

①第二回現地調査 業務概要説明

Second-round meeting of Bilateral Cooperation Project for Air Pollution Prevention and Greenhouse Gas Reduction ~Co-benefits Approach~

- 01 Review of first-round meeting
- 02 Agenda of Today
- 03 Survey finding by Japanese side
- 04 Draft proposal from Japanese side
- 05 Activities in this fiscal year



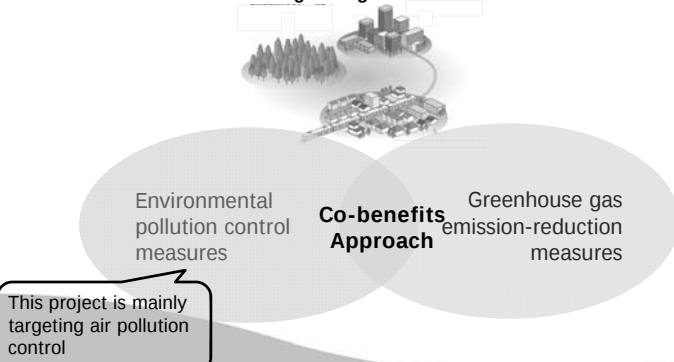
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01 Review of first-round meeting

What is “Co-benefits Approach”?

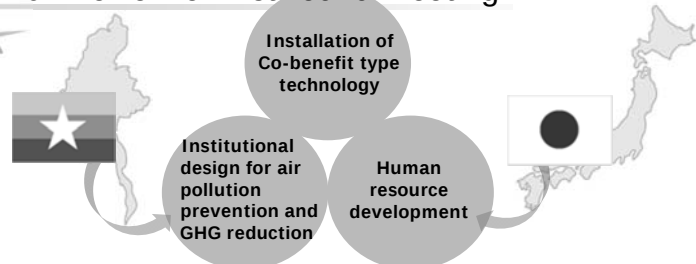
“Co-benefits Approach” is integrated efforts to address environmental pollution control issues and climate change mitigation concerns



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01 Review of first-round meeting



Activity	2015	2016	2017
Technology installation	Proposing model project	Planning of model project	Implementing model project
Institutional design	Basic research of regulatory system	Collaborative study of regulatory system	Policy recommendation of regulatory system
Human resource development	Information sharing about air pollution control technology	Study of management structure for air pollution control	Trial of enhanced management structure

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01 Review of first-round meeting

2015	October	Exchange of opinions
	November	Further discussions
	December	First discussion between MOECAP and MOEJ
2016	January	Joint policy research meeting Seminar in Myanmar
	February	Study tour to Japan Memorandums exchange

Joint policy research meeting

Discussion meeting about policies and regulations for air pollution control among policymakers and experts from two countries (Myanmar-Japan).

Seminar in Myanmar

Information sharing between two countries: Myanmar's side introduce current air pollution situation in Myanmar, while Japanese side introduces environmental technologies, regulatory systems, and management structures.

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02 Agenda of Today

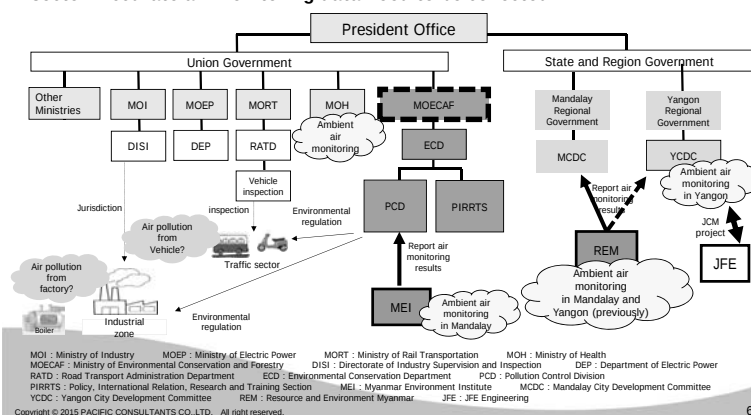
- ✓ Discuss the details of whole Bilateral Project
- ✓ Discuss the activity that we can collaborate for in the first fiscal year (2015)
 - 1) “Air quality and exhaust gas monitoring technology manual” (Draft)
 - 2) Dates, venues, participants and programs of
 - Joint policy research meeting in Myanmar
 - Seminar in Myanmar
 - Study tour to Japan

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03 Survey finding by Japanese side (Draft)

Several ministries and organizations are monitoring ambient air in major cities. Air pollutants seem to be emitted mainly from traffic and industrial sector. Accurate air monitoring data need to be collected.



MOI : Ministry of Industry
MOECAP : Ministry of Environmental Conservation and Forestry
RATD : Road Transport Administration Department
YCDC : Yangon City Development Committee
MOEP : Ministry of Electric Power
ECD : Environmental Conservation Department
MEI : Myanmar Environment Institute
REM : Resource and Environment Myanmar
MORT : Ministry of Rail Transportation
DISI : Directorate of Industry Supervision and Inspection
PIRTS : Policy, International Relation, Research and Training Section
JFE : JFE Engineering
MOH : Ministry of Health
DEP : Department of Electric Power
PCD : Pollution Control Division
MCDC : Mandalay City Development Committee

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04 Draft proposal from Japanese side



●Environmental technologies, etc.

- ✓ Optimization of the method of monitoring the air quality and the exhaust gas
- ✓ Promotion of cleaner production to the industrial sector (Older boiler efficiency operation, etc.)



●Rule and system

- ✓ Effective use and sharing of such air quality monitoring data



●Development of human resources

- ✓ Creating a "Air quality and exhaust gas monitoring technology manual" (Draft)
- ✓ Environmental education aimed at prevention of air pollution in the current and future
- ✓ Ongoing training of specialized human resources responsible for the analysis of air quality and monitoring of exhaust gas

04 Draft proposal from Japanese side



MOECA(ECD)
&
e.g) MOI, MORT,
YCDC, MCDC



MOEJ
Environmental Control
Technology Office,
Environmental
Management Bureau

2018~

[Technology] Organizing bilateral liaison conference for implementing the co-benefits type air pollution measures
[system] Continual air monitoring and data sharing (developing inventory)
[Human resources] Continual training of human resources responsible for the air pollution prevention

2017

[Technology] Leasing the optimum equipment for air quality and exhaust gas monitoring
[system] Completing the Manuals "Air environment and exhaust gas monitoring technology"
[Human resources] Public practice for the improvement of analytical techniques such as air environment measurement data

2016

[Technology] Surveying suitable monitoring equipment after grasping major air pollution sources in Myanmar
[System] Collecting current air quality monitoring data etc.
[Human resources] Public training for improvement of air quality monitoring technology (quality control etc.)

2015

[Technology] Surveying the accuracy of equipment for air quality and exhaust gas monitoring (currently in use)
[System] Creating Manuals for learning air environment and exhaust gas measurement technology (1st Draft)
[Human resources] Holding seminar related to air quality monitoring and air pollution measures

05 Activities in this fiscal year

- ✓ Discuss the details of whole Bilateral Project
- ✓ Discuss the activity that we can collaborate for in the first fiscal year (2015)
 - 1) "Air quality and exhaust gas monitoring technology manual" (Draft)
 - 2) Dates, venues, participants and programs of
 - Joint policy research meeting in Myanmar
 - Seminar in Myanmar
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 - 1) "Air quality and exhaust gas monitoring technology manual" (Draft)
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 - Seminar in Myanmar
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05 Activities in this fiscal year

2015	October	Exchange of opinions
	November	Further discussions
	December	First discussion between MOECA and MOEJ
2016	January	Joint policy research meeting Seminar in Myanmar
	February	Study tour to Japan Memorandums exchange

Joint policy research meeting (Around 10 policy makers)

Discussion meeting about policies and regulations for air pollution control among policymakers and experts from two countries (Myanmar-Japan).

Seminar in Myanmar (50-100 of policymakers and experts)

Information sharing between two countries: Myanmar's side introduce current air pollution situation in Myanmar, while Japanese side introduces environmental technologies, regulatory systems, and management structures.



Review of today

Today we discussed and studied further about

- ✓ Details of three-years Bilateral Project
- ✓ Activities in this fiscal year
 - 1) Air monitoring technology manual (Draft)
 - 2) Dates, venues, participants and programs of
 - Joint policy research meeting in Myanmar
 - Seminar in Myanmar
 - Study tour to Japan

Thank you

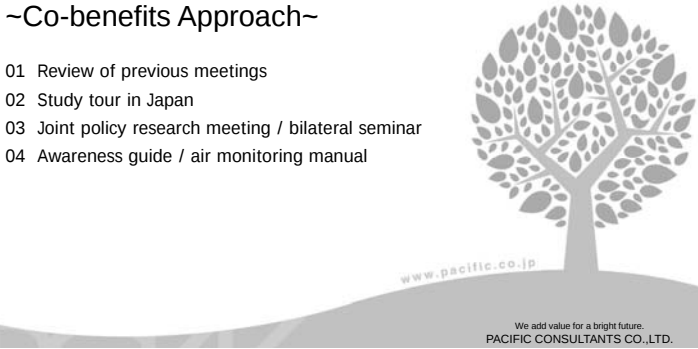


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②第三回現地調査 業務概要説明

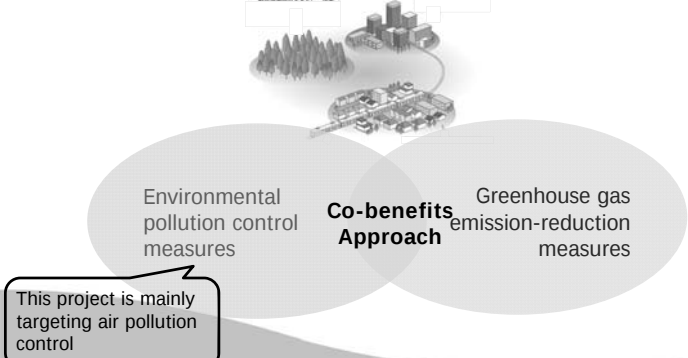
Bilateral discussion for
Bilateral Cooperation Project
for Air Pollution Prevention and
Greenhouse Gas Reduction
~Co-benefits Approach~

- 01 Review of previous meetings
- 02 Study tour in Japan
- 03 Joint policy research meeting / bilateral seminar
- 04 Awareness guide / air monitoring manual



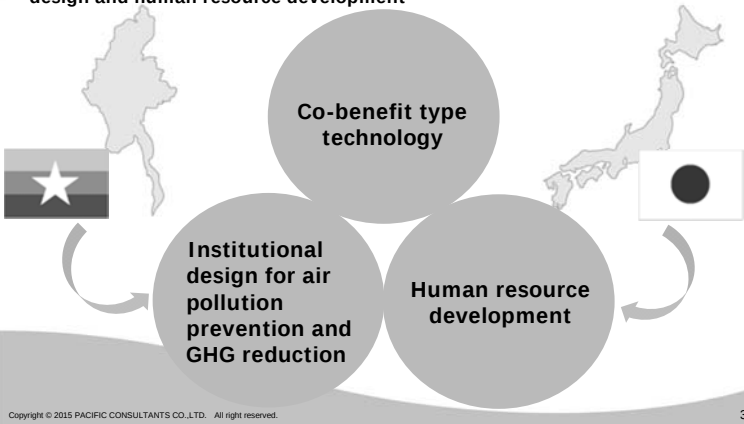
01 Review of previous meetings

What is “Co-benefits Approach”?
“Co-benefits Approach” is integrated efforts to address environmental pollution control issues and climate change mitigation concerns



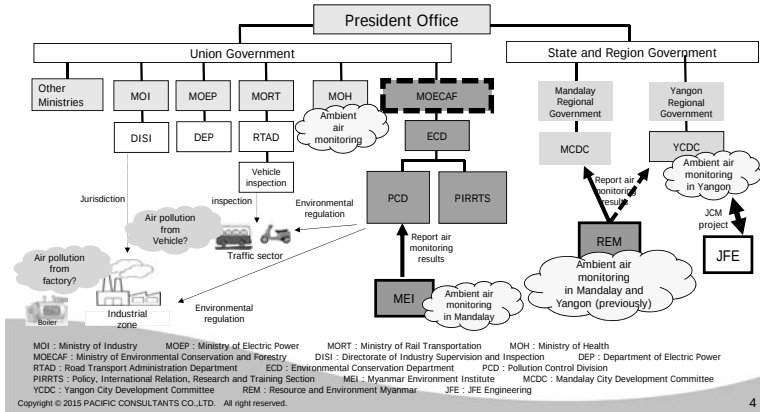
01 Review of previous meetings

“Bilateral Cooperation project” is project that two countries work together to tackle air pollution issue by packaging co-benefit technology, institutional design and human resource development



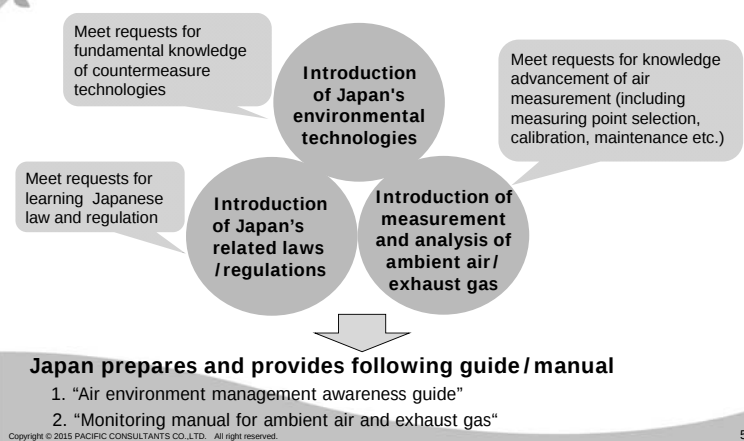
01 Review of previous meetings

Several ministries and organizations are monitoring ambient air in major cities. Air pollutants seem to be emitted mainly from traffic and industrial sector.
Accurate air monitoring data needs to be collected.



01 Review of previous meetings

Bilateral cooperation project of this year



01 Review of previous meetings

Schedule of this fiscal year

- | | | |
|------|----------|---|
| 2015 | October | - Exchange of opinions |
| | November | - Further discussions |
| | December | - First discussion between MOECAF and MOEJ |
| 2016 | January | - Preparing awareness guide / air monitoring manual |
| | February | - Study tour to Japan |
| | | - Joint policy research meeting |
| | | - Seminar in Myanmar |

Today's agenda

- ✓ Japan study tour
- ✓ Joint policy research meeting
- ✓ Bilateral seminar
- ✓ Awareness guide / air monitoring manual

02 Study tour in Japan

Japan study tour(DRAFT)

Study tour to learn air pollution measures, Japanese history and/or approach to low-carbon society.

Date 30th January to 6th February, 2016
Invitee 4 people (government(1), measurer and data administrator(2) and researcher (1)*)
*MOECAF ECD is recommending ECD, YCDC and MCDC, and MEI, respectively
Accompanying Pacific Consultants (2people), Interpreter(1 person)

Date	Site
30JAN(Sat)	Leave Yangon
31JAN(Sun)	Arrive Tokyo
1FEB(Mon)	AM: Welcome talks from MOEJ PM: TBD
2FEB(TUE) - 4FEB(THU)	Candidate sites * Bold is MOECAF suggestion - Air monitoring site -Museum of environment - Low carbon model city -Thermal power plant - Waste treatment (incineration, recycling, landfill) -Automotive testing and research -Sludge treatment plant - Automobile inspection - Cement Plant -Steel plant
5FEB(FRI)	AM: TBD PM: wrap-up meeting with MOEJ
6FEB(Sat)	Arrive Yangon

03 Joint policy research meeting / bilateral seminar

Joint policy research meeting (DRAFT)

Discussion meeting about policies and regulations for air pollution control among policymakers and experts from two countries (Myanmar-Japan).

Date/Time 13:00 – 15:00 23th February, 2016
Venue MOECAF ECD conference room
Participant Myanmar: MOECAF ECD
Japan: MOEJ, HORIBA, JARI, Taiheiy Engineering
secretariat: PCKK

Agenda(Draft)

No	Content
1	Air pollution issue (PCKK) - Sources, main pollutants
2	Air pollution situation in Myanmar (MOECAF) - Current situation, future view
3	Japanese history of dealing with air pollution (MOEJ) - Air pollution history, Japan's antipollution laws/regulations
4	How to overcome air pollution problem - Accurate air monitoring system (HORIBA) - Vehicle exhaust gas abatement measure (JARI) - Energy saving solution in industrial sector (Taiheiy Engineering)

03 Joint policy research meeting / bilateral seminar

Bilateral seminar (DRAFT)

Information sharing between two countries: Myanmar's side introduce current air pollution situation in Myanmar, while Japanese side introduces environmental technologies, regulatory systems, and management structures.

Date/Time 12:30~17:30 25th February, 2016
Venue UMFCCI conference room
Organizer Myanmar: MOECAF
Japan: MOEJ (secretariat: PCKK, EBP)
Participant Myanmar: (Government) MOH, MOI, MORT, YCDC, MCDC, Ma-Hta-Tha
(Public) MEI, REM, Industry park, factories etc.
Japan: Japan embassy, JICA, JETRO, HORIBA, JARI, Taiheiy Engineering etc.

Agenda(Draft)

- Opening remark (MOECAF)
- Policy of bilateral cooperation project (MOEJ)
- Japan's environmental laws/regulations (MOEJ)
- Awareness guide and air monitoring manual (PCKK)
- Air pollution and monitoring situation in Myanmar (MOECAF, YCDC, MCDC, MEI)
- Air quality monitoring technology (HORIBA)
- Vehicle exhaust gas abatement measure (JARI)
- Energy saving solution in industrial sector (Taiheiy)
- Closing remarks (MOEJ)

04 Awareness guide / air monitoring manual

I. Air environment management awareness guide

Contents

- Air pollution**
 - Pollution source
 - Main air pollutant
 - History
- Air pollution situation in Myanmar**
 - Traffic sector
 - Light industry
 - Heavy industry
 - Others
- Air pollution control measure in Japan**
 - Laws and regulations
 - Air Pollution Control Law
 - Automobile NOx - PM Law
 - Atmospheric Environmental Regional Observation System (Soraname)
 - Technology
 - High quality fuel
 - Combustion management and energy saving
 - Process management
 - Dust collector
 - Flue-gas desulfurization equipment
 - Flue-gas denitration equipment
 - Removing harmful substances
 - VOC treatment
 - Automotive measures

