

Uttarakhand: The Golden Combination of Cheap Energy and a Large Industrial Base

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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 organizations 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>.

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Abstract

Uttarakhand currently enjoys a context where power cuts are limited, electricity tariffs are some of the lowest in India, full electrification is close to being achieved, and the state's public power distribution company (discom) has low levels of debt and does not require government subsidy support. This position has been achieved because Uttarakhand has a large base of cheap hydro power capacity, and rapid growth in industry over the last 16 years has delivered large, paying customers to the state's public discom. Despite this relatively strong position, over the last 16 years aggregate technical and commercial (AT&C) losses at the state's discom, whilst falling rapidly as a percentage of overall sales, have remained high amongst all consumer groups other than large industry, and in the state's "plains" districts. There are persistent unresolved problems with deficient meters and revenue realisation. Were it not for the golden combination of cheap hydro power and a large industrial base, Uttarakhand's distribution sector would likely resemble that of its neighbour, Uttar Pradesh, where discoms are financially struggling. Looking forward, Uttarakhand's ability to rely upon cheap power and industry looks fragile. In recent years, agreements to buy more expensive gas and renewables have been made, industry has increasingly been using Open Access (OA) regulations to buy electricity from providers other than the state's discom, and incentives that brought industry to Uttarakhand are coming to an end.

Introduction

The state of Uttarakhand, originally named Uttaranchal, was formed on November 9, 2000. It has a population of just over 10 million,¹ and achieves above the national average for average household expenditures, literacy, and on some health indicators.² Uttarakhand was carved out of Uttar Pradesh following years of popular protests. Calls for statehood were motivated by the economic and political marginalisation that the area had suffered while still part of Uttar Pradesh.³ While talk of statehood for Uttarakhand dates back decades, the movement for separation gained traction when, in 1994, the Samajwadi Party government in Uttar Pradesh sought to introduce a 27 percent quota on government jobs and education for Otherwise Backward Castes (OBCs). In the Uttarakhand region, the OBC population was just 2 percent of the overall population. With high unemployment and poor economic development, people aspired primarily to government jobs and education.⁴ A hurdle to statehood over the decades prior to 2000 had been the common argument that Uttarakhand would be economically unviable as a state. However, at the time of its formation, hydro power and tourism were projected as the basis upon which it could be economically successful.⁵

The headline story of Uttarakhand's electricity distribution sector is one of transformation, and the relatively good financial performance for the state's public electricity distribution company (discom), the

¹ Census of India. "2011 Census."

² Jean Drèze and Amartya Sen, *An Uncertain Glory: India and Its Contradictions*, (London: Penguin, 2013).

³ Anup Kumar, *The Making of a Small State: Populist Social Mobilisation and the Hindi Press*, (New Delhi: Orient Black Swan, 2011).; Emma Mawdsley, "Uttarakhand Agitation and Other Backward Classes," *Economic and Political Weekly* 31, no. 4 (1996): 205-10.; Niraja Gopal Jayal, "Same Wine, Same Bottle, New Label?" *Economic and Political Weekly* 35, no. 49 (2000): 4311-14.

⁴ E. Mawdsley, "After Chipko: From Environment to Region in Uttaranchal," *Journal of Peasant Studies* 25, no. 4 (1998): 36-54.

⁵ Sridhar Krishna, "Economic Profile of Uttaranchal," *Economic and Political Weekly* 37, no. 19 (2002): 1843-49.

Uttarakhand Power Corporation Limited (UPCL). This paper traces how this has been a direct result of the golden combination of cheap hydro power and the arrival of large industrial consumers. Following the state's creation, Uttarakhand inherited 3700 million units (MU) of hydro power capacity from Uttar Pradesh,⁶ meaning that low tariffs could be set for all consumers groups. Coupled with this inherited situation, in 2003 the Government of India passed a package of incentives for industry to set up in Uttarakhand, and in the years following 2002 the state government actively encouraged industry. The result of this was that large industry moved to the state en masse. In 2001-2002 the UPCL's industry consumers made up 21.4 percent of consumption,⁷ whereas by 2014-2015 industry made up 55.40 percent of sales.⁸ Benefiting from cheap hydro power and the arrival of industrial consumers, the UPCL has seen its aggregate technical and commercial (AT&C) losses decline from 54.56 percent in 2001-2002 to 18.82 percent in 2014-2015. The UPCL has not required annual government subsidies. Uttarakhand looks set to provide 24x7 power and to achieve full electrification in several years.

Beyond this headline story, there has however been slow progress over the last 16 years to in reducing aggregate technical and commercial (AT&C) losses attributable to consumer groups other than large industry consumers. The Uttarakhand Electricity Regulatory Commission (UERC) has repeatedly identified and highlighted problems with defective meters, meter reading, billing, ghost customers at the UPCL, and very low load factors recorded for some industry consumers. Yet the UPCL has been very slow to deal with these problems, despite multiple annual orders to do so. AT&C losses attributable to consumers excluding large industry consumers were 41.25 percent in 2003-2004, and were still 30.62 percent in 2014-2015.⁹ Further, from 2007 onward, the state has suffered from seasonal power shortages nearly every year and has had to resort to load shedding. Cheap power and a large industrial base appear to be a windfall that has meant that reform and improvements in the distribution sector have not been essential. Without cheap hydro power and a large industrial base, Uttarakhand's distribution sector would likely look much like that of Uttar Pradesh where, with expensive power, low industrial demand, and high AT&C losses, discoms suffer large annual losses.

Going forward, the golden combination of cheap power and reliable industry revenue looks fragile. While Uttarakhand has been able to rely upon cheap hydro power, and currently buys cheap short-term power from central exchanges during periods of seasonal deficit, there has been a failure to develop sufficient new hydro power capacity. In recent years, agreements to buy gas and renewables have been made, which are more expensive sources of energy, and if rates for short-term power rise this will also put pressure on the UPCL's financial position. Furthermore, over the last five years, industry use of OA to buy cheaper power from sources other than the UPCL has been growing, and tax incentives that brought industry to Uttarakhand are coming to an end.

This paper is structured as follows. It starts with background context about electricity generation in Uttarakhand and the performance of the state's distribution sector. It then outlines the position of the state's distribution sector and the UPCL at the time statehood was won, and traces how in the years

⁶ UERC, "Order on ARR and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

⁷ "Order on ARR and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

⁸ "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

⁹ Figure 10 Data Source: UERC, "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

following 2002 the UPCL's position was transformed. It shows how in these early years there was, however, a failure to deal with problems around revenue realisation, defective meters, and ghost customers. The paper then moves on to outline how from 2007 onward, under a new government and while industrialisation was continuing and the position of the state's discom improved, seasonal power deficits were leading to annual power crises and problems with revenue realisation, defective meters, and ghost customers were still not dealt with. The final section of this paper explores how while the state is close to achieving 24x7 power and full electrification, at the same time industrialisation is slowing, industrial policies are coming to an end, cheap power is no longer a certainty, and AT&C losses beyond large industry consumers have still not been comprehensively tackled.

I. Context

As of November 2016, Uttarakhand had an allocated power capacity of 3,719 MW.¹⁰ Figures 1 and 2¹¹ show the make-up and ownership of Uttarakhand's generation capacity. Per-capita consumption was 1,154 kWh in financial year 2015, up from 1,012 kWh in 2012,¹² a number significantly higher than the average for India, which was 884 kWh per capita in 2011-2012.¹³ In 2011, 87 percent of all households were using electricity as a main source of light, up from 60.3 percent in 2001; 95.5 percent of urban households had electricity.¹⁴ Statistics from the National Family Health Survey (NFHS) state that in 2015-2016 electrification had reached 97.5 percent.¹⁵ The state government has committed to achieving 100 percent electrification by 2018, with 100,407 households identified as still requiring electrification.¹⁶

¹⁰ CEA, "Monthly Generation Reports."

¹¹ Data for Figures 1 and 2: CEA, "Monthly Generation Reports."

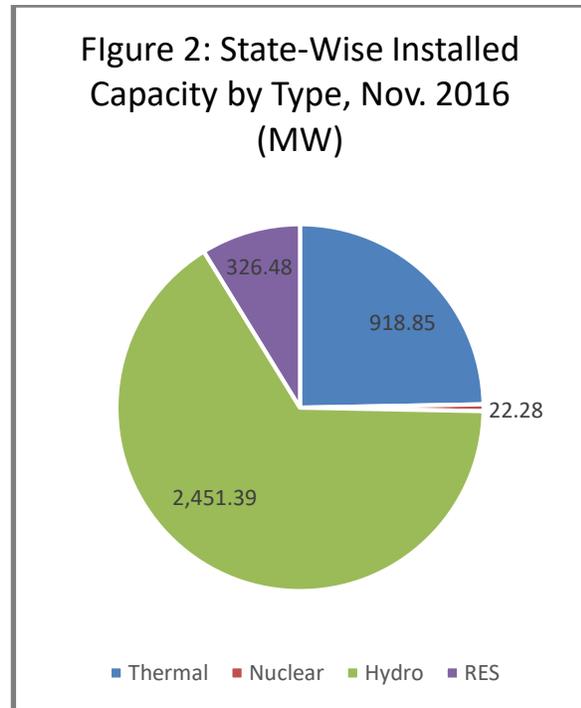
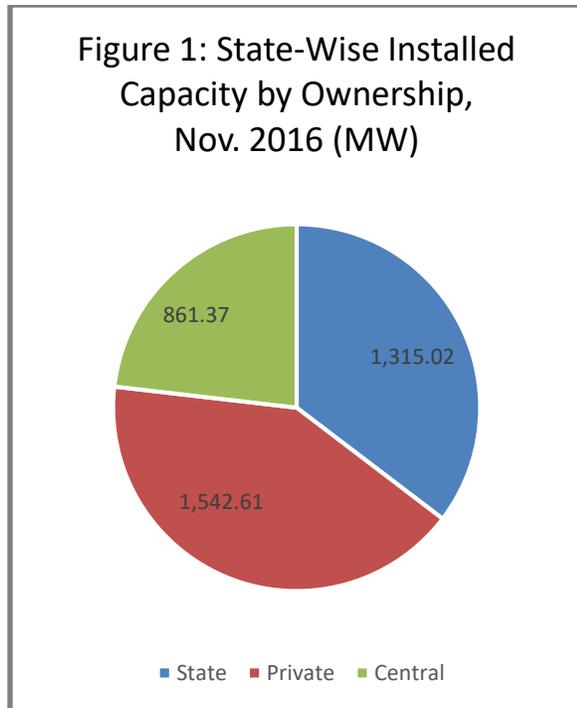
¹² Gol, and GoU, "24x7 Power for All Uttarakhand," (Government of India and Government of Uttarakhand, 2015).

