Company name:
Electraqua Tech S.L.

Business Plan

2025-2030

UNIVERSITAT DE BARCELONA

Spin-off

Content

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ABOUT ELECTRAQUA

Vision

To be the **global leader** in electrochemical wastewater treatment, pioneering technologies that set new standards for **environmental sustainability**, operational excellence, and **water resource conservation** in the pharmaceutical and cosmetics industries.

Mission

To revolutionize industrial wastewater treatment in the pharmaceutical and cosmetics industries through **innovative** electrochemical technologies, contributing to a **cleaner future**.

Values

- We are committed to excellence through **continuous improvement**, actively seeking feedback from partners and customers to **enhance our services**.

- Commitment to **sustainable solutions** that mitigate global climate challenges, fostering a **greener and more resilient future**.

Founders & executive team

Dr. M. Fernanda Murrieta Chagollán

CEO & Co-founder

- Experience in **electrochemical technologies** for water treatment and **reactor characterization.**
- Complementary **business training** (PRODUCTE project from AGAUR)
- Finalist in the **13th PREACCELERACIÓ program** by Barcelona Activa

Dr. Birame Boye

CSO & Co-founder

- Experience in the field of **technology transfer** and **startup creation** in Africa, EU and America.
- Twice winner of the Veneto StartCup Business Plan and R&D competitions in Italy in 2004
- > 40 publications, patents and conferences

Prof. Ignacio Sirés Sadornil

Scientific advisor & Co-founder

- Associate Professor, at the Faculty of Chemistry of the University of Barcelona
- H-index = 64
- **17500 citations**
- World Top-2% (Stanford) & Top-3 EChem Spain
- **2 PATENTS**

Dr. Diego R.V. Guelfi

Research Manager

- >5 years of experience in **electrochemical technologies** for water treatment
- Postdoctoral researcher at the University of Barcelona

Advisors

Prof. José Luis Cortina

Technology advisor

Dr. Benoît F.C. Lefevre

Technology advisor

Dr. Francisco Alcaide

Technology advisor

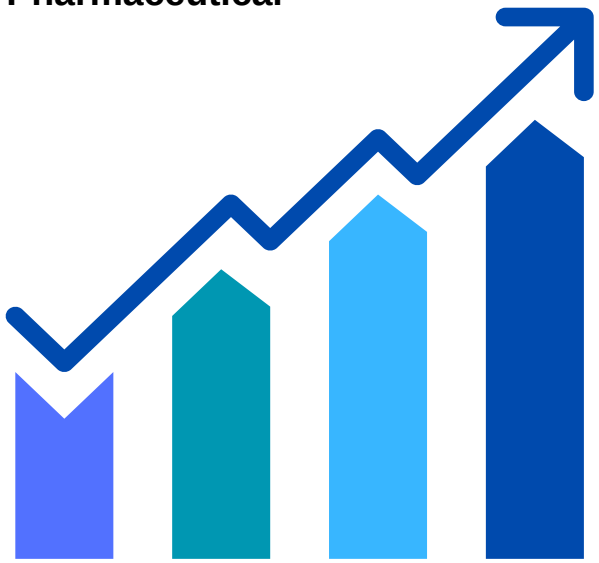
Mateo B. Pastur

Business advisor

THE MARKET OPPORTUNITY & TRENDS

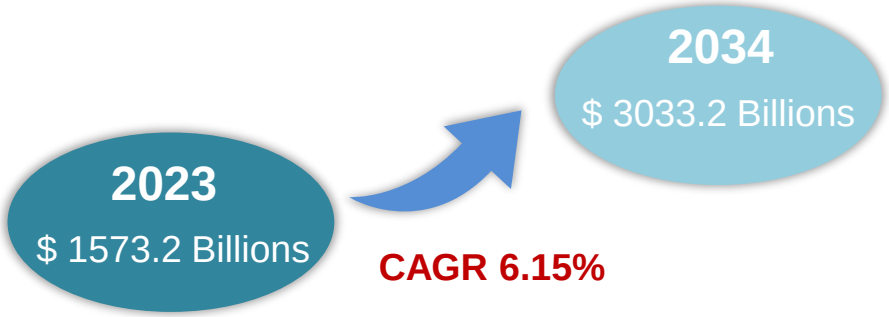
Market evolution

- **Water & wastewater treatment**
- **Pharmaceutical**



- According to the BBC research report, the projected **market size of the global water and wastewater treatment** is projected to grow

- According to the Towards Healthcare report, the **global pharmaceutical market size** is projected to grow



Market trends in water treatment

- Adoption of advanced technologies (membrane filtration, UV disinfection)
- Water reuse & recycling solutions
- New technologies for energy neutrality
- Decentralized & modular systems

- Stringent regulations
- Fluctuating price of raw materials for water treatment
- Real time monitoring and optimization

Waster and wastewater treatment equipment market. Markets and markets Link

Waster and wastewater treatment equipment market. Precedence Research Link

Market size

Hypothesis and calculation

TAM only considers pharmaceutical companies, neither cosmetic nor urban wastewater.

In Europe, there are 3,000 manufacturing sites according the following data related to pharma development products.

In USA, there are 1,574 biopharmaceutical manufacturing sites according to this report, although it is forecast that these add to a large number of other manufacturing sites of interest.

SAM only considers data in Europe.

