

FOSSIL FUEL SUBSIDIES: THREE QUESTIONS, EVIDENCE AND WAY FORWARD

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The views expressed in this Note are those of the author and do not necessarily represent the views of either the Government of India or the global Green Climate Fund (GCF). The Note is intended to help frame certain key analytical questions, and shape some re-thinking on globally cooperative efforts to address fossil fuel subsidies and climate change actions.

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The G-20 has committed itself to rationalize and eliminate inefficient fossil-fuel subsidies, with targeted subsidies for the poorest. The analytical basis, and measures, could be improved. This Note, in that context, asks three questions---rationale for the proposal, measuring the ‘subsidy’, and addressing energy poverty---and some evidence. It concludes with a ‘Way Forward’ that is likely to be more conceptually demanding, but more effective, equitable and efficient for globally cooperative outcomes.

Question 1: What is the Rationale for the G-20 Focus on Eliminating Fossil-Fuel Subsidies? And is it well based on evidence?

The G-20 declaration in Los Cabos, 2012 had this to say on climate change and fossil-fuel subsidies, with my highlighted emphasis:

‘We emphasize the need to structurally transform economies towards a climate-friendly path over the medium term. We welcome the creation of the G20 study group on climate finance, in order to consider ways to effectively mobilize resources taking into account the objectives, provisions and principles of the UNFCCC in line with the Cancun Agreement and ask to provide a progress report to Finance Ministers in November. We support the operationalization of the Green Climate Fund (para 71).

We welcome the progress report on fossil fuel subsidies, and *we reaffirm our commitment to rationalize and phase out inefficient fossil fuel subsidies that encourage wasteful consumption over the medium term while providing targeted support for the poorest.* We ask Finance Ministers to report back by the next Summit on progress made, and acknowledging the relevance of accountability and transparency, to explore options for a voluntary peer review process for G20 members by their next meeting. We also welcome a dialogue on fossil fuel subsidies with other groups already engaged in this work (para 74).’

There are potentially three reasons for the G20 to focus on eliminating fossil-fuel subsidies. The first is that it makes macroeconomic sense, since the subsidies are a drag on the fiscal outcomes, especially in fiscally stressed settings. Second, by the same token, it raises potential financing resources to address climate change investments, globally and nationally---promoting alternative paths of growth even as it shifts price incentives away from the current heavy reliance on fossil fuels towards a low-carbon path (the ultimate objective). Third, it might help reduce “wasteful” consumption of fossil-fuels.

The G-20 focuses on the third reason as the main one. The often common related assumption is that fossil fuel ‘subsidies’ are high in emerging developing countries, as opposed to that in developed countries. Is this correct? Which of the three possible reasons for a focus on raising fossil-fuel prices to more economic levels (read eliminate inefficient ‘subsidies) makes most sense, why, and in which countries should the focus be as far as moving rapidly on climate change actions and their financing?

Subsidy elimination involves essentially an argument for raising fossil-fuel energy prices substantially higher to more economic levels. We shall turn to the question of correct measurement of such economic subsidies in the next section. But an important prior question is to understand whether higher prices actually results in substantially reduced consumption of fossil-fuels, and therefore makes the stated G-20 objective and instrument well aligned? We report in Table 1 below Price and Income Elasticities of Energy Demand by various sources of energy for both developing and developed countries (which represents a likely range).

It turns out that fossil-fuel and energy price elasticities are remarkably low, whether in the short-run (SR) or in the longer-run (LR). It is near-zero in most developing countries in the short-run, and becomes slightly higher in the longer-term but still remains very low and inelastic---because essentially there are very few viable technologies and alternatives to modern energy demand other than from fossil-fuels in virtually all developing countries. Fossil-fuel prices would therefore have to be raised dramatically to have any significant effect on quantities.

In the case of kerosene in rural areas, or LPG and electricity in urban areas, there is a (surprisingly) higher price elasticity in developing countries (in sharp contrast to that in developed countries). But the reason is that for poor households at very low energy consumption levels---contrast with developed countries---households have the option and will shift back to traditional and alternative energy for lighting and cooking (e.g., firewood, sticks, agricultural residues), or do without. This potentially adds to the problem of carbon emissions and negative impacts on health and education. It is simply not correct to say that because most of the subsidies accrue to higher income households, higher prices for fossil-fuels do not matter for the poor. They do matter.

