

MILLENNIUM INSTITUTE ON GREEN AMMONIA AS ENERGY VECTOR, **MIGA**

Impact Area Energy
Speciality: Electrochemistry

The energy transition towards zero emissions presents several challenges, including long-term energy storage. Ammonia (NH₃) is an energy vector due to its ability to store and transport chemical energy or be used directly as fuel.

NH₃ is the raw material for fertilizers, benefiting almost half of the world's population. The production of NH₃ from hydrogen and nitrogen, Haber-Bosch (H-B), consumes almost 2% of the world's energy and generates ~1.9 metric tons of CO₂/ton NH₃. The dependence of the H-B process on fossil fuels, its high CO₂ emission, and the role of NH₃ as a vector of energy and fuel have driven interest in finding sustainable and environmentally benign alternatives for its production.

The H-B process and the cement and steel industries are the most significant contributors to global warming. Given this, it has been searched for ways to electrochemically produce NH₃ using renewable energy to prevent the intermediate H₂ production process and to reduce emissions and energy consumption. MIGA's vision for the future is to produce NH₃ directly from air and water at the local scale, using electrochemical processes. On the other hand, the NH₃ electrolysis is complementary to the H₂ economy since it provides alternatives for its transport and storage.

MIGA's mission is to address this challenge with an interdisciplinary approach that bridges current technological gaps, advancing knowledge and technology, discovering interdisciplinary training for new researchers, and contributing to installing clean energy-based economies for Chile and the international community.

Research lines:

- Electrochemical production of NH₃
- Production of H₂ from NH₃ electrolysis
- Design and prototypes of NH₃ fuel cells and components
- Corrosion and wear processes
- Green ammonia economy



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>> SCIENTIFIC PRODUCTIVITY:

Recently awarded Millennium Institute, no publications have been reported.

*Data updated by Millennium
Institute to June 2023



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>> CONTACT INFORMATION:

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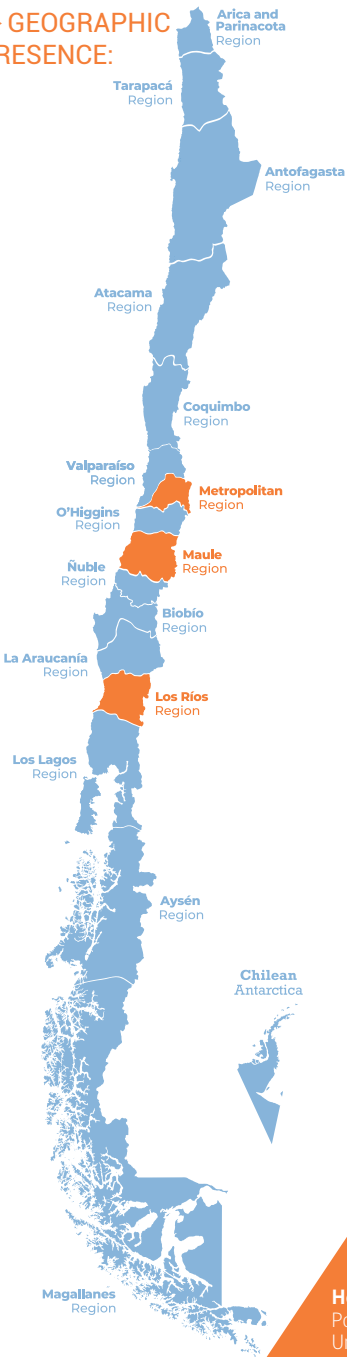
>> RESEARCHERS:

Main Researchers:
Mauricio Isaacs Casanova, María Jesús Aguirre Quintana.

Associate Researchers:
José Mejía, Juan Francisco Armijo, Carlos Restrepo, Diego Celentano, Loreto Troncoso, Magdalena Walczak, Mamié Sancy, Enzo Sauma.

Assistant Researchers:
Rodrigo del Río, Galo Ramíre, Samuel Hevia, César Sáez, Esteban Ramos, Judith Lisoni.

>> GEOGRAPHIC PRESENCE:



>> MAIN ACHIEVEMENTS:

- Recently awarded Millennium Institute, no main achievements have been reported.



>> OUTREACH ACTIVITIES:

- Recently awarded Millenium Institute, no outreach activities have been reported.