

Mexico's efforts to phase out and rationalise its fossil-fuel subsidies

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



Prepared by the members of the peer-review team: China, Germany, Indonesia, Italy, New Zealand, the United States, and the OECD (Chair of the peer-review).

15 November 2017

ACRONYMS AND ABBREVIATIONS

APEC	Asia-Pacific Economic Cooperation
ASEA	<i>Agencia de Seguridad, Energía y Ambiente</i> (National Agency for Safety, Energy and Environment of Mexico)
Bcf/d	billion cubic feet per day
CENACE	<i>Centro Nacional de Control de Energía</i> (National Center for Energy Control)
CFE	<i>Comisión Federal de Electricidad</i> (Federal Electricity Commission)
CNH	<i>Comisión Nacional de Hidrocarburos</i> (National Hydrocarbons Commission)
CRE	<i>Comisión Reguladora de Energía</i> (Regulatory Commission of Energy)
EIA	U.S. Energy Information Administration
ESWG	G20 Energy Sustainability Working Group
EUR	euro
G20	Group of Twenty economies
GDP	gross domestic product
GW	gigawatts
GWh	gigawatt hour
ICAO	International Civil Aviation Organisation
IDC	intangible drilling costs
IEA	International Energy Agency
KMZ	Ku-Maloob-Zaap production field
kWh	Kilowatt hours
LNG	liquefied natural gas
LPG	liquefied petroleum gas
mbd	millions of barrels (of 42 U.S gallons or 159 litres) per day
MICARE	Minera Carbonifera Escondido
MIMOSA	Minera Monclova
Mt	million tonnes
MSR	Mexico self-report
MWh	megawatt hour
MXN	Mexican peso
OECD	Organisation for Economic Co-operation and Development
PEMEX	<i>Petróleos Mexicanos</i> (Mexican Petroleums)
PIE	<i>Productores Independientes de Energía</i> (Independent Power Producers)
SAGARPA	<i>Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación</i> (Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food)
SHCP	<i>Secretaría de Hacienda y Crédito Público</i> (Mexican Secretariat of Finance and Public Credit)
SENER	<i>Secretaría de Energía</i> (Secretariat of Energy)
Tcf	trillion (10 ¹²) cubic feet

tCO₂	tonne of carbon dioxide
TPES	total primary energy supply
USD	United States dollar
VAT	value-added tax

EXECUTIVE SUMMARY

Germany and Mexico announced in 2016 that they would undertake a reciprocal peer review of their fossil-fuel subsidies under the auspices of the G20. With China and the United States setting the precedent for these peer reviews as the first countries to participate in such an undertaking, Germany and Mexico are the second pair of countries to follow suit. The two countries negotiated terms of reference in the months that followed their decision, and proceeded to invite other countries and international organisations to take part in the review. In the case of Mexico, those invited participants were (in addition to Germany): China, Italy, Indonesia, New Zealand, the United States, 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 Mexican officials and the review team, but also within the review team itself. After summarising the key aspects of Mexico's energy landscape, the report discusses the ongoing reforms of transport fuel pricing. It also describes the subsidies (and other measures) that Mexico and the review team have identified in the course of the review process, as per the terms of reference agreed between Germany and Mexico (Annex 1), and on the basis of the report that Mexico produced on its own subsidies (i.e. its self-report, or MSR).

The review team unanimously praises the remarkable accomplishment of the Mexican government in carrying through with its reform of its petroleum-fuel pricing and taxation. After nearly a decade of heavily subsidising the end-user prices of gasoline, diesel and LPG, Mexico started a gradual reduction of net subsidies in 2013, and eventually succeeded in levying positive net taxes in 2015. Market liberalisation features heavily in the ongoing reform. As a result of administrative decisions, the prices for gasoline and diesel in 2016 were held within a band of +/- 3% of the 2015 price. However, on 1 January 2017 the regulation allowed the maximum price for gasoline to rise by as much as 20%. Moreover, starting in 2017, regions whose gasoline and diesel markets are identified as sufficiently competitive are allowed to fully liberalise the prices of these fuels. The market for liquefied petroleum gas (LPG) has already been fully opened to competition from the beginning of 2017.

The review team also noted the recent introduction of the carbon tax, which is now the only tax, apart from value-added tax (VAT), applied to fuel use outside of road transport. However, its rates are substantially below those originally proposed in 2013, and the weight-averaged enacted rates remain well below the lower-end estimates of the social cost of carbon. The rates also do not reflect the different fuels' respective carbon contents, as coal has been taxed at much lower rates than other fuels, and natural gas has been fully exempted from the carbon tax.

Contrary to developments in the market for transport fuels, electricity prices for the residential sector and agricultural users remain well below the average cost of supplying the electricity, with net subsidies amounting to USD 3.8 billion in 2015. Mexican authorities classify electricity subsidies as a different, although indirectly linked, issue from fossil-fuel subsidies. However, the panel was of the view that, as would be the case of subsidising the output of any energy-intensive process (e.g., steel-making), electricity subsidies are likely indirectly contributing to an increased final consumption of fossil fuels. The review team thus encourages Mexico to consider the impact of its current support for electricity consumption on the demand for natural gas, petroleum products and coal.

Finally, the Mexican self-report identifies five other measures, classified as tax-exemptions or tax-differentiation, which provide fiscal incentives to fossil fuels' consumers and producers. These include, among other measures: reduced energy excise tax for fishers and farmers, and carbon tax exemptions and reductions.

Mexico does not consider these policy tools as subsidies, arguing that no price set above the full marginal cost of supplying the fuel to the end user could represent an inefficiency-inducing subsidy. Despite the particular definition of an "inefficient subsidy" as proposed in the Mexican self-report, the peer review team noted that the term as used by many G20 members could include tax-exemptions and tax-differentiations on fossil fuels. Although Mexico's effort to include these measures in the report for the sake of transparency is commendable, the country is also encouraged to consider reviewing its fuel-tax concessions, recognising that these measures could be leading to more consumption and pollution than would have otherwise been the case, perhaps causing other distortions.

The review team agreed that public health and environmental externalities, such as particulate pollution, arising from fossil fuel consumption and production should be considered when determining the coverage and extent of tax reductions and exemptions. Similarly, the review team encourages the Mexican authorities to include in its ongoing domestic considerations on the reform of electricity subsidies the effects that such reforms have on the use of fossil fuels for electricity generation.

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Introduction

Background and context

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.

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 by the People’s Republic of China and the United States of America¹ that the two countries would undertake a reciprocal peer review of their fossil-fuel subsidies under the G20 process. Other countries — Germany, Mexico, Indonesia, and Italy — have since joined China and the United States in agreeing to undertake peer reviews of their own subsidies under the G20. A similar exercise is taking place in the context of APEC, with Peru, New Zealand, the Philippines and Chinese Taipei each having already undergone a peer review of their subsidies in, respectively, 2014, 2015, 2016 and 2017. The review of Viet Nam is expected to be completed in 2017.

As indicated in the terms of reference prepared by Germany and Mexico², the purpose of G20 peer reviews is to:

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

To that purpose, Mexico has prepared a self-report (henceforth the MSR, for “Mexico 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 November 2016. This review team comprised the representatives from different countries and international organisations that Mexico invited to participate in its peer review under the G20, namely China, Germany, Indonesia, Italy, New Zealand, the United States, and the Organisation for Economic Co-operation and Development (OECD). At the request of Mexico and the Germany, the OECD chaired their peer reviews.

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1. These countries are henceforth denoted as “China” and “the United States” respectively.
 2. See Annex 1.

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

- Mr. Han Wenke (China, National Development and Reform Commission)
- Mr. Feng Shengbo (China, National Development and Reform Commission)
- Ms. An Qi (China, National Development and Reform Commission)
- Mr. Xu Wen (China, Ministry of Finance)
- Mr. Shi Wenpo (China, Ministry of Finance)
- Mr. Hans-Borchard Kahmann (Germany, Federal Ministry of Finance)
- Mr. Philip Langenhan (Germany, Federal Ministry of Finance)
- Mr. Marius Backhaus (Germany, Federal Ministry for Economic Affairs and Energy)
- Mr. Martin Schöpe (Germany, Federal Ministry for Economic Affairs and Energy)
- Ms. Karin Franzen (Germany, Gesellschaft für Internationale Zusammenarbeit; observer on behalf of the Secretariat of the German-Mexican Energy Partnership)
- Mr. Rofyanto Kurniawan (Indonesia, Ministry of Finance)
- Ms. Zulvia Dwi Kurnaini (Indonesia, Ministry of Finance)
- Mr. Gionata Castaldi (Italy, Ministry of the Environment)
- Mr. Wolfgang D'Innocenzo (Italy, Ministry of Economic Development)
- Mr. David Buckrell (New Zealand, Ministry of Business, Innovation and Employment)
- Ms. Jessica Isaacs (United States, U.S. Treasury)
- Mr. David Gottfried (United States, U.S. Treasury)
- Ms. Assia Elgouacem (OECD, Trade and Agriculture Directorate)
- Ms. Aleksandra Paciorek (OECD, Trade and Agriculture Directorate)
- Mr. Ronald Steenblik (OECD, Trade and Agriculture Directorate): Chair

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 Germany and the Mexico specify that the most common forms of subsidies include:

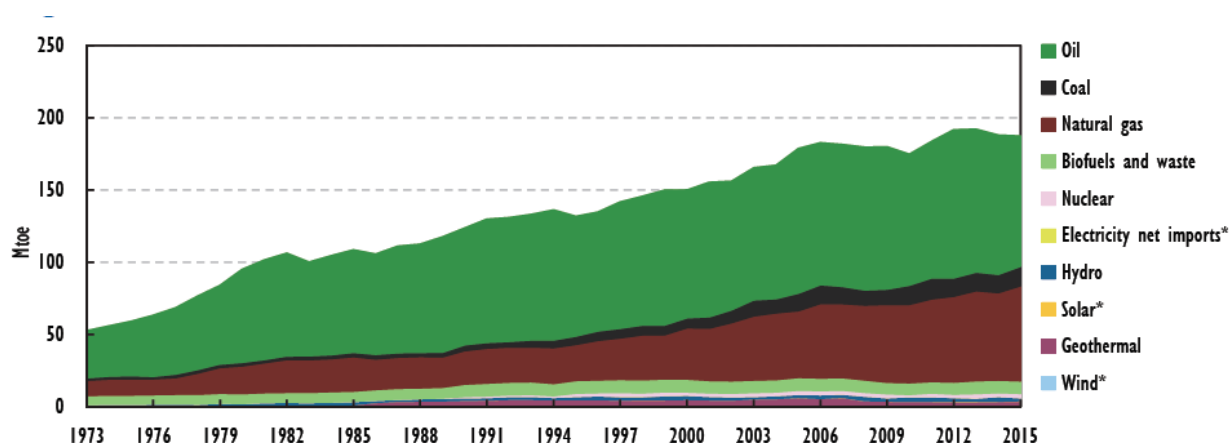
- direct budgetary support;
- tax-code provisions;
- government provision either at no charge or for below-market rates of auxiliary goods or services that facilitate fossil-fuel use or production; and
- requirements that non-government entities provide particular services to fossil-fuel producers at below-market rates, or that require non-government entities to purchase above-market quantities of fossil fuels or related services.

An overview of Mexico's energy sector: resources, market structure, prices and taxes

Energy resources and market structure

Fossil fuels largely dominate Mexico's energy mix. Oil accounts for around a half (51%), and natural gas for a further third (33%) of the country's total primary energy supply (TPES).³ The remaining part is provided by coal (6%), followed by renewables (5%) and biofuels (4%), with a single nuclear plant contributing 1% of energy (Figure 1). In recent years the share of oil in Mexico's TPES has been steadily declining, while that of natural gas has been growing rapidly. After a sharp decline, coal mine production has been increasing since 2010, reaching an output of 15.3 million tonnes in 2015. Mexico exports more than a quarter of the energy it produces, and imports around 40% of the energy it consumes (IEA, 2017c).

Figure 1. Mexico's total primary energy supply, 1973-2015



Note: Data for 2015 are estimated.

* Negligible.

Source: IEA (2017a).