In developed countries too, fossil-fuel price elasticities are also relatively inelastic (higher in the longer-run) because of the consumption life-styles, technologies and other institutional policy biases that favor road transport and burning of cheap natural gas and coal for heating and electricity. As incomes grow (and as income disparities also widen favoring higher income-brackets), they dominate quantities consumed.

The ongoing structural shifts in world oil demand, with rising demand in non-OECD countries, has the additional effect of lowering price responsiveness. World demand growth by 2030, in the absence of other accompanying non-price interventions (i.e., new non-fossil-fuel investments and technology) is potentially being seriously under-estimated; the sub-period breakdowns suggest that the world (G-30) long-run price elasticity was four times greater between 1971-89 than in 1989-2008 (-0.65 versus -0.15; Dargay and Gately, 2010).

In sharp contrast, in both cases, **income-elasticities** are much higher than price elasticities, near unity, except in road transport in developed OECD countries, where they well exceed unity.

Table 1: Price and Income Elasticities of Fossil Fuel Use

	Price Elasticity Fast-Growing Developing Countries SR (LR)	Price Elasticity OECD SR (LR)	Income-Elasticity Fast-Growing Developing Countries LR	Income Elasticity OECD LR	
Total Oil	-0.03 (-0.07)	-0.028 (-0.25)	0.87	0.88	
Residual Oil	-0.04 (-0.37)	-0.054 (-1.2)	0.49	0.56	
Other Oil	-0.04 (-0.07)	-0.027 (-0.31)	1.17	1.11	
Electricity	-0.87	-0.1 (-0.4)	0.78	0.96	
Kerosene/LPG	R:-0.75/U:-1.01	-0.25 (-0.51)	R:0.84/U:0.94	0.94	
Gasoline (4)	(-0.36)	(-0.33)	1.37	1.41	
Diesel (4)	(-0.13)	(-0.38)	1.12	1.60	

Source: (1) Dargay, J., D. Gately and H. Huntington, December 2007. Price and Income Responsiveness of World Oil Demand, NYU; Dargay, J and D. Gately, 2010. World oil demand's shift toward faster growing and less price-responsive products and regions, NYU. (2) Bernstein and R. Madlener, 2011. Residential Natural Gas Demand Elasticities in OECD, Aachen University. (3) Athurokala W. and C. Wilson, 2005. Estimating Residential Demand for Electricity: Application of Co-integration and Causality Analysis, Queensland University of Technology. (4) Dahl, C, 2012. Measuring global gasoline and diesel prices and income elasticities, Energy Policy (41) pp2-13; (5) Gundimeda, H. and G. Kohlin, 2006. Fuel Demand Elasticities for Energy and Environmental Policies Indian Sample Survey Evidence. (6) Espey, M. 1998. Gasoline Demand revisited: A meta-analysis of elasticities, Energy Economics (20)

A second empirical detail that is often over-looked but vital in this context is to actually seek to measure how well or not developing countries have actually adjusted their fossil-fuel prices in recent times (Table 2).

This also has to be seen in the context of high volatility in commodity prices and cycles in global markets that sometimes have more to do with known market imperfections in global fossil-fuel commodity and global financial markets, and escalating geo-political conflicts, as distinct from 'fundamentals'. There is also no clear benchmark of a 'competitive' market price for many fossil-fuels¹. Therefore, the conceptual definition of an economic subsidy remains problematic (see further in next section). The price volatility of many fossil-fuels additionally makes both the measurement of such economic subsidies conceptually difficult (e.g., should the benchmark be a moving average of world prices, if so, over what period; and what is the 'true' economic cost in the absence of market imperfections?).

¹ The law of one, 'competitive and efficient' fossil fuel price is routinely violated. Oil and gas prices are heavily influenced by producer cartel and dominant producer strategies in world markets. There is no clear-cut empirical evidence and the best that can be inferred is that the cartel's power is not constant and tends to vary (B. Fattouh and L. Mahadeva, 2013. OPEC: What Difference has it Made?) and may be more akin to an optimal price-leader strategy (Smith, J. 2009. World Oil: Market or Mayhem? CEEPR, MIT and Sloan School; Bockem, S. 2004. Cartel Formation and Oligopoly Structure: a new assessment of the crude oil market). Large oil companies may also influence prices, and sudden 'spikes' are evidence of bubbles and inefficiencies. Within each fossil-fuel category, there are also large 'quality' and geographical price segmentations, such as Brent and West Texas Intermediate crude oil, natural gas between North America, Europe and Asia, and incomplete integration of global coal markets with short-run dynamics in individual markets unexplained by transportation costs (Zaklan A., A. Cullmann, C. Neumann and C. von Hirschhausen, 2012. The globalization of steam coal markets and the role of logistics: An empirical analysis. Energy Economics, Vol. 34, No.1).

