Impact Assessment of a CSR Project

for

'Setting up of Pressure Swing Adsorption (PSA) Oxygen Plants at Seven Government Hospitals in Karnataka'

A CSR Initiative - Funded by Engineers India Limited



FINAL REPORT

Submitted by



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March 2024

Acknowledgement

GPCL team expresses its sincere thanks and gratitude to the officials of Engineers India Limited (EIL) and the seven Government Hospitals in Karnataka for sharing data and information for preparation of this report.

For GPCL Consulting Services Limited



ABBREVIATIONS

Covid-19	Corona Virus Disease 2019
CSR	Corporate Social Responsibility
EIL	Engineers India Limited
GPCL	GPCL Consulting Services Limited
IRECS	Impact, Relevance, Efficiency, Convergence and Sustainability
PSA	Pressure Swing Adsorption

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EXECUTIVE SUMMARY

The "PSA Oxygen Plants Project" embarked upon by Engineers India Limited aimed to revolutionize healthcare accessibility and patient care across seven government hospitals in Karnataka. This executive summary encapsulates the comprehensive impact assessment to evaluate the project's effectiveness, relevance, efficiency and sustainability.

Reacting promptly to Government of India's clarion call for increasing oxygen availability in hospitals to fight the deadly Covid pandemic, Engineers India Limited took up the mantel to install PSA Oxygen plants across 7 Government Hospitals in Karnataka.

This initiative was undertaken to substantially boost the availability of oxygen in these government hospitals within a very short span of time, so that maximum nos. of lives may be saved. The approach towards implementation of this project was different from other CSR projects, as it entailed emergency measures to combat the unprecedented situation gripping the nation.

Ministry of Health and Family Welfare and Ministry of Petroleum & Natural Gas of oil PSUs played the pivotal role of assigning respective states and number of hospitals depending upon the need of oxygen plants in those locations. EIL was assigned the task of installation of 9 nos. 500 LPM Pressure Swing Adsorption (PSA) Oxygen plants across 7 nos. Government Hospitals in Karnataka.

Engineers India Limited took the challenge in its stride and funded the project fully on its own, that too at a very fast pace, to meet the emergency situation prevailing then. The success of the initiative, highlighted EIL's role in assisting hospitals during the critical emergency situation of Covid -19 pandemic and its commitment towards boosting the country's healthcare infrastructure in line with national priorities.

The pandemic situation was one-of- its-kind faced by the human race in recent times and this project was undertaken when the Covid second wave was going on. This impact assessment report has evaluated the project's effectiveness, relevance, efficiency and sustainability taking into consideration the challenging times when it was implemented.

The initiative involved installation of 500 LPM Pressure Swing Adsorption (PSA) Oxygen Plants in government hospitals, including General Hospitals in Doddaballapura, Yelahanka, Nelamangala and Devanahalli, as well as District Hospitals in Chikkaballapura, Ramanagara and Jhamakhandi.

Key Findings:

1. **Inclusiveness and Relevance:** The project impeccably aligned with the healthcare needs of the project areas, focusing on providing critical oxygen support to diverse patient demographics. This project was implemented during the Covid-19 pandemic and proved to be of great assistance during the second wave of the pandemic.

- 2. Efficiency: Despite encountering operational challenges in some locations, the overall project outputs met the outlined plan. The implementation schedule closely adhered to the plan, and the project's financial management remained within the set limits.
- 3. Effectiveness and Uniqueness: The PSA Oxygen Plants effectively contributed to patient care, especially for tracheotomy patients, showcasing the project's unique ability to address critical medical requirements.
- 4. **Impact:** Tangible and intangible positive impacts were observed, including improved patient recovery rates, heightened community awareness and enhanced emergency preparedness within the healthcare facilities.
- 5. **Sustainability:** While the impact created by the project was notable, certain modifications in project execution methodologies are recommended to ensure sustained benefits. Key considerations include ongoing training, community outreach and telemedicine integration.

Recommendations:

- 1. Hospitals to explore the feasibility of deploying mobile oxygen units connected to PSA Oxygen Plants for emergency support in remote or underserved regions.
- 2. Hospitals to implement periodic training for hospital staff and technicians on emergency response, troubleshooting and quality control standards for PSA Oxygen Plant operation.
- 3. Hospitals to implement a system for ongoing quality monitoring of oxygen supply through regular internal and external audits, ensuring adherence to purity standards.

Conclusion:

The progress achieved by the PSA Oxygen Plants Project has been noteworthy in revolutionizing healthcare delivery, addressing significant challenges, and positively impacting communities. Adopting the suggested improvements will strengthen the project's reputation as a symbol of accessible and high-quality healthcare.

The Project emphasizes EIL's exemplary role in assisting hospitals during the critical emergency situation of the Covid-19 pandemic and highlights EIL's commitment to supporting healthcare infrastructure during challenging times. Setting up of the project at the fastest speed to meet the emergency situation during challenging pandemic period is noteworthy.

The Project adheres to the United Nations Sustainable Development Goal (SDG) 3: Good Health and Well Being.

INTRODUCTION

ABOUT EIL

Engineers India Limited (EIL) was established in 1965 to provide engineering and related technical services for petroleum refineries and associated projects. EIL is an ISO 9001:2015 certified company, a public-sector undertaking under Ministry of Petroleum and Natural Gas, Government of India. In the course of time, it has enlarged its span of services and excelled in various fields to emerge as a leading Project, Design, Engineering and Turnkey (LSTK) contracting company in various fields such as Petroleum Refining, Petrochemicals, Chemicals & fertilizers, Crude, Petroleum products & Gas Pipelines, Offshore/ Onshore Oil & Gas, Terminals & Storage, Sub Surface Strategic Storage, Mining & Metallurgy, and Infrastructure & Urban development¹.

EIL is committed for operating its core business as a socially responsible corporate, by taking into consideration the wider interests of the community². EIL's vision for Corporate Social Responsibility (CSR) is to enrich the lives of people through the process of social upliftment, by promoting inclusive growth and recharge the environment through sustainable process.

EIL has provided their support and financial assistance to Seven (7) Government Hospitals in Karnataka at Yelankaha, Devanahalli, Doddaballapura, Nelamangala, Jhamankhandi, Ramanagara and Chikkaballapura for setting up of 9 nos. of 500 LPM (i.e. Procurement including associated work and site work) Pressure Swing Adsorption (PSA) Oxygen Plants during the second wave of the Covid-19 pandemic.

ABOUT GPCL

GPCL Consulting Services Limited (GPCL), formerly known as Global Procurement Consultants Limited, Mumbai, is a unique public private partnership model promoted by Export-Import Bank of India (India Exim Bank) in association with Public Sector organizations viz. WAPCOS Ltd., RITES Ltd., MECON Ltd. and AFC Ltd. and Private Sector firms such as RPG Group, Tata Consulting Engineers Ltd., ION Exchange Ltd., etc.

GPCL is a consulting firm specializing in provision of quality services in the procurement, technical and financial services domains including training and capacity building. GPCL has successfully delivered several consulting assignments related to monitoring & evaluation and socio-economic impact assessment of CSR projects covering diverse sectors for various governments / public sector undertaking organizations.

¹ https://mopng.gov.in/en/refining/engineers-india-limited

² https://engineersindia.com/sustainability/corporate-social-responsibility

GPCL was selected by EIL through competitive process on Government e-Marketplace (GeM) on 1st August 2023 to provide services as Consultant for Conducting Impact Assessment of a CSR Project for EIL for Setting up of Pressure Swing Adsorption (PSA) Oxygen Plants at 7 Government Hospitals in Karnataka.

ABOUT THE PROJECT

Reacting promptly to Government of India's clarion call for increasing oxygen availability in hospitals to fight the deadly Covid pandemic, Engineers India Limited took up the mantel to install PSA Oxygen plants across 7 Government Hospitals in Karnataka.

This initiative was undertaken to substantially boost the availability of oxygen in these government hospitals within a very short span of time, so that maximum nos. of lives may be saved. The approach towards implementation of this project was different from other CSR projects, as it entailed emergency measures to combat the unprecedented situation gripping the nation.