04 Awareness guide / air monitoring manual

II. Monitoring manual for ambient air and exhaust gas emission

Contents

- Air pollution**
 - Pollution source
 - Main air pollutant
 - Significance of air monitoring
- Ambient air Monitoring**
 - Determination of monitoring point
 - General ambient air monitoring station
 - Automobile exhaust gas monitoring station
 - Monitored pollutants
 - General ambient air monitoring station
 - Automobile exhaust gas monitoring station
 - Measurement principle
 - Measuring procedure
 - Device management
 - Data analysis
- Monitoring of vehicle exhaust gas**
 - Monitored pollutants
 - New vehicle
 - Vehicle in use
 - Measurement principle
 - New vehicle
 - Vehicle in use
 - Measuring procedure
 - Device management
- Monitoring of fixed emission sources**
 - Monitored pollutants
 - Measurement principle
 - Monitoring procedure
 - Device management

*Min Thein (Mr.)
Assistant Director
Environmental Conservation Department
Ministry of Environmental Conservation and Forestry (MOECF)
Republic of the Union of Myanmar*

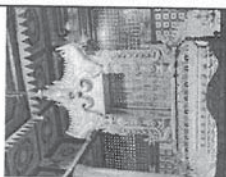
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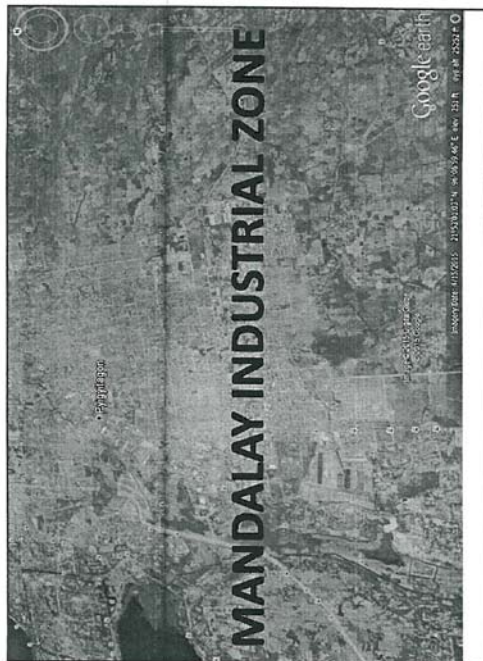
- Mandalay City Profile
- Mandalay Industrial Zone History
- Background Information of Mandalay ECD and Air Quality Monitoring Activities
- Need and Gap
- Way Forward

- ❖ Last Ancient Royal Capital City of Myanmar
- ❖ Located at Eastern Part of Ayeeyarwaddy River, in The Middle Portion of Central Myanmar

Central Myanmar

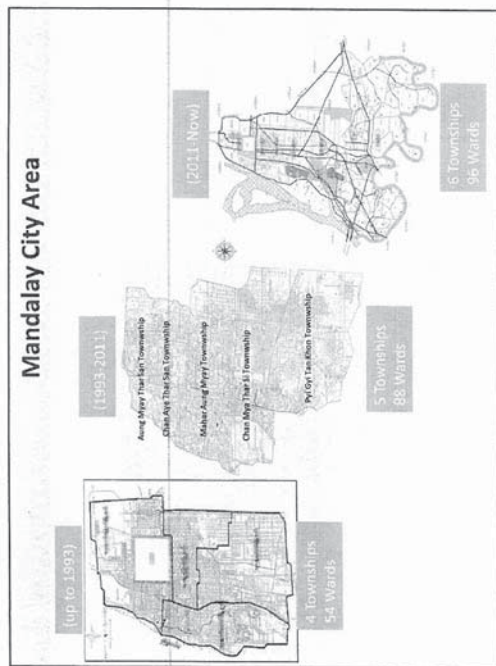
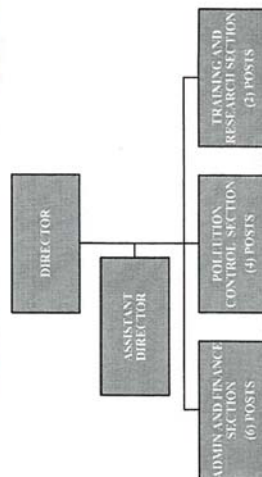
- ❖ Total area is 44.59 square miles
- ❖ Population is 1.46 millions
- ❖ The 2nd Last King Mindon (Konbaung Dynasty)
- ❖ Established in (1857-1859)
- ❖ In 2007, The 150th Anniversary of Mandalay City was held
- ❖ Now Our City Age is about 158 years

[illegible]



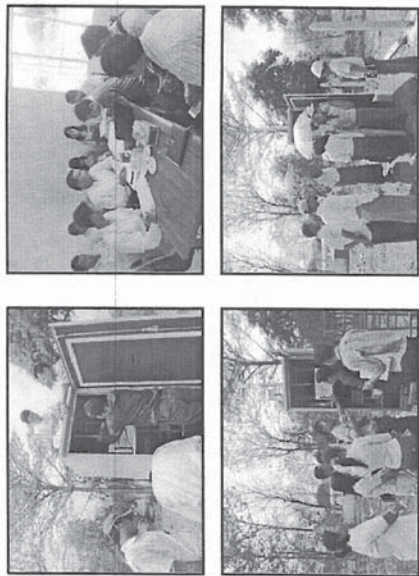
Background Information (ECD, MDY) and Air Quality Monitoring Activities

- Under MOECAP, Environmental Conservation Department (ECD) established in 2012
- ECD office for Mandalay Region has been set up on 1.10.2013



Background History of Mandalay Industrial Zone

- Zone 1 is established in 1990
- Zone 2 is established in 1999
- Zone 3 is established in 2013
- Total area is 736 hectares
- Nowadays combination of all zones, we called Mandalay Industrial Zone
- It is located at South East of Yangon-Mandalay Express Way in Pyigyidagon Township
- Big Factory - 392
- Medium Factory - 304
- Small Factory - 596
- Total - 1292



MP101M

Main specifications

Geiger-Müller counting time	: Programmable from 10 to 200 s
Scan periods	: 10 min, 1/4 - 1/2 - 1 - 2 - 3 - 4 - 6 - 12 - 24 - 48 hours
Measurement cycles	: 1 - 2 - 3 - 4 - 6 - 12 - 24 - 48 - 72 - 96 hours
Measurement threshold	: Depends on periods, cycles and flow rates selected for 24-hour cycle and flow rate of 1 m ³ /h, 0.5 µg/m ³
Noise (σ with Tc = 200 s)	: 3 µg/cm ² on one period of 2 h (PM10).
Minimum detectable limit (2 σ with Tc = 200 s)	: 6 µg/cm ² on one period of 2h (PM10)
Beta source	: Carbon 14 radioisotope.
Gauge adjustment	: Automatic on each cycle change
Calibration	: By reference gauge

Technology Transfer Project for PM 2.5 monitoring (PMTT)

- Location – Mandalay ECD Office
- Signed MOU with Asia Center for Air Pollution Research (ACAP) on May 19, 2015
- Install and train for PM 2.5 Monitoring Equipment at the end of April 2015 by ACAP & ESI
- We will need to report the out coming data to EANET (Acid Deposition Monitoring Network in East Asia) through Country's National Center (Department of Meteorology and Hydrology, Yangon)

手配
2-4月 - 1ヶ月分を日本
に送る。

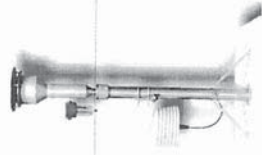
所中子に2.5のPM2.5を測定する。
→ MOEAPに報告する。

Objectives

- To monitor daily record of PM 2.5 parameter, atmospheric temperature and humidity
- To support drawing in air quality standard
- To support drawing in air quality management
- To cooperate with international association

PM2.5
日本-ASEAN
協力センター

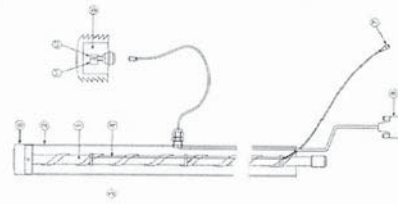
Thermal regulation(RST)



- Sampling is done at ambient Temperature
- Relative humidity and temperature are continuously measured
- If RH > 60% the heating start and is kept at 5° > Text to avoid condensation

$$T_{\text{release}} = T_{\text{atmospheric}} + 5^{\circ}\text{C}$$

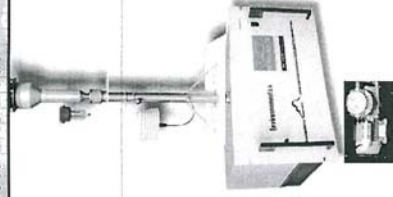
Régulation Thermique (RST)



- (1) – duct tube 20 mm
- (2) – protection sheath 60 mm
- (3) – heating wire
- (4) – internal temperature sensor
- (5) – met sensors (Text, HR)
- (6) – sampling head adaptor
- (7) – heating line connector
- (8) – DB15 connector for signals

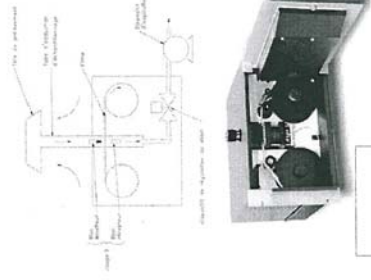
2294107400

Components of MP101M



- Sampling head
- RST tube
- MP101M
- External pump

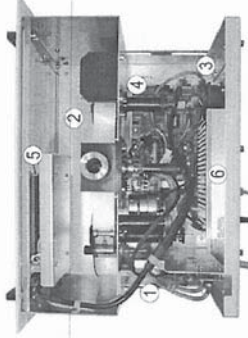
Analyzer main functions



- Sampling particle size PM10 or PM2.5 (head)
- Thermal regulation (RST)
- Dust sampling on filter (MP101M)
- Measurement of the mass by beta absorption (C14 and GM tube)
- Flow rate 1m³/h (pump)