Despite this context, and large difference in ‘capacity to pay’ between the rich countries and the poor countries, the scale of adjustment of fossil-fuel prices in developing countries at very low levels of ‘life-line’ average consumption has been remarkably good. For example, net oil importing countries had a pass-through coefficient of 99% for gasoline, and 90% for diesel, only slightly lower than for all High Income Countries (with much higher incomes, and more diverse sources of fuel and technologies).

The problem is primarily a narrow one related specifically to net oil exporters and their immediate region, where the circumstances are complicated by the issue of ‘rent’ distribution.

Moreover, there is no evidence that developing countries have seen a rise in ‘wasteful’ consumption of fossil fuels in terms of measured changes in energy-intensity of their economies: all have seen a significant decline in energy intensity (Table 3), the highest among the Upper Middle Income countries; the relative laggards are, in fact, the Developed Countries and oil exporting regions.

Table 2: Pass Through Coefficients (percentage) for Gasoline and Diesel (percentage of Countries in Each Category, Except median), 2009-2012

Category	Median Pass-through (G/D)	<0	0-50	50-75	75-100	100-150	>150
Low Income	65/61	0/0	31/31	25/25	13/25	19/19	13/0
Lower Middle	70/78	13/21	25/25	8/8	21/21	33/25	0/0
Upper Middle	95/96	12/8	16/16	8/20	20/20	32/32	12/4
High	135/114	0	0	0	13/13	63/8	25/0
Net Oil Importer	99/90	2/2	18/20	11/13	20/29	38/33	11/2
Net Oil Exporter	36/18	25/30	35/30	15/25	15/5	10/10	0

Source: Kojima, M. (2012), Oil price Risks and Pump Price Adjustments, Policy Research Working Paper 6227, World Bank. Pass-Through Coefficient defined as change in Retail price over Change in Benchmark Fuel price (%)

Table 3: Change in Energy Intensity By Country Income Category and Region, 1999-2008

Category	Median	<-15%	<-15-5%	<-5-0%	>0-5%	>5%
Low Income	-0.4	0	6	52	39	3
Lower Middle	-0.5	2	4	56	32	4
Upper Middle	-0.9	8	6	61	22	2
High	-0.4	0	0	72	28	0
South Asia	-0.5	0	0	57	42	4
Middle East &NA	-0.1	8	0	42	42	8

Source: Kojima, M. (2012), Oil price Risks and Pump Price Adjustments, Policy Research Working Paper 6227, World Bank. Pass-Through Coefficient defined as change in Retail price over Change in Benchmark Fuel price (%)

The overall evidence is clear:

- Fossil-fuel ‘subsidy’ elimination, in most developing countries, by itself may do very little directly to reduce fossil-fuel demand in developing countries, or for that matter, in developed countries, or for the world economy as a whole---because the price elasticities are so low and falling, and because the income-elasticities are so much higher and will therefore lead to consistently higher consumption growth with faster income growth expected in developing countries over time. ‘Subsidy’ elimination

therefore has inherently limited ability to achieve its objective of reducing “wasteful” consumption, however apparently logical that it may appear.²

- The pass-through coefficients of recent fuel price adjustments measured over 2009-2012 in developing countries has been remarkably good: 90-99% for gasoline and diesel, and further delayed adjustments are taking place consistent with smoothing price shocks given exceptional volatility in global oil and energy markets.
- The reductions in energy-intensity of the economies in developing countries have out-paced those in developed economies, despite far more energy insecure economies, limited incomes, and limited access to technology. There is therefore no evidence to support the argument about subsidies on fossil-fuels as the main source of ‘wasteful’ energy use in developing countries. Instead, rapid new technology shifts to renewables, altered sector investments in transport and energy demand, together with rising energy-efficiency standards and regulations, and improved access to modern alternative energy for households, as well as price and non-price incentives, are needed—all critical elements of a ‘low-carbon’ growth path that will raise costs substantially.
- Subsidies for certain products, such as kerosene or LPG cylinders are provided because there are very energy-poor households, often with no access to other modern energy, and are much more price elastic households—and will revert to inefficient traditional sources or do without if prices are sharply raised. The fact that it is poorly targeted is clearly an important issue, but (means or income tested) is not easy to design or implement, especially where the populations below and above any chosen specific and low income cut-off are large. If ‘energy poverty’ is an issue even in the richest countries, it is much more so in developing countries (see later).
- There are a small number of countries, mostly in the oil-producing and exporting countries in the Middle East & North Africa, that choose to keep their domestic fossil-fuel and energy prices very low, mostly for their own domestic political economy reasons in terms of sharing the “rents” within their borders that the rest of the world provides to them. In only these places do we really have the problem and potential for substantial savings in “wasteful” consumption, but that remains a small number of countries.
- Eliminating fossil-fuel subsidies are, however, a near-perfect fiscal instrument---in both developing and developed countries---for precisely the same reason, because of very low price-elasticities of demand. This by itself has little directly to do with global climate change mitigation and reduction of fossil-fuel use; in other words, the