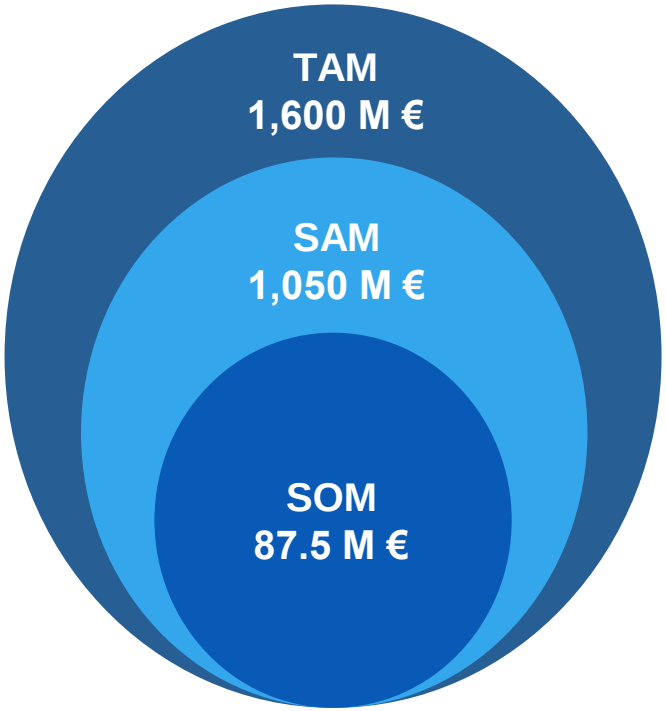
SOM considers the following data from the following countries:

- Spain
- France
- UK
- Portugal
- Italy

However, this only includes CDMO manufacturing sites and not all the potential sites where the solution of Electraqua can be installed. Other aggregated data were not available.

For the pricing strategy, **350 k€** per module was considered, with the estimation that one module will be needed per manufacturing site. However, it is difficult to estimate the exact number of modules to be installed, as it depends on volume of wastewater at each manufacturing site.

The market is bigger than represented in this TAM calculation, since cosmetic data are not included.



OPPORTUNITY

Opportunity

Water is a valuable resource that is under pressure worldwide.

- Water stress is already occurring in Europe. It affects 20% of Europe's territory and 30% of the population every year [1].
- Europe's waters continue to be impacted by chemicals. **Only 29%** of Europe's surface water bodies achieve a **good chemical status** that can be partly attributed to long-lived pollutants [1].
- Industrial operations release **various harmful substances into water bodies**. These include **organic matter, nutrient-rich compounds like nitrogen and phosphorus** [2].
- **Micropollutants** are found in small concentrations in water bodies with adverse impacts on public health. Micropollutants originate from products that are used daily, including **industrial chemicals, pharmaceuticals, cosmetic products**, among others [3].

[1] Europe's state of water 2024: the need for improved water resilience, EEA Link

[2] Industrial pollutant releases to water in Europe, EEA Link

37%

of EU surface water are standing in good ecological status [1]

Micropollutants

enter water bodies primarily through wastewater treatment plants [3]

Opportunity

Future European Union (EU) policies aimed at reducing micropollutants in water.

- Water Framework Directive (WFD, 2.000) mandating EU member states to achieve good water quality in all surface and groundwater bodies by 2027. This involves **prioritizing reductions in wastewater generation** and **pollutant discharges** (Directive 2000/60/EC, 2000) [4].

- **The Environmental Quality Standards Directive** (Directive 2008/105/EC) lays down environmental quality standards (EQS) for priority substances and certain other pollutants as provided by the WFD. The directive sets EQSs for **priority substances and eight other pollutants**. These substances include the **metals cadmium, lead, mercury and nickel, and their compounds; benzene; polyaromatic hydrocarbons; and several pesticides** [5].

- The recent **Directive (EU) 2024/3019** of the European Parliament and the Council of 27 November 2024 concerning urban wastewater [6], highlights the need to take action to address the issue of **micropollutants**, which are hazardous for public health and the environment even in low concentrations. Then, **quaternary treatments should be introduced** to ensure micropollutants removal from wastewaters.

[4] Directiva 2000/60/EC Link

[5] Directiva 2088/105/CE Link

[6] Directiva 2024/3019 Link

The problem

Pharmaceutical and cosmetics companies will meet new limitations: Extended producer responsibility

Pharmaceuticals are essential for human and animal health. However, increasingly they are recognised **as a contaminant of emerging concern to environmental and human health when their residues enter freshwater systems**.

- Worldwide there have been attributed **5 million deaths to antibiotic-resistant bacterial infections** in 2019 alone. In **2050**, antibiotic resistance could be the leading **cause of death.**

- Member States shall take measures to ensure that by **31 December 2028**, producers who place any of the micropollutants listed in the Directive on the market have **extended producer responsibility** [6].

