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THE ECONOMIC SIDE IS THE PRODUCTION AND PERFORMANCE OF SOLAR PANELS

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Abstract: Solar panels play an important role in stimulating innovation, increasing competitiveness in the international market, electrifying rural and remote areas, as well as improving the quality of life of the population and promoting social progress. Installation of solar panels is a useful and environmentally friendly solution for the energy supply of homes and businesses. Solar panels allow you to save electricity, reduce greenhouse gas emissions and use renewable energy sources.

Key words: solar panels, renewable energy, electricity, technological innovations, production, installing costs

Solar panels are devices that convert sunlight into electricity. They have many benefits for the development of the economy, such as reducing greenhouse gas emissions, creating jobs, and lowering energy costs. Solar panels can also increase energy security and resilience, as they reduce dependence on fossil fuels and foreign imports. Solar panels can be installed on rooftops, in fields, or in remote areas where grid access is limited. They can also be integrated with other renewable energy sources, such as wind and hydro, to create a more diversified and reliable energy mix. Solar panels are becoming more affordable and efficient, thanks to technological innovations and economies of scale. According to the International Energy Agency, solar power could provide more than 20% of global electricity by 2050, making it one of the key drivers of the energy transition and the green recovery. Solar panels are devices that convert sunlight into electricity. They have many advantages over other sources of energy, such as fossil fuels or nuclear power.

Some of the advantages of solar panels are: They are renewable and sustainable. Solar panels can produce electricity as long as there is sunlight, which is abundant and inexhaustible. Unlike fossil fuels, which are finite and depleting, or nuclear power, which produces radioactive waste, solar panels do not harm the environment or

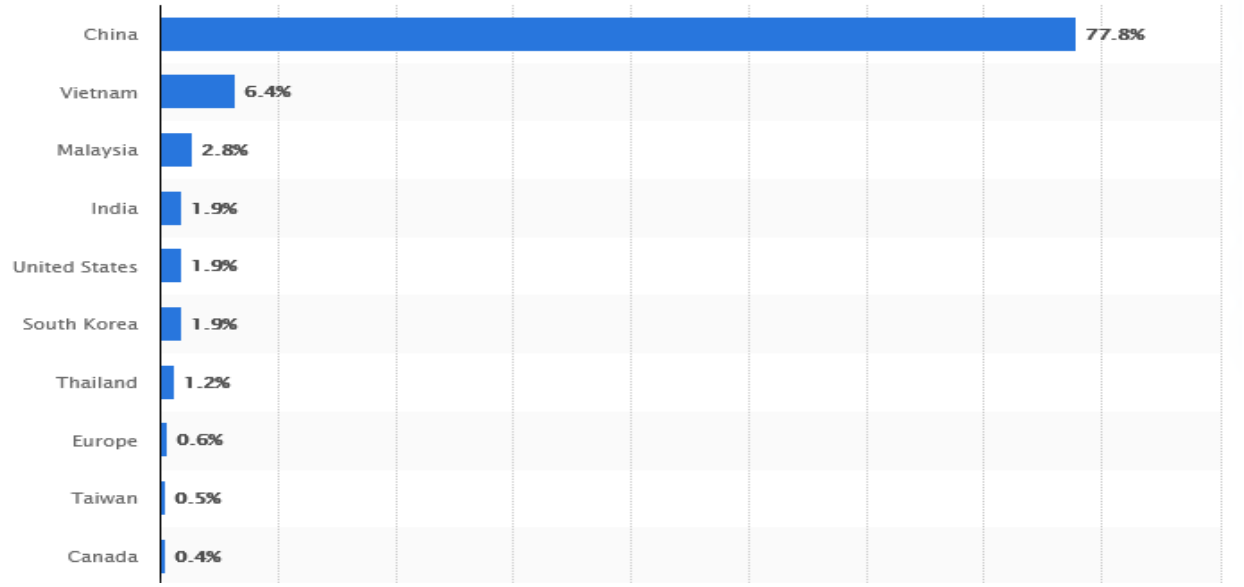
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contribute to climate change. They are cost-effective and low-maintenance. Solar panels have low operating costs, as they do not require fuel or moving parts. They also have long lifespans, ranging from 25 to 30 years, and require minimal maintenance. Solar panels can reduce or eliminate the need for grid electricity, which can save money on utility bills and protect against power outages.

Picture 1. Distribution of solar photovoltaic module production worldwide in 2022, by country[8]

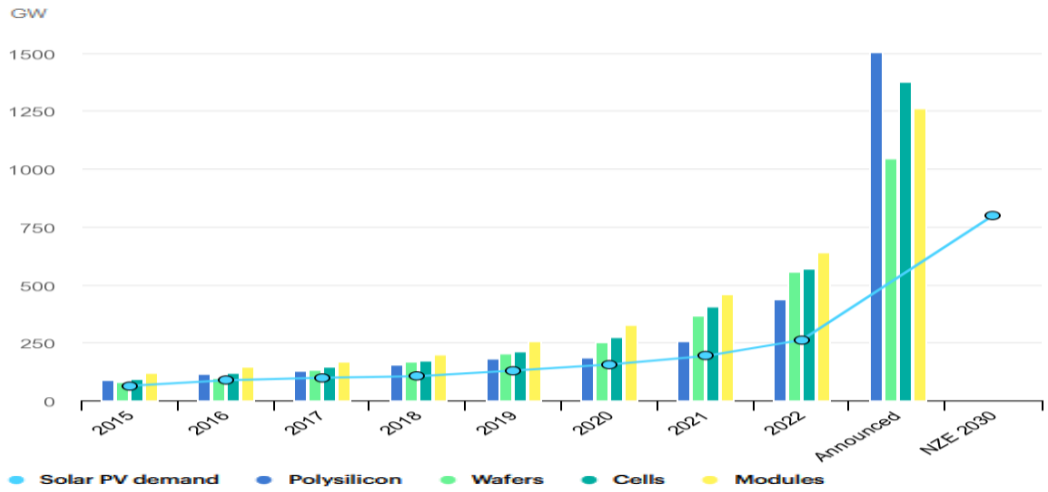


In 2022, China accounted for 77.8 percent of the global photovoltaic (PV) module production. The country representing the second-largest share of PV production was Vietnam, accounting for just 6.4 percent. Global trends in solar energy: Solar is one of the fastest-growing energy technologies in the global market, as the average cost of using solar PV has decreased over the years. Recent years have seen impressive annual growth in the global production volumes of solar modules. At the same time, the average installed cost for solar photovoltaics has consistently decreased every year since 2010. While the annual figures fluctuated, investments in solar energy technologies worldwide were significantly higher than just a decade ago. China dominates the solar industry: In addition to dominating the PV module production market, China is also the global leader in installed PV capacity. What’s more, one of the leading solar company in terms of revenue, Jinko Solar, is headquartered in Shanghai.

[8] *https://www.statista.com/statistics/130055/global-solar-energy-share-electricity-mix/*

They are versatile and flexible. Solar panels can be installed in various locations, such as rooftops, fields, deserts, or even space. They can also be integrated with other technologies, such as batteries, inverters, or smart grids, to enhance their performance and functionality.

Picture 2. Solar PV manufacturing capacity according to announced projects and in the Net Zero Scenario, 2015-2030[9]



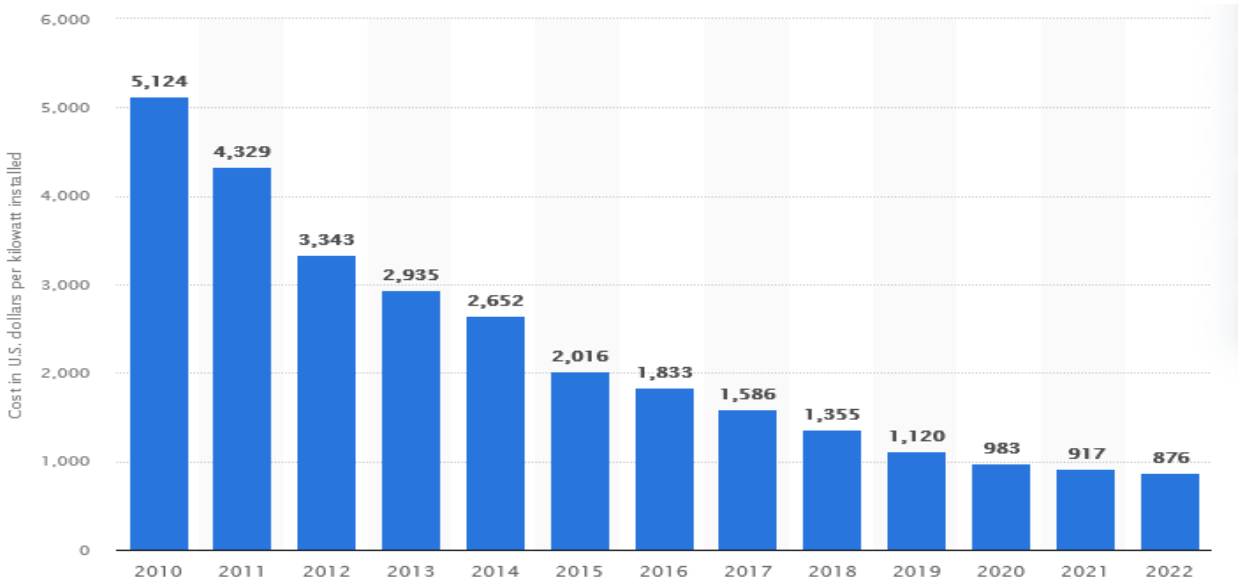
Solar panels can provide electricity for different purposes, such as lighting, heating, cooling, or transportation. Solar panels are a promising and beneficial technology that can help meet the growing demand for energy while preserving the environment and improving the quality of life.

