



Global Smart Energy Federation
Formerly known as Global Smart Grid Federation

NEWSLETTER

April 2025

THE GROWING MARKET SHARE FOR EVs PAVES THE WAY TO MORE ENERGY FLEXIBILITY FOR THE GRIDS



Despite significant uncertainties, electric cars' market share is on course to exceed 40% by 2030 as they become increasingly affordable in more markets, new IEA report shows

Following another year of robust growth, global sales of electric cars are on track to surpass 20 million in 2025, accounting for over a quarter of cars sold worldwide, according to the new edition of the IEA's annual Global EV Outlook.

The report, out 15th of May, shows that despite recent economic headwinds that have put pressure on the auto sector, global sales of electric cars have continued to break records as electric models become increasingly affordable. Sales exceeded 17 million globally in 2024, putting EVs' share of the global car market above 20% for the first time, as forecasted by the IEA previously. And in the first three months of 2025, electric car sales were up 35% year-on-year. All major markets, and many others, saw new records for first-quarter sales.

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China maintains its position as the EV market leader, with electric cars accounting for almost half of all car sales in 2024. The number of electric cars sold in China last year (more than 11 million) is equivalent to the total sold worldwide in 2022. Emerging markets in Asia and Latin America have also become new centres of growth, with total electric car sales across these regions surging by more than 60% in 2024.

In the United States, electric car sales grew by about 10% year-on-year, reaching more than one in ten cars sold. Europe saw sales stagnate as subsidy schemes and other supportive policies waned, though the market share of electric cars remained around 20%.

“Our data shows that, despite significant uncertainties, electric cars remain on a strong growth trajectory globally. Sales continue to set new records, with major implications for the international auto industry,” said IEA Executive Director Fatih Birol. “This year, we expect more than one in four cars sold worldwide to be electric, with growth accelerating in many emerging economies. By the end of this decade, it is set to be more than two in five cars as EVs become increasingly affordable.”

Uncertainties over global economic growth and the evolution of trade and industrial policies could affect the outlook. But sales of EVs are being supported by their increasing affordability, the report finds.

On a global level, the average price of a battery electric car fell in 2024 amid growing competition and declining battery costs. In China, two-thirds of all electric cars sold last year were priced lower than their conventional equivalents, even without purchase incentives. However, the purchase price gap with conventional cars persisted in many other markets. The average battery electric car price in Germany, for example, remained 20% higher than that of its conventional counterpart. In the United States, battery electric cars were still 30% more expensive.

EVs remain consistently cheaper to operate across many markets, based on current energy market prices. Even if oil prices were to fall as low as \$40 per barrel, running an electric car in Europe via home charging would still cost about half as much as running a conventional car at today's residential electricity prices.

According to the report, almost one-fifth of electric car sales worldwide are of imported vehicles. China accounts for more than 70% of global production. This included many emerging economies, where electric car prices fell considerably on the back of Chinese imports.

The possibility for the TSOs of many countries to develop flexibility based on EV charging, as well as bidirectional charging flows. This may complexify the management of the grid but will also bring new solutions to some countries, where importing is costly and that will take advantage of this situation either from a technical and a financial point of view

Article contributed by Valerie-Anne Lencznar GSEF Ambassador–Europe & Francophone Africa Regions

Announcing India Smart Utility Week (ISUW 2026)



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Global Stories on Smart Grid

UL Solutions Announces Improved Testing Methods for BESS to Address Industry Innovations and Evolving Fire Risks

UL Solutions has announced enhancements to the testing methods for battery energy storage systems (BESS). The new testing methods will address industry innovations, including test methods for non-lithium-ion battery chemistries, such as sodium-ion batteries, considering the development of battery technology and addressing fire risk mitigation. The changes in UL Solutions test methods showcase updates found in the fifth edition of ANSI/CAN/UL 9540A, the Standard Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, the American and Canadian national standard for addressing thermal runaway propagation for energy storage systems.

Read More: <https://shorturl.at/KhxRj>

EdgePoint Towers Deploys First Solar Hybrid Site in Malaysia

EdgePoint Towers, a subsidiary of EdgePoint Infrastructure, has launched its first solar hybrid telecom site in Malaysia as part of its renewable energy initiative. The 5.9 kWp site operates autonomously with solar energy and battery storage, aiming to provide up to 100 percent of the energy needed for telecom operations and significantly reduce diesel dependency. The deployment will enhance sustainability, cost efficiency, and connectivity, particularly in remote transport corridors. The initiative is expected to cut the site's annual carbon emissions by around 78 percent, with further solar and hybrid site rollouts planned across Malaysia by the end of 2025.

