OxyCare

Monitoring Supply and Operation of Oxygen Devices in India

(29.8 LPM)

Flow

Purity

(96.5%)

Pressure

(4.7 Bar)

Edited by **MUKESH KUMAR RALLI**

D uring the second COVID-19 wave, the oxygen requirement in health institutions increased exponentially. The Government of India planned to install enough oxygen equipment in all healthcare facilities around the nation to accommodate this enormous demand.

In line with this vision, OxyCare has been developed by the NIC Himachal Pradesh State Centre in consultation with the NIC Health Informatics Division in a very short time to meet the oxygen requirements in the country

Ajay Singh Chahal
Dy. Director General & SIO
ajay.chahal@nic.in

Sandeep Sood
Sr. Technical Director
sood.sandeep@nic.in

Sanjay Kumar
Sr. Technical Director
sanjay.kmr@nic.in
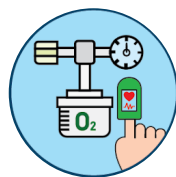
The timely availability of oxygen in Hospitals became a major requirement during the second wave of the COVID-19 pandemic in May-June 2021. The Ministry of Health & Family Welfare, Government of India initiated the OxyCare project to ensure timely supply of various Oxygen equipment, installation and proper functioning, to Government Health Institutions at grass root level. OxyCare MIS has been developed by NIC to meet this challenge.

during the second wave of the COVID-19 pandemic. It monitors the functioning of the oxygen devices, namely, Oxygen Concentrators, Pressure Swing Adsorption (PSA) Oxygen Generation Plants, Ventilators, and Cylinders. As of now, OxyCare has been implemented across all the States and Union Territories of the country, covering multiple oxygen devices.

Features

The main objective of OxyCare is to ensure the timely delivery and proper installation of oxygen equipment at the last level of health facilities across India, up to Community Healthcare and Wellness Centres. OxyCare monitors them to ensure their proper functioning and maintenance. The Prime Minister's Office, the Ministry of Health & Family Welfare, the States, and the Districts can access this information on the portal in the form of a role-based dashboard.

While the delivery, reporting, and monitoring are done through the web-based portal, the receipt of equipment is done through an associated mobile app developed for the health facilities. The problem reporting and annual maintenance contracts are also monitored through this ecosystem.

The OxyCare mobile app is available on both Android and iOS platforms and uses a Secure Quick Response (QR) Code to receive only the correct equipment since the QR code cannot be read by other apps.

For monitoring PSA Oxygen Plants in a big hospital, real time data collection and reporting are done through an Internet of Things (IoT) based device for making better decision at the higher management levels.

The OxyCare - Oxygen Management Information System has been developed through collaborative efforts and proved to be very useful for the users across India. The IOT based monitoring of PSA plants has been instrumental in making these plants functional quickly to meet the oxygen demand.

Vishal Chauhan, IAS
Joint Secretary
Ministry of Health & Family Welfare
Government of India
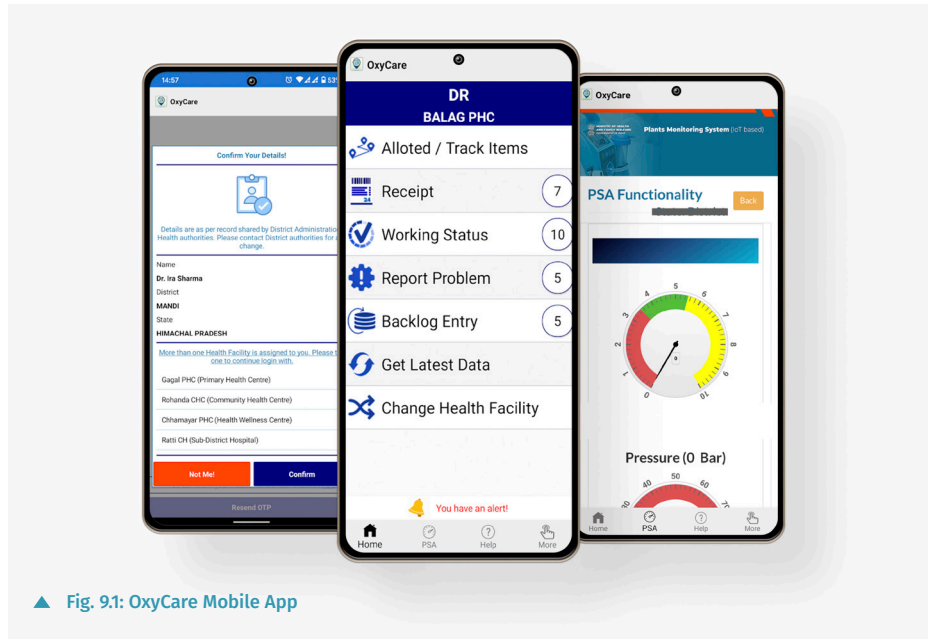
▲ Fig. 9.1: OxyCare Mobile App

