



Invitation for proposals from MSMEs/Innovators for working in the DSIR-Common Research and Technology Development Hub (CRTDH) established at CSIR-CEERI's Incubation-cum-Innovation Hub (IIH), Jaipur Centre, CFC-1, Malviya Industrial Area, Jaipur-302017

AIMS AND OBJECTIVES

Innovation is the key for successful entrepreneurship. However, there are challenges in bringing innovative ideas to the markets. There are Start-ups/MSEs with innovative ideas that may face difficulties in translation in to a marketable product/ process due to lack of an ecosystem for innovation including the sophisticated testing facilities, equipment/ infrastructure, intellectual support, etc.

The Common Research and Technology Development Hubs (CRTDHs) have been established by the Department of Scientific and Industrial Research (DSIR), Govt. of India with an objective to foster industry-institution interaction and address the above problems faced in translational research by the MSEs thereby providing an eco-system for research and innovation in the country. The hub would provide technical support, infrastructure and sophisticated analytical as well advanced research equipment facility to the MSEs for carrying out competitive technological research to translate new ideas into marketable products as well as utilize the already developed technologies available in the CSIR laboratories for taking them to market.

Three such hubs have already been running under the scheme, two at CSIR-CCMB, Hyderabad and CSIR-IHBT, Palampur in the sector of Affordable Healthcare and the third at CSIR-NIIST, Thiruvanthapuram in the sector of Environmental Interventions. Four new centres along with CSIR-CEERI centre which is in the area of electronics/renewable energy were approved in Dec. 2016. Other centres are at CSIR-CMERI, Durgapur, IIT Gandhinagar and IIT Roorkee. **The CRTDHs are National Facilities operated on a non-commercial cost-plus basis for the benefit of MSEs as well as startups/innovators.**

Focus Areas of DSIR-CRTDH at CSIR-CEERI's IIH Jaipur Centre

The DSIR-CRTDH facility at Jaipur has been setup in the area of 'electronics/renewable energy' to conduct high quality and relevant product oriented research to meet specific industry requirements and disseminate first hand research information to MSE's/ Start-up's for product innovation. State-of-the-art facilities and support for engineering design, product evaluation and ideation for innovative electronic/renewable energy products in collaboration with MSE's is the key intent of this unique and people designed facility. Strategic predictions indicate that industry 4.0 and industry 5.0 (new industrial revolution) will happen through smart devices and their intelligent integration. Hence, affordable electronic intelligent appliances touching every aspects of human life, such as, health, water, food, infrastructure, industry, which are the products of future, will be brought in for exploitation. CEERI through this initiative will help new generation electronic/renewable energy industries.



This DSIR-CRTDH facility is focusing on valued R&D in the following frontier areas,

- Renewable energy for domestic and/or micro-grid compatible appliances
 - Solar inverter-cum-pump
 - Efficient Solar Energy Conversion
- Automotive Electronics
 - Condition Monitoring (Engine, Tyre, etc.)
 - Connected Cars
 - Driver Assist Systems
- MEMS based Sensors and Electronic Systems
- Real-time and Intelligent Embedded Appliances
- Point-of-care Diagnostic Products
- Industrial Robotics
- Industrial Applications of Plasma Technology

Facilities available in DSIR-CRTDH at CSIR-CEERI's IIH Jaipur Centre

The DSIR funded Common Research & Technology Development Hub (CRTDH) is housed at CSIR-CEERI's Incubation-cum-Innovation Hub, Jaipur Centre, CFC-1, Malviya Industrial Area, Malviya Nagar, Jaipur. CSIR including CEERI knowledgebase and developed technologies will be brought in for exploitation by MSEs for introduction of novel products. CSIR-CEERI's facilities at Pilani will also be available for utilization to enhance the reliability of products and processes.

The CRTDH is coming up as a completely air-conditioned facility of about 10,000 sqft area with portable benchtops and following sophisticated equipment in addition to basic amenities:

1. Solar Grid Tied Inverter Testing Facility

- Grid Simulator (30 kVA)
- PV array simulator (2* 15 kW)
- Smart RLC load for Anti-islanding testing
- High End Power Analyzer
- High End Digital Storage Oscilloscopes

With available set of equipment, the testing, characterization and certifications can be done for following standards.