MP101M

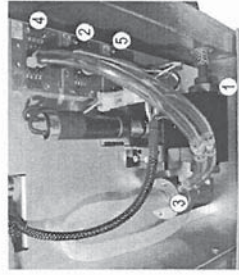
- (1) – flow regulation
- (2) – collector and beta gauge assembly
- (3) – electronic part
- (4) – module board
- (5) – Arm7 board
- (6) – power supply board



Upside view

MP101M

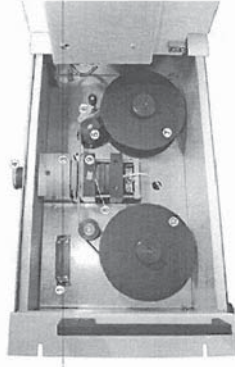
- (1) – one motor driven valve
- (2) – upstream Pressure sensor P2
- (3) – flat orifice
- (4) – downstream Pressure sensor P1
- (5) – atmospheric P sensor



Flow regulation view

MP101M

- (1) – reference gauge
- (3) – source holder
- (4) – RST connector
- (5) – capstan
- (6) – pinch roller
- (7) – take up reel
- (8) – Geiger-Muller detector
- (9) – pressuer assembly
- (10) – pay out reel



Front door open

MP101M

- (1) – Power supply block (with fuse)
- (2) – Fan
- (3) – connector for RST
- (4) – RS232/422 DB25 connector
- (5) – external pump connector
- (6) – DB15 met sensor connector
- (7) – TC2/IP plugg
- (8) – pump outlet
- (9) – holding screws (cover)
- (10) – Estel board (option)
- (11) – CPM connection (option)
- (12) – holding screws (rear panel)



rear panel

PM 2.5 Monthly Report (April)

Date	PerCone ug/m3	WHO Standard guideline 25 ug/m3	Japan Standard guideline 35 ug/m3
28.4.2015	40.7	+	+
29.4.2015	39.1	+	+
30.4.2015	41.1	+	+

Maximum

Minimum

+

Higher than WHO/Japan standards

PM 2.5 Monthly Report (May)

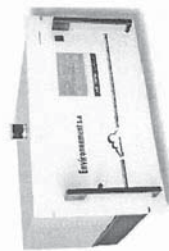
Date	PerCone ug/m3	WHO Standard guideline 25 ug/m3	Japan Standard guideline 35 ug/m3
1.5.2015	34.3	+	-
2.5.2015	45.8	+	+
3.5.2015	46.1	+	+
4.5.2015	66.9	+	+
5.5.2015	66.7	+	+
6.5.2015	33.8	+	-
7.5.2015	40.8	+	+
8.5.2015	40.1	+	+
9.5.2015	144.8	+	+
10.5.2015	144.8	+	+
11.5.2015	40.4	+	+
12.5.2015	118.3	+	+
13.5.2015	178.7	+	+
14.5.2015	98.6	+	+
15.5.2015	121.8	+	+
16.5.2015	164.9	+	+
17.5.2015	213.7	+	+
18.5.2015	185.7	+	+
19.5.2015	196.8	+	+

Maximum

Minimum

Higher than WHO/Japan standards

MP101M



Preventive maintenance

Preventive maintenance

Nature of operations	Periodicity	Sheet N°
- Check of Picolino pump assembly	1 year	4.3.1
- Check of KNF pump assembly	1 year	4.3.2
- Sampling heads cleaning	1 month	4.3.3
- Multiplexer (MUX) signals verification	3 months	4.3.4
- Replacement of filter ribbon	1 to 3 years	4.3.5
- Verification of pressure exerted on the filter	1 year	4.3.6
- Flow rate and leak rate tests	3 months	4.3.7
- Calibration of sampling flow rate	6 months	4.3.8
- Beta gauge calibration	6 months	4.3.9
- Contamination test	1 month	4.3.10
- Beta gauge check (gauge test, mass test)	6 months	4.3.11
- Verification / Replacement of TC and RH sensors	6 months	4.3.12

Results of Air Quality(MEI)

Sampling Location	MAQN-1				WHO, 2005			Japan
	Nov.	Dec.	Jan.	Feb.	March	April	Guideline	Interim target 2
SO ₂ (μg/m ³)	84.65	193.34	143	200.2	28.6	56.6	20	50
NO ₂ (μg/m ³)	64.86	35.53	56.4	94	112.8	93.4	200 (1 hr)	NA
CO (ppm)	0.85	2.99	0.4	0.67	0.68	0.56		
PM 2.5 (μg/m ³)	86.60	204.12	140.23	232.33	19.69	78.4	25	50
PM 10 (μg/m ³)	98.20	217.72	145.28	227.77	91.96	94.5	50	100

MAQN-1 (Industrial Zone - 2)

Results of Air Quality(MEI)

Sampling Location	MAQN-2				WHO, 2005			Japan
	Nov.	Dec.	Jan.	Feb.	March	April	Guideline	Interim target 2
SO ₂ (μg/m ³)	70.93	80.08	114.4	57.2	143	28.6	20	50
NO ₂ (μg/m ³)	64.86	48.5	131.6	150.4	94	150.4	200 (1 hr)	
CO (ppm)	0.80	0.52	0.41	0.71	1.5	0.62		
PM 2.5 (μg/m ³)	87.80	87.3	69.54	106.45	64.74	71.23	25	50
PM 10 (μg/m ³)	94.10	99.3	75.3	118.18	96.71	99.74	50	100

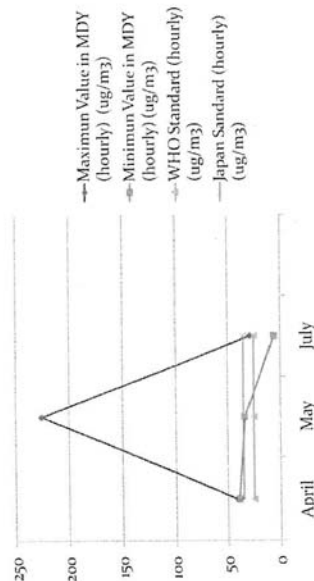
MAQN-2 (Nursery Garden)

PM 2.5 Monthly Report (July)

Date	Per Conc. ug/m ³	WHO Standard guideline 25 ug/m ³	Japan Standard guideline 35 ug/m ³
7.7.2015	18.5	-	-
7.8.2015	18.5	-	-
8.7.2015	17.7	-	-
9.7.2015	25.8	-	-
10.7.2015	19.1	-	-
11.7.2015	18.8	-	-
12.7.2015	18.8	-	-
13.7.2015	18.8	-	-
14.7.2015	18.8	-	-
15.7.2015	13.7	-	-
16.7.2015	11.1	-	-
17.7.2015	9.1	-	-
18.7.2015	10.9	-	-
19.7.2015	10.4	-	-
20.7.2015	10.2	-	-
21.7.2015	6.3	-	-
22.7.2015	6.3	-	-
23.7.2015	17.1	-	-
24.7.2015	7.4	-	-
25.7.2015	15.9	-	-
26.7.2015	15.9	-	-
27.7.2015	15.9	-	-
28.7.2015	15.9	-	-
29.7.2015	15.9	-	-
30.7.2015	21.1	-	-
31.7.2015	13.3	-	-

Maximum Minimum
Higher than WHO/Japan standards
Lower than WHO/Japan standards

Comparing between the PM 2.5 data result and WHO & JAPAN Standard



Way Forward

- To announce Environmental Quality Standards
- To announce Air Quality Standards
- To build Air Quality Monitoring Stations
- Have to make Factory's Owner to obey Law, Rules , EQS and AQS

AQS

Thank You

Results of Air Quality(MEI)

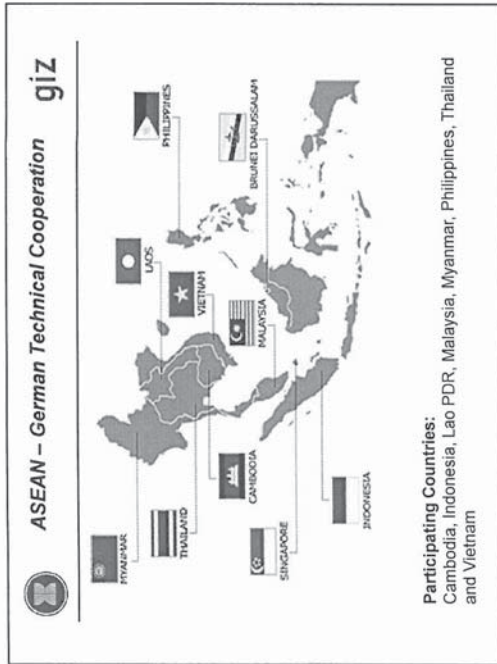
Sampling Location	Parameter	MAQN-3		WHO, 2005				Japan		
		Nov	Dec	Jan	Feb	March	April	Guideline	Interim target 2	Interim target 1
	SO ₂ (µg/m ³)	64.06	114.4	85.8	171.6	143	143	20	50	125
	NO _x (µg/m ³)	69.37	76.89	75.2	75.2	94	94	200 (1 hr)		
	CO (ppm)	1.76	5.16	0.93	0.65	1.92	1.9			
	PM 2.5 (µg/m ³)	47.70	78.3	93.7	106.67	130	46.76	25	50	75
	PM 10 (µg/m ³)	94.10	82.5	97.45	115.82	172	47.1	50	100	150

MAQN-3 (Inside MOEP Compound, 78th Street between 26th and 27th Road)