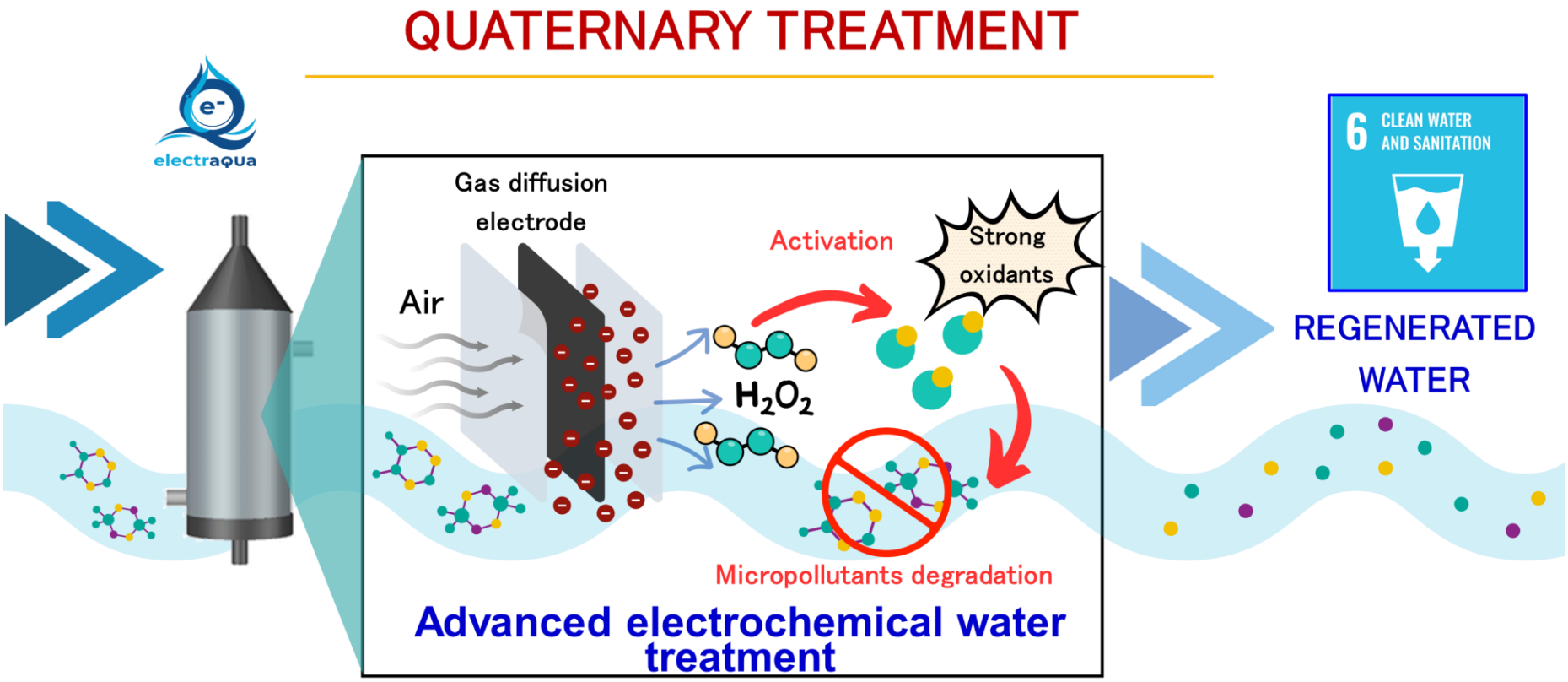
92%

of toxic micropollutants in wastewater come from the pharmaceutical and cosmetics sectors [6]

80%

of the cost for micropollutant removal might be paid by pharmaceuticals and cosmetics companies [6]

The solution



The value proposition

Electraqua system removes persistent pollutants and microorganisms using a reactor that generates **Hydrogen Peroxide** on-site

1. **Hydrogen peroxide** (H_2O_2) is generated on-site, eliminating the costs of procurement and the safety risks associated with its transportation, storage, and handling. The system reduces reliance on external suppliers and the associated supply vulnerabilities. This increases operational reliability and reduces the risk of disruptions due to shortages or logistical issues.

2. **Complete elimination of pharmaceutical ingredients and toxics of the water systems** by implementing a plug-and-play solution in-company in pharmaceutical and cosmetics sectors.

3. The electrochemical reactor can be **easily integrated with other treatment systems** without the need for major changes in the current infrastructure, it does not require an engineering civil operation and could potentially lead to a **30% reduction of costs**.

4. Only **air and electricity** are used as the primary inputs to generate the main reagent required in the treatment, and **no additional chemical products are needed**. Any potential chemical consumables are inexpensive, and the catalyst does not rely on critical raw material (CRMs).

The value proposition

Electraqua system removes persistent pollutants and microorganisms using a reactor that generates **Hydrogen Peroxide** on-site

- The electrochemical **reactor is equipped with a gas diffusion electrodes** (the best for H_2O_2 production).
- The solution provides the capacity to **work on in continuous operation,** without the need of recirculation. With this new reactor design, the electrochemical reactor is transformed from one intended for H_2O_2 production to one for contaminant degradation.
- Additionally, it **increases the cathodic regeneration of the catalyst** (commonly iron) used in electro-Fenton and photoelectro-Fenton processes, and more importantly, reduces ohmic drop, allowing for **lower energy consumption and treatment of poorly conductive waters.**
- The patent with application number PCT WO2021160831 has been filled in 2020 and **protects the design of the electrochemical reactor.** The patent is filled in EU, USA and China and is currently under evaluation. This patent protects the entire system.

International patent application

PCT: *WO2021160831*

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Competitive advantages

The competitive advantage identified is as follows:

- Compared to other treatment methods, the proposed system ensures **100% removal of persistent pollutants and microorganisms**. The proposed system will complement the treatment carried out by water treatment plants.
- The system offers safe operating conditions, is sustainable, and easily scalable.
- By generating chemicals on-site, the system reduces **the environmental footprint associated with the production, transportation, and storage of chemicals**. This aligns with principles of green chemistry, which prioritize environmentally sustainable practices.
- Electricity-driven treatment process, allowing the system to be **integrated with various types of clean energy.**
- It ensures **minimal generation of toxics residues,** as it is a transformational technology.
- Similar technologies operating with recirculation have been identified so far but they have the challenge of only accepting low volumetric capacity. This implies low oxidative efficiency of the produced H_2O_2.

