ပူးတွဲ (3)　နှစ်နိုင်ငံအကြား ပူးပေါင်းဆောင်ရွက်ရေး လုပ်ငန်းအတွက် စဉ်းစားသုံးသပ်ရန် လေ့လာစုံစမ်းခြင်း
(နှစ်ကြိမ် နှင့် သုံးကြိမ်မြောက် ကွင်းဆင်းလေ့လာခြင်း) ဆက်စပ် စာရွက်စာတမ်းများ

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

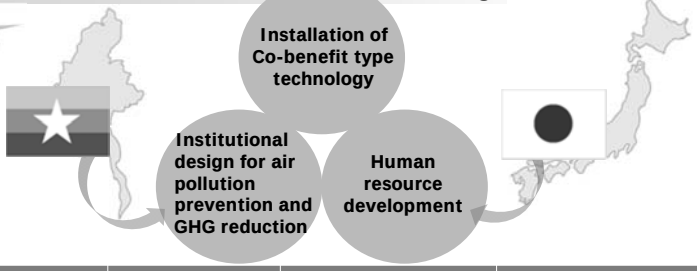
Environmental pollution control measures

Co-benefits Approach

Greenhouse gas emission-reduction measures

This project is mainly targeting air pollution control

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

01 Review of first-round meeting

2015	**October**	**Exchange of opinions**
	November	**Further discussions**
	December	**First discussion between MOECAF 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.

02 Agenda of Today

✓ Discuss the details of whole Bilateral Project

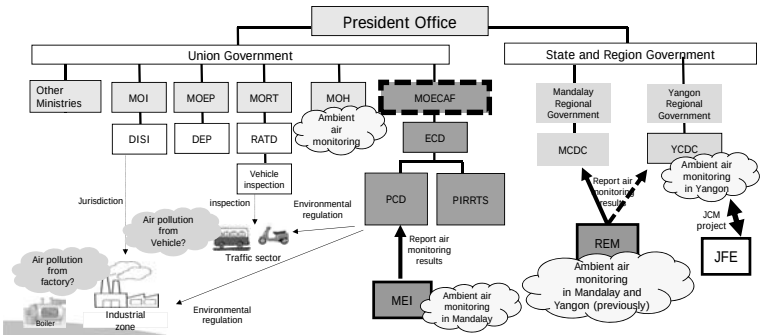
✓ Discuss the activity that we can collaborate for in the first fiscal year (2015)

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

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

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

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

MOEJ Environmental Control Technology Office, Environmental Management Bureu

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
  - Study tour to Japan

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05 Activities in this fiscal year

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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

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

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01 Review of previous meetings

What is “Co-benefits Approach”?

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Environmental pollution control measures

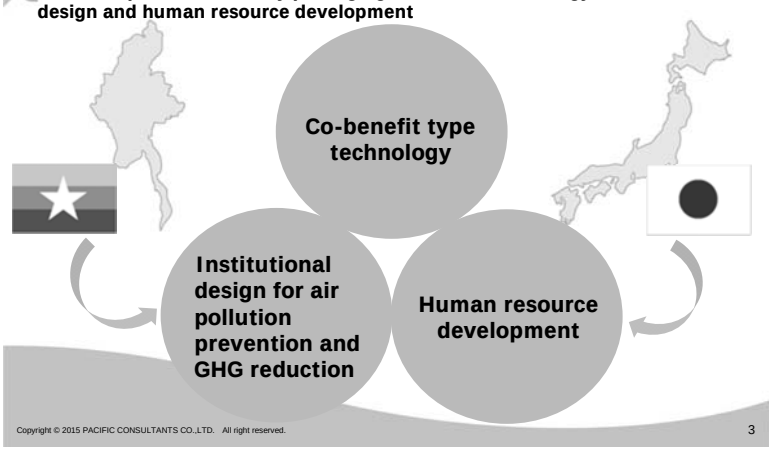
Co-benefits Approach

Greenhouse gas emission-reduction measures

This project is mainly targeting air pollution control

01 Review of previous meetings

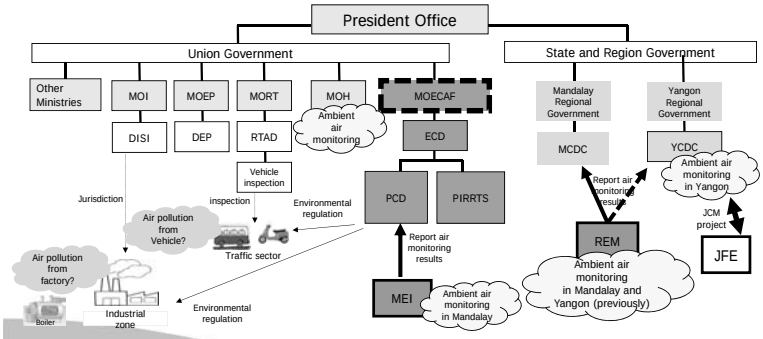
“Bilateral Cooperation project” is project that two countries work together to tackle air pollution issue by packaging co-benefit technology, institutional design and human resource development



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.



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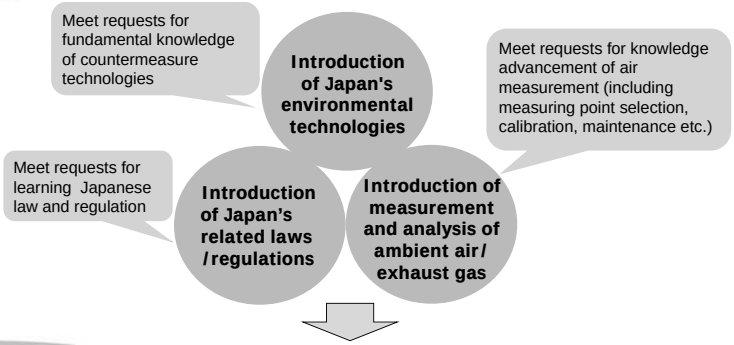
01 Review of previous meetings

Bilateral cooperation project of this year



Japan prepares and provides following guide / manual

1. “Air environment management awareness guide”
2. “Monitoring manual for ambient air and exhaust gas“

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, Taiheiyo 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 (Taiheiyo 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, Taiheiyo Engineering etc.

