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New & Renewable Energy
(R&D Coord. and HRD Division)**

Sub:- Draft Technology Development and Innovation Policy (TDIP) for New & Renewable Energy

The Ministry of New & Renewable Energy (MNRE) has been supporting RD&D for Technology Development and Demonstration for commercialisation of New & Renewable Energy Systems/Devices. In view of fast technology development in renewable energy across the globe and enhanced target of renewable power set in India, the MNRE has decided to bring out Technology Development and Innovation Policy (TDIP) in furtherance of RD&D efforts aiming at promoting indigenous technology development and manufacture, improving quality and reliability of energy supply for large scale deployment of New & Renewable Energy technologies/systems for various applications in the country.

2. The draft TDIP is enclosed for comments and suggestions. The comments/suggestions may please be provided by 20.10.2017 at the following address.

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**Ministry of New and Renewable Energy
(R&D Coordination Group)**

Technology Development and Innovation Policy (TDIP) for New and Renewable Energy (NRE) 2017

1. Background

1.1 Technology development and innovation have played a key role in widespread deployment of new and renewable energy in recent years, globally. In Indian context, the Research, Development and Demonstration (RD&D) has been supported by the government since last more than three decades for resource assessment, technology development and demonstration for promotion of new and renewable energy in the country. The Ministry of New and Renewable Energy (MNRE) has been supporting RD&D in accordance with the guidelines contained in this Ministry's OM No.1/1/2015 dated 18th October 2010. The said policy and guidelines encompasses the aims and focus of RD&D Programme and provisions for support for technology development and demonstration through various academic and research institutions including autonomous bodies and industry. Solar energy research and demonstration got tremendous response as follow up to launch of National Solar Mission in 2010. The RD&D efforts are directed towards material/process/technology development, demonstration and entrepreneur development with emphasis on improving efficiency and cost reduction.

1.2 In view of fast technology development in renewable energy across the globe and enhanced target of renewable power set in India for addressing the growing energy needs and climate change concerns, the MNRE has decided to bring out "Technology Development and Innovation Policy(TDIP)" in furtherance of RD&D effort aiming at promoting indigenous technology development and manufacture, improving quality and reliability of energy supply for large scale deployment of new and renewable energy technologies/systems for various applications in the country. Technology development integrated with innovation is essential to attain global competitiveness in social and economic development. It would require a robust framework and an ecosystem for supporting technology development, validation and innovation till commercialization of technologies/systems. The various aspects of "Technology Development and Innovation Policy (TDIP)" are described in successive paragraphs.

2. RD&D Investment

2.1 In the global context, R&D expenditure on renewable energy technology was \$9.1 billion in 2015 against total RE investment of \$286 billion as per UNEP document "Global Trends in RE Investment-2016" published by Bloomberg. China's R&D

expenditure was comparable with Europe's, each investing \$2.8 billion. Spending in Europe fell 8% compared to 2014 while that in China rose 4%. The US investment on R&D in 2015 was \$1.5 billion. Solar continues to dominate renewable energy R&D, with spending rising 1% to \$4.5 billion and equal to that in all the other sectors combined globally. In India, MNRE's expenditure on R&D in 2015-16 was \$15.92 million, which is significantly less as compared to China. Nevertheless, the support has strengthened R&D capacity of research/academic institutions, industries in technology/process development in solar, bioenergy, wind energy, small hydro, hydrogen and fuel cells in the country. The MNRE has also supported a Centre of Excellence at Centre for Innovation and Entrepreneurship (CIIE) at IIM, Ahmedabad for entrepreneur development in renewable energy

