

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



We must continue to develop new methods to increase our understanding of the multiple non-equilibrium processes in batteries: with increasing technology demands, coupled with ZC goals that dictate



Global energy demand is projected to grow between 11 percent (in the Continued Momentum scenario) and 18 percent (in the Slow Evolution scenario) by 2050. Most of this growth will come from emerging economies, ???



Major shifts underway today are set to result in a considerably different global energy system by the end of this decade, according to the IEA's new World Energy Outlook 2023. The phenomenal rise of clean energy technologies such as solar, wind, electric cars and heat pumps is reshaping how we power everything from factories and vehicles to home ???



Development of New Energy Storage during the 14th Five -Year Plan Period, emphasizing the fundamental role of new energy storage technologies in a new power system. The Plan states that these technologies are key to China's carbon goals and will prove a catalyst for new business models in the domestic energy sector. They are also



Energy storage that is used as an energy source for EV charging infrastructure, including in combination with an on-site PV system
Long-duration energy storage Energy storage that can fulfil most of the above applications over longer periods of time
Battery Storage - a global enabler of the Energy Transition 5

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



The World Energy Outlook 2023 provides in-depth analysis and strategic insights into every aspect of the global energy system. Against a backdrop of geopolitical tensions and fragile energy markets, this year's report explores how structural shifts in economies and in energy use are shifting the way that the world meets rising demand for energy.



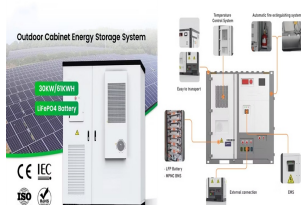
Of course, as EVs and stationary storage reach global markets and battery demand diversifies, new opportunities will be created around the world to produce batteries near demand centres. However, today's front-runners, which have thus far dominated the supply of batteries to EV makers in China, the European Union and the United States, are



Renewable energy's share of total global energy consumption was just 19.1% in 2020, according to the latest UN tracking report, but one-third of that came from burning resources such as wood.



A gloomy economic outlook leads to lower projections of energy demand growth in this Outlook than in last year's edition. High energy prices, heightened energy security concerns and strengthened climate policies are putting an end to a decade of rapid progression for natural gas; its annual demand growth slows to 0.4% from now to 2030 in the Stated Policies Scenario ???

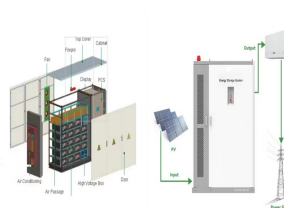


1. Introduction. In order to mitigate the current global energy demand and environmental challenges associated with the use of fossil fuels, there is a need for better energy alternatives and robust energy storage systems that will accelerate decarbonization journey and reduce greenhouse gas emissions and inspire energy independence in the future.

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



Description. Description: This line chart shows energy intensity trends by end-use subsector in the Global Net-zero scenario from 2021 to 2050 (indexed to 100). Energy intensity for passenger transport declines the most, to 30 by 2050 (or a 70% decline relative to 2021 levels), while the decline in energy intensity for freight transport is much lower, at 66 by 2050.



Three years into the decade of energy storage, deployments are on track to hit 42GW/99GWh, up 34% in gigawatt hours from our previous forecast. Global energy storage's record additions in 2023 will be followed by a 27% compound annual growth rate to 2030, with annual additions reaching 110GW/372GWh, or 2.6 times expected 2023 gigawatt



Chapter 2 ??? Electrochemical energy storage. Chapter 3 ??? Mechanical energy storage. Chapter 4 ??? Thermal energy storage. Chapter 5 ??? Chemical energy storage. Chapter 6 ??? Modeling storage in high VRE systems. Chapter 7 ??? Considerations for emerging markets and developing economies. Chapter 8 ??? Governance of decarbonized power systems



now well understood. The energy transition has made great strides in some areas but is still struggling with the scale and scope of the global challenge, as the COP meeting in Dubai acknowledged. Hydrocarbon demand globally continues to rise, even as progress in new energy technology and the renewables build-out gathers steam.



As we have noted in previous Global Energy Outlooks, world primary energy demand has experienced a series of energy additions, not energy transitions, with newer technologies such as nuclear, wind, and solar building on top of incumbent sources such as biomass, coal, oil, and natural gas. To achieve international climate goals and limit warming to ???

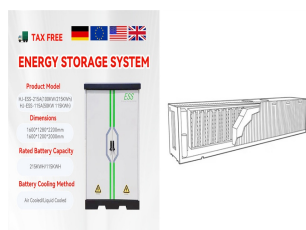
FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



Europe and China are leading the installation of new pumped storage capacity ??? fuelled by the motion of water. Batteries are now being built at grid-scale in countries including the US, Australia and Germany. Thermal energy storage is predicted to triple in size by 2030. Mechanical energy storage harnesses motion or gravity to store electricity.



The International Energy Outlook 2023 (IEO2023) explores long-term energy trends across the world. IEO2023 analyzes long-term world energy markets in 16 regions through 2050. We developed IEO2023 using the World Energy Projection System (WEPS), 2 an integrated economic model that captures long-term relationships between energy supply, ???



A legacy of the global energy crisis may be to usher in the beginning of the end of the fossil fuel era: the momentum behind clean energy transitions is now sufficient for global demand for coal, oil and natural gas to all reach a high point before 2030 in the STEPS. The share of coal, oil and natural gas in global energy supply ??? stuck for



The demand for energy storage continues to escalate, driven by the pressing need to decarbonise economies through renewable integration on the grid while electrifying sources of consumption. In this dynamic ???



The global demand for lithium-ion batteries is surging, a trend expected to continue for decades, driven by the wide adoption of electric vehicles and battery energy storage systems 1.However, the

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



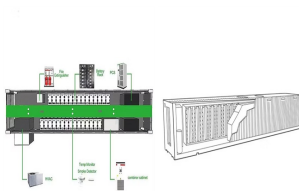
Due to the growing need for novel energy storage solutions and the integration of renewable energy, the global market for energy storage, which includes both CAES and LAES, is expected to develop significantly and reach over \$8 billion by 2024 [41]. Fig. 2 shows the global increase in PHS and CAES capacity in the past few years, as described in



The rise in global energy demand also boosted CO₂ emissions by over 5% in 2021. Given the Thus to account for these intermittencies and to ensure a proper balance between energy generation and demand, energy storage systems (ESSs) are regarded as the most realistic and effective choice, which has great potential to optimise energy



There is high energy demand in this era of industrial and technological expansion. This high per capita power consumption changes the perception of power demand in remote regions by relying more on stored energy [1]. According to the union of concerned scientists (UCS), energy usage is estimated to have increased every ten years in the past [2].



Energy use is one of the human systems most directly exposed to changes in the climate 1,2. Rising ambient temperatures are expected to increase hot season cooling demand 3 and could decrease cold



In the past few decades, electricity production depended on fossil fuels due to their reliability and efficiency [1]. Fossil fuels have many effects on the environment and directly affect the economy as their prices increase continuously due to their consumption which is assumed to double in 2050 and three times by 2100 [6] g. 1 shows the current global ???

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



A new report by researchers from MIT's Energy Initiative (MITEI) underscores the feasibility of using energy storage systems to almost completely eliminate the need for fossil fuels to operate regional power grids, reports David Abel for The Boston Globe.. "Our study finds that energy storage can help [renewable energy]-dominated electricity systems balance ???



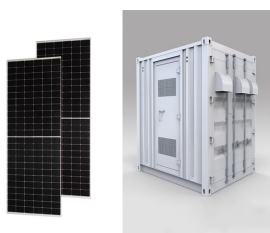
Globally, communities are converting to renewable energy because of the negative effects of fossil fuels. In 2020, renewable energy sources provided about 29% of the world's primary energy. However, the intermittent nature of renewable power, calls for substantial energy storage. Pumped storage hydropower is the most dependable and widely used option ???



Traditionally, CEM was used by regulated electric utilities to identify the least-cost mix of generation and transmission resources to meet expected future electricity demand 14.Over time, new



Energy storage is key to secure constant renewable energy supply to power systems ??? even when the sun does not shine, and the wind does not blow. Energy storage provides a solution to achieve flexibility, enhance grid reliability and power quality, and accommodate the scale-up of renewable energy. But most of the energy storage systems ???



The Global Energy Perspective 2023 offers a detailed demand outlook for 68 sectors, 78 fuels, and 146 geographies across a 1.5° pathway, as well as four bottom-up energy transition scenarios with outcomes ranging in a warming of 1.6°C to 2.9°C by 2100.. As the world accelerates on the path toward net-zero, achieving a successful energy transition may require ???

FUTURE DEMAND FOR NEW GLOBAL ENERGY STORAGE



More ambitious policies in the US and Europe drive a 13% increase in forecast capacity versus previous estimates New York, October 12, 2022
??? Energy storage installations around the world are projected to reach a cumulative 411 gigawatts (or 1,194 gigawatt-hours) by the end of 2030, according to the latest forecast from research company BloombergNEF (BNEF).