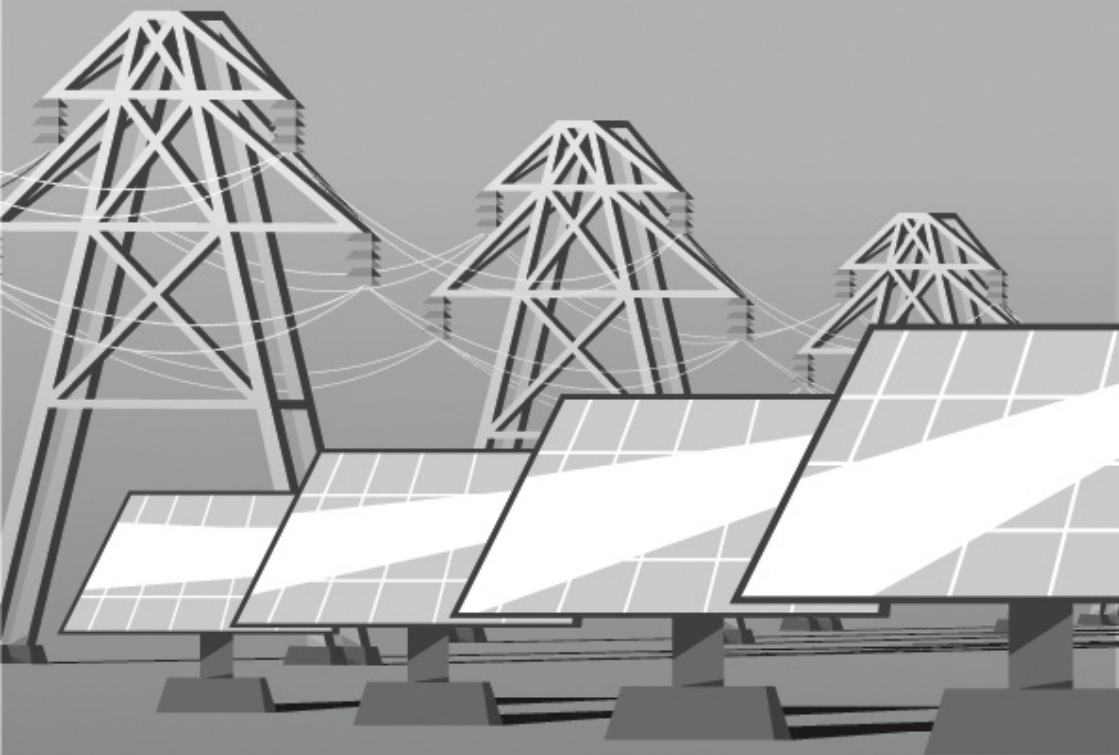


China's Green Revolution

Energy, Environment and
the 12th Five-Year Plan



Contents

Introduction

Isabel Hilton 5

1. The plan 12

What's in the Five-Year Plan?

Olivia Boyd and Tan Copsey 13

2. The green era 16

China's green era begins

Hu Angang and Liang Jiaochen 17

3. Energy-intensity - has China got it right? 22

Reining in China's energy targets

Liu Jianqiang 23

“China needs higher targets”

Yang Fuqiang, Hou Yanli and Li Jingjing 27

Behind China's green goals

Feng Jie and Yuan Duanduan 31

4. China's challenge to the world 37

A test for Europe?

Shin Wei Ng 38

Meanwhile in America

Linden Ellis 42

A spur to action in Hong Kong

Thomas Ho 48

5. Looking beyond the plan 51

The continuing crisis

Sam Geall 52

Introduction: the evolving blueprint

Isabel Hilton

Since China launched its 1st Five-Year Plan (FYP) in 1953, China's five year plans have been both a blueprint for the immediate future and a showcase of the political economy of the day. Important as each plan has been, the evolution of the process has been neither smooth nor trouble free.

In the early years of the People's Republic, successive plans revealed some very different priorities within the ruling party and, on occasion, the tensions of other events: there was a hiatus between the second and third plans, for instance, from 1962 to 1966, following the Sino-Soviet split. The first plan had been drawn up with Soviet advice, and stressed large-scale construction, rapid heavy industrialisation under increasing state control and the beginnings of agricultural collectivisation. In many respects, the plan was successful, with rapid growth in iron and steel output, mining and energy.

The period of the second plan (1958-62) spanned the Great Leap Forward and delivered continuing growth in heavy industry, but had catastrophic results in agriculture and widespread starvation attended its implementation. The third plan, (1966 -70) with a new emphasis on accumulation and defence, reflected increased international tensions following the break with the USSR in 1961. Officially the plan's targets were achieved, despite the continuing disruption and chaos of the Cultural Revolution.

The fourth plan (1971 -75) was the last of the Mao era. From 1976, China changed course, entering the period officially known as reform and opening. This strategic shift was reflected in the *Ten Year National Economic Development Plan Outline for 1976-1985*, and marked the beginning of three decades of rapid growth – sometimes too rapid – and the transformation of

Chinese economic and social conditions. By the time the ninth (1996-2000) and tenth (2001-05) plans were completed, GNP per capita had quadrupled on a 1980 baseline, foreign direct investment had soared, infrastructure had been transformed and China's turbo-charged rise was well under way.

Although the gains had been huge, some critics were beginning to voice concern over the unsustainability of this model of rapid industrialisation and the government's emphasis on GDP growth above every other factor. The 10th FYP included some environmental targets: to increase forest coverage to 18.2%, to raise the urban green rate to 35%, and to reduce urban and rural pollutants by 10% compared to 2000.

The 11th FYP still held growth and development as its primary goal, but also reflected the government's growing concern with the environmental costs of China's development model. It aimed to stimulate the growth of services and increased investment in research and development and set a number of related targets, including a 20% reduction in energy consumption per unit of GDP over the five years of the plan, a 30% reduction in water consumption per unit of industrial added value, an increase of the coefficient of effective use of water for irrigation from 0.45% to 0.5%, a further 1.8% increase in forest coverage and a 10% reduction of major pollutants. Some of the methods used -- the closure, for instance, of small and inefficient coal fired power plants -- addressed more than one target.

Setting targets is one thing, achieving them is another and the 11th FYP energy density and pollution targets suffered from a continuing stress on growth and a lack of effective enforcement. China has many laws and regulations, but systematic implementation continues to be a weak point. Nevertheless, the concern to rebalance the Chinese economy has been growing. By the time of the writing of the 12th FYP, what had begun as a relatively modest environmental ambition had developed into a significant change of course.

The transition from one FYP to the next is a key moment in China, closely watched by foreign and Chinese analysts. After 30 years of breakneck growth, with all the attendant difficulties and consequences of that model of development, the 12th FYP demonstrates a much more robust ambition to make the difficult transition towards a more sustainable model. If it is successful, the 12th FYP could prove to be a pivotal moment in Chinese development, of international as well as domestic importance.

China's strategic challenge is to get onto a more sustainable development path, while meeting public expectations of improved living standards and employment. The current development model is exhausted for a number of familiar reasons: it is still too inefficient, too wasteful of energy and natural resources, it generates too many damaging externalities and it depends on an abundant pool of cheap labour, which China no longer has. At a similar stage of development, Japan, Korea and Taiwan all made the transition to higher value, more innovative and more technologically advanced models, much as China is trying to do today. In China's case, the urgency is the greater because of three decades of damage to water, air, soil and human health, with the attendant social unrest they have brought.

But such transitions are not easy and China faces a number of problems that were perhaps less acute in other countries on similar development paths. One of the biggest differences is simply that of scale and the difficulties of a one-size-fits-all set of measures across a wide spectrum of development stages. While one part of the country is trying to move up the value chain, other, poorer parts are still eager to embrace the old industrial models to raise local living standards and to create jobs in less developed regions. This will make overall targets for efficiency and environmental public goods harder to meet. China also needs to develop its domestic market in a country where the material benefits of the previous 30 years have been unevenly distributed and where the immaturity of social safety nets still encourages people to save rather than spend.

The tensions between the growth imperative and sustainability have been in evidence throughout the last two five-year plans, especially with regard to environmental targets. While the 10th FYP stressed the need for energy efficiency and set targets for the reduction of pollution, most of them were missed. As the State Council observed, reviewing the result of the plan:

“There is no breakthrough in some in-depth environmental issues that should have been addressed during the ‘10th Five-Year Plan’ period. There is no fundamental change in the inappropriate industrial structure and extensive economic growth mode. There are also such problems as environmental protection lagging behind economic growth, poor or inflexible mechanism, insufficient input and capacity. The phenomena of no strict observation of laws, little punishment to lawbreakers, poor law enforcement and supervision are still very common.”

