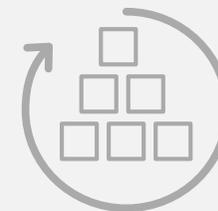


China

Growth and the Environment:
From Tradeoff to Circularity

Circular model



Service model



Maintenance model



China's lower growth target acknowledges reality

From supercharged growth...

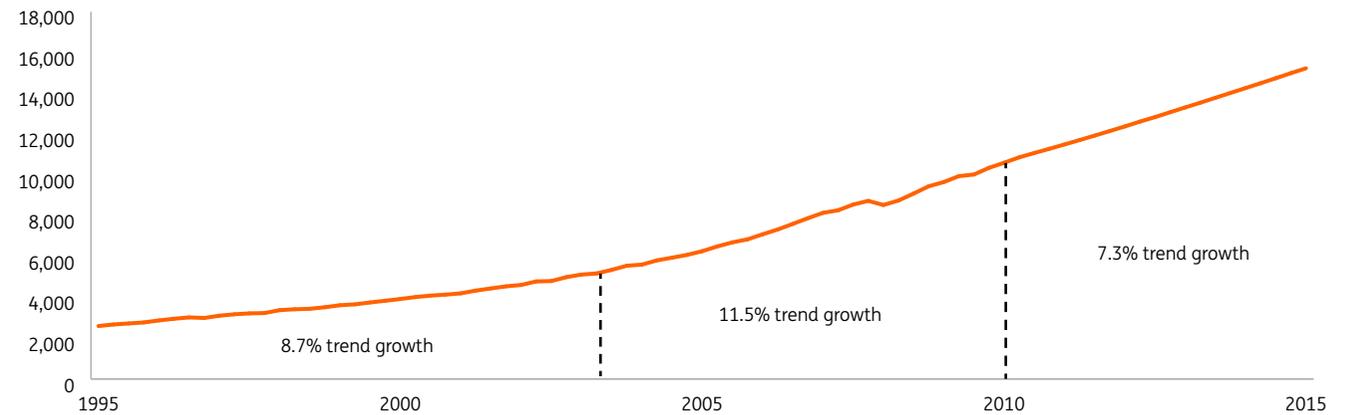
Growth during the 12th Five-Year Plan (2011-15) averaged a steady 7.3%, the third period of steady economic growth in the last twenty years (Figure 1). Rapid, 8.7% catchup growth in 1994-2001 gave way to supercharged, 11.5% growth after China joined the World Trade Organization in 2001.

...to a new normal

At the March annual National People's Congress session Premier Li Keqiang outlined the economic targets for the 13th Five-Year Plan (2016-20). The plan will build on "five development concepts": innovation, coordination, green development, openness and inclusiveness. Left unchanged was the goal of transforming China into a "moderately prosperous society" by 2020, though it was deemed compatible with a lower growth target, 6.5-7.0%, down from 7.5% in the previous Plan.

Figure 1 Economic growth has slowed down from 12% to 7%

GDP in China (billions of 2010 RMB)



Source: EMED data service, ING Bank

WTO membership fuelled supercharged growth... ...but accelerated the growth of carbon emissions

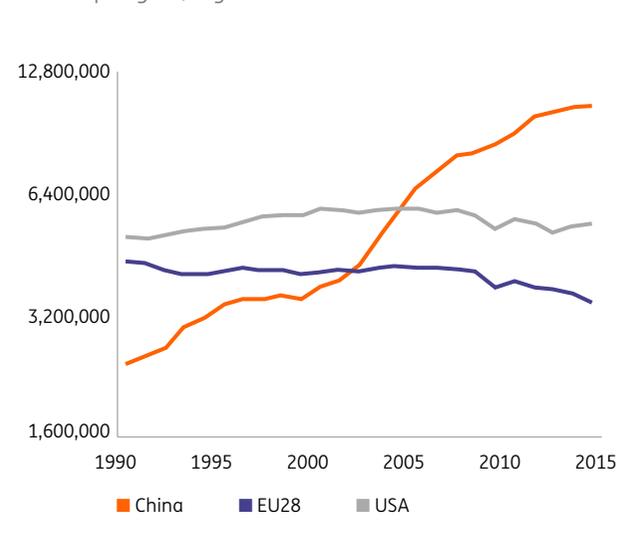
Keeping economic growth on track...