¹³ Planning Commission, "Annual Report (2013-14): On the Working of State Power Utilities & Electricity Departments," (2014).

¹⁴ Census of India, "2011 Census."

¹⁵ Gol, "National Family Health Survey-4 2015-16," (International Institute for Population Studies, Mumbai, 2016).

¹⁶ Gol, and GoU, "24x7 Power for All Uttarakhand," (Government of India and Government of Uttarakhand, 2015).



In 2016, the Ministry of Power praised the performance of the UPCL, highlighting its low AT&C losses, its healthy collection efficiency, and its lack of reliance upon subsidy support from the state government.¹⁷ The UPCL’s financial losses in recent years have been low, and a net profit of Rs. 323 crore was achieved in 2013-2014. Table 1 shows the finances of the UPCL since 2007-2008. Accumulated financial losses at the UPCL stood at Rs. 1,695 crore in FY 14.¹⁸ AT&C losses were 18.82 percent in 2014-2015, with Figure 3 presenting the dramatic decline in AT&C losses achieved in recent years. Figures 4 and 5 show revenue raised and the sale of power by customer type, highlighting the rapid growth of revenue and sales to industry. Figure 6 shows how average cost of supply (ACS) has been close to average revenue realised (ARR) over recent years, and was higher in 2013-2014.¹⁹

Uttarakhand has a high potential for renewable energy. The Government of Uttarakhand recently estimated that there is the potential for 18,175 MW of hydro power in the state, and estimated a potential of about 3,000 MW for small, mini, and micro hydro power.²⁰ The government currently plans to add 345 MW of renewable energy plants and save 358.64 MU through energy efficiency measures by FY 19.²¹

¹⁷ Power Ministry, “State Distribution Utilities Fourth Annual Integrated Rating,” (Power Ministry. New Delhi, 2016), p. 20.

¹⁸ GoI, and GoU, “24x7 Power for All Uttarakhand,” (Government of India and Government of Uttarakhand, 2015), p. 5.

¹⁹ Data for Figures 2, 3, 4, 5, and 6 from UERC tariff rulings, various years.

²⁰ Ibid.

²¹ Ibid.

Table 1: Income, Subsidy Received, and Profit (Rs. Crore) at the
UPCL

Year	Total Income (w/o subsidy)	Profit (w/o subsidy)	Profit (subsidy received)	Subsidy Booked	Subsidy received
2007-08	1,220	-487	-487	0	0
2008-09	1,633	-469	-469	0	0
2009-10	2,177	-391	-391	0	0
2010-11	2,691	-204	-204	0	0
2011-12	3,355	-417	-417	0	0
2012-13	3,524	-16	-16	0	0
2013-14	3,885	323	323	0	0
2014-15	4,466	-260	-260	0	0

Figure 3: UPCL Annual AT&C Losses (%)

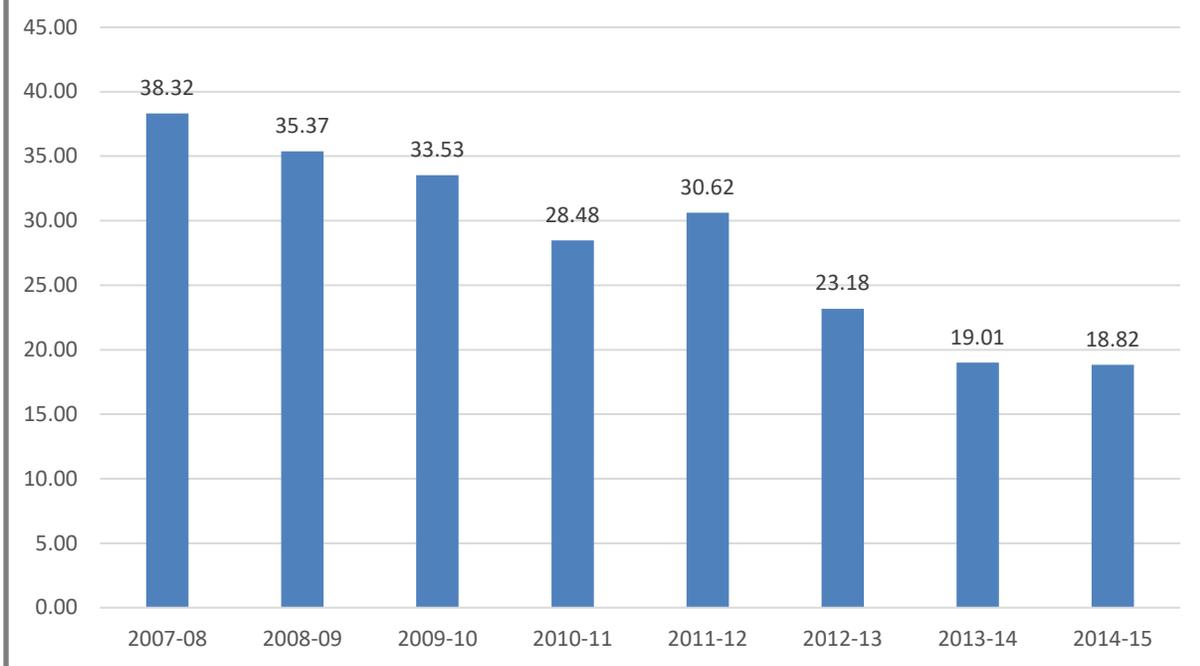


Figure 4: Consumer Category-Wise Revenue (Rs. Crore)

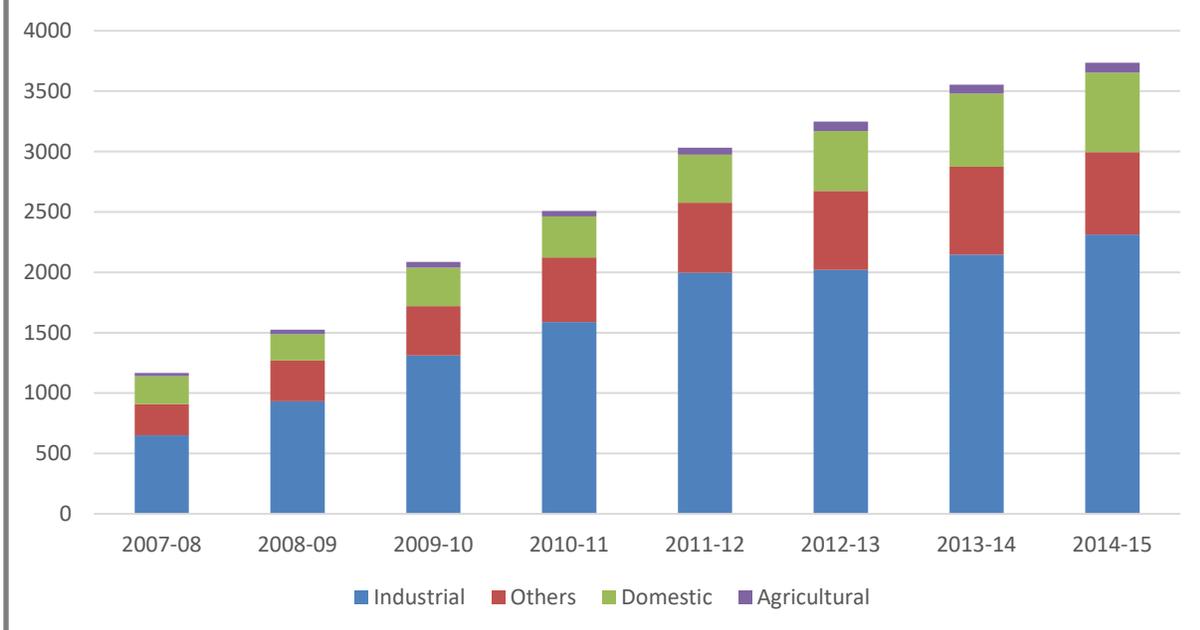


Figure 5: Consumer Category-Wise Sale of Power (MWh)

