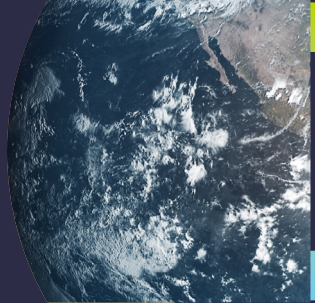
循环经济助力
中国可再生能源零废转型倡议

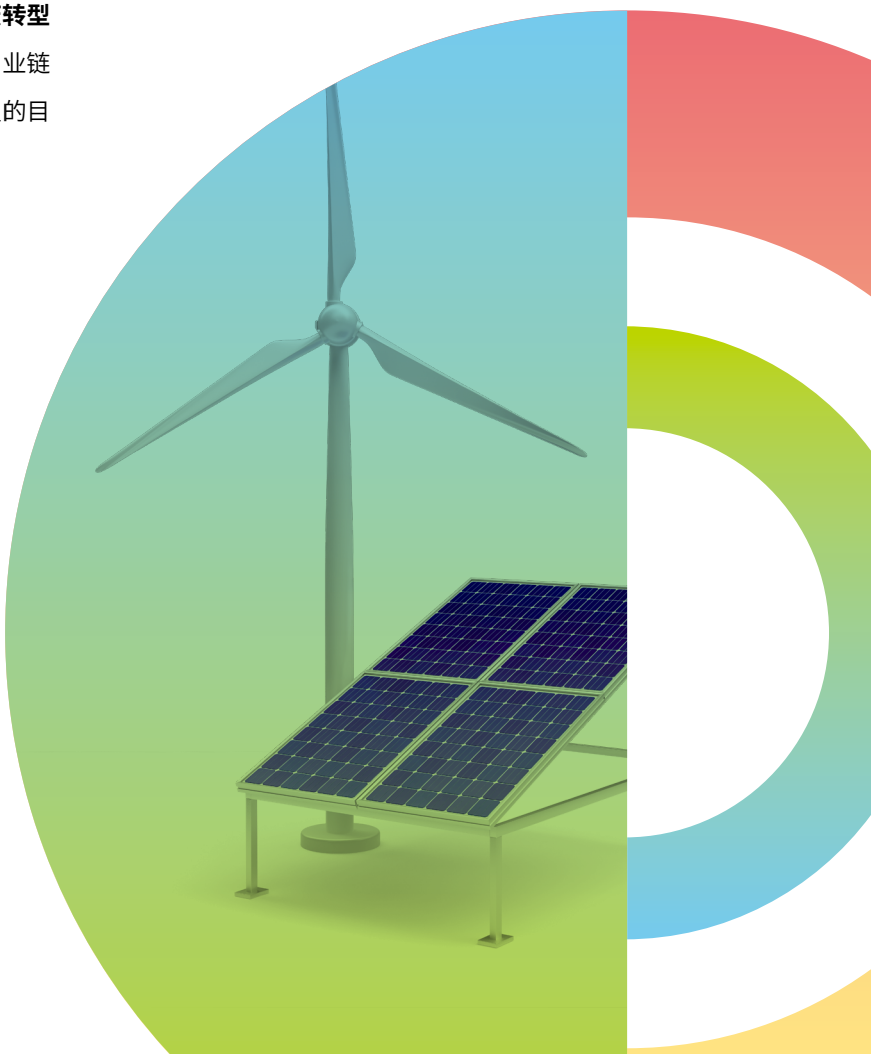


我们，中国可再生能源转型的参与者、支持者和关注者，在“合作共谋能源变革，共建共享绿色未来”这一主题下相聚 2023 国际能源变革论坛（中国苏州），决心采取更加有力的行动，加强跨行业协作，形成合力，推动中国可再生能源产业链加速向循环经济转型，助力实现碳达峰碳中和目标。