Competitive advantages

Alternatives

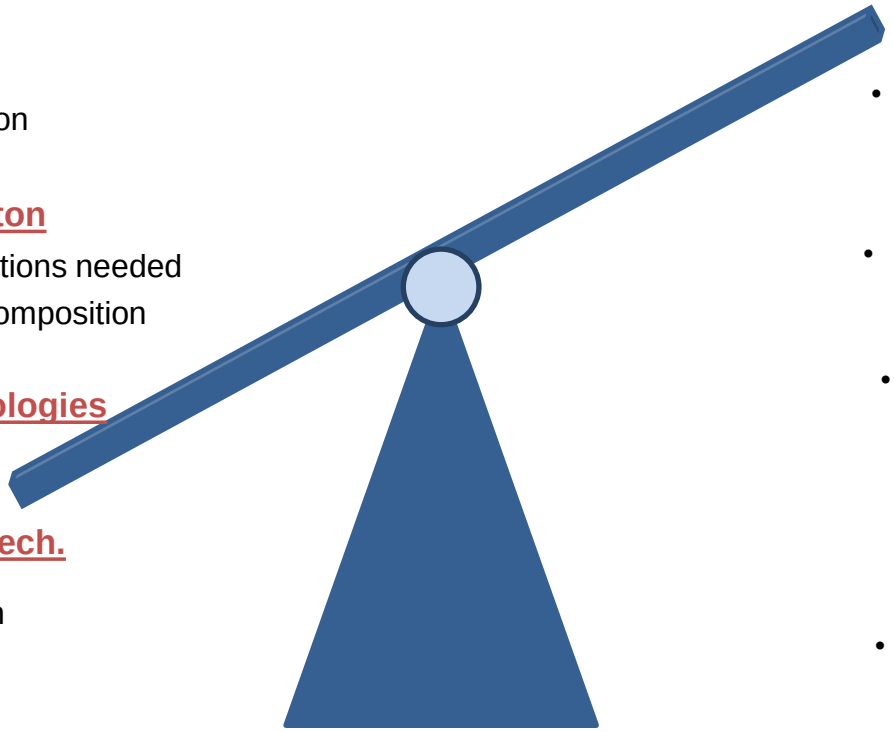
Active Carbon
- Physical separation
- Regeneration costs
- High production of solid waste

Ozone
- Bromates production

Conventional Fenton
- Safe storage conditions needed
- Costs of H_2O_2 decomposition

Membrane Technologies
- High costs

Electrochemical Tech.
- Chlorine production
- Toxic by-products



- **On-site production** of the main reagent for the treatment: **H_2O_2**
- **Reduces** the dependance of **external suppliers**
- **Only air and electricity** as main consumables
- **Complete degradation** of organic pollutants and microorganisms
- **Easy integration** with other systems

Direct competitors

Company	Location	Technology	Low CAPEX	100% degradation	No toxic waste and by-products	High reactor capacity by step
electraqua	 Barcelona	Electrochemical H_2O_2-based processes	✓	✓	✓	✓
HYK Hydrokemos	 Barcelona	Electro-oxidation based on chlorine production	✗	✓	✗	✗
e-Watts	 Barcelona	Electrocoagulation, electro-oxidation, electro-peroxone	✗	✓	✗	✗
HYDROS QUÍMICA	 Madrid	Electrocoagulation, Fenton process	✗	✓	✗	✗

Why now?

- Water stress worldwide.
- 37% of Europe's surface water bodies achieved a good or high ecological status and only 29% achieved a good chemical status.
- In 2050, antibiotic-resistance infections could be the leading cause of death.
- New Directive 2024/3019 concerning urban wastewater:
  Extended Polluter Responsibility for pharmaceutical and cosmetics industries.
- Member States will first update national implementation programmes in 2028.
  By 2030, quaternary treatments must be implemented.

GO TO MARKET

Target market

The main target markets include pharmaceutical and cosmetics companies. As the initial focus, Electraqua is targeting the entire value chain of the pharmaceutical sector, which is significant in Spain:

1. Pharmaceutical drug manufacturers for human and animals.
2. Fine chemical companies to produce pharma products.

The pharmaceutical sector in terms of company size is divided into:

Large Corporations: The pharmaceutical industry is characterized by several multinational corporations (MNCs) that dominate a significant portion of the market. These large corporations typically have extensive research and development (R&D) capabilities, global manufacturing facilities, and diversified product portfolios. Examples of large pharmaceutical companies in the EU include Novartis, Roche, Pfizer, and Sanofi.

SMEs: In addition to large corporations, there are numerous SMEs operating in the pharmaceutical sector across the EU. These SMEs may specialize in niche therapeutic areas, drug delivery technologies, or contract manufacturing services. They often play a vital role in fostering innovation, providing specialized expertise, and contributing to the diversity of the pharmaceutical ecosystem.

