3.2.1.1 Grants from Government and nongovernmental agencies for research projects, endowments, Chairs in the institution during the last five years

Enclosed copies of grant award letters/ project completion letter/ expenditure statements and utilization certificates

Funding agency:

Geethanjali College of Engineering Technology (GCET)

Title of the project: (BEES project) Alternate Energy Using Stored Water

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

Project Title: Alternate Energy using Stored Water (Inhouse project)

Service Provider : Mr Lolla Srinivasa Murthy Bio Electrical and Energy Systems (BEES) 76 Prashant Nagar, Malakpet, Hyderabad – 500 036 Mobile: 98498-57173 E-mail <lolla@ieee.org>, <lsmurthy32@hotmail.com >

Principal Investigator: Dr. R.S. Raju

Objective : To design and develop alternate energy system using stored water.

Sanctioned amount : Rs 7.00 Lakhs

Project period : 1-1/2 years (starting 10-02-2018)

Work done : An alternate energy system has been developed to generate electrical power using stored water. The functionality of the system has been demonstrated. The project has been completed in January 2020; however, improvements are being made to enhance the efficiency.

Outcome

25

: The functionality of system is demonstrated. This was aimed to generate electricity by passing part of the college water line through the system so that electricity is generated. The outgoing water will be used for wetting college lawns and plants.

Benefit to college : The design methodology is established which would be useful in developing a similar type of clean **energy systems** to the nearby villages for generating electricity as per their needs.

S.N.	Contents
01	MoU dated 06-02-2015
02	Scheme of implementation of project
03	Minutes of meetings
04	Completion certificate
05	Benefit to college
06	Financial statement

PHINCIPAL

Geethanjali College of Engg. and Tech. Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

MEMORANDUM OF UNDERSTANDING

Ref: GCETBEES – Hyderabad

BETWEEN



Geethanjali

College Engineering and Technologystriving towards Perfection

Accredited by NBA, Newdelhi Approved by AICTE and Permanently Affiliated to JNTUH ISO 9000 : 2008 Certified

AND



Y

BIO ELECTRICAL AND ENERGY SYSTEMS an SSI Registered Company, Registered Office Plot No. 76, West Prashanth Nagar, Amberpet/ Malakpet, Hyderabad-500036

Geethanjali College of Engineering and Technology Accredited by NBA New Delhi

Sy. No. 33 & 34, Cheeryal (V), Keesara (M), R. R. Dist., 501301, Telangana, India

1 of 4

Geethanjali College of Engg. and Tech. Cheeryal (V), Keesara (M), Medchel Dist.(T.S.)-501 301.

MEMORANDUM OF UNDERSTANDING [MOU]

This Memorandum of Understanding [MoU] is executed on the 06th of February 2015 (effective date) at Cheeryal (V), Keesara (M), R. R. Dist., Telangana.

BETWEEN

Geethanjali College of Engineering and Technology, Sy. No. 33 & 34, Cheeryal (V), Keesara (M), Pin:501301 Telangana, represented through its Secretary, which expression shall unless repugnant to the context of meaning therefore include its successors and permitted assignees of the FIRST PARTY.

AND

BIO ELECTRICAL AND ENERGY SYSTEMS an SSI Registered Company, having Registered Office located at Plot No. 76, West Prashanth Nagar, Amberpet/ Malakpet, Hyderabad-500036, represented through its CEO Which expression shall include its successors in the office and permitted assignees of the SECOND PARTY.

Whereas, First party is having one of its objective as to promote Industry Institute Interaction through various currently running real time projects by way of coordination with Industries, National labs and other premier Institutions. In the Process the Institute will be well prepared to meet with the market demands, readily employable skills with state of art Technologies.

AND

Whereas, Second Party has the capabilities and expertise in devising methods, developing systems and providing solutions particularly in Health & Energy sectors, having currently working on couple of projects such as 'Fuel Enrichment Techniques using pulse Technology and Micro Controllers' and Swasth Bharath, an IT Project on integrating Health systems for community outreach, involving premier Institutions and national labs like IIT Bombay and CSIR- IICT Hyderabad.