The government renewed its efforts to balance headline GDP growth and environmental protection in the 11th FYP, stressing:

“the transformation from focusing on economic growth ignoring environmental protection into putting equal emphasis on both. The authority takes the enhancement of environmental protection as an important tool to adjust economic structure and shift economic growth mode and seek development under environmental protection. The second is the transformation from environmental protection lagging behind economic growth into the synchronisation of environmental protection and economic development. .. thus changing the situation of pollution followed by treatment, or destruction going along with environmental control. The third is the transformation from mainly employing administrative methods to protect the environment into comprehensive application of legal, economic, technical and necessary administrative methods to address environmental problems.”

The challenge of implementing the plan was the familiar one of balancing job creation and growth with environmental protection and, again, the results were mixed. Important investment, for instance, in water treatment did not result in as much improvement in water quality as was hoped; a series of major pollution incidents and a steady accumulation of dangerous

pollutants such as heavy metals in surface water and soil illustrated the continuing difficulties of implementing effective environmental protection at all levels.

One of the most high profile targets of the 11th FYP, that of reducing energy density by 20%, also had mixed results and points to the difficulties of maintaining sectoral targets against a background of other variables. The targets suffered for a number of reasons: the lack of clear pathways was certainly one, but the ambition was also affected by higher than anticipated economic growth and the impacts of China's stimulus measures, taken in response to the global economic crisis.

In the closing months of the 11th FYP, officials scrambled to meet the targets, often with environmentally highly counter-productive results: cutting electricity supplies to hospitals, traffic lights and factories, as some authorities did, is an unconvincing approach that brought other negative consequences, including unanticipated pressure on diesel supplies as factory owners reached for their generators, generating pollution along with the electricity.

So what are the chances of success for the 12th FYP? As is made clear in the following articles, it deepens China's ambitions to be green, both as a strategy for the next phase of industrialisation and in the hope of remediating its domestic environmental crisis. Environmental protection is highlighted as a "pillar industry", along with information technology and biotechnology. Despite the continued push to urbanisation, building and real estate will come under closer scrutiny, both for environmental standards and in order to slow the loss of China's farmland to development.

Investment in low-carbon technologies, including electric cars and other targeted sectors, will help to position China as a leading player in the next generation of technologies, with benefits both for the balance sheet and the environment. Energy targets are less ambitious and since the low-hanging fruit has already been picked, they will continue to be challenging.

Another area in which great efforts have been made, but targets may be missed is the goal of achieving a 15% share of renewable energy in China's overall supply by 2020. Here, the scale and speed of investment has been impressive, but Chinese analysts still predict that the target will be hard to reach.

The government's prime concern for the 12th FYP is the related question of re-balancing a society that has suffered from a severely uneven distribution of the benefits of growth. To meet its ambition of encouraging domestic consumption, the government needs to raise the share of the national income enjoyed by ordinary people. Interestingly enough, the government has been inviting consultations on such instruments as free collective bargaining as one possible way of doing this. Underpinning this effort is the concern for social stability. Internal security remains a key priority, but as long as there are social and economic reasons for discontent, the bill for internal security will continue to rise. Indeed, in late 2010, the government's spending on internal security overtook the cost of external defence. Addressing the root causes of discontent in the distribution of benefits, land rights, health and social security should pay off in security savings.

One aspect of the plan that could have profound effects is the ambition to move small farmers into rural conurbations of up to 250,000 people, allowing for a better delivery of services and amore efficient, larger scale farming. How those plans are executed – and how those conurbations are built will have other social and environmental impacts.

Will China succeed in its ambitions to achieve greener growth and greater social stability in the 12th Five-Year Plan? Let us hope so; one lesson from the 11th Five-Year Plan is that clear pathways to achieving targets are important and need to be an integral part of the planning process. China's systems of accounting for and managing energy use are now more developed and will continue to mature over the life of the plan. The more skills grow at local and provincial levels in energy efficiency, carbon accounting and low

carbon growth, the more likelihood there is that China will avoid a repeat of the embarrassment of missing its targets.

Finally, given the size of China and the development gap between the east coast and many inland provinces, how can the government avoid arbitrage of pollution industries, in which dirty factories close down in one part of China only to be welcomed elsewhere? Transferring the problem is not solving it, but for the time being such practices are likely to continue. Speaking in Hong Kong last year, Dr Li Junfeng, deputy director general of the Energy Research Institute in Beijing, argued that the 12th FYP, with its ambitions to turn China into a model of low-carbon growth, was likely to have uneven results, due to differences in development. Local variations, he explained, were both predictable and necessary. “It’s very difficult,” he said, “to have a goal for the entire country. We need local flexibility.”



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China's Green Revolution

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I. The plan

On March 14, 2011, China officially adopted its 12th Five-Year Plan at the closing sessions of China's National People's Congress and Chinese People's Political Consultative Conference, the two bodies that convene once a year to determine national-level policy. The plan has been hailed as a turning point for China's green development, but what did it actually say? *chinadialogue's* **Olivia Boyd** and **Tan Copsy** run through the headline policies.

What's in the Five-Year Plan?

Olivia Boyd and Tan Copsey

The 12th FYP is a blueprint for China's development from 2011 to 2015 and its green targets will shape the country's action on the environment over the next five years. Here is a summary of the plan's key environmental points:

Targets

The plan includes binding targets on resource and environmental protection.

Energy – A 16% cut in energy intensity (energy consumed per unit of GDP), 17% cut in carbon intensity (carbon emitted per unit of GDP) and a boost in non-fossil fuel energy sources to 11.4% of primary energy consumption (it is currently 8.3%).

Pollution – There is an 8% reduction target for sulphur dioxide and chemical oxygen demand and a 10% reduction target for ammonia nitrogen and nitrogen oxides, the latter of which come mainly from China's dominant coal sector. There will also be a focus on cutting heavy-metal pollution from industry.

Water – Water intensity (water consumed per unit of value-added industrial output) is set to be cut by 30% by 2015.

Forestry – China also aims to boost forests by 600 million cubic metres and forest cover to 21.66%.

Climate – Both carbon taxes and carbon trading have been widely discussed and may be introduced in the next five years, though there is no detailed information on this in the 12th FYP.

Investment

Investment in environmental protection is expected to exceed 3 trillion yuan over the five-year period. Much of this will go on pollution control, helping achieve targets to significantly cut the release of major pollutants.

As part of its strategy to reduce reliance on fossil fuels, China is aiming to build 40 additional gigawatts of nuclear energy capacity by 2015 (though the Fukushima nuclear accident in Japan prompted the government to suspend approvals for new power stations while it reviewed safety measures). It also plans to significantly boost investment in hydropower and add 70 gigawatts of new wind farms and 5 gigawatts of new solar farms.

The plan mandates significant investment in public transportation in order to achieve goals including the construction of 35,000 km of high-speed rail and connecting every city with more than 500,000 residents.

Major themes

The plan aims for average annual GDP growth of 7% – much smaller than the 10% on average achieved over the period of the 11th five-year plan – and is seeking what it terms “inclusive growth” – rebalancing the economy to spread the benefits more equally, as well as alleviating social inequality and protecting the environment. The economy as a whole is still expected to grow by almost 40% over this period.

As part of the drive to realise these goals, the government will boost investment in “improving people’s livelihood”. Some 36 million apartments for low-income families will be built or renovated. The population living in urban areas will continue to grow and is likely to reach 51.5%. The government wants to create 45 million jobs in urban areas, keep registered urban unemployment below 5% and boost domestic consumption. Pension schemes are now to cover all rural residents and 357 million urban residents.

Related targets include the population growing to no greater than 1.39 billion and an increase average life span by one year.

Beijing will also prioritise – with the aid of tax breaks and beneficial procurement policies – the development of seven “Strategic Emerging Industries” (SEIs): biotechnology; new energy; high-end equipment manufacturing; energy conservation and environmental protection; clean-energy vehicles; new materials and next-generation information technologies. It is thought these industries could contribute 8% of GDP by 2015, up from approximately 5% now.

What comes next?

The FYP is neither the beginning nor the end of the policy-making process. New targets and investment build on existing work and further policies will be developed and implemented over the period of the plan to help China meet strategic goals. An announcement of sector-specific policies is expected in 2011. Intriguingly the possibility of a total energy consumption target was raised by Zhang Guobao, a former Minister in charge of the National Energy Administration. He suggested that China would cap total energy use at 4 billion tons coal equivalent (TCE) by 2015. It is possible that this target could be included in the specific policy-plans for the energy sector.

