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Justice in Mitigation after Paris

Anthropogenic climate change affects the lives and well-being of hundreds of millions of people now and into the foreseeable future. The change is driven by the use of greenhouse gases, most importantly CO₂. According to recent scientific projections surveyed by the Intergovernmental Panel on Climate Change (IPCC), the mean equilibrium surface temperature of the Earth by the end of this century is likely to be 2.6 to 4.8°C unless we begin to reduce global emissions.¹ Warming at that rate is unprecedented in human history. Its effects are likely to be devastating, including widespread species loss and destruction of ecosystems, heat waves, extreme precipitation and tropical storms, and large and irreversible sea-level rise from terrestrial ice sheet melting. The rise in sea level could swamp low-lying island nations, such as Kiribati and Tuvalu, and could threaten major coastal cities including New York, Mumbai and Shanghai. Drought could render some parts of Africa and Asia uninhabitable. Food and water supplies are likely to become much less secure, and there would be, increased risks from food- and water-borne as well as vector-borne diseases such as malaria, increased displacement due to migration, increased risks of violent conflicts, slowed economic growth, and increased poverty.

Policies responding to climate change raise important questions of justice because they seek to change how, or the extent to which, people will be affected by the change by requiring certain kinds of actions from others. The concept of justice is the idea that people have valid claims regarding their liberties, powers, and property within an institutional order. Particular accounts of justice can be understood as accounts of who the moral creditors are and what they are owed morally. Something like this is what Dr. Martin Luther King, Jr. had in mind when in a speech at the March on Washington he declared that “[W]e have come to our

nation's capital to cash a check. When architects of our republic wrote those magnificent words of the Constitution and the Declaration of Independence, they were signing a promissory note to which every American was to fall heir."² African Americans, like all American, are owed rights. Insofar as these have not been honored, there must also be moral debtors, those from whom payment is due. The concept of responsibility concerns that. The concepts of justice and responsibility are then correlative.

Justice in climate change policy has two dimensions. The intergenerational dimension concerns the claims that people in the future would have that constrain energy and climate change policy for people now alive. The question of how much we must mitigate on behalf of future generations is a concern of intergenerational justice. The international or global dimension concerns the claims that our contemporaries around the world might make regarding energy and climate change policies. The question of whether some states, or their citizens, can claim a liberty to pursue energy intensive development strategies even if that involves increasing emissions falls into this dimension of global or international justice. In the following two sections I discuss principles of intergenerational and international justice that seem appropriate to climate change policy. After that I discuss the prospect for achieving justice in these areas in the wake of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) in December of 2015.

Justice between Generations

One plausible demand of intergenerational justice relevant to climate change is the principle that we should minimize our contribution to, and seek to prevent (even when we do not contribute to it), unjustified harm to others. Unjustified harm is any setback to a person's interests brought about by institutions, policies, or other people that she does not plausibly deserve. Punishment is a setback to a person's interest that in a well-functioning criminal justice system usually is not unjustified. But if a group of people is targeted by policies that

disenfranchise them that would be a case of unjustified harm. Climate change is driven by the concentration of greenhouse gases in the atmosphere. Climate change mitigation policies aim to reduce and eventually halt activities that increase the concentration of greenhouse gasses in the atmosphere. A plausible reason for why we should mitigate climate change is that we owe it to future people to minimize our contribution to, and to seek to prevent, their harm.

Our knowledge of the relationship between present actions and the future harms of climate change is limited. There is little doubt that unless we act to mitigate, the surface temperature of the Earth will continue to rise. How much exactly is not certain. But there is a range of warming that seems most likely, namely 2.6 to 4.8°C this century. Higher warming cannot be ruled out; and a tiny minority of climate scientist thinks it will be less. The damage caused by climate change is largely a function of the warming. So, many of the damages then are matters of probability. For example, global warming is expected to increase the risk of intense tropical storms. The principle that requires that we minimize our contribution to, and prevent, harm can be understood as a principle requiring risk reduction. We should seek minimize the risks that we impose and seek to prevent the imposition of risks by others.