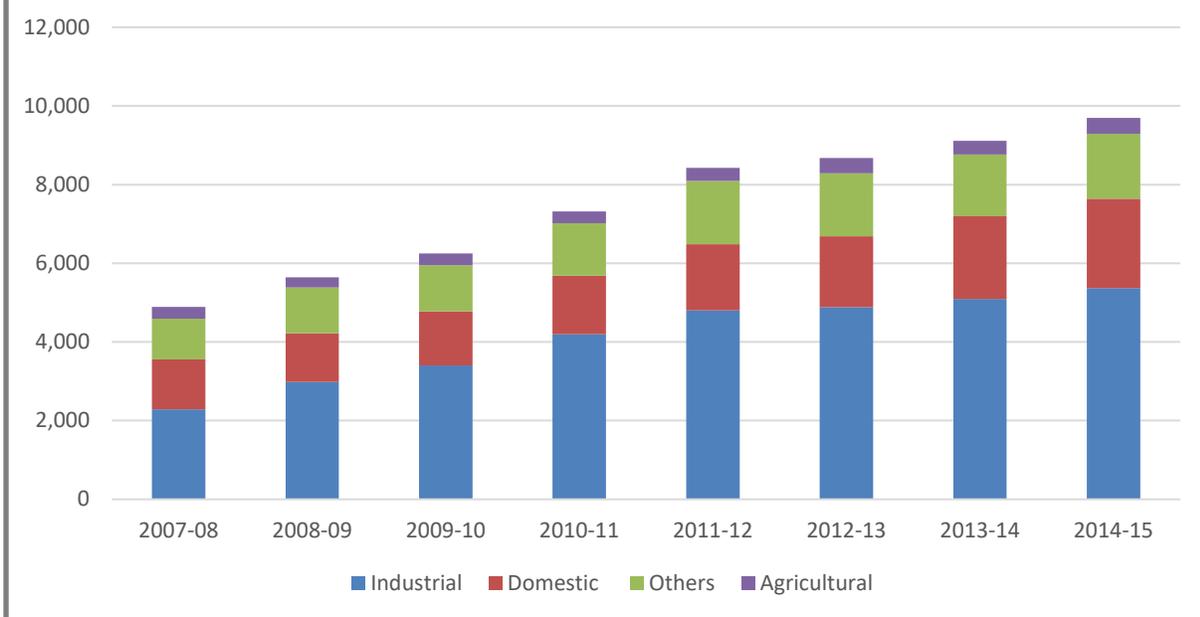
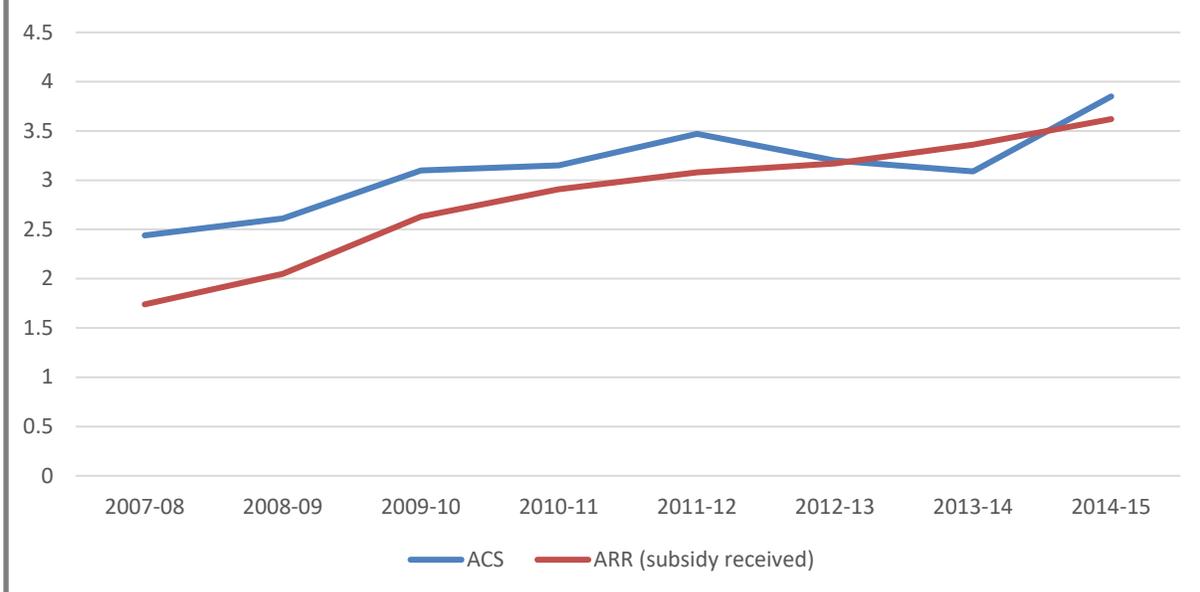


Figure 6: Average Cost of Supply versus Average Revenue Realised by UPCL (Rs. / Unit)



I. The Journey of a New State to Industrial Strength

Before Uttarakhand's formation, the area that would make up the state, much like the rest of the then undivided Uttar Pradesh, had a low level of industrial electricity consumption and a weak electricity transmission infrastructure. Industrial consumption made up 21.4 percent of all consumption in 2001-2002,²² while in Uttar Pradesh the equivalent figure was 20 percent.²³ Per capita electricity consumption in 1995-1996 for Uttar Pradesh was 207 kWh. While in the Dehradun and Nainital districts per capita consumption was respectively 595.8 kWh and 517.5 kWh, in the hilly districts it was much lower; for example, in Pithoragarh the figure was 71.7 kWh, while in Garhwal it was 44.5 kWh.²⁴ In 2001, the Uttar Pradesh Electricity Regulatory Commission (UPERC) estimated the transmission and distribution (T&D) loss for Uttarakhand to be 30.8 percent compared with 35.97 percent for undivided Uttar Pradesh.²⁵ Uttarakhand did, however, have a higher per capita income of more than Rs. 12,000 compared with only Rs. 7,000 in Uttar Pradesh.²⁶ Officers at the UPCL anecdotally speak of how, prior to statehood, districts that would make up Uttarakhand were an undesirable posting for employees at the Uttar Pradesh State Electricity Board.²⁷

Uttarakhand inherited a challenging electricity distribution sector. The state's transmission and distribution infrastructure needed investment, revenue realisation was low, and there were large outstanding dues, particularly from government customers.²⁸ In their first tariff ruling, the UERC estimated that AT&C losses had been 54.56 percent in 2001-2002, while revenue realisation from government customers was below 10 percent. In Uttar Pradesh, AT&C losses were below 50 percent in 2001-2002.²⁹ Uttarakhand inherited a large base of hydro power, however, and had an overall energy surplus throughout the year, even during months when hydro power production was lower. In 2003, the total energy available to Uttarakhand was 5,300 MU, while the state's requirement was 3,900 MU. Uttarakhand had access to 3,700 MU of cheap hydro power and excess power was being sold out of the state.³⁰

The model of one public generation company and one public transmission and distribution company was adopted. Uttarakhand was formed the year after a Bharatiya Janata Party (BJP)-led government in Uttar Pradesh had broken up its own electricity board and was planning the creation of multiple discoms, which were to be rapidly privatised. Notably, the same plans for privatisation were not put into place in Uttarakhand, despite there being a BJP-led interim government; indeed, there has only recently been a limited political push to privatise distribution in several high-loss districts. In 2001, the Uttarakhand Power Corporation Limited (UPCL) was set-up as the sole public discom responsible for transmission and distribution, and the Uttarakhand Jal Vidyut Nigam Limited (UJVNL) was established to manage the

²² UERC, "Order on ARR and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

²³ UPERC, "Order Dt 01/09/01-Tariff Order of UPPCL for F.Y. 2001-02," (Lucknow: Uttar Pradesh Electricity Regulatory Commission, 2001).

²⁴ *Ibid.*

²⁵ *Ibid.*

²⁶ Niraja Gopal Jayal, "Same Wine, Same Bottle, New Label?" *Economic and Political Weekly* 35, no. 49 (2000): 4311-14.

²⁷ Interviews with present and former officials at the UPCL.

²⁸ See the UERC (2003) Order on ARR and Tariff for Financial Year 2003-04 for more on the condition of the UPCL and the distribution sector in Uttarakhand at the time of state formation.

²⁹ UERC, "Order on ARR and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

³⁰ *Ibid.*

state's hydro power generating capacity. In 2004, the Power Transmission Corporation of Uttarakhand Limited (PTCUL) was formed to maintain and operate transmission lines and substations.

Following the state assembly elections in 2002, having emerged as the largest party, the Congress Party formed a government, with N. D. Tiwari named chief minister (CM). Tiwari had previously been CM of Uttar Pradesh on three occasions, where he was known as the father of industrialisation. He had then held several positions in Rajiv Gandhi's government, including Minister of Industries briefly. During the five years that he served as CM, a strong push for industrialisation was made in Uttarakhand.

In 2003, the Government of India launched a new industrial policy for Uttarakhand and Himachal Pradesh, providing generous tax and central excise benefits to industry investing in the states. Qualifying industries were eligible for a 100 percent outright excise duty exemption for a period of 10 years, and a 100 percent income tax exemption for an initial period of 5 years, with a partial exemption for a further 5 years. Other benefits and subsidies were also offered alongside this.³¹ The government in Uttarakhand was strongly supportive of industry coming to the state, setting up and promoting industrial parks.³² Between 2004-2005 and 2014-2015 Uttarakhand would achieve a compounded annual growth rate (CAGR) of 16.5 percent for industry and 12.3 percent in services, putting it well above the national average of close to 7 percent.³³ Between 2005-2006 and 2007-2008 the rate of industrial growth in the state was above 30 percent.³⁴ By 2007, Tata Motors, Bajaj Auto, Mahindra & Mahindra, Hero Honda, Ashok Leyland, and Nestle had all set-up in the state, bringing 30,000 crore in investment.³⁵ Steel factories also set up. Between 2000-2001 and 2010-2011, the number of factories more than tripled.³⁶ Industry coming to Uttarakhand benefited from cheap and relatively reliable electricity at a time when electricity was very unreliable in neighbouring states.