2. The green era

Hu Angang is one of China's best-known economists. He is professor at the Chinese Academy of Sciences and Tsinghua University and the director of the Centre for China Study, a leading policy think-tank. Hu has worked as the chief editor for China Studies Report, a circulated reference for senior officials. **Liang Jiaochen** is a PhD student at Tsinghua University's School of Public Policy and Management. Here, they suggest that with its 12th Five-Year Plan, China is making history: launching not only a development blueprint, but a global green revolution.

China's green era begins

Hu Angang and Liang Jiaochen



Five-year plans (FYPs), which set down and clarify national strategy, are one of China's most important policy tools. Just as they have helped to drive China's economic success over recent decades, so they will play a pivotal role in putting the country on a green development path. The 12th Five-Year Plan, now under consideration by the National People's Congress, marks the beginning of that process in earnest.

FYPs embody the concept of progressing by degrees, or developing step by step. This approach has been one of the driving forces behind China's economic progress in recent decades, and will now provide the platform for its green development. It is the methodology underpinning China's socialist modernisation: to reach a new step in development every five years. Unstinting efforts over a number of FYPs have driven China's transformation.

Climate change presents a long-term and all-encompassing challenge for China. It demands a long-term development strategy and broad goals, as well as near-term action plans and concrete policies. Combining these is precisely the idea behind FYPs.

At the global climate-change summit in Copenhagen in 2009, China demonstrated it has the long-term political will to respond to climate change; to work with the world to limit global temperatures to no more than two degrees Celsius above pre-industrial temperatures (the goal set out in the Copenhagen Accord). In November that year, the Chinese government formally put forward its medium-term targets on climate change: a reduction in energy intensity of 40% to 45% on 2005 levels by 2020, and generation of 15% of energy from non-fossil fuel sources by the same date.

The period from 2005 to 2020 takes in three FYPs, the 11th, 12th and 13th. In each five-year period, national circumstances and long-term strategy will inform the selection of appropriate targets. In this way, further steps towards the medium-term development goals set for 2020 – themselves part of a longer-term green development strategy – will be taken. The development philosophy of China's five-year plans will be combined with its green development strategy.

We have already seen some success in the 11th FYP period (2005 to 2010), during which China met its energy-saving and emission-reduction targets, a good first step towards achieving 2020 targets. Next we need to research, set and implement energy-saving and emission-reduction goals for the 12th FYP, taking further steps along the same path.

One of the key strengths of Chinese socialism is its capacity for long-term, national-level planning – its political continuity. FYPs are an important example of this. Despite the twists and turns of history, China has held firm in its modernisation goals. China is one of the few nations able to pursue

long-term development goals, rather than chop and change as political parties with differing stances succeed one another.

Long-term policy continuity is vital for dealing with issues like climate change. Cutting greenhouse-gas emissions and building a low-carbon economy require an overhaul of both our mode of economic development and our lifestyles. Achieving this requires perseverance. This is where China's policymaking framework shows its strengths. China's enduring and stable political system, in combination with its five-year planning structure, will ensure that the country maintains a consistent, long-term strategy for tackling climate change at the same time as formulating policies that respond to the needs of the time.

These are strengths many other nations lack. The classic example is the United States. During the presidency of George W Bush – a Republican – the US neglected its emissions-reduction responsibilities and refused to ratify the Kyoto Protocol. When Democrat president Barack Obama took power, there was a policy turnaround and the United States became actively involved in global climate-change cooperation and investment in renewable energy. But then came last year's mid-term elections, and the Republican party seized back control of the House of Representatives, the lower chamber of the US senate; a major setback for the Democrats that has left a question mark hanging over a number of Obama's green reforms.

China's political advantages are clear. It needs to make further use of these, using five-year plans as the basis for steady progress towards green development.

Successes in energy-saving and emissions-reduction over the last five years give us a taste of what's to come. In our evaluation of the 11th FYP, we found that targets on population, resource conservation and environment were all fulfilled. Energy intensity dropped by about 20% as planned. Arable land cover was held at 1.2 million square kilometres, a higher figure than was targeted.

Meanwhile, water consumption per unit of industrial value added dropped 35% against a target of 30%. The coefficient of effective use of water for irrigation reached the targeted 0.5. And chemical oxygen demand (an indirect measure of water pollution) dropped by 14%.

Carbon-dioxide emissions also fell – by an accumulative 12% – more than the 10% goal mandated by the plan. The binding targets for energy-saving and emission-reduction in particular showed the value of “hard limits”. Major progress was made on green development, providing important experience for further implementation during the 12th FYP.

The 12th FYP is the first for which the theme will be green development. Again, a point will be made of the need to “construct a resource-conserving and environmentally friendly society”. The plan will explicitly say that, faced with ever-stronger environmental and resource constraints, China must increase its sense of urgency and establish concepts of green and low-carbon development. With a focus on energy-saving and emission-reduction, it must introduce incentives and disincentives to help promote resource conservation and green production and consumption.

The green development strategy has six supporting pillars, each with its own section in the plan: actively responding to climate change; strengthening conservation and management of resources; developing the “circular economy”; enhancing environmental protection; promoting ecological protection and restoration; and strengthening systems for water management and disaster prevention and alleviation.

Green development targets are also more apparent in the new FYP. Population goals aside, the number of resource and environmental targets accounts for 33.3% of the total, up from 27.2% in the 11th FYP. It also sets the key aims that will frame China’s response to climate change. These include: reductions in carbon-dioxide intensity, reductions in carbon-dioxide emissions – by increasing the proportion of non-fossil fuels in

energy structure – and the creation of new forest areas to boost forest cover, timber reserves and carbon sinks.

The 12th FYP sets out both “carrot” and “stick” approaches. For the first time, this FYP aims to reform resource pricing and establish a system of payment for environmental services. It requires stronger assessment of responsibility for energy-saving and emission-reduction targets, appropriate control of total energy consumption and the application of green development in all economic activity.

Also for the first time, the 12th FYP puts forward an “ecological security” strategy. In areas where development is limited or banned, ecological protection will be rigorously enforced and green buffer zones will be used to shield vulnerable land. There will also be funding for specific ecological restoration projects, so that our children and grandchildren will be able to enjoy a beautiful China.

The 12th FYP is a true green development plan, which marks China’s entry into a green development era. It is a historical moment: the point at which China launches – and joins – the global green revolution and adopts a concrete plan of action for responding to climate change. The positive effects will be felt worldwide.

3. Energy-intensity: has China got it right?

The 12th FYP's goal to reduce energy-intensity (energy consumed per unit of GDP) by 16% is the most prominent of its environmental aims. But is it the right target? Not everyone thinks so. In the months leading up to the plan's adoption, researchers and environmental campaigners engaged in a fierce debate over the right level at which to set the target, some pushing for greater ambition, others urging caution. Here, prominent figures from different sides of the argument explain their viewpoints in the lead-up to release of the 12th FYP.

First, **Pan Jiahua**, executive director of the Research Centre for Sustainable Development at the Chinese Academy of Social Sciences, tells **Liu Jianqiang**, Beijing-based deputy editor of *chinadialogue*, that China's energy-intensity targets should be kept in check. Then WWF's **Yang Fuqiang**, **Hou Yanli** and **Li Jingjing** counter that China's energy targets don't go far enough, urging the government to adopt more ambitious goals to help the country meet the challenges ahead. Finally, in an excerpt translated from the Chinese newspaper *Southern Weekend*, reporters **Feng Jie** and **Yuan Duanduan** explore the provincial politics of the Chinese government's decision on the targets.

Reining in China's energy targets

Liu Jianqiang



Liu Jianqiang: Over the last five years – the 11th Five-Year Plan period – China's energy consumption per GDP unit, or energy intensity, has dropped by 19.06%. This led some to recommend a 20% decline as the target for the 12th Five-Year Plan, while others argued for 18%. What do you think most appropriate?

Pan Jiahua: Personally, I would say 15% is more reasonable.

LJ: Why? That's less than has been achieved in the past five years.

PJ: First, let's look at the data from the 11th Five-Year Plan. During that period, targets were set for a 20% fall in energy intensity and a 10% fall in both chemical-oxygen demand [a measure of water pollution] and sulphur-dioxide

emissions. What happened was that, while energy intensity dropped by 19.06%, chemical-oxygen demand and sulphur-dioxide emissions actually fell by 12.45% and 14.29% respectively, thereby beating the targets. This shows that, with more investment, overall emissions of conventional pollutants can be cut. But control of energy intensity isn't like that because, when investment increases, so does energy consumption.