Not all the foreseeable negative outcomes of climate changes, however, are matters about which scientists are confident enough in their understandings to assign a probability of their occurrence. It does not follow from that the outcomes are low risk. Uncertainty about outcomes can exist simply because the processes are not well understood.³ If they were understood, we might have reason to consider them high risk. Sea-level rise is an important instance of this. Sea-level rise due to the thermal expansion of the oceans and melting of glaciers is projected to be in the range of 0.45 to 0.82 meters this century, unless we take additional action to mitigate climate change.⁴ That's a significant rise of the sea-level in a short period of time. And it is likely to cause a lot of damage. According to one report 150 million people, three times more than now, would be exposed to a 1 in 100 year flooding event due to higher storm surges caused by that much sea-level rise.⁵ But there is the

uncertain possibility that sea-level rise will be higher if terrestrial ice sheets melt and collapse.

According to the AR5,

There is high confidence that sustained warming greater than some threshold would lead to the near-complete loss of the Greenland ice sheet over a millennium or more, causing a global mean sea level rise of up to 7 m. Current estimates indicate that the threshold is greater than about 1°C (low confidence) but less than about 4°C (medium confidence) global mean warming with respect to pre-industrial. Abrupt and irreversible ice loss from a potential instability of marine-based sectors of the Antarctic ice sheet in response to climate forcing is possible, but current evidence and understanding is insufficient to make a quantitative assessment.⁶

Over the time period the 21st century the collapse of the Antarctic ice sheets could increase the sea-level rise predictions by several tenths of a meter.⁷

How, if at all, should the demand of justice to minimize contribution to, and prevent, harm apply in cases where the harm is uncertain rather than risky? There is considerable debate about whether it is possible to specify circumstances in which greater caution would be warranted in the face of uncertainty.⁸ Our response to uncertainty should no doubt depend considerably on the circumstance. When resources are scarce we do not want to waste them protecting against harms that seem only possible. It is possible that the planet could come under attack from an intergalactic malign force. But that hardly warrants building an expensive defense system. But in cases like the uncertain threat of even greater sea-level rise due to terrestrial ice sheet melting, taking action that would reduce the likelihood of occurrence is arguably morally required. What is it about ice sheet collapse that makes the difference? The following four conditions are jointly sufficient to warrant precautionary action in circumstances of uncertainty:

1. The harmful outcome could possibly come about by means that are in general terms understood.
2. Several of the understood causal antecedents of the outcome are in place.
3. The harm would be sufficiently grave that there is good reason to avoid it even if doing so excludes the pursuit of other opportunities.
4. The costs of avoiding the harm are minor in comparison to the costs of the harmful outcome.

It is not hard to think of examples that would illustrate these conditions with respect to harm to ourselves. If picking up a relatively unimportant item from a store would require that I park in zone in which my car might be towed away, then it would be folly for me to do so. Better to wait and get the item some other time. When the harm would fall on others, precaution is morally required. Sea-level rise due to terrestrial ice sheet collapse satisfies these conditions. In general terms there is no mystery about why ice sheets would collapse. We have seen enough melting and breaking of ice to know that process that might cause it are underway. The additional harm caused by significantly more sea-level rise (seven times more) is something we have very good reason to avoid. And mitigation can be accomplished at comparatively minor costs. This simply reinforces the case for the urgency to mitigate on behalf of future people.