² Even the second joint report to the G-20 by the IEA, OECD and the World Bank acknowledges that their estimated reduction of fossil-fuel demand by 2020 would essentially be a relatively small ‘blip’ in global demand, estimated to fall by 5% by 2020 if all countries eliminated their fuel subsidies, when what the world needs is in fact a much larger decline in “unburnable” fossil fuels (**Unburnable Carbon 2013: Wasted Capital and Stranded Assets**, Carbon Tracker Initiative, Grantham Research Institute, Climate Change and the Environment)

argument for elimination of fossil-fuel subsidies in developing countries rests primarily on a fiscal issue, and we examine this further (below).

- If the G-20 declaration is, however, taken seriously by its constituents as a globally cooperative pact to address climate change outcomes and reducing fossil fuel use globally through fossil-fuel pricing policy changes, then there are three vital reasons to immediately start to raise fossil-fuel prices in developed countries through the imposition of adequate carbon taxes on fossil-fuel use to significantly higher levels: (1) to *fiscally fund and finance global mitigation efforts* and alternative green technologies (in both developed and developing countries), improve their alarming near-term fiscal circumstances, and fully fund their obligations to finance adaptation and mitigation efforts in developing countries, on which there is little measurable real progress; (2) price fossil-fuels to more appropriate economic levels in developed countries, *taking into account the large negative externalities and climate change risks imposed by their current levels of massive fossil-fuel use on a per capita basis*; and, (3) set their energy prices at higher and more predictable levels to *endogenously attract and make viable many new technology investments in alternative energy by the private sector and in financial markets that are ‘waiting in the wings’*.

Question 2: What is the Right Economic Price of Fossil-Fuels on an acceptable basis so that we know what the true levels of economic subsidies are in both developed and developing countries? And how should we apply this to be non-regressive and fair burden-sharing on costs?

One other key problem with the G-20 declaration that has bedeviled any sensible approach to eliminating fossil-fuel subsidies is how to measure such subsidies on an acceptable economic basis. All countries impose taxes on fossil-fuels in one form or another, such as import taxes or sales taxes and local consumption taxes. On the other hand, many also subsidise such fuels through a range of instruments, such as targeted ones to poor households, by less well-targeted means such as by type of fuel source, and sometimes by taxing distribution companies or domestic producers, or conversely, by providing large amounts of producer subsidies in one form or another. Looking only or primarily at government budgetary heads of such expenditures on subsidies is therefore not very useful, because of complex measurement issues with respect to cross-taxation and subsidies, and hidden or implicit taxes and subsidies.

In addition, we need a way to take into account the negative externalities of fossil-fuel use through its effects on carbon emissions, with big users often being hidden from their effective subsidies because we don't account for such negative externalities. We need to factor in the true carbon price, including such negative externalities.

Finally, incomes and the capacity to pay must be factored, in setting such economic prices inclusive of negative externalities by different countries. In particular, any uniform price of fossil fuels, regardless of relative incomes across countries, is not the correct measure, because it will impose a regressive taxation when it comes to designing the economic price of fossil fuels globally---especially once we admit that fossil fuels have to be taxed for their negative externalities. We illustrate all these issues and their implications for the elimination of fossil-

fuel subsidies across countries as stated in the G-20 declaration further below. Again, the emphasis is on evidence and an empirical approach.

The standard budgetary measurement of subsidies results in quite distorted outcomes. The OECD notes in particular the problem identified above, and the current two approaches:

'The estimates from the IEA and the OECD are based on two different approaches, which provide distinct but complementary information. For that reason, the two sets of data are not directly comparable and cannot be added.