China joined the World Trade Organization (WTO) in 2001. Economic growth increased in the following period due to increased trade. This WTO growth dividend was fading when the Global Financial Crisis (or Transatlantic Financial Crisis as it's known in China) erupted. China's policymakers responded with a massive credit stimulus that supported near-double-digit growth in 2009 and 2010. Growth slowed from 2011 when the ill effects of the credit boom led the authorities to scale it down. Cleaning up the ill effects and keeping the economy on track to hit the moderately prosperous society target is the medium-term challenge for China's policymakers.

...and reducing the side effects

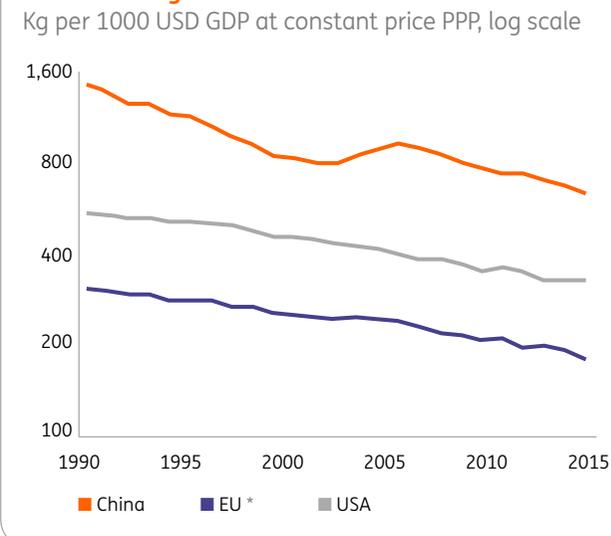
Environmental degradation was among the ill-effects, though problems had been accumulating for years. The period of supercharged, WTO dividend growth was associated with an acceleration in the growth of carbon emissions (Figure 2) to the extent of reversing for a time the downtrend in carbon emission per unit of GDP that had been in place since the early 1990s (Figure 3). With the growth slowdown the rate of growth of emissions has slowed to its earlier level and the downtrend in emissions per unit of GDP has resumed, albeit at a slower pace than prevailed earlier (Figure 3). However, a persistent effect of supercharged growth is that China is a larger carbon emitter than the US and Europe combined.

Figure 2 Total CO₂ emissions on the rise in China
Kiloton per year, log scale



Source: The Economic Database for Global Atmospheric Research (EDGAR)

Figure 3 Relative CO₂ emissions are also high, but declining
Kg per 1000 USD GDP at constant price PPP, log scale



Source: The Economic Database for Global Atmospheric Research (EDGAR)

* Estimate for EU based on Germany, UK, France, Italy, Spain and Netherlands

Urbanization is a powerful driver for economic growth... ...but comes at a cost

Improving China's carbon intensity...

The authorities are committed to reducing the economy's carbon footprint. At the November 2014 APEC summit in Beijing the Chinese and US governments agreed to reduce the carbon intensity of growth by 60-65% and to source 20% of energy needs from non-fossil sources by 2030.

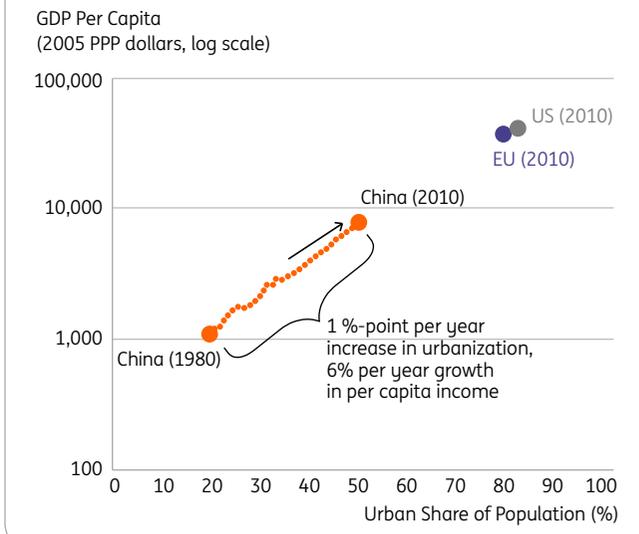
...might be difficult in the process of urbanization

However, China is an upper-middle income economy, not an advanced economy. Its growth targets require rapid catch-up growth. In the past this has meant trading off fast growth for environmental degradation. Urbanization, for example, is a powerful growth driver – since 1980 a one percentage

point annual rise in urbanization has been associated with 6% annual growth of per capita income (Figure 4) – but it also has been associated with urban sprawl and wasteful resource use, including energy consumption. Urban residents use three times as much energy as rural residents according to the World Bank.



