



Department of Science & Technology (TPEM)  
Technology Development & Transfer (TDT) Division

Project Proposal under  
DHI-TPEM Technology Platform for Electric Mobility  
(TPEM)

Project Title:	
Category	
Research Area	
Principal Investigator	
Lead Institution	
Date of Submission	

The Project Proposals may be submitted (1 hard copy + soft copy of proposal in PDF) between Dec.1, 2016 and Jan.15, 2017 to:

TDT Division, Department of Science & Technology, Technology Bhawan, New Mehrauli Road, New Delhi- 110016.

Attention:

Mr. Sajid Mubashir, Scientist G (Email: [sajid@nic.in](mailto:sajid@nic.in)) or  
Dr. Krishna Kanth Pulicherla, Scientist C (Email: [kkpulicherla.TPEM@gov.in](mailto:kkpulicherla.TPEM@gov.in))

## Call for Proposals (Brief)

The Detailed Call for Proposals is available on TPEM website: [www.dst.gov.in](http://www.dst.gov.in)

You may also write to us for a copy at [sajid@nic.in](mailto:sajid@nic.in)

The Technology Platform for Electric Mobility (TPEM) is a joint initiative of the Department of Heavy Industry (DHI) and the Department of Science & Technology (TPEM) to support R & D Consortia Projects involving multiple companies and academic institutions. The Consortia projects will be eligible for grant-in-aid funding upto 60% and the rest will be contributed by industry partners in terms of resources, manpower, equipment and facilities.

**The project proposals are invited in the following areas.**

### TPEM Program 1. Lithium Battery

- Project 1.1. Two Wheeler Traction Battery [48/ 72V, max-2.5 kwh],
- Project 1.2. Three Wheeler Traction Battery [48/ 72V, max-6 kwh],
- Project 1.3. Four Wheeler Traction Battery [72V, max-16/24 kwh],
- Project 1.4. Bus Traction Battery [750 V, max-250 kwh] for 18.5 tonne, 12 meter bus.

### TPEM Program 2. Charging Infrastructure

- Project 2.1. AC Chargers with Net Metering facility
- Project 2.2. Technology Pilot for DC Charging technologies for low voltage vehicles (2W, 3W & small cars)
- Project 2.3. Technology pilots for EV Bus Charging at Bus Depots for Urban Transit Fleets
- Project 2.4. Technology pilot for communication channel & protocol between the vehicles, charging stations and control station.

### TPEM Program 3. Driving Cycle & Traffic Pattern

- Project 3.1. Segmented studies on the Urban Driving Cycle & Traffic Pattern for different categories of vehicles using telematics equipment and traffic surveys, for 1 year, covering winter, summer & monsoon.

### TPEM Program 4. Motors & Drives

- Project 4.1. Electric Two Wheeler (e-2W) Reference Vehicle
- Project 4.2. Electric Three wheeler (e-3W) Reference Vehicle

### TPEM Program 5. Lightweighting of xEVs

- Project 5.1. Lightweight solutions for optimally designed xEV, encompassing vehicle body structure, chassis and sub-systems, that will meet customer requirements and regulations.

## Contents

Section-1.Overview of the Project.....	4
1.1.Project Title:.....	4
1.2.Lead Investigators.....	4
1.3.Details of Collaborating Institutes and Industry.....	4
1.4.Please give names of 5-6 Area Experts.....	5
Section-2.Forwarding Letters.....	6
2.1.Undertaking from Principal Investigator.....	6
2.2.Endorsement from Head of Organisation.....	7
2.3.Undertaking from collaborating Industries/ Agencies.....	8
Section-3.Relevance of Proposed Project.....	9
3.1.Current Status of the technology.....	9
3.2.Significance of the project.....	9
Section-4.Project Work Summary.....	10
4.1.Detailed Objectives.....	10
4.2.Technical Details.....	10
Section-5.Detailed Work Plan.....	11
List of Work-Packages.....	11
5.1.Work package-1 (WP-1).....	11
5.2.Work package-2 (WP-2).....	12
5.3.Work package-3 (WP-3).....	13
5.4.Work package-4 (WP-4).....	14
Section-6.Budget Summary (in ₹ lakhs).....	15
Section-7.Itemised Budget.....	17
7.1.Manpower.....	17
7.2.Consumables.....	17
7.3.Contingencies.....	18
7.4.Other Costs (Outsourcing/ Fabrication/ Testing/ Patenting).....	18
7.5.Domestic Travel – from – TPEM Grant (in ₹ lakhs).....	19
7.6.Equipment proposed to be procured.....	19
7.7.List of equipment available with participating agencies, relevant to the project.....	19
Section-8.Annexure: Justification for Itemized Budget.....	20
8.1.Consumables.....	20
8.2.Contingency & Travel.....	20
8.3.Other Costs.....	20
8.4.Permanent Equipment.....	20
Section-9.Biodata of Investigators.....	21
9.1.Principal Investigator (1):.....	21
9.2.Investigator (2):.....	21
9.3.Investigator (3):.....	22
9.4.Investigator (4):.....	22