The 12th Five-Year Plan won't see the same decrease as the 11th Five-Year Plan as, during the 11th Five-Year Plan, a lot of China's small power plants and steelmakers were shut down – now, there's nothing left to close. Energy efficiency at large Chinese firms is already close to global levels. Thermal-electricity generation is more efficient than in Japan, vehicle fuel efficiency is higher than in the United States. So energy-intensity reductions during the 12th Five-Year Plan are bound to be less than those of the 11th Five-Year Plan.

LJ: What is the goal for economic growth during the 12th Five-Year Plan? And what's the relationship between that and reductions in carbon intensity?

PJ: The setting of emissions targets for the 12th Five-Year Plan is of course linked to economic growth. During the 12th Five-Year Plan, provincial GDP growth targets remain high – for example, 8% for developed cities including Beijing, Shanghai and Zhejiang and 13.5% for Chongqing.

There's a coefficient of elasticity of energy consumption. For example, every 1% of GDP growth led to 1% of extra energy consumption during the 10th Five-Year Plan, but during the 11th Five-Year Plan, 1% of GDP growth caused 0.7% of extra energy consumption. So, during the 12th Five-Year Plan, even with economic restructuring, that elasticity coefficient is going to reach 0.5. If average GDP growth is around 10%, energy consumption will grow by 5% to 7%, if GDP growth is 8%, energy consumption will grow by 4%. Using those figures, energy-intensity reductions in the 12th Five-Year Plan will be less than in the 11th.

LJ: What challenges are there for cutting carbon emissions during the 12th Five-Year Plan?

PJ: There is the issue of regional differentiation. Eastern developed regions have large cuts to make, and these are expensive and difficult, so they don't want to take too much on. Central and western parts of China, meanwhile, want to attract energy-hungry industries from the east for the sake of economic development, so they actually want to increase emissions – they're not willing to make cuts either.

The Chinese government operates top-down management: central government forces local government to make emissions cuts and, to achieve that, local governments have to enforce power cuts. That's how you end up with power being cut even to hospitals.

LJ: What would you suggest?

PJ: Emissions cuts shouldn't mean enforced conformity to an arbitrary standard. There should be room for flexibility, according to local conditions. For example, implementation could be over different periods – Beijing can't make much reduction during the 12th Five-Year Plan, but perhaps it could make larger cuts during the 13th Five-Year Plan. There could also be trading between regions – the cost of cuts in Beijing is high, so it could buy emissions reductions from Shanxi.

Also, China is making great efforts to develop renewable energy in order to cut emissions, but there are two problems it needs to watch out for. First, this will result in large increases in fossil-fuel extraction, as wind and solar power are not constant and need to be backed up by fossil-fuel plants in order to meet peak demand. Second, renewable energy is expensive and requires subsidies – where is that money going to come from? It has to come from fossil fuel. So at the moment, China isn't ready for any great leaps forward in wind power. The technology isn't mature. There should be more research, not widespread rollouts.

LJ: If that's the case, can China realise its commitment to reducing carbon intensity by 40% to 45% by 2020?

PJ: Yes, it works. There was a drop of 19.06% in energy intensity in the 11th Five-Year Plan, which means a drop in carbon intensity of 20% to 21%. If there's another drop of 15% in the 12th Five-Year Plan, and 5% to 10% during the 13th

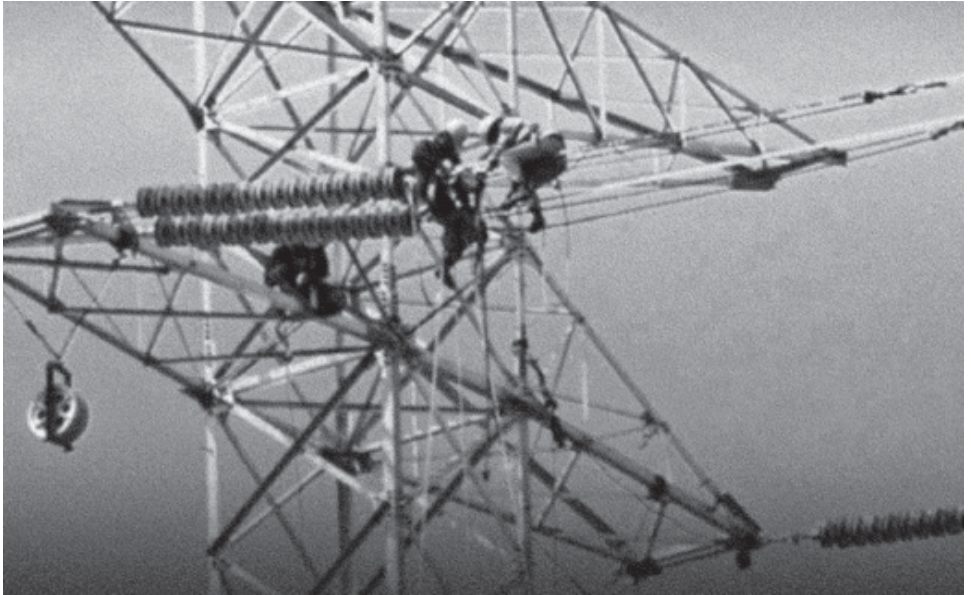
Five-Year Plan, then we've met our commitment. So, as a researcher, I propose an energy-intensity target for the 12th Five-Year Plan of about 15% – no less than 13%, no more than 17%.

LJ: Your proposal is different from many Chinese academics, officials and NGOs. For example, Yang Fuqiang, WWF China's director of global climate solutions, says the 12th Five-Year Plan should again set a target of 20%.

PJ: I don't agree with those extreme suggestions. It seems that such radical cuts have very bad consequences, like power to hospitals being cut off. China needs to be responsible and consider people's quality of life – we can't forget that for the sake of emission cuts. If we just cut emissions, without giving any thought to the consequences, and then use that to demand the same of other poor nations, where does that leave the world? I don't agree with being too extreme.

“China needs higher targets”

Yang Fuqiang, Hou Yanli and Li Jingjing

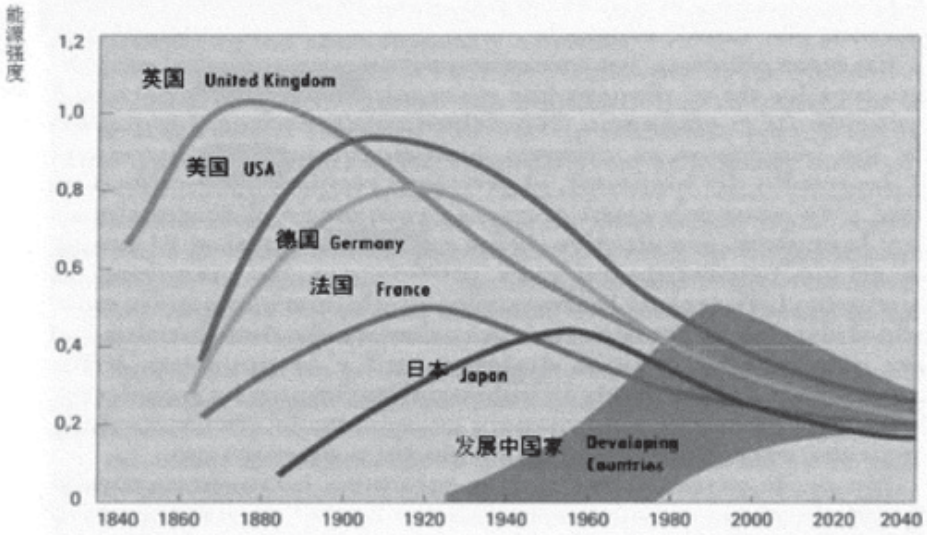


China's 12th Five Year Plan (FYP) aims to transform the way the country develops by adjusting its economic structure. One way to achieve this aim is to set legally binding targets on energy-intensity and carbon-intensity reduction – which should be both ambitious and robust in their implementation. But how ambitious should they be?

In developed nations, the history of economic growth shows a common pattern with regard to energy consumption: energy intensity rises, peaks and then falls rapidly. During the period of rising energy intensity (early industrialisation), economic growth requires greater energy input and support. In the mid and late stages of industrialisation, less energy input is required.

But developing countries can grasp a “late-mover advantage”: they can benefit from more developed technologies, trade and the transfer of

manufacturing. Hence, the same amount of GDP growth can be achieved with fewer resources. China currently has that late-mover advantage.



