Harvard Project on Climate Agreements

Living Mitigation Plans: The Co-Evolution of Mitigation Pledge and Review

Joseph E. Aldy
Harvard University

The fifth in a series of annual discussion papers supported by the Enel Foundation

October 2016
Discussion Paper ES 16-5

Living Mitigation Plans: The Co-Evolution of Mitigation Pledge and Review

Joseph E. Aldy
Harvard University

October 2016

THE HARVARD PROJECT ON CLIMATE AGREEMENTS

The goal of the Harvard Project on Climate Agreements is to help identify and advance scientifically sound, economically rational, and politically pragmatic public policy options for addressing global climate change. Drawing upon leading thinkers in Argentina, Australia, China, Europe, India, Japan, and the United States, the Harvard Project's research focuses in part on the architecture, key design elements, and institutional dimensions of a new international regime based on the 2015 Paris Agreement. The Project is directed by Robert N. Stavins, Albert Pratt Professor of Business and Government, Harvard Kennedy School. For more information, see the Project's website: www.hks.harvard.edu/hpca

ACKNOWLEDGEMENTS

The Harvard Project on Climate Agreements is grateful to the Enel Foundation for its generous support of a series of annual discussion papers on climate policy and agreements, of which this paper is the fifth.

The Harvard Project receives additional support from the Harvard University Climate Change Solutions Fund; the Belfer Center for Science and International Affairs and the Ash Center for Democratic Governance and Innovation—both located at the Harvard Kennedy School; the Harvard University Center for the Environment; Christopher P. Kaneb (Harvard AB 1990); and the International Emissions Trading Association (IETA).

Previous sponsors of the Harvard Project on Climate Agreements include: ClimateWorks Foundation, the Doris Duke Charitable Foundation, and the James M. and Cathleen D. Stone Foundation.

The closely affiliated, University-wide Harvard Environmental Economics Program receives additional support from the Enel Endowment for Environmental Economics at Harvard University, the Mossavar-Rahmani Center for Business and Government at the Harvard Kennedy School, BP, Chevron Services Company, Duke Energy Corporation, and Shell.

CITATION INFORMATION

Aldy, Joseph E. "Living Mitigation Plans: The Co-Evolution of Mitigation Pledge and Review" Discussion Paper ES 2016-5. Cambridge, Mass.: Harvard Project on Climate Agreements, October 2016.

LIVING MITIGATION PLANS: THE CO-EVOLUTION OF MITIGATION PLEDGE AND REVIEW

Joseph E. Aldy[1]

Harvard Kennedy School

ABSTRACT

The 2015 Paris Agreement completed the transition to pledge-and-review as the core of the multilateral climate policy architecture. With ambitious long-term temperature goals and country-specific emission mitigation pledges set through 2030, the unfinished business coming out of the Paris talks is the design and implementation of the climate transparency mechanism. This paper reviews the poor transparency track record under the UN Framework Convention on Climate Change, and uses this performance to motivate engagement of non-stakeholders to enhance the rigor of the information and analysis of countries' emission mitigation efforts. If agreement and implementation of a formal transparency mechanism takes considerable time, then ad hoc processes involving representatives of civil society, the business community, and academia could fill the void. In particular, these efforts could experiment with alternative approaches to review, enable the comparison of mitigation efforts among countries, identify mitigation effort metrics of interest to governments and their stakeholders, promote policy learning, develop and test approaches to reviewing the reviews, and inform the ambition *and* design of future mitigation pledges that facilitate more effective climate transparency. Supplementing the formal transparency mechanism with such ad hoc efforts could enhance the quality of review, thereby increasing credibility and building trust in the dynamic process of setting and implementing emission mitigation pledges.

1 joseph_aldy@hks.harvard.edu; Mailbox 114, Harvard Kennedy School, 79 JFK Street, Cambridge, MA 02138; +1-617-496-7213. Daniele Agostini, Mariano Morazzo, Rob Stavins, Rob Stowe, and Marika Tatsutani provided constructive comments on an earlier draft. The author is grateful to Bryan Galcik for layout and design of the paper. This paper has been supported by a grant from the Enel Foundation.

1. INTRODUCTION

The 2015 Paris Agreement makes an important step forward in the multilateral effort to combat climate change. The Agreement sets ambitious goals, including the objective to limit global warming "to well below 2ºC above pre-industrial levels".[2] More than 180 countries submitted emission mitigation contributions (intended nationally determined contributions, or INDCs), about 150 more than the number of countries with emission commitments under the 1997 Kyoto Protocol. To assess progress toward the long-term temperature goal, the Agreement establishes regular processes for global stocktaking and periodic updating of countries' mitigation pledges. The Agreement also calls for more rigorous transparency to inform these stocktaking and updating efforts.

The Paris Agreement represents the culmination of the transition toward a pledge-and-review climate regime envisioned by world leaders who personally negotiated the 2009 Copenhagen Accord. While countries undertook considerable effort in crafting and communicating their emission mitigation pledges (INDCs) over 2015, the unfinished work coming out of the Paris talks is in the design of a transparency and review regime. Ongoing negotiations will elaborate the details of the transparency mechanism, including the roles of countries in self-reporting, experts in conducting analysis, and peers in undertaking review.

The review of countries' mitigation actions will be critical to enabling more ambitious mitigation efforts over time. A long literature on negotiations and international environmental agreements emphasizes the importance of making both pledges and subsequent performance transparent to other parties to an agreement (Schelling 1956; Barrett 2003; Aldy 2014b). Given the repeated nature of emission mitigation pledges envisioned under the Paris Agreement, verifying countries' past performance can increase confidence and build trust that they will deliver on future rounds of pledges (Chayes and Chayes 1991). Moreover, recent experimental evidence suggests that a transparency mechanism could increase both the ambition of pledges and the realized mitigation performance relative to a regime without review (Barrett and Dannenberg 2016).