A. Grid Tied inverter

- a) **Efficiency Testing:(IEC 61683: Photovoltaic systems - Power conditioners - Procedure for measuring efficiency)**



- b) **Maximum power point tracking (MPPT) testing: (EN50530:**
Overall efficiency of grid connected photovoltaic inverters)
- c) **Anti-islanding testing:(IEC 62116:** Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters), **(IEC 61727:** Photovoltaic (PV) systems - Characteristics of the utility interface)

B. Off-grid Inverter

- a) Efficiency Testing (**IEC 61683** (Scope: Linear loads))
- b) MPPT Testing **EN50530**

For **IEC 60068-2 (1, 2, 14, 30):** Environmental testing (Cold, Dry heat, Change of temperature, Damp heat, cyclic (12 h + 12 h cycle) and for **IEC 62509:** Battery charge controllers for photovoltaic systems –Performance and functioning, **Environmental Chamber and Battery Simulators** respectively will be added soon.

2. Magnetron sputtering system -A technology dissemination facility for Artificial Jewellery Coating

A reactive sputtering system with capabilities for reactive deposition/co-sputtering of thin layers of several materials (Magnetic and Non-magnetic) and also different oxides, Intermetallic Alloys, etc. is available with possible uses for Decorative coatings on artificial jewellery, R&D sputtering application, Optical coating, Photovoltaic coating, Metals, metal oxides and dielectric coatings, Tool coatings, etc.

3. Other Facility (Immediate plans) at Jaipur Centre:

- CNC, multilayer PCB machines
- 3D printer
- Electronics equipment testing facility
- Design engineering centre facility with sophisticated softwares
- Rapid Prototyping (Surface mount facility)
- Assembling and manufacturing Facilities with Basic Workshop

Details available at website <https://www.ceeri.res.in/jaipur/>

In addition to above, the following facilities, Constancy/Services at CSIR-CEERI Head Office in Pilani are also available for usage by the MSEs on case to case basis:

1. Microwave Tubes Area

- Glass to Metal Sealing
- High Temperature Sealing/Joining
 - Metal-Metal
 - Metal–ceramic (Metallised ceramic).
 - High Vacuum (10^{-10} Torr, std cc/sec) Sealing/Joining.
- High Emission Density Electron Emitters
- Thin Film Coating
- High Temperature Annealing/Sintering of vacuum grade materials.
 - Max Temp: 1600 °C .
 - Size: Upto (3'' dia & Hight 6'')
- Glass blowing techniques
- Electro Plating (Clean)
 - Gold, Ag, Ni and Cu
- High Vacuum Micro wave tubes /Fabrication components facility
- High frequency (up to 220 GHZ) Characterization facility
- UHV processing of (Any Components/Vacuum Devices)
- Leak detection up to 10^{-10} Torr (std cc/sec)
- High voltage breakdown testing
- Spot laser welding
- High Energy X-ray Machine: Non-destructive high energy X-ray testing facility to metal ceramic envelopes/enclosure
- TIG welding of metal (Metal joints in protection atmosphere)

2. Cyber Physical System Area

- **Pressure sensor characterization facility**

The facility is capable enough to characterize absolute, differential and gauge pressure sensor. Temperature and humidity chamber is used to analyze impact of temperature on pressure sensor. The facility makes use of pressure controller, temperature & humidity chamber and SMU. The measurement ranges are listed as follows –

Maximum pressure = 95 Bar

Minimum pressure = 0.1 mBar

Measurement uncertainty = ± 0.008 % of reading

Temperature range = -15 to 105 C

RH = 10% to 90%

Voltage/current measurement limit = $\mu\text{V/nA}$

- **PCB development and rework facility**

The facility is capable enough to develop dual layer PCB on a FR4 substrate. The system works on the principle of milling. The milling is performed by a combination of metal bits with flat and v-groove tip. Based on application, the tips are chosen. After milling, the IC is



mounted on PCB using a reflow principle. The facility makes use of milling and reflow machine. The achieved parameters are as follows -

- Minimum drawn width = 100 μ m
- Rub-out option = yes
- Package compatible = BGA, SOIC, TSOP etc
- Mounting error < 200 μ m

- **Accelerometer characterization facility**

Accelerometer (both piezo-resistive, piezo-electric) functional validation is possible with shaker. A calibration report is generated after sensor mounted on the shaker. The report includes parameters like harmonic components and SNR values (dynamic characteristics) of sensor under test. The facility consist of a closed loop air bearing shaker, power amplifier, control software and sensor interface modules. The achieved parameters are as follows -

- Bandwidth = 5 to 15 kHz
- Range = 30g (maximum)
- Excitation type = Sine
- Parameters calculated = Harmonic, SNR, Output amplitude