Energy intensity and the late-developer's advantage, State Council Development Resource Centre. Vertical axis is energy intensity (tons of standard coal/ten thousand RMB of GDP)

There is a large potential for structural energy savings in the 12th FYP. Research has found that up to 60% of energy savings to 2020 could come from upgrading China's economic structure, and the other 40% from technological changes. After 2020, technology could account for 50% or more of energy savings.

During the 11th FYP, structural savings only accounted for less than 10% of total energy savings; the vast bulk of savings were achieved through technological improvements. Energy-saving targets in the 12th FYP need to be set higher if they are to lead to real structural shifts.

Only high targets will have a real impact on policy: the average energy-saving rate for each five-year plan period between 1980 and 2010 has been 18%. Energy-hungry sectors, such as the heavy chemical industry, steel and

concrete, have been growing rapidly for the past decade. According to official figures, growth in these sectors is likely to slow. Add in government macro-control of real estate and other adjustments, and the rate of growth in energy consumption is bound to fall. In short, the economy is already on track to achieve an energy-intensity reduction of up to 18% in the 12th FYP period. Setting such a low target will not change policy or help China to meet the serious challenges it faces.

China also needs a new method for verifying its targets. For its 11th FYP targets, the government effectively looked at the final year alone to decide whether they had been achieved. This was inadequate. A new method for assessing overall performance over the five-year period should include full totals of energy saved and emissions reduced, not only reductions in intensity. After all, even if energy-intensity or carbon-intensity targets have been met, energy consumption or carbon-dioxide emissions may still have increased.

In the final quarter of 2010, many local governments adopted the disingenuous strategy of imposing power cuts, not only to increase that year's energy-saving rates, but also to reduce overall power consumption for 2010 and thus achieve a greater energy-intensity drop in comparison with the first year baseline figure.

But over the past five years, more energy has been consumed in China – and more carbon dioxide emitted. China needs to more thoroughly assess overall energy-savings and emissions reductions and set annual targets, so that firms have a reference for determining their own annual goals and are able to achieve overall reductions. This is particularly important for carbon trading. If measurements aren't made in terms of total energy saved, or carbon emissions avoided, there will be too much uncertainty to establish and run effective carbon markets.

The government should implement energy-saving and carbon-intensity targets in tandem. During the 11th FYP, there were doubts raised about

the breakdown of the 20% energy-saving target. Using energy- and carbon-intensity targets can overcome this problem. For example, fuel substitution can help to increase energy efficiency, but has a greater impact on carbon-emissions reduction. Energy saving usually leads to carbon cuts, but the reverse is not necessarily true. Therefore, government incentives should differ: for example, there could be different rewards for completing both or only one target, and sanctions for failing to meet either. Different regions may also want to propose different targets: for example, there could be lower targets in the less developed west of China.

It is crucial to establish a win-win situation for central and local governments when setting binding energy and carbon targets. The struggle between different levels of government in the 12th FYP targets has drawn widespread attention. If targets are too low - say, as low as 16% - the authority of the central government will be weakened at the local level on issues of crucial importance to the economy and people's livelihoods.

It is our opinion that targets should be highest in the east of China, lower in the centre and lower still in the west. The economy in western China lags behind the rest of the country, so it's reasonable to allow higher rates of economic growth, but those provinces should still meet binding targets.

Sector-specific targets, which were missing in the 11th FYP, should also be included in the 12th FYP. Public participation should be built into the long-term mechanisms, so that central government demands gradually become aligned with those at a local level – and local targets are no less stringent than central guidance.

Behind China's green goals

Feng Jie and Yuan Duanduan



After a year of debate, China finally unveiled its green goals for the next five years. On March 5, premier Wen Jiabao presented his “government work report” during China’s annual parliamentary session in Beijing, revealing the key goals of the country’s 12th Five-Year Plan (FYP). These include targets to cut energy intensity by 16% and carbon intensity by 17% by the end of 2015. China also aims to boost the proportion of non-fossil fuels in primary energy consumption to 11.4%.

The figures may appear dull, but they will direct China’s energy-saving and emission-reduction efforts over the next five years, and have a huge impact on the country’s economic growth and output. But how were they determined?

In the build up to the 2011 “Two Sessions” (the simultaneous meetings of the National People’s Congress and the Chinese People’s Political

Consultative Conference held in Beijing once a year) the heads of two key economic planning bodies in each of China's 31 provinces – the Development and Reform Commission and Economic and Information Commission – received their specific “tasks” for the 12th FYP period from Beijing.

While an overall goal to cut energy-intensity (energy consumed per unit of GDP) by 16% was set for the nation, at a provincial level this figure was adjusted up or down to suit local conditions – namely, each region's level of development. The provinces were classified into four rough groups: coastal developed, developed, central or western.

In the far west, Qinghai, Xinjiang and Tibet, which have large ethnic minority populations, were treated as special cases and given energy-intensity targets of 10%. Ningxia and Gansu, also in the west, got 15%. Eastern or central provinces were allocated targets of 16%, or one to two percentage points higher.

This approach contrasts with the 11th FYP, under which the majority of provinces were set a 20% target. In the second half of 2010, many local governments, under huge pressure to hit these goals, resorted to power cuts – triggering widespread complaints about the application of blanket, arbitrary targets.

According to reports submitted by each province to this year's parliamentary sessions in Beijing, only Xinjiang admitted it had failed to hit its 11th FYP target – achieving a 10.2% cut against a target of 20%. Of the 30 other provinces, eight said they had either hit their targets earlier than required or exceeded them, while four – Anhui, Fujian, Jiangxi and Qinghai – gave ambiguous responses. Anhui, for example, said it “expected to be able to hit” its target, while Fujian said it “will hit” its target. The remainder all said they had fully met their emissions-reduction obligations.

For local officials, there is a direct link between achieving these targets – even by the skin of their teeth – and keeping their jobs. This led to the

absurd situation last year where local officials chose to cut off power to businesses, even hospitals, in order to meet their energy-saving goals. Responding to public anger over the measures, Zhang Ping, the chair of the National Development and Reform Commission (NDRC) – China’s top economic planning body – made a public apology on March 6, admitting that the institution had made errors due to a lack of experience.

In addition to energy-saving targets, goals for cutting carbon-intensity (carbon dioxide emitted per unit of GDP) were also allocated. An authoritative source explained that the use of dual targets is only transitional – it is very likely that, after the 13th FYP, carbon-intensity targets will replace energy-intensity targets altogether, as they are “more comprehensive and more easily comparable internationally”.

Why 16%?

Why did the government go for a 16% energy-saving target, rather than 18% or 20%? Different academic camps have been debating the appropriate level continuously since late last year. He Jiankun, director of Tsinghua University’s Laboratory of Low Carbon Energy, has done some calculations and believes the new target, though on paper lower than that of the previous five years, is still ambitious: “A 16% drop in energy intensity in the 12th FYP will require more energy to be saved than during the 11th FYP, as total GDP will be larger during the 12th FYP period,” he said.

The challenge is compounded by the fact most cheap and quick energy-saving measures have been exhausted over the last five years, and there is now less potential for shutting down out-dated facilities. During the 11th FYP period, 72 gigawatts of small thermal-power plants were closed – only half as much capacity remains to be closed down during the 12th FYP.

But Jiang Kejun, a researcher with the NDRC’s Energy Research Institute, is still convinced that a 20% drop in energy intensity would be possible over the next five years, with appropriate policy, rational economic development

and stronger adjustments to economic structure. In early February, he and several colleagues put forward this suggestion in the hope of influencing the government's decision. But in February, the disappointing realisation dawned on him that the 16% target was already a done deal

Despite a six-month debate, the different sides failed to persuade each other. They do, however, agree on where the 16% figure has come from: China's 2020 targets.

In the lead up to the global climate-change talks in Copenhagen in 2009, the Chinese government committed to cutting carbon intensity by 40% to 45% on 2005 levels by 2020, and to including binding targets to achieve this in its five-year plans.

He Jiankun has worked it out: carbon intensity during the 11th FYP period dropped by around 20%; with a fall of 17% to 18% over the next five years, and then a further 16% to 17% drop under the 13th FYP, the 45% reduction by 2020 will be achieved.

“The current 16% energy-intensity target has been set by working backwards from the 40% carbon-intensity target for 2020,” agrees Yang Fuqiang, WWF's director of global climate solutions. “But it is inadequate just to consider climate change – energy-saving is an important weapon for meeting a number of different challenges.”