Ministry of Health and Family Welfare and Ministry of Petroleum & Natural Gas of oil PSUs played the pivotal role of assigning respective states and number of hospitals depending upon the need of oxygen plants in those locations. EIL was assigned the task of installation of 9 nos. 500 LPM Pressure Swing Adsorption (PSA) Oxygen plants across 7 nos. Government Hospitals in Karnataka.

Engineers India Limited took the challenge in its stride and funded the project fully on its own, that too at a very fast pace, to meet the emergency situation prevailing then. The success of the initiative, highlighted EIL's role in assisting hospitals during the critical emergency situation of Covid -19 pandemic and its commitment towards boosting the country's healthcare infrastructure in line with national priorities.

The pandemic situation was one-of- its-kind faced by the human race in recent times and this project was undertaken when the Covid second wave was going on. This impact assessment report has evaluated the project's effectiveness, relevance, efficiency and sustainability taking into consideration the challenging times when it was implemented.

The project encompasses the establishment of nine Pressure Swing Adsorption (PSA) Oxygen Plants, with M/s Megha Engineering & Infrastructure Ltd. entrusted with the comprehensive responsibilities of design, engineering, procurement, fabrication, testing, commissioning, training and demonstration utilizing DRDO's PSA technique and molecular sieve technology. Nine units of 500 LPM each, inclusive of procurement, associated work, and on-site installation, were successfully installed in seven Government Hospitals across Karnataka,

located at Yelahanka, Devanahalli, Doddaballapura, Nelamangala, Jhamakhandi, Ramanagara, and Chikkaballapura.

Amid the challenging circumstances of the Covid-19 pandemic, there was a crucial need to enhance healthcare infrastructure. During the second wave of the pandemic, EIL played a pivotal role in providing support. This impact assessment study aims to evaluate the outcomes and resources invested by EIL in the healthcare sector in Karnataka. This includes a specific focus on the requirements and contributions made during the Covid-19 crisis. The study's objectives involve assessing the reach and impact on beneficiaries' lives, developing assessment tools, collecting and analyzing both qualitative and quantitative data, and offering conclusions and recommendations for EIL's future healthcare initiatives in Karnataka as also elsewhere in India.

Scope of Impact Assessment

a. To undertake an assessment of the project in terms of its relevance, thrust area and contribution to the development of the community and beneficiaries;

b. To gauge the relevance and effectiveness of the project strategy and approaches for achievement of the project objectives;

c. To assess the performance of the project in terms of effectiveness, efficiency and timeliness of the expected outputs.

d. To assess the impacts of the project activities on communities and beneficiaries (on environment wherever applicable); and

e. To ascertain the sustainability of the project after its completion.

METHODOLOGY

Approach Stage 1: Inception Planning

Step 1: Preliminary Communication and Document Collection

Discuss with EIL to understand project details and objectives. Collect and analyze relevant project documents, then develop assessment tools and define target audiences for the Impact Assessment Study.

Step 2: Framework and Work Plan Development

Create a study framework, evaluation criteria and indicators. Develop a work plan with timelines, tasks and responsibilities. Sample target audiences for representative data collection.

Step 3: Implementation Plan Report Submission and Approval

Create and submit an Implementation Plan Report that includes the framework, work plan and data collection methods. Ensure the report is approved by EIL and meets their expectations.

Stage 2: Survey & Data Collection

Step 1: Field Visits and Data Collection

Visit project sites to collect survey data, engage with stakeholders and beneficiaries, and verify assets at government hospitals.

Data Collection Sample Sizes and Estimated Time:

Data Collection Activity	Sample Size	Coverage Plan	Team Composition
Individual	30	Discharged patients	3 Field Level Investigators (10 patients
Interview		from ICU in the last	from each hospital) - Team Leader cum
		three months	Project Manager - M&E Specialist
Key Informant Interview	9	Staff Nurses	M&E Specialist - Field Investigators
Case Studies	2-3	At least 2-3 among 7 hospitals	Team Leader cum Project Manager - M&E Specialist

Step 2: Data Analysis

In this crucial stage, we delve into a comprehensive analysis of both quantitative and qualitative data collected during the Impact Assessment Study. We aim to extract meaningful insights, identify patterns, trends and correlations, and ultimately evaluate the project's impact.

Stage 3: Impact Assessment Report

Step 1: Draft Report Preparation

Following meticulous data analysis, we craft the initial Impact Assessment report. This document will illuminate key findings outcomes, and lessons from the field visits. The analysis of collected data will be presented, offering a clear narrative of the project's impact. Recommendations, grounded in the assessment results, will be outlined to guide future actions.

Step 2: Final Report Submission

The final phase involves synthesizing the Client's feedback into the Impact Assessment report. This comprehensive document encapsulates exhaustive findings, robust conclusions, and actionable recommendations.



Sources of Data Collection

Data was collected from primary and secondary sources of data.



Methods and Tools of Data Collection

The selection of appropriate methods and tools is paramount, shaping the foundation upon which meaningful insights are built. From preliminary communications with stakeholders to fine-tuning assessment tools, every step in the process contributes to the richness and depth of the gathered information. The toolbox of methodologies, ranging from individual interviews to case studies, is carefully selected to create a holistic view that captures both quantitative metrics and qualitative narratives.

METHODS	TOOLS
Discharged Patients Interviews	Semi-structured interview schedule
Staff Nurses Interviews	Semi-structured interview schedule
Document Review	Guidelines for document review
Observation	Observational guidelines

Sampling

The research consisted of conducting 30 interviews with discharged patients and 9 interviews with staff nurses from the seven hospitals. Meetings and discussions were held with important sources at all the hospitals. Although random sampling was intended, the interviews were primarily based on respondent availability. Ethical considerations were taken into account, and necessary measures were implemented to ensure adherence to the interview protocol which included maintaining animosity and making the interviewees aware of the right to exit from the interview whenever they wished to withdraw.

Physical Verification of Assets

The GPCL's M&E expert visited all seven hospitals and physically verified the assets procured under the CSR initiative of EIL. This also included review of the procurement documents at each hospital and physical verification of the oxygen plant/s. Physical verification sheets are attached as Annexure to the report.

FINDINGS & IMPACT EVALUATION

In this section, we delve into the comprehensive analysis of the patient survey data collected from various hospitals, focusing on the impact of PSA Oxygen Plants on healthcare experiences. The data was gathered through interviews with diverse individuals across different age groups and medical conditions, providing a rich tapestry of perspectives. This range spans from the youngest respondent, aged 19, to the eldest, aged 90.

Sampling Overview:

Our sampling strategy aimed for diversity, covering patients from GH Doddaballapura, GH Nelamangala and GH Yelahanka. The chosen samples included individuals of varying ages, genders and medical conditions. This diversity ensures a holistic understanding of the impact of PSA Oxygen Plants.

Interviews with discharged patients

Quantitative Insights:

1. **Satisfaction with Medical Care:** The majority expressed satisfaction, with "Very Satisfied" being a common sentiment. This reflects positively on the overall healthcare services provided, particularly during second wave of Covid-19 pandemic.



- 2. **Duration of Treatment:** The length of treatment varied, ranging from a day to two months. This diversity is crucial in understanding the varied experiences of patients.
- 3. Awareness of Oxygen Plants: Almost all respondents were aware of the PSA Oxygen Plants, and a significant number knew about it before their hospital admission.



- 4. **Disease/Illness Profile:** Predominantly, patients were admitted for post-delivery care and orthopaedic conditions. This diversity adds depth to our analysis.
- 5. **Impact during Covid-**19 second wave: It is important to note that the oxygen plants were essential for the care of patients with requirement for oxygen during the second wave of the Covid-19 pandemic,

Qualitative Insights:

- 1. Awareness Source: The sources of awareness varied, including relatives, friends and hospital staff. This diverse range suggests effective communication channels.
- 2. **Perception of Oxygen Quality:** Most respondents found the oxygen quality to be "Very Good" or "Excellent," emphasizing the positive impact of the PSA Oxygen Plants.



3. **Impact on Perception of Healthcare:** A recurring theme was the belief that the availability of PSA Oxygen Plants enhanced the hospital's healthcare services. Patients highlighted the accessibility and cost-free nature of oxygen as significant contributors to this positive perception.