The demands of justice to minimize or prevent risk and uncertain harm provide justification for a policy of mitigation. Should mitigation aim at 2°C? A precise temperature target cannot be a demand of justice since there is just too much uncertainty involved in both our understanding of the climate system and the consequences of our policy. But there is good reason think that the 2°C goal is a good one. The cost of producing energy by means of photovoltaic cells is dropping. That makes the 2°C goal less expensive for present generations and therefore the burdens of achieving it seem more reasonable. Now, we might be tempted to think that as our technology develops we can do more to adapt at a lower cost and therefore

we need to worry less about hitting an ambitious climate target. But given the uncertain threat of catastrophic changes, such as rapid land-based ice sheet melting, it is also possible that our capacity to adapt could be outstripped by the extent of the negative effects. Generally, as we've seen above, uncertainty with respect to the possibility of very bad effects of climate change seems to argue for a low warming limit. There is some momentum coming out of the Paris Agreement to strive for an even lower goal of 1.5°C, especially in light of the threat that climate change poses to low lying islands. That would be a very ambitious goal. The policy requirements of achieving it are currently being studied by the IPCC. After these are clearer it we will be able to say whether the goal would be reasonable.

International Justice

Achieving any particular temperature target for mitigation will require the cessation of the use of fossil fuels. This is because temperature increase is driven by the atmospheric concentration of greenhouse gases, especially CO₂; and CO₂ remains in the atmosphere for so long before it is recycled back to the Earth's surface that for practical purposes what matters in hitting a temperature target are cumulative emissions since the beginning of the Industrial Revolution.⁹ For any temperature target there is then a finite historical CO₂ emissions budget. We are well past the halfway point for hitting the 2°C budget.¹⁰ Indeed, unless we begin to decrease our emissions we will exceed that budget in 2037.¹¹ Mitigation policy must aim ultimately for a carbon free global economy before the end of the present century. But currently global emissions are increasing. So, the first step in any effective global mitigation policy has to be to decrease global emissions fossil fuels almost immediately. Methods of doing that whether through reducing subsidies to fossil fuels, statutory emissions limits, carbon taxes, or emission trading schemes will have the effect of making fossil fuels more expensive.

Much of the world desperately needs expanded access to inexpensive energy. There are over 2 billion people who currently live in energy poverty, which understood by International Energy Agency to mean that they lack either access to electricity or modern cooking fuels.¹² About 1.4 billion of these people lack access to electricity. There is a strong correlation between the extent of energy poverty in a country and its lack of human development (which the UN Human Development Program measures in terms of per capita income, education, and health).¹³ It is not entirely clear which direction the causation runs, but it is obvious that modern well-developed economies require electricity and fuel.¹⁴ 145 million people die prematurely each year from the indoor pollution caused by burning biomass. This outstrips both malaria and tuberculosis.¹⁵ The burdens of energy poverty fall heavily on women and children. The onerous work of gathering fuel is typically their job.¹⁶ Lack of street lighting makes women more vulnerable to sexual assaults. Children suffer disproportionately from the respiratory diseases caused by indoor pollution and their learning is constrained by lack of electricity. A major challenge of mitigation policy, then, must also be not to hinder efforts to expand access to energy. Making energy more expensive across the board would, of course, do that.

The centrality of the use energy to the success of poverty eradicating development plans explains the inclusion of the right to sustainable development in the 1992 UNFCCC treaty. Article 3, paragraph 4 states that, “The parties have the right to, and should promote, sustainable development.”¹⁷ This is the treaty framework that governs all UN climate change negotiations. Pressure from least developed and developing countries that their efforts to eradicate poverty not be hindered by a mitigation agreement continues to be strong and steady. In agreement reached in Paris in 2015 it was reiterated: “This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty.”¹⁸

In the UNFCCC negotiating context where least developed and developing countries are eager not to have the cost of energy raised by mitigation policies to such an extent that policies serving the aim of poverty eradication would be undermined, the right to sustainable development is best interpreted as a claim right that developing and underdeveloped states have on industrialized ones that climate change policies not harm national efforts to pursue development. Respecting the right, so interpreted, would seem to require either the liberty to continue to use fossil fuels over the short term and the corresponding obligation on the part of developed states to reduce their emissions enough to offset that use or a claim on developed states for financial assistance in making the transition to renewable energy in a manner that does not slow development.