In the five years following 2002, the distribution sector in Uttarakhand was transformed and a favourable consumer mix was won for the UPCL. Central and state funding was used to make investments in strengthening and extending the states' transmission and distribution infrastructure. Table 7³⁷ shows the increasing consumption of subsidising consumer groups relative to subsidised groups in the three years following 2002, while Table 8³⁸ shows the increasing percentage of sales attributable to industry. While in 2002-2003 the cross subsidy per kWh was above 2.25 rupees, in 2004-2005 it was Rs. 1 per kWh, and for 2006-2007 the approved rate was targeted to be below 0.25 rupees per kWh.³⁹

³¹ Gol, "New Industrial Policy and Other Concessions for the State of Uttaranchal and the State of Himachal Pradesh," (Department of Industrial Policy & Promotion, New Delhi: Government of India, 2003).

³² Tapas Chakraborty, "Himalayan Singur, Minus Mamata," *The Telegraph*, 2008.

³³ ASSOCHAM. "U'khand Emerges Numero Uno Clocking Highest Growth in Industry & Services Sectors across India: Assocham Study," (The Associated Chambers of Commerce & Industry of India).

³⁴ P. Naithani, "On Industrial Development of Uttarakhand: Policy Framework and Empirical Evidences," *The Journal of Industrial Statistics* 3, no. 1 (2014), 151.

³⁵ P. Joshi, "Uttarakhand CM at Centre of Two Scams," *India Today*, 2010.

³⁶ P. Naithani, "On Industrial Development of Uttarakhand: Policy Framework and Empirical Evidences," *The Journal of Industrial Statistics* 3, no. 1 (2014), 150.

³⁷ Figure 7 Source: UERC (2005) Transmission & Distribution for FY 2005-06, p. 112.

³⁸ Figure 8 data source: UERC, "Order on Approval of Business Plan and Multi-Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

³⁹ "Tariff Order for 2005-06," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2005).

Figure 7: Share of Subsidising Versus Subsidised Consumer Categories

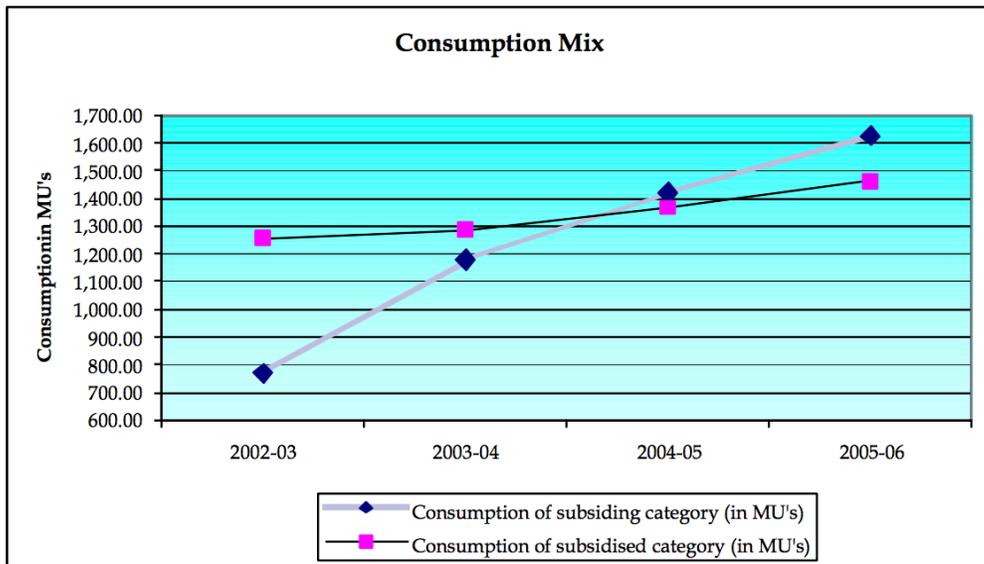
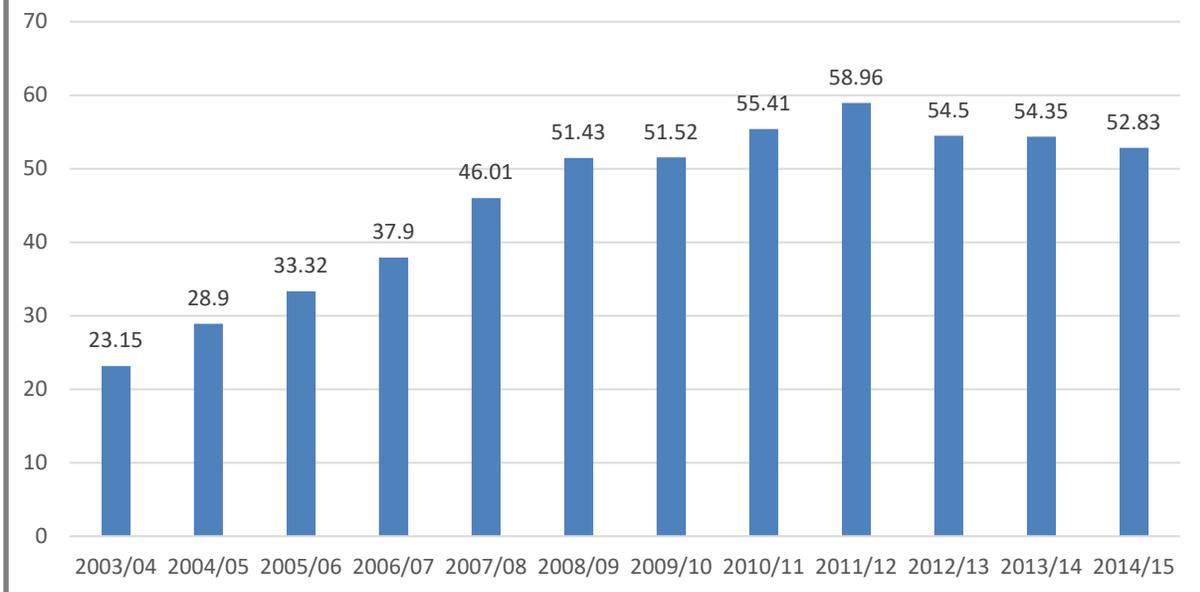


Figure 8: HT Industry Consumer Sales as a % of Total Sales



The Uttarakhand Electricity Regulatory Commission (UERC), which was established in 2002, played a central role in shifting the state to the low-tariff environment that was important for industrialisation. The UERC submitted its first tariff ruling in 2003. Until this time, the UPCL had been charging their customers the Uttar Pradesh tariff rates that had been in place before the state was formed. The UERC most importantly ruled that the UPCL should be paying the UJVNL less for hydro power. They determined that the prevailing rate of 60.5 paise per unit paid to the UJVNL, approved by the state

government but not by the UERC, was arbitrarily high, and set out a lower rate for hydro power of 37 paisa per unit. On this basis, and as a result of the wider Aggregate Revenue Requirement (ARR) information that they had, the UERC simplified tariffs and reduced tariffs for most classes of consumers. In particular, industry saw a significant simplification and reduction in their tariffs.⁴⁰ While in 2001-2002 the then undivided Uttar Pradesh had an approved average power purchase price of Rs. 1.52 per unit, in 2002-2003 the estimated average power purchase price that the UERC calculated and approved was just Rs. 0.62 per unit.⁴¹

By 2007-2008, HT industry⁴² made up 46 percent of consumer sales.⁴³ Uttarakhand had quickly been changed into a state where there was a strong base of industry, where the UPCL did not need subsidies from the state government, and where tariffs were some of the lowest in India. The improving situation for the electricity distribution sector in these early years was almost entirely a fortunate result of cheap hydro power and industrialisation. Over the same period, very little reduction was made in AT&C losses if HT industry is exempted from the statistics. Collection of total outstanding dues even fell in the two years following state formation.⁴⁴

While the UPCL was seeing its finances improve in the 2000s, and the UERC was seeking to carry out independent tariff setting and highlight where the UPCL needed to improve its performance, the UPCL was resistant to independent tariff-setting and efforts to deal with its underlying problems. During the 2000s, the UERC faced opposition and non-compliance to its tariff setting role. While the UPCL did submit an ARR to the UERC in 2003, they submitted it late and multiple shortcomings were identified by the UERC. After the UERC had asked for revisions several times, and despite the continued shortcomings, the UERC accepted a revised ARR because a tariff ruling was several months overdue. The following year the UPCL's ARR was submitted six months late, and according to the UERC it lacked basic information. The UERC asked for a revised ARR to be submitted, but the UPCL delayed their submission of a new version several times. So in December 2004, one year after the ARR should have been submitted, the UERC started a suo-moto tariff determination. In January 2005, the UPCL submitted ARRs for 2004-2005 and 2005-2006 which were accepted.⁴⁵ Following the UERC's 2003 tariff ruling, the UJVL went to APTEL to challenge the UERC's decision to reduce the amount that the UPCL paid for hydro power. They were partly successful, and several aspects of the UERC's 2003 tariff ruling were overturned and changes were made to the depreciation and return on investment they could claim from the UPCL.⁴⁶

The government tried on several occasions to give tariff directions to the UERC in its first years of operation, but the UERC resisted this.⁴⁷ In response to the UERC acting in an independent manner, the government acted to change the commission from being a one-member commission into a three-member commission, giving them the opportunity to appoint two further members. One former regulator recounted that: "When we established the commission, the government had not yet realised the full impact of creating regulatory commissions. When we set up, and were making the first

⁴⁰ UERC. "Order on ARR and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

⁴¹ Ibid.

⁴² HT Industry refers to a sub-group of large industry consumers connected with high-tension wires.

⁴³ UERC, "Approval of Business Plan and Multi-Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

⁴⁴ UERC, "Tariff Order for 2005-06," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2005).

⁴⁵ Ibid.

⁴⁶ *Appeal No. 189 of 2005*, (2005), Appellate Tribunal Court.

