مدينة الملك عبد الله للطاقة
الذرية والمتجددة K•A•CARE

Energy Observatory

JOURNAL

October 2023

Renewable Energy News

The Hydrogen Stream: India, Saudi Arabia sign hydrogen agreement

Saudi Arabia and India have forged an agreement to develop electrical interconnections and promote low-carbon hydrogen. The partnership extends to the co-production of clean hydrogen and renewable energy. Additionally, Saudi Arabia will soon showcase the world's first passenger hydrogen-powered train in Riyadh, while collaborations between Masdar and Boeing aim to further sustainable aviation fuel (SAF) production. SAF can cut carbon emissions by up to 85% when compared to standard jet fuel. Other global ventures include the Australian Renewable Energy Agency launching a new hydrogen program and various companies initiating projects related to clean hydrogen and ammonia.

Image: Press Information Bureau India

Source

Saudi Arabia announces launch of hydrogen train tests

Saudi Arabia has commenced testing on hydrogen trains in a bid to transition to more eco-friendly transport options. Saudi Arabia Railways (SAR) made the announcement after partnering with the French train company, Alstom. These operational tests aim to adapt the trains to Saudi's environment, ensuring they're fit for future deployment. H.E. Saleh Al-Jasser, the Minister of Transportation and Logistics, highlighted that this move aligns with the nation's push for sustainability and the Saudi Vision 2030's objectives. Hydrogen trains are seen as a pivotal innovation since they operate without carbon emissions, making them a key player in the journey towards sustainable energy.

Source

NEOM's ENOWA advancing renewable energy and clean hydrogen to reduce carbon footprint

ENOWA, NEOM's water and electricity subsidiary, is actively working to reduce the carbon footprint from energy-intensive desalination processes. In a recent interview, CEO Peter Terium highlighted the incorporation of renewable energy to decrease harmful emissions globally. Addressing traditional water systems' inefficiencies, Terium emphasized reducing system leakages to cut down on desalination needs. NEOM aims to shift from conventional wastewater treatments to sustainable methodologies. By 2030, NEOM's energy mix will be 100% renewable, contributing to the Kingdom's 50% renewable target. Terium lauded Saudi Arabia's forward-thinking approach towards its Vision 2030 objectives. Moreover, NEOM's collaboration with Air Products Qudra and their first hydrogen fueling station exemplifies their environmental commitment. At the MENA Climate Week, the potential and challenges of hydrogen as a sustainable energy source were discussed.

Source

1 GLOBAL ENERGY NEWS

MENA region's renewable energy capacity surges by 400% annually

The Middle East and North Africa (MENA) region has reported an impressive 292 gigawatts increase in potential renewable energy capacity, marking a 400% growth since 2022, as per the Global Energy Monitor's findings. This surge can power nations like Saudi Arabia, Egypt, and Qatar collectively, emphasizing the region's dedication to eco-friendly energy solutions. Interestingly, over 60% of these advancements focus on clean hydrogen production. Notably, MENA sovereign wealth funds-supported firms, ACWA Power and Masdar, have made significant international investments in renewables, with ACWA Power involved in over 20.2 GW of potential capacity abroad. Masdar aims to deploy 20 GW of solar and wind capacity in Africa by 2035, along with creating a designated climate fund.

Source

Brazilian water tank maker unveils new polyethylene PV mounting structures

Fortlev Solar, a Brazilian company, has developed a new solar mounting structure called Lastro Solar. It is made from polyethylene, which is a lightweight and durable material. The company claims that the new structure can reduce assembly times by 50% compared to traditional metal structures Eduardo Nascimento Fortlev Solar's engineering manager said to PV magazine "For example, the average installation time of a 100 kW array, with 185 modules, is 14 days, with Lastro Solar, this time is reduced to half of the time." Lastro Solar is also easy to install and can be used on a variety of terrain, including clear and rugged areas. It is also mobile with a weight of 15kg, which allows for relocating solar panels as needed.