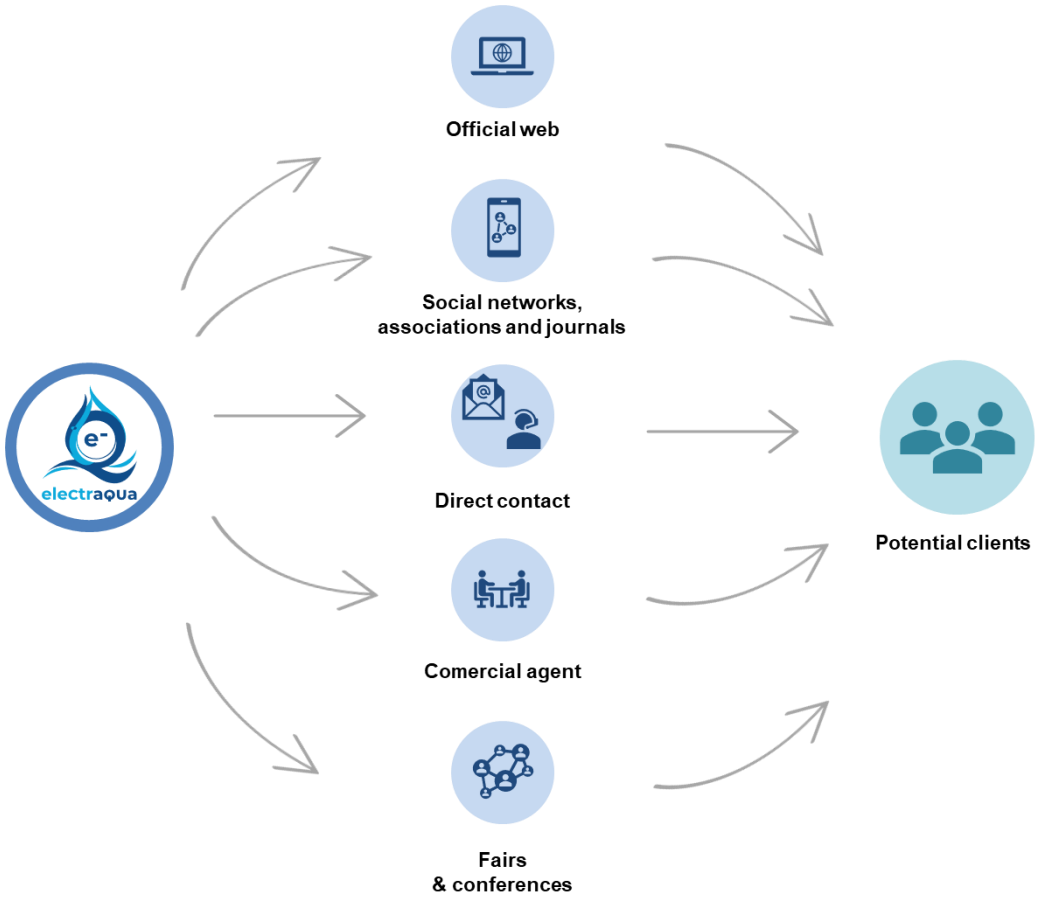
Target market

The main target market is pharmaceutical companies and cosmetics industries.

They are already collaboration agreements in place to test the technology at pharmaceutical manufacturing sites:

We are aiming to attract those companies that have strong environmental policies in terms of water scarcity and reuse in their industrial plants.

Relevant channels



- Advertise products & services
- Blog & newsletter

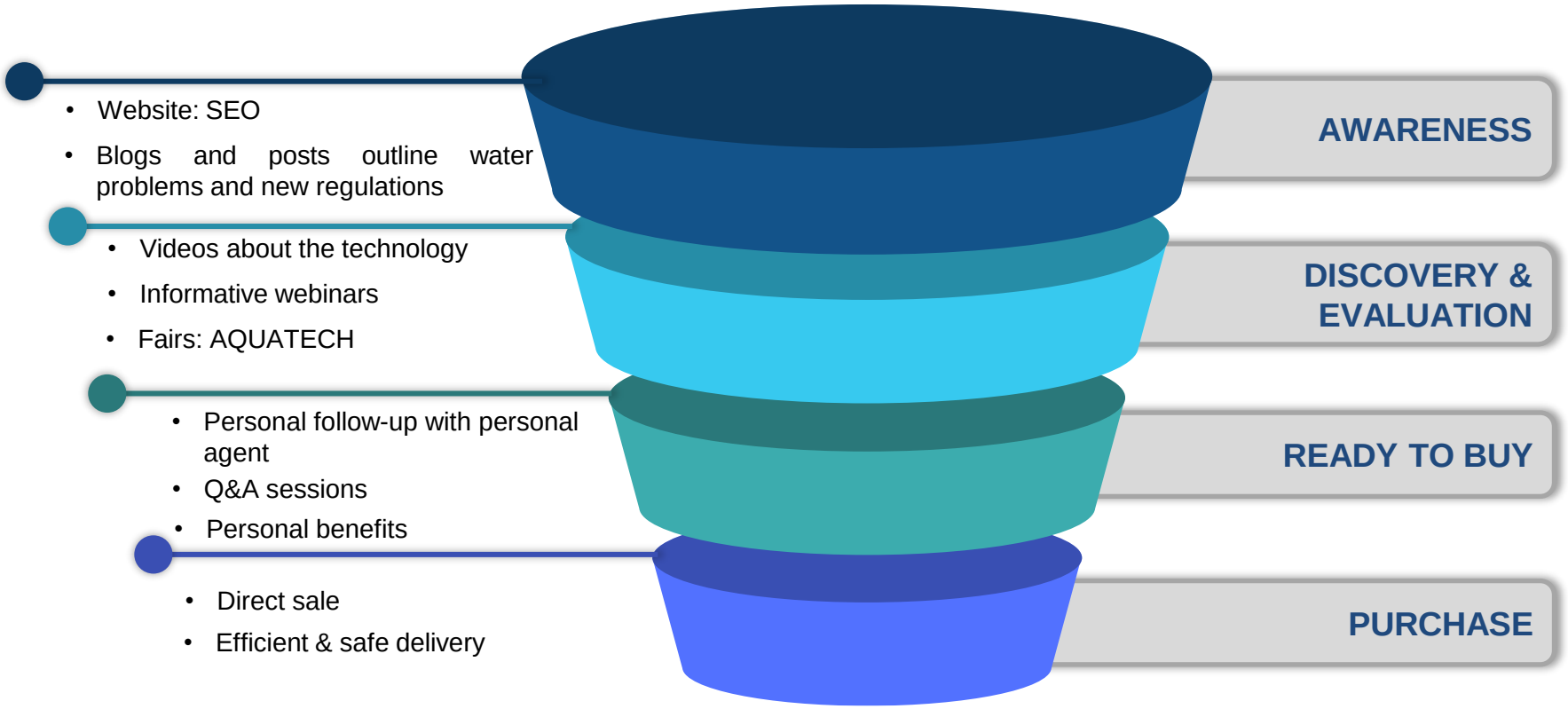
- Connect with potential clients & partners
- Constant maintenance to increase visibility
- Clusters in water sector (Catalan Water Partnership)
- Publications in environmental journals (RETEMA)

