



**Government of Bihar**  
Finance Department

**Economic Survey**  
**2014 - 15**



### Interlinking of Rivers

With a view of resolving the issue of drought in south Bihar and flood devastations in North Bihar, there is a proposal of interlinking the rivers and transferring the surplus water of north Bihar rivers to south Bihar rivers by pumping through the Ganga. For improving the drainage, providing canal irrigation to raise cropping intensity to 250 percent, and optimizing the use of available water resources, action is being taken by the respective departments to implement the scheme of interlinking of rivers. This will first require identifying the rivers to be interlinked and, then, preparing the detailed project reports for them. These schemes will be formulated in such a way that they do not cross the state or international boundaries. In future, however, these could be extended to include the inter-state or international schemes as per the requirements of the state.

The Water Resources Department of the state government is about to execute an ambitious river interlinking plan in the state. The project will interlink four rivers — Budhi Gandak, None, Baya and Ganga. The state government is of the view that the linking of the four rivers will reduce the devastation caused by floods in Begusarai, Samastipur and Khagaria districts. The National Water Development Authority (NWDA) has prepared the DPR for interlinking of these rivers. NWDA is also preparing the DPR for four more river interlinking projects in Bihar. These are:

- (a) Kohra-Chandrawat Link : The preparation of pre-feasibility report for this project is in process and the estimated cost is Rs 168.89 crore. The project will benefit East and West Champaran districts.
- (b) Bagmati-Budhi Gandak Link via Belbadhar : The preliminary report for this project has been prepared. The project will cost Rs. 125.96 crore. It will benefit Sheohar, Sitamarhi and Muzzafarpur districts.
- (c) Kosi-Ganga Link : The preliminary report of this project for the construction of 10 km channel is being prepared. This project will benefit Khagaria and Bhagalpur districts.
- (d) Transfer of Kosi basin water through Kosi-Mechi Link canal : The preliminary report for this project is being prepared. The estimated cost of the project is Rs. 88.93 crore.

### **4.10 Power Sector**

Economic growth depends upon the availability of adequate, reliable and quality power at a competitive rate. Electricity now has become necessary for all the facets of life and has been recognized as a basic human need. It is key to accelerate the economic growth, generation of

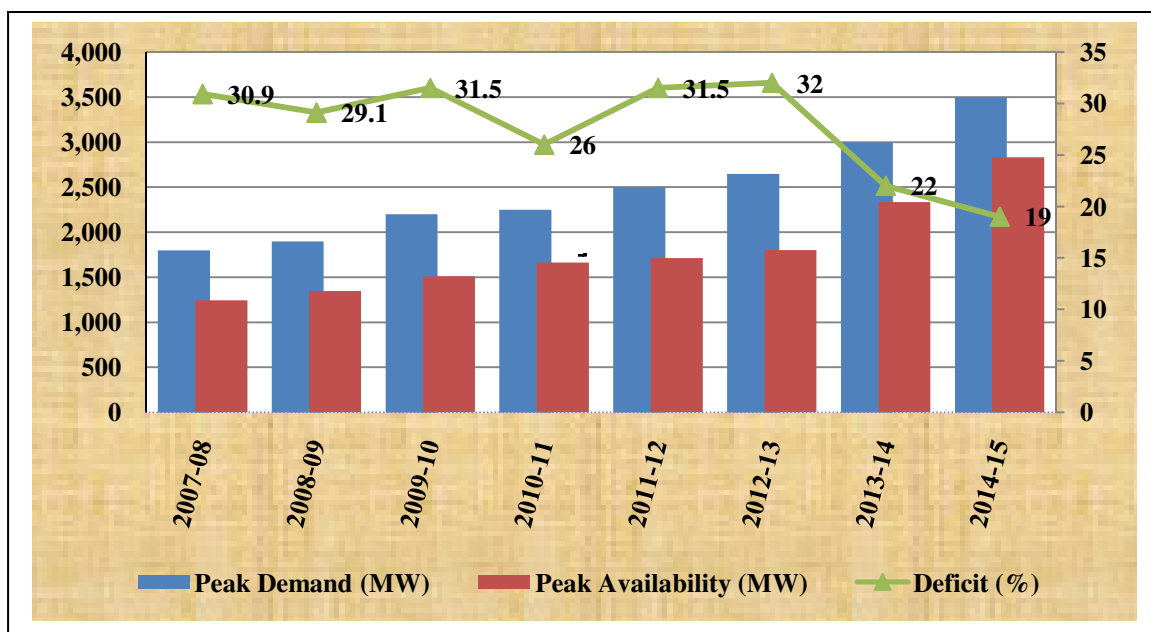
employment, elimination of poverty, and human development. Bihar's economy is now growing fast; however, this growth may not be sustainable due to shortage of power. The per capita power consumption in the state is only 144 kwh, much lower than the all-India average of 927 kwh. The acuteness of the power problem in Bihar can be understood better in the context of demand. As is apparent from Table 4.46, the peak deficit has been around 30 percent for several years till 2012-13. In 2013-14 and 2014-15, the deficit was brought down, but it is still as high as 22 percent and 19 percent respectively.