Figure 4 China's rapid urbanization brings prosperity



Source: World Bank, Penn World Tables, ING Bank

Green development requires reform... ...both in terms of public finances and the economic model

“Zombie” companies

Making urbanization and the environment less about tradeoffs and more about circularity requires action on a variety of fronts. The building boom created excess capacity in several heavily polluting industries. In February 2016 the China Banking Regulatory Commission and other major

ministries jointly issued a circular on policies to restructure excess debt and so-called “zombie” companies. The authorities have announced plans to close excess coal and steel capacity over a number of years.



Public finances

Sprawling urbanization is partly due to local governments' practice of financing municipal expenses practice through land sales. In a 2014 interview Finance Minister Lou Jiwei described legislative changes aimed at reducing local governments' addiction to land financing. Regional policies could not grant fiscal benefits to enterprises without State Council approval and local tax policy could not be more preferential than national tax laws and regulations permitted. This year the authorities will expand tax resources for local governments by replacing the current business income tax and different local taxes that distort the marketplace with a VAT.

Circular economy

The challenge reaches further than the financial sector and public finances. In fact, decoupling growth and environmental impact requires a new economic paradigm from the typical 'take, make and waste' approach of production towards a 'reduce, reuse and recycle' approach. The concept of the circular economy aims to present a solution to this challenge by combining revenue with social impact. It enables businesses to grow and prosper while keeping the environment and society intact, ensuring growth for themselves as well as future generations.

China needs system change towards a circular economy

Attitude towards nature

Attitude towards production

Closing loops

Product life extension

Performance economy

Earnings model

Multiple values and principles

Supply chain

Characteristics of a linear economy

Forcing nature to produce more

Take, make and waste

One lifetime use of products, components, materials and energy

Products become obsolete while they are still usable

Consumers buy goods

Producers determine sales price of products

Money is the dominant value in business models

Companies improve efficiencies in isolation of each other



Characteristics of a circular economy

Doing more with what nature can produce

Reduce, reuse and recycle

Materials and energy flow infinitely in cycles through the economy

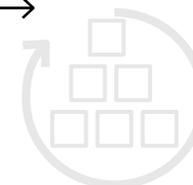
Product life is extended in new applications or products serve as valuable inputs for other products

Accessibility and performance instead of ownership are leading in many consumption markets. Consumers increasingly share products

Producers charge price for the use of the product

Business models are based on multiple values (financial alongside environmental and social values)

Companies work together to increase value along the supply chain. Risk and benefits are shared upstream and downstream



Business models in the circular economy are different from the ones in the linear economy

ING's report Rethinking Finance in a Circular Economy is all about the 'what and how' of a circular economy, the new business models that drive it and its implications for financial institutions ([click here to download the report](#)). It concludes that business models in the circular economy are distinctively different from business models in the linear economy (table 1).

Table 1 Differences between conventional and circular business models

	Conventional business models	New business models
Principles for value creation	Business continuity and profit optimisation are the overriding principles	Circular business models open the way to incorporate multiple principles for value creation. Beyond financial values, environmental and social business values are also taken into account. Creating impact is a central theme in these models.
Co-operation	Traditional buyer supplier relationships in linear supply chains. The benefits of the product or service are limited to the buyer and seller (exclusive business models).	Companies in circular supply chains often co-operate beyond traditional buyer supplier relationships that characterize linear supply chains. Instead they operate in a network of companies and institutions that often involve a strong element of collaboration and co-creation.
Transaction	Transactions emerge in B2B or B2C markets with money as medium of exchange.	New market segments arise in which consumers interact with other consumers (C2C) and in which economic agents act both as manufacturer as well as consumer (C2B). Money is the main, but not necessarily the sole, medium of exchange as goods or services are for example exchanged against energy, time or waste.
Ownership	Ownership is central for the consumption of products and services.	Access to a service is more important than ownership of a product that delivers the service.
Success measurement	Success is measured in a financial cost benefit analyses for the parties involved in the transaction (seller and buyer).	Success is measured in a cost benefit analyses that incorporated financial and non-financial values for all the stakeholders involved as well as society at large.

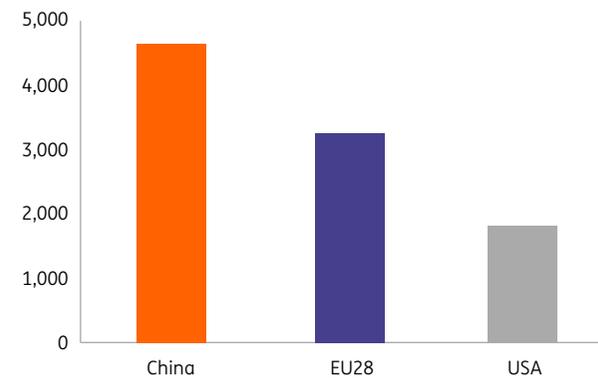
Source: Jonker, Accenture and ING Bank

China's large capital goods industry provides opportunities for change towards the circular economy

The capital goods industry provides a point in case as companies are revisiting their business models. This provides China with opportunities to make its economy more resource efficient since the market for capital goods equals US\$4.6 trillion (figure 5) or 35% of Chinese manufacturing. As such, the sector is much larger in China compared to the USA and EU and growth is likely to be higher in the coming years as well (figure 6). Whereas the capital goods markets in the USA and Europe experienced severe downturns following the Global Financial Crisis, the market in China was hardly affected and in fact continued to grow.

Figure 5 China's large capital goods industry is larger...

