

EUROPA AWARDS FOR SUSTAINABILITY EUMCCI 2019

Revamping of an existing Mini Incinerator in Pangkor Island, Malaysia

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(Now in the process of changing to Alamflora Environmental Services (AFES))

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DRB-HICOM Environmental Services

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INTRODUCTION

- ▶ Island and highland resorts has limited space/land for landfill disposal of MSW
- ▶ Incinerators provide some solution
- ▶ In 2010, a turnkey contract awarded to a local company to build and operate 4 incinerators (10-100 tpd Rotary Kilns) to dispose MSW.
- ▶ In 2014/15, the contract for the O&M for the plants were terminated due to premature failures (low availability, high emissions).
- ▶ in 2017, the government budget was constrained, tendered the project through PFI approach.
- ▶ **DRB HICOM Environment Services (DHES) won the contract to revamp two plants Pangkor Island (20 tpd) and Operates for 6 years**
- ▶ The design work begins only in January 2018.

Part 1: Addressing The Incinerator Revamping



DESIGN TARGETS

2 MAJOR TARGETS for PLANT IMPROVEMENT TO ENSURE GOOD WASTE MANAGEMENT:

- ▶ **Higher Plant Availability and Economical to Operate**
 - ▶ **Baseline plant availability** was about **50%**
 - ▶ **Reduce diesel consumption** (No baseline data for Pangkor, Langkawi RM35/ton MSW)
- ▶ **Achieving Better Combustion or Emission**
 - ▶ **CO: New Regulation From 125 mg/Nm³ down to 50 mg/Nm³**
 - ▶ **Dioxin and Furan: Existing Plant dioxin emission dwindled, above regulatory limit of 0.1 ng/Nm³**
 - ▶ **Bottom Ash: Better than existing 25% Lol**
 - ▶ **Zero liquid leachate discharge**



Incineration section



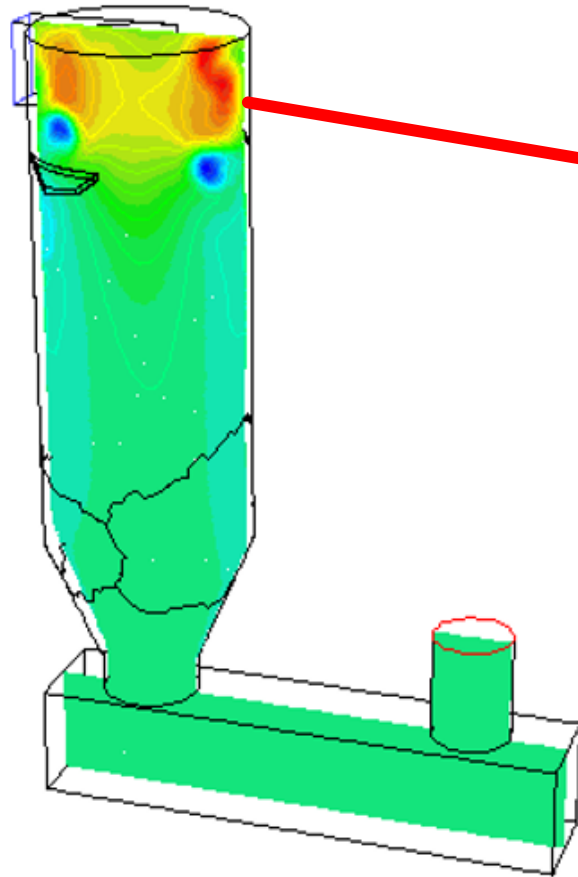
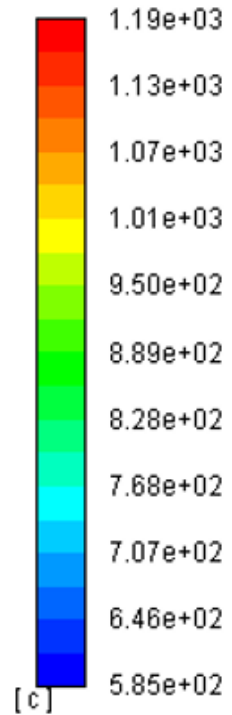
Bag filter



