

NEWSLETTER #23

December 6th, 2024

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Happy holidays

Industries are exploring electrification to align with renewable energy and to reduce GHG emissions, but how flexible can energy-intensive production truly become? Tobias Fleiter's featured piece examines the potential and challenges, from hybrid energy systems to market barriers like high electricity costs and grid fees. While the promise is vast, practical hurdles remain. Could smarter policies and innovations unlock this flexibility? Read on to explore the possibilities. Newsletter #23 also features a comprehensive roundup of recent publications, events, and open positions across the field. Explore the links to dive deeper into the latest developments. This will be the last newsletter of the year but we will be back with RENEWed strength in 2025.

Do you have content to share, ideas or other thoughts?

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How flexible can electrified industrial production be in the future?

Featured piece by [Tobias Fleiter](#)

We were lucky enough to spend two years working with a team from different perspectives on precisely this question.

And first of all, most energy-intensive plants will also produce in the future when the sun is not shining or the wind is not blowing. Of course, there are many examples of flexibility potential that work. However, we should take a realistic view and also look at the additional costs. Stopping production means a loss of production, ramping up is only possible if investments have previously been made in excess capacity and

storage systems require higher generation capacities and grid connections. Industries with high capital costs typically create competitiveness through maximum plant utilization.

What seems most promising to us is hybrid energy systems. This means supplementing gas-fired boilers or CHP plants with heat pumps or electrode boilers that are operated flexibly in line with market signals. This strategy enables a low-risk entry into the transformation and allows companies to gain experience not only with technical operation, but also with the electricity market. The output and duration of electric operation can be continuously increased in line with market signals. In the long term, natural gas can be replaced by hydrogen.

And is this a niche topic or is it relevant? In fact, we are talking about a huge amount of energy here: in Germany alone, around 200 TWh of process steam could be provided by such systems. So the potential is huge, but in Germany at least, there is a lack of implementation. High electricity prices, comparably low gas prices and electricity grid charges that are designed for continuous operation make investments in additional electrical steam generation uneconomical at present. To make this more tangible: We conducted an interview with a paper mill that invested in an electric steam boiler 3 years ago.

Surprise: Since then, the electric boiler was hardly running.

Bigger surprise: Even in times when electricity wholesale prices in Germany were at 0 euros, only gas-fired CHP was used.

The reason: the grid charges alone were higher than the gas price including the CO₂ surcharge. Paradoxically, the grid fees prevented operation, although this would presumably have relieved the strain on the grids. However, the discussion about the reform of grid fees is in full swing at the moment. Perhaps Germany can learn from other countries?

You can download the study [here](#) (in German, English summary).

Projects and initiatives

[HILT CRC]

The Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC), based in Australia, works to transition the steel, iron, alumina and cement industries to reduce the heavy industry's CO₂ emissions. [LINK](#)

[IDRIC]

The Industrial Decarbonisation Research and Innovation Centre (IDRIC) works to develop innovative industry decarbonisation solutions at pace and scale from its base in the UK. [LINK](#)

[Net-Zero Industries Innovation Mission]

HILT CRC and the Austrian Institute of Technology (AIT) coordinates the Net-Zero Industries Innovation Mission with the aim to ensure that by 2030, there is a suite of technical solutions available that are sufficiently proven to facilitate the full decarbonisation of heavy industries in multiple regions of the world, by 2050. [LINK](#)

[Safe H-DRI]

Horizon Europe project aiming to better understand H-DRI behaviour in order to update transport system standardisation for the developing green iron & primary steel supply chains. [LINK](#)

ScienceForUkraine

#ScienceForUkraine is a community group of volunteer scholars and students around the world to help scholars and students affected by Russia's war in Ukraine. [LINK](#)

Events

Here, you can find tips about upcoming events and summaries from past events that might have skipped your attention.

UPCOMING EVENTS

[Industry conference]

Industrial Decarbonisation Europe 2025

9-10 April | Amsterdam

More information: [LINK](#)

PAST EVENTS

[Webinar]

Enhancing Resilience and Efficiency: Circularity-by-Design

UNECE: Group of Experts on Energy Efficiency, Task Force on Energy Efficiency in Industry

Bi-monthly open discussion forum,

October 10, 2024, online

More information: [LINK](#)

[Seminar, in German]

3. Symposium Klimaneutrale Unternehmen. CSRD und Klimaneutralität: Lästige Pflicht oder Chance für Unternehmen?

November 27, 2024, Stuttgart

[Training Week]

Latin America Energy Efficiency Policy

December 2-5, 2024, São Paulo, Brazil

More information: [LINK](#)

[Research seminar]

Erez Maggor: Bidenomics, Industrial Policy, and the Twenty-First Century American Developmental State

