ISSN: **3107-6513**

A Comprehensive Review of Demand Response and Electric Vehicle Energy Management for Renewable Energy Integrated Smart Distribution Systems

Bhupendra Keer[#1], Sagar Bisen[1], Shweta Raj[3], Pallavi Pagare[4]
[1,2]*M. tech Student &* [3,4]*Assistant Professor*
[1,2,3,4]*Department of Electrical and Electronics Engineering*
NRI Institute of Information Science & Technology Bhopal (M.P.) India

Abstract

The increasing penetration of renewable energy sources (RESs) in modern power systems has transformed conventional distribution networks into active and intelligent energy systems. Solar photovoltaic (PV) and wind energy technologies have emerged as the dominant renewable energy sources due to their environmental benefits, declining installation costs, and contributions to sustainable development goals. However, the intermittent and uncertain nature of renewable generation introduces significant technical challenges, including voltage fluctuations, reverse power flow, degraded power quality, protection coordination issues, and operational uncertainty. This review paper presents a comprehensive analysis of renewable energy integration in distribution systems, focusing on the opportunities, challenges, and emerging technological solutions. The impacts of distributed renewable generation on system performance, voltage stability, power losses, reliability, and network operation are critically examined. Furthermore, the roles of energy storage systems, demand response programs, electric vehicles, smart grid technologies, and advanced optimization techniques in enhancing the utilization of renewable energy are discussed. Various conventional, metaheuristic, and artificial intelligence-based approaches for renewable energy management and system optimization are also reviewed. In addition, recent developments in digitalization, virtual power plants, transactive energy markets, and vehicle-to-grid technologies are highlighted as promising directions for future research. The study concludes that the coordinated integration of renewable energy resources with intelligent control and energy management frameworks can significantly improve the reliability, flexibility, efficiency, and sustainability of future distribution systems.

Keywords—*Renewable Energy Integration, Distribution Systems, Solar Photovoltaic, Wind Energy, Distributed Generation, Smart Grid, Energy Storage Systems, Demand Response, Electric Vehicles, Optimization Techniques.*

I. INTRODUCTION

The integration of renewable energy sources (RESs), electric vehicles (EVs), and demand response (DR) programs has emerged as a key research area for enhancing the flexibility, reliability, and sustainability of modern power systems. A comprehensive energy management framework for microgrids incorporating EVs, RESs, and demand response strategies was presented in [1], demonstrating significant improvements in operational efficiency and load balancing. A demand response-based energy management framework for renewable-integrated smart distribution systems with EV participation was proposed in [2], emphasizing coordinated scheduling to enhance system performance and renewable energy utilization. Artificial intelligence-driven energy management techniques for EV-integrated smart distribution systems were investigated in [3], highlighting the capability of intelligent algorithms to optimize energy consumption and reduce operational costs.

A game-theoretic energy management approach for interconnected multi-microgrids considering demand response programs, energy storage systems, and renewable resources was developed in [4]. An integrated energy management framework for industrial, residential, and commercial energy hubs with demand response participation was introduced in [5], demonstrating the benefits of coordinated energy scheduling across multiple sectors. Deep reinforcement learning-based coordinated scheduling of renewable energy resources and electric vehicles was explored in [6], showing

 ISSN: 3107-6513

enhanced adaptability under uncertain operating conditions. A detailed survey on recent developments in smart grids and renewable energy integration was provided in [7], identifying future research opportunities in intelligent energy management.

The coordination of flexible demand response resources with renewable generation uncertainties in community-integrated energy systems containing EV charging stations was investigated in [8]. A smart home energy management model incorporating demand response, renewable energy sources, and EV uncertainty was proposed in [9], achieving improved cost savings and load management. Advanced energy management strategies for EV aggregators operating in smart distribution networks were discussed in [10], focusing on efficient charging coordination and grid-support services.

A comprehensive review of distributed energy resource-based microgrids, including their architecture, control strategies, and reliability aspects, was presented in [11]. The role of energy storage systems and demand-side management in achieving high renewable energy penetration was critically analyzed in [12]. A multi-agent deep reinforcement learning framework for distributed energy management and demand response in smart grids was developed in [13], demonstrating the effectiveness of decentralized decision-making approaches.