Need and Gap

- Environmental Quality Guidelines
- Air Quality Management
- National Air Quality Standards
- Skillful of Human Resources
- Cooperation with Civil Societies and NGOs and have to pay awareness program in Education and Social Sectors
- Law Enforce

- 需要的 100% 工業地 100%
 - 需要 100% 工業地 100%
 - 需要 100% 工業地 100%

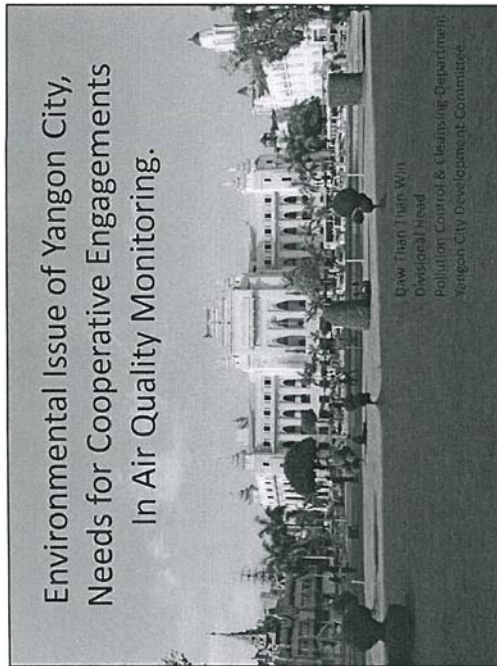


Air Quality Monitoring

- At 2012, ambient air quality was measured at Nay Pyi Taw and Yangon at our Occupational Health Division from January to December once a week.

4

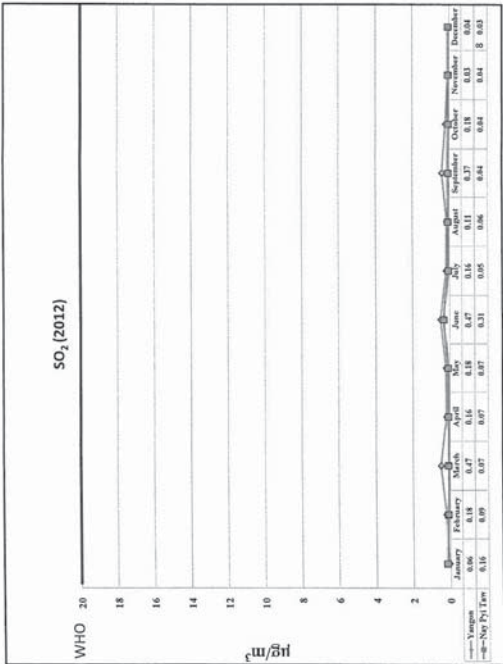
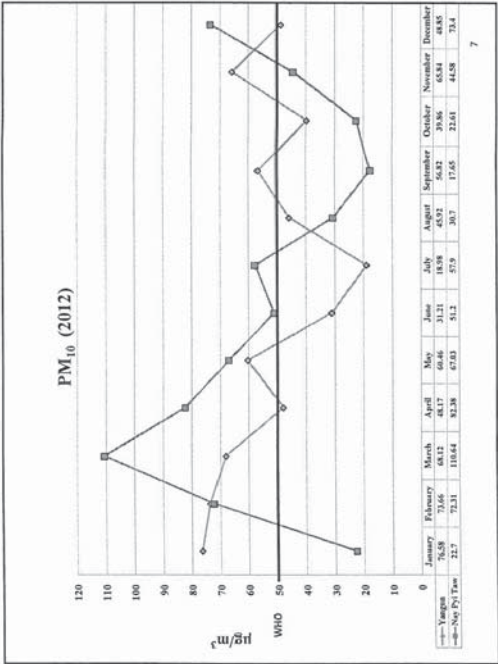
12/15 MONDAY
YCDC 7:00 PM



Daw Than Than Win

Situation of AQM

- It cause by **automobiles**, **industrialization** and others.
- YCDC air quality monitored at 2007 in Yangon City.
- Yangon City have no monitoring devices.
- In July 2013, Hold the training Program of **AWGESC + GIZ + YCDC**, Training on Air Quality Monitoring.
- Participated relevant Ministries of Myanmar.
- GIZ will donate the some AQM devices to YCDC, according to hot spot area,
- GIZ collaboration with YCDC for capacity building and mitigation on AQM.
- It not enough for the YCDC administrative area.

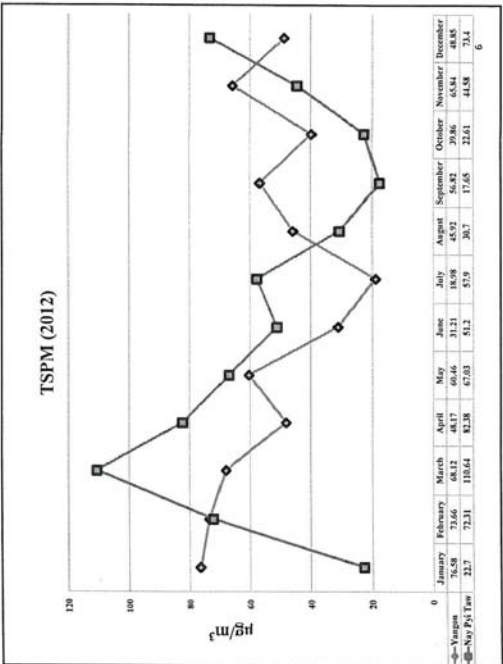


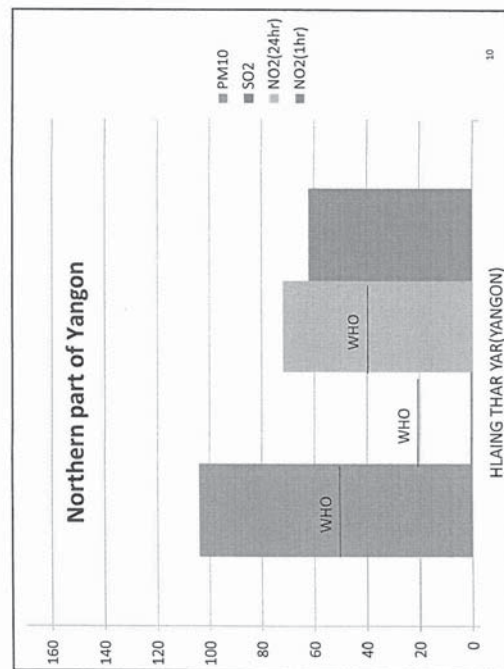
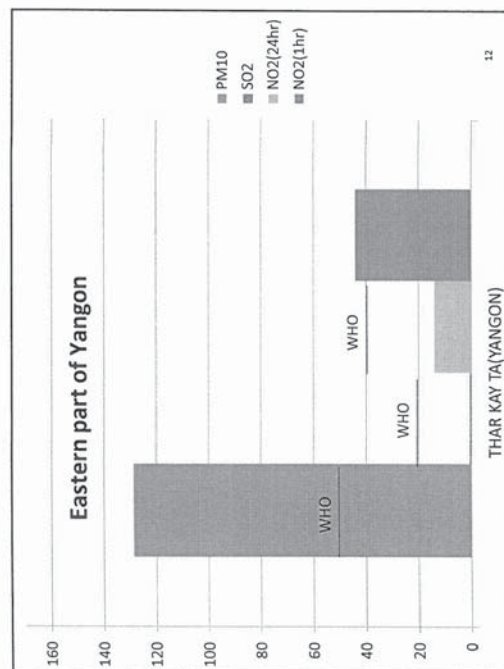
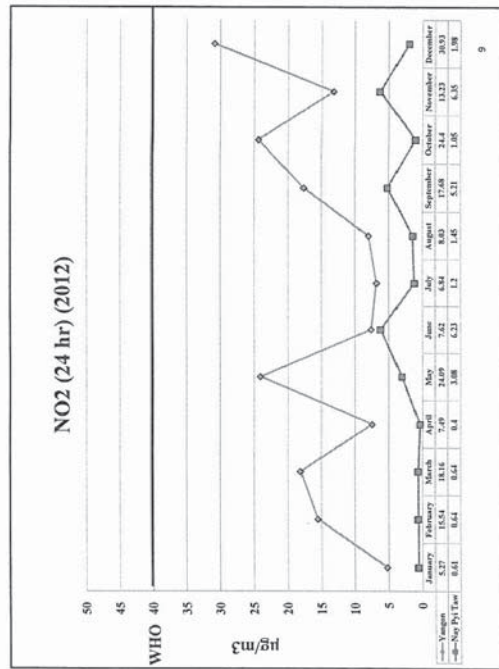
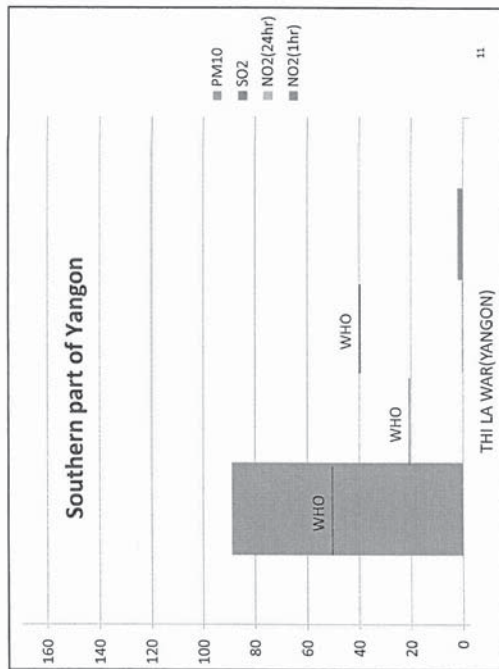
ASEAN – German Technical Cooperation
can Air for Smaller Cities in the ASEAN Region

giz

Objective

To equip participants with basic knowledge and information on air quality management and technical knowledge on air quality monitoring