Some of the key features of OxyCare are:

● Single Sign-On through Government Email

● Different login interface for App and Portal for App users

● Responsive Website

● Dynamically controlled role-based application access

● Device Stock Management

● Web interface for all Stakeholders / Data Sharing

● Data analytics / Graphs / Warnings / Auto-alert emails

● Complaint Response Management System

● AMC, FAC Certificate, Problem Reporting and Resolution

● Dashboard (IoT-PSA, OCs, Ventilator, Cylinder)

● Mobile apps on Android and iOS platforms for reading secure QR codes and other functions at the Health facility level

● OxyEngineer mobile app for resolving complaints sent by Health facilities through the OxyCare app

● For PSA plants, IoT devices have been set up to send live functioning data to portal for monitoring oxygen flow, purity, pressure and runtime

Technology Used

● .Net framework 4.5 with MS SQL Server 2019

● Xamarin for mobile app development for Android and iOS

● Bharat Maps for GIS

● Secure QR Code generation

● IoT-based data capturing and dashboard using High Charts

● Cloud hosted, security audited and load balancer enabled

▼ Fig. 9.2: OxyCare Portal Homepage
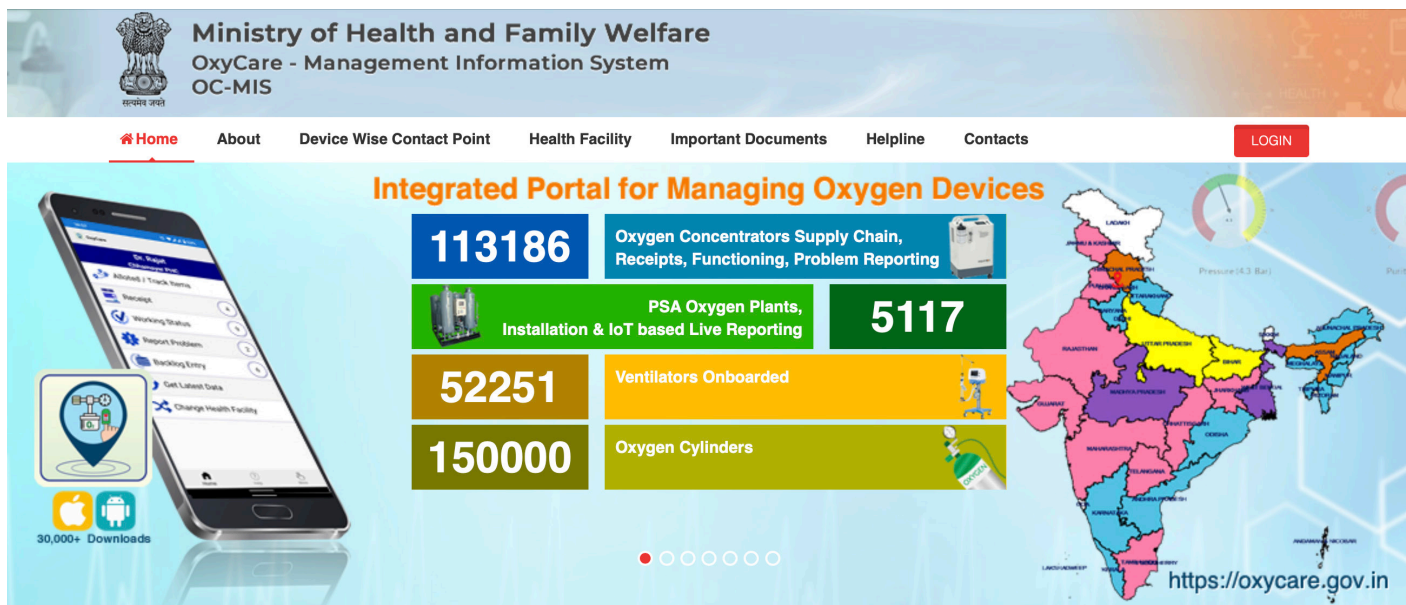
Innovations Applied

IoT-based Monitoring of PSA Plants

Every PSA Oxygen Generation Plant has a pre-fitted IoT device which transfers data related to the functioning of the plant to central server at a fixed time interval. The photographs of installed plants and its GPS locations are also captured and made available along with relevant parameters to monitoring authorities as shown in the Figure 9.3.