AND

Whereas the First & Second party desire to collaborate sharing the strengths and expertise towards practical implementation of Community interest projects, networking with people, national labs and other premier Institutions.

2 of 4

Geethanjali College of Engg. and tech. Cheeryal (V), Keesara (M), Medchel Dist (T.S.)-501 301.





Date: January 27, 2020

Completion Certificate

Reference: Agreement, dated February 25, 2018

Subject : Inhouse project "Alternate Energy system using Stored Water" - Phase-I.

The above project was jointly taken up by Geethanajali College of Engineering and Technology (GCET), Hyderabad and Bio-electrical & Energy Systems (BEES), Hyderabad with a motive to address energy issues. As an alternate to Government supplied energy, and also to lessen the burden on distribution transformers, this activity on stored energy was taken up to generate additional power.

The work was successfully completed in terms of developing: (i) torque module, (ii) guided turbine with stored water, (iii) generator module using permanent magnets, (iv) load balancing and power management unit and (v) display monitoring panel with all safely features. The basic functionality of the the system was demonstrated to the fully satisfactory in terms of power generation.

A paper titled "exploring alternative energy sources to supplement and cover the downtime of wind and solar to improve the resilience of smart grids" was accepted for presentation in "International Conference ISUW-2020", scheduled during March 03-07, 2020 in New Delhi.

(Lolla Srinivasa Murthy) CEO, Bio-electrical & Energy Systems (BEES) 76, Prashant Nagar (West), Hyderabad -500 036

Bio Electrical & Energy Systems 76, Prashanth Hagar Colony West, Malakpet, Hyderabad-S00036, Telangana State, INDIA.



(Dr Udaya Kumar Susarla) Principal Geethanjali College of Engineering and Technology, Hyderabad PRINCIPAL Geethanjali College of Engg. and Tech. Clearyal (V), Keesare (M), Medchal Dist. (T.S.)-501 301.

PRINCIPAL Geethanjali College of Engg. and Tech. Cheeryal (V), Keesara' (M), Medakel Dist. (T.S.)-501 301.

- > The parties to this MoU undertake to treat as CONFIDENTIAL AND PRIVELEGED, information of the other party and any other information related to the programs and opportunities under this MoU, which is so classified as confidential in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.
- > This MoU shall require the ratification of the competent executive body of both the parties.
- > The Intellectual Property Rights (IPR) of all the material (training, requirements etc.,) shall vest with the original owners with due acknowledgement of the efforts of the contributors and the source form where some of the material is referenced.

In consideration of the mutual covenants contained herein above and the terms and conditions of this MoU and in witness whereof both the parties have herein set their hand/seal:

19

For and on behalf of First Party [Geethanjali College of Engineering [Bio Electrical and Energy Systems] and Technology]

For and on behalf of Second Party

Mr. G. R. Ravinder Reddy Secretary Geethanjali College of Engineering and Bio Electrical and Energy Systems an Technology Sy. No. 33 & 34, Cheeryal (V), Keesara (M), R. R. Dist., - 501 301 Telangana

Mr. L. Srinivasa Murthy CEO

Office Plot No. Reg. 76. West Prashanth Nagar, Amberpet/ Malakpet, Hyderabad-500 036.

Name of the witness with affiliation - Name of the witness with affiliation -**First party**

Second Party

4 of 4

Geethaniali College of Engg. and resara (M), Medchal Dist (T.S

- Shall encourage and motivate their faculty members to become resource persons for this engagement & this MoU related opportunities.
- Shall constitute a 'Joint Steering Committee to track the progress of the Projects through quarterly meetings particularly Swasth Bharath IT project in Health Sector and Fuel Enrichment Techniques project in Energy sector.