- **AI facility with following features**

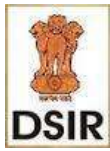
- NVIDIA DGX Systems with Volta 100 over NVLink offers 3X the speed of prior generations
- NVLink accelerates at 10X faster than PCIe.
- Powered by NGC Deep Learning Stack
- Deep learning training, interface and accelerated analytics in one system
- Faster training of deep learning models
- Containerized environment allows use of multiple different deep learning frameworks simultaneously
- On-demand access of GPU computational resources

- **Solar Simulator Facility:**

Specifications:

AC line input Line voltage	3 x 360 – 440
VAC Line frequency	48 – 62 Hz
Mains connection type	3L+PE (no neutral)
Input current	3 x 40 Arms
Output ratings Output power range	0 – 20 kW
Output voltage range	0 – 600 VDC
Output current range	0 – 40 A

The TopCon Quadro TC.P series represents a range of well-introduced fully programmable unidirectional DC power supplies. The digital control offers full output control of voltage, current and power as well as an adjustable internal resistance simulation. As all REGATRON power supplies, TC.P series are based on a multi-processor architecture which not only enables seamless crossover of controller modes but also real-time onboard data processing.

**Laboratory Oil Testers OTS 100AF Facility****Specifications**

Power supply Line voltage	85 to 265 VAC
Measuring range of OTS100AF	0 to 100 kV rms maximum (50 kV - 0 - 50 kV)
VAC Line frequency	50/60 Hz
Internal printer	Yes
Interface	USB
Display	3.5 in display
Weight	30Kg
Vessels	400 ml

Megger's range of automatic oil test sets performs accurate breakdown voltage tests on mineral, ester and silicone insulating liquids. Common across the range precision, shatter proof test vessels are easy to clean and provide repeatable results, whether they are used in the field or laboratory featuring lock in precision electrode gap setting adjustment wheels. The transparent, shielded lid and large test chamber allows easy access to the test vessel, enabling users to see what is happening within the test chamber.

- **Dielectric Test Sets Facility**

Specifications

Power supply Line voltage	220VAC
Output Current	5 mA for 5 min
VAC Line frequency	50/60 Hz
Ripple	Less than 2% on capacitive samples
Temperature range	Operating: -20 to +130° F (-30 to +55° C)
Relative Humidity range	Operating: 0 to 90% noncondensing
Weight	63Kg

The High Voltage DC Dielectric Test Sets (160 kV) provide the most dependable, portable dc high-voltage sources for checking the quality of electrical power cables, motors, switchgear, insulators, transformers and capacitors. Each portable set (heaviest is 73 lb, 32.8 kg) is comprised of two separate modules:

Control Module This module allows the operator to switch-select the appropriate current output range, adjust the output level and monitor both the applied voltage and leakage current at a safe distance from the high voltage being delivered to the load under test. No voltage higher than input ac power is present in the control module.

High-Voltage Module An air-insulated design receives its instructions from the control unit. It generates the dc high voltage that is delivered to the load under test.

- **Rapid PCB prototyping**

A new era of state-of-the art circuit board plotters for in-house rapid PCB prototyping is available. This compact high-speed plotter provides unequalled precision and performance for quickly and easily milling and drilling circuit board prototypes in minutes. In-house PCB prototyping gets your designs to market faster by eliminating production delays and high costs that can occur with outside vendors.

- **Hardware-in-the-Loop System Facility**

Specifications

Processor	4 cores
Channels	16 x Analog inputs (AI) 16 x Analog outputs (AO) 32 x Digital inputs (DI) 32 x Digital outputs (DO)
Resolution	16 bit
Analog IO voltage range	± 10 V
Built-in scope	Yes
Machine models support	Basic, Advanced
Connectivity	USB Ethernet
Compatibility	HIL DSP Interface HIL Breakout board HIL dSpace Interface HIL uGrid DSP Interface
Software	HIL Control Center

HIL test, and HIL certify power electronics controllers with the industry leading hardware-in-the-loop system is available. This compact, extremely powerful, 4-core HIL provide all the tools needed to test power electronics controllers in a wide range of applications: solar and wind power generation, battery storage, power quality and motor drives.

- Consultancy on VLSI Design, IoT, Embedded System, etc.

III. Smart Sensors Area

Manufacturing facility:

- Semiconductor grade thin films using Sputtering and e-beam evaporation
 - Metals like Ti-Au, Ti-Pt, Cr-Au, etc.
 - Dielectric films like SiO₂, SiN, etc.
 - Metal oxides like SnO₂, ZnO, etc.
 - Die attach and wire Bonding of devices on various substrates
 - Customized packaging of electronic devices
 - Mask making for lithography

Characterization facility:

- Electrical characterizations like I-V and C-V, of sensors or semiconductor devices
- Mechanical characterizations like Pressure and Acceleration, of electronic devices
- Temperature characterizations of electronic devices

- Thin films characterizations like FTIR, Raman, SEM, AFM, XRD, EDAX

Consultancy services:

- Sensors design and development consultancy

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4. Central Workshop Facility

A well-equipped central workshop facility is also available with a capability of the fabricating a variety of mechanical components and following services are offered to MSEs/Startups

- Prototyping
- Batch Production
- Precision mechanical components
- Assembly of fabricated components and assemblies to system parts.