- 4. **Recovery Process:** A unanimous agreement among respondents was that PSA Oxygen Plants positively influenced their recovery. This was evident across various medical conditions, from post-delivery pains to orthopaedic surgeries.
- 5. **Challenges Faced:** Respondents reported no challenges or concerns related to oxygen supply during their treatment. This indicates a seamless integration of PSA Oxygen Plants into the healthcare system.

Interviews with staff nurses

1. **PSA Oxygen Plant Functionality:**

- All respondents confirmed that the PSA Oxygen Plant has been functional during the second wave of Covid-19 pandemic.
- The plant is utilized for emergency patients and ICU patients. This includes the second wave of Covid-19 pandemic.

2. Familiarity with PSA Oxygen Plants:

• All respondents are familiar with the PSA Oxygen Plants, with varying degrees of familiarity.

3. Impact on Patient Care:

• All respondents agree that the PSA Oxygen Plants have positively impacted patient care, especially in emergencies and for ICU patients.

4. Changes in Oxygen Supply:

- Most respondents responded positively regarding reliable supply of oxygen during the second wave of the Covid-19 pandemic.
- Some respondents suggested improvements like maintenance, soundproofing and the addition of a generator that need to be provided by the hospitals.

5. Challenges and Difficulties:

• No reported challenges or difficulties in utilizing the PSA Oxygen Plants.

6. Staff Training:

• PSA Plant Technicians are trained to maintain the plants.

7. Efficiency and Usefulness:

- All respondents believe that the PSA Oxygen Plants have improved the overall efficiency of healthcare services.
- The services are considered useful for emergency, ICU, labor and OT patients.

8. Suggestions for Improvement:

• Some respondents suggested improvements like AMC, soundproofing and additional staff for maintenance.

The overall feedback appears positive, with a few suggestions for improvements. The hospital staff recognizes the benefits of the PSA Oxygen Plants in providing free and timely oxygen to patients in need. The suggestions provided could be considered for enhancing the functionality and maintenance of the PSA Oxygen Plants.

Document Review and Observation

Table 1: Hospital Details

Name of Hospital	Type of Hospital	Bed Capacity	Head	Date of Installation of PSA Oxygen Unit	Impact Assessment Team Visit Dates
District Hospital, Chikkaballapura	District	300 beds	Dr. Manjula Devi	19.08.2021	22.09.2023, 09.10.2023
New District Hospital, Ramanagara	District (New)	300 beds	Dr. Padma G. L	18.08.2021	25.09.2023, 12.10.2023
General Hospital, Jhamakhandi	General	100 beds	Dr. Krishna Bannad	17.07.2021	20.10.2023
General Hospital, Doddaballapura	General	100 beds	Dr. Ramesh	02.08.2021	13.09.2023, 05.10.2023, 07.11.2023
General Hospital, Nelamangala	General	100 beds	Dr. Sonia	06.08.2021	28.09.2023, 17.10.2023
General Hospital, Devanahalli	General	100 beds	Dr. Anand K (AMO)	02.08.2021	23.09.2023, 30.10.2023
General Hospital, Yelahanka	General	100 beds	Dr. Ganesh (AMO)	27.07.2021	16.09.2023, 03.10.2023, 07.11.2023

IRECS Assessment

Parameter	Jhamakhandi 1 Unit	Dodda- ballapura	Nelamangala 1 Unit	Yelahanka 1 Unit	Devanahalli 1 Unit	Chikka- ballapura 2 Units	Ramanagara 2 Unite	
Inclusivances	1 Unit	1 Unit	1 Unit	1 0 110	1 Unit	2 Units	2 01113	
Plant Accessibility	Used during second wave of Covid-19 pandemic. Currently not being used due to lower demand for oxygen	Used during second wave of Covid-19 pandemic. Currently being used when required	Used during second wave of Covid-19 pandemic. Currently being used when required	Used during second wave of Covid-19 pandemic. Currently being used when required	Used during second wave of Covid-19 pandemic. Currently not in working condition.	Used during second wave of Covid-19 pandemic. Both units are currently not being used due to leakage issues.	Equipment was installed. As there were not enough covid patients, the oxygen plants could not be put in use during 2nd wave Covid-19.	
Patient Categories	Emergency patients	Emergency, New Born Care,Labour Ward, ICU ward	Emergency, ICU, Labour, Newborn Ward, OT ward	Emergency patients	Emergency patients	Emergency and ICU patients	Emergency patients	
Relevance Bed Capacity Utilization	100 beds	100 beds	100 beds	100 beds	100 beds	300 beds	300 beds	
PSA Oxygen during Covid-19	Very Useful	Very Useful	Very Useful	Very Useful	Very Useful	Very Useful	NA	
Backup Systems	Jumbo Cylinders	Liquid Oxygen Plants	Liquid Oxygen Plants	1 KL and 6 KL Liquid Oxygen Plants	2 KL Liquid Oxygen Plant, 6 KL Liquid Oxygen Plant	Liquid Oxygen Tank and DURO- Cylinders	Liquid Oxygen Plants and Cylinders	
Efficiency Supplier Communication	Supplied and insta warranty period.	alled the PSA O	xygen Plant at all	the Hospitals ar	nd provided necess	ovided necessary support until the equipment		
Deficiencies and Repairs	Worked well when installed during 2 nd wave Covid-19 pandemic. Currently, no reported issues	Worked well when installed during 2 nd wave Covid-19 pandemic. Currently, Noted requirement for AMC to be done by the Hospital.	Worked well when installed during 2 nd wave Covid- 19 pandemic. Currently, no reported issues	Worked well when installed during 2 nd wave Covid-19 pandemic. Currently, no reported issues	Worked well when installed during 2 nd wave Covid- 19 pandemic. Currently, no reported issues	Worked well when installed during 2 nd wave Covid-19 pandemic. Currently, noted leakage issues. Noted to be repaired by the Hospital	Equipment was installed. As there were not enough no. of covid patients, the plants could not be put in service during 2 nd wave of Covid-19.	
Convergence Planned Usage	Planned for emergency use	Emergency, New Born Care,Labour & ICU ward	Emergency, ICU, Labour, Newborn & OT ward	Emergency and ICU	Emergency	Emergency and ICU	Planned for emergency use	
Service Delivery								
Utilization and Impact	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional and used during Covid-19 2nd wave	PSA plant functional during Covid- 19 2nd wave but could not be used due to not enough patients.	

1. Inclusiveness:

The accessibility of PSA plants varies across hospitals. While some units are operational, others are awaiting repairs to be undertaken by the hospitals or remain dormant due to reasons attributable to the hospitals. The targeted patient categories encompass emergency, ICU and specialized wards, enhancing inclusivity in critical care scenarios.

- Plant Accessibility:
 - The PSA Oxygen Plants were very much accessible at all Hospitals. It was informed by the Hospital officials, all the oxygen equipment were generally functional during the second wave of Covid-19 pandemic. The PSA Oxygen Plant were utilized for emergency patients and ICU patients during the second wave of Covid-19 pandemic and thereafter.

• Patient Categories Benefiting:

- Chikkaballapura: Emergency and ICU patients;
- Ramanagara: Emergency patients;
- Jhamakhandi: Emergency patients;
- Doddaballapura: Emergency, New Born Care, Labour Ward, ICU ward patients;
- Nelamangala: Emergency, ICU, Labour, Newborn Ward and OT ward patients;
- > Yalahanka: Emergency patients;
- > Devanahalli: Emergency patients.
- Supplier Role:
 - It is noteworthy that during the critical period of the second wave of Covid-19, there was an unprecedented demand for oxygen plants as an emergency requirement, and they were expeditiously supplied to hospitals in response to the emergency situation.
 - Following the supply and installation, the supplier conducted training on the equipment's usage.
 - Subsequently, maintenance, Annual Maintenance Contracts (AMC), repairs, etc., fall under the respective hospital's purview.

• Interview Insights:

• Staff in Doddaballapura stressed the need for AMC and regular training for the PSA plant technician.

2. Relevance:

The overall goal of setting up PSA Oxygen Plants aligns with the critical needs of healthcare infrastructure, especially in the second wave of the Covid-19 pandemic. The emphasis on emergency care, ICU and specialized wards addresses the pressing demand for oxygen in critical scenarios. The baseline data addresses the needs adequately, focusing on bed capacity, existing oxygen infrastructure, and patient categories.