2.2 The trend of support for RD&D in new and renewable energy in India has increased significantly during the last decade. Compared to RD&D expenditure of Rs.72.62 crores in 10th Plan Period, an amount of Rs.336.56 crore was spent in 11th Plan Period. 169 R&D projects were sanctioned in the areas of solar thermal, solar cells, biogas, biofuel, biomass gasification, hydrogen and fuels cells with total outlay of Rs.525 crore in 11th Plan Period. Centres for Excellence were created for supporting research and education in advanced areas in solar. Solar accounted for 60% of total funds sanctioned. R&D projects taken up resulted into development of solar cells, crystalline silicon solar cell of 18% efficiency at lab scale, demonstration of solar thermal power generation in MW scale, biogas as fuel for cooking, power generation and transport applications. In hydrogen and fuel cell, the focus had been on technology development and demonstration for stationary, motive and portable power generation applications. In 12th Plan Period, 112 projects were sanctioned/implemented and a total amount of Rs.568 crore was spent on RD&D in the proportion; solar (60%), wind energy (15%), bio-energy(12%), Hydrogen and Fuel Cells(9%) and small hydro power(4%). Notwithstanding, the impact of RD&D on translation into product/technology for commercial applications has not been significant.

3. Mission Technology Development and Innovation

3.1 In the above perspective, it is imperative now to focus on technology development and innovation to achieve global competitiveness in technology development, and hence indigenous manufacture to utilize the vast potential of new and renewable energy for various applications in efficient and cost effective manner. Therefore, it's important that budget for technology development effort in new and renewable energy be doubled for the current 3-Year Plan Period with focus on application oriented technology development and demonstration. Private sector investment and involvement has to be encouraged for translating RD&D outputs and innovation into commercial outcomes. Further, the success of technology development

would require a robust testing, validation and standardization infrastructure for quality assurance. Concurrently, human resource development should be supported by nurturing research and training at all levels including performance testing and measurements for creating skilled manpower for efficient and quality results.

3.2 Thus, there is a need to create the necessary framework for enabling integration of technology development and innovation in identified priority areas utilizing endogenous resources, strengths and capacities for technology needs of the country. The ultimate goal is to increase the share of new and renewable energy in total energy mix in the country, ensuring access, availability and affordability to as large a population as possible. Further, to bring in transparency, there is a need to develop an e-platform, where research results could be publicly shared subject to IPR restrictions.

4. TDIP for NRE: A New Perspective

4.1 A conducive and inclusive policy for promoting indigenous technology development and manufacture is of paramount importance for widespread promotion of new and renewable energy for various applications in the country. Such a Technology Development and Innovation Policy (TDIP) should be based on a robust ecosystem and support mechanism for integration of technology development with innovation and performance validation to meet the technology needs of the country. It would exploit RD&D capacity continuously developing new ideas and concepts as well as new technologies. Further, technology development efforts should continue to be supported till commercial manufacture.

4.2 The TDIP aims at setting a comprehensive framework and ecosystem for implementation of Technology Development Programme (TDP). It will involve increased interaction among researchers, innovators industries, scientists, related stakeholders and departments and policy makers sharing knowledge and expertise for working in consortia. Innovation ideas will be encouraged by cash prizes and further support for translating ideas into prototypes and then for scaling up. The strategy would be based on supporting project proposals in focused areas for pilot plant/technology/process development, demonstration, and commercialization taking into account scalability and bankability, and also to encourage exploration of new ideas and concepts to achieve long term goals of the Ministry.

5.0 Vision

5.1 The TDIP aims at:

- (i) To encourage innovative ideas/innovation/research for developing prototypes for improvement in renewable energy

systems/devices/components.

- (ii) To develop and demonstrate the technology for promotion of the use of new and renewable energy for wide ranging applications across the country in cost effective manner.
- (iii) To strengthen R&D/academic/engineering institutions/organizations, industries, etc. for pursuing research in advanced areas for technology development for commercialization so that India becomes an international leader in the renewable energy technology domain.
- (iv) Making MNRE's national institutions as R&D institutions of global excellence.
- (v) To create a robust testing, standardization and certification infrastructure for quality and reliability assurance of new and renewable energy systems/devices/components.

