
Climate Solutions Big Bet: 2019 Annual Report

Spring 2020

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MacArthur
Foundation

Prepared by:

Grassroots
SOLUTIONS

In collaboration with:



PROTAGONIST



Acknowledgements

Grassroots Solutions deeply appreciates the opportunity to prepare this report. It has been a privilege working with the MacArthur Foundation as the evaluation and learning partner for the Climate Solutions Big Bet. The contents of the 2019 Annual Report reflect the efforts of a team of people that spans multiple geographies and continents. That team is led by Lindsay Hanson, Christina Kuo, Courtney Lee, and Grace Bouwer from Grassroots Solutions working in collaboration with Tom Novick from M+R Strategic Services (M+R).

Others assisted with data collection and analysis and provided technical inputs that helped us to assess progress, changes in the 2019 landscape, and the Foundation's contribution in the U.S., Indian, and Chinese contexts. Specifically, we want to acknowledge:

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Also, we are grateful to the Climate Solutions Core Group and Office of Evaluation for their time and involvement to help ensure that this report and other products we develop are as timely and relevant as possible to meet the Foundation's evolving information needs.

Finally, we thank the Climate Solutions grantees working to address the defining challenge of our time. In 2019, they provided substantial data and insights—including through grant reports, annual surveys, interviews, small-group discussion, grantee convenings, and research—which are reflected in the findings and conclusions presented.



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The 2019 Annual Report was commissioned by the MacArthur Foundation; however, its contents do not necessarily represent the views of the Foundation.

The MacArthur Foundation seeks impact, including policy change, in accordance with identified goals and subject to legal limitations imposed on private foundations by law. Ongoing evaluation by a learning partner is integral to the Foundation’s work throughout the strategy life cycle. Periodic deliverables are issued to track progress in advancing climate-friendly policies toward the Foundation’s desired outcomes and to assess impact.

Grantees also receive funds from other sources and attribution of results or impact to specific sources of funds is not generally possible. The Foundation carefully reviews proposed grants to be sure that grant funds are used only for permitted purposes. No Foundation grant funds were used to influence legislation except as permitted by applicable regulations and the grant agreements. No Foundation grant funds were used by grantees to participate in any political campaigns.

As permitted by law, on occasion the Foundation made general operating support grants to eligible organizations that were not earmarked for lobbying but that could be used for lawful advocacy purposes as determined by the organization. Also, Foundation funds may have been appropriately used for other lawful advocacy and educational purposes, including nonpartisan analysis and research as permitted under the grant agreement.



Introduction



Purpose and Contents of the Report

Since 2016, Grassroots Solutions, with assistance from M+R and other contributors, has partnered with the MacArthur Foundation to evaluate its theory of change and strategy for the Climate Solutions Big Bet. As the evaluation and learning partner, Grassroots Solutions is responsible for providing feedback about the Foundation’s emerging strategy, measuring progress, and offering constructive critiques to inform decisions and refinements made by the Foundation. More

specifically, we are tasked with implementing activities that will allow the Foundation to measure impacts and outcomes, track developments in global- and country-specific contexts, frame challenges, and identify opportunities as they arise.

To meet the Foundation’s evolving information needs, each year we produce three types of products:

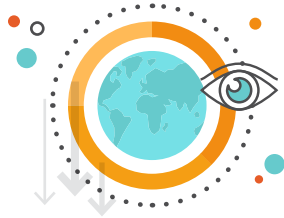
- Annual reports
- Quarterly status updates and technical briefings
- Evaluation management and process deliverables such as work plans

The purpose of this annual report is to facilitate learning and action. This report builds on the 2018 Annual Report and the 2014-2017 Climate Solutions Big Bet Baseline and Landscape Report. In it we explore findings about progress toward the Foundation’s desired impacts and outcomes, changes in the broader landscape that could help or hinder the Foundation’s work, and, to the extent possible, the contribution of the Foundation’s strategy in promoting leadership and climate solutions. Also, we document refinements to the Foundation’s theory of change.

It is important to acknowledge that this report, like previous annual reports, represents a snapshot in time. Contexts and conditions continue to rapidly evolve in ways that could affect the Foundation’s strategy. In the conclusion, we reflect on the relevance of the Foundation’s theory of change based on what we learned in 2019 as well as key developments in early 2020. Going forward, Grassroots Solutions will continue to provide quarterly status updates and technical briefings to help the Foundation understand emerging trends and opportunities in as close to real time as possible.

We hope the 2019 Annual Report provides useful insights to inform appropriate adjustments to the design and implementation of the Climate Solutions Big Bet. We are always eager for feedback from the Foundation, its grantees, advisors, and funder partners about what would make future reports more useful as learning tools and complementary to other research and information available to the Climate Solutions team and its collaborators.

1 | About the Climate Solutions Big Bet



Relevant Background

The world is experiencing the disruptive effects of climate change. The principal cause is the accumulation of atmospheric CO₂ and other heat-trapping substances emitted by the burning of fossil fuels for energy production and the increasing use of land in ways that limit its ability to absorb greenhouse gases. There is scientific consensus that allowing the earth's temperature to rise more than two degrees Celsius above pre-industrial levels will cause significant and ever-increasing negative impacts around the world such as rising seas, severe droughts, and food and water insecurity. Indeed, many of these negative impacts are happening now, when global temperature rise is still below 1.5 degrees Celsius.

Three countries are responsible for a large share of global emissions: the U.S., China, and India. Historically, the U.S. has been the largest emitter. China is currently the world's largest emitter, and India's emissions are increasing rapidly. The working theory of change (explored further in Section 2 of this report) is that the U.S., India, and China must lead the world's efforts to address climate change. Each nation will have its own style, approach, advances, setbacks, and goals, though collectively they must ensure a steep decline in current and future greenhouse gas emissions within the next decade. If these three nations exert leadership on climate change, then other nations will be compelled to act, and humanity will be on a path toward ensuring global temperature rise stays well below two degrees Celsius.

In October 2018, the Intergovernmental Panel on Climate Change, which is the United Nations body for assessing the science related to climate change, released a special report on the impacts of global warming. The report painted a dire picture of the immediate consequences of climate change. Limiting global warming will require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. For example, global net human-caused emissions of CO₂ will need to fall by approximately 45% from 2010 levels by 2030.¹ When world leaders gathered in Madrid in December 2019 for the twenty-fifth session of the Conference of the Parties, the assessment issued by the United Nations was that greenhouse gas emissions were still rising dangerously and even deeper cuts will be required.² If urgent climate action is not taken now, then temperatures could increase by more than three degrees Celsius by the end of the century.

In 2019, a groundswell of climate activism made global headlines. Millions of young people on every continent fueled a wave of strikes, demonstrations, and protests demanding urgent action.³ More than 1,000 localities declared states

¹ Masson-Delmotte, V., Zhai, P., & Pörtner, H.-O. (2018). Global Warming of 1.5°C. Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/sr15/>

² UN Climate Change Conference. (2019, December 2). Retrieved from <https://unfccc.int/cop25>

³ Taylor, M., & Watts, J. (2019, September 27). Climate crisis: 6 million people join latest wave of global protests. <https://www.theguardian.com/environment/2019/sep/27/climate-crisis-6-million-people-join-latest-wave-of-worldwide-protests>

of “climate emergency,” including New York City, and extreme climate-related weather events displaced millions of people in India and elsewhere.⁴ According to the Yale Program on Climate Change Communication’s November 2019 survey, in the U.S., nearly six in ten (58%) Americans are now either “Alarmed” or “Concerned” about global warming. From 2014 to 2019, the proportion of “Alarmed” nearly tripled.⁵ In addition, despite a lack of new government policies to dictate corporate action on climate change, more than 20 multinational companies made new commitments to use renewable energy for their electricity.⁶

At the same time, increasing momentum to advance climate solutions was countered by backlash and the persistent challenge of well-resourced opposition. Opponents include a savvy network of think tanks, advocacy organizations, trade associations, and others supported by conservative funders and companies. Prior to the launch of the Foundation’s Climate Solutions Big Bet, Drexel University sociologist Robert Brulle examined the funding behind the climate denial movement. He found that the “91 think tanks and advocacy organizations and trade associations that make up the American climate denial industry pull down just shy of a billion dollars each year, money used to lobby or sway public opinion on climate change and other issues.”⁷ In 2019, opponents attempted to discredit the direness or urgency of climate change by portraying advocates as hysterical, insincere, or hypocritical. They cast doubt on the science through various techniques (e.g., claims of scientific bias, lack of scientific consensus, the notion that earth’s temperatures have been naturally changing throughout history, etc.) and posited that humans’ contributions to climate change are uncertain and unquantifiable.⁸

The findings and conclusions in this 2019 Annual Report about progress toward the Foundation’s desired outcomes and impacts, the contribution of its strategy, and implications for the Foundation’s theory of change are presented with this background in mind.

Overview of the Foundation’s Climate Solutions Portfolio

To ensure that global temperature rise stays well below two degrees Celsius, the Foundation is supporting and promoting effective leadership and climate solutions. From 2014 through 2019, the Foundation awarded 157 grants to 90 organizations totaling approximately \$302 million dollars. It has directed 72% (\$218 million) of its portfolio to supporting work in the U.S., 13% (\$39 million) to India, and 4% (\$10.3 million) to China. The remaining 11% included support for efforts to pass and implement the Kigali Amendment to the Montreal Protocol and exploratory grants

⁴ Barnard, A. (2019, July 5). A ‘Climate Emergency’ Was Declared in New York City. Will That Change Anything? *New York Times*. <https://www.nytimes.com/2019/07/05/nyregion/climate-emergency-nyc.html> and Calma, J. (2019, December 27). 2019 was the year of ‘climate emergency’ declarations. <https://www.theverge.com/2019/12/27/21038949/climate-change-2019-emergency-declaration>

⁵ Goldberg, M., Gustafson, A., Rosenthal, S., Kotcher, J., Maibach, E., and Leiserowitz, A. (2020). For the first time, the Alarmed are now the largest of Global Warming’s Six Americas. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.

⁶ Source: “Some corporations step up climate action as government policies stall.” September 24, 2019. <https://www.washingtonpost.com/climate-environment/2019/09/24/some-corporations-step-up-climate-action-government-policies-stall/>

⁷ Source: “Meet the Money Behind The Climate Denial Movement.” *Smithsonian.com*. December 23, 2013. <https://www.smithsonianmag.com/smart-news/meet-the-money-behind-the-climate-denial-movement-180948204/#ZLvQfUOqtRkJ2y1.99>. Read more: <https://www.smithsonianmag.com/smart-news/meet-the-money-behind-the-climate-denial-movement-180948204/#EcELyEUw0fKIITFd.99>

⁸ Source: Narrative Analytics--Narrative Refresh: U.S. Climate Change Discourse. Protagonist. May 2019.

related to carbon pricing.⁹ In 2019, 68% of the Foundation’s active grants supported work in the U.S., 15% in India, and 4% in China. The remaining 13% supported efforts designed to bolster the leadership of these three countries but were not limited to work within their borders.¹⁰

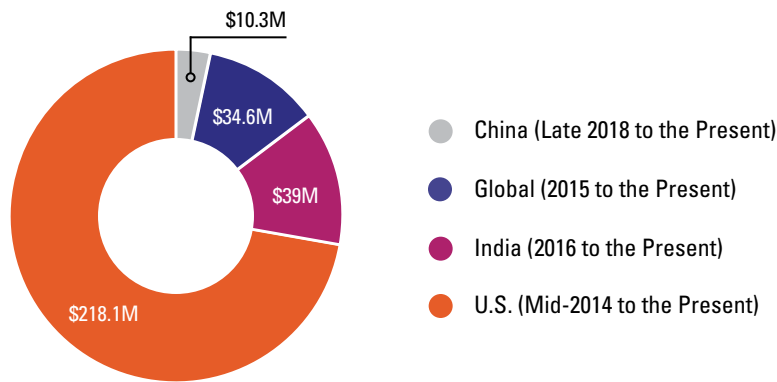


Figure 1: Climate Solutions Grants: 2014 to 2019, in U.S. dollars

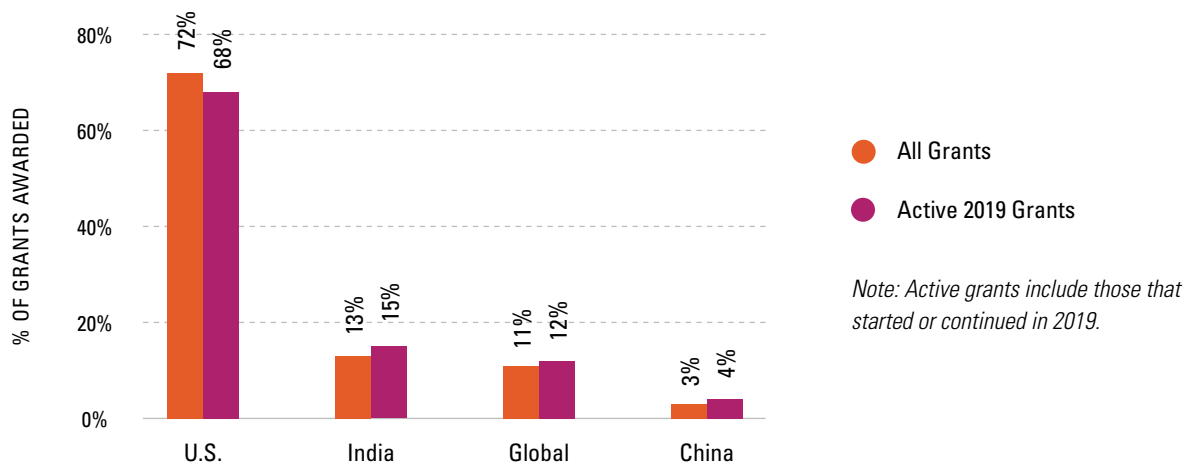


Figure 2: Climate Solutions Active 2019 Grants Compared to All Grants Since 2014

⁹ The Kigali Amendment to the Montreal Protocol will bring about a global phase-down of HfCs. In 2019, the Foundation continued to work with other climate funders as part of the Kigali Cooling Efficiency Program. Together they have pledged more than \$50 million to improve the energy efficiency of cooling and refrigeration equipment, lower cooling demand while improving access to cooling technology in developing countries, and to promote market innovations to spur adoption of climate-friendly coolants. The U.S., India, and China are all involved, and it is an illustration of climate leadership. The Kigali Cooling Efficiency Program is the subject of a separate evaluation. The findings from that evaluation will be assessed in concert with other data we are tracking and analyzing.

Creating and expanding markets for carbon has also been a core component of the Foundation’s leadership strategy. The Foundation’s position has been that carbon pricing plays a crucial role in lowering carbon dioxide emissions and facilitating a global transition toward a low carbon economy. In addition to its grantmaking in each country-specific context, the Foundation has explored opportunities to enact carbon pricing around the world to advance support for carbon pricing policies.

¹⁰ Source: Climate Solutions_All Previously Awarded Briefs. MacArthur Foundation, January 2, 2020. Active grants include those that started or continued in 2019.

Since the launch of the Climate Solutions Big Bet, the Foundation’s grants have largely supported activities associated with two approaches: advancing climate-friendly policies and regulatory action and altering political discourse. The remainder of the Foundation’s grants support activities aimed at broadening the climate solutions coalition and improving partnerships, expanding funding opportunities and the climate solutions philanthropic community, and creating or expanding markets for carbon.¹¹ The composition of the grant portfolio since 2014 and active grants in 2019 are shown in the graphs that follow.

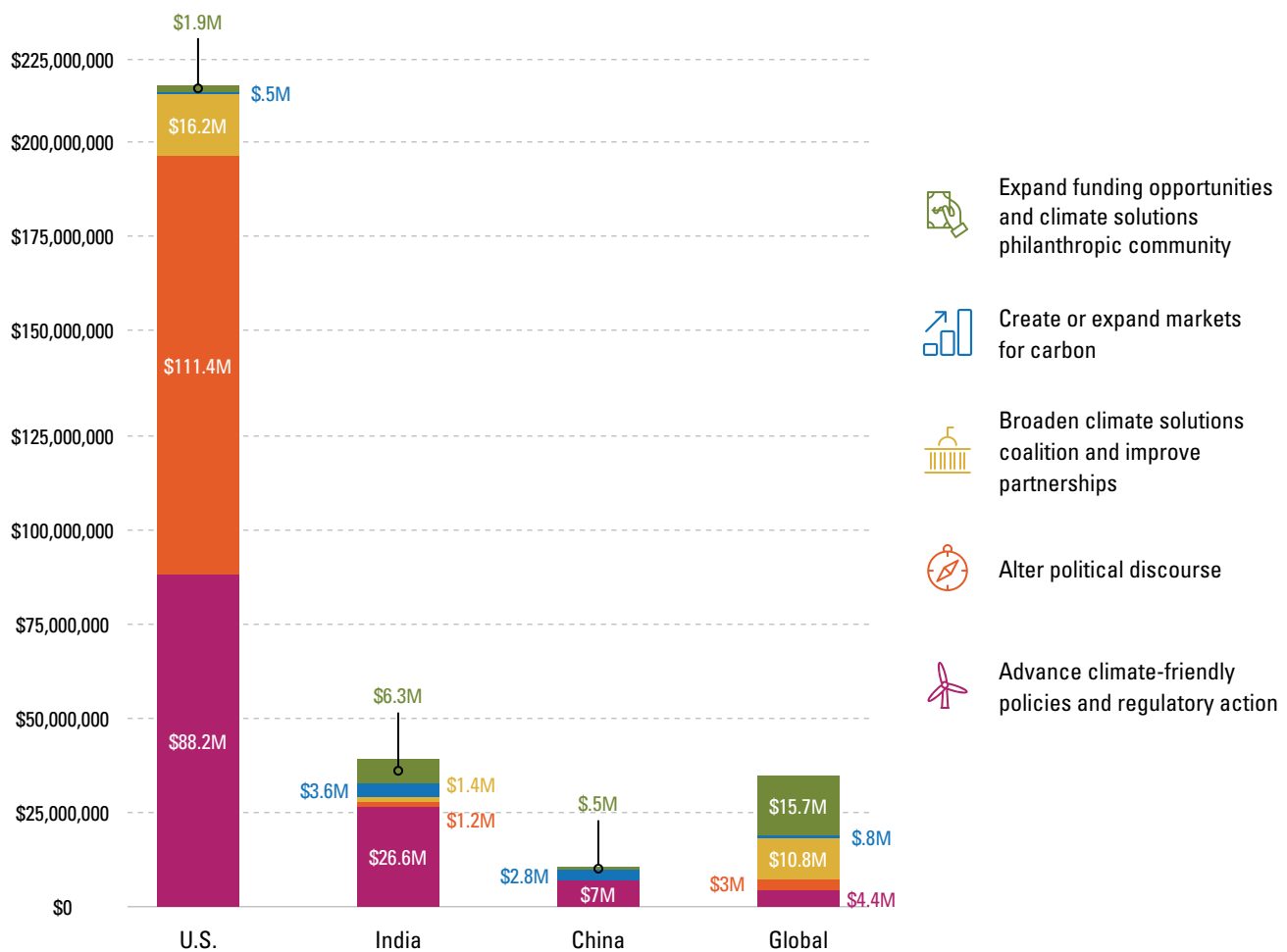


Figure 3: Climate Solutions Portfolio by Approach - All Grants, in U.S. dollars

Note: The grants are coded based on the primary approach each grantee is advancing, but several organizations are undertaking a variety of activities to promote climate solutions that could be categorized under multiple approaches.

¹¹ Source: Climate Solutions_All Previously Awarded Briefs. MacArthur Foundation, January 2, 2020.

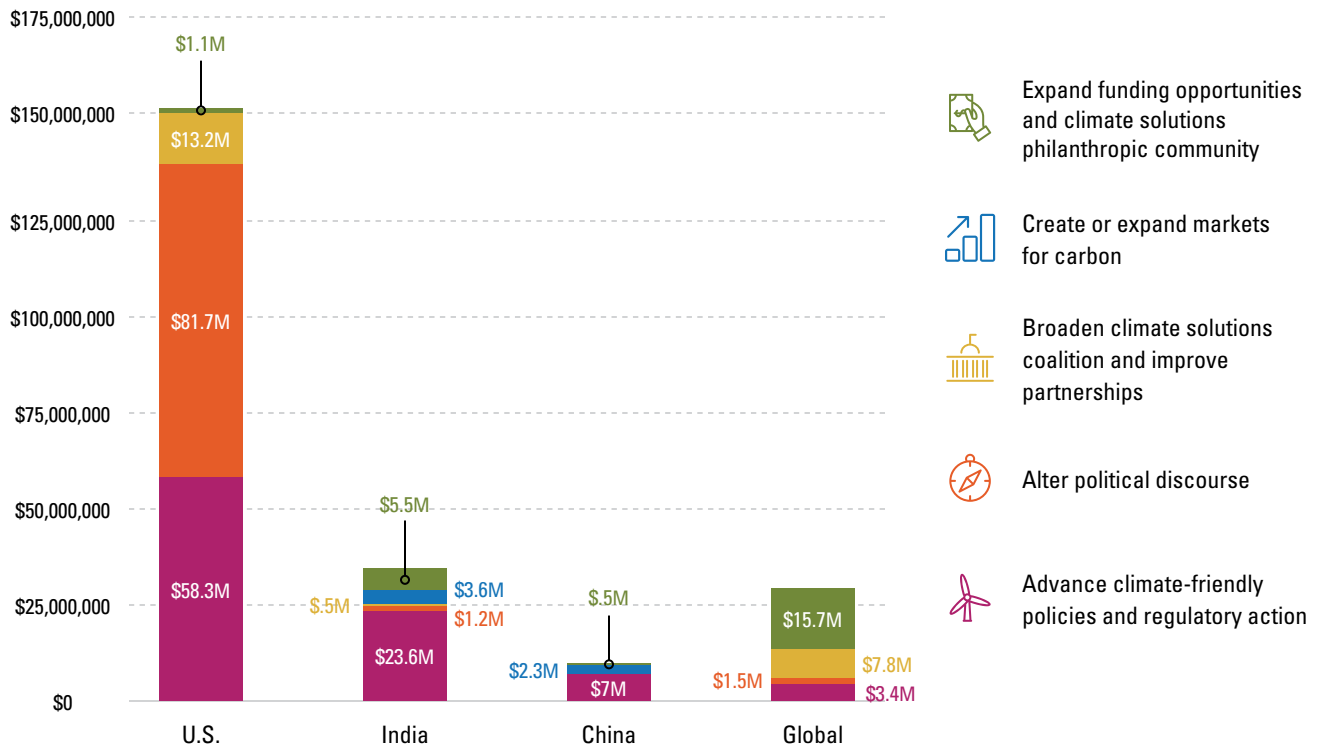


Figure 4: Climate Solutions Portfolio by Approach - Active 2019 Grants, in U.S. dollars

Note: The grants are coded based on the primary approach each grantee is advancing, but several organizations are undertaking a variety of activities to promote climate solutions that could be categorized under multiple approaches.

It is worth noting that the breakdown by approach in each country-specific context varies from the totals shown in the previous illustrations. Since 2015, most U.S. grants were awarded to organizations focused on altering political discourse (\$111.4 million), followed by \$88.2 million to advance climate-friendly policies and regulatory action, \$16.2 million to broaden the climate solutions coalition and improve partnerships, and the remainder to create or expand markets for carbon and expand funding opportunities and the climate solutions philanthropic community. Since 2016, approximately \$27 million of the Foundation's grants in India have supported the advancement of climate-friendly policies and regulatory action, followed by \$6.3 million to expand funding opportunities and climate solutions in the philanthropic community, \$3.6 million to create or expand markets for carbon, \$1.2 million to alter political discourse, and \$1.4 million to broaden the climate solutions coalition and improve partnerships. In 2018, the Board of Directors approved initial grants in China. To date, approximately \$7 million of the Foundation's grants in China have supported the advancement of climate-friendly policies and regulatory action, followed by \$2.8 million to create or expand markets for carbon. The remaining grants support efforts to expand funding opportunities and the climate solutions philanthropic community.

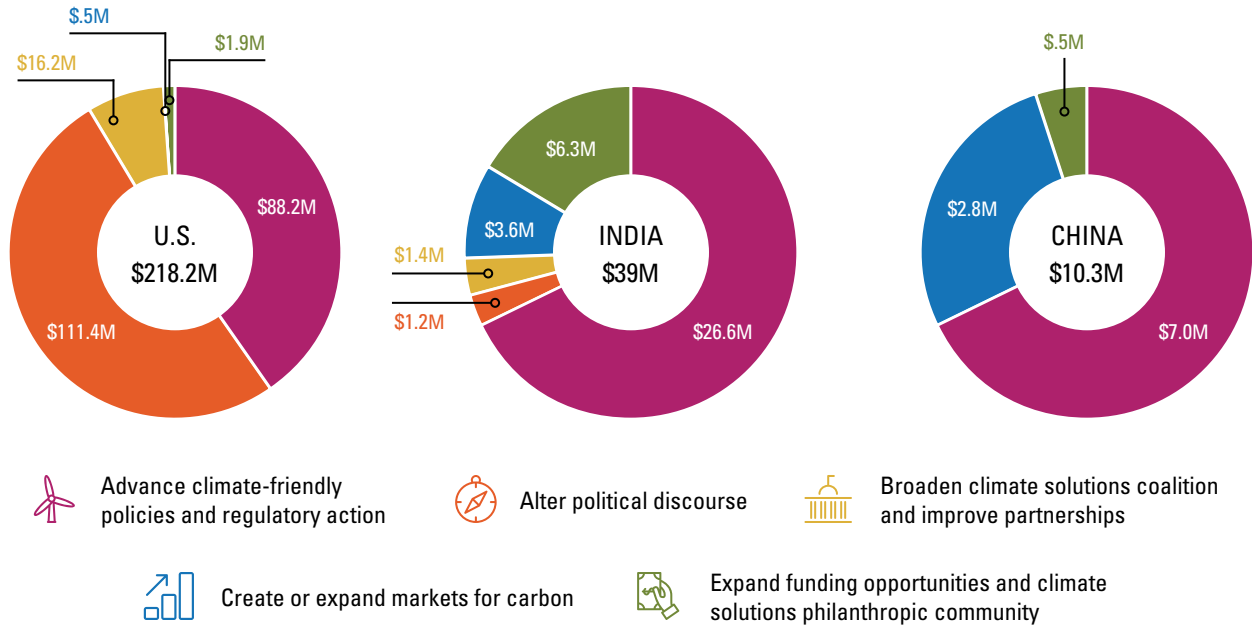


Figure 5: Climate Solutions U.S., India, and China Portfolios by Approach - All Grants, in U.S. dollars

In addition, climate financing is part of the Foundation’s approach to expanding funding opportunities in the climate solutions philanthropic community, which it hopes will contribute to catalyzing renewable energy production, particularly rooftop solar in India.

2 | Theory of Change



Goal and Pathway to Change

Ensuring that global temperature rise stays well below two degrees Celsius over pre-industrial levels—the science-based threshold to avoid catastrophic climate change—is the overall goal of the Foundation’s Climate Solutions Big Bet. The pathway to achieve that goal is based on the premise that if the U.S., India, and China exert global leadership on climate change, then other nations will be compelled to act. Leadership can come from government, the private sector, and civil society. It will be demonstrated through policies, actions, and investments in the U.S., India, and China that:

- Decrease the carbon-intensity of their respective economies
- Reduce greenhouse gas emissions (e.g., CO₂, methane, and HfCs)
- Build political will and public demand for climate solutions

The theory of change accounts for the fact that each nation’s leadership will ebb and flow as each country faces social, economic, and political pressures to moderate the pace of implementing and sustaining significant greenhouse gas emissions reductions in their respective economies. At the same time, based on the most relevant science, the theory of change posits that at least these three countries must begin to implement policies, take actions, and encourage investments that significantly accelerate greenhouse gas emission reductions by no later than 2025.

Linked to the high-level pathway to achieve the Foundation’s goal are theories of change for the U.S., India, and China. The Foundation’s U.S. theory of change is that sufficient U.S. leadership will provide credibility and standing to influence and facilitate developing countries to act. To maintain its global climate leadership over the next five years the U.S. must:

- Accelerate its own reductions in greenhouse gases
- Build the political will to advance solutions to climate change
- Promote a less carbon intensive global economy

In India, the Foundation’s theory of change is predicated on the country stepping forward as a world climate leader by:

- Reducing greenhouse gas emissions, while also achieving development goals
- Embedding climate change prominently in public discourse
- Pioneering a sustainable, inclusive growth model

In China, the Foundation seeks to ensure that Chinese leadership on climate change is robust, durable, and global. China’s handling of its own emissions and how its domestic and foreign policy decisions affect emissions in other developing countries are viewed as critical elements of China’s climate leadership. The working version of the Foundation’s theory of change is predicated on the country demonstrating leadership by:

- Supporting a robust carbon emissions trading market
- Implementing environmental laws and regulations to incentivize a low-carbon economy
- Building bilateral relationships throughout Southeast Asia and information sharing about climate solutions
- Refashioning existing global trade, transportation, and financing institutions and systems and limiting the shift of greenhouse gas emissions to other regions and the world (e.g., through its broadly defined Belt and Road Initiative, China is embarking on a \$1 trillion effort to enhance energy, transport, and communications infrastructure spanning at least 60 countries across Asia, Europe, Africa, and Oceania)

Visual representations of the Climate Solutions theories of change are shown on the pages that follow.

A Note about Refinements to the Foundation's Theory of Change

At the time of writing, a context assessment focusing on key areas related to the Foundation's current strategy in China was just getting underway. At the highest level, the purpose of the assessment is to help the Foundation understand outside influences on its strategy and whether its initial grantmaking is gaining traction. The primary focus of the assessment is on an Emissions Trading Scheme, given its significance to the Foundation's programming in China, and the following areas of inquiry: 1) "how change happens," through the planning process around the Emissions Trading Schemes and, where possible, links to the 14th Five-Year Plan; 2) the role of western philanthropies; 3) the Foundation's current approach of regranteeing, and the opportunities and limitations of that approach; and 4) the Chinese government's level of ambition for the Emissions Trading Scheme as the Five-Year Plan is being developed. We anticipate that findings from the context assessment will inform refinements to the China theory of change in 2020.

Figure 6: *The Foundation's Theory of Change*

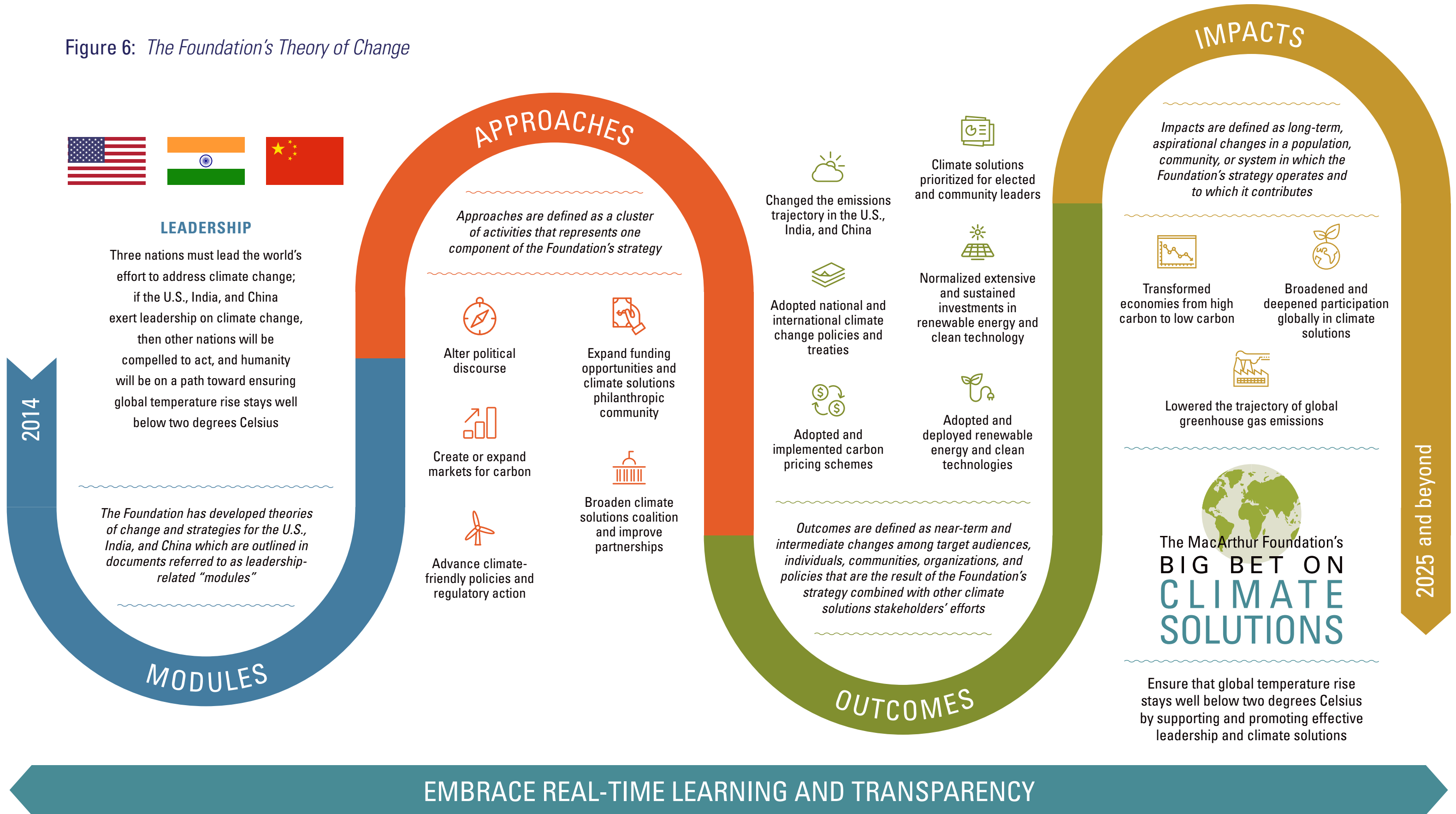


Figure 7: U.S. Theory of Change

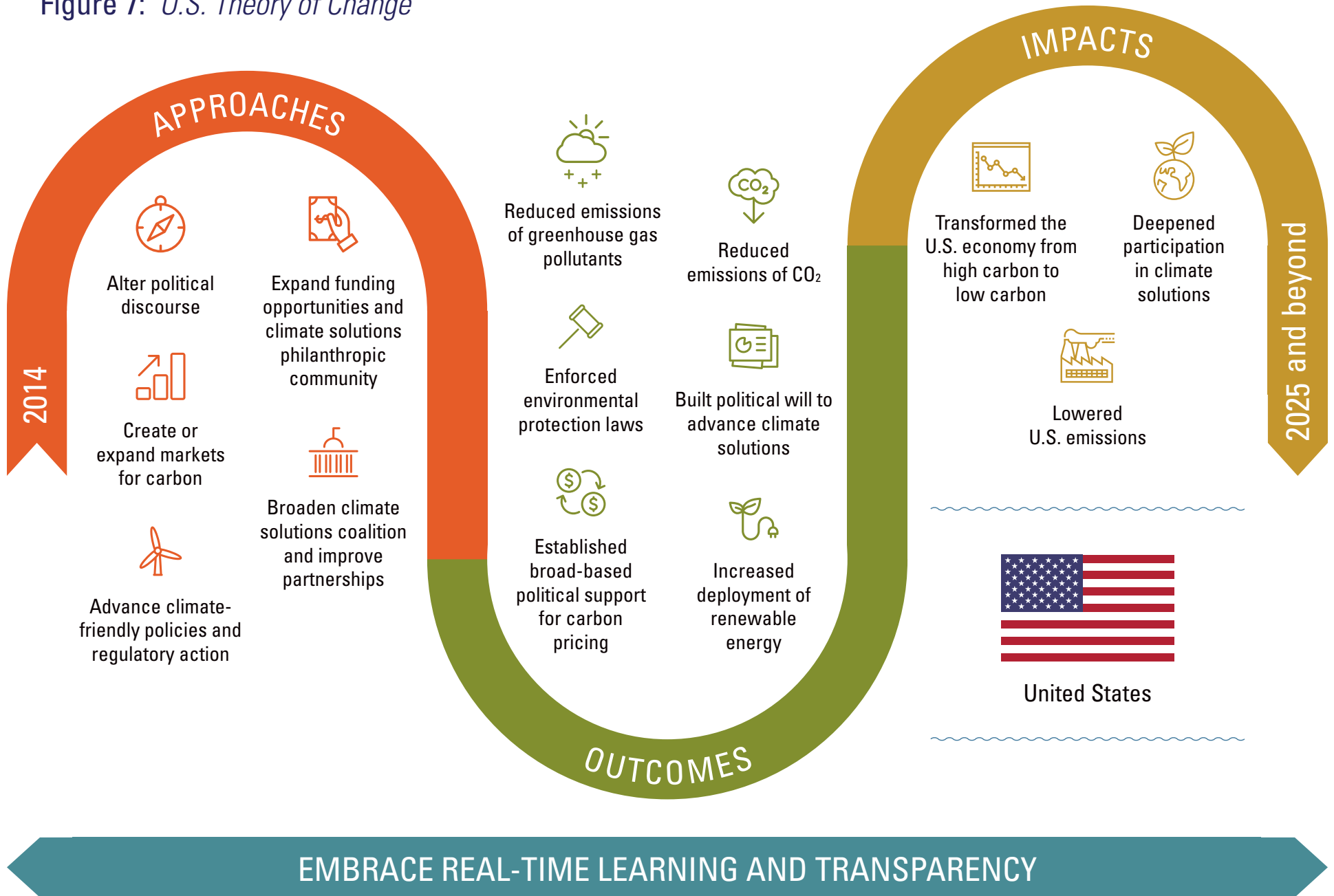
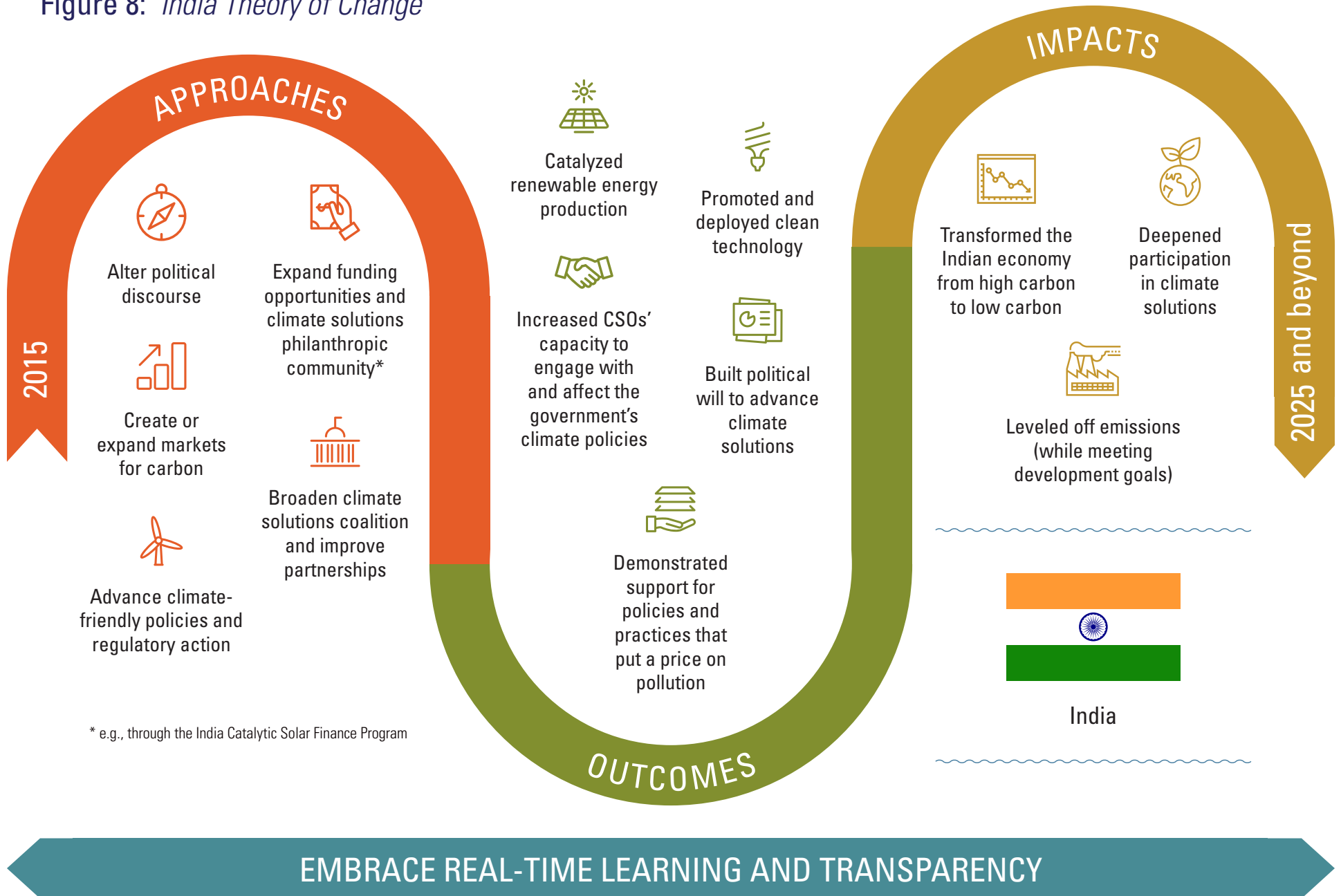
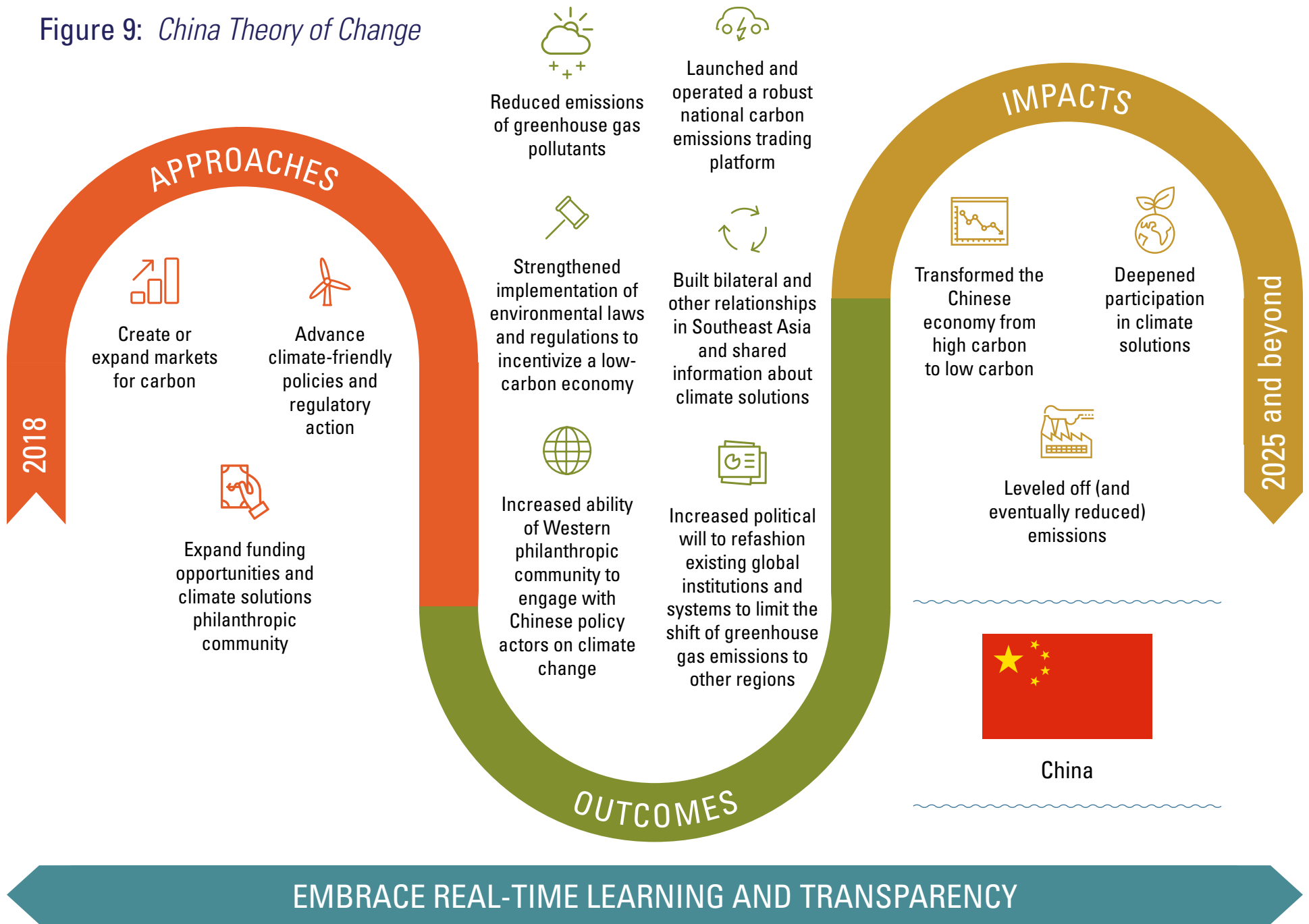


Figure 8: India Theory of Change



* e.g., through the India Catalytic Solar Finance Program

Figure 9: *China Theory of Change*



Relationship Between Approaches, Outcomes, and Impacts

Over the long term, the Foundation hopes that the sum of its efforts—along with the work of many others—will contribute to lowering the trajectory of global greenhouse gas emissions, broadening and deepening participation in climate solutions (i.e., more countries are more active in climate solutions and in more substantive ways), and transforming economies from high carbon to low carbon. To achieve these long-term impacts, the Foundation has identified a variety of near-term and intermediate outcomes that demonstrate leadership. These outcomes represent the sought-after results of the Foundation’s strategy, including:

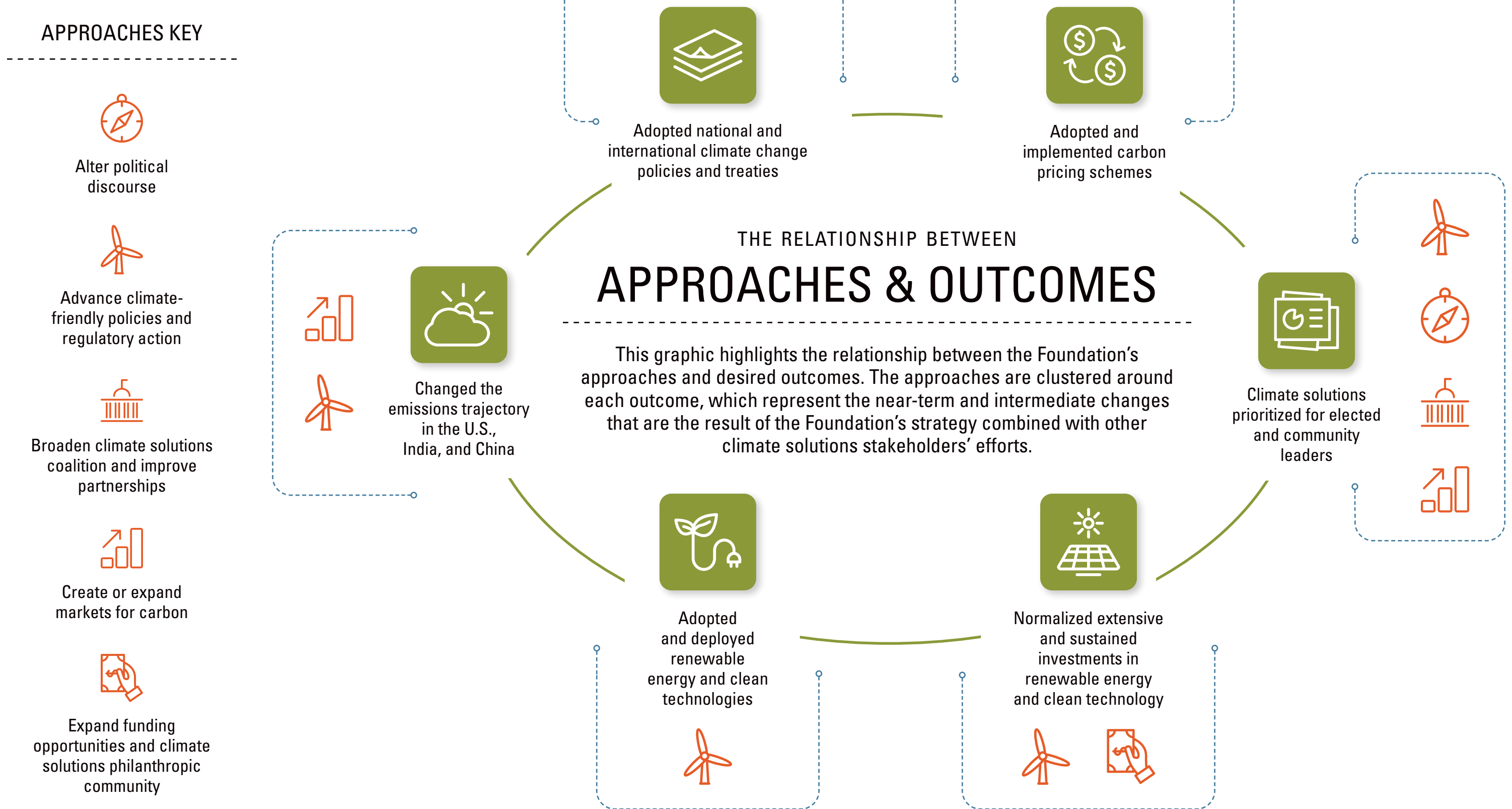
- Changes in the emissions trajectory in the U.S., India, and China
- The adoption of national and international climate change policies and treaties
- The adoption and implementation of carbon pricing schemes
- That climate solutions are prioritized for elected and community leaders
- Normalization of extensive and sustained investments in renewable energy and clean technology
- The adoption and deployment of renewable energy and clean technologies

The Foundation supports multiple approaches—clusters of activities that represent components of the Foundation’s strategy—to achieve its desired outcomes. They include:

- Altering political discourse
- Creating or expanding markets for carbon
- Advancing climate-friendly policies and regulatory action
- Expanding funding opportunities and the climate solutions philanthropic community
- Broadening the climate solutions coalition and improving partnerships

The relationship between the Foundation’s various approaches and desired outcomes at the initiative level is shown in the Figure on the following page.