'The IEA's analysis of energy subsidies utilises the price-gap approach which compares the end-use prices paid by consumers, with reference prices (i.e. prices that would prevail in a competitive market).³ The difference between the consumer price and the reference price is the price gap, and subsidy removal amounts to its elimination.

For countries that import a given product, subsidy estimates derived through the price-gap approach are explicit. That is, they represent net expenditures resulting from the domestic sale of imported energy (purchased at world prices in hard currency), at lower, regulated prices. In contrast, for countries that export a given product – and therefore do not pay world prices – subsidy estimates are implicit and have no direct budgetary impact. Rather, they represent the opportunity cost of pricing domestic energy below market levels, i.e. the rent that could be recovered if consumers paid world prices. For countries that produce a portion of their consumption themselves and import the remainder, the estimates represent a combination of opportunity costs and direct government expenditures.

The OECD inventory addresses a broader range of measures used in OECD member countries, including many that do not reduce consumer prices below world levels. It uses a broad concept of support that encompasses direct budgetary transfers and tax expenditures that provide a benefit or preference for fossil-fuel production or consumption, either in absolute terms or relative to other activities or products. No judgment is therefore made as to whether or not such (tax expenditure) measures are inefficient or ought to be reformed. Since the benchmark tax treatment varies from country to country, the value of this type of support is not comparable across countries.'

Despite these shortcomings, the second joint Report submitted to the G-20 (and influencing their deliberations) concluded that the total fossil-fuel subsidies were some US\$323 billion in 2009, using the IEA approach, and that virtually all of it (95%) in terms of consumption subsidies was taking place outside the OECD countries---meaning in the developing world---whereas for production subsidies, it was more balanced. Here is the latest updated statement from the IEA chief:

"Figures from the IEA show that global fossil fuel subsidies jumped to \$523bn in 2011, which Birol said represented an incentive to emit carbon equivalent to \$110 per tonne. In contrast, the EU emissions trading system currently provides a disincentive to emit carbon of less than \$10 per tonne. Analysts argue that the bulk of fossil fuel subsidies are found in developing and emerging economies...."

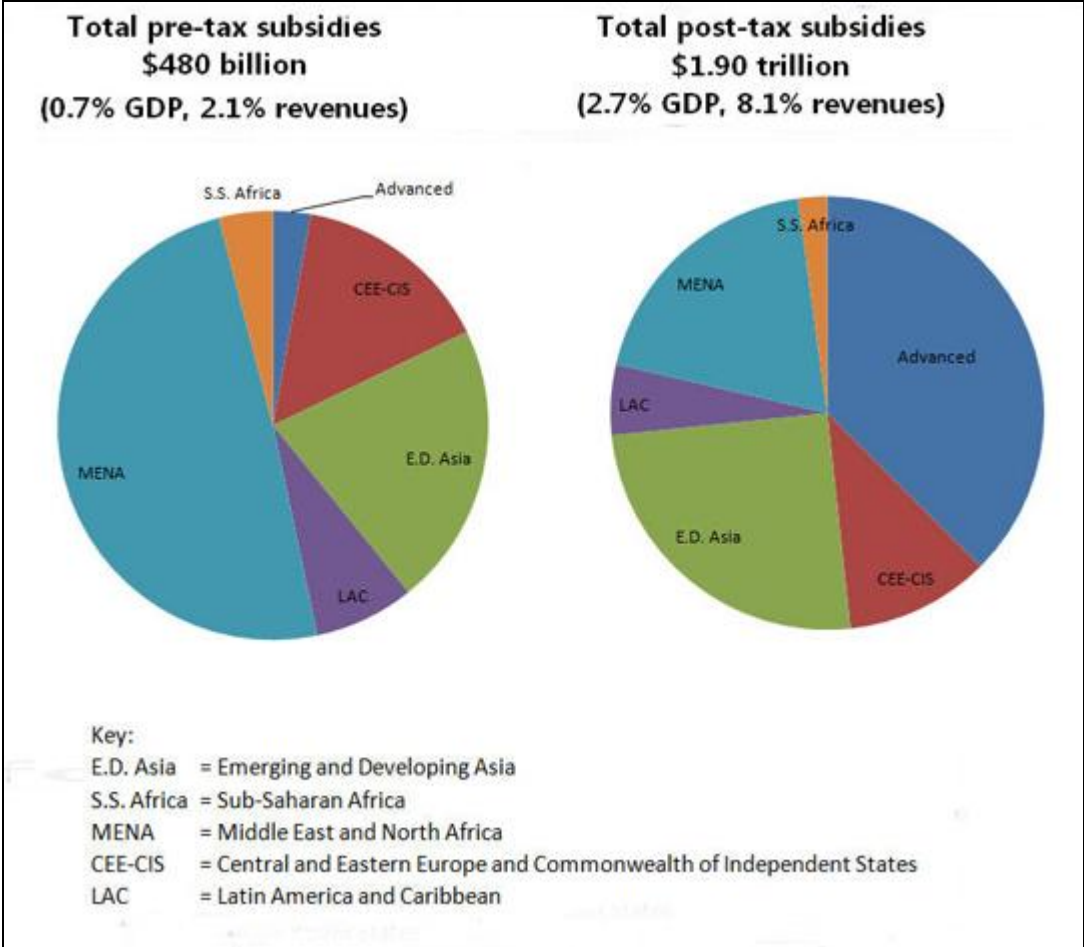
The IMF in its latest paper on the subject⁴ has gone further than the previous studies in addressing some of these fundamental issues. It provides uniform estimates of both pre-tax consumer subsidies (similar to the IEA estimates), as well as post-tax energy subsidies that

³ See earlier extensive remarks and footnote about the difficulties of a 'competitive' market in fossil-fuels.

⁴ IMF, 2013. Energy Subsidy Reform: Lessons and Implications

tries to take into account a “corrective Pigouvian tax” to account for externalities associated with CO2 emissions, local pollution and the like; and a revenue component, reflecting ad valorem equivalent taxes consistent with taxation of any commodity.

The results are now evidently more balanced as to the distribution of implicit “energy subsidies”: (1) estimated pre-tax subsidies (US\$480 billion) are heavily weighted towards oil-producing countries in the Middle-East; and (2) calculated post-tax subsidies (US\$1.9 trillion) are greatest in the developed countries.



Source: IMF, 2013

There are some other assumptions in the IMF analysis that merit further attention. First, a uniform global carbon warming damages of US\$25 per ton has been assumed, (which translates into about \$0.05-0.06 per litre of gasoline or diesel). Second, some adjustment for ‘willingness-to-pay’ has been made for the **non-carbon** corrective fuel taxes (assuming an income elasticity of 0.8 between willingness to pay for reduction of externalities, and per capita income following an OECD study). Note that the authors do not make the same adjustments to the **carbon price**.

A key issue is whether a uniform carbon price above in the latest IMF study makes sense or not, given very large income differences across countries, especially in terms of equity.

Let me focus for a moment on the uniform carbon price assumption. A search through the empirical literature shows several very strong arguments and evidence instead for a non-uniform price and/or combined with substantial income compensatory arrangements⁵:

- An ‘uniform’ price for fossil-fuels leads to the highest effective prices for consumers in poor countries, when adjusted for incomes; for example, among 55 countries, Indian consumers paid the highest price for gasoline relative to incomes and Switzerland, Norway, Australia and the United States the lowest
- Schroeder (2008) argues that an uniform carbon tax would place a disproportionate burden---a regressive tax incidence which is well established⁶---on developing countries given differences in per capita incomes, and instead a carbon tax should be levied on the basis of per capita carbon emissions⁷
- Another study (d’Autume et. al. 2012) argues that if a global uniform tax is adopted, then it has to go-hand-in-hand with substantial cash transfers from the richer to the poorer countries to address inequity.⁸
- Crampton and Stoft (2011) goes further, to demonstrate in a game-theoretic framework that a global agreement to an uniform carbon price is important and has to include equity based transfer payments through a ‘global green fund’, with payments transparently and explicitly linked to per capita emissions and is essential to bring about cooperation (lowest marginal costs of abatement will carry the highest social costs, and vice-versa, and therefore the burden of adjustment is highest for the poorest countries otherwise).⁹
- Landis and Bernauer (2012) argue that there is yet another reason, why an uniform carbon price, if agreed, has to accommodate substantial transfer payments (e.g. \$27 billion a year from OECD to non-OECD countries) to make the system work, because

⁵ Exactly analogous to the argument for cash transfers to poor households within countries made in the IMF study: ‘The fifth element in successful subsidy reform, and in some ways the most critical, is to implement mitigating measures to protect the poor. Targeted cash or near-cash transfers, such as vouchers, are the preferred approach. Cash transfers give beneficiaries the flexibility to purchase the amount and type of energy that best suits their needs, or to buy other goods and services’. Energy Subsidy Reform: The Way Forward, Presentation by David Lipton (IMF)

⁶ Gale, G. 2013. Carbon Taxes as Part of the Fiscal Solution, Brookings.

⁷ Schroeder, F. 2008. Carbon Taxes for Managing Climate Change, G-24 Policy Brief No. 27.

⁸ Antoine d’Autume, Kathleen Schubert and Cees Withageen, 2012. Towards an Unified Global Tax on Carbon, Paris School of Economics, July.

⁹ Crampton, P. and S. Stoft, 2011. Global Climate Games: How Pricing and a Green Fund Foster Cooperation, University of Maryland and Global Energy Policy Center

different countries have different discount rates to investing in emission reductions versus other growth objectives.¹⁰

What is abundantly clear from all of the above are 2 things: (1) the ‘right’ price for fossil-fuels, and therefore the extent of fossil-fuel subsidies is still not certain and well-defined in the context of global climate change, and will need to wait for a global agreement on what constitutes an efficient and equitable carbon price across countries that reflects differences in per capita emissions of CO₂, and therefore of per capita fossil-fuel use, and/or differences in per capita incomes; and (2) if an ‘uniform’ carbon price is sought to be applied that also includes the negative externalities associated with fossil-fuel carbon emissions¹¹, then it must be also accompanied by substantial and ‘unconditional’ public transfers (one estimate being US\$27 billion a year) from richer (above world average per capita emissions) to poorer countries (below world average per capita emissions), without any other extraneous conditions (i.e., ‘private sector’ access or ‘business model frameworks’ related to such transfer that is often sought to be attached, should be obviously additionally funded) and should be based on a transparent basis.

Question 3: How Big an Issue is Energy Poverty in Developing Countries? And how does it affect Fossil-Fuel Subsidy Elimination Objectives?

Energy poverty is massive in poor countries. For example, a recent paper for India estimates that 57 percent of households in rural areas are energy poor, and 28% in urban areas.

At such levels of energy poverty, simply providing better ‘targeted’ energy subsidies is no longer fully effective nor possible (exclusion and inclusion problems are severe). Instead, it is equally or more about improved access, differential life-line pricing (a standard process in electricity markets) and other direct subsidy measures in access to modern energy, and policies (producer and consumer subsidies) to reduce energy poverty through large-scale support to rural electrification, more modern cooking fuels, improved biomass uses, and other measures.¹²

Traditional biomass globally used by some 1.6 billion people without access to electricity or modern fuel for lighting, cooking and energy in developing countries, is unsafe, unsustainable and inefficient (Birol, 2007). At current trends, that number is expected to only decline to 1.4 million by 2030; and during the early stages of economic development, shifts to modern energy have very high economic returns to development outcomes, and may well justify large subsidies in one way or another where these are fiscally affordable (for example, providing

¹⁰ Landis F. and T. Bernauer, 2012. Global Carbon Pricing Among Countries with Different Economic Prospects, CEPC Working Paper 85, ETH Zurich.

¹¹ Market characteristics do not support such a notion of equal prices. First, pricing difference occur because of availability or not of natural resources, because of transport differentials, and other non-tradeable characteristics of energy supply---such as vast differences in natural gas prices across countries. Second, a global ‘monopoly’ would charge different prices for different consumers by their capacity or willingness to pay, as evident for example in pricing of many such products such as pharmaceuticals---the mean price of drugs vary by as much as 6-fold between rich and poor countries.

¹² Khandker, S. D. Barnes and H. Samad, 2010. Energy Poverty in Rural and Urban India, Policy Research Working Paper 5463, The World Bank.

LPG cylinders and stoves to all who use traditional biomass in poor countries would make little difference to aggregate fossil-fuel use worldwide), and nor is it likely to be provided by the private sector left to itself.¹³ In other words, efficient fossil-fuel pricing cannot be easily separated from the equity argument, and needs compensatory arrangements to improve access and affordability.