Figure: Fortlev Solar

Source

JBM Solar unveils plans for 320MW UK solar

JBM Solar, part of the RWE Group, has initiated a consultation for a 320MW solar project in Yorkshire, UK, known as Peartree Hill Solar Farm. The proposed project is located to the east of Beverley in East Riding, Yorkshire, comprising multiple areas of land connected by underground cables. The consultation period runs from October 9 to November 6, 2023.

While the plans are in the early stages, JBM Solar is committed to preserving and enhancing natural habitats and species, aiming to achieve a "biodiversity net gain" through new plantings and habitat creation. The project also includes provisions for improved public access, such as enhanced footpaths, wildflower meadows, picnic areas, information boards, and educational trails.

Source

Nuclear Energy News

IAEA Mission Recognizes Saudi Arabia's Commitment to Radiation Safety, Identifies Areas for Further Improvement

An International Atomic Energy Agency (IAEA) mission said the Kingdom of Saudi Arabia has demonstrated commitment to safety for all applications and occurrences of radiation sources in the country. The IAEA recommended some actions for improvement, including establishment of a national strategy for radioactive waste management.

Source

First-Ever Nuclear Energy Summit to be Held in Brussels in March 2024

The International Atomic Energy Agency (IAEA) and Belgium announced today that a Nuclear Energy Summit (NES) will be held early next year in Brussels to highlight the importance of nuclear energy in tackling global challenges to reduce fossil fuel use, improve energy security and drive economic growth.

The NES will be hosted by the IAEA in conjunction with the Atoms4NetNetZero initiative, bringing together leaders from across the globe to discuss the future of nuclear energy.

Source

Ex-Fusion and Tokyo Tech establish collaborative research cluster for laser fusion

EX-Fusion Inc. has established a Collaborative Research Cluster focused on advancing liquid metal devices for the realization of commercial laser fusion reactors in collaboration with Tokyo Institute of Technology. Laser fusion is a technology that induces nuclear fusion reactions by irradiating fuel with lasers, resulting in the generation of energy. Leveraging seawater resources, it offers a safe and sustainable energy supply option.