Petroleum and other liquids

As of the end of 2015, Mexico's proved reserves of conventional oil stood at 9.7 billion barrels, and its technically recoverable shale-oil resources, located mainly close to its northern border, were estimated at 13.1 billion barrels (OGJ, 2016). The country is the world's 12th largest producer of petroleum and other hydrocarbon liquids, with 2016 production amounting to 2.5 million barrels per day (mbd) (PEMEX, 2017). Output is dominated by crude oil (86%), followed by lease condensate, natural gas liquids, and refinery processing gains. However, in recent years total production has fallen sharply,

3. Total primary energy supply (TPES) is the sum of energy production and imports, minus both exports and international aviation and bunker fuel. To that are also added changes in stocks. TPES is thus equivalent to primary energy demand.

being 32% lower in 2015 than it was at its peak in 2004, and its lowest level since 1981 (EIA, 2016).

Previously a major producing field, output from the Cantarell offshore field has fallen significantly over the past decade. In 2015, it produced just 9% of the nation's crude oil, compared with 63% in 2004. In absolute terms, Cantarell's output declined by 90%, from 2.1 mbd in 2004, to 0.2 mbd in 2015 (CNH, 2016). The fall in output has been partly offset by increasing production from the Ku-Maloob-Zaap field (KMZ), which tripled its production between 2004 and 2017, reaching the level of around 0.86 mbd at the beginning of the year. Two other important oil production centres are Litoral de Tabasco and Abkatun-Pol-Chuc. The remaining 25% of crude oil production is extracted from onshore fields.

In 2015 Mexico exported nearly a half of its crude oil production (1.17 mbd), making it the world's tenth largest net exporter of oil. Simultaneously, Mexico is a net importer of refined petroleum products. Gasoline accounted for 58% of the 0.74 mbd of refined products it imported, followed by diesel and liquefied petroleum gases (LPG) (PEMEX, 2016a). The main refined petroleum products exported by Mexico are: residual fuel oil, naphtha and pentanes plus, with their total exports equal to almost 0.2 mbd in 2015 (PEMEX, 2016a). The United States is the principal recipient of Mexico's crude oil exports, and its largest source of its refined product imports.

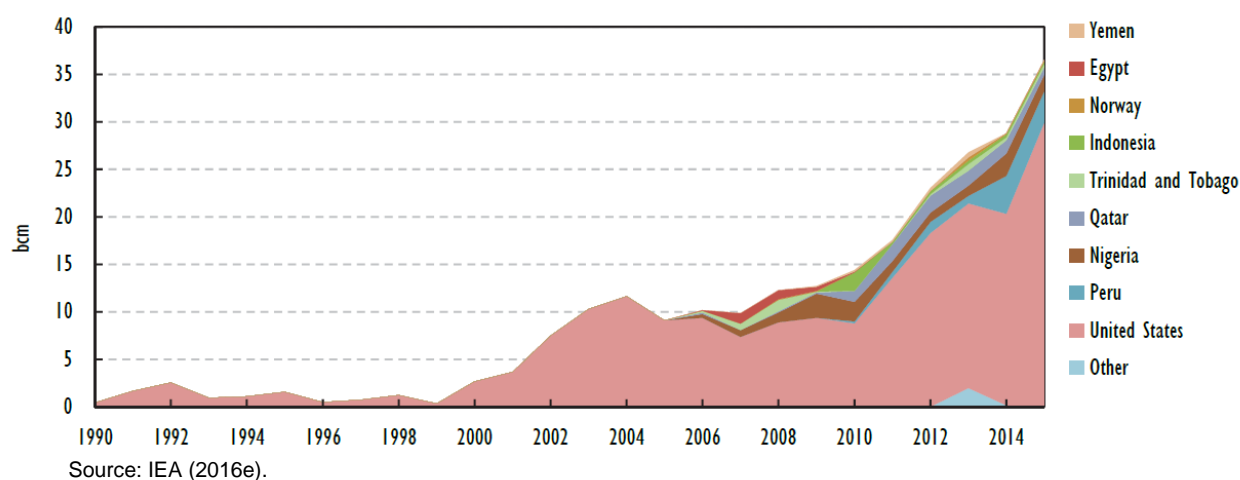
Six Mexican refineries operated by *Petroleos Mexicanos* (PEMEX) have a total refining capacity of 1.54 mbd. In 2015 they produced an output of 1.27 mbd, down 9% from 2014. In addition, PEMEX controls half of the 0.33 mbd Deer Park refinery in Texas. Over the past decade, Mexico has maintained fairly stable total oil consumption, of around 1.7 mbd in 2015. Nearly half (46%) of the petroleum product sales can be attributed to gasoline, and a quarter (23%) to diesel (PEMEX, 2016b).

Natural gas

At 15.3 trillion cubic feet (Tcf) of proved reserves, Mexico has a substantial resource base of natural gas (OGJ, 2016). Mexican production, on the other hand, estimated at 1.4 Tcf in 2015, is modest compared with that of Canada (5.8 Tcf) and the United States (27.2 Tcf). This can in part be explained by the higher domestic price of crude oil relative to the price of natural gas, which resulted in PEMEX giving preference to developing oil. Nearly three quarters of natural gas produced in Mexico comes from associated fields. However, in contrast with crude oil, more natural gas comes from the onshore fields (such as Samaria-Luna) and the offshore Tabasco field, than from Cantarell or KMZ (EIA, 2016).

Mexico is a net importer of natural gas, predominantly through a pipeline network from the United States (82% of all natural gas imports in 2015, see Figure 2). Following an upward trend in recent years, imports from the United States reached an average of 3.4 billion cubic feet per day (Bcf/d) in 2016, more than doubling since 2010. Shale gas resources are being developed slowly. Demand for natural gas is expected to rise by a fifth between 2015 and 2030 – mostly as a result of growth in gas-based power-generating capacity (SENER, 2016b).

Figure 2. Natural gas net imports by country, 1990-2015



In recent years, Mexico has relied on imports of liquefied natural gas (LNG), mainly from Peru, to compensate for pipeline constraints (IGU, 2016). In 2015 it imported 251 Bcf of LNG, equal to 24% of total natural gas imports for the year. However, these LNG imports are likely to continue following a downward trend, as pipeline imports of cheaper natural gas from the United States increase. According to Platts Analytics Bentek Energy, U.S. natural gas exports to Mexico are likely to rise by 30% in 2017.

Coal

Most of Mexico's coal deposits are concentrated in the state of Coahuila, in the northern part of the country, near the border with the United States. Domestic supplies are boosted by imports coming predominantly from the USA, Canada and Colombia. In 2015, Mexico produced 15.3 million tonnes of coal, including 3.2 Mt of hard coal, and 12.1 Mt of brown coal (IEA, 2017a).

Over the past 50 years, the Mexican coal-mining industry has been thoroughly restructured. The 1961 "*mexicanisation*" of the industry required 51% of all firms' capital to be owned by Mexicans. As a result of a reform of the mining code in 1975, coal was restricted to be mined only by firms with state participation. As a result, foreign investment in majority state-owned firms was limited to a maximum of 34%, while minority state-owned firms retained the limit of 49%. Since 1992, the Mexican Mining Law has allowed full control of coal mining assets by both Mexican and foreign mining companies, subject to a standard concession-based process.

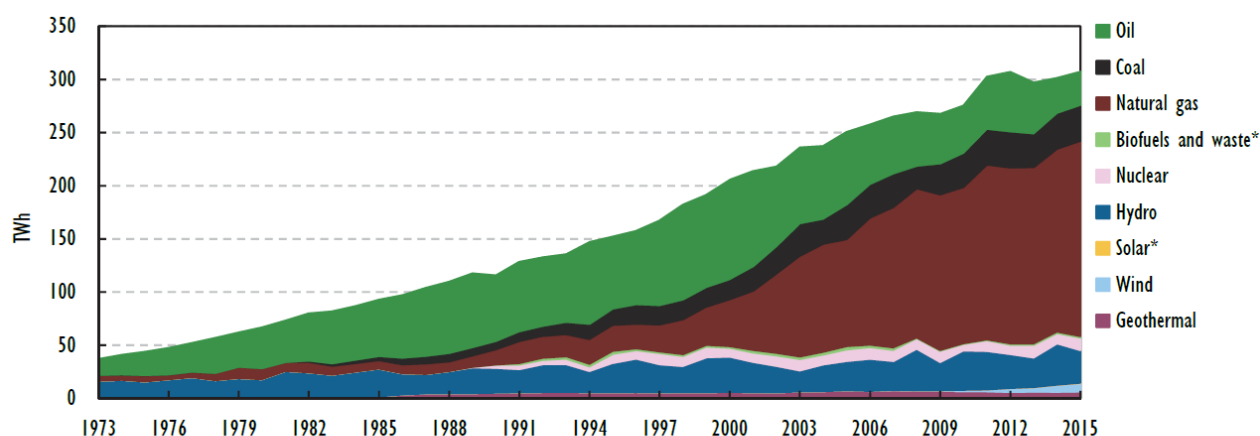
While international companies used to participate in coal production, the market is currently an oligopoly, with three companies – *Minera Carbonifera Escondido* (MICARE), *Minera Monclova* (MIMOSA) and *Carbonifera de San Patricio* – producing the vast majority of Mexico's coal output. Several other informal producers are also active, but their output is hard to quantify as they rarely follow regulations (Dominguez Ordonez, 2015). No state-owned companies are currently involved in coal extraction. However, because the coal resources themselves belong to the Mexican people, the Government charges royalties on coal extraction, equal to 7.5% of producers' net profits.

Electricity

Electricity demand in Mexico is rising at a rapid pace, having more than doubled over the last two decades. While nearly the whole population (99%) has access to electricity, consumption per-capita remains relatively low. Mexican industry consumes a significantly higher proportion of electricity (56%) than in other OECD countries, although demand in the buildings sector (residential and services) has been increasing by over 4% per year, reaching almost 40% of final electricity consumption in 2014 (IEA, 2016a).

With 68 gigawatts (GW) of installed generating capacity, in 2015 Mexico generated around 310 billion kilowatt-hours (kWh), a 21% increase since 2005 (SENER, 2016a). Nearly three fourths of the country's electricity capacity, and 80% of its electricity generation, is based on the combustion of fossil fuels (Figure 3). In particular, around 60% of electricity in Mexico is generated from natural gas, the use of which increased by nearly 83% between 2005 and 2015, supplied to a significant extent (nearly 40%) through imports from the United States.

Figure 3. Electricity generation by source, 1973-2015



Note: Data are estimated for 2015.

* Negligible.

Source: IEA (2016f).

The share of fossil fuels in the electricity mix is set to decline significantly by 2024 when, according to the 2013 National Energy Strategy, 35% of electricity is expected to be generated using non-fossil fuel sources (SENER, 2016a). Mexico exports modest amounts of electricity to the United States (7.1 billion kWh in 2014), as well as to Belize and to Guatemala (EIA, 2016).

Energy-market ownership and organisation

PEMEX is one of the world's largest integrated oil companies, created in 1938 as Mexico's only producer and refiner of petroleum and natural gas. The *Comisión Reguladora de Energía* (CRE) regulates relevant parts of the energy sector (electricity, as well as mid- and downstream in hydrocarbons), while the exploration and extraction of hydrocarbons is regulated and supervised by the *Comisión Nacional de Hidrocarburos* (CNH). Energy policies are conducted and enacted by the *Secretaría de Energía*

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(SENER). Since 1995, downstream activities have become open to private-sector operators, allowing them to participate in one of the downstream functions of transport, storage or distribution.

In 2014, aiming to address the decline in domestic energy production, the Mexican government pushed through constitutional reforms that ended PEMEX's monopoly over the oil and natural gas sectors, and gave foreign companies access into the industry. Exploration and production can now be contracted under new models, such as licenses, production-sharing, profit-sharing, or service contracts. Prior to those reforms, foreign investors could only be paid for services, without benefitting from shares or profits obtained from the exploitation of hydrocarbon resources. Finally, the reforms advocate for strengthening the regulatory authorities of SENER and CNH, and resulted in establishing a new environmental protection agency, the *Agencia de Seguridad, Energía y Ambiente* (ASEA).

While remaining a state-owned company, PEMEX is now more budgetary- and administratively independent, and is required to compete with other companies when bidding for access to new fields. After the implementation of the 2014 energy reforms, PEMEX was allowed to receive or maintain resources in a Round Zero, before they became available via public auction. The company secured as a consequence 83% of the country's proven oil and gas reserves (OGM, 2014). On the other hand, in Round One PEMEX won, in partnership, just one out of the 39 contracts awarded, in addition to the farmout of the Trión field. In July 2016, the CNH launched a bidding process for Round 2, which was conducted in three phases and covered the exploration and production of hydrocarbon activities in both shallow waters and onshore (EY, 2017).