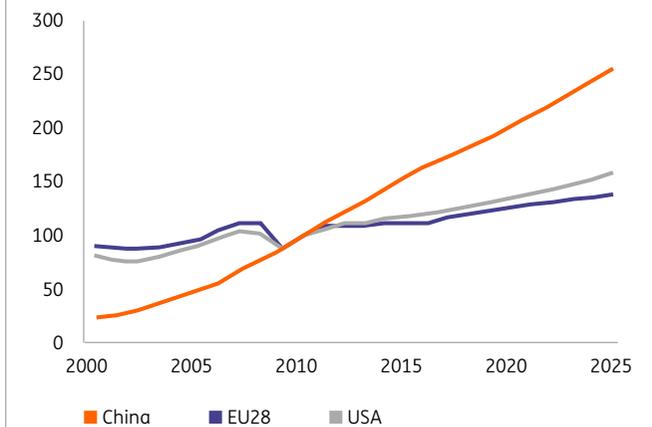
2014 US\$ billions



Source: Oxford Economics, ING Bank

Figure 6 ...and shows faster growth

Index, 2010 = 100



Source: Oxford Economics, ING Bank

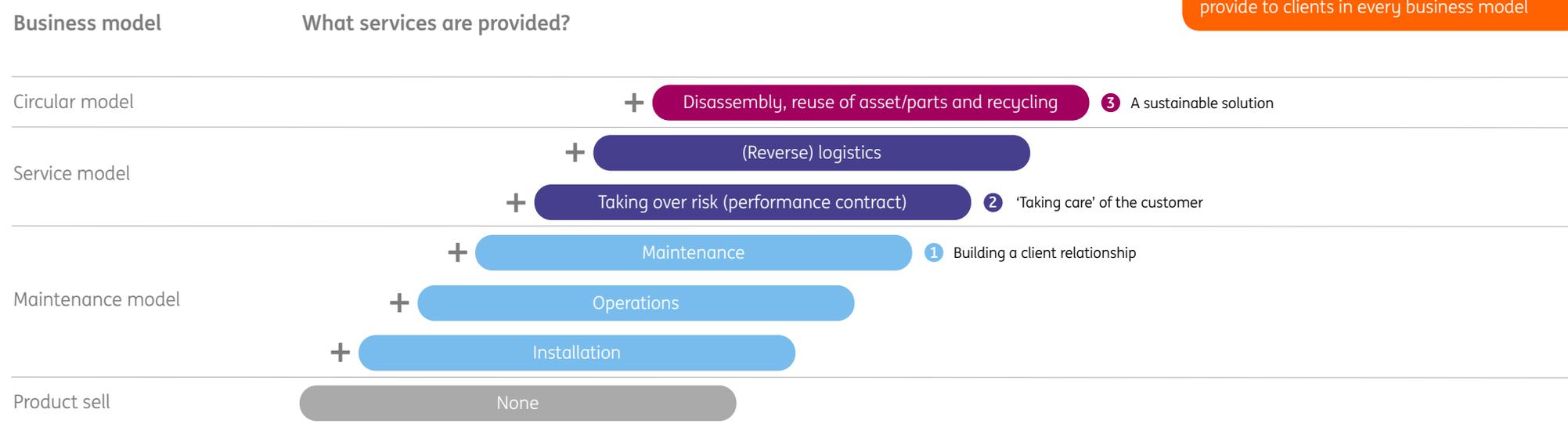
From product sales to sustainable customer solutions

Greening China's increasingly important capital goods market is a multistage process in which more and more services are added to the traditional 'product sell' business model: from maintenance to financial services and risk

sharing contracts to full swing circular business models that close production loops through reverse logistics and by designing capital goods for easy disassembly and maintenance (figure 7).

For more information on the 'stairway to circularity' and the four business models see: ING, [From Assets to Access](#), 2016.

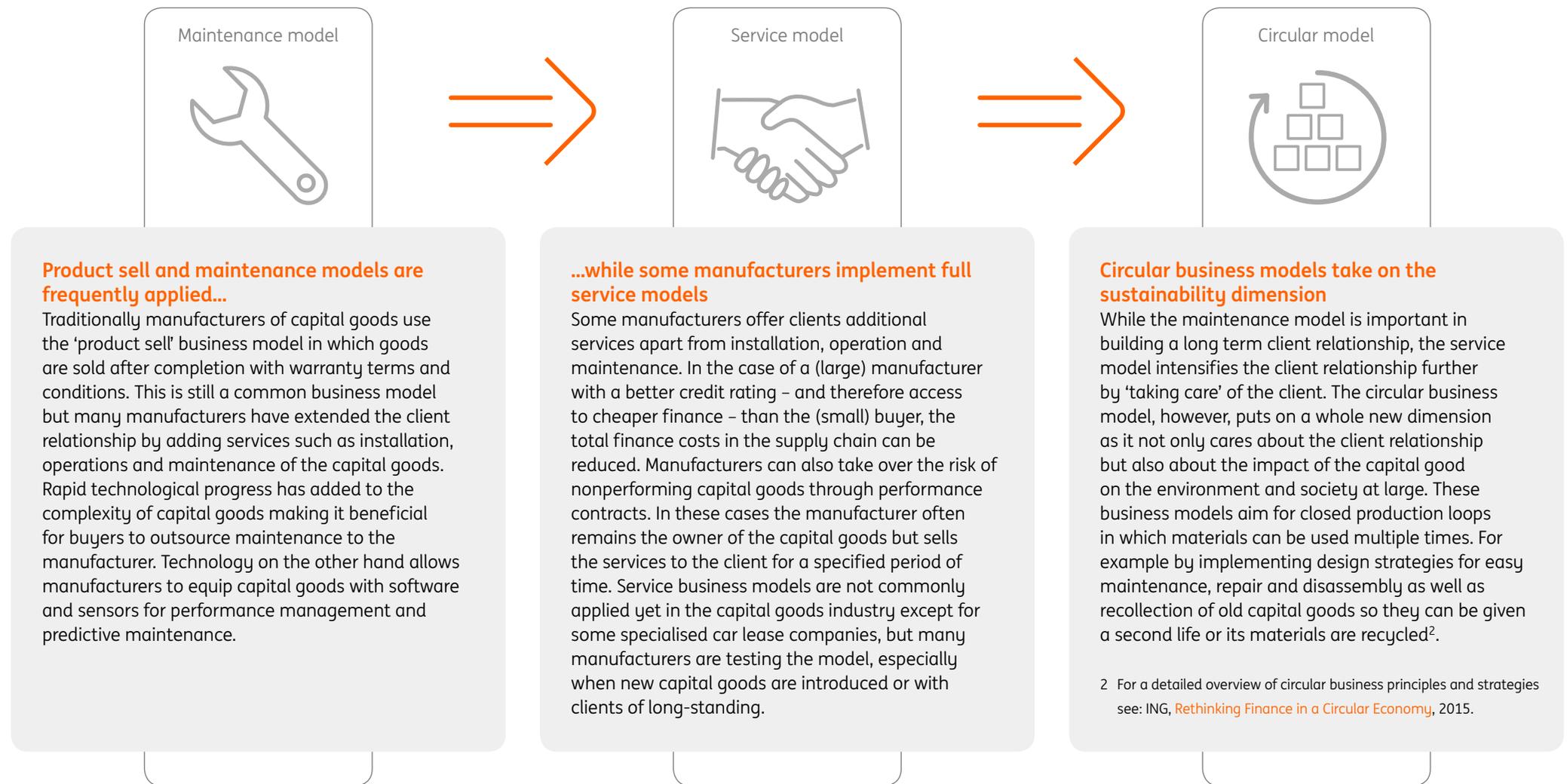
Figure 7 Stairway to circularity: stages in business model development for capital goods



