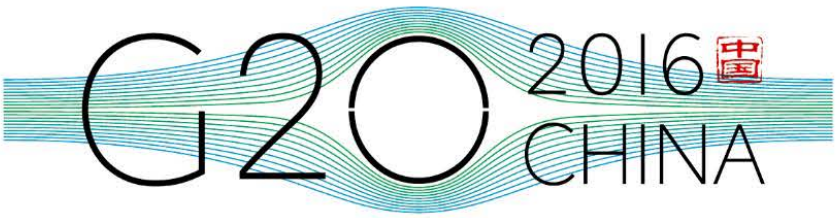

The United States' efforts to phase out and rationalise its inefficient fossil-fuel subsidies

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

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Report prepared by members of the peer-review team: China, Germany, Mexico, and the OECD (Chair of the peer review).

5 September 2016

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ABBREVIATIONS AND ACRONYMS

APEC	Asia-Pacific Economic Cooperation
ARPA-E	Advanced Research Projects Agency-Energy
BOEM	U.S. Bureau of Ocean Energy Management
BLM	Bureau of Land Management
CBO	Congressional Budget Office
CCS	Carbon capture and storage
CRS	Congressional Research Service
DMD	Domestic manufacturing deduction
DOI	U.S. Department of the Interior
EOR	Enhanced oil recovery
EAS	Essential Air Services
EIA	Energy Information Administration
ESWG	Energy Sustainability Working Group
FE	Office of Fossil Energy (DOE)
FERC	Federal Energy Regulatory Commission
FY	Fiscal Year
G&G	Geological and geophysical expenditures
GOA	Government Accountability Office
HTF	Highway Trust Fund
IDC	Intangible drilling costs
IEA	International Energy Agency
IOs	International organisations
IRS	Internal Revenue Service
JCT	Joint Committee on Taxation
LIHEAP	Low-Income Home Energy Assistance Program
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
OECD	Organisation for Economic Co-operation and Development
OMB	Office of Management and Budget
OPEC	Organisation of Petroleum-Exporting Countries
OSLTF	Oil Spill Stability Fund
SPR	Strategic Petroleum Reserve
TPES	Total primary energy supply
USD	United States dollar

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 the United States, those invited participants were (in addition to China): Germany, Mexico, 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 U.S. officials and the review team, but also within the review team itself. After summarising key aspects of the United States' energy landscape, the report addresses each stage of the supply chain for fossil fuels, discussing in detail the subsidies (and other measures) that the United States and the review team have identified in the course of the review process, as per the terms of reference negotiated between the United States and China, and on the basis of the report that the United States produced on its own subsidies (i.e. its self-report).

Throughout the last decade, two trends have characterised the evolving energy landscape in the United States. First, the U.S. has entered a new era of energy abundance, upstaging longstanding concerns relating to energy security. Innovations in extraction technologies (notably horizontal drilling and fracking) have allowed U.S. shale drillers to push domestic crude-oil production to near-record levels while attaining record levels of domestically produced natural gas. Unlike conventional oil and natural-gas production, upfront costs for technologies such as hydraulic fracturing are often lower and project timelines shorter, increasing the share of small and medium-sized involved in primary hydrocarbon production.

Second, the Administration is taking steps to foster the transition towards a cleaner, more energy-efficient economy. To reduce the country's greenhouse-gas emissions, the Federal Government put in place carbon pollution standards for new and modified power plants and the Clean Power Plan to address greenhouse gas emissions from existing power plants. Under the Clean Power Plan, states are required to establish standards of performance for existing power plants to achieve specified emission performance rates (lbs CO_2/MWh) or the equivalent reductions in total emissions (tons of CO_2). States are given the flexibility to develop and implement tailored plans that ensure that the plants in their state achieve the standards, and can use cost-effective, market-based measures including emissions trading with other states. Domestic emissions of CO_2, NO_X and SO_X have, meanwhile, followed a mostly downward trend since 2005. This is largely because coal has become an increasingly unprofitable alternative to natural gas for generating electricity, in large part due to the expansion of shale-gas production that has made natural gas cheaper throughout the country. The Clean Power Plan follows these existing trends in the power sector.

Bearing in mind the above developments, 16 inefficient fossil-fuel subsidies benefitting upstream activities (**exploration, development, and extraction of fossil fuels)** were identified by the United States in its self-assessment. In the present report, those subsidies are grouped according to the branch of government responsible for their reform. U.S. officials have indicated their intention to reform all 16 measures, though in most cases reform can only take place with action by the U.S. Congress. The review team generally agrees with the Government that these upstream measures are likely inefficient and recommends the pursuit of ongoing reform efforts.

The U.S. self-report did not identify any fossil-fuel subsidy for the **bulk transportation of fossil fuels by rail and barges**. It is the understanding of the review team that the costs of constructing, operating and maintaining inland waterways, however, are largely borne by the taxpayer, and while more than half of the volume of freight transported concerns fossil fuels. In principle, dedicated funding could be generated by levying excise taxes on fuel used in the country's inland waterway system, though even with the recent increase of excise taxes on fuel used on inland waterways from USD 0.20 to USD 0.29 per gallon, the system still falls far short of full-cost recovery. It is on these grounds that the review team encourages the Federal Government to reassess the financing structure of inland waterways, in particular the levels of user fees and fuel-excise taxes.

There were no federal subsidies identified by the United States or the review team that currently support the **refining or processing of fossil fuels**. The review team did, however, enquire about previous U.S. trade restriction that prevented domestic producers from exporting crude oil between 1973 and the end of 2015. Some researchers have suggested that the ban may have had a depressing effect on the domestic prices of crude oil supplied to some refineries in the interior of the country.[1] U.S. experts maintain, however, that the ban had no price-depressing effect on crude oil supplied to domestic refineries, and that the low prices seen were the result of other, mainly structural factors. Similarly, the net costs of maintaining and operating the Strategic Petroleum Reserve (SPR), the world's largest emergency reserve of crude oil, is entirely covered by budgetary appropriations, unlike, as is the case in many other countries, by the industry. Because this financing arrangement falls outside of the definition of a subsidy in the terms of reference for the peer review, it was not discussed in-depth.

Discussions between the review team and the United States also revolved around energy pricing more generally, as the spending for the designated purpose of fuel tax revenues consistently runs a deficit. In the United States, petroleum products are sold at a rate well below the OECD average. This is partly because motor fuels, fuels used on inland waterways, and crude oil are all subject to comparatively low excise taxes. In the case of motor fuels, the rationale underlying the level of taxation is that revenues from this tax are channelled into the Highway Trust Fund (HTF), the main purpose of which is to cover the construction and maintenance costs of federal highways. This explains why off-road users in the U.S. are exempt from the excise taxes normally applied to motor fuels. However, the HTF in recent years has been perennially in deficit. The Administration, as a way to remedy this revenue shortfall, and to fund additional investments in U.S. infrastructure, cleaner technologies, and climate-change resilience, has recently proposed to Congress that an additional fee equivalent to USD 10.25 be levied per barrel of crude oil.

The U.S. self-report identified only one **subsidy for fossil fuels used in the residential sector**, namely the Low Income Home Energy Assistance Program (LIHEAP). This measure also was the only subsidy not deemed "inefficient" by the Federal Government and thus not proposed for reform.

The short to medium-term phase-out of "inefficient" subsidies identified in the present report is a necessary step to comply with the target date of 2025 that was declared by G7 members in Ise-Shima, Japan, in May 2016.[2] Since fossil-fuel subsidy reforms hold the prospect of contributing to pollution

1 . See, for example, the paper by Lissy Langer, Daniel Huppmann, and Franziska Holz (February 2016), "Lifting the US Crude Oil Export Ban: A Numerical Partial-Equilibrium Analysis", *DIW Berlin Discussion Paper No. 1548*. Available at SSRN: http://ssrn.com/abstract=2733473 or http://dx.doi.org/10.2139/ssrn.2733473

2 The exact wording of the G7 Ise-Shima Leaders' Declaration, issued at the conclusion of the G7 Ise-Shima Summit (26-27 May 2016) is: "We remain committed to the elimination of inefficient fossil fuel subsidies and encourage all countries to do so by 2025." See: http://www.mofa.go.jp/files/000160266.pdf. Also relevant is the Leaders' Statement on a North American Climate, Clean Energy, and Environment Partnership (https://www.whitehouse.gov/the-press-office/2016/06/29/leaders-statement-north-american-

reduction while removing an important source of price distortions, the Federal Government should continue its efforts to convince citizens of the need for sound policy actions. More information on fossil-fuel subsidies, their effects and beneficiaries would make necessary reforms easier to identify and would result in more efficient policies. In the longer term, price reform should go beyond eliminating the subsidies discussed above, and move towards internalising the environmental damage that arises from the production and consumption of fossil fuels through efficient energy taxation.

climate-clean-energy-and-environment), which stated: "We commit to phase out inefficient fossil fuel subsidies by 2025 and call on the other members of the G-20 to do the same."

INTRODUCTION

Background and context[3]

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 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.[4]

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[5] by the People's Republic of China and the United States of America[6] 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 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, and Vietnam and Chinese Taipei are currently undertaking APEC reviews.

As indicated in the terms of reference prepared by China and the United States[7], 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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3 The section that follows greatly benefitted from discussions with the United States officials and the in-country visit that the peer-review team conducted in Washington D.C. in May 2016. Those were the result of extensive planning and preparation by the Federal Government of the United States, for which the review team is very grateful.

4 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.

5 www.whitehouse.gov/the-press-office/2013/12/05/us-fact-sheet-strengthening-us-china-economic-relations

6 These countries are henceforth denoted as "China" and "the United States" respectively.

7 See Annex 1.

To that purpose, the United States prepared a self-report (henceforth the USR, for "United States 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 representatives from China, Germany, Mexico, and the Organisation for Economic Co-operation and Development (OECD). At the request of China and the United States, the OECD chaired their peer reviews.

The composition of the review team for the United States is as follows:

- Mr. Han Wenke (China, Director General of the Energy Research Institute, National Development and Reform Commission)
- Ms. Song Qiuling (China, Deputy Director General of Economic Construction Department, Ministry of Finance)
- Mr. Su Ming (China, Deputy Director General of the China Academy of Fiscal Sciences)
- Mr. Xu Wen (China, Research Professor of the China Academy of Fiscal Sciences)
- Mr. Feng Shengbo (China, Deputy Director of Energy Research Institute, National Development and Reform Commission)
- Mr. Shi Kelu (China, Officer of Economic Construction Department, Ministry of Finance)
- Mr. Li Yanzhong (China, Officer of International Cooperation Department, National Energy Administration)
- Ms. An Qi (China, Research Associate of Energy Research Institute, National Development and Reform Commission)
- Mr. Shi Wenpo (China, Associate Research Professor of China Academy of Fiscal Sciences)
- Mr. Liang Qi (China, Research Associate of Energy Research Institute, National Development and Reform Commission)
- Mr. Martin Schoepe (Germany, Ministry for Economic Affairs and Energy)
- Mr. Marius Backhaus (Germany, Ministry for Economic Affairs and Energy)
- Mrs. Antje Pflugbeil (Embassy of the Federal Republic of Germany in Washington D.C., United States)
- Mr. Michael Weber (Embassy of the Federal Republic of Germany in Washington D.C., United States)
- Mr. Alejandro Marquinez (Mexico, Ministry of Finance)
- Mr. Eduardo Camero (Mexico, Ministry of Finance)
- Mr. Ronald Steenblik (OECD, Trade and Agriculture Directorate)
- Mr. Jehan Sauvage (OECD, Trade and Agriculture Directorate)
- Ms. 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 transfer 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.

The terms of reference indicate that the focus of the exercise ought to be on national-level policies. The existence of state-level and municipal-level subsidies is, however, acknowledged by the United States.

