China
Growth and the Environment: From Tradeoff to Circularity
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

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.

![Image of urban area with signs and people]

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

### 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>
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<th>Table 1 Differences between conventional and circular business models</th>
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<td><strong>Conventional business models</strong></td>
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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

**Figure 6** ...and shows faster growth
Index, 2010 = 100

Source: Oxford Economics, ING Bank
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](image)

**Business model** | What services are provided?  
---|---  
Circular model | Disassembly, reuse of asset/parts and recycling (Reverse) logistics  
Service model | Taking over risk (performance contract) Maintenance  
Maintenance model | Operations Installation  
Product sell | None

Source: ING Bank

Finance is a service that a manufacturer can provide to clients in every business model.
Product sell and maintenance models are frequently applied...
Traditionally manufacturers of capital goods use the ‘product sell’ business model in which goods are sold after completion with warranty terms and conditions. This is still a common business model but many manufacturers have extended the client relationship by adding services such as installation, operations and maintenance of the capital goods. Rapid technological progress has added to the complexity of capital goods making it beneficial for buyers to outsource maintenance to the manufacturer. Technology on the other hand allows manufacturers to equip capital goods with software and sensors for performance management and predictive maintenance.

...while some manufacturers implement full service models
Some manufacturers offer clients additional services apart from installation, operation and maintenance. In the case of a (large) manufacturer with a better credit rating – and therefore access to cheaper finance – than the (small) buyer, the total finance costs in the supply chain can be reduced. Manufacturers can also take over the risk of nonperforming capital goods through performance contracts. In these cases the manufacturer often remains the owner of the capital goods but sells the services to the client for a specified period of time. Service business models are not commonly applied yet in the capital goods industry except for some specialised car lease companies, but many manufacturers are testing the model, especially when new capital goods are introduced or with clients of long-standing.

Circular business models take on the sustainability dimension
While the maintenance model is important in building a long term client relationship, the service model intensifies the client relationship further by ‘taking care’ of the client. The circular business model, however, puts on a whole new dimension as it not only cares about the client relationship but also about the impact of the capital good on the environment and society at large. These business models aim for closed production loops in which materials can be used multiple times. For example by implementing design strategies for easy maintenance, repair and disassembly as well as recollection of old capital goods so they can be given a second life or its materials are recycled.2

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](image-url)

*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.
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