Figure 10: Approaches and Outcomes Relationship



Country-specific mapping of the relationship between the Foundation’s approaches and desired outcomes was also done for the U.S. and India, and each approach has defined characteristics that guide the Foundation’s grantmaking. A preliminary map of approaches and outcomes for China will be informed by the context assessment completed in 2020. It is worth noting that while the relationship between the Foundation’s desired outcomes and longer-term impacts could be direct, there are other channels through which outcomes could shape impacts. For example, achieving one outcome could shape another outcome or there could be spillover effects.

Data Informing Strategy Adjustments

Since the launch of the Climate Solutions Big Bet, evaluation data, other research, and insights from grantees and advisors have informed adjustments to the Foundation’s strategy, grantmaking, and approaches it supports to achieve its desired outcomes. These data and information have also helped the Foundation decide when to stay the course. Some examples of adjustments or learning in action include, but are not limited to, the following:

- **Relationship between and among the U.S., India, and China:** When the Big Bet launched, the Foundation was primarily focused on the role of U.S. leadership. Today the Foundation’s Climate Solutions portfolio reflects an increased emphasis on the climate leadership of India and China.
- **Focus on candidate and policymaker discourse:** In March 2016, Grassroots Solutions worked with the Climate Solutions team to clarify that, although broad improvements across the full spectrum of climate discourse were important to promote solutions in the U.S., the Foundation’s main focus is federal and state policymakers and elected officials. With that backdrop in mind, then Grassroots Solutions helped the Foundation refine its theory of change to reflect that “building political will” is the Foundation’s desired outcome, and activities aimed at altering discourse are ways that the Foundation approaches building that will.
- **Engaging the center-right:** The Foundation does not support one ideological camp alone. The Climate Solutions team have used evaluation data and quarterly status updates to better understand messages and message frames that appeal to conservatives and Republicans and then provided grants to U.S. groups well positioned to engage conservatives around energy policy reforms.
- **Fostering collaboration among India grantees and working together to define success:** When the Big Bet launched in India, a prominent climate movement did not exist. As a first step, the Foundation sought to strengthen civil society’s ability to engage in legally permissible ways with the Government of India and state policymakers and do so collectively. In late 2019, the Foundation supported a convening where grantees worked together based on aligned interest and expertise to identify ambitious yet realistic milestones, how civil society could play a role, and what the grantees could achieve together. This information may inform refinements to the Foundation’s targets and desired outcomes.
- **Choosing to concentrate on energy-related emissions and strengthening support for subnational activities in the U.S.:** In both the U.S. and India, the Foundation’s grantees concentrate on reducing energy-related emissions. After both the 2016 and 2018 U.S. elections, some adjustments to the Foundation’s grantmaking were considered. For example, when Donald Trump was elected president in 2016, the U.S.’s leadership role on the international stage decreased. The Foundation could have allocated more resources to China but instead saw evidence of success at the subnational level as a strong reason to bolster support for subnational activities and defensive efforts to prevent rollbacks. In 2018, when the U.S. House of

Representatives flipped, the Foundation could have chosen to change its approach to supporting climate and energy issues at the federal level. Instead, the Foundation, using evaluation and other data, decided to continue supporting subnational activities to create the conditions and groundswell for federal action.

- **Air quality in India:** Record levels of air pollution in India have contributed to mounting public outcry in the country for action. The Foundation made some adjustments to its grantmaking in response to the crisis to encourage more engagement on climate change and make further inroads with policymakers around the topic of air quality to promote climate solutions.
- **Strategic communications:** In 2019, the Climate Solutions team decided to make strategic communications an explicit component of its theory of change. Beginning in 2020, the Foundation's Communications Department will support two approaches in the U.S. and India: altering political discourse and advancing climate-friendly policies. In the U.S., its activities are designed to help build political will for climate solutions. In India, they are intended to contribute to improving civil society organization's capacity to engage with and affect the government's climate policies. Once the theory of change for China has been refined, the Foundation will map institutional communications activities to the approaches it supports to achieve its desired outcomes.

Unknowns and Assumptions

At a high-level, energy and economic issues, changes in the political landscape, climate effects (such as drought and sea-level rise), grantee capacity, and unforeseen obstacles could all affect or undermine the Foundation's theory of change. In the U.S., well-resourced opponents and the outcome of the 2020 presidential elections create uncertainty. An unknown in India remains the actual, as opposed to perceived, influence of civil society organizations to affect the government's policies. In all three countries, economic volatility, social unrest, and trade disputes could have unknown consequences.

In addition, a variety of assumptions underpin the Foundation's theory of change and country-specific strategies. Fourteen have been identified by the Foundation so far, and twelve underpinned its original country-specific strategies for the U.S. and India. Assumptions are factors that the Foundation believed could influence the success of its strategy and wanted to test. Assumptions can be categorized as challenges or enabling factors. Especially in India, the assumptions originally identified by the Foundation were primarily contextual.



U.S.

- Americans are open to addressing climate change
- Most elected officials perceive voters as indifferent to climate policy action
- A carbon price is the most feasible solution to reduce CO₂ emissions
- Conservative support for national climate policy is essential
- A climate message must convey the problem and the solution
- The Clean Power Plan can incorporate disparate climate messages



India

- The Indian government is grappling with how ambitious its Nationally Determined Contribution is
- The usual avenues of Western-style philanthropic investment are not as robust in the climate and energy area
- Existing civil society capacity in energy and climate is mostly concentrated in New Delhi
- Indian states and cities need to be equipped to plan for low-carbon development and clean energy, but most Indian cities still lack many of the tools they need to provide low-carbon leadership
- Pledged funds from bilateral and multilateral development agencies have not been deployed because of a lack of policy clarity and underdeveloped renewables sector
- Policy and finance challenges are inhibiting the Indian government's ability to realize its goal of 40% solar capacity from grid-tied but distributed roof-top projects



China

- Promoting climate leadership in China will put competitive pressure on the U.S. to not be the global outlier
- China can seize the opportunity to lead on the international stage in part because of domestic pressure for improved quality of life
- A robust emissions trading scheme is the most feasible way to significantly reduce CO₂ emissions
- Surgical philanthropic investments can have an outsized impact

While not necessarily a formally-articulated assumption, after the Trump administration announced the U.S.'s withdrawal from the Paris Accord, the Foundation strengthened its support for state-based work in hopes that the U.S. could continue to make progress promoting climate solutions through the actions of subnational players and the private sector. Also, there was some speculation that the U.S. withdrawal from the Paris Accord could unleash other countries' pent-up ambition to take greater climate action.

In the findings that appear later in this report, we explore what we are learning about the Foundation's assumptions and the extent to which they have been affirmed, warrant refinement, or have been abandoned. In 2020, the Strategy Review provides an opportunity to revisit the Foundation's original assumptions and reflect on refinements or additions. Then the methodologies and measures described in the next section of the report can be updated, where applicable. This will ensure that the Foundation can test assumptions in a way that informs ongoing adaptations to the Foundation's theory of change and strategy.

3 | Evaluation Framework



Elements of the Framework

At the highest level, Grassroots Solutions’ role, with assistance from M+R and other contributors to data collection and analysis, is to evaluate the Foundation’s theory of change and answer two big-picture questions:

- How is the Foundation’s strategy contributing to promoting leadership and climate solutions?
- How are the Foundation’s strategy and its grantees adapting to work more effectively?

To answer these questions, we have adopted an evaluation and learning framework that comprises four types of activities related to measuring and tracking impacts, outcomes, the landscape, and how the work is progressing.

We think of these activities fitting together like puzzle pieces that will help the Foundation to:

- 1 | Better understand the ultimate contribution of its work
- 2 | Measure progress toward the specified results of the Foundation’s efforts that demonstrate climate leadership
- 3 | Better understand the contexts in which the Foundation’s work is taking place
- 4 | Identify and document what approaches are working well and what approaches need to be adjusted



Figure 11: Evaluation and Learning Framework

These four types of activities are being applied to evaluation and learning about the overall Climate Solutions initiative and the leadership-focused modules that have been developed for the U.S., India, and China. However, the way that they are applied is flexible and module- or country-specific, reflecting the different results the Foundation seeks and factors like the capacity of civil society organizations, the structure of the political systems, and more. Therefore, what is being measured and the way in which we are tracking progress and assessing the contribution of the Foundation's strategy in the U.S. is not the same as in India or in China.

Measuring Progress Toward Desired Impacts and Outcomes

As noted in the previous section of this report, the Foundation's theory of change details a pathway to ensuring global temperature rise stays below two degrees Celsius that is predicated on the leadership of the U.S., India, and China to achieve three aspirational changes: 1) lower trajectory of global greenhouse gas emissions, 2) broad and deep participation in climate solutions, and the 3) transformation of economies from high carbon to low carbon. To measure progress toward these long-term impacts, Grassroots Solutions is tracking:

- Changes in the trajectory of global emissions (CO₂, methane, HfCs, and more) and the trajectories of emissions in the U.S., India, and China
- Growth in the number of countries participating in the Paris Climate Accord and the quality of the commitments various countries make, including the U.S., India, and China
- Changes in the carbon intensity of the economy and global markets

To achieve its long-term impacts, the Foundation identified a variety of near-term and intermediate changes in the U.S., India, and China that demonstrate leadership. These outcomes represent the sought-after results of the Foundation's strategy. In the U.S., the Foundation's desired outcomes fit into five categories related to: 1) emissions, 2) political will, 3) policies and treaties, 4) renewable energy and clean technology, and 5) carbon pricing. In India, the Foundation has identified five outcomes that, if achieved, demonstrate leadership. These include catalyzing renewable energy production, increasing civil society organizations' capacity to engage with and affect the government's climate policies, promoting and deploying clean technology, building political will, and demonstrating support for policies and practices that put a price on pollution. In China, the Foundation has identified six desired outcomes related to emissions, political will, regional relationships, defense of environmental protections, the role of Western philanthropy, and carbon emissions trading.

Associated with the desired outcomes are multiple data points that we are tracking to understand and measure progress (See Appendix A). Baselines have been established for the U.S. (2012) and India (2015). Those data were presented to the Foundation in 2017. It is worth noting that some measures were updated in 2018 and others in 2019. For example, in the U.S., the Trump administration's repeal and replacement of the Clean Power Plan rendered some of the data points we were tracking moot. Instead, to assess progress in defending environmental protection laws, we are tracking the outcomes of litigation. To assess progress in building political will, in addition to examining changes in political and public discourse, we are tracking state-level policies aimed at reducing emissions of greenhouse gases. In India, climate financing is an important part of the Foundation's approach to expanding funding opportunities and the climate solutions philanthropic community. With that in mind, we are tracking some new measures to better assess progress and the Foundation's contribution to catalyzing renewable energy production. Others will likely be refined, deleted, or added in the coming year to reflect changes in the Foundation's emergent climate strategy and its evolving information needs for China.

In 2020, Grassroots Solutions will continue to work closely with the Foundation to further clarify the near-term and intermediate changes sought by the Foundation and help use evaluation data to maximize its impact in the U.S., India, and China. This process will likely include revisiting some indicators of progress, measures, and targets. For example, in October 2019, the Foundation hosted a convening where India grantees grappled with what it would take to significantly scale up efforts to build political will, expand and promote renewable energy and clean technology, and put a price on pollution. Grassroots Solutions facilitated a half-day workshop to grapple with changing contexts, progress, and ways that civil society organizations and cohorts of grantees could help achieve reasonable, yet more ambitious, milestones by 2022. Drawing on their subject matter expertise and work they were undertaking with support from the Foundation, in small groups grantees wrestled with identifying the kind of progress that is possible and strategies to achieve proposed milestones. The proposed milestones offered a positive, forward-thinking alternative to the barriers identified in the 2018 Annual Report. Each corresponded to the Foundation's desired outcomes in India. They were drawn from what we have learned about some of the biggest challenges to scaling up climate solutions in India and realizing more transformative change.

The proposed 2022 milestones were: 1) the distribution sector's financial health supports the promotion of renewables, 2) deployment of 40 gigawatts of rooftop solar, 3) widespread adoption of energy efficiency practices by small- and medium-sized industrial enterprises, 4) increased political interest in and commitment to introducing a carbon pricing regime, 5) widespread deployment of electric mobility solutions, and 6) urgent action taken by the government to address the sources and causes of air pollution. The rationale for selecting 2022 was that that year is linked to the government's renewable energy targets. We selected a year that was far enough out to encourage "big thinking," but near-term enough to provoke thoughtfulness about urgency. Together the grantees provided feedback about how appropriate or relevant the milestone was and proposed amendments or adjustments to the Foundation. Then they identified ways that civil society could contribute to progress and what grantees could do together.

Also, in 2019, after an extensive search, Grassroots Solutions engaged a firm with expertise in China to help further clarify successful entry points for the Foundation, better understand the landscape, and facilitate the Climate Solutions team's decisions about its theory of change and grantmaking.

Assessing the Foundation's Contribution

Grassroots Solutions has adopted tailored methodologies to assess the contribution of the Foundation's work that are specific to the approaches the Foundation is undertaking to achieve its desired outcomes in each country-specific context. Our goal is to assess the Foundation's contribution as rigorously as possible, recognizing that 1) establishing causal linkages is not the goal and would be virtually impossible, 2) the funding levels for each approach are not the same, and 3) some activities the Foundation is funding are more distinctive than others (i.e., there are fewer funders supporting the same activities). With that in mind, the assessments of some of the Foundation's approaches are intensive and "deep." In other cases, the assessments are lighter touch and "broad."

For example, the Foundation supports multiple approaches in the U.S., India, and China to achieve its desired outcomes. To assess the contribution of these approaches, we are analyzing a variety of data sources and employing various methodologies. As noted in the previous section of the report, one way the U.S. will demonstrate leadership is by building political will. To promote leadership in this area, the Foundation is supporting efforts to alter political discourse. In this instance, Grassroots Solutions enlisted Protagonist to help analyze the climate change narrative

landscape in the U.S.¹² With Protagonist's help, we are examining who the influencers are, how the narratives are shifting over time, and the ways that the Foundation's grantees appear in the narrative landscape. Protagonist's input into our analysis is supplemented by a review of self-reports from grantees, independently verifiable data, and other information such as opinion polling conducted by the Yale Program on Climate Change Communications and Gallup.

In India, to measure progress and assess the Foundation's contribution, we are working closely with Oxford Policy Management based in New Delhi to collect and analyze data at three levels:

- 1 | Grantees' self-reported activities and results (e.g., collected through annual surveys, interviews, and grant reports)
- 2 | Insights gathered through interviews with government stakeholders, third-party observers, or publications that can confirm or challenge the grantees' self-reporting
- 3 | Independently verifiable quantitative data, and where not available, qualitative information to fill key gaps¹³

The three levels of data are being applied in multiple ways. For example, one of the Foundation's desired outcomes is that civil society organizations' capacity to engage with and affect the government's climate policies is increased. To achieve that outcome, the Foundation is supporting activities to advance climate-friendly policies and broaden the climate coalition and partnerships with government. One indication of progress is that central and state governments look to civil society organizations as stakeholders and partners in the policymaking processes. To assess the contribution of the Foundation in this area, we are tracking the percentage of grantees and grantee-supported organizations actively participating in government agencies or task forces and their self-reported results. That information is being examined in conjunction with insights gathered from government stakeholders about the value of grantees' participation and broader changes in the capacity of civil society organizations and sector since baselines were established in 2015.

In 2019, we began implementing refinements proposed in 2018 to help us gain a better understanding of the contribution of the Foundation's approach to expanding funding opportunities in India and address the following questions about the Foundation's climate financing:

- What can be said about collaboration among the Foundation and other funders?
- What is the interplay between climate financing and other grants? Are there spillover effects?
- To what extent have climate financing activities had an accelerant effect? How catalytic were they?

For more detailed information about how the approaches the Foundation supports map to its desired outcomes, and the methodologies we are employing to assess the Foundation's contribution, please see Appendix B.

¹² Narratives articulate a population's underlying beliefs, attitudes, and assumptions. "Narrative Analytics" is a systematic approach to understand, shape, and track narratives by combining the depth of social science with the scale of data science. Synthesizing large robust data sets of social and other online media, Narrative Analytics uses evidence-based strategies to map, track, measure, and shift discourse.

¹³ For example, qualitative data collected from discussions with "key informants," including grantees and non-grantees who take part in full-day workshop-style discussions or interviews facilitated by Oxford Policy Management that focus on the Foundation's desired outcomes and discussing in detail some of the political and economic factors surrounding them.

4 | What We Are Learning



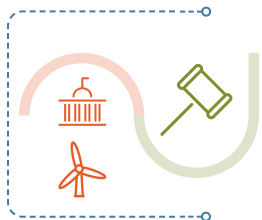
To achieve its long-term impacts, the Foundation has identified a variety of desired outcomes in the U.S., India, and China that demonstrate leadership. These outcomes represent the sought-after results of the Foundation’s strategy shown in the theory of change illustrations on pages 10, 11, 12, and 13. Associated with the Foundation’s desired outcomes and impacts are multiple data points that we are tracking to assess progress and how the Foundation’s work contributed to that progress.

Twelve findings emerged from our analysis of the quantitative and qualitative data collected and tracked through 2019. The first eleven explore what we learned about the U.S. and India. Each finding corresponds to one of the Foundation’s desired outcomes and includes three subsections in which we explore: 1) progress achieved in 2019 and since baselines were established, 2) the contribution of the Foundation’s funded approaches, and 3) relevant changes in the landscape that affect progress. Finding 12 delves into progress toward the Foundation’s desired longer-term impacts in each country and at the initiative level. The last part of this section explores some early observations about contextual factors in China that could help or hinder the Foundation from gaining traction there. Taken together, this section sets up the conclusions we reached about the relevance of the Foundation’s theory of change and implications for the future.

Each finding includes a slider (see the key below) that illustrates our interpretation of overall progress toward each of the Foundation’s desired outcomes and impacts. The position of the slider reflects our analysis of the data collected, tracked, and analyzed since the launch of the Climate Solutions Big Bet and compared to the baselines established.

SETBACK	NEUTRAL	PROGRESS
<ul style="list-style-type: none">• Significant setbacks or backsliding• In worse position since baselines established	<ul style="list-style-type: none">• No significant setbacks but also no significant “win(s)”• In the same position since baselines established	<ul style="list-style-type: none">• Notable “win(s)”• In an improved position since baselines established

Findings: U.S.



Enforcement of Environmental Protection Laws

1. In 2019, progress to enforce federal-level environmental protection laws was negligible. The pace of regulatory rollbacks increased, and legal challenges introduced in 2017 and 2018 to prevent further dismantling of climate-related policies and regulations were resolved in the Trump administration's favor. Foundation-supported activities (in tandem with other groups' efforts) helped prevent backsliding from happening sooner but did not ultimately prevent a variety of environmental deregulations from going into effect.

Progress Toward the Foundation's Desired Outcome



Efforts in 2019 to prevent or further delay the Trump administration's rollback of environmental protection laws were largely unsuccessful. The Trump administration appeared emboldened and demonstrated a more confident grasp of the regulatory process, advancing more rollbacks at a faster pace. In June 2019, the Environmental Protection Agency finalized the Affordable Clean Energy (ACE) rule, which is the Trump administration's replacement for the Clean Power Plan.¹⁴ According to the Environmental Protection Agency, the ACE Rule "establishes emission guidelines for states to use when developing plans to limit carbon dioxide (CO₂) at their coal-fired electric generating units." Whereas the Clean Power Plan outlined state-specific targets for reducing emissions from the power sector based on a national CO₂ emissions reduction goal of 30%, the ACE rule directs states to set standards of performance for individual power plants. In effect, it allows states to decide how much to cut emissions.¹⁵ That leaves the U.S. with a patchwork of standards and rules for CO₂ emissions reductions instead of a unified national plan, and the ACE rule allows states to set standards of performance for individual power plants. It also creates an opening for individual energy producers to lobby state regulators for performance standards that are favorable for them and their power plants. That said, despite the repeal of the Clean Power Plan, most states (31) are set to achieve their 2020 benchmarks for carbon emissions reductions.

Because states are no longer compelled to comply with the Clean Power Plan, Grassroots Solutions is tracking active federal lawsuits instead of state compliance. In 2019, the Trump administration proposed, advanced, or finalized 34 rollbacks of environmental protection regulations compared to seven in 2018 and two in 2017.¹⁶ These rollbacks included the replacement of the Clean Power Plan with the ACE rule and laxer regulation of methane and HfCs.¹⁷ Climate and environmental advocates, many funded by the Foundation, worked to keep pace, filing 102 climate-related lawsuits, mostly against the federal government's actions. That equated to 24 additional lawsuits introduced in 2019 compared to 2018.

¹⁴ The Clean Power Plan was President Obama's signature domestic policy to fight climate change. Its aim was to reduce greenhouse gas emissions from power plants, the single largest source of emissions in the U.S. at the time.

¹⁵ Sabin Center for Climate Change Law.

<http://blogs.law.columbia.edu/climatechange/2019/06/20/four-important-points-about-epas-affordable-clean-energy-rule/>

¹⁶ Regulatory Rollback Tracker. Harvard University, Environment and Energy Law Program. <https://eelp.law.harvard.edu/regulatory-rollback-tracker/>

¹⁷ Rollbacks of regulations of methane and HfCs are also explored in more detail in Finding 5.

In addition to defensive efforts to uphold environmental protections, states (on behalf of investors) filed shareholder lawsuits against fossil fuel companies such as ExxonMobil. The claimants cited that the companies under-disclosed the risk of climate change to their investors. However, climate advocates encountered a major setback when the first of these shareholder lawsuits went to trial and was dismissed in New York state court.¹⁸ Two additional cases with the same legal theory were filed by climate advocates in 2019—one based on federal securities law and the other the Massachusetts Consumer Protection Act.¹⁹

Despite favorable trial court and appellate-level decisions in 2017 and 2018, legal challenges brought by states to prevent rollbacks of environmental protection laws did not fare much better. In 2019, the Tenth Circuit Court of Appeals dismissed Wyoming v. U.S. Department of Interior (2019), a case that consolidated appeals by California, New Mexico, Wyoming, and environmental groups. The consolidation included the California and New Mexico v. BLM (2017) cases that challenged stays of the Obama-era so-called “Methane and Waste Prevention” rule. Since the Trump administration had already finalized weaker methane waste prevention regulations, the Court ruled that the appeal was moot.²⁰ Another case resolved in the Trump administration’s favor was Mexichem Fluor, Inc. v. Environmental Protection Agency. Mexichem Fluor, Inc. challenged an Obama-era rule requiring more stringent management of equipment using HfC substitutes in order to reduce leakages of those substances.²¹ The D.C. Circuit Court of Appeals vacated the refrigerant management rule, upholding it only to the extent that manufacturers are required to replace HfCs that were previously installed as substitutes for ozone-depleting substances.²² Finally, in response to the ACE rule, 29 states and cities filed a lawsuit to prevent the implementation of the Rule.²³ The outcome of that lawsuit is still pending.

Contribution of the Foundation’s Work

The Foundation’s grantees have contributed to defensive efforts that helped delay rollbacks of environmental protections, but since 2017, it has been an uphill battle to prevent further dismantling regulations from taking effect. To enforce environmental protection laws, the Foundation funds activities to advance climate-friendly policies and regulatory action and broaden the climate solutions coalition and improve partnerships. In 2018 and 2019, several of the Foundation’s grantees were involved in, or connected to, efforts to defend environmental protections. Some were engaged in lawsuits. Others concentrated on defending climate-related rules through the regulatory process.

Lawsuits can take a long time to produce results and there were signs that the Trump administration was not willing to wait for the courts to act. For example, some of the Foundation’s grantees were involved in litigation to help communities place a cost on the damages caused by fossil fuels companies, claiming that they downplayed the risk and cost of climate change. An example of this was California and New Mexico v. BLM (2017). Climate advocates

¹⁸ People of the State of New York v Exxon Mobil Corp. (2018). http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2020/20200227_docket-4520442018_decision.pdf

¹⁹ In re Exxon Mobil Corp. Derivative Litigation (2019) and Commonwealth v Exxon Mobil Corp (2019). <http://climatecasechart.com/case/von-colditz-v-exxon-mobil-corp/>

²⁰ State of Wyoming v. Department of Interior. 10th Circuit Court of Appeals. April 9, 2019. <https://law.justia.com/cases/federal/appellate-courts/ca10/18-8027/18-8027-2019-04-09.html>

²¹ Regulatory Rollback Tracker. Harvard University, Environment and Energy Law Program. <https://eelp.law.harvard.edu/2017/09/hydrofluorocarbons-and-kigali-amendment-to-montreal-protocol/>

²² Mexichem Fluor, Inc v. Environmental Protection Agency. D.C. District Court of Appeals. April 5, 2019. http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2019/20190405_docket-17-1024_judgment.pdf

²³ State of New York, et. als. v. Environmental Protection Agency. https://ag.ny.gov/sites/default/files/2019_08_13_final_petition_for_review.pdf

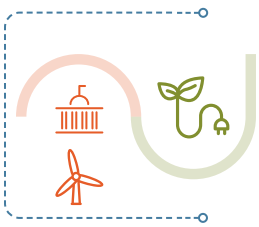
defended regulation of methane emissions and were generally successful in their efforts to delay and prevent the Trump administration from rolling back rules in the lower courts. However, as noted earlier, the Tenth Circuit Court of Appeals dismissed Wyoming v. U.S. Department of Interior (2019) as moot. In addition to the methane lawsuits, grantees submitted testimony to prevent the Environmental Protection Agency from rolling back mercury and air toxics standards, which are designed to protect communities by limiting emissions of mercury and other hazardous pollutants from coal and oil-fired power plants. At the time of writing, the proposed rollbacks had not been finalized by the agency.

Also, the Foundation's grantees continued to advance legal strategies to publicize the fossil fuel industry's internal documentation about the environmental impact of industry practices and create precedent for future climate change lawsuits. The New York state case was the first of these cases to go to trial and was summarily dismissed by the trial judge. However, the other two cases filed by advocates were still pending trial at time of writing. There were some other state level victories of note. For example, in Ohio, the Supreme Court struck down FirstEnergy's coal bailout, which one of the Foundation's grantees had been fighting in court.

Finally, a number of grantees were engaged in activities to oppose the ACE rule. However, the Environmental Protection Agency set up a process for the new rule that met the minimal requirements of the regulatory process of notice and comment but provided little opportunity for environmental groups and others to engage and voice their concerns.

Changes in the Landscape that Affected Progress

The results of the 2018 elections and subsequent changes in the makeup of the U.S. House of Representatives showed promise for future enforcement of environmental protection laws but had little immediate effect in 2019. The Democratic majority in the House of Representatives appears poised to take more proactive action on climate change than before. The Climate Action Now Act, H.R. 6 was one of the first ten bills introduced by the new House majority. The bill aims to keep the U.S. in the Paris Accord and prohibit the use of federal funds to withdraw from the agreement. It passed 231 to 190, with three Republicans casting their votes in favor. In addition, the House also convened a Select Committee on the Climate Crisis to focus climate-related legislative efforts. Still, at the time of writing, the Republican leadership in the Senate has refused to take up any House-passed climate legislation.



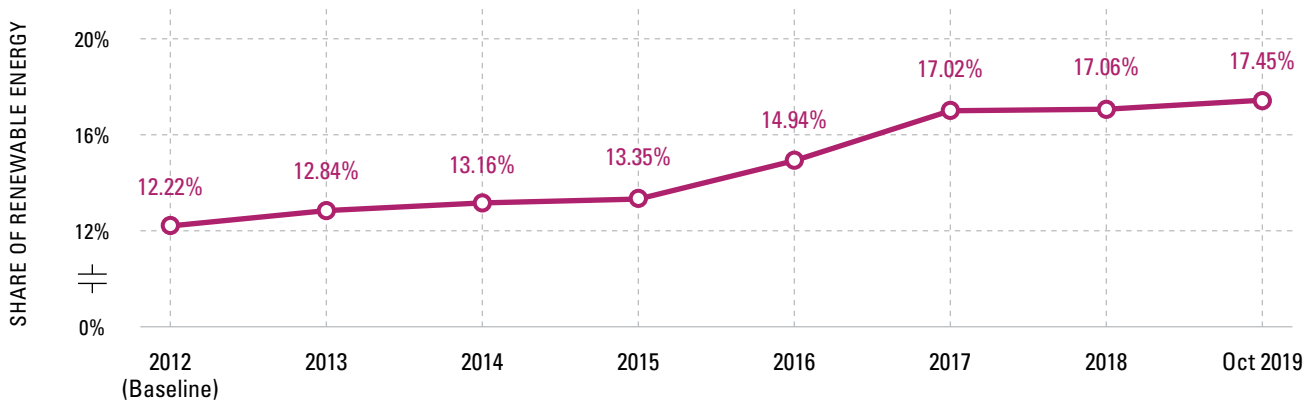
Increased Deployment of Renewable Energy

2. Since the launch of the Climate Solutions Big Bet, renewable energy has accounted for an ever-increasing share of energy generation in the U.S., and the country is close to producing 20% of its energy from renewables by 2020. In 2019, changes in the political landscape and private sector investment created favorable conditions for continued deployment of renewable energy. Foundation-supported efforts, especially at the state level, contributed significantly to improving renewable portfolio standards, advancing infrastructure enhancements, and helping defeat regressive campaigns.

Progress Toward the Foundation's Desired Outcome



In 2019, growth in the adoption and deployment of renewable energy in the U.S. remained positive. The Foundation is supporting activities aimed at achieving a target of 20% of energy production from renewables by 2020. Since baselines were established, progress to achieve that target is generally on track, with increases propelled by growth in solar and wind-generated energy. Based on data available from January through October 2019, renewable energy accounted for 17.45% of total energy generated in the U.S., a total of 604,461 megawatt hours.²⁴ Renewables surpassed coal as a source of energy generation for the first time in April 2019.²⁵ That said, the data available for 2019 suggest that the share of total U.S. energy generated from renewable sources was a little shy of the Energy Information Administration's projection of 19%. Looking ahead, the Energy Information Administration projects that renewables will account for 20% of energy generation in 2020, surpassing nuclear and coal in the early part of this decade.²⁶



Source: U.S. Energy Information Administration, www.eia.gov

Figure 12: Renewable Share of Total U.S. Energy Generation

²⁴ "Electric Power Monthly." Energy Information Administration. November 2019. <https://www.eia.gov/electricity/monthly/>

²⁵ "U.S. electricity generation from renewables surpassed coal in April." Energy Information Administration. June 26, 2019. <https://www.eia.gov/todayinenergy/detail.php?id=39992>

²⁶ "EIA expects U.S. electricity generation from renewables to soon surpass nuclear and coal." Energy Information Administration. January 30, 2020. <https://www.eia.gov/todayinenergy/detail.php?id=42655>

To assess progress, we are also tracking changes in federal funding and tax credits to support adoption and deployment of renewables and clean energy technology. In 2019, neither federal spending nor tax incentives changed significantly despite the Trump administration's proposals to slash clean energy funding at the Department of Energy by 70%. At the end of the year, President Trump signed a spending bill that included support for clean energy research. However, clean energy tax credits for electric vehicles, battery storage, offshore wind, and solar that the Democrat-controlled House of Representatives passed did not make it into the final version of the budget bills signed by the president.²⁷

At the subnational level, state governments used policy and regulatory levers to raise the floor on how much renewable energy would be required in their energy generation mix. In 2019, eight states and the District of Columbia increased renewable energy portfolio standards or set more ambitious targets. The standards require that a specified percentage of the electricity that utilities sell comes from renewable resources, and these policies also help promote economic development and reduce emissions.²⁸ Historically, renewable portfolio standards are associated with and still play an important role in the increases in deployment of renewable energy. Since 2000, renewable portfolio standards have accounted for approximately half of all growth in renewable electricity generation and capacity, but that changed in 2017. After that, renewable portfolio standards accounted for one-third of new capacity.

Colorado, the District of Columbia, Maine, Maryland, New Mexico, Nevada, New York, and Washington increased their existing renewable requirements. For example, the bill that passed in March 2019 requires New Mexico to get 50% of its energy from renewables by 2030 and 80% by 2040. By 2045, it must be entirely carbon-free. In April, the Nevada Legislature passed a bill that requires the state to generate 50% of its electricity from renewable resources by 2030 and aim for 100% carbon-free resources by 2050. In June 2019, Maine doubled its renewable portfolio standard from 40% by 2017 to 80% by 2030 and set a goal of 100% renewables by 2050.²⁹ In Wisconsin, Governor Tony Evers circumvented the Legislature and signed an executive order in August 2019 that put the state on a path to achieve 100% carbon-free electricity by 2050.³⁰ Ohio was the only state to weaken its renewable portfolio standard, decreasing it from 12.5% by 2027 to 8.5% by 2026. Also, the solar carve-out—part of a state's renewable portfolio standard that sets a specific goal for electricity generation from solar panels—was removed from the law.³¹

²⁷ "Appropriations: Winners and Losers in Year-end Spending Bills." E&E News. December 20, 2019. <https://www.eenews.net/stories/1061857847>

²⁸ Berkeley Lab, Electricity Markets & Policy Group. U.S. Renewables Portfolio Standards: 2018 Annual Status Report, November 2018. <https://emp.lbl.gov/publications/us-renewables-portfolio-standards-1>

²⁹ "U.S. Renewable Portfolio Standards: 2019 Annual Status Update." Berkeley Lab, Lawrence Berkeley National Laboratory. July 2019. https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf

³⁰ Wisconsin governor orders 100% carbon free by 2050, despite lack of legislative support." Utility Dive. August 19, 2019. <https://www.utilitydive.com/news/wisconsin-governor-orders-100-carbon-free-by-2050-despite-lack-of-legisla/561177/>

³¹ House Bill 6 2019. Ohio State Legislature. <https://www.legislature.ohio.gov/legislation/legislation-summary?id=GA133-HB-6>

Contribution of the Foundation's Work

Since 2015, the Foundation's U.S. grantees have significantly and positively affected adoption and deployment of renewable energy. We see evidence that the Foundation's approaches to increase the deployment of renewable energy through its grantmaking in the U.S.—advancing climate-friendly policies and regulatory action and broadening the climate solutions coalition and improve partnerships—have produced favorable results. The contribution of the Foundation's work is particularly evident at the state level and in changes to renewable portfolio mandates.

In 2019, at least 18 of the Foundation's U.S. grantees were involved in efforts to increase the deployment of clean energy and nine participated in activities to promote changes to state renewable portfolio standards.³³ Grantees played a significant role in increasing awareness about Nevada's successful bill to increase its renewable portfolio standard. Grantees were also engaged in education efforts culminating in Governor Tony Evers' of Wisconsin executive order enacted in August 2019, which put the state on a path to achieve 100% carbon-free electricity by 2050. Lastly, grantees worked with Republican Governor Larry Hogan on Maryland's increased renewable energy portfolio standard by educating and advocating for the Clean Energy Jobs Act.

The Foundation's grantees were engaged in a variety of other activities to advance climate-friendly policies or prevent backsliding as well, including promoting enhancements to the electrical infrastructure necessary for increased deployment of renewable energy. For example, in 2019, they assisted with efforts in Minnesota aimed at streamlining the connection of solar and other renewables to the grid. Foundation-supported work in Texas helped defeat measures that would have negatively affected growth of new wind and solar generation.³⁴

Finally, in 2019, Grassroots Solutions undertook a state assessment to better understand changes in the trajectories among ten states with the highest greenhouse gas emissions, how those changes connect to deployment of renewable energy, and the role of the Foundation's strategy. The ten states with the highest emissions are California, Florida, Illinois, Indiana, Louisiana, Michigan, New York, Pennsylvania, and Texas. Between 2015 and 2018, half of the Foundation's grantees advancing climate-friendly policies or regulatory action and broadening the climate solutions coalition promoted clean energy in the ten states examined (9 of 18 grantees that completed the 2019 survey). And one-third (6 out of 18 respondents) worked to increase renewable portfolio standards. Among states with the highest emissions, the prevalence of climate-friendly policies adopted between 2015 and 2018 correlated with the number of Foundation-supported grantees and activities. For example, renewable generation increased at a faster rate in California, Illinois, and Texas than states where there were fewer Foundation-supported activities. The annual grant reports corroborated the survey data. Grantees primarily associated with advancing climate-friendly policies and regulatory action and broadening the climate solutions coalition contributed to successes in California, Illinois, Michigan, New York, and Ohio.

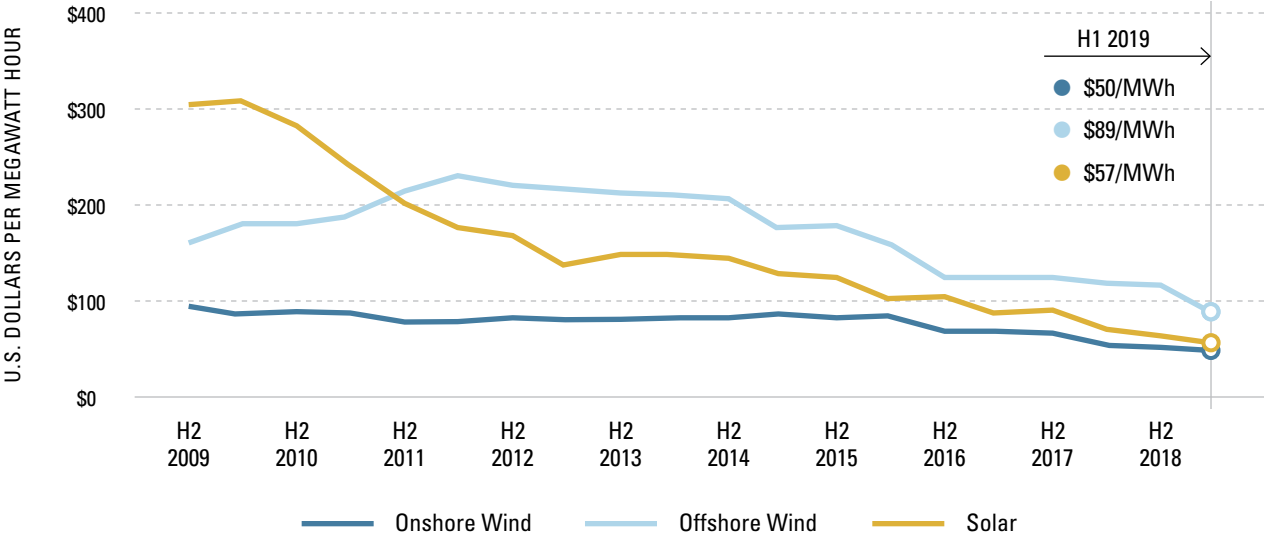
³³ Based on self-reported information gathered through the 2019 U.S. Grantee Survey administered April 2019.

³⁴ "Subsidies for Renewables Under Attack in Texas." *The Houston Chronicle*. April 25, 2019.
<https://www.houstonchronicle.com/business/energy/article/Subsidies-for-renewables-under-attack-in-Texas-13795289.php>

Changes in the Landscape that Affected Progress

The election or re-election of governors who supported climate solutions helped create conditions in 2019 that were more favorable to increasing the adoption and deployment of renewables at the state level. Colorado, New Mexico, Nevada, Maine, and Wisconsin have newly-elected governors who campaigned on addressing climate change.³⁵ Climate solutions also played a prominent role in Republican Governor Larry Hogan’s re-election campaign in Maryland.

In addition, in 2019, the private sector continued to make robust investments in renewable energy. Bloomberg New Energy Finance reported that between 2010 and the first half of 2019 \$356 billion was invested in clean energy in the U.S.³⁶ The significant falling cost of renewable energy, especially in offshore wind and solar, contributed to the growth in investment. Since 2009, the levelized cost of solar photovoltaics is down by 81%.³⁷ In addition, in its annual look at global corporate investment in clean energy, Bloomberg New Energy Finance reported that corporations buying purchase power agreements increased 44% in 2019 compared to 2018.³⁸



Source: UN Environment, Frankfurt School - UNEP Centre, Bloomberg New Energy Finance

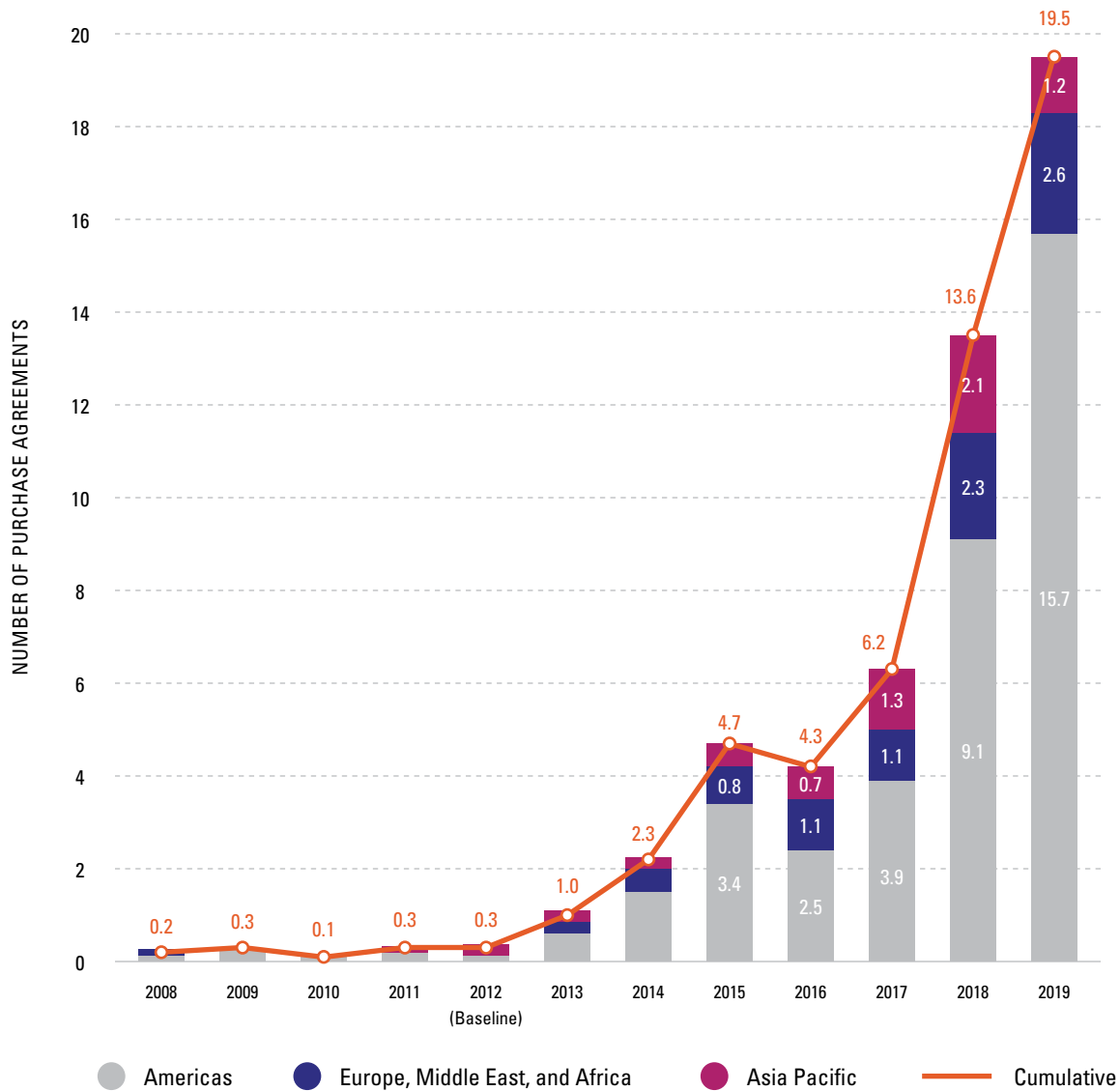
Figure 14: Levelized Costs of Electricity for Onshore Wind, Offshore Wind, and Solar, in U.S. Dollars per Megawatt Hour

³⁵ "Governors could drive the next wave climate change action." Vox.com. November 8, 2018. <https://www.vox.com/energy-and-environment/2018/11/7/18071770/midterm-election-results-governor-climate-change>

³⁶ "A Decade of Renewable Energy Investment, Led by Solar, Tops USD 2.5 Trillion" Bloomberg New Energy Finance. September 6, 2019. <https://about.bnef.com/blog/decade-renewable-energy-investment-led-solar-tops-usd-2-5-trillion/>

³⁷ "Clean Energy Investment Is Set to Hit \$2.6 Trillion This Decade." Bloomberg New Energy Finance. September 5, 2019. <https://www.bloomberg.com/news/articles/2019-09-05/clean-energy-investment-is-set-to-hit-2-6-trillion-this-decade>

³⁸ "Corporate Clean Energy Buying Leapt 44% in 2019, Sets New Record." Bloomberg New Energy Finance, January 28, 2020 <https://about.bnef.com/blog/corporate-clean-energy-buying-leapt-44-in-2019-sets-new-record/>

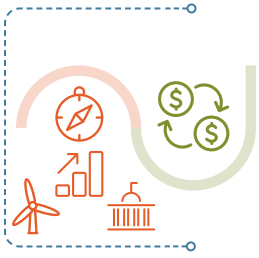


Source: Bloomberg New Energy Finance

Figure 15: Global Corporate Purchase Power Agreement Volume

Although the political and economic contexts were increasingly favorable in 2019, often new projects encountered local opposition that impeded more robust deployment of renewable energy. In a report released by the Brookings Institution, the authors cited projects around the country, including in California and Virginia, where local citizens opposed solar and wind projects due to the location of those projects in their communities. Projects faced less local opposition when residents were engaged in community involvement efforts at the beginning and felt that the developers were trustworthy.³⁹

³⁹ "Renewables, Land Use, and Local Opposition in the United States." The Brookings Institution. January 2020. https://www.brookings.edu/wp-content/uploads/2020/01/FP_20200113_renewables_land_use_local_opposition_gross.pdf



Broad-Based Political Support for Carbon Pricing

3. In 2019, progress to establish broad-based support for carbon pricing in the U.S. was mixed. There was limited political appetite at the federal level to advance schemes to put a price on pollution. Political support at the subnational level showed more promise. States in the Northeast and Mid-Atlantic regions continued to make the most headway, and the Foundation’s positive contributions were visible in the technical assistance grantees provided to state agencies and policymakers.

Progress Toward the Foundation’s Desired Outcome

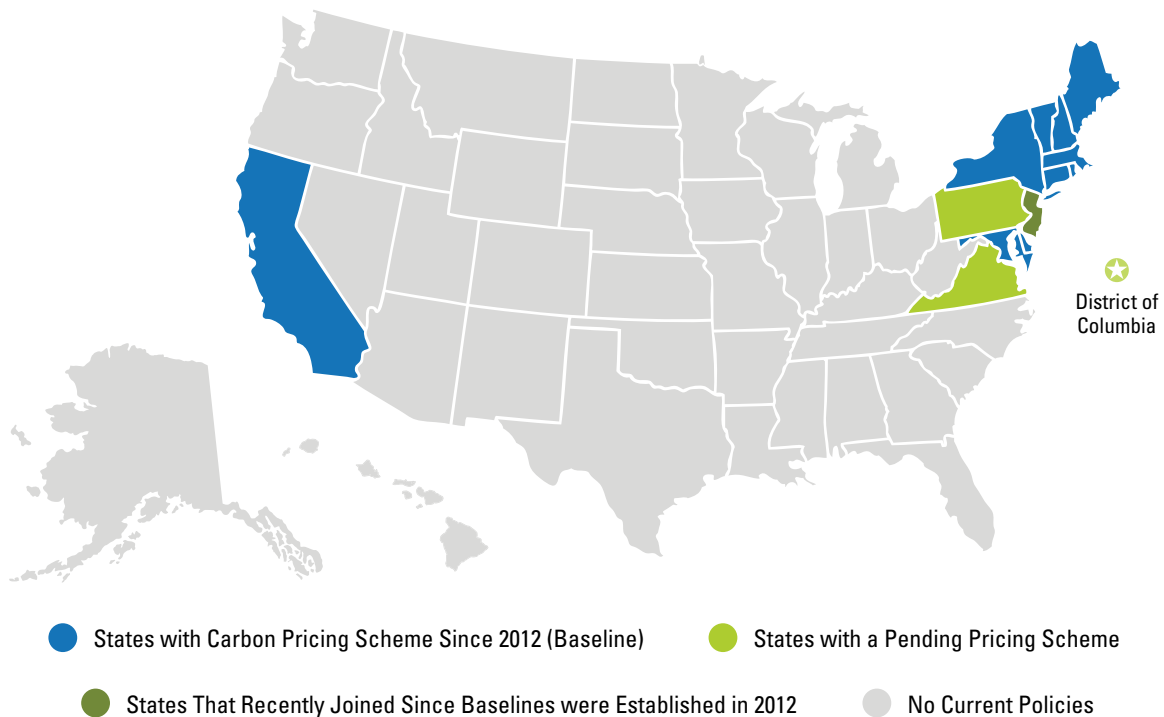


In 2019, signs of broadening political support for carbon pricing were most evident at the state level, especially in the Northeast and Mid-Atlantic regions. To assess progress, we are tracking legislation introduced, debated, and passed, and ballot measures proposed and passed, including the expansion of existing schemes that align with the Foundation’s priorities. At the federal level, eight congressional carbon pricing proposals were introduced. Three included joint House and Senate versions and five originated in the House. Three of the bills had bipartisan sponsors.⁴⁰ At the time of writing, all bills were sitting in committee pending action. When baselines were established in 2012, 10 states had adopted schemes to put a price on carbon. The Foundation’s desired target is that 15 states adopt carbon pricing policies by 2020. As of 2019, 11 states and the District of Columbia have adopted some form of pricing scheme and two states—Virginia and Pennsylvania—are on a path to become members of the Regional Greenhouse Gas Initiative.

In 2019, New Jersey officially rejoined the Regional Greenhouse Gas Initiative, the first mandatory market-based program in the U.S. to reduce greenhouse gas emissions from the power sector, bringing the current membership to ten states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.⁴¹ Pennsylvania and Virginia are on a path to join. In Pennsylvania, Governor Tom Wolf directed the state’s Department of Environmental Protection to begin the process of applying for membership. In Virginia in 2019, legislative and regulatory processes to become a member continued.

⁴⁰ “Carbon Pricing Proposals in the 116th Congress.” Center for Climate and Energy Solutions. September 2019. <https://www.c2es.org/site/assets/uploads/2019/09/carbon-pricing-proposals-in-the-116th-congress.pdf>

⁴¹ More information about the Regional Greenhouse Gas Initiative available at <https://www.rggi.org/>



Source: *Center for Climate and Energy Solutions*

Figure 16: *State Carbon Pricing Policies*

In addition, the Transportation Climate Initiative, a regional collaboration that seeks to develop the clean energy economy and reduce oil dependence and greenhouse gas emissions from the transportation sector, gained more traction in 2019. This multi-state effort builds on the successful model developed through the Regional Greenhouse Gas Initiative. It is significant because it aims to address emissions from a sector that accounts for more CO₂ emissions than electricity generation for the participating states.⁴² In a big step forward, the Transportation Climate Initiative released a memorandum of understanding for public comment that would establish a transportation-related cap and trade program.⁴³ The coalition originally included 11 Northeast and Mid-Atlantic states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont) and the District of Columbia. Virginia joined the Transportation Climate Initiative at the end of 2019. New Hampshire was the only state to back out. In late 2019, Governor Chris Sununu announced the state would not participate.⁴⁴

⁴² "Mitigating Greenhouse Gas Emissions in the Northeast and Mid-Atlantic Transportation Sector: A Cap-and-Invest Approach." *Harvard Environmental Law Review*. February 18, 2018. https://harvardelr.com/2018/02/18/mitigating-greenhouse-gas-emissions-in-the-northeast-and-mid-atlantic-transportation-sector-a-cap-and-invest-approach/#_ftn8

⁴³ "Regional Proposal for Clean Transportation Reaches Milestone." Transportation and Climate Initiative of the Northeast and Mid-Atlantic. December 2019. <https://www.transportationandclimate.org/main-menu/tcis-regional-policy-design-process-2019#Latest%20Updates>

⁴⁴ "New Hampshire Declines to Participate in the Transportation Climate Initiative." New Hampshire Governor Chris Sununu. December 17, 2019. <https://www.governor.nh.gov/news-media/press-2019/20191217-climate-initiative.htm>

Finally, 44 other carbon pricing or tax-related bills were introduced or considered in 14 states in 2019. Of that total, 26 are still pending action, one was enacted in California that strengthened the state's existing emissions trading system, and the other 17 failed.⁴⁵

Contribution of the Foundation's Work

In 2019, activities supported by the Foundation to broaden political support for carbon pricing had the most positive effect at the subnational level, especially in the Northeast and Mid-Atlantic regions. To date, the Foundation has provided funding for seven grantees advancing approaches to establish broad-based political support for putting a price on carbon. Two organizations are involved in efforts to advance climate-friendly policies and regulatory action. The rest are undertaking activities to alter political discourse. In 2019, technical support provided by grantees—conducting analyses that informed policy design, hosting educational workshops, and other engagements with state agencies and governors' offices—contributed to the expansion of the Regional Greenhouse Gas Initiative and strengthening the Transportation and Climate Initiative.

For example, grantees worked closely with staff at the Virginia Department of Environmental Quality on a power sector rule connected to the Regional Greenhouse Gas Initiative. They conducted legal and policy analysis to inform policy design, including the power sector rule, which became law in May 2019. Also, a few grantees worked with state regulators on the Transportation Climate Initiative and transportation-related cap and trade program described earlier. Other grantees worked with policymakers in the Northeast and Mid-Atlantic states to help them incorporate lessons learned in California and engaged with Governor Charlie Baker and his administration to build bipartisan support for the Transportation Climate Initiative.

However, grantees' and other climate solutions advocates' efforts to build political support for carbon pricing continued to stall at the federal level. Some of the Foundation's grantees engaged conservative lawmakers to increase bipartisan support by asking them to co-sponsor three of the House bills; however, none of the Congressional bills on carbon pricing had a hearing nor was there any major legislative action on the subject in 2019.

Changes in the Landscape that Affected Progress

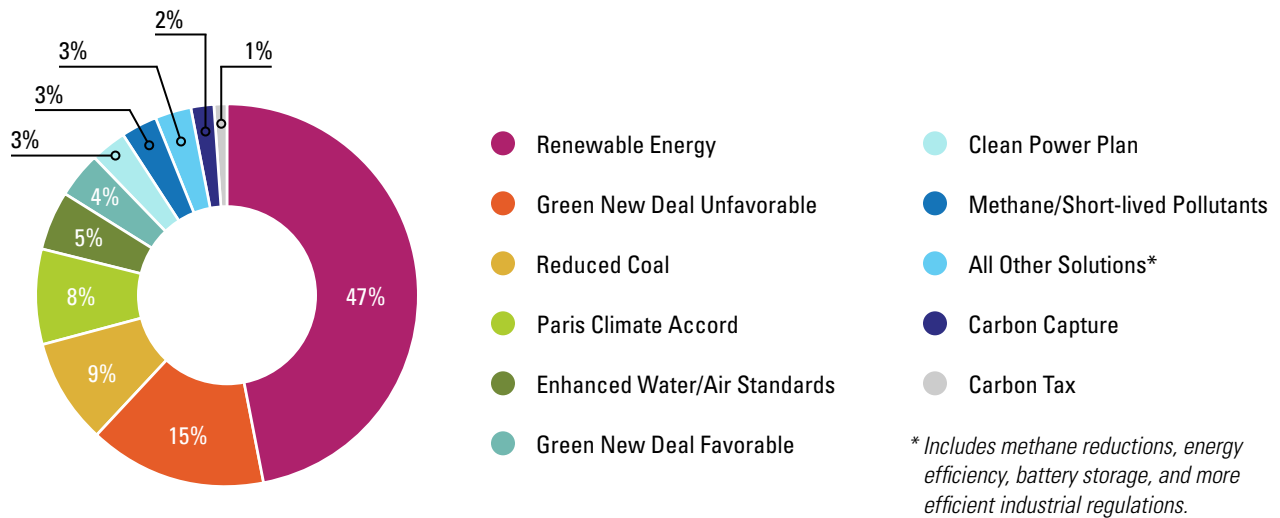
Governors continued to play an integral role in advancing carbon pricing schemes. Gubernatorial leadership on climate is especially important because the executive branch oversees the agencies that develop regulations and implement climate solutions at the state level. Also, in the absence of legislative action or will, executive power can be wielded to advance technocratic solutions like carbon pricing. The legislative process presents more opportunities for legislators to act based on political ideology and for opponents to influence the outcome.

There are other significant obstacles that have hindered progress to advance carbon pricing schemes. Partisanship is one. In Washington two efforts to adopt a carbon emissions fee through legislation and a ballot measure both failed. Even with substantial support for action on climate change, Washington Initiative 1631 was defeated in November 2018 by a 56.3% to 43.7% margin. This was the second time Washington voters opposed a carbon pricing scheme;

⁴⁵ National Council of State Legislatures. 50 State Searchable Bill Tracking Database. <https://www.ncsl.org/research/telecommunications-and-information-technology/ncsl-50-state-searchable-bill-tracking-databases.aspx>

the first time was in 2016. In a 2019 study of the two failed initiatives, researchers found that political ideology was the biggest predictor of support or opposition.⁴⁶ Liberal voters were much more likely to support carbon pricing compared to conservatives. Additionally, voters' general attitudes toward taxes affected their support for carbon pricing or emissions taxation schemes. Opponents of the 2018 initiative in Washington outspent supporters two-to-one and successfully reframed the measure as tax. The study concluded that a carbon tax would fail in every other state with a ballot initiative.

Also, carbon pricing does not drive favorable conversation about climate change compared to other solutions (see the Figures that follow). In the public discourse, carbon pricing accounted for only 5% of the conversation (a 1% drop compared to 2018). Among candidates and policymakers, that percentage was even lower. In 2019, carbon pricing initiatives accounted for approximately 1% of solutions mentioned by candidates and policymakers about climate change. Its minimal presence in public discourse correlated with a lack of conversation and action among lawmakers at the federal level and most states. For example, despite most Democrats voicing commitments to addressing climate change, there was little interest shown by House members to push for a carbon tax. Even the Green New Deal, a high-profile policy concept introduced by Representative Alexandria Ocasio-Cortez and Senator Ed Markey, did not include a carbon pricing scheme.⁴⁷ Instead, the Green New Deal emphasized plans to mobilize “every aspect of American society toward 100% clean and renewable energy, guarantee a good job to all members of our society, and create economic prosperity for all.”⁴⁸



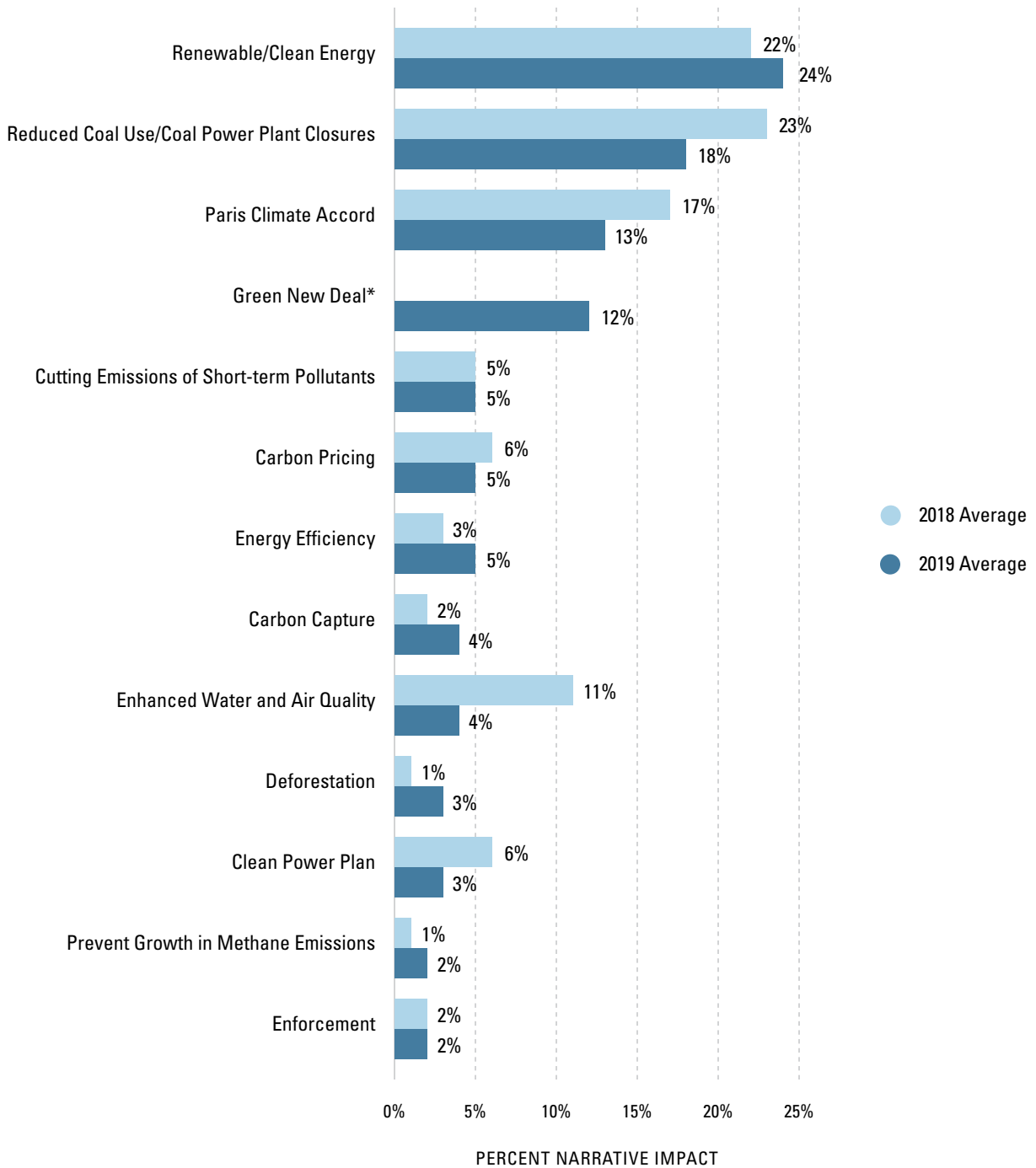
Source: Protagonist

Figure 17: Climate Change Solutions Driving Favorable Candidate/Policy maker Conversation on Climate Change in 2019 (Percentage of Mentions)

⁴⁶ “Why Carbon Taxes are so Hard to Pass.” Tax Policy Center. August 15, 2019. <https://www.taxpolicycenter.org/taxvox/why-carbon-taxes-are-so-hard-pass>

⁴⁷ “The Green New Deal doesn’t include carbon pricing. Some say that’s a big mistake.” Adam Wenick, PRI. April 11, 2019. <https://www.pri.org/stories/2019-04-11/green-new-deal-doesnt-include-carbon-pricing-some-say-thats-big-mistake>

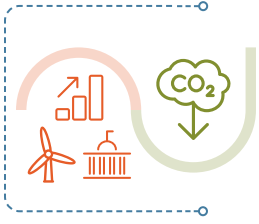
⁴⁸ More information and links to the Resolutions are available at <https://www.sunrisemovement.org/gnd>



Source: Protagonist

* Tracking the Green New Deal began in 2019.

Figure 18: Climate Change Solutions Driving Favorable Public Conversation on Climate Change in 2018 and 2019



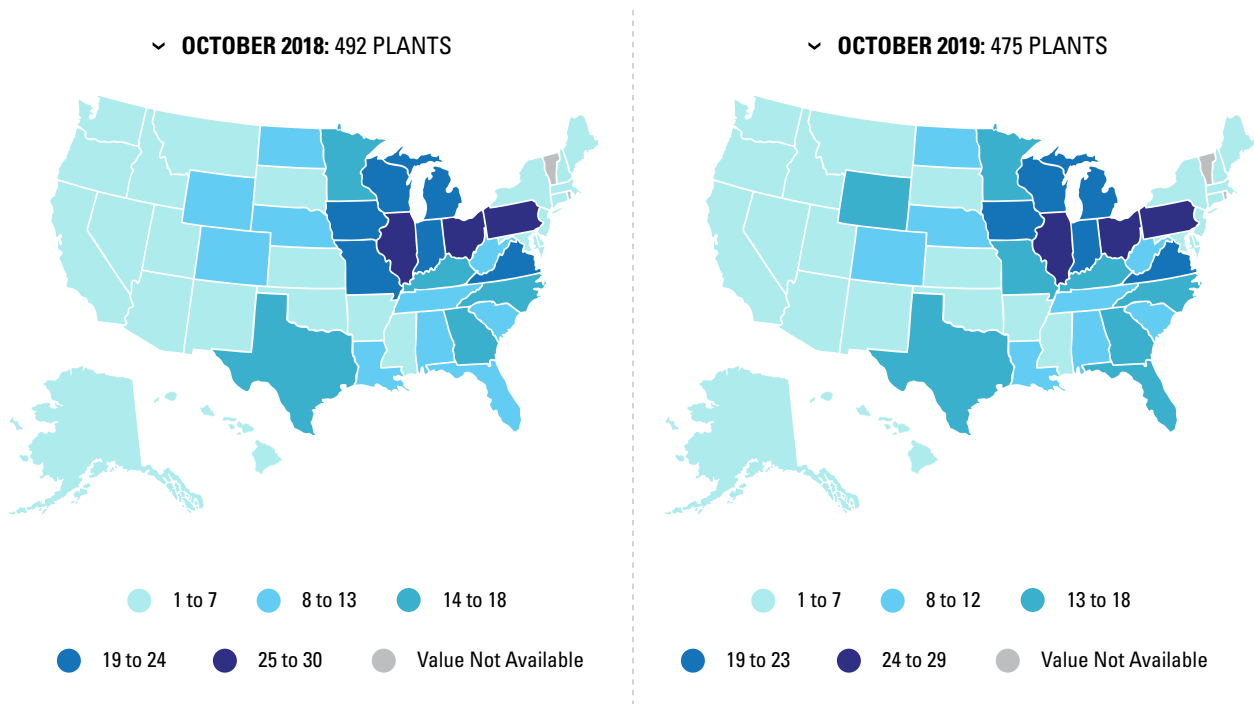
Reduced Emissions of CO₂

4. Energy generated by coal continued to decline in 2019 and Foundation-supported activities contributed substantially to additional closures of coal-fired power plants and other efforts to reduce energy-related CO₂ emissions. However, there are warning signs that the rate of CO₂ emissions reductions in the country may be slowing as emissions from sectors such as transportation cancel out other gains.

Progress Toward the Foundation's Desired Outcome



In 2019, progress to reduce CO₂ emissions from energy generated by coal remained solid. Since baselines were established in 2012, 64.719 gigawatts of summer generating capacity of electricity from coal have been retired. The country is on track to meet the Foundation's desired 2020 target: the retirement of 62-67 gigawatts of net summer capacity of coal-generated electricity. The retirements between October 2018 and October 2019 reduced the country's summer generating capacity of electricity by approximately 16 gigawatts, which equated to the retirement 13 coal-fired generating units in a twelve-month period. As shown in the Figures that follow, as of October 2019, there were 475 active coal-fired power plants in the U.S. compared to 492 in October 2018.

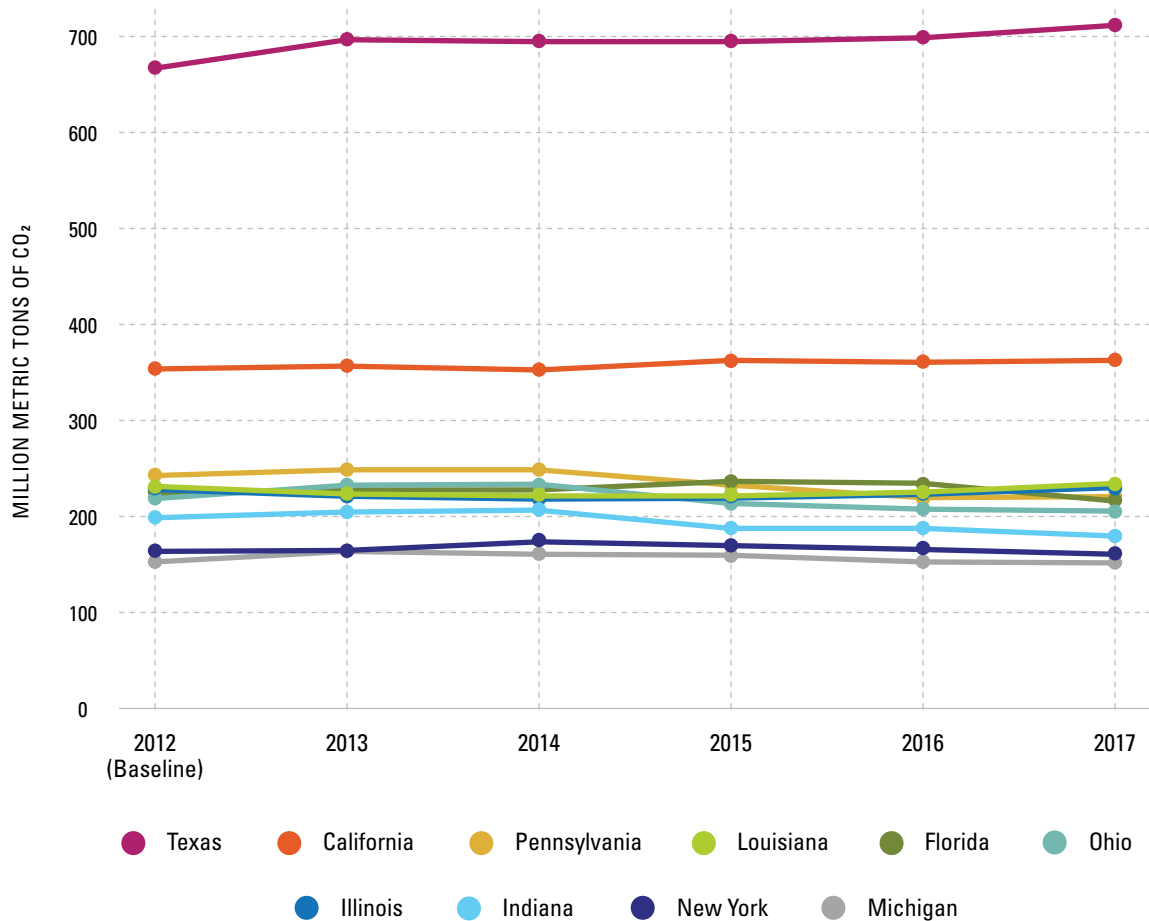


Source: U.S. Energy Information Administration, www.eia.gov

Figure 19: Number of Power Plants for Coal in the U.S. by State,* October 2018 and October 2019

* Data about active coal-fired plants fluctuate seasonally. While it might appear that coal plants were added in a state, they are not necessarily new, but in use again.

Between 2012 and 2017, CO₂ emissions declined in the U.S. by 1.9%.⁴⁹ Also, since the launch of the Climate Solutions Big Bet, CO₂ emissions declined or leveled off among the top-ten energy-related emitters of CO₂ in the U.S.: California, Florida, Illinois, Indiana, Louisiana, Michigan, New York, Ohio, Pennsylvania, and Texas. Decreasing or flattening emissions among the top-ten emitters were consistent with the downward trend in energy-related emissions of CO₂ nationally.⁵⁰ The biggest declines in emissions occurred in Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania between 2015 and 2017. Emissions also went down in Florida, but not by as much. In California, emissions increased slightly, but remained relatively stable. Among the seven states that saw declines, emissions were reduced by approximately 66 million metric tons between 2015 and 2017. Texas and Louisiana, however, emitted a combined total of approximately 26 million additional metric tons of CO₂ during the same period.

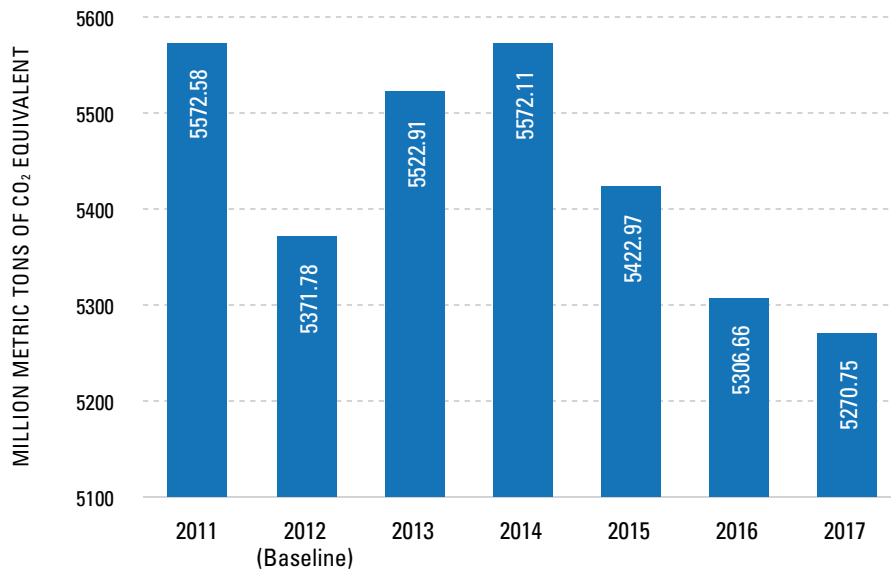


Source: U.S. Energy Information Administration State Carbon Dioxide Emissions Data, www.eia.gov

Figure 20: State CO₂ Emissions, in Million Metric Tons

⁴⁹ The Environmental Protection Agency released emissions data for the first time in two years. Data are now available through 2017.

⁵⁰ National energy-related CO₂ emissions in 2015 was 5,274.12MMT of CO₂, and in 2016 was 5,189.40MMT of CO₂. U.S. Energy Information Administration. Energy-Related Carbon Dioxide Emissions 2005-2016, February 2019.



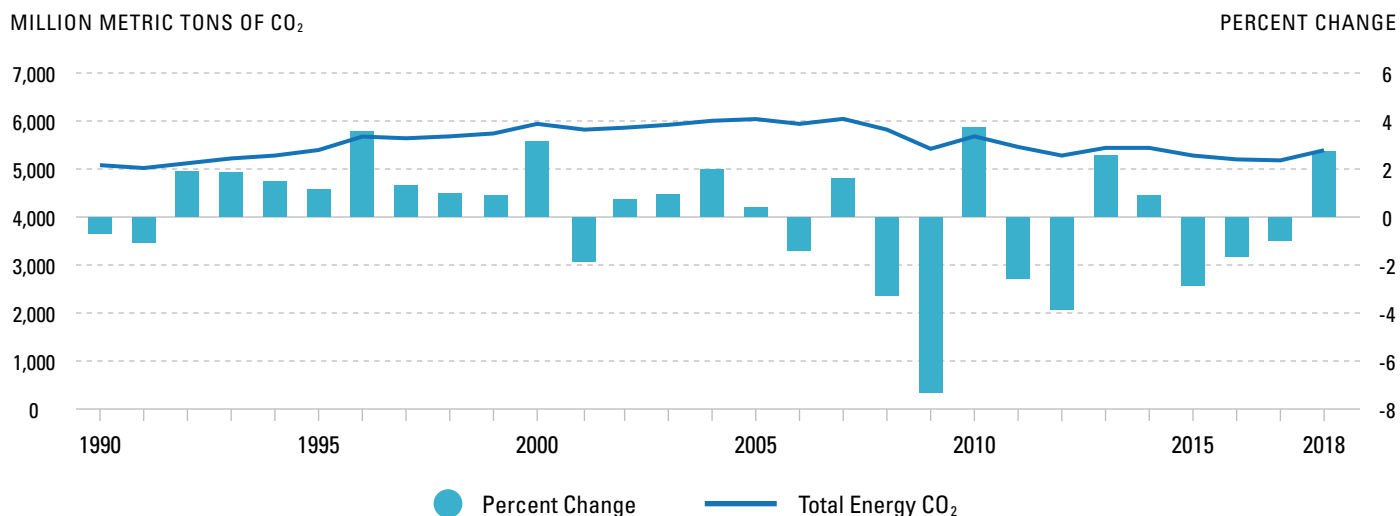
Source: Environmental Protection Agency Greenhouse Gas Inventory, www.epa.gov

Figure 21: Overall U.S. CO₂ Emissions

It is worth noting that recent data from the Energy Information Administration suggest an uptick—albeit temporary—in energy-related emissions in 2018 followed by lower projections for 2019.⁵¹ The Energy Information Administration cited demand for heating and cooling due to a colder winter and hotter summer, transportation, and strong economic growth as the primary drivers of increases in 2018. Also, among the ten states that account for 50% of U.S. energy-related CO₂ emissions, eight of the states made progress in reducing those emissions, however, Texas and Louisiana negated nearly half of those gains. In better news, the Energy Information Administration projected that energy-related emissions in 2019 dropped due to retirements of coal-generated electricity, equating to a 2.2% decrease in energy-related CO₂ emissions.⁵² Updated figures for 2019 from the Administration will be available in November 2020.

⁵¹ To track progress on CO₂ emissions we primarily examine data from two sources, the Environmental Protection Agency tracks the U.S.’ overall greenhouse gas emissions, and the Energy Information Administration tracks emissions only from energy-related activities—production and generation. The pace of data collection and public release of data is different for the agencies, therefore there are lags in availability of data on greenhouse gas emissions. At the time of writing, the Environmental Protection Agency is two years behind. The Energy Information Agency is one year behind. “U.S. Energy-Related Carbon Dioxide Emissions, 2018.” Energy Information Administration. <https://www.eia.gov/environment/emissions/carbon/>

⁵² “EIA expects U.S. energy-related CO₂ emissions to fall in 2019” Energy Information Administration. www.eia.gov



Source: U.S. Energy Information Administration, *Monthly Energy Review*, October 2019

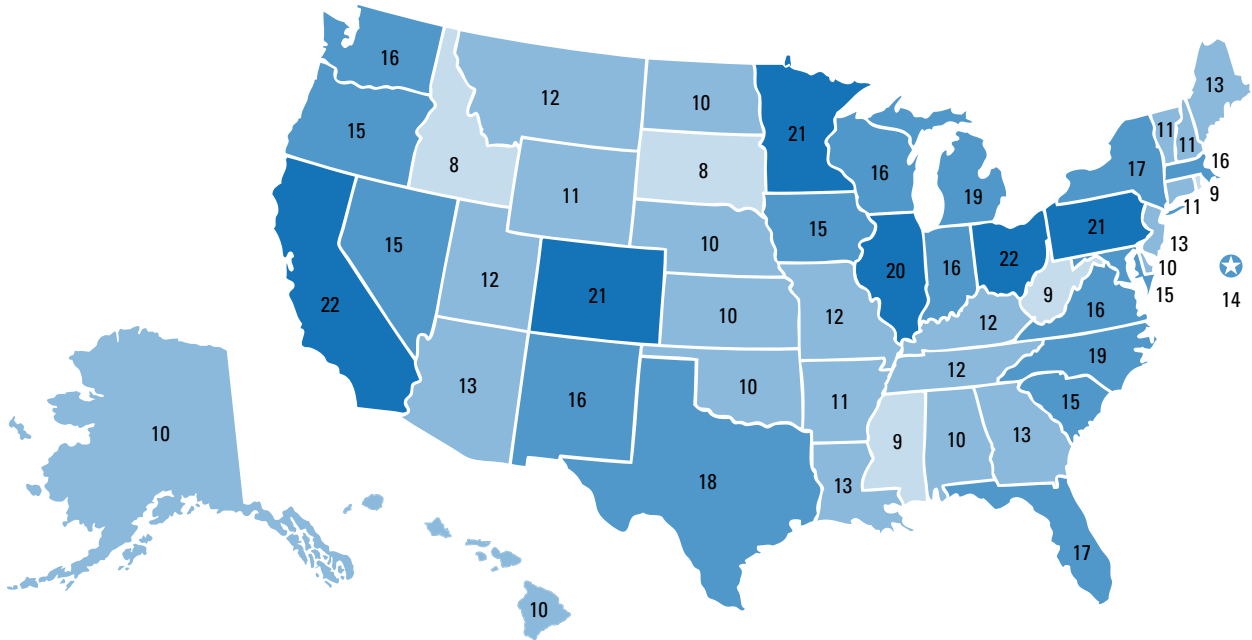
Figure 22: Energy-related CO₂ Emissions, 1990-2018, in Million Metric Tons of CO₂

Contribution of the Foundation’s Work

In 2019, the Foundation’s approaches to reduce energy-related CO₂ emissions continued to produce favorable results. Since 2014, the Foundation’s grantees have undertaken efforts to engage a wide variety of constituencies, regulators, and utilities to identify, mitigate, or close some of the country’s most polluting coal-fired electricity-generating units. This was particularly evident in states with the highest emissions of CO₂. To achieve its desired outcomes, the Foundation is currently supporting multiple organizations that are advancing climate-friendly policies and regulatory action and broadening the climate solutions coalition and improving partnerships.

In 2019, grantees played a significant role in negotiations with state utility regulators and utility companies that contributed to closing four power plants located in Ohio, Pennsylvania, and Arkansas. In addition, since 2015, the Foundation’s grantees have been working in ten of the highest-emitting states that have an outsized impact on CO₂ emissions nationally. Among them, in states with many Foundation-supported grantees, CO₂ emissions decreased by an average of 8.4 million tons. In states with fewer grantees, emissions increased by 2.8 million tons. Between 2015 and 2019, large numbers of grantees worked in California (22 grantees), Illinois (20 grantees), Ohio (22 grantees), and Pennsylvania (21 grantees). Among the ten states with the highest emissions, those with many Foundation grantees saw, on average, a closure of 5.8 coal plants between 2015 and 2018. States with fewer grantees and Foundation-supported activities saw a drop of only 3.4 coal plants.⁵³ The total number of grantees that self-reported working in each state with support from the Foundation are shown in the map on the following page.

⁵³ The mean average of coal plant closures for states with fewer and more Foundation-funded activities reflect data we gathered from grant reports in June and July 2019, as well as the data from the grantee survey. Based on this data, it was clear that Texas was a state with significant Foundation-funded activities and Michigan had fewer Foundation-funded activities than we originally thought. It is worth noting that correlation is not the same as causation. Going forward, more qualitative data could help the Foundation further understand its contribution to activities aimed at reducing emissions of CO₂ at the state level.



Source: 2019 U.S. Grantee Survey

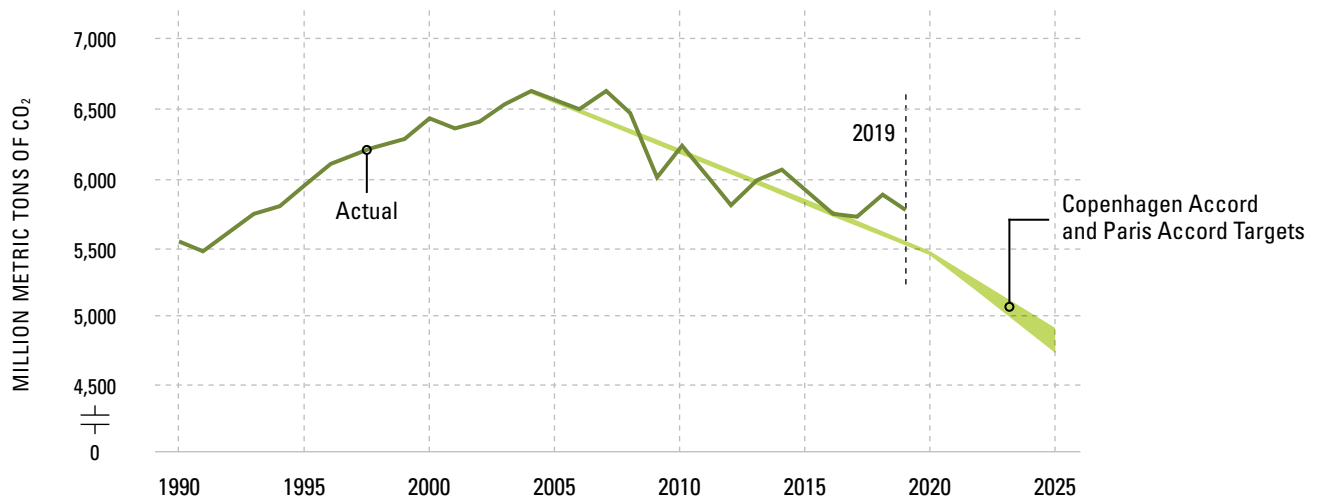
Figure 23: States Where Climate Solutions Grantees Were Working in 2019

Also, in 2019 grantees opposed policies that gave government subsidies to the fossil fuel industry or replaced coal with fossil gas generating units. For example, a few grantees worked together with the Indiana Utility Regulatory Commission to prevent the energy company Vectren from replacing a coal-fired plant with an 850-megawatt gas plant. These grantees also worked with Northern Indiana Public Service Company. The company announced its plans to retire coal plants and replace them with clean energy, energy efficiency, and storage. Others were involved in efforts to block coal-fired and gas-fueled power plant subsidies and impose transmission costs on renewable energy units, which would have undermined that state’s competitive electricity market. In Ohio, grantees promoted ending preferential financial policies for energy and oil and gas companies by opposing the state’s financial bailout of FirstEnergy’s coal operations.

Changes in the Landscape that Affected Progress

Although energy-related CO₂ emissions from coal continued to decline the fastest, those gains are being wiped out by increases in emissions from other sectors. The Rhodium Group estimates that the U.S. has not made any net reductions in CO₂ emissions in the past three years.⁵⁴ Also, the country is behind where it should be to reach the 26-28% emissions reductions target pledged by 2025. The graph that follows shows the historical emissions trajectory with the targets outlined in the Paris Accord.

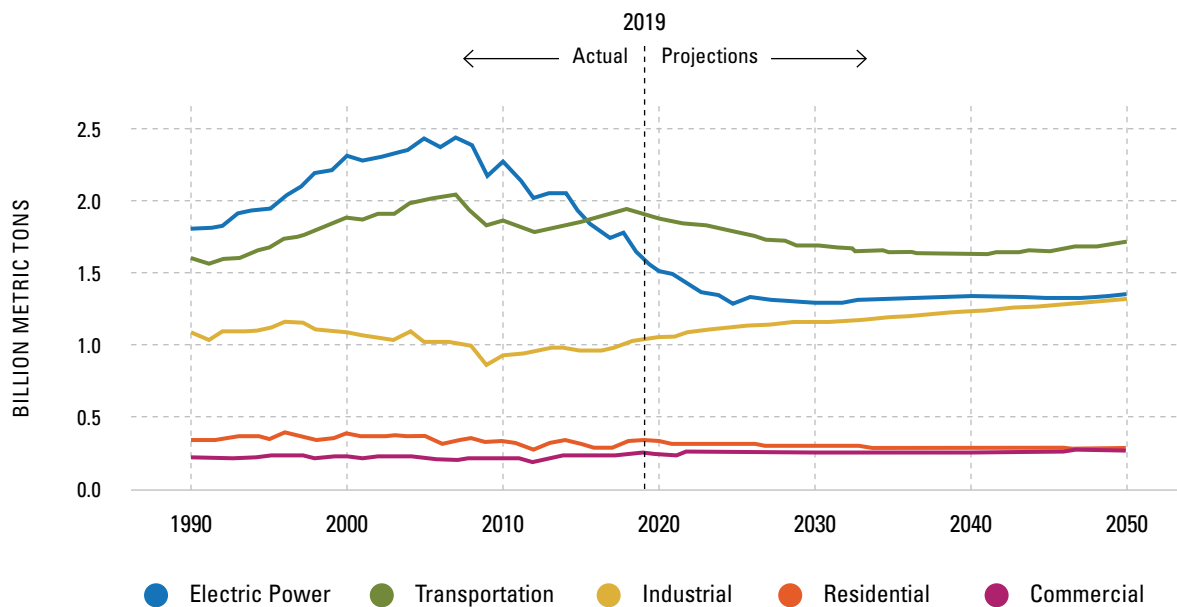
⁵⁴ Preliminary U.S. Emissions Estimates for 2019. Rhodium Group. <https://rhg.com/research/preliminary-us-emissions-2019/>



Source: Rhodium U.S. Climate Service

Figure 24: U.S. Emissions Relative to International Commitments

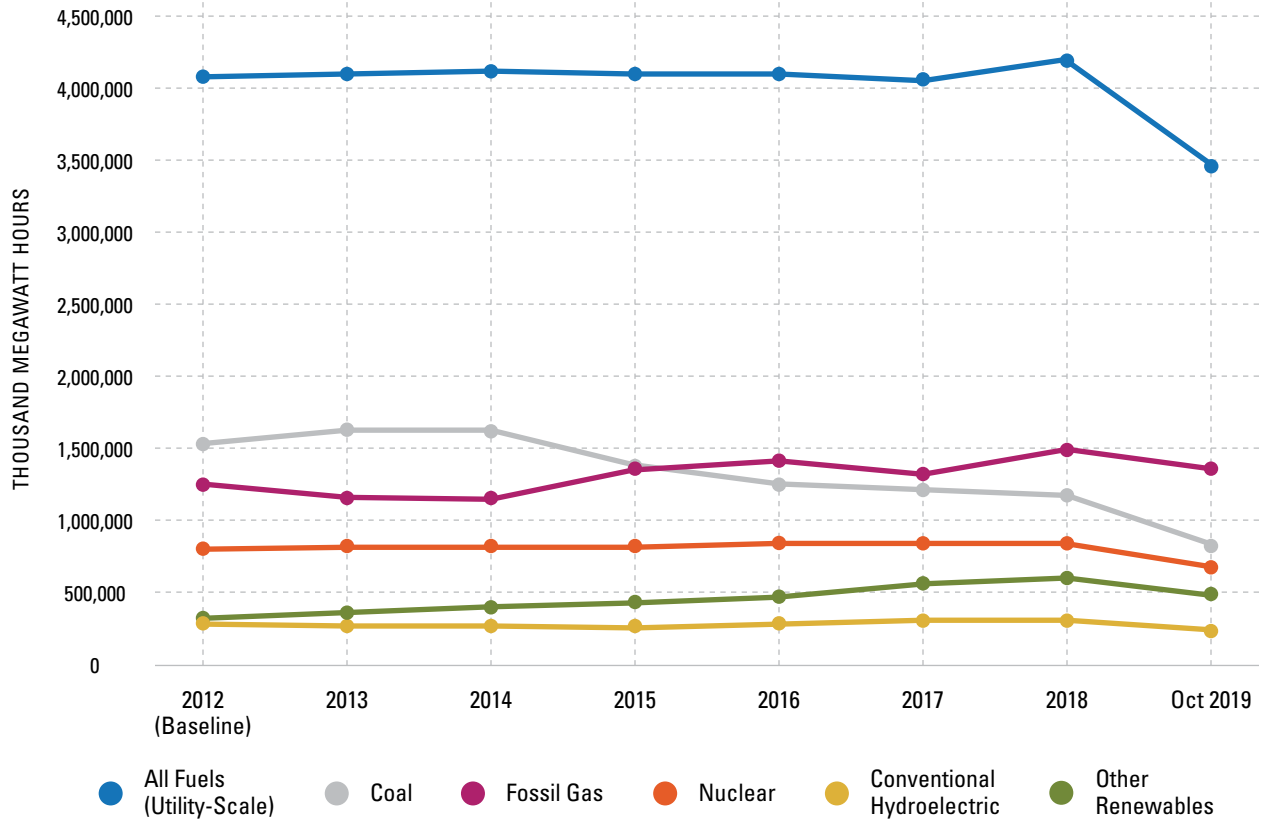
Despite significant reductions in coal-generated electricity, other sectors such as transportation and agriculture had higher emissions. Also, fossil gas is replacing coal-generating units, further negating coal-related progress. In its Annual Energy Outlook 2020, the Energy Information Administration explained that the projected 2019 reductions in CO₂ emissions were largely due to the energy sector, which decreased compared to other major sectors.⁵⁵



Source: U.S. Energy Information Administration in its Annual Energy Outlook, 2020

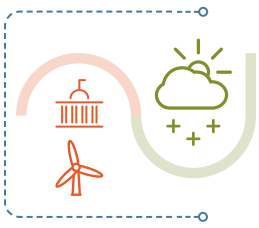
Figure 25: Energy-related CO₂ Emissions by Sector, in Billion Metric Tons

⁵⁵ Annual Energy Outlook 2020. Energy Information Administration <https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Emissions.pdf>



Source: U.S. Energy Information Administration, www.eia.gov

Figure 26: U.S. Net Generation by Fuel Source, in Thousand Megawatt Hours



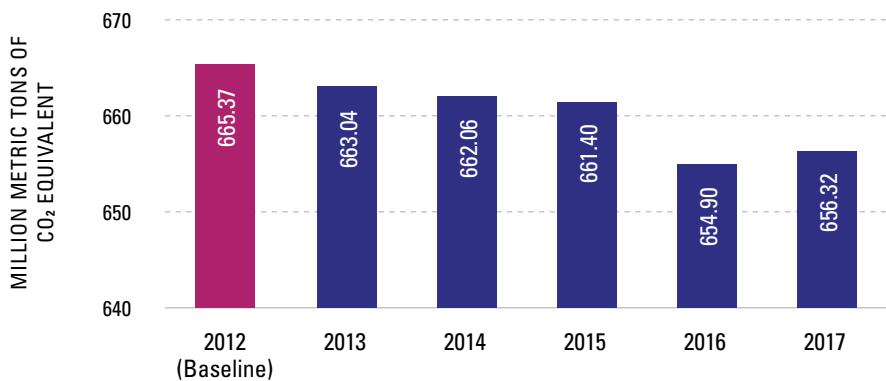
Reduced Emissions of Greenhouse Gas Pollutants

5. At the federal level, progress to reduce emissions of greenhouse gases was set back. As noted in Finding 1, the pace of regulatory rollbacks increased, and legal challenges to prevent further dismantling of climate-related policies and regulations were resolved in the Trump administration’s favor. Some states took proactive steps to pick up the federal government’s slack, and Foundation-supported activities had a positive effect in curbing methane emissions from the oil and gas industry.

Progress Toward the Foundation’s Desired Outcome



Based on emissions data available through 2019, there was no progress at the federal level to reduce emissions of methane or HfCs. Smaller-scale efforts at the subnational level to curtail emissions of these gases were more successful. Although methane and HfCs still make up a relatively small proportion of total greenhouse gas emissions, they matter because of their “Global Warming Potential.”⁵⁶ To assess progress toward the Foundation’s desired outcome, we are tracking changes in the trajectories of gases, such as methane and HfCs, and regulation of emissions from short-lived pollutants. Since baselines were established in 2012, overall methane emissions have decreased by 1.4%. At the same time, data released by the Environmental Protection Agency in 2019 showed increases.⁵⁷ Methane emissions reported for 2017 went up by 1.4mmtCO₂e from 654.9mmtCO₂e in 2016 to 656.3mmtCO₂e in 2017, ending a multi-year period of decreases.⁵⁸ The increase correlated with growth in fossil gas extraction.



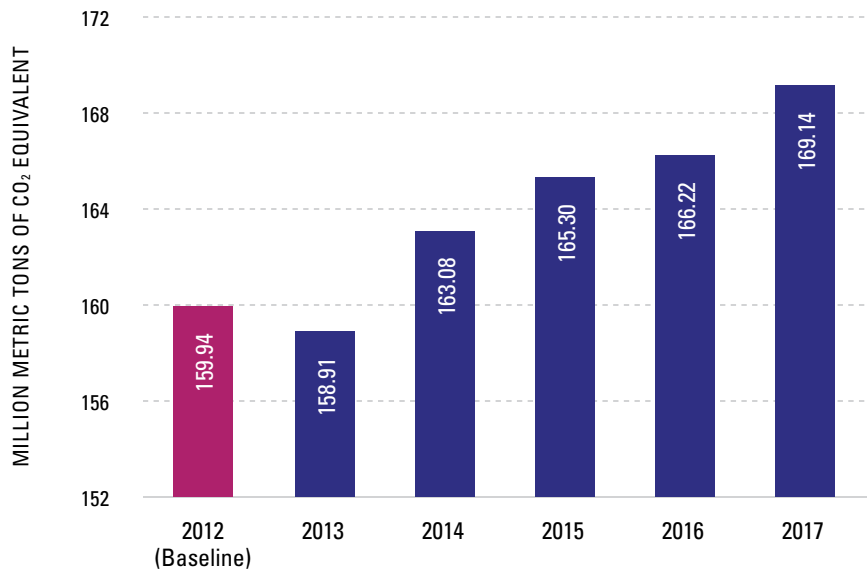
Source: Environmental Protection Agency, www.epa.gov

Figure 27: U.S. Methane Emissions Trends, in Million Metric Tons of CO₂ Equivalent

⁵⁶ The Global Warming Potential of a greenhouse gas is the efficiency of that gas compared to carbon dioxide to trap atmospheric heat. This is a unit of measurement that the International Panel on Climate Change developed to compare the ability of different greenhouse gases to trap heat relative to other gases. Methane is 25 times more effective at trapping heat than CO₂.

⁵⁷ The 2017 data is the most up-to-date data available at the time of writing. In addition, the Environmental Protection Agency revised some of the data from the previous years.

⁵⁸ Greenhouse Gas Inventory Explorer. Environmental Protection Agency. <https://cfpub.epa.gov/ghgdata/inventoryexplorer/#allsectors/allgas/gas/all>



Source: Environmental Protection Agency, www.epa.gov

Figure 28: U.S. HFC Emissions Trends, in Million Metric Tons of CO₂ Equivalent

Although the pace of federal regulatory rollbacks increased in 2019, there were signs of bipartisan congressional support to reduce the emissions of HfCs. Senators John Kennedy (R-La.) and Tom Carper (D-De.) introduced the American Innovation and Manufacturing Act of 2019, which would require that the U.S. phase down HfCs by 2036—a similar timetable to the Kigali Amendment.⁵⁹

At the state level, more strides were made in 2019 to reduce emissions of greenhouse gas pollutants besides CO₂. More states enacted laws or adopted regulations of methane emissions from oil and gas extraction, production, and transportation. As one of her first acts as New Mexico governor, Michelle Lujan Grisham, directed state officials to develop regulations to reduce methane emissions from the oil and gas industry.⁶⁰ New Hampshire enacted a law requiring oil and gas facilities to track and report the amount of methane lost to leaks.⁶¹ New Mexico and New Hampshire joined California, Colorado, Ohio, Pennsylvania, and Wyoming in regulating methane emissions. In addition, Governor Jay Inslee of Washington signed a package of clean energy bills that included one that phases down HfCs for new equipment, starting in 2020.⁶² California is the only other state that has a similar law in place. New Jersey and Vermont enacted phase down laws of HfCs in 2019.

⁵⁹ Environment and Energy Law Program, Harvard University. Hydrofluorocarbons and Kigali Amendment to Montreal Protocol. <https://eelp.law.harvard.edu/2017/09/hydrofluorocarbons-and-kigali-amendment-to-montreal-protocol/>

⁶⁰ Executive Order 2019-003, New Mexico. https://www.governor.state.nm.us/wp-content/uploads/2019/01/EO_2019-003.pdf

⁶¹ New Hampshire SB 123, 2019. <http://custom.statenet.com/public/resources.cgi?id=ID:bill:NH2019000S123&ciq=ncsl29e&clientmd=f7f5500a02143d024dd609342df33f8e&mode=current text>

⁶² HB 1112 2019-2020: Reducing Greenhouse Gas Emissions from Hydrofluorocarbons. <https://app.leg.wa.gov/billsummary?BillNumber=1112&Year=2019&Initiative=false>

It is unclear, however, if progress made among the states mentioned will be enough to compensate for backsliding at the federal level, especially since state regulations are not uniform. Furthermore, at the time of writing, Texas and North Dakota, two of the states with the largest gas extraction footprint, have not enacted regulations to curb emissions of methane.

Contribution of the Foundation's Work

Since the launch of the Climate Solutions Big Bet, the Foundation has contributed to some significant, proactive victories in targeted states to address methane emissions. In 2019, its grantees had favorable—albeit more limited—links to strides made at the subnational level. To reduce emissions of greenhouse gas pollutants, the Foundation funds activities to advance climate-friendly policies and broaden the climate solutions coalition. Its grantees have helped states to adopt their own methane emissions policies in the absence of federal regulations or reduce emissions of short-lived pollutants through other means. These activities included providing technical policy assistance, direct methane emissions measurements, or policy recommendations and research.

For example, the Virginia Department of Environmental Quality created a work group to explore options for reducing emissions of methane from gas extraction, storage, and transportation. In October 2019, the work group released a final report with recommendations.⁶³ In the report, three Foundation-funded grantees were cited as members of the work group. In addition, grantees worked with state regulators and governors in Colorado, New Mexico, Pennsylvania, and Wyoming on policies and regulations to create and strengthen existing efforts to reduce methane emissions from the oil and gas industry. One organization played a particularly significant role working with Governor Wolf's Administration in Pennsylvania to develop an existing source proposal for methane.

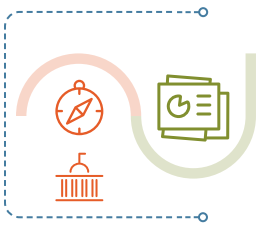
Changes in the Landscape that Affected Progress

As mentioned in Finding 1, opposition to environmental protections at the federal level presents a significant barrier to emissions reductions of methane and HfCs. In 2019, the Environmental Protection Agency announced two new proposals to roll back methane regulations. The proposals would eliminate rules requiring oil and gas companies to reduce methane emissions from their operations. The Agency accepted public comments through November 25, 2019 and held one public hearing on October 17, 2019 in Dallas. At the time of writing, the public comment period was closed and the Environmental Protection Agency had not released finalized rules for methane.⁶⁴ It is worth noting that BP, ExxonMobil, and Shell publicly opposed the rollback of federal methane regulations; however, the companies maintained leadership roles in the American Petroleum Institute, which requested, publicly supported, and lobbied for the rollback of Obama-era methane rules.⁶⁵

⁶³ Ad Hoc Work Group Concerning Methane Leakage from Natural Gas Infrastructure. Virginia Department of Environmental Quality. [https://townhall.virginia.gov/L/GetFile.cfm?File=meeting%5C53%5C29695%5CMinutes DEQ 29695 v2.pdf](https://townhall.virginia.gov/L/GetFile.cfm?File=meeting%5C53%5C29695%5CMinutes%2029695%20v2.pdf)

⁶⁴ Proposed Policy Amendments 2012 and 2016 New Source Performance Standards for the Oil and Natural Gas Industry, August 29, 2019 <https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/proposed-policy-amendments-2012-and-2016-new>

⁶⁵ Environment and Energy Law Program, Harvard University. <https://eelp.law.harvard.edu/2017/09/epa-voc-and-methane-standards-for-oil-and-gas-facilities/>



Building Political Will

6. The volume and favorability of discourse among candidates and policymakers on climate change hit an all-time high in 2019. The surge was driven by changes in the makeup of Congress, increasing demand for political action on climate by center-left policymakers, and a groundswell of climate activism among young people. Foundation-supported activities to alter discourse contributed positively to the momentum. Grantees appeared frequently in media coverage and helped infuse policymaker discourse with more discussion about solutions such as renewable energy. At the same time, despite 2019 being a breakthrough year, overall public discourse still did not reflect a focus on solutions or clear calls to action. Also, favorable conversation about climate change among conservatives was present but minimal, and there was rising backlash to bold solutions such as the Green New Deal.

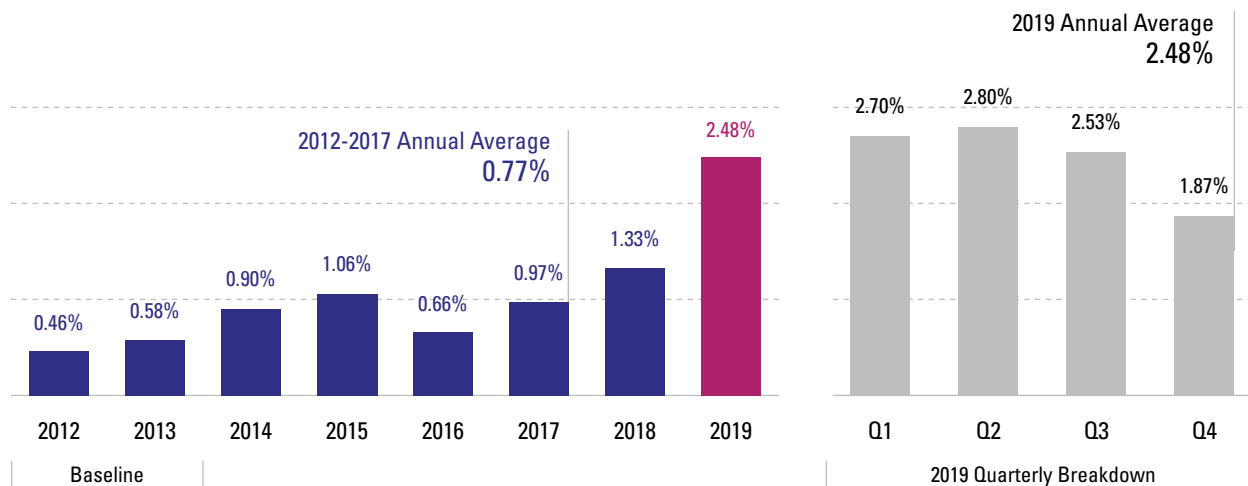
Progress Toward the Foundation's Desired Outcome



Since the launch of the Climate Solutions Big Bet, to achieve its desired outcomes, the Foundation has invested significantly in efforts to alter political discourse. To assess progress and the Foundation's contribution to promoting U.S. leadership in this area, Grassroots Solutions, with assistance from Protagonist, is tracking changes in 1) candidate and policymaker discourse, 2) the solutions orientation of media coverage, and 3) the base of climate advocates. See Appendix B for additional details about the methodology adopted.

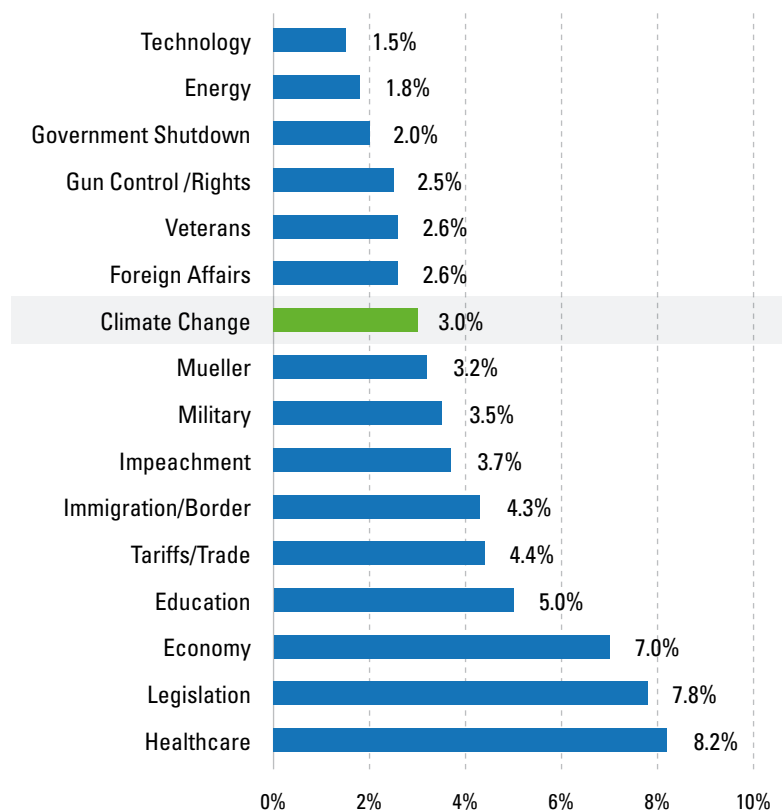
Candidate and Policymaker Discourse

2019 was a breakthrough year for candidate and policymaker discourse on climate change. Since baselines were established in 2012 and 2013, the volume and favorability of candidate and policymaker discourse reached a high-water mark of 2.80% in the second quarter. The spike was driven by conversation about the Green New Deal. In 2019, the total volume averaged 2.48% compared to 1.33% in 2018—an 86% increase. Until recently, progress to grow candidate and policymaker discourse on climate change has been incremental and the overall volume low. By way of comparison, other issues such as healthcare and immigration have accounted for a much larger proportion of the policymaker discourse. In 2019, climate change featured more prominently and accounted for 3% of posts from policymakers' official handles.



Source: Protagonist

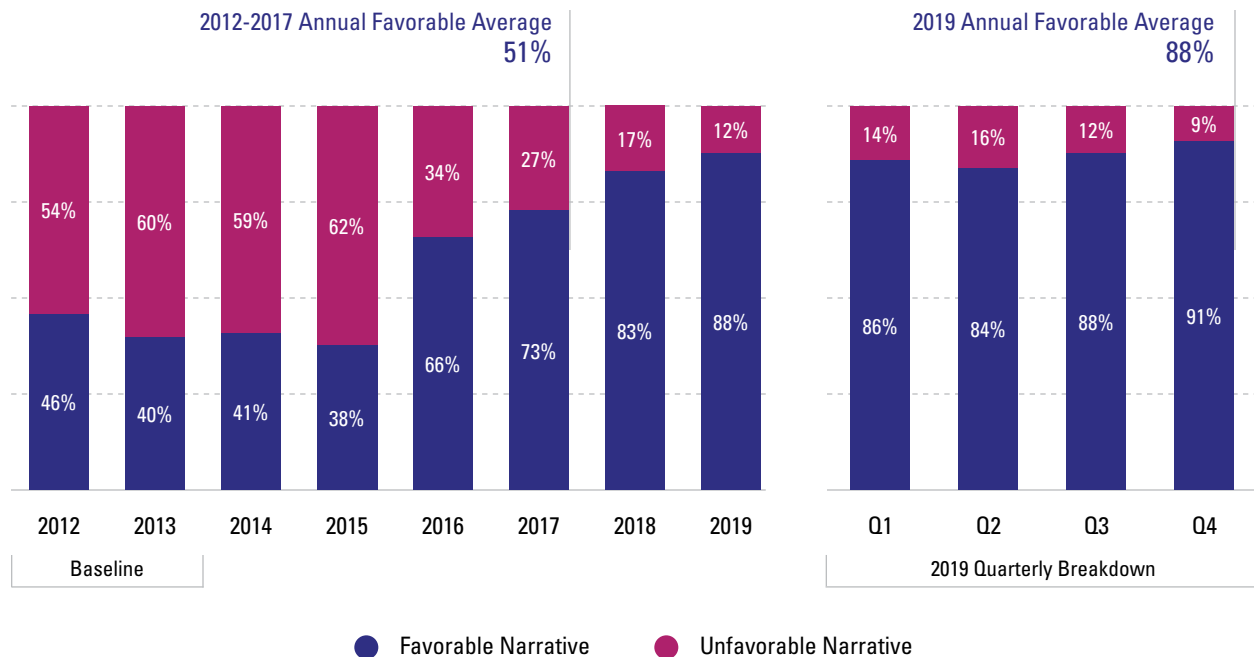
Figure 29: Percent of Total Candidate and Policymaker Discourse on Climate Change, 2012-2019



Source: Protagonist

Figure 30: Topics in Policymaker Discourse (from policymakers' official Twitter handles, including U.S. Senators, House Representatives, State Governors, and State Attorneys General), 2019

The favorability of candidate and policymaker discourse also hit an all-time high in 2019. Since 2017, favorable commentary has comprised more than 70% of the overall candidate and policymaker discourse. In 2019, the annual average was 88%, and favorable commentary accounted for a notable 91% of candidate and policymaker discourse in the fourth quarter. The spikes in favorable commentary over the course of 2019 were driven primarily by Democratic policymakers and correlated with House Democrats introducing the Green New Deal, Earth Day, Greta Thunberg’s appearances before the United Nations and U.S. Congress, the Trump administration announcing official withdrawal from the Paris Accord, and House Speaker Nancy Pelosi leading a bicameral Congressional Delegation to Madrid, Spain for the 2019 United Nations Framework Convention on Climate Change (COP25).



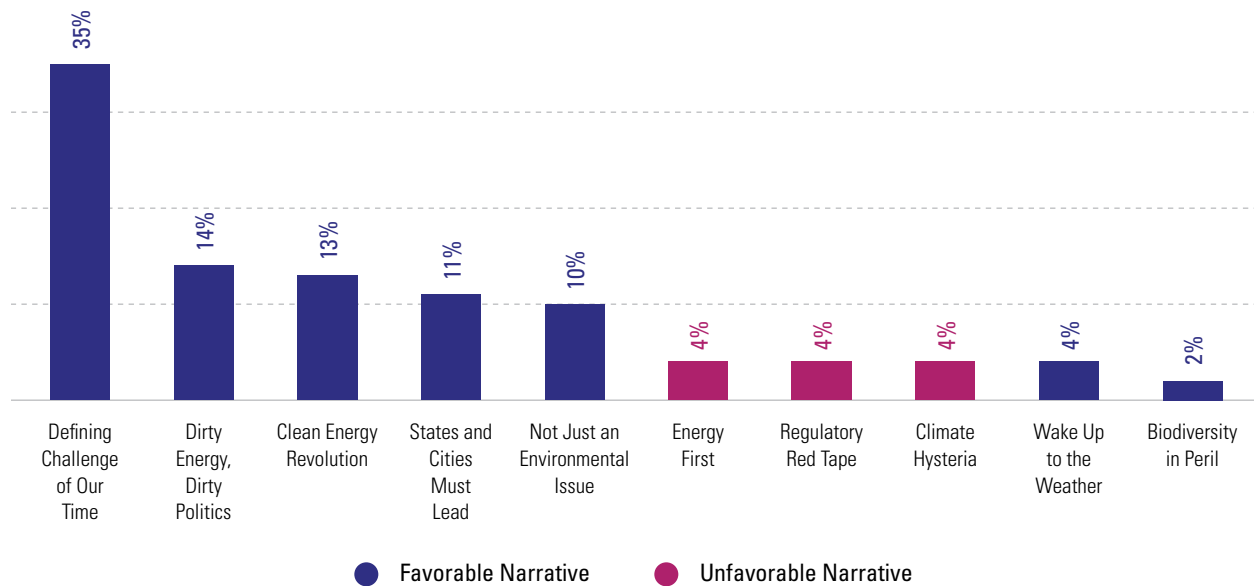
Source: *Protagonist*

Figure 31: *Candidate and Policymaker Discourse on Climate Change in 2019, Total Favorable/Unfavorable Narrative Distribution*

Two out of seven favorable narratives identified by Protagonist—“Defining Challenge of Our Time” and “Dirty Energy, Dirty Politics”—featured most prominently in the candidate and policymaker discourse in 2019.⁶⁶ Those narratives accounted for 49% of that discourse and were propelled largely by Democrats and the center-left as opposed to Republicans or the center-right. Also, although favorable, neither narrative is focused on solutions.

⁶⁶ See Appendix C for a complete overview of the U.S. Narrative Landscape. Originally, Protagonist identified 11 narratives that comprise the “narrative landscape” tracked from 2012 to 2018; seven were favorable and four were unfavorable. Currently, we are tracking ten. The abridged description of “Defining Challenge of Our Time” is that “time is running out; we must embrace bold action to avoid catastrophe.” The abridged description of “Dirty Energy, Dirty Politics” is that “the science denying federal administration—the byproduct of years of dirty money and misinformation—must be stopped.” In 2019, Grassroots Solutions worked with Protagonist to refresh the assessment of narrative landscape. Through that undertaking, Protagonist observed some changes. “Climate Hysteria” is a new unfavorable narrative that we are currently tracking. Its emergence reflects a consolidation of two unfavorable narratives that were previously tracking: “Green Conspiracy” and the “So-Called Science.” Its abridged description is that “the liberal hysteria over climate change is a deliberate campaign based on manipulated science to manufacture fear.”

“Defining Challenge of Our Time,” accounted for 35% of candidate and policymaker discourse on climate change. The prominence of “Defining Challenge of Our Time” was nearly three times higher than “Dirty Energy, Dirty Politics” at 14%. It is worth noting that the third-most prominent narrative, “Clean Energy Revolution”, gained considerable ground in the third and fourth quarters of 2019. That narrative accounted for 19% of the candidate and policymaker discourse in the second half of the year, and it was up 10% compared to 2018.

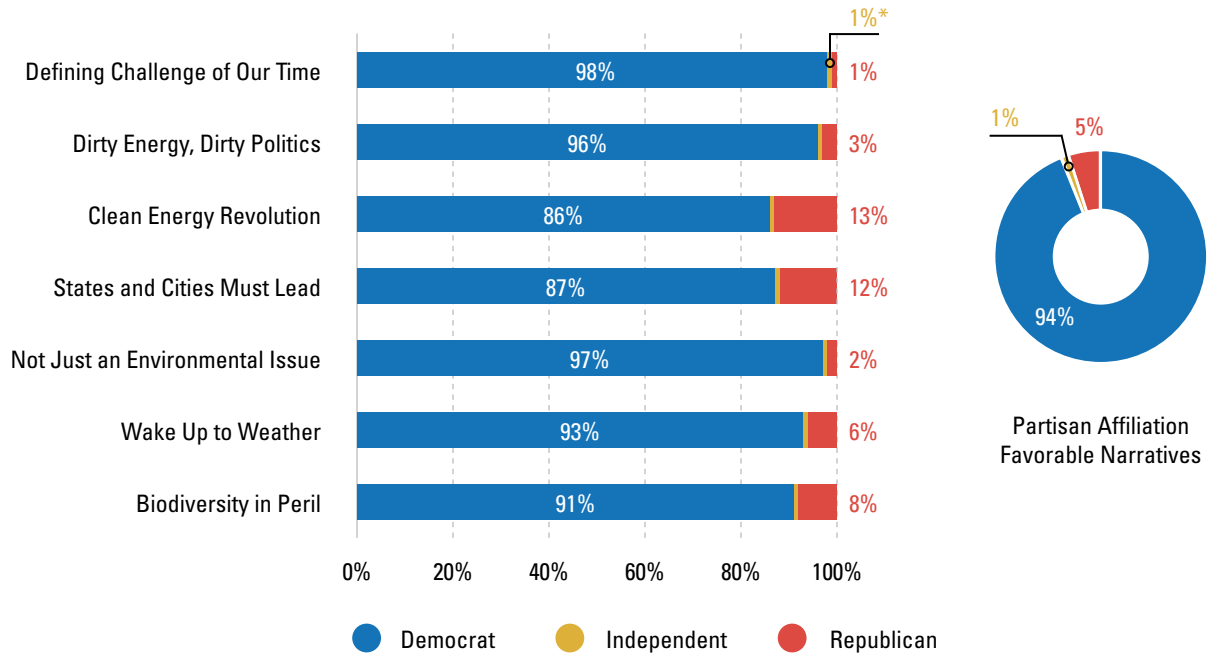


Source: *Protagonist*

Figure 32: *Narrative Impact in the Candidate and Policymaker Discourse on Climate Change in 2019*

In addition, since 2017, we have tracked the partisan makeup of candidate and policymaker discourse. Based on the 2019 data analyzed, we continued to observe a pronounced ideological divide.⁶⁷ Democrats were overwhelmingly associated with favorable narratives on climate change. Republicans were largely associated with unfavorable narratives. Also, discourse among Democratic candidates and policymakers was infused with more solutions than their Republican counterparts. When Republicans did mention solutions, it was often in opposition rather than offering support or proposing climate solutions. One exception was renewable energy. Although it was mentioned less frequently by Republicans (9%) than Democrats (37%), it was a climate solution that appeared in both Democrats’ and Republicans’ commentary. Also, in 2019, we observed a slight increase in Republican affiliation with two favorable narratives: “Clean Energy Revolution” and “States and Cities Must Lead.”

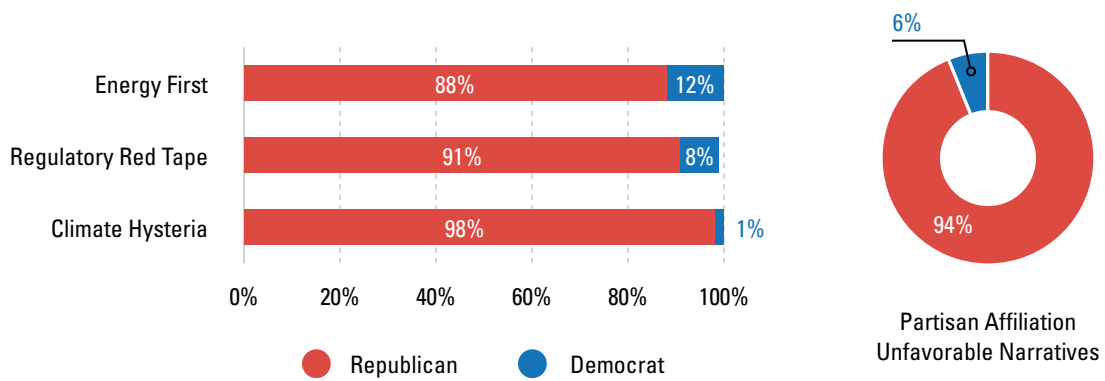
⁶⁷ Partisanship was the best proxy to understand the ideological breakdown of conversation about climate change that aligns with each narrative. Favorable and unfavorable narratives by partisan affiliation were based on candidates’ and policymakers’ self-declared party identification.



* Independents represent 1% for all Narratives

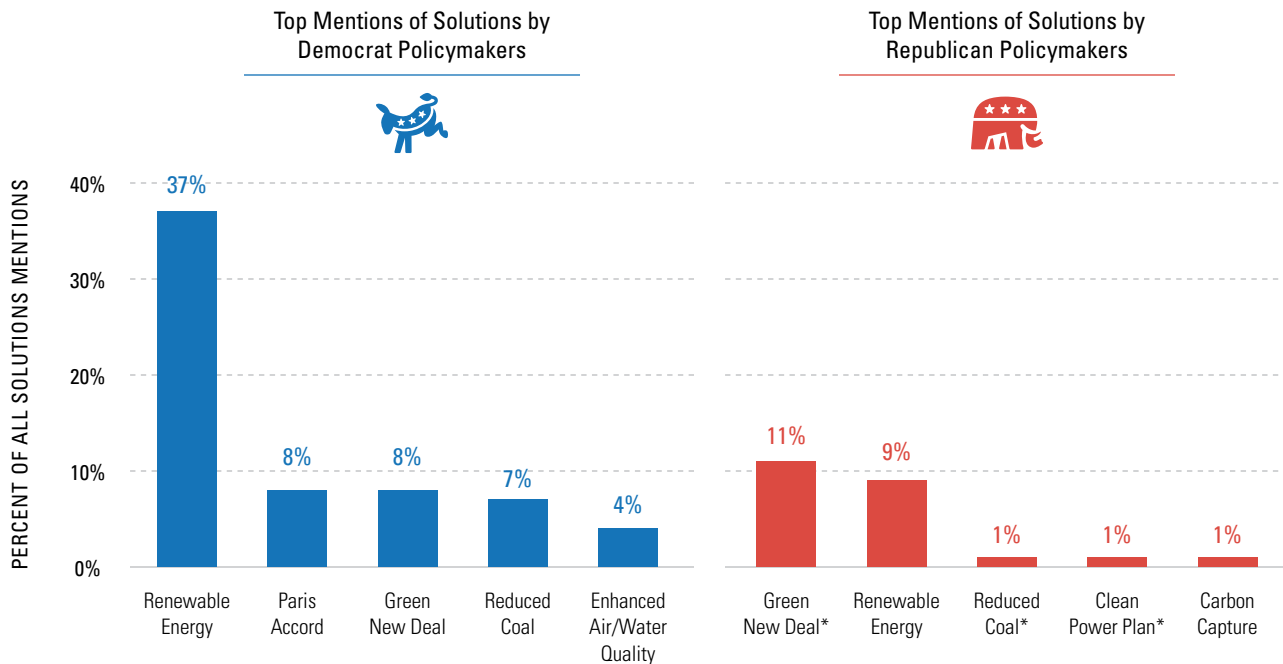
Source: Protagonist

Figure 33: Climate Change Narratives and Partisan Affiliation, 2019 (Favorable Narrative)



Source: Protagonist

Figure 34: Climate Change Narratives and Partisan Affiliation, 2019 (Unfavorable Narrative)



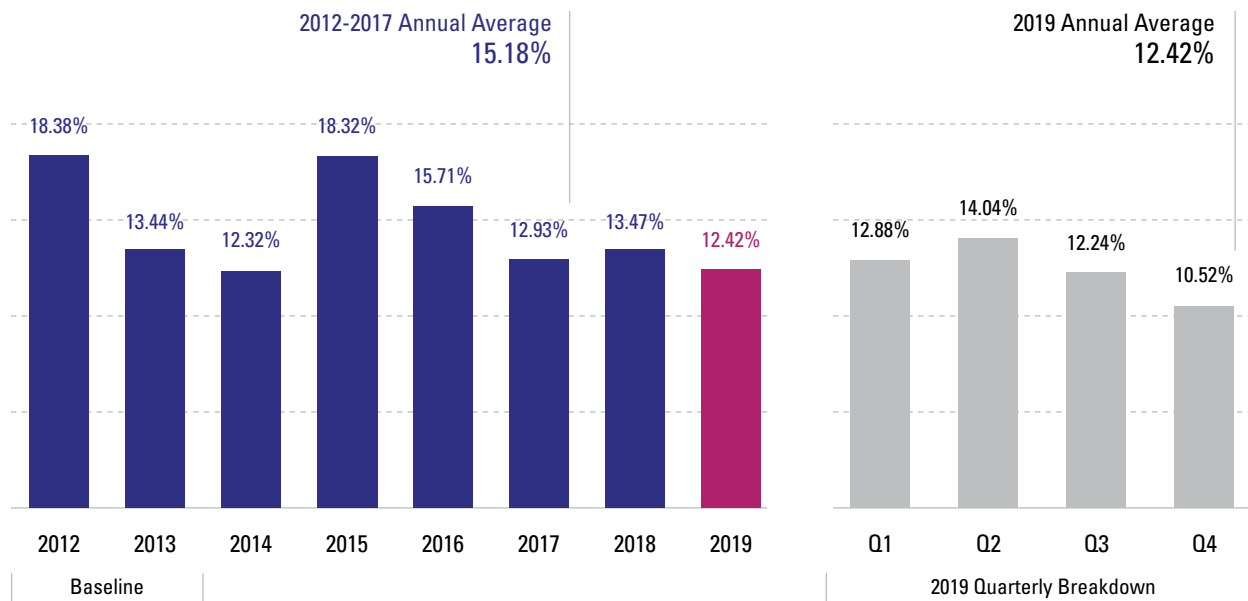
* Discussion of these solutions was primarily unfavorable

Source: Protagonist

Figure 35: Solutions in the Policymaker Discourse by Partisan Affiliation, 2019

The Solutions Orientation of Media Coverage

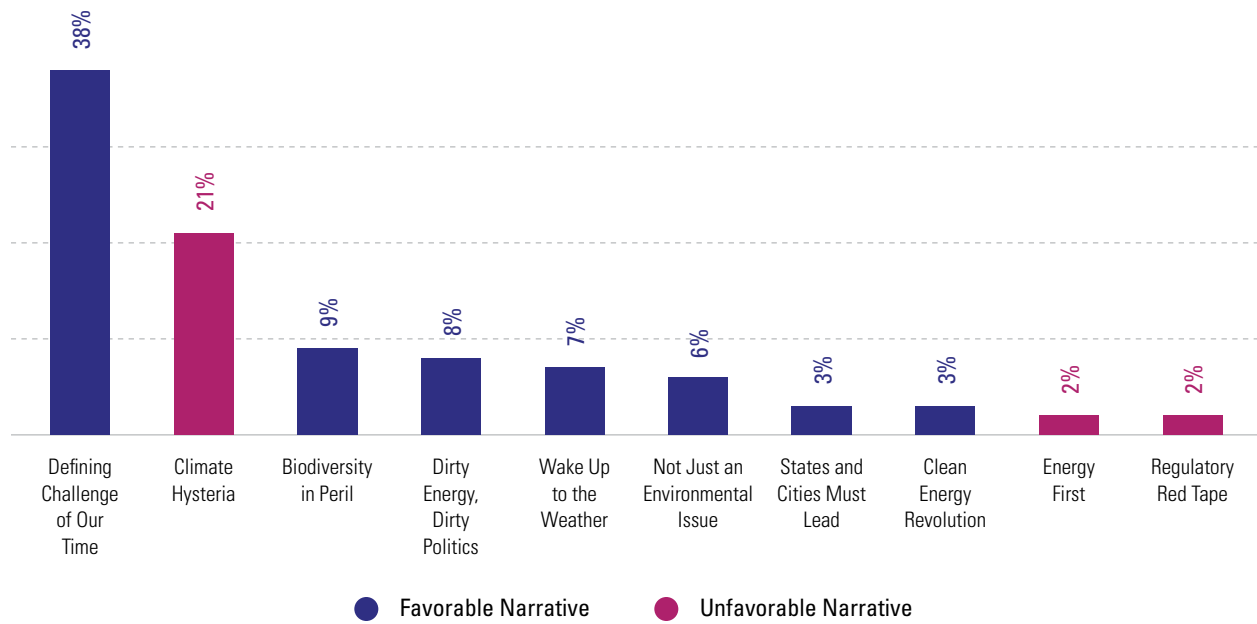
Despite growth in the volume and favorability of discourse among candidates and policymakers, media coverage of climate change and overall public discourse was not solutions-focused (public discourse includes, but is not limited to, candidates and policymakers). One assumption that underpins the Foundation’s U.S. theory of change is that climate messages must convey both the problem and the solution. Since baselines were established, the percentage of public discourse devoted to climate solutions has trended downward. From 2012 to 2017, the annual average was 15.18%. In 2018, it was 13.47%. In 2019, it dropped to 12.42%, which equates to a decrease of nearly 5% compared to the baselines.



Source: *Protagonist*

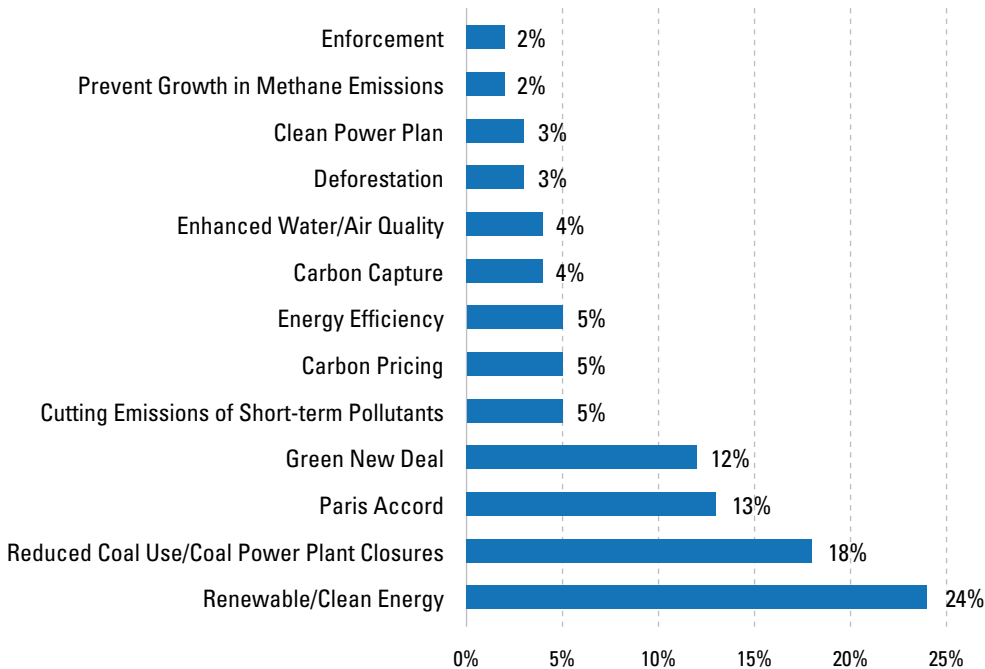
Figure 36: *Percent of Total Public Discourse Climate Change Conversation Devoted to Solutions*

Since 2017, one narrative—“Defining Challenge of Our Time”—has been most prominent among both policymakers and the broader public. In 2019, it accounted for 38% of overall public discourse on climate change. “Defining Challenge of Our Time” increased in prominence in mainstream and progressive media outlets in 2019, but this narrative is not anchored in a specific solution. Instead, it is often linked with generalized calls for action. That said, the most talked-about solutions were renewable/clean energy, reduced coal use/coal power plant closures, the Paris Accord, and the Green New Deal. Together these solutions drove a disproportionate amount of the favorable conversation about climate change.



Source: Protagonist

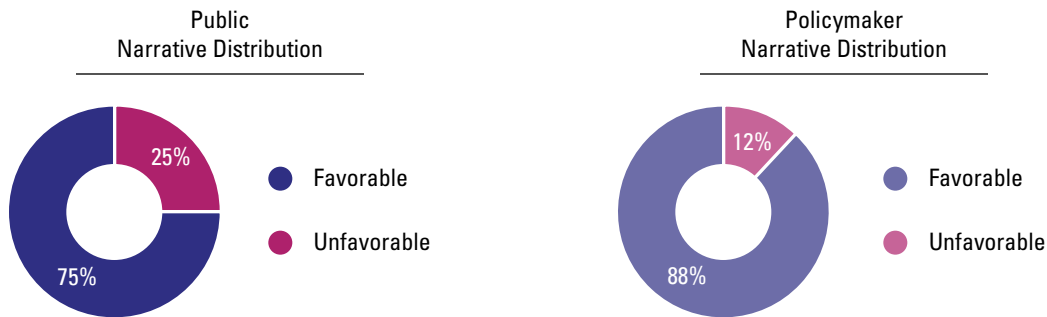
Figure 37: Narrative Impact in Public Discourse on Climate Change in 2019



Source: Protagonist

Figure 38: Narrative Impact of Solutions Within the Public Discourse on Climate Change, Q1-Q4, 2019 Averages

Although outright denial of climate change and disputes over the climate science among both policymakers and the public remained relatively low overall, public discourse on climate change continued to be less favorable than discourse among candidates and policymakers. In 2019, one unfavorable, non-solutions focused narrative surged in the public discourse: “Climate Hysteria.” It was the second most prominent narrative in the public discourse and represented a significant consolidation of climate solutions opponents’ messaging. Its emergence matters because of the potential for unfavorable commentary and media coverage to have a negative influence on policymakers and political will to advance climate solutions, especially during a presidential election year. The differences between policymaker and the public discourse are shown in the pie charts that follow.



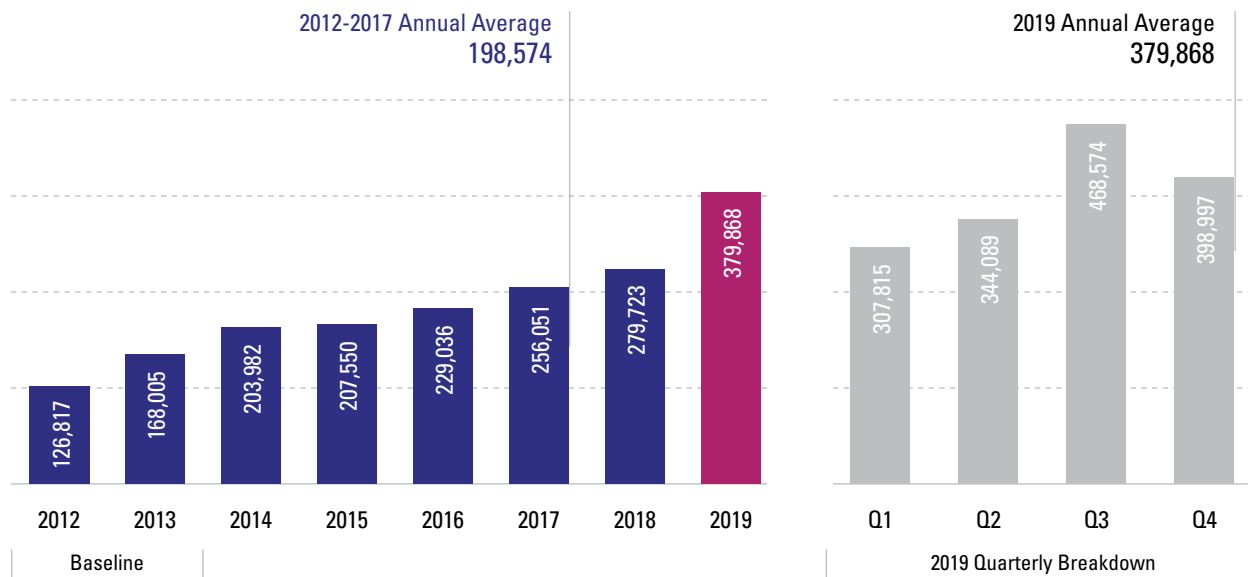
Source: *Protagonist*

Figure 39: *Public versus Policymaker Discourse on Climate Change in 2019 (Favorable and Unfavorable Narrative Distribution)*

The Base of Climate Advocates

Finally, in 2019, the number of advocates for climate solutions continued to grow. From 2012 through 2017, an annual average of 198,574 unique contributors participated in climate change conversations each month.⁶⁸ In 2018, the annual average was 279,723. In 2019, that number went up to 379,868—a 36% annual increase and the largest annual jump since baselines were established. The major increase in the third quarter was sparked by public backlash to President Trump’s anti-climate change rhetoric, the Democratic presidential nomination contest, and momentum from the international youth climate movement.

⁶⁸ This includes social media accounts posting climate-related content and may include new accounts added to Twitter or existing accounts that have become active in the climate change discussion. It is worth noting that these were unique contributors in the narrative conversations about climate change; more Americans mention climate change online each quarter. Also, the increase in unique accounts significantly outpaced the growth in Twitter usage in the U.S. during this period.

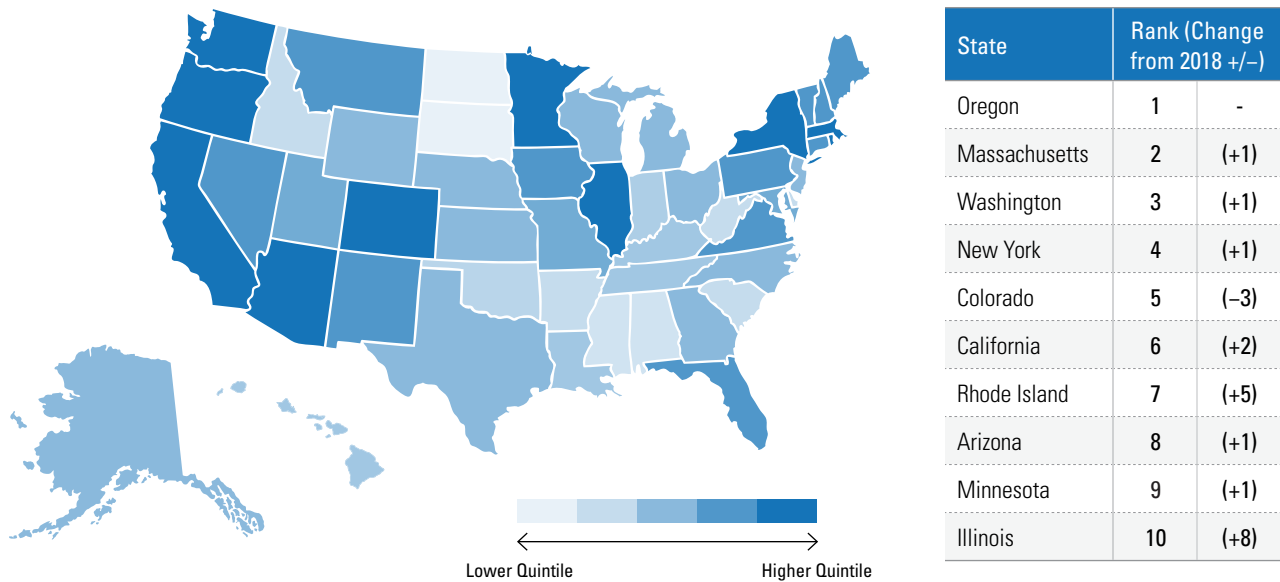


Source: Protagonist

Figure 40: Average Unique Contributors* to Climate Change Conversation per Month

* Average unique contributors measures number of social media accounts posting climate-related content; may include new accounts added to Twitter or existing accounts that have become active in climate change discussion.

At the same time, although the base of advocates grew substantially in 2019, the growth was not evenly distributed across states, and the per capita distribution of advocates for climate solutions has not changed significantly since the launch of the Climate Solutions Big Bet. With limited exceptions, climate advocates are concentrated in coastal states and states with a history of support among the center-left for climate solutions and policies. Eight of the ten states with the most unique contributors participating in climate change conversations each month remained the same in 2019 compared to 2018. Illinois was one state that moved into the top-ten; Nevada dropped down.



Source: Protagonist

Figure 41: Volume of Solution Mentions per Capita in 2019*

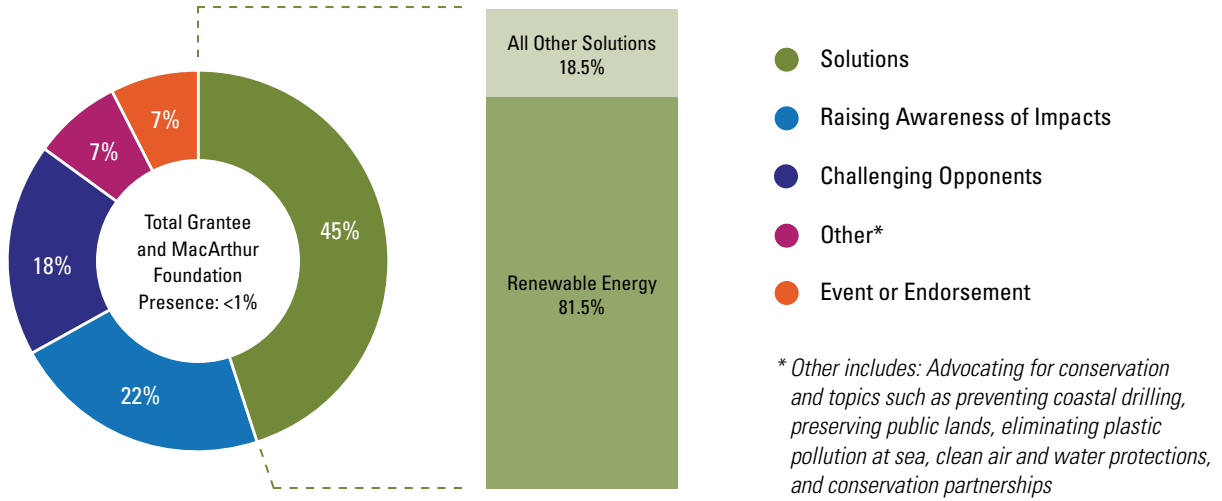
* Data represents the number of posts discussing climate change solutions favorably weighted by the state population.

Contribution of the Foundation's Work

In 2019, the Foundation's grantees helped nurture increases in favorable conversation among policymakers, generate positive media coverage and normalize solutions, and accelerate growth in the base of climate advocates. To achieve its desired outcome, since 2014, the Foundation has invested heavily in activities aimed at altering political discourse and broadening the climate solutions coalition. This subset of the Foundation's U.S. portfolio is the largest. In 2019, 21 grantees worked with a variety of constituencies that include long-term climate advocates, veterans, businesses, faith groups, and conservatives. A key characteristic of the Foundation's approach is that by supporting authoritative organizations and messengers, the Foundation hopes that elected state and federal officials will recognize the need for climate solutions and be motivated to act.

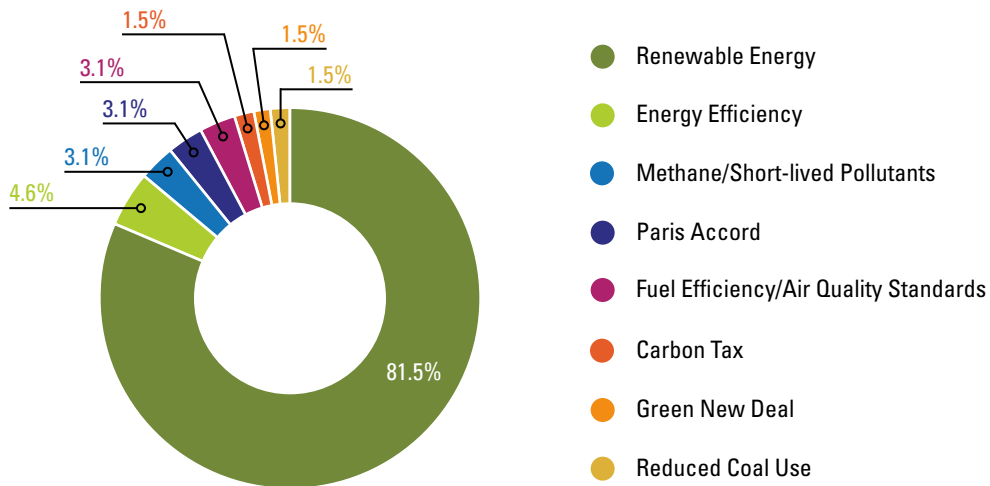
In 2019, the Foundation's grantees helped nurture and grow favorable commentary about climate change among candidates and policymakers. Twenty-three organizations were directly mentioned, or their content was mentioned, by candidates and policymakers (note: not all these organizations were primarily funded by the Foundation to undertake activities associated with altering discourse; some were funded mainly to advance climate-friendly policies or broaden the climate solutions coalition). Approximately half of all mentions of the Foundation's grantees by policymakers included a reference to a solution, and 81.5% of the time that solution was renewable energy. Total mentions of the Foundation's grantees and climate solutions by candidates and policymakers increased by 13% compared to 2018. Evidence of the strategy's contribution to candidate and policymaker discourse was most visible in the growth of the "Clean Energy Revolution" narrative which increased 10% compared to 2018.

✓ Total Policymaker Mentions of Grantees and Solutions Up 13% over 2018 ✓



Source: Protagonist

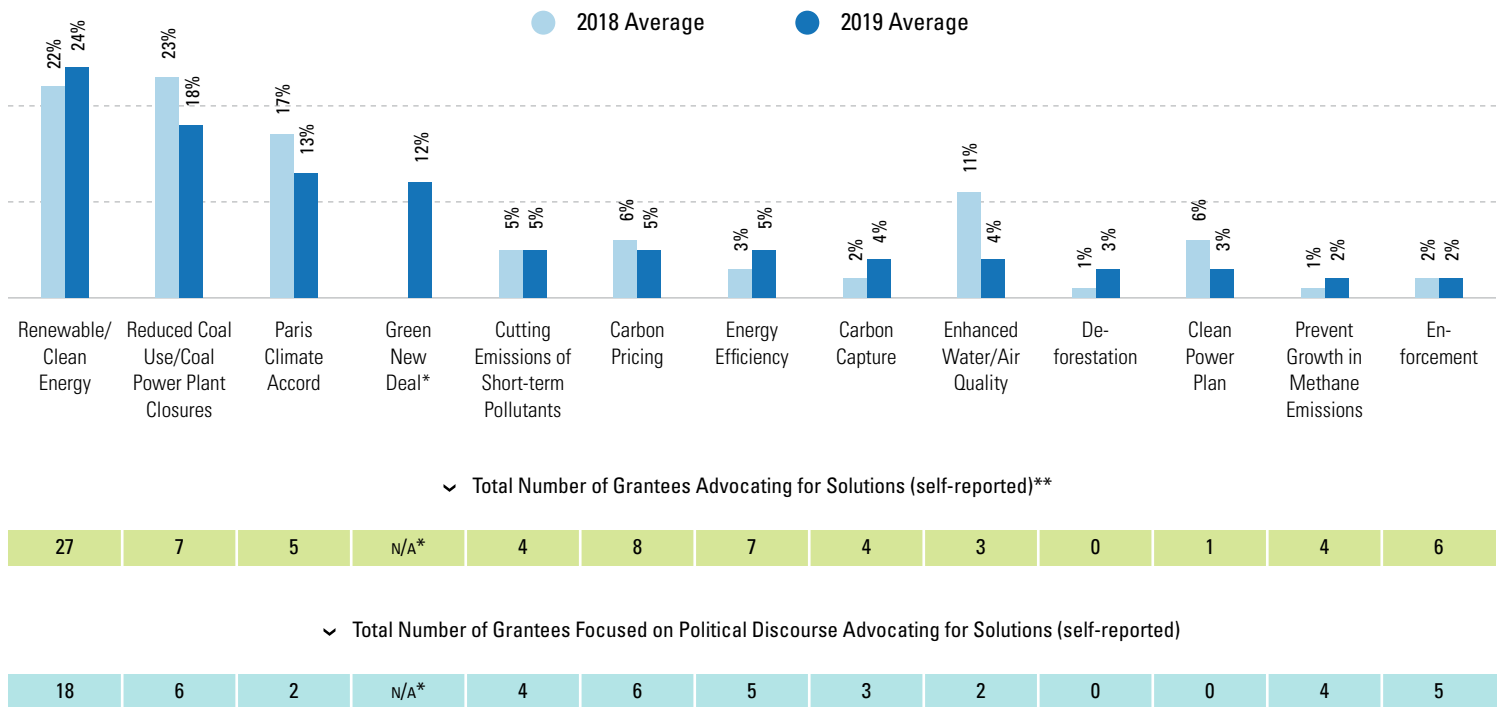
Figure 42: Grantee Mentions in Candidate/Policyholder Discourse by Topic, Q1-Q4 2019



Source: Protagonist

Figure 43: Grantee Mentions with Solutions in Candidate/Policyholder Discourse, Q1-Q4 2019

In addition, in 2019, the Foundation and its grantees contributed to generating positive media coverage and normalizing climate solutions in public discourse.⁶⁹ The Foundation’s grantees appeared in 8.5% of the media coverage on climate change in 2019, a level that is significant given the size and diversity of the climate change media landscape. In 2019, grantees were frequently mentioned in media outlets that included the *New York Times*, *The Washington Post*, *Washington Examiner*, *The Guardian*, *Reuters*, *Associated Press*, and more. They helped shape the media coverage of significant climate-related events such as the country’s official withdrawal from the Paris Accord, COP25, and the Environmental Protection Agency’s regulatory rollbacks. As noted earlier, the climate solution driving most of the favorable conversation about climate change in the broader public discourse was renewable/clean energy, which was consistent with the focus of many the Foundation’s grantees.



* Tracking of the Green New Deal as a Solution began in January 2019.

** Grantee responses to survey question: “What are the main climate solutions your organization is advocating for in 2019 with support from the Foundation? Choose up to THREE.”

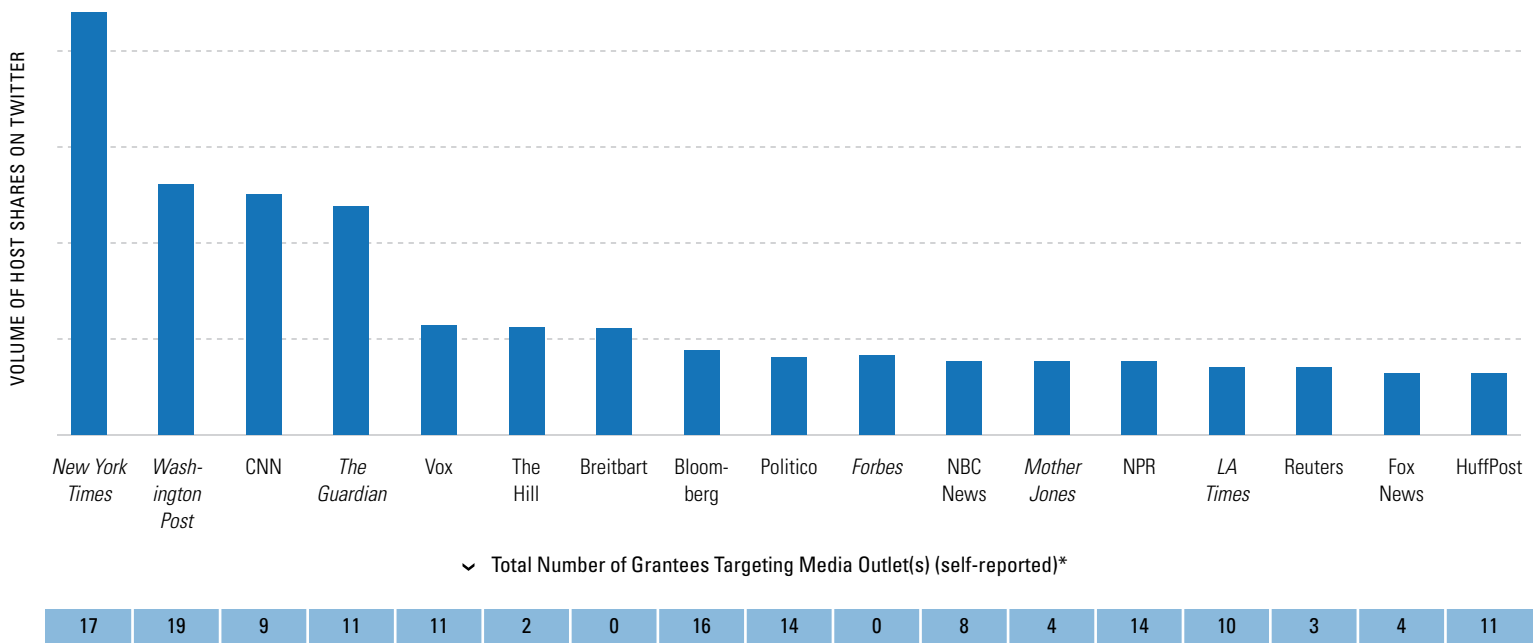
Source: Protagonist

Figure 44: Climate Change Solutions Driving the Favorable Conversation in the Public Discourse, 2019 Average

⁶⁹ Grantees presence in media coverage is a weighted measure that takes into account source prominence and the amount of social sharing of articles that mentioned grantees.

Also, in 2019, the ten states with the most unique contributors participating in climate change conversations each month—Oregon, Massachusetts, Washington, New York, Colorado, California, Rhode Island, Arizona, Minnesota, and Illinois—were by and large states where there were active policy debates that grantees were involved in amplifying or driving.

At the same time, there was diffusion in terms of the solutions promoted and some disconnects between what grantees were working on and the most prominent solutions driving favorable conversation in the public discourse. And we see less evidence to suggest that the Foundation’s strategy helped diversify the base of support or counter the rise of “Climate Hysteria,” especially in conservative media. Foundation-supported activities had the most influence in generating favorable coverage of climate solutions by mainstream and progressive outlets.



* Grantee responses to survey question: “Which media outlet(s) does your organization primarily target to generate earned media?”

Source: Protagonist

Figure 45: Top Climate News Sources on Social Media and Grantee Targets, 2019 (Volume of Host Shares on Twitter)

Changes in the Landscape that Affected Progress

Recently elected Members of Congress and governors who made climate change a priority during their 2018 campaigns continued to advance climate solutions in 2019. The Democrat-controlled House of Representatives held numerous committee hearings about the causes and effects of climate change and potential solutions to address it. Also, newly elected and re-elected governors pushed for climate change mitigation and adaptation efforts in their states, using their “bully pulpit” to help make the case for the climate action. For example, Governors Tony Evers (D-WI), J.B. Pritzker (D-IL), Tim Walz (D-MN), Gretchen Whitmer (D-MI), and Tom Wolf (D-PA) were all elected or re-elected in 2018. In 2019, each encouraged presidential candidates and other Great Lakes governors to join them in addressing the impact of climate change on Midwestern states, especially the Great Lakes basin.⁷⁰

In the 2018 Annual Report, we noted that discourse on climate change showed signs of increasing polarization. That trend continued in 2019 and the gap in opinions between Democrats and Republicans on climate change widened. Polling conducted by the Pew Research Center in 2019 found that 73% of Democrats say that climate change is a very big problem compared to 17% of Republicans.⁷¹ The poll showed that climate change, along with healthcare, was among the top two national problems identified by Democratic respondents. In contrast, Republicans were more concerned with illegal immigration and drug addiction.⁷² Polling commissioned by The Gallup Group in March 2019 found that Democrats are three times more likely to say they are worried about the environment compared to Republicans. It showed that approximately 86% of Democratic respondents think that the government is not doing enough to protect the environment as opposed to only 25% of Republican respondents—a 61% difference between self-identified partisans.⁷³ Findings from the Pew Research Center and Gallup were consistent with polling conducted in 2019 by the Yale Program on Climate Change Communication, which found that 83% Democrats think that global warming should be a high priority for the President and Congress compared to 22% of Republicans.⁷⁴

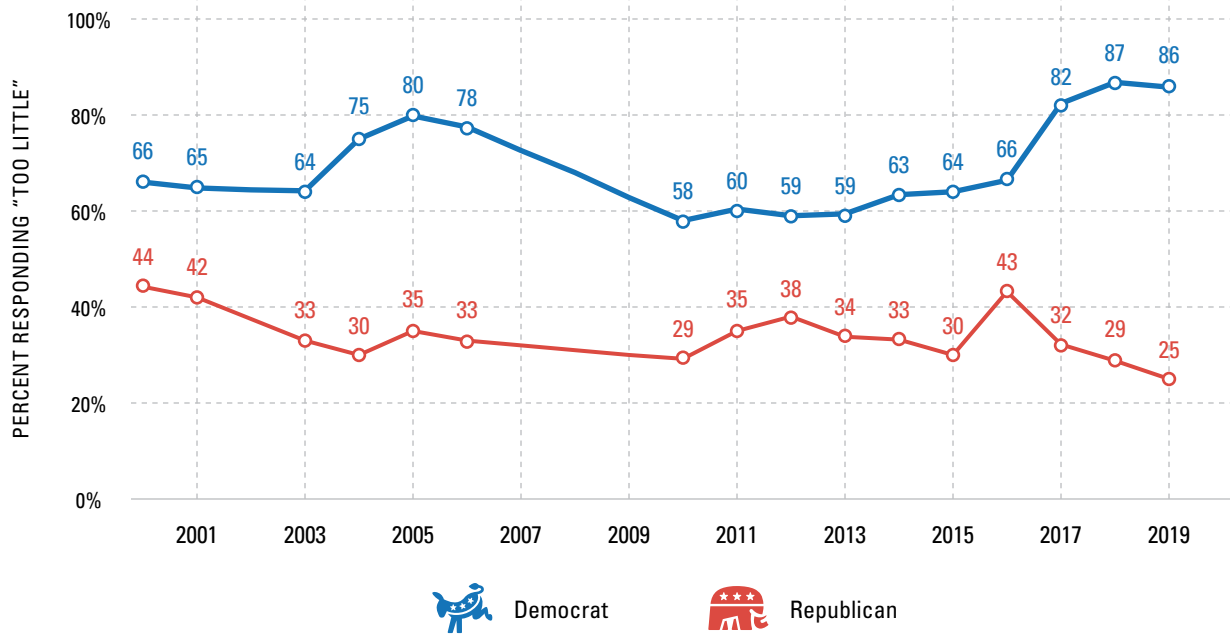
⁷⁰ “Five Midwestern governors push presidential candidates to aid Great Lakes.” The Associated Press. July 31, 2019. <https://www.greatlakesnow.org/2019/07/five-midwestern-governors-push-presidential-candidates-to-aid-great-lakes/>

⁷¹ U.S. Public Views on Climate and Energy.” Pew Research Center. November 25, 2019. <https://www.pewresearch.org/science/2019/11/25/u-s-public-views-on-climate-and-energy/>

⁷² “In a politically polarized era, sharp divides in both partisan coalitions.” Pew Research Center. December 17, 2019. <https://www.people-press.org/2019/12/17/views-of-the-major-problems-facing-the-country/>

⁷³ Partisan Polarization on the Environment Grows Under Trump.” The Gallup Group. April 5, 2019. <https://news.gallup.com/opinion/gallup/248294/partisan-polarization-environment-grows-trump.aspx>

⁷⁴ “Politics and Global Warming.” Yale Program on Climate Change Communications. November 2019. <https://climatecommunication.yale.edu/wp-content/uploads/2020/01/politics-global-warming-november-2019b.pdf>



Source: Gallup

Figure 46: Seeing Government as Doing Too Little to Protect the Environment, by Party Group

Assumptions that Underpin the U.S. Strategy

As noted on page 18, six assumptions were identified by the Foundation that underpin its U.S. strategy. While not a formally-articulated assumption, after the Trump administration announced the U.S.'s withdrawal from the Paris Accord, the Foundation strengthened its support for state-based work in hopes that the U.S. could continue to make progress promoting climate solutions through the actions of subnational players and the private sector. Also, there was some speculation that the U.S. withdrawal from the Paris Accord could unleash other countries' pent-up ambition to take greater climate action.

Based on the data tracked and analyzed through 2019, below is an overview of the assumptions, the status of each one, and our assessment of whether each assumption was affirmed, warrants refinement, or was abandoned.

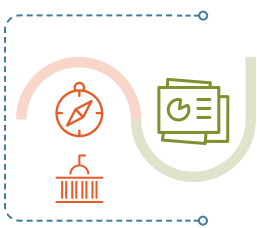
Assumption	Status	Assessment	Notes
Americans are open to addressing climate change	Tested	Affirmed	Polling, Protagonist, and other data show that Americans increasingly demand action on climate change and think that federal and state governments are doing too little.
Most elected officials perceive voters as indifferent to climate policy action	Tested	Mixed and warrants refinement	Voters and the American public view climate change with increasing urgency; at the same time, voters are polarized and public discourse on climate change is not particularly solutions-focused.
A carbon price is the most feasible solution to reduce CO ₂ emissions	Tested	Mixed and warrants refinement	Carbon pricing is a highly effective way of reducing emissions; however, that does not make it "the most feasible solution" given lackluster political and public support.
Conservative support for national climate policy is essential	Tested	Mixed and warrants refinement	Conservatives do not need to be won over en masse and have yet to demonstrate leadership. Momentum is being driven by the center-left. Enough conservative support, however, can bolster efforts to advance some popular climate solutions, especially renewable energy. It can also help neutralize opposition.
A climate message must convey the problem and the solution	Tested	Mixed and warrants refinement	All messages do not necessarily need to convey both parts, which does not negate the opportunity for the Foundation and its grantees to strive to infuse more solutions in the discourse.
The Clean Power Plan can incorporate disparate climate messages	Abandoned	No recent data collected	The Clean Power Plan was replaced by Affordable Clean Energy Rule, rendering this assumption moot. It is worth noting that before that happened, environmental justice-related messages were noticeably absent.

(continued next page)

Assumption	Status	Assessment	Notes
The U.S. could continue to make progress promoting climate solutions through the actions of subnational players and the private sector*	Tested	Mixed	States have stepped up to fill a federal-level void, but the lack of a national, 50-state climate policy allows laggard states to erase gains made in states that are leading on climate.
The U.S. withdrawal from the Paris Accord could unleash other countries' pent-up ambition to take greater climate action*	Tested	Mixed	Other countries have stepped up, but a variety of domestic economic and political challenges have made it difficult for other countries to fill the gap in global leadership left by the U.S. withdrawal from the Paris Accord. Our assessment of this assumption was informed by evidence explored in the Findings that follow.

* Not formally articulated as assumptions in the Foundation's materials.

Findings: India



Political Will to Advance Climate Solutions

7. 2019 was dominated by the national elections and economic, social, and constitutional matters. Despite these competing priorities for policymakers' attention, political will to promote climate solutions was stable and climate factored into the national campaigns and aftermath. The Foundation's support for efforts to alter discourse and broaden the climate solutions coalition had an increasingly positive effect in 2019, especially in shaping the parliamentary debates surrounding air pollution, and (albeit to a lesser extent) in helping to increase state-level leadership and ambition to mitigate climate change.

Progress Toward the Foundation's Desired Outcome



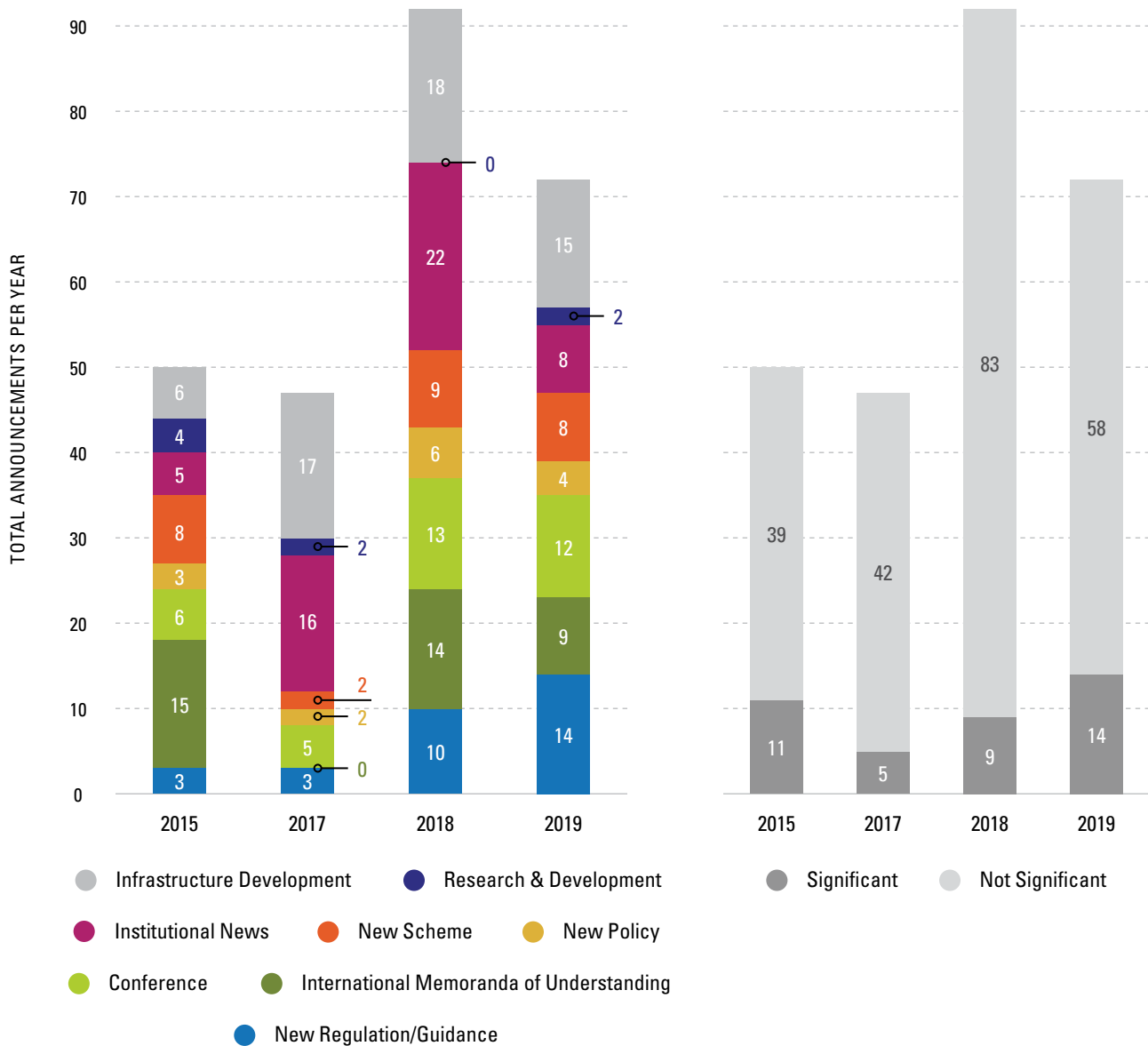
In 2019, the Government of India's commitment to the Paris Accord and climate solutions remained solid. To measure progress toward the Foundation's desired outcome, we are tracking statements and announcements related to climate change and climate solutions made by central and state governments. Although the total number of announcements decreased in 2019, the volume and proportion of the "significant announcements" increased compared to 2017 and 2018.⁷⁵ Most of the announcements were released by the Ministry of Power and Ministry of Environment, Forest and Climate Change (57 out of 72 total). The rest were released by the Ministry of New and Renewable Energy. Fourteen of the 72 climate and energy-related announcements were significant. These included the launch of the global Coalition for Disaster Resilient Infrastructure,⁷⁶ establishing a higher renewable energy target of 450 gigawatts by 2030, and others such as:

- The launch of the super-efficient air conditioning program
- A new rating program for microwaves and washing machines
- Measures to promote hydroelectricity, including its reclassification as a renewable source
- Measures to revive stressed thermal plant assets
- A new payment security mechanism for purchase of power by distribution companies
- The launch of the National Clean Air Program
- The launch of the India Cooling Action Plan
- India and Sweden, along with nine other countries and companies announced a new Leadership Group for Industry Transition that will drive transformation in hard-to-decarbonize and energy-intensive sectors

⁷⁵ The categorization reflects Oxford Policy Management's analysis of press releases from three ministries and our best judgment about what constitutes a significant or major announcement.

⁷⁶ The Prime Minister launched the global Coalition for Disaster Resilient Infrastructure at the United National Climate Summit in September. The government also pledged nearly \$68 million to kickstart it. It was described as a partnership between governments, multilaterals and civil society, to combine knowledge generation and sharing, technical support to countries. It was spearheaded by the United Nations Office for Disaster Risk Reduction and disaster management agencies in India. The central government's interest was reportedly to promote a positive global image and highlight India's extreme vulnerability to the impacts of climate change.

- BS-VI vehicle emission norms⁷⁷
- A new Kisan Urja Suraksha evam Utthaan Mahabhiyan scheme (solar energy access for farmers)
- A new rooftop solar energy program



Source: Government of India Press Releases

Figure 47: Type and Number of Announcements by the Government of India, including by Significance of Announcement

⁷⁷ The major difference between the existing BS-IV and forthcoming BS-VI norm is the presence of sulfur in fuel. Emissions standards were set to keep a check on the pollutant levels emitted by vehicles that use combustion engines.

In 2019, there was other evidence of progress to build political will to advance climate solutions. For example, during the national campaign and aftermath there were a few noteworthy developments:

- Climate change and clean energy featured more prominently in the manifestos of the two major political parties than previously.
- There was an increase in parliamentary activity on air pollution. For example, the Lok Sabha had a full-day debate on the issue, with all parties calling for action. A Private Members Bill, developed with inputs from various civil society organizations, was drafted to reform the legislation to strengthen reporting and accountability for air pollution. A formal cross-party Parliamentary Forum for air pollution was also in development. The Prime Minister, however, made no statement during the peak pollution period.
- There was a move toward electrifying railways, although there are serious technical and financial challenges to bringing that to fruition.
- The changing geopolitics, attacks in Saudi Arabia, and other issues prompted a renewed concern for India's energy security.

On a less positive note, in 2019, political commitment to the International Solar Alliance appeared to waiver. It was difficult to mobilize the promised funding and tensions emerged between the secretariat and senior government officials. The International Solar Alliance may require further thought leadership and executive support to function as a true intergovernmental organization of 121 countries working in alignment to reduce dependency on fossil fuels.

Contribution of the Foundation's Work

The Foundation's approaches and the work of its grantees had an increasingly positive effect in 2019. To achieve the Foundation's desired outcome that political will to advance climate solutions is built, the Foundation is supporting activities aimed at altering political discourse and broadening the climate solutions coalition to engage with the central and state governments. There was encouraging evidence that the grantees' individual and collaborative contributions helped increase political commitment for ambitious cross-sectoral, economy-wide action on climate change and air pollution.

As noted earlier, in 2019, there was a notable uptick in parliamentary activity on air pollution. Several grantees were engaged in developing recommendations that contributed to the establishment of an official Parliamentary Forum for Air Pollution. At the time of writing, that forum had already convened multiple times to discuss what Members of Parliament can do and a Private Members Bill was developed. Grantees' research, in tandem with work of other climate allies, was used during the first-ever parliamentary debate on air pollution during the Winter Season. In 2019, there was also evidence of increased collaboration across civil society to promote a consistent narrative and message on air pollution. For example, through op-eds, research, and engaging with stakeholders, one grantee worked to frame air pollution as a national issue, public health emergency, and that multiple sources of the problem must be tackled at once. Other grantees, as well as parliamentarians, pushed a similar message.

In addition, in 2019, grantees helped strengthen the Clean Air Collective, a group of organizations mobilizing support for action on air pollution. One grantee is nurturing formal and informal networks on air pollution. Others authored joint articles, trained journalists, and provided regulatory and data advice to the Collective. The Foundation's grantees also created a public online repository of resources about air pollution, which is hosted by a government research institute, and represents a formal collaboration between the Government of India and civil society, including the

Foundation's grantees. The site allows any researcher to upload a new study or report and access approximately 4,000 studies. It was used by parliamentarians to prepare for a debate on the subject.

Finally, central to "India in a Warming World," which heavily involved one of the Foundation's grantees, was the notion that India's development efforts cannot ignore climate change. That book spurred discussions among a variety of influential policy and decision-makers. There were also promising—albeit more limited—signs that the Foundation's work contributed favorably to increasing state-level leadership. For example, grantees engaged with state governments to join the Under2Coalition, and states such as West Bengal took more proactive steps to promote electric mobility. The Under2Coalition is a global community of state and regional governments committed to ambitious climate action in line with the Paris Accord.

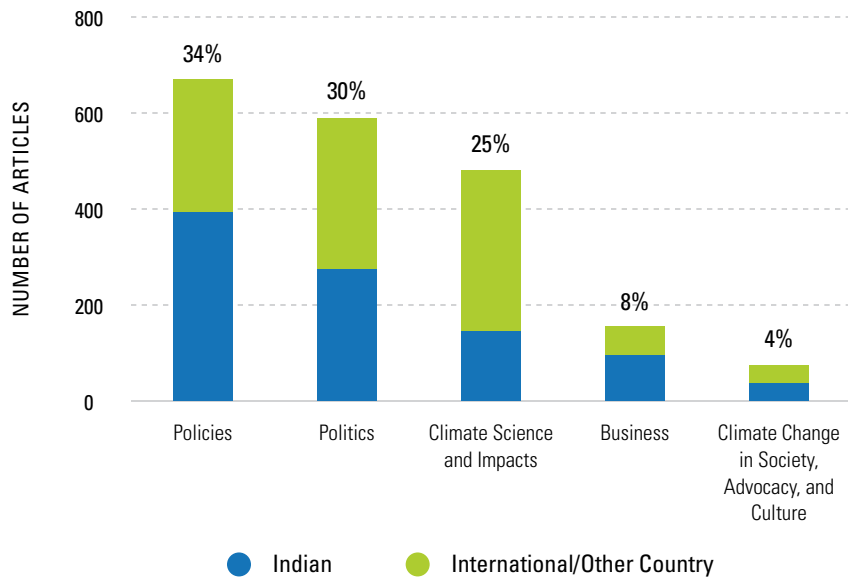
Changes in the Landscape that Affected Progress

Economic, social and constitutional issues in 2019—especially economic—hindered progress to significantly ramp up the country's level of ambition to advance climate solutions. The Government of India was preoccupied with slowdowns in the economy and concerns about the banking sector. Although stalled investments and muted consumption did not appear to directly affect political commitment to addressing climate change, economic woes were a filter through which the central government reviewed all policy decisions. Also, during the campaign, driven by poor performances in earlier state elections, the Bharatiya Janata Party focused on increasing livelihoods for farmers. The productivity and sustainability of the agriculture sector was discussed as one of the underlying structural causes of the economic slowdown. Although the linkage to climate change was not made, the conversation about the need to increase the resilience of the agriculture sector could present opportunities in the future.

A more positive change in the broader landscape was that media coverage of climate change in India grew among English-language outlets, favorable, and more nationally- than internationally-driven. Climate is an increasingly prevalent theme; however, a significant percentage of stories are centered around the notion that other countries need to do more to promote climate solutions. While there is neither reliable public polling nor media monitoring data available to help assess the relationship between public perception and political will, in 2019, the Centre for Policy Research published a book with support from the MacArthur Foundation ("India in a Warming World: Integrating Climate Change and Development"). The book includes a chapter on how climate change was reported by the English print media between 2010 and 2017.⁷⁸

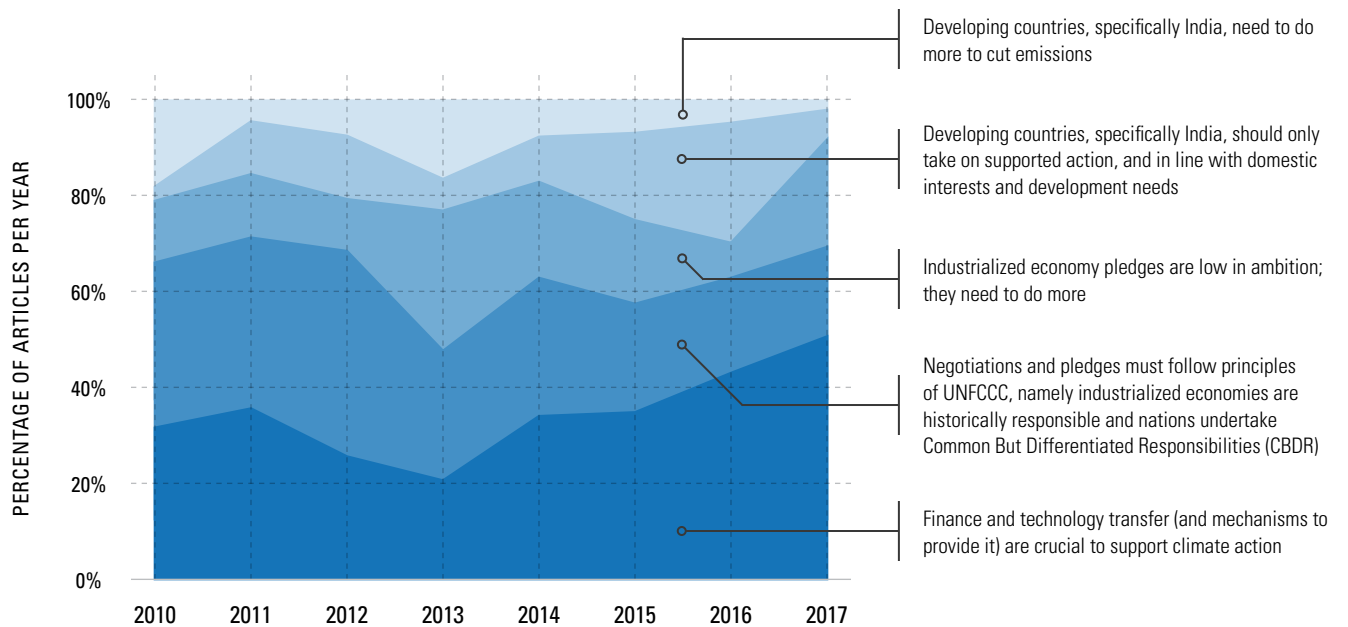
Since 2010, coverage of climate change rarely drops below 50 articles per month and there has been a gradual increase in nationally-driven climate stories. Also, only 0.5% of coverage analyzed in the sample was skeptical of climate science. Most climate stories (74%) were focused on mitigation and the other 26% on adaptation. Thirty-four percent reflected a narrative frame that industrialized countries need to facilitate technology and finance transfer as part of their climate efforts. Twenty-nine percent were underpinned by the idea that international negotiations must respect the principle of "Common but Differentiated Responsibilities." Seventeen percent stressed that industrialized economies' pledges are not ambitious. Only a small percentage espoused the narrative that developing countries, specifically India, need to do more to cut emissions or should do more but in line with domestic interests.

⁷⁸ Jogesh, Anu (2019). "Looking Out, Looking In: The Shifting Discourse on Climate Change in the Indian Print Media" in N. Dubash (Ed) (2019). India in a Warming World: Integrating Climate Change and Development. New Delhi: OUP, pp. 301-325.



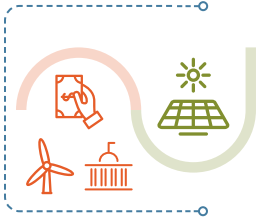
Source: *India in a Warming World: Integrating Climate Change and Development*, page 309

Figure 48: Dominant Themes in a Sample of English Print Media in India, 2010-2017



Source: *India in a Warming World: Integrating Climate Change and Development*, page 319

Figure 49: Dominant Narratives in a Sample of English Print Media in India, 2010-2017



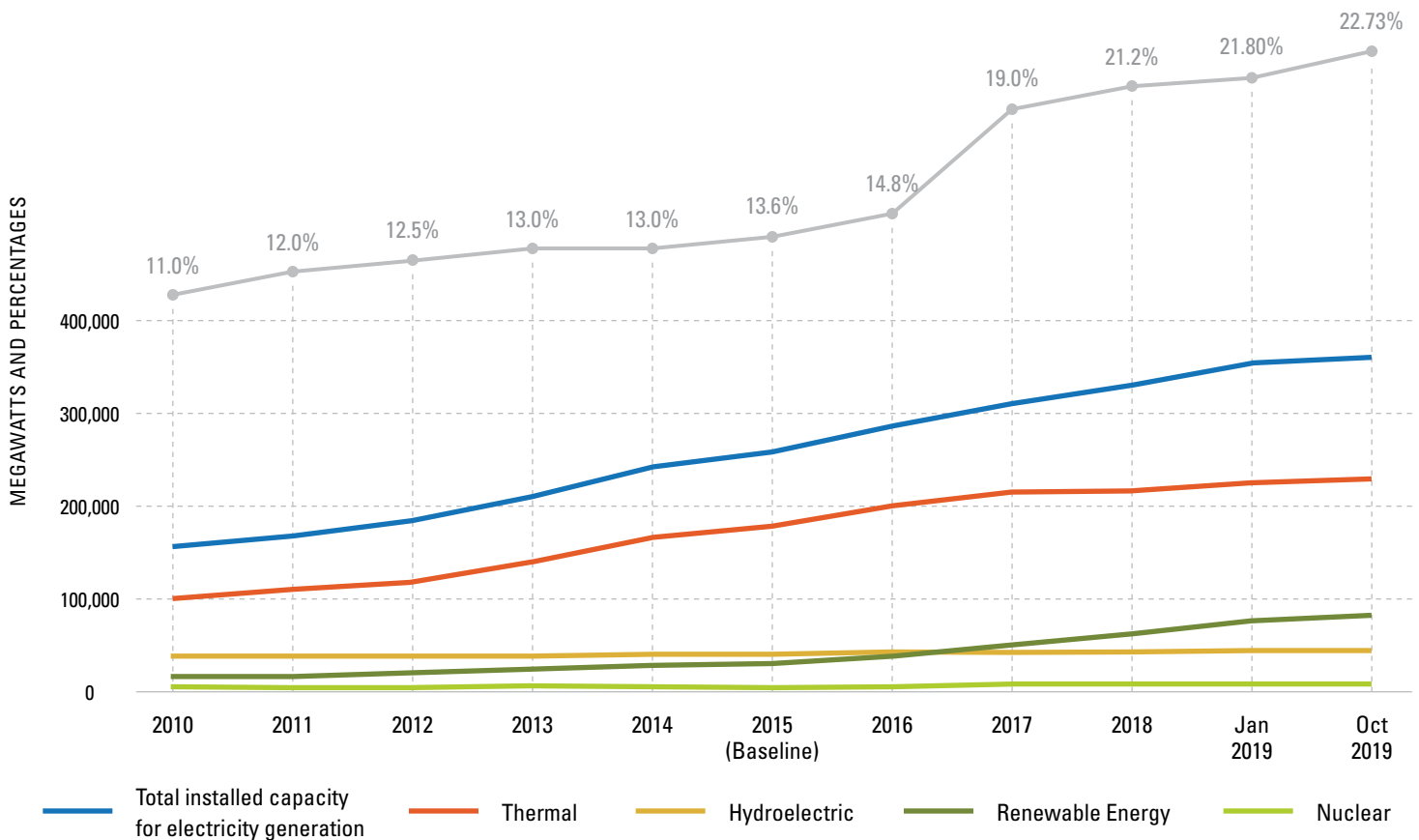
Renewable Energy Production

8. Renewable energy production in India continued to expand in 2019 but at a slower pace. Despite political commitment to boosting production, other conditions enabling more rapid expansion did not improve. Foundation-supported efforts contributed favorably by strengthening policies and regulatory mechanisms and helping mitigate barriers to mobilizing financing.

Progress Toward the Foundation's Desired Outcome



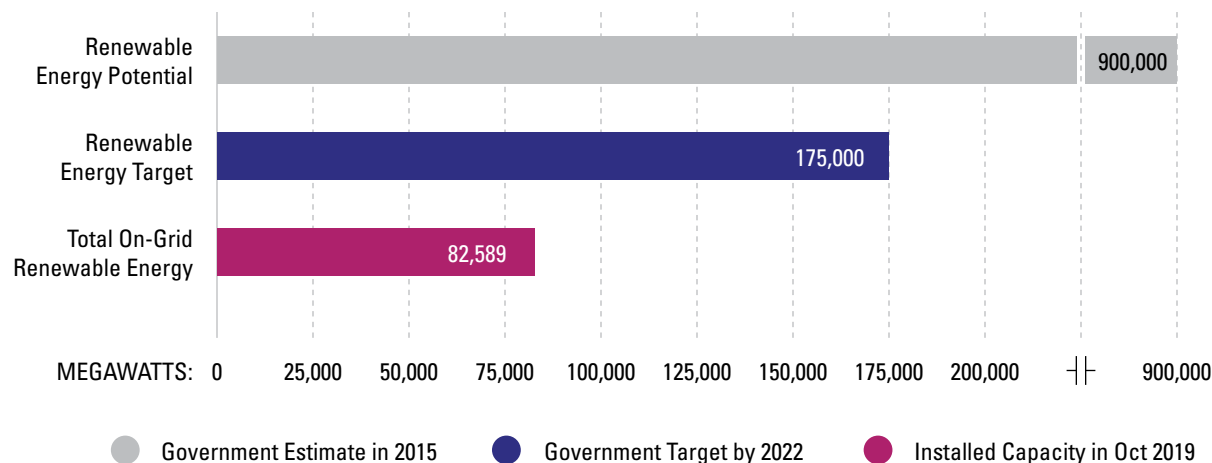
In 2019, renewable energy production slowed down compared to previous years. The Foundation is supporting activities aimed at achieving the country's renewable energy targets by 2022, and more specifically, further tapping the potential of rooftop solar to help meet those targets. Between January and October 2019, renewables accounted for approximately 23% of India's total installed capacity and nearly 83 gigawatts. That equated to a 6% annual increase in total installed capacity. By comparison, there was a 17% increase in installed capacity between 2017 and 2018, compared to 26% in the period from 2016 to 2017 and 29% in the period from 2015 to 2016.



Source: Ministry of Power Annual Reports

Figure 50: India's Total Renewable Energy Installed Capacity, in Megawatts and Percentage

Despite two consecutive years of slower growth since baselines were established, the Government of India rejected a report that questioned whether the country would meet its 2022 renewable energy target, which is shown in the illustration that follows.⁷⁹ To support its claim, the Government pointed to an additional 39 gigawatts at various stages of procurement, leaving a gap of 23 gigawatts.

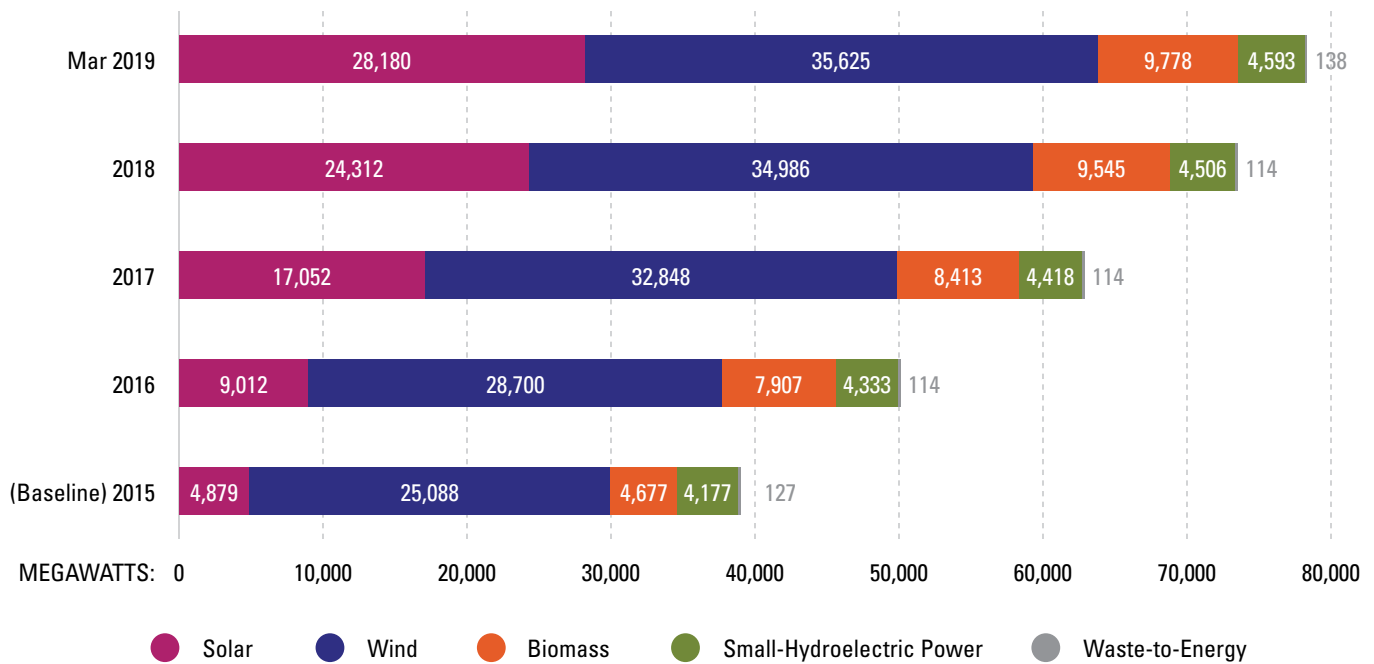


Source: Ministry of New and Renewable Energy Annual Report, <https://mnre.gov.in/annual-report>

Figure 51: Comparison of On-Grid Installed Capacity in 2019 with the Government of India's 2022 Target and 2015 Estimated Potential, in Megawatts

Based on data available through March 2019, wind power continued to account for much of the renewable energy installed capacity in India, but its proportion dropped from 64% in 2015 to 46% in 2018. The proportion of renewable energy installed capacity from solar increased from approximately 11% to 36%. Although the annual growth rate of grid-connected solar was less in 2019 (16% as of October) compared to previous years, growth in grid-connected solar over the past two years was still higher than the 2% growth rate in wind. Thermal remained the largest source of power, accounting for more than 62% of the installed capacity for electricity generation in 2019.

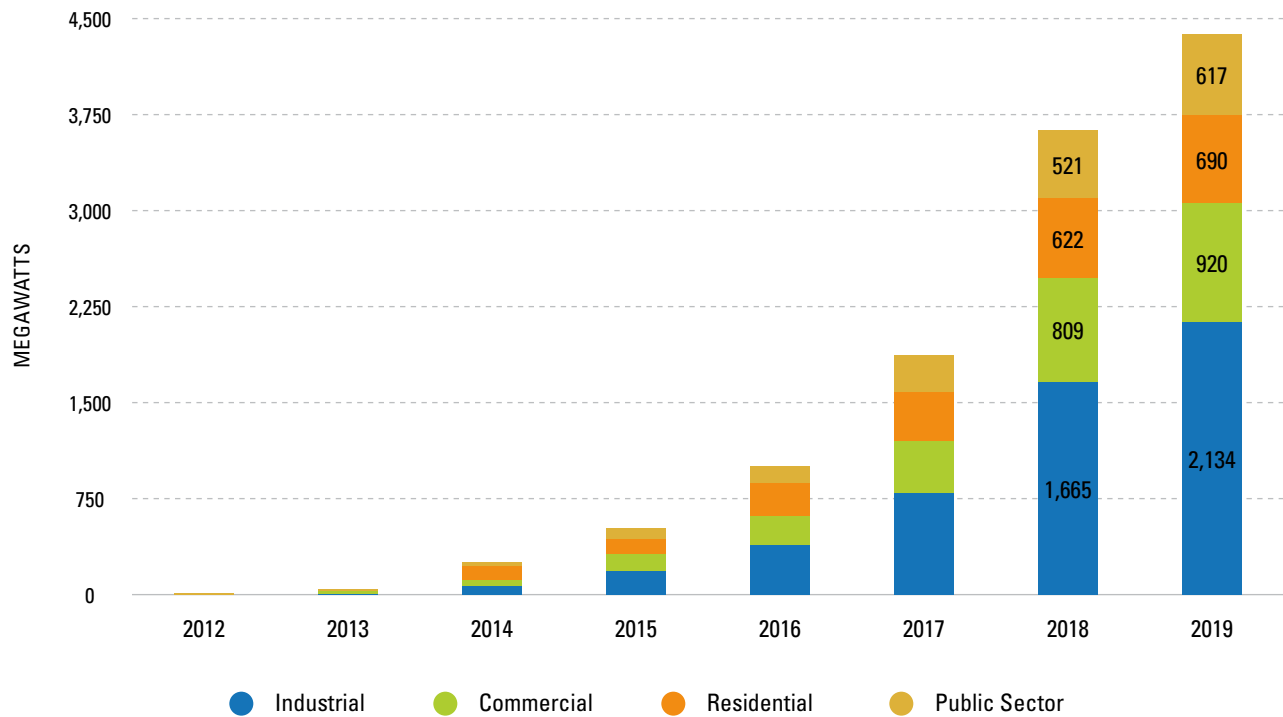
⁷⁹ CRISIL (2019). Return to Uncertainty: Policy blues, tariff caps mean capacity additions in renewable energy are set to fall well short of the 2022 goal. New Delhi: CRISIL. Available at <https://www.crisil.com/en/home/our-analysis/reports/2019/10/return-to-uncertainty.html#>



Source: Ministry of New and Renewable Energy Annual Report, <https://mnre.gov.in/annual-report>

Figure 52: Installed Grid-Connected Renewable Energy Capacity, in Megawatts

As of March 2019, total rooftop solar installed capacity reached 4,361 megawatts. Forty-nine percent was installed in the industrial sector, 21% in the commercial sector, 16% was residential, and 14% in the public sector. Additions in installed rooftop capacity slowed in 2019, increasing by 21% compared to annual increases of approximately 85 to 95% in previous years. That said, the average system size continued to increase due to a greater adoption by commercial and industrial energy users. In 2019, a small number of states dominated the rooftop solar segment: Maharashtra (618 megawatts of installed capacity), Rajasthan (393 megawatts), Tamil Nadu (364 megawatts) and Gujarat (312 megawatts). The largest developers were Cleantech (12% market share), CleanMax (10%), Fourth Partner (5.9%), ReNew (5%), and Amplus (4.4%).



Source: *Bridge to India*

Figure 53: *Rooftop Solar Installed Capacity, 2015-2019, in Megawatts*

Contribution of the Foundation’s Work

Since 2016, the Foundation’s work has contributed favorably to expanding production of renewable energy. The Foundation supports a variety of approaches to catalyze renewable energy through its grants and climate financing. Activities funded include advancing climate-friendly policies and regulatory action, expanding funding opportunities and the climate solutions philanthropic community, and broadening the climate solutions coalition and improving partnerships. In 2019, the Foundation’s grantees were particularly successful in helping to strengthen policies and regulations as well as mobilizing financing for renewables. The Foundation chose to prioritize rooftop and off-grid solar because of its importance to India in meeting its 2022 Paris Accord commitments related to the acceleration of renewable energy.

For example, several grantees’ policy recommendations were adopted or formally endorsed by central and state government partners, including the Energy Storage Roadmap for India (2019-2032) and a Credit Guarantee Mechanism for rooftop solar. A couple of the Foundation’s grantees identified the need for a Credit Guarantee Mechanism to overcome the financial barriers to scaling-up rooftop solar for micro, small, and medium enterprises. The recommendation was adopted by the Ministry of New and Renewable Energy and put forward to the Scheme Finance Commission for approval.

The Foundation’s India grantees were also involved in advancing regulatory measures. One organization developed an evidenced-based process to amend existing regulations to integrate decentralized renewable energy into the

distribution grid. As a result, the Delhi Electricity Regulatory Commission considered increasing its cap on distribution transformers for rooftop solar from 30% to 80-100% (in-case of urban feeders) to allow them to harness more solar power. The Commission has already considered the changes in the existing regulations, and is not consulting other utilities on this proposed amendment. In Andhra Pradesh, the public utility agreed to introduce an online remote monitoring system for distributed solar rooftop power plants. In West Bengal, the state-owned utility issued guidelines saying consumers should have smart photovoltaic inverters installed, which reflected grantees' recommendations. Other state regulators and utilities have expressed interest in replicating these measures to accelerate solar rooftop development at distribution downstream.

Also, although financial flows were a challenge in 2019, there was growing evidence of the effect of the Foundation's work to mobilize financing and mitigate one of the key barriers to expanding renewables. The US-India Catalytic Solar Finance Program, which is supported by the Foundation, proposed several financing instruments and mechanisms to mobilize funds for rooftop solar. This included how to use Alternative Investment Funds to access capital markets. In one instance, Foundation-supported work directly resulted in new investments in renewable energy; however, the indirect influence of the changes on renewable capacity expansion could not be quantified. One grantee demonstrated a model of using energy demand "aggregators" as an effective route to mobilize investments in renewable energy and energy efficiency. As a result, two industrial clusters developed a low-carbon plan, tendered out contracts, and installed mostly onsite renewable energy. A few residential apartment buildings are in the process of procuring solar panels for common areas. Another grantee took a similar approach and secured interest from 15 housing cooperatives for installing rooftop solar.

Changes in the Landscape that Affected Progress

Challenges facing renewable energy production in 2018 persisted in 2019, and conditions for further expansion of renewables did not improve. Financial flows slowed down, troubles with the procurement process continued, and the overall financial health of the renewables sector was cast into further doubt. All these factors had a negative impact on the expansion of centralized renewable energy.

For example, there were multiple attempts by state-owned distribution companies to renegotiate Power Purchase Agreements and repeated delays in payment. A persistent, underlying problem in India is that distribution companies have been locked into high tariffs. Although data on distribution companies' losses were not publicly available for 2019, overdues (payments delayed by more than 60 days) to power producers increased by 27% compared to previous years. These developments made investors nervous and raised concerns about risk. There were only eight private equity transactions in utility-scale solar between January and September 2019 totaling approximately \$567 million (significantly less than the previous two years).

In addition, there were some specific constraints that prevented more rapid expansion of rooftop solar in 2019. Given the high upfront costs of installations, the economics made the most sense for commercial and industrial users who could access subsidies. Nearly 70% of the rooftop solar installed followed a "CAPEX business model" where a consumer pays 100% of the system cost upfront. Small businesses or residential consumers tend to have lower credit ratings and struggle to access loans from banks. Other barriers to expanding rooftop solar in 2019 are described in more detail below.

- **Inconsistent net metering:** Nearly all states in India had some form of net metering policies in 2019, but there were challenges in the design and implementation of state policies, and inconsistencies among them.

- **Limited engagement by distribution companies:** In general, distribution companies remained concerned about the growth of rooftop solar, fearing loss of their highest paying consumers.
- **Limited consumer demand and awareness:** There have been consistently low levels of consumer awareness about the benefits of rooftop solar, how to access financing, and how to go about installations.

The summary that follows show changes in the barriers and opportunities to expand centralized and decentralized renewable energy in 2019.⁸⁰

2019 Enabling Environment for Expansion of Renewable Energy			
Centralized Renewable Energy			
	Status	New Barriers	New Opportunities
Policy and Regulation	Positive		<ul style="list-style-type: none"> › New regulations to help renewable energy integration on grid (e.g., automation to national registry, forecasting) › New regulations to promote cross-border electricity trade
Institutions	Poor		
Financial	Poor	› Canceled and renegotiated tenders affected investor confidence	› “UDAY 2.0” scheme expected in future to address distribution companies’ losses
Political Will	Positive		<ul style="list-style-type: none"> › New 450-gigawatt target › Interest in potential for jobs in the sector
Technology	Positive ↑		› Advances in floating solar and wind-solar-storage hybrids
Decentralized Renewable Energy			
	Status	Barriers	Opportunities
Policy and Regulation	Mixed		› New Kusum scheme will install off-grid and on-grid solar pumps (also to try and reduce distribution companies’ subsidy burden)
Institutions	Poor		
Financial	Very Poor		
Political Will	Poor		› Signs of renewed interest in micro and mini grids
Technology	Positive		

(continued next page)

⁸⁰ The summary reflects qualitative data collected from discussions with “key informants,” including grantees and non-grantees who took part in full-day workshop-style discussions or interviews facilitated by Oxford Policy Management, focusing on the Foundation’s desired outcomes and discussing in detail some of the political and economic factors surrounding them.

2019 Enabling Environment for Expansion of Renewable Energy (cont.)

Rooftop Solar			
	Status	Barriers	Opportunities
Policy and Regulation	Mixed	<ul style="list-style-type: none"> › Maharashtra moving away from net metering 	<ul style="list-style-type: none"> › Several policies adopted, particularly Phase II of rooftop solar program
Institutions	Poor		
Financial	Poor		
Political Will	Mixed		<ul style="list-style-type: none"> › A variety of state initiatives (e.g., Gujarat new residential rooftop solar scheme and Delhi distribution companies innovating in rooftop solar scheme)
Technology	Mixed		<ul style="list-style-type: none"> › Reduced costs

Despite some persistent challenges, there were a few positive changes in the enabling environment to further catalyze renewable energy production. As noted in Finding 7, political will to expand centralized renewable energy remained stable. The Government established an even higher renewable energy target of 450 gigawatts by 2030. Also, technology costs continued to drop, which provided some stimulus to the rooftop solar market.



Clean Technology Deployment

9. Despite some significant obstacles preventing more rapid promotion of energy efficiency and deployment of clean technology, progress in 2019 was steady. The implementation of various government schemes continued and advancements in electric mobility were particularly promising. The Foundation's grantees successfully helped shape clean technology-related policies and deepened collaborations with the government and private sector, which contributed to quantifiable energy savings.

Progress Toward the Foundation's Desired Outcome



In 2019, the promotion and deployment of energy efficiency and clean technology continued gradually. The fact that gains were made in 2019 despite current constraints was in and of itself a noteworthy accomplishment. To assess progress toward the Foundation's desired outcome, indications of progress include that a clear vision and policy platform on clean technology and its role within India's state and central governments is articulated, collaboration between clean technology and other sectors of the Indian economy increase, and the government and private sector promote greater use of energy efficiency measures. In 2019, some of the most notable developments included:

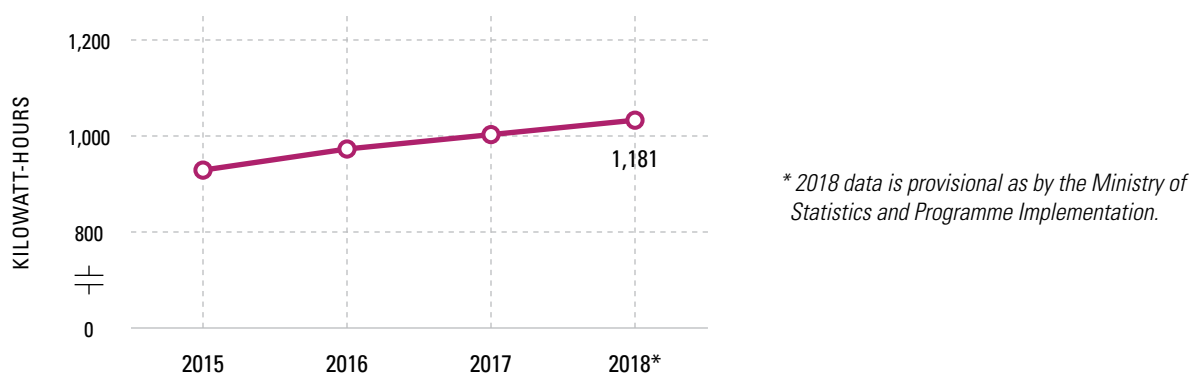
- **Clarity about electric mobility targets and interest in electric vehicles grew:** Previously, there was no national target or overarching policy strategy for energy efficiency and clean technology (beyond the increasingly outdated 2010 National Mission for Enhanced Efficiency), and it was barely mentioned in the Nationally Determined Contribution. In 2019, the Government of India clarified its focus on two- and three-wheeled electric vehicles, which reflected growing backlash against four-wheeled vehicles and growing interest in mainstreaming electric mobility into public transportation systems. The Government launched incentives for commercial electric vehicles and charging infrastructure, which were generally well received. In addition, guidelines and standards for charging infrastructure were adopted.

Also, in 2019, state-level action on electric vehicles increased. Additional states and cities piloted electric bus schemes (e.g., 40 were deployed and 190 were in the pipeline in Kolkata). Some of the more progressive distribution companies also got involved. In Bangalore, for example, the distribution company is planning to establish 80 charging stations.

- **The Cooling Action Plan formally launched:** In 2018, we reported on steady expansion and ratcheting up of appliance standards through the draft Cooling Action Plan. In 2019, India became first country to launch an action plan, which reflected collaboration between and among government and civil society organizations. The Cooling Action Plan is focused on reducing emissions while generating employment; however, at the time of writing, there was no clear roadmap for its implementation.
- **Roll out of labeling and standards continued:** In 2019, there were signs that the Bureau of Energy Efficiency became stronger and more effective. The agency focused on complex appliances (e.g., chillers) and issued quick revisions to air conditioning standards. Also, there was increased awareness of the energy labeling scheme described in the 2018 Annual Report thanks to more outreach by the Bureau of Energy Efficiency.

At the same time, the central government continued to struggle with the competitiveness of the country's domestic industries. In 2019, the Government of India opted out of the Regional Comprehensive Economic Partnership due to concerns that it would put its industry and agriculture at risk. For some sectors, particularly steel, energy efficiency in India lags well behind international standards.

Some of the other measures we are tracking to assess progress toward the Foundation's desired outcome are electricity consumption by sector and the number of Energy Service Companies empaneled with the Bureau of Energy Efficiency. Based on the most recent data available, electricity consumption per capita continued to go up, reaching 1,181 kilowatt hours per capita. The increase was driven by electricity consumption in the industrial and domestic sectors. Despite low per capita energy usage in India compared to the U.S. or China, consumption is growing. This poses challenges to further promotion of energy efficiency and clean technology.



Source: Ministry of Statistics and Programme Implementation, <http://www.mospi.gov.in/>

Figure 54: Electricity Consumption per Capita, in Kilowatt-hours

Total Electricity Consumption by Sector, in Gigawatt-hours					
	2015 (Baseline)	2016	2017	2018	2019
Domestic	238,876	255,826	273,550	-	-
Industry	423,523	440,206	468,825	-	-
Agriculture	173,185	191,151	204,293	-	-
Commercial	86,037	89,825	96,141	-	-
Traction and Railway	16,594	15,683	14,356	-	-
Other	62,976	68,493	73,079	-	-
TOTAL	1,001,191	1,061,184	1,130,244	DATA NOT AVAILABLE	DATA NOT AVAILABLE

Source: Ministry of Statistics and Programme Implementation, <http://www.mospi.gov.in/>

Contribution of the Foundation's Work

Since the launch of the Foundation's work in India, grantees have effectively engaged with decision-makers to inform policy developments. Also, grantees' partnerships with government actors and other civil society organizations have yielded quantifiable energy savings. To expand clean technology deployment in India, the Foundation is supporting a variety of approaches, including expanding funding opportunities and the climate solutions philanthropic community, advancing climate-friendly policies and regulatory action, and broadening the climate solutions coalition and improving partnerships.

Several of the Foundation's grantees played an instrumental role in the development of the world's first national Cooling Action Plan, which received significant international attention. The Plan was widely credited as an example of multiple civil society partners coordinating to support action by the central government.

The Government of India's press release stated: "The development of ICAP has been a multi-stakeholder inclusive process encompassing different Government Ministries/Departments/Organizations, Industry and Industry Associations, Think tanks, Academic and R&D institutions."

In 2019, grantees also continued to help strengthen the Bureau of Energy Efficiency's institutional capacity. The time it takes the agency to develop a new energy efficiency standard has decreased from an average of three years to 18 months. In addition, one grantee worked with the Bureau to publish their second (and expanded) Energy Efficiency Index of Indian states' efforts. Another organization closely supported the Bureau to develop new energy efficiency standards for a voluntary labeling scheme for microwave ovens, as well as improve existing standards for washing machines. The estimated electricity savings for the new microwave oven scheme and revised standards for washing machines was more than three billion units by 2030.

Other examples that illustrate the contribution of the Foundation's approaches included the Ministry of Commerce adopting one grantee's concept of Sustainable Special Economic Zones and seeking to pilot it. Also, several grantees collaborated on initiatives that successfully informed policy decisions and investments in clean technology such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (or FAME 2 scheme) and Kerala's Electric Vehicle strategy. Another organization forged a collaboration among 140 units within two industrial clusters on various energy efficiency measures saving approximately 48,000 kilowatt hours and among hundreds of residents of ten apartment complexes on measures that will save approximately 0.5 million units of electricity.

Finally, one of the Foundation's grantees used its "Urban Mobility Lab" concept to forge unique partnerships on electric mobility in Pune and Delhi. Ten "solution providers" were selected for each city to participate in a collaborative platform with city, state, and central government authorities to co-develop mobility solutions. In Delhi, the solution providers committed to deploying 35,000 electric passenger vehicles and several hundred charging stations. An idea for government fleet electrification in Pune received an allocation of Rs 105 crore (approximately \$13.7 million) from the Municipal Corporation. These efforts also catalyzed wider action. In Delhi, a coalition of 38 companies organized by the Foundation's grantee launched "Deliver Electric Delhi," a working group to launch 1,000 electric vehicles for last-mile deliveries. In addition, several of the providers have since deployed mobility solutions which were directly or indirectly influenced by the ideas and partnerships generated. It is worth acknowledging that we cannot quantify results from the Urban Mobility Lab concept in terms of energy savings, but we know that matching city governments with electric mobility solution providers has directly led to new investments.

Changes in the Landscape that Affected Progress

In 2019, barriers to ramping up deployment of energy efficiency and clean technology showed limited signs of improvement, mostly in the transport sector. The summary that follows shows the status of barriers and opportunities to expand energy efficiency and the deployment of clean technology by sector.⁸¹

Summary of Sector-Specific Enabling Environment for Clean Technology			
Clean Technology and Energy Efficiency in Transportation Sector			
	Status	New Barriers	New Opportunities
Policy and Regulation	Positive ↑		› Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME 2) provided new policy clarity
Institutions	Mixed ↑		› Positive role of the Bureau of Energy Efficiency
Financial	Poor	› Not enough investment in infrastructure	
Political Will	Positive ↑		› Focus on 2- and 3- wheelers
Technology	Mixed	› BS-VI emission norms a challenge for industry	› Battery swapping got increased attention
Clean Technology and Energy Efficiency in Residential Sector			
	Status	Barriers	Opportunities
Policy and Regulation	Mixed		› PM Affordable Housing Scheme is opportunity
Institutions	Mixed		› Bureau of Energy Efficiency decision-making process improved
Financial	Mixed		
Political Will	Mixed		
Technology	Mixed ↓		
Clean Technology and Energy Efficiency in Industry Sector			
	Status	Barriers	Opportunities
Policy and Regulation	Mixed		
Institutions	Mixed		
Financial	Mixed		
Political Will	Mixed	› Industry argues against responsibility for power sector emissions	› India appointed co-chair of Industrial Transition track under United Nations Climate Summit
Technology	Positive		

⁸¹ The summary reflects qualitative data collected from discussions with “key informants,” including grantees and non-grantees who took part in full-day workshop-style discussions or interviews facilitated by Oxford Policy Management, focusing on the Foundation’s desired outcomes and discussing in detail some of the political and economic factors surrounding them.



Policies and Practices to Put a Price on Pollution

10. No significant strides were made to put a price on pollution. In 2019, there was little change in the barriers or opportunities to advance policy or practices. The Foundation’s contributions to progress were limited, however, there were a couple of important bright spots: the launch of the first emissions trading scheme for particulate matter and engagements with the private sector.

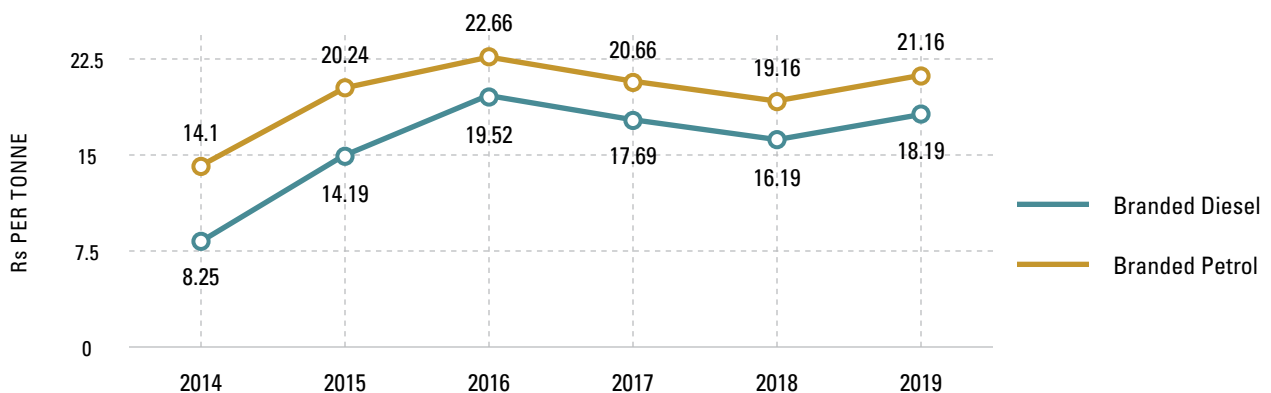
Progress Toward the Foundation’s Desired Outcome



As was the case in 2018, gains to advance pollution-pricing policies and practices at the federal level were negligible in 2019. Efforts at the subnational level and among the private sector were slightly more promising. To assess progress toward the Foundation’s desired outcome, we are tracking data related to multi-stakeholder discussions about emissions measurements, central and state government signaling a commitment to expand the domestic carbon market, increasing institutional capacity to implement a well-functioning emissions trading system, and businesses preparing inventories of CO₂ emissions.

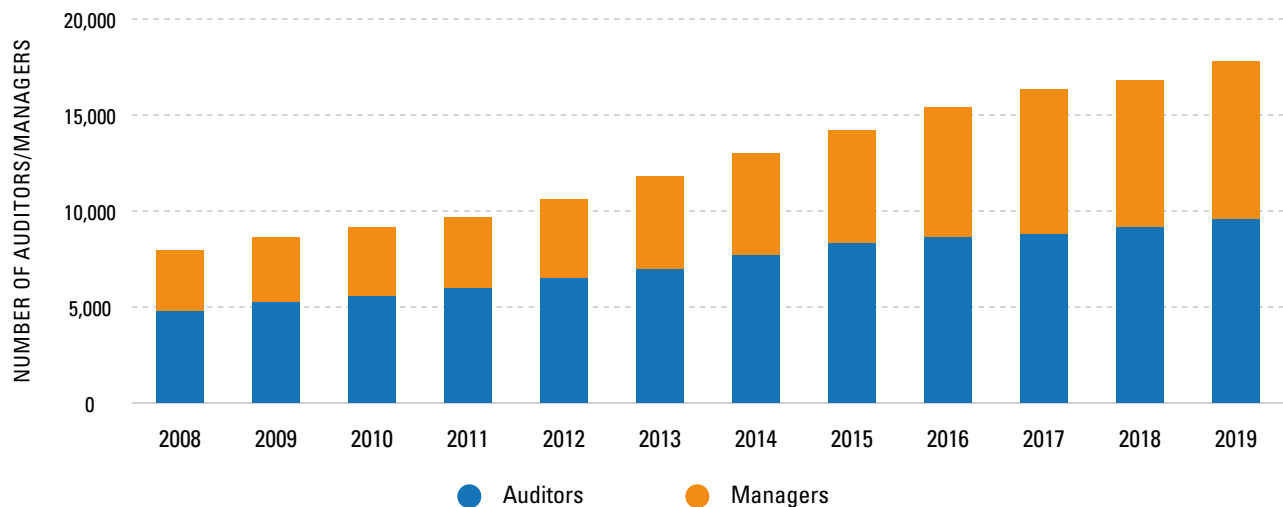
At the end of 2019, it was reported that the Prime Minister’s office proposed waiving the “coal cess” to help finance pollution-cutting technology. A coal cess is levied on the dispatch of coal by producers and discourages coal consumption by increasing its cost. More than half of India’s coal-fired power plants were on track to miss sulfur oxide emissions targets. Waiving the tax was expected to ease the financial stress of distribution companies but would also make coal more competitive against renewables. Also, although the Government of India had previously convened a working group to explore options for carbon markets, there was no follow up and the working group did not convene in 2019.

Following the general election, the Government did raise the excise duty and imposed a road and infrastructure cess, totaling Rs 2 per liter for both petrol and diesel, and the number of Certified Energy Auditors increased slightly in 2019.



Source: Ministry of Finance

Figure 55: Total Central Excise Duty on Branded Petrol and Branded Diesel, in Rs per Tonne



Sources: Ministry of Power, <https://powermin.nic.in/> and Bureau of Energy Efficiency, <https://www.beeindia.gov.in/>

Figure 56: Number of Certified Energy Auditors

In 2019, the most promising developments were in the state of Gujarat. The city of Surat launched the country's first pilot cap-and-trade system. The city put a cap on emissions of Particulate Matter 10. Industry emitters can buy and sell permits to meet the cap. With support from several civil society organizations, the scheme is being closely monitored.

It is also worth noting that, although the Government of India did not publish new inventories for economy-wide greenhouse gas emissions, there was a steady, slow increase in voluntary private initiatives. For example, more companies voluntarily reported on emissions with the Carbon Disclosure Project, an organization based in the United Kingdom which supports companies and cities to disclose environmental impact. Approximately 50% of these Indian companies have set a carbon price in the range of \$5-50. In addition, there was a small and important increase in the number of large companies setting internal science-based targets for emission reductions.

Contribution of the Foundation's Work

Foundation-funded activities to advance pollution pricing were limited but produced some outsized results in 2019, affecting the world's first pilot emissions trading scheme for particulate matter and additional business reporting and commitment to climate solutions. The Foundation aims to enhance commitment and action on pollution pricing by supporting activities to alter political discourse, expand the climate solutions philanthropic community, advance climate-friendly policies and regulatory action, and broaden the climate solutions coalition and improve partnerships.

As noted earlier, there was one notable instance of state-level leadership pollution-pricing. The city of Surat in Gujarat established a pilot emissions trading scheme, the first in the world, for particulate matter. One hundred fifty-eight industrial plants now have emissions limits for particulate pollution which they can meet through investments to reduce pollution or by purchasing credits. This pilot reflects multiple years of close engagement by one of the Foundation's grantees. That organization also supported the city in establishing a real-time monitoring system.

Also, in 2019, there was an uptick in businesses reporting on pollution and commitment to action. With one grantee’s engagement and technical support, 50 companies are now committed to carbon pricing, and 38 have signed up to setting science-based targets. These figures were also shared with the Government of India, who in turn, made a reference about the voluntary targets at the United Nations Climate Summit.

Changes in the Landscape that Affected Progress

Since the launch of the Foundation’s work in India, there have been no significant changes in the barriers or opportunities to put a price on pollution. In 2019, limited political will to consider pollution pricing, particularly on carbon, remained a major constraint. A summary of the main barriers and opportunities are shown in the table that follows.⁸²

Summary of Enabling Environment for Putting a Price on Pollution			
	Status	New Barriers	New Opportunities
Policy and Regulation	Mixed		<ul style="list-style-type: none"> › Government commissioned a study on potential of “green credits” in India
Institutions	Poor		<ul style="list-style-type: none"> › Despite overall poor status of institutional capacity, pilot emissions trading scheme in Gujarat provides a good learning opportunity
Political Will	Poor	<ul style="list-style-type: none"> › Government not engaging meaningfully on Article 6 negotiations under Paris Accord, and no follow up with working group previously convened on subject 	

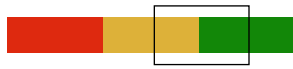
⁸² The summary reflects qualitative data collected from discussions with “key informants,” including grantees and non-grantees who took part in full-day workshop-style discussions or interviews facilitated by Oxford Policy Management, focusing on the Foundation’s desired outcomes and discussing in detail some of the political and economic factors surrounding them.



Capacity of Civil Society Organizations to Engage With Government

11. In 2019, collaborations with and among civil society organizations and the government were increasingly commonplace and fruitful. Also, there were concrete signs that India grantees’ collective capacity to engage effectively on climate policy development and partner with state and central government improved.

Progress Toward the Foundation’s Desired Outcome



Since baselines were established, there have been some changes in the makeup of organizations involved in advancing climate-friendly policies and signs of increased capacity among civil society organizations to collaborate with each other and with state and central government. Indications that progress is being made toward the Foundation’s desired outcome of increasing civil society organizations’ capacity to engage with the Government of India on climate policy include: 1) central and state government look to civil society organizations as stakeholders and partners in the policymaking processes, 2) civil society organizations’ recommendations are incorporated into government-proposed national and international climate policies, and 3) a broader base of organizations participate in advocacy efforts around climate solutions.

In 2019, organizations considered to be active and influential in informing federal-level climate policies changed but not dramatically. Forty-nine civil society organizations were identified by key informants; 18 organizations were added to the list in 2019 and five were removed.⁸³ Among the organizations identified, 12 were widely deemed most influential, and nine of those twelve were grantees. Also, more organizations were focused on the policy dimensions of climate change and were viewed as a partner of the Government of India to a greater extent.

How “Major” Civil Society Organizations Were Rated by Key Informants				
	2015	2017	2018	2019
Rank	% of the Major Civil Society Organizations			
Proportion of the Civil Society Organization’s Work is on Climate Change/Renewable Energy				
Very High Proportion	0%	0%	0%	0%
High Proportion	33%	39%	33%	27% ↓
Medium Proportion	53%	44%	44%	60% ↑
Low Proportion	14%	17%	22%	10% ↓
Very Low Proportion	0%	0%	0%	0%

(continued next page)

⁸³ The original list was composed primarily of the members of the Climate Action Network South Asia from India. A number of these members were small organizations with only limited work at the national level on climate change. By 2019, their presence and visibility were such that most of those interviewed were not able to identify them.

How “Major” Civil Society Organizations Were Rated by Key Informants (cont.)				
	2015	2017	2018	2019
Rank	% of the Major Civil Society Organizations			
Proportion of the Civil Society Organization’s Climate Change/Renewable Energy Work is Policy Focused				
Very High Proportion	0%	0%	0%	0%
High Proportion	28%	33%	31%	46% ↑
Medium Proportion	56%	53%	47%	46% ↓
Low Proportion	17%	14%	22%	9% ↓
Very Low Proportion	0%	0%	0%	0%
Extent to Which the Government of India Sees Civil Society Organizations as Partners				
Very High Extent	0%	0%	0%	0%
High Extent	17%	17%	17%	26% ↑
Medium Extent	44%	47%	36%	57% ↑
Low Extent	39%	33%	42%	15% ↓
Very Low Extent	0%	3%	6%	2% ↓
Extent to Which the Government of India Sees Civil Society Organizations as Critics				
Very High Extent	3%	3%	3%	2% ↓
High Extent	3%	3%	3%	4% ↑
Medium Extent	11%	8%	8%	11% ↑
Low Extent	53%	58%	58%	68% ↑
Very Low Extent	30%	28%	28%	15% ↓

Source: Key Informants—Grantees and Non-Grantees—Who Took Part in Full-Day Workshop-Style Discussions or Interviews

In 2019, civil society organizations directly informed flagship policy initiatives such as the Cooling Action Plan and had more indirect effects on electric vehicles and increasing India’s renewable energy target. Also, civil society groups were increasing organized into coalitions around different themes (e.g., renewable energy, air pollution, electric vehicles) that included both international and national organizations. Their voices were amplified by working together and these collaborative or coalition efforts reduced some of the risks associated with advocacy following crackdowns in 2015 and 2016.

Contribution of the Foundation's Work

In 2019, grantees were increasingly collaborative and innovative, and we see clear signs that their capacity to engage with central and state governments paid dividends. Since the launch of the Climate Solutions Big Bet, the Foundation has provided significant support for activities aimed at increasing civil society organizations' capacity to engage with the central and state governments on climate policy. To achieve its desired outcomes, the Foundation supports approaches to broaden the climate solutions coalition and advance climate-friendly policies and regulatory action.

Nearly all India grantees reported examples of working formally or informally with other grantees and civil society organizations to engage with government and advance climate solutions. For example, there were at least three grantees that worked together to support the development of the India Cooling Action Plan. And, six or seven of the Foundation's grantees collaborated to promote electric vehicles.

Also, there were several grants that delivered clear capacity benefits to the recipients, which manifested in grantees embracing new opportunities and innovative approaches. For example:

- One grantee's internal capability on power sector modeling was significantly enhanced, they mentored another grantee.
- Another grantee established a Centre of Excellence in Air Pollution Studies which included setting an internal strategy, hiring experts, and carrying out technical analysis on the issue for the first time.
- One organization significantly expanded its team to look at energy efficiency and established enough convening power and influence to hold a large national conference.
- Multiple grantees worked with residential cooperatives and apartment complexes—a completely new audience.
- One organization refocused its economics team on longer-term and strategic (rather than tactical) issues.
- Another grantee cultivated relationships with a new set of government partners on electric mobility.

Finally, as noted on page 17, in late 2019, the Foundation supported a convening where grantees worked together based on aligned interest and expertise to identify ambitious yet realistic milestones, how civil society could play a role, and what the grantees could achieve together. That information is informing refinements to the Foundation's targets and desired outcomes. The convening also sparked conversations among grantees that resulted in concrete follow-up actions. For example, one discussion on electricity governance led three grantees to develop a joint concept note for a future program on the issue. Another small-group discussion on electric mobility led to multiple grantees organizing a joint event.

Changes in the Landscape that Affected Progress

In 2019, there were developments in the broader social, political, and economic contexts that affected the nature and extent to which civil society organizations could engage with and inform the national climate policymaking process. Some developments were positive, some less so. Examples are included in the following bullets.

- **NITI Aayog's capacity challenges:** NITI Aayog's funding increased in 2019, but its internal capacity remained insufficient.⁸⁴ It continued to be effective in organizing consultations with civil society organizations, but not following up. Also, some of NITI Aayog's key reports were widely criticized for having factual errors, including reports and data on electric vehicles, air pollution, Delhi's water crisis, and employment figures. Many civil society organizations still work to get their reports endorsed by them, but the think-tank's credibility took a hit.
- **Increase in funding and engagement on air pollution:** Civil society has collected data and evidence on air pollution for several years. In 2019, there was a noticeable increase in funding around the issue, including for continuing data collection and research as well as advocacy and technical support. This is something we will continue track in 2020.
- **Major new bilateral programs in the pipeline:** In 2019, multilateral and bilateral agencies (e.g., USAID and UK Foreign and Commonwealth Office) designed new programs on the power sector and renewables, including opening gas markets.

⁸⁴ The National Institution for Transforming India, also called NITI Aayog, was formed in January 2015. It is a policy think tank of the Government of India, established with the aim to achieve Sustainable Development Goals and to enhance cooperative federalism by fostering the involvement of State Governments of India in the economic policymaking process. For more information, visit <https://niti.gov.in/>

Assumptions that Underpin the India Strategy

As noted on page 18, six assumptions were originally identified by the Foundation that underpin its India strategy. Based on the data tracked and analyzed through 2019, below is an overview of the assumptions, the status of each one, and our assessment of whether each assumption was affirmed, warrants refinement, or was abandoned.

Assumption	Status	Assessment	Notes
The Indian government is grappling with how ambitious its Nationally Determined Contribution is	Tested	Mixed and warrants refinement	Available data suggest that India's emissions intensity target is achievable. The Government of India increased its renewable target to 450 gigawatts by 2030. Also, the Government is increasingly aggressive about promoting electric vehicles, suggesting that it is not, in fact, grappling with how ambitious those goals are but planning to meet its commitments.
The usual avenues of Western-style philanthropic investment are not as robust in the climate and energy area	Tested	Affirmed	Although more foundations are now working in India, Indian philanthropy is growing, and there is growing interest in climate, philanthropic investments in India are still not as focused on climate as other issues. Also, mitigation-related work is mostly funded by international rather than domestic philanthropic institutions.
Existing civil society capacity in energy and climate is mostly concentrated in New Delhi	Tested	Affirmed	The reference to "capacity in energy and climate" stems from the importance of policy development, adoption, and implementation to advance climate solutions. It is worth noting that some civil society organizations operating at the national level are investing in offices in states.
Indian states and cities need to be equipped to plan for low-carbon development and clean energy, but most Indian cities still lack many of the tools they need to provide low-carbon leadership	Tested	Affirmed yet warrants modest refinement	Although mostly affirmed, both Indian states and cities need to be equipped to plan for low-carbon development and clean energy. Data about the enabling environment suggest they still lack a combination of knowledge, capacity, and tools to enable smooth flow of information. Also, India's Smart Cities Mission was launched in 2015 by Prime Minister Narendra Modi with the aim of upgrading infrastructure to cope with a growing population. The hope was that it would help cities be better equipped, but the scheme has not delivered because of its focus and volume of funding.

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Assumption	Status	Assessment	Notes
Pledged funds from bilateral and multilateral development agencies have not been deployed because of a lack of policy clarity and underdeveloped renewables sector	Tested	Not affirmed and suggest abandoning	India's renewables sector is not underdeveloped. Data analyzed do not suggest that a lack of policy clarity or underdevelopment are the root causes. Instead, regulatory uncertainty and general bureaucratic challenges pose bigger barriers. And there are issues with private capital, which affect rooftop solar in particular.
Policy and finance challenges are inhibiting the Indian government's ability to realize its goal of 40% solar capacity from grid-tied but distributed roof-top projects	Tested	Affirmed	The intensity of these challenges has varied over time, but they are still factors that inhibit the Indian government's ability to realize its goal.

While not a formally articulated assumption, there was some speculation that the U.S. withdrawal from the Paris Accord could unleash other countries' pent-up ambition to take greater climate action. That has not fully played out in the case of India for a variety of reasons, including that the country is grappling with a variety of economic, social, and constitutional issues that have prevented further political attention to climate change mitigation. At the same time, India is sticking to what was pledged, which is significant.

Findings: Impacts



Broadened and Deepened Participation in Climate Solutions, Trajectory of Emissions, and Carbon Intensity of Economies

12. Since baselines were established, progress to deepen participation in climate solutions, lower or level off emissions, and transform economies from high to low carbon has been mixed. Encouraging developments include that energy-related emissions flattened in 2019, and India and China appear on track to meet their Nationally Determined Contributions. Also, there were notable successes at the subnational level in the U.S. to advance climate solutions, which the Foundation's approaches contributed to in a particularly positive way.

At the same time, the scientific consensus is that meeting the Paris Accord goals will not be enough. Even more urgency and ambition are required to keep global warming well below 2 degrees Celsius. Furthermore, based on current projections, the U.S. will struggle to meet, much less exceed, its net emissions reduction targets. Mounting rollbacks of environmental protections call into question the likelihood of the country taking bold near-term federal action to demonstrate leadership.

Progress Toward the Foundation's Desired Impacts



Overall global energy-related CO₂ emissions flattened in 2019 following two years of increases, but net emissions of CO₂ increased, as did global surface temperature. Both India and China are on track to meet climate goals outlined in the Paris Accord. In contrast, the U.S. is not poised to meet its targets. To assess progress toward the Foundation's desired impacts in the U.S., India, and China, we are tracking the trajectory of greenhouse gas emissions in each country, whether the countries exceed their emissions goals, and changes in the carbon intensity of their economies.⁸⁵ In addition, at the initiative level, to understand the ultimate contribution of the Foundation's work, we are tracking treaties and international forums, and multilateral agreements on climate as indications that global participation in climate solutions is broadening and deepening. This includes tracking the implementation of the 2015 Paris Accord.

In 2019, the drop in energy-related emissions was caused in part by a decline in CO₂ emissions from the power sector in advanced economies, the expanding role of renewable sources (mainly wind and solar), fuel switching from coal to fossil gas, and higher nuclear power output.⁸⁶ Also, substantial declines in coal use in the U.S. and the European Union, combined with slower growth in India and China, contributed to flattening energy-related emissions.⁸⁷ In the

⁸⁵ At the time of writing, data about carbon intensity per Gross Domestic Product were still only available through 2014. See Appendix A for more details.

⁸⁶ "Global CO₂ emissions in 2019." International Energy Agency. February 11, 2020. <https://www.iea.org/articles/global-co2-emissions-in-2019>.

⁸⁷ "Global carbon emissions projected to hit record levels, due to big jumps by China, India." MarketWatch. December 3, 2019. <https://www.marketwatch.com/story/global-carbon-emissions-projected-to-hit-record-levels-due-to-big-jumps-by-china-india-2019-12-03>

U.S., coal-fired electricity continued to decline in 2019; however, the declines were not enough to offset increases from other sectors. The Rhodium Group estimates that the U.S. has not made any net reductions in CO₂ emissions in the past three years.⁸⁸ Similarly, despite slower growth in coal use in India and China, projected net CO₂ emissions increased by 2.6% and 1.8%, respectively.⁸⁹ Lastly, according to the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, global atmospheric CO₂ levels in 2019 were 412.43 parts per million, the highest on record since 1958. The average global surface temperature for 2019 was 0.95°C (1.71°F) above the 20th century average. This was the second highest temperature recorded since 1880 (the highest was set in 2016).

The Climate Action Tracker, an independent scientific analysis produced by two research organizations tracking climate action, ranks each country based on “NDCs, 2020 pledges, long-term targets and current policies against whether they are consistent with a country’s fair share effort to the Paris Agreement’s 1.5°C temperature goal.”⁹⁰ Ranks are based on six different categories: critically insufficient, highly insufficient, insufficient, 2°C compatible, 1.5°C Paris Agreement compatible, and role model. According to the Tracker, India remains on track to achieve its emissions target because of its advances in renewables. It is categorized as 2°C compatible. However, if India were to abandon plans to build new coal-fired power, it would be ranked even more favorably (1.5°C compatible). Based on current policies, China is expected to meet its 2030 targets and the new national Emissions Trading Scheme, with the first trades expected in 2020, will play a key role in reaching those targets. That said, Climate Action Tracker ranked China as insufficient because its targets are not widely seen as ambitious enough. In 2019, the U.S. joined the Russian Federation, Saudi Arabia, Turkey, and Ukraine ranked as critically insufficient. If implemented fully, current U.S. federal policies could result in an increase in the U.S.’s annual greenhouse gas emissions equivalent to the total annual emissions of the state of California by 2030.

On November 4, 2019, the Trump administration formally notified the United Nations of the U.S.’s official withdrawal from the Paris Accord (to date, it is the only country to pull out). Withdrawal will take effect starting November 2020. The Paris Accord required all signatory countries to remain in the Agreement for the first three years after it entered into force on November 4, 2016. After three years, parties can leave following a one-year wait period. As a result, the U.S. State Department was still involved in 25th Conference of the Parties (COP25) in 2019. House Speaker Nancy Pelosi and a delegation of 13 Representatives and one Senator attended the meeting with high-level officials in Madrid to deliver the message that Congress remains committed to the Paris Accord. At best, the U.S. played a contradictory role, reinforcing concerns about its effect on other nations and its ability to meet its own emissions reduction targets.

Although new pledges were not expected at COP25, climate observers hoped that countries might send a strong message of intent for the next year. Four months earlier, the United Nations Climate Action Summit included several announcements. Sixty-five countries and subnational economies committed to cutting greenhouse gas emissions to net zero by 2050. Seventy countries committed to boosting national action plans by 2020. However, attendees were unable to reach consensus in many areas, pushing decisions into 2020. The United Nation’s Secretary General

⁸⁸ Preliminary U.S. Emissions Estimates for 2019. Rhodium Group. <https://rhg.com/research/preliminary-us-emissions-2019/>

⁸⁹ Plumer, Brad. “Carbon Dioxide Emissions Hit a Record in 2019, Even as Coal Fades.” *New York Times*. December 3, 2019. <https://www.nytimes.com/2019/12/03/climate/carbon-dioxide-emissions.html>

⁹⁰ “The major emitters that are meeting their Paris Agreement pledges.” Axios. June 1, 2019. <https://www.axios.com/paris-agreement-countries-meeting-pledges-1261f497-3ec7-4192-ba21-83ae339762be.html>

António Guterres said he was “disappointed” with the results of COP25 and that “The international community lost an important opportunity to show increased ambition on mitigation, adaptation and finance to tackle the climate crisis.”⁹¹ In addition, in 2018, we reported on the promise of the International Solar Alliance. As noted in Finding 7, it has yet to reach its potential. Constraints include mobilizing the promised funding.

One bright spot was that in January 2019 the Kigali Amendment to the Montreal Protocol went into effect. The U.S., India, and China were all originally involved, and it is an illustration of climate leadership. The goal of the Amendment is to reduce production and consumption of HfCs by more than 80% by 2047. The Amendment will help to avoid a rise of up to 0.4 Celsius in global temperature by the end of the century.⁹² Sixty-five countries ratified the international agreement; however, in 2019, the U.S. did not. Another positive development in 2019 was that Prime Minister Modi launched the global Coalition for Disaster Resilient Infrastructure at the United National Climate Summit in September. The government pledged nearly \$68 million to kick start it. It was described as a partnership between governments, multilaterals and civil society, to combine knowledge generation and sharing, technical support to countries. It was spearheaded by the United Nations Office for Disaster Risk Reduction and disaster management agencies in India. The central government’s interest was reportedly to promote a positive global image and highlight India’s extreme vulnerability to the impacts of climate change.

Contribution of the Foundation’s Work

It is difficult to establish strong linkages between specific approaches the Foundation supports and its desired long-term impacts at the initiative level. It is easier to draw connections to its desired outcomes in each country-specific context. That said, the Foundation’s support along with other climate funders on a global phase-down of HfCs through the Kigali Cooling Efficiency Program is a model for philanthropic support for emissions reductions. Also, the Foundation’s work in the U.S. and India continued to have positive incremental effects within a broad ecosystem of climate actors. In the U.S., the Foundation and its grantee partners have contributed significantly to reductions in energy-related emissions. Grantees influenced more closures of coal-fired power plants, helped states adopt CO₂ and methane emissions regulations in the absence of federal regulations, and accelerated deployment of renewable energy at the subnational level. In addition, volume and favorability of discourse among candidates and policymakers on climate change hit an all-time high in 2019. Grantees appeared frequently in media coverage and helped infuse policymaker discourse with more discussion about solutions such as renewable energy. Taken together, the approaches the Foundation supports in the U.S. are contributing to a more favorable trajectory of CO₂ and other greenhouse gas emissions and positive changes in the carbon intensity of the U.S. economy by mitigating federal inaction, and as noted in the examples provided in Finding 1, slowing (if not preventing) further backsliding on environmental protections.

In India, it is similarly difficult to precisely quantify the scale or direct and indirect effects of the Foundation’s work on reducing greenhouse gas emissions. Data do show, however, that recent gains are contributing to the Foundation’s desired impacts. Among the examples mentioned in the earlier Findings, some developments in 2019 are noteworthy:

- The strengthened policy regime for electric mobility and pilots in various states
- Adoption of India’s first Emission Trading System

⁹¹ “COP25: Key outcomes agreed at the UN climate talks in Madrid.” Carbon Brief. December 15, 2019. <https://www.carbonbrief.org/cop25-key-outcomes-agreed-at-the-un-climate-talks-in-madrid>

⁹² “World takes a stand against powerful greenhouse gases with implementation of Kigali Amendment.” United Nations Environment Program. January 3, 2019. <https://www.unenvironment.org/news-and-stories/press-release/world-takes-stand-against-powerful-greenhouse-gases-implementation>

- Launch of the India Cooling Action Plan and global leadership by India on the issue
- Increased parliamentary activity on air pollution
- Increased coordination and collaboration among civil society organizations on climate change

Going forward, it may be feasible to make some more precise estimates, but this will require monitoring results beyond the life cycle of the grants. For example, one grantee designed a Credit Guarantee Mechanism for rooftop solar for the Ministry of New and Renewable Energy. It is also worth underlining the many examples of the Foundation's India grantees being increasingly innovative. To increase ambition and the country's climate leadership, these organizations are experimenting with new, more risky approaches than previous funding streams would allow.

In China, it is much too soon to report on the contribution of the Foundation's work toward its desired impacts of leveling off emissions, deepening participation in climate solutions, or transforming the Chinese economy from high carbon to low carbon. We will have more information about the role that outside influences have on the Foundation's China strategy and whether its initial grantmaking is gaining traction in 2020.

Changes in the Landscape that Affected Progress

Broader changes in the landscape that affect progress toward the Foundation's desired impacts and the trajectory of global greenhouse gas emissions include market and economic forces, other countries' participation in climate solutions, the upcoming U.S. presidential election, and role of the youth movement. In the U.S., in addition to public and political pressures to reduce energy-generated by coal, market forces have accelerated closures of coal plants in favor of cheaper fossil gas and renewable energy. In India, weaker economic growth and an unexpectedly strong monsoon season led the country to generate more electricity from its hydroelectric dams and less from coal plants. In China, the government invested in new infrastructure to stimulate its slowing economy. In addition to its domestic activities, China's actions abroad could have an important impact on future global greenhouse gas emissions. For example, China is financing and building both fossil fuel and renewables infrastructure worldwide through its Belt and Road Initiative, an ambitious program to connect Asia with Africa and Europe via land and maritime networks along six corridors. For all coal plants developed outside of China under the initiative, a quarter have committed or proposed funding from Chinese financial institutions and companies.

The United Nation's 26th Conference of Parties (COP26) is scheduled for November 2020. The U.S. Presidential election is scheduled to occur a week before COP26. The outcome of the elections will affect the U.S.'s role and the country's participation. As noted earlier, U.S. withdrawal from the Paris Accord is scheduled to effect in November 2020. Meanwhile, President Trump's general election opponents have pledged to rejoin the Agreement. Furthermore, at the time of writing, 107 countries besides the U.S., India, and China indicated that they would enhance their targets and climate action; however, these countries represent only 15% of global emissions. Currently, three nations—the Marshall Islands, Suriname, and Norway—have already submitted enhanced climate plans to the United Nations. These countries represent 0.1% of global emissions. Also, there is tremendous uncertainty about the impact that the coronavirus will have on health, the economy, and climate, including but not limited to, postponing COP26 dialogues in Glasgow.

In addition, other international agreements could affect the trajectory of global greenhouse gas emissions. In early 2019, airlines around the world began to monitor their CO₂ emissions as part of the United Nations Civil Aviation Organization's Carbon Offset and Reduction Scheme for International Aviation. The Environment Protection Committee of the International Maritime Organization also accelerated a variety of measures to cut worldwide

greenhouse gas emissions from ocean shipping by 50% by 2050. Advancements included strengthening existing mandatory requirements for new ships to be more energy efficient, initiating the Fourth IMO GHG Study, adopting a resolution that encourages cooperation with ports to reduce emissions from shipping, approving a procedure to assess the impact of new measures, and establishing a multi-donor trust fund for greenhouse gases.⁹³ In November 2019, an intersessional working group gathered and agreed on a draft resolution that would urge member states to develop and update a voluntary National Action Plan. The draft will be put forward to the committee for adoption in March 2020.

Finally, in 2019, a groundswell of climate activism made global headlines.⁹⁴ Millions of young people on every continent fueled a wave of strikes, demonstrations, and protests demanding urgent action. More than 1,000 localities declared states of “climate emergency” and extreme climate-related weather events displaced millions. Globally, in 2019, there was increasing momentum to advance climate solutions.

⁹³ “UN agency pushes forward on shipping emissions reduction.” International Maritime Organization. May 20, 2019. <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/11-MEPC-74-GHG.aspx>

⁹⁴ Taylor, M., & Watts, J. (2019, September 27). Climate crisis: 6 million people join latest wave of global protests. <https://www.theguardian.com/environment/2019/sep/27/climate-crisis-6-million-people-join-latest-wave-of-worldwide-protests>

China: Initial Observations about the Emissions Trading Scheme Landscape

As mentioned in Section 2 of this report, a context assessment related to the Foundation's current strategy in China is in progress. At the highest level, the purpose of the assessment is to help the Foundation understand outside influences on its strategy and whether its initial grantmaking is gaining traction. Our focus is on the Emissions Trading Scheme (ETS), given that the Foundation believes a successful national carbon trading program will play a significant role in helping China reduce its emissions. What follows are initial observations about the landscape that reflect early stage analysis of available literature and the Foundation's grant briefs. As part of the context assessment, interviews with key informants were scheduled to take place between January and March 2020. Those interviews were postponed due to the COVID-19 pandemic. We anticipate resuming the interviews with key informants later this spring and presenting a more robust technical report on the Chinese context in the summer of 2020.

Emission Trading Scheme Landscape

China is moving quickly to nationalize and expand the reach of its ETS. To test and learn about how a carbon market could operate, the central government set up eight pilot markets. In 2013 and 2014, seven pilot carbon markets were established in five provincial-level cities, Beijing, Chongqing, Shanghai, Tianjin, and Shenzhen, and two in-depth projects in the Hubei and Fujian provinces. The latter launched its pilot project in 2016. In 2017, the central government released a framework for a national ETS along with a central government-approved work plan. The work plan described the regulation of 1,700 power sector actors that together account for approximately 30% of national emissions.⁹⁵ According to this plan, simulated trades were expected to begin at the end of 2019. The plan also laid out a gradual expansion of the national ETS to begin near the end of 2020, including bringing the country's coal-fired electricity sector and seven other industries under the national ETS. The seven industries are oil, chemical, construction materials, steel, nonferrous metals, papermaking, and shipping.

Although the central government holds final decision-making authority, diverse government entities are involved in helping to implement and expand the national ETS. A lack of coordination among them could affect progress. At the national level, the Ministry of Ecology and Environment Department of Climate Change and their main think-tank, the National Center for Climate Change Strategy and International Cooperation, are currently the leading agencies on the development and regulation of the national ETS. The Ministry of Finance and the Ministry of Commerce, as well as their related provincial agencies, regularly release national ETS policies. In addition, national institutions of higher education—most notably, Tsinghua University's Center for China Carbon Market Research—are influential in developing policy concepts and implementation designs for the national ETS. Lastly, the provincial governments of the eight pilot projects and think tanks at those local provincial universities are influencing the implementation of those projects.

In addition to government actors, the domestic private sector, consulting companies, and independent think tanks, and civil society organizations also play an important role in the implementation and expansion of the national ETS. A deeper understanding of the organizations and their role in supporting the national carbon market will offer insights into how the Foundation can chart a targeted strategy to support one of China's signature climate initiatives. Private industry and its trade and business associations play an important role as an interface between

⁹⁵ 1,700 power sector actors which are responsible for more than 26,000 metric tonnes of CO₂ per year or consume more than 10,000 tonnes of coal equivalent per year.

government regulators and national carbon market participants by communicating industry concerns to regulators and communicating regulations to its members. Consulting companies help market participants prepare for and benefit from national ETS participation. Two consulting firms of note are Independent Commodity Intelligence Service, which monitors the status of emission rights trading in China, and SinoCarbon, which has close connections to government agencies. The latter helps industry clients understand and implement national ETS policies and regulations. Finally, domestic independent think tanks and civil service organizations have contributed to the carbon market's development. This group of domestic actors will be explored more through the interviews with key informants.

There are also several international organizations working with Chinese organizations and agencies, including the ones mentioned above, to help develop policies and increase domestic capacity to implement the national ETS. Some organizations of note are:

- **The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH:** Since 2012, GmbH—in cooperation with the National Development and Reform Commission, Chinese Ministry of Ecology and Environment, the National Centre for Climate Change Strategy and International Cooperation, the International Carbon Action Partnership, and the emissions exchanges in Shanghai, Beijing and Hubei—has implemented the “ETS in China – Capacity Building of Emissions Trading Systems in China.”
- **ICF:** An international consulting firm that develops training materials and implements a project to train officials in every province on best practices and operations of the ETS.
- **China Carbon Forum:** The Forum develops and promotes the China Carbon Pricing Report on an annual basis in collaboration with SinoCarbon and ICF. It is funded by the Embassy of the Federal Republic of Germany in Beijing, the Royal Norwegian Embassy in Beijing, the Kingdom of the Netherlands' Ministry of Economic Affairs and Climate Policy, and Energy Foundation China. The China Carbon Forum regularly collects the opinions of ETS participants across China regarding the operation of pilot projects and assess companies' preparedness and expectations around carbon pricing.

Chinese and foreign climate policy experts identified the ETS as one the country's most important climate policy initiatives, but also the most in need of reform.⁹⁶ Though many organizations and agencies are working to support this initiative, challenges related to capacity, technical knowledge, and legal and policy frameworks (including enforcement mechanisms) exist. The flip side to these challenges is that they offer opportunities for the Foundation to support increasing the country's ambition and leadership, as well as hastening progress toward an effective national rollout and operation of a national carbon market in China. From the literature review, we identified seven of the most significant and well-documented challenges to implementation of the ETS.

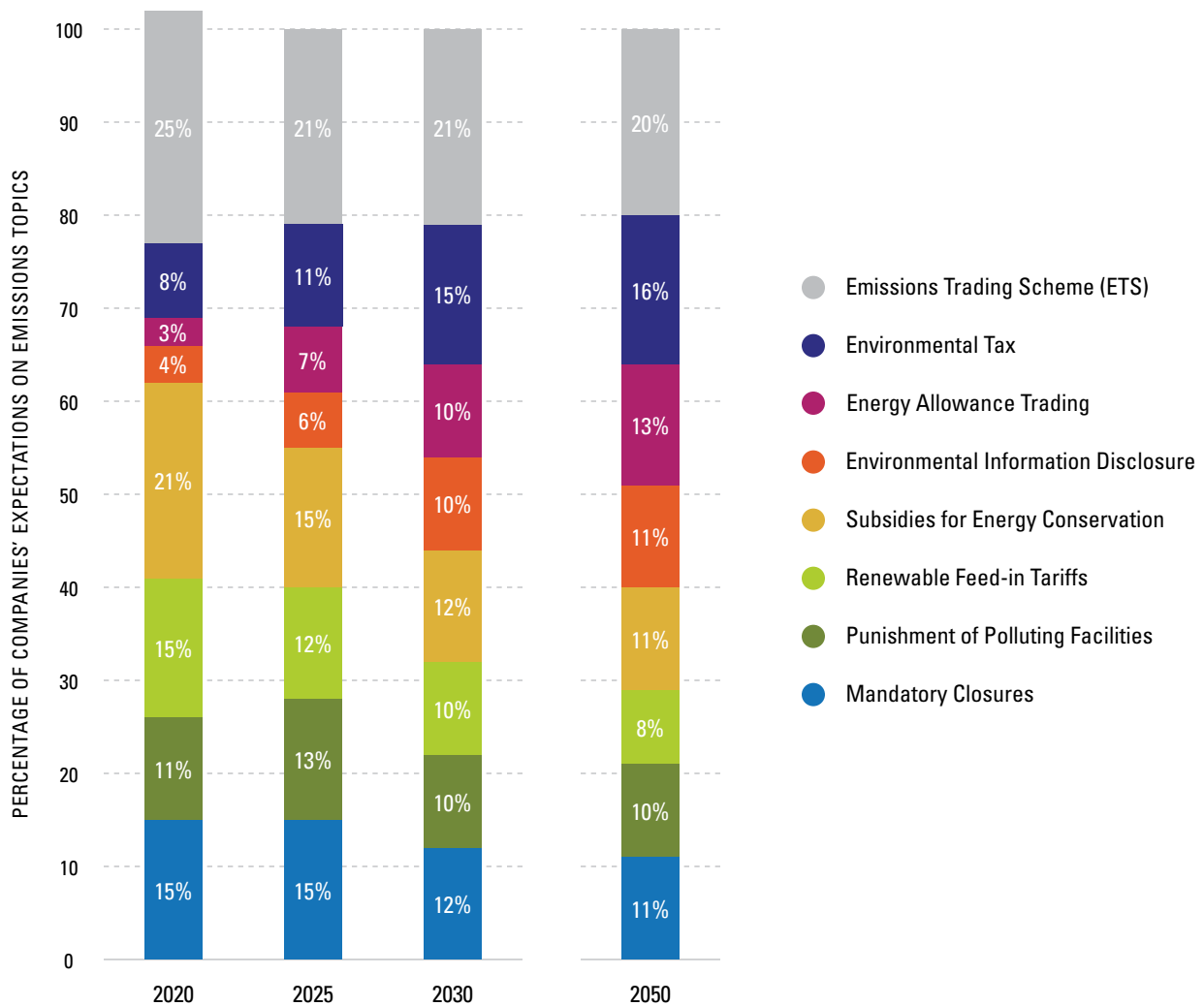
- 1 | **Unfair calculation of baseline emissions.** The current baseline emissions calculation penalizes companies in the trading markets for being efficient. Historic emissions are used to determine the proportion to which companies must reduce their emissions, however, improvements to reduce emissions during the baseline calculation period are not taken into consideration. Companies that reduced their greenhouse gas emissions in the past are expected to reduce their emissions in the same proportion as a company who did not reduce their emissions during the baseline calculation period. In practice the companies who

⁹⁶ Assessing the Policy gaps for achieving China's climate targets in the Paris Agreement]. Nature Communications. October 2019. <https://www.nature.com/articles/s41467-019-09159-0>

reduced their emissions during the baseline period will have to spend more money to achieve the same proportion as more polluting company.

- 2 | Transparency in rule making.** The lack of transparency in the rule making process by government bodies to market participants makes compliance by companies difficult and risky.
- 3 | Regional differences in capacity.** Regions vary in their technical capacity, knowledge, and skilled people needed, especially high-quality, third-party carbon verification services and information management. Significant carbon auditing was undertaken in the early years of ETS implementation; however, in recent years, this practice has not received adequate national support. There is a risk of losing momentum, databases, and expertise if this technical capacity and knowledge is not supported or required by policy.
- 4 | Too much allowance for offsetting.** During the 2017 trading period, nearly 50 million metric tons of CO₂ equivalent was traded from all eight pilot projects, more than three times that of 2014. At the same time, offsetting exceeded 100 million metric tons of CO₂ equivalent. This means that emission reductions were not occurring within the regulated sectors. Instead, they were shifted elsewhere. In 2017, only the Beijing and Shenzhen ETS emission rights trading exceeded offset trading.
- 5 | Lack of national legal framework.** All ETS activity at the national level is governed by guidelines, “Interim Measures on the Management of Carbon Emissions Trading,” issued by the National Development and Reform Commission in 2014.⁹⁷ Local governments may have their own versions of these guidelines. While Beijing and Shenzhen have passed local laws, regulation and compliance at the national level is not backed up by strong legal measures which leads businesses to interpret as too high risk for them to participate.
- 6 | Lack of integration and coordination with other environmental management policies.** China has thousands of energy-savings and emission-reduction policies in place under different government ministries and agencies. There is need to coordinate policies to avoid multiple counting or subsidization of emission reduction and even fraud. In a 2019 survey of more than 350 ETS market participants and business associations in China, ETS was viewed as the most important tool for managing greenhouse gas emissions in 2020. However, the same survey participants believe that environmental taxes and energy allowance trading will increase in the future. In addition, they believe that other policy tools will grow in importance and be used alongside taxes and energy allowance trading. These include Environmental Information Disclosure, subsidies for energy conservation, renewable feed-in tariffs, administrative fines for polluting facilities, and the mandatory closures of obsolete facilities (See Figure the follows). The need to coordinate diverse policies can reduce the burden on business and help clarify interactions between these policies and their respective regulatory agencies.

⁹⁷ The NDRC is the government ministry formerly responsible for greenhouse gas emission regulation in China. In 2018 after a major governmental reorganization, this responsibility was shifted to the Ministry of Ecology and Environment.



Sources: 2019 China Carbon Pricing Survey Report, December 2019
<http://www.chinacarbon.info/wp-content/uploads/2019/12/2019-China-Carbon-Pricing-Survey-Report-20191227.pdf>

Figure 57: Industry Expectations About the Most Important Motivations for Companies to Reduce Greenhouse Gas Emissions, by Year

7 | Lack of incentives for companies to participate, resulting in last-minute compliance and market liquidity problems. Many companies see ETS as a regulatory hurdle and do not dedicate resources to it. They do not trade until close to the end of the compliance period, which leads to liquidity issues and pricing challenges.

The Foundation's Work in China

In 2019, the Foundation made a handful of targeted investments in China that directly or indirectly support the national ETS. One of its desired outcomes is that a robust national carbon emissions trading platform is launched and operated. To achieve this outcome, the Foundation is funding a variety of activities that can help address some of the challenges described earlier.

For example, one grantee is working to find fairer ways to determine emissions allocations rather than using historic emissions data without considering reductions made by companies during the baseline period. Also, approximately half of the Foundation's China grantees are partnering with domestic organizations to address gaps in technical knowledge and capacity, including finding ways to overcome a lack of environmental policy coordination.

Beyond grantmaking, the Foundation is also using its convening power and sharing its own experience and knowledge to bring new funders to the table and facilitate information-sharing among grantees and other climate partners. In November 2019, the Foundation participated in the 20th Anniversary celebration of Energy Foundation in China. In prepared remarks, the Foundation's president, John Palfrey, highlighted the Foundation's role in promoting collaboration between organizations and central and subnational governments. He said that the Foundation "will find new ways to support and deepen the collaboration between China and US states. For example, California is a leader in the United States on policies that boost renewable energy and reduce carbon emissions."

5 | Conclusion



The Foundation’s pathway to ensuring that global temperature rise stays well below two degrees Celsius over pre-industrial levels is based on the premise that if the U.S., India, and China exert global leadership on climate change, then other nations will be compelled to act. The development of this report provided an opportunity to reflect on the relevance of the Foundation’s theory of change and progress achieved since baselines were established. In this conclusion, Grassroots Solutions, with assistance from M+R and our other collaborators, grappled with implications for the Climate Solutions strategy and three key questions posed by the Foundation:

- Is the theory of change valid and adequate to reach the intended impacts?
- Does progress to date demonstrate momentum and provide a line of sight to significant, meaningful, and sustainable long-term outcomes and impact?
- Does the landscape suggest continued windows of opportunity for progress?

Based on the data analyzed to date, what follows is our interpretation of the answers to those questions as well as recommendations for the Foundation, its grantees, and other collaborators to consider.

Is the Theory of Change Valid and Adequate to Reach the Intended Impacts?

For the most part, yes, with a couple of important caveats. The Foundation’s focus on the three geographies—the U.S., India, and China—remains sound. However, whether the actions of these countries add up to enough leadership to compel other countries to act is tenuous.

Evaluation data support the Foundation continuing to focus on the U.S., India, and China. Combined these three countries make up 50% of the world’s CO₂ emissions. Their actions will continue to have an outsized impact on global greenhouse gas emissions and the earth’s surface temperature. Also, we see evidence that each country is taking a variety of promising steps at either the federal level, subnational level, or both to decrease the carbon-intensity of their respective economies, reduce greenhouse gas emissions (e.g., CO₂, methane, and HfCs), and build political will and public demand for climate solutions. Among two of the three largest emitters—India and China—there is consistent national commitment to tackle climate change. Resolve to address climate change at the top levels of government in India and China is strong. In the U.S., subnational commitment continues to grow, discourse among candidates and policymakers is very favorable, and there is increasing willingness among the private sector to act even in the absence of federal action on climate.

At the same time, the actions of the three countries are not necessarily equating to other countries being compelled to act, and there are increasing signs that the U.S. is having a mixed or even counterproductive effect on the international stage. Despite withdrawal from the Paris Accord, the U.S. has still been engaging in negotiations, making the process more difficult for other countries and throwing up roadblocks to identifying more ambitious

emissions reduction targets. The result of the upcoming elections will have a profound impact on the role the U.S. plays internationally going forward. Absent a new administration in 2021, it is increasingly unlikely that the federal government can exert substantial positive influence on the international stage or questionable whether actions at the subnational level will add up to enough influence to compel other nations to follow suit.

After the 2016 elections, there was hope that India and China would step up and fill the void created by the U.S. stepping back. That hope has in part been realized, but a variety of domestic factors have hampered each country from playing an even bigger role on the international stage. In India, positive developments include the International Solar Alliance and Prime Minister Modi launching the global Coalition for Disaster Resilient Infrastructure at the United National Climate Summit in September 2019. At the same time, economic, political, and constitutional issues may have diverted some political attention from climate. India is facing a sharp economic downturn. In international climate negotiations, the country has emphasized the need for advanced economies to fulfill financial commitments to assist poorer, developing countries. Meanwhile, protests against a new citizenship law broke out in cities across the country. Demonstrators fear the law will endanger the nation's Muslim minority and dozens of deaths have already been recorded.

In the 2015 Paris negotiations, China was criticized for its demand to be treated like a developing country. By 2019, the country had become a participant in the Major Economic Forum, where ministers from leading countries work together to maintain momentum and common understanding in climate talks. The Forum had previously been run by the U.S., but Canada took over when the U.S. pulled out, and now China is playing a prominent role. While these signs are positive, and China continues to aggressively pursue domestic decarbonization, there are signals that the country's desire to play an international leadership role is weakening in the face of economic slowdowns and the U.S.-China trade war.

A Note about the Just Imperative⁹⁸ and COVID-19

The Climate Solutions Core Group is on a journey to incorporate equity into its strategy. The Foundation's Just Imperative lays out intentions that are partially reflected in its current grantmaking. For example, since 2018, the Foundation has taken steps to diversify and provide more support for organizations that represent low-income and communities of color and are led by leaders from those communities (especially in the U.S.). It is also embracing transparency and power-

sharing as evidenced in the 2019 India grantee convening. These are important steps to align the Climate Solutions Big Bet with the Foundation's Just Imperative. At the same time, it is unclear the degree to which diversity, equity, and inclusion are embedded in the theory of change. Without being more explicit about the aims of the Climate Solutions program when it comes to diversity, equity, and inclusion and how those aims will be achieved, the Big Bet stands to fall short. For example, in the U.S. especially, we see that organizations led by and for under-represented communities are often expected to bolster work of white-led organizations rather than being positioned as leaders and equal partners. Those disproportionately affected by climate change have an even bigger stake in climate mitigation as well as powerful and salient experiences that can translate into generating more public and political will for climate solutions. They also bring relationships necessary to engage new audiences and broaden the climate solutions coalition.

⁹⁸ <https://www.macfound.org/press/perspectives/just-imperative-update-progress/>

In addition, it is worth acknowledging that we reached these conclusions before the emergence of the novel coronavirus (COVID-19). The full extent of the impacts on climate change policies and the three countries' roles are unknown. It is, however, clear that this global health crisis will cause untold deaths and suffering and have an unprecedented economic effect, especially among the poor and vulnerable. Governments will face stark tradeoffs, navigating immediate priorities and longer-term economic fallout. The pandemic may also present opportunities. Countries are already beginning to plan financial stimulus programs, which could provide significant opportunities for decarbonization and clean energy. The Chinese government is expected to announce a stimulus package to boost its economy in the short-term and provide building block for a new sustainable and technology-driven economic model going forward. Although no climate-friendly provisions made it into the recent U.S. \$2 trillion stimulus bill, additional congressional actions will be taken to stimulate the economy providing opportunities for climate advocates.

Does Progress To Date Demonstrate Momentum and Provide a Line of Sight to Significant, Meaningful, and Sustainable Long-term Outcomes and Impact?

Although numerous trends we have been tracking are headed in the right direction, the pace of progress does not match the starkness of the challenge or the hoped-for ambition the Foundation has identified to demonstrate leadership. Progress in the U.S. and India to deepen participation in climate solutions, lower or level off emissions, and transform from high to low carbon economies has been mixed. We generally see steady—rather than “breakout” or “transformative”—changes. Since 2015, the most significant progress and contribution of the Foundation's work was made toward the following outcomes, which provide the clearest line of sight to achieve the Foundation's goals:

U.S.

- **Deployment of Renewable Energy**
Subnational commitment continues to grow, resulting in more renewable energy policies adopted than at any point in recent history
- **Reduced Emissions of CO₂**
Energy-related emissions continue to decline, especially energy generated by coal, and states are stepping up to fill the gaps left by the federal government
- **Building Political Will**
Discourse among candidates and policymakers in the U.S. on climate change is at an all-time high and has been dominated by Democrats promoting favorable narratives and introducing bold new solutions

India

- **Deployment of Renewable Energy**
Renewable energy continues to expand, and the Government of India doubled its 2030 target

- **Capacity of Civil Society Organizations to Engage with Government**
Collaborations with and among civil society organizations and the government are increasingly commonplace and fruitful
- **Clean Technology Deployment**
Progress to promote energy efficiency and deployment of clean technology is steady; the implementation of various government schemes continued and advancements in electric mobility is particularly promising
- **Building Political Will**
Political will has not changed significantly but remains high and important developments include increasing activity on air pollution

China

- **Building Political Will**
Resolve to address climate change at the top levels of government in China is strong
- **National Carbon Emission Trading Platform**
A variety of activities can help address some of the challenges to its successful operation

Does the Landscape Suggest Continued Windows of Opportunity for Progress?

Yes, but there are substantial headwinds (e.g., mounting rollbacks of environmental protections in the U.S. call into question the likelihood of the country taking bold near-term federal action, economic uncertainty in India and China, the unknown effects of COVID-19, and the relatively short time horizon to make rapid and far reaching transitions to reduce emissions). Compelling windows of opportunity include growing alarm about the climate science, the makeup of elected leadership, increasing global climate activism, and the role of the private sector.

As noted on pages 2 and 3, in 2019, a groundswell of climate activism made global headlines. Millions of young people on every continent fueled a wave of strikes, demonstrations, and protests demanding urgent action. More than 1,000 localities declared states of “climate emergency.” In India, media coverage of climate change is growing among English-language outlets, is increasingly favorable, and is more nationally, rather than internationally, driven. Climate is an increasingly prevalent theme.

In the U.S., climate is surging as a voter priority.⁹⁹ According to the Yale Program on Climate Change Communication’s November 2019 survey, in the U.S., nearly six in ten (58%) Americans are now either “Alarmed” or “Concerned” about global warming. From 2014 to 2019, the proportion of “Alarmed” nearly tripled. The election or re-election of officials who support climate solutions are helping to create conditions that are more favorable to advancing climate solutions.

⁹⁹ <https://www.theatlantic.com/science/archive/2020/02/poll-us-voters-really-do-care-about-climate-change/606907/>

In the U.S., India, and China, the private sector continues to make robust investments in renewable energy. Also, more than 20 multinational companies made new commitments to use renewable energy for their electricity. A report released September 2019 found that more than 1,100 institutional investors—including global wealth managers, sovereign wealth funds, public pension funds, and foundations, totaling over \$11 trillion in assets—committed to divesting from fossil fuels and investing in clean energy.¹⁰⁰ Lastly, at the beginning of 2020, Blackrock Financial, the world’s largest asset manager, announced it would divest from coal.

Recommendations for Consideration

With the upcoming Strategy Review, it is an opportune moment for the Foundation and its grantee partners to explore together what has worked, what has not, and what constitutes enough progress and urgency. Specific recommendations that stem from the Findings for the Foundation’s consideration follow.

Climate Solutions Theory of Change and Strategy

- **Consider refinements to the theory of change** to focus on key levers within the U.S., India, and China that can have the greatest impact on reducing emissions in a way that is both ambitious and just. The current theory of change reflects an emphasis on the right countries; however, evaluation data support concentrating less on geographic leadership as opposed to zeroing in on ways to boost urgency and ambition within those countries to lower the trajectory of CO₂ and greenhouse gas emissions.
- **Although there are no “silver bullets,” examine how more cohesion and focus among subsets of the Foundation’s portfolio could help advance more ambitious aims. Furthermore, we suggest considering a more aggressive stance on work already supported as opposed to new or greater diffusion in the solutions promoted.** For example, subnational work in the U.S. has resulted in multiple states implementing policies to require a transition to 100% carbon-free or renewable energy. These accomplishments could be expanded to more states. In India, the Foundation’s grantees are well positioned to help identify or revise umbrella goals, timelines, messaging, and targets for each approach and its associated outcomes. What are reasonable yet ambitious milestones between now and 2025? We see an opportunity to build on the most promising initial gains and ensure follow-through as opposed to broadening the array of climate solutions supported.
- **Stay focused on reducing energy-related emissions while collaborating with other funders to ensure that Foundation-funded activities are complementary to other climate funders and actors working to address rising emissions from other sectors.** The rationale for this is that reductions in energy-related CO₂ emissions are being canceled out in part by increases from other sectors (e.g., transportation).

¹⁰⁰ “Global Fossil Fuel Divestment and Clean Energy Investment Movement Crosses \$11 Trillion Milestone” 350.org. September 9, 2019. <https://350.org/press-release/global-fossil-fuel-divestment-11/>

- **Reevaluate the prioritization of carbon pricing and consider moving away from supporting activities related to creating or expanding markets for carbon in the U.S and India as originally envisioned.** Progress to promote a carbon tax or put a price on pollution has had limited or mixed success. If there is one approach and related outcome worth deprioritizing in the U.S. and India, it may be carbon pricing; however, based on evaluation data, the lack of progress may have more to do with how that solution has been advanced than the solution itself. There are bright spots at the subnational level in the U.S. and India, and efforts in China will be worth watching. Perhaps the Foundation should be seeking to support efforts to change the economics of climate change and the impacts on countries and communities. A revised outcome could encompass carbon markets and just transition.
- **Reexamine how the current approaches supported do or do not support communities that are most impacted by the effects of climate change and what it might take to support their leadership to develop and advance solutions.** This will look different in each country-specific context and require refinements to both how the work is done (approches) and what constitutes success (outcomes and impacts). In addition, although the Foundation has signaled that additional grantmaking in the short-term will be limited, however, it has other resources that are very valuable: its convening and reputational power. It could elevate the profile of existing grantees that represent communities most affected by the negative impacts of climate change by positioning these groups as leaders, not just in broadening the coalition, but in identifying, framing, and promoting climate-friendly policies. The 2019 India grantee convening provides a good example. The program staff created a forum that strongly encouraged collaboration, information-sharing, and transparency among the grantees and between the Foundation and the grantees. As a result, we already see increasing evidence of ambition and innovation.

U.S.

- **Capitalize on momentum among candidates, policymakers, and the public and align activities to alter political discourse around one of the highest-impact narratives (e.g., “Defining Challenge of Our Time” or “Clean Energy Revolution”).** Then work to infuse that narrative with solutions that have the greatest potential to reduce emissions and transform the U.S. economy. Candidate and policymaker discourse on climate change reached an all-time high and is overwhelmingly favorable. Also, polls show that 2020 is the first time in American political history where climate change is a top-tier issue. These factors coming together at the same time provide an “organizing moment.”
- **Continue to support subnational efforts and identify a narrower set of geographic states and regions to focus on that are ripe to advance transformative climate solutions that could have positive spillover effects and because of their potential federal-level importance.** Absent federal action, state actions help frame the discourse around climate, affect emissions, and provide models for federal legislation. Grantees’ work has helped close a significant number of coal-burning power plants. As a result, many large utilities, including several in the Upper Midwest, are not planning to sharply cut their coal and gas use in favor of renewables. Six states are also implementing policies to move away from fossil fuels and require a transition to 100 percent carbon-free or renewable energy. But in many regions, fossil gas continues to dominate as a replacement fuel. Nationwide, energy companies plan to add at least 150 new gas plants and thousands of miles of pipelines locking in decades of new fossil fuel use. Doubling down on state policies that move away from fossil fuels would affect emissions and provide decarbonization models for federal legislation.

- **Do joint scenario planning with grantees.** If the November elections result in a new administration, history shows that there will be a narrow window to enact federal policies on climate—likely less than two years. Conversely, if President Trump is re-elected, then it is equally important to plan and prepare. Helping build consensus among grantees in advance would be useful. Also, the Foundation could work with grantees to define steps beyond re-joining the Paris Accord that would demonstrate U.S. leadership or ambition.
- **Identify potential ways with other funders and grantees to put climate action and resilience at the center of longer-term economic stimulus packages.** The impact of COVID-19 going forward is unknown. Although no climate-friendly provisions made it into the recent \$2 trillion stimulus bill, additional congressional actions will be taken to stimulate the economy. In 2019, The American Recovery Act provided substantial resources to bolster the deployment of renewable energy and clean technology. This massive infusion of federal resources helped propel the growth in renewable energy in the past decade. The next stimulus bills are likely to be the largest investments in infrastructure in the U.S. in decades providing a similar significant opportunity to invest in clean energy. The Foundation should work with colleague funders and grantees to align efforts to take advantage of this opportunity.

India

- **Building on the earlier recommendation, concentrate on building on the most promising initial gains and ensuring follow-through** as opposed to broadening the array of climate solutions supported.
- **Focus on some key structural barriers to tackle that are currently impeding transformative change.** As an example, 2019 saw an increased slowdown in the Indian economy, which became the primary preoccupation of the Government of India. The grant portfolio does not directly explore opportunities that the economic challenges could offer (e.g., the need for India to increase its local manufacturing sector and massively expand formal employment opportunities). The Government's interest in electric vehicles and solar panel manufacturing is a direct response to this, and there could be more opportunities to build a "green" agenda into economic recovery plans.
- **Consider support (or working with other funders to ensure complementary support from other sources) for grassroots and mobilizing citizen-led campaigns and additional strategic communications efforts in India to help connect climate change to high-profile challenges.** The current mix of grantees is dominated by research-focused civil society organizations. Some of these grantees are working directly with the private sector, and in many cases, these are the grants for which direct influence on energy saved or renewables installed is possible to assess. However, the lack of diversity in the profile of organizations could affect the type and degree of change likely. For example, there are no grantees focused exclusively on mobilizing a citizen-led campaign.

China

- **Although in early stages of our analysis, the inclusion of a fully operational national ETS in both its international commitments and domestic policy would go a long way in elevating China's global leadership on climate as well as signaling its long-term commitment to addressing climate change.** The ETS is an important mechanism for reducing greenhouse gas emissions in China. Along with other policy tools, it is expected to make an important contribution to peaking China's emissions as soon as possible. A properly operating national ETS is important for China to meet its international Nationally Determined Contribution and could play a major role in the development of China's economy if China adopts a national

emissions cap in its 14th Five-Year Plan. At the same time, the impact of the COVID-19 pandemic on the ETS and China's ability to pursue emissions reductions at the same level and intensity it had planned is unclear. There are signals from the Chinese government that there will be no further action on the ETS in 2020; however, this is something we will continue to track closely.

- **The “one-step removed” nature of the Foundation’s investments require careful planning before deploying new resources or allocating current resources differently.** Due to registration requirements for foreign philanthropies and nongovernmental organizations, the Foundation has adopted an intermediary approach to its grantmaking in China, selecting grantees that are registered under the “Law on the Management of the Activities of Overseas NGOs within Mainland China.”
-

Appendix A: Data Points Tracked

There are a variety of measures that we are using to assess progress toward the Foundation's desired impacts and outcomes and how the approaches undertaken are contributing to promoting leadership and climate solutions. What follows are illustrations of categories of measures identified in collaboration with the Foundation for the overall Climate Solutions initiative, the U.S., India, and China. Linked to these measures are evolving targets that represent the quantity, value, or amounts of something that the Foundation wants to happen within a specific timeframe. The remainder of Appendix A includes specific data points we have tracked since baselines were established (2012 for the U.S. and 2015 for India) through 2019.



Impact Measures



Overall Climate Solutions Initiative

IMPACT: Lowered the trajectory of global greenhouse gas emissions

Indicators of Progress:

- Favorable changes in the trajectory of global CO₂ and greenhouse gas emissions

IMPACT: Broadened and deepened participation globally in climate solutions

Indicators of Progress:

- Increase in the number of countries participating in the Paris Accord (quantity)
- Increase in the number of countries that exceed their goals (quality)

IMPACT: Transformed economies from high carbon to low carbon

Indicators of Progress:

- Positive changes in the carbon intensity of the global economy



U.S.

IMPACT: Lowered U.S. emissions

Indicators of Progress:

- Favorable trajectory of CO₂ and greenhouse gas emissions

IMPACT: Deepened participation in climate solutions

Indicators of Progress:

- The U.S. exceeds its emissions reduction goals

IMPACT: Transformed the U.S. economy from high carbon to low carbon

Indicators of Progress:

- Positive changes in the carbon intensity of the U.S. economy



Impact Measures (cont.)



India

IMPACT: Leveled off emissions (while meeting development goals)

Indicators of Progress:

- Favorable trajectory of CO₂ and greenhouse gas emissions

IMPACT: Deepened participation in climate solutions

Indicators of Progress:

- India exceeds its emissions reduction goals

IMPACT: Transformed the India economy from high carbon to low carbon

Indicators of Progress:

- Positive changes in the carbon intensity of the Indian economy



China

IMPACT: Leveled off (and eventually reduced) emissions

Indicators of Progress:

- Favorable trajectory of CO₂ and greenhouse gas emissions

IMPACT: Deepened participation in climate solutions

Indicators of Progress:

- China exceeds its emissions reduction goals

IMPACT: Transformed the Chinese economy from high carbon to low carbon

Indicators of Progress:

- Positive changes in the carbon intensity of the Chinese economy



Outcome Measures



Overall Climate
Solutions Initiative

OUTCOME: Changed the emissions trajectory in the U.S., India, and China

Indicators of Progress:

- **U.S.:** Enforcement of environmental protection laws and reductions in emissions of CO₂ and other greenhouse gas emissions
- **India:** Leveling off of CO₂ and other greenhouse gas emissions
- **China:** Leveling off (and eventually reducing) emissions of CO₂

OUTCOME: Adopted national and international climate change policies and treaties

Indicators of Progress:

- **India:** Improvements in civil society organizations' capacity to engage with government on climate policy
- **U.S., India, and China:** Climate solutions have become a consistent and high priority for elected and community leaders
- **U.S. and India:** Changes in political discourse around climate change and support for climate solutions

OUTCOME: Adopted and implemented carbon pricing schemes

Indicators of Progress:

- **U.S., India, and China:** Increase in political support for carbon or pollution pricing

OUTCOME: Normalized extensive and sustained investments in renewable energy and clean technology

Indicators of Progress:

- **U.S. and India:** Improvements in conditions for innovation and collaboration between public and private sectors

OUTCOME: Adopted and deployed renewable energy and clean technologies

Indicators of Progress:

- **U.S., India, and China:** Improvements in the renewable energy mix for jurisdictions



U.S.

OUTCOME: Enforced environmental protection laws

Indicators of Progress:

- Prevention of rollbacks (new)¹⁰¹

OUTCOME: Reduced emissions of CO₂

Indicators of Progress:

- Coal plant closures¹⁰²

OUTCOME: Reduced emissions of greenhouse gas pollutants

Indicators of Progress:

- Regulation of emissions of short-lived pollutants
- TBD¹⁰³

OUTCOME: Built political will to advance climate solutions

Indicators of Progress:

- Increased candidate discourse on climate in 2016 presidential election and in midterm 2018 congressional elections
- Normalization of solutions-oriented media coverage
- Larger and broader base of advocates for climate solutions
- Majority of U.S. federal lawmakers support climate solutions
- Majority of U.S. state lawmakers support climate solutions (new)¹⁰⁴

OUTCOME: Established broad-based political support for carbon pricing

Indicators of Progress:

- Legislation introduced, debated, passed, and ballot measures proposed and passed, including expansion of existing carbon pricing schemes in line with Foundation priorities

OUTCOME: Increased deployment of renewable energy

Indicators of Progress:

- Federal and state governments encouraged and incentivize development and deployment of solar, wind, and other forms of renewable energy

¹⁰¹ Through 2018, we were still tracking changes in the number of states complying with Clean Power Plan; however, we are now tracking the outcomes of litigation aimed at preventing rollbacks. Also, we are tracking the adoption of state-level policies aimed at reducing emissions, which cuts across the Foundation's desired outcomes yet is categorized under political will. Going forward, we will continue to work with the Foundation and its grantees to continue to revisit what we are tracking and measuring to assess progress.

¹⁰² Until 2018, Clean Power Plan implementation was cited as an indicator of progress; however, we revised this to more explicitly concentrate on coal plant closures.

¹⁰³ Originally, we were tracking whether new incidences of asthma (nationally and in designated high-risk communities) leveled off. We are continuing to work with the Foundation and its grantees to identify a relevant way of assessing progress toward the Foundation's desired outcome of reducing greenhouse gas emissions.

¹⁰⁴ Related to this some of the data points we are tracking now include state level climate-friendly policies introduced and adopted.



Outcome Measures (cont.)



India

OUTCOME: Catalyzed renewable energy production

Indicators of Progress:

- Creation of renewable energy financing ecosystem¹⁰⁵
- Central and state governments and private sector prioritize renewable energy adoption and deployment to stabilize the electric grid and broaden electrification of India¹⁰⁶
- Data about renewable energy accessible to interested stakeholders
- Increasing availability of information on decentralized renewable energy

OUTCOME: Promoted and deployed clean technology

Indicators of Progress:

- A clear vision and policy platform on clean technology and its role within India's state and central governments is articulated
- Increasing collaboration between clean technology and other sectors of the Indian economy
- Government and private sector promote greater use of energy efficiency measures

OUTCOME: Increased civil society organizations' capacity to engage with and affect the government's climate policies

Indicators of Progress:

- Central and state government look to civil society organizations as stakeholders and partners in the policymaking processes
- Civil society organizations' recommendations are incorporated into government-proposed national and international climate policies
- Broader base of civil society organizations participate in advocacy efforts around climate solutions

OUTCOME: Built political will to advance climate solutions

Indicators of Progress:

- Central and state governments issue public statements and policies related to climate change and climate solutions
- Public-at-large and segments, including the private sector, weigh in on climate and energy policies

¹⁰⁵ In 2018, although the indicators themselves did not change, we decided to track additional data points starting in 2019 that would speak to broader contextual changes that relate to the Foundation's climate financing. These included the portfolio/deal value of financial transactions for utility-scale solar and wind, price trends for residential rooftop solar, and total rooftop solar installed capacity.

¹⁰⁶ Ibid.



Outcome Measures (cont.)

OUTCOME: Demonstrated support for policies/practices that put a price on pollution

Indicators of Progress:

- Increasing multi-stakeholder discussions about emission measurement
- Central and state government signaling a commitment to expand a domestic carbon market
- Increasing institutional (civil society organizations and government) capacity to implement a well-functioning emissions trading system
- Businesses prepare inventories of CO₂ emissions



China

OUTCOME: Reduced emissions of greenhouse gas pollutants

Indicators of Progress:

- TBD*

OUTCOME: Strengthened implementation of environmental laws and regulations to incentivize a low-carbon economy

Indicators of Progress:

- TBD*

OUTCOME: Increased ability of Western philanthropic community to engage with Chinese policy actors on climate change

Indicators of Progress:

- TBD*

OUTCOME: Launched and operated a robust national carbon emissions trading platform

Indicators of Progress:

- TBD*

OUTCOME: Built bilateral and other relationships in Southeast Asia and shared information about climate solutions

Indicators of Progress:

- TBD*

OUTCOME: Increased political will to refashion existing global institutions and systems to limit the shift of greenhouse gas emissions to other regions

Indicators of Progress:

- TBD*

* Measures for China are currently in development.

Impact Measures



EMISSIONS: Lowered the trajectory of global greenhouse gas emissions

- 1.A.1.1 Change in global surface temperature (in Celsius)
- 1.A.1.2 Atmospheric CO₂ levels (in parts per million based on the last measurement of the year)
- 1.A.1.3 Change in sea level (in millimeters based on the last measurement of the year)

	2012	2013	2014	2015	2016	2017	2018	2019
Change in Global Surface Temperature (relative to 1951-1980 average)	0.63	0.65	0.74	0.87	0.99	0.9	0.82	0.95
Atmospheric CO ₂ Levels	395.09	397.62	399.62	402.56	405.6	407.46	409.07	412.43
Change in Sea Level	70.6	69.1	75.7	85.6	86.1	86.8	89.4	96*

* As of September 2019

Source: National Aeronautics and Space Administration (NASA) Statistics, <https://climate.nasa.gov/vital-signs/global-temperature/>

- 1.B.1 CO₂ emissions (in million metric tonnes)

	2012	2013	2014	2015	2016	2017	2018	2019
World Emissions*	35,470.89	35,837.59	36,138.29	-	-	-	-	-
U.S. Emissions**	5,371.7	5,522.9	5,572.1	5,423.0	5,306.7	5,270.7	-	-
India Emissions*	2,018.50	2,034.75	2,238.38	-	-	-	-	-
China Emissions*	10,028.57	10,258.01	10,291.93	-	-	-	-	-

* Source: The World Bank, <https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?end=2014&locations=CN-IN-US-1W&start=1990&view=chart>

** Source: U.S. Environmental Protection Agency, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2016>



CARBON PRICING: Transformed economies from high carbon to low carbon

- 2.A.1 Changes in the carbon intensity of global economy (in billions of U.S. dollars)

	2012	2013	2014	2015	2016	2017	2018	2019
U.S.	\$40.6	\$35.3	\$37.0	\$44.1	\$43.1	\$40.5	\$46.5	-
India	\$7.8	\$6.6	\$8.3	\$10.2	\$13.7	\$10.9	\$11.4	-
China	\$61.7	\$62.0	\$87.8	\$102.9	\$96.9	\$126.6	\$93.20	-
Global	\$257.3	\$234.0	\$273.0	\$285.9	\$274.0	\$297.8	\$288.30	-

Source: Frankfurt School-United Nations Environment Programme,
<https://wedocs.unep.org/bitstream/handle/20.500.11822/29752/GTR2019.pdf?sequence=1&isAllowed=y>

- 2.A.2 Carbon intensity per Gross Domestic Product for G20 member nations (in kilo tonnes of CO₂ per billion 2005 U.S. dollars)

	2012	2013	2014	2015	2016	2017	2018	2019
Argentina	75.97	76.23	75.38	-	-	-	-	-
Australia	62.09	59.29	57.12	-	-	-	-	-
Brazil	53.35	54.92	57.02	-	-	-	-	-
Canada	55.57	55.31	54.54	-	-	-	-	-
China	221.91	214.48	201.12	-	-	-	-	-
France	19.28	19.38	17.68	-	-	-	-	-
Germany	61.98	63.12	58.90	-	-	-	-	-
India	164.34	161.28	162.91	-	-	-	-	-
Indonesia	132.96	131.13	126.57	-	-	-	-	-
Italy	27.02	25.90	23.96	-	-	-	-	-
Japan	33.42	32.81	31.92	-	-	-	-	-
Mexico	53.15	50.63	48.86	-	-	-	-	-
Russia	224.93	220.68	213.52	-	-	-	-	-
Saudi Arabia	148.38	147.01	148.67	-	-	-	-	-

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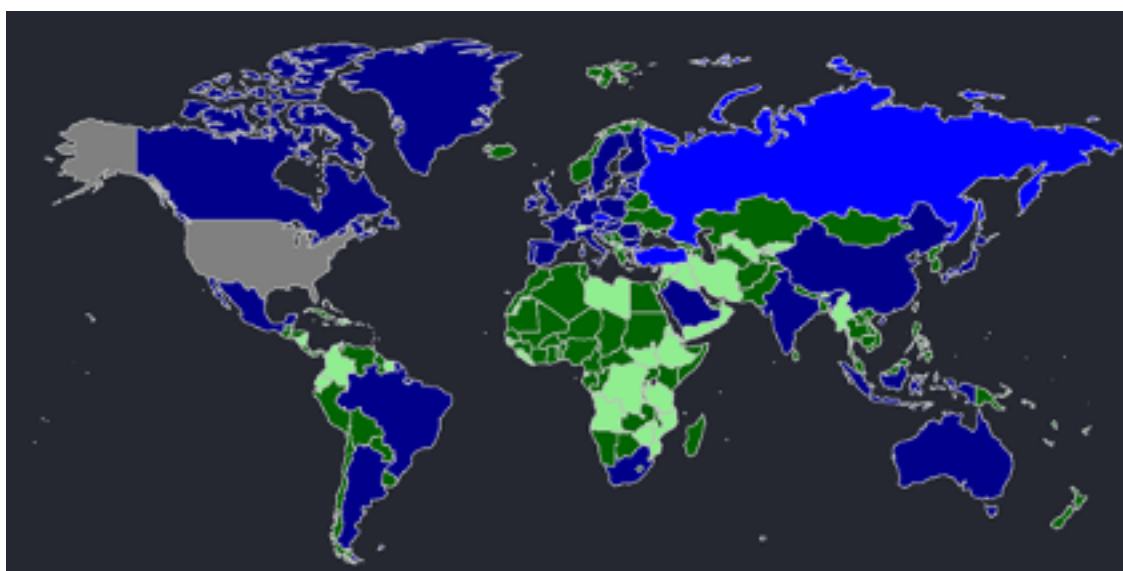
	2012	2013	2014	2015	2016	2017	2018	2019
South Africa	187.06	183.35	180.27	-	-	-	-	-
South Korea	70.65	69.66	68.77	-	-	-	-	-
Turkey	59.13	56.11	57.48	-	-	-	-	-
United Kingdom	24.82	23.95	21.81	-	-	-	-	-
U.S.	46.60	46.84	46.36	-	-	-	-	-
European Union	35.62	35.02	33.05	-	-	-	-	-

Source: The Shift Project Data Portal, <http://www.tsp-data-portal.org/Carbon-Intensity-of-GDP#tspQvChart>



POLICIES/TREATIES: Broadened and deepened participation globally in climate solutions

- 3.A.1 Paris Climate Accord



● Signature ● Entered into Force ● G20 Signature ● G20 Entered into Force ● Plans to Withdraw

Source: United Nations Framework Convention on Climate Change, <https://unfccc.int/process/the-paris-agreement/status-of-ratification>

• 3.A.2 Montreal Protocol



● Ratified ● G20 Ratified ● Did Not Sign

Source: United Nations Environment Programme, <http://ozone.unep.org/en/treaties-and-decisions>

• 3.A.3 Kigali Amendment



● Signed ● Ratified ● G20 Signed ● Did Not Sign

Source: United Nations Environment Programme, <http://ozone.unep.org/en/treaties-and-decisions>

U.S. Outcome Measures



EMISSIONS: Reduced CO₂ and other greenhouse gas emissions

- 1.a.1.1 U.S. Greenhouse gas emissions by gas (in million metric tonnes of CO₂ equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019
Carbon Dioxide	5,371.7	5,522.9	5,572.1	5,423.0	5,306.7	5,270.7	-	-
Methane	665.4	663.0	662.1	661.4	654.9	656.3	-	-
Nitrous Oxide	335.8	365.4	362.7	374.1	364.5	360.5	-	-
Fluorinated Gases	159.9	158.8	163.1	165.3	166.3	169.1	-	-

Source: U.S. Environmental Protection Agency, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2017>

- 1.a.1.2 Coal-fired power plants retired in the U.S.

	2012	2013	2014	2015	2016	2017	2018	2019*
Active Coal-fired Plants	649	642	635	623	589	564	534	475
Cumulative Number of Plants Retired	57	80	100	142	183	193	-	-

* As of October 2019

Source: U.S. Energy Information Administration, <https://www.eia.gov/electricity/data/browser/>

- 1.a.1.3 Megawatts of coal-fired plants retired

	2012	2013	2014	2015	2016	2017	2018	2019*
Coal-fired Megawatts Retired (based on net summer capacity)	7,910.7	4,741.3	3,942.8	13,736.5	7,245.5	6,263.1	12,907.20	7,971.9
Electricity Generated by Coal	1,514,043	1,581,115	1,581,710	1,352,398	1,239,149	1,207,901	1,146,393	818,104

* As of October 2019

Source: U.S. Energy Information Administration, <https://www.eia.gov/electricity/data.php#gencapacity>

- 1.a.1.4 CO₂ emissions (kilograms per 2010 U.S. dollars of Gross Domestic Product)

	2012	2013	2014	2015	2016	2017	2018	2019
CO ₂ Emissions	0.329	0.326	0.324	-	-	-	-	-

Source: *The World Bank*, <https://data.worldbank.org/indicator/EN.ATM.CO2E.KD.GD?locations=US>

- 1.a.1.5 Energy-related CO₂ emissions by sector (in million metric tons of CO₂)

	2012	2013	2014	2015	2016	2017	2018	2019
Residential	932	958	970	932	894	867	891	-
Commercial	1,043	1,100	1,115	1,037	982	947	1,017	-
Industrial	1,481	1,501	1,513	1,455	1,424	1,429	1,445	-
Transportation	1,773	1,796	1,815	1,839	1,871	1,888	1,916	-
Total Energy-Related CO₂ Emissions	5,229	5,356	5,413	5,263	5,170	5,130	5,269	-

Source: *U.S. Energy Information Administration*, <https://www.eia.gov/environment/emissions/carbon/>



POLITICAL WILL: Built political will to advance climate solutions

- 2.a.1 Percent of candidate/policymaker discourse on climate change
- 2.a.2 Favorable and unfavorable discourse among candidates/policymakers
- 2.b Percent of public media conversation on climate change devoted to solutions

	2012	2013	2014	2015	2016	2017	2018	2019
Percent of Candidate/ Policymaker Discourse on Climate Change	0.46%	0.58%	0.90%	1.06%	0.66%	0.97%	1.33%	2.48%
Favorable Discourse	46%	40%	41%	38%	66%	73%	83%	88%
Unfavorable Discourse	54%	60%	59%	62%	34%	27%	17%	12%
Percent of Public Media Conversation on Climate Change Devoted to Solutions	18%	13%	12%	18%	16%	13%	13%	12.42%

Source: *Protagonist*

- 2.c U.S. Federal votes on energy and climate bills

	2012	2013	2014	2015	2016	2017	2018	2019
Votes Protecting Clean Energy/Climate (Senate)	6	3	1	3	2	1	0	1
Votes Harming Clean Energy/Climate (Senate)	1	1	2	10	3	10	5	3
Votes Protecting Clean Energy/Climate (House)	1	2	0	1	7	1	1	9
Votes Harming Clean Energy/Climate (House)	16	12	18	12	10	9	7	4

Source: *League of Conservation Voters Scorecard*, <http://scorecard.lcv.org/scorecard?year=all>

- 2.d State level climate-friendly policies introduced and adopted

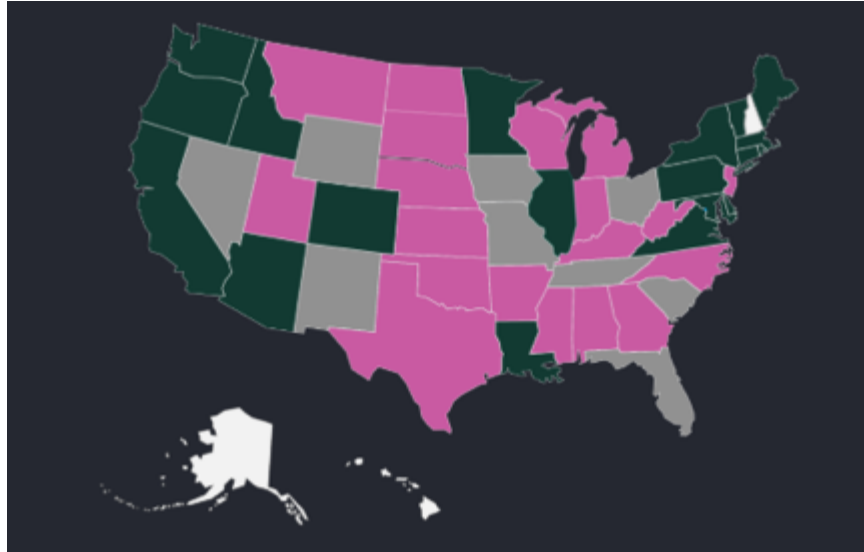
State	2019 Introduced	2019 Adopted	State	2019 Introduced	2019 Adopted
Alabama	0	0	Montana	33	5
Alaska	4	0	Nebraska	19	6
Arizona	13	3	Nevada	16	8
Arkansas	8	6	New Hampshire	68	8
California	93	21	New Jersey	234	9
Colorado	15	9	New Mexico	38	6
Connecticut	71	5	New York	207	5
Delaware	4	3	North Carolina	24	3
District of Columbia	2	0	North Dakota	7	5
Florida	25	0	Ohio	11	2
Georgia	5	2	Oklahoma	21	3
Hawaii	112	16	Oregon	42	8
Idaho	5	3	Pennsylvania	35	0
Illinois	49	8	Rhode Island	34	0
Indiana	10	1	South Carolina	15	3
Iowa	20	1	South Dakota	7	5
Kansas	3	0	Tennessee	4	1
Kentucky	4	2	Texas	34	4
Louisiana	1	1	Utah	15	9
Maine	55	19	Vermont	42	9
Maryland	43	10	Virginia	113	25
Massachusetts	116	1	Washington	50	9
Michigan	22	6	West Virginia	12	0
Minnesota	97	2	Wisconsin	8	0
Mississippi	10	2	Wyoming	14	0
Missouri	26	2	TOTAL:	1,559	191

Source: National Conference of State Legislatures. Energy State Bill Tracking Database. www.ncsl.org



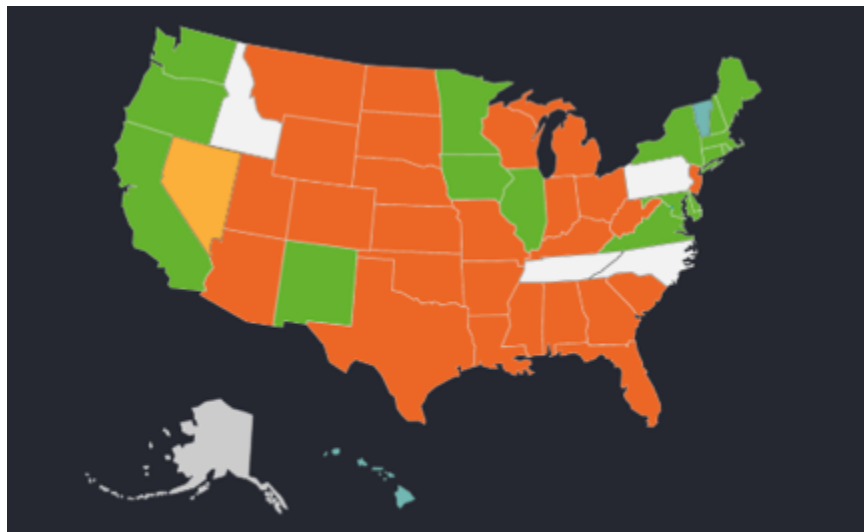
POLICIES/TREATIES: Enforced environmental laws

- 3.b.1 Status of Clean Power Plan (CPP), 2016 (*No longer applicable; going forward this measure will not be tracked*)



- 19 States: Suspending CPP Implementation
- 19 States: Continuing CPP Implementation
- 9 States: Assessing Whether to Continue CPP Implementation

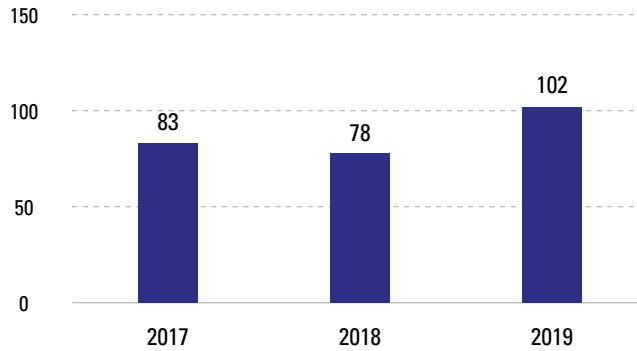
Source: E&E News, https://www.eenews.net/interactive/clean_power_plan#planning_status



- 1 State: Exempt
- 26 States: Suing
- 16 States: Supporting
- 4 States: Not Suing
- 1 State: Opposing
- 2 States: Exempt and Supporting

Source: E&E News, https://www.eenews.net/interactive/clean_power_plan#legal_challenge_status

- 3.c.1 Number of Federal climate change-related lawsuits



Source: Columbia Law School Sabin Center for Climate Change Law. U.S. Climate Change Litigation. <http://climatecasechart.com/us-climate-change-litigation/>



RENEWABLES AND CLEAN TECHNOLOGY: Increased deployment of renewable energy

- 4.a.1 Net Generation: All sectors (in thousand megawatt hours)
- 4.a.2 Net Generation: Renewables (in thousand megawatt hours)

	2012	2013	2014	2015	2016	2017	2018	2019*
Coal	1,514,043	1,581,115	1,581,710	1,352,398	1,239,149	1,205,835	1,145,962	818,104
Natural Gas	1,225,894	1,124,836	1,126,609	1,333,482	1,378,307	1,296,415	1,478,727	1,334,854
Nuclear	769,331	789,016	797,166	797,178	805,694	804,950	807,084	672,041
Conventional Hydroelectric	276,240	268,565	259,367	249,080	267,812	300,333	292,524	230,814
Wind	140,822	167,840	181,655	190,719	226,993	254,303	272,650	247,182
All Utility-scale Solar	4,327	9,036	17,691	24,893	36,054	53,286	63,825	64,087
Geothermal	15,562	15,775	15,877	15,918	15,826	15,927	15,967	13,584
Wood/Wood-derived Fuels	37,799	40,028	42,340	41,929	40,947	41,152	41,005	33,339
Other Biomass	19,823	20,830	21,650	21,703	21,813	21,610	20,896	15,455
All Solar	-	-	28,924	39,032	54,866	77,276	93,365	94,915
Small-scale Solar Photovoltaic Systems	-	-	11,233	14,139	18,812	23,990	29,539	30,829

* As of October 2019

Source: U.S. Energy Information Administration, <https://www.eia.gov/electricity/data/browser/>

- 4.a.3 Percent of U.S. energy production from renewables and investment in clean energy deployment (in billions of U.S. dollars)

	2012	2013	2014	2015	2016	2017	2018	2019*
U.S. Energy Production from Renewables**	12.22%	12.84%	13.16%	13.35%	14.94%	17.02%	17.06%	17.45%
New Private Sector Investment in Clean Energy Deployment***	\$40.60	\$35.30	\$38.40	\$51.40	\$46.40	\$40.50	\$46.50	-

* As of October 2019

** Source: U.S. Energy Information Administration

*** Source: Frankfurt School-United Nations Environment Programme,
<https://wedocs.unep.org/bitstream/handle/20.500.11822/29752/GTR2019.pdf?sequence=1&isAllowed=y>

- 4.a.4 Where Americans got their electricity, 2017 versus 2018 (in thousand megawatt hours)

	2017	2018	% Change
Coal	1,205,835	1,145,962	-5.2%
Petroleum Liquids	12,414	16,245	+23.6%
Petroleum Coke	8,976	8,981	+0.1%
Natural Gas	1,296,415	1,468,727	+11.7%
Other Gas	12,469	13,463	+7.4%
Nuclear	804,950	807,084	+0.3%
Conventional Hydroelectric	300,333	292,524	-2.7%
Renewable Sources	386,968	408,348	+5.3%
Wind	254,303	272,650	+6.7%
Solar	53,286	63,825	+16.5%
Wood/Wood-derived Fuels	41,152	41,005	-0.4%
Other Biomass	21,610	20,896	-3.4%

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	2017	2018	% Change
Geothermal	15,927	15,967	+0.3%
Hydroelectric Pumped	-6,495	-5,905	-10.0%
All Energy Sources	4,034,271	4,174,398	+3.4%

Source: U.S. Energy Information Administration, <https://www.eia.gov/electricity/data/browser/>

- 4.b U.S. production and investment tax credits (in billions of U.S. dollars)

	2012	2013	2014	2015	2016	2017	2018	2019
Production Tax Credit	\$1.6	\$1.7	\$1.5	\$2.6	\$3.4	\$4.5	\$5.1	-
Investment Tax Credit	\$0.5	\$0.5	\$0.6	\$1.2	\$2.6	\$1.9	\$2.8	-
Combined Tax Credits	\$2.1	\$2.2	\$2.1	\$3.8	\$6.0	\$6.4	\$7.9	-

Source: Congressional Research Service, M. Sherlock, "The Value of Energy Tax Incentives for Different Types of Energy Resources." <https://fas.org/sgp/crs/misc/R44852.pdf>



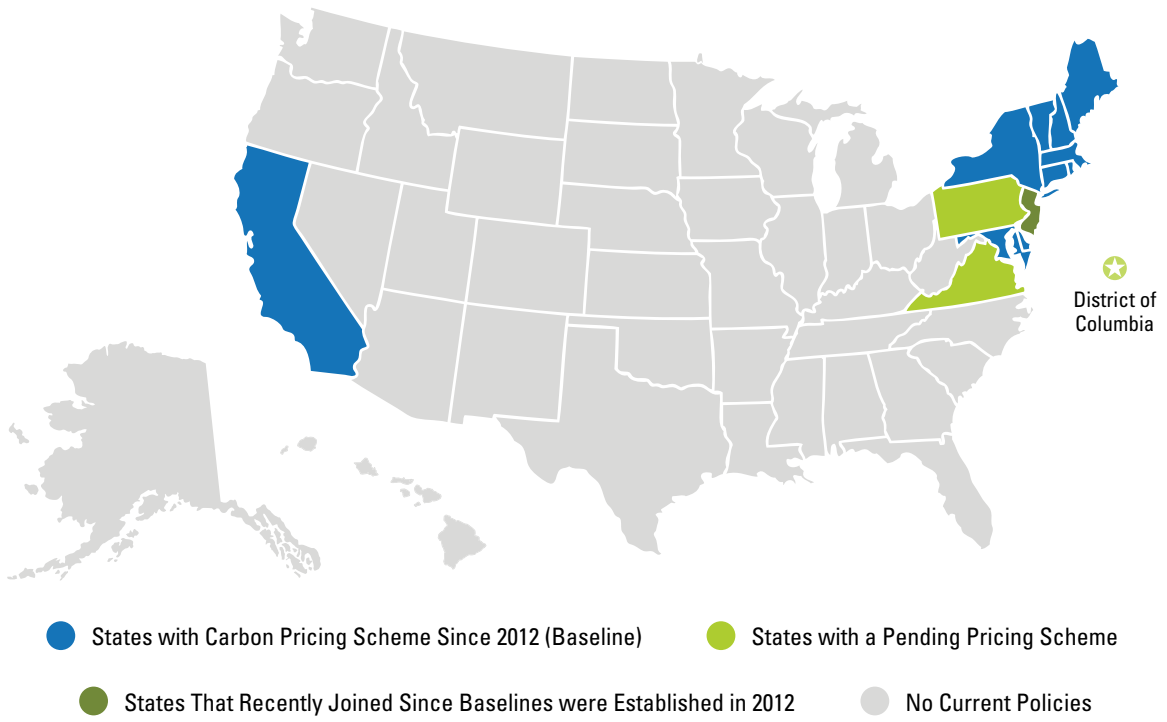
CARBON PRICING: Established board-based support for carbon pricing

- 5.a Carbon intensity of U.S. Gross Domestic Product (in kilograms of CO₂ per 2011 Purchasing Power Parity dollars of Gross Domestic Product)

	2012	2013	2014	2015	2016	2017	2018	2019
Carbon Intensity of U.S. Gross Domestic Product	0.323	0.32	0.318	-	-	-	-	-

Source: The World Bank, <https://data.worldbank.org/indicator/EN.ATM.CO2E.PPGD.KD?end=2014&locations=US&start=1990&view=chart>

• 5.b State Carbon Pricing Policies



Source: *Center for Climate and Energy Solutions*

India Outcome Measures



POLICIES/TREATIES: Increased civil society organization's capacity to engage with and affect the government's climate policies

- 1.a.1.1 Percent of major civil society organizations focusing on climate/renewable energy and policy

	2015	2016	2017	2018	2019
Very High Proportion	0%	-	0%	0%	0%
High Proportion	28%	-	33%	31%	46%
Medium Proportion	56%	-	53%	47%	46%
Low Proportion	17%	-	14%	22%	9%
Very Low Proportion	0%	-	0%	0%	0%

Source: Oxford Policy Management Context Assessment

- 1.a.1.2 Percent of major civil society organizations working on federal climate change policy that the Government of India see as a partner

	2015	2016	2017	2018	2019
Very High Extent	0%	-	0%	0%	0%
High Extent	17%	-	17%	17%	26%
Medium Extent	44%	-	47%	36%	57%
Low Extent	39%	-	33%	42%	15%
Very Low Extent	0%	-	3%	6%	2%

Source: Oxford Policy Management Context Assessment

- 1.a.1.3 Number of the most influential civil society organizations on climate change policy

	2015	2016	2017	2018	2019
Major Civil Society Organizations on Climate Change Policy	36	-	36	36	49

Source: Oxford Policy Management Context Assessment



RENEWABLES: Catalyzed renewable energy production

- 2.a.1.1 Creation of renewable energy financing ecosystem (INR crore, 1 INR crore = \$153,600)

	2015	2016	2017	2018	2019
Gross Budgetary Support for Renewable Energy	246	-	-	-	-

Source: Ministry of New and Renewable Energy Annual Report, <https://mnre.gov.in/annual-report>

- 2.a.1.2 National Clean Energy Fund (INR crore, 1 INR crore = \$153,600)

	2015	2016	2017	2018	2019
Annual Budget	5,123	6,902	8,703	-	-
Annual Disbursement	5,234	6,902	0	-	-

Source: Ministry of New and Renewable Energy Briefing Note, http://doe.gov.in/sites/default/files/NCEF%20Brief_post_BE_2017-18.pdf

- 2.b.1.1 Total installed capacity for electricity generation based on renewable energy (from solar, wind, biomass, small hydropower, and waste-to-energy, in megawatts)

	2015	2016	2017	2018	2019
Total Installed Capacity for Electricity Generation based on Renewable Energy	38,821	50,018	62,846	77,641	78,314

Source: Ministry of New and Renewable Energy Annual Reports, <https://mnre.gov.in/annual-report>

- 2.b.1.2 Percent renewable energy in India's total Installed capacity electricity mix (not including large hydroelectric power)

	2015	2016	2017	2018	2019
Percent of India's Total Installed Capacity for Electric Generation (Based on renewable energy, not including large hydroelectric power)	13.6%	14.8%	18.4%	21.2%	22.73%

Source: Ministry of New and Renewable Energy Annual Reports, <https://mnre.gov.in/annual-report>

- 2.b.1.3 Total installed capacity for electricity on-grid by technology (in megawatts)

	2015	2016	2017	2018	2019*
Solar	4,879	9,012	17,052	24,312	28,180
Wind	25,088	28,700	32,848	34,986	35,625
Biomass	4,677	7,907	8,413	9,545	9,778
Small Hydropower	4,177	4,333	4,418	4,506	4,593
Large Hydropower	40,863	42,703	43,139	44,963	45,399
Waste-to-Energy	127	114	114	114	138

* As of March 2019

Source: Ministry of New and Renewable Energy Annual Reports, <https://mnre.gov.in/annual-report>

- 2.b.1.4 Total installed capacity for decentralized (off-grid/captive) power capacities (in megawatts)

	2015	2016	2017	2018	2019
Total Installed Capacity for Off-grid/ Captive Power Capacities	1,236	1,403	1,555	1,818	-

Source: Ministry of New and Renewable Energy Annual Reports, <https://mnre.gov.in/annual-report>

- 2.b.1.5 Total installed capacity for electricity decentralized (off-grid/captive) power capacities by technology (in megawatts)

	2015	2016	2017	2018	2019
Waste-to-Energy	146	163	175	175	-
Biomass Cogeneration, Gasifiers, Aero-Generators	782	841	827	827	-
Solar Photovoltaic Systems	289	406	552	767	-
Other	17	68	49	49	-

Source: Ministry of New and Renewable Energy Annual Reports, <https://mnre.gov.in/annual-report>

- 2.b.1.6 Portfolio/deal value of financial transactions for utility-scale solar and wind (USD millions)

	2015	2016	2017	2018	2019
Equity	268.7	423	1,007	1,830.7	-
Green Bonds	795.9	1,361	2,664	650	-
M&A	0	1,741.1	1,676.2	906.5	-
Debt	0	0	2,573	2,795.66	-
IPO	0	100	0	0	-
Joint Venture	0	0	11.1	350	-
Mezzanine	0	0	108	28	-

Source: *Bridge to India*

- 2.b.1.7 Total rooftop solar installed capacity (in megawatts)

	2015	2016	2017	2018	2019
Industrial	194	399	811	1,665	2,134
Commercial	117	222	396	809	920
Residential	137	254	373	622	690
Public Sector	74	137	285	521	617
TOTAL:	522	1,012	1,865	3,617	4,361

Source: *Bridge to India*

- 2.b.1.8 Price trends for residential rooftop solar - for PV module, inverter and balance of systems (in INR/Wp)

	2015	2016	2017	2018	2019
Price trends for residential rooftop solar	-	70	67	62	55

Source: *Bridge to India*

- 2.b.2 Effective ways to expand off-grid renewable energy (ratings 1-5, 5 = highest)

	2015	2016	2017	2018	2019
Rating of Adequacy of Technology	4	-	4	4	4
Rating of Adequacy of Political Will	3	-	2	2	2
Rating of Adequacy of Policies and Regulations	3	-	3	-	3

Source: Oxford Policy Management Context Assessment



CLEAN TECHNOLOGY: Promoted and deployed clean technology

- 3.a.1.2 Total electricity consumption by sector (in megawatt hours)

	2015	2016	2017	2018*	2019*
Domestic	238,876	255,826	273,550	-	-
Industry	423,523	440,206	468,825	-	-
Agriculture	173,185	191,151	204,293	-	-
Commercial	86,037	89,825	96,141	-	-
Traction and Railway	16,594	15,683	14,356	-	-
Other	62,976	68,493	73,079	-	-
Total	1,001,191	1,061,184	1,130,244	-	-

* Data not available since 2017.

Source: Ministry of Statistics and Programme Implementation, <http://www.mospi.gov.in/>

- 3.a.2.1 Number of Energy Service Companies empaneled with Bureau of Energy Efficiency

	2015	2016	2017	2018	2019
Energy Service Companies empaneled with Bureau of Energy Efficiency	129	137	141	125	150

Source: Bureau of Energy Efficiency, <https://www.beeindia.gov.in/>



CARBON PRICING: Demonstrated support for policies and practices that put a price on pollution or carbon

- 4.b.1.1 Number of Certified Energy Auditors

	2015	2016	2017	2018	2019
Certified Energy Auditors (Ministry of Power)	8,542	8,820	9,219	9,330	9,926
Certified Energy Auditors (Bureau of Energy Efficiency)	5,986	6,790	7,477	7,698	8,193

Sources: Ministry of Power, <https://powermin.nic.in/> and Bureau of Energy Efficiency, <https://www.beeindia.gov.in/>



POLITICAL WILL: Built political will to advance climate solutions

- 5.a.1.1 Number of major announcements from Government of India: Renewable Energy
- 5.a.1.2 Number of major announcements from Government of India: Clean Technology
- 5.a.1.3 Number of major announcements from Government of India: Climate Change

	2015	2016	2017	2018	2019
Renewable Energy	18	-	6	28	18
Clean Technology	4	-	9	10	10
Climate Change	3	-	4	3	7

Sources: Oxford Policy Management; Ministry of Power, <https://powermin.nic.in/>; Ministry of New and Renewable Energy, <https://mnre.gov.in/>; and Ministry of Environment, Forest and Climate Change, <http://envfor.nic.in/>

Appendix B: Methodologies for Assessing the Foundation's Contribution

As mentioned in Section 3 of this report, Grassroots Solutions has adopted tailored methodologies to assess the contribution of the Foundation's work that are specific to the approaches the Foundation is undertaking to achieve its desired outcomes in each country-specific context. How the approaches the Foundation supports map to its desired outcomes and examples of the methodologies employed to analyze the Foundation's contributions in the U.S. and India are described in more detail here.

U.S. Examples

The Foundation supports multiple approaches in the U.S. to achieve its desired outcomes. To assess progress and the contribution of these approaches, Grassroots Solutions is analyzing a variety of data sources and employing various methodologies. For example, one way the U.S. will demonstrate leadership is by building political will. To promote leadership in this area, the Foundation is supporting efforts to alter political discourse. With Protagonist's help, we are examining who the influencers are, what is causing climate narratives to change, how the narratives are shifting over time, and the ways that the Foundation's grantees appear in the narrative landscape.¹⁰⁷ More specifically, we are investigating the "signature" of the Foundation's grantees in the public and policymaker discourse by tracking and analyzing direct mentions of each organization as well as similarities between grantee messaging and candidates' and policymakers' talking points and statements in social and traditional media channels, the solutions-orientation of outgoing messages produced by grantees, which solutions are most prominent, and more. Indicators of progress since baselines were established in 2012 and 2013 are:

- **Increased candidate and policymaker discourse on climate.** Data sources analyzed include Twitter handles, press releases, op-eds, blog posts, public Facebook pages, and quotes in media articles for the president, senators, representatives, governors, candidates, and materials about grantee messaging.
- **Normalization of solutions-oriented media coverage.** Data sources analyzed include online content about one of 15 identified solutions such as reducing fossil fuel subsidies, energy efficiency, reduced coal use, renewable energy, and carbon pricing, and grantees' outgoing messaging and talking points.
- **A larger and broader base of advocates for climate solutions.** Data sources analyzed include individuals and accounts commenting or engaging favorably through state and local newspapers, policy reports, press releases, and social media, including Twitter, Facebook groups, blogs, forums, and insights about grantees' geographic priorities.

Protagonist's input into our ongoing analysis is supplemented by a review of self-reports from grantees, independently verifiable data, and other information such as opinion polling conducted by the Yale Program on Climate Change Communications and Gallup.

¹⁰⁷ Narratives articulate a population's underlying beliefs, attitudes, and assumptions. "Narrative Analytics" is a systematic approach to understand, shape, and track narratives by combining the depth of social science with the scale of data science. Synthesizing large robust data sets of social and other online media, Narrative Analytics uses evidence-based strategies to map, track, measure, and shift discourse.

Another example is that in late 2018 Grassroots Solutions proposed taking a more in-depth look at three of the other approaches the Foundation supports in the U.S. and its grantees' activities to advance climate-friendly policies and regulatory action, to broaden the climate solutions coalition and improve partnerships, and to create or expand markets for carbon at the state level. With input from the Climate Solutions team, we decided to focus on the top-ten energy-related emitters of CO₂ in the U.S.: Texas, California, Florida, Louisiana, Pennsylvania, Ohio, Illinois, Indiana, New York, and Michigan. The purpose of a deeper state-focused assessment was: 1) to better understand the changes in the trajectories among states with the highest energy-related CO₂ emissions between 2015 and the present, 2) progress toward the Foundation's desired outcomes, and 3) the Foundation's role.

In the fall of 2019, Grassroots Solutions presented initial findings about the ten states with the highest energy-related emissions of CO₂ between 2015 and 2018. Based on feedback from the Climate Solutions team, going forward we have agreed to update the assessment on an annual basis to answer the following learning questions:

- What explains the variation in trajectories among the top-ten energy-related emitters and progress toward the Foundation's desired outcomes?
- What is the connection between certain sectors (i.e., residential, commercial, industry, and transportation) and the emissions trajectories?
- How do the Foundation's funded approaches affect each other? Do certain approaches have an accelerant effect on others?
- How have Foundation-funded activities in certain states shaped climate policies or advocacy in other states (e.g., are there channels through which actions in one state spill over to another)?

Our ongoing analysis includes quantitative and qualitative dimensions, including examining:

- State energy-related CO₂ emissions
- Per capita energy-related CO₂ emissions
- Carbon intensity of the energy supply
- State renewable portfolios
- Policies (legislation and regulations) related to CO₂ and methane emissions adopted
- Emissions by sector (residential, commercial, industrial, and transportation)
- Emissions by fuel source (natural gas, petroleum, coal, and oil)

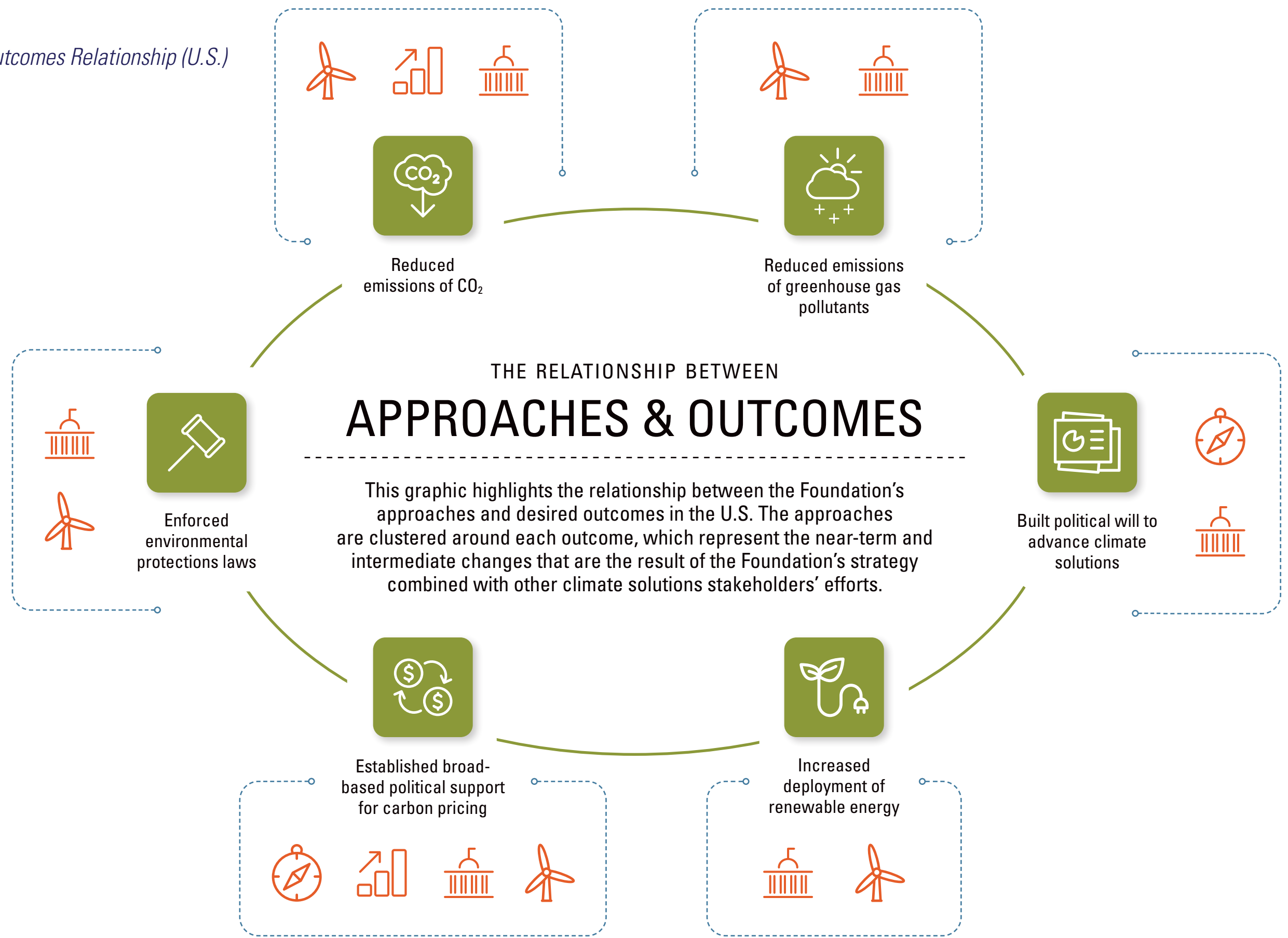
Grantee survey data, interviews, and grant reports provide additional insights, which are analyzed in conjunction with information we are already tracking from the National Conference of State Legislatures, the state public utilities commissions, the U.S. Energy Information Administration, and more.

An illustration of the relationship between the Foundation's approaches and desired outcomes in the U.S. appears on the following page.

Figure 58: Approaches and Outcomes Relationship (U.S.)

APPROACHES KEY

-  Alter political discourse
-  Advance climate-friendly policies and regulatory action
-  Broaden climate solutions coalition and improve partnerships
-  Create or expand markets for carbon
-  Expand funding opportunities and climate solutions philanthropic community



India Examples

Since 2016, the Foundation has supported multiple approaches in India to achieve its desired outcomes and awarded approximately \$39 million in grants.¹⁰⁸ As noted in Section 3, to measure progress and assess the Foundation's contribution, we are collecting and analyzing data at three levels:

- Grantees' self-reported activities and results
- Insights gathered through interviews with government stakeholders, third-party observers, or publications to validate or challenge the grantees' self-reporting
- Independently verifiable quantitative data, and where not available, qualitative information to fill key gaps¹⁰⁹

For example, one of the Foundation's desired outcomes is that civil society organizations' capacity to engage with and affect the government's climate policies is increased. To achieve that outcome, the Foundation is supporting activities to advance climate-friendly policies and broaden the climate coalition and partnerships with government. One indication of progress is that central and state governments look to civil society organizations as stakeholders and partners in the policymaking processes. To assess the contribution of the Foundation in this area, we are tracking the percentage of grantees and grantee-supported organizations actively participating in government agencies or task forces and their self-reported results. That information is being examined in conjunction with insights gathered from government stakeholders about the value of grantees' participation and broader changes in the capacity of civil society organizations and sector since baselines were established in 2015.¹¹⁰

Also, the Foundation is supporting multiple approaches to catalyze renewable energy. One indication of progress is the creation of a renewable energy financing ecosystem. To assess the contribution of the Foundation in this area, we are tracking financing leveraged for renewable energy through grantee-developed mechanisms. That information is being examined in conjunction with insights gathered from relevant stakeholders about the value of the mechanisms developed by the grantees, a review of independent Internet-based sources, and data tracked about changes in India's electricity generation since baselines were established in 2015.¹¹¹

The graphic on the following page illustrates the relationship between the Foundation's approaches and desired outcomes in India.

¹⁰⁸ Source: Climate Solutions_All Previously Awarded Briefs. MacArthur Foundation, January 31, 2019.

¹⁰⁹ For example, qualitative data collected from discussions with "key informants," including grantees and non-grantees who take part in full-day workshop-style discussions or interviews focusing on the Foundation's desired outcomes and discussing in detail some of the political and economic factors surrounding them.

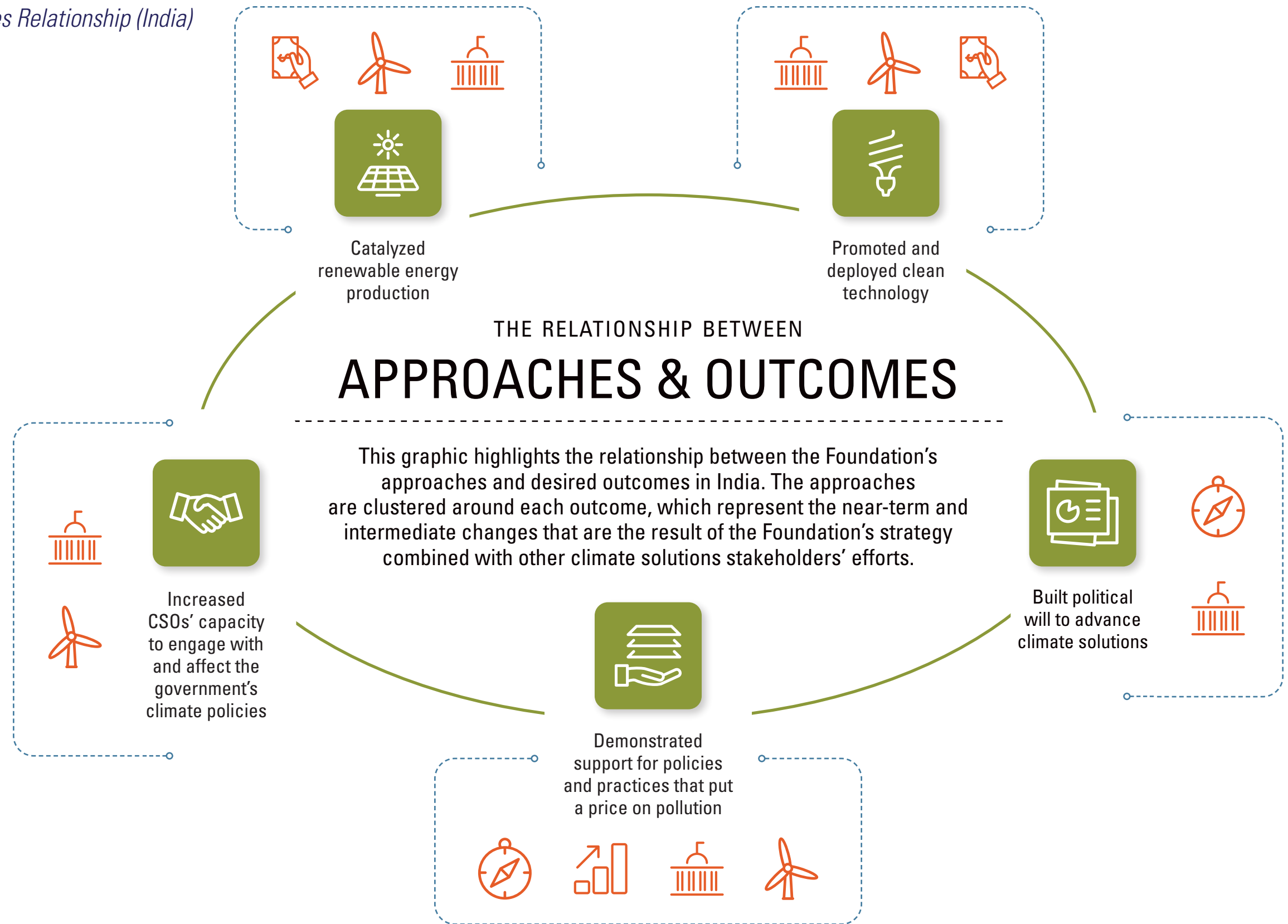
¹¹⁰ Changes we are tracking include the number of civil society organizations perceived as "major" players on renewable energy or climate at the federal level, the percentage of major civil society organizations considered partners and/or critics of the Government of India, and more.

¹¹¹ Changes we are tracking include the total percentage of India's total installed capacity for electricity generation based on renewable energy, gross budgetary support for renewable energy, loans sanctioned by the Indian Renewable Energy Development Agency, and more.

Figure 59: Approaches and Outcomes Relationship (India)

APPROACHES KEY

-  Alter political discourse
-  Advance climate-friendly policies and regulatory action
-  Broaden climate solutions coalition and improve partnerships
-  Create or expand markets for carbon
-  Expand funding opportunities and climate solutions philanthropic community



Appendix C: Glossary of Terms

Below are definitions for key terms that appear in this report. Most correspond to the Foundation’s glossary of evaluation terms.

TERM	DEFINITION
Approach	An approach is a cluster of activities that represents one component of the Foundation’s strategy.
Baseline	Baselines represent the starting points—generally prior to the Foundation’s involvement—related to each indicator of progress that we will use for comparison to assess progress toward desired outcomes.
Carbon Dioxide (CO₂)	According to the U.S. Environmental Protection Agency, carbon dioxide is the primary greenhouse gas emitted through human activities. It enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and wood products, and also a result of certain chemical reactions (such as manufacturing of cement).
Civil Society Organizations	Non-state, not-for-profit, voluntary entities formed by people in the social sphere that are separate from the State and the market. Civil society organizations can include community-based organizations as well as non-governmental organizations. (This definition is adapted from the United Nations Guiding Principles Reporting Framework.)
Clean Power Plan	The Clean Power Plan is a U.S. policy aimed at combating climate change that was first proposed by the Environmental Protection Agency in June 2014; the final version of the plan was unveiled by President Obama on August 3, 2015.
Fluorinated Gases (HfCs, PFCs, SFS, NF₃)	The Environmental Protection Agency defines that Hydrofluorocarbons (HfCs), perfluorocarbons (PFCs), sulfur hexafluoride (SFS), and nitrogen trifluoride (NF ₃) are synthetic, power greenhouse gases that are emitted from a variety of industrial processes. They are sometimes used as substitutes for stratospheric ozone-depleting substances like chlorofluorocarbons and halons. In addition, these gases are usually emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases.
Green New Deal	The “Green New Deal” is proposed congressional resolution that aims at addressing climate change and economic inequality. It lays out a federal plan to wean the U.S. from fossil fuels, curb planet-warming greenhouse gas emissions, and guarantee new jobs in the clean energy industry. It was introduced by Representative Alexandria Ocasio-Cortez of New York and Senator Edward J. Markey of Massachusetts.
Impacts	Impacts are the long-term, aspirational changes in a population, community, or system in which the Foundation’s strategy operates and to which it contributes.

TERM	DEFINITION
Indicators of Progress	Indicators of progress are statements of measurement used to show progress toward a strategy's intended outputs, outcomes, or impacts; can be qualitative or quantitative.
International Solar Alliance	An alliance of more than 122 countries, initiated by India, with the primary objective to work for efficient exploitation of solar energy to reduce the dependency on fossil fuels.
Measures	Measures refer to the information that we will count and the methods we will use to measure the indicators.
Methane (CH₄)	The Environmental Protection Agency states that methane is emitted during the production and transport of coal, natural gas, and oil. It is a result of livestock and other agricultural practices and by the decay of organic waste in municipal solid landfills.
Narrative Analytics	Narratives articulate a population's underlying beliefs, attitudes, and assumptions. Narrative Analytics is a systematic approach to understand, shape, and track narratives by combining the depth of social science with the scale of data science. Synthesizing large robust data sets of social and other online media, Narrative Analytics uses evidence-based strategies to map, track, measure, and shift discourse.
Nationally Determined Contribution	The Paris Accord required all Parties to prepare, communicate, and maintain a Nationally Determined Contribution (NDC) that outlines each country's intended commitment and long-term goals to reduce national emissions and adapt to the impacts of climate change.
Nitrous Oxide (N₂O)	According to the Environmental Protection Agency, nitrous oxide is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste.
Outcomes	Outcomes are near-term and intermediate changes among target audiences, individuals, communities, organizations, and policies that are the result of the Foundation's strategy combined with other climate solutions stakeholders' efforts.
Paris Climate Accord	The Paris Accord is an agreement within the United Nations Framework Convention on Climate Change aimed to strengthen the global response to the threat of climate change by keeping global temperature rise well below two degrees Celsius above pre-industrial levels. Negotiations took place at the United Nations Framework Convention on Climate Change's 21st Conference of the Parties in Paris, France and was signed in December 2015.
Political Discourse	Political discourse refers to discourse among federal and state policymakers and candidates for elected office. The Foundation is focused on altering political discourse within the permitted constraints of the law applicable to private foundations.
Public Discourse	Public discourse includes policymakers as well as the public.

TERM	DEFINITION
Qualitative Data	Descriptive information that can be observed and analyzed, but not precisely measured (e.g., stories and reflective insights; interviews with grantees, intellectual partners, and other funders).
Quantitative Data	Numerical information that can be measured and counted (e.g., emissions, people involved, number of legislative bills adopted, and media coverage).
Regional Greenhouse Gas Initiative	The first mandatory market-based program in the U.S. to reduce greenhouse gas emissions by establishing a regional cap on the amount of CO ₂ pollution a power plant can emit by issuing a limited number of tradable CO ₂ allowances. It is a cooperative effort among states mostly in the Northeast and Mid-Atlantic.
Renewable Portfolio Standards	A U.S. state regulation that requires the increased production of energy from renewable energy sources such as wind, solar, biomass, and geothermal.
Strategy	The Foundation's strategy is a pathway, or set of objectives, designed to achieve change at the outcome and impact levels.
Targets	The quantity, value, or amount of something (e.g., the desired change) related to each indicator that we want to happen within a specific period.

Overview of the U.S. Climate Change Narrative Landscape

	NARRATIVE TITLE	ABRIDGED NARRATIVE DESCRIPTION
Favorable	Defining Challenge of Our Time	Climate change is the defining challenge of our time and time is running out; we must embrace bold action to avoid catastrophe.
	Not Just an Environmental Issue	Climate change will impact every aspect of our society from our economy, to our health, to national security, and it is especially devastating for vulnerable communities.
	Dirty Energy, Dirty Politics	The science denying federal administration—the byproduct of years of dirty money and misinformation—must be stopped.
	Clean Energy Revolution	Clean energy spells jobs, innovation, and prosperity for all—what are we waiting for?
	Wake-Up to the Weather	You only need to go outside or listen to your local weather report to see that climate change is real.
	States/Cities Must Lead	Our ability to fight climate change depends on states and communities far beyond the beltway.
Unfavorable	Biodiversity in Peril	We must protect our planet and its amazing animals which are the biggest victims of humanity's effects on the environment.
	Climate Hysteria*	The liberal hysteria over climate change is a deliberate campaign based on manipulated science to manufacture fear.
	Regulatory Red Tape	Regulations in the name of climate change are destroying jobs and hampering American competitiveness.
	Energy First	Fossil fuels are not the enemy; we need pragmatism to solve both the energy and environmental challenges we face.

* Climate Hysteria is a new unfavorable narrative that we are currently tracking. Its emergence reflects a consolidation of two unfavorable narratives that were previously tracking: “Green Conspiracy” and the “So-Called Science.”