





The role of electrification and innovative adhesive solutions for a sustainable future

The Global Energy Perspective 2023 explores scenarios for a sustainable energy future, emphasizing electrification to reduce global emissions. With solar and battery technologies needing significant scaling, companies like tesa offer innovative adhesive solutions for automotive and industrial sectors, overcoming bottlenecks and supporting the shift toward green, carbon-neutral power generation.

The global energy landscape is undergoing a significant transformation, driven by the need to mitigate climate change and transition to sustainable energy sources. The Global Energy Perspective 2023 outlines various scenarios for the energy transition, aligned with the goals of the Paris Agreement, which aims to limit global warming to well below 2°C, with a preference for a pathway that keeps temperature rise within 1.5°C.

Overview of the energy transition scenarios

The 2023 perspective examines the outlook for demand and supply of energy commodities along a 1.5°C pathway,

alongside four additional energy transition scenarios. These scenarios consider a range of outcomes, from 1.6°C to 2.9°C by 2100, and are shaped by more than 400 drivers across sectors, technologies, policies, costs, and fuels. These drivers include the pace of technological progress, policy enforcement, industry innovation, and shifting consumer behavior.

These outlines aim to inform decision-makers about the challenges that need to be overcome to enable the energy transition and achieve a more sustainable future. A key aspect is the role of electrification, which,



along with the continuing shift toward green and carbon-neutral power generation, is expected to play a crucial role in reducing global emissions.

Demand for electrification technologies

The energy transition has triggered significant demand for technology that enables electrification. To support this shift, enabling technologies like solar photovoltaic (PV), wind power, heat pumps, and battery energy storage systems (BESS) must be scaled up over the next decade.

However, this scaling process faces several bottlenecks, such as supply chain risks, labor shortages, and uncertainty in capital deployment. These issues could impact the ability to meet the growing demand for electrification technologies.

Despite these challenges, the bottlenecks can also present opportunities for value creation, particularly for original equipment manufacturers (OEMs). Companies specializing in technical adhesive solutions, like tesa, can play a pivotal role in overcoming these bottlenecks. tesa has decades of experience supporting global automotive manufacturers and leading personal electronics brands. Its expertise makes it a reliable partner for innovative adhesive solutions in environmentally friendly electrification and automotive digitalization.

Adhesive solutions

The automotive sector is rapidly transitioning to electric and hybrid vehicles,

requiring advanced adhesive solutions to support these new technologies. A diverse portfolio of adhesives is essential to address the unique demands of this evolving market, and a range of products has been developed to meet these needs.

One critical area where adhesive products play a vital role is electrical insulation in electric and hybrid vehicles. These vehicles feature intricate electrical systems, making robust insulation for battery cells and modules essential for safety and reliability. Specially designed adhesive tapes ensure

this level of insulation, contributing to the long-term durability of these advanced vehicles.

Another crucial application for adhesive products is mounting components such as battery cells, modules, functional sheets, and spacers. These parts require strong and reliable adhesion to reduce movement during operation, which helps to minimize damage. Adhesive tapes engineered for secure mounting keep these components in place, even under challenging conditions, ensuring stability and safety.



Electric and hybrid vehicles also need effective cushioning and thermal insulation to protect battery packs from vibrations and temperature fluctuations. Adhesive tapes specifically designed for these purposes provide stability and maintain optimal operating temperatures. This not only extends battery life but also enhances vehicle safety.

Grounding and shielding are additional critical needs in electric vehicles to prevent electrical noise and maintain safety. Specialized adhesive tapes provide reliable grounding and electromagnetic shielding, protecting sensitive electronic systems and upholding industry safety standards.

Battery pack sealing and labeling represent other key applications for adhesive solutions. Sealing adhesive products protect battery packs from moisture and contaminants, ensuring safe and efficient performance. Adhesive tapes for labeling allow for clear identification and traceability of battery modules, crucial for safety and maintenance.

These adhesive solutions are developed in close collaboration with leading original equipment manufacturers (OEMs) and tiered suppliers in the automotive industry. This collaborative approach ensures that the products meet strict industry requirements and support the growth of electrification technologies. By working closely with stakeholders, these solutions align with the latest automotive designs and standards.

The partnership with OEMs allows for a deeper understanding of the challenges faced by the automotive industry. This knowledge enables the development of adhesive solutions that address specific needs, whether it's evolving vehicle design or new safety and performance standards.

The energy transition also encompasses advancements in solar energy technology. Ultra-thin, high-power, flexible photovoltaic materials are increasingly being researched and developed, paving the way for self-powered products, such as

sensors, wearables, and IoT devices. tesa contributes to these developments by offering adhesive tapes that enable the integration of thin, ultralight solar modules into components like wearables, vehicles, or building elements.

The company's self-adhesive charge collection tape, tesa® 60860, is designed to interconnect flexible thin-film solar cells to modules. This tape combines bonding and electrical connection in one product, providing a simpler, cleaner alternative to traditional fasteners. It is also easy to use, withstands lamination processes, and does not require heat or curing time.

Bonding adhesive solutions for industry

Bonding adhesive tapes are versatile solutions used across various industries, offering reliable adhesion and specialized properties to meet a range of demanding requirements. These tapes are designed to perform under challenging conditions, providing durability and flexibility for industrial applications.



In electronics, bonding adhesive tapes are used to bond various components such as circuit boards, displays, and sensors, while providing electrical insulation and resistance to environmental factors. The thermal conductivity and electrical insulation properties of these tapes are well-suited for these applications, ensuring secure adhesion and functional protection.

The automotive sector, which includes electric and hybrid vehicles, relies heavily on bonding adhesive tapes to mount and secure both interior and exterior components like trims, panels, and insulation materials. The flexibility and durability of these tapes make them ideal for use in automotive assembly lines, where efficiency and reliability are crucial.

Bonding adhesive tapes are not just about basic adhesion, they offer various special properties that enhance their utility. Tapes with cushioning properties can absorb vibrations and shocks, making them ideal for automotive and electronics applications where components are subject to movement or impact. Damping adhesive tapes reduce noise and vibrations, providing a quieter environment, which is beneficial in automotive and appliance contexts. Tapes with thermal conductivity properties can transfer heat away from sensitive components, helping to maintain optimal operating temperatures, crucial for electronics and electrical applications.

These bonding adhesive tapes provide several advantages over traditional



fastening methods like gluing, welding, or mechanical fasteners. They are typically easier to use, reducing assembly time and complexity. Unlike other methods, they do not require heat or specialized equipment for application, making them safer and more convenient for industrial use.

Conclusion

The Global Energy Perspective 2023 highlights the importance of transitioning to sustainable energy sources to mitigate climate change. Electrification, coupled with green and carbon-neutral power

generation, is essential for reducing global emissions. The shift toward electrification presents challenges, but also opportunities for value creation.

Companies like tesa play a key role in supporting this transition through their innovative adhesive solutions, designed to meet the demands of the automotive, solar, and other industrial sectors. Their expertise and global supply chain contribute to a cleaner, more sustainable energy future.

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