THE

7 SOLAR WONDERS

SolarPower Europe

SOLAR: LEADING THE ENERGY TRANSITION

In just a couple of years, solar has evolved dramatically to become the most affordable clean energy technology and is now a major element of our energy system, anticipated to become the dominant source of energy in Europe by 2050.

Solar is now the world's fastest-growing energy source. In fact, more solar was deployed than any other single energy technology in 2018 – reaching impressive new heights in efficiency, affordability, and flexibility at a record pace.

It all began here: Europe was and continues to be the cradle of solar innovation. It was the first region to embrace the technology wholeheartedly and provide genuine support for its mass deployment across the continent.

We are only just beginning to harvest solar's enormous potential and benefits in Europe — to power our lives with clean electricity, lower our electricity bills, and provide a reliable and secure source of infinite energy. With solar, we can accelerate the energy transition, champion sustainable growth and innovation, create new green jobs, and help deliver a carbon-neutral Europe before 2050.

SolarPower Europe

WONDER 1

Solar: the people's energy choice

Solar is the energy choice of Europeans. A European Social Survey (ESS) on 'European Attitudes toward Climate Change and Energy (2018)' found that solar power has the highest level of support in Europe, with 89% of Germans, 85% of Italians, and 85% of French saying it was their preference.

EU citizens believe that solar is the best technology to affordably address climate change and ultimately help meet the EU's 2050 decarbonisation goal.[1] Its popularity stems from its versatility: solar installations can be large or small, owned by traditional utilities or households. From homes to schools, hospitals to businesses, solar empowers everyone to take an active part in the energy transition. Beyond Europe, solar can provide easy access to clean electricity and could therefore accompany developing countries in their overall sustainable growth.

[1] European Social Survey 'European Attitudes toward Climate Change and Energy (2018)'.

The benefit of solar power is that I'm saving money with electricity bills and I can spend more time with my family having a little more money.

Andreea Bordea
Resident of Cartierul Solar, the Solar Neighbourhood, Romania

Photo: Shutterstock / nullplus

Photo: BayWa r.e. renewable energy GmbH

2018
saw annual solar installations in EU-28 increase by
36%

WONDER 2

Solar in Europe: we're sitting on a goldmine

Today, solar energy provides up to 5% of Europe's electricity. However, recent 2050 scenarios suggest that solar could account for 36% of Europe's electricity demand by 2050.[2] In a 100% renewable energy mix scenario, this figure rises to an incredible 69%![3] This is highly promising for Europe's energy transition and the EU economy as it moves towards sustainable electrification. Already in 2019, solar installations are expected to increase by 110% in EU-28.

[2] Bloomberg New Energy Finance.
[3] Lappeenranta-Lahti University of Technology LUT.

Photo: iStock

WONDER 3

Solar: the most affordable energy for all

Solar has seen the steepest cost reduction of all energy technologies in the last 20 years, with average prices falling from 5,000 EUR per kW in 2000 to 196 EUR per kW today. At present, large-scale solar is cheaper than any fossil fuel or nuclear source, steadily below 0.04 EUR per kWh. Due to its high cost-competitiveness, twice as much solar energy was installed as wind in 2018 and more solar was installed than any new capacity of conventional energy.[4] In recent technology-neutral tenders held in the EU, not only did solar outbid wind but it won the entire auction!

Did you know:
Solar bidding prices have halved in the last 3 years

[4] SolarPower Europe, Global Market Outlook 2019-2023.

In 2018
solar represented
3.6M
jobs worldwide

Solar is the biggest employer in the renewable energy sector, creating more jobs per installed watt than any other power generation source.

Source: *International Renewable Energy Agency*

WONDER 4

Solar: creating new green jobs in Europe

Solar jobs are growing in Europe - as a result of new installations and growth in cumulative capacity, jobs are set to double by 2021 compared to 2016. In Europe, most jobs in solar are created locally and therefore cannot be relocated, ensuring significant contribution to long-term socioeconomic development. In fact, for every TWh of power produced, solar currently creates 1,100 jobs in the EU.

What's more, IRENA's 2018 Global Energy Transformation report shows that solar energy alone could create 11.85 million jobs by 2050. This would translate into at least 1.7 million solar jobs in Europe, according to estimates from Lappeenranta University.

WONDER 5

Solar: champion of sustainability

Solar energy is a sustainability leader, saving 96% of GHG emissions compared to coal and 93% compared to gas.

It is true that solar manufacturing, to a limited extent, relies on certain critical raw materials and precious metals (e.g., silicon or silver), but these are increasingly being replaced, reduced, and recycled.[5]

Solar energy saves

96%

GHG emissions compared to coal

In the EU, recycling of solar panels is mandatory, and technical recycling yields reach up to 90% of panel weight

Source: *European Parliament and Council (2012). Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).*

Photo: Generg

[5] ITRPV (2019) International Technology Roadmap for Photovoltaic (ITRPV): 2018 Results (10thEdition). Available at: https://itrpv.vdma.org/documents/27094228/29066965/ITRPV%302019.pdf/78cb7c8c-e91d-6f41-f228-635c3a8abf71

WONDER 6

Solar can be the grid's close friend

Today, solar is a flexible and reliable technology.[6] Breakthrough power electronics allow residential and utility-scale solar solutions to reduce grid congestion and optimise the integration of renewables into the energy system, even without storage. In Australia, Florida, and Canada, solar companies, working directly with TSOs and DSOs, provide more accurate and effective flexibility services than conventional energy sources.[7] Soon, combining solar with other renewable energy sources (e.g., wind or biomass), as well as digital and storage solutions, will make on-demand solar electricity a reality.

