3.1.1 Grants received from Government and non-governmental agencies for research projects / endowments in the institution during the last five years

Academic Year	:	**2021-2022**
Name of the Project Application	:	**Three Wheeler Electric Bike for Construction**
Name of the Principal Investigator	:	**Dr. Pandi Maharajan. M** Associate Professor, Department of Electrical and Electrical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
Name of the Co-Principal Investigator	:	**Mr. Ganesh. K** Assistant Professor, Department of Electrical and Electrical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
Name of the Funding Agency	:	A.M.Subburaj Engineering, Theni
Amount Sanctioned	:	**Rs. 2,50,000** /-
Duration of the project	:	Six Months

THENI MELAPETTAI HINDU NADARGAL URAVINMURAI

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

3.1.1 Grants received from Government and non-governmental agencies for research projects / endowments in the institution during the last five years

Academic Year	:	**2021-2022**
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Name of the Co-Principal Investigator	:	**Mr. Ganesh. K** Assistant Professor, Department of Electrical and Electrical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
Name of the Funding Agency	:	A.M.Subburaj Engineering, Theni
Amount Sanctioned	:	**Rs. 2,50,000 /-**
Duration of the project	:	Six Months

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY THENI 625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

THENI MELAPETTAI HINDU NADARGAL URAVINMURAI

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Date: 01/11/2022

To

A.M.Subburaj Engineering,
18/1 Kamarajar Street,
N.R.T Nagar,
Theni-625531

Dear Sir,

Sub: ***Research project work – Joint Venture*** – reg.

The Nadar Saraswathi College of Engineering and Technology (NSCET), known for its updated infrastructure and facilities, was established in the year 2010. It is situated in Vadaputhupatti, Annanji, in Theni. Nadar Saraswathi College of Engineering and Technology (NSCET) focus on providing high quality learning and teaching atmosphere coated with layers of discipline and structured behavior. We offer courses in the disciplines of Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering and Mechanical Engineering and PG Courses in Manufacturing and Structural Engineering. Our college is also involved in Fostering research and Consulting work in Engineering Competence. Our Mechanical Engineering faculty members also have expertise in their core area of Mechanical Engineering. Therefore, I am writing this letter to express our interest in establishing research work and joint venture collaboration with A.M.Subburaj Engineering. We are looking forward to the opportunity of working together with a new research venture from A.M.Subburaj Engineering.

Thanking you,

Yours sincerely,

01/11/22

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of
Engineering and Technology
Vadapudupatti, Theni-625 531.

THENI 625 531

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Principal
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Engineering and Technology
Vadapudupatti, Theni-625 531.

முனுசாமி துணை

A.M. Subburaj
Engineering Contractor

18/1, Kamarajar Street,
N.R.T. Nagar, **THENI** - 625 531.

Date: 04/11/2022

To

The Principal,
Nadar Saraswathi College of Engineering and Technology,
Annanji (P.O), Vadapudupatti,Theni-625 531.

Dear Sir,

Subject: ***Research Project Fund*** – reg.

Ref: Project proposal letter dated on 01/11/2022

I hope that this letter reaches you in good health. I am writing to officially convey our endorsement and backing for the joint project proposal entitled "Three Wheeler Electric Bike for Construction" in collaboration with Nadar Saraswathi College of Engineering and Technology. Upon thorough examination of the project specifics outlined in your proposal, we are enthusiastic about the prospective breakthroughs in electric transportation that can be achieved through this partnership. The proposal's creative approach is in line with our company's dedication to sustainability and technical progress. As a condition of our approval, we pledge to furnish the essential resources, such as access to pertinent facilities, technological proficiency, and cooperation with our team members, to guarantee the triumph of the E-Bike development project. In addition, we anticipate creating consistent lines of communication and project milestones to oversee the advancement and tackle any obstacles that may occur along the partnership. If you need any further information or explanation, please don't hesitate to contact me. We are eager about the cooperative endeavours that lie ahead and have full assurance that this initiative will yield important results for both our organisations. We appreciate your consideration of our proposal and eagerly anticipate a fruitful relationship.

Thank you

Your faithfully,

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY
THENI
625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of
Engineering and Technology
Vadapudupatti, Theni-625 531.

THENI MELAPETTAI HINDU NADARGAL URAVINMURAI

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Date: 10/11/22

To

A.M.Subburaj Engineering,
18/1 Kamarajar Street,
N.R.T Nagar,
Theni-625531.

Dear Sir,

Subject: ***Research project work-Acknowledging your letter dated*** **04/11/2022** - Submission of the Project Proposal titled Three Wheeler Electric Bike for Construction - Reg.