## Section-1. Overview of the Project

### 1.1. Project Title:

### 1.2. Lead Investigators

#### 1.2.1. Principal Investigator (PI)

Name	
Designation	
Agency & address	
Telephones (Mobile; Landline)	
E-mail	
Date of birth	

#### 1.2.2. Co-Principal Investigator (Co-PI)

Name	
Designation	
Agency & address	
Telephones (Mobile; Landline)	
E-mail	
Date of birth	

### 1.3. Details of Collaborating Institutes and Industry

#### 1.3.1. Partner-1

Name	
Designation	
Agency & address	

Telephones (Mobile; Landline)	
E-mail	
Date of birth	

**1.3.2. Partner-2**

Name	
Designation	
Agency & address	
Telephones (Mobile; Landline)	
E-mail	
Date of birth	

**1.4. Please give names of 5-6 Area Experts**

(Please give complete postal address, telephone numbers and e-mail addresses)

1.4.1.

1.4.2.

1.4.3.

1.4.4.

1.4.5.

1.4.6.

## Section-2. Forwarding Letters

### 2.1. Undertaking from Principal Investigator

1. I have enclosed a print-copy and a soft-copy (PDF) of the Project Proposal titled: \_\_\_\_\_, complete in all respect, along with (a) Endorsement from the Head of the Organisation (on letter head), and (b) Undertakings from the Collaborating Industries/Agencies
2. I have not submitted this Project Proposal titled : \_\_\_\_\_ or similar work, elsewhere for financial support.
3. I shall ensure that if an equipment is available for use in my Organization, it will not be proposed to be purchased under the Project.

Name & Designation:	Date:
Signature:	Place:
Stamp/ Seal:	

## 2.2. Endorsement from Head of Organisation

1. Name of Agency: \_\_\_\_\_
2. I, on behalf of the organization, welcome the participation of Dr/Mr/Ms \_\_\_\_\_ as the Principal Investigator (PI) and Dr/Mr/Ms \_\_\_\_\_ as the Co-PI for the Project Proposal titled: \_\_\_\_\_.
3. In the unforeseen and legitimate event of discontinuation by the PI, the Co-PI will assume full responsibility for completion of the Project. Information to this effect, endorsed by me, will be promptly sent to TPEM
4. The equipment and facilities (including administrative) available with the institute and those being procured under the project will be made available to the Investigator(s) throughout the duration of the Project.
5. I will ensure that the financial and purchase procedures in the project will be as per the prevailing norms, and that the Organisation shall provide timely the Statement of Expenditure and the Utilization Certificate of the Funds under the Grant as required by TPEM in the prescribed format.

Name & Designation:	Date:
Signature:	Place:
Stamp/ Seal:	

### 2.3. Undertaking from collaborating Industries/ Agencies

1. Name of Agency: \_\_\_\_\_
2. I have gone through the Project Proposal entitled \_\_\_\_\_ submitted by Dr./Mr./Ms. \_\_\_\_\_ of \_\_\_\_\_ (Name of the Organization) for TPEM funding and I hereby affirm that my Organization/ Company is committed to participate in the Project to the full extent as indicated in the Project Proposal including the technical and financial commitments described in the project proposal.

Name & Designation:	Date:
Signature:	Place:
Stamp/ Seal:	



## Section-3. Relevance of Proposed Project

### 3.1. Current Status of the technology

#### 3.1.1. Internationally

#### 3.1.2. Indian scenario and technological gap

#### 3.1.3. Development status at the participating agencies

### 3.2. Significance of the project

#### 3.2.1. Major applications of the proposed technology

#### 3.2.2. Target Beneficiaries & Expected Impact

#### 3.2.3. What further works will required after the project, for commercial exploitation of technology?

## Section-4. Project Work Summary

### 4.1. Detailed Objectives

#### 4.1.1. Specific Objectives

#### 4.1.2. Scientific Basis and Methodology

### 4.2. Technical Details

#### 4.2.1. Targeted level of development under the project

(Describe the Prototypes/ Process Demonstration; preferably with reference to Technology Readiness Levels)

