

CHAPTER -15

ENERGY

15.1 About 60 percent area of the state is desert/semi desert characterized by low population density, long transmission and distribution lines with lesser load. The state is deficient in water resources and conventional resources of power generation like coal, oil and gas for undertaking new hydro power/thermal power generation schemes. However there is vast potential for power generation from non-conventional energy sources like wind, solar and biomass, therefore, emphasis on renewable energy will supplement the electricity requirement of the State. The gross annual per capita consumption of electricity during 2004-05 of Rajasthan was 583.32 kwh as compared to all India average of 612.50 kwh.

15.2 The Rajasthan Power Sector Reforms Act unbundled RSEB into one generation, one transmission and three distribution companies at Jaipur, Jodhpur and Ajmer. It also established the Rajasthan Electricity Regulatory Commission. The state is one of India's most advanced states in terms of metering and collections (more than 95% electricity is metered & sustained rate is also about 95%).

15.3 Despite growth in connectivity, there are issues like unconnected households and low consumption of electricity that need to be improved. Agriculture accounts for about 41 percent and industry for over 31 percent of total consumption of electricity in the state. Though almost 75% of electricity consumers are domestic but they account for only 20 percent of the total consumption. Only 55 percent households have access to electricity. About 91 percent villages are connected but electrification has not penetrated adequately at the household level, therefore, 56 percent rural households are still unconnected. The number of customers is around 38.50 lakhs.

Strengths, Weaknesses, Opportunities & Threats Analysis

Strengths:

15.4 Generating company is handling 259 MW generation capacity at a very high level of efficiency (more than 90%).

- Track record of completing the generation projects ahead of the schedule.
- Strong commitment of the State Government for additional generation capacity & conducive policy for captive generations.
- Low level of power & fuel purchase creditors
- Transmission system is very robust, higher revenue collection efficiency.

Weaknesses

- Staff strength is decreasing continuously due to retirement, as staff strength was frozen in 1981.
- Investment on Transmission & Distribution System is quite higher due to large geographical area.
- Weak financial position of distribution companies due to highly subsidised tariff for agriculture & domestic consumers and revenue from sale of electricity is not enough to cover the cost of the supply.

Opportunities

- Outsourcing of certain process may lead to improvement in overall efficiency.
- Joint Ventures, PPP, franchise models may enhance mobilisation of additional resources.
- Changing global market will lead to competition and enhance service standard.
- Captive generation through open access & use of sprinkler, drip irrigation, efficient pumps may reduce the demand supply gap.

Threats

- More than 50 percent consumers are getting electricity on subsidised rates. As per FRP, rationalization of tariff is required. If timely rationalisation of tariff is not done then sustained high T&D losses may adversely affect the economic viability of distribution companies.

15.5 The outlays of the Tenth Five Year Plan of the five companies alongwith likely expenditure and proposed outlays for the Eleventh Five Year Plan and the Annual Plan 2007-08 are as follows:-

(Rs. in crores)

Company	Tenth Plan		Proposed Outlay	
	Outlay (at constant prices)	Likely Exp.	Eleventh Plan	Annual Plan 2007-08
1 Raj. Vidyut Utpadan Nigam Ltd.	1120.31	1096.00	11443.00	2741.00
2 Raj. Vidyut Prasaran Nigam Ltd.	2778.76	4769.39	6600.00	1022.00
3 Jaipur Vidyut Vitran Nigam Ltd.	1013.69	1328.29	2530.00	453.00
4 Ajmer Vidyut Vitran Nigam Ltd.	1030.61	1171.78	2282.00	652.00
5 Jodhpur Vidyut Vitran Nigam Ltd.	706.03	1119.91	2350.00	450.00
Total	6649.40	9485.37	25205.00	5318.00

15.6 The company-wise details of outlays proposed for the Eleventh Five Year Plan are as follows:-

(Rs. in crores)

Particulars	RVUN	RVPN	JVVN	AVVN	JDVVN	Total
1. Generation	11443.00	80.00	-	-	-	11523.00
2. Transmission	-	3895.00	-	-	-	3895.00
3. Sub-Transmission	-	-	530.00	580.00	730.00	1840.00
4. WB Funded Works	-	625.00	740.00	775.00	360.00	2500.00
5. Normal RE	-	-	882.00	495.00	900.00	2277.00
6. Feeder Renovation Programme	-	-	50.00	180.00	80.00	310.00
7. RGGVY/AREP	-	-	328.00	252.00	280.00	860.00
8. Cash Support for FRP	-	2000.00	-	-	-	2000.00
Total	11443.00	6600.00	2530.00	2282.00	2350.00	25205.00