Ref: Your Reference letter Dated 04/11/2022

I am writing to extend my heartfelt gratitude on behalf of the faculty and students of Nadar Saraswathi College of Engineering and Technology for granting us the opportunity to submit our project proposal to A.M.Subburaj Engineering. We are truly honored and grateful for the chance to be considered for collaboration on this project. We understand the importance of your companies to the industry and recognize the value of working with a reputed organization like A.M.Subburaj Engineering. Your support in allowing us to present our ideas and solutions is both encouraging and motivating for our academic community. Hence, I am submitting a research proposal titled "**Three Wheeler Electric Bike for Construction**" for your kind perusal and further action. And all the necessary budget as well as the allocation of team members for the proposed project, kindly receive the same and do the needful.

Yours Sincerely,

10/11/22

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

THENI 625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
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THENI MELAPETTAI HINDU NADARGAL URAVINMURAI

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Date: 10/11/2022

To

A.M.Subburaj Engineering,
18/1 Kamarajar Street,
N.R.T Nagar,
Theni-625531.

Dear Sir,

Sub: ***Submission of Project proposal with Budget & Allocation of Team****-reg.*

With reference to the above, herewith, I submit a project proposal attached with budget and also assigning the team for the forthcoming research project, kindly receive it and do the needful.

Yours Sincerely,

10/11/22

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY
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Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Nadar Saraswathi College of
Engineering & Technology

Submission of Research Proposal

On

Three Wheeler Electric Bike for Construction

Submitted

to

RN Builders , Theni

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY
THENI
625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of
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Tamilnadu, India.

Three Wheeler Electric Bike for Construction

1. Background

Electric three-wheeled bikes designed for construction purposes offer a versatile and eco-friendly solution for transportation and light-duty tasks within construction sites. These vehicles can be customized to meet specific requirements in the construction industry. Here are some key aspects and potential features of such electric bikes:

- Load Capacity:
- Battery and Range:
- Off-road Capabilities:
- Customization:
- Safety Features:
- Durability:
- Environmental Benefits:
- Regulations:
- Cost-efficiency:
- Maintenance:

2. Need

The need for e-bikes arises from a desire for eco-friendly, cost-effective, and efficient transportation solutions. E-bikes provide a convenient way to travel short to moderate distances while reducing reliance on cars, minimizing environmental impact, promoting healthier lifestyles, and offering an affordable alternative for commuting or leisure.

3. Proposed work

Our research project, titled "E-Bike", seeks to address key challenges in current E-Bike design and functionality. The primary objectives of this research endeavour include:

Improving Energy Efficiency: Investigating and implementing technologies to enhance the energy efficiency of E-Bike systems, thereby extending battery life and reducing environmental impact.

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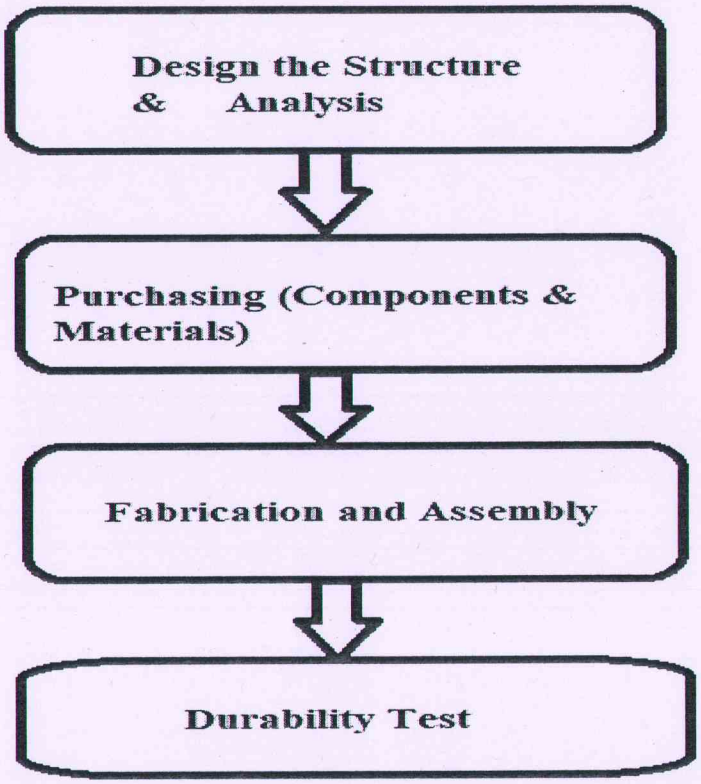
Enhancing User Experience: Conducting user-centric studies to identify areas for improvement in user interface, comfort, and safety features, ensuring a positive and seamless riding experience.
Sustainability Integration: Exploring eco-friendly materials and manufacturing processes to align E-Bike production with sustainable and environmentally conscious practices.



4. Components:

Components for a three-wheeler electric bike can vary depending on the specific design, purpose, and manufacturer. However, here are some common components you might find in a typical electric three-wheeled bike for construction or similar uses:

Frame: The frame of the bike is the main structure that supports all other components. It's usually made of steel, aluminum, or other durable materials, designed to handle the weight of cargo and provide stability.

Electric Motor: The electric motor powers the bike and propels it forward. Motors can be mounted on different parts of the bike, such as the rear axle or the front wheel hub, and vary in power and efficiency.

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Vadapudupatti, Theni-625 531.

Battery: Batteries store the electrical energy needed to power the electric motor. Lithium-ion batteries are commonly used due to their high energy density and relatively light weight. The battery capacity determines the range and performance of the bike.

Controller: The controller manages the flow of electricity from the battery to the motor. It regulates the speed and assists in providing torque to the wheels.

Drive System: This includes the transmission or drivetrain, which transfers power from the motor to the wheels. In hub motors, the motor is directly connected to the wheel hub, while mid-drive systems have the motor integrated with the bike's gears.

Brakes: Braking systems can include disc brakes, drum brakes, or regenerative braking systems that help slow down and stop the bike. Safety is crucial, especially in construction settings.

Suspension: Depending on the terrain, some electric three-wheeled bikes might have suspension systems to absorb shocks and improve ride comfort.

Cargo Area or Trailer: These bikes might have a built-in cargo area, basket, or be designed to accommodate trailers to transport tools, equipment, or construction materials.

Lights and Reflectors: For safety, bikes are usually equipped with headlights, taillights, and reflectors to ensure visibility, especially in low-light conditions.

Display and Controls: A control panel or display unit allows the rider to monitor battery level, speed, and other important information. It may also include controls for adjusting power modes or assistance levels.

Wheels and Tires: Wheels and tires are designed for stability and durability, with the ability to handle various terrains commonly found in construction sites.

5. Funding Requirements:

To achieve the outlined objectives, we are seeking 2,50,000/- in research funding. The funds will be allocated across the following critical areas:

Research Personnel: Support for a dedicated team of researchers, engineers, and specialists with expertise in electric vehicle technology, user experience, and sustainable design.

Laboratory and Testing Facilities: Access to cutting-edge laboratories and testing equipment to conduct comprehensive analyses on energy efficiency, safety, and user experience.

Materials and Components: Procurement of high-quality, sustainable materials and components for prototype development and testing.

Data Collection and Analysis: Funding for surveys, focus groups, and data analysis tools to gather valuable insights on user preferences and behavior.

Dissemination of Results: Resources for presenting research findings at conferences, publishing in peer-reviewed journals, and sharing insights with the broader academic and industrial communities.

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Vadapudupatti, Theni-625 531.

6. Expected Impact:

The successful completion of this research project is anticipated to have the following impacts:

Advancements in E-Bike Technology: Contributing to the development of more efficient and user-friendly E-Bike systems.

Knowledge Dissemination: Sharing research findings with the academic and industrial communities to foster collaboration and further advancements in electric mobility.

Sustainable Practices: Proposing and promoting sustainable practices in E-Bike manufacturing, encouraging environmentally responsible production.

7. Acknowledgment and Collaboration:

We propose acknowledging the funding organization prominently in all research outputs, publications, and presentations resulting from this project. Additionally, we welcome opportunities for collaboration, including joint events, workshops, or any other initiatives that align with the objectives of the research.

8. Next Steps:

We would be honoured to discuss this funding proposal further and address any questions or provide additional information. A meeting at your convenience would be greatly appreciated to explore potential collaboration and ensure alignment with your organization's goals.

Thank you for considering our research funding proposal. We are enthusiastic about the opportunity to contribute to the advancement of E-Bike technology and look forward to the possibility of collaboration.

9. Work Plan:

S.No	Work	Duration
1	Research and Analyse the Existing work	1 month
2	Materials and Component purchasing	1 month
3	Frame Fabrication	1 month
4	Assemble the drives and Circuits	1 month
5	Durability testing and rework	1month
6	Documentation	1month

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Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

10. Principal and Co-Principal Investigators:

1. **Dr. M. Pandi Maharajan,** Associate Professor, Department of Electrical and Electrical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
2. **Mr. K. Ganesh,** Assistant Professor, Department of Electrical and Electrical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.