**Table 4.46 : Power Supply Position in Bihar**

Year	Peak Demand (MW)	Peak Availability (MW)	Deficit (MW)	Deficit (%)
2007-08	1800	1244	556	30.9
2008-09	1900	1348	552	29.1
2009-10	2200	1508	692	31.5
2010-11	2250	1664	586	26.0
2011-12	2500	1712	788	31.5
2012-13	2650	1802	848	32.0
2013-14	3000	2335	665	22.0
2014-15	3500	2831	669	19.0

Source : Bihar State Power Holding Company, GOB

**Chart 4.10 : Peak Demand Deficit**



The Bihar State Power Holding Company has recently submitted to the Central Electricity Authority (CEA) that the peak load is expected to rise by around 14 percent per annum till 2016-17 (Table 4.47). This implies that the energy deficit is likely to widen in Bihar in the near future.

**Table 4.47 : Forecast of Peak Load and Energy Requirement**

Year	Peak Load (MW)	Energy Requirement (MU)
2014-15	3873	23214
2015-16	4472	26330
2016-17	5108	29539

Source: Department of Energy, GOB

#### Institutional Structure of Power Sector

In April, 1958, the Bihar State Electricity Board (BSEB) was originally constituted under Section 5 of the Electricity (Supply) Act, 1948 and was mandated for the management of generation, transmission, distribution and other electricity-related activities in Bihar. Under the new Bihar State Electricity Reforms Transfer Scheme 2012, the BSEB has been unbundled into five companies in November 1, 2012 — (i) Bihar State Power (Holding) Company Limited (BSPHCL), (ii) Bihar State Power Generation Company, (iii) Bihar State Power Transmission Company, (iv) South Bihar Power Distribution Company and (v) North Bihar Power Distribution Company. The responsibilities of the newly-formed companies are briefly described as below:

Bihar State Power (Holding) Company Limited (BSPHCL): This Company will own shares of the newly-incorporated, reorganized four companies — Bihar State Power Generation Company Limited, Bihar State Power Transmission Company Limited, South Bihar Power Distribution Company Limited, and North Bihar Power Distribution Company Limited. It is vested with the assets, interest in property, rights and liabilities of the erstwhile BSEB. The Company will primarily be an investment company. It will co-ordinate their activities, handle disputes and provide all necessary support to them.

Bihar State Power Generation Company Limited (BSPGL) : This company is responsible for coordinating and advising other companies and concerns, including subsidiaries, engaged in the generation of electricity. The coordination and advisory roles include all matters concerning the construction, operation and maintenance of generating stations and associated facilities. It is also responsible for procuring fuel and its transportation to various sites and settling pending disputes.