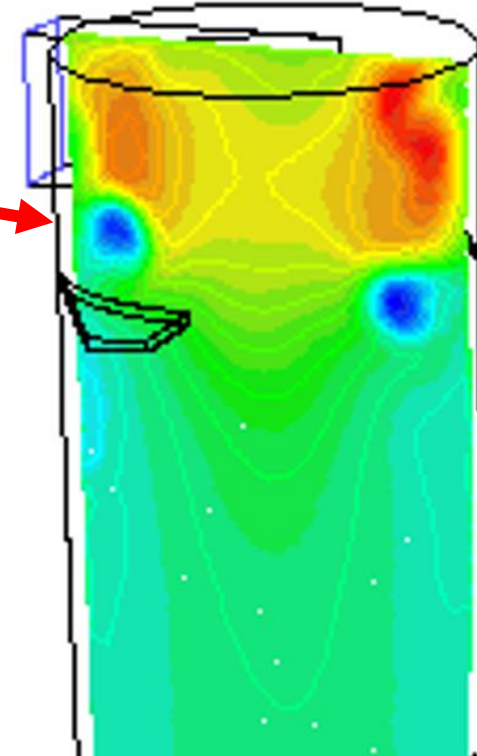
Structure done, bag house done

Dismantling the bridging of RK I line A

contour-1
Static Temperature



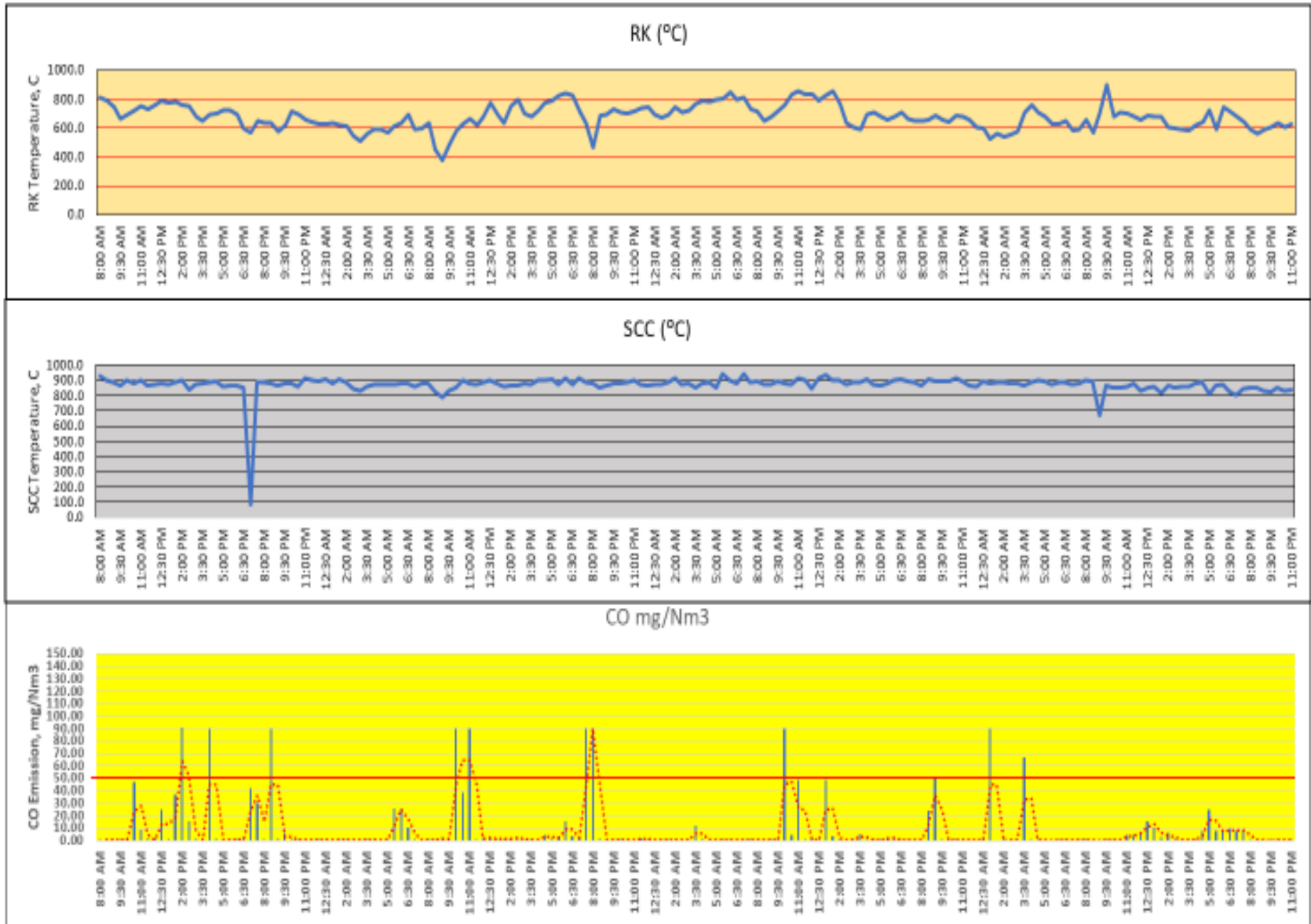
Using
Computer
Simulation,
CFD, to help
design good
SCC



