



Affordable 24x7 Power To All @2019-

Fuel Security & Distribution Reforms -



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D.S. Rawat
Secretary General
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Power has emerged as a critical driver for sustainable economic development. However, India incurs a loss of significant portion of its GDP due to shortage of electricity. To bridge the rising demand-supply gap and reduce import dependency of fuel, it is imperative to invest in clean energy technologies and remove transmission and distribution losses, which amount to 26.4% of the produced electricity. It has immediate implication on the tariff for the customer.

Existing grids are constrained to meet growing demands of power along with providing stable and sustainable supply of energy. Such challenges make a compelling case to adopt smart grid technologies in India, which not only improve efficiency of existing grids, but also help meet the growing demand through demand response management system.

I sincerely thank our Knowledge Partner M/s Resurgent India for its effort in preparing the report on this critical issues of affordable 24x7 power to all by 2019.

I believe this publication will serve as a value resource providing necessary information to various stakeholders in the power sector.

I wish the Conference all success



D.S. Rawat
Secretary General

MESSAGE

Jyoti Prakash Gadia
Managing Director
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The government's ambitious plan to provide 24x7 power to all in the country by 2019 reflects its strong commitment to revive growth. The availability of quality, reliable and affordable power helps in the rapid socio-economic growth of the country, especially the backward region. An efficient, robust and financially healthy power sector is imperative for overall growth and poverty reduction.

In order to achieve the programme objectives, the government has set out a bold plan of enhancing the existing generation, transmission and distribution capacities.

Through this report, we have tried to provide a detailed account of activities that the government plans to undertake to strengthen the power sector so as to achieve the objective of 24*7 affordable power by 2019. These activities have been categorized under power generation, transmission and distribution.

Some of the key initiatives around improving power generation include augmenting coal availability and establishing strong linkages of its supply to the thermal power stations and improving rail logistics. Though the recent coal auctions have helped in kick-starting the thermal power projects, high priority needs to be accorded to thermal plants which are already commissioned or ready to be commissioned in the future auctions as well.

Crucial initiatives to improve transmission system include simplifying the land acquisition process for securing the 'Right of way' by formulating a policy which addresses the issue of inadequate compensation raised by the farmers / landowners. At the same time, there should be a mechanism to secure optimal utilization of existing land and ROWs so as to minimize the impact of land acquisition delays and other prevailing uncertainties that impede the progress of the project.

On the power distribution front, the imminent objective should be to reduce AT&C losses. The National Electricity Plan targets reduction of AT&C losses to about 17.5% by 2018-19; achievement of this is closely linked to the overall success of the programme.

Finally, steps have to be taken to correct the loss-making distribution infrastructure by improving the financial viability and operational efficiency of distribution utilities. This would require developing a holistic plan to address issues of discoms pertaining to inadequate financing, delayed payment of subsidies by State Governments and inadequacy and irregularity of tariff revision by the State Regulatory Commissions.

I believe that the success of this programme can lay a solid foundation for growth and economic development in India. I hope that our views in this report will help stakeholders in executing the programme effectively.

Jyoti Prakash Gadia
Managing Director
Resurgent India Limited

Affordable Power to all by 2019

‘Affordable 24x7 Power To All @2019’

Programme Objectives & Background



The Government of India has declared 24x7 power supply as one of the most important objectives of its policy for reviving economic growth. As a result, in June 2014, the Government announced its commitment to provide affordable power to all by 2019. In order to meet the Government's commitment, the Union Power Minister advised the Forum of Regulators (FOR) to develop a road map for achieving the same. Subsequently, the FOR constituted a Working Group to develop a road map for providing 24x7 quality power supply to all consumers by 2019.

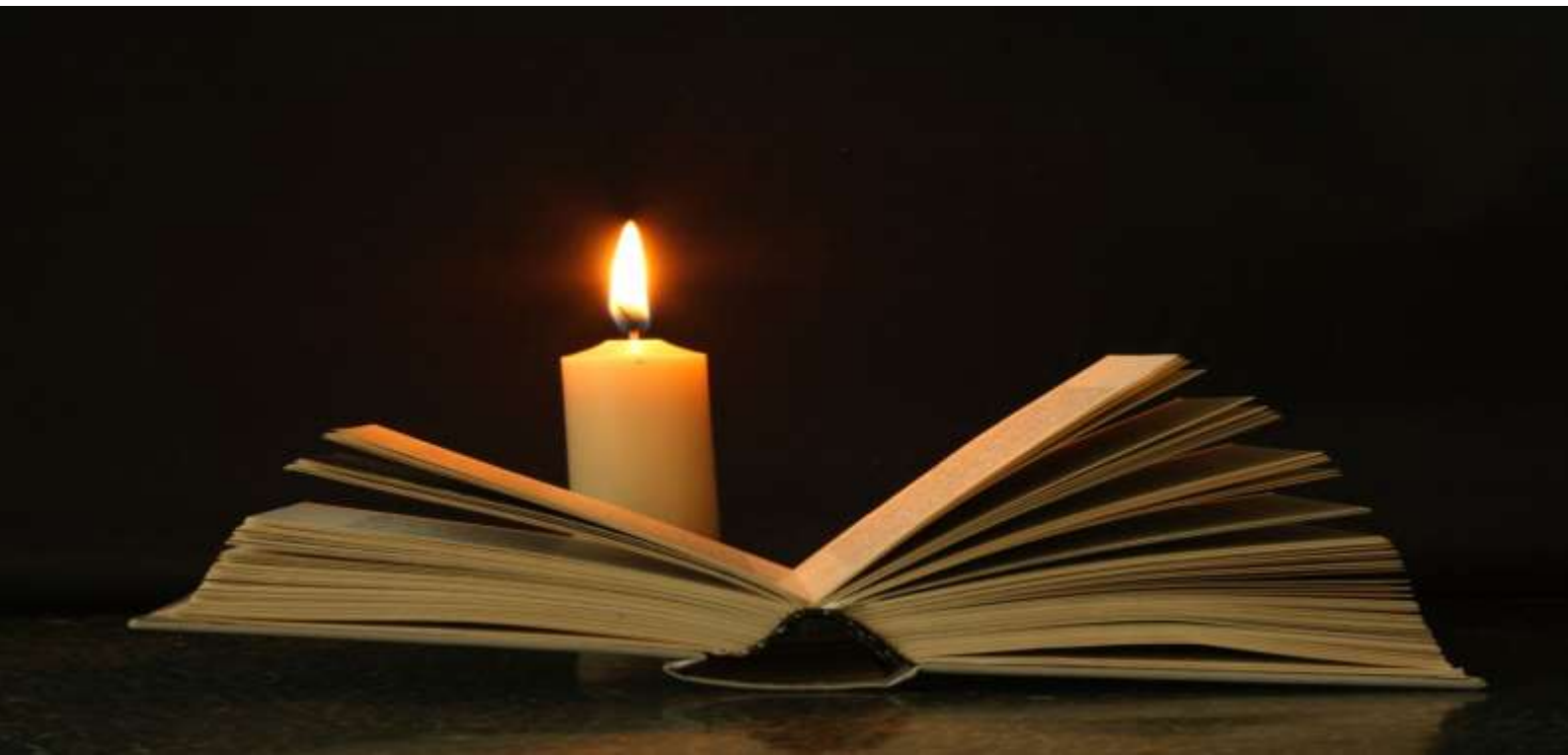
The broad objectives laid down by the Forum of Regulators for the programme are -

