FORUM OF REGULATORS

REPORT FOR NORTH EASTERN REGION

December, 2018

Table of Contents

List of Figures

List of Tables

Executive Summary

North-Eastern region of India which is commonly known as 'Seven Sisters' consists of the States of Assam, Arunachal Pradesh, Tripura, Meghalaya, Nagaland, Mizoram, Manipur. Sikkim is also considered as the member of North East. In past few years, these States have gained more attention towards its developments in all sectors and especially a more radical transformation in their Power Sector.

In order to anticipate these developments further, during the 59th Meeting of the Forum of Regulators (FOR) held at Guwahati, a Task Force has been formed consisting of the Members of Forum and that of the North East States so that they could share their expertise for facilitating the North Eastern Region for undertaking immediate remedial actions and to further improve the sector performance.

Scope of the Report:

a. To assess the Power Sector performance of North Eastern States.
b. To suggest measures for improvement of the key challenges faced by each State.
c. To recommend a roadmap to implement the suggested measures within a stipulated period.

In light of the above scope, during the 1st Meeting of the Task Force in October, 2017, the FOR Secretariat was directed to prepare formats in order to collect the requisite data from all States in the North Eastern Region. Subsequently, the recommended formats were prepared and circulated to all the respective States ERC's/JERC's of the North Eastern Region (NER) by the FOR Secretariat.

Further, based on the available data of the respective States, the Task Force further conducted a detailed comparative analysis on each State by defining the different key parameters on which the respective States would be graded on a scale of 1 to 3.

The comparative analysis of every State has been conducted based on their power supply scenario data to assess power surplus/deficit scenario, followed by information availability such as Regulatory findings, Key Performance Index (KPI), Frequency of Tariff revision, assessment of ARR parameters such as O&M Expenses, Power Purchase Cost, etc., Efficiency of the DISCOMs of the respective States such as AT&C Loss percentage, billing and collection efficiency etc.

Parameters considered for Performance Analysis of N-E States:

Following key parameters are considered for performance analysis of N-E State**s**

1. State Profile
2. Time lines for Tariff Petition filing for G-T-D for last 5 Years

3. Power Supply Position – Demand v/s Availability in MW and MU for last 5 years.
4. Cost of Power Generation – Type of power station, Installed /contracted capacity, fixed change, Energy Charge, Cost per Unit and Total Cost for last 5 years.
5. Average Cost of Supply (ACoS) and Average Power Purchase Cost (APPC), consumer mix
6. Energy Balance
7. Trend of Approved ARR
8. Billing Efficiency
9. Collection Efficiency
10. Trend of AT&C Loss
11. Fatal and Non-Fatal Accident Report
12. Year wise addition of Distribution Transformers
13. Failure of Distribution Transformers
14. Number of Faulty Meters
15. RE Targets and Capacity Additions
16. RPO Compliance and Targets
17. Key Regulations by SERC

On comparison of the respective State's performance, rankings/Grading for each State has been given which are being summarized below. This was only done for the sake of recommending extent of initiative to be taken by each State so as to bring more efficiency in the sector.

State	Rank	Grade*
Meghalaya	1	1
Assam	2	2
Sikkim	3	2
Arunachal Pradesh	4	3
Manipur	5	3
Nagaland	6	3
Mizoram	7	3
Tripura	8	3

**The above gradation is based on the available data provided by the respective States, which may subject to change after the complete availability of required data.*

Where,

Grade 1: States who achieve 1st grade in 70% parameters are good performers and requires little attention

Grade 2: States who achieve 2nd grade & above in 70 % of parameters are average performers and requires significant support and attention

Grade 3: States who achieve 3rd grade &above in 70 % of parameters and where information availability is an issue are poor performers and requires substantial review of practices and constant support till performance improve

On the basis of above considerations, a roadmap of the Task Force has been formulated and detailed in the report.

Deliberations in FOR

The report of the Task Force was presented before the FOR during 65thmeeting held on 13th November, 2018 at Bhubaneswar, Odisha. After deliberations on the report, the Forum endorsed the Recommendations and Way forward of the Task Force.

Key Recommendations

A. Corporatisation or Functional Segregation of Generation, Transmission and Distribution Business

Electricity supply business in some States like Sikkim, Nagaland, Arunachal Pradesh and Mizoram is managed by the Government Departments and Tripura all utilities functions are performed by one company. It is observed that, the State where energy sector is managed by Government Departments are lagging in timely submission of tariff petition which may have impact on timely revision of tariff. It is also observed that the States such as Meghalaya and Assam are performing better as compare to other States in Region. Hence, it is proposed that such States, needs to initiate the process of Corporatisation or Functional Segregation of the energy sector in the State and have independent board responsible for the performance of the Company/Unit. To begin with, these States may initiate the process of maintaining separate Regulatory Accounts for Generation, Transmission and Distribution business.

B. Preparation of a roadmap for the future demand.

As per the information made available to the Task Force, it is found that almost all the States in North East has deficit of about 0.5 to 6%. It is therefore necessary that Regulatory Commissions of each State start doing multiyear tariff proceedings in which all the utilities including the department of power should be asked to give a 5 year business plan indicating demand and supply and investments to be made in next five years. It is also being recommended that Discom and Transmission Company or the power department start proper load forecasting based on historical demand, seasonal variation, business expansion etc. by using latest tools. In case of shortages, the SERC should explore the use of Open Access for some of the consumers in their State. The concept of Distributed Generation by RE should also be explored for meeting energy demand of areas located at remote places.

C. Energy Audit at Sub-Station and Feeder level

The Regulatory Commission is being advised to implement mechanism of Energy Audit at substations and important feeders. It is being advised that quarterly report on such audit should be submitted by the concerned department to the Commission. This will enable the utilities to know the area where losses are high where it need corrective action.

D. Reduction in AT&C Losses

National average for AT&C losses is 23.03 % as per UDAY portal. Most of the North Eastern States have reported much higher losses than the national average. It is understood that the region is geographically different due to hills and uneven terrain. However, taking action in the field by the utility alongwith the general public can reduce the losses to much lower level compared to existing scenario. The Regulatory Commissions are being advised to place a mechanism on the basis of energy audit report for areas having maximum losses, where licensee should be asked to give quarterly report showing trend of losses month wise. It is recommended to direct the licensee not to compromise on the collection efficiency. There is no substitute other than 100% collection. The data says that collection efficiency has improved which is an encouraging trend and this needs to be supported by IT enabled automated metering and billing infrastructure.IT based monitoring tools for periodic maintenance of Distribution Network can be useful for distribution utilities operating in the hilly area of North-East. It is also suggested to make Key Consumer Cell in each state on the basis of their load, consumption and revenue and start building IT data base. Regular monitoring of their metering, billing and collection will definitely improve the financial position of the sector. DT wise monitoring of losses in key revenue areas will also be helpful

E. Issuance and Implementation of DSM Regulations.

The Forum of Regulators came up with model Deviation Settlement Mechanism Regulations at State level in March 2017.States such as Assam and Meghalaya have initiated the regulatory process for preparation of DSM Regulations for their States. However, other NE States are yet to come up with the DSM Regulations.

F. Bridging Gap between ACOS and ARR:

It can be inferred that the gap between ACOS and ARR is considerably high for most of the States. Therefore, measures need to be taken to reduce the gap between Average Cost of Supply (ACS) per unit of power and per unit average revenue realized (ARR). The gap between ACS and ARR may be reduced by improving operational efficiencies of Discoms, reduction in cost of power by improving performance parameters of generators, enforcing financial discipline on Discoms through alignment with State finances. This would improve the financial health of the DISCOMs. It is recommended to SERC to pass orders in all tariff matters regularly and also find out a reasonable mechanism of quarterly revision in Fuel and Power Purchase Price Adjustment (FPPPA), based on state's specifics.

G. Region specific Data Portal:

It is recommended to have an open data portal specific to the north eastern region on lines of UDAY, UJALA etc. The availability of data specific to the region may provide a base ground to quality research and may bring in further scope of improvements. The formats may be prepared in association with FOR.

H. Strengthening of State Load Despatch Centre of N-E States:

With increasing share of renewable energy penetration into grid, there are significant emerging regulatory developments and growth of electricity market operations at State/national level such as introduction of intra-state DSM framework, potential introduction of real-time/intra-day market, Ancillary services market. Hence, the role of power system operations and market operations by SLDC is going to be even more crucial during the coming times. Hence, it is recommended that SERCs in N-E region needs to adopt the model Regulations for SLDCs as and when released by the Forum of Regulators. It is also recommended to strengthen SLDCs in line with Pradhan Committee and SAMAST Report.

I. Region specific Core Groups for knowledge exchange and capacity building:

It is recommended to have region specific core group for knowledge exchange and capacity building of personnel of Discoms and SLDCs. Formation of core group for SAMAST implementation in N-E region has demonstrated the need of such groups for effective implementation of schemes such as UDAY, UJALA, various recommendations of Forum of Regulators, implementation of DSM framework etc.

J. Institutional Strengthening of State Regulatory Commissions in the N-E Region:

It is observed by the Task Force that, the most of the State Regulatory Commissions in the N-E Region are not having adequate technical staff for performing the functions specified under the Electricity Act, 2003. Besides the Tariff determination process, the Regulatory Commission also needs to undertake the performance monitoring of Generation, Transmission and Distribution businesses of utilities, effective implementation of Regulations like Renewable Purchase Obligations, Consumer Advocacy, timely and effective implementation of directives of the Commission , all of , which needs adequate manpower in the State Commission. Hence, it is recommended that the SERCs in the region may undertake a recruitment process against the vacant posts and also if necessary, initiate the process of seeking approval for additional staff from respective State Governments.

Further, Capacity building and Training of staff of the State Regulatory Commission is also required for enhancement of skills. Hence it is recommended that the State Regulatory Commissions with assistance of the State Governments may take up national and international Training programmes for their Staff. It is also recommended to increase more interaction and training of staff of utilities and SERCs with staff of peer Regulatory Commissions and also recommended to start collaboration among other State Commission and share the skill among their staff from time to time. FOR may take this initiative.

i. North-Eastern SERCs/ JERC should direct their Utilities to regularly monitor progress against the parameters specified in the report through a compliance format as part of the ARR process. SERCs could use the formats/ templates used for this exercise to undertake quarterly/ six monthly review in case of some of the technical parameters e.g. distribution loss/ ATC loss, distribution transformer failure rate, defective meter replacement, pending connections etc.

ii. The FOR Standing Technical Committee will monitor the progress of implementation of parameters referred in the report periodically and submit a status report to the FOR.

iii. The Report of the FOR on the North East Region shall be sent to all the State Governments of the North-Eastern Region for their reference and necessary action as recommended by the Forum of Regulators.

The Way Forward

The Forum believes that the study undertaken by the Task Force is not a onetime exercise but is a continual process for performance enhancement. The State Commissions in the N-E Region need to continue with periodic monitoring of the performance parameters discussed in this Report. The SERCs in the N-E region may also review the performance parameters discussed in this report during ARR/APR processing of Utilities.

Further, State Commissions and the other stakeholders such as State Utilities and State Governments in the N-E Regions also need to undertake eeffective and time bound implementation of Ministry of Power's schemes such as UDAY, UJALA, implementation of SAMAST as recommended by the Forum of Regulators, Deviation Settlement Mechanism Framework in the N-E Region to implement grid discipline in the N-E Region. Creation of Core groups of Discoms and SLDCs in the N-E region for knowledge exchange and capacity building shall be useful for collective development of States in the N-E Region. The State Commission in the N-E Region may also create an open data portal for maintaining State specific data.

The Report of the FOR on the North East Region shall be sent to all the State Governments of the North-Eastern Region for their reference and necessary action

Report on Power Sector – North Eastern Region

A. Background

1. During the 59th Meeting of the Forum of Regulators (FOR) held at Guwahati, it was decided that a Task Force constituting Members of the Forum may be formed to identify issues of concern and the members could share their expertise for facilitating the North Eastern Region to take urgent remedial action and improve the performance.

2. Consequently, the Competent Authority in FOR accorded approval for constitution of the Task Force FOR to identify issues concerning North Eastern States with respect to the Energy Sector and to suggest recommendations. The composition of Task Force is as follows:

(i)	Chairperson, Gujarat Electricity Regulatory Commission	Chairman
(ii)	Chairperson, Assam Electricity Regulatory Commission	Member
(iii)	Chairperson, Arunachal Pradesh State Electricity Regulatory Commission	Member
(iv)	Chairperson, Joint Electricity Regulatory Commission (Manipur & Mizoram)	Member
(v)	Chairperson, Meghalaya State Electricity Regulatory Commission	Member
(vi)	Chairperson, Nagaland Electricity Regulatory Commission	Member
(vii)	Chairperson, Sikkim State Electricity Regulatory Commission	Member
(viii)	Chairperson, Tripura Electricity Regulatory Commission	Member
(ix)	Chairperson, Himachal Pradesh Electricity Regulatory Commission	Member
(x)	Chairperson, Maharashtra Electricity Regulatory Commission	Member
(xi)	Chairperson, Tamil Nadu Electricity Regulatory Commission	Member
(xii)	Secretary, Central Electricity Regulatory Commission	Coordinator

3. The scope of the Task Force is as under:
    a) To assess power sector performance.
    b) To suggest measures for improvement of performance.
    c) To recommend a roadmap to implement the measures in a time bound manner.

4. Accordingly, the 1st Meeting of Task Force was held on 09th October 2017, in New Delhi. During the discussion, it was highlighted that there is a need to conduct orientation programs for the Officers of SERCs/JERCs, of the North Eastern Region to provide them more exposure to various developments and issues in the power sector. Accordingly, two training programmes were conducted and facilitated by the FOR Secretariat as under:

    - The 1st Capacity Building Programme for Officers of SERCs/JERCs of the North East Region on various technical issues, regulatory aspects and tariff fixation in collaboration with Indian Institute of Corporate Affairs, Gurugram. The same was held from 17-19 November 2017. The programme provided

exposure to Regulators and Regulatory Staff of SERCs/JERCs in the North Eastern Region on various developments and issues in the power sector.

- The 2nd Capacity Building Programme was held in May 2018 in Gandhinagar, Gujarat in association with Gujarat Electricity Regulatory Commission (GERC).

5. The FOR Secretariat was also directed to prepare formats to collect the requisite data from all States in the North Eastern Region. Based on the formats prepared by FOR Secretariat and circulated to the SERCs/JERCs of the North Eastern Region.

6. The 2nd meeting of Task Force for NE Region was held on 20th September, 2018 in CERC, New Delhi. The representatives of IDAM Infrastructure Advisory Private Ltd (IDAM Infra), who were requested by the Task Force to assist in preparation of the report, presented the salient features of the report. The key findings and recommendations were summarized and presented during the meeting.

7. It was decided that, the draft report along with the formats may be mailed to all the North East States to seek requisite information so as fill the data gapsby 20th October 2018.More qualitative and quantitative analysis to be done on the available data from States. There should be emphasis on key consumer database, including the high value consumers and enabling recommendation for ensuring 100% collection.

8. The Task Force requested USAID/IDAM to assist in preparation of the final report. USAID/IDAM has consented to assist the FOR Task Force and their efforts in this regard are appreciated. Chairman, Task Force requested M/s IDAM to furnish the Final report by 30th October2018 and copy of the same be given to all members for their feedback in a week's time and finally the Committee submits its report to FOR for further deliberation at the earliest.

9. Accordingly, the FOR Secretariat prepared the revised formats and circulated to the SERCs/JERCs of the North Eastern Region. Based on the revised data received from SERCs/JERC of the N-E Region, the analysis of data is carried out and presented in the subsequent chapters.

B. Power Scenario in North Eastern Region

- **Power Supply Position in the North Eastern Region**

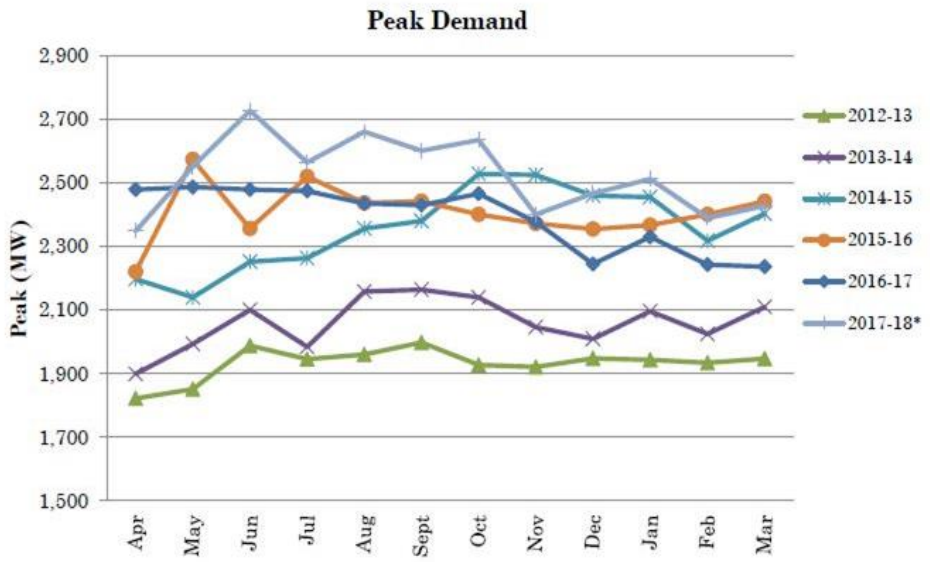


Figure 1: Month-Wise Power Supply Position of N-E Region from FY13 to FY18(Peak Demand)

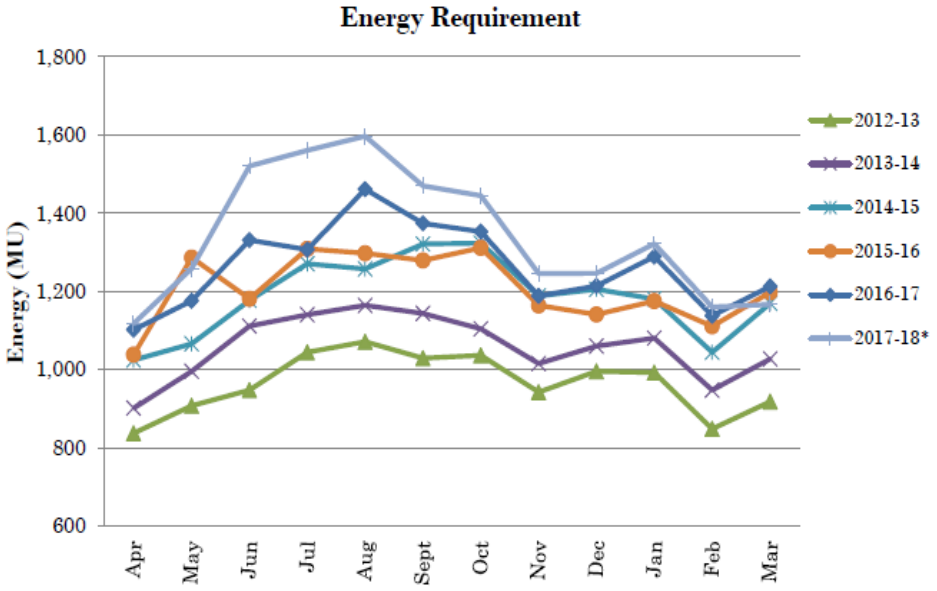


Figure 2: Month-Wise Power Supply Position of N-E Region from FY 13 to FY18 (in MU)

The changing pattern of demand and energy requirement in the North Eastern Region emphasizes onthe need for use of advanced tools for forecasting, scheduling and deviation management of grid resources.

Improved visibility of intra-state entities, facilitating multiple transactions for intra-state, inter-state and inter-region necessitate ramping of infrastructure of metering, communication, scheduling and energy accounting.

- **North-Eastern States: Deviation Quantum and Charges**

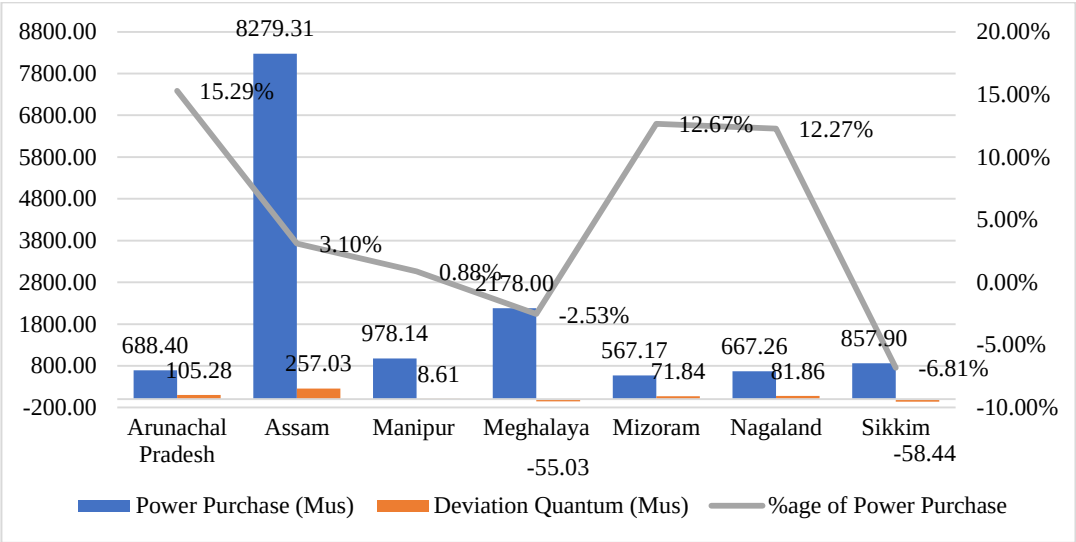


Figure 3: Deviation Quantum as a Percentage of Power Purchase

Deviation quantum is significantly higher (12% to 15%) insome States, in annualized terms.The Total Deviation Quantum for North Eastern Region is 469.59 MUs as against the totalPower Purchase of 13,358.28 MUs for FY 2015-16 (3.52%).

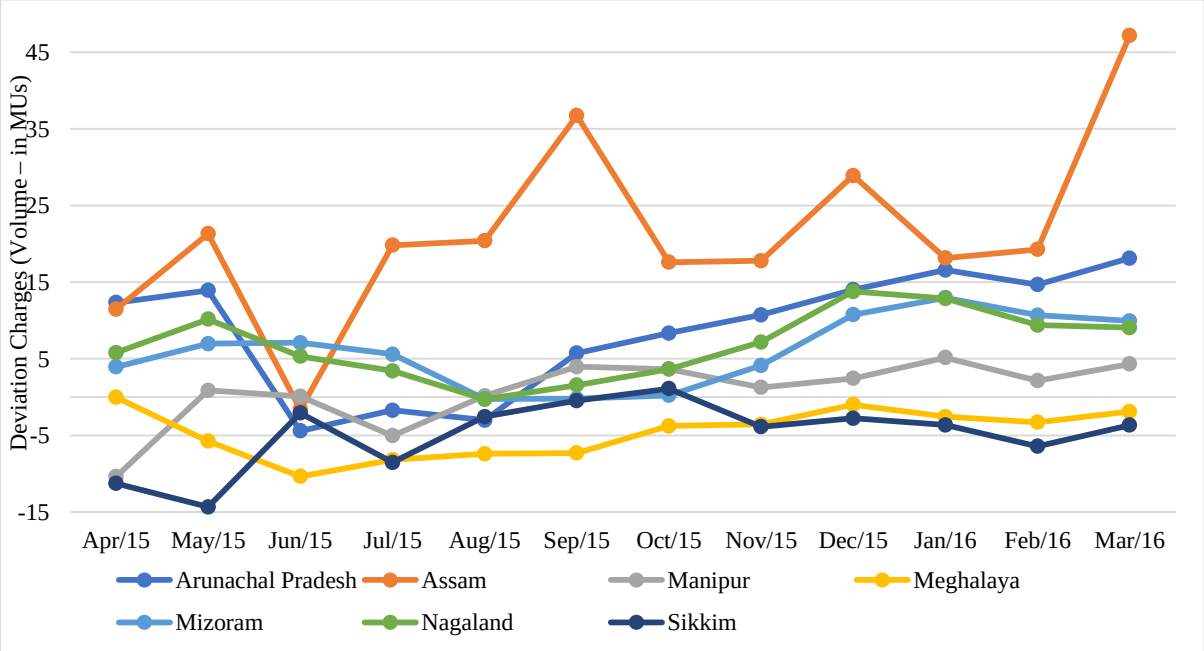


Figure 4: Monthly Variation of Deviation Units (Volume in MUs)

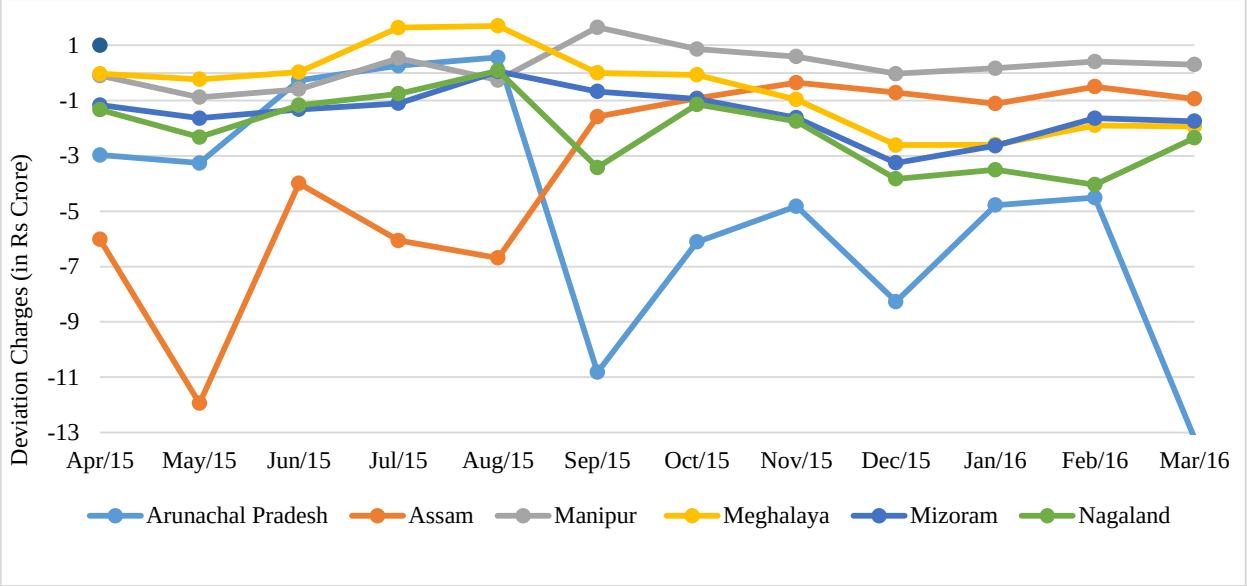


Figure 5: Monthly Variation of Deviation Charges (Value in Rs. Crore)

The Total Deviation Charges for North Eastern Region is Rs (-) 146.49 Crore as against the total ARR of Rs. 6,302.75 Crore for FY 2015-16 (-2.32%).

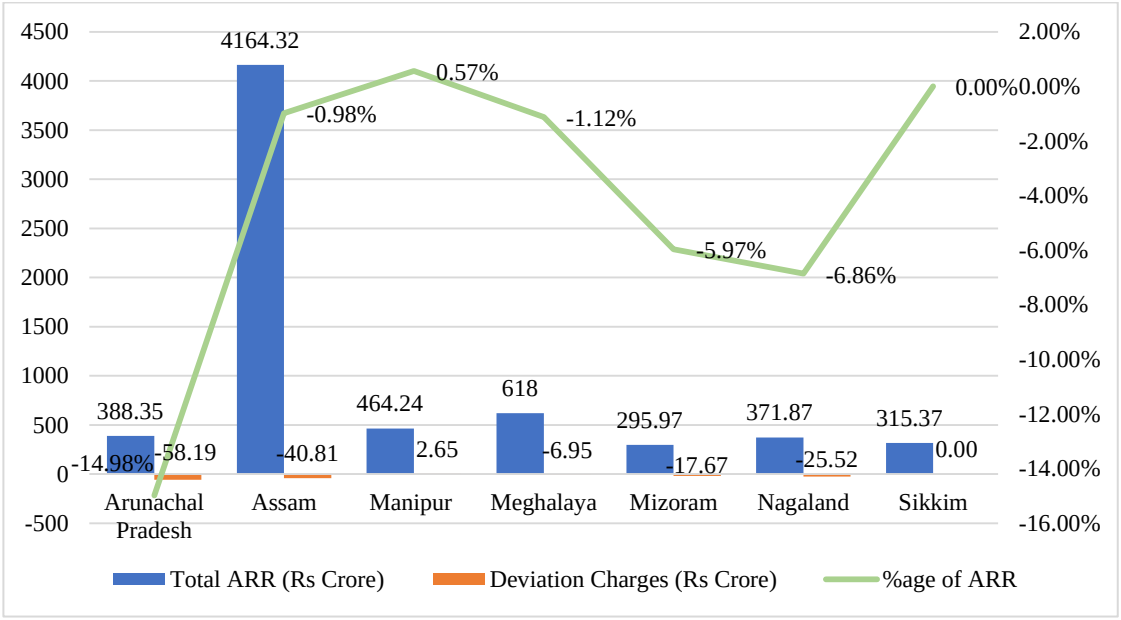


Figure 6: DSM Charges as a Percentage of ARR

Imbalance handling and Management of Deviation charges would have an impact on the overall ARR of Utility.

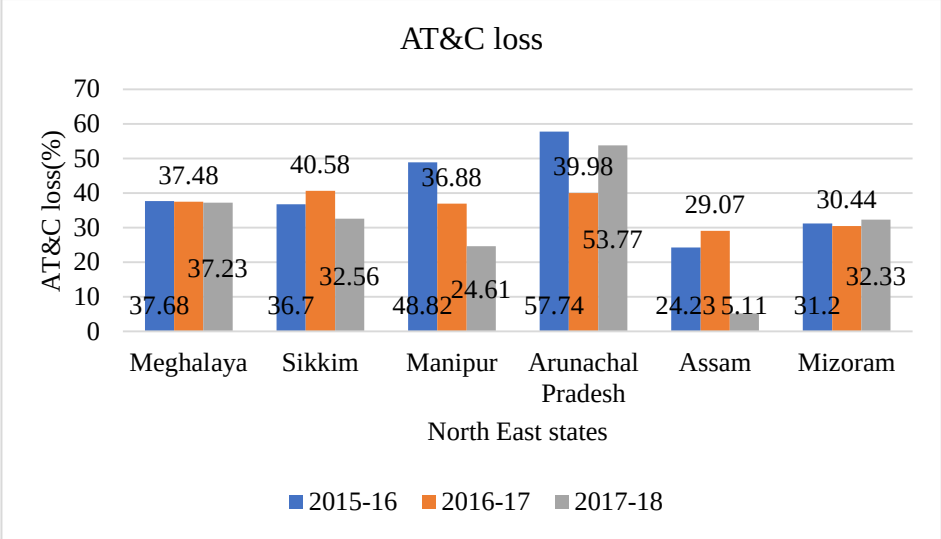


Figure 7: AT&C loss for North Eastern states

Table 1: Power supply position of N-E States (As on 31 March, 2018)

State	Installed capacity (MW)			Requirement (MU)	Availability (MU)	Surplus (+)/ Deficit (-) in %
	Thermal	Hydro	RE			
Meghalaya	140.09	387.19	31.05	1555	1551	-0.3
Sikkim	87.03	823	52.11	486	485	-0.2
Manipur	138.97	88.93	5.51	872	827	-5.4
Arunachal Pradesh	71.52	97.45	110	799	789	-1.3
Assam	1027.53	431.23	46.56	9095	8779	-3.6
Nagaland	70.33	53.37	31.67	795	771	-3.1
Tripura	643.85	62.38	21.1	2600	2552	-1.9
Mizoram	61.16	94.19	36.67	497	488	-1.8

Consumer Grievance Redressal Mechanism in North Eastern States

Table 2: Status of Three level consumer grievance Redressal Mechanism

State	Regulatory grievances
Meghalaya	Yes
Sikkim	No
Manipur	Yes
Arunachal Pradesh	No
Assam	Yes
Nagaland	Yes
Tripura	Yes
Mizoram	Yes

1 Overview of Meghalaya State Power Sector

1.1 Basic Information

Table 3: Information of Meghalaya State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Meghalaya State Electricity Regulatory Commission (MSERC)
Date of Constitution of ERC	15th November 2003
Name of Generating Company	Meghalaya Power Generation Corp. Ltd. (MePGCL)
Name of Transmission Utility	Meghalaya Power Transmission Corp. Ltd. (MePTCL)
Name of Distribution Utility	Meghalaya Power Distribution Corp. Ltd. (MePDCL)

1.2 Generation Tariff Petition – Timelines

The following table shows timelines for Generation Petition.

Table 4: Timelines for Generation Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	14.12.2012	16.12.2013	22.12.2014	5.02.2016	23.11.2016
Admission of ARR Petition	15.12.2012	18.12.2013	02.01.2015	07.02.2016	25.11.2016
Issue of Tariff Order	29.03.2013	31.03.2014	31.03.2015	31.03.2016	31.03.2017
Filing of True-up Petition	15.02.2016	16.01.2017	2.01.2018	X	X
Admission of True-up Petition	20.02.2016	18.01.2017	9.01.2018	X	X
Issue of True-up Order	30.03.2017	31.03.2017	X	25.09.2018	X

1.3 Transmission Tariff Petition- Timelines

The following table shows timelines for Transmission Petition.