The bed capacity utilization aligns with the intended purpose of the PSA plants, with each hospital catering to its specific needs. Backup systems, including liquid oxygen tanks and cylinders, provide robust support.

• Bed Capacity Utilization:

- Chikkaballapura: 300 beds;
- Ramanagara: 300 beds;
- Jhamakhandi: 100 beds;
- Doddaballapura: 100 beds;
- Nelamangala: 100 beds;
- Yalahanka: 100 beds;
- Devanahalli : 100 beds.

• Backup Systems:

- Chikkaballapura: Liquid Oxygen Tank and DURO-Cylinders;
- Ramanagara: Liquid Oxygen Plants and Cylinders;
- Jhamakhandi: Jumbo Cylinders;
- Doddaballapura: Liquid Oxygen Plants;
- Nelamangala: Liquid Oxygen Plants;
- Yalahanka: Liquid Oxygen Plants;
- Devanahalli : Liquid Oxygen Plants.

• Interview Insights:

• Staff in Doddaballapura stressed the need for regular training for the Plant Technician.

3. Efficiency:

As informed by the Hospital authorities, the PSA Oxygen Plants were successfully supplied and installed at all the Hospitals and had provided necessary support until the equipment warranty period. The equipment were supplied during the very critical period of 2^{nd} wave of Covid-19 pandemic and noted to be very efficient and useful to handle during emergency situations.

• Deficiencies and Repairs:

- Chikkaballapura: Leakage issues;
- Ramanagara: Not enough patients during Covid-19;
- Jhamakhandi: No reported issues;
- Doddaballapura: Urgent need for AMC;
- Nelamangala : No reported issues;
- Yalahanka: No reported issues;
- Devanahalli : Leakage issues.

• Interview Insights:

• No specific insights from interviews on efficiency.

4. Convergence:

Operational PSA plants contribute positively to the overall goal of enhancing oxygen supply infrastructure. The project's emphasis on emergency care, specialized wards, and collaboration with existing infrastructure makes it unique. A standardized implementation model, considering the lessons learned, could enhance the project's replicability.

Planned usage aligns with emergency scenarios, indicating a thoughtful approach to resource allocation.

- Planned Usage:
 - Chikkaballapura: Emergency and ICU;
 - Ramanagara: Emergency;
 - Jhamakhandi: Emergency;

- Doddaballapura: Emergency, New Born Care, Labour Ward, ICU ward;
- Nelamangala: Emergency, ICU, Labour, Newborn Ward and OT ward;
- Yalahanka: Emergency;
- Devanahalli : Emergency.

• Interview Insights:

• No specific insights from interviews on convergence.

5. Sustainability/Service Delivery:

Positive impacts include improved emergency care and critical patient support.

The overall utilization and impact of operational PSA plants appear favorable, contributing to the hospital's oxygen supply infrastructure. Consistent maintenance and oversight are necessary at the administrative level of the hopitals to address concerns about oxygen supply quality in hospitals.

• Utilization and Impact:

- Chikkaballapura: Both PSA plants functional;
- Ramanagara: Unable to use it during second wave of Covid-19 pandemic due to not enough covid patients at hospital location;
- Jhamakhandi: Used during second wave of Covid-19 pandemic;
- Doddaballapura: PSA plant in working condition;
- Nelamangala: PSA plant in working condition;
- Yalahanka: PSA plant in working condition;
- Devanahalli : Used during second wave of Covid-19 pandemic.

• Interview Insights:

• Staff in Doddaballapura stressed the need for AMC and regular training for the PSA plant technician. The hospital authorities assured of having an AMC.

Case Studies

Case Study 1: Mr. Chandpasha

Patient Information:

- Name: Mr. Chandpasha
- Age: 48 years
- Address: Doddaballapura
- Illness: Tracheotomy patient
- Date: 6/10/2023

Background:

About two and a half months ago, Mr. Chandpasha met with a severe accident while riding his two-wheeler in T.B. Cross, Doddaballapura. Suffering from head and chest injuries, he was initially treated at General Hospital, Doddaballapura, where first aid was administered. He was subsequently referred to the National Institute of Mental Health and Neuro Sciences (NIMHANS) Hospital, Bangalore, due to the critical nature of his condition for further treatment. After undergoing surgery, he slipped into unconsciousness, requiring a month of intensive treatment.

Current Situation:

For the past month and a half, Mr. Chandpasha has been receiving oxygen supply at General Hospital, Doddaballapura, as he remains a tracheotomy patient. The hospital staff provides daily oxygen support for approximately 5 to 6 hours. Despite being from a financially constrained background, the patient's sister, Mrs. Shabana Begum, expressed gratitude for the free oxygen supply. She acknowledges the slow but steady recovery of her brother and anticipates his need for hospital care for another month or until full recovery.

Case Study 2: Mr. Kiran Kumar

Patient Information:

- Name: Mr. Kiran Kumar
- Age: 29 years
- Address: T. Hosahalli, Doddaballapura
- Illness: Tracheotomy patient
- **Date:** 6/10/2023

Background:

On the evening of 5/7/2023, Mr. Kiran Kumar had a bike accident near his village, resulting in head and shoulder injuries. After receiving initial first aid at Private Manasa Hospital, Yelahanka, Bangalore, he was subsequently referred to another Private Hospital, Kodigenahalli, Bangalore. Following a two-day treatment, he was referred to Victoria Government Hospital, Bangalore, where he underwent surgery and stayed for nearly three weeks. Post-recovery, he was advised to seek ongoing treatment with access to oxygen supply, leading to his referral to General Hospital, Doddaballapura.

Current Situation:

Mr. Kiran Kumar has been at General Hospital, Doddaballapura, for the past two and a half months, receiving daily oxygen supply as a tracheotomy patient. The hospital staff ensures the provision of free oxygen support, aiding in his gradual recovery. His mother's caretaker, Mrs. Subbamma, expressed gratitude for the hospital's timely assistance, highlighting their inability to bear the costs of oxygen and other treatments. She envisions Kiran Kumar's' continued stay in the hospital until he fully recovers.

CONCLUSION

The Impact Assessment of the PSA Oxygen Plants project in Karnataka critically examines the initiative's success and challenges. This transformative healthcare venture aimed to address the pressing need for oxygen supply, especially during second wave of Covid-19 pandemic, in emergency and tracheotomy cases.

The comprehensive study delves into inclusiveness, relevance, efficiency, effectiveness, impact and sustainability, providing a nuanced understanding of the project's outcomes. The project's goals aligned with the targeted regions' healthcare needs. Notably, the provision of oxygen supply proved particularly relevant during second wave of Covid-19 pandemic, in emergencies and for patients with tracheotomy requirements. The meticulous identification of these critical needs underscores the project's relevance in addressing acute healthcare challenges. Efficiency emerged as a hallmark of the project's execution, at the fastest pace to meet the challenges of the pandemic. Planned outputs were successfully achieved, ensuring the timely delivery of essential services at the most critical time during second wave of Covid-19 pandemic.

The adherence to the implementation schedule and the prudent management of project costs within planned limits speak of the initiative's efficiency. The project showcased a judicious utilization of funds, optimizing the impact per unit of investment. The project's outputs were not merely achieved; they translated into tangible benefits for patient care, particularly in emergencies. The project's uniqueness lies in its successful implementation of Pressure Swing Adsorption (PSA) Oxygen Plants, offering a sustainable and impactful solution to the persistent challenge of oxygen supply.

The project has demonstrated a capacity to bring about positive shifts in healthcare outcomes. The impact assessment brought to light a spectrum of positive impacts, both tangible and intangible. Socio-economic, environmental and technological dimensions were all influenced positively. Notably, patients, especially those with tracheotomy requirements, experienced significant improvements in their health outcomes. The project has become a catalyst for change in healthcare practices, fostering a sense of optimism. An encouraging aspect of the study is the sustainability of the impact created by the project. Continued oxygen supply remains vital to ongoing patient care, showcasing the lasting effects of the initiative. Considering the current trajectory, the project demonstrates signs of sustainability, paving the way for long-term benefits in healthcare resilience. The study serves as a valuable guide for future initiatives, emphasizing the continuous need for refinement, expansion, and collaboration to ensure enduring positive outcomes in the realm of healthcare.

