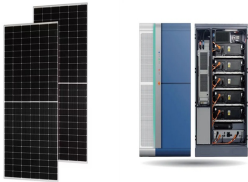


THE IMPACT OF SILICON PRICE DECLINE ON ENERGY STORAGE



Do subsidies affect the development of energy storage industry in China? In addition, subsidies in China only aim at RES, this is an indirect subsidies for energy storage and will reduce the incentive effects for energy storage. To sum up, on one hand, reasonable subsidies directly impact the development of energy storage industry.



Will we use more silicon in 2023 than in 2004? Of course, we're going to use massively more silicon in 2023 than we did in 2004. In 2004, we deployed 1,044 MW of solar power, using just over 16,000 t of silicon globally. Bloomberg reports that 268 GW of solar was deployed in 2022, which is about 250 times more capacity than what was deployed in 2004.



Why is energy storage industry in China a big problem? Judging from the present condition, cost problem is the main barrier. And the high performance and high security of the relative technology still need to be improved. Until 2020, energy storage industry in China may not be spread massively and the key point during this period is the technology research.

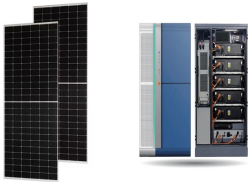


How much silicon does a solar cell use? Silicon is the semiconductor material at the heart of most solar cells. Thanks to advancements in technology, solar is now powering the world with a lot less silicon. Research by Fraunhofer ISE shows that in 2004, 16 grams of silicon were needed to produce a single watt of solar cells. By 2021, that number had shrunk to just over 2 grams.



What was the growth rate of energy storage industry in 2015? Driven by the Euramerican and Asia-Pacific market, worldwide energy storage industry experienced fast development in 2015. According to CNESA, global cumulative installed capacity of energy storage system was 946.8 MW (excluding PSS, CAES and heat storage) by the end of 2015 and the growth rate was 12.7% compared with year 2014.

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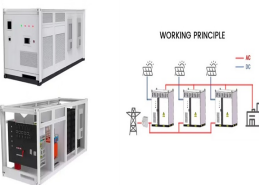
What are the problems limiting the commercialization of China's energy storage? Besides the objective technology immaturity, there exist other problems restricting the commercialization of China's energy storage including the high cost, incomplete technical standard system, imprecise evaluation system and imperfect policies. 3.1. Low technical-economic efficiency caused by high cost



The decline in silicon prices is a major challenge for most silicon manufacturers. In the period from late 2020 to early 2021, only 5 of the original 20 global producers have been able to withstand the severe restructuring seen in ???



Renewable Energy Market Update - June 2023 - Analysis and key findings. the average monthly price of polysilicon ??? a crucial material for crystalline silicon solar PV cell production ??? was four times higher than at the ???



However, after stabilizing in March, prices fell sharply, dropping below the cost line for all companies. Although stockpiling in early June helped support prices temporarily, they ???



Meanwhile, the number of production bases cutting production increased due to rising electricity prices. Solarbe Consulting's statistics show that silicon material production in ???

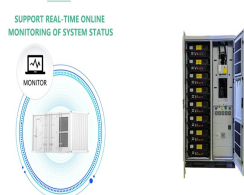
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Silicon material has the largest price decline in the Chinese PV industry. In 2023, the price of monocrystalline dense material fell by 66.91%, the price of M10 wafers and G12 wafers fell by 48.66% and 38.37% respectively.



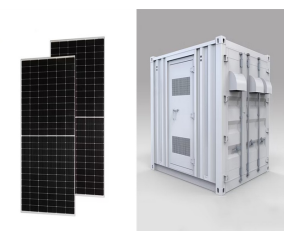
Small-scale lithium-ion residential battery systems in the German market suggest that between 2014 and 2020, battery energy storage systems (BESS) prices fell by 71%, to USD 776/kWh. With their rapid cost declines, the role of BESS for ???



Lithium, nickel, and cobalt prices, commonly used in anodes, significantly drive the total decline. Battery makers use cheaper silicon-based anode materials, which replace or blend with graphite and offer higher energy ???



The results indicate that the effects of mineral depletion on the net energy returns of renewable energy technologies will be marginal. Indeed, even for very high increases in the ???



Based on information collected by Solarbe, the prices for silicon wafers and cells have remained relatively stable, reducing the price difference caused by size variation. However, the price of p-type modules continues to ???

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This development in battery modern technology is paralleled by innovations in solar energy, where silicon photovoltaic panels have actually become the leading type due to their efficiency ???



London and New York, June 7, 2023 ??? The costs of wind power and battery energy storage projects have come down from levels seen in 2022, at the height of global supply chain constraints and the impacts of the Ukraine war. The ???



However, the scenario changed during 2022???23 due to the decline in prices of silicon metal. Scenario over 2022???23. Prices of silicon metal sharply declined from end-2022. Prices reduced by 60???70% over 4Q22???1Q23, ???