

**No. 3-2/2015-16(R&D)**  
**Ministry of New and Renewable Energy**

Block No.14, CGO Complex  
Lodi Road, New Delhi-110003

Dated: 7<sup>th</sup> December, 2017

**OFFICE MEMORANDUM**

**Subject: Lab Policy for Testing, Standardization and Certification for Renewable Energy Sector**

**1. Introduction**

1.1 The Ministry of New and Renewable Energy (MNRE) promotes development and deployment of new and renewable energy for addressing the growing energy needs and climate change concerns of the country. Various programmes are implemented to promote new and renewable energy for different applications across the country. A reasonable manufacturing base for renewable energy systems/devices has been created in the country. As a result, at present, renewable power aggregates to around 60GW in the country. In addition, 1530 MW is being produced through decentralised systems for off-grid applications, which includes SPV home lighting, street lighting, solar pumps, biomass gasifiers, etc. Solar flat plate collectors and evacuated tube collectors are used for water heating. Solar box type cookers are being promoted for cooking and solar concentrating collectors for community/commercial cooking and industrial process heat applications. Biogas plants are promoted for cooking, power generation and Bio CNG applications. Biomass cookstoves are promoted as clean cooking solutions.

1.2 Globally, the last five years have witnessed a rapid development and up-gradation of renewable energy technologies, particularly for solar and wind applications. In SPV, due to technology development and commercialization there is growing concern for module manufacturers to maintain reliability of the SPV systems and related components to ensure desired performance during the specified life of the systems. In the Indian context, the government in 2015 set an ambitious target of reaching 175 GW capacities of renewable power by 2022, which includes 100GW of Solar and 60 GW of Wind, the remainder being met by SHP and Biomass. The enhanced target has given significant impetus to solar and wind grid power deployment. The expansion of renewable energy programmes has created the necessity for developing/updating standards of various renewable energy systems and related components and strengthening/setting up performance testing and certification facilities for quality assurance.

**2. Need of Standards**

2.1 Standards, Testing and Certification are key components that make significant impact on renewable energy technology development and deployment and contribute to their

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further growth through a number of benefits such as creating financing options, decreasing product costs and hence increasing the market. Though International Standards are relied upon for quality assurance, they need to be harmonized to meet the performance requirements in local climatic conditions and life of the product. The test protocols and standards need to be monitored and updated with technology progression ensuring quality and reliability of the products for desired applications on a regular basis. This requires adequate well skilled and experienced scientific and technical manpower, test labs equipped with modern equipment and instrumentation, adopting scientific methodology and test protocols for testing and performance evaluation of technologies/systems, components, etc.

### **3. Testing and Certification Infrastructure**

3.1 The MNRE has created autonomous institutes for R&D and performance testing and certification in solar, wind and bioenergy. National Institute of Solar Energy (NISE), Gurgaon, Haryana, has been set up for R&D, performance testing and certification of SPV, solar thermal systems, devices and components used in SPV and Solar Thermal Programmes implemented by MNRE. NISE is also engaged in training at all levels in solar energy projects. In addition, three test labs in R&D organizations supported by MNRE and two private sector labs, namely, UL India Pvt. Ltd., and TUV Rhineland are engaged in performance testing and certification in SPV Programmes. National Institute of Wind Energy (NIWE), Chennai has been set up for R&D, performance testing and certification in wind energy. Sardar Swaran Singh National Institute of Bio-energy (SSS-NIBE) at Kapurthala, Punjab has been set up for R&D, training, testing and evaluation in bio-energy. The performance testing in small hydropower (SHP) is done by Alternate Hydro Energy Centre (AHEC), IIT, Roorkee, Uttarakhand. Test centres are also supported for solar thermal, biogas and cookstoves in R&D/academic institutions.

3.2 Test labs with adequate trained manpower are critical components for reliable performance and timely delivery of performance test results to industry/project developers. Further, in order to ensure the quality consistency between testing centres results, certification processes and coordination among test labs for exchange of experiences including test results, joint testing should be organized on the same samples for mutual acceptance of testing and certification results. Regulatory measures through field inspection of samples are essential for quality control.

### **4. Need for Lab Policy**

4.1 In view of the enhanced target and increased applications, a concrete action plan for standards, testing and performance certification is essential for the successful growth of renewable energy in the country. Further, in order to ensure the quality and reliability of components manufactured indigenously, and also to ensure reliability and quality of the imported equipment, components & sub-systems, it necessary to establish a quality infrastructure in-terms of standards/specifications, test laboratories, referral institutes, mechanism for review, monitoring and inspection of the same. The policy should also involve regulatory mechanism for field inspection of deployment programmes.

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4.2 The lab infrastructure should include collaboration with lead international institutions for getting exposure to international practices in updating standards, test protocols and certification practices. The certification process should be based on assurance of quality and reliability of performance throughout the specified design life of the systems/components

4.3 Thus, a Lab Policy laying down a framework for establishing, operating, managing, maintaining and monitoring the testing, standardization and performance certification services including regulatory framework, and promoting better coordination of activities among test labs, programmes and institutions is essential for the successful growth of renewable energy in the country. Such a policy will encourage the commitment of manufacturers to maintain consistency in products and ensuring their quality and reliability for widespread adoption of various renewable energy systems/devices.

## **5. Lab Policy for Testing, Standardization and Certification**

### **5.1 Vision**

5.1.1 To bring out the need together with clarity in methodology/procedure in testing, standardization and certification to maintain quality and reliability of performance of renewable energy systems/components/devices.

5.1.2 To create a robust and efficient testing, standardization and certification system for quality control in renewable energy sector to make the country a global leader in renewable energy.

### **5.2 Mission**

5.2.1 The policy aims to adopt/update/develop standards of all renewable energy systems/components/devices, strengthening test labs in-line with international practices and making performance certification mandatory in order to ensure quality and reliability in renewable energy supply in the country. Imported systems and components will also be tested in test labs for their efficiency, reliability, life and performance in Indian climatic conditions, though these components and subsystems could have been certified by the Testing Agencies in the country of their origin as per the International Standards. International standards pertaining to installation & commissioning, grounding, performance monitoring, inspection and evaluation of all renewable energy systems shall be adopted/updated/developed and implemented.

5.2.2 The MNRE institutions will be strengthened for R&D and for testing, standardisation and certification in the respective areas to make them global Centres of Excellence in new and renewable energy. All the test labs will be required to be accredited by NABL and approved by BIS. The qualifying products need to be registered with BIS for deployment.

5.2.3 The Policy aims at bringing out regulatory measures to control the quality in field. It will encourage the manufacturers to ensure quality of products produced and supplied in the field as per test reports, ensuring confidence in users for desired performance during the design life time of the product. The Policy mandates periodic testing by the accredited test labs to measure and document degradation of the performance of a particular product.

### 5.3 Objectives

5.3.1 The objectives of the policy are as follows;

- (i) To adopt International Standards and develop/update Indian Standards and make performance testing and certification mandatory for all RE systems and components;
- (ii) To affirm government commitment and support for the organization and management of quality, efficient, cost-effective and sustainable performance testing services of all RE Systems and components;
- (ii) To strengthened test labs for developing test protocols and standards for ensuring quality of products;
- (iii) To establish national standards for laboratory quality systems and performance testing and certification;
- (iv) To empower the establishment, implementation and monitoring of the national testing and standardization plan;
- (v) To ensure adequate financial and human resources to meet the requirements of testing, standardization and certification services;
- (vi) To encourage research and collaboration to inform and improve the quality and consistency of performance testing and certification services.
- (vii) To ensure that the Quality Management Systems of all labs are inline with the requirements of the International Standards of ISO/IEC 17025.

### 5.4. Policy Framework

5.4.1 The policy framework is as follows:

- i. A Standards, Test and Quality Control Committee (STQCC) for the entire renewable energy sector will be set up in MNRE with Secretary, MNRE as Chairman and experts in the related subjects including representatives from BIS and NABL as Members, and Adviser (R&D Coord.) as Member Secretary to oversee and coordinate the development of standards and protocols and performance testing and certification practices for renewable energy systems, components and devices used for various applications and to monitor the implementation of the same by test labs.
- ii. A sub - STQCC will be set up in each of the three MNRE institutes with eminent subject experts from R&D/academic institution as Chairpersons and experts in respective areas including representatives of industries as members and Head of the Institute as Member Secretary to coordinate the development/updating of standards and test protocols in respective areas and monitoring the implementation by test labs. In small hydropower, the

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Alternate Hydro Energy Centre (AHEC), IIT Roorkee will set up a sub-STQCC on the same pattern and to coordinate the activity. These sub-STQCCs will interact with BIS for adoption of appropriate Indian standards in the respective sectors.

- iii. At least two members of the Sub STQCC; one from MNRE institute and the other from any other test lab in the subject area will regularly participate in ISO and BIS meetings to update their knowledge in the field. The composition will be decided by the respective sub-STQCCs.
- iv. For rapid expansion of the testing infrastructure, CSIR, IITs, NITs and other institutional labs will be encouraged to set up test facilities as they have scientific manpower and infrastructure available. MNRE may provide assistance for any additional infrastructure required.
- v. All MNRE institutes will be strengthened and upgraded to make them world class R&D, testing and certification institutes. They will be required to obtain accreditation for this purpose at the earliest.
- vi. Human resource management will be integral part of testing, standardisation and certification processes.
- vii. A Laboratory information and management system will be maintained.
- viii. Safety and waste management standards will be adopted/developed/updated.
- ix. Financing options to be explored and ensured for smooth functioning of test labs. A reasonable fee can be charged for the testing.

## **5.5 Institutional Mechanism.**

5.5.1 MNRE institutions, namely, NISE, NIWE and NIBE will be strengthened to make them world class centres of excellence in R&D, technology validation, testing, standardization and certification in respective areas. These institutes will set up test facilities for systems/devices/components in respective areas for various applications. In small hydro power, the test facility at AHEC, IIT Roorkee will be strengthened on the same pattern. The standard development and certification process would be based on domestic climatic conditions. These institutes will act as primary test labs. They will also collaborate with international labs to get exposure to developments in the area and to develop solutions for standards, testing and certification process matching Indian conditions. These institutes will maintain active interaction with industries in respective areas, instilling confidence in all stake holders in the sector. Test Labs in other areas such as Hydrogen, Fuel Cell, Geothermal, etc. will be set up when technology demonstration in these areas would be found practical.

5.5.2 Test labs set up in other organizations will be secondary labs. The primary test labs will also be responsible for establishing network with secondary test labs strengthening them, including comparison of test results and calibration practices for quality assurance.

### **National Institute of Solar Energy (NISE)**

5.5.3 NISE, Gurgaon is a key institute for technology demonstration, validation, performance testing and certification in solar energy technologies/systems/devices/components. NISE will set up test facilities in all areas of Solar PV and Thermal Programmes and will coordinate standards, testing and certification and setting up test labs in all areas under the supervision of sub-STQCC. In SPV, test protocols and standards for SPV module, invertors, battery storage, electronic and balance systems for domestic lighting, street lighting, grid connection, including roof top power, water pumping, storage, installation etc. will need to be up-dated/developed. The test facilities need to be developed matching the system capacity for desired application ranges. In addition, adequate test labs will be set up to cater the testing and performance certification requirements of modules, water pumps, battery storage, invertors, grid-power, etc. In solar thermal, standards available will be updated and standards for dish concentrators, parabolic trough concentrators and components, etc. will be developed. Solar Thermal Test facilities will be strengthened for performance testing and certification. CSIR labs and R&D institutions having infrastructure will be approached for setting up additional test labs.

### **National Institute of Wind-Energy (NIWE)**

5.5.4 NIWE, Chennai will coordinate the activity for wind sector. In wind, there is a need for setting up test facility for testing of wind components such as blade testing, Drive Train Testing, etc. The component testing will help in indigenous technology development. A comprehensive plan for Indian Standards and Test Protocols (BIS) need to be developed properly at component, turbine and wind power plant level. One more test lab is needed to cater to the requirements of testing and certification of 60GW wind power. This will also facilitate inter lab comparison of test results.

### **National Institute of Bio-Energy (NIBE)**

5.5.5 NIBE, Kapurthala will work out and coordinate a programme for R&D, testing, standards and certification for biogas plants and systems, biomass cookstoves, biomass power, gasifier, etc. Biogas Development and Training Centres(BDTCs) supported by MNRE under Biogas Programme will be strengthened and will be associated with NIBE for the purpose. In the field of biomass cookstoves, Test Centres set up for performance testing will be strengthened, and these centres will also be associated with NIBE for coordination of performance testing, standardisation and certification.

### **Alternate Hydro Energy Centre (AHEC)**

5.5.6 AHEC, IIT Roorkee will coordinate activity relating to SHP. AHEC will review the standards and test protocols being followed in SHP testing. One more test lab will be set up in some other institution to cater to the need for testing and performance certification requirements in SHP. This will also help inter-lab comparison of test results. The test labs should be strengthened for testing, standardization and certification at par with international practice. The test lab needs to be accredited by NABL.

5.5.7 All these institutes should establish certification service at par with international level. These institutes will bring out standards/updated Indian Standards (BIS) with test protocols for the complete systems and standards in consultation with BIS within 6 months from the date of issue of this policy.

## 5.6 Work Plan - Guidelines

### Testing laboratory

5.6.1 As a part of quality infrastructure, a network of laboratories with adequate equipment/facility and expert manpower is essential for the testing and certification. All the test laboratories should have established and implemented demonstrable quality systems as per IEC/ISO 17025 standard, according to which certain mandatory facilities, procedures and NABL accreditation are to be maintained by the respective laboratories.

5.6.2 The test labs will need to fulfil the following minimum conditions:

- Quality system accreditation as per IEC/ISO17025 for performance testing for all systems and components used for various applications. This should be endorsed by authorised national organization like NABL.
- All the measurements and test procedures should have traceability as per the prescribed standards.
- All test labs shall store, transport and deploy equipment as per the requirements of the accreditation.
- All test labs will ensure calibration of their equipment at regular intervals to achieve the specified accuracy and repeatability of the measurements.
- The laboratory should have relevant and adequate manpower for testing and performance certification of product.
- All facilities of the laboratories should be available for inspection and scrutiny by MNRE and authorised committee(s) as and when demanded.

## 5.7 Management

5.7.1 The test labs should function and maintain with transparent quality system as follows;

- (i) The test labs should maintain all the facilities, and appropriate calibration certificates for each of the equipment used during testing. The laboratory should have environment required for testing; and specific components or systems as per the relevant standards.
- (ii) A valid NABL or an equivalent accreditation certificate by an authorised accreditation body in the country should be available with the laboratory for each system and component authorized for testing and certification.
- (iii) The test laboratory will notify on its website the requirements for the registration, such as order form, requirements from user, capacity/capability, and a detailed check list for submission of sample for testing. This format should be common for all laboratories as prescribed by MNRE. Further details on test fees, approximate

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time required for testing a product, and number of samples required for certification should be specified. For the information of users, the laboratory should also intimate the user number of customers already registered for similar testing, and his own priority number as per list.

- (iv) The registration should be transparent based on the first come first serve principle.
- (v) The process of performance testing and issuing performance testing results should be transparent, and the test results should be uploaded on website for public information.
- (vi) All the laboratories should follow the same test protocols while testing similar products as per the relevant standards. In case of standards in a specific area not having been laid down, a common acceptable test protocol should be developed by respective Sub-STQCC and the same will be adopted by all the test labs upon approval of STQCC/MNRE.
- (vii) To maintain the commonality and ease of understanding the contents of the test report, all laboratories will adopt a uniform performance test report format for a specific product or system as per the reporting requirements of the relevant standard. The respective Sub-STQCC should develop and communicate standard test reporting templates for all major test, component and system level to be followed by all Test Labs.
- (viii) All laboratories in network of certification of specific component/system should participate in Round Robin proficiency tests for all the products they are authorised for. The Round Robin test will be initiated at least once a year by lead MNRE test lab in their respective area for assessment and for taking corrective steps to ensure quality, conformity of the measurements, calibration, repeatability and accuracy in of test labs and test results.

## **5.8 Implementation**

### **Testing of new product or application:**

5.8.1 Whenever testing of a new product is required, respective Sub-SQCC should examine the applicability of standard available. Based on the requirements, available standards, a procedure will be developed and the sample will be tested in at least three labs. If the measurements and reported data match within the permissible error limit or uncertainty of measurement, the same procedure can be formalised to be adopted by other labs for performance testing. The procedure can be reviewed and revised, with the consultation of all test labs in the network and final decision by MNRE.

### **Technical Meets:**

5.8.2 All test laboratories should participate in the technical meets on the respective subject organised by the Sub-STQCC in MNRE institutions, once in six months in order to discuss the various technical issues and other relevant points pertaining to testing and certification. The meeting should also review the applicability of current standards, test

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methods and adoption/adaptation of new standards, test procedures for existing and new applications and systems in the respective area.

### **Training of the personal**

5.8.3 Employing the relevant and required expert man power for testing of a product is the most important aspect of the test laboratory. The person(s) involved in the testing should possess minimum required qualification, expertise and experience to conduct a specific experiment or measurement. The test lab should develop professional competency development program for its personnel and accordingly training programme should also be imparted for the personnel and skill sets of its personnel and development in line with the requirements of relevant standards.

### **Collection of Samples:**

5.8.4 The samples should be taken at three stages of life cycle; prototype to establish design, production at the factory and supply from the field. If the performance of the sample is found similar within the specified measurement range, only then can the product be considered reliable. The performance of RE products on/from the field needs to be measured on a periodic basis. The period may be laid down in consultation with the industry so as to validate the designed life time of the product; and establish degradation of performance and track its variance from the envisaged degradation.

### **Transportation:**

5.8.5 Transportation of the samples is a key element for testing. Damage to the samples occurs during transportation, and mishandling of the samples. Transportation standards should be followed for submitting sample to test labs. The necessary transportation and shipping condition tests are mandatory as per National/International guidelines, and standards.

## **6. Testing Collaboration for Quality Assurance**

6.1 A network of test labs in each area will be established for exchange of experience on test results, test procedures including calibration procedure, exchange of calibration samples, challenges for differences in test conditions in different climatic conditions/locations etc. MNRE Institutions will also coordinate the activity of collaboration with international labs to get exposures to developments in the area and to strengthen related the test labs, including comparison of test results and calibration practices. In small hydro, AHEC, IIT Roorkee will coordinate the activity in the similar manner. These institutes will maintain active interaction with industries in respective areas, instilling confidence to all stake holders in the sector

## **7. Committees**

7.1 The implementation of the lab policy will be coordinated by the following two committees.

**8. STQCC in MNRE:** A STQCC will be set up in MNRE to coordinate and monitor testing, standardization and certification services and for reviewing the Lab Policy and for considering suggestions for modification, if any. The committee will comprise members to be drawn from various scientific institutions involved in R&D, technology development, applications and they should be knowledgeable on measurements, standards, Industry, and user requirements. The terms of reference of the STQCC will be as follows;

- (i) To develop the plan for setting up test laboratories, standards, testing and certification, and allocation of official resources for implementation;
- (ii) To coordinate setting up standards for performance testing and certification for systems and components and guide the testing and certification services in accordance with the plan;
- (iii) To suggest manpower requirement and setting up mechanisms for training of staff to carry out the functions of test labs;
- (iv) Monitoring compliance i.e. with standards for human resources and competence.
- (v) This committee to meet once in six months to review the policy and implementation.

**9. Quality Control Regulatory Committee:** This committee to be headed by the concerned Programme/Divisional Head in-charge from MNRE will monitor the implementation of quality assurance including inspection and bringing out quality control order for the respective programme. The committee shall have programme Officers of MNRE, representatives from DeitY, DIPP and BIS as members. The terms of reference of this Committee will be as follows;

- (i) The committee will take policy decisions on validity of testing and certification of a particular make and capacity RE systems/component corresponding to deployment target and period.
- (ii) The committee will meet every quarter to study the adequacy of the regulatory frame work and modify the same if required.
- (iii) To draw samples, inspection of system installations, picking up systems for testing from the field, and assessment of the compatibility and conformity of the products to a specified standard(s) or performance specifications.

9.1 Surveillance tests will be organised by jointly by BIS and MNRE or their authorised representatives. Sample(s) can be picked up from the manufacturing site or field supply site and the same will be tested as per qualification tests in related test lab.

## **10. Financing**

10.1 In order to ensure the quality and efficient testing services, it is important to ensure adequate financial support for test labs. These labs may be supported in partnership mode including public-private mode and mobilising CSR funds. The test labs may also be set-up on self-sustained basis. International collaboration will need to be explored to strengthen the various test labs and also to get exposure to revision in test protocols, standards and new equipment for measurement in the respective areas.

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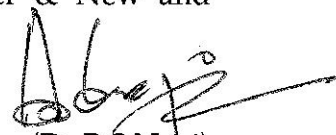
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## 11. Expenditure

11.1 The implementation of lab policy including activity of STQCC will be coordinated by R&D Coordination Division. The members of the committees will be paid TA/DA as per rule and sitting fee as applicable in MNRE. The expenditure will be met from the RD&D Budget Head. The activity of the Regulatory Committee will be coordinated by the concerned division. The expenditure on the meetings will also be met from RD&D Budget Head.

11.2 This issues with the approval of Hon'ble Minister (IC) of Power & New and Renewable Energy.



(Dr B S Negi)

Adviser/Scientist 'G'

To

1. All JS/Advisers, MNRE
2. JS & FA, MNRE
3. Director General, National Institute of Solar Energy (NISE), Gwalpahari, Gurgaon.
4. Director General, National Institute of Wind Energy (NIWE), Chennai, Tamilnadu.
5. Director General, National Institute of Bio-Energy (NIBE), Kapurthala, Punjab.
6. All Test Lab associated with MNRE programmes
7. Director General, Bureau of Indian Standards (BIS), Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-110002.
8. Joint Secretary (Sh. Sudhanshu Pandey), Department of Commerce, Ministry of Commerce & Industry, Udyog Bhawan, New Delhi-110011.
9. Director, National Physical Laboratory (CSIR), Dr. KS Krishnan Marg, New Delhi 110012
10. Private Secretary to Hon'ble Minister(IC) for Power and New and Renewable Energy.
11. PPS to Secretary, MNRE
12. PPS to Additional Secretary, MNRE.