Conclusion, and Way Forward

This Note asked three questions:

- (1) Is there evidence that eliminating fossil-fuel subsidies in developing countries is a high priority to lowering ‘wasteful’ fossil-fuel consumption? While intuitively right, the emphasis is misplaced. Demand is highly price unresponsive, and driven instead by growth and incomes. Most developing countries have passed through rapid increases in global fossil-fuel prices. Most have also achieved rapid improvements in energy efficiency. The subsidy (read low price) issue is mainly in oil producing and exporting countries. Raising prices is primarily a fiscal issue, because inelastic fossil-fuel demand is a near-perfect fiscal tool.
- (2) What is the right price for fossil-fuels, and a better definition of ‘subsidy’? Economic prices must reflect ‘negative externalities’ of carbon emissions. We are making some progress, but not everywhere. Developed countries have the highest incomes and highest per capita contributions to CO₂ emissions. The costs of not doing so are massive, and incorporating them are easily affordable in terms of ‘willingness and capacity to pay’ (e.g., some estimates of 6 to 7 cents per litre, but could be higher). The evidence is also clear that if a global standard of carbon price is to be applied, and fossil-fuel use lowered, then this has to be also accompanied by ‘unconstrained’ large transfers of public fiscal resources from richer to poorer countries--to address a package of price and non-price policy actions in the latter to shift demand to lower carbon alternatives.
- (3) Is there an additional equity case for energy subsidies? Yes, because energy poverty is massive in many poorer countries. The answer is not to just or only ‘tinker’ with prices, ‘targeting’ and ‘cash transfers’--and raising fossil fuel prices will definitely hurt the poor without compensating measures--but to do much more: accelerate dramatically energy access, including rapid rural electrification through grid-based and distributed alternative energy sources, access to modern cooking fuels and improved biomass, ‘life-line’ pricing, and many similar measures, all of which are possible to finance through ‘global’ transfers through the Green Climate Fund and similar arrangements .

¹³ Birol, F. 2007. Energy Economics: A Place for Energy Poverty in the Agenda? The Energy Journal, Vol. 28, No. 3.

The Way Forward. What is the way ahead? The G-20 is one appropriate forum to take up the issues further since at the heart of the question is fiscal and financial issues. One crucial direction, as evident from this Note, is to identify innovative ways to massively fund the required shifts away from fossil-fuel use to lower carbon alternatives---with new technologies, policies, and investments in many developing countries, while also addressing energy poverty, quite apart from adaptation. This too is very clearly on the G-20 agenda.

How do we do this?

- One part of the answer is to eliminate fossil fuel subsidies using an economic price benchmark that reflects the carbon damages of burning fossil-fuel use in high per capita use countries, as above. But this will need to be probably gradually phased-in, and a significant part of the additional fiscal resources may be possibly diverted to meet national fiscal goals first, but a part should flow over time to global efforts.
- The other crucial part of the answer is, in the meantime, G-20 developed countries collectively should be taking the right and immediate solution to borrow funds from global bond markets---through combined sovereign guarantees---longer-term global climate change funds, raised through a Special Purpose Vehicle (SPV) by IFIs or the Green Climate Fund, for financing and funding the public transfers needed now.
- Part of the future flows of carbon taxes would (easily) finance the interest and repayment costs over time. The initial size must be sizeable, about US\$30-50 billion. This would be crucial to ensure adequate scale, predictability, appropriate burden-sharing (with no ‘free-riding’ by some countries versus others), and up-front global commitment that in turn would enable equal policy commitments by developing countries to pursue lower carbon growth shifts now.¹⁴ Both are committed to these goals formally, and institutions have been set up (such as the Green Climate Fund). But because the financing and resource mobilization means has been fundamentally absent, there has been prolonged discussion, but no real action. The other problem has been to try and shift these burdens---under the head of ‘leveraging’ on to private sector or the IFIs. Private funds cannot undertake public goods functions, and the IFIs have multiple goals and constrained capital. Finally, in the absence of such global commitments, the tendency has been to shift towards multiple and small bilateral and other fragmented efforts that cannot deliver the goods.

To conclude, the time to act is now. The G-20 goal to reduce fossil-fuel use globally is right, and must be done through a combination of price and non-price policies, global carbon taxes, equity through substantial fiscal resource raising, and ‘unconstrained’ transfers from richer to poorer countries, along the per capita emissions to address country specific and owned policies and outcomes. The costs would be small, the potential gains massive. Game theoretic approaches also suggest that perhaps this is the only way to arrive at a cooperative global outcome.

¹⁴ These issues are discussed in analytical detail in Dasgupta, D. et. al. (2013). The Delhi Vision Statement: Green Climate Fund, Working Paper, Ministry of Finance, Climate Change Unit.

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