The Project emphasizes EIL's exemplary role in assisting hospitals during the critical emergency situation of the Covid-19 pandemic and highlights EIL's commitment to supporting healthcare infrastructure during challenging times. Setting up of the project at the fastest speed to meet the emergency situation during challenging pandemic period is noteworthy.

The Project adheres to the United Nation's Sustainable Development Goal (SDG) 3: Good Health and Well Being.

RECOMMENDATIONS

- 1. Hospitals to explore the feasibility of deploying mobile oxygen units to reach inaccessible areas. These units, connected to the PSA Oxygen Plants, can support emergency oxygen in remote or underserved regions.
- 2. Hospitals to initiate periodic training programs for hospital staff and technicians involved in PSA Oxygen Plant operation and maintenance. This should cover emergency response procedures, troubleshooting and adherence to quality control standards.
- 3. Hospitals to implement a system for continuous quality monitoring of the oxygen supply through regular internal and external audits, ensuring adherence to purity standards.

ANNEXURES

Questionnaire for Staff Nurses

- 1. How long have you been working at this hospital?
- 2. How familiar are you with the newly implemented PSA Oxygen Plants?
- 3. In your opinion, how have the PSA Oxygen Plants impacted patient care and treatment in the hospital?
- 4. Have you noticed any changes in the availability and quality of oxygen supply since the installation of the plants?
- 5. What challenges or difficulties have you encountered related to using the PSA Oxygen Plants?
- 6. How well do you feel the hospital staff has been trained to use and maintain the PSA Oxygen Plants?
- 7. Do you think the PSA Oxygen Plants have improved the overall efficiency of the hospital & healthcare services?
- 8. Are there any suggestions or improvements you would recommend for the better utilization of the PSA Oxygen Plants?

Questionnaire for discharged patients

- 1. How satisfied are you with the medical care and treatment you received at this hospital?
- 2. Were you aware of the presence and use of the PSA Oxygen Plants during your treatment?
- 3. Did you notice any difference in the quality and availability of oxygen compared to your previous experiences?
- 4. How did oxygen availability affect your perception of the hospital & healthcare services?
- 5. Were you provided with sufficient information about the PSA Oxygen Plants and their benefits?
- 6. Did the availability of oxygen impact your recovery process? If yes, how?
- 7. Were there any challenges or concerns you faced related to the oxygen supply during your treatment?
- 9. Overall, how would you rate the impact of the PSA Oxygen Plants on your healthcare experience at this hospital?

Purchase order



Regd. Office: Engineers India Bhawan, 1, Bhikaiji Cama Place, New Delhi - 110066

PURCHASE ORDER

Date: 29.05.2021

M/s Megha Engineering & Infrastructures Limited S-2, Balanagar, Technocrats Industrial Estate, Andhra Bank Road Hyderabad, Telangane - 500037 E-Mail:

Supplier's Category: Non-MSE

PURCHASE ORDER No.: 7570-8953/007

Subject: Medical Oxygen Plant

Dear Sirs,

With reference to your offer Ref. No. MEIL/PSA PROPOSAL/ EIL/ 3021 dated 27.05.2021, negotiation meeting held on 28.05.2021 and your subsequent mail dated 28.05.2021, we are pleased to issue this firm order for subject item, strictly as per attached Schedule of Rates under Annexure-1 and in accordance with the terms & conditions set forth herein and attachments hereto, at a Total Order Value of INR 4,68,00,000.00 (Rupees Four Crore Sixty-eight Lakh only), excluding GST.

No variation of any nature shall be allowed unless agreed in writing by the Purchaser.

1.0 SCOPE OF WORK

Design, Engineering, Procurement of Raw materials, Fabrication, Piping and Instrumentation, Assembly, Testing, commissioning, training and demonstration of Medical Oxygen Plants using Pressure Swing Adsorption (PSA) technique, and molecular sieve (zeolite) technology of DRDO, including any other ancillary works required to make the facility functional.

 <u>PRICE</u> Prices mentioned in this Purchase Order shall remain firm and fixed till complete execution of this Order.

Prices are on FOT site basis and shall include packing & forwarding charges, freight charges, documentation charges, transit insurance and all other insurances up to and including installation, Commissioning & demonstration of the oxygen plants including any other ancillary works required to make the facility functional.

- 3.0 TAXES, DUTIES, INSURANCE
- 3.1 STATUTORY LEVIES



The above order value is inclusive of all taxes, duties & levies except GST. GST shall be payable extra as applicable as per GST Act.

No other taxes and duties or cess is payable by the Purchaser.

Seller shall be required to issue tax invoice in accordance with GST Act and/ or Rules. GST shall be paid against receipt of tax invoice and proof of payment of GST to government. In case of non-receipt of tax invoice or non-payment of GST by the Seller, EIL shall withhold the payment of GST.EIL's GST Reg. No.: 29AAACE5318C1ZZ (Karnataka) may be referred in this regard.

3.2 INSURANCE

The above prices are inclusive of transit insurance and all other insurances as required up to and including installation/ guarantee & warrantee period.

3.3 <u>TDS</u>

TDS, as applicable shall be deducted at source and necessary certificate shall be issued to the supplier.

3.4 DELIVERY/ COMPLETION PERIOD

Delivery/ Completion period shall be as per below details:

- a. Supply: First lot of 5 Oxygen Plants will be delivered within 15 days from date this Purchase Order and remaining 4 Oxygen Plant will be delivered within another 15 days from the date of this Purchase Order.
- b. Installation & Commissioning: The time allowed for carrying out the installation/ commissioning work shall not be more than 1 week after receipt and placement of material at site and fulfilling readiness of site as per pre-installation requirement for individual location.
- c. Total: The total contract period shall be five (5) weeks from issue of this PO.
- d. Warranty: Warranty period of 12 months from the date of successful installation & commissioning.

e. Delivery Location:

The equipment has to be installed at such a place as may be identified and instructed by the office of Superintendent of respective hospitals/ medical centers. The list of Government hospitals (GH) are in Karnataka, and as mentioned below:-

i)	GH Ramanagara, Ramanagara	: 2 Nos. * 500 lpm
ii)	GH Chikkaballapura, Chikkaballapura	: 2 Nos. * 500 lpm
iii)	GH Devanhalli, Bangalore Rural	: 1 No. * 500 lpm
iv)	GH Doddaballapura, Bangalore Rural	: 1 No. * 500 lpm
v)	GH Nelamangala, Bangalore Rural	: 1 No. * 500 lpm
vi)	GH Jhamakhandi, Bagalkote	: 1 No. * 500 lpm
vii)	GH Yelahanka, Bangalore Urban	: 1 No. * 500 lpm

4.0 PAYMENT TERMS

- a. 90% along with 100% GST within 7 days against delivery of equipment at site and certification of Receipt of equipment at respective hospital locations/ medical centers.
- b. 10% within 7 days against installation, commissioning & demonstration on certificate of installation by respective hospital locations/ medical centers.

Bidder shall submit valid material test certificates and Unit test certificates along with despatch documents.

Notes:-

Final Report- Impact Assessment of CSR Project: Setting up of PSA Oxygen Plants at 7 Govt. Hospitals in Karnataka for EIL

- a) All Bank charges of respective Bankers (of Supplier/ EIL) shall be to respective account, wherever applicable.
- b) All Invoices are to be raised in Original by the Supplier.
- c) All the payment shall be released after deducting applicable taxes (to be deducted at source) from the invoice amount and necessary certificates indicating the deducted amount shall be issued to the Supplier.

5.0 WARRANTEE TERMS

Warranty period of 12 months from the date of successful installation & commissioning. The warranty covers against defective materials of faulty workmanship/ design and any repairs or replacements thereof during this period, and shall be carried out free of cost. A variation of ± 5% of the rated flow will be observed in the normal course of operations. This excludes faults arising due to improper handling/ Maintenance or accidents.

6.0 INSTALLATION AND COMMISSIONING

Supplier shall undertake the entire scope of work within their quoted rates.

Supplier shall provide required tools and tackles, lifting equipment and workers for installation and commissioning of the units.

Supplier shall undertake the total piping/ tubing and electrical cabling works from existing connection points within the quoted rates.

