SESSION 5: MULTIPLE BENEFITS OF ENERGY EFFICIENCY: A FOCUS ON AIR POLLUTION

"Corporate Drivers for Energy Efficiency and Air Quality in Buildings"

06.06.18

ENGR. AMBROSIO FERRIS S. TANGCO III

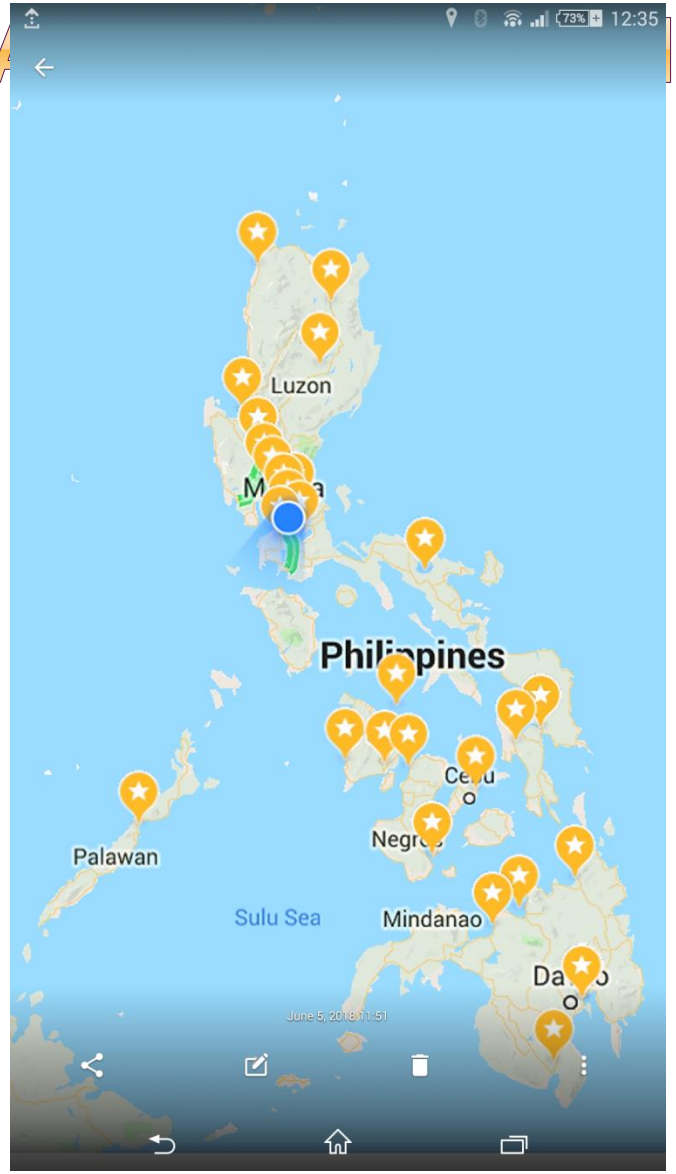
Engineering Project Manager - Energy Conservation, Upgrading, Innovations, Environmental Health and Safety (ECUIEHS)

ROBINSONS LAND CORPORATION

Reference: https://www.linkedin.com/in/ambrosio-ferris-s-tangco-iii-a5825a73/?midToken=AQEhHT5vpyT54A&trk=eml-email_jobs_geo_digest_01-header-27-profile&trkEmail=eml-email_jobs_geo_digest_01-header-27-profile-null-4b1ahw~jh6vlc72~s7-null-neptune%2Fprofile~vanity%2Eview&lipi=urn%3Ali%3Apage%3Aemail_email_jobs_geo_digest_01%3BQ6T%2F45tOQoKK0Va1gc%2F59g%3D%3D

ROBINSONS LAND CORPORA IES

- 47
- 45
- 19
- 16
- And still growing...



(47) Operational Malls

OUTLINE OF PRESENTATION

- What is Air Pollution?
- What is Air Quality?
- Philippine National Commitments
  - Government
  - Private (Robinsons Land Corporation)
- Conclusion
- Personal Quote of Hope
- References

WHAT IS AIR POLLUTION?

WHAT IS AIR POLLUTION?

WHAT IS AIR POLLUTION?

- DENR-EMB, R.A. 8749 Philippine Clean Air Act of 1999 and DENR Administrative Order No. 2000 - 81
  - Any alteration of the physical, chemical and biological properties of the atmosphere, or any discharge thereto of any liquid, gaseous or solid substances that will or is likely to create or **to render the air resources of the country harmful, detrimental, or injurious to public health, safety or welfare** or which will adversely affect their utilization for domestic, commercial, industrial, agricultural, recreational, or other legitimate purposes

WHAT IS AIR QUALITY?

WHAT IS AIR QUALITY?

Air Quality Index (AQI) Values	Levels of Health Concern
0 to 50	Good
51-100	Moderate
101-150	Unhealthy for Sensitive Groups
151-200	Unhealthy
201-300	Very Unhealthy
301 to 500	Hazardous

World Health Organization, (2018, May 2) - New data from WHO shows that **9 out of 10 people breathe air containing high levels of pollutants. Updated estimations reveal an alarming death toll of 7 million people every year caused by ambient (outdoor) and household air pollution.**

PHILIPPINE NATIONAL COMMITMENTS

GOVERNMENT

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR)

- Per R.A. 8749, or Clean Air Act of 1999:

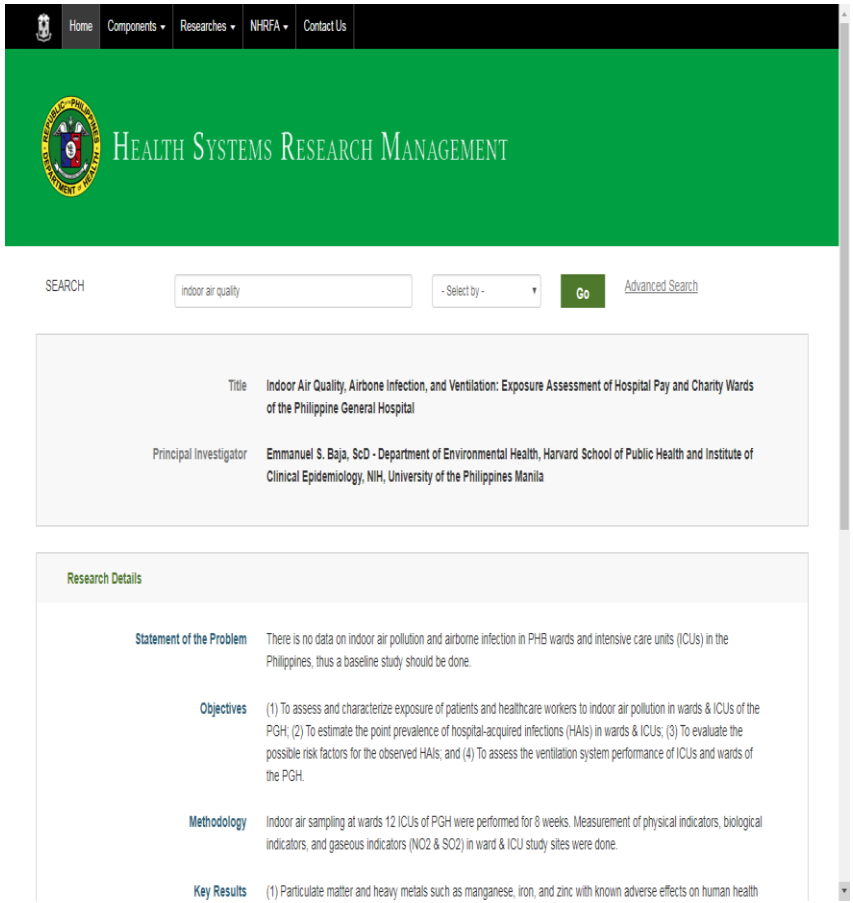
1. For National Ambient Air Quality Guideline for Criteria Pollutants:

Pollutants	Short Term [a]			Long Term [b]		
	$\mu g/m^3$	ppm	Averaging Time	$\mu g/m^3$	ppm	Averaging Time
Suspended Particulate Matter [c] –						
TSP	230 [d]		24 hours	90		1 year [e]
PM-10	150 [f]		24 hours	60		1 year [e]
Sulfur Dioxide [c]	180	0.07	24 hours	80	0.03	1 year
Nitrogen Dioxide	150	0.08	24 hours			
Photochemical Oxidants as Ozone	140	0.07	1 hour			
	60	0.03	8 hours			
Carbon Monoxide	35 mg/Ncm	30	1 hour			
	10 mg/Ncm	9	8 hours			
Lead [g]	1.5		3 months [g]	1.0		1 year

[a] Maximum limits represented by ninety-eight percentile (98%) values not to exceed more than once a year.
[b] Arithmetic mean
[c] SO_2 and Suspended Particulate matter are samples once every six days when using the manual methods. A minimum of twelve sampling days per quarter or forty-eight sampling days each year is required for these methods. Daily sampling may be done in the future once continuous analyzers are procured and become available.
[d] Limits for Total Suspended Particulate Matter with mass median diameter less than 25-50 µm.
[e] Annual Geometric Mean.
[f] Provisional limits for Suspended Particulate Matter with mass median diameter less than 10 microns and below until sufficient monitoring data are gathered to base a proper guideline.
[g] Evaluation of this guideline is carried out for 24-hour averaging time and averaged over three moving calendar moths. The monitored average value for any three months shall not exceed the guideline value.

DEPARTMENT OF HEALTH (DOH)

- Also follows R.A. 8749, for ambient air quality standards, but for indoor air quality standards, on-going studies are still being conducted.



PHILIPPINE SOCIETY OF MECHANICAL ENGINEERS (PSME)

- Indoor Air Quality Parameters (Philippines)
  - Temperature:
    - 20C – 23.33C
  - Humidity:
    - 45%-55%

PRIVATE (ROBINSONS LAND CORPORATION)

CHILLER REPLACEMENT/UPGRADING PROJECTS

- Under the DENR-EMB-PCEEP program, Robinsons replaced 10-15 year old chillers **from (4) malls, thus reducing overall the number of CFC/HCFC/ODS chillers used.**
- **Improvement in energy efficiency was also noticeable.**

Philippines - Chiller Energy Efficiency Project

CHILLER REPLACEMENT/UPGRADING PROJECTS

- Malls with Replaced 10-15 Year Old Chillers:

CHILLER REPLACEMENT/UPGRADING PROJECTS

- Malls with Replaced 10-15 Year Old Chillers:

CHILLER REPLACEMENT/UPGRADING PROJECTS

- Malls with Replaced 10-15 Year Old Chillers:

CHILLER REPLACEMENT/UPGRADING PROJECTS

- Malls with Replaced 10-15 Year Old Chillers:

AIR HANDLING UNIT (AHU) AND FAN COIL UNIT (FCU) FILTERS (ALL)

- From the chillers, before the cooled air enters the building premises, the ambient air that enters the AHUs and FCUs, passes through filters installed in the units to filter out the unwanted particles.

PLACEMENT OF PLANTS INSIDE THE BUILDINGS (ALL)

- Aside from their aesthetics side, they play a small role in acting as natural air purifiers for the internal part of the building

Robinsons Galleria Cebu Indoor Garden

INSTALLATION OF AIR PURIFIERS (OFFICE BUILDINGS)

- Air purifiers are also placed in our office buildings to further improve the indoor air quality, clear the air of allergens and other harmful particles.

FRESH AIR AND EXHAUST SYSTEMS (FOOD CLIENTS OF MALLS)

- A standard kept within the buildings and malls, in order to continuously exhaust contaminated air from the indoor premises.
- Usually included with the AHUs and FCUs, but for kitchen areas, additional exhaust systems are required and also a fresh air system.

AIR QUALITY MONITORING SYSTEM (IN PROGRESS)

- Although air quality daily checking is currently done manually, there is a plan in progress to install a air quality monitoring system in the buildings to constantly check on the indoor air quality of the buildings in congested areas (e.g. Work floor, cafeteria)

WHY IS INDOOR AIR QUALITY IMPORTANT?