Yang added that the decision to set the 12th FYP target at a comparatively low level may have been connected to the fact that the claimed achievement under the 11th FYP – a 19.1% reduction in energy intensity – was actually an exaggeration. *Southern Weekend* learned that the 16% target was chosen after progress under previous plans had been assessed, as well as future energy-saving potential, but that the Copenhagen commitment was also a factor.

Tug of war

As far back as December, researchers pressing for higher targets realised that, while the overall energy-intensity target had not formally been finalised, provincial governments had already been informed of national energy-intensity goals.

Towards the end of last year, Wang Yongyao, head of Ningxia's Economic and Information Commission, was nervously waiting for targets from central government so that he could set production levels for energy-intensive products such as calcium carbide and ferroalloys. Ningxia had earlier shut down crucial but energy-hungry industries for three months in order to meet energy-saving and emissions-reduction targets.

Ningxia had calculated that an appropriate energy-intensity reduction target for the province would be 2.1%, Wang explained. If the state were to set a 16% target, there would be a huge gap.

As with the 11th FYP, the 12th FYP set an overall target for the country and then allocated provincial targets accordingly. However, this time around, both central and provincial governments were much more cautious.

At the start of the 11th FYP, the NDRC told provinces to send in their proposed energy-saving targets. Not realising the potential impact of these targets, the provinces were extremely ambitious. Jilin, for example, set itself a goal of a 30% reduction in energy intensity, to which the NDRC did not object. When mid-period evaluations were carried out in 2008, it was found there was no hope of this target being met, and it was eventually adjusted to 22%.

An authoritative source revealed that a three-stage process was used to allocate provincial-level targets. First, provincial governments submitted their proposed target to central government and the NDRC responded with an adjusted target. This was then repeated. Finally, the provinces submitted

a third figure, which was examined and approved by the National People's Congress before being announced as part of official provincial tasks.

One source familiar with the process described it as a “tug-of-war” between central and provincial government. The provincial governments make sure to keep their first proposal low, while central government, aware that its response will again be undercut, keeps something in reserve.

While setting these targets is a top-down process, warnings about the challenges of implementation from the provinces were taken into account. This did not mean they secured the low targets they wanted, however. In the end, Ningxia – far from getting its desired 2.1% target – was told to achieve a 15% reduction, only one percentage point lower than the national target.

Pan Jiahua, member of China's National Climate Change Expert Committee and director of the Institute for Urban and Environmental Studies at the Chinese Academy of Social Sciences (CASS) sums up the process: “The [energy-intensity target in the] 11th Five-Year Plan was a political decision, and so is that in the 12th Five-Year Plan. Discussion is one thing; policy is another.”

4. China's challenge to the world

Shin Wei Ng is a researcher at think-tank E3G (Third Generation Environmentalism) and the co-author of a recent report, “Chinese challenge or low carbon opportunity”. The ambitious green goals in China’s new five-year plan, Ng writes here, will prove to be a test for EU leadership. Then, **Linden Ellis**, US project director at *chinadialogue*, asks a roundtable of US-based experts what they think of the 12th FYP and how Beijing’s latest green pledges might affect the United States. And, finally, **Thomas Ho**, chief executive of Hong Kong-based Gammon Construction and chairman of the Climate Change Business Forum, says the special administrative region must now show carbon leadership of its own.

A test for Europe?

Shin Wei Ng

China's 12th Five-Year Plan was approved after the annual sessions of the National People's Congress and Chinese People's Political Consultative Conference – bodies that meet once a year to discuss and determine national-level policies. Central to the FYP are the government's aims to accelerate social development, expand domestic demand and develop new strategic industries.

Over the next five years, the Chinese economy is expected to grow by 50% to US\$7.5 trillion (49.3 trillion yuan); its working population, however, is also expected to peak around 2015 to 2017. To address the impending challenges and maintain steady economic growth, the Chinese government will shift from a focus on the quantity of growth to the quality of development.

Five-year plans are more than mere political intent – delivery of their targets is a crucial source of political legitimacy for the Chinese leadership. Despite some difficulties, strong top-down measures have meant that the Chinese government has managed to achieve most of the environmental targets set under the 11th FYP. As China starts to deliver on its potential, the 12th FYP will further intensify China's "green transition", which is particularly critical in helping China to implement its 40% to 45% carbon-intensity reduction target by 2020.

The 12th FYP is also meant to cover a critical shift in China's development model: the economy will move towards higher value-added sectors and create Chinese companies that are global players. In particular, the green and low-carbon sectors have been identified as the core part of a new industrial strategy and an important pillar for growth. Despite China's environmental aspirations, continuous rapid economic growth may threaten its ambition –

local governments striving for high GDP growth over the next five years will cast a long shadow on China's future carbon and energy-intensity targets.

There are both quantitative and qualitative differences between the new FYP and its predecessor. A significant change is the role of the market – the Chinese government will create new markets and encourage the use of market mechanisms, potentially including emissions-trading or a carbon tax, to achieve its environmental goals.

This is a necessity rather than a choice: as China has exhausted almost all of its low-hanging fruit under the 11th FYP, it now has to rely on comprehensive economic restructuring and innovation to achieve its environmental ambitions. The 12th FYP also extends China's environmental ambition from solving local pollution problems to increasing its share in the global clean technology and energy markets.

China's new industrial strategy will prioritise the development of seven industries: alternative energy, biotechnology, new-generation information technology, high-end equipment manufacturing, advanced materials, alternative-fuel cars and energy saving and environmental protection. The total value-added output of the new industries is expected to account for 8% of China's GDP in 2015 and 15% by 2020.

By placing substantial amounts of public investment in these sectors and providing the right policy framework over the next five to 10 years, the Chinese government aims to increase dramatically the capacity and competitiveness of Chinese businesses in the green sector. For example, under the draft "New Energy Industry Development Plan 2011-2020", the Chinese government plans to invest 5 trillion yuan (US\$761 billion) in the new-energy sector by 2020. Investment in environmental protection is expected to top 3 trillion yuan by 2015, and the government also plans to invest 100 billion yuan in the alternative-energy vehicles industry over the next 10 years.

China will also experiment with new governance approaches in its “low-carbon pilots”, schemes recently announced in eight cities and five provinces, affecting more than 300 million people.

In addition to encouraging the emergence of new “green” industries, the Chinese government will also introduce hard environmental targets under the 12th FYP. This will include a 16% to 17% carbon- and energy-intensity target, sectoral performance standards (energy consumption and pollution control) for heavy industry, and 11.4% share of non-fossil fuel energy in primary-energy consumption. The government also plans to invest 5.3 trillion yuan (US\$807 billion) in the power sector and 500 billion yuan (US\$76 billion) on ultra high voltage (UHV) transmission lines under the 12th FYP. Two to three trillion yuan (US\$304 billion to US\$457 billion) is expected to be pumped into renewable energy and investments in smart grids are expected to top 4 trillion yuan over the next 10 years.

The 12th FYP presents both risks and opportunities for Europe and European businesses. Europe’s current leadership in low-carbon technologies means that it will benefit from the growth in China’s clean energy and green markets. For example, European companies are already very active in meeting high Chinese demand for modern grid infrastructure. Also, Europe will certainly benefit from China’s proactive contribution to curbing greenhouse-gas emissions globally, although currently the emissions-reduction pledges put on the table by both regions are not sufficient to keep warming below two degrees Celsius above pre-industrial temperatures – the goal recognised in the Copenhagen Accord.

On the other hand, the rise of global Chinese companies in these sectors means that Europe will face stronger competition for market share and may eventually lose its competitive edge if it does nothing. This new dynamic will help define the EU-China relationship moving forward.

Europe cannot stop or avoid China’s rise, but it can prepare itself for the challenges it brings. The financial crisis has knocked the EU’s confidence, and

its internal discussions currently seem to be moving away from the strong strategic focus established through the process around climate and energy packages from 2007 to 2008. As China increases its synergy in combating climate change and developing a green economy under its 12th FYP, there is increasing fragmentation between the growth, energy and climate agendas at both policy and political level in Europe.

To stimulate economic growth and maintain its competitiveness, Europe needs to maximise the benefits and minimise the risks of China's green transition. Firstly, Europe needs to ensure strong domestic demand for low-carbon goods and services by raising EU emissions-reduction targets to 30% by 2020. Failure to do so may dampen new investment and innovation. Secondly, Europe needs to invest strategically in key infrastructure assets such as super and smart grids and support its clean-technology sector by building markets in key areas. In particular, as the future battleground shifts from production to innovation, Europe needs to maintain its competitive edge by investing in ambitious initiatives such as the Strategic Energy Technology (SET) plan.