- Email campaigns to promote the company, including education content to better understand the value proposition.
- Direct calls

- Building relationships
- Find contacts

- Water sector
- Pharmaceutical sector
- Cosmetics sector

Sales funnel



Pricing strategy

- Electraqua designs and sells the reactor, and installs the system in the client site.
- 3 different installments – 60% in advance, 30% when installation is ready, 10% after 48 h of functioning of the plant.
- The product is sold as a module that contains the needed reactors to treat the water flow of the potential client. The common module will comprise 10 reactors with a total capacity of 1000 L/h. The full system costs around 500 - 700 k€ depending on the number of modules to be installed.
- O&M contract for the electrochemical modules as an annual recurrent revenue in each of the client, around 15 – 23 k€.

Relevant operation activities

TECHNOLOGY ROADMAP

TRL	Description	Achievement	Public funds	Date
3 -4	Experimental proof of concept Technology validated in laboratory scale	**First prototype (1-5 L/h) for laboratory-scale testing**. This refers to the development of the initial prototype, capable of processing water at a rate of up to 5 litres per hour, specifically designed for testing and evaluation in laboratory. Incorporation of María F. Murrieta into the team.	25 k€	2020
5	Technology validated in relevant environment	**Construction of the scaled prototype (10-100 L/h) for validation in a relevant environment.** Design and construction of the test bench allowing for the execution of the corresponding experiments to validate the technology. **Obtaining wastewater from different sectors of interest** for characterization and subsequent use in the developed system: This involves acquiring wastewater samples from various sectors or industries for analysis and characterization. **Technology validation in simulated environments.** **Patent** entry into national stages (Europe, USA, China).	100 k€	2021
6	Technology demonstrated in relevant environment	**Tests to evaluate the technical feasibility** of the developed system by obtaining key performance indicators (KPIs) related to hydrogen peroxide production and the removal of target contaminants. **Working with real wastewater from relevant companies** for characterization and use in technical tests to validate the technology. **Designing the flow system for conducting experimental tests**: This includes designing and setting up the flow system necessary for conducting experimental tests. **Characterization of the electrochemical reactor**, study of hydrogen peroxide generation capacity. Conducting **experimental tests** in simulated media using various electrochemical advanced oxidation processes to validate the constructed system. Tests of reactor stability. Incorporation of Diego R.V. Guelfi into the team.	300 k€	2022-2024

TRL	Description	Achievement	Resources	Date
7	System prototype demonstration in operational environment	**Demonstrating pilot operation** in a pharmaceutical company for 1 year with real water flow rates. An agreement is already signed. Pre-sale **product refinement and design optimization**. Defining the **specifications**. The objective is to ensure the robustness of the Electraqua system.	500 k€	2025-2026
8	System complete and qualified	Pilot testing at **2 different sites** from different sectors with actual water flows. Engineering project for manufacturing and/or assembling Electraqua units. Certification.	1 M€	2026-2027
9	Actual system proven in operational environment	Build the manufacturing process with an **industrial partnering** strategy, set-up operations and sales strategy to be ready for market launch. Agreement with an industrial partner to **scale the business model**	NA	2027
NA	Product industrialization and market commercialization	Sales team development **Technical team growth** for the operation of the systems	NA	2027-2028
NA	Product internationalization strategy	Agreement with an **international industrial partner** First international sales Achieve a portfolio of 22 clients	NA	2029-2030

Programs participated

PREACCELERACIÓ
(October 2024 - February 2025)

- Promotes entrepreneurial projects and Deep Tech start-ups
- Improves entrepreneurial skills
- Boosts the business model
- Attracts professional private investors

BUSINESS MODEL

Business model

Fixed income (one time sale)

- Advanced water treatment systems (Turnkey plants)
- Electrochemical reactors

Recurring revenues

- Operation & Maintenance activities
- Consumables (Electrodes)
- Systems rental & water as a service

FINANCIAL PROJECTIONS

Financials

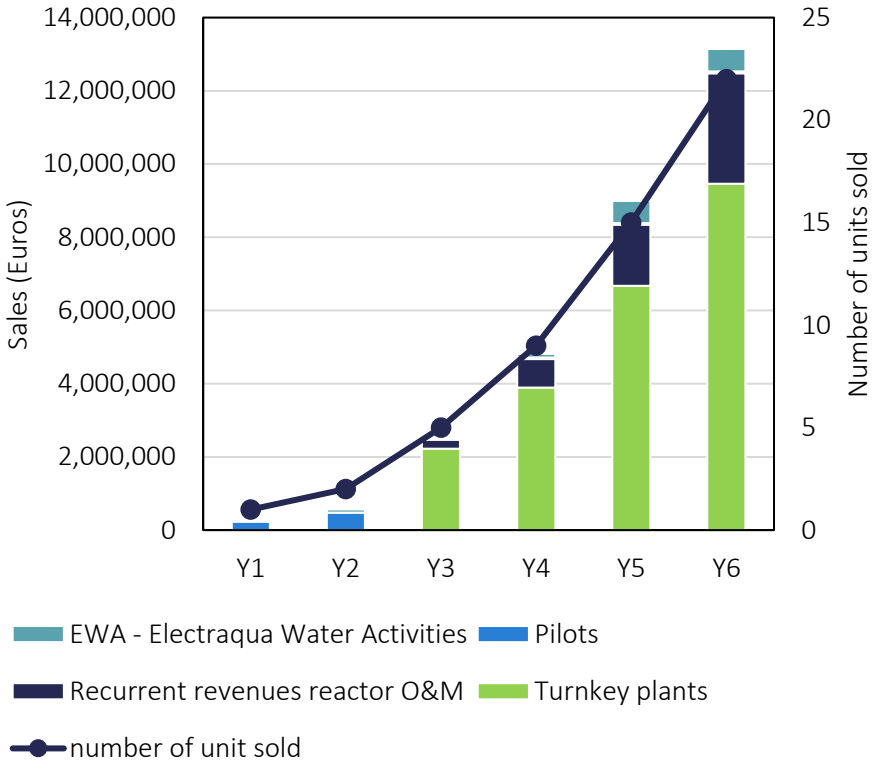
Direct sales – The sales will be mainly achieved by **direct selling**. That means that the generation of the lead will have two main channels:

- Digital marketing: social network, direct email marketing, online adverts, cold calling, associations and journals.
- Active participation in fairs with stands or online events or seminars.

Commercial Agents – In order to grow internationally there will be the need of creating a network of independent commercial agents that are specialised in sustainable technologies in water, pharma and cosmetic sectors.

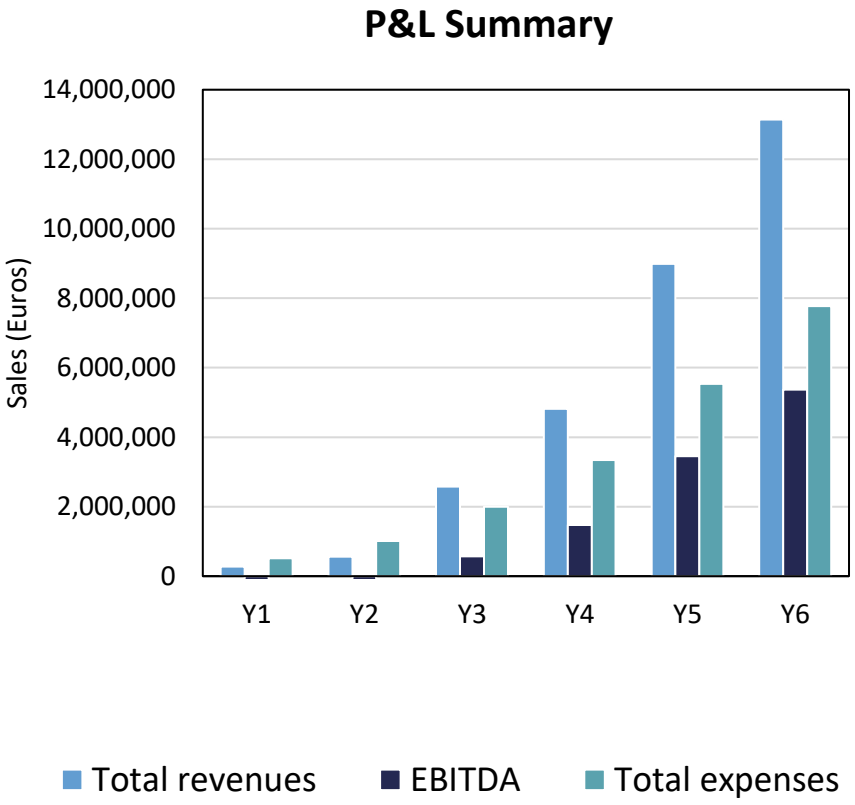
System integrators (Pre-escriptors) – They will have a role in the sales service building the plant but it can happen that at the same time they are commercial agents of our technology.

- Companies that offer water treatment services.
- Environmental engineering and consultancy.