Agenda(Draft)

1.Opening remark (MOECAF)
2.Policy of bilateral cooperation project (MOEJ)
3.Japan's environmental laws/regulations (MOEJ)
4.Awareness guide and air monitoring manual (PCKK)
5.Air pollution and monitoring situation in Myanmar (MOECAF, YCDC, MCDC, MEI)
6. Air quality monitoring technology (HORIBA)
7. Vehicle exhaust gas abatement measure (JARI)
8. Energy saving solution in industrial sector (Taiheiyo)
9. Closing remarks (MOEJ)

04 Awareness guide / air monitoring manual

I. Air environment management awareness guide

Contents

04 Awareness guide / air monitoring manual

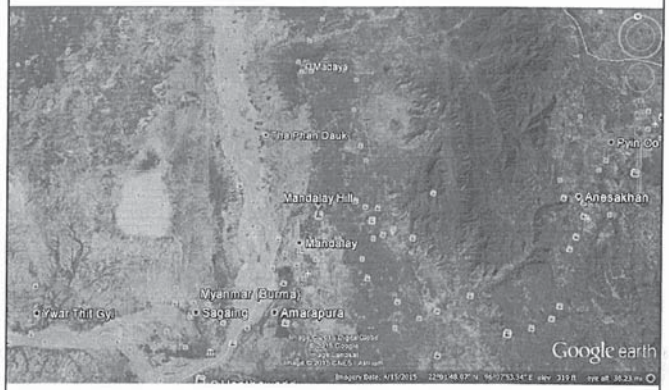
II. Monitoring manual for ambient air and exhaust gas emission

Contents

Brief History of Mandalay City

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

Mandalay City



12/15 MOECAF
MOECAF プロジェ

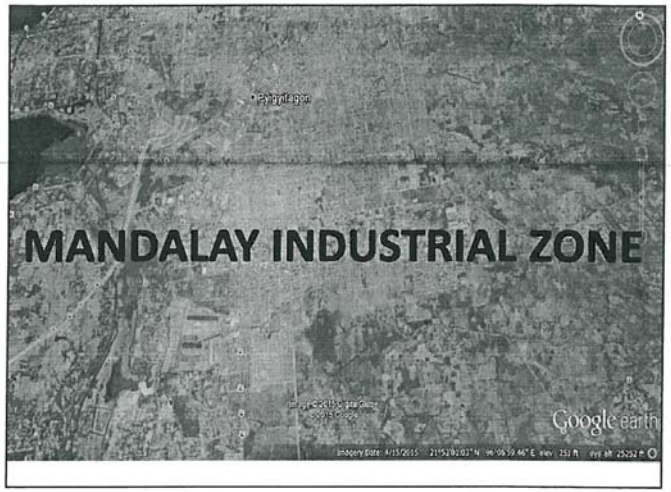
Air Quality Monitoring Function in Mandaly Environmental Conservation Department

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

マンダレー ECD.

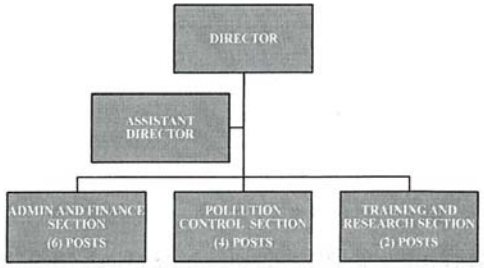
Presentation Outlines

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



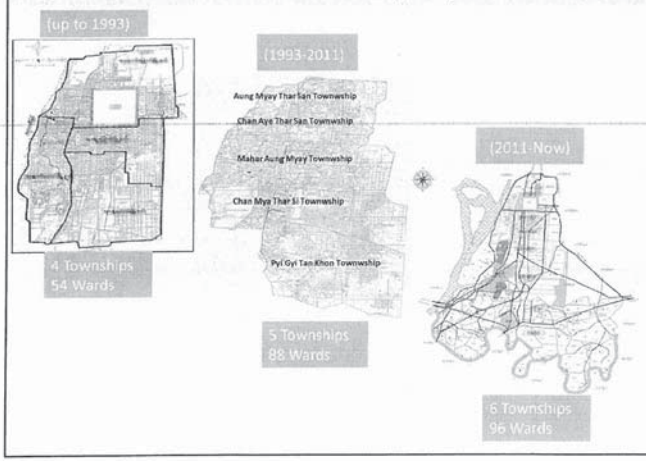
Background Information (ECD, MDY) and Air Quality Monitoring Activities

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



Total : 17

Mandalay City Area



Background History of Mandalay Industrial Zone

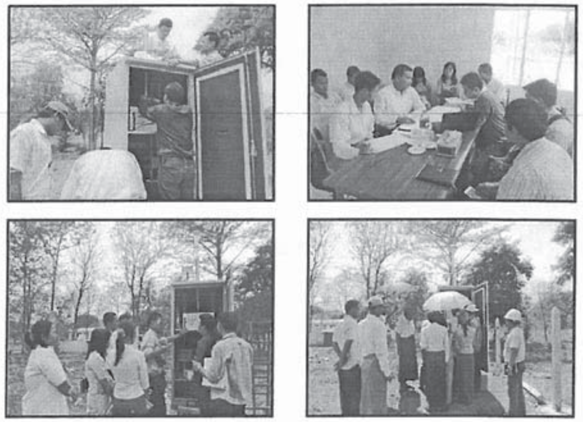
- Zone 1 is established in 1990
- Zone 2 is established in 1999
- Zone 3 is established in 2013
- Total area is 736 hectares
- Nowadays combination of all zones,we called Mandalay Industrial Zone
- It is located at South East of Yangon-Mandalay Express Way in Pyigyidagon Township
- Big Factory - 392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

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)

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



MP101M

Main specifications

Geiger-Müller counting time	: Programmable from 10 to 200 s
Scan periods	: 10 mn, 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	: Carbone 14 radioelement, half-life of radioelement ≈ 5730 ans
Gauge adjustment	: Automatic on each cycle change
Calibration	: By reference gauge

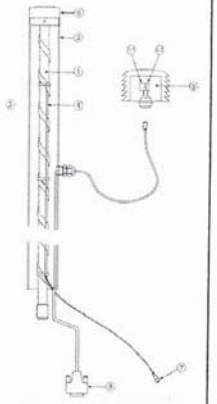
Thermal regulation(RST)

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

$T_{prélèvement} = T_{atmosphérique} + 5\ °C.$

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



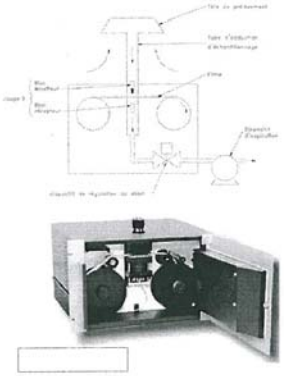
モニタリング装置

Components of MP101M

- Sampling head
- RST tube
- MP101M
- External pump

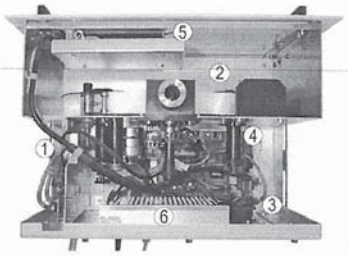
Analyzer main functions

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



MP101M

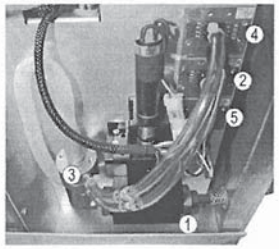
- (1) – flow regulation
- (2) – collector and beta gauge assembly
- (3) – electronic part
- (4) – module board
- (5) – Arm7 board
- (6) – power supply board



Upside view

MP101M

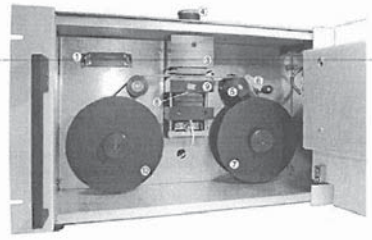
- (1) – one motor driven valv
- (2) – upstream Pressure sensor P2
- (3) – flat orifice
- (4) - downstream Pressure sensor P1
- (5) – atmospheric P sensor



Flow regulation view

MP101M

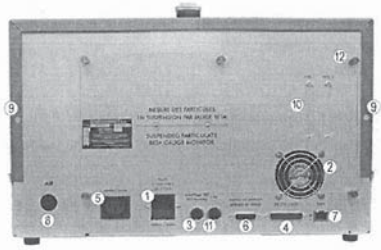
- (1) – reference gauge
- (3) – source holder
- (4) – RST connector
- (5) - capstan
- (6) – pinch roller
- (7) – take up reel
- (8) - Geiger-Muller detector
- (9) – pressuer assembly
- (10) – pay out reel



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) - TCP/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	Per.Conc 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	Per.Conc 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	+	+
7.5.2015	33.4	+	-
8.5.2015	40.8	+	+
9.5.2015	60.1	+	+
10.5.2015	144.8	+	+
11.5.2015	47.3	+	+
12.5.2015	49.4	+	+
19.5.2015	118.3	+	+
20.5.2015	178.7	+	+
21.5.2015	98.6	+	+
22.5.2015	121.8	+	+
23.5.2015	164.9	+	+
24.5.2015	225.1	+	+
25.5.2015	185.7	+	+
26.5.2015	196.8	+	+

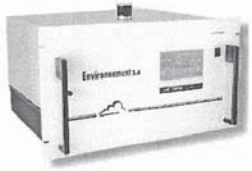
Maximum

Minimum

\+ Higher than WHO/Japan standards

MP101M

Preventive maintenance



Preventive maintenance

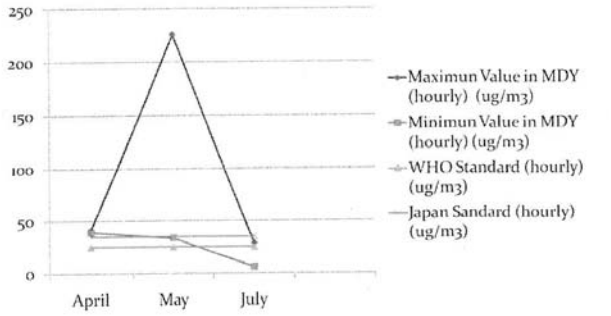
Nature of operations	Periodicity	Sheet N°
– Check of Picolino pump assembly	1 year	4.3.1
– Check of KNF pump assembly	1 year	4.3.2
– Sampling heads cleaning	1 month	4.3.3
– Multiplexer (MUX) signals verification	3 months	4.3.4
– Replacement of filter ribbon	1 to 3 years	4.3.5
– Verification of pressure 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 T°C and RH sensors	6 months	4.3.12

PM 2.5 Monthly Report (July)

Date	Per.Conc ug/m3	WHO Standard guideline 25 ug/m3	Japan Standard guideline 35 ug/m3
7.7.2015	18.5	-	-
8.7.2015	25.1	+	-
9.7.2015	17.7	-	-
10.7.2015	25.8	+	-
11.7.2015	19.1	-	-
12.7.2015	18.8	-	-
13.7.2015	18.9	-	-
14.7.2015	28.5	+	-
15.7.2015	13.7	-	-
16.7.2015	11.1	-	-
17.7.2015	8.1	-	-
18.7.2015	9.7	-	-
19.7.2015	10.9	-	-
20.7.2015	10.4	-	-
21.7.2015	10.2	-	-
22.7.2015	6.3	-	-
23.7.2015	6.1	-	-
24.7.2015	17.1	-	-
25.7.2015	7.4	-	-
26.7.2015	15.9	-	-
27.7.2015	10.9	-	-
28.7.2015	5.8	-	-
29.7.2015	10.5	-	-
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



Results of Air Quality(MEI)

Sampling Location	MAQN-1						WHO, 2005			Japan
Parameter	Nov.	Dec.	Jan.	Feb.	March	April	Guideline	Interim target 2	Interim target 1	
SO_2 (µg/m³)	84.65	193.34	143	200.2	28.6	56.6	20	50	125	
NO_2 (µg/m³)	64.86	35.53	56.4	94	112.8	93.4	200 (1 hr)	NA	NA	
CO (ppm)	0.85	2.99	0.4	0.67	0.68	0.56				10
PM 2.5 (µg/m³)	86.60	204.12	140.23	223.19	69.4	78.4	25	50	75	
PM 10 (µg/m³)	98.20	217.72	145.28	227.77	91.96	94.5	50	100	150	

MAQN-1 (Industrial Zone – 2)

Results of Air Quality(MEI)

Sampling Location	MAQN-2						WHO, 2005			Japan
Parameter	Nov.	Dec.	Jan.	Feb.	March	April	Guideline	Interim target 2	Interim target 1	
SO_2 (µg/m³)	70.93	80.08	114.4	57.2	143	28.6	20	50	125	
NO_2 (µg/m³)	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				10
PM 2.5 (µg/m³)	87.80	87.3	69.54	106.45	64.74	71.23	25	50	75	
PM 10 (µg/m³)	94.10	99.3	75.3	118.18	96.71	99.74	50	100	150	

MAQN-2 (Nursery Garden)

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

Thank You

Results of Air Quality(MEI)

