

# A Review on Energy Policies and Scenario in India

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## ABSTRACT

Now a day's Energy plays a vital role in every sector like agriculture, industry, transport, commercial and domestic. Energy is the primary key for development of the country. Only two types are sources for energy generations are presents that are Non Renewable and Renewable Sources. But due to climate change and fossil fuel depletion renewable sources are becoming major reason for focusing for energy generation. Renewable Energy (RE) generation is useful to decrease pollution, global warming etc. Although the high cost of the renewable energy generation is the main barrier in this field but there are many schemes which plays a very important role in this field. These policies encourage the consumer to used renewable sources for energy. This paper introduces the main energy challenges in India and different types of energy policies existing to overcome that challenges and what are the institutional programs presenting in India for energy policies.

## KEYWORDS

Energy Administration in India, policies in India, Barriers in India, present government reports, conclusion

## 1. INTRODUCTION

India has the world's second largest population of around 1.24 billion in 2015 and the World's seventh largest island. India has a most powerful self-governing following system parallel with an economy with traces of socialism and a widening income gap between urban and rural areas as well as among states. India is not well endowed with energy resources in comparison with the large population. Due to having only 0.6%, 0.4% of the world's oil, gas and coal reserves, it led to India towards import. However, due to a number of structural issues, both operation and assessment of energy minerals have been poor. India's renewable energy potential is huge .It is marked that an integrated and hybrid approach towards developing household energy resources, and giving special notice to the ones in which India may have superior potentials, has been engaging the attention of India's economic planners.

Renewable contribute about 12.3% of the total installed capacity in the country [8]. Around 97% of the installed capacity is grid-connected and stand alone power constitutes a small share [7]. Wind continues to be the mainstay of grid connected renewable power in India. Globally, India ranks sixth in terms of renewable electric power global capacity [9]. The historical growth of Renewable has been wonderful with a compounded annual growth rate of 23% over the last decade[9]. The rate of growth has been mainly important for solar over the last three years, which grew from less than 10 MW to more than 0.7 GW in 2005–2006 [7]

All the above reasons make it vital for India's economic planners to strategize India's energy sector, and help in increase energy security of the country. This calls for a strategy both in the area of energy order and deliver, along with tons of energy policy including price, guideline, and division strategy to obtain secure energy supplies at constant prices. Energy efficiency is a common factor across the sectors, and the Government gives its aim to enhance energy intensity by 20 - 25% by 2020. However, energy efficiency and renewable energy require large open funding with a healthy policy support to ensure sufficient returns over long periods of time. Expertise is also a very significant input, mainly in the area of energy achievement. Therefore, India's energy policy would essentially include action on both demand and supply sides with due concern to policy, investment and machinery

## 2. ENERGY ADMINISTRATION IN INDIA

Basically central and state government plays a very important role for promotion and Development of renewable energy. Fig 1 shows the basic structure of energy administration in India. Planning commission working on the top level with five ministries are in charge of energy policy for individual fuel sectors, and other ministries and state governments directly and indirectly have influence on energy policy.

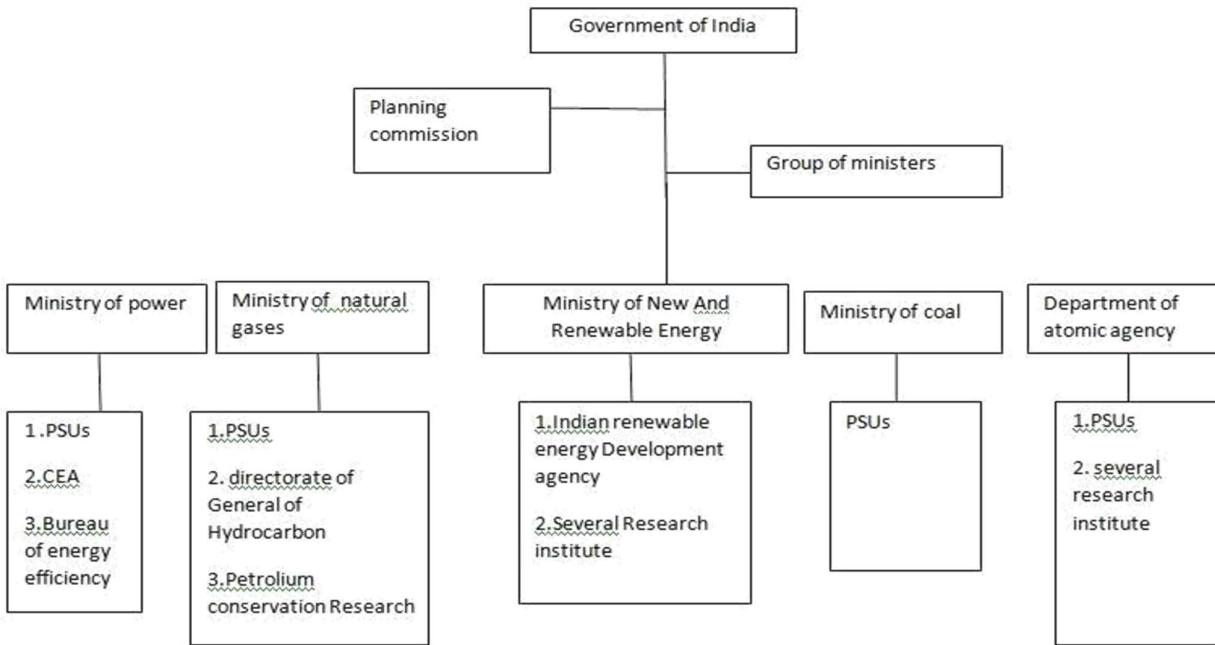


Fig. 1. Structure of energy administration in India

## 2.1 Planning Commission

The Planning Commission was constituted by the government of India in 1950. This commission used to speed up economic development by allocating national resources efficiently and ensuring opportunities to all. The Planning Commission has tasks to assess national income, to determine priority and prepare plans. The role of the Planning Commission is essential as it formulates the five-year plans and monitors their success based on discussion with the central ministries and state governments in the process, yet it lacks the power to implement the policies.

## 2.2 Group of Ministers (GOM)

GOM is a collective decision making mechanism with permanent members. In case a policy issue requires the involvement of more than one ministry, a group of relevant ministers is formed with the prime minister's approval. The membership work changes with the issue at hand. The objective of formation of the GOM is-

1. To bring the imminent issue into the policy discussion [5]
2. To ensure better organization among ministries,
3. To reflect on various aspects relating to the policy issue [5]
4. To expedite the decision making process [5]

## 2.3 Role of state and central government agencies

Table no. 1 shows below, the role of state and central agencies.

## 3. ENERGY POLICIES

The Government of India introduces several policies

1. Integrated Energy Policy 2008
2. Electricity act 2003
3. Tariff policies
4. National action plan on climate change

### 3.1 Integrated Energy Policy 2008

The Integrated Energy Policy (IEP) is the first energy policy formed by the Indian government. This integrated energy policy linked with sustainable growth that covers all sources of energy and addresses all aspects of energy use and supply including energy security, accessibility, affordability and cost. The committee was set up in 2004 and final report approved by cabinet in December 2008. One of the salient features of the IEP is that the each energy sector should be consistent with the overall energy policy and should provide a level playing field to all players whether public or private. It also offers various scenarios based on different energy mixes and implementation of demand-side management. It set the directions for long-term energy strategy.

**Table 1. Role of state and central government agencies (report from TERI)**

| Government         | Central government (Ministry of Power or finance)  | MNRE  | CERC (central electricity regulatory commission)  |
|--------------------|--|---|---|
| Central government | 1. develops national Electricity tariff policies for renewable and non renewable energy<br>2. provides incentive for renewable energy encouragement      | 1. Develops different laws for renewable energy.<br>2. Sets different technical standards.<br>3. motivate by different promotion programs for renewable energy,<br>4. Increase different R&D department for renewable energy.   | 1. Set guidelines for tariff for renewable energy sources.<br>2. regulates the third party sale |
| State government   | State government   | State nodal agency  | SERCs (state electricity regulatory commission)   |
|                    | 1. Develops state levels electricity tariff policies for renewable and non renewable energy<br>2. provides incentives for renewable energy encouragement | 1. Conduct different sources assessment for renewable energy sources<br>2. Increase different sources assessment for renewable energy sources<br>3. Provides facilities for those projects like land etc.<br>4. Promote awareness programs for adoption of renewable energy<br>5. Maintain database on non conventional sources | 1. Set guidelines for tariff for renewable energy sources<br>2. regulates the third party sale  |

### 3.2 Electricity act 2003

An Act to combine the laws relating to Energy System, trading and use of electricity & introduce the ideas which are helpful for the development of electricity industry, promoting, protecting interest of consumers and supply of electricity to all areas, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental there to.

- i. National Policy on standalone systems for rural areas and nonconventional energy systems National policy on electrification and local distribution in rural areas
- ii Joint responsibility of State Government and Central Government in rural electrification

The concerned State Government and the Central Government shall jointly endeavor to provide.

### 3.3 Tariff Policy

The tariff policy has been evolved in consultation with the State Governments and the Central Electricity Authority (CEA) and keeping in view the advice of the Central Electricity Regulatory Commission and suggestions of various stakeholders.

The objectives of this tariff policy are to:

- a. Ensure accessibility of electricity to consumers at reasonable prices.
- b. Ensure financial viability of the sector and attract investments [3]
- c. Promote transparency, consistency and predictability in regulatory approaches Improve in quality of supply.

### 3.4 National Action Plan on Climate Change

India's first National Action Plan on Climate Change (NAPCC) is proposed on 30 June 2008 [4]. The plan identify around nine core "national missions" running through 2017. the plan identifies measures that promote

our development objectives .It says these national measures would be more successful with assistance from developed countries, and pledges that India's per capita greenhouse gas emissions [4] The NAPCC promote the photovoltaic energy for power generation and other uses .and making solar usable as compared conventional energy options.

The plan includes:

- increase the solar thermal technology in city areas, developing, and commercial organization;
- To increase the manufacture of photovoltaic cell
- A goal of organize at least 1000 MW of solar thermal power generation.
- Organize of a solar R &D center,
- Increased international collaboration on technology development,
- Increase the domestic developed capacity
- Increased government financial support and worldwide support: Other Programs

The NAPCC also describes other initiatives:

- The government supporting the research and development of IGCC and supercritical technologies and mandating the retirement of inefficient coal-fired power plants and.[4]
- Under the Electricity Act 2003 and the National Tariff Policy 2006, certain percentage of grid-based power from renewable sources should purchase by the central and the state electricity regulatory commissions [4].
- Under the Energy Conservation Act 2001, it is required to take energy audits and an energy labeling program by large energy consuming industries [4].

## 4. BARRIERS IN INDIA

During peak periods Irregular electricity generation from renewable resources like wind and solar, increase their low reliability in demand. These technologies needs back-up power system, which increases cost of the system. Other additional issues are grid connection and costs of transmission this is mainly reduce the use of renewable energy. The barriers for use of renewable energy technologies are broadly classified as a) Economic and Technological barriers b) Market-related barriers and c) Institutional barriers.

### 4.1 Economic and Technological Barriers

- a. Technical standards are not well established for many renewable energy technologies.
- b. Renewable energy sources only depended on

natural sources. If there is no presence of sources than it is difficult to produce the energy like Fuel diversity for biomass,

- c. Renewable energy sources such as small hydro are very often located in isolated and remote areas that require high investment in transmission and distribution for power supply.
- d. High potential of non conventional supply sources exist in remote areas. This supply-demand mismatch coupled with the problems in transmission of power from such regions leads to a very large share of the potential left vacant.
- e. Instability of grids and low reliability develop problems in take power from non conventional.
- f. To start the operation wind energy requires high reactive power.
- g. Insufficient servicing and low protection of equipments increase very low customer confidence on technology adoption.

### 4.2 Market Related

- a. The creation of „spot" markets for wholesale power will be mainly harsh to non conventional which are available only from time to time. spot markets will find it difficult to finance and develop renewable energy based generation projects with high investment costs as compared to wholesale market
- b. Increasing participation of private companies can increase the cost of capital.
- c. high operation costs are involved due to non-existence of market for renewable energy
- d. With the structure of power purchase agreement consumer retail power at fixed rates from generators.
- e. Due to doubts about technology performance and small level of information and knowledge High-risk perception in accepted by the renewable energy technologies.

### 4.3 Institutional

- a. Lack of trained workers for education, display, protection and operation along with insufficient awareness and information programs for technology distribution impedes renewable energy diffusion. Information regarding renewable energy projects is not easily available, which dissuade further funds in RETs.
- b. The increased liability of public expenditure may hold back for non conventional through financial incentives like grant, subsidy, soft-loan, etc. Non-incorporation of renewable energy issues in the regulatory policy and lack of awareness among regulators further restrict technology penetration.
- c. Lack of well-defined policies for private contribution and delays in clearances and allotments for private sector projects decreases.

**Table 2 Report of village electrification as on 30-11-2014 as per 2011 census**

| S. No.            | States/UTs        | Total inhabited Villages as per 2011 census | Village electrified as on 31-03-2014 |       | Cumulative achievements on 30-11-2014 | % villages electrified as on 30-11-2014 | Unelectrified villages as on 30-11-2014 |
|-------------------|-------------------|---|--------------------------------------|-------|---------------------------------------|---|---|
|                   |                   |   | Numbers                              | %     |                                       |   |   |
| 1                 | Andhra Pradesh    | 26286                                       | 26286                                | 100.0 | 26286                                 | 100.0                                   | 0                                       |
| 2                 | Arunachal Pradesh | 5258  | 3586                                 | 68.2  | 3645                                  | 69.3                                    | 1613                                    |
| 3                 | Assam             | 25372                                       | 24404                                | 96.2  | 24549                                 | 96.8                                    | 823                                     |
| 4                 | Bihar             | 39073                                       | 37002                                | 94.7  | 37316                                 | 95.5                                    | 1757                                    |
| 5                 | Chhattisgarh      | 19567                                       | 19055                                | 97.4  | 19116                                 | 97.7                                    | 451                                     |
| 6                 | Goa               | 320   | 320                                  | 100.0 | 320                                   | 100.0                                   | 0                                       |
| 7                 | Gujarat           | 17843                                       | 17843                                | 100.0 | 17843                                 | 100.0                                   | 0                                       |
| 8                 | Haryana           | 6642  | 6642                                 | 100.0 | 6642                                  | 100.0                                   | 0                                       |
| 9                 | Himachal Pradesh  | 17882                                       | 17880                                | 99.99 | 17880                                 | 99.99                                   | 2                                       |
| 10                | J& K              | 6337  | 6224                                 | 98.2  | 6224                                  | 98.2                                    | 113                                     |
| 11                | Jharkhand         | 29492                                       | 27164                                | 92.1  | 27213                                 | 92.3                                    | 2279                                    |
| 12                | Karnataka         | 27397                                       | 27363                                | 99.88 | 27363                                 | 99.99                                   | 34                                      |
| 13                | Kerala            | 1017  | 1017                                 | 100.0 | 1017                                  | 100.0                                   | 0                                       |
| 14                | Madhya Pradesh    | 51929                                       | 50381                                | 97.0  | 50453                                 | 97.2                                    | 1476                                    |
| 15                | Maharashtra       | 40956                                       | 40920                                | 99.99 | 40920                                 | 99.9                                    | 36                                      |
| 16                | Manipur           | 2379  | 2061                                 | 86.6  | 2061                                  | 86.6                                    | 318                                     |
| 17                | Meghalaya         | 6459  | 5132                                 | 79.5  | 5167                                  | 80.0                                    | 1292                                    |
| 18                | Mizoram           | 704   | 596                                  | 84.7  | 636                                   | 90.3                                    | 68                                      |
| 19                | Nagaland          | 1400  | 1261                                 | 90.1  | 1261                                  | 90.1                                    | 139                                     |
| 20                | Odisha            | 47677                                       | 38920                                | 81.6  | 38927                                 | 81.6                                    | 8750                                    |
| 21                | Punjab            | 12168                                       | 12168                                | 100.0 | 12168                                 | 100.0                                   | 0                                       |
| 22                | Rajasthan         | 43264                                       | 39036                                | 90.2  | 39058                                 | 90.3                                    | 4206                                    |
| 23                | Sikkim            | 425   | 425                                  | 100.0 | 425                                   | 100.0                                   | 0                                       |
| 24                | Tamil nadu        | 15049                                       | 15049                                | 100.0 | 15049                                 | 100.0                                   | 0                                       |
| 25                | Tripura           | 863   | 837                                  | 97.0  | 837                                   | 97.0                                    | 26                                      |
| 26                | Uttar Pradesh     | 97813                                       | 96515                                | 98.7  | 96515                                 | 98.7                                    | 1298                                    |
| 27                | Uttarakhand       | 15745                                       | 15638                                | 99.3  | 15638                                 | 99.3                                    | 107                                     |
| 28                | West bangal       | 37463                                       | 37461                                | 99.99 | 37461                                 | 99.99                                   | 2                                       |
|                   | Total states      | 596780                                      | 571186                               | 95.7  | 517990                                | 95.8                                    | 24790                                   |
| Union territories |                   |   |                                      |       |                                       |   |   |
| 1                 | A&N Island        | 396   | 308                                  | 77.8  | 308                                   | 77.8                                    | 88                                      |
| 2                 | Chandigarh        | 5   | 5                                    | 100.0 | 5                                     | 100.0                                   | 0                                       |
| 3                 | D&N haveli        | 65  | 65                                   | 100.0 | 65                                    | 100.0                                   | 0                                       |
| 4                 | Daman & diu       | 19  | 19                                   | 100.0 | 19                                    | 100.0                                   | 0                                       |
| 5                 | Delhi             | 103   | 103                                  | 100.0 | 103                                   | 100.0                                   | 0                                       |
| 6                 | Lakshadweep       | 6   | 6                                    | 100.0 | 6                                     | 100.0                                   | 0                                       |
| 7                 | Pondicherry       | 90  | 90                                   | 100.0 | 90                                    | 100.0                                   | 0                                       |
|                   | Total UTs         | 684   | 596                                  | 87.1  | 596                                   | 87.1                                    | 88                                      |
|                   | Total             | 597464                                      | 571782                               | 95.1  | 572586                                | 95.8                                    | 24878                                   |

(Source CEA)

- d. Private participation in renewable energy projects.
- e. The government policies for diffusion of non-conventional, determined by economic and financial incentives, are weak. Wind energy is the perfect example for this where lowering and removal of incentives led to almost capability stagnation.
- e. For the development of renewable energy technologies, there are barriers in obtaining viable forms of finance due to lack of knowledge and alertness of these technologies, high-risk perception, and uncertainties regarding resource assessment [12]
- f. Projects requires for continuous power supply. Fairly, the supplementary fuel may be a fossil fuel like coal, oil or gas. Under the existing institutional arrangements, such a project using a combination of fuels may not qualify for IREDA"s requirements for a renewable energy project [13]
- g. Non-availability of infrastructure such as land and transmission and distribution networks in potential sites of renewable energy supply leads to low exploitation of their potential.

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## 5. PRESENT GOVERNMENT REPORT

Table 2 shows above that electricity in India is not provided yet as on November 31, 2014 More than 70% population lives in rural areas in India where connection of grid is not possible so some standalone system for electricity generation is needed to provide the electricity in for un-electrified areas. It may be connected to grid or may be use stand alone.

## 6. CONCLUSIONS

In the case of renewable energy technologies that are near-commercial stage, learning by doing will help in lowering of costs in accordance with the „experience curve effect" and aid in commercialization of the technology. The experience curve effect for Solar PV shows that for each doubling of cumulative sales, the production cost has declined by about 20 percent. Learning investments in markets for these technologies will catalyze development of sustainable commercial renewable energy market and provide incentives to reach cost competitiveness. An issue in this context is tapping funds from venture capital sources for the development of Renewable Energy Technologies (RETs) needs. International co-operation in R&D, setting up of technology transfer mechanisms to accelerate technology transfers between developed and developing countries and promotion of North-South and South-South co-operation will aid in technology cost reductions.