

Policy surveillance in the G-20 fossil fuel subsidies agreement: lessons for climate policy

Joseph E. Aldy¹

Received: 27 February 2015 / Accepted: 11 September 2015
© Springer Science+Business Media Dordrecht 2015

Abstract Inadequate policy surveillance has undermined the effectiveness of multilateral climate agreements. To illustrate an alternative approach to transparency, I evaluate policy surveillance under the 2009 G-20 fossil fuel subsidies agreement. The Leaders of the Group of 20 nations tasked their energy and finance ministers to identify and phase-out fossil fuel subsidies. The G-20 leaders agreed to submit their subsidy reform strategies to peer review and to independent expert review conducted by international organizations. This process of developed and developing countries pledging to pursue the same policy objective, designing and publicizing implementation plans, and subjecting plans and performance to review by international organizations differs considerably from the historic approach under the UN Framework Convention on Climate Change. This paper draws lessons from the fossil fuel subsidies agreement for climate policy surveillance.

1 Introduction

The combustion of fossil fuels represents a majority of the anthropogenic contribution to global climate change. To mitigate fossil fuel carbon dioxide emissions, an extensive literature has focused on pricing fossil fuels' carbon externality (Aldy et al. 2010). This focus on carbon pricing instruments misses what is an important first step in “getting prices right” for fossil fuels in much of the world. With about three-fifths of the world population living in countries with subsidized fuels and electricity,¹ an efficient energy policy would first eliminate fossil fuel subsidies and then explore ways to price carbon. While the UN Framework Convention on Climate Change (UNFCCC) negotiations have been silent on fossil fuel subsidies, the Group

¹Constructed by author based on data in IEA (2013).

This article is part of a Special Issue on “Alternate Structures for Global Climate Action: Building Blocks Revisited” edited by Richard B. Stewart and Bryce Rudyk

✉ Joseph E. Aldy
joseph_aldy@hks.harvard.edu

¹ Harvard Kennedy School, Resources for the Future, National Bureau of Economic Research, Center for Strategic and International Studies, Cambridge, MA, USA

of 20 (G-20) leaders, representing the largest developed and developing countries, agreed to phase-out fossil fuel subsidies at their 2009 Pittsburgh summit.

This fossil fuel subsidies elimination agreement illustrates the potential for narrowly focused, small group approaches to coordinate international action on climate change. This agreement can leverage G-20 countries' own economic and fiscal interests in reforming subsidies. Doing so could minimize incentives for free-riding and serve as an important building block to more effective climate policy. The G-20 agreement illustrates Stewart et al. (2013) club strategy to promoting plurilateral regimes by focusing on non-climate objectives (e.g., rationalizing energy prices) that can deliver meaningful greenhouse gas emission reductions.

A distinctive design characteristic of the G-20 agreement is its transparency. Not only did leaders pledge to phase out their subsidies, but they also agreed to a system of policy surveillance. In this context, policy surveillance refers to the generation and analysis of information on fossil fuel subsidy reform strategies, including, energy prices, emission reductions, costs and cost-effectiveness, potential cross-border impacts, and ancillary benefits (Aldy 2014). The G-20 leaders have agreed to regular reporting of self-identified subsidies and subsidy phase-out strategies that are subject to review by experts at international organizations and peers.

In this paper, I evaluate the key characteristics of the G-20 fossil fuel subsidies agreement, with an emphasis on what can be learned from its transparency provisions. The next section of the paper describes the G-20 agreement. Section three compares this approach under the Pittsburgh agreement to the Kyoto Protocol approach. Section four addresses the question of why countries may seek to coordinate international action on domestic policy reforms. In section five, I draw lessons for climate policy from the G-20 agreement's policy surveillance. The final section concludes.

2 Overview of G-20 fossil fuel subsidies agreement

At the 2009 Pittsburgh G-20 summit, the leaders of the twenty largest developed and developing nations agreed to “phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support to the poorest” (G-20 Leaders 2009). The G-20 leaders called on all nations to eliminate their fossil fuel subsidies, and APEC leaders echoed the call to phase out such subsidies at their 2009 Singapore summit. In 2009, these G-20 and APEC countries represented about 96 % of global coal consumption, 83 % of global oil consumption, and 61 % of global gas consumption, as well as 87 % of global coal production, 62 % of global gas production, and 57 % of global oil production.²

The focus on “inefficient fossil fuel subsidies” in the G-20 agreement was intended to permit some exceptions. Subsidies targeting low-income households – such as the U.S. Low Income Home Energy Assistance Program – would be permitted under this agreement. Subsidies for fossil fuel technologies that lower carbon emissions – such as carbon capture and storage – would also be exempt. While some countries called for an explicit phase-out date, the leaders agreed to an ambiguous “medium term” timeframe for delivering on this commitment.

² Constructed by author based on data in U.S. EIA (n.d.).

