33

STANDING COMMITTEE ON ENERGY

(2012-13)

FIFTEENTH LOK SABHA

MINISTRY OF NEW AND RENEWABLE ENERGY

[Action Taken on the recommendations contained in the Twenty-Ninth Report (15th Lok Sabha) on Availability of Identified Non-Conventional Resources Of Energy – Their Potential Vis-a-Vis Utilization]

THIRTY-THIRD REPORT

LOK SABHA SECRETARIAT
NEW DELHI

April, 2013/Chaitra 1935 (Saka)

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Presented to Lok Sabha on 23.04.2013

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(2012-13)

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* Expired on 1st March, 2013
\# Nominated as member of the Committee w.e.f. 28th March, 2013

INTRODUCTION

I, the Chairman, Standing Committee on Energy having been authorized by the Committee to present the Report on their behalf, present this 33rd Report on the action taken by the Government on the recommendations contained in 29th Report of the Standing Committee on Energy on the subject Availability of Identified Non-Conventional Resources of Energy – Their Potential vis-à-vis Utilization.

2. The 29th Report was presented to the Lok Sabha/laid in Rajya Sabha on 24th August, 2012. Replies of the Government to all the recommendations contained in the Report were received on 22nd November, 2012.

3. The Report was considered and adopted by the Committee at their sitting held on 13th March, 2013.

4. An Analysis on the Action Taken by the Government on the recommendations contained in the 29th Report of the Committee is given at Appendix-II.

5. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in the body of the Report.

NEW DELHI
16 April, 2013
Chaitra 26, 1935 (Saka)

MULAYAM SINGH YADAV,
Chairman,
Standing Committee on Energy

CHAPTER I

REPORT

This Report of the Standing Committee on Energy deals with the action taken by the Government on the Observations/Recommendations contained in their Twenty-ninth Report (Fifteenth Lok Sabha) on 'Availability of Identified Non-Conventional Resources of Energy-Their Potential vis-à-vis Utilization'.

2. The Twenty-Ninth Report was presented to Lok Sabha on 24th August, 2012 and was laid on the Table of Rajya Sabha on the same day. The Report contained 14 Observations/Recommendations.

3. Action Taken Notes in respect of all the Observations/Recommendations contained in the Report have been received from the Government. These have been examined and categorized as follows:

(i) Observations/Recommendations which have been accepted by the Government:
Serial Nos.1,2,3,4,5,6,7,8,9,10,11,12 and 14

Total - 13
Chapter-II

(ii) Observation/Recommendation which the Committee do not desire to pursue in view of the replies of the Government:
Nil

Total - 00
Chapter-III

(iii) Observation/Recommendation in respect of which the replies of the Government have not been accepted by the Committee and which require reiteration:

Nil

Total–00
Chapter-IV

(iv) Observation/Recommendation in respect of which the final reply of the Government is still awaited:

Serial No. 13

Total - 01
Chapter-V

4. The Committee desire that Action Taken Notes on the Observations/Recommendations contained in Chapter-I and Chapter V of the Report may be furnished to the Committee within three months of the presentation of this Report.

5. The Committee will now deal with action taken by the Government on some of their Observations/Recommendations that require reiteration or merit comments.

A. Solar Energy

(Recommendation Sl. No.8, Para No.2.9)

6. The Committee had felt the need to identify and specify the exact potential spots of solar energy to locate projects so that they become viable. The Committee had been informed that to strengthen the solar resource assessment and to meet the requirement of availability of solar radiation data, 51 solar radiation monitoring stations have been set up at sites of high potential in the country. The Committee were also apprised that the first draft of the Solar Atlas under preparation would be completed by December, 2012 and the second version by December, 2013. Finding that data in the atlas would be useful for both the Government and the investors, the Committee had recommended that the preparation of Solar Atlas be expedited so that the stake holders / private sector participants are aware of the potential sites which will facilitate them to make large scale capital investment in solar energy projects / applications.

7. The Ministry of New and Renewable Energy in their Action Taken Reply have stated as under:

> "This is to inform the Committee that a data policy has been brought out by C-WET, who is implementing the Solar Radiation Resource Assessment (SRRA) project, to make available the captured data to all the stakeholders. Work on developing initial draft of solar atlas is going on and efforts are made to use all the data available from SRRA stations as well as IMD stations".

8. The Committee were earlier apprised that the first draft of the Solar Atlas under preparation by the Ministry would be completed by December, 2012 and the second version by December, 2013. The Committee find that

data policy has been brought out by C-WET, the implementing agency for the Solar Radiation Resource Assessment project, to make available the captured data to all the stakeholders. They also find that work on developing initial draft of solar atlas is going on. The Committee would like to emphasize that work on Solar Atlas is not moving on at desired pace and setting up of Solar Radiation Resource Assessment Stations also needs a review for mid-course correction; if required. The Committee expect the work to pick up the required pace and would like to know the status and future programme relating to finalization of Solar Atlas urgently.

(Recommendation Sl.No.9, Para No.2.10)

9. The Committee had noted that high cost of solar power is one of the barriers in harnessing the solar energy potential of the Country and had expressed their concern over the high prices and the poor quality of the solar equipment. The Committee had also felt that drastic reduction in the cost of solar energy will be possible through promotion and strengthening of R&D activities in a big way. The Committee, had therefore, recommended that the Government should not only provide adequate financial stimulus to the solar sector but also involve/promote/ strengthen the various centres and institutions involved with R&D activities and also to encourage international cooperation mainly for technological advancements and technology transfer with particular emphasis on indigenization of technology with the objective of lowering cost of harnessing solar energy.

10. The Ministry of New and Renewable Energy in their Action Taken Reply have stated as under:

> " The R&D policy of the Ministry is quite comprehensive having full scope of the participation of industry and academia within the country as well as from abroad. In addition to having focus on development of products and devices, it allows to bring advanced technologies into the country for field demonstration and performance validation under Indian conditions. This is aimed at to lead adaptation of the foreign technologies with indigenization to

the extent possible. The academic institutions who implement MNRE sponsored R&D projects are provided support under various heads including manpower, equipment and machinery, consumables and travel. As a part of JNNSM, the following Centers of Excellence have been sanctioned by the Ministry:

- IIT Bombay: Research and education in the area of photovoltaics
- IIT Rajasthan: Research and education in the area of solar thermal
- IIM Ahmedabad: Technology incubation and development of entrepreneurship
- CEPT University, Ahmedabad: Solar passive architecture and green building technologies
- Amrita Nano Science Centre for next generation solar cells

In solar photovoltaics research, the leading countries are Japan, Germany, Australia and USA. In India also, the Ministry has sponsored a number of projects aiming at new and emerging technologies (viz. dye sensitized solar cells, organic solar cells) with better efficiencies and reduced cost. In solar thermal, various power technologies such as solar tower and parabolic dishes are being developed in collaboration with leading international experts. Some technologies for industrial process heat requirements from abroad, such as parabolic troughs and non-imaging concentrators, are being evaluated under Indian conditions as a part of MNRE sponsored projects. In addition, bilateral initiatives including Indo-Spanish and Indo-US collaborations for development of technologies have been initiated.

The Ministry has also set up a high powered Solar Energy Research Advisory Council headed by Dr. Anil Kakodkar to guide Ministry on various aspects of leading R&D in the country."

11. The Committee note the Ministry's initiatives regarding R&D policy focusing on development of products and devices. They also note that the Ministry are providing support to the academic institutions in multiple ways who are implementing their sponsored R&D projects such as manpower, equipment, machinery, consumables and travel. While the Committee take note of the efforts made by the Ministry in terms of

technology advancement, they would like to emphasis that the objective and the essence behind the recommendation of the Committee to strengthen the various centres and institutions involved with R&D activities and also to encourage international cooperation is for reduction in the cost of solar energy for tapping maximum available potential. The Committee are in fact concerned about the high cost of production of solar energy which is stated to be one of the barriers in harnessing the potential. The Committee, therefore, re-emphasize their recommendation that the Government should strengthen the various centres and institutions involved with R&D activities and also encourage international cooperation mainly for technological advancements and technology transfer with particular emphasis on indigenization of technology with the objective of lowering cost of harnessing solar energy. They also note that a high powered Solar Energy Research Advisory Council has been set up to guide the Ministry on various aspects of leading R&D activities in the country. The Committee would also like to be apprised of the progress made in this regard and the time frame within which it is likely to submit its report.

(Recommendation Sl. No.10, Para No. 2.11)

12. The Committee had noted that the project of solar resource assessment is being implemented by C-WET, Chennai, an autonomous institution of the Ministry. The Committee were unable to comprehend as to how the work related to solar energy was assigned to C-WET instead of SEC. The Committee had observed that solar potential assessment is the primary function of the Solar Energy Centre and had also felt that all activities related to solar energy should have been entrusted to SEC. C-WET which is a specialized body meant for assessment and development of wind energy technology in the country itself is finding difficult to manage its own affairs efficiently because validation of their

own wind atlas revising the wind potential is yet to be finalized. The Committee, had therefore, recommended that SEC should be conscious of its elementary responsibilities and be well-equipped to handle them deftly. No organization can come up strongly without proper base work and hence all the activities with regard to solar energy – resource assessment, development, harnessing, and periodic technological upgradation should be handled in an integrated and coordinated manner by the Solar Energy Centre itself

13. In their Action Taken Reply, the Ministry have stated as under:

> It is true that CWET is an autonomous and specialized institution of the Ministry in the area of wind resource assessment and wind technology development. Being conscious of the capabilities of CWET in managing wind resource assessment stations in various parts of the country and their experience in understanding needs of the project developers for resource data, the Ministry entrusted task of solar radiation resource assessment also to CWET in a project mode. The project has capacitated C-WET to implement the project in professional manner involving all stakeholders including Solar Energy Centre and India Meteorological Department. The project has been implemented successfully by C-WET and data is available to the developers and other stakeholders. There is a proposal in advanced stage to convert solar energy centre into National Institute of Solar Energy, an autonomous institution, where all activities pertaining to solar energy are likely to be consolidated.

14. The Committee note that Solar Energy Centre (SEC) is a premier institute for research, technology evaluation and demonstration facility of the Ministry and also works on science and engineering aspects of solar energy technologies. However, the Committee note that the Ministry had entrusted task of solar radiation resource assessment to C-WET in view of the latter's capabilities in managing wind resource assessment stations in various parts of the country and their experience in understanding needs of the project developers for resource data. In this context, the Committee had strongly recommended that SEC should be conscious of its elementary responsibilities and be well-equipped to handle them deftly and

the activities related to solar energy should have been entrusted to SEC. The Ministry have now informed that the solar radiation resource assessment was entrusted to C-WET in project mode which has now been successfully implemented after involving all developers/ stakeholders including SEC and Indian Meteorological Department. Further the data is now available to all developers/stakeholders. The Committee are satisfied that solar radiation assessment work has been shared with all developers/stakeholders. However, they recommend that in future all activities related to solar energy viz. resource assessment development, harnessing and periodic technological upgradation should be entrusted to SEC only so as to bring about better co-ordination and effective realization of the objective with which it has been set up.

The Committee also note that the Ministry now proposed to convert Solar Energy Centre into National Institute of Solar Energy, an autonomous institution, where all activities pertaining to solar energy are to be consolidated. The Committee trust that with converting SEC into a National autonomous Institute to deal with all aspects of solar energy, the sector would get a desired boost. They, therefore, would like the Ministry to implement the proposal in a time frame.

B. Biomass Energy

(Recommendation Sl No.11, Para No.2.12)

15. The Committee found the overall exploitation of biomass potential in the country was very low and felt that more systematic and objective planning in coordination with States is required for better organization of the resources and maximum utilization of the biomass potential. The Committee, had therefore, recommended that the Ministry should critically review their own performance and work out a concrete action plan to motivate and / or persuade the potential States which have shown lack of interest in the biomass power sector and also to interact with these States and advice the State Governments to provide suitable incentives so as to attract more private investment in usage of biomass power and instill confidence in the investors. The Committee had also been informed that the MNRE has constituted a number of sub-groups to study relevant issues relating to biomass power sector. The Government had been asked to apprise the Committee of the status and outcome of the sub-groups constituted in this regard. The Committee had also recommended that the Ministry should specially focus on dissemination of information and give wide publicity about the authentic data on surplus biomass residues and also to publicise the Biomass Resource Atlas so that the issue of assessing surplus agro residue availability is resolved.

16. In their Action Taken Reply, the Ministry have stated as under:

> "The Ministry has been continuously pursuing with the biomass power potential States to create setting up of a single window clearances system to provide speedy clearance required from various departments / agencies for setting up of various biomass power projects. The Ministry is monitoring the progress for setting up of various biomass power projects through periodic review meetings with state governments.
>
> The Ministry is also interacting with CERC and SERC's for tariff related issues and requesting them to rationalize the tariff. In this context, CERC has formed an Expert Committee for undertaking detailed study on "Performance / viability of biomass based plants operating in the country including prevailing biomass prices". The 1st meeting of this Committee has taken place recently and has solicited views on committee various stakeholders.
>
> In order to initiating various biomass based power programmes during the 12th plan based on the recommendations of Sub-Groups set up by the Ministry, a target of 2100 MW power projects (1400 MW for bagasse cogeneration, 500 MW for biomass power and 200

MW for small tail end projects) have been proposed. The 12th Plan is yet to be approved by Planning Commission.

A Biomass Resource Atlas for India has been prepared for surplus agro residues which have been placed on the website of the Indian Institute of Science, Bangalore (http://lab.cgpl.iisc.ernet.in/Atlas/). The Biomass Resource Atlas has been periodically updated and now includes surplus forestry wastes for power generation. The Biomass Resource Atlas has provided good quality information on different crop residues through GIS maps. Based on this, the promoters are advised ascertain existing uses of biomass for thermal applications in boilers, furnaces, kilns etc. before finalizing location of the power project in potential states.

The Ministry is continuously making its efforts to create awareness through organizing seminars, workshops, business meets, etc. under biomass power programmes in biomass potential states to create awareness amongst various stake holders including financial institutions".

17. The Committee are satisfied to note that a 'Biomass Resource Atlas' for India has been prepared. They also find that it has been placed on website and the Ministry is continuously making efforts to create awareness among the stakeholders including financial institutions for larger use of these resources. The Committee desire that the Ministry should continue the awareness campaign with greater effectiveness.

The Committee also note that with regard to tariff related issues of biomass power, the Ministry/CERC have formed an Expert Committee for undertaking detailed study on performance / viability of biomass based plants operating in the country including prevailing biomass prices. The Committee would like to be apprised of the recommendations of the Expert Committee and follow-up action by the Government therever in due course in this regard.

C. Geo-Thermal Energy

(Recommendation Sl. No.13, Para No.2.14)

18. The Committee had noted that the Government has not made any efforts to enhance awareness or provide incentives or benefits to attract investment in the geothermal sector or induce private parties to explore and harness the untapped energy in this sector. They had also felt that the sector need more research and innovation with escalating environmental problems with the growing needs of energy, the country cannot ignore exploration and exploitation of the huge geo-thermal energy potential. The Committee had, therefore, recommended that the Ministry should focus their efforts in early exploitations of the existing potential and explore more potential sites and also to take concrete steps to promote and provide adequate fiscal and financial incentives so as to attract investment in geo-thermal sector. The Committee had also asked the Ministry to proactively initiate geothermal based model project in collaboration with other successful countries in the sector and promote technology transfer from each collaboration to develop indigenous technology. The Committee also desired the Ministry to take aggressive steps in educating the significance of the geo-thermal energy in present scenario to general public and especially to the major industrial participants by organizing awareness programmes, conferences etc.

19. The Ministry in their Action Taken Reply have stated as under:

> "The Government has signed Memorandum of Understanding with Governments of Australia, Iceland and Philippines for scientific co-operation, research in renewable energy sector and to explore the potential of Geo-thermal in India. Indian Companies have Collaboration Agreements with Foreign Companies in Geothermal Energy Sector i.e. these are (i) Reykjavik Geothermal, Iceland and Thermax, India (ii) Icelandsbanki, Iceland; Mannvit, Iceland and Bhilwara Group, India have set up a Joint - Venture i.e. Bhilwara Mannvit Green Energy Ltd (BMGEL) (iii) Kaldara Iceland and Hindustan Turbomachinery, Bangalore (iv) NTPC – Mitshubishi, Japan (v) ONGC – Talboom, Belgium.
>
> To exploit the geothermal energy sources, we need to map the deep surface structure and to demarcate the area of geothermal heat trapped inside the surface so that decisions regarding deep drilling, estimation of its potential, number of years for which the resource can be profitably tapped etc. can be taken. So far we have been able to undertake only shallow bore hole drilling at some of our geothermal fields.

Magneto-telluric (MT) studies were assigned to National Geophysical Research Institute (NGRI), Hyderabad to assess the deep reservoir temperature of potential sites at Puga geothermal field located in the north-west Himalayan range in Ladakh and Tatapani geothermal field in the Sarguja district of Chhattisgarh. Further, a project on MT investigations for assessing the geothermal potential in Satluj-Spiti, Beas and Parbati valley in Himachal Pradesh, Badrinath-Tapovan in Uttarakhand and Surajkund in Jharkhand was assigned to NGRI has shown promising geothermal potential at Surajkund in Jharkhand and Badrinath - Tapoban area in Uttarakhand

There is a good potential of geo-thermal energy in the Ladakh region However, due to high altitude, difficult terrain, harsh weather conditions, very short working period, difficulty in taking transmission lines to load centers and high cost the projects for tapping geo-thermal energy could not be taken up so far. Jammu and Kashmir State Power Development Corporation Limited (JKSPDC) in collaboration with M/s Thermax and Reykjavik Geothermal, Iceland have initiated an action for setting up of 5 MW Geothermal Power Plant at Puga. Recently an International Seminar was held at Leh, Ladakh, where experts from Australia were also present. The other stakeholders including Nodal Agencies, NGRI, ONGC, DRDO including MNRE were present. In the brainstorming session it was opined to take-up collaborative projects to explore potential available in Ladakh region. It is also proposed to undertake activities for setting up of at least one multipurpose R&D-cum technology demonstration energy power generation project in each of the potential States namely, Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, J&K, Jharkhand, Maharashtra, Uttarakhand, West Bengal and others".

20. The Committee acknowledge the initiatives of the Ministry in terms of scientific co-operation and research for exploration and exploitation of geo-thermal potential in the country. The Committee also note that the Ministry have proposed to undertake activities for setting up of at least one multipurpose R&D-cum technology demonstration energy power generation project in each of the potential States namely, Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, J&K, Jharkhand, Maharashtra,

Uttarakhand, West Bengal and others. They would like to be apprised of the development in this regard.

The Committee had also recommended the Ministry to provide adequate fiscal and financial incentives to attract investment in geo-thermal sector. The Ministry is, however, silent on this aspect of the Committee's recommendation. The Committee would like to be apprised of the detailed provisions of fiscal and financial incentives proposed by the Government for development and harnessing of geo-thermal sector.

CHAPTER II

OBSERVATIONS/ RECOMMENDATIONS WHICH HAVE BEEN ACCEPTED BY THE GOVERNMENT

(Recommendation Sl. No.1, Para No.2.2)

Non-conventional Energy Resources – Potential vis-à-vis Utilization

So far there was no definite figures for the available potential of non-conventional energy sources in the country. The MNRE has now estimated the renewable energy power potential in the country to be around 1,89,900 MW of which the solar energy constitute more than 50 per cent followed by wind, biomass, small hydro etc. The achievement till the 11th Plan period have been stated to be near about 25000 MW put together all forms of energies under this sector. This is about 13 per cent realization of the estimated potential. As the solar energy constitute a lion share in the total potential of the sector and the development of solar energy is yet to take off in a significant way, the renewable energy sector has failed to register its presence in the total electricity production of the country. In the entire Indian power sector, as on date the renewable energy contributes only about 12 per cent which shows that the sector is to march ahead henceforth. The Committee have been apprised that there is constant increase in the pace of renewable energy development since 9th Plan onwards in terms of MW, it has increased to about 25,000 MW at the end of 11th Plan (31.3.2012) from about 3,900 MW in the year 2003. Out of this, wind energy has contributed substantially with a shore of 17353 MW. The Committee feels that renewable energy programme is primarily private sector driven and it offers significant investment and business opportunities and hence a conducive atmosphere for attracting private entrepreneurs would give much needed fillip to the sector. The Committee, therefore, recommends that those segment of the renewable energy which have partially developed should be supported by research and development, fiscal incentives and financial support, for increasing the percentage contribution of the renewable energy in the total electricity generation capacity. Simultaneously, the pace of development in the solar energy sector should also be expedited as unless this sector grows the renewable energy will not have the significant presence in the total electricity scenario of the country and will ever remain a marginalized entity.

Reply of the Government

The total installed capacity from various renewable energy sources as on 31st October, 2012 is 26,267 MW. The renewable energy installed capacity in the country is now more than the installed capacity from gas and nuclear energy. A capacity addition of about 30,000 MW is being targeted during the 12th Plan from various renewable energy technologies. Wind energy is targeted to contribute

about 15,000 MW, followed by solar power (10,000 MW) small hydropower (2100MW), biomass power (2700 MW). With this, about 29% of the renewable energy potential will be realized by the end of 12th Plan.

Various sub-group set-up to formulate 12th Plan for Renewable Energy have recommend steps to attract private sector and create business opportunities to accelerate pace of development of renewable energy in the coming years. The Ministry is giving special emphasis on the R&D in the areas where commercial development is yet to be achieved. The budget for R&D is proposed to be doubled in the 12th Plan. Apart from focused R&D in Solar Energy, Hydrogen energy, Fuel cells, Bio fuels, Geothermal are the areas receiving attention of the Ministry. Areas and sub-areas of research in these new technologies have been identified. The Jawaharlal Nehru National Solar Mission aims to install 20,000 MW solar power by 2022; 2000 MW of off-grid; 20 million sqm of solar thermal collector area and 20 million rural households to have solar home lighting by 2022.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.2, Para No.2.3)

The Committee note that the potential of renewable energy sources identified in the country is 1,89,900 MW, in which the share of solar, wind power, small hydro power (upto 25 MW), biomass, bagasse, waste to energy is 1,00,000 MW, 49,000 MW, 15,000 MW, 17,000 MW, 5,000 MW and 3,900 MW respectively. Further the revised potential of wind energy by C-wet has been estimated to be around 1,00,000 MW at 80 m. height (yet to be validated). After validation of revised wind potential the total potential of renewable energy in the country would be about 2,50,000 MW. However, the achievement from the resources have been far from satisfactory. As of now wind power has the major contribution followed by small hydro amongst the renewable energy sources. The achievement in other areas are minimal. A scrutiny of state-wise data reveals that the performance in the States with huge potential has been extremely unsatisfactory as the achievement has either been nil or negligible. About 5311 MW potential of wind power is available in the State of Jammu and Kashmir with nil achievement. Likewise, under biomass a potential of 1044 MW and 1364 MW have been identified in the States of Kerala and Madhya Pradesh, but the achievement in these two States are nil and only 8.5 MW respectively. The potential under geo-thermal and tidal energy is yet to be assessed. The Committee feel that most of the renewable energy potential is either under-utilized or not utilized at all. The approach of the Government into this sphere leaves much to be desired. The Government projection of installed capacity at the end of 12th Plan is also not satisfactory. Even if the projected figure of 54,414 MW (cumulative) capacity is achieved (if at all) the total installed capacity will be

around only 29 per cent of the identified potential. This percentage will further go down substantially if the revised potential of wind energy is validated and more potential sites are identified with regard to other sources. The Committee while acknowledging the efforts of the Ministry, recommend the Ministry to come out with a multipronged strategy to fully exploit the identified potential of the renewable energy sources and also to focus in the areas where potential have been identified but achievements are less. The Committee also recommend the Ministry to put sincere efforts for identification and evaluation of new potential sites for maximum exploration of huge potential lying untapped.

Reply of the Government

The Ministry has prepared strategic plan for faster development of Renewable Energy in the Country. The 12th Plan of the Ministry has outlined strategy to accelerate exploitation of Renewable Energy potential in the Country. Taking into constriction the realistic pace of implementation and subject to availability of funds, the target for 12th plan have been fixed at 30,000 MW.

Renewable energy sector in India is now seen as significant player in the grid connected power generation and an essential player for energy access. Renewable energy is supporting the government agenda of 'inclusive growth' and will be part of the solution to meet the nation's energy needs. Identification of new sites is an on-going process. All technology areas have programmes for identification of new potential sites / areas. This activity is being further strengthened and enlarged, more so in the areas of wind and solar energy. It may be mentioned that resource assessment activity in both wind energy and solar energy is receiving special attention of the Ministry in the 12th Plan Period. The entire country is proposed to be covered through additional wind masts and solar radiation measurement equipments for better and more accurate resource assessments. Wind resource assessment is also being planned at 80 m mast height. 50 more new solar radiation measurement stations are now proposed to be set up.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.3, Para No.2.4)

The Committee note that the main constraints put forward by the Ministry in bridging the gap between potential and achievement are inherent intermittent nature of renewable energy sources, grid synchronization limitations on account of intermittent nature of supply, higher capital investment, requirement of preferential tariffs, difficulties in servicing and maintenance in difficult areas, etc. The Committee feel that the obstacles highlighted by the Ministry are neither

unforeseen nor insurmountable and the implementation of the various projects under the renewable energy programme of the Ministry cannot be left to suffer on account of these administrative and functional bottlenecks. The Committee feel that every sector has certain obstacle and these have to be dealt with a view to ensure attainment of the goals. Hence, the Ministry is duty bound to ensure that the issues are addressed from all angles and a practical and pragmatic solution is worked out in coordination with all concerned in order to harness the indentified potentials optimally. The Committee take note of the fact that to overcome these constraints the Government has taken various steps and measures which include support of R&D activities, development of new technologies and products that are cost effective, affordable and reliable, provision of fiscal and financial incentives and encouraging private investment. While acknowledging the efforts of the Ministry in mitigating the hurdles, the Committee recommend that the Ministry should take concerted efforts to strengthen the sector on policy front, pricing mechanism, single window clearance, technology inflow, investment models and above all nurturing the spirits of all stakeholders to ensure that the target set for generation of electricity from renewable energy sources are achieved within stipulated time frame. The Committee, therefore, recommend the Ministry to adopt a comprehensive policy for ensuring adequacy of required funds, technological framework, strict and enforceable time schedule, required skilled manpower, time-bound clearances and conducive atmosphere for entrepreneurs. Besides, sufficient public awareness about the importance of renewable energy should also be created with attractive proposals for attracting investments in the sector.

Reply of the Government

The Recommendations of the Committee have been noted. The Ministry is making efforts in all directions to accelerate pace of implementation of renewable energy programmes. The Ministry is regularly interacting with CERC on the policy front. It has also participated in the meetings of Forum of Regulators to ensure suitable policy regime including RPOs, tariff etc. in the States to encourage all technologies for power generation from renewable. The Ministry is organizing periodic meetings with the States and other stake holders to address State specific issues and also monitor implementation of various projects and programmes. R&D efforts pertaining to various renewable energy technologies have been considerably stepped up by the Ministry in the last two-three years. This pace of R&D is proposed to be accelerated in the 12th Plan also. With persistent efforts with the Planning Commission, the Ministry is hopeful of getting substantial increase in the budget for the 12th Plan in comparison to the 11th Plan, which will help in enlarging scope of various renewable energy programmes in the country. As part of 12th Plan, the Ministry has also drawn specific programmes for manpower development through the involvement of various academic institutions, universities, IITs, ITIs. The Ministry is giving special emphasis towards projecting renewable energy achievements and conducive policy environment in India, at international forums to attract

investments in the renewable energy sector. In this direction, an international seminar was organized in New Delhi on 8th – 9th October 2012 where Ministers of about 40 countries participated. Further, a meeting of ASEAN countries was also organized on 5th – 7th November to showcase strength of India in the renewable energy sector. Indian delegations are also participating in investment meets organized in various countries.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.4, Para No.2.5)

Wind Energy

The Committee note that wind energy is the fastest growing renewable energy technology for generating grid connected power amongst various renewable energy sources. Reportedly, a total capacity of 17,353 MW has been established up to March, 2012 which is 70 per cent of the cumulative deployment of grid interactive renewable power. The Committee are, however, not satisfied with the achievement so far under the sector. Despite the fact that it is 70 per cent of the total grid-interactive power, it is approximate one-third of its own old estimated potential i.e. 49130 MW. With the validation of wind energy potential at 1,00,000 MW, the achievements in the sector would look very ordinary. In this sector too, the performance in States like Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, Karnataka and Gujarat is far from satisfactory. The installed capacity in Andhra Pradesh and Karnataka is only 245 MW and 1933 MW against the estimated potential of 5394 MW and 8591 MW respectively. Further, estimated potential of capacity has not been reported from the States of Central, Northern and North-Eastern regions of the country. The Committee trust that the revised wind atlas must have included the aforementioned potential areas of the country. The Committee accordingly recommend that the Ministry should take urgent steps for validation/approval of revised wind atlas and to initiate projects for the new identified areas across the country.

Reply of the Government

In spite of power being concurrent subject of the State and Centre, the achievement of 17353 MW installed capacity has been mainly driven by Government of India's promotional policies and preferential tariffs of the State Governments. Almost entire investment in wind power projects has come from private investor. The installations in few States like AP and Karnataka being less is due to the choice of locations by the investors on account of wind

availability and state policies. Investor's choice of site for wind power development is not under the control of Government of India.

As per the Wind Atlas for India prepared by C-WET, the estimated potential for the States of Central, Northern and North-Eastern regions are shown in the table below:

Region	State	50m (Validated) level MW*	@ 80 m level MW*
Northern States	Haryana	-	93
	Himachal Pradesh	20	64
	Jammu & Kashmir	5311	5685
	Uttarakhand	161	534
	Uttar Pradesh	137	1260
Central	Madhya Pradesh	920	2931
	Maharashtra	5439	5961
	Jharkhand	-	91
	Bihar	-	144
	Chhattisgarh	23	314
North-Eastern	Arunachal Pradesh	201	236
	Assam	53	112
	Manipur	7	56
	Meghalaya	44	82
	Nagaland	3	16
	Orissa	910	1384
	Sikkim	98	98

*MW- Mega Watt

In order to validate the above results, Ministry/ CWET have already initiated the process and so far, 45 nos. of Wind Monitoring Stations of 80 m height have been commissioned and are in operation. The Ministry/ CWET have also initiated a project to install 75 nos. of Wind Monitoring Stations at 100 m level in 7 states (Tamilnadu, Andra Predesh ,Karnataka,Maharastra,Gujarat, Rajasthan & Madhyapredesh).

Ministry had also allowed Private developers for carrying out Winds measurements in 2008. The private developers have installed more than 400

wind monitoring stations and the same are being vetted by CWET as per the guidelines prepared by MNRE.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

***(*Recommendation Sl. No.5, Para No.2.6)**

The Committee note with satisfaction that the expenditure in the 11th Plan period under wind energy sector has been on the expected lines except for the year 2008-09 where it was Rs. 8.41 crore against the allocation of Rs. 14 crore. There has been increase in the plan outlay of the 12th Plan which has been pegged at Rs.1,600 crore and for the financial year 2012-13 it has been placed at Rs. 100 crore. However, approval is only Rs.45 crore. About the constraints, land availability, procedure for land allotment, infrastructure for power evacuation and transmission have been cited to be major problems in the development of the sector. The Committee have been apprised that to encourage installation of wind power projects in the country, the Government provides various incentives, viz. fiscal incentives, tax holiday on income from generation, concessional custom duty on import of specified components, excise duty exemption from manufacture of wind electric generators, preferential tariff and Generation Based Incentive (GBI). The Committee appreciate the Ministry's initiatives towards promotion of wind power generation. The Committee are also given to understand that the cost of production of wind energy in India is lower as compared to most other countries. In view of the foregoing, the Committee recommend the Ministry to play a pivotal role for maximum generation of power from wind energy through private entrepreneurs by giving them conducive atmosphere. The Committee also desire the Ministry to strengthen its mechanism through State Nodal Agencies/State Governments for identification of more potential sites and assessment of wind resource and also ensure proper functioning of the projects installed.

Reply of the Government

The Wind Resource Assessment programme, since the financial year 2008-2009, has been implementing as per a new set of improved guide lines. As per the new guidelines, C-WET's role is limited to providing technical expertise in selection of sites and assistance at various stages of implementation of the project to the SNA (State Nodal Agencies). Under this, SNA has greater responsibility in identification of sites, clearances from the various statutory agencies, making land available, procurement of masts, custody of material etc. Hence, a periodical review on the status of implementation of the Wind Resource Assessment projects in their respective states are conducted by Ministry/ CWET by inviting the officials from various State Nodal Agencies. The requisite training has been provided to the officials on various facets of Wind Resource

Assessment such as handling of GPS, Data-logger, Wind Sensors and identification of suitable sites for wind monitoring studies etc.

Recently in the second week of October, 2012, a special training programme was organized by CWET for officials from 16 State Nodal Agenices and imparted training to the SNAs officials on " Wind Resource Assessment Methodology and Techniques" and about 25 officials attend the aforesaid training programme in CWET, Chennai. CWET also planned to impart training to North East region SANs official at their office during November second week. With all these efforts, it is expected that more potential sites will be identified to install wind power projects in the country.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.6, Para No.2.7)

Small Hydro Power

The Committee note that hydro power projects upto 25 MW capacity are classified as small hydro projects and potential of about 15000 MW has been estimated from 5718 identified sites in the country. Of this potential, about 50 per cent lies in the States of Himachal Pradesh, Uttrakhand, Jammu Kashmir and Arunachal Pradesh. Maharashtra, Chhatisgarh, Karnataka and Kerala are also stated to be having sizeable potential. As on 31st March, 2012, 3395 MW capacity has been installed and projects of about 940 MW are in various stages of implementation. Thus present capacity is about 22 percent of the estimated potential. In Committee's view, the achievement in this regard is far from satisfactory. The Committee, however, acknowledge the efforts of the Ministry for achieving the target of 1400 MW set for 11th Five Year Plan. In view of this, the Committee believe the Ministry would be able to achieve its 12th Plan target of 2000 MW and would also strive to achieve more than the target set. The Committee take note of the initiatives taken by the Government for faster exploitation of SHP potential in the country which among others include formation of a separate sub-group to draw the 12th Plan and the Action Plan for achieving 12th Plan targets and another sub-group to look into the issues of transmission/evacuation infrastructure and environmental aspects including land and forest clearance issues. AHEC, IIT Roorkee has also been asked to prepare a roadmap in this regard. . The Committee find that the sub-group has made suggestions for actions required to accelerate pace of exploitation in this sector such as reviewing State policies to ensure momentum of private sector participation, continuation of subsidies to 12th Five Year Plan for covering risks and making small hydro projects economically viable and enhancing the scope of micro hydel and water mill scheme. The sub-groups constituted to look into the issue of transmission/evacuation infrastructure, environmental aspects including

land and forest clearance issues for renewable energy based power projects has also suggested prudent practices for faster statutory clearances for renewable energy based power projects. The Committee also note the steps taken by the Ministry to study specific areas of concern. The Committee desire the Ministry to consider the observations and recommendations of the sub-groups seriously and implement the same in letter and spirit so that the initiatives of the Ministry are more result oriented. Further, the Committee recommend that for maximum exploitation of SHP potential, more vigorous and all out efforts should be undertaken by involving State Governments and agencies responsible for small hydro development in the identification and utilization of available potential. The Committee also recommend that the Working Group constituted having representatives from MNRE, CEA, the Ministry of Power, Central Water Commission and some of the State Governments may be asked to expedite the work relating to identification of the potential of small hydro sites in the country.

Reply of the Government

The total installed capacity of small hydro projects, as on 31.10.2012 is 3452 MW and projects of about 1300 MW are in various stages of implementation. During the 11th Plan a capacity of 1419 MW was added and a target of 2100 MW has been fixed for the 12th Plan. As recommended by the Committee, the Ministry is working to accelerate pace of exploitation of small hydro in the country. In this direction, the Ministry has stepped up its efforts to closely interact with the States and emphasized on establishing a method of regular project-wise monitoring. It is strongly felt that project wise monitoring and regular interaction with the States and SHP developers can help to increase pace of implementation of the projects. Apart from regular interaction with the States with high small hydro potential, the Ministry has also interacted with the States with moderate potential to set up SHP projects. Now quarterly review meetings are been held with the States for close monitoring of projects. Information regarding allotment of potential sites to the private sector, their implementation schedules and their Plan for next five years or so has been collected.

The Ministry is working on the recommendations of the sub-group for accelerated development of small hydro. The new scheme proposed to be announced for the 12th Plan Period would be based on the recommendations of the sub-group. It may be mentioned that the working group constituted for examining the potential has completed its task and the revised potential of small hydro in the country, based on sites allotted by the States, is now estimated at about 20,000 MW.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.7, Para No.2.8)

Solar Energy

The Committee note that India is endowed with a vast solar energy potential where most part of the country receive 4-7 kilowatt hours of solar radiations per square meter per day with 250-300 sunny days in a year. The Committee was apprised that the total solar energy potential in the Country has been estimated to be more than 1,00,000 MW which is more than 50% of the existing identified renewable energy potential. The Committee were informed that under the first phase of Jawaharlal Nehru National Solar Mission (JNNSM) it has been envisaged to set up 1,300 MW of grid connected & off grid solar plants by March, 2013. The Committee were further informed that a capacity of 3,000 MW has been proposed through Government support and another 6,000 MW through mechanism of Renewable Purchase Obligations (RPOs) and Renewable Energy Certificates (RECs) during the 12th Plan. The Committee have been given to understand that at the end of the 12th Plan the cumulative solar energy capacity would be 10,941 MW. Against this backdrop, the Committee note that as on 31st March, 2012, the total installed solar energy capacity in the Country is only 941 MW which constitutes less than 4 % of the total renewable energy installed capacity in the Country. Under Jawaharlal Nehru National Solar Mission (JNNSM), as on 29th February, 2012, only 188 MW of grid solar power has been commissioned against the target of 1,100 MW. Whereas, projects of only 83.5 MW capacity have been sanctioned against the target of 200 MW off-grid solar applications. Under Solar thermal collectors, against the target of 7 million sq. meters 4.88 million sq. meters have been done.

The Committee take cognizance of the fact that the MNRE have come a long way from 2 MW of grid connected solar power in 2009 to 941 MW in 2012. The Committee find that the solar energy sector has got the much needed boost after the launch of JNNSM. The Mission has facilitated to a considerable degree not only in the cost of setting up solar energy projects but also in tariff bidding due to increase in volumes and competition in the sector. However, the Committee feel that there is need for constant monitoring and effective interventions by the Government to ensure that targets sets are achieved fully. The Committee also observe that in the first phase of JNNSM many new and small players, not having much experience in the field, have bagged most of the projects by quoting low tariff rate. The Committee being a little apprehensive about their timely commissioning and proper functioning of the awarded projects, strongly recommend that the Government should not become complacent in regard to the monitoring of these projects awarded under the first phase of the Mission. Rather remedial/ proactive measure should be taken to remove the present/ anticipated hurdles in commissioning of these projects as the success of the first phase of the Mission will play a crucial role in shaping up the remaining two phases of the Mission. Needless to emphasize the impetuous the success of

the Mission will provide to this sector in bringing the cost down to attractive level. The Committee also recommend that Government should make sincere efforts to convert solar energy targets fixed for the 12th Plan into reality by taking proactive measures to ensure proper funding of the coming up projects, timely grant of various clearances, strict monitoring of the progress of the development of the projects etc.

Reply of the Government

As on 31 October, 2012 the total installed grid- interactive solar power generation capacity in the country has reached 1045 MW.

Under JNNSM as on 31-10-2012, 269 MW off grid solar power has been commissioned against the target of 1100 MW. Whereas, off-grid projects of 151 MWp capacity have been sanctioned against a target of 200 MWp of which projects of aggregate capacity of 43.59 MWp have been commissioned. Due to scarcity of funds the targets for sanctioning fixed under off-grid scheme has been reduced to 30 MWp from 100 MWp for the year 2012-13. Under Solar Thermal collectors, against the target of 7 million sq.meters, achievement is 5.95 million sq.meter.

The Ministry is continuously monitoring the progress of implementation of the projects allotted under Phase-I of the JNNSM and making necessary interventions to ensure achievement of the set target. In case of the projects supported through NVVN, the Ministry has constituted a review Committee chaired by the Joint Secretary (Solar), MNRE and comprising of senior officials of Ministry of Power, CEA and NVVN, which regularly takes stock of the projects progress besides taking necessary action for resolving any bottlenecks. In the case of smaller projects supported under GBI scheme through IREDA, a review Committee headed by the Joint Secretary (Solar), MNRE and comprising officials of MNRE Finance, IREDA, CEA, SECI has been set-up to review the projects progress and resolve bottlenecks.

With regards to the Committee's observations that *in the first Phase of the JNNSM many new and small players not having much experience in the field have bagged most of the projects by quoting low tariff rate,* it is submitted that out of total 30 projects allotted under Batch-I, 26 have already been commissioned while two were cancelled initially and another two lapsed due to non-fulfillment of stipulated requirements. Furthermore, the projects allotted under Batch II are mostly large projects in the range 5-20 MW and the same have been bagged by mostly big players only.

The Ministry has noted the suggestion of the Committee for strict monitoring of the projects, which will be made more rigorous. Regarding the recommendation to ensure proper funding of the projects, suitable mechanisms for the same are being worked out in consultation with major stakeholders and

will be incorporated in the second phase of the Mission commencing from April 2013.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.8, Para No.2.9)

The Committee observe that there has been a rough assessment of the solar energy potential in the country. Though India is endowed with abundant sunshine, it is vital to identify and specify the exact spots to locate projects so that they become viable. The Committee have been informed that to strengthen the solar resource assessment and to meet the requirement of availability of solar radiation data, 51 solar radiation monitoring stations have been set up at sites of high potential in the country. The data so collected will augment the existing solar resource maps based on satellite imagery. The Committee were also apprised that the first draft of the Solar Atlas under preparation would be completed by December, 2012 and the second version by December, 2013. The Committee find that data in the atlas would be useful for both the Government and the investors and latter would base their projects on the authentic zone-wise data. The Committee, therefore, desire that the preparation of Solar Atlas should be expedited so that the stake holders / private sector participants are aware of the potential sites which will facilitate them to make large scale capital investment in solar energy projects / applications. Needless to emphasize that soon after its finalization the Ministry would make the Solar Atlas Data readily available and accessible to the State Governments and potential investors.

Reply of the Government

This is to inform the committee that a data policy has been brought out by C-WET, who is implementing the Solar Radiation Resource Assessment (SRRA) project, to make available the captured data to all the stakeholders. Work on developing initial draft of solar atlas is going on and efforts are made to use all the data available from SRRA stations as well as IMD stations.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.9, Para No.2.10)

The Committee note that the major constraints faced by the solar sector is non- availability of the bank finance, change in the rate of interest in the bank

loans, lack of data on the performance and operation and maintenance requirements of the projects. The Committee also find that high cost of solar power is also one of the barriers in harnessing the solar energy potential of the Country. The high cost has been attributed to lower volumes, higher capital cost and import of equipments/technology. The Committee have expressed their concern time and again over the high prices and the poor quality of the solar equipment The Committee are given to understand that under the JNNSM, R&D efforts are being made for accelerating ongoing R&D efforts on different aspects of solar photovoltaic and solar thermal technologies, including multi disciplinary research, with the objective of improving the efficiency, systems performance and reducing the cost. While acknowledging the R&D efforts under JNNSM, the Committee recommend that R&D related centres and institutions may also be functionally strengthened and financially equipped to meet the various challenges of research and development. The Committee feel that drastic reduction in the cost of solar energy will only be possible through promotion and strengthening of R&D activities in a big way. Though the indigenous equipments are cheaper in comparison to imported, but they have the quality issue, whereas, the imported counterparts are of good quality, but have exorbitant price. The Committee feel that in the given scenario focus of R&D activities on development of quality product at cheaper rate is need of the hour. The Committee, therefore, recommend that the Government should not only provide adequate financial stimulus to the solar sector but also involve/promote/ strengthen the various centres and institutions involved with R&D activities. The Committee also recommend that Ministry should encourage international cooperation mainly for technological advancements and technology transfer with particular emphasis on indigenization of technology with the objective of lowering cost of harnessing solar energy.

Reply of the Government

The R&D policy of the Ministry is quite comprehensive having full scope of the participation of industry and academia within the country as well as from abroad. In addition to having focus on development of products and devices, it allows to bring advanced technologies into the country for field demonstration and performance validation under Indian conditions. This is aimed at to lead adaptation of the foreign technologies with indigenization to the extent possible. The academic institutions who implement MNRE sponsored R&D projects are provided support under various heads including manpower, equipment and machinery, consumables and travel. As a part of JNNSM, the following Centers of Excellence have been sanctioned by the Ministry:

- IIT Bombay: Research and education in the area of photovoltaics
- IIT Rajasthan: Research and education in the area of solar thermal
- IIM Ahmedabad: Technology incubation and development of entrepreneurship
- CEPT University, Ahmedabad: Solar passive architecture and green building technologies

- Amrita Nano Science Centre for next generation solar cells

In solar photovoltaics research, the leading countries are Japan, Germany, Australia and USA. In India also, the Ministry has sponsored a number of projects aiming at new and emerging technologies (viz. dye sensitized solar cells, organic solar cells) with better efficiencies and reduced cost. In solar thermal, various power technologies such as solar tower and parabolic dishes are being developed in collaboration with leading international experts. Some technologies for industrial process heat requirements from abroad, such as parabolic troughs and non-imaging concentrators, are being evaluated under Indian conditions as a part of MNRE sponsored projects. In addition, bilateral initiatives including Indo-Spanish and Indo-US collaborations for development of technologies have been initiated.

The Ministry has also set up a high powered Solar Energy Research Advisory Council headed by Dr. Anil Kakodkar to guide Ministry on various aspects of leading R&D in the country.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.10, Para No.2.11)

The Committee note that the Government had approved the policy framework and announced Jawahar Lal Nehru National Solar Mission in January, 2010 with an objective to establish India as a global leader in solar energy. Solar Energy Centre has also been in existence since early 1982 as an umbrella organization to coordinate all activities with regard to development of solar energy in the country. This Centre is a premier research, technology evolution and demonstration facility of the Ministry. It works on science and engineering aspects of solar energy technology. SEC works in the development of solar energy technologies and practices and contributes to the advancement of related science and engineering. The Solar Energy Centre has also undertaken a number of projects which can broadly be identified in the following categories I) Solar Research Assessment ii) Solar Power Generation iii) Solar Cooling iv) Solar Thermal Process Heat v) Solar Lighting and vi) Referal Test Centre for solar energy devices. On a question regarding role played by SEC in the field of technology advancement it has been stated that the projects undertaken by SEC serve the basic of objective of JNNSM. However, the Committee have also been informed that in order to strengthen the solar resource assessment and to meet the requirement of availability of Solar Radiation data, 51 solar radiation monitoring stations have been set up at sites of high potential in the country. This project is being implemented by C-WET, Chennai, an autonomous institution of the Ministry. The Committee are unable to comprehend as to how the work related to solar energy was assigned to C-WET instead of SEC. Regarding preparation of Solar Atlas, the Committee have been informed that agreement on

Shaving Satellite Data from ISRO would begin from April 2012 and first draft will come out in December 2012. Besides, Solar Energy Centre also works as a Referral Test Center for solar energy devices, provides assistance for up-gradation of test facilities to regional test centers etc. The Committee observe that solar potential assessment is the primary function of the Solar Energy Centre. Based on the success of this task, other activities of the Centre gets validation.The Committee feel all activities related to solar energy should have been entrusted to SEC. C-WET itself is finding it difficult to manage its own affairs efficiently because validation of their own wind atlas revising the wind potential is yet to be finalized. Moreover, C-WET is a specialized body meant for assessment and development of wind energy technology of the country. The Committee, therefore, strongly recommend that SEC should be conscious of its elementary responsibilities and be well-equipped to handle them deftly. No organization can come up strongly without proper base work and hence all the activities with regard to solar energy – resource assessment, development, harnessing, and periodic technological upgradation should be handled in an integrated and coordinated manner by the Solar Energy Centre itself. This will be in fulfillment of the objective for which it has been set up.

Reply of the Government

It is true that CWET is an autonomous and specialized institution of the Ministry in the area of wind resource assessment and wind technology development. Being conscious of the capabilities of CWET in managing wind resource assessment stations in various parts of the country and their experience in understanding needs of the project developers for resource data, the Ministry entrusted task of solar radiation resource assessment also to CWET in a project mode. The project has capacitated C-WET to implement the project in professional manner involving all stakeholders including Solar Energy Centre and India Meteorological Department. The project has been implemented successfully by C-WET and data is available to the developers and other stakeholders. There is a proposal in advanced stage to convert solar energy centre into National Institute of Solar Energy, an autonomous institution, where all activities pertaining to solar energy are likely to be consolidated.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.11, Para No.2.12)

Biomass Energy

The Committee find that the estimated potential of biomass including bagasse co-generation power in the country is 22000 MW and the cumulative achievement is 3135 MW (as on 31.03.2012). The Committee are not impressed to find that only 14 percent of the estimated potential has been exploited so far. Although, the targets set in for 10th and 11th Plan have been achieved yet the fact remains that huge potential is still left untapped in most of the States. Another disquieting fact is the glaring non-achievement in the States of Kerala, Madhya Pradesh & Punjab. In spite of 1044 MW, 1364 MW, 3472 MW potential identified, the capacity installed in these states is nil, 1 MW and 98.5 MW respectively. The Committee have been informed that considerable time is taken in implementing biomass power projects mainly due to lack of firm data on surplus biomass availability for specific project area, interrupted supplies of biomass, steep price variations in biomass supply due to competitive use of biomass as fertilizer / manures etc., uncertainty associated with tariffs fixation in some potential States / inadequate tariff support from regulatory bodies and lack of working capital requirements for storing huge stock of biomass materials for ensured year round operation, requirement of a number of clearances by different departments of State Governments, high price of biomass as well as variations in its price. For promotion and creation of awareness in the field of biomass power, the Ministry is providing central financial assistance to various States and organising seminar, symposia, training programmes etc. The Committee also find that the Ministry have been interacting with the States to identify single agency to facilitate speedy approval and also has frequent interactions with Forum of Regulators (FOR) and CERC to ensure tariff revision etc. for better viability of the projects. The Committee desire the Government to persistently follow up with concerned States and concerned authorities for timely implementation of the projects. While acknowledging the various initiatives and steps taken by the Government, the Committee feel that a more systematic and objective planning in coordination with States is required for better organization of the resources and maximum utilization of the biomass potential. The Committee recommend that the Ministry should critically review their own performance and work out a concrete action plan to motivate and / or persuade the potential States which have shown lack of interest in the biomass power sector. They should also interact with these States and advice the State Governments to provide suitable incentives so as to attract more private investment in usage of biomass power and instill confidence in the investors. The Committee have also been informed that the MNRE has constituted a number of sub-groups to study relevant issues relating to biomass power sector. The Committee would like to be apprised of the status and outcome of the sub-groups constituted in this regard. The Committee further recommend that the Ministry should specially focus on dissemination of information and give wide publicity about the authentic data on surplus biomass residues. They should also

publicise the Biomass Resource Atlas so that the issue of assessing surplus agro residue availability is resolved.

Reply of the Government

The Ministry has been continuously pursuing with the biomass power potential states to create setting up of a single window clearances system to provide speedy clearance required from various departments / agencies for setting up of various biomass power projects. The Ministry is monitoring the progress for setting up of various biomass power projects through periodic review meetings with state governments.

The Ministry is also interacting with CERC and SERC's for tariff related issues and requesting them to rationalize the tariff. In this context, CERC has formed an Expert Committee for undertaking detailed study on "Performance / viability of biomass based plants operating in the country including prevailing biomass prices". The 1st meeting of this committee has taken place recently and has solicited views on committee various stakeholders.

In order to initiating various biomass based power programmes during the 12th plan based on the recommendations of Sub-Groups set up by the Ministry, a target of 2100 MW power projects (1400 MW for bagasse cogeneration, 500 MW for biomass power and 200 MW for small tail end projects) have been proposed. The 12th Plan is yet to be approved by planning commission.

A Biomass Resource Atlas for India has been prepared for surplus agro residues which have been placed on the website of the Indian Institute of Science, Bangalore (http://lab.cgpl.iisc.ernet.in/Atlas/). The Biomass Resource Atlas has been periodically updated and now includes surplus forestry wastes for power generation. The Biomass Resource Atlas has provided good quality information on different crop residues through GIS maps. Based on this, the promoters are advised ascertain existing uses of biomass for thermal applications in boilers, furnaces, kilns etc. before finalizing location of the power project in potential states.

The Ministry is continuously making its efforts to create awareness through organizing seminars, workshops, business meets, etc. under biomass power programmes in biomass potential states to create awareness amongst various stake holders including financial institutions.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.12, Para No.2.13)

Urban and Industrial Waste to Energy

The Committee note that there exist a potential of about 2600 MW power from urban wastes and about 1300 MW from industrial wastes. The Committee are dismayed to find that against the estimated potential, a capacity of only 90 MW has been installed as on 31st March, 2012. The Committee are not satisfied with the poor performance of the Ministry under this sector. Even the pilot projects commissioned have not shown any encouraging results. In the Committee's view the waste to energy is an attractive initiative, as it serves a dual purpose of waste disposal and energy production. Also, the problems caused by solid and liquid wastes can be significantly mitigated through the adoption of environment-friendly waste to energy technologies that will allow treatment and processing of wastes before their disposal. The environmental benefits of waste to energy, as an alternative to disposing of waste in landfills, are clear and compelling, as this would reduce the quantity of wastes, generate a substantial quantity of energy from them, and greatly reduce pollution of water and air, thereby offering a number of social and economic benefits that cannot easily be quantified. The Committee also find that with increasing industrialization/urbanization and changes in the pattern of life due to economic growth there is generation of increasing quantities of wastes leading to pollution and threat to environment. The Committee note that the Ministry is promoting the generation of energy from waste by providing incentives and subsidies to the investors and project developers. However, seeing the actual achievement under this sector, the Committee feel that the sector needs revamp in all aspects. The Committee, therefore, strongly recommend a detailed analysis of costs and availability of fund, promotion of the research on type of waste and its technological option, studies on resource assessment, technology up-gradation and active involvement of private sector participants. Performance evaluation is also required for effective and efficient implementation of the projects. The Committee also recommend that systematic data should be computed to the extent possible such as the value of recyclable, the amount of environmental pollution from waste sources and quantity of industrial waste generated so as to get a better understanding of this sector. The Committee further emphasise that there should be wide publicity about the significance of using this source of energy besides making available data and key statistics to the potential investors.

Reply of the Government

The Programme on Energy from Urban and Industrial Wastes has been got evaluated by an independent agency. The study includes benefit – cost analysis, performance assessment of projects, technology assessment, etc. The report is under finalization and the programme for the 12th Plan period will be developed accordingly. Further, a National Master Plan on waste-to-energy,

including resource and technology assessment, has already been prepared. As regards research and development on waste-to-energy, it may be mentioned that while technologies of biomethanation and combustion are already matured, research and development has been taken up at Indian Institute of Science, Bengaluru on development of gasification technology for waste-to-energy.

As regards projects based on Municipal Solid Wastes is concerned, a project of 16 MW capacity installed at Okhla, New Delhi, the first of the five projects to be supported by the Ministry, has been working successfully since January, 2012. Waste-to-Energy projects of an aggregate capacity of over 60 MW are already under installation in the cities of Bengaluru, Hyderabad, New Delhi, Pune and Solapur. These projects are expected to lead to replication of similar projects in other big cities in the country.

A detailed evaluation of Municipal Solid Waste-to-Energy projects, including issues related to recyclables and environmental pollution, would be carried out after successful commissioning of a few of these projects. The outcome of such an evaluation will form the basis for future of municipal solid waste-to-energy programme in India. While workshops and seminars for publicizing waste-to-energy are organized from time to time, an intensive programme to publicise the option of Waste-to-Energy Projects can be taken up after the success of a few projects based on municipal solid wastes.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

(Recommendation Sl. No.14, Para No.2.15)

Tidal Energy

The Committee note that India has a long coast line of about 7500 Km. with the estuaries and gulfs where tides are strong enough to move turbines for electrical power generation. They also note that the estimated potential of tidal energy is about 8200 MW in the country which includes about 7000 MW in the Gulf of Cambay and 1200 MW in the Gulf of Kutchh in the State of Gujarat and about 100 MW in the Gangetic Belt in the Sunderban region in the State of West Bengal. The Committee find that in the tidal energy sector also, India is still in its nascent stage. The Committee find that no pilot project has been set up so far in the tidal energy sector by the Government. In fact, the demonstration tidal power project namely Durgaduani Creek the tidal power plant in Sunderban, West Bengal (3x1.25MW) was sanctioned to WBREDA in 2008 at an estimated cost of Rs.48 crore and targeted to be completed in 33 months from the date of sanction. The WBREDA entrusted NHPC to execute the project as per the MoU signed between the two. The Committee find that the central financial assistance of Rs.3 crore was sanctioned by the Ministry in this regard. The Committee are astonished to find that over the last four years there has been no

progress in regard to setting up of the project. On enquiry of the same the Committee were informed that the cost of the project estimate bids stands at Rs.238 crore against the initial estimate of Rs.48 crore and in view of this the Government of West Bengal has decided not to continue with the project. To the utter dismay of the Committee, the project has been cancelled by the Ministry due to its exorbitant cost. The Committee do not approve of this course of action. The initial unrealistic and totally unrelated projection of the project cost reflected a poor estimation and improper planning. The Committee feel that the matter has been unduly delayed thereby escalating the project cost manifold. It clearly reflects the non-serious approach which the Ministry has adopted in harnessing the potential in this sector despite the fact that so far not even a single pilot project has taken. While emphasizing the significance of energy generation through tidal power, the Committee strongly feel that assessment of economic feasibility and viability of the projects should be evolved in the initial stage itself so that the estimated cost of the projects are rationally fixed. The Committee, therefore recommend that a systematic, scientific proper assessment of the tidal energy potential be worked out especially with the help of State Nodal Agencies in the coastal States forthwith. This would provide relevant data and information to the potential investors in the field. The Committee also emphasize that proper and adequate financial incentives should be given for promotion of investment in the tidal energy sector so as to harness the available potential in the sector. To start with a pilot project has to be initiated by the Ministry in coordination with concerned State Government to assure the private investors that the projects are viable.

Reply of the Government

Central Electricity Authority (CEA) conducted the economic tidal power study during early 80's on Indian coastline mainly in the states Gujarat and West Bengal based on barrage Technology. According to the study, there is an estimated potential of tidal energy of the order of 8000 MW in the country. This includes about 7000 MW in the Gulf of Cambay and 1200 MW in the Gulf of Kutch in the State of Gujarat and about 100 MW in the Gangetic Delta in the Sunderbans region in the State of West Bengal.

Ministry of New and Renewable Energy has policy guidelines for Research, Development and Demonstration in the area of New and Renewable Energy including tidal energy. The policy has provision to provide financial support for resource assessment, research and development and demonstration projects with financial incentives up to 50% of the project cost to the State Implementing Agencies for the development of tidal energy projects on cost sharing basis.

[Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012]

CHAPTER III

OBSERVATIONS/ RECOMMENDATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN VIEW OF THE GOVERNMENT'S REPLIES

-NIL-

CHAPTER IV

OBSERVATIONS/RECOMMENDATIONS IN RESPECT OF WHICH THE REPLIES OF THE GOVERNMENT HAVE NOT BEEN ACCEPTED BY THE COMMITTEE AND WHICH REQUIRE REITERATION

-NIL

CHAPTER V

OBSERVATION/RECOMMENDATION IN RESPECT OF
WHICH FINAL REPLY OF THE GOVERNMENT
IS STILL AWAITED

(Recommendation Sl. No.13, Para No. 2.14)

Geo-Thermal Energy

The Committee note that geothermal energy is heat stored in deep interior of the earth that can be used for producing electricity and also for direct heat applications. Reportedly, Geological Survey of India has identified about 340 geothermal hot springs with 10,000 MW potential in the country which are perennial with surface temperatures ranging from 37-90 C which is suitable for direct heat applications. The Committee observe that the geothermal energy potential in India has apparently not been scientifically and systematically assessed nor any utilization reported. The Committee find that the Government has practically done nothing in geothermal sector. Not only this the Government has not made any efforts to enhance awareness or provide incentives or benefits to attract investment in the geothermal sector or induce private parties to explore and harness the untapped energy in this sector as is done in other renewable energy sectors like wind energy and solar energy. Regarding the assessment of the geothermal energy potential in the country, the Committee have been informed that the magneto-telluric (MT) studies were assigned to National Geophysical research Institute (NGRI), Hyderabad. A good potential of geothermal energy has also been reported in the Ladakh region of Jammu and Kashmir. High altitude, difficult terrain, harsh wheather condition, short working period, difficulty in taking transmission lines to load centres and high cost of the projects are some reported hindrances for tapping geothermal energy. The Committee find that in geothermal energy sector, the country is in a seminal stage. They feel that the sector need more research and innovation with escalating environmental problems with the growing needs of energy, the country cannot ignore exploration and exploitation of the huge geo-thermal energy potential. The Committee, therefore, recommend that the Ministry should focus their efforts in early exploitations of the existing potential and explore more potential sites. The Committee were apprised that the Ministry has proposed to commission at least one geothermal based power project in each of the potential States viz. Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir and Jharkhand during the 12th Plan period. The Committee feel that commissioning of at least one pilot project of geothermal energy would encourage investors and private participants in the sector. The Committee, recommend that the Ministry should take concrete steps to promote and provide adequate fiscal and financial incentives so as to attract investment in geo-

thermal sector. Further, the Committee desire that the Ministry should proactively initiate geothermal based model project in collaboration with other successful countries in the sector and promote technology transfer from each collaboration to develop indigenous technology. Also, the Ministry should take aggressive steps in educating the significance of the geo-thermal energy in present scenario to general public and especially to the major industrial participants by organizing awareness programmes, conferences etc.

Reply of the Government

The Government has signed Memorandum of Understanding with Governments of Australia, Iceland and Philippines for scientific co-operation, research in renewable energy sector and to explore the potential of Geo-thermal in India. Indian Companies have Collaboration Agreements with Foreign Companies in Geothermal Energy Sector i.e. these are (i) Reykjavik Geothermal, Iceland and Thermax, India (ii) Icelandsbanki, Iceland; Mannvit, Iceland and Bhilwara Group, India have set up a Joint - Venture i.e. Bhilwara Mannvit Green Energy Ltd (BMGEL) (iii) Kaldara Iceland and Hindustan Turbomachinery, Bangalore (iv) NTPC – Mitshubishi, Japan (v) ONGC – Talboom, Belgium.

To exploit the geothermal energy sources, we need to map the deep surface structure and to demarcate the area of geothermal heat trapped inside the surface so that decisions regarding deep drilling, estimation of its potential, number of years for which the resource can be profitably tapped etc. can be taken. So far we have been able to undertake only shallow bore hole drilling at some of our geothermal fields.

Magneto-telluric (MT) studies were assigned to National Geophysical Research Institute (NGRI), Hyderabad to assess the deep reservoir temperature of potential sites at Puga geothermal field located in the north-west Himalayan range in Ladakh and Tatapani geothermal field in the Sarguja district of Chhattisgarh. Further, a project on MT investigations for assessing the geothermal potential in Satluj-Spiti, Beas and Parbati valley in Himachal Pradesh, Badrinath-Tapovan in Uttarakhand and Surajkund in Jharkhand was assigned to NGRI has shown promising geothermal potential at Surajkund in Jharkhand and Badrinath - Tapoban area in Uttarakhand

There is a good potential of geo-thermal energy in the Ladakh region However, due to high altitude, difficult terrain, harsh weather conditions, very short working period, difficulty in taking transmission lines to load centers and high cost the projects for tapping geo-thermal energy could not be taken up so far. Jammu and Kashmir State Power Development Corporation Limited (JKSPDC) in collaboration with M/s Thermax and Reykjavik Geothermal, Iceland have initiated an action for setting up of 5 MW Geothermal Power Plant at Puga. Recently an International Seminar was held at Leh, Ladakh, where experts from Australia were also present. The other stakeholders including Nodal Agencies, NGRI, ONGC, DRDO including MNRE were present. In the brainstorming

session it was opined to take-up collaborative projects to explore potential available in Ladakh region. It is also proposed to undertake activities for setting up of at least one multipurpose R&D-cum technology demonstration energy power generation project in each of the potential States namely, Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, J&K, Jharkhand, Maharashtra, Uttarakhand, West Bengal and others.

Ministry of New and Renewable Energy
O.M. No. 8/2/2011-P&C, Dated 22.11.2012

Comments of the Committee

(Please see Para No. 20 of Chapter – I of the Report)

NEW DELHI
16 April, 2013
Chaitra 26, 1935 (Saka)

MULAYAM SINGH YADAV,
Chairman,
Standing Committee on Energy

APPENDIX – I

MINUTES OF THE SIXTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2012-13) HELD ON 13TH MARCH, 2013 IN COMMITTEE ROOM 'C' PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1500 hrs. to 1700 hrs.

PRESENT

LOK SABHA

Shri Mulayam Singh Yadav - Chairman

2. Shri P.C. Chacko
3. Shri Shripad Yesso Naik
4. Shri Jagdambika Pal
5. Shri Ravinder Kumar Pandey
6. Dr. Padamsinha Bajirao Patil
7. Shri Gutha Sukhender Reddy
8. Shri C.L. Ruala
9. Shri Sushil Kumar Singh
10. Shri Radha Mohan Singh
11. Shri Jagada Nand Singh

RAJYA SABHA

12. Shri V.P. Singh Badnore
13. Shri Bhubaneswar Kalita
14. Shri Bhagat Singh Koshyari
15. Dr. Anil Kumar Sahani
16. Shri Motilal Vora

SECRETARIAT

1.	Shri Brahm Dutt	-	Joint Secretary
2.	Smt. Abha Singh Yaduvanshi	-	Director
3.	Shri N.K.Pandey	-	Additional Director

2. At the outset, the Chairman welcomed the Members of the Committee

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3. X X X X X X X X X X X

4. X X X X X X X X X X X

5. The Committee then took up for consideration and adoption of the draft Report on Action Taken on the recommendations contained on the 29th Report on 'Availability of Identified Non-Conventional Resources of Energy – Their potential vis-à-vis utilization' and adopted the same without any changes. The Committee also authorized the Chairman to finalise the aforementioned Report and present the same to both the Houses of Parliament in the current Session.

6. A verbatim record of the proceedings of the sitting of the Committee has been kept.

The Committee then adjourned.

APPENDIX II

(Vide Introduction of Report)

ANALYSIS OF ACTION TAKEN BY THE GOVERNMENT ON THE OBSERVATIONS/ RECOMMENDATIONS CONTAINED IN THE TWENTY-NINTH REPORT (15TH LOK SABHA) OF THE STANDING COMMITTEE ON ENERGY

(i)	Total number of Recommendations	14
(ii)	Observations/Recommendations which have been accepted by the Government:	
	Sl. Nos. 1,2,3,4,5,6,7,8,9,10,11,12 and 14	
	Total:	13
	Percentage	93%
(iii)	Observations/Recommendations which the Committee do not desire to pursue in view of the Government's replies:	
	Nil	
	Total:	00
	Percentage	00%
(iv)	Observation/Recommendation in respect of which the replies of the Government have not been accepted by the Committee and which require reiteration:	
	Nil	
	Total:	00
	Percentage	00%
(v)	Observation/Recommendation in respect of which final replies of the Government are still awaited:	
	Sl. No.13	
	Total:	01
	Percentage	07%