Finally Europe should take advantage of China's new industrial policy and environmental ambitions by working with the Chinese to create an even bigger global market for clean technologies. This will require Europe to set up a strategic partnership with China within a robust and reciprocal framework, which emphasises low carbon. Areas for cooperation could include joint development of standards, development of an intellectual-property rights (IPR) framework, co-development of technology, investment and services access and government procurement.

Given the focus on the low-carbon race and the large amount of public money going into supporting low-carbon technologies and markets in both Europe and China, a failure to build a strong or strategic partnership and work together towards the common good will increase the propensity for protectionist measures. This would be highly detrimental to the interests of both regions and to environmental integrity.

Meanwhile in America

Linden Ellis

As China set impressive targets to reduce emissions and increase investment in environmental services, politicians in the United States presented a bill to strip the US Environmental Protection Agency (EPA) of its authority to regulate greenhouse gases. The world's two biggest carbon emitters appear to be pulling in different directions on green investment. But how will China's 12th Five-Year Plan influence the debate over American environmental policy? And what business opportunities and risks does it present? Here, a group of US experts offer their opinions.

How do green investments in China's 12th Five-Year Plan reflect on the United States?

Jake Schmidt

International climate policy director, Natural Resources Defense Council

China's 12th Five-Year Plan introduces several key climate change and environmental targets – including carbon intensity and two additional major pollutants – and phrases correctly the dangers of unsustainable development. A national climate-change law, for which the National Development and Reform Commission [China's top economic planning body] just opened a commenting phase, could potentially guide this transformation.

Of course, as with anything in China, the devil is in the details: we have heard a lot about “new market mechanisms” and strategic industries. It will be critical for China to translate these policy commitments into energy-specific plans and to implement regulations that have meaningful teeth.

China is embracing the clean-energy economy – a US\$13 trillion [85.4 trillion yuan] market over the next two decades. This investment is starting to pay dividends in China as new industries are emerging, creating jobs, reducing unsustainable development and bringing local air-pollution benefits. Sadly, some politicians in US Congress are taking a short-sighted view of job creation. They are choosing to cut key funding that will drive clean-energy investments now and into the future. The Obama administration is standing strong to these challenges.

Policymakers in the United States are following China's movements very closely. So it is my hope that China's ambition is matched and exceeded by US resolve. A clean-energy race to the top is our best solution to climate change.

Dian Grueneich

Former commissioner, California Public Utilities Commission, 2005-2010

China's new five-year plan – combining economic growth with energy efficiency – follows the path that the US state of California has taken successfully for three decades. The focus on creating clean-technology jobs and curbing carbon is likewise similar. The United States provided significant short-term clean technology funding in the American stimulus package. However, to compete globally, the next steps must be to establish a national clean-energy plan with mandatory efficiency and renewable standards, a carbon emission reduction law and sustained clean-technology investment.

Through codes and standards and utility-efficiency programmes, California has kept its per capita electricity consumption flat, while achieving economic growth comparable to the rest of the United States. China's new development plan can accomplish the same.

In 2008, I oversaw the creation of the "California Long-Term Energy Efficiency Strategic Plan", a 12-year roadmap for comprehensive market transformation efforts. Looking at China's new plan, it has many of the

necessary elements. However, it will be essential that China independently measures the changes in carbon-intensity and energy-intensity, through state-of-the-art evaluation, measurement and verification (EM&V).

There will be challenges in China's increased use of renewables but here too, China and California can learn from each other, as California moves towards its 33% renewable goal. A major focus is transmission planning and integration of intermittent resources into the grid.

I look forward to the implementation of China's new five-year plan and certainly offer any lessons learned in California from our similar efforts.

How should the United States respond to the environmental and climate elements in China's 12th Five-Year Plan?

Jennifer Morgan

Director, Climate and Energy Program, World Resources Institute

On climate change, China is showing positive signs by setting clear and concrete carbon and energy intensity targets. These targets are consistent with China's previous goals – in the range of 40% to 45% reductions by 2020, compared to 2005 levels – ensuring that as China's economy grows, it can rein in its emissions.

The 12th Five-Year Plan also contains a goal for China to meet 11.4% of its fuel consumption with non-fossil fuels by 2015. This will include development of new nuclear and hydro capacity, as well as at least 70 gigawatts of wind-power capacity and 5 gigawatts of solar-power capacity.

While the United States and China are clearly at different levels of development – including with regard to the environment – they share many integrated interests. Greater investment in clean energy can help drive

clean-energy production in the United States by opening new markets and reducing supply costs.

As the world's two largest greenhouse-gas emitters, both China and the United States need to do their part to reduce global emissions. On the climate front, the US administration has stood by its goal of reducing carbon emissions by 17% by 2020. But more action is needed to meet this target.

Ultimately, what matters most are results on the ground. Both countries should aspire to achieve the same goals: continued economic prosperity, while protecting people and the environment.

What risks and opportunities does China's 12th Five-Year Plan present to US businesses?

Sean Randolph

President and chief executive, Bay Area Council Economic Institute

The outlines of China's 12th Five-Year Plan confirm and build on directions set in the 11th Five-Year Plan: an accelerated commitment to lower carbon intensity, reduced energy consumption per unit of GDP and increased use of renewables. Despite the obstacles and challenges it will face – including implementation at local and provincial levels and the fact that, in absolute terms, the use of coal will actually increase – the Chinese government has shown it has the will and capacity to meet these targets.

The energy components of the plan link to broader national strategies, including increased expenditure on research and development, more domestic innovation, lower reliance on imported technology and a shift toward higher domestic consumption. From a US business standpoint, there are several take-aways:

- Despite some continuing criticism of China's unwillingness to agree to global greenhouse-gas reduction targets, the government is committed to energy goals that are consistent with those targets, and is acting on them. From a climate-change perspective, this is good news.
- China's growing commitment to efficiency and renewables presents a market opportunity for overseas partners. However, its emphasis on indigenous innovation and reduced technology imports raises the possibility that trade barriers could limit those opportunities – something that US companies and the US government should watch closely.
- China's growing strength as an exporter of cleantech products will challenge US producers, and will also raise the question of whether more should be done to encourage production in the United States.
- If barriers in both directions can be kept to a minimum, bilateral opportunities should grow for joint research and investment in both directions.

Ginny Fang

Executive director, ChinaSF

In the years since China's accession to the World Trade Organisation, we have seen the start of an unprecedented transformation within the global economic, political and social order. It comes as no surprise that the Chinese central government will include high targets to reduce energy and carbon intensity, primary energy consumption and increase non-fossil energy sources in the country's 12th Five-Year Plan.

China's top leaders have adopted sustainability, both economic and environmental, as a key target for the future development of the country.

Next week, I will travel to Beijing to speak to a conference on the development of China's green building industry and highlight some of

San Francisco's development projects that exemplify leading sustainable-development strategies. Naturally, I am there to spotlight our city's accomplishments, but also to seek partners interested in being part of these developments.

San Francisco has many pioneering companies that can benefit from China's climate and environmental targets by actively seeking partnership and business opportunities overseas. Furthermore, as Chinese companies are pushed to go abroad – another important part of the 12th Five-Year Plan – the increased internationalisation of Chinese companies will offer further opportunities.

Although there will be challenges to navigate, I believe that there will be a net positive benefit to both American and Chinese businesses. With increased contact, there will be a greater level of understanding on both sides, enhancing the possibility of collaboration. And this, hopefully, will yield not only financial benefits, but also help drive the innovation needed to address the energy challenges we face together, as a planet.

A spur to action in Hong Kong

Thomas Ho

Chinese officials have clearly determined that wealth generation alone won't deliver greater economic and social maturity. Energy efficiency, renewables, clean technologies and environmental protection are essential as well. Hong Kong should take heed.

In fact, the relative weighting afforded to the environment as against the economy in the recently released 12th Five Year Plan is truly stunning.

The plan calls for the current rapid pace of growth to be slowed substantially, from the 11.2% average of 2006-2010, to 7% for the upcoming five-year period. It aims to deliver more sustainable, energy-efficient growth through an array of interlocking targets and policies.

When Chinese policymakers set themselves a goal, they spare no policy tool in its pursuit. Thus traditional inputs to wealth creation – land, water and coal – are all to be limited.

On the supply side, trillions of yuan will be invested in cleaner, more carbon-efficient power generation and distribution. On the demand side, energy-intensive industries will face increasing constraints, while consumers will be encouraged to purchase greener, reusable or recyclable products. Experiments with market mechanisms, such as taxing and trading, will inform broader efforts to put a price on carbon.