Bihar State Power Transmission Company Limited (BSPTL) : This company is responsible for the transmission of electricity and is vested with the transmission assets, interest in property, and rights and liabilities of the erstwhile BSEB. Besides planning and coordination activities, this company is expected to develop an efficient system of intra-state transmission lines for electricity, connecting load centres to the generating stations.

North and South Bihar Power Distribution Companies Limited (NBPDC and SBPDCL) : These two companies undertake the activities of distribution to all consumers, trading of electricity, and implementation of rural electrification schemes (RGGVY), Special (BRGF), R-APDRP, State Plan and ADB funded schemes. The introduction of open access in distribution as per the Electricity Act 2003 and the directions of the regulator is also the responsibility of these two companies. They also tender, finalise and execute Power Purchase Agreements and other agreements for sale or purchase of electricity.

The allocation of fund for BSPHCL and its subsidiary companies, BREDA and BSHPC was Rs. 3110.92 crore in 2013-14, which increased to Rs. 4189.92 crore in 2014-15. The breakup of this amount under various heads is given in Table 4.48, including the funds for Restructured Accelerated Power Development and Reforms Project (R-APDRP).

**Table 4.48 : Approved Outlay**

(Rs. crore)

Years	BRGF	BSPHCL	Generati on	Transmis sion	Distribut ion	EAP	BSHPC	BSHPC (RIDF)	BREDA	<b>Total</b>
2013-14	2125.00	367.346	25.00	25.00	215.00	225.00	15.00	63.57	50.00	<b>3110.916</b>
2014-15	1650.00	369.2143	61.68	661.00	1099.18	220.00	38.9257	69.92	20.00	<b>4189.92</b>

Source : Department of Energy, GOB

## Generation

Despite various measures taken up by the state government, Bihar is almost entirely dependent on the central sector allocations to meet its energy demand. The power generation in Bihar is primarily fossil fuel-based. The state government has several plans for power generation through Bihar State Power Generation Company. As may be seen from Table 4.49, the power availability during the peak period was 2335 MW in 2013-14, which increased to 2829 MW in September, 2014. Own generation as percentage of peak demand was only 3.1 percent in 2013-14. Table 4.49 also presents the break up of power generated and purchased by the state in last 9 years.

**Table 4.49 : Power Generation and Purchase vis-à-vis peak demand**

(MW)

Year	Peak Demand	Met by			Peak Deficit	Peak Deficit as % of Peak Demand	Own Generation as % of Peak Demand
		Own Generation	Import (purchase)	Total			
2005-06	1175	42.72	1052.28	1095	80	6.81	3.64
2006-07	1275	37.48	1175.52	1213	62	4.86	2.94
2007-08	1800	64.17	1179.83	1244	556	30.89	3.57
2008-09	1900	72.15	1275.85	1348	552	29.05	3.80
2009-10	2200	56.35	1451.65	1508	692	31.45	2.56
2010-11	2250	152.00	1512.00	1664	586	26.04	6.76
2011-12	2500	66.00	1646.00	1712	788	31.52	2.64
2012-13	2650	NA	1802.00	1802	848	32.00	0.0
2013-14	3000	94.00	2241.00	2335	665	22.16	3.13
2014-15 (up to Sept)	3200	68.00	2761.00	2829	371	11.53	2.13

Source : BSPHCL, GOB

This poor situation regarding the power generation can be better comprehended from the present status of the three generating units that remained in Bihar after the states bifurcation in 2000.

### (1) Barauni Thermal Power Station

Barauni Thermal Power Station (BTPS) is the only power station under the State sector. Although BTPS has 7 different units, 5 of them have already run through their working life and are not in anymore. Renovation and modernization work of remaining two units viz. 6 and 7 of 110 MW each is in progress. Construction works of two new units of 250 MW each is also going on under the extension programme. With consistent efforts of the state government, the coal linkage and environmental clearance have been obtained for these two new units. It is expected that one of the two units will be operational by September, 2015.

