



Bridging the Oxygen Gap: A Sustainable Approach to Lifesaving Care

A sustainable solution to ensure reliable medical oxygen supply



Problem



According to the Pan American Health Organization,

9 out of 10

Low-income hospitals do not have enough resources to offer oxygen therapy to their patients, leading to over

800,000 preventable deaths every year.

There are many limiting factors to the supply of oxygen in hospitals:



High patient demand

Oxygen supply cannot meet its demand, especially in densely populated areas. This was particularly highlighted during the Covid-19 pandemic, but it is prevalent to this day.



Difficult transportation

Oxygen cylinders are commonly delivered by trucks; however, roads leading to remote areas are often in poor conditions. Logistics may also be challenged by long distances and poor weather conditions.



Budget limitations

Insufficient funds prevent hospitals from purchasing enough oxygen cylinders. Additionally, expenses on the storage, handling and transportation are high.

Solution

OxyGen is an innovative solution addressing the critical need for reliable oxygen supply in low-income hospitals.

Our machine allows hospitals to have a reliable, in-house supply of oxygen. Inspired by photosynthesis, it captures carbon dioxide, produces oxygen and methanol, and stores the oxygen in tanks for medical use. The equation for the process is as follows:

$2\text{CO}_2 + 4\text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + 3\text{O}_2$; using a copper oxide (Cu_2O) catalyst.

Unlike other oxygen production methods, *OxyGen* employs membrane-based Direct Air Carbon Capture technology (m-DACC) in its machines, an emerging technology yet to be used in medical applications. The reaction chamber and other parts will be uniquely developed by *OxyGen*.

Our competitors are other medical grade oxygen providers, and there are two kinds:

1. Companies that produce oxygen in industrial plants and then supply to hospitals through oxygen tanks. This method is currently the most common one and is how most medical centers worldwide get their oxygen.



Our competitors are other medical grade oxygen providers, and there are two kinds:

2. Enterprises that sell oxygen generators, which is more similar to our product, however the method currently used is PSA oxygen generators. This is comparatively a more emerging market with some hospitals employing these on location plants. There are concerns regarding scalability, cost, and logistics; preventing PSA generators from dominating the market.

What is PSA?

A pressure swing adsorption (PSA) oxygen generator is a source of medical-grade oxygen. It is a technology used to separate oxygen gas from a mixture of gases.



Target Audience & Market

OxyGen aims to benefit hospitals, emergency care facilities, and healthcare centers,
by providing a sustainable and efficient solution to the shortages of medical oxygen. This is especially valuable in areas with limited access to traditional oxygen supply chains.

The global medical oxygen market is currently valued at 3 billion.
Its value is expected to grow with increasing demand due to aging populations, rising respiratory diseases, and healthcare expansion.

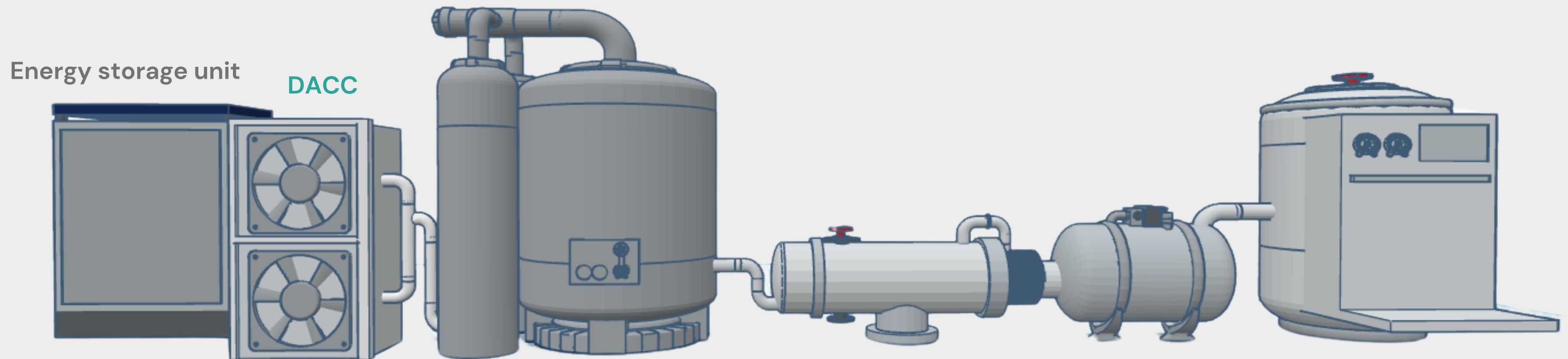
Our key stakeholders include hospitals and health care providers (users), governments and NGOs supporting medical infrastructure (customers), and potential partners such as research institutions and environmental organizations.

