Sri Venkateswara College of Engineering

VIDYUT

Department of Electrical and Electronics Engineering

Official News Letter

Bidirectional charging technologies (V2G)

Volume 1 | Issue 8 | August- 2023

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SRI VENKATESWARA COLLEGE OF ENGINEERING DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Vision of the Institution

To be a leader in Higher Technical Education and Research by providing the state of the art facilities to transform the learners into global contributors and achievers.

Mission of the Institution

To develop SVCE as a "CENTRE OF EXCELLENCE" offering Engineering Education to men and women at undergraduate and postgraduate degree levels, bringing out their total personality, emphasizing ethical values and preparing them to meet the growing challenges of the industry and diverse societal needs of our nation.

Vision of the Department

The vision of Electrical and Electronics Engineering Department is to provide a high standard of education in Electrical and Electronics Engineering so as to meet the industry standards through domain knowledge, programming and soft skills.

Mission of the Department

M1: To create state of the art facilities such that the students excel in Electrical and Electronics Engineering education.

M2: To equip students with a well defined curriculum to meet the requirements of Industries and society.

M3: To promote a culture of research, innovation and entrepreneurship in the thrust and allied areas of Electrical and Electronics Engineering.

M4: To inculcate soft skills and foster ethical values and shape the total personality of the students.

Program Educational Objectives (PEOs) UG-EEE

PEO1: Graduates will serve as engineering contributors in the emerging fields of Electrical and Electronics Engineering.

PEO2: Graduates will become entrepreneurs through human centered design thinking and innovation.

PEO3: Graduates will be successful in pursuing higher studies in engineering or management.

PEO4: Graduates will be effective and ethical team players in the field of green energy management and sustainability.

Program Outcomes (POs) for UG-EEE

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components processes that meet the specified needs with appropriate consideration for the

public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and lead.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) for UG-EEE (R2022)

PSO1: Design, analyse and implement Power Electronics circuit with smart control systems for Industrial drives and Electric Vehicles.

PSO2: Analyse the safety, stability, control and protection of vertical and deregulated Smart grid power systems, and interconnection of micro grid, comprising Renewable, Storage and Nano technologies.

Program Outcomes (POs) for PG-PED

PO1: An ability to independently carry out research/investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

Program Specific Outcomes (PSOs) for PG-PED

PSO1: The ability to design and analyze Power Electronic converters and control of Electric drives for Industrial applications.

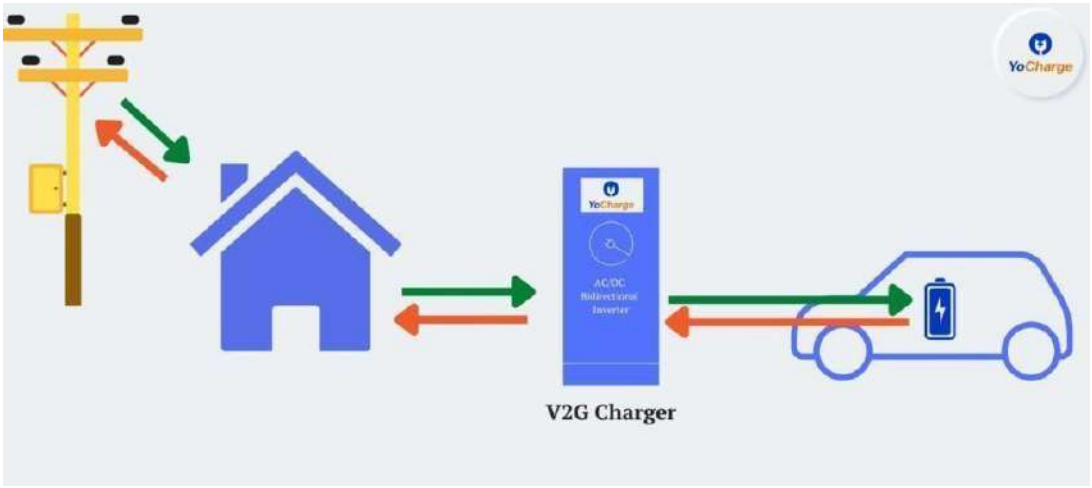
PSO2: The ability to apply Power Electronic Circuits in Transmission and distribution network of Power System and interconnection of Renewable Energy.