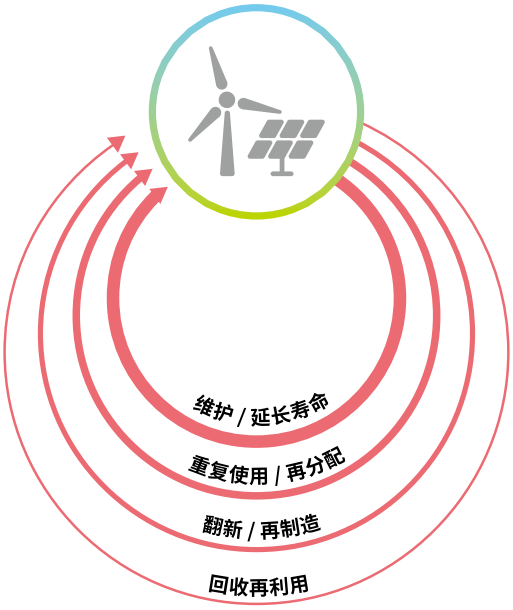
我们意识到，发展风能、太阳能等可再生能源对于落实《巴黎协定》和《联合国 2030 可持续发展议程》，实现中国碳达峰碳中和目标至关重要。我们认识到，中国是全球可再生能源发展的主要推动力，中国可再生能源特别是风电、光伏发电的大规模发展为全球能源转型、应对气候变化作出了巨大贡献。同时，我们注意到，随着风电、光伏等可再生能源设施设备迎来集中退役潮，废旧光伏组件、风机叶片等新兴固体废弃物的可持续管理和规模化处置成为亟待解决的问题。这些废弃物大量积聚可能引发新的环境和资源挑战，对能源体系绿色低碳转型构成潜在威胁。

在此背景下，我们提出**循环经济助力中国可再生能源零废转型倡议**，呼吁各方采取一致行动，支持中国可再生能源全产业链向循环经济转型，共筑可再生能源体系的零废未来。倡议的目标包括：

- **强化循环设计**：循环设计要求在设计产品、服务和系统时考虑全局。就产品设计而言，在设计阶段就要考虑产品全生命周期的环境影响。同时还应当研究拓展新材料替代方案，在不牺牲性能要求和使用安全的前提下，减少材料使用。推广轻量化、易再用、易拆解、易回收的设计方案，提高再生材料使用含量。
- **延长产品使用寿命**：通过定期维护、升级改造、维修翻新和再制造等循环经济手段，推动可再生能源设备和零部件的重复使用，减少退役设备和零部件产生量。
- **打通回收再生链路**：健全废弃光伏组件和风机叶片等新兴固废的回收再利用体系，提高关键材料的高值化回收利用率，推动减量化、资源化、无害化处置，实现零填埋，倡导零焚烧。



循环经济助力
中国可再生能源零废转型倡议



可再生能源价值链的循环图：优先考虑内循环

实现上述目标，我们向各利益相关方发出五点倡议：

1. **分享行业知识和经验，为政策制定提供科学依据**。分享产品生命周期数据、回收利用率、材料使用情况等信息，关注早期低效设备提前退役、新型设备寿命延长等因素影响，积极推动可再生能源产品设计准则、新兴固废回收处置办法、复合材料固废处理标准等政策、标准、规范的出台，支持建立可再生能源零废转型的长效政策机制。

2. **搭建利益相关方交流平台，促进可再生能源价值链健康有序发展**。搭建交流平台，促进原材料企业、可再生能源发电设备制造企业、可再生能源开发企业、退役设备回收企业、金融机构、行业组织等相关方之间的交流，凝聚共识，开展试点示范，探索商业模式，推动市场健康有序发展。经济效益，促进产业协同发展。

3. **多环节并重，攻坚克难解决可再生能源零废技术瓶颈**。从原材料研发使用、产品设计生产、项目建设运营、设备退役回收等环节，选取合适的技术路线，减少原料使用量，增加环境友好性，实现退役设备的全量高值化利用。