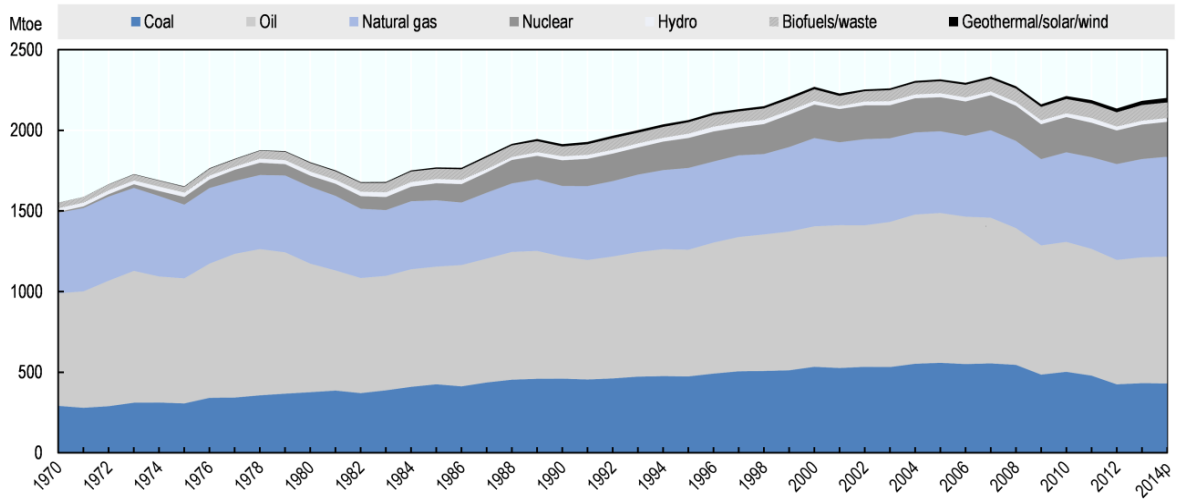
Commodities and products that are to be considered "fossil fuels" for the purpose of the country's peer review under the G20 may include coal (including raw coal, solid fuels, coal gas, and coal-bed methane), petroleum (including crude oil, natural gas liquids, and refined petroleum products), natural 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. by pipeline 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.

Energy resources and market structure

The United States is a leading producer and consumer of energy, possessing large and diverse resource endowments. Although U.S. reserves and production of oil and natural gas declined until recently, production has been boosted by new hydrocarbons discoveries in the Gulf of Mexico and by the development of new technologies allowing the extraction of vast new resources of unconventional oil and gas, notably shale gas and tight oil (see glossary). The United States is essentially self-sufficient in coal, and largely self-sufficient in natural gas. Imports of crude oil, however, have historically been high, though they only accounted for 44% of total supply in 2014, down from 70% in 1984. Overall, fossil fuels make up 84% of the United States' primary energy supply (as of 2014), a relatively large share by OECD standards. The country's fuel mix, dominated by oil (40%), has barely changed over the last decade (Figure 1).

Figure 1. The United States' total primary energy supply (1970-2014)



Note: Data for 2014 are provisional.

Source: IEA.

The United States has a strong tradition of private ownership in energy and generally takes a market-based approach to energy policy. One of the few regulations applying to the energy sector emerged as a result of the 1973 Arab oil embargo: until Congress lifted the ban in December 2015, with a few exceptions producers could not export crude oil (but could still export refined products). The country's reliance on oil imports, together with global excess supply, may, however, impede a material increase in exports in the near term. More generally, the United States' domestic oil market is deregulated and open to competition. Oil extraction is fully in the hands of private enterprises. With the recent development of the country's shale-oil and tight-oil resources, petroleum production has grown significantly on non-federal lands while fluctuating on federal lands, leading to an increase in the share of recoverable oil resources underlying non-federal lands (from 63.6% in 2010 to 78.6% in 2014).

In a similar vein, the United States' coal industry is entirely privately owned, with the four largest coal producers accounting for more than half of the country's total coal production. As with oil, significant deposits lie under federal lands in the west, but are leased to private companies. As of January 2016, the Obama Administration has halted new leases for coal mined from federal lands, but existing leases are still in effect. Most of the coal produced in the United States is used for power generation, where until recently it was the dominant fuel (33% in 2015). New federal regulations imposing more-stringent carbon-emission standards for conventional power-plants, together with a trend towards lower natural-gas prices, are, however, expected to gradually reduce the electricity sector's reliance on coal.

As regards the natural-gas sector, the United States' market is large, competitive, and well-integrated with markets in Canada and Mexico, given its extensive national networks and high-pressure transmission pipelines. Technological advancements in natural-gas extraction methods have substantially increased domestic production over the past years, ultimately resulting in lower prices and a growing interest by foreign markets. Efforts are underway to expand and develop new infrastructure for exporting LNG to Asia, Europe, and elsewhere through liquefaction terminals in the Gulf of Mexico. The industry is largely in private hands with the only public ownership seen in the distribution segment at the local level.

Prices and taxes

In general, all forms of energy that are not directly conveyed from the source to the consumer (e.g. natural gas) are not subject to any federal price controls in the United States. Some states, however, have the authority to implement price ceilings for oil products. Price formation for electricity varies by state, with some oversight by the Federal Energy Regulatory Commission (FERC) and state regulatory commissions, depending on the status of deregulation in the state. FERC regulates the transmission and transportation of electricity and natural gas in interstate commerce.

Taxes on energy are mainly levied by the states and the Federal Government. For fossil-fuel producers, taxable income is subject to the federal corporate tax at a maximum rate of 35% (for corporations earning income in excess of USD 15 million annually). States generally follow the federal approach in determining taxable income, with some variations. Once taxable income is defined, states can levy corporate taxes at different rates, ranging from 0-12%. Although local jurisdictions (counties or municipalities) can also levy taxes, the resulting tax burden is relatively small compared with federal and state income taxes. In addition, several fossil-fuel-producing states apply severance taxes on the removal of non-renewable resources from the ground. The tax base is generally the volume or value of the oil, natural gas, coal, or other natural resource extracted. Severance taxes can make up 72% of total state tax collection, as was the case in Alaska in 2014.

Rules pertaining to the ownership of underground resources in the United States differ from those of other fossil-fuel-producing countries in that private owners often possess the corresponding mineral rights for sub-surface resources. In most other countries, sub-surface mineral resources generally belong to the public, irrespective of whether the land above is privately held. As regards federal lands and federal offshore waters, mineral rights for the production of coal, crude oil, and natural gas are normally subject to a bonus offered by the lessee as part of a competitive bid, annual rental rates and royalties. With the exception of Alaska, the revenues collected from mining companies for mining on federal land are shared on a 50-50 basis between the Federal Government and the state in which the land lies.

Since 1920, the Federal Government has charged a royalty of 12.5 % on oil and gas extracted from federal lands; these rates have not changed since then. Producers of hydrocarbons extracted from off-shore deposits were charged 12.5% until the rate was increased in 2007 to 16.67% before finally reaching the current rate of 18.75% in 2008. Each rate increase was imposed on new leases only. Onshore rates have not changed to reflect technological advances and market conditions (BLM, 2015). Nevertheless, royalties paid by oil and gas companies operating on federal lands continue to be a large non-tax source of revenue for

the Federal Government. The bulk of Federal lands are managed by the U.S. Forest Service and the Bureau of Land Management (BLM), both of which direct their revenues to the U.S. Treasury. In the case of non-federal onshore areas and offshore state waters (waters within 12 nautical miles of the coast), each state determines what royalties, severance taxes, or rents are to be paid.

Nearly all of the United States' 50 states impose a sales tax – i.e., an ad valorem tax on the retail price before tax – on most goods and services purchased by non-commercial consumers, but only 10 of them apply sales tax to motor fuels. However, all states levy excise taxes on motor fuels, at average rates as of 1 April 2016 of USD 0.2088 per gallon (USD 0.055 per litre) of gasoline and USD 0.2021 per gallon (USD 0.053 per litre) of diesel. Many states also levy additional taxes, generally to raise money for environmental contingency funds, such as to clean up oil spills. These taxes averaged a bit under USD 0.09 per gallon (USD 0.023 per litre) for both fuels as of 1 April 2016. At the federal level, excise taxes are levied on highway motor fuels and fuels used in powering commercial cargo vessels navigating on inland or intra-coastal waterways, both of which are not inflation-adjusted, and on aviation fuels used for domestic flights. Federal excise-tax rates on motor fuels have remained unchanged since 1997, at USD 0.184 per gallon (USD 0.0486 per litre) for gasoline, and USD 0.244 per gallon (USD 0.645 per litre) for diesel fuel.

Proceeds from federal excise taxes levied on sales of highway motor fuels in the United States are earmarked for financing road construction and maintenance through the Highway Trust Fund, though revenues collected generally fall short of full cost recovery, except for a small portion that goes to the Leaking Underground Storage Tank (LUST) Trust Fund. The Administration is aware of this shortfall, and has recently proposed to Congress levying an additional fee equivalent to USD 10.25 per barrel (roughly USD 0.25 per gallon of refined fuel, or USD 0.066 per litre) of oil to remedy the situation, and to fund additional investments in U.S. infrastructure, cleaner technologies, and climate change resilience. Excise taxes on fuel used on inland waterways increased, however, in April 2015 from USD 0.20 to USD 0.29 per gallon (USD 0.077 per litre). Environmental taxes also apply at the federal level in the form of a USD 0.08 per-barrel excise tax on crude oil received at a U.S. refinery and on petroleum products entering the United States for consumption, use, or warehousing (increasing to USD 0.09 per barrel in 2017). Proceeds from this tax are directed to the Oil Spill Liability Trust Fund, which serves to cover some of the costs associated with oil spills. Overall, energy is taxed at a relatively low rate in the United States compared with other OECD countries (OECD, 2015b).

Federal fossil-energy research and development

Federal fossil-energy research and development (R&D) are carried out by an eponymous programme (FER&D) from the Department of Energy's (DOE) Office of Fossil Energy (FE). The largest project funded conducts research on carbon capture and storage technologies (*CCS & Power Systems*). Though much smaller in scale, a number of R&D projects are also focussed on fuel supply impact mitigation, some of which have contributed to the original research on the development of technologies allowing for the extraction of unconventional domestic resources, notably shale gas. While the FER&D programme was initiated in 1975, funding for it was increased substantially under the 2009 American Recovery and Reinvestment Act for research on carbon capture and storage.[8] Besides R&D, FE also operates various petroleum reserves, including the Strategic Petroleum Reserve (SPR).

[8] For more information see http://energy.gov/sites/prod/files/2014/03/f8/15_Budget_Brief_0.pdf

General observations

The structure of the U.S. energy market has undergone significant changes over the last five years owing to path-breaking technological advancements in oil and gas extraction, and historically low interest rates. Notably, shale gas and tight oil now occupy a significant share of total oil and gas production, and this share is expected to increase over the coming years. At the same time, growing capacity in natural-gas production, together with increasingly strict emission regulations, have led to plunging prices and production levels for coal, leaving many of the country's largest producers in dire straits.

In contrast with the fast changing energy landscape, fossil-fuel subsidies, and more generally oil and gas taxation in the United States, have proven comparatively stable over the last decade. Since 2010, eleven proposals have been made by the Administration to eliminate fossil-fuel subsidies. All of these proposals were included in the USR and discussed in the present report. For reform to happen Congress must, however, pass enabling legislation; the Administration itself cannot take action on its own to reform these provisions. Congress has not taken action on any of the eleven proposals to date.

In this context, the USR provides a useful starting point for understanding the scope and magnitude of fossil-fuel subsidies in the United States, and charting a course for reform. It serves to inform policy makers and the public about the Administration's position on these measures, though the report concentrates on federal subsidies to hydrocarbons and hard minerals, and hence does not discuss all possible forms of fossil-fuel subsidies. Almost all the subsidies described in the USR are deemed "inefficient" by the Government and are either in the process of, or proposed for reform.

The remainder of this section presents the policies that the United States has described and nominated for reform in the USR, 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 sixteen policies the United States has identified in the USR and the corresponding identification codes. The text boxes below describing individual measures were initially prepared by the United States and their content taken directly from the USR.

