

Fossil fuel subsidies in Latin America: the challenge of a perverse incentives structure

Hernan Carlino, Micaela Carlino (Fundacion Torcuato Di Tella)

REFORM OF THE FOSSIL FUEL SUBSIDY REGIMES - TAKING ADVANTAGE OF THE SOCIAL AND POSITIVE ECONOMIC IMPACTS

Fossil fuel subsidies have considerable negative, environmental, economic, and social effects. The reform of the fossil fuel subsidy regime in Latin America and the Caribbean allows us to benefit from the favourable economic, fiscal, social and environmental impacts resulting from the removal of the existing subsidies. The change in the incentives structure for the energy system also facilitates the development of renewable energy, contributing to removing the investment barriers put in place by the current incentives and freeing up fiscal resources that can be rerouted into social policies and help fulfil sustainable development objectives.

REFORM OF THE FOSSIL FUEL SUBSIDY REGIMES - BARRIERS TO REFORM AND POLICY DESIGN

Despite the benefits of removing the subsidies, experiences in LAC demonstrate that there are substantial barriers standing in the way of subsidy reform, from a wide-reaching social base, that limit the room for the reforms, often causing delays or neutralising them completely. Although the drive for reform has gained impetus both in the region and on a global scale, it is necessary to define a careful reform strategy that protects the most vulnerable groups from potential negative impacts, and which clearly communicates the favourable effects of the various stages of the reforms, eliminating the price distortions that result from wasteful consumption and the inefficient allocation of resources.

REFORM OF THE FOSSIL FUEL SUBSIDY REGIMES - A SUBSTANTIAL CONTRIBUTION TO MITIGATING CLIMATE CHANGE THAT SHOULD BE ENCOURAGED AND RECOGNISED BY THE PARIS AGREEMENT

The reduction in greenhouse gas emissions due to the removal of fossil fuel subsidies is considerable, according to global and regional estimates. The 2015 agreement should promote and facilitate the reforms by recognising their importance, providing technical support for quantifying the impacts, and supplying funding for the transformation processes implied by these reforms. Implementing a work programme on the reform of the subsidy regime within the framework of the Convention, with technical and methodological components, should facilitate reforms on a global scale.

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1. INTRODUCTION AND AIM

Eliminating subsidies for evidently inefficient and environmentally detrimental fossil fuels constitutes one of the most effective ways of contributing to climate change mitigation and stimulating investments that facilitate the transformation towards a green economy. In spite of their unfavourable impacts these subsidies are widely available, and in many cases they are politically difficult to remove, and once introduced they usually remain.

So, despite increasing worry about the influence these often perverse incentives could have on climate change and energy security, across most of the world subsidies are still given to the fossil fuel industry. It is true that in many cases these subsidies are the consequence of decades of evolution of energy policies, but over the past few years there has been a marked increase in the scale of the subsidies in many countries, despite a recent reduction in petroleum and gas prices. Some of the subsidies have come about for social reasons, but in certain cases they also respond to the considerable pressure exerted by the industry.

The economic, distributional, environmental, and resource allocation consequences, and the negative impacts of the subsidies on macroeconomic performance, economic sustainability and the environment, at both a local and global level, have generated a debate on the need to gradually reduce them.

Although the recent drop in oil prices has modified the situation somewhat, existing schemes tend to persist. For this reason, at the international level there is a steadily growing consensus that there should be a strategy promoting the reform of fossil fuel subsidies in order to discourage excessive energy consumption and moves investments towards clean energy.

Understanding the magnitude of the fossil fuel subsidies, their logic, and their impact is crucial

for judging whether, at least in certain cases, they represent an efficient and justifiable allocation of resources, or if it is possible to achieve the same objectives through alternative policies and measures, and to then decide on potential regulatory reforms, in accordance with welfare, economic, fiscal and environmental benefits that these may involve.

In this document we examine the questions relating to fossil fuel subsidies, with emphasis on the Latin America and the Caribbean region, in the context of the multilateral negotiations. We also take into account other relevant aspects from the fossil fuel subsidy reforms underway in various forms in many countries.

We also emphasise certain elements related to this topic that could be incorporated into the new agreement for governing global climate action post-2020 and which increase the level of ambition in this five-year period. In this way, we examine the conditions the Paris agreement could create that would facilitate the reform process and make it possible to effectively implement it.

2. ANALYSIS

2.1. Background

In recent decades, many countries have set out to decrease governmental support to the production or consumption of fossil fuels, although they have had varying degrees of success. Strictly speaking, the question of energy subsidies has been a somewhat drawn out subject of the debate concerning efficiency and effectiveness. More recently, the debate has intensified as part of the negotiations on an international regime to tackle climate change and the urgent need to drastically reduce greenhouse gas emissions, making it even more complex.

The high prices of petroleum derivatives, particularly from 2005 onwards¹, has increased the pressure on many countries to introduce or increase energy subsidies with the intention of protecting consumers from the shock of changing prices in the volatile global energy markets, despite the economic cost and indirect effects on the efficiency and the distribution of income

In the LAC region, historically, fossil fuels prices have been maintained below international prices. To this end, different mechanisms have been used.

In the 2009 G20 summit in Pittsburgh, the leaders of the twenty largest developed and developing economies agreed to gradually remove subsidies for fossil fuels. This position was later reaffirmed in successive meetings, although they also were forced to explain that progress in these reforms had been rather slow.

Meetings of the G8 and G20, the International Monetary Fund, the International Energy Agency, the OECD, and the World Bank, to name but a few, expressed the need to gradually eliminate fossil fuel subsidies as an essential part of a transition towards a low carbon economy. Some of the estimates available in these areas indicate that completely eliminating these subsidies on a global scale would reduce greenhouse gas emissions by approximately 13%.

