Transition from LPG to Green H2

Exacta's primary goal is to identify and develop the most effective applications for green hydrogen (H_2), focusing on maximizing its impact across various industries. In pursuit of this, Exacta is exploring opportunities in both industrial kitchens—where clean cooking solutions are essential—and in demanding processes such as metal cutting and brazing that require high-temperature performance. By addressing these diverse operational needs, Exacta aims to accelerate the transition to sustainable energy practices in sectors with significant fuel consumption. We at Exacta have approached the green Hydrogen implementation through the Distributed Energy production model, whereby we are focussing on production at/near site instead of centralised production and transportation.This permits us to reach Small/Medium enterprise and institutions homes and hospitality estabilishments

As a practical example of this approach, the following framework outlines the transition of commercial kitchen operations from traditional Liquefied Petroleum Gas (LPG) to green hydrogen as a clean cooking fuel. It also details the recovery and utilization of oxygen generated during hydrogen production, demonstrating a comprehensive model for decarbonizing kitchen operations while capturing added value from by-products.

The objective of this reference framework is to demonstrate the **technical approach, environmental benefits, and high-level commercial implications** of adopting green hydrogen in place of fossil-based cooking fuels. The parameters and values presented herein are **illustrative only** and are intended to support conceptual evaluation, feasibility assessment, and decision-making discussions.

Exacta is actively focused on developing applications for green hydrogen, targeting not only industrial kitchens but also operations such as metal cutting and brazing. This dual emphasis ensures that green hydrogen solutions are tailored for both culinary and high-temperature industrial processes, supporting broader adoption across diverse sectors.

This document presents an **example project framework** illustrating the transition of commercial kitchen operations from **Liquefied Petroleum Gas (LPG)** to **Green Hydrogen (H_2)** as a clean cooking fuel, along with the **recovery and utilization of Oxygen (O_2)** generated during hydrogen production.