Source

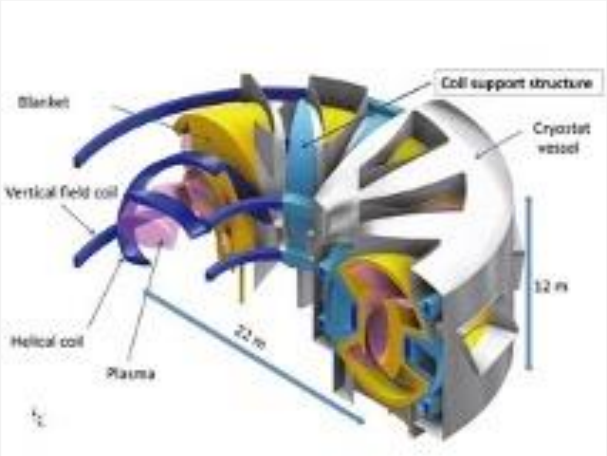


Image: nuclearpowerdaily.com

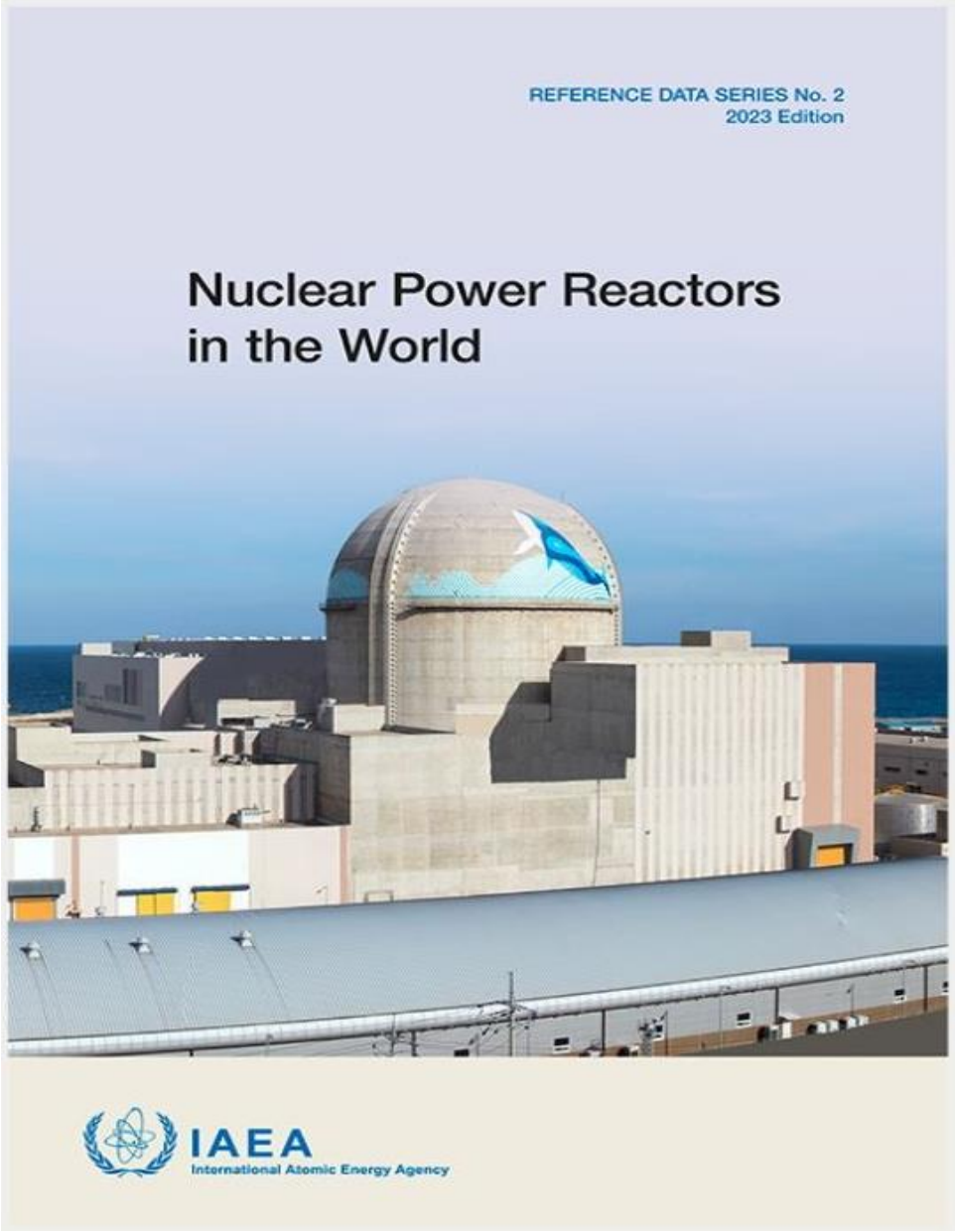
Slovenia's nuclear plant shut down over leak

Slovenia has started a preventive shutdown on their nuclear power plant on last Thursday because of a leak in the site's containment building. As the operator mention in the news that the shutdown is needed to determine the exact source of the leak and the measures needed to fix it. The last shutdown on Slovenia occurred in 2020, after an earthquake that shook neighbouring Croatia.

Source

Report title: **Nuclear Power Reactors in the World, IAEA**

This 43rd edition of reference data series No. 2 provides the most up-to-date reactor data that the IAEA has access to. The data includes summaries of the status of power reactors operating at the end of 2022, those under construction and those that have been shut down. The data also includes performance data for reactors operating in the Member States. The data is collected by designated national correspondents (NCRs) in the Member States, and the data is used to support the IAEA's PRIS (Power Reactor Information System).



