination of Kelani River Water

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2. Laws Related to Water Pollution Control

Types of laws in Sri Lanka

- Constitution: Chapter VI, 27 (14) & 28 (f)
- Parliament Laws
 - National Policy & Legislation
- Local Authorities

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- Parliament Laws
 - Irrigation Ordinance No. 32 of 1946
 - Mahaweli Authority of Sri Lanka Act No. 23 of 1979
 - Water Resources Board Act No. 29 of 1964
 - National Water Supply and Drainage Board Law No. 2 of 1974
 - **National Environmental Act No. 47 of 1980**
 - Board of Investment Sri Lanka Act No.49 of 1992

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National Environmental Act

- Provisions in the National Environmental Act (NEA) and its Amendments.
- No. 47 of 1980, No. 56 of 1988, No. 53 of 2000

- Part I - Establishment of CEA
- Part II - Powers, functions and duties of the Authority.
- Part III - Staff of the Authority
- Part IV - Environmental Management
 - Part IVA - Environmental Protection**
 - Part IVB - Environmental Quality**
 - Part IV C - Approval of Projects**
- Part V - General

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Part IV A –Environmental Protection

- Regulatory provisions for environment protection
- Regulations for pollution control
- Control discharges from prescribed activities by Environmental Protection Licence (EPL) system.
- In operation from 1st July 1990 to date.
- No person shall carry on any prescribed activity except;
 - (a) under the authority of a licence issued by the Authority.
 - (b) In accordance with such standards and other criteria as may be prescribed under this Act.

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Part IV B –Environmental Quality

- Regulatory provisions for environment Quality
- Regulations for maintain quality of environment
- Wastewater discharge standards.
- In operation from 1st July 1990 to date.

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Wastewater Discharge Standards

Two Criteria

- Discharge mode
- Industry Specific

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3. Implementation Issues and Drawbacks

- EPL is an even system for large and small activities
- No proper legal procedure for locating industries
- No load based system for discharges
- Practical difficulties in application of discharge standards
- No environmental quality parameters established for water sources

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4. Proposed New Laws and Regulations

- NEA amendments
 - Make provisions for load based system
(Regulatory power for charging system on waste load)
 - Increase fines and more power to the authority
 - Regulatory power on locating industries
- New regulations and amendments
 - New regulation for environmental quality standards for water resources
 - Amendment for EPL required activity list for easy monitoring
 - Amendment for water discharge standards

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- Load Based Fee system
 - Polluter Pay Principle Provisions to the NEA
 - Prepare Regulations for application
 - Sector wise application with 1 or 2 parameters
 - Outcomes
 - Generation of a fund for environment development
 - Reduction of pollution load to the environment



- New regulation for location of industries
 - Help to control and manage discharges at the planning stage
 - Minimize effects to the environment
- Environmental quality standards
 - Use as baselines
 - Help for monitoring and detect pollution
 - Classification of water bodies

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- Amendment for EPL required activity list
 - Present Regulation – Industries categorized as
 1. List A
 2. List B
 3. List C
 - In Future Amendment , List A will be further divided as 1A and 2A
 - 1A – Will consist highly polluting industries and will be strictly Monitored

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- **wastewater discharge standard**

- Standards for sea outfall (long / short) and offshore
- lechate standards for solid waste disposal facility
- Effectiveness of 1: 8 dilution scenario
- Guideline for irrigation of treated wastewater
- Phase out the industry specific standards by general standards

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5. Conclusion

- No. of laws and regulations for water pollution control and wastewater reduction
- Industrialization is drastically increasing nearby water bodies and increase the pollution
- Need strengthening of existing legal framework
- Need new legal approaches for better compliance

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Natural Wastewater Treatment System at Hikkaduwa (Waste Stabilization Ponds)



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***Next Generation Compliance is
Important to Protect and Save
the Environment for 3rd
Generation***

THANK YOU!