4. **加强国际交流与合作，共筑可再生能源零废未来**。依托“一带一路”能源国际合作伙伴关系平台，通过举办研讨会，开展联合研究，参观考察等活动，促进各国各组织间互学互鉴，根据需求向全球南方国家提供可再生能源循环经济转型方面的能力建设和技术援助。深化国际产业合作，构建更加稳定、多元的供应链格局，对冲极端突发事件风险，共同维护全球供应链韧性。

5. **以人为本，促进可再生能源产业链的公正转型**：确保可再生能源产业链从原料开采、加工制造到项目建设、运行维护、退役处置等多环节实现公平公正，关注社会利益和人类健康，创造更多就业机会，减少不平等现象。

研究表明，循环经济不仅能推动可再生能源零废转型，同时也能降低可再生能源产业链的温室气体排放，并减少对生物多样性的影响。我们将积极倡导政府部门、企业和社会各界通力合作，形成全社会共治体系，促进可再生能源循环经济转型的落地。通过采取这些措施，中国有望加速实现可再生能源体系的零废未来，进而推动实现碳达峰碳中和目标，助力建设新时期人与自然和谐共生的现代化。

发起单位

中国循环经济协会可再生能源专业委员会
中国能源研究会能源与环境专业委员会

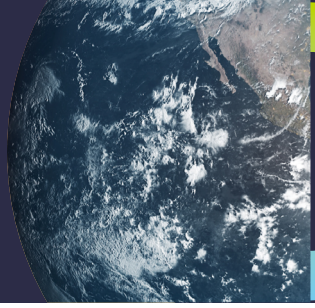
北京计鹏信息咨询有限公司

中国物资再生协会纤维复合材料再生分会

特别支持单位

艾伦·麦克阿瑟基金会（英国）北京代表处

Embracing Circular Economy for the Zero-Waste Transition of the Renewable Energy Value Chain in China