2.2. The nature of the problem

Latin America houses one of the largest hydrocarbon reserves on the planet. In previous years, the region had increased its subsidies, both explicit and implicit, directed at the production and consumption of fossil fuels and electrical energy, directly and indirectly, from thermal power generation.

One explanation, which may also extend to what happens in other parts of the world, is that the prevalence of this type of subsidy is dependent on political economy. Although the lowest-income groups receive comparatively reduced benefits from fossil fuel subsidies, there is normally considerable opposition to their removal, as the energy price increase in energy resulting from the reform can worsen the situation of a country's poorest people. This frequently happens because of flaws in the design and implementation of the respective policies, in particular when determining the beneficiaries of the subsidy and allocation mechanisms to be used. This way, subsidies can be introduced to decrease the impacts on prices and the resulting inflationary effect.

It is possible to see energy subsidies being applied in many countries in the region as well as the underlying justification. This may involve, depending on the case, obtaining improvements in welfare, distributing wealth derived from natural resources to the entire population, promoting economic development, creating jobs, bringing in additional revenue from oil royalties received from private companies operating in the country, and stimulating new sources of energy supply and, therefore, decreasing energy dependence.

Nevertheless, energy subsidies compete for limited budgetary resources and occupy significant fiscal space, which could be destined for essential services, discourage efficiency improvements, both regarding supply and demand, and make new forms of renewable energy uncompetitive.

2.3. Some definitions

As in other areas, there is no universally accepted definition of what constitutes subsidies for fossil fuels nor is there an agreed upon method for measuring its economic incidence or socio-economic impacts

Subsidies for fossil fuels can be defined as a deliberate intervention by governmental policy that specifically focuses on those fuels, and on the electricity or heat generated by them, and which has one more of the following effects:

- i. To reduce the net cost of the acquired energy;
- ii. To reduce the production or transport cost of the fuel, electricity or heat; and,
- iii. To increase the income of the resource owners or suppliers of fuel, electricity or heat.

It must be remembered that the definition and identification of the subsidy and its method of calculation also depend on the purpose of the particular assessment, i.e., whether the goal is to determine their cost, their budgetary impact, their contribution to the efficient allocation of resources, or the transparency of current government programmes. Subsidies in the energy sector can also be compared with other economic sectors, or going even further, with the magnitude of subsidies at a regional or global level.

In general terms, a subsidy is a payment made by a government to an energy producer or consumer, with the aim of stimulating the production or use of a specific fuel, or a certain type of energy.

The differences in approach make it possible to establish two definitions of what is meant by the term subsidy: i. those involving financial transfer; or ii. those determined by the effects they cause:

- i. financial transfer: financial aid from the government to producers and/or consumers of

1. Even if recently these prices have been falling

particular goods, in the form of a direct monetary transference or tax relief;

ii. a subsidy is a governmental measure that either reduces the price paid by the consumers, increases that received by the producers, or reduces the producer's costs.

The first type, with the emphasis on the financial transfer aspect, is consistent with the definition in the Agreement on Subsidies and Countervailing Measures of the World Trade Organisation (WTO), where a subsidy is defined as:

a. a financial contribution by a government involving a direct transfer of funds, foregone revenue, the provision by government of goods and services, excluding infrastructure; and,

b. any form of income protection or price support that increases exports or reduces imports.

At the same time, in line with the International Energy Agency's consideration of the effects they produce, energy subsidies are any government action that affects the energy sector by reducing the cost of energy production, by increasing the price charged by the producers, or reducing the price paid by consumers. In Latin America, according to OLADE (the Latin American Energy Association), in the energy field a subsidy is understood as the "provision of public aid that is economic and fixed-term in character" that is part of a policy including price controls, subsidies to companies, or subsidies to users, amongst other measures.²

An agreement on a common definition of what constitutes a subsidy, as well as the standards for estimating the various elements comprising it, are still the subject of discussion. Determining an operational definition that allows the construction of aggregate estimates of subsidies and indicators is not only desirable, but is the first step towards a full understanding of the impact of subsidies on the economy, society and the environment, both locally and globally, and the extent of compliance with the initial goals that gave rise to the subsidies.³

The International Energy Agency (IEA) has established the practice of estimating subsidies for fossil fuels using the "price-gap" approach, which is based on estimating the gap between domestic prices and an international reference level.

The price gap approach has allowed estimates to be made of fossil fuel subsidies in different

Table 1. Some definitions of subsidies

Direct	The state covers the price difference
Indirect	Through a reduction in the price of a commodity the government aims to increase the spending power of the benefiting party.
Cross	Below-cost prices are compensated for by other above-cost prices
Universal	The price is lower for the entire population, independently of the income of each income group and other factors
Segmented	The price is lower for specific population groups that fulfil certain conditions
Pre-tax	The price paid by the consumer is lower than the cost of supplying the energy
Post-tax	The price paid by the consumer is less than the cost and also takes into account the Pigovian Tax, which reflects the externalities associated with the energy consumption
Consumer	The price is below the market or reference price
Producer	Production costs are reduced through various mechanisms (e.g., above-cost production price, below-cost raw material price, and tax treatment differential)

countries and to be compared, but it has its own limits as it only partially covers the mechanisms used to give subsidies.

So, according to Koplou, we can say that despite the price-gap approach being a relatively simple method for measuring subsidies over time and allowing this to be done simultaneously for a number of countries, given the complexity of energy policy interventions, the approach has certain limitations that affect its use and the accuracy of its estimates. These limitations stem from two main sources: i. the challenges associated with estimating the necessary input information for calculating an accurate price gap; and, ii. the types of interventions or market effects which are not adequately incorporated by this analysis tool. (Koplou 2010)

As assessments of existing subsidy structures mainly rely on the price-gap approach, it is necessary to remember, then, that this approach may have some systematic biases that should be recognised when it is applied.