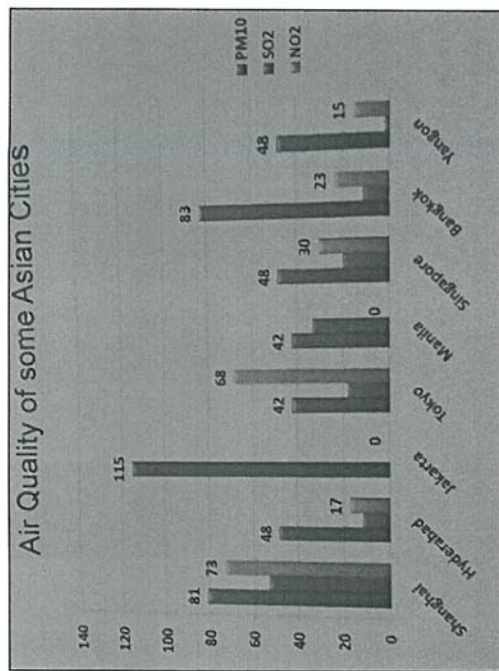




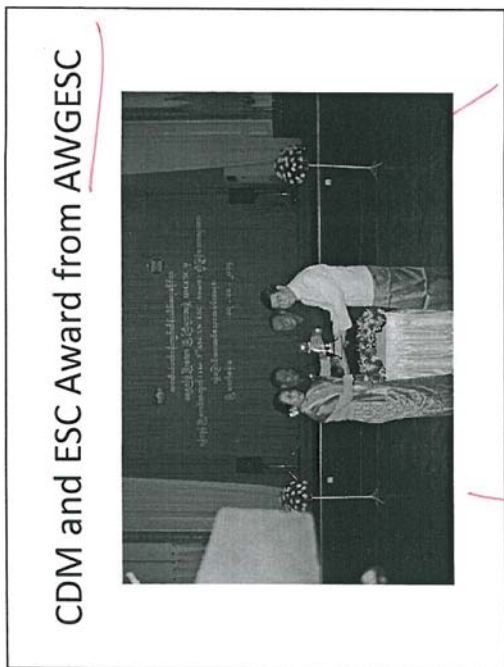
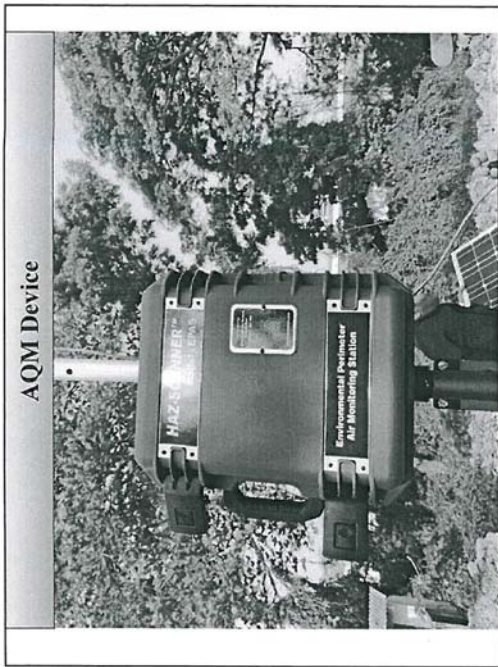
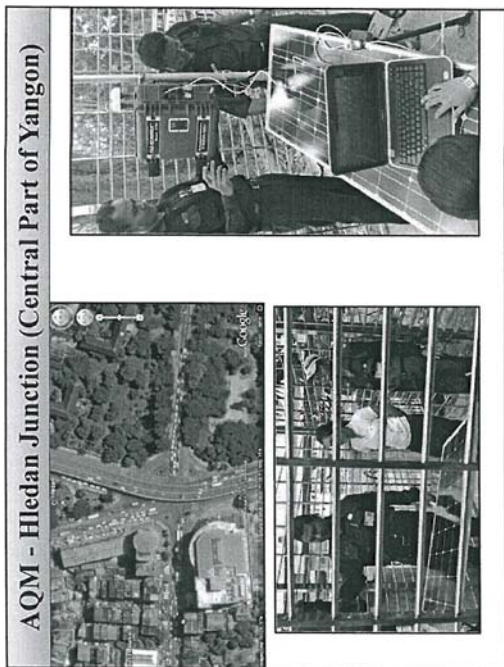
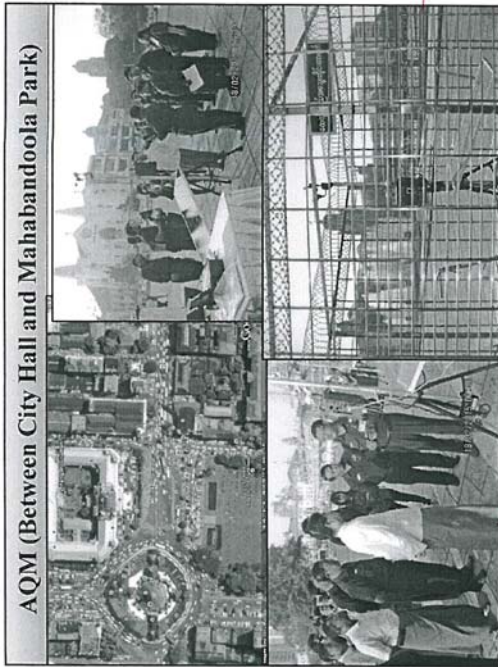
Automobile Growth in Yangon City		
Sr	Year	Number of Vehicles(Ygn.)
1	2008	186,931
2	2009	194,087
3	2010	204,763
4	2011	215,893
5	2012(June)	279,096
6	2013 - November	319,211

Current Situation of Air Quality Monitoring

- Type of Air Quality Monitoring Device
 - HAZ-SCANNER Modern EPAS
- Parameters monitored by AQM Device
 - 11 parameters
 (CO₂, CO, CH₄, NO₂, SO₂, PM_{2.5} and PM₁₀, Relative Humidity, Wind Speed, Wind Direction and Temperature)
- Proposed locations for monitoring
 - ❖ Air Quality Stations
 - ① Between City Hall and Mahabandoola Park
 - ② Near Hlaeden Junction
 - ③ In front of Mingalardon Administrative Office
 - ❖ Mobile Stations
 - 64 (industrial zones, public area, parks, disposal sites, cemeteries, etc.)



Yangon City Ambient Air Quality				
Pollutants	Time weighted average	Concentration in ambient air		
		Industrial Area	Residential Rural, etc.	Sensitive Area
		µg/m³	µg/m³	µg/m³
Sulphur Dioxide (SO ₂)	Annual Average*	0.3	1.25	1
	24 hours**	0.66	2.50	2
Oxides of Nitrogen as NO ₂	Annual Average	22	23	21
	24 hours	44	46	42
Suspended Particulate Matter (SPM)	Annual Average	189	119	143
	24 hours	375	238	186
Respirable (<10 µm) (RPM)	Annual Average	137	66	71
	24 hours	274	132	142

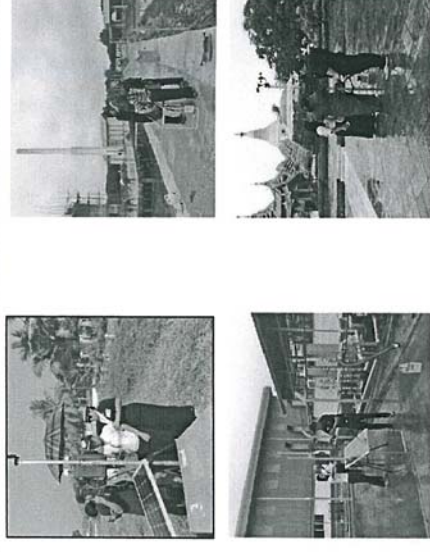


Key finding of Clean Air

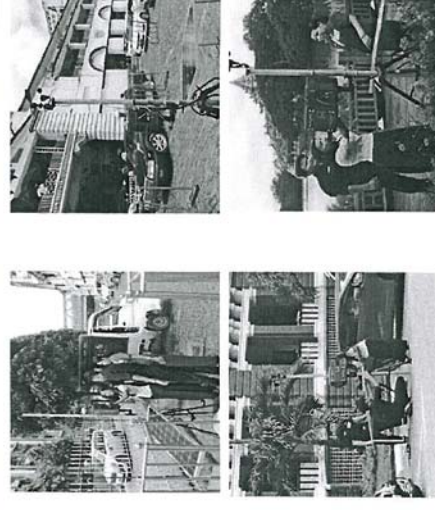
- Weakness of Law, Rules and regulation
- Research and development in AQM
- Capability Building of AQM
- Advanced Technologies and Technology transfer
- Data Inventory and base line data
- Mitigation plan
- Carbon credit
- Clean Development mechanism

