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SHORT BIO

I am a postdoctoral researcher at the Chair of Energy Economics and Assistant Professorship of Energy Market Design at the University of Cologne. My research focuses on (1) the impact of renewable energy deployment on electricity markets and greenhouse gas emissions (2) the ex-post evaluation of energy and environmental policies with a particular focus on distributional consequences. I apply modern microeconomic tools to evaluate these policies and provide insights for energy and environmental decision-making.

REFERENCES

Mar Reguant

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Northwestern University
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François Lévêque

CERNA, Mines Paris - PSL
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Sven Heim

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Matthieu Glachant

CERNA, Mines Paris - PSL
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RESEARCH FIELDS

Energy Economics, Environmental and Resource Economics, Power Systems, Applied Econometrics

POSITIONS

2025–present Post-doctoral researcher, Institute of Energy Economics, **University of Cologne**
2024–2025 Post-doctoral researcher, CERNA, **Mines Paris - PSL**

EDUCATION

2024 Visiting stay, **Barcelona School of Economics**, invited by Mar Reguant
2020–2024 PhD in Economics, **Mines Paris - PSL**
Thesis: *Three Essays on the Impacts of Renewable Energy Deployment*
Co-supervisors: François Lévêque, Sven Heim
Jury: Mar Reguant, Anna Creti, Klaus Gugler, Nicolas Astier
2018–2019 MSc, Environmental Technology, **Imperial College London**
Thesis: *An assessment of the impact on food security and water stress of BECCS in the US*
2016–2019 MSc, Energy, **CentraleSupélec**

Spin City: Local Externalities of Wind Turbines (with Sven Heim and Mario Liebensteiner) – *Energy Economics*, 2026

- *Abstract:* Wind turbines offer significant environmental benefits but also create negative local externalities, such as noise and visual pollution, which can lead to local tensions and community resistance to the energy transition. This paper investigates both the negative and positive externalities of wind turbine siting in Germany. Utilizing an instrumental variables approach, we find that wind turbine siting decreases house purchase prices by 1.9% in affected municipalities, with this adverse effect being most pronounced for the first turbines installed. Additionally, the siting of wind turbines reduces local tourism and leads to fewer building permits being issued for apartments and houses, exacerbating the housing shortage. On the positive side, each installed wind turbine increases a municipality's local tax capacity by 1.8% through their contribution to local commercial tax income. Our findings suggest that the negative externalities can be mitigated by investing the increased tax revenue into local amenities and services, thereby compensating for the adverse effects of wind turbines.

WORKING PAPERS

The impact of electricity market integration on the cost of CO₂ emissions abatement through renewable energy promotion – Revision requested at *The Energy Journal*, resubmitted

- *Abstract:* The integration of electricity markets is widely promoted for its positive impact on competition and energy security. However, little is known about its consequences on emissions and on the optimal deployment of renewable energies. In this paper, I exploit the sudden and substantial expansion of the Spanish-French electricity interconnector to causally estimate the impact of integration on the quantity and location of CO₂ emissions avoided by Spanish wind production, as well as its impact on the electricity prices of both countries. I find that integration has increased the amount of emissions avoided in France but decreased that avoided in Spain for each additional megawatt-hour of Spanish wind. The increase in France does not offset the decrease in Spain, resulting in a reduced environmental value of Spanish wind. For the effect on prices, the previously non-significant impact on French prices before the expansion becomes significant afterwards, highlighting a cross-border merit order effect. I then calculate the cost of reducing one tonne of CO₂ for the Spanish consumer through the wind energy subsidy program. Due to the price effect, there is a net gain of 26.1€/tCO₂ which drops to 3.6€/tCO₂ following the expansion. On the other hand, the French consumer benefits for free from the abatement of 2 megatonnes of CO₂ annually, financed at a cost of 143€/tCO₂ by the Spanish taxpayer post-expansion. This suggests that the current operation of the markets might incentivize freeriding on neighboring countries' subsidies for renewable electricity. Finally, I calculate the marginal impact of wind generation on welfare, considering the decrease in electricity generators' profits due to the price effect and the gains related to emissions abatement. The subsidy policy is welfare improving starting from a social cost of carbon of 60€/tCO₂ pre-expansion and 70€/tCO₂ post-expansion.

When Wind Blows Through the Backdoor: Revisiting IV Estimates of Household Elasticities under Real-Time Electricity Pricing During the Energy Crisis (with Oliver Ruhnau and Henri Herrmann) - CESifo working paper

- *Abstract:* We estimate household electricity demand responses to hourly prices under real-time pricing using Finnish smart-meter data, contrasting results under the European energy crisis with those from previously relatively stable market conditions. Methodologically, we show that the standard wind-based IV approach, which instruments prices with day-ahead wind generation forecasts, can be biased in residential settings with electric heating, because local wind conditions directly shift electricity demand through heating-related channels. Controlling for hourly local wind speeds provides a simple correction that preserves a strong first-stage, reduces IV price coefficients by about 70 percent before the crisis and about 40 percent during the crisis. Yet, elasticities remain significant at -0.020 and -0.041, respectively. The direct wind effect on demand is economically meaningful: a 1 m/s increase in local wind speed raises hourly consumption by about 1 percent, comparable to the demand response induced by a 25–30 €/MWh price increase. Translating the elasticities into bill impacts yields mean annual per-household savings from short-run demand response of about €15.57 before the crisis and about €104.27 during the crisis, indicating moderate savings relative to total annual electricity expenditures.

How fuel switching impacts the environmental value of renewable energy – Revision requested at *Economics of Energy and Environmental Policy*

- *Abstract:* This paper empirically examines the environmental value of renewable energy in the United States, focusing on how it varies with changes in coal and gas prices following the shale gas revolution. Results reveal significant regional differences in the environmental benefits of renewables, driven by the coal-to-gas cost ratio. To improve interpretability, this ratio is also mapped to a fictional carbon price. The analysis shows that lower carbon prices typically see renewables displacing gas generation, yielding relatively modest environmental benefits. As carbon prices increase, coal generation becomes the marginal technology, enhancing the environmental value of renewables until a threshold is reached. Beyond this point, coal becomes uneconomical, and the environmental value decreases as gas takes over as the marginal generator. These findings suggest implementing regionally differentiated subsidies for renewable energy, with higher subsidies allocated to regions with greater current environmental value. Subsidies should also reflect expected future increases in environmental value due to projected changes in fuel prices and carbon pricing, ensuring long-term effectiveness.

WORK IN PROGRESS

When a Carbon Tax Backfires: Cross-Border Externalities of Environmental Policy (with Guillaume Wald)

- *Abstract:* We evaluate the spillover effects of the 2015 expansion of the German MAUT toll system, which extended toll liability to trucks weighing between 7.5 and 12 tonnes. We quantify its impact on traffic volume, air quality (PM2.5), and road safety along two major highways: the German A5 and the French A35. Using monthly data from 2013 to 2019, we employ a difference-in-differences design, leveraging inland regions of France and Germany as control groups. Our preliminary findings suggest an increase in traffic accidents, injuries, and air pollution on the French side of the border. These results contribute to the broader discussion on congestion externalities and crossborder environmental spillovers arising from unilateral road pricing policies.

The price relationship between French and Spanish gas hubs: evidence from threshold vector error-correction model (with Olivier Massol)

- *Abstract:* We investigate whether Spain's underutilized LNG regasification capacity could help mitigate Europe's natural gas supply gap following Russia's 2022 invasion of Ukraine. Despite substantial diversification efforts, Europe remains critically dependent on Russian gas, and the sharp reduction in imports created major risks for energy security. Spain possesses significant idle regasification capacity, but its effective contribution depends on both the diversity of supply and the ability to transport gas to Northwest Europe. Using a new energy security indicator and a Threshold Vector Error Correction Model to assess market integration between Spain and France, we show that Spain is not yet positioned to significantly improve European energy security. We argue that strengthening the depth and maturity of the Spanish market is a prerequisite before new infrastructure investments can play a substantial role.

PRESS ARTICLES

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| 2022 | “Embargo total ou partiel... Quelles solutions pour couper dans les importations gazières de Russie ?” with François Lévêque, <i>The Conversation</i> |
| 2021 | “Des Français très peu exposés au prix de marché de l'électricité” with François Lévêque, <i>Les Echos</i> |

AWARDS & GRANTS

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| 2025 | Marie Skłodowska-Curie Actions PF Seal of Excellence |
| 2024 | 2nd prize, <i>FAERE Young Economist Award</i> |
| 2020-2024 | Full Doctoral Fellowship, Fondation Mines Paris |

REFeree SERVICES

Journal of the Association of Environmental and Resource Economists (JAERE)

CONFERENCES & SEMINARS

2026	WCERE (Cascais), CERNA Research Seminar (Paris)
2025	MWEET (Manchester), IAEE International Conference (Paris), EAERE Annual Conference (Bergen), FAERE Annual Conference (Nantes), YEEES Young Energy Economists and Engineers Seminar (Cologne)
2024	FAERE Annual Conference (Strasbourg), EAERE Annual Conference (Leuven), 14th Toulouse Conference on the Economics of Energy and Climate (Toulouse), 12th Mannheim Conference on Energy and the Environment (Mannheim), FAERE doctoral workshop (Annecy), PSE doctorissimes (Paris), IAEE 2024 Conference (Istanbul), EEM International Conference on the European Energy Market (Istanbul)
2023	YEEES Young Energy Economists and Engineers Seminar (Nuremberg), Dauphine PhD Workshop (Paris), WEP Workshop on Energy Policy (Castelló de la Plana)
2022	FAEE PhD workshop (Grenoble), IAEE International Conference (Tokyo), YEEES Young Energy Economists and Engineers Seminar (Copenhagen), EEM International Conference on the European Energy Market (Ljubljana), Dauphine PhD Workshop (Paris), Séminaire PSL de recherches en économie de l'énergie (Paris)
2021	Journée des doctorants PSL, Conférence i3

TEACHING & WORK EXPERIENCE

2025 – today	Courses: Energy and Environmental Economics, Net Zero Energy Systems, Power DSOs and the Energy Transition: Regulation for Investments and Flexibility, University of Cologne
2024	Guest Lecturer: Advanced Coding for Economists (PhD), Mines Paris - PSL
2022–2023	Teaching Assistant in Microeconomics, ESCP Business School
2021–2022	Teaching Assistant in Game Theory, Université Panthéon-Assas
2021	Teaching Assistant in Environmental Economics, Mines Paris - PSL
2021–2022	Student board member, FAEE (French Association of Energy Economists)
2019–2020	Business Developer Intern, EPEX SPOT , Paris

ADVISING

2024 – today	Master thesis: 1 × second advisor, University of Cologne
2020 – 2024	Econometrics Research Project for Civil Engineer (MSc): 3 × first advisor, Mines Paris - PSL

TECHNICAL AND LANGUAGE SKILLS

Programming: Python, Stata, R, LaTeX

Languages: French (native), English (fluent)