



FUTURE INDIA THROUGH RENEWABLE SOURCE OF POWER

By

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Under the guidance of

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**A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
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Dear Sir,

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I hereby give my acceptance to guide the above student through the ‘‘Dissertation work Future India through Renewable Source of Power’’, which is a mandatory requirement for the award of EMBA degree.

Thanking You
Yours Sincerely



(SATISH V.V.)



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This is to certify that Ms.Nandhini Thirumurugan a student of MBA in Power management SAP ID 500064133 of UPES has completed this dissertation on "Future India through Renewable source of Power" under my supervision.


Further this is to certify that the work is based on the investigation made, data collected and analyzed by her and it has not been submitted to any other university or institution for award of any degree. In my opinion it is adequate in scope and utility, as a dissertation towards partial fulfillment for the award of degree of MBA – Power Management

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Declaration by Student

I Nandhini T a student of MBA in Power management SAP ID 500064133 of UPES, declare that dissertation titled “**FUTURE INDIA THROUGH RENEWABLE SOURCE OF POWER**” was carried out by me in partial fulfilment of the requirements for fulfilment of the requirements for MBA Power Management of university of petroleum & energy studies Dehradun

It is my original work and has not been submitted to any other organization for any purpose.

A handwritten signature in black ink that reads "T. Nandhini". The signature is written in a cursive style with a long horizontal stroke extending to the right.

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EXECUTIVE SUMMARY

Introduction

As the world undertakes its chartered path towards development, growth and employment generation, to ameliorate the lives of millions of people, it becomes imperative to appreciate the looming ramifications of environmental degradation and ecological imbalances – best reflected in carbon emissions – caused by climate change. Of late, growth in emission has been directly linked to overall economic growth and this linkage is unlikely to be broken in the years to come. At the same time, it is increasingly being realized that climate change is unequivocal and therefore an international collective action is critical in driving an effective, efficient and equitable response to this challenge.

Energy and climate are inextricably linked with any change in energy sector activity, seemingly affecting the latter. The irony is that the energy so used is neither adequate to satiate the demands of the global populace nor is it helping the planet to remain healthy and inhabitable for future generations. Although, there is no single remedy to this issue, a series of measures could be undertaken by various stakeholders in addressing challenges arising out of climate change and thereby help in sustainable development. In terms of per capita emissions, the oil producing countries have been leading the flock with 6 countries (namely Qatar, Kuwait, Bahrain, UAE, Brunei, Saudi Arabia) figuring in the top 10 during 2013 apart from Luxembourg, Tobago, Australia, and USA.

India in solar Alliance

India, with an annual per capita CO₂ emission of 1.49 MT/person was ranked among the lowest. Set against this backdrop, the progressive substitution of fossil fuels as primary sources of energy becomes a critical component of any noteworthy measure aimed at climate change mitigation. This is especially relevant for developing and emerging countries whose energy needs are increasing rapidly in line with their strong economic growth. The panacea for all this is increasing usage of renewable sources of energy including solar. Solar is one of the key renewable sources of reliable and accessible electricity. Once the solar infrastructure is installed, energy from it can be accessed for a long duration with relatively less cost. For years, solar has been a potential solution for millions who do not have access to electricity across the world, but high costs and slow development in technology has left it largely out of reach. This however is changing – with increased investment, cheaper products and innovative business models, energy generation from solar rays is not only on the rise but could potentially transform the way the world is powered. An added, and perhaps more important, benefit is the rapid and sustainable development of solar energy applications, which is a key to accelerating solar energy's global march to achieving grid parity.

The solar industry is still young and the market opportunities are massive. Despite the significant potential and opportunity for solar energy development, and the geographic and socioeconomic advantages, there exists an anomaly amongst countries in harnessing solar power. This situation runs the risk of a 'solar divide', where developing and less developed countries are not able to participate in the fruits of green growth that developed countries are pursuing, creating a paradoxical situation where the countries rich in solar resources are not in a position to harness their resources, while the countries with relatively less solar resources are in a position to do so.

Taking cognizance of such an anomaly, the Government of India along with like-minded partner countries have conceived the International Solar Alliance as a coalition of 121 solar resource rich countries lying within the Tropics of Cancer and Capricorn with the objective of harnessing solar energy that these countries are endowed with. This Study highlights that capacity building, financial cooperation, and technological development remains the key to the success of this Alliance, and discusses possible strategies towards capturing the true potential of solar energy in these countries. The Study has also made an effort towards preparing a 'Cooperation Matrix' and has outlined various financing models that could be explored among member countries, going forward

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Chapter 1 Introduction

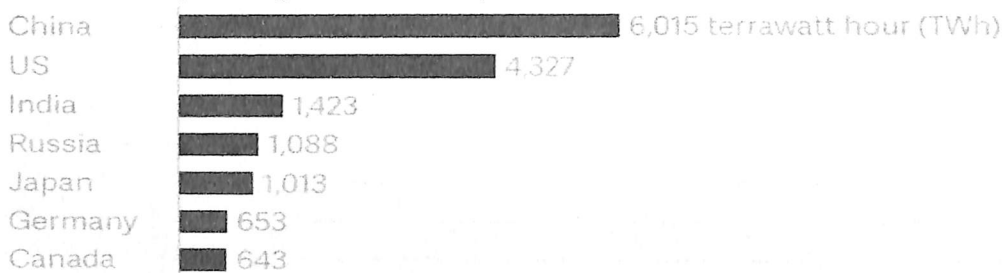
Power is an essential requirement for all facts of our life and has been recognized as a basic human need. It is the critical infrastructure on which the socio-economic development of the country depends. The growth of the economy and its global competitiveness hinges on the availability of reliable and quality power at competitive rates. The demand of power in India is enormous and is growing steadily. The vast Indian power market, today offers one of the highest growth opportunities for private developers.

India now generates around 1,160.1 billion units of electricity in financial year 2017, up 4.72% from the previous year. The country is behind only China which produced 6,015 terrawatt hours (TWh. 1 TW = 1,000,000 megawatts) and the US (4,327 TWh), and is ahead of Russia, Japan, Germany, and Canada.

1.1 Overview

India is the world's third-largest producer of electricity power generated in 2016

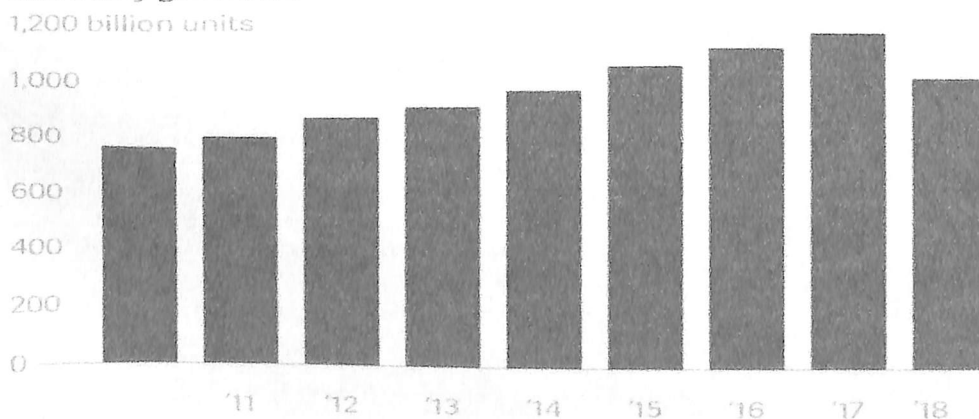
India is the world's third-largest producer of electricity power generated in 2016



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Total electricity production stood at 1,003.52 billion units in India between April 2017 and January 2018. "Multiple drivers (like industrial expansion and rising per capita income) are leading to growth in power demand; this is set to continue in the coming years," said a report by the India Brand Equity Foundation (IBEF), an arm of the Indian government's ministry of commerce.