27 november 2024

More information: [LINK](#)

[Forum]

Capacity-building workshop on digitalization in energy

December 3, 2024, Bangkok and online

More information: [LINK](#)

[Workshop]

Supporting Electric Mobility as Enabler of Digital and Green Transformations in the UNECE Region,

November 27-28, 2024, Istanbul and online

More information: [LINK](#)

[Webinar]

Near-Zero Emissions Materials Production and Trade

December 6, 2024, online

More information: [LINK](#)

[Green Finance and Investment Forum]

OECD: Mobilising private capital for industry decarbonisation: The role of international cooperation and partnership

October 15, 2024, online

More information: [LINK](#)

[Workshop]

OECD: Multi-stakeholder event on financial industry decarbonisation

October 14, 2024, online

More information: [LINK](#)

Please let us know if you want your event featured in this newsletter!

Open positions

We aim to publish all open positions we receive via the network. Do you know of an open position in the field? Send us an email: renew.industry@gmail.com. Positions with short notice could be relevant to some of our members, and we can share them with the network between the newsletters.

[Programme Manager]

Steel Decarbonisation Programme Manager – Japan

Please note there is no formal closing date for this role, if you are interested, we would encourage you to apply as soon as possible.

More info: [LINK](#)

Open calls

[The Climate Investment Funds (CIF)]

CIF's Industry Decarbonization Program will invest in pioneering low carbon pathways in developing countries for these heavy-emitting industries and more sectors, notably clean technology supply chains. It is designed to spur innovation, prove technologies, and advance a just transition to zero carbon economies. [LINK](#)

[Innovation Fund Net-Zero technologies]

Innovation Fund Net-Zero technologies. Deadline to submit applications Q2 2025. [LINK](#)

Recent publications

This section combines peer-reviewed journal publications, project reports and other scientific work that has been published recently. We follow a sectoral classification for the publications listed below complemented by a General / cross-sectoral / circular category for publications spanning across several industrial sectors or even the entire economy. Please feel free to share any publication you would like to see listed here in the next newsletter, by sending an email to renew.industry@gmail.com.

General / cross-sectoral / circular

[Peer-reviewed] Oh, S., & Al-Juaied, M. (2024). Decarbonizing industrial hubs and clusters: Towards an integrated framework of green industrial policies. *Energy Research & Social Science*, 118, 103777. [LINK](#)

[Peer-reviewed] Shafiee, R. T., & Schrag, D. P. (2024). Carbon abatement costs of green hydrogen across end-use sectors. *Joule*. [LINK](#)

[Peer-reviewed] Neuwirth, M., Fleiter, T., & Hofmann, R. (2024). Modelling the market diffusion of hydrogen-based steel and basic chemical production in Europe – A site-specific approach. *Energy Conversion and Management*, 322, 119117. [LINK](#)

[Peer-reviewed] Diesing, P., Lopez, G., Blechinger, P., & Breyer, C. (2025). From knowledge gaps to technological maturity: A comparative review of pathways to deep emission reduction for energy-intensive industries. *Renewable and Sustainable Energy Reviews*, 208, 115023. [LINK](#)

[Preprint] Raillard-Cazanove, Q., Knibiehly, T., & Girard, R. (2024). *Decarbonisation of industry and the energy system: Exploring mutual impacts and investment planning* (arXiv:2410.23025). arXiv. [LINK](#)

[Report] Lassery, G. (2024). *Global programme for hydrogen in industry—Guide on ISO/TS 19870*. UNIDO/ISO. [LINK](#)

[Report] Hasanbeigi, A., Springer, C., & Sibal, A. (2024). *Electrifying European industry—Part 1: Electrification of industrial processes*. Global Efficiency Intelligence. [LINK](#)

[Report] Springer, C., Hasanbeigi, A., & Sibal, A. (2024). *Electrifying European industry—Part 2: Electric boilers and steam generating heat pumps*. Global Efficiency Intelligence. [LINK](#)

[Report] [In German] Fleiter, T., Haendel, M., Klobasa, M., Lux, B., Khanra, M., Männer, W., Bussmann, S., Kiefer, C., Al Dabbas, K., Schwotzer, C., Kaiser, F., & Gondorf, C. (2024). *Flexibilisierung elektrifizierter*

Industrieprozesse—Eine Analyse der technischen und ökonomischen Herausforderungen aus Unternehmens- und Systemperspektive. Kompetenzzentrum Klimaschutz in energieintensiven Industrien (KEI). [LINK](#)

[Report] Ruschhaupt, P., & Koen, A. (2024). *Decarbonizing High-Temperature Heat in Industry: Technology assessment and policy recommendations for Europe* [Technical Report]. Future Cleantech Architects (FCA). [LINK](#)

