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	:	**2018-2019**
Name of the Project Application	:	**Compact Solar Water Heater for Domestic Application**
Name of the Principal Investigator	:	**Mr. A. Vembathu Rajesh** Assistant Professor, Department of Mechanical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
Name of the Co-Principal Investigator	:	**Mr. B. Nagarajan** Assistant Professor, Department of Mechanical Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Theni.
Name of the Funding Agency	:	**RN Builders.**, Theni
Amount Sanctioned	:	**Rs. 2,30,000**/-
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.

Date: 25/09/2018

To

RN Builders,
172/c-18, 1St Floor,
SVA Complex, Solaimalai Ayyanar Kovil St.
Bungalowmedu,
Theni – 625 531.

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 **RN Builders.** We are looking forward to the opportunity of working together with a new research venture from RN Builders.

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 sincerely,

25/09/2018

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

RN BUILDERS

Vastu Plan | Construction | Renovation | Labour Contracts

GSTIN – 33BKIPR6686Q1Z2

Date: 01-10-2018

To

The Principal,

Nadar Saraswathi College of Engineering and Technology,

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

Dear Sir,

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

Ref: Your Reference Letter Dated 25-09-2018.

I have your letter of request for the research project. For mechanical engineering applications, we at **R N Builders** are experienced in modern building and Traditional building. In this regard, we require your college's assistance with research on Compact Solar Water Heater setup for **Apartment Building**. In light of this, we are delighted to comply with your request and extend an invitation to submit a research proposal. We anticipate that the research effort will be successful in advancing the production of solar water heater. Therefore, we ask that you submit a thorough project proposal that includes a budget.

Thank you

Your Faithfully,

R N Builders

RN BUILDERS ★ GSTIN: 33BKIPR6686Q1Z2 ★ THENI-625531

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

172/C-18, 1st floor, SVA Complex, Solaimalai Ayyavar Koil Street, Bungalo Theni Theni – 625531.

Contact: 766 7166 955 | 770 8993 259 WWW.RNBUILDER.IN Rnbuilderstheni@gmail.com

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: 04/10/2018

To

RN Builders,
172/c-18, 1St Floor,
SVA Complex, Solaimalai Ayyanar Kovil St.
Bungalowmedu,
Theni – 625 531.

Dear Sir,

Subject: ***Research project work-Acknowledging your letter dated*** **01/10/2018**- Submission of the Project Proposal titled " Compact solar water heater for domestic application"- Reg.

Ref: Your Reference letter Dated 01.10.2018

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 **RN Builders**. We are truly honored and grateful for the chance to be considered for collaboration on this project. We understand the importance of your company's to the industry and recognize the value of working with a reputed organization like RN Builders. 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 **"Compact solar water heater for domestic application"** for your kind perusal and further action. And the entire necessary budget as well as the allocation of team members for the proposed project, kindly receive the same and do the needful.

Yours Sincerely,

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.

04/10/18

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: 04/10/2018

To

RN Builders,
172/c-18, 1St Floor,
SVA Complex, Solaimalai Ayyanar Kovil St.
Bungalowmedu,
Theni – 625 531.

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,

04/10/18

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.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

Proposal

Compact Solar Water Heater for Domestic Application

Background

A solar water heater for domestic applications harnesses the abundant and renewable energy of the sun to provide hot water for household use. It's an eco-friendly, cost-effective, and sustainable alternative to traditional water heating systems that rely on electricity or gas.

These systems typically consist of solar collectors mounted on rooftops or other suitable locations to capture sunlight. The collectors contain specially designed absorber plates or tubes that absorb solar radiation and convert it into heat. This heat is transferred to a fluid, usually water or a heat transfer solution, circulating through the collectors.

The heated fluid is then conveyed to a well-insulated storage tank where it remains until needed. From there, it can be used for various domestic purposes such as bathing, washing dishes, laundry, and space heating.

Key Components:

Solar Collectors: These panels or collectors are designed to absorb sunlight and convert it into heat energy.

Heat Transfer Fluid: Water or an antifreeze solution circulates through the collectors, absorbing heat and transferring it to the storage tank.

Storage Tank: The heated fluid is stored in a well-insulated tank to maintain its temperature until it's used.

Backup Heating Element: Some systems include a backup heating element, typically electric, to ensure a continuous supply of hot water during periods of low sunlight or high demand.

Control System: A control unit regulates the flow of the heat transfer fluid to optimize efficiency and prevent overheating.

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.

Objectives

The primary objective of a compact solar water heater for domestic applications is to provide an efficient, cost-effective, and sustainable solution for households to meet their hot water needs using solar energy. Here are the key objectives:

Efficient Hot Water Generation: The main goal is to efficiently generate hot water using sunlight as the primary energy source. Compact solar water heaters are designed to capture and convert solar radiation into heat energy for heating water.

Space-Saving Design: Compact solar water heaters are specifically designed to occupy minimal space, making them suitable for installation in residences where space might be limited, such as apartments, small homes, or rooftops with restricted area.

Cost-Effectiveness: These systems aim to provide a cost-effective alternative for households, reducing reliance on conventional energy sources like electricity or gas for water heating. Over time, they offer savings on utility bills, offsetting the initial investment cost.

Environmentally Friendly: One of the primary objectives is to reduce the carbon footprint by utilizing renewable solar energy, thereby decreasing greenhouse gas emissions associated with traditional water heating methods.

Reliable Hot Water Supply: These systems aim to ensure a consistent and reliable supply of hot water for domestic use, meeting the needs of households while being independent of external energy sources.

Ease of Installation and Operation: Compact solar water heaters are designed for ease of installation and user-friendliness. They should be simple to operate and maintain, making them accessible to a wide range of homeowners.

Durability and Longevity: Manufacturers aim to produce systems with durable components that can withstand various weather conditions and have a long service life, providing reliable performance over an extended period.

Adaptability to Various Settings: These systems are designed to be adaptable and versatile, suitable for different geographical locations, climates, and household sizes.

Integration with Existing Infrastructure: They are often designed to be compatible with existing plumbing infrastructure, making installation and integration into homes more convenient.

Promotion of Renewable Energy Adoption: By offering a practical and efficient solution for residential hot water needs, compact solar water heaters aim to encourage the adoption of renewable energy technologies among households.

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.

Timeline

1. Feasibility Study: (1 month) [November 1, 2018 – November 31, 2018]
2. Design and Material Analysis: (1 month) [December 1, 2018- December 31, 2018]
3. Material Purchasing: (1 month) [January 1, 2019 - January 31, 2019]
4. Installation and Integration (1 month) [February, 2019- February 26, 2019]
5. Testing and Optimization: (1 month) [March 1 2019, April 30, 2019]

Budget Allocation

1. Design and Prototyping: Rs. 1,75,000/-
2. User Interface Development: Rs. 50,000/-
3. Documentation: Rs. 5,000/-

Total Budget: 2,30,000/-

04/10/2018

Principal Investigator

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: 04/10/2018

The Following faculty members are assigned for conducting the research work for the proposed project titled "Compact solar water heater for domestic application".

List of Faculty members

S. No	Name of the PI & Co-PI	Designation and Specialization	Contact Information
1.	**Mr. A. VembathuRajesh**	Assistant Professor/ Mechanical Engineering	9976412468 Avr.krj@gmail.com
2.	**Mr. B. Nagarajan**	Assistant Professor/ Mechanical Engineering	9894933543 Mech.nagaraj543@gmail.com

04/10/18

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.,
Principal
Nadar Saraswathi College of Engineering and Technology
Vadapudupatti, Theni-625 531.

RN BUILDERS

Vastu Plan | Construction | Renovation | Labour Contracts

GSTIN – 33BKIPR6686Q1Z2

Date: 15-10-2018

To

The Principal,
Nadar Saraswathi College of Engineering and Technology
Vadaputhupatti
Theni -625531

Dear Sir,

Sub: Compact solar water heater for domestic application –Project Proposal accepted & Sanctioned a Research fund of Rs. 2,30,000-Reg.

Ref: Your Reference letter Dated 04-10-2018

I am delighted to inform you that the proposal for the Compact solar water heater for domestic application has been thoroughly reviewed and approved. We recognize the potential impact and significance of your project, and we are enthusiastic about supporting its successful execution. The approved fund for project is **INR 2,30,000 (Two Lakhs and Thirty Thousand Indian Rupees).** This budget encompasses the costs associated with the purchase, installation, and any additional requirements to ensure the smooth implementation of the project.

Approved Project Details:

Project Title	: Compact solar water heater for domestic application
Project Duration	: 15-10-2018 to 30-04-2019
Approved Budget	: Rs.2,30,000/- (for Materials and Component Purchase including transport and Fabrication) , Cheque No: 199718
Project Investigators Details	: Mr. A. Vembathurajesh, & Mr. B. Nagarajan,

We also respectfully request that the Project Investigator periodically forwards all required reports to us for further action in the future.

RN BUILDERS ★ GSTIN: 33BKIPR6686Q1Z2 ★ THENI-625531

Yours Faithfully,

R N Builders

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

172/C-18, 1st floor, VA Complex, Subramaniapuram, Kovil st, Bungalaipatti, Theni-625531
Contact: 766 7166 955 | 770 8993 259 WWW.RNBUILDER.IN Rnbuilderstheni@gmail.com

AXIS BANK LTD
THENI [TN], THENI TAMIL NADU, 625531
IFS CODE - UTIB0000299

VALID FOR THREE MONTHS FROM THE DATE OF ISSUE

1	5	1	0	2	0	1	8
D	D	M	M	Y	Y	Y	Y

Pay Nadar Saraswathi College of Engineering and Technology या धारक को or Bearer

रुपये Rupees Two lakhs and Thirty thousand Only

अदा करें ₹ 2,30,000/-

A/c.No.	920020074057064

CAPRE 299460

M.R. Arul

Payable at par at all branches of Axis Bank Ltd in India.

920020074057064
Please sign above

⑈199718⑈ 625211102⑆ 299460⑈ 29

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.

UTILIZATION CERTIFICATE

1. Title of the Project : Compact Solar Water Heater for Domestic Application.
2. Name of the Institution : Nadar Saraswathi College of Engineering and Technology, Theni
3. Name of the Principal Investigator : Mr. A. VembathuRajesh, AP/Mech, Mr. B. Nagarajan, AP/Mech

Certified that out of ₹2,30,000 of grants-in-aid sanctioned during the year2018-2019 in favor of Nadar Saraswathi College of Engineering and Technology under consultancy projects dated 15/10/2018 and ₹2,30,000. A sum of ₹2,30,000 has been utilized for the purpose of developing a Compact Solar Water Heater for Domestic Application, Result validation for which it was sanctioned. I further certify that the entire grant amount has been utilized judiciously and exclusively for the purpose stated in the research proposal.

30/04/2019
PRINCIPAL INVESTIGATOR

30/04/19

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

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

RN BUILDERS

Vastu Plan | Construction | Renovation | Labour Contracts

GSTIN – 33BKIPR6686Q1Z2

Date: 05-05-2019

To

The Principal,

Nadar Saraswathi College of Engineering and Technology,

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

Dear Sir,

Subject: ***Compact Solar Water Heater for Domestic Application***– reg.

We hereby acknowledge the receipt of the research team's ***Utilization Certificate*** on the project, which was led by Assistant Professor **Mr. A. VembathuRajesh** of the Department of Mechanical Engineering. This report was assessed by our expert's group, and we are additionally delighted to illuminate you that the submitted project report outcomes are acceptable for our production necessities, and we value the cooperation on this understanding.

We hope that we will have the opportunity to join again in another research project, and once again, we are grateful to Nadar Saraswathi College of Engineering and Technology for the successful completion of the research project.

Thanking you.

Yours Faithfully,

R N Builders

RN BUILDERS ★ GSTIN: 33BKIPR6686Q1Z2 ★ THENI-625531

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.

172/C-18, 1st floor, S[illegible] Complex, Somaimalai Ayyanar Kovil st, Bungalowmedu, Theni – 625 531.

Contact: 766 7166 955 | 770 8993 259 WWW.RNBUILDERS.IN rnbilderstheni@gmail.com