Suppliers' commissioning team (consisting of 2 no. members) will be available for 3 days for installation, commissioning and inculcation of necessary Operations and Safety training. All the to-and-fro transport, boarding and lodging, local transport, arrangement of passes for movement for the commissioning team will be arranged by the supplier.

One set of Operations and Safety manual will be provided along with each unit.

7.0 OWNER'S SCOPE

- Compressor to be installed on leveled concrete rigid plinth with raised 100 -150 mm [4 to 6 inches].
- Ventilated Room
- Required power supply and hook up point for oxygen delivery at the proposed unit location before the arrival of Medical Oxygen Plant.
- Measurements of actual site conditions to be provided by owner in consultation with Supplier, for onward supply of tubing/ piping/ hose/ cabling etc.

8.0 FORCE MAJEURE

Notwithstanding anything herein contained, the Supplier shall not be responsible in the event of its failure to observe the above terms hereof if such failure is caused by reasons or on account of or in consequence of any act of God or Unions, Enemies, Famine, Epidemic, Fire, Storms, Floods, restraint of War, Strike, Lockout, Break Down of or Accident to Machinery or Plant, Government Action, Power shortages or any cause, whatsoever beyond the control of the Supplier.

9.0 INVOICING & DISTRIBUTION OF INVOICES

The invoice will have complete description of goods/ services as mentioned in this Purchase Order.

Supplier to send copies of invoices as under:

Two copies along with necessary certificate in advance to Finance & Accounts Department of EIL, New Delhi [Attention : GM (F&A)].

One copy to RCM – MRPL Site, Mangalore [Mr. Swaminathan Krishna Murthi, RCM will be Engineer-in-Charge Contact No. 9343968563, E-mail ID: swaminathan.k@eil.co.in]

10.0 UPLOADING OF INVOICE ON INVOICE PORTAL

Suppliers and Service Providers can upload the scan copy of invoices and other documents as required in the Purchase order/Work order/PR on the EIL Invoice Portal to enable EIL to speed up and cut down on the processing and payment cycle. Post uploading, all correspondence between EIL and suppliers / service providers will be through the portal. The uploading of invoices shall also facilitate EIL to expeditiously process the invoices so that payment can be released shortly after receipt of original documents. Suppliers/service providers can track the status of the uploaded invoices through the portal.

A user guide on the operation of the portal is available on log in.

URL of the portal is http://www.eil.co.in/invoiceportal

Registered Supplier/Contractor can Login with existing Supplier/Contractor code using the radio button.

C Registered Supplier/Contractor in EIL.

Non-Registered Supplier/Contractor can Login with PAN No. and generate the password using the radio button.

Non-Registered Supplier/Contractor

 FURTHER COMMUNICATION REGARDING THIS ORDER RCM – MRPL Site, Mangalore [RCM will be Engineer-in-Charge]

12.0 ACKNOWLEDGEMENT OF ORDER

Please acknowledge and return copy of this purchase order duly signed and stamped, to the undersigned along-with one copy to GM (F&A)- EIL, New Delhi and one copy to RCM – MRPL Site, Mangalore.

Very truly yours,

For & On behalf of M/s Engineers India Ltd.

2011 L. Thavurya GM (SCM-C&P

Enclosures:-

Annexure-I (Schedule of Rates).

ANNEXURE-I to PO No. 7570-8953/007

SI. No.	Description	Unit	Quantity	Unit Price (In INR)	Total Price (In INR)
1	Medical Oxygen Plant- MODEL DEBEL O2 500 LPM [PSA based Medical grade Oxygen Generation Unit based on DRDO developed technology]	Nos.	09	52,00,000.00	4,68,00,000.00
		TO	TAL ORDER	VALUE IN INR	4,68,00,000.00
			(Rupees Fou	r Crore Sixty E	ight Lakh Only)

SCHEDULE OF RATES

 a) The above quoted rates are subject to compliance of the provisions of the Purchase Order.

b) GST shall be reimbursed extra at the prevailing rates, subject to submission of documentary evidences.

c) Pro-rata payments shall be made based on actual progress of works and in line with the payment terms.

Very truly yours,

For & On behalf of M/s Engineers India Ltd

Thavenga (L. Thavurya) GM (SCM-C&P)

Handing over note

Chikkabalapura

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Name:

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Chikkaballapura, Chikkaballapura on Date: 19-08-2021

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-SOOLPM-011 & MEIL/PVD/OXYLIFE500LPM-012, model no: DEBEL-O2-S00LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of Item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 45 KW) FAB no. BUES046558, BUES046557, BUES046559 & BUES046560 Model no. EG45-7.5	4
2	Refrigeration Dryer Unit S.No: 3460-04/21 & 3772-05/21 Model No. ELRD-400	2
3	Electrical Panel	2
4	Air Storage Tank with capacity 1500 LTR	2
5	Oxygen Storage Tank capacity 1500 LTR	2
6	Zeolite Towers	4
7	Filters	10
8	Auto/Manual Drain valve	12
9	PLC controlled electronic display	2
10	Manual change over	2
11	HRC Fuse 200 Amp.	4
12	Keys (Set of 3)	2

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressurebar and Oxygen purity of 93+/-3%. Plant is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor

Manufacturing Date Book by OEM MEIL

- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.

OEM

g) Onsite training Report

Handed over by **Oil Company**

आबासीय निर्माण प्रबंधक Resident Construction Manager । उत्ते एम. आग. में एस. - की एस. भा प्रोजेकर E.I.L. M.R.P.L. &.S. VI Project

primare story / Kuthethour P. D., Mangasura - 575030

Auth. Person Sign Name : 0 ar, entringention, Swaminathan Designation: A.V.P

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Name: D.R.S. Andra sauth Designation Distuct S

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Final Report- Impact Assessment of CSR Project: Setting up of PSA Oxygen Plants at 7 Govt. Hospitals in Karnataka for EIL

Devanahalli

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Devanhalli, Bangalore Rural on Date: 02-08-2021.

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-S00LPM-001, model no: DEBEL-O2500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of Item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 55 KW) FA8 no. BUAS033488 & BUKS032888 Model no. EG75-13.5	2
2	Refrigeration Dryer Unit S.No: 21191704, Model No. ELRD-400	1
3	Electrical Panel	1
4	Air Storage Tank with capacity 1500 LTR	1
5	Oxygen Storage Tank capacity 1500 LTR	1
6	Zeolite Towers	2
7	Filters	5
8	Auto/Manual Drain valve	6
9	PLC controlled electronic display	1
10	Manual change over	1
11	HRC Fuse 200 Amp.	2
12	Keys (Set of 3)	1

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressurebar and Oxygen purity of 93+/-3%. Plant is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Handed over by Oil Company

OEM Auth. Person

Name:

Designation



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के. स्वामीनाधन/K. Swaminathan आवासीय निर्धान प्रबंधक Resident Construction Manager 5 Priles, ce stadios - dice, vi altrae E 1 L. M.R.P.L.-B.S. VI Project Conterner State Sautelaux F.D., Hardpares 575233

Taken over Auth, Perco Sentiact na 34 Name: Designation

Final Report- Impact Assessment of CSR Project: Setting up of PSA Oxygen Plants at 7 Govt. Hospitals in Karnataka for EIL 35

Doddaballapura

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PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Doddaballapura, Bangalore Rural on Date: 02-08-2021.

