

# **China's efforts to phase out and rationalise its inefficient fossil-fuel subsidies**

**A report on the G20 peer review of inefficient fossil-fuel subsidies that encourage wasteful consumption in China**

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encourage wasteful consumption in China

Report prepared by members of the peer-review team: Germany, Indonesia, the  
United States, the IMF, and the OECD (Chair of the peer review).

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## TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS.....	4
EXECUTIVE SUMMARY .....	5
INTRODUCTION.....	8
Background and context .....	8
The scope of fossil-fuel subsidies .....	9
AN OVERVIEW OF CHINA’S ENERGY SECTOR: RESOURCES, MARKET STRUCTURE, PRICES, AND TAXES .....	11
Energy resources and market structure .....	11
Energy prices and taxes .....	12
GOVERNMENT SUPPORT FOR FOSSIL FUELS IN CHINA.....	14
General observations.....	14
1. Subsidies for the exploration, development, and extraction of fossil fuels .....	14
[T-c-2] A consumption-tax policy of “refund after payment” for refined oil produced by oil (gas) field enterprises for own use.....	17
[T-c-3] A policy of exempting China National Petroleum Corporation (CNPC) from land-use tax .....	18
[T-c-4] A policy of land-use tax exemption for China National Offshore Oil Corporation (CNOOC) .....	19
2. Subsidies for the refining and processing of fossil fuels.....	19
[T-c-1] A policy of consumption-tax exemption for oil consumed by refined oil manufacturing enterprises for own use.....	21
3. Subsidies for power and heat generation .....	21
[T-c-6] A policy of exempting thermal power stations from land-use tax in cities and towns .....	23
[T-c-7] A policy of VAT exemption for heating fees of heat supply enterprises for individual residents.....	23
[T-c-8] A policy of exempting heat-supply enterprises from real-estate tax and urban land-use tax .....	24
[S-c-1] A Series of Subsidies Derived from Petroleum Fuels Price and Tax Reform .....	26
5. Subsidies for fossil fuels used in the residential sector.....	27
[T-c-5] A preferential tax-rate policy of value-added tax (VAT) on coal gas and liquefied petroleum gas .....	28
MAKING REFORM HAPPEN.....	29
China’s broader policy context: “One Centre and Two Combinations” .....	29
Communicating progress on subsidy reform .....	29
Enabling subsidy reform .....	30
Addressing externalities.....	32
REFERENCES .....	34

ANNEX 1: TERMS OF REFERENCE FOR G-20 VOLUNTARY PEER REVIEWS BY CHINA AND THE UNITED STATES ON INEFFICIENT FOSSIL FUEL SUBSIDIES THAT ENCOURAGE WASTEFUL CONSUMPTION .....	37
I. The Purpose of the Peer Review .....	37
II. Preparations for the Peer Review (the “self-reporting process”).....	37
III. Procedures of the Peer Review .....	38
IV. Arrangement of the Peer Review Process .....	39
ANNEX 2: GLOSSARY .....	40



## ACRONYMS AND ABBREVIATIONS

<b>CAGP</b>	Central Asian Gas Pipeline
<b>CHP</b>	Combined Heat and Power
<b>CNOOC</b>	China National Offshore Oil Corporation
<b>CNPC</b>	China National Petroleum Company
<b>CNY</b>	Chinese yuan
<b>CSR</b>	China self-report
<b>ESWG</b>	Energy Sustainability Working Group
<b>GHG</b>	Greenhouse gas
<b>IEA</b>	International Energy Agency
<b>IMF</b>	International Monetary Fund
<b>IOs</b>	International organisations
<b>LIHEAP</b>	Low-Income Home Energy Assistance Program
<b>LNG</b>	Liquefied natural gas
<b>LPG</b>	Liquefied petroleum gas
<b>MFN</b>	Most favoured nation
<b>MOF</b>	Ministry of Finance
<b>NDRC</b>	National Development and Reform Commission
<b>NEA</b>	National Energy Administration
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OPEC</b>	Organisation of Petroleum-Exporting Countries
<b>SAT</b>	State Administration of Taxation
<b>SOE</b>	State-owned enterprise
<b>TPES</b>	Total primary energy supply
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>USD</b>	United States dollar
<b>VAT</b>	Value-added tax

## EXECUTIVE SUMMARY

China and the United States announced in December 2013 that they would undertake a reciprocal peer review of their fossil-fuel subsidies under the auspices of the G20. These peer reviews being the first of their kind in the G20, the two countries negotiated terms of reference in the months that followed, and proceeded to invite other countries and international organisations to take part in the review. In the case of China, those invited participants were (in addition to the United States): Germany, Indonesia, the IMF, and the OECD. The OECD was also asked to chair the review, and to act as a co-ordinator and facilitator among the participants.

The present report is an outcome of this peer-review process, providing a succinct account of the discussions that took place between the Chinese authorities and the review team, but also within the review team itself. After summarising key aspects of China's energy landscape, the report addresses each stage of the supply chain for fossil fuels, discussing in detail the subsidies (and other measures) that China and the review team have identified in the course of the review process, as per the terms of reference negotiated between China and the United States, and on the basis of the report that China produced on its own subsidies (i.e. the self-report).

In the case of **upstream fossil-fuel activities (e.g. exploration and extraction)**, the review team has noted the central role that vertically integrated state-owned enterprises play in China, and the importance of recent changes, such as the introduction of new *ad-valorem* resource taxes on fossil fuels and the challenges that low prices for coal and hydrocarbons pose for the industry. Bearing this in mind, three inefficient subsidies for upstream activities were identified in China's self-report: one excise-tax refund for refined petroleum products used in oil and gas extraction, and two urban land-use tax exemptions benefitting the upstream activities of state-owned CNPC and CNOOC. Chinese authorities have indicated their intention to reform all three measures, though at different time horizons. They noted in particular that urban land-use tax concessions might encourage a larger scale of production than would normally be the case.

The review team generally agreed with the Government that these three subsidies are likely inefficient, though a full analysis of the excise-tax system would be necessary for confirming that presumption, something which the review team did not have the resources to investigate. The review team also encourages China to quantify the value of concessions in relation to urban land-use taxes. Together with a clearer timeline for reform, estimates of the fiscal cost for these measures should help chart a course of action for phasing them out.

Upstream subsidies may also be offered at the sub-national level in the form of social transfers paid to unemployed fossil-fuel workers, primarily in coal mining. If sub-national governments are using tax money or borrowed funds, or are prompting banks to make non-market-based loans to coal mines to cover labour costs (and perhaps other operating costs), this would constitute a potentially important upstream subsidy. The panel was not able to determine the extent of this activity but wishes to note that it could fit within the definition of subsidy that the panel was instructed to identify and review.

China imposes lower rates of resource tax for particular production zones and for certain extraction methods (e.g. enhanced oil recovery). The panel noted that differential resource tax rates could potentially constitute a subsidy, depending on local resource conditions. Chinese authorities have, however, indicated that they do not consider lower rates of resource tax to be an inefficient subsidy on the grounds that these tax reductions seek to encourage greater resource recovery.



Because most of China's energy sector is vertically integrated, the **refining and processing** of fossil fuels tends to involve the same companies that are found upstream. This underscores the need for the review to consider the taxes and subsidies applied to particular activities along the whole supply chain. Although the Central Government has, at times, intervened to compensate oil and gas companies for losses they had incurred in refining as a result of the regulated, low retail prices, this does not seem to be the case any longer, owing to the lower crude-oil prices that have prevailed since late 2014, and to the energy price reforms that China has undertaken over recent years.

In particular, the Government has introduced a price floor that seeks to prevent the prices for refined oil products from dropping below what they would cost if the price of crude oil drops below lower than USD 40 per barrel, a measure that effectively makes petroleum products more expensive in China than they are in many other countries. It is the understanding of the review team that this price floor does not benefit producers of crude oil as the extra revenues generated by the higher prices are entirely set aside in a dedicated special account. Proceeds from this account are then used by the authorities to promote cleaner investments elsewhere (e.g. in energy efficiency) or saved for use as a buffer during future price hikes. In other words, the price floor does not appear to be providing support to the refining sector, with the possible exception of some funds directed toward the upgrading of refineries to improve fuel quality. The review team, however, was not able to investigate the consequences of the price floor for upstream activities. Only one inefficient subsidy was in the end identified in the CSR at the refining stage, namely an excise-tax refund for the own use of refined petroleum fuels by refiners, which China intends to reform in the short-run.

**Electricity generation** in China has generally been a profitable activity in recent years, in contrast with the **generation of heat**. Roughly two-thirds of the country's heating plants—coal-based for the most part—seem to be operating at a loss due to the persistence of regulated, below-cost heat tariffs for residential users. With only a subset of those plants receiving subsidies from provincial governments, losses often result in cross-subsidies originating from the electricity segment and toward the heat segment. China's self-report identified three inefficient subsidies benefitting the power and heat sector in China, two of which are urban land-use tax concessions benefitting thermal power plants and heat utilities respectively. As with urban land-use tax concessions for upstream producers (CNPC and CNOOC), those measures might encourage a larger scale of production than would normally be the case, and the review team encourages the Government to quantify, where possible, the value of those concessions. The third inefficient subsidy for power and heat generation identified in the review is a VAT exemption on the fees charged by heat utilities, which the Government has introduced to compensate those utilities for the regulated, below-cost tariffs they are charging. The review team has expressed a view that the reform of regulated tariffs for district heating could serve to improve the efficiency with which heat is used while removing the need for compensating heat utilities in the first place. Targeted policy instruments can, however, be used for helping poor households afford the energy they need.

The largest measure for which an estimate was provided in China's self-report was a set of subsidies benefitting a number of **professional fuel users**, such as fishermen, foresters, taxi drivers, and public-transport companies. Though large in scale (CNY 94 billion [USD 15 billion] in 2013 in total), the subsidies appear to be decoupled from fuel usage at the aggregate, national level, although the review team was not able to determine the extent to which this was effectively the case. Provincial authorities also retain some discretion in how they choose to apportion the funds to the different beneficiaries, with some still linking funds to local fuel consumption. The review team therefore recommends that China continue decoupling the subsidies from fuel usage (to the extent possible), and eventually phase out payments in a gradual fashion.

China's self-report identified only one subsidy benefitting the **residential sector** directly, namely a reduced rate of VAT for the sale of certain energy products to residential users (coal gas, LPG, natural gas, and coal products). China was not able to provide a quantitative estimate of the fiscal cost for this measure, nor was a clear timeline for reform made available. The review team therefore encourages the Government

to collect data and qualitative information for assessing the extent to which this subsidy has achieved its stated objective, which is to improve the access of poor households to energy. The review team believes this measure is likely to be a poor instrument for targeting support to those who most need it, so alternatives ought to be explored.

Many of China's energy policies are in a state of flux as the Government plans to introduce new reforms and laws that should affect future energy pricing and taxes. This adds to recent policy initiatives that reaffirmed China's commitment to move toward more market-based prices and toward taxes that better reflect the environmental damage that economic activities can cause. The reform of China's fossil-fuel subsidies is a necessary step toward that goal as it holds the prospect of contributing to pollution reduction while removing one major source of price distortions in the economy. China should continue its efforts to ensure that the most vulnerable segments of society are not adversely affected by the reform. More information on fossil-fuel subsidies, their effects, and their beneficiaries would make the necessary reforms easier to identify and would result in more efficient policies. Price reform should go beyond eliminating the fossil-fuel subsidies discussed above, and eventually capture the environmental externalities that arise from the production and consumption of fossil fuels through efficient pricing (or "corrective taxation" to use the IMF's terminology).





## INTRODUCTION

### Background and context<sup>1</sup>

G20 Leaders committed in 2009 to “phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest.” APEC Leaders made a similar commitment in 2009. To follow up on this commitment, members of both groups have since engaged in a voluntary process of periodically reporting on their fossil-fuel subsidies. The G20 has also commissioned three reports on the broader question of energy subsidies from selected intergovernmental organisations (IOs), including the IEA, the OECD, OPEC, and the World Bank.<sup>2</sup>

In an effort to further facilitate the sharing of experience and mutual learning among G20 members, G20 Finance Ministers announced in February 2013 that they would seek to develop a framework for voluntary peer reviews for rationalising and phasing out inefficient fossil-fuel subsidies that encourage wasteful consumption. This led in December 2013 to a joint announcement<sup>3</sup> by the People’s Republic of China and the United States of America<sup>4</sup> that the two countries would undertake a reciprocal peer review of their fossil-fuel subsidies under the G20 process. Other countries—Germany, Mexico, and Indonesia—have since joined China and the United States in agreeing to undertake peer reviews of their own subsidies under the G20. A similar exercise is taking place in the context of APEC, with Peru, New Zealand, and the Philippines each having already undergone a peer review of their subsidies in, respectively, 2014, 2015, and 2016, while Viet Nam and Chinese Taipei are currently undertaking APEC reviews as well.

As indicated in the terms of reference prepared by China and the United States<sup>5</sup>, the purpose of G20 peer reviews is to:

1. find out the basic situations, differences, and experience of fossil fuel subsidies in various countries;
2. push forward the global momentum to identify and reduce inefficient fossil fuel subsidies;
3. improve the quality of available information about inefficient fossil fuel subsidies;
4. and share lessons and experience of relevant reform.

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<sup>1</sup> The sections that follow greatly benefitted from discussions with Chinese authorities and the in-country visit that the peer-review team conducted in Beijing in April 2016. Those were the result of extensive planning and preparation by the Central Government of China, for which the review team is very grateful.

<sup>2</sup> See for instance the 2010 report that was jointly prepared by the IEA, OPEC, the OECD, and the World Bank for the Toronto Summit of June 2010.

<sup>3</sup> [www.whitehouse.gov/the-press-office/2013/12/05/us-fact-sheet-strengthening-us-china-economic-relations](http://www.whitehouse.gov/the-press-office/2013/12/05/us-fact-sheet-strengthening-us-china-economic-relations)

<sup>4</sup> These countries are henceforth denoted as “China” and “the United States” respectively.

<sup>5</sup> See Annex 1.

To that purpose, China has prepared a self-report (henceforth the CSR, for “China self-report”) describing the measures that the country is submitting for review by a designated team of experts, and submitted it to the peer-review team in December 2015. This review team comprised the representatives from different countries and international organisations that China invited to participate in its peer review under the G20, namely Germany, Indonesia, the United States, the International Monetary Fund (IMF), and the Organisation for Economic Co-operation and Development (OECD). At the request of China and the United States, the OECD chairs their peer reviews.

The composition of the review team for China was as follows:

- Martin Schoepe (Germany, Ministry for Economic Affairs and Energy)
- Marius Backhaus (Germany, Ministry for Economic Affairs and Energy)
- Sandra Retzer (Germany, Gesellschaft für Internationale Zusammenarbeit)
- Jonas Rußbild (Germany, Gesellschaft für Internationale Zusammenarbeit)
- Rofyanto Kurniawan (Indonesia, Ministry of Finance)
- Noor Iskandarsyah (Indonesia, Ministry of Finance)
- Ginanjar Wibowo (Indonesia, Ministry of Finance)
- Peter Wisner (United States, U.S. Treasury)
- John Horowitz (United States, U.S. Treasury)
- Anna Jewell (United States, U.S. Treasury)
- Jessica Isaacs (United States, U.S. Treasury)
- Sanjeev Gupta (IMF, Fiscal Affairs Department)
- Ronald Steenblik (OECD, Trade and Agriculture Directorate)
- Jehan Sauvage (OECD, Trade and Agriculture Directorate)
- Christina Timiliotis (OECD, Trade and Agriculture Directorate)

### **The scope of fossil-fuel subsidies**

Although the G20 has not adopted a formal definition of what constitutes a fossil-fuel subsidy, the terms of reference prepared by China and the United States specify that the most common forms of subsidies include:

- direct budgetary support (or “fiscal expenditure subsidies” as stated in China’s self-report);
- tax-code provisions (or “tax-preference provisions”);
- government provision either at no charge or for below-market rates of auxiliary goods or services that facilitate fossil-fuel use or production; and
- requirements that non-government entities provide particular services to fossil-fuel producers at below-market rates, or that require non-government entities to purchase above-market quantities of fossil fuels or related services.

Both the terms of reference and the CSR indicate that the focus of the exercise ought to be on national-level policies, especially since fiscal measures and taxation in China are predominantly decided by the Central Government. Some consideration may further be given to province-level or municipal-level subsidies.

The CSR also specifies the commodities and products that are to be considered “fossil fuels” for the purpose of the country’s peer review under the G20, namely coal (including raw coal, solid fuels, coal gas, and coal-bed methane), petroleum (including crude oil, natural gas liquids, and refined petroleum products), natural gas (including associated and non-associated gases), and the heat and electricity generated using the above fuels. This scope does not include fossil fuels used for non-energy purposes (e.g. their transformation into solvents such as white spirit).

Activities that can attract subsidies in relation to fossil fuels are here taken to comprise the entire supply chain for fossil fuels, starting from the upstream segment (the exploration, development, and extraction of fossil resources) and moving down the chain to bulk transportation (e.g. through pipelines or freight train), refining, transformation, and wholesale and retail sales of refined products. They also include those fuels’ later combustion by the industrial, residential, governmental, and transport sectors. The discussion of individual measures in Section 3 reflects the scope of these activities along the supply chain.

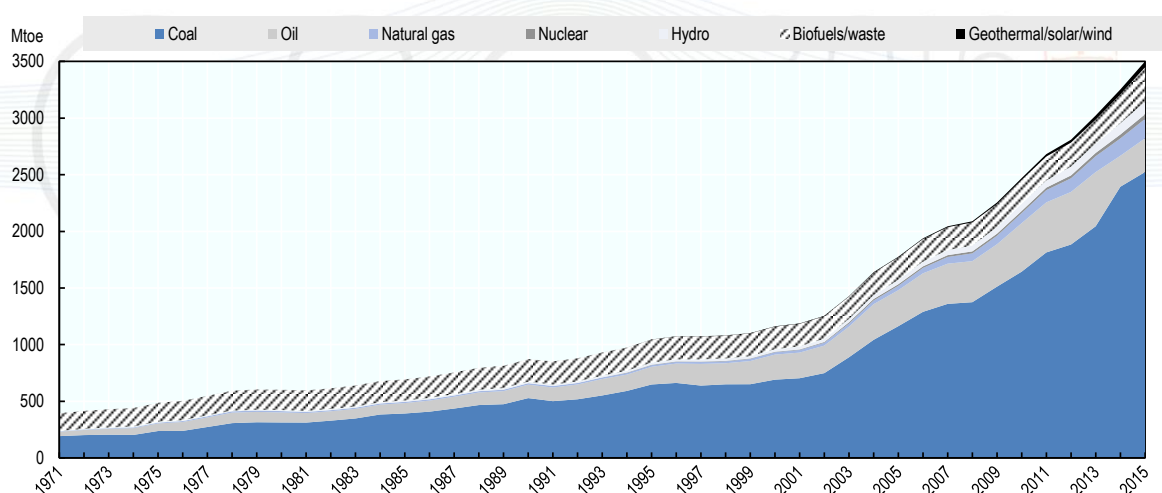


## AN OVERVIEW OF CHINA'S ENERGY SECTOR: RESOURCES, MARKET STRUCTURE, PRICES, AND TAXES

### Energy resources and market structure

China is the world's largest producer and consumer of coal and a significant player in the extraction of crude oil and natural gas. Once effectively self-sufficient in all fossil fuels, China's vast coal production no longer meets domestic needs and the country became a net importer of coal products in 2009 (from Australia and Indonesia mostly). Fossil fuels largely dominate China's total primary energy supply (Figure 1), with coal alone accounting for 64% (as of 2015), followed by petroleum products (18%). Although natural gas only met 6% of the country's energy needs in 2015, the Central Government has taken steps to gradually increase reliance on that fuel given its lower CO<sub>2</sub>-emissions factor. The need to rein in the country's greenhouse-gas (GHG) emissions and local atmospheric pollution has also led China to invest heavily in renewable-energy capacity in recent years, particularly onshore wind and solar photovoltaic energy sources.

**Figure 1. China's total primary energy supply (1971-2015)**



Data source: IEA (2015), National Bureau of Statistics of China.

China's energy market has historically been characterised by highly regulated production and retail prices, and a strong involvement of state-controlled companies in various stages of the supply chain. In the coal sector, the Shenhua Group is China's (and the world's) largest producer by volume, with an annual output exceeding 300 million tonnes. While it is less concentrated than in many OECD countries, China's thermal-coal industry is increasingly dominated by large state-owned actors. The country's National Energy Administration (NEA, under the management of the NDRC) recently unveiled plans foreseeing the closure of thousands of small, high-cost mines in coming years as part of a broader initiative to phase out low-quality coal and address over-capacity. Together with falling coal prices, this should accentuate the industry's concentration further as large producers stand to benefit from economies of scale.

In the oil and gas sector, state-owned CNOOC, PetroChina<sup>6</sup>, and Sinopec together account for the vast majority of all upstream and downstream activity. Foreign oil and gas companies are, however, increasingly participating in the exploration and development of offshore or technically challenging projects, through joint ventures of production-sharing contracts. Most crude-oil production has traditionally taken place onshore in the northeast and north-central regions, though some drilling occurs in shallow waters offshore. With old fields maturing, China is increasingly turning to enhanced oil-recovery techniques and new offshore discoveries—including deepwater fields—as a way to sustain production.

In the case of natural gas, fast-increasing demand has led to the development of unconventional gas sources (e.g. coal-bed methane, coal-to-gas, and shale gas) and larger volumes of imported LNG (mostly from Australia, Qatar, and Southeast Asia). The country is also investing in new import capacity by pipeline, such as the Central Asian Gas Pipeline (CAGP), which was partially completed in the late 2000s, and which connects Western China to Kazakhstan, Turkmenistan, and Uzbekistan. Agreement with Russia was also reached in 2014 to link the two countries in Eastern Siberia through the Power of Siberia pipeline.

China's power sector remains heavily dependent on coal, which accounted for 75% of all electricity generated in 2013, followed by hydropower (17%). A series of reforms undertaken in 2002 unbundled the sector vertically, and power generation is now in the hands of several large state-owned companies—such as the China Huaneng Group and the China Datang Corporation—and a number of smaller power producers owned by local authorities or the private sector. Two large companies operate the transmission and distribution networks under the purview of the NEA. The NDRC is responsible for price and competition regulation in most segments of the energy market.

### Energy prices and taxes

Although the NDRC has in the past set consumer prices for natural gas and petroleum products below international market rates, recent years have witnessed a trend toward more market-based pricing mechanisms. In the case of natural gas, a pilot programme was launched in 2011 in the southern provinces of Guangdong and Guangxi to tie city-gate prices for natural gas to prices applying in the Shanghai urban market for fuel oil and LPG. This trial scheme was subsequently extended to the whole country in three phases; the last such phase took effect in April 2015 and allows natural-gas prices in China to be determined more flexibly at the city-gate level. For electricity, the NDRC and its regional counterparts set on-grid wholesale prices received by electricity generators administratively at the power plant or generating-equipment level. Retail electricity prices are set for each province and are regularly adjusted. More reforms are expected in 2017 that should progressively liberalise electricity tariffs at the wholesale level.

While they are still subject to legally binding regulations (generally in the form of price caps), prices for refined petroleum products in China have evolved more in line with international market rates since reforms were undertaken in 2009 and 2013. The new system allows the NDRC to adjust retail prices whenever imported crude prices fluctuate by more than CNY 50 (about USD 8) a tonne in a 10-working-day window. It is intended to help relieve the pressure on refiners who often rely on imported crude oil but sell refined products at regulated prices. More recently—and in response to sharp drops in the price of imported crude—the Central Government introduced a price floor that seeks to prevent the prices for refined oil products from dropping below what they would cost if the price of crude oil drops to below

<sup>6</sup> PetroChina is the listed and largest subsidiary of the China National Petroleum Company (CNPC).



USD 40 per barrel, a measure which effectively makes petroleum products more expensive in China than they were in many other countries as of January 2016.<sup>7</sup>

All land and below-ground resources in China are considered public property, and use rights are granted by the Ministry of Land Resources. Upstream oil and gas activities are generally subject to an ad-valorem resource tax of 6%, though lower rates can apply to certain projects using enhanced oil-recovery techniques or to geologically challenging fields (e.g. deepwater projects). Beyond conventional hydrocarbons, the tax also applies to the extraction or utilisation of unconventional oil and gas sources such as shale gas. A special tax on windfall profits (i.e. the Special Oil Gain Levy) is also levied on the revenues of major oil and gas firms, the rates for which vary in line with international crude prices (between 20% and 40%). Unlike for oil and gas, resource tax rates imposed on domestic sales of coal are determined by provincial governments, and need to be approved by the Ministry of Finance and the State Administration of Taxation. Current rates range between 2% and 10% of the sales value depending on the province.

Energy products sold in China are generally subject to the regular rate of VAT (17%) though natural gas, coal gas (town gas), LPG, biogas, and coal products used for residential heating all attract a preferential rate of 13% when sold for residential use. The Central Government also levies excise taxes on sales of most refined petroleum products. As is the case in most OECD countries, diesel fuel sold in China is subject to a lower rate of excise tax (CNY 1.2 per litre; USD 0.18 per litre) than gasoline (CNY 1.52 per litre; USD 0.23 per litre). Exemptions also exist, notably on domestic aviation fuel.

<sup>7</sup>

The Government maintains that the benefits importers derive from the difference between market rates and the price floor (i.e. USD 40 per barrel) are set aside in a special account under State supervision for funding investments in energy efficiency and green initiatives, and for serving as a cushion in the event of future price hikes. Some funds may also go toward investments in the upgrading of oil refineries.



## GOVERNMENT SUPPORT FOR FOSSIL FUELS IN CHINA

### General observations

Many policies related to energy are in a state of transition in China, making it difficult at times to assess the effects of particular subsidies. As the country embarks on carbon trading on a national scale in 2017, a number of changes are expected to affect the power sector and energy-intensive industries.<sup>8</sup> The year 2017 should also mark the beginning of a transition toward liberalised electricity tariffs at the wholesale level, and the continued application of more stringent emission standards in both new and existing thermal power plants. Meanwhile, recent reforms of resource taxation have altered the fiscal regime for the production of coal, crude oil, and natural gas. This is combined with ongoing energy pricing reform for petroleum products, such as the recent price floor imposed on refined fuels by the Government (equivalent to a price of USD 40 per barrel of crude oil), and the extension nation-wide of a pilot scheme for the market-based pricing of natural gas in cities.

The CSR provides nonetheless a useful starting point for understanding the scope and magnitude of fossil-fuel subsidies in China, and charting a course for reform. Although the report concentrates mainly on Central-Government tax concessions, and hence does not discuss all possible forms of fossil-fuel subsidies, it is the first time that Chinese authorities have released such detailed information on policies that encourage the production or consumption of fossil fuels in the country. Building on this achievement, the review team encourages the Government to further pursue its efforts toward improving transparency on subsidies by including other forms of support such as preferential loans, loan guarantees, support of a regulatory nature, and the support provided at the provincial level.

The remainder of this section presents the policies that China has described and nominated for reform in the CSR and the questions and comments raised by members of the peer-review team. In what follows, discussions of particular measures are organised according to their impact along the fossil-fuel supply chain, starting with the upstream exploration and development of fossil-fuel resources, and progressing downstream to refining and their use in power and heat generation, transport, and the residential sector. Table 1 shows the nine policies China has identified in the CSR and the corresponding identification codes. The text boxes below describing individual measures were initially prepared by China and their content taken directly from the CSR.

### 1. Subsidies for the exploration, development, and extraction of fossil fuels

Upstream fossil-fuel activities in China are dominated by a number of large state-owned enterprises (SOEs). In oil and natural-gas extraction, those include publicly listed, vertically integrated entities such as CNPC (i.e. PetroChina), Sinopec, and CNOOC, all of which are now active in extraction, refining, bulk transport (e.g. through pipelines or LNG terminals), and distribution through networks of service stations. A number of these companies also conduct R&D and engineering activities on a significant scale. As is the case in most fossil-fuel-producing countries, the low crude prices that have prevailed since 2014 pose a

<sup>8</sup> The cap that would apply to this trading system has not been announced yet. If the cap were non-binding or excessively high, then the trading system may not have substantial effects on China's power system.

serious challenge to Chinese oil and gas firms operating upstream. Challenges are even more pronounced in coal-mining, where SOEs like the Shenhua Group have been grappling with over-capacity and have had to curtail activities at a number of mines throughout the country. This led the government to raise its MFN import tariffs on coal from zero to 3-6% in 2014 in an attempt to protect domestic producers from international competition.

**Table 1. The nine policies that China has identified in the CSR**

Full name of the measure	Measure identifier	Estimated fiscal cost	
		CNY (billions)	USD (billions)
Subsidies for the exploration, development, and extraction of fossil fuels			
A consumption-tax policy of “refund after payment” for refined oil produced by oil (gas) field enterprises for own use	T-c-2	2.7	0.4
A policy of exempting China National Petroleum Corporation (CNPC) from land-use tax	T-c-3	n.c.	n.c.
A policy of land-use tax exemption for China National Offshore Oil Corporation (CNOOC)	T-c-4	n.c.	n.c.
Subsidies for the refining and processing of fossil fuels			
A policy of consumption-tax exemption for oil consumed by refined oil manufacturing enterprises for own use	T-c-1	0.1	0.02
Subsidies for power and heat generation			
A policy of exempting thermal power stations from land-use tax in cities and towns	T-c-6	n.c.	n.c.
A policy of VAT exemption for heating fees of heat supply enterprises for individual residents	T-c-7	n.c.	n.c.
A policy of exempting heat-supply enterprises from real-estate tax and urban land-use tax	T-c-8	n.c.	n.c.
Subsidies for fossil fuels used in transport			
A Series of Subsidies Derived from Petroleum Fuels Price and Tax Reform	S-c-1	94	15
Subsidies for fossil fuels used in the residential sector			
A preferential tax-rate policy of value-added tax (VAT) on coal gas and liquefied petroleum gas	T-c-5	n.c.	n.c.

China’s tax regime for fossil-fuel extraction has undergone major changes over recent years, culminating in the introduction of *ad-valorem* resource taxes on coal, crude oil, and natural gas.<sup>9</sup> Together with the shift from specific to *ad-valorem* resource taxes, the Central Government also reduced the number of levies and fees applying to fossil-fuel upstream activities. In the case of coal, which accounts for the bulk of all resource-tax revenues, tax rates now vary by province within a range of 2% to 10% of the domestic sales value of coal. Mineral-resources compensation charges applying to crude oil and natural gas were, meanwhile, reduced to zero in late 2014 and the rate of resource tax correspondingly increased from 5% to 6%.

<sup>9</sup> *Ad-valorem* resource taxes on crude oil and natural gas were first introduced in June 2010 as a trial in the resource-rich Uyghur Autonomous Region of Xinjiang, before they were then extended to the whole country starting in November 2011. The shift to *ad-valorem* resource taxes on coal occurred later, in December 2014.

Targeted reductions in resource-tax rates are available for qualifying activities, such as tertiary-recovery methods for oil extraction and certain deep-water projects (e.g. deeper than 300 m). While differential resource-tax rates could potentially constitute a subsidy, further information would be needed to determine whether the differential rates of resource tax could be rationalised. China has, however, indicated that it does not consider lower rates of resource tax to be an inefficient subsidy on the grounds that these tax reductions seek to encourage greater resource-recovery. Although foreign oil and gas companies can only participate through joint ventures with Chinese producers, they have at times attracted tax preferences, such as lower mining fees and tax exemptions on imported equipment and materials.<sup>10</sup> The Government also supports the production of shale gas through direct, per-unit grants, but those were reduced starting in 2016.

In line with the goal of reducing excess capacity in certain sectors (e.g. coal mining and steel production), the Central Government is encouraging, and in some cases directing funding to, sub-national governments to cover social transfers and retraining or resettlement costs for unemployed fossil-fuel workers, primarily in coal mining.<sup>11</sup> These payments could be considered efficient (in the sense of being non-distortionary) for closed mines if both the company and the miners did not anticipate that labour costs would be picked up by sub-national governments. The payments could also be considered effective where they are predicated on the permanent closure of inefficient mines and reduced overall excess capacity.

The CSR identifies three subsidies currently benefitting upstream fossil-fuel activities in China: one excise-tax refund for refined petroleum products used in oil and gas extraction (T-c-2), and two urban land-use tax exemptions benefitting the upstream activities of CNPC and CNOOC (T-c-3 and T-c-4 respectively); see descriptions at the end of this section.

As mentioned in the CSR, China intends to reform the excise-tax refund for refined petroleum products<sup>12</sup> consumed by oil and gas firms (T-c-2) in the short-term, though no precise date is provided. The review team agrees with the Chinese authorities that this measure likely undermines energy efficiency and conservation, and may not be consistent with the country's broader approach to taxation as spelled out in the 13<sup>th</sup> Five-Year Plan.<sup>13</sup> The appropriateness of this tax treatment eventually depends on the broader tax framework, however—something which the review team did not have sufficient resources to investigate. In their interview with the review team, industry representatives noted that oil and gas exploration and extraction in China consume large volumes of refined petroleum products, which explains the large amount of tax-revenue foregone due to this measure (CNY 2.7 billion annually according to the China's Central Government). Industry representatives also indicated that oil and gas producers operating in China would probably not reduce their consumption of refined petroleum products much if the authorities were to increase excise taxes on these products. If this proved to be the case, the environmental benefits of reforming this measure may turn out to be limited (at least in the short-run, until producers start adjusting

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<sup>10</sup> The team of experts from China indicated to the peer-review team that measures benefitting Sino-foreign joint ventures only apply to grandfathered projects that were undertaken prior to 2011. New projects are therefore not eligible.

<sup>11</sup> State Council meeting on 22 January. Ministry of Industry and Information Technology press release on 25 February. [http://english.gov.cn/premier/news/2016/01/24/content\\_281475277746575.htm](http://english.gov.cn/premier/news/2016/01/24/content_281475277746575.htm)

<sup>12</sup> As indicated above in the overview of China's energy sector, rates of excise tax on refined petroleum products consumed in China were, as of April 2016, CNY 1.52 per litre of gasoline (and naphtha) and CNY 1.2 per litre of diesel fuel and fuel oil.

<sup>13</sup> The last section of this report discusses how subsidy reform fits within China's overarching policy goals, including those described in the 13<sup>th</sup> Five-Year Plan.

their operations), though the change may yield substantial fiscal benefits in the form of increased tax revenues.

Concerning the two exemptions from urban land-use tax that China has identified (T-c-3 and T-c-4), the CSR mentions that the Chinese Government intends to reform both measures in the mid- to long-term, though no particular date is specified. While the two exemptions reported in the CSR benefit only state-owned CNPC and CNOOC<sup>14</sup>, discussions with the team of Chinese experts clarified that the measures have since been amended. Although the exemptions now benefit more companies than before (about 15 of them), the benefits to each individual enterprise are considerably smaller since the scope of eligible land has been narrowed down. The industry seems to regard the exemptions from urban land-use tax as an important element of profitability and competitiveness, citing estimates of USD 1-2 per barrel. Rates of urban land-use tax concern only urban and some mining areas, and can vary significantly depending on the locality and the size of cities or towns.

To further improve transparency on the scope and scale of fossil-fuel subsidies, the review team urges China to work to estimate the fiscal cost of concessions in relation to urban land-use taxes. In the absence of more information on the cost of these measures, it was difficult for the review team to assess potential fiscal and environmental benefits from reform. Revenues from urban land-use taxes currently account for a relatively small proportion of total tax revenues in China, which could suggest a relatively small fiscal gain following reform. More information would nevertheless be needed to reach a better understanding of the situation.

The review team also encourages China to provide a timetable for reform, clarifying what mid- to long-term might mean in practical terms. It is the team's understanding that China is in the process of reforming its urban land-use taxes and combining them with real-estate taxes.

***[T-c-2] A consumption-tax policy of “refund after payment” for refined oil produced by oil (gas) field enterprises for own use***

*Overview of the subsidy programme:* This measure rebates in full the amounts of the excise tax levied on refined petroleum products purchased by oil and gas producers and consumed by them in connection with the production of crude oil.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT.

*Eligible subsidy recipients:* upstream oil and gas enterprises.

*Duration of the subsidy programme:* since 2009.

*Annual cost estimates:* CNY 2.7 billion.

*Policy basis:* The Notice of the Ministry of Finance and the State Administration of Taxation on the "Refund after Payment" Policy of Excise Tax on Oil Produced by Oil (Gas) Field Enterprises for Their Own Use (Cai Shui [2011] No.7).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the short- or medium-term.

<sup>14</sup> The exemptions seem to have been introduced at a time when CNPC and CNOOC were the only companies conducting exploration and extraction of oil and gas in China.

*China's comments on the policy (based on the CSR):*

This policy provides a "refund after payment" for refined oil produced by upstream oil and gas enterprises for their own use. This measure reduces the cost of crude-oil exploitation, but also encourages overuse of crude oil and refined oil, making it an inefficient fossil-fuel subsidy.

Preferential policies for refined oil consumed in crude-oil exploration (T-c-2) and refined oil production (T-c-1) are not conducive to improving energy efficiency and conservation. These policies were intended to solve recurring problems associated with the refined-oil tax reform of 2008 and instances of double taxation of fuel. According to the requirement of the Third Plenary Session of the 18<sup>th</sup> Central Committee of the Communist Party of China, the collection scope, procedures and rates of excise-tax should be adjusted. Taxation procedures for certain refined oil products need to be reinstated. Holistic planning should be pursued when adjusting this policy and the comparable exemption for refiners (T-c-1). China thus suggests studying ways to adjust the above-mentioned excise-tax preferential policies in the short-term.

***[T-c-3] A policy of exempting China National Petroleum Corporation (CNPC) from land-use tax***

*Overview of the subsidy programme:* Land used specifically for oil or gas production, and for construction units of the affiliated companies and branches of CNPC in the industrial and mining areas outside cities, counties and established towns, is exempted from land-use tax for the time being.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT

*Eligible subsidy recipients:* CNPC

*Duration of the subsidy programme:* since 1989

*Annual cost estimates:* N.A.

*Policy basis:* The Regulations of the State Administration of Taxation on Exempting Affiliated Units of China National Petroleum Corp from Land use Tax (Guo Shui Di Zi [1989] No. 88).

*Information sources:* websites of MOF and SAT

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (based on the CSR):*

By exempting CNPC from land-use tax in cities and towns, this policy has reduced the costs incurred by the company in producing oil and natural gas and encouraged a larger scale of production, thus leading to excessive production of fossil fuels. It therefore qualifies as an inefficient fossil-fuel subsidy. Such exemptions from urban land-use tax for oil and gas producers, and the exemption of stamp tax for oil and natural gas, are not conducive to energy efficiency and the promotion of market-based pricing. These existing policies should therefore be reformed.



**[T-c-4] A policy of land-use tax exemption for China National Offshore Oil Corporation (CNOOC)**

*Overview of the subsidy programme:* The land used by CNOOC and its affiliated companies for the following purposes (land used for the construction of offshore structures, such as: jackets and platform modules; wharfs; oil and gas transportation pipelines; communication antennae; roads, railways, special lines and airports outside the office and living areas) is exempt from land use tax.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT

*Eligible subsidy recipients:* China National Offshore Oil Corporation

*Duration of the subsidy programme:* since 1990

*Annual cost estimates:* N.A.

*Policy basis:* The Regulations of the State Administration of Taxation on Exempting China National Offshore Oil Corporation and its Affiliated Units from Land Use Tax (Guo Shui You Fa [1990] No.3).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (based on the CSR):*

By exempting CNOOC from land-use tax in cities and towns, this policy has reduced the costs incurred by the company in producing oil and natural gas and encouraged a larger scale of production, thus leading to excessive production of fossil fuels. It therefore qualifies as an inefficient fossil-fuel subsidy. Such exemptions from urban land-use tax for oil and gas producers, and the exemption of stamp tax for oil and natural gas, are not conducive to energy efficiency and the promotion of market-based pricing. These existing policies should therefore be reformed.

## **2. Subsidies for the refining and processing of fossil fuels**

The same SOEs that dominate the upstream fossil-fuel sector in China also have a strong presence in oil-refining and processing given their high degree of vertical integration. CNPC and CNOOC are hence very active in the segment, as is Sinopec. This means that any tax imposed on, or subsidy provided to, refiners may need to be understood in conjunction with other taxes and subsidies applied upstream or downstream of the refining segment. In the case of other countries with large vertically integrated oil companies, losses incurred by refiners due to low, regulated consumer prices are sometimes compensated through a mix of direct government subsidies (or tax breaks) and cross-subsidies between upstream activities and refining (i.e. the profits made upstream are used to make up for losses incurred at the refining stage).

In the case of China, the Central Government has, at times, intervened to compensate oil and gas companies for losses they had incurred in the refining segment as a result of the regulated, low retail prices. This compensation has taken different forms, such as direct grants or VAT rebates on imported LNG (OECD, 2015). However, this kind of compensation has been substantially reduced, owing to the lower crude-oil prices that have prevailed since late 2014, and to the energy price reforms that China has undertaken over recent years.



The CSR identifies one subsidy benefitting oil refineries in China. This subsidy is an excise-tax refund for the use of refined petroleum fuels by refiners (T-c-1). As with the excise-tax refund for refined petroleum products used in oil and gas extraction (T-c-2), the Government has expressed its intention to reform this tax refund for refiners in the short- to medium-term, though no particular date is specified.

The review team agrees with the Chinese authorities that this measure likely undermines energy efficiency and conservation, and may not be consistent with the country's broader approach to taxation as spelled out in the 13<sup>th</sup> Five-Year Plan.<sup>15</sup> Unlike VAT—which seeks to tax the value added at each particular stage of a supply chain—excise taxes are independent of the product or activity's value. They are typically used because the use of that product imposes uncompensated costs on non-users (i.e. it generates an externality), or because of the need for the government to raise additional tax revenue, usually for a specific purpose related to the volume of use rather than its value (or both). In either case, deviations from the “normal” tax benchmark undermine the effectiveness of the tax. As with the previously mentioned excise-tax exemption, the appropriateness of this tax treatment depends on the broader tax framework, however. The panel did not have sufficient resources to evaluate the excise-tax exemption in the context of China's overall tax system and efficiency of the tax.

In the particular case of refiners, concerns about double-taxation may, nevertheless, warrant some consideration. This might be an issue if a government were to tax both the fuel used by refiners as feedstock (i.e. the intermediate inputs that are transformed through the refining process) and the output of the refining process (i.e. the refined petroleum products that are sold by refiners for distribution downstream). The tax refund identified by the CSR (T-c-1) concerns only process energy, however; that is, the measure only concerns the refined petroleum products (e.g. diesel fuel and fuel oil) that refiners use as a value-adding factor as part of their regular production processes, as opposed to the fuels that refiners transform for subsequent distribution downstream. The case for taxing those fuels is therefore stronger in that particular case. As with the previously mentioned excise-tax exemption for refined petroleum products used by oil and gas producers (T-c-2), the appropriateness of this tax treatment eventually depends on the broader tax framework, however — something which the review team did not have sufficient resources to investigate.