⁴⁷ Interviews with two former regulators at the UERC.

regulations, no one bothered about the regulations. However, when they realised that the commission was independent-minded, the government decided to make the commission a three-man commission, bringing in two new members.”

As well as setting tariffs, the UERC was also proactive in identifying and highlighting problems with billing, revenue realisation, and with metering, and released orders for the UPCL to address these areas. However, their orders were largely met with inaction. Starting with their first tariff ruling in 2003, the UERC identified where improvements needed to be made and auditing was necessary, while also highlighting incorrect figures in the accounts that the UPCL provided. In their first report they concluded that the UPCL was hiding losses by inflating the reported consumption of unmetered agricultural users.⁴⁸ Already in 2003, the UERC set targets for the UPCL to improve billing, metering, and to bring down AT&C losses. When little progress had been made, in 2005-2006 the UERC engaged IIT Roorkee to audit the UPCL accounts and identify where losses were occurring. This study found that there were large numbers of unmetered connections, connections listed as metered that were unmetered, and many metered connections that had been listed as defective for many years but no action had been taken to check and replace these meters.⁴⁹ Where there were defective meters, billing was done at a fixed normative rate. The UERC asked the UPCL to put together a plan to tackle the problems identified. No plan was submitted, and so the UERC carried out a further study between 2006-2007. This found that approximately 70 percent of UPCL’s consumers were billed on actual meter reading, while the remainder were billed on the basis of assumed consumption or normative consumption. A large number of unmetered consumers were being shown as metered ones, with fictitious meter numbers, and these consumers were being billed a fixed normative amount. The UPCL was also still supplying consumers who had not paid their bills for years. The UERC’s study also found problems with metering and billing of large industry, with basic errors in bills and suspiciously low load factors recorded for some large industry consumers. The study showed that there had been no improvement in meter reading, billing, or realisation over the 15-month period their study covered.⁵⁰

In their 2009 tariff orders, the UERC again reported that few improvements had been made. Despite repeated meetings and brainstorming with managers and the Board of Directors at the UPCL, assurances of action, and the hiring of 1,100 staff by the UPCL to deal with the problems, little or no progress was made.⁵¹ The UERC highlighted how they had identified up to 46,636 “ghost” consumers with fictitious meter numbers who were listed in billing data, and that the UPCL, despite requests, had not removed these customers from their accounts.⁵² They further noted that despite the total number of customers in the state increasing from 8 lakh to over 12 lakh, the percentage of consumers billed on an actual consumption basis stayed at 70 percent from April 2005 to March 2009.⁵³ Finally, they outlined how a number of industry customers were still recorded with load factors below 10 percent.

The first chairman of the UERC wanted to introduce a higher tariff for areas where theft levels were higher, but this was opposed by the government and the UPCL and was not implemented.⁵⁴ The UERC

⁴⁸ *Ibid.*

⁴⁹ UERC, “Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For 2007-08 & 2008-09,” (Dehradun: Uttarakhand Electricity Regulatory Commission, 2008).

⁵⁰ *Ibid.*

⁵¹ UERC, “Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For 2009-10,” (Dehradun: Uttarakhand Electricity Regulatory Commission, 2009).

⁵² *Ibid.*

⁵³ *Ibid.*

⁵⁴ Interview with former chairman of the UERC.

had little recourse to effective enforcement measures. They did on several occasions fine individual officers of the UPCL when orders were ignored. For example, in 2006 they fined the MD of the UPCL Rs. 5,000, and then Rs. 100 for each day of continued default in regards to meter reading failures. However, this fine was successfully challenged and overturned in the APTEL courts. On several occasions the UPCL or officers at the UPCL have challenged sanctions from the UERC in the courts, highlighting the difficulty for the UERC in trying to enforce their orders.⁵⁵

In the years following statehood, the government in Uttarakhand was focused on supporting and promoting new hydro power. Building hydro power was understood as key to developing the state economy. At the same time, in the 2000s, hydro power was being promoted by the central government in Delhi at a national level. However, developing new hydro power plants proved to be slow, with planned projects facing environmental opposition and corruption allegations. The growth in hydro power capacity in the state did not match the growth in demand following industrialisation.

OA regulations were passed in 2004, but there was no industry demand for OA at the time because electricity was cheap and reasonably reliable. In the 2000s, the UERC also worked to encourage industry and public participation in the tariff determination process. This was successful in terms of industry participation, with industry widely participating in the hearing processes for tariff setting. However, no strong consumer groups developed in the state. The UERC also established an Advisory Council, with both industry and consumer representatives invited onto it.

II. Reaping the Windfall of Cheap Hydro Power and Industry; Slow Progress in Performance Improvements

State elections in March 2007 saw the BJP emerge as the biggest party; despite rapid industrial growth, there was a strong anti-incumbency move. The BJP successfully painted the former Congress government as having failed to develop the state beyond several industrial pockets.⁵⁶ The years following 2007 saw a period of greater political instability, and several changes of CM. Initially, B.C. Khanduri was appointed as CM; he was the choice of the central BJP party. But he did not have the support of the state's BJP lawmakers, and he was replaced in 2009 by Ramesh Pokhriyal. Finally, because of various scam allegations, B.C. Khanduri came back as CM for six months from September 2011. This allowed the party to project a clean figure for the state for elections.⁵⁷ The BJP government continued to promote industrialisation, although by the end of the 2000s there were land shortages in the plains where most industry was setting up. Then the 2008 Hill Industrial Policy was launched, introducing new incentives for industry in hilly areas. In 2011, an extension of the 2008 Hill Industrial Policy focused on extending benefits until 2025 and on promoting new industrial hubs in the hills.⁵⁸ Central and state funds were utilised to make significant investment in the state's transmission infrastructure, and in systems and software at the UPCL. At the end of the decade, Uttarakhand was one

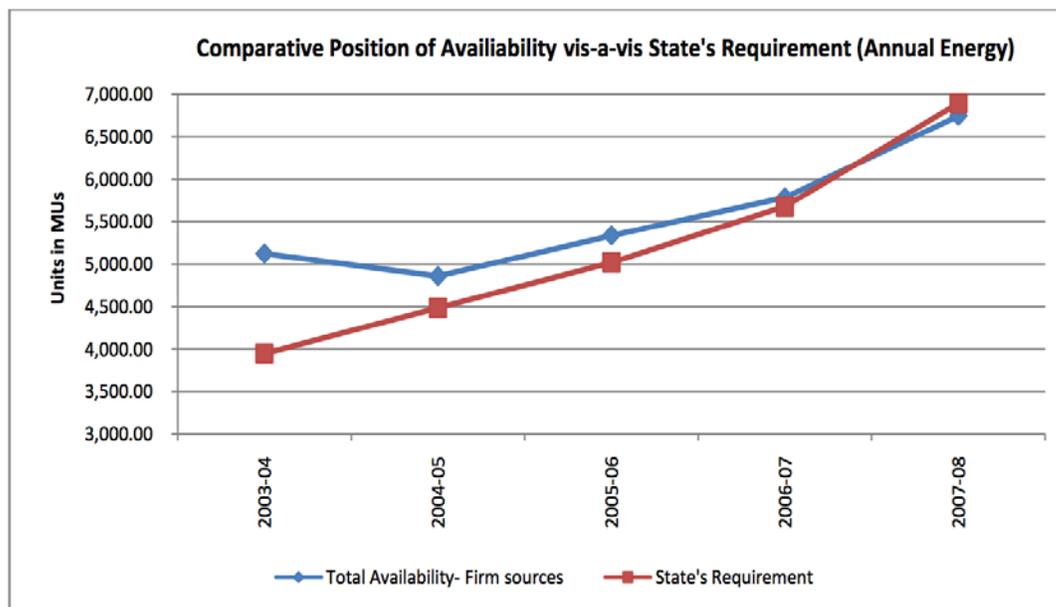
⁵⁵ *Jug, No. 115 of 2007*, (2007), Appellate Tribunal for Electricity.

⁵⁶ Subhash Mishra, "Right up the Hill," *India Today*, 2007.

⁵⁷ Rakesh Mohan Chaturvedi, "Uttarakhand Politically Unstable since Formation," *The Economic Times*, 2016.

⁵⁸ "Uttarakhand Seeks to Give Fresh Boost to Industry," *Business Standard*, 2007; S. Prashant, "Uttarakhand to Set up 11 New Industrial Hubs," *Business Standard*, 2011.

Figure 9: The Electricity Supply and Demand Position in Uttarakhand Between 2003–04 and 2007-08



of the first states in India to get Part A of APDRP funds.⁵⁹ Uttarakhand’s government continued to promote and support large hydro power. However, environmental objections saw many projects stall, and at the end of the BJP government’s time in office the CM had to cancel a number of hydro power projects as a result of the allegations of corruption surrounding them.⁶⁰ As a result of problems with new hydro power, the government took steps at the turn of the century to commission gas-fired power plants to meet projected demand increases.⁶¹

By 2007, seasonal gaps between demand and allocated supply were becoming a problem, resulting in a situation where either the UPCL had to buy short-term power from central exchanges or resort to load shedding. Figure 9⁶² shows this. In 2008, the growing gap between demand and supply was exacerbated because of drought conditions, leading to much lower levels of hydro power being generated. The UPCL resorted to long hours of load shedding from 2008 onward; for example, in 2008 there was a seasonal shortfall of 2-3 million units of power.⁶³ To deal with seasonal generation from hydro power, Uttarakhand organises power banking with other states each year. During months of surplus generation, they sell power out of the state, and during deficit months they buy power back. In 2008-2009 the UPCL

⁵⁹ UERC, “Application No. 1005 UPCL/C-4 Dated 03.02.2010 Filed by Uttarakhand Power Corporation Limited Seeking Approval of the Commission for the Investment on the Project Covering the Works Covered under Part A of Restructured-Accelerated Power Development & Reform Program of Ministry of Power, Govt. Of India Including Non-RAPDRP Areas for the Development of Integrated and Unified Solutions,” 2010.

