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Project Proposal

(To be submitted in duplicate)

I. Project Profile

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| 1. | Name and Designation of the Applicant | Dr. Jayaraj Kochupillai Principal Mar Baselios Christian College of Engineering and Technology |
| 2. | Official Address of the Applicant (with E-mail id, FaxNo., Office Ph. No. & Mobile No.) | Mar Baselios Christian College of Engineering and Technology Pallikkunnu P O, Peermade Idukki - 685531, KERALA 9400288670 principal@mbcpeermade.com |
| 3. | Category Applied | Institution |
| 4. | Category of Applicant's Institution/Lead Institution | Academic Institution (Private) |
| 5. | Registration No. (In the case of NGOs) | NA |
| 6. | Name and Address of the Consortium members | Dr. Abdul Rahman K Asst. Prof. Mechanical Engg. Dept. MBC CET Peermade Mr. Anu Nair P Asst. Prof. Mechanical Engg. Dept. MBC CET Peermade |
| 7. | Project title | Vortex Induced Renewable and Nonpolluting Wind Energy Conversion System |
| 8. | Research Category | Sponsored Research |
| 9. | Area of Research | Wind Energy ✓ |

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| 10. | Topic/problem selected for research : (Select from Annexure 1 of Guidelines) | Novel Wind Energy Conversion System: Building a novel bladeless wind energy conversion system [Vortex Induced Vibration Wind Power Generator (VIVWPG)] by developing a novel electro-mechanical mechanism |
| 11. | Duration of the Project (months) | 36 |
| 12. | Project Cost (in Rs.) a) Total Project Cost b) Financial support requested from ANERT c) Applicant's Contribution | a) 4.2 Lakhs Indian Rupees b) 4 Lakhs c) Manpower and assigned room for research in the college campus itself with all electrical and computer facilities |
| 13. | Details of Principal Investigator a. Name and Designation b. Official address (with E-mail id, Fax No., OfficePh. No. & Mobile No.) c. Date of entry in present service d. Date of superannuation (Certificate from the Investigators - PI and Co-PI is enclosed) | Dr. Jayaraj Kochupillai ,Principal Mar Baselios Christian College of Engineering and Technology ,Pallikkunnu P O, Peermade Idukki - 685531, KERALA 9400288670 principal@mbcpeermade.com date of joining - 1/7/2020 |
| 14. | Details of Co-Principal Investigator a. Name and designation b. Official address (with E-mail id, Fax No., OfficePh. No. & Mobile No.) c. Date of entry in present service d. Date of superannuation (Consent from the Co-Principal Investigator is enclosed) | Dr. Abdul Rahman K, Assistant Professor Mar Baselios Christian College of Engineering and Technology ,Pallikkunnu P O, Peermade Idukki - 685531, KERALA 9176492110 abdurahmank@mbcpeermade.com date of joining -1/8/2018 |
| 15. | Details of Co-investigator(s) a. Name and designation b. Official address c. Date of entry in present service d. Date of superannuation (Certificate from the Co-Investigator is enclosed) | Anu Nair P, Assistant Professor Mar Baselios Christian College of Engineering and Technology ,Pallikkunnu P O, Peermade Idukki - 685531, KERALA 9495913507 anunair67@gmail.com date of joining – 7/1/2019 |
| 16. | Whether the PI has received financial support under any schemes of ANERT: | No |

