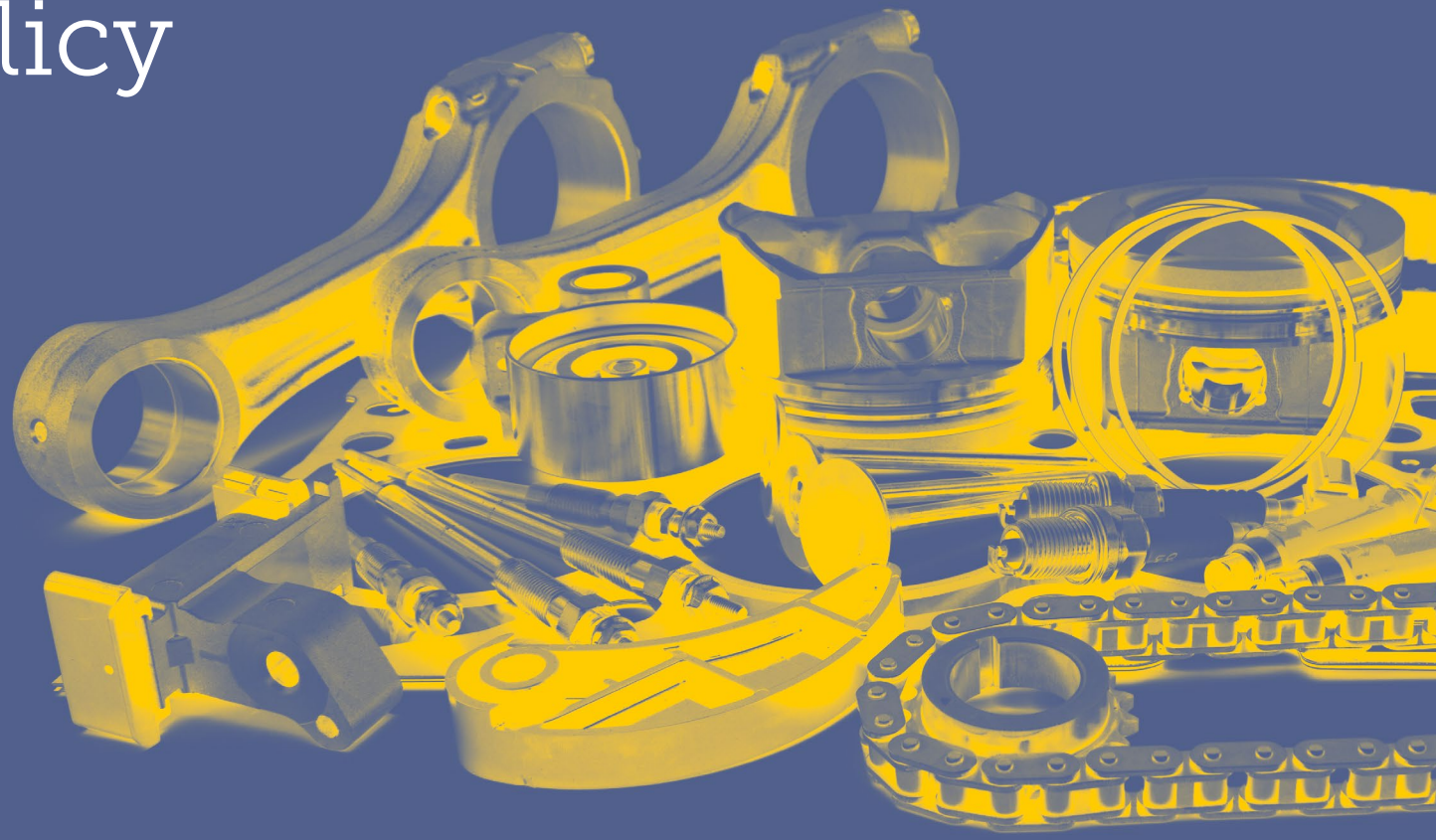
ELLEN MACARTHUR FOUNDATION

Advancing vehicle remanufacturing in China: the role of policy



Part of a series of case studies that exemplify elements of the Universal circular economy policy goals in practice.