1. Achieve reliable 24x7 power supply to domestic, industrial and commercial consumers by 2018-19
2. Ensure power supply for irrigation pumps for 8 to 10 hours a day depending upon the agro climatic factors in different States
3. Provide access to all unconnected households by 2018–19

In order to achieve the programme objectives, the FOR formulated the following strategies -

1. Ensure adequate addition to existing capacity by leveraging both the conventional and renewable sources to meet the forecasted demand
2. Optimize energy mix and improve operational efficiency of state generation plants
3. Strengthen the transmission and distribution network to meet the existing and future demand for power
4. Ensure substantial reduction in AT&C losses
5. Improve the operational efficiency and financial viability of power discoms
6. Introduce energy conservation / energy efficiency measures to reduce end-use energy consumption
7. Extend the electricity supply to all un-electrified households on a mission mode in States which have coverage of houses below the national average

Power Demand & Supply— Analysis and Key findings



Power: Demand and Supply position

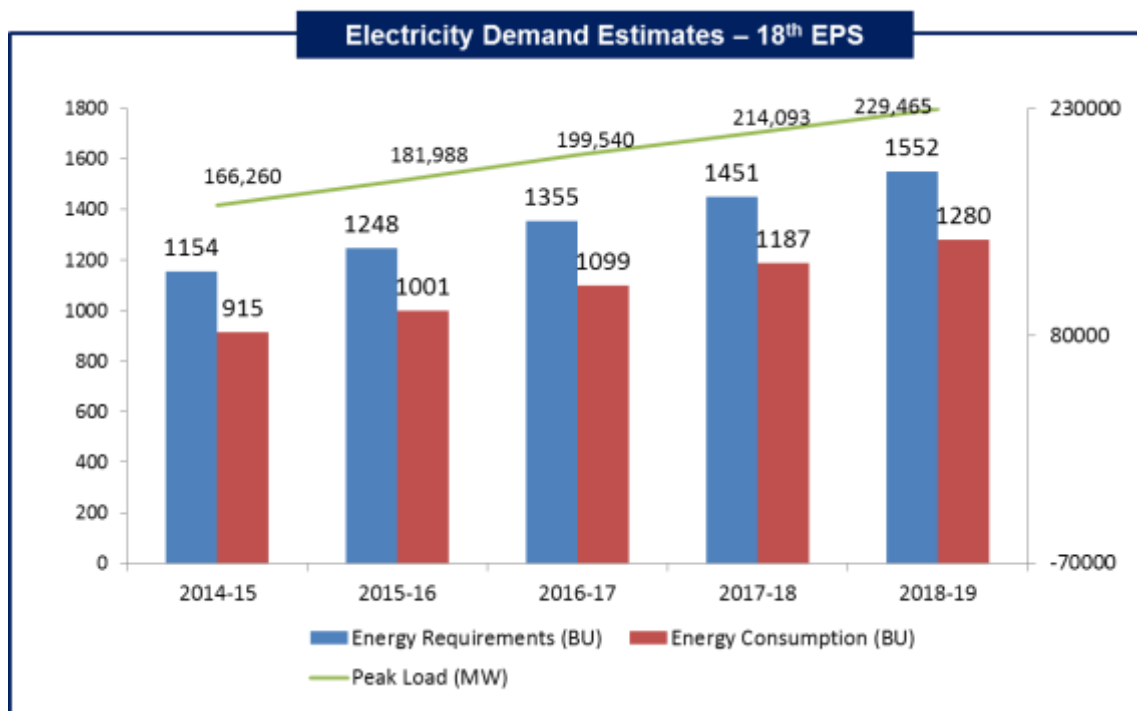
The installed generation capacity in India as on 31st Aug 14 was about 253 GW including 69.50% from Thermal, 16.10% from Hydro, 1.90% from Nuclear and 12.5% from Renewable energy sources. Even with the installed capacity of 253 GW, the demand that could be met during 2013-14 was less than 130 GW, representing a shortage of nearly 15% against the estimated demand of about 156 GW.

The failure to meet the peak demand was mainly due to the following factors – a) The coal and gas power plants operate at low PLF due to fuel supply constraints b) Transmission constraints, and c) The inability of distribution companies to contract long term power supply.

As per the 18th Electric Power Survey (EPS) of Central Electricity Authority (CEA), the energy requirement for the year 2018-19 is expected to be 1552 Billion Units and the peak demand of 2,29,465 MW.