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A Presentation

on

Environmental Compliance and Enforcement India: Approaches for Improving Compliance

**Ministry of Environment, Forests and Climate Change
Government of India
21 September, 2015**

1

Structure of Presentation

- Legislative & Regulatory Framework
- Status of Environmental Standards Notified
- Powers of Central Govt. & Pollution Control Boards
- Regulatory Tools for Enforcement of Legislation
- Status of Implementation of Water & Air Acts
- Approaches for improving compliance
- Rules under Review / proposed for Amendments
- Challenges

2

Regulatory & Legislative Framework

Acts	Rules
Forest, Wildlife, Biodiversity & Cruelty to Animals	
Wildlife (Protection) Act, 1972	Wild Life Protection Rules, 1973 and amendments
The Indian Forest Act 1927	The Indian Forest Rules, 1966 and amendments
Forest (Conservation) Act, 1980	Forest (Conservation) Rules, 1980 amended in 2004, 2014
Biological Diversity Act, 2002	Biological Diversity Rules, 2004
Prevention of Cruelty to Animals Act, 1960	Prevention of Cruelty to Animals Rules, 1960 and amendments
Environment	
Water (Prevention and Control of Pollution) Act, 1974 amended in 1988	Water (Prevention and Control of Pollution) Rules, 1975 amended in 1976 & 1978
Water (Prevention and Control of Pollution) Cess Act, 1977 amended in 1992 and 2003	Water (Prevention and Control of Pollution) Cess Rules, 1978 amended in 1992

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Acts and Rules contd...

Acts	Rules
Environment	
Air (Prevention and Control of Pollution) Act, 1981 amended in 1988	The Air (Prevention and Control of Pollution) Rules, 1992
Environment (Protection) Act, 1986	Environment (Protection) Rules, 1986 and various Rules notified under this Act
Public Liability (Insurance) Act, 1991 amended in 1992	The Public Liability Insurance Rules, 1991 amended in 1991
National Green Tribunal Act, 2010	National Green Tribunal Rules, 2010, 11, 12 & 13

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Major Thematic Rules notified in EPA

- The Manufacture, storage and import of **Hazardous Chemicals** Rules, 1989 (amended in 2000)
- The **Hazardous Wastes** (Management, Handling and Trans-boundary Movement) Rules 2008 (initially notified in 1989, amended in 2003 and re-notified in 2008)
- The **Bio-Medical Waste** (Management & Handling) Rules, 1998
- The **Batteries** (Management & Handling) Rules, 2001
- The **Chemical Accidents** (Emergency, Planning, Preparedness and Response) Rules, 1996
- The **Ozone Depleting Substances** (Regulation and Control) Rules, 2000)
- **Municipal Solid Wastes** (Management and Handling) Rules 2000 (Being amended)
- The **Plastics** (Management and Handling) Rules, 2011
- The **E-Waste** (Management and Handling) Rules, 2011

In addition to above rules many other notifications have been issued from Time to time like EIA, CRZ, & Eco -sensitive zones, etc

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Status of Environmental Standards Notified

- **Total Standards notified :**
- 101 Standards notified for emissions, effluent, Noise, Ambient Water Genset /Engine related to industrial sector
- National Ambient Air Quality Standards(2009) for 12 pollutants.
- Ambient Noise Standards for Different Areas/Zones(2000)
- During XII FY plan 15 existing standards to be revised & 06 new standards will be notified
- **Revised/ new standards ready for issuance:** 8 (paints, manmade fibre, fertilizers, automobiles workshops, Gas based Genset, CETPs, coffee processing and pulp & paper)

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Powers of Central Govt. & Pollution Control Boards

	POWERS	WATER ACT	AIR ACT	EPA	Purpose
1	To obtain information	Section 20	Section 25	Section 20	To assess the process, emission/effluent loads, etc..
2	To take samples	Section 21	Section 26	Section 11	Legal sampling procedures
3	Entry & Inspection	Section 23	Section 24	Section 10	Right to entry by empowered person to verify compliance
4	Consent Management	Section 25/26/27	Section 21	-	Issuance/restrictions/withdrawal for trade discharge or emissions
5	Authorization/Registration for waste management	-	-	Rules Notified under E(P)Act.	To ensure environmentally sound waste management
6	Powers to carryout certain works by SPCB	Section 30	-	--	When a person fails to execute functions given under consent
7	Emergency Measures in episodic cases	Section 32	Section 23	Section 9	SPCBs/ authorities/agencies shall take-up emergency remedial measures
8	Powers to restrain/punishment of polluter through courts	Section 33	Section 22 A	Section 16	Govt. /SPCB/ACPCB/authorised agency approach courts
9	Power to give directions (stoppage of process/closure/disconnection of electricity etc.)	Section 33 A	Section 31 A	Section 5	Govt./CPCB/SPCBs/Authorised agencies/Persons may issue directions
10	Taking over functions of SPCB or Issuance of directions	Section 18(1b)	-	-	On default of SPCBs, Govt./CPCB may take over functions on the directions of central Govt. ⁷