The state-owned *Comisión Federal de Electricidad* (CFE) controls most of Mexico's installed generating capacity. It is also the sole supplier of retail electricity since the 2009 takeover of *Luz y Fuerza del Centro*, a state-owned company that managed distribution of electricity in Mexico City. However, even before the 2013 Energy Reform and according to 1992 amendments to the Public Electricity Service Act, private companies were allowed to sell the power to CFE. Independent generators, *Productores Independientes de Energía* (PIE), own currently around a quarter of total power capacity, and generate up to 40% of electricity, ensured predominantly by combined-cycle turbines powered with natural gas (CFE, 2015).

The energy reform is expected to encourage private investors to participate in electricity generation, and might allow them to engage in distribution in the future. Transmission however, will remain a monopoly (IEA, 2016b). The sector is regulated by CRE, and the national grid is operated by the *Centro Nacional de Control de Energía* (CENACE).

Energy pricing

Following the energy reforms of 2014, prices of gasoline, diesel, natural gas and LPG are being liberalised to increasingly align with market prices. However, the electricity price for residential consumers still remains held well below average cost (IEA, 2016a).

Petroleum products

As a result of price regulation, petroleum fuels in Mexico were heavily subsidised until early-2014 (Box 1). Following the reforms package, the subsidies were then

Mexico's efforts to phase out and rationalise its fossil-fuel subsidies

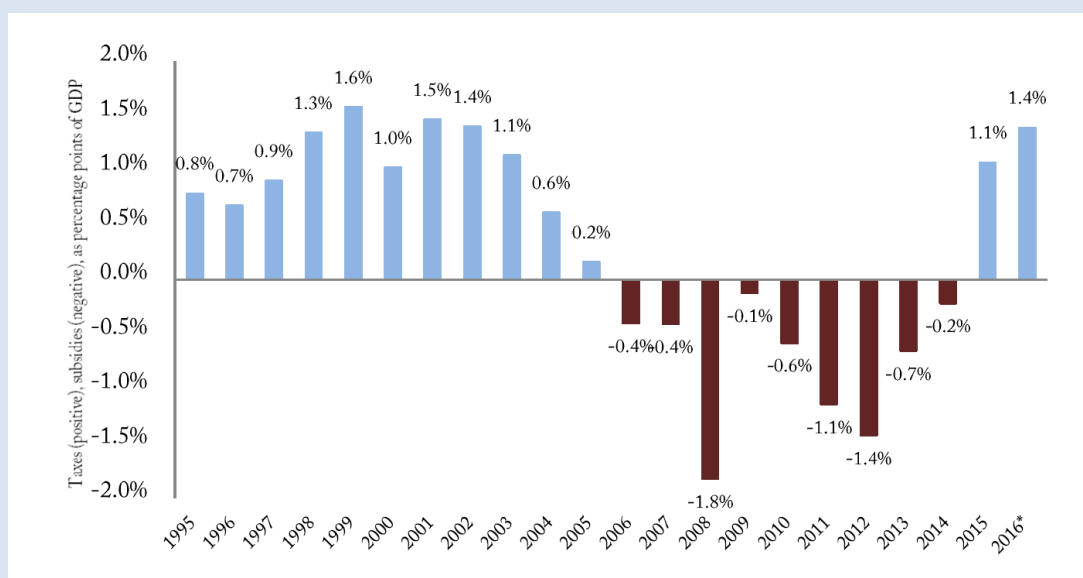
gradually reduced, eventually leading to net taxes. Liberalisation of gasoline and diesel markets features heavily in the ongoing reform. In January 2016, maximum prices started following a pre-determined formula which allowed the price movements of international prices to be increasingly transmitted to consumers. However, throughout 2016, Mexican prices were allowed to reflect changes in international reference prices only within a band of +/- 3% of the December 2015 price.

Box 0.1. Past government interventions in fuel prices

Prior to the 2012 decision to entirely phase-out transport fuels subsidies, Mexico had heavily supported them for nearly a decade (see Figures below). In the peak year – 2008 – the country spent nearly USD 20 billion subsidising the consumption of gasoline, diesel and liquefied petroleum gas (LPG), a figure that had increased more than fourfold from the previous year. This represented not only a direct expenditure and opportunity cost equivalent to nearly 1.6% of its GDP, but it also meant foregoing a valuable source of income: fuel taxes had previously provided significant revenues for the national government, on average equivalent to 1.1% of GDP annually for the period between 1995 and 2004.

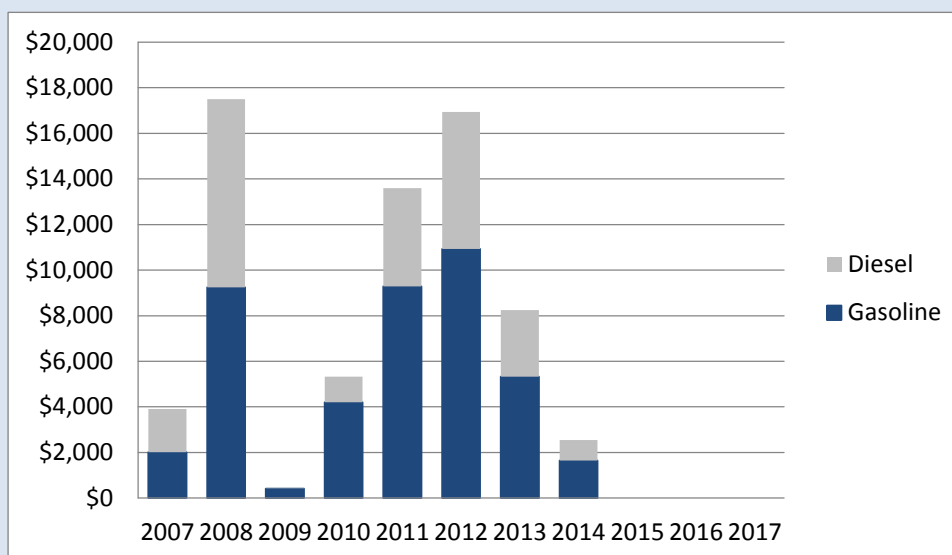
The primary policy objective was to smooth the price changes that consumers would have otherwise faced as international prices were rising. Smoothing was done through paced, monthly increases in prices. However, during the first decade of the 2000s, those gradual increases in prices were not able to catch-up with the even faster increases in the international prices of petroleum products, and revenues started to fall. Between January 2000 and December 2010, the domestic prices of gasoline and diesel in Mexico increased by 81% and 128% respectively, while international petroleum prices rose by 231%. The result was that consumer prices in the Mexican market were well below the international opportunity cost for a significant part of the past decade, creating a strong drag on public finances.

Figure 4. Gasolines and diesel taxes or subsidies, as a percentage of GDP



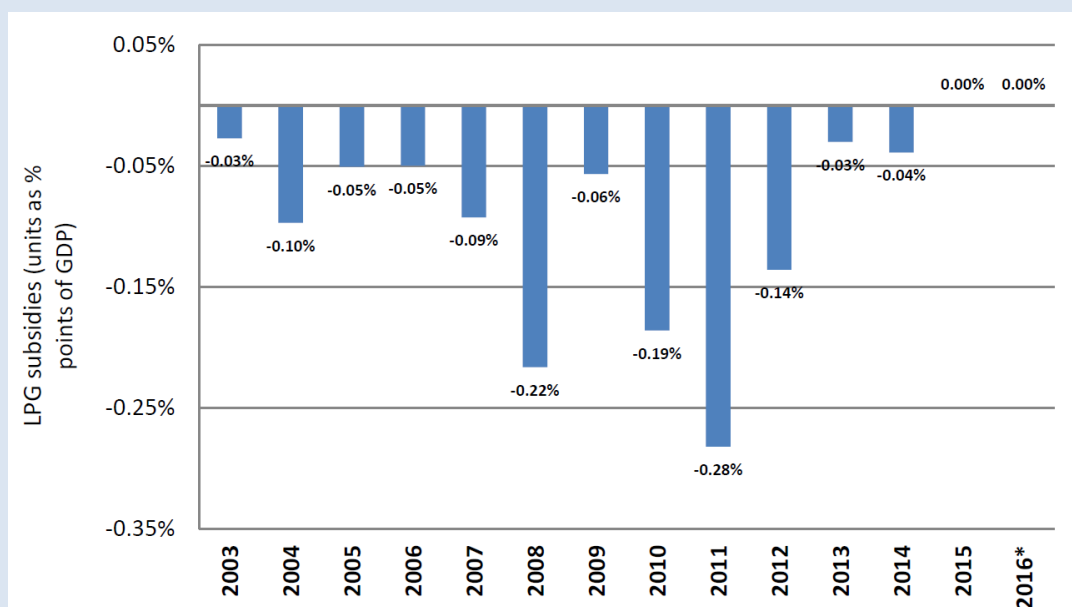
Source: Mexican Self-Report.

Figure 5. Subsidies to gasoline and diesel, mln USD



Source: OECD Database on Budgetary Support and Tax Expenditures.

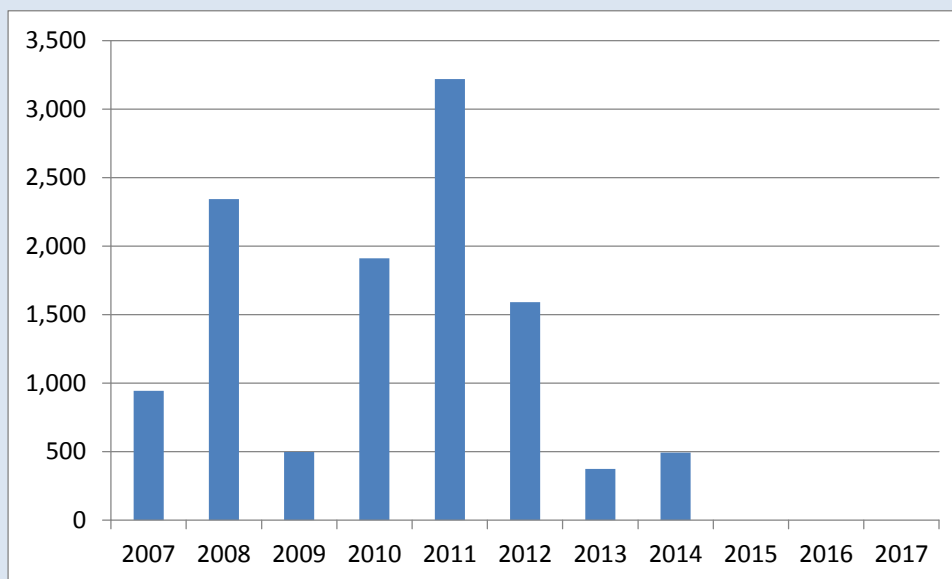
Figure 6. Subsidies for LPG (as % points of GDP)



*Source: SHCP, Global Petrol Prices, 2016 projected, US-EIA and International Energy Agency.

Source: Mexican Self-Report.