Finance is a service that a manufacturer can provide to clients in every business model

Source: ING Bank

Climbing the stairway to circularity: from maintenance to circular business models



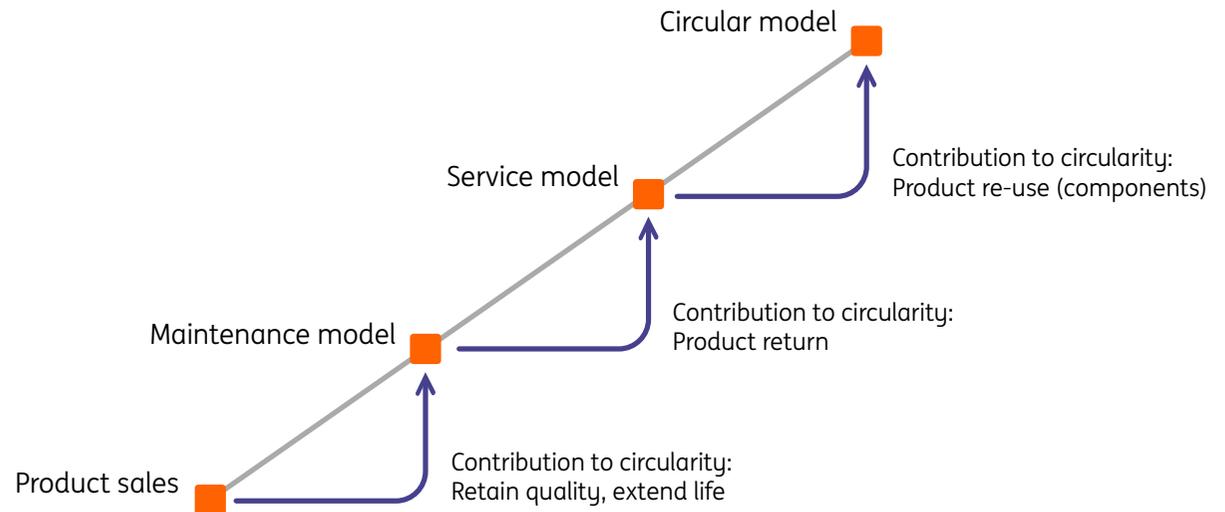
Gradual move to circular model most likely to succeed

Move in one jump not necessarily easier

The increasing embrace of circular models is no measure for their success. Companies that immediately introduce a circular model in the interest of 'sustainability' face a considerable challenge. The transition from product sales to service model is considerably challenging enough in itself. When implementing the circular model in one go it is important that design, return logistics and re-use of products also are well aligned and organised. The customer proposition in particular, which is highlighted in the service model, must be really watertight.