Prepared by: Aseel Zamzami

Source

3 TAKE A LOOK AT DATA VISUALIZATION

1) The Rise of Employment Renewable Energy for Each Technology, IRENA

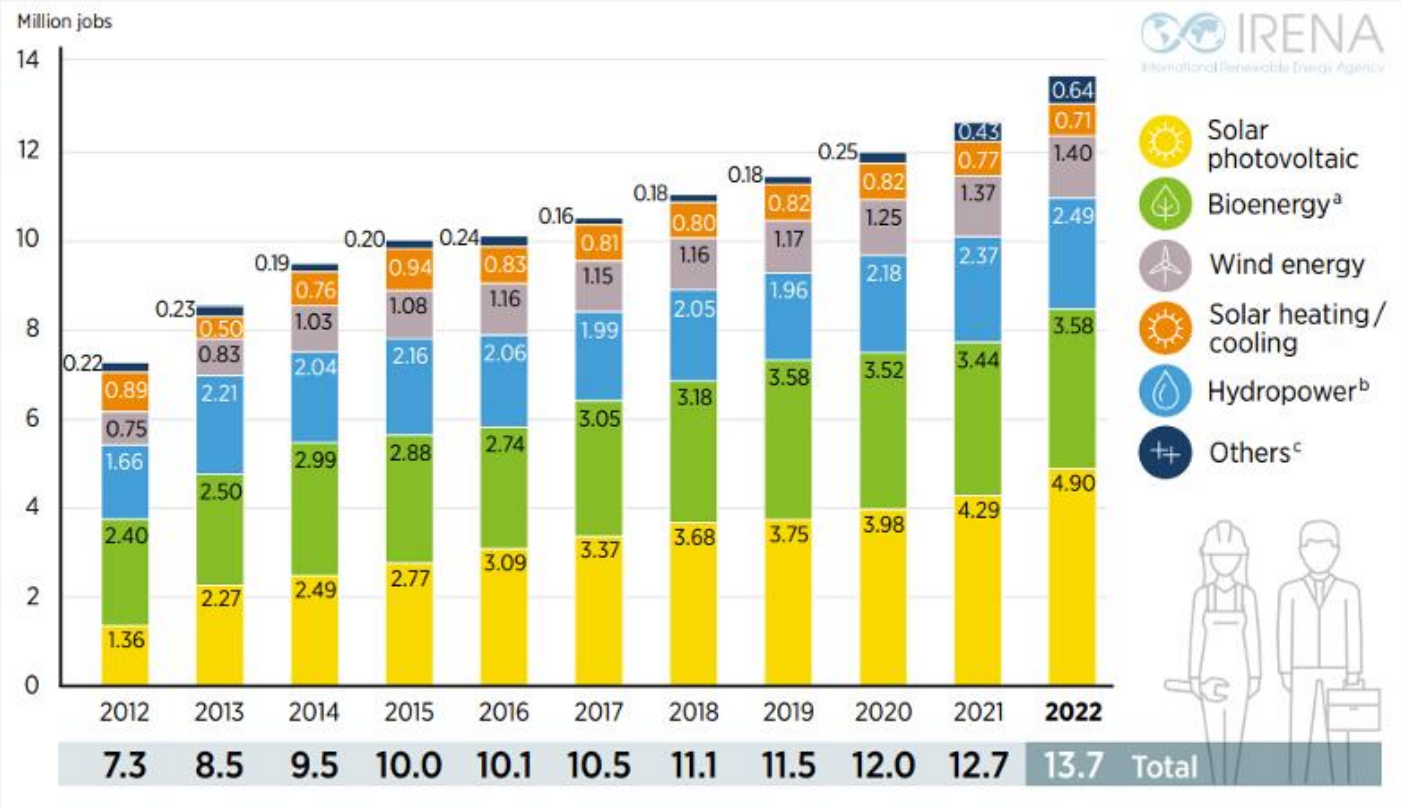


Figure 1: Number Jobs in renewable energy industry (IRENA)

The tenth edition of the "Renewable Energy and Jobs: Annual Review 2023" presents the latest global employment figures in the renewable energy sector. These estimates are derived from IRENA's methodologies and calculations, as well as a wide range of reports from government agencies, industry associations, NGOs, and academic experts.

