

# RIGOROUS AND RELEVANT: APPLYING LESSONS FROM THE HISTORY OF IPCC SPECIAL REPORTS TO THE POST-PARIS AGREEMENT WORLD

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*As the preeminent authority on the science of climate change, the Intergovernmental Panel on Climate Change (“IPCC”) plays a key role in international climate negotiations and sub-global climate policy. The shift in the international climate regime brought about by the Paris Agreement has created new challenges and new opportunities for the IPCC. However, many of the questions facing the IPCC today, both about the role of science in politics and about how the IPCC should balance its independence against its obligations to various stakeholders, have their roots in tensions as old as the organization itself. Through an examination of the interplay between science and politics in the early IPCC and an exploration of several case studies of IPCC Special Reports, this Note seeks to draw lessons from past experience. It argues for a broad understanding of the IPCC’s role that includes solution-oriented science, increased interplay between—though not blending of—science and politics, and continued interaction with stakeholders outside of the United Nations Framework Convention on Climate Change. It also highlights the value of timely reports and provides insight into how the timing of reports can influence negotiations. Finally, it seeks to apply the lessons learned from the IPCC’s history to help answer the question of how the IPCC should modify its assessment cycle and work products to align with the quinquennial Global Stocktake process required by the Paris Agreement.*

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## INTRODUCTION

### A. *New Context, Old Questions*

The Paris Agreement, which went into effect in 2016, seeks to limit global warming to 2°C and to promote efforts to limit the increase to 1.5°C.<sup>1</sup> Unlike earlier international agreements, such as the Kyoto Protocol, the Paris Agreement takes a bottom-up approach. Rather than specifying emissions caps, the agreement requires each signatory country to create an emissions reduction pledge known as a Nationally Determined Contribution (“NDC”).<sup>2</sup> The NDCs submitted to date are insufficient to keep warming below 2°C,<sup>3</sup> but the agreement includes a mechanism intended to ratchet up commitments over time. Under Article 14 of the agreement, the Conference of the Parties (“COP”) will undertake a Global Stockade (“GST”) in 2023 and every five years thereafter.<sup>4</sup> Each GST will provide an opportunity for the global community to assess progress and for countries to enhance their NDCs.<sup>5</sup>

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1. See Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104, <https://perma.cc/4UWL-2DVA> [hereinafter *Paris Agreement*].
  2. See U.N. Framework Convention on Climate Change, *Report of the Conference of the Parties on its Twenty-First Session, Held in Paris from 30 November to 13 December 2015*, Paris Agreement, U.N. Doc. FCCC/CP/2015/10/Add.1, annex, art. 4, para. 2 (Jan. 29, 2016), <https://perma.cc/5NP9-PFBZ>.
  3. See Kelly Levin & Taryn Fransen, *Why Are INDC Studies Reaching Different Temperature Estimates?*, WORLD RESOURCES INST. BLOG (Nov. 9, 2015), <https://perma.cc/B5AF-LUYJ>.
  4. *Paris Agreement*, *supra* note 1, art. 14.
  5. See *id.*

As the preeminent scientific authority on climate change, the Intergovernmental Panel on Climate Change (“IPCC”) is expected to play a major role in providing information to support the GSTs. The agreement itself calls for the GSTs to be based on “the best available science,”<sup>6</sup> and more recent decisions by the international community have explicitly recognized the role of the IPCC.<sup>7</sup> This responsibility provides the IPCC with new opportunities to inform policy, but also presents methodological and logistical challenges. While the organization has often focused on global research programs and has worked assiduously to avoid prescribing policy, there is now a need for “regulatory science” to help evaluate progress along the path to lower emissions, and for solution-oriented insights that assist countries in enhancing their NDCs.<sup>8</sup> These new approaches require increased collaboration with policymakers, which some may see as a threat to the autonomy and scientific authority of the Panel.<sup>9</sup> The IPCC must also address the mismatch between its seven-year assessment cycle<sup>10</sup> and the quinquennial schedule of the GSTs. The approach that the IPCC chooses will have significant implications both for the interactions between the IPCC and the United Nations Framework Convention on Climate Change (“UNFCCC”) and for the responsiveness of the IPCC to emerging issues and stakeholders outside of the UNFCCC.

While the Paris Agreement creates a novel context for the IPCC, many of the tensions the Panel must confront are as old as the organization itself. The IPCC has long sought to balance its obligation to support the international negotiation process with its own independence and the needs of other stakeholders. It has striven, and at times struggled, to negotiate the boundary between science and politics. Since its inception, the IPCC has balanced these factors in an effort to enable appropriate responses to climate change while maintaining its own, sometimes fragile, credibility.

One tool that the IPCC has used to balance these tensions is the Special Report. While each IPCC assessment cycle is organized around the production of a comprehensive Assessment Report summarizing the existing state of climate change research, the Panel also produces more focused reports. These Special Reports are generally shorter and less time-intensive than Assessment

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6. *Id.*

7. See U.N. Framework Convention on Climate Change, *Matters Relating to Article 14 of the Paris Agreement and Paragraphs 99–101 of Decision 1/CP.21*, Paris Agreement, U.N. Doc. FCCC/CP/2018/10/L.16 at 4 (Dec. 14, 2018), <https://perma.cc/4B6F-74BA>.

8. See Silke Beck & Martin Mahony, *The IPCC and the New Map of Science and Politics*, 9 WILEY INTERDISCIPLINARY REV. e547, 6 (2018), <https://perma.cc/TG6V-FYU6>.

9. MARTIN MAHONY & WARREN PEARCE, THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: TRANSFERABLE MODEL OR CAUTIONARY TALE? 6 (2018).

10. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, INFORMATION ON THE SBSTA AND THE IPCC SPECIAL EVENT ON IPCC ASSESSMENTS AND THE GLOBAL STOCKTAKE (2016) (“Based on . . . a seven-year cycle, the products of the next (seventh) assessment cycle of the IPCC would be expected to become available from 2027–2029.”).

Reports. They have served a variety of functions, from providing time-sensitive information to the UNFCCC to engaging with industry stakeholders or sub-national governments. This diversity of approaches and objectives makes the history of Special Reports uniquely instructive for assessing how the IPCC can be most effective.

Through an examination of the interplay between science and politics in the early IPCC and an exploration of several Special Reports as case studies, this Note argues that the IPCC should not limit itself to maintaining a globally accepted baseline of climate change science. That role is critically important, but the IPCC can and should do more to inform and enable climate action. First, the IPCC should continue to provide timely and targeted insights to inform negotiations. The IPCC originally created Special Reports to play precisely this role. However, the history of Special Reports demonstrates that “timely” does not mean merely “up-to-date” or “on-time” for a specific international negotiation. Rather, a timely report is one that addresses a specific need on a timeframe that facilitates decisionmaking. The IPCC’s ability to produce timely reports is closely tied to the structure of its assessment cycles. Second, the IPCC should strengthen its support for outside stakeholders. Special Reports are not merely tools for addressing urgent issues that cannot wait until the next Assessment Report; rather, they are useful in their own right. The history of Special Reports and of the IPCC itself is one of expanding engagement with stakeholders outside of the UNFCCC—a trend that should continue in the post-Paris Agreement world. Finally, while some in the early years of the IPCC regarded separation from the negotiation process as necessary for scientific integrity, today’s IPCC should strive for an interweaving of science and policy, though not a blending of the two. The IPCC cannot allow its answers to be based on politics, but it can and should allow politics to inform the questions it asks. While not prescribing policy, the IPCC should transparently present policy-relevant factors even when doing so appears to favor a specific policy approach, and should continue its move toward solution-oriented science.

The remainder of Part I provides a primer on the structure of the IPCC and a brief review of the relevant literature. Part II then explores the founding and early history of the IPCC. It describes how the IPCC was formed as a product of complex political dynamics and how Special Reports in turn arose as a means of informing climate negotiations without compromising the rigor of the science presented. It also examines how—notwithstanding their aims—early Special Reports largely failed to contribute to international negotiations, because by the time they were released (shortly before the start of the formal negotiations), discussions had already become political and parties were set in their positions.

Part III of this Note describes how the scope, purpose, and intended audience of Special Reports have expanded, and provides five case studies of Special Reports, each of which contains lessons for how the IPCC can effectively in-

form the response to climate change. Part IV then aggregates the lessons learned, both from the early IPCC and from the case studies, drawing conclusions about the multifaceted value of Special Reports, the importance of responsiveness and timing in producing and releasing reports, and the role of science in politics.

Finally, having developed a set of lessons learned, this Note concludes in Part V by applying them to the current questions about how the IPCC should align its cycles with the GST. After the first GST in 2023, the IPCC will need to provide inputs to a GST every five years. Because this cadence does not align with the seven-year timeframe under which the IPCC has carried out its Fifth and Sixth Assessment Cycles,<sup>11</sup> the IPCC has proposed three potential approaches to the Seventh Assessment Cycle.<sup>12</sup> First, the cycle could be shortened to five years with a new set of Assessment Reports released to support each quinquennial GST.<sup>13</sup> Second, the IPCC could increase the length of each cycle to ten years while providing a more succinct update in the middle of the cycle.<sup>14</sup> Third, the IPCC could maintain the current cycle length and support each GST with a targeted Special Report.<sup>15</sup> While important factors around budgeting and staffing logistics are outside the scope of this Note, the history of IPCC Special Reports lends compelling support for the second scheduling option.

### B. Structure of the IPCC

While the historical analysis below often treats the IPCC as a monolithic entity, this is far from the reality. For that reason, a brief description of the structure of the IPCC and its formal position in international law is instructive. See Figure 1 for a visual representation.

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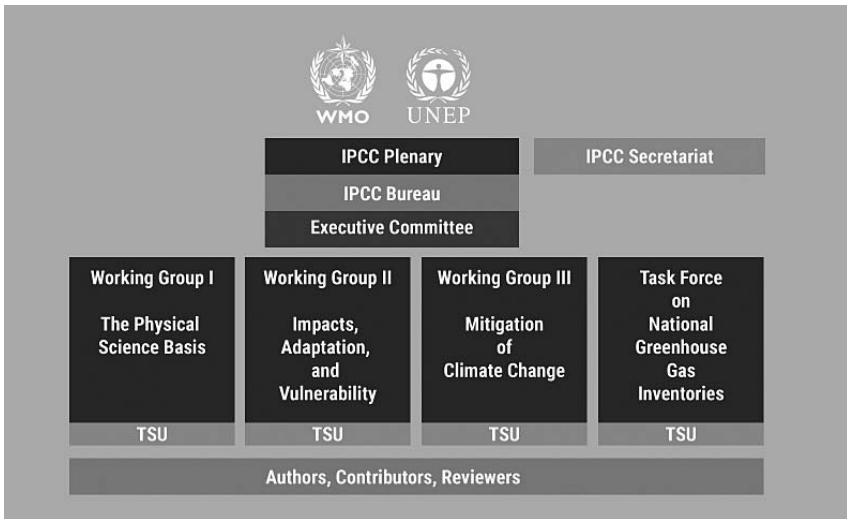
11. *See id.*

12. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE—ALIGNING THE WORK OF THE IPCC WITH THE NEEDS OF THE GLOBAL STOCKTAKE UNDER THE PARIS AGREEMENT 3 (2018) [hereinafter IPCC, ALIGNING].