There are two justifications of the right that both invoke non-controversial and widely shared moral principles. The first justification rests on the principle of promise keeping. The parties who signed original 1992 document pledged to respect the right to sustainable development; they are therefore obliged to do so. But even if they had not made such a promise they would nonetheless be duty-bound to respect the right to sustainable development. For fairness would require it. In a cooperative enterprise parties should not be assigned a devastatingly heavy burden when that can be avoided by laying comparatively much lighter burden on other parties. This is especially the case if the burden would include prohibiting the party from pursuing an aim it is morally required to pursue. Mitigation policies that would hinder or slow poverty eradicating human development would assign poor states that kind of burden.

The Paris Agreement

The agreement reached at the 21st Conference of the Parties (COP 21) of the UNFCCC in Paris is significant for several reasons, but perhaps most all because it seems to have salvaged an international negotiating process that had been in doubt ever since the COP 15 in

Copenhagen in 2009 failed to produce the robust treaty that had been hoped for. Agreement in Paris was possible in part because the process of making emissions reduction pledges was decentralized. The pledges states made were not the product of diplomatic wrangling but instead the result of states deciding on their own, through their own political processes, what they were willing to do. This is the pledge part of a process that is sometimes referred to as “pledge and review.”

The decentralized process that gave rise to the Paris Agreement was, however, a mixed blessing. The good in the process is twofold. First, decentralization fostered broad agreement. Because states were to be subject only to obligations that they authored themselves there was no major reason for any state to reject the agreement. Additionally, decentralization provided a procedural safeguard for the substantive norm of the right to sustainable development. Since states were not pressured into their obligations, they could be assured that the agreement was not going to constrain unduly their development objectives. There is, however, plenty of reason for concern about the Paris Agreement as well. Most obviously the problem with a decentralized pledge process is that it does not ensure that the sum of the pledges is sufficient to hit the goal of limiting warming to well below 2°C. Independent analyses of the pledges made in Paris provide reasons to think they considerably overshoot the target. One recent report projects that the warming that would occur if the pledges were met would be in the range of 2.6°C to 3.1°C.¹⁹ At the high end, that is more than double the 1.5°C that is also mentioned in the agreement as a possible goal.

Greater mitigation ambition is needed by states if the global warming limits affirmed in Paris are to have a good chance of being met. The need for states to increase their mitigation ambition is recognized in the Paris Agreement. Article 4, paragraph. 3 of the Agreement states that, “Each Party’s successive nationally determined contribution will represent a progression beyond the Party’s then current nationally determined contribution and reflect its highest possible ambition.”²⁰ In other words, subsequent pledges by states are

expected, and they are expected to be more ambitious, each time, than the state's previous pledge. In accordance with the review part of pledge and review, the agreement envisions a survey of progress in achieving the aims of the agreement (called a "stocktake") occurring at 5 year intervals beginning in 2023 (Article 14, paragraph 2). After each review, pledges would be expected to be renewed. Due the limit on cumulative emissions if the warming is to be limited to 2°C, delaying the first stocktake till 2023 will require that subsequent pledges be very ambitious since 2016 states (even assuming they act in accordance with their pledges) would have been pursuing policies that overshoot the limit. Greater ambition sooner, of course, would require a less drastic change of course later.

Can countries be expected to keep the pledges that they have made? If renewable energy were to remain significantly more expensive than fossil fuels over the period until the first stocktake, there would be the possibility that mitigation efforts would be hampered by a collective action problem. Although each state has an interest in having warming limited so as reduce the risks of climate change, it might well be the case that no state has an economic interest in assuming the costs necessary to keep its pledge. If the costs of mitigation were to reduce economic growth somewhat or require businesses to assume costs without which they would be more competitive economically, then, if other states pursue mitigation policies it could be advantageous for a state not to do so since the mitigation aims would be in any case approximated by actions of other states, and if other states do not pursue mitigation policies, then a state would be competitively disadvantaged by pursuing mitigation.