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II. Technical Information

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| A | General |
| | 1. Title of the Research proposal VORTEX INDUCED RENEWABLE AND NONPOLLUTING WIND ENERGY CONVERSION SYSTEM |
| | 2. Project Type 1) Up-gradation/improvement of present RE technology/systems /process |
| B | <p>Abstract</p> <p>In the recent decades because of the global demand to control the pollution and climatic change, energy conversion from nonpolluting renewable energy resources became predominant like from wind and solar energy. In India there is a significant scope in converting wind energy to useful rotary motion or electrical energy apart from the solar energy conversion. Though the use of wind turbine is not a new innovation there are a lot of new recent developments in this field. Generally, there are two main categories of wind turbine system namely horizontal and vertical wind turbines and both has its own characteristic turbine blade designs. A new novel method in this field is vortex induced vibration wind power generator (VIVWPG). Here there are no blades, instead a mast (or a cylindrical body) vibrates with wind flow (or velocity). These vibration guides the rotor coils to move backward and forward in a permanent magnet to produce the power. The vibration is caused due to the vortex shedding phenomenon which if fine-tuned to the natural frequency of mast it vibrates in its resonance. This enhances the vibration and produce increased power output. The main challenge is in fine tuning of the natural frequency of mast according to the variation in wind velocity and there is a need of novel mechanism to control it. This bladeless technology is highly ecofriendly with no effects on bird life</p> <p>MBC College of Engineering and Technology Peermade, Idukki, Kerala is situated in a mountain and hilly region in the Western Ghats. The college is at a height of 1100m from sea level. Because of this geography the region has good flow of wind and its velocity ranges between 2 to 6 m/s. Hence this novel VIVWPG can be easily analyzed and implemented here and can contribute a nonpolluting renewable energy source to wherever possible.</p> <p>Three groups of undergraduate students are currently (2020-21) working on this project on the following three related fields respectively, a) Ansys simulation study on the effect of vortex shedding on different cylindrical bodies, b) Magnetic confinement method to tune the body/mast vibration in resonance with wind velocity and c) Method to visualize and analyze the displacement, forces and moments of vibrating body using LabVIEW graphic coding software. The future work includes model making of VIVWPG based on the results of earlier studies and using NI modules and DAQ system for acquiring the signals from sensors from the vibrating body and analysis through already built LabVIEW code to study and improve further and finally implement it.</p> <p>In order to develop this novel wind power generator which increases the knowledge of the students and make them a research-oriented engineer, there are needs of instruments purchase to measure the vibration, sensors to capture the physical parameters, digital and analogue signal acquiring instruments, ANSYS simulation software, DAQ system, high speed computer with respect to the above theme. Thus, for this rurally situating institution and for the development of students and faculty, the recipient institution is requesting for a project fund release for the development of this wind power generator which will help all college department students to acquire new knowledge and for enhanced project work output and by that contributing to the society.</p> |

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| C | <p>Technical Proposal</p> <ol style="list-style-type: none"> 1. Relevance vis-à-vis state needs 2. Status of research on the proposed topic: <ol style="list-style-type: none"> (a) National Status (b) International Status 3. Gap areas 4. Objectives 5. Methodology 6. Roles and Responsibilities of each consortium member 7. Work plan including time schedule & chart 8. Details of R&D/Innovation component in the proposed work <p>(File attached)</p> |
| D | <p>Bio data of Principal Investigator, Co-PI and Co-Investigators</p> <ol style="list-style-type: none"> 1. Detailed bio-data of PI with E-mail id, Fax No., Office Ph. No. & Mobile No 2. Detailed bio-data of Co-PI with E-mail id, Fax No., Office Ph. No. & Mobile No 3. Detailed bio-data of Co-I with E-mail id, Fax No., Office Ph. No. & Mobile No <i>(Detailed bio-data of PI & Co-PI and Co-Investigators included in each copy of the proposal)</i> 4. Experience of PI in the concerned field <i>(Included List of publication of PI in the relevant field)</i> 5. Status of the projects currently with PI. Title Funding agency Duration Status 6. Self appraisal of the PI to execute the project 7. Benefits to the Society from the proposed work and relevance to the knowledge upliftment <p>(Details of 1 to 7 are attached separately)</p> |
| E | <p>Facilities at the Participating Institution</p> <ol style="list-style-type: none"> a) List of equipment and facility available with the institution/PI. <ol style="list-style-type: none"> a) ANSYS Simulation Software and LabView Graphical Programming Software b) Assigned room for the research with all electrical facilities b) Details of equipment/facilities indicating free time (%) <ol style="list-style-type: none"> a) None c) Details of special software & equipment required with justification for purchase including the details of the nearest lab/institution where the facility is available <ol style="list-style-type: none"> a) Data acquisition system -1.8 Lakhs (Minimum 2 channel DAQ with accelerometer) |
| F | Budget |

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| SI No. | Description | | | | Amount (Rs.) | | | |
|----------------|---|--------------|-------------------|------------------------|--------------|--------|--------|----------|
| | | | | | Year 1 | Year 2 | Year 3 | Total |
| 1 | Design – Using ANSYS Analysis | | | | | | | |
| i | NA | | | | 0 | 0 | 0 | 0 |
| ii | NA | | | | 0 | 0 | 0 | 0 |
| Sub head Total | | | | | | | | 0 |
| 2 | Fabrication and Installation | | | | | | | |
| i | Materials for Model and Prototype Making | | | | 20,000 | 30,000 | | 40,000 |
| ii | Model and Prototype Making & Installation | | | | 20,000 | 20,000 | | 40,000 |
| Sub head Total | | | | | | | | 80,000 |
| 3 | Project Manpower | | | | | | | |
| Sl. No. | Name of Post | No. of Posts | Duration (months) | Emoluments (per month) | Amount (Rs.) | | | |
| | | | | | Year 1 | Year 2 | Year 3 | |
| i | Project Fellow/RA | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ii | Technical Assistant | 1 | 12 | 10,000 | 60,000 | 60,000 | 0 | 1,20,000 |
| iii | | | | | | | | |
| Sub head Total | | | | | | | | 1,20,000 |
| 4 | Software | | | | | | | |
| i | NA | | | | 0 | 0 | 0 | 0 |
| ii | NA | | | | 0 | 0 | 0 | 0 |

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| Sub head Total | | | | | | | 0 |
|-----------------------|---|----------|------------|--------------|--------|--------|----------|
| 5 | Equipment | | | | | | |
| Sl. No. | Name of Equipment | Quantity | Rate (Rs.) | Amount (Rs.) | | | |
| | | | | Year 1 | Year 2 | Year 3 | |
| 1. | DAQ with accelerometer and voltage controller | 1 | 1,80,000 | 1,80,000 | 0 | 0 | 1,90,000 |
| | | | | | | | |
| Sub head Total | | | | | | | 1,90,000 |

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|----------------|--|------|---|---|------|
| 6 | Instrumentation -For setting up the measuring equipments | | | | |
| i | Electrical and electronics work tools and cable wires | 5000 | 0 | 0 | 5000 |
| ii | | | | | |
| Sub head Total | | | | | 5000 |

| 7 | Consumables | | | | | | |
|-----------------------|--------------------|----------|------------|--------------|--------|--------|---|
| Sl. No. | Item | Quantity | Rate (Rs.) | Amount (Rs.) | | | |
| | | | | Year 1 | Year 2 | Year 3 | |
| | NA | 0 | 0 | 0 | 0 | 0 | 0 |
| | NA | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub head Total | | | | | | | 0 |

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|----------------|---------|---|---|---|---|--|
| 8 | Testing | | | | | |
| i | 0 | 0 | 0 | 0 | 0 | |
| ii | 0 | 0 | 0 | 0 | 0 | |
| Sub head Total | | | | | 0 | |

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|----------|--|--|--|-------|---|---|-------|
| 9 | Travel | | | | | | |
| i | For the purchase of materials required | | | 10000 | 0 | 0 | 10000 |

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| | | | | | |
| ii | | 0 | 0 | 0 | 0 |
| Sub head Total | | | | | 10000 |
| 10 | Contingencies (upto 5% of sum of Items 1 to 9 and to be claimed on the basis of actual expenditure during settlement) | | | | 15000 |
| GRAND TOTAL | | | | | 4,20,000 (4 Lakhs & 20,000) |

List of documents enclosed (Submit all the required documents and tick against each of them)

- ☒ Endorsement from the Applicant (on letter head)
- ☒ Copy of Registration Certificate in the case of NGOs
- ☒ Certificate from the Investigators (PI and Co-PI)
- ☒ Consent from the Co-Principal Investigator
- ☒ Consent from all the Co-Investigators (.....Nos.)
- ☒ Certificate regarding pending UC/SoE and
- ☒ Detailed bio data of the PI and Co-Principal investigator and Co-Investigators

Place
Date

Peermade Idukki
12/02/2021

Name & Signature of PI

Dr. Jayaraj Kochupillai