13. *See id.*

14. *See id.*

15. *See id.*

FIGURE 1 – STRUCTURE OF THE IPCC<sup>16</sup>

The IPCC consists of the governments of 195 countries, whose representatives meet once or twice per year in a plenary session.<sup>17</sup> The governments must approve the decisions that the IPCC takes and, critically, must sign off on the language included in the Summary for Policy Makers section of each IPCC report.<sup>18</sup> This process can water down some scientific conclusions, but has the benefit of ensuring that IPCC reports reflect a common understanding of the science of climate change shared by nearly all of the world’s governments.<sup>19</sup>

At the start of each assessment cycle, the governments elect an Executive Committee and a Bureau of scientists.<sup>20</sup> The Executive Committee is composed of the IPCC Chair, the IPCC Vice-Chairs, and the Co-Chairs of the three Working Groups and the Task Force on National Greenhouse Gas Inventories (“TFI”).<sup>21</sup> The Bureau is a slightly larger group, which also includes the Vice-Chairs of the three Working Groups.<sup>22</sup> While the membership of the two groups overlaps substantially, they have separate purposes. The Executive Committee, created in 2010, seeks to strengthen coordination across working groups

16. *Structure of the IPCC*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <https://perma.cc/HN8N-29AR>.

17. Jasmine Livingston, *Climate Science for Policy? The Knowledge Politics of the IPCC after Copenhagen 76* (2018) (unpublished Ph.D. dissertation manuscript, Lund University) (on file with the Harvard Environmental Law Review).

18. *See id.*

19. Telephone Interview with Christopher Field, Perry L. McCarty Director of the Stanford Woods Institute for the Environment (Jan. 22, 2019).

20. *Structure of the IPCC*, *supra* note 16.

21. *Id.*

22. *Id.*

and oversees the IPCC's communication efforts including addressing any errors discovered in completed reports.<sup>23</sup> The Bureau is tasked with much broader responsibilities, which include providing "guidance to the Panel on the scientific and technical aspects of its work, advis[ing] on related management and strategic issues, and tak[ing] decisions on specific issues within its mandate."<sup>24</sup>

The bulk of the IPCC's work is undertaken by the hundreds of scientists and experts, nominated by member governments or observer organizations and selected by the Bureau to serve as Coordinating Lead Authors, Lead Authors, Contributing Authors, and Review Editors for the three Working Groups. Working Groups I, II, and III focus on the physical science basis of climate change; impacts, adaptation, and vulnerability; and climate change mitigation, respectively.<sup>25</sup> In addition, the TFI manages the National Greenhouse Gas Inventories Programme, which develops and updates methodologies for greenhouse gas ("GHG") accounting and reporting.<sup>26</sup> Each of the three Working Groups and the TFI is supported by a Technical Support Unit ("TSU"), funded and hosted by a Developed Country Co-Chair.<sup>27</sup>

Despite the scale of the IPCC, the Secretariat—its only permanent structure—has just 13 permanent staff members, located at the World Meteorological Organization ("WMO") headquarters in Geneva, Switzerland.<sup>28</sup> The Secretariat handles all of the IPCC's logistics, manages its budget, and serves as the principle point of contact for the UN system, including the UNFCCC and the IPCC's two parent organizations, the WMO and the United Nations Environment Programme ("UNEP").<sup>29</sup>

### C. Background on Existing Literature

The literature contains a number of perspectives on the creation of the IPCC and its early work, but none places particular emphasis on the role of Special Reports. Among the most detailed accounts is *A History of the Science and Politics of Climate Change*, authored by the IPCC's first Chairman, Bert Bolin.<sup>30</sup> Shardul Agrawala presents another valuable perspective in a two-part series of papers that analyze the creation and early development of the IPCC.<sup>31</sup>

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23. See Livingston, *supra* note 17, at 74.

24. *Structure of the IPCC*, *supra* note 16.

25. See *id.*

26. See *Task Force on National Greenhouse Gas Inventories*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <https://perma.cc/9DWN-RDDW>.

27. See Livingston, *supra* note 17, at 75.

28. See *id.* at 74.

29. See *Structure of the IPCC*, *supra* note 16.

30. BERT BOLIN, *A HISTORY OF THE SCIENCE AND POLITICS OF CLIMATE CHANGE: THE ROLE OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE* (2007).

31. Shardul Agrawala, *Context and Early Origins of the Intergovernmental Panel on Climate Change*, 39 *CLIMATIC CHANGE* 605 (1998) [hereinafter Agrawala I]; Shardul Agrawala,

These papers provide a window into the political and scientific rationales for much of the IPCC structure, its peer review process, and its interactions with the UNFCCC. Sonja Boehmer-Christiansen presents a highly critical perspective in a three-part series of papers.<sup>32</sup> Some experts have dismissed Boehmer-Christiansen's conspiratorial approach as overly simplistic.<sup>33</sup>

In a more recent paper, Mike Hulme and Martin Mahony attempt to summarize the IPCC's origins, structure, and approach to uncertainty, as well as its wider impact on scientific knowledge, public discourse, and policy.<sup>34</sup> Much recent scholarship has focused on the IPCC as a boundary organization at the intersection of science and politics, as well as on its shifting role in the post-Paris Agreement world.<sup>35</sup> In 2017, the journal *Environmental Science and Policy* devoted an entire special issue to "[s]olution-oriented global environmental assessments."<sup>36</sup> In an article published in that issue, Kari De Pryck and Krystal Wanneau observe that the IPCC has begun to challenge the conventional boundaries between science and policy through what the authors term "anti-boundary" work.<sup>37</sup>

While relying heavily on this previous work and acknowledging that critical questions about communication, developing country representation, and engagement with other non-state actors remain to be answered, this Note seeks to fill a specific gap in the literature by extracting lessons from the history of Special Reports, and by applying these lessons to questions about the structure and content of IPCC work products going forward.

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*Structural and Process History of the Intergovernmental Panel on Climate Change*, 39 CLIMATIC CHANGE 621 (1998) [hereinafter Agrawala II].

32. Sonja A. Boehmer-Christiansen, *A Scientific Agenda for Climate Policy?*, 372 NATURE 400 (1994); Sonja A. Boehmer-Christiansen, *Global Climate Protection Policy: The Limits of Scientific Advice*, 4 GLOBAL ENVTL. CHANGE 140, 185 (1994) (pts. 1 & 2).
33. Mike Hulme & Martin Mahony, *Climate Change: What Do We Know About the IPCC?*, 34 PROGRESS PHYSICAL GEOGRAPHY 705, 706 (2010).
34. *Id.* at 705–06.
35. See, e.g., Beck & Mahony, *supra* note 8 (reviewing literature on the IPCC as a boundary organization); Livingston, *supra* note 17.
36. See generally Martin Kowarsch & Jason Jabbour, *Solution-Oriented Global Environmental Assessments: Opportunities and Challenges*, 77 ENVTL. SCI. & POL'Y 187 (2017).
37. Kari De Pryck & Krystal Wanneau, *(Anti)-Boundary Work in Global Environmental Change Research and Assessment*, 77 ENVTL. SCI. & POL'Y 203 (2017).



I. EARLY HISTORY OF THE IPCC AND THE ADVENT  
OF SPECIAL REPORTS

A. *Political Birth of a Scientific Organization: Founding of the IPCC*

The idea that increasing CO<sub>2</sub> concentrations could lead to increased global temperatures dates back to the late 1800s.<sup>38</sup> However, it was not until the 1970s that concerns about anthropogenic global warming began to be taken seriously.<sup>39</sup> Early research was conducted in the United States, and the National Academy of Sciences carried out the first assessments of the science of climate change.<sup>40</sup> Several international assessments and conferences culminated in a major conference in the city of Villach, Austria in 1985,<sup>41</sup> hosted by UNEP, the WMO, and the International Council for Science (“ICSU”). Participants at the conference reached a consensus that the global mean temperature would increase by 1.5°–4.5° in response to a doubling of CO<sub>2</sub> concentrations in the atmosphere,<sup>42</sup> and that “in the first half of the next century a rise of global mean temperature could occur which is greater than any in man’s history.”<sup>43</sup>

From very early on, questions began to arise about how scientists could inform policy to address the problem. The Villach Conference recommended the creation of the Advisory Group on Greenhouse Gases (“AGGG”).<sup>44</sup> The AGGG, which was composed of two representatives from each of its three parent organizations (UNEP, WMO, and ICSU), met for the first time in 1986.<sup>45</sup> However, it soon became clear that given the AGGG’s small size and budget and its lack of connections to world governments, it had little chance of catalyzing international negotiation on the issue.<sup>46</sup> Bert Bolin, a member of the panel, described himself as “very ambivalent to the work of the AGGG because it had no money and no muscle.”<sup>47</sup> This was the first clear indication that the international community needed a stronger scientific organization with direct ties to world governments.

Around the same time, UNEP Executive Director Mostafa Tolba sent a letter to U.S. Secretary of State George Schultz.<sup>48</sup> Tolba was confident that climate change posed a major threat, and having recently launched the Vienna

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38. See BOLIN, *supra* note 30, at 6–7.

39. See *id.* at 33.

40. See *id.*

41. See Agrawala I, *supra* note 31, at 607–08.

42. LEIGH GLOVER, *POSTMODERN CLIMATE CHANGE* 77 (2006).

43. Agrawala I, *supra* note 31, at 608.

44. See BOLIN, *supra* note 30, at 38.

45. See *id.* at 38–39.

46. See BOLIN, *supra* note 30.

47. Agrawala I, *supra* note 31, at 610.

48. See *id.* at 609.

Convention for the Protection of the Ozone Layer, he hoped to see a similar process play out for climate change.<sup>49</sup> However, as Peter Usher, Tolba's key advisor during the ozone negotiations, noted, while "politics caught up with ozone, climate change was born in politics."<sup>50</sup>

Schultz showed the letter to other members of the Reagan Administration and was met with mixed responses.<sup>51</sup> Several agencies had carried out their own assessments and disagreed about the magnitude of the problem and the level of uncertainty.<sup>52</sup> While EPA and the State Department supported the idea of an international convention, the dominant view in the Reagan Administration was that the science was insufficient to justify policy action.<sup>53</sup> As such, the United States proposed an intergovernmental panel to assess the problem. This would provide increased certainty, buy time, and—because the panel would answer to member governments—would prevent Tolba from controlling the process.<sup>54</sup> The U.S. proposal was modified, and by 1988, the WMO invited member countries to meet and agree on the establishment of the IPCC.<sup>55</sup> Thus, the IPCC was created both to overcome the challenges encountered by the AGGG and to assuage U.S. concerns. From the beginning, the IPCC was meant to ensure that science would inform the political process, but also to keep the science somewhat independent of politics.