Sampling Location	MAQN-3						WHO, 2005			Japan
Parameter	Nov.	Dec.	Jan.	Feb.	March	April	Guideline	Interim target 2	Interim target 1	
SO_2 (µg/m³)	64.06	114.4	85.8	171.6	143	143	20	50	125	
NO_2 (µg/m³)	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				10
PM 2.5 (µg/m³)	47.70	78.3	93.7	106.67	130	46.76	25	50	75	
PM 10 (µg/m³)	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

ASEAN – German Technical Cooperation giz

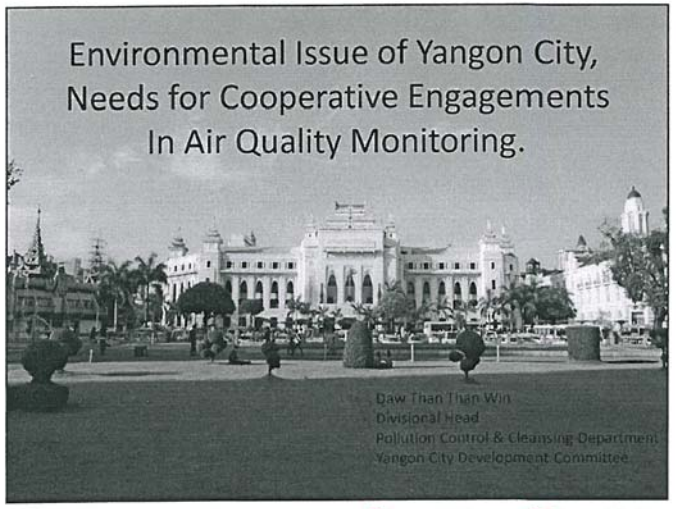
Participating Countries:
Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Vietnam

Air Quality Monitoring in 2012

- **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

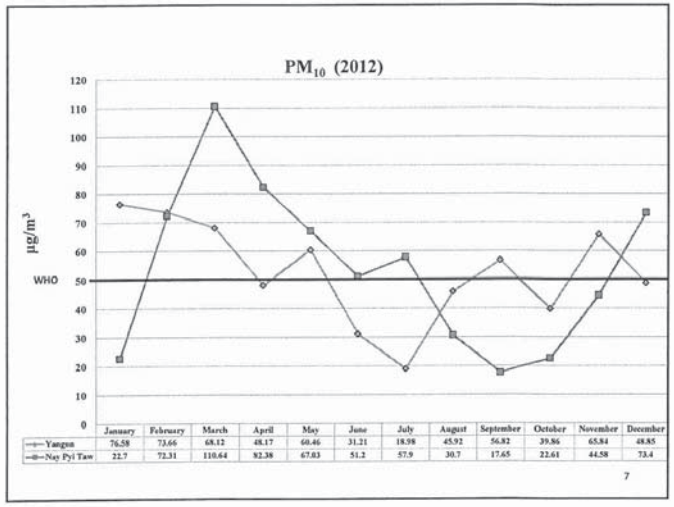
12/15 MOECAF
YCDC ဘဲ့ပေး

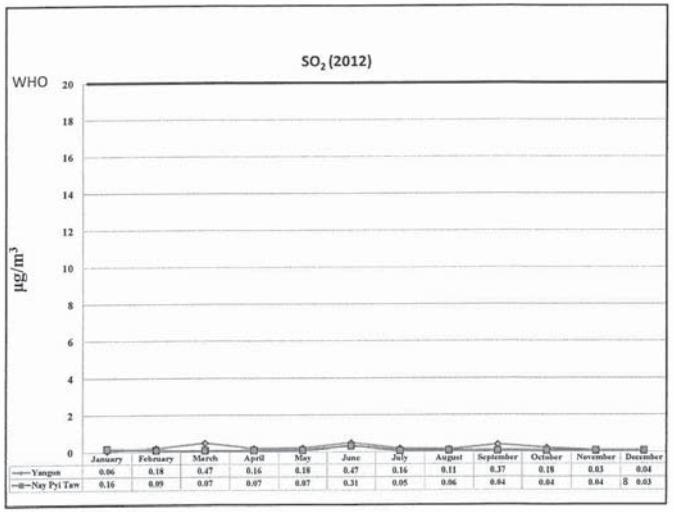


Daw Than Than Win

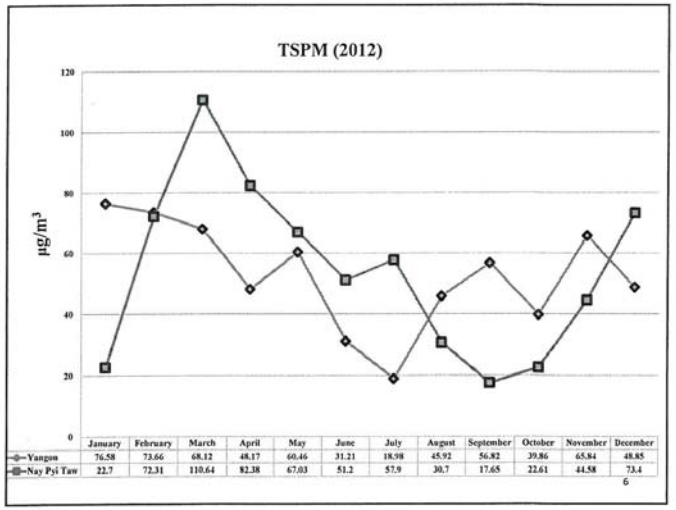
Situation of AQM

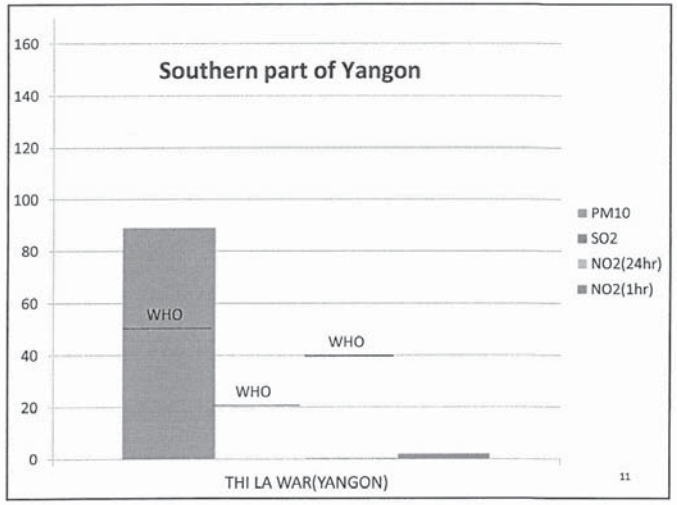
- It cause by automobiles, Industrialization and others.
- YCDC air quality monitored at 2007 in Yangon City.
- Yangon City have no monitoring devices.
- In July 2013, Hold the training Program of (AWGESC + GIZ + YCDC), Training on Air Quality Monitoring.
- Participated relevant Ministries of Myanmar.
- 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.

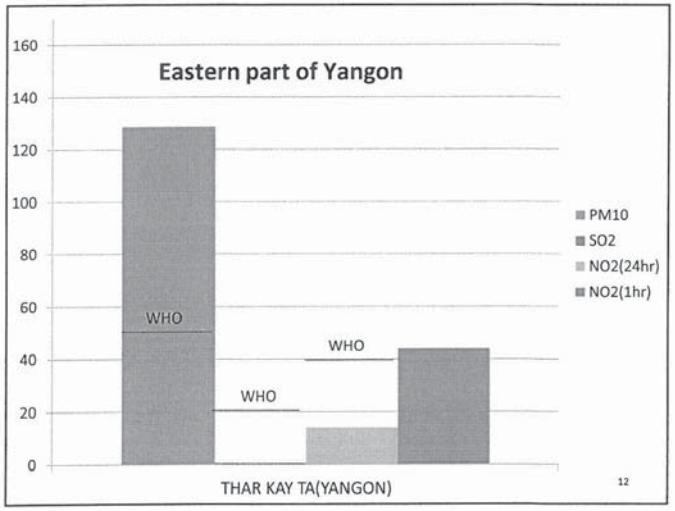

PM10 (2012)
µg/m3
WHO
120
110
100
90
80
70
60
50
40
30
20
10
0
January February March April May June July August September October November December
Yangon 76.58 73.66 68.12 48.17 60.46 31.21 18.98 45.92 56.82 39.86 65.84 48.85
Nay Pyi Taw 22.7 72.31 110.64 82.38 67.03 51.2 57.9 30.7 17.65 22.61 44.58 73.4
7

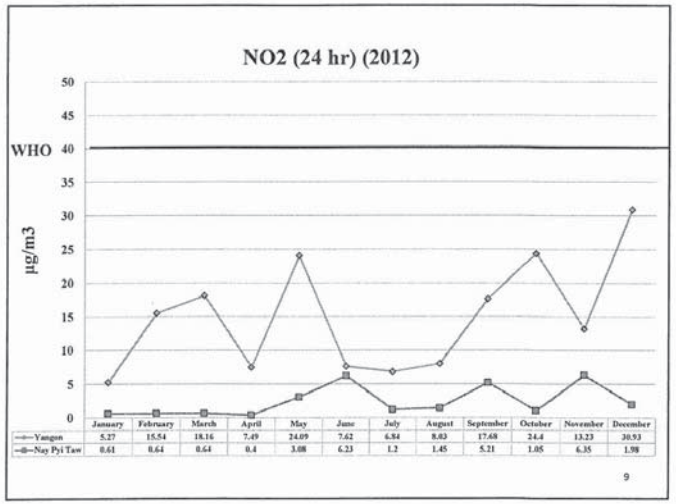

SO2 (2012)
WHO
µg/m3
20
18
16
14
12
10
8
6
4
2
0
January February March April May June July August September October November December
Yangon 0.06 0.18 0.47 0.16 0.18 0.47 0.16 0.11 0.37 0.18 0.03 0.04
Nay Pyi Taw 0.16 0.09 0.07 0.07 0.07 0.31 0.05 0.06 0.04 0.04 0.04 0.03
8

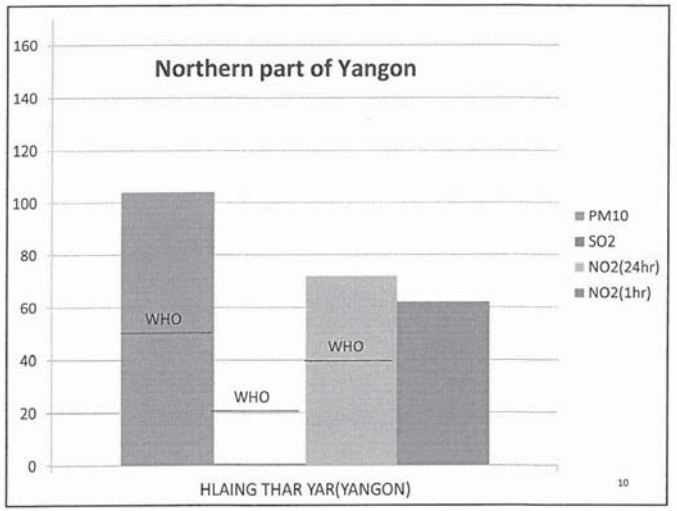

EAN – German Technical Cooperation
ean Air for Smaller Cities in the ASEAN Region"
german cooperation
giz
Objective
To equip participants with basic knowledge and information on air quality management and technical knowledge on air quality monitoring
5


TSPM (2012)
µg/m3
120
100
80
60
40
20
0
January February March April May June July August September October November December
Yangon 76.58 73.66 68.12 48.17 60.46 31.21 18.98 45.92 56.82 39.86 65.84 48.85
Nay Pyi Taw 22.7 72.31 110.64 82.38 67.03 51.2 57.9 30.7 17.65 22.61 44.58 73.4
6


Southern part of Yangon
160
140
120
100
80
60
40
20
0
WHO
WHO
WHO
PM10
SO2
NO2(24hr)
NO2(1hr)
THI LA WAR(YANGON)
11


Eastern part of Yangon
160
140
120
100
80
60
40
20
0
WHO
WHO
WHO
PM10
SO2
NO2(24hr)
NO2(1hr)
THAR KAY TA(YANGON)
12


NO2 (24 hr) (2012)
WHO
µg/m3
50
45
40
35
30
25
20
15
10
5
0
January February March April May June July August September October November December
Yangon 5.27 15.54 18.16 7.49 24.09 7.62 6.84 8.03 17.68 24.4 13.23 30.93
Nay Pyi Taw 0.61 0.64 0.64 0.4 3.08 6.23 1.2 1.45 5.21 1.05 6.35 1.98
9