For above the following high end techniques/equipments are available:

- Turning (Conventional & CNC)
- Milling
- Grinding (Centerless & Surface Grinding)
- Fitting (Bench Work, Hand filing, Drilling, Tapping, etc.)
- Wire Cut EDM
- Welding (Gas & Electric)
- 3D Printing
- Sheet Metal

Please visit website: <https://www.ceeri.res.in/>



Working models

a. Flexible/ Virtual Model:

The MSEs/Innovators may plan to work on their innovations themselves or opt for virtual/physical presence through technical support from the professionals at CSIR-CEERI. The equipment/facilities can be used by themselves or seek necessary help from Scientists of CSIR-CEERI in consultation with the principal investigator for the DSIR-CRTDH project at CSIR-CEERI's IIH Jaipur. In this model, Intellectual Property remain with the MSEs/ Innovator. The patent cost will be borne by the company.

b. Licensing Model:

MSEs/Innovators having some idea but not confident of taking forward their ideas may explore licencing of innovative/ patented technologies developed by CSIR-CEERI scientists. These can be further developed into marketable products based on the experience and assessment of MSEs/Innovators.

Scientists at DSIR-CRTDH-Jaipur would provide technical support, infrastructure and equipment usage to MSEs. The Intellectual Property remains with CSIR-CEERI on the patented technologies. Whereas any new development/ improvement of existing technology, the IP will be co-shared and also the expenditure in filing the patent.

c. The Joint Venture Model:

Two or more MSEs can agree to pool their resources for the purpose of development of a new product/process/service. DSIR-CRTDH-Jaipur will provide R&D support to MSEs for developing innovative products and to build confidence, strengthening and competitiveness by extending technical assistance. The IP will be jointly shared by the MSEs and CSIR-CEERI for joint development of the product/ process.

How to Apply?

Proposals from MSEs/startups/innovators are invited by DSIR-CRTDH-Jaipur as per the enclosed Application Proforma. The filled proforma can be submitted anytime during the year to CSIR-CEERI at iiijaipur@ceeri.res.in. The proposals shall be considered by a Management Committee (MC) constituted under the scheme. Only the proposals approved by the MC shall be allowed access to the facility and undertake project work on the agreed terms and conditions for development of innovative products and processes.

Charges for carrying out development work at DSIR-CRTDH-Jaipur

The charges for carrying out development work shall comprise of only direct expenses

towards the following:-

- a) Cost of manpower of CSIR staff deployed and temporary project staff deployed.



- b) Cost of consumables/raw-material components.
- c) Cost of physical inputs/services/utilities.
- d) Equipment usage cost.
- e) Contingencies including extra payment envisaged e.g. for hiring infrastructure facilities, experts, computer time, information, etc.
- f) Others (if any)



PROFORMA FOR PROPOSAL FOR UTILIZATION OF COMMON RESEARCH & TECHNOLOGY DEVELOPMENT HUB (CRTDH) AT JAIPUR

I. The Company Profile

1. Name and Address/Phone number of the Applicant/Company:
2. Company's Legal Status:
3. Name of Principal Investigator (PI):
4. Name of the MD/CEO/CTO:
5. Educational Qualification and experience of PI:
6. Annual Turnover of the company (preferably last 3 years, to be supported with Annual Report)
7. Team & Expertise available:
8. Present activities of the applicant and R&D, if any

II. Technology/Product/ service details

1. Project title:
2. Status of the work already carried out by the PI such as:
 - a. Proposed products / services
 - b. Technology already developed and tested
 - c. Technology demonstrated at pilot scale
 - d. Patents filed
 - e. Technology certification received
 - f. Market survey and business plan completed
 - a. Consumers/ users feedback received, if any



3. Technology/Products/ required

- i. Description of the product/technology/service required from CSIR-CEERI/CRTDH
- ii. Innovation merit and uniqueness of the technology/product:
- iii. Category of technology/innovation (specify process/product/new Application):
- iv. If the idea involves use of existing intellectual property, give details of the owner and arrangements of sourcing the innovation and terms of its commercialization:
- v. Project summary giving broad details of the activities to be undertaken, action plan, major milestones/timelines, patenting of Innovation and expected duration of completion, etc.
- vi. Please comment on the environment and safety aspects of the project / product:

4. Any such products available in the market:

- b. Market survey demand-supply, marketing strategy

III. Proposed Modalities of Engagement:

1. License patent/technology of CSIR-CEERI/CSIR and product development
2. Product development, based IP of the company (if any), with intellectual participation by CSIR-CEERI
3. Co-development of product/service/technology with CSIR-CEERI scientist
- 4.. List of facilities available at DSIR-CRTDH-Jaipur proposed to be used under your project: (leave blank if not known)
- 5.. List of facilities available at CSIR-CEERI Head Quarter at Pilani proposed to be used under your project: (leave blank if not known)
- 6.. End Product/Outcomes/Deliverables:
- 7.. Any other information that you wish to share with us to help us in judging your proposal.



IV. Declaration:

I/we declare that all the statements made in this application are true, complete and correct to the best of my/our knowledge and belief. In the event of any information, found false or incorrect, my/our candidature will stand cancelled and all my/our claims will be forfeited.

Place:

Date:

(Signature of the applicant)



Terms & Conditions to be agreed upon by MSEs/Startups/Innovators/industry for undertaking project work and usage of facilities under DSIR-CRTDH at CSIR-CEERI's IJH Jaipur

1. The MSEs/innovators shall acknowledge the utilisation of DSIR-CRTDH facility on the package of products developed under the programme and marketed.
2. The marketed product packaging will clearly state that the CSIR-CEERI and DSIR will not be responsible for the quality and efficiency of the goods and that the sole responsibility of the product rests with the MSE/ Innovators with respect to quality and efficiency.
3. In case of any dispute arising out of the scope of work in terms of physical targets, the decision of Director CSIR-CEERI shall be binding upon by MSE.
4. CRTDH-Jaipur will in no way be responsible and/or undertake any liability that may arise on account of any manpower that may be engaged/deployed for work by MSME.
5. All the project related activities of MSEs will be open to the Management Committee and DSIR Officials for monitoring and inspection. Concerned officers of DSIR may visit the CRTDH-Jaipur for ascertaining the progress of work and attempt to resolve any difficulties that might be encountered in the course of implementation.
6. The MSE/Innovator shall maintain separate project experimentation records that shall be available for review by the Management Committee members.
7. The assets/equipment acquired by MSEs and brought to the CRTDH facility shall need the approval of Director, CSIR-CEERI/Scientist-in-charge, CSIR-CEERI's Jaipur Centre.
8. DSIR/CSIR-CEERI will not have any liability towards the manpower appointed by the MSMEs working in the CRTDH for implementation of the project.
9. DSIR/CSIR-CEERI will have no responsibility in case of any loss is caused to any life or property due to accident, fire or any other reasons. The participating MSEs working in the CRTDH are bound to adopt the safety measures put in place by CSIR-CEERI to safeguard human life and property of CRTDH.



10. DSIR/CSIR will have no liability on account of any omission or commission of regulatory/statutory requirement by participating MSEs/innovators and their companies.

11. MONITORING:

The projects of MSEs will be periodically reviewed and monitored by Management Committee constituted by DSIR.

12. DISPUTES:

The DSIR, MoST does not own any responsibility for disputes arising out of IPR issues, however, the rules and regulations of CSIR shall apply and Director, CSIR-CEERI is empowered to take a view as deemed fit.

13. TERMINATION OF THE PROJECT:

The MSEs/Innovators and CRTDH can terminate the project with prior notice at any stage on mutually agreed terms and conditions..

14. ARBITRATION:

Any dispute arising during the course of the project shall be referred to the sole arbitrator appointed by Director, CSIR-CEERI and the arbitration proceedings shall take place under the "Indian Arbitration Act, 1940"

15. REGULATORY APPROVALS:

All the regulatory and statutory approvals for the product/process development and for marketing should be taken by the MSE/Innovator. DSIR and CSIR/CSIR-CEERI shall not hold any responsibility for delay and denial of approvals.



UNDERTAKING OF THE INNOVATOR/ MSE/ INDUSTRY

I / We agree to the above terms and conditions in connection with usage of facilities and undertaking work in the DSIR-CRTDH facility at CSIR-CEERI's Incubation-cum Innovation Hub, Jaipur Centre, CFC-1, Malviya Industrial Area, Malviya Nagar, Jaipur-302017 for our project concerning “_____”

Name :

Signature/

Designation and :

Thumb Impression

Organization

(If representing the organization)