OxyCare Mobile App

OxyCare mobile app supplements the OxyCare portal and is used by Health Facility In-charge (HFIC) across various health facilities in the country to record the receipt of various medical equipment. The app also provides a feature to add functioning details of oxygen equipments, report problems (if any), and add mock drill details for the PSA Oxygen Plant.

As the app is being used by an exclusive user group (HFICs), users need to be whitelisted. This is done by the District Nodal Officers / Chief Medical Officers by first updating the Health Facility Master file and adding the HFIC details through the Health Facility Management, available at the OxyCare portal. Later, the prospective user can check his or her details by clicking on the Health Facility link on the web portal **(https://oxycare. gov.in)**.
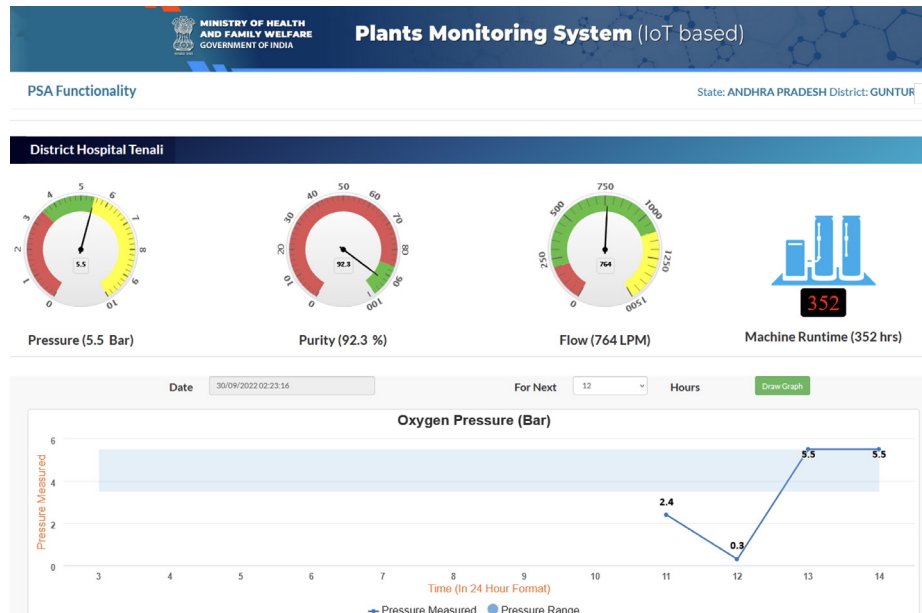
Benefits

OxyCare portal has proved to be quite useful to the Ministry of Health & Family Welfare in allocation, supply, installation, monitoring and maintenance of oxygen equipment in Health Facilities pan country. Some of these benefits are listed below

● Single system for tracking supply, installation of multiple oxygen equipment

● Tracking of supply chain from manufacturers' location

O xyCare - Oxygen Management Information System has been developed by NIC in difficult times during the Covid19 pandemic with innovative features like secure QR code which can be read by the specific mobile app used by Health Facility Users. NIC has done excellent work to enable Ministry to fast track the supply and availability of oxygen in rural and urban health facilities across India.
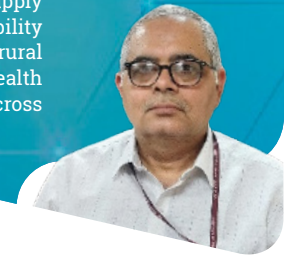
Sunil Kumar
Dy. Director General & HoG
NIC Health Projects

● Real time IoT-based monitoring of devices, mock drills

● GIS-based plotting of installed devices along with photographs

● Futuristic platform for meeting similar requirements / exigencies during any pandemic

● Online problem reporting and its resolution using OxyCare Engineer mobile app

● Role-based dashboard for device delivery/ operational status for each level

● System generated email alerts / status report to State / Ministry administrators

Award

OxyCare portal has been conferred upon the Award of Excellence by CSI SIG eGovernance Awards 2021 under the Project Category. (Refer Fig. 9.4) It is implemented in all 36 States / UTs covering more than 2 lakh health facilities with over 3 lakh oxygen equipments.

Way Forward

OxyCare portal has achieved the target of providing various oxygen equipment in health facilities across the country. Technologies like Secure QR code generation and scanning and IoT-based monitoring of the working of PSA Oxygen plants have been the enablers. The portal is being enhanced to meet any kind of exigency during such pandemics in the future.

▲ Fig. 9.3: IoT-based data transfer and meters for pressure, purity and flow of PSA Oxygen Generation Plants

▼ Fig. 9.4: MoHFW and NIC teams receive the CSI eGovernance Award of Excellence 2022