The below guide describes and compares different oxygen sources and storage methods. It is adapted from The World Health Organization's (WHO) Oxygen sources and distribution for COVID-19 treatment centres Interim guidance.

Acronyms

- ASU: Air Separation Unit.
- PSA: Pressure Swing Adsorption.
- VSA: Vacuum-Swing Adsorption.
- VIE: Vacuum-Insulated Evaporator.

	Cylinders	**Concentrators**	**Oxygen plant (PSA/VSA)**	**Liquid Oxygen (ASU+VIE)**
Description	A refillable metal storage vessel is used to store and transport oxygen in compressed gas form. Cylinders require regular refilling at a gas plant and transportation to and from the plant.	A self-contained, electrically powered medical device designed to concentrate oxygen from ambient air using PSA technology.	An onsite oxygen generating system using PSA or VSA technology, supplying pressurised oxygen via a central pipeline system, or used to fill cylinders.	ASU produces high-volume liquid oxygen stored and transported in bulk cryogenic tanks. VIEs store liquid oxygen on-site and convert it to gas for use and require regular refilling.
Oxygen produced	Gas, high pressure. Oxygen purity depends on source (PSA versus cryogenic).	Gas, low pressure. Oxygen purity 90-95%.	Gas, medium-high pressure. Oxygen purity 90-95%.	Liquid, very high pressure. Oxygen purity 99%.
Use case	Backup oxygen source. Transport services. Good primary oxygen source for small facilities, low demand. Distribution in 'hub-and-spoke' model from a central plant. Where the power supply is	Good primary oxygen source for small facilities, low demand, and remote facilities with poor transport. Home care.	Direct supply to hospitals (medium and large). Central cylinder filling point in 'hub-and-spoke' model.	Direct supply to hospitals (medium and large). Central cylinder filling point for distribution. Where power supply is intermittent or unreliable.

	intermittent or unreliable.			
Clinical application	For all oxygen needs, including high-pressure devices (CPAP, ventilators). Located nearby patients or at a central manifold for distribution to multiple patients/wards.	For most oxygen needs, except high-pressure devices (e.g., some CPAP machines and ventilators). Located nearby patients for delivery direct or via flowmeter stand.	For all oxygen needs, including high-pressure supply (CPAP, ventilators). Located at a central onsite location.	For all oxygen needs, including high-pressure supply and in facilities where power supply is intermittent or unreliable. VIE at a central onsite location.
Distribution mechanism	Connected to manifold of central/sub-central pipeline distribution system, or directly connected to the patient with regulator, flowmeter and tubing.	Direct to the patient with tubing or to multiple patients via a flowmeter stand.	Central/sub-central pipeline distribution system, or can be used to refill cylinders (for distribution to manifold system, individual wards, or other facilities.	Central pipeline distribution system, or can be used to refill cylinders (for distribution to manifold system, individual wards, or other facilities.
Electricity requirement	No	Yes	Yes	Minimal*
Maintenance requirement	Limited maintenance required by trained technicians.	Moderate maintenance is required by trained technicians, who could be in-house.	Significant maintenance of system and piping required by highly trained technicians and engineers can be provided as part of contract.	Significant maintenance of system and piping required by highly trained technicians and engineers can be provided as part of contract.
User care	Moderate; regular checks of fittings and connections, regular checks of oxygen levels, cleaning exterior.	Moderate; cleaning of filters and device exterior.	Minimal; at terminal unit only.	Minimal; at terminal unit only.
Merits	No power requirement. Pressurised supply compatible with	Continuous oxygen supply (if power available).	Continuous oxygen supply. Can be cost-effective for large facilities.	Minimal power requirements. High-volume storage with small space

	all devices. Portable.	Low upfront and running costs. Output flow can be split among multiple patients.	Pressurised supply compatible with all devices.	requirement. Pressurised supply compatible with all devices.
Drawbacks	Exhaustible supply, small volume. Requires transport/ supply chain. Highly reliant upon supplier. Risk of gas leakage. Risk of unwanted relocation. Price is highly variable and high running costs (refill, transport).	Low volume output (limited to one or few patients per device). Low-pressure output (not suitable for many CPAP or ventilator devices). Requires uninterrupted power. Requires backup cylinder supply. Requires maintenance.	High capital investment and substantial running costs. Requires uninterrupted power. Needs adequate infrastructure. High maintenance for piping. Requires backup cylinder supply. Risk of gas leakage from piping system.	Requires transport/ supply chain. Exhaustible supply. High maintenance for piping. Needs adequate infrastructure. Requires backup cylinder supply. Risk of gas leakage from piping system

* VIEs can fill cylinders and supply central piped systems without requiring electricity to compress the gas, but they do need some power for alarm and safety systems. ASUs are huge gas production complexes with very high energy needs.