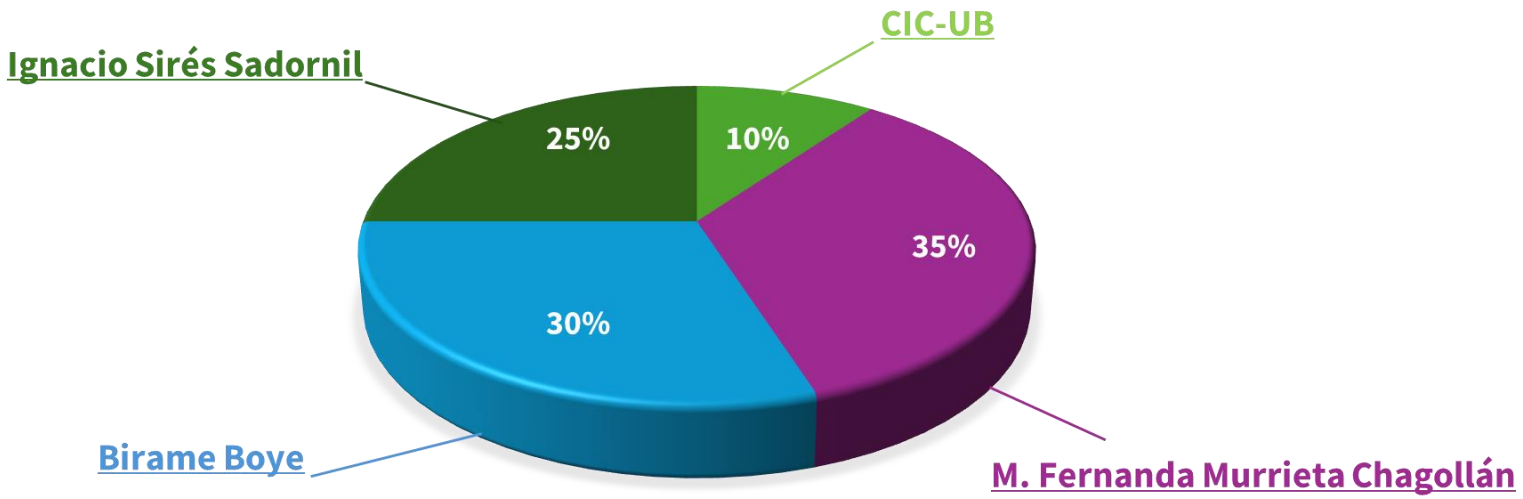


Financials

- Electraqua is planning to **develop 3 pilots** in different companies before scaling up to commercial sales.
- In 2027, it is planned to **acquire 3 new clients** to reach 2.5 M€ of sales.
- Total sales will reach **12 M€ in 2030** when the new legislation is planned to come in place. This means to have **22 clients** where they have installed the modules.
- Gross margin and net profit is planned to reach up to **57% and 28% in 2030**.
- The total funding need for the first two years of development of technology is around **995 k€**.
- It is planned to have grants for the value of **635 k€** considering Neotec and EU funds.
- The total private funding round is **350 k€** .
- The use of funds is mainly to **develop the technology and cover all the salary cost involved in this development**.

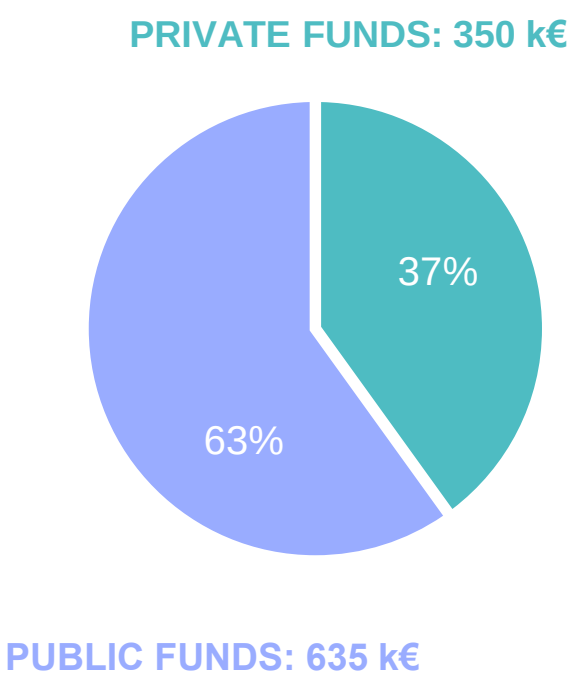


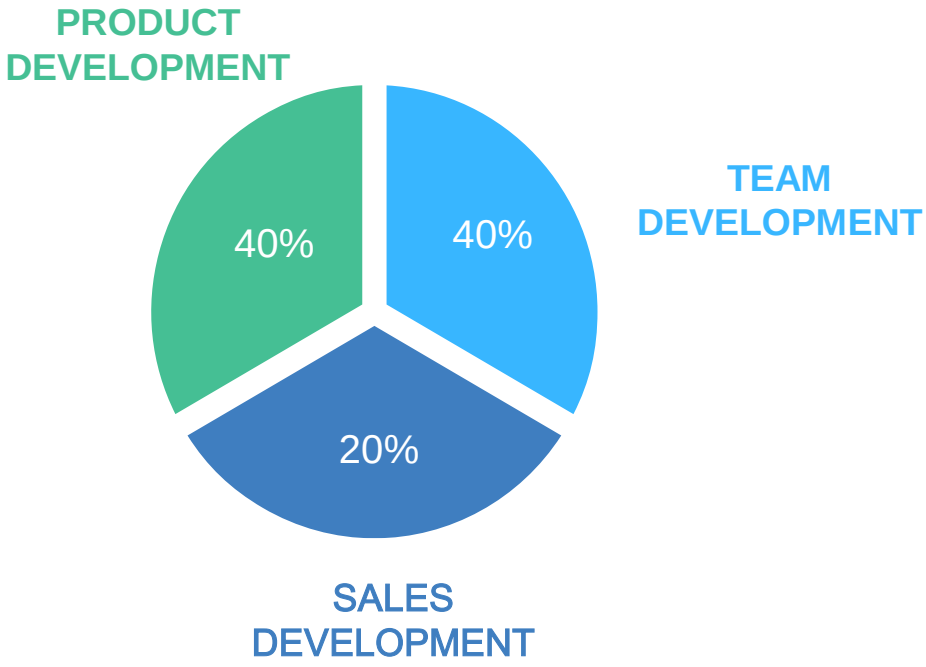
Equity


Ignacio Sirés Sadornil
25%
CIC-UB
10%
35%
30%
Birame Boye
M. Fernanda Murrieta Chagollán

INVESTMENT SIZE & USE OF FUNDS

Use of funds


PRIVATE FUNDS: 350 k€
37%
63%
PUBLIC FUNDS: 635 k€


PRODUCT DEVELOPMENT
40%
40%
TEAM DEVELOPMENT
20%
SALES DEVELOPMENT

Thank you

Barcelona , Spain

María Fernanda Murrieta Chagollán

mf.murrieta@electraqua.com

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