How it works

Our machine has five main regions:

Region #1: DACC

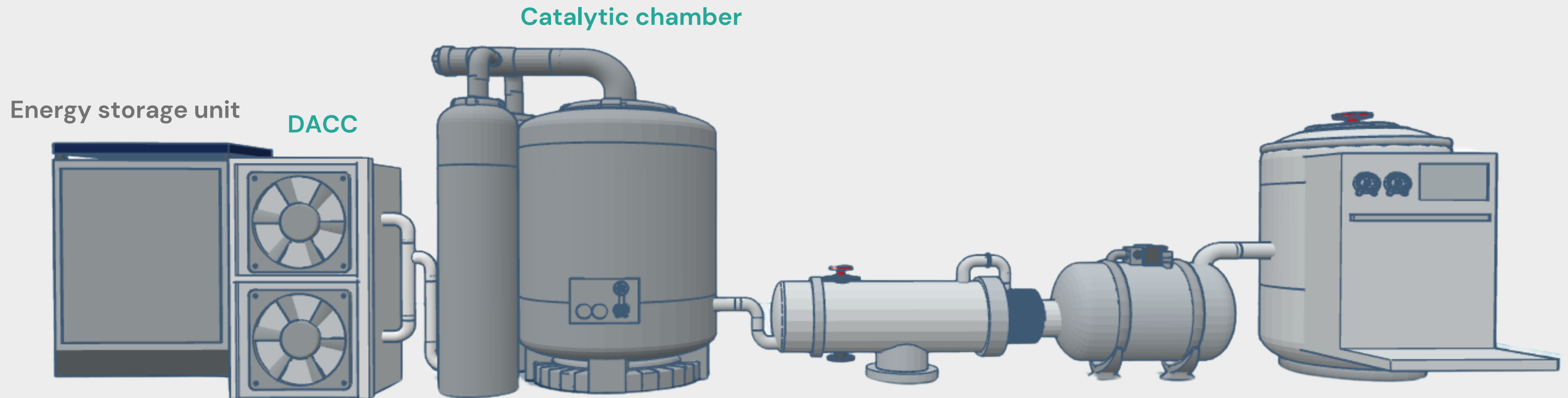
Membrane-based direct air carbon capture (DACC) technology is employed to separate and collect carbon dioxide molecules from the atmosphere. This, as with the rest of our machine, is powered by the energy storage unit, which collects and stores energy from solar panels.



Our machine has five main regions:

Region #2: Catalytic chamber

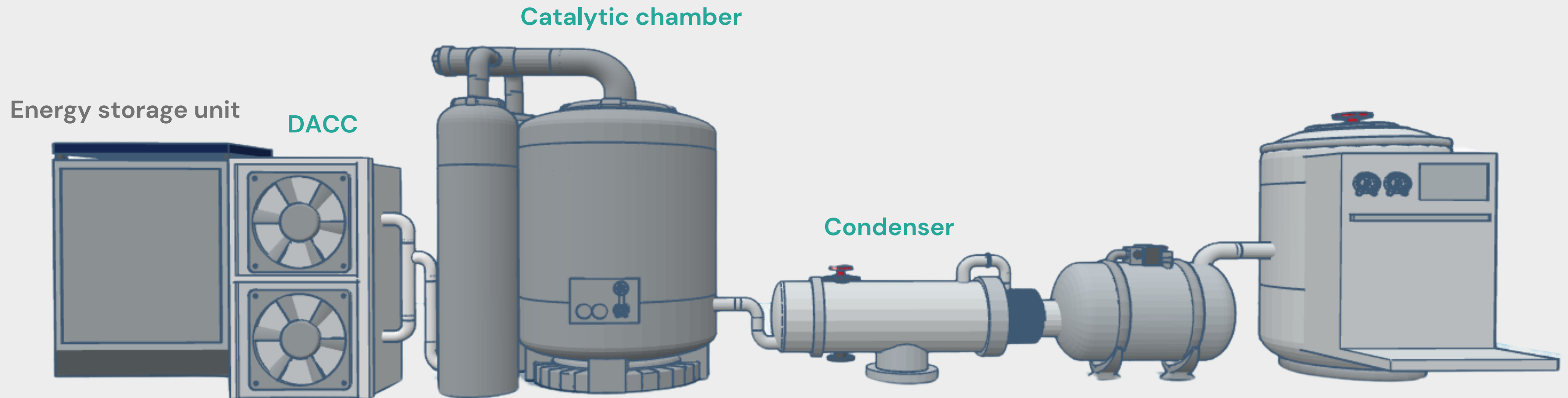
Inside the catalytic chamber is where reactions occur. Carbon dioxide, supplied by the DACC, reacts with water to form methanol and oxygen. A copper oxide substrate catalyzes this reaction.



Our machine has five main regions:

Region #3: Condenser

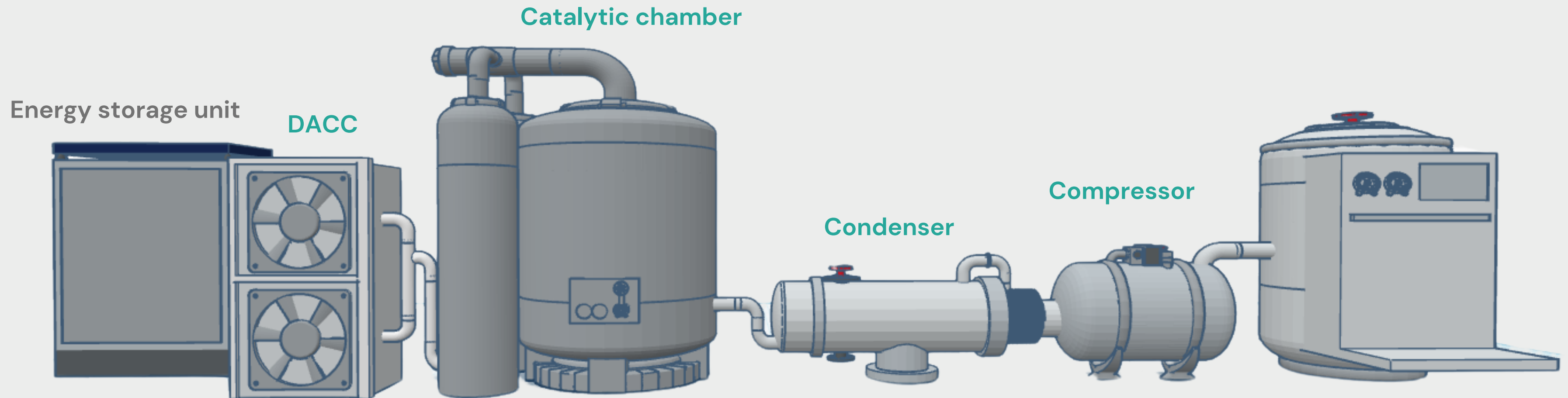
By leveraging the different condensation points between the products, oxygen will remain in its gaseous state while the methanol is condensed and collected in an underground tank for later use. The remaining oxygen gas will move on to the next region.