The IPCC's actions at its first session in November 1988 reinforced its commitment to keeping science relevant but independent. Bolin, a strong advocate for the panel's institutional independence,<sup>56</sup> was elected chairman.<sup>57</sup> After much debate, the IPCC agreed upon an expedited schedule that would enable it to complete its First Assessment Report in time for the 1990 UN General Assembly meeting.<sup>58</sup> This decision quickly paid off. By 1990, the UN General Assembly had been engaged with the issue of climate change for several years, but it was only upon receiving a presentation of the report that the General Assembly decided to form an Intergovernmental Negotiating Committee ("INC") to work toward the establishment of a Framework Convention on Climate Change.<sup>59</sup> While the IPCC and INC worked closely together for the next

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49. *See id.*

50. *Id.* at 614.

51. *See id.* at 611.

52. *See id.*

53. *See id.* at 613.

54. *See id.* at 614.

55. *See id.* at 615.

56. *See* BOLIN, *supra* note 30, at 48.

57. *Id.* at 49.

58. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE FIRST SESSION OF THE IPCC (GENEVA) (1988); *see also* BOLIN, *supra* note 30, at 50.

59. *See* BOLIN, *supra* note 30, at 69.

few years, the creation of the INC marked a formal separation of climate science from climate negotiation.<sup>60</sup>

With that separation, Bolin had the opportunity to ensure that the IPCC's science was rigorous and credible. While only Working Group I had pursued external peer review for the First Assessment Report, the IPCC decided that all future reports should be subject to an extensive formal peer review process.<sup>61</sup> Even as the IPCC worked to enhance its scientific credibility, it remained an intergovernmental organization that needed to provide actionable information to its member states and the INC. This balancing act eventually led to the IPCC mantra "policy relevant but not policy prescriptive," which has shaped its publications ever since. It also led to the advent of Special Reports.

### B. Birth of the UNFCCC and of the Special Report

Special Reports emerged to balance the goal of providing credible and authoritative science with the need to provide timely insight to inform the climate negotiation process. Upon its creation in December 1990, the INC was expected to submit a proposal for a framework convention on climate change to the UN Conference on the Environment and Development (the Earth Summit), scheduled for June 1992 in Rio de Janeiro.<sup>62</sup> The IPCC's Second Assessment Report was not expected to be complete until 1994 or 1995.<sup>63</sup> However, seeking to contribute to the Rio negotiations, the IPCC decided at its fifth session in March 1991 to complete a Supplementary Report that would tackle a few critical issues in time for the 1992 negotiations.<sup>64</sup> Although this report was not technically a "Special Report," the Supplementary Report was the IPCC's first targeted report<sup>65</sup> and the first of several reports that sought to provide specific and timely information to the INC and later the UNFCCC.

While the report contained critical data, including new information about sources and sinks of CO<sub>2</sub> and the global warming potentials of other gasses, Bolin notes that by the time the report was released in February 1992, the negotiations had become "purely political," and relatively little attention was

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60. See Agrawala II, *supra* note 31, at 634–35; see also BOLIN, *supra* note 30, at 69–70.

61. See *id.* at 624–25.

62. See Alan D. Hecht & Dennis Tirpak, *Framework Agreement on Climate Change: A Scientific and Policy History*, 29 CLIMATIC CHANGE 371, 387 (1995).

63. See BOLIN, *supra* note 30, at 71.

64. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE 5TH SESSION OF THE IPCC (GENEVA) (1991).

65. The 1992 Supplementary Report addressed six specific topics. These included: (1) Assessment of National Net Greenhouse Gas Emissions, (2) Predictions of Regional Distribution of Climate Change, (3) Issues Related to Energy and Industry, (4) Forestry Related Issues, (5) Vulnerability to Sea Level Rise, and (6) Emissions Scenarios. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, THE SUPPLEMENTARY REPORT TO THE IPCC IMPACTS ASSESSMENTS (1992).

paid to the new results.<sup>66</sup> This experience, like several of the Special Report case studies below, demonstrated that providing a new report shortly before a contentious negotiation may contribute little. However, this experience also showed the value of having a common baseline of scientific understanding, created by the First Assessment Report, even if that baseline was not completely up-to-date. According to Jean Ripert, who chaired the climate negotiations in Rio, the intergovernmental nature of the IPCC helped to educate government bureaucrats and make them more willing to come to the negotiating table.<sup>67</sup> Bolin also notes that “it does not seem likely that a Climate Convention would have been agreed [to] at Rio if a well-organized and scientifically credible assessment had not been available in 1990.”<sup>68</sup>

The UNFCCC, which emerged from the Rio Summit, created new demands for the IPCC. Article 21 of the text states that “[t]he head of the interim secretariat . . . will cooperate closely with the Intergovernmental Panel on Climate Change to ensure that the Panel can respond to the need for objective scientific and technical advice.”<sup>69</sup>

Just as importantly, Article 2 of the convention includes a commitment to avoid “dangerous anthropogenic interference.”<sup>70</sup> However, the amount of warming that would be acceptable under this standard was left open to interpretation. This question has provided one of the clearest examples of the complex interactions that occur at the boundary between science and policy, and is further examined below in discussion of the IPCC’s most recent Special Report.

### C. *Interactions with the Early UNFCCC*

By the ninth session of the IPCC in June 1993, it appeared that the Framework Convention would enter into force before the IPCC’s Second Assessment Report was scheduled to be completed.<sup>71</sup> The Convention had already been ratified by twenty-nine countries and required fifty total ratifications to go into effect.<sup>72</sup> Raul Estrada-Oyuela, Chairman of the INC, informed the IPCC through a letter to Bolin that the INC needed additional information about the “relative forcing of different greenhouse gases, . . . the state of knowledge for assessing impacts of climate change, . . . and an evaluation of current scenarios

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66. BOLIN, *supra* note 30, at 75.

67. See Agrawala II, *supra* note 31, at 635, 39.

68. BOLIN, *supra* note 30, at 77.

69. U.N. Framework Convention on Climate Change, *opened for signature* June 4, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 164.

70. *Id.*

71. See BOLIN, *supra* note 30, at 86.

72. U.N. Framework Convention on Climate Change, *supra* note 69.

of greenhouse gas emissions” prior to the first meeting of the COP to the UNFCCC.<sup>73</sup>

To provide information to negotiators in a timely manner, the IPCC decided to undertake its first Special Report. The report contained three parts. Working Group I addressed issues relating to radiative forcing.<sup>74</sup> Working Group II undertook the task of creating a report establishing “Technical Guidelines for Assessing Climate Change Impacts and Adaptations.”<sup>75</sup> Finally, Working Group III reviewed the IPCC IS92 emissions scenarios, which had been used in the 1992 supplemental report.<sup>76</sup> Though these emissions scenarios were already widely used by scientists in 1994, a more extensive analysis of the assumptions behind the scenarios and their appropriate uses was viewed as critical to more clearly defining the term “dangerous anthropogenic interference” in Article 2 of the UNFCCC.<sup>77</sup>

The three-part IPCC Special Report was released as planned. However, it encountered controversy, in part because of a botched press release.<sup>78</sup> Industries with an interest in preventing action on climate change were beginning to undertake a strategy of discrediting climate science, and claimed that the press release provided evidence that the IPCC was seeking to promote the personal views of specific scientists rather than the broader scientific consensus.<sup>79</sup> This development made it critical for the IPCC not only to employ a rigorous and independent process in order to present accurate information, but also to appear independent and rigorous so as not to be vulnerable to attack.

While the Special Report was ultimately approved by the IPCC a few months before the first COP, it met a fate similar to that of the first Supplemental Report. Negotiators at the conference appeared even more inclined to take seriously the findings of the First Assessment Report than they had three years earlier, but the Special Report received little attention.<sup>80</sup> Again, it appears, the politics of the negotiation developed based on older science, and new information was not readily factored in. It is worth noting that in the nearly five years after the release of the First Assessment Report, many areas of climate science had progressed significantly. Nevertheless, the old findings were sufficient to enable negotiations.

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73. See Agrawala II, *supra* note 31, at 635.

74. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 1994: RADIATIVE FORCING OF CLIMATE CHANGE 1 (1995) [hereinafter IPCC, CLIMATE CHANGE 1994].

75. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC TECHNICAL GUIDELINES FOR ASSESSING CLIMATE CHANGE IMPACTS AND ADAPTATION ii (1994).

76. See IPCC, CLIMATE CHANGE 1994, *supra* note 74, at vii.

77. See BOLIN, *supra* note 30, at 91–92; *supra* note 71 and accompanying text.

78. See BOLIN, *supra* note 30, at 103.

79. See *id.*

80. See *id.* at 109–10.

Following the first COP of the UNFCCC, the relationship between the IPCC and the UNFCCC shifted. The IPCC no longer dealt directly with high-level officials involved in the ongoing negotiations, but instead coordinated with the Subsidiary Body for Scientific and Technological Advice (“SBSTA”), the newly formed technical arm of the UNFCCC.<sup>81</sup>

The eleventh session of the IPCC, held in December 1995 after the release of the Second Assessment Report, marked the end of the IPCC’s tumultuous transformation. From a body created to produce a single authoritative assessment and vested with the obligation to jumpstart an international climate convention, the IPCC had become an independent intergovernmental organization with a variety of tools to contribute to the ongoing climate negotiations.

This early period of the IPCC’s history is instructive because it was the most volatile period of the organization’s history and clearly illustrates some of the tensions that have reemerged in the context of the Paris Agreement. In this early period, the IPCC sought to ensure its own independence and rigor, but also to accommodate the needs of the UNFCCC. These twin goals provided the impetus for the creation of Special Reports. However, as described in the next section, Special Reports have evolved significantly in the years since.

The IPCC’s experience with its first Assessment Report, first Supplementary Report, and first Special Report demonstrate that given the politics of climate change, negotiators are willing to rely on a common baseline of scientific information even if that information is slightly out-of-date, but are less willing or able to integrate new information when they receive it shortly before a negotiation. Later Special Reports, described below, reinforce this pattern. While Special Reports may not have gotten off to an auspicious start, the next section demonstrates their potential utility when properly employed.