Regulatory Tools for Enforcement of Legislation

Tools for Enforcement	Timelines
❖ Environmental clearances at Central Level /State Level • Applicable for specific activities mentioned in EIA notification	60 days for prescribing TOR 45 days for public consultation 60 days for appraisal 45 days for communicating decision
❖ Consent to Establish by SPCBs • establishment of any new industry/process • For expansion or modification of existing industrial process	Within 4months
❖ Consent to Operate by SPCBs • allowing industry / process to operate for a specific period . Stipulates norms for compliance	Within 4 months
❖ Authorization / Registration by SPCBs management and handling of wastes such as Hazardous wastes, Biomedical waste, E-Waste, Plastic Waste, Municipal Solid Waste, etc.	Within 3 months

Status of Implementation of Water & Air Acts

Monitoring and Testing Network

- 2500 water quality monitoring stations for monitoring quality of rivers, lakes, tanks, ponds, creeks, canals and ground water established
- 582 air quality monitoring stations established in 244 cities/towns in 28 States and 5 Union Territories of the country. Regular Monitoring of SO₂, NO₂, PM₁₀ at all locations
- An MoU is finalized with Central Ground Water Board for sharing the groundwater monitoring network of 15000 locations
- There are more than 110 recognized laboratories for testing environmental samples under EPA

Inspections and Surveillance Activities

- All industries are regulated under Water Act & Air polluting industries under Air Act.
- As per report by CPCB 805 industries were inspected by CPCB in last 4 years.
 - ✓ 108 directions under Section 5 of EPA and 51 directions under Section-18 (1)(b) of Water/Air Act were issued for ensuring compliance
- Out of 3261 highly polluting 17-Category of industries, 2335 industries are complying norms and 353 units are closed.

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Rules under Review / proposed for Amendments

Review of existing Waste Management Rules

- The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules 2008 (initially notified in 1989, amended in 2003 and re-notified in 2008)
- The Bio-Medical Waste (Management and Handling) Rules, 1998
- Municipal Solid Wastes (Management and Handling) Rules 2000 (being amended by including C&D waste)
- The E-Waste (Management and Handling) Rules, 2011

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Approaches for Improving Compliance

- Amalgamation of EPA, Water Act and Air Act (umbrella Act)
- Revising a system of financial penalties (civil administrative)
- Revamping Central & State level authorities
- Clubbing consent and authorization under EPA, Water Act & Air Act
- Revision and formulation of new standards is ongoing process
- Single window Environmental Clearances
- Harmonization of inspection protocols
- Establishment of National Green Tribunal- faster dispute settlement

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Approaches for Improving Compliance- contd.

- Strengthening of Regulatory authorities- manpower, computerization, financial assistance, capacity building, business process re-engineering etc.
- Classification of industries based on pollution potential (R-59, O-93, G-53, W-36)
- Identification of pollution hotspots (43)
- Identification of polluted river stretches (302)
- Zero Liquid Discharge- Pulp & Paper, Distillery, Sugar, Tannery & Textile (sector specific action plans)
- Sector Specific action plans for all other industrial categories
- Corporate Social Responsibility (2% of profit- includes environment)

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Approaches for Improving Compliance

- Use of ICT in inspection, monitoring, reporting, verification, data processing and management
- Physical Inspections strengthened by induction of IT- based instruments
- Online IT-enabled Environmental Clearances, consent management, authorization
- Online emission/effluent monitoring (24x7)-1200 devices installed-self regulation
- Continuous Ambient Air Quality Stations- 57 + 45 by March 2016 in 40 cities against the target of 66 cities
- Use of sensor, satellite and GIS/GPS based pollution monitoring (Ganga polluted river stretches)

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Approaches for Improving Compliance-contd.

