

Global Energy Subsidies

Scale, Opportunity Costs, and Barriers to Reform

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Government subsidies to energy producers, transporters, and consumers are widespread throughout the world and represent a large public investment in the energy sector. In theory, this investment could be funding a variety of social goals such as providing the poor with access to basic energy services and addressing common environmental problems linked to energy extraction and consumption. Although some subsidies do address these types of concerns, most either do not, or do not do so effectively.

Far from helping to alleviate energy poverty, subsidies distort the relative prices of energy options, resulting in over-exploitation of fossil fuels and exacerbating associated environmental costs. Below-market prices to industrial, commercial, and retail customers mute incentives to conserve energy, and can contribute to 'subsidy clusters', pockets of industries that become reliant on subsidized energy inputs in order to be competitive (Koplow 1996). Capital investment into real estate infrastructure may undervalue energy efficiency as well, locking in a region or country to excess consumption for many decades.¹ Efforts to suppress domestic energy prices below world market levels often give rise to smuggling and black market operations as people try to profit from the pricing differentials. Finally, the fiscal cost of subsidies can absorb such a large portion of available government revenues that it crowds out spending in critical areas focused on improving population welfare or transitioning the country to a cleaner energy path.

While there is no exact global estimate, financial subsidies to energy are measured in many hundreds of billions of dollars per year. External costs of energy fuel cycles are relevant as well. They include a wide variety of negative impacts on human health and environmental quality from energy extraction, conversion, and consumption, and have been estimated to exceed a trillion dollars

¹ For both industrial and commercial consumption, looking at trends in energy consumed per unit of GDP can provide insights into how seriously countries are integrating global price signals on energy into capital investment patterns. It is notable, for example, that '[b]etween the oil price hikes of the 1970s and the global financial crisis in 2008–09, GDP per unit of energy increased in the oil-importing countries, but declined or stayed level in the oil-exporting ones: Saudi Arabia, Iran, Malaysia and Nigeria' (Lahn and Stevens 2011: 8). See also Fattouh and El-Katiri (2012).

per year globally. Though not directly funded by government budgets as financial subsidies are, external costs nonetheless exacerbate the pricing distortions caused by financial subsidies, further skewing energy investment and conservation patterns.

Despite the clear benefits of subsidy removal, political impediments have greatly slowed the pace of reform around the world. Once governments begin subsidizing particular fuels, they are often ‘trapped’ in policies that make little fiscal, developmental, or environmental sense but that are protected and defended by subsidy recipients. In some cases, reforms are successfully implemented but are then rolled back due to subsequent changes in political or market conditions.²

Subsidies to electric or natural gas distribution and generation infrastructure represent a slightly different twist on this same problem. Pricing of energy services at levels below break-even is common, as are utilities reliant on state subsidies so that they can continue to operate despite high rates of non-payment or theft. Both result in inadequate revenues to maintain and grow the enterprise. Existing customers may benefit from artificially low power rates and therefore resist price increases. Over time, however, the utility is starved of needed capital to maintain its existing system. The low or negative returns also preclude network expansion to the very customers and service regions it needs to reach in order to ameliorate energy poverty and improve the quality of life for the billions of people without access to modern energy services.

Energy subsidies are thus not an effective policy to alleviate energy poverty. As currently structured, they tend to be part of the problem, not the solution. Only recently has the international community begun to come to terms with just how big a problem they are—remarkably, the cost of energy subsidies far exceeds the estimated cost of effective energy access policies. This chapter reviews current estimates on the magnitude of energy subsidies globally, including what remains missing from the tallies; inefficiencies with subsidy targeting; the growing opportunity costs of not reforming; and the impediments to making subsidy reform a reality.

15.1. QUANTIFIED FINANCIAL SUBSIDIES TO ENERGY EXCEED \$750 BILLION ANNUALLY

Subsidy measurement has been improving in recent years. The International Energy Agency (IEA), for example, has been producing estimates of consumer subsidies to fossil fuels (i.e. where local prices are below world prices) annually in its World Energy Outlook, rather than intermittently as was done in the past. Beginning in 2010, the Organization for Economic Cooperation and Development (OECD) began systematically inventorying fossil fuel subsidies that target producers within OECD member states (OECD 2013).³ The OECD’s effort is one of the

² Kojima (2009, 2013) and IMF (2013) summarize many past attempts at pricing reform around the world.

³ OECD’s review includes producer subsidies to extraction, transport, refining, and processing, as well as a granular review of consumer subsidies.

first to recognize the importance of capturing state and provincial subsidies to energy, rather than just federal or nationwide supports. Both the International Monetary Fund (IMF) and the World Bank have been assessing fossil fuel pricing regimes throughout the world, and the degree to which shifts in world prices show up in domestic markets. They have benefited from detailed pricing surveys of key petroleum transport fuels around the world undertaken every two years by the German Society for International Cooperation (GIZ 2012). More granular subsidy reviews, focusing on a specific fuel or a handful of countries, have also been produced by the United Nations Environment Programme and by non-governmental organizations such as Earth Track and the Global Subsidies Initiative.

Increased reporting is due in part to a growing recognition that the scale of subsidies is so large that competent fiscal planning requires that it is addressed, and that subsidy reform must be integrated into any logical response to global greenhouse gas emissions. Formal approval among the 20 largest economies in the world (the G-20) to phase out environmentally harmful subsidies to fossil fuels has also provided political support for action, though the success of that commitment remains far from certain.⁴ Finally, a growing number of researchers around the world are focused on the issue and continue to produce important new analysis of the subject.

This progress is extremely valuable. Still, substantial gaps remain and a full accounting of global energy subsidies has never been done (Box 15.1). Global estimates of subsidy magnitude are likely well below actual levels of support. Further, and perhaps more important, available estimates are primarily broad national averages that miss subsidy ‘hot spots’—specific regions or types of activities that are disproportionately supported by subsidies. Fossil fuel extraction in environmentally sensitive regions, and efforts to spur production of lower-quality deposits where such development would otherwise be uneconomic, are two examples.