## II. SPECIAL REPORTS IN THE “MODERN” IPCC: CASE STUDIES

In the 24 years since the eleventh session of the IPCC in 1995, the IPCC has released four additional Assessment Reports and ten additional Special Reports, with two more Special Reports scheduled for release this summer.<sup>82</sup> The uses for Special Reports and their intended audiences have expanded substantially, as has the set of stakeholders who may request a new report. This diversity of approaches, as well as the diversity in outcomes, provides ample opportunity to extract lessons relevant to the post-Paris Agreement context. Discussion of every Special Report is outside the scope of the Note, but five case studies have been selected to explicate the most relevant lessons for today’s context. Building on the lessons of the early IPCC, the case studies illuminate the importance of timeliness. Not only should the IPCC release reports well

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81. *See id.*

82. *See Timeline of Reports*, IPCC, <https://perma.cc/R85C-5QYX> [hereinafter IPCC, *Timeline*].

before a targeted international negotiation, but the IPCC should maintain sufficient flexibility to address emerging scientific or political issues in a timely manner. The case studies also demonstrate the benefits of an expansive understanding of the role of Special Reports and of engaging stakeholders outside of the UNFCCC. Finally, they shed light on the interactions between science and politics and on how the IPCC can maintain its scientific credibility as it shifts toward a solution-oriented approach.

### A. Aviation and the Global Atmosphere

The Special Report on Aviation and the Global Atmosphere, published in 1999, was requested by the International Civil Aviation Organization (“ICAO”) and the Parties to the Montreal Protocol, and was undertaken in collaboration with the Ozone Science Panel of the Montreal Protocol.<sup>83</sup> As the first Special Report to be requested by a party not associated with the UNFCCC, the first to focus on a specific industry, and the first to explicitly target an audience outside of the community of scientists and international negotiators, it marked an expansion of the potential scope and user base of IPCC Special Reports.<sup>84</sup> The report provided early hints of the potential for an IPCC report to serve decision-makers outside of the UNFCCC process and to promote additional scientific research. Later reports, described in Case Studies D and E below, have more fully realized this potential. This case study also demonstrates the benefits of flexibility: When presented with the opportunity to collaborate on a cutting-edge topic, the IPCC was able to quickly allocate appropriate resources.

In 1996, the study of aviation’s impact on the atmosphere was a new and dynamic field. A conference hosted by NASA determined that more research was needed in order to “make definitive predictions of the effects of aviation on the atmosphere.”<sup>85</sup> However, it also concluded that that the existing knowledge was sufficient to begin an assessment process.<sup>86</sup> Daniel Albritton, a researcher who helped to organize the conference, was also a Co-Chair of the Scientific Assessment Panel of the Montreal Protocol and a member of IPCC Working Group I.<sup>87</sup> After the NASA conference, the Scientific Assessment Panel of the

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83. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT 1999–AVIATION AND THE GLOBAL ATMOSPHERE (1999) [hereinafter IPCC, AVIATION AND THE GLOBAL ATMOSPHERE].

84. See *id.* at vii.

85. See *Symposium on the Global Atmospheric Effects of Aviation, Stratospheric Processes and Their Role in Climate*, SPARC NEWSL. (Verrières-le-Buisson, France), July 1996, at 10–11.

86. See *id.*

87. Telephone Interview with Joyce Penner, Ralph J. Cicerone Distinguished University Professor of Atmospheric Science, University of Michigan (May 22, 2014).

Montreal Protocol discussed the need for an assessment, and the IPCC followed suit.<sup>88</sup>

By the time that assessment was formally proposed at the IPCC, a chapter on aircraft emissions had already been requested for the 1998 scientific assessment for the Montreal Protocol.<sup>89</sup> Given the recent research and opportunity for collaboration, the IPCC saw this as the perfect time to address the implications of a potentially important contributor to climate change. The Report of the twelfth session of the IPCC also anticipated important decisions and transformations in the aviation industry. The Report stated that “[a]ircraft manufactures [were] aiming to make a decision about commitments to a new supersonic transport before the year 2000” and that the “fleet size and fuel efficiencies point[ed] to an emerging CO<sub>2</sub>-emissions sector of significance.”<sup>90</sup>

The stated objective of the report was “to provide accurate, unbiased, policy-relevant information to serve the aviation industry and the expert and policymaking communities.”<sup>91</sup> For that reason, the report contained two separate components. The first, undertaken by Working Group I, was to understand the effects of emissions in the upper troposphere and lower stratosphere on both stratospheric ozone and radiative forcing.<sup>92</sup> The second was to look at possible technological changes as well as the costs and benefits of operational changes that could decrease impacts on the ozone layer or the climate. This second task fell within the purview of Working Group III.<sup>93</sup>

Joyce Penner, one of the coordinators of the Report, notes that this type of report can bring knowledge together in ways that spur innovation and continued research.<sup>94</sup> While it is difficult to quantify the effect that this report had on new research or on the aviation industry as a whole, it does appear to have dramatically raised the salience of the issue of aviation’s contribution to climate change. In the aftermath of the report, governments, industry actors, and NGOs began to consider methods for reducing GHG emissions from aviation, including technological improvements and emissions trading schemes.<sup>95</sup> The CEO of the Scandinavian airline SAS argued that in light of the Report, “an environmentally conscious airline should reduce its environmental impact by

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88. *See id.*

89. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE TWELFTH SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) Appendix D (1996).

90. *Id.*

91. IPCC, AVIATION AND THE GLOBAL ATMOSPHERE, *supra* note 83, at vii.

92. Telephone interview with Joyce Penner, *supra* note 87.

93. *Id.*

94. *Id.*

95. *See* Allen Pei-Jan Tsai & Annie Petsonk, *Tracking the Skies: An Airline-Based System for Limiting Greenhouse Gas Emissions from International Civil Aviation*, 6 ENVTL. LAW. 763, 770–72 (2000).



[two percent] per year at the very least.”<sup>96</sup> Ultimately, regulating aviation has proved difficult.<sup>97</sup> However, at the very least, the report set an important precedent by expanding the potential scope and user base of IPCC Special Reports.

### B. *Land Use, Land-Use Change, and Forestry*

The IPCC Special Report on Land Use, Land-Use Change, and Forestry (“LULUCF”) stands in stark contrast to the report on Aviation and the Global Atmosphere. Rather than being motivated by scientific or technical developments, the LULUCF Special Report was requested by SBSTA in order to inform specific provisions of the Kyoto Protocol, which had been recently negotiated in 1997.<sup>98</sup> This case study illustrates that an IPCC report can positively impact negotiations when it is narrowly targeted at specific provisions under consideration. It also reinforces the observation in the previous case study that the IPCC enhances its own effectiveness when it maintains the flexibility to respond promptly to the need for a new Special Report.

Article 3.3 of the Kyoto Protocol stated that direct land use change should be included in carbon accounting under the Protocol, but Article 3.4 of the Protocol left the task of considering other forms of land use change to future negotiations.<sup>99</sup> The Special Report on LULUCF aimed to address that issue. As stated in its preface, the goal of the report was “to assist the Parties . . . by providing relevant scientific and technical information to describe how the global carbon cycle operates and what the broad-scale opportunities and implications of [afforestation, reforestation, and deforestation] and additional human-induced activities are, now and in the future.”<sup>100</sup>

The UNFCCC attributed great significance to the report. At the fourth meeting of the COP, held in Buenos Aires in 1998, delegates elected to table discussion about defining terms in Articles 3.3 and 3.4 until the release of the IPCC report.<sup>101</sup> Once the report was released in 2000, negotiators were initially unable to reach agreement. However, the following year, issues regarding LULUCF definitions and rules for implementing Article 3.4 were finally resolved.<sup>102</sup>

96. *Id.* at 773.

97. See, e.g., Jörgen Larsson et al., *International and National Climate Policies for Aviation: A Review*, CLIMATE POL’Y (2019), <https://perma.cc/YZD2-JX7B>.

98. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, LAND USE, LAND-USE CHANGE, AND FORESTRY, at vii (R. T. Watson ed., 2000) [hereinafter IPCC, LULUCF].

99. Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22.

100. See IPCC, LULUCF, *supra* note 98, at vii.

101. See UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, REPORT OF THE PARTIES ON ITS FOURTH SESSION (BUENOS AIRES) 41 (1998).

102. *Reporting on LULUCF Activities Under the Kyoto Protocol*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, <https://perma.cc/5GLC-S8B7>.

The LULUCF Report provided specific and timely information to the UNFCCC. It was critical that the IPCC be able to produce the report relatively quickly given that the UNFCCC was explicitly waiting for it. This is the one situation in which a report released shortly before a negotiation appears to have had a positive impact. However, it is worth noting that even here, the science did not provide an immediate solution and a deal was not reached until the following year.

### C. Renewable Energy Sources and Climate Change Mitigation

The 2011 Special Report on Renewable Energy Sources and Climate Change Mitigation (“SRREN”)<sup>103</sup> provides a cautionary tale about how the effectiveness of a report can be undermined when it is not produced in a timely manner and about how inflexibility in the IPCC assessment cycle can lead to such an outcome. It also demonstrates the importance of maintaining a consistent approach when assessing several technologies or scenarios, as failure to do so may effectively prescribe undesirable policy outcomes.

Initially suggested by the German delegation in 2005 at the twenty-fourth session of the IPCC, this report was six years in the making.<sup>104</sup> Discussion at the twenty-fifth session of the IPCC led to the conclusion that the resources to undertake the Special Report would not be available until after the completion of AR4 in 2007.<sup>105</sup> By the time a scoping meeting for the report was held in 2008,<sup>106</sup> it was early in the fifth IPCC assessment period. As observed by Christopher Field, Co-Chair of Working Group II and an editor of the Special Report on Managing the Risks of Extreme Events, the IPCC assessment cycle structure dictates that Special Reports can only be undertaken during the middle of the cycles.<sup>107</sup> At the start of the cycle, the new members of the IPCC have not yet even been chosen, and at the end, all effort is concentrated on the Assessment Report.<sup>108</sup> This allows only a limited time during which Special Reports can be undertaken and accounts for the periodic nature of their publication (see Figure 2).<sup>109</sup>

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103. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION (2011) [hereinafter IPCC, SRREN].

104. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE 24TH SESSION OF THE IPCC (MONTREAL) 2 (2005).

105. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE 25TH SESSION OF THE IPCC (PORT LOUIS, MAURITIUS) 3–4 (2006).

106. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE 27TH SESSION OF THE IPCC (VALENCIA) 2 (2007).