Figure 7. Subsidies for LPG, mln USD

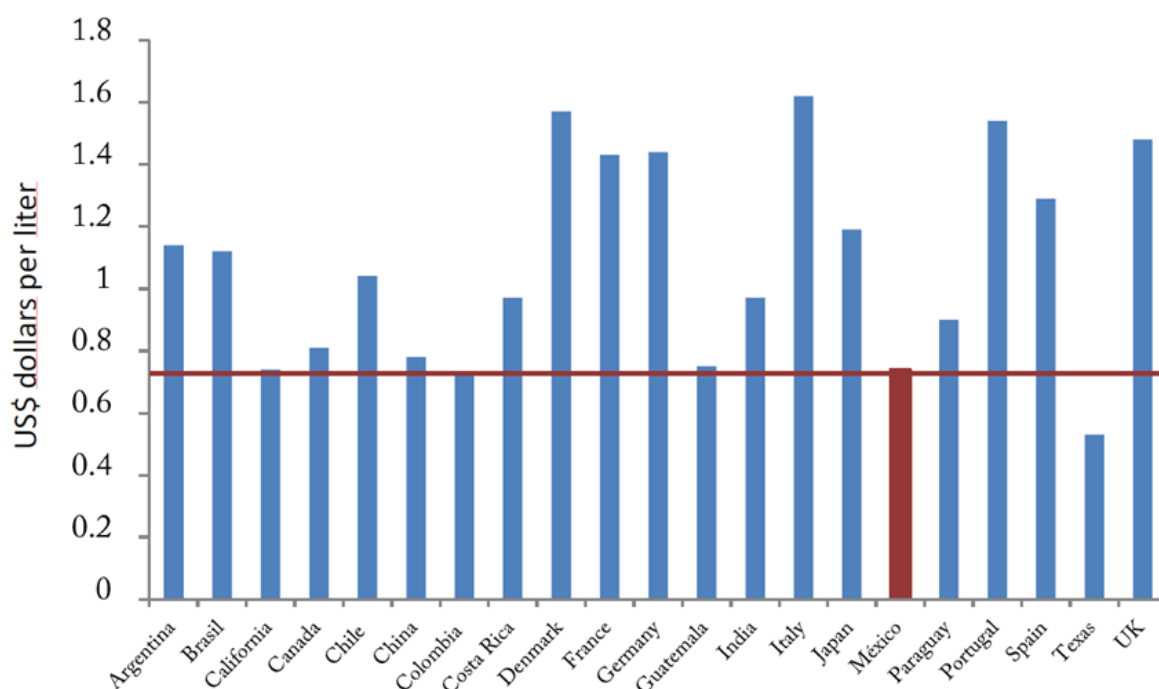


Source: OECD Database on Budgetary Support and Tax Expenditures.

Even after the recent reforms, gasoline and diesel prices in Mexico remain lower on a post-tax than those in most OECD countries. They are also either equal to or lower than the prices charged by its main trading partners and neighbouring economies, with the exception of the U.S. State of Texas, where prices remain much lower as a result of the State's well-defined low-tax policy (Figure 4).

In addition to the price increase, since the beginning of 2017 the Ministry of Finance introduced regional price differentiation across 90 different regions of Mexico. While gasoline pricing was previously uniform across the country, it would henceforth reflect the cost of distribution to different regions in those areas determined by CRE to have satisfied certain requisite conditions allowing gasoline and diesel to be set by the market.

Figure 8. Prices for regular gasoline in selected countries as of October 2016



Source: Mexican Self-Report.

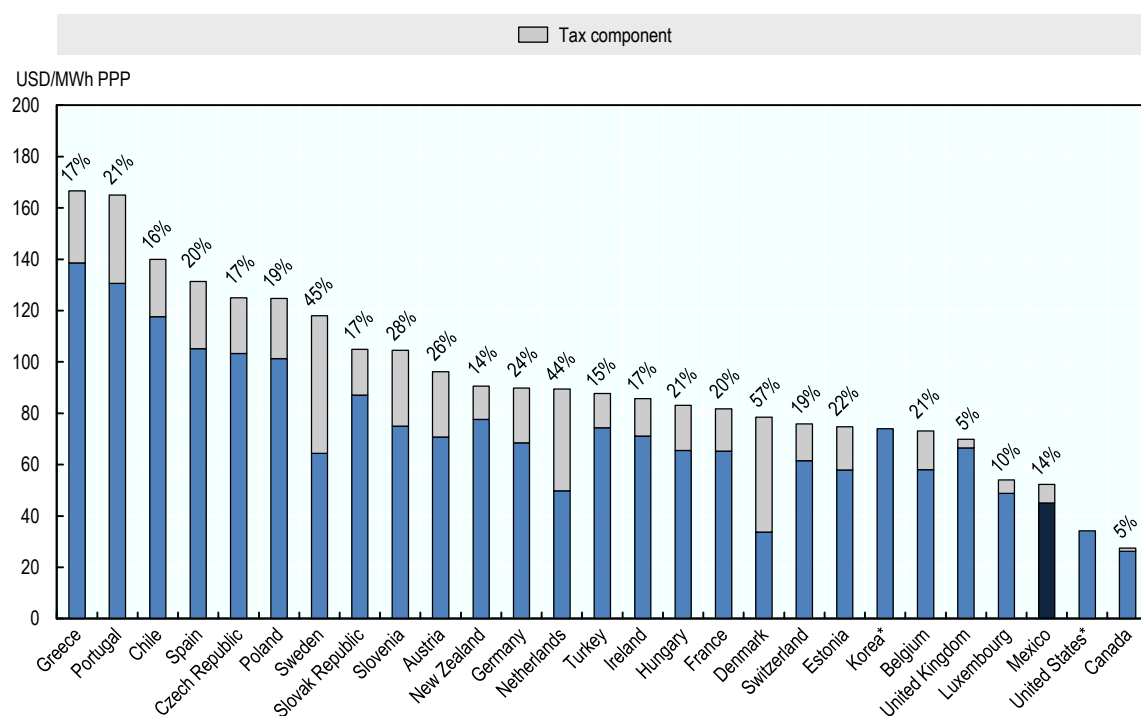
After over a decade of a price-cap policy, the market for liquefied petroleum gas (LPG) was fully opened to competition beginning 1 January 2017. The cap had been put in place in 2000 to reflect LPG's status as a basic consumption good, on which poor parts of society depend heavily. Between 2003 and 2016, domestic retail prices were set below international market rates, with the national maximum average price being updated monthly.

Natural gas

Prices of natural gas in Mexico have been declining in real terms over the last 20 years, and are still among the lowest in the OECD (Figure 5 and 6). The fuel is exempted from the carbon tax, and subject to VAT only (general *ad valorem* tax applied to all goods and services, except foodstuffs and medicines). With the VAT rate of 16%, the tax component constitutes 14% of the final price, well below the OECD average of 21%.

The Government is also evaluating opportunities to reduce the domestic price of gas by increasing imports of cheaper natural gas from the neighbouring United States. To enable this possibility, it is currently involved in a major programme to build new pipeline capacity, across the border with the United States, and inside Mexico (IEA, 2017).

Figure 9. Household natural gas prices in Mexico and in IEA member countries, 2015

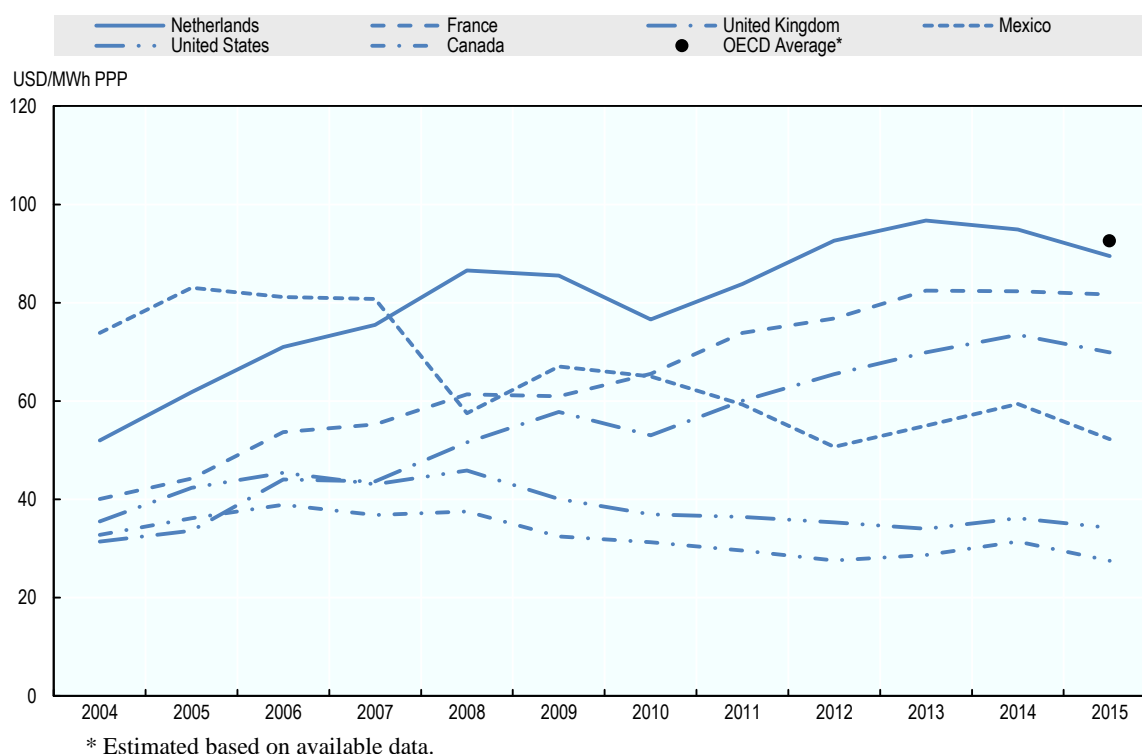


Note: Data not available for Australia, Finland, Italy, Japan and Norway.

* Tax information not available.

Source: IEA (2016c), *Energy Prices and Taxes 2016*, Q1

Figure 10. Household natural gas prices in Mexico and in selected IEA member countries, 2004-2015



Source: IEA (2016c), Energy Prices and Taxes 2016, Q1

The CRE regulates wholesale prices of natural gas, taking into account the distance to the American border to reflect the cost of gas imported by pipeline, although consumer prices have been liberalised since the mid-1990s. It aims to make prices fully market-based by the end of 2017, as private companies increasingly compete with PEMEX.

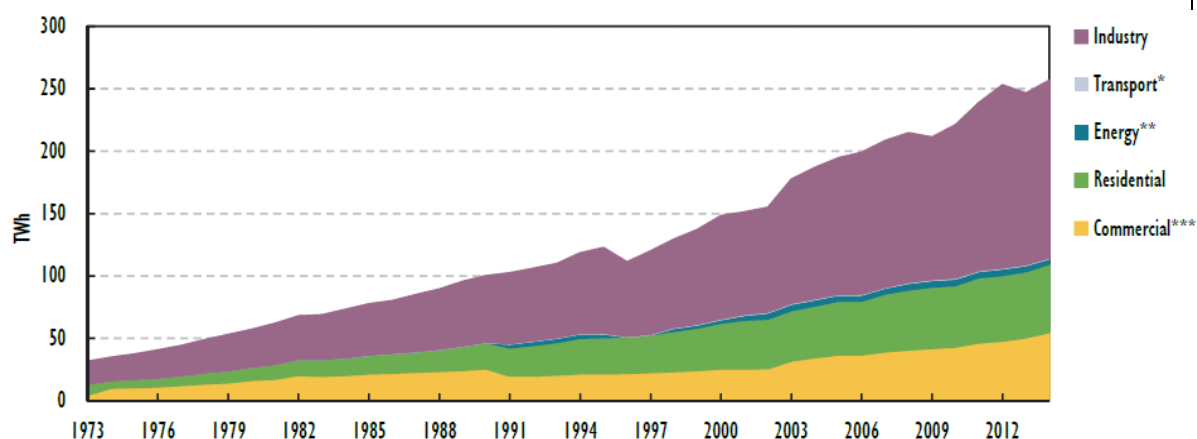
Electricity

Average electricity tariffs for the residential sector and agricultural users do not reflect the average cost of supply, with CFE covering a large part of the subsidies burden (IEA, 2016a) (Box 2). Today all electricity tariffs are approved by the *Secretaría de Hacienda y Crédito Público* (SHCP). However, the Electric Industry Law aims to change the price setting process, allowing prices to be determined by the market with an independent regulator (the CRE), who provides oversight and publishes the efficient costs of supplying electricity.

Box 2. Electricity subsidies in Mexico

Initially present mostly due to a failed attempt to index prices to inflation, electricity subsidies in Mexico became influenced by political decisions. At over MXN 91 billion (USD 5.8 billion) in 2015, the subsidies are focused on households and the agricultural sector (mostly large farmers in northern Mexico), which combined consume just over 30% of total electricity. This compares with over a half (56%) electricity consumption by industry, and around a fifth by commercial and public services (21%) (see Figure below) (IEA, 2017a).

Figure 11. Electricity consumption in Mexico by sector, 1973-2014



* Negligible.

** *Energy* includes coal mining, oil and gas extraction, and refining.

*** *Commercial* includes commercial and public services, agriculture, fishing and forestry.

Source : IEA (2016d).

The tariff structure remains exceptionally complex, with over 100 tariffs currently available to domestic households. Consequently, the subsidy rate differs substantially across consumer and tariff categories, which are determined by the tariff bands, combined with regional and seasonal variations in pricing.

