

CONTENTS

CHAPTER	DESCRIPTION	PAGE NO.
	PREFACE	i-iv
	OVERVIEW OF POWER SECTOR	v-xxvii
	EXECUTIVE SUMMARY	1-64
Chapter 1	DEMAND FOR POWER AND GENERATION PLANNING	65-138
Chapter 2	TRANSMISSION PLANNING	139-172
Chapter 3	DISTRIBUTION INCLUDING VILLAGE AND HOUSEHOLD ELECTRIFICATION	173-210
Chapter 4	LEGISLATIVE & POLICY ISSUES- FORMULATION, IMPLEMENTATION & FEEDBACK	211-250
Chapter 5	DEMAND SIDE MANAGEMENT ENERGY EFFICIENCY & ENERGY CONSERVATION	251-268
Chapter 6	RESEARCH & DEVELOPMENT	269-302
Chapter 7	KEY INPUTS	303-340
Chapter 8	FINANCIAL ISSUES OF POWER SECTOR	341-386
Chapter 9	HUMAN RESOURCE DEVELOPMENT	387-406
Chapter 10	DEVELOPMENT OF POWER SECTOR IN NORTH-EASTERN REGION	407-432
	ACRONYMS	433-440



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PREFACE

The Planning Commission constituted the Working Group on Power to formulate the programme for development of the power sector during the 12th Plan, under the Chairmanship of Secretary (Power) with Member (Planning), CEA as its Member Secretary.

Since its constitution in March 2011, the Working Group held three meetings on 20th April, 2011, 28th July, 2011 and 26th September, 2011 respectively. During the first meeting of the Working Group, it was decided to constitute nine specialized Sub-Groups to address specific areas of the power sector and to comprehensively cover all the Terms of Reference of the Working Group. The Subgroups separately held their deliberations and their progress was regularly reviewed. This Report of the Working Group is a product of the culmination of the efforts put in by the various Subgroups.

Over the past 60 years or so, India has taken rapid strides in the development of the power sector both in terms of enhancing power generation as well as in making power available to widely distributed geographical boundaries. In order to meet the increasing demand for electricity, to fuel the economic growth of the country, large additions to the installed generating capacity and development of associated transmission and distribution network are required. However this developmental process has to be within the realms of sustainable development and environmental concerns.

During the past, the power sector was perceived to be riddled with some fundamental weaknesses, which necessitated initiation of the reform process in the Sector. Even though a number of policy initiatives have been put in place, the task of transforming the power sector is yet to be achieved. Our endeavor is to realise the stipulations of the Electricity Act 2003 as well as various policies of the Government and to ensure fructification of their intended benefits. Further, lifeline energy needs of all households must be met. Therefore, it has been the vision and the constant effort of the Government, to not only increase the generation of power in the country but also to ensure that power reaches all people with particular attention to the poor and vulnerable sections of the society.

The various Sub-Groups formed under the main Working Group deliberated on various issues as per their Terms of Reference inter alia covering Demand Projections, Generation, Transmission, Distribution including Households & Rural Electrification, Regulatory and Policy Issues, Demand Side Management & Energy Efficiency measures, Research & Development, Key Inputs, Manpower Planning & Training and Fund Requirement. The Report of the Working Group is based on the final Subgroup Reports and includes a separate chapter on development of North-Eastern Region.

The planning for the 12th Plan is in accordance with the Government's Low Carbon Growth Strategy to ensure sustainable development of the power sector. The Working Group Report has estimated a capacity addition of about 76,000 MW during the 12th Plan to meet the demand projections of the country. In our efforts to reduce GHG emissions, emphasis is being given to the development of nuclear power, hydro power as well as power from renewable sources. While planning for 12th Plan, the impact of Demand Side Management as well as Energy Efficiency measures by Bureau of Energy Efficiency have also been accounted for. However, each State needs to adopt futuristic planning and based on its estimates of requirement and availability of power from different sources, must tie-up for balance power requirement with power producers. Since need is felt to create peaking capacity in the country, the Working Group has recommended setting up of a Task Force under CERC to comprehensively address all issues related to creation of peaking and reserve capacity in the country. The Report also broadly indicates the capacity addition requirement during 13th Plan so that advance action could be initiated during the 12th Plan itself.

During the last five years we have almost fulfilled our dream of having, "One Nation One Grid". Commensurate with the generation capacity addition plans, transmission and distribution network has also been planned to facilitate power reaching the ultimate consumer. An Inter Regional transmission capacity of 37,800 MW has been planned for the 12th Plan. Transmission line additions of about 1,00,000 ckt. Kms, HVDC terminal capacity of 13,000 MW and AC transformation capacity of 2,70,000 MVA has been planned for the 12th Plan. The country need to initiate steps to evolve Smart Transmission Grid with a view to improve the reliability & efficiency of the power sector as a whole. The Report also outlines the strategy to evolve Smart Transmission Grid.

To ensure that the benefits of the increased availability of power reaches the poorest of the poor living in the rural areas, the Government has implemented the Rajiv Gandhi Grameen Vidyutikaran Yojana with vigour and determination. The Government's R-APDRP initiative aims at reducing AT&C losses through application of IT for energy auditing and accounting and through technological up gradation and strengthening of distribution infrastructure. Apart from availability and access, it is imperative to supply reliable and quality power. Reliability is manifested in the twin matrix of system availability and adequate reserves and redundancies across the value chain to cater to unforeseen situations. Since the distribution sector still remains an area of concern, major constraints being experienced and suggestions to make the distribution sector technically robust and financially viable have been covered by the Report.

The Mission of the Government is to provide quality power to all at reasonable rates. The enactment of the Electricity Act in June 2003 was a major milestone, which paved the way for development of the power sector within a competitive and liberal framework while protecting the interests of the consumers, as well as creating a conducive environment for attracting investments in the sector. The National Electricity Policy and the National Tariff Policy were finalized by the Government to steer the evolution of the power sector within the ambit of the Act. However, while traversing the developmental path, need has been felt to review certain aspects of the Electricity Act and the Government's policies. This is essential in order to make the Government's objectives achievable in accordance with the stipulated intentions, within the boundaries of the institutional and financial viability. The power sector can not deliver on its social commitments unless it is commercially and financially viable. To improve the financial health of the distribution utilities, measures are required to strengthen governance standards of DISCOMS, tariff rationalization and optimising the procurement cost of power. To cover all these issues, appropriate recommendations have been made by the Working Group in respect of legislative and policy changes required to keep the reform process on track. These need to be taken up by the Government on priority.

As a responsible nation, a two pronged strategy has been adopted whereby on one hand, continuous efforts are being made to augment the supply of clean and green power, and on the other, emphasizing the need for demand side management and energy efficiency measures. Energy Efficiency and Demand Side Management has assumed great importance in view of the need to conserve depleting energy resources as well as to minimize the carbon footprint of the power sector. Various programmes of the Bureau of Energy Efficiency have been outlined along with the likely impact and savings expected during the 12th Plan. Research and Development in the power sector is required to play an important role and therefore collaborative research in a phased manner is needed to bridge the gap between knowledge and technology. This is expected to go a long way in finding solutions for the problems existing as well as likely in the future. Areas in the power sector requiring R & D have been identified in the Report.

Timely availability of key inputs and Infrastructural support is essential for the development of the power sector. The Report highlights the requirement of various inputs, constraints being experienced in their availability and possible measures which are required to be taken. The report has identified shortage of fuel as a major challenge to the power sector. Unless adequate availability of fuel (coal & gas) is ensured for the generating plants (existing & those on the anvil) it would be very difficult to maintain the momentum of the Sector. Human resource development and capacity building demands a very pragmatic approach to attract, utilize, develop and conserve valuable human resources. A separate chapter on North Eastern Region has also been included.


The Working Group has estimated that the total fund requirement during the 12th Plan, considering each aspect of the power sector, is expected to be about Rs 14 lakh crs including Rs. 1,35,100 Cr required for renewable.

As the Indian power sector is embarking on increasing the generation and transmission capacities, key challenges lie ahead and are required to be dealt with. Power sector is poised at a crucial juncture where it is expected to meet the growing challenges of the future as well as being faced with some fundamental constraints in its path of evolution. With ambitious capacity addition plans, fuel emerges as the most significant constraint, which project developers have to grapple with and the lenders are hesitant to take the risk. Poor financial condition of State utilities due to high AT&C losses and inadequate tariff also are major constraints in the sector. Other major constraints being faced by the power sector pertain to delays in environment clearances and other key inputs such as land and water. Shortage of talent and trained manpower in the construction sector is a long term problem and is likely to continue to push up project costs and risks. Even though concerted efforts are being made to tackle these issues, it is felt that since they concern initiatives/ action to be taken by various other Ministries and Departments, intervention at the highest level is required to comprehensively work out plausible solutions.

I may mention that the capacity addition of 76,000 MW being planned for the 12th Plan comprises of about 63,000 MW coal based projects which are expected to fructify provided adequate domestic coal is available for the power projects. Import of coal to meet shortfall of domestic coal is inevitable, but related issues of increase in cost of generation and thus the tariff increasing has also to be addressed. Therefore the matter related to availability of domestic coal needs to be vigorously pursued and domestic coal production needs to be increased to meet the requirement of the 12th Plan power projects. Shortage of domestic gas will also have to be addressed on priority.

Of course the challenges before the power sector are many, but I am sure we would be able to tackle them with the support of all the stakeholders. I sincerely hope that the "Working Group Report on Power for 12th Plan" would be useful for preparation of 12th Plan documents by Planning Commission.

I acknowledge the contribution of all the members of the Working Group, the various Subgroups and the officers from Ministry of Power and Central Electricity Authority but for whose efforts this report would not have been possible.



(P. Uma Shankar)

New Delhi,
January 2012

Secretary to the Government of India
Ministry of Power &
Chairman, Working Group on Power

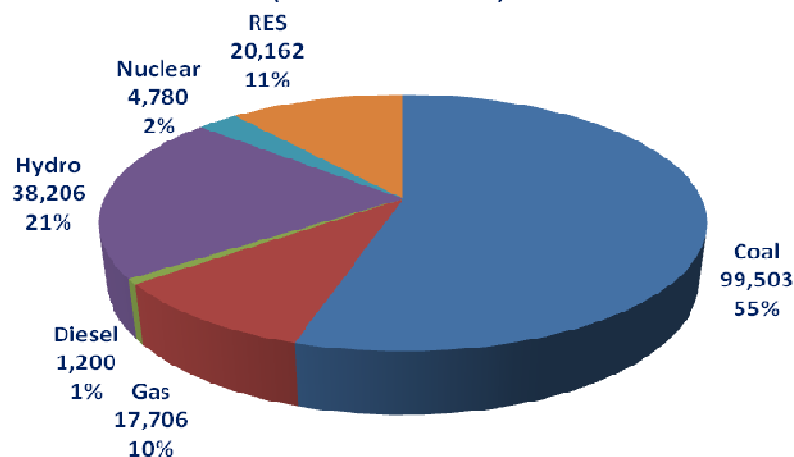
OVERVIEW OF POWER SECTOR

Power Sector is at a crucial juncture of its evolution from a controlled environment to a competitive, market driven regime which endeavors to provide affordable, reliable and quality power at reasonable prices to all sectors of the economy. The Gross Domestic Product (GDP) of our country has been growing at the rate of about 8% for the last several years. The liberalization and globalization of the economy is leading to an increased tempo in industrial and commercial activities and this, coupled with penetration of technology and I.T. in the day-to-day life of the common man, is expected to result in a high growth in power demand. It is accordingly essential that development of the Power Sector shall be commensurate with the overall economic growth of the nation.

The Indian power sector is one of the most diversified in the world. Sources for power generation range from commercial sources like coal, lignite, natural gas, oil, hydro and nuclear power to other viable non-conventional sources like wind, solar and agriculture and domestic waste. The demand for electricity in the country has been growing at a rapid rate and is expected to grow further in the years to come. In order to meet the increasing requirement of electricity, massive addition to the installed generating capacity in the country is required. While planning the capacity addition programme, the overall objective of sustainable development has been kept in mind.

Since its structured growth post Independence, Indian power sector has made substantial progress both in terms of enhancing power generation and in making available power to widely distributed geographical boundaries. The Installed generation capacity in the Utility sector has increased to about 1,81,500 MW at the end of August 2011. The Indian power sector is largely coal based with the total Installed Capacity comprising of 99,503 MW (55 %) coal based, 17,706 MW (10%) gas based, 1200 MW (1%) diesel generation, 38,206 MW (21%) hydro, 4,780 MW (2 %) nuclear and 20,162 MW (11%) from renewable energy sources. Development of Renewable Energy Sources is being accorded special

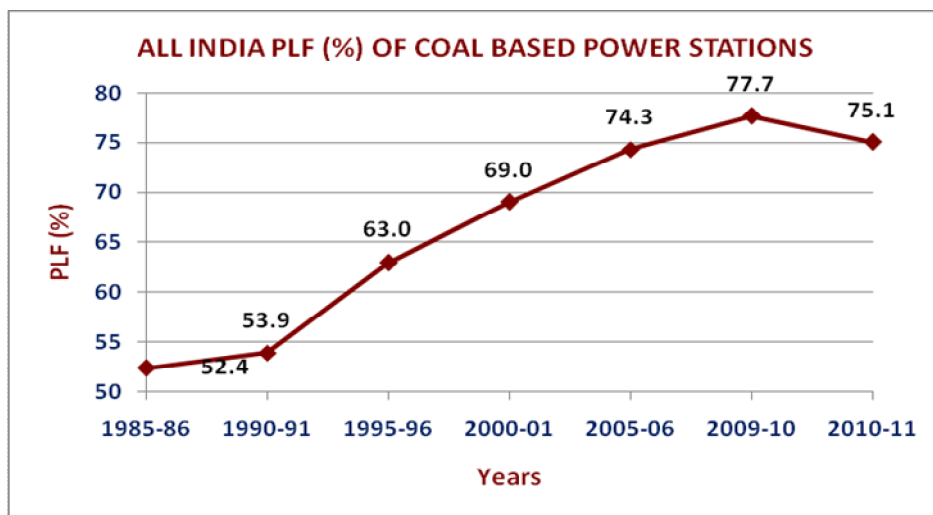
GROWTH OF ELECTRICITY GENERATION IN INDIA (END OF AUG.2011)



emphasis in view of their inherent advantages. The Installed Capacity from Renewable Sources has grown to 20,162 MW in June 2011 comprising 3,226 MW in State Sector & 16,936 MW in Private Sector.

The total annual power generation has grown to about 811 BU, whereas the thermal generation has grown to 665 BU in 2011. The performance of thermal power plants in the country has steadfastly improved and the Plant Load Factor of coal based stations has increased from 52.4% during 1985-86 to 77.68 % in 2009-2010 & 75.06% during 2010-11. The Installed Capacity of captive power plants having more than or equal to 1MW capacity has grown to more than 30,000 MW at present.

Over decades, a robust inter-state and inter- regional transmission system has evolved in the country which facilitates widespread reach of power over the vast area of the country. In 1947 the maximum voltage level of transmission line was 132 kV which was subsequently increased to 220 kV in 1960 and 400 kV in 1977. To reduce Right of Way requirement for transmission lines and overcome



constraints in availability of land for substations, 765 kV transmission voltage is being increasingly adopted and Gas Insulated Stations are being provided wherever availability of land is a problem. HVDC 500 kV back to back was introduced in the year 2000.

Recognizing the need for development of National Grid, thrust was given to enhancement of the interregional capacity in a phased manner. The total Inter-regional transmission capacity by the end of 10th Plan was 14,050 MW which is now planned to grow to about 25,650 MW by 11th Plan end.

The per capita consumption of electricity in the country has increased from 15.6 units in 1950 to about 766 units during the year 2009-10. The National Electricity Policy of the Government of India stipulates that this is to be increased to over 1000 units per annum in 2012.

At the time of Independence, only about 1500 villages of the country had access to electricity. The scenario has changed significantly since then. It has been possible to extend electricity to about 5,38,296 numbers of villages out of a total of 5.93,732 as per census of 2001 villages thereby electrifying 90.8% of villages. As per rough estimates, out of this about 18,000 villages are located in remote and difficult areas and it is not possible to extend power supply to these villages through the existing power grid. Electrification of these villages, therefore, is proposed to be done through various sources of distributed generation including non-conventional sources of energy.

In spite of the massive addition in generation, transmission and distribution capacity over the last sixty years, growth in demand for power has always exceeded the generation capacity augmentation. Although the country has achieved capacity addition of about 1,81,500 MW over the last Six decades, peak and energy shortages of varying magnitude are being experienced. During the year 2010-11, the country faced an energy shortage of 73,236 MU(8.5%) and a peak shortage of 12,031 MW (9.8%).

During the 11th Five Year Plan, a capacity addition of about 52,000 MW is expected which is over 250% of the achievement during 10th Plan and highest ever since independence. The high achievements of the 11th Plan have been facilitated due to the stringent monitoring of ongoing power projects at various levels in CEA/MOP. Other Initiatives of the Government have been the formulation of the New Hydro Policy, setting up of Ultra Mega Power Projects, enhancing the partnership of private sector in manufacture of power equipments and Bulk ordering of 11 units of 660 MW each with supercritical technology with mandatory phased indigenous manufacturing programme to promote indigenous manufacturing capability.

The Working Group on Power was constituted by the Planning Commission vide its Office Order No.1-15/1/2011-P&E dated 4th March, 2011 to formulate the power programme for 12th Plan. Secretary (Power) was the Chairman of the Working Group and Member (Planning), CEA was the Member Secretary of the Working Group. The Composition and Terms of Reference of the Working Group for Twelfth Plan are given in **Appendix-A**.

The first meeting of the Working Group was held on 20th April, 2011 under the Chairmanship of Secretary (Power). It was decided to constitute 9 specialized Sub-Groups to go into the specific areas to cover comprehensively all the Terms of Reference of the Working Group. Subsequently, review meetings of the Working Group were held in MoP on a regular basis to assess the progress of the Sub-Groups from time to time. Details of the various Sub Groups and Term of Reference are enclosed in **Appendix- B**

The Sub-Groups discussed various issues regarding Demand, Generation, Transmission & Distribution Expansion Planning, Households & Rural Electrification, Demand Side Management & Energy Efficiency Issues, Research & Development, Manpower Planning & Training and Fund Requirement. A separate chapter has also been included on development of North Eastern Region.

The report is based on 11th Plan likely capacity addition of 62,374 MW corresponding to which the 12th Plan capacity addition requirement is 75,785 MW and 13th Plan capacity addition requirement is 93,400 MW (assuming a capacity addition of 62,374 MW in 11th Plan & 75,785 MW in 12th Plan from conventional sources). However, it is felt that the likely capacity addition during the 11th Plan would be of the order of about 52,000 MW.

Various Sub-Groups submitted their Reports to the main Working Group. Based on the recommendations of these Sub-Groups the Report of the Working Group for 12th Plan has been formulated for submission to the Planning Commission.

The Power Sector is endeavoring to meet the challenge of providing adequate power needed to fuel the growing economy of the country. However, this growth of the Power Sector has to be within the realms of the principles of sustainable development. A Low carbon growth strategy has been adopted in our planning process and highest priority is accorded to development of generation based on renewable

energy sources. Thrust is also accorded to maximizing efficiency in the entire electricity chain, which has the dual advantage of conserving scarce resources and minimizing the effect on the environment. It is in this context that this Report has drawn up the Plans for development of the Power Sector during the 12th Plan.

No.1-15/1/2011-P&E
Government of India
Planning Commission
(Power & Energy Division)

Yojana Bhawan
Sansad Marg,
New Delhi – 110 001.

Dated: 4th March, 2011.

ORDER

Subject:-**Constitution of a Working Group on Power for formulation of Twelfth Five Year Plan.**

It has been decided to constitute a Working Group on Power in the context of preparation of Twelfth Five Year Plan. The composition and Terms of Reference of the Group will be as follows :

A. Composition

Secretary, Ministry of Power – Chairman

Members

1. Sr. Adviser (Energy), Planning Commission
2. Chairperson, Central Electricity Authority
3. Representative of Ministry of New & Renewable Sources of Energy.
4. Representative of Department of Atomic Energy
5. Representative of Ministry of Coal
6. Representative of Ministry of Petroleum & Natural Gas
7. Representative of Ministry of Environment & Forest
8. Representative of Department of Science & Technology
9. Member (Planning), Central Electricity Authority – Member Secretary

PSUs

1. CMDs:
National Thermal Power Corporation (NTPC)
National Hydro Electric Power Corporation (NHPC)
Power Grid Corporation of India Ltd. (PGCIL)
Power Finance Corporation (PFC)
Rural Electrification Corporation (REC)
Nuclear Power Corporation of India Ltd.(NPCIL)
2. Chairman/CMDs
Gujarat Urja Vikas Nigam Ltd.(GUVN)
Haryana Vidyut Prasaran Nigam (HVPN)
Karnataka Power Corporation Ltd. (KPCL)

Maharashtra State Electricity Distribution Co.Ltd.(MSEDCL)
Grid Corporation of Orissa Ltd. (GRIDCO)

Private Sector Representatives and other non-official Members –

to be nominated separately

B. Terms of Reference

- i) To review the status of various policies notified under the provisions of Electricity Act, 2003 and to identify steps needed to realize the objectives of the Electricity Act, 2003.
- ii) To recommend an industry structure that would enhance the number of players, promote competition, provide a consistent and transparent pricing regime and raise conversion, transmission, distribution and end use efficiency.
- iii) To review the likely achievement vis-à-vis targets during the Eleventh Plan period towards Generation, Transmission, Distribution and Renovation & Modernization (R&M). An analysis of the reasons for shortfalls, if any, may be highlighted.
- iv) To review the current status of captive generation in the country, highlight issues facing this sub-sector and make recommendations for enhancing captive generation during the Twelfth Plan Period.
- v) To review the effectiveness of the Twelfth Plan Schemes such as Accelerated Power Development & Reforms Programme (APDRP) and Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) and to suggest modifications and/or give its recommendations.
- vi) To assess the State-wise/region wise demand for power in terms of both peak and energy requirements.
- vii) To recommend the optimal mix of additional generating capacity to be created during the Twelfth Plan period in terms of hydro, thermal (coal, gas, lignite and liquid fuel) and nuclear generation on the basis of relative economics of different fuels at different locations. Advance action to be taken in the Twelfth Plan period for the Thirteenth Plan projects may also be identified.
- viii) To assess the potential for improving availability of power from existing power stations through Renovation & Modernization/life extension.
- ix) To review the on-going reform process undertaken by States in the power sector with special emphasis on financial health of distribution utilities.
- x) To suggest Energy conservation measures through Demand Side Management (DSM) such as staggering of load, time of the day metering and pricing, reduction in the energy intensity of the large consumers etc.
- xi) To develop a work plan to tackle problems in ash disposal, pollution and other environmental issues.
- xii) To make recommendations regarding S&T programme to be implemented in the Twelfth Plan period and the institutional arrangements necessary therefore.
- xiii) To explore avenues for purchase of power from neighboring countries through joint venture schemes.
- xiv) To assess the investment requirement for the Twelfth Plan in the Power Sector.
- xv) To assess the infra-structural support such as transportation, port facilities, construction and manufacturing capabilities, roads, etc. that would be required for implementation of the Twelfth and Thirteenth Five Year Plans.

3. In order to assist the Working Group in its task, separate Sub-Groups on specific aspects may be formed by the Working Group. These Sub-Groups will furnish their reports to the Working Group.
4. The Chairman of the Working Group may co-opt experts as may be considered necessary.
5. The Working Group will submit its report to the Planning Commission latest by 30th September, 2011.
6. Non-Official members shall be entitled to payment of TA/DA by the Planning Commission as per SR 190(a), Official members will be entitled to payment of TA/DA by their respective Departments/Organizations, as per the rules of entitlement applicable to them.
7. The name(s) of the Representative(s) of various organizations, as per the above composition may be communicated to the Member Secretary of the Working Group under intimation to Dr.Arbind Prasad, Senior Adviser(Energy), Planning Commission.
8. Shri Somit Dasgupta, Adviser (Power), Planning Commission, Room No.322 B, Yojana Bhawan, New Delhi – 110 001 (Telephone No.23096608), shall be the Nodal Officer for this Working Group.

-sd-

(R.K.Kaul)
Consultant (Power)

1. Chairman, Working Group
2. Chairperson, Central Electricity Authority
3. Member (Planning), Central Electricity Authority, Member-Secretary of the Working Group
4. All Members of the Working Group

Copy for information to :

1. PS to Deputy Chairman
2. PS to Member (Energy)
3. PS to Member Secretary
4. PS to Senior Adviser (Energy)
5. All Heads of the Division/Adviser (PC)
6. PC Division (2 copies)

- sd-

(R.K.Kaul)
Consultant (Power)

No.1-15/1/2011-P&E
Government of India
Planning Commission
(Power & Energy Division)

Yojana Bhawanm
Sansad Marg,
New Delhi – 110 001.

Dated: 16th March, 2011.

ORDER

Subject:-**Constitution of a Working Group on Power for formulation of Twelfth Five Year Plan.**

In continuation of this office order of even number dated 4th March, 2011 on the above subject, the names of the private Sector Representatives and other non-official Members are inducted as per the list given below:

Private Sector Representatives

1. CEO, Reliance Energy Company
2. Managing Director, Tata Electric Company
3. Chairman, Torrent Electric Company

Others non-official Members –

1. Dr.E.A.S.Sarma, Former Secretary, Ministry of Power
2. Shri Girish Sant, PRAYAS
3. Dr.Leena Srivastava, TERI
4. Shri Divaker Dev, Ex.CMD, REC and Ex.Chairman, UTERC
5. Shri Navroj Dubash, Centre for Policy Research
6. Prof.G.V.Siva Krishna Rao, Andhra University

A copy of the above office order dated 4th March, 2011 is also enclosed for reference to the above Members.

-sd-

(R.K.Kaul)
Consultant (Power)

1. Chairman, Working Group
2. Chairperson, Central Electricity Authority
3. Member (Planning), Central Electricity Authority, Member-Secretary of the Working Group.
4. Members of Private Sector Representatives and other non-official Members listed above.

SUB-GROUP 1**DEMAND PROJECTION AND GENERATION PLANNING****Constitution**

- Chairperson, CEA Chairman of subgroup
- Chief Engineer, (IRP), CEA Member Secretary of subgroup

Members

- Member (Thermal), CEA
- Member (Planning), CEA
- Member (Hydro), CEA
- Joint Secretary (Planning), MoP
- Representative of Planning Commission
- Representative of NTPC
- Representative of NHPC
- Representative of PFC
- Representative of NPCIL
- Chairman, Regional Power Committees
- Representative of Gujarat Urja Vikas Ligam Ltd
- Representative of Haryana Power Department
- Representative of Electricity Department of Assam
- Representative of APGENCO
- Representative of Bihar State Electricity Board
- Representative of Ministry of Coal
- Representative of Ministry of Petroleum & Natural Gas
- Representative of Ministry of Environment & Forests
- Representative of Department of Road, Transport & Highways
- Representative of Ministry of Railways
- Representative of MNRE
- Representative of BHEL
- Ministry of Heavy Industries
- Ministry of Commerce
- Representative of TERI
- Secretary, CERC.
- Dr E A S Sarma, Former Secretary (MoP)
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Representative of Essar
- Representative of CII
- Shri Girish Sant, PRAYAS (NGO)

- Chief Engineer (DMLF), CEA
- Chief Engineer (TETD), CEA

Terms of Reference of Sub-Group 1 – DEMAND PROJECTION AND GENERATION PLANNING

- To review the likely achievement viz-viz targets during 11th Plan period towards generation including non-conventional sources and R&M/LE. An analysis of the reasons for shortfalls if any may be highlighted
- Demand Assessment in terms of peak and energy requirements considering impact of DSM and Energy Conservation measures.
- Recommend optimal mix of additional Generation Capacity for 12th Plan – Listing of Projects & their phasing and advance action for 13th Plan during 12th Plan including broad identification of projects
- Suggest Policies to shift to Super-critical technologies (12th Plan to act as transitional 5 years)
- Assessment of generation capacity addition during 12th Plan from grid connected non-conventional energy sources
- Assess potential for R&M/LE and formulate plans to maximize benefit (efficiency & capacity utilization)
- Captive Plants
 - Review Status
 - Highlight issues facing this sub-sector
 - Recommendations for enhancing captive capacity during 12th Plan
- Human Resource Development plans
- Investment Requirement during 12th Plan

SUB-GROUP 2- TRANSMISSION PLANNING INCLUDING NATIONAL GRID

Constitution

- Member (PS), CEA
 - Chief Engineer (SP&PA) CEA
- Chairman of subgroup
Member Secretary of subgroup

Members

- Chairman Regional Power Committees – 5 Nos.
- Representative of NTPC
- Representative of POWER GRID
- Representative of PFC
- Representative of PTC
- Representative of MNRE
- Representative of UPPTCL
- Representative of WBPDC
- Representative of Tamil Nadu TRANSCO
- Representative of MSETCL
- Representative of Tripura
- Joint Secretary (Trans), Ministry of Power
- Representative of Planning Commission
- Representative of Ministry of Environment & Forests
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Chief Engineer (IRP), CEA
- CEO of POSOCO
- Representative of Power Exchanges (IEX, PXIL)
- Representative of BHEL
- Representative of Ministry of Commerce
- Representative of MEA
- Secretary CERC
- Representative of KEC International Ltd
- Representative of Adani Power

Terms of Reference of Sub-Group 2 – TRANSMISSION PLANNING INCLUDING NATIONAL GRID

- Review achievements of 11th Plan targets for Transmission & analysis of reasons for shortfall
- Integrated development of transmission system keeping in view the requirement of National Grid, open access in transmission and trading, and evacuation of renewable energy.
- Bringing in transmission planning efficiency for optimal utilization of resources.
- To explore avenues for purchase of power from neighboring countries through joint venture schemes
- Development of Transmission Plan for 12th /13th Plan considering Right of Way Issues and in accordance with stipulations of Smart Grid
- To suggest measures to facilitate ROW and provision of compensation.
- Human Resource Development plans
- Investment Requirement during 12th Plan

SUB-GROUP 3-DISTRIBUTION INCLUDING VILLAGE & HOUSEHOLD ELECTRIFICATION

Constitution

- | | |
|-----------------------------|------------------------------|
| • Joint Secretary (RE), MoP | Chairman of subgroup |
| • Director, REC | Member Secretary of subgroup |

Members

- Representative of Council of Power Utility
- Representative of State Power Discoms – **GRIDCO**, Chattisgarh, Tripura, Karnataka, UP
- Representative of Ministry of Rural Development
- Dr S.K.Chopra, Consultant, Planning Commission
- Representative of MNRE
- Representative of IREDA
- Representative of IEEMA
- Representative of PRAYAS
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Representative of NABARD
- Representative of TERI
- Shri Divakar Dev, Ex CMD, REC & Ex-Chairman, UTERC
- Chief Engineer (DPED), CEA

Terms of Reference of SUB-GROUP 3-DISTRIBUTION INCLUDING VILLAGE & HOUSEHOLD ELECTRIFICATION

- Review likely achievements during 11th Plan in meeting targets for Distribution and Rural Electrification. Analysis of reasons for shortfall.
- Plan for distribution system including Smart Grid, Rural Electrification and development of Non-conventional Energy Sources to meet requirement of remote areas which are not feasible or not economical to be connected to the grid.
- Measures for making available reliable and quality power to consumers at affordable rates
- Achievements and Plans regarding Non Conventional Energy Sources including decentralized distributed generation
- Review effectiveness of following 11th Plan schemes and to suggest modifications and/or give recommendations
 - R-APDRP
 - RGGVY
- Human Resource Development plans
- Investment Requirement during 12th Plan.

SUB-GROUP 4-LEGISLATIVE AND POLICY ISSUES – FORMULATION, IMPLEMENTATION & FEEDBACK**Constitution**

- Additional Secretary, MoP
- Director, MoP (R&R)
- Chairman of subgroup
- Member Secretary of subgroup

Members

- Joint Secretary (Planning & Policy), MoP
- Chief Engineer (Legal), CEA
- Representative of MNRE
- Representative of Council of Power Utility
- Representative of State Power Utility – (Haryana, WB, Maharashtra, AP, Assam)
- Representative of NTPC
- Representative of NHPC
- Representative of POWER GRID
- Secretary, CERC
- Representative of Maharashtra Regulatory Commission
- Secretary of Bihar Regulatory Commission
- Representative of Forum of Regulators
- Representative of POSOCO (Shri S.K. Soonee)
- Representative of PFC
- Representative of BHEL
- Representative of CII / FICCI
- Representative of TERI
- Representative of Planning Commission
- Representative of IIM Ahmedabad
- Representative of National Council of Applied Economic Research
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Representative of PRAYAS, Pune
- Sh Navraz Dubash, Center for Policy Research
- Prof. G.V. Shiva Krishna Rao, Department Andhra University

TERMS REFERENCE OF SUB-GROUP 4-LEGISLATIVE AND POLICY ISSUES – FORMULATION, IMPLEMENTATION & FEEDBACK

- Review status of various Policies notified under Electricity Act, 2003 and identify steps to realize objectives of Act
- Recommend Industry Structure to
 - Enhance number of players
 - Promote Competition
 - Provide Consistent & Transparent pricing regime and raise conversion, transmission, distribution and end use efficiency
 - Improve efficiency
- Review of ongoing Reform process undertaken by states in the Power Sector with special emphasis on financial health of distribution utilities and suggest measures for long-term viability of power sector.
- To suggest legal changes, if required, to facilitate ROW and provision of compensation

SUB-GROUP 5-DEMAND SIDE MANAGEMENT, ENERGY EFFICIENCY & ENERGY CONSERVATION
Constitution

- | | |
|-------------------------|------------------------------|
| • Director General, BEE | Chairman of subgroup |
| • Secretary, BEE | Member Secretary of subgroup |

Members

- Advisor (Energy), Planning Commission
- Director (EC), Ministry of Power
- Representative of Ministry of Petroleum & Natural Gas
- Representative of Ministry of Coal
- Representative of Department of Road, Transport & Highways
- Representative of Ministry of Railways
- Representative of Department of Industrial Policy & Promotions
- Representative of National Productivity Council
- Representative of MNRE
- Executive Director, Petroleum Conservation Research Association
- Representative of Indian Renewable Energy Development Agency
- Representative of APTRANSCO
- Representative of State / Power Utility – 5 Nos. (Delhi, WB, Gujart, Andhra Pradesh, Sikkim)
- Representative of TERI
- Representative of Bureau of Indian Standards, New Delhi
- Representative from Indira Gandhi Institute of Development & Research, Mumbai
- Dr. Anshu Bhardwaj , Director, C-Step (Centre for Study Of Science Technology and Policy
- Representative from , IIT, Delhi
- Representative from Confederation of Indian Industry, New Delhi.
- Representative of Federation of Indian Chambers of Commerce & Industry
- Representative of IEMMA
- Representative of ELCOMA
- Representative of ESCO (Energy Service Companies)
- Representaive of POSOCO (Shri S.K. Soonee)
- Sh Girish Sant, PRAYAS, Pune
- Sh. Ajit Kapadia, Director, Centre for Fuel Studies & Research Vadodara
- Representative of Reliance Power Ltd
- Representative of Tata Electric Comapny
- Representative of Torrent
- Chief Engineer (GM), CEA
- Chief Engineer (C&E), CEA
- Chief Engineer (DPED), CEA
- Prof R. Balasubramanian , IIT , Delhi.

TERMS OF REFERENCE OF SUB-GROUP 5-DEMAND SIDE MANAGEMENT, ENERGY EFFICIENCY & ENERGY CONSERVATION

- Assess Energy Conservation measures implemented and review achievements till 11th Plan.
- Suggest Energy Conservation Measures through Demand Side Management (DSM) such as staggering of load, time of day metering and pricing, reduction in energy intensity of large consumers etc.
- Formulate DSM and Energy Efficiency Targets for 12th Plan and measures to be adopted to meet these targets, including Financial incentives and new financial instruments to finance energy efficiency projects.
- Achievements and Plans with respect to Missions of Climate change
- Human Resource Development Plans
- Investment Requirement during 12th Plan

SUB-GROUP 6-TECHNOLOGICAL ADVANCEMENT AND RESEARCH & DEVELOPMENT

Constitution

- | | |
|--|---|
| <ul style="list-style-type: none"> • Director General, CPRI • Executive Director (R&D), NTPC | <p style="text-align: right;">Chairman of subgroup</p> <p style="text-align: right;">Member Secretary of subgroup</p> |
|--|---|

Members

- Representative of Planning Commission
- Representative of State / Power Utility – Maharashtra State Electricity Distribution Co. Tamil Nadu Electricity Board, KPTCI, Delhi Transco PSEB
- Representative of Ministry of Power
- Representative of BHEL
- Representative of L&T
- Representative of IEEMA
- Representative of ERDA, Baroda
- Representative of Department of I T
- Representative of Ministry of E&F
- Representative of CBI & P
- Representative of Bureau of Energy Efficiency
- Representative of MNRE
- Representatives of Deptt of Science & Technology (including CSIR, Fly Ash Mission, CCS)
- Prof. Bhim Singh, IIT, Delhi.
- Representative of IIT, Kanpur
- Representative of IIM, Ahmedabad
- Representative of NTPC, POWERGRID, NHPC
- Representative of TERI
- Representative of ASSOCHAM
- Prof G V Shiva Krishna Rao, Andhra University
- Chief Engineer (TETD), CEA
- Chief Engineer (TCD), CEA
- Chief Engineer (HETD), CEA
- Chief Engineer (R&D), CEA
- Chief Engineer (SETD)
- Prof. R. Balasubramanian, IIT, Delhi.

TERMS OF REFERENCE OF SUB-GROUP 6-TECHNOLOGICAL ADVANCEMENT AND RESEARCH & DEVELOPMENT

- Review of Existing R&D Facilities & Programmes in Power Sector
- Recommendations regarding Science & Technology programmes to be implemented during 12th Plan, including identification, transfer and diffusion of technology in various areas of the Power Sector such as GIS, Ultra supercritical technology, IGCC etc. Institutional arrangements to take up above programmes to be identified. Applied research in specific areas, adoption and adaptation.
- To develop work plan to tackle problems in ash disposal, pollution and other environmental issues.
- Human Resource Development Plans
- Investment requirement during 12th Plan

SUB-GROUP 7- ISSUES CONCERNING KEY INPUTS

Constitution

- | | |
|---------------------------------|------------------------------|
| • Joint Secretary(Thermal), MoP | Chairman of subgroup |
| • Chief Engineer, (TPIA) CEA | Member Secretary of subgroup |

Members

- Representative of Planning Commission
- Representative of Ministry of Power
- Representative of Ministry of Coal
- Representative of Ministry of Heavy Industry
- Representative of Ministry of Railways
- Representative of Ministry of Mines
- Representative of Ministry of Shipping & Transport
- Representative of Ministry of Steel
- Representative of Ministry of Petroleum & Natural Gas.
- Representative of Coal India Limited
- Representative of NTPC, NHPC, NJPC, POWERGRID, BHEL
- Representatives of States (One in each Region) (Rajasthan, West Bengal, MP, Karnataka, Arunachal Pradesh)
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Representative of IEEMA
- Representative of CII
- Representative of JV of L&T&MHI
- Representative of JV Alstom & Bharat Forge
- Representative of JV of Toshiba & JSW
- Representative of Inland Waterways Authority of India
- Chief Engineer (IRP), CEA
- Chief Engineer (OM), CEA
- Chief Engineer(HETD), CEA
- Chief Engineer(OM),CEA
- Chief Engineer (TETD), CEA

TERMS OF REFERENCE OF SUB-GROUP 7- ISSUES CONCERNING KEY INPUTS

- To assess infrastructural support required for 12th & 13th Plan
 - Fuel
 - Land and Water requirement
 - Transport (Railways, Roads, Waterways, Gas pipeline, LNG terminals)
 - Port Facilities

- Construction & Manufacturing Capabilities specifically erection machinery & erection agencies including Civil & BOP contractors.
- Steel, Cement, Aluminum and other material

SUB-GROUP 8-FINANCIAL ISSUES

Constitution

- CMD, PFC
- MD & CEO, SBI Caps

Chairman of subgroup
Member Secretary of subgroup

Members

- Representative of Planning Commission
- Joint Secretary & FA, MoP
- Representatives of States (One in each Region) (HP, Bihar, Gujarat, Manipur, Tamil Nadu)
- Representative of Department of Financial Services
- Representative of IDFC
- Representative of IDBI
- Representative of Institute of Public Finance
- Representative of Torrent
- Representative of ICICI
- Representative of CRISIL
- Representative of LIC
- Representative of GIC
- Representative of Reliance Power Ltd
- Representative of Tata Electric Company
- Representative of Torrent
- Economic Advisor, CEA
- Representative of REC
- Representative of RBI
- Director (Planning) , Ministry of Power.
- Mr. Gunit Chadha, CEO – India, Deutsche Bank AG.

TERMS OF REFERENCE OF SUB-GROUP 8-FINANCIAL ISSUES

- Review of Financial Issues
- To assess the investment requirement for 12th Plan in the power sector
- Policy issues concerning arrangement of funds for Power Sector

SUB-GROUP 9-HUMAN RESOURCE DEVELOPMENT & CAPACITY BUILDING

Constitution

- CMD NTPC
- DG, NPTI

Chairman of subgroup
Member Secretary of subgroup

Members

- Joint Secretary (T), MoP
- Joint Secretary (RE/APDRP/IT/PFC), MoP
- Representatives of States (One in each Region) Chhatisgarh, J&K, Kerala, West Bengal, Assam)
- Representative of BEE.
- Representative of Ministry of Labor
- Representative of BHEL
- Ministry of HRD
- Representative of IGNOU
- Representative of IIT, Delhi
- Representative of IIM, Bangalore
- Representative of MDI, Gurgaon
- Representative of Project Management Associates
- Shri S.K. Soonee, POSOCO
- Shri Sudhir Wadera, Coord. Consultant
- Representative of NTPC
- Representative of DVC
- Representative of Jindal Power
- Representative of Tata Electric Company
- Representative of TERI
- Representative of CPRI
- Representative of PGCIL
- Representative of NPC
- Prof G V Shiva Krishna Rao, Andhra University
- Chief Engineer(HRD) CEA

TERMS OF REFERENCE OF SUB-GROUP 9-HUMAN RESOURCE DEVELOPMENT & CAPACITY BUILDING

- Review existing manpower in Power Sector and training facilities / programmes and to suggest measure for training of staff in various categories.
- Review and make broad assessment of man power requirements state-wise and category-wise for construction, operation and maintenance of generation, transmission and distribution systems during 12th & 13^h Plans.
- To assess the financial requirement of man power planning and training arrangement during 12th & 13th Plans.