Read More: <https://shorturl.at/Vic3A>

Bulgaria Finalizes \$670 Million Funding for Nearly 10 GWh of Energy Storage

The Ministry of Energy of Bulgaria has selected 82 winning energy storage projects for a share of BGN 1.15 billion (€588 million/US\$670 million) in financial support. The scheme will support the construction and commissioning of 82 standalone energy storage projects spread across the country, which will add up to 9,712.89 MWh of usable energy storage capacity. Storage projects will be connected to either the transmission network of system operator ESO EAD or local distribution networks.

Read More: <https://shorturl.at/FIOTB>

JBM, Hitachi Tie Up to Integrate ZeroCarbon BatteryManager To E-Buses

Hitachi ZeroCarbon has partnered with JBM Electric Vehicles to integrate its BatteryManager platform into electric buses in India, marking a first-of-its kind collaboration with the Indian market. The partnership aims to bring combined technical expertise to assess the performance and resilience of electrified transport in high demand urban environments. The electric bus OEM serving markets across India, the Middle East, APAC, and Europe, Hitachi's ZeroCarbon BatteryManager will be used to collect real-time data from the pilot fleet.

Read More: <https://shorturl.at/hBQ27>

Stellantis and Factorial Energy Reach Key Milestone in Solid-State Battery Development

Stellantis and Factorial Energy successfully validated automotive-sized solid-state battery cells with 375Wh/kg energy density, a major step toward commercial use. Breakthrough FEST® technology enables fast charging from 15% to 90% in 18 minutes. The battery cells can operate in temperatures from -30°C to 45°C (-22°F to 113°F), with potential for further expansion and demonstrate high power capabilities up to 4C discharge. Stellantis is incorporating Factorial's solid-state batteries into a demonstration fleet by 2026. Stellantis and Factorial Energy's collaboration extends beyond cell development to optimizing pack architecture, improving vehicle integration, and enhancing overall range and cost efficiency.

Read More: <https://bitly.cx/aUZW>



Global Stories on Smart Grid

IoT Revolutionizes Transformer Health Monitoring in India's Smart Grids

Smart grids in India are increasingly integrating IoT-based transformer monitoring to prevent equipment failure and improve operational efficiency. These systems track parameters like oil level, temperature, humidity, and load conditions in real time, helping utilities detect early warning signs and reduce outages and maintenance costs. The Central Electricity Authority recommends robust Distribution Transformer Monitoring Units (DTMUs) equipped with GPS, GPRS, IoT, and RF technologies, enabling seamless communication and theft detection. Meanwhile, smart substations with automated controls and protection systems are enhancing power reliability and enabling unmanned operation.

The Revamped Distribution Sector Scheme (RDSS) is supporting the deployment of 250 million smart meters and system-level metering across India. Combined with AI/ML-driven failure analysis, these innovations are key to modernizing India's power infrastructure and ensuring real-time energy auditing.

Read more- <https://tinyurl.com/u38t4fc2>

Huawei Unveils All-Scenario Grid Forming ESS

At Intersolar Europe 2025, Huawei Digital Power held the FusionSolar Strategy & New Product Launch with the subject "Smart PV & ESS: Powering a Grid Forming Future." This launch, which attracted around 300 global customers and partners, focused on all-scenario grid formation and high-quality development, providing next-generation grid forming ESS technologies and solutions for utility, microgrid, C&I, and residential applications. The launch catapulted the renewable energy sector into the grid-forming age.

Read more: <https://shorturl.at/Xryxq>

Wirepas Technology Gains Traction in India's AMI

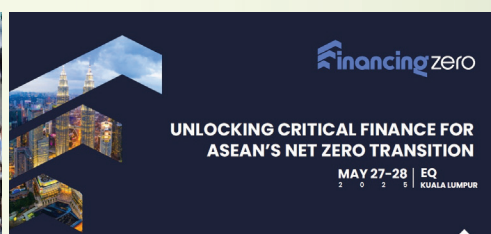
Wirepas's 5G RF mesh technology is increasingly used for India's AMI deployments, offering a decentralized, cost-efficient communication network where smart meters act as nodes. A single cellular gateway can support up to 300 mesh-connected meters, reducing costs and addressing cellular coverage issues. Already in 25% of new Indian smart meter deployments, Wirepas is expanding via local partnerships. This trend could influence other large-scale IoT deployments.