With over 95% of household electricity being sold at heavily subsidised rates, the scheme fails to achieve public policy goals, according to the IEA (2016b). Electricity subsidies remain highly regressive, supporting relatively rich households and farmers, who consume most of the electricity. A decade ago, the three lowest income deciles were receiving around 16% of electricity subsidies, while the top three deciles received nearly 40%. As of the beginning of 2017, the distribution of benefits between the income deciles had not changed.

Table 1. IEA estimates of Mexico's electricity subsidies and price/cost ratios, 2015

Tariff	Sales (GWh)	Revenues (MXN million)	Average price (MXN/MWh)	Costs (MXN million)	Average cost (MXN / MWh)	Subsidy (million MXN)	Price / cost ratio
Household tariffs							
1	20 139	22 096	1 097	59 697	2 964	37 601	0.37
1A	2 314	2 421	1 046	6 691	2 892	4 270	0.36
1B	5 807	6 255	1 077	15 061	2 593	8 806	0.42
1C	12 186	14 144	1 161	28 738	2 358	14 594	0.49
1D	3 007	3 402	1 131	6 987	2 324	3 585	0.49
1E	3 861	3 791	982	8 761	2 269	4 970	0.43
1F	6 288	5 955	947	13 737	2 185	7 782	0.43
Household high energy consumption tariff (DAC)	2 384	8 129	3 411	5 155	2 163		1.58
Commercial users' tariffs							
2	13 125	37 355	2 846	29 891	2 277		1.25
3	1 664	3 945	2 371	3 365	2 023		1.17
7	21	83	3 853	55	2 567	0	1.5
Public services tariff							
5	1 261	4 274	3 389	2 056	1 630		2.08
5A	4 032	11 342	2 813	8 208	2 036		1.38
6	3 676	6 933	1 886	6 481	1 763	2	1.07
Agricultural tariffs							
9	34	116	3 419	113	3 338	23	1.02
9CU and 9N	9 565	4 597	481	13 889	1 452	9 291	0.33
9M	460	833	1 809	713	1 550	190	1.17
Medium-voltage tariffs							
OMs	14 613	26 139	1 789	21 417	1 466		1.22
HMs	66 575	88 449	1 329	86 550	1 300		1.02
High-voltage tariffs							
HSs	25 560	29 197	1 142	27 358	1 070		1.07
HTs	15 629	14 620	935	14 939	956	318	0.98
TOTAL	212 201	294 077	1 386	359 864	1 696	91 433	0.82

Source: IEA (2016b).

Defined by the IEA as the difference between electricity price paid by the consumers, and the average cost of supply, the magnitude of electricity subsidies is directly linked with the efficiency of the CFE. A number of studies indicate that improving this efficiency requires substantial efforts to reduce operating costs, invest in new generating plants, improve management, and increase compliance with bill payments (IEA, 2016b).

Finally, the permanence of Mexico's fossil fuel subsidies phase-out will also be essential in successfully achieving the 2024 target of generating 35% of electricity from non-fossil fuel sources (tagged as "clean energy"), as compared with its 2015 contribution of 20%, and the level of 25% expected to be reached by the end of 2017.

Table 2. IEA estimates of end-user electricity subsidies (USD million), 2010-15

Energy source	2010	2011	2012	2013	2014	2015
Residential	6624	6974	6820	7567	7641	5149
Tariffs 1 to 1F	6624	6974	6820	7567	7641	5149
Tariff DAC	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Services	204	179	129	168	113	0
Agricultural	813	1019	971	1016	1010	600
Industrial	440	0	0	0	0	0
Medium-sized businesses	390	0	0	0	0	0
Large industries	50	0	0	0	0	20
Total gross amount	8082	8172	7920	8751	8764	5769
Surplus in tariffs (cross-subsidy)	- 505	- 1075	- 1347	- 1569	- 2170	- 1618
Fiscal support and other (net)*			- 724	- 403	- 107.5	- 344
Net amount of subsidies **	7577	7097	5850	6779	6487	3807
Public use taxes	4412	4612	3400	3603	4423	0
Write-off of tariff insufficiency not covered by public use taxes	3165	2485	2449	3176	2064	3807

* Transfers to cover the cost of fuel and differences between products and export costs and portering.

** Recorded in the financial statement audited by an independent auditor.

Source: IEA (2017).

Taxes

In addition to a 16% VAT, which is applied to most goods, including fuels, Mexico currently applies two specific-rate (*ad quantum*) taxes to fuel use: an excise tax (applied to road transport fuel only, and consisting of two components), and a carbon tax (Table 3). The revenues from both the federal excise (part II) and the carbon tax are not earmarked, and flow to general government revenues, with the revenues from the specific excise tax (part I) flowing to local and regional governments.

Table 3. Structure of Mexico's excise and carbon taxes on fuel

Name	Tax base	Introduced in	Mechanism
Specific excise tax on transport fuels	Premium & regular gasoline, diesel for transport use	2008	Part I: Fixed rates (<i>ad quantum</i>), rate is added to final price, including VAT Revenue is directed to Mexican states and municipalities
		1980	Part II: Before January 2016: Determined by the Ministry of Finance on a monthly basis.
		Last reformed in 2016	Since January 2016: Fixed rates (<i>ad quantum</i>)
Carbon tax	Gasoline, diesel, fuel oil, kerosene, LPG, coal, other fossil fuels	2014	Fixed rates (<i>ad quantum</i>)

Source: Arlinghaus and Van Dender (2017).

Before the energy reform, Mexico's tax rates on road transport fuels have been the very lowest in the OECD. While still at the lower end, they have now moved more in line with other OECD countries. With the effective taxes per tonne of carbon (excise plus carbon taxes) set at just below EUR 140 per tCO₂, Mexico is one of the few countries pricing gasoline and diesel emissions equally.

Excise tax

Excise taxes are applied at the first sale or first import, on premium and regular gasoline, as well as on diesel. The rate comprises two elements. The "Part I" component is added to the final retail price of fuels after VAT, with the highest rates applied to premium gasoline, followed by regular gasoline (*magna*), and the lowest rate for diesel. The revenues collected through this tax are then turned over to the Mexican states and municipalities. The "Part II" component (fuel tax) has been substantially revised under recent energy reforms. Between 2006 and 2014, negative fuel tax rates were applied in order to moderate domestic price fluctuations of gasoline and diesel, resulting in substantial governmental subsidies. Since January 2016, excise tax rates have been fixed (Table 4), at levels more in line with those of other OECD and G20 countries.

Table 4. Excise tax on transport fuels, net of stimulus (USD per liter)

Fuel	2016	2017
Regular gasoline (<i>magna</i>)	0.15	0.15
High-octane gasoline (<i>premium</i>)	0.11	0.17
Diesel	0.22	0.17

Source: Ley del Ingreso Especial sobre Productos y Servicios (Excise Tax Law), yearly agreement on Fiscal Stimulus.

Carbon tax

The carbon tax is a new policy instrument, and the only tax applied to fuel use outside of road transport. However, its rates remain substantially below those originally proposed in 2013 (Table 5), and fail to reflect the different fuels' respective carbon

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contents. While the proposed rates envisaged a carbon tax of MXN 70.68 per tCO₂, the weight-averaged enacted rates were set at MXN 22.79 per tCO₂ (EUR 1.16) – less than 1/25th of the lower-end estimate of carbon's climate cost alone (estimated by the OECD at EUR 30 per tCO₂) (Arlinghaus and Van Dender, 2017).

In addition, despite its relatively high estimated social costs, coal is taxed at much lower rates than other fuels. The lawmakers' rationale behind the reduced rate was a relatively low initial price of coal, and unwillingness to increase its after-tax price by a much higher proportion than for other fuels. Natural gas has been exempted from the carbon tax, although it accounts for around a third of Mexico's total primary energy supply (TPES), with the rationale being that it is the lowest pollution emitter among the industrial fossil fuels.

Table 5. Mexico's carbon tax rates deviate from the principle of pricing carbon emissions at uniform rates

Fuel	Unit	Proposed in 2013		Enacted ¹		
		MXN		MXN		Euro ²
		per unit	per tCO ₂	per unit	per tCO ₂	per tCO ₂
Natural Gas	m3	0.1194	70.7	0	0.00	0.00
Propane (LPG)	litre	0.1050	70.7	0.0591	39.80	1.79
Butane		0.1286	70.7	0.0766	42.09	1.89
Gasoline		0.1621	70.7	0.1038	45.25	2.03
Aviation kerosene (Turbosine)		0.1871	70.7	0	0.00	0.00
Other kerosene		0.1871	70.7	0.1240	45.25	2.03
Diesel		0.1917	70.7	0.1259	46.42	2.09
Fuel Oil		0.2074	70.7	0.1345	45.83	2.06
Petroleum Coke	kg	0.189	70.4	0.0156	5.81	0.26
Coal Coke		0.193	70.7	0.0368	13.48	0.61
Mineral Coal		0.178	70.6	0.0275	10.90	0.49

1. Carbon tax rates have remained unchanged since their enactment, except for the yearly adjustment for inflation.

2. Based on the exchange rate on 6 November 2017, when 1 euro = MXN 22.25.

Source: Own estimations, based on interviews with the Centro Molina economic instruments design team that worked in the proposal, pointed out that the initiative used emission factors that corresponded to having exactly the same price per ton of CO₂ for all fossil fuels (MX\$70.7 per tCO₂). Emission factors may differ

Government support for fossil fuels in Mexico

General observations

Mexico's energy market, and the manner in which it provides support to fossil-fuel producers and consumers, has been greatly transformed over the last three years. The country's opening up of its markets to foreign producers and distributors has been accompanied by the raising of consumer prices for transport fuels, and the establishment of higher levels of excise taxes, plus the introduction of the carbon excise tax. Mexico is also committed to making a transition towards renewable energy and greater energy efficiency.

Mexico's Self-Report (MSR) lists 10 support measures, some of which have ended and others newly instated to address certain end users (Table 6). Only those measures enacted by the Federal Government are mentioned in the MSR. The MSR generally differentiates between budgetary transfers and tax benefits. The bulk of the remaining support measures included in the MSR are energy tax preferences benefitting farmers, fishing vessels, or public transport. Apart from the policies that formerly subsidised the general prices of gasoline and diesel, no reform-plan exists for the other policies identified in the MSR, which are not considered inefficient by the Mexican administration as they do not decrease prices below marginal costs.

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

Provisions for producers of hydrocarbons

Before 2014, only the national oil company, *Petroleos Mexicanos* (Pemex), could explore and produce hydrocarbons in Mexico. Pemex paid royalties based on the fiscal regime established in law. Royalty payments were determined on a net profit basis, so that it retained a share of net income.

Currently, the private sector can take part in these activities through a contracting regime; as of the end of 2016, 30 exploration and production contracts had been awarded in four bidding rounds. Contracts are awarded in a public bidding process to the bidder who offers the best economic terms to the State, so in that sense the fiscal regime is endogenous and bids should reflect, among other things, whatever corporate taxes must be paid.

Regarding the fiscal conditions established for hydrocarbon exploration and extraction, companies are liable to pay the standard corporate income tax, and VAT under general conditions. In order for the government to capture economic rents from hydrocarbons production, the tax burden is significantly higher than for any other economic activities. First, a basic royalty is levied as a percentage of gross revenues and two payments are made depending on the acreage of the contract. These payments are included in all contracts and are determined in Hydrocarbons Revenue Law (*Ley de*

Ingresos sobre Hidrocarburos). On top of this, an additional royalty (for licenses) or a share of profits (for production-sharing contracts) is determined in the bidding process. In the case of a tie, an additional cash payment is determined). Overall, once corporate income taxes are considered, the contracts will pay on average more than 70% of profits to the State, which is in line with the government take in other countries.