- Launched Air Quality Index in 11 cities- awareness building
- Creation of Environment Data Bank- policy/decision making, dissemination, awareness building
- Right To Information Act mandates placing information, data etc on website for public
- Involvement of students, teachers in monitoring (IITs, Engg. Colleges)
- Specific training modules for enforcement officers of State regulatory agencies- more than 519 (2010-2015)officers trained

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Challenges

- Securing compliance to environmental standards especially in SME Sector
- Strengthening of Pollution Control Boards
- Restoration of environment in CPAs
- Creation of Common treatment infrastructure like CETPs, TSDFs- 19 States/UTs have no access to TSDFs.
- Waste to Energy models are yet to pickup- only one plant in the country
- Recycling of E-waste and plastic waste in unorganized sector is a concern
- Lack of proper system for Plastic Waste Management with municipal bodies in cities/towns

THANKS



Closed Circuit Television Cameras (CCTV) surveillance system used to detect flaring and dark smoke emission

Mr Sivapalan s/o Perumal
Senior Engineer
Pollution Control Department
National Environment Agency

Next Generation Compliance in Asia Conference
Bangkok, Thailand
21-23 Sep 2015



Presentation Outline

Current Measures & Initiatives

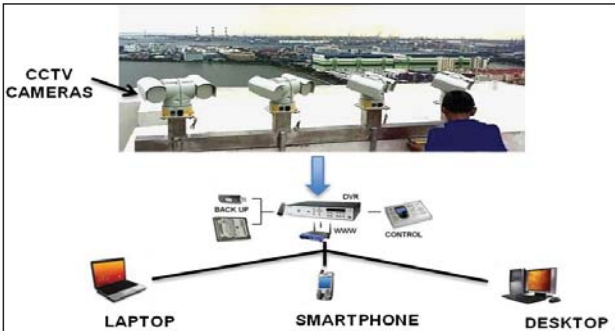
What Is Flaring?

- Air Pollution Control
- Current Workflow
- Moving Forward
- CCTV
- Continuous Improvements

Target Achieved

Current Measures & Initiatives

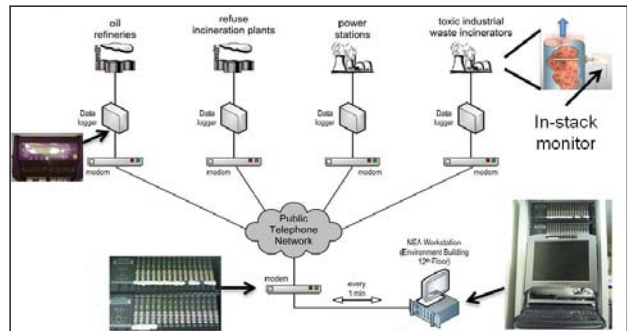
Stationary (Industrial) & Mobile Sources



Industrial CCTV system



Vehicle emission checks



Telemetric in-stack continuous monitoring system



What is 'Flaring'?

“Flaring” is an important safety device used in refineries and petrochemical facilities for excess hydrocarbon gases to be burnt off safely.



Flaring can produce dark smoke

Incomplete combustion of these hydrocarbons can result in the formation of soot, causing dark smoke.



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Importance of monitoring dark smoke



Environmental Impact

- Acid rain
- Smog

Health Impact

- Particulates – Respiratory diseases, lung cancer, infant mortality
- CO – Suffocation
- SO₂ – Lung problems
- NO_x – Influenza, bronchitis

Impact to NEA

- Unease amongst public; complaints
- Organizational goal to provide clean air
- Early indication of many issues such as process upset, inefficient operation of pollution control equipment, power blackout and fires

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Air Pollution Control – Dark Smoke

NEA regulates air pollution from industries under the Environmental Protection and Management (Air Impurities) Regulations

Dark smoke emissions must comply with Ringelmann Chart No 1, not longer than 5 min in an hour

Two processes carried out by the Pollution Control Department (PCD) to enforce dark smoke emissions:

- 1) Smoke observations
- 2) Submission of smoke density meter recorder charts



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Air Pollution Control - Regulations

NEA regulates air pollution from industries under the Environmental Protection and Management (Air Impurities) Regulations

