

This paper provides a quick-read summary of a webinar that was held in July 2024, as part of a series on circular economy in renewable energy infrastructure. To read more about the series visit our dedicated page [Circular renewables webinar series](#)

SESSION 6: ACCELERATING CIRCULAR RENEWABLES – JULY 2024

The final session focused on actions to accelerate the uptake of circular economy across renewables. Dr Anne Velenturf from the University of Leeds chaired a panel discussion with:

- Ajinkya Kale from the Council on Energy, Environment and Water who investigated [circular economy strategies for India's solar industry](#). He developed a model to predict solar waste and to analyse the economics of PV recycling. He is also interested in business models and strategies for a thriving circular economy in India's solar sector.
- Rémy Le Moigne who founded the consultancy Gate C, to support companies to realise the benefits from circular economy solutions such as reducing costs, lowering emissions and developing new circular products and services. He carried out a [study on circular economy for renewables](#) for a UK investment company, resulting in policy recommendations that were presented in Westminster.
- Heather Plumpton from Green Alliance who prepared [policy analyses on critical raw materials and energy independence](#) to enable ambitious environmental policies. She is advocating for demand reduction and circularity in the transition towards renewable energy systems.
- Prof Russell Hall from University of Warwick / HVMC who investigated sustainable manufacturing and solutions to reduce industrial emissions. He is involved in offshore wind materials forecasting and aligning practices in the steel industry practices with demands in renewable energy and sustainability.

The session started with an overview of key points made in the series by the participants, session chairs and speakers. Participants have taken part in a number of polls throughout the series, helping to generate an understanding of the >600 people who attended the sessions. The series attracted participants with highly diverse backgrounds, with the majority having no or little experience with circular economy, and a smaller group who is adopting circular economy solutions or who may even be entirely focused on this in their profession. Participants took part in the series to gain more understanding and knowledge about circular renewables, learn about good practice, hear about opportunities, ideas and to be inspired, and to understand challenges and possible solutions.

Circular renewables were considered important due to the high demand to access materials in a sustainable manner within planetary boundaries, to reach net-zero, reduce waste, attract investment and maintain positive public perception. Main challenges that were flagged included the pressure on cash flow to make changes, technological complexity, maturity and risk perception, changing mindsets, and limited collaboration and understanding along supply chain. Circular supply chains could be enabled by greater traceability and transparency of materials, and is driven by growing resource scarcity, policy support and incentives (particularly financial incentives), communication and collaboration, and responsible business practices.

Three areas of key insights were summarised from previous sessions. First, speakers displayed a high diversity in perspectives in what circular economy is, but were unanimous in emphasising that it has to go beyond recycling. Circular strategies that were highlighted were design, for example to ease disassembly, reduce the number of different materials in components, and extend product life. Moreover, measures to reduce energy demand across the economy were proposed, to limit the demand for materials to build renewable energy infrastructure. Finally, various opportunities were identified to slow and close loops between renewable technologies to enhance component reuse and recycle (critical) materials.

A second area of key insights underlined the high uncertainty in material flow forecasts. While mountains of waste were predicted, flows towards recycling have been smaller than expected for the outstanding reason that renewable infrastructure is being reused and refurbished at far higher rates than anticipated. While circular economy solutions were generally presented with strong business cases, uncertainties in material flows hinder actionable investments.

The third area of key insights focused on enablers, proposing standards and regulations to improve data collection on material volumes and qualities. This will provide a better evidence base to enable investment and policy decisions. There can be stark differences between the economic viability of circular renewables investments across countries, where the critical mass of materials can vary by a factor 2-3 for unknown policy / market reasons. A lack of investment is risking continued downcycling of materials rather than higher value recycling. Investment into end-of-use facilities has to be in parallel with investment into manufacturing, for there to be markets for the off-take of recovered materials. Policy has to take a whole system approach to bring the various enabling conditions for circular renewables together at the right time, such as access to land, ports, investment and skilled people. Closer collaboration to align circular economy solutions along the supply chain is also necessary.

The discussion focused on prioritising the next steps to enable circular economy solutions in renewables. Rémy Le Moigne advocated for design improvements for circular economy such as easing disassembly, creating the right economic and policy conditions to build circular value chains that currently are not taking shape yet, and increasing investment. Manufacturers, policymakers, and investors should collaboratively drive the transition to circular renewables. Heather Plumpton agreed and argued for a policy champion to integrate circular renewables into climate, industrial, trade and resources policies across government departments. She warned that the urgency of the challenges is often underestimated, considering that challenges need to be resolved in the short-term rather than in 10 years, making five recommendations ([published in this report](#)):

1. Make circular renewables an international priority for climate diplomacy.
2. Policies for better data such as material passports and data infrastructure to integrate (existing) data on material stocks and flows e.g. in the National Materials Datahub, to identify infrastructure requirements and enable investment.
3. Integrate circular renewables into climate and industrial policy, for example through public procurement rules.
4. Forecast skills needs and deal with emerging gaps.
5. Improve financing of circular business models by better accounting for the risks of linear supply chains and the resilience benefits of circular supply chains.

Russell Hall added perspective from a manufacturing angle, proposing to embed circularity into the UK's industrial strategy to drive manufacturing and sustainability. This would help to make circular renewables a reality, make manufacturing part of its own renewable energy supply chain, and become an example across sectors. Industrial strategy is critical to attracting investment. Ajinkya Kale emphasized the need to integrate circular economy solutions into Product Linked Incentive (PLI) schemes, for example for solar and battery sectors. Moreover, currently there is a lack of or ineffective extended producer responsibility in global supply chains, to drive reverse logistics and ensure efficient collection mechanisms for reusable and recyclable materials in a safe certified way by skilled people.

Global measures that could help include stringent measures against trans-frontier shipments of waste, to ensure end of life management within countries or regions. Moreover, international standards on design for recovery and robust environmental, social, and governance (ESG) standards for mining can further support the establishment of circular supply chains. International measures for sustainable resource management and circular economy practices depend on global cooperation.

The panel discussed priorities for research, development and innovation, highlighting the importance of developing high value material recovery solutions, material substitution to reduce dependency on critical resources, and carry out material flow assessments to inform policy and investment decisions.

To conclude, this session emphasised the importance of collaboration to coordinate efforts among researchers, innovators, policymakers, and industry players to advance circular economy in renewables. Proactive policy measures are key to creating conducive environments for circular practices and drive sustainable resource management. Continuous innovation is needed to develop technologies, improve renewables designs, and provide robust data frameworks to enable policy and investment into circular renewables.

A note on artificial intelligence: This short paper was first drafted using artificial intelligence to summarise the recorded webinar. Prior to this publication it was then reviewed, and edited and corrected where necessary by Dr Anne Velenturf, Senior Researcher and project lead.