#### 4.2.2. Proposed target specifications & performance standards

#### 4.2.3. Innovative Elements/Components of the Project

## Section-5. Detailed Work Plan

### List of Work-Packages

No	Title of Work-Package	Lead Investigating Agency
1		
2		
3		
4		

### 5.1. Work package-1 (WP-1)

#### 5.1.1. Goals in WP-1

Title of WP-1					
Objective					
Deliverable					
Duration		Start Date		End Date:	

#### 5.1.2. Major Tasks in WP-1

1	
2	
3	
4	

#### 5.1.3. Agencies & their roles in WP-1

ID	Agency	Role
A		
B		
C		

D		
---	--	--

## 5.2. Work package-2 (WP-2)

### 5.2.1. Goals in WP-2

Title of WP-2					
Objective					
Deliverable					
Duration		Start Date		End Date:	

### 5.2.2. Major Tasks in WP-2

1	
2	
3	
4	

### 5.2.3. Agencies & their roles in WP-2

ID	Agency	Role
A		
B		
C		
D		

### 5.3. Work package-3 (WP-3)

#### 5.3.1. Goals in WP-3

Title of WP-3					
Objective					
Deliverable					
Duration		Start Date		End Date:	

#### 5.3.2. Major Tasks in WP-3

1	
2	
3	
4	

#### 5.3.3. Agencies & their roles in WP-3

ID	Agency	Role
A		
B		
C		
D		

#### 5.4. Work package-4 (WP-4)

##### 5.4.1. Goals in WP-4

Title of WP-4					
Objective					
Deliverable					
Duration		Start Date		End Date:	

##### 5.4.2. Major Tasks in WP-4

1	
2	
3	
4	

##### 5.4.3. Agencies & their roles in WP-4

ID	Agency	Role
A		
B		
C		
D		

## Section-6. Budget Summary (in ₹ lakhs)

	Item	1 <sup>st</sup> Year		2 <sup>nd</sup> Year		3 <sup>rd</sup> Year		Total	
		TPEM	Partners	TPEM	Partners	TPEM	Partners	TPEM	Partners
1.	Manpower								
2.	Consumables								
3.	Contingency								
4.	Other Costs*								
5.	Travel								
6	Permanent Equipment								
7	Overhead Charges								
	Total								

(\*Outsourced work, Fabrication & Testing)

Total Project Budget = ₹        lakhs,  
 Request for TPEM Grant= ₹        lakhs,  
 Partners Contributions= ₹        lakhs,

Research Manpower to be engaged in the project:

JRF (₹ 25,000 +HRA)	SRF (₹ 28,000 +HRA)	RA-I (₹ 36,000 +HRA)	RA-II (₹ 38,000 +HRA)	RA-III (₹ 40,000 +HRA)

### Norms for Manpower & Overheads, from TPEM Grants

#### Manpower @ Research Institutes

Nomenclature & Emoluments	Qualification
Junior Research Fellow (₹25,000/- + HRA)	Post Graduate Degree in Basic Science with NET qualification or Graduate Degree in Professional course with NET qualification or Post Graduate Degree in Professional Course
Senior Research Fellow (₹28,000/- + HRA)	Qualification prescribed for JRF with two years of research experience
Research Associate-I (₹36,000/- + HRA)	Ph.D/ MD/ MS/ MDS or equivalent degree or having 3 years of research, teaching and design and development experience after MVSc/ M.Pharm/ ME/ M.Tech with at least one research paper in Science Citation Indexed (SCI) journal. The Research Associate Scale may be decided by the institute/ organization based on the experience of the candidate.
Research Associate-II (₹38,000/- + HRA)	
Research Associate-III (₹40,000/- + HRA)	

## Overheads @ Research Institutes

Overhead amount is towards meeting the cost of academic expenses including infrastructural facilities at the host institutes, and is permissible as given below: :

- a) For projects costing upto ₹1 crore, 10% of the total cost for educational institutions and NGOs and 8% for laboratories and institutions under Central Government Departments/Agencies;
- b) For projects costing more than ₹1 crore and upto ₹5 crore, overheads of ₹15 lakh or 10% of total cost whichever is less;
- c) For projects costing more than ₹5 crore and upto ₹20 crore, ₹20 lakh will be provided as overheads; and
- d) For projects costing more than ₹20 crore, the quantum will be decided on a case to case basis.



## Section-7. Itemised Budget

### 7.1. Manpower

#### 7.1.1. Budget for Salaries - TPEM Grant

Designation	Qualification	Salary per month	Number of Persons	Amount (in ₹ lakhs)	Role Description
				₹ lakhs	

#### 7.1.2. Budget for Salaries - Partner Contribution

Designation	Qualification	Salary per month	Number of Persons	Amount (in ₹ lakhs)	Justification
				₹ lakhs	

### 7.2. Consumables

Please provide the quantified list of consumables along with cost estimates/quotations in the Annexure  
(Item, Quantity & Unit cost)

#### 7.2.1. Budget for Consumable Materials - TPEM Grant (in ₹ lakhs)

1st Year	2nd Year	3rd Year	Total
₹	₹	₹	₹
₹	₹	₹	₹
₹	₹	₹	₹

#### 7.2.2. Budget for Consumable Materials (Partners Contribution ) (in ₹ lakhs)

1st Year	2nd Year	3rd Year	Total
₹	₹	₹	₹
₹	₹	₹	₹
₹	₹	₹	₹

### 7.3. Contingencies

Please provide the basis of cost estimates in the Annexure.

#### 7.3.1. Budget for Contingencies- TPEM Grant (in ₹ lakhs)

1st Year	2nd Year	3rd Year	Total
₹	₹	₹	₹
₹	₹	₹	₹
₹	₹	₹	₹

#### 7.3.2. Budget for Contingencies (Partners Contribution) (in ₹ lakhs)

1st Year	2nd Year	3rd Year	Total
₹	₹	₹	₹
₹	₹	₹	₹
₹	₹	₹	₹

### 7.4. Other Costs (Outsourcing/ Fabrication/ Testing/ Patenting)

Please provide the basis of cost estimates/quotations in the Annexure.

#### 7.4.1. Budget for Other Costs-TPEM Grant (in ₹ lakhs)

Item	1st Year	2nd Year	3rd Year	Total
Outsourcing	₹	₹	₹	₹
Fabrication	₹	₹	₹	₹
Testing	₹	₹	₹	₹
Others	₹	₹	₹	₹

#### 7.4.2. Budget for Other costs- Partners Contribution (in ₹ lakhs)

Item	1st Year	2nd Year	3rd Year	Total
Outsourcing	₹	₹	₹	₹
Fabrication	₹	₹	₹	₹
Testing	₹	₹	₹	₹
Others	₹	₹	₹	₹

### 7.5. Domestic Travel – from – TPEM Grant (in ₹ lakhs)

Please provide the basis of cost estimates in the Annexure. (journeys, purpose)

1st Year	2nd Year	3rd Year	Total
₹	₹	₹	₹
₹	₹	₹	₹
₹	₹	₹	₹

### 7.6. Equipment proposed to be procured

Please provide justification in Annexure on the use of equipment in project. Provide supporting Quotation

#### 7.6.1. Budget for Permanent Equipment – TPEM Grant

Description of Equipment	Foreign/ Indigenous	Unit Landed Cost (CIF, Custom Duty etc.)	Number of Items	Total (in ₹ lakhs)
		₹		₹
		₹		₹
		₹		₹

#### 7.6.2. Budget for Permanent Equipment - Partner Contribution

Description of Equipment	Foreign/ Indigenous	Unit Landed Cost (CIF, Custom Duty etc.)	Number of Items	Total (in ₹ lakhs)
		₹		₹
		₹		₹
		₹		₹

### 7.7. List of equipment available with participating agencies, relevant to the project

Description of Equipment	Foreign/ Indigenous	Agency where it is located

## **Section-8.     Annexure: Justification for Itemized Budget**

Please provide justification against each sub-heading below, along with supporting Quotation.

### **8.1.   Consumables**

### **8.2.   Contingency & Travel**

### **8.3.   Other Costs**

### **8.4.   Permanent Equipment**

## Section-9. Biodata of Investigators

### 9.1. Principal Investigator (1):

9.1.1. Name, Designation, Agency:

9.1.2. Gender & Date of Birth:

9.1.3. Qualifications:

9.1.4. Employment Experience (Last 10 years):

9.1.5. Publications (Last 5 years):

9.1.6. Patents:

9.1.7. Research Thesis Guided:

### 9.2. Investigator (2):

9.2.1. Name, Designation, Agency:

9.2.2. Gender & Date of Birth:

9.2.3. Qualifications:

9.2.4. Employment Experience (Last 10 years):

9.2.5. Publications (Last 5 years):

9.2.6. Patents:

9.2.7. Research Thesis Guided:

9.3. Investigator (3):

9.3.1. Name, Designation, Agency:

9.3.2. Gender & Date of Birth:

9.3.3. Qualifications:

9.3.4. Employment Experience (Last 10 years):

9.3.5. Publications (Last 5 years):

9.3.6. Patents:

9.3.7. Research Thesis Guided:

9.4. Investigator (4):

9.4.1. Name, Designation, Agency:

9.4.2. Gender & Date of Birth:

9.4.3. Qualifications:

9.4.4. Employment Experience (Last 10 years):

9.4.5. Publications (Last 5 years):

9.4.6. Patents:

9.4.7. Research Thesis Guided: