Climate Solutions Big Bet: 2014–2017 Initiative Baseline and Landscape Report

Spring 2018

Prepared for:

MacArthur Foundation

Prepared by:

Grassroots SOLUTIONS

In collaboration with:

M+R

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Executive Summary

Since 2016, Grassroots Solutions and M+R Strategic Services (M+R) have partnered with the MacArthur Foundation to evaluate its theory of change for the Climate Solutions Big Bet. The purpose of this report is to communicate what we have learned about the period prior to the launch of the Big Bet, changes since baselines were established for the U.S. and India, and developments in the context in which the Foundation is advancing its theory of change.

The MacArthur Foundation's Goal and Pathway to Change

Ensuring that global temperature rise stays well below 2 degrees Celsius over pre-industrial levels 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., CO_2, methane, and HfCs)
- Build political will and public demand for climate solutions

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, 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 changes that demonstrate leadership. It supports multiple approaches—clusters of activities that represent components of the Foundation's strategy—to achieve the following desired outcomes:

- 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

2014

MODULES

LEADERSHIP

Three nations must lead the world's effort to address climate change; if the U.S., India, and China exert leadership on climate change, then other nations will be encouraged to follow suit, and humanity will be on a path toward ensuring global temperature rise stays well below 2 degrees Celsius

CARBON PRICING

In development

NATURAL SOLUTIONS

In development

The Foundation has developed theories of change and strategies for the U.S. and India, which are outlined in documents referred to as leadership-related "modules." China is in development. Future modules will outline strategies around carbon pricing and natural solutions

APPROACHES

Approaches are defined as a cluster of activities that represents one component of the Foundation's strategy

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

OUTCOMES

Outcomes are defined as 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

- Changed the emissions trajectory in the U.S., India, and China
- Adopted national and international climate change policies and treaties
- Adopted and implemented carbon pricing schemes
- Climate solutions prioritized for elected and community leaders
- Normalized extensive and sustained investments in renewable energy and clean technology
- Adopted and deployed renewable energy and clean technologies

IMPACTS

Impacts are defined as long-term, aspirational changes in a population, community, or system in which the Foundation's strategy operates and to which it contributes

- Transformed economies from high carbon to low carbon
- Broadened and deepened participation globally in climate solutions
- Lowered the trajectory of global greenhouse gas emissions

2025 and beyond

The MacArthur Foundation's

BIG BET ON CLIMATE SOLUTIONS

Ensure that global temperature rise stays well below 2 degrees Celsius by supporting and promoting effective leadership and climate solutions

EMBRACE REAL-TIME LEARNING AND TRANSPARENCY

Figure 1: *The Foundation's Theory of Change*

Evaluation Framework

In collaboration with the Foundation, Grassroots Solutions and M+R developed a framework to evaluate the Foundation's theory of change and answer two big-picture questions: 1) How is the Foundation's strategy contributing to promoting leadership and climate solutions? 2) How are the Foundation's strategy and its grantees adapting to work more effectively?

The evaluation framework comprises four types of activities related to measuring and tracking impacts, outcomes, the landscape, and how the work is progressing (see Figure 2 for an explanation of each of the four types of activities). These activities are designed to help the Foundation:

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

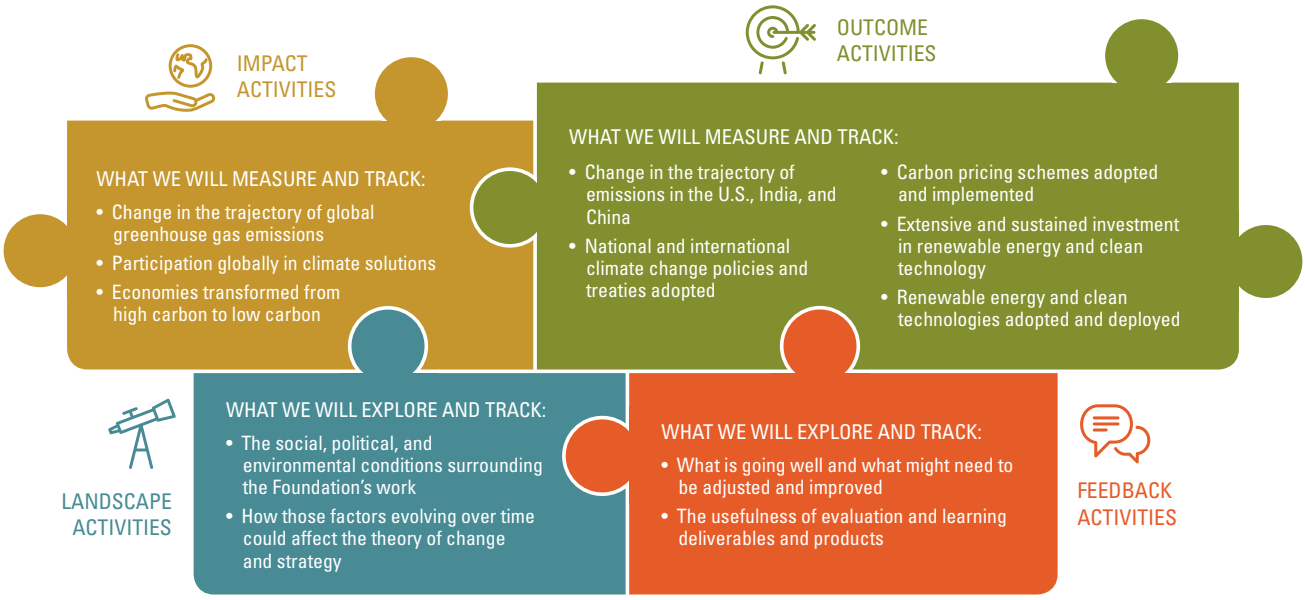

Figure 2: *Evaluation and Learning Framework*

Associated with the Foundation's desired impacts and outcomes are multiple data points that Grassroots Solutions and M+R are tracking. The baselines represent the starting points—generally prior to the Foundation's involvement—that will be used for comparison to measure progress toward the Foundation's desired impacts and outcomes. So far, we have established baselines for the U.S. (2012) and India (2015).

See Appendix A of the 2014-2017 Initiative Report for a complete list of baselines and data points tracked.

What We Are Learning

In this report there are three high-level takeaways about the baseline data and period prior to the launch of the Foundation's Big Bet. In addition, 11 findings emerged from Grassroots Solutions' and M+R's analysis of the data points tracked through 2017 and changes in the contexts in which the Foundation is advancing its theory of change. The 11 findings that appear in the report reflect significant developments at the initiative level, in the U.S., and for India. What follows are 1) highlights from the section about the baselines and 2) conclusions reached about potential implications for the Foundation, its grantees, and other collaborators in the field to consider that flow from the findings.

1. Interpreting the Baselines: High-Level Takeaways

Climate Change Was Important, but Not a Top Political Priority

In the U.S. in 2012 and India in 2015, there was growing consensus among political leaders that something needed to be done to address the global problem of climate change. That momentum culminated in the signing of the Paris Accord in 2015. At the same time, prior to the launch of the Foundation's Climate Solutions Big Bet, climate change was not a top political priority in either the U.S. or India. The reasons for the lack of immediacy to address the problem were unique in each context.

In the U.S. in 2012, climate change had not broken through among policymakers. Addressing the problem faced strong political headwinds. It was a polarizing topic among candidates, policymakers, and the American public. Typically, in a presidential election year, more attention is paid by the media, candidates, and voters to important issues—such as climate change—that affect the country.[1]

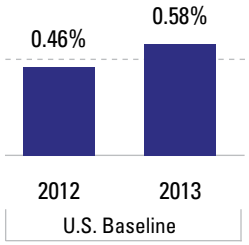

Figure 3: *Total Candidate and Policymaker Discourse on Climate Change (Source: Protagonist Narrative Analytics)*

However, in 2012, the portion of candidate and policymaker discourse devoted to climate change was very low. Climate change was not a significant priority for American voters either. It did not garner close to the same attention as the economy, jobs, and healthcare. The baseline data examined lend credence to the Foundation's commitment to messaging climate through different frames. By supporting authoritative organizations and messengers that can connect climate change to public health, national security, and economic competitiveness, the Foundation hopes that elected state and federal officials will recognize the need for climate solutions and be motivated to act – for example, through climate-friendly energy policies and regulatory action.

Similarly, in India in 2015, climate change was deemed important, but not a top political priority. One significant difference is that the baseline period coincided with an important international event: the annual Conference of Parties (COP21) and negotiations around the United Nations Framework Convention on Climate Change in Paris. The Government of India actively engaged in the negotiations. In the run up to COP21, the Government was preparing its Intended Nationally Determined Contribution and participating in bilateral discussions with foreign governments. Even though Prime Minister Modi's rhetoric signaled that India wanted to proactively contribute to global climate change mitigation, the Indian economy was his foremost concern.[2]

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[1] Zeller, Jr., Tom & Zelman, Joanna (October 23, 2012). Climate Change Not Mentioned in Presidential Debates for the First Time in a Generation. Huffington Post. https://www.huffingtonpost.com/2012/10/23/climate-change-presidential-debate_n_2004067.html

[2] Ministry of Power, Renewable Energy and Coal, January 2015: "Renewable energy sources and energy efficient technologies feature prominently are in the agenda, but 'energy access for all' is the first step. Also, from a cost perspective, while the trajectory of renewables looks promising, at present, thermal power is indeed the cheapest source of energy generation. For a country whose per-capita GDP is a modest $1,500, it's unreasonable to burden the common man with significantly higher costs in the present, considering the large investments required; while major polluters in the world have not done so themselves during their own development period."

Promising Conditions for Growth in Renewable Energy and Clean Technology

Prior to the launch of the Foundation's Climate Solutions Big Bet, the U.S. and India were well positioned to expand the deployment of renewable energy and clean technology. Despite the encouraging groundwork that had been laid, questions abounded in 2012 and 2015 about how quickly each country could overcome distinctive barriers to rapidly scale up electricity generation from renewables and lower greenhouse gas emissions.

Flattening energy consumption in the U.S. in 2012, despite economic growth, created conditions favorable to replacing energy generation capacity from coal with renewables. The main barrier was political apathy. A dramatic increase in the scale of renewables and clean technology required ramping up political commitment and investment, especially since the funds appropriated through the American Recovery and Reinvestment Act to spur private sector deployment of renewable energy and energy efficiency were beginning to phase down in 2012. The baseline data analyzed support the Foundation's choice to fund activities to advance climate-friendly energy policies and regulatory action and broaden the climate solutions coalition and partnerships. These efforts were designed to sustain and build more political momentum for renewables. The data from 2012 also illustrate the interconnected nature of various components of the U.S. theory of change.

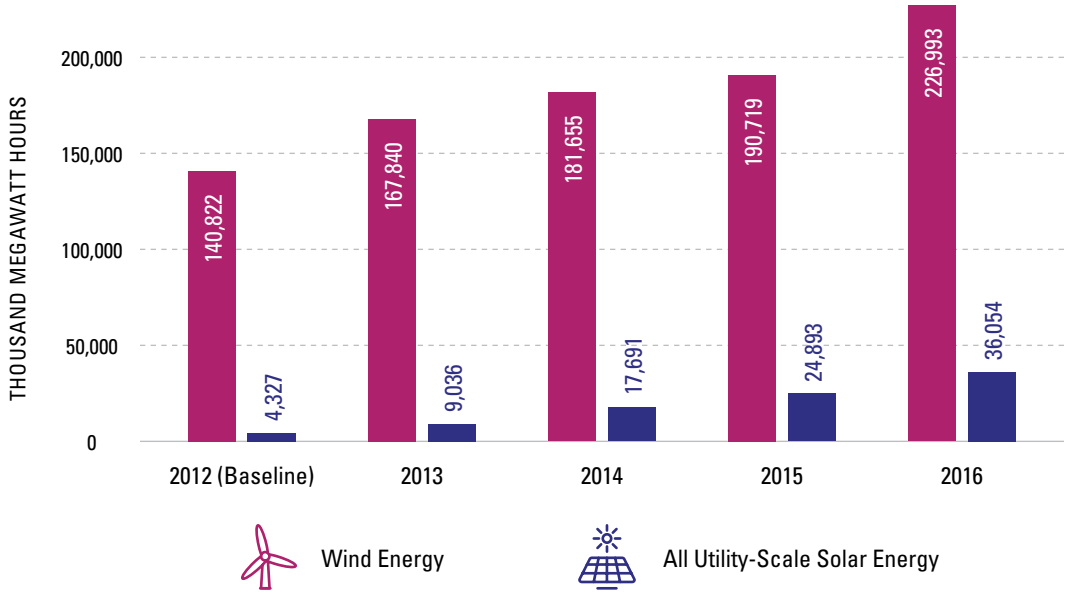


Figure 4: *U.S. Net Generation of Wind and Utility-Scale Solar Energy in Megawatt Hours (Source: www.eia.gov)*

By 2015, renewable energy had expanded significantly in India. Installed capacity from renewables was at a five-year high, and the country appeared poised for exponential growth in both renewable energy and clean technology. There was vast, untapped potential, as well as investor interest. At the same time, in 2015, renewables still accounted for a low proportion of the overall energy mix in India. According to the Ministry of New and Renewable Energy, in 2015, renewables—solar, wind, biomass, and small-hydroelectric—contributed 13% of India's total installed capacity and approximately 5% of total generation. The power sector was struggling to keep up with the rapidly increasing population (which exceeded 1.3 billion) and real Gross Domestic Product growth rates of 8% (energy consumption had almost doubled by 2000). The most significant constraints to the expansion of renewable energy

were a complicated set of interwoven factors around access to finance, regulations, and institutional issues. The Foundation's India strategy and theory of change largely reflect an understanding of the barriers that existed in 2015. The data corroborate the Foundation's decision to provide grants to groups advancing climate friendly energy policies and broaden the climate solutions coalition, while also expanding funding opportunities through its impact investments.

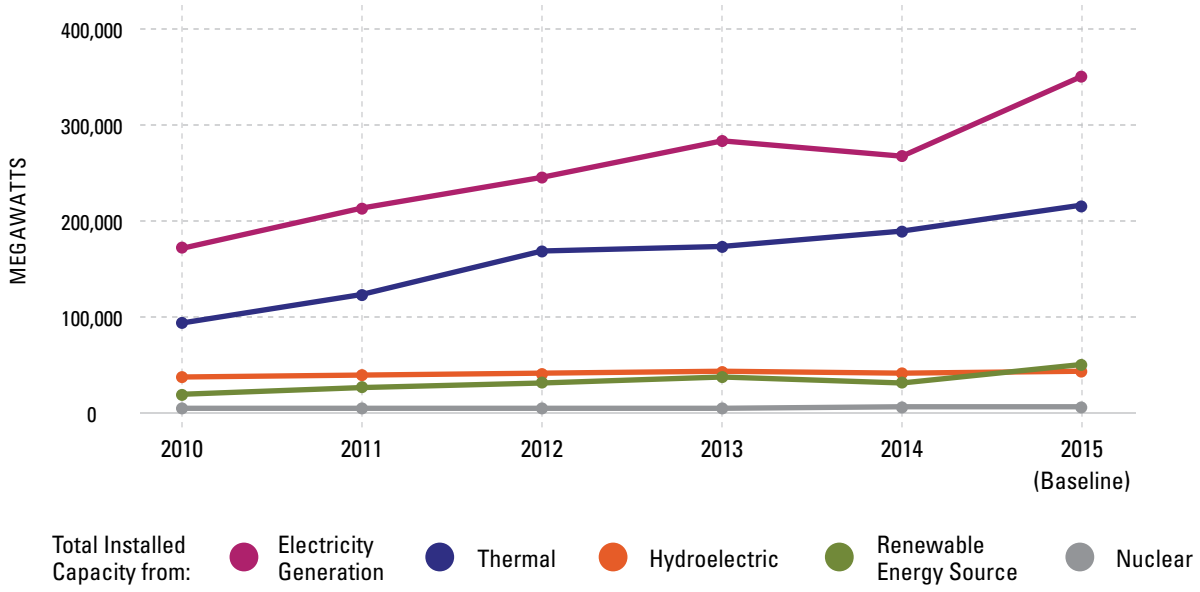


Figure 5: *India Installed Capacity for Electricity in Megawatts (Source: Ministry of New and Renewable Energy)*

Modest Capacity in India to Influence Government Policy

In 2015, a considerable number of Indian civil society organizations were regularly interacting with the Government of India on climate policies, particularly in the run-up to COP21. At the same time, there were limits to their engagement with, and influence on, the Government's climate policies.

Prior to the launch of the Climate Solutions Big Bet, there were approximately 36 "major" civil society organizations working on climate change and renewable energy policy at the national level in India. Most of these organizations (86%) dedicated at least half of their work to climate change or renewable energy. Eighty-nine percent were focused on policy, as opposed to implementation of projects or scientific research.[3] Generally, civil society organizations were able to exert influence within the parameters dictated by the Government of India. Civil society organizations tended to try and exert influence on climate policy by presenting themselves as a partner of the Government of India rather than a critic or watchdog.[4] The Foundation's decision to invest substantially in capacity-building appears timely and relevant. At the same time, the barriers to engagement and influence are high, which raises questions about how best to balance the Foundation's ambitions with the realities on the ground.

[3] Source: Evaluation of MacArthur Foundation's Climate Solutions Programme in India Baseline Landscape Study. Oxford Policy Management, January 2018.

[4] Traditionally, civil society organizations had focused on putting climate change on the political agenda or by communicating new ideas; however, in the run-up to COP21, it was clear that that task had largely been achieved. The Government of India had announced ambitious renewable energy targets, particularly for solar energy. Therefore, most organizations publicly agreed with the its position to seek a balance between increasing energy consumption to drive economic growth and controlling greenhouse gas emissions.

2. Conclusion: Implications for the Foundation's Theory of Change

The development of this report provided an opportunity to reflect on whether progress is occurring that demonstrates climate leadership and the relevance of the Foundation's theory of change. Based on our analysis of the data points tracked through 2017, most aspects of the Foundation's approaches and its theory of change still appear sound and relevant. The data examined affirms a continued focus on promoting leadership in the U.S., India, and China to achieve the Foundation's desired long-term impacts. The three countries remain the largest emitters and their actions carry weight far beyond their borders.

At the same time, the U.S. abdicated—at least temporarily—its international role on climate by withdrawing from the Paris Accord, calling into question U.S. leadership. U.S. domestic policies advanced by the Trump administration have also created uncertainty about the country's ability to meet its own emissions reduction targets. So far, the Foundation has responded to these challenges by funding defensive efforts to enforce domestic environmental protection laws and by strengthening its support for proactive subnational activities. While action at the federal level will ultimately be necessary to advance climate solutions at scale, there are some indications that the U.S. can continue to make progress in its efforts to reduce emissions and transition to a cleaner economy through the actions of subnational players (regions, states, counties, and cities) and through the private sector.

Although some other trends are headed in the right direction, the pace of changes—particularly around political discourse in the U.S.— do not match the Foundation's stated ambitions, the magnitude of the challenge, or the hoped-for progress toward the outcomes the Foundation has identified to demonstrate leadership. The most striking example is that overall discourse in the U.S. among candidates and policymakers on climate change is low. U.S. public discourse on climate is not solutions-focused, and there is limited evidence to suggest that authoritative messengers are connecting climate change to public health, national security, and economic competitiveness in a widespread way.

Since baselines were established, in India, the central government has been an active participant in international climate negotiations and has established ambitious goals. It is committed to making the International Solar Alliance a success. The Alliance is the first treaty-based, multilateral organization based in India, and it is a demonstration of India's growing leadership on climate change in the world. Also, the central government has been focused on delivering on its goals under the Paris Accord, particularly with regards to the expansion of renewable energy. Although the Government of India made fewer new policy announcements in 2017, the data analyzed suggest an increased focus at the central and state levels on implementation of existing policies to meet the country's targets. In addition, from 2016 to 2017, for the first time, the net capacity of renewable energy added was higher than energy added from conventional sources.

Despite these promising developments, there are significant barriers to India achieving a 40% share of renewables in the electricity mix by 2030. The financial health of the distribution sector continues to inhibit the expansion of renewables, and there are signs that, due to institutional and technical challenges, the central government is shifting attention away from decentralized renewable energy. Moreover, there is no coherent national vision around clean technology. Instead, in 2017, the Government of India focused on implementing a variety of schemes focused on end use efficiency.

Other factors that could help or hinder the advancement of the Foundation's theory of change over the next year include the 2018 U.S. elections and the 2019 Indian elections, especially the Foundation's efforts to advance climate-friendly policies in each country. It is worth noting that U.S. withdrawal from the Paris Accord has created an opening for countries, such as India and China, to step forward as global leaders on climate change. It is still early to see what role India will play in helping to fill the global leadership vacuum left by the U.S. and reduce greenhouse gas emissions, while also achieving development goals. With federal elections occurring in early 2019, there is speculation that the Government of India may be more focused on its primary domestic agenda of improving the economic condition for Indians with less attention on climate goals. China has aggressively stepped forward to fill the void left by the U.S. on the international stage pledging to "take a driving seat in international cooperation to respond to climate change."

Introduction

Purpose and Contents of the Report

Since 2016, Grassroots Solutions and M+R Strategic Services (M+R) have partnered with the MacArthur Foundation to evaluate its theory of change for the Climate Solutions Big Bet. We are responsible for providing feedback about the Foundation's emerging strategy and offering constructive critiques to inform strategic decisions and refinements made by the Foundation. More specifically, Grassroots Solutions and M+R are tasked with implementing activities that will allow the Foundation to measure impacts and outcomes, track developments in both a global- and country-specific context, frame the challenges as they evolve at a global and country level, and identify issues as they arise.

To meet the Foundation's information needs, Grassroots Solutions and M+R, with input from the Climate Solutions team, identified three categories of evaluation products that we will present each year:

- Baselines (as applicable for modules that are in development) and annual reports
- Quarterly status updates and periodic pieces about highlights and trends
- Evaluation management and process deliverables such as monthly checklists of tasks and work plans

The purpose of this report, like other evaluation products created, is to facilitate learning. In it we communicate what we have learned about the period prior to the launch of the Big Bet, changes since baselines were established, and developments in the contexts in which the Foundation is advancing its theory of change. Also, we document refinements to the theory of change in narrative and visual form. Looking ahead, the theory of change may be amended to reflect strategies or approaches (e.g., clusters of activities that represent one component of the Foundation's strategy) developed around carbon pricing and natural solutions.

We hope this report's contents provide relevant insights. Since it is the first initiative report produced by Grassroots Solutions and M+R, we see it as something of an experiment. We are eager for the Foundation's and its collaborators' feedback about what would make future reports more useful as learning tools and complementary to other evaluation products created. We envision that future reports will delve more deeply into progress toward the Foundation's desired impacts and outcomes and the contribution of its strategy. The organization of the remainder of this document is as follows:

1. About the Climate Solutions Big Bet
2. Theory of Change
3. Evaluation Framework
4. What We Are Learning: Interpreting the Baselines and Findings
5. Conclusion

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 carbon dioxide 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 2 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. 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 projected to surpass China's.

The working theory of change (explored further in the next section) is that these three nations—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 and 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 follow suit, and humanity will be on a path toward ensuring global temperature rise stays well below 2 degrees Celsius.

Overview of the Climate Solutions Portfolio

To ensure that global temperature rise stays well below 2 degrees Celsius, the Foundation is supporting and promoting effective leadership and climate solutions. As of May 2018, the Foundation has awarded 97 grants to 60 organizations totaling approximately $198 million dollars. To date, 77% ($152 million) of the Foundation's grantmaking has been directed to activities in the U.S. and 12% ($24 million) to India. The remaining 11% includes $10 million approved in June 2017 supporting efforts to pass and implement the Kigali Amendment to the Montreal Protocol and exploratory grants related to carbon pricing.[5]

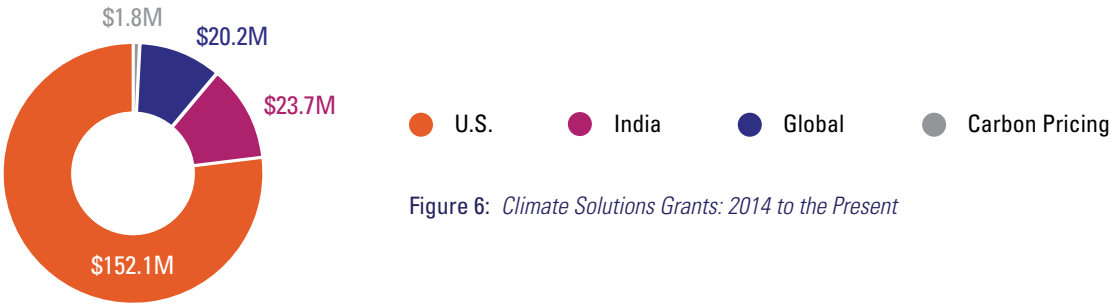
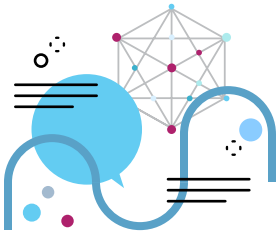


Figure 6: *Climate Solutions Grants: 2014 to the Present*

[5] Source: Climate Solutions_All Previously Awarded Briefs. MacArthur Foundation, May 18, 2018.

2 | Theory of Change



Goal and Pathway to Change

Ensuring that global temperature rise stays well below 2 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., CO_2, 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 over the next decade as each country faces social, economic, and political pressure to moderate the pace of implementing and sustaining significant greenhouse gas emissions reductions in their respective economies.

Linked to the high-level theory of change shown in Figure 7 on the following page are theories of change and strategies that have been created for the U.S. and India.The Foundation's U.S. theory of change (see Figure 8 on page 13) 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[6]

In India, the Foundation's theory of change (see Figure 9 on page 14) 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

[6] The end of the five-year period coincides with the year 2020. That year marks a major milestone in the Paris Accord that must be met to change the trajectory of global greenhouse emissions in 2025 and beyond.

2014

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Three nations must lead the world's effort to address climate change; if the U.S., India, and China exert leadership on climate change, then other nations will be encouraged to follow suit, and humanity will be on a path toward ensuring global temperature rise stays well below 2 degrees Celsius

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IMPACTS

Impacts are defined as long-term, aspirational changes in a population, community, or system in which the Foundation's strategy operates and to which it contributes

- Transformed economies from high carbon to low carbon
- Broadened and deepened participation globally in climate solutions
- Lowered the trajectory of global greenhouse gas emissions

The MacArthur Foundation's
BIG BET ON
CLIMATE
SOLUTIONS

Ensure that global temperature rise stays well below 2 degrees Celsius by supporting and promoting effective leadership and climate solutions

2025 and beyond

EMBRACE REAL-TIME LEARNING AND TRANSPARENCY

Figure 7: *The Foundation's Theory of Change*

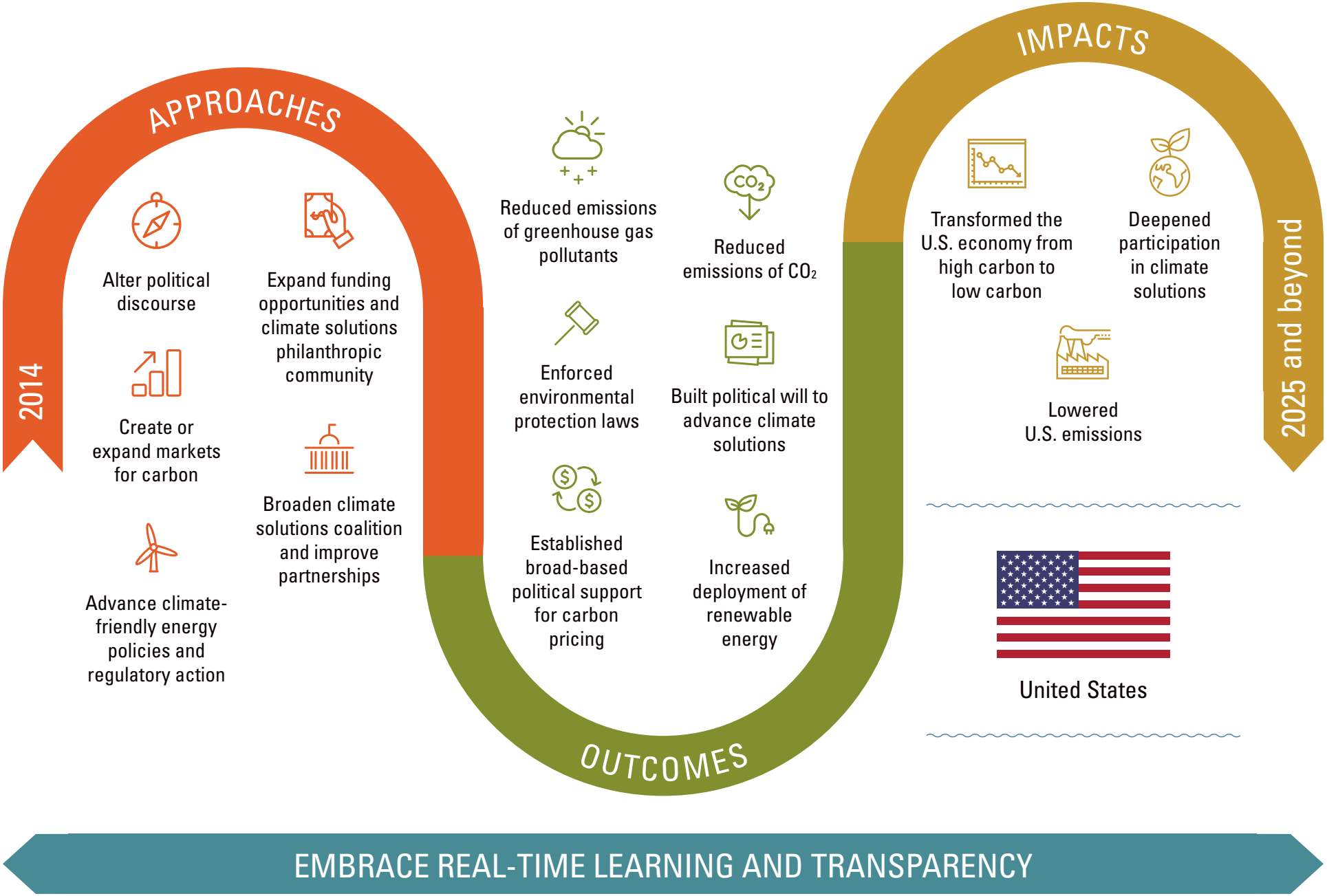

Figure 8: *U.S. Theory of Change*

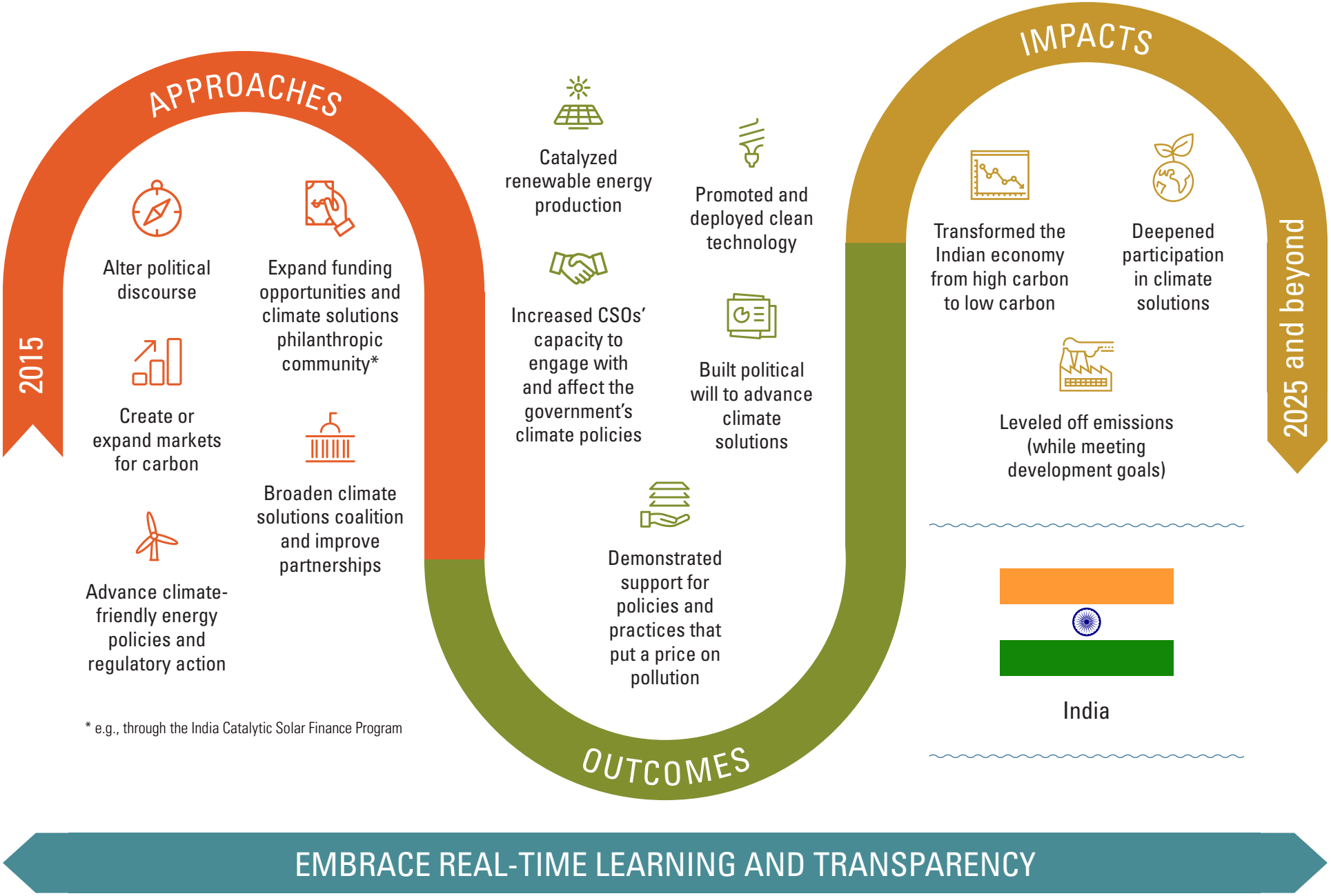

Figure 9: *India Theory of Change*

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 the impacts shown in the theory of change: lower trajectory of global greenhouse gas emissions, broad and deep participation in climate solutions (i.e., more countries are more active in climate solutions and in more substantive ways), and economies transformed from high carbon to low carbon. To achieve these long-term impacts, the Foundation has identified a variety of near-term and intermediate changes (or 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 energy 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 Figure 10 that follows on page 16.[7]

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[7] 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 MacArthur 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 MacArthur Foundation grant funds were used by grantees to participate in any political campaigns.

As permitted by law, on occasion the MacArthur 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.

THE RELATIONSHIP BETWEEN

APPROACHES & OUTCOMES

This graphic highlights the relationship between the Foundation's approaches and desired outcomes. The approaches are clustered around each outcome, which represent the near-term and intermediate changes that are the result of the Foundation's strategy combined with other climate solutions stakeholders' efforts.

APPROACHES KEY

- Alter political discourse
- Advance climate-friendly energy 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

Adopted national and international climate change policies and treaties

Adopted and implemented carbon pricing schemes

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

Climate solutions prioritized for elected and community leaders

Adopted and deployed renewable energy and clean technologies

Normalized extensive and sustained investments in renewable energy and clean technology

Figure 10: *Relationship Between the Foundation's Approaches and Outcomes*

Country-specific mapping of the relationship between the Foundation's approaches and desired outcomes has also been done for the U.S. and India, and each approach has defined characteristics that guide the Foundation's grantmaking. For example, funding activities to alter discourse is one of the ways the Foundation hopes to build the political will necessary to advance climate solutions. From 2014 to 2017, in the U.S., the Foundation awarded grants to 19 organizations working to alter political discourse. Characteristics of the Foundation's approach include:

- A focus on legislators: The Foundation's target audience is federal and state policymakers, elected officials, and candidates.
- An openness to debating solutions, but not climate science: The Foundation's stance is that the science is settled, and it is supporting efforts that advance solutions to climate change.
- Commitment to messaging climate through different frames. Various constituencies are discussing climate in multiple ways. By supporting authoritative organizations and messengers that can connect climate change to public health, national security, and economic competitiveness, the Foundation hopes that elected state and federal officials will recognize the need for climate solutions and be motivated to act—for example, through climate-friendly energy policies and regulatory action.

It is worth noting that while the relationship between the Foundation's desired outcomes and longer-term impacts could be direct (e.g., stronger enforcement of environmental protection laws in the U.S. could directly shape greenhouse gas emissions) there are other channels through which outcomes could shape impacts.

- First, two outcomes could interact to have a greater effect than the sum of each outcome's individual effect. For instance, adoption of carbon pricing schemes and the prioritization of climate solutions by politicians could interact to have a bigger effect on the transformation of economies than the simple combined effect of each. Were politicians to increasingly prioritize climate solutions around the same time as the adoption of carbon pricing schemes, this could lead company boards to sit down and seriously consider the sustained political will around climate solutions and think about how to adjust company operations to decrease their carbon footprint.
- Second, achieving one outcome could shape another outcome. The adoption of carbon pricing schemes could lead to more investment in clean technologies, as the costs to dirty technologies will become greater with carbon pricing schemes, so the financial benefits to clean technologies will increase.
- Third, there could be spillover effects. Were the U.S. to adopt a carbon pricing scheme, this could affect the types of demands U.S. companies make on foreign companies they source products from. For example, there could be U.S. regulations (or business association voluntary agreements) that regulate the carbon footprint of imported products, which could shape emissions in the source country. While the presence of these unique channels might be hard to assess empirically, these are plausible ways in which the effect of the Foundation's approaches could be amplified.

Unknowns and Assumptions

At a high-level, energy and resource 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, economic volatility, the political landscape in Congress and in state legislatures, the legal limbo of the Clean Power Plan, and the outcome of the 2016 presidential election, including the Trump administration's unfavorable stance on climate change, all create uncertainty. An unknown in India is the actual, as opposed to perceived, influence of civil society organizations to affect the government's policies. In addition, a variety of assumptions underpin the Foundation's theory of change and country-specific strategies. The evaluation and learning activities described in the next section of the report will test those assumptions and help inform adaptations to the Foundation's theory of change and strategy.

3 | Evaluation Framework

Elements of the Framework

At the highest level, Grassroots Solutions' and M+R's role as the evaluation and learning partner 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 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. and India. 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 India.

Measuring Progress Toward Desired Impacts and Outcomes

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

- Changes in the trajectory of global emissions (CO_2, 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 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 has identified a variety of near-term and intermediate changes in the U.S. and India 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 emissions, political will, policies and treaties, renewable energy and clean technology, and 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.

Associated with the desired outcomes in the U.S. and India are multiple data points that we are tracking to understand and measure progress (See Appendix A). The tables that follow provide an overview of the impact and outcome measures that have been identified in collaboration with the Foundation. Linked to these measures are evolving targets that represent the quantity, value, or amount of something that the Foundation wants to happen within a specific timeframe.

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 CO_2 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 CO_2 and greenhouse gas emissions

IMPACT: Deepened participation in climate solutions

Indicators of Progress:

- The U.S. exceeds its emissions 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

India

IMPACT: Leveled off emissions (while meeting development goals)

Indicators of Progress:

- Favorable trajectory of CO_2 and greenhouse gas emissions

IMPACT: Deepened participation in climate solutions

Indicators of Progress:

- India exceeds its emissions 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

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 CO_2 and short-lived greenhouse gas pollutants
- **India:** Leveling off of CO_2 and other emissions
- **China:** TBD

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 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

Outcome Measures (cont.)

U.S.

OUTCOME: Enforced environmental protection laws

Indicators of Progress:

- Uphold executive powers to address climate mitigation
- Increase in number of states complying with Clean Power Plan and adoption of high quality plans, or the extent to which states will meet their CO_2 emissions reductions, despite repeal of the Clean Power Plan

OUTCOME: Reduced emissions of CO_2

Indicators of Progress:

- Clean Power Plan implementation and/or specific coal plant closures

OUTCOME: Reduced emissions of greenhouse gas pollutants

Indicators of Progress:

- Regulation of emissions of short-lived pollutants
- New incidences of asthma (nationally and in designated high-risk communities) level off

OUTCOME: Built political will to advance climate solutions

Indicators of Progress:

- Increased candidate discourse on climate in 2016 presidential election and in mid-term 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

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[8]

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

[8] Although this indicator of progress refers to legislation, no MacArthur Foundation funds were used to lobby. Any Foundation efforts relating to legislation were limited to lawful advocacy for educational purposes.

Outcome Measures (cont.)

India

OUTCOME: Catalyzed renewable energy production

Indicators of Progress:

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

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 CO_2 emissions

Selection of Measures

In mid-February 2016, Grassroots Solutions and M+R initiated a discovery and evaluation design process. Through that process, Grassroots Solutions, M+R, the Climate Solutions team, and others delved into questions that helped inform refinements to the Climate Solutions theory of change and develop an evaluation framework, including identifying measures and how to go about assessing the contribution of the Foundation's strategy. The process involved determining what questions needed to be answered and then answering those questions collaboratively. Ultimately, the questions that the Foundation, Grassroots Solutions, and M+R explored fell into three categories. A sample is included below.

Questions about the Theory of Change and Learning

- What is the theory of change for the U.S., India, China?
- What specifically is the role that the Foundation will play in advancing that theory of change?
  - › Who is the Foundation seeking to influence or benefit?
  - › What impacts and outcomes are the Foundation seeking to achieve?
  - › When will it achieve the outcomes?
  - › How will it and others make the outcomes happen?
  - › Where and under what circumstances will the Foundation do its work?
- What does the Foundation want to learn about the work in, or related to, the U.S., India, China, etc.?
- What activities are undertaken by the Foundation to produce the desired effects in the U.S., India, China, etc.?
- What is unique about the Foundation's strategy and contribution?

Questions related to Progress

- What near-term and longer-term external changes (e.g., policies, environmental shifts, etc.) does the Foundation hope to help bring about?
- What near-term changes in the landscape do we care about?
- What are the indicators we will use to measure changes in the landscape and progress toward the desired external changes that the Foundation is more directly involved in bringing about?
  - › What are the measures and targets that correspond with the indicators?
  - › Which indicators matter the most?
- What internal effects of learning among the network (e.g., the Foundation and its grantees) do we want?

Other Key Questions

- What are the sources of the data we will use to measure progress?
- What products do we need to create to capture decisions made, pivot points, learning, and progress?
- How will we go about establishing baselines?

To answer these questions, Grassroots Solutions and M+R created worksheets for the overall initiative, the U.S., and India. The worksheets served as reference tools for capturing and refining the Foundation's desired impacts and outcomes, as well as indicators of progress, measures, targets, and data sources. They also provided space to identify the Foundation's priorities, timeline considerations, the analytic approach to assessing the contribution of the Foundation's strategy, and preliminary baseline data.

We anticipate replicating the collaborative process to develop or refine current evaluation designs to account for the Foundation's investments in China, carbon pricing, and natural solutions. Also, we will continue to engage with Climate Solutions stakeholders regularly and directly— Foundation staff, grantees, and intellectual partners (as appropriate)—in the refinement of the data points tracked and analyzed. For example, during the original drafting of the evaluation framework, India grantees were just starting their work, and discussions about measuring progress toward desired outcomes in India were underway. The India grantee convening in mid-December 2016 yielded additional insights that helped clarify outcomes, indicators of progress, and related data points to measure and track.

Assessing the Foundation's Contribution

Grassroots Solutions and M+R have adopted or proposed 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 will be intensive and "deep." In other cases, the assessments will be lighter touch and "broad." Examples of the varying methodologies employed to analyze the Foundation's contributions in the U.S. and India are explained further in the sections that follow.

U.S. Examples

Since 2014, the Foundation has supported multiple approaches in the U.S. to achieve its desired outcomes. Figure 12 on the following page illustrates the relationship between these approaches and the Foundation's desired outcomes in the U.S. To assess the contribution of the Foundation's approaches in this specific context, we have developed and are implementing varying methodologies. For example, one of the Foundation's desired outcomes is that political will to advance climate solutions is built. To achieve that outcome, the majority of the U.S. portfolio is dedicated to activities to alter political discourse. Therefore, the methodology employed to both track progress and assess the contribution of the Foundation's approach to altering discourse is intensive.

THE RELATIONSHIP BETWEEN

APPROACHES & OUTCOMES

This graphic highlights the relationship between the Foundation's approaches and desired outcomes in the U.S. The approaches are clustered around each outcome, which represent the near-term and intermediate changes that are the result of the Foundation's strategy combined with other climate solutions stakeholders' efforts.

APPROACHES KEY

- Alter political discourse
- Advance climate-friendly energy 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

Reduced emissions of CO_2

Reduced emissions of greenhouse gas pollutants

Enforced environmental protections laws

Built political will to advance climate solutions

Established broad-based political support for carbon pricing

Increased deployment of renewable energy

Figure 12: *Relationship Between the Foundation's Approaches and Outcomes*

Grassroots Solutions and M+R enlisted Protagonist to help analyze the climate change narrative landscape in the U.S.[9] 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. 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.

To date, to assess the Foundation's contribution in these areas, we have examined the "signature" of the Foundation's grantees in the public and policymaker discourse by tracking and analyzing direct mentions of each organization. Going forward, to enhance our assessment of the Foundation's contribution we plan to: 1) investigate similarities between grantee messaging and candidates' and policymakers' talking points and statements in social and traditional media channels, 2) explore the solutions-orientation of outgoing messages produced by grantees and which solutions are most prominent, and 3) track grantee mentions per capita by state in the discourse and then analyze that information alongside data about state-level grantee activities.

Other desired outcomes in the U.S. include reducing emissions of CO_2 and greenhouse gas pollutants. To achieve these outcomes, the Foundation is supporting activities to advance climate-friendly energy policies. To assess the contribution of this approach, we plan to conduct comparative geographic analyses. In collaboration with the Foundation, we will identify a subset of states based on criteria that could include: 1) states where the Foundation is supporting activities that are particularly unique (and targeted by a limited number of other climate funders), 2) states targeted by the Foundation in concert with other climate funders, and 3) states that are not targeted by the Foundation. The comparative analysis will be supplemented by a review of annual grant reports and interviews with a subset of grantees and external observers. Similar comparative analyses will be done to assess the approaches the Foundation is undertaking in the U.S. to increase renewable energy, establish support for carbon pricing, and enforce environmental protection laws.

[9] 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.

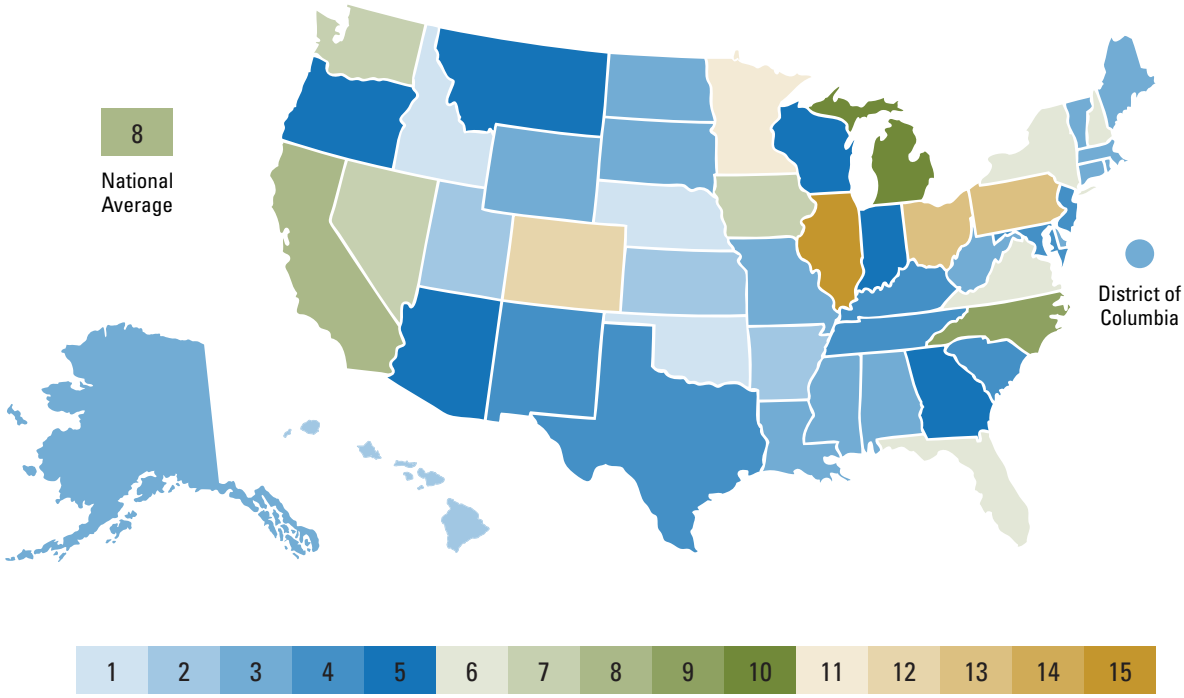

Figure 13: *Number of the Foundation's U.S. Grantees Focused on Each State*

India Examples

Since 2016, the Foundation has supported multiple approaches in India to achieve its desired outcomes and awarded approximately $24 million in grants.[10] Figure 14 on the following page illustrates the relationship between the Foundation's approaches and desired outcomes in India.

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 gaps[11]

[10] Sources: Climate Solutions Strategy Update, Prepared for the Board of Directors, September 12, 2017. Climate Solutions_All Previously Awarded Briefs. MacArthur Foundation, May 18, 2018.

[11] 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.

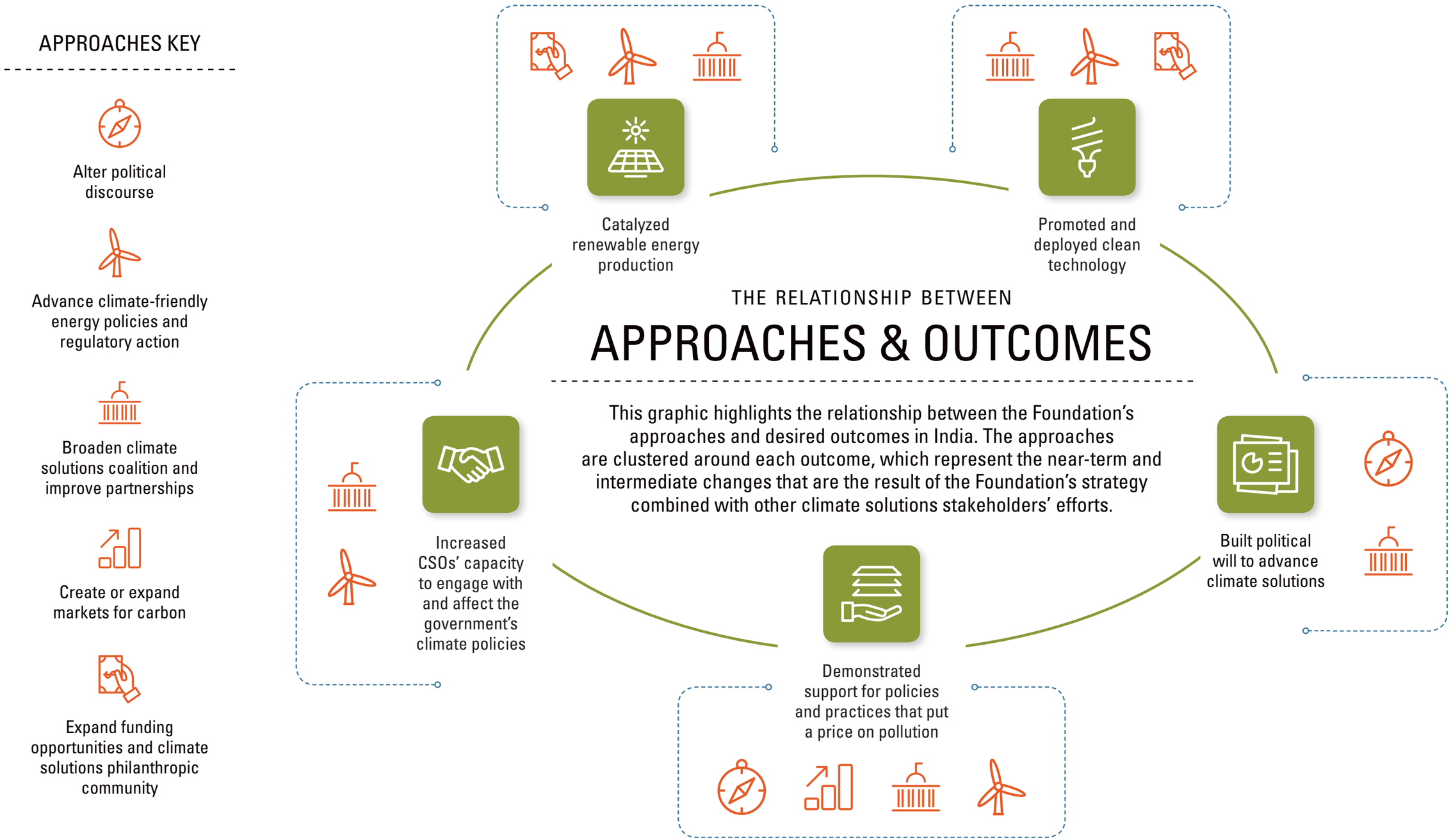

Figure 14: *Relationship Between Approaches and Outcomes (India)*

The three levels of data are being applied in the following 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.[12]

The Foundation is also 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.[13]

METHODOLOGICAL LIMITATIONS

One big-picture challenge, which also presents an opportunity, is how we continue to best align and learn from diverse ways of measuring progress and assessing the Foundation's contribution in promoting leadership in vastly different contexts: the U.S., India, and China. Grassroots Solutions and M+R continue to wrestle with how best to gauge the ultimate contribution of the Foundation's work and how the whole of the Climate Solutions Big Bet is evolving into something greater than the sum of the parts. We posited that if some outcomes in certain contexts matter more than others, then the answer may lie in developing some form of equation. The equation would represent how each of the outcomes is weighted, related to one another, and their compounding influence in achieving the Foundation's goal to ensure that global temperature rise stays well below 2 degrees Celsius.

In addition, umbrella goals, timelines, messaging, or incremental targets have not been determined in conjunction with grantees for each approach. This lack of cohesion may be contributing to the uneven nature of the data reported by grantees, which makes it more difficult to interpret in aggregate. As a result, we have had to think creatively about effective ways to assess the Foundation's contribution (e.g., enlisting Protagonist in the U.S. to help assess efforts to alter discourse). This is a conversation that Grassroots Solutions and M+R look forward to continuing with the Foundation, its grantees, and other collaborators in 2018 and beyond.[14]

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[12] 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.

[13] 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.

[14] At the time of writing, this was an accurate description of some of the challenges and limitations; however, it is worth noting that the Foundation has been working with grantees to gather input about the evaluation designs in each country-specific context and solicit feedback that informs strategic decision-making.

Baselines

The baselines represent the starting points—generally prior to the Foundation's involvement—that Grassroots Solutions and M+R are using for comparison to measure progress toward the Foundation's desired impacts and outcomes. As noted earlier, associated with the impacts and outcomes are a variety of data points that we are tracking. So far, we have established baselines for the U.S. (2012) and India (2015). That data was presented to the Foundation in June 2017 and October 2017, respectively. The next section of the report explores what the baselines tell us about the period prior to the launch of the Climate Solutions Big Bet and what we are learning about progress to date. For a complete list of baseline data and data points tracked, see Appendix A.

4 | What We Are Learning

This section is divided into four parts. In the first part, there are three high-level takeaways that reflect Grassroots Solutions' and M+R's interpretation of the baseline data. These takeaways explore what the data examined tell us about the period prior to the launch of the Foundation's Big Bet.

In the second, third, and fourth parts of this section, there are 11 findings that emerged from our analysis of the changes since baselines were established and developments in the contexts in which the Foundation is advancing its theory of change. The findings are organized into three groups and reflect significant developments at the initiative level, in the U.S., and for India. They relate to the impact and outcome measures outlined in the previous section of the report about the evaluation framework.

It is worth noting that Grassroots Solutions and M+R spent much of 2017 working with Oxford Policy Management to establish baselines for India. The findings highlight the most relevant changes since baselines were established in 2015. The findings reflect our analysis of the quantitative data available and qualitative insights from key informants. Key informants included grantees and non-grantees who took part in a full-day, workshop-style discussion focusing on the Foundation's desired outcomes and some of the political and economic factors surrounding them.

Interpreting the Baselines

Climate Change Was Important, but Not a Top Political Priority

In the U.S. in 2012 and India in 2015, there was growing consensus among political leaders that something needed to be done to address the global problem of climate change. That momentum culminated in the signing of the Paris Accord in 2015. At the same time, prior to the launch of the Foundation's Climate Solutions Big Bet, climate change was not a top political priority in either the U.S. or India. The reasons for the lack of immediacy to address the problem were unique in each context.

U.S. Baselines

In the U.S. in 2012, climate change had not broken through among policymakers. Addressing the problem faced strong political headwinds. It was a polarizing topic among candidates, policymakers, and the American public. Typically, in a presidential election year, more attention is paid by the media, candidates, and voters to serious issues affecting the country. However, in 2012, the portion of candidate and policymaker discourse devoted to climate change was very low. Climate change accounted for only 0.46% of the policymaker discourse, and it was not mentioned in any of the presidential debates.[15] Furthermore, most of the discourse that took place among candidates

[15] Sources: Protagonist Narrative Analytics Analysis Session Presentation and Zeller, Jr., Tom & Zelman, Joanna (October 23, 2012). Climate Change Not Mentioned in Presidential Debates for First Time in a Generation. Huffington Post. https://www.huffingtonpost.com/2012/10/23/climate-change-presidential-debate_n_2004067.html

and policymakers was unfavorable. Candidates' and policymakers' positions were entrenched, and their discourse illustrated deep divisions on the issue. Not until 2014 would candidate and policy maker discourse about climate change increase significantly and the conversation become more dynamic.

In 2012, climate change was not a significant priority for American voters either. It did not garner close to the same attention as the economy, jobs, and healthcare. According to the Pew Research Center, climate change was not among the top-12 issues voters cited as "very important" for their vote.[16] Energy made the list; however, respondents did not necessarily consider it through the lens of climate change. Instead, energy was viewed by voters as a priority because of its impact on their daily lives—its cost and access to it. Also, its perceived importance among voters decreased between 2008 and 2012.

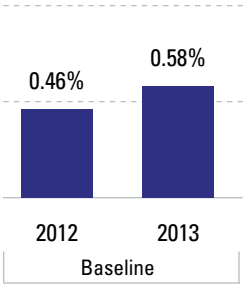


Figure 15: *U.S. Baseline Percent of Total Candidate and Policymaker Discourse on Climate Change*

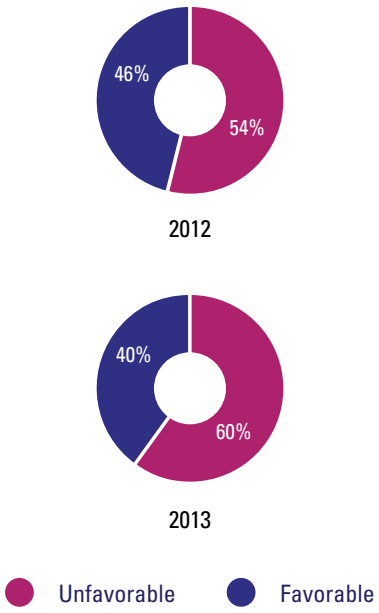


Figure 16: *U.S. Baseline Unfavorable and Favorable Candidate and Policymaker Commentary on Climate Change*

Voters who state: "Each is very important to my vote ..."	2008	2012	Change
Economy	87	87	0
Jobs	80	83	+3
Healthcare	73	74	+1
Education	73	69	-4
Budget Deficit*	69	68	-1
Taxes**	71	66	-5
Medicare	-	65	-
Terrorism	72	60	-12
Foreign Policy	-	60	-
Energy	77	55	-22
Abortion	39	46	+7
Immigration	52	41	-11

Source: *Pew Research Center, Sept. 12-16, 2012. Based on registered voters. All 2008 figures are from Aug., except *May 2008 and **Oct. 2008.*

Figure 17: *Voters' Priorities 2008 – 2012*

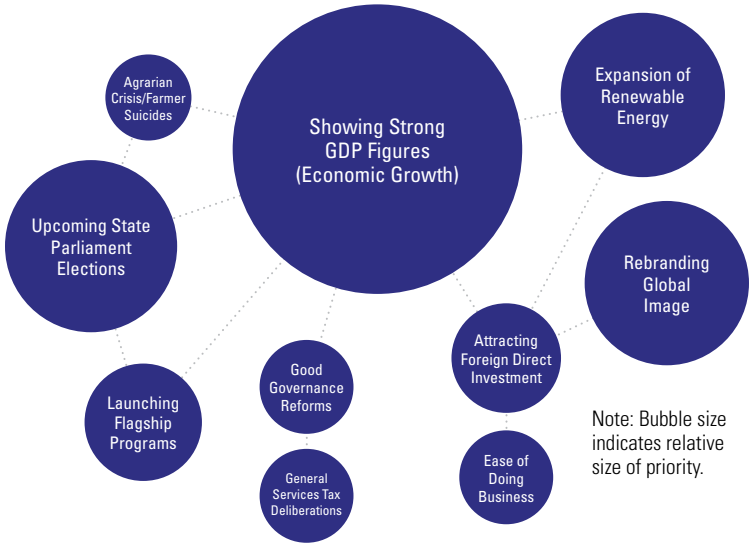
[16] Energy, Terrorism, Immigration Less Important Than in 2008: For Voters it is Still the Economy (2012, September 24). Pew Research Center. http://www.people-press.org/2012/09/24/for-voters-its-still-the-economy

The baseline data analyzed largely corroborate the Foundation's assumption that Americans were open to addressing climate change, but elected officials perceived them as indifferent. The baselines also suggest that, to elevate the importance of climate change, it needed to be couched in terms that connect to voters' everyday lives. Energy—access to it, cost, and how it is produced—are tangible to voters, and much of modern American life is dependent on it. The baseline data examined lend further credence to the Foundation's commitment to messaging climate through different frames. By supporting authoritative organizations and messengers that can connect climate change to public health, national security, and economic competitiveness, the Foundation hopes that elected state and federal officials will recognize the need for climate solutions and be motivated to act – for example, through climate-friendly energy policies and regulatory action.

India Baselines

Like the U.S. in 2012, climate change was deemed important in India in 2015, but not a top political priority. One significant difference, however, is that the baseline period coincided with an important international event: the annual Conference of Parties (COP21) and negotiations around the United Nations Framework Convention on Climate Change in Paris. The Government of India actively engaged in the negotiations. In the run up to COP21, the Government was preparing its Intended Nationally Determined Contribution and participating in bilateral discussions with foreign governments. Even though Prime Minister Modi's rhetoric signaled that India wanted to proactively contribute to global climate change mitigation, the Indian economy was his foremost concern.[17]

There was an apparent disconnect between the Government of India's emerging international leadership role on climate change and the policies and actions adopted domestically. Many of its economic policies were being implemented at the expense of climate change. In 2015, the Government launched a variety of flagship programs, promoting the "ease of doing business" and promoting "economic growth at all costs." Some of the most politically important programs launched were the Make in India initiative, Swachh Bharat Abhiyan (Clean India Mission), and the Smart Cities Mission. In many cases, the programs did not include a clear articulation of how they would



Source: *Key Informants Discussion*

Figure 18: *Government of India Priorities in 2015*

[17] Ministry of Power, Renewable Energy and Coal, January 2015: "Renewable energy sources and energy efficient technologies feature prominently are in the agenda, but 'energy access for all' is the first step. Also, from a cost perspective, while the trajectory of renewables looks promising, at present, thermal power is indeed the cheapest source of energy generation. For a country whose per-capita GDP is a modest $1,500, it's unreasonable to burden the common man with significantly higher costs in the present, considering the large investments required; while major polluters in the world have not done so themselves during their own development period."

be implemented, so the impact on greenhouse gas emissions was either unknown or contradictory. For example, the Make in India initiative promoted industrial expansion, which was going to be fueled by an increase in coal-fired power plants. The Government of India had relaxed rules for obtaining environmental clearances for new infrastructure projects, including coal mining projects.[18] Additionally, the Government was committed to promoting renewable energy as a route to achieving universal electricity access, but the benefits of renewables to decrease emissions were not driving the policy; rather, they were a welcomed co-benefit. The Government of India's industrial policy was driven by a continued increase in coal production and consumption, and it was sensitive to criticism about coal.

Promising Conditions for Growth in Renewable Energy and Clean Technology

Prior to the launch of the Foundation's Climate Solutions Big Bet, the U.S. and India were well positioned to expand the deployment of renewable energy and clean technology. Despite the encouraging groundwork that had been laid, questions abounded in 2012 and 2015 about how quickly each country could overcome distinctive barriers to rapidly scale up electricity generation from renewables and lower greenhouse gas emissions.

U.S. Baselines

In 2012, government investments in renewable energy through the American Recovery and Reinvestment Act of 2009 were producing results.[19] Wind energy accounted for approximately 140,822,000 megawatt hours of net electricity generation in 2012 and utility-scale solar accounted for approximately 4,327,000 megawatt hours. Together they accounted for 3.5% of U.S. electricity net generation.

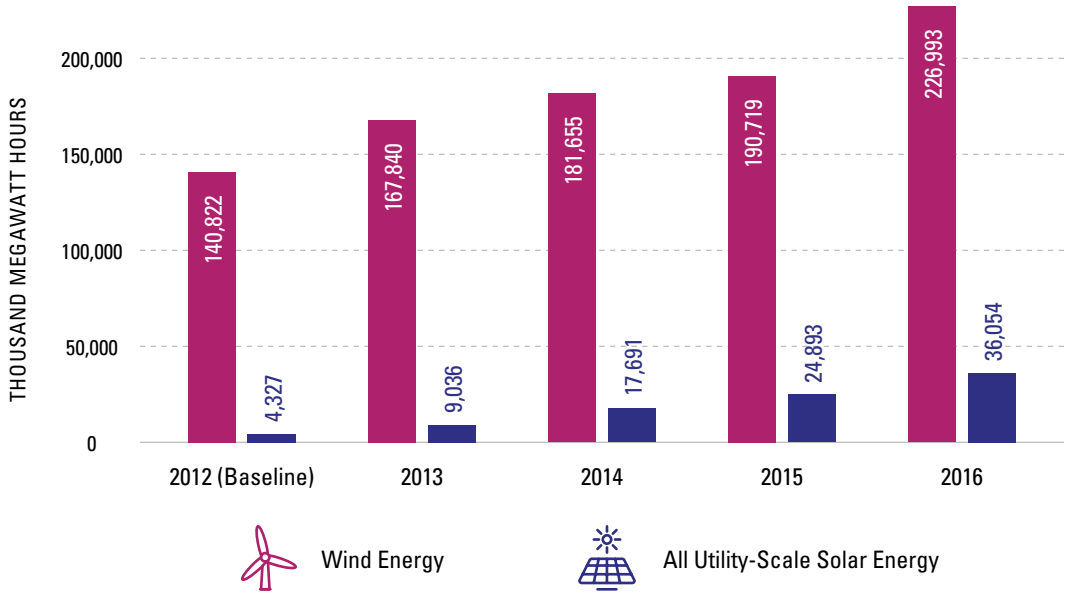


Figure 19: *U.S. Net Generation of Wind and Utility-Scale Solar Energy in Megawatt Hours (Source: www.eia.gov)*

[18] Source: Evaluation of MacArthur Foundation's Climate Solutions programme in India Baseline Landscape Study. Oxford Policy Management, January 2018.

[19] For more details about the Act, see the 2009 White House Press Release: https://obamawhitehouse.archives.gov/administration/vice-president-biden/reports/progress-report-transformation-clean-energy-economy.

Additionally, electricity generation from coal was at an all-time low of 1,514,043,000 megawatt hours; however, natural gas made up much of the lost generation from coal.

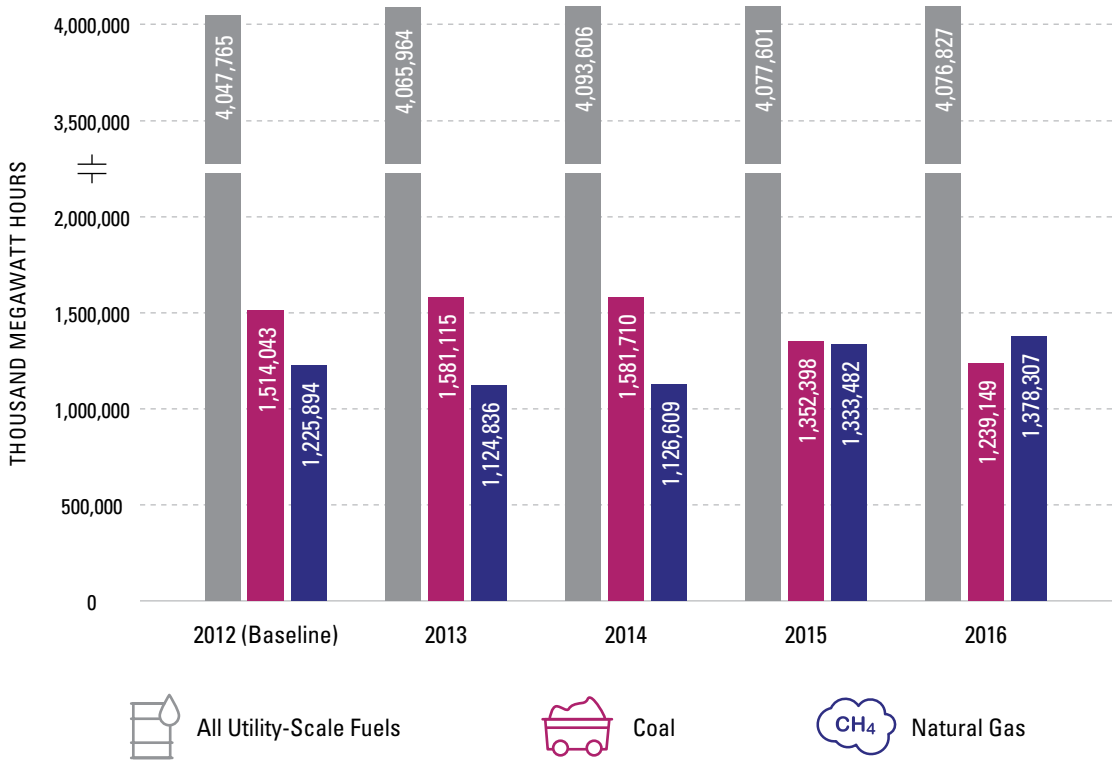


Figure 20: *U.S. Net Generation of Energy in Megawatt Hours (Source: www.eia.gov)*

The American Recovery and Reinvestment Act of 2009 also included investments in clean technology, which helped spur private investments as well. The Obama administration recognized that energy efficiency was integral to reducing the carbon intensity of the U.S. economy. Historically, economic growth had tracked with growth in energy consumption; however, as the U.S. economy continued to grow and recover from the Great Recession, energy consumption remained flat. In 2012, investments were producing positive results. Figure 21 on the following page highlights energy consumption in the residential, commercial, and industrial sectors.

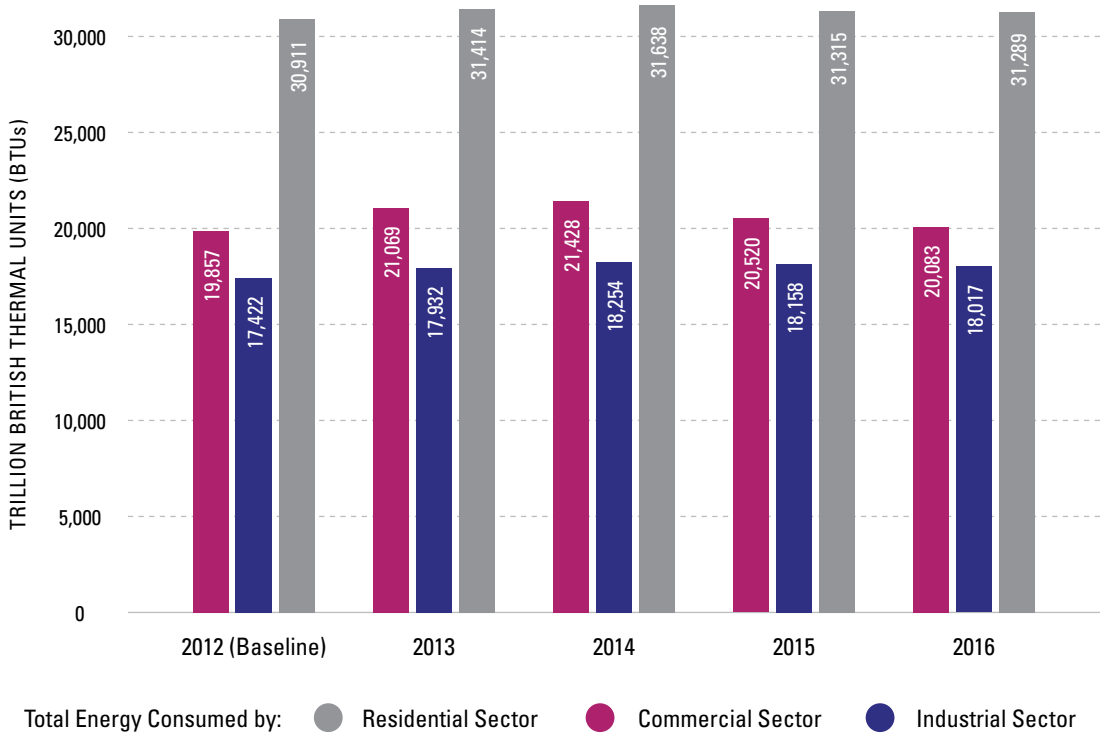


Figure 21: *U.S. Energy Consumption by Sector in British Thermal Units (Source: www.eia.gov)*

Flattening energy consumption in the U.S. in 2012, despite economic growth, created conditions favorable to replacing energy generation capacity from coal with renewables. The main barrier was political apathy. A dramatic increase in the scale of renewables and clean technology required ramping up political commitment and investment, especially since the funds appropriated through the American Recovery and Reinvestment Act to spur private sector deployment of renewable energy and energy efficiency were beginning to phase down in 2012.

The baseline data analyzed support the Foundation's choice to fund activities to advance climate-friendly energy policies and regulatory action and broaden the climate solutions coalition and partnerships. These efforts were designed to sustain and build more political momentum for renewables. The data from 2012 also illustrate the interconnected nature of various components of the U.S. theory of change. For example, political will to advance climate solutions is integral to increasing deployment of renewable energy. As shown in the first takeaway ("Climate Change Was Important, but Not a Top Political Priority"), political will in 2012 was insufficient in the face of the challenge posed by climate change.

Finally, since it is the private sector that is encouraged to use renewable energy and clean technologies (the U.S. government does not deploy utility-scale renewable energy), the baseline data reinforce the importance of tracking developments within the private sector as well. The evaluation framework includes landscape activities to explore the broader context in which the Foundation's work takes place. At the same time, whether the Foundation's strategy and the corresponding evaluation framework have adequately accounted for the vital role of the private sector in helping or hindering the advancement of the Foundation's theory of change in the U.S. is an open question that warrants continued discussion.

India Baselines

By 2015, renewable energy had expanded significantly in India. Installed capacity from renewables was at a five-year high, and the country appeared poised for exponential growth in both renewable energy and clean technology. There was vast, untapped potential, as well as investor interest. For example, in 2015, it was estimated that India's solar potential was more than 750 gigawatts and 302 gigawatts for wind.[20] In an effort to seize upon these opportunities, Prime Minister Modi and the Government of India established ambitious goals for on-grid and off-grid renewable energy deployment.

At the same time, in 2015, renewables still accounted for a low proportion of the overall energy mix in India. According to the Ministry of New and Renewable Energy, in 2015, renewables—solar, wind, biomass, and small-hydroelectric—contributed 13% of India's total installed capacity and approximately 5% of total generation. In contrast, coal contributed around 70% of total installed capacity, and consumption was growing.[21] On-grid, installed renewable energy capacity was just 38.8 gigawatts in 2015.

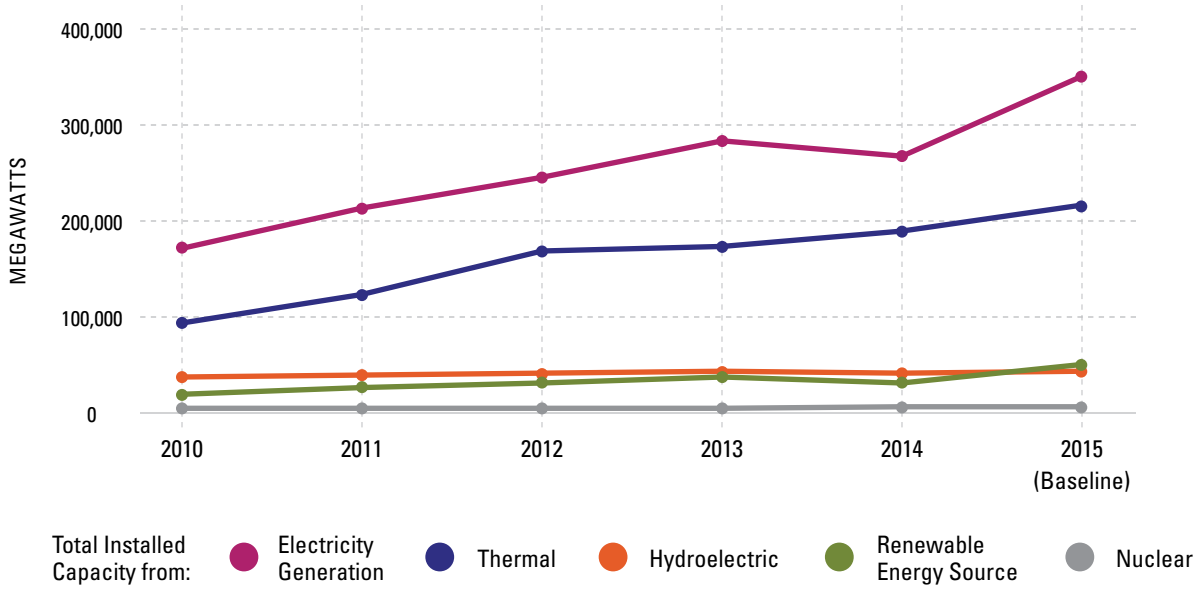


Figure 22: *India Installed Capacity for Electricity in Megawatts*

[20] Source: Evaluation of MacArthur Foundation's Climate Solutions Programme in India Baseline Landscape Study. Oxford Policy Management, January 2018.

[21] Ibid.

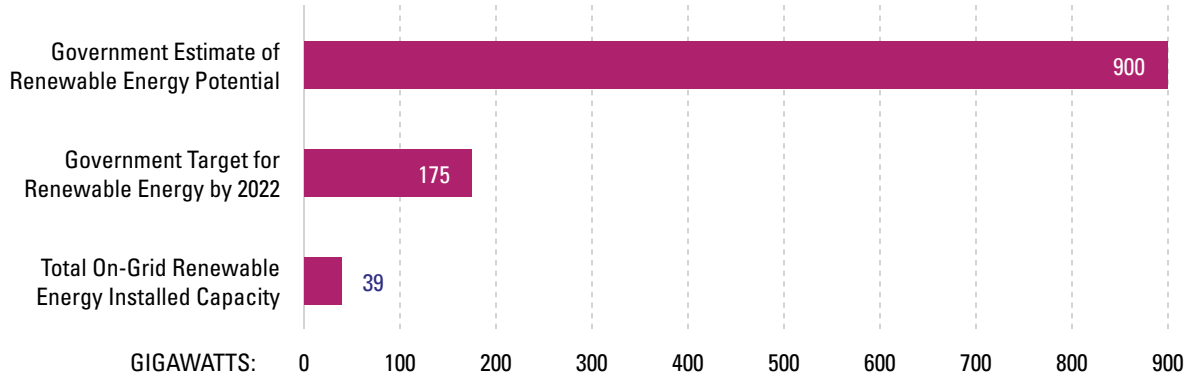


Figure 23: *Grid-Connected Renewable Energy Installed Capacity in 2015, Compared to Potential and Target in Gigawatts*

Additionally, prior to the launch of the Foundation's work in India, the power sector was struggling to keep up with the rapidly increasing population (which exceeded 1.3 billion) and real Gross Domestic Product growth rates of 8% (energy consumption had almost doubled by 2000). There were easier, more carbon-intensive ways to achieve economic development goals, which resulted in under-developed policies and regulations around renewable energy and clean technology. The most significant constraints to the expansion of renewable energy were a complicated set of interwoven factors around access to finance, regulations, and institutional issues. In many cases, the barriers were not specific to renewables but related to the power sector in India in general. The range of barriers to the expansion of renewable energy production in 2015 are shown in the Figure that follows.

	Connectivity	Status	Barrier
Policy and Regulations	On-Grid	Positive	Gaps in enforcement and implementation policies and regulations
	Off-Grid	Mixed	No dedicated policies for micro-grids
			Some states have rooftop solar policies and regulations, but lack implementation of those policies and regulations
Government Institutional Capacity	On-Grid	Very Poor	Lack of capacity to implement policies and regulations, especially at the sub-national level
	Off-Grid	Poor	Lack of understanding of the off-grid sector
Financing Infrastructure	On-Grid	Poor	Distribution companies are main buyers of renewable energy, but unwilling to purchase "expensive" power
			Limited project financing options
			Capital is expensive for renewable energy projects
			Purchase power agreements are not honored
	Off-Grid	Very Poor	Limited project financing options
			Uncertainty of grid expansion creates hesitancy to finance off-grid projects

Figure 24: *Barriers to Deployment of On-Grid and Off-Grid Renewable Energy*

	Connectivity	Status	Barrier
Political Will	On-Grid	Very Positive	Political constraints at the sub-national level affects the financial health of the power sector
	Off-Grid	Mixed	Secondary priority to grid expansion
			Concern by Government of India in duplicating subsidies
Technology	On-Grid	Mixed	Limited investment in Research & Development
			Lack of ancillary services and technical expertise in grid connectivity and fuel source variability
	Off-Grid	Positive	Challenges presented by inverters and other similar system technologies for roof top and micro-grids
			Metering and grid technologies still unreliable and costly

Figure 24 (cont.): *Barriers to Deployment of On-Grid and Off-Grid Renewable Energy*

It is worth noting that, even though there was a lot of investor interest in renewables in 2015, viable projects struggled to receive financing. The Government of India was supporting renewables and clean energies through loans and the National Clean Energy and Environment Fund; however, the scale of the financing did not match the goals articulated by the Government or the country's potential.

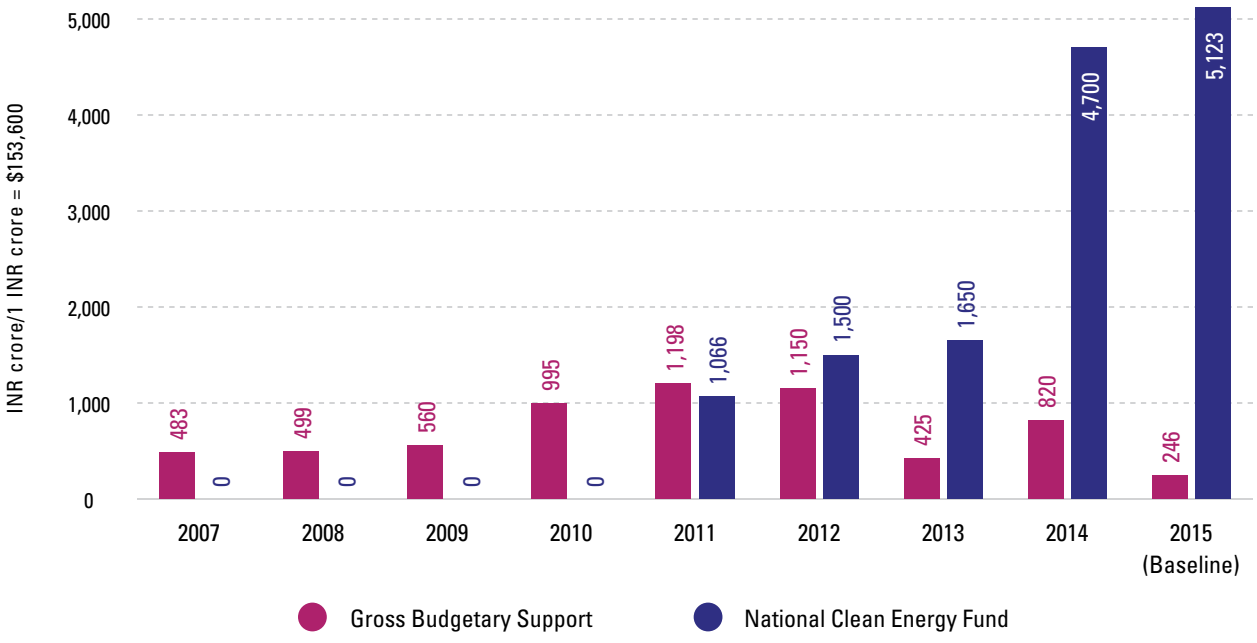


Figure 25: *India Gross Budgetary Support and National Clean Energy Fund for Renewable Energy Promotion Investment*

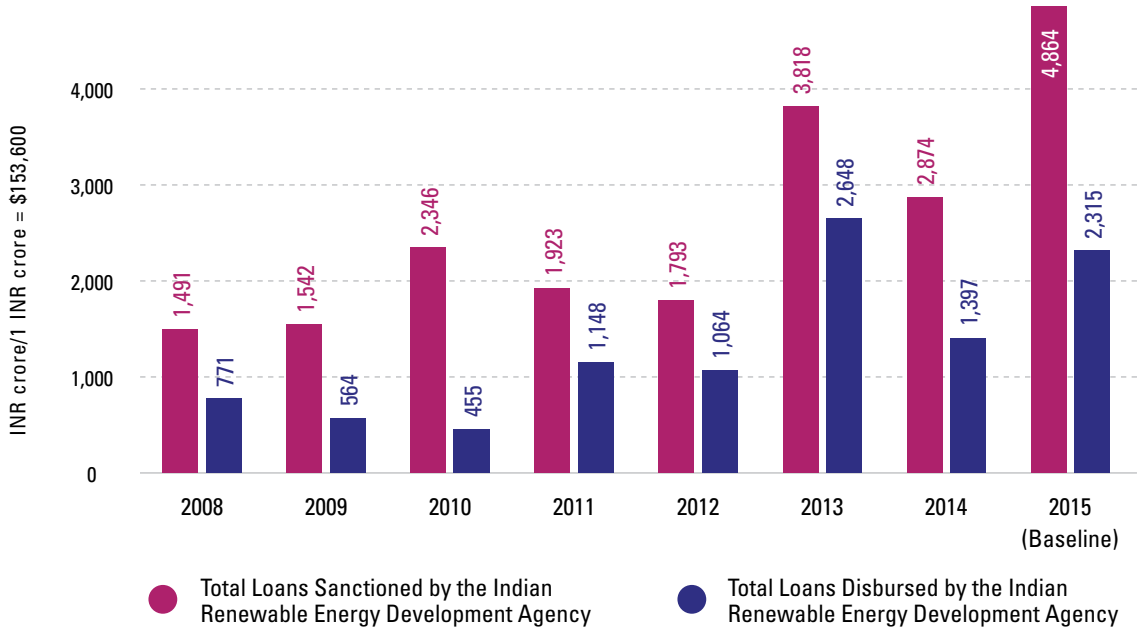


Figure 26: *Government of India Loans for Renewable Energy*

The Foundation's India strategy and theory of change largely reflect an understanding of the barriers that existed in 2015. The data corroborate the Foundation's decision to provide grants to groups advancing climate friendly energy policies and broaden the climate solutions coalition, while also expanding funding opportunities through its impact investments.

Modest Capacity to Influence Government Policy

In 2015, a considerable number of Indian civil society organizations were regularly interacting with the Government of India on climate policies, particularly in the run-up to COP21. At the same time, there were limits to their engagement with, and influence on, the Government's climate policies.

India Baselines

Prior to the launch of the Climate Solutions Big Bet, there were approximately 36 "major" civil society organizations working on climate change and renewable energy policy at the national level in India. Most of these organizations (86%) dedicated at least half of their work to climate change or renewable energy. Eighty-nine percent were focused on policy, as opposed to implementation of projects or scientific research.[22]

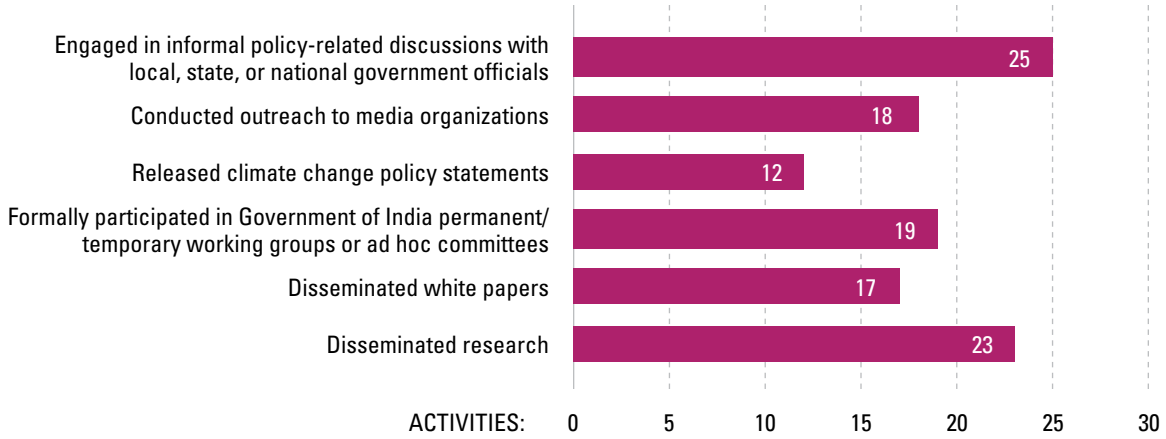
In 2015, the Government of India was primarily interested in engaging with civil society organizations to ensure a positive image was projected domestically and internationally around its Intended Nationally Determined Contribution. Many organizations provided technical assistance on specific topics. For example, the Government of India contracted with The Energy and Resources Institute to provide analysis on future energy demand scenarios.

[22] Source: Evaluation of MacArthur Foundation's Climate Solutions Programme in India Baseline Landscape Study. Oxford Policy Management, January 2018.

The other main avenues for organizations to engage with the Government on national climate policy in 2015 included:

- The Prime Minister's Council for Climate Change, which Prime Minister Modi reconstituted in late 2014
- Government-convened working groups or committees with experts
- Ad-hoc requests to provide officials with analysis and data
- Individual relationships with officials who reached out as needed to trusted individuals for advice and information

Generally, civil society organizations were able to exert influence within the parameters dictated by the Government of India. The Government was wary of civil society, especially organizations that received foreign funding or were anti-coal.[23] Civil society organizations tended to try and exert influence on climate policy by presenting themselves as a partner of the Government of India rather than a critic or watchdog.[24] Ultimately, the final decision-making process about India's Intended Nationally Determined Contribution and target setting was a closed process. It was unclear how the Government of India came up with the exact target of 175 gigawatts of solar energy by 2022, although key informants interviewed reported that industry stakeholders were more directly involved than civil society organizations. Moreover, there were few opportunities for civil society organizations and the Government to have an open, two-way, consensus-building debate. Instead communication tended to go in one direction; the Government listened without offering much in return. In the survey Grassroots Solutions and M+R administered to the Foundation's India grantees in December 2017, most respondents reported engaging in activities in 2015 that were consistent with a partnership role. Many were focused on research and technical assistance as opposed to U.S.- and Western-style advocacy.



Source: *Survey of India Grantees, December 2017*

Figure 27: *Activities Undertaken by the Foundation's India Grantees in 2015 to Promote Climate Change Policies and Regulations*

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[23] There were several international organizations with anti-coal campaigns targeting India at the United Nations Framework Convention on Climate Change negotiations. In June 2014, the Government of India Intelligence Bureau produced a report stating that the activities of civil society organizations operating in India, including Greenpeace, will have a negative impact on economic growth by 2 to 3% and labeled them a "threat to national security." In April 2015, the Government of India froze Greenpeace's bank accounts and suspended its ability to accept foreign funds. The highly politicized nature of the debate around coal meant most national civil society organizations were very careful in how they discussed the issue.

[24] Traditionally, civil society organizations had focused on putting climate change on the political agenda or by communicating new ideas; however, in the run-up to COP21, it was clear that that task had largely been achieved. The Government of India had announced ambitious renewable energy targets, particularly for solar energy. Therefore, most organizations publicly agreed with the its position to seek a balance between increasing energy consumption to drive economic growth and controlling greenhouse gas emissions.

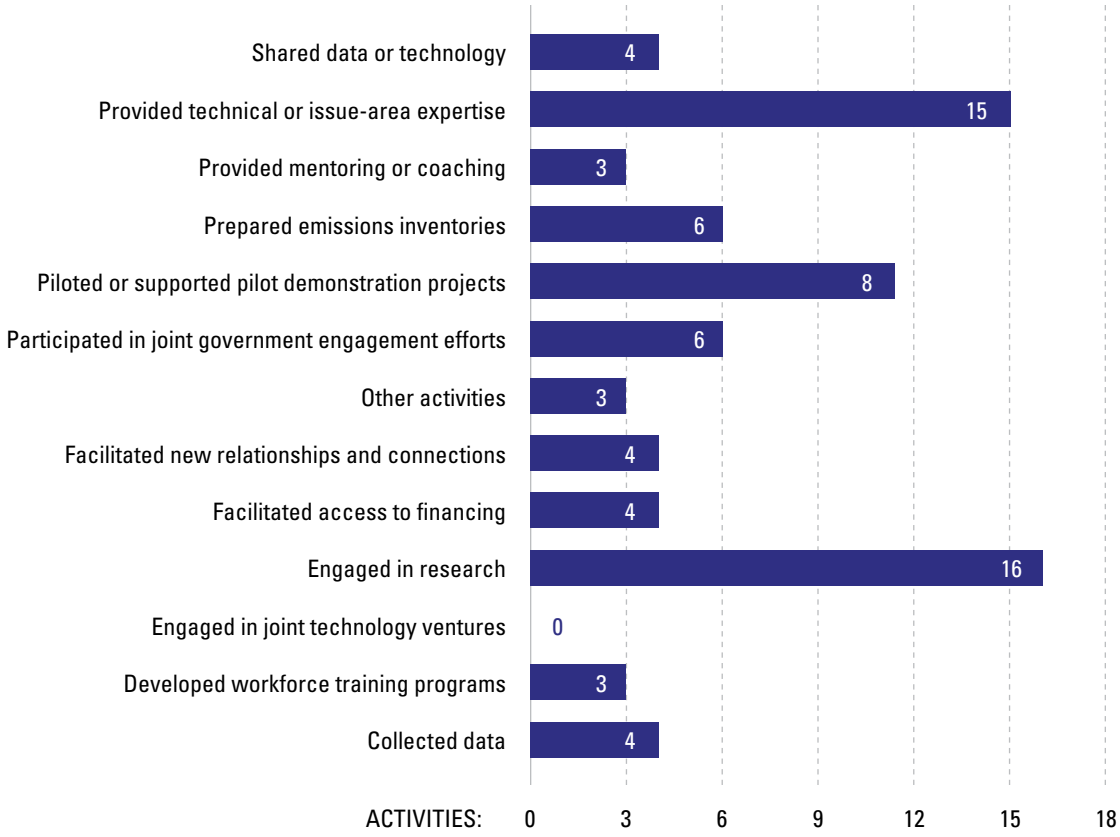

Figure 28: *Grantee Activities Undertaken to Promote Renewable Energy Deployment, Clean Technology, and Putting a Price on Pollution*

But not all constraints that limited the ability of civil society organizations to influence national climate policy in 2015 were external. Technical capacity gaps also hindered civil society organizations' ability to engage with and influence climate policies. For example, only a few organizations had robust climate modeling capabilities, and they struggled to compete with consultancies and industry to provide useful advice to the Government. The gap in technical capacity was self-reinforcing in part because of the Government's open process for procuring contractors. Civil society organizations struggled to compete with consultancies that could submit low bids, and as a result, missed out on contracting opportunities.

The Foundation's decision to invest substantially in capacity-building appears timely and relevant. At the same time, the barriers to engagement and influence are substantial, which raises questions about how best to balance the Foundation's ambitions with the realities on the ground. The evaluation framework includes landscape activities (i.e., the "Context Assessment" undertaken and updated with the help of Oxford Policy Management) to track the role that other actors—industry, consultancy firms, academics, and more—play in shaping climate policies. Understanding the relative influence of civil society organizations vis-à-vis other stakeholder groups will help inform potential adjustments and refinements, if not at the theory of change level, to the approaches and activities the Foundation supports.

Findings: Climate Solutions Initiative

As noted earlier, in the three remaining parts of this section, there are 11 findings that emerged from our analysis of changes since baselines were established and developments in the contexts in which the Foundation is advancing its theory of change. These findings build on the previous high-level takeaways about the baselines and set up the conclusion and implications that follow.

Global Participation in Climate Solutions

1. By announcing its withdrawal from the Paris Accord in 2017, the U.S. abdicated—at least temporarily—its national leadership role on climate and created uncertainty about the country's ability to meet its emissions reduction targets.

To better understand the ultimate contribution of the Foundation's work, Grassroots Solutions and M+R are measuring and tracking treaties, international forums, and multi-lateral agreements on climate as indications that global participation in climate solutions is broadening and deepening. Prior to 2017, the U.S. played a vital role in working with other nations to adopt and ratify the Paris Accord, and it was implementing domestic policies to lower the trajectory of greenhouse gas emissions. In 2016, then-candidate Trump campaigned on a pro-coal, anti-regulation agenda, stating he would scrap the Clean Power Plan, pull out of the Paris Accord, and dismantle much of the work on climate change enacted by the Obama administration.

After President Trump's inauguration in early 2017, it became clear that the new administration was going to follow through on its campaign rhetoric. The President appointed climate deniers to key regulatory positions, and after two months in office, he signed an executive order directing the Environmental Protection Agency to begin dismantling the Clean Power Plan. In June 2017, President Trump announced U.S. withdrawal from the Paris Accord. Currently, the U.S. is the only country in the world that has rejected the treaty. In 2017, Syria—the last remaining holdout—joined the Paris Accord. Although the earliest that the U.S. can officially withdraw is November 4, 2020, by making this announcement, national government has abandoned the leadership role on climate change that it had previously played on the international stage.

At the same time, there are indications that other nations and regions are stepping into the leadership void created by the U.S. India and China publicly reiterated their commitment to meeting their emissions reduction targets. Also, China made moves to assume the political mantle for global climate leadership, backed by financial resources and investments in renewable sources of energy, especially solar power. At the end of 2017, President Xi Jinping announced China's intention to start the world's largest carbon market,[25] and India is stepping up its global leadership through the International Solar Alliance.[26]

Amid uncertainty about the long-term implications of the U.S.'s withdrawal from the Paris Accord, the Kigali Amendment to the Montreal Protocol, which will bring about a global phase-down of hydrofluorocarbons (HfCs),

[25] Bradsher, Keith and Friedman, Lisa. "China Unveils an Ambitious Plan to Curb Climate Change Emissions." New York Times. December 19, 2017. https://www.nytimes.com/2017/12/19/climate/china-carbon-market-climate-change-emissions.html

[26] The International Solar Alliance is an effort to standardize solar technology for 121 solar-rich nations.

is moving forward and will take effect in January 2019. The goal is to achieve a more than 80% reduction in HfC consumption by 2047. If successful, the Amendment will avoid an up to 0.5 degrees Celsius increase in global temperature by the end of the century. For the Amendment to take effect, at least 20 parties needed to ratify it. That milestone was reached November 17, 2017. While the Trump administration has not made a final decision on ratification, it signaled its support of the Amendment at the 29th Meeting of the Parties to the Montreal Protocol. Meanwhile, the Foundation joined with other climate funders as part of a U.S. philanthropic pledge of up to $50 million to accelerate technology transfer to energy-efficiency technology for air-conditioning and other cooling systems by developing countries.

Trajectory of Global Greenhouse Gas Emissions and Surface Temperature

2. Global energy- and industry-related carbon emissions have plateaued; however, that trend may be short-lived and easily reversed by economic growth.

One of the other data points that Grassroots Solutions and M+R are measuring and tracking to assess the ultimate contribution of the Foundation's work is global temperature. In November 2017, the United Nations Environment Programme released its annual "Emissions Gap" report (https://www.unenvironment.org/resources/emissions-gap-report) on the disparity between the world's stated ambitions on climate and the actions taken. The 2017 report details that global energy- and industry-related carbon emissions plateaued. At the same time, the report points out that overall greenhouse gas emissions continue to rise, mainly because of land-use changes and forestry emissions. The report also states that even if all countries fulfill their Nationally Determined Contributions, additional emissions reductions will be necessary to keep global temperature rise below 2 degrees Celsius. This tracks with the Foundation's assessment that additional urgency and ambition are needed to bend the global emissions curve.

In addition, in 2017, changes in conditions across much of the globe's land and ocean surfaces continued. Record warmth was observed across parts of the western and central Pacific Ocean, western Indian Ocean, southern South America, the southwestern contiguous U.S., and parts of the northern Atlantic Ocean, Africa, the Middle East, and eastern Asia. According to the NOAA National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/global/201713), the global land surface temperature was 1.31 degrees Celsius/2.36 degrees Fahrenheit above the 20th century average, making 2017 the third highest in the 138-year record, behind 2016 (warmest) and 2015 (second warmest).

Findings: U.S.

Enforcement of Environmental Protection Laws and Subnational Leadership to Reduce Emissions of Greenhouse Gas Pollutants

3. In 2017, as the federal government sought to undo the work of the previous administration, climate advocates took to the courts and regulatory processes to enforce existing laws and regulations. Additionally, states and cities continued to advance climate-friendly energy policies and practices.

In 2017, President Trump announced Scott Pruitt as his pick to head the Environmental Protection Agency. Pruitt is a climate change denier who had sued the Agency more than a dozen times as Oklahoma's attorney general, most notably leading a 27-state lawsuit against the Clean Power Plan. Once confirmed, he immediately began to undo much of the previous administration's work on climate. Pruitt withdrew an Obama-era request for more detailed information on oil and natural gas facilities aimed at better tracking the industry's methane and volatile organic compound emissions (a few of the Foundation's grantees had worked to secure these regulations.) In addition, the Environmental Protection Agency was empowered to reconsider the Obama-era emissions requirements for vehicles and began the process of dismantling the Clean Power Plan. 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. The Agency issued advance notice of proposed rule-making for a proposal to replace the Plan. In the fourth quarter of 2017, the Agency began taking public comments and has scheduled three additional public hearings. It hopes to complete work on this by October 2018. That brief time frame makes it harder for environmental groups to effectively challenge the rollback.

Despite the Trump administration's aggressive actions in 2017, which were largely supported by the Republican-led Congress,[27] other U.S. constitutional institutions have pushed back. Litigation-focused efforts have been effective avenues to both enforce existing laws and ensure regulations meant to reduce emissions of greenhouse gas pollutants are not gutted. For example, the U.S. Senate rejected a measure that would have repealed Obama-era regulations on methane emissions, which punted rollback of the rule to the Department of Interior. The Foundation supports work at both the federal and state levels regulating methane, a potent accelerator of climate change, and it is one of the short-lived pollutants Grassroots Solutions and M+R are tracking. In October 2017, a federal judge ruled the Interior Department's suspension of the methane emissions rules was illegal, since it had already gone into effect (State of California v. BLM, Nos. 17-cv-03804-EDL and 17-cv-3885-EDL (N.D. Cal., Oct. 4, 2017)). The Interior Department is continuing to proceed with a separate proposal that would push back the methane emissions rule compliance deadline until January 2019. A coalition of nearly 20 environmental and Native American tribal groups sued the Administration in December 2017 for this delay. While litigation is reactive, it can keep important frameworks in place so that rules and regulations can be reinstated or strengthened when political leadership changes.

Despite regressive developments at the federal level, states have continued to act by instituting cap-and-trade programs, regulating methane, and promoting clean energy. In December 2017, Pennsylvania announced it will implement new and updated permits that require controlling the emission of methane and other pollutants from new gas wells, transmission stations, and pipelines. After President Trump's announcement to withdraw from the Paris Accord, a bipartisan coalition of states and territories formed the United States Climate Alliance. The coalition is led and supported by California, Colorado, Connecticut, Delaware, Hawaii, Maryland, Massachusetts, Minnesota, New Jersey, New York, North Carolina, Oregon, Puerto Rico, Rhode Island, Vermont, Virginia, and Washington. The coalition is committed to reducing greenhouse gas emissions consistent with the goals of the Paris Accord. Also, governors of the Regional Greenhouse Gas Initiative states have committed to reducing power plant emissions by another 30% by 2030.[28]

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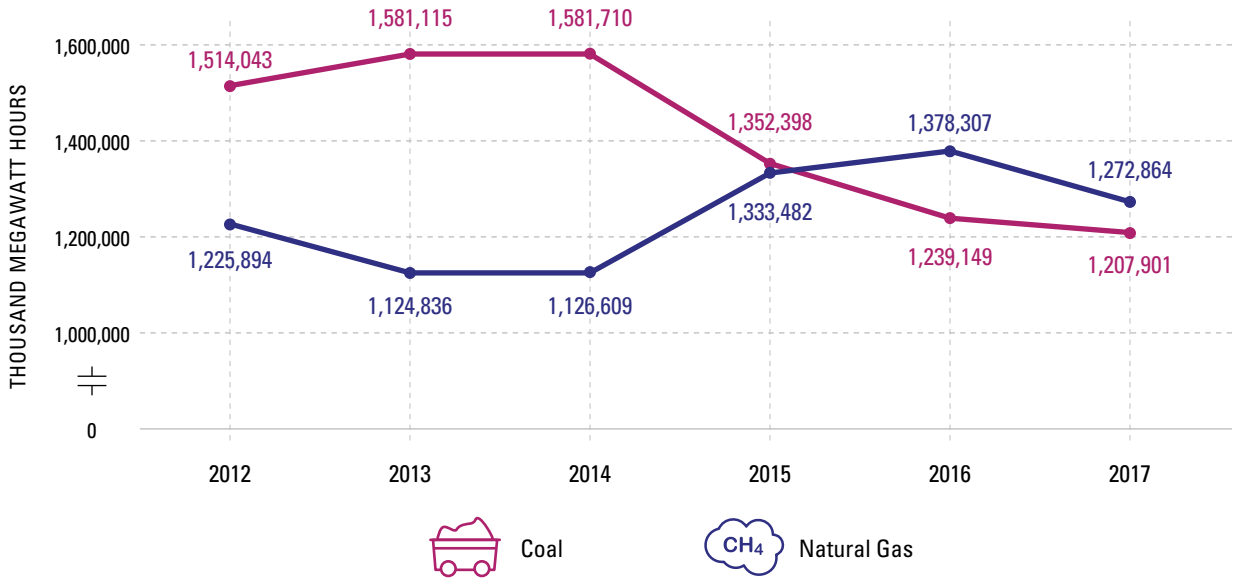
[27] "Tracking Deregulation in the Trump Era." The Brookings Institute. https://www.brookings.edu/interactives/tracking-deregulation-in-the-trump-era/

[28] "RGGI Agrees to Cut Power Plant Pollution by another 30%" https://www.nrdc.org/experts/bruce-ho/rggi-states-set-new-standard-climate-action-2017.

Reducing Emissions of CO_2

4. Coal continued to decline as the fuel of choice for energy generation in the U.S., and there are some initial indications that the Foundation's approach is having a positive effect.

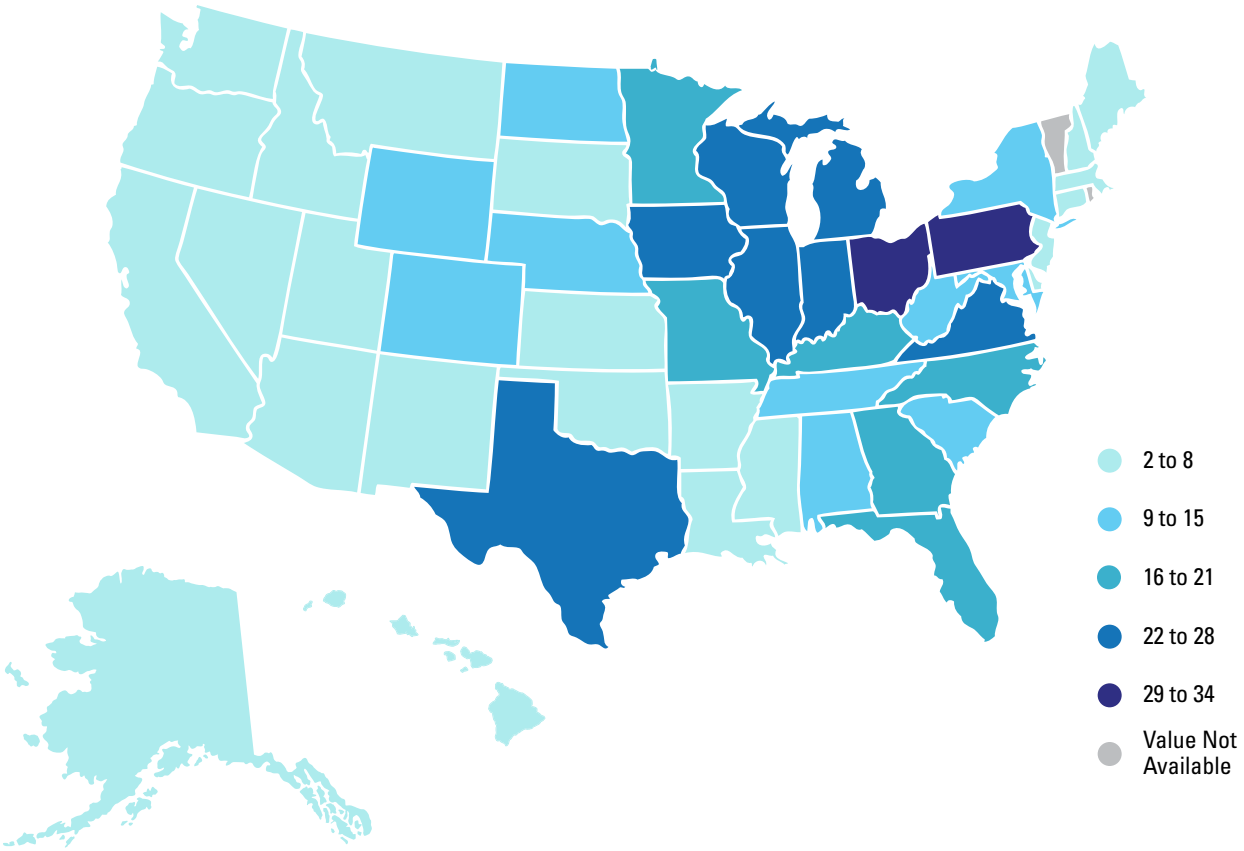
Despite the Trump administration's pro-coal stance, electricity generated by coal continued to decline in 2017. Electricity generated from natural gas also declined. The corresponding decline in natural gas is significant because climate change advocates and scientists are concerned about the replacement of coal with another fossil fuel.



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

Figure 29: *U.S. Net Generation of Electricity from Coal and Natural Gas in Megawatt Hours*

One of the other data points we are tracking related to emissions of CO_2 is the number of coal-fired power plants retired. In 2017, there were 564 coal-fired power plants in the U.S., and 5.5 gigawatts of coal-fired power generation were retired. Since President Trump took office, 20 coal plant closures were announced, and more than double the amount of coal-fired generation that was retired in 2017 is scheduled to come offline in 2018. Figure 30, on the following page, illustrates the number of power plants in the U.S.

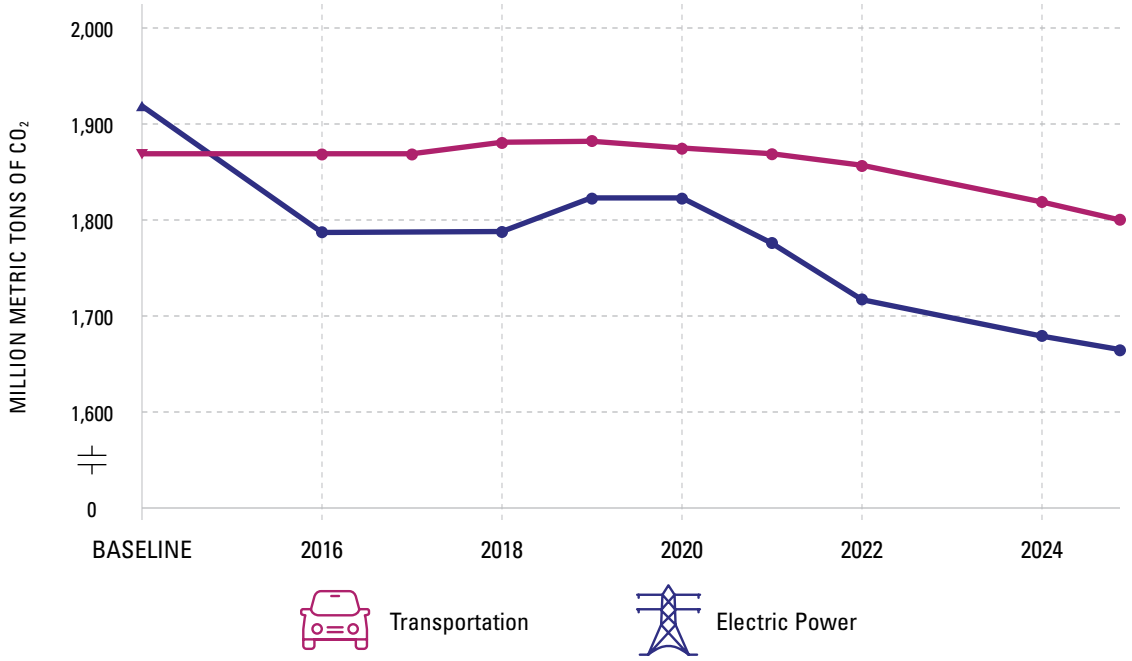


Source: *U.S. Energy Information Administration, www.eia.gov*

Figure 30: *Number of Power Plants in the U.S. by State (564 Plants Total)*

In October 2017, Vistra Energy and its subsidiary, Luminant Energy, announced the closure of three coal-fired power plants in Texas, totaling 4,000 megawatts of generating capacity. In addition, in November 2017, Louisville Gas and Electric Company and Kentucky Utilities Company announced the shutdown of two coal-fired units in Kentucky. These closures marked a major milestone. Since 2010, there have been 266 coal plant retirements or announced retirements.

Although coal-related developments in 2017 were mostly positive, reductions in CO_2 emissions from electricity generation may not be enough to achieve the Foundation's desired long-term impacts.[29] In 2016 (data for 2017 is not yet available), carbon emissions from electricity generation fell below emissions from transportation. That trend is predicted to continue, highlighting the importance of the Foundation undertaking its approaches in concert with other climate change actors targeting emissions from transportation.[30]



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

Figure 31: *U.S. Carbon Dioxide Emissions Projections from Transportation and Electricity Generation in Million Metric Tons of CO_2*

Deployment of Renewable Energy

5. Electricity generated by renewable energy reached historic levels in the U.S. in 2017.

The U.S. Energy Information Administration estimated that half of the new, utility-scale, generating capacity added will be from renewables. The Administration has not released numbers for the fourth quarter of 2017 nor aggregate numbers for the year. Based on data available through the third quarter of 2017, 19.85% of U.S. electricity generation capacity came from renewable sources, a 4.91% increase from 14.94% in 2016.

[29] "Power sector carbon dioxide emissions fall below transportation sector emissions." Monthly Energy Review. U.S. Energy Information Administration. December 19, 2017. https://www.eia.gov/todayinenergy/detail.php?id=34192#

[30] At the time of writing, reducing emissions from the transportation sector was not a primary focus for the Foundation. However, there are a few grantees that indicated that transportation is one of many sources of emissions they have, or will, undertake efforts to address. In addition, the Foundation continues to coordinate with other funders (e.g., Bloomberg Philanthropies, the Hewlett Foundation, the Heising-Simons Foundation, the Sea Change Foundation, and more) that support organizations working to reduce emissions from sources that include transportation.

As federal-level commitment to renewable energy waned in 2017, states continued to forge ahead. California is on pace to achieve its 2030 target in 2020. If the current pace continues, 50% of California's power will come from renewables by 2020. Additionally, by the end of 2017, 29 states, Washington, D.C., and three territories had adopted renewable portfolio standards. Eight states and one territory have set renewable energy goals. Significant developments included: increased renewable energy portfolio targets adopted in Maryland, Michigan, New York, Oregon, Rhode Island, and Washington, D.C.; requirements for new wind and solar projects and other major reforms to the renewable portfolio standards procurement process in Illinois; and a new offshore wind carve-out and solar procurement program in Massachusetts.

Building Political Will: Policymaker Discourse

6. Discourse among candidates and policymakers on climate change continues to increase and is favorable, but overall volume remains low.

To measure progress and assess the contribution of the Foundation's activities to build political will, Grassroots Solutions and M+R, with assistance from Protagonist, are tracking changes in candidate and policymaker discourse. Since baselines were established in 2012 and 2013, climate change discourse among candidates and policymakers has grown, and progress is being made. At the same time, despite heading in a positive direction, the overall volume of candidate and policymaker discourse dedicated to climate change remains small. In 2017, policymaker discourse on climate averaged 1.01%.[31]

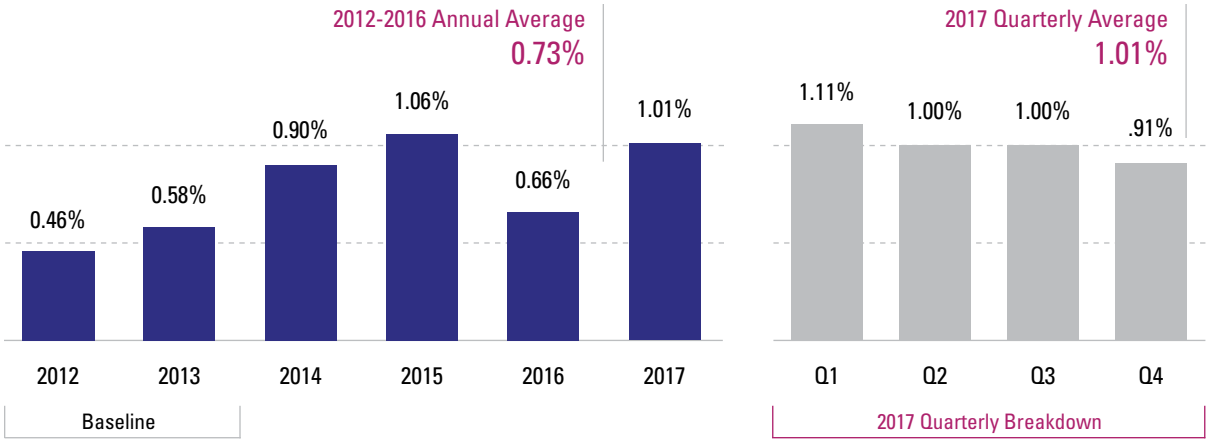


Figure 32: *Percentage of Total Candidate and Policymaker Discourse on Climate Change*

[31] Sources: Protagonist Narrative Analytics Analysis Session Presentation; Tracking Updates for April 1, 2017 – June 30, 2017; Tracking Updates for July 1, 2017 – September 30, 2017; and Tracking Updates for October 1, 2017 – December 31, 2017.

By way of comparison, other narrative analyses conducted by Protagonist in 2017 showed that issues such as healthcare and immigration accounted for approximately 4% and 2% of the policymaker discourse, respectively. Events such as Scott's Pruitt's nomination to lead the Environmental Protection Agency, weather events, and the Trump administration's decision to withdraw from the Paris Accord produced short-term spikes. However, none of these events appeared to drive lasting changes.

	NARRATIVE TITLE	ABRIDGED NARRATIVE
Favorable	Defining Challenge of Our Time	We cannot afford to wait; the science is settled, and we must take urgent action to shift from the dangerous path we are on.
Favorable	Not Just an Environmental Issue	Climate Change will impact every aspect of our society from our economy, to our health, to national security.
Favorable	Dirty Energy, Dirty Politics	Big Energy is actively promoting and profiting from climate denial at a great cost to our planet and future.
Favorable	Clean Energy Revolution	Clean energy spells jobs, innovation, and prosperity for all—what are we waiting for?
Favorable	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.
Favorable	States/Cities Must Lead	Our ability to fight Climate Change depends on states and communities far beyond the beltway.
Favorable	Biodiversity in Peril	We must protect our planet and its amazing animals who are the biggest victims of humanity's effects on the environment.
Unfavorable	So-Called Science	There is no scientific consensus that Climate Change is real, harmful, or caused by human activity.
Unfavorable	Green Conspiracy	Climate Change is a hoax, perpetrated on the American people by corrupt politicians, bent scientists, and special interests.
Unfavorable	Regulatory Red Tape	Regulations in the name of Climate Change are destroying jobs and hampering American competitiveness.
Unfavorable	Energy First	Fossil fuels are not the enemy; we need pragmatism not alarmism to solve the energy and environmental challenges we face.

Figure 33: *U.S. Climate Change Narrative Landscape*

Between 2012 and 2015, unfavorable commentary on climate (e.g., voicing opposition to policies such as the Clean Power Plan) comprised approximately half of the commentary among candidates and policymakers. In 2016, that changed, and unfavorable policymaker discourse sharply decreased. In 2017, favorable commentary comprised more than 70% of the candidate and policymaker discourse; it was highest in the first quarter (78%) and lowest in the second quarter (73%).[32] From 2016 through the first quarter of 2017, three favorable narratives—"Dirty Energy,

[32] Sources: Protagonist Narrative Analytics Analysis Session Presentation; Tracking Updates for April 1, 2017 – June 30, 2017; Tracking Updates for July 1, 2017 – September 30, 2017; and Tracking Updates for October 1, 2017 – December 31, 2017.

Dirty Politics," "Defining Challenge of Our Time," and "Clean Energy Revolution"—featured most prominently in the candidate and policymaker discourse. During that period, candidates and policymakers led the public in commenting on renewable energy and tying climate change to public health, national security, and economic competitiveness. This appears consistent with the Foundation's commitment to messaging climate through different frames.

Since 2016, outright denial of climate change and disputes over the climate science have been infrequent. The "So-Called Science" and "Green Conspiracy" narratives have comprised less than 10% of candidate and policymaker discourse. The decrease in science skepticism expressed in the policymaker discourse correlates with grantees' efforts to raise the political cost of science denial. Since 2014, the Foundation's discourse-focused grantees have been mentioned explicitly by policymakers and candidates calling out opponents who dispute scientific evidence. This aligns with the Foundation's position that the science is settled.

Building Political Will: Normalization of Solutions-Oriented Media Coverage

7. Although favorable, the public discourse on climate does not demonstrate a focus on solutions or clear call to action.

Another data point that we are tracking to measure progress and assess the contribution of the Foundation's activities to build political will is the normalization of solutions-oriented media coverage. One assumption that underpins the Foundation's U.S. theory of change is that climate messages must convey the problem and the solution. Since baselines were established, the amount of public discourse on climate change devoted to solutions has remained relatively flat. From 2012 to 2016, the percentage of public discourse devoted to solutions averaged 15.63%. In 2017, the quarterly average was 12.59%. There was a spike in the second quarter of 2017, but that was followed by a precipitous drop in the third quarter and a modest rebound in the fourth quarter.[33]

Favorable narratives comprise most of the public discourse on climate, but not all favorable narratives consistently invoke solutions. Furthermore, the Foundation and its grantees are mostly connected to favorable but non-solutions-focused narratives in that discourse. From 2016 through the first quarter of 2017, the Foundation's and grantees' presence in the public discourse devoted to climate change was approximately 5%. During that same period, mentions of the Foundation and its grantees aligned with favorable narratives 73% of the time. For example, the Foundation's grantees have a sizable footprint in the "Wake Up to the Weather" narrative. Although favorable, it is one of the least solutions-focused narratives. Between the second and third quarter of 2017, "Wake up to the Weather's" share of the overall public discourse increased from 5% to 15%, and then dropped to 8% in the fourth quarter. The increase in the third quarter was driven by reporting on hurricanes, especially recovery efforts in Houston; however, coverage was not focused on solutions. From 2016 through the first quarter of 2017, the Foundation's presence in the public discourse was primarily associated with the "Defining Challenge of Our Time" narrative (.27%). Only three narratives—"Dirty Energy, Dirty Politics," "Clean Energy Revolution," and "States and Cities Must Lead"—include mentions of solutions more than 50% of the time.

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[33] Identified in collaboration with the Foundation, the full list of solutions examined by Protagonist included: carbon pricing (carbon tax, cap on emissions, emissions trading); carbon capture/sinking/sequestration; reduced coal use/coal plant closures, overall reductions of CO_2 levels, elimination of fossil fuel subsidies, cutting emissions of short-lived climate pollutants, preventing growth in methane emissions from agriculture, the Clean Power Plan, the Paris Accord, energy efficiency, enhanced water and air quality standards, more efficient industrial regulations, renewable energy/clean energy, enforcement, and funding efforts to reduce emissions from deforestation and degradation.

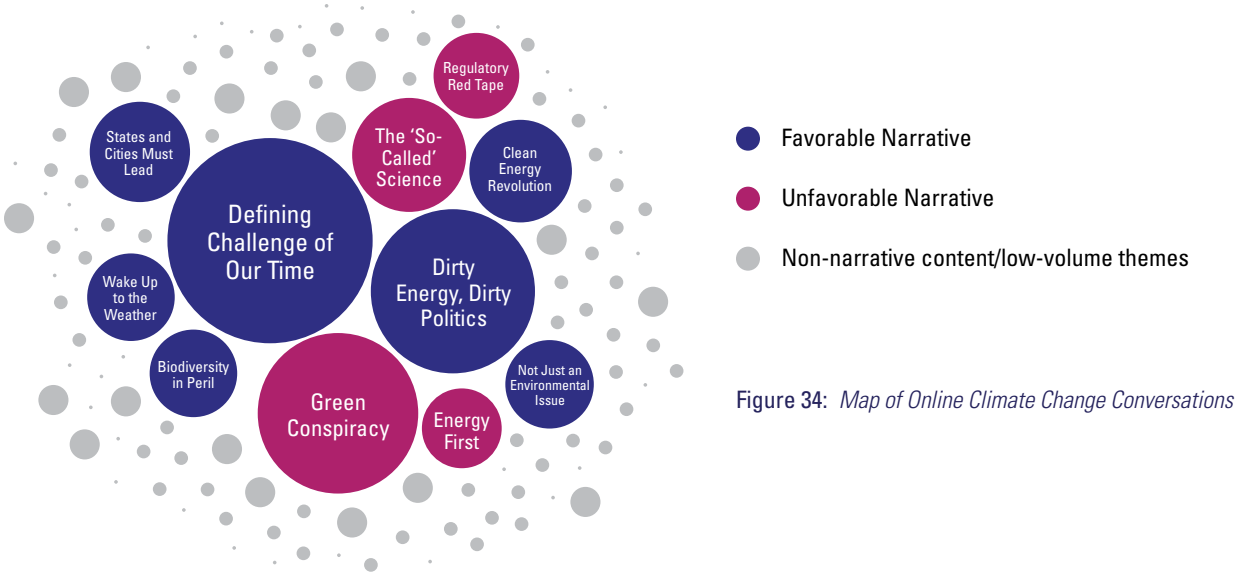


Figure 34: *Map of Online Climate Change Conversations*

Reduced coal use and renewable energy are the two most talked about solutions in the public discourse, and there is strong alignment between those solutions and the grantees' messaging. What we are learning about the public discourse with the help of Protagonist is consistent with public polling done by Gallup and the Yale Program on Climate Change Communication in the spring and fall of 2017 which found that more than two-thirds of Americans support increased use of renewable energy over carbon-based energy (i.e., coal, oil, and natural gas).[34]

Although there is alignment between the solutions most prominent in the grantees' messaging and prominent solutions in the public discourse, it is a crowded conversation. There is not narrative cohesion. Of the 11 climate narratives, seven are favorable and contain a variety of solutions that each account for less than 1% of the public discourse on climate change, including reducing fossil fuel subsidies and carbon capture. Additionally, it is worth noting that unfavorable narratives calling climate science into question—"The So-Called Science" and "Green Conspiracy"—continue to account for a significant percentage of the total public conversation (25% from 2016 through the first quarter of 2017 and approximately 13% in the second and third quarters of 2017). This matters because, even though overall public discourse (which includes policymakers) has become more favorable, science skepticism is still pervasive. It can be inferred from the low volume of solutions in the overall public discourse that conversation about whether climate change is happening, and its cause, continues to present an obstacle to promoting more solutions.

Building Political Will: Base of Advocates for Climate Solutions

8. The base of advocates for climate solutions is growing, but it lacks diversity.

A third data point that Grassroots Solutions and M+R are tracking to measure progress and assess the contribution of the Foundation's activities to build political will is the change in the base of advocates for climate solutions. Since baselines were established in 2012 and 2013, the number of online contributors to the climate change conversation

[34] Sources: Gallup March 1 – 5, 2017 phone survey. http://news.gallup.com/poll/206159/. Yale Program on Climate Change Communications' October 20 – November 1, 2017 web-based survey. http://climatecommunication.yale.edu/publications/politics-global-warming-october-2017/7/

has grown substantially (up more than 40%). From 2012 through 2016, 186,078 unique contributors participated in climate change conversations each month.[35] In 2017, the quarterly average was 256,015. Increasing engagement with favorable narratives is indicative of overall growth in the advocacy base. Contributors commenting favorably about climate change and solutions grew much faster than contributors commenting unfavorably (66% as opposed to 17%). Favorable contributions jumped up in 2014 during the midterm election and in 2015 around the Paris Accord.

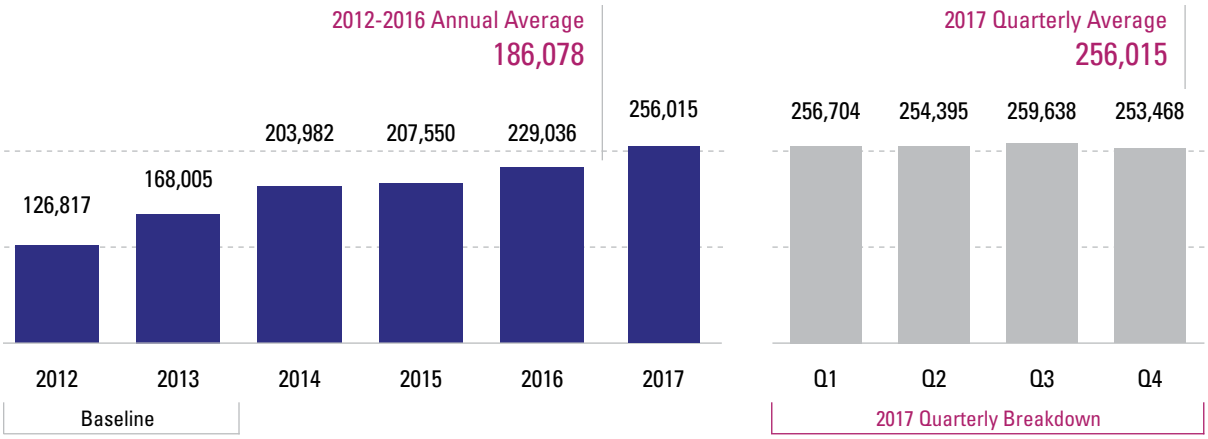


Figure 35: *Average Unique Contributors to Climate Change Conversation Per Month*

At the same time, although the base of advocates is larger, it continues to lack diversity. Favorable climate change discourse is concentrated around five media outlets, and advocates are engaging primarily within center left-leaning publications and forums. Additionally, in 2017, the geographic distribution of mentions of the Foundation's discourse-focused grantees remained highest in the Northeast and on the West Coast. These are regions where policymakers and media are likely to ask grantees to go on the record as experts, and the volume of mentions tracks with locations where the major environmental groups have large memberships. At the same time, the concentration of the grantees' footprint points to a potential challenge of "preaching to the choir," as opposed to broadening the base of advocates.

It is worth noting that discourse on climate change shows signs of increasing polarization. There is a growing gap between those on the left and right of the political spectrum, which poses obvious challenges to broadening the base. Research conducted by Gallup and the Yale Program on Climate Change Communication show partisan divisions.[36] For example, in Gallup's 2017 polling on environment and climate change they found that 41% of Republicans and 73% of Democrats believe that the effects of climate change have already begun. The partisan split is larger when asked about belief in the human cause of climate change. Only 40% of Republicans believe that climate change is due to human activity as opposed to 87% of Democrats. Lastly, only 18% of Republicans compared to 58% of

[35] 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 than 200,000 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.

[36] Source: Americans views on the environment, global warming and energy. Gallup. March 2018. http://news.gallup.com/poll/231530/global-warming-concern-steady-despite-partisan-shifts.aspx?g_source=link_NEWSV9&g_medium=tile_1&g_campaign=item_231971&g_content=Global%2520Warming%2520Concern%2520Steady%2520Despite%2520Some%2520Partisan%2520Shifts

Democrats believe global warming will pose a serious risk in their lifetime. These recent figures suggest a lack of urgency to address climate change and provide a sense of how likely the American public may be engage on the issue, including pressuring policymakers to act.

Findings: India

Capacity to Engage With and Affect the Government's Climate Policies

9. Since baselines were established in 2015, opportunities for civil society organizations to partner with the Government of India have narrowed somewhat, and there has been no immediate change in the capacity or influence of the sector.

Indications that progress is being made toward the Foundation's desired outcome of increasing civil society organizations' capacity to engage with and affect the government's 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.

By 2017, the Government of India had established climate policies and ambitious goals, particularly around renewable energy. According to the key informants interviewed, the Government was most interested in receiving practical support from civil society organizations to help implement its plans, and it looked to industry and the private sector for technical expertise. Although civil society organizations are not overwhelmingly viewed as partners, neither are they viewed by the Government as critics.

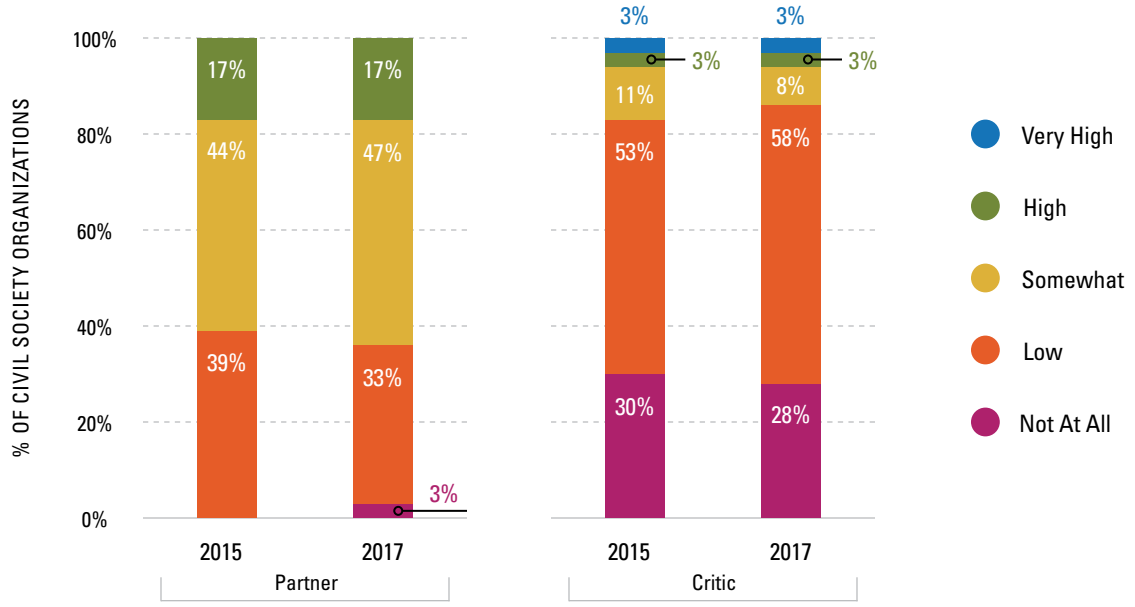


Figure 36: *Percentage of Civil Society Organizations in India Perceived as Partners or Critics by Key Informants*

Additionally, since baselines were established in 2015, the number of "major" organizations identified as active on national climate policy in India did not change significantly nor did perception of their role or influence. Approximately 36 organizations were identified by key informants, and the proportion working on climate change and policy are illustrated in the Figure below.

	2015	2017
RANK	% of Civil Society Organizations	
Proportion of Civil Society Organizations Working on Climate Change or Renewable Energy		
Very High	0%	0%
High	33%	39% ↑
Medium	53%	44% ↓
Low	14%	17% ↑
Very Low	0%	0%
Proportion of Civil Society Organizations Working on Climate Change or Renewable Energy that is Policy-Focused		
Very High	0%	0%
High	28%	33% ↑
Medium	56%	53% ↓
Low	17%	14% ↓
Very Low	0%	0%

Figure 37: *How "Major" Civil Society Organizations Were Rated by Key Informants*

Political Will to Advance Climate Solutions

10. The Government of India's political priorities did not change significantly in 2017. Addressing climate change remains a priority, and the Government is focused on delivering on its promises.

Since baselines were established in 2015, the Government of India has been an active participant in international climate negotiations. As a demonstration of its climate change mitigation commitment, the Government created the International Solar Alliance. In 2017, it was fundraising to make it operational. The type and number of announcements by the Indian Government is indicated on the following page.

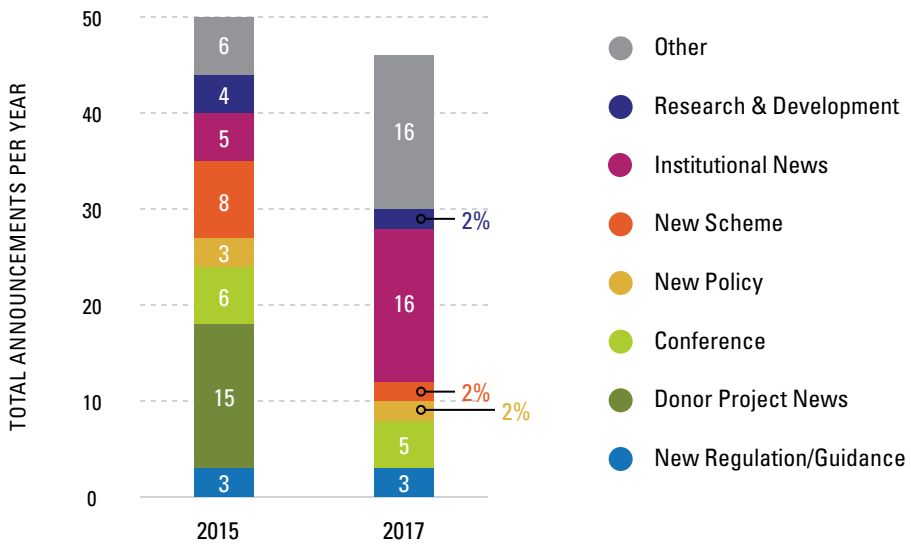


Figure 38: *Type and Number of Announcements by the Government of India*

Another data point Grassroots Solutions and M+R are tracking to measure progress in building political will are statements and policies related to climate change and solutions made by central and state governments. Comparing 2015 and 2017, the number of announcements and policies made by the Government of India was similar (approximately 50 as opposed to 47). In 2017, the most significant announcements were:

- The launch of the new Energy Conservation Building Code
- New national program to distribute solar power battery banks to unelectrified households
- Cabinet ratification of the Paris Accord
- National Bank for Agriculture and Rural Development accredited for direct access under Green Climate Fund
- New guidelines for tariff-based competitive bidding for solar power

Unsurprisingly, there was a decrease in the number of new schemes announced, as the Government's focus shifted to implementation of the major policies and announcements it had made in 2015.

Although the sustained number of announcements suggest that the Government of India's commitment to addressing climate change remains high, key informants signaled that there is growing skepticism about the Government's follow through. Some programs that launched in 2015 have not produced results, and others have been delayed significantly. For example, the REINVEST conference of renewable energy investors, announced in 2015, was postponed twice. As of 2017, it had not been rescheduled, and it was unclear when it would take place.

Renewable Energy Production

11. The state of the renewable energy sector is increasingly strong and poised for continued growth; however, financing and other barriers inhibit the expansion necessary to meet the Government of India's targets.

Between 2015 and the end of 2017, renewable energy continued to expand, following a positive 10-year trend. As of 2017, renewables—solar, wind, biomass, and "small-hydro"—contributed more than 18% of India's total installed capacity compared to 14% in 2015. In 2017, solar and wind power increased dramatically. Grid-connected installed capacity jumped to 62 gigawatts (from 38 gigawatts in 2015), and off-grid renewables accounted for 1,555 megawatts of installed capacity.[37]

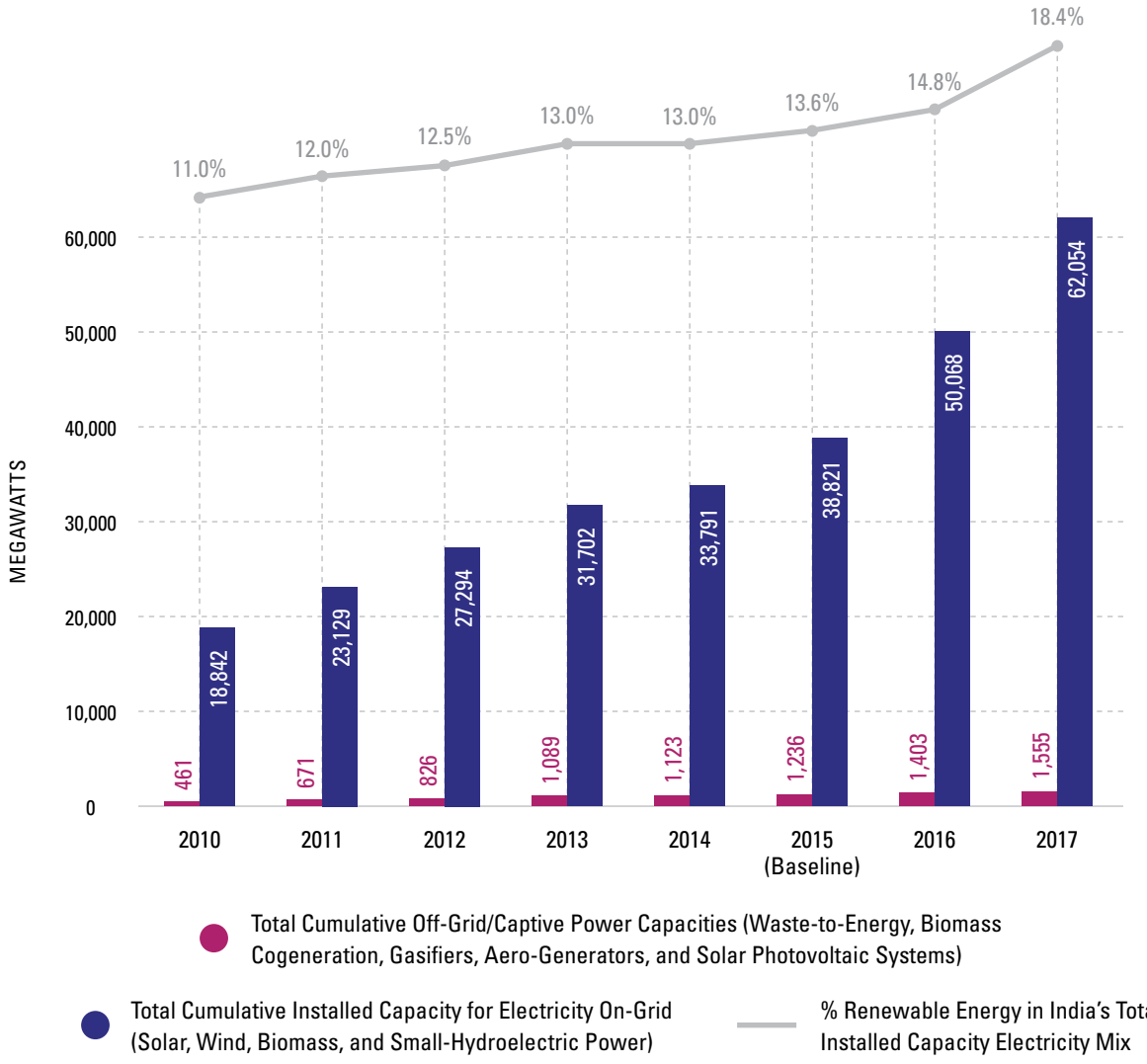


Figure 39: *India's Total Renewable Energy Installed Capacity in Megawatts and Percentage*

[37] These are provisional figures from an end of year Government of India press release. The final figures for 2017 and 2018 will be confirmed in the Ministry of New and Renewable Energy's Annual Report released in the spring of 2018.

Through 2017, wind energy still dominated the proportion of grid-connected installed renewable energy capacity, but its proportion dropped from 64% in 2015 to 53% in 2017. Grid-connected solar grew around 85% annually since baselines were established in 2015. In contrast, wind grew 14% each year.

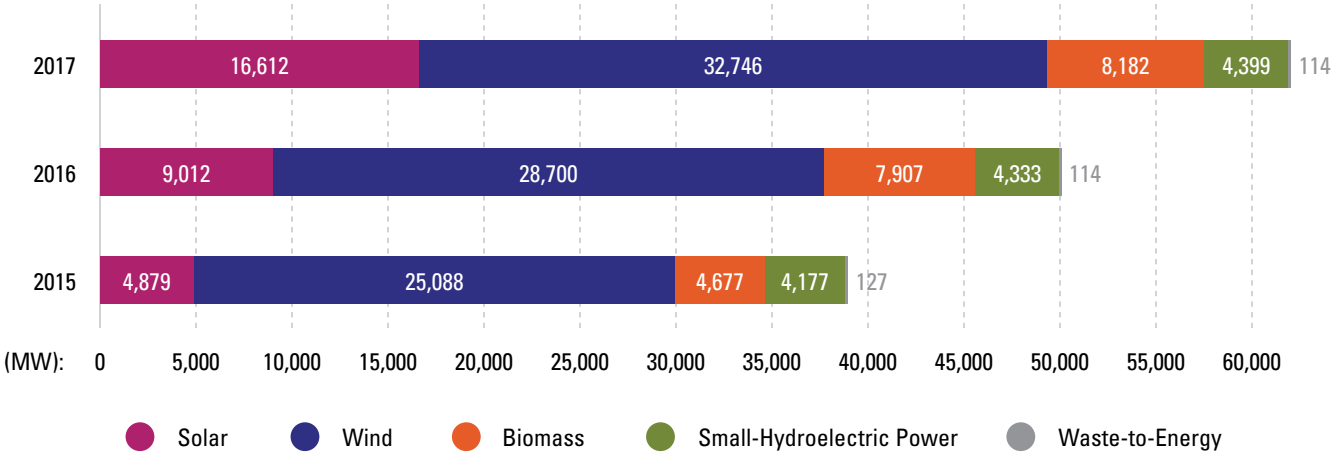


Figure 40: *Installed Grid-Connected Renewable Energy Capacity in Megawatts*

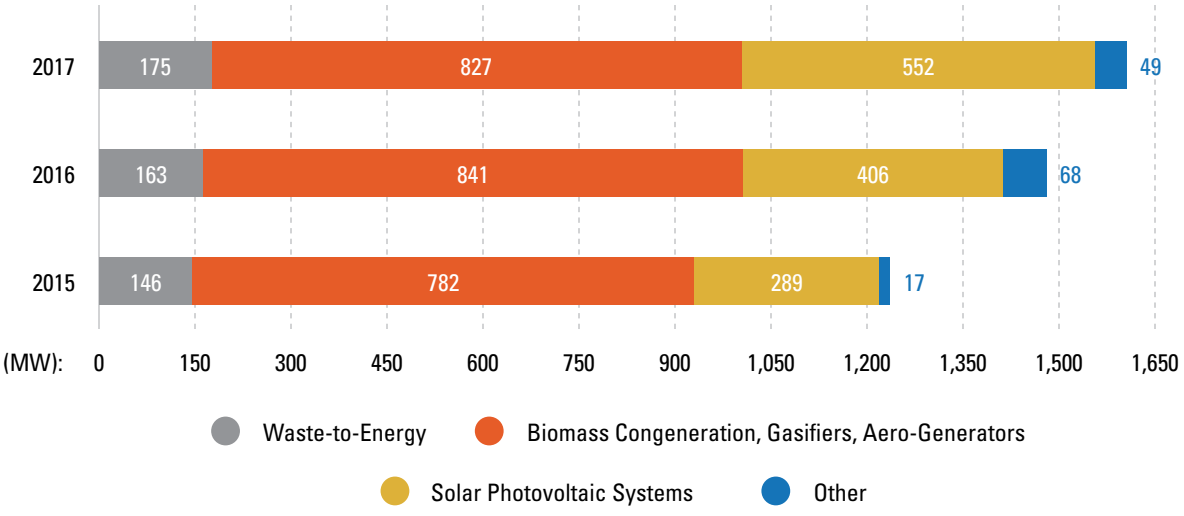


Figure 41: *Installed Off-Grid Renewable Energy Capacity in Megawatts*

Although the continued and accelerated expansion of renewable energy since 2015 is impressive, the growth rate fell short of the targets set to meet India's energy demands and flatten the trajectory of its greenhouse gas emissions. By 2017, the Government of India was increasingly skeptical that it would be able to meet its targets for off-grid renewable energy. Barriers to even higher rates of renewable energy production remained relatively consistent between 2015 and 2017; chief among them was financing. For example, in 2017, the Government of India diverted unspent funds from the National Clean Energy Fund to help companies comply with the General Services Tax.

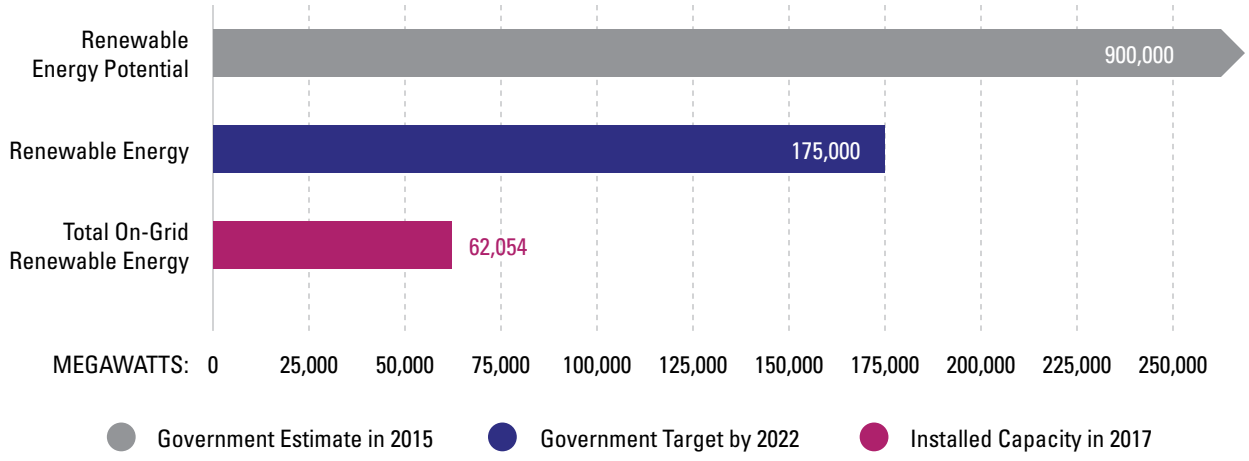


Figure 42: *Comparison of Installed Capacity in 2017 with the Government of India's Target by 2022 and Estimate in 2015 in Megawatts*

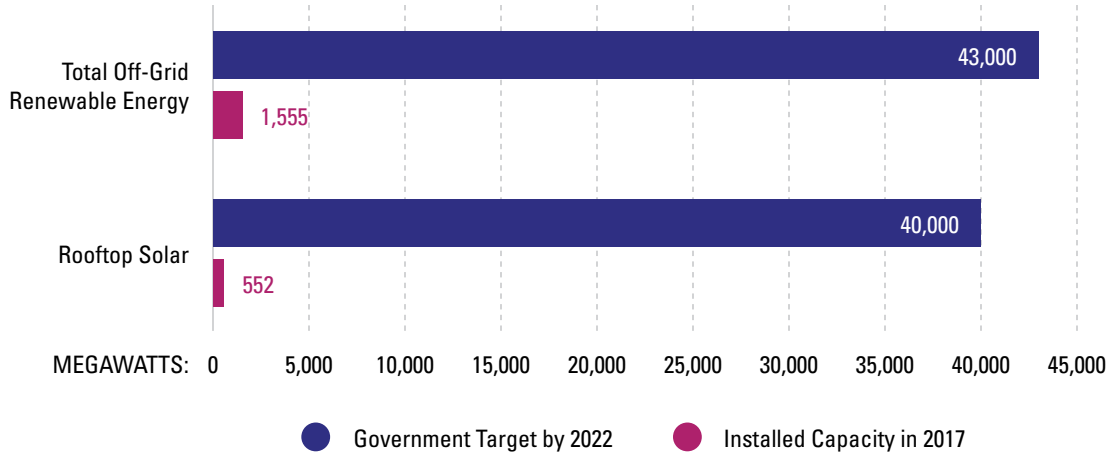


Figure 43: *Comparison of Installed Capacity in 2017 with the Government of India's 2022 Targets in Megawatts*

5 | Conclusion

As noted earlier, the pathway to ensuring that global temperature rise stays well below 2 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 whether progress is occurring that demonstrates climate leadership and the relevance of the Foundation's theory of change. To conclude, what follows is Grassroots Solutions' and M+R's interpretation of the implications for the Foundation, its grantees, and other collaborators in the field to consider.

Implications for the Foundation's Theory of Change

Based on our analysis of the data points tracked through 2017, most aspects of the Foundation's approaches and its theory of change still appear sound and relevant. The data examined affirms a continued focus on promoting leadership in the U.S., India, and China to achieve the Foundation's desired long-term impacts. The three countries remain the largest emitters and their actions carry weight far beyond their borders.

At the same time, the U.S. abdicated—at least temporarily—its international role on climate by withdrawing from the Paris Accord, calling into question U.S. leadership. U.S. domestic policies advanced by the Trump administration have also created uncertainty about the country's ability to meet its own emissions reduction targets. So far, the Foundation has responded to these challenges by funding defensive efforts to enforce domestic environmental protection laws and by strengthening its support for proactive subnational activities. While action at the federal level will ultimately be necessary to advance climate solutions at scale, there are some indications that the U.S. can continue to make progress in its efforts to reduce emissions and transition to a cleaner economy through the actions of subnational players (regions, states, counties, and cities) and through the private sector.

Although some other trends are headed in the right direction, the pace of changes—particularly around political discourse in the U.S.—do not match the Foundation's stated ambitions, the magnitude of the challenge, or the hoped-for progress toward the outcomes the Foundation has identified to demonstrate leadership. The most striking example is that overall discourse in the U.S. among candidates and policymakers on climate change is low. U.S. public discourse on climate is not solutions-focused, and there is limited evidence to suggest that authoritative messengers are connecting climate change to public health, national security, and economic competitiveness in a widespread way. This raises questions about a key characteristic of the Foundation's approach: 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—for example, through climate-friendly energy policies and regulatory action. Recent polling conducted by the Yale Program on Climate Change Communication and Gallup affirm that changing contextual factors may inhibit the Foundation's efforts to advance its theory of change and alter discourse. These factors include an increasingly polarized political environment and that climate change is still not seen as a priority by the American public.

Since baselines were established, the Government of India has been an active participant in international climate negotiations and has established ambitious goals. It is committed to making the International Solar Alliance a success. The Alliance is the first treaty-based, multilateral organization based in India, and it is a demonstration of India's growing leadership on climate change in the world. Also, the central government has been focused on delivering on its goals under the Paris Accord, particularly with regards to the expansion of renewable energy. Although the Government made fewer new policy announcements in 2017, the data analyzed suggest an increased focus at the central and state levels on implementation of existing policies to meet the country's targets. In addition, from 2016 to 2017, for the first time, the net capacity of renewable energy added was higher than energy added from conventional sources. More energy was generated from wind and solar power than ever before.

Despite these promising developments, there are significant barriers to India achieving a 40% share of renewables in the electricity mix by 2030. The financial health of the distribution sector continues to inhibit the expansion of renewables, and there are signs that, due to institutional and technical challenges, the central government is shifting attention away from decentralized renewable energy. Moreover, there is no coherent national vision around clean technology. Instead, in 2017, the Government of India focused on implementing a variety of schemes focused on end use efficiency. There was a slow and steady increase in the implementation of those schemes—several states adopted energy building codes, there was an expansion of labeling schemes, and phase two of the market-based 'Perform, Achieve, Trade' energy efficiency scheme began. The Government also made several statements about electric vehicles, but without any policy or funding announcements.

Other factors that could help or hinder the advancement of the Foundation's theory of change over the next year include the 2018 U.S. elections and the 2019 Indian elections, especially the Foundation's efforts to advance climate-friendly policies in each country. It is worth noting that U.S. withdrawal from the Paris Accord has created an opening for countries, such as India and China, to step forward as global leaders on climate change. It is still early to see what role India will play in helping to fill the global leadership vacuum left by the U.S. and reduce greenhouse gas emissions, while also achieving development goals. With federal elections occurring in early 2019, there is speculation that the Government of India may be more focused on its primary domestic agenda of improving the economic condition for Indians with less attention on climate goals. China has aggressively stepped forward to fill the void left by the U.S. on the international stage pledging to "take a driving seat in international cooperation to respond to climate change."

Grassroots Solutions and M+R, with support from our collaborators in the U.S. and India, will continue to monitor what happens, as well as the effects of these elections on domestic and international policies. And we will continue to examine the long-term global impact on the international community's ability to stay below the 2 degrees Celsius goal.

Appendix A: Baselines and Data Points Tracked

Associated with the impacts and outcomes are a variety of data points that we are tracking and analyzing to assess progress toward the Foundation's desired impacts and outcomes and how the approaches undertaken are contributing to promoting leadership and climate solutions. So far, we have established baselines for the U.S. (2012) and India (2015).

Following is a list of baseline data and changes in the data points tracked for the overall Climate Solutions initiative, the U.S., and India.

Impacts

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 CO_2 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
Change in Global Surface Temperature (relative to 1951-1980 average)	0.63	0.65	0.74	0.87	0.99
Atmospheric CO_2 Levels	395.09	397.62	399.62	402.56	405.6
Change in Sea Level	70.6	69.1	75.7	85.6	86.1

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

- 1.B.1 CO_2 emissions (in million metric tonnes)

	2012	2013	2014	2015	2016
World Emissions	35,470.89	35,837.59	36,138.29	-	-
U.S. Emissions	5,119.44	5,159.16	5,254.28	-	-
India Emissions	2,018.50	2,034.75	2,238.38	-	-
China Emissions	10,028.57	10,258.01	10,291.93	-	-

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

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
U.S.	$40.6	$35.3	$37.0	$44.1	-
India	$7.8	$6.6	$8.3	$10.2	-
China	$61.7	$62.0	$87.8	$102.9	-
Global	$257.3	$234.0	$273.0	$285.9	-

Source: *http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf*

- 2.A.2 Carbon intensity per Gross Domestic Product for G20 member nations

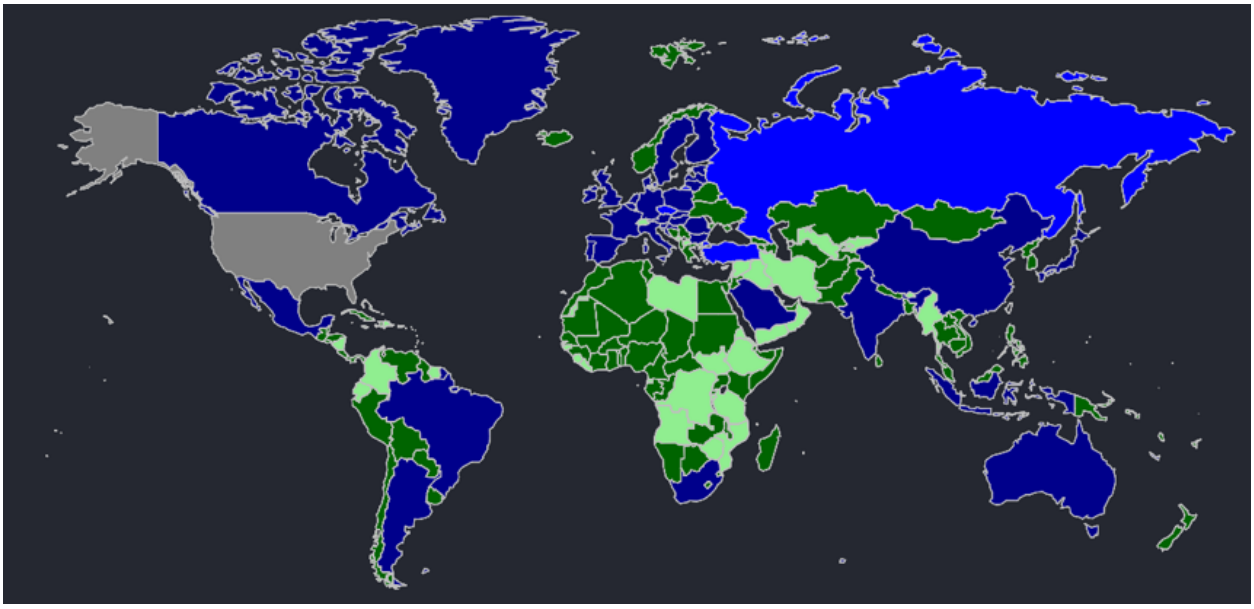
	2012	2013	2014	2015	2016
Argentina	$75.97	$76.23	$75.38	-	-
Australia	$62.09	$59.29	$57.12	-	-
Brazil	$53.35	$54.92	$57.02	-	-
Canada	$55.57	$55.31	$54.54	-	-
China	$221.91	$214.48	$201.12	-	-
France	$19.28	$19.38	$17.68	-	-
Germany	$61.98	$63.12	$58.90	-	-
India	$164.34	$161.28	$162.91	-	-
Indonesia	$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	-	-
South Africa	$187.06	$183.35	$180.27	-	-
South Korea	$70.65	$69.66	$68.77	-	-

	2012	2013	2014	2015	2016
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: *http://www.tsp-data-portal.org/Carbon-Intensity-of-GDP#tspQvChart*

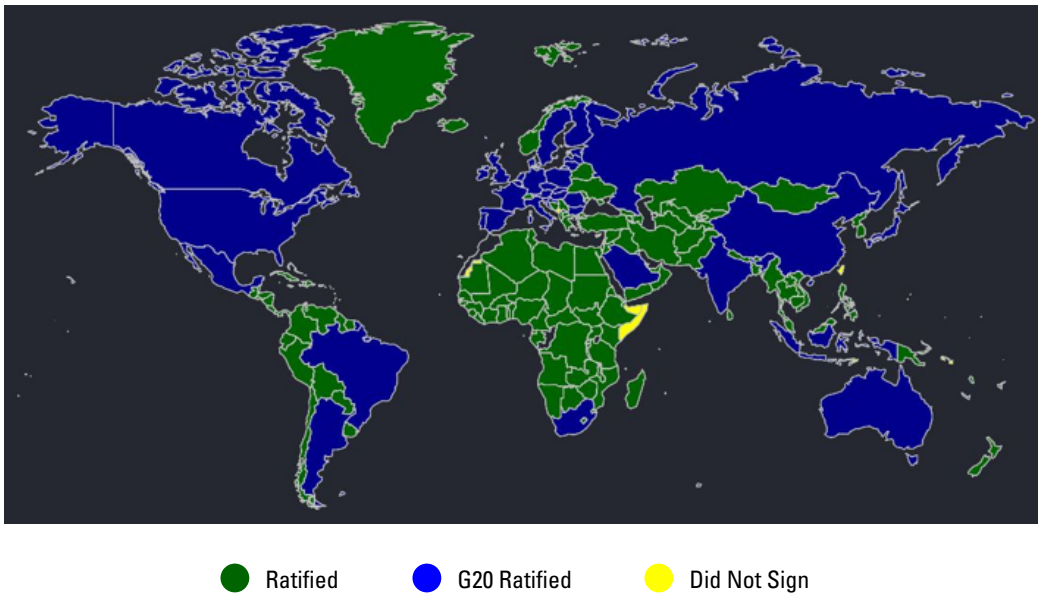
POLICIES/TREATIES: Broadened and deepened participation globally in climate solutions

- 3.A.1 Paris Climate Accord



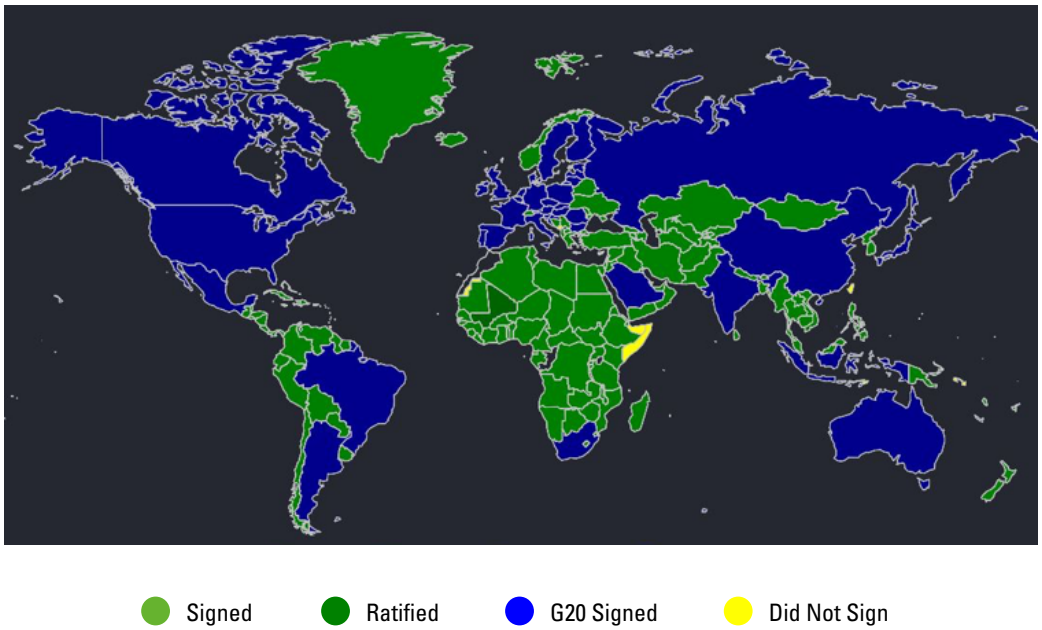
Source: *United Nations Framework Convention on Climate Change, https://unfccc.int/process/the-paris-agreement/status-of-ratification*

- 3.A.2 Montreal Protocol



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

- 3.A.3 Kigali Amendment



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

U.S.

EMISSIONS: Reduced emissions of greenhouse gas pollutants and CO_2

- 1.a.1.1 U.S. Greenhouse gas emissions by gas (in mmtCO_2e)

	2012	2013	2014	2015	2016	2017
Carbon Dioxide	5,362.1	5,514.02	5,565.5	5,411.41	5,330.27	-
Methane	666.07	658.77	659.14	655.72	633.44	-
Nitrous Oxide	340.73	335.53	335.48	334.81	328.39	-
Fluorinated Gases	169.39	171.74	179.57	184.71	177.06	-

Source: *U.S. Environmental Protection Agency, www.epa.gov*

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

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

Source: *U.S. Energy Information Administration*

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

	2012	2013	2014	2015	2016	2017
Coal-fired Megawatts Retired (based on net summer capacity)	10,308.0	6,291.0	4,489.7	14,802.2	7,197.3	11,110.80
Electricity Generated by Coal	1,514,043	1,581,115	1,581,710	1,352,398	1,239,149	1,207,901

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

- 1.a.1.4 CO_2 emissions (kilograms per 2010 U.S. dollars of Gross Domestic Product)

	2012	2013	2014	2015	2016	2017
CO_2 Emissions	0.329	0.326	0.324	-	-	-

Source: *Worldbank, https://data.worldbank.org/indicator/EN.ATM.CO2E.KD.GD?locations=US*

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
Percent of Candidate/ Policymaker Discourse on Climate Change	0.46%	0.58%	0.90%	1.06%	0.66%	0.97
Favorable Discourse	46%	40%	41%	38%	66%	73%
Unfavorable Discourse	54%	60%	59%	62%	34%	27%
Percent of Public Media Conversation on Climate Change Devoted to Solutions	18%	13%	12%	18%	16%	13%

Source: *Protagonist*

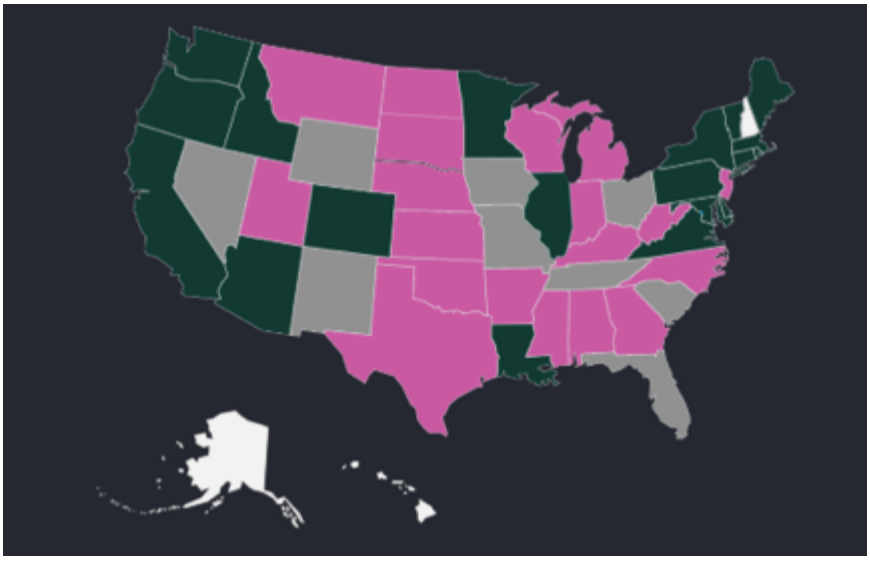
- 2.c U.S. Federal votes on energy and climate bills

	2012	2013	2014	2015	2016	2017
Votes **Protecting** Clean Energy/Climate (Senate)	6	3	1	3	2	-
Votes **Harming** Clean Energy/Climate (Senate)	1	1	2	10	3	-
Votes **Protecting** Clean Energy/Climate (House)	1	2	0	1	7	-
Votes **Harming** Clean Energy/Climate (House)	16	12	18	12	10	-

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

POLICIES/TREATIES: Enforced environmental laws

- 3.b.1 Status of Clean Power Plan (CPP), 2016

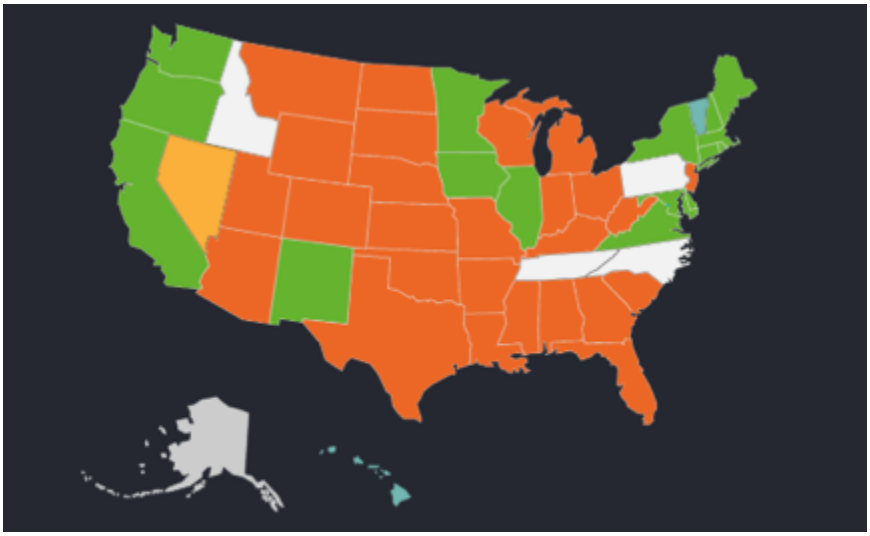


19 States: Suspending CPP Implementation

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*

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
Coal	1,514,043	1,581,115	1,581,710	1,352,398	1,239,149	1,207,901
Natural Gas	1,225,894	1,124,836	1,126,609	1,333,482	1,378,307	1,272,864
Nuclear	769,331	789,016	797,166	797,178	805,694	804,950
Conventional Hydroelectric	276,240	268,565	259,367	249,080	267,812	300,045
Wind	140,822	167,840	181,655	190,719	226,993	254,254
All Utility-scale Solar	4,327	9,036	17,691	24,893	36,054	52,958
Geothermal	15,562	15,775	15,877	15,918	15,826	15,976
Wood/Wood-derived Fuels	37,799	40,028	42,340	41,929	40,947	43,284
Other Biomass	19,823	20,830	21,650	21,703	21,813	20,773
All Solar	-	-	28,924	39,032	54,866	77,097
Small-scale Solar Photovoltaic Systems	4,327	9,036	17,691	24,893	36,054	52,958

Source: *U.S. Energy Information Administration 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
U.S. Energy Production from Renewables*	12.22%	12.84%	13.16%	13.35%	14.94%	-
New Private Sector Investment in Clean Energy Deployment**	$40.60	$35.30	$38.40	$51.40	$46.40	-

Sources: **U.S. Energy Information Administration*
***https://europa.eu/capacity4dev/unep/documents/global-trends-renewable-energy-investment-2017*

- 4.a.4 Where Americans got their electricity, 2017 versus 2016 (in thousand megawatt hours)

	2016	2017	% Change
Coal	1,239,149	1,207,901	-2.5%
Petroleum Liquids	13,008	12,583	-3.3%
Petroleum Coke	11,197	8,508	-24%
Natural Gas	1,378,307	1,272,864	-7.7%
Other Gas	12,087	14,159	+10.6%
Nuclear	805,694	804,950	-0.1%
Conventional Hydroelectric	267,812	300,045	+12.0%
Renewable Sources	341,633	387,245	+13.4%
Wind	226,993	254,254	+12.0%
Solar	36,054	52,958	+46.9%
Wood/Wood-derived Fuels	40,947	43,284	+5.7%
Other Biomass	21,813	20,773	-4.8%
Geothermal	15,826	15,976	+0.9%
Hydroelectric Pumped	-6.686	-6.495	-2.9%
All Energy Sources	4,076,675	4,014,804	-1.5%

Source: *U.S. Energy Information Administration Browser*

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

	2012	2013	2014	2015	2016	2017
Production Tax Credit	$1.6	$1.7	$1.5	$2.6	$3.4	-
Investment Tax Credit	$0.5	$0.5	$0.6	$1.2	$2.6	-
Combined Tax Credits	$2.1	$2.2	$2.1	$3.8	$6.0	-

Source: *Congressional Research Service, M. Sherlock*

CARBON PRICING: Established board-based support for carbon pricing

- 5.a Carbon intensity of U.S. Gross Domestic Product (in kilograms of CO_2 per 2011 Purchasing Power Parity dollars of Gross Domestic Product)

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

Source: *World Bank, https://data.worldbank.org/indicator/EN.ATM.CO2E.PP.GD.KD?end=2014&locations=US&start=1990&view=chart*

India

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
Very High Proportion	0%	-	0%
High Proportion	28%	-	33%
Medium Proportion	56%	-	53%
Low Proportion	17%	-	14%
Very Low Proportion	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
Very High Extent	0%	-	0%
High Extent	17%	-	17%
Medium Extent	44%	-	47%
Low Extent	39%	-	33%
Very Extent	0%	-	3%

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
Major Civil Society Organizations on Climate Change Policy	36	-	36

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
Gross Budgetary Support for Renewable Energy	246	-	-

Source: *Ministry of New and Renewable Energy Annual Report, 2015-16*

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

	2015	2016	2017
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, and small and large hydropower in megawatts)

	2015	2016	2017
Total Installed Capacity for Electricity Generation based on Renewable Energy	80,215	93,206	107,346

Source: *Ministry of New and Renewable Energy Annual Reports*

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

	2015	2016	2017
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%

Source: *Ministry of New and Renewable Energy Annual Reports*

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

	2015	2016	2017
Solar	4,879	9,012	16,612
Wind	25,088	28,700	32,746
Biomass	4,677	7,907	8,182
Small and Large Hydroelectric Power (Combined)	45,444	47,473	49,692
Waste-to-Energy	127	114	114

Source: *Ministry of New and Renewable Energy Annual Reports*

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

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

Source: *Ministry of New and Renewable Energy Annual Reports*

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

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

Source: *Ministry of New and Renewable Energy Annual Reports*

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

	2015	2016	2017
Rating of Adequacy of Technology	4	-	4
Rating of Adequacy of Political Will	3	-	2
Rating of Adequacy of Policies and Regulations	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
Domestic	238,876	259,311	-
Industry	423,523	426,665	-
Agriculture	173,185	195,473	-
Commercial	86,037	98,333	-
Traction and Railway	16,594	17,217	-
Other	62,976	69,269	-
Total	1,001,191	1,066,268	-

Source: *Ministry of Statistics and Programme Implementation*

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

	2015	2016	2017
Energy Service Companies empaneled with Bureau of Energy Efficiency	129	137	141

Source: *Bureau of Energy Efficiency*

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

- 4.b.1.1 Number of Certified Energy Auditors

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

Source: *Ministry of Power/Bureau of Energy Efficiency*

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
Renewable Energy	18	-	6
Clean Technology	4	-	9
Climate Change	3	-	4

Source: *Oxford Policy Management, Government of India websites*

Appendix B: Glossary of Terms

Below are definitions for key terms that appear in this document and 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.
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.
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.
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.
Measures	Measures refer to the information that we will count and the methods we will use to measure the indicators.
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.
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.
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 American 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).
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.