A full subsidy review entails a systematic examination of a wide variety of policy instruments at multiple levels of government used to transfer value from the public to the private sector. Subsidies at the sub-national level can be surprisingly large (Koplow and Lin 2012). In addition to relatively transparent direct cash transfers, subsidies through credit markets, tax breaks, caps on private liability from spills or accidents, reduced royalty payments on publicly-owned minerals, and purchase mandates requiring market purchase of higher-cost resources are all common in many countries. Direct government ownership of energy infrastructure or service enterprises is also widespread globally and tends to be rife with subsidies.

The IEA’s price gap measures do not detail specific instruments but rather capture subsidies only if they result in drops in domestic energy pricing (Koplow 2009). The OECD’s current work is capturing some, though not all, of these instruments. An earlier review of fossil fuel subsidies in four countries (Koplow et al. 2010) found that basic data on many of these policy types was extremely difficult to obtain and sometimes nonexistent, particularly in countries without a

⁴ As documented in Koplow (2012) and Koplow and Kretzmann (2010), tangible progress towards reform attributed to the G-20 commitment has thus far been fairly limited.

Box 15.1. Gaps in global estimates of energy subsidies

Geographic. Subsidies to producers in developing countries are systematically missing from global estimates, though coverage of consumer subsidies in these regions is improving. Outside of a handful of OECD countries, subsidies at the state or provincial levels are rarely captured, though they can be substantial (Koplow and Lin 2012; OECD 2012; IEA 2012).

Policy type. There is growing coverage of grants and many types of tax breaks (OECD 2013). Substantial coverage gaps remain for producer support via subsidized credit or insurance, regulatory oversight and site remediation, energy security (shipping lanes, stockpiling) and bulk transport costs, and tax-exempt corporate forms. Capture of subsidies through government-owned energy infrastructure or service organizations also remains low.

Non-payment. Price gap metrics capture underpricing, but do not capture power theft and non-payment. These 'hidden' costs of power were larger than underpricing in some regions (Joint Report 2010: 17).

User fees. Many countries levy a variety of fees or taxes on fuels that are earmarked (hypothecated) for specific uses closely linked to particular fuels—for example, building and maintaining transit infrastructure or cleaning up oil spills or abandoned sites. These fees are sometimes improperly deducted from subsidy estimates, or shortfalls in actuarially-based fee collections are not incorporated into subsidy tallies (Koplow 2009, 2010).

strong tradition of government transparency and public accountability. Box 15.1 identifies a number of core gaps among current numbers, not only in policy types but also in geographic coverage and in the calculation of price gap values.

Broader coverage would provide important insights into the real scale and distribution of subsidies, particularly in environmentally sensitive regions of the world. However, even currently available data indicates the scale of the problem is staggering. Subsidies to fossil fuel consumers alone were \$523 billion in 2011 (IEA 2012). Adding available data on subsidies to the producer side, as well as subsidies to renewables and nuclear, drives the total up to about \$840 billion annually (roughly 1 per cent of global GDP). Over the 2007–11 period, this amounts to more than \$3.5 trillion (see Table 15.1).

Table 15.1. Total quantified financial subsidies to energy

	<i>Billions of USD</i>					
	2011	2010	2009	2008	2007	2007–11
Fossil fuels ¹	589	475	361	622	404	2,451
Renewables ²	88	66	60	48	44	306
Nuclear ³	<u>162</u>	<u>159</u>	<u>157</u>	<u>156</u>	<u>152</u>	<u>787</u>
All	839	700	579	825	600	3,544

Notes

¹ OECD consumer subsidies to South Korea and Mexico deducted to avoid double counting. IEA price gap subsidies to fossil-fuel electric allocated back to source fuels based on country-level data on the fuel mix of power generation. IEA (2011a, 2012, 2013); OECD (2012); and Sauvage (2013). ² IEA (2011a and 2012). ³ Kitson, Wooders, and Moerenhout (2011) midpoint value. Single year annual value for 2009, adjusted for inflation, was applied to other years in the series. No adjustments made to incorporate the taxpayer costs of the Fukushima nuclear accident.

Subsidies are often defended on the grounds that they help transition economies towards more sustainable energy systems or that they alleviate poverty. However, their efficacy in achieving these ends is inadequate.

15.1.1. Subsidies delay achieving core environmental goals

Of the \$3.5 trillion in quantified financial subsidies to energy between 2007 and 2011, nearly 70 per cent supported fossil fuels, versus only 8 per cent for generally cleaner renewables. In turn, nearly two-thirds of quantified subsidies to fossil fuels supported oil and coal rather than cleaner natural gas (Figure 15.1). It is estimated that removal of consumer subsidies would reduce global greenhouse gas emissions by 8 per cent by 2050, or nearly 10 per cent if OECD countries cap their carbon emissions at the same time (Burniaux and Chateau 2011: 16).

The external costs of energy extraction and consumption on human health, environmental quality, and the global climate are widespread and are additive to financial subsidies. They are properly included when measuring the under-pricing of particular energy resources in the marketplace, and they tend to exacerbate distortions created by financial subsidies. A literature review conducted by Geneva-based Global Subsidies Initiative found a very wide range of externality estimates (Figure 15.2), indicative of differing methodologies, time periods of analysis, and estimation challenges. However, even using a midpoint of the estimate range indicates a scale of external costs on the order of \$1.5 trillion *per year* globally, the vast majority associated with fossil fuels.⁵

Thus, current information suggests that total financial subsidies and uncontrolled externalities top \$2 trillion per year, equivalent to more than 3 per cent of global gross domestic product.⁶

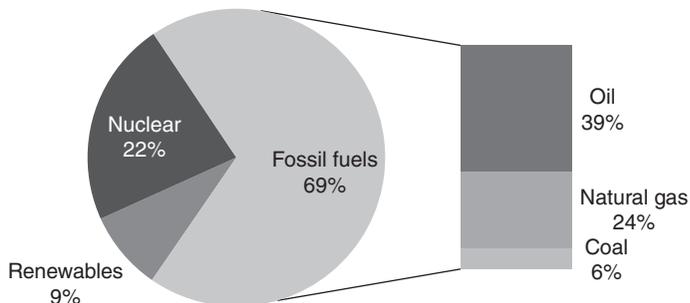


Figure 15.1. Fossil fuels receive most subsidies

Source: Earth Track calculations, OECD 2013, IEA 2011b, IEA 2012, Sauvage 2013, Bromhead 2013

⁵ The IMF (2013: 9) estimated fossil fuel externalities based on damage estimates associated with greenhouse gas emissions. Though the approach was different, the resultant value was quite close to the \$1.5 trillion per year midpoint shown in Figure 15.2.

