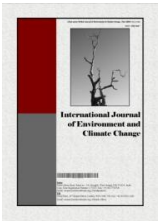

International Journal of Environment and Climate Change

10(12): 255-263, 2020; Article no.IJECC.63688
ISSN: 2581-8627
(Past name: British Journal of Environment & Climate Change, Past ISSN: 2231–4784)

How States Can Drive the Next Era of Climate Management in India: Perspectives in Mainstreaming Climate Actions from Gujarat

Shanal Pradhan[1*] and Shwetal Shah[2]

[1]Council on Energy, Environment and Water, Sanskrit Bhawan, Qutab Institutional Area, New Delhi – 110067, India.
[2]Department of Climate Change, Government of Gujarat, Sachivalaya, Gandhinagar – 382010, Gujarat, India.

Authors' contributions

This study was done collaboratively by both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJECC/2020/v10i1230302
Editor(s):
(1) Dr. Nese Yilmaz, Istanbul University, Turkey.
Reviewers:
(1) Elena Díaz Galán, Rey Juan Carlos University, Spain.
(2) Rutinaias Haholongan, Sekolah Tinggi Ilmu Ekonomi Indonesia, Indonesia.
Complete Peer review History: http://www.sdiarticle4.com/review-history/63688

Mini-Review Article

Received 15 October 2020
Accepted 20 December 2020
Published 31 December 2020

ABSTRACT

At the September 2019 UN climate action summit, India vowed to upscale its climate action by focusing on a low carbon pathway through renewables and other forms of clean energy, adopting sustainable mobility, preserving water, and securing finances for this transition. Implementing and up scaling these actions form an influential agenda under India's Nationally Determined Contributions (NDCs) to the Paris Agreement. The emphasis on national determination and its success strongly hinges on the ambition of the states and the seriousness it has for driving climate actions. The initial step is to streamline such activities at sub-national levels to achieve climate change goals. Indian states, like countries, are too at different starting points with dissimilarities in their economic and developmental interests. Climate priorities took center stage for a few states, while many others have not been too aspirational due to misplaced prerogatives and differing capabilities. Thus, a pertinent question which arises is, could cross-pollination of ideas and innovations push states for concrete climate actions? This paper discusses a few prominent initiatives from the progressive state of Gujarat that could facilitate the exchange of climate measures in other states.

**Corresponding author: E-mail: shanal.pradhan@gmail.com;*

Keywords: Climate action; mitigation; state; policy; India; Gujarat.

1. INTRODUCTION

At the national level, India has a prime role to play in the international climate negotiations, where in its latest accord, the 2015 Paris Agreement sets three numeric targets for 2030. They include reducing the emissions intensity by 33 per to 35 per cent from 2005 levels, achieve an installed power capacity of 40 per cent from non-fossil fuel sources, and create an additional carbon sink of 2.5–3.0 $GtCO_2e$ from forest and tree cover. While the efforts are ongoing to achieve these targets, the sudden pandemic has brought climatic endeavors to a halt, with much of the attention towards economic recovery. Still, India has achieved a reduction in emission intensity of GDP by 21 per cent over the period 2005-2014 [1]. But the country needs to regain the momentum, to be compatible with the 1.5 degrees scenario in accordance with the Paris Agreement. The States have a critical role to play in the country's clean and green transition and through a case study, it aims to throw light on a few of the State initiatives, especially from Gujarat to put the spotlight back on sub-national climate actions.

2. MATERIALS AND METHODS

The study was conducted using a variety of secondary resources (journals, review papers, articles, websites) that provided a good description of the present state of climate actions being done and those in progress. Documentation was provided by the premier institutions like the Gujarat Energy Development Agency (GEDA) to provide authentic data about its progress in the State. Further, the State of focus, Gujarat lies in northwestern India, bordering Arabian sea both to the west and south east. The State covers an area of 1,96,024 sq km with a population of about 60,383,628. Its diverse ecosystem ranges from the deserts, scrublands, grasslands, deciduous forests, and wetlands to mangroves, coral reefs, estuaries, and gulfs [2].

3. STATES DIFFER IN THEIR CLIMATE ACTIONS

Few Indian states have been a leader in implementing radical and ambitious climate change actions and plans. While some states are lagging on this front, the aim is to compel these states to push for more robust measures. For instance, Gujarat is a pioneer in leading climate actions among states in India. It set up the country's first Climate Change Department in 2009. Recently, the state piloted India's first Emissions Trading Scheme (ETS) in select few industrial areas of Surat [3]. In 2017, Maharashtra, too initiated the country's first-star rating program, to reduce air pollution from stationary sources by disclosing industrial particulate matter air pollution data. Within this program, around 300 industries are covered and rated on a 1-5 star scale based on their performance and data made publicly available on the website for improving monitoring, vigilance, and transparency [4]. The program also rates cities based on the particulate matter concentration reported by the monitoring stations. Besides, the Maharashtra Pollution Control Board (MPCB) proposes action plans for critically polluted industrial clusters [5,6]. Odisha, too initiated the Star Rating Programme in 2018, that captures data on particulate matter emissions from major industrial plants for pollution regulation [7].

In March 2018, Maharashtra enforced the state-wide plastic ban on select plastic items. It is working towards implementing the '*Buy Back Scheme*,' a collection mechanism aimed at inducing consumers to discard their plastic milk pouches responsibly to retailers/collection centers for recycling purposes [8,9]. Other states could benefit from adopting similar measures. Despite its benefits, creating such ripple effects in climate actions at the State level is not occurring at the intended speed. Institutional and regulatory barriers are the most persistent impediments that inhibit the adoption of best mitigation or adaptation practices across states. For instance, the Buy-Back Scheme in Maharashtra is met with fierce opposition by diary owners as an impractical step. States also assume that since no other state has come up with such directives, it is unjust to pass the onus to only one [10]. In such circumstances, states should realize that initiating such examples could make a positive impact in making successful inroads elsewhere. It could act as a pilot testbed with the potential for scaling up and fine-tuning policies for other states. Nonetheless, strengthening cooperation and sharing of experiences at the state and local levels

domestically maybe decisive in mitigating climate problems.

4. MAINSTREAMING CLIMATE ACTIONS IN GUJARAT

At the sub-national level, Gujarat has taken the driving seat in its effort to address climate change. It established a separate and dedicated Climate Change Department in 2009, which created enormous impacts on Government policies, programs, and people's participation. Gujarat has demonstrated well in streamlining actions in mitigation and adaptation sectors as well. Even the fifth assessment report of the Intergovernmental Panel on Climate Change, mentions Gujarat's initiatives at the sub-national level explicitly [11].

From the mitigation aspect, the Government of Gujarat (GoG) has taken steps to reduce reliance on coal by declaring no further issue of permits for new thermal plants from September 2019 onwards. Days after this announcement, Chhattisgarh, a state rich in coal reserves, made a similar statement, although neither of them has made any permanent legislation. States like Tamil Nadu, Rajasthan, and Karnataka are also poised to follow their footsteps as per the analysis done by Climate Trends [12]. These examples demonstrate that best practices are likely to be emulated, provided states have the motivation and political willingness.

Gujarat's progress in renewables, which provides direct mitigation benefits, is undisputed with the second-highest installed capacity for wind (7491 MW) and ranks 6th position on solar (2948 MW) among the states as of March 2020. Around 77 MW of biomass and 69 MW of mini-hydropower plants is installed [13], while the total share of installed capacity stood at 31 percent for renewables and conventional at 69 percent by March 2020 [14]. On the generation front, the renewable share is about 12 percent, which the state plans to increase to 17 per cent by 2022 and take the overall installed renewable capacity of the state to 30,000 MW [15,16].

Its solar rooftop program is a success with almost 68,000 installations, and 8,00,000 planned by the end of 2022. As shown in Fig. 1, the state is positioned first in terms of rooftop solar installation, with around 522 MW as of March 2020, which constitutes 21 per cent of the entire country's installation (2515 MW) [17].

Favourable state policies (subsidies, incentives, quicker installation timelines) created an enabling environment for promoting the widespread expansion of solar rooftops that helped attain this feat. The residential sector has the highest rooftop installation, followed by industrial and government building sectors due to benefits from the Central Government subsidy of 40 per cent up to 3 kW, and 20 per cent for 4 to 10 kW of the capital cost of the solar system provided for setting up these systems (refer Table 1) [18]. More than 68,000 beneficiaries have benefitted from this program within the last three years, and by 2022 around 8 lakhs of them will be added through state subsidies [19].

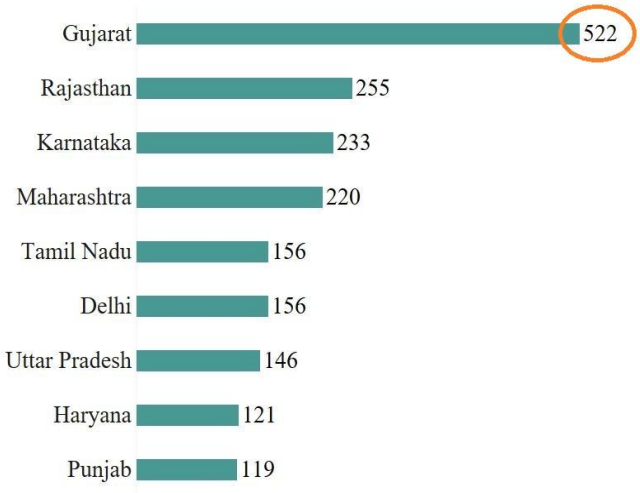

Fig. 1. State-wise data of rooftop solar installed in MW (shown above 100) as on March 2020 (MNRE)

Table 1. Status of solar rooftop installed in Gujarat segment-wise as of 9 March 2020 (GEDA)

Category	Commissioned Units	Capacity in Percent
Residential	68324	52.0
Industrial	1159	28.0
Commercial	1166	4.5
Others	713	3.5
Government	1487	12.0

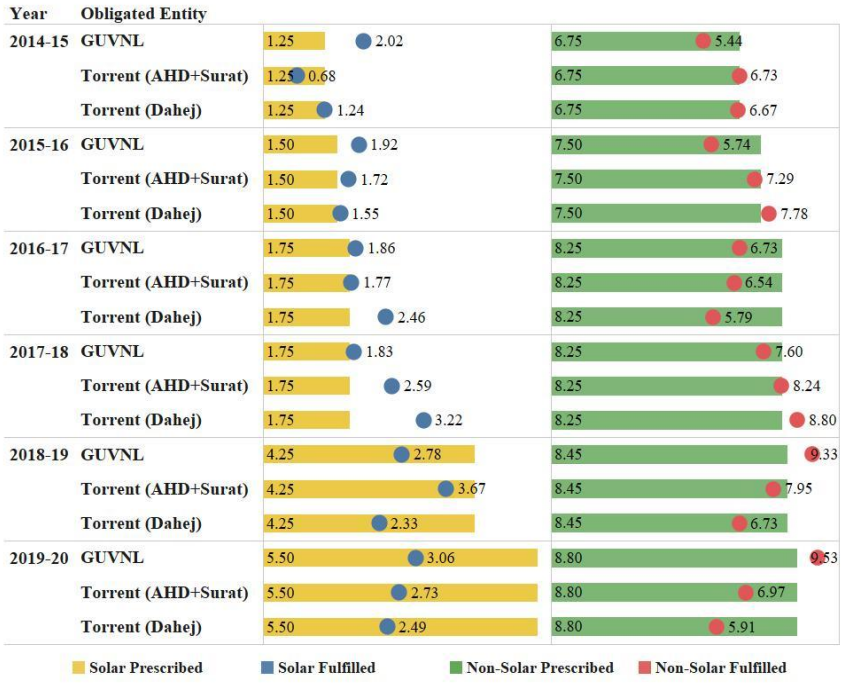

Fig. 2. RPO compliance details for Gujarat DISCOMs in percent (up to first quarter 2019-2020) (GEDA 2020)

The RPO obligation trends of major discoms in the State (GUVNL, Torrent (AHD+Surat), and Torrent (Dahej) have higher targets for non-solar than solar. Fig. 2 displays a graph that shows the prescribed and fulfilled RPO targets in percent for major discoms from 2014-2015 to 2019-2020 (till the first quarter) [20]. Both the goals and the achieved RPO shows growth in the respective period.

In terms of adaption, Gujarat is known for its water management, including flood control strategy. It managed its water supply even in low years of rainfall due to its robust infrastructure of the canal network, river linking, and water storage management. Furthermore, the state has managed to significantly increased its mangrove cover from 427 sq. km in 1987 (the year in which the India State of Forest Report started surveying mangrove cover) to 1177 sq. km in 2019 [21]. Large scale plantations and protection measures, development, and monitoring of these habitats, capacity building, and awareness programs, etc. have facilitated this incremental growth [22].

5. INFRASTRUCTURE, CITIES AND LOCAL ACTION

Change never happens in a vacuum, but through the convergence of multiple actors – government, business, industry, and the public need to work together at local levels. GoG actively strengthened local action to address climate change by developing and enhancing green infrastructure in cities. For instance, public transport has improved in the cities of Ahmedabad, Vadodara, Surat, Rajkot and Ahmedabad became the first city to order 300

electric buses [23]. The state has initiated a Policy for Reuse of treated wastewater in 2018 [24]; at the same time, solid waste management, sewage treatment initiatives are more effective in urban and rural areas of Gujarat [25]. Cities like Rajkot have developed its Climate Resilient City Action Plan while Surat has formed its Resilience strategy for sustainable development. Given the pressing climate challenges we are facing, these are some of the exceptional examples compared to other cities [26,27]. In World cities day 2019, Surat was the only Indian city among ten global cities to win the Netexplo Smart cities award 2020 with UNESCO in the resilience category for its work on developing a mobile water quality control and wastewater recycling system [28].

6. ROLE OF INSTITUTIONS

Gujarat has demonstrated reasonable efforts in establishing institutions that played a pivotal role in delivering the vision of green development for the state. The State Nodal Agency for renewable energy, Gujarat Energy Development Agency (GEDA), undertook massive clean energy-driven initiatives that expand beyond renewables to transportation and building sectors, energy efficiency and awareness programs, etc. Mitigation efforts of the department can be outlined into several thrust areas viz. bio energy, wind, solar, and energy conservation efficiency programs. Table 2 shows the initiatives of GEDA in various project areas.

Fig. 3 shows the thematic areas and scale of these green energy programs, alongside the location of projects. Besides establishing institutions for a dedicated purpose, effective communication between departments has been critical in ensuring smooth coordination in implementing policies. GoG has continuously renewed or amended its policies (industrial and renewable systems) in all of its key sectors.

Recently, on 17 September 2020, the State released a compendium titled '*Building a Climate Resilience Gujarat – A Decade of Climate Action and Road-map For the Future,'*prepared by the State Climate Change Department. As many as 10 Memorandum of Understanding were signed with several institutes to conduct research and development in themes of climate shown in Table 3. These initiatives clearly show that the State has a clear roadmap to achieve its climate goals through various mechanisms and sectors backed up by these institutions [29] (GIB 2020).

7. INNOVATION IN FINANCE

It was pretty evident that during the development of the first SAPCC many States faced uncertainties and resource limitations in creating and implementing their State Action Plans. However, in the second round of the SAPCC which most of the States are at present, there is some clarity compared to the earlier phase in terms of developing them. Even though, mapping finance for climate actions are still a challenge and it is even more challenging for States to set up their own funding mechanisms. Most of the time they rely on Central funds which can be difficult to access and the situation has not eased; more so as the pandemic struck globally. Thus, as echoed by some of the State officials who oversee the planning of these SAPCCs, it is still a very early phase for the States to set up their own climate funding mechanism.

With uncertainty prevailing around climate finance in the country, Gujarat has been the one State which innovatively initiated the *Green Budget* in 2016-2017.The Green Budget provides financing for flagship programs of several departments within the state, which contribute to either mitigation or adaptation actions [30]. For the financial year 2020-21, the total outlay for the green budget is a massive amount of Rs 5922 Crore [31].

Table 2. Green initiatives undertaken by GEDA as of 29 February 2020 (GEDA 2020)

Programs/Projects	Unit	Cumulative Achievement
Windfarms	MW	7,492
Solar power projects (ground-mounted)	MW	2,417
Solar rooftop systems	MW	469
Solar water heating systems	Lpd	11,491,779
Institutional biogas plants	m3/day	24,035
Battery operated vehicle	Nos.	7,866

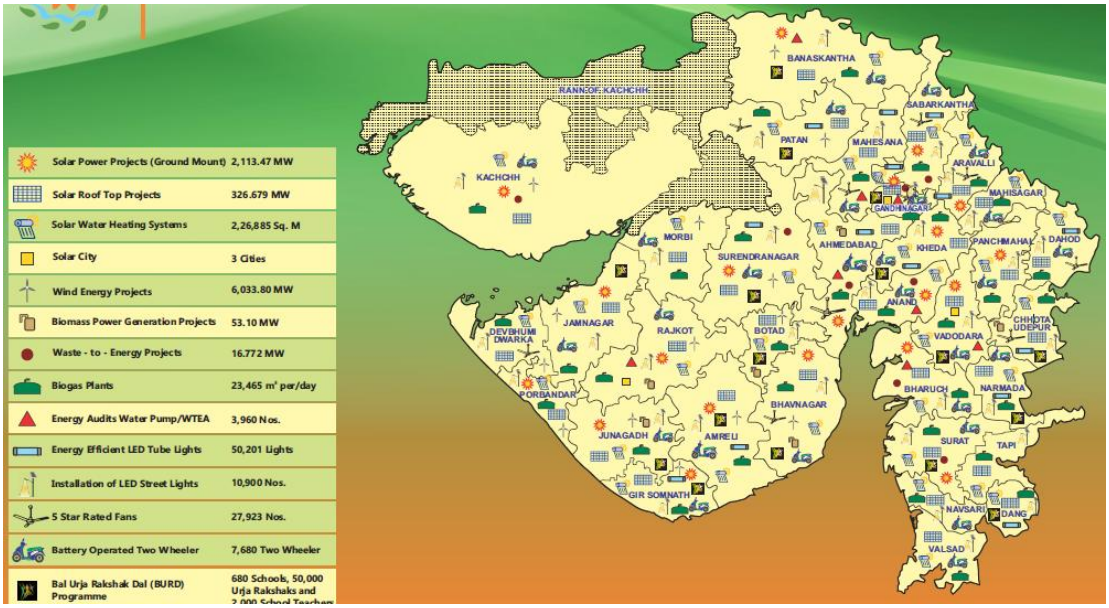

Fig. 3. Map highlighting the expansion of GEDA's clean energy activities (GEDA)

Table 3. Memorandum of understanding signed with several institutions

MoUs signed with institutes	Purpose
Bhaskaracharya Institute of Space Application and Geo Informatics	To reduce the effects of climate change and increase the use of recycled energy
Indian Institute of Management-Ahmedabad	Climate change risk management of mitigation climate finance and climate policy
Indian Institute of Technology-Gandhinagar	Capacity building of climate change and environment, research and scientific knowledge;
Gujarat State Road Transport Corporation and Gujarat Gas	To increase the use of clean fuel
Chief Town Planner	Prepare building code to save energy
Gujarat Council of Science & Technology and the Community Science Center	Create public awareness about climate change.
Anand Agriculture University	To generate Bio-gas from Dung and to invent technology to generate renewable energy from farm produce wastes;
Gujarat State Biotechnology Mission	To conduct research for use of biotechnology in arresting climate change
Knowledge Consortium under the Education Department	To incorporate more knowledge in the syllabus of higher studies.

Another example is the state's National Adaptation Fund for Climate Change project, which showcases a good utilization of Central funds for convergence and grass-root activities in remote and rural areas of Kachchh district [32]. Further, the 2019 state budget focuses on pollution-free clean energy [33] with an amount of Rs. 1,000 crores specially earmarked for extending solar rooftop systems [34,35]. Whereas the budget of 2020 focuses on robust water management [36].

8. DISCUSSION

As of present, there is no legislation on climate change either at the National or Sub-National level in the country. While the NAPCC and SAPCCs act as guiding documents that put climate change in the spotlight, there was still no clarity of the framework provided or a clear financial strategy during the first SAPCC exercise. However, the streamlining of climate actions with existing programs and policies within

several departments were equally important. Partnerships and knowledge exchange between states need to strengthen to create a dynamic where states prompt each other to do more and emulate best practices. Indian states are at an infantile stage when it comes to building capacity for facing climate challenges. Institutional structures need to be more robust for creating a knowledge base, and coordination and accountability are necessary across line departments for developing the state [37].

Every state needs to navigate a feasible pathway that includes synergies and trade-offs to contribute to the NDCs. States need more clarity on accessing financing options beyond the state budget. A state climate hub or a knowledge-exchange mechanism that assists them in climate actions in the context of their developmental and economic needs is required. As evident, all these involve systemic changes and streamlining of activities that should have started years ago when the SAPCCs formulated. Department of Science and Technology, Government of India, has funded State level knowledge centers under the National Mission for Strategic Knowledge on Climate Change (NMSKCC) [38]. Gujarat's NMSKCC center is jointly working under GEER Foundation and IIT Gandhinagar [39].

Out of the many existing challenges, a vital roadblock for the States to figure out is their role in the broader national goals and its commitment to the NDCs. Most of the first phase of SAPCCs are largely adaptation oriented and moreover, according to the new guidelines set up by the Ministry of Environment Forest and Climate Change, it does not require States to develop a Greenhouse gas (GHG) inventory. This clearly implies that States as such do not have climate targets of their own, but only a national one which are the NDCs. Thus, without States developing a GHG inventory in the second phase of the SAPCCs, poses severe implications.

First of which are the SAPCCs will still remain adaptation focused as before. Second, the methods through which States meet their NDC targets are hazy as they are not encouraged to have State emissions, thus the SAPCCs will not produce the desired outcomes in terms of targeting the right sectors for mitigation. Third consequence is that unless States are aware of their highest emitting sectors, proposing mitigation outcomes will not serve the purpose. Developing SAPCCs will rather be an unfruitful exercise, as mitigation is at the heart of meeting the NDC targets with sub-national efforts playing a key role. States can only declare their voluntary mitigation measures in their second State Action Plans, but in order to meet the national climate targets and the overarching goal of addressing the climate threat in a strategic, technical and scientific manner, the inclusion of GHG inventory is a necessary step forward.

9. CONCLUSION

Gujarat has time and again reaffirmed its position as an active participant in climate actions at the regional level. Its strategic innovation at the policy, practice, and implementation levels sets a high benchmark. For example, the successful implementation of the country's first ETS scheme will undoubtedly have a profound impact on other states, and they are likely to follow. The expansion of this scheme to curb greenhouse gas emissions will place Gujarat as a flag bearer rather than an active participant among states. Since the state announcement of no new thermal plants, the generated capacity from green energy sources will likely increase. Allocating healthy targets, for example, in the case of renewably generated electricity, is a useful approach taken by GoG to allow for continuous self-assessment of its mitigation commitments. A key takeaway for other states is the support of local initiatives, as shown by the GoG and empowering municipalities that ensure multi-pronged development outcomes. Its innovation in earmarking separate category of funds for climate actions is commendable as shown through the Green Budget.

Climate change action in our country has always been a matter of the Centre, imposed from the top. Despite this, as a state, Gujarat has had many climate governance successes reiterated throughout this article. It has shown greater responsibility by acting individually in making low carbon choices that should motivate other states too.

However, unless the SAPCCs are streamlined with the overarching national target of the NDCs and even the Sustainable Development Goals, it remains a futile effort. Gujarat shows much potential to offset emissions with the highest share of clean energy in the country and thus States should instead be supported to evaluate their

emissions transparently to mitigate effectively and faster.

COMPETING INTERESTS

Authors have declared no competing interests.

REFERENCES

1. Sinha R, Ganeshan S. The need for re-strategising climate policies in the new-normal scenario; 2020.
   Available:https://www.teriin.org/article/need-re-strategising-climate-policies-new-normal-scenario
   Accessed 7 Dec 2020
2. Go G. "Gujarat State Portal | All About Gujarat | Gujarat Fact File"; 2020.
   Available:https://gujaratindia.gov.in/about-gujarat/fact-file.htm.
3. GPCB Emissions Trading Scheme (Pilot Project). In: Gujarat Pollut. Control Board; 2019.
   Available:https://gpcb.gujarat.gov.in/webcontroller/page/emissions-trading-scheme-pilot-project. Accessed 15 Dec 2019
4. MPCB. MPCB Annual Report 2017-2018. Mumbai; 2017.
5. MPCB. Star rating program: An effective and affordable tool for air pollution abatement; 2018.
   Available:https://mpcb.info/about-program/
   Accessed 15 Dec 2019
6. MPCB. Action plan for industrial cluster report-2018. In: Maharashtra Pollut. Control Board; 2019.
   Available:http://www.mpcb.gov.in/pollution-index/action-plan-2018
   Accessed 15 Dec 2019
7. EPIC-India. Odisha Chief Minister Naveen Patnaik launches Star Rating Program for Industries to Reduce Pollution. In: EPIC-India; 2018.
   Available:https://epic.uchicago.in/odisha-chief-minister-naveen-patnaik-launches-star-rating-program-industries-reduce-pollution/
   Accessed 15 Dec 2019
8. Environment Dept. Maharashtra Plastic and Thermocol Products (Manufacture, Usage, Sale, Transport, Handling and Storage) Notification. Medicolegal, India; 2018.
9. Karelia G. Maharashtra plastic ban: Two weeks on, checklist of banned items issued and plastic buyback scheme announced. In: NDTV; 2018.
   Available:https://swachhindia.ndtv.com/maharashtra-plastic-ban-things-included-excluded-in-the-ban-22629/
   Accessed 15 Dec 2019
10. Kasabe N. Maharashtra dairy owners oppose plastic buyback programme. In: Financ. Express; 2019.
    Available:https://www.financialexpress.com/industry/maharashtra-dairy-owners-oppose-plastic-buyback-programme/1598255/
    Accessed 15 Dec 2019
11. Somanathan E, Sterner T, Sugiyama T. National and sub-national policies and institutions; 2014.
12. Sarkar S. Major Indian states could declare no new coal. In: India Clim. Dialogue; 2019.
    Available:https://indiaclimatedialogue.net/2019/12/06/indian-states-signal-beginning-of-no-new-coal/
    Accessed 15 Dec 2019.
13. MNRE. State-wise installed capacity of grid interactive renewable power as on 31.03.2020; 2020.
    Available:https://mnre.gov.in/the-ministry/physical-progress
    Accessed 9 May 2020.
14. CEA. Installed capacity (in MW) of power utilities in the States/UTs located in Western Region; 2020.
    Available:http://cea.nic.in/reports/monthly/installedcapacity/2020/installed_capacity-03.pdf
    Accessed 9 May 2020
15. GEDA. Renewable Energy- Highlights. Gandhinagar; 2019.
16. The Hindu Business Line. Gujarat looks to add capacities in wind and solar energy. In: The Hindu Business Line; 2019.
    Available:https://www.thehindubusinessline.com/news/national/gujarat-looks-to-add-capacities-in-wind-and-solar-energy/article25913111.ece#
    Accessed 15 Dec 2019.
17. MNRE. State-wise installed capacity of grid interactive renewable power as on 31.03.2020; 2020.
    Available:https://mnre.gov.in/the-ministry/physical-progress
    Accessed 9 May 2020
18. GEDA. Salient Features of scheme for Residential Rooftop Solar Projects – 2018 -19; 2019.
    Available:www.geda.gujarat.gov.in
    Accessed 25 Dec 2019.

19. GEDA. Gujarat energy developement agency; 2020. Available:https://geda.gujarat.gov.in/ Accessed 19 Jul 2020
20. GEDA renewable energy- Highlights. Gandhinagar; 2019.
21. FSI. India state of forest report 2019; 2019.
22. GoG. Mangrove conservation. In: Princ. Chief Conserv. For. Head For. Force; 2019. Available:https://forests.gujarat.gov.in/mangrove-conserv.htm#fiveTwoThree. Accessed 21 Dec 2019
23. Business Standard News. Govt approves 5,595 e-buses in 64 cities under FAME India's second phase; 2019. Available:https://www.business-standard.com/article/economy-policy/govt-approves-5-595-e-buses-in-64-cities-under-fame-india-s-second-phase-119080801716_1.html. Accessed 21 Dec 2019
24. GoG .Policy for reuse of treated wastewater. Gandhinagar; 2018.
25. Dutta S. Gujarat's New Waste Management Policy: From Zero Waste By 2023 To ODF Plus Status; 2018. Available:https://swachhindia.ndtv.com/gujarat-zero-waste-odf-plus-new-policy-manual-scavengers-rehabilitation-23429/ Accessed 21 Dec 2019.
26. 100RC Surat Resilience Strategy. Surat; 2017.
27. ICLEI. Gujarat CM releases Climate Resilient City Action Plan for Rajkot. In: Clim. Resilient City Action Plan; 2019. Available:http://southasia.iclei.org/newsdetails/article/gujarat-cm-releases-climate-resilient-city-action-plan-for-rajkot.html Accessed 16 Apr 2020
28. UNESCO. World cities day: Innovation at the heart of the city and the list of smart cities for 2020. In: United Nations Educ. Sci. Cult. Organ; 2019. Available:https://en.unesco.org/news/world-cities-day-innovation-heart-city-and-list-smart-cities-2020?utm_source=miragenews&utm_medium=miragenews&utm_campaign=news Accessed 15 Dec 2019
29. GIB. Gujarat Information Bureau; 2020
30. GoG. Modified budget estimates of climate change department for 2019-2020. Ahmedabad; 2020.
31. GoG. Speech of shri nitinbhai patel deputy chief minister on budget estimates 2020-2021 (Part A). Gandhinagar; 2020.
32. NABARD. NABARD - National Bank For Agriculture And Rural Development. In: Proj. Sanction. under Natl. Adapt. Fund Clim. Chang; 2020. Available:https://www.nabard.org/content.aspx?id=585. Accessed 21 Apr 2020
33. GoG. Budget document; 2019.
34. GEDA. Renewable energy- highlights. Gandhinagar; 2019.
35. GoG. State Budget for 2019-20 is presented as 'Focused Budget' to make Gujarat as 'Sustainable Developmental State': CM. In: Gov. Gujarat; 2019. Available:https://gujaratindia.gov.in/media/news.htm. Accessed 16 Dec 2019
36. GoG. Speech of Shri Nitinbhai Patel Deputy Chief Minister on Budget Estimates 2020-2021 (Part A). Gandhinagar; 2020.
37. Dubash N, Rajamani L. Rethinking India's approach to international and domestic climate policy. New Delhi Geer Foundation (2018) Gujarat Ecological Education and Research (GEER) Foundation; 2019.
38. DST. Climate change programme; 2020. Available:https://dst.gov.in/climate-change-programme Accessed 21 Apr 2020 Available:https://geerfoundation.gujarat.gov.in/Home/Page/Ecological-Research Accessed 21 Apr 2020
39. Geer Foundation. Gujarat Ecological Education and Research (GEER) Foundation; 2018. Available:https://geerfoundation.gujarat.gov.in/Home/Page/Ecological-Research Accessed 21 Apr 2020.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/63688