23

AQM – Mobile Stations

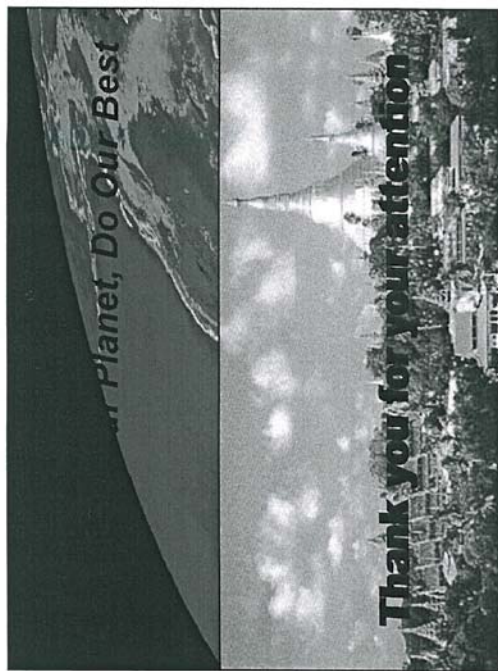


AQM – Mobile Stations



Conclusion

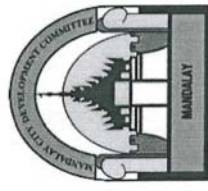
- To reduce carbon emission
- To implement air quality monitoring system
- To maintain green area
- To grow trees and plants
- To set up aim to get green area
- To set up sufficient green area while extension new city and planning new housing
- To try to clean, green and livable city for public.
- Create the Public cleansing boundaries



12/15 MDECAT
MDEC A02

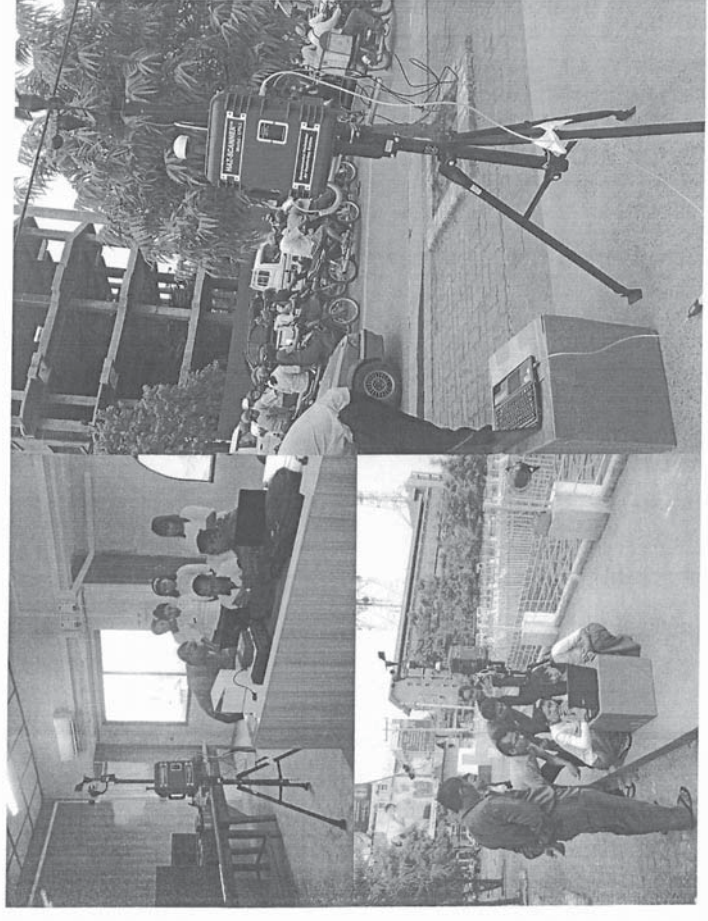


HAZ-SCANNER v2.0
10-05-05, 10-01-05



Mandalay City Development Committee

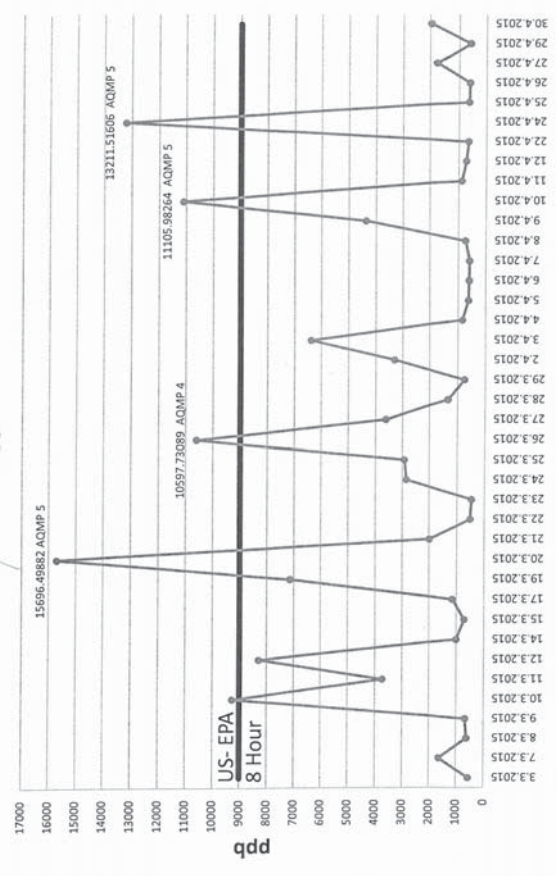
Ambient Air Quality Monitoring System Introduction and Training



Monitoring Unit

- Haz Scanner Model-EPAS
- Automatic Sensing
- Sensors
 - PM10
 - CO
 - NO
 - NO2
 - HC
- Record Count- Every minutes
- Battery Type

Traffic Jan ~ 1990



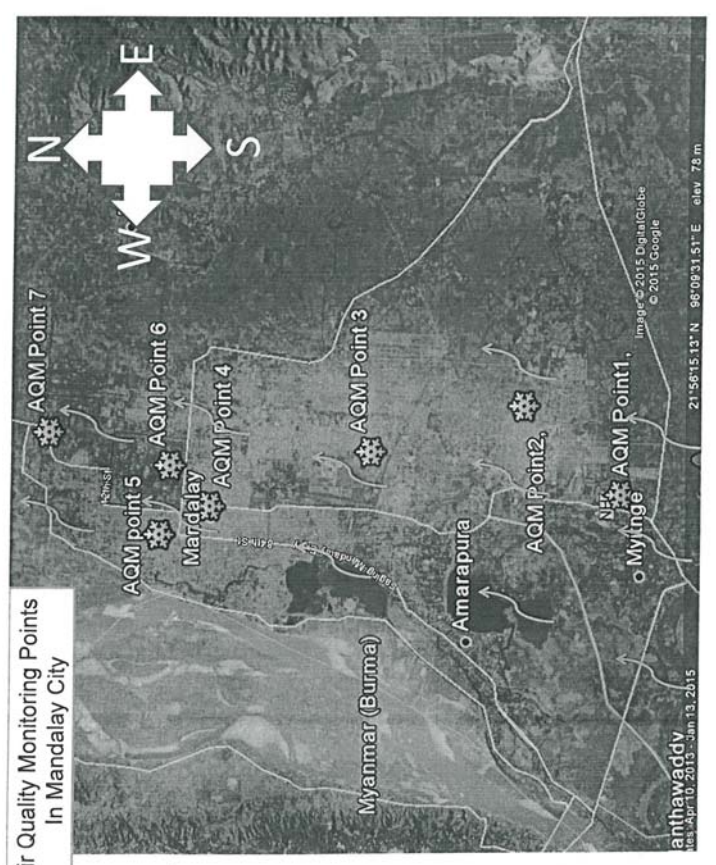
Air Quality Monitoring Points Selection

Mandalay City

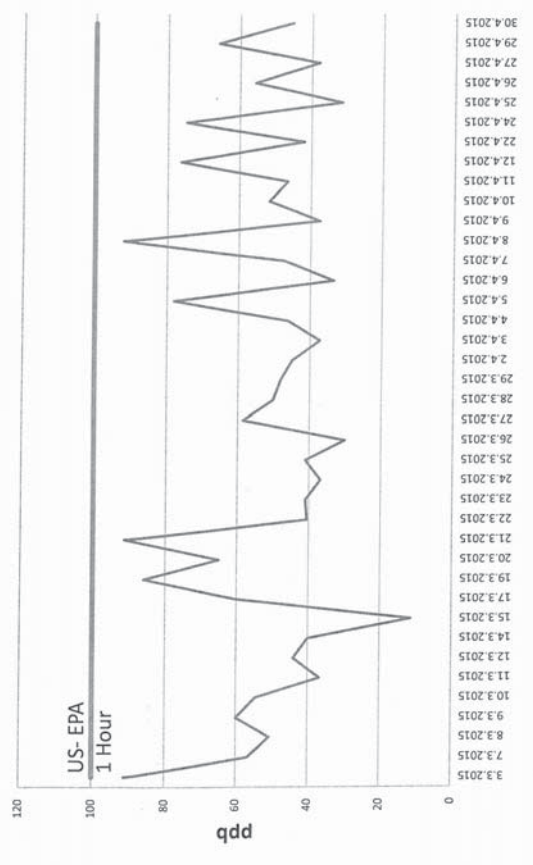
❖ In the Summer and Raining season, the wind is mostly south to north, totally 9 months per annum.