⁶ Based on World Bank GDP figures for 2009 and 2010 (World Bank 2013a).

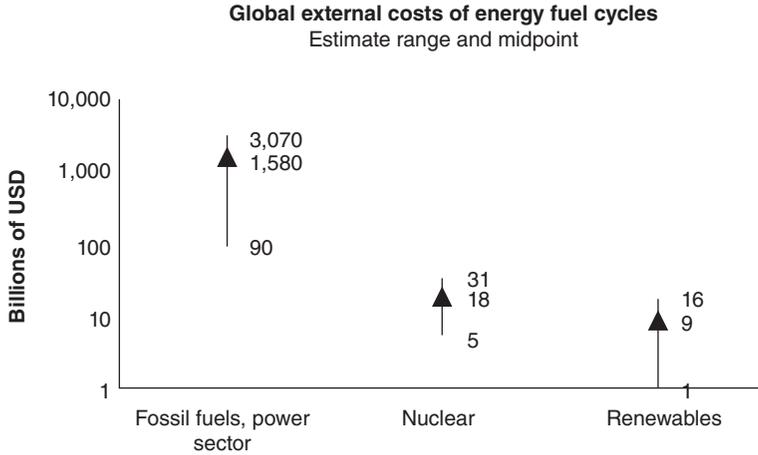


Figure 15.2. Global external costs of energy fuel cycles, estimate range and midpoint.

Source: Kitson, Wooders, and Moerenhout (2011)

The relative costs of energy options drive which fuels attract the most research and development spending as well as levels of capital investment. These factors, in turn, influence the market uptake of particular energy technologies. The misallocation of investment driven by combined financial subsidies and externalities is large, as are the resultant damages to human health and the environment.

15.1.2. Energy poverty

The IEA estimates that 1.3 billion people have no access to electricity, 85 per cent of them located in rural areas. This grouping includes two-thirds or more of the population in developing Africa (IEA 2012: 535). Roughly 2.6 billion people have no access to clean cooking fuels. They rely on traditional biomass instead—fuels that are time-consuming, and often dangerous, to collect. Notable pockets of underservice for cooking fuels include half the population of developing Asia and roughly 80 per cent of Sub-Saharan Africa. As with access to electricity, more than 80 per cent of those lacking access to clean cooking fuels live in rural areas (IEA 2012: 529–34).

Access to modern energy services has been clearly demonstrated to improve health, productivity, and welfare for recipient families. Access has important gender benefits as well. The World Bank notes that electrification allows women 'increased scope for evening activities, greater flexibility in organizing household activities as daylight is no longer a constraint, enhanced security, the potential for undertaking income-producing activities such as handicrafts, and reduction in time required for collecting water if electrification improves water supply' (World Bank 2010: 19, 45).

Much of the money spent subsidizing fossil fuels has aimed to keep prices on transport and cooking fuels below market levels. Although this would seem supportive of expanded energy access, in practice the policies have not been very effective in helping the poorest sectors of society. Higher energy consumption by the wealthy, political influences on subsidy awards, diversion of subsidized fuels for resale on the black market at higher prices, and gaps in infrastructure necessary for the poor even to access subsidized flows of natural gas or electricity have all contributed to a high 'leakage' rate of subsidy dollars away from those most in need of support.

Surveys of developing countries found that only 8 per cent of fossil-fuel subsidies reached consumers in the poorest 20 per cent of the population (IEA 2011a) and less than 25 per cent reached the poorest two quintiles (Joint Report 2010: 24).⁷ Leakage rates for gasoline have been particularly high according to IMF analysis, with an estimated \$33 in subsidies to gasoline required for each \$1 that actually reached the poorest 20 per cent of society (del Granado, Coady and Gillingham 2010: 13).

15.2. REASONS TO REFORM

A combination of immense magnitude, high leakage rates to wealthier consumers, and support to more polluting fuel cycles all create powerful economic, social, and environmental pressures for reform. The poorer the country and the larger the energy subsidies, the more the policies constrain government operating flexibility and crowd out social welfare needs.

The fiscal burdens of these subsidies to developing countries in particular can be severe, absorbing a large portion of available government revenues. As shown in Table 15.2, even countries with relatively small subsidies in terms of absolute funding levels may be crowding out other public spending. In 15 of the 38 countries for which the IEA tallies consumer subsidies, fossil fuel subsidies exceeded 5 per cent of 2011 gross domestic product. As of the end of 2011, according to IMF analysis, half of the countries in the Middle East and Central Asia had fuel subsidies exceeding 2.3 per cent of GDP and half of the countries in Sub-Saharan Africa had fuel subsidies greater than 1.3 per cent of GDP (Coady, Flamini and Antonio, 2012: 48).

Government revenues provide a better proxy than GDP for the opportunity cost of squandering limited public resources on fuel subsidies. Whereas GDP picks up all actors in an economy, government revenues tie much more closely to the non-deficit budget constraint facing the very government with the power to set and modify the subsidy policy. The figures are striking: 30 of the 38 countries tracked by the IEA had subsidies in excess of 5 per cent of federal revenues, and nearly one-quarter of the sample was spending more than 20 per cent of federal revenues.

⁷ Countries surveyed were Angola, Bangladesh, China, India, Indonesia, Pakistan, Philippines, South Africa, Sri Lanka, Thailand, and Vietnam.