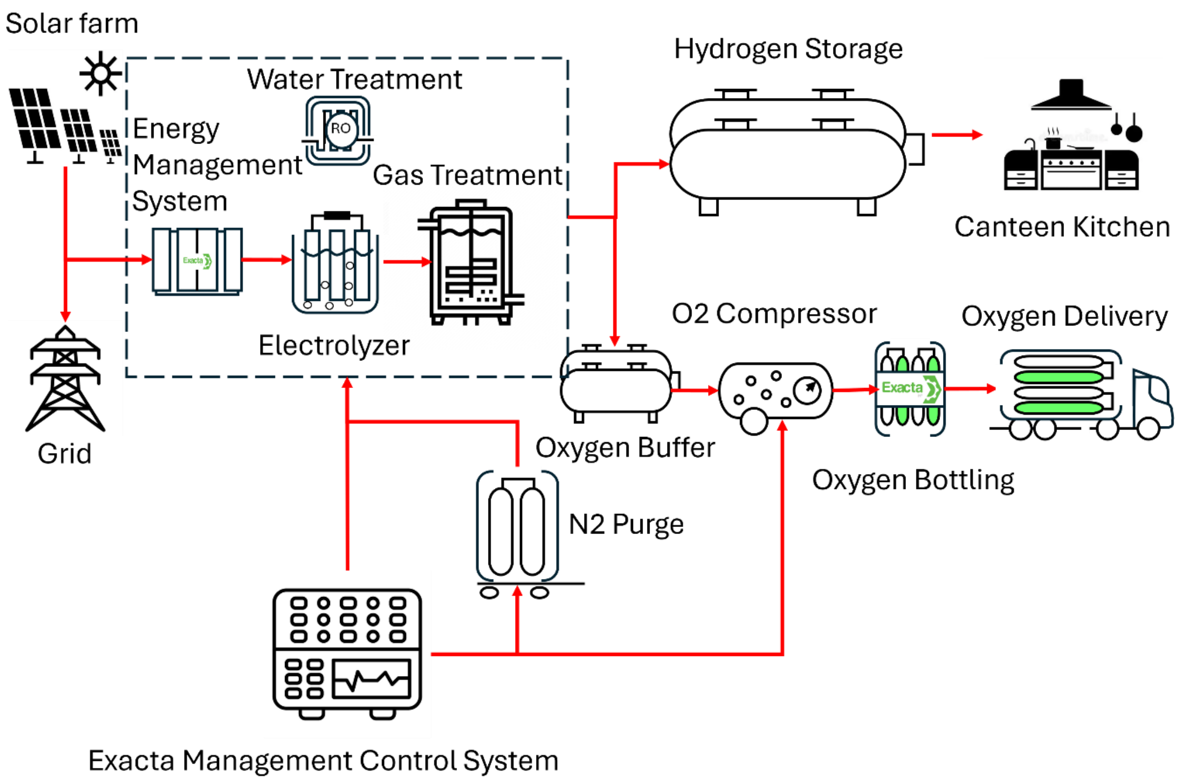
1. Project Approach Overview

The proposed system replaces conventional LPG-based cooking with **hydrogen generated through renewable-powered electrolysis**, ensuring zero carbon emissions at the point of use. The overall approach is designed to ensure operational continuity, safety, and scalability.

Key elements of the project approach include:

- Migration from LPG burners to hydrogen-compatible cooking systems
- On-site or near-site hydrogen generation using renewable electricity
- Safe hydrogen storage, distribution, and kitchen integration
- Recovery, purification, and utilization or sale of by-product Oxygen
- Modular system design enabling phased expansion

This approach enables commercial kitchens to transition from fuel consumption to **clean energy asset ownership**, while maintaining cooking performance equivalent to conventional LPG systems.



2. Environmental Impact and Carbon Footprint Reduction

The shift from LPG to Green Hydrogen delivers a **structural reduction in carbon emissions**.

- LPG combustion inherently produces carbon dioxide and contributes to direct (Scope-1) emissions.
- Green Hydrogen combustion produces **only water vapor**, resulting in zero carbon emissions at the kitchen level.
- When hydrogen is produced using renewable electricity, the full energy chain supports long-term decarbonization goals.

Comparative Environmental Matrix (Indicative)

Parameter	LPG-Based Kitchen	Green Hydrogen Kitchen
Fuel Source	Fossil-based	Renewable-derived
CO_2 Emissions at Point of Use	High	Zero
Local Air Pollutants	Present	Negligible
Carbon Cost Exposure	Increasing	Eliminated
Alignment with Net-Zero Targets	Limited	Strong

3. Oxygen Recovery and Value Creation

A distinctive feature of the green hydrogen system is the **generation of Oxygen as a by-product** during electrolysis.

Instead of venting Oxygen to atmosphere, the project framework enables:

- Recovery of high-purity Oxygen
- Sale to external medical, industrial, wastewater, or food-processing users
- Internal utilization where applicable

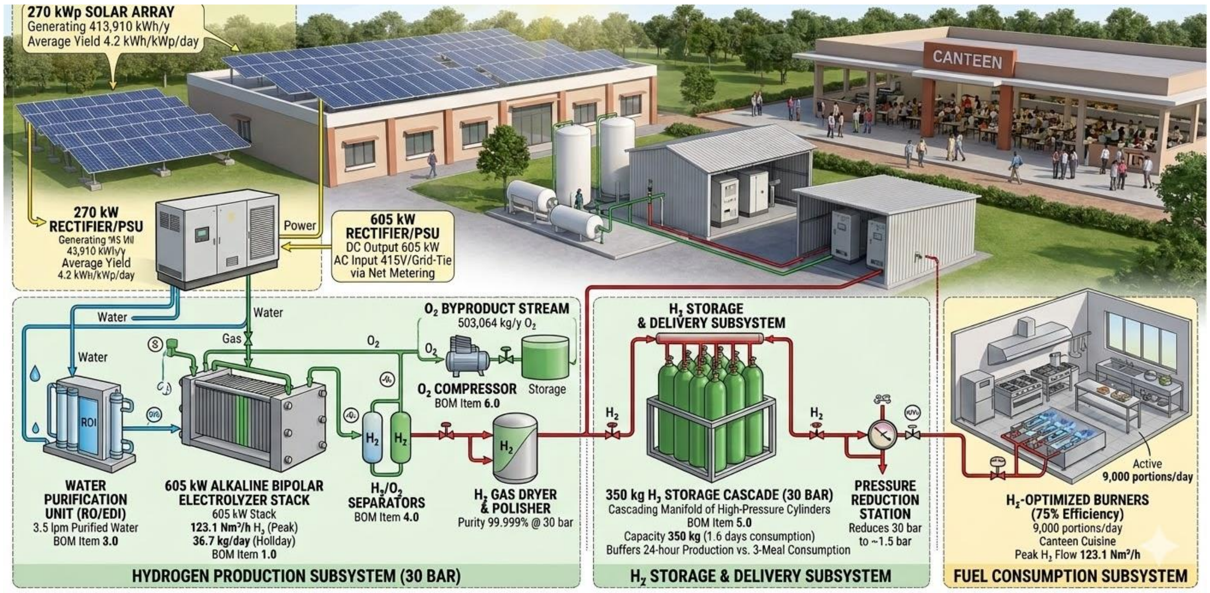
This transforms the energy system into a **dual-output model**, producing both clean fuel and a commercially valuable by-product.