6.0 TDIP Mission

6.1 The TDIP should lead to indigenous technology development and manufacture of new and renewable energy systems/devices, including storage systems and related components for different applications, including transportation, portable and stationary applications for rural, urban, industrial and commercial sectors through:

- (i) Carrying out Renewable Energy Resource Survey, Assessment and Mapping including studies on optimum utilization of resources and impact.
- (ii) Technology Mapping and Benchmarking;
- (iii) Inviting nominations for competition for awards for innovation and supporting the winners for R&D for prototype development which should be continuously monitored for start-up/scale up;
- (iv) Research, Development and Demonstration(RD&D);
- (v) Developing hybrid systems for improving new and renewable energy supply.
- (vi) Laying down standards, specifications and performance parameters at par with international levels and facilitate industry in attaining the same;
- (vii) Promoting technology development effort for domestic manufacture by supporting the start-up/scale up/industry through financing mechanism;
- (viii) Aligning costs of new and renewable energy products and services with international levels and facilitate industry in attaining the same;
- (ix) Appropriate international level quality assurance accreditation and facilitate industry in obtaining the same;
- (x) Setting up of National capabilities for accurate & precise measurements of device efficiency through realization of "primary standards" that are

traceable to the international standards.

- (xi) Facilitation of industry in becoming internationally competitive.
- (xii) Providing sustained feed-back to manufacturers on performance parameters of new and renewable energy products and services with the aim of effecting continuous upgradation so as to attain international levels in the shortest possible time span;
- (xiii) Providing cost-competitive new and renewable energy supply options.
- (xiv) Promoting a national network of R&D Centers so that India becomes globally competitive.

6.0 Technology Development Programme(TDP)-Strategic Action Plan

6.1 TDP activities would focus on research, innovation, design and technology development that would lead to eventual manufacture of complete systems, even if those activities are required to be shared among different institutions. The process of technology development would involve reliable, accurate and precise measurements of system/device parameters, improvement in efficiency and cost effectiveness and analysis for scalability and bankability of the product/process ensuring commercialization, and bring R&D to global levels. Thus, there would be a need for system integration broadly covering, inter-alia, the following areas: -

- (i) Development of various new and renewable energy systems including high efficiency solar cells and solar cells based on new materials, thermal, wind, bioenergy, geothermal and small hydro- electric plants as well as exploring new materials and concepts to enhance these.
- (ii) Supporting institutions/industries for “Setting up Test Labs for Testing, Standardization and Certification including calibration facilities such as “Solar Cell Efficiency” to calibrate primary reference cells for the photovoltaics research labs and industry
- (iii) Stand-alone new and renewable energy products to provide cost-effective energy for cooking, lighting, motive power, cooling, drinking water and drying;
- (iv) Distributed new and renewable energy systems to provide cost-competitive energy supply options for cooking, lighting and motive power to offset load on the grid;
- (v) New and renewable energy products for industrial and commercial applications, including energy recovery from urban and industrial wastes and effluents to aim at conservation of energy; and
- (vi) MW-scale grid interactive renewable electricity systems to contribute towards bridging the gap between fossil fuel based electricity generation supply and demand.
- (vii) Alternate Fuels (hydrogen, biofuel and biogas) to supplement and eventually substitute liquid hydrocarbons/fossil fuel systems;
- (viii) Carrying out studies on applications of RD&D, policy and regulatory

aspects and optimum utilization of resources.

- (xv) Promote bilateral cooperation between Indian R&D centers & global R&D Centres.

6.0 System Focus

6.1 TDP activities shall eventually lead to, inter alia, the manufacture of:

- (i) Solar Thermal (High Temperature) power generation systems.
- (ii) Solar Thermal Urban and Industrial Applications.
- (iii) Buildings utilizing renewable energy concepts.
- (iv) MW scale SPV Systems.
- (v) MW scale wind turbine electric generators for low wind regimes.
- (vi) Biogas energy systems and plants for cooking, heating, refrigeration, space cooling, power generation, motive and automotive applications.
- (vii) Biomass/waste combustion/gasification coupled with IC engines gas turbines and integrated combined cycle systems for co-generation/ tri-generation and setting up Bioenergy-refineries.
- (viii) Development of low cost micro/small hydro equipment including control and monitoring system.
- (ix) Simulators for RE grid interactive power stations.
- (x) Bio-fuel systems.
- (xi) Hydrogen/Fuel Cell systems.
- (xii) Hybrid systems.
- (xiii) Geothermal and Tidal Energy systems.
- (xiv) Energy storage devices, including those for grid power.
- (xv) Any other identified area.