The estimated demand for electricity over the period 2014-19 is shown in the chart below:

Figure 1: Electricity Demand Estimation

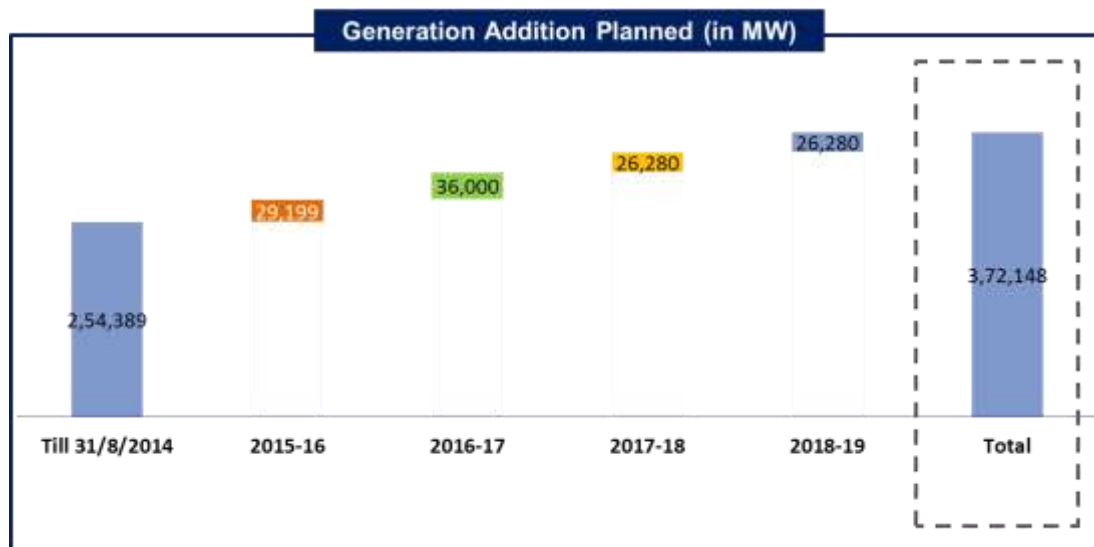


Source: Forum of Regulators, CERC

As per the National Electricity Plan, the generation capacity required by 2018-19 is 3,72,140 MW, which if achieved will result in generation of 1,677 BU adequate to meet the energy requirement.

For meeting the projected demand of 2,29,465 MW in 2018-19, following metrics will have to be maintained – a) Loss of load probability (LOLP) of 0.2% as recommended by the CEA b) Generation capacity will have to be operated at a PLF of 76% for coal and 75% for gas.

Figure 2: Generation Addition Planned (MW) Summary



Source: Forum of Regulators, CERC

Demand & Supply of Power: Key Analysis

The key findings from the demand supply analysis are mentioned below -

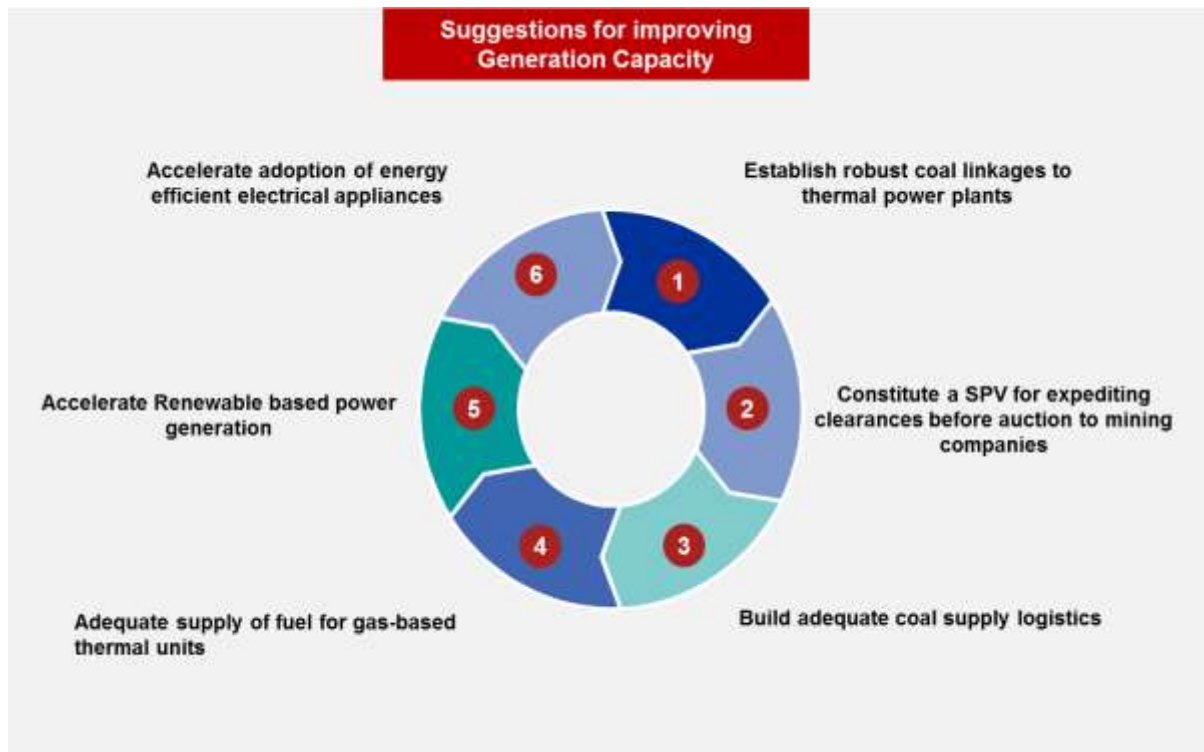
The programme objectives of affordable 24x7 power supply by 2019 can be met if -

- The generation capacity is augmented to 3,72,140 MW by 2019, as envisaged in the National Electricity Plan
- Transmission constraints are minimized including reduction in T&D losses to about 17.5% by 2018-19
- Distribution network is improved including transformation of distribution utilities into operationally efficient and financially viable units
- There is widespread adoption of energy efficiency measures to significantly moderate energy consumption and peak demand

Key Strategies for Achieving Programme Objectives

a) Increase Generation Capacity





In order to meet the programme objectives, additional generation capacity has to be developed based on the projected annual energy demand and peak load requirement. Essentially, the plan should focus on the measures listed below -

Establish robust coal linkages to thermal power plants - Adequate supply of coal for thermal power plants and securing operational capabilities at a higher PLF than what has been achieved in the past are the key imperatives for achieving the overall programme objectives. Creation of additional capacities in coal-based power plants can be achieved, only if proper coal linkages are established for such projects.

The projected domestic coal requirement will be over 800 Mn tonnes by 2016-17 against the projected availability of only 560 Mn tonnes for the power sector. Therefore suitable amendments to the Coal Mining Nationalization Act will be required to enable auction of coal blocks to interested mining companies.

Additionally, the government can also consider augmenting supply of coal through imports. With the international coal prices witnessing a drop, contracts for long term and medium basis can be secured to bridge the gap.