Table 15.2. Subsidies to fossil fuel consumers crowd out other spending priorities

Country	Annual subsidy amount to consumers (billions of USD) ¹	Fossil fuel subsidy amount as percentage of:		
		GDP ²	Federal revenues ³	Public spending on health care ⁴
Algeria	13.4	7.0%	16.9%	144.9%
Angola	1.3	1.3%	2.3%	47.7%
Argentina	10.0	2.2%	8.5%	34.9%
Azerbaijan	2.0	3.1%	8.6%	186.5%
Bangladesh	5.8	5.1%	41.5%	202.8%
Brunei	0.5	n/a	6.1%	100.1%
Chinese Taipei	1.6	0.3%	2.0%	n/a
China	31.0	0.4%	1.7%	11.4%
Colombia	0.7	0.2%	0.7%	2.9%
Ecuador	5.6	8.4%	17.8%	157.1%
Egypt	24.5	10.4%	43.3%	274.8%
El Salvador	0.6	0.0%	12.4%	34.7%
India	39.7	2.4%	23.1%	82.0%
Indonesia	21.3	2.5%	15.3%	159.8%
Iraq	22.2	19.3%	21.3%	244.0%
Iran	82.2	17.0%	62.7%	327.1%
Kazakhstan	5.8	3.3%	13.5%	109.1%
Korea	0.2	0.0%	0.1%	0.3%
Kuwait	11.1	6.3%	10.4%	432.8%
Libya	3.1	8.5%	5.5%	98.5%
Malaysia	7.2	2.6%	12.2%	70.1%
Mexico	15.9	1.4%	5.9%	29.5%
Nigeria	4.4	1.8%	18.7%	58.9%
Pakistan	11.1	5.3%	37.6%	273.1%
Peru	0.3	0.2%	0.5%	3.9%
Philippines	1.5	0.7%	4.3%	31.6%
Qatar	6.0	3.4%	9.6%	255.2%
Russia	40.2	2.2%	9.7%	45.7%
Saudi Arabia	60.9	10.6%	19.4%	356.7%
South Africa	1.4	0.3%	1.5%	6.7%
Sri Lanka	1.1	1.9%	13.4%	79.9%
Thailand	10.3	0.3%	15.1%	60.0%
Turkmenistan	5.8	22.8%	22.0%	962.8%
Ukraine	9.3	5.7%	17.5%	69.2%
UAE	21.8	6.3%	16.7%	240.7%
Uzbekistan	12.7	22.8%	77.5%	497.5%
Venezuela	27.1	8.6%	23.3%	449.3%
Vietnam	4.1	3.4%	9.7%	57.6%
Country counts				
Total countries		37	38	37
Subsidies > 100% of metric		0	0	18
Subsidies > 50% of metric		0	2	26
Subsidies > 25% of metric		0	5	32
Subsidies > 10% of metric		6	22	33

Notes

¹ Price gap subsidies to consumers in 2011 from IEA (2012). ² 2011 GDP data from World Bank (2013a). ³ Federal estimated revenues for 2012 from CIA (2013). ⁴ Health-care spending based on World Health Organization data compiled by the *Guardian* newspaper (2012). Population data used to scale per capita to national figures from World Bank (2013b).

The scale of subsidies relative to other social objectives (Tables 15.2 and 15.3) is of equal concern.

- **Universal access to modern energy.** Overall subsidies to fossil fuels are more than 15 times the \$34 billion per year in incremental funding that the IEA estimates would be sufficient to achieve universal access to clean cooking fuels and electricity by 2030. Many country-specific values are even worse. Unlike actual subsidies for universal access, most of the fuel subsidies benefit upper-income quintiles. Targeted funding for expanding energy access is paltry in comparison, even when supplemental support from international agencies and lending institutions is combined with funding by national governments. Total spending for universal access amounted to only \$15.5 billion for the 2005–2010 period, or less than \$3 billion per year (Piebalgs 2012: 82).⁸
- **Public spending on health care.** Inadequate availability and access to health care is an endemic problem throughout the developing world. Yet governments in fully half of the countries evaluated by the IEA spent more on fossil

Table 15.3. Fossil fuels subsidies are five times funding for climate mitigation (millions of USD)

Country	Fast start climate pledge (average, 2010–12)	Subsidies to fossil fuel consumers, 2011	Ratio of subsidies to mitigation
Australia	206	8,362	40.5 ×
Austria	—	509	0 ×
Belgium	63	2,770	44 ×
Canada	406	3,178	7.8 ×
Denmark	68	1,277	18.9 ×
Finland	46	2,323	50.5 ×
France	528	3,569	6.8 ×
Germany	528	6,603	12.5 ×
Greece	—	270	n/a
Iceland	—	—	0 ×
Ireland	53	101	1.9 ×
Italy	—	2,752	n/a
Japan	5,000	439	0.1 ×
Netherlands	130	440	3.4 ×
New Zealand	24	43	1.8 ×
Norway	333	698	2.1 ×
Spain	157	2,417	15.4 ×
Sweden	336	2,762	8.2 ×
Switzerland	49	269	5.5 ×
United Kingdom	793	6,606	8.3 ×
United States	2,500	13,146	5.3 ×
Total	11,220	58,534	5.2 ×

Source: Oil Change International (2012)

⁸ The United Nations Sustainable Energy for All initiative may lead to some uptick in baseline spending. More than 100 commitments for a variety of appliance purchases, financing, and extended energy access will result in \$320 billion in direct investments, 10 per cent of which is earmarked for modern energy access for the poor. However, overall spending remains below what is needed to provide universal access (IEA 2012: 531).

fuel subsidies to consumers than they spent on health care. Seventy per cent had subsidy levels equal to half or more their public spending on health care.

- **Commitments to fast start climate finance.** While fossil fuel subsidies within most OECD countries are not high relative to overall government revenues, they nonetheless have important social opportunity costs. The quantified subsidies to fossil fuels within the OECD (but a portion of the actual total) are more than five times the level of financial commitments that these very same governments have made to ameliorate climate change around the globe (Oil Change International 2012).