107. Interview with Christopher Field, *supra* note 19.

108. See *id.*

109. *Id.*

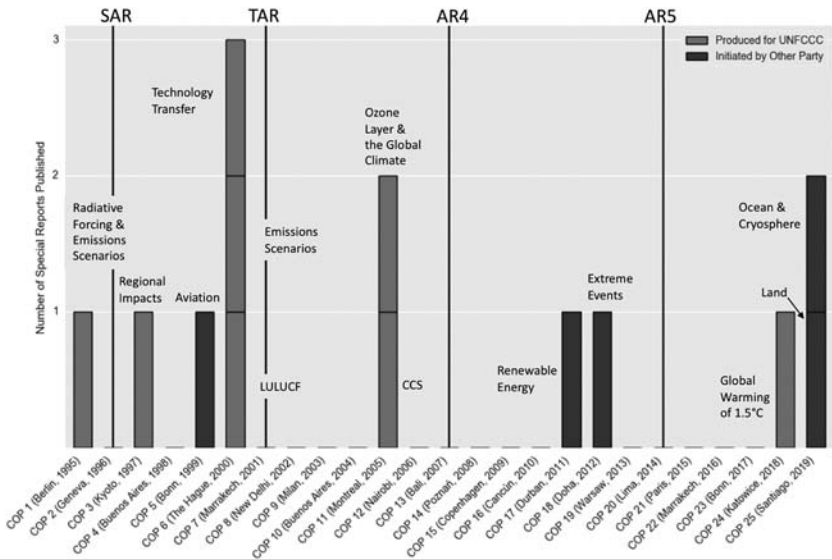


FIGURE 2 – SPECIAL REPORTS BY YEAR (EACH SPECIAL REPORT IS ASSOCIATED WITH THE FIRST UNFCCC COP MEETING AT WHICH IT COULD HAVE BEEN DISCUSSED, EVEN IF IT WAS RELEASED IN THE PREVIOUS CALENDAR YEAR)

SRREN was a casualty of these dynamics. Had a Special Report on renewables been published in the mid-2000s, it might have contributed groundbreaking insight. However, when the report was finally published in 2011, significant literature already existed on the topic. The report added relatively little to the ongoing dialogue on the issue.<sup>110</sup>

The report's credibility was also damaged by an overly optimistic press release, which cited a single renewable penetration scenario based on a study by Greenpeace International.<sup>111</sup> Like the botched press release for the first Special Report, this poorly crafted press release tarnished an IPCC Special Report, and again suggested that IPCC reports needed not only to be rigorous, but must also have that rigor clearly communicated to the public.

A lack of cohesiveness and consistency across chapters further undermined the report's effectiveness.<sup>112</sup> As Daniel Kammen (a coordinating lead author on a chapter titled "Policy, Financing and Implementation") noted, the authors of

110. Interview with Daniel Kammen, Class of 1935 Distinguished Professor of Energy at the University of California, Berkeley, in Cambridge, MA (Jan. 30, 2019).

111. See *IPCC SRREN Report Reveals Legitimate Issues with the Organisation's Communications*, CARBON BRIEF (June 17, 2011), <https://perma.cc/M566-BSUD> (describing how highlighting unrepresentative renewable energy scenario led to accusations of bias and conflict of interest).

112. Interview with Daniel Kammen, *supra* note 110.

specific chapters tended to be enthusiastic about the potential of the technology they were writing about, and efforts to compare feasibility and cost effectiveness across technologies were limited.<sup>113</sup> This combination likely resulted in extremely optimistic assessments of bioenergy, both in terms of emissions intensity and future growth.<sup>114</sup> Had the report been more influential, its inconsistent approach could have led to misplaced policy priorities. While the IPCC always seeks to be policy-relevant without being policy-prescriptive, failure to apply a consistent approach or clearly communicate tradeoffs can end up effectively prescribing suboptimal policy. A more widely reported example is presented below in the discussion of the Special Report on Global Warming of 1.5°C.

*D. Managing the Risks of Extreme Events and Disasters to Advance  
Climate Change Adaptation*

Published prior to the Paris Agreement, the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (“SREX”) gave an early indication of the potential of solution-oriented science. It also demonstrated the benefit of reports targeted at stakeholders outside of the UNFCCC.

Norway, with the support of Sudan, Finland, Iceland, Peru, and Mexico, first suggested the potential topic at the twenty-eighth session of the IPCC in April 2008.<sup>115</sup> The report that emerged two-and-a-half years later was broad and interdisciplinary, but also specific enough to inform action by local and national governments that were already facing climate-related risks.<sup>116</sup> While previous IPCC reports had discussed the climate science of extreme events, this report analyzed the intersection of these events with human exposure and vulnerability for the first time.<sup>117</sup> This analysis required bringing together specialists in “disaster risk management, and disaster risk reduction . . . with experts in the areas of the physical science basis of climate change (WGI) and climate change impacts, adaptation, and vulnerability (WGII)”<sup>118</sup> In order to demonstrate the practical application of climate disaster risk management, the report

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113. *Id.*

114. *See* IPCC, SRREN, *supra* note 103.

115. *Summary of the 28th Session of the International Panel on Climate Change*, 12 EARTH NEGOTS. BULL. 28 (Apr. 13, 2008), <https://perma.cc/J2FQ-P5M3>.

116. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTION: SPECIAL REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, at ix (2012) [hereinafter IPCC, MANAGING RISKS].

117. *See id.*

118. *Id.*

included 14 detailed case studies ranging from heat waves in Europe, to fires in Australia, to cyclones in Myanmar and Bangladesh.<sup>119</sup>

The report, which has been described as a “how to” manual for policymakers, proved that while Special Reports evolved as a method of communicating science to the UNFCCC, their role has expanded beyond this singular purpose. For the first time, the IPCC, with support from Norway and the Climate Development Knowledge Network (“CDKN”), made an organized and concerted effort to communicate its results to decision makers around the world.<sup>120</sup> The CDKN released an additional set of three reports with lessons more specifically targeted for Africa, Asia, and Latin America and the Caribbean.<sup>121</sup> Events were held to discuss the findings of SREX from Brazil, to Pakistan, to Senegal.<sup>122</sup> Some countries, such as Vietnam, took it upon themselves to build on the report and create a custom SREX report, specific to their country, to be used in policymaking.<sup>123</sup> The Report has been downloaded over 73,000 times,<sup>124</sup> and appears to have been well received and widely deployed.

### E. Global Warming of 1.5°C

The Special Report on Global Warming of 1.5°C (“SR1.5”) is the most recent report released by the IPCC. Both the report itself and the process leading to its creation illustrate the recent shift in the IPCC’s approach and provide lessons for future reports. First, this case study demonstrates that scientists and policymakers can interact productively in a complex and nonlinear way without jeopardizing the quality or credibility of the science. Secondly, it shows that IPCC reports can influence the production of new original research. Thirdly, it illustrates how the clear presentation of tradeoffs can lead to effective policy, in contrast with opaque presentation of tradeoffs, which may appear more policy-neutral, but can have the effect of prescribing bad policy. Finally, it reinforces the lesson learned early in the IPCC’s history that a report released shortly before an international negotiation may fail to advance the negotiation.

In the lead-up to COP 24—at which the Paris Agreement was negotiated—the UNFCCC conducted a Structured Expert Dialogue (“SED”) on the Convention’s Long-Term Global Goal (“LTGG”). Since the original contro-

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119. See *id.* at 489–529.

120. Interview with Christopher Field, *supra* note 19.

121. See *New Reports Help Developing Countries Plan for Climate Extremes*, ECOSYSTEM MARKETPLACE (Apr. 17, 2012), <https://perma.cc/59MQ-GRJ9>.

122. See *Working Groups I & II*, IPCC SREX, <https://perma.cc/Z7JD-FJLR>.

123. See THANH HUONG ET AL., VIET NAM SPECIAL REPORT ON MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTATION: SUMMARY FOR POLICY MAKERS (2015), <https://perma.cc/TN2J-JGMB>.

124. Intergovernmental Panel on Climate Change (IPCC), “SREX Presentation: Chris Field at COP18,” YOUTUBE (Nov. 29, 2012), <https://perma.cc/K7G7-S8ZQ>.

versies about the meaning of “dangerous anthropogenic interference” in the early 1990s, the global community had settled uneasily on 2°C as the maximum allowable increase in average temperature.<sup>125</sup> This target was a product of both science and politics, more closely tracking what was viewed as plausible than what level of warming was deemed to be “dangerous.”<sup>126</sup>

The SED took place over the course of two years and included five sessions on thirteen different occasions.<sup>127</sup> The sessions provided opportunities for government representatives to interact directly with experts, largely from the IPCC. While these interactions were largely positive, some efforts were made to blur the line between science and politics. For instance, in response to one presentation, a government representative sought to instruct a scientist to present more politically palatable findings, saying “in my perspective the presenter brought to us a negative vision regarding the image of biofuels. I would like to kindly ask you the presenter to elaborate a little bit more on the positive points of the biofuels.”<sup>128</sup> If tolerated, this blending of science and politics could undermine both the accuracy and the credibility of climate science.

Fortunately, the dialogue was mostly constructive. It ultimately lent support to the contentions of low-lying and small island nations that limiting warming to 2°C might be insufficient to prevent devastating results. These findings formed the basis for the target included in the Paris Agreement, which seeks to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursu[e] efforts to limit the temperature increase to 1.5°C above pre-industrial levels . . . .”<sup>129</sup>

While references to 1.5°C had appeared in a number of other UNFCCC documents, most scientists were surprised by the result of the SED, by the inclusion of this goal in the Paris Agreement, and by the very notion that 1.5°C was a viable target.<sup>130</sup> Petteri Talaas, Secretary-General of the WMO, expressed the view of many scientists when he stated that “existing and committed emissions already put the world beyond such an ambitious temperature target.”<sup>131</sup> Given the dramatic, societal changes that would be required to hit such a target, many scientists felt it would be unethical to present 1.5°C as a plausible

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125. See Petra Tschakert, *1.5°C or 2°C: A Conduit's View from the Science-Policy Interface at COP20 in Lima, Peru*, 2 CLIMATE CHANGE RESPONSES 3 (2015).

126. See *id.* at 1–3.

127. See Livingston, *supra* note 17, at 173.

128. See *id.* at 9.

129. *Paris Agreement*, *supra* note 1.

130. See Livingston, *supra* note 17, at 205.

131. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, REPORT OF THE 51ST SESSION OF THE IPCC BUREAU (GENEVA) 1 (2016).

long-term outcome.<sup>132</sup> Because the global average temperature has already risen about 1.0°C, some scientists also found consideration of a 1.5°C scenario to be uninteresting science.<sup>133</sup> For these reasons, relatively little research had been conducted, either on emissions paths that would be required to achieve such a goal or on the benefits of limiting warming to 1.5°C rather than 2°C.<sup>134</sup>

When the Paris COP requested a report on Global Warming of 1.5°C and the IPCC accepted the request, scientists around the world were suddenly motivated by the prospect of having their research included in an IPCC report.<sup>135</sup> There were few publications on 1.5°C before 2015, but in 2017 there were around 25, and in 2018, there were approximately 215.<sup>136</sup>

Creating demand for research on 1.5°C was not the only way that the Paris Agreement altered the climate science landscape. While the only direct reference to the IPCC in the Paris Agreement relates to governments using IPCC methodologies to quantify and report their emissions, the Paris Agreement's bottom-up approach and its use of quinquennial GSTs fundamentally changed the way that science can contribute to the UNFCCC process.<sup>137</sup> The primary role of climate science may no longer be to provide warnings about the global implications of unchecked warming, but rather to provide individual parties to the agreement with tools to enhance their NDCs and to assess progress toward meeting global targets.<sup>138</sup>

SR1.5 was the first IPCC report published in this new era and the results are promising. The authors seem to have made a concerted effort to create a solution-oriented, well-integrated report that provides policymakers with useful information. This was the first IPCC report to be created collaboratively by all three working groups,<sup>139</sup> yet it does not suffer from the same types of flaws as SRREN.<sup>140</sup> By presenting all pathways within the same framework and comparing them across a variety of metrics, the report comes closer to being policy prescriptive than many past reports. While potentially uncomfortable for those who seek to maintain a wide chasm between science and politics, this approach seems both more helpful and more honest than the alternative.