The successful coal auction for re-allocation of 33 of the 204 coal blocks de-allocated by Supreme Court following the coal scam during UPA government, has helped kick-starting at least 20,000 Mw of completed thermal power projects stuck for want of coal linkage. However, in the future auctions as well, due priority should be accorded to thermal plants which are already commissioned or ready to be commissioned in the near future.

Constitute a SPV for expediting clearances before auction to mining companies -The allocation of coal blocks which have not been auctioned yet should be guided by a special purpose vehicle for expediting the process of getting environmental and other clearances before auctioning them to the end users / developers.

Build adequate coal supply logistics - Besides augmenting the supply of coal through mining, efforts need to be directed to strengthen the capabilities of the Indian railways to transport coal to thermal plants located in far flung areas. The option of laying down new railway tracks closer to the thermal plants can be considered. In addition to this, the use of washed coal should be incentivized for thermal plants located more than 500 kms from the coal mines to reduce the problem of logistics and ensure supply of fuel for the generating units

Adequate supply of fuel for gas-based thermal units - Ensuring adequate supply of fuel for the gas-based thermal units is vital to the strategy for providing 24x7 power supply. It is estimated, that the peak demand for power can be met with the operation of all existing gas-based generating units with at least 60% PLF

At present, the installed gas based capacity of about 22,000 MW in India requires about 70 mscmd to operate at a PLF of 70%. However with only about 25 mscmd gas being available, these units operate at significantly lower levels, that is, at 25-30% PLF. Therefore, there is an immediate need to address the issue of the availability of gas at affordable prices so as to supplement the power capacity from gas bases units

Accelerate Renewable based power generation— Considering the fact that the renewables have a short gestation period, there should be emphasis on renewable capacity addition particularly in solar and wind energy. Discoms should be mandated to make payments to RE generators on priority, preferably by opening LCs.

In order to integrate renewable energy successfully into the grid, the following measures need to be undertaken on priority:

- a. Establish 'Renewable Energy Management System' in select states such as Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, Gujarat, Rajasthan and Madhya Pradesh. This management system will monitor the renewable energy generation on real time basis and perform forecasting and scheduling of renewable power in 15 minutes blocks. REMS will provide a consolidated view of renewable power generation value every 15 minutes to the state load dispatch center for each hour, on a 24 hour rolling basis. This will enable the proper scheduling of the rest of the generation in the state.
- b. Develop ancillary services such as frequency balancing mechanisms and hour-ahead markets to secure a higher penetration of renewable energy generation.
- c. One of the issues for renewable-energy rich states is the deviation settlement mechanism. There is a need to review the present scheduling and balancing mechanism enabling higher penetration of renewable energy sources. For example, for wind variation in Tamil Nadu and Karnataka, hydro resources in Karnataka, Kerala and Andhra Pradesh can be used for balancing services.
- d. In order to mitigate network congestion during variation in renewable energy power generation, it is advised to strengthen the inter-regional and inter-state network to accommodate higher renewable power in renewable rich states.
- e. Access to credit is a critical factor impacting building of renewable capacities. Government needs to explore alternative financing options for this sector besides extending credit through IREDA, its nodal agency. Also, the loan tenure for renewable generating projects can be extended to 20 years as against the prevailing 12 year repayment schedule with a moratorium of two years.

- f. Lack of adequate payment security to renewable energy developers has hindered the growth of renewable energy in some states. It becomes difficult for generating companies to service their debt when there is a delay in payments from discoms. In order to resolve this, the Electricity Act, 2003, should be amended to ensure that all distribution companies provide adequate payment security to RE generators in the form of Letters of Credit or Escrow payments.

Over the years, government has taken several steps to promote the use of renewable energy. Some of the recent initiatives by the government to encourage use of renewable energy include introduction of RPOs and RECs. Under the RPO mechanism, discoms are mandated to purchase minimum ratio of their total power from renewable sources. There are however substantial problems with the compliance as majority of discoms record poor adoption and continue to remain below the RPO trajectory.

Further, recently, the government is contemplating steps to make it mandatory for conventional power project developers to set up renewable energy plants in future in order to promote clean energy. The idea of this concept is to make renewable generation obligation (RGO) compulsory for developers of conventional thermal power plants so as to commission renewable energy projects in future. This would be implemented by gradually replacing all old plants with new generation units operating on new technology to improve fuel efficiencies. Under this mechanism, the developers will be able to bundle tariff of both conventional and renewable power to the utilities, and therefore the discoms will not have to comply with RPO targets separately.

Accelerate adoption of energy efficient electrical appliances – Accelerate adoption of energy efficient electrical appliances so as to reduce overall energy requirement and peak demand. Further, it is important to replace existing irrigation pumps with more efficient devices. At present, nearly 20% of electricity is being used in the agriculture sector for pumping water. By replacing the inefficient irrigation pumps with star rated efficient pumps, the country can save about 25–30% of electricity per annum.

b) Strengthen Transmission Infrastructure



Current status of Transmission system - Over the years, the transmission system has evolved from a system of sub regional networks to strong regional networks inter-connected by high voltage transmission lines. Though all the regions are inter-connected, there are persisting congestion problems and corridor bottlenecks constraining the exchange of power from surplus regions to deficit regions.

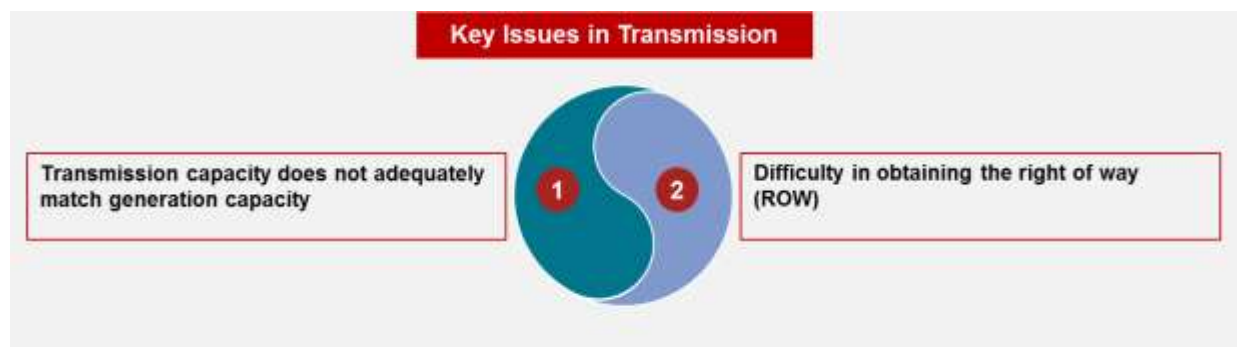
The transmission networks available in the country at the end of 2012-13 are shown below –

Figure 3: Total Line Length in ckm (as on 31st March 2013)

Voltage Class in kV	Length of lines (ckm)
HVDC (OH)	8008
800 kV	6472
400	110408
230 & 220 kV	138534
132/110/90	155595
78/66	58403
33/22/20	395608
15/11	2954056
6.6/3.3/2.2	33026
TOTAL LENGTH	9080556

The total number of step-up transformers installed at various electricity generating stations and sub-stations in the country as on March 2013 was 2,993 having an aggregate capacity of 196,005 MVA. The total number of step-down and distribution transformers were 52,421 and 62,51,685 with an aggregate capacities of 998,663 MVA and 374,418 MVA respectively.

Key issues in the existing Transmission system



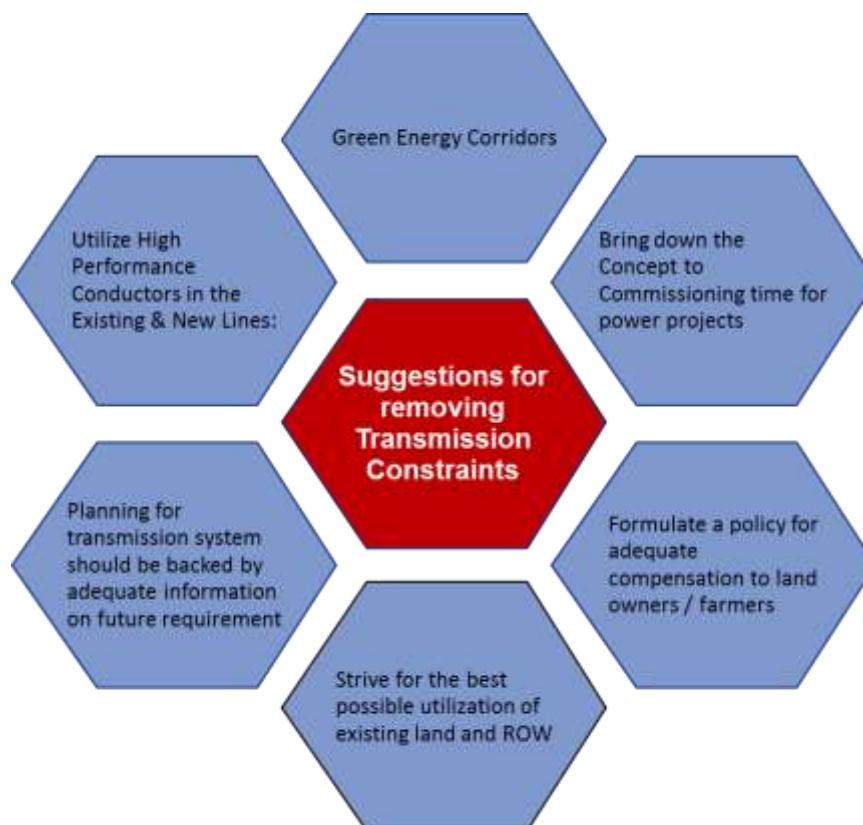
Transmission capacity does not adequately match generation capacity - The present transmission capacity in the country does not adequately match the generation capacity, and is not sufficient to meet the fluctuations in load requirements. This creates holdups in the flow of power from power surplus regions to power deficit regions and between states. For example- In the National Capital Region, inadequate transmission capacities have constrained the flow of power between state boundaries. Likewise, the Southern region states are unable to obtain surplus power from the Eastern and Western Regions (Orissa, Gujarat) due to corridor bottlenecks. As per estimates, in the

Affordable Power to all by 2019

year 2012-13, about 1.93 BU of energy could not be dispatched from generating plants because of transmission constraints.

Difficulty in obtaining the right of way (ROW) - During the 12th Plan period, there is a target to add about 107,440 circuit kilometers (ckm) of transmission lines, 270,000 MVA of AC transformation capacity and 12,750 MW of HVDC systems to the existing transmission system. One of the major challenges faced in the expansion of new transmission lines is the difficulty in obtaining additional right of way (ROW). In order to build the transmission lines targeted in the 12th Plan, about 1.4 million acres of land is required. Acquisition of land for laying transmission networks is resisted by farmers and other land owners mainly on account of inadequate compensation. Major transmission projects are getting delayed on account of the inability of the transmission utilities to obtain ROW as planned resulting in rise in project costs as well as continued inadequacy of transmission capacities.

Suggestions for eliminating the transmission constraints



Bring down the Concept to Commissioning time for power projects – Reduce the conceptualization-to-award process from about 21 months to about 5-6 months under the competitive bidding framework. As a result, the Ministry of Power can save about 5-6 months from the project development time by obtaining some essential clearances in parallel to the project bidding phase. The project team faces significant difficulties in acquiring land for sub stations and RoW in urban areas. This problem pertains to the value of compensation to be paid for the land to the farmer or the land owner. It is imperative that the State governments address this issue to agree on more liberal compensation packages so the time required for land acquisition is reduced.

Planning for transmission system should be backed by adequate information on future requirement: The transmission system should be planned based on potential generation areas and more accurate load projections and capture possible market transactions. All stakeholders need to sit together and share more realistic load and generation projections before arriving at transmission requirement.

Utilize High Performance Conductors in the Existing & New Lines: Use of High Performance Conductors - HTLS need to be adopted to increase power transfer intensity. Additionally, the loadability of the existing transmission system should be increased by adding adequate reactive power compensation through series compensation, dynamic shunt compensation, FACTS and mechanically switched capacitor banks. Further, underground lines should be considered for all transmission below 220 kV, and the RoW in existing corridors used for higher capacity lines.

Strive for the best possible utilization of existing land and ROW- The possibility of more optimal utilization of the existing land and RoWs should be explored since land acquisition is affected by delays and uncertainties. It is imperative to take steps to increase power transfer per width of RoW by upgrading the existing transmission corridors to higher voltages. This can be accomplished by increasing the capacity of transmission lines through re-conductoring using High Temperature Low Sag (HTLS) conductors. It has been observed, that re-conductoring takes much less time (~ 6 months), as compared to creating a new parallel corridor (~ 4-5 years).

Formulate a policy for adequate compensation to land owners / farmers -It has been witnessed that acquisition of land for laying transmission networks is opposed by farmers and land owners on account of the inadequate compensation. Therefore, there is an urgent need to ease this process by formulating a policy for payment of adequate compensation to land owners / farmers based on the present market value.

Green Energy Corridors: There should be a plan in place to increase the generation of renewable energy substantially in the coming years. Factors like availability of land for solar energy units and the potential for wind energy dictate that generation from these sources may be concentrated in a few states in the beginning. The transmission infrastructure should be developed at intrastate, inter-state and inter-regional levels to evacuate additional capacities of renewable energy and remove the transmission constraints.

c) Improve and Enhance Distribution Network



Presence of a robust distribution network is vital to achieve 'affordable power to all by 2019'. At present, the distribution network in the country comprises of a total of 8,603,136 circuit kilometers of distribution lines catering to nearly 200 million consumers. Since majority of the distribution utilities are owned by the State Governments, they are subject to their control and influence in their day to day functioning as well as in the policies pursued by them.

Listed below are some of the suggestions for improving the distribution network in the country-

Upgrade existing distribution network - It has been witnessed that discoms are unable to meet the demand for electricity, which is evident from the frequent load shedding, poor voltage and high degree of interruptions in supply. The programme objectives can be achieved not only by increasing the generation capacity but also by ensuring adequate quality of supply. This would entail significant investments in improving the existing distribution networks. These would include re-conductoring of distribution lines, addition of transformation capacities, and adequate provision of reactive power in the system as well as adoption of smart grid technologies. The funds required for up gradation can be raised by discoms from financial institutions and external aid agencies. These loans can be repaid from revenues arising on account of better efficiency in distribution management.

Undertake research study to estimate future demand for power: It has been noticed, that at present discoms do not properly plan future requirement of power. Programme success will require accurate estimation of demand suitably factoring in the increased electrification of rural areas and other locations. For this, each state would need to undertake an exhaustive study focusing on load estimation / growth and assessing the current level of transmission and distribution losses. Once the information on load profiles and system losses is available, the utilities can adequately plan for power procurement to meet the projected demand.

Electrification of Un-electrified Households: As per 2011 census, six states in the country have more than 40% of their households without electricity. The situation is even worse in north-east states, where more than 50% of its households are without electricity even though resources for power generation are relatively abundant.

Under the programme, the highest priority should be accorded to accomplishing 100% electrification of un-electrified households. For this, a mission mode approach can be adopted, particularly in states, which witness less than the national average proportion of electrified households.

Target reduction in AT&C Losses: The success of the programme rides significantly on the reduction of AT&C losses. The National Electricity Plan targets reduction of AT&C losses to about 17.5% by 2018-19. To achieve this, special programs can be developed to strengthen distribution networks and to reduce unauthorized use of power. This will require substantial investments in upgrading the distribution networks by converting low voltage distribution lines into High Voltage Distribution Systems (HVDS), rigorous energy auditing, preventing theft of power by switching to aerial-bunched cables (ABC) and by improving the metering system in the rural and urban areas.

Comprehensive adoption of consumer level and DTC level metering: The strategy for 'Affordable 24*7 power for all by 2019' must include universalization of consumer level and DTC level metering. Absence of metering and accounting of energy at different levels in the distribution network causes losses to discoms. Due to these losses, there is increasing burden of subsidy payments on the State Governments and, in some cases, unsustainably high tariff for the paying consumers. The SERCs should mandate implementation of DTC metering with advanced metering systems as part of the capital expenditure of the distribution utilities.

Need for reforms around electricity supply to agricultural sector – There is a pressing need for reforms around electricity supply to the agriculture sector. It has been noticed, that in most states, the supply to the agriculture sector is unmetered and subsidized which results in losses for the discoms. Though the subsidy payments by the state government are a relief but are not adequate to cover the cost of supply to the agriculture sector. Also, the payment of subsidy by State Governments is not made on a timely basis in spite of the legal requirement of advance payment of subsidy under the Electricity Act, 2003.

Adoption of energy efficient measures in the agricultural sector -There is a significant potential for adoption of energy efficient measures in the agricultural sector. There have been instances of successful pilot projects across several states like Gujarat, Maharashtra and Karnataka, where inefficient irrigation pumps were replaced with star rated pumps resulting in energy savings up to 25-30%. Going forward, several discoms should start investing in energy efficient pumps with the help of energy saving companies (ESCOs).

Establish dedicated feeders for agricultural use: There is an urgent need for states to take up feeder segregation to regulate electricity supply to the agriculture sector. The states which book significant electricity consumption for irrigation purposes should consider setting up dedicated agricultural feeders which are separate from the rural feeders so as to ensure 24x7 supply to consumers and to reduce peak demand by avoiding supply to irrigation pump sets during peak hours.

This step will not only help in regulating the quantity of subsidized supplies, but will also support in scheduling supply to the agriculture sector during off-peak hours. Example- Gujarat has implemented a feeder separation programme under the name 'Jyothi Grama Yojana'. This programme has been successful in supplying power to the agriculture sector for about 8–10 hours a day and 24x7. Other states such as Punjab, Madhya Pradesh, Andhra Pradesh and Karnataka have also adopted feeder separation programs to regulate electricity supply to the agriculture sector.

Leverage solar energy for meeting irrigation requirement- Solar energy can be leveraged to power irrigation pumps, given the softening of prices of solar PV cells in recent years. This will help in solving irrigation problems especially on sunny days, when the requirement for irrigating crops is maximum. The resultant savings in energy will also help in reducing the subsidy burden on the State Governments and non-agricultural consumers. Government should initiate a major programme for incentivizing the use of solar power for irrigation pump sets to progressively reduce the use of grid power for irrigation.

Reform the management culture in discoms- There is an urgent need to reform the culture in discoms which currently lacks commercial direction, merely focusing on providing services without much regard for financial returns. The distribution utilities are therefore caught in a vicious cycle of poor quality supply, leading to inadequate recovery of cost of service, which affects their ability to incur capital and maintenance expenditure to improve the quality of supply. The discom resources including the field / operations staff and the management need to be trained in techno-commercial and regulatory aspects to increase both their technical efficiency and financial accountability. For this purpose, Government should consider establishing Power Sector Management Training Centers in each State.

Improve financial effectiveness of discoms: The non-recovery charges for discoms from consumers such as farmers, local bodies and even government departments are massive, amounting to INR 70,000 crore per year. Consequently, these discoms are unable to procure the required quantity of electricity due to their weak financial position. As a result, the discoms have not been able to make

necessary investments to strengthen the distribution networks and adopt standard maintenance practices to ensure satisfactory quality of supply.

The viability of the entire power sector depends upon the financial health and the operational efficiency of the discoms. Therefore, it is important to focus on improving their performance, especially the performance of the Government owned discoms. These discoms need to be reoriented to adhere to operational procedures so as to achieve the overall programme objectives.

The availability of adequate institutional finance, timely payment of subsidies by State Governments and adequacy and regularity of tariff revision by the State Regulatory Commissions will go a long way in securing the financial effectiveness of discoms.

Remodel the subsidy payment system- One of the main reasons responsible for the poor financial viability of discoms is the inadequate returns from the subsidized consumer categories such as farmers and other weaker sections. Due to the poor financial position of the state governments in some states, the subsidy payments to discoms are either delayed or irregular, thereby further compounding their problems. Therefore, in order to address this issue, it is imperative to design a system of ensuring that payment of subsidies to electricity utilities for free or subsidized supply is made a priority charge on the state finances.

Adequate and timely revision of tariffs by SERCs - There is a need for adequate and regular tariff revisions by the State Electricity Regulatory Commission to ensure effective functioning of discoms. Guided by a notification issued by the Appellate Tribunal for Electricity in November 2012, the SERCs have been introducing tariff revisions in some states where tariff revision was delayed or was irregular in the past. This measure needs to be replicated in SERCs across other states as well.

Financial restructuring of unviable discoms- It has been witnessed, that majority of the discoms have not availed the option of financial restructuring that was available under the Shunglu committee report. Most distribution utilities have not only recorded accumulated losses, but also unrecoverable arrears on their balance sheets as part of their assets. Therefore, the financial restructuring scheme needs to be modified to identify the actual financial strength of discoms by excluding such unrecoverable dues and making applicable to all distribution utilities which are in need of institutional finance to implement distribution reforms.

Set up power planning cells under the guidance of central electricity authority- There is a need to set up power planning cells at the state level to support discoms in preparing and submitting plans for the next 5-10 years. At present, most states do not have an agency to support the overall planning and coordination for the development of the power sector.

Adoption of Smart Grid technology- Recently, the government initiated National Smart Grid Mission to make the Indian power infrastructure cost effective, responsive and reliable.

Smart-grid facilitates efficient and reliable end-to-end intelligent two-way delivery system from source to sink through integration of renewable energy sources, smart transmission and distribution. Smart-grid also enables real time monitoring and control of power system as well as helps in reduction of AT&C losses, demand response and demand side management, power quality management, outage management, smart home energy system, etc.

Smart-grid technologies are being increasingly deployed in developing and industrially developed, countries. Smart-grid technologies enable utilities and their customers to enhance energy efficiency, increase the reliability and resilience of power supplies, and reduce greenhouse gas emissions at the

same time. In this way, smart-grid technology brings efficiency and sustainability in meeting the growing electricity demand.

Commercial and industrial facilities account for nearly 50 percent of peak electricity demand in India. That puts great value on the smart grid technology that can improve energy efficiency and intelligently adjust to grid supply-and-demand conditions.

Recently, Honeywell and Tata Power Delhi Distribution (TPDDL) announced installation of automated demand response (ADR) system for commercial and industrial companies in an area in New Delhi. This ADR system enables the utility to optimize grid performance, that is, reduce energy consumption during times when grid supply is low or strained. Further, this technology also helps in reducing brownouts and blackouts that periodically affect residents and businesses across the covered area.

Smart-grid technology and systems, along with renewable energies such as solar and wind power, can reduce the need to mine and burn more coal and import oil while greatly expanding energy access and security. Going forward, smart grid technology can play a pivotal role in addressing longstanding sustainable energy and development challenges in India.

Overall Funding Requirement to meet Programme Objectives



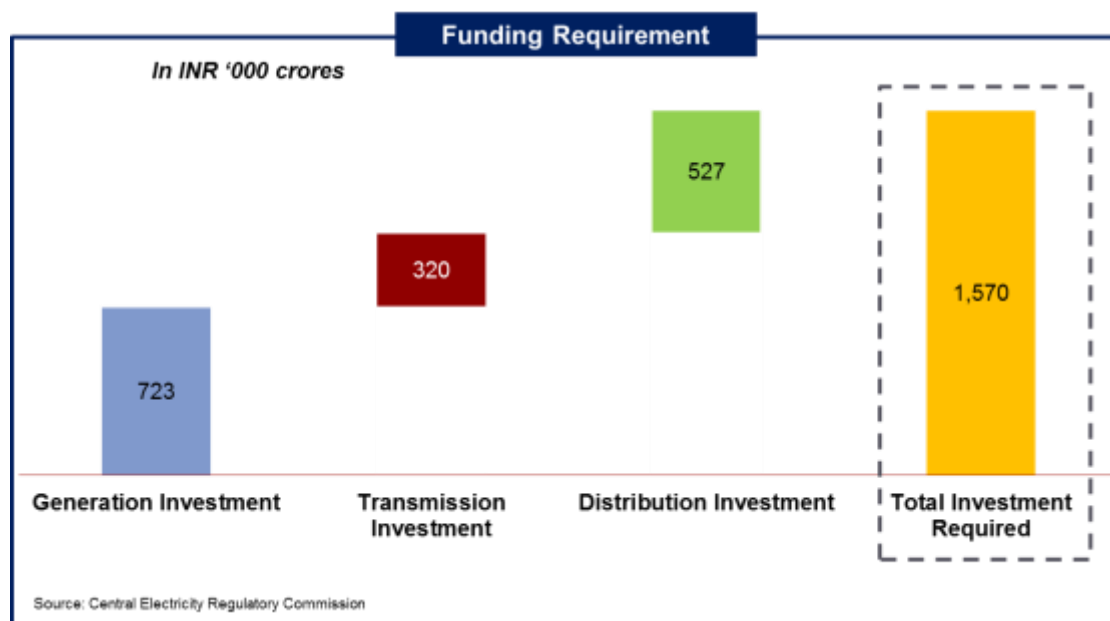
In order to meet the programme objectives of providing 'Affordable power to all by 2019' an investment of INR 15,70,397 Crore would be required. This amount would be required in the area of power generation, transmission and distribution. The investments required in each of the segment would be as following -

Generation: As per estimates, about INR 7,23,397 Crore of investment is needed in the generation sector to achieve required generation target by 2018-19. Most of this investment is expected to flow from the private sector.

Transmission: About INR 3,20,000 Crore of investment is needed to build a secure and reliable transmission system. This investment accounts for both the central and state sector.

Distribution: About INR 5,27,000 Crore of investment is required in the distribution system in the next five years to supply quality and reliable power to all consumers. Even though the investment appears to be higher side, the loss reduction and the efficiency improvement will pay back the investment in a shorter period. This investment also includes the agriculture feeder segregation program being envisaged as recommended by the other sub-committee of FOR.

Figure 4: Total Funding Requirement



Conclusion



The Government is committed to provide affordable power to all by 2019 as it considers it as one of the important levers for reviving growth. In the past, it has been witnessed that the demand for power has not been adequately met on account of several factors such as fuel supply, transmission and distribution constraints.

In order to achieve the programme objectives of 24*7 affordable power, several measures will have to be taken across power generation, transmission and distribution.

As per estimates, in order to achieve the programme objectives, the projected demand of 2,29,465 MW will have to be met by 2018-19; This will require increasing the installed capacity for power generation from the present 2,53,000 MW to 3,72,140 MW by 2018-19.

One of the key steps in improving power generation includes building strong linkages between thermal plants and coal supply so as to meet the expected demand of 800 million tonnes by 2018. Further, rail logistics need to be strengthened for better coverage and transport of larger volume of coal.

For improving the transmission infrastructure, there is a need to augment the Inter-regional / Inter-state transmission capacity by adding new transmission lines so as to increase the Inter State transmission capacity from the present 27750 MW to 68050 MW. Further, in order to ease the land acquisition process for ROW an appropriate compensation policy need to be formulated which

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addresses the issues of the farmers / landowners. While this is done, measures to undertake the optimal utilization of existing land and ROWs should be initiated.

On the power distribution front, there is an urgent need to upgrade the existing distribution network and reduce AT&C losses. The achievement of the latter is critical to the overall success of the programme. The National Electricity Plan targets reduction of AT&C losses to about 17.5% by 2018-19. To achieve this, special programs aimed at reducing the unauthorized use of power have to be developed such as rigorous energy auditing, preventing theft of power by switching to aerial-bunched cables (ABC) and improving the metering system in the rural and urban areas.

Additionally, the financial viability of the discoms will have to be improved as the overall effectiveness of the power sector is based on their performance. A suitable approach has to be developed which addresses the principal issues of discoms around adequate financing, timely payment of subsidies by State Governments and adequacy and regularity of tariff revision by the State Regulatory Commissions.

In order to achieve the overall programme objectives, an investment of INR 15,70,397 Crore will be required. Given the limited resources of the government, the private sector is expected to play a pivotal role in meeting the investment target.

About ASSOCHAM

THE KNOWLEDGE ARCHITECT OF CORPORATE INDIA

Evolution of Value Creator

ASSOCHAM initiated its endeavour of value creation for Indian industry in 1920. Having in its fold more than 400 Chambers and Trade Associations, and serving more than 4,00,000 members from all over India. It has witnessed upswings as well as upheavals of Indian Economy, and contributed significantly by playing a catalytic role in shaping up the Trade, Commerce and Industrial environment of the country. Today, ASSOCHAM has emerged as the fountainhead of Knowledge for Indian industry, which is all set to redefine the dynamics of growth and development in the technology driven cyber age of 'Knowledge Based Economy'. ASSOCHAM is seen as a forceful, proactive, forward looking institution equipping itself to meet the aspirations of corporate India in the new world of business.

ASSOCHAM is working towards creating a conducive environment of India business to compete globally. ASSOCHAM derives its strength from its Promoter Chambers and other Industry/Regional Chambers/Associations spread all over the country.

VISION

Empower Indian enterprise by inculcating knowledge that will be the catalyst of growth in the barrier less technology driven global market and help them upscale, align and emerge as formidable player in respective business segments.

MISSION

As a representative organ of Corporate India, ASSOCHAM articulates the genuine, legitimate needs and interests of its members. Its mission is to impact the policy and legislative environment so as to foster balanced economic, industrial and social development. We believe education, IT, BT, Health, Corporate Social responsibility and environment to be the critical success factors.

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ASSOCHAM represents the interests of more than 4,00,000 direct and indirect members across the country. Through its heterogeneous membership, ASSOCHAM combines the entrepreneurial spirit and business acumen of owners with management skills and expertise of professionals to set itself apart as a Chamber with a difference. Currently, ASSOCHAM has more than 100 National Councils covering the entire gamut of economic activities in India. It has been especially acknowledged as a significant voice of Indian industry in the field of Corporate Social Responsibility, Environment & Safety, HR & Labour Affairs, Corporate Governance, Information Technology, Biotechnology, Telecom, Banking & Finance, Company Law, Corporate Finance, Economic and International Affairs, Mergers & Acquisitions, Tourism, Civil Aviation, Infrastructure, Energy & Power, Education, Legal Reforms, Real Estate and Rural Development, Competency Building & Skill Development to mention a few.

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ASSOCHAM derives its strengths from the following Promoter Chambers: Bombay Chamber of Commerce & Industry, Mumbai; Cochin Chambers of Commerce & Industry, Cochin; Indian Merchant's Chamber, Mumbai; The Madras Chamber of Commerce and Industry, Chennai; PHD Chamber of Commerce and Industry, New Delhi and has over 4 Lakh Direct / Indirect members. Together, we can make a significant difference to the burden that our nation carries and bring in a bright, new tomorrow for our nation.

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