TEMPERATURE PROFILE OF SCC WITH FG INLET 800 C

Typical Plant Performance

(Normal Average CO emission 9.0 mg/Nm³, Red Dots showing a moving average)



Visual Bottom Ash Quality

(Lol about 1% vs Baseline >20%)



Plant Performance Achievement Summary

Parameters	Baseline/Regulation	Achievement
Plant Availability	50%	>85%
Diesel consumption	RM35/ton MSW	RM30/ton MSW
Carbon Monoxide	125 mg/Nm ³ as per EIA2008 Approval (New Limit 50 mg/Nm ³)	Average 9-20 mg/Nm ³
Dioxin	0.1 ng/Nm ³	0.036
Bottom Ash (Loss of Ignition)	25%	1%
Leachate (liquid)	Discharge 2m ³ /day to Std B	Zero discharge

PART 2: ADDRESSING SUSTAINABILITY

What environmental issue(s) does the project address

Sustainable Solid Waste Management

- Air pollution
- Water pollution
- Land management/pollution
- Greenhouse gas emissions (Indirectly if we succeeded in revamping the incinerator)

Positive Impact of the Project

- The plant now in stable operation, higher availability with reduced diesel consumption compared to baseline.
- **Newly Upgraded Systems Resulting in Good Emission to Air, Water and Land**
 - Good for the Environment
- **New Instrumentation and Controls (I&C) including CEMS –**
 - Better monitoring and control of the plant,
 - Meeting Malaysian Clean Air Regulation 2014.

Does your initiatives fall under the Sustainable Development Goals?

Pangkor economy very much depends on fishing and tourism industry. Therefore:

- **Maintaining/ sustaining the island resources is very critical** (SDG6, SDG 14, SDG 15)
- **Good solid waste management** is a prerequisite for sustainable society (SDG6, SDG 11, SDG 14, SDG15)
- **Emissions** from the incinerator **complied to the regulations** safe for the environment (Note: **Zero leachate emission** is a novel achievement) (SDG 13, 14, 15)

What is the rationale of targeting these areas of work?

