

IAQ QUALITY SUSTAINABILITY AWARD 2021 - ONE-PAGE SUMMARY

Project and contact details

The name of the quality sustainability project (max. 100 characters)

3-in-1 Low Carbon Technology Project: TRIGEN

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Organisation(s), country, where the project-members are working, including Web-page links

Mahindra & Mahindra Ltd, Automotive Division, Mumbai, Maharashtra India

Project description

Mahindra Automotive sector, Kandivli plant manufacturing Pick up Vehicles having 1 Lac capacity per Year has inhouse facility of Aggregate, Paint and Vehicle Assy in same premises. Plant uses about 60MU of Electricity, 36Tons of LPG and 3Million SCM of PNG as energy per annum. Electricity with share of 73% is used for driving equipment, Heating/ cooling application. This is a major contributor for the Scope 2 emission

Problem Statement- With Uncertainty of Green Energy generation like Solar and Wind, need to embrace 24x7 Low Carbon reliable technology with Quantum Carbon benefit in pursuit of SBTi and Carbon Neutrality by 2040

Analysis Performed- 1. Various forms of Energy used in Plant 2. Carbon associated with each of commodity 3. Scanning of environment if any low carbon technology available, 4. Validation of TRIGEN project- Applicability to Mahindra like Cooling, Heating and Electricity Generation, technical and commercial feasibility study.

Solution: Breakthrough project using 3-in-1 technology "TRIGEN". As the name suggests, it has got 3 elements, Gas based Engine with Alternator to generate electricity, VAM to run on Flue gases to chill water which is used for Space cooling through AHUs and Heating of the water using Engine Jacket cooling water. Since PNG has got a Low Carbon footprint, there is a big scope available for mitigation.

Project Execution Start- December 28, 2019 Project Execution End – December 18, 2020

Quality Methods used

1. Flow chart for Decision making considering prevalent condition
2. M FMEA- Need to consider the system completely rather than only the equipment used in TRIGEN. This helped in improving site condition and infrastructure for reliable performance
3. Run chart for monitoring and establishing the performance parameters
4. SPC for all parameters of critical processes.
5. FMEA for all processes linked to TRIGEN.

Results

Project linked to UN SDG 7- Clean and affordable energy

PNG has a low carbon footprint as compared to Electricity and hence is a better option. However a Gas based Engine for producing Electricity solely will have efficiency of only 41%, but, by harnessing the other by-products like flue gases to run VAM to produce Chilling effect and using Engine jacket cooling water to heat water, the efficiency of system increases to 85% to give a significant Carbon mitigation. Moreover, unlike Renewable energy like Solar and Wind, TRIGEN gives reliable performance 24x7.

Accrued Benefits:

- Generation of 54 Lac KWh / Annum used towards plant operations and offsetting of 22 Lac KWh/Annum through use of waste heat used for heating and cooling applications.
- Carbon Mitigation of 2000Tons per annum with 8000Hrs running, = 0.250 Tons/Hr

Project leverage potential

This Project can be replicated and viable in any industry and has a wide scope where heating and cooling requirements exists. E.g. Auto industry, Process industries etc.

Picture/Image describing the project