7.0 Activities

7.1 TDP activities in new and renewable energy sector shall, inter-alia, include:

- (i) Development of technology, processes, components, sub-systems and systems and standardized test protocols for development and certification purposes of systems and related technologies listed in paragraph 5.0 above.
- (ii) Technology validation and demonstration of systems/ devices listed in paragraph 5.0 above, including *Primary Standards for photovoltaic parameters*, new and innovative technologies/systems/sub-systems/materials and components.
- (iii) Prototype development of systems/ devices listed in paragraph 5.0 above.
- (iv) Setting up of Centres of Excellence in thematic areas of research and education
- (v) Facilitate manufacture of materials, devices, components and systems for systems/ devices listed in paragraph 5.0 above.
- (vi) Raising capacity utilization factor of grid-interactive and distributed power generation systems.
- (vii) Lowering cost of new and renewable energy systems/ devices.

- (viii) Facilitate setting up R&D infrastructure in PPP mode for any or entire range of activities in any renewable energy technology/application.

8.0 Road Map - Deployment Aims

8.1 TDP activities shall be oriented towards meeting system/ equipment requirement for the following deployment aims:

- (i) Grid interactive renewable power: Around 17% grid power installed capacity through renewable power by 2017 and around 30% by 2022.
- (ii) Alternate Fuels–bio-CNG and hydrogen: Substitution of upto 5% oil by bio CNG and hydrogen in transport, portable and stationary applications by 2022 and up to 10% by 2032.
- (iii) New and renewable energy in urban areas:
 - (a) Energy recovery from municipal waste - in all classes-I cities including municipal corporations where suitable waste is available by 2022, and from all cities including towns by 2032 .
 - (b) Solar Water heating systems -100% coverage of all prospective users like institutions, hotels, hospitals etc. by 2022.
 - (c) 100% coverage of street lighting control systems by solar sensors in all cities - by 2022.
- (iv) New and renewable energy in industry:
 - (a) Energy recovery from industrial wastes where suitable waste is available across the country – by 2032.
 - (b) Solar Water heating systems - 100% coverage of potential industries – by 2022.
 - (c) Cogeneration - 100% coverage of potential sugar and other biomass based industry - by 2022.
 - (d) Polygeneration systems in industries such as food processing, pharmaceuticals, specialty chemicals, etc.
- (v) New and renewable energy in rural areas:
 - (a) Provision of lighting/ electricity in all remote un- electrified census villages apart from remote hamlets of electrified census villages by 2022.
 - (b) Augmentation of cooking, heating, refrigeration, lighting, motive and automotive applications and power generation through renewable energy means in electrified villages by 2022.
 - (c) Biogas Power (Off-grid) for all diaries, goshallas, farming sector, etc. by 2022.

9.0 Partners

9.1 TDP shall be taken up through the following Partners:

- (i) Solely or jointly by Research and Development Institutions; Academic Institutions, Autonomous Institutions.
- (ii) Solely or jointly by Developers and Manufacturers of new and renewable energy technologies, processes, materials, components, sub-systems, products and services; in public and private sector;

- (iii) A consortia of Indian and foreign companies, led by an Indian company with more than fifty one percent ownership by Indian citizens including NRIs.
- (iv) Jointly by a consortia of industry and R&D organizations and institutions
- (v) Union Ministries/ Departments/Agencies / PSUs; States/ UTs Government departments/ agencies and institutions funded by Union/ State/ UT Governments, which have adequate infrastructure for taking up R&D.
- (vi) Startups having adequate infrastructure

10.0 Monitoring

10.1 The TDP effort should, interalia, lead to the following:

10.1.1 Macro Indicators: Share of:

- (i) Renewable electricity in electricity-mix; and
- (ii) Distributed generation systems using renewable sources.
- (iii) Alternate fuels in liquid fuel-mix;
- (iv) Renewable energy in energy-mix;

10.1.2 Micro Indicators: Share of indigenously designed, developed and manufactured:

- (i) Solar Photovoltaic systems;
- (ii) Wind Turbine Electric Generators;
- (iii) Solar Thermal high temperature systems;
- (iv) Vehicles using alternate fuels;
- (v) Pump-sets using alternate fuels;
- (vi) Captive generation systems using alternate fuels including biogas;
- (vii) High pressure gasification systems coupled with high efficiency turbines;
- (viii) High efficiency micro turbines;
- (ix) Hybrid Systems;
- (x) Standardized small hydro equipment/turbine
- (xi) Any other indicator so included, including papers published, patents obtained, and awards.