Leaders have agreed to many things in various “G-#” summit declarations over the years, but such “G-#” processes do not provide the enforcement mechanisms common in treaty agreements. Instead, leaders can raise the political cost – to their counterparts, their successors, and even themselves – of failing to deliver on their commitments by making such failure transparent (Chayes and Chayes 1991; Keohane 1998; Simmons 1998). In the G-20 agreement, leaders established processes of implementation and review to promote such transparency. Leaders tasked energy and finance ministers to identify their nation’s fossil fuel subsidies, develop a plan for eliminating these subsidies, and report to leaders on their progress. The G-20 published a summary report of each member’s identified subsidies and the plan for eliminating them at the 2010 G-20 summit. Leaders have continued to task energy and finance ministers to continue their efforts and report back regularly (G-20 2012).

To complement self-reporting, the G-20 leaders tasked four international organizations – the International Energy Agency (IEA), the Organisation for Economic Co-operation and Development (OECD), the Organization of Petroleum Exporting Countries (OPEC), and the World Bank – to undertake a joint assessment of fossil fuel subsidies. This includes an examination of countries’ subsidies, their proposed subsidy reforms, as well as the aggregate economic, energy, and environmental impacts of these subsidies. These international organizations published their joint report to G-20 leaders at the 2010 Toronto meeting and have continued to provide analysis and reviews of countries’ implementation strategies. In addition to these Joint Reports (2010a, b), the IEA (2013), OECD (2013), and the IMF (2013) have produced their own estimates of country-specific fossil fuel subsidies.

At the 2013 G-20 summit, leaders supported broad participation in a voluntary “country-owned” peer review process (G-20 Leaders 2013). Through this process, small groups of G-20 nations work together in reviewing one or more nations within each group that voluntarily submit their policies for review (G-20 2013). Third-party experts and non-G20 countries may participate in the reviews at the reviewed country’s discretion. The peer review addresses the fossil fuel subsidies identified for phase out by the country under review. A reviewed country may agree to a broader assessment, including analysis of other potential subsidies, barriers to subsidy reform, etc. Initiated in 2014, the first round of peer reviews address China and the United States, and the second round address Germany and Mexico.

3 Comparing Kyoto to Pittsburgh

This section sets the foundation for drawing lessons from the G-20 fossil fuel subsidies agreement for climate policy by comparing the Pittsburgh agreement with the status quo approach to climate policy at the time, the Kyoto Protocol. The focus on review and surveillance in Pittsburgh set the stage for the important role of transparency in the Copenhagen Accord. The transition from the Kyoto architecture to the pledge and review approach under Copenhagen has continued in the multilateral talks under the Durban Platform for Enhanced Action, launched in 2011.

The Pittsburgh G-20 agreement to eliminate fossil fuel subsidies represents a fundamentally different approach to tackling climate change than the Kyoto Protocol (Table 1). These agreements reflect very different processes – the 20 largest developed and developing countries versus 190+ countries – that delivered very different products – a non-binding two-paragraph leaders’ agreement versus a 28-article protocol requiring ratification. The

Table 1 Comparing the Pittsburgh architecture to the Kyoto architecture

Pittsburgh	Kyoto
Non-binding leaders' agreement	Legally-binding treaty instrument
Developed and emerging nations; open club	Industrialized countries; closed club
Focus on policy instruments – agree on government policy lever (reform energy prices)	Focus on environmental outcomes (economy-wide emission goals)
Independent review of actions and nationally-reported reforms	Nationally-reported emission inventories
20 country process	190+ country process

architecture of these agreements has important implications for the design and implementation of transparency mechanisms.

The structure of the Pittsburgh G-20 fossil fuel subsidies phase-out agreement differs significantly from that of the Kyoto Protocol.³ The Kyoto Protocol is a top-down, legally binding instrument, although there are no effective mechanisms to compel participation in or to enforce compliance with its commitments.⁴ This agreement focused on environmental outcomes – economy-wide emission targets – for a closed club of industrialized nations, but did provide the means for a developing country to take on an emission commitment.⁵ The industrialized countries with commitments report annual emission inventories to the UNFCCC secretariat, although most developing countries have reported no more than two annual emission inventories over the past two decades (Aldy 2013). While there is a review of developed countries' emissions estimates, there was very little systematic review of policy actions that affect emissions in the pre-Copenhagen period (Breidenich and Bodansky 2009).

In contrast, the Pittsburgh deal is a non-binding leaders' agreement. Resulting from a summit negotiation, the stakes of the Pittsburgh agreement for leaders are potentially greater than what their negotiators agree to at annual UN climate talks. The absence of explicit enforcement mechanisms, however, could lower the stakes. In contrast to the Kyoto Protocol, which required emission commitments by one in five of the UNFCCC membership, the Pittsburgh agreement called for full participation by its members in phasing out subsidies. The Pittsburgh agreement focuses on policy instruments – agreement on a policy lever, as opposed to national emissions over which governments have incomplete control – through an open club architecture that encourages participation by non-G-20 countries. By structuring an agreement around national governments' specific, domestic actions, the agreement facilitates assessments of whether countries delivered on, or at least made a good faith effort in delivering on, their commitments (Victor 2007). The leaders requested independent review of nations' subsidies and reform efforts by international organizations as well as by their peers. While the Kyoto Protocol reflected the culmination of a climate-focused negotiation process, the Pittsburgh agreement was part of a multi-issue leaders' declaration, which provided opportunities for issue linkage.