China has adopted the circular economy as a national priority in the late 2000s, recognising it as a means of generating growth that is decoupled from resource use. Dedicated remanufacturing policies within this strategic national priority have already seen automobile refurbishment and recycling rates increase by more than 15% by 2019.

Remanufacturing uses approximately 60% less energy and 70% fewer materials than making new products, halving the cost and reducing emissions by 80%.[1] Recovering and re-engineering components from IT equipment, machinery, and vehicles makes better use of the embodied energy and thus helps to tackle climate change, reduce pollution, and limit finite resource extraction.

Vehicle remanufacturing in particular has a huge market potential in China, a country with an existing stock of 365 million vehicles. The automotive repair and maintenance market is currently valued at RMB 1 trillion (USD 157 billion) annually and remanufacturing represents an opportunity for further growth.

SOURCE: INDEPENDENT

This case study analyses three key policies that have propelled the growth of the vehicle remanufacturing sector in China.

Financial and regulatory incentives to increase collection rates

Collecting end-of-life vehicles from consumers has been a bottleneck for Chinese enterprises since 2001. However, a 2013 policy from the National Development and Reform Commission (NDRC) and the Ministry of Finance (MOF), *Swap the Old for Remanufacturing*, had a catalytic effect on the collection rate of scrapped vehicles in China, increasing it by around 5% by 2016.[2]

The policy provides subsidies to enterprises that collect both entire end-of-life vehicles and component parts – as well as machines and machine tools – for remanufacturing. Additionally, it incentivises customers to buy remanufactured products by offering a 10% discount compared to buying new, which retailers can claim directly from the government.

In addition, the *Regulation on Scrapped Vehicles*, which stipulated that only raw materials like metal could be recovered from used vehicle parts, was revised in 2019 following industry feedback. Designed to prevent illegal remanufacturing activities when it was introduced in 2001, the policy had been impeding growth of vehicle

NDRC 'AUTO PARTS REMANUFACTURED PRODUCT' LABEL

remanufacturing by limiting what could be recovered and sold to metal only. Under the latest regulation, the five major parts of a vehicle (the engine, steering gear-box, transmission, car-frame, and the front and rear axle) can be sold directly to qualified remanufacturing enterprises. These changes created a stronger enabling environment, expanding the scale of industrial remanufacturing and achieving a higher rate of end-of-life vehicle recovery.

Pilot programmes and industrial clusters to promote best practice and foster activity

Starting in the early 2010s, the Chinese government implemented a range of pilot projects to test the market potential for vehicle remanufacturing and identify ways to support the sector. For example, in 2014, the Ministry of Industry and Information Technology (MIIT) announced a list of 20 pilot enterprises licensed to sell remanufactured products, from construction machinery to office equipment, stipulating that products must be at least of an equivalent quality to new. To be listed, an enterprise had to satisfy strict requirements relating to the scale of production, management systems, and repair skills, and had to agree to periodic monitoring. The success of these initial pioneer enterprises encouraged other small- and medium-sized businesses into the sector, and by 2016 there were 76 pilot companies in operation.

SOURCE: BARUM-TYRES

Rising interest in remanufacturing in the wake of these pilots led to the establishment of dedicated industrial parks for remanufacturing, with the State Council announcing in 2015 a target of more than 100 industrial zones. The Shanghai Lingang Industrial Park of Remanufacturing, for example, was set up in 2013 and quickly attracted more than 200 remanufacturing companies, together generating over RMB 1.2 billion (USD 189 million) in annual revenues by the end of the year. By 2016, international companies had also set up operations in the park, such as Daimler-Benz, which selected the site for its Asia-Pacific remanufacturing centre.

Public funding to support technological advancement and standards

Remanufacturing requires expertise and advanced technology systems. China has been investing in specialist skills since 2003 through the National Key Laboratory for Remanufacturing. To date, its team of academics and researchers have been granted 40 Chinese and international patents, and published around 900 papers and 18 national standards for remanufacturing.

Adding to this body of research, in 2017 MIIT issued a Smart Remanufacturing Action Plan (2018-2020) aimed at facilitating breakthroughs in key technologies such as disassembly, damage detection, and forming processes. In addition, it helped to fund the establishment of 100 high tech enterprises, R&D centres, service centres, information platforms and industry clusters to scale remanufacturing activities in China. Crucially, MIIT also issued an official certificate for approved remanufactured products under this policy, which guarantees their functionality and quality is equal to or better than the new original products. This helped qualified products gain visibility and legitimacy in the market space.

Timeline of policy developments

2001 To prevent illegal remanufacturing activities, the State Council regulation on remanufacturing stated that vehicle parts should only be used for metal recovery.

2005 Adoption of the proposal on *Acceleration of Development in Circular Economy* encouraged end-of-life product recovery.

2008 Adoption of the *Circular Economy Promotion Law*.

2008 Regulations on Automobile Components Remanufacture Pilots listed key vehicle components for pilots at 14 companies.

2013 The NDRC and the MOF published the *Swap the Old for Remanufacturing* policy.

2014 MIIT announced *The List of Pilot Remanufacturing Enterprises*.

2017 Adoption of the *Circular Development Lead Act* again highlighted the need for remanufacturing standardisation.

2017 MIIT issued its *Smart Remanufacture Action Plan (2018-2020)* to support key remanufacturing technologies.

2019 The State Council published the *Revised Regulation on Scrapped Vehicles,* updating the 2001 legislation and enabling five major parts of a vehicle to be sold directly to registered remanufacturing enterprises.

2020 In 2020, the NDRC published its *Temporary Regulation on Automobile Component Remanufacture Management*.

2021 The State Council issued the *Action Plan for Carbon Peaking Before 2030*, and four ministries and commissions including the Ministry of Industry and Information Technology (MIIT) issued the *Implementation Plan for the Pilot Program of the Extended Producer Responsibility System for Automobile Products* to:

1. guide automobile manufacturers to self-build or jointly-build a reverse recycling system for end-of-life vehicles in accordance with laws;
2. strengthen information sharing with end-of-life vehicle recycling and dismantling enterprises and comprehensive resource utilisation enterprises;
3. expand the use of recycled materials, remanufactured products and used parts and components;
4. realise high-value utilisation of the dismantled products from end-of-life vehicles;
5. improve the comprehensive utilisation efficiency of automobile resources; and
6. explore the establishment of the extended producer responsibility (EPR) management system for automobile products.

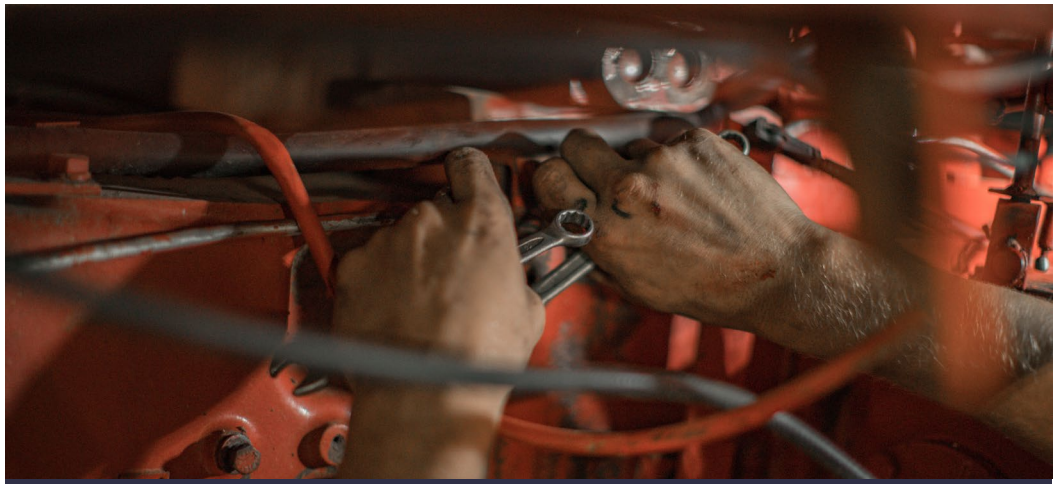
Going forward

China's carbon reduction ambitions have made vehicle remanufacturing more relevant than ever: the industry was among the focus areas of the State Council's *Action Plan for Carbon Peaking by 2030*. In 2021, the NDRC, MIIT, Ministry of Ecology and Environment (MEE) and five other relevant departments jointly issued the Interim Measures for the Regulation and Administration of Automotive Parts Remanufacturing, which outlined the next steps needed for the industry to mature. The Regulation encourages the use of third-party technical quality standards, as well as improvements in value chain management, from reverse logistics to traceability, which will all contribute to the development of the sector.

With continued policy support, technological advancement and by increasing consumer trust through clear regulations, the Chinese remanufacturing industry could continue to capitalise on its huge market potential.

Lessons learned

Setting remanufacturing as a strategic sector of the economy
In line with its vision for a circular economy, the Chinese government defined vehicle remanufacturing as a strategic sector to achieve resource circulation and reduce pollution. This has led to the development of an enabling policy framework for the industry, which has in turn provided the conditions and momentum for the industry to grow.



SOURCE: NINA MERCADO, UNSPLASH

Providing incentives to create material loops
By providing subsidies for the collection of scrapped vehicles, through Swap the Old for Remanufacturing, the government created financial incentives for companies to keep vehicles and their materials in use. By encouraging customers to buy remanufactured products at a 10% discount, the subsidies have also promoted the establishment of a secondary market. The establishment of green industrial parks created valuable industry clusters that supported growth in remanufacturing activities.

Fostering collaboration among key actors
The NDRC, The State Council, MIIT, and the MOF have all been involved in the evolution of policies to develop and grow the vehicle remanufacturing industry. Orchestrated interventions from different ministries have supported different elements of the industry such as technological advancement and collection of scrapped vehicles. In addition, the government engaged a range of stakeholders on policy developments, co-creating the necessary skills and legislatory backdrop for success.

Promoting the growth of automotive remanufacturing activities through policies: how this policy example illustrates elements of the Universal circular economy policy goals framework

This example illustrates several aspects of the Universal circular economy policy goals framework including:

GOAL 2
Managing resources to preserve value
Remanufacturing maximises material use, increases return on invested energy, and can deliver multiple circular economy loops, while reducing emissions, waste, and virgin material demands. Through revised regulations, combined with subsidies, the Chinese government helped increase the collection rate of scrapped vehicles. Extending the lifespan of vehicle parts supports the creation of secondary markets for remanufactured vehicles. These benefits can be further increased by stimulating circular design for vehicles through product policies.

GOAL 3
Make the economics work
The prevailing economic policies and incentives are hardwired for and by the linear economy. Aligning subsidies, business support and other economic instruments with circular economy principles can enable circular economy business decisions to become the norm rather than the exception. By providing economic incentives, such as subsidies, for the collection of end-of-life vehicle parts and for remanufactured products, the Chinese government has promoted the growth of the sector.

GOAL 4
Invest in innovation, infrastructure, and skills
By supporting the technologies, skills, and infrastructure that support the remanufacturing industry, the Chinese government has unlocked new circular economy opportunities. The establishment of high tech enterprises, R&D centres, and information platforms have helped to scale remanufacturing activities in China. Funding research and innovation programmes is essential to unlock new circular economy insights and drive long-term innovation. In this case, it has led to the development of patents and new national standards for remanufacturing.

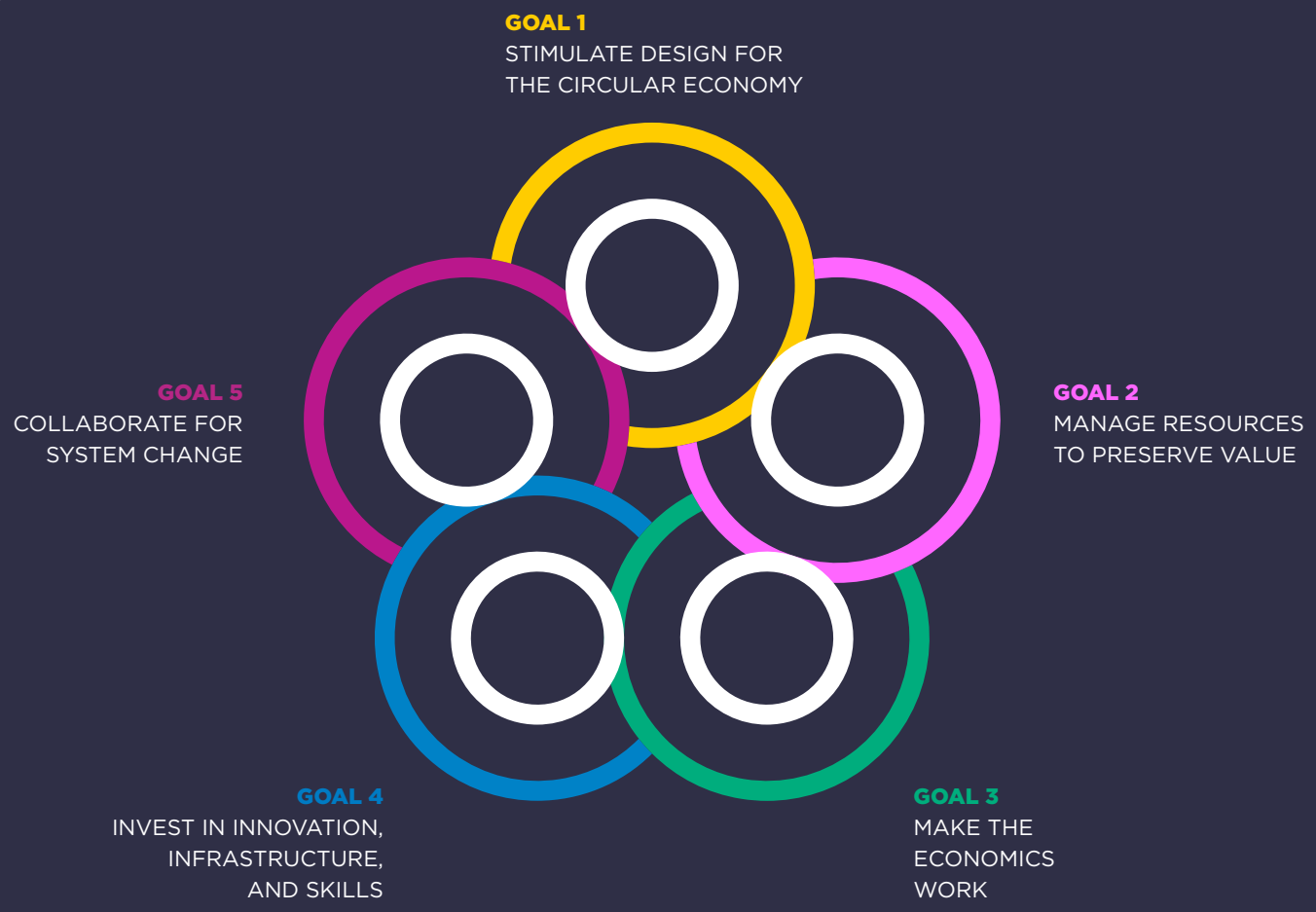
GOAL 5
Collaborate for system change
The transition to a circular economy is supported by a whole-of-government approach and collaboration with stakeholders from across sectors and industries. With the involvement of multiple ministries, as well as the feedback from companies and the engagement and development of research centres, the Chinese government has supported the exchange of knowledge that has informed policy and facilitated breakthroughs in key remanufacturing technologies.

Endnotes

1 Huang H., Qian Z., Liu Z., Metal Magnetic Memory Technique and Its Applications in Remanufacturing, Science Press Beijing, (2021).

2 Jian Cao et.al. Overview of remanufacturing industry in China: Government policies, enterprise, and public awareness, Journal of Cleaner Production, Volume 242 (2020).

About the Universal Circular Economy Policy Goals



In January 2021 the Ellen MacArthur Foundation, published a paper Universal circular economy policy goals: enabling the transition to scale, aiming to create a common direction of travel in policy development for a faster transition to a circular economy. The five circular economy policy goals detailed in the paper can offer solutions to key global challenges such as climate change, biodiversity loss, and pollution, whilst delivering economic development.

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