Table 6. The 10 policies that Mexico identified in the Mexican Self-Review

Full name of the measure	Estimated annual fiscal cost (2013) USD millions	Estimated annual fiscal cost (2016) USD millions
Measures for the exploration, development and extraction of fossil fuels		
Provisions for producers of hydrocarbons	0	0*
Subsidies and tax benefits for fossil fuels used in transport		
Implicit subsidies for gasoline and diesel	8245	0
Implicit subsidies for LPG	373	0
Tax benefit for gasoline consumption in the northern border region	81	512
Diesel excise tax accreditation to public transport	0	1062
Measures for fossil fuels used in the manufacturing, agricultural and forestry sectors		
Support for agricultural and fishing activities	245	127
Diesel excise tax accreditation to industrial machinery, other than transportation	0	493
Diesel excise tax accreditation to fisheries machinery, including vessels	0	85
Diesel excise tax accreditation to farming machinery	0	222
Other tax benefits		
Carbon tax exemptions and reductions	N.A.	100.8

* The Mexican Government explains that any net fiscal cost of these measures is actually zero, as competitive bidding returns to the State whatever fiscal provisions are given to producers, and that E&P producers are being levied significantly higher taxes on them than in the rest of the economy.

Three particular taxes and duties treatments are established in the Hydrocarbons Revenue Law:

- Unlike firms in other industries, a company's income and expenditures obtained from exploration and production activities are "ringfenced" from other business activities for corporate income tax purposes. In addition, contractual payments are determined individually for each contract, according to its own fiscal terms. Thus the fiscal treatment for hydrocarbons producers is more stringent than for other activities.
- For corporate income tax purposes, an accelerated depreciation is provided as follows: a 100% depreciation rate is allowed for exploration investments, and 25% for investments in wells. This measure might potentially favour technology lock-in, giving an advantage to technologies characterised by a high share of capital costs per unit of investment (OECD, 2010).

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- For deep-water projects, contractors are allowed to carry forward losses for up to 15 years (the general treatment in Mexico is ten years). Loss carry forward refers to the ability of a company to credit losses incurred in one year against its tax liability in future years. In many other countries, loss carry forward is granted for an unlimited number of years (Tordo, 2007), making Mexico more restrictive than typical in other countries.

Table 7. Specific provisions for hydrocarbon producers

Objective	Foster investment in the Mexican E&P sector				
Revenue foregone (millions of dollars)	2013	2014	2015	2016	2017
	0	0	0	0	0
Legal basis	Ley de Ingresos sobre Hidrocarburos				
Recent developments	No provision has been made to eliminate the treatment, as any benefit accrued to contractors would be reflected in the bids offered in the licensing rounds and hence on the fiscal terms and there is a high level of government take in the activity.				
Outlook	No change in policy expected				

Source: Fiscal Expenditure Budget, SHCP

Having been awarded only in 2015 and 2016, most of the contracts are either being formalized or under the exploration phase and are, not yet producing positive revenue streams. Hence there is not as yet enough information to estimate any potential revenue loss.

2. Subsidies and tax benefits for fossil fuels used in transport

The ongoing reforms of the transport fuels pricing

After the 2012 decision to phase out subsidies to gasoline, diesel and LPG, Mexico managed to successfully move to positive taxes on transport fuels. The country kept its policy of smoothing fuel price increases, with the goal that domestic prices would eventually catch up to international ones by the gradual reduction of net subsidies. As a result, by 2013 transport fuel subsidies had fallen in real terms to their lowest levels in a decade, and by 2014 Mexico was able to cross the threshold into positive taxes. The fall in international petroleum prices in 2014 helped to consolidate the subsidy reform efforts and net taxes collected from gasoline and diesel totalled more than USD 10 billion in 2015. A similar picture was observed for liquefied petroleum gas (LPG), for which subsidies had been completely phased-out by 2015.

In 2015, administratively determined prices for gasoline, diesel and LPG were transformed into maximum prices, preparing for the opening of private fuel imports and having the possibility of new participants offering below this price.

Mexico's efforts to phase out and rationalise its fossil-fuel subsidies

In 2016, maximum prices were set to follow a pre-determined formula so they would track changes in the international reference ones, within a band of +/-3% of the December 2015 price. The use of this formula allowed reference price movements in 2016 to be, at least partially, passed on to consumers.

In October 2016, the Mexican Congress approved legislation to further increase flexibility in gasoline and diesel markets, starting in 2017. The regulator of the energy sector, the *Comision Reguladora de Energia* (CRE) is in charge of identifying the regions in the country that have satisfied the requisite conditions to allow prices for gasoline and diesel to be set by the market; in December 2016, it published a calendar for the gradual liberalisation of prices across the country, with the last regions slated to be liberalised in December of 2017. In the case of LPG, the market was fully opened to competition at the beginning of 2017. The fuel will not be subject to any other excise tax, only the per-litre carbon tax, summed once VAT has been applied to the base value.. Overall, this reform has been substantial, yielding benefits for Mexico's budget and for the environment.

Table 8. Consumption subsidies for gasoline and diesel

Objective	Avoid volatility in fuel prices for final consumers				
Revenue foregone (million dollars)	2013	2014	2015	2016	2017
	8,245	2,833	0	0	0
Legal basis	Ley de Hidrocarburos, Ley del Impuesto Especial a la Producción y Servicios, Ley de Ingresos de la Federación para el Ejercicio 2017				
Recent developments	The subsidy was eliminated starting in mid-2014, and 2015 was the first complete year for which positive revenues were created.				
Outlook	Since 2016, the fuel tax is set at a fixed rate (<i>ad quantum</i>). Starting in 2017, prices were gradually allowed to be set by market conditions. All of these provisions preclude observing subsidies in the future.				

Source: Fiscal Expenditure Budget, SHCP. Figure for 2017 is expected as positive taxation policy is robust.

Table 9. Consumption subsidies for LPG

Objective	Avoid volatility in LPG prices for consumers				
Revenue foregone (millions of U.S. dollars)	2013	2014	2015	2016	2017
	373	493	0	0	0
Legal basis	Ley de Hidrocarburos, Ley de Ingresos de la Federación para el Ejercicio 2017				
Recent developments	The subsidy was eliminated in 2015.				
Outlook	Consistent with what was established in the Energy Reform, prices started being freely set by the market at the beginning of 2017, this strongly reduces the likelihood of a return of subsidies in the future.				

Source: Fiscal Expenditure Budget, SHCP Figure for 2017 is expected as positive taxation policy is robust.

Tax benefit for gasoline consumption in the northern border region

Confronted with low gasoline prices in neighbouring Texas and other US border states, Mexico applies reduced excise tax rates for cities near the US-Mexico border. After the 2014 phase-out of the VAT reduction in the border region, the reduction can be obtained on the general excise tax only, while the VAT, the carbon tax, and other taxes must always be applied. The benefit can be acquired uniquely for gasoline purchase, and is gradually reduced until 45 km inland in order to minimize arbitrage opportunities with the rest of the country.

Until 2016 the goal was to equalise the prices on both sides of the border, allowing the excise tax to absorb the difference up to its full amount. The prices were then adjusted bi-weekly to reflect price changes on the U.S. side. Since January 2017, the government has allowed up to a 15% difference across the border. Moreover, having no possibility to set prices from 2017, as all the border regions were liberalised as of June of 2017, Mexico's policy moved towards determining tax exemption, and allowing final prices to react accordingly.

In addition, the way retail fuelling stations account for the fuel has recently changed. Previously, gasoline was supplied by PEMEX at a pre-tax price. Now, however, stations are required to purchase gasoline with a full excise tax, and ask for its refund after the final sale.

Table 10. Tax benefit for gasoline consumption in the northern border

Legal basis	Presidential decree published each year, in addition a weekly adjustment (if any) applied to the tax stimulus to avoid large price differentials				
Revenue foregone (millions of U.S. dollars)	2013	2014	2015	2016	2017
	81	289	705	512	519
Outlook	There are no plans at present for fundamental changes to this arrangement.				

Source: Fiscal Expenditure Budget, SHCP. Figure for 2017 is an estimate given future reference prices at time of reporting.

3. Tax benefits for fossil fuels used in the manufacturing, agricultural and forestry sectors

Energy prices for agricultural and fishing activities

In the case of the tax exemption for diesel and gasoline used by fishers and farmers, the Rural Energy Law (*Ley de Energía para el Campo*) requires that fishers and farmers be given a "stimulus" price for electricity and fuels. The tax benefit is primarily intended to reduce their costs, in the expectation that it would help moderate food-price increases in response to rising fuel prices. In order to receive an allocation of reduced-tax fuel, approximately proportionate to the size of the land and the number of machines used, participants must have enlisted in the Ministry of Agriculture, Rural Development, Fisheries and Aquaculture's (SAGARPA) programme. The listing is open to all farmers and fishers, independent of their size, activity or wealth.

Over time this support measure has been granted combining different instruments; for example between 2011 and 2017 CONAPESCA has directly allocated a specific budget to provide a fixed amount of subsidy per litre to those fishers registered in their support programmes. Additional stimulus has also been given to diesel and gasoline

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prices by means of reduced excise tax, again available only for fishers and farmers registered in SAGARPA's programmes, with fishers receiving the tax stimulus from 2011 to 2017, while farmers only between 2011-2013, and then again in 2017.

A study by the Universidad Iberoamericana (Almendarez et al., 2013) showed that for most of Mexican fishing vessels the allocated quota is fully used, implying that the exemption leads to no price distortion in fishing behaviour. To ensure that the supported fuel is not subsequently diverted to other consumers, numerous spot checks on the fuel use are conducted. More analysis still needs to be done on the policy's effect on energy efficiency and environmental outcomes, including over-exploiting of fishing stocks, and expanding agricultural areas over natural land.

Table 11. Fossil fuel subsidies and tax expenditures related to gasoline and diesel used in agriculture and fishing

Objective	Reducing production costs for the primary sector.				
Revenue foregone (millions of U.S. dollars)	2013	2014	2015	2016	2017
	245	63	171	127	63
Legal basis	Ley de Energía para el Campo.				

Data for 2013 include budget-based subsidies. Data for 2017 are estimates.

Source: Ministry of Finance estimation with data from the National Fisheries Council and Ministry of Agriculture.

4. Other tax benefits

Diesel excise tax credit for specific economic activities

Mexico's tax code includes the possibility for certain activities to credit the transport fuel-excise taxes paid on their consumption of diesel towards other taxes, in particular against their income taxes. This benefits only firms in the formal economy and only those among them that generate positive profits during the fiscal year. This tax advantage only became relevant in 2015 and 2016, when transport fuel-excise taxes began to be consistently positive. The activities and sectors receiving the tax advantage are:

- Public transport (including taxis).
- Industrial sector machinery other than transport vehicles.
- Fisheries activities, including consumption by fishing vessels.
- Equipment used in mining.
- Farming (a 100% rebate on the machinery use, only 35.5% for other uses).

Farming and fisheries are thus entitled to benefit from both excise tax reduction, and a tax credit. However, given the requirement that beneficiaries participate in the formal economy, the tax credit tends to favour larger commercial farms, able to generate sufficient income. Since low-income farmers with small pieces of land are often exempted from, or avoid paying income tax, they benefit mainly from the excise-tax exemptions. The potential effect on participation in the formal economy is thus an important factor to be considered in an integrated evaluation of the two policy tools.

Inclusion of public transport within the transport fuel-excise-tax credit scheme has helped to keep the tariffs for public transport stable, despite significant fuel-price increases in recent years. There has been, however, significant growth in the value of the tax credit for public transport since 2015 (Table 12).

Table 12. Diesel excise tax credit, specific economic activities

Objective	Reducing production costs				
<i>Economic activity:</i>	Revenue foregone (USD millions)				
	2013	2014	2015	2016	2017
Public transport	0	0	810	1,062	1,309
Industrial machinery, other than transportation	0	0	376	493	532
Fisheries machinery, including vessels	0	0	65	85	6
Farming machinery	0	0	174	222	92
Legal basis	<i>Ley de Ingresos de la Federación</i>				
Recent developments	No provision has been made for degression				
Outlook	No change in policy expected				

Source: Fiscal Expenditure Budget, SHCP. Figure for 2017 is an estimation given future reference prices at time of reporting

Carbon-tax exemptions and reductions

While fossil fuels have been subject to a carbon tax since 2014, certain fuels and activities are subject to reduced, or even zero carbon tax rates. As previously mentioned, natural gas is fully exempted from the tax, as the industrial fossil fuel with lowest carbon emissions per unit of energy, and the one with lowest local air pollutants. By contrast, LPG, which has a similar emissions profile to natural gas (respectively 17.2 kilogrammes of carbon per gigajoule (kg/GJ), and 15.3 kg/GJ), is subject to the full carbon tax.