In these circumstances there is need for transparency in reporting activities so that it would be discernable when states are shirking. The Paris Agreement takes note of that need. It says in Article 4, paragraph 3 that "Parties shall account for their nationally determined contributions. In accounting...Parties shall promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting." Stating a norm of transparency is very important, more important still will be its

realization in practice. If states are seen to be making good on their pledges, they will accrue reputational gains that might recompense some of their economic loss. Seeing others make good on their proposals also builds trust and helps to reduce the tendency to seek competitive advantage. That serves the aim getting increased ambition in the next round of pledges.²¹

There is also need for an authoritative body that could promote compliance with the pledges. In Article 15, paragraphs 1 and 2 the Agreement declares that “A mechanism to facilitate implementation of and promote compliance with the provisions of this Agreement is hereby established. The mechanism...shall consist of a committee that shall be expert-based and facilitative in nature and function in a manner that is transparent, non-adversarial and non-punitive.” The inclusion of a Compliance and Implementation Committee is a nod to the problem of the incentives not to comply that could undermine the success of the agreement. It is noteworthy, however, that the committee should be non-adversarial and non-punitive. That is indicative of a fundamental problem in devising an institution that would encourage compliance. Wide spread compliance is good, but each state would like to avoid sanctions. So, although a centralized system of punishment might go a long way towards undermining the collective action problem, it might also discourage states from entering into the agreement. The representation structure of the Compliance and Implementation Committee has been established, but its membership has not yet.²² It remains to be seen whether a non-punitive compliance mechanism will be effective in eroding the collective action problem.

The Paris Agreement, then, constitutes a step forward for international negotiations to mitigate climate change insofar as it has the potential to serve as the basis for broad international cooperation. That cooperation is necessary to serve the aim intergenerational justice to minimize contribution to and prevent the risks and uncertainties of harm due to climate change. Broad cooperation is fostered by the decentralized means by which states commit to mitigate climate. The decentralized process also helps to secure the aim of international justice requiring that the right to sustainable development be respected since

states cannot be pressured into making mitigation commitments that would harm their pursuit of poverty eradicating human development. The principal worry regarding mitigation is that the decentralized process may not be up to the task of addressing the collective action problem that threatens to frustrate international negotiations. The next section addresses the prospects for progress in mitigation.

Prospects for Progress

The collective action problem that threatens international cooperation is driven by the costs transitioning from fossil fuels to renewable energy. As long as fossil fuels are cheaper, every state has interest in there being generalized mitigation, but no state has an economic interest in assuming the costs of mitigation regardless of what other states do. But the severity that collective action problem is lessening as the cost of renewable energy in comparison to fossil fuels falls.

One reason that the comparative cost of renewable energy is falling is that the absolute cost of renewable energy, solar power and wind in particular, is dropping quickly. Although the levelized cost of coal is often estimated to be less than solar, the costs of solar are steadily falling.²³ Solar energy's share of the global market has doubled seven times in the last 15 years. Economies of scale are driving down costs; every time solar's share of the market doubles costs fall 24 percent.²⁴ In contrast, coal consumption is dropping in OCED countries. The U.K. now produces less energy from coal than it did in 1850. Coal consumption has even flattened out in China.²⁵ Moreover, the comparative cost of renewable energy is less than previously thought because coal is more expensive than has been appreciated. The market price of coal does not fully incorporate its costs, which take the form of environmental and health costs. A recent report by the International Monetary Fund argues that these costs amount to nearly 4 percent of global GDP. In other words, coal is much more expensive than the price reflects.²⁶ We now have a better accounting of the full health costs of fossil fuels. In

2016 for the first time the International Energy Agency dedicated a *World Energy Outlook Special Report* to energy, air pollution, and health. The report finds that fossil fuel combustion in energy plants and industrial facilities is responsible for 3 million premature deaths each year.²⁷ As the costs of renewables fall and the real price fossil fuels is understood to be higher, the gap between the costs of the fuels drops. And some studies now indicate that solar and wind are already cheaper than coal and gas in some markets.²⁸ Insofar the collective action problem is driven by the cost of transitioning to renewable energy, the closing of the gap between the cost of renewable energy and fossil fuels is very good news.

