

IAQ QUALITY SUSTAINABILITY AWARD - ONE-PAGE SUMMARY

The One-Page Summary should be in English and submitted as Appendix 1 to your Application. It will also be published on the IAQ Quality Sustainability Award Homepage; <http://iaqaward.com>. The length of this document must not exceed 1 page.

Project and contact details		
The name of the quality sustainability project (max. 100 characters) <u>IoT enabled, digitally integrated air conservation using predictive analytics</u>		
Contact Person Darshan.desai@ceat.com	Telephone +91 9879566113	Email Darshan.desai@ceat.com
Organisation(s), country, where the project-members are working, including Web-page links CEAT Ltd, Halol Plant, India		

Explain the essence of the project, the problem statement, the analysis performed, steps taken, and methodology used.

Sustainability vision for CEAT Limited was released in the year 2021 stating “50% Carbon footprint reduction by 2030”. Scope covers entire for entire product lifecycle stages (cradle to grave). This includes significant areas of Design & product development, RM Supply & product distribution and Manufacturing operations..

CO2 reduction from manufacturing operations empathises major focus in below categories

- Increase use of renewable energy sources
- Reduce Energy Consumption

Green power usage at CEAT Halol plant is increased from 0% to 36% in last 3 Years. Similarly, green fuel usage capability at our Boiler is established by incorporating necessary upgradation in boiler furnace and ESP system. Now, Boiler can handle biofuel as well.

Towards Energy Consumption reduction, we had taken up multiple projects on specific power consumption reduction. We are showcasing specific air consumption reduction project on specific power consumption reduction.

Multiple PDCA chart is demonstrated with long term trend to demonstrate improvement in specific energy consumption over years.

Below is brief project description.
Plant air compressors consumes 37% of total utility power; amounting to 29000 kwh/day. High carbon footprint and high energy cost are primary driver to take up project.

0.097 kwh/kg compressed air power consumption, equivalent to

- **12.55 Million KWH** of power consumption
- **10617 TCO2** emission
- **95.4 Million INR** Energy bill

Plant network is very complex as it consists of 3 varieties of air. In addition, 8 km long network with 300 connected machines and 1 lac plus flexible joints makes plant highly vulnerable. It was real challenge to identify fix losses and leakages from this network.

Key improvement initiatives are briefly described below

- **Intelligent flow Control** – Pressure drop between generation and user points compared and identified upto 1.2 kg/cm² during cyclic consumption. Besides air reservoirs, IFC installed to act at reservoir helping in minimising loading/unloading at compressor end and reduced pressure drop.
- **Network simplification** – P&ID validated and bottleneck areas identified. Network simplified ensure basic hygiene in air network.
- **Ring main** – Dead ends observed in air network creating air quality issue and increase in drain frequency, ring mains created to tackle this issue
- **Thermal Imager** – This instrument helped us in identified leakages from distance accurately with minimum efforts.

- **Connected flow meter** – 9 flow meters installed at 9 stream to identify area wise consumption trend. Further all flow meters connected with SCADA and integrated with MES Server.
- **Digital Application** – Mobile app developed to upload all leakages for effective identification, stratification, analysis with corrective and preventive actions
- **Digital Dashboard** -Trend and stratification, Heat map, Predictive tools and alarms were developed to track performance on real-time basis for continuous air system monitoring.

Total cost involved for completing all these activities were around INR 2.8 million.

RESULTS AND EFFECTS ACHIEVED;

Significant improvement and results achieved, to describe major few

- **29% reduction** in Air specific consumption reduced from 0.097 to 0.069 kwh/kg
- **2935 TCO2** reduction annually
- **36.2 million kwh** power saving
- **275.32 million INR** Saving in energy bill
- **3 Million INR Capex** on additional compressor avoided with plant expansion

Project leverage potential

Compressed air is generally used in most of industrial application. Typically , it is costliest energy source as effective efficiency is less than 20%.

With digital tool application and simple basic engineering principles towards hygiene improvement, most of the industries can be benefited.

Picture/Image describing the project

Stratification and Trend



Heat Map - Equipment & Assembly Wise



Predictive Tool and Alarm

Area/Phase	Parameter/Value	Alert Status	Alert Level
1000 Leaking & Substation - Phase 1	1.112.84	Alert Not Required	17.17%
1000 Leaking - Phase 1	96.2	Alert Not Required	96.2
Stock - Phase 2	96.2	Alert Not Required	3.29%
1000 Leaking - Phase 1	4.902.11	Alert Check to be Done	40.49%
1000 Leaking - Phase 1	26.982.26	Alert Check to be Done	99.99%
1000 Leaking & Substation - Phase 2	1.472.81	Alert Check to be Done	43.07%
1000 Leaking - Phase 1	96.2	Alert Not Required	96.2
1000 Leaking - Phase 1	4.902.11	Alert Not Required	99.97%
Filter - Phase 1	3.092.41	Alert Not Required	34.42%
Filter - Phase 2	1.772.84	Alert Not Required	14.17%
Filter - Phase 1	3.172.83	Alert Not Required	29.9%

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