Overview of Electricity Generation and Consumption in Rajasthan

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Abstract: Rajasthan is the biggest state of India so it is necessary to develop Rajasthan as the backbone of country and we know that power resources play a key factor in the modern agricultural, industrial and economic development. It is said that, chronically Rajasthan has been power Hunger state.

In this paper we will discuss about various power plants established in India, their location, generation capacity, and other various details so is to make a brief overview about the power consumption and generation in Rajasthan. As well as we will also make a focus about the hope of non-conventional renewable resource of energy. Non-conventional sources like solar and wind energy may play vital role in converting Rajasthan into a power surplus state.

Keywords: T.P.P, H.P.P, Non-Conventional, RERC

1. Introduction

The Rajasthan electricity regulatory commission (RERC) is responsible for regulation Electricity sector in Rajasthan. Also RERC is responsible for distribution of electricity, distribution of licensees among consumers, electricity rate and other activities.

Rajasthan Rajya Vidyut Utpadan Nigam Ltd. (government of Rajasthan) looks after the generation of electricity in Rajasthan. Establishment of new power plant, their maintenance, and other sectors are taken under the functioning of Rajasthan Rajya Vidyut Utpadan Nigam Ltd.

We will elaborate all power generating sectors of Rajasthan liker thermal power plant, solar plant, diesel power plant etc. one by one.

The main power sources of Rajasthan are,
- Thermal power plant
- Hydro power plant
- Gas power plant
- Wind power plant
- Biomass power plant
- Solar power plant
- Nuclear power plant

2. Thermal power plant

Thermal Power Plant:
1) Surat garh super thermal power plant
2) Kota super thermal power plant
3) Chhabra thermal power plant
4) Kalisindh thermal power station
5) Giral lignite power plant
6) Barsingar thermal power station
7) Jsw barmer power station
8) Kawai thermal power station
9) VS lignite power plant

1) Surat Garh Super Thermal Power

Fig. 2. Surat Garh Super Thermal Power Plant

Surat Garh Thermal Power Plant is the first super Thermal power plant of Rajasthan. It was established in May -1998. It has installed capacity of 1500 megawatt power, which is
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still highest in the state.

Also, there are 6 units in Surat Garh thermal power station and each one of them has capacity of 250 mw power. It is located 27 km away from Surat Garh town in Ganganagar in district on the left bank of IGNP at up stream of Surat Garh barrage. The station is operated and maintained by Rajasthan Vidyut Utpadan Nigam limited.

It is coal based thermal station which receives coal from MP and JHARKHAND. It receives water from Indira Gandhi canal. Now a day it is generating 1500 mw electricity with six units of 250 MW each and it is expected to generate 2660 mw electricity after the setup of 7th and 8th unit.

2) Kota Super Thermal Power Plant

Kota super thermal power station is located on the left bank of river Chambal in Rajasthan principal industrial city kota infrastructural facilities like adequate a water availability in kota barrage throughout the year.


Table 1
SSTPS progress at a glance

<table>
<thead>
<tr>
<th>Stage no.</th>
<th>Unit no.</th>
<th>Capacity</th>
<th>Date of Commercial run</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unit 1</td>
<td>250MW</td>
<td>May 1998</td>
<td>Running</td>
</tr>
<tr>
<td>2</td>
<td>Unit 2</td>
<td>250MW</td>
<td>March 2000</td>
<td>Running</td>
</tr>
<tr>
<td>3</td>
<td>Unit 3</td>
<td>250MW</td>
<td>October 2001</td>
<td>Running</td>
</tr>
<tr>
<td>4</td>
<td>Unit 4</td>
<td>250MW</td>
<td>March 2002</td>
<td>Running</td>
</tr>
<tr>
<td>5</td>
<td>Unit 5</td>
<td>250MW</td>
<td>June 2003</td>
<td>Running</td>
</tr>
<tr>
<td>6</td>
<td>Unit 6</td>
<td>250MW</td>
<td>March 2009</td>
<td>Running</td>
</tr>
<tr>
<td>7</td>
<td>Unit 7</td>
<td>660MW</td>
<td>-</td>
<td>Under construction</td>
</tr>
<tr>
<td>8</td>
<td>Unit 8</td>
<td>660MW</td>
<td>-</td>
<td>Under construction</td>
</tr>
</tbody>
</table>