Relatively expensive lease concepts or 'return deposit constructions' sometimes create too many barriers for customers and prevent the successful marketing of a concept. It remains essential to take the proposition to the customer as the starting point. For capital goods manufacturers in particular, the move towards a circular model is more likely to succeed if it follows the path of maintenance model followed by service model.

Figure 8 Gradual transition to circular model



Source: ING Economics Department

Regulation is likely to be a main driver towards circular business models

The carrot...

Manufacturers see strong demand for the 'product sell' as well as maintenance business models and increasingly for the service model. Demand for the circular business models is still limited. First of all, consumer demand for circular products is still lacking. Circular business models do see increased demand from entrepreneurs that want to make their business more sustainable, but apart from demand in the B2B market, end demand from consumers is still limited (B2C market). And the halving of commodity prices from their 2010 peaks lessens the urgency for businesses to transform linear business models and reuse resources from old products in new ones (figure 9).

...and the stick

If consumer demand lags as a driver of circular business models, regulation does not. In December 2015 the EU adopted a Circular Economy Package which aims to increase recycling rates to 65% for municipal waste and 75% for packaging waste in 2030. It also contains a binding landfill target to reduce landfill to a maximum of 10% of all waste by 2030. Furthermore, rules are implemented to promote the reparability, durability, recyclability and energy efficiency of products (Ecodesign Directive). However, from a circular economy perspective, it is a missed opportunity that the proposed binding targets to increase resource productivity at a macro level did not make it into the final Directive.

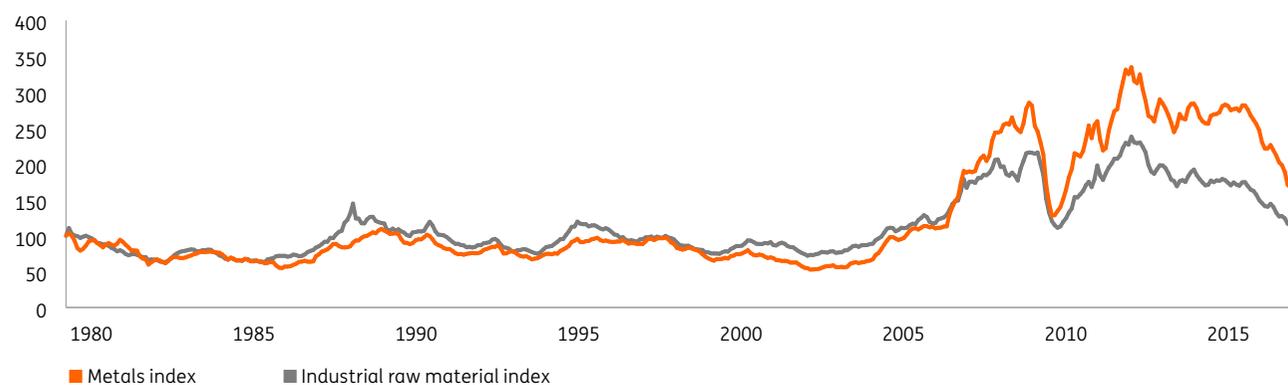
Nevertheless, these measures will require entrepreneurs to increase the circularity of their business models in the coming years as the EU directive is translated into national legislation by the member states. In Europe, this can be a lengthy process. In that respect China's strong central government may be an advantage. Rapid urbanisation could also be a major advantage for China compared to Europe. Europeans usually are working in city structures that are decades or centuries old. China in some cases is building cities from scratch. It can build smart cities that make use of circular technologies and business models on a scale not seem possible in Europe.

Bottom line

While the classical tradeoff between economic growth and environmental degradation is still largely in place authorities have pragmatically modified policy to encourage circularity. We expect continued pragmatism as China strives to meet its ambitious targets for growth and the environment.

Figure 9 Commodity prices have fallen from their peak

Index 1980 = 100



Source: Macrobond, ING Bank

Colophon and disclaimer

Authors

Gerben Hieminga	Senior Economist, Netherlands	gerben.hieminga@ing.nl	+31 6 8364 0072
Jurjen Witteveen	Principle Economist, Netherlands	jurjen.witteveen@ing.nl	+31 6 8363 5786
Tim Condon	Chief Economist, Asia, Singapore	tim.condon@asia.ing.com	+65 6 232 6020

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