(2) Kanti Bijlee Utpadan Nigam Limited (KBUNL)

KBUNL is now a wholly owned subsidiary of the National Thermal Power Corporation (NTPC). It has two units of 110 MW each. The power production has started in one of the units after renovation and modernization last year.

(3) Kosi Hydel Power Station (KHPS)

Kosi Hydro Power Station (Kataiya), Birpur, consisting of 4 units of 4.8 MW each was commissioned during 1970-78. This project was handed over to Bihar State Hydel Power Corporation (BSHPC) on November 16, 2003. The renovation work of 3 out of 4 units has been completed and power generation has started.

At present, the work is in progress for four more generating units in Bihar. On completion of all these projects, the dependence of Bihar on the central sector for power will be lessened. The details of these new projects are presented below:

- (1) Nabinagar Stage-1 Plant : This project is located in Aurangabad district of Bihar. For this power project, construction works of three units of 660 MW each in progress. Due to sustained efforts of the state government, coal linkage has been allotted by the Ministry of Coal of the central government for starting own production in the state.
- (2) Power Projects in Buxar, Bhagalpur and Lakhisarai : The agreement has also been signed with Satluj Hydro Electric Corporation for the construction of power project at Chausa (Buxar), having two units of 660 MW each. In addition, agreement has also been signed with NHPC and NTPC for the construction of two thermal power plants of 660 MW each. The plant in Pirpainti (Bhagalpur) will be constructed by NHPC and that in Kajara (Lakhisarai) by NTPC.
- (3) Ultra Mega Power Project (Banka) : A proposal has been sent for the establishment of a power project in Banka (approximately 4000 MW), for which 2500 acres of land has been identified. The Department of Water Resources of the state government has given consent for 120 cusecs from the Ganga river.
- (4) Mathauli Hydel Power Project (West Champaran) : The construction work for this power project is near completion. It has a capacity of 800 KW.

## Power Position

The energy demand of the state is estimated to increase manifold in the near future from around 3000 MW in 2013-14 to 6000 MW. In view of this, the state government has planned for many projects for enhancing the capacity of power generation. The energy requirement in the state was 20,460 million units during 2013-14, as against 14,066 million units in 2009-10; but the availability of energy during these two years has been only 13,981 MU and 9603 MU, respectively. Table 4.50 shows the deficit in power supply in the state. The overall power supply position has not been satisfactory during the past several years. But since 2013-14, the power supply position has shown improvement.

**Table 4.50 : Requirement, Availability and Shortfall in Power**

Year	Installed Capacity (MW)	Power generated (MU)	Power purchased (MU)	Availability (MU)	Energy Requirement (MU)	Shortfall (MU)	State Sector Capacity (MW)	Available Supply (MW) from State sector
2005-06	1424.1	149.0	7235.0	7383.0	10293.0	2910.0	364.1	264.1
2009-10	2932.8	242.0	9361.0	9603.0	14066.0	4463.0	372.8	272.8
2013-14	7050.0	456.0	14437.0	13981.0	20460.0	6023.0	110.0	90.0

Source : BSPHCL, GOB

## Transmission

Power is supplied to various categories of consumers through a transmission network, which also involves the transformation of high voltage power to lower voltage. The transmission network serves as an important link between the generation and distribution of electricity. The challenges pertaining to the transmission process are, thus, mostly related to the growing needs of the other two segments — generation and distribution.

Consequent upon the establishment of 6 new Grid Sub-Stations and 29 new Power Sub-Stations for strengthening the transmission system in 2013-14, a total of 203 Power Transformers and 2932 Distribution Transformers were either installed or augmented in the state. Besides, 40,551-kms long dilapidated transmission wires were also replaced. The time limit for replacement of burnt defective transformers is fixed at 24 hours in urban areas and 72 in rural areas. The transmission of power in Bihar is done at 400 KV, 220 KV, 132 KV, and 132/25 KV voltage levels. The



transmission network of the BSPTC consists of 101 sub-stations and approximately 8394 circuit kilometers (CKM) long transmission lines. The transmission system is capable of transmitting 9750 MVA of power. The details of existing transmission infrastructure in Bihar are presented in Table 4.51.