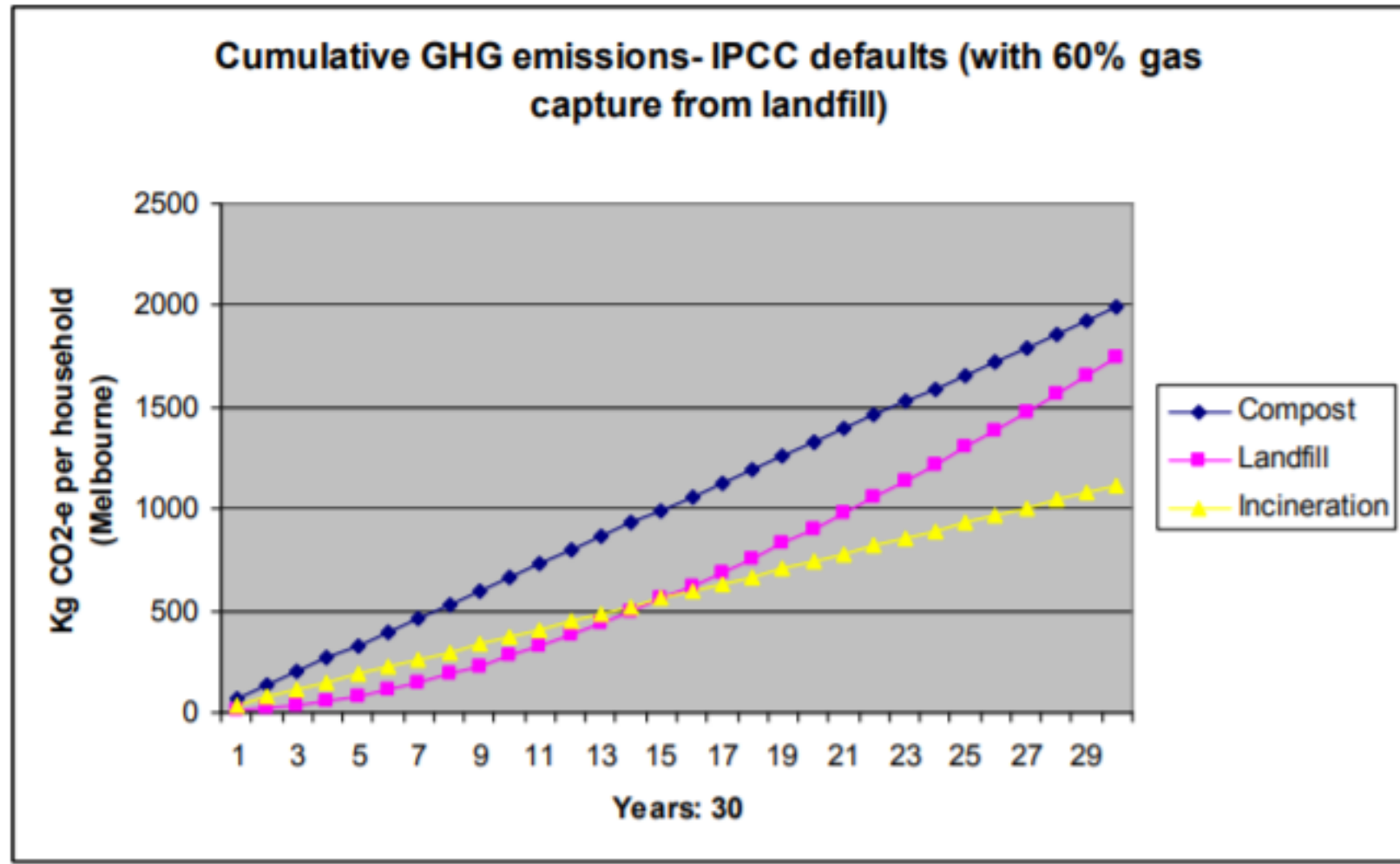
- **Proper management of limited island resources (e.g. Land is scarce)**
- **Activities within the island shall bring back benefits to its communities**
- **Good Solid Waste Management is essential to tourism industry.**
- **With the growth of its fishing and tourism industries, more solid waste generated and need to be professionally managed.**

Conclusion

- ▶ The Pangkor Incinerator Was Successfully Upgraded with **High Plant Operational Availability** and **Meeting Latest DoE Emission Standards**
- ▶ Pangkor is now **fully equipped with good and functioning** solid waste management **infrastructure from collection to disposal (incinerator)**
- ▶ The Project **Contributed to SDG Goals Directly or Indirectly**

Thank You

GHG Emission: Incineration vs Landfill (Baseline)



Waste management options to control greenhouse gas emissions – Landfill, compost or incineration?

Paper for the ISWA Conference, Portugal, October 2009

by Barbara Hutton, Research student, Master of Sustainable Practice, RMIT University, Ed Horan, Program Director, Master of Sustainable Practice, RMIT University, Melbourne and Mark Norrish, Mathematics, Australian National University, Canberra (Australia)

Pangkor Incinerator PFD