15.7 The company-wise details of outlays proposed for the Annual Plan 2007-08 are as follows:-

(Rs. in crores)

Particulars	RVUN	RVPN	JVVN	AVVN	JDVVN	Total
1. Generation	2741.00	10.00	-	-	-	2751.00
2. Transmission	-	552.00	-	-	-	552.00
3. Sub-Transmission	-	-	105.00	110.00	150.00	365.00
4. WB Funded Works	-	60.00	50.00	200.00	50.00	360.00
5. Normal RE	-	-	124.00	120.00	75.00	319.00
6. Feeder Renovation Programme	-	-	25.00	100.00	50.00	175.00
7. RGGVY/AREP	-	-	149.00	122.00	125.00	396.00
8. Cash Support for FRP	-	400.00	-	-	-	400.00
Total	2741.00	1022.00	453.00	652.00	450.00	5318.00

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15.8 At present Rajasthan Vidyut Utpadan Nigam owns & operates the following power stations in the state sector. The capacity includes unit commissioned upto 2005-06.

S.No.	Power Stations	Installed Capacity (MW)
1.	Suratgarh Thermal Power Station	1250
2.	Kota Thermal Power Station	1045
3.	Ramgarh Gas Thermal Power Plant	110.50
4.	Mahi Hydel Power Plant	140
5.	Mini Micro Hydel Schemes	23.85
	Total	2569.35

15.9 In addition to this, RVUN is managing & operating following two power stations, which are owned by RVPN:

1. Rana Pratap Sagar Hydel Power Plant	172 MW
2. Jawahar Sagar Hydel Power plant	99 MW
Total	271 MW

15.10 Installation work of following power projects is under process.

S. No.	Power Station	Capacity (MW)	Commissioning Date
1.	Giral Lignite Thermal Power Station Stage-I	125	Jan,07
2.	Giral Lignite Thermal Power Station Stage-II	125	June, 08
3.	Dholpur Gas Power Project Stage-I	330	Aug., 07
4.	Chhabra Thermal Power Project Stage-I	500	Sept., 08
5.	Kota Thermal Power Station Unit-7	195	Nov.,08
6.	Suratgarh Thermal Power Station Unit-6	250	Nov.,08
	Total	1525 MW	

15.11 Other identified power projects for the Eleventh Five Year Plan are as follows:

S.No.	Project	Capacity (MW)	Estimated Cost (Rs. in crores)
1.	Chhabra Thermal Power Project Stage-II (Joint-venture)	500	2200.00
2.	Dholpur Gas Thermal Power Project Stage-II (Joint-venture)	330	1155.00
3.	Kali Sind Thermal Power Station	1000	4600.00
	Total	1830	7955.00

15.12 Funding sources for the activities of the Rajasthan Vidyut Utpadan Nigam Ltd. are as follows:-

(Rs. in crores)

	Source	Eleventh Plan 2007-12	Annual Plan 2007-08
1	State Equity	2446.00	658.00
2	Loan from PFC/Commercial Bank	8996.00	2083.00
	Total	11443.00	2741.00

15.13 The proposed outlays of Rs. 11443.00 cr. And Rs. 2741.00 cr would be utilized on the following projects.

(Rs. in crores)

S. No.	Item/ Project	Proposed Outlays	
		Eleventh Plan	Annual Plan 2007-08
1	Giral Lignite Thermal Power Project Stage-II	336.00	236.00
2	Dholpur Gas Power Project Stage-I	425.00	425.00

S. No.	Item/ Project	Proposed Outlays	
		Eleventh Plan	Annual Plan 2007-08
3	Chhabra Thermal Power Project Stage-I Phase-I	1840.00	1020.00
4	Kota Thermal Power Project Unit-7	780.00	410.00
5	Suratgarh Thermal Power Project Unit-6	900.00	470.00
6	Chhabra Thermal Power Project Stage-I, Phase-II	2200.00	160.00
7	Kalisind Thermal Power Project	4600.00	-
8	Chhabra Thermal Power Project Stage-II (J.V.)	172.00	-
9	Dholpur Gas Thermal Power Project Stage II (J.V.)	190.00	-
10	Survey Investigation Schemes & carried over liabilities	100.00	20.00
	Total	11443.00	2741.00

15.14 Scheme-wise details are as follows:

Giral Lignite Thermal Power Project Unit-I (1x125 MW)

15.15 125 MW Unit-I of the project is at the final stage of commissioning at Giral district Barmer. Lignite for the project will be provided by the M/s RSMM Ltd. from adjacent Giral Mines. 12 cusec water withdrawal from IGNP has been received. Due to unprecedented rains in Barmer has caused some delay in erection process of the project. All efforts are being made to commission the project by January, 2007.