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

Except for the Low Income Home Energy Assistance Program (LIHEAP), all fossil-fuel subsidies singled out for review by the United States pertain to the upstream exploration, development, and extraction of hydrocarbons or coal. Total funds disbursed or tax-revenue foregone by the Federal Government under each measure vary substantially, ranging from zero to USD 3 400 million annually. Where subsidies are tied to production or sales levels, however, the corresponding amounts of tax-revenue foregone follow a common trend. Soaring domestic production of fossil fuels has increased revenue foregone considerably since 2010, though this trend was subsequently reversed in mid- 2015. Accordingly, the lower subsidy levels observed in 2015 will only prevail as long as crude-oil prices remain low.

The USR identifies 16 measures currently benefitting upstream fossil-fuel activities in the United States (Table 1); all are deemed "inefficient" by the current Administration on the grounds that their original purpose was found to be outdated or inappropriate. Small or independent producers have, for instance, long been protected and supported by targeted tax breaks as a means to secure the domestic availability of natural resources for energy consumption. In light of the world-wide oil glut, the unprecedented growth of domestic (shale) gas production, and the falling demand for coal, this reasoning is no longer justified. The U.S. shale-gas boom in particular was characterised by low entry and exit barriers

that have created greater opportunities for small and medium-sized enterprises (Stevens, 2012), which have thus been able to adjust rapidly to price swings. This increased price-elasticity of supply, together with an expanding domestic market, no longer justify the provision of support to fossil-fuel producers, including small or independent ones.

Table 1. The 17 policies that the U.S. identified in the US Self Review

Full name of the measure	Measure identifier	Estimated annual fiscal cost USD (millions)
Subsidies for the exploration, development, and extraction of fossil fuels		
Expensing of Intangible Drilling Costs	p-1	1 629
Percentage Depletion for Oil and Natural-Gas Wells	p-2	966
Domestic Manufacturing Deduction for Fossil Fuels	p-3	1 049
Two Year Amortization Period for Geological & Geophysical Expenditures	p-4	288
Percentage Depletion for Hard Mineral Fossil Fuels	p-5	209
Expensing of Exploration and Development Costs for Hard Mineral Fuels	p-6	53
Capital Gains Treatment for Royalties of Coal	p-7	31
Deduction for Tertiary Injectants	p-8	10
Exception to Passive-Loss Limitation for Working Interests in Oil and Natural-Gas Properties	p-9	19
Enhanced Oil Recovery Credit (EOR) Credit	p-10	0
Marginal Wells Credit	p-11	0
Corporate Tax Income Exemption for Fossil-Fuel Publicly Traded Partnerships	p-12	342
Excise Tax Exemption for Crude Oil Derived from Tar Sands	p-13	52
Royalty-Exempt Beneficial Use of Fuels	p-14	39
Royalty-Free Flaring and Venting of Natural Gas	p-15	70
Liability Cap on Natural Resource Damage	p-16	Not calculated
Subsidies for fossil fuels used in the residential sector		
Low-Income Home Energy Assistance Program (LIHEAP)	c-1	3 400

Fossil-fuel subsidies are also often granted in order to avoid producers shutting down operating wells in response to sudden price drops. Hedging producers against market-price volatility, however, reduces incentives to innovate and develop productivity-enhancing technologies. For instance, in the aftermath of the 2014-15 collapse in oil prices, many producers can now operate profitably at much lower crude-oil prices than before (Decker et al., 2016). It is the opinion of the review team that productivity gains may have been even higher in the absence of producer support measures.

The USR identifies three subsidies in relation to capital expenses incurred at the development stage of fossil fuels, all of which provide a benefit to the fossil-fuel industry in the form of deferred tax payments: the expensing of intangible drilling costs (IDCs) (p-1), the expensing of exploration and development costs for hard mineral fuels (p-6), and a two-year amortization period for geological and geophysical expenditures.

In the case of hydrocarbons, at least 70% of the exploration and development costs can be deducted in the year in which they are incurred. This contrasts with the generally applied capitalisation of ordinary operating expenses. Small firms with a limited cash flow operating in the shale-gas industry were major beneficiaries of this provision (Stevens, 2012). The expensing of IDCs constitutes in particular the largest available tax break available to oil producers in the United States. It is estimated that IDCs make up between 60-80% of all drilling costs (CRFB, 2013). Repealing the expensing of IDCs would thus entail substantial fiscal gains.

The United States proposes to repeal both subsidies. As for subsidies p-1–p-13, however, successful reforms depend upon approval from Congress. The review team encourages the United States to pursue its reform efforts and approves the classification of both subsidies as "inefficient".

[p-1] Expensing of Intangible Drilling Costs

Description of the subsidy: Taxpayers may elect to deduct intangible drilling costs (IDCs) in the year the cost is paid or incurred with respect to the development of an oil or natural-gas property located in the United States. For an integrated oil company that has elected to expense IDCs, 30% of the IDCs on productive wells must be capitalized and amortized over a 60-month period.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Oil and natural-gas producers.

Annual cost estimates: USD 1 629 million (*Source:* FY2016 Mid-Session Review).

Duration of the subsidy: Longstanding, but since 1989 in its present form.

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal expensing of intangible drilling costs and 60-month amortization of capitalized intangible drilling costs. Intangible drilling costs would be capitalized as depreciable or depletable property, depending on the nature of the cost incurred, in accordance with the generally applicable rules. The proposal would be effective for costs paid or incurred after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The expensing, rather than capitalization, of IDCs provides a tax preference to the oil and natural-gas industry. This provision, like other oil and natural-gas preferences the Administration proposes to repeal, distorts markets by encouraging more investment in the oil and natural-gas industry than would occur under a neutral tax system. This market distortion is detrimental to long-term energy security and is also inconsistent with the Administration's policy of supporting a clean energy economy, reducing our reliance on oil, and cutting greenhouse-gas emissions. Moreover, the tax subsidy for oil and natural gas must ultimately be financed with taxes that result in underinvestment in other, potentially more productive, areas of the economy. Requiring capitalization of IDCs would place the oil and natural-gas industry on a cost-recovery system similar to that employed by other industries, and reduce economic distortions.

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[1] For all items (except for publicly traded partnerships) for which the U.S. Treasury is the responsible agency, the Treasury calculates the annual cost by projecting the average annual difference in Federal tax revenues between current law and the proposed revision over fiscal years 2016 through 2025, assuming the subsidy is removed effective after 31 December 2015. For publicly traded partnerships, the projection is based on the assumption that the change in tax treatment is effective after 31 December 2020, and the annual cost measures the average annual difference in Federal tax revenues over fiscal years 2021 through 2025.

The annual cost estimates and elimination dates are based on the USR that was submitted to the peer review team in December 2015. Subsequently, the Administration has proposed eliminating these subsidies in the fiscal year 2017 (FY2017) budget, and simultaneously updated the cost estimates and the date of policy enactment on which the cost estimates are based. The most recent estimates may be found in the FY2017 midsession review at https://www.whitehouse.gov/omb/budget/MSR.

[p-6] Expensing of Exploration and Development Costs for Hard Mineral Fuels

Description of the subsidy: Mining companies may elect to deduct 70% of domestic exploration and development costs. The 30% of expenses that cannot be deducted must be capitalized and amortized over a 60-month period. Taxpayers may also elect to capitalize mine exploration and development expenses and amortize them over a 10-year period. If this election is made, the expenses will not be tax preference items under the alternative minimum tax.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Companies that mine hard mineral fuels (lignite, sub-bituminous coal, bituminous coal, or anthracite).

Annual cost estimates: USD 53 million (*Source:* FY2016 Mid-Session Review).

Duration of the subsidy: Longstanding; *since 1990 in its present form*.

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal expensing, 60-month amortization, and 10-year amortization of exploration and development costs relating to coal and other hard mineral fossil fuels. The costs would be capitalized as depreciable or depletable property, depending on the nature of the cost incurred, in accordance with generally applicable rules. The other hard mineral fossil fuels for which expensing, 60-month amortization, and 10-year amortization would not be allowed include lignite and oil shale. The proposal would be effective for costs paid or incurred after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The expensing of exploration and development costs relating to coal and other hard mineral fossil fuels provides a tax preference to these fossil-fuel industries. Capitalization of exploration and development costs relating to coal and other hard mineral fossil fuels would place taxpayers in that industry on a cost recovery system similar to that employed by other industries and reduce economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil fuel tax preferences.)

A number of federal agencies provide publicly available geological information that can be used by fossil-fuel producers. The U.S. Geological Survey may be the most relevant agency in this regard, although the information they provide is predominantly scientific and not primarily focussed on production-relevant data. Where producers wish to gather proprietary information through exploration activities, a *two-year amortization period for geological and geophysical expenditures* (G&G; see glossary) can be granted. Activities that are eligible for this tax provision are those conducted by private, for-profit companies, who typically do not release their findings, which makes it difficult to justify this provision on the basis that it helps provide a public good.

The proposed reform by the Federal Government would increase the amortisation period for geological and geophysical expenditures from two to seven years in the case of independent oil and gas producers, as was already the case prior to the Energy Policy Act 2005.[9] A seven-year recovery period is considered to be roughly consistent, on average, with capitalisation and recovery of G&G expenses through depletion (including those incurred in connection with unsuccessful exploration efforts). The introduction of a standard depreciation period would provide significant administrative savings for both industry and the government. On request by the review team, the United States experts explained that it would neither be feasible nor desirable to expense unsuccessful exploration efforts while amortising successful ones over the life of the income-generating asset (i.e. the field). Reintroducing a depletion system as was used in the past would entail significant administrative costs for all parties involved.

9 The proper depreciation method for most expenditures ("property"), including geological and geophysical expenditures, is described in IRS publication 946.

[p-4] Two Year Amortization Period for Geological & Geophysical Expenditures

Description of the subsidy: Geological and geophysical expenditures incurred by independent producers in connection with domestic oil and natural-gas exploration may be amortized over two years. For integrated oil companies, these costs must be amortized over seven years.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: independent oil and natural-gas producers.

Duration of the subsidy programme: since 2005

Annual cost estimates: USD 288 million (FY2016 Mid-Session Review).

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would increase the amortization period from two to seven years for geological and geophysical expenditures incurred by independent producers in connection with all oil and natural-gas exploration in the United States. Seven year amortization would apply even if the property is abandoned, and any remaining basis of the abandoned property would be recovered over the remainder of the seven year period. The proposal would be effective for amounts paid or incurred after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The accelerated amortization of geological and geophysical expenditures incurred by independent producers provides a tax preference to the oil and natural-gas industry. Increasing the amortization period for geological and geophysical expenditures incurred by independent oil and natural-gas producers from two years to seven years would provide a more accurate reflection of their income and more consistent tax treatment for all oil and natural-gas producers. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

In a similar vein, the production of oil, natural gas, and hard mineral fuels attracts preferential tax treatment through the use of percentage depletion in writing off expenses that are capitalised into the basis of mineral properties (as opposed to depletion on the basis of costs; see glossary). In general, eligibility is limited to non-integrated oil and gas firms regardless of their size, although production levels shall not exceed 1 000 barrels of oil per day, or its natural-gas equivalent. Firms that develop an oil or gas well may take a deduction based on a percentage of their gross income rather than on the capital costs of the project (cost depletion). The latter would place firms on a cost-recovery system similar to that employed in other industries. To the extent that percentage depletion allows independent producers to deduct more than the initial cost of their investment, and given that the allowable deduction is calculated as a fraction of gross income from the property (i.e. the sales the value), percentage depletion effectively amounts to a per-unit output subsidy. Moreover, eligible recipients are required to elect the type of depletion that effectively results in greater financial benefits to them (but at greater fiscal cost to the Government). It is the opinion of the review team that percentage depletion provides an undue advantage to the extraction of fossil fuels in the United States. Reform of this provision is therefore strongly encouraged.