As any business leader knows, the proof of a plan is in its execution. China is undertaking a radical transformation of its economy, on a scale never before attempted. Even if it hits every target, its carbon footprint will rise. But two central tenets will help ensure China's low-carbon movement is a one-way journey. The first is an increasingly transparent policy and legal regime to spur business investment. The second is an industrial policy

favouring clean technology and clean energy, to position China for market leadership. Both will be reinforced as targets are codified into regional and sub-regional laws and regulations.

Where does this leave Hong Kong? It leaves it with a growing “regulatory gap” between the special administrative region and the mainland. This could grow into a “market gap” and a “skills gap” in the nascent low-carbon marketplace. Hong Kong needs to act quickly and with clarity of purpose, to avoid jeopardising its future competitiveness.

The good news is that it has a starting point. In September, environment secretary Edward Yau proposed a climate strategy for Hong Kong. The target was to cut carbon intensity by 50% to 60% from 2005 levels by 2020, equivalent to absolute carbon emissions reduction of 19% to 33%.

The proposal relies heavily on shifting power generation from carbon-intensive coal to nuclear power, with smaller increases in gas and renewable energy. It also calls for improving building energy efficiency, reducing emissions from transport and creating fuel from waste.

Hong Kong now should aim for a dialogue on how to meet its energy needs, climate-change objectives and air-quality goals. Imported nuclear power has been a successful part of Hong Kong’s strategy for some time. The Climate Change Business Forum [CCBF – the author is chairman of its executive committee] supports a well-informed public that can more confidently endorse decisions regarding how to pursue these goals in the future, with a view toward safety, emergency response, communications and long-term energy security.

The government has identified some of the right levers for a comprehensive climate-change plan. But alone they will not be sufficient to deliver the transformation Hong Kong needs to remain competitive. In our view, Hong Kong needs what China has: a comprehensive plan using every policy and market tool at our disposal.

Such a plan would incorporate demand-side management for both businesses and consumers. It needs to discourage wasting energy, and promote actions to use energy more wisely. Hong Kong should also work closely with China on carbon pricing, to ensure that it can partake of whatever scheme is introduced, provided they are fair across sectors and that there is assurance that funds are channeled into environmental projects.

The Hong Kong SAR government holds a unique set of powers that, properly wielded, could jump-start the low-carbon strategy. As creator of laws, it can introduce progressively stringent requirements for energy generation and use. As keeper of public health, it can ensure that health is at the centre of its cost-benefit analysis of energy and pollution laws. As guardian of the environment, it can guarantee protection for biodiversity in our land and marine areas. And as market maker, it can create a surge in local demand for carbon-smart goods and services.

Government can also exhibit leadership by example. This means measuring, reporting and reducing carbon. Yau has asked CCBF companies to set aggressive targets for carbon reduction. The government should do the same, and be the first mover in setting such targets.

This will require whole-of-government thinking to run a carbon-smart city, and whole-of-government action to transition to a low carbon economy. Business leaders need to be on board. We think that they will be: a 2010 CCBF survey revealed that 82% of Hong Kong business managers see the value of investing in energy-efficient, low-carbon products and services. But only 31% are planning to make such investments. They are waiting for market demand and government action. Hong Kong should make them wait no longer.

5. Looking beyond the plan

Environmentalists have rightly praised the green ambition in China's latest development blueprint and welcomed the country's clean-technology drive. But is this the whole picture? Sam Geall, *chinadialogue's* deputy editor, considers China's continuing environmental crisis and argues that, beyond top-down targets, fuller public participation will be crucial to building a greener China.

The continuing crisis

Sam Geall

If, as economist Hu Angang writes earlier in this collection, China's green era is beginning, what might that mean for China and the world? This e-book hopefully makes clear that investing in clean industries and putting forward the right targets and policies on energy and environment in the 12th Five-Year Plan – and enforcing them properly – does matter. But does it end there?

The country's drive towards low-carbon development – enshrined in targets like the pre-Copenhagen pledge to reduce carbon intensity by 40% to 45% by 2020 – has already spurred innovation in inspiring ways. Despite problems with grid connectivity, China has now overtaken the United States in wind energy capacity, reaching a total of 41.8 gigawatts of installed turbines at the end of last year.

In October, I visited the construction site for GreenGen, a highly efficient research, development and demonstration coal power plant near Tianjin, in northeast China. The government has given this nearly completed project its full backing. The components for the plant, which combines integrated gasification combined cycle (IGCC) technology with carbon capture and storage (CCS) in its next phase, are almost entirely domestically sourced. If that project is successful, Jiang Kejun from the Energy Research Institute has said, China plans to build 20 more. It seems that some of China's green ambition has paid off. As our roundtable of American experts makes clear (See "Meanwhile in America"), China's climate progress is particularly praiseworthy when compared to the laggardly United States.

But is that the whole picture? Other aspects of China's environmental crisis continue to generate immense concern. In February 2011, China's top environment minister issued a stern warning, itself an echo of statements in recent years from vice-minister Pan Yue: namely, that pollution imperils his

country's prospects for future growth and well-being. Said Zhou Shengxian: "Natural resources are shrinking, degenerating and drying up. Ecological and environmental decay has become a bottleneck and a serious obstacle to our economic and social development. If our homeland is destroyed and we lose our health, then what good does development do?"

Zhou's statement should remind us that low-carbon development is an important start, but it does not necessarily mean green growth or healthy people. If we are concerned about the environment, it's not enough to look at energy and carbon targets alone. There have been attempts to calculate the price of the ecological bottleneck to which Zhou refers: according to one World Bank estimate from 2007, the costs of air and water pollution in China are equal to almost 6% of its GDP. Another study by Harvard University researchers found that for every yuan of coal burned in China there was a cost of 0.58 yuan in health damages.

However, such studies cannot accurately account for more complex and uncertain – yet potentially disastrous – environmental effects, such as the bioaccumulation of toxic chemicals from high-tech manufacturing in the country's ecosystems, or the cascading effects of climate change on the many communities that rely on water sources at the planet's "Third Pole" on the Tibetan Plateau. Nor can such analyses foretell the unfair and potentially brutal toll on poor and marginalised people in China, as they – like anywhere else in the world – suffer the brunt of environmental change.

There are hopeful signs that the environmental focus in the FYP does go beyond clean energy and carbon reduction: for example, it includes plans to improve risk assessment, prevention and treatment of heavy-metal contamination in particularly blighted areas, and to ameliorate soil pollution in the countryside. But perhaps what is most significant about Zhou's statement is that it questions the merits and meaning of development itself, and implicitly the way our societies seek to measure growth and the values associated with it.

China's last major foray into environmental economics – the nationwide “green GDP” study that promised to adjust the country's main development index by internalising the costs of pollution and natural resource depletion – was unexpectedly “delayed indefinitely” before publication in 2007. Now proposals for new benchmarks, which could measure national well-being or the country's ecological state of affairs, have started to re-emerge – and sometimes from the top. China's premier, Wen Jiabao, recently endorsed the idea in a public online chat. Said Wen: “An official's performance and political achievements should be evaluated by whether the public are happy or not, dissatisfied or not, but not by how many high-rise buildings and projects he had been involved in.”

Such approaches have their limits too, of course. The Kingdom of Bhutan's Gross National Happiness is the most famous example of a well-being-based index – and it has not created an ideal society. But Wen's statement also points to a vitally important part of the ecological health equation: the structures of our societies and the relationships between people and their representatives in government.

Looking at *chinadialogue's* coverage and commentary throughout the year, it is clear that 2010 was a good year for wind power installation and new energy innovation in China, but a bad year for public participation in the environment. In July 2010, when the company Zijin Mining caused a toxic spill in southeast China, it took nine days for the story to come out, as the local government and even the local environmental protection bureau maintained a news blackout. On the last day of the year, the environment ministry rejected a request from non-profit group Chongqing Green Volunteers to re-examine the incident and its impacts.

The spill, which killed thousands of tonnes of fish, is one of many examples of less-than-transparent behaviour negatively affecting local people in China. The resulting lack of trust also perhaps helps to explain some of the more panicked reactions – buying salt in bulk, for example – to the recent nuclear accident in Japan. This is why assessing China's environmental future also

means considering China's progress and regulations on accountability and civil society.

A rather ambiguous section of the FYP pledges to support the “transfer of government functions to social organisations” and strengthen “social supervision”, but also to improve the “healthy and orderly development” and “government supervision” of such groups. This needs to be part of the conversation. The discussion about China's new green era will not only involve investors, managers and technocrats; it's also about the country's grassroots green defenders – its journalists, lawyers, NGO activists and concerned citizens.



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