Giral Lignite Thermal Power Project Unit-II (1x125 MW)

15.16 Unit-II of the Lignite Based Thermal Power Project is being established at Giral district Barmer. M/s RSMM Ltd. has confirmed availability of lignite from Soneri mines. Land & water allocated for unit-I is adequate for the Unit-II also. Clearance from Ministry of Environment & Forest has been received and Ms BHEL & M/s Tata Projects have been ordered for main equipment & composite balance of plant package respectively.

15.17 Estimated cost of the project is Rs. 618 crores, out of which Rs. 185 crores will be provided by the State Government as equity. Remaining 70% capital cost will be arranged by resorting to borrowing. The project is targeted for commissioning by June, 2008. Likely expenditure on the project during the Tenth Five Year Plan is Rs. 124.00 crores, out of state equity. Remaining Rs. 61.00 crore of state equity is proposed for the year 2007-08.

Dholpur Gas Thermal Power Project Stage-I (3x110 MW)

15.18 330 MW combined cycle gas based thermal power plant is being established at Dholpur. Clearances from all the concerned authorities have been obtained. The project shall comprise 2x110 MW Gas Turbine Units & 1x110 MW Steam Turbine Unit to operate in combined cycle mode source where heat from gas turbine shall be utilized in the steam

turbine unit to generate power. Thus there will be no expenditure on fuel requirement of the steam turbine unit.

15.19 Orders for main equipments has been placed on M/s BHEL and gas supply agreement has been signed with ONGC for providing 1.5 mm SCMD gas from the Panna-Mukta Tapti fields. Gas will be transported to site on HBJ pipeline for which agreement has been signed with GAIL. Total cost of the project is Rs. 1155 crores, out of which 30% share i.e. Rs. 347 crores shall be provided by the State Government as equity and remaining 70% capital cost shall be arranged by resorting to borrowing from PFC. State equity of Rs. 320 crores has been provided for the project and remaining Rs. 27 crores is proposed for the year 2007-08. Gas Turbine Units are expected to be commissioned by March, 07 and Steam Turbine Unit by August, 07.

Chhabra Thermal Power Project Stage-I (2x250 MW)

15.20 2x250 MW Thermal Power Project Stage-I is being established at Chhabra district Baran. 526 ha. land has been made available for the project. Water Resources Department has agreed to provide 500 mcft water from Baithali dam, Hindloth dam and anicuts on Parvati river. M/s TCF has been appointed consultant for the project. All statutory clearances have been obtained. Orders for the main package & composite balance plant package have been placed on M/s BHEL & M/s Punj Lloyd respectively. Civil work and excavation work are under progress.

15.21 Estimated cost of the project is Rs. 2350 crores, out of which 20% of the capital cost i.e. Rs. 470 crores is being arranged as state equity. Balance amount of the capital cost shall be arranged by resorting to borrowing from PFC/REC/Commercial Banks. Rs. 320 crores is proposed for the Eleventh Five Year Plan, as the balance share of state equity. Out of which Rs. 200.00 crores is for the Annual Plan 2007-08. First unit of the project is targeted for commissioning by Sept., 08 and the second unit by Dec., 08.

Kota Thermal Power Station Unit-7 (1x195 MW)

15.22 All statutory clearances for establishing 195 MW Thermal Power Station at Kota Unit-7 have been obtained. Available land & water at KTPs are adequate for Unit-7 also. Orders for main equipment package & composite balance plant package have been placed on M/s BHEL M/s Tata Projects respectively. Commissioning of the project is targeted by November, 08.

15.23 Estimated cost of the project is Rs. 880 crores, out of which 20% of capital cost i.e. Rs. 176 crores is to be provided by the State Government as equity, balance capital cost shall be arranged by resorting to borrowing from financial institutions. An amount of Rs. 30.00 crores has already been provided out of the state equity. State equity of Rs. 146

crores is proposed for the Eleventh Five Year Plan, out of which Rs. 90 crores is for the Annual Plan 2007-08.

Suratgarh Thermal Power Station Unit-6 (2 x 250 MW)

15.24 All statutory clearances for establishing 2 x 250 MW Suratgarh Thermal Power Station Unit-6 have been obtained. Available land and water at STPS are adequate for the unit-6 also. Orders for main equipment package and composite balance of plant package have been placed on M/s BHEL & M/s Indure respectively. Commissioning target of the project is November, 08.

