Research at the UAI Center for Energy Transition

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CENTER FOR ENERGY TRANSITION
UNIVERSIDAD ADOLFO IBÁÑEZ

Australia-Chile Clean Energy and Sustainability Symposium
24/03/24

OUTLINE

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UAI Center for Energy Transition (CEnTra)

CENTRA Mission

The Center for Energy Transition conducts and transfers interdisciplinary research that allows society to advance an energy transition towards economical, environmentally friendly, socially acceptable and reliable energy demand and supply.

CENTRA Vision

To be a national and international benchmark in applied research for the generation and transfer of solutions to global energy challenges and public policies that favor the development of a sustainable energy sector.

CENTRA Researchers

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Danilo Jara


Francisco


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Sample of Projects

1. CENTRA Industrial Research Chairs (IRC) Program

- The CENTRA IRC program was established in 2022 with the objective of closing the gap between scientific research and industrial applications in the energy sector in Chile.
- The inaugural IRC, sponsored by ACESOL, aimed to develop a computational platform consisting of databases and automated modeling, analysis and visualization tools to evaluate the impact of distributed generation on distribution networks, both for specific projects and for system-level hosting capacity analysis. The project is currently in the second year of execution.
- We are currently expanding our developments towards a commercial platform with multiple services for DNO and DG developers. A new layer of capabilities will be developed for the platform in the coming years, including the management of local energy markets.
- Research partnerships are highly welcome to address remaining challenges.

2. Long-Term Energy Planning Models

- We have developed several advanced models for the optimization of energy systems with a focus on the electricity sector, and on generation and transmission assets.
- We are continually improving our models to better represent the new challenges of the energy sector, associated with:
  - The integration of synthetic fuels,
  - the consideration of resilience in the face of natural disasters, and
  - the role of distributed energy resources in the national energy matrix.
- There is great interest in exploring research partnerships that address new methodological approaches for modeling large-scale energy systems or advanced optimization techniques for handling large-scale models.

3. Green Hydrogen and Synthetic Fuels

- CENTRA is committing significant efforts to strengthen research capabilities associated with the technological, environmental, regulatory, and geopolitical aspects of the development of a large-scale green hydrogen production and export industry in Chile.
- Furthermore, our research group is venturing into research on direct CO2 capture technologies, which is a central technology for the development of the synthetic fuels industry.
- These research topics are perfectly aligned with the objectives of the Clean Technologies Institute (ITL), which offers significant funding opportunities.

4. Sustainability and Wellbeing

- The most common approach to research on sustainability is one that takes societal needs as external inputs and aims at producing the technology that can fulfill them using cleaner resources and processes.
- We usually avoid bringing human behavior into the picture for multiple reasons, but mainly (I think) because we have not created the right instances to have thoughtful conversations between engineers, social scientists, health professionals, historians and philosophers, among others, centered on the topic of sustainability and wellbeing.
- Momentum is growing at our institution to start a new initiative that jointly addresses pressing research questions on Sustainability and Wellbeing from a true transdisciplinary perspective.
- We believe the potential outcomes of such endeavor are far reaching, impacting early childhood and school education, health, technology, and public policy in general.
- If you are having similar discussions at your institutions, let's talk!

5. Other research interests

- Sustainable cities: use of territory, water management, waste management, energy suppy, and local organization and governance.
- Nanophotonics for solar thermal energy management and conversion technologies, (e.g., passive radiative cooling coatings, solar fuels, desalination or thermochromic smart-windows).
- State of health determination, repairs and recertification of silicon photovoltaic panels and batteries for 2nd use in the context of a circular economy;
- Bioremediation of polluted waters contaminated with nutrients and others.

What has worked for us so far?

1. Coordinator: Designate a leader at each institution, willing to go the extra mile to make collaboration a reality.
2. Initial Funding: Allocate funds for in-person exploratory visits by potential research collaborators.
3. Get to know each other: Co-host research seminars (virtual is fine!) where potential collaborators can learn about each other's research interests and approaches.
4. Engage: Invite collaborators to join research proposals that allow international collaborators to collaborate (there is usually money available for short-term research stays)

This approach has proven effective for CENTRA in ongoing research collaborations with the University of Waterloo (faculty exchange, joint publications) and Simon Fraser University (student exchange, joint funding applications), both in Canada.

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Thank you!

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