- Minimizes the health hazards and issues with our customers, clients and employees.
- Reduces the energy costs because ideal air quality standards helps the cooling system maintain a proper workload level, therefore the system does not have to work harder.
- Minimizes growth of molds and bacteria.
- Air congestion inside the building is avoided.
- **IT WELCOMES A MORE FRUITFUL VISITING, LIVING AND WORKING EXPERIENCE FOR OUR CUSTOMERS, GUESTS, CLIENTS AND EMPLOYEES!!**

CONCLUSION

CONCLUSION

PERSONAL QUOTE OF HOPE

PERSONAL QUOTE OF HOPE

"From the past, present and into the future, we continue to breathe and share the same air. It has provided life, and where there is life, there is hope."

~ Engr. Ambrosio Ferris Tangco III, 06.05.18

REFERENCES

- Nathanson, J. (2018). *Air pollution*. Encyclopedia Britannica. Retrieved June 4, 2018, from https://www.britannica.com/science/air-pollution.
- Essick, P. (2017, October 17). Air Pollution Causes, Effects, and Solutions. Retrieved June 4, 2018, from https://www.nationalgeographic.com/environment/global-warming/pollution/.
- Ulag, G. (2011). *Unhealthy Riding - The streets of Metro Manila*. Retrieved June 4, 2018, from http://bikersworld101.blogspot.com/2011/01/unhealthy-riding-streets-of-metro.html.
- Seeker. (2015, October 2016). *How Exactly Does Smoking Kill?*. Retrieved June 4, 2018, from https://www.youtube.com/watch?v=oW45KJMuEhI.
- Castro, E. (2013). *Recommendations when choosing a refrigerant*. Retrieved June 4, 2018, from http://www.datacenterconsultores.com/recommendations-when-choosing-a-refrigerant.
- Miguel, C. (2018). *AIR QUALITY MANAGEMENT*. Retrieved June 4, 2018, from https://www.denr.gov.ph/news-and-features/latest-news/51-air-pollution-management.html.
- Elaw.org. (1998). *Philippine Clean Air Act of 1999*. Retrieved June 4, 2018, from https://www.elaw.org/system/files/philippines.caa.pdf.
- Abaya, P. (2000, November 7). *IMPLEMENTING RULES AND REGULATIONS FOR RA 8749*. Retrieved June 4, 2018, from http://policy.denr.gov.ph/2000/ENV_DAO_2000-81.pdf.
- Collins. (2018). *Definition of 'air quality'*. Retrieved June 4, 2018, from https://www.collinsdictionary.com/dictionary/english/air-quality.
- Conserve Energy Future. (2018). *What is Air Quality?*. Retrieved June 4, 2018, from https://www.conserve-energy-future.com/what-is-air-quality.php.
- World Health Organization. (2018, May 2). *9 out of 10 people worldwide breathe polluted air, but more countries are taking action*. Retrieved June 4, 2018, from http://www.who.int/news-room/detail/02-05-2018-9-out-of-10-people-worldwide-breathe-polluted-air-but-more-countries-are-taking-action.