15.25 Estimated cost of the project is Rs. 1000.00 crores, out of which 20% i.e. Rs. 200.00 crores is to be made available by the State Government as equity. Remaining capital cost shall be arranged by resorting to borrowing from financial institutions. Rs. 30.00 crores has already been provided out of the share of state equity. State equity of Rs. 170.00 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 100.00 crores is for the Annual Plan 2007-08.

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15.26 The resources envisaged for financing the outlays of the Rs. 6600.00 crores for the Eleventh Five Year Plan and Rs. 1022.00 crores for the Annual Plan 2007-08 are as follows:-

(Rs. in crores)

	Resources	Eleventh Plan	Annual Plan 2007-08
1	Bonds	450.00	-
2	LIC	250.00	100.00
3	Rural Electrification Corporation	1230.00	236.00
4	PFC/Commercial Banks	1256.00	113.00
5	World Bank	500.00	48.00
6	State Equity	914.00	125.00
7	Transition support for FRP	2000.00	400.00
	Total	6600.00	1022.00

15.27 These outlays are proposed to be utilized on the following activities:-

(Rs. in crores)

	Resources	Proposed Outlay	
		Eleventh Plan	Annual Plan 2007-08
1	Generation (Shared Generating Project)	80.00	10.00
2	Transmission	4520.00	612.00
3	Transition support for FRP	2000.00	400.00
	Total	6600.00	1022.00

Generation (Shared Generating Projects)

15.28 A provision of Rs. 80.00 crores has been proposed for the Eleventh Five Year Plan as share of Rajasthan in shared generation projects of Bhakra Beas Project and Rahu Ghat Hydro Electric Project, out of which Rs. 10.00 crores is for the Annual Plan 2007-08 including Rs. 1.00 crore for survey and investigation of new projects.

Bhakhra Beas Management Board Works

15.29 During the Eleventh Five Year Plan, uprating of five units of Bhakhra Left Bank are proposed from 108 MW to 126 MW. Rajasthan will get 13.698 MW power out of it.

Rahu Ghat Hydro Electric Project

15.30 In the 12th meeting of Madhya Pradesh and Rajasthan State Control Board held on 03.06.1999, it was decided to take up the survey and investigation work of the following four hydel projects under Rahu Ghat Hydro Electric Power Project.

S.No.	Name of Dam Site	FRL (Meter)	Firm Power (M.W.)
1	Devi Pura (Rajasthan)	182.5	31
2	Gujjapura (MP)	143.0	10
3	Jiatpura (MP)	131.0	10
4	Barsala (MP)	119.0	16
	Total		67

15.31 The cost and benefits of the above projects is to be shared equally between the two states.

Transmission

15.32 At the end of the Tenth Five Year Plan, the likely level of transmission system, targets for the Eleventh Five Year Plan and Annual Plan 2007-08 are as follows:

S.No.	Head of Scheme	Unit	Likely level as on 31.3.07	Target Eleventh Plan	Target Annual Plan 2007-08
I.	400 KV Lines	Km	1075	2445	-
	400 KV Substations	MAV	2955	2205	-
		No.	4	7	-
II.	220 KV Lines	Km	8623	2950	400
	220 KV Substations	MVA	10255	2600	400
		No.	54	26	4
III.	132 KV Lines	Km.	12089	1750	350
		MVA	11615	1875	375
	132 KV Substations	No.	262	75	15

DISTRIBUTION COMPANIES

15.33 The details of resources envisaged for financing the outlays of Rs. 7162.00 crores for the Eleventh Five Year Plan are as follows:-

(Rs. in crores)

Resources	Proposed Outlay Eleventh Five Year Plan			
	Jaipur	Ajmer	Jodhpur	Total
1. LIC	245.00	330.00	370.00	945.00
2. REC	860.00	485.00	912.00	2257.00
3. Feeder Renovation Programme	50.00	180.00	80.00	310.00
4. RGGVY/AREP	328.00	252.00	280.00	860.00
5. State Equity	455.00	415.00	420.00	1290.00
6. World Bank	592.00	620.00	288.00	1500.00
Total	2530.00	2282.00	2350.00	7162.00

15.34 The details of resources envisaged for financing the outlays of Rs. 1555.00 crores for the Annual Plan 2007-08 are as follows:-

(Rs. in crores)

Resources	Proposed Outlay Annual Plan 2007-08			
	Jaipur	Ajmer	Jodhpur	Total
1. LIC	40.00	30.00	80.00	150.00
2. REC	119.00	120.00	75.00	314.00
3. Feeder Renovation Programme	25.00	100.00	50.00	175.00
4. RGGVY/AREP	149.00	122.00	125.00	396.00
5. State Equity	80.00	120.00	80.00	280.00
6. World Bank	40.00	160.00	40.00	240.00
Total	453.00	652.00	450.00	1555.00