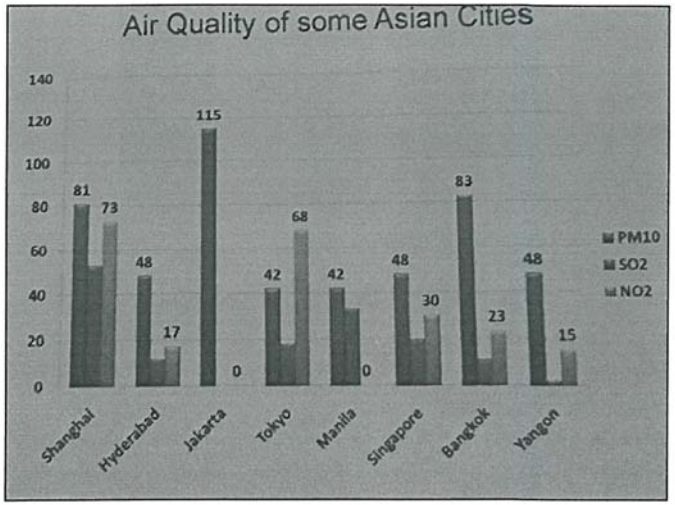

Northern part of Yangon
160
140
120
100
80
60
40
20
0
WHO
WHO
WHO
PM10
SO2
NO2(24hr)
NO2(1hr)
HLAING THAR YAR(YANGON)
10

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

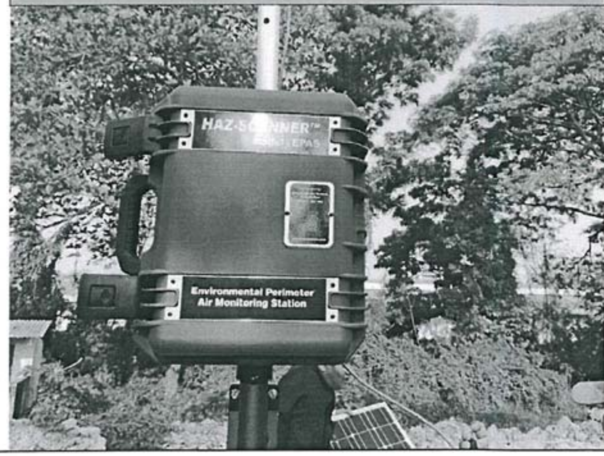
- Type of Air Quality Monitoring Device - HAZ-SCANNER Modern EPAS
- Parameters monitored by AQM Device - 11 parameters (CO2, CO, CH4, NO2, SO2, PM2.5 and PM10, Relative Humidity, Wind Speed, Wind Direction and Temperature)
- Proposed locations for monitoring - 67 予定
  - Air Quality Stations - 3
    - ① Between City Hall and Mahabandoola Park
    - ② Near Hladen 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

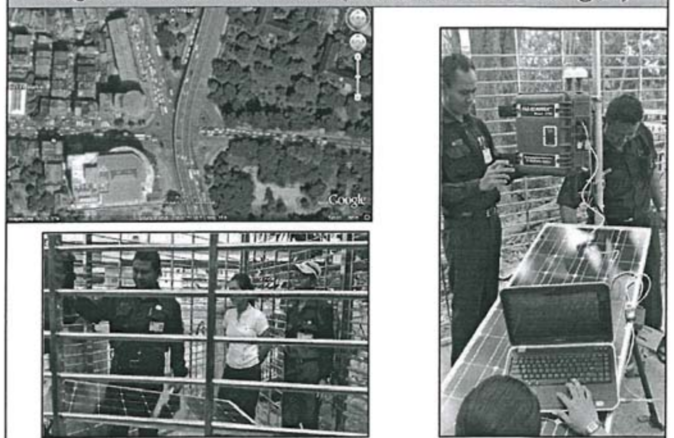
AQM Device



CDM and ESC Award from AWGESC

AQM (Between City Hall and Mahabandoola Park)

AQM - Hledan Junction (Central Part of Yangon)



Key finding of Clean Air

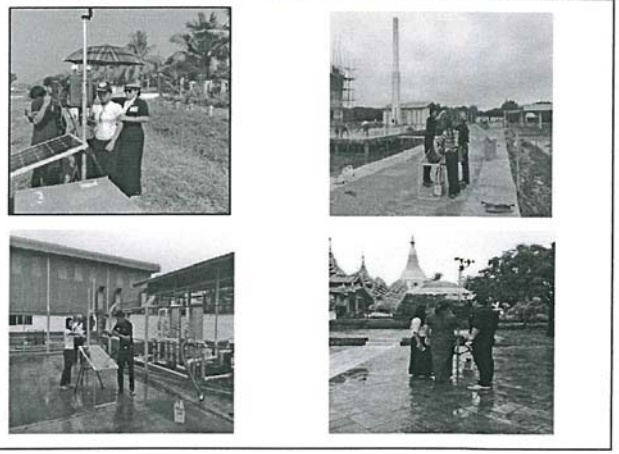
- Weakness of Law, Rules and regulation
- Research and development in AQM
- Capability Building of AQM
- Advanced Technologies and Technology transfer
- Data Inventory and base line data
- Mitigation plan
- Carbon credit
- Clean Development mechanism

23

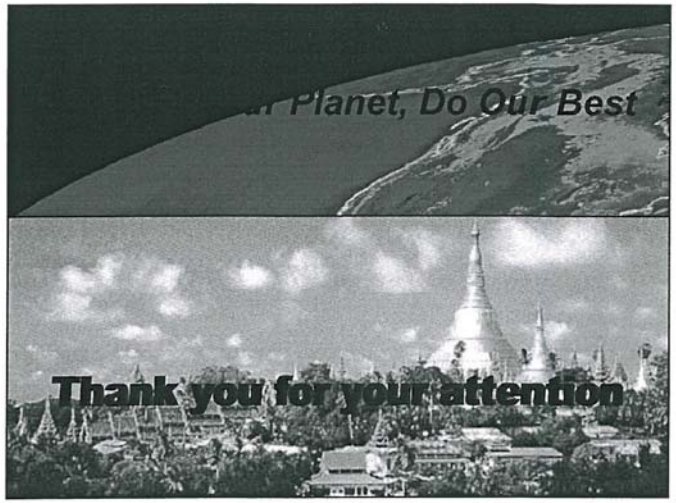
Conclusion

- 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

AQM – Mobile Stations



AQM – Mobile Stations


Planet, Do Our Best
Thank you for your attention

12/15 MOECAF
MCDC 九份

3

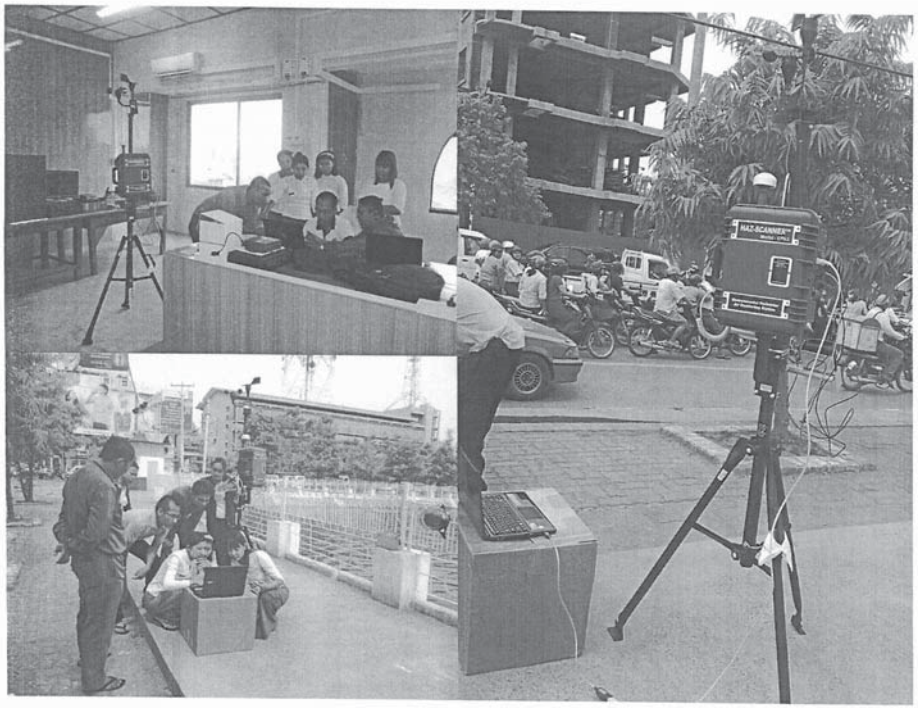
MANDALAY CITY DEVELOPMENT COMMITTEE
MANDALAY

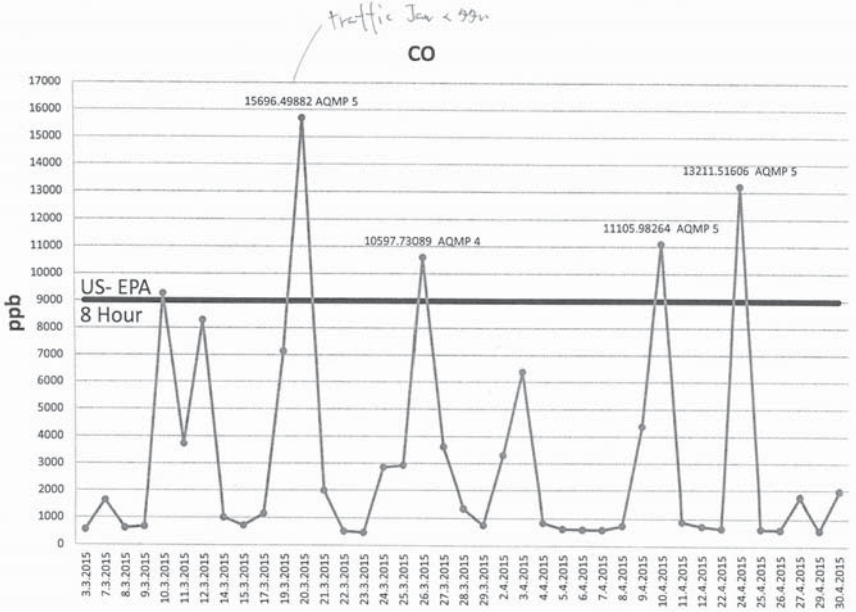
Mandalay City Development Committee

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



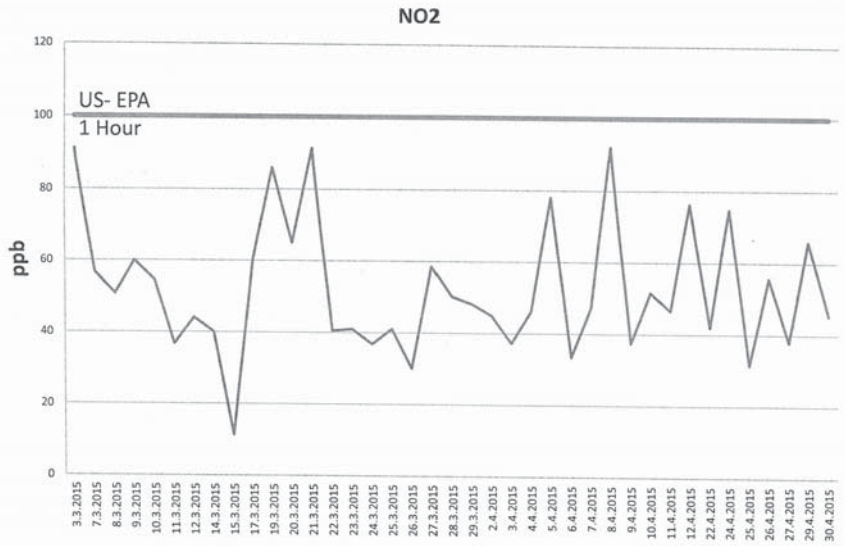


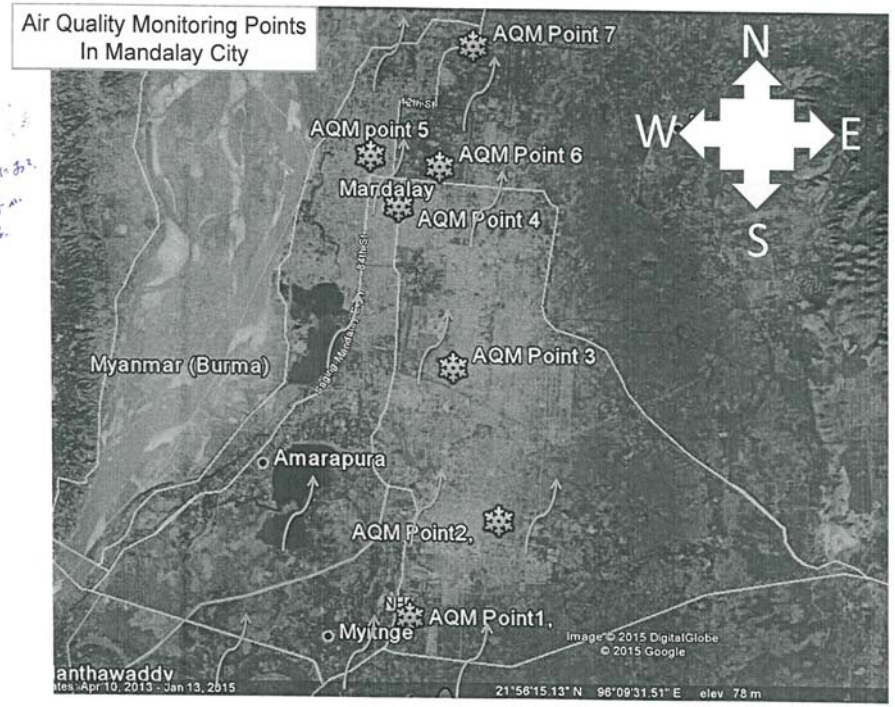
Air Quality Monitoring Points Selection

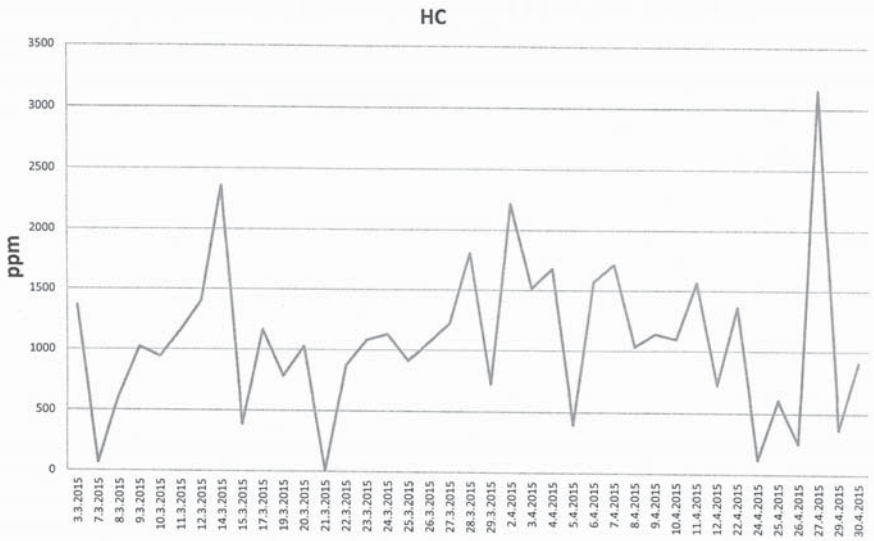
Mandalay City

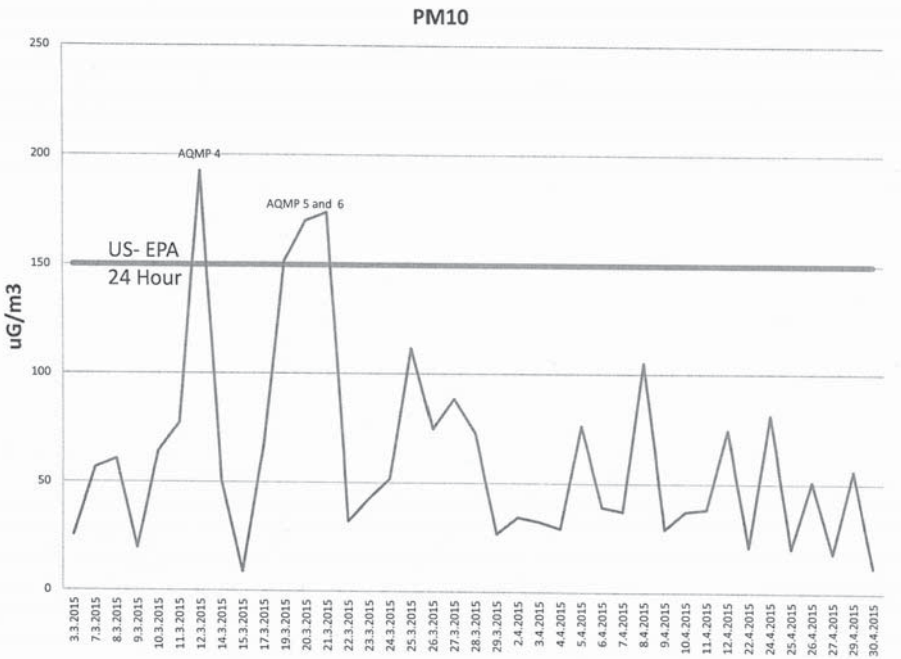
- In the Summer and Raining season, the wind is mostly south to north, totally 9 months per annum.

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



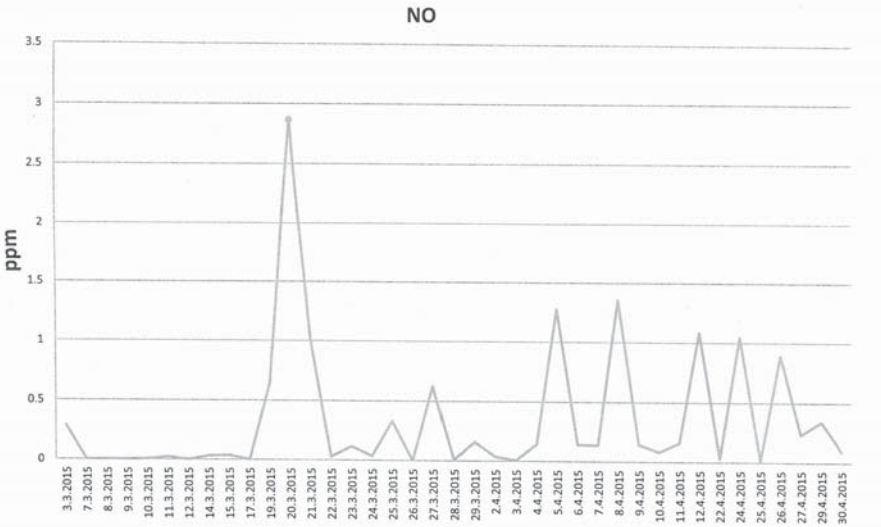






Upgrade the Monitoring Unit

- 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).

12/15 MOECAF
MEI プレゼン

12/15/2015

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	Guideline
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

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

Sampling Location	MAQN-1						
Parameter	Nov.	Dec.	Jan.	Feb.	March	April	Guideline
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

-Sulfur dioxide (SO_2) concentration in all 3 stations were higher than the guideline value (20 µg/m3) of WHO standard.

-NO_2 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.