The review team noted that the amount of tax revenue foregone due to the refund is fairly small, representing about CNY 100 million annually according to the CSR (about USD 15 million). This means that the fiscal and environmental benefits of reform might be limited in size, especially when weighed against the potential administrative complexity that applying the tax to refiners may entail. The Chinese expert team acknowledged that monitoring the amounts of refined petroleum products consumed by refiners as process energy would likely be difficult, but emphasised that tax audits and inspections are regularly conducted that should help enforce the tax. Reform of the tax refund is therefore encouraged by the review team.

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<sup>15</sup> The last section of this report discusses how subsidy reform fits within China's overarching policy goals, including those described in its 13<sup>th</sup> Five-Year Plan.

***[T-c-1] A policy of consumption-tax exemption for oil consumed by refined oil manufacturing enterprises for own use***

*Overview of the subsidy programme:* Refined petroleum products consumed as process fuel during the refining of oil, which is independently produced by refined oil manufacturing enterprises, are exempt from excise tax.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT.

*Eligible subsidy recipients:* refined oil production enterprises.

*Duration of the subsidy programme:* since 2009.

*Annual cost estimates:* CNY 100 million.

*Policy basis:* The Notice of the Ministry of Finance and the State Administration of Taxation on the Exemption of Excise tax on Oil Produced by Refined Oil Manufacturing Enterprises for Their Own Use (Cai Shui [2010] No.98).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the short- or medium-term.

*China's comments on the policy (from the CSR):*

This policy exempts from excise tax the refined petroleum fuels produced by oil refineries that these enterprises consume as process fuel during production. This measure reduces the cost of refined-oil production, but has also caused the wasteful use of crude oil and refined oil to a certain extent. It therefore qualifies as an inefficient fossil-fuel subsidy.

Preferential policies for refined oil consumed in crude-oil exploration (T-c-2) and refined oil production (T-c-1) are not conducive to improving energy efficiency and conservation. These policies were intended to solve recurring problems associated with the refined-oil tax reform of 2008 and instances of double taxation of fuel. According to the requirement of the Third Plenary Session of the 18th Central Committee of the Communist Party of China, the collection scope, procedures, and rates of excise taxes should be adjusted. Taxation procedures for certain refined oil products need to be reinstated. Holistic planning should be pursued when adjusting this policy and the comparable tax refund for upstream producers (T-c-2). China thus suggests studying ways to adjust the above-mentioned excise-tax preferential policies in the short-term.

### **3. Subsidies for power and heat generation**

Similar to other segments of the energy sector, most power and heat generation capacity in China remains in the hands of large SOEs such as the Huaneng Group. Coal is still the dominant fuel used for generating the electricity and heat that the country consumes, the prices for which are negotiated directly between power generators and coal-mining firms. Although most electricity tariffs are currently set administratively by the NDRC at the level of individual power-generating units, the Government is expecting reforms to take place in 2017 that would liberalise wholesale tariffs and make them more market-based. To prepare for the change, and in accordance with new legislation mandating the use of pollution-reduction equipment in power plants, Chinese authorities have offered transitory assistance for retrofitting existing power plants with such equipment. Assistance takes the form of tariff premiums financed through a surcharge on electricity ratepayers, and which vary with the type of air pollutant abated (e.g. CNY 0.02 per KWh in the case of sulphur oxides).

Electricity generation in China has generally been a profitable activity in recent years, in contrast with the generation of heat. Roughly two-thirds of the country's heating plants—coal-based for the most part—seem to be operating at a loss due to the persistence of regulated, below-cost heat tariffs for residential users. A subset of these plants receives subsidies from provincial governments. For other heat plants, losses are often covered by cross-subsidies originating from the electricity segment and toward the heat segment. Although the Government is fully aware of the problems caused by below-cost heat tariffs, it noted that the provision of heat at affordable prices forms an important element of social policy since it tends to benefit a large number of low-income households. Heat is in that sense often perceived as a “network of public interest” in China.

Various news sources and sector experts have pointed out that fossil-fuel-based electricity may have at times received preferential access to the electricity grid while renewable energy sources faced high levels of curtailment.<sup>16</sup> The review team was not able to determine the extent to which this is still the case. Notable is that new administrative measures adopted by the NDRC in March 2016 require power transmission companies to provide grid connectivity for all renewable-power generating sources; the new measures also oblige the transmission companies to make guaranteed purchases of a portion of the electricity generated by wind turbines and large solar plants.<sup>17</sup> The team recognises the difficulty for non-experts in determining whether grid access is equitable, given the differences in location, variability, and reliability of different types of electricity generation. Despite these limitations, the review team wishes to note that any preferential access offered to fossil-fuel electricity fits within the definition of a subsidy that the team was instructed to identify and review.

The CSR identifies three subsidies benefitting the power and heat sector in China, two of which concern the urban land-use tax (T-c-6 and T-c-8) and one which concerns VAT (T-c-7). The former two measures resemble other urban land-use tax exemptions found in China, such as those for the land used by CNPC and CNOOC in oil and gas extraction (T-c-3 and T-c-4), though they here concern the land occupied by thermal power plants and heat suppliers. Accordingly, the findings of the review team for these two measures echo those for other urban land-use tax exemptions, in particular as regards the need to quantify the fiscal cost of the measures and clarify the timeline for reform. In addition, the review team noted that urban land-use tax exemptions do not seem to benefit certain renewable-energy power plants, such as solar photovoltaic farms or wind turbines. Although most of those plants are probably free of urban land-use taxes anyway since they are located outside urban areas, the exemption could distort the playing field against renewable energy sources as urban development continues to spread into peri-urban areas.

The third subsidy for power and heat generation that the CSR identifies (T-c-7) is the exemption of heating fees charged by utilities from the VAT that normally applies to sales of goods and services in China at a rate of 17%. This measure seeks to compensate heat utilities for the regulated, below-cost tariffs they are charging. It seems to concern mostly the heat supplied by coal-fired CHP plants, though the exemption applies irrespective of the fuel used for generating that heat.

It is the opinion of the review team that the reform of regulated heat tariffs could serve to improve the efficiency with which heat is used while removing the need for compensating heat utilities in the first

<sup>16</sup> See, for example, “China steps up efforts to tackle curtailment of renewable energy”, available at [www.reuters.com/article/us-china-renewables-idUSKCN0SE0NG20151020](http://www.reuters.com/article/us-china-renewables-idUSKCN0SE0NG20151020), and “China's String of New Policies Addressing Renewable Energy Curtailment: An Update”, available at <http://www.raponline.org/featured-work/chinas-string-of-new-policies-addressing-renewable-energy-curtailment-an>.

<sup>17</sup> See, for example, <http://www.renewableenergyworld.com/articles/2016/04/china-s-string-of-new-policies-addressing-renewable-energy-curtailment-an-update.html>

place. Targeted policy instruments may, however, be used for helping poor households afford the energy they need. In their discussion with the review team, Chinese experts noted that the Government intends to eventually rationalise the VAT exemption for heating fees in the mid- to long-term, but that doing so in the short-run would pose a number of risks and challenges. In particular, China cited concerns in relation to the current economic slowdown, which makes it harder for households to cope with higher heat prices, and the need to embed this reform within a broader package of energy pricing reform and targeted social transfers. The review team encourages China to proceed with those changes as soon as circumstances allow.

***[T-c-6] A policy of exempting thermal power stations from land-use tax in cities and towns***

*Overview of the subsidy programme:* The land that is used for ash yards, ash transport pipelines, oil and gas pipelines, special railway lines and infrastructure for water and heat supply that lie outside the perimeter of thermal power stations, is exempt from land-use tax in cities and towns.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT

*Eligible subsidy recipients:* thermal power enterprises

*Duration of the subsidy programme:* since 1989

*Annual cost estimates:* N.A.

*Policy basis:* The Regulations of State Administration of Taxation on Issues Concerning the Exemption of Land Use Tax for Power Industry (Guo Shui Di Zi [1989] No.13).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (based on the CSR):*

By exempting thermal power stations from land-use tax in cities and towns, this policy has reduced the costs of fossil-fuel-based power generation and encouraged a larger scale of production, thus leading to excessive production and use of fossil fuels. It therefore qualifies as an inefficient fossil-fuel subsidy. Such exemptions from urban land-use tax for thermal-fired power plants are not conducive to energy efficiency and the promotion of market-based pricing. These policies should therefore be reformed, with the exception of combined heat and power (CHP) plants using back-pressure, non-condensing turbines.

***[T-c-7] A policy of VAT exemption for heating fees of heat supply enterprises for individual residents***

*Overview of the subsidy programme:* Revenue from the heating fee, which is charged by heat-supply enterprises on heat supplied to individual households, is exempted from normal VAT.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT

*Eligible subsidy recipients:* residents

*Duration of the subsidy programme:* 2011 – 31 December 2015 (extended since).

*Annual cost estimates:* N.A.

*Policy basis:* The Notice of the Ministry of Finance and the State Administration of Taxation on Continuing the Implementation of Preferential Policies on Value-Added Tax, Real Estate Tax and Urban Land Use Tax for Heat Supply Enterprises (Cai Shui [2011] No.118).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (from the CSR):*

China's VAT exemption for heating enterprises helps reduce these companies' tax burden. It is intended to ensure the normal business operation of heating enterprises, where the supply price of heat is not yet set at a market rate, (i.e. it is still regulated and maintained below costs) and also takes into consideration issues regarding the amounts of heat supplied at lower prices to low-income groups. This policy is not, however, conducive to energy conservation, and is not well targeted at lower-income groups. Phasing out this policy, except for combined heat and power (CHP) plants using back-pressure, non-condensing turbines, is suggested in combination with the reform of pricing policies for heating, and policies to provide compensation to lower-income groups.

It should be noted, though, that clean and efficient urban heat supply can be helpful in meeting increasing demand from citizens. Back-pressure type CHP is highly energy-efficient, while pollutant emissions are far below other forms of coal heating, making it a relatively attractive option.

#### ***[T-c-8] A policy of exempting heat-supply enterprises from real-estate tax and urban land-use tax***

*Overview of the subsidy programme:* The heat-supply enterprises that charge a fee for the supply of heat to households are exempted from the real-estate tax and the urban land-use tax on plants, and on the land used for supplying heat to residents. Heat-supply enterprises that supply heat to households and residential units, or which engage in other production and business activities, are exempted from the real-estate tax and the urban land-use tax for an amount equivalent to the share of the heating fees in the utilities' gross incomes.

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT.

*Eligible subsidy recipients:* residents.

*Duration of the subsidy programme:* 1 July 2011 – 31 December 2015 (subsequently extended).

*Annual cost estimates:* N.A.

*Policy basis:* The Notice of the Ministry of Finance and the State Administration of Taxation on Continuing the Implementation of Preferential Policies on Value-Added Tax, Real Estate Tax and Urban Land Use Tax for Heat Supply Enterprises (Cai Shui [2011] No.118).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (from the CSR):*

China's preferential treatment of heating enterprises under the country's urban land-use tax and real-estate tax helps reduce these companies' tax burden. It is intended to ensure the normal business operation of heating enterprises, where the supply price of heat is not yet set at a market rate (i.e. it is still regulated and maintained below costs), and also takes into consideration issues regarding the amounts of heat supplied at lower prices to low-income groups. This policy is not, however, conducive to energy conservation, and is not well targeted at lower-income groups. Phasing out this policy (except for combined heat and power (CHP) plants using back-pressure, non-condensing turbines) is suggested in combination with the reform of pricing policies for heating, and policies to provide compensation to lower-income groups.

It should be noted, though, that clean and efficient urban heat supply can be helpful in meeting increasing demand from citizens. Back-pressure type CHP is highly energy-efficient, while pollutant emissions are far below other forms of coal heating, making it a relatively attractive option.



As in many countries, sales of motor fuels in China are subject to both regular VAT (17%) and excise taxes. As of April 2016, rates of excise tax were CNY 1.52 for gasoline and CNY 1.2 for diesel fuel. Together with the newly introduced price floor on refined petroleum products (equivalent to a price of USD 40 a barrel for crude oil), this makes motor fuels in China more expensive than in several OECD countries and in many emerging economies.<sup>18</sup> While most individual cars in China are powered using gasoline, professional vehicles such as trucks and fishing boats rely predominantly on diesel fuel.

Following a series of reforms that gradually liberalised prices for motor fuels starting in 2006, the Central Government introduced a number of direct subsidies for professional fuel users such as farmers, foresters, operators of fishing vessels, taxi drivers, and urban and rural public-transport companies. (See box, below.) These subsidies together form the one measure the CSR identifies for transport fuels (S-c-1). Total funds disbursed under this measure amounted to over CNY 94 billion in 2013 (about USD 15 billion), making it the largest subsidy estimated in the CSR.

While the bulk of funding comes from the Central-Government budget, provinces are responsible for managing many of the payments and implementing the subsidies more broadly. Although total funds disbursed under this measure seem to be set by the Central Government irrespective of projected fuel usage (i.e. they are decoupled from fuel usage), provincial authorities retain some discretion in how they choose to apportion the funds to the different beneficiaries. In other words, even where the total funds are decoupled from overall fuel usage or prices (the extent to which they are was not something the peer review was able to determine), some provinces may decide to direct more funds toward a particular category of beneficiaries deemed more affected by fuel-price increases. Consequently, the policy might still provide certain recipients with an incentive for consuming more gasoline or diesel fuel. However, in the absence of more information on implementation of this policy and on the sub-national allocation of funds, the review team was unable to arrive at a firm conclusion on this issue. The team would nonetheless encourage China to continue decoupling subsidies from fuel usage.

<sup>18</sup>

See, for example: [www.giz.de/expertise/downloads/giz-2015-en-ifp2014.pdf](http://www.giz.de/expertise/downloads/giz-2015-en-ifp2014.pdf).



**[S-c-1] A Series of Subsidies Derived from Petroleum Fuels Price and Tax Reform**

*Overview of the subsidy programme:* In 2008, the State Council issued the document Circular of the State Council on Implementing Petroleum Fuels Price and Tax Reform, which indicates that in the process of reforming petroleum fuels prices and taxes, subsidy mechanisms ought to be improved for the following fuel users: grain farmers, low-income groups, and public service industries (e.g. urban public transport). Previous increases in oil prices have increased the costs of oil consumption but affected various groups differently.

Subsidies for urban and rural highway passenger transportation, inter-island and rural waterway passenger transportation, and fishery (including overseas fishery) are funded by specific transfer payments from the central budget and are described below. Subsidies for the taxi industry are temporary and also funded from the central budget. The petroleum-price subsidies for grain farmers are, however, included within China's broader, comprehensive agricultural input subsidies (e.g. along with subsidies for fertilisers), while subsidies for low-income groups are included as part of subsistence allowances for residents (with the amount of subsidies based on a comprehensive consideration of overall inflation price and price adjustments for petroleum and natural gas). As a result, these latter two sets of subsidies are not addressed in the discussion below.

In 2009, seven ministries jointly issued the document titled Circular on Further Improving the Mechanism of Subsidies for Grain Farmers, Low-Income Groups and Public Service Industries after the Petroleum Fuels Price and Tax Reform. The circular indicates that, when prices for petroleum products exceed the price level that prevailed before the 2006 reform (that is, when the price of gasoline exceeds CNY 4 000 per tonne and the price of diesel exceeds CNY 3 870 per tonne), petroleum price subsidies will be triggered, with the amount of subsidies evolving in line with the oil price.

Furthermore, the Ministry of Finance and other relevant ministries issued a series of interim measures for administration of the special funds as indicated below for different industries such as farming, fishery, forestry, urban and rural highway passenger transportation, and urban and rural highway passenger transportation respectively.

Relevant ministries or government bodies involved in implementing the subsidy programme: Ministry of Finance, National Development and Reform Commission, Ministry of Supervision, Ministry of Transport, Ministry of Agriculture, National Audit Office, State Forestry Administration.

*Eligible subsidy recipients:* public-service industries, employed population in the forestry, fishery and farming sectors.

*Annual cost estimates:* According to the national public finance expenditure balance sheet, the annual costs of subsidies derived from petroleum fuels price and tax reform are listed in Table 2, below.

**Table 2. Annual costs of subsidies derived from petroleum fuels price and tax reform**  
(Unit: CNY 100 million)

Year		2010	2011	2012	2013
Fishery		67.69	207.29	236.63	259.13
Forestry		15.41	50.10	61.73	46.34
Transportation	Urban public transport	96.03	306.53	363.16	311.53
	Rural road passenger transportation	36.46	128.77	148.17	114.26
	Taxi	63.13	186.06	209.90	170.43
Other		13.28	21.90	22.70	41.14

*Note:* Petroleum price subsidy for the grain farmers is included in the total of comprehensive agricultural subsidies. Petroleum price subsidy for low-income groups is included in subsistence allowances for residents. The two subsidies are not separately accounted in the national public finance expenditure balance sheet.

*Data Source:* the national public finance expenditure balance sheet.

*Duration of the subsidy programme:* since 2009.

*Policy basis:* Circular of the State Council on Implementing Petroleum Fuels Price and Tax Reform (State Council 2008 Circular 37), Circular on Further Improving the Mechanism of Subsidies for Grain Farmers, Low-Income Groups and Public Service Industries after the Petroleum Fuels Price and Tax Reform (MOF 2009 Caijian Circular 1), Circular on Issuing Implementation Opinions on Further Improving the Dynamic Adjustment Mechanism of Comprehensive Agricultural Subsidies (MOF 2009 Caijian Circular 492), Circular on Issuing Interim Measures for Administration of the Special Fund of petroleum price subsidy for the fishery (MOF 2009 Caijian Circular 1006), Circular on Issuing Interim Measures for Administration of the Special Fund of petroleum price subsidy for the forestry (MOF 2009 Caijian Circular 1007), Circular on Issuing Interim Measures for Administration of the Special Fund of petroleum price subsidy for urban and rural highway passenger transportation (MOF 2009 Caijian Circular 1008), Circular on Issuing Interim Measures for Administration of the Special Fund of petroleum price subsidy for inter-island and rural waterway passenger transportation (MOF 2009 Caijian Circular 1008), the national public finance expenditure balance sheet.

*Information sources:* websites of MOF and Chinese government.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (based on the CSR):*

The subsidies comprised under this item originate in earlier reforms of China's petroleum fuels prices and taxes. They are widespread in the country, spanning a large range of subsidy recipients. Their main targeted beneficiaries are low-income groups, such as farmers. However, the subsidies still give rise to a number of problems, such as poorly-targeted policy design, difficulties in effectively distributing the subsidies to low-income groups, and a heavy fiscal burden. There is also a lack of co-ordination in the provision of the different subsidies. For instance, policy objectives under the petroleum-price subsidies for the fisheries sector and those under the subsidy for marine fishermen who transfer to other industries are not co-ordinated. The former are designed to compensate fishermen for the increased costs caused by upward adjustments in petroleum prices. The latter are designed as a scrappage incentive scheme for marine fishery vessels in the form of one-off payments. Because cumulative amounts under the fuel subsidies may sometimes be larger than those under the scrappage incentive scheme, the fishermen may prefer to retain their fishery vessels, which can have a negative impact on the scrappage policy's effectiveness and bring about wasteful and inefficient consumption of oil.

More generally, given the problems that exist in the provision of subsidies associated with petroleum fuels price and tax reform—such as inefficient policy performance, poorly-targeted policy design, policy effects that encourage wasteful consumption, policy goals that are difficult to meet, and a great fiscal burden—, these subsidy policies should be reformed.

Petroleum fuel subsidies for sectors like urban public transport, following the reform of refined oil prices, should be comprehensively designed and adjusted. Taking into account prevailing conditions in the five subsidised sectors, China would seek to implement reform in categorised ways, and reduce and substitute the subsidies for special fund and general-transfer payments, while adjusting the product price subsidies.

## 5. Subsidies for fossil fuels used in the residential sector

The CSR identifies only one subsidy benefitting the residential sector directly, and which reduces the rate of VAT to 13% (compared with the normal rate of 17%) for sales of coal gas and LPG to residential users (T-c-5). China has indicated in the CSR its intention to reform that measure for coal gas in the mid- to long-term, but does not discuss LPG. The review team noted that natural gas and coal products sold to households also attract a reduced rate of VAT at 13%, though these products are not mentioned in the CSR.

The expert team from China was not able to provide a quantitative estimate of the fiscal cost for this measure. Nor was a clear timeline for reform made available. The review team encourages the Government to provide an estimate of the fiscal cost of this measure and to provide a clearer statement of the various fiscal, environmental, and social costs and impacts of VAT reductions for the residential use of coal gas, LPG, natural gas, and coal products. Better data and qualitative information would certainly help assess the

extent to which this subsidy has achieved its stated objective, which is to improve the access of poor households to energy. Using these data, indicators could be derived for tracking progress (or the lack thereof) toward meeting a given set of numerical targets. They could also pave the way for alternative instruments for helping poor households. The Federal Government of the United States regularly conducts, for instance, in-depth reviews of its Low-Income Home Energy Assistance Program (LIHEAP) that contain useful information about the programme's recipients and the effectiveness and magnitude of the assistance it provides (U.S. Department of Health and Human Services, 2014).

VAT exemptions have the drawback of not targeting recipients, and so do not allow a distinction to be made on the basis of income or energy poverty. The APEC peer review of fossil-fuel subsidies in Peru, for example, identified a VAT exemption for fossil fuels purchased in the country's Amazonian regions that was introduced on social grounds, notably to promote the economic development of these regions (APEC, 2014). The APEC peer-review team concluded at the time that the measure had proven ineffective in meeting its stated objective and that it was costly in fiscal terms. It therefore went on to recommend that the Peruvian Government replace the VAT exemption with targeted social and regional development programmes. In the same vein, the review team encourages China to explore other possible instruments that might prove better suited than the VAT reduction for alleviating poverty and improving energy access. In that regard, the expert team from China remarked that direct subsidies like cash transfers can entail higher administrative costs than lower VAT rates, particularly where different layers of government are involved in the provision of social assistance.

***[T-c-5] A preferential tax-rate policy of value-added tax (VAT) on coal gas and liquefied petroleum gas***

*Overview of the subsidy programme:* This policy refers to a preferential rate (13%) of value-added tax applied on sales of coal gas and liquefied petroleum gas (LPG).

*Relevant ministries or government bodies involved in implementing the subsidy programme:* MOF, SAT.

*Eligible subsidy recipients:* enterprises producing coal gas and liquefied petroleum gas.

*Duration of the subsidy programme:* since 1994.

*Annual cost estimates:* N.A.

*Policy basis:* The Interim Regulations on Value-added Taxes (Article 2 (ii)).

*Information sources:* websites of MOF and SAT.

*Planned reform timeline:* In the medium- to long-term.

*China's comments on the policy (based on the CSR):*

A preferential VAT rate of 13% is levied on coal gas and LPG used for home heating. This can encourage the excessive use of coal gas and LPG, and so the policy qualifies as an inefficient fossil-fuel subsidy. The lower tax rate aims to provide assistance to households for daily necessities, but is not conducive to energy conservation and is not specifically targeted at lower-income groups. In particular, the policy fails to discriminate among different income groups as it applies to all social residents. Reform of this policy is therefore suggested, in combination with the reform of pricing for the residential use of fossil fuels, and more general assistance for lower-income groups.

## MAKING REFORM HAPPEN

### China's broader policy context: "One Centre and Two Combinations"

Building on the reform blueprint of the Third-Plenum of the 18<sup>th</sup> Communist Party of China, the Five-Year Plan for 2016-20 stresses the quality of economic growth, with much emphasis placed on a green model of development and sustainability concerns. This includes the advancement of reforms for aligning China's tax system more with environmental protection, and an increasing reliance on price signals for promoting a more efficient allocation of resources. The Central Government has in particular made energy efficiency and conservation a priority, as China's energy consumption per unit of GDP remains about 20% above the OECD average. This priority is sometimes referred to as "One Centre", in the sense that improving the efficiency with which fossil fuels are used ought to be at the *centre* of China's energy-reform strategy. "Two Combinations" then refers to the *combination* of a gradual move toward market-based pricing and a comprehensive reform of the country's tax system.

By contributing to pollution reduction and by removing one major source of price distortions, the reform of fossil-fuel subsidies forms one central instrument of this broader reform strategy. While fossil fuels will likely keep playing an important part in China's energy mix in the short- to medium-term, subsidy reform—together with a broader drive toward getting energy prices right so that they reflect the environmental costs of energy consumption—could help improve the efficiency with which fossil fuels are used in major sectors like energy, transport, buildings, and manufacturing. The reform of fossil-fuel subsidies would also be in line with China's own climate goals, which foresee the country's CO<sub>2</sub> emissions peaking in 2030 or earlier.

### Communicating progress on subsidy reform

In the aftermath of the Pittsburgh Summit of September 2009, at which G20 Leaders committed to phase out and rationalise in the medium-term inefficient fossil-fuel subsidies that encourage wasteful consumption, member countries began reporting annually on their own inefficient fossil-fuel subsidies through submissions to the G20 Energy Sustainability Working Group (ESWG). Several reports on energy subsidies were also commissioned by the group to international organisations, starting with a 2010 analysis by the IEA, OPEC, the OECD, and the World Bank on the scope of energy subsidies (IEA, OPEC, OECD, and World Bank, 2010).

While these initiatives have contributed to raising awareness of fossil-fuel subsidies among the policy community, the peer-review process that China and the United States agreed to undertake marks an important step forward in the direction of more transparency on fossil-fuel subsidies. The terms of reference that the two countries adopted for the peer review have helped cement a shared understanding between them of what constitutes a fossil-fuel subsidy. This led the two countries to report their own subsidies on a common basis, as evident in the self-reports that China and the United States submitted to the review teams in December 2015. These self-reports formed the starting point for the peer review.



The CSR that the Chinese authorities prepared constitutes in that regard a notable achievement, providing an unprecedented, government-led look at policies supporting the production and consumption of fossil fuels in China. The document covers several policies such as tax refunds for petroleum products used by refiners and upstream companies, or direct transfers to professions with high fuel use such as fishermen, foresters, taxi drivers, and public-transport companies. In doing so, the CSR, together with the self-report prepared by the United States and the subsequent peer reviews, sets a useful precedent that could in the future be emulated by other countries. The approach also complements the work that international organisations such as the IEA, the IMF, and the OECD have been doing to document and estimate subsidies and other forms of support for fossil fuels.

By allowing other countries and participating international organisations to ask questions about particular subsidies or support policies—including some that were not included in the CSR—the peer review itself contributes to increasing transparency on fossil-fuel subsidies. The exchange it fosters should also help establish a convergence of views over what ought to be considered an “inefficient subsidy” under the G20 commitment.

To improve that reporting process even further, the review team encourages:

- Efforts to improve and provide more information on the various taxes that apply to energy producers and consumers, and on the relevant tax revenues. The latter are important for understanding how significant are the fiscal gains from reforming tax concessions.
- Research on the beneficiaries of fossil-fuel subsidies in China, where data permits, though in a grouped manner to avoid breaching taxpayer confidentiality. The review team recognises that China does not yet possess a fully established tax expenditures system, but hopes that the peer-review process can help spur progress toward that goal.
- Research to improve data and understanding of the environmental impacts that fossil-fuel subsidies have in China, both in terms of GHG emissions and in terms of local air and water pollution.
- The provision of more information on the rules that the Government uses for setting the prices of energy products in China, where those are still regulated. More information on the reserve fund set aside by the authorities for stabilising energy prices in case of future price hikes would also be helpful.
- Provinces to provide at least the same degree of information and data that is currently available for Central-Government level measures.

### **Enabling subsidy reform**

A number of countries have taken recent action to reform some of their fossil-fuel subsidies since crude-oil prices started plummeting in late 2014. In the G20, for example, India, Indonesia, and Mexico all made great strides by reforming some of their largest consumer subsidies for motor fuels: India progressively eliminated its diesel-fuel subsidies between 2012 and 2014 through monthly price increases; Indonesia phased out its gasoline subsidies in 2015 while capping those for diesel fuel—which mostly benefit fishermen—at IDR 1 000 per litre (about USD 0.08 per litre); and Mexico took advantage of the lower crude-oil prices in late 2014 to start levying positive rates of excise duties on gasoline and diesel fuel (both fuels previously attracted subsidies in the form of negative excise-tax rates) (OECD, 2015). Reformers can also be found outside the G20, with economies as diverse as Austria, Malaysia, and the



Netherlands having reformed some of their policies conferring support to fossil fuels in the past few years (IMF, 2015; OECD, 2015).

In many cases, lower crude-oil, natural-gas, and coal prices have helped make reform happen by softening the impact of subsidy removal on consumers' purchasing power. This creates, however, a risk that governments start reinstating subsidies if and when crude-oil prices increase again. Low energy prices might also cause governments in resource-rich countries to increase subsidies to domestic fossil-fuel producers, in an attempt to shore up production and employment. Both risks highlight the necessity for the G20 and international organisations alike to keep monitoring developments in the area of fossil-fuel subsidies, and to continue improving transparency on those policies that might qualify as fossil-fuel subsidies.

Beyond the favourable context of low oil prices, the IMF has identified—through its experience in providing technical assistance—six common factors of success in subsidy reform (IMF, 2015).<sup>19</sup> Those are:

- First, *a comprehensive reform plan*, which clearly articulates the reform's long-term objectives, is needed. As indicated in the CSR, the phasing out or rationalisation of fossil-fuel subsidies will often call for a systemic approach to reform, namely one that draws on different parts of the government. The challenges are indeed many, requiring that different policy objectives be weighed and balanced against each other to eventually achieve a socially acceptable and welfare-enhancing outcome. In other words, governments need to embed subsidy reform within a broader strategy.
- Second, *price increases should be appropriately phased and sequenced*.
- Third, *improvements should be made in the efficiency of state-owned enterprises* in the energy sector to help reduce their fiscal burden. This is particularly important in China given the role that SOEs play in the energy sector there. Reform options could here include the opening up of the sector to international competition and ensuring competitive neutrality, so that private enterprises compete on equal terms with SOEs.
- Fourth, *mitigating measures should be undertaken to protect the poor*. Addressing social vulnerability and distributional implications forms an essential ingredient of success. Targeted cash or near-cash transfers, such as vouchers, should be preferred to other instruments like food or labour-income subsidies (Durand-Lasserve et al., 2015).
- Fifth, *energy pricing should be depoliticized* to make reforms durable. An automatic price mechanism, which incorporates a smoothing rule to prevent sharp increases in domestic prices, can be introduced, and implementation should be carried out by an independent body.
- Sixth, *an effective communication strategy should be put in place* to inform the public about the size of subsidies, as well as the potential benefits of subsidy reform, such as the scope to reallocate spending to other priorities (e.g. health and education). This underlines again the importance of improving transparency on fossil-fuel subsidies, their effects, and their beneficiaries.

<sup>19</sup>

The World Bank, the OECD, and the Global Subsidies Initiative (GSI) have also produced studies discussing the conditions under which subsidy reform is most successful. See, for example, World Bank (2014), OECD (2011), and GSI (2013).

## Addressing externalities

Subsidy reform is but one step of a broader process toward getting the prices right. As indicated above, China has made market-based pricing and environmental taxation key objectives of its strategy for ensuring that economic growth can be sustained over the long-term. This is apparent in current moves to liberalise energy prices and to turn pollution discharge fees into an environment protection tax, which will start being collected after legislation is passed by the National People's Congress. This particular tax is to be imposed on wastewater, waste gas, solid waste, and noise at rates that are based on a consideration of the current discharge fee on pollutants, actual administrative costs, the scale of environmental damage, and charging practice.

The peer-review team sees much merit in such proposals. Price reform should go beyond eliminating the fossil-fuel subsidies discussed above, and capture environmental externalities that arise from the production and consumption of fossil fuels through efficient pricing (i.e. the correction of externalities through taxes or tradable emission permits). Failure to price energy correctly, either through undercharging for supply costs or environmental costs, or through failing to fully apply general consumer taxes to fossil fuels, leads to an inefficient allocation of resources. **In the view of the IMF, any undercharging of energy—for supply costs, environmental costs, or failure to apply general consumption taxes—is tantamount to a subsidy (Clements et al., 2013).**

In fact, the environmental costs of fossil-fuel use are quite large, most importantly in the form of global warming, local air and water pollution, and, in some instances, the extent to which the use of petroleum fuels contributes to traffic congestion and accidents (Clements and others, 2013; Parry and others, 2014). Energy prices should therefore reflect environmental externalities as Brazil, German, Israel, Poland, and the United Kingdom have aimed to do with their gasoline prices.

**According to estimates by the IMF, under-pricing for externalities and the failure to fully apply general consumption taxes to fossil fuels in China amounted to CNY 13.8 trillion (USD 2.3 trillion) in 2015, with undercharging for global warming representing 19% of the total, air pollution 76%, and undercharging for congestion, accidents, and general consumption taxes the remaining 5% (Coady and others, 2015).<sup>20</sup> Taxing coal to reduce air pollution and carbon emissions would help China meet the carbon-emission reduction pledge that it submitted for the UNFCCC's 2015 Paris Agreement.**

**IMF staff estimates suggest that moving from existing energy prices to prices fully covering supply and environmental costs would raise 8.5% of GDP in new revenue, would reduce China's carbon emissions by roughly 30% and (with incentives for flue-gas desulfurization and similar control technologies) reduce fossil-fuel related air-pollution deaths by over 60%.<sup>21</sup> Some problems will ultimately require more refined pricing, however.**

*A greater emphasis on energy taxation rather than regulation could help achieve environmental objectives at much lower economic cost.* Environmental taxes are a far more cost-efficient approach to addressing the environmental externalities from fossil-fuel consumption, compared with regulatory approaches such as strengthening control of energy consumption and increasing the stringency of energy-efficiency standards. Inefficient energy prices distort resource allocation by encouraging over-consumption of energy and causing environmental damage. Taxes also raise scarce public revenue, which can be put to socially productive use.

<sup>20</sup> See also [www.imf.org/external/np/fad/subsidies/data/codata.xlsx](http://www.imf.org/external/np/fad/subsidies/data/codata.xlsx).

<sup>21</sup> These estimates are, however, sensitive to different assumptions for contentious factors, in particular global warming damages and the valuation of premature deaths from air pollution.

China has recognised that current environmental impacts are unsustainable and, as the CSR indicates, various regulations have been (or are planned to be) introduced, including efforts to cut coal consumption, implement strict energy-efficiency standards, extend carbon trading on a national scale by 2017, promote the use of non-fossil fuel energy, and promote the use of advanced technologies to conserve energy and reduce emissions. In addition, *ad hoc* policies that regulate the use of cars, and the operation of relatively polluting industries, are frequently being adopted.

While all these policies can help reduce fossil-fuel consumption and environmental damage, their efficiency impacts are difficult to evaluate, in particular as many of these policies have a specific sectoral focus, some overlap with each other, and they likely result in very different emission prices across sectors and programmes (OECD, 2013).

By contrast, if environmental taxes are properly targeted, they can promote and strike the efficient balance between the entire range of opportunities for mitigating environmental damages (through energy conservation, adoption of emission control technologies, use of renewable energy, and other responses that cannot be regulated, like a less intensive use of energy-consuming products). Regulatory approaches involving multiple programmes have higher administration costs, cannot achieve the efficient balance between different mitigation opportunities, and forgo a potentially major source of new revenue.



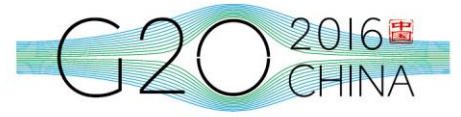
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## **ANNEX 1: TERMS OF REFERENCE FOR G-20 VOLUNTARY PEER REVIEWS BY CHINA AND THE UNITED STATES ON INEFFICIENT FOSSIL FUEL SUBSIDIES THAT ENCOURAGE WASTEFUL CONSUMPTION**

*As of 8 July 2014*

### ***I. The Purpose of the Peer Review***

The G-20 Leaders committed to rationalize and phase out inefficient fossil fuel subsidies that encourage wasteful consumption over the medium term while being conscious of the necessity to provide targeted support for the poorest. To fulfil this commitment, the G-20 developed a voluntary peer review process.

In support of that G-20 commitment, in December 2013, China and the United States stated in the Joint Fact Sheet on Strengthening China-U.S. Economic Relations: “The United States and China commit to undergo peer reviews under the G-20 process and rationalize and phase out inefficient fossil fuel subsidies that encourage wasteful consumption over the medium term, while providing targeted support for the poorest.”

The purpose of the peer review is to: (1) find out the basic situations, differences, and experience of fossil fuel subsidies in various countries, (2) push forward the global momentum to identify and reduce inefficient fossil fuel subsidies, (3) improve the quality of available information about inefficient fossil fuel subsidies, and (4) share lessons and experience of relevant reform.

This document presents terms of reference and a work plan to carry out the peer review.

### ***II. Preparations for the Peer Review (the “self-reporting process”)***

To carry out the peer review efficiently, each country is to determine the extent to which fossil fuel subsidies currently exist in its country. This should be done through a self-report. Several G-20 countries have carried out self-reporting in the past. Each country can determine how it wishes to prepare its self-reporting. One means of carrying this out could be through the use of expert panels. China and the United States may consider establishing expert panels to study and identify issues such as the definition and scope of the inefficient fossil fuel subsidies in their respective countries, to map-out the current status of inefficient fossil fuel subsidies, and put forward policy measures to reform those subsidies. Each country is to also maintain a designated point of contact in the government who is responsible for overseeing the work of the self-report, then overseeing the work of the subsequent peer reviews, and for communicating with the other country.

Expert panels may contain relevant experts, familiar with issues such as macro-economy, energy pricing, fiscal policy, sociology, poverty, and energy statistics. The expert panels may wish to consult with experts from international organizations, including those who may be members of the peer review teams.

Each country may decide if it wishes to seek external input into its self-review. For example, workshops could be organized to review the self-reporting, to reach common understanding on the self-reporting by respective countries, and to improve the policy reports relating to inefficient fossil fuel subsidies, so as to lay the foundation for the voluntary peer review.

In determining what to include in their respective self-reports, the United States and China take note of the studies carried out by international organizations such as the International Monetary Fund, Organization for Economic Cooperation and Development, the Global Subsidy Initiative, and the World Bank. These relevant reports provide references for the United States and China. Based on these expert reports, the most common forms of subsidies include:

1. Direct budgetary support;
2. Tax code provisions;
3. Government provisions of auxiliary goods or services either at no charge or for below-market rates to facilitate fossil fuel use or production; and,
4. Requirements that non-government entities provide particular services to fossil fuel producers at below-market rates, or that require non-government entities to purchase above market quantities of fossil fuels or related services.

The self-reporting and the subsequent peer reviews should focus on national-level subsidies but may also consider state- and municipal-level subsidies.

### ***III. Procedures of the Peer Review***

- **Designating Points of Contact**

The country undergoing a peer review should select a point of contact that is responsible for coordinating the review. The point of contact serves as the interface with the review team. The point of contact may be established as soon as the terms of reference are completed.

- **Setting-up Peer Review Teams**

Relevant experts with experience on the subject of fossil fuel subsidy reform should be selected to carry out the review. As China and the United States have announced their intention to undergo a peer review at the same time, both countries are expected to serve on the review team for the other country, respectively. At the same time, the two countries intend to invite experts from G-20 member countries and from international organizations to join the review teams; G-20 member countries who join the review team should commit to undergo a peer review process. International organizations may invite special unpaid technical experts from other countries (including non-G20 countries) to participate on the review teams, and the title and country of the consultants will be listed.

Additionally, China and the United States commit to consult each other before inviting reviewers for their respective teams. Some overlap on the two review teams would enhance the consistency of the review results.

- **Conducting the review**

The majority of the work is expected to be carried out remotely (e.g., through conference calls, exchange of information by email, etc.). Face-to-face meetings, as needed, can be scheduled. There also should be at least one in-person meeting in each country undergoing the peer review. Any information that is shared should be done so with all the identified reviewers. The peer review teams are expected to use the self-reporting documents as the basis for the review, seeking to understand why and how the various subsidies were identified and for those to be phased out.

- **Scope of review**

The policies and measures that China and the United States have identified in their self-reporting form the basis of the review. The reviewers may inquire about inefficient fossil fuel subsidy issues which are not included in the self-reporting.

- **Finalize a report**

The review team is responsible for writing a report of their work and observations. Each country is expected to concur on the final content prior to release. The reports should, at a minimum:

1. provide a brief summary of the discussions that took place;
2. identify each inefficient fossil fuel subsidy that is being reviewed, per the scope;
3. for those inefficient fossil fuel subsidies that the country has proposed for reform, identify its annual cost and the policy objective of the subsidy;
4. detail the strategies and timeframes for rationalization and phase out of the aforementioned subsidies and describe the current status of the phase-out plan;
5. consider ways to improve transparency in the inefficient fossil fuel subsidies that are discussed;
6. consider any proposed action that could accelerate the reform process in each country; and,
7. recognise any successful recent reform of fossil fuel subsidies and identify lessons learned.

#### ***IV. Arrangement of the Peer Review Process***

- **Preparation**

Each country prepares its self-report as described above, keeping the other country abreast of the process.

- **Organizing the Peer Review**

Designate points of contact. Set up peer review teams. The self-reporting is given to the peer reviewers. Conduct peer reviews.

- **The peer review teams conduct the review and prepare a report**

Peer review teams review the self reporting, seek clarifications, and conduct visits as necessary. Reports are writing by the peer review teams. Each country under-going the review is expected to concur on the final content prior to release. A precondition for releasing the report is that at least one G20 member, in addition to China and the United States commit to undergo a Fossil Fuel Subsidy Peer Review.

[The timeline as of July 2014 is not reproduced here as it is no longer valid.]

## ANNEX 2: GLOSSARY

**City-gate:** A point or measuring station at which a distributing gas utility receives gas from a natural-gas pipeline company or transmission system.

**Coal-bed methane:** Methane found in coal seams that is a source of unconventional natural gas.

**Coal gas:** Also known as town gas. Substitute natural gas produced synthetically by the chemical reduction of coal at a coal gasification facility and supplied to users through a piped distribution system.

**Enhanced oil recovery:** Also known as **tertiary oil recovery**. Enhanced oil recovery (EOR) follows primary recovery (oil produced by the natural pressure in the reservoir) and secondary recovery (using water injection). Various EOR technologies exist, such as steam injection, hydrocarbon injection, underground combustion, and CO<sub>2</sub> flooding.

**Production-sharing contract:** Also known as a production-sharing agreement (PSA). A PSA is an agreement between a company and a host country on the percentage of oil each party will receive after specified costs and expenses have been paid under cost recovery. Under a PSA, the company generally gives the State cash payments in the form of royalties and income tax.

**Tax expenditure:** Tax expenditures describe revenue losses attributable to provisions of tax law that allow a special exclusion, exemption, or deduction from gross income, or which provide a special credit, a preferential rate of tax, or a deferral of tax liability. These exceptions are often viewed as alternatives to other policy instruments, such as spending or regulatory programmes.

**Total primary energy supply:** Equivalent to total primary energy demand. Total primary energy supply (TPES) represents inland demand only and, except for world energy demand, excludes international marine and aviation bunkers.

**White spirit:** A highly refined distillate with a boiling point range of about 150 degrees to 200 degrees Centigrade. It is used as a paint solvent and for dry-cleaning purposes.

*Sources:* US EIA, IEA, OECD, Open Oil, US Treasury.