³ At the 2012 Doha Conference of the Parties, the Kyoto Protocol was extended through 2020.

⁴ The United States bore no explicit non-participation penalty for failing to ratify the Kyoto Protocol and Canada escaped any non-compliance penalty by withdrawing from the Kyoto Protocol two weeks prior to the end of the first compliance period.

⁵ In 1998 and 1999, the Government of Argentina proposed to take on an emission target, but its proposal was rebuffed by the 1999 UNFCCC Conference of the Parties (Aldy 2004).

The Pittsburgh agreement represents a “pledge, implement, review” framework, akin to pledge and review proposals for climate policy (Schelling 2002; Pizer 2007). Given the importance of engaging all large countries in combating climate change, the Pittsburgh G-20 is a valuable example of the design of a plurilateral agreement characterized by developed and developing countries’ actions. Prior to 2009, the international climate policy debate had been plagued by an anachronistic dichotomy, dating to 1992, that required mitigation effort by about 35 industrialized countries, but no specified mitigation contributions by the rest of the world. This dichotomy failed to reflect changes in developing countries’ ability to mitigate emissions as well as their dramatic emissions growth (Aldy and Stavins 2012).

Subsequent to the Pittsburgh summit, heads of state personally negotiated the 2009 Copenhagen Accord that represents another version of “pledge, implement, and review.” Copenhagen is the first international climate agreement that included mitigation actions by developed and developing countries. In the Copenhagen Accord, leaders agreed on a much more robust transparency regime than included in past agreements: expanding measurement, reporting, and verification of developed countries’ mitigation and establishing a system of international consultations and analysis for developing country mitigation. International consultations and analysis requires regular reporting on emission mitigation subject to expert, third-party review and a facilitative sharing of views among nations.⁶ Such transparency over emission mitigation could build trust among countries and increase credibility in a pledge, implement, and review regime. It can also promote learning about effective mitigation strategies and inform future pledges.

The ultimate assessment of any climate change mitigation agreement rests on its impact on greenhouse gas emissions. Taken at face value, the Kyoto Protocol was a success. Industrialized countries’ greenhouse gas emissions were 10–15 % below their 1990 levels over 2008–2012 (UNFCCC n.d.), beating the Protocol’s aggregate goal of 1990 -5 % over the first commitment period.⁷ Nonetheless, global carbon dioxide emissions grew nearly 60 % over 1990–2012, and the rate of growth in the decade after the Kyoto talks more than doubled the rate leading up to the talks (Aldy 2013). In contrast, the International Energy Agency (2010) estimates that eliminating all fossil fuel subsidies would reduce global CO₂ emissions by about 6 % by 2020 and represent a 10 % reduction in global emissions by 2050. Realizing these emission reductions, of course, will require meaningful domestic policy reforms. Since the fall in oil prices began in 2014, several G-20 countries have moved forward with subsidy reforms, including India and Indonesia. Others have claimed that the medium-term time frame in the agreement calls for a longer phase-out – over 2020 or even later, while some countries, like the United States, have proposed to eliminate fossil fuel subsidies but failed to secure legislative passage. Finally, as noted below, there are also countries, such as Saudi Arabia and Russia whose combined subsidies are on the order of \$100 billion, that claim they have no domestic fossil fuel subsidies and thus have no plans to change the way they price fuels and electricity.

⁶ In December 2014, Namibia became the first developing country to submit a report under the international consultations and analysis mechanism, and twelve more have done so through May 31, 2015.

⁷ These estimates include the United States and Canada, and the range depends on whether to include land-use change-related emissions in the totals. Technically, some Annex B countries could employ a base year other than 1990, and these alternative base years were employed for these calculations.

4 Why coordinate on domestic fossil fuel subsidy reform?

Coordination among a small group of nations to deliver on emission-reduction activities or policy reforms begs questions about why these countries seek to work with other nations.⁸ If these countries would have taken such actions anyway – because they are in each of these nations’ narrow self-interest – then what are the returns to international coordination? For example, why would governments negotiate a plurilateral agreement calling for eliminating fossil fuel subsidies that would appear, on strict benefit-cost grounds, to be in each country’s interest to undertake unilaterally?

The political economy of subsidy reform may yield a more ambiguous policy prescription than a standard social welfare analysis. Within some governments, ministers may hold differing views on the need for reforming energy prices. The G-20 may provide an opportunity to influence domestic policy debates and weaken domestic opposition to subsidy reform. The G-20 is largely run through finance ministries and an international agreement calling for the elimination of fossil fuel subsidies could legitimize policy reforms that finance ministries generally support. In this way, the finance ministries use an international agreement to constrain domestic economic policy (Gourevitch 1978). This may be especially important in contexts in which finance ministries face opposition to the idea of subsidy reform within their respective governments, and an international agreement could create international pressure supporting their position. If there is not an influential voice in the government favoring the international agreement – e.g., the United States in 2001 on the Kyoto Protocol – then the constraints that such an agreement could impose would be insufficient to secure domestic implementation (Putnam 1988).

In some countries, concentrated special interests could support fossil fuel subsidies, such as industrial beneficiaries. These special interests could argue that low fuel prices are necessary from an economic competitiveness standpoint if their trade partners also subsidize fossil fuels. A similar line of reasoning applies to trade policy.⁹ The political economy of special interests help explain why governments maintain trade barriers, even if on net they hurt domestic consumers more than they help domestic producers (Grossman and Helpman 1994). Trade policy provides another analog for strategic behavior and coordination of subsidy reforms. A government may decide it is in its best interest to lower tariffs, but may wait to do so until it has secured tariff reductions among trade partners. Likewise, a government may delay subsidy reform unless it knows that other similar countries are undertaking comparable reforms.¹⁰ A plurilateral agreement could facilitate reciprocal actions that weaken the position of the special interests that support the status quo.

By negotiating a fossil fuel subsidies reform agreement as part of a broader leaders’ declaration, the G-20 can effectively link issues in the negotiation in order to secure a positive outcome on a large set of issues (Mayer 2010). Moreover, for the developing countries, many of which have been clamoring for a seat at the table of a G-# meeting, agreeing to sound economic policy such as this subsidy phase-out could be considered part of the new responsibilities as a member of the leading “G” group. Leaders who deliver domestic benefits from

⁸ Given the emergence of small group efforts – see Stewart et al. 2013 for numerous examples – this is a question germane to many building block approaches to international climate policy.

⁹ Thanks to Scott Barrett for pointing out this parallel.

¹⁰ Thanks to a referee for suggesting this point.

other elements of the G-20 declarations can leverage the associated public support for potentially more divisive agreements such as fossil fuel subsidy reform.

An international agreement that implements transparency provisions – such as information collection and dissemination by international organizations – can reduce costs to the parties to the agreement (Hafner-Burton et al. 2012). By tapping the expertise of an international organization, an international agreement could facilitate information transmission to domestic publics, convey the case for the policy reform, and reduce domestic opposition (Thompson 2006b). By providing an independent assessment of a country's effort and a comparison with the effort of its peers, regular policy surveillance can legitimize domestic policies (Francois 2001). Leaders often reference summit declarations when communicating to their respective domestic audiences on the rationale for their policies (Putnam 1988). Drawing from the results of a transparency mechanism can only strengthen the case for leaders when engaging their domestic publics – when they are making clear progress in implementing their commitments – but raise the costs to those leaders who are failing to make progress.

Working through a targeted, small group process may provide an opportunity for learning. Governments may recognize that reducing subsidies would yield net social benefits, but they may not know how to design and implement a politically effective reform strategy. Coordination on policy transparency provides for learning that could inform successful domestic reform.

5 Lessons from the G-20 fossil fuel subsidies agreement for climate policy

The G-20 fossil fuel subsidies agreement illustrates potential lessons for the design and implementation of both targeted, small-group climate policy efforts as well as multilateral climate agreements.

5.1 Focus on transparency

As a result of norms, technical capacity, and political will, countries may differ in the forms and stringency of actions that they could take to address climate change risks. Plurilateral and multilateral agreements can reflect this heterogeneity in action while maintaining consistency across countries in the policy surveillance and review of these actions. Keohane (1994) emphasizes the importance of information-producing institutions to facilitate collaboration among nations. Wettestad (2007) also notes the positive relationship between public information about nations' performance under an agreement and the trust it builds. Designing implementation institutions that enable countries to learn of the comparability of their respective efforts as well as the adequacy of their aggregate efforts can play an important role in building support for collaborative international action (Aldy and Pizer 2015).

By providing an independent assessment of a country's effort and a comparison with the effort of its peers, regular surveillance can legitimize domestic policies by highlighting reciprocal actions by other countries. Political leaders who push for their nations to take on more ambitious climate change risk reduction policies could benefit from an institution collecting and publicizing information on their actions. Public information about a nation's actions can empower its leaders and stakeholders to call on and pressure that nation to deliver on its commitments.

For those countries failing to deliver policy reforms in line with their commitments, a credible review mechanism could improve the efficacy of “naming and shaming.” In other international policy contexts, such as human rights, naming and shaming has had some positive impacts in reducing human rights violations (Hafner-Burton 2008; Krain 2012). In other environmental policy contexts, such as the U.S. Toxic Release Inventory, the disclosure of a firm’s toxic pollution contributed to both adverse stock market responses and subsequent voluntary reductions in emissions (Konar and Cohen 1997).

5.2 Employ expert review

In designing a system of transparency, expert review by third parties can serve as a credible source of information. Drawing from experts among various international organizations to evaluate fossil fuel subsidy reforms mirrors the approaches taken by the IMF, OECD, and the World Trade Organization (Aldy 2013, 2014), but not the status quo under the UNFCCC. As Levi (2009) notes, the reports produced as the result of expert reviews in international policy contexts have served to inform domestic policy and international negotiations. The surveillance process can also highlight the successful efforts to reduce such subsidies and to illustrate possible strategies that other countries could emulate as they implement their commitments.

Relying on external experts at established international organizations also mitigates concerns about politicization of the transparency mechanism and allows for a rapid ramping up of the review process. A potential limitation of relying on existing international organizations, however, may be the legitimacy of those with incomplete memberships. For example, some developing countries may question reviews by the International Energy Agency, whose membership is comprised of developed nations.

5.3 Employ peer review

Coupling peer review with expert review enhances transparency on implementation, and can empower domestic stakeholders as well as peer nations’ within the G-20 to apply pressure to push a country to deliver on its commitment. The quality and productivity of peer engagement – a review of a peer’s commitments as well as a facilitative discussion to understand a peer’s program, objectives, and political economy – will reflect the quality of the expert review and transparency regime. Nations may initiate an informal bilateral dialogue with those nations lagging far behind (to pressure them to do more) or demonstrating accomplishment (to learn how to follow their lead). The peer review process could employ the outputs of the expert review to compare actions, policies, and outcomes among a set of peer countries. Such a process could frame opportunities for pressuring peers, especially the laggards, to do more in the next round of negotiations. This could also serve to inform one’s own domestic constituencies about comparable efforts among peers and potentially influence coalition-building and advocacy in a peer country’s domestic political sphere.

There are pros and cons of conducting peer review in the G-20 framework. Levi (2009) called for a climate policy review mechanism in the G-20 or Major Economies Forum because “reviews will only be useful if they are coupled with an effective forum for high-level political engagement” (p. 4). The downside of peer review through the G-20 is that the entire suite of issues addressed at each summit renders fossil fuel subsidies as a second-tier consideration. As a result, countries may exert only limited peer pressure on subsidies, recognizing that the key negotiations at a given summit may rest on more pressing issues at the top of the G-20 agenda.

Of course, this expanded set of issues addressed in the G-20 could provide for issue linkage to leverage progress on subsidy reform. The large array of issues on the G-20 agenda may have facilitated the support and agreement on the fossil fuel subsidies reform proposal in the first place (e.g., Mayer 2010 on issue linkage in negotiations). Engaging heads of state on fossil fuel subsidy reform may spur action that may not be attainable in fora with lower-level participation.

5.4 Permit an open club approach

The G-20 agreement explicitly invites non-G-20 countries to follow suit in eliminating their fossil fuel subsidies and provides an opportunity for non-G-20 members to participate in peer review. For example, the Friends of Fossil Fuel Subsidy Reform – including Costa Rica, Denmark, Ethiopia, New Zealand, Norway, Sweden, and Switzerland – participate in the G-20 peer review process. This open club approach increases information flow and supports broader learning about effective ways to implement subsidy reform. Learning about effective reform efforts can then spillover to countries outside of the G-20 club. Policy surveillance in an open club framework promotes the dissemination of information and knowledge, a public good, that could benefit club members by leveraging subsidy reform outside of the club, i.e., de facto opt-in to the fossil fuel subsidies agreement. (Victor 2007).

5.5 Demonstrate proof of concept in targeted, small group efforts

Given the lack of progress in designing a successful, comprehensive international climate policy architecture, one of the key motivations for targeted, small group efforts is to identify actions and processes that can successfully result in lowering greenhouse gas emissions. A well-designed transparency regime can provide the information necessary to demonstrate whether the small-group process delivered on its objectives. It can illustrate the most effective reforms and highlight potential opportunities for scaling up the effort to a larger set of countries or even to the full UNFCCC negotiations. Periodic information collection and analysis can also benefit goal-setting and implementation in iterative negotiation processes, such as in Thompson's (2006a) adaptive management scheme for international climate policy.

Working in a smaller group of similar countries may permit a more extensive system of policy surveillance. For example, the G-20 members have substantially more resources and bureaucratic competency than the average of the UNFCCC membership. Thus, G-20 members can draw on the technical expertise of their bureaucracies – and in some cases their civil societies and academia – to experiment with ideas for effective policy surveillance. Demonstrating a well-functioning system of policy surveillance for the largest developed and developing countries can then serve as a model for large-group contexts, such as the UNFCCC.

There is a challenge, however, in eliciting interest by some governments – or specific interests or ministries within a government – in implementing and attempting to scale up specific, small-group efforts. For example, consider that 30 G-20 and APEC nations agreed to eliminate their fossil fuel subsidies.¹¹ The risks posed by climate change served as one of the primary motivations for both agreements. In 2010, 24 of these nations “associated” with the Copenhagen Accord and 22 “inscribed” greenhouse gas emission goals, actions, and policies

¹¹ This count excludes Hong Kong and Chinese Taipei, which are not UNFCCC parties.

with their association. None of these countries listed fossil fuel subsidy elimination in their mitigation policy inscriptions. This suggests that some countries did not view the G-20 agreement as a building block for their respective domestic contributions to mitigating greenhouse gas emissions. It may also reflect heterogeneity of preferences within a government and a country's domestic politics. Or it could reflect a fundamental lack of policy coordination among finance ministries that support G-20 negotiations and environment and foreign ministries that participate in UNFCCC negotiations.

5.6 Define clearly the policy objective

What does it mean to “phase out and rationalize... inefficient fossil fuel subsidies?” The international community does not have a standard definition for fossil fuel subsidies (Joint Reports 2010a). The ambiguity in the objective may have permitted leaders to reach agreement on subsidy reform in 2009.¹² Such ambiguity, however, complicates efforts to evaluate progress. If countries do not agree on what subsidies are, then that undermines the measurement and assessment in policy surveillance, which is necessary to inform policy management, effective peer engagement, and demonstration of policy success.

The G-20 governments have not agreed on a definition of fossil fuel subsidies and decided to defer to each country in how it defines such subsidies. International organizations, such as the IMF and IEA, typically employ the “price gap” approach (IMF 2013; IEA 2010). Under this approach, the retail price for fuel in a given country is compared to a benchmark market price, e.g., the market price at an international trading hub. The estimated subsidy reflects the gap – effectively the opportunity cost – between the in-country price and its benchmark.

A variety of policy measures could be classified as a fossil fuel subsidy under this price gap approach. In many countries, the government regulates the price of fuels and electricity. In some cases, the government employs a formula that permits the price of fuels to move – with a lag – with underlying market forces (China and Jordan have employed this approach (Fattouh and El-Katiri 2012)). Other countries make a determination of the price of fuels as a part of an annual budget process, such as in Cameroon (IMF 2011). Still other nations employ an opaque, ad hoc process that does not change fuel prices regularly, such as Saudi Arabia (Fattouh and El-Katiri 2012). Subsidies may also be implemented through vouchers, in-kind assistance, or even incomplete bill collection.

Saudi Arabia has indicated that it does not believe it subsidizes gasoline and diesel because the products are sold at prices above the marginal cost for extracting and refining Saudi crude oil. Under this perspective, there are no explicit government outlays, which some countries view as necessary for a subsidy. For countries with a national oil company and price setting below market prices, the fuel subsidies may not involve government outlays but instead reduced revenues from the oil company to the national treasury. In this interpretation, the opportunity cost of the fuel is irrelevant.

On the other extreme, the IMF has employed a broader, full social cost measure that counts a given country's fuel prices as subsidized if they do not appear to reflect the opportunity cost of the fuel and its full social cost, e.g., pollution, climate, and congestion externalities. This so-called “after-tax” approach yields dramatically higher estimates of fuel subsidies of about \$2 trillion, four times the \$500 billion estimate under the price gap approach (IMF 2013). This approach is quite peculiar, since very few countries have set their energy fiscal regimes as a

¹² I thank two referees for making this important point.

function of fossil fuel externalities. Instead, the after-tax price for energy in many developed countries reflects either a user fee perspective (e.g., U.S. motor fuel taxes) or the need to generate general revenue for the treasury (e.g., many European nations). These nations have revealed their preference politically for alternative approaches to addressing pollution externalities, such as emission-reduction or efficiency mandates for energy-using physical capital, like power plants and automobiles. The IMF is effectively combining fossil fuel subsidies, as defined through the price gap approach, and its preferred objective that countries implement environmental taxes in its estimated measure of subsidies.

These various perspectives on what constitutes a fossil fuel subsidy have resulted in a wide range of estimates. Table 2 illustrates this substantial variation, with examples of countries' self-identified fossil fuel subsidies, IEA estimates, and IMF full social cost estimates. Some countries, such as Saudi Arabia, Russia, and China report zero consumption subsidies, despite IEA estimates on the order of \$30–\$60 billion (and IMF estimates a factor of 2–10 times greater). The IMF “post-tax” measure is two orders of magnitude larger than the OECD estimated subsidies for the United States. This dramatic variation risks clouding, instead of clearing up, the picture of fossil fuel subsidies in practice among some of the largest economies in the world. If the countries participating in the agreement cannot reach agreement on what constitutes the policy objective, then it may undermine efforts to employ transparency to highlight success and to shame failure in delivering on the subsidies phase-out agreement.

5.7 Applying lessons to climate policy

In light of these lessons, let me suggest some specific ways for designing more effective transparency in international climate policy. First, countries should structure their contributions to facilitate transparency and review. Clear, objective characterizations of contributions – such as an emissions target, a carbon price, or an unambiguous policy change (e.g., elimination of

Table 2 2011 Fossil fuel subsidies, identified by G-20 members, IEA, OECD, and IMF (Billion USD)

Country	Self-Identified subsidies	Production subsidies (OECD)	Consumption subsidies (OECD/IEA)	IMF “Post-tax” consumption subsidies
Canada	<1	1	2	27
China	0	–	31	280
Indonesia	15	–	21	45
India	14	–	40	84
Germany	2	3	3	22
Japan	0	< 1	< 1	46
Russia	0	–	40	120
Saudi Arabia	0	–	61	112
South Korea	< 1	< 1	2	17
USA	4	6	6	517

G-20 nations' self-identified subsidies are from the summary of progress reports (G-20 2012). China, Japan, and Saudi Arabia did not submit progress reports in 2012. They each reported no “inefficient fossil fuel subsidies” in 2010 (G-20 2010). Developed countries production and consumption subsidies are from the OECD (2013). Developing countries consumption subsidies are from IEA (2013). The “Post-Tax” consumption subsidies have been calculated based on Appendix 4 of IMF (2011, 2013) country GDP estimates available through the World Economic Outlook database.

fossil fuel subsidies) – would enable subsequent review. Countries could include descriptions of their implementation strategies and provide data and their own analysis to demonstrate the credibility of their pledged contribution and promote its assessment. Such elements could be formalized in the emerging intended nationally determined contributions under the UNFCCC negotiations, and reflect an evolution from the tasking of energy and finance ministers to identify subsidies and develop a phase-out plan under the G-20 agreement.

Second, the review mechanism for these contributions should identify environmental, economic, and energy outcomes of a country's effort to implement its pledge. This would be similar to the analyses produced in the international organizations joint reports on fossil fuel subsidies. The climate reviews would also evaluate the efficacy and cost-effectiveness of domestic policies and highlight those success stories for potential use in other nations. The review could also apply specific metrics of effort to enable comparison of mitigation effort across countries (see Aldy and Pizer 2015).

Third, the UNFCCC could task experts at existing international organizations to conduct the expert review of countries' contributions. These experts could conduct ex ante review of proposed contributions as well as ex post review on the implementation of the contributions. The international organizations could also develop data collection and analysis standards and train staff working in low-capacity countries to implement these standards. Over time, such reviews could be tasked to a climate-specific permanent staff (see Victor 2007; Aldy 2013).

Fourth, these expert reviews would serve as inputs into a peer review mechanism. To demonstrate how such peer reviews could work, the Major Economies Forum could serve as a testing ground for this new transparency model. For example, two countries could be identified as the lead for the review of a third MEF country (akin to the process in OECD economic policy reviews, see Aldy 2014). The reviews would be open to non-MEF members, to take advantage of potentially relevant expertise outside of the MEF, to assess how the review model could be applied to smaller countries, and to encourage policy knowledge and evaluation spillovers to more countries.

6 Conclusions

The G-20 fossil fuel subsidies agreement represents an important example of a plurilateral approach to mitigating greenhouse gas emissions. The agreement focuses on rationalizing fuel prices, which, given the significant fiscal demands subsidies place in many nations, is in many countries own self-interest. The emission reductions forecast under complete fossil fuel subsidy elimination would exceed those delivered by the Kyoto Protocol.

The extensive attention focused on the design of policy surveillance under the G-20 agreement yields important lessons and insights for additional plurilateral agreements as well as the broader UNFCCC negotiations. Given the growing role of pledge and review in both plurilateral and multilateral climate negotiations, the expert and peer review mechanisms called for by G-20 leaders can serve as a model for these alternative fora. Such policy surveillance can provide opportunities for learning and actionable information, which have been missing under the UNFCCC process. The ambiguity and dramatic range of fossil fuel subsidy estimates also deliver a cautionary tale for the need to identify explicit policy objectives in order to facilitate clarity in the review process.

Acknowledgments This research has been supported by BP, the Harvard Kennedy School Environment and Natural Resources Program, and the Roy Family Endowment. Maria Davydenko, Napat Jatusripitak, Carlos Paez, and Ryan Powell provided excellent research assistance. Thanks to Amos Bromhead for providing IEA subsidies data. This work has benefited from comments provided on an earlier version by Bryce Rudyk, Dick Stewart, three referees, and seminar participants at Columbia, the Council on Foreign Relations, Harvard, MIT, and Resources for the Future.

References

- Aldy JE (2004) Saving the planet cost-effectively: the role of economic analysis in climate change mitigation policy. In: Lutter R, Shogren JF (eds) *Painting the white house green: rationalizing environmental policy inside the executive office of the president*. Resources for the Future Press, Washington, DC
- Aldy JE (2013) Designing a bretton woods institution to address global climate change. In: Fouquet R (ed) *Handbook of energy and climate change*. Edward Elgar, Cheltenham
- Aldy JE (2014) The crucial role of policy surveillance in international climate policy. *Clim Change* 126(3–4):279–292
- Aldy JE, Pizer WA (2015) Alternative metrics for comparing domestic climate change mitigation efforts and the emerging international climate policy architecture. *Rev Environ Econ Policy*, forthcoming
- Aldy JE, Stavins RN (2012) Climate negotiators create an opportunity for scholars. *Science* 337:1043–1044
- Aldy JE, Krupnick AJ, Newell RG, Parry IWH, Pizer WA (2010) Designing climate mitigation policy. *J Econ Lit* 48(4):903–934
- Breidenich C; Bodansky D (2009) Measurement, reporting and verification in a post-2012 climate agreement. *Pew Center on Global Climate Change Report*, April. Arlington, VA
- Chayes A, Chayes AH (1991) Compliance without enforcement: state behavior under regulatory treaties. *Negot J* 7(3):311–330
- Fattouh B; El-Katiri L (2012) Energy subsidies in the arab world. *Arab Human Development Report Research Paper Series*
- Francois JF (2001) Trade Policy Transparency and Investor Confidence: Some Implications for an Effective Trade Policy Review Mechanism. *Rev Int Econ* 9(2):303–316
- G-20 (2010) Annex: G-20 initiative on rationalizing and phasing out inefficient fossil fuel subsidies. Prepared for the Toronto G-20 Leaders Summit
- G-20 (2012) Fossil fuel subsidy reduction progress report compilation. June 2012
- G-20 (2013) Methodology for G-20 voluntary peer reviews on inefficient fossil fuel subsidies that encourage wasteful consumption. G-20 Energy Sustainability Working Group
- G-20 Leaders (2009) G-20 Leaders' Declaration, Pittsburgh G-20, September
- G-20 Leaders (2013) G-20 Leaders' Declaration, Russia G-20. September
- Gourevitch P (1978) The second image reversed: the international sources of domestic politics. *Int Organ* 32(4): 881–912
- Grossman GM, Helpman E (1994) Protection for sale. *Am Econ Rev* 84(4):833–850
- Hafner-Burton EM (2008) Sticks and stones: naming and shaming the human rights enforcement problem. *Int Organ* 62(4):689–716
- Hafner-Burton EM, Victor DG, Lupu Y (2012) Political science research on international law: the state of the field. *Am J Int Law* 106:47–97
- IEA (2010) *World energy outlook 2010*. IEA, Paris
- IEA (2013) *Subsidies summary 2007-2011*. Dataset transmitted via personal communication from Amos Bromhead, Office of the Chief Economist, IEA, June 6, 2013
- IEA, OPEC, OECD, and the World Bank (Joint Report) (2010a) *Analysis of the scope of energy subsidies and suggestions of the G-20 initiative*. Joint report prepared for the G-20 Summit Meeting, Toronto, Canada, June 26–27, 2010
- IEA, OECD, and the World Bank (Joint report) (2010b) *The scope of fossil-fuel subsidies in 2009 and a roadmap for phasing out fossil-fuel subsidies*. Joint report prepared for the G-20 Summit Meeting, Seoul, Korea, November 11–12, 2010
- IMF (2011) *Cameroon: staff report for the 2011 article IV consultation*. September. IMF, Washington, DC
- IMF (2013) *Energy subsidy reform: lessons and implications*. IMF, Washington, DC
- Keohane RO (1994) *Against hierarchy: an institutional approach to international environmental protection*. In: *Complex cooperation: institutions and processes in international resource management*. Scandinavian University Press, Oslo

- Keohane RO (1998) International institutions: can interdependence work? *Foreign Policy* 110:82–96
- Konar S, Cohen MA (1997) Information as regulation: the effect of community right to know laws on toxic emissions. *J Environ Econ Manag* 32(1):109–124
- Krain M (2012) J'accuse! does naming and shaming perpetrators reduce the severity of genocides or politicides? *Int Stud Q* 56:574–589
- Levi MA (2009) Creating a climate policy review mechanism. Harvard Project on International Climate Agreements Viewpoint, November
- Mayer FW (2010) Multi-level games. In: Enderlein H, Walti S, Zum M (eds) *Handbook on multi-level governance*. Edward Elgar Publishing, Cheltenham
- OECD (2013) Inventory of estimated budgetary support and tax expenditures for fossil fuels 2013. OECD, Paris
- Pizer WA (2007) Practical global climate policy. In: Aldy JE, Stavins RN (eds) *Architectures for agreement: addressing global climate change in the post-Kyoto world*. Cambridge University Press, Cambridge
- Putnam RD (1988) Diplomacy and domestic politics: the logic of two-level games. *Int Organ* 42(3):427–460
- Schelling TC (2002) What makes greenhouse sense? *Foreign Aff* 81(3):2–9
- Simmons BA (1998) Compliance with international agreements. *Ann Rev Polit Sci* 1:75–93
- Stewart RB, Oppenheimer M, Rudyk B (2013) A New strategy for global climate protection. *Clim Change* 120: 1–12
- Thompson A (2006a) Management under anarchy: the international politics of climate change. *Clim Change* 78: 7–29
- Thompson A (2006b) Screening power: international organizations as informative agents. In: Hawkins DG, Lake DA, Nielson DL, Tierney MJ (eds) *Delegation and agency in international organizations*. Cambridge University Press, Cambridge
- U.S. EIA. (n.d.) International Energy Statistics. Internet: <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm>, accessed May 21, 2015
- UNFCCC (n.d.) Time Series – Annex I, Data for greenhouse gas (GHG) total. Internet: http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php, accessed August 19, 2014
- Victor DG (2007) Fragmented carbon markets and reluctant nations: implications for the design of effective architectures. In: Aldy JE, Stavins RN (eds) *Architectures for agreement: addressing global climate change in the post-Kyoto world*. Cambridge University Press, Cambridge
- Wettstad J (2007) Monitoring and verification. In: Bodansky D, Brune J, Hey E (eds) *The oxford handbook of international environmental law*. Oxford University Press, Oxford, pp 974–994