Oxygen Utilization Matrix (Indicative)

Parameter	LPG System	Hydrogen with O_2 Recovery
By-product Generation	None	Oxygen
Commercial Value	Nil	₹10–20 lakh / year
Revenue Impact	None	Positive
Contribution to Project ROI	None	Enhancing

4. Capital Expenditure (CAPEX) Comparison

The transition to Green Hydrogen involves higher upfront investment compared to LPG; however, this investment results in long-life, modular energy assets.



CAPEX Comparison Matrix (Indicative – INR)

Parameter	LPG System	Green Hydrogen System
Initial Capital Investment	₹15–25 lakh	₹1.8–2.5 crore
Major Assets	Burners, piping	Electrolyzer, storage, controls
Asset Life	8–10 years	15–20 years
Expandability	Limited	Modular / scalable
Long-Term Asset Value	Low	High

5. Operating Expenditure (OPEX) Comparison

Operating costs differ significantly in structure between LPG and Green Hydrogen systems.

OPEX Comparison Matrix (Indicative – INR)

Parameter	LPG System	Green Hydrogen System
Primary Cost Driver	LPG fuel	Electricity
Annual Energy Cost	₹35–45 lakh	₹20–30 lakh
Price Volatility	High	Lower
Logistics Dependency	High	Minimal
Maintenance Cost	Low	Moderate

6. Carbon Cost and Compliance Impact

As carbon regulations tighten, fossil fuel-based kitchens face increasing compliance and implicit carbon costs.

Carbon & Compliance Matrix (Indicative – INR)

Parameter	LPG System	Green Hydrogen System
Direct CO_2 Emissions	High	Zero
Carbon Cost Exposure	₹8–15 lakh / year (implicit)	Nil
ESG Compliance Burden	High	Minimal
Regulatory Risk	Increasing	Low

7. Net Cost Position and ROI Outlook

When evaluated on a lifecycle basis, Green Hydrogen systems benefit from **fuel cost stability, carbon cost avoidance, and oxygen revenue offsets**.

Net Annual Cost Position (Indicative)

Parameter	LPG System	Green Hydrogen System
Gross Operating Cost	High	Moderate
Oxygen Revenue Offset	Nil	Yes
Carbon Cost Avoidance	No	Yes
Net Cost Trend	Increasing	Stable / declining

ROI and Lifecycle Value Matrix (Indicative)

Parameter	LPG System	Green Hydrogen System
CAPEX Recovery	Not applicable	5–7 years (indicative)
Operating Life	Limited	Long-term
Cost Trajectory	Rising	Improving
Strategic Value	Fuel expense	Energy asset
Long-Term ROI Potential	None	Strong

8. Overall Value Proposition

As demonstrated through the above matrices, the Green Hydrogen Kitchen model represents a **fundamental shift** from fossil fuel dependence to a **clean, future-ready energy system**.

Key outcomes include:

- Elimination of combustion-related carbon emissions
- Reduced exposure to fossil fuel price volatility
- Improved ESG and regulatory alignment
- Enhanced long-term economics through Oxygen monetization

This example framework illustrates how commercial kitchens can achieve **decarbonization, cost stability, and value creation** through the adoption of Green Hydrogen.

Disclaimer

All figures and parameters presented in this document are indicative reference values provided solely to illustrate comparative scale. Actual project values will depend on site conditions, system sizing, operating hours, electricity tariffs, and commercial arrangements.