India's power generation has grown at a CAGR of 7 % since 2010

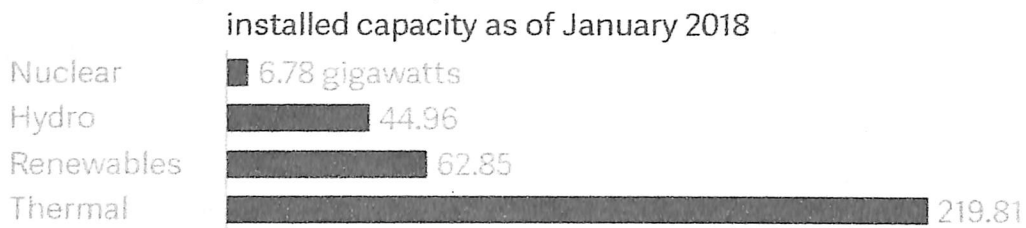


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1.2 Back ground

The country's installed power generating capacity of 334.4 gigawatt (GW, or 1,000 megawatts) as of January 2018 is the world's fifth-largest. Over the last five years, India put up 99.21 GW of additional capacity. Of this, 91.73 GW came from thermal sources, 5.48 GW from hydro, and 2 GW from nuclear sources.

Where India gets its electricity from



However, production levels are not enough to meet the rising demand which has outstripped supply by about 7.5%. So India now plans to tap the \$14.94 billion opportunity in the power-transmission market, according to the IBEF. Over the last 17 years, foreign direct investment (FDI) in the sector has reached \$12.97 billion, accounting for 3.52% of all FDI inflows into the country.

Chapter 2 Review of Literature

2.1 Review Area Broad

As India has a vast range of Renewable Energy power production, Indian government has signed an agreement with International solar Alliance to Make one world one Grid. This dissertation is all about future power renewable energy production utilisation for which the respective act announced by Indian Government.

The Indian power sector governed by the Ministry of Power (MoP) can be categorized into three arms -

Generation, Transmission and Distribution. Actual production of electricity, using diversified sources (ranging from conventional sources like coal, oil, natural gas etc. to non-conventional sources like wind, solar and domestic waste) can be regarded as the Generation segment. Transmission facilitates delivery of electricity through high voltage towers and interconnected lines from a generation plant to the distribution point. Distribution is the final stage in the delivery of electric power through which electricity received at the distribution centers is supplied to retail consumers and businesses via poles and wires.

2.2 Review Area Narrow

In India, the Centre and the state governments were constitutionally entrusted to lay down the laws, issue licenses for the development of power supply network and to create State Electricity Board (SEB) in each State (Indian Electricity Act, 1910 and The Electricity (Supply) Act, 1948). Over the years, electricity generation and transmission sectors were opened to the private sector (through an amendment to the 1948 Act in 1991 and The Electricity Laws (Amendment) Act 1998). However, distribution remained exclusively in the domain of the States. Inefficient planning, lack of investment, over-staffing, inadequate maintenance, power theft, non-billing or incorrect billing led to mounting losses to SEBs. Mismatch between tariffs and cost of generating power, delay in increasing tariff rates, below-cost tariffs to different consumer groups, and free electricity to agriculture weakened the finances of state utilities, making distribution sector unappealing for private investments to venture into. To address problems faced by the power sector especially for the purpose of distancing state governments from tariff determination, the central government, in 1998, passed the Electricity Regulatory Commissions Act to mandatorily create the Central Electricity Regulation Commission which is delegated to set the tariff of centrally controlled generation companies. States too were provided with an option to either set up a commission or function under the existing procedure.

Nevertheless, it was only after the enactment of the Electricity Act, 2003, that the power sector underwent transformation. The Electricity Act, 2003 which came into effect from June 02, 2003 replaced some of the previous laws to provide for the development of the power sector as a whole and shift regulated business to competitive business. It is “an Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions.” (Source: Central Electricity Regulatory Commission) The

Accelerated Power development and Reform Programme (APDRP) which was first contemplated by the Central Government in 2002-03 to improve financial viability of the SEBs, reduce losses, improve quality and availability of power supply was modified further by the XI Plan as Restructured Accelerated Power Development and Reform Programme (R-APDRP).

The programme was approved for IT enablement and strengthening of distribution sector through up-gradation for which funds are provided through loans to be converted into grant after achieving certain level of loss reduction. The Ministry of Power, in 2012, had attempted to turnaround the power distribution sector by announcing Financial Restructuring Plan (FRP) under which 50% of the short-term liabilities of Discoms were taken over by the respective state governments and the remaining 50% were refinanced by the Discoms into longer maturity loans. The scheme failed following an inability on the part of States as well as Discoms to comply with the stipulated reduction in Aggregate Technical and Commercial (AT&C) losses.

The FRP was plagued by unwillingness of States to take over Discom debts because of the lack of fiscal space to move within their respective fiscal responsibility and budget management ("FRBM") targets, or within their borrowing ceilings. Incapability on the part of Discoms to adhere to turnaround in the operational performance increased States' losses subsequently. Liquidity constraints resulted in severe slippages in implementation and the failure. Losses actually widened in the States that implemented the scheme after 18 months of its announcement.