11. Institutional Mechanism

11.1 A strong institutional mechanism for collaboration will be established for encouraging research and for efficient transforming knowledge into technology and monitor technology development and innovation to meet the technology needs of the country. The MINRE institutions, namely, National Institute of Solar Energy (NISE), National Institute of Wind Energy (NIWE) and National Institute of Bio-energy (NIBE) have to be strengthen for technology development and validation, Testing, Standardization and certification in solar, wind and bioenergy, respectively, making them world class institutes in the respective areas. All other test centres will be strengthen for performance testing and certification for quality control. Adequate test

labs with skilled manpower need to be ensured for the purpose.

11.2 A coordinated approach utilizing expertise of institutions/industries in the respective areas will be adopted for implementation of TDP. Consortiums where different investigators with complimentary expertise come together will be encouraged. The support will be available on the basis of merit of the project matching MNRE's thrust areas and requirements and keeping in view the strength of the project proponent and infrastructure facilities available in the institutions.

12. Financial Support Mechanism

12.1 Innovative ideas will be rewarded with cash prizes. The winners will be provided with support mechanism for transforming their ideas/prototypes to commercial products as start-ups for entrepreneur development. For technology development and demonstration, MNRE may provide up to 100% financial assistance as core support to R&D/academic /government/non-profit institutions for prototype/process/system / technology development strengthening/setting up specialized Centres of Excellence in the area of new and renewable energy. The Centres of Excellences will be funded in form of TDI projects with an aim to strengthen the expertise of the research groups for pursuing research in advanced areas for technology development and demonstration, and also for promoting R&D in the area in the country by conducting trainings and workshops. In the case of proposals for carrying out studies of policy issues and analysis purported to renewable energy, 100% funding will be supported by MNRE.

12.2 Financial assistance for projects including the technology validation and demonstration projects that involve partnership with industry/private institutions including Engineering Colleges should normally be restricted to 50% of the project cost. Projects from private academic institutions, including engineering colleges accredited by government accreditation body will be eligible for 50% support. The balance funds will be met by such institutes/industries. Projects aiming at applications of R&D/demonstration of technology/systems will be supported up to 50% of the project cost. Innovative projects will be supported through start-up support mechanism, which will involve investment agreement with investors.

12.3 The Technology Demonstration Projects involving industry shall generally cover the activities taken up after successful completion of a lab scale/ bench scale work either by industry and/or by lab/ institutions with a view to facilitate field evaluation and demonstration of the product(s), processes, technology, system-integration having potential to lead to their commercialization in the country. These projects may also support technologies sourced from other countries for assessing their suitability and adaptability under Indian conditions.

13. International Collaboration

13.1 The international cooperation for taking up joint research, design and development activities in advanced areas of new and renewable energy will be supported. Collaboration with institutions of ISA Member countries will also be supported in mutually identified areas. A suitable MoU for implementation will be signed between the participating organizations/agencies as per requirements of collaboration. These projects will have provision for exchange of visits of scientists, researchers working in technology development projects.

14. Technology Development Advisory Committee (TDAC)

14.1 An empowered Technology Development Advisory Committee (TDAC) is essential for pragmatic appraisal and review of achievements of technology development projects, besides guiding the priority of technology development needs. A TDAC will be constituted for appraisal and review of TDP projects and for identifying thrust areas for support for faster development of technologies/systems. Expert committees will be set up for monitoring the implementation of projects in order to maintain timelines.

14.2 A comprehensive TDAC comprising experts from all areas of new and renewable energy and other S&T departments with Secretary, MNRE as the chairman and an eminent scientist in new and renewable energy as the co-chairman will be set up to oversee the RD&D programme. The role of the TDAC will be as follows:

- i. To take stock of TD efforts in New & Renewable Energy in both domestic and international level and accordingly oversee the progress in RD&D efforts
- ii. Suggest specific TD activities for support by MNRE.
- iii. Review the TDP of the MNRE and make an assessment of achievements and suggest measures for strengthening the TDP for support by MNRE.
- iv. Appraise all TD project proposals and make recommendation.

15. Implementation

15.1 Technology development will be promoted through a coordinated approach creating an enabling environment for encouraging innovation and RD&D keeping in view applications and commercial prospects. Innovative ideas will be supported for scaling up till entrepreneur development. Collaborative RD&D in focused research areas will be encouraged through supporting Centres of Excellence and collaboration between institutions and/or institutions and industry. Interaction between academia, industries and utilities will be promoted by organizing regular interactive session. Research Groups engaged in R&D for promotion of new and renewable energy working in R&D/academic institutions, engineering colleges (both public and private approved by government accredited body), industries, other organizations, etc. will be supported for taking up

research, development and demonstration projects for technology development integrating innovation for continuous improvement. Support will be in form of projects. A robust framework for evaluation, review, appraisal and monitoring with ecosystem for continuous support for technology development until manufacture has been evolved for the purpose. The framework and process is described below;

Awards for Innovation

15.2 Innovation in new and renewable energy will be fostered by organizing competitions at national level wherein innovators will be given opportunity to present their innovative ideas/innovation/prototypes before a judging committee. Nominations will be invited through MNRE web and also national/regional dailies. The winners will be given awards in form of cash prize. They will also be given opportunity to pursue their innovation for prototype development and then scale up.

Start-Ups/Scale-Up

15.3 The MNRE has gained experience from Centre of Excellence supported at CIIE, IIM Ahmedabad for supporting start-ups for prototype development and then scaling up for entrepreneur development. An ecosystem with proper appraisal and financing mechanism will be evolved for supporting start-ups/scale-ups raised out of innovation for entrepreneur development. This will promote indigenous development and manufacture of new and renewable energy technologies/systems/components. Another window will be set up through IREDA for bringing investment for promoting start-ups.

Study on Policy Research

15.4 Study on policy research and analysis of implementation of various programmes including impact of technology development support and field implementation of projects/programmes will be supported for improvement. This may include study on impact of systems design, integration, resource assessment, optimum utilization of resources and systems, quality control, regulatory mechanism and socio economic impact of renewables.

Standing Invitation for Proposals

15.5 TD projects will be supported in the broad identified areas in different sectors of new and renewable energy, which will be announced by the Ministry through its website/national dailies from time to time. The proposals can be submitted round the year, however, the proposals received up to the end of March will be decided by end of June and those received between April and October will be decided by end of January of

the following year. Applications will be accepted only in e-Mode and necessary software will be put in place by MNRE in a time bound manner.

Submission of Proposals

15.6 The project proponents will be required to prepare TD project proposals in prescribed format. The proposal can be submitted online or through hard copies. The project proposals will need to be prepared with a detailed literature survey of the work already done both nationally and internationally in the proposed field of research. The objectives of the project should be clear, focused and realistic. The project activities proposed to be based on proven scientific principles and evidence supported by publications in reputed journals and a realistic assessment of specifications and cost.

15.7 The proposal shall bring out the need of the project with proper assessment of viability of the product/outcome and with clear-cut deliverables characterized by performance parameters. The overall relevance will need to be supported by proper assessment for scalability and bankability of the product proposed to be developed. The implementation mechanism should have the work plan with matching time-lines. The proposal will be accompanied with a certificate that the research proposal is original and the same research has not been (or is being) carried out elsewhere or in the same organization.

15.8 Each Principal Investigator will give a declaration to avoid duplicate funding of the project. Also, they will ensure that no same or similar research is being done in India or abroad the PI is aware of.