Our machine has five main regions:

Region #4: Compressor

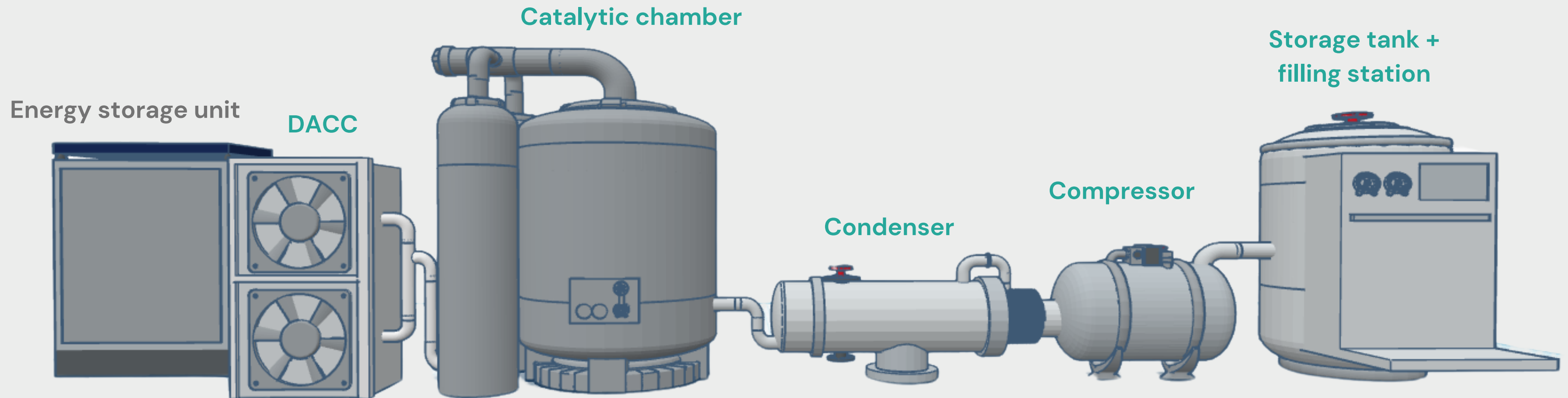
Before the oxygen arrives to the compressor, it passes through a series of filters to remove any potential impurities. Once in the compressor, the oxygen is compressed to ensure its safe handling and storage in the tank.



Our machine has five main regions:

Region #5: Storage Tank

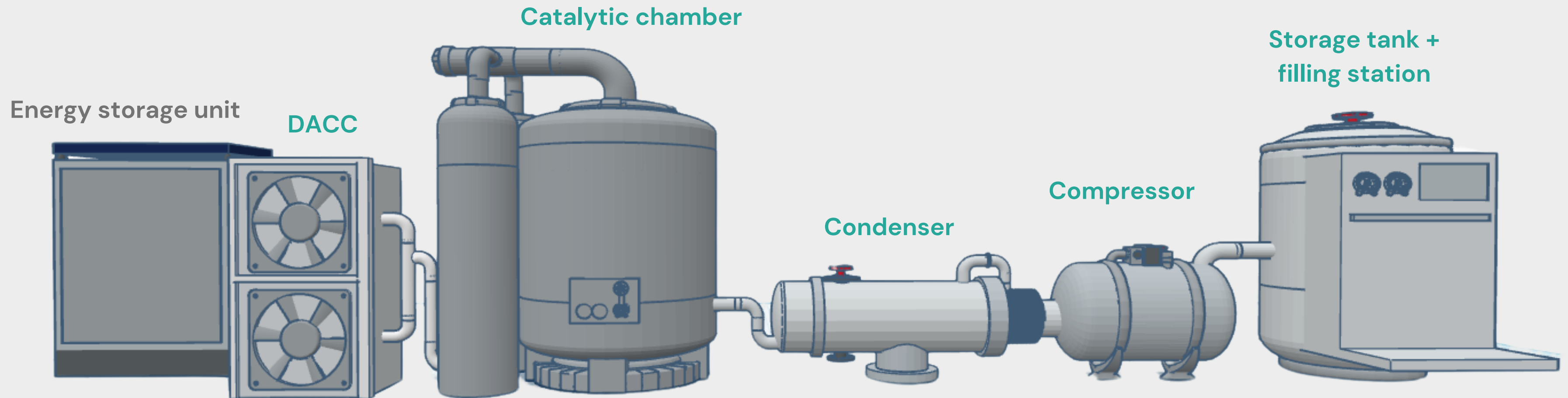
Finally, the compressed oxygen is temporarily stored in a high-capacity, pressurized tank before it is used to fill individual oxygen cylinders in the attached station.



Security measures:

Equipped with a network of pipes and valves, we ensure precise control during the process of filling oxygen cylinders.

Our machine also counts with emergency valves, sensors and AI readings to maintain a constant monitoring of our system in addition to the monthly maintenance and evaluations provided by an approved technician.



Impact & Sustainability

Positive impact and benefits:

Environmental

Reduces greenhouse gases through DACC component, and makes oxygen production more eco-friendly.

Social

Improves healthcare access, saving lives in areas with limited medical resources.

Economical

Lowers hospital costs by reducing dependence on expensive oxygen supply chains.

OxyGen supports 4 SDGs:

SDG #13 CLIMATE ACTION

OxyGen helps fight climate change by removing carbon dioxide from the air while producing oxygen.

SDG #12 RESPONSIBLE CONSUMPTION AND PRODUCTION

OxyGen reduces waste and makes oxygen generation cleaner and more resource-efficient.

SDG #3 GOOD HEALTH AND WELL-BEING

OxyGen provides a steady and reliable supply of medical oxygen, improving healthcare access, especially in remote areas.

SDG #9 INDUSTRY, INNOVATION, AND INFRASTRUCTURE

OxyGen uses advanced technology to make oxygen production more efficient and sustainable.



Technology & Innovation

OxyGen uses direct air carbon capture (DACCC) technology combined with artificial photosynthesis to produce medical-grade oxygen efficiently. This innovative approach captures carbon dioxide from the air and, through a catalytic process, converts it into oxygen and methanol as a byproduct.

Membrane-based DACCC is an emerging technology where air from the atmosphere is taken in by large fans, this air passes through a series of membranes that filter out the carbon dioxide molecules. The now 'clean' air is released while the carbon dioxide molecules trapped in the membranes is stored for use.

Additionally, we incorporate artificial intelligence, specifically machine learning to optimize oxygen production, calculating and making improvements as the processes occur.

Business Model

OxyGen operates as a B2B,
marketing itself through campaigns, direct meetings with clients, and
presentations to NGOs and government campaigns.

Our business' revenue streams

1. Machine sales

Production cost for one machine:

\$18,500

2. Maintenance fee

Retail price per machine:

\$30,000

3. Methanol sales

+ monthly maintenance fee per machine of \$100.

OxyGen is an investment.

On average, a hospital spends around \$200,000 only on oxygen cylinders every year. Investing on OxyGen, their expenses on medical oxygen would lower throughout the years.