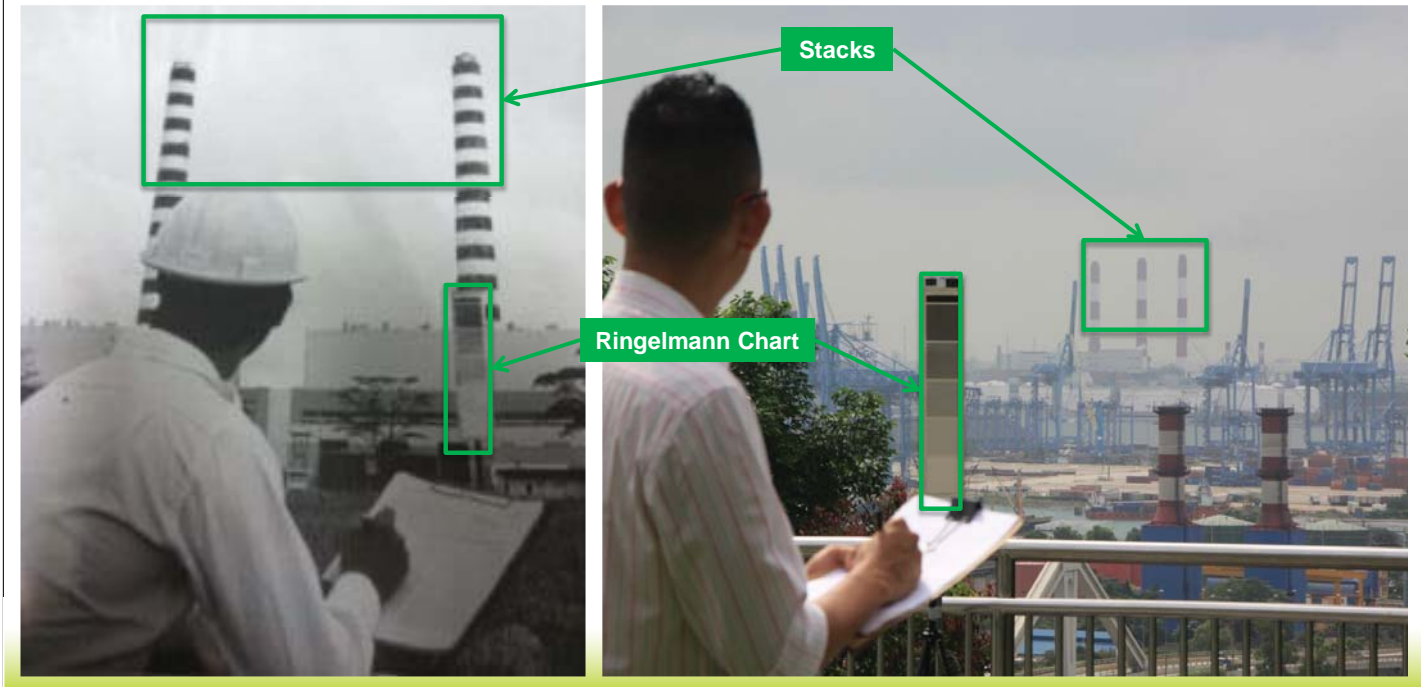
Industries are required to maintain and operate **air pollution control equipment**



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Current Workflow – Smoke Observations (1)

Since 1971, PCD enforcement officers have conducted regular smoke observation hourly at a vantage point.



Current Workflow – Smoke Observations (2)

May 2013						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
Smoke Observation 8:00AM - 9:00AM						

Each smoke observation takes about 1 hour and is done about 3 times each month.

However, episodes of dark smoke may occur anytime, anywhere!

Current Workflow – Smoke Density Meter Recorder (SDMR)

PCD requires industries to submit SDMR charts on a monthly basis.



The charts do not provide a complete picture of the situation and PCD often has to give the benefit of doubt to the company.

Without appropriate supporting evidence, PCD has no means to verify the information given.

Similarly, episodes of dark smoke may go unnoticed.

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Moving Forward - Target Setting

More robust and sustainable surveillance system covering a wide extent of industries

Introduce a more pro-active approach to monitoring of dark smoke emissions

Allow early intervention to reduce pollution

Provide accurate and immediate update to the public

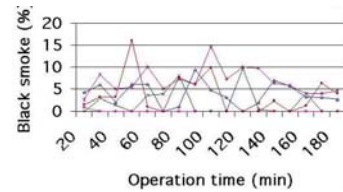
Serve as supporting evidence for appropriate action

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Moving Forward - Evaluation of Possible Solutions

Problems : Lack of manpower and means to verify data

Option 1: Upgrading of SDMR system to view measurements of smoke emissions online