[p-2] Percentage Depletion for Oil and Natural-Gas Wells

Description of the subsidy: Depletion is available to any person having an economic interest in a producing oil and natural-gas property. There are generally two types of depletion – cost and percentage depletion. Cost depletion is limited to the taxpayer's basis in the property, whereas percentage depletion is not limited by the basis, but is subject to other limitations. The percentage depletion deduction is further generally limited to the lesser of 65% of the taxable income before the depletion allowance or 100% of the taxable income from the property before the depletion allowance.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Percentage depletion for producing oil and natural-gas property (15% rate) is available only to independent producers and royalty owners and is limited to average production of 1,000 barrels of oil per day or its natural-gas equivalent.

Duration of the subsidy programme: Longstanding; since 1975 in its present form.

Annual cost estimates: USD 966 million (*Source:* FY2016 Mid-Session Review)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal percentage depletion with respect to oil and natural-gas wells. Taxpayers would be permitted to claim cost depletion on their adjusted basis, if any, in oil and natural-gas wells. The proposal would be effective for taxable years beginning after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

Percentage depletion effectively provides a lower rate of tax with respect to a favoured source of income relative to cost depletion. Cost depletion computed by reference to the taxpayer's basis in the property would place oil and natural-gas producers on a cost-recovery system similar to that employed by other industries and reduce economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

[p-5] Percentage Depletion for Hard Mineral Fossil Fuels

Description of the subsidy: Percentage depletion is available for coal and lignite (10% rate) and oil shale (15% rate). The percentage depletion deduction is generally subject to the alternative minimum tax at a 20% rate to the extent it exceeds the adjusted basis of the property. The deduction may not exceed 50% of the net income from the mineral property in any year.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Companies that mine hard mineral fuels (lignite, sub-bituminous coal, bituminous coal, anthracite, or oil shale).

Duration of the subsidy programme: Longstanding; since 1984 in its present form.

Annual cost estimates: USD 209 million (*Source:* FY2016 Mid-Session Review).

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal percentage depletion with respect to coal and other hard mineral fossil fuels. The other hard mineral fossil fuels for which no percentage depletion would be allowed include lignite and oil shale. Taxpayers would be permitted to claim cost depletion on their adjusted basis, if any, in coal and other hard mineral fossil-fuel properties. The proposal would be effective for taxable years beginning after 31 December 2015.

Implementation of Elimination: The US Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

Percentage depletion, rather than cost depletion, effectively provides a lower rate of tax with respect to a favoured source of income. Cost depletion computed by reference to the taxpayer's basis in the property would place these fossil-fuel industries on a cost-recovery system similar to that employed by other industries and reduce economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil fuel tax preferences.)

Unlike many of the other provisions, the *domestic manufacturing deduction (DMD)* for fossil fuels is a relatively recent support measure that provides an extra deduction for certain activities taking place in the United States, with a view to promoting U.S. manufacturing and related activities. The provision was enacted by the American Jobs Creation Act in 2004, though the Emergency Economic Stabilization Act of 2008 limited the deduction for companies in the oil and gas sector to just 6% of qualifying oil and gas income (compared with 9% for other qualifying activities). Producers are entitled to claim the DMD in combination with other subsidies, for instance the percentage depletion. The United States Government estimates the oil and gas deduction to be only a small fraction of the total DMD that is claimed every year, though the measure ranks second in the USR in fiscal terms. In the discussions with the review team, the United States reaffirmed their commitment to eliminate this subsidy.

[p-3] Domestic Manufacturing Deduction for Fossil Fuels

Description of the subsidy: A deduction is allowed with respect to income attributable to domestic manufacturing and production activities. For taxable years beginning after 2009, the manufacturing deduction is generally equal to 9% of the lesser of qualified production activities income for the taxable year or taxable income for the taxable year, limited to 50% of the W-2 wages of the taxpayer for the taxable year. The deduction for income from oil and natural-gas production activities is computed at a 6% rate.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: This deduction is widely available and not targeted at fossil-fuel industries.

Duration of the subsidy programme: since 2004.

Annual cost estimates: USD 1 049 million (*Source:* FY2016 Mid-Session Review)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would exclude from the definition of domestic production all gross receipts derived from the sale, exchange or other disposition of oil, natural gas or a primary product thereof and of coal, other hard mineral fossil fuels, or a primary product thereof for taxable years beginning after 31 December 2015.

Implementation of Elimination: The US Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The manufacturing deduction, which is available to all taxpayers that generate qualified production activities income, effectively provides a lower rate of tax for income from certain activities, including the production of fossil fuels. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

Another tax break encouraging the production of fossil fuels comes in the form of the *capital-gains treatment for royalties of coal*. Under this tax provision, the coal and lignite royalties collected by private landholders are treated as a capital gain rather than ordinary income, and therefore taxed at a lower rate. The provision was introduced by Congress in 1951 to protect owners of mining rights from income taxes and capital-gains taxes, which then reached an all-time high of 91% for income and 25% for capital gains in order to secure financing funds for the Korean War. Since then, tax rates have fallen to a maximum of 39.6% for income and 23.8% for capital gains, but the provision remains available to eligible coal-mining companies. The review team agrees that this measure likely undermines the conservation of natural resources and welcomes efforts made by the U.S. to reassess the subsidy in today's context.

[p-7] Capital Gains Treatment for Royalties of Coal

Description of the subsidy: Royalties received on the disposition of coal generally qualify for treatment as long-term capital gains. This treatment does not apply unless the taxpayer has been the owner of the mineral in place for at least one year before it is mined. The treatment also does not apply to income realized as a co-adventurer, partner, or principal in the mining of the mineral or to certain related party transactions.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Private landholders.

Duration of the subsidy programme: Longstanding; since 1984 in its present form

Annual cost estimates: USD 31 million (*Source:* FY2016 Mid-Session Review).

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal capital gains treatment of coal and lignite royalties and would tax those royalties as ordinary income for amounts realized in taxable years beginning after 31 December 2015.

Implementation of Elimination: The US Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The capital-gains treatment of coal and lignite royalties provides a tax preference to these fossil-fuel industries. Treating royalties as ordinary income would make oil and gas industry financing more similar to the financing available to other industries and reduce economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil fuel tax preferences.)

Tertiary injectants are increasingly used by producers for the purpose of tertiary, or enhanced oil-recovery methods, which increase the production from old reservoirs by up to 15% through the injection of substances like CO_2 (ARI, 2011).[10] Unlike many of the other provisions, this deduction is available to all taxpayers and not limited to independent oil and gas producers. The review team noted that similar deductions might not be considered "inefficient" by some members of the team, in particular China, as EOR techniques can help increase production efficiency. Discussions revolved around whether views of oil companies with respect to the efficiency of these policies, and the phasing out of them, differ from those of the US Government. The U.S. argued that because tertiary-injection expenses confer multi-year benefits to producers, the costs incurred should not be expensed (deducted entirely in the year in which they are incurred), but capitalised and amortised over multiple years.

[10] Qualified tertiary recovery methods are described in a set of regulations issued in 1979. They include alkaline or caustic flooding, conventional steam drive injection, cyclic steam injection, immiscible gas displacement, in site combustion, micro-emulsion flooding, miscible fluid displacement, polymer augmented water-flooding, and unconventional steam drive injection.

[p-8] Deduction for Tertiary Injectants

Description of the subsidy: Taxpayers engaged in petroleum-extraction activities may generally deduct qualified tertiary injectant expenses incurred while applying a tertiary recovery method to increase the recovery of crude oil.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Taxpayers engaged in petroleum-extraction activities

Duration of the subsidy programme: Longstanding; since 1988 in its present form.

Annual cost estimates: USD 10 million (*Source:* FY2016 Mid-Session Review).

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal the deduction for qualified tertiary-injectant expenses for amounts paid or incurred after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The deduction, rather than capitalization, of tertiary injectants provides a tax preference to the oil and natural-gas industries. Capitalization of tertiary injectants would place the oil and natural-gas industry on a cost-recovery system similar to that employed by other industries and reduces economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

In general, the Federal Government allows investors to deduct only a limited amount of losses from "passive activities", defined by the Internal Revenue Service (IRS) as "any rental activity or any business in which the taxpayer does not materially participate". Working interests in oil and gas wells, however, are an exception to the rule: they are not considered to be passive interests by the tax code. Instead, all net losses incurred in conjunction with well-head production are permitted to be offset against other forms of active income, including wages, interest payments, and capital gains. The review team agrees that this provision gives oil and gas companies a competitive edge over other types of energy companies, and that it ought to be reformed in due course.

[p-9] Exception to Passive-Loss Limitation for Working Interests in Oil and Natural-Gas Properties

Description of the subsidy: Under normal rules, passive losses that remain after being netted against passive income generally can only be carried forward to offset passive income in future years. The exception permits losses from working interests in oil and natural-gas properties to offset active income. The exception is only available if the working interest is owned in a way that does not limit the taxpayer's liability.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Partnerships engaged in eligible oil and gas production activities

Duration of the subsidy programme: Longstanding; since 1996 in its present form.

Annual cost estimates: USD 19 million (*Source:* FY2016 Mid-Session Review)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal the exception from the passive loss rules for working interests in oil and natural-gas properties for taxable years beginning after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The special tax treatment of working interests in oil and natural-gas properties provides a tax preference to the oil and natural-gas industries. Eliminating the working-interest exception would subject oil and natural-gas properties to the same limitations as other activities and reduce economic distortions. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

Besides the *deduction for tertiary injectants*, the application of enhanced oil-recovery techniques further attracts a 15% *tax credit for expenses associated with an EOR* project in the United States. Since EOR costs may overlap with qualified tertiary-injectant expenses or intangible drilling costs, the deductions must be reduced by the amount of EOR credit attributable to such costs. The EOR credit for oil begins to phase out when the IRS-published reference price per barrel of oil exceeds USD 28, adjusted for inflation from the base year 1991, with comparable parameters specified for natural gas. The phase-out is gradual over the range of USD 28 to USD 34 (adjusted for inflation from 1991).[11] As average crude-oil prices were not projected to fall below the upper bound price over the next decade, the annual cost estimate is USD zero in the FY2016 Mid-Session Review. Crude oil and natural gas prices have fallen recently, which raises the possibility that the enhanced oil recovery credit or even the marginal wells credit could at some future point become available. No preliminary assessment could be made by the peer review team regarding the corresponding fiscal impact (if any). The review team welcomes the U.S. proposal to repeal this tax credit and to treat EOR expenses like any other production expenses (so that they would be capitalised and amortised or depleted as appropriate).

[p-10] Enhanced Oil Recovery (EOR) Credit

Description of the subsidy: A 15% credit is provided for expenses associated with an EOR project in the United States. An EOR project is a project that involves the use of one or more tertiary recovery methods to significantly increase the amount of recoverable crude oil. The credit is phased out when the reference price of oil exceeds a statutory amount indexed to inflation.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Participants in an EOR project

Duration of the subsidy programme: Since 1995 in its present form.

Annual cost estimates: USD 0 million (*Source:* FY2016 Mid-Session Review)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal the tax credit for enhanced oil recovery projects beginning after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The credit provides a tax preference to the oil and natural-gas industries. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

11 The inflation factor used to determine the reference price is available here: https://www.irs.gov/irb/2015-26_IRB/ar15.html. The 2016 reference price for oil at which the EOR credit would begin to phase out is around USD 46 per barrel. This is an estimate; readers should consult the IRS for exact reference prices of oil and natural gas.

In a similar way, producers operating a marginal well, defined by the IRS as a well with an average daily production below 3 barrels, are eligible for a tax credit that becomes fully available when the reference price falls below USD 15 per barrel (USD 1.67 per thousand cubic feet of gas).[12] The index price is regularly adjusted for inflation and published by the Internal Revenue Service (IRS). In light of the currently low oil and gas prices, which may lead this credit to become available for a time, current reform efforts are strongly encouraged by the review team.

[p-11] Marginal Wells Credit

Description of the subsidy: A production tax credit is provided for marginal wells or wells that have an average daily production of not more than 3 barrels per day. The credit is phased out when the reference price of oil or gas exceeds a statutory amount indexed to inflation.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients:

Duration of the subsidy programme: since 2004

Annual cost estimates: USD 0 million (*Source:* FY2016 Mid-Session Review).