⁶⁰ P. Joshi, “Uttarakhand CM at Centre of Two Scams,” *India Today*, 2010.

⁶¹ “Gail Plans to Set up Power Plants in Uttarakhand,” *The Hindu*, 2011.

⁶² Figure 9 Source: UERC (2009) Concept Paper on Power Cuts.

⁶³ “Severe Power Crisis May Hit Industry in Uttarakhand,” *Business Standard*, 2008.

arranged to bank 363.1 MU of power.⁶⁴ This system has not always work well. For example, in 2010, power had to be returned to other states even as Uttarakhand faced a deficit and power cuts were being imposed.⁶⁵ There was also a tense political relationship between the state and central government following 2007. In 2008, the state government accused the centre of withholding power, causing the state's power crisis. Meanwhile, the UPA government in Delhi, which had shut down a gas power plant supplying Uttarakhand, accused the state of failing to make proper arrangements for power banking.⁶⁶

In response to power shortages, the UPCL requested large tariff increases for industry, and the UERC put forward tariff increases for industry consumers on the basis of government direction. However, industry groups were successful in challenging the UERC's 2009-2010 and 2010-2011 tariff orders in the APTEL Courts, on the basis that tariffs had been increased according to the policy direction of the government, which is against regulations.⁶⁷ As a result, the tariff had to be changed, and the UPCL resorted to longer hours of load shedding.⁶⁸ Demand management measures were also implemented to deal with the power crisis. The UERC took the lead on this front. Different peak and off-peak tariffs were introduced to encourage industry to use less power at peak times. For example, customers who bought a solar hot water heater were offered a rebate of 50 rupees per month in 2005-2006, and 75 rupees per month from 2006-2007 onward. However, by 2011 the UERC's own figures suggest only 264 customers had made use of this offer.⁶⁹

Beyond problems with seasonal shortages, Uttarakhand was reaping the benefits of cheap power and industrial demand. In the five years following the 2007 election, the headline rate of AT&C losses at the UPCL continued to steadily decline. In 2007-2008 the rate was 38.32 percent, and by 2012-2013 it was 23.18 percent.⁷⁰ This decline was largely the result of the UPCL's growing base of industrial consumers. In their 2011 tariff ruling, the UERC noted how the UPCL had the advantage of industrial consumers being only 1.1 percent of their total customers, but contributing 63 percent of their revenue.⁷¹ Beyond industrial consumers, problems remained with revenue realisation, meters, and with so-called "ghost" customers. AT&C losses were over 50 percent in many towns, such as Vikasnagar, Pauri, Uttarkashi, Ramnagar, Haldwani, Gopheswar, Nainital, Almora, Pithoragarh, Champawat, and Ranikhet.⁷² In 2010, the UERC reported that while some districts had seen improvements in losses, others saw little improvement or their situation worsened.⁷³ Defective metering was increasing in some places. In 2011, the UERC reached the damning conclusion that: "It is evident that the three major functions of the

⁶⁴ UERC, "Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For 2009-10," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2009).

⁶⁵ "Power Crunch Causes Tiffs between Depts," *The Tribune*, 2010.

⁶⁶ "Khanduri Blames Centre over Wheat and Power Crisis," *Outlook India*, 2008.

⁶⁷ *Appeal No.152 of 2011*, (2011), Appellate Tribunal for Electricity.

⁶⁸ In an interview with a former regulator and official of the UPCL, it was recounted that, because the UPCL was unable to raise tariffs to buy expensive short-term power, they resorted to load shedding.

⁶⁹ UERC, "Order on Determination of Retail Tariff for FY 2011-12, Re-Determination of Tariff for FY 2009-10 & Truing up of Revenues and Expenses from FY 2005-06 to FY 2009-10 for Uttarakhand Power Corporation Ltd.," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2011).

⁷⁰ UERC, "Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For FY 2014-15," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2014).

⁷¹ UERC, "Order on Determination of Retail Tariff for FY 2011-12, Re-Determination of Tariff for FY 2009-10 & Truing up of Revenues and Expenses from FY 2005-06 to FY 2009-10 for Uttarakhand Power Corporation Ltd.," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2011).

⁷² S. Sharma, "Power Losses: UPCL to Bring Feeders under Energy Audit," *The Tribune*, 2011.

⁷³ UERC, "Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For 2010-11," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2010).

licensee, i.e., metering, billing, collection, are in total disarray. Lot of efforts are required by the licensee to set them right.”⁷⁴ The UERC was identifying the problem of “ghost” customers each year; however, up until 2012, action was still not taken to remove these customers.⁷⁵ The UERC refused to allow losses above targets to be claimed through higher tariffs in ARRs. However, they did not have the enforcement power to make the UPCL crack down on defective meters and “ghost” customers. Looking at Uttarakhand as it faced increasing power shortages from 2007, and did not effectively plan for further cheap hydro power, it is apparent that the state’s windfall of cheap power and a large industrial base is in many ways a lucky structural position, not politically or technically engineered within the state.

As a demand and supply gap developed and load-shedding hours were increased, industry sought the option of OA from the UERC. As a result, in 2010, the UERC laid out regulations for industry to be able to make use of OA.⁷⁶ Industry in the state generally did not want to cut their relationship with the UPCL entirely, but wanted to be able to access power during seasonal deficit periods and when load shedding was taking place.⁷⁷ The UERC drew up OA regulations that distinguished between short-term, medium-term, and long-term OA, setting different charges for each. Transmission, wheeling, and cross-subsidy charges were not given for short-term OA during seasonal deficit periods.⁷⁸

Some explicit political interference in the power sector was evident in Uttarakhand. Shortly before the elections in 2012, the UPCL spent a very large amount of money buying expensive power on the open market. This violated guidelines from the UERC on the purchasing of expensive power from the open market.⁷⁹ When the government realised the importance of the UERC, they tried to ensure that members more favourable to the discom and generator would be placed in the UERC. After the first chairman retired, for a number of years the UERC became less proactive in pushing the UPCL to improve its performance.⁸⁰ After the first years of the UERC’s operation, the government tried to reign-in the independence of the commission and it went through a stage where it was less assertive.⁸¹

III. Can Uttarakhand Sustain Its Golden Combination of Cheap Power and Industry, While Also Meeting Its Commitments to 24x7 Power?

In 2012, the Congress Party came back to power but without an overall majority. Since then, Uttarakhand has continued to experience political instability. Initially, Vijay Bahuguna, the choice of the central Congress Party, was projected as CM in the state. However, following the severe flooding in Uttarakhand in 2013 and strong criticism of the response of the government to the floods, in February

⁷⁴ UERC, “Order on Determination of Retail Tariff for FY 2011-12, Re-Determination of Tariff for FY 2009-10 & Truing up of Revenues and Expenses from FY 2005-06 to FY 2009-10 for Uttarakhand Power Corporation Ltd.,” (Dehradun: Uttarakhand Electricity Regulatory Commission, 2011, p. 134).

⁷⁵ UERC, “Order on Retail Tariff for Uttarakhand Power Corporation Ltd. For FY 2012-13,” (Dehradun: Uttarakhand Electricity Regulatory Commission, 2012).

⁷⁶ UERC, “UERC (Terms & Conditions of Intra-State Open Access) Regulations, 2010,” edited by Uttarakhand Electricity Regulatory Commission, (Dehradun, 2010).

⁷⁷ Interviews with regulators and industry associations.

⁷⁸ S. Prashant, “Uttarakhand Approves Open Access System for Industries,” *Business Standard*, 2010.

⁷⁹ S. Sharma, “UPCL Violated Guidelines Blatantly in Power Purchase,” *The Tribune*, 2012.

⁸⁰ This account of the UERC becoming less proactive for a number of years was confirmed in multiple interviews with regulators and officers.

⁸¹ This view was expressed in interviews with two former regulators, and with industry associations.

2014 Harish Rawat, the choice of the local Congress Party, became CM.⁸² Over the next two years President's Rule was imposed twice in the state. In 2012, the government acted to relieve the debt level of the UPCL, whose accumulated losses were Rs. 1,948.22 crore in 2010-2011, with a Rs. 915 crore package.⁸³ The new CM also ordered an inquiry in 2012 into alleged scams from previous years in the state, including the alleged hydro power scam.⁸⁴ The Congress government moved to further push industrialisation in higher areas, recognising the lack of development in the hills.⁸⁵ The state has continued to face seasonal power crises, with demand failing to meet supply during the lean hydro power months. Significant power shortages hit the state in 2012, 2014, and 2015 and the UPCL resorted to power cuts.⁸⁶

In 2015, the Government of Uttarakhand committed the state to achieving 24x7 power by 2018, and launched a drive for full electrification. Providing 24 hours of electricity supply to all classes of consumers by 2018, including those households currently not connected, appears to be very achievable. The finances of the UPCL are relatively strong. In 2016 the Power Ministry's report on India's power sector gave Uttarakhand's discom a very good "A" rating.⁸⁷ In their 24x7 plan, the government states that almost 24 hours is already being supplied in urban areas, 22-24 hours in rural areas, and 19-22 hours to industries. They state that providing 24-hour electricity would result in an increase in peak demand from 1,930 MW currently to 2,845 MW in FY 19, and an increase in the state's energy requirement from 12,617 MU in FY 15 to 18,062 MU in FY 19.⁸⁸ New planned capacity will see 1,035 MW newly available by FY 19, at an investment of Rs. 3,666 crores. Even with this new capacity, higher demand will mean a shortfall of 23-30 percent versus long-term allocated power, and so short-term power will be purchased from the open market and new longer term capacity planned.⁸⁹ Just over one lakh households still need to be electrified, and funding from the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) will be used for this.⁹⁰ Uttarakhand also signed up to UDAY in 2016, so that the state could access central government financial support for transmission system upgrades.⁹¹ The UPCL did not require the financial repackaging support of UDAY.⁹² Targets set out in UDAY include a commitment by the UPCL to reduce their AT&C losses from 18.64 percent in FY 2014-15 to 14.50 percent in FY 2018-19. They also commit to increase their hours of supply in areas where losses are reduced, to eliminate the ACS and ARR gap by FY 2018-19, and to electrify all households by FY19. Many of these targets were already in place.