Option 2: Using video cameras for monitoring of real-time smoke emissions



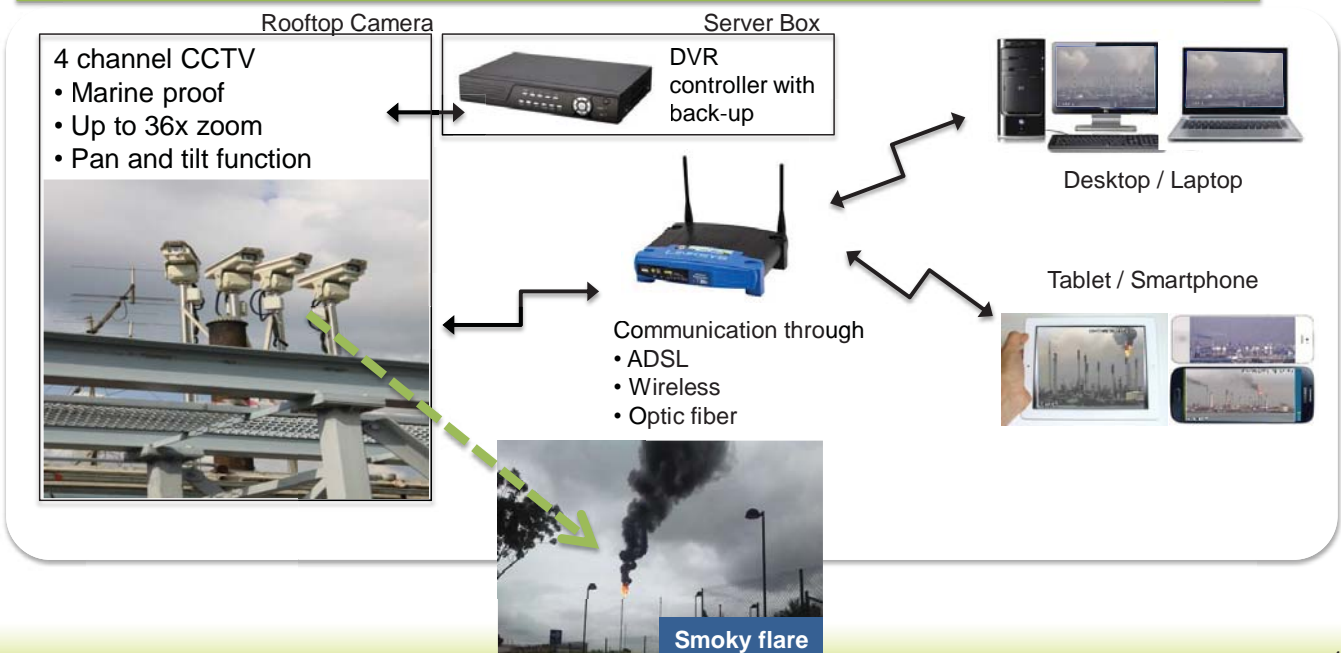
Option 3: Using closed circuit (CCTV) for monitoring of real-time smoke emissions



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Moving Forward - Implementation

Developed a **CCTV video recording system** where **real-time situation** of industries could be **viewed online remotely through computers and mobile devices**



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Moving Forward - Implementation

Problem / Challenges

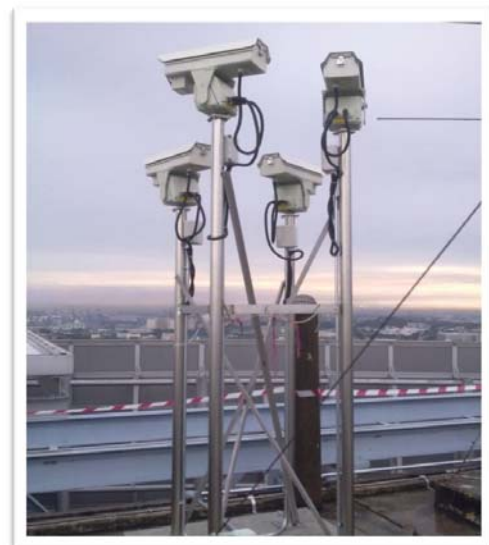
As Singapore is highly urbanized the search for suitable tall buildings to monitor the wide landscape of about 100 tall chimneys and 15 elevated flare stacks was very challenging.

Improvements Made

- a. Survey buildings around Singapore for over a 6- month period
- b. Engage and convince building owner and management that the installation of CCTV systems would give rise to mutual benefit for all parties involved.