The report's approach to Biomass Energy with Carbon Capture and Sequestration ("BECCS") provides a good example. BECCS requires the produc-

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132. See Jasmine E. Livingston & M. Rummukainen, Taking Science By Surprise: The Knowledge Politics of the IPCC 1.5 Special Report, at 11–12 (unpublished manuscript) (on file with author).

133. See *id.* at 10–11.

134. See *id.* at 10–12.

135. See *id.* at 12, 15.

136. See *id.* at 14.

137. See Beck & Mahony, *supra* note 8, at 6.

138. See *id.*

139. See Livingston & Rummukainen, *supra* note 132, at 2.

140. Interview with Daniel Kammen, *supra* note 110.

tion of biomass, which if undertaken at a large scale would dramatically alter the ways that land is used across the globe and would likely lead to outcomes that would be socially unacceptable.<sup>141</sup> The Fifth Assessment Report (“AR5”) included four emissions scenarios or Representative Concentration Pathways (“RCPs”),<sup>142</sup> the most ambitious of which, RCP 2.6, required substantial quantities of negative emissions from technologies like BECCS.<sup>143</sup> Unfortunately, because the implications of implementing BECCS at a large scale were not well understood by many outside the research community, the inclusion of RCP 2.6 created the perception of feasibility for a likely undesirable scenario.<sup>144</sup> SR1.5, on the other hand, is very transparent about which scenarios include BECCS and the associated land area required.<sup>145</sup>

The UNFCCC asked that SR1.5 be completed before the start of the Talanoa Dialogue. The dialogue was intended to be an inclusive, participatory, and transparent approach to engaging a broad array of stakeholders in the lead up to COP 24 in December 2018.<sup>146</sup> While the Special Report does appear to have contributed to the dialogue, its reception at COP 24 was less encouraging. Four countries—the United States,<sup>147</sup> Russia, Saudi Arabia, and Kuwait—objected to language “welcoming” the report and insisted that the COP only “take note” of the report.<sup>148</sup> Many other parties, particularly small island nations, were angered by this failure to welcome a report that the UNFCCC itself had requested.<sup>149</sup> The issue proved a sticking point for several days until negotiators finally agreed to “welcome[ ] the timely completion” of the report.<sup>150</sup> While the report itself cannot be blamed for this obstructionist behavior, this episode further reinforces the observation that reports released shortly before a COP are unlikely to advance the negotiation.

141. See, e.g., Beck & Mahony, *supra* note 8, at 7; see also Kevin Anderson & Glen Peters, *The Trouble with Negative Emissions*, 354 SCIENCE 182, 183 (2016).

142. *Scenario Process for AR5*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <https://perma.cc/T3ES-GWU8>.

143. See Beck & Mahony, *supra* note 8, at 6.

144. See *id.* at 7.

145. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C 16 (2018).

146. See *UN Opens Talanoa Dialogue Portal, Aiming for Higher Climate Ambition*, UNFCCC (Jan. 26, 2018), <https://perma.cc/3AC5-88Z5>.

147. While the U.S. negotiators objected to the welcoming of SR1.5, the report is also playing an important role in domestic politics. The Green New Deal, a high-profile joint resolution introduced in the U.S. Congress was largely structured around the findings of the report. See *Recognizing the Duty of the Federal Government to Create a Green New Deal*, H.R. Res. 109, 116th Cong. (2019).

148. See Simon Evans & Joceyln Timperly, *COP24: Key Outcomes Agreed at the UN Climate Talks in Katowice*, CARBON BRIEF (Dec. 16, 2018), <https://perma.cc/ZF48-DFQT>.

149. See Joshua S. Hill, *COP24 Begins To Devolve As Key Countries Block IPCC 1.5 Report*, CLEANTECHNICA (Dec. 10, 2018), <https://perma.cc/4KAN-PVRX>.

150. See Evans & Timperly, *supra* note 148.



### III. LESSONS LEARNED

#### A. *The Value of Special Reports*

As the case studies demonstrate, some Special Reports have been effective at advancing climate negotiations, national or sub-national climate policy, or climate science itself, while others have been less successful. Special Reports have served a number of purposes, from providing specific necessary information to negotiators (e.g., LULUCF), to engaging with other international institutions (e.g., Aviation), to providing tools for local and national policymakers (e.g., SREX). While some of the information contained in these reports might plausibly have been included in an Assessment Report, there have been benefits to producing separate, more narrowly focused reports. The Aviation Report enabled collaboration with ICAO and the Parties to the Montreal Protocol and highlighted an emerging issue that had received little attention up to that point. SR1.5 stimulated research in a policy-relevant area and reshaped public and political understandings of the climate crisis, as evidenced in the United States by the report's central role in proposals for a Green New Deal. Some have argued that the IPCC should release a new report each year<sup>151</sup> in order to maximize the visibility of climate science and its contribution to climate policy. A 2014 survey found that nearly a quarter of scientists in Working Group I supported replacing Assessment Reports with a rolling succession of Special Reports. While that idea is no longer on the table, Special Reports continue to serve a variety of compelling purposes.

#### B. *The Importance of Timing*

In addition to demonstrating the expanded scope of engagement with stakeholders, these case studies reinforce the lessons learned in the early years of the IPCC about the importance of releasing reports well in advance of relevant negotiations, and add new lessons about benefits of a responsive IPCC. The reception of SR1.5 at COP 24 demonstrated the inability of a recently released scientific report, even a particularly compelling one, to cut through the politics of a negotiation. The Special Report on LULUCF might be regarded as an exception to this rule, because the UNFCCC awaited its publication to conclude negotiations on the subject. However, even in that case the release of the report did not immediately resolve the political disputes. SRREN and the Aviation Report also highlighted the importance of timing. SRREN demonstrated how the value of a Special Report may be undermined if it is not completed in a timely manner, while the Aviation Report showed how responsiveness and flexibility in timing can facilitate collaboration.

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151. Telephone Interview with Field, *supra* note 19.

These case studies, combined with the lessons of the early IPCC, suggest that to effectively contribute to a COP negotiation, a report must be released well in advance, ideally before the previous meeting of the COP. Advanced release ensures that the new science serves as part of the background of the negotiation, rather than as a last-minute addition to be ignored or disputed. The IPCC already seems to have recognized this lesson, and has scheduled AR6 for release before the 2022 COP, which will precede the 2023 GST.<sup>152</sup> These case studies also suggest that because the timeliness of Special Reports can be important, their current cadence—in which Special Reports can only be produced around the midpoint of each assessment cycle—limits their effectiveness.

### C. Science and Politics

Since its founding, the IPCC has existed to inform policy. Its earliest reports sought to provide negotiators the information they needed to create a climate convention. Many of its later reports, such as the Special Report on LULUCF, responded to the convention's explicit requests for information. Still, the IPCC's interactions with politics and policy today differ from those of the past. The Paris Agreement and the current policy landscape demand that the IPCC not only identify problems, but also provide solutions. This approach began to become evident with SREX's use of case studies, but became a clear priority with the 2015 election of IPCC Chairman Hoesung Lee, who stated that he wants to be remembered as "the chairman that shifted the IPCC's focus to solutions."<sup>153</sup>

This shift challenges the notion that the IPCC is not policy prescriptive. By providing a solution, particularly a policy solution, the IPCC might appear to be prescribing a policy. However, SREX's case studies and SR1.5's pathways suggest that the IPCC can effectively strike a balance between providing solutions and prescribing policy. SREX's case studies demonstrate several methodological approaches to a variety of extreme events in various regions vulnerable to climate change.<sup>154</sup> They provide policymakers not with cookie cutter solutions, but with a breadth of real-world experiences on which to base their own adaptation responses. In SR1.5, the IPCC does not prescribe policy, but rather comprehensively examines the costs and benefits of various pathways. Clear communication of these costs and benefits is critical to informing optimal policy decisions. It is also necessary in order to avoid creating a misguided impression of optionality, as the IPCC arguably did with its failure to clearly communicate the dependence of RCP2.6 on BECCS in AR5. There may be

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152. See IPCC, *Timeline*, *supra* note 82.

153. De Pryck & Wanneau, *supra* note 37, at 208.

154. See IPCC, *MANAGING RISKS*, *supra* note 116, at 489.

cases where, once all costs and benefits are presented, a single pathway or approach is clearly optimal. In such cases, the IPCC may be seen as prescribing policy, but if these costs and benefits are determined rigorously, the IPCC should not obscure the optimal choice.

In addition to the shift toward solution-oriented science, the IPCC's interactions with policymakers and the UNFCCC have become more complex and nonlinear. SR1.5 is illustrative. Consideration of a 1.5°C target began with the concerns of vulnerable countries that a 2°C target was insufficient. It went through the SED process, which included extensive interaction between scientists and policymakers, and was then included in the Paris Agreement. While historically the IPCC had used science to inform international agreements, here the reverse also took place. The SED and the Paris Agreement provided the motivation for SR1.5, which in turn motivated scientists to produce new research. This back and forth, with politics influencing which research was conducted, challenges the traditional notion of scientific independence, but also enables scientific answers to policymakers' most important questions.

A recent article by De Pryck and Wanneau identifies these and other related trends in the IPCC and terms them "anti-boundary" work.<sup>155</sup> This terminology makes sense as a contrast with the boundary work identified by other authors, which involves the separation of science from other disciplines.<sup>156</sup> However, the IPCC's past experience suggests that the goal should not be to completely eliminate the boundary or blur the lines between science and politics, but rather to increase productive interaction across them. The mental image of the two domains should not be of an overlapping Venn Diagram, but of interlocking gears.

To illustrate this point, consider the exchange mentioned above in the discussion of the SED.<sup>157</sup> The problem with a government representative asking for "more on the positive points of the biofuels"<sup>158</sup> is that such a request demands that science (or at least its presentation) be changed in the interest of political expediency. A more constructive dialogue, leading to new scientific questions or innovative policy ideas, would have been more likely if the representative had instead asked, "The political situation in my country necessitates the use of biofuels. Are there ways we can mitigate the problems you describe?" Similarly, if the scientist had replied to this hypothetical question by saying, "No, you should never promote biofuels," then that would cross the line into policymaking. The scientist might instead reply, "The research suggests that some of the problems with biofuels are difficult to mitigate, but others could be addressed through the following actions . . . ." The differences at play here may

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155. See De Pryck & Wanneau, *supra* note 37.