Past transparency efforts under the UN Framework Convention on Climate Change (UNFCCC) have primarily focused on counting emissions. That approach, however, may not be particularly informative. For example, Russia's greenhouse gas emissions have fallen at least 30% below its Kyoto target of 1990 emission levels over the past two decades. But this reflects poor economic performance, not an ambitious emission mitigation program. Transparency will need to move beyond "counting tons." Specifically, the transparency mechanism can reflect the demand for information, which will be a function of the interests of parties to the climate agreement. Governments may request the collection, analysis, and dissemination of

2 Decision 1/CP.21, Annex, Paris Agreement, Article 2.1(a); see: http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf.

information through the transparency mechanism that address the interests of their domestic publics and stakeholders (Aldy and Pizer 2016; Aldy et al. 2016b). Some business stakeholders may view transparency as a way to assess the policy and economic landscape in a given country for purposes of determining future investments. Other business stakeholders, concerned about potential adverse competitiveness impacts of the domestic programs they operate under, may be interested in assessing the comparability of mitigation effort among countries, with a particular focus on the energy-cost impacts of domestic mitigation programs borne by their competitors (Aldy and Pizer 2015). Environmental stakeholders may use assessments of a country's mitigation program and comparisons with other countries to identify and pressure laggard countries. Addressing these interests will require information on the economic, energy, and environmental impacts of domestic mitigation policies.

The elaboration of the transparency mechanism and the evolution of the pledge-and-review regime need to account for the relationship between pledges and reviews. How and what is subject to transparency and review can inform and influence the design of mitigation pledges. The dynamic nature of mitigation pledging, as well as the dynamic nature of producing and evaluating information about mitigation in practice, suggests the importance of a flexible approach to pledge and review. Aldy (2015a) described "living mitigation plans" as a way to implement a dynamic approach to mitigation pledges:

> "A Living Mitigation Plan should highlight a country's emission mitigation goal(s), describe its efforts to implement this goal, present the details of its plans for domestic policy surveillance and review, and outline the process by which the country would update implementation policies in response to new information…. [T]he Living Mitigation Plan would be a collection of documents, information, data, and analyses that each country would continually update over time. Just as the INDC is 'nationally determined,' all of the elements of the Living Mitigation Plan would also be nationally determined and contributed." (Aldy 2015a, p. 25)

This would require more than simply submitting a mitigation pledge, although the nationally determined contribution could serve as the framing document for a Living Mitigation Plan. Moreover, the Living Mitigation Plan approach could integrate pledge and review, promoting a dynamic in which the analysis of mitigation policy performance would then feed into the updating of the domestic mitigation program and subsequently inform a country's mitigation pledge. Due to the scale and demands of such an exercise, which will require an array of skills and expertise, a Living Mitigation Plan approach will need to leverage experts in civil society, the business community, and academia.

The next section of this paper reviews the call for transparency in the Paris Agreement. The third section discusses the challenge of promoting transparency under an incomplete transparency

regime, reflecting either the interim period until negotiators finalize the implementation of the Paris Agreement's transparency provisions or the failure of negotiators to agree on a sufficient transparency regime. The fourth section examines in detail how Living Mitigation Plans can represent the co-evolution of pledge and review. The final section addresses the policy implications of this work.

2. TRANSPARENCY IN THE PARIS AGREEMENT

The Paris Agreement builds on the 2014 Lima Call for Climate Action by inviting countries to submit their mitigation pledges (INDCs) "in a manner that facilitates the clarity, transparency, and understanding of the intended nationally determined contributions."[3] While the INDC and the content of the INDC are communicated to the Conference of the Parties on a voluntary basis, the guidance to countries is to craft an emission mitigation pledge that enables its review. This is quite important given the substantial heterogeneity in the forms of mitigation pledges submitted in the run-up to the Paris talks. Countries expressed their intent to reduce emissions relative to a historic base year (different countries selected different base years, however), through reductions in the carbon intensity of economic output, through percentage reductions from a forecast emission level, by achieving an emissions peak by a specified year, and by increasing the non-fossil fuel share of energy consumption, among other policy objectives. Such heterogeneity and deference to the discretion of sovereigns to structure their pledges likely played a major role in eliciting near universal participation in the Paris Agreement's mitigation contributions, but it also enhances the value of a transparency regime to facilitate an understanding of what such an "apples and oranges" approach to pledges means in practice. This is important both in assessing the aggregate impact of the mitigation pledges as well as examining the comparability of effort among individual countries.

Supplying Information in Mitigation Pledges

The Paris Agreement and the Lima Call to Climate Action specified the types of information countries could include in the submission of their mitigation pledges:

> "[The Conference of the Parties] *[a]grees* that the information to be provided by Parties communicating their nationally determined contributions, in order to facilitate clarity, transparency and understanding, may include, as appropriate, *inter alia*, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse

3 Decision 1/CP.20, "Lima Call for Climate Action," par. 13; http://unfccc.int/resource/docs/2014/cop20/eng/10a01.pdf; see also Decision 1/CP.21, pars. 13, 25, 27 (among others), http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf.

> gas emissions and, as appropriate, removals, and how the Party considers that its nationally determined contribution is fair and ambitious, in the light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2".[4]

The voluntary nature of the INDCs and the suggested information for inclusion in the communication of the INDC would not appear to constrain in any way what countries do. The "*inter alia*" in the Paris Agreement quote above makes it clear that this list is not exhaustive. Moreover, the Paris Agreement tasks future negotiations to develop further guidance on the supply of information to facilitate transparency and understanding. Even if negotiators find it difficult to reach agreement on this guidance, a select group of countries could move beyond the Paris Agreement guidance described above in order to establish a new norm for pledging and transparency. There are no barriers to this under the Agreement, and such an approach could enable experimentation and learning that could inform future negotiations over the guidance.

The information provided in the INDC submission increases the "publicity" of a country's mitigation intentions. As Schelling (1956) noted, in negotiating contexts premised on committing one's reputation, publicity is required for both the initial offer and the final outcome: "if secrecy surrounds either point, or if the outcome is inherently not observable, the device [reputational commitment] is unavailable" (Schelling 1956, p. 288). Thus, the enhanced transparency in INDCs is important for facilitating agreement among parties to the UNFCCC, but it is not sufficient. The Paris Agreement recognizes this, and calls for greater transparency on countries' outcomes.