REFERENCES

- Enviroequipmentinc.wordpress.com. (2015, March 13). *U.S. BRINGING ITS FOREIGN AIR QUALITY MONITORING TO INDIA, VIETNAM & MONGOLIA*. Retrieved June 4, 2018, from https://enviroequipmentinc.wordpress.com/2015/03/13/u-s-bringing-its-foreign-air-quality-monitoring-to-india-vietnam-mongolia/.
- Unfccc.int. (2018). *KP Introduction*. Retrieved June 4, 2018 from https://unfccc.int/process/the-kyoto-protocol.
- Unfccc.int. (2018). *The Paris Agreement*. Retrieved June 4, 2018 from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.
- Chen, H. (2017, March 17). *Philippines Joins the Paris Agreement on Climate Change*. NRDC. Retrieved June 4, 2018, from https://www.nrdc.org/experts/han-chen/philippines-joins-paris-agreement-climate-change.
- La Viña, A., Reyes, M. and Labaria, E. (2017, March 26). *The Philippines, Climate Change, and the Paris Agreement*. Retrieved June 4, 2018, from https://newsbits.mb.com.ph/2017/03/26/the-philippines-climate-change-and-the-paris-agreement/.
- La Viña, A., Reyes, M. and Labaria, E. (2017, March 26). *The Philippines, Climate Change, and the Paris Agreement*. Retrieved June 4, 2018, from http://faspselib.denr.gov.ph/sites/default/files//170326_Mla%20Bull_The%20Philippines%2C%20Climate%20Change%2C%20and%20the%20Paris%20Agreement_1.pdf.
- Air.emb.gov.ph. (2018). *Laws and Policies for Air Quality Management*. Retrieved June 4, 2018, from https://air.emb.gov.ph/?page_id=27.
- Emb.gov.ph. (2018). *About the PCEEP*. Retrieved June 4, 2018, from https://emb.gov.ph/about-the-pceep/.
- Denr.gov.ph. (2017). *Philippine Chillers Energy Efficiency Project (PCEEP)*. Retrieved June 4, 2018, from http://faspselib.denr.gov.ph/taxonomy/term/33.
- BusinessDictionary. (2018). *chlorofluorocarbon (CFC)*. Retrieved June 4, 2018, from http://www.businessdictionary.com/definition/chlorofluorocarbon-CFC.html.

REFERENCES

- Air.emb.gov.ph. (2014, November 19). *DENR-EMB Launches the Anti-Smoke Belching Night Operation*. Retrieved June 4, 2018, from https://air.emb.gov.ph/?p=94.
- Doe.gov.ph. (2017, December 8). *Over 170 Companies and Individuals Win Energy Efficiency Awards | DOE | Department of Energy Portal*. Retrieved June 4, 2018, from https://www.doe.gov.ph/press-releases/over-170-companies-and-individuals-win-energy-efficiency-awards.
- Bwc.dole.gov.ph (2017). *Labor Code of the Philippines*. Retrieved June 4, 2018, from http://bwc.dole.gov.ph/images/Downloads/LaborCodeofthePhilippines2017.pdf.
- Deped.gov.ph. (2011, July 5). *DO 52, s. 2011 - Strengthening Environmental Education in Public and Private Schools*. Retrieved June 4, 2018, from http://webcache.googleusercontent.com/search?q=cache:http://www.deped.gov.ph/orders/do-52-s-2011&num=1&strip=1&vwsrc=0.
- Lyles Construction Group. (2011, April). *800 Ton Chiller Replacement at Central Plant*. Retrieved June 4, 2018, from http://www.lylesgroup.com/blog/800-ton-chiller-replacement-at-central-plant/.
- Smith, B. (2016). *Clean Technology Needed to Make Your City 100% Renewable*. Retrieved June 4, 2018, from https://www.azocleantech.com/article.aspx?ArticleID=618.
- Stonehill College. (2018). *H.O.P. E. Service Immersion Program*. Retrieved June 4, 2018, from https://www.stonehill.edu/offices-services/campus-ministry/hope/.
- Baldwala, J. and Mehrotra S. (2015, May 20). *Parenting Through the Tough Times*. Retrieved June 4, 2018, from https://theswaddle.com/parenting-during-divorce/.

REFERENCES

- EPA. (2018, June 1). *Greenhouse Gas Equivalence Calculator*. Retrieved June 4, 2018, from https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
- Robinsons Land Corporation. (2018). *Businesses*. Retrieved June 5, 2018, from http://www.robinsonsland.com/businesses/
- Baja, E. (2018). *Indoor Air Quality, Airbone Infection, and Ventilation: Exposure Assessment of Hospital Pay and Charity Wards of the Philippine General Hospital*. Retrieved June 5, 2018, from http://hsrm.doh.gov.ph/researches/view/23
- Urban Planters. (2017). *How To Improve Air Quality With Plants*. Retrieved June 5, 2018, from http://www.urbanplanters.co.uk/wp-content/uploads/2017/07/How-To-Improve-Air-Quality-with-Plants-The-Value-of-Plants-1.pdf

THANK YOU!!
MARAMING SALAMAT!!