Table 2
Kota super thermal power station

<table>
<thead>
<tr>
<th>1</th>
<th>Location</th>
<th>Kota, Kota Rajasthan( India )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Status</td>
<td>Operational</td>
</tr>
<tr>
<td>3</td>
<td>Commission date</td>
<td>1998</td>
</tr>
<tr>
<td>4</td>
<td>Operator(s)</td>
<td>Rajasthan Vidyut Utpadan Nigam Ltd(RVUNL)</td>
</tr>
<tr>
<td>5</td>
<td>Primary fuel</td>
<td>Coal power generation</td>
</tr>
<tr>
<td>6</td>
<td>Units operational</td>
<td>Seven</td>
</tr>
<tr>
<td>7</td>
<td>Name plate capacity</td>
<td>1241.00mw</td>
</tr>
</tbody>
</table>

3) Barsingsar Thermal power station

The undated satellite photo below shows the power station in Barsingsar village in Bikaner District Unit 1-2

- Unit -1 (125mw) was Commissioned on June 28, 201
- Unit-2(125mw) was commissioned on January 25, 2011
- Unit-3(250mw) received its Environmental clearance on July 30, 2012
- In its 2013- 2014 annual report NLC Started the company was seeking environmental.
- In May 2015 the NLC Board approved investing in the 250 mw Barsigsar extension and hadla lignite Mine at a cost of 2, 628 crore.
- Extension of the existing Barsingsar power project at an aggregate cost rupees 2638.04 crore (Nov. 2014)
- Government of Rajasthan has allocated mining lease area of 15.66383 sq. km.
- Implement the above project through epic mode and the project is expected to be commissioned during the year 2019.
- Cumulative expenditure increased up to 31st march 2015 is 3.08 crore and 31st march 2016 is 3.34 crore.

Fig. 3. Kota Super Thermal Power Plant
Fig. 4. Barsingsar thermal power station
4) **Kawai Thermal Power Station**

The Kawai Thermal Power station is a 1320 mw coal fired power station in Kawai district Baran, Rajasthan, India. It was commissioned in 2014. The project was developed by Adani power Rajasthan limited, a subsidiary of Adani power.

A power purchase agreement has been executed with Jaipur vidyut vitran nigam limited, Ajmer vidyut nigam limited and jodhpur Vidyut Nigam limited for the sale of 1200 MW power for term of 25 year at a tariff having a non-escapable component and an escapable component fuel and fuel transportation with yearly escalation us notified by CERC escalation indexes from time to time. According to the central electricity authority unit 1 will be commissioned in January 2013 and unit 2 in April 2013. The power station was commissioned in January 2014.

In September 2014 Adani power applied to expand the power station by 1600 MW.

5) **Chhabra Thermal power station**

There are 6 running units of chhabra thermal power plant. Unit 1 to 4 of chhabra thermal power plant is located at MOTI PURA chowki Village Chhabra Tehsil, Baran District Rajasthan (India) And unit 5 and 6 are located to the north of existing plant. This is a thousand megawatt coal fired power station and 1320 MW expansion of the power station is under construction. It began as a 500 megawatt power station commissioned in 2009 2010. The Chhabra thermal power station is under construction of two 250 megawatt units.

6) **Kalisindh Thermal Power Station**

Kalisindh thermal power station is located at about 7 km south west of Jhalawar near Nimoda, Undal, Motipura, Singharia and Devri village in Jhalawar district of Rajasthan state.

That plant site is about 12 km from jhalawar. And 2km from state highway no 19 and 8km from proposed Ramganj mandi Bhopal broad gauge rail line

**Sponsor:** Rajasthan RV Utpadan Nigam  
**Location:** Kalisindh village, Jhalawar district, Rajasthan  
**Coordinates:** 24.5325129, 76.100353 (exact)

**Status:**

(1) Phase 1: Unit 1: Operating (2014)
7) **JSW Barmer Power Station**

JSW Barmer (Jalipa Kapurdi) Power station is a partly commissioned coal–fired power station in Rajasthan, India. It is proposed by JSW Energy subsidiary Raj West Power.