Read more: <https://tinyurl.com/ntty8ddu>

China Advances Vehicle-to-Grid (V2G) with 30 Large-Scale Pilot Projects:

China's National Development and Reform Commission (NDRC) has launched the first round of large-scale pilot projects for vehicle-to-grid (V2G) interaction. This program aims to use electric vehicles' energy storage capability to give flexibility and support to the power grid, representing a significant step towards integrating EVs into the smart grid ecosystem.

Read more: <https://tinyurl.com/3s2ky2z7>



RAMOKGOPA KICKSTARTS SA'S PRIVATE SECTOR-POWERED GRID EXPANSION



South Africa's grid bottlenecks are strangling its renewable energy boom. On Tuesday, the minister of electricity and energy announced a new programme aimed at tackling the problem. Minister of Electricity and Energy Dr Kgosientso Ramokgopa on Tuesday morning introduced the Independent Transmission Programme (ITP), marking the first major step in bringing private capital into South Africa's historically state-owned transmission monopoly. "We want to create a dispensation where we are going to accommodate the investments by private sector players on the transmission side," he said. The minister announced that on Friday, 28 March, he issued a Ministerial Determination under Section 34 of the Electricity Regulation Act. The determination identifies seven corridors totalling more than 1,000km, specifically earmarked for private sector funding and construction. Ramokgopa noted South Africa had to achieve 5% annual economic growth to meet NDP targets – something currently unattainable due in large part to constraints in electricity infrastructure.

"Our renewable energy assets are not fully exploited as a result of the constraints on the transmission side," the minister said. The project aims to unlock 3,222 megawatts by August 2029.

"Our view is that there's a need for us to ensure that we are able to accelerate and support transmission infrastructure development."

Much has been made of South Africa's laggardly attempts to bring online additional, low-carbon generation capacity as it seeks to simultaneously reduce the economy's carbon intensity, ensure energy security and retire coal-fired power stations in line with climate policies and health imperatives.

Article contributed by Nick Singh, GSEF Ambassador for Anglophone Countries in Africa



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UTILITIES SHOULD CHALLENGE ITS LIMITS, NOT LIMIT ITS CHALLENGES

In my earlier articles, I have written about Inverter Based Resources (IBRs) and other new technologies both in the context of distributed generation and utilization. Here I explore why certain utilities get to accommodate these much faster and more easily.



The past three decades have seen an explosion in digitally controlled technologies in (a) generation (wind, PV, PMG, IBRs); and (b) utilization (smart controls, EV charging, battery/thermal energy storage). Many of these technologies are collectively employed both as a grid resource and as a customer resource (behind the meter). The modular miniaturization of these technologies into KW sized units together with smart controls is gaining market growth and will likely be sold at hardware stores much like appliances. Examples today include 10-30 KW residential hybrid inverters (dc linked BESS, PV, EV, other) with the ability to manage AC loads and support the grid (both KW and KVAR). A second example would be a bidirectional EV charger (V2G, V2H).

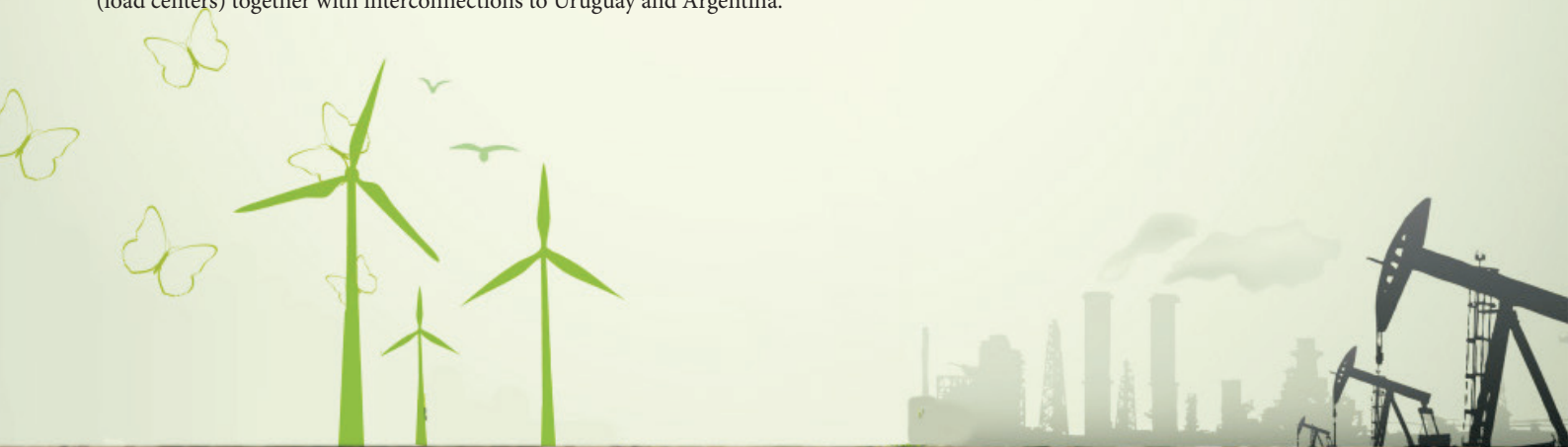
The above development has led to recognizing (a) EVs as both transportation and backup power; (b) DERMs as a “decongestant” to the distribution grid; (c) customer roof-top PV with BESS as last-mile “non-wires” capacity; and (d) maximization of T&D connected renewable generation (RE) as low-priced energy when available. At the heart of this enablement is ensuring a two-way power flow with adequate capacity, power quality, stability, reliability, and resilience. This conversion journey rides on the back of digital technologies (digital sensors, inverters, distributed decision support and digital communications).