1st year

\$200,000

Expenses on oxygen tanks



\$124,800

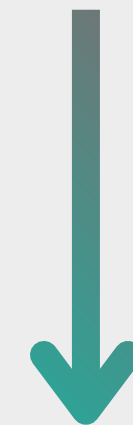
Investment with *OxyGen*

- 4 machines
- Maintenance fee for 4 machines

2nd year +

\$200,000

Expenses on oxygen tanks



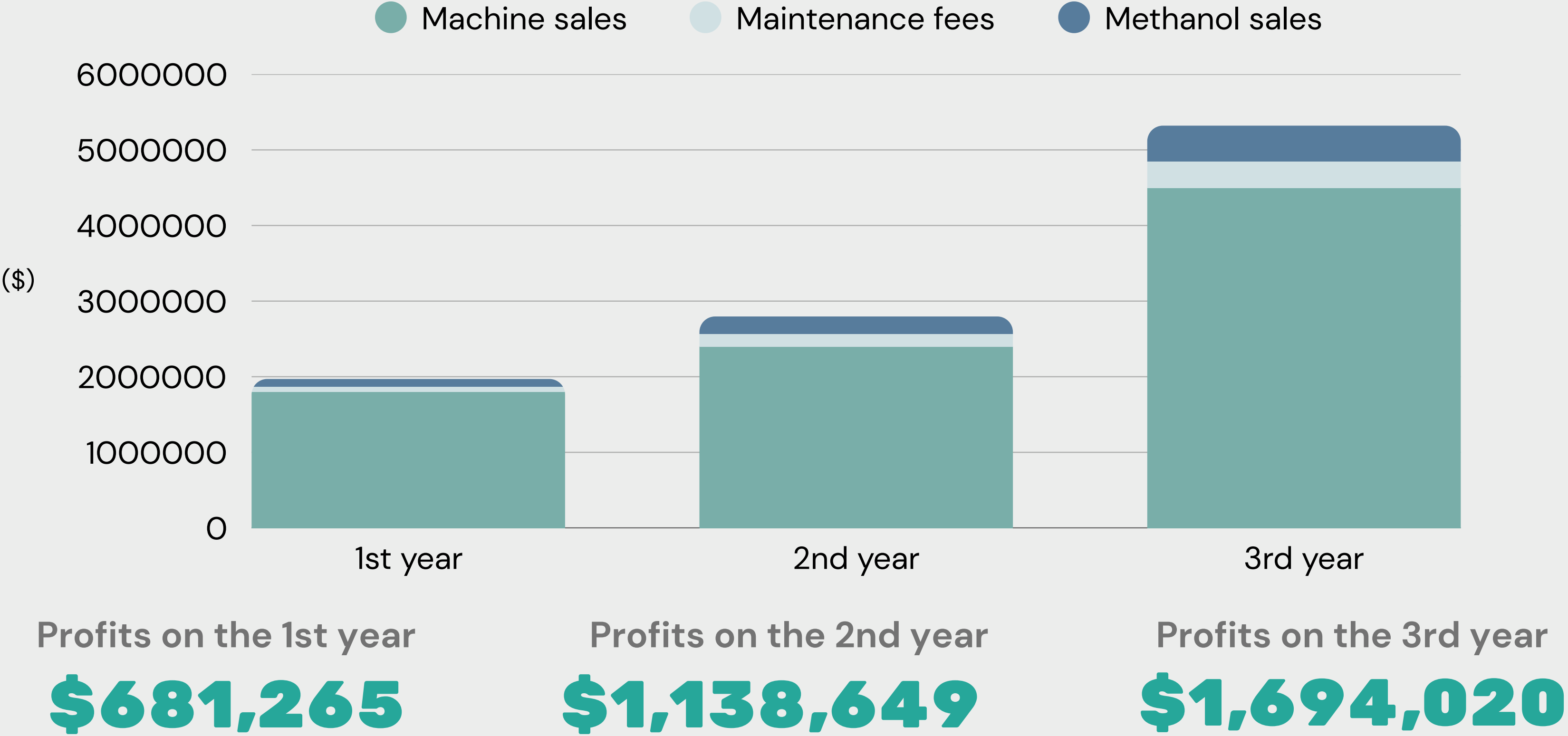
\$4,800

Investment with *Oxygen*

- Maintenance fee for 4 machines



Financial projections for the first three years are:



Challenges & Next Steps

Challenges...

OxyGen faces challenges such as adapting to high-altitude regions, gaining trust in the medical industry, and ensuring cost-effective scalability. Competing with established providers requires strong credibility and regulatory approvals.

Next steps...

We've learned that collaboration with hospitals, researchers, and policymakers is crucial for refining the technology and addressing concerns. Moving forward, we aim to enhance efficiency, lower costs, and expand accessibility by improving our catalytic process and optimizing integration with hospital systems.

Partnering with global health organizations will help bring sustainable oxygen solutions to underserved areas, ensuring a reliable, eco-friendly, and affordable oxygen supply for healthcare facilities worldwide.