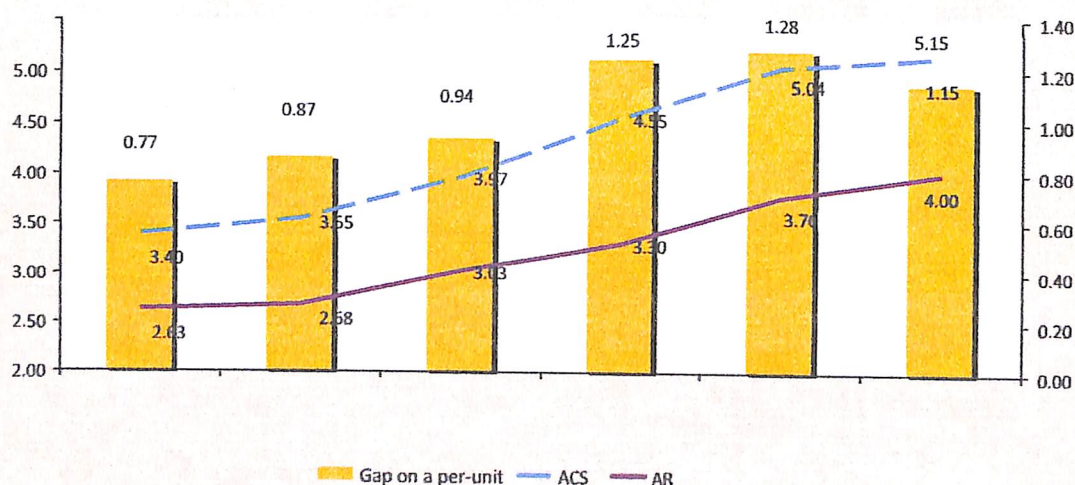
The UDAY scheme can be considered as the improved version of FRP scheme as it focuses on improved operation efficiency, financial discipline, reduction in the cost of power generation, financing future losses and working capital of Discoms by States along with the liability management

Chapter 3 Problem Statement

Distribution companies (Discoms) are the intermediaries between generators and the endusers of power which purchase electricity from wholesale markets and provide it to retail customers. Discoms charge a mark-up over their cost of supply to earn return in addition to other income they earn from investments. As Discoms are the backbone for the entire electricity supply chain by generating revenues for the sector, their debt overhang is seen as a bottleneck for the sector.

While technical losses can largely be attributed to infrastructural issues and consumption mix at different voltage levels, the bigger problem is poor billing and collection efficiency. The Chart given next shows the financial gap per unit of power in Discoms as a difference between average cost of supply (ACS) and average revenue (AR). Since 2008-09, the gap per unit has been consistently on the rise from 0.77 to 1.18 in 2012-13. During 2013-14, however, the gap reduced marginally to 1.15. The primary reason for the increasing gap could be non-equivalent increase in tariff in relation to increase in cost of inputs.

Chart 1: Gap (₹/kwh) for Utilities Selling Directly to Consumers at an All-India level



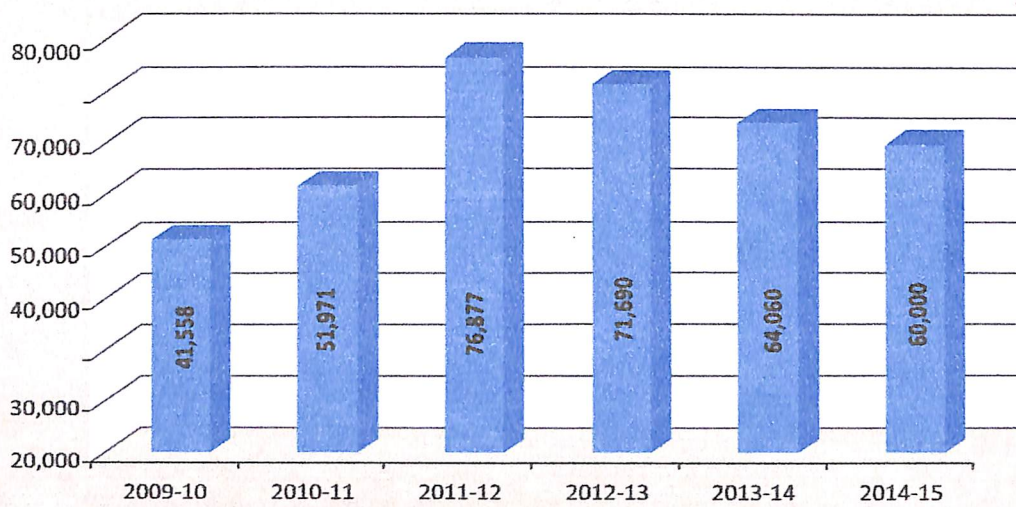
Source: Power Finance Corporation Ltd. Note: Average Cost of Supply (ACS) = Total Expenditure / Total input energy (Kwh); Average Revenue (AR) = Revenue from sale of power (excluding subsidy) + other income / Total input energy (Kwh); Gap = ACS - Average Revenue

Financial gap per unit per state for 2013-14 is illustrated in the following chart. Out of 30 States, just 5 states, namely, Sikkim, Uttarakhand, Delhi, Kerala and West Bengal, were profit making states without state government subsidies. 11 states had a gap of less than Re.1 per unit, while remaining 14 had a gap of more than Re.1 per unit. It can also be observed that 9 states made up 75% of the total loss per unit during 2013-14.

The deteriorating financial health of distribution companies has become an area of concern. They are caught in a vicious circle with operational losses being funded by debts, reducing their ability to buy power to satisfy demand. Delayed and inadequate tariff hikes that are quite below the cost can be termed as the main reason for mounting losses. Apart from this revenue side constraint, there are other factors from the cost side such as failure on part of the states to undertake financial restructuring of Discoms in terms of fixing tariff on a regular basis and setting up of the State Electricity Distribution Responsibility Act, unforeseen cost of fuel, a sharp increase in the use of expensive imported coal last minute, rising interest expenses due

to Discoms' increased borrowing to meet cash-flow needs led to escalation in cost that played a crucial role in making finances weak for these companies. Outstanding debt of Discoms increased from about `2.40 lakh crore in 2011-12 to about `4.30 lakh crore in 2014-15, with interest rates upto 14-15% and accumulated losses of approximately `3.80 lakh crore (as on March, 2015).

Chart 3: DISCOM losses



3.1 Reasons behind Discom losses:

Technical losses	Technical losses are caused by power theft, overloading of existing lines due to higher demand for power, non-upgradation of equipment, improper relocation of distribution substations and provisioning for additional distribution transformers in the pipeline.
Commercial losses	Commercial losses arise due to low metering/billing/collection efficiency, causing persistent gaps between ACS and ARR. Furthermore, faulty meters, billing on average consumption basis, delays in revenue collections and unauthorised usage of power by agricultural and rural consumers also contribute to heavy commercial losses.
Rise in subsidy dependence	Delay and nonpayment of subsidies by state governments is a major source of loss for Discoms. These subsidies are meant to be paid to them to compensate for cheaper power supplies to certain segments promised by the state governments. In particular, the subsidy burden for distribution companies is estimated to have increased due to higher costs and cheaper tariff for the farm sector.
Under pricing and reporting lags	Selling prices have been historically set significantly lower than the procurement price for electricity, influenced by the political agenda of state governments. Furthermore, Discoms release their financial results with a considerable lag, which complicates the assessment of their financial viability by potential lenders.
Power in concurrent list	Electricity is a concurrent subject under the purview of states; as a result, oversight of Discoms is the domain of state governments. Consequently, it is difficult for the Central Government to reform Discoms directly.
Reduction in Power Purchase Agreements (PPAs)	The lower energy requirement of Discoms due to their fragile financial health has resulted in fewer PPAs. Going forward, signing of new PPAs will depend on the ability of Discoms to enter into longterm commitments. This implies that in the short term market, electricity generating companies will continue to remain exposed to volatile prices.

Chapter 4 Research Design Methodology & Plan

4.1 Introduction about ISA:

ISA stands for International Solar Alliance, As the world undertakes its chartered path towards development, growth and employment generation, to ameliorate the lives of millions of people, it becomes imperative to appreciate the looming ramifications of environmental degradation and ecological imbalances – best reflected in carbon emissions – caused by climate change. Of late, growth in emission has been directly linked to overall economic growth and this linkage is unlikely to be broken in the years to come. At the same time, it is increasingly being realized that climate change is unequivocal and therefore an international collective action is critical in driving an effective, efficient and equitable response to this challenge.

The solar industry is still young and the market opportunities are massive. Despite the significant potential and opportunity for solar energy development, and the geographic and socioeconomic advantages, there exists an anomaly amongst countries in harnessing solar power. This situation runs the risk of a ‘solar divide’, where developing and less developed countries are not able to participate in the fruits of green growth that developed countries are pursuing, creating a paradoxical situation where the countries rich in solar resources are not in a position to harness their resources, while the countries with relatively less solar resources are in a position to do so.

Taking cognizance of such an anomaly, the Government of India along with like-minded partner countries have conceived the International Solar Alliance as a coalition of 121 solar resource rich countries lying within the Tropics of Cancer and Capricorn with the objective of harnessing solar energy that these countries are endowed with. This Study highlights that capacity building, financial cooperation, and technological development remains the key to the success of this Alliance, and discusses possible strategies towards capturing the true potential of solar energy in these countries. The Study has also made an effort towards preparing a ‘Cooperation Matrix’ and has outlined various financing models that could be explored among member countries, going forward.

4.2 International Solar Alliance: Overcoming the Challenges in Solar

The International Solar Alliance (ISA) is conceived as a coalition of solar resource rich countries, located between the Tropic of Cancer and the Tropic of Capricorn, to address their special energy needs and to provide a platform to collaborate on addressing the identified gaps through a common, agreed approach. Currently, there is no focused international agency in place to address the specific solar technology deployment needs of the solar resource rich countries. The International Solar Alliance represents a conglomeration of a huge diversity in terms of access to electricity. An analysis of data for the 121 member countries of this Alliance reveals that only 23 countries had 100% of their population having access to electricity in 2012, while 54 countries had less than 66% of their population having access to electricity. The figure 66% has been considered as the benchmark given that it is the average percentage of population having access to electricity in the 121 ISA member countries. These countries can potentially harness solar energy in a cost-effective manner, if a concerted and coordinated effort is made to share the experiences from other similar countries and efforts are undertaken on finding solutions which are designed to be locally appropriate for difficult conditions, while still remaining affordable. Some of these countries have limited access to technologies and shortage

of financial resources hampers large-scale deployment. A coalition of these countries for solar energy development and solar technology applications would help in addressing the special energy needs of these countries, and in the long run, reduce reliance on fossil fuels by increasing the share of solar energy in their energy mix.

4.3 The UDAY Scheme

The Union Cabinet approved the UDAY scheme on November 5, 2015 for the financial turnaround and revival of Discoms and ensures a sustainable solution to the problem of distribution losses. Under this scheme, participating States are required to issue non-SLR bonds against the Discom loans, proceeds of which will be transferred to Discoms for paying off loans to lender banks or financial institutions. Lenders banks, on the other hand, would not levy prepayment charges. The remaining outstanding debt of Discoms is required to be converted by banks into longer dated loans or bond with interest rate not more than bank's base rate plus 0.10% or alternatively Discoms may issue State guaranteed bonds against the debt at a rate not exceeding the bank's base rate plus 0.10%.

Ujwal DISCOM Assurance Yojana (UDAY) - States shall take over 75% of Discom debt outstanding as of September 2015, reduction of Aggregate Technical & Commercial (AT&C) losses to 15% and decrease in Gap (cost revenue) by 2018-19, increased supply of domestic coal to substitute for imported coal, prohibition to avail short term debt from banks for financing losses.

4.4 Features of UDAY Scheme

State Takeover of Discom Debt	Debt takeover mechanism	UDAY Bonds	Treatment of residual debt	Future Discom financing
Scheme available only for State Discoms including combined generation, transmission and distribution undertakings	Debt of Discom will be taken over in the priority of debt already due, followed by debt with highest cost.	Non-SLR bonds issued by States shall have maturity period of 10-15 years with a moratorium on repayment of principal up to 5 years, as required by the State.	Up to 25% of the grant can be given as equity where the Discom requires equity support.	Bank/FIs henceforth cannot advance short term debt to Discoms for financing losses.
States shall take over 75% of Discom debt as on September 30, 2015. Debt shall be taken over as: 2015-16 – 75% 2016-17 – 25%	Transfer to Discom by State will be as grant with an option to spread the grant over three years (MoP can further relax by 2 years for high debt States).	10 year Bond Pricing: The 10 year UDAY bonds would be priced at the 10 year G-sec + 0.50% spread for 10 year SDLs + 0.25% spread for non-SLR status on semi-annual compounding basis, or market determined rate, whichever is lower. This may be further reduced if the interest is paid on monthly basis.	Discom debt to be taken over by the State will include Discom bonds which are committed to be taken over by the State as part of FRP 2012 including bonds already taken over in 2015-16.	Working capital loans from Bank/FIs will only be allowed up to 25% of the Discom's previous year's annual revenue.
Discom debt is defacto borrowing of States which is not counted in de jure borrowing. Principal debt taken over will not be included in fiscal deficit of States. However, interest has to be serviced within FRBM limits.	States will issue non -SLR including SDL bonds in the market or directly to the respective banks /Financial Institutions (FIs) holding the Discom debt to the appropriate extent. Proceeds shall immediately be transferred by the States to the Discoms, which in turn shall discharge the corresponding amounts of Bank/FIs debt.	Bonds to be issued against the loans of FIs, including REC and PFC, would first be offered for subscription by the market including pension and insurance companies. Balance, if any, would be taken over by banks in proportion to their current lending to Discoms.	For amount transferred as loan, the interest rate payable by the Discoms to the State for the intervening period shall not exceed the rate of interest on the bonds issued by the State.	States shall take over the future losses of Discoms in a graded manner.
Operationalized through a tripartite agreement amongst the Ministry of Power, State Government and the Discom.	Banks/FIs shall not levy any prepayment charge on the Discom debt.		Residual Discom debt to be converted into bonds to be offered to market at a likely rate of State Bond + 0.10%. If not converted into bonds, Banks can lend at interest rate not higher than Banks Base rate + 0.10%.	Loss financing after October 1, 2015 only as per loss trajectory finalized by States with MoP and only through SDLs or Discom bonds backed by State guarantee.

4.5 Electricity Amendment Act 2018:

The Ministry of Power of India has recently announced the draft proposed amendments to the Electricity Act, 2003. The proposed amendments aim to be in line with the country's changing electricity markets and systems, with their large renewable capacities and the emergence of a smart grid network.

The Amendment proposes important changes in renewable energy, cross-subsidy, open access, operations & responsibility of ERCs, and many other changes. Some of these are discussed in brief below:

4.5.1 Renewable Energy

The EA Amendment 2018 proposes several amendments that are favourable to the RE sector. Some of these are:

- Definition of Renewable Purchase Obligation and Renewable Generation Obligation introduced.
- RPO has been separately defined. Related to this, the definition of "Obligated Entity" has also been introduced.
- RGO means the Renewable Energy Generation capacity required to be established to be procured from Renewable Energy Sources, and sale of such energy along with the electricity generated from the coal or lignite based thermal generating station, by a generating company establishing a coal or lignite based thermal generating station.
- Introduction of renewable energy service company which provides renewable energy to consumers in the form of electricity.
- Introducing policies in order to support RE sector like National Renewable Energy Policy to promote smart grid, ancillary support, and decentralized distributed generation in accordance with the provisions of the Act;
- A penalty of maximum Rs. Fifty lakh for non-compliance of RGO. (Reduced from 1 Cr. to 50 Lakh, the earlier penalty was on 1 lakh.)
- For non-compliance of RPO, an additional penalty is proposed, which shall be minimum of Rs 1 per unit with a maximum of Rs 5 per unit depending on the extent of the shortfall.
- Generation and supply of renewable energy will not require any license for such generation and supply.

4.5.2 Cross-subsidy

The draft EA Amendment proposes (a) time-bound reduction in cross-subsidies (CSS), and (b) CSS to be not more than 20% of the wheeling charge. These provisions are nothing new. The EA 2003 also included provisions for reduction of CSS. But these were watered down later.

The proposal that CSS be 20% of wheeling charges is significant, as if implemented, it will reduce CSS significantly. Also, the provision for charging "additional surcharge" is proposed to be deleted – this will also have a significant impact as in recent years states have used high additional surcharge as a tool to discourage open access.

4.5.3 Open Access

The draft EA Amendment states the following with respect to open access:

“With effect from the commencement of the Electricity (Amendment) Act, 2018, all consumers having a connected load of 1 Mega Watt and above with the power system, may procure at their option electricity through open access under contractual agreement from any generating company, trading licensee, or from any other source.”

This implies automatic open access, without the need for permission from the Discom. If implemented, this will be a radical change and can potentially transform the electricity market in the country.

4.5.4 Separation of Carriage and Content

One of the key provisions in the previous EA amendment (proposed in 2014) was the separation of carriage and content – i.e. further breakup of the Discom into supplier and network operator, and also allowing multiple suppliers in the area of the Discom. This proposal was met with significant resistance from the state when the Standing Committee of the Parliament viewed the amendment. As a result, the current amendment, while retaining the provisions, has significantly diluted the scope of carriage and content separation by leaving it entirely to the decision of the state government.

In our opinion, this is a pragmatic approach, as it may allow the passage of the EA Amendment act without significant resistance from the states. However, the flip side of this approach is that such a reform will take a long time to be realized on the ground, and there will be significant differences between states. The EA2003 has heralded the break-up of Electricity Boards into Genco, Transco and Discom’s. Fifteen years on, the separation is still only partially effective in most states.

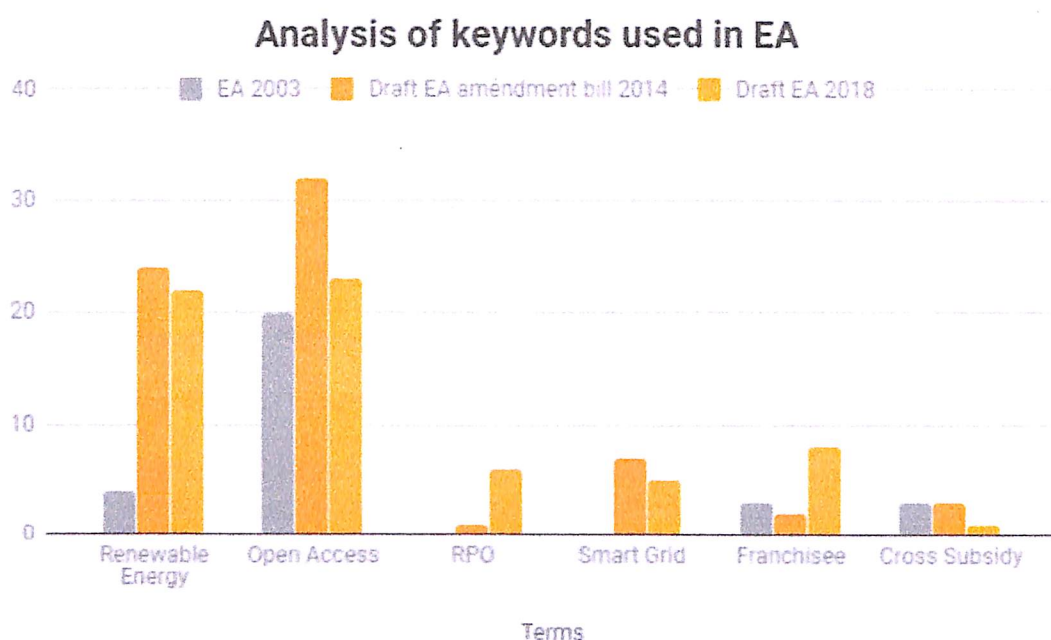
4.5.5 Others

- Subsidy to be provided only through “Direct Benefit Transfer”. This can be a potential game-changer for the Discoms, and even for the entire sector. Today, subsidies are paid through the Discom, which, even though is a commercial entity, often works as a government arm. If DBT is introduced, it can pave the way for genuine Discom reforms on commercial principles.
- Every proceeding before the Appropriate Commission shall be decided efficiently. Matters related to passing through in tariff on account of change in law/duties/taxes etc shall be decided in a maximum of 30 days. All other matters will be disposed of within 90 days. Regulatory Commission shall have all the powers of a civil court.
- Development of market: Another important change has been the mandate to promote forward and futures contracts in electricity.

We believe that the proposed changes will have a wide and deep impact on the electricity sector. The promotion of RE and removal of roadblocks for development of RE and of open access in the country is a welcome step and one that was long overdue.

The separation of distribution and supply function also signifies a fundamental shift in the way electricity is distributed in the country. However, by watering down the provisions for the same and giving states the choice to implement is a pragmatic way the government has adopted to allow the passage of EA Amendment. In any case, this change is likely to take a long time to start showing on the ground.

Another radical change proposed is of paying subsidies through “Direct Benefit Transfer” only. This can be a potential game-changer for the sector and can pave the way for genuine Discom reforms on commercial principles.



The Infographic displayed above analyses the extent of usage of certain keywords in Electricity Act 2003, Draft EA amendment bill 2014 and the latest Draft Electricity Act 2018. The graph is prepared to understand how the government’s priority has evolved over the years from only conventional power to renewable energy as well.

The word ‘Renewable’ is used 22 times in Draft EA 2018, 23 times in Draft EA bill 2014 and just 4 times in EA 2003. Similarly, Open Access is used 20 times in EA 2003, 32 times in Draft EA bill 2014 and 23 times in Draft EA 2018.

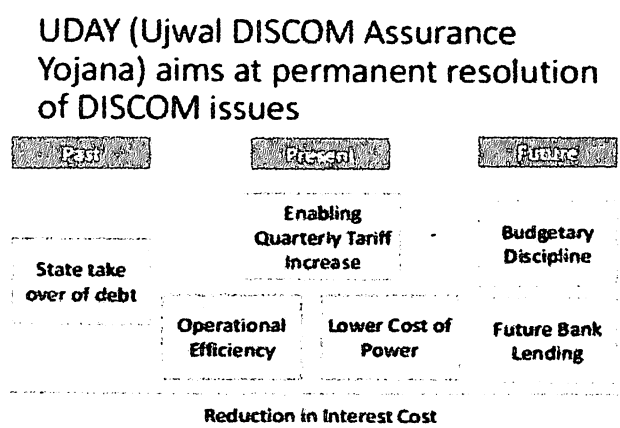
Terms like RPO and Smart Grid have no mention in EA 2003, while in Draft EA bill 2014 RPO was used once & smart grid 7 times whereas Draft EA 2018 smart grid was used 5 times and Franchisee was used the highest 8 times in Draft EA 2018. The term Cross Subsidy is used the least in Draft EA 2018 just once and 3 times in both EA 2003 and Draft EA bill 2014.

Chapter 5 Result & Discussion

5.1 Findings

The UDAY scheme will not only help to improve the financials of Discoms, it will also account for huge capital savings for the Indian banking sector, especially the Public Sector Banks which have maximum exposure to the power sector. The UDAY scheme rather than being a scheme doling out free funds without accountability is more of an attempt at financial restructuring for all the parties involved - the States, Discoms and their creditors. It is essentially a mechanism of converting outstanding Discom debt to tradable instruments rather than NPAs, thus, freeing up further funding channels. This will reduce the financial pressure on the Discoms and the resultant reduction in the cost of power can be passed on to the final consumers. Discoms will be forced to improve their operational efficiency to avail further financing as banks will be providing financial support to these companies only for capital requirement by way of loans only upto 25% of the respective Discom's previous year's annual revenue. Short term loans to finance operations will no longer be provided by the banks. States too will take over and fund future losses of Discoms in a graded manner only until financial year 2020-21. Banks will not be required to take any haircuts under UDAY.

UDAY comes with strict budgetary constraints, provisions for monitoring by Central teams and binding operational milestones for the State governments and Discoms. Operational efficiency improvements like compulsory smart metering, upgradation of transformers, meters etc., energy efficiency measures like efficient LED bulbs, agricultural pumps, fans & air-conditioners etc. will reduce the average AT&C losses from around 22% to 15% and eliminate the gap between Average Revenue Realized (ARR) & Average Cost of Supply (ACS) by 2018-19. Reduction in cost of power would be achieved through measures such as increased supply of cheaper domestic coal, coal linkage rationalization, liberal coal swaps from inefficient to efficient plants, coal price rationalization based on GCV (Gross Calorific Value), supply of washed and crushed coal, and faster completion of transmission lines. NTPC alone is expected to save `0.35/unit through higher supply of domestic coal rationalization/swapping of coal which will be passed on to Discoms/consumers.



The UDAY scheme will force fiscal prudence on the part of the States as it requires them to absorb a part of future losses of the Discoms while providing for the cost of servicing their

subsidies in their Budgets. Financial liabilities of Discoms are the contingent liabilities of the respective States and need to be recognized as such. States shall take over 75% of Discom debt as on September 30, 2015 over two years - 50% of Discom debt shall be taken over in 2015-16 and 25% in 2016-17. This will reduce the interest cost on the debt taken over by the States to around 8-9%, from as high as 14-15%; thus improving overall efficiency. Further provisions for spreading the financial burden on States over three years, will give States flexibility in managing the interest payment on the debt taken over, within their available fiscal space in the initial few years. A permanent resolution to the problem of Discom losses will be achieved by States taking over and funding at least 50% of the future losses (if any) of Discoms in a graded manner. It also provides incentives for performing states. States will thus be compelled to achieve operational efficiencies and reduce losses in order to avoid budgetary constraints that would hamper future expenditure and development.

UDAY is expected to result in annual savings of \$30 billion (₹ 1.80 lakh crore) by 2018-19, which means saving of ₹ 1.20 per unit. As per Ministry estimates, takeover of 75% of the debt raises savings by ₹ 26,000 crore. Supply of domestic coal is being also increased and through swapping alone; the cost of power can be reduced by around ₹ 36,000 crore. Plant load factor will be increased in efficient plants while inefficient ones will be downgraded, leading to savings thousands of crores which will go to final consumers.

5.2 Benefits of UDAY

Government	Industry & Consumers	Banks & Investors	Additional Benefits for States	Discoms
Achievement of 24X7 Power for All	Availability of 24X7 power improving quality of life and efficiency	Avoid banking contagion (₹ 40,000 crore of repayments due to banks in 2015 -16) which will create significant NPAs	States accepting the scheme and performing as per operational milestones will be given additional/ priority funding through DDUGJY, IPDS, Power System Development Fund (PSDF) or other such schemes of MoP and MNRE	Enabling quarterly tariff increase to mitigate cost increase burden
Power to 5 crore households without electricity	Lower cost of power -Typical 3,000 MW NTPC plant running at 60% Plant Load Factor (PLF) has a fixed cost of	Lower risk for existing investments and loans in power, coal and renewables sector	Such States shall also be supported with additional coal at notified prices and, in case of availability through higher capacity utilization, low cost power from	Operational efficiency

	₹2.67/unit, vs ₹1.80 at 90% PLF		NTPC and other Central Public Sector Undertakings (CPSUs)	
Speedy achievement of electrification of remaining 18,500 villages	Global competitiveness of industry	Lower capital adequacy provisions as direct exposure to state governments would attract 0% risk-weight, compared to 20% for state government guaranteed exposure to Discoms, thus freeing up substantial amount of risk-weighted capital. The remaining Discom loans would attract lower provisioning as they would be classified as standard		Lower cost of power
Energy security through coal and renewables		Increased procurement of power by Discoms revives existing power projects suffering from low PLFs		Reduction in interest cost
Reduce Current Account Deficit (CAD) from higher diesel import (current annual imports of around ₹50,000 crore)		Reduces investment uncertainty across the sector		Opportunity to break even in the next 2 - 3 years
Meet ambitious renewable energy commitments as a responsible global citizen				Enforcing financial discipline through alignment with State finances

Revive investments in power sector to create jobs				Future bank lending channels opened
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However, deteriorating fiscal health of participating States in the future is seen as one of the areas of concern. Only the debt is taken over by States, not the interest payment, which has been kept out of the fiscal deficit calculation in the first two years within FRBM purview. Since State governments are responsible for Discoms' increasing losses, from 2017-18 onwards, these losses will be added to respective participating State's FRBM targets in a progressive manner starting with 5% of losses that year. The effect of burgeoning liabilities may not be experienced in the near future, but it may have its impact in the medium term as it will considerably reduce fiscal space available to States for the developmental expenditure adversely impacting the growth. Inability of States to stick to fiscal consolidation targets will, in turn, force the Central Government to adjust more

5.3 UDAY- Issuance Mechanism

In March 2016, RBI asked for bids from market participants interested in subscribing to the UDAY bonds through private placement route. Given non-SLR status by RBI, these securities were issued by eight State Governments under the Government Securities Act, 2006 and are eligible for market repo. Four States have also issued UDAY bonds in the current fiscal taking the total stock of UDAY bonds issued to 1,48,427.95 crore as of July 31, 2016. This comprises 8.44% of the total stock of outstanding SDLs worth 17,57,917.59 crore for all States and the Union Territory of Puducherry (As of end - July). The share of UDAY bonds is 23.65% of the total outstanding stock of SDLs of the eight States that have issued these bonds

5.4 Profile of UDAY bonds issued

UDAY bonds have added substantially to the future debt liabilities of the participating States for the next decade and a half. The near-term liability for these bonds is the highest for Rajasthan, which also has the highest proportionate share of UDAY bonds in total debt. While SDLs are generally issued for the 10-year tenor, the UDAY bonds have been issued over a 15-year tenor, as a result, they comprise the entire stock of outstanding SDLs for UDAY bonds have been issued at multiple maturities to suit the appetite of various investor groups. The higher yields compared to the central government securities is expected to attract investments. In general, Uttar Pradesh has had to offer the highest yields for these bonds as it has resorted to maximum borrowing from the market. As per various news reports, the UDAY bonds were subscribed to mainly by banks, mutual funds, the EPFO and LIC. Provident fund organizations and insurance companies have also shown a great deal of interest in the UDAY bonds.

Despite the worsening in their fiscals, most States managed to issue the UDAY bonds at lower coupons than their existing securities for the respective tenors, primarily as a result of the rally in the benchmark 10-year central government bond following the Budget, which was the basis for the pricing of these bonds. As a result, States such as Rajasthan were able to issue UDAY

bonds at coupons lower than the cut-offs in the primary auctions for their 10-year SDLs. For example, while the cut-off in the primary auction of 10-year SDL for Uttar Pradesh held on March 9 was 8.58%, it issued UDAY bond maturing in 2026 at a coupon of 8.39% on March 10, 8.30% on March 21 and for 8.21% on March 29.

5.5 Impact on Primary Market

Overall indebtedness of States has been on an upward trajectory, especially during 2015-16 when market borrowings jumped more than 22% over the previous fiscal. While the RBI was able to conduct market borrowing operations in a smooth manner without undue disruptions, the apprehensions about the incremental supply of state bonds due to the UDAY issuances led to the hardening of the cut-offs in the SDL auctions in the last quarter of 2015-16. Lack of clarity on the RBI provisions regarding the bonds also added to the negativity made especially severe due to the prevailing liquidity tightness. The increased supply was also blamed for the lack of FPI interest in SDLs despite enhancement of limits, on fears of supply outstripping demand. The market received some support after the RBI clarified that the DAY bonds would be issued on private placement basis and could be considered for classification under the held-to-maturity (HTM) category. While the investors were able to lock in at higher yields, the interest costs for the borrowers were higher despite a downward trajectory in policy rates. Impact of the UDAY issuances was observable with investors differentiating between states based on their fiscal position and the quantum of losses accumulated by their Discoms. The yield gap spiked in the last quarter of 2015-16, hitting the States that had back-ended their market borrowing, especially the ones that were expected to issue UDAY bonds. Yields started declining post RBI's clarifications and have stabilized over 2016-17 despite the continued supply of UDAY bonds.

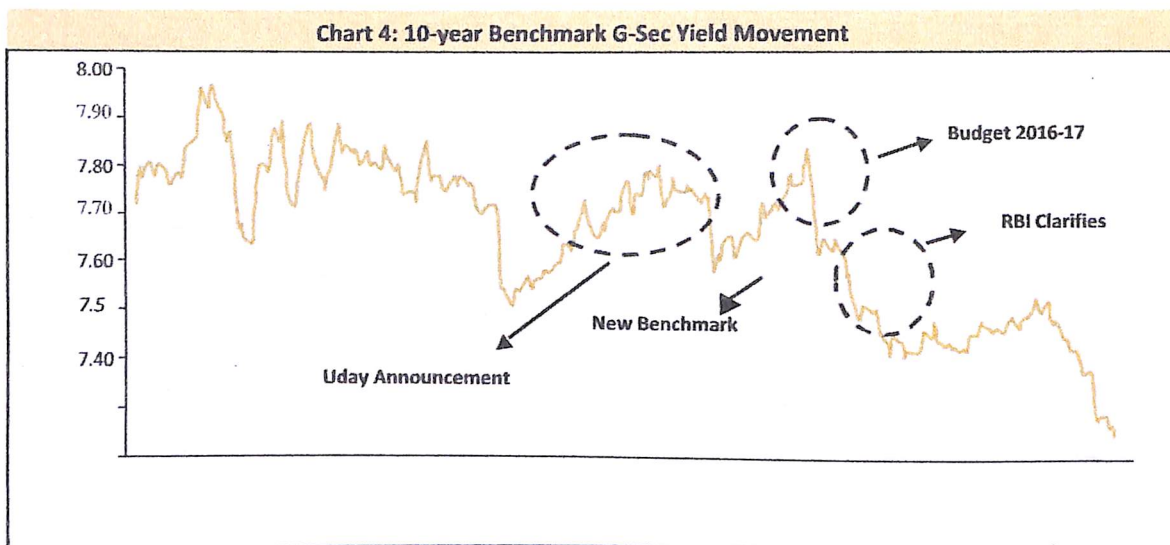
5.6 Impact on Secondary Market

The final quarter of 2015-16 was very volatile for the bond market as sentiments swung both ways. The first auction of the new calendar year saw aggressive bidding for the new 10-year benchmark. However, the interest soon fizzled out on apprehension of further increase in yields of SDLs due to the impending impact of the UDAY bonds as well as increased borrowings by the states towards the fiscal year end. The bond market yields continued rising throughout February on the uncertainty over the central government's budget as well as apprehensions on demand for existing securities due to the increased SDL auctions. Market sentiments improved after the budget as the government reiterated its commitment to fiscal consolidation. RBI's clarifications on the UDAY bonds helped sustain the rally. SDL yields spiked in January-February 2016 by almost 30-40 bps as the market already apprehensive about State finances on account of the enhanced State borrowings, awaited clarity on the UDAY issuances. The incremental supply of SDLs resulted in subdued demand and increase in yields demanded in the secondary market. Commensurate to the spike in yields of SDLs, spreads over g-secs also rose during the last quarter of 2015-16 (close to 50 bps), peaking in February 2016, and declining thereafter throughout March as the market got increased clarity from the RBI over the implementation of the scheme. The highest spread was observed for Jharkhand in February followed by Bihar and Uttar Pradesh. Despite the initial negativity in the market over the

non-SLR status of these bonds, they have found sufficient liquidity in the secondary market – both outright and market repo segments unlike the power bonds issued earlier by States. The share of UDAY bonds in total trading of SDLs during April- July 2016 was almost 32% in the outright and a substantial 87% in the repo segment. Overall, UDAY bonds had a share of 59.15% in the SDL trading in the securities segment (outright and repo). UDAY bonds have turned into preferred instruments in the market Repo segment with a turnover ratio of 3.96 in the past four months. UDAY bonds issued by Uttar Pradesh are the most liquid in both the markets.

Almost 77.13% of the trading in UDAY bonds in the outright market is done over-the-counter.

Mutual Funds followed by Private Sector Banks have been the most active participants in secondary outright market for UDAY bonds. However, in terms of net activity Provident Funds have been the most active buyers followed by Mutual Funds. Private Sector Banks and Public Sector Banks have been the most active sellers. Public Sector Banks and Mutual Funds are the biggest buyers of UDAY bonds in the market repo segment, while Private Sector Banks and Primary Dealers use these bonds to raise money. UDAY bonds are also being actively used by corporates for borrowing in the repo segment. The bonds have thus found flavour in the secondary market as well.



5.7 Improvement of UDAY scheme

The UDAY scheme is an improvement over all the previous efforts of the government to clean the power sector by providing much-needed impetus to Discoms. However, to achieve complete success, certain issues need to be addressed. The UDAY scheme is expected to finance short term debts of Discoms and targets profitability of Discoms through four initiatives - improving efficiencies, reducing cost of power, reducing interest burden and enforcing financial discipline through alignment with state finances. Overcoming structural flaws in the functioning of Discoms by providing them with operational and financial autonomy will ensure strong financials of these companies in the long term. Most of the Discoms are still under the control of state governments which hesitate to revise tariffs to garner public support for the

elections. The number of distribution utilities filing tariff hike petitions and revising electricity prices is declining. At the same time, debt ridden companies lack funds to invest in strengthening of the transmission and distribution (T&D) network incurring higher and higher AT&C and T&D losses.

Trading Summary UDAY Bonds in 2016-17

State	Outright				Repo			
	Trades	Value (Cr)	% Share in Total SDL Traded	Turnover Ratio of UDAY Bonds	Trades	Value (Cr)	% Share in Total SDL Traded	Turnover Ratio of UDAY Bonds
Rajasthan	1439	16417.02	9.56	0.56	508	45881.00	27.06	3.16
Uttar Pradesh	1032	20522.72	11.95	1.05	511	55666.00	32.83	5.69
Haryana	149	1391.39	0.81	0.11	200	36480.00	21.52	5.62
Punjab	1178	11348.07	6.61	1.51	82	3520.00	2.08	0.93
Jharkhand	75	1115.95	0.65	0.40	6	411.00	0.24	0.30
Jammu & Kashmir	273	2458.67	1.43	2.30	2	50.00	0.03	0.09
Bihar	84	683.49	0.40	0.88	103	3996.00	2.36	10.28
Chhattisgarh	175	982.11	0.57	2.26	17	960.00	0.57	4.41
Total	4405	54919.42	31.97	0.74	1429	146964.00	86.69	3.96

Chapter 6 Conclusion

The amendment in the electricity act and UDAY scheme will result in the benefit of the nation with ONE GRID ONE NATION. Our current Prime Minister has implemented these changes in the power industry to bring up the country to the next level. And India is one of the countries who signed the Agreement to fulfill the conditions and go green project.

UDAY is being projected by the government as a shining example of the utilization of the best principles of cooperative and competitive federalism. Despite being an optional scheme, so far, 16 States/Union Territory have joined with the combined Discom debt (including CPSU dues) of around 2.51 lac crore, attracted by incentives to be given to each participating State once the desirable targets mentioned in the agreement are achieved in the next two financial years on one hand, and pushed on the other hand by the dire financial state of their Discoms.

- The power purchaser can opt the supplier by themselves. If they wish, they can change their power supplier at any time.
- The debt of DISCOMS will be reduced, hence the rate of power transmission will be reduced.
- The power supplier can sell the power to nearby purchaser so that the transmission loss can be reduced.
- Power generation will be more and the power cuts will be less.
- Even the rural places can electrify with a lot of options and benefits.
- The ultimate benefit of UDAY will accrue to the final consumers. Reduced levels of transmission and AT&C losses would mean a lesser cost per unit of electricity to consumers.
- Further, financially and operationally healthy DISCOMs would be in a position to supply more power. Higher demand for power from Discoms would mean a higher PLF of generating units and therefore, a lesser cost per unit of electricity which would again mean a lesser cost per unit of electricity to the consumers. Thus, the scheme would allow speedy availability of cheaper power 24x7 to hitherto unconnected villages/households etc. which would in turn boost the economy, provide more employment opportunities for the people of the States and thereby, improve the standard of living of the people.

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Questionnaire

1. Under UDAY, Discoms can convert their debt into state _____ but are required to fulfil certain conditions.
a) Government bonds b) Interest c) Asset d) None of the above
2. ACS stands for _____.
a) Average Currency support b) Average cost of supply c) Annual Cost to Supply
d) Annual Currency support
3. ARR stands for _____.
a) Average Revenue Realized b) Average rate recognized c) Annual Revenue Realized
d) Annual rate recognized
4. RGO stands for _____.
a) Renewable Energy Generation b) Renew Equivalent Guarantee c) Register Energy
Generation d) Recreate Energy Generation
5. India, with an annual per capita CO2 emission of _____ was ranked among the lowest.
a) 1.68 MT/ person b) 1.98 MT/ person c) 1.48 MT/ person d) 1.11 MT/ person
6. The Electricity Act, 2003 which came into effect from _____ replaced some of the previous laws
a) June 05, 2003 b) July 03, 2003 c) June 02, 2003 d) July 05, 2003
7. The Union Cabinet approved the UDAY scheme on _____ for the financial turnaround and revival of Discoms and ensures a sustainable solution to the problem of distribution losses.
a) November 5, 2015 b) December 5, 2015 c) October 2, 2014 d) November 2, 2014
8. Almost _____ of the trading in UDAY bonds in the outright market is done over-the-counter
a) 77.13% b) 89% c) 93.45% d) 79%
9. UDAY is being projected by the government as a shining example of the utilization of the best principles of _____ and competitive federalism.
a) Collective b) Disclosive c) Cooperative d) Profitability
10. UDAY Stands for _____.
a) Ujwal DISCOM Assurance Yojana b) Union DISCOM Acquired Yojana c) Universal DISCOM Acquired Yojana d) Under DISCOM Acquired Yojana