Table 5: Timelines for Transmission Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	14.12.2012	11.12.2013	22.12.2014	5.02.2016	16.11.2016
Admission of ARR Petition	17.12.2012	13.12.2013	02.01.2015	7.02.2016	18.11.2016
Issue of Tariff Order	28.03.2013	10.03.2013	30.03.2015	30.03.2016	31.03.2017
Filing of True-up Petition	05.02.2016	10.01.2017	2.01.2018	X	X
Admission of True-up Petition	8.02.2016	15.01.2017	9.01.2018	X	X
Issue of True-up Order	30.03.2017	31.03.2017	25.09.2018	X	X

1.4 Distribution Tariff Petition - Timelines

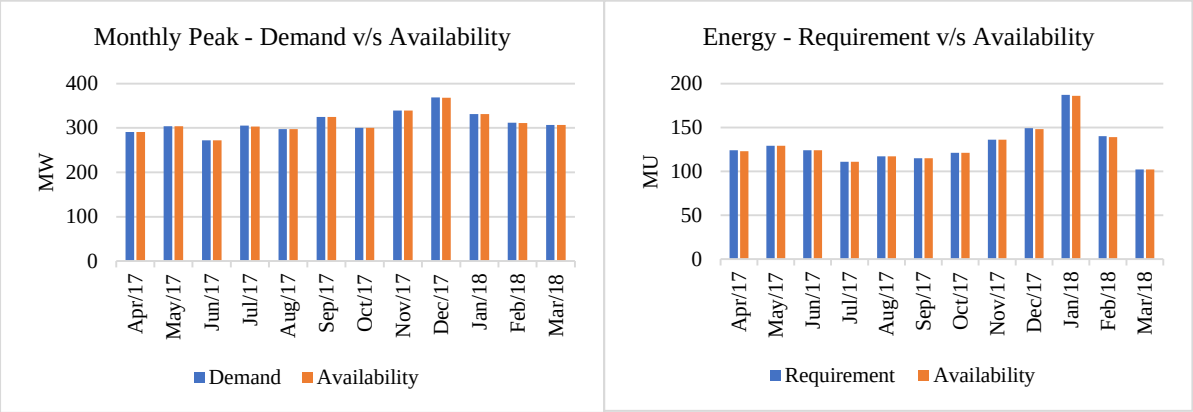
The following table shows timelines for Distribution Tariff Petition.

Table 6: Timelines for Distribution Tariff Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	14.12.2012	16.12.2013	22.12.2014	5.02.2016	23.11.2016
Admission of ARR Petition	16.12.2012	18.12.2013	02.01.2015	07.02.2015	25.11.2016
Issue of Tariff Order	31.03.2013	31.03.2013	31.03.2015	31.03.2016	31.03.2017

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of True-up Petition	15.02.2016	15.01.2017	2.01.2018	X	X
Admission of True-up Petition	20.02.2016	20.01.2017	9.01.2018	X	X
Issue of True-up Order	30.03.2017	31.03.2017	25.09.2018	X	X

1.5 Power Supply Position in Meghalaya



The graph shows Month-wise power supply position of Meghalaya during the year 2017-18 (Peak Demand and in terms of Energy).

1.6 Cost of Power Generation

The following table shows Power Generation Cost and other details for FY 2015-16 to 2017-18 for Meghalaya

Table 7: Power Generation Cost and Other Details for FY 2015-16 to 2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Generated (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Generated(MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Generated(MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Hydro - SGS										
Umiam St.- I	36	116	1.32	15.27	116	1.4	16.14	99.45	1.52	15.09
Umiam St.-II	20	46	1.84	8.46	46	1.96	8.97	42.65	2.63	11.21
Umiam St.-III	60	139	1.82	25.33	139	1.94	26.91	125.38	1.81	22.68
Umiam St.-IV	60	207	1.22	25.31	207	1.3	26.91	186.32	1.22	22.64
Umtru	11.2	39	1.22	4.75	39	1.28	2.02	20.25	1.2	2.44
Sonapani	1.5	5	1.82	0.91	5	1.88	0.92	5.89	2.43	2.44
MLHEP	126	480	2.82	135.45	480	2.82	135.54	450	3.94	177.4
NUHEP	40	X	X	X	75	5.16	19.35	X	X	X
Lakroh	1.5	X	X	X	X		X	X	X	X
Total	**356.20**	**1,032**			**1,107**			**929.94**		

The year-wise energy drawn and variation in power generation cost for FY 2015-16, 2016-17 and 2017-18 is as below.

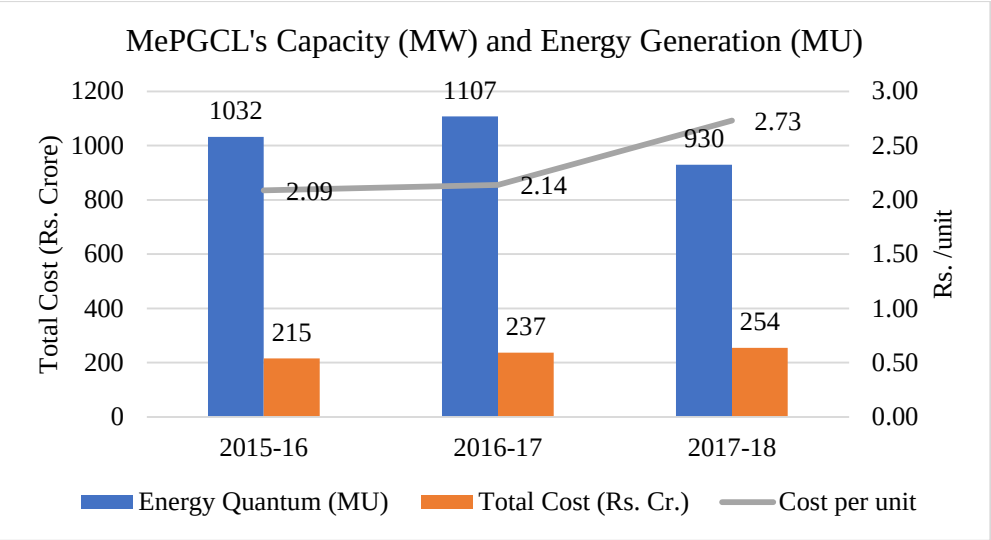


Figure 8: Year-Wise Energy Generation (MU)and Total Cost, Cost per Unit for FY16 to FY18

The graph shows rising trend from FY 2015-16 to 2016-17; however, the dip in energy drawn can be seen from FY 2016-17 to 2017-18.

1.7 Power Purchase Cost

Table 8: Power Purchase Cost for FY 2015-16 to FY2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
NTPC	64.21	136	3.63	49.41	222	3.89	86.36	336	4.30	144.56
OTPC	-	346	2.42	83.73	346	2.48	85.89	346	2.54	113.44
NEEPCO	151.15	556	3.06	170.23	556	2.94	163.77	556	3.15	175.42
NHPC	13.01	50	3.07	15.33	50	3.07	15.33	-	-	-
Total		**1,088**	**2.92**	**318.7**	**1,174**	**2.99**	**351.35**	**1,238**	**3.5**	**433.42**

1.8 Average Cost of Supply (ACoS) and Average Power Purchase Cost (APPC)

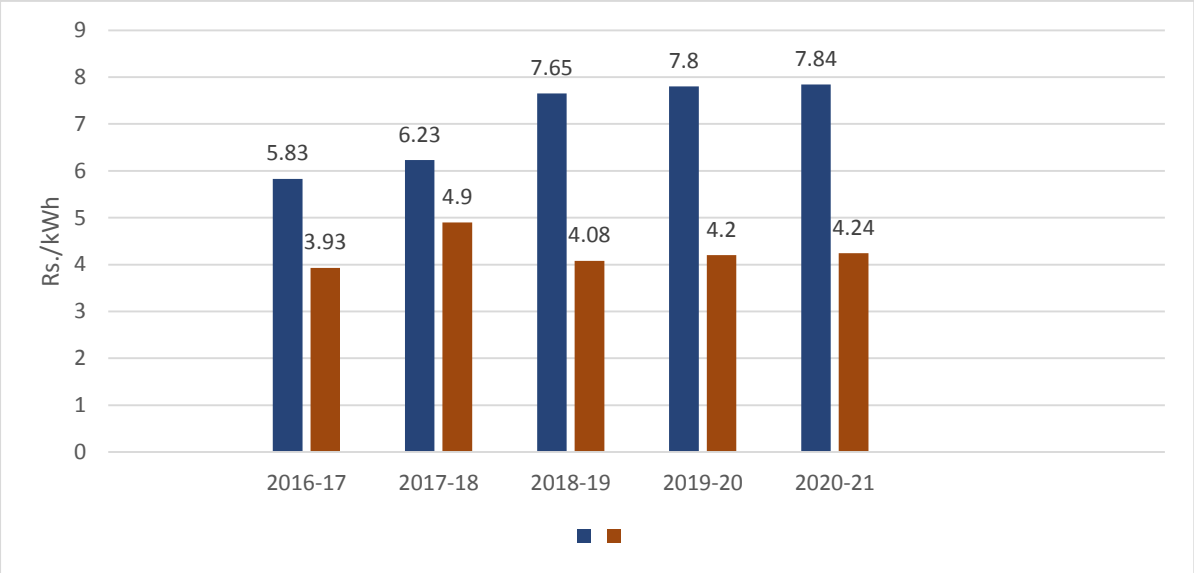


Figure 9: ACoS and APPC Variation for Meghalaya

1.9 Energy Balance

Table 9: Energy Balance for Meghalaya

	Particulars	2015-16	2016-17	2017-18
A	**Energy Requirement**			
1	Total Energy Sales (Within State and Sale to Assam)	1,068	1,118.00	1,173.00
2	Distribution Loss (in %)	23.00%	22.00%	21.00%
3	Energy Requirement	1,387.00	1,433.00	1,485.00
B	**Energy Availability**			
4	Energy Purchase from ER (Considering Eastern RegionLoss @2.12%)	133.10	133.10	133.10
5	Energy Purchase from North Eastern Region	1,010.00	1,096.00	1,210.00
6	Net Energy Available at NERLDC (Considering NER Tr Loss @2.99%)	1,108.9	1,192.35	1,302.94
7	Net Energy Purchase from MePGCL	1,032	1,107.00	1,182.00
8	Total Energy Available at NERLDC	2,099.70	2,299.35	2,484.94
9	Net Energy Available for MePDCL (Considering Intra-State Tr Loss @4%)	2,015.70	2,207.38	2,385.54
10	Surplus/Deficit	628.70	774.38	900.54
11	Grossed Up by 4%	654.90	806.64	938.07

The energy balance table for Meghalaya depicts total energy input including inter-state bilateral purchase/sale as 1,068 MU, 1,118 MU and 1,173 MU for FY2015-16, 2016-17 and 2017-18 respectively.

1.10 Trend of Approved ARR

The following graph depicts the trend of approved/trued-up ARR for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Meghalaya.

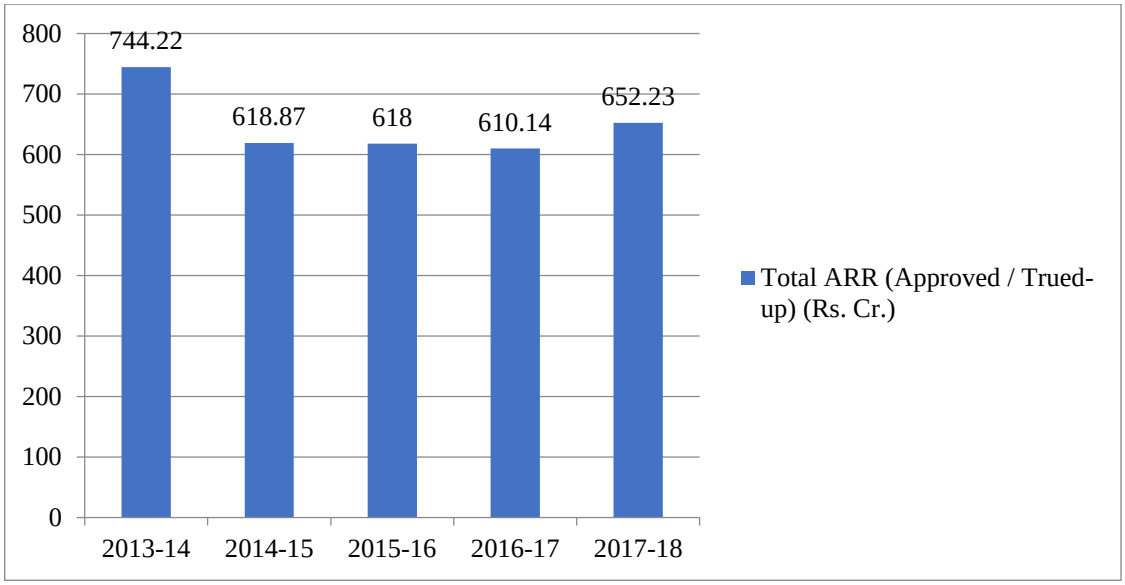


Figure 10: Trend of Approved ARR for FY14 to FY18 in Meghalaya

1.11 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17and 2017-18 in Meghalaya.

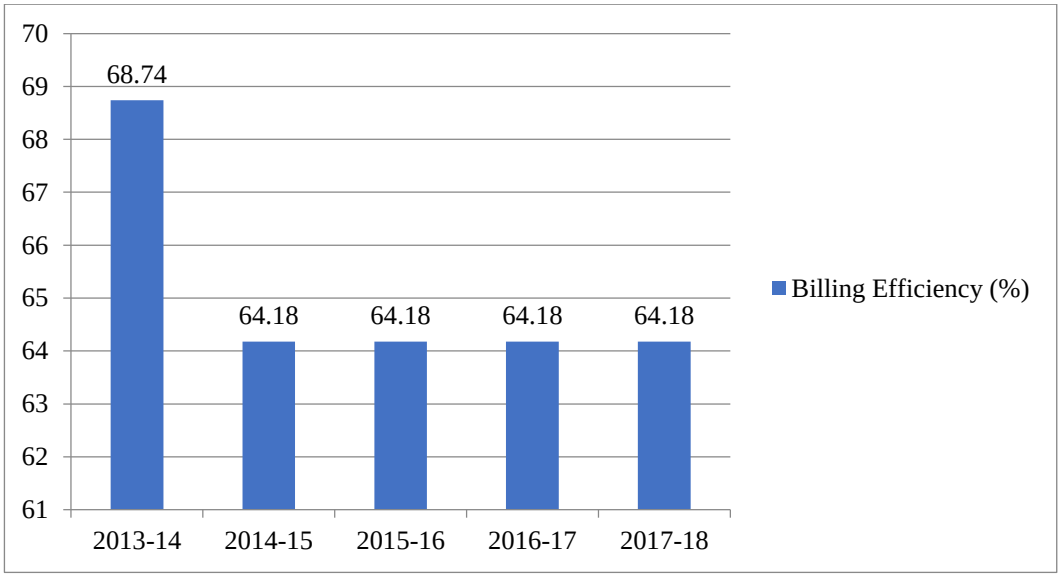


Figure 11: Billing Efficiency for FY14 to FY18 in Meghalaya

The billing efficiency had shown a decline in FY 2014-15. However, it has been constant in the recent years.

1.12 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Meghalaya.

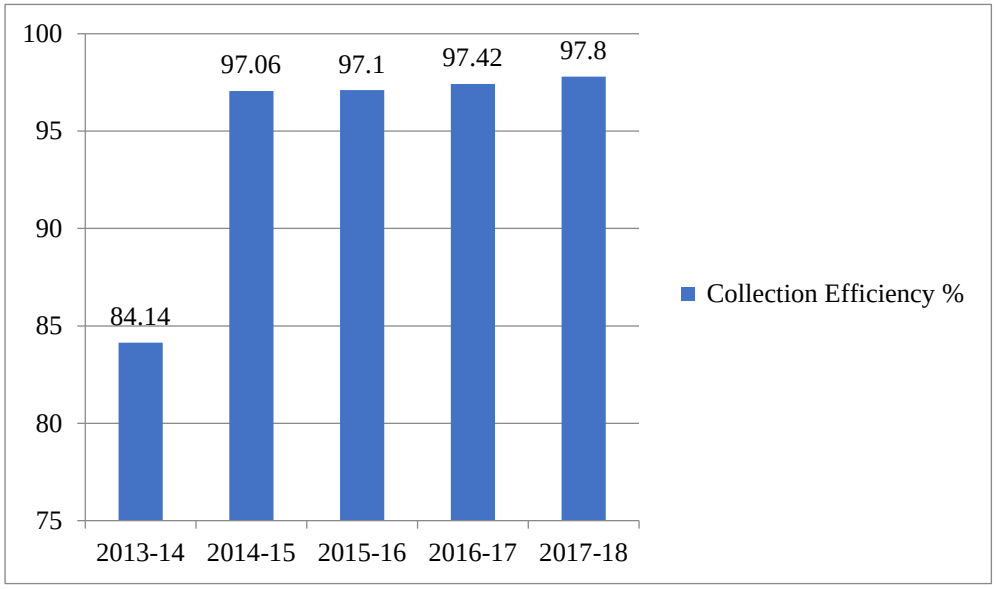


Figure 12: Collection Efficiency for FY14 to FY18 in Meghalaya

The collection efficiency had shown a rise in FY 2014-15. In the recent years, it has been increasing gradually.

1.13 Trend of AT&C Loss

The following graph depicts the trend of AT&C loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Meghalaya.

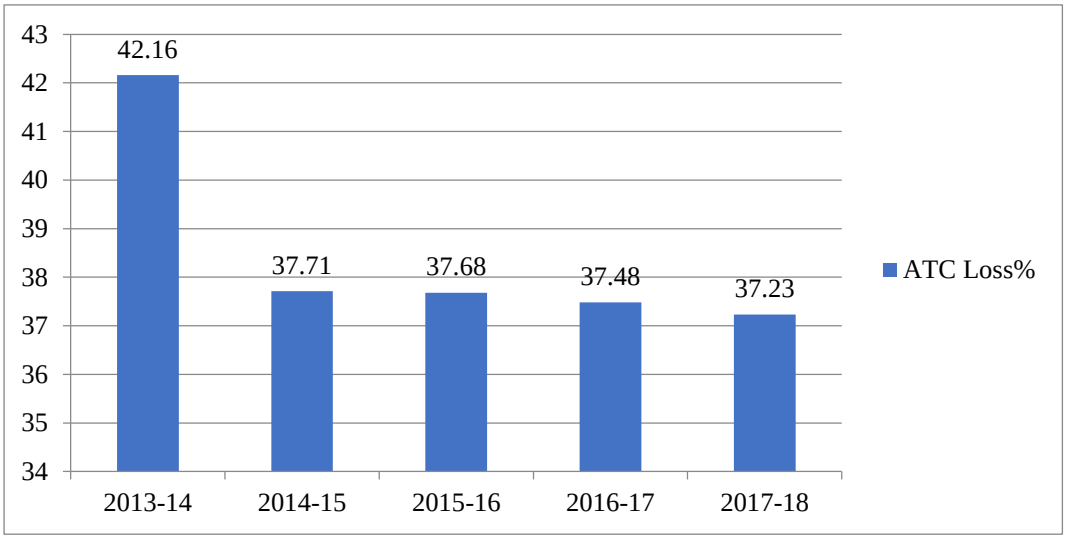


Figure 13: AT&C Loss for FY14 to FY18 in Meghalaya

1.14 Fatal and Non-Fatal Accident Report

The following graph depicts the trend of Fatal and Non-fatal Accident for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Meghalaya.

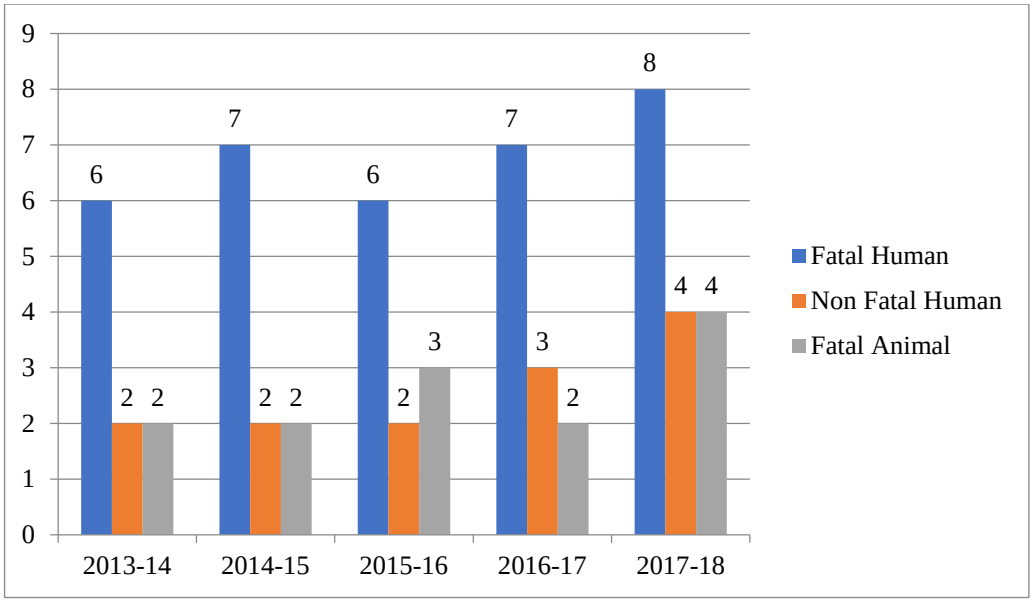


Figure 14: Fatal and Non- Fatal Accidents inFY14 to FY18 in Meghalaya

1.15 Status of Distribution Transformer

The following graph depicts the total number of distribution transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Meghalaya.

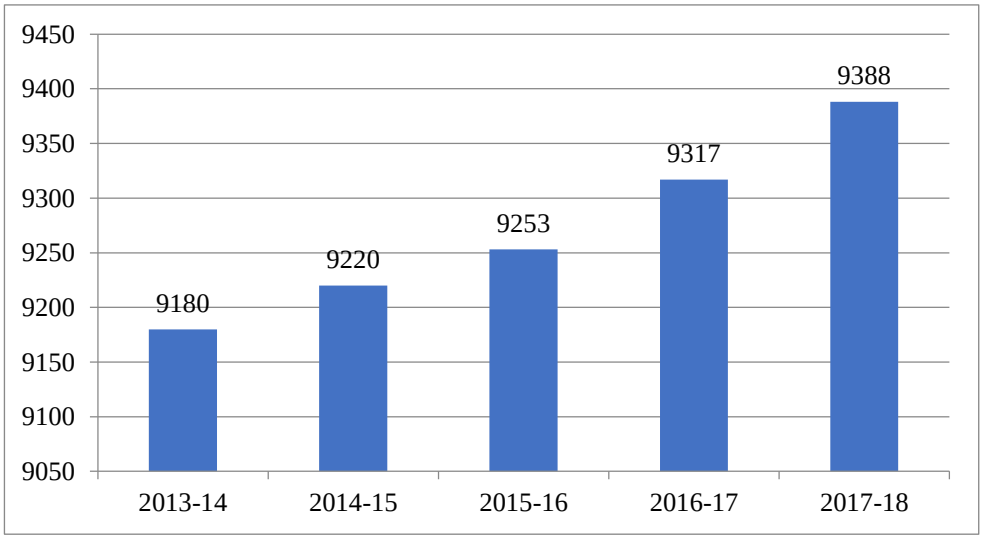


Figure 15: Total Number of Distribution Transformers during FY 14 to FY18 in Meghalaya

1.16 Status of Failed Transformers

The following graph depicts the total number of failed transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Meghalaya.

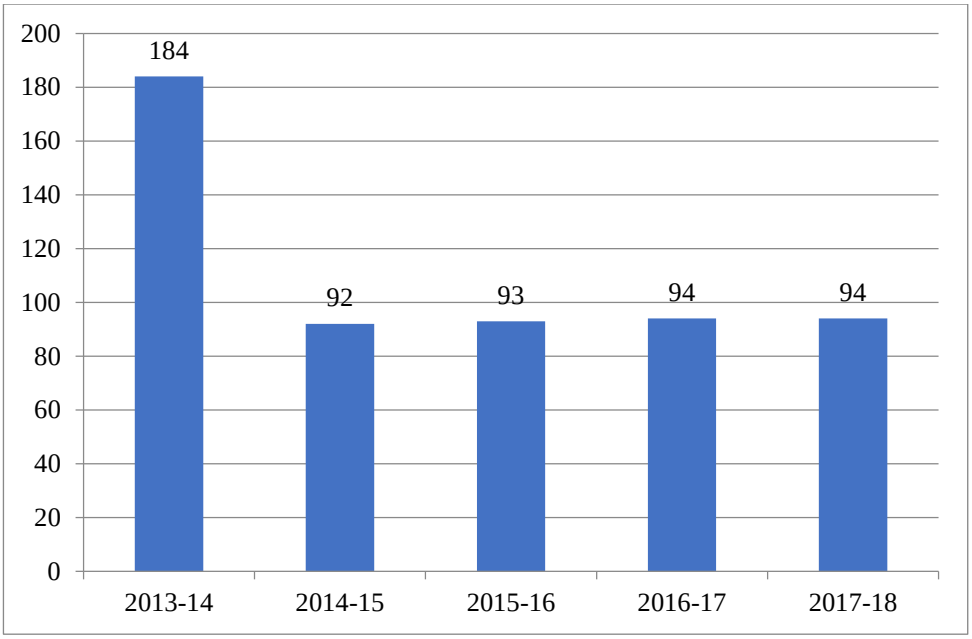


Figure 16: Total Number of Failed Transformers at the End of FY14 to FY in Meghalaya

1.17 Number of Faulty Meters

The following graph depicts the total number of faulty meters at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Meghalaya.

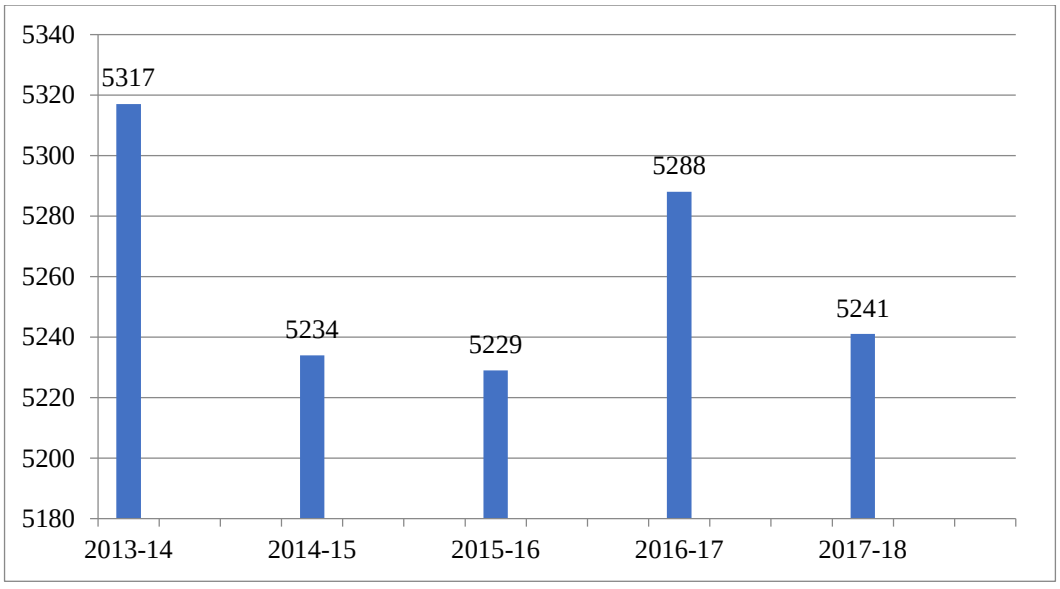


Figure 17: Total Number of Faulty metersat the End of FY14 to FY 18 in Meghalaya

1.18 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Meghalaya.

Table 10: RE Potential, Targets and Current Installed Capacity for Meghalaya

	Solar	Wind	SHP	Biomass	Total
Potential in MW	3,000	90	436	165	**3,691**

	Solar	Wind	SHP	Biomass	Total
MNRE Target in MW	161	0	50	0	**211**
Achievement in MW	0.01	0	31	0.08	**31.09**

Source: MNRE Annual Report 2017-18

1.19 RPO Compliance and Targets

The following table shows RPO targets and compliance status in Meghalaya.

Table 11: Meghalaya RPO Compliance and Targets for FY 16 to FY 21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	MSERC	Achieved	MNRE	MSERC	Achieved
2015-16		0.41	0.41		1.09	1.09
2016-17	2.75	0.42	0.42	8.75	1.58	1.58
2017-18	4.75	0.43	0.43	9.50	2.07	2.07
2018-19		0.75			3.25	
2019-20	7.25	1.00		10.25	4.00	
2020-21	8.75	1.25		10.25	4.75	
2021-22	10.50			10.50		

RPO Compliance as per the target set by MSERC. REC purchased by holding company from Power Exchange.

1.20 Key Regulations by MSERC

The following table shows the status (Draft/Notified) of key Regulations prepared by MSERC in Meghalaya.

Table 12: Status of Key Regulations preparedby MSERC

Regulations	Date	Status
Open Access	27.04.2012	Notified
Forecasting and Scheduling for Wind and Solar Generation Sources (F&S)	31.10.2018	Notified
Deviation Settlement Mechanism (DSM) Regulations	16.08.2018	Draft
Renewable Purchase Obligation (RPO)	22.10.2018	Notified
Net Metering for Solar Rooftop PV plants	25.02.2015	Notified
State Grid Code	27.04.2012	Notified
Multi Year Tariff (MYT)	15.09.2014	Notified

1.21 Status of Meghalaya as per SAMAST Report

- In the state of Meghalaya, hydro generation is predominant.
- Interstate STOA commenced from 2009. Presently, there are seven STOA customers and DSM is applicable only to these STOA customers. Boundary meters for STOA customers is in place.

- Reservoir hydro generation is regulated for deviation control.
- No deviation charges receivable for under-drawal; but, is payable for O/D @ 105% of DSM rate STOA customers. SLDC only prepares deviation account. No reserves held by SLDC. No TDS deducted at source by STOA customers. Most of the STOA is through PX, only few bilateral STOA exists.

1.22 Summary of Key Parameters for the State:

Parameters	Meghalaya
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	adequate
2) Information in Regulatory filings/Orders	adequate
3) info availability in audited accounts	NA
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	yearly
2) Transmission tariff filing/revision	yearly
3) Retail tariff filing/revision	yearly
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Surplus
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	8%
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	64%
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	5%
Power purchase details	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Hydro
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	3.5
3) RPO Compliance (fully comply/partial comply/no compliance)	Fully complied
Loss level	
1) Transmission Loss (<5%/5-10%/>10%)	4%
2) Distribution loss (<15%/15-30%/>30%)	21%
3) AT&C loss (<15%/15-30%/>30%)	37%
Efficiency	
1) Billing efficiency (>90%/75-90%/<75%)	64%
2) Collection efficiency (>90%/75-90%/<75%)	97.80%
Status of signing of UDAY (Yes/No)	Yes

2 Sikkim

2.1 Basic Information

Table 13: Information of Sikkim State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Sikkim State Electricity Regulatory Commission
Date of Constitution of ERC	15th November 2003
Name of the Generating Company	Energy and Power Department, Govt. of Sikkim (Unbundling of the Department has not been done so far)
Name of the Transmission Utility	
Name of the Distribution Utility	

2.2 Generation Tariff Petition - Timelines

The following table shows timelines for Generation Petition.

Table 14: Timelines for Generation Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	30.11.2012	29.11.2013	29.11.2014	27.11.2015	29.11.2016
Admission of ARR Petition	15.01.2013	10.12.2013	24.02.2014	05.12.2015	12.12.2016
Issue of Tariff Order	30.03.2013	15.04.2014	31.03.2015	11.04.2016	21.03.2017
Filing of True-up Petition	29.11.2013	29.11.2014	27.11.2015	29.11.2016	Yet to be done
Admission of True-up Petition	10.12.2013	24.02.2014	05.12.2015	12.12.2016	Yet to be done
Issue of True-up Order	15.04.2014	31.03.2015	11.04.2016	21.03.2017	Yet to be done

2.3 Transmission Tariff Petition- Timelines

As functional segregation of the Energy & Power Department, Government of Sikkim has not been done, no separate petitions were filed for Transmission business.

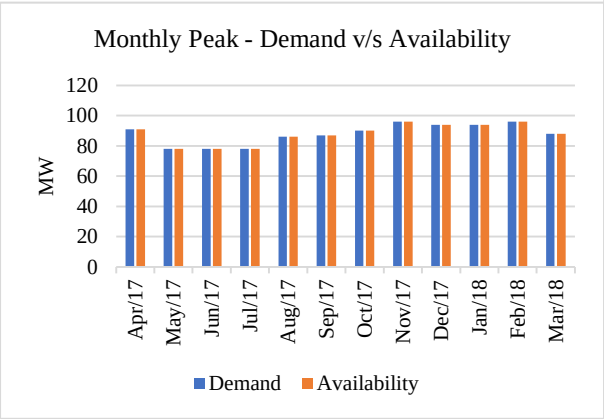
2.4 Distribution Tariff Petition - Timelines

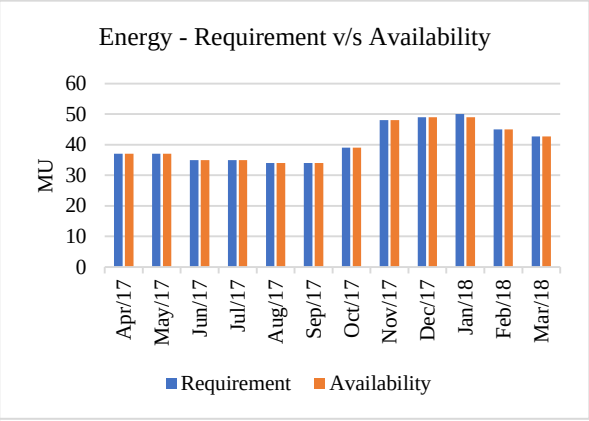
The following table shows timelines for Distribution Tariff Petition.

Table 15: Timelines for Distribution Tariff Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	30.11.2012	29.11.2013	29.11.2014	27.11.2015	29.11.2016
Admission of ARR Petition	15.01.2013	10.12.2014	24.02.2015	05.12.2015	12.12.2016
Issue of Tariff Order	30.03.2013	15.04.2014	31.03.2015	11.04.2016	21.03.2017
Filing of True-up Petition	24.02.2015	27.11.2015	29.11.2016	27.11.2017	21.03.2017
Admission of True-up Petition	29.11.2013	29.11.2014	27.11.2015	29.11.2016	Yet to be done
Issue of True-up Order	15.04.2014	31.03.2015	11.04.2016	21.03.2017	Yet to be done

2.5 Power Supply Position of Sikkim





The graph shows Month-wise power supply position of Sikkim during the year 2017-18 (in terms of peak and in terms of energy).

2.6 Cost of Power Generation

As stated above, the Distribution, Generation and Transmission Business in the Sikkim State is being handled by the Energy & Power Department of State Government and so far the un-bundling of the Department into separate utilities has not been done by the Government. The Energy & Power Department operates with budgetary support from the State Government and implements new schemes/projects etc with financial assistance/funds received from the Central Government and the State Government.

The Licensee has filed a combined tariff petition under Multi Year Tariff regime only from the F.Y 2018-19 onwards as per the directives of the Commission.

Further all the generating resources in the State are Central Generating Stations, whose tariff is determined by Central Commission. Hence, no separate power generation cost as determined by State Commission is available.

2.7 Power Purchase Cost

The following table shows Power Purchase Cost and other details for FY 2015-16 to 2017-18 for Sikkim.

Table 16: Power Procurement Cost and Other Details for FY 2015-16 to 2017-18

Name of the Plant/ Other Sources	2015-16				2016-17				2017-18			
	Capacity Contracted (MW)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Capacity Contracted (MW)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Capacity Contracted (MW	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Barhi Super TPS	20.06	14.53	13.57	19.71	20.56	30.18	11.22	33.95	10	123.3	4.31	**51.8**
Farakka Super TPS	26	85.78	4.38	35.36	26	113.1	3.73	44.09	26	133.0	3.56	52
Farakka Super TPS-III		0.00		(-)0.0005		0.00		(-)0.14		0.00		

Name of the Plant/ Other Sources	2015-16				2016-17				2017-18			
	Capacity Contracted (MW)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Capacity Contracted (MW)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Capacity Contracted (MW	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Khalgaon Super TPS-I	13	52.86	3.95	19.58	13	63.97	3.37	22.30	13	77.59	3.58	27.4
Khalgaon Super TPS-II	5	23.83	3.8	8.45	5	21.63	3.38	7.08	5	36.11	3.23	11.4
Talchar Super TPS	24	169.74	2.13	35.51	24	153.9	2.59	43.97	24	166.6	2.49	43.0
Rangit-III HEP	8	44.37	2.91	1.98	8	43.51	3.76	1.70	8	43.86	3.86	0.95
Teesta-V HEP	67.27	343.98	2.33	8.20	67.27	353.3	2.4	7.61	67.27	356.7	1.83	4.97
PTC (Chukha HEP)	6	39.60	1.84	7.30	6	45.62	2.07	9.48	6	37.29	2.36	8.80
WBSEDCL (Ramam HEP)	10	53.83	1.35	6.89	10	52.65	1.28	6.74	10	23.96	1.28	3.07
SPDC Ltd (Lachung, Manglay and Rongli HEPs)	10	29.38	3.72	10.94	10	27.09	3.89	10.54	5	26.35	3.98	10.5
Total	**189.3**	**857.91**		**98.85**	**189.8**	**904.89**		**109.42**	**174.3**	**1,024.8**		**110.09**

The year-wise energy drawn and variation in power procurement cost for FY 2015-16, 2016-17 and 2017-18 are as below.

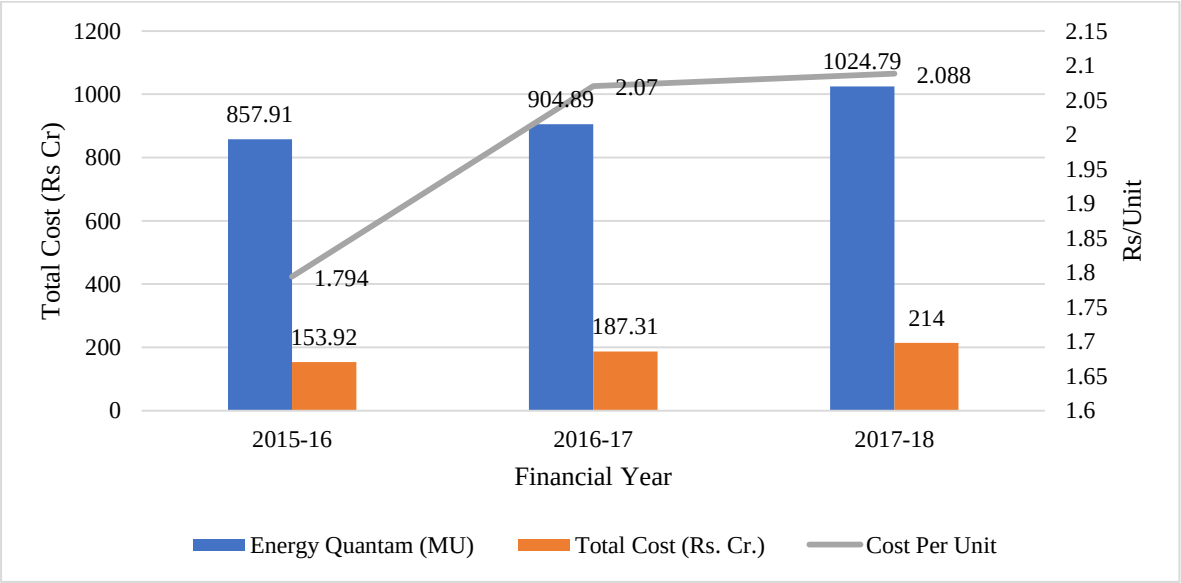


Figure 18: Year-Wise Energy Drawn and Variation in Power Procurement Cost for FY16 to FY18

The graph shows rising trend in energy drawn from FY 2015-16 to 2017-18.

2.8 Consumer Mix

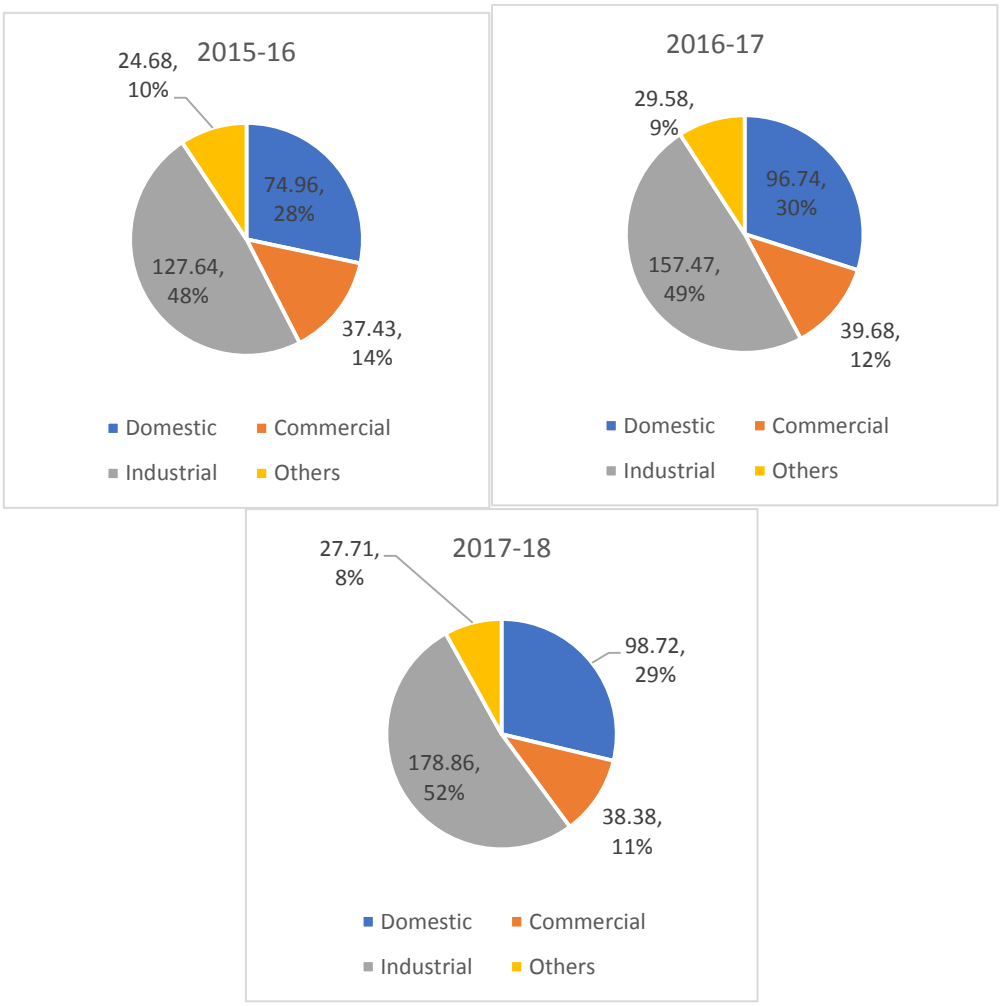


Figure 19: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Sikkim

2.9 Energy Balance

Table 17: Energy Balance for Sikkim

		2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilateral Purchase/Sale) (MUs)	386.41	466.14	508.98
2	Inter-State Transmission Losses (MUs)			
3	Total Energy Received at Periphery of the Discom(State PP) (MUs)	386.41	466.14	508.98
4	Intra-State Transmission Losses (MUs)			
5	Energy Available for Sale (MUs)(Discom PP)	386.41	466.14	508.98
6	Energy Sold to Consumers of the Discom (MUs)	246.71	323.47	343.73
7	Sale of Surplus Energy to Other Entities (MUs)			
8	Total Energy Sold in MUs	246.71	323.47	343.73
9	Distribution Losses in MUs	139.7	142.67	165.25
10	Surplus/Deficit Energy (MUs)			

The energy balance table for Sikkim depicts total energy input including inter-state bilateral purchase/sale as 386.41 MU, 466.14 MU and 508.98 MU for FY 2015-16, 2016-17 and 2017-18 respectively.

2.10 Trend of Approved ARR

The following graph depicts trend of approved ARR for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

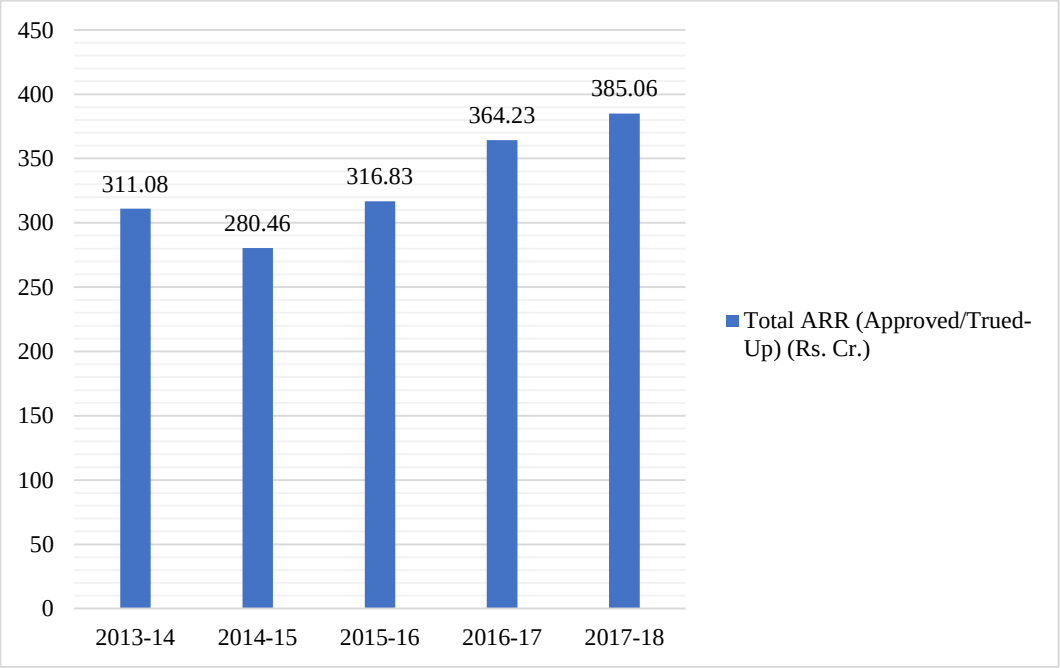


Figure 20: Trend of Approved ARR for FY14 to FY18 in Sikkim (for G/T/D combined Business)

2.11 Status of Subsidy received from State Government

The Energy & Power Department, Govt of Sikkim, is handling Distribution, Transmission and Generation business in the State. The Department functions with budgetary support of the State Government. Hence, no separate subsidy is required to be provided. However, this may be also one of the reason, for very high difference between ACoS and ARR.

2.12 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

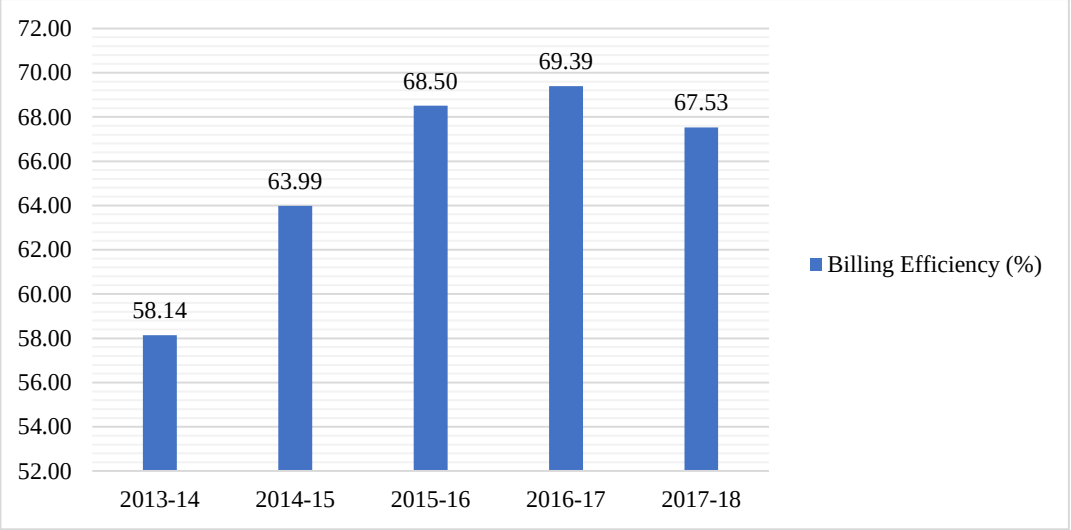


Figure 21: Billing Efficiency for FY14 to FY18 in Sikkim

The billing efficiency has increased from FY 2013-14 to 2016-17. However, it has declined in the recent year.

2.13 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

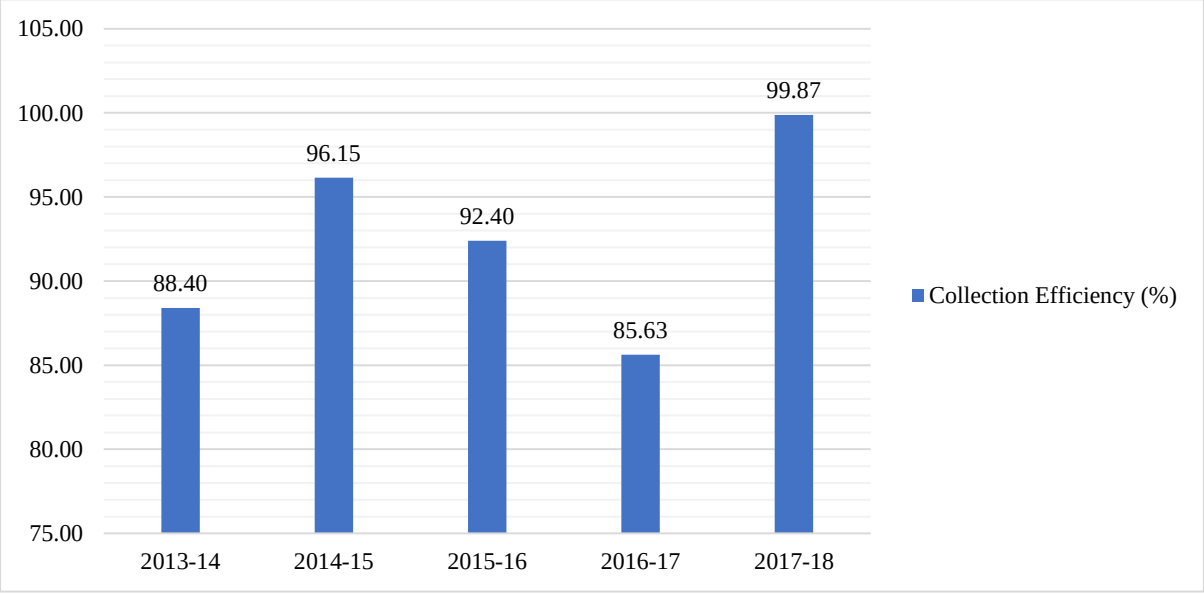


Figure 22: Collection Efficiency for FY14 to FY18 in Sikkim

2.14 Trend of AT&C Loss

The following graph depicts trend of AT&C loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

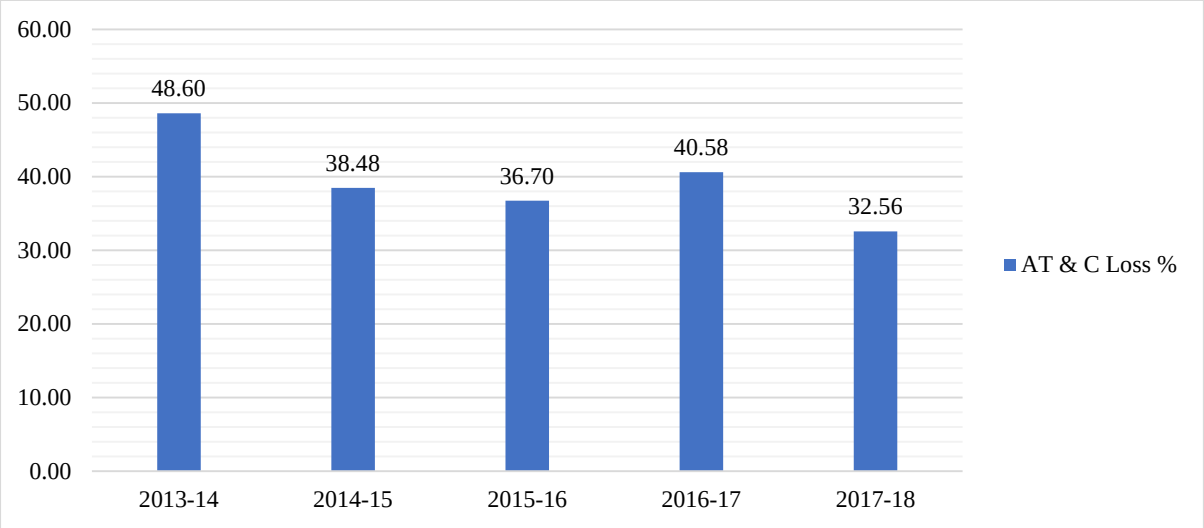


Figure 23: AT&C Loss for FY14 to FY18 in Sikkim

2.15 Average Cost of Supply (ACoS) and Average Revenue Realisation (ARR)

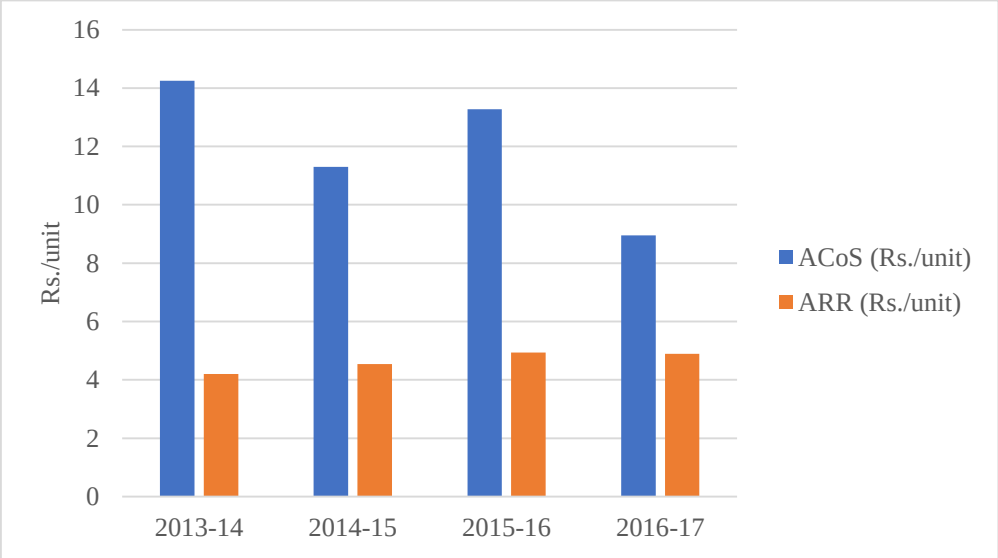


Figure 24: ACoS and ARR Variation for Sikkim

The above graph show that, there is large difference in Average Cost of Supply and Average Revenue Realisation. The some of the major reasons are poor billing efficiency, higher AT &C Losses. The Distribution Licensee and the SERC is expected to devise the time bound road map to improve billing efficiency and reduce AT &C losses.

2.16 Fatal and Non-fatal Accident Report

The following graph depicts the trend of Fatal and Non-fatal Accident for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

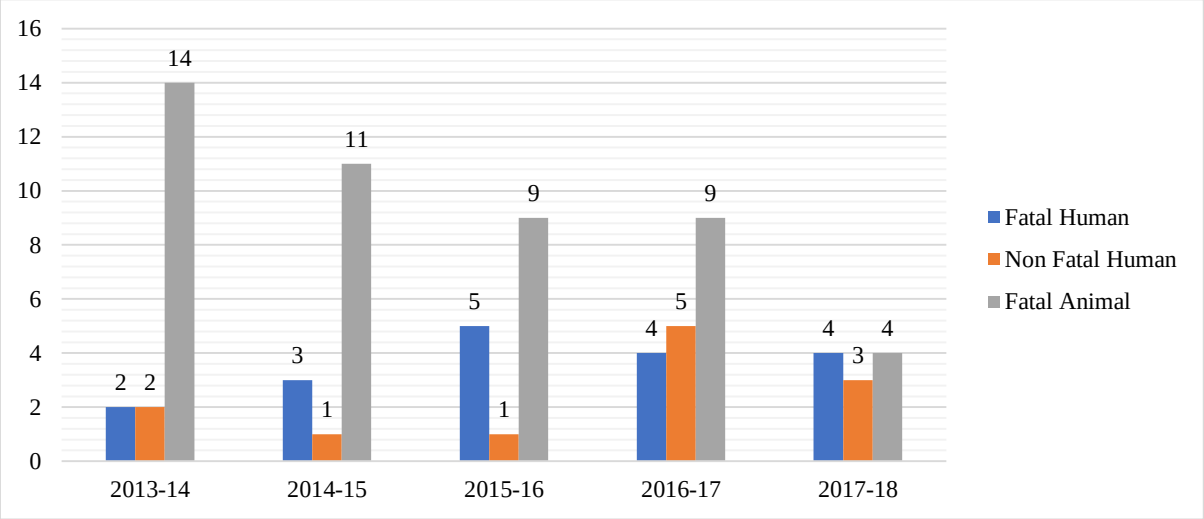


Figure 25: Fatal and Non-Fatal Accidents in FY 14 to FY18 in Sikkim

2.17 Status of Distribution Transformer

The following graph depicts the total number of distribution transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

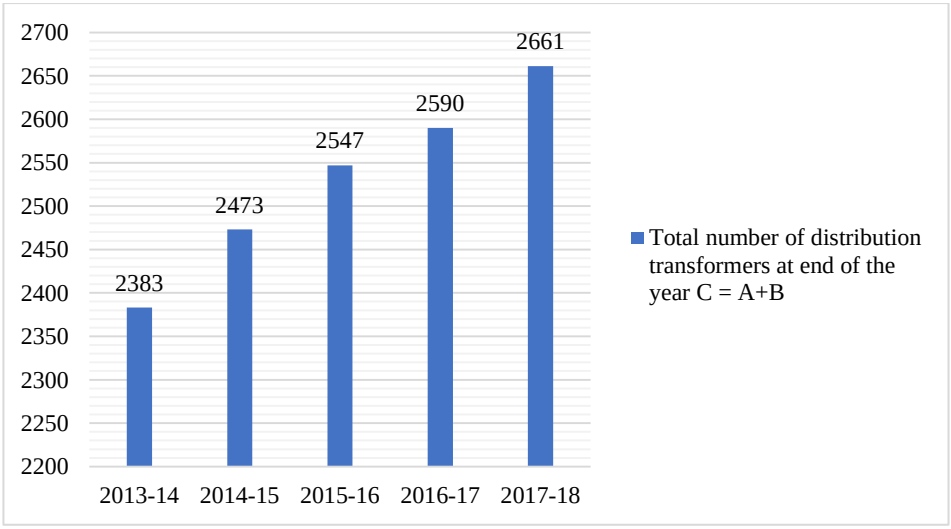


Figure 26: Total No. of Distribution Transformers at the End of FY14 to FY18 in Sikkim

2.18 Status of Failed Transformers

The following graph depicts the total number of failed transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Sikkim.

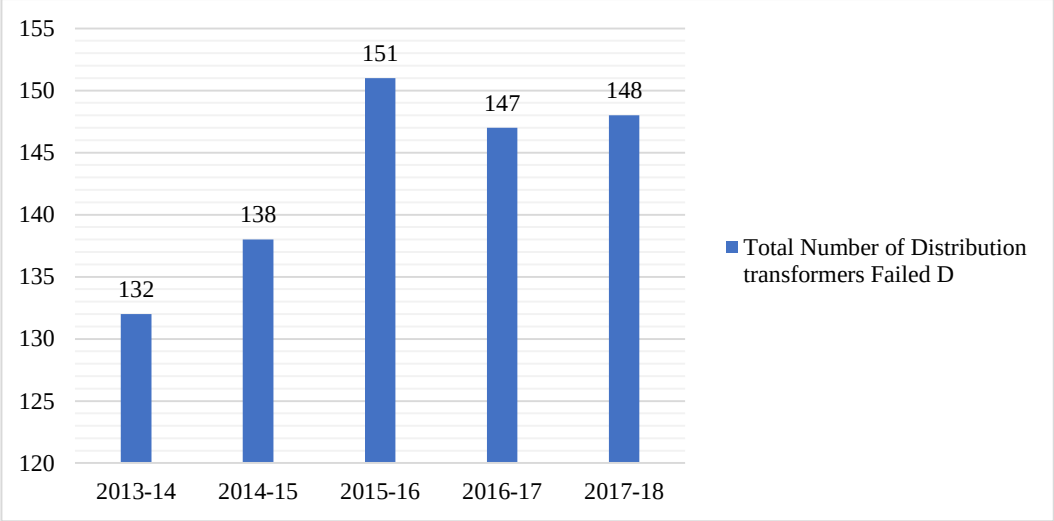


Figure 27: Total No. of Failed Transformers at the End of FY14 to FY18 in Sikkim

2.19 Number of Faulty Meters

The following graph depicts the total number of faulty meters at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18.

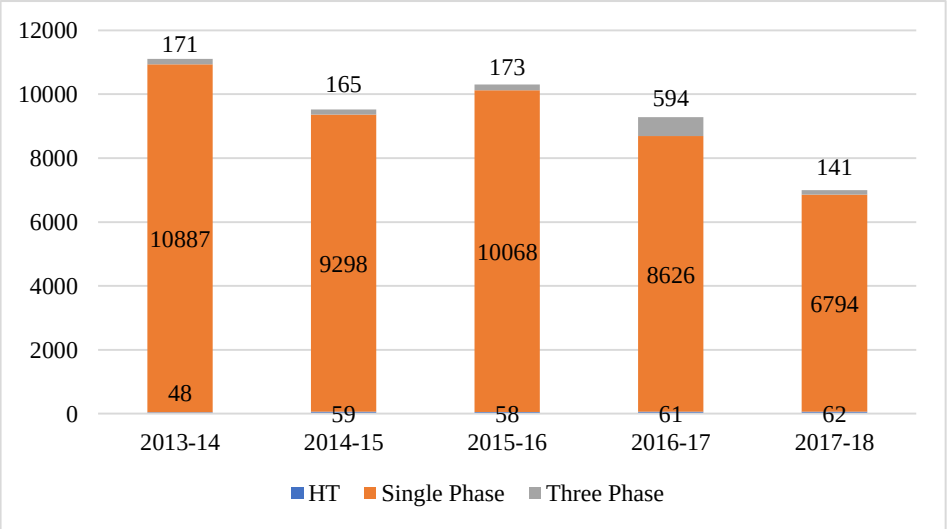


Figure 28: Total Number of Faulty meters at the End of FY14 to FY18

2.20 Renewable Energy Targets and Capacity Additions

The following table shows renewable energy targets and current status of RE installations in Sikkim.

Table 18: RE Potential, Targets and Current Installed Capacity for Sikkim

	Solar	Wind	SHP	Biomass	Total
Potential in MW	4,940	98	267	2	**5,307**
MNRE Target in MW	36		50		**86**
Achievement in	0.01	0	52.11	0	**52.12**

	Solar	Wind	SHP	Biomass	Total
MW					

Source: MNRE Annual Report 2017-18

2.21 RPO Compliance and Targets

The following table shows RPO targets and compliance status in Sikkim.

Table 19: Sikkim RPO Compliance and Targets for the FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	SSERC	Achieved	MNRE	SSERC	Achieved
2015-16		0.75			4.25	
2016-17	2.75	0.75		8.75	4.25	
2017-18	4.75	4.75		9.50	9.59	
2018-19	6.75	6.75		10.25	10.25	
2019-20	7.25	6.75		10.25	10.25	
2020-21	8.75	6.75		10.25	10.25	
2021-22	10.50			10.50		

2.22 Key Regulations Notified by SSERC

The following table shows the status (Draft/Notified) of key Regulations prepared by SSERC in Sikkim.

Table 20: Status of Key Regulations Prepared by SSERC

Regulations	Date	Status
Open Access Regulation	30.06.2012	Notified
F&S for Wind and Solar Generation Sources	NA	Yet to be prepared
Deviation Settlement Mechanism Regulations	NA	Yet to be prepared
Renewable Purchase Obligations Regulations	23.09.2013	Notified
Net Metering for Solar PV Rooftop plants	31.12.2014	Notified
State Grid Code	27.06.2013	Notified
Multi Year Tariff (MYT) Regulations	21.052014	Notified

2.23 Details of Open Access

As of now there is no Open Access consumers in the State.

2.24 Employee Strength in the Regulatory Commission

Table 21: Details of filled, sanctioned and vacant posts in the Regulatory Commission of Sikkim

Sr.	Designation	No. of Filled Posts	No. of Sanctioned Posts	No. of Vacant Post
1	Secretary	1	1	0
2	Director (Tariff)	1	1	0
3	Director (Legal)	1	1	0
4	Financial Advisor	1	1	0
5	Under Secretary	1	1	0
6	Deputy Director	1	1	0
7	Senior Accountant	1	1	0
8	Office Assistant	3	4	1

Sr.	Designation	No. of Filled Posts	No. of Sanctioned Posts	No. of Vacant Post
9	Driver	2	2	0
10	Peon	1	1	0
	Total Post	**13**	**14**	**1**

2.25 Summary of Key Parameters of State

Parameters	Sikkim
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	adequate
2) Information in Regulatory filings/Orders	adequate
3) info availability in audited accounts	NA
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	yearly
2) Transmission tariff filing/revision	yearly
3) Retail tariff filing/revision	yearly
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Surplus
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	34%
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	59%
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	2%
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Mix
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	1.58
3) RPO Compliance (fully comply/partial comply/no compliance)	Partial compliance (SHP)
Loss level	
1) Transmission Loss (<5%/5-10% />10%)	NA
2) Distribution loss (<15%/15-30% />30%)	>30%
3) AT&C loss (<15%/15-30% />30%)	32.56%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	67%
2) Collection efficiency (>90%/75-90% /<75%)	99.00%
Status of signing of UDAY (Yes/No)	Yes

3 Manipur

3.1 Basic Information

Table 22: Information of Manipur State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Joint Electricity Regulatory Commission for Manipur and Mizoram
Date of Constitution of ERC	18.01.2005
Name of the Generating Company	Manipur State Power Company Ltd. (MSPCL)
Name of the Transmission Utility	
Name of the Distribution Utility	Manipur State Power Distribution Company Limited (MSPDCL)

3.2 MSPCL (Generation& Transmission) Tariff Petition - Timelines

The following table shows timelines for Generation and Transmission Petition.