Team

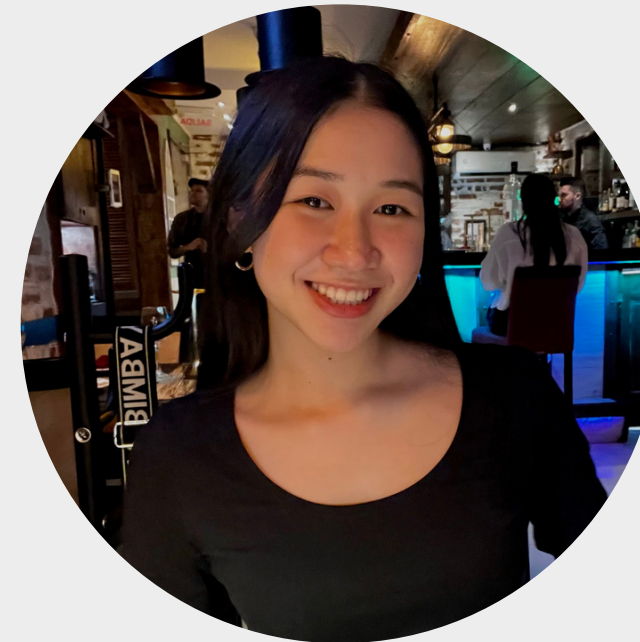
Hello! Meet the *OxyGen* team:



Tvisha Kamdar Mehta

Chief Executive Officer

With great leadership skills, and a passion for medicine, Tvisha oversees our projects, making sure we are realistic and practical.



Ashley Chen Zhu

Chief Operating Officer

Ashley applies her design and organization skills to help put our ideas into creative designs and ensuring they follow regulations.



Alejandra Pinzón León

Chief Marketing Officer

Alejandra develops our social media presence and our brand's image, creating strategies to engage clients and investors using her marketing knowledge.



Suryansh Rawat

Chief Financial Officer

In charge of the business plans, models and estimates, Suryansh makes sure that our innovation transitions into a real profitable company.