An Article by Dr. S Arulmozhi,Assistant Professor, on "Bidirectional Charging Technologies"

Bidirectional Charging Technologies: Unleashing the Potential of Vehicle-to-Grid (V2G) Integration

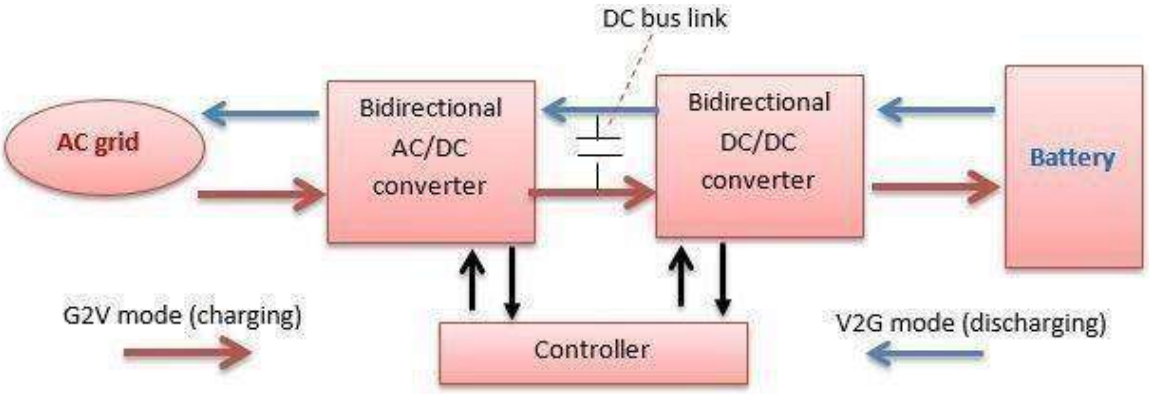
The electric vehicle (EV) revolution is not confined to the roads alone; it's reshaping the way we interact with energy systems. Bidirectional charging technologies, a hallmark of innovation in the EV landscape, are set to transform the concept of vehicle-to-grid (V2G) integration. In this technical article, we delve into the intricacies of bidirectional charging, its underlying technologies, benefits, challenges, and the transformative impact it holds for energy management and grid stability.

Bidirectional charging, often referred to as V2G technology, allows electric vehicles to not only draw energy from the grid but also send surplus energy back to it. This dynamic two-way flow enables EVs to function as both energy consumers and energy sources, providing unprecedented flexibility to the grid.



Key Components of Bidirectional Charging:

- Power Electronics: Advanced power electronics ensure the efficient transfer of energy between the EV's battery and the grid, minimizing losses during the conversion process. Bidirectional charging systems are equipped with bi-directional AC/DC converters that enable the flow of energy in both directions. These converters manage the conversion between the vehicle's battery and the grid.



- Smart Communication: Bidirectional charging relies on real-time communication between the vehicle, the charging station, and the grid. Communication protocols such as ISO 15118 enable seamless coordination.

- Energy Management System: Centralized energy management systems monitor grid conditions, energy demand, and renewable energy availability to optimize bidirectional energy flows.

Benefits of Bidirectional Charging:

- Grid Stabilization: EVs equipped with bidirectional capabilities can provide grid services by adjusting their charging and discharging patterns to match grid demand. This helps stabilize the grid during peak load periods.
- Renewable Energy Integration: Bidirectional charging enhances the integration of intermittent renewable energy sources, such as solar and wind, by storing excess energy and releasing it when needed.
- Demand Response: EVs can participate in demand response programs, reducing energy consumption during peak demand times and supporting grid stability.
- Emergency Backup Power: In cases of power outages or emergencies, bidirectional-capable EVs can supply energy to homes, businesses, or critical infrastructure.

Challenges and Considerations:

- Battery Degradation: Frequent charging and discharging cycles could impact the longevity of the EV's battery. Advanced battery management systems are crucial to mitigate potential degradation.
- Data Security: Secure communication protocols are essential to safeguard against unauthorized access and ensure the integrity of bidirectional energy flows.
- Regulatory Frameworks: Developing regulations that accommodate bidirectional charging, including energy pricing, grid integration, and safety standards, is an ongoing challenge.
- Vehicle Compatibility: Bidirectional capabilities require vehicles to have specific battery chemistries and technologies that support frequent charging and discharging.

Conclusion:

Bidirectional charging technologies hold immense promise for the future of energy management and grid stability. By transforming EVs into mobile energy assets, bidirectional charging has the potential to reshape the way we generate, distribute, and consume energy. As technology advances and regulatory frameworks evolve, bidirectional charging will play a pivotal role in achieving a sustainable and resilient energy future.

References:

1. Mojumder MRH, Ahmed Antara F, Hasanuzzaman M, Alamri B, Alsharef M. Electric Vehicle-to-Grid (V2G) Technologies: Impact on the Power Grid and Battery.Sustainability.2022;14(21):13856. https://doi.org/10.3390/su142113856.
2. https://news.ti.com/blog/2022/08/23/the-vehicle-to-grid-vision-unleashing- power-electric-vehicles
3. https://www.clean energy reviews.info/blog/bidirectional-ev-charging-v2g- v2h-v2l

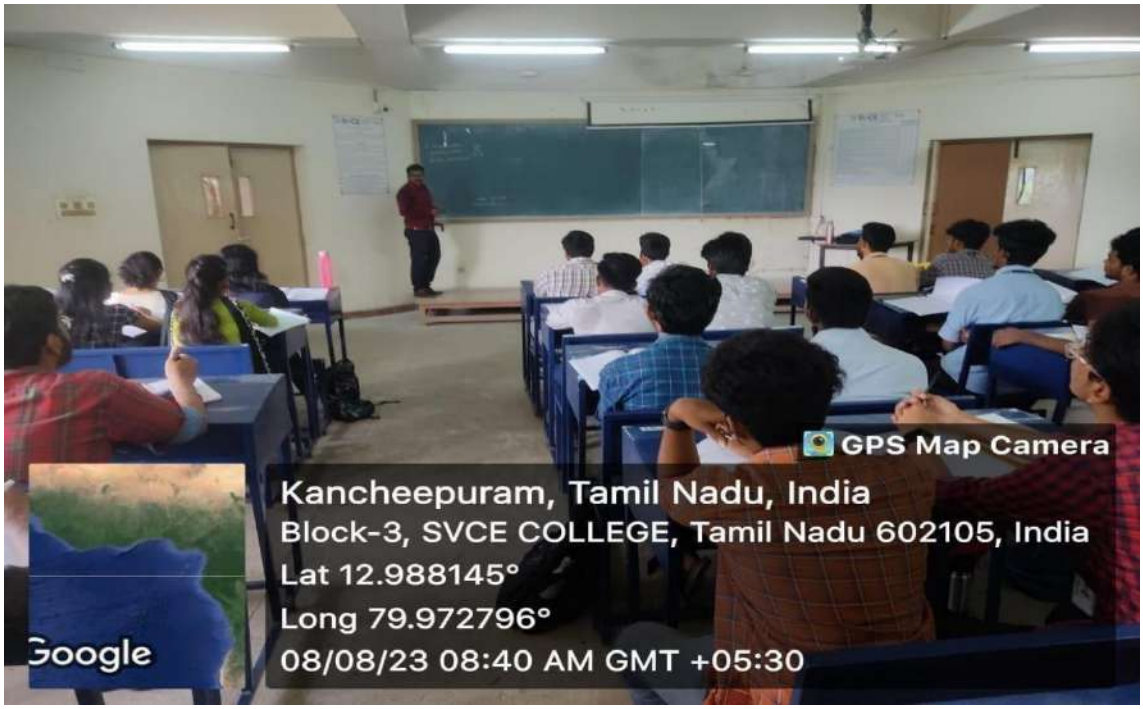
Student Participations

Ministry of Electronics and Information Technology, IIT Madras and IITM Pravartak Technologies Foundation are collaborating to present the "Digital India RISC-V Symposium, a one-day event showcasing the future of Electronics" in India through the RISC-V pathway.

This Symposium featured insightful tech talks by esteemed academics and industry experts, interactive stalls showcasing indigenous RISC-V processors, an engaging hackathon, and a special Investor meeting. From Department of Electrical and Electronics engineering, around 30 students from 2nd and 3rd year collectively participated and benefited from the program.

Placement Activity

The placement Cell at SVCE organized a Soft skill (Employability) training program for six days for all the third and second year students (from 14th to 19th August 2023 and 21st t to 26th August 2023 respectively) to enhance the student's aptitude, verbal and logical reasoning skills in order to improve their chance of clearing the aptitude test during placements. M/s Springboards conducted the training program for the batch. Students from the department of EEE actively participated in the training session. A training session in progress is shown below.



Faculty Participation

Dr.S.Arulmozhi, and Dr.D.Amudhavalli, Assistant Professors successfully completed the hands on workshop on "Designing of IOT Applications" from 2 nd - to 3 rd August ,2023 conducted by department of Mechanical engineering and department Information Technology in association with IobiT solution , Bangalore.

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DEPARTMENT OF MECHANICAL ENGINEERING
&
DEPARTMENT OF INFORMATION TECHNOLOGY
In association with
IobiT Solutions

PARTICIPATION CERITIFICATE

This is to certify that Dr. / Mr. / Ms. ARULMOZHI S of Electrical and Electronics Engineering has successfully completed the two day hands on workshop on "DESIGNING IOT APPLICATIONS" from 02.08.2023 to 03.08.2023 conducted by the Department of Mechanical Engineering and Department of Information Technology in association with IobiT solutions - Bengaluru.

Mr. S. Karthikeyan	Dr. V. Vidhya	Dr. S. Ramesh Babu	Dr. S. Ganesh Vaidyanathan
Director	Head	Head	Principal
IoBiT Solutions	Information Technology	Mechanical Engineering	SVCE

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DEPARTMENT OF MECHANICAL ENGINEERING
&
DEPARTMENT OF INFORMATION TECHNOLOGY
In association with
IobiT Solutions

PARTICIPATION CERITIFICATE

This is to certify that Dr. / Mr. / Ms. AMUDHAVALLI. D of Electrical and Electronics Engineering has successfully completed the two day hands on workshop on "DESIGNING IOT APPLICATIONS" from 02.08.2023 to 03.08.2023 conducted by the Department of Mechanical Engineering and Department of Information Technology in association with IobiT solutions - Bengaluru.

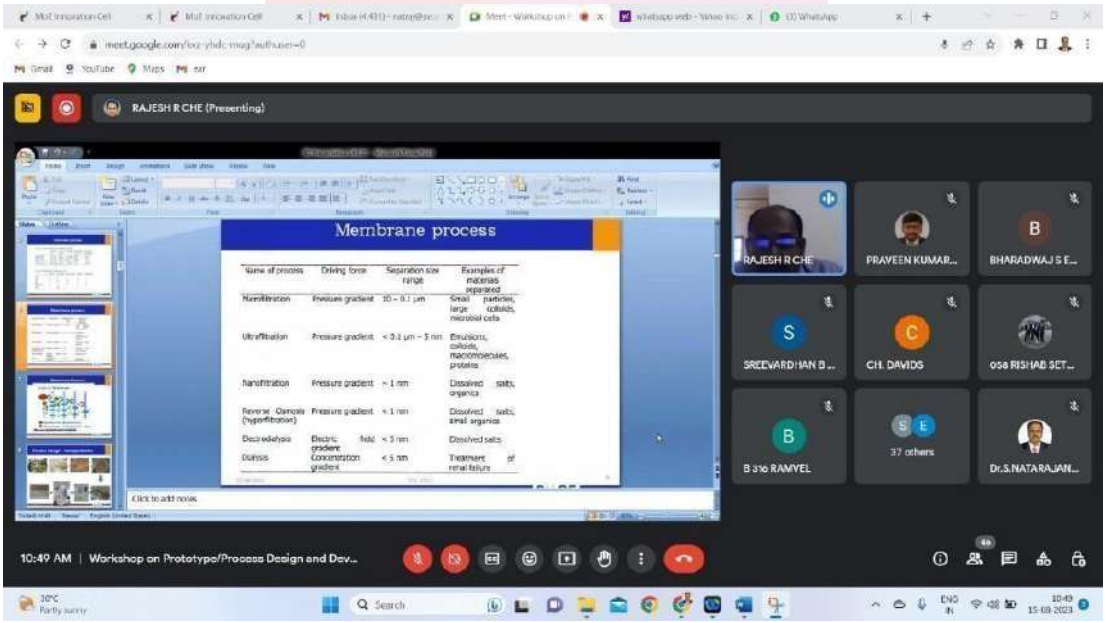
Mr. S. Karthikeyan	Dr. V. Vidhya	Dr. S. Ramesh Babu	Dr. S. Ganesh Vaidyanathan
Director	Head	Head	Principal
IoBiT Solutions	Information Technology	Mechanical Engineering	SVCE

Women Empowerment cell

A meeting for WEC members was conducted on **18.08.2023 at 2.30 PM** at software laboratory in Electrical and Electronics Engineering department to plan about the upcoming events for this AY 2023-24.

Institution Innovation Council (IIC) – SVCE

IIC SVCE, organized a workshop on "Prototype/Process design and development" on 15.08.2023 at 10.30 AM. Faculty members and students of dept EEE attended the workshop.



Institution innovation council of SVCE (IC201810371-IIC, Sriperumbudur, organizing a mentoring session on “Angel Investment / VC Funding Opportunity for early stage entrepreneurs” on 17.8.2023, 11.00 AM as a part of Quarter –IV,IIC level–II activity.

Institution innovation council of SVCE (IC201810371-IIC), Sriperumbudur organized a field/ exposure visit to MSME recognized entrepreneurship promotion and incubation centre(SVCE EPIC) & Multidisciplinary Nano Research Centre of Excellence on 17.08.2023,11.00 AM as a part of Quarter –IV ,IIC level– III activity. IIC student members and other few EEE students attended the program.

Research Centre Activities

PhD Viva voce.

Mr. M. Athappan (Reg.No:1415499813) Assistant Professor, ECE, defended his thesis "Design and Analysis of High Speed Arithmetic Circuits and Multi-Operand Adders for DSP Applications" on 04.08.2023 (Friday), 11.30AM at Seminar Hall , Department of Electrical and Electronics Engineering, under the guidance of Dr.KR. Santha , Professor & Head , EEE.

Mr. Nanda Kumar S (Reg No: 17143997309) Part Time Research Scholar, defended his thesis “Optimized fuzzy logic based controller for frequency regulation of micro grid with renewable energy sources" on 28th August 2023 at 11.30AM in the Seminar Hall, Department of EEE, Sri Venkateswara College of Engineering, Sriperumbudur under the guidance of Dr. NK.Mohanty, Professor, EEE.

Ph.D Guide.Dr.N K Mohanty, Mr.S Nanda Kumar, Dr.S Subramanian, Professor, Annamalai University and Dr.R K Behera, Professor, IIT Patna

Events conducted by Association of Electrical and Electronics Engineering(AEEE)

The valedictory function of Association of Electrical and Electronics Engineers (AEEE) was conducted on 29th Aug 2023 from 2:30 PM to 3:15 PM at Video Hall. The event started with an address by Dr.KR. Santha, HoD, EEE and Convener, AEEE . The chief guest, Dr.S.Kumaravel, Associate Professor, EEE delivered a lecture on "Load Frequency Control Challenges with Renewable Energy Integration". The office bearers of the association were felicitated and the event concluded with a vote of thanks.

The inaugural function of Association of Electrical and Electronics Engineers (AEEE) for the academic year 2023-24 was conducted on 31st August, 2023 from 9:00 AM to 11:30 AM at Video Hall.

The event started with an address by Dr. KR. Santha, HoD, EEE and Convener, AEEE .The chief guest, Mr.B.ILAYARAJA, Senior Manager, R&D-Battery TAFE Limited delivered a guest lecture on "VISION TOWARDS OPPORTUNITIES IN ELECTRIC VEHICLE". The office bearers of the year 2023-24 were felicitated and the event concluded with a vote of thanks.

"Technology Readiness Level (TRL) of AI for Job Market and Entrepreneurship" – ISTD,SVCE

The Indian Society for Training and Development Student Chapter –ISTD - SVCE organized its fourth event One Day Program on "Technology Readiness Level (TRL) of AI for Job Market and Entrepreneurship" on 30.08.2023, Wednesday, from 9:30 AM - 03.00 PM, exclusively for 2 nd and 3 rd year students..

This event presented valuable insights into the Technology Readiness Level of Artificial Intelligence in the context of the job market and entrepreneurship. It is an excellent opportunity for our students to gain practical knowledge and interaction with experts in the field.

Alumnus Feedback

Mr.Varun.KV

(Batch of 2014-18)

Business Analyst at Cognizant

SVCE is a good platform where faculty members posses excellent domain knowledge and they always guided us through the right path. I really liked the experience at SVCE and we had ample placement opportunities and good learning experience from the campus both through the curricular and placement training.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NEWSLETTER

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Mr. S. Bharadwaj, Assistant Professor/EEE

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