There is still a good consumer mix for the government to be able to achieve its targets. In 2013-2014, of the 17.83 lakh consumers in the state, 87.52 percent were domestic, 10.18 percent were non-domestic consumers, and 0.62 percent were industry consumers. Industry consumers counted for 56.17 percent of consumption and 63 percent of revenue.⁹³ However, there are challenges to Uttarakhand attaining

⁸² Sanjev Singh, "Uttarakhand: Congress Faces Rout, Can Harish Rawat Stop the Slide?," *FirstPost*, 2014.

⁸³ P. Prashant, "UPCL Gets Rs 915-Cr Package from Govt," *Business Standard*, 2012.

⁸⁴ Anupam Trivedi, "U'khand's New Power Policy to Favour Local Communities," *Hindustan Times*, 2015.

⁸⁵ Kautilya Singh, "Small Is Beautiful: Why Uttarakhand Is Role Model for India," *Times of India*, 2014.

⁸⁶ "Power Crisis Deepens in State," *The Pioneer*, 2014.; "UPCL Faces Power Crisis as Output Dips," *The Pioneer*, 2015.; "Uttarakhand Reels under Severe Power Crisis," *The Hindu*, 2012.

⁸⁷ Power Ministry, "State Distribution Utilities Fourth Annual Integrated Rating," edited by Power Ministry (New Delhi, 2016).

⁸⁸ GoI and GoU, "24x7 Power for All Uttarakhand," edited by Government of India and Government of Uttarakhand, 2015, p. 4.

⁸⁹ *Ibid*, p. 5

⁹⁰ *Ibid*, p. 4.

⁹¹ Vineet Upadhyay, "Uttarakhand Joins Uday Scheme Aiming to Gain Power Surplus Worth Rs 962 Crore," *Times of India*, 2016.

⁹² Interviews with officers at the UPCL.

⁹³ UERC. "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)." (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

24x7 electricity. The UPCL intentionally does not provide 24-hour supply to high-loss agricultural feeds, as doing so impacts their revenue realisation.⁹⁴ Unless tariffs rise or the government subsidises 24-hour supply to such consumers, the UPCL has little incentive to do so in the future. Providing 24x7 power will be easier if there is a separation between agricultural and non-agricultural feeders, and agricultural feeders are exempted from the target of 24 hours of supply.⁹⁵ Further, business associations in Uttarakhand question the ability of the state to deliver 24-hour supply, pointing out that outages are common and reliability has deteriorated in recent years. Two further issues also highlight the challenges ahead. First, over the last three years the share of industry consumption in the state has fallen as a result of industrial consumers moving to use OA. Second, large numbers of mainly domestic consumers are being added every year, but the UPCL tends to see higher losses amongst domestic consumers. Between March 2014 and March 2015, the number of consumers with the UPCL increased from 17.83 lakh to 18.91 lakh, with 90 percent of the increase made up by domestic consumers.⁹⁶

Looking forward, there is uncertainty around the extent to which the UPCL will be able to continue to rely upon cheap power and a high industrial demand. Following major flooding in Uttarakhand in 2013, the Supreme Court of India set up a committee to look at whether hydro power had affected the severity of the floods and whether hydro plants then being built would have a negative environmental impact. This led to the suspension of all but one major hydro project. The state government has stated its opposition to this, but a block on new clearances is in place.⁹⁷ Developing hydro power is further complicated by the multiple environmental and forestry clearances required. The government has recently turned its focus on supporting the development of micro and small hydro power, seeing a potential of 3,000 MW of capacity for such systems.⁹⁸ To date, however, small and micro hydro power show little signs of producing the large increases in capacity that the state requires to meet electricity demand cheaply. In 2014, the government agreed to buy 2.5 MU per day of hydro power from Himachal Pradesh, at a rate of Rs. 2.97 per unit.⁹⁹ This extended some additional cheap power to Uttarakhand.

The UPCL has been buying short-term power through e-auctions to meet short-term demand.¹⁰⁰ While this power is currently cheap, continued low rates cannot be guaranteed, and the UERC has been pushing the UPCL to not rely so heavily upon short-term power purchasing. In light of this situation, starting with the BJP government in office from 2007-2012 and continued by the Congress government, there has been a turn towards gas, with several new generation plants commissioned. In 2016, the government signed a 25-year agreement to buy electricity from three gas-based power plants in the state.¹⁰¹ However, electricity from gas power plants is much more expensive than hydro power, and this poses a longer-term challenge to Uttarakhand's status as a low-tariff state. For example, a rate of Rs. 4.70/kWh was provisionally approved by the Commission for this gas power in 2016-2017, while the average approved purchase price of power from all other sources in 2016-2017 was Rs. 2.83¹⁰².

⁹⁴ Interviews with regulators.

⁹⁵ View expressed in interviews with regulators.

⁹⁶ *Ibid.*

⁹⁷ Anupam Trivedi, "U'khand Rejects Govt Report on 2013 Floods," *Hindustan Times*, 2015.

⁹⁸ GoUK, "Policy for Development of Micro & Mini Hydro Power Projects Upto 2 Mw-2015," (Dehradun: Government of Uttarakhand, 2015).; Anupam Trivedi, "U'khand's New Power Policy to Favour Local Communities," *Hindustan Times*, 2015.

⁹⁹ Anupam Trivedi, "Uttarakhand Buys 2.5 Mn Units of Power from Hp Daily," *Hindustan Times*, 2014.

¹⁰⁰ "Uttarkhand to Be First State to Buy Short-Term Power through E-Auction," *The Economic Times*, 2016.

¹⁰¹ D. Kunwar, "Kashipur Plants to Power State," *The Times of India*, 2016.

¹⁰² UERC, "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

As well as cheap power being increasingly uncertain, the UPCL might not be able to rely upon a large industrial base to maintain its financial position in the coming years as industrialisation has been slowing. There is a shortage of available land, and for industry already in Uttarakhand the central government benefits that attracted them over the last 15 years are now coming to an end. There has also been public opposition to new industrial developments.¹⁰³ Thus, it is unclear whether industry will stay in Uttarakhand as the benefits end, especially if electricity is unreliable or if tariffs cannot be kept low. The Uttarakhand government has sought to maintain its attractiveness to industry. For example, it hired Ernst and Young to work on the ease of doing business in Uttarakhand and to help the state set up a regulatory one-stop shop. Yet problems remain evident. In 2016, following tariff rises, industry associations complained to the government that the state was losing its low-tariff status, and that unscheduled load shedding was a problem for industry.¹⁰⁴ There is a growing demand for OA, with the UERC arguing that this is why industry consumption as a percentage of total consumption has fallen in recent years.¹⁰⁵ In 2011-2012, the quantity of power traded through OA was 10.34 MU, while in 2013-2014 this figure had increased to 281.03 MU—although in 2014-2015 the figure was down to 181.37 MU.¹⁰⁶ If industry does turn to OA in large volumes in the coming years, this will be a serious threat to the UPCL's position.

The UPCL has managed to steadily reduce the overall AT&C losses over the last 16 years. In 2001-2002, AT&C losses were at 54.56 percent, but are now down to 18.82 percent.¹⁰⁷ They have introduced new billing software and systems, and are currently working on a new central control centre. This will allow them to monitor what is happening at a sub-station level. In recent years, the UPCL has submitted its ARRs on time. As part of the state's R-APDRP programme, transmission infrastructure and sub-stations and lines are being upgraded, while state financing is being used to lay aerial bunch cables to cut theft. The introduction of KVH billing has also helped to cut down on theft. This all shows that progress is being made by the UPCL.

However, there remains an ongoing problem of high losses beyond HT industry and in the "plains" districts. In 2012, nearly 40 percent of all theft was being reported from three cities: Haridwar, Kashipur, and Rudrapur.¹⁰⁸ Figure 10¹⁰⁹ shows how AT&C losses for consumers excluding HT industry consumers have remained high. The view expressed by regulators and officers is that it is difficult for the UPCL to crack down on theft because of the political protection of theft in plains areas, and that it is difficult for officers to operate independently of political interference. Anecdotally, the plains districts are understood to be "plum postings," because of the earning potential for officers posted there.¹¹⁰ These continuing problems highlight how Uttarakhand has been lucky to have cheap power and a large industry base, which wallpapers over the kind of theft and billing problems, which in other states such as

¹⁰³ Sanjev Singh, "Uttarakhand: Congress Faces Rout, Can Harish Rawat Stop the Slide?," *FirstPost*, 2014.

¹⁰⁴ "Phd Chamber Resents Power Tariff Hike, Unscheduled Cuts." *The Tribune*, 2016.