A “Phase 1” of 8*135MW units was completed in 2013. An additional 660mw has been proposed.

In January 2012 presentation to investor, JSW Energy stated the entire first phase of the plant (8*135MW) will be completed in 2012. Actual completion was in early 2013. The company stated that it has entered into a “long term arrangement for entire capacity with state government distribution utilities.

Waterford power plant is sourced from Indore Gandhi Canal by constructing a 185km pipeline.

JSW states that Rajasthan state minerals and mining Ltd and Raj west power limited have collaborated to setup a joint venture company. Barmer Lignite mining Company Limited (BLMCL). This is the first and largest public private partnership in the state of Rajasthan. It shall be mining and supplying lignite from Jalipaand Kapurdi mines.

8) **VS Lignite Power Plant**
- Capacity-135MW
- Commission date-for Bikaner district
- Primary fuel-Combustion boiler
- Nameplate capacity -135MW

3. **Hydro power plant**

There are two hydro power plant are running in Rajasthan.
- 1) Chambal hydroelectric project
- 2) Mahi hydroelectric project

4. **Gas power plant**

There are two gas power plants in Rajasthan. They are
- 1) Dholpur Combined Cycle Power Plant
- 2) Ramgarh Gas Thermal Power Plant.

1) **Dholpur Combined Cycle Power Plant**

It is located in Dholpur Rajasthan it is operated by the Rajasthan Rajya Vidyut Utpadan Nigam LTD (RVUNAL). It’s capacity is 330MW. Its estimated coast is Rs. 1155Cr. It is started in March 2007 only one unit. Now it is in the stage 3 unit started in December 2007.

2) **Ramgarh gas thermal power station.**

It is located at Ramgarh in Jaisalmer district. It is started in 15 Nov.1994.

The plant is operated by Rajasthan Rajya Vidyut Utpadan Nigam. Total capacity is 270.5MW.
There are five major wind energy in Rajasthan. They are,

1) Welspum energy commission
   - Capacity- 20MW
   - Commission date
   - Primary fuel
   - Place/area- Rajasthan

2) Nalco wind power project.
   - Capacity- 50MW
   - Commission date- 2013
   - Primary fuel
   - Place-Rajasthan(Jaisalmer)

3) CLP India wind power plant.
   - Capacity- 100MW
   - Commission date: 2013
   - Primary fuel
   - Place: Rajasthan

4) Inox wind park GSS Rajasthan wind power plant
   - Capacity- 54118 MW, 02 units
   - Commission date: June 2015, for Gujarat
   March 2016, for Rajasthan

5) Suzlon energy limited wind power plant.
   - Capacity: 17000MW
   - Commission date: 1995 (23 years ago)
   - Area: world wide

6. Biomass power plant

1) Dholpur consigned power plant station (RVVN)
   - Capacity: 330 MW, it has 2 units
   - Commission date: March 2007
   - Nameplate capacity: 330 MW

2) Ramgarh gas thermal power station (RVVN)
   - Capacity: 270.5 MW, it has 5 units
   - Commission date: 15 November 1994
   - Nameplate capacity: 270.5 MW
   - Primary fuel: Natural gas

7. Solar power plant

Solar Power Plant in Rajasthan:

By the virtue of nature and geography, Rajasthan has highest number cloud–free days and high insolation ideal for the generation of solar power plants in Rajasthan. Also due to highest level of solar radiation, abundant and availability at the cheapest rate and an investor friendly policy. Therefore, the day is not so much far off when Rajasthan become the hub of solar energy.

There are so many solar plants working in Rajasthan. Some important solar projects of Rajasthan are
1) Dhirubhai Ambani solar park, Pokhran, Jaisalmer
2) Bhadla solar park, Bhadla, Johpur
Some private companies are also producing solar energy.

8. Nuclear power station

The Rajasthan atomic power station (RAPS). Also Rajasthan power project is located at Rawatbhata in the state of Rajasthan, India.

9. Conclusion

This paper presented overview of electricity generation and consumption in Rajasthan

References

[2] The Rajasthan electricity regulatory commission (RERC)