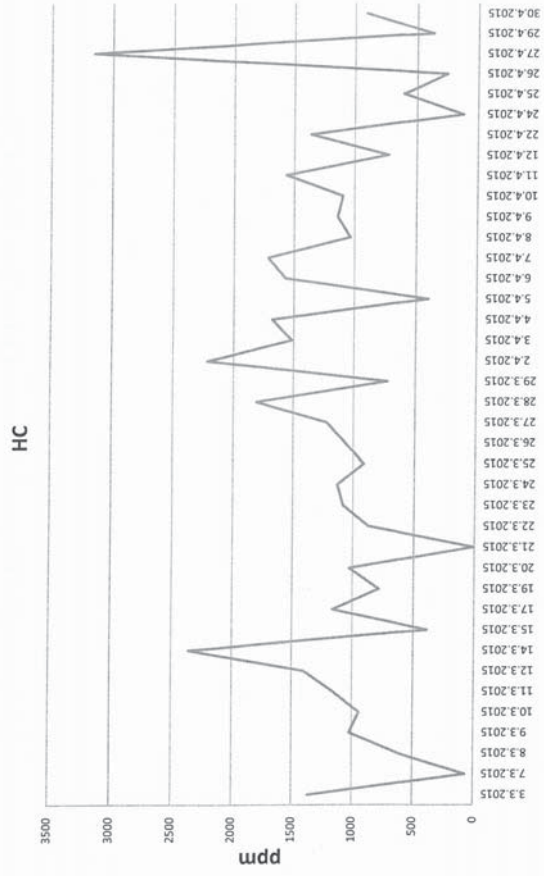
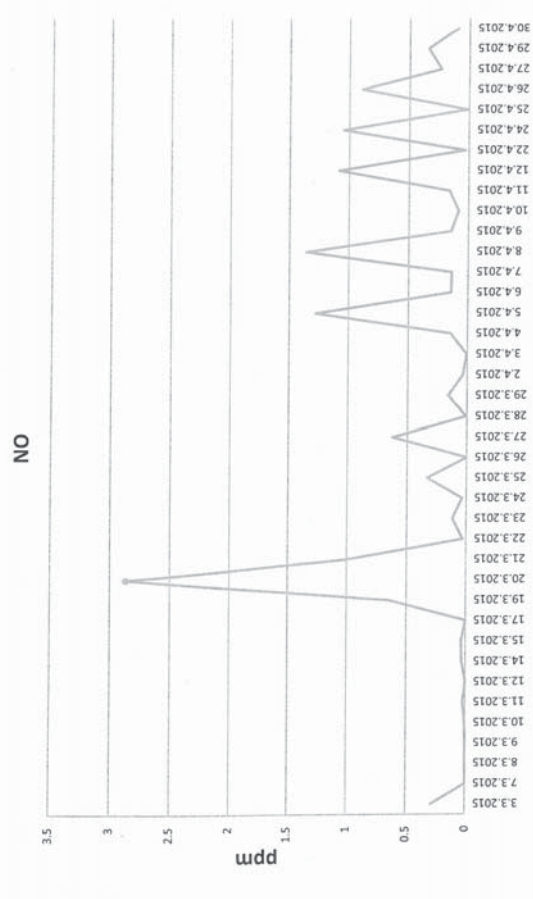
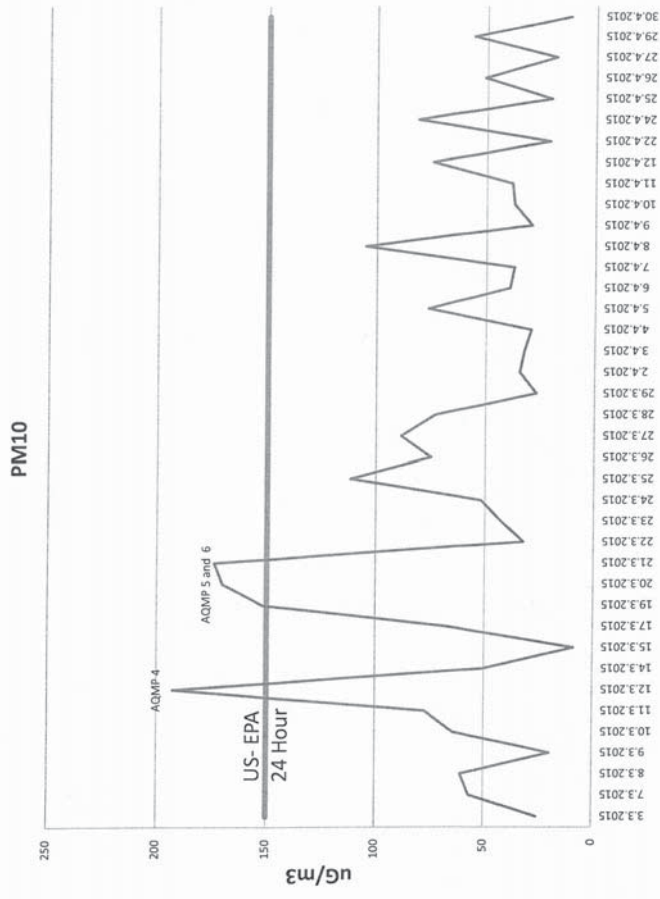
	Location	Characteristic
1	AQMP 1	Southern Edge of City
2	AQMP 2	Inside of the Industrial Zone
3	AQMP 3	MCDC's Worker Housing
4	AQMP 4	Yadanabon Plaza
5	AQMP 5	Conner of 84 and 26 roads
6	AQMP 6	City Hall
7	AQMP 7	Top of the Mandalay Hill

Air Quality Monitoring Points In Mandalay City



NO2





Upgrade the Monitoring Unit

- SO₂
- CH₄
- O₃
- Lead

Needs

- Organization Structure
- Capacity Building
- Cooperation
- Budget

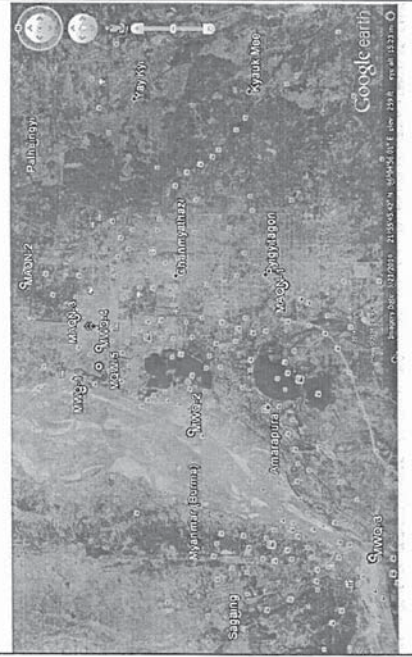
Thank you very much.

Survey Location

There are three air quality monitoring locations.

1. MAQN 1 (within the compound of Industrial Zone-2)
2. near Myaing Hay Wun Park, northern part of Mandalay city
3. Inside the MOEP compound, junction of 26th street and Yangon-Mandalay Express Road

Figure 1. present maps of the monitoring locations of air, noise and water quality. (MAQN-1, MAQN-2 and MAQN-3).



An Investigation on Some Air Quality Parameters of Mandalay City

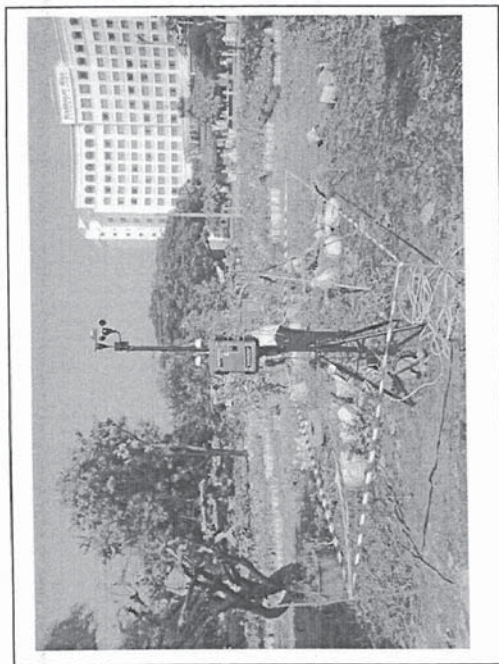
Win Maung
Chairman

Myanmar Environment Institute (MEI)

The main objective

- To get background ambient air quality data of Mandalay city.

Sampling Location	MAQN-2							W
	Parameter	Nov.	Dec.	Jan.	Feb.	March	April	
SO ₂ (µg/m ³)	64.90	73.26	106.00	59.57	27.58	28.6	20	
NO ₂ (µg/m ³)	64.86	48.53	139.58	158.61	120.25	150.4	200 (1 hr)	
CO (mg/m ³)	0.91	0.6	0.47	0.81	0.78	0.71	NA	



Sampling Location	MAQN-3							W
	Parameter	Nov.	Dec.	Jan.	Feb.	March	April	Guideline
	SO ₂ (µg/m ³)	58.58	104.85	85.65	150.46	122.81	34.26	20
	NO ₂ (µg/m ³)	69.37	76.87	80.17	84.29	90.83	94	200 (1 hr)
	CO (mg/m ³)	2.01	5.9	1.06	0.74	1.72	2.18	NA

Sampling Location	MAQN-1								Guideline
	Parameter	Nov.	Dec.	Jan.	Feb.	March	April		
	SO ₂ (µg/m ³)	77.57	177.26	125.79	189.61	145.34	56.6	20	
	NO ₂ (µg/m ³)	64.86	35.58	48.31	89.73	96.89	93.4	200 (1 hr)	
	CO (mg/m ³)	0.97	3.42	0.46	0.77	2.2	0.64	NA	

Table 1-12 Ambient air quality results. (November to April)

-Sulfur dioxide (SO₂) concentration in all 3 stations were higher than the guideline value (20 µg/m³) of WHO standard.

-NO₂ and CO concentration are normal and within the limit of IFC, WHO

Conclusion

-The air pollution concentration vary spatially and temporally
-changes in meteorological and topographical condition.
-vehicles, industries, domestic sources and natural sources.