The path towards a two-way power flow grid in distribution networks (Dx) was initiated in the early 2000s in select developed countries. This was because of strong public push towards GHG reduction that led to distributed renewable energy (RE), smart meters (SM), time-of-use (TOU), conservation & demand management (CDM), feed-in-tariffs (FIT), net-metering (NM) and energy efficiency (EE) programs. Major amendments to T&D Codes and Regulations were made and utilities had to upgrade their network, their planning/operating tools and shortening connection wait-times to accept such explosive growth in distributed generation and customer roof top PVs. I was in the thick of this then in my Canadian utility career, driving new technical architectures and systems.

To manage this huge change, almost a decade (2004-2014) of international collaborative effort was undertaken by the utilities amongst themselves and together with the academia, laboratories, and associations, to better understand the effects of two-way power flows in the distribution (Dx) network. Several dynamic operating and “reverse flow” limits were derived based on the network architecture (short urban feeders vs. long rural feeders). Many MV feeder protections were changed from simple overcurrent to impedance protections. Line regulators were replaced with bidirectional ones. For the first time, the notion that all distribution feeders are not the same in accepting RE was established. Each feeder had its own “hosting capacity” limits.

This effort in Dx upgrades is now the biggest enabler of more RE, public EV charging, energy storage, DERMs, etc. The change did not come easy nor cheap for the industry, the utilities and the regulator. For example, inverter-based resources (IBRs) are “smarter” today and can manage PCC voltage (utility custody) with VAR injections and low voltage ride-through during external short-circuits. IBRs today can be programmed to not just maximize KW output but manage VARs as well. A second example would be bidirectional EV charging with V2H/V2G capabilities.

The transmission grid (Tx) too, has seen many investments this past decade in EHV, HVDC, STATCOM and new interconnections with neighboring countries. This has now allowed for large (1,000 MW+) RE connections with the ability to evacuate this renewable power to load centers much farther away. Amongst the developing countries China, Brazil and India stand out in expanding their transmission network as a national priority to accept larger RE power. China leads the world in RE and UHV transmission system expansion (added 374 GW of RE in 2024). This is more than 8 times the USA and 5 times EU last year. Indian transmission grid is adding 40 GW of RE per year for a projected total of 500 GW RE by 2030. Brazil too has adopted this focus with its three very long HVDC lines connecting their North (RE sites) with the South (load centers) together with interconnections to Uruguay and Argentina.



So, with all these new developments, where will new investments be needed in T&D while continuing this two-way power flow pathway and simultaneously addressing climate change resiliency. While there are many areas, the following themes should be at the forefront:

1. **Prosumer Focused LV Connections:** The last mile LV connections should be capable of feeding in and exporting power seamlessly from the customer's premises. This means the LV/MV interface should manage capacity congestion, load-factor limits and other power quality issues in real-time. This may mean local community energy storage, LV service connection upgrades, single to 3-phase residential service conversions and provisioning peer-peer retail (neighborhood) energy transactions.
2. **Reliable and Resilient MV Distribution System:** Reliability and resiliency are at opposite ends of the probability and impact spectrum, yet a serious attempt must be made to meet both climate change together with future electrification needs. These include ring-main circuits, feeder automation, phase balancing, DT capacity increase and providing requisite energy storage. Undergrounding of overhead MV lines will become the norm. Currently Dx is the weakest link globally in meeting local resiliency needs, principally because of overhead power delivery.
3. **Expanding Transmission Interconnections:** While most modern transmission networks appear adequate to meet today's needs, they are ill-suited for connecting large RE generation (1,000MW+) and large loads (data centers) at short notice of 2-3 years. Distributed SMRs will also likely add to this generation mix in the next 5 years. A second objective would be to move power across much larger distances to remote load centers in neighboring countries. There is a huge need to build HVDC lines both domestically and with interconnections to neighboring regions (subsea cables included).
4. **Dynamic Climate Inclusive System Controls:** Tomorrow's NMS and ADMS systems will need to include non-grid, real-time, mesoscale data (weather, solar irradiation, wind speeds, etc.) much more granularly (say 20-50 km geographic grids). In addition, travelling weather patterns from adjacent areas and associated concatenated risks will need to be dynamically managed. India in 2024 had four incidents of 7,000 MW swings due to travelling cloud cover in its western region. A second focus would be ambient temperature adjusted dynamic ratings for large power assets (transformers, lines, cables). A third focus would be modelling the system impact of adverse climatic effects. All this will increase the average NMS and ADMS data processing points by 10-fold (few hundred million).

The above initiatives will not be cheap. The current planning cycles, supply chain, and regulatory approval mechanisms are not suited for this. We will need to mitigate planning risks, initiate a rolling five-year plan with yearly reviews and have enough reserve capital and resources to speed up T&D project execution at short notice.

On an ending note, customer expectation will be driven by technology and their patience will be driven by lost opportunity. The utility of the future should challenge its limits and not limit its challenges.

Article contributed by Ravi Seethapathy, GSEF Ambassador for Americas



India Smart Grid Forum



Energia Eficiente





Global Smart Energy Federation

ANNOUNCING INTERNATIONAL DELEGATION TO LATIN AMERICAN SMART GRID FORUM





04 - 08 August 2025 | SAO PAULO, BRAZIL

ISGF & GSEF In partnership with ECOEE is taking an International delegation to The Latin American Smart Grid Forum scheduled from 04 -08 August 2025 in São Paulo, Brazil

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The 49th IPA Convention & Exhibition 2025, Indonesia
<https://convex.ipa.or.id/>

27th – 28th May 2025

Financing Zero 2025, EQ Kuala Lumpur, Malaysia
<https://www.financingzero.com/>

27th -29th May 2025

World Utility Congress (WUC), Abu Dhabi, UAE
<https://www.worldutilitiescongress.com/>

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2nd - 6th June, 2025

Asia Clean Energy Forum, Manila, Philippines
<https://asiacleanenergyforum.adb.org>

3rd – 4th June 2025

Eurelectric 2025 Power Summit, Brussels, Belgium
<https://www.eurelectric.org/events/powersummit-2025/>

3rd – 4th June 2025

2nd Annual National Virtual Power Plant Summit,
Denver, CO
<https://energyconferencenetwork.swoogo.com/vpps25/6802249vpps25/6802249>

16th – 19th June 2025

CIREN, Geneva, Switzerland
<https://www.cired2025.org/>

18th -20th June 2025

Japan Energy Summit & Exhibition, Tokyo
<https://www.japanenergyevent.com/>

9th -10th July 2025

Solar & Storage Live Vietnam 2025, Vietnam
<https://solarandstoragelive.com/>

4th -5th August 2025

17th Latin American Smart Grid Forum, São Paulo, Brazil
<https://www.smartgrid.com.br/eng>

27th -29th August, 2025

Clean Energy Ministerial, Busan, Korea
<https://www.cleanenergyministerial.org/>

9th -11th September, 2025

Enlit ASIA, Bangkok, Thailand
<https://www.enlit-asia.com/>

17 – 18 September 2025

Data Center Asia, Jakarta International Expo
Convention, Kemayoran, Jakarta 2025
<https://www.datacenter-asia.com/jakarta/>

07th – 08th October, 2025

Innovation for Cool Earth Forum, Tokyo
<https://www.icef.go.jp/>

27th -31st October 2025

Singapore International Energy Week, Marina Bay Sands
<https://www.siew.gov.sg/>

18th - 20th November, 2025

Enlit Europe, Bilbao, Spain
<https://www.enlit-europe.com/>

02nd – 05th February 2026

DistribTech International, San Diego, CA, USA
<https://www.distributech.com/>

25–27 March 2026

12th India Smart Utility Week (ISUW 2026),
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<https://www.aseancleanenergyexpo.com/>

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