The report provides an overview of renewable energy employment worldwide in 2022 and in select countries. It explores job numbers, job quality, and workforce diversity within the core segments of the renewable energy supply chain, taking into account investment, deployment trends, and various policy contexts.

The main highlight of this edition is that the global renewable energy industry employed approximately 13.7 million people directly and indirectly in 2022. This number has been steadily increasing over the past decade, starting at 7.3 million in 2012. The growth is primarily attributed to solar photovoltaic (PV), bioenergy, hydropower, and wind power. Socio-economic models from IRENA's World Energy Transitions Outlook series suggest that the substantial investment required to address climate change will create millions more jobs in the coming decades.

Prepared by : Saleh Al Dwhuyhe

Source

2) The World Banking in Extreme Heat, IEA

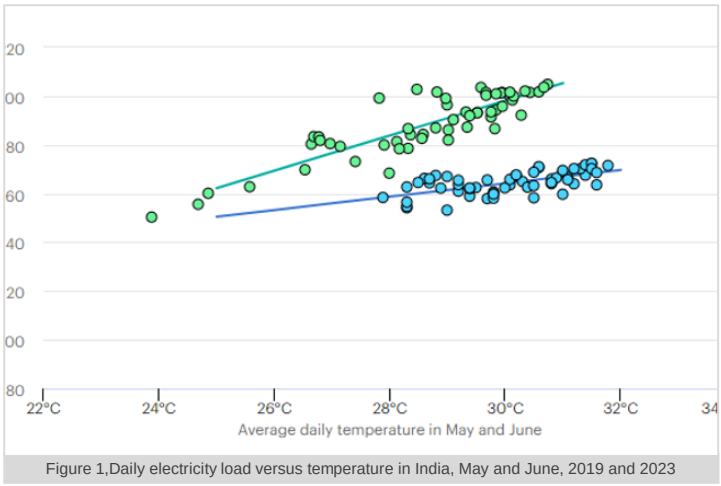


Figure 1,Daily electricity load versus temperature in India, May and June, 2019 and 2023

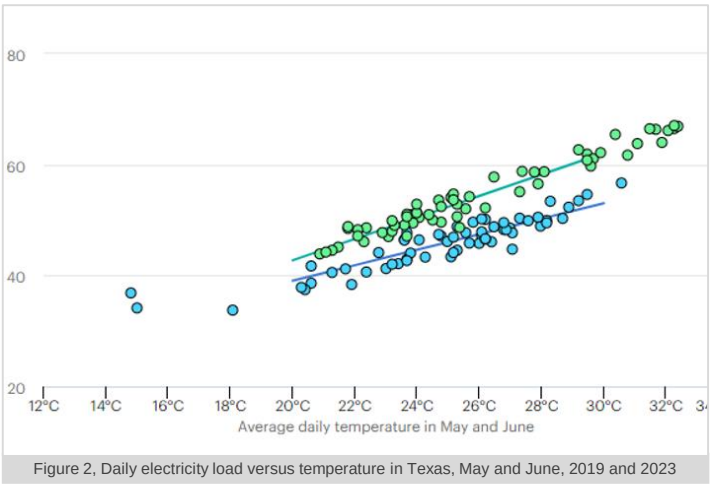


Figure 2, Daily electricity load versus temperature in Texas, May and June, 2019 and 2023

This intense heat is driving up the need for air conditioning and, consequently, increasing electricity consumption. This can create a vicious cycle of higher greenhouse gas emissions, exacerbating the global warming problem. Additionally, due to elevated electricity prices resulting from the global energy crisis, consumers are facing higher cooling costs, often paying double for inefficient air conditioning. As temperatures climb, there is a corresponding increase in people using air conditioning. In Texas, for instance, a mere 1°C rise above 24°C in daily average temperatures results in a 4% surge in electricity demand. In India, where air conditioner ownership is less common, the same temperature increase leads to a 2% uptick in demand. Over the past two months, power grids in India and the Southeastern United States, along with 10 other countries including Brazil, China, Colombia, Japan, Malaysia, and Thailand, have experienced peak demand at record levels.

The increasing reliance on air conditioning puts stress on power systems, leading to potential shortages, restrictions, and even blackouts. Grid operators may need to activate older and more polluting power plants to meet the rising demand. This situation underscores the urgency of addressing cooling needs and improving energy efficiency as temperatures continue to rise.

Prepared by: Fahad Alwfi

Source

Research Title: A techno-economic evaluation of utility scale solar power generation, Mohammad Raghib Shakeel and Esmail M.A. Mokheimer

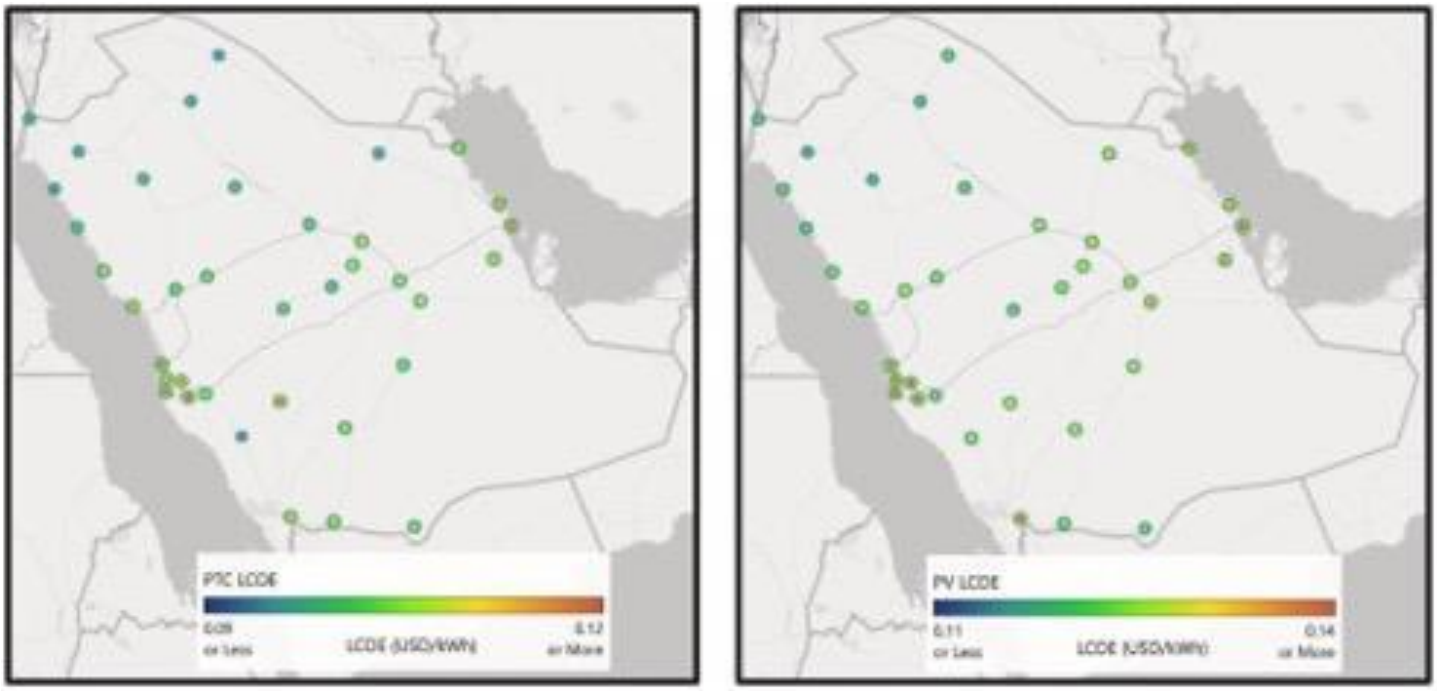


Figure 1: Number Jobs in renewable energy industry (IRENA)