There seems to be a tendency towards renewable energy becoming less expensive than fossil fuels, even without new mitigation policies that can be expected to raise the price of fossil fuels. But that tendency will not necessarily dissolve the collective action problem. This is because the problem is driven by beliefs rather than facts. Until investors are confronted with irrefutable evidence and consumers with lower prices, it is possible for disinformation campaigns to remain effective. Depending on the modelling assumptions made, studies indicate that one half to two thirds of all remaining fossil fuels reserves cannot be exploited if we are to have a reasonable chance of limiting warming to 2°C.²⁹ That gives the fossil fuel industry a tremendous incentive to discourage mitigation efforts and falsify climate science. One way to do that, which has proven effective in other cases, such as tobacco, is to finance disinformation campaigns.³⁰ These campaigns can affect public opinion and therefore indirectly affect legislation. And where political systems allow fossil fuel companies to exercise political influence on legislation directly, we can expect them to do so. According to one study the fossil fuel industry spent almost \$351 million donating to, and influencing, 113th Congress of the US. That industry also received nearly \$42 billion in federal production and exploration subsidies.³¹ Clearly the donations were well spent. The influence that money buys can be a significant hindrance to justice in mitigation policy.

Dissolving the factual basis for the collective action problem, does not necessarily ensure that the collective action problem will simply go away. Reasonable hope of limiting warming to 2°C will require not only that the costs line up in favor of renewable energy but that public opinion and political will do so as well. Achieving that will require public education and political struggle in many countries. There are efforts such as this underway in several countries. On many university campuses there are efforts to have the universities divest their portfolios from fossil fuels; and churches are also following suit.³² There are campaigns to inform shareholders about the bad investment that fossil fuels are over the longer term.³³ And there are very important efforts to halt the construction of, and even shutdown existing, coal fired power plants.³⁴

Concluding Remarks

Justice between generations requires that the present generation takes steps to limit global warming. International justice requires that this be done in a manner that is consistent with poorer states continuing to pursue energy intensive, poverty eradicating human development strategies. The Paris Agreement lays out the basis for international cooperation to achieve justice in climate change mitigation. But much needs to be done. States must keep the pledges that they have made; and they must increase the ambition of their pledges significantly. The burden in that regard must fall first on wealthy countries in order to ensure that poverty eradicating human development can continue where it is needed. If the price of renewable energy does not fall sufficiently, states can be expected to attempt to shirk their responsibilities. Even if the price of fossil fuels continues to fall, the political influence of the fossil fuel industry could frustrate the mitigation effort. In either case, the best prospects for achieving justice in mitigation after the Paris Agreement lies in the success of movements that seek to redirect energy investment and policy towards renewable energy.

¹ AR5 Synthesis Report for Policy makers. P. 10-11.

² Martin Luther King, Jr., “I Have a Dream” in James M. Washington, ed. *A Testament of Hope: the Essential Writings and Speeches of Martin Luther King Jr.* (San Francisco: Harper San Francisco, 1986), pp. 217-220.

³ Frank H. Knight, *Risk, Uncertainty, and Profit* (New York: Hart, Schaffner and Marx, 1921), chp. 8.

⁴ AR5 WG1, summary for Policy makers, p. 25.

⁵ Nicholls, R. J. et al. (2008), “Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates”, OECD Environment Working Papers, No. 1, OECD Publishing. <http://dx.doi.org/10.1787/011766488208>

⁶ AR5 WG1, SPM. p. 29.

⁷ *Ibid.*, pg. 25.

⁸ For elaboration of the skeptical view see for example Cass Sunstein, *Laws of Fear: Beyond the Precautionary Principle* (Cambridge: Cambridge University Press, 2005), pt. 1 and Richard Posner, *Catastrophe: Risk and Response* (Oxford: Oxford University Press, 2004), chp. 3.

⁹ AR5, SPM, p. 9-10.