15.3. SUBSIDY ‘TRAPS’: WHY REFORM DOESN’T HAPPEN

Despite the compelling logic of eliminating fossil fuel subsidies, many attempted reform efforts have not been successful. The persistence of subsidies can be seen in the degree to which increases in world fossil fuel prices ‘pass through’ to end-consumers in countries around the world. An IMF assessment found that most low- and middle-income countries passed through less than 70 per cent of the sharp increases in global fossil fuel price increases that occurred through mid-2008, with similarly low levels of price adjustments for the 2008–2011 period. They observed particularly low pass-through in Sub-Saharan Africa and in the Middle East and Central Asian regions (Coady, Flamini, and Antonio 2012: 48).

World Bank data on the same issue provides more resolution by fuel type, but shows comparable results. Median pass-through rates in lower-income countries lag higher-income countries for all fuels but liquefied petroleum gas (LPG). Median pass-through for net oil exporters was barely more than one third of the change in world prices for gasoline, and less than 10 per cent for both kerosene and LPG (Kojima 2012: 21, 22). During times of rising oil prices, many countries stop or even reverse price reforms that they had previously begun to implement (Kojima 2013).

In contrast, full pass-through has been the norm in advanced economies. Energy prices are set to a much greater degree by market forces; adjustments happen automatically and are expected by key market participants. A variety of strategies, from the hedging of fuel supply costs by energy-intensive industries to lifeline rates or grants to let low-income residents afford basic energy, have been implemented.

15.3.1. Economic and political drivers of subsidy traps

For the many countries with government intervention in fuel prices, reform is challenging. Efforts to protect domestic consumers or industries often become entrenched and difficult to end. Governments end up ‘trapped’ into continuing these policies over a long period of time despite high fiscal, social, and environmental costs. The economic and political constraints to subsidy reform tend to feed on each other. Economic factors drive increased political activity, while political activity protects and expands the financial transfers.

Initial subsidy creation, and subsequent retention, is often driven by a mix of pure interest-based politics and 'legitimate' purposes of government such as poverty reduction or addressing other social ills (Victor 2009: 14). However, it is common to tie symbolic objectives with social qualities in order to bolster public support for subsidies that mostly transfer significant financial resources to concentrated economic interests (Koplou 2007). Indeed, this is not difficult to do, as with 'so many goals, there is rarely a shortage of inspiration for government to invest a subsidy to serve some purpose' (Victor 2009: 14).

With large financial flows at stake, groups organize to capture the economic rents that changes in government funding, market rules, or tax policies can send their way. These returns may be directly pecuniary, such as grants or artificially low consumer prices. However, they may also come in the form of greater market power or reduced market risks. In the case of declining or globally-inefficient industries, the primary impact of subsidies may be enabling globally uncompetitive firms to remain in the market, avoiding either closure or expensive restructuring. Even subsidies that initially start primarily to support social policies can, over time, be altered such that a greater share of the total support flows to more powerful segments of society.

Incumbents block reform. Though modifications do happen, the political process can make them challenging to accomplish. Even existing subsidy beneficiaries are often unable to optimize subsidy capture by modifying policies in light of new market entrants or changing market conditions, and thus they focus lobbying support on protecting what they have. This process 'locks in' political support for particular fuels, sectors, or technologies, slowing technical progress (Victor 2009: 19).⁹

The longer artificially low energy prices persist in an economy, the more difficult it becomes to escape the trap (Lahn and Stevens 2011: 20). The portion of a country's capital base that was procured assuming cheap energy grows over time, and this installed base drives up the expected economic dislocations from allowing prices to reach world market levels. Political factions benefiting from the established subsidy policies become increasingly entrenched and more sophisticated as well, compounding the challenge. While government revenues pay much of the cost of consumer subsidies, a portion is normally extracted from energy market participants as well—through regulation of prices or tax levels. These domestic energy firms face low returns, which discourage both new entrants and new investment by incumbents. The lack of new investments further worsens the stagnation.¹⁰

In practice, the economic gains from some types of subsidy policies may be short-lived. Economist Gordon Tullock noted a 'transitional gains trap' where

⁹ Victor (2009: 19) notes that blocking new entrants from tapping into a particular subsidy is an important part of protecting current gains, referencing the example of US import tariffs on Brazilian ethanol that, for many years, helped to ensure the economic benefit of US tax credits flowed primarily to US producers.

¹⁰ Steenblik (2007) describes additional categories of subsidies as *sympathetic support* (policies that influence the direction of technological development to support domestic producers) and *compensatory support* (policies that drive up input prices for downstream consumers, requiring related consumption subsidies to ensure that the higher-cost domestic products can find a market).

windfalls would accrue to market participants at subsidy initiation but would be quickly capitalized into the value of assets linked to subsidy eligibility (e.g. subsidy-eligible farm land, taxi operating medallions, legacy water rights, subsidized mineral leases). New entrants would pay more for these assets, bringing down returns on the subsidized activities to normal levels (Tullock 1975). End the subsidy, though, and asset prices immediately fall again, with the then-owner bearing the full cost. Thus, transitory gains or not, market incumbents all have a strong interest in defending the subsidy.

Poverty reduction. Most energy subsidies are ineffective policy tools to extend energy access to the poor, with high leakage rates to industry and wealthier citizens. Particularly in countries with corrupt or ineffective governance and few safety nets, however, even the small portion that does reach the poor can be important. As a result, poorly planned and executed subsidy removal schemes can disproportionately harm the lowest-income quintiles. Sudden increases in the cost of basic energy or energy-intensive goods and services (often food and public transit) can make them unaffordable, worsening energy poverty. A compilation of impacts from subsidy reform in nine developing countries, for example, found a more severe percentage decline in income or increase in expenditures for the bottom income quintile than for the top (Joint Report 2010: 80).

Where fuel price reforms inadequately addressed the basic needs of the poor prior to implementation, political unrest and sometimes violence has ensued. Many attempted energy subsidy reforms have subsequently been rolled back or weakened.¹¹

Black markets. By definition, domestic price subsidies create two-tiered pricing for what is essentially a fungible, commodity product. Intermediaries diverting subsidized supplies away from their intended recipients to sell on the black market at a higher price are common in most countries subsidizing petroleum. Because subsidy reform would eliminate the pricing disparity, people involved with the black market (sometimes including government officials) will oppose reform.

All of these economic interests play into political strategies to expand subsidies, or at least to protect existing programmes from elimination or dilution by new claimants. The concentrated benefits to subsidy recipients provide both salience and funding for organization and rent sharing with politicians or other officials who rely on such contributions to fund electoral campaigns or remain in power. In contrast, the taxpayers who ultimately fund the subsidies are a diffuse group. Any single taxpayer will not see much financial gain from beating back a particular subsidy, and absent a crisis will not invest the necessary time or money to do so.

¹¹ The Joint Report (2010: 37) notes six examples where violence and protests followed fuel price increases that were required as lending conditions by the World Bank or IMF between 1977 and 1996. In half of these (Tunisia 1983, Egypt 1977, and Morocco 1981), the price increases were rolled back. While the external requirement may have made these reforms particularly unpopular, more recent reforms initiated internally have met a similar fate, such as in Pakistan and Nigeria. Kojima (2009, 2013), GSI (2013), and IMF (2013) also provide useful reviews of past reform efforts.

15.3.2. Beating the trap: what has worked?

There have been enough attempts to reform energy prices over the years that some common guidelines have been developed (Joint Report 2010; Bacon and Kojima 2006; Coady et al. 2010; Laan, Beaton, and Presta 2010; IEG 2008; TERI 2011; GSI 2012, 2013; IMF 2013). These fall into the general categories of using broader changes within the economy to also fix energy pricing; acknowledging and addressing from the outset whatever dislocations may result from reform; communicating clearly about the costs of current policies, and both the benefits and challenges of reform; and instituting reforms that are not reliant merely on political goodwill to remain effective.

- **Macro conditions can leverage reform.** Reforms are far more likely to be successful in times of crisis, such as when the fiscal costs of the subsidy are so high that some action must be taken (Joint Report 2010: 36).¹² These periods create the political will to make larger policy shifts, despite transition costs. Crises may also involve elevated assistance from the IMF or World Bank, providing an opportunity to thoughtfully link fiscal support to structural price reforms in energy markets.¹³ National goals to join groups such as the European Union can provide similar (non-crisis) leverage. These factors were important in price reforms in the power sector within Eastern Europe (IEG 2008). Similarly, to the extent ancillary economic conditions (e.g. rising incomes, declining inflation, or the ability to boost public spending in other areas) can mute the impact of price shifts, resistance to subsidy removal will be reduced.
- **Mitigating measures should be built in from the outset.** Subsidy reforms will create some losers, and they may include concentrated and powerful interest groups. Mitigating measures can reduce resistance to change by allowing a transition period or by providing cash or in-kind compensation to the most vulnerable recipients of the subsidies. Transitional support may also sometimes be needed to achieve buy-in from powerful groups even if they don't face increased poverty from reforms. More careful targeting of the subsidy can reduce leakage rates while still protecting the needy.¹⁴ However, political pressures to expand transitional payments and derail reforms are common, and phased changes must be structured so that they are very hard to roll

¹² The World Bank notes, for example, that it has been 'difficult to engage in price reforms in petroleum- or gas- producing countries not under fiscal stress' (IEG 2008: 55).

¹³ Caution is needed on the linkage. When energy price increases were linked to accessing international assistance in the past, there was insufficient advance warning or explanation on the logic of the linkage. Political unrest resulted (Joint Report 2010: 37).

¹⁴ A World Bank survey of cash transfer programmes across multiple sectors (not just energy) found they had a much lower leakage rate than universal fuel subsidies (Joint Report 2010: 39). Reforms can also target energy resources less central to the very poor first, such as premium gasoline rather than basic kerosene (IMF 2013). Kojima (2013) notes the variety of strategies that governments have deployed to mitigate energy price impacts more broadly across the economy. These include hedging, bulk purchases, improved infrastructure and storage to reduce logistics costs, and promoting more effective price competition.

back.¹⁵ If transitional assistance is provided, the rationale for doing so must be logical and clearly stated, and the assistance must be strictly limited in scope and duration (Joint Report 2010: 38).

- **Transparency on existing subsidies and reform plans increases chances of success.** Data on subsidy programmes, conveyed through carefully designed communications, can help highlight programme inefficiencies and inequities. Too often subsidies don't even show up in budget documents, a data gap that has harmed many past reform efforts (IMF 2013: 23). Specifics on the total transfers and key beneficiaries can be important in silencing political resistance by well-organized current beneficiaries. For the general populace, education and communications on how the needs of the poorest citizens will be protected post-reform is critical. It is important that the negative effects of reform also be discussed openly (GIZ 2012). A review of scores of reform efforts by the IMF indicated that 'strong political support and proactive public communications' almost tripled the changes of subsidy reform success (IMF 2011: 47).
- **Government competence and reputation affects confidence in reforms.** Transitions require confidence that the government will have the will and the capability to make good on transitional support or other promises it made to achieve buy-in on the reforms, and to prevent backsliding that will undermine the positive aspects of the shift. Pairing subsidy reform with other reforms or actions that address long-running concerns on corruption, property rights, or welfare can help build confidence. Nonetheless, implementing reform is likely to be more challenging in countries with a history of poor governance.
- **Reforming the price mechanism is necessary to prevent backsliding.** Political support for subsidy reform ebbs and flows depending on local politics, broader economic conditions, and global energy prices. To prevent a reversion to subsidies when oil prices rise, for example, a shift from ad hoc (politically determined) energy prices to market prices is important. Where this isn't politically possible, shifting to automatic price adjustments based on internationally-measurable benchmarks is a second-best strategy to reduce (though not eliminate) the risk of backsliding (Coady et al. 2010; IMF 2013: 32).

15.3.3. Segmenting subsidy traps can help identify promising reform strategies

Individual country circumstances vary, and past experience indicates that not all attempted subsidy reforms succeed. However, there are a number of variants on the subsidy trap problem rather than a single one, and tailoring reform strategies to the type of subsidy in place can be helpful in boosting the success rate. Table 15.4 details the main policy issues and provides examples of appropriate reform strategies for each.

¹⁵ Transitional payments to accompany fuel price reforms in Iran, for example, quickly expanded to cover a larger and larger portion of the population and ended up costing more than the original subsidies did (Kojima 2013: 30).

Table 15.4. Escaping the subsidy trap varies by policy type

Policy area and related reform trap	Potential solutions
<p>Subsidized extraction or market rights Inexpensive access to raw materials or allocated market rights (e.g. operating permits or export licenses) provide windfall to initial recipient. Rights may be politically allocated rather than merit- or auction-based. Recipients often include state-owned enterprises.</p>	<p>Offset transitional losses via grants, tax write-offs, or slow phase-in. Political risks during transitional phase as incumbents seek to obtain new subsidies and also derail reform of old ones.</p>
<p>Asset prices often rise to reflect the enhanced value of the opportunity, though resale of rights at higher prices means subsequent owners earn only normal returns.</p>	<p>Publicizing the full costs of subsidies and their beneficiaries can be useful. Expanding beneficiaries of reform to include the populace (as with royalty trust funds that are required to distribute dividends each year) can also alter the political dynamics of reform. Privatization can be useful for nationalized assets or firms, forcing a shift to more market-based operations.</p>
<p>Incumbents fight reform or new entrants. National owners may be focused on politically-based wealth redistribution rather than efficient management.</p>	
<p>Socialization of high-risk portions of fuel cycle Advocated to ‘jump start’ risky technologies, key technical, environmental, or financial risks of fuel cycles are capped or shifted entirely to the public. Common in both developed and developing countries; examples include transport support to access Arctic oil, government investment into oil sands, socializing nuclear waste management and accident risks, and capturing carbon emissions from coal.</p>	<p>Key points of leverage are at policy inception. Force competition between all higher-cost marginal supply options rather than looking at a fuel or field in isolation. Re-price the government services giving rise to the subsidy so that fees adequately compensate taxpayers for the risks they are taking on, rather than targeting break-even at best. Finally, tightly restrict the subsidy duration and eligibility to ensure rapid phase-out as conditions change (including rising energy prices) and to prevent ‘subsidy creep’ to an ever-broader set of recipients.</p>
<p>Policies mask critical price signals, accelerating development of resources that may have elevated environmental problems or public risks at the expense of alternatives. Government involvement becomes an unquestioned part of fuel cycle economic baseline.</p>	
<p>Consumer subsidies <i>To general populace.</i> Despite high leakage rates, consumer subsidies remain important to many of the poor in the developing world. Because reform can cause undesired hardships for this group of citizens, inadequate planning and communication related to energy price increases, or a failure to build sustainable support for reform and credible substitute safety nets for the poor, have often resulted in popular unrest and violence.</p>	<p>Political support for reform is an absolute prerequisite. A credible transition plan drives success here: phased price adjustments; clear communication and education to affected sectors on reasons and impacts; and replacement of fuel subsidies to the poor with more efficient instruments such as cash transfers or vouchers.</p>
	<p>Challenges include a large black market or corruption; lack of a competent government to deliver replacement support; or an inability to limit transitional support only to the groups that need it. Even if somewhat inefficient, replacement policies may nonetheless improve on the prior subsidies.</p>

To industrial and commercial sectors. Subsidized energy prices for industrial and commercial infrastructure skew investment patterns and over time result in 'subsidy clusters' filled with energy-inefficient plants, equipment, and buildings. Export-based commodity industries are particularly at risk from these policies over time, as they have limited ability to pass through higher fuel prices to customers. They are likely to resist reform more strongly than other sectors.

Black-market intermediaries. Dual-tier pricing to consumers supports smuggling and black markets as well. These groups will seek to block reform to protect their market, sometime violently.

Pricing networked energy services (power, natural gas) at below long-term break-even

Existing customers may mobilize to protect favourable pricing, or to prevent extensive enforcement against resource theft or non-payment of bills.¹⁶ Groups most hurt by these conditions tend to be the very poor who are not currently serviced by transmission or pipeline networks. They are not politically mobilized or powerful, and tend to be ignored.

Inadequate revenues over time lead to decay in existing infrastructure and returns too low to justify enhanced service quality or expanded service area.

Phase-in of reforms can signal firms they need to re-price energy costs in all new capital decisions while reducing premature retirement of existing capital.

Direct subsidies to capital replacement may also be useful in particular sectors, such as when both the energy suppliers and the industries are government-owned. However, they are politically difficult to target efficiently and so should be used sparingly.

Market adjustments to privatize parts of the fuel cycle or allow in new competitors can also spur upgrades more quickly. For inefficient real estate infrastructure, mandated disclosure of heating and cooling costs can establish building operating costs as a competitive attribute of leases or sales.

Full elimination of dual pricing structures can eliminate the black markets but can also cause other unrest. Using electronic debit cards to ration subsidized fuel or deliver lump sum cash payments in lieu of fuels can protect the poor, better target subsidies, and reduce or eliminate black market diversions. These approaches still require basic competence within the government, and thus sometimes break down. However, they can be a useful transition to market-based pricing, or to deliver substitute benefits.

Quantifying the costs of the market distortions, particularly to business and the poor, may help undermine any popular support the illegal operators have.

Evaluation and disclosure of the scale of subsidies, and the groups that benefit most from them, can alter the political dynamics of reform. More clearly delineating the costs of unreliable and low-quality power can also help achieve buy-in for better maintenance, system upgrades, and enforcing non-payment and power theft. Surveys indicate that many customers are willing to pay more for higher-quality power (Komives et al. 2005).

More targeted subsidies to overcome barriers to access for key user groups such as the poor are far more efficient than maintaining low prices to all users. Obtaining separate funding for this group as a welfare transfer can protect the utility against

continued

¹⁶ The World Bank (Komives et al. 2005: 1) notes that '[s]ubsidies to utility customers are widely popular among policymakers, utility managers, and residential customers alike, and yet subsidies remain the subject of much controversy'.

Table 15.4. Continued

Policy area and related reform trap	Potential solutions
<p>Cross-subsidies in power distribution, bulk energy transport</p> <p>Gross revenue targets may support basic network operations but only by large cross-subsidies among customer classes that create inaccurate price signals for consumers and for utility planning. Favoured classes may also organize politically to protect their status.</p>	<p>the revenue erosion that cross-subsidies can sometimes cause. Support payments predicated on adequate power efficiency, reliability, and quality can further spur better operations.</p> <p>Any reform will be more difficult if existing managers or utilities are viewed as corrupt or inept. In some cases, privatization can help align management interests with service efficiency. This is more difficult with utility-like services than with other sectors, as some natural monopoly aspects of the networks remain; solid regulatory oversight and enforcement would also be needed.</p>
<p>Urban areas often face elevated charges to fund the higher cost of serving remote, low-density loads. Efficient break-points for grid extension versus decentralized power resources or suppliers are therefore lost.¹⁸ IEA estimated that 93 per cent of the energy supply gap for mini-grid or off-grid supplies would be renewable; in that context, the cross-subsidies appear a significant market impediment for renewable technologies (IEA 2011b: 89). Cross-subsidies between higher-income and lower-income customers are also common, though these can be challenging in utility systems where overall revenues barely suffice to meet operational needs.</p>	<p>Cost transparency is needed to highlight the real economics of different customer classes; this is helpful whether or not the information is immediately used to alter tariffs. Particularly in regions with sparse distribution infrastructure currently in place, proper costing should make decentralized power options more viable in many areas.¹⁷</p>
<p>Challenges differ somewhat depending on whether expanded access involves boosting connection rates to an existing grid or requires grid extension.</p>	<p>With accurate data, better decisions can be made on which groups require cross-subsidies and how best to fund those needs.</p> <p>Although consumption may be subsidized for poor customers, connection fees and fixed monthly charges may remain high, resulting in many citizens not connecting to the grid. Targeted funding to cover the connection costs can be important in making expanded access work. Development aid is one funding source; redirecting savings from subsidy reforms (particularly provisions with high leakage rates) is another.¹⁹</p>

¹⁷ Grid extension, separate mini-grids, or decentralized power resources can all be appropriate solutions to extended energy access, both individually and sometimes in combination. Policy frameworks will perform better if they don't bias decisions on the best service delivery model (World Bank 2010: 14).

¹⁸ Rising power distribution and transportation costs in rural areas make off-grid sources of supply, including mini-grids or home-based solar systems, more economic. High-cost supplies that need to be distributed into areas with a low population density remain a challenge, but the off-grid solutions are nonetheless cheaper (World Bank 2010: 25).

¹⁹ High fixed charges for connections can undermine lifeline rate structures for low-consuming customers (Komives et al. 2005: 87).

15.4. SUMMARY

Energy subsidy reform has attracted increasing attention and research in recent years as a useful lever to help countries reign in fiscal deficits, redirect public spending to areas with higher social benefit, and avoid undermining efforts to address global climate change. Financial subsidies totalled nearly \$840 billion in 2011, and more than \$3.5 trillion over the 2007–11 period. External costs of energy systems, primarily fossil fuels, are estimated to be an additional \$1.6 trillion per year, and are additive to the financial subsidies in distorting the energy prices on which energy investment and deployment decisions are made. Combined financial subsidies to energy plus external costs amount to more than 3 per cent of global GDP. For many developing countries, spending on fossil fuel subsidies exceeds what governments spend on health care for these populations and absorbs an unsustainable amount of federal budgets.

Spending on fuel subsidies mostly leaks to higher income quintiles rather than helping improve the lives of the world's poorest citizens. The lost opportunity is huge: annual subsidies are more than 30 times the incremental funding needed to achieve universal access to modern energy services, a transition the IEA notes would bring with it large improvements in public health and quality of life. OECD countries, on average, are subsidizing fossil fuels at a rate five times the level they are willing to commit to addressing climate change around the world. The potential to achieve a variety of important social goals by redirecting current subsidy flows is clear. Yet despite the strong logic of reforming subsidies, many countries are trapped into continuing existing policies because ending them would cause political unrest among current beneficiaries or because they are unable to credibly provide an alternative safety net for the poor.

Successful reform efforts have involved a number of common themes. Leveraging macro-economic changes to incorporate price reforms can help governments implement reforms during periods that will cause less dislocation. Advance planning is needed, however, so as to be ready to implement changes when conditions are good.

Assessing which groups are likely to lose under reform and building in appropriate mitigation measures from the outset, particularly to protect the poor, has been critical in avoiding popular unrest as subsidies are phased out. Integrating subsidy reform more directly with universal energy access targets is also important. Many existing subsidies have been justified based on claims that they helped the poor; it is only fair to ensure that a portion of the savings is deployed to help achieve that goal. However, just as improperly-targeted government energy subsidies bleed budget capacity away from higher-impact social spending, so too does underpricing of grid-based power or gas erode the ability of utilities to remain viable and expand. Accurately measuring both utility subsidies and cross-subsidies is a first step in fixing the problem. Even if tariffs do not immediately change to target only those who need them, better decisions amongst core options can be made, such as whether to extend grids, to subsidize connection and fixed costs to existing grids, or to reach new areas via decentralized power resources rather than line extensions.

Particularly for very low income customers, subsidizing the tariff per kWh may be less important than reducing the connection fees and monthly fixed costs of services so that small initial increments of power or natural gas become affordable. Subsidies to clean cooking facilities have focused on technologies that can be supported at a small scale by an indigenous industry, rather than being reliant on outside support and providers. It would be useful to deploy additional funds freed up by subsidy reform to extend this type of approach.

The most difficult challenges of subsidy reform and effective redeployment of the savings to achieve goals such as universal energy access are political. A consistent finding from reform case studies is the importance of gathering much more detailed information on subsidy costs and core beneficiaries than is routinely collected, using that information to overcome more powerful vested interests that will try to block reform, and communicating transparently about both the benefits and the risks of planned changes. To ensure that successes are not rolled back in short order, the reform strategies—particularly how energy prices are set—need to be incorporated into the legal framework of the country rather than remaining within the decision-making domain of policymakers.

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