Techno-economic analysis of utility scale parabolic trough collector (PTC) and photovoltaic (PV) plants is carried out for 40 cities in Saudi Arabia. The PTC- and PV-based utility scale plants with and without storage are compared based on various techno-economic parameters and their ability to satisfactorily provide constant power to the load. Previous work available in the literature focused on either PV or PTC technologies without storage. The plants are designed to act as constant load plants capable of producing 150 MWe. The analysis revealed that the LCOE for the PTC-based plant with 9-h thermal energy storage varied between 0.093 and 0.132 USD/kWh while that of PV-based plants with 9-h battery storage capacity, varied between 0.121 and 0.156 USD/kWh. However, the Annual Load Satisfaction Factor (ALSF) was found to be 0.58–0.74 for the PV-based plants in comparison with 0.47–0.73 for that of the PTC-based plant. The net present value (NPV) of the PTC-based plants were found to be higher than that of the PV-based plants. The benefit to cost ratio (BCR) of the PTC-based plant varied between 0.939 and 1.280 (with an average of 1.105) while that of the PV-based plant was found to be 0.903–1.062 (with an average of 0.984).

Source

5 EXPERT'S COMMENTARY

Article Title: Bifacial PV Panels- Changing the Rules

The dominance of photovoltaic (PV) technology observed today, in particularly crystalline silicon (c-Si), is usually attributed to market incentives and government support, in addition to the emergence of Chinese manufacturers receiving low cost financing for factories from their government. This story, however, ignores the many innovations that took place. A clear example of such innovations is the introduction of bifacial cells and panels.

In a bifacial panel, the cells are encapsulated in glass from both sides (or a transparent polymer sheet from the back) to allow light coming from both front and back to be captured. With the arrival of bi-facial panels, an added energy production, referred to as bifaciality gain, can be as high as 25%, depending on the reflection from the land (albedo).

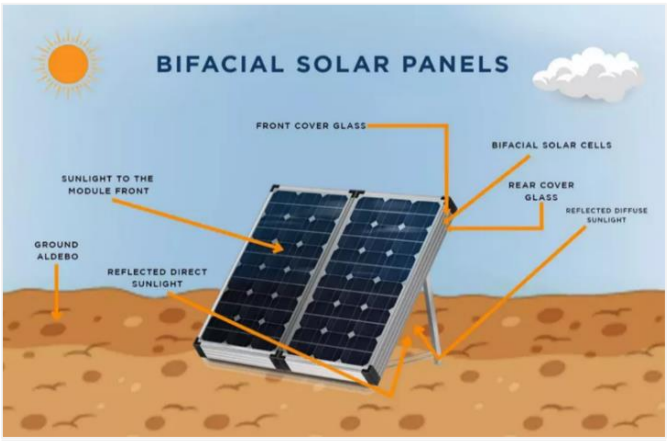


image: novergysolar.com

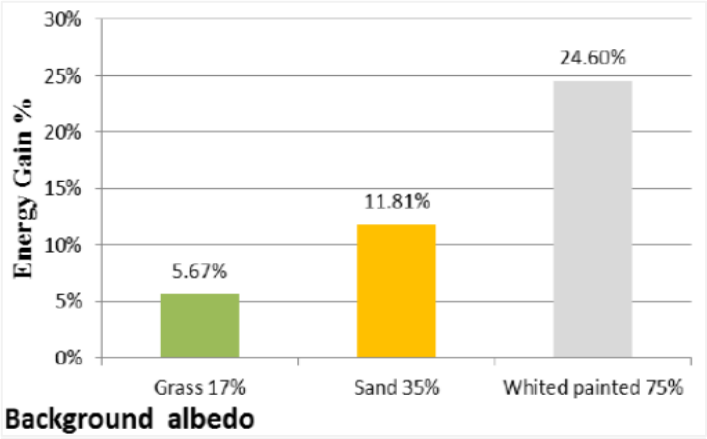


image: trinasolar.com.