Coal has been taxed at a reduced rate. The reason for this was that the industry argued successfully that the relatively low initial price of coal would increase by as much as 25% after the tax was imposed, compared with less than 5% for other fuels. The actual increase (after the imposition of the tax) was therefore on the order of 12.5%.

In addition, fuels used in production processes for something other than combustion – e.g., the manufacture of plastics – are exempt from the tax, on the assumption that no CO₂ is emitted. Finally, all aviation kerosene (*turbosine*) and other aviation fuels are exempted from the carbon tax. While the Chicago Convention of the International Civil Aviation Organization (ICAO) includes the explicit obligation for all signatories to not tax aviation fuels used in international flights, it does not prevent the taxation of fuel used in domestic flights. Applying excise taxes differently to the same economic activity could lead however to legal challenges, however, as Mexican law does not allow discrimination in the application of excise taxes to the same economic activity.

For fuels other than gasoline and diesel, carbon tax remains the most important tax in place after VAT. Price signals for energy savings and energy efficiency in those sectors depend therefore heavily on the carbon tax. While a powerful tool, no increase in its rate is currently being contemplated, and the tax is only being updated in line with inflation.

Table 13. Carbon-tax exemptions and reductions

Objective	Establish natural gas as baseline, comply with international aviation treaties and lighten the impact on coal.				
Revenue foregone (millions of dollars)	2013	2014	2015	2016	2017
	N.A.	272.9	167.7	100.8	
Legal basis	<i>Ley del Impuesto Especial a la Producción y Servicios</i> , Presidential decree, January 2014.				
Outlook	Reforms to ICAO Chicago Convention are required to eliminate the tax exemption for jet fuel used in international flights.				

Source: Fiscal Expenditure Budget, SHCP. Figure for 2017 estimated using future reference prices.

The peer-review team's evaluation

Preamble

In reviewing the efforts of Germany and Mexico to reform their inefficient fossil-fuel subsidies, the peer-review team followed a process similar to that followed in the first G20 peer reviews, of China and the United States. This involved:

- Reviewing the self-reports of the two countries, and sending a list of questions and requests for clarification to each country.
- The countries providing written responses (in one case) to the peer-review team's questions.
- The peer-review members meeting in person with officials from the two countries; in the event, these meetings took place in Berlin during the week of 6 February 2017.
- The OECD writing the first drafts of the peer reviewers' reports, and circulating those to other members of each review team for comments.
- The OECD submitting the revised drafts of the peer reviewers' reports to the countries for comments and factual corrections.
- Revising the reports, taking into consideration the comments of the reviewed countries, and eventually producing final reports that could be agreed to by all parties.

Readers should bear in mind that, in reviewing the efforts of Germany and Mexico to reform their inefficient fossil-fuel subsidies, the peer-review teams were bound by both the G20's collective views on the initial reform mandate and on the conduct of the peer reviews, which are voluntary, and the specific terms of reference agreed between the two countries under review.

The 2009 G20 Leaders' Communiqué encourages its members to “rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption”, while recognising “the importance of providing those in need with essential energy services, including through the use of targeted cash transfers and other appropriate mechanisms”. The challenge confronting review-team members is that none of the key terms in this instruction — medium term, inefficient, or fossil-fuel subsidies — have been defined by the G20. The question of whether the term “fossil fuel subsidies” includes subsidies to electric power production (to the extent that it is based on the combustion of fossil fuels) or to the consumption of electricity was also not specified. China and Germany included measures relating to electricity in both of their respective self-reports; Mexico and the United States did not.

The question of which types of subsidies encourage wasteful consumption has also been left to interpretation by the G20 members themselves. The first pair of G20 voluntary peer reviews of inefficient fossil fuel subsidies highlighted the intentions of the reviewed countries, China and the United States, at that time to phase out certain tax measures that actually benefitted fossil-fuel production, on the argument that in so doing

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prices were reduced, thus encouraging wasteful consumption. Likewise, Germany, in its self-report, highlights the reform of its support measures for domestic production of hard coal. Mexico on the other hand, argues that from the microeconomic theory point of view, inefficiency of tax exemptions does not exist unless the value of externalities is higher than the resulting net tax.

The terms of reference for completed and ongoing peer reviews all listed the same types of policies for consideration in the peer review. These are listed in the terms of reference (Annex 1) as including:

- direct budgetary support;
- tax-code provisions;
- government provisions of auxiliary goods or services either at no charge or for below-market rates to 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.

A point that the G20 has stressed on several occasions is that the reform of inefficient fossil-fuel subsidies is a sovereign issue dependent on the unique situation and priorities of the individual countries. In short, it is the prerogative of the reviewed countries themselves to identify which subsidies they wish to reform, and which they deem not necessary to reform, most commonly because the country considers those subsidies to not be inefficient, but sometimes for other reasons.

That said, the role envisaged for the review teams is more than simply to acknowledge and document the reviewed countries self-reports. One contribution they are expected to make is to recognize any successful recent reform of fossil fuel subsidies and identify lessons learned. In this case, the main successful reforms are those relating to the on-going reforms of Mexico's subsidies to gasoline and diesel fuel used in the transport sector, and to consider any proposed action that could accelerate the reform process in each country.

Successful reforms of fossil-fuel subsidies and lessons learned

Over the last four years, Mexico implemented a fundamental reform of its energy policies. After nearly a decade of heavily supporting the consumption of gasoline, diesel and LPG, Mexico started a gradual reduction of net subsidies in 2013, and eventually succeeded in moving towards a situation in which those fuels were charged net positive taxes. Market liberalisation has featured heavily in the ongoing reform. As a result of administrative decisions, the prices for gasoline and diesel in 2016 were held within a band of +/- 3% of the 2015 price. However, on 1 January 2017 the regulation allowed the maximum price for gasoline to rise by as much as 20%. Moreover, starting in 2017, regions whose gasoline and diesel markets are determined by a government commission to be sufficiently competitive, will see their gasoline and diesel prices fully liberalised. By 2018 all regional markets are expected to have full market prices, with exceptions limited to locations where collusion or other anti-competition situations do arise. The market for liquefied petroleum gas (LPG) has already been fully opened to competition since the beginning of 2017. As a consequence, the prices of transport fuels now reflect their costs more accurately.

The reform has also transformed the state-owned monopolies, *Petroleos Mexicanos* (PEMEX) and the Federal Electricity Commission (CFE) into so-called “state productive enterprises”⁴, opening the historically monopolised oil, gas and electricity sectors to competition. As such, it has enabled increased investment, improved transparency, and strengthened Mexico’s energy security and environmental sustainability. The Mexican reform experience thus holds valuable lessons for other emerging economies wishing to carry out a broad-based reform of the energy sector.

One is that Mexico’s energy-sector reform formed part of a much broader structural and institutional reform package “*Pacto por Mexico*”, introduced by President Enrique Peña Nieto shortly after his 2012 inauguration. Alongside changes to the energy sector, the *Pacto por Mexico* targeted a number of key sectors of the economy, many of which had long been identified as in need of deregulation, including of financial services and telecoms, as well as labour market- and education-quality reforms. Through increased efficiency and productivity, the reform aims to modernise Mexico’s economy, and boost its long-term growth.

The second is that, following the introduction of necessary constitutional changes in December 2013, the energy sector reform has been pursued at a steady and determined pace. This process allowed a certain degree of implementation flexibility, allowing the subsidies to be reduced gradually, and ensuring sufficient market competitiveness before prices for transport fuels could be fully liberalised. Simultaneously however, the Government conveyed a clear message regarding irreversibility of the process, rejecting the possibility of providing transport fuel subsidies in the future.

Finally, the reforms generated significant new revenues for Mexico’s budget, turning a large loss in revenues, which were still USD 8.6 billion in 2013, into a valuable new source of income from gasoline and diesel taxes, raising over USD 10 billion in tax revenue in 2015. These additional revenues, in turn have enabled targeted assistance to be able to be given to the poor.

Most members of the review team also regard as encouraging Mexico’s recent introduction of a carbon tax, which became the first tax applied to fuel use outside of road transport. However, the rates of this tax remain substantially below those originally proposed in 2013, and are a fraction of the lower-end estimates of the marginal social cost of carbon emissions. The taxes also do not reflect the different fuels’ respective carbon contents, as coal has been taxed at a much lower rate than that applied to other fuels, and natural gas has been fully exempted from the carbon tax. An increase of the carbon tax rate is not currently under discussion.

Nevertheless, the carbon tax, together with the excise taxes, now provides a tool that could be used to progressively more fully internalise the negative externalities of fossil fuel use in the future. Higher carbon prices across sectors and fuels would likely prompt reductions in GHG emissions, and facilitate a cost-effective fulfilment of Mexico’s commitments to its UNFCCC (United Nations Framework Convention on Climate Change) targets.

Despite certain weaknesses, the Mexican reform is definitely one of the most ambitious ones conducted globally in recent years. According to IEA projections to 2040, due to the reform Mexico will experience improved energy efficiency, decreased growth

4. Productive enterprises of the state, of which these are the only two so designated, have more autonomy over their management and budget, and have greater flexibility to engage in private contracting, than do other state-owned enterprises.

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in CO₂ emissions, and a larger contribution from renewable energy in the mix of fuels used in electricity generation. The IEA estimates indicate that, in the absence of the reform, Mexico's GDP in 2040 would be 4% lower, leading to a total cumulative loss of one trillion US dollars in economic output, relative to the current projected scenario — owing largely to declining oil production, rising electricity costs, and reduced household spending (IEA, 2016a).

Improving the transparency of other support measures to fossil-fuels

Mexico, like Germany, is to be commended for listing in its self-report not only the inefficient fossil fuel subsidies that it is in the process of reforming, but also other measures that it considers to confer support to the production or consumption of fossil fuels, but deems to be not inefficient.

In the previously completed voluntary peer reviews, of China and the United States, the two countries adapted specific criteria to determine whether or not a measure qualified as “inefficient”. In the event, tax codes that favoured fossil-fuel producers were one common example of inefficient measures, and various policy efficiency assessments were considered based on policy specifics.

In the current round of voluntary peer reviews, Mexico argues that none of its tax exemptions and reductions should be considered as “subsidies”, as the prices that consumers face remain at or above the marginal cost of production (Box 3). However, the evaluation does not account for the welfare immiserating effects of environmental externalities from the consumption of energy products, nor the question of whether the exemption improves the efficiency of the tax-collection system, including costs associated with administering the exemptions. According to this framework, any tax reduces economic welfare, and therefore any relief from a tax increases welfare. Mexico, nevertheless, acknowledges that externalities should be taken into account and once measured appropriately, then an improved evaluation of the policies could be provided.

Germany, in its self-report, generally makes a more micro-economic argument, focusing on the efficiency aspect of subsidies. The report defines subsidies as extending to tax differences and exemptions but argues that intention of the G20 when choosing the word “inefficient” was to highlight those measures that resulted in the prices paid by consumers being below the marginal cost of production. In defending existing subsidies, Germany focuses on whether granting relief from the full rate of an energy or environmental tax would threaten the international competitiveness of the affected industry, or lead to the migration of CO₂ emissions or pollution to another country with less-stringent environmental regulations. In a few cases, a tax exemption is justified on the need to avoid double taxation.

Various reports to the G20 — notably, the joint report to the G20 of the IEA, the OECD, OPEC, and the World Bank (2011) — have acknowledged that not all fossil-fuel subsidies are inefficient. They have also stressed, however, that to properly distinguish between those fossil-fuel subsidies that enhance the well-being of an economy and those that can be classified as inefficient requires weighing their social costs and benefits. The peer-review team offers its observations on the measures mentioned in Mexico's self-report that were documented but deemed to be not inefficient, and therefore in no need of reform.

Box 2. Mexico's definition of an inefficient subsidy

Given no official definition by the G20 of an inefficient fossil fuel subsidy, the Mexican self-report divides the term into three “degrees of approximation” on the definition of inefficiency. It identifies subsidies that hold prices below opportunity cost in the international markets as the most direct and relevant form of inefficient subsidies. While it also classifies tax-exemptions, and tax-differentiations, applied to fossil fuels as “inefficient taxes”, it does not consider them to be inefficiency-inducing subsidies.

Mexico argues that in the latter case, the fuel is not sold below its marginal cost of production, so in a strict welfare-economics sense the policy would not be generating any dead-weight loss; it would not be causing economic inefficiency, at least not directly. The Mexican self-report proposes this as a potential stopping point, maintaining that tax differentials should not be considered as sources of inefficient subsidies as long as each and every tax remains equal to or greater than zero. At most it could represent inefficient taxing, it argues, not inefficiency-inducing subsidies, meaning the same revenue could be obtained with a lower welfare cost trade-off.

The economics literature, however, stresses that the question of efficiency is an empirical one. As succinctly explained by Lenjosek (2004, p. 22),

To determine whether an efficiency gain [from the introduction of a tax measure] actually does result, further analysis is needed of real income change in the market directly affected, the size of any market failure (or potential economic benefit from correcting it), policy-induced spillover effects on other markets, economic and social costs associated with raising revenues to finance the tax measure, and administration and compliance costs.

Moreover, differentiation in tax rates on fuels can create additional demands on resources. Tax authorities must expend time and effort to monitor taxpayers, and taxpayers do the same to avoid or evade the tax. Differences in tax rates can also lead to artificial divergences in end-user prices. This tends to distort economic decisions, such as whether farmers or owners of fishing vessels invest in machinery that is more costly but also more fuel-efficient. Low tax rates are less costly to an economy than high tax rates, and broadening the base of taxation leads allows more government revenue to be collected without increasing the tax rate (Marion, 2013).

Despite the particular definition of an “inefficient subsidy” as proposed in the Mexican self-report, the peer review team noted that the term as used by many G20 members could include tax-exemptions and tax-differentiations on fossil fuels. Although Mexico's effort to include these measures in the report for the sake of transparency is commendable, the country is also encouraged to consider reviewing its fuel-tax concessions, recognising that these measures could be leading to more consumption and pollution than would have otherwise been the case, perhaps causing other distortions. Similarly, the review team encourages the Mexican authorities to include in its ongoing domestic considerations on the reform of electricity subsidies the effects that such reforms have on the use of fossil fuels for electricity generation.

One framework to assess the performance of tax measures in achieving policy objectives is that proposed by the World Bank (Lenjosek, 2004). In the case of Mexico's tax expenditures, the following questions are salient to consider in order to establish their relevance, effectiveness and efficiency:

- *Relevance.* Is the tax measure consistent with policy priorities, and does it realistically address the actual need? Energy tax policy in Mexico has the dual role of addressing both climate policy objectives as well as reducing cost burden of targeted users, including farmers, hydrocarbons producers, and public transport. However, the tax benefits reduce those sectors' energy cost burden, encouraging their consumption of fossil fuels. These two opposite effects create a trade-off and a misalignment between economic policies and climate objectives.

- *Effectiveness.* Is the tax measure meeting its objectives effectively, within budget, and without unwanted outcomes? Tax expenditures to food producers and public transport warrant further investigation to gauge their success in reducing output price increases.
- *Efficiency.* Is the tax measure the most appropriate and efficient means to achieve objectives, relative to alternative design and delivery approaches? First, the cost-effectiveness of the measure should be quantified in terms of the income generated from the forgone government revenue. For the measure to be efficient, the income generated should be at least as much as the revenue forgone. The costs and benefits of the measure would then be quantified to determine the resulting excess burden in meeting its objective of preventing price increases, and supporting competitiveness of targeted sectors. Therefore, the measure should be able to meet its objectives at the lowest cost possible.

Under the current tax scheme, certain fuels and sectors remain effectively untaxed under specific taxes, being subject to VAT only. While tax exemptions for certain users (such as farmers and fishermen) are admittedly still provided by most G20 countries, Mexico is encouraged to review the policies over time, looking for alternative and less distortive ways of benefitting the targeted activities. Absent information about the extent to which paying a full tax on energy products in these activities would affect prices and greater transparency on how the tax rates and reductions from them are determined, the review team was unable to evaluate the efficiency of the various fuel-tax reductions and exemptions.

In order to finalise its energy-sector reforms, Mexico still needs to fully liberalise diesel and gasoline prices, and further stimulate competition in the energy sector. While the opening of monopolised oil, gas and electricity markets will help to provide consumers with more competitive prices, policy makers need to counter incumbents' incentives to use their market power. Throughout the implementation process, Mexico has to ensure a high degree of transparency and of regulatory certainty. Beyond the work done for the purpose of this report, Mexico is encouraged to periodically review the support embedded in tax policies on fuels, providing reasoning for such support when it exists, and considering reform when the rationale appears too weak.

Naturally, any changes to taxes or subsidies are likely to have distributional impacts. Although the tax and subsidy reform is generally considered to be progressive, higher energy prices can affect energy affordability for poor households. Additional revenues raised from reformed taxes could thus partly be used for social compensation measures.

Finally, the effectiveness of the energy reforms would be enhanced if the policy makers succeeded in addressing the problem of high levels of tax avoidance and evasion associated with informal coal operations.

The peer review process is a revelatory and a salutary learning experience for both reviewed and participating countries. The preparation of the peer reviews has allowed countries to look thoroughly at their support measures and provide more information on the policies than what is provided in their respective annual reports. Mexico's accomplishment in reforming the petroleum-fuel pricing and taxation is remarkable, and holds valuable lessons for other emerging economies wishing to carry out a broad-based reform of the energy sector. However, Mexico, alongside other G20 countries, can benefit from further dialogue on the definitional differences when it comes to what constitutes a fossil fuel subsidy, and which of those is considered inefficient.

Mexico's efforts to phase out and rationalise its fossil-fuel subsidies

BIBLIOGRAPHY

- Almendarez, L. C., C. Enríquez, A. Guevara, V. Hernández, J. A. Lara, C. Meza, G. Munro, C. Muñoz Piña, G. Ponce, M. Ross, S. Salas and J. C. Seijo (2013), *Reforma en los Subsidios a la Pesca*, WWF-Fondo Mundial para la Naturaleza, México.
- Arlinghaus J. and K. Van Dender (2017), “Environmental tax and subsidy reform in Mexico”, *OECD Taxation Working Papers*, No. 31, OECD Publishing, Paris, <http://dx.doi.org/10.1787/a9204f40-en>.
- CFE (2015), *Annual Report*, Comision Federal de Electricidad, Mexico City.
- Cisneros-Montemayor, A. M., E. Sanjurjo, G. R. Munro, V. Hernández-Trejo, and U. R. Sumaila (2016), “Strategies and rationale for fishery subsidy reform”, *Marine Policy* 69, pp. 229-236.
- CNH (2016), *Reported de incadores de extraccion*, Comisión Nacional de Hidrocarburos, Mexico City.
- Dominguez Ordonez, C. (2015), *G20 Subsidies to Oil, Gas and Coal Production: Mexico*, Overseas Development Institute, London.
- EIA (2016), *Country Analysis Brief: Mexico*, U.S. Energy Information Administration, U.S. Department of Energy, Washington D.C.
- EY (2017), *2017 Global Oil and Gas Tax Guide*, EYGM Limited, London, <http://www.ey.com/gl/en/services/tax/global-oil-and-gas-tax-guide---country-list>.
- IEA (2017a), *Energy Policies beyond IEA Countries: Mexico 2017*, International Energy Agency, OECD Publishing, Paris.
- IEA (2017b), “World oil statistics”, *IEA Oil Information Statistics* (database). DOI: <http://dx.doi.org/10.1787/data-00474-en>
- IEA (2017c), “OECD product supply and consumption”, *IEA Oil Information Statistics* (database). DOI: <http://dx.doi.org/10.1787/data-00478-en>
- IEA (2016a), *Mexico Energy Outlook*, World Energy Outlook Special Report, International Energy Agency, OECD Publishing, Paris.
- IEA (2016b), *Fossil Fuel Subsidy Reform in Mexico and Indonesia*, International Energy Agency, OECD Publishing, Paris.
- IEA (2016c), *Energy Prices and Taxes 2016*, International Energy Agency, OECD Publishing, Paris.
- IEA (2016d), *Electricity Information*, International Energy Agency, OECD Publishing, Paris.
- IEA (2016e), *Natural Gas Information 2016*, International Energy Agency, OECD Publishing, Paris.
- IEA (2016f), *Energy Balances of OECD Countries 2016*, International Energy Agency, OECD Publishing, Paris.
- IEA (2015a), *CO₂ Emissions from Fuel Combustion: Highlights*, International Energy Agency, OECD Publishing, Paris.
- Mexico’s efforts to phase out and rationalise its fossil-fuel subsidies

- IEA (2015b), *Medium-Term Gas Market Report 2015*, International Energy Agency, OECD Publishing, Paris.
- IEA, OPEC, OECD, and World Bank (2011), *Joint report by IEA, OPEC, OECD and World Bank on fossil-fuel and other energy subsidies: An update of the G20 Pittsburgh and Toronto Commitments*, report prepared for the G20 Meeting of Finance Ministers and Central Bank Governors (Paris, 14-15 October 2011) and the G20 Summit (Cannes, 3-4 November 2011). Available at https://www.iea.org/media/g20/1_2011_Joint_report_IEA_OPEC_OECD_WorldBank_on_fossil_fuel_and_other_energy_subsidies.pdf.
- IGU (2016), *IGU World Gas LNG Report – 2016 Edition*, International Gas Union, Fornebu.
- Lenjosek, Gordon J. (2004), “A framework for evaluating tax measures and some methodological issues”, in H.P. Bixi, C.M.A. Valenduc and Z.L. Swift (eds.), *Tax Expenditures — Shedding Light on Government Spending through the Tax System: Lessons from Developed and Transition Economies*, The World Bank, Washington, D.C., pp. 19-44.
- Marion, Justin (2013), “Should we broaden the fuel tax base?”, *Penn Wharton Public Policy Initiative Issue Brief*, Vol. 1, No. 7 (July), Available at <https://publicpolicy.wharton.upenn.edu/issue-brief/v1n7.php>.
- OECD (2010), *Taxation, Innovation and the Environment*, OECD Publications, Paris.
- OGJ (2016), *Worldwide Look at Reserves and Production*, Oil and Gas Journal, PennWell Corporation, Houston.
- OGM (2014), *An Overview of Round Zero Results and Round One Content*, Oil and Gas Mexico, Mexico City.
- PEMEX (2017), *Monthly Petroleum Statistics: Liquid Hydrocarbons Production*, Petróleos Mexicanos, Mexico City.
- PEMEX (2016a), *Monthly Petroleum Statistics: Volume of Exports of Refined Products, Natural Gas and Petrochemicals*, Petróleos Mexicanos, Mexico City.
- PEMEX (2016b), *Monthly Petroleum Statistics: Volume of Domestic Sales of Refined Petroleum Products and Natural Gas*, Petróleos Mexicanos, Mexico City.
- Ramírez-Rodríguez, M. and L. César Almendárez-Hernández (2013), “Subsidies in the jumbo squid fishery in the Gulf of California, Mexico”, *Marine Policy* 40, pp. 117-123.
- Rivera-Planter, M., C. Muñoz-Piña and M. Montes de Oca-Leon (2013), “Economic instruments for sustainability in Mexico’s marine protected areas and the perverse subsidy challenge”, in Essam Yassin Mohammed (ed.), *Economic Incentives for Marine and Coastal Conservation: Prospects, Challenges and Policy Implications*, Routledge, London and New York, pp. 229-264.
- SENER (2016a), *Programa de Desarrollo del Sistema Electrico Nacional*, Secretaría de Energía, Mexican Government, Mexico City.

SENER (2016b), *Prospectiva de Gas Natural 2016-2030*, Secretaría de Energía, Mexican Government, Mexico City.

Tordo, S. (2007), *Fiscal Systems for Hydrocarbons: Design Issues*, World Bank Working Paper, No. 123, World Bank, Washington, D.C.

ANNEX 1: TERMS OF REFERENCE FOR G-20 VOLUNTARY PEER REVIEWS BY MEXICO AND GERMANY ON INEFFICIENT FOSSIL FUEL SUBSIDIES THAT ENCOURAGE WASTEFUL CONSUMPTION

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 2014-2015, Mexico and Germany announced their participation in the G-20 peer review process, in a second round of peer reviews following the China-United States peer reviews.

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. **Mexico and Germany** 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, **Mexico and Germany** 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 **Mexico and Germany**. 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 co-ordinating 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 **Mexico and Germany** 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, **Mexico and Germany** 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 **Mexico and Germany** 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. recognize 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 written 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, the United States, **Mexico and Germany**, commit to undergo a Fossil Fuel Subsidy Peer Review.