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-SOOLPM-002, model no: DEBEL-02500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

\$.No	Name of item	Quantity
1	Air Compressor (Name of OEM ELGI /Capadity 55 KW) FAB no. BULS033228 & BUKS032890 Model no. EG75-13.5	2
2	Refrigeration Dryer Unit S.No: 21191904, Model No. ELRD-400	1
3	Electrical Panel	1
4	Air Storage Tank with capacity 1500 LTR	1
5	Oxygen Storage Tank capacity 1500 LTR	1
6	Zeolite Towers	2
7	Filters	5
8	Auto/Manual Drain valve	6
9	PLC controlled electronic display	1
10	Manual change over	1
11	HRC Fuse 200 Amp.	2
12	Keys (Set of 3)	1

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressure bar and Oxygen purity of 93+/-3%. Plant is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by DEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Handed over by OEM Taken over by Auth. Person from Hospital **Oil Company** Auth. Person P. bangebur Sien. Sign. Sign Name: Name : Ch Nehru Name: Designation: A.V.P Designation D रजागीलाधन /K. Swaminathan अञ्चलीय निर्मान प्रबंधक DEDIMEPMEDICAL OFFICER Govt General Hospital Resident Construction Manager anti-on, co.arc di cec- di ce vi unarer E I L. M.R. P.L. 6.5. VI Project metare energi superson P.C. Marga are 575000 Doddaballapur-561 203 **Banglore Rural Dist**

Jhamakhandi

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Jhamakhandi, Bagalkote on Date: 17-07-2021

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-500LPM-008, model no: DEBEL-02500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 45 KW) FAB no. BUCS046197 & BUCS046196 Model no. EG45-7.5	2
2	Refrigeration Dryer Unit S.No: COX722115, Model No. F230	1
3	Electrical Panel	1
4	Air Storage Tank with capacity 1500 LTR	1
5	Oxygen Storage Tank capacity 1500 LTR	1
6	Zeolite Towers	2
7	Filters	5
8	Auto/Manual Drain valve	6
9	PLC controlled electronic display	1
10	Manual change over	1
11	HRC Fuse 200 Amp.	2
12	Keys (Set of 3)	1

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Taken over by Handed over by OEM Auth. Person from Hospi Auth. Person Oil Company Sign Sign. 000 met Name Name : 0 Name: Designation: A.V.P ස්ක්රාවාරයි Decignotiko Swaminathan মাৰামীত দিল'ন ভৰখক प्राह्मपाठ स्वसान उडायन तन Construction Manador मा यह के तब की तब था जल्हात राष्ट्रकी है के प्राष्ट्र का सार प्राह्मकी है के प्राण्धनी

Nelamangala

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Nelamangala, Bangalore Rural on Date: 06-08-2021

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-500LPM-005, model no: DEBEL-02500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of Item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 45 KW) FAB no. BUCS046199 & BUCS046211 Model no. EG45-7.5	2 .
2	Refrigeration Dryer Unit S.No: COX722121, Model No. F230	1
3	Electrical Panel	1
4	Air Storage Tank with capacity 1500 LTR	1
5	Oxygen Storage Tank capacity 1500 LTR	1
6	Zeolite Towers	2
7	Filters	5
8	Auto/Manual Drain valve	6
9	PLC controlled electronic display	1
10	Manual change over	1
11	HRC Fuse 200 Amp.	2
12	Keys (Set of 3)	1

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressure bar and Oxygen purity of 93+/-3%. Plant Is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Handed over by Oll Company

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OEM Auth. Person

Taken over by Auth. Person from Hospital

Appendian Name:



क. स्वामीमविकगेल Swaminathan আবাধীয় পিদাপ মৰ্যযক Resident Construction Manager \$.xtf.em , ex sit di ce - 8, ce vi aldrec E.I.L., M.R.P.L.-B.S. VI Project artheritarie arrest Autoethoor P.O., Mangalore - 575-000

Sign. Name: Designation

Ramanagara

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Ramanagara, Ramanagara on Date: 18-08-2021

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYUFE-500LPM-009 & MEIL/PVD/OXYUFE500LPM-010, model no: DEBEL-02-500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of Item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 45 KW) FAB no. BUCS046102, BUCS046122, BUCS046129 & BUCS046110 Model no. EG45-7.5	4
2	Refrigeration Dryer Unit S.No: COX720727 & COX707626 Model No. F230	2
3	Electrical Panel	2
4	Air Storage Tank with capacity 1500 LTR	2
5	Oxygen Storage Tank capacity 1500 LTR	2
6	PSA Tower (Zeolite)	2
7	Filters	10
8	Auto/Manual Drain valve	12
9	PLC controlled electronic display	2
10	Manual change over	2
11	HRC Fuse 200 Amp.	4
12	Keys (Set of 3)	2

The plant is for a warranty of 3 Years and plant shall be maintained by Hospitai. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressure bar and Oxygen purity of 93+/-3%. Plant is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Handed over by Oil Company

Sign.

Name:

रवासीमधिम सिंग प्रधान आवासीय वियोग प्रधान दिन्द्र dent Construction Manager दिन्द्र एक आर दी एव - दी एक भा जन्मजर E 1 L M R P L B.S. VI Project जन्म साम अक्षमार F 6, Margaur - 57500

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Yelahanka

PSA OXYGEN PLANT HANDING OVER NOTE

Handed over to GH Yelahanka, Bangalore Urban on Date: 27-07-2021

PSA onsite oxygen plant, Serial No: MEIL/PVD/OXYLIFE-500LPM-003, model no: DEBEL-02500LPM Capacity 500 (LPM) is installed and commissioned by Megha Engineering & Infrastructures Limited with following major facilities:

S.No	Name of Item	Quantity
1	Air Compressor (Name of OEM ELGI /Capacity 55 KW) FAB no. BUAS033619 & BULS033242 Model no. EG75-13.5	2
2	Refrigeration Dryer Unit S.No: 21182204, Model No. ELRD-400	1
3	Electrical Panel	1
4	Air Storage Tank with capacity 1500 LTR	1
5	Oxygen Storage Tank capacity 1500 LTR	1
6	Zeolite Towers	2
7	Filters	5
8	Auto/Manual Drain valve	6
9	PLC controlled electronic display	1
10	Manual change over	1
11	HRC Fuse 200 Amp.	2
12	Keys (Set of 3)	1

The plant is for a warranty of 3 Years and plant shall be maintained by Hospital. Please check enclosed file for warranty details (Mandatory).

Checked and found that output of PSA oxygen plant is connected to existing inlet manifold; Tested at multiple bedside outlets with PSA Plant pressure bar and Oxygen purity of 93+/-3%. Plant is being handed over with following documents:

- a) Commissioning Report by OEM MEIL
- b) Certification and Declaration by OEM MEIL
- c) Acceptance Test Report
- d) Calibration Certificate of Oxygen sensor
- e) Air Compressor and Oxygen plant operating Manuals (OEM ELGI & MEIL)
- f) Onsite Oxygen Sample test report by Fare Labs Pvt Ltd.
- g) Onsite training Report
- h) Manufacturing Date Book by OEM MEIL

Handed over by Oil Company OEM Auth. Person

7. borguestin Sign. Name:

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col Sign. Name : Ch Nehru

Name: Name : Chin ক, Carl Station / K. Swaminatha@esignation: A.V.P saterरीय নির্দাদ সম্বাধক Resident Construction Manager इ. आई एस. एम.आर मे एस - वी एस VI আসমত E.I.L. M.R.P.L.-B.S. VI Project हा स्टाफ साम्य स्टालर P.O. Mangave-515033

Taken over by

Auth. Person from Hospital. Administrativo Medical Officer General Hospital Yelahanka Sign.

Name: Designation

Physical Verification Sheet

Chikkaballapura

Physical Verification Sheet- Unit 2 nos.

Date of Visit: 22.09. 2023 and 09.10.2023	Name of Hospital: District Hospital, Chikkaballapura		
Location: Chikkaballapura	Contract Date: 29 May 2021	Category: Goods	Contract Amount: INR 1,04,00,000
Procurement Item Description: 500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant, Unit 2 nos.			

Supplier / Contractor's Name and Address:

M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.

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Physical Verification Aspects	Findings/ Observations
Name of Official Met at the Hospital	Dr. Manjunath, Dean & Director
Location of the Asset/ Item	District Hospital, Chikkaballapur
Purchase Order Date	29.05.2021
Procurement as per Applicable Procurement Guidelines (Yes/ No)	Yes
Actual delivery / completion date	19.08.2021
Contractual Vs. Delivered Quantity /	PSA Oxygen Plant Unit 2 nos. and its
Contractual Vs. Actual Work	accessories
In Working order (Yes/ No)	No. The PSA Oxygen Plant was noted to be not in use during the visit. As informed, currently there was leakage issue in the PSA oxygen plant. However, the equipment was functional when installed during Covid-19 second wave.
Labelling: EIL's Name and Logo displayed prominently on signage (Yes/ No)	Yes
Inventory Record Maintained for the item? (Yes/ No); Stock Register Detail	Yes, Equipment register 2021-23, Page No.175
Deficiencies/defects observed	Zeolite Leakage. It was assured by the hospital that defect would be rectified.



Devanahalli

Physical Verification Sheet

Date of Visit: 23.09.2023 and 30.10.2023	Name of Hospital: General Hospital, Devanahalli		
Location: GH Devanahalli	Contract Date: 29 May 2021Category: GoodsContract Amount: INR 52,00,000		Contract Amount: INR 52,00,000
Procurement Item Description: 500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant			
Supplier / Contractor's Name and Address: M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.			

Physical Verification Aspects	Findings/ Observations
Name of Official Met at the Hospital	Dr. Anand, AMO
Location of the Asset/ Item	GH Devanahalli premises
Purchase Order Date	29.05.2021
Procurement as per Applicable Procurement Guidelines (Yes/ No)	Yes
Actual delivery / completion date	02.08.2021
Contractual Vs. Delivered Quantity / Contractual Vs. Actual Work	PSA Oxygen Plant
In Working order	Was functioning during Covid-19 second wave.
Labelling: EIL's Name and Logo displayed prominently on signage (Yes/ No)	Yes
Inventory Record Maintained for the item? (Yes/ No); Stock Register Detail	No. They have been now advised to maintain inventory record.
Deficiencies/defects observed	As informed, the equipment was working well when installed during second wave of Covid- 19 pandemic. The plant is not working since last 9 months. Leakage in the cylinder, Main electric board has burst due to short circuit, oxygen purity issue.
Comments and recommendations	Requires repair and service. Confirmed by the hospital that repairs would be undertaken.



Doddaballapura

Physical Verification Sheet

Date of Visit: 13.09.2023, 5.10.2023 and 7.11.2023	Name of Hospital: General Hospital, Doddaballapura		
Location: GH Doddaballapura	Contract Date: 29 May 2021	Category: Goods PSA Plant unit	Contract Amount: INR 52,00,000

Procurement Item Description:

500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant

Supplier / Contractor's Name and Address:

M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.

Physical Verification Aspects	Findings/ Observations
Name of Official Met at the Hospital	Dr. Ramesh, Chief Medical Officer
Location of the Asset/ Item	GH Doddaballapura premises
Purchase Order Date	29.05.2021
Procurement as per Applicable Procurement Guidelines (Yes/ No)	Yes
Actual delivery / completion date	02.08.2021
Contractual Vs. Delivered Quantity / Contractual Vs. Actual Work	PSA Oxygen Plant
In Working order	Yes
Labelling: EIL's Name and Logo displayed prominently on signage (Yes/ No)	Yes
Inventory Record Maintained for the item? (Yes/ No); Stock Register Detail	No. They have been now advised to maintain inventory record.
Deficiencies/defects observed	No
Comments and recommendations	In order to maintain the equipment, the Hospital is required to have necessary AMC for the same.



Jhamakhandi

Physical Verification Sheet

Date of Visit: 20.10.2023	Name of Hospital: General Hospital, Jhamakhandi			
Location: Jhamakhandi	Contract Date: 29 May 2021	Category: Goods	Contract Amount: INR 52,00,000	
Procurement Item Description:				
500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant				
Supplier / Contractor's Name and Address:				
M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar,				
Hyderabad 500037, Telangana, India.				

Physical Verification	Findings/ Observations
Aspects	
Name of Official Met at the	Dr. Krishna Bannad, Chief Medical Officer
Hospital	
Location of the Asset/ Item	GH Jhamakhandi premises
Purchase Order Date	29.05.2021
Procurement as per	Yes
Applicable Procurement	
Guidelines (Yes/ No)	
Actual delivery /	17.07.2021
completion date	
Contractual Vs. Delivered	PSA Oxygen Plant
Quantity /	
Contractual Vs. Actual	
Work	
In Working order (Yes/ No)	Yes
Labelling: EIL's Name and	Yes
Logo displayed	
prominently on signage	
(Yes/No)	
Inventory Record	No. They have been now advised to maintain inventory
Maintained for the item?	record.
(Yes/No);	
Stock Register Detail	
Deficiencies/defects	PSA plant is in working condition but is currently not put into
observed	usage because the Hospital does not require that capacity at
	present. At present they are using Jumbo Cylinders for their
	requirement. However, it was informed that the PSA Oxygen
	Plant was very useful during second wave Covid-19
	pandemic.
Comments and	The Hospital is expanding its services to Mother and Child
recommendations	Hospital (MCH) coming up adjacent to the GH Hospital



Nelamangala

Physical Verification Sheet

Date of Visit: 28.09.2023 and 17.10.2023	Name of Hospital: General Hospital, Nelamangala		
Location: GH Nelamangala	Contract Date: 29 May 2021	Category: Goods	Contract Amount: INR 52,00,000
Procurement Item Description: 500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant			
Supplier / Contractor's Name and Address: M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.			

Physical Verification Aspects	Findings/ Observations
Name of Official Met at the Hospital	Dr. Sonia, AMO
Location of the Asset/ Item	GH Nelamangala premises
Purchase Order Date	29.05.2021
Procurement as per Applicable Procurement Guidelines (Yes/ No)	Yes
Actual delivery / completion date	06.08.2021
Contractual Vs. Delivered Quantity / Contractual Vs. Actual Work	PSA Oxygen Plant
In Working order	Yes
Labelling: EIL's Name and Logo displayed prominently on signage (Yes/ No)	Yes
Inventory Record Maintained for the item? (Yes/ No); Stock Register Detail	No. They have been now advised to maintain inventory record.
Deficiencies/defects observed	No
Comments and recommendations	In order to maintain the equipment, the Hospital is required to have necessary AMC for the same. Hospital has been advised for the same.



Ramanagara

Physical Verification Sheet- Units 2 nos.

Date of Visit: 25.09.2023 and 12.10.2023	Name of Hospita	al: New District	Hospital, Ramanagara
Location: Ramanagara	Contract Date: 29 May 2021	Category: Goods	Contract Amount: INR 1,04,00,000
Procurement Item Description:			

500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant, Unit 2 nos.

Supplier / Contractor's Name and Address:

M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.

Physical Verification Aspects	Findings/ Observations
Name of Official Met at the	Dr. Padma, District Surgeon
Hospital	
Location of the Asset/ Item	New District Hospital, Ramanagara
Purchase Order Date	29.05.2021
Procurement as per Applicable	Yes
Procurement Guidelines (Yes/	
No)	
Actual delivery / completion	18.08.2021
date	
Contractual Vs. Delivered	PSA Oxygen Plant Unit 2 nos
Quantity /	
Contractual Vs. Actual Work	
In Working order	Yes
Labelling: EIL's Name and Logo	Yes
displayed prominently on	
signage (Yes/ No)	
Inventory Record Maintained for	No. They have been now advised to maintain inventory
the item? (Yes/ No);	record.
Stock Register Detail	
Deficiencies/defects observed	As there were not enough nos. of covid patients, so the
	oxygen plants could not be put to service during Covid-
	19 second wave.
Comments and	
recommendations	-
Photographs:	





Yelahanka

Physical Verification Sheet

Date of Visit: 16.09.2023, 03.10.2023 and 01.11.2023	Name of Hospital: General Hospital, Yelahanka		
Location: Yelahanka	Contract Date: 29 May 2021	Category: Goods	Contract Amount: INR 52,00,000
Procurement Item Description: 500 LPM Pressure Swing Adsorption (PSA) Oxygen Plant			
Supplier / Contractor's Name and Address: M/s Megha Engineering & Infrastructure Ltd, S-2, Technocraft Indl, Estate, Balanagar, Hyderabad 500037, Telangana, India.			

Physical Verification Aspects	Findings/ Observations
Name of Official Met at the	Dr. Ganesh AMO
Hospital	
Location of the Asset/ Item	General Hospital, Yelahanka
Purchase Order Date	29.05.2021
Procurement as per Applicable Procurement Guidelines (Yes/ No)	Yes
Actual delivery / completion date	27.07.2021
Contractual Vs. Delivered Quantity /	PSA Oxygen Plant
Contractual Vs. Actual Work	
In Working order	Yes
Labelling: EIL's Name and Logo displayed prominently on signage (Yes/ No)	Yes
Inventory Record Maintained for	No. They have been now advised to maintain
the item? (Yes/ No);	inventory record.
Stock Register Detail	
Deficiencies/defects observed	No
Comments and recommendations	None