In addition:

- This MoU will be effective when signed by both the parties and shall remain valid for a two years term from the effective date (as stated above) which may be extended, from time to time, with mutual consent. The MoU may be amended/extended, at any time, with the mutual written consent of both parties.
- The MoU may be terminated at any time during the period of its validity through mutual consent after sixty days Notice from either side in this regard.
- No amendment or change hereof or addition hereto shall be effective or binding on either of the parties hereto unless set in writing and executed by the respective duly authorized representatives of each of the parties hereto.
- The obligations of First Party and Second Party have been outlined in the MoU. However, during the operation of MoU circumstances may arise which may call for alterations or modifications of this agreement. These alterations will be mutually discussed and agreed upon in writing.
- If any dispute or difference of any kind whatsoever may arise out of the implementation of this MoU between the parties in connection with or arising out of this agreement or out of the breach, termination or invalidity of the agreement hereof, the First Party and Second Party shall attempt for a period of 30 days, after receipt of Notice by the other party, of the existence of a dispute and to settle such dispute in the first instance by mutual discussions between the parties.

3 of 4

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COLLEGE COLLEG

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY

Minutes of Meeting on "Alternate Energy System", held on July 10, 2019 in Director's chamber

Title of project: Development of Alternate Energy System using Stored Water

Agenda: Integration of system in the shed, constructed recently.

The following members were present:

S.N.	Name	Designation	E-mail	Mobile No
1	Dr S Udaya Kumar	Principal	uksusarla@gmail.com	9866308257
2	Dr RS Raju	Dean, R&D	raju.ceeri@gmail.com	94137 23303
3.	Mr L Srinivasa Murthy	CEO, BEES	lolla@ieee.org,	9849857173.
5.			murthy@bees-consulting.ne	t 79012 87173

Minutes of Meeting:

1. Principal reviewed the progress made on the above project. Dr Raju briefed that the shed is ready for shifting the modules. Mr Murthy wanted extra amount, primarily, due to the prolongation of the project. He expressed his views as following:

a) Progress of shed construction work:

It is observed that the construction work is completed with all necessary things to move in the system modules for further system integration, Machinery erection, installation and commissioning. Staff also updated and confirmed that the plinth, electrical points, door, window slides and separate earth pit exclusively for the system are provided.

b) The need for Extra budget:

The initial projected cost is Rs 4.4 Lac and the time duration is around 6 to 9 months. Amount already disbursed is Rs 4.0 Lac. The present requested amount is another 3.0 Lac having 12 week time bound execution task period.

BEES is requested to provide detailed expenditure incurred, costs involved in procuring and processing to customize the various system modules with enough documentation and bills for further discussion in the committee at the institution level.

Waifting of modules: Mr Murty expressed that he will start the shifting work and will take up integration activity after the above payment is made to him.

Action points:

1. Payment to BEES: sending the proposal to management \rightarrow action Dr Raju

Roger Lac may pl. be released to BEE (ThroLac) Roppe

2. (a) Shifting of modules, (b) integration of system and (c) testing of system \rightarrow action Mr Murthy, and members of the project team.

 $\frac{B_{DRODE}}{ic/7/2019}$ (RS Raju), Dean, R&D

Copy to: 1. Chairman and Principal

2. All Members of the meeting.

The project cost, as incurred by BEES, has been increased due becarding the period of time and (b) Certain weber features incorporated. principal 25 requested to approve This additional amount of Rn 3.0 Lac so that the remaining work could be completed been Ropanie 18172019

neipal To Alc sten 09/08/19

July 11,2017

Project:

Implementing an Idea to use stored water reserves As an alternative source for "Distributed Power Generation"

Theme: A clean Energy Promotion Policy For achieving a Low-carbon Society

. A project initiation, Modular, scalable and extendable to neighborhood community benefit

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- B. Statement of the Problem
- C. Scope

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 - (ii) Planning stage for community deployment
- C. Benefits
- D. Energy System R&D Budget details
- E. Timetable

3. Conclusions

- A. Summary of Key Points
- B. Request of Action

4. References

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I. INTRODUCTION

A) Background

Indian Government Policy

- As per its latest targets, the government is looking to raise solar power generation capacity to 48 Giga Watts (GW) by early 2019, out of a targeted 100GW from solar by 2022.
- To ensure that there is a stable market for solar energy, the central government has already made it mandatory for state power utilities to buy a certain amount of this clean energy from independent power producers (IPPs).
- The duty structure for equipment needed to generate solar energy is more favorable compared to that needed for producing wind power.
- Government is ensuring grid connectivity and subsidies for rooftop solar projects.
- As of now about 70% of India's electricity generation capacity is from fossil fuels. India is largely dependent on fossil fuel imports to meet its energy demands.
- By 2030, India's dependence on energy imports is expected to exceed 53% of the counters total energy consumption. Greater import dependence is a a threat to India's energy security as it introduces global market volatility into the mix.
- It also adds to a huge import bill leading to a loss of valuable foreign capital. We need to shift our focus towards the renewable energy sources.
- After the concluding Paris talks, wherein countries agreed to limit their emissions so as to contain the global temperature rise to CO2, the need to develop renewable energy sector gains even more importance.
- There are various sources of renewable energy like wind, nuclear, solar, tidal, geothermal etc. But, in this article, we shall mainly talk about the solar energy and various policy initiatives of India in this sector.

Some of the present challenges

- We cannot generate energy during the night time with solar energy.
- And, also during day time, the weather may be cloudy or rainy, with little or noon radiation. Hence, this makes solar energy panels less reliable as a solution.
- Only those areas that receive good amount of sunlight are suitable for producing solar energy.
- Solar panels also require inverters and storage batteries to convert direct electricity to alternating electricity so as to generate electricity. While installing a solar panel is quite cheap, installing other equipment becomes expensive.
- The land space required to install a solar plant with solar panel is quite large and that land space remains occupied for many years altogether and cannot be used for other purposes.
- Energy production is quite low compared to other forms of energy.

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• Solar panels require considerable maintenance as they are fragile and can be easily damaged. So extra expenses are incurred as additional insurance costs.

B) Statement of the problem

Most of the solar panels that are used are not designed for high temperatures, in remote areas with high temperatures, it is being found that we are not getting the required units of power. The panels do not yield their optimal usage.

And also Dust is another problem in India, especially in places like Rajasthan, where the dust conditions are really bad and require frequent cleaning around two times a month, which then increases the operational costs.

There is alluvial dust (present in plains of north India and delta regions of south India). This type turns into mud when water is poured. Then there is sandy dust (present in Rajasthan and Gujarat), which can be washed away easily with water.

Apart from the dust, one other main issue is the hardness of the water.

Hard water is not suitable for cleaning, and companies have to invest in reverse osmosis (RO) and other technology to make it suitable.

Since many large-scale power plants are located in the interior regions of Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Chhattisgarh and parts of South India, getting soft water on sites becomes difficult at times. Therefore, reverse osmosis or distillation plants have almost become mandatory for solar plants in order to provide water which can be used for cleaning modules.

While the government has sanctioned Rs.5,000 crore to provide a 30 per cent capital subsidy for rooftop solar installations, this works out to a one-time fix. Consumers will still be expected to foot the water bill and cleaning bill which means that individual households will also have to bear the operational costs of having solar modules on their roofs

Skill Labor cost

Skilled workforce required for cleaning and maintenance is not available in these areas and so companies have to bring them in from other areas and train them.

All this results into higher operational costs but solar tariffs in India have fallen tremendously which pose a future risk for the industry.

Thus companies in India are beginning to employ new technologies to counter the dust problem. For example anti-soiling technology like dust-free glass with self-cleaning hydrophobic Nano-coating which stops dust from sticking to the glass of the module.

C) Scope

The proposal covers an introduction to Low head hydraulic energy utilization, how it can be an alternative source of electricity, and how it will benefit our college, neighborhood community in Keesara, students, faculty, and staffs. It encompasses the construction and installation process of draft, turbine and generators , where should they be located, how much electricity they can produce, how much will be the needed budget for the project, how long would they last, and how the project should be managed by the staffs of GCET in association with Bio Electrical & Energy Systems

2 DISCUSSION

A) Details of the Proposed Solution

A range of technologies have been developed for low head higher flow sites which tend to rely on **'reaction'** rather than **'impulse**' machines.

Reaction machines develop torque by reacting to the weight and low pressure of water and are lighter and cheaper to manufacture.

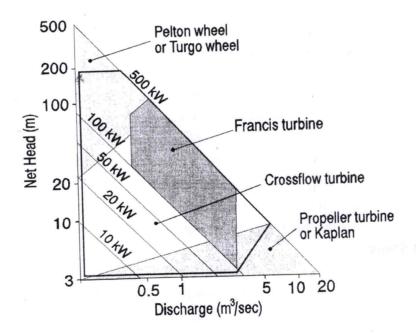
Impulse machines develop torque from high pressure high velocity jets and therefore require casings (Pelton, Turgo, Ossberger Cross Flow, Motor Pump Sets). Cross Flow turbines are also suitable for low heads.

Reaction machines which are suitable for rivers and beck's include:-

- Traditional Waterwheels (overshot, midshot, undershot, backshot)
- Propeller (Kaplan, Francis, compact axial, bulb type, stratflo, H&VAWT),
- Archimedean Screw Turbines (old but proven technology)

In this project we will be using Impulse type machines to generate high velocity jets so as to develop the required torque for driving the generators

Typical classification of hydropower generating units



- Large- hydro: More than 100 MW and usually feeding into a large Electricity grid
- Medium-hydro: 15 100 MW usually grid connected Small-hydro: 1 - 15 MW - usually grid connected
- Mini-hydro: Above 100 kW, below 1 MW; most often grid connected
- Micro-hydro: From 5kW up to 100 kW; usually provided power for a Small communities but many now being grid connected (thousands)
- **Pico-hydro**: From 300 watts up to 5kW (usually stand-alone) but some

CIPAISmall systems have been successfully grid connected (10 - 50,000+)

Geethanjali Collette of Art99, antroducme Cheerval (V), Keesara (NI), Nietokal Dist.(I.S.)-501 301. the neighborhoods.

Work Assignment

After a successful installation, the committee should assign university personnel who manage the project on campus and in the community. It should include electrical experts that have basis knowledge with the Hydraulic and Turbine technology.

Training Stage

After the work assignment, the chosen personnel should be trained on how to manage the technology and what to do when they encountered problems. They should be trained on how to troubleshoot and fix minor problems that the technology might encounter.

Maintenance

The maintenance should include but is not limited to a daily routine check of the installed draft and turbines per building.

C) Benefits

Once the proposal has been implemented, there will be a great impact not only to the college and community, but also to the students, faculty, employees, and the environment.

• Students

It should benefit the students not only by exposing them to the practical way of handling the projects, but also giving them the awareness of the existence of such technologies and will provide them an inspiration that they are not limited to doing only what they see every day in life, but they can also do what they can imagine.

• Faculty

There is a high probability that the faculty is motivated, because it enables them to be involved in solving the real community neighborhood problems to provide cost effective solutions in a modular way ranging from college to community level. It will be a fulfilling experience for them, as they can improve the quality of life by implementing new technologies. And besides the reputation of the institute, it also increases its impact and will be felt in the neighborhood and as well in the state.

Staffs

This technology might open opportunities to those who needs additional sources of income by having the chance to grab a position on the planning or the maintenance committees particularly in community deployment.

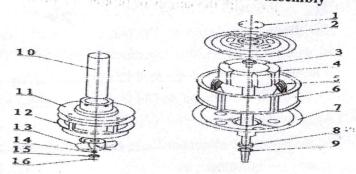
• University

This project is not yet implemented on any universities or colleges in our country and by being the first to use this technology, the university may stand as a role model to other universities. This project also proves that the university is GREEN (environment-friendly).

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B) Methodology

(i) Design verification at unit level



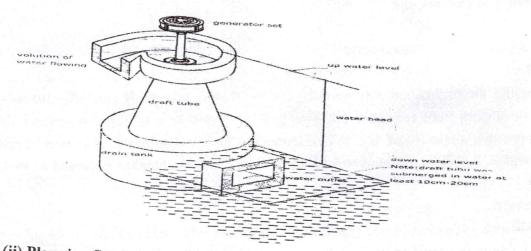
Typical diagram of Rotor Stator assembly

1. Bearing Cap, 2. Loam cake, 3. Bearing, 4. Rotor, 5. Stator coil, 6. Motor Barrel, 7. Pedestal, 8. Bearing 9. Oil Seal, 10. Thimble, 11. Water cone, 12. Pour cover, 13. Runner, 14. Spring pad, 15. Nut, 16. Cotter

The proposed Water Head for this project can be in between 1m to 5m

The turbine uses the draft tube to form a vacuum tube to pull the water from upstream to create a jet stream with force. Because of this force, the impulse blade will rotate and convert the hydraulic energy into mechanical energy. Thereby the rotating blades which are coupled to shaft drive the generator to generate the electricity.

Draft construction diagram



(ii) Planning Stage for community deployment.

Cheerval (U), Reesona (N), Medica

Blueprint validation

The college and the associated industry should authorize a committee for planning the project. On the planning stage, the committee members must do a blueprint of where the housing of the draft, water head and installation of generator should be located. The proponent suggests that they should study the factors that would affect the efficiency of the technology - focusing mainly on the parameters like the amount of electrical energy generated.

Observations may be made per infrastructure specified on the blueprint and the head and pressure where it can gain more energy. Also included on the planning stage is whether which company should Geethanjali College

• Environment

By using stored water as renewable energy resource, we can readily help our environment. By reducing emissions towards zero emissions, we might help prevent unwanted payback to our nature. It might not stop climate change but it will help prevent it. It will also be a great help to stop natural calamities like typhoons which are mostly caused by the heat trapped on our atmosphere.

D) Energy System R&D Budget details, (Budget Break-up)

1)	System Parts and spares	1,20,000
2)	Contingency	25,000
3)	TA/DA	25,000 (~Rs 4,000 pm 2 persons)
4)	Manpower & Other Services	2,40,000 (2 persons, 6 months)
5)	Consumables	30,000
6)	Overheads	*40,000 (10% of Total Cost) Not included
7)	Maintenance	-NA-

Total Budget to initiate: E. Timetable

The planning stage should take at least 3 months to 6 months. Testing the observation of the prototypes should only take 1 month. Installation Depending on the buildings chosen, the number of days may vary based on the power capacity generation and the number of units. But it would probably take at least 3 months to 1 year on installation for ten numbers of 10 power units on the whole community if decided. For Work Assignment, it should only take 1 month. Training After the work assignment and the training of the personnel should only take 1 to 3 months. Maintenance is continuous process.

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3 CONCLUSION

A) Summary of Key Points

Stored or Stagnant water resources are common. It may be viewed as a type of renewable energy that is always available and free. Its usage can be of great value, it just needs implementation for us to see its importance and its help not only to us but also to the environment and to our world in general.

B) Request of Action

The importance of utilizing renewable energies is presented above. From that it is evident, that every individual and organization should work hard and should not leave any opportunity to march towards betterment in exploring new technologies. Therefore the proponent suggests that this proposal should be looked into immediately and thoroughly so that the institute will remain in the front, creating a vibrant environment where the students and staff involve in solving real time problems in a creative way.

4 REFERENCES

Geethanjali College of Engg. and Tech. Cheeryal (V), Keesara (M), Medchal Dist.(T.S.)-501 301.

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(9) Request of Arrion

• Processing of a set of a plate is a more state of a set of a presented of second or a factor of a solution or an individual and organ zeros should reade be a set of a se

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