National Reporting

Under the Agreement, countries "shall regularly provide" a national greenhouse gas emission inventory report and "information necessary to track progress made in implementing and achieving its nationally determined contribution" (Article 13, paragraph 7). This builds on the discussion of emission mitigation pledges in the Agreement, which notes that countries shall account for their nationally determined contributions and promote "environmental integrity, transparency, accuracy, completeness, comparability, and consistency" in these efforts (Article 4, paragraph 13). While the former focuses on accounting for tons of emissions, the latter permits a more informative assessment of a country's mitigation effort. The outstanding question is what will be agreed to in the negotiations that will operationalize the reporting on progress, versus what will be left at the discretion of countries. Again, this creates an opportunity for progressive, transparent countries to establish the norm for the content and structure of reporting on progress toward achieving a mitigation pledge.

---

4 Decision 1/CP.21, par. 27; http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf.

Technical Review

The Paris Agreement calls for a "technical expert review" of the information submitted by countries. The Agreement is clear that this review should go beyond a simple assessment of how a country's emissions compare with its pledge: "the technical expert review… shall consist of a consideration of a Party's… *implementation and achievement* of its nationally determined contribution" (Article 13, paragraph 12; emphasis added). Moreover, the review shall identify areas of improvement for the reviewed country, illustrating an interest in promoting policy learning that may facilitate more ambitious future pledges as well as more effective policy implementation.

A critical element of the Paris Agreement's technical review will also include an assessment of developing countries' capacity-building needs (Article 13, paragraph 11). The quality of the reviews will reflect, in part, the quality of the reporting by countries. Just as efforts by the International Monetary Fund to establish data and reporting protocols and invest in the training of in-country experts to implement these protocols resulted in an improved Article IV consultation process (Aldy 2014b), identifying resource needs—financial and human—and addressing them could enhance the value of climate transparency. These efforts could also serve to focus the attention of non-party stakeholders and experts to undertake analyses for those countries that could most benefit from supplementary technical assistance.

Global Stocktaking and Mitigation Pledge Updating

Such technical expert reviews will feed into future deliberations about emission pledges and actions. The Paris Agreement calls for a "global stocktake" every five years (Article 14, paragraph 1). Through this global stocktaking, countries will assess collective progress toward the goals of the Agreement in a facilitative manner and use the outcomes to inform individual countries' decisions to update and enhance their mitigation pledges and efforts. The Agreement calls for regular updating of nationally determined contributions every five years, with a no-backsliding condition—i.e., each successive mitigation pledge should be more ambitious than the status quo for that country.

These processes will establish the iterative, repeated nature of the negotiations on emission mitigation pledges. This has several important implications for the supply of information and analysis of pledges as well as for the incentives to ramp up ambition over time. First, the repeated game increases the likelihood that a country will deliver on its pledge, so long as its actions are public (Barrett 2003). If a country benefits from the contributions of others in one round, then it is more likely to reciprocate in order to leverage similar benefits in the subsequent rounds. Second, the resource investment in the transparency and policy surveillance regime can be spread over multiple review cycles. Spreading these fixed costs over a longer period of time may make it more feasible, politically and economically, to make a larger investment in transparency. Third, the focus on cumulative global outcomes and updating country-specific

contributions to the global climate change mitigation effort will establish the demand for review and analysis of both the aggregate impacts of mitigation efforts and the comparability of effort among countries. A rigorous, legitimate assessment of each of these can produce a shared understanding that would serve as a strong foundation for successively more ambitious mitigation pledges and actions over time.

3. TRANSPARENCY UNDER AN INCOMPLETE TRANSPARENCY REGIME

Historically Inadequate Multilateral Climate Transparency

Historically, the UNFCCC has had a poor record with respect to reporting, review, and transparency. Since the UNFCCC entered into force in 1994, developed countries have submitted annual emission reports, pursuant to established guidelines subject to expert review. In contrast, developing countries' emissions reports are made as a part of their infrequent national reports (so-called national communications), and are neither subject to the same data standards as developed countries nor to a process of expert review (Breidenich and Bodansky 2009; MacFaul 2006). Even the regular reporting of developed countries' emissions is insufficient to characterize the effectiveness of emission mitigation actions in these countries (Ellis and Larsen 2008; Breidenich and Bodansky 2009; Thompson 2006). The system of periodic national reports is so incomplete and inconsistent that it is not possible to credibly compare effort among countries or even compare effort *within* a country over time (Thompson 2006).

In sharp contrast to other international policy venues, such as the International Monetary Fund and the World Trade Organization, the UNFCCC has dramatically different standards and expectations for reporting and review between developed and developing countries. In the lead-up to the 2009 Copenhagen climate talks, the most recent emission inventory for many developing countries, including China, dated from 1994 (Aldy 2013). At those 2009 negotiations, President Obama personally negotiated with major developing countries an agreement that their emission mitigation pledges would be subject to "international consultations and analysis," a term incorporated in both the Copenhagen Accord and Cancun Agreements. The term reflected an expectation that developing countries would do more than simply report: experts and other parties would analyze the reported information and this would feed into a consultative process, not unlike the Article IV consultations undertaken through the International Monetary Fund. To implement "international consultations and analysis," subsequent climate negotiations called for developing countries to submit biennial update reports of their national communications, with the first reports due in December 2014, and subsequent reports due every two years thereafter. Nearly 120 countries, including China, have failed to submit their initial biennial reports, now some 22 months late at the time of this draft. Moreover, the absence of templates or standards for reporting has resulted in

an "apples and oranges" problem in the submitted biennial reports that preclude meaningful comparisons across countries. Since the reports serve as the initial inputs for any kind of consultation and analysis, the failure to report completely undermines the transparency of the international consultations and analysis provision.