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal the production tax credit for oil and natural gas from marginal wells for production in taxable years beginning after 31 December 2015.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The credit provides a tax preference to the oil and natural-gas industries. See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.

The USR further lists the *corporate income tax exemption for fossil-fuel publicly traded partnerships* among the subsidies in need of reform. The use of publicly traded partnerships is common in the oil and gas industry, numbering approximately 100 such partnerships in upstream, downstream, and bulk-transportation firms. Given the large losses incurred by those partnerships as a result of current market conditions, profits and thus the value of this subsidy, have witnessed a falling trend.

In response to the review team's question as to why the annual cost estimate is considerably smaller than reported elsewhere (e.g. Koplow, 2013), the United States explained that estimates of reported annual costs often warrant a cautious interpretation. Koplow (2013), for instance, reports tax-expenditure estimates, which do not necessarily equal revenue estimates due to behavioural effects and interactions with other tax provisions. Instead, other sources such as the Joint Committee on Taxation estimated that repealing this exemption would raise even less revenue than projected by the Administration (JCT, 2016a).

The last of the measures for which reform would fall under the responsibility of Congress exempts crude oil derived from tar sands from the excise taxes that would apply under normal rules. The proceeds from excise taxes on crude oil and petroleum products are normally channelled into the Oil Spill Liability Trust Fund (OSLTF). With respect to the applicable definition, a 1980 House committee report stated that "the term crude oil does not include synthetic petroleum, e.g., shale oil, liquids from coal, tar sands, or biomass, or refined oil." The IRS, in charge of collecting excise taxes, hence concluded that crude oil

12 The 2016 reference price at which the Marginal Wells Credit would begin to phase out is around USD 19 per barrel. This is only an estimate; readers should consult the IRS for exact reference prices.

derived from oil sands had to be discharged from this tax – a conclusion that results in tax-revenue foregone of up to USD 52 million annually.[13]

[p-12] Corporate Income Tax Exemption for Fossil-Fuel Publicly Traded Partnerships

Description of the subsidy: Publicly traded partnerships are generally subject to the corporate income tax. Partnerships that derive at least 90 % of their gross income from depletable natural resources, real estate, or commodities are exempt from the corporate income tax. Instead they are taxed as partnerships. They pass through all income, gains, losses, deductions, and credits to their partners, with the partners then being liable for income tax (or benefitting from the losses) on their distributive shares.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients: Publicly traded partnerships.

Duration of the subsidy programme: since 1987.

Annual cost estimates: USD 342 million (*Source:* FY2016 Mid-Session Review)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would repeal the exemption from the corporate income tax for publicly traded partnerships with qualifying income and gains from activities relating to fossil fuels. Such publicly traded partnerships would be taxed as C corporations for taxable years beginning after 31 December 2020.

Implementation of Elimination: The U.S. Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR)

The credit provides a tax preference to the oil and natural-gas industries. (See expensing of intangible drilling costs for further analysis of the effects of fossil-fuel tax preferences.)

To this date, tar sands are primarily (if not solely) imported from Canada. Against this background, the debate about the approval of the Keystone XL pipeline, which would have transported up to 830 000 barrels of oil-sands-derived crude oil to U.S. refineries has taken on new significance, given that a large share of the imported crude oil would be exempt from excise taxes. As revenues collected through the excise taxes serve the purpose of funding the costs associated with oil spills, a question of tax neutrality arises as to oil spills involving tar sands (CRS, 2016). The occurrence of three such pipeline spills (2010 Enbridge Spill in Michigan; 2013 ExxonMobil Spill in Arkansas; 2016 TransCanada spill of its Keystone pipeline in South Dakota) underscores the need for reform of this tax provision. In light of these shortcomings, the review team strongly encourages the envisaged reform of this tax exemption.

[13] In line with the original definition, this tax concession would also apply to tight oil. However, in its Program Manager Technical Assistance (PMTA-2014-10) the IRS concluded that tight oil "is a type of crude oil [and t]herefore, based on the plain language of the Code, tight oil from Bakken that is received at a refinery in the United States or entered into the United States for consumption, use, or warehousing, is taxable under § 4611(a)." In general, while PMTAs cannot constitute a precedent, they indicate the IRS' position for future, similar industry requests (Deloitte, 2015). For more information see https://www.irs.gov/pub/lanoa/PMTA-2014-10.pdf.

[p-13] Excise Tax Exemption for Crude Oil derived from Tar Sands

Description of the subsidy: An excise tax is imposed on: (1) crude oil received at a U.S. refinery; (2) imported petroleum products (including crude oil) entered into the United States for consumption, use, or warehousing; and (3) any domestically produced crude oil that is used (other than on the premises where produced for extracting oil or natural gas) in or exported from the United States if, before such use or exportation, no taxes were imposed on the crude oil. The tax is USD 0.08 per barrel for periods before 1 January 2017, and nine U.S. cents per barrel for periods after 31 December 2016. Crudes such as those that are produced from bituminous deposits as well as kerogen-rich rock are not treated as crude oil or petroleum products for purposes of the tax. The tax is deposited in the Oil Spill Liability Trust Fund to pay costs associated with oil removal and damages resulting from oil spills, as well as to provide annual funding to certain agencies for a wide range of oil pollution prevention and response programmes, including research and development.

Responsible agency: U.S. Department of the Treasury.

Eligible subsidy recipients:

Duration of the subsidy programme: since 2011

Annual cost estimates: USD 52 million (*Source:* FY2016 Budget)

Planned reform timeline: The Administration's Fiscal Year 2016 Budget proposal would extend the excise tax to crudes such as those produced from bituminous deposits as well as kerogen-rich rock for taxable years beginning after 31 December 2015.

Implementation of Elimination: The US Congress must pass enabling legislation for this proposal to become law.

The United States' comments on the policy (from the USR): The exemption provides a tax preference to crude oil derived from tar sands.

In what follows, the report concentrates on those subsidies that were identified by the USR, and which fall under the responsibility of the Department of Interior (DOI). Unlike the measures discussed so far, the reform of the subsidies discussed below is not contingent upon approval by Congress. Within the DOI three agencies manage mineral resources lying on federal territories: the Bureau of Land Management (BLM), the Bureau of Ocean Energy Management (BOEM), and the Bureau of Safety and Environmental Enforcement (BSEE).

The first measure pertains to the *exemption of royalties for the beneficial use of fuels (p-14).* Beneficial uses include the use of fuel in drilling-rig engines, enhanced recovery, and lifting, heating or compressing oil and natural gas. Similarly, for onshore federal oil and natural-gas extraction activities *the venting and flaring of natural-gas* is exempt from royalties (p-15). The DOI notes that operators are already required to report and seek approval for any hydrocarbons that are used for beneficial purposes or are vented or flared. The costs associated with monitoring tax-exempted volumes fall primarily on operators, but do involve some federal costs to monitor and verify operator's submission of data. The administrative burden of monitoring the amounts of gas (or oil) involved would thus be minimal, thereby making the reform process easier.[14]

[14] The Bureau of Land Management has also proposed a rule to update decades-old standards to reduce wasteful venting, flaring, and leaks of natural gas from onshore wells located on Federal and Indian oil and gas leases. The proposed standards would establish requirements and incentives to reduce the waste of gas and clarify when royalties apply to lost gas. This rule is expected to be finalised this year.

Given that methane has a global warming potential 28-36 times that of CO_2 over 100 years (EPA, 2016a), participants of the review discussed during the in-country visits whether penalising venting more than flaring could constitute a more efficient tax design. In general, operators currently flare gas where practicable as a matter of safety and operating standards, even though the official *Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases* (NTL-4A) does not prescribe this preference. For example, operators will flare (and not vent) associated gas from oil wells when not delivered to the market. The BLM's proposed rule would codify that preference for flaring over venting where practicable. This rule is expected to be finalised this year.

The DOI further informed the review team about a recently drafted (12 May 2016) Information Collection Request by the US EPA that requires oil and natural-gas companies to provide extensive information in order to develop regulations that would reduce methane emissions from existing oil and gas sources. In addition, the EPA announced plans to issue a Request for Information to seek information on innovative strategies to "accurately and cost-effectively locate, measure, and mitigate methane emissions" (EPA, 2016b). Finally, estimates of the social cost of methane developed by EPA could potentially be used to design a fee on methane emissions.[15]

In general, requiring flaring rather than venting could be accomplished through regulation but not through royalty policies. As measure p-15 makes clear, vented or flared natural gas is not subject to royalty under current law since it is not transported from or sold from a lease. Additionally, not all offshore facilities have the capability to flare (i.e., flare booms) and some would need to undergo expensive structural reinforcement to handle the load of a flare boom.

[p-14] Royalty-Exempt Beneficial Use of Fuels

Description of the subsidy: Onshore and offshore oil and natural-gas companies may use hydrocarbons for "beneficial purposes" on the lease without paying Federal royalties. These purposes include use as fuel for drilling rig engines, enhanced recovery, and for lifting, heating, or compressing oil and natural gas.

Responsible agency: U.S. Department of the Interior, Bureau of Land Management (BLM)

Eligible subsidy recipients: Lessees

Duration of the subsidy: For the BLM, since 1980 (in its current form – See NTL-4A)

Annual cost estimates: USD 39 million estimated annual average royalty value.[1]

Planned reform timeline: The Bureau of Land Management (BLM) is preparing a Proposed Rule to update the permitting of beneficial use of oil and gas at onshore facilities; this rule is expected to result in beneficial use being consistently applied across onshore production activities. Similar updates could be developed for offshore facilities.

Implementation of Elimination: The proposed rule was published in February 2016, with the final rule scheduled for publication in late2016. The rulemaking is a high priority for the BLM.

The United States' comments on the policy (from the USR)

The United States public foregoes royalty payments on vented and flared volumes.

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15 The EPA is also in the process of finalising a set of standards to reduce methane, volatile organic compounds (VOCs) and toxic air emissions in the oil and natural gas industry. For more information see https://www3.epa.gov/airquality/oilandgas/actions.html

[1]The estimates for Royalty-Exempt Beneficial Use of Fuels and Royalty-Free Flaring and Venting of Natural Gas were calculated by multiplying natural gas data from ONRR (gas consumed for beneficial purposes or approved by the BLM or BSEE) by an average royalty paid per thousand cubic feet (mcf) of gas extracted in individual states for each sales year over 2006-13. The average annual royalty value per mcf was calculated using ONRR's sales volume and royalties paid data on their statistical website. If royalties were charged on these volumes operators of oil and gas wells would have an incentive to reduce the volumes vented and/or flared and, therefore, the values presented here are upper-bound estimates.

[p-15] Royalty-Free Flaring and Venting of Natural Gas

Description of the subsidy: For onshore Federal oil and natural-gas extraction activities, oil and gas companies may vent (release to the atmosphere) or flare (burn) natural gas under a variety of situations, including tests, emergencies, and when it is uneconomical to get the gas to market (for instance due to a lack of infrastructure for storage and transport). Oil and gas companies do not pay Federal royalties on gas that is legally vented or flared. Absent emergencies or special operational considerations, in concept, all natural gas extracted should bear royalties regardless of whether it is sold or vented or flared. For offshore Federal oil and gas extraction activities, the Bureau of Safety and Environmental Enforcement (BSEE) regulations already require that facilities processing more than an average of 2,000 barrels of oil per day must install flare or vent meters. BSEE regulations also require that requests to approve flaring or venting cannot be justified on the basis of the avoidance of lost revenue (i.e. there is no allowance of offshore venting or flaring based on economic grounds).

Responsible agency: U.S. Department of the Interior.

Eligible subsidy recipients: Lessees

Duration of the subsidy programme: For BLM, since 1980 (in its current form – See NTL-4A)

Annual cost estimates: USD 70 million estimated annual average royalty value.

Planned reform timeline: BLM is preparing a Proposed Rule addressing venting and flaring to establish standards to limit the waste of vented and flared on-shore gas, to minimize the amount of venting and flaring that takes place on oil and gas production facilities on Federal and Indian lands, and to establish standards for determining avoidable versus unavoidable losses.