156. See *id.*

157. See *supra* notes 120–23 and accompanying text.

158. See Livingston & Thonia, *supra* note 127, at 9.

seem trivial in the context of a single conversation, but their importance is clearer in the context of an entire IPCC report. It would be deeply counterproductive if the IPCC were asked to produce a report describing only the benefits of biofuels without their costs. Such a report would not accurately reflect the science and, as with the skewed press release for SRREN, would undermine public confidence in the institution. A report that failed to clearly articulate the drawbacks of biofuels relative to other technologies, out of concern about prescribing policy, would be similarly problematic as it could lead to poor policy outcomes such as an overinvestment in biofuel incentives. Finally, a report that went beyond communicating the costs and benefits of biofuels and concluded, for instance, that biofuels should be completely phased out would also be problematic. Policymakers are likely to be better equipped than scientists to make the broad value judgements required in policymaking and to be accountable for their decisions. Perhaps more importantly, prescribing such a policy could cause leaders in biofuel production to question the IPCC's findings, undermining the Panel's critical role in establishing a universally accepted scientific baseline. As observed from the reception of SR1.5, countries may seek to challenge a report that they perceive as contrary to their interests. A report that went beyond science and into explicit policymaking would bolster these types of objections. The line between clearly communicating tradeoffs and prescribing policy is a fine one, but it is a line the IPCC must walk. Today, more than ever, the IPCC is in a position to enable policy action, but it can only do so if it communicates clearly and maintains the accuracy and credibility of its science.

#### IV. APPLYING LESSONS LEARNED TO ALIGNMENT WITH THE GLOBAL STOCKTAKE

Today, in the world of the Paris Agreement, the IPCC is reconsidering its role. In an effort to assist policymakers in enhancing their commitments, all three of the AR6 working groups have adopted a solution-oriented approach.<sup>159</sup> Beyond AR6, the IPCC's future is less clear. However, the IPCC has agreed to support the GSTs, and COP 24 helped to clarify the IPCC's expected role. The GST will follow a process similar to the SED that occurred in the leadup to the Paris Agreement.<sup>160</sup> This process will include three stages: information collection and preparation, technical assessment, and consideration of outputs.<sup>161</sup> While the IPCC will likely inform all three stages, the COP 24 output texts explicitly emphasize the IPCC's role in the technical assessment stage.<sup>162</sup>

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159. Interview with Daniel Kammen, *supra* note 110.

160. See Evans & Timperley, *supra* note 148.

161. See *Decision -/CMA.1 - Matters Relating to Article 14 of the Paris Agreement and Paragraphs 99-101 of Decision 1/CP.21*, at 1 (Dec. 14, 2018).

162. See *id.* at 4.

The goal of this stage will be to evaluate progress on mitigation, adaptation, provision of climate finance, and, to a lesser extent, examine losses and damage already experienced.<sup>163</sup>

While AR6 will be released in time to support the first GST, the IPCC has already begun to consider how it will need to adjust its subsequent assessment cycle in order to support future GSTs.<sup>164</sup> The IPCC secretariat is considering three options for aligning assessment cycles with the GSTs.<sup>165</sup> The first option would be to shorten the cycle to five years and release a new set of Assessment Reports to support each quinquennial GST.<sup>166</sup> The second option would be to increase the cycle length to ten years and provide a more succinct update in the middle of the cycle.<sup>167</sup> The final option is to maintain the current cycle and support each GST with a targeted Special Report.<sup>168</sup> The IPCC received input from 37 countries and the European Union on this issue.<sup>169</sup> The responses relating to work products and timing are summarized in Appendix Table 2.

The remainder of this section presents the themes of the governments' responses, constructs a rough model of the work products that could be produced under each proposed cycle length, and concludes by applying the lessons learned from the IPCC's history to argue in favor of a ten-year cycle with a midterm update and built-in flexibility around Special Reports.

#### A. *Feedback from Governments*

As Appendix Table 2 indicates, many countries—regardless of their precise opinions about future work products and schedules—emphasized the need to maintain the quality and rigor of IPCC science.<sup>170</sup> However, beyond this common goal, countries disagreed about many of the specifics of how to interact with the GSTs. The most common response was that not enough information was available, largely because the precise form of the GSTs was yet to be defined.<sup>171</sup> These countries also hoped to gain insight from observing the effect of the SR1.5 on the Talanoa Dialogue and on COP 24.<sup>172</sup>

Another common response was that the IPCC should maintain its current process for Assessment Reports and use Special Reports to provide input to the

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163. See Evans & Timperley, *supra* note 148.

164. See IPCC, ALIGNING, *supra* note 12, at 1.

165. See *id.* at 1–2.

166. See *id.* at 3.

167. See *id.*

168. See *id.*

169. See *id.* at 1.

170. See, e.g., IPCC, ALIGNING, *supra* note 12, at 20.

171. See, e.g., *id.* at 10.

172. See, e.g., *id.* at 15.

GSTs.<sup>173</sup> Some of the countries with this view were concerned that shortening the cycle would harm the quality of the science, while lengthening the cycle would lead to out-of-date science.<sup>174</sup> A number of countries that expressed a preference for keeping the existing assessment schedule failed to provide any explanation at all.<sup>175</sup> Finally, eight countries endorsed a five-year assessment cycle, motivated largely by a concern for up-to-date science.<sup>176</sup> Four endorsed a ten-year cycle with an update report in the middle.<sup>177</sup>

Some important considerations addressed in these opinions, such as how to budget limited resources and how long IPCC authors and other officials should serve, fall outside the scope of this Note. However, as Ireland observed in its submission, many of the other factors that countries consider important can be informed by looking at the history of Special Reports.<sup>178</sup>

### B. *Outlining the Scenarios*

As several countries note, in order to choose between proposed schedules, it is important to first determine what types of reports could be produced on each schedule.<sup>179</sup> Furthermore, as Australia points out, while the first GST will be supported by AR6, there is little reason to believe that a standard Assessment Report is the ideal vehicle for informing a GST.<sup>180</sup> The IPCC will need to facilitate the emissions accounting process and report on progress toward the LTGG. Given its shift toward a solution-oriented approach, it can also likely provide valuable information to countries seeking to increase the ambition of their mitigation or adaptation efforts. It is much less clear, however, that the GST will benefit from the updates on the physical science of climate change that are typically included in an Assessment Report. Many of these areas of the science do not change rapidly,<sup>181</sup> and based on the history, it seems unlikely that the GST efforts will be significantly hampered by slightly out-of-date information. That said, a number of countries have expressed concerns about out-of-date science,<sup>182</sup> and the perception that the science is out-of-date could undermine the notion of a common baseline understanding that the IPCC has worked so hard to achieve. Given these considerations, it seems ideal to support each GST with a comprehensive assessment of progress toward the LTGG and

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173. See, e.g., *id.* at 12.

174. See, e.g., *id.* at 42.

175. See, e.g., *id.* at 13.

176. See, e.g., *id.* at 11.

177. See, e.g., *id.* at 16.

178. See *id.* at 28.

179. See, e.g., *id.* at 19.

180. See *id.* at 4.

181. Telephone Interview with Joyce Penner, *supra* note 92.

182. See IPCC, ALIGNING, *supra* note 12, at 31.

of solutions for reaching the target and adapting to climate impacts, along with at least a brief update on other areas of climate science. This could be included in a report and also discussed in sessions like those organized for the SED.

Thus, a five-year cycle would likely consist of a semi-comprehensive Assessment Report, as described above, every five years, along with one (as recommended by Brazil)<sup>183</sup> or two (as recommended by Spain)<sup>184</sup> Special Reports. Given the difficulty of producing a Special Report at the start or end of a cycle, there would be a short window during which these reports could be produced close to the midpoint of the cycle.

A ten-year cycle would likely include a very comprehensive Assessment Report, including both traditional scientific updates and solution-oriented insights, every ten years. A report closer to the minimum necessary to support a GST would be released around the midpoint of the cycle. Extrapolating from the current seven-year cycle—which has often included three Special Reports—it seems likely that a ten-year cycle could include four or five, though one of those would be the midpoint GST update. There might be more flexibility in scheduling Special Reports, though limitations at the beginning and end of the cycle would remain.

Finally, if the IPCC maintained the current seven-year cycle, a comprehensive Assessment Report would be produced every seven years, with each cycle also including one or two additional reports similar to the midpoint report described above. This would likely leave room for at most one or two more traditional Special Reports, depending on the cycle. These Special Reports, as in past cycles, would be produced around the middle of the cycle.

### C. *Applying Lessons from History*

Maintaining the current seven-year cycle appears to be the least optimal option. While its appeal may be obvious—if it's not broken, don't fix it—the drawbacks are significant. As Japan noted in its submission, by requiring one—or possibly two—Special Reports each assessment cycle just to support the GSTs, the IPCC would either become overloaded or would sacrifice its ability to work on anything else.<sup>185</sup> In a seven-year cycle with, at most, two Special Reports, the IPCC would be less able to address emerging issues independent of the GST, and would be prevented from taking advantage of opportunities to build on its expanding engagement with stakeholders outside of the UNFCCC. Collaborations like the Aviation Report might never happen, and the inflexibility of the assessment cycle would lead to longer timeframes that could undermine the effectiveness of the reports, as occurred with SRREN.

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183. *See id.* at 7.

184. *See id.* at 45.

185. *See id.* at 30.

The difference between five- and ten-year cycles is one of degree, but a ten-year cycle seems most ideal for building on the IPCC's past success. Both options would provide the inputs required for each GST, but the ten-year cycle could allow for more flexibility in scheduling and possibly for a greater quantity of Special Reports. The only clear advantage of a five-year cycle is that certain scientific information could be kept slightly more up-to-date. However, as observed with the first COP and first Special Report, maintaining the most up-to-date science is less important than ensuring a common baseline understanding of the science. Furthermore, as noted by Singapore in its submission, Special Reports could be used, as necessary, to provide updates on rapidly evolving topics for which a decennial update is inadequate.<sup>186</sup> The crucial benefit of a ten-year cycle is that it would be possible to build in flexibility such that Special Reports can be produced in a responsive and timely manner when the need or opportunity presents itself. This would enable the IPCC to continue to meet the needs of the UNFCCC (as it did with the LULUCF report), address emerging issues and take advantage of opportunities for collaboration (as it did with the Aviation Report), and address a wider range of topics and stakeholders than would be possible under the other proposed options.

Finally, regardless of which assessment cycle configuration is selected, the history of Special Reports strongly suggests that the IPCC should release its Assessment or Special Reports in support of the GST well in advance, ideally before the previous year's COP. As demonstrated by the LULUCF report, even relatively narrow reports intended to support a negotiation should be released well in advance. With proper planning, this should be possible with any of the proposed assessment cycle schedules.