15.35 Proposed amounts for various activities of the Distribution Companies for the Eleventh Five Year Plan are as follows:-

(Rs. in crores)

Schemes	Proposed Outlay Eleventh Five Year Plan			
	Jaipur	Ajmer	Jodhpur	Total
1. Sub Transmission	530.00	580.00	730.00	840.00
2. WB Funded Works	740.00	775.00	360.00	1875.00
3. Normal Rural Elect.	882.00	495.00	900.00	2277.00
4. Feeder Renovation Programme	50.00	180.00	80.00	310.00
5. RGGVY/AREP	328.00	252.00	280.00	860.00
Total	2530.00	2282.00	2350.00	7162.00

15.36 Proposed amounts for various activities of the Distribution Companies for the Annual Plan 2007-08 are as follows:-

(Rs. in crores)

Schemes	Proposed Outlay Annual Plan 2007-08			
	Jaipur	Ajmer	Jodhpur	Total
1. Sub Transmission	105.00	110.00	150.00	365.00
2. WB Funded Works	50.00	200.00	50.00	300.00
3. Normal Rural Elect.	124.00	120.00	75.00	319.00
4. Feeder Renovation Programme	25.00	100.00	50.00	175.00
5. RGGVY/AREP	149.00	122.00	125.00	396.00
Total	453.00	652.00	450.00	1555.00

Feeder Renovation Programme

15.37 The distribution system suffers from very high losses as well as poor quality of infrastructure. The present distribution losses in the state are as high as 40 percent. A massive Feeder Renovation Programme has been launched for renovation of distribution feeders to bring down T&D losses. All 8475 rural distribution feeders will be covered by 2008-09 with a capital investment of Rs. 3914 crores. The main objectives of this programme are as follows:

1. Reduce T&D losses & burning rate of transformers
2. Providing reliable power supply to all
3. Reduction of peak demand in agriculture season.

Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY)

15.38 The Government of India has launched the scheme of RGGVY in April 2005. As per this scheme, all the villages/hamlets will have to be electrified during the next 5 years and provide access of electricity to rural households including BPL families. Connections to BPL families will be given free of cost. 90% of the cost of the scheme would be released as grant where 10% as loan. Rajasthan Electricity Corporation has been designated as Nodal Agency for implementation of this programme.

15.39 33 Number of schemes has been submitted to REC covering 1746811 BPL households and 652907 general households and 6596 dhanies. Total cost of these projects is Rs. 1033 crores. REC has so far sanctioned 17 schemes, which are to be completed by March, 2007. 16 Nos. of schemes which are pending for sanction with 'REC covers 1101768 BPL households, 276234 general households of 23460 villages.

RAJASTHAN RENEWABLE ENERGY CORPORATION

15.40 Rajasthan Energy Development Agency and Rajasthan State Power Corporation Ltd. have been merged in 2000 to form a new Corporation namely Rajasthan Renewable Energy Corporation responsible for development of non-conventional energy sources. This Corporation is presently engaged in rural electrification and establishing 140 MW Solar Power Plant at Mathania.

15.41 A provision of Rs. 683.43 crores was kept for Tenth Five Year Plan against which likely expenditure is only Rs. 61.21 crores. Shortfall in expenditure is mainly due to the fact that Mathania Solar Power Project could not take place.

15.42 Provisions of Rs. 1625.00 lakhs and Rs. 280.00 lakhs have been proposed for the Eleventh Five Year Plan & the Annual Plan 2007-08 respectively for the Corporation for rural electrification and grants for establishment expenses.

Rural Electrification

15.43 There are still a large number of un-electrified villages in the state. These villages are located in remote areas and sparsely populated due to which cost of electrification of these villages is very high. Therefore, these villages are economically illuminated through Solar Photo Voltaic Domestic Lighting System (DLS). State Government is providing a subsidy of Rs. 4550/- for installing a DLS. Likely achievements during the Tenth Five Year Plan in installation of DLS is 13730 against the target of 5000. It is proposed to provide subsidy of Rs. 1125.00 lakhs for installing 24725 DLS during the Eleventh Five Year Plan and Rs. 180.00 lakhs for 3956 DLS during the Annual Plan 2007-08.

Mathania Solar Power Project

15.44 140 MW Solar Power Plant is proposed to be established at Mathania district Jodhpur with World Bank loan assistance. Only token provisions of Rs. 50.05 lakhs and Rs. 10.01 lakhs have been proposed for the Eleventh Five Year Plan & the Annual Plan 2007-08 respectively.