Implementation of Elimination: The proposed rule was published in February 2016, with the final rule scheduled for publication in late 2016. The rulemaking is a high priority for BLM.

The United States' comments on the policy (from the USR)

The United States public foregoes royalty payments on vented and flared volumes.

Last in the producer subsidies identified by the USR is the *Liability Cap on Natural Resource Damages*. Enacted by the Oil Pollution Act of 1990, the measure provides that the party held responsible for an oil-spill covers the costs related to the clean-up only up to a cap of USD 75 million. The remainder of clean-up costs are then covered by the Oil Spill Liability Fund (OSLF), which is itself financed through excise taxes levied on crude oil (as indicated above). Only the Deepwater Horizon oil spill has exceeded this amount to date, though the defendant party, British Petroleum (BP), was ruled to have committed "gross negligence", in which case the provision does not apply. In a reaction to this case and to recommendations made by various researchers, the BOEM increased the limit of liability to USD 134 million in 2014 and indexed the amount to inflation. This change was commended by the team as important for shifting more of the financial burden of cleaning up oil spills onto those responsible for the accidents, thus creating more of an incentive for them to take precautionary measures against such spills.

[p-16] Liability Cap on Natural Resource Damages

Description of the subsidy: The Oil Pollution Act of 1990 (OPA) requires responsible parties to pay oil-spill clean-up costs, with a USD 75 million cap on payouts for private economic and public natural-resource claims (exceptions to the cap include gross negligence). To date no spill apart from the Deepwater Horizon has had damages large enough to exceed the cap, so this provision has not been invoked. In the case of Deepwater Horizon, the courts made a finding of gross negligence on the part of the operator. One of the provisions of the cap is that it shall not apply for damages caused by gross negligence. So even in the case of Deepwater Horizon, the cap did not apply.

Responsible agency: U.S. Bureau of Ocean Energy Management (BOEM).

Eligible subsidy recipients:

Duration of the subsidy programme: since 1990.

Annual cost estimates: Not estimated. To date there have not been any spills for which the liability cap provision has lowered a responsible party's liability for a specific spill.

Planned reform timeline: The liability cap is set by statute and may only be adjusted to address significant increases in the Consumer Price Index (CPI). The Bureau of Ocean Energy Management (BOEM) is authorized to increase the cap to keep pace with inflation. In the future, BOEM will adjust the cap every three years to account for inflation.

Implementation of reform: On 11 December 2014, the Bureau of Ocean Energy Management (BOEM) administratively increased the limit of liability for oil-spill related damages from USD 75 million to approximately USD 134 million for offshore oil and gas facilities. This increase is consistent with recommendations to increase the liability cap from the National Commission on the BP Deepwater Horizon Oil Spill and other studies, and represents the maximum increase allowable under the Oil Pollution Act of 1990. The increase applies to facilities handling oil and gas in Federal and State waters seaward of the coastline. The rule also contains a mechanism to regularly update the limit of liability cap in the future to reflect changes in inflation over time based on the CPI.

The United States' comments on the policy (from the USR): Damages attributable to an oil company in excess of the cap would be borne by the United States public.

Support to the coal-mining industry

Parts of the Appalachian region that were once the heartland of U.S. coal mining are now facing increasing costs and declining demand. Average weekly coal commodity prices of Appalachian coal are well above those of competitive regions, such as the Powder River Basin or the Uinta Basin (EIA, 2015a). A number of mines in the Appalachian region are thus closing or being idled, creating a potential need for social assistance. While much of this type of assistance is provided by the individual states, the Federal Government has at times allocated funds to help unemployed coal miners, as well as providing general, community development assistance through the Appalachian Regional Commission (ARC).[16] For example, in 2012 the U.S. Department of Labor awarded a USD 1.8 million National Emergency Grant (NEG) to WorkForce West Virginia to provide retraining and reemployment services to dislocated coal miners and displaced homemakers affected by mass layoffs and coal mine closures.[17] The grant helped participants find new career paths outside the coal mining industry and long-term reemployment opportunities. Such

16 The ARC is a regional economic development agency established in 1965 through a partnership of federal, state and local authorities.

17 See: http://www.wvcommerce.org/App_Media/assets/doc/businessandworkforce/workforcewv/Miner_Training_Grant_QA_Final_9_24_12.pdf

assistance in line with that provided in the past by countries such as France, Germany, and Poland to manage their declining coal industries.

Upon request by members of Congress, the Energy Information Administration (EIA), an agency whose reports are not subject to review by the rest of Executive Branch of the United States Government, periodically reviews federal subsidies beneficial to energy-sector activities.[18] Against this background, the review team called upon the United States to explain not including in the USR some of the measures that can be found in the latest report on energy subsidies published by the EIA (EIA, 2015b). Detailed answers for all eight measures identified, most of which relate to the coal-mining industry, can be found in Table 2. More generally, the U.S. emphasized that the EIA functions as its own entity and does not necessarily reflect the Administration's position. This discrepancy is, for instance, reflected in the use of a different definition of fossil-fuel subsidies. The U.S. also noted that several of the measures were not included because they have expired.

Table 2. Subsidies identified by the EIA (2015b) that are not listed in the USR, with U.S. response

Subsidies listed by the EIA 2015 report on federal energy subsidies	Comment by the United States
Amortization of Certain Pollution Control Facilities	The law provides that an eligible facility may not significantly increase the output or capacity, extend the useful life, or reduce the total operating costs of the plant or other property. Thus, the provision does not enhance the consumption of fossil fuels. The law also does not provide an advantage to new plants because no new plants that would otherwise require eligible pollution-control facilities are planned.
Credit for Investment in Clean Coal Facilities	Projects that are eligible for remaining unallocated credits must include equipment that separates and sequesters at least 70% of the project's total carbon-dioxide emissions. Thus, this credit does not increase greenhouse-gas emissions from fossil-fuel combustion, and therefore does not constitute an inefficient subsidy. In addition, these allocated credits are capped and no expansion is being proposed.
Energy Production Credit (Refined coal and Indian coal)	The refined coal credit expired at the end of 2011. The Indian coal credit was scheduled to expire, was extended by Congress at the end of 2015 and is now due to expire at the end of 2016.
Exclusion of Special Benefits for Disabled Coal Miners	This is a social programme, not an energy programme.
Partial Expensing for Advanced Mine Safety Equipment	Extended by the PATH Act of 2015. Expires at the end of 2016.
Advanced Energy Manufacturing Facility Investment Tax Credit	This measure supports the manufacture of clean-energy products and therefore does not constitute an inefficient fossil-fuel subsidy.
Mine Rescue Training Credit	Extended by the PATH Act of 2015. Expires at the end of 2016.

[18] See: https://www.eia.gov/analysis/requests/subsidy/.

Subsidies for the extraction of unconventional hydrocarbons

All producer subsidies discussed above equally benefit conventional and unconventional oil and gas sources (e.g. shale gas). However, the DOI has pointed out that more flaring of associated gas occurs from unconventional oil wells where the infrastructure to market gas is lacking. Whether that gas is considered an avoidable or unavoidable loss, and is either royalty bearing or not royalty bearing, is currently determined on a site-specific basis.

2. Subsidies for the bulk transportation of fossil fuels

None of the measures nominated by the United States in the USR pertain specifically to the transportation of fossil fuels by pipeline, rail, ship, barge, or truck. Beneficiaries under "[p-12] Corporate Income Tax Exemption for Fossil-Fuel Publicly Traded Partnerships" and "[p-3] Domestic Manufacturing Deduction for Fossil Fuels" may, however, include businesses engaged in the bulk transportation and refining (or processing) of coal, oil, and natural gas.

Subsidies for the transportation of coal by rail

Data from the U.S. Department of Transportation indicate that fossil fuels (and coal in particular) are among the top commodities transported through rail and internal waterways in the United States.[19] As for railroads, the government has various programmes in place to finance grade separation and adapt the infrastructure to double-sized containers. Since railroads are not the primary mode used in fossil-fuel transportation, and the height of the hopper cars used to transport coal has not increased in many years, these programmes are not considered subsidies in the present report. Neither the U.S. nor the review team are aware of any other subsidies to railroad infrastructure.

Diesel fuel used in rail locomotives is not taxed at the federal level, and it generally not taxed by the individual states, though at least 10 states impose a full or partial sales tax on locomotive fuel.

Subsidies for the transportation of coal by barge

When it comes to the operation of inland waterways, however, the picture is reversed: according to U.S. experts, USD 923 million are spent annually on the operation or maintenance (roughly two-thirds) and construction (one third) of inland waterways. Operation and maintenance costs are fully borne by the U.S. Treasury, whereas construction costs are equally split between the Inland Waterway Trust Fund and the Treasury. As 56% of the volume of freight transported on the inland waterway is accounted for by fossil fuels, the review team argues that responsible parties are not paying their fair share to cover the costs of upgrading and maintaining waterway infrastructure. This revenue shortfall imposes substantial costs on the federal Inland Waterways Trust Fund, the U.S. Treasury and, eventually, the taxpayer. Although the excise tax on fuel used on inland waterways recently increased from USD 0.20 to USD 0.29 and the Administration has requested a USD 1.2 billion user fee over ten years, the system would still fall short of full-cost recovery.

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[19] The Association of American Railroads (AAR) similarly notes that "no single commodity is more important to America's railroads than coal. In 2013, it accounted for almost 40 percent of tonnage, about 21 percent of carloads, and nearly 20 percent of rail revenue for U.S. Class I railroads. Coal is also an important commodity for many non-Class I railroads. Coal accounts for approximately one in five freight railroad jobs." Shale oil from states in the north of the country (e.g. North Dakota) is also increasingly shipped south by rail. See https://www.aar.org/todays-railroads/what-we-haul?t=energyproducts

3. Subsidies for the refining and processing of fossil fuels

U.S. trade restrictions on crude oil

Until December 2015, when the ban was lifted, domestic producers were forbidden to export crude oil — This policy was imposed in the 1970s to prevent the price controls being applied at the time from creating undesirable side effects. The review team inquired whether the ban had the effect of a depressing prices of crude oil supplied to domestic refineries, and the explanation that they received from U.S. experts was that infrastructure and market forces had more of an influence on domestic prices than the export ban. Moreover, the review team was informed that no active policies are currently in place to depress prices for crude oil received by refiners.

The Strategic Petroleum Reserve

The Strategic Petroleum Reserve (SPR) was created in 1975 to provide a secure reserve of petroleum that could be accessed quickly in the event of a major disruption in supply. It has since become the world's largest emergency reserve of crude oil. Most OECD countries use stockpiling in order to meet their IEA obligations relating to energy security. Public provision of stockpiling does not, however, necessarily entail a transfer from taxpayers to the oil industry (OECD, 2015a). In some cases (e.g., France), governments charge the industry a fee to cover the costs associated with running the storage facilities. In others (e.g., the United Kingdom), regulations require that the private sector build and maintain the necessary stockpiles. In the case of the SPR, the U.S. Federal Government has full ownership of all petroleum stocks and facilities, the net operating costs of which are covered by budgetary appropriations.

In their discussion with the review team, U.S. experts explained that the SPR is not viewed by the Government as being inappropriately financed by the general budget. This is because they consider the SPR, and more generally the contribution it makes to energy security, to be a public good. The review team agrees that this specific activity does not necessarily fall under the definition of a subsidy mentioned in the peer review's terms of reference.

4. Subsidies for power and heat generation

Though not discussed in the USR, there continue to exist (at least on paper) numerous tax breaks and forms of government-supported financial assistance that can benefit the construction of new fossil-fuel-fired power plants. These include tax-free bonds[20] (in the case of plants built by municipalities or rural electric co-operatives), and investment incentives provided by state or local governments. However, it became clear during the discussions with the U.S. experts that none of these two types of measures were specific to fossil-fuel plants; tax-free bonds are available to all types of public utilities, regardless of the fuel used; and investment tax credits are not available for fossil-fuel plants but for renewables and a particular kind of carbon credit for carbon sequestration equipment.