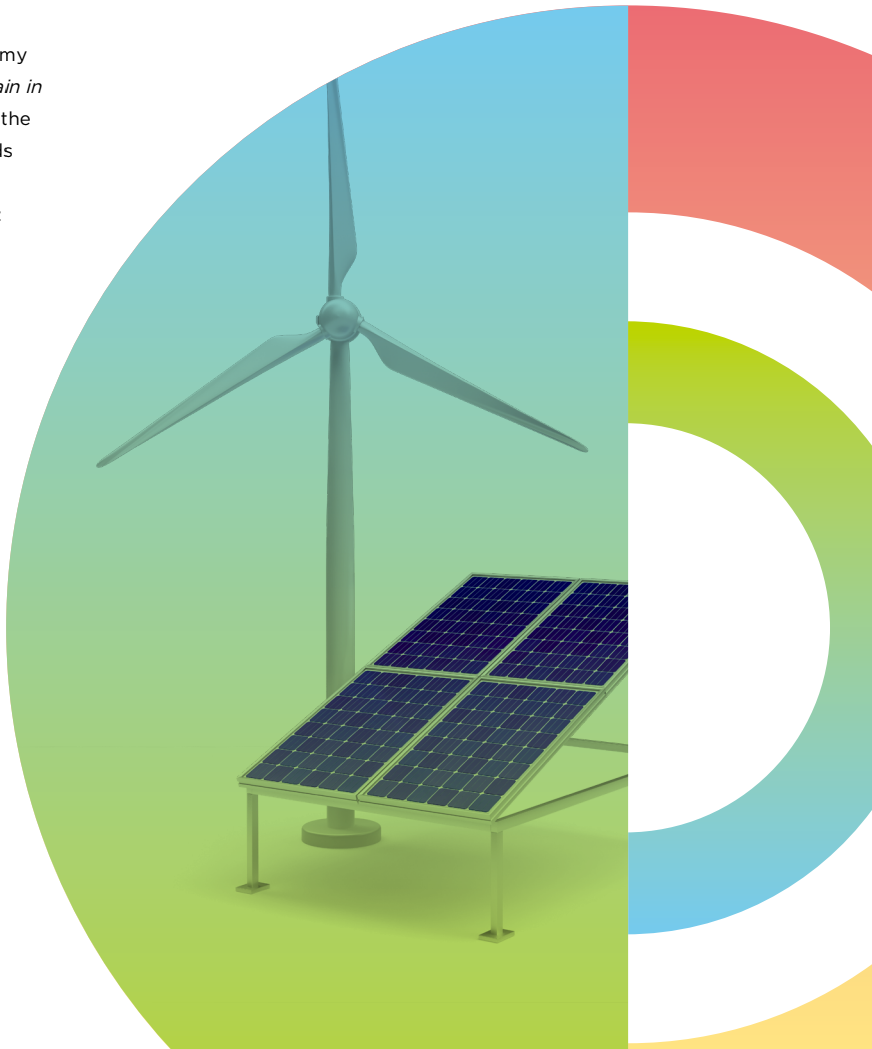


We, participants, supporters, and advocates of China's renewable energy transition, have gathered under the theme "Jointly promote energy transition for a shared green future" at the 2023 International Forum on Energy Transition in Suzhou, China. With determination, we pledge to take more robust actions, enhance cross-industry collaboration, build synergies, and accelerate China's renewable energy transition towards a circular economy. Our collective efforts aim to contribute to achieving carbon peak and carbon neutrality targets in China.

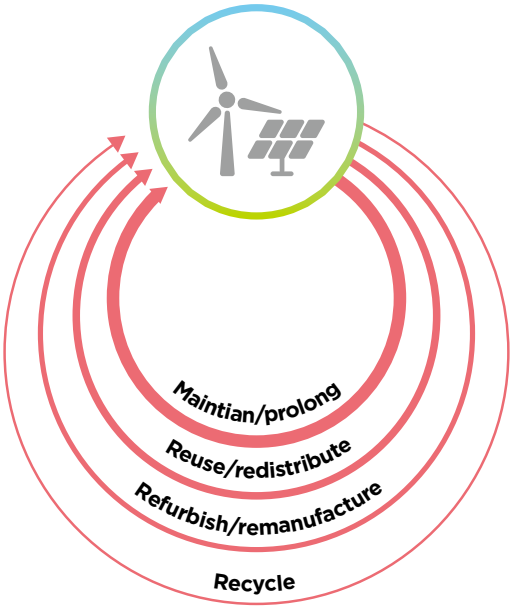
We recognize the critical role of developing renewable energy such as wind and solar power in aligning with the Paris Agreement and the United Nations' 2030 Agenda for Sustainable Development, as well as in achieving China's Carbon Peak and Carbon Neutrality goals. We acknowledge that China stands as a major driving force behind the global expansion of renewable energy, particularly in the significant development of wind and solar PV. This massive growth has made substantial contributions to global energy transition and efforts to combat climate change. However, we also acknowledge that as renewable energy equipment approaches their retiring stages in large numbers, sustainable management and large-scale disposal of emerging solid waste materials like discarded photovoltaic modules and wind turbine blades have become a pressing issue. The substantial accumulation of such retiring materials could potentially give rise to new environmental and resource challenges, posing a latent threat to the green and low-carbon transition of the energy system.

In this context, we launch the Initiative Embracing Circular Economy for *the Zero-Waste Transition of the Renewable Energy Value Chain in China*, calling for unified actions from all stakeholders to support the transition of China's entire renewable energy supply chain towards a circular economy, thereby shaping a zero-waste future for the renewable energy system. The objectives of this initiative include:

- **Strengthening Circular Design**: Circular design requires holistic (re-)thinking in products, services and system design. In terms of product design, the lifecycle impacts should be considered during the design phase. Explore innovative materials, aiming to reduce material use without sacrificing performance and safety criteria. We advocate for promoting product design that prioritizes lightweight, reusability, ease of disassembly, and recyclability, while encouraging increased use of recycled materials.
- **Extending Product Lifespan**: Through practices like routine maintenance, repowering upgrades, refurbishment, and remanufacturing, a circular economy aims to boost the reuse of renewable energy equipment and components, thus decreasing the volume of retired equipment and parts.
- **Establishing an Integrated Recycling System**: A comprehensive recycling system for emerging solid waste like discarded photovoltaic modules and wind turbine blades is to be established. This includes enhancing the high-value recycling rate of critical materials and advocating for waste minimisation, waste valorisation and safe disposal, ultimately achieving zero landfilling and promoting zero incineration.



Embracing Circular Economy for the Zero-Waste Transition of the Renewable Energy Value Chain in China



Circular Diagram of Renewable Value Chain: Prioritising the Inner Loops

To achieve the above-mentioned objectives, we propose **five strategic focus areas** to all stakeholders:

1. **Share Industry Insight and Expertise to Inform Evidence-Based Policy Making**: Share product lifecycle data, recycling rates, material usage information, and other relevant data. Pay attention to factors such as premature retirement of early inefficient equipment and the extension of the lifespan of new equipment. .Actively promote the development of policies, standards, and regulations, such as renewable energy product design guidelines, methods for handling emerging solid waste recycling and disposal, and protocols for dealing with composite material waste. Support the establishment of a long-term policy mechanism for the zero-waste transition of renewable energy.
2. **Establish a Stakeholder Communication Platform to Foster the Sustainable Scaling-up of Renewable Energy**: Foster interactions among critical material suppliers, renewable energy equipment manufacturers, renewable energy developers, recycling companies, financial institutions, industry associations, and other pertinent stakeholders. Build momentum, launch pilot and demonstration initiatives, delve into emerging business models, and advance a well-regulated market.
3. **Address Technological Challenges Across Multiple Stages**: Tackle technological bottlenecks hindering the zero-waste transition of renewable energy. Choose optimal technological paths at stages ranging from material innovation, product design and production, project construction and operation, to equipment retirement and recycling. Reduce material usage, enhance environmental friendliness, and achieve comprehensive high-value recovery of retired equipment.
4. **Enhance International Collaboration and Exchange**: Collaborate to pave the way for a waste-free future in renewable energy. Leveraging the "Belt and Road" energy international cooperation platform, we plan to organize seminars, conduct joint research, and facilitate site visits, among other activities. The goal is to promote mutual learning and collaboration among countries and organizations. According to the needs of countries in the global South, efforts will be made to provide capacity building and technical assistance in the field of renewable energy circular economy transition. Additionally, international industrial cooperation will be deepened, with the aim of establishing a more stable and diversified supply chain framework to mitigate risks from extreme and unforeseen events. This will collectively enhance the resilience of global supply chains.
5. **People-Centric Approach for a Just Transition**: Ensure a fair and equal transition of the renewable energy value chain across multiple stages, from raw material extraction and processing to project construction, operation and maintenance, and retirement and disposal. Focus on societal interests and human well-being, create more employment opportunities, and reduce inequalities.

Research demonstrates that the circular economy not only drives the zero-waste transition but also mitigates greenhouse gas emissions within the renewable energy value chain and reduces impacts on biodiversity. We will strongly advocate for collaborative initiatives involving government agencies, enterprises, and civil society while establishing a sound governance framework. Through these initiatives, China seeks to expedite the attainment of a waste-free future in the renewable energy sector. This, in turn, will contribute significantly to the realization of carbon peak and carbon neutrality objectives and accelerate the advancement of modernization featuring harmony between humanity and nature.

Initiating Organisations

Chinese Renewable Energy Industries Association
Energy & Environment Committee of China Energy Research Society

Beijing Jipeng Investment Information & Consultant Company Ltd.

China Composites Recycling of CRRA

Special Supporting Organisation

Ellen MacArthur Foundation (UK) Beijing Representative Office