Systemics Thinking

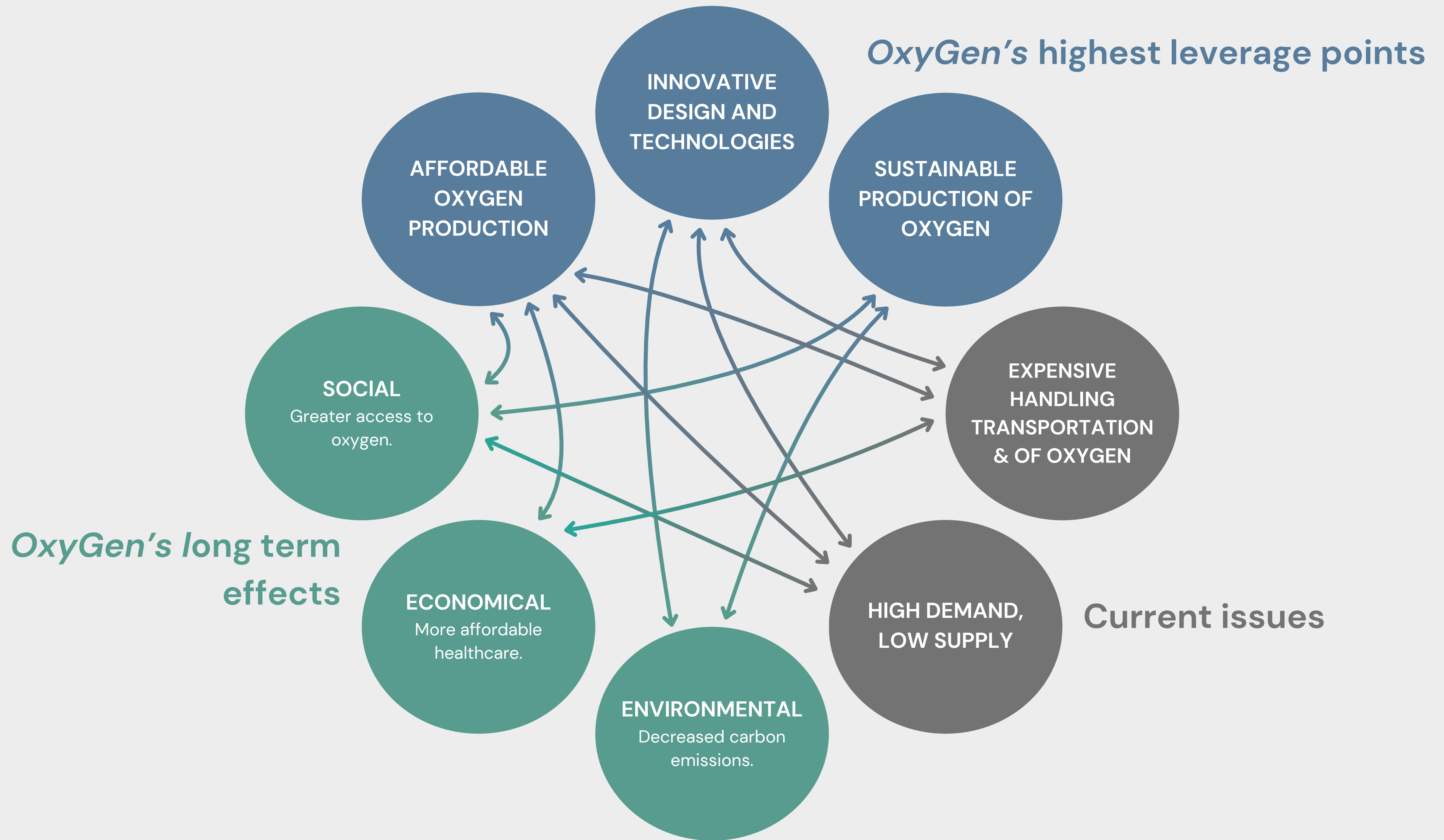
There is a broader system of factors affecting oxygen availability in hospitals. The issue extends beyond high hospital demands, it is affected by management, economic and social factors as well.

Highest leverage points:

- **Affordable OxyGen Production:** OxyGen reduces significantly the costs of hospitals for oxygen production while securing a reliable in-house oxygen supply.
- **Sustainability:** Our approach to oxygen production decreases the environmental impact conventional oxygen production plants have; instead, we focus on creating a system that produces oxygen in line with sustainability goals
- **Technology:** The implementation of AI ensures efficient functioning of the system, making it reliable and optimizes the process.

Long term effects:

- **Social:** Greater access to oxygen, improving healthcare around the world.
- **Environmental:** Decreased carbon emissions and more efficient use of resources for a sustainable production.
- **Economic:** Lower healthcare costs for patients and lower expenses for health centers.



**Support from
Innova Nation**



“Innova Nation challenged us to create, innovate and solve problems beyond the idea – to design, test and refine a real – world solution. We didn’t just develop OxyGen, we grew as innovators, gaining skills that will stay with us long after this project.”

Through Innova Nation, our team gained a platform to implement and improve key skills needed to manage and develop our project. The diverse workshops covered a range of topics such as sustainability, business models and artificial intelligence; laying the foundation for OxyGen. Inspired by the Sustainable Development Goals (SDGs) and cutting-edge research on artificial photosynthesis, we shaped our vision and created OxyGen.

Later, in the accelerator phase of ideas, the program’s resources and connections with industry experts in financial and public speaking played a crucial role in refining our project and how we pitched it. Access to expert guidance allowed us to improve OxyGen’s feasibility and maximize its impact.

It's time for action...

It's time for action.

A bit of your interest is all we need. Support *OxyGen* with feedback, commentary, suggestions, and more.

Contact information:



oxygen.team24@gmail.com

Keep up with our journey:



[@oxygen.team24](https://www.instagram.com/oxygen.team24)



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