5. Subsidies for the industrial use of fossil fuels

Fuel-tax concessions for off-road users

Proceeds from federal fuel-excise taxes in the United States are earmarked mainly for financing road construction and maintenance through the Highway Trust Fund, except for 0.10 cents per gallon dedicated

[20] Bonds, the yields from which are not subject to U.S. federal income tax.

to the LUST Trust Fund.[21] Under such a system, off-road users of fuel, such as farmers, are generally exempted from paying fuel-excise taxes on the grounds that they do not use the roads that the fuel taxes finance. This contrasts with the situation in several other G20 members, where the revenues from fuel taxes are directed toward general government budgets, and are therefore not earmarked for specific purposes such as road construction and maintenance.

Under an alternative baseline, where all uses of motor fuels are taxed in the same way, exemptions from the motor-fuel tax would normally be considered tax expenditures. This alternative baseline implicitly assumes that the motor-fuel excise tax is specifically intended to raise general revenue by increasing the final price of the taxed item, or to reduce environmental and human health related externalities associated with the consumption of the fuel, rather than to reduce the externalities associated with the use of vehicles on highways (i.e. other than congestion costs), or the direct cost of funding the highway system.

While differential fuel-tax rates would in most cases constitute a subsidy, the review team understands that in the case of the U.S. the specific use of these taxes for highway maintenance and construction might justify differences in taxation rates. However, the review team wishes to note that concerns about the solvency of the HTF call into question the the rationale underlying the tax concession, which is that it serves as a user fee. On various occasions, the Congressional Budget Office has found itself constrained to authorise transfers from the General Fund of the U.S. Treasury in order to keep the HTF solvent., Recent estimates are that the cumulative shortfall is expected to grow to USD 108 billion by 2025 (CBO, 2015). At the same time, the OECD has shown that removing fuel-tax concessions benefitting U.S. farmers could result in additional revenues of the order of USD 1 040 million annually (OECD, 2015a). Although revenues of this order of magnitude could not solve the solvency crisis in itself, the review team encourages the U.S. to consider widening the scope of taxes for motor-fuels.

Retail prices for petroleum producers

More generally, reviewers noted that retail prices for petroleum products in the United States tend to be lower than in many OECD countries (OECD, 2015b). As indicated in the overview of the energy market, federal excise taxes apply to motor fuels, fuels used on inland waterways, and on crude oil. Recent reform efforts include a proposal by the Administration to apply a fee of USD 10.25 per barrel of crude-oil equivalent on all crude petroleum and products produced or imported to the United States, to be fully phased in by 1 October 2021; revenue from this tax would be used to fund transport infrastructure used by the oil industry to be gradually phased in over five years.[22] No reform proposals have been filed to increase the excise tax for motor fuels, however. Considering the benefits of higher excise-tax levels in reducing greenhouse gas emissions, the review team urges the U.S. government to reassess and further discuss

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21 There are actually two sets of accounts under the Highway Trust Fund: the Highway Account and the Transit Account. The latter is used to fund public-transit projects. In 2015, about 18.3% of Highway Trust Fund inter-governmental transfers and outlays were channelled through the Transit Account (CBO, 2016).

22 Exported crude oil and petroleum products would not be subject to the fee, and home heating oil would be temporarily exempted from it. The proposed fee was included in the Administration's Budget Proposal, submitted to Congress in February 2016. To date it has not been acted on by Congress, however. Meanwhile, some of the taxes that are currently funding the Highway Trust Fund are scheduled to expire on 30 September 2022.

current tax levels, and consider increasing and expanding excise taxes levied on fuels, particularly motor fuels.[23] The U.S. notes that this would require Congressional action.

6. Subsidies for fossil fuels used in the residential sector

The one subsidy for fuels and electricity used in the residential sector that the United States has identified in the USR (but not for reform) is the *Low-Income Home Energy Assistance Program (LIHEAP)*. The programme, which has been in place for 35 years, is primarily designed to ensure the heating and cooling of homes located in states disproportionally affected by extreme weather conditions. States are also granted the right to operate other types of energy programmes (e.g. trainings to improve energy efficiency). Eligibility criteria are set on a state-by-state basis but must follow guidelines dictated at the federal level.

[c-1] Low-Income Home Energy Assistance Program (LIHEAP)

Description of the subsidy: A discretionary block grant awarded to States, territories, and tribes and tribal organizations to provide home-heating and cooling energy assistance to low-income households. Grantees may use a portion of their LIHEAP funds for low-cost residential weatherization services and for programme administration. Federal guidelines limit eligibility to households with incomes up to 150% of poverty or 60% of State median income. In FY 2012, the average LIHEAP heating benefit (heating and winter crisis benefits combined) was USD 587, representing 63.7% of average home heating expenditures for LIHEAP households.

Responsible agency: U.S. Department of Health and Human Services (HHS).

Eligible subsidy recipients: Households with incomes up to 150% of the official poverty rate, or 60% of State median income.

Duration of the subsidy programme: since 1981

Annual cost estimates: USD 3 400 million in fiscal year 2016.

Planned action: Authorization for this programme expired at the end of 2007, but Congress has continued to provide annual appropriations. The Administration does not propose eliminating this programme, which is targeted to low-income households.

The United States' comments on the policy (from the USR)

LIHEAP assistance is targeted to vulnerable households (those with elderly, disabled or young children) and to the poorest (those with the highest energy burdens relative to their income). These households are targeted as they may face serious health and safety risks if they do not have adequate heating and cooling in their homes. In FY2012, 32% of LIHEAP households that received heating assistance had an elderly member, 35% included a disabled member, and 21% had a child under five years old. The weighted average energy burden among LIHEAP heating recipient households was 12%, compared to 9% among all low-income households.

Leveraged resources: LIHEAP grants to state, tribes, and territories also leverages other energy related resources, such as discounted utility rates, weatherization assistance, telephone discounts, and other private and public resources. During FY2010, these grantees leveraged a total of USD 2.996 billion from their private and public partners.

[23] The terms of reference for the peer review (see Annex 1) mentions "tax code provisions" among "the most common forms of subsidies"; these are understood by the review team to relate at a minimum to tax preferences (such as exemptions or reductions favouring particular users) spelled out in a country's tax code. Whether or not excise taxes that are generally low compared with those in other G20 countries (or some other benchmark) fall outside this definition, they are nevertheless germane to the objective of reducing inefficient fossil-fuel consumption.

Several concerns were raised by the review team in the discussion with the United States. For instance, members of the panel asked about the extent to which the equality of treatment among the beneficiaries of aid in different states could be guaranteed under different eligibility criteria. In this regard, experts from the United States acknowledged the existence of differences among eligible beneficiaries but maintained that the latter were small. The review team was also interested in hearing about the risk of fraud within the programme. In fact, a 2007 investigation by Pennsylvania's state auditor had found serious irregularities in the budget appropriation, providing the basis for a nation-wide analysis on the risk of fraud within the programme. The resulting 2010 report of the Government Accountability Office (GAO) concludes with recommending that protecting measures, such as internal controls, be significantly improved (GAO, 2010). Several changes were implemented in the LIHEAP programme as a result of the GAO investigation to improve the integrity of the programme and prevent fraud.

Besides LIHEAP, 13 other U.S. antipoverty programmes provide benefits to low-income individuals and families.24 These include food programmes (SNAP), housing assistance, job-training programmes and many more. The particular motivation for LIHEAP lies in the view of the US government that energy is considered a necessity. In their discussions with the review team, experts noted that general social assistance would not provide a better alternative for helping low-income households than home energy assistance, as all other programmes also have a specific purpose. Replacing LIHEAP by general assistance would thus coincide with other low-income support programmes and increase the administrative burden.

7. Expired support measures

A number of federal tax provisions supporting the U.S. fossil-fuel industry have expired in recent years. Some may still give rise, however, to positive amounts of support in the form of tax revenue foregone. In many cases, this is because these provisions have allowed the accelerated depreciation or expensing of certain classes of assets, some of which are still being written off today (or would be today if the assets had been depreciated conventionally). Although newly acquired capital assets no longer qualify for these tax provisions, older assets may still attract support through preferential tax treatment. This is the case with measures such as the "Accelerated depreciation of gas distribution pipelines and some refining equipment". Other expired measures still benefit qualifying facilities that were placed in service prior to a set date. This is the case with measures such as the "Refined Coal Credit". Expired support measures fall outside the scope of subsidies defined by the terms of reference as there is no longer any policy to be reformed. However, since some of these subsidies still confer a benefit to qualifying facilities, the review team would like to acknowledge their existence.

8. Sub-national support measures

While a detailed discussion of sub-national support measures is beyond the scope of this report, members of the review team still wish to note that support provided by individual U.S. states exist on both the production and the consumption side. Most support is provided through the corporate income-tax system and increasingly targets the production stage (extraction, transportation or refining) of crude oil (OECD, 2015a). As with the support measures identified by the USR, sub-national fossil-fuel subsidies span a wide range of features of the tax code, and vary from state to state. Examples include accelerated-depreciation allowances for capital expenditures, preferential capital-gains treatment for oil and natural gas produced from less geologically favourable fields, and tax credits for mining coal from thin seams (OECD, 2015a). The effects of these measures is similar to that of the federal measures discussed above — that is

24 These include: a negative income tax, SNAP, housing assistance, SSI, Pell grants, TANF, child nutrition, head start, job training program, WIC, child care, Lifeline and the Medicaid program.

to say, to make the exploration, development or production of fossil fuels more profitable than it would be in the absence of these measures.

On the consumer side, fuels used for home heating and to power machinery used in farming and commercial fishing is often exempted from sales or fuel-excise taxes. The effect of these measures is to reduce the cost of consuming fossil fuels in particular economic activities, relative to other activities.

The United States' broader policy context

Environmental issues occupy a prominent position in the policy agenda of the current Administration. A number of projects were launched under the American Recovery and Reinvestment Act of 2009 to support the dissemination of clean-energy technologies while stimulating economic growth (e.g., investment in smart grids). Further actions taken by the Government included the advancement of international commitments to upgrade carbon-free sources of electricity[25]; the development of regulations to limit methane emissions from oil and gas wells (EPA, 2016b); and the establishment of emission performance rates for existing fossil fuel-fired power plants through the Clean Power Plan (CPP).

The Clean Power Plan (CPP), which was unveiled by President Obama on 3 August 2015 and promulgated by the EPA, is directed at the country's largest source of carbon pollution, namely the power sector (31% of national CO_2 emissions in 2013). Under the Clean Power Plan, states are required to establish standards of performance for existing power plants to achieve specified emission performance rates (lbs CO_2/MWh) or the equivalent reductions in total emissions (tons of CO_2). States are given the flexibility to develop and implement tailored plans that ensure that the plants in their state achieve the standards, and can use cost-effective, market-based measures including emissions trading with other states. Domestic emissions of CO_2, NO_X and SO_X have, meanwhile, followed a mostly downward trend since 2005. This is largely because coal has become an increasingly unprofitable alternative to natural gas for generating electricity, in large part due to the expansion of shale-gas production, which has made natural gas cheaper throughout the country. The Clean Power Plan thus follows these existing trends in the power sector.