Crystalline polysilicon remains the dominant technology for PV modules, with a market share of more than 97%. Various different types of wafers and cells are used for crystalline polysilicon solar, with some more efficient than others. The shift to more efficient monocrystalline wafers accelerated in 2022, with the technology capturing almost all crystalline PV production. In parallel, a more efficient cell design (Passivated Emitter and Rear Cell [PERC]) is also expanding its dominance with almost 60% market share. Other new, even higher-efficiency cell designs (using technologies such as TOPCon, heterojunction and back contact) also saw expanded commercial production and captured about 35% of the market in 2022.

Picture 3. Average installed cost for solar photovoltaics worldwide from 2010 to 2022 (in U.S. dollars per kilowatt)[10]

[9] https://www.iea.org/data-and-statistics-/charts/solarpv-manufacturing-capacity-to-announced-projects-and-in-thenet-zero-scenario-2015-2030

[10] *https://www.statista.com/statistics/130055/global-solar-energy-share-electricity-mix/*



Between 2010 and 2022, the average installed cost of photovoltaics worldwide declined steadily due to the widespread availability of materials, which reduced production expenses. In 2022, the average installed cost of solar PV systems stood at 876 U.S. dollars per kilowatt. Likewise, the levelized cost of electricity (LCOE) for solar photovoltaics has seen a similar trend over the past decade. The solar energy industry has seen significant job growth in recent years as the demand for renewable energy sources has increased. According to the National Renewable Energy Laboratory (NREL), employment in the solar industry increased by 66% from 2015 to 2016 and by an additional 24% from 2016 to 2017. The job growth in the solar energy industry is expected to continue, as more countries set ambitious goals for reducing their greenhouse gas emissions and increasing their use of renewable energy sources. According to the International Energy Agency, the solar energy sector is projected to create millions of new jobs globally by 2040.

Conclusion: Solar panel costs are an important factor to consider when deciding whether to install a solar power system for your home. Solar panel costs can vary significantly depending on the size, type, and quality of the panels, as well as the complexity and location of the installation. The most energy-efficient and durable panels, such as monocrystalline panels, tend to be more expensive than less efficient and durable ones, such as polycrystalline panels. The installation cost can also depend on factors such as roof pitch, orientation, shading, wiring distance, and local regulations. Solar panel costs are expected to continue to decline in the future as

technology improves and economies of scale are achieved. Depending on your energy usage, electricity rates, and solar production, you can save money on your utility bills by generating your own clean power. The payback period, or the time it takes to break even on your solar panel costs, typically ranges from five to 15 years. By installing solar panels on your home, you can contribute to the fight against climate change and support the transition to a more sustainable energy future.

Solar panels are a great way to reduce your carbon footprint and save money on your electricity bills. By installing solar panels, you can generate your own clean and renewable energy from the sun, which is abundant and free. Solar panels also increase the value of your property and make you eligible for various incentives and rebates from the government and utility companies. Solar panels are easy to install and maintain, and they can last for decades with minimal degradation. Solar panels are not only good for the environment, but also for your wallet and your future.

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