Table 23: Timelines for Generation and Transmission Petition

Activity	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	30.11.2013	30.11.2014	28.12.2015	30.11.2016
Admission of ARR Petition	20.01.2014	01.06.2015	28.12.2015	01.05.2017
Issue of Tariff Order	28.02.2014	27.02.2015	29.02.2016	28.02.2017
Filing of True-up Petition	30.11.2016	30.11.2016		
Admission of True-up Petition	01.05.2017	01.05.2017		
Issue of True-up Order	28.02.2017	28.02.2017		

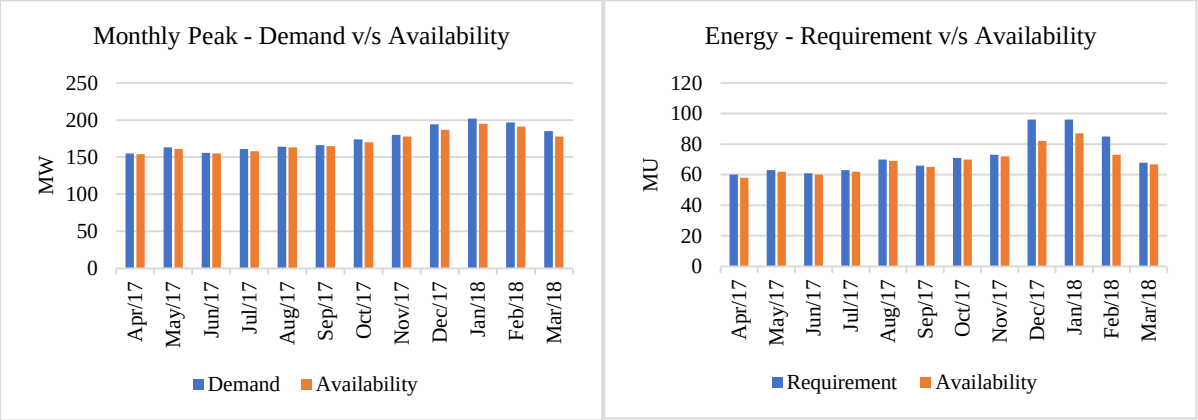
3.3 Distribution Tariff Petition - Timelines

The following table shows timelines for Distribution Tariff Petition

Table 24: Timelines for Distribution Tariff Petition

Activity	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	30.11.2013	30.11.2014	30.11.2015	30.11.2016
Admission of ARR Petition	20.01.2014	01.06.2015	28.12.2015	01.03.2017
Issue of Tariff Order	28.02.2014	27.02.2015	29.02.2016	28.02.2017
Filing of True-up Petition	30.11.2016	30.11.2016		
Admission of True-up Petition	01.03.2017	01.03.2017		
Issue of True-up Order	28.02.2017	28.02.2017		

3.4 Power Supply Position



The graph shows Month-wise power supply position of Manipur during the year 2017-18 (in terms of peak and in terms of energy).

3.5 Cost of Power Generation

The following table shows Power Generation Cost and other details for FY 2015-16 to 2017-18 for Manipur State.

Table 25: Power Generation Cost for FY 2015-16 to 2017-18

Name of the Plant/Other Sources	Capacity contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
State Generating Stations (SGS)										
Hydro - SGS		0.33			0			0.33		
Diesel - SGS		0.68			0.68			0.68		
Total - SGS	**45.11**	**1.01**	**11.78**	**1.19**	**0.68**	**17.5**	**1.19**	**1.01**	**11.78**	**1.01**

The year-wise energy drawn and variation in power Generation cost for FY 2015-16, 2016-17, 2017-18 is as below.

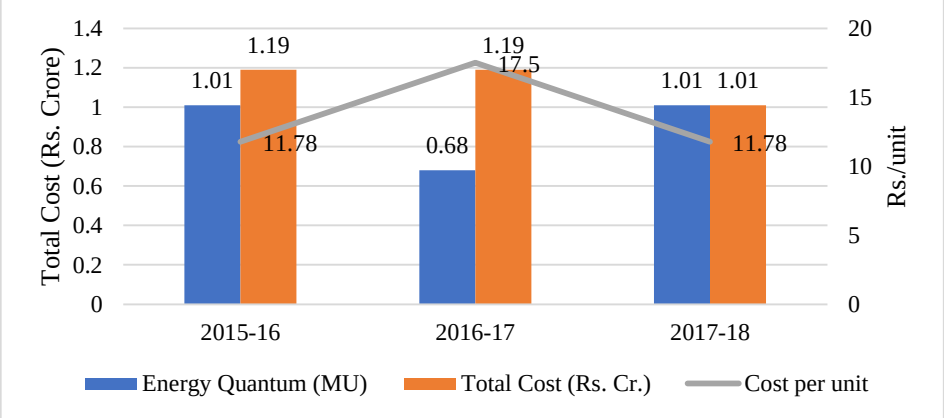


Figure 29: Year-Wise Energy Drawn and Variation in Power Generation Cost for FY16 to FY18

The graph shows rising trend from FY 2016-17 to 2017-18; but, the dip in energy drawn can be seen from FY 2015-16 to 2016-17.

3.6 Power Purchase Cost

Table 26: Power Purchase Cost for FY 2015-16 to FY 2017-18

Name of the Plant/ Other Sources	Capacity (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
NEEPCO										
Kopili -I HEP	200.00	49.74	0.9	4.46	71.27	1.15	8.19	76.31	1.19	11.74
Kopili-II HEP	25.00	6.51	1.94	1.26	7.03	1.8	1.26	7.66	1.75	1.51
Khandong HEP	50.00	11.07	1.9	2.11	12.43	2.02	2.51	16.52	2.04	4.06
Ranganadi HEP	405.00	110.01	2.68	29.5	104.31	2.29	23.89	116.98	2.33	38.61
Doyang HEP	75.00	12.08	4.73	5.72	19.43	4.98	9.66	20.47	5.1	14.05
Assam GBPP	291.00	139.62	3.83	53.45	118	3.38	39.85	117.62	3.44	66.91
Agartala GTP I & II	135.00	51.67	3.49	23.12	73.27	2.84	20.79	53.84	2.94	22.41
Pare HEP	110									
Loktak HEP	105	186.95	1.86	34.77	304.11	2.7	58.94	344.19	3.13	86.34
Baramura GBPP Unit IV and V	42.00	79.34	3.13	24.85	73.53	3.01	22.15	41.49	3.01	15.89
OTPC Pallatana Unit I & II	726.60	197.21	3.6	55	230.44	2.93	67.51	222.55	2.92	79.28
NTPC BongaigaonU-I & II	500				57.37	8.55	49.07	29.78	5.74	60.08
		844.2			1071.19			1047.41		400.88

3.7 Average Cost of Supply (ACoS) and Average Revenue Realization (ARR)

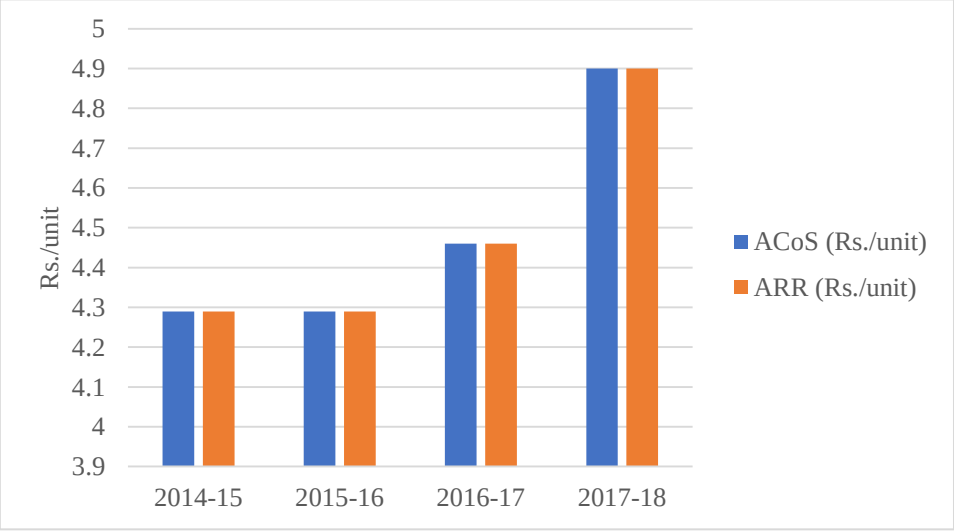


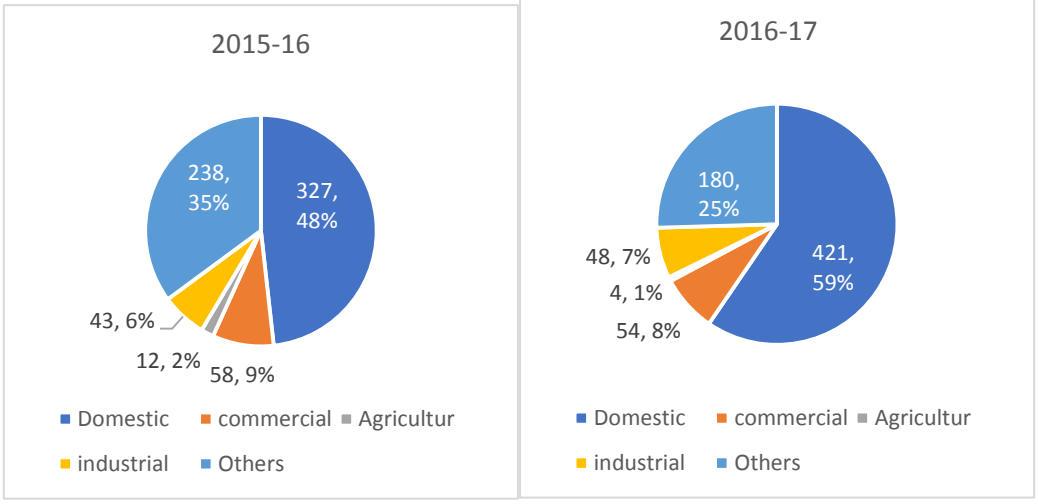
Figure 30: ACoS and ARR Variation in Manipur

The above graph shows that, the Commission has balanced the AcoS v/s ARR and Discom has also been able to realise the revenue estimated by the State Commission.

3.8 Consumer Mix

Table 27: Consumer mix of Manipur for FY 2015-16 to FY 2017-18

Consumer Category	2015-16			2016-17			2017-18		
	Total Load (MW)	No. of Consumers	No. of Units Billed (MUs)	Total Load (MW)	No. of Consumers	No. of Units Billed (MUs)	Total Load (MW)	No. of Consumers	No. of Units Billed (MUs)
Domestic (BPL)	1.783	20273.00	10.00	1.852	28947	15.00	2.008	34134	7.00
Domestic (Other than BPL)	301.017	204601.00	317.00	339.674	257967	406.00	368.237	304198	372.00
Commercial / Non-Domestic LT	32.158	12307.00	50.00	35.005	13141	50.00	37.785	14247	42.00
Commercial HT	4.000	10.00	8.00	0.862	11	4.00	1.097	15	6.00
Agricultural LT	0.200	40.00	4.00	0.17	44	1.00	0.268	46	1.00
Agricultural HT	1.595	23.00	8.00	0.993	20	3.00	0.993	20	1.00
Industrial LT	16.074	2898.00	20.00	17.384	2780	28.00	18.845	3335	18.00
Industrial HT	10.473	73.00	23.00	10.999	121	20.00	11.924	139	10.00
Public Lighting	1.130	380.00	7.00	1.056	452	6.00	1.144	435	5.00
Public Water Works LT	0.200	10.00	10.00	0.19	8	3.00	0.19	8	4.00
Public Water Works HT	21.924	170.00	30.00	20.213	167	15.00	21.928	170	15.00
Bulk Supply HT	56.731	965.00	191.00	54.197	836	156.00	58.755	1003	95.00
Total	447.285	241750.00	678.00	482.595	304494	707.00	523.174	357750	576.00



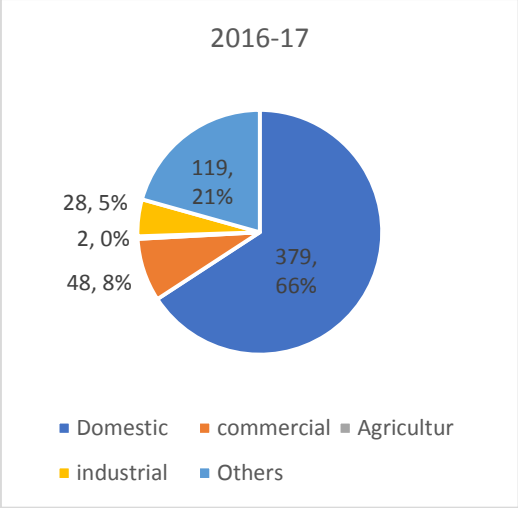


Figure 31: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Manipur

3.9 Energy Balance

Table 28: Energy Balance for Manipur

	Particulars	2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilateral purchase/Sale) (MUs)	979.15	1071.19	1055.17
2	Inter-State Transmission Losses (MUs)	27.66	28.92	28.49
3	Total Energy Received at Periphery of the discom(State PP) (MUs)(1-2)	951.49	1042.27	1026.68
4	Intra-State Transmission Losses (MUs)	34.25	38.76	36.96
5	Energy Available for Sale (MUs)(Discom PP)(3-4)	917.24	1003.51	989.72
6	Energy Sold to consumers of the Discom (MUs)	474.98	511.92	563.98
7	Sale of Surplus Energy to Other Entities (MUs)	235.96	267.74	249.97
8	Total Energy Sold in Mus (6+7)	710.94	880.29	813.95
9	Distribution Losses in Mus (5-8)	214.5	223.85	175.77
10	Surplus / Deficit Energy (MUs)	227.76	210.32	255.00

The energy balance table for Manipur depicts total energy input including inter-state bilateral purchase/sale as 979.15 MU, 1071.19 MU and 1055.17 MU forFY2015-16, 2016-17 and 2017-18 respectively.

3.10 Trend of Approved ARR

The following graph depicts the trend of approved ARR for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur.

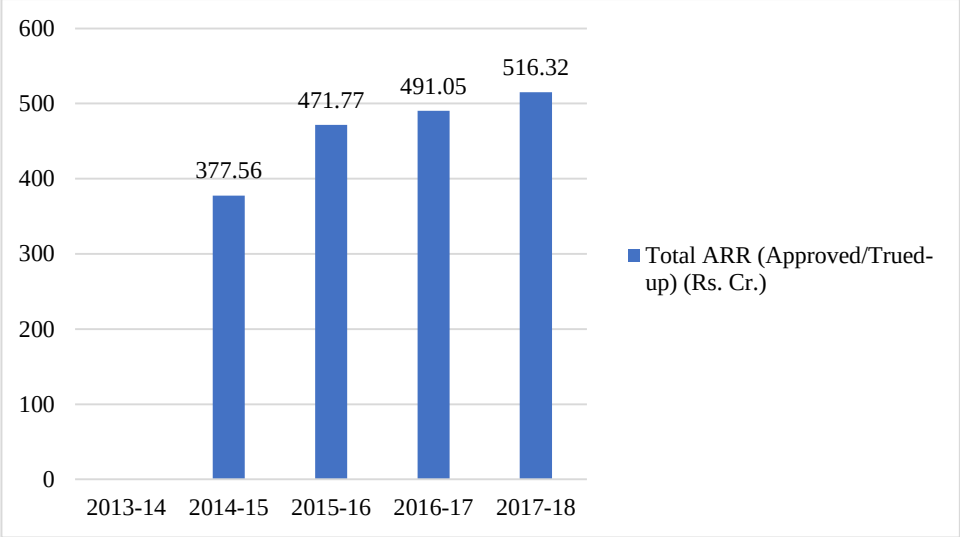


Figure 32: Trend of Approved ARR for FY 15 to FY18 in Manipur

The Annual Revenue Requirement (ARR) of MSPDCL has been steadily increasing from FY 2014-15 to 2017-18.

3.11 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2014-15, 2015-16, 2016-17and 2017-18 in Manipur.

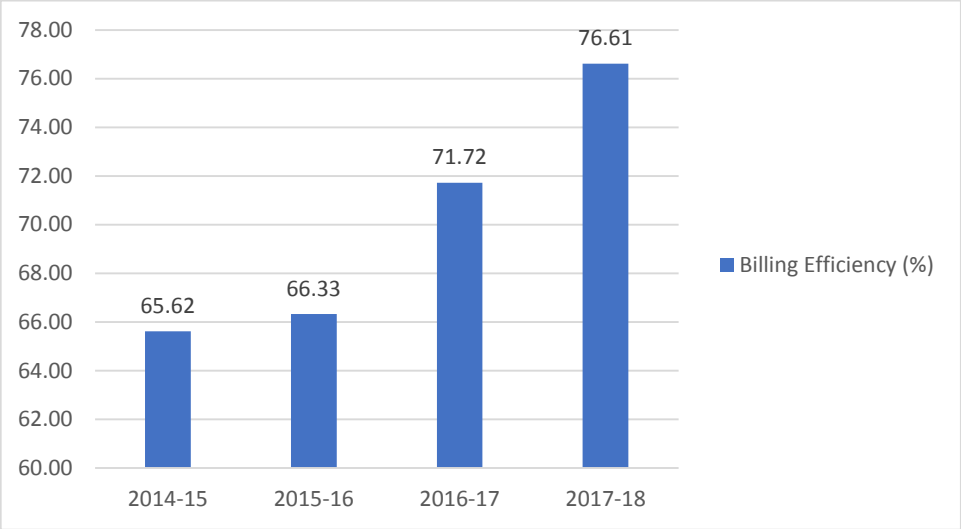


Figure 33: Billing Efficiency for FY15 to FY18 in Manipur

The billing efficiency had shown a rise in recent years, from 65.62 % in FY 2014-15 billing efficiency had reached up to 76.61% in FY 2017-18.

3.12 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur.

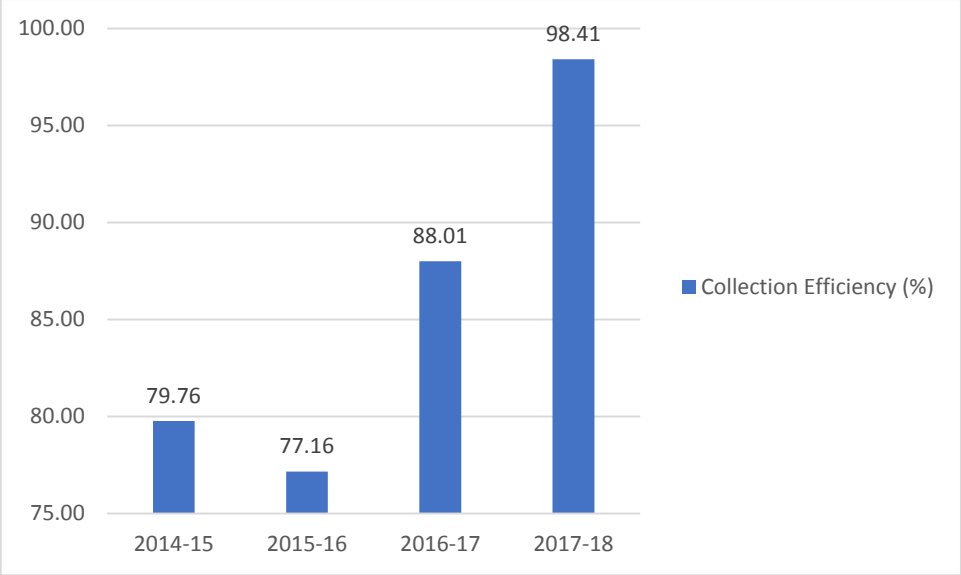


Figure 34: Collection Efficiency for FY 15 to FY18 in Manipur

The collection efficiency had shown a rise in FY 2016-17. In the recent years, it has been increasing gradually.

3.13 Trend of AT&C Loss

The following graph depicts the trend of AT&C loss for FY 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur.

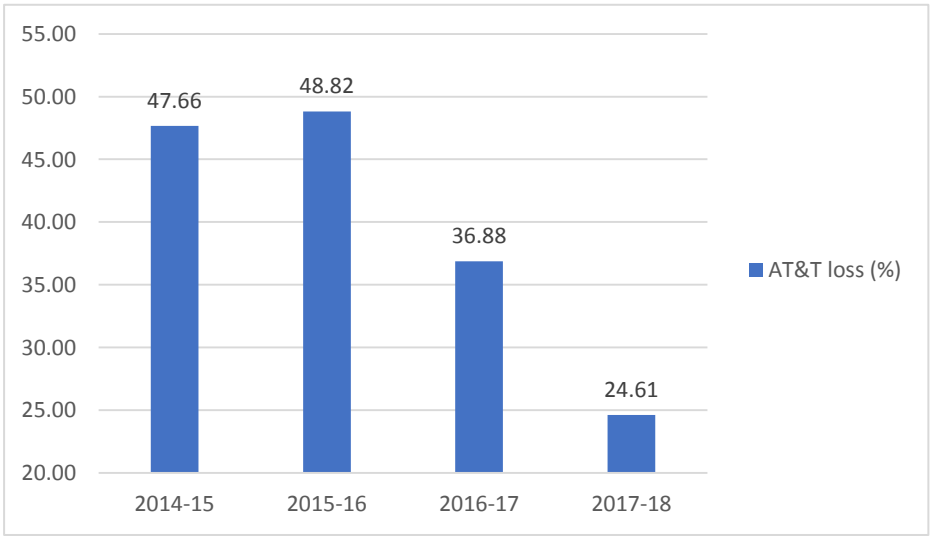


Figure 35: AT&C Loss for 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur

Note: Revenue Billed and Revenue Collected includes the Government Subsidy booked and received from 2016-17 onwards (as per direction from CEA new AT&C loss Calculation methodology).

3.14 Fatal and Non-Fatal Accident Report

The following graph depicts the trend of Fatal and Non-fatal Accident for FY2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur.

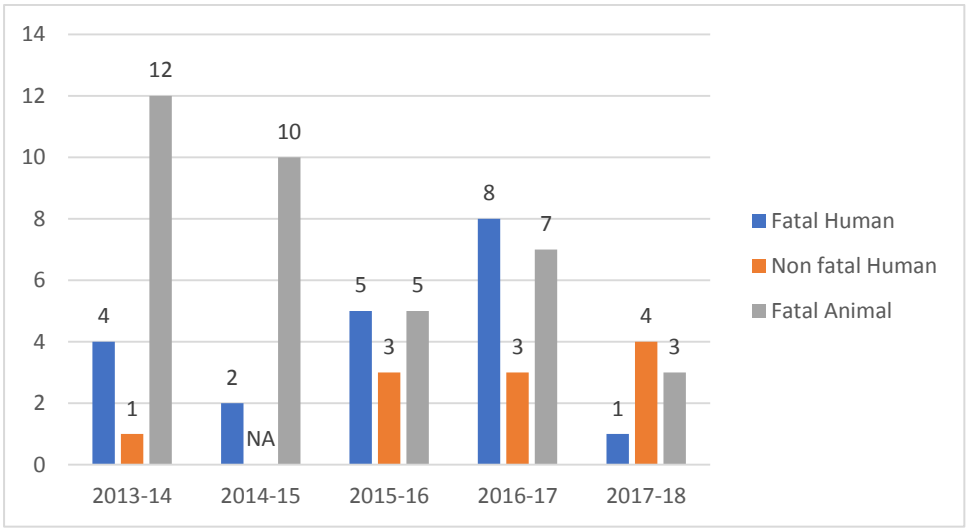


Figure 36: Fatal and Non- Fatal Accidents inFY 14 to FY 18 in Manipur

3.15 Status of Distribution Transformers

The following graph depicts the total number of distribution transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Manipur.

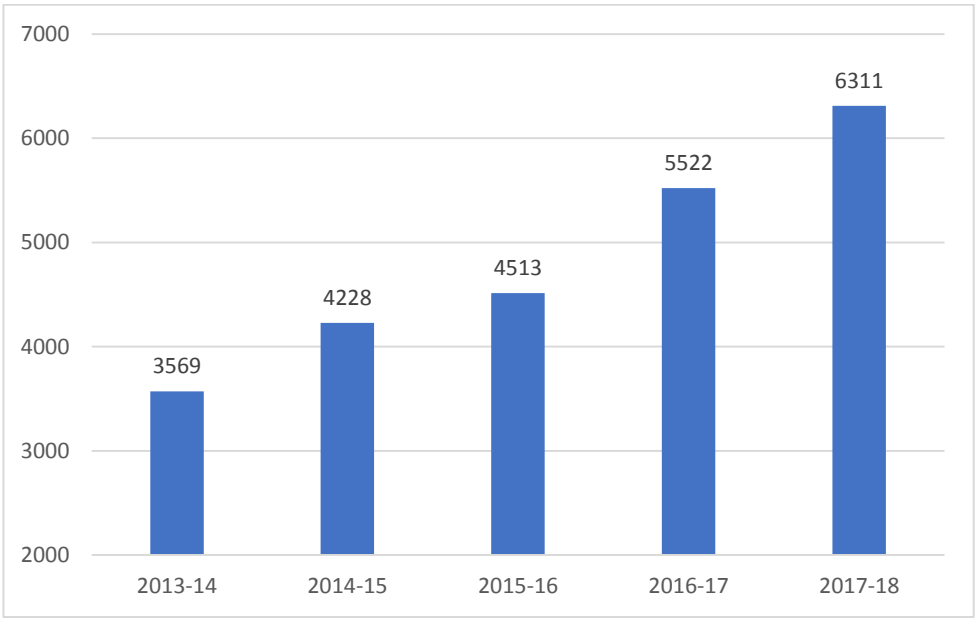


Figure 37: Total Number of Distribution Transformers during FY14 to FY18 in Manipur

3.16 Status of Failed Transformers

The following graph depicts the total number of failed transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Manipur.

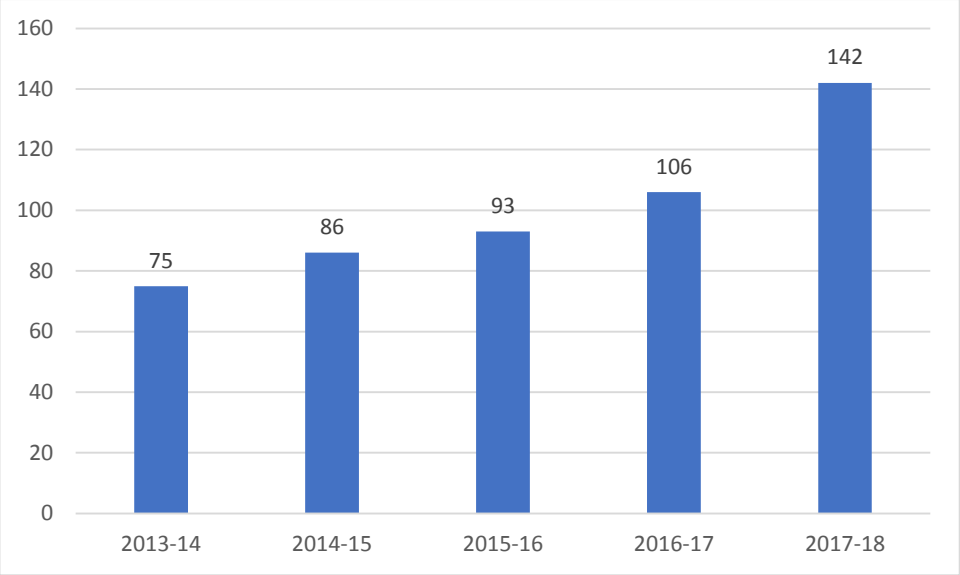


Figure 38: Total No. of Failed Transformers at the End of FY14 to FY18 in Manipur

3.17 Number of Faulty Meters

The following graph depicts the total number of faulty meters at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Manipur.

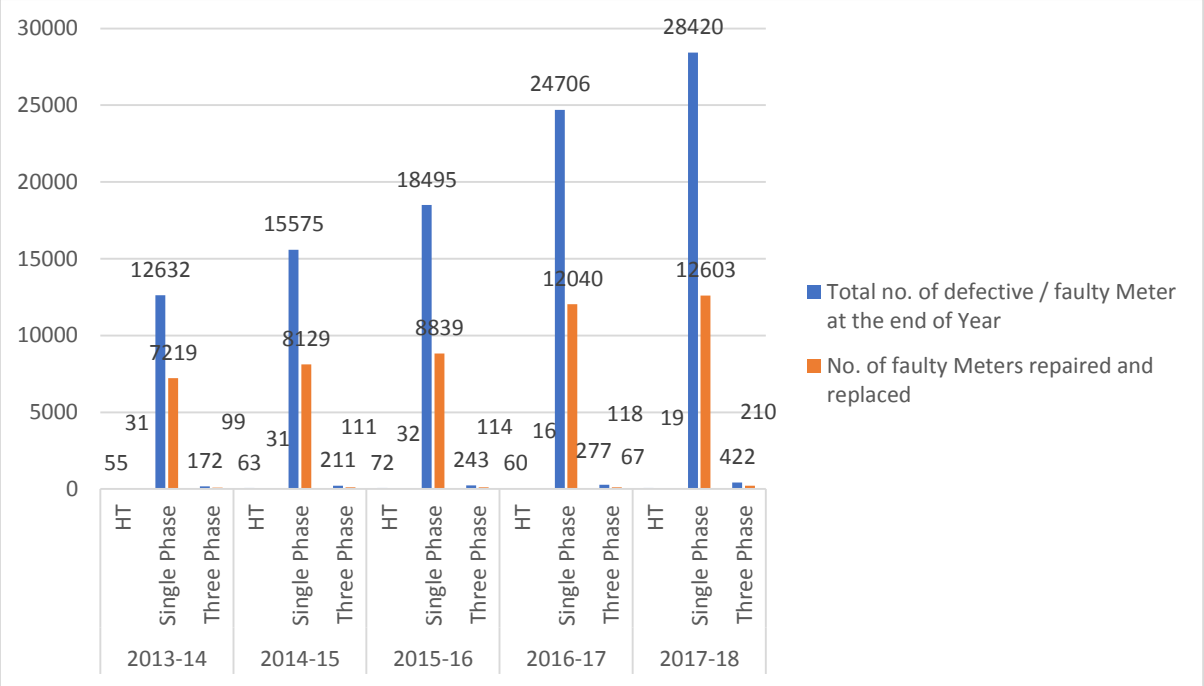


Figure 39: Total Number of Faulty meters at the End of FY14 to FY18 in Manipur

3.18 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Manipur.

Table 29: RE Potential, Targets and Current Installed Capacity for Manipur

	Solar	Wind	SHP	Biomass	Total
Potential in MW	10,630	56	109	15	**10,811**
MNRE Target in MW	105	0	0	0	**105**
Achievement in MW	1.33	0	5.45	0.84	**7.62**

Source: MNRE Annual Report 2017-18 and CEA Executive Summary, July 2018

3.19 RPO Compliance and Targets

The following table shows RPO targets and compliance status in Manipur.

Table 30: Manipur RPO Compliance and Targets for FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	JERC	Achieved	MNRE	JERC	Achieved
2016-17	2.75	2.75	0.00%	8.75	8.75	0.92
2017-18	4.75	4.75	**	9.50	9.50	
2018-19	6.75	6.75	***	10.25	10.25	
2019-20	7.25	7.25		10.25	10.25	
2020-21	8.75	8.75		10.25	10.25	

** For FY 2017-18 has been stayed by Supreme Court Order dated 8/5/2017. So no solar REC is traded in the Energy Exchange Platform during 2017-18.
*** Ongoing year

3.20 Key Regulations by JERC

The following table shows the status (Draft/Notified) of key Regulations prepared by JERC in Manipur.

Table 31: Status of Key Regulations Published by JERC

Regulations	Date	Status
Open Access Regulations	12.07.2010	Notified
(F&S) for Wind and Solar Generation Sources		Notified
Deviation Settlement Mechanism Regulations		Yet to published
Renewable Purchase Obligations	15.05.2010	Notified
Net Metering for Solar PV Rooftop Plants	23.09.2016	Notified
State Grid Code	12.07.2010	Notified

3.21 Details of Open Access

As of now there are no Open Access consumers in the State of Manipur.