The CPP regulations were promulgated under the Clean Air Act, and require states to establish standards of performance for existing fossil fuel-fired power plants to achieve specified emission performance rates (lbs CO2/MWh) or the equivalent reductions in total emissions (tons of CO_2). States are then required to develop plans on how to achieve the goals that were set. States are free to choose how they can reduce their emissions, though they must submit credible emission-reduction plans by September 2016, or, with an extension approval, by September 2018. In the event that a state fails to submit an acceptable strategy, the EPA will implement a federal plan for the sources in that state.[26]

The CPP is but one of a large number of initiatives pushed forward by the current Administration to address emissions that contribute to climate change. In recent years it has also promulgated more stringent fuel-economy standards for automobiles and trucks, and invested heavily in improving the energy-efficiency of buildings, including buildings managed by government departments. The Advanced Research Projects Agency-Energy (ARPA-E) has since 2009 funded over 400 potentially transformational energy

25 For instance, on 29 June 2016, the United States, Mexico and Canada pledged 50% clean power by 2025.

26 However, in February 2016 the U.S. Supreme Court granted a stay of the rule pending judicial review. The decision was made after a request by a coalition of 27 states and other groups had been filed, arguing that the CPP exceeds the EPA's regulatory authority. US experts note that the Court's decision was not on the merits of the rule, and the Administration believes the CPP will be upheld when the merits are considered because the rule rests on a strong technical and legal foundation. States have no legal obligations under the CPP while the stay is in effect.

technology projects, mainly related to alternative fuels, energy efficiency, energy storage, smart grids, and solar energy.[27]

Together with the abovementioned initiatives, the reform of fossil-fuel subsidies constitutes a central instrument of the country's broader strategy to mitigate climate change. Despite a growing reliance on natural gas, most of the United States' energy consumption still comes from oil and coal, the combustion of which poses the greatest threat to the climate, and to human health. Although fossil fuels will continue to play an important role in the U.S. economy in the short- to medium-term, the reform of subsidies targeted at their production and consumption would help improve the efficiency with which fossil fuels are used in the power sector, transport, buildings and manufacturing.

By raising federal revenues, the reform of fossil-fuel subsidies also allows for more flexibility in readjusting other distortive taxes, such as those on corporate or individual income. From a purely economic point of view, the distortionary effect of taxes rises disproportionately with the tax rate applied. The economic literature has thus argued for low rates and broad bases in taxation while eliminating targeted tax relief (OECD, 2010). In line with these recommendations, fossil-fuel reform hence constitutes a fiscally sound policy that has the potential to reduce tax-system distortions affecting work, investment or consumption decisions.

Communicating progress on reform

The United States stands as a rare example when it comes to the reporting of fossil-fuel subsidies, and of budgetary transfers and tax expenditures more generally. In the aftermath of the Congressional Budget Act of 1974, the Office of Management and Budget (OMB), an executive body responsible for preparing the budget of the US Federal Government, started to produce detailed reports of U.S. federal tax expenditures on an annual basis. Estimates prepared by the OMB cover a substantive range of subsidies, though they are dismissive of indirect taxes on motor fuels and the majority of tax expenditures at the sub-national level. The latter can, however, be found in specific tax-expenditure reports produced by the states themselves.

Estimates from the OMB are usually complemented with measures identified by the Joint Committee on Taxation (JCT) of the US Congress. Upon request (e.g. by the U.S. Congress), the EIA also reviews federal subsidies beneficial to energy-sector activities, including budgetary transfers and tax expenditures.[28] In-depth reviews of selected US federal tax expenditures and a thorough analysis of contextual policies are sometimes produced by the Government Accountability Office (GAO) and the Congressional Research Service (CRS).

Following 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 formally committed to engage in a self-reporting process, through submissions to the G20 Energy Sustainability Working Group (ESWG).

Although these initiatives have raised awareness of fossil-fuel subsidies, the peer-review process that China and the United States agreed to undertake marks an important step in the direction of greater transparency. The terms of reference adopted in the context of the peer review have helped consolidate a common understanding of what is to be considered a fossil-fuel subsidy. It is on these grounds that both

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27 For more detail see https://www.whitehouse.gov/energy/climate-change.

28 See: https://www.eia.gov/analysis/requests/subsidy/.

China and the United States were able to submit their self-reports in December 2015, which served as a foundation for the present report.

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 USR – the peer review itself contributes to increasing transparency on fossil-fuel subsidies. The exchange it fosters should also help establish a convergence of views of what ought to be considered an "inefficient subsidy" under the G20 commitment.

To improve further the existing reporting process, the review team:

- Encourages the individual states to provide at least the same degree of transparency and the same amount of information than currently applies to federal measures.

- Encourages research be undertaken, where data permit (and without breaching taxpayer confidentiality, e.g. by providing information in a grouped manner) on the beneficiaries of fossil-fuel subsidies in the United States.

- Improve the data and understanding of the environmental impacts that fossil-fuel subsidies have in the United States, both in terms of GHG emissions and local environmental and human health damages resulting from the exploration, extraction and use of fossil fuels.

- Encourages further research into possible support to fossil-fuels not identified in the course of the review, such as preferential loan-guarantees, investment incentives, and regulations favouring fossil-fuel producers or fossil-fuel-based power generators.

Enabling subsidy reform

When attempting fossil-fuel subsidy reform, governments are often concerned more with managing the impact of the reform than with the implementation process itself. Not so in the case of the United States, where proposed fossil-fuel subsidy reforms are generally blocked when they reach the legislature. Unlike many other countries envisaging similar reforms, the power to legislate in the United States is not vested in one party but resides with Congress. A result of this system is that political processes can only happen if a sufficient number of citizens are informed about the case for reform and are motivated enough to express their views to their representatives in Congress. However, most of the measures that have been proposed by the Administration for reform since 2010 relate to fossil fuel production, and therefore are complex or obscure to the average citizen — in contrast with the consumption subsidies that governments are trying to reform in other parts of the world.

For the United States, it is therefore crucial to adopt a bottom-up approach in order to inform and, most importantly, to convince constituencies of the need to reform before the actual reform is proposed to Congress. To build support, an effective communication strategy must be put into place, which emphasises the potential benefits of subsidy reform, such as the scope to reallocate some of the savings to other priorities (e.g. infrastructure and education). Depending on political sensitivities, the reform of fossil-fuel subsidies can also be conveyed as a means to achieve other, more socially beneficial objectives. Voters are mobilised when the ultimate goal of a reform tangibly improves their life (GSI, 2013); maintain the general fiscal or environmental argument alone is often not a sufficient condition for a successful reform processes.

The review team understands that the reform authority of the Federal Government is limited without congressional approval, but recommends that additional efforts be dedicated to convince constituencies of the need to reform those subsidies that are deemed "inefficient" in the present report. Two factors in particular contribute to making this the right time for reform: first, energy security no longer justifies producer support since the United States has considerably increased its domestic production capacity; and

second, urgent policy-action is needed to mitigate GHG emissions. Since the United States has already proposed to set a target date of 2025 for the phasing out of inefficient FFS by G20 countries, which was since endorsed by G7 Leaders in their May 2016 Declaration at Ise-Shima, Japan, the review team sees much merit in taking the necessary steps to successfully achieve the targeted objectives as soon as possible.

Addressing externalities

While this review focuses on direct, inefficient fossil fuel subsidies, in a broader sense the reform of fossil fuel policy could go beyond eliminating subsidies and address environmental externalities that arise from the production and consumption of fossil fuels, including through efficient pricing (or "corrective taxation"). The combustion of fossil fuels in particular imposes large external costs, most importantly in the form of local pollution and global warming, though these costs are difficult to measure precisely (National Research Council, 2010; Parry et al., 2014).

The United States has, for many decades, gradually tightened controls on emissions from fossil-fuel-fired power plants and industrial facilities, and also on emissions from vehicles. Various regulations have been (or are planned to be) introduced, including those that would reduce coal consumption, encourage energy-efficiency, promote the use of non-fossil-fuel energy, and promote the use of advanced technologies to conserve energy and reduce emissions. It has also funded research into these various technical solutions.

While all these policies can help reduce fossil-fuel consumption and environmental damage, their effects on efficiency 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. Co-ordinating regulations and taxation around carbon prices would send a clearer signal to all economic actors and help establish an effective price system. In terms of cost-effectiveness, taxes and trading systems outperform other policy instruments, such as non-market based policies or tax credits for renewable energy, which often entail higher costs to society per tonne of CO_2 abated (OECD, 2013).

Meanwhile, largely as a result of its use of fossil fuels, the United States still counts as one of the largest emitters of greenhouse-gas emissions in the world. And conventional pollutants released during combustion still impose costs on property, the natural environment, and human health. A 2009 study by the National Research Council[29], for example, estimated that the (primarily) health damages from air pollution associated with electricity generation and motor vehicle transportation alone was on the order of USD 120 billion in 2005. And that figure does not include damages to the climate, harm to ecosystems, effects of some air pollutants such as mercury, and risks to national security (which the report examines but does not monetise).

One way to reduce these damages would be to levy environmental taxes on fossil fuels. If they were properly targeted, such taxes could strike an 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 the use of energy-consuming products).

Taxing fuels to reduce air pollution and carbon emissions would be a far more efficient approach to addressing the environmental externalities from fossil-fuel consumption, compared with the regulatory approaches which currently dominate the policy mix (OECD, 2012). A greater emphasis on energy

[29] *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*; Available from http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12794

taxation could thus help to achieve environmental objectives at much lower economic cost and to meet the carbon emission reduction pledge that the United States submitted under the 2015 Paris Agreement.

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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 fulfill 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

Depletion: The using up of natural resources by mining, drilling, quarrying stone, or cutting timber. The depletion deduction allows an owner or operator to account for the reduction of a product's reserves.

***Cost depletion*:** Expenses that are capitalised into the basis of mineral properties are recovered (i.e. deducted) over time as resources are extracted from the wells or mines.

***Percentage depletion*:** A certain percentage, specified for each mineral, is multiplied by the producer's gross income from the property during the tax year and deducted.

Enhanced oil recovery (EOR): 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_2 flooding.

Flaring or venting of natural gas

> ***Flaring:*** Gas disposed of by burning in flares usually at the production sites or at gas processing plants.
>
> ***Venting:*** Gas released into the air on the production site or at processing plants.

Geological and geophysical expenditures: Costs incurred by the taxpayer to obtain data for the acquisition of mineral properties.

Intangible drilling costs: Costs related to drilling and necessary for the preparation of wells for production that have no salvageable value. These include costs for wages, fuel, supplies, repairs, survey work, and ground clearing. They compose roughly 60% to 80 % of total drilling costs. Intangible drilling costs are one of the largest tax breaks available specifically to oil companies, allowing companies to deduct most of the costs of drilling new wells in the United States.

Liability Cap: Agreement (usually contained within the engagement letter) which limits the amount for which a professional may be sued by his client in the event of any negligence or breach of contract.

Marginal Wells: Oil or gas wells nearing the end of their economically useful life.

Oil Spill Liability Trust Fund: The Oil Spill Liability Trust Fund (OSLTF) provides an immediate source of federal funding to respond to oil spills in a timely manner.

Passive loss: Loss from passive activities that exceeds the income from passive activities. Passive activities include trade or business activities in which the producer does not materially participate, i.e. if the producer is not involved in the operation of the activity on a regular, continuous, and substantial basis.

Publicly traded partnerships: Partnership, any interest in which is regularly traded on an established securities market.

Qualified tertiary injectant expenses: Any cost paid or incurred (whether or not chargeable to capital account) for any tertiary injectant (other than a hydrocarbon injectant which is recoverable) which is used as a part of an enhanced recovery method. (26 U.S. Code § 1930)

Royalty: Landowner's entitlement to part of the total revenue produced. A royalty is agreed upon as a percentage of the lease, minus what was reasonably used in the Lessee's production costs. The royalty is paid by the Lessee to the owner of the mineral rights, the Lessor in the Lease.

Shale gas and oil: A type of unconventional oil found in shale formations (shale rock and other low permeability rock formations), extracted through the development of horizontal drilling techniques and hydraulic fracturing used in shale rock and other low permeability rock. Shale formations are only a subset of all low permeability tight formations, which include sandstones and carbonates, as well as shales, as sources of tight oil production.

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.

Tar sands: A combination of clay, sand, water, and bitumen, a heavy, black, viscous oil (also referred to as oil sands). Tar sands can be mined and processed to extract the oil-rich bitumen, which is then refined into oil. Tar sands are mined and processed to generate oil similar to oil pumped from conventional oil wells, but the extraction of oil from tar sands is more complex than conventional oil recovery.

Tight oil: Oil or natural-gas liquids contained in very low permeability rock. See *shale gas and oil*.

Sources: CRFB, US EIA, IEA, IRS, OECD, Open Oil, US Treasury.