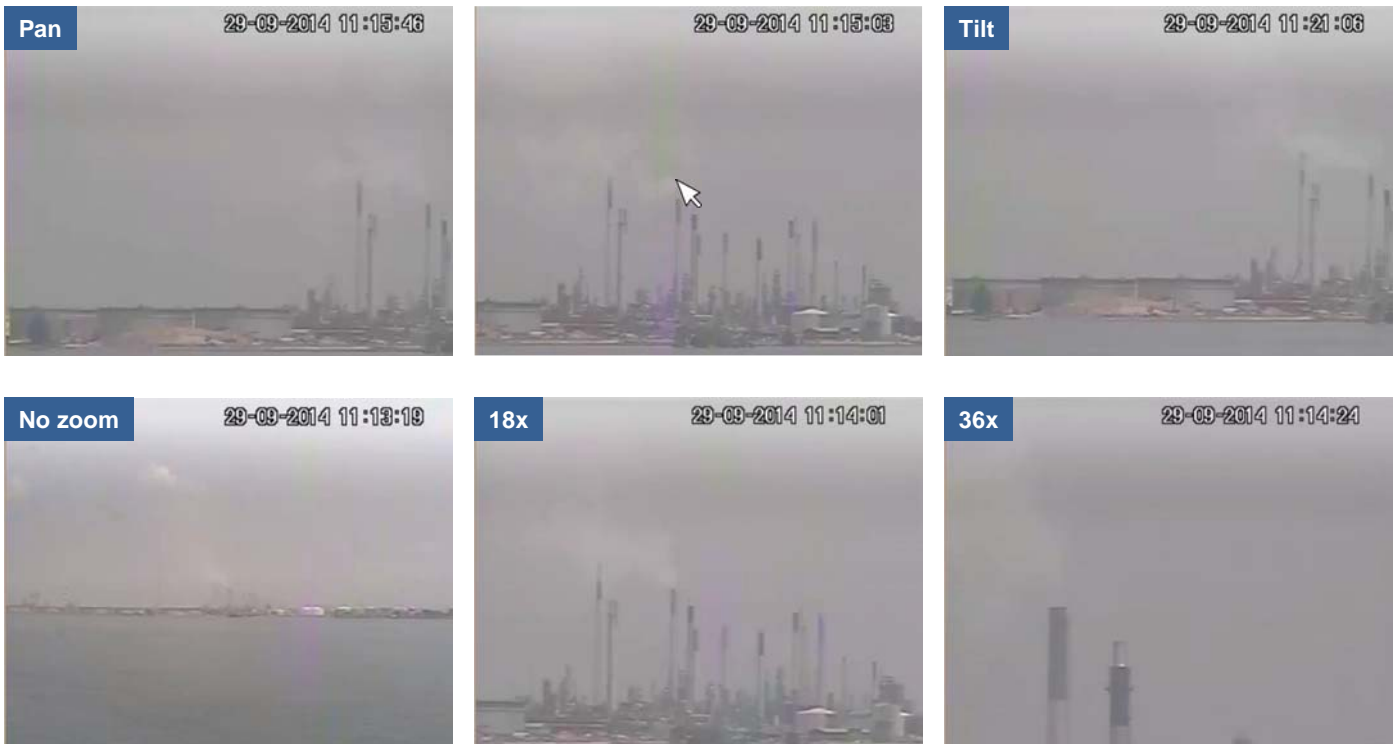
15

CCTV – Typical Setup



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CCTV – Pan , Tilt, Zoom



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CCTV – Standardization & Maintenance

Standardization

- First CCTV installed covered only some parts of Southern Singapore, now **all** flare stacks in Singapore are monitored.

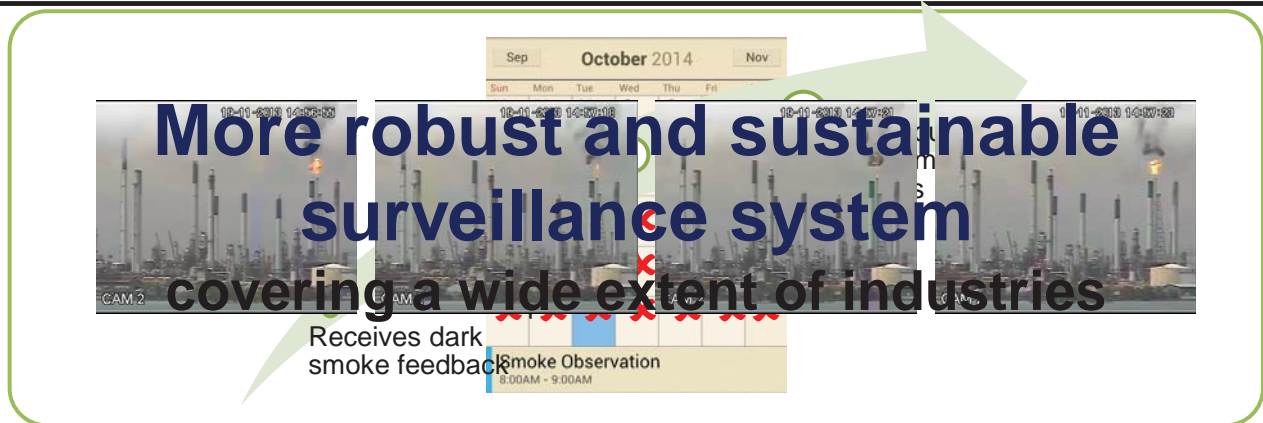
Maintenance

- Close contact with vendor and building management to resolve any related issues.



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CCTV – Validation (Target)



Introduce a more pro-active approach to monitoring of dark smoke emissions

Allow early interventions to reduce pollution
Provide accurate and immediate updates to the public

Serve as supporting evidence for appropriate action

CCTV – Validation (Costs)

Based on additional manpower requirement to conduct enforcement work for smoke emission at 9 different locations for 12 hours during day time, excluding transportation cost, the estimated annual productivity gain

S\$1,000,000
(US\$720,000 / 25,000,000THB)

Cost of CCTV system = **S\$200,00**
(US\$145,000 / 5,000,000THB)

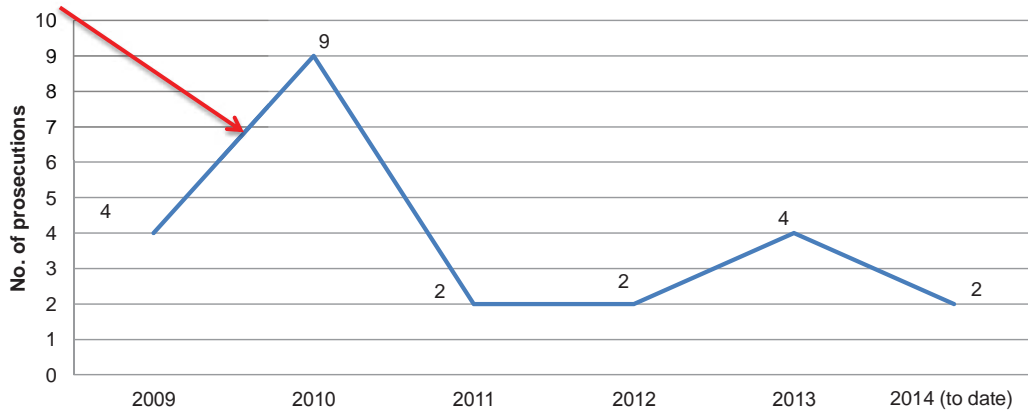
CCTV – Validation (Enforcement)

Prosecution

In 2010, 9 prosecution actions were taken against the industries using 24/7 video recording as evidence.

In subsequent years, the number of violations reduced.

Implementation of CCTV system in Aug 2009 **No. of prosecutions**



Continuous Improvement

Wireless Connection

- Limited bandwidth
- CC off
- off
- the
- int
- wi
- tra

500 to 1,000 GB

- Back-up function

Video analytics

- Use of video analytics to alert officers of dark smoke that exceeds limit

Continuous Improvement

Include surveillance of **high volume of dust emissions** from process areas, and closely follow other incidents at oil and chemical terminals

Expand CCTV coverage for future industrial areas such as the major industrial development in the southern half of Jurong Island

Use of CCTV systems to **monitor construction sites for non-compliance** of prohibitions such as prohibited working period

Understand what public is experiencing during periods of **smoke haze** and matching of visibility with PSI levels, to have a clearer perception of the situation.

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Achieving Our Target

Move from ad-hoc surveillance mode to continuous real-time monitoring

Lesser pollution and better air quality

Greater job satisfaction amongst officers

Raise public confidence and trust in NEA



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Our Environment

Safeguard • Nurture • Cherish