While albedo is clearly an important factor in determining the bifaciality gain, it is not the only one. Other factors include the solar cell structure itself. In fact, the introduction of bifacial panels drove innovations in mono crystalline silicon cell technology, where the goal is not just to increase conversion efficiency from the front of the cell but also to increase conversion efficiency from the back of the cell. This introduced a new term, bifaciality factor, which refers to the ratio of the conversion efficiency from the back to the front under similar conditions. Not to be confused with the bifaciality gain, which refers to the energy increase of the panel in actual operating conditions, the bifaciality factor is a characteristic of the solar cell itself. The current PERC cell structure (Passivated Emitter and Rear Contact) has a bifaciality factor of around 70%. New entrants to the market, which include TOPCon (Tunnel Oxide Passivated Contacts) and heterojunction (HJT) have bifaciality factor of 85% and 92%, respectively.

With bifacial panels, the optimum configuration is no longer as straightforward as pointing the panels to the south (in northern hemisphere) at an angle equal to the latitude of the location. Rather, we need to consider what the rear of the panel will actually see. This view factor changes by the tilt of the panel, the spacing between the different panels, and the height of the panel above the ground. The mounting structure also needs to minimize shading losses from the back of the panels. An optimum configuration for bifacial panels will clearly depend on the location itself because of the albedo. Investigation of optimum configuration of bifacial panels is clearly an important research topic because of its impact on energy production, and hence on project economics.

In conclusion, the arrival of bifacial panels inspired new innovations in c-Si technology and has managed to set c-Si technology apart from its traditional competitors. This is not the end of innovation, however. A new tandem structure of perovskite on crystalline silicon promises higher efficiencies at lower cost, and KSA is at the heart of this effort. Recent world record of 31% for tandem perovskite cells on silicon was demonstrated at KAUST. Issues of stability and scalability of the technology are still preventing the commercialization of those cells. However, if history is any guide, we know that it is only a matter of time before the newcomer will start to claim market share; hence, the need for continued innovations.

By: Dr. Raed Sherif

6 EVENTS

International Conference on Nuclear Security: Shaping the Future

ICONS 2024 will provide a global forum for ministers, policymakers, senior officials and nuclear security experts to discuss the future of nuclear security worldwide, whilst providing opportunities for exchanging information, sharing best practices and fostering international cooperation.

20-24 May 2024, Vienna, Austria

Source

International Conference on Research Reactors: Achievements, Experience and the Way to a Sustainable Future

The objective of the Conference is to foster exchange of information on operating and planned research reactors. It is a forum in which reactor operators, managers, users, regulators, designers and suppliers can share experience in all relevant areas including safety, security, operation, fuel front and back-end options, utilization, infrastructure and capacity building, and management, and showcase how achievements and experience attained with research reactors in these areas, contribute to a sustainable future.

27 Nov – 1 Dec 2023, Dead Sea, Jordan

Source

29th IAEA Fusion Energy Conference (FEC 2023)

The 29th Fusion Energy Conference (FEC 2023) aims to provide a forum for the discussion of key physics and technology issues as well as innovative concepts of direct relevance to the use of nuclear fusion as a future source of energy.

London, United Kingdom of Great Britain and Northern Ireland

Source

Saudi Arabia Smart Grid 2023

With more than 2500 participants and 70 exhibitors, this prestigious event provides an excellent opportunity to promote products, services, ideas and business in a comprehensive way as it attracts the attention of the regional governmental, scientific, business and technological community

18 – 20 December 2023, Riyadh

Source

6 EVENTS

COP28 UAE - United National Climate Change Conference

COP28 will convene in the UAE in November 2023. COP28 UAE brings the world together at a critical moment for global transformative climate action.

30 November – 12 December 2023, UAE

Source

26th World Energy Congress 2024

The 26th World Energy Congress is a critical turning point for leadership on clean and inclusive energy transitions worldwide and an opportunity to spring forward in redesigning energy for people and planet.

22-25 April 2024, Rotterdam, Netherlands

Source

Intersolar Middle East

Intersolar Middle East is held in Dubai World Trade Centre Dubai on 16 to 18 April 2024 showing the companies news of United Arab Emirates and internationals related to sectors Solar energy, Renewable energies

April 16–18, 2024, Dubai World Trade Center

Source