3.22 Details of Pending Cases

Table 32: Details of pending cases in Manipur

Year	No. of Orders issues by the Commission	No. of Orders challenged in APTEL/ High court	No. of Cases Pending
2013-14	NIL	NIL	NIL

Year	No. of Orders issues by the Commission	No. of Orders challenged in APTEL/ High court	No. of Cases Pending
2014-15	2	NIL	NIL
2015-16	3	NIL	NIL
2016-17	5	NIL	NIL
2017-18	3	NIL	NIL

3.23 Employee Strength in the Regulatory Commission

Table 33: Details of filled, sanctioned and vacant posts in the Regulatory Commission o Manipur

Sr.	Designation	No. of Filled Posts	No. of Sanctioned Posts	No. of Vacant Post
1	Secretary	0	1	1
2	Chief (Engineering)	1	1	0
3	Chief (Finance)	0	1	1
4	Deputy Chief (Economics)	0	1	1
5	Deputy Chief (Legal)	0	1	1
6	Assistant Secretary	1	1	0
7	Assistant Chief (Engineering)	1	1	0
8	Assistant Chief (Finance)	0	1	1
9	Bench Officer	0	1	1
10	Principal Private Secretary	2	2	0
11	Pay & Accounts Officer	1	1	0
12	Private Secretary	2	5	3
13	Personal Assistant	0	1	1
14	Stenographer	3	3	0
15	Clerk-cum-Operator	4	4	0
16	Cashier/Bill Clerk	1	1	0
17	Despatch Clerk	1	1	0
	Total Post	**17**	**27**	**10**

3.24 Summary of Key Parameters for State

Parameters	Manipur
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	partial
2) Information in Regulatory filings/Orders	partial
3) info availability in audited accounts	partial
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	Once
2) Transmission tariff filing/revision	Once
3) Retail tariff filing/revision	Once
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Surplus

Parameters	Manipur
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	NA
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	NA
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	NA
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Predominantly thermal
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	2.80
3) RPO Compliance (fully comply/partial comply/no compliance)	no compliance
Loss level	
1) Transmission Loss (<5%/5-10%/>10%)	3.60%
2) Distribution loss (<15%/15-30%/>30%)	18%
3) AT&C loss (<15%/15-30%/>30%)	44.00%
Efficiency	
1) Billing efficiency (>90%/75-90%/<75%)	64%
2) Collection efficiency (>90%/75-90%/<75%)	97.80%
Status of signing of UDAY (Yes/No)	Yes

4 Arunachal Pradesh

4.1 Basic Information

Table 34: Information of Arunachal Pradesh State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Arunachal Pradesh State Electricity Regulatory Commission
Date of Constitution of ERC	07.05.2010
Name of the Generating Company	Department of Hydro Power Development
Name of the Transmission Utility	Transmission Planning and Monitoring Zone, Department of Power
Name of the Distribution Utility	Department of Power

4.2 Generation Tariff Petition - Timelines

The following table shows timelines for Generation Petition.

Table 35: Timelines for Generation Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	10.04.2013	NA	24.02.2015	NA	17.03.2017
Admission of ARR Petition	1.05.2013	NA	11.03.2015	NA	18.04.2017
Issue of Tariff Order	23.07.2013	NA	12.05.2015	NA	08.09.2017
Filing of True-up Petition	NA	NA	NA	NA	NA
Admission of True-up Petition	NA	NA	NA	NA	NA
Issue of True-up Order	NA	NA	NA	NA	NA

4.3 Transmission Tariff Petition- Timelines

The following table shows timelines for Transmission Petition.

Table 36: Timelines for Transmission Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	NA	NA	NA	19.03.2018	19.03.2018
Admission of ARR Petition	NA	NA	NA	Under Review	Under Review
Issue of Tariff Order	NA	NA	NA	Under Review	Under Review
Filing of True-up Petition	NA	NA	NA	Under Review	Under Review
Admission of True-up Petition	NA	NA	NA	Under Review	Under Review
Issue of True-up Order	NA	NA	NA	Under Review	Under Review

4.4 Distribution Tariff Petition - Timelines

The following table shows timelines for Distribution Tariff Petition.

Table 37: Timelines for Distribution Tariff Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	01.03.2013	10.03.2014	09.01.2015	15.12.2015	17.01.2017
Admission of ARR Petition	20.03.2013	29.04.2014	11.03.2015	25.01.2016	30.03.2017
Issue of Tariff Order	30.05.2013	03.06.2014	21.04.2015	29.02.2016	26.09.2017

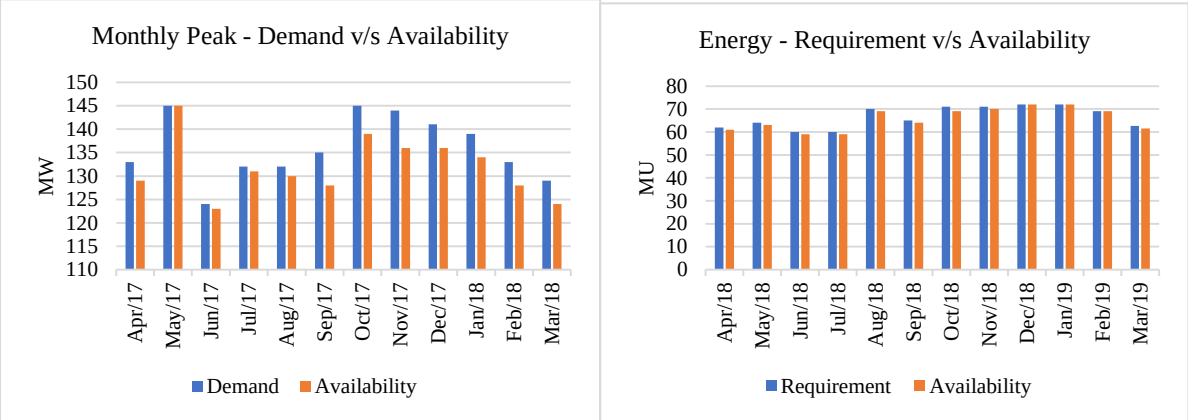
Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of True-up Petition	NA	NA	09.01.2015	15.12.2015	17.01.2017
Admission of True-up Petition	NA	NA	110.3.2015	25.01.2016	30.03.2017
Issue of True-up Order	NA	NA	21.04.2015	29.02.2016	26.09.2017

4.5 Cost of Power Generation

Table 38: Power Generation Cost for FY 2015-16 to FY 2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Generated (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Generated(MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Generated(MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
All SGS (Hydro)	60	55	2.30	12.65	52.03	2.46	12.8	59.41	2.69	15.98

4.6 Power Supply Position



The graph shows Month-wise power supply position of Arunachal Pradesh during the year 2017-18(in terms of peak and in terms of energy).

4.7 Power Purchase Cost

The following table shows Power Purchase Cost and other details for FY 2015-16 to 2017-18 for Arunachal Pradesh.

Table 39: Power Purchase Cost and Other Details for FY 2015-16 to 2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
NHPC Loktak	5.19	30.39	4.23	12.85	17.56	3.62	6.36	0	0	0
Ranganadi HEP (RHEP)	26.17	63.6	2.39	15.2	71.58	2.97	21.27	71.95	2.76	19.84
Free Power From RHEP	48.6	175	0.00	0	175	0.00	0	157.84	0.00	0

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Kopili - I	10.38	33.66	1.30	4.36	27.8	1.11	3.09	50.36	0.94	4.75
Kopili - II	1.5	4.64	2.22	1.03	4.57	1.71	0.78	6.04	3.33	2.01
Khandong	2.1	7.48	3.10	2.32	3.66	2.35	0.86	7.91	1.92	1.52
AGBPP	16.57	96.41	4.20	40.5	97.05	5.03	48.77	70.27	3.28	23.06
AGTPP		38.53	4.16	16.01	37.61	2.97	11.18	59.05	3.09	18.25
AGTCCPP	9.05									
Doyang	5.14	16.04	3.16	5.07	10.74	3.25	3.49	16.93	0.00	0
NTPC Farakka	3.04	0			21.22	4.24	9	20.27	2.96	6.01
NTPC Kahalgaon	1.6	2.91	4.40	1.28	11.71	4.92	5.76			0
NTPC Talcher	1.4	14.16	2.75	3.89	13.89	2.61	3.63			0
NTPC Bongaigaon	12.83							92.12	3.28	30.22
OTPC Palatana	22.02	154	2.67	41.12	73.94	2.89	21.37	123.35	2.86	35.24
DHPD	60	55	2.30	12.65	52.03	2.46	12.8	59.41	2.69	15.98
Total	**225.59**	**691.82**		**156.28**	**618.36**		**148.36**	**735.50**		**156.88**

The year-wise energy drawn and variation in power procurement cost for FY 2015-16, 2016-17 and 2017-18 are as below.

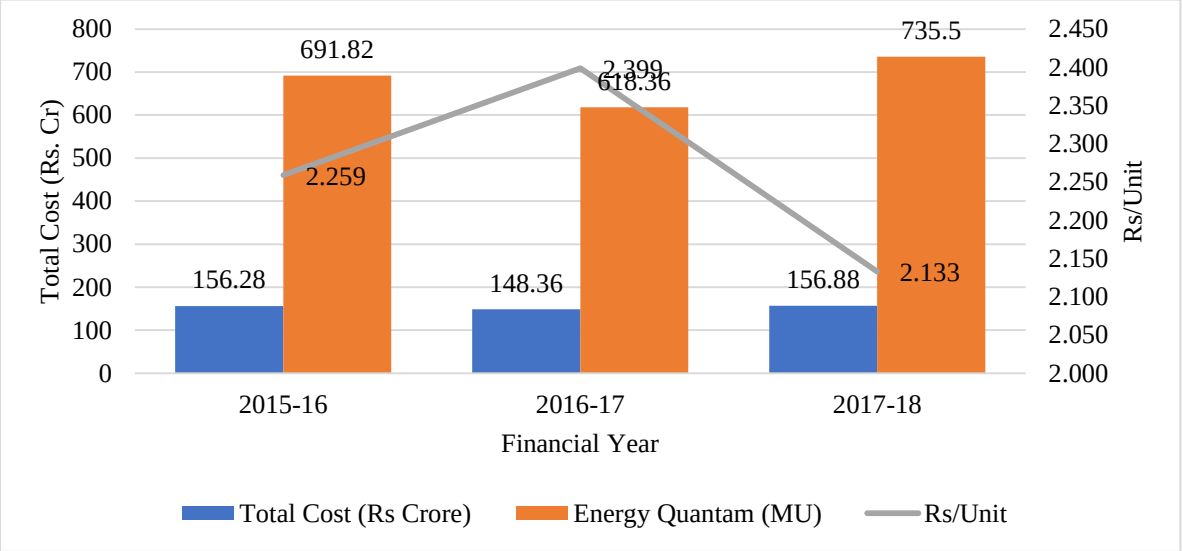


Figure 40: Year-Wise Energy Drawn and Variation in Power Procurement Cost for FY16 to FY18

The graph shows decreasing trend from FY 2015-16 to 2016-17; but, the rise in energy drawn can be seen from FY 2016-17 to 2017-18.

4.8 Average Cost of Supply (ACoS) and Average Power Purchase Cost (APPC)

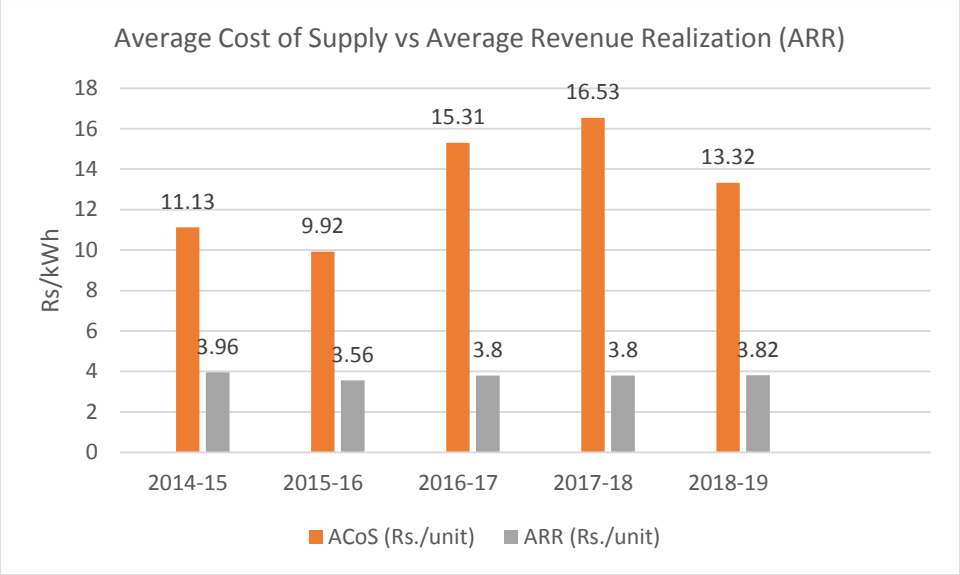


Figure 41: ACoS and APPC Variation for Arunachal Pradesh

4.9 Consumer Mix

Table 40: Consumer mix of Arunachal Pradesh for FY 2015-16 to FY 2017-18

Consumer Category	2015-16			2016-17			2017-18		
	Total Connected Load (MW)	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**	**Total Connected Load (MW)**	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**	**Total Connected Load (MW)**	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**
Domestic (BPL)	NA	23905	7	NA	58401	23	NA	59632	24
Domestic (Other than BPL)		145231	108		146837	125		154360	129
Commercial / Non-Domestic		19900	37		21481	37		24806	43
Agricultural		0	0		2	0		44	0
Industrial LT		275	3		298	62		296	4
Industrial HT		10	85		23	13		49	99
Public Lighting		2400	8		1276	12		1877	13
Public Water Works		151	5						
Railways		NA	NA		NA			NA	NA
Others		11751	77		233	70		297	66
Sale of Surplus Power, if any		1	0		0	0			
Total		203624	331		228551	343		241361	378

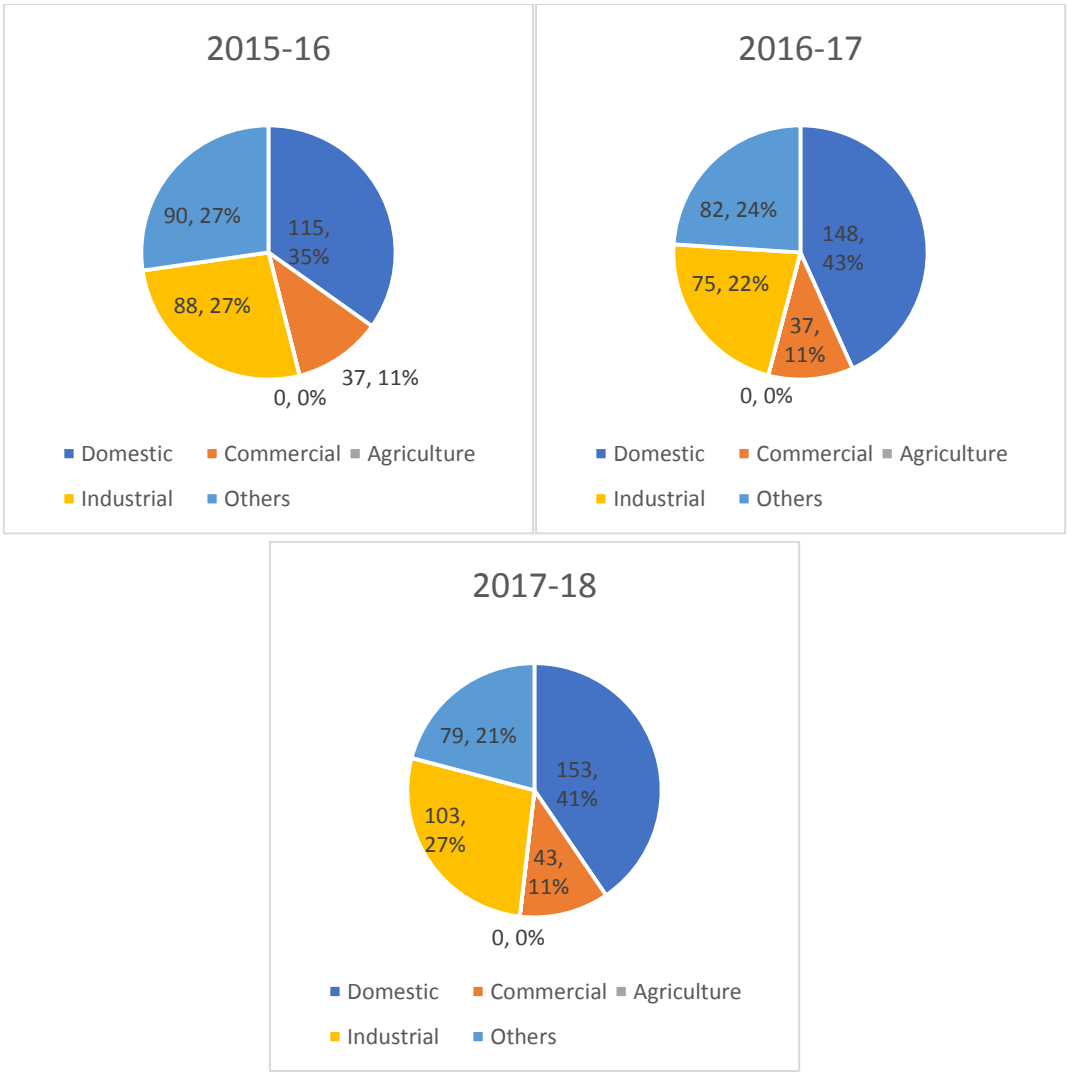


Figure 42: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Arunachal Pradesh

4.10 Energy Balance

Table 41: Energy Balance for Arunachal Pradesh

		2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilateral Purchase/Sale) (MUs)	527.6	636.76	700.77
2	Inter-State Transmission Losses (MUs)	19.8	20.34	17.8
3	Total Energy Received at Periphery of the Discom(State PP) (MUs)	507.8	616.42	682.97
4	Intra-State Transmission Losses (MUs)	14.2	21.65	NA
5	Energy Available for Sale (MUs)(Discom PP)	493.6	594.77	682.97
6	Energy Sold to Consumers of the Discom (MUs)	331	355.06	378.08
7	Sale of Surplus Energy to Other Entities (MUs)	70.4	55	59.96
8	Total Energy Sold in MUs	401.4	410.06	438.04
9	Distribution Losses in MUs	92.2	184.71	244.93
10	Surplus/Deficit Energy (MUs)	NA	NA	NA

The energy balance table for Arunachal Pradesh depicts the total energy input including inter-state bilateral purchase/sale as 527.6 MU, 636.76 MU and 700.77 MU for FY2015-16, 2016-17 and 2017-18 respectively.

4.11 Trend of Approved ARR

The following graph depicts the trend of approved ARR for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Arunachal Pradesh.

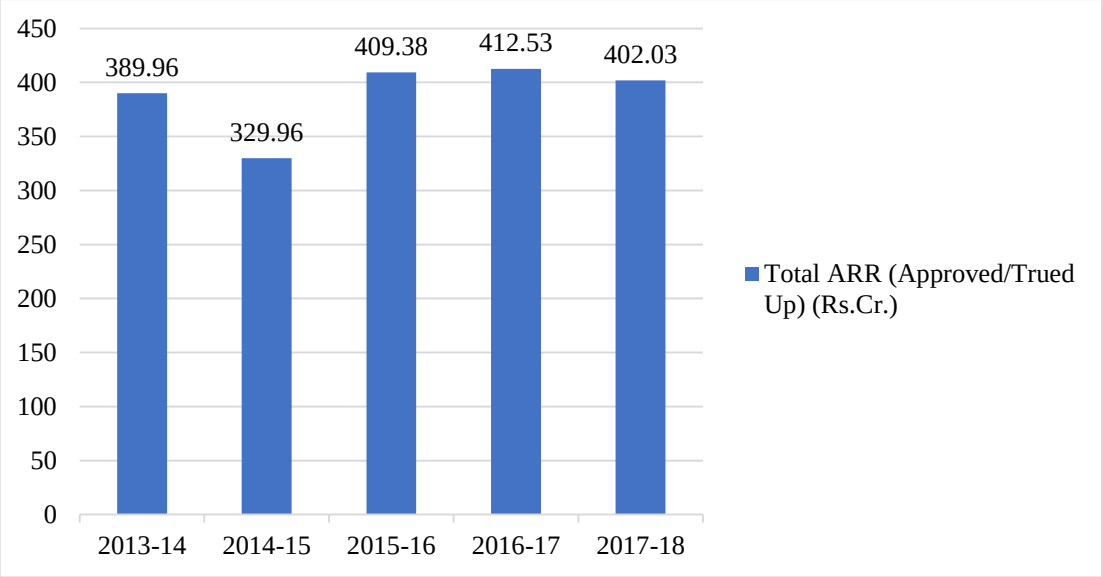


Figure 43: Trend of Approved ARR for FY14 to FY18 in Arunachal Pradesh (Distribution Business)

4.12 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Arunachal Pradesh.

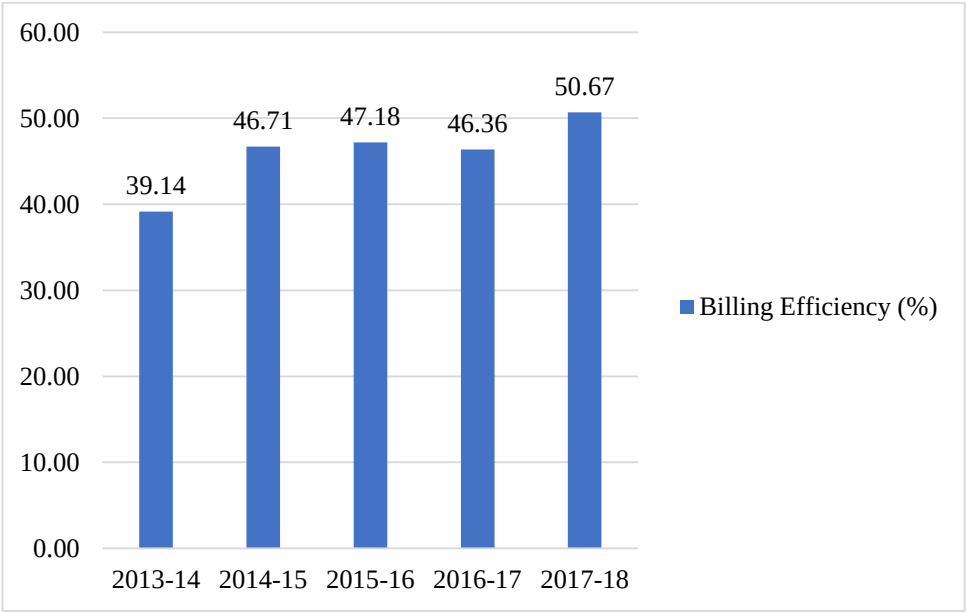


Figure 44: Billing Efficiency for FY14 toFY18 in Arunachal Pradesh as per APDOP's Petition

The billing efficiency declined in FY 2014-15. However, it has been constant in the recent years.

4.13 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Arunachal Pradesh.

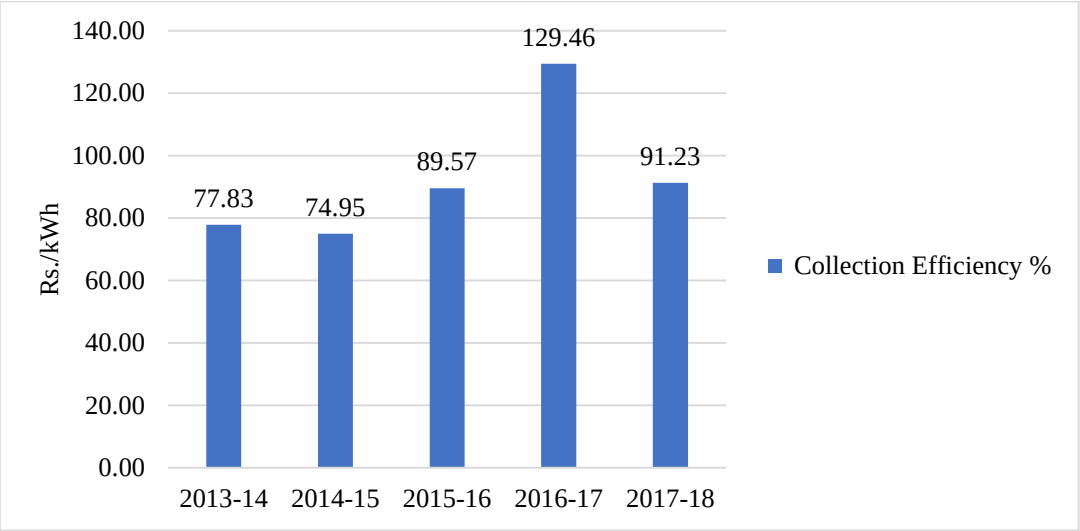


Figure 45: Collection Efficiency for FY14 to FY18 in Arunachal Pradesh

The collection efficiency had shown a rise in FY 2014-15. In the recent years, it has been increasing gradually.

4.14 Trend of AT&C Loss

The following graph depicts the trend of AT&C loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Arunachal Pradesh.

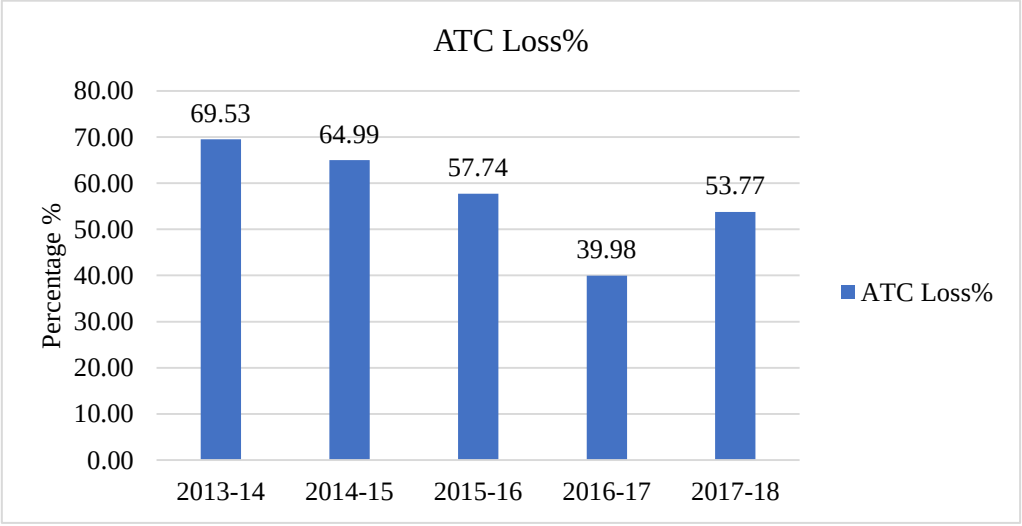


Figure 46: AT&C Loss for FY14 to FY 2017-18 in Arunachal Pradesh

4.15 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Arunachal Pradesh.

Table 42: RE Potential, Targets and Current Installed Capacity for Arunachal Pradesh

	Solar	Wind	SHP	Biomass	Total
Potential in MW	3,000	90	436	165	**3,691**
MNRE Target in MW	39		500		**539**
Achievement in MW	4.40	0	104.60	0	**109**

Source: MNRE Annual Report 2017-18

4.16 RPO Compliance and Targets

The following table shows RPO targets and Compliance status in Arunachal Pradesh.

Table 43: Arunachal Pradesh RPO Compliance and Targets for the FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	APSERC	Achieved	MNRE	APSERC	Achieved
2015-16		0.20	0.2%	6.8	6.8	Achieved
2016-17	2.75	2.75	1.5%	8.75	8.75	Achieved
2017-18	4.75	4.75	Yet to be verified	9.50	9.50	Yet to be verified
2018-19	6.75	6.75		10.25	10.25	

APDOP is drawing 100% power generated by these small/mini/micro hydro stations which is enough to meet the Renewable Energy Compliance for non-Solar RPO.

4.17 Key Regulations by APSERC

The following table shows the status (Draft/Notified) of key Regulations prepared by APSERC in Arunachal Pradesh:

Table 44: Status of Key Regulations Preparedby APSERC

Regulations	Date	Status
Open Access Regulations	19.11.2012	Notified
F&S for Wind and Solar Generation Sources Regulations	NA	Yet to be prepared
Deviation Settlement Mechanism Regulations	NA	Yet to be prepared
Renewable Purchase Obligations Regulations	11.04.2012	Notified
Net Metering for Solar PV Rooftop PV Regulation	07.12.2016	Notified
State Grid Code	19.11.2012	Notified

4.18 Details of Open Access

There are 4 Short Term Open Access Consumers procuring power from Power Exchange.

4.19 Summary of Key Parameters of the State

Parameters	Arunachal Pradesh
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	partial
2) Information in Regulatory filings/Orders	partial
3) info availability in audited accounts	NA
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	Thrice
2) Transmission tariff filing/revision	Once
3) Retail tariff filing/revision	yearly
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	TBI
2) Energy situation	TBI
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	>50% (Very high employee exp.)
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	About 50%
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	3%
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	2.12
3) RPO Compliance (fully comply/partial comply/no compliance)	Non- Solar compliance but Solar Non-Compliance
Loss level	
1) Transmission Loss (<5%/5-10% />10%)	2.57%
2) Distribution loss (<15%/15-30% />30%)	>30% (except FY16)
3) AT&C loss (<15%/15-30% />30%)	>30%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	<50%
2) Collection efficiency (>90%/75-90% /<75%)	Improving from 78% to 91% (FY18)
Status of signing of UDAY (Yes/No)	Yes

5 Assam

5.1 Basic Information

Table 45: Information of Assam State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Assam Electricity Regulatory Commission
Date of Constitution of ERC	28 February 2001
Name of the Generating Company	Assam Power Generation Corporation Ltd. (APGCL)
Name of the Transmission Utility	Assam Electricity Grid Corporation Ltd. (AEGCL)
Name of the Distribution Utility	Assam Power Distribution Company Ltd. (APDCL)

5.2 APGCL (Generation) Tariff Petition - Timelines

The following table shows timelines for Generation Petition.

Table 46: Timelines for Generation Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Filing of ARR Petition for each FY	30.11.2012	20.12.2014	20.12.2014	01.09.2016	01.09.2016
Date of Admission of ARR Petition by ERC	04.04.2013	13.04.2015	13.04.2015	31.10.2016	31.10.2016
Date of Issue of Tariff Order by ERC	21.11.2013	21.11.2014	24.07.2015		31.03.2017
Date of filing of True-up Petition	20.12.2014	21.12.2016	21.12.2016	29.11.2017	yet to be done
Date of Admission of True-up Petition	13.04.2015	28.12.2016	28.12.2016	13.12.2017	,,
Date of Issue of True-up Order by ERC	24.07.2015	31.03.2017	31.03.2017	19.03.2018	,,

5.3 AEGCL (Transmission) Tariff Petition - Timelines

The following table shows timelines for TransmissionPetition.

Table 47: Timelines for Transmission Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Filing of ARR Petition for each FY	01.02.2013	24.01.2014	31.01.2015	31.10.2016	31.10.2016
Date of Admission of ARR Petition by ERC	04.04.2013	11.05.2014	10.04.2015	17.12.2016	17.12.2016
Date of Issue of Tariff Order by ERC	21.11.2013	21.11.2014	24.07.2015		31.03.2017
Date of filing of True-up Petition	31.01.2015	31.10.2016	31.10.2016	30.11.2017	yet to be done
Date of Admission of True-up Petition	10.04.2015	17.12.2016	17.12.2016	13.11.2017	,,
Date of Issue of True-up Order by ERC	24.07.2015	31.03.2017	31.03.2017	19.03.2018	,,

5.4 Distribution Tariff Petition - Timelines

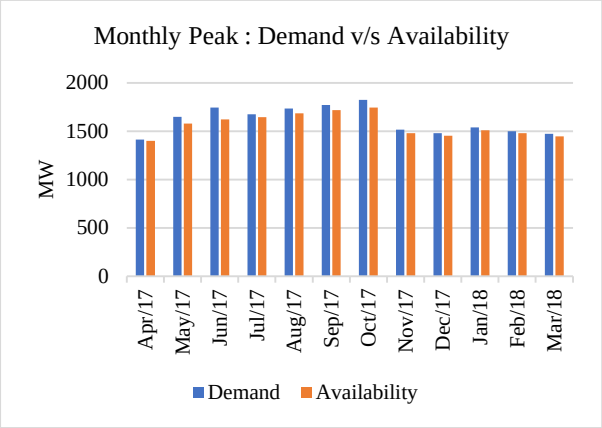
The following table shows timelines for Distribution Tariff Petition.

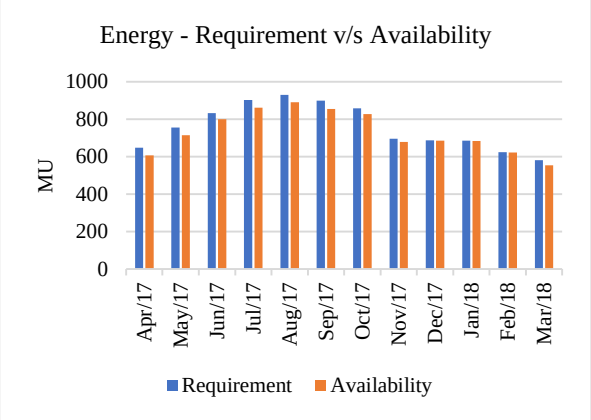
Table 48: Timelines for Distribution Tariff Petitions

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Filing of ARR Petition for each FY	31.01.2013	31.12.2013	31.01.2015	02.11.2016	02.11.2016
Date of Admission of ARR Petition by ERC	04.04.2013	11.06.2014	17.04.2015	17.12.2016	17.12.2016
Date of Issue of Tariff Order by ERC	21.11.2013	21.11.2014	24.07.2015		31.03.2017
Date of filing of True-up Petition	31.01.2015	02.11.2016	02.11.2016	30.11.2017	yet to file

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Admission of True-up Petition	17.04.2015	17.12.2016	17.12.2016	13.12.2017	,,
Date of Issue of True-up Order by ERC	24.07.2015	31.03.2017	31.03.2017	19.03.2018	,,

5.5 Power Supply Position





The graph shows Month-wise power supply position of Assam during the year 2017-18(in terms of peak and in terms of energy).

5.6 Cost of Power Generation

The following table shows power generation cost and other details for FY 2015-16 to 2017-18 for Assam State.