2.4. Quantifying fossil fuel subsidies on the global and regional scales

According to estimations made in a recent study by the International Monetary Fund (IMF) "How Large are Global Energy Subsidies?", it is projected that energy subsidies for 2015, not including the Pigovian tax in the calculation⁴ (i.e., before tax), will cost more than 330 billion dollars globally,

2. Organización Latinoamericana de Energía (OLADE), *La tarifa social de la energía en América Latina y el Caribe* (The social cost of energy in Latin America and the Caribbean), 2013

3. IDDRI, Working Paper N°18/14, *Engaging the productive sector in the climate change negotiations*, Marina C. F. P. D. Drummond, Renato G. Flôres Jr. (Fundação Getúlio Vargas, Brazil), November 2014 | climate

4. Considering the cost of externalities

representing approximately 0.4% of the world-wide GDP and reflecting a decline of around a third with respect to the amounts considered for 2011 and 2013, when the pre-tax subsidies reached 0.7% of the global GDP.^{5 6}

Disaggregating global subsidies by energy type (calculated pre-tax and projected for 2015) reveals that the petroleum subsidies account for around 40% of the total, followed by electricity subsidies (29.7%) and natural gas (27.9%), with coal picking up a very small share in the subsidies.

One of the most important findings of the previously mentioned IMF study is the magnitude of the subsidies when the calculation considers the post-tax subsidies: in this case, the estimation projects that they will reach \$5.3 billion, the equivalent of 6.5% of the global GDP for 2015. Not only is the magnitude of the subsidies substantial; their penetration is also high, both in developed and developing economies, and it extends to oil-producing countries as well as those that are not. Also significant is the extraordinary magnitude of the difference between the subsidies calculated before and after taxes are applied. This includes the entirety of the externalities resulting from the use of the fossil fuels, because the post-tax subsidies are, according to the projections for 2015, up to 16 times greater than the corresponding calculation of the pre-tax subsidies. This fact reveals the extremely high cost of fossil fuel use at the global and local levels if the externalities this use implies are measured. When we break down the costs of the global post-tax subsidies by energy type, projected for 2015, it is clear that when the externalities for coal subsidies are also taken into account, they now rank in first place, accounting for almost 60% of the total (particularly due to the inclusion in the estimation of the effects of local pollution), followed by petroleum subsidies (28.3%), natural gas (9.6%) and, finally, electricity subsidies (2.7%)

According the latest global and regional estimates of the International Monetary Fund, in LAC, the total cost of energy subsidies in 2015 will add up to about 41 billion dollars. This projection is the cost threshold for the energy subsidies in the region, as this sum does not take into account the negative externalities and costs (e.g., environmental, health, and welfare) associated with these subsidies.⁷

5. International Monetary Fund, Fiscal Affairs Department, How Large are Global Energy Subsidies? May 2015.

6. International Monetary Fund, Fiscal Affairs Department, How Large are Global Energy Subsidies? Country-level Subsidy Estimates, 29th June, 2015.

7. Based on data from the International Monetary Fund,

Box 1. Price-gap approach

In the case of fossil fuels, the subsidy is usually measured as the difference between the international reference price and the domestic price. This method is known as the Price-Gap Approach. This approach quantifies major deviations in the energy prices of a country with respect to the global prices of that good.

$$\text{Subsidy} = (P_i - P_r) * Q$$

Where P_i : international reference price;

P_r : domestic price ex refinery;

Q : quantity consumed

In net fuel exporting countries, subsidies are implicit provided that production costs are covered. The subsidies represent the opportunity cost of selling domestically at a lower value than that which would be obtained if the product were exported.

In net importing countries, subsidies require an outlay to cover the difference between the domestic selling price and the fuel import price.

$$P_i = P_{FOB} + \text{quality} + \text{transport costs}$$

For net importers, the reference prices are calculated based on the import parity price, which is the FOB price in the closest, liquid market, e.g. the Gulf Coast of the United States, adjustments for quality, import taxes and transport costs from that port to the domestic market.

The ex-refinery price is the final price discounting taxes and marketing and transport/internal distribution costs.

Unlike petroleum, gas and coal, electricity is not widely traded internationally, so there is no reliable reference price. In the case of the IEA estimates, the reference prices are based on the average cost of generation, transmission and distribution in each country.

According to some estimates, universal dismantling of subsidy structures could decrease global oil consumption could decrease by about 4 million barrels per day, which in turn could boost a reduction in the price of fossil fuels (International Energy Agency 2012). In the OECD area, meanwhile, for each dollar disbursed to support renewable energy, another six are destined for fossil fuel subsidies (IEA, 2013).

On average, the subsidy in relation to GDP for LAC countries, projected for 2015 and based on IMF data, amounts to 0.68% (see Table 2). However, there is considerable variation in the size and types of subsidies applied in the region. In some cases the subsidies constitute almost permanent policy options, while in others they represent a quasi-discretionary response to events with negative social consequences for households, like petroleum and gas price fluctuations.

Fiscal Affairs Department, How Large are Global Energy Subsidies? Country-level Subsidy Estimates, 29th June, 2015.

Table 2. Subsidy (pre-tax), projected for the year 2015

	% of GDP	% of tax revenue			% of GDP	% of tax revenue
Venezuela	10.46	46.23		Bahamas	0.47	n.d.
Belize	2.63	9.63		Panama	0.34	1.69
Trinidad and Tobago	2.62	9.03		Guatemala	0.24	2.44
Haiti	2.24	12.02		Colombia	0.20	0.78
El Salvador	1.95	11.44		Barbados	0.19	0.59
Nicaragua	1.93	9.35		Dominica	0.10	0.33
Bolivia	1.88	5.80		Paraguay	0.09	0.50
Dominican Republic	1.87	13.46		Brazil	0.07	0.20
Surinam	1.62	7.42		Honduras	0.00	0.00
Argentina	1.62	4.22		Costa Rica	0.00	0.00
Ecuador	1.53	4.39		Uruguay	0.00	0.00
Guyana	1.25	5.45		Chile	0.00	0.00
Antigua and Barbuda	0.78	4.44		Mexico	0.00	0.00
St. Kitts and Nevis	0.49	1.16		Jamaica	0.00	0.00
Granada	0.48	2.37		Peru	0.00	0.00
Total LAC		0.68			2.31	

Source: developed based on IMF data

An earlier study, also by the IMF, specifically analysing the situation in LAC, estimated the pre-tax level of annual subsidies for 2011-13 as around 1.8% of the GDP, comprising 1% for fuel subsidies and 0.8% for electricity. This study identifies levels of subsidies in countries such as Mexico, Brazil and Honduras, which are not verified in the subsequent IMF forecasts made in 2015.⁸

The difference between the global estimate, with regional disaggregation, and the specific estimate for LAC, both carried out by the IMF, can be attributed to the different periods considered (the first projected for 2015 and the second based on the period 2011-2013). For this reason it could incorporate the effects of declining oil prices and gas in recent years, with the consequent reduction in the amount of subsidies⁹. It should also be noted that the estimated level of subsidies in Latin America and the Caribbean is much more detailed and widespread when considering subsidies for electricity generation, a fact which increases the incidence of this with respect to the overall estimate

8. International Monetary Fund, 2015: Energy Subsidies in Latin America and the Caribbean: Stocktaking and Policy Challenges, WP/15/30, Gabriel Di Bella, Lawrence Norton, Joseph Ntamungiro, Sumiko Ogawa, Issouf Samake, and Marika Santoro, February 2015.

9. It is necessary to remember that global reduction of subsidies expressed in terms of global GDP represented 43% between the estimates for 2011-2013 and the projections for 2015.

The Inter-American Development Bank (IDB), meanwhile, stated that in the region “there is evidence that the subsidy structure in the energy sector is backward, too expensive and creates market distortions that discourage investments in more efficient technologies and/or cleaner fuels.” (IDB 2013) However, the IDB maintains that the available studies look at specific cases in certain sectors and countries in the region and that there are no uniform information sources or comprehensive analyses on the subject of fuel subsidies in LAC

There is wide variability in the amount and type of energy subsidies that are applied in the region; according to the IMF study, this depends largely on the institutional quality and energy wealth of the countries, as well as, to a lesser extent, economic performance. Many large economies in the region have subsidised energy, particularly fossil fuels, as have smaller economies like those in Central America and the Caribbean, but with a greater emphasis on electricity, as this represents the main energy produced in the area

Thus the estimated fuel subsidies projected for 2015 tend to be higher and more entrenched in petroleum and natural gas-producing countries as well as those with relatively low levels of institutional development, like Venezuela (the 1st ranked LAC for the amount of subsidy in terms of GDP), Trinidad and Tobago (3rd), Bolivia (7th), Argentina (10th) and Ecuador (11th).

Country	Focus of the subsidies
Venezuela	<ul style="list-style-type: none"> An economy strongly driven by its oil production, as the country with the largest reserves of crude in the world, has been fixing the pump prices of gasoline at nominal values in the local currency since 1997.
Uruguay	<ul style="list-style-type: none"> Energy initiatives for renewable sources (wind energy and biomass), are reducing the use of fossil fuels for generating electricity Although the country is having success with renewable energy, a large part of the electricity generation is still thermal. The state oil company (ANCAP) makes losses that are covered in the budget.
Mexico	<ul style="list-style-type: none"> Recent energy reform will lead to increased exploration, production and investment in the petroleum sector in the Gulf of Mexico in the coming years. High prices of imported natural gas, relatively limited hydroelectric resources, and insufficient infrastructure have restricted investment in renewable energies with the exception of the wind energy. The government levies internal revenues to compensate for fuel price volatility; the negative value in the past actually represented a subsidy, financed via the budget. Currently the tax is positive.
Argentina	<ul style="list-style-type: none"> Management of the consumer price of fuel, at the same time as receiving export taxes for crude The government accepts losses in the budget of YPF, the national oil company.
Chile	<ul style="list-style-type: none"> The petroleum price stabilisation fund (FEPP - Fondo de Estabilización de Precios del Petróleo) was set up in 1991 to stabilise domestic fuel prices, isolating them from the short-term volatility that affects international prices. When it was created, the FEPP subsidised six petroleum derivatives (petrol; domestic kerosene; diesel; liquefied gas; naphtha; and, petroleum fuel), but by 2011 only one was being applied, to domestic kerosene. Gradual elimination of generalized subsidies and reduction of the tax burden while faced with an increasing demand for fuel that was largely satisfied by means of imports at increased prices.
Colombia	<ul style="list-style-type: none"> Progress towards eliminating subsidies for fuel oil and diesel fuel, and reducing discretionary measures to stimulate artificially low prices. The subsidies structure, both implicit and explicit, for petrol and diesel were introduced in 1983 and became the equivalent of 1.6% of the GDP.
Haití	<ul style="list-style-type: none"> The public electricity company Electricite d'Haiti (EDH) consumes a significant portion of the government budget through an annual subsidy of more than \$200 million to maintain operations. The purpose of the subsidy is to provide electricity to a larger percentage of the population, as less than a quarter have access and this is for a limited period of time (about 10 hours per day). Even so the supply of electricity is limited, reliability is reduced, and energy is expensive.
Nicaragua	<ul style="list-style-type: none"> A subsidy is given to low-income users, whose consumption is less than 150 kWh per month, while citizens who use less than 300 kilowatts are exempted from VAT.
El Salvador	<ul style="list-style-type: none"> Subsidy through its electrical energy distributing company, the government of El Salvador awarded a grant to residential consumers who use less than 99 kWh per month. Given the drop in international fuel prices, the subsidy was eliminated for consumers who were in the 100-200 kWh range. Overall, the rates to end users have not undergone major modifications since June 2006, a fact which has been achieved through a general subsidy covering 100% of the variation in price between the Market Regulation System and that day's rates.

In producing countries, fuel prices have remained stable below international prices for long periods of time. In most of them, aid is granted through “regulated” consumer prices, which has led to ever greater subsidies. This policy has been directed at transferring the country’s natural wealth to society in general (e.g., in Venezuela and Ecuador which have significant oil reserves), or as a way to attenuate the effects of energy prices in inflationary periods (e.g., in Argentina).

Although some countries in the region have increased their efforts to stimulate the use of renewable energies, e.g., in Brazil, Costa Rica, Chile or Uruguay, many other in Latin America still depend primarily on fossil fuels.

In the case of exporting countries, while the price is greater than the production cost the subsidies require no budgetary financing, as this is the

opportunity cost of selling locally instead of exporting. But in the case of importing countries the subsidy requires government financing. In other countries, where import needs are higher, the subsidies are lower relative to their GDP, e.g., Chile, Uruguay, and Costa Rica.

In some countries, like Chile, Colombia and Peru, price stabilisation mechanisms are used, resulting in higher taxation only in times of high international prices. It also avoids the highly volatile international oil and derivatives prices being transferred to the domestic market. The advantage of this type of mechanism is that the subsidies are temporary and depend on the evolution of international prices. Nevertheless, in times of high prices, such as during 2013 and early 2014, the level of subsidy becomes significant, if consumer prices are held constant. The key here is that the

mechanisms are designed so that they can be reversed and that the pricing actually reflects market signals.

In most LAC countries electricity subsidies come about as social or industrial development policies, seeking to provide access to lower-cost energy for specific groups, such as nationally strategic productive sectors, or low-income consumers. In effect, the countries that grant the largest electricity subsidies are those of Central America and the Caribbean. Social subsidies are awarded depending on conditions of use (maximum ranges of between 200 and 300 kWh/month), as well as additional socioeconomic factors. In the case of social subsidies, these are a limit to maximum consumption, rational use, and energy efficiency.

The main policy focus in the transport sector has been on the use of fossil fuels and recently it has begun to put more emphasis on biofuels. The percentage of participation in the latter is still small but growing. Subsidies for public transport are more efficient in terms of social inclusion, transport capacity and getting people to use it, reducing emissions and traffic congestion, public health, and public infrastructure. Transport subsidies, however, require instruments of control and measurement indicators, as a transfer from private to public transport is hoped for, provided that the level of service and reliability are high.

3. POSITIVE IMPACTS OF THE GRADUAL REMOVAL OF FOSSIL FUEL SUBSIDIES

Among other things, the energy policy of a country is aimed at controlling how the energy market functions; ensuring energy security and equitable access to energy; promoting energy efficiency and energy savings, as well as contributing to sustainable development, including the introduction of new and renewable forms of energy; and also encouraging the interconnection of the energy networks. In this context energy subsidies can play a socially important role, since they can stimulate the productivity of a given sector, the use of a particular fuel, or a certain type of energy, as well as improving access to energy for citizens and settlements with limited resources.

However, energy subsidies have a wide range of impacts that affect macroeconomic variables such as public accounts, the balance of payments, the potential for economic growth, and the energy intensity level of the investment, as well as external trade flows. Therefore, an effectively planned and implemented energy reform would have positive impacts from the point of view of society as a whole. There are also potential impacts on income

distribution and welfare, as well as fiscal and environmental benefits. For example, the environmental benefits have a greater effect on urban populations; on the other hand, higher energy prices affect energy-intensive businesses.

Although in the long-term resources should be redirected from unprofitable subsidised activities to others that could be profitable in the absence of subsidies, transitional financing will be required for certain parts of the population or sectors of the economy. Moreover, the reform should focus on the development of effective policy instruments that protect vulnerable groups, and that produce, among other benefits, the following:

- The reduction of a high tax burden, often financed by public borrowing, a fiscal burden on certain sectors, and a lower budget allocation to productive or social spending.
- A reduction in environmental damage and the deaths and diseases associated with atmospheric concentrations of greenhouse gases, as well as its consequent impacts, and local environmental pollution.
- An increase in energy efficiency investments and practices, in renewable energies, low-carbon technologies and infrastructure, reducing exposure to the volatility of the international energy markets.
- Improved efficiency in the support given to lower socioeconomic strata, as generalised subsidies are mainly absorbed by high income sectors.
- A reduction in the economic attractiveness of carbon-intensive activities.
- A decrease in the cost and speed of transition towards carbon-neutral scenarios and zero emissions.

3.1. Welfare

Estimating the effects on household expenses, and in a wider sense welfare, resulting from a change in energy prices needs to take into consideration both the direct and indirect impacts, which result from the increase of other prices due to raised energy prices. The reduction or redirection of generalized subsidies for targeted subsidies, improves the efficiency of support given to lower socioeconomic strata. The generalised subsidies for fuel, electricity and public transport clearly generate smaller burdens on household expenditure. Nevertheless, these subsidies do not impact the entire population equally, as the higher socioeconomic strata benefit more as they consume a greater amount of energy.

Expressed in terms of an alternative use of public resources, such as health spending, fuel subsidies represent a significant burden on the fiscal accounts. In effect, in several countries energy

subsidies are a considerably greater burden than spending on health or education. In fact, in some countries in the region the cost of fossil fuel subsidies is very high and, for example, exceeds public health spending. Such is the case of Venezuela, which allocates 10.5% of its GDP to energy subsidies and only 3.6% to health spending.¹⁰ On the other hand, in countries like Uruguay, Costa Rica, Colombia and Chile, where the energy subsidies are minimal, a relatively high percentage of the GDP is allocated to education and health: Costa Rica 10% to health and 7% to education, Uruguay 8.75% to health, Chile 7.75% to health, Colombia 7% to health and 5% to education.

Therefore, reducing subsidies, in addition to discouraging consumption (decreasing the associated environmental and health costs), and improving the relative profitability of alternative energies, would release fiscal resources to be used in other areas, such as investment in education and health, sanitation, access to water, telecommunications and clean energies.¹¹ In this sense it should be remembered that, according to World Bank data for 2010, 6.2% of the population in LAC population had no access to potable water, 18.4% had no access to sanitation, and 23% had no telecommunications.

Subsidised fuel prices also generate cost overruns for the state as the promotion, among other things, of a greater volume of vehicles requires a bigger investment in infrastructure and operating expenses for that same infrastructure. It also involves increased costs associated to public health, due to the number of accidents and illnesses associated to the higher pollution levels. Universal subsidies give signals that are opposite those of rational energy use, as low prices stimulate overconsumption. Therefore, for example, a sliding scale according to the level of energy use should be implemented.

3.2. Tax impacts

Energy subsidies impose high fiscal costs by forgoing revenue or transferring resources to certain actors or segments of the population. In many cases, that greater tax burden is translated into a budget deficit that worsens as international prices increase and domestic prices stay at the

same levels, leading to greater debt and, consequently, the fiscal sustainability of the economy is compromised.

In LAC, the energy subsidies in 2015 accounted for about 2.5% of tax revenues, the most outstanding cases being Venezuela, with about half of its revenue going to subsidise energy, while in the majority of Central American and the Caribbean countries this averaged between 10 and 15%. Moreover, these percentages are substantially increased if one takes into account not only the subsidies but also the associated negative externalities (post-tax).

Because in most cases the subsidies are not accounted for in a transparent manner, national resources may end up being allocated in a different way to a country's spending priorities.

On the other hand, if these countries are net importers of energy, a decrease in subsidies reduces the energy consumption improving the energy balance, and therefore the country's trade balance. A reduction in generalised fuel subsidies may improve the energy balance. Therefore, an energy subsidy reform benefits a country by reducing a high tax burden, financed by public borrowing, a fiscal burden on certain sectors and a lower budget allocation for productive spending/investment, while at the same time improving the trade balance.

3.3. Competitiveness

Energy subsidies can have a detrimental effect on the cost of supplying energy, if they are funded because of pressure on the supplier's profits. In this kind of scenario the companies will have fewer resources to sustain revenues, profitability and, therefore, investment, while at the same time their debt levels increase. The subsidies, therefore, affect incentives to invest, eroding assets and making the sector dependent on the government for its survival. For example, in some countries in the region, below-cost electricity tariffs that have lasted more than a decade have resulted in lower investments, and consequently in residential and industrial power cuts.

3.4. Environmental impacts

The use of fossil fuels, mainly in the transport, generation and industrial sectors, is associated with negative externalities, strongly linked, among other things, to air pollution.

Even when certain taxes are applied to energy, the prices in many instances are not high enough to avoid consumption above the optimum level expected from the social point of view. That means

10. World Bank, World Development Indicators, World Health Organisation Global Health Expenditure database

11. United Nations, Rio+20 United Nations Conference on Sustainable Development. Sustainable development 20 years on from the Earth Summit, progress, gaps and strategic guidelines for Latin America and the Caribbean, 2012-134, March 2012.

that prices are not high enough to offset the negative externalities associated with energy use and environmental damage (pollution of air and water, degradation of the landscape, and so on), traffic congestion (longer travel times and higher road maintenance costs), and health problems, especially respiratory illness, because of local pollution, and an increase in victims due to more accidents.

Therefore, a well-directed energy subsidy policy favours a reduction in environmental damage and the deaths and diseases associated with atmospheric concentrations of greenhouse gases and local environmental pollution. On the other hand, resources are freed up that allow an increase in energy efficiency investments, renewable energies and infrastructure, reducing exposure to the volatility of the international energy markets.

4. REFORMING THE FOSSIL FUEL SUBSIDY SYSTEM

Despite a favourable context for reform in LAC, given that currently the region is exhibiting generally sustained growth rates, gradually decreasing poverty, and, now, lower fossil fuel prices, energy subsidies remain in place in a large part of the region, and even in countries that have made progress towards this kind of reform, it has not always been possible to entirely complete the process.

Reducing the subsidies presents challenges, mainly due to the possible short-term economic and social consequence, as increased fuel prices could have impacts on competitiveness, decelerating growth and reducing employment

In theory, however, and according to Burniaux and Chateau (2011), the removal of subsidies should generate economic gains that result from increased consumer welfare and a more efficient allocation of resources. As can be seen from their study on the impact of the gradual phasing out of subsidies between 2013 and 2020, these authors estimate that the unilateral removal of subsidies for fossil fuels would result in welfare gains for most economies and regions, ranging from 0.3% to over 4% in 2050, relative to a baseline established in 2008.¹²

It is therefore key to have an in-depth understanding and thorough knowledge of the costs and benefits derived from maintaining the subsidies in order to build support for reform. In particular, the absence of information on the real cost of subsidies

can make it difficult to establish the relationship between the subsidies, the fiscal exposure, and the economic effects.

An analysis of some of the reform processes that have been put in practice indicates that, among the main lessons which can be extracted from these processes, is the fact that they must begin with an understanding of the political logic that originally led to the creation of the subsidy. This enables strategies to be developed that offset the negative effects of the reform and thus combat any potential opposition to its implementation. Later, there must be transparency in the cost of the subsidies, as in some cases they are retained because stakeholders do not know the details of the costs they are taking on, especially in the case of indirect subsidies. It is also essential to guarantee a series of reform implementation stages in order to ensure success.

Firstly, there must be a systematic plan of reform with long-term goals. The subsidies are usually long-term structural schemes, and therefore require a structural solution that enables the transition from a system of inefficient social aid, to a strategic, targeted and sophisticated system. This must be well-prepared prior to implementation, and have both the necessary internal coordination as well as sufficient external support to enable an effective change. Internally, this should involve institutional reforms, including removing the political aspect of energy price-fixing mechanisms. In most countries, the main barrier to subsidy reform is political, meaning generating support for this is key.

At the same time, the reform must include a communication strategy, that reaches the entire population in a clear and concise manner. For this it is necessary to disseminate information on the magnitude of the subsidies, their impact on the governmental budget, and the associated fiscal cost. In addition, the benefits of the reform must be effectively translated to the population in terms of concrete economic and social improvements.

4.1. Regulatory reforms

A comprehensive plan of regulatory reform for the energy sector requires clearly defined long-term objectives and an analysis of the impact of the reform.

For the subsidy's evaluation, creation, maintenance, reduction or removal, a series of questions must be taken into account:

- What are the objectives of the subsidy?
- Which activities should be subsidised?
- Who should receive the subsidy?
- Which subsidy mechanism should be employed?

12. The study was carried out using a database of 37 economies that account for around 95% of the global subsidised fossil fuel consumption.

The aims of the subsidies may include help for the most needy and improved equity, assuring the power supply or stimulating local production and generating the associated jobs. Nevertheless, one of the main challenges is the period during which the subsidy policy remains in effect. Without a predetermined limit for gradually reducing or eliminating the subsidies, these can result in a permanent tax burden for the state, which is out of proportion with the benefits that were envisaged when implementing the subsidy mechanisms.

Also to be taken into consideration is what should be subsidised, including reliable and affordable energy, clean energy sources, new forms of energy and investment in energy efficiency. The subsidies can be segmented (low income sectors, rural sector or remote communities) and to specific industries. Identifying the objectives of the subsidies allows the optimal mechanisms for their implementation to be defined.¹³

Energy subsidy policies should not only focus on sectors that do really require assistance, but also promote a change in the production of energy from less clean to cleaner sources. To do this, the entire structure of energy taxes and subsidies must be completely analysed as a portfolio of supply options.

A successful reform of energy subsidies should sever the tie between the long-term energy policy and energy-pricing mechanisms. Energy-pricing policies should reflect market signals to generate appropriate incentives. An automatic pricing mechanism based on a formula that reflects market signals could outline the way to change to a deregulated market. Specific automatic mechanisms, or state intervention only under certain determined, clearly laid down conditions, would favour a complete reform and avoid discretionary governmental intervention, strengthening the institutions and improving the credibility of the system.

Rerouting the existing energy subsidies and the issuing of appropriate price signals improves the allocation of resources in the economy, efficiency in the energy sector, and the quality of public spending. The subsidy portfolio should combine efficiency and control, in order to make the initially proposed impact, and be effectively expressed. The removal or redirection of energy subsidies promotes more efficient capital allocation in the energy sector by creating the proper incentives for developing competitive supplies. While in the short-term energy subsidy reform may increase

energy prices and, therefore, production costs, in the long term it will lead to the reallocation of resources to activities that are less energy intensive or more efficient.

Often there is no energy substitute available immediately or at a competitive price, so the policies must encourage the development of this in order to achieve competitiveness and efficiency. The introduction of new and emerging technologies can have high initial costs, but it is expected that these will reduce according to economies of scale, and the increased experience that will be incorporated as there is further implementation, both globally and at country level.

4.2. Impact studies and measures for protecting vulnerable groups

In LAC countries, subsidies play an important role in relation to social equity. In particular, the use of surveys or censuses of household expenses relating to the different types of energy used allows consumption patterns to be examined and classified according to income levels. The results of these studies allows an analysis of whether the benefits of the subsidies reach the lowest income strata. For example, various studies show that petrol, diesel and LPG spending increases with increased of income, but this is not true of kerosene. Electricity consumption shows no clear pattern according to income levels, and it varies by country, even if it has been observed that consumption level subsidies tend to be more progressive and, in fact, this is the mechanism which is used in many of the LAC countries. In this context, it is crucial that countries that decide to maintain energy subsidies find information to develop an adequate targeting mechanism.

In practice, the measurement of subsidy performance has been described in detail by Komives *et al.* (2005) and comprises three aspects:

- Benefit incidence: measures how poor households benefit vs. all other households, defined by the ratio of total benefits received by poor households and the proportion of poor households out of the total number of households.
- Incidence of beneficiaries: what proportion of poor households receive the benefit, as measured by the percentage of poor households that do not receive the subsidy.
- Materiality: the degree of importance of the subsidy received by poor households defined as the percentage of the subsidy received compared with the total household income.

Measuring subsidies can identify which actually benefit the target groups, and help reduce or

13. Subsidies in the Energy Sector: An Overview, Background Paper for the World Bank Group Energy Sector Strategy, Robert Bacon, Eduardo Ley, and Masami Kojima, July 2010

eliminate those that do not do so in order to implement specific policies that address the needs of the significant sectors of the population while resulting in lower costs for the government and the general public.

5. MITIGATING CLIMATE CHANGE IN LAC, SUBSIDY STRUCTURES AND THE INTERNATIONAL FRAMEWORK FOR REFORMING THEM

Greenhouse gas emissions in Latin America and the Caribbean linked to energy are relatively low compared to the world average, as the region accounts for 5.3% of global energy emissions while regional GDP is 7.5% of Global Product (WRI-CAIT, 2014; World Bank, 2012). Emissions distribution in the region has its own very particular characteristics: emissions linked to transport are higher in LAC (31%) than globally (18%), while those linked to the energy sector account for 29% of energy emissions; this contrasts with the global figure of 44%. Fugitive emissions are higher than in other regions, given the importance of the oil and gas industry in some countries in the region. The low energy-sector emissions on a regional level can be explained by the low-carbon energy matrix, driven primarily by a relatively clean electricity matrix (mainly hydropower and thermal power generation with natural gas).

GHG emissions trends also show some marked differences. While total emissions are growing at a relatively slower rate than in other developing regions, energy emissions are increasing more quickly. This particular feature is due to a drastic reduction in emissions in the land-use sector, a change in land use and forestry, particularly as a result of reduced emissions in the Amazon region. In fact energy emissions grew by approximately 76% between 1990 and 2011, and the forecast is they will continue growing in an inertial scenario. Therefore, in order to maintain a low-carbon energy sector over time, the region needs to strengthen its mitigation strategies through the increasing use of unconventional renewable energies, energy efficiency and electricity savings.

However, the continued existence of a subsidy structure for fossil fuels, which the countries in the region introduced at some point for a variety of different reasons, among them, to allow communities on low incomes in particular greater access to energy, as well as the high fiscal cost they represent, distorts prices in the energy market. These distortions encourage an inefficient and costly use of the available energy resources and consolidate

the position of carbon-intensive energy sources, thus blocking opportunities for the introduction of innovative power generation technologies in line with the region's extraordinarily abundant supply of unconventional resources (including wind, solar, geothermal and biomass).

In turn, these disincentives encourage public and private investment decisions that could lead to the strengthening of a fossil fuel-based model, while throwing doubt on the economic and financial viability of the options for taking advantage of renewable resources and introducing innovative technologies.

The provision of subsidies for the exploration, production and consumption of fossil fuels that are maintained over time therefore creates a scenario on a national scale that has a threefold potential for social losses. First, they support the profitability of an industry and channel a source of resources for preserving high carbon-intensity assets that cannot be exploited without highly negative adverse, or even catastrophic, effects. Second, they discourage and help to divert investment which could go towards profitable low-carbon alternatives (solar energy, wind power and even energy efficiency). And, third, they strengthen the criteria for taking decisions involving carbon-intensive energy options.

Moreover, while on the one hand targets for reducing emissions and national low-carbon development plans are agreed to, climate funding is used to make these changes possible, even in some cases introducing subsidies for unconventional renewable energies, on the other hand, time as fiscal resources are being allocated to fund and maintain fossil fuel subsidies.

Introducing or withdrawing subsidies are national decisions that countries make as part of their efforts to achieve sustainable development, political stability, growth and equality. Therefore, in order that reforms targeting the dismantling of the subsidy structures for fossil fuels that still exist in the region are politically feasible (something that applies to other regions as well), any decisions taken within the framework of an agreement in Paris should consider the following initiatives:

- The agreement should include an objective to gradually remove subsidies on fossil fuels, including those for the exploration, production and consumption of fossil fuels, and those for the production of electricity from fossil fuels. This goal, with a defined timeline, at 2025 or 2030, should be adopted through a COP decision when the details of the Paris agreement are negotiated.
- This goal should include a work program for the fossil fuel subsidies reform that

also look at political, economic, technical and methodological aspect, as well as financial means for its implementation. As part of this program, should be included the development adoption of common methods to be used in estimating fossil fuel subsidies, pre- and post-tax. For this it will be necessary to create an *ad hoc* mechanism in the Convention, possibly within the SBSTA. These methods must avoid the bias that limits the political reliability of today's prevalent focuses.

- The introduction into the work programme for the reform of the fossil fuel subsidy regimes a work plan to analyse the disinvestment in the oil and gas industry that facilitates conversion processes and shifts investment, particularly those to do with research, development and the exploration of new reserves, into investments into the development of renewable energy, and which decrease any adverse effects in terms of employment and growth in the sectors affected by this structural transformation
- The inclusion of financial aid mechanisms to facilitate the dismantling of fossil fuel subsidy structures in developing countries that might be considered eligible within the mitigation window of the Green Climate Fund, for which the specific COP guidelines for this fund will be required. This aid must, in particular, consider support for changes in the regulatory frameworks, strengthening the institutions and improving their capacities.
- Giving guidance to the Green Climate Fund so that it can support the development and introduction of innovative financial instruments to expand the supply of renewable energies on a large scale, making it possible to reduce the impact of the changes that will follow a gradual removal of the subsidies, contributing to avoiding price variability, and increasing the offer long term
- Joint development of research programmes, collaboration with the region's central banks, and the subsequent introduction of criteria and preferential assessment standards for investment in energy efficiency and renewable energies in the national banking systems, with respect to requests for funding and credit lines that help investment in the fossil fuel sector.
- Promotion of the transfer of resources currently allocated as subsidies for the exploration of new fossil fuel reserves to financial aid for the transition to low-emission economies and universal access to energy. ■

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Fossil fuel subsidies in Latin America: the challenge of a perverse incentives structure

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