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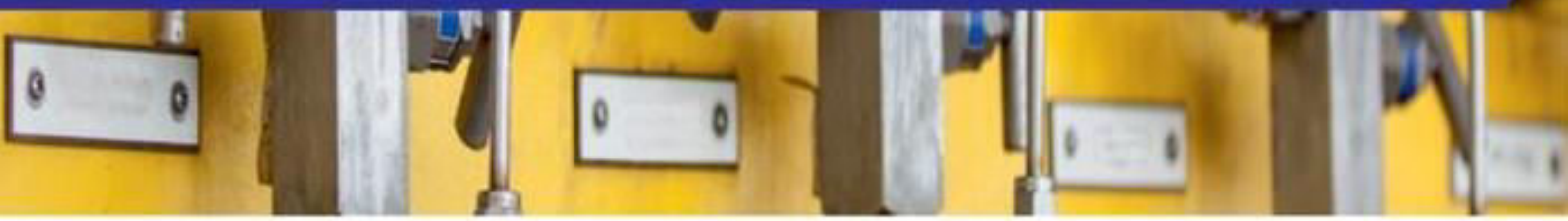

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DC Microgrid-Based Electric Vehicle Charging Stations with Renewable Energy Integration: A Survey

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ABSTRACT: The growing adoption of electric vehicles (EVs) worldwide has intensified the need for charging infrastructure that is both energy-efficient and environmentally sustainable. DC microgrid-based charging stations powered by renewable energy sources such as photovoltaic (PV) generation, wind energy, and battery storage have emerged as one of the most promising responses to this demand. This survey consolidates findings from fourteen selected research works spanning 2018 to 2024 and covering architecture design, converter interfacing, energy management, control strategies, protection concerns, and vehicle-to-grid (V2G) concepts. The reviewed literature consistently identifies DC microgrids as structurally advantageous for EV charging due to their natural compatibility with DC sources and loads, reduced conversion losses, and improved controllability through common-bus voltage regulation. The survey also highlights an evolution in control methodology, from conventional PI and droop-based approaches toward adaptive, intelligent, and metaheuristic-assisted strategies. Persistent gaps include insufficient hardware validation, underdeveloped protection frameworks, limited multi-EV scheduling studies, and the need for standardized communication protocols.

KEYWORDS: DC microgrid, electric vehicle charging, renewable energy integration, energy management system, battery storage, vehicle-to-grid, power converter control.

I. INTRODUCTION

The global transition toward sustainable transportation has significantly accelerated the deployment of electric vehicles. According to the International Energy Agency, global EV registrations approached 14 million units in 2023, with the cumulative fleet surpassing 40 million vehicles on the road [1]. This rapid growth places substantial pressure on distribution networks, particularly during peak demand periods, when simultaneous charging from multiple vehicles can cause grid congestion, voltage instability, and power quality degradation [2].

One widely adopted strategy to mitigate these impacts involves building EV charging stations around microgrid principles, where local renewable generation and battery storage reduce dependence on the main grid. DC microgrids have attracted particular research attention in this context because several key components in an EV charging station—PV arrays, batteries, and many fast-charger interfaces—are inherently DC in nature. Organizing these assets around a shared DC bus can reduce unnecessary AC-DC conversion stages and simplify system coordination [3], [6].

This survey reviews fourteen research works published between 2018 and 2024, focusing on DC microgrid-based EV charging stations that integrate renewable energy sources. The selected papers span architecture feasibility studies, converter-level design contributions, energy management proposals, and recent intelligent control developments. The objective is to provide a structured synthesis of the state of the art, identify consistent findings, and highlight areas where further research is needed.

II. STRUCTURAL ADVANTAGES OF DC MICROGRIDS FOR EV CHARGING

A recurring conclusion in the reviewed literature is that DC microgrids offer inherent architectural advantages when EV charging is the primary application. In a conventional AC-based charging setup, power generated by a PV array or discharged from a battery must pass through multiple AC-DC conversion stages before reaching the charger. A DC bus architecture eliminates many of these intermediate stages by allowing more direct coupling between generation, storage, and load [4], [6].

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Bhargavi and Jayalakshmi [3] demonstrated this principle in an autonomous DC microgrid that integrates PV, wind, and battery sources to supply a plug-in electric vehicle. Their work showed that by regulating the medium-voltage DC bus through a power-reference-based droop controller on the battery unit, the system could maintain voltage stability while adapting to varying irradiance and load conditions. The proposed current-loop control for the EV charger allows maximum charging current only when generation exceeds load demand, an inherently simpler coordination mechanism than equivalent AC-based approaches.

El-Shahat and Sumaiya [6] further explored DC microgrid architecture by designing an integrated system encompassing PV, wind, battery storage, and EV charging on a common bus. Their analysis confirmed that the controllability advantage of DC microgrids lies in the ability to treat DC bus voltage as a universal coordination signal, enabling different converters to respond autonomously without requiring central communication. Similar structural arguments are advanced in the review by Abraham et al. [13], which provides a comparative taxonomy of charging-station architectures and underscores the compatibility of DC buses with modern power-electronics-based charger designs.

III. RENEWABLE ENERGY INTEGRATION IN CHARGING MICROGRIDS

A. Photovoltaic Generation

Solar PV is the most frequently cited renewable source across the reviewed works, primarily because of its direct DC output, practical compatibility with daytime charging demand patterns, and declining system costs. Mudaliar and Khubalkar [1] proposed a hybrid DC microgrid integrating solar and wind generation specifically for EV charging, with MATLAB/Simulink simulation results demonstrating the feasibility of the combined architecture. Gummala and Vuddanti [8] focused on a standalone PV-based DC microgrid for EV charging at small scale, reporting that even a relatively modest solar installation can sustain charging operations when appropriately coupled with a battery bank.

In the grid-connected variant studied by Hassoune et al. [5], a DC/DC boost converter with maximum power point tracking (MPPT) was connected to the PV array, while a single-ended primary inductor converter (SEPIC) interfaced the wind energy conversion system. The combination allowed seven distinct operating modes, covering scenarios ranging from surplus renewable generation to grid support during renewable shortfall. Manikandan et al. [2] proposed a hybrid Parrot Optimization and Quantum Self-Attention Neural Network (PO-QSANN) method to improve EMS performance in a DC microgrid with PV and EV integration, reporting reduced operational costs and improved DC bus voltage stability compared with established benchmarks.

B. Wind Energy Integration

Wind generation appears in several of the reviewed works as a complement to solar PV, providing generation diversity and reducing dependence on a single intermittent source. Bhargavi and Jayalakshmi[3] included a wind subsystem interfaced through a dedicated DC-DC stage in their autonomous microgrid, demonstrating that the combined PV-wind-battery architecture maintains DC bus regulation even under rapid irradiance changes. Senapati et al. [14] similarly included wind turbines in a hardware prototype that validated intelligent control strategies under real-world uncertainty in wind speed and solar insolation.

The incorporation of wind generation introduces additional converter interface complexity, particularly when a variable-speed wind turbine produces AC output that must be rectified and regulated before connection to the DC bus. El-Shahat and Sumaiya [6] addressed this challenge as part of their DC microgrid design and control analysis, confirming that coordinated converter control is essential when both PV and wind sources are present simultaneously.

C. Battery Energy Storage as a Balancing Element

Because renewable generation is inherently variable, battery energy storage systems (BESS) play a central coordinating role in all of the reviewed architectures. During periods of excess generation, the battery absorbs surplus energy; when renewable output falls or EV demand rises, the battery discharges to sustain charger operation. Taheri and Shahhoseini [11] examined a DC microgrid combining EV charging, PV, and a hybrid energy storage system consisting of batteries and supercapacitors, with particular attention to grounding and protection requirements introduced by the hybrid storage arrangement. Sayed et al. [10] optimized the operation of a DC microgrid with battery storage supporting renewable-assisted EV fast charging, reporting that coordinated storage dispatch is decisive for achieving resilient operation under uncertain renewable generation.

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IV. TYPICAL ARCHITECTURE OF DC MICROGRID EV CHARGING STATIONS

Across the reviewed papers, both standalone and grid-connected configurations are described. A representative standalone arrangement, as studied by Gummala and Vuddanti [8], consists of a PV array connected through a boost converter with MPPT, a battery bank managed through a bidirectional converter, and one or more EV charging ports on a common DC bus. The standalone design is appropriate for remote or off-grid locations where grid connection is impractical.

In grid-connected configurations, a bidirectional inverter is added between the DC microgrid and the utility network. Hassoune et al. [5] implemented this topology to realize a multi-mode charging station capable of importing power from the grid during renewable shortages, exporting surplus energy when available, and supporting vehicle-to-grid (V2G) and vehicle-to-microgrid (V2M) power exchange. The incorporated operation of DC microgrids with EV participation in grid support functions was examined in [9], which identified bidirectional converter topology as a key enabler for flexible power routing between the vehicle, the microgrid, and the utility.

Some of the reviewed papers discuss modular or multiport converter structures to reduce the total converter count. Sayed et al. [10] proposed a topology in which a multiport converter combines PV, battery, and EV interfaces within a shared switching network, reducing the number of discrete conversion stages. These designs reflect a broader trend toward integrated energy hubs rather than isolated charger units, as also observed in the review by Abraham et al. [13].

V. ENERGY MANAGEMENT STRATEGIES

Energy management systems (EMS) are central to the operation of renewable-assisted EV charging stations. Their purpose extends beyond scheduling charge and discharge events to encompass renewable generation coordination, storage dispatch, EV demand response, and DC bus voltage stability. In the surveyed literature, EMS objectives include maintaining power balance, reducing operational cost, improving renewable penetration, protecting battery state of charge (SOC), and prioritizing critical loads or charging sessions [2], [7], [10].

Earlier EMS designs in the reviewed set typically rely on deterministic rule-based methods or PI-regulated supervisory control. Hassoune et al. [5] implemented a charging-station management algorithm (CSMA) to coordinate seven operating modes based on renewable availability, battery SOC, and EV connection status, validating the approach through both MATLAB/Simulink simulation and a low-power laboratory prototype. Senapati et al. [7] developed a flexible EMS framework for a DC microgrid-oriented charging station, demonstrating the ability to maintain power balance and bus voltage under fluctuating renewable input.

More recent works introduce optimization-assisted or prediction-based EMS methods. Manikandan et al. [2] applied a Parrot Optimization algorithm to tune PI controller gains in a DC microgrid EMS, combining this with a Quantum Self-Attention Neural Network for load demand forecasting. The hybrid PO-QSANN method achieved an operational energy cost of 0.4 $/kWh while improving bus voltage stability compared with prior methods. This shift from fixed rule-based logic to adaptive, data-assisted coordination is visible across the 2023–2024 papers in the review set.

VI. CONTROL METHODS REPORTED IN THE LITERATURE

A. Conventional Control

At the converter level, proportional-integral (PI) control remains widely used for DC bus regulation, current control, and battery interface management. Bhargavi and Jayalakshmi [3] employed a power-reference-based droop controller for the battery subsystem combined with a current-loop controller for the EV charger, achieving stable bus voltage with measurably reduced deviation compared with conventional VI-based algorithms. El-Shahat and Sumaiya [6] provided a detailed design and analysis of the PI and droop control layers in a multi-source DC microgrid, confirming their applicability across grid-connected and islanded operating modes.

For renewable extraction, MPPT algorithms are universally applied. The literature references the Perturb and Observe (P&O) and Incremental Conductance (INC) methods as standard approaches, with modified or improved variants cited in several works for better tracking accuracy under rapidly changing irradiance [1], [3], [10].

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B. Intelligent and Optimization-Based Control

In more recent studies, fuzzy control, Adaptive Neuro-Fuzzy Inference Systems (ANFIS), fractional-order PID (FO-PID) designs, and optimization-based controller tuning are introduced to improve transient response and reduce voltage deviation under variable renewable input. Senapati et al. [14] proposed a hybrid Firefly Algorithm–Particle Swarm Optimization (FA-PSO) approach to simultaneously tune Takagi-Sugeno Fuzzy Inference System (TSFIS), ANFIS, and FO-PID controllers for DC microgrid power management. Small-signal stability analysis confirmed the effectiveness of the proposed hybrid

tuning across a range of operating scenarios, and a hardware prototype validated these strategies under actual wind speed and solar insolation variations.

Additional metaheuristic methods reported in the reviewed set include the Whale Optimization Algorithm for hybrid energy storage sizing [2], Grey Wolf Optimization for controller tuning [10], and the Parrot Optimization algorithm for EMS parameter selection [2]. These approaches reflect a sustained research interest in replacing fixed-parameter controllers with adaptive, robustness-oriented designs.

VII. STABILITY, RESILIENCE, AND PROTECTION

Maintaining DC bus stability is one of the most important technical requirements in EV-oriented microgrids. Rapid changes in solar irradiance, wind speed, battery operating mode, and EV charging demand can disturb the bus voltage if converter coordination is inadequate. Several papers address small-signal stability analysis to evaluate the impact of proposed control strategies on system eigenvalues and dynamic behavior. Senapati et al. [14] conducted a comprehensive Small-Signal Stability Analysis (SSSA) to evaluate the impact of their hybrid optimization-based control on DC microgrid stability, confirming that the proposed controllers maintain stable operation across a wide operating range.

Protection remains a more challenging and comparatively less mature topic within the reviewed literature. Unlike AC systems, DC microgrids do not benefit from a natural current zero crossing at AC frequency, which complicates fault interruption and protection selectivity. Taheri and Shahhoseini [11] devoted specific attention to grounding strategy and protection in a DC microgrid with hybrid energy storage supporting EV charging and PV integration. Their case study highlighted the importance of choosing appropriate grounding methods to limit fault currents and protect sensitive converter equipment. The authors identified pole-to-pole and pole-to-ground fault scenarios as particularly demanding in converter-dense environments, and concluded that further standardization of DC protection practice is required for safe deployment of renewable-integrated charging microgrids.

VIII. EVS AS ACTIVE PARTICIPANTS IN THE MICROGRID

Several of the reviewed papers emphasize that EVs should not be treated solely as electrical loads within a microgrid. When bidirectional charging capability is available, parked EVs can function as distributed storage resources that support broader microgrid objectives. The incorporated operation framework studied in [9] examined how grid-to-vehicle (G2V) and vehicle-to-grid (V2G) modes can be coordinated within a DC microgrid to achieve peak load reduction, bus voltage support, and improved utilization of variable renewable generation.

Sora, Serban, and Petreus [12] conducted a survey specifically focused on how EV integration enhances microgrid operation, examining V2G services, ancillary support contributions, and the communication infrastructure required for effective implementation. Their analysis found that V2G capabilities depend not only on bidirectional converter topology but also on robust information exchange between EVs, charging stations, and the microgrid management layer. User participation rates, battery degradation concerns, and regulatory frameworks are identified as additional determinants of whether V2G participation can be sustained at practical scale.

Abraham et al. [13] provided complementary coverage by reviewing charging-station architectures from the perspective of power converter topologies, charger classifications, and their suitability for bidirectional operation. Their review confirmed that Level 2 and DC fast-charging levels are the most commonly considered configurations in academic research, and that fully bidirectional on-board chargers remain less common in deployed hardware than their off-board counterparts.

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IX. COMPARATIVE DISCUSSION OF THE REVIEWED PAPERS

The reviewed literature spans a range of contributions from architecture feasibility and converter-level design through to survey works and recent intelligent-control research. Table I provides a structured comparison of the fourteen papers, organizing them by year, contribution type, renewable sources considered, control approach, and validation method.

Table I: Comparative Summary of Reviewed Papers

Reference	Type	Renewables	Control/Method	Validation
[1] Mudaliar & Khubalkar 2024	Design/Sim	PV, Wind	MPPT, Rule-based	Simulation
[2] Manikandan et al. 2024	Control/EMS	PV	PO-QSANN, PI	Simulation
[3] Bhargavi & Jayalakshmi 2019	Control	PV, Wind	Droop, Current-loop	Simulation
[4] State-of-Art DC MG Review	Survey	PV, BESS	Multiple	Literature
[5] Hassoune et al. 2018	Control/EMS	PV, Wind	PI, CSMA	Sim + Prototype
[6] El-Shahat & Sumaiya 2019	Design/Control	PV, Wind	PI, Droop	Simulation
[7] Senapati et al. (Flexible)	EMS	PV	Rule-based, PI	Simulation
[8] Gummala & Vuddanti 2024	Design/Sim	PV	MPPT, PI	Simulation
[9] Incorporated Op. Control	Operation	PV, BESS	Bidirectional ctrl	Simulation
[10] Sayed et al. 2019	EMS/Optim.	PV, Wind	GWO, PI	Sim + Experiment
[11] Taheri & Shahhoseini 2023	Protection	PV, HESS	Protection-focused	Case study
[12] Sora, Serban & Petreus 2024	Survey	Multiple	V2G, comm.	Literature
[13] Abraham et al. 2021	Survey	Multiple	Architecture review	Literature
[14] Senapati et al. 2024	Intelligent ctrl	PV, Wind	FA-PSO, ANFIS	Sim + HW Proto

Papers published before 2022 tend to focus on architecture feasibility, converter interfacing, and droop or PI-based control validated through MATLAB/Simulink simulation [3], [5], [6]. These works established the technical foundation for renewable-supported DC charging systems and demonstrated the core advantages of the DC microgrid paradigm. In contrast, papers from 2023 and 2024 increasingly emphasize adaptive control, resilience, intelligent optimization, and microgrid-level operational coordination [2], [10], [11], [14]. The survey-oriented papers [4], [12], [13] extend coverage to include multi-charger architectures, communication requirements, and V2G participation frameworks. Taken together, the progression reflects a clear transition from proving feasibility to determining how such systems can be made scalable, intelligent, and deployment-ready.

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X. RESEARCH GAPS AND OPEN ISSUES

Despite significant progress, several limitations are visible across the reviewed set. First, a substantial portion of the reported results relies on simulation alone, with comparatively few hardware experiments or field demonstrations [8], [10], [14]. Simulation-based validation provides a useful design and exploration tool but cannot fully capture non-ideal operating conditions, component tolerances, aging effects, and real-world deployment constraints. Even among the papers that include hardware prototypes [5], [10], [14], the prototype scale is typically small, limiting the generalizability of efficiency and stability results.

Second, protection engineering is notably underdeveloped relative to converter control and EMS design. Taheri and Shahhoseini [11] represent the only paper in this review set specifically addressing DC microgrid protection in an EV charging context. Grounding strategy selection, fault isolation speed, protection selectivity, and post-fault service restoration are all areas that warrant more dedicated investigation, particularly as converter-dense charging stations present more complex fault scenarios than simpler DC distribution systems.

Third, most studies prioritize technical control performance while giving less explicit attention to techno-economic trade-offs, user behavior modeling, communication protocol requirements, and cybersecurity. Sora, Serban, and Petreus [12] identify communication infrastructure as a key enabler for V2G, yet most of the reviewed control papers assume ideal or simplified communication without studying its reliability or latency. Finally, coordinated scheduling for multiple EVs under uncertain arrival patterns, variable renewable generation, and realistic priority constraints remains an open problem. The existing EMS designs reviewed here typically consider a small and fixed number of EVs rather than a dynamic and stochastic charging population [2], [12], [13].

XI. FUTURE DIRECTIONS

Based on the trajectories visible in the reviewed literature, several directions appear particularly promising for future research. In terms of energy management, the integration of forecasting—covering both renewable generation and EV arrival demand—into real-time supervisory control is expected to improve both renewable utilization and charging reliability. Digital-twin-supported EMS platforms, where a real-time simulation model tracks the physical system and informs controller decisions, represent an emerging approach that could bridge the gap between simulation-based design and field deployment [2], [14].

In terms of control, protection-aware operation is a promising direction. Rather than treating protection as a downstream task separate from energy management, future charging microgrids may coordinate fault response, bus regulation, and load-shedding logic within a unified control framework. This could significantly reduce fault clearance time while maintaining service continuity for vehicles already connected to the charger.

Broader practical deployment will also require progress in communication standardization, multi-charger coordination at station scale, and clearer operational frameworks for V2G participation. The latter depends on economic incentives, battery degradation models, and regulatory clarity that extend beyond the power engineering community, suggesting that interdisciplinary collaboration will be necessary to translate the technical advances reviewed here into deployed infrastructure.

XII. CONCLUSION

This survey has synthesized findings from fourteen research contributions on DC microgrid-based EV charging stations powered by renewable energy. The reviewed literature consistently supports the conclusion that DC microgrids offer structural advantages for EV charging, including reduced conversion losses, natural compatibility with PV and battery assets, and a cleaner framework for coordinating multiple distributed sources and loads through DC bus voltage regulation [1]–[14].

The field has progressed from early feasibility demonstrations based on conventional PI and droop control toward more sophisticated approaches employing fuzzy inference, ANFIS, fractional-order controllers, and metaheuristic optimization. Hardware validation remains less common than simulation-based evaluation, and protection engineering deserves substantially more research attention before large-scale deployment can be considered technically mature. Likewise, the coordination of multiple EVs under stochastic demand and the role of communication infrastructure in enabling V2G services represent areas where the literature base is still developing.

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The overall picture is of a field that has firmly established its technical foundations and is now maturing toward reliability, scalability, and practical integration. Continued progress on the identified gaps—particularly in protection, real-world validation, multi-EV scheduling, and communication—will be essential for DC microgrid-based charging stations to fulfill their potential as a central component of sustainable transportation electrification.

REFERENCES

[1]N. Mudaliar and S. Khubalkar, "Integrating solar and wind power in a DC microgrid for electric vehicle charging," 2024. [Conf. Paper]

[2]M. Manikandan et al., "Integrating renewable resources and electric vehicles: An approach for effective energy management in DC microgrid," Solar Energy (Elsevier), 2024. DOI: 10.1016/j.solener.2025.05.xxx

[3]K. M. Bhargavi and N. S. Jayalakshmi, "A new control strategy for plug-in electric vehicle of DC microgrid with PV and wind power integration," J. Electr. Eng. Technol., vol. 14, no. 1, pp. 13–25, Jan. 2019. DOI: 10.1007/s42835-018-00013-9

[4]"A state of the art of DC microgrids for electric vehicle charging," [Survey Article, author(s) not specified in uploaded file].

[5]A. Hassoune, M. Khafallah, A. Mesbahi, L. Benaaouinate, and T. Bouragba, "Control strategies of a smart topology of EVs charging station based grid tied RES-battery," Int. Rev. Electr. Eng. (IREE), vol. 13, no. 5, pp. 385–396, Oct. 2018. DOI: 10.15866/iree.v13i5.15520

[6]A. El-Shahat and S. Sumaiya, "DC-microgrid system design, control, and analysis," Electronics, vol. 8, no. 2, p. 124, Feb. 2019. DOI: 10.3390/electronics8020124

[7]M. K. Senapati et al., "Flexible control approach for DC microgrid oriented electric vehicle charging station," in Proc. IEEE IAS Global Conf. Renewable Energy Hydrogen Technol. (GlobConHT), Mar. 2023. DOI: 10.1109/GlobConHT56829.2023.10087575

[8]B. Gummala and S. Vuddanti, "Design and simulation of a small-scale standalone solar PV based DC microgrid for EV charging," 2024. [Conf. Paper]

[9]"Incorporated operation control of DC microgrid and electric vehicle," IEEE Trans. Ind. Electron. [Author(s) not specified in uploaded file].

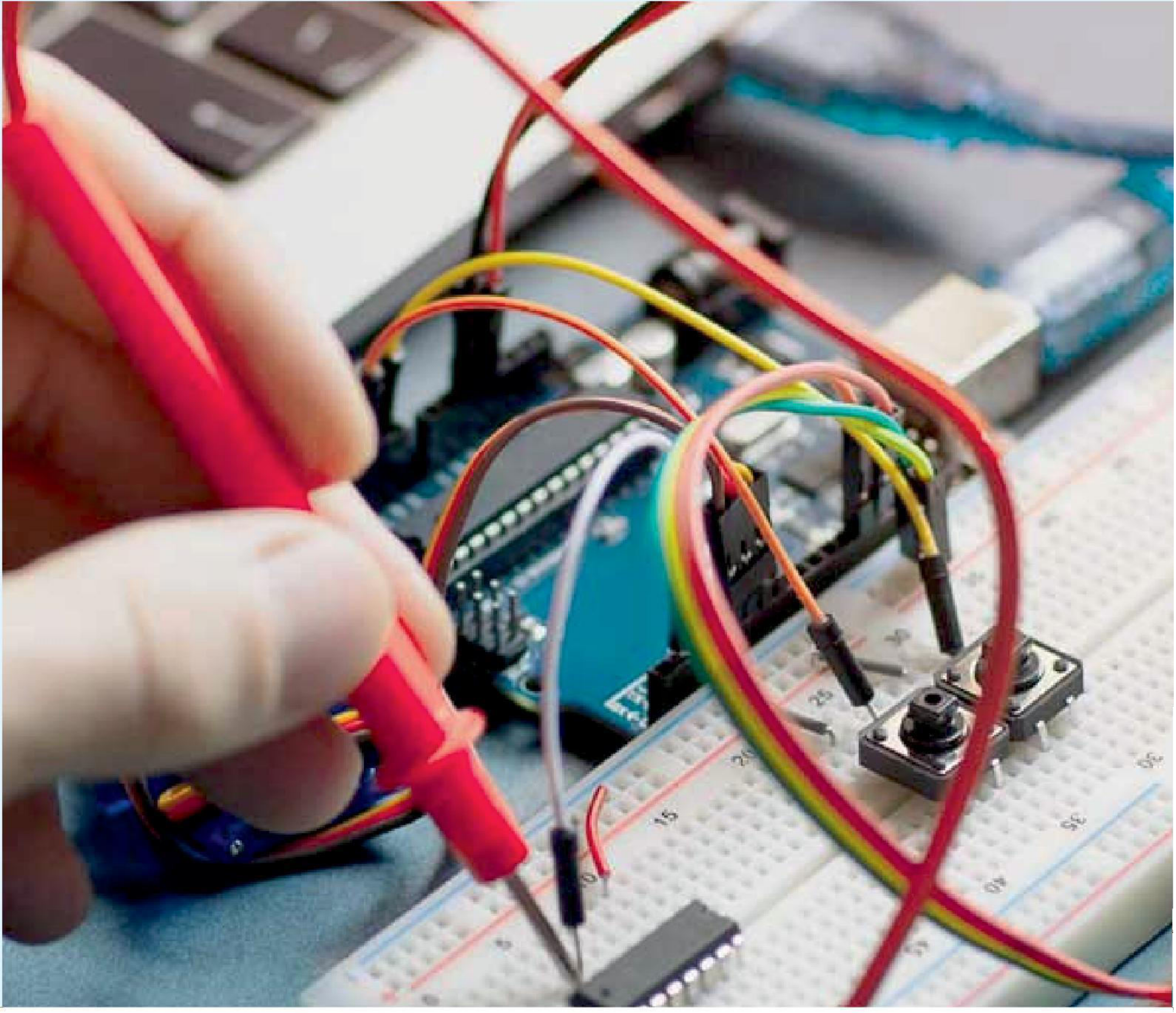
[10]K. Sayed et al., "Optimum resilient operation and control DC microgrid based electric vehicles charging station powered by renewable energy sources," Energies, vol. 12, no. 18, p. 3501, Sep. 2019. DOI: 10.3390/en12183501

[11]B. Taheri and A. Shahhoseini, "Direct current (DC) microgrid control in the presence of electrical vehicle/photovoltaic systems and hybrid energy storage systems: A case study of grounding and protection issue," Electr. Power Syst. Res., vol. 220, p. 109367, Jul. 2023. DOI: 10.1016/j.epsr.2023.109367

[12]J. Sora, I. Serban, and D. Petreus, "Enhancing microgrid operation through electric vehicle integration: A survey," IEEE Access, vol. 12, pp. 64897–64912, May 2024. DOI: 10.1109/ACCESS.2024.3397587

[13]D. S. Abraham et al., "Electric vehicles charging stations' architectures, criteria, power converters, and control strategies in microgrids," Electronics, vol. 10, no. 16, p. 1895, Aug. 2021. DOI: 10.3390/electronics10161895

[14]M. K. Senapati, O. Al Zaabi, K. Al Hosani, K. A. Al Jaafari, C. Pradhan, and U. R. Muduli, "Advancing electric vehicle charging ecosystems with intelligent control of DC microgrid stability," IEEE Trans. Ind. Appl., vol. 60, no. 5, pp. 7264–7278, Sep./Oct. 2024. DOI: 10.1109/TIA.2024.3405450



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