Challenges to Agreeing on a Rigorous Transparency Regime

Some developing countries lack the institutional capacity to monitor emissions, evaluate programs and policies, estimate emission reductions across various sources and sectors in their economies, and report this information. For example, the 2013 UNEP "Emissions Gap" report notes that "serious information gaps preclude comprehensive assessment of several countries' emission trajectories under current policies" (UNEP 2013, p. 12). This highlights the importance of making resources—financial and human capital—available to developing countries, as called for under the Paris Agreement and common in other multilateral policy surveillance mechanisms (Aldy 2014b).

The precedent established by this track record complicates efforts to enhance the rigor and legitimacy of transparency under the Paris Agreement. Some countries may prefer ambiguity about their own mitigation performance. Other countries may claim that implementing transparency may violate their sovereignty (even though they permit similar policy surveillance in other multilateral contexts). The wealthier countries may not provide sufficient resources to finance a ramping up of the quality of the transparency mechanism. Even if all of these hurdles can be overcome, it will take time to design and implement a credible transparency mechanism.

Living Mitigation Plans and Opportunities for Non-Party Stakeholders in Climate Transparency

Under an incomplete, formal transparency regime, parties and non-party stakeholders can take actions to promote transparency. Living Mitigation Plans could serve as an interim approach to transparency. Non-party stakeholders can help supply data and analysis to enhance transparency, as well as identify (create the demand for) the kind of information that they would find valuable about a country's implementation of its mitigation pledge. The demand for information could specify the metrics of mitigation effort that stakeholders would welcome. Moreover, stakeholders could begin to frame the policy debate on criteria and benchmarks for evaluating emission mitigation performance metrics. Several concrete examples follow.

Despite the fact that most emission mitigation pledges take the form of some kind of quantitative emission contribution, the key factors driving private investment in low- and zero-carbon technologies in a given country will be the price of energy, the explicit (e.g., tax) or implicit (e.g., regulation) price on carbon, as well as more general investment conditions (rule of law, enforcement of contracts, etc.). Thus, compiling and reporting information on energy and carbon prices can inform investors and firms that are deciding where to allocate their resources for climate-friendly investment. Moreover, constructing such measures in a comparable manner across countries could further inform private-sector investment decisions. Supplying such data could leverage business-sector resources. In some cases, private firms collect higher quality energy price data than do governments, such as in the case of high-frequency, spatially-disaggregated data on gasoline and diesel prices in the United States. In cases where implicit carbon prices must be estimated, business experience in complying with greenhouse gas emission regulations could inform and calibrate the empirical tools used to estimate such prices. These efforts could also tap into ongoing efforts at the OECD to estimate the implicit price of carbon under various mitigation policies (e.g., OECD 2013).

In the case of climate transparency, carbon pricing has a special appeal beyond the typically discussed attributes of promoting cost-effectiveness and delivering strong incentives for innovation. Implementing carbon pricing either through a carbon tax or cap-and-trade produces a transparent price signal that makes it straightforward to compare mitigation programs in other countries based on carbon pricing. The existence and stringency of carbon pricing policies also demonstrate the seriousness with which a country takes the implementation of its emission mitigation pledge. Such instruments signal both a good-faith effort—presuming that they are meaningfully ambitious—and a metric of mitigation effort that is focal for business and investor decisions on the deployment and innovation of climate-friendly technology.

Environmental stakeholders may focus on emission reductions relative to a no-policy counterfactual. This may be a more appealing metric of performance than the level of emissions since factors unrelated to climate policy—economic growth, weather variations, the world price of oil, etc.—may play substantial roles in determining a country's emission level in a given year. This measure of effort may facilitate the identification of the most effective emissions-abatement policies, which environmental groups may advocate for both in national capitals and as the basis for more ambitious pledges in future rounds of international negotiations. Since counterfactual emissions are, by definition, not observed, various modeling tools will be necessary to estimate emission reductions for any given country. Modeling teams in think tanks and academia could employ simulation models as well as estimate statistical models in order to quantify emission reductions for countries, and do so in an internally consistent manner that enables comparability of efforts.

Learning from Intended Nationally Determined Contributions

Implementing transparency measures outside the UNFCCC could thus leverage the strengths of non-state actors and focus on issues of interest to them. These efforts could evaluate the characteristics and information provided in the mitigation pledges as well as what non-party stakeholders can glean from mitigation performance in practice. For example, analysis of INDCs could reveal countries' preferences, interests, and objectives, which could inform subsequent negotiations (Keohane and Victor 2016). Second, these analyses could investigate "country-specific emission gaps." Just as some in civil society have examined the gap between the cumulative impact of the INDCs on global emissions and the emissions trajectories believed to be required for limiting warming to 2°C, analysts could identify gaps between the ambition of any given country's INDC target and its domestic mitigation program. For example, a number of U.S. environmental groups and independent analysts have investigated whether the United States can achieve its 2025 INDC emission pledge under current policies and, if not, what additional actions could be sufficient to deliver on the pledge (Hausker et al. 2015; Larsen et al. 2016; Vine 2016). These analyses estimate that the United States will reduce its emissions 22%–23% below 2005 levels by 2025 under current law, policies, and regulations, while aggressively pursuing additional mitigation efforts under current law could deliver on the U.S. pledge of 26%–28% below 2005 levels by 2025.

Independent assessments of INDCs and current forms of climate transparency—such as biennial update reports—could also serve to examine the sufficiency of information provided in these submissions. Can analysts undertake rigorous analysis with the data available in the INDCs and status quo reporting mechanisms? Do some countries represent a "gold standard" in terms of information provision that could be identified and recommended as a new norm for INDCs and reporting going forward? The emergence of the INDC approach and the discretion left to countries in how they structure and communicate their INDCs represents a natural experiment that could be exploited to learn about the effectiveness of alternative approaches to INDCs. Likewise, heterogeneity in the developing country biennial reports may also serve as a way to learn about alternative approaches, and provide a contrast with the common template employed by developed countries in their biennial update reports.

Variation in the form of the INDCs likely imposes differential data and analysis requirements for the transparency regime. As a simple example, the review of a carbon intensity emission mitigation pledge requires, by definition, data on emissions and economic output. By contrast, one could compare a country's emissions with its mitigation pledge, if the nationally determined contribution is specified as a percentage reduction from a historic base year, without economic output data. Non-party stakeholders could examine the various INDC forms and describe how these may influence the review of countries' performance. This work could also inform efforts to consider the construction of metrics of mitigation effort that would enable comparisons among peers (Aldy and Pizer 2016).

The interim review of mitigation effort under the Living Mitigation Plan approach could facilitate the identification of effective mitigation policies. There may be cases in which a country implements a new mitigation policy that delivers greater than anticipated emission reductions or the expected emission reductions at lower than anticipated costs. The interim review and analysis could highlight these cases of impressive performance that could inform the updating of countries' mitigation pledges. Indeed, if a country or set of countries find that their successful implementation of emission mitigation policies delivers greater than expected emission reductions, they could push for more ambitious mitigation pledges *early* in the iterative process of updating pledges. Given the emphasis in the Paris Agreement for enhancing pre-2020 ambition, and noting that this could promote even more ambitious post-2020 action, such a strategy would likely be welcomed by the Conference of the Parties and create a positive dynamic for ratcheting up ambition over time. Such learning could also be distributed more broadly as a best public policy practice that other countries could emulate, thereby permitting them to consider more ambitious pledges in subsequent rounds of climate talks. Finally, learning about policy performance can also inform business decisions about long-term investments since firms could use this information to update their expectations about the future of national and multilateral climate policy.

4. CO-EVOLUTION OF PLEDGE AND REVIEW

Implementing Living Mitigation Plans in Practice

A Living Mitigation Plan can build on the nationally determined contributions countries intend to deliver under the Paris framework. In particular, a Living Mitigation Plan could provide opportunities for frequent updating of policy descriptions and associated data and analyses for a country's domestic mitigation program while also providing key insights from interim reviews of those policies. Consider the case of the United States. It submitted its INDC in March 2015. Since then, the Obama Administration finalized its Clean Power Plan, which will lower the U.S. power sector's carbon dioxide emissions by 32% below 2005 levels by 2030. If the United States could augment the information in the INDC with the final Clean Power Plan regulation, regulatory impact analysis, and updates on the legal status of the rule as it undergoes judicial review, that would enhance the credibility of the U.S. nationally determined contribution. Going forward, additional changes to U.S. energy and climate policy that could impact the likelihood that the United States will deliver on its pledge in Paris could be reflected in information made available in conjunction with the 2015 INDC.

The Living Mitigation Plan could also reflect interim, domestic reviews of policy performance. Specifically, Living Mitigation Plans could include the processes and results of retrospective reviews of a country's domestic mitigation program. As discussed later, effective retrospective review and analysis of public policy interventions requires planning before the implementation of these policies. Such planning would focus on data collection protocols, identification of

empirical methods and tools for evaluating policy performance, and, as necessary and feasible, the design of the policy intervention to enable rigorous statistical evaluation of its effects (Aldy 2014a). Such retrospective reviews could inform interim assessments of a country's mitigation effort and help shape policy reforms.

With opportunities for international linkage of emission mitigation efforts as well as implicit linkages across borders via energy markets, analyses of domestic mitigation programs could also characterize spillovers of these programs. Analyses of implicit spillovers could address how international trade influences the implementation and performance of emission mitigation policies, such as through global fossil fuel prices and the deployment of low-carbon technologies. Explicit spillovers could occur via emission trading or other market-based approaches for shared efforts to mitigate emissions. Living Mitigation Plans could include regular updates on linked mitigation programs, transfers of emissions allowances, and reviews of the efficacy and environmental integrity of the linked regimes.

In practice, a Living Mitigation Plan would include a country's emission mitigation pledge, a description of domestic implementation, interim progress reports and retrospective evaluations, frequent updates on emissions inventories, updates on emission forecasts, details on the financing of and results of supported mitigation activities, and related information. Collecting and publicizing this information would enhance the legitimacy of the multilateral climate transparency regime and reduce the time and resource burden of conducting independent policy surveillance. Moreover, it could facilitate independent assessments by interested stakeholders, leverage complementary analyses by expert stakeholders, and promote the comparison of mitigation efforts among countries.

Increasing the supply of information through Living Mitigation Plans could be achieved by expanding the UNFCCC INDC web portal to permit the regular updating of data, analyses, reporting, and policy descriptions for each country. The web portal would also be supplemented by information and analyses submitted by non-party stakeholders. A Living Mitigation Plan—by providing a means for collecting information on domestic policy implementation and evaluation—aims to strengthen the links between the emission pledge and the review of that pledge. By establishing a close relationship between mitigation pledging and transparency, the process of developing, communicating, and understanding information about a country's current pledge can better inform consideration of future pledges.

Planning for Reviews

Rigorous and informative review of mitigation programs will require thoughtful planning of the reviews. The data collection exercise will likely involve much more than accounting for tons of greenhouse gas emissions. Analysis of the efficacy and cost-effectiveness of emission mitigation policies will depend on a broad understanding of—and data on—the energy,

economic, land-use, and other related implications (such as local air quality co-benefits) of the domestic policy program. The planning for reviews should then address the data needs and analytic tools envisioned for reviewing emission mitigation performance.

Any given country could explicitly account for the periodic review of its mitigation efforts as it develops and implements new climate change policy. Indeed, careful consideration of the research design for performance review could enable rigorous statistical analysis of the cause and effect of emission policies as well as improved model calibration for those contexts in which simulation models are available for policy evaluation (Aldy 2014a; Aldy 2016). A country could leverage free analytic resources—which could be especially important for smaller and less-wealthy countries—by providing access to data to non-party stakeholders, including environmental and business stakeholders as well as academics. This transparency with the data produced by the domestic policy surveillance regime would enable third parties to analyze the impacts of a country's mitigation program, replicate the work of government analysts (thereby improving robustness, enhancing legitimacy, and increasing trust), and allow for extensions of policy analysis to promote policy learning.