**Table 4.51 : Existing Infrastructure for Transmission**

Voltage	No. of Sub-Stations	Line length (CKM)	Transformer Capacity (MVA)
400 KV	—	75	—
220 KV	11	1,662.97	3530
132 KV	83	6,742.03	6370
132 / 25 KV	3	NA	110
<b>Total</b>	<b>97</b>	<b>8,480.00</b>	

Source : Department of Energy, GOB

### Distribution

The distribution is an extremely important component of the whole electricity supply chain, as this is the only arm that generates revenue. This revenue enables the state government to improve the entire supply chain, by purchasing more electricity from the central sector. Thus, a major challenge of the power sector reforms lies in the efficient management of the distribution sector.

The two distribution companies, one for north Bihar and other for south Bihar, are already implementing several schemes for expanding and strengthening their distribution networks which had started in 2012-13. These ongoing schemes include transformer replacement, procurement of new transformers, replacement of old conductors of existing HT & LT lines, and construction of new HT & LT lines, PSS and bays.

During the recent years, the demand for electricity has continuously been increasing in the state, because of both fast economic growth and the growth of population. The problems arising from this increasing demand for power are further complicated by the fact that energy sales have been increasing only modestly, at about 7 percent per annum. The most important reason for this is the huge transmission and distribution (T&D) losses in the state. In 2013-14, it was as high as 42 percent (Table 4.52). The new distribution companies have been trying to address this issue by improving the billing and collection system, along with the metering of all consumer connections. Energy accounting and auditing at feeders and distribution transformers (DT) are essential for reducing these losses, and the distribution companies have already started this exercise. For

overall improvement in transmission and distribution system, schemes worth Rs. 8308.67 crore have been sanctioned under special plan during the 12<sup>th</sup> Plan and the work is in the advanced stage of implementation.

**Table 4.52 : Approved and Actual T&D Losses (Percentages)**

Year	2009-10	2010-11	2011-12	2012-13	2013-14		2014-15	
					NBPDCL	SBPDCL	NBPDCL	SBPDCL
T&D Losses	38.32	43.59 (35.26)	44.05	41.00	38.00	47.69	31.48	44.65
T&D Losses approved by BSERC	35.00	32.00	29.00	27.50	23.00	23.00	21.40	21.40

Note : This figures for 2010-11 to 2013-14 are on the basis of the revised norms of consumption for un-metered categories of consumers. The two figures for 2010-11 are based two different norms.

Source : Department of Energy, GOB

### Operational and Financial Status

The generation and purchase of power in Bihar increased from 9837 MKwh in 2009-10 to 15,045 Mkw in 2013-14. With increase in sales, the revenue collection also increased, despite huge T&D losses. But the financial losses, measured in terms of cost coverages, have been constantly high. In 2013-14, it was 52.2 percent for the north Bihar distribution network, and 50.4 percent for south Bihar distribution network. The operational and financial status of BSEB are described in Table 4.53.

**Table 4.53 : Operational and Financial Status of Power Sector**

Item	2009-10	2010-11	2011-12	2012-13	2013-14	
					NBPDCL	SBPDCL
Generation and Purchases (MWh)	9837	10883	11966	12614	5778.16	9266.43
Sales (MKwh)	6067	6139	6698	7213	3604.83	4636.66
Losses (Percentage)	38.32	43.59 (35.26)	44.05	41.28 (AV)	37.61	49.96
Average Revenue (Rs./kwh)	3.03	3.87	4.64	4.54 (AV)	4.17	4.86
Sale of Power (Rs. crore)	1839.00	2376.00	3109.00	3307.00	1503.66	2254.77
Total Income (including subsidies) (Rs. crore)	2796.00	3618.00	5421.00	6518.00	2803.62	4203.50
Total Cost (Rs. crore)	4292.00	5240.00	7799.00	7036.00	2877.88	4472.19
Cost Coverage (tariff/cost) (Percentage)	43.00	46.00	40.00	50.00	52.25	50.42

Note : The figures for leakage in 2010-11 are on the basis of revised norms of consumption for un-metered categories of consumers. Based on earlier norms the T&D loss is 35.26 percent only

Source : Department of Energy, GOB

### Programmes for Electrification

Three important programmes of the central government for expanding the coverage of electricity supply are — Restructured Accelerated Power Development and Reforms Programme (R-APDRP), Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), and Special Plan (Backward Region Grant Fund). The working of these programmes are presented below:

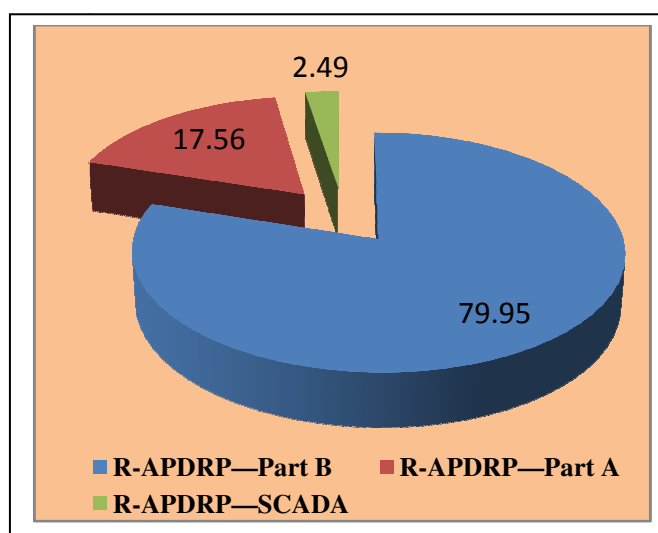
Restructured Accelerated Power Development and Reforms Programme (R-APDRP) : Under Part-A of the R-APDRP scheme, the work in 71 towns (33 in north Bihar and 37 in south Bihar) is under progress. The distribution system is being strengthened under Part-B of the scheme in 64 towns and under the ADB-funded scheme in 7 towns. The work in 7 towns under the ADB-funded scheme is on the verge of completion. The aim is to provide real-time monitoring and control, minimizing loss, balancing load, and improving voltage profiles. The details of expenditure under R-APDRP are presented in Table 4.54.

**Table 4.54 : Capital Expenditure of R-APDRP**

Project Component under R-APDRP	Outlay (Rs. crore)
R-APDRP—Part A	253.68
R-APDRP—Part B	1155.21
R-APDRP—SCADA	36.00
<b>Total</b>	<b>1444.89</b>

Source : Department of Energy, GOB

**Chart 4.11 : Outlay (Percentage) under R-APDRP**



Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) : Bihar, with only 11.3 percent urban population as per 2011 census, remains the least urbanized state in India, the national average being around 31.1 percent. Thus, improving connectivity of rural areas to the power grid is of great importance. In view of this, the rural electrification work is being carried out in all the 38 districts of the state under RGGVY (10th Plan and 11th Plan), Phase-I. The work of total electrification under RGGVY (11th Plan), Phase-II for 11 districts of Bihar (7 districts under SBPDCL and 4 districts under NBPDCCL) is in advance stage of completion and for the remaining 27 districts, the work order has been sanctioned, survey work has been completed and some villages have already been electrified. Progress of Rural Electrification under RGGVY is given in the Table 4.55.

**Table 4.55 : Progress of Rural Electrification under RGGVY**

Activities	PGCIL	NHPC	BSPHCL	Total
<b>Construction of Power Sub-Stations</b>				
Covered under Tenth Plan	75	11	NIL	86
Covered under Eleventh Plan	10	29	64	103
Number of Power Sub-stations Charged	81	37	32	150
<b>Electrification of Villages</b>				
No. of Villages Electrification 10th Plan	14746	1860	NIL	16606
No. of Villages Electrification 11th Plan	3562	1814	2053	7429
Total no. of villages electrified	18308	3674	2053	24035
<b>Electrification of BPL Households</b>				
No. of households electrified 10th Plan	539307	197736	0	737043
No. of households electrified 11th Plan	394176	558864	422726	1375766
No. of households to be electrified (Target)	947779	1100256	1780442	3828477
No. of households electrified (Achievement)	933483	756600	449626	2139709
Achievement %	98.49	68.77	25.25	55.89
Total No. of households electrified	933483	756600	449626	2139709

Source : Department of Energy, GOB

### Special Plan (BRGF)

Various schemes under special plan (BRGF) has been approved by Planning Commission, GOI for strengthening and immediate removal of constraints under Transmission and Distribution Sectors in 12th Plan. Till date, a sum of Rs. 8308.67 crore has been sanctioned for energy sector.

### Bihar Renewable Energy Development Agency (BREDA)

As mentioned above, most of Bihar's installed generation capacity is concentrated in thermal power plants. This leads to a concern not only about the clean generation of electricity, but also puts a fiscal burden on the state, given that the prices of coal may be very volatile. Thus, aside from promoting hydel power projects, the state government has also created an agency called Bihar Renewable Energy Development Agency (BREDA), which is responsible for the development of projects that would use non-conventional energy sources for production of electricity. The state government provides funds to BREDA for expenditure on subsidies for the schemes and also for the expenditure on establishments.

### Recent Developments in Power Sector

- The idea of new service connection by organizing special camps resulted in 2.25 lakhs of new service connections in October 2014.
- For facilitation of new and redressal of grievances regarding HT connections, online facility has been started.
- For payment of electricity bills, provision has been made for alternatives like ATM, Sahaj Vasudha Kendra, ATP Machine, Net Banking, Mobile Phone and Grameen Banks. In addition, services of mobile vans have also been provided to the consumers for bill payment at their doorsteps.
- 5000 Solar Lanterns have been distributed to Scheduled Caste and Scheduled Tribe households in Gaya, Nawada, Jamui, Jehanabad, Araria and Madhubani districts on 100 percent subsidy basis, through the medium of 'Jeevika'.
- Under the Solar Photo Voltaic Programme, 4900 Solar Domestic Lights have been provided to beneficiaries in Gaya, Nawada, Jamui, Jehanabad, Araria, Madhubani and Purnea districts, at a subsidized rate through the medium of 'Jeevika'.
- Installation work for 25 KWP Solar Rooftop Power Plant at all District Collectrates, District Hospitals and District Government Houses is going on.
- In Patna, under the BEE Programme for replacement of conventional street light to LED street lights, 366 LED street lights have already been installed.

- Construction work of hydel project started at Dehra (1 MW) and Sipaha (1 MW) at Patna canal is in final stage.
- '24x7 Fuse Call Centre' has been established for providing uninterrupted power supply and redressal of consumer grievances.
- Installation work is going on for 560 sets of Solar Pumping System in five districts under Bihar Sourya Kranti Sinchai Yojna, out of which 400 have already been installed.
- Bi-monthly camps will be organized for delivering new service connection to the people.
- Revenue-Linked Supply scheme has been proposed in the state for increasing the revenue. Under this scheme, power would be supplied in proportion to the revenue obtained.
- It has been decided to organise 'Lok Adalat' for quick disposal of long pending Departmental Proceedings, which will add to the job satisfaction of the employees.
- To promote energy conservation, an Energy Conservation Policy is being prepared by the Bureau of Energy Efficiency, under the Ministry of Power of the central government.
- A Solar policy is being prepared to promote solar energy and attract investors in the state.
- A Biomass policy is under preparation for encouragement of biomass energy and attract investors in the state.