Principal Investigator

Principal

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

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THENI MELAPETTAI HINDU NADARGAL URAVINMURAI

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Date:10/11/2022

The Following faculty members are assigned for conducting the research work for the proposed project titled "Three Wheeler Electric Bike for Construction".

List of Faculty members

S. No	Name of the PI & Co-PI	Designation and Specialization	Contact Information
1.	**Dr. Pandi Maharajan. M**	Associate Professor/ Electrical and Electronics Engineering	9025432443
2.	**Mr. Ganesh. K**	Assistant Professor/ Electrical and Electronics Engineering	9566893474

PRINCIPAL

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of
Engineering and Technology
Vadapudupatti, Theni-625 531.

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முனுசாமி துணை

A.M. Subburaj
Engineering Contractor

18/1, Kamarajar Street,
N.R.T. Nagar, **THENI** - 625 531.

Date: 15/11/2022

To

The Principal,
Nadar Saraswathi College of Engineering and Technology,
Annanji (P.O), Vadapudupatti, Theni-625 531.

Dear Sir,

Subject: ***Approval of Project "Three Wheeler Electric Bike for Construction" and Issuance of Cheque***

We are glad to notify you that your project proposal, named "Three Wheeler Electric Bike for Construction" has received a thorough evaluation by **A.M.Subburaj Engineering, Theni**, and it has been approved. We acknowledge the potential influence and importance of your initiative, and we are eager to assist in its effective implementation.

The project encompasses research, development, prototyping, and testing of the Tamarind Cover Removal Machine within the approved budget. Additionally, it includes the creation of a user interface and comprehensive documentation for machine users.

In order to expedite the commencement of your project activities, we are delighted to provide a cheque for the authorized budget of ***Rs. 2,50,000/- Cheque No: 000601*** **at Karur Vysya Bank, Theni.** It is crucial that the money be used efficiently and effectively in accordance with the authorized project plan.

Thank you for your dedication and commitment to this innovative project. We eagerly anticipate witnessing its success.

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625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of
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Vadapudupatti, Theni-625 531.

Yours faithfully

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THENI, D.NO 1540,, T R RAMANATHAN COMPLEX,, PERIYAKULAM ROAD,, THENI, TAMIL NADU - 625531
IFSC : KVBL0001193

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या धारक को

Rupees रुपये Two Lakhs and Fifty Thousand only

₹ 2,50,000/-

A/c. No. खाता क्र.	1193221000000056	INITIAL आद्यक्षर	

FOR SUBBURAJ A M

VOID

PROPRIETOR / PROPRIETRIX/AUTHORISED SIGNATORY
Please sign above

⑈000601⑈ ⑆250531021⑆ 021407⑈ 11

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ISO 9001 : 2015 Certified Institution
Vadapudupatti, Annanji (po), Theni - 625 531,
Tamilnadu, India.

Project Report

PROJECT COMPLETION REPORT

1. Project Title: Three Wheeler Electric Bike for Construction
2. Name of the Investigator : Dr. M.PandiMaharajan
   a. E-mail: hodeee@nscet.org
   b. Contact Address: Nadar Saraswathi College of Engineering and Technology, Annanji(P.O), Vadapudupatti, Theni-625531.
   c. Mobile No.: 9025432443
3. Name of the Institution of which Investigator is attached: Nadar Saraswathi College of Engineering and Technology
4. Name of the Director / Principal of the Institution: Dr. M.PandiMaharajan
5. Date of Release of R & D Grant: 15/11/2022
6. Amount of R & D Grant: Rs. 2,50,000
7. How much work is yet to be completed with the reason of delay: **NIL**
   a. Percentage of work completed: 100%
   b. Amount utilized till date: Rs.2,50,000
8. How much work is yet to be completed with the reason of delay: **NIL**
   a. Work yet to be completed with details: **NIL**
   b. Reason for delay : NIL
9. Probable date of completion of the project: **NIL**

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Vadapudupatti, Theni-625 531.

10. Amount of matching grant: 2,50,000 INR
    a) Name and address of the organization: Nadar Saraswathi College of Engineering and Technology, Annanji(P.O), Vadapudupatti, Theni-625 531.
    b) Amount received: Rs.2,50,000
    c) Amount utilized till date: Rs. 2,50,000
11. Name of the organizations providing support to the project: **NIL**
    a. Name of the organization: **NIL**
    b. Nature of support e.g. financial, technical and infrastructural: **NIL**
    c. Support yet to be received: **NIL**
12. Project Achievements in brief:

    The scope of three-wheeler electric bikes is quite diverse and expansive, covering various industries, purposes, and user needs. Here are some aspects of the scope of these vehicles such as Urban Logistics and Last-Mile Delivery, Cargo Transportation, Commercial Applications, Mobility Solutions etc.. within a budget of Rs. 2,50,000/-.

Objectives

1. **Improving Energy Efficiency:** Investigating and implementing technologies to enhance the energy efficiency of E-Bike systems, thereby extending battery life and reducing environmental impact.
2. **Enhancing User Experience:** Conducting user-centric studies to identify areas for improvement in user interface, comfort, and safety features, ensuring a positive and seamless riding experience.
3. **Sustainability Integration:** Exploring eco-friendly materials and manufacturing processes to align E-Bike production with sustainable and environmentally conscious practices.

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Components used:

Frame: The frame of the bike is the main structure that supports all other components. It's usually made of steel, aluminum, or other durable materials, designed to handle the weight of cargo and provide stability.

Electric Motor: The electric motor powers the bike and propels it forward. Motors can be mounted on different parts of the bike, such as the rear axle or the front wheel hub, and vary in power and efficiency.

Battery: Batteries store the electrical energy needed to power the electric motor. Lithium-ion batteries are commonly used due to their high energy density and relatively light weight. The battery capacity determines the range and performance of the bike.

Controller: The controller manages the flow of electricity from the battery to the motor. It regulates the speed and assists in providing torque to the wheels.

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Brakes: Braking systems can include disc brakes, drum brakes, or regenerative braking systems that help slow down and stop the bike. Safety is crucial, especially in construction settings.

Suspension: Depending on the terrain, some electric three-wheeled bikes might have suspension systems to absorb shocks and improve ride comfort.

Cargo Area or Trailer: These bikes might have a built-in cargo area, basket, or be designed to accommodate trailers to transport tools, equipment, or construction materials.

Lights and Reflectors: For safety, bikes are usually equipped with headlights, taillights, and reflectors to ensure visibility, especially in low-light conditions.

Display and Controls: A control panel or display unit allows the rider to monitor battery level, speed, and other important information. It may also include controls for adjusting power modes or assistance levels.

Wheels and Tires: Wheels and tires are designed for stability and durability, with the ability to handle various terrains commonly found in construction sites.

Principal Investigator

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY THENI 625 531

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Tamilnadu, India.

UTILIZATION CERTIFICATE

1. Title of the Project : Three Wheeler Electric Bike for Construction
2. Name of the Institution : Nadar Saraswathi College of Engineering and Technology, Theni
3. Name of the Principal Investigator : Dr. Pandi Maharajan. M
   Mr. Ganesh. K

It is confirmed that a total of ₹ 2,50,000 in grants-in-aid was approved in the year 2022-2023 for Nadar Saraswathi College of Engineering and Technology for consultancy projects on 15/11/2022. An amount of ₹2,50,000 has been allocated for the development of an Three Wheeler Electric Bike for Construction, specifically for the aim of validating the results. I confirm that the full grant amount has been used prudently and solely for the purpose outlined in the study proposal.

10/5/23

PRINCIPAL INVESTIGATOR

10/05/23

PRINCIPAL

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY ★ THENI 625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
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முனுசாமி துணை

A.M. Subburaj
Engineering Contractor

18/1, Kamarajar Street,
N.R.T. Nagar, **THENI** - 625 531.

Date:23/05/2023

To

The Principal,

Nadar Saraswathi College of Engineering and Technology,

Annanji (P.O), Vadapudupatti, Theni-625531.

Dear Sir,

Subject: ***Three Wheeler Electric Bike*** – reg.

Ref: Project report submitted dated on 10/05/2023.

We confirm that we have received the project report, which was generated by the research team directed by Associate Professor Dr. M. Pandi Maharajan, from the Department of Electrical and Electrical Engineering. The report was evaluated by our panel of specialists, and we are delighted to notify you that the results contained in the project report match our production criteria. We commend the cooperative endeavour and comprehension exhibited throughout this endeavour.

We eagerly anticipate the opportunity to collaborate on future scientific endeavours. We would like to once again extend our appreciation to Nadar Saraswathi College of Engineering and Technology for their invaluable contribution to the successful completion of this research endeavour.

Thanking you.

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY
THENI
625 531

Dr. C. MATHALAI SUNDARAM, M.E.,M.B.A.,Ph.D.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

Yours Faithfully,