Evaluation of Proposals:

15.9 The proposals received in the MNRE will be evaluated by the concerned Divisions with the help of subject matter experts in prescribed format, wherever required. Subject-wise Panel of Experts will be empanelled for the purpose. The evaluation should be completed within 2 months of time. The proposals will be sent to experts on line for expeditious comments. In case the proposal is revised, MNRE will subject to revaluation by same or other experts.

15.10 The feedback from experts, if leading towards strengthening of proposals will be shared with the proponents, otherwise decision will be taken by an appropriate Committee appointed by the MNRE. Principal Investigator (PI) of the qualifying projects will be called for making presentations before the committee, which will appraise the projects and make recommendation.

Review and Appraisal

15.11 A comprehensive TDPAC comprising experts in all areas including integration

of systems and components and commercialization will carry out review and appraisal of projects for consideration. The TDAC will comprise eminent experts in the related subjects (two experts in each area of new and renewable energy) from R&D/academic institutions, industries, and other related government departments with Secretary, MNRE as the Chairman and an eminent Scientist as the Co-chairman. The TDAC would normally meet twice a year for review and for appraising the proposals.

Monitoring Mechanism

15.12 All the projects supported by the MNRE will be monitored rigorously to ensure timely execution and achievement of deliverables and also to allow any mid-course corrections, if considered necessary. For this, a panel of experts and organizations will be involved in consultation with TDAC in its meetings. The expert / organization for monitoring purposes shall be identified at the time of approval of the proposals.

15.13 Each project with an outlay of more than Rs 1.00 crore would be required to be visited at least once in a year, whereas for other projects, visits may be undertaken as and when necessary. A report on the status of activities and achievements vis-à-vis. the sanctioned objectives/ deliverables and milestones would be prepared and submitted to the Ministry.

Technology/Process Validation of Outcomes

15.14 The achievements claimed under the projects will be subjected to validation of the technology/process so that appropriate action is taken on furthering the technology development and demonstration in the area. On completion, the outcome of the project will be screened by expert committee to be constituted with the approval of RDAC. The achievements will be subjected to measurements in relevant accredited test labs in the country or outside country.

16. NRE Technology Development Conclave

16.1 R&D Conclave will be organized once a year to publicize R&D efforts and achievements thereof such that the talent available anywhere across the country is utilized in the process of technology development and for promotion of new and renewable energy in the country. The participants will include researchers, innovators, experts from R&D/academic institutes/industries, policy makers, etc.

17. Budget line for TD Programme

17.1 The entire activities of TDP including MNRE institutions and other Test Centres will be administered under the budget "Technology Development Programme(TDP)". A separate administrative approval with distribution of budget for various activities of TDP, including MNRE institutes and other Test Labs will be issued by TD Coordination Division.

The budget will include provision for expenditure on organizing meetings of TDAC, Conclave, monitoring and any other activity relating to TDIP. The meetings of will be coordinated by the TD Coordination Group, MNRE and the visits of Monitoring Committee by the respective Groups. The expenditure on capacity building for research, lab infrastructure and trainings will be met from the budget head of Human Resource Development Programme. The implementation will follow guidelines.

18. Funding Distribution Provision

18.1 Funding will be available for both public and private institutions including private industrial sector engaged in RD&D and technology development and manufacture. The budget allocation for TDP will be available in the proportion as given in table below;

Sl. No.	Type of institutions/Items	Type of projects	Proportion of allocation (%)
1	R&D/academic institutions/ Organizations including Engineering Colleges and public/private industrial sector (Private institutions approved by AICTE/ Government Accreditation Body and public/private sector will have to share 50% cost of project).	Prototype/process/system/ technology development;	30
2.	R&D/academic institutions/Organizations/industries or consortium sharing 50% of the project cost.	Applications of R&D/demonstration of technology/systems	30
3.	NISE,NIWE, NIBE and other Test Centres	RD&D, technology validation, Testing, Standardization, Certification, training.	20
4.	Innovation competitions/Policy Research and analysis/ Monitoring/Conclave/Meetings. etc.	R&D/academic/social organizations.	5
5.	Innovative Projects/Start-Ups	Scale up for commercialization/entrepreneur development	10
5.	International Collaboration in R&D including with ISA Member Countries	Joint R&D with National Institutions including of ISA Countries	5