¹⁰ *Ibid.*

¹¹ See <http://www.trillionthtonne.org/>.

¹² International Energy Agency, *World Energy Outlook 2011*.

¹³ International Energy Agency (IEA), *Energy Poverty: How to Make Modern Energy Access Universal* (Paris: OECD/IEA, 2010), p. 32.

¹⁴ David I. Stern, “The Role of Energy in Economic Growth,” in Lakshman Guruswamy ed., *International Energy and Poverty* (New York: Routledge, 2016), 11-23.

¹⁵ IEA, *Energy Poverty*, 13-14.

¹⁶ *Ibid.*

¹⁷ United Nations Framework Convention on Climate Change. See

<https://unfccc.int/resource/docs/convkp/conveng.pdf>.

¹⁸ UNFCCC, Conference of the Parties, Twenty-first session (Paris Agreement), Article 2, paragraph 1. See <https://unfccc.int/resource/docs/2015/cop21/eng/109.pdf>.

¹⁹ “Joeri Rogelj, et al, “Paris Agreement climate proposals need a boost to keep warming well below 2 °C” *Nature* 534 (2016): 631-639.

²⁰ Paris Agreement.

²¹ Elinor Ostrom, “A Polycentric Approach for Coping with Climate Change,” The World Bank, Development Economics, Office of the Senior Vice President and Chief Economist, October 2009. Available on line at

<http://documents.worldbank.org/curated/en/480171468315567893/pdf/WPS5095.pdf>.

(Accesses Sept. 22, 2016.)

²² Christina Voigt, “The Compliance and Implementation Mechanism of the Paris Agreement,” *Review of European Community and International Environmental Law* 25 (2015): 161-173.

²³ International Energy Agency (IEA), Nuclear Energy Agency, and Organization for Economic Cooperation and Development (OECD), “The Projected Costs of Generating Energy 2015 Edition.” Available on line at <https://www.oecd-neo.org/ndd/pubs/2015/7279-proj-costs-electricity-2015-es.pdf>. (Accessed Sept. 23, 2016.)

²⁴ Tom Randall, “Wind and Solar are Crushing Fossil Fuels,” *Bloomberg* April 6, 2016. Available on line at <http://www.bloomberg.com/news/articles/2016-04-06/wind-and-solar-are-crushing-fossil-fuels>. (Accessed Sept. 23, 2016.)

²⁵ *Ibid.*

²⁶ David Coady, et al., “IMF Working Paper: How Large are Global Energy Subsidies?” 2015. Available on line at <https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf>.

(Accessed Sept. 23, 2016.)

²⁷ OECD and IEA, *Energy and Air Pollution: World Energy Outlook Special Report 2016, Executive Summary*, p. 1.

²⁸ Carbon Tracker Initiative, “The End of the Load for Coal and Gas.” Available on line at <http://www.carbontracker.org/report/the-end-of-the-load-for-coal-and-gas/>. (Accessed Sept. 24, 2016).

²⁹ Various studies are compared in IEA, “Can CO₂ Capture and Storage Unlock ‘Unburnable Carbon’?” May 2016. Available on line at http://www.ieaghg.org/exco_docs/2016-05.pdf. (Accessed Sept. 24, 2016.)

³⁰ See Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth from Tobacco Smoke to Global Warming* (New York: Bloomsbury, 2010), chp. 6.

³¹ Oil Change International, „Fossil Fuel Funding to Congress: Industry Influence in the US.” Available on line at <http://priceofoil.org/fossil-fuel-industry-influence-in-the-u-s/>. (Accessed Sept. 24, 2016.)

³² See Fossil Free: <http://gofossilfree.org/what-is-fossil-fuel-divestment/>. (Accessed Sept. 24, 2016.)

³³ See Carbon Tracker Initiative: <http://www.carbontracker.org/>. (Accessed Sept. 24, 2016.)

³⁴ See the Sierra Club Beyond Coal: <http://content.sierraclub.org/coal/>. (Accessed Sept. 24, 2016.)