While a country or set of countries could voluntarily take this approach to their domestic transparency regime and illustrate it as a model for reporting into the multilateral transparency regime, other countries may be less enthusiastic to pursue this route in the absence of a formal agreement on the UNFCCC transparency mechanism. Ad hoc stakeholder reviews could fill this void in the interim. To some extent, this occurred as a form of ex ante review of pledges over the course of 2015. As countries formally submitted their INDCs, a number of groups in civil society conducted their own assessments of the pledges. Consider two examples. The Climate Action Tracker website, produced by four European research organizations (Climate Analytics, Ecofys, NewClimate Institute, and the Potsdam Institute for Climate Impact Research), provided assessments of INDCs submitted in the run-up to the 2015 Paris talks (CAT 2015). The Climate Transparency Initiative (2016) has produced an assessment of emission mitigation efforts by the Group of 20 countries as an illustration of independent, rigorous information and analysis of large developed and developing countries' domestic climate change policies (CIT 2016).

These efforts focused on the headline emission mitigation contribution for each country, with much less attention on the domestic mitigation programs in place or proposed to deliver on those contributions. And to be fair, many INDCs did not provide sufficient detail for an assessment of expected mitigation outcomes. Some analysts have assumed that countries implement economy-wide least-cost emission mitigation policies in order to produce estimates of cost, price, and emission reduction metrics for comparison of mitigation effort among major economies (Aldy et al. 2016a, 2016b). As countries begin to implement their mitigation actions and policies, non-party stakeholders will have the opportunity to observe and analyze actual policy performance.

Coordination of ad hoc stakeholder reviews of mitigation efforts could deliver potentially significant benefits. By examining a suite of countries' mitigation programs, such reviews could experiment with various templates for assessing and comparing mitigation effort. Moreover, they could focus on a set of case studies—for example, all countries implementing cap-and-trade programs—that could augment learning potential about policy effectiveness. Alternatively, stakeholder reviews could focus on a group of countries—for example, the countries participating in the Major Economies Forum—to enable learning about effective mitigation policies in practice (Aldy and Pizer 2016; Aldy 2015b). The coordination of stakeholder reviews could also leverage data and stimulate creativity on tools and frameworks for review and analysis.

These ad hoc efforts could inform the institutionalization of transparency and review under the UNFCCC process. As demonstrations of various types and forms of review, ad hoc efforts could highlight the pros and cons of an array of approaches; ensure a broad, common understanding of alternative approaches; and serve as the foundation of political and diplomatic support for a preferred transparency regime.

Interim Review of Mitigation Pledges

Interim review of mitigation pledges will be necessary in light of the regular global stocktaking and rounds of repledging expected under the Paris framework. For a given country, an interim review can inform other countries and domestic publics on progress toward the mitigation pledge. As a result, countries that may not be on track for delivering their pledged contribution will have the evidentiary basis to modify their domestic mitigation program. And countries that are making adequate progress toward their pledges will be in a more credible position to advocate for more ambitious pledges by other countries in the subsequent round of pledging. Interim reviews may also illustrate cases in which a country makes a good faith effort, but unexpected shocks undermine the efficacy of its domestic emission mitigation programs. For example, the 2011 Fukushima nuclear disaster significantly disrupted government plans to ramp up the use of nuclear power as part of Japan's emission mitigation program. Waiting until 2025 or 2030 for review would forego substantial benefits of the transparency mechanism.

With the schedule for stocktaking and updating of pledges already set in the Paris Agreement, countries can structure their data collection and analysis to inform these efforts. Stakeholders may also time their ad hoc analyses in line with this schedule. The challenge lies in the fact that the first global stocktaking and repledging may occur before agreement and implementation of the transparency mechanism under Paris. The fact that most developing countries have failed to submit their initial biennial update report as of September 2016, despite agreement on this new form of transparency in the 2009 Copenhagen Accord and 2010 Cancun Agreements, suggests a potentially long lag in designing and implementing transparency and review.

Reviewing the Reviews

Not only can periodic reviews of mitigation pledges facilitate more ambitious pledges over time, reviews of the transparency regime can also inform reforms that improve the implementation of mitigation program reviews. Incorporating such reviews in the design of the transparency mechanism can ensure that the UNFCCC's approach to transparency meets the needs of the countries making regular mitigation pledges; reflects the latest and most rigorous insights from data sciences, statistical analysis, modeling, and other analytic methodologies; and delivers a credible, legitimate assessment of countries' mitigation pledges. Before full implementation of the transparency mechanism under the Paris Agreement, an ad hoc review of the various ad hoc transparency efforts could likewise inform the Paris review process and establish a norm of "reviewing the reviews."

Integrating Ex Ante and Ex Post Review

The ex post review of a previous round of pledges can add value to an ex ante review of the subsequent round of proposed pledges. For example, an evaluation of the performance of domestic mitigation pledges under a given country's first nationally determined contribution can shed light on the ambition and feasibility of its second nationally determined contribution. If a country implements an economy-wide carbon tax and it realizes emission reductions greater than expected, then that provides confidence that it could deliver on an even more ambitious pledge in the next round. Conversely, if a country fails to implement adequate domestic policies to deliver on its initial pledge, then that may suggest that it needs to demonstrate the political will for more substantial mitigation policies as a basis for its next pledge.

Thus, the review of pledges—to assess performance toward meeting a previously established pledge and to form expectations about future pledges—would draw from much of the same information. To promote consistency across reviews and maximize the returns to reviewing resources, ex ante and ex post reviews could be integrated. Ex post reviews of mitigation performance could provide data and related information to calibrate prospective assessments. Given Schelling's guidance for publicizing both the pledge and the outcome, a common ex ante and ex post review process would ensure consistency in the information produced in the transparency mechanism.

Using Review to Inform the Design of Future Mitigation Pledges

The review, analysis, and consultations on a country's mitigation pledge can influence the design of future nationally determined contributions. In the review of reviews discussed above, a specific charge could be to identify the characteristics of INDCs that enable rigorous review and, in turn, enhance the credibility of the contribution. As Aldy and Pizer (2016) note, some forms of mitigation goals map clearly to metrics of mitigation effort. For example, an INDC specified as an economy-wide carbon tax would map one-for-one to a carbon price metric.

Alternatively, an INDC structured as a percentage reduction from a forecast business-as-usual emission level would also map clearly to an emission reduction metric.

Beyond the headline form of a country's mitigation objective, the review of pledges could also highlight the most important types of information and ways of communicating that information in the submission of an INDC. Likewise, the reviews could illustrate the benefits of updating information, if not necessarily the headline goal, through the Living Mitigation Plan approach.

5. POLICY IMPLICATIONS AND NEXT STEPS

The Marrakech talks represent, among other things, the first step in implementing the Paris Agreement. While previous negotiating experiences suggest that finalizing the implementation details might take some time—for example, resolving the details of the 1997 Kyoto Protocol required talks through 2001—the world is not waiting. The unprecedented speed of ratification has resulted in the Paris Agreement entering into force less than a year after the closing of the Paris talks. Moreover, continuing changes to the global climate and increasing global greenhouse gas emissions demand action. Thus, work to elaborate the transparency mechanism will continue in Marrakech and future conferences of the parties, but also informally through ad hoc processes with parties and non-party stakeholders.

The Paris Agreement emphasizes the potential role of non-party stakeholders, including civil society, the private sector, financial institutions, and subnational governing authorities, in a markedly more open and positive manner than previous multilateral climate agreements. The agreement specifically calls for leveraging the expertise and knowledge of non-party stakeholders to complement the contributions of parties, convention bodies, and international organizations in the existing technical review processes of pledges through 2020. Soliciting "experiences and suggestions"[5] creates an opportunity for stakeholders to inform, shape, and demonstrate approaches to transparency that can facilitate greater mitigation over time. Moreover, the Agreement reiterates this enthusiasm for non-party stakeholders by noting that it "encourages non-party stakeholders to increase their engagement" (paragraph 119). Finally, the section of the Agreement titled "Non-Party Stakeholders" further highlights the potential role for stakeholders. In particular, by focusing on the role of domestic mitigation policies and carbon pricing, stakeholders could play a role in integrating the design of domestic policy, the review of these policies, and the implications for the transparency and assessment of mitigation pledges under the Paris framework.

Indeed, interest in domestic mitigation policies and actions will continue to grow as parties and stakeholders seek a better understanding of how nationally determined contributions are

5 Decision 1/CP.21, par. 109(a); http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf.

implemented and whether such implementation delivers on a given country's initial pledge. Stakeholders often have more extensive input on the design of domestic policy, including emission mitigation policy, than on a headline goal made in multilateral negotiations. Understanding what policies will work in practice can draw from stakeholder expertise. In addition, stakeholders can work with policymakers on the design of domestic policy to facilitate the supply of information for the benefit of both domestic policy review and international climate policy transparency (Aldy 2016). This can improve the efficacy of domestic policies, promote cost-effectiveness, enable greater policy learning, and enhance the credibility of a country in international negotiations by rigorously demonstrating a good faith effort in mitigating greenhouse gas emissions. The integrated approach to pledge and review represented by the Living Mitigation Plan framework described in this paper would be more effective if it can draw from stakeholder expertise in both the implementation of the pledge through domestic policy and in its review.

Given the likelihood of an incomplete transparency regime, at least for some time, this opportunity for leveraging non-party stakeholders to complement the transparency regime holds important promise. Promoting greater transparency through Living Mitigation Plans could operationalize the theory of mutually reinforcing successive ambition behind the Paris Agreement: if a country takes a step forward in mitigating its emissions (delivering on its own pledge) *and* if it can see that its peers, neighbors, and trading partners have also taken a similarly meaningful step (transparency on others' performance in attaining their pledges), then it would be that much more likely that the country will take an even more ambitious second step on mitigation. The outcome in Paris has enshrined the pledged contributions of countries for that first step. The task going forward will center on ensuring that there is credible transparency concerning the actions of peers, neighbors, and trading partners to give countries the confidence—and to address the concerns of their domestic stakeholders and publics—that they are moving in lockstep with the rest of the international community. If the implementation of the Paris Agreement can achieve this dynamic over time, then it will succeed in delivering progressively more ambitious emission mitigation in the effort to combat climate change.

REFERENCES

Aldy, Joseph E. 2013. Designing a Bretton Woods Institution to Address Global Climate Change. In: Fouquet, Roger, ed. *Handbook of Energy and Climate Change*. Cheltenham, UK: Edward Elgar. Earlier version accessible online as Harvard Kennedy School Faculty Research Working Paper RWP12-017. May 2012. https://research.hks.harvard.edu/publications/workingpapers/citation.aspx?PubId=8381.

Aldy, Joseph E. 2014a. Learning from Experience: An Assessment of the Retrospective Reviews of Agency Rules and the Evidence for Improving the Design and Implementation of Regulatory Policy. Report commissioned by the Administrative Conference of the United States. October 17 Draft. www.acus.gov/sites/default/files/documents/Aldy%2520Retro%2520Review%2520Draft%252011-17-2014.pdf.

Aldy, Joseph E. 2014b. The Crucial Role of Policy Surveillance in International Climate Policy. *Climatic Change* 126 (3-4): 279-292. http://dx.doi.org/10.1007/s10584-014-1238-5. Earlier version accessible with no subscription as Harvard Project on Climate Agreements *Viewpoints*. October 2013. http://belfercenter.ksg.harvard.edu/publication/23548.

Aldy, Joseph E. 2015a. Evaluating Mitigation Effort: Tools and Institutions for Assessing Nationally Determined Contributions. Harvard Project on Climate Agreements. November. http://belfercenter.ksg.harvard.edu/publication/25957/evaluating_mitigation_effort.html

Aldy, Joseph E. 2015b. Policy Surveillance in the G20 Fossil Fuel Subsidies Agreement: Lessons for Climate Policy. *Climatic Change*, published online September 28. http://dx.doi.org/10.1007/s10584-015-1505-0. Earlier version accessible with no subscription as Harvard Project on Climate Agreements Discussion Paper 15-70. June 2015. http://belfercenter.ksg.harvard.edu/publication/25462.

Aldy, Joseph E. 2016. The Role of Domestic Policy Surveillance in the Multilateral Climate Regime. In: R. Stavins and R. Stowe, eds., *The Paris Agreement and Beyond: International Climate Change Policy Post-2020*, Harvard Project on Climate Agreements, October: 43-46. http://belfercenter.ksg.harvard.edu/publication/26975.

Aldy, Joseph E. and William A. Pizer. 2015. Competitiveness Impacts of Climate Change Mitigation Policies. *Journal of the Association of Environmental and Resource Economists* 2(4): 565-595. http://dx.doi.org/10.1086/683305.

Aldy, Joseph E. and William A. Pizer. 2016. Alternative Metrics for Comparing Domestic Climate Change Mitigation Efforts and the Emerging International Climate Policy Architecture. *Review of Environmental Economics and Policy* 10: 3-24. http://dx.doi.org/10.1093/reep/rev013. August 4, 2015 draft accessible online at: https://dash.harvard.edu/handle/1/22808338.

Aldy, Joseph E., William A. Pizer, and Keigo Akimoto. 2016a. Comparing Emissions Mitigation Efforts across Countries. *Climate Policy* http://dx.doi.org/10.1080/14693062.2015.1119098. Earlier version accessible online as Resources for the Future Discussion Paper 15-32: www.rff.org/research/publications/comparing-emissions-mitigation-efforts-across-countries.

Aldy, Joseph E., William Pizer, Massimo Tavoni, Lara Aleluia Reis, Keigo Akimoto, Geoffrey Blanford, Carlo Carraro, Leon E. Clarke, James Edmonds, Gokul C. Iyer, Haewon C. McJeon, Richard Richels, Steven Rose, and Fuminori Sano. 2016b. Economic Tools to Promote Transparency and Comparability in the Paris Agreement. *Nature Climate Change*. Published online August 22, 2016. http://dx.doi.org/10.1038/nclimate3106.

Barrett, Scott. 2003. *Environment and Statecraft: The Strategy of Environmental Treaty-Making*. Oxford: Oxford University Press.

Barrett, Scott and Astrid Dannenberg. 2016. An experimental investigation into 'pledge and review' in climate negotiations. *Climatic Change* (138): 339-351. http://dx.doi.org/10.1007/s10584-016-1711-4.

Breidenich, Clare and Daniel Bodansky. 2009. Measurement, Reporting and Verification in a Post-2012 Climate Agreement. Pew Center on Global Climate Change Report, April. Arlington, VA: Pew Center. www.c2es.org/docUploads/mrv-report.pdf.

Chayes, Abram and Antonia Handler Chayes. 1991. Compliance without Enforcement: State Behavior under Regulatory Treaties. *Negotiation Journal* 7(3): 311-330. http://dx.doi.org/10.1111/j.1571-9979.1991.tb00625.x.

CAT (Climate Action Tracker). 2015. Tracking INDCs. http://climateactiontracker.org/indcs.html.

CTI (Climate Transparency Initiative). Climate Transparency G20 Report 2016—Brown to Green. www.climate-transparency.org/g20-brown-to-green.

Ellis, Jane and Kate Larsen. 2008. Measurement, Reporting, and Verification of Mitigation Actions and Commitments. OECD and IEA Publication COM/ENV/EPOC/IEA/SLT(2008)1. Paris: OECD and IEA. www.oecd.org/env/cc/41762333.pdf.

Hausker, Karl, Kristin Meek, Rebecca Gasper, Nate Aden, and Michael Obeiter. 2015. Delivering on the U.S. Climate Commitment: A 10-Point Plan Toward a Low-Carbon Future. (2015). World Resources Institute. www.wri.org/sites/default/files/WRI15_WorkingPaper_post-2020_0.pdf.

Keohane, Robert O. and David G. Victor. 2016. Cooperation and Discord in Global Climate Policy. *Nature Climate Change* 6(6): 570-575. http://dx.doi.org/10.1038/nclimate2937.

Larsen, John, Kate Larsen, Whitney Herndon, Shashank Mohan. 2016. Taking Stock: Progress Toward Meeting US Climate Goals. (2016). The Rhodium Group, January 28. http://rhg.com/wp-content/uploads/2016/01/RHG_Taking_Stock_of_US_Climate_Goals_Jan28_2016.pdf.

MacFaul, Larry. 2006. "Developing the Climate Change Regime: The Role of Verification." In: Rudolf Avenhaus, Nicholas Kyriakopoulos, Michel Richard, and Gotthard Stein, eds. *Verifying Treaty Compliance*. Springer, 171-209.

OECD (Organisation for Economic Co-operation and Development). 2013. Effective Carbon Prices. Paris: OECD. www.oecd.org/env/tools-evaluation/effective-carbon-prices-9789264196964-en.htm.

Schelling, Thomas C. 1956. An Essay on Bargaining. *American Economic Review* 46(3): 281-306. http://www.jstor.org/stable/1805498.

Thompson, Alexander. 2006. Management under Anarchy: The International Politics of Climate Change. *Climatic Change* 78: 7-29. http://dx.doi.org/10.1007/s10584-006-9090-x.

UNEP (United Nations Environment Programme). 2013. *The Emissions Gap Report 2013*. November. www.unep.org/publications/ebooks/emissionsgapreport2013.

Vine, Doug. 2016. US Can Reach Its Paris Agreement Goal. Center for Climate and Energy Solutions blog. www.c2es.org/blog/vined/us-can-reach-its-paris-agreement-goal.

HARVARD Kennedy School
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Harvard Project on Climate Agreements

79 John F. Kennedy Street
Cambridge, MA 02138

+1 617 496 8054
climate@harvard.edu

www.hks.harvard.edu/hpca

This publication was printed on 100% post-consumer-waste recycled paper.