¹⁰⁵ UERC, "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

¹⁰⁶ *Ibid.*

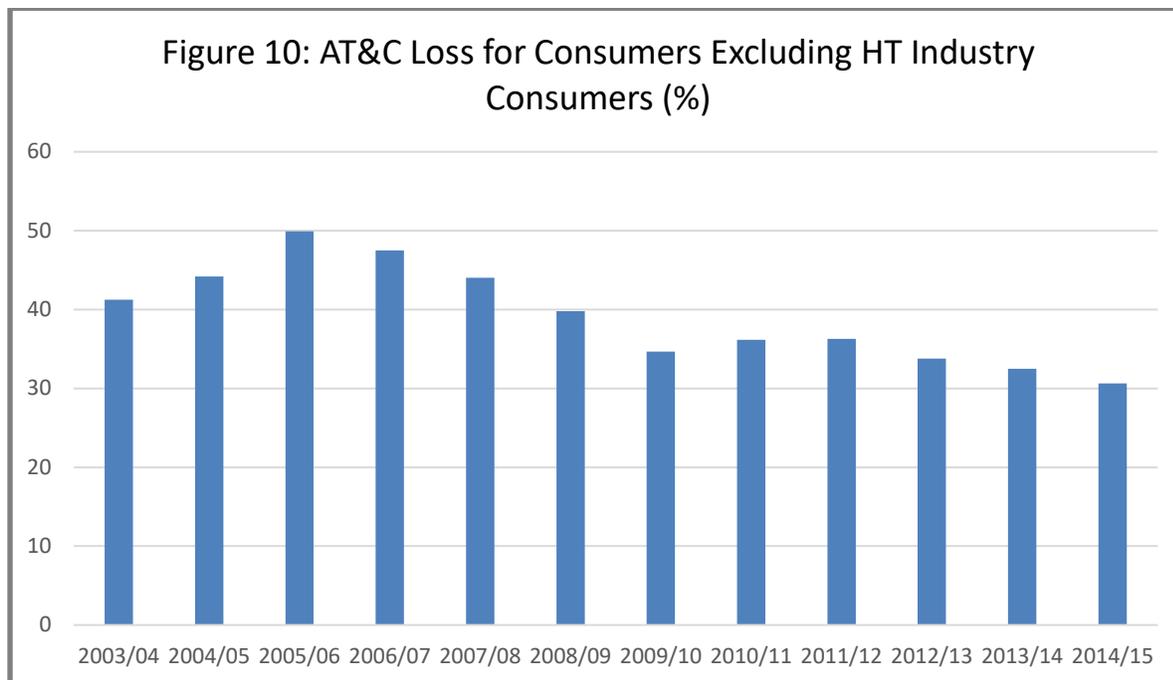
¹⁰⁷ *Ibid.*; UERC, "Order on Arr and Tariff for Financial Year 2003-04," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2003).

¹⁰⁸ P. Prashant, "UPCL Gets Rs 915-Cr Package from Govt." *Business Standard*, 2012.

¹⁰⁹ Table 10 Data Source: UERC. "Order on Approval of Business Plan and Multi Year Tariff Petition for Uttarakhand Power Corporation Ltd. For Second Control Period (FY 2016-17 to FY 2018-19)." (Dehradun: Uttarakhand Electricity Regulatory Commission, 2016).

¹¹⁰ This was identified as a problem in conversations with multiple stakeholders. However, there is no substantive evidence on the matter.

Uttar Pradesh, have resulted in struggling discoms. There is a need for improvements in the training of staff at the UPCL, and a culture shift is needed.¹¹¹ Detailed data about theft and defective meters has been made available by the UERC on an annual basis over the last decade, and multiple orders have been given to improve on problems, but action remains very slow.



Over the last 16 years, the UERC has repeatedly ordered the UPCL to improve its performance and has identified where improvements are needed. They have disallowed claims for higher tariffs to cover losses that the UPCL has accrued above targets set, or to cover bad debts. They have also set penalties where targets are not met. It seems clear that tariff orders have been the cornerstone of forcing better performance at the UPCL since statehood. The UERC has a largely permanent staff, which means that they are better able to work independently of interference, and the commission has developed in-house expertise. The UERC has, however, struggled to enforce improvements at the UPCL, and the UPCL has been reluctant to follow orders or to productively engage with the UERC.¹¹²

The UERC has been active in facilitating and fostering industry participation in the electricity distribution sector. Business associations in the state take a positive view of the role of the commission, seeing it as having introduced transparency into the sector, and as being a body where they can seek grievance redress. There is wide participation by industry and local businesses at public hearings. There are not any large organised consumer groups, however, despite encouragement by the UERC.

The government is now promoting renewables beyond large hydro power in Uttarakhand. While this adds capacity in the state, it will increase the upward pressure on electricity prices in the coming years. The UERC has in recent years been proactive in ordering the UPCL to comply with Renewable Purchase Obligations (RPOs), and has demanded that the UPCL buy Renewable Energy Certificates (RECs) when it

¹¹¹ View expressed by regulators and officers at the UPCL.

¹¹² Interviews with regulators at the UERC.

has not met its targets. When the UPCL failed to hit their RPO level in 2014, the UERC fined the MD of the UPCL Rs. 20,000, while adding an additional daily fine of Rs. 2,000 until compliance was met.¹¹³ The Uttarakhand Renewable Energy Development Agency (UREDA) has been tasked by the UERC to commission 300 MW of solar power over the next 2 to 3 years. This is despite the state having cheap hydro power and land shortages in areas where solar power is viable.¹¹⁴ The Uttarakhand Solar Power Policy 2013 set a target of 500 MW of solar power by 2017.¹¹⁵ In 2016, the Government of Uttarakhand invited applications for 10MW of grid-connected rooftop PV and small-scale solar systems of 5 KW each.¹¹⁶ The feed-in-tariff agreed upon for rooftop solar power that the UPCL will pay customers was set at Rs. 9.2 per unit¹¹⁷—a figure significantly higher than the current average cost per unit for power paid by the UPCL. Projects to support biomass and bio-waste generation are also being promoted, and Uttarakhand has agreed to buy bundled coal and solar electricity from the NTPC. Demand reduction measures are being pushed by the UERC, and an LED bulb replacement program has been run. Under the 24x7 program, UREDA is tasked with reducing demand by 5 percent. A time-of-day-tariff and incentives for solar hot water heaters have been key tools used to target demand reduction.

Notably, privatisation of distribution has not yet taken place in Uttarakhand, despite it being pushed in multiple other states in India. During the last BJP government's time in power between 2007-2012, the UPCL put forward plans for the privatisation of power distribution at Roorkee and Rudrapur, in Udham Singh Nagar district, where AT&C losses are very high.¹¹⁸ Yet, this plan made little progress. In 2015, plans were announced by the Congress government to privatise power distribution at Kashipur in Udham Singh Nagar and Roorkee in Haridwar district, using a public private partnership model where the government would handle the infrastructure while private companies would run the lines and collect revenue.¹¹⁹ However, 11,000 employees from the power companies in Uttarakhand threatened to go on strike if the government moved ahead with privatisation,¹²⁰ and the plans were quickly shelved.¹²¹

Conclusion

Uttarakhand's electricity distribution sector has, in many regards, fared well since the state was formed. The combination of cheap hydro power and a large industrial base has meant that Uttarakhand's one public discom, the UPCL, has performed well financially and has not required annual subsidies. Over the last 16 years, headline AT&C losses have been reduced dramatically. Further, the UPCL has made significant improvements to its billing and monitoring systems, and appears close to being able to provide 24x7 power. Full electrification has almost been achieved. Over the last 16 years, the UERC has played an important role in keeping tariffs low and in pushing for improvements at the UPCL. However, Uttarakhand's golden combination of cheap power and large industry base is arguably one that has not been engineered politically or technically within the state. Furthermore, while the benefits of cheap

¹¹³ UERC, "Petition Seeking Waiver of Per Day Penalty Imposed by the Commission Vide Order Dated January 22, 2014 for Non-Compliance of Directions Issued Vide Order Dated September 11, 2013," (Dehradun: Uttarakhand Electricity Regulatory Commission, 2014).

¹¹⁴ Tom Kenning, "Indian State Uttarakhand Launches Solar Tender for 170MW Despite 'Limited Potential'," *PV Tech*, 2015.

¹¹⁵ GoUK, "Policy for Development of Micro & Mini Hydro Power Projects Upto 2 MW-2015," (Dehradun: Government of Uttarakhand, 2015).

¹¹⁶ Tom Kenning, "India's Uttarakhand Inviting Applications for 10MW Rooftop and Small-Scale Solar," *PV Tech*, 2016.

¹¹⁷ Shahla Siddiqui, "Now, Consumers Can Set up Solar Plant and Sell Surplus to UPCL," *Times of India*, 2015.

¹¹⁸ S. Prashant, "Rawat to Privatise Power Distribution in 2 Towns," *Business Standard*, 2015.

¹¹⁹ "Power Supply in Roorkee, Kashipur to Be Privatised," *The Tribune*, 2015.

¹²⁰ Shahla Siddiqui, "11k Power Employees Threaten Stir against Govt's Privatization Bid," *Times of India*, 2015.

¹²¹ "Govt Fails to Privatise Power Distribution," *The Tribune*, 2015.

power and industry have been relied upon, there has been a failure by the UPCL to deal with problems around defective meters, and to crackdown on high AT&C losses beyond industrial consumers. While the UERC has on an annual basis identified where the problems are, there appears to be a lack of political and administrative will and capacity to reduce AT&C losses.

Looking forward, the combination of cheap power and plentiful industry consumption looks fragile, as Uttarakhand buys more expensive gas and renewables-based electricity and as industrial incentives run out. Uttarakhand's government has not yet faced having a discom in the kind of financial crisis that states like Uttar Pradesh have had to deal with every few years over recent decades. It has never had to solve the puzzle of how to become financially strong with a low base of industrial consumers. It has not yet tested whether the state has the political stability or leadership to tackle a worsening of the financial situation at the state's discom, or whether governments in Uttarakhand would be willing to oversee a comprehensive drive to crack down on theft and bring down AT&C losses.