#### CONCLUSION

In response to the enactment of the Paris Agreement and the need to support the GSTs, the IPCC is shifting toward an approach of greater engagement with political stakeholders and more solution-oriented science. While this new reality poses new challenges, much can be learned from the organization's past. By analyzing the early history of the IPCC and case studies of several Special Reports, this Note has demonstrated the importance of timing and the value of expanding stakeholder engagement, and has shown how the lessons of the past can be applied to alignment with the GSTs.

In the world of the Paris Agreement, quality and credibility are as central to the IPCC's effectiveness as ever, but that does not imply that the Panel should fear change. Indeed, the IPCC's history confirms that it has never been a static organization. By embracing new approaches, the IPCC may be able to leverage its credibility to catalyze policy change.

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186. *See id.* at 44.



## APPENDIX

A. Table 1 – Special Reports of the IPCC

Report Title	Year of Publication	Requesting Party
Radiative Forcing of Climate Change and An Evaluation of the IPCC IS92 Emission Scenarios	1994	Prepared in preparation for the first COP of the UNFCCC
The Regional Impacts of Climate Change: An Assessment of Vulnerability	1997	SBSTA
Aviation and the Global Atmosphere	1999	International Civil Aviation Organization (ICAO) and the Parties to the Montreal Protocol
Land Use, Land-Use Change, and Forestry	2000	SBSTA
Emissions Scenarios	2000	Decided Internally
Methodological and Technological Issues in Technology Transfer	2000	SBSTA
Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons	2005	UNFCCC and The Montreal Protocol
Carbon Dioxide Capture and Storage	2005	At COP 7, a draft decision was taken to invite the IPCC to write a technical paper on geological storage of carbon dioxide
Renewable Energy Sources and Climate Change Mitigation	2011	Recommended by IPCC Scoping Meeting
Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation	2012	The Government of Norway and the United Nations International Strategy for Disaster Reduction
Global Warming of 1.5°C	2018	COP 21 of UNFCCC
Climate Change and Land	2019	Based on input from IPCC member countries
The Ocean and Cryosphere in a Changing Climate	2019	Based on input from IPCC member countries

B. Table 2 – Summary of Government Feedback on Alignment with Global Stocktake

		Reason for Preference	Other Key Considerations
Prefer 5 Year	Brazil	Effectively contributes to ambition raising. Tends to align with needs of various stakeholders who are aligned with GST schedule. Most cost effective.	Consider only one SR per cycle or SRs and Technical Reports in alternating cycles. Concern that 10-year cycle would reduce IPCC exposure and result in outdated reports.
	Chad	Climate change is happening quickly.	People will forget IPCC if reports are infrequent.
	Liechtenstein	New science will be available for GST and shorter cycle will reduce number of publications considered.	10-year cycle would lead to outdated information.
	Mauritius	Will help to ensure appropriate decisions at COP (cites role of AR5 <sup>187</sup> in creation of Paris Agreement).	Keeping 7-year cycle would lead to coordination complications and result in too many documents for UNFCCC to review. Could support 10-year cycles as long as update report is comprehensive.
	Mexico	Climate science is dynamic and evolving and a 5-year cycle seems feasible.	5-year cycle might require additional resources. 5-year cycle would reduce need for Special Reports on rapidly evolving topics.
	Spain	Would provide most up-to-date science.	7-year cycle would require extra parallel effort that could be better devoted to shorting cycle to 5 years. Should limit SRs to two per cycle.
	Togo		

187. Comment refers to AR4, but based on context it is likely AR5 was intended.

		Reason for Preference	Other Key Considerations
Prefer 10 Year	Turkey	Best align with GST and cycles can overlap. 10 years is too long and 7 does not align with GST.	
	Australia	Most flexible and least costly (5-year would be too costly, 7-year too complicated and inconsistent).	Typical Assessment Report might not be best input to GST.
	Ecuador	The current cycle is almost ten years anyway and it would be better to align with the GST. Can use SR1.5 as a model for how to provide input to GST.	5-year cycle is inadvisable because science needs more time to develop and assessment process requires more than 5 years. 7-year cycle would require complex parallel processes.
	Singapore	Also open to 5-year cycle. Opposed to 7-year cycle because it would be difficult to synchronize processes. 5-year cycle would be optimal for allowing IPCC reports to feed into GST and for outputs from GST to inform IPCC reports, but would increase workload and could undermine rigor of assessments. 10-year cycle with update would address these concerns.	10-year cycle would require flexibility if new UNFCCC needs arise mid-cycle. Need to consider whether 10-year term for IPCC officials is acceptable.
	Swaziland	5-year cycles would need to overlap which would be difficult for authors. 7-year cycles would make it more challenging to contribute to GSTs.	UNFCCC processes are not internally aligned, with biennial updates and national communications every 4 years.

		Reason for Preference	Other Key Considerations
Prefer 7 Year	Canada	Allows flexibility. Updates could be modeled on 1992 Supplemental Report.	GST details not yet determined. Could always reassess after first GST. 5-year cycle would increase strain on scientific community and limit opportunity for SRs. 10-year cycle could limit responses to rapidly changing areas of science and would increase volume of research to consider in each AR.
	China	Existing process has been effective at ensuring the quality and influence of IPCC reports.	Importance of rigorous process.
	Croatia		Open to other options.
	Cyprus	Other options are too long or too short.	
	Iraq		Emphasis on developing country representation.
	Republic of Korea	Concern that 5-year cycle would overburden scientists, IPCC officials, governments, etc., and that 10-year cycle would not keep up with new science.	
	Republic of Tanzania	Unclear. Cites decision made at end of Fifth Assessment Cycle.	
Slovak Republic			

		Reason for Preference	Other Key Considerations
More Consideration Required	Switzerland	Changes not really needed until after Seventh Assessment Cycle. If Seventh Assessment Cycle begins in 2020, it can be complete for 2028 GST without changing cycle length. Based on experience with the first two GSTs, necessary changes can then be made.	Focus should be on providing best available science to GST rather than on cycle alignment. Need to avoid undermining quality and credibility.
	Argentina	GST details not yet determined.	IPCC should consider stakeholders beyond GST. 10-year term for IPCC officials may be too long.
	Belgium	GST details not yet determined. GST support is only one IPCC objective and broader consideration of IPCC future is required.	Financial Constraints. Chance to learn from SR1.5.
	Denmark	IPCC contribution to GST is a broader conversation than just the question of cycle alignment. Since AR6 is aligned with first GST, decision is not urgent.	Need to support both UNFCCC processes and maintain the independence and integrity of IPCC. Can learn from how the IPCC SR1.5 feeds into the UNFCCC Talanoa Dialogue. Need more consideration of budgetary impact and procedural changes required by each option.
	Estonia	GST details not yet determined.	Need to support both UNFCCC processes and maintain the independence and integrity of IPCC. Can learn from how the IPCC SR1.5 feeds into the UNFCCC Talanoa Dialogue.
	European Union	Need to determine number and types of reports to be produced to inform GST and maintain independence and authority.	Need more consideration of budgetary impact and procedural changes required by each option. Can learn from experience of Talanoa Dialogue and reception of SR1.5.

	Reason for Preference	Other Key Considerations
France	France is a co-chair of the Task Group and does not wish to express an opinion.	Need to consider impact on IPCC production, organization of cycles, budget, and procedure.
Germany	More time needed for careful consideration.	Need to maintain the independence and integrity of IPCC. Needs to work for the scientific community. Should consider only AR7 and the second GST to allow flexibility beyond 2028.
Hungary	Need more fully elaborated options. Will have more information after Talanoa Dialogue and COP 24.	Should prioritize provision of best available science to UNFCCC, taking into account budgetary and procedural impacts.
Indonesia		
Ireland	This is an important decision that deserves more consideration.	Should review lessons learned over past 30 years to determine how to effectively support GSTs while maintaining the integrity and authority of the IPCC. This includes reviewing: current AR process and possible streamlining, process for SRs and for GHG accounting and reports, past communications with the UNFCCC.
Japan	Insufficient information to determine whether changes would pose risks to the quality of IPCC reports.	Need to consider budget, feasibility, and consistency with cycles of scientific research. Need to consider effect of extra Special Reports associated with keeping a 7-year cycle on author workload, development of other Special Reports, etc. Should consider lessons learned from SR1.5 and Talanoa Dialogue.

	Reason for Preference	Other Key Considerations
Luxembourg	Broader alignment needed in order to deliver reports fit for purpose to GST. Should consider adapting structure and principles of IPCC to achieve alignment.	Need to support both UNFCCC processes and maintain the independence and integrity of IPCC. Impact on scientific community. Budgetary impact. Experience with Talanoa Dialogue, SR1.5, and COP 24.
Netherlands	More time needed for careful consideration. Cycle length proposals should be combined with proposals for IPCC products.	Importance of IPCC's reputation as a leading scientific authority. Need to consider impact on IPCC production, organization of cycles, budget, and procedure.
New Zealand	Need more information on implications of options. Should wait for completion of Special Reports currently in progress.	5-year cycle may require additional resources and could create the perception that report is only for GST. 10-year cycle would create long time commitments for IPCC officials. 7-year cycle would require the least change.
Norway	Much broader discussion needed than simply choosing cycle length. Need to consider alignment with IPCC principles and procedures.	Important to clearly communicate to UNFCCC that IPCC will provide necessary information for GST. Downtime between cycles should be eliminated. Lessons should be learned from Talanoa Dialogue and reception of SR1.5.
Republic of Azerbaijan	May indicate slight preference for 5-year cycle but unclear. Other options appear acceptable as long as there is an IPCC report to inform the GST.	
United Kingdom	Insufficient information and possibility of other options.	Important to consider IPCC relevance to all stakeholders, including but not limited to the UNFCCC.

*C. Acronyms and Abbreviations*

AGGG	Advisory Group on Greenhouse Gasses
AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
AR6	Sixth Assessment Report
BECCS	Biomass Energy with Carbon Capture and Sequestration
CDKN	Climate Development Knowledge Network
COP	Conference of the Parties
GHG	Greenhouse Gas
GST	Global Stocktake
ICAO	International Civil Aviation Organization
ICSU	International Council for Science
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
LTGG	Long-Term Global Goal
LULUCF	Land Use, Land-Use Change, and Forestry
NDC	Nationally Determined Contribution
RCP	Representative Concentration Pathway
SBSTA	Subsidiary Body for Scientific and Technological Advice
SED	Structured Expert Dialogue
SREX	Special Report on Managing Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
SRREN	Special Report on Renewable Energy Sources and Climate Change Mitigation
SR1.5	Special Report on Global Warming of 1.5°C
TFI	Task Force on National Greenhouse Gas Inventories
TSU	Technical Support Unit
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization