CENTRE FOR POLICY RESEARCH

RAP® Energy solutions for a changing world

What Powers Success on the Ground? The Gradual Reform of Electricity Distribution in Gujarat

Working Paper
Mapping Power Project

Siddharth Sareen
April 2017

Project Overview

This working paper was written as part of a collaborative research project, Mapping Power, which aims to provide a state-level analysis of India's electricity governance. The project is coordinated by Sunila S. Kale (University of Washington, Seattle), Navroz K. Dubash (Centre for Policy Research), and Ranjit Bharvirkar (Regulatory Assistance Project), and carried out by a team of 12 researchers. The research explores the views and perspectives of various stakeholders and organisations in each state and how they will be affected by new initiatives in India's electricity sector, as well as the forces and constraints that shape decision-making in electricity governance. Using data from qualitative interviews with key informants buttressed by quantitative data, the research team covered 15 states as part of the analysis: Andhra Pradesh, Bihar, Delhi, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal. You can learn more about Mapping Power as well as access other working papers in the series here: http://www.cprindia.org/projects/mapping-power

Acknowledgements

Author: Siddharth Sareen, sidsareen@gmail.com

Preparation of this paper was supported by the Regulatory Assistance Project. This paper was informed, in part, by 26 interviews with a broad range of electricity sector stakeholders that were conducted on a not-for-attribution basis. The author wishes to thank the interviewees who generously took some of their valuable time to share their perspectives, as well as audiences at an Energy Transitions workshop (Berlin), an Ecological Challenges conference and a University of Oslo seminar (Oslo), a Max Weber Centre seminar (Erfurt), and an Energy Impacts workshop (Bergen) for helpful discussions in early 2017.

Suggested Citation

Siddharth Sareen, "What Powers Success on the Ground? The Gradual Reform of Electricity Distribution in Gujarat", Working Paper, Mapping Power Project (Centre for Policy Research and the Regulatory Assistance Project, 2017).

Table of Contents

Abstract

Among Indian states, Gujarat's electricity distribution sector has come to be regarded as exemplary. Its distribution companies have A+ credit ratings and acceptably low loss levels, and provide 24/7 power throughout the energy surplus state, with separate feeders for up to eight hours a day of agricultural supply. Reforms enacted in Gujarat subsequent to the national Electricity Act of 2003 have now been initiated nationwide. What are the factors that have made this sector such a successful model and what particular set of circumstances enabled them to work in Gujarat? Are there shortcomings that are glossed over in the dominant narrative on its performance, such as the slowdown in solar energy growth despite Gujarat's championing role in this regard even prior to the national solar policy of 2011? Are the benefits uniformly distributed, or do some stakeholders continue to benefit at the cost of others, owing to the present configuration of incentives and institutional structure? Based on 26 expert interviews and secondary research, this study addresses these questions, finding that Gujarat's gradual but substantive application of key aspects of reforms has been instrumental for its relative success in the distribution sector, eased by a favourable consumer mix and supportive policy environment. An encouraging picture of the sector emerges, especially pertaining to innovative and pioneering efficiency measures. It is also noted, however, that some roadblocks exist for a truly committed push toward a country-leading sector, in the form of mixed progress on competition and renewable energy development and the persistence of lacunae such as popular engagement with the sector.

Introduction

Gujarat has long been seen as a model state in the Indian context, with a consistently prosperous and dynamic economy,[1] and the electricity distribution sector is no exception. Besides having championed wind energy early on and more recently also solar energy, the state managed to implement efficiency measures effectively and go through with a smooth corporatisation process as part of electricity reforms, leading to some of the lowest aggregate technical and commercial (AT&C) loss levels nationally, not only in its two largely urban private distribution licensee areas, but also for the four public distribution companies (discoms) it founded as part of sectoral unbundling in the early 2000s. Coupled with its impressive performance on finances and rural electrification, these successes suggest that critique broadly applied to the sector in other states might fail to understand Gujarat, or that this case might indeed be instructive of how factors constraining sectoral development in other states can be overcome. Yet the institutional structure is no different in Gujarat, suggesting that problems that have been chronic to the sector, such as an inability to entirely stem political interference, might simply have played out in a manner leading to more positive outcomes in this context compared to elsewhere, not least helped by a favourable industry-heavy consumer mix. This piece furnishes a detailed overview of recent developments in the sector to describe the extent to which the Gujarat model has succeeded on fronts where others have encountered problems. In doing so, it seeks to put forward a nuanced analysis of the factors that have contributed to its particular evolution.

The next section provides the historical background and institutional structure of Gujarat's distribution sector, contextualising key aspects within the state's political economy. A brief description of the methods is followed by a section featuring empirically informed analysis of the political economy of Gujarat's distribution sector, highlighting the gains and losses for various stakeholders. Thereafter, a section discusses what recent sectoral developments imply for these actors and institutions, focussing

[1] Maitreesh Ghatak and Sanchari Roy, "Two States: A Comparative Analysis of Gujarat and Bihar's Growth Performance Between 1981–2011," *India Review* 14;1 (2015): 26–42.

on emerging issues such as the renewable energy trajectory as well as trends in popular engagement and social inclusion. It includes a closing reflection on how, despite political influence over the distribution sector, Gujarat has been able to achieve crucial gains through a combination of factors in its sectoral development.

I. Sectoral Overview Contextualised Within Political Developments

In November 2015, total installed capacity in Gujarat was 29,431 megawatts (MW), or 10.66 percent of the national total of 282,023 MW.[2] This serves 6.27 crore people, or 5.18 percent of India's population of 121 crore, spread out over 1.96 lakh km^2, or 5.96 percent of India's 32.87 lakh km^2 area, meaning instate distribution deals with a population density comparable to the national average. In terms of energy sources, more than 16 gigawatts (GW) is coal-based and almost 7 GW is based on gas, with more than 6 GW coming from renewable sources, including 4 GW of wind energy and 1 GW of solar energy, with 559 MW nuclear and 772 MW hydel making up the rest.[3] Gujarat was one of the first states to become energy surplus, with installed capacity rising rapidly from 4,747 MW in 1990 to 8,366 MW in 2000 (when it was already approaching being at par with demand) and 13,790 MW in 2010 to its present level. With peak demand in 2015 to 2016 being only 14,982 MW, there is vast excess installed capacity.

Sectoral Reforms During the Onset of Liberalisation in the 1990s

Going further back, however, there is a history of more modest numbers. While the Ahmedabad Electric Company Limited and the Surat Electric Company have operated across 356 and 52 km^2 since 1913 and 1920, respectively, and are now run by two private licensees under Torrent Power Limited, it was only in 1960 that the state of Gujarat and with it the Gujarat Electricity Board (GEB) were established, under Section 5 of the Electricity (Supply) Act, 1948, with an initial capacity of 315 MW and a consumer base of 14 lakhs. By 1991, Gujarat had become the first state to all but achieve 100-percent village electrification, having extended the grid to 17,940 of its 18,028 villages. As India adopted its broad economic agenda of liberalisation, privatisation, and globalisation, power sector reforms began at varying pace across different states. The corporatisation of Gujarat's electricity sector started in 1993, with the incorporation of the Gujarat State Electricity Corporation Limited (GSECL), although it only commenced commercial operations in 1998, followed a year later by the GEB promoting another fully owned subsidiary to set up the Gujarat Energy Transmission Corporation Limited (GETCO). It was also in 1998 that the Electricity Regulatory Commissions Act was passed, followed by the Gujarat Electricity Regulatory Commission (GERC) being established in 1999, which set up the current regulatory structure of the electricity sector.

With AT&C losses at creditably low 21.10 percent in 1992-1993 and 18.20 percent in 1996-1997, and an India-topping staff productivity of 2.5 and 1.9 employees per million kWh (MU) of electricity sold during the same years, Gujarat seemed to be doing well during the 1990s.[4] The ugliest point in the transition is perhaps when the newly formed regulatory authority GERC looked into the accounts of the GEB prior to

[2] Central Electricity Authority, Ministry of Power, Government of India.
[3] Central Electricity Authority figures until June 30, 2016.
[4] V. Santhakumar, "Impact of the Distribution of the Cost of Reform on Social Support for Reforms: A Study of Power Sector Reforms in Indian States," India Development Foundation, Gurgaon, 2003, accessed January 13, 2017, institut.veolia.org/sites/g/files/dvc1121/f/assets/documents/2016/08/vsanthakumar.pdf

its unbundling. The GERC's first tariff order in 2000, finding a large discrepancy between the GEB's claimed AT&C losses (20 percent) and the GERC's own determination (34 percent), pointed out that a "substantial quantity of consumption is shown by way of agricultural use and as such it is difficult to assess use of unauthorised power or loss of power by way of theft that might have been added or included in the use of agricultural sector."[5] This harked back to 1983, when Gujarat removed agricultural meters and started supplying electricity for agricultural pump-sets on an horsepower tariff basis. Shortly after this criticism, Hansen and Bower (2003) wrote about the electricity sector's financial and other systemic problems in India, saying, "The problems are particularly acute in Gujarat state, which represents a microcosm of the key issues faced throughout India, where a complicated and overlapping regulatory structure and new entrant prohibitions have stifled new electricity sector investment."[6]

These developments coincided with the coming to power of the Bharatiya Janata Party (BJP) in 1998 under Keshubhai Patel, who had served as Chief Minister (CM) for an earlier BJP government during a brief stint in 1995. The BJP inherited a state in which the agricultural share of consumption had risen dramatically from less than 17 percent in 1970-1971 to 48 percent in 2000, as per the GEB.[7] This was a function of farmers shifting from the 1970s onward from diesel engines to submersible electric pumps as rural electrification increased, with rapid uptake from 1988 onward, as the GEB switch from metered agricultural connections to flat tariffs linked to pump horsepower became widespread, in response to charges of farmer exploitation owing to corruption and arbitrariness in meter reading and billing under the old system,[8] and partly ostensibly due to policy diffusion besides, given that some states had switched to flat metering two decades previously. Then onwards, farmer lobbies ensured that the government maintained the low flat tariff, meaning that increased agricultural consumption led to mounting losses for the GEB.[9] Losses were exacerbated by the use of "tetas" or capacitors in tapping lines to convert single-phase to triple-phase power by lakhs of farmers awaiting agricultural connections.[10] As in many other states hit by the irrigation-electricity-politics conundrum, this was a matter of grave concern in Gujarat in 2001,[11] when Narendra Modi took over as CM for more than 12 years, marking a strong period of BJP rule that continues to date, with Anandiben Patel having taken over in 2014 upon Modi's election as India's Prime Minister, followed by the incumbent BJP CM Vijay Rupani in August 2016, as the timeline in Table 1 comparing political and sectoral developments shows.

[5] GERC, "Tariff Order No. 19 of 1999," Gujarat Electricity Regulatory Commission, Ahmedabad, 2000.
[6] Christopher Joshi Hansen and John Bower, "Political Economy of Electricity Reform: A Case Study in Gujarat, India," Oxford Institute for Energy Studies, 2003, accessed January 13, 2017, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/EL03-PoliticalEconomyofElectricityReformACaseStudyofGujaratIndia-ChristopherHansen-2003.pdf
[7] By way of comparison, GUVNL figures for March 2016 were 27 percent.
[8] Tushaar Shah and Shilp Verma, "Co-Management of Electricity and Groundwater: An Assessment of Gujarat's Jyotirgram scheme," *Economic and Political Weekly* (2008): 59–66.
[9] Vidyut Joshi and Akash Acharya, "Addressing Agricultural Power Subsidy: A Case Study of North Gujarat," Surat: Centre for Social Studies, 2005.
[10] Interview with Bharatiya Kisan Sangh representative on September 27, 2016.
[11] For in-depth treatment, see Jagadip Narayan Singh, "Politics of Agriculture Interest Groups: A Case Study of the Bharatiya Kisan Sangh and Its Interaction With the Gujarat State Government Over Power (Electricity) Issues" (PhD diss., MS University of Baroda, 2005), accessed March 31, 2017, http://shodhganga.inflibnet.ac.in/handle/10603/72186

Table 1: Timeline of Political and Power Sector Events Since Electricity Distribution in 1913 Until 2016

Political Events	Year	Power Sector Events
	1913	Ahmedabad Electric Company Limited (now Torrent Power Limited): Licensee for 356-km^2 area in Ahmedabad and Gandhinagar (12.6 lakh consumers)
	1920	Surat Electric Company Limited (now Torrent Power Limited): Licensee for 52-km^2 area in Surat (4.7 lakh consumers)
Gujarat established as an Indian state following several changes after independence in 1947	1960	GEB established under Section 5 of the Electricity (Supply) Act 1948 with 315 MW capacity and 14 lakh consumers
	1970	Agricultural share of consumption 16.7 percent
	1991	First state to achieve 100-percent village electrification (17,940/18,028)
	1993	Start of corporatisation of electricity sector, GSECL incorporated
BJP government comes into power in Gujarat, re-elected until date	1998	Commercial operations of GSECL commence; central Electricity Regulatory Commissions Act
	1999	GERC established
Narendra Modi replaces Keshubhai Patel as CM, BJP re-elected in 2002	2001	Agricultural share of consumption 43 percent
	2003	Central Electricity Act passed, ERC Act effective June 10, 2003, Gujarat Electricity Industry (Re-organisation & Regulation) Act passed

	April 2005	GEB unbundled into six state electric companies under the holding company Gujarat Urja Vikas Nigam Limited (GUVNL): • Generation company: GSECL • Transmission company: GETCO • Four regional distribution companies: o Uttar Gujarat Vij Company Limited (UGVCL) o Dakshin Gujarat Vij Company Limited (DGVCL) o Madhya Gujarat Vij Company Limited (MGVCL) o Paschim Gujarat Vij Company Limited (PGVCL)
	2005	Jyotir Gram Yojana (feeder separation, later inspiration for DDUJGY scheme)
BJP re-elected under Chief Minister Modi	2007	Wind Power Policy
	2009	Solar Power Policy, prior to national policy, kicks off solar growth
	2010	Principal GERC (Procurement of Energy from Renewable Sources) Regulations
BJP re-elected under Modi	2012	
Modi becomes Indian prime minister, Anandiben Patel takes over as chief minister	2014	
	2015	Gujarat Solar Power Policy (new), including net metering guidelines
	2015	Gujarat joins Ujwal Discom Assurance Yojana (UDAY), tenth state to do so, with A+ ratings for all four of its public discoms
Vijay Rupani takes over as chief minister	2016	Gujarat Wind Power Policy (new)

Sectoral Unbundling and Corporatisation Under Prolonged BJP Rule

Early in this period of political stability, with the passage of the central Electricity Act, 2003, the Gujarat Electricity Industry (Re-organisation & Regulation) Act was passed, followed by the unbundling of the GEB into six public electric companies under a holding company Gujarat Urja Vikas Nigam Limited (GUVNL) in 2005: the existing generation (GSECL) and transmission (GETCO) companies, and four regional distribution companies: Uttar (UGVCL), Dakshin (DGVCL), Madhya (MGVCL), and Paschim Gujarat Vij Company Limited (PGVCL). At the same time, an ambitious initiative by the name of Jyotigram Yojana (JGY) was undertaken with an investment of Rs. 1,170 crore, envisaging rural feeder segregation, or the separation of technical infrastructure by putting in place a parallel network of lines for round-the-clock three-phase electric supply to domestic users and scheduled three-phase electric supply to agricultural users to run pumps. The implementation of this measure – aimed at stemming losses from theft, increasing social inclusion in terms of quality rural electric supply, and increasing revenue generation – worked notably well, yielding efficiency gains and becoming a model that states are now trying to emulate nationwide. Credit was accorded to Chief Minister Modi for strong leadership that enabled the effective implementation of an elegant technical solution to a problem that has long proven intractable in many Indian states.[12] A decade after JGY was initiated, Gujarat's electricity sector transformation was being lauded as a best practice that embodied a positive agenda, political will, and managerial leadership, and one that drove change as a socio-technical process through the contextualised implementation of feeder reforms.[13]

Table 2: ACS, ARR, Direct Subsidy Received, and Percentage AT&C Loss by Utility and State

Discom	ACS (Rs./kW)	ARR (Rs./kW)	ARR (Rs./kW) (with subsidy)	AT&C Loss (%)
DGVCL				
2007-2008	3.53	3.49	3.53	15.23
2010-2011	4.14	4.17	4.21	13.08
2014-2015	5.20	5.22	5.23	10.81
MGVCL				
2007-2008	3.38	3.30	3.39	17.17
2010-2011	3.80	3.75	3.84	14.83
2014-2015	4.90	4.87	4.94	11.47
PGVCL				
2007-2008	2.55	2.33	2.55	32.74
2010-2011	3.00	2.84	3.01	26.75
2014-2015	3.78	3.65	3.79	25.18
UGVCL				
2007-2008	2.58	2.14	2.58	17.23
2010-2011	3.26	2.92	3.27	7.20
2014-2015	4.06	3.81	4.07	10.21

[12] N. Madhavan, "The transformer," *Business Today*, February 5, 2012, accessed January 14, 2017, http://businesstoday.intoday.in/story/gujarats-power-sector-turnaroundstory/1/21750.html.

[13] Tushaar Shah, Madhavi Mehta, Gopi Sankar, and Shankar Mondal, "Organizational Reform in Gujarat's Electricity Utility: Lessons for Revitalizing a Bureaucratic Service Delivery Agency," 2012, accessed January 14, 2017, http://www.iwmi.cgiar.org/iwmi-tata/PDFs/2012_Highlight-06.pdf.

That this infrastructural investment has resulted in managerial efficiencies is visible in the financial trajectory of the sector in subsequent years. The average cost of supply (ACS) increased steadily during the GEB years, from Rs. 1.10 per kWh in 1990-1991 to Rs. 2.77 per kWh in 1998-1999, and continued to rise after sectoral unbundling, reaching Rs. 3.42 per kWh in 2010-2011 and Rs. 4.35 per kWh in 2014-2015. As Table 2 on the previous page shows, two of the discoms (DGVCL and MGVCL) managed to increase the average revenue realised (ARR) at a similar rate. The other two (PGVCL and UGVCL) had revenue gaps before subsidy of up to 44 paise per unit in 2007-2008, but these had decreased to a maximum of 25 paise per unit in 2014-2015. Including the subsidy received, all four public discoms have been matching costs with revenue realisation for the past decade.

Differences in revenue realisation by region have become obvious with unbundling into four public discoms. Today, the four regional discoms UGVCL, DGVCL, MGVCL, and PGVCL cover 50,000, 23,000, 24,000, and 100,000 km^2 across 32 lakh, 29 lakh, 29 lakh, and 47 lakh consumers, respectively. The higher dependence of PGVCL and UGVCL on agricultural subsidies can be partly explained by the higher proportion of the low-tariff agricultural category in their consumer mix, as Table 3 shows. In the case of PGVCL, it is also attributable to considerably higher AT&C losses than for the other discoms, reflecting the physical challenge of serving a low-density population of small-scale farmers. By contrast, UGVCL's agricultural consumers have relatively larger land holdings and electricity demand, and the discom also has a high proportion of industrial consumers, although not as much as DGVCL or MGVCL, as Table 3 shows.

Table 3: Numbers, Percentage Sales, ARR, and Total Revenue Recovered by Consumer Category, 2007-2008 and 2014-2015

Consumer Category	Number (%)	Sales (%)				ARR (Rs./kWh)				Total RR (Rs. crore)			
		D	M	P	U	D	M	P	U	D	M	P	U
2007-2008													
Domestic	77.64	15.53	24.36	15.72	9.14	3.14	3.14	3.04	2.86	389	372	565	268
Agricultural	9.41	6.64	15.33	34.02	57.00	1.15	0.82	1.17	1.13	61	79	470	658
Industrial	11.54	67.64	42.14	44.21	26.85	4.50	4.69	4.29	4.70	2431	962	2244	1293
Others	1.41	10.19	18.17	6.05	7.01	4.71	4.59	5.61	3.72	383	406	402	267
2014-2015													
Domestic	77.64	12.96	25.28	14.54	10.01	5.06	5.01	4.90	4.75	1187	1068	1612	838
Agricultural	9.41	4.16	12.48	29.02	45.83	2.56	2.47	2.61	2.64	193	260	1712	2127
Industrial	11.54	65.72	52.34	41.18	33.51	6.44	6.64	6.44	6.47	7656	2928	6004	3816
Others	1.41	17.16	9.90	15.26	10.65	3.41	5.34	3.68	3.50	1057	445	1269	656

All 67.65 lakh rural households statewide have been electrified, at least on paper. The two private distribution licensees operate in the urban areas of Ahmedabad and Gandhinagar (Torrent AEC Ltd.) and Surat (Torrent SEC Ltd.). As Table 4 shows, both the GEB during the 1990s and now the public discoms have been maintaining AT&C loss levels at approximately 20 percent overall, with three of the four discoms at approximately 15 percent. Even PGVCL, which has a large agricultural consumer base in areas with low water availability and the lowest consumer density, has reduced loss levels from 32.74 in 2007-

2008 to 25.18 in 2014-2015 (cf. Table 2). The increase in productivity of public discoms is also visible in the average number of employees per MU having continued to decrease steadily from 1.61 in 2000-2001 to 1.02 in 2005-2006 and 0.93 in 2010-2011.[14] The urban areas that Torrent Power Limited runs in Gujarat have long had among the lowest loss levels in the country.[15] Overall, AT&C losses for the public discoms have been in the 18.58- to 20.41-percent range during 2012-2016, with a target of gradually lowering them to 16.31 percent by 2020.[16] Even the 22.81-percent loss level of 2007-2008 (cf. Table 4) is acceptable within an Indian context and indicates that the distribution sector in Gujarat has been in much better shape than most other states in terms of efficient infrastructure and revenue realisation.

Table 4. AT&C Loss Percentage in 1995-1996, 1998-1999, and 2007-2008 to 2014-2015

Year	1995-1996	1998-1999	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Loss (%)	18.30	20.10	22.81	22.04	22.81	16.89	19.26	19.87	15.93	16.06

Since the advent of an independent regulatory authority, the four public discoms and two private licensees file separate annual petitions for Average Revenue Requirement and tariffs with GERC. Torrent Power Limited has consistently had a solid financial performance. In December 2015, the four public discoms were the only ones in the country to be given an A+ credit rating. This is unsurprising because, as shown, there is little revenue gap between ARR and ACS in Gujarat, and none after including the agricultural subsidy.[17] In 1999-2000 under the GEB, the total share of consumption by consumer category was 9.02 percent by domestic, 47.84 percent by agricultural, 29.34 percent by industrial, and 13.80 percent by other consumers. In terms of the current consumer mix, consumption is 15.82 percent for domestic use, 26.71 percent by agricultural users, 34.12 percent industrial, and 23 percent by other users, including 16.14 percent by so-called Low Tension Medium Demand (LTMD) consumers, a category that comprises primarily industrial demand.[18] Hence, industrial consumption constitutes approximately 50 percent of total demand.

This high proportion of high-tariff consumers works in Gujarat's favour financially. In 2015, Gujarat became the tenth state to join the UDAY, but had a very marginal share in the national discom debt of Rs. 4,37,000 crore. Although its accumulated debt was Rs. 2,400 crore in 2013,[19] at the start of 2017 Gujarat had yet to issue any bonds under UDAY, suggesting that by the time it opted in to UDAY in 2015, sectoral debt had been cleared or was minimal. In general, the state follows a progressive tariff structure, with charges per unit increasing with incremental consumption levels ranging from Rs. 3.05 to Rs. 5.20 for domestic consumers. Besides varying by consumer type, being steadily higher from agricultural to domestic to non-domestic and industrial consumers, these also vary between the public

[14] Ibid.
[15] Torrent Power Limited, "Investor presentation," 2015, accessed January 14, 2017, http://www.torrentpower.com/pdf/investors/13-01-2016_mewtb_investor_presentation_q4_14_15.pdf.
[16] DISCOM Wise AT&C Loss Trajectory by MoP in Consultation With Discoms, http://www.apdrp.gov.in/IPDS_Order_Guidelines/AT_And_C_Loss_Trajectory.pdf.
[17] https://www.idfc.com/pdf/publications/Gujarat-Distribution-Reforms-Draft-Report.pdf.
[18] GUVNL, March 2016, figures displayed at SWITCH Global Expo in October 2016.
[19] http://reports.ambitcapital.com/reports/Ambit_Utilities_UDAYscheme_23Dec2015.pdf.

discoms and the private licensees. Unlike other states, Gujarat uses marginal quarterly tariff adjustments through an instrument known as the Fuel and Power Purchase Price Adjustment (FPPPA) to change energy charges based on costs. This sort of problem-driven policy design and execution has characterised Gujarat's electricity sector, with smoothly interfacing technical, financial, and administrative capacities.[20] Tariff hikes (at different rates for the public and private discoms) besides these marginal adjustments tend to exclude agricultural and BPL consumers who constitute a significant proportion of the consumer base.

Developments Consolidating Sectoral Gains Over the Past Decade

Leveraging its financial health, Gujarat has been able to lead the way in terms of renewables, offering a high tariff for initial solar energy development even prior to the national policy and consistently developing its wind capacity, which has now crossed 4 GW. Shortly after its much-cited JGY initiative, Gujarat turned its attention to renewable energy, issuing a Wind Power Policy in 2007 and a Solar Power Policy in 2009, the latter kicking off solar growth even prior to the national solar policy being introduced in 2011. On the heels of these moves came the Principal GERC (Procurement of Energy from Renewable Sources) Regulations, 2010 (PERC Regulations). Both of the initial policies have recently been revised in the form of the Gujarat Solar Power Policy, 2015, which includes net metering guidelines, and the Gujarat Wind Power Policy, 2016. But in recent years, Gujarat has stopped solar addition after its initial splurge, because it is meeting its solar RPO targets, whereas wind continues at a steady rate and remains close to RPO targets. In the past two years, GUVNL reached 7.66 percent against 9.00 percent in 2015-2016, and 7.41 percent against 8.00 percent in 2014-2015. Torrent Power Limited reached 9.01 percent in 2015-2016.

A linked key development during the past decade has been the introduction of open access (OA) to consumers above 1 MW, allowing primarily industrial consumers to switch from discoms to other supply sources courtesy of captive power plants (CPPs) or by accessing out-of-state supply via the power exchange. CPPs and OA consumers are not yet complying with RPOs on a regular basis, with a case sub-judice in the High Court,[21] despite the GERC having ordered that the Supreme Court ruling in the Rajasthan case makes them liable.[22] OA has also proven somewhat controversial for other reasons, which are taken up in the next section based on stakeholders' inputs.

For 2010-2011, 2011-2012, and 2012-2013, the PERC Regulations set RPO targets at 5.00, 6.00, and 7.00 percent, respectively, of which solar and bagasse comprised 0.25, 0.50, and 1.00 percent each, and wind comprised 4.50, 5.00, and 5.50 percent, respectively. This was applicable to distribution licensees, captive, and OA consumers above 5 MW. In 2014, the GERC (Procurement of Energy from Renewable Sources) (First Amendment) Regulations, 2014, specified the RPO targets for 2013 through 2017. The 2013-2014 year maintained previous levels, with graded increases mandated in the next three years. These place the 2015-2016 target at 9.00 percent, including 1.50 percent solar and 6.25 percent wind,

[20] Namrata Chindarkar, "Beyond Power Politics: Evaluating the Policy Design Process of Rural Electrification in Gujarat, India," *Public Administration and Development* 37;1 (2017): 28–39.
[21] Interview with GERC official on September 21, 2016.
[22] Supreme Court, Civil Appeal No. 4417 of 2015, Hindustan Zinc Ltd. versus Rajasthan Electricity Regulatory Commission, New Delhi (2015).

and the 2016-2017 target at 10.00 percent, including 1.75 percent solar and 7.75 percent wind supply, with bagasse maintained at 0.50 percent.[23]

Thus, secondary research (supported by some interviews) suggests that the story of Gujarat's development sector so far has been characterised by successful efficiency measures leading to social inclusion and financial health by addressing a problem many states have found intractable through rural feeder separation. Good financial standing has enabled investment in renewable energy, while sectoral reforms have brought about institutional and regulatory structures that in turn enable the use of sophisticated instruments such as the FPPPA and seemingly rational decision-making in the distribution sector. Although political influence is visible in the maintenance of highly subsidised and often flat agricultural tariffs, long-term rule by one political party has provided a stable platform for policy vision and implementation, and the overall gains accomplished by the sector have translated into real improvements in terms of reliable quality power supply across Gujarat.

Following a summary of the methods used to investigate these aspects empirically, the next section presents and analyses different stakeholders' views on the recent developments that emerged to be most important. A concluding section uses this grounded account to draw out the pros and cons of the distribution sector's current growth trajectory for Gujarat's populace.

II. Methods

Over the course of 26 expert interviews (some with two interviewees) in September and October 2016, the author collected data by engaging with perspectives of current or retired top- and middle-management representatives of the following types of institutions: three from the regulatory commission, five from the distribution companies, six from the state government energy department, two from energy consultancies, one from civil society, one from an agricultural association, one from academia, two from business associations, two from the renewable energy agency, one from a private renewable energy enterprise, one from the office of the Chief Electrical Inspector, and one from a media house. Interviews lasted between one-half and two-and-a-half hours, with the median length being an hour. Time constraints and a supply-side focus meant consumer groups were not as well-represented as other stakeholders, although this was partly a function of relatively lacklustre civil society engagement with the distribution sector. Although directly interviewing and observing consumers, field staff, and ground operations was not within the envisaged scope of this study, findings indicate that this would be very relevant for future in-depth research.

III. Actors and Institutions: The Political Economy of Distribution

Across stakeholders, interviewee responses to the general query of the most important developments in Gujarat's electricity distribution sector since the turn of the millennium flagged these key positives: the gradual nature of corporatisation of the sector; the cultural proclivity for sound business practices and

[23] Gujarat Energy Development Agency discussion paper, 2016, http://www.gercin.org/uploaded/document/774822eb-6538-4da5-8097-6ebb8ed4710b.pdf.

conducive environment for good governance in Gujarat;[24] the unprecedented success of agricultural feeder separation reforms alongside vigilance by a dedicated electricity police force that together stemmed losses and improved sectoral finances; the pioneering role of former CM (now PM) Narendra Modi in bringing about a profitable sector and installing sufficient generation capacity including solar energy; and the above-average performance of the sector in Gujarat in recent years compared to other states. As these interviewees stated, these successes took place despite the persistence of many challenges, such as a relatively costly electricity generation mix and state government subsidies for low agricultural tariffs, thanks in large part to a high proportion of demand from high-tariff industrial category consumers within the mix. Takes on these issues naturally differed across stakeholders, as this section aims to unpack by presenting these findings. It also serves to lay out a selection of prime concerns voiced by specific stakeholders in an attempt to nuance our understanding of the manner in which the developments mentioned previously have played out since sectoral unbundling. This provides a basis to analyse the manner in which different stakeholders have benefitted from or borne the brunt of the state's changing electricity distribution sector. The subsequent section relates this analysis with the preceding background on the regional political economic context.

Key Reforms: Managerial, Financial, and JGY

A good place to begin is with the views of top-level management within GUVNL, the holding company that oversees the four public discoms' operations as well as those of the generation and transmission utilities, and conducts bulk electricity purchase and sale on their behalf. Notably, many of GUVNL's key staff come from senior positions in the discoms. One of these senior managers emphasised how critical the contribution of political distancing has been in Gujarat:

> "Previously we were in the same shape as others. We started getting results 2005 onwards. In general, people were not bothered about costs earlier. That attitude changed with unbundling. The main thing about the distribution sector is that political interference leads to a loss-making proposition, ultimately for the consumer as well. For example, if you do not levy cost-effective tariffs on a particular consumer sector, that sector will suffer and the manpower and concerned officers will become demotivated. Then they will try to get their cuts in any way possible. So we have to streamline people and processes. We have always tried motivating employees. There is no other miracle, only people working. Government will has been strong throughout this period."[25]

While highlighting these managerial aspects, he also nodded to the role of expertise:

> "Some aspects like power procurement are not decentralised. This is a techno-specialised aspect and we only have a few skilled employees buying at the exchange and ensuring the best rates and reliable supply over time, so we did not want them to get spread out and have each discom trying without enough expertise."[26]

Like the GUVNL manager, other interviewees largely attributed the manner in which processes and people were streamlined to two key aspects of reforms, which themselves required expertise. The first

[24] See also Archana Dholakia and Ravindra H. Dholakia, "Governance, Efficiency and Effectiveness in Gujarat." In *The Making of Miracles in Indian States: Andhra Pradesh, Bihar, and Gujarat*, edited by Arvind Panagariya and M. Govinda Rao. Oxford: Oxford University Press, 2015.
[25] Interview with GUVNL official on October 8, 2016.
[26] Ibid.

was setting finances right, primarily by renegotiating some existing power purchase agreements during 2003 through 2005, which helped contain ACS within levels it was feasible to match ARR with. Generators had been showing an exaggerated heat rate, and because the PPAs were on a cost-plus basis, this gave the government the leverage to renegotiate.[27] As then-GEB Chairman Manjula Subramaniam recalled:

> "I was already Secretary in EPD [Department of Energy and Petrochemicals] and thought I would last in this new position for maximum four months, because back then that was the norm, since there had been no official GEB Chairman for a long time. We had loans at 17 percent interest rates! We constituted a committee to renegotiate PPAs. There was a lot of hue and cry but we had a very balanced team. We used the low 8 percent rates prevalent then to restructure debt. Lower rates are not available now which is the problem for Rajasthan. Just as we restructured debt, we did the same with generators with whom we had PPAs and got them low interest rates too, so we could bring down our payment rates to them. In one year, we had saved 1,000 crore extra."[28]

This was possible because the GEB received close support from the state in the form of the EPD and the Department of Finance, guided by its Chairman's experience with national liberalisation reforms. A former senior EPD member who was involved in these financial developments underscored the magnitude of this achievement:

> "Renegotiating PPAs elsewhere is unheard of. Modi took it up. Suppliers used to ask for payment of unused 20 percent of PLF [Plant Load Factor] as 'deemed generation' so we were paying fixed costs for 90 percent PLF even though we were only demanding 70 percent PLF. It was a case of *nausikhuay* [new kids on the block] emulating foreign PPAs, with counter-guarantees to ensure they got paid no matter what happened. We managed to adjust these issues."[29]

But in addition to renegotiating PPAs, sectoral finances also required greater transparency. As a former senior GERC official explained, there was a great deal that needed fixing:

> "Distribution was the issue. Meters wouldn't be there, or wouldn't work. Losses were put on agriculture using some idiotic formula. We got a TERI [The Energy and Resources Institute] study done to ascertain the T&D losses around 2001. Our staff used to show 20 percent on the books. TERI's estimate based on state-of-the-art monitoring came to 35 percent! There was a lot of opposition as people didn't want the details to come out. … Our engineers were technically good but lacked financial accounting skills. … There were two power accounting centres, in Ahmedabad and Rajkot. I asked the CEO of one, and he didn't know the revenue and expenditure of even his own profit centre! There was no commercial mindset in power in Gujarat. Three percent return was mandated by the old Electricity Act. In 1999, we got hit by a tax of Rs. 100 crore, because we were showing profits on our books. I said this was ridiculous, so I looked into the matter and told them to get their act straight. For the first time we showed actual losses, and in 1998-99 we had cumulative losses of Rs. 2,500 crore."[30]

[27] Ninad Rajpurkar, "Identifying Best Practices in Public-Private Partnerships in Renewable Energy" (Masters thesis, MIT, 2015).
[28] Manjula Subramaniam interview on October 11, 2016.
[29] Former EPD official interview on October 11, 2016.
[30] Former GERC official interview on October 11, 2016.

Like this first aspect, the second key aspect revolved around capable management and leadership. They were both made possible by strong political vision and will and backed by financing. The second one was the JGY feeder separation reform that enhanced operational efficiency and revenue realisation. As per a former discom manager:

> "The key aspects of JGY were regulating water drawal through segregation by bypassing the *teta* [phase converter improvised by farmers using capacitors] and using the SDT [Special Design Transformer] to supply rural domestic power in parallel. … With feeder separation, there is more transparency, so actual transmission losses are visible. This makes it easier to identify where the losses are, which vigilance teams and dedicated police stations are acting on. We are looking into a mobile police battalion to see if this could be a cost-effective avenue.'[31]

This reform has been key to keeping good financial performance going, and has been complemented by measures like the FPPPA fuel surcharge since 2004 to ensure timely recovery of variable costs. Since 2000, the discoms have only been releasing metered connections for agriculture to further increase accountability through oversight, although phasing out existing flat-rate connections has remained politically infeasible. As a senior GERC official explained, "There has been a big gain in efficiency achieved by the licensees. They have avoided franchisees. There has been both technical and financial improvement, and both quality and amount of supply have gone up."[32] This points to the importance of efficiency reforms over time in terms of their impact on the ideological commitment of actors within the distribution sector, and whether they see public discoms as capable of managing their own affairs well or being in need of private franchisees to bring in efficiency. JGY has kept the balance firmly in favour of the former preference in Gujarat, unlike, for instance, in Rajasthan. An elected post-holder within the only farmer organisation currently actively representing farmers in the sector, the Bharatiya Kisan Sangh, however, complicates the narrative about JGY by contextualising discoms' interests vis-à-vis those of more marginalised stakeholders:

> "We demanded 10-12 hours agricultural power, then the government scheduled 8 hours, and good quality reliable power became available. Domestic supply started for all villages, then all households, through JGY. PLF used to be very low. We found out losses were high due to inefficiency and corruption – low-grade coal, poor maintenance – while discom staff swallowed funds. … There is scope for the discoms to manipulate these figures [pointing out fluctuations in annual AT&C loss figures in a GUVNL report that he finds inexplicable]. One of our operators who has three *mandlis* [i.e., three circles within a district] in each of which each pumpset is operated constantly whenever there is power to be shared amongst several small farmers, calculated that there was 3.5-4.5 hours of actual power supply and use per day. The problem is the discoms get Rs. 4,200 crore in agricultural subsidy and only 1,000 crore from the farmers, so for them it helps to show higher agricultural consumption to get more money from the government. But moving to meters with corrupt staff who will exploit us is not an option for us either. So we keep the flat category, but in this there is no incentive for farmers to conserve power, while there is incentive for discoms to cheat. Farmers in many parts of Gujarat don't use pumpsets many months of the year, when crops don't need it and when there is rain during the monsoon, yet they pay flat rates for 365 days of the year. Even then when we talk to them they are unwilling to move to metered rates because the staff have harassed them so much."[33]

[31] Interview with GUVNL official on October 8, 2016.
[32] Interview with GERC official on September 21, 2016.
[33] Interview with Bharatiya Kisan Sangh representative on September 27, 2016.

This was backed by the account of a former senior official based on his experience within multiple discoms, who pointed a finger at government officials with their hands in the pie as well:

> "I used to sit with the farmers and hear their problems. The SDO [sub-divisional officer] etc. take cuts everywhere possible and cheat the farmers. We optimised the rural electricity corporation norms in order to optimise performance knowing all this, in order to have better revenue in the long run through more satisfied consumers."[34]

Thus, incentives are in place for discoms to over-report flat-rate agricultural consumption to claim higher government subsidies, but farmers are wary of a move back to metered connections based on experiences of cheating by discom field staff. In short, the managerial gains that leadership and expertise have secured through rationalising finances and instituting efficiency measures during the past two decades of reforms have not altogether led to a transparent sector with only winners: there are, perhaps inevitably, also losers. But top management explained GUVNL's approach by pointing to the one-third-of-a-million pending agricultural connections, which are being installed with meters:

> "By adding more than 100,000 per annum we are stretched to physical capacity. Beyond this execution suffers. We will complete them all within the next few years. Financing is not an issue, the government is ready to transfer us money immediately. Even though the whole process is already contracted out, we can barely monitor execution even now."

This suggests that Gujarat might be able to stamp out the persistent problem of flat-rate meters in the near future.

Contentious Current Concerns? Open Access, Renewable Energy, and Public Engagement

Another consumer category feels much less marginalised. This is industry, the largest contributor to discom finances. Although slightly disgruntled with the homeostasis that the GERC and discoms seem to have achieved on the subject of OA for consumers above 1 MW, they are satisfied with the quality and reliability of power. One Chamber of Commerce representative highlighted the importance of reliable supply for Gujarat's major industries, such as pharmaceuticals, textiles, and chemicals, which use continuous processes, with any disruption causing heavy losses. He said, "They are happy with the current quality of service compared to any savings from switching. The savings are about Rs. 2 per unit after all the open access charges."[35] Another Chamber of Commerce representative emphasised that it is an issue of finding a balance:

> "When utilities were given the right to be maintained as a monopoly, consumers were also given the right to choose. Ground realities of social obligations dictate the need to safeguard the discoms. But they should consider an option of purchasing certain percentages from out-of-state and some from the discoms for private players."[36]

GUVNL employees, although on board the social obligation sentiment, gave no indication of considering any such offerings, which could lessen demand from their high-tariff consumer base.

[34] Interview with former discom official on October 7, 2016.
[35] Interview with a Chamber of Commerce representative on September 22, 2016.
[36] Interview with a Chamber of Commerce representative on October 9, 2016.

A Torrent Power manager with regulatory expertise put the ball in the government's court:

> "We didn't get involved although it impacted us negatively. GERC has approached it without considering the overall perspective. Open access consumers were indulging in gaming, which disrupts planning for distributors, who have to cater to a variety of consumers. So it is not only about the spirit of competition. It is a question of policy."[37]

An EPD official took no prisoners as he put this in context:

> "In normal cases, OA is granted for all long-term applicants. Due to transmission constraints, we are unable to grant it for short-term applicants. Everything is implemented based on regulations. Discoms have a universal supply obligation. So their supply management should not suffer due to frequent changes in demand by private consumers trying to always go after the best rate. So transmission must prioritise the discoms. This is in accordance with the Electricity Act."[38]

GERC's top management addressed OA in terms of its implications for renewable energy uptake, explaining that wind energy gets pulled back because of it:

> "The charges we levy on OA consumers include 0.80 fixed charges, 1.20 cross subsidy, 0.60 additional surcharge, and around 0.10 charge for losses, meaning the estimated sale is a bit higher than the actual supply because we include a small percentage for losses. So in all around Rs. 2 other than fixed charges. With these Rs. 2, they still make good savings compared to the industrial tariffs by buying from the power exchange, but unfortunately since wind is above Rs. 4, it costs around the same as the industrial tariff. Hence nobody bothers to adopt it in OA."[39]

Despite this death knell for wind within OA, wind capacity addition has been steady in Gujarat, despite relatively low purchase rates being on offer. A senior GUVNL manager confidently explained that, "Signing a contract with GUVNL means lower costs for developers in terms of administration, financing and operational costs, since our system is working pretty much on auto mode. I always think like the Delhi roads: create roundabouts, not crossings."[40] Wind is problematic when it comes to transmission, because the daily and seasonal fluctuations are high and the throughput falls far short of the 4-GW installed capacity, especially during summer months when demand is high. A senior official of the Gujarat Energy Development Agency (GEDA), which as the state nodal agency for renewable energy is directly involved, instantiated, "Yesterday, we had a high of 991 MW and a low of 299 MW. The regulations demand a PLF of minimum 24 percent but usually it stays below 20 percent in practice."[41] Contrary to views expressed by a GERC official, this GEDA official deemed gas availability too low to complement wind and therefore saw wind as causing a grid management problem. Solar energy has better complementarity, and the same official explained GEDA's history with it:

> "Gujarat had a first-mover policy in 2009, thanks to then-CM's foresightedness. Under this policy we allotted the first 1,000 MW to players at rates of up to Rs. 15 per unit for an initial period then Rs. 5 per unit in the latter part of 25 years. They came flocking in and by 2012 we had 900

[37] Interview with Torrent Power Ltd. employee on October 6, 2016.
[38] Interview with EPD official on October 5, 2016.
[39] Interview with GERC official on September 21, 2016.
[40] Interview with GUVNL official on October 8, 2016.
[41] Interview with GEDA official on September 23, 2016.

> MW installed and stopped any further allotment. The national policy on solar came in in 2011 and it was our earlier action that generated the quick lift-off for it so the country gained through the interest created among developers who have taken it up in other states like Rajasthan. We had a strict qualification criterion of only those developers who got plants commissioned within the control period getting the higher tariff for the initial period, but around 80 percent made it, which was higher than we expected. So now we are stuck buying solar at higher tariffs for the next decade but then we have the good rate of Rs. 5 per unit tied in for many years thereafter. When we stopped allotment we allowed solar CPPs but there were basically no takers for this because of the high installation cost. All developers wanted to come for the high initial tariff. We got 1,000s of MW in initial bids but only the first 1,000 MW qualified for the allotment in 2009."[42]

A former GEDA official who was involved in the remarkable installation of solar capacity shared corresponding views:

> "We didn't have a single MW of solar energy around. We invited a series of stakeholders, then held a meeting with 35 of them. GERC confirmed Rs. 15 per unit initial tariff and the costs associated with solar went down, so the rush began. We got 350 proposals from developers, which we evaluated on financial and managerial strength of the applicants rather than sectoral experience which hardly anyone had with solar. We allotted in small capacity, a maximum of 25 MW and down to 2 MW. We didn't want to give big projects to a few big people which might misfire. Now the market has matured. Banks are willing to provide financial support for solar."[43]

An industry representative, however, bristled at the topic:

> "Renewable energy is also business, those [small] developers are not here to do charity. … Why should they not be allowed to sell at free market rates to whoever they want? Then they also don't allow five small players to set up a windmill plant collectively, so this rules out MSMEs. They are only interested in favouring large businesses. ... The government gets a few percent in commission from the large companies … which they cannot demand from small players, so they are only interested in supporting large companies. Everyone knows these things work on commission basis."

This claim, made in the presence of his friends who nodded agreement, proved recurrent. A renewable energy consultant with long-term sectoral exposure pulled no punches:

> "Modi was a single point of leadership, so there was no problem of multiple authors. They are not looking to promote solar anymore, it was initially a political game of oneupmanship. … He used the government machinery for his furtherment and agenda."

Based on professional engagement with the solar sector in Gujarat, he declared it obvious that bureaucrats were dependent on their ministers. "What happens depends on whether the guy at the top in GEDA or GERC pushes it or not," he claimed, explaining that political power influenced by well-financed lobbies drives top-down decision-making across sectors in Gujarat, concluding that, "so only

[42] Ibid.
[43] Interview with former GEDA official on September 27, 2016.

big players get their way." But for even an investigative journalist to make this claim, he stated flatly, would involve big personal risk.[44]

A significant mover on the solar energy scene in Gujarat shared more moderate views, reflecting on positive details:

> "The unique thing about Gujarat is that other players from pharmaceuticals and diamond jewellery were able to get into the [solar] sector, because the financial and managerial background was prioritised and the sector was opened to them on that basis. Due to the solar park [Charanka], GETCO got pressure to develop infrastructure. They first installed 560 MW transmission and now have 1,050 MW solar capacity. Many 5-MW players have come in even outside the solar park, scattered across the state. The country owes cost reduction in solar to Gujarat ushering it in."[45]

A detailed explanation of the constraints that solar developers currently face, however, suggested that continued solar growth is unlikely to happen as smoothly. This came from an official within the Office of the Chief Electrical Inspector (CEI):

> "I have seen developers suffer. They have to approach CEI, GEDA, GETCO, and GUVNL separately, it is a big hassle for even a 1-kW project which takes a minimum of three months to get approval for, and larger projects take at least six months. Three authorities send three electrical inspectors to make site visits. Not only time, this takes transport and manpower expenses. Then one has to know all procedures and the right people in each agency; they all demand different sets of documents to provide their certifications. After that, to get the MNRE subsidy you have to submit all these certificates, then they do their own inspection which causes further delays before transferring the subsidy much after the project is installed. With single-window clearance you could give all powers of different agencies to one authority and ask for the minimum documents online. GERC has the power to make this happen now!"[46]

A final and related key issue emerged regarding popular participation in the sector, or the lack thereof. Respondents' views on this were largely similar. A senior journalist with a long-term interest in this sector pointed out that GERC's move to its swanky new offices in GIFT One City near Gandhinagar from its leased premises in Ahmedabad in 2013 was a real blow:

> "There were calls from consumer groups that GERC shouldn't move so far. There is no bus, direct transport – they have their own buses running, nobody knows where it stops, when it goes. This increases inaccessibility for the consumers."[47]

An energy auditor had views informed by extensive engagement with industrial consumers: "Consumers have got their main demands satisfied in terms of quality reliable power, so they are focussing on business. When people are busy with activity they generally don't disturb the system."[48] A State Advisory Council member, however, brought forward a key concern regarding consumer advocacy. He pointed out that initially the Consumer Grievance Redressal Forum (CGRF) Chairman and Members were

[44] Interview with renewable energy consultant on September 24, 2016.
[45] Interview with solar energy specialist on September 27, 2016.
[46] Interview with an official from the Office of the CEI on October 13, 2016.
[47] Interview with senior reporter on October 12, 2016.
[48] Interview with energy auditor on September 29, 2016.

all from the discoms. Upon repeat objections to the GERC and Ministry of Power, the GERC began selecting independent members rather than discom employees, although the discoms still advertise the posts. Until 2011, he said:

> "Ninety percent of the decisions [of the CGRF] favoured the discoms. Even the 10 percent that favoured the consumers weren't implemented. Now the GERC has stipulated public display of results in terms of a positive or negative outcome, and while about 60 percent favour the discoms, 40 percent go with the consumers."[49]

A senior GUVNL official had a contrasting take on this:

> "CGRF is being reviewed by GERC on a regular basis, hence it feels pressure to show more action. People have a mistaken assumption that favouring consumers is necessary for achieving this, which biases their orders in favour of consumers. Now many consultants have cropped up as consumer representatives. … Now instead of officers, advocates are presenting cases in the GERC, from both sides, and also in CGRF and to the ombudsman. The intent was that members of these forums, who have a fairly independent view, would give justice based on the case, not that these cases should require much interpretation of law. … It can become a problem if they start working too much like a judicial body. Then the utility cannot go on appeal against the consumer and it will become only one-way. It is not an issue yet but might become one later."

A senior journalist struck a more balanced chord between these competing perspectives, observing that:

> "There are some groups who have managed to make consumer interests heard during GERC hearings. Some organisations who have funding from some parties represent on behalf of consumers, but they ultimately have their own agenda, and give fight only to some extent and don't go beyond. Consumers themselves don't have a voice. There are open hearings, GERC calls for public hearings, but there is also lack of awareness on part of consumers. So only those with hidden agendas get involved."[50]

A senior researcher likewise lamented that communication remains a major challenge within the sector: "The grid engineers, who are very good, work in isolation. They should work together with the BEE [Bureau of Energy Efficiency] nodal agency GEDA. The green save-the-earth types all get together in a separate group rather than engaging."[51]

Since the GERC's formation, first the GEB and since 2006 the four discoms have held public hearings on tariffs on an annual basis close to the GERC's location, which used to be Ahmedabad and since 2013 is Gandhinagar. Table 5 presents a snapshot of civil society participation during this period. Participation, while certainly existing, has been subdued, with attendees primarily including the same consumer representatives with long-term sectoral involvement, especially from industry, and retired employees still engaging with the sector.

Table 5. Civil Society Participation Through Written Responses and Hearing Attendance Over Time

[49] Interview with State Advisory Council member on September 27, 2017.
[50] Interview with senior reporter on October 12, 2016.
[51] Interview with experienced researcher on September 22, 2016.

Year	# Written Responses	# Hearing Participants	# Hearings	# Locations
2004 (GEB)	36/116*	65	1 (12-21 May)	1 (Ahmedabad)
2006	DGVCL 18, MGVCL 11, PGVCL 18, UGVCL 12	DGVCL 10, MGVCL 7, PGVCL 11, UGVCL 9	1 (6-10 Apr)	1 (Ahmedabad)
2010	16	14	1 (25-26 Feb, 3 Mar)	1 (Ahmedabad)
2015	22**	13**	1 (11, 15 Feb)	1 (Gandhinagar)

* 116 objections or responses submitted, which the GERC took up as 36 objections, citing overlaps.

** These are the numbers for PGVCL, with other discoms showing smaller subsets of the same ones.

IV. Implications of Sectoral Trajectory for Gujarat's Distribution Sector

Having identified the enabling factors that have made Gujarat's distribution sector a successful model and the constraints that have surfaced through this study, this section focusses on key details and unpacks their implications. This points to areas where scope for future gains exist in the sectoral trajectory, and others where further constructive developments are unlikely given the regional political economic context. Possible lessons from Gujarat's implementation of efficiency and accountability measures are prioritised, while resisting the tendency to call for a complete end to political influence within the regulatory structure, which is tricky to diagnose, let alone influence, from outside.

The main takeaway from the sectoral analysis based on study findings above is that owing to the timely and well-conceived refinancing and feeder separation efficiency measures that were implemented as part of a measured corporatisation process during the early 2000s, Gujarat's distribution sector has been able to sit pretty for the past decade and more. Other factors to their advantage, such as a large proportion of high-tariff consumers, sufficient installed capacity, a stable political environment in which the power sector is put forward as a well-performing achievement of the incumbent party, and a regional emphasis on good governance as the state's mantra, have helped discoms capitalise on this relatively comfortable state of affairs. The question that the latter half of the preceding section brings up, however, is whether the sector has settled into a suboptimal state of homeostasis on several key fronts: competition, renewable energy uptake, and popular engagement.

In each of these cases, GERC's regulatory role has ensured that policy requirements are met, yet the outcomes somehow seem to fall short of embodying the spirit and intent of these policies. Industrial consumers are disallowed short-term OA to discourage speculative trading on the power exchange, citing discoms' priority of meeting their universal supply obligation. But an effort to enable short-term OA in the future so as to enable consumers to purchase cheap excess power from the exchange is conspicuously missing from the agenda. RPOs have been met by discoms for now, thanks to quick large-scale solar capacity addition and existing installed wind capacity, but there is no emphasis on promoting the distributed installation of more solar capacity or building complementarity into the generation mix and transmission network for wind, given its large daily and seasonal output fluctuations. Tariff hearings are held annually with the public and see mostly the same actors showing up to participate, but no novel

measures to increase public outreach, connect with other consumers, or ensure strong public access to the GERC are put in place, despite its relocation to a distant site away from the public eye since 2013. There is a sense of going through the motions rather than of proactively growing the sector. A highly publicised global expo on electricity hosted by the state in Vadodara, which the author attended over several days in October 2016, put forward a very self-congratulatory image of the power sector with nationally and internationally important delegates – but any attempt to make the sector's operations comprehensible and its employees accessible to the general public failed to reflect in the design of both the space and the elaborate programme.

Each of the three previous aspects can be expanded into a variety of concerns:

(i) Demand for OA from industrial consumers in Gujarat tends to peak during the monsoon season when out-of-state supply is at its cheapest levels annually, coinciding with the time of year when discoms face their lowest demand in general, with neither agricultural pumpsets nor heating or cooling appliances being used much. This provides a perverse incentive for discoms to hold up enabling short-term OA, thus limiting their exposure to disruptions in what are quite predictable, stable demand schedules at present. It is hard to believe that setting up short-term OA is outside GUVNL's reach were it more firmly pushed by the GERC. Indeed, corporatisation has enabled GUVNL to rationalise coordination between generation, transmission, and distribution sectors. Having achieved excess capacity allows it to rationalise supply without much pressure of demand-side management – an advantage it seems keen to hold on to, but at some cost to developing a competitive electricity sector.

(ii) Discoms have been dragging their feet on ordering and installing bidirectional meters to delay buyback from rooftop solar in practice, given their perverse incentive to sell the existing installed capacity for which they are already tied into PPAs. Moreover, the new net metering policy severely limits prospects for growth by specifying individual caps on installable solar capacity (50 percent of connected load) and transmittable supply levels (50 percent of installed solar capacity). This dampens economic incentives for small-scale solar generation to a degree unjustified by any concerns of avoiding grid overload. Having initially locked itself into high purchase rates for a large chunk of solar power, GEDA has not taken a strong lead on pushing RPO mandates for CPPs or financing aggressive renewable energy development. Policies hold back small players, for example, from being able to participate in and benefit from wind energy.

(iii) Apart from the question of GERC's swanky GIFT One City offices being quite hard to access for ordinary people, there do not seem to be any consumer representative organisations that have seriously engaged with the sector in recent years, besides one main farmer group. One chief concern of this group – agricultural connection pendency – is being addressed, even if the reason for this is partly the upcoming state elections, with the main limitation being discoms' capacity to ensure quality installation of more than 1 lakh connections annually. But complete rural electrification in turn implies reduced push and markets for distributed renewable energy capacity in favour of large, concentrated, and fossil-fuel-based generation. This begs the question of whether, with the sector having become stable and profitable, public engagement can continue and be geared toward participating in making quantum leaps to a different, brighter power future, or whether current achievements are enough for people to turn their attention to other problems affecting their lives more obviously. It would seem the latter.

As seen in these issues, which like much else in this tightly knit sector often overlap with each other, electricity distribution in Gujarat is still very much modulated by complex socioeconomic and political dynamics. There is no denying that the regional political economy has made for a quite positive sectoral trajectory in the state in many respects. But this relative success in electricity distribution is allowing Gujarat to be strategic in which battles it picks now, and although this ensures sectoral stability, it fails to press for urgent changes in areas where large gains remain to be made, unless they come accompanied by threats of distinct visibility (outcomes of grievance redressal) or scope for political mileage (installing quick solar capacity). Innovative efficiency measures have enabled sufficient gains over time for sectoral effects of politics to seem tolerable.

Such tolerance ultimately runs the risk for some sectoral irrationalities persisting and keeping Gujarat from achieving truly world-class standards or sufficiently passing on benefits to its consumers, even as it manages to maintain its reputation as a standard-bearer among Indian states. For instance, Gujarat has done more than any other state to match its revenue flows to current costs with its FPPPA initiative. Yet procurement constitutes a potential problem area, with one interviewee saying discoms should steer clear of their indulgence in "hardware monopolies" as supplies are high-priced and low-quality. Initial boosts to the sector's finances came from close cooperation with the finance department to access credit at low rates, alongside a strong push to renegotiate existing PPAs and loans for the discoms' benefit. More recently, there have been instances of revising a PPA upward instead and allowing high coal freight costs and losses. As an interviewee pointed out, this constitutes benefits not being passed on to the consumer, and at least in the latter case this has been addressed by imposing stringent caps. These examples point to a tendency toward complacency if the sector is not kept in check now that its performance regularly meets minimum standards; what is required is a strong push toward further improvements, both internally as well as through public scrutiny. There are indications of the former through initiatives such as a fast-track employee scheme that allocates high-performing discom staff to hardship postings and tasks them with turning ailing regions around. Public engagement, however, remains worryingly low.

Going forward, Gujarat can in many ways look to its own recent past as a good example to learn from. There is a lot of credit given to the former chief minister Modi. This may seem to throw into question the point of the power sector's institutional structure with a quasi-judicial regulator and (at least in theory) independent utilities devoid of political interference. Some interviewees stated with strong conviction that there are deeply entrenched powerful vested interests that one would not be wise to poke. But a strong CM can be synonymous with hands-off government, if s/he prevents lower-level politicians from tinkering with the sector, allowing it to be independently regulated and run. In this sense, Gujarat presents an argument for benevolent leadership of the distribution sector by a political administrator. Beyond initial success, however, such an approach can also limit incentives. Having timely policies in place along with a business culture of getting things done in mutually beneficial ways has held Gujarat's distribution sector in good stead since the early 2000s. This is important for the current state and sectoral leadership to bear in mind. As long as the current standard is maintained and gradually improved, there is a sense that things are going well enough for everyone to avoid having to deal with any awkward questions. But this also limits the likelihood of the emergence of reforms for further accountability and public ownership of the sector.