Table 49: Power Generation Cost and Other Details for FY 2015-16 to 2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Generation (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy generation(MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy generation (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
State Generating Stations (SGS)										
APGCL		1744.82	4.22	737.18	1557.26	3.83	596.62	1549.5	2.92	452.3
Total - SGS		**1744.82**	**4.22**	**737.18**	**1557.26**	**3.83**	**596.62**	**1549.5**	**2.92**	**452.3**

Year-wise energy generation and variation in energy generation cost for FY 2015-16, 2016-17 and 2017-18 areas below.

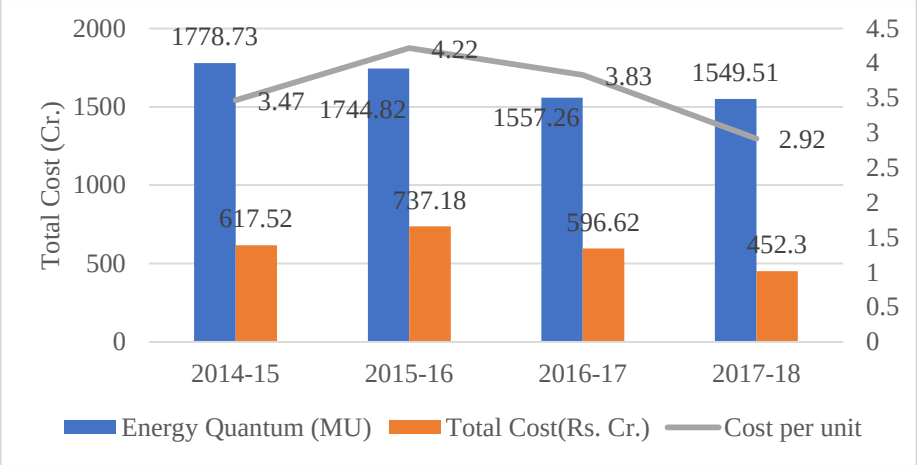


Figure 47: Year-Wise Energy generation and Variation in Power generation cost for FY15 to 2017-18

The graph shows decreasing trend in the energy generation from FY 2015-16 to 2017-18.

5.7 Power Purchase Cost

Table 50: Power Purchase Cost for FY 2015-16 to FY 2017-18

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
NTPC										
Bongaigon TPS										
Farakka STPS		236.05	3.18	75.04	277.26	3.4	94.18	269.68	3.8	102.6
Kahalgaon I		132.23	3.2	42.3	130.99	3.39	44.35	141.74	3.47	49.12
Kahalgaon II		537.76	3.34	179.68	524.56	3.42	179.57	568.68	3.48	197.9
Talcher STPS		142.65	2.08	29.63	136.5	2.8	38.16	144.15	2.54	36.65
Farakka STPS III		160.16	4.81	77.11						
NHPC										
Loktak HEP		152	3.59	54.5	210.4	2.77	58.21	226.1	3.07	69.5
NEEPCO										
Kopili HEP		358.72	0.8	28.6	514.29	2.06	106.05	516.5	0.94	48.7
Kopili - II HEP		49.1	1.71	8.4	52.93	1.62	8.58	55.9	1.11	6.2
Khandong HEP		95.14	1.7	8.4	106.39	1.85	19.7	139.1	1.46	20.3
Ranganadi HEP		566.47	2.63	149.06	534.95	2.4	128.17	580.9	2.52	146.2
Doyang HEP		67.08	4.74	31.08	107.65	5.03	54.13	114.1	4.29	48.9
AGBPP		924.78	3.82	353.26	812.5	3.45	280.7	801.4	3.34	267.9
AGTPP		267.54	4.19	112.18	371.36	2.94	109.1	317.1	3.44	109.1
AGTPP 2		66.89	0.75	4.99						
MeECL		28.65	5.84	16.74	17.72	6.08	10.78	0.68	7.94	0.54
Bilateral sources/PEX		940.62	1.74	163.6	931.82	3.58	333.84	1252.98	3.84	481.11

Name of the Plant/Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
UI Pool/ DSM		257.37	3.08	79.17	393.56	2.48	97.79	276.57	2.54	70.21
OTPC										
Palatana		1098.73	4.62	507.38	1287.24	3.61	464.95	1259.3	3.25	409.2
BTPS*					1020.85	5.32	542.93	912.7	5.32	485.41
Total Power Purchase		**8279.31**		**3434.64**	**9200.36**		**3727.97**	**9222.15**		**4297.87**

5.8 Average Cost of Supply (ACoS) and Average Revenue Realisation (ARR)

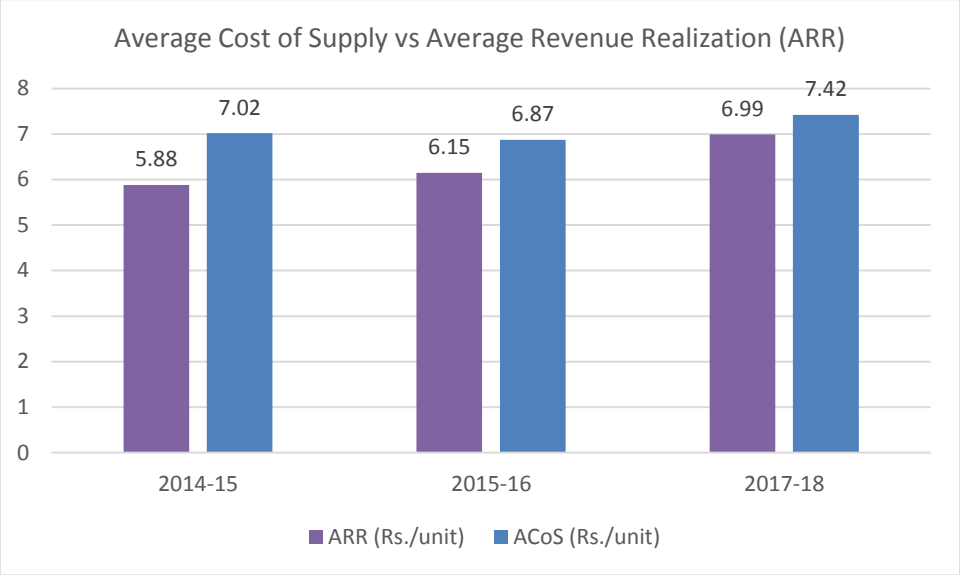


Figure 48: ACoS and ARR Variation for Assam

5.9 Consumer Mix

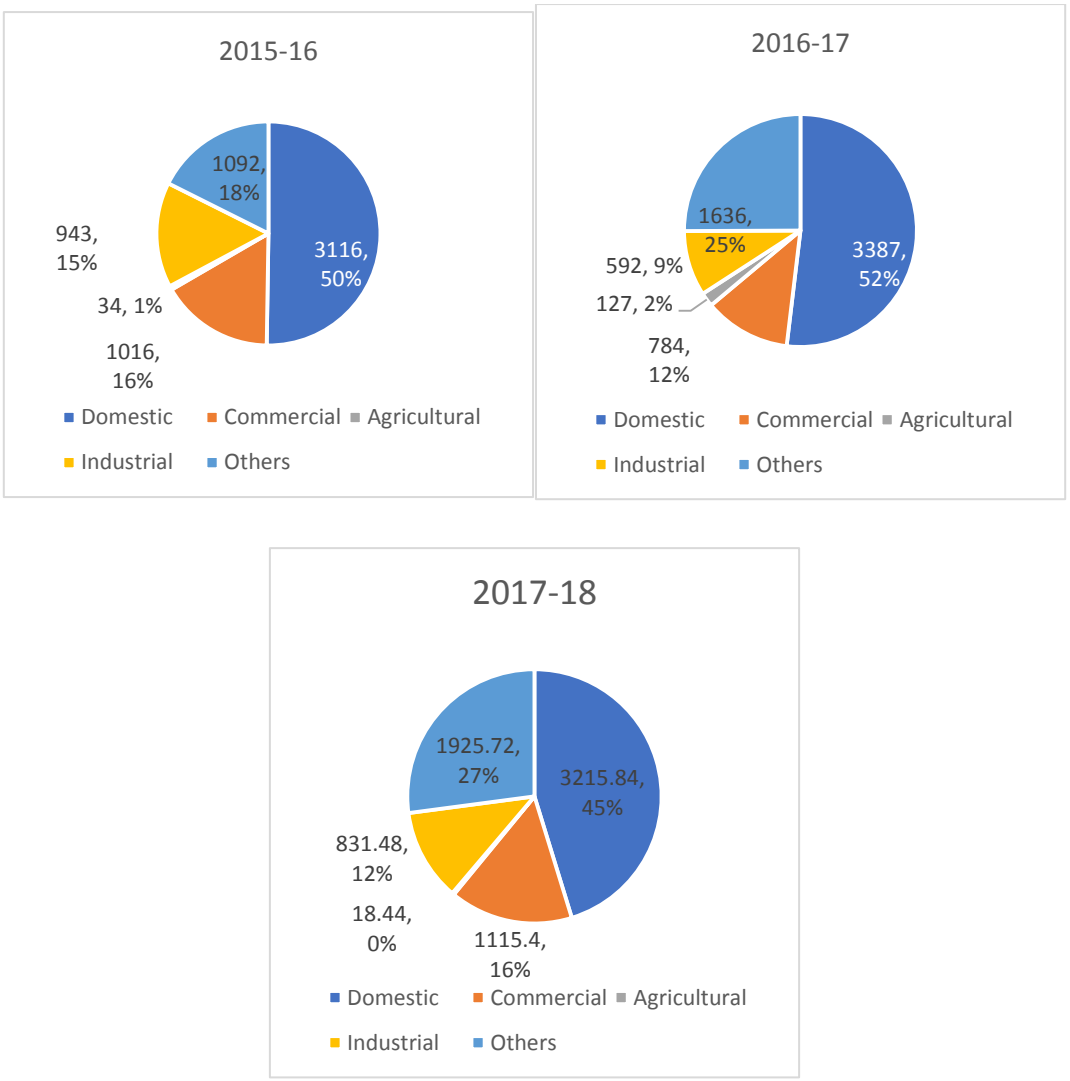


Figure 49: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Assam

5.10 Energy Balance

Table 51: Energy Balance for Assam

	Description	2015-16	2016-17	2017-18
1	Energy Sales	6200	6526	7107
2	Distribution Loss (%)	17.60%	17.35%	17.10%
3	Energy Requirement at T<>D periphery	7525	7896	8574
4	Intra State (AEGCL) Transmission Loss (%)	3.64%	3.54%	3.49%
5	Energy Input to Transmission System	7809	8186	8884
s6	Inter State (PGCIL) Pooled Loss (%)	1.18%	1.40%	1.27%
7	Export of Periodic Surplus Energy			
8	Total Energy Requirement	8231	8302	8998

The energy balance table for Assam depicts total energy input including inter-State Bilateral purchase/Sale as 6200 MU, 6526 MU and 7107 MU for years 2015-16, 2016-17 and 2017-18 respectively.

5.11 Trend of Approved ARR

The following graph depicts trend of approved ARR for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Assam.

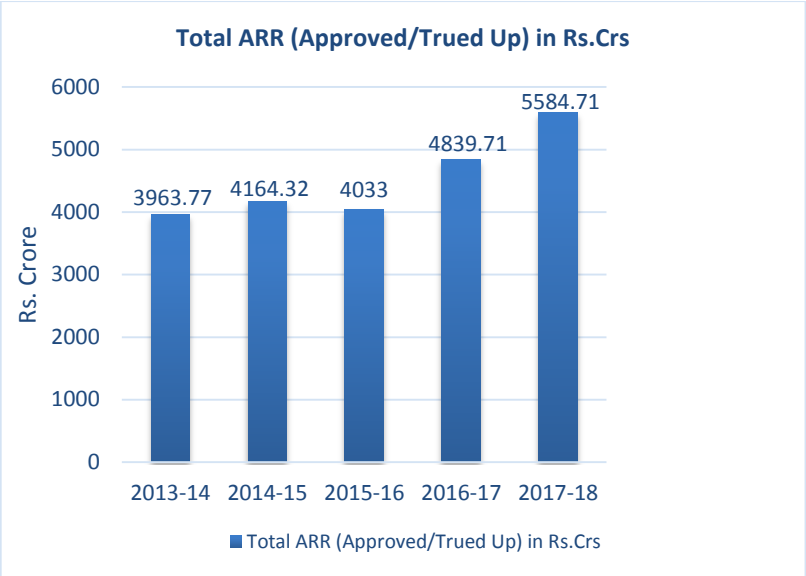


Figure 50: Trend of Approved ARR for FY14 to FY18 in Assam

5.12 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Assam.

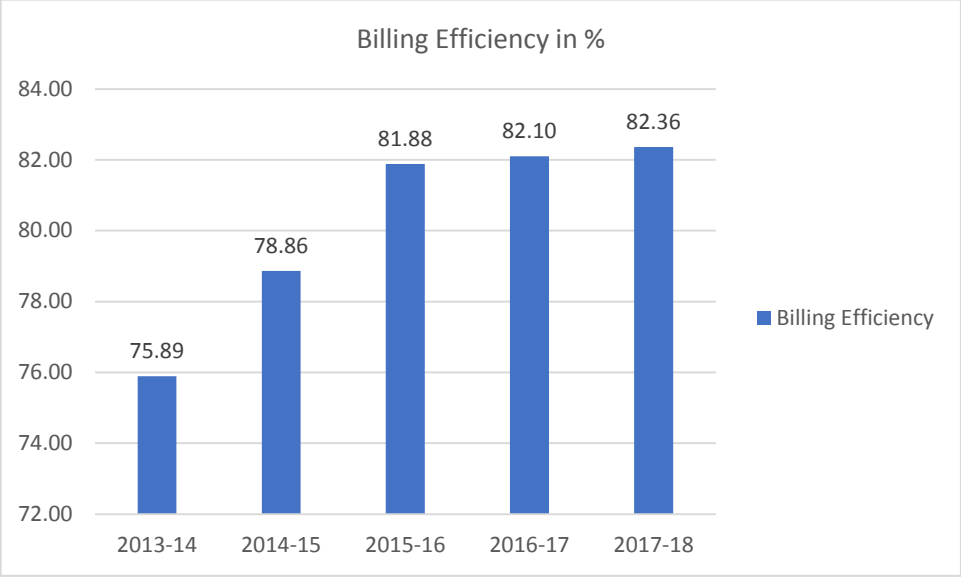


Figure 51: Billing Efficiency for FY14 to FY18 in Assam

The billing efficiency is not following any trend but lying in between 70% to 77%.

5.13 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Assam.

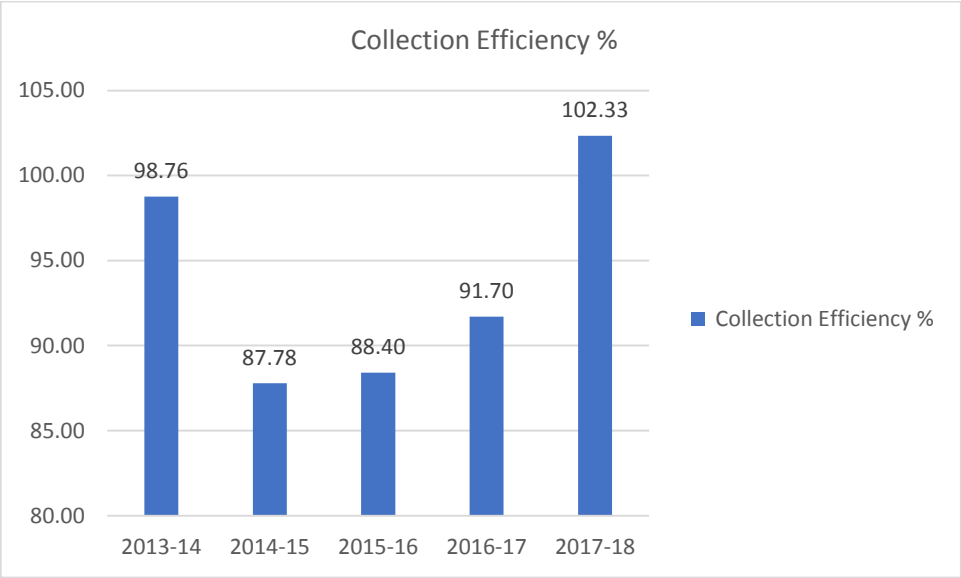


Figure 52: Collection Efficiency for FY14 to FY18 in Assam

The Collection efficiency had shown a decline from FY2013-14 to FY2016-17, however has a much higher value in FY 2017-18. Billing Efficiency is higher than 100% because previous years left over collection is collected in following years.

5.14 Trend of AT&C Loss

The following graph depicts the trend of AT&C Loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Assam.

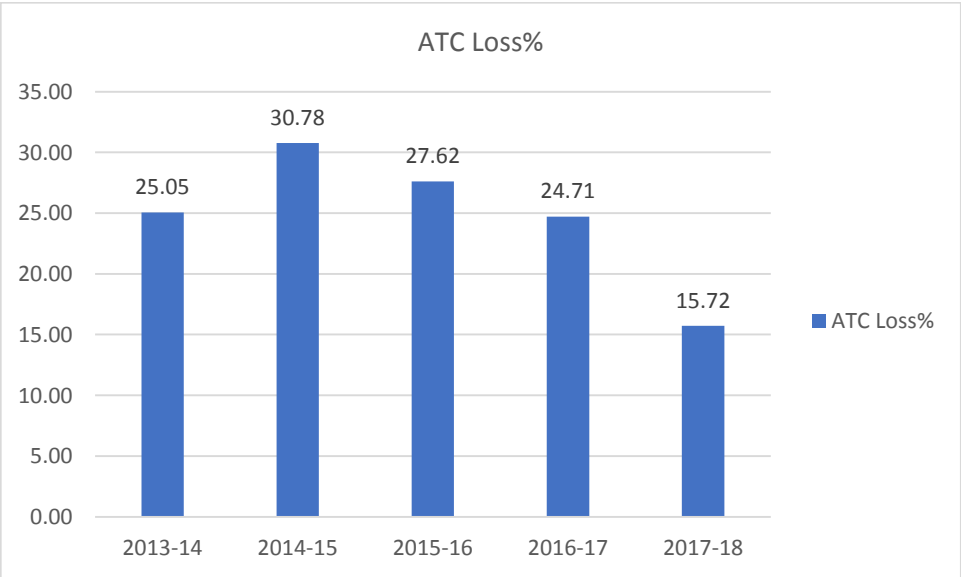


Figure 53: AT&C Loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Assam

5.15 Fatal and Non-Fatal Accident Report

The following graph depicts the trend of Fatal and Non-fatal Accident during FY2013-14 to 2017-18 in Assam.

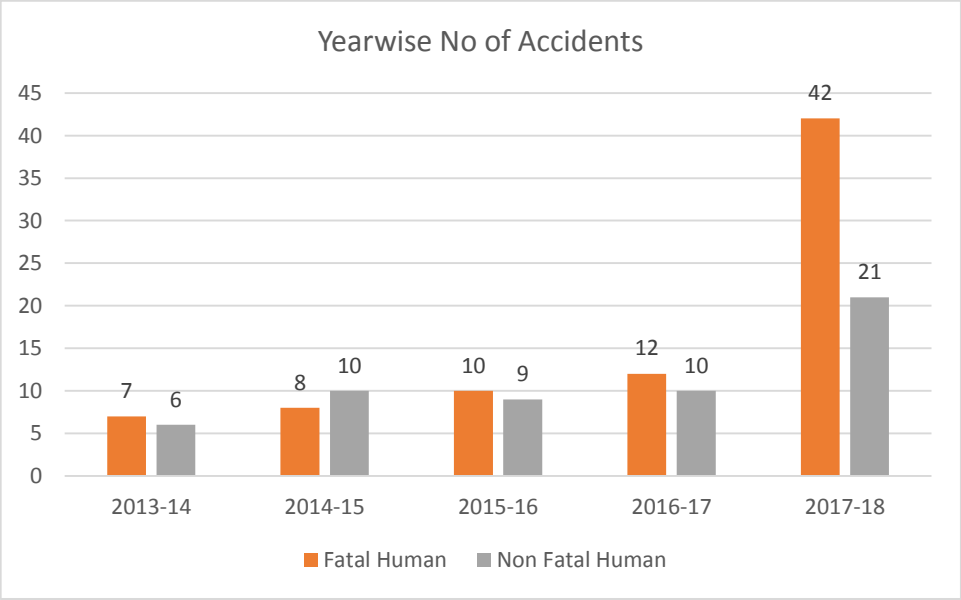
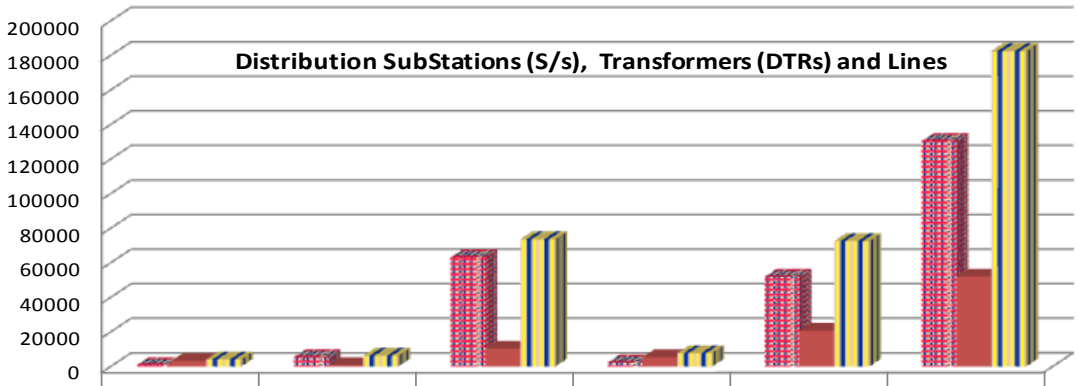


Figure 54: Fatal and Non- Fatal Accidents inFY 14 to FY 18 in Assam

5.16 Status of the Distribution System:

The Assam Power Distribution Company Limited (APDCL) is responsible for electricity distribution in the State of Assam having a consumer base of around 43 lakh consumers as on 31st March, 2018. APDCL is divided into 3 Regions, 8 Zones; 19 circles; 45 Divisions and 158 subdivisions. The status of distribution Substations, Distribution Transformers (DTRs) and Lines (Provisional) for FY 2017-18 are shown below:



	33/11 KV S/s (No.)	11 KV/ LT DTR (No.)	DTRs (No.)	33 KV Lines (Ckt Km)	11 KV Lines (Ckt Km)	LT Lines (Ckt. Km)
Rural	883	5417	63278	2316	51942	130486
Urban	3323	893	10428	5405	20745	52116
Total	4206	6310	73706	7721	72687	182602

5.17 Status of Distribution Transformers

The following graph depicts the year wise total number of distribution transformers added at the end of FY 2013-14 to FY 2017-18 in Assam.

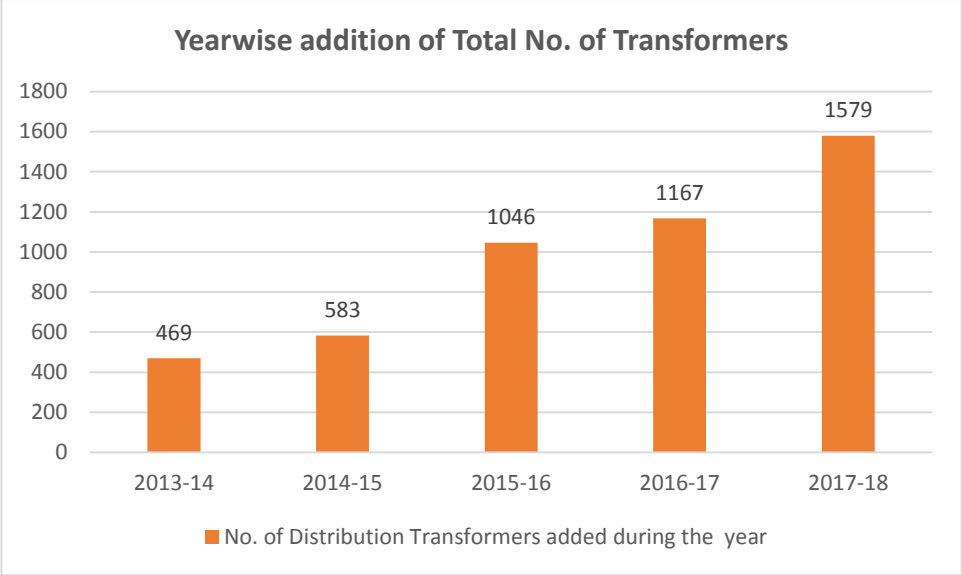


Figure 55: Total No. of Distribution Transformers added during FY14 to FY18 in Assam

5.18 Status of Failed Transformers

The following graph depicts the year wise total number of failed transformers during FY 2013-14 to FY 2017-18 in Assam.

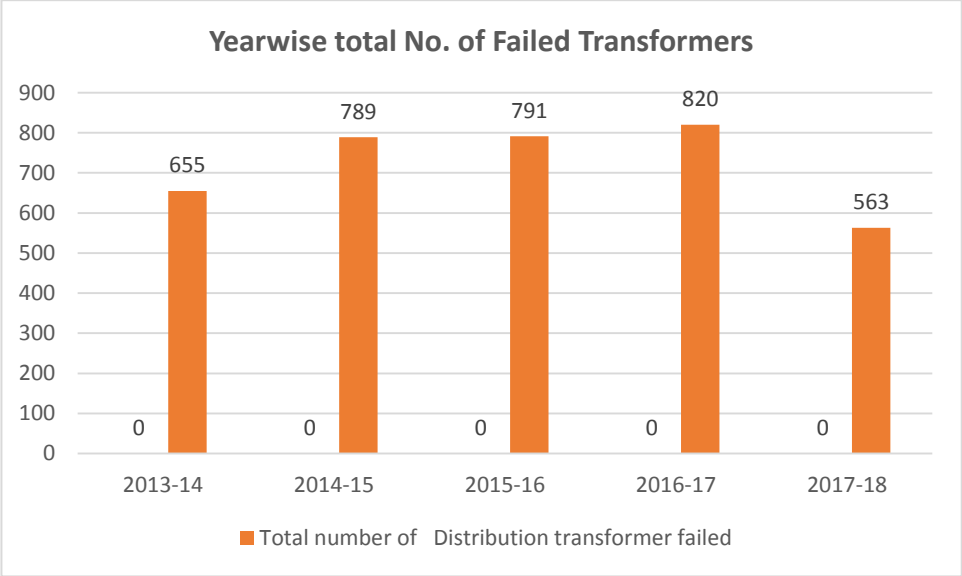


Figure 56: Year wise total No. of Failed Transformers during FY14 to FY18 in Assam

5.19 Number of Faulty Meters

The following graph depicts the year wise total number of faulty meters during FY 2013-14, 2014-15, to FY 2017-18 in Assam.

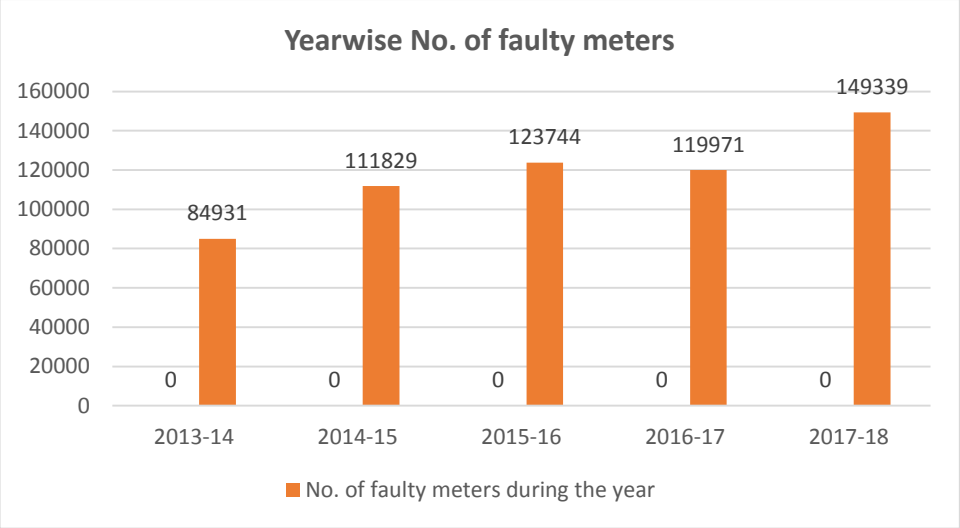


Figure 57: Year wise Number of Faulty meters during FY14 to FY18 for APDCL, Assam

5.20 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Assam.

Table 52: RE Potential, Targets and Current Installed Capacity for Assam

	Solar	Wind	SHP	Biomass	Total
Potential in MW	13760	112	239	220	**14330**
MNRE Target in MW	663		25		**688**
Achievement in MW	12.45		34.11		**46.56**

Source: MNRE Annual Report 2017-18 and CEA Executive Summary, July 2018

5.21 RPO Compliance and Targets

The following table shows RPO targets and compliance status in Assam.

Table 53: Assam RPO Compliance and Targets for the FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	AERC	Achieved	MNRE	AERC	Achieved
2015-16			0.25			6.75
2016-17	2.75	1	1	8.75	3	3.00
2017-18	4.75	4	1.25	9.50	5	3.25
2018-19	6.75	5	1.50	10.25	6	3.50
2019-20	7.25	6		10.25	7	
2020-21	8.75	7		10.25	8	
2021-22	10.50	8		10.50	9	

5.22 Key Regulations by AERC

The following table shows the status (Draft/Notified) of key Regulations prepared byAERC in Assam.

Table 54: Status of Key Regulations Published by AERC

Regulations	Date	Status
Open Access Regulations	07.02.2018	Draft

Regulations	Date	Status
F&S Regulations for Wind and Solar Generation	25.06.2018	Draft
Deviation Settlement Mechanism Regulations	02.11.2018	Draft
Renewable Purchase Obligations Regulations	02.11.2010	Notified
Net Metering Regulations Rooftop solar PV	02.05.2015	Notified
State Grid Code	30.06.2018	Draft

5.23 Employee Strength in the Regulatory Commission

Table 55: Details of filled, sanctioned and vacant posts in the Regulatory Commission ofAssam

Sl. No.	Designation of posts	Sanctioned Strength	Post filled		Vacant Posts
			On	On	
1	Secretary	1	1	-	-
2	Director (Tariff)	1	-	-	1
3	Director (Engg.)	1	-	-	1
4	Joint Director (Tariff)	1	-	1	-
5	Joint Director (Engg.)	1	-	-	1
6	Joint Director (Finance)	1	-	-	1
7	Deputy Director (Tariff	1	1	-	-
8	Deputy Director (Tariff	1	-	1	-
9	Deputy Director (Gen, PPA Procurement & Planning)	1	-	-	1
10	Assistant Director (IT	1	-	-	1
11	Pay & Accounts Officer	1	-	-	1
12	Office Superintendent	1	1	-	-
13	Accountant	1	1	-	-
14	P.S to Chairperson/ Steno	1	1	-	-
15	P.S to Members	2	2	-	-
16	Junior Administrative Assistant/Cashier/Librarian	3	2	-	1
17	Drivers	3	3	-	-
18	Grade IV (Peon & Chowkidar)	5	5	-	-
TOTAL		**27**	**17**	**2**	**8**

5.24 Summary of Key Parameters of the State

Parameters	Assam
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	adequate
2) Information in Regulatory filings/Orders	adequate
3) info availability in audited accounts	adequate
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	yearly
2) Transmission tariff filing/revision	yearly
3) Retail tariff filing/revision	yearly

Parameters	Assam
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Deficit
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	17%
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	85%
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	1%
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Mix
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	4.66
3) RPO Compliance (fully comply/partial comply/no compliance)	partial compliance
Loss level	
1) Transmission Loss (<5%/5-10% / >10%)	3.49%
2) Distribution loss (<15%/15-30% />30%)	17%
3) AT&C loss (<15%/15-30% />30%)	15 -30%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	77-90%
2) Collection efficiency (>90%/75-90% /<75%)	>90%
Status of signing of UDAY (Yes/No)	Yes

6 Nagaland

6.1 Basic Information

Table 56: Information of Nagaland State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Nagaland Electricity Regulatory Commission (NERC)
Date of Constitution of ERC	21.02.2008
Name of the Generating Company	The Department of Power, Nagaland which is yet to be corporatize, looks after all these 3 sectors till date.
Name of the Transmission Utility	
Name of the Distribution Utility	

6.2 Generation Tariff Petition - Timelines

The following table shows timelines for Generation Petition.

Table 57: Timelines for Generation Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Filing of ARR Petition for Each FY	NIL	NIL	NIL	NIL	06.11.2017-HDPL29.11.2017-RVSPL
Date of Admission of ARR Petition	NIL	NIL	NIL	NIL	04.04.2018 and

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
by ERC					30.11.2017
Date of Issue of Tariff Order by ERC	NIL	NIL	NIL	NIL	11.04.2018 and 20.12.2017
Date of filing ofTrue-up Petition	NIL	NIL	NIL	NIL	
Date of Admission of True-up Petition	NIL	NIL	NIL	NIL	NIL
Date of Issue of True-up Order by ERC	NIL	NIL	NIL	NIL	NIL

6.3 Dept. of Power, Nagaland (Transmission) Tariff Petition - Timelines

As Department of Nagaland is undertaking Generation, Transmission and Distribution business, no separate Petition is being filed by Department of Power, Nagaland. The Distribution Petition includes Tariff for Transmission and Generation business also.

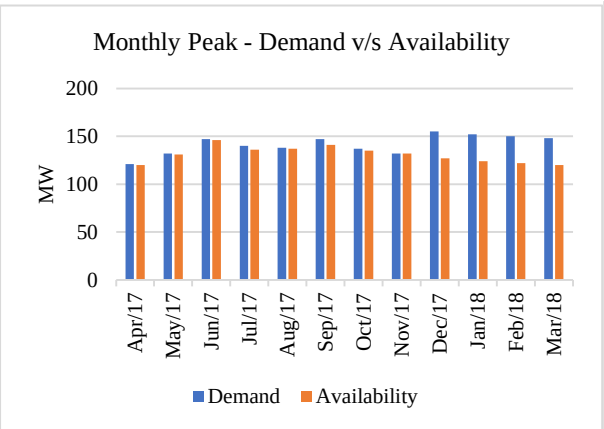
6.4 Distribution Tariff Petition - Timelines

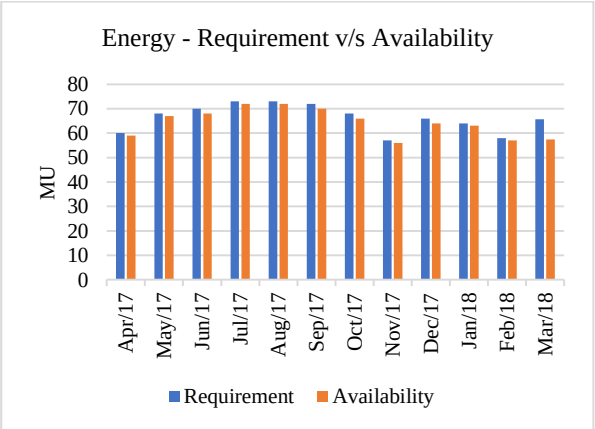
The following table shows the timelines for Distribution Tariff Petition.

Table 58: Timelines for Distribution Tariff Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Date of Filing of ARR Petition for each FY	06.10.2012	28.11.2013	10.11.2014	30.11.2015	30.11.2016
Date of Admission of ARR Petition by ERC	31.10.2012	29.11.2013	09.01.2015	30.11.2015	30.11.2016
Date of Issue of Tariff Order by ERC	19.12.2012	31.03.2014	27.02.2015	21.03.2016	28.03.2017
Date of filing of True-up Petition	Not filed	Not filed	Not filed	Not filed	Not filed
Date of Admission of True-up Petition	Not filed	Not filed	Not filed	Not filed	Not filed
Date of Issue of True-up Order by ERC	Not filed	Not filed	Not filed	Not filed	Not filed

6.5 Power Supply Position





The graph shows Month-wise power supply position of Nagaland during the year 2017-18(in terms of peak and in terms of energy).

6.6 Power Purchase Cost

Table 59: Power Purchase Cost for FY 2015-16 to FY 2017-18

Name of the Plant/ Other Sources	Capacity contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
Loktak, NHPC	6.76	33.24	3.6	11.97	32	3.6	11.52	36.99	3.93	14.55
Khandong NEEPCO	3.33	11.18	2.92	3.26	18	2.93	5.27	12.44	2.11	2.62
Kopili– I, NEEPCO	12.3	41.25	1.07	4.41	47	1.07	5.03	45.91	0.99	4.55
Kopili – II, NEEPCO	1.44	05.34	2.04	1.09	07	2.04	1.43	05.96	2.14	1.27
Ranganadi, NEEPCO	21.63	69.50	3.2	22.24	106	3.2	33.92	77.35	2.97	22.98
Doyang, NEEPCO	13.48	27.48	5.14	14.12	18	3.2	33.92	30.59	4.7	4.77
AGTPP (Tripura)	4.52	32.48	4.53	14.71	35	4.54	15.89	36.14	5.06	20.26
AGBPP	16.91	96.02	4.04	38.79	95	4.04	38.38	106.87	4.28	45.79
NTPC		95.76	3.61	34.57	111.46	3.61	40.24	152.32	4.43	67.5
OTPC– Palatana	13.51	122.95	2.8	34.43	113	2.81	31.75	136.84	3.27	44.74
Other Stations										
Short term GEFL		56.54	3.66	20.7	28.54	3.68	10.5	62.93	2.86	18
Shortterm NVVNL Ltd		NIL			104.00	3.65	12.04			
Short term DTCL		NIL								
PTC		10.8	3.41	3.4	20	3.007	6.014	12.02	3.53	4.25
UI		81.91	3.06	25.06				40.68	2.5	10.18

6.7 Average Cost of Supply (ACoS) and Average Revenue Realization (ARR)

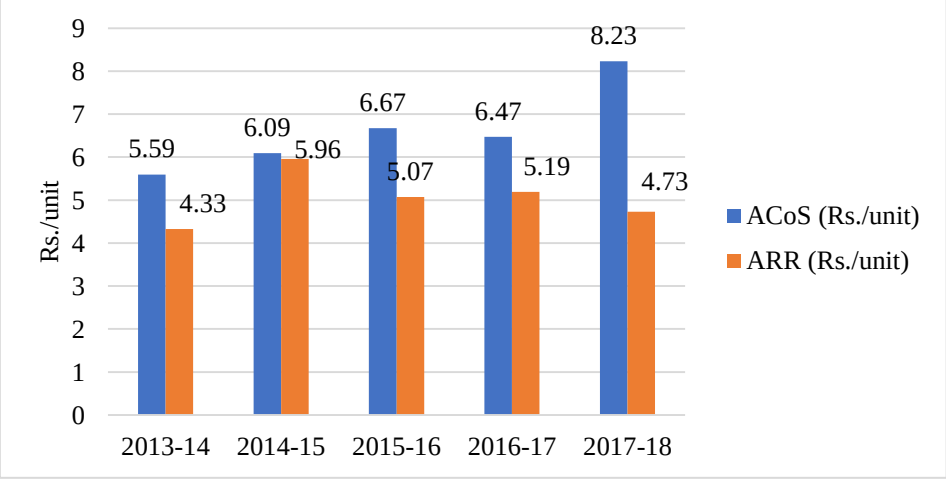


Figure 58: ACoS and ARRVariation for Nagaland

6.8 Consumer Mix

Table 60: Consumer mix of Nagaland for FY 2015-16 to FY 2017-18

Consumer	2015-16	2016-17	2017-18

Category	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)
Domestic (BPL)	95	242270	284.48	95	243416	320.27		244571	318.67
Domestic (Other than BPL)									
Commercial / Non-Domestic	16	19846	82.64	16	20988	74.3		22054	99.47
Agricultural	10	1	0	10	1	0		1	0
Industrial LT and HT	12.5	2896	63.36	12.5	2899	55.14		2907	72.51
Public Lighting	8	600	11	8	600	12.87		600	11.21
Public Water Works	7.5	30	4.59	7.5	30	10.16		30	4.59
Railways									
Others	30	1050	102.84	30	1070	98.42		1085	109.88
Sale of Surplus Power, if any	179			179					
Total	**358**	**266693**	**548.91**	**358**	**269004**	**571.16**		**271248**	**616.33**

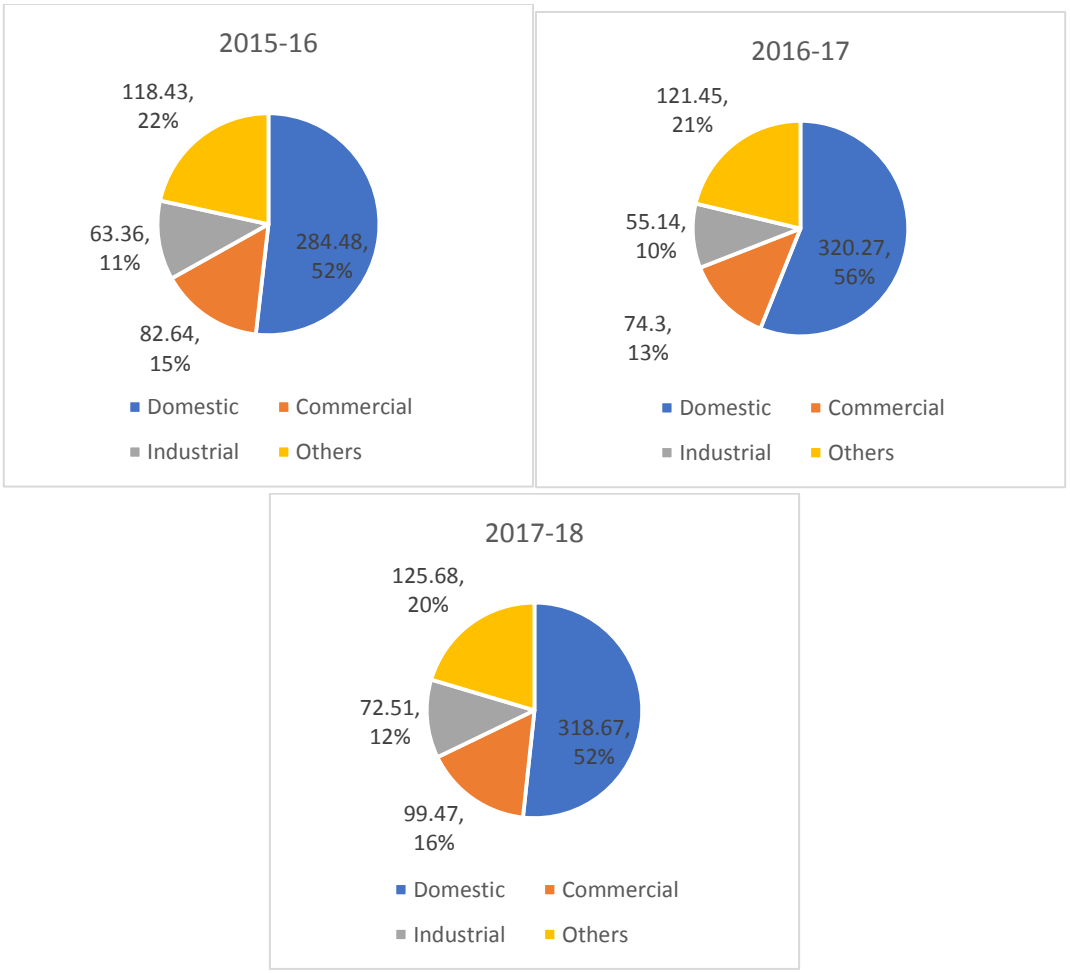


Figure 59: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Nagaland

6.9 Energy Balance

Table 61: Energy Balance for Nagaland

	Particulars	2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilateral Purchase/Sale) (MUs)	772.58	811.18	854.69
2	Inter-State Transmission Losses (MUs)	22.5	23.63	24.89
3	Total Energy Received at Periphery of the Discom (State PP) (MUs) (1-2)	750.08	787.55	829.8
4	Intra-State Transmission Losses (MUs)	201.18	207.2	213.7
5	Energy Available for Sale (MUs) (Discom PP)(3-4)	548.9	580.35	616.1
6	Energy Sold to consumers of the Discom (MUs)	548.9	580.35	616.1
7	Sale of Surplus Energy to Other Entities (MUs)	23.68	25	25
8	Total Energy Sold in MUs (6+7)	572.58	605.35	641.1
9	Distribution Losses in MUs (5-8)	-23.68	-25	-25
10	Surplus/Deficit Energy (MUs)	0	0	0

The energy balance table for Nagaland depicts total energy input including inter-State bilateral purchase/Sale as 632.57 MU, 705.83 MU and 773.76 MU for years 2013-14, 2014-15 and 2015-16 respectively.

6.10 Trend of Approved ARR

The following graph depicts the trend of approved ARR over years 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18in Nagaland.

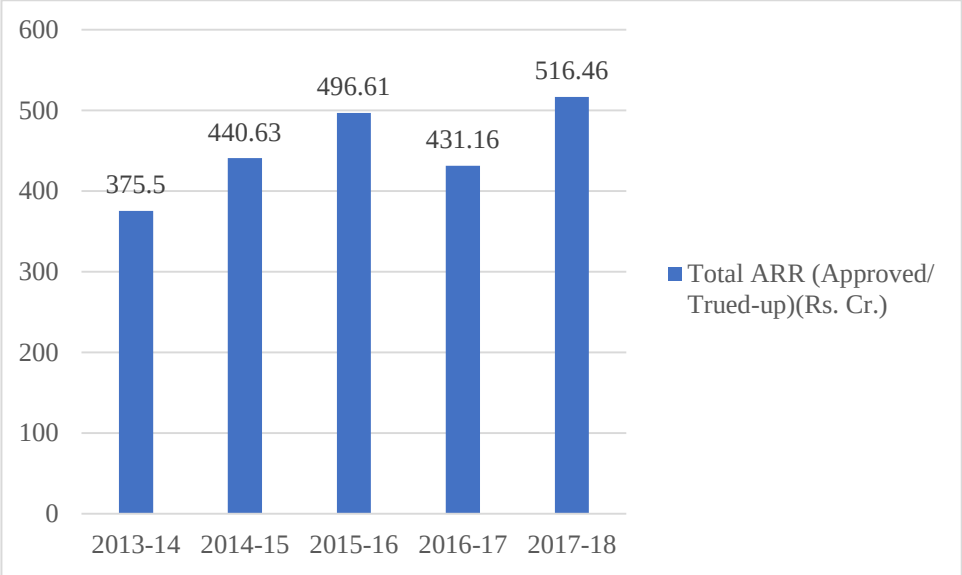


Figure 60: Trend of Approved ARR for FY14 to FY18 in Nagaland

6.11 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Nagaland.

Table 62: RE Potential, Targets and Current Installed Capacity for Nagaland

	Solar	Wind	SHP	Biomass	Total
Potential in MW	7090	16	197	10	**7513**
MNRE Target in MW	61		15		**76**
Achievement in MW	0.50		30.67	0.50	**31.67**

Source: MNRE Annual Report 2017-18 and CEA Executive Summary, July 2018

6.12 RPO Compliance and Targets

The following tableshowsRPO targets and compliance status inNagaland.

Table 63: Nagaland RPO Compliance and Targets for FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)			
	MNRE	NERC	Achieved	MNRE	NERC	Achieved	Achieved (MU)
2016-17	2.75	2.75	0	8.75	8.75	8.75	85
2017-18	4.75	4.75	0	9.50	9.50	9.50	85
2018-19	6.75	6.75	0	10.25	10.25		85
2019-20	7.25	7.25	0	10.25	10.25		85
2020-21	8.75	8.75	0	10.25	10.25		85

6.13 Key Regulations by NERC

The following table shows the status (Draft/Notified) of key Regulations prepared byNERC in Nagaland.

Table 64: Status of key Regulations Prepared by NERC

Regulations	Date	Status
Open Access Regulations	31.01.2012	Notified
F&S Regulations for Wind and Solar Generation	NA	Yet to be prepared
Deviation Settlement Mechanism Regulations	NA	Yet to be prepared
Renewable Purchase Obligations Regulations	29.08.2011	Notified
Net Metering Regulations for Rooftop Solar PV generation	05.12.2016	Notified
State Grid Code	09.05.2012	Notified

6.14 Details of Open Access

As of now there are no Open Access consumers in Nagaland.

6.15 Details of Pending Cases

Table 65: Details of pending cases in Nagaland

Year	No. of Orders issues by the Commission	No. of Orders challenged in APTEL/ High court	No. of Cases Pending
2013-14	1	NIL	NIL
2014-15	1	NIL	NIL
2015-16	1	NIL	NIL

Year	No. of Orders issues by the Commission	No. of Orders challenged in APTEL/ High court	No. of Cases Pending
2016-17	1	NIL	NIL
2017-18	3	NIL	NIL

6.16 Employee Strength in the Regulatory Commission

Table 66: Details of filled, sanctioned and vacant posts in the Regulatory Commission o Nagaland

Sr.	Designation	No. of Filled Posts
1	Chairman	1
2	Secretary	1
3	Deputy Director (Legal)	1
4	Private Secretary	1
5	Assistant Engineer (Tariff)	1
6	Office Assistant	1
7	Driver	1
8	Peons	2
9	Security Guard	1
	Total	**10**

The Nagaland Commission is under staff. Proposal for creation of additional Posts i.e. chief (Engineering,) & Asst. Chief (Engineering) is under submission with the state government.

6.17 Summary of Key Parameters of the State

Parameters	Nagaland
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	partial
2) Information in Regulatory filings/Orders	partial
3) info availability in audited accounts	NA
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	NA
2) Transmission tariff filing/revision	NA
3) Retail tariff filing/revision	yearly
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Deficit
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	24%
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	41%

Parameters	Nagaland
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	22.41%
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Hydro
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	3.50
3) RPO Compliance (fully comply/partial comply/no compliance)	No Regulations
Loss level	
1) Transmission Loss (<5%/5-10% />10%)	>26%
2) Distribution loss (<15%/15-30% />30%)	Included in Transmission loss
3) AT&C loss (<15%/15-30% />30%)	>30.00%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	NA
2) Collection efficiency (>90%/75-90% /<75%)	NA
Status of signing of UDAY (Yes/No)	Yes

7 Tripura

7.1 Basic Information

Table 67: Information of Tripura State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Tripura Electricity Regulatory Commission (TERC)
Date of Constitution of ERC	31.5.2004
Name of the Generating Company	Tripura Power Generation Limited, Constituted on 26.08.2016
Name of the Transmission Utility	Tripura State Electricity Corporation Limited, constituted on 10-06-2004 and Operationalized on 01.01.2005
Name of the Distribution Utility	

7.2 Generation and Transmission Tariff Petition - Timelines

As Tripura State Electricity Corporation Limited is handling Transmission and Distribution business there are no separate Petition for Generation and Transmission business. Distribution Tariff Petition includes Generation and Transmission business petition.

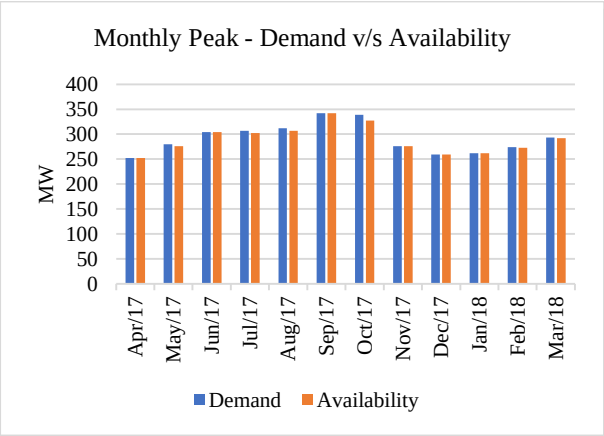
7.3 Tariff Petition - Timelines

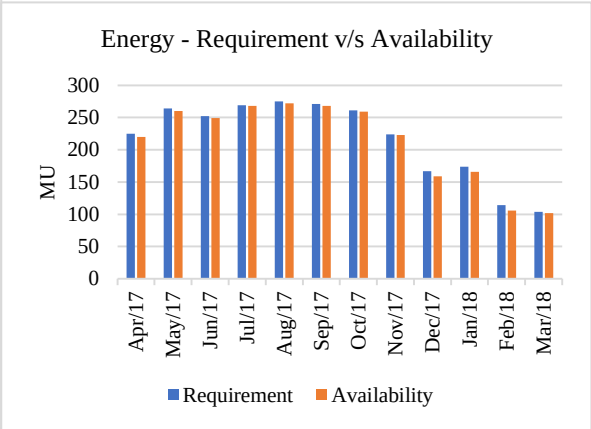
The following table shows the timelines for Tariff Petition.

Table 68: Timelines for Tariff Petition

Activity	2013-14	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	11.03.2013	18.07.2014		06.06.2018	06.06.2018
Admission of ARR Petition by ERC	15.03.2013	12.08.2014		not yet admitted	not yet admitted
Issue of Tariff Order by ERC	25.06.2013	22.11.2014			
filing of True-up Petition	12.08.2014				
Admission of True-up Petition	05.09.2014				
Issue of True-up Order by ERC	22.11.2014				

7.4 Power Supply Position





The graph shows Month-wise power supply position of Tripura during the year 2017-18(in terms of peak and in terms of energy).

7.5 Power Purchase Cost

Table 69: Power Purchase Cost for FY 2015-16 to FY 2017-18

Name of the Plant/ Other Sources	Capacity contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
Assam GPP		111.70	3.87	43.19	100.11	3.43	34.35	99.75	3.46	34.54
Agartala GPP		136.62	3.23	44.11	152.60	2.85	43.48	116.15	2.87	33.34
Kopili -II		8.73	1.93	1.68	8.40	1.94	1.63	10.49	1.38	1.45
Ranganadi		97.59	2.63	25.69	92.41	2.28	21.09	103.45	2.18	22.60
Doyang		10.62	4.68	4.97	16.92	4.92	8.33	17.83	4.83	8.61
Khandong		9.38	1.92	1.80	10.40	2.04	2.12	13.80	1.76	2.43
Kopili		39.31	0.90	3.54	53.81	1.14	6.14	60.86	1.07	6.52
Monarchak					114.56	3.90	44.68	626.33	3.87	242.18
Loktak		60.26	2.90	17.49	81.72	2.61	21.30	93.30	2.70	25.18
Palatana		919.12	2.67	245.22	1082.34	2.99	323	1063	3.27	347.45
BgTPP					41.56	10.60	44.07	94.22	6.05	57.00
Monarchak Solar Power					6.96	2.90	2.02	6.58	2.90	1.91

7.6 Energy Balance

Table 70: Energy Balance for Tripura

	Particulars	2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilatral Purchase/Sale) (MUs)	2,386.30	2,641.04	3,049.14
2	Inter-State Transmission Losses (MUs)	92.82	87.79	84.27
3	Total Energy Received at Periphery of the Discom (State PP) (MUs)	2,293.48	2,553.25	2,964.87
4	Intra-State Transmission Losses (MUs)	69.41	71.39	76.25
5	Energy Available for Sale (MUs) (Discom PP)	2,224.07	2,481.87	2,888.62
6	Energy Sold to consumers of the Discom (MUs)	813.06	866.56	928.01
7	Sale of Surplus Energy to Other Entities (MUs)	1,136.66	1,363.46	1,693.98
8	Total Energy Sold in MUs	1,949.71	2,230.02	2,622.00
9	Distribution Losses in MUs	274.36	251.84	266.62
10	Surplus/Deficit Energy (MUs)	0.00	0.00	0.00

The energy balance table for Tripura depicts total energy input including inter-State Bilateral purchase/Sale as 2386.30 MU, 2641,04 MU and 3049.14 MU for years 2015-16, 2016-17 and 2017-18 respectively.

7.7 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Tripura.

Table 71: RE Potential, Targets and Current Installed Capacity for Tripura

	Solar	Wind	SHP	Biomass	Total
Potential in MW	2080		47	5	**2131**
MNRE Target in MW	105				**105**
Achievement in MW	5.09*		16.01		**21.10**

Source: MNRE Annual Report 2017-18 and CEA Executive Summary, July 2018

* additionally TREDA has installed solar systems of 2 MW as scatter way.

7.8 RPO Compliance and Targets

The following tableshowsRPO targets and compliance status inTripura.

Table 72: Tripura RPO Compliance and Targets for FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	TERC	Achieved	MNRE	TERC	Achieved
2015-16		5			6	
2016-17	2.75	6			6	
2017-18	4.75	7			6	
2018-19	6.75	8			6	
2019-20	7.25	9			6	
2020-21	8.75					

7.9 Key Regulations by TERC

The following table shows the status (Draft/Notified) of key Regulations prepared by TERC.

Table 73: Status of key Regulations Prepared by TERC

Regulations	Date	Status
Open Access Regulations	15.07.2011	Notified
F&S Regulations for Wind and Solar Generation	18.11.2016	Notified
Renewable Energy Regulations-2015 (MYT)	18.12.2015	Notified
Deviation Settlement Mechanism Regulations	20.07.2016	Draft
Renewable Purchase Obligations Regulations	15.07.2011	Notified
Net Metering Regulations for Rooftop Solar PV generation	22.06.2016	Notified
State Grid Code	15.07.2011	Notified

7.10 Summary of Key Parameters of State

Parameters	Tripura
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	partial
2) Information in Regulatory filings/Orders	partial

Parameters	Tripura
3) info availability in audited accounts	partial
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	NA
2) Transmission tariff filing/revision	NA
3) Retail tariff filing/revision	4 times
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Surplus
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	NA
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	NA
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	NA
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Mix
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	3.40
3) RPO Compliance (fully comply/partial comply/no compliance)	Partial
Loss level	
1) Transmission Loss (<5%/5-10% />10%)	3%
2) Distribution loss (<15%/15-30% />30%)	<15%
3) AT&C loss (<15%/15-30% />30%)	30%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	NA
2) Collection efficiency (>90%/75-90% /<75%)	NA
Status of signing of UDAY (Yes/No)	Yes

8 Mizoram

8.1 Basic Information

Table 74: Information of Mizoram State Power Utilities and Regulatory Commission

Name of the Electricity Regulatory Commission	Joint Electricity Regulatory Commission for Manipur and Mizoram
Date of Constitution of ERC	23rd July, 2004
Name of the Generating Company	Power & Electricity Dept. of Mizoram
Name of the Transmission Utility	
Name of the Distribution Utility	

8.2 Petition for Power & Electricity Department- Timelines

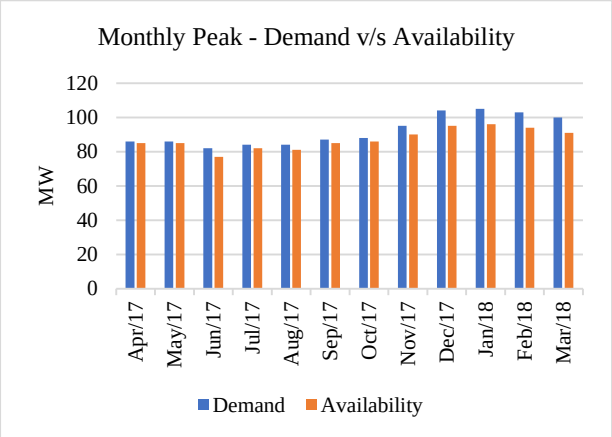
The following table shows timelines for Generation Petition.

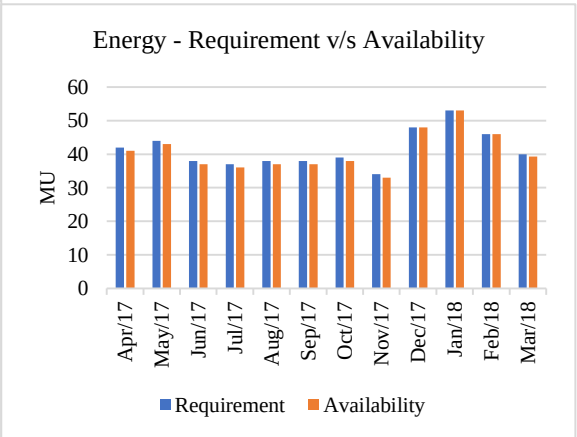
Table 75: Timelines for Petition for Power & Electricity Department

Activity	2014-15	2015-16	2016-17	2017-18
Filing of ARR Petition	30.11.2013	30.11.2014	30.11.2015	30.11.2016
Admission of ARR Petition	20.01.2014	22.12.2014	28.12.2015	01.05.2017
Issue of Tariff Order	28.02.2014	27.02.2015	29.02.2016	28.02.2017
Filing of True-up Petition	30.11.2015	30.11.2016		
Admission of True-up Petition	28.12.2015	01.05.2017		
Issue of True-up Order	29.02.2016	28.02.2017		

* Note: Unbundling of Power & Electricity Dept. of Mizoram has not been done. Therefore, no separate petitions were filed.

8.3 Power Supply Position





The graph shows Month-wise power supply position of Mizoram during the year 2017-18(in terms of peak and in terms of energy).

8.4 Power Purchase Cost

Table 76: Power Purchase Cost for FY 2015-16 to FY 2017-18

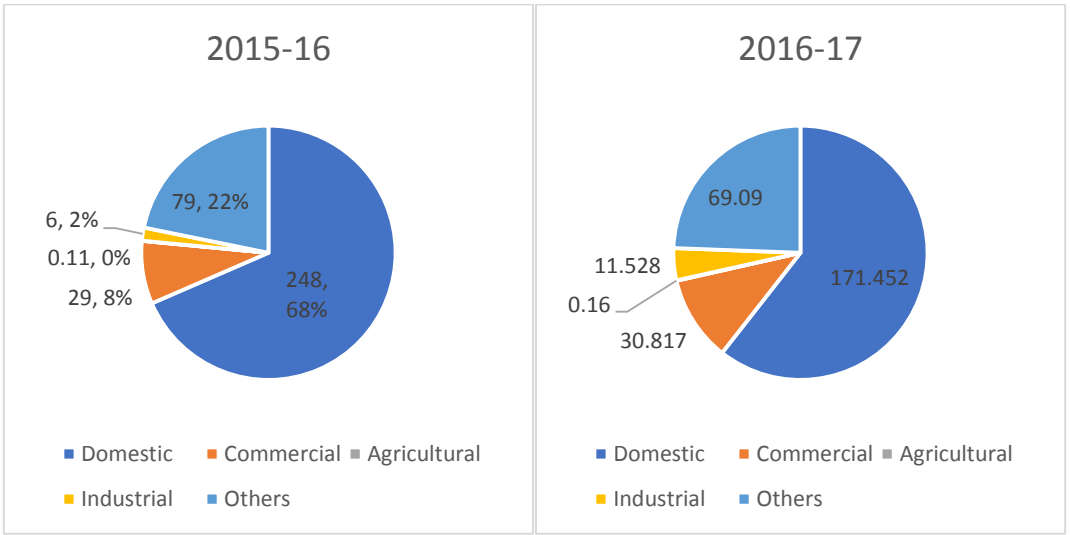
Name of the Plant/ Other Sources	Capacity Contracted (MW)	2015-16			2016-17			2017-18		
		Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)	Energy Drawn (MU)	Cost per kWh (Rs.)	Total Cost (Rs. Cr.)
Central Generating Stations (CGS)										
NTPC										
Bongaigon TPS	13.54	0	5.20	48.16	92.62	5.20	48.17	66.09	5.78	38.23
Farakka STPS	2.24	13.61	3.30	5.10	15.45	3.30	5.10	15.29	3.78	5.79
Kahalgaon	1.18	8.57	3.32	2.83	8.53	3.32	2.83	9.09	3.47	3.16
Talcher STPS	1.4	9.44	2.59	2.36	9.13	2.59	2.36	9.5	2.41	2.29
NHPC										
Loktak HEP	5.27	25.99	3.49		28.54	3.49	9.95	30.99	3.11	9.63
NEEPCO										
Kopili HEP	9.24	30.97	1.15	5.10	44.39	1.15	5.10	36.44	1.06	3.86
Kopili - II HEP	1.51	5.65	1.80	1.10	6.11	1.80	1.10	6.68	1.25	0.83
Khandong HEP	1.97	6.64	2.02	1.51	7.46	2.02	1.51	8.36	1.63	1.36
Ranganadi HEP	23.09	75.15	2.29	16.24	70.77	2.29	16.24	66.8	1.90	12.69
Doyang HEP	3.94	8.04	4.98	6.44	12.94	4.98	6.44	12.31	4.25	5.23
AGBPP	15.74	83.38	4.22	27.21	64.44	4.22	27.21	71.13	3.25	23.12
AGTPP	8.88	45.28	3.58	15.47	43.28	3.58	15.47	41.62	2.41	11.44
TSECL										
B'mura - IV	5.25	37.62	3.01	12.05	40.01	3.01	12.05	27.8	3.01	8.37
B'mura - V	5.25	38.65	3.01	10.10	33.52	3.01	10.10	22.1	3.01	6.66
OTPC										
Palatana	22	103.57	2.89	35.50	123.06	2.89	35.50	117.21	3.28	38.48
TOTAL	**173.25**	**492.56**	**3.06**		**600.25**	**46.85**	**3.31**	**541.41**	**3.25**	**171.13**

8.5 Consumer Mix

Table 77: Consumer mix of Mizoram for FY 2015-16 to FY 2017-18

Consumer Category	2015-16			2016-17			2017-18		
	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)	Total Connected Load (MW)	Number of Consumers	Number of Units Sold/ Billed (MUs)
Domestic (BPL)	2.856	16406	4.00	1.921	16981	4.00	4.324	12702	4.00
Domestic (Other than BPL)	259.09	189927	242.00	168.158	194675	250.00	320.34	201832	232.00
Domestic HT	1.327	6	2.00	1.373	6	4.00	6.856	36	4.00
Commercial / Non-	28.679	7366	28.00	29.683	7551	31.00	59.92	20696	35.00

Consumer Category	2015-16			2016-17			2017-18		
	Total Connected Load (MW)	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**	**Total Connected Load (MW)**	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**	**Total Connected Load (MW)**	**Number of Consumers**	**Number of Units Sold/ Billed (MUs)**
Domestic									
Commercial HT	1.096	63	1.00	1.134	65	2.00	14.841	138	11.00
Agricultural LT	0.025	20	0.01	0.026	21	0.10	0.019	22	0.02
Agricultural HT	0.13	1	0.10	0.134	1	0.10	0.085	1	0.10
Industrial LT	5.321	720	3.00	4.13	738	3.00	5.402	1099	3.00
Industrial HT	9.53	14	3.00	7.398	15	3.00	11.957	30	8.00
Public Lighting	1.733	780	8.00	1.794	788	9.00	1.927	2905	8.00
Public Water Works LT	0.953	13	1.00	0.986	14	1.00	0.083	12	1.00
Public Water Works HT	48.569	40	46.00	37.702	41	50.00	40.39	58	59.00
Bulk Supply HT	36.853	267	24.00	28.607	274	25.00	16.215	264	17.00
Sale of Surplus Power, if any									
Total	396.162	215623	362.11	283.046	221170	382.20	482.359	239795	382.12



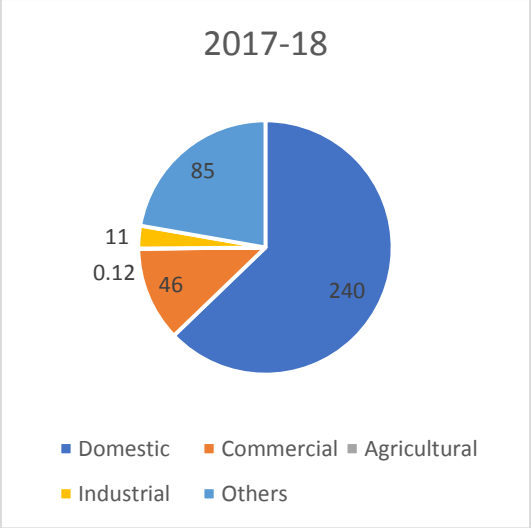


Figure 61: Consumer mix for FY 2015-16, 2016-2017 and 2017-18 in Mizoram

8.6 Energy Balance

Table 78: Energy Balance for Mizoram

	Parameters	2013-14	2014-15	2015-16	2016-17	2017-18
1	Total Energy Input (Including Inter-State Bilateral Purchase/Sale)	479.21	537.67	594.43	696.89	668.40
2	Inter State Transmission Losses	29.76	30.92	32.40	33.10	31.75
3	TotalEnergy Received at Periphery of the Discom (State PP) (1-2)	449.45	506.76	562.03	663.79	636.65
4	Intra State Transmission Losses	13.48	15.20	16.86	19.91	19.10
5	Energy available for Sale (Discom)(3-4)	435.97	491.55	545.17	643.88	617.55
6	Energy sold to consumers of the Discom	286.00	327.21	338.88	353.54	395.78
7	Sale of Surplus Energy to Entities	13.181	42.23	79.28	186.31	164.66
8	Total Energy Sold (6+7)	299.18	369.44	418.16	539.85	560.44
9	Distribution Losses (5-8)	136.79	122.11	127.01	104.03	57.11

The energy balance table for Mizoram depicts total energy input including inter-state bilateral purchase/sale as 479.21 MU, 537.67 MU, 594.43 MU, 696.89 MU and 668.40 MU for FY 2013-14 to 2017-18 respectively.

8.7 Trend of Approved ARR

The following graph depicts the trend of approved ARR for FY 2014-15, 2015-16, 2016-17 and 2017-18 in Mizoram.

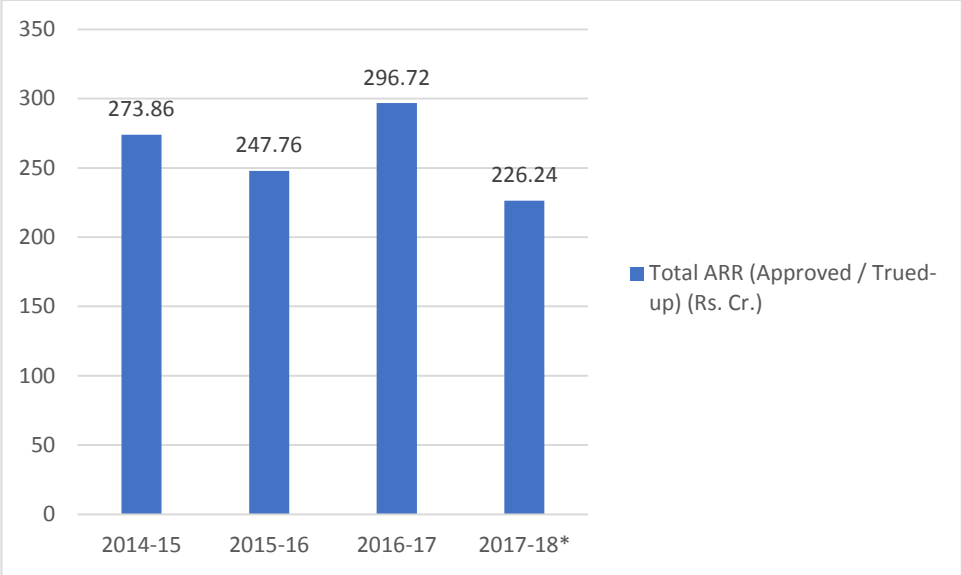


Figure 62: Trend of Approved ARR for FY15 to FY18 in Mizoram

8.8 Billing Efficiency

The following graph depicts the trend of billing efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17and 2017-18 in Mizoram.

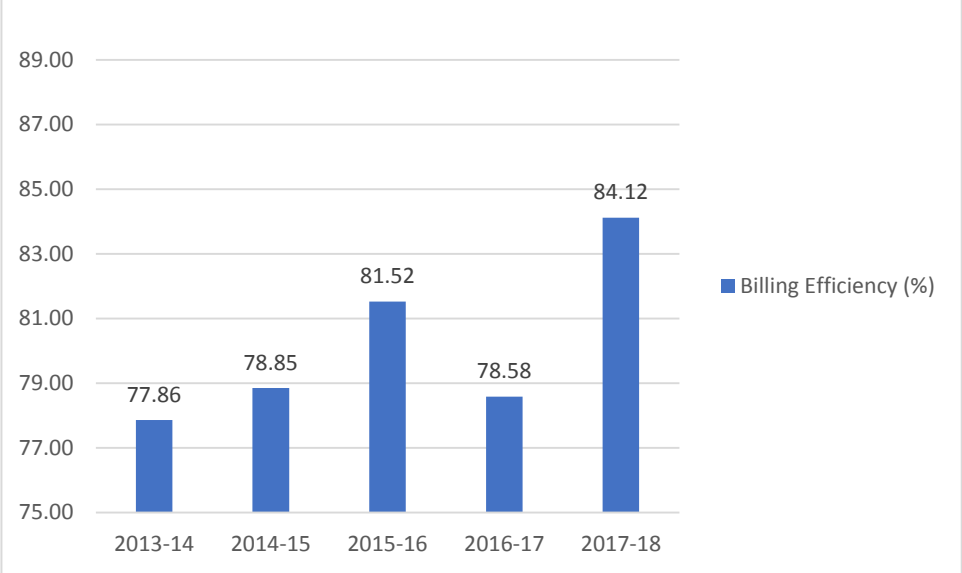


Figure 63: Billing Efficiency for FY14 to FY18 in Mizoram

The billing efficiency had not shown an overall increasing trend from FY 2013-14 to FY 2017-18, except FY 2016-17 where billing efficiency has slightly decreased to 78.58%.

8.9 Collection Efficiency

The following graph depicts the trend of collection efficiency for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Mizoram.

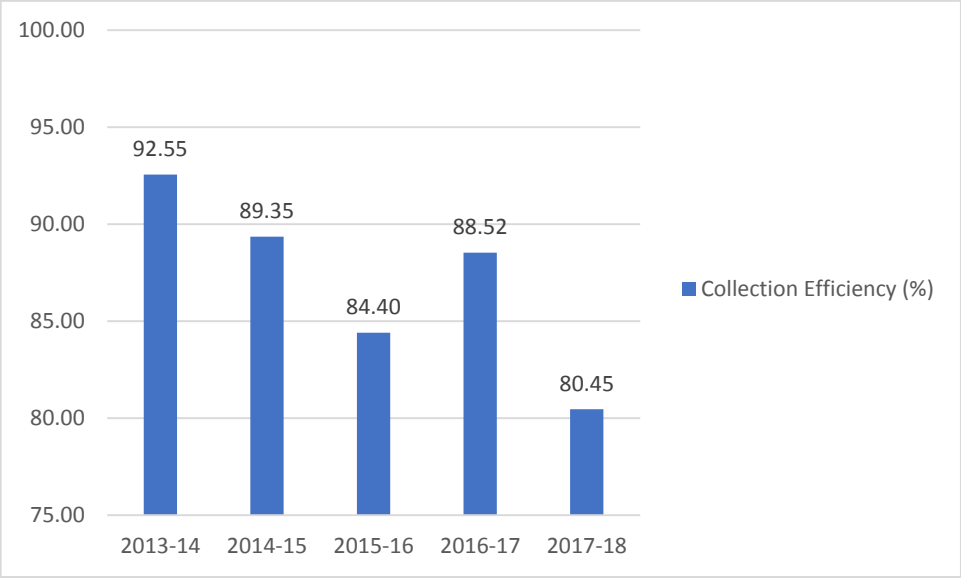


Figure 64: Collection Efficiency for FY14 to FY18 in Mizoram

The collection efficiency had not shown an overall decreasing trend from FY 2013-14 to FY 2017-18, except FY 2016-17 where collection efficiency has slightly increased to 88.52%.

8.10 Trend of AT&C Loss

The following graph depicts the trend of AT&C loss for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Mizoram.

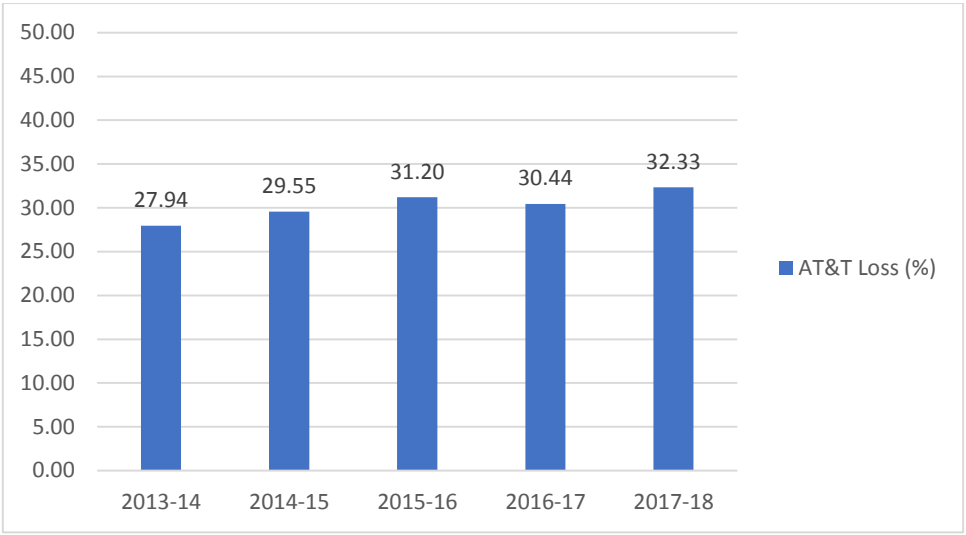


Figure 65: AT&C Loss for FY14 to FY18 in Mizoram

8.11 Fatal and Non-Fatal Accident Report

The following graph depicts the trend of Fatal and Non-fatal Accident for FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Mizoram.

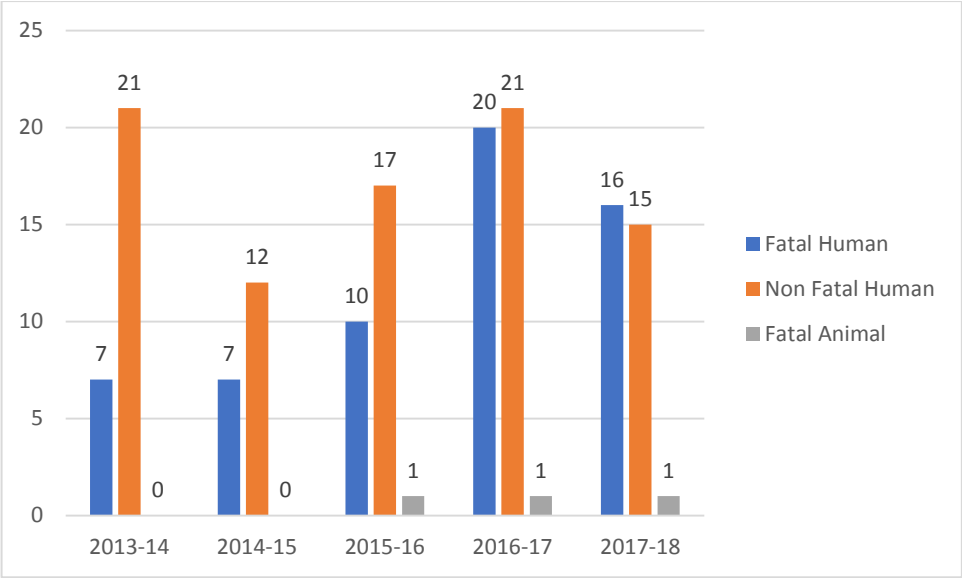


Figure 66: Fatal and Non- Fatal Accidents inFY14 to FY18 in Mizoram

8.12 Distribution Transformers

The following graph depicts the total number of distribution transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 in Mizoram.

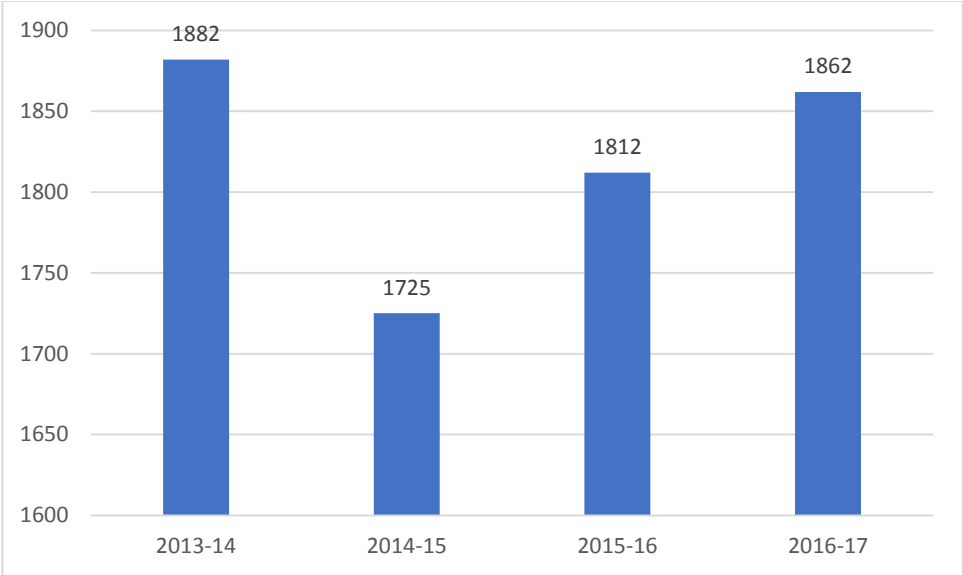


Figure 67: Total Number of Distribution Transformers at the End of FY14 to FY18 in Mizoram

8.13 Failed Transformers

The following graph depicts the total number of failed transformers at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Mizoram.

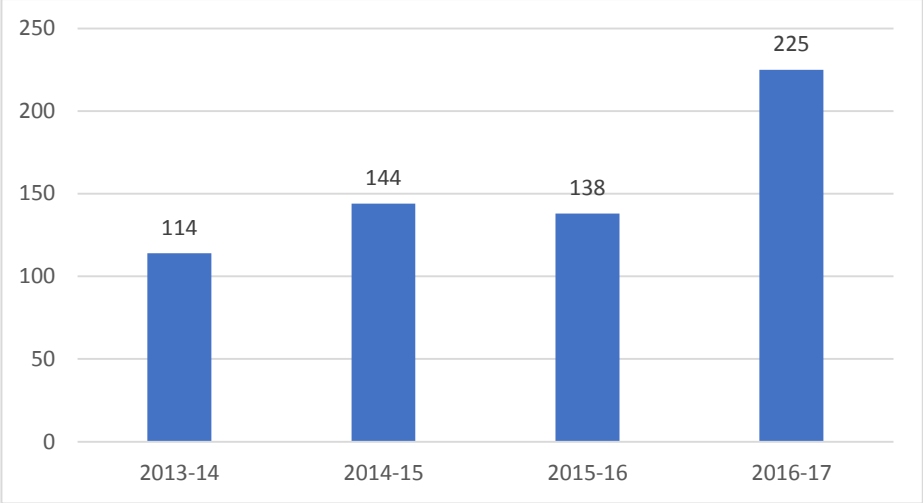


Figure 68: Total Number of Failed Transformers at the End of FY14 to FY18 in Mizoram

8.14 Number of Faulty Meters

The following graph depicts the total number of faulty meters at the end of FY 2013-14, 2014-15, 2015-16, 2016-17 and2017-18 in Mizoram.

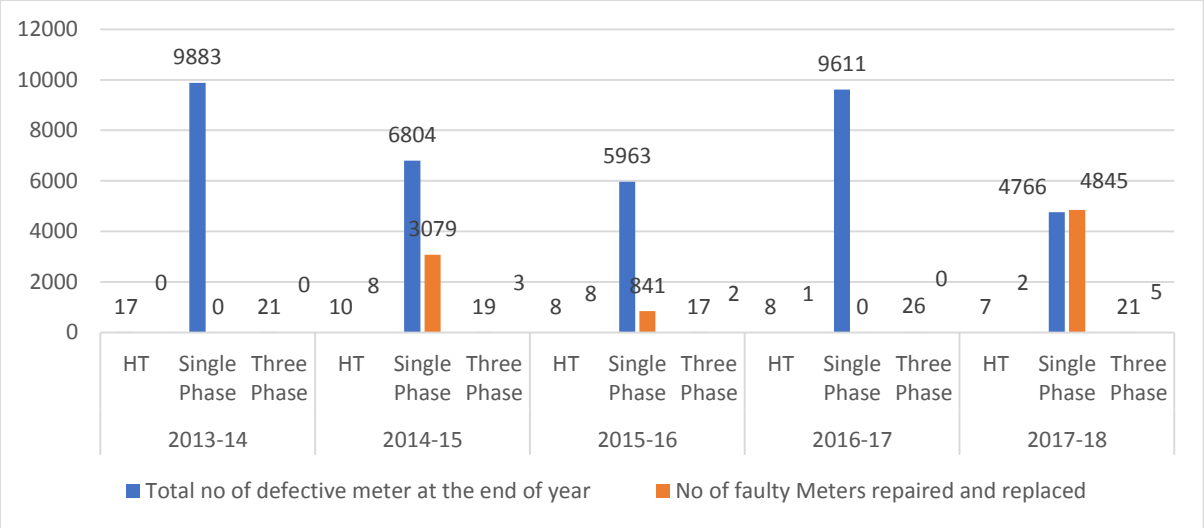


Figure 69: Total Number of Faulty meters at the End of FY14 to FY18 in Mizoram

8.15 RE Targets and Capacity Additions

The following table shows RE targets and current status of RE installations in Mizoram.

Table 79: RE Potential, Targets and Current Installed Capacity for Mizoram

	Solar	Wind	SHP	Biomass	Total
Potential in MW	9090		169	3	**9261**
MNRE Target in MW	72		25		**97**
Achievement in MW	0.20		36.47		**36.67**

Source: MNRE Annual Report 2017-18 and CEA Executive Summary, July 2018

8.16 RPO Compliance and Targets

The following table shows RPO targets and compliance status in Mizoram.

Table 80: Mizoram RPO Compliance and Targets for FY 2015-16 to FY 2020-21

Year	Solar (in %)			Non-Solar (in %)		
	MNRE	JERC	Achieved	MNRE	JERC	Achieved
2016-17	2.75	2.75	0.00	8.75	8.75	20.89% (7.02Mus)
2017-18	4.75	4.75	**	9.50	9.50	
2018-19	6.75	6.75	***	10.25	10.25	
2019-20	7.25	7.25		10.25	10.25	
2020-21	8.75	8.75		10.25	10.25	

** For FY 2017-18 has been stayed by Supreme Court Order dated 8/5/2017. So no solar REC is traded in the Energy Exchange Platform during 2017-18

*** Ongoing year

8.17 Key Regulations by JERC

The following table shows the status (Draft/Notified) of key Regulations prepared by JERC in Mizoram.

Table 81: Status of Key Regulations Prepared by JERC

Regulations	Date	Status
Open Access Regulations	12.07.10	Notified
F&S Regulations for Wind and Solar Generation		Notified
Deviation Settlement Mechanism Regulations		Yet to be notified
Renewable Purchase Obligations Regulations	15.5.10	Notified
Net Metering for Solar PV Rooftop Generation	23.09.16	Notified
State Grid Code	12.07.10	Notified

8.18 Details of Open Access

As of now there are no Open Access consumers in Mizoram.

8.19 Details of Pending Cases

Table 82: Details of pending cases in Mizoram

Year	No. of Orders issues by the Commission	No. of Orders challenged in APTEL/ High court	No. of Cases Pending
2013-14	NIL	NIL	NIL
2014-15	2	NIL	NIL
2015-16	3	NIL	NIL
2016-17	5	NIL	NIL
2017-18	3	NIL	NIL

8.20 Employee Strength in the Regulatory Commission

Table 83: Details of filled, sanctioned and vacant posts in the Regulatory Commission of Mizoram

Sr.	Designation	No. of Filled Posts	No. of Sanctioned Posts	No. of Vacant Post
1	Secretary	0	1	1
2	Chief (Engineering)	1	1	0
3	Chief (Finance)	0	1	1
4	Deputy Chief (Economics)	0	1	1
5	Deputy Chief (Legal)	0	1	1
6	Assistant Secretary	1	1	0
7	Assistant Chief (Engineering)	1	1	0
8	Assistant Chief (Finance)	0	1	1
9	Bench Officer	0	1	1
10	Principal Private Secretary	2	2	0
11	Pay & Accounts Officer	1	1	0
12	Private Secretary	2	5	3
13	Personal Assistant	0	1	1
14	Stenographer	3	3	0
15	Clerk-cum-Operator	4	4	0
16	Cashier/Bill Clerk	1	1	0
17	Despatch Clerk	1	1	0
	Total Post	**17**	**27**	**10**

8.21 Summary of Key Parameters of the State

Parameters	Mizoram
Information Availability (adequate/partial/poor)	
1) availability of key performance indicators	partial
2) Information in Regulatory filings/Orders	partial
3) info availability in audited accounts	partial
Frequency of Tariff revision (yearly/once or twice in 5 year/before 5 years	
1) Generation tariff filing/revision	NA
2) Transmission tariff filing/revision	NA
3) Retail tariff filing/revision	4 times
Power Deficit/surplus scenario for past 3 years (surplus in all years/surplus in recent year/deficit in all 3 recent years)	
1) Peak situation	Deficit
2) Energy situation	Surplus
Key ARR parameters as a percentage of ARR	
1) O&M as a percentage of ARR (Generally 10%)	16%
2) Power purchase cost as a % of ARR (Generally 75 to 85%)	61%

Parameters	Mizoram
3) Interest expenses including IoWC as % of ARR (Generally 6-7 % of ARR)	2%
Power purchase	
1) Source mix - (predominantly hydro/almost equal mix of hydro thermal/predominantly thermal)	Mix
2) Average Power Purchase Cost- (< 2.5/2.5-4/>4 Rs. Per Unit)	3.16
3) RPO Compliance (fully comply/partial comply/no compliance)	Non compliance
Loss level	
1) Transmission Loss (<5%/5-10% />10%)	<5%
2) Distribution loss (<15%/15-30% />30%)	Reducing from 31% (FY14) to 9% (FY18)
3) AT&C loss (<15%/15-30% />30%)	32.17%
Efficiency	
1) Billing efficiency (>90%/75-90% /<75%)	75-90%
2) Collection efficiency (>90%/75-90% /<75%)	75-90%
Status of signing of UDAY (Yes/No)	Yes

9 Deliberations in FOR

The report of the Task Force was presented before the FOR during 65th meeting held on 13th November, 2018 at Bhubaneswar, Odisha. The recommendations of the Task Force includes Functional Segregation of Generation, Transmission and Distribution Business, Bridging the Gap between ACOS and Per unit average revenue realized (ARR), Issuance and Implementation of DSM Regulations, Preparation of a roadmap for catering to future growth in demand, Energy Audit at Sub-Station and Feeder level, Reduction in AT&C Losses, Region specific Data Portal, Strengthening of SLDCs of N-E States, Region specific Core Groups for knowledge exchange and capacity building and Institutional Strengthening of State Regulatory Commissions in the N-E Region.

The Way Forward recommended by the Task Force includes the North-Eastern States to take up a continuous process for performance enhancement by periodic monitoring of the performance parameters discussed in this Report during ARR/APR processing of Utilities; SERCs and other stakeholders such as State Utilities and State Governments in the N-E Regions to undertake effective and time bound implementation of schemes like UDAY, UJALA, implementation of SAMAST, DSM to implement grid discipline in the N-E Region and Creation of Knowledge exchange platform for sharing regulatory developments/ innovations amongst NE States which can include core groups of Discoms and SLDCs in the N-E region.

After deliberations on the report, the Forum endorsed the recommendations and Way forward of the Task Force.

10 Key Recommendations

A. Corporatisation or Functional Segregation of Generation, Transmission and Distribution Business

Electricity supply business in some States like Sikkim, Nagaland, Arunachal Pradesh and Mizoram is managed by the Government Departments and Tripura all utilities functions are performed by one company. The Electricity Act, 2003 recommends unbundling of Electricity Sector for improving efficiency in Generation, Transmission and Distribution Sectors. It is observed that, the States where Energy Sector is operated by Government Department are lagging in timely submission of Tariff Petition which may have impact on timely revision of Tariff. It is alsoobserved that, the States like Meghalaya and Assam are performing better as compare to other States in Region when compared with following key performance parameters such as;

i. Average Revenue Realization (ARR) as compare Average Cost of Supply (ACoS),

ii. The AT &C Losses,

iii. Billing efficiency and Collection efficiency

iv. Failure of Distribution Transformers

v. Replacement of Faulty Energy meters

Hence, it is proposed that such States, needs to initiate the process of Corporatisation or Functional Segregation and their independence in the energy sector in the State. To begin with, these States may initiate the process of maintaining separate Regulatory Accounts for Generation, Transmission and Distribution business.

B. Preparation of a roadmap for the future demand.

As per the information made available to the Committee, it is found that almost all the States in North East has deficit of about 0.5 to 6%. It is therefore necessary that Regulatory Commissions of each State start doing multiyear tariff proceedings in which all the utilities including the department of power should be asked to give a 5 year business plan indicating demand and supply and investments to be made in next five years. It is also being recommended that Discom and Transmission Company or the power department start proper load forecasting based on historical demand, seasonal variation, business expansion etc. by using latest tools. In case of shortages, the SERC should explore the use of Open Access for some of the consumers in their State. The concept of Distributed Generation by RE should also be explored for meeting energy demand of areas located at remote places.

C. Energy Audit.

The Regulatory Commission is being advised to implement mechanism of energy audit at substations and important feeders. It is being advised that quarterly report on such audit should be submitted by the concerned department to the Commission. This

will enable the utilities to know the area where losses are high where it need corrective action.

D. Reduction in AT&C Losses

National average for AT&C losses is 23.03 % as per UDAY portal. Most of the North Eastern States have reported much higher losses than the national average. It is understood that the region is geographically different due to hills and uneven terrain. However, taking action in the field by the utility along with the general public can reduce the losses to much lower level compared to existing scenario. The Regulatory Commissions are being advised to place a mechanism on the basis of energy audit report for areas having maximum losses where licensee should be asked to give quarterly report showing trend of losses month wise. It is recommended to direct the licensee not to compromise on the collection efficiency. There is no substitute other than 100% collection. The data say that collection efficiency has improved which is an encouraging trend and this needs to be supported by IT enabled automated metering and billing infrastructure.IT based monitoring tools for periodic maintenance of Distribution Network can be useful for distribution utilities operating in the hilly area of North-East. It is also suggested to make Key Consumer Cell in each state on the basis of their load, consumption and revenue and start building IT data base. Regular monitoring of their metering, billing and collection will definitely improve the financial position of the sector. DT wise monitoring of losses in key revenue areas will also be helpful

E. Issuance and Implementation of DSM Regulations.

The Forum of Regulators came up with model Deviation Settlement Mechanism regulations at State level on March 2017.States like Assam and Meghalaya has initiated the regulatory process for preparation of DSM Regulations for their states. However, other NE States are yet to come up with the DSM Regulations. It is advisable that otherState are also required to frame their DSM Regulations for implementation of ABT mechanism in the State.

F. Implementation of SAMAST in the N-E Region

TheForum of Regulators has framed the Report for scheduling, Accounting, Metering and Settlement of Transactions in electricity (SAMAST) in July, 2016.N-E States have formed the core group of representatives of SLDCs under the guidance of NERLDC and prepared the DPRs for SAMAST implementation in respective states and submitted for PSDF funding. The same core group may be continued for regional coordination and further ground level implementation of SAMAST in the region.

G. Bridging Gap between ACOS and ARR:

It can be inferred that the gap between ACOS and ARR is considerably high for most of the States. Therefore, measures need to be taken to reduce the gap between

Average Cost of Supply (ACS) per unit of power and per unit average revenue realized (ARR). The gap between ACS and ARR may be reduced by

- improving operational efficiencies of Discoms,
- reduction in cost of power by improving performance parameters of generators,
- reduction in interest cost of Discoms,
- enforcing financial discipline on Discoms through alignment with state finances. This would improve the financial health of the DISCOMs.

It is recommended to SERC to pass orders in all tariff matters regularly and also find out a reasonable mechanism of quarterly revision in Fuel and Power Purchase Price Adjustment (FPPPA), based on state's specifics.

H. Region specific Data Portal:

It is recommended to have an open data portal specific to the north eastern region on lines of UDAY, UJALA etc. The availability of data specific to the region may provide a base ground to quality research and may bring in further scope of improvements. The formats may be prepared in collaboration with FOR.

I. Strengthening of State Load Despatch Centre of N-E States:

There are significant emerging regulatory developments and growth of electricity market operations at state/national level such as introduction of intra-state DSM framework, potential introduction of real-time/intra-day market, Ancillary services market, and with increasing share of renewable energy penetration into grid. The role of power system operations and market operations by SLDC is going to be even more crucial during coming period. Forum of Regulators are coming up with model Regulations for strengthening of SLDCs and improving independency of SLDCs. It is recommended that, SERCs in N-E region needs to adopt the model Regulations for SLDCs as when published by Forum of Regulators. It is also recommended to strengthen SLDCs in line with Pradhan Committee and SAMAST Report.

J. Region specific Core Groups for knowledge exchange and capacity building:

It is recommended to have region specific core for knowledge exchange and capacity building of personnel of Discoms and SLDCs. Formation of core group for SAMAST implementation in N-E region has demonstrated the need of such groups for effective implementation of schemes like UDAY. UJALA, various recommendations of Forum of Regulators, implementation of DSM framework etc.

K. Institutional Strengthening of State Regulatory Commissions in the N-E Region:

It is observed by the Task Force that, the most of the State Regulatory Commissions in the N-E Region are not having adequate Technical Staff for performing the functions specified under the Electricity Act, 2003. Besides the Tariff determination

process, the Regulatory Commission also needs to undertake the performance monitoring of Generation, Transmission and Distribution businesses of utilities, effective implementation of Regulations like Renewable Purchase Obligations, Consumer Advocacy, timely and effective implementation of directives of the Commission, which needs adequate manpower to the State Commission. Hence, it is recommend that, the SERCs in the region may under the process of strengthening the organisation by undertaking recruitment process against the vacant posts and also if necessary, initiate the process of getting approval for additional staff from respective State Governments.

Further, Capacity building and Training of staff of the State Regulatory Commission also required for improvement in the performance. Hence it is recommended that, the State Regulatory Commissions with the help of State Governments may undertake national and International Training programs for their Staff. It is also recommended to start collaboration among other State Commission and share the skill among their staff from time to time. FOR may take this initiative. It is also recommended to increase more interaction and training of staff of utilities and SERCs with staff of peer Regulatory Commissions.

L. Periodic monitoring by FOR Technical Committee :

As recommended by the FOR during 65th Meeting, North-Eastern SERCs/ JERC may direct their Utilities to regularly monitor progress against the parameters specified in the report through a compliance format as part of the ARR process. SERCs could use the formats/ templates used for this exercise to undertake quarterly/ six monthly review in case of some of the technical parameters e.g. distribution loss/ ATC loss, distribution transformer failure rate, defective meter replacement, pending connections etc. The FOR Standing Technical Committee will monitor the progress of implementation of parameters referred in the report periodically and submit a status report to the FOR.

11 Way Forward

The FOR believes that the study undertaken by the Task Force is not a onetime exercise but is a continual process for performance enhancement. The State Commissions in the N-E Region need to continue with periodic monitoring of the performance parameters discussed in this Report. The SERCs in the N-E region may also review the performance parameters discussed in this report during ARR/APR processing of Utilities.

Further, State Commissions and the other stakeholders such as State Utilities and State Governments in the N-E Regions also need to undertake eeffective and time bound implementation of Ministry of Power's schemes such as UDAY, UJALA, implementation of SAMAST as recommended by the Forum of Regulators, Deviation Settlement Mechanism Framework in the N-E Region to implement grid discipline in the N-E Region. Creation of Core groups of Discoms and SLDCs in the N-E region for knowledge exchange and capacity building shall be useful for collective development of States in the N-E Region. The State Commission in the N-E Region may also create an open data portal for maintaining State specific data.

The Report of the FOR on the North East Region shall be sent to all the State Governments of the North-Eastern Region for their reference and necessary action.