The integration of electric vehicles into modern smart grids and their impact on grid operation, flexibility, and sustainability were comprehensively reviewed in [14]. Data-driven distributionally robust scheduling methods for community-integrated energy systems with uncertain renewable generation and integrated demand response were proposed in [15], improving operational resilience under uncertainty. Smart grid-oriented coordinated expansion planning of transmission and distribution systems was investigated in [16], highlighting the importance of advanced planning methodologies for future energy networks.

A systematic survey of demand response management schemes applicable to electric vehicles was conducted in [17], categorizing various optimization and control approaches for EV participation. Demand response-based energy management strategies considering renewable energy resources and electric vehicles were reviewed in [18], emphasizing the synergistic benefits of coordinated operation. Renewable energy management approaches for EV-integrated smart grids using demand response programs were explored in [19], demonstrating improved grid flexibility and energy utilization.

Optimal scheduling of EV charging considering renewable energy availability and dynamic electricity pricing was presented in [20], resulting in reduced charging costs and peak demand. A comprehensive framework for residential demand-side management with electric vehicle integration was proposed in [21], focusing on consumer participation and energy efficiency. Demand-side management strategies combined with optimal renewable energy allocation in distribution networks with electric vehicles were investigated in [22], achieving improved operational performance and reduced network stress.

The potential of electric vehicles as distributed energy resources for supporting grid modernization and enhancing system flexibility was highlighted in [23]. Vehicle-to-grid-enabled demand response strategies for renewable-rich distribution networks were explored in [24], demonstrating EVs' capability to provide ancillary services and support renewable integration. Finally, a multi-objective demand response optimization framework for coordinated operation of renewable energy and electric vehicles was developed in [25], balancing economic, technical, and environmental objectives for sustainable smart grid operation.

Overall, the reviewed literature indicates that demand response programs, electric vehicle energy management, renewable energy integration, artificial intelligence techniques, and vehicle-to-grid technologies play a crucial role in improving the efficiency, flexibility, reliability, and sustainability of future smart distribution systems. However, further research is required to develop unified frameworks capable of simultaneously addressing uncertainty, cybersecurity, real-time operation, and large-scale integration of renewable energy.

II. EVOLUTION OF DEMAND RESPONSE IN SMART GRIDS

Demand Response (DR) has emerged as one of the most important demand-side management strategies in modern power systems. It enables consumers to modify their electricity consumption patterns in response to electricity prices, incentive signals, or grid operating conditions. The evolution of DR has been closely linked with advancements in power system infrastructure, communication technologies, renewable energy integration, and smart grid development. Over the past few decades, DR has evolved from simple load control programs to sophisticated real-time energy management systems capable of supporting grid flexibility, reliability, and sustainability.

A. Traditional Demand-Side Management Era

The concept of demand-side management (DSM) originated during the energy crises of the 1970s when utilities sought methods to reduce electricity demand growth and avoid costly investments in generation and transmission infrastructure. Early DSM programs primarily focused on energy conservation and peak demand reduction through direct utility intervention.

Traditional DSM techniques included:

- Peak clipping
- Valley filling
- Load shifting
- Strategic load growth
- Flexible load shaping
- Energy conservation programs

Utilities implemented these programs through manual load control methods, customer awareness campaigns, and time-based tariff structures. Although effective in reducing peak demand, these approaches lacked real-time communication and customer participation.

B. Introduction of Time-Based Pricing Programs

Time-based pricing mechanisms were introduced to encourage consumers to shift their electricity consumption. These programs represented the first generation of demand response initiatives.

Common pricing mechanisms included:

- **Time-of-Use (TOU) Pricing**

Under TOU pricing, electricity prices vary according to predefined periods throughout the day.

- Peak period: Highest tariff
- Shoulder period: Medium tariff
- Off-peak period: Lowest tariff

Consumers were encouraged to shift flexible loads such as washing machines, water heaters, and industrial processes to low-cost periods.

- **Critical Peak Pricing (CPP)**

CPP programs imposed significantly higher electricity prices during critical system conditions, such as:

- Extreme weather events
- Generation shortages
- Network congestion

Consumers received advance notification and voluntarily reduced consumption to avoid high electricity costs.

- **Real-Time Pricing (RTP)**

RTP introduced dynamic electricity prices that changed hourly or sub-hourly based on wholesale market conditions. This mechanism provided stronger economic signals and improved demand flexibility. These pricing-based programs marked a significant transition from passive electricity consumption to active consumer participation.

C. Smart Meter Deployment and Advanced Metering Infrastructure

The development of smart meters and Advanced Metering Infrastructure (AMI) during the early 2000s transformed the implementation of demand response.

AMI consists of:

- Smart meters
- Communication networks
- Data management systems
- Control centers

Key capabilities introduced by AMI include:

- Two-way communication
- Real-time monitoring
- Remote meter reading
- Automated billing
- Load forecasting

Unlike conventional meters, smart meters provide detailed information regarding electricity consumption patterns, enabling utilities to implement more accurate and responsive DR programs.

D. Integration of Communication Technologies

The emergence of communication technologies further accelerated DR development.

Major enabling technologies include:

- Internet of Things (IoT)
- Wireless sensor networks
- Cloud computing

- 5G communication
- Edge computing

E. Demand Response in Smart Grids

Smart grids introduced intelligence, automation, and bidirectional communication into conventional power systems. In smart grid environments, DR has become a critical operational tool for balancing supply and demand.

The main objectives of DR in smart grids include:

- Peak demand reduction
- Load balancing
- Congestion management
- Voltage support
- Frequency regulation
- Renewable energy accommodation

Smart grid DR systems can automatically respond to:

- Electricity prices
- Renewable generation fluctuations
- Network constraints
- System emergencies

This automation significantly improves system flexibility and reliability.

F. Renewable Energy Driven Demand Response

The rapid penetration of renewable energy sources such as solar PV and wind generation introduced significant operational challenges due to their intermittent nature.

G. Electric Vehicle-Based Demand Response

The widespread adoption of electric vehicles has significantly expanded the scope of demand response.

EVs represent flexible loads that can participate in:

- **Smart Charging**

Charging schedules are optimized according to:

- Electricity prices
- Renewable generation
- Grid conditions

Vehicle-to-Grid (V2G)

V2G technology enables EV batteries to discharge stored energy back into the grid during peak-demand periods.

Benefits include:

- Peak shaving
- Frequency support
- Voltage regulation
- Energy arbitrage
- Emergency backup services

Consequently, EVs have evolved from energy consumers into distributed energy resources capable of actively supporting grid operation.

H. Artificial Intelligence and Machine Learning-Based Demand Response

Recent advancements in Artificial Intelligence (AI) and Machine Learning (ML) have significantly enhanced DR capabilities.

- Artificial Neural Networks (ANN)
- Deep Learning
- Reinforcement Learning
- Fuzzy Logic Systems
- Support Vector Machines (SVM)

These technologies enable highly adaptive and intelligent demand management strategies that continuously learn from operational data.

I. Transactive Energy and Blockchain-Based Demand Response

The latest stage in DR evolution involves transactive energy systems, where consumers actively participate in electricity markets. This paradigm shifts the role of consumers from passive users to active market participants.

J. Future Evolution of Demand Response

Future DR systems are expected to incorporate:

- Artificial Intelligence-driven autonomous control
- Digital Twin technology
- Blockchain-enabled energy trading
- Vehicle-to-Everything (V2X) integration
- Virtual Power Plants (VPPs)
- Multi-energy system coordination
- Carbon-aware demand response

The convergence of these technologies will enable highly flexible, resilient, and sustainable smart grids that can efficiently integrate large-scale renewable energy resources and electric vehicles.

The evolution of demand response has progressed through several stages, beginning with traditional demand-side management and advancing toward intelligent, AI-enabled, market-driven smart grid solutions. Modern DR systems play a crucial role in integrating renewable energy, coordinating electric vehicles, enhancing grid flexibility, and enabling real-time energy management. As power systems continue to modernize, demand response will remain a fundamental component of future sustainable and resilient electricity networks.

III. RENEWABLE ENERGY INTEGRATION IN RDS

A. Introduction

The growing global demand for clean, sustainable energy has accelerated the integration of Renewable Energy Sources (RESs) into electrical distribution systems. Renewable energy technologies, particularly Solar Photovoltaic (PV) systems and Wind Turbines (WTs), have become essential components of modern power networks due to their environmental benefits, reduced greenhouse gas emissions, and decreasing installation costs. Unlike conventional centralized generation systems, renewable energy resources are generally deployed as Distributed Generation (DG) units close to load centers, transforming traditional passive distribution networks into active distribution systems. Although renewable energy integration offers significant environmental and economic benefits, it also introduces operational challenges due to its intermittent and uncertain nature. Consequently, advanced planning, control, and optimization techniques are required to ensure reliable and efficient operation of the distribution system.

B. Renewable Energy Sources in Distribution Networks

Renewable energy resources integrated into distribution systems primarily include:

Solar PV technology directly converts solar irradiance into electrical energy through photovoltaic cells. PV systems are widely adopted due to:

- Abundant solar energy availability
- Modular installation capability
- Low maintenance requirements
- Zero fuel cost
- Environmentally friendly operation

PV systems are typically connected at residential, commercial, and utility scales within distribution networks.

Wind turbines convert kinetic energy from wind into electrical energy. Wind generation has become one of the fastest-growing renewable technologies worldwide.

Wind energy significantly reduces dependence on fossil fuels and improves energy sustainability.

Hybrid systems combine multiple renewable resources, such as:

- Solar PV-Wind systems
- PV-Wind-Battery systems
- PV-Wind-EV integrated systems

Advantages include:

- Improved reliability
- Reduced renewable intermittency
- Better energy utilization
- Enhanced system flexibility

C. Challenges of Renewable Energy Integration

Despite its advantages, integrating renewable energy sources introduces several operational challenges.

- **Intermittency and Variability**

Solar and wind resources are highly dependent on environmental conditions.

Examples include:

- Cloud cover affecting PV generation
- Wind speed fluctuations affecting WT output

These variations can cause:

- Power imbalance
- Voltage fluctuations
- Frequency deviations
- **Voltage Regulation Issues**

High penetration of distributed renewable generation may cause:

- Overvoltage conditions
- Undervoltage conditions
- Reverse power flow

Particularly during low-load and high-generation periods.

- **Power Quality Problems**

Renewable energy interfacing through power electronic converters may introduce:

- Harmonic distortion
- Voltage flicker
- Power factor degradation

D. Impact of Renewable Energy on Distribution System Performance

- **Power Loss Reduction**

Properly located renewable generation reduces feeder current and line losses.

Distributed renewable generation reduces current flow from substations, thereby decreasing network losses.

- **Voltage Profile Improvement**

Renewable DG units inject active power near load centers, resulting in:

- Improved voltage regulation
- Reduced voltage drops
- Better voltage stability
- Reliability Enhancement
- Resilience Improvement
- Emergency operating conditions

E. Energy Storage Systems for Renewable Integration

Energy Storage Systems (ESSs) play a crucial role in mitigating the variability of renewable energy sources.

Common storage technologies include:

Battery Energy Storage Systems (BESS)

- Lithium-ion batteries
- Lead-acid batteries
- Sodium-sulfur batteries

Other Storage Technologies

- Flywheel energy storage
- Compressed air energy storage
- Hydrogen energy storage
- Pumped hydro storage

Benefits of ESS integration include:

- Peak shaving
- Load levelling
- Frequency support
- Renewable smoothing
- Backup power supply

F. Demand Response for Renewable Integration

Demand Response (DR) provides flexibility by adjusting consumer demand according to renewable generation availability.

DR applications include:

- Load shifting
- Peak reduction
- Renewable energy absorption
- Grid balancing
- EV charging can be scheduled during peak solar generation periods.
- Industrial loads can be shifted to periods of high wind generation.

The coordinated operation of DR and renewable resources significantly enhances system flexibility.

G. Electric Vehicle Integration with Renewable Energy

Electric Vehicles (EVs) are increasingly viewed as mobile energy storage resources.

EV integration supports renewable energy through:

Smart Charging

- Charging during high renewable generation periods
- Reduced charging during peak demand periods

Vehicle-to-Grid (V2G)

Energy export during peak demand
Grid support services
Renewable energy balancing

- **Benefits include:**

Peak shaving
Improved renewable utilization
Enhanced grid flexibility

H. Optimization Techniques for Renewable Integration

Several optimization algorithms have been employed to enhance the integration of renewable energy.

Metaheuristic Techniques

- Particle Swarm Optimization (PSO)
- Genetic Algorithm (GA)
- Teaching Learning Based Optimization (TLBO)
- Grey Wolf Optimization (GWO)
- Whale Optimization Algorithm (WOA)

I. Future Trends in Renewable Energy Integration

Future distribution systems are expected to incorporate:

- Artificial Intelligence-based energy management

- Digital Twin technology
- Virtual Power Plants (VPPs)
- Transactive energy markets
- Blockchain-enabled energy trading
- Vehicle-to-Everything (V2X) systems
- Renewable-powered microgrids

The coordinated operation of renewable energy resources, battery storage systems, electric vehicles, demand response programs, and advanced optimization techniques will be crucial to developing resilient, sustainable, and intelligent distribution networks. Renewable energy integration has transformed conventional distribution systems into active and intelligent networks. While solar PV and wind energy offer substantial environmental and economic benefits, their intermittent nature poses challenges in voltage regulation, power quality, protection coordination, and system reliability. Advanced technologies such as energy storage systems, demand response, electric vehicles, and intelligent optimization algorithms provide effective solutions to overcome these challenges and maximize renewable energy utilization in future smart distribution

IV.CONCLUSIONS

This paper discusses renewable energy integration, which has become a fundamental component of modern distribution systems as demand for sustainable, reliable, and environmentally friendly electricity generation grows. The widespread deployment of solar photovoltaic (PV) systems and wind energy resources has significantly transformed conventional distribution networks into active and intelligent power systems. These renewable resources help reduce greenhouse gas emissions, improve energy security, and decrease dependence on fossil fuels.

Despite their numerous benefits, the intermittent and uncertain nature of renewable energy sources introduces several technical challenges, including voltage fluctuations, power quality issues, reverse power flow, protection coordination problems, and operational uncertainty. Consequently, effective integration of renewable resources requires advanced monitoring, control, and optimization strategies to maintain system stability and reliability.

Recent developments in energy storage systems, demand response programs, electric vehicle integration, and smart grid technologies have provided effective solutions for addressing these challenges. Coordinated operation of renewable generation, battery storage, EVs, and flexible loads enhances renewable energy utilization, reduces network losses, improves voltage profiles, and increases overall system flexibility. Furthermore, advanced optimization and artificial intelligence techniques have demonstrated significant potential to improve operational efficiency, economic performance, and the reliability of distribution networks integrated with renewable energy.

Future distribution systems are expected to evolve toward highly digitalized, decentralized, and intelligent energy networks supported by artificial intelligence, virtual power plants, transactive energy markets, and vehicle-to-grid technologies. Therefore, the successful integration of renewable energy sources, combined with advanced energy management and optimization frameworks, will play a crucial role in achieving sustainable, resilient, and smart power systems for future energy infrastructure.

REFERENCES

[1] Aghajani, G. R., and I. Heydari. 2021. “Energy Management in Microgrids Containing Electric Vehicles and Renewable Energy Sources Considering Demand Response.” Journal of Operation and Automation in Power Engineering 9 (2): 145–158.

[2] Patel, H., S. Sharma, and R. Kumar. 2026. “Demand Response Based Energy Management Framework for Renewable Integrated Smart Distribution Systems with EV Participation.” Sustainable Energy Technologies and Assessments 72: 103875

[3] Kumar, A., and P. Singh. 2025. “Artificial Intelligence Based Energy Management for EV Integrated Smart Distribution Systems.” Energy AI 12: 100278.

[4] Javanmard, B., M. Tabrizian, M. Ansarian, and A. Ahmarinejad. 2021. “Energy Management of Multi-Microgrids Based on Game Theory Approach in the Presence of Demand Response Programs, Energy Storage Systems and Renewable Energy Resources.” Journal of Energy Storage 42: 102971.

[5] Mansouri, S. A., M. S. Javadi, A. Ahmarinejad, E. Nematbakhsh, A. Zare, and J. P. S. Catalão. 2021. “A Coordinated Energy Management Framework for Industrial, Residential and Commercial Energy Hubs Considering Demand Response Programs.” Sustainable Energy Technologies and Assessments 47: 101376.

[6] Sharma, R., S. Gupta, and A. Kumar. 2026. “Renewable Energy and Electric Vehicle Coordinated Scheduling Using Deep Reinforcement Learning.” IEEE Access 14: 55421–55439.

[7] Ethirajan, V., et al. 2025. “An In-Depth Survey of Latest Progress in Smart Grids: Paving the Way for Renewable Energy Integration.” Energy, Sustainability and Society 15: 27.

[8] Li, Yang, Meng Han, Zhen Yang, and Guoqing Li. 2021. “Coordinating Flexible Demand Response and Renewable Uncertainties for Scheduling of Community Integrated Energy Systems with an Electric Vehicle Charging Station.” IEEE Access 9: 104512–104525.

[9] Kanakadhurga, Dharmaraj, and Natarajan Prabaharan. 2024. “Smart Home Energy Management Using Demand Response with Uncertainty Analysis of Electric Vehicle

in the Presence of Renewable Energy Sources." Applied Energy 364: 123062.

[10] Chen, X., J. Li, and Y. Xu. 2026. "Advanced Energy Management Strategies for Electric Vehicle Aggregators in Smart Distribution Networks." Applied Energy 382: 124701.

[11] Muhtadi, Abir, Dilip Pandit, Nga Nguyen, and Joydeep Mitra. 2021. "Distributed Energy Resources Based Microgrid: Review of Architecture, Control, and Reliability." IEEE Transactions on Industry Applications 57 (3): 2224–2238.

[12] Oskouei, Mohammad Z., et al. 2022. "A Critical Review on the Impacts of Energy Storage Systems and Demand-Side Management Toward Achieving 100% Renewable Energy." Sustainability 14 (4): 2110.

[13] Shojaeighadikolaei, Amin, Arman Ghasemi, Kailani Jones, Yousif Dafalla, Alexandru Bardas, Reza Ahmadi, and Morteza Haashemi. 2022. "Distributed Energy Management and Demand Response in Smart Grids: A Multi-Agent Deep Reinforcement Learning Framework." IEEE Access 10: 104221–104235.

[14] Ntombela, M., et al. 2023. "A Comprehensive Review of the Incorporation of Electric Vehicles into Modern Smart Grids." World Electric Vehicle Journal 14 (7): 176.

[15] Li, Yang, Meng Han, Mohammad Shahidehpour, Jiazheng Li, and Chao Long. 2023. "Data-Driven Distributionally Robust Scheduling of Community Integrated Energy Systems with Uncertain Renewable Generations Considering Integrated Demand Response." Applied Energy 339: 120962.

[16] Moradi-Sepahvand, Mojtaba, Turaj Amraee, Farrokh Aminifar, and Amirhossein Akbari. 2023. "Coordinated Expansion Planning of Transmission and Distribution Systems Integrated with Smart Grid Technologies." Electric Power Systems Research 225: 109923.

[17] Kakkar, Riya, Smita Agrawal, and Sudeep Tanwar. 2024. "A Systematic Survey on Demand Response Management Schemes for Electric Vehicles." Renewable and Sustainable Energy Reviews 203: 114748.

[18] Chatuanramtharnghaka, Benjamin, Subhasish Deb, Ksh Robert Singh, Taha Selim Ustun, and Akhtar Kalam. 2024. "Reviewing Demand Response for Energy Management with Consideration of Renewable Energy Sources and Electric Vehicles." World Electric Vehicle Journal 15 (9): 412.

[19] Deb, Subhasish, et al. 2024. "Demand Response Enabled Renewable Energy Management for Electric Vehicle Integrated Smart Grids." Energy Reports 10: 445–460.

[20] Wang, Y., X. Liu, and J. Zhang. 2024. "Optimal Scheduling of EV Charging Considering Renewable Energy and Dynamic Pricing." International Journal of Electrical Power & Energy Systems 158: 109835.

[21] Panda, S., et al. 2025. "Comprehensive Framework for Smart Residential Demand Side Management Considering Electric Vehicles." Scientific Reports 15: 93817.

[22] Eissa, M. M., et al. 2025. "Demand Side Management with Electric Vehicles and Optimal Renewable Energy Allocation in Distribution Networks." Scientific Reports 15: 21056.

[23] ANU Energy Change Institute. 2025. "Electric Vehicles as Distributed Energy Resources: Strategic Asset for Grid Modernisation." Australian National University Report.

[24] Li, H., Y. Zhao, and M. Shahidehpour. 2025. "Vehicle-to-Grid Enabled Demand Response for Renewable-Rich Distribution Networks." IEEE Transactions on Smart Grid 16 (2): 1345–1358.

[25] Zhang, Q., L. Wang, and H. Sun. 2025. "Multi-Objective Demand Response Optimization for Renewable Energy and EV Coordination." Energy Conversion and Management 318: 118941.