[Report] Hasanbeigi, A.; Sibal, A. 2024. *The Scale and Impact of Green Public Procurement of Steel and Cement in Canada, Germany, the UK, and the US*. Global Efficiency Intelligence and UNIDO. [LINK](#)

[Report] IEA (2024), *Definitions for Near-Zero and Low-Emissions Steel and Cement, and Underlying Emissions Measurement Methodologies*, IEA, Paris. [LINK](#)

[Peer-reviewed] Miettinen, J., & Ollikainen, M. (2024). The impacts of climate and energy policy instruments on forest bioeconomy. *Forest Policy and Economics*, 169, 103338. [LINK](#)

[Peer-reviewed] Roussanaly, S., Gundersen, T., & Ramirez, A. (2025). Putting the costs and benefits of Carbon Capture and Storage into perspective: A multi-sector to multi-product analysis. *Progress in Energy*, 7, 013002. [LINK](#)

[Report] OECD/Climate Club (2024), *Mapping financial and technical assistance for industry decarbonisation in emerging markets and developing economies: Taking stock of trends in hard-to-abate sectors*, OECD Publishing, Paris. [LINK](#)

[Peer-reviewed] Kumar, T. R., Beiron, J., Marthala, V. R., Pettersson, L., Harvey, S., & Thunman, H. (2024). Enhancing early-stage techno-economic comparative assessment with site-specific factors for decarbonization pathways in carbon-intensive process industry. *Carbon Capture Science & Technology*, 100338. [LINK](#)

[Peer-reviewed] Ahokas, J., Järvensivu, P., & Toivanen, T. (2024). Ideas behind transformative innovation policy: Economists confronting missions and sustainability transition in Finland. *Environmental Innovation and Societal Transitions*, 53, 100927. [LINK](#)

[Peer-reviewed] Emanuelsson, A. H., Rootzén, J., & Johnsson, F. (2025). Financing high-cost measures for deep emission cuts in the basic materials industry—Proposal for a value chain transition fund. *Energy Policy*, 196, 114413. [LINK](#)

[Report] IEA (2024), *World Energy Outlook 2024*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Energy Technology Perspectives 2024*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Global Hydrogen Review 2024*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Breakthrough Agenda Report 2024*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Southeast Asia Energy Outlook 2024*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Recycling of Critical Minerals*, IEA, Paris. [LINK](#)

[Report] IEA (2024), *Energy Efficiency 2024*, IEA, Paris. [LINK](#)

[Editorial] Hammond, G.P., 2024. 'Editorial: Towards net-zero 'greenhouse gas' emissions by 2050', *Proc. Instn Civil. Engrs: Energy*, 177 (3): 95-97. [LINK](#)

[Briefing] Darby, S.J., G.P. Hammond and J. Wu (2024). 'Briefing: Stocktaking Global Warming - The outcomes of the 2023 Dubai Climate Summit (COP28)', *Proc. Instn Civil. Engrs: Energy*, 177 (5): 193–204, [LINK](#)

[Comment] Richstein, J.C. et al. (2024) Catalyzing the transition to a climate-neutral industry with carbon contracts for difference, *Joule*, 2024, ISSN 2542-4351. [LINK](#)

Steel

[Peer-reviewed] Liu, X., Liu, Y., Bai, C., Peng, R., & Chi, Y. (2024). Pathways for decarbonizing China's iron and steel industry using cost-effective mitigation technologies: An integrated analysis with top-down and bottom-up models. *Renewable Energy*, 237, 121506. [LINK](#)

[Peer-reviewed] Bilici, S., Holtz, G., Jülich, A., König, R., Li, Z., Trollip, H., Call, B. M., Tönjes, A., Vishwanathan, S. S., Zelt, O., Lechtenböhmer, S., Kronshage, S., & Meurer, A. (2024). Global trade of green iron as a game changer for a near-zero global steel industry? - A scenario-based assessment of regionalized impacts. *Energy and Climate Change*, 5, 100161. [LINK](#)

[Peer-reviewed] Sun, J., Na, H., Yuan, Y., Qiu, Z., Du, T., Li, Y., Zhang, L., & Wang, W. (2024). A systematic review of decarbonization pathway and modeling conception in iron and steel industry at micro-, meso-, and macro-levels. *Environmental Science and Pollution Research*. [LINK](#)

[Peer-reviewed] Åhman, M., & Arens, M. (2024). Are electricity prices and cross-subsidies a barrier to decarbonising India's steel industry? *Utilities Policy*, 91, 101853. [LINK](#)

[Peer-reviewed] Shen, J., Zhang, Q., Tian, S., Li, X., Liu, J., & Tian, J. (2024). The role of hydrogen in iron and steel production: Development trends, decarbonization potentials, and economic impacts. *International Journal of Hydrogen Energy*, 92, 1409–1422. [LINK](#)

[Peer-reviewed] Watari, T., & McLellan, B. (2024). Decarbonizing the global steel industry in a resource-constrained future—A systems perspective. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 382(2284), 20230233. [LINK](#)

[Report] Steinzor, N., & Cooney, J. (2024). *Dirty steel, dangerous air. The health harms of coal-based steelmaking*. Industrious Labs. [LINK](#)

[Peer-reviewed] Zhong, L., Lin, Y., Yang, M., He, Y., Liu, X., Yu, P., & Xie, Z. (2025). Spatiotemporal pattern of embodied carbon emissions from in-use steel stock in countries along the Belt and Road. *Resources, Conservation and Recycling*, 214, 108038. [LINK](#)

[Peer-reviewed] Eshkfataki, A. T., Baniasadi, E., Parvanian, A. M., & Amiri, A. (2024). In-house green hydrogen production for steelmaking decarbonization using steel slag as thermal energy storage material: A life cycle assessment. *Energy*, 133966. [LINK](#)

Chemicals / plastics

[**Peer-reviewed**] Zanon-Zotin, M., Baptista, L. B., Draeger, R., Rochedo, P. R., Szklo, A., & Schaeffer, R. (2024). Unaddressed non-energy use in the chemical industry can undermine fossil fuels phase-out. *Nature Communications*, 15(1), 8050. [LINK](#)

Cement / ceramics / glass

[**Peer-reviewed**] Román, Á. F. G., Mirmohammadsadeghi, S., & Kabir, G. (2024). CO₂ Emissions Projections of the North American Cement Industry. *Engineering Proceedings*, 76(1), Article 1. [LINK](#)

[**Report**] Global Cement and Concrete Association (2024). *Cement Industry Net Zero Progress Report 2024/25*. [LINK](#)

Out of the scientific box

In this section, we keep track of news, op-eds, blog posts, videos and other content on industrial decarbonisation that has gained attention beyond the research community. Have you spotted something? Contact us: renew.industry@gmail.com!

[**Article**] The Economist reports the demand of poorer countries for more equity regarding the implementation of CBAM schemes by the EU and other developed economies. [LINK](#)

[**Article**] The Economist delves into the causes of the economic slowdown of Europe's industrial powerhouse, Germany, since the Covid-19 pandemic. [LINK](#)

[**Commentary**] Ankita Gangotra ([##@AnGangotra](#)), Alex Dolan and Willy Carlsen of the World Resources Institute (WRI) advocate for international collaboration to enable the decarbonisation of the fragmented supply chains that are heavy industries. [LINK](#)

[**Policy Brief**] An investment strategy to keep the European Green Deal on track [LINK](#)

[**Global Climate Finance Sankey**] Industry still lagging behind in Global Landscape of Climate Finance 2023 [LINK](#)

[**COP29 panel**] Presentation by [Hasan Akbulut](#) (Turkish Steel Producers Association) on the Turkish steel industry in the COP29 panel “Future of the Steel Industry: Decarbonisation, Circular Economy, and Emerging Challenges” organised by the Istanbul Minerals and Metals Exporters Association. [LINK](#)

From the social media feed (#industrydecarbonisation)

Campaigners denounce ArcelorMittal's 'blackmail' over green steel in Europe. [Climate-pulse.com](#)

Solar power has scaled up faster than any other source of electricity in history [@nicolasfulghum](#)

[@bataille_chris](#) points us to the UNEP Emissions Gap Report 2024 [LINK](#)

[Bethanie Carney Almroth](#) and colleagues calling for Legally Binding Reduction Targets for Primary Plastics Production

Getting to know the Network

The RENEW Industry Network aims to connect researchers and strategists focused on industrial decarbonisation. We continue to grow with more than **750 members** working in organisations located in **20 different countries**, including many European countries but also the U.S., Canada, India, Australia and beyond.

From time to time, we include a short interview with a network member on their research topic and ongoing work on industrial decarbonisation. **Do you want to introduce yourself in this section, or share your latest research with the network?** Contact us: renew.industry@gmail.com

Get involved!

The RENEW Industry Network is constantly looking for interested researchers who want to share their work, organise events or in other ways interact with other researchers in the field. Any ideas are welcome, regardless of whether you want to be involved in our activities on a regular basis, or do a short one-off stunt.

We are looking forward to hearing from you!

Contact us via email at renew.industry@gmail.com or drop us a direct message via Twitter at [@RENEWIndustry!](https://twitter.com/RENEWIndustry)

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