[6] Grid Intelligent Solar Report, SolarPower Europe (2019).
[7] Grid Intelligent Solar Report, SolarPower Europe (2019).

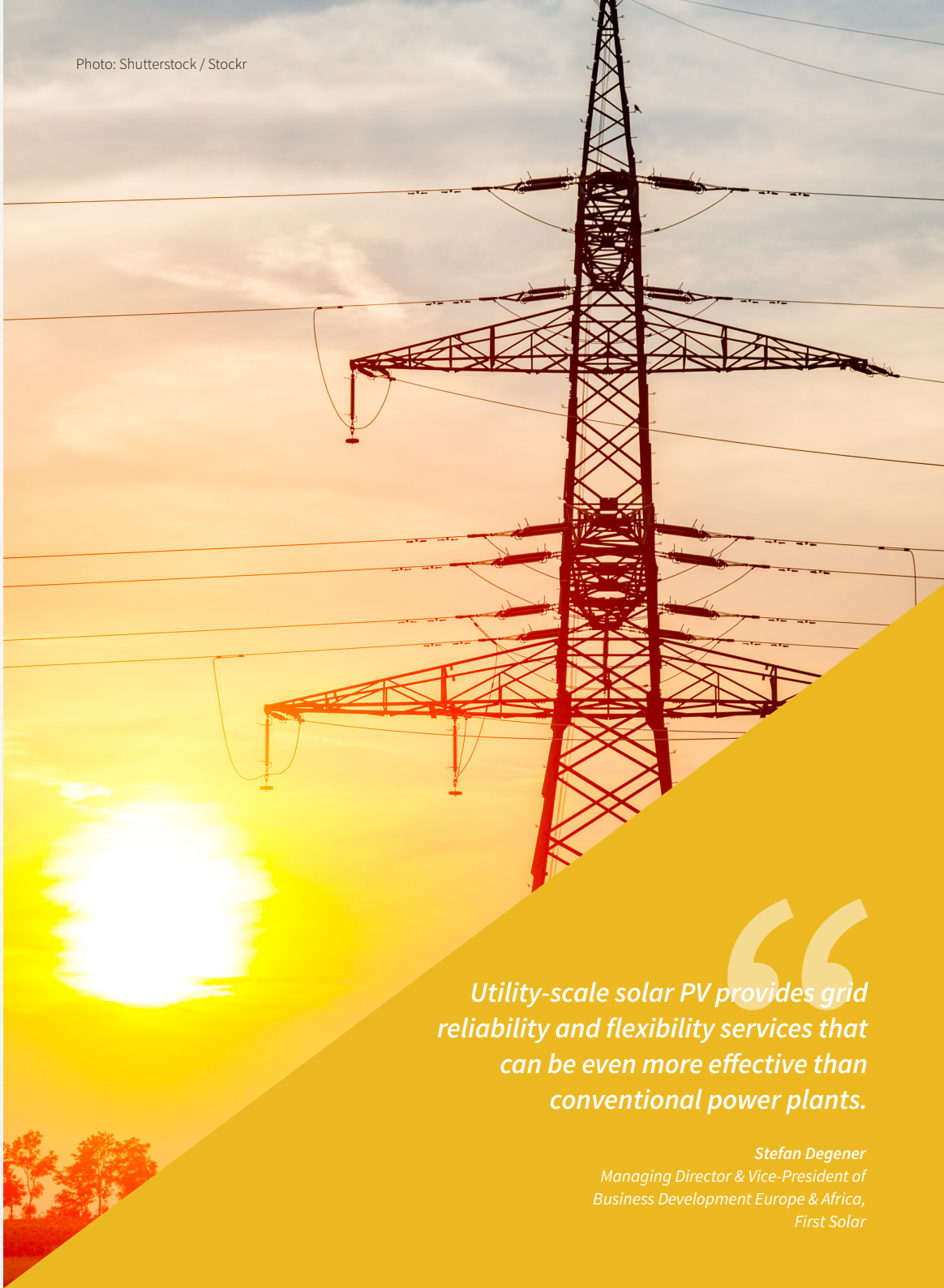

Photo: Shutterstock / Stockr

Utility-scale solar PV provides grid reliability and flexibility services that can be even more effective than conventional power plants.

Stefan Degener
Managing Director & Vice-President of Business Development Europe & Africa, First Solar

WONDER 7

Solar powers all sectors of the economy sustainably

From buildings to transport, industry to agriculture, solar is the most easily deployed and versatile clean energy technology to power a range of sectors and economic activities. It enables consumers and industries to profit from low-cost electricity, and contributes to new and innovative business models, including those beyond the energy sector.

According to a recent study from the European Commission,[8] if EU-based corporate buyers committed to sourcing renewable electricity to meet 30% of their total electricity demand by 2030, the EU renewable energy sector would generate more than €750bn in gross added value and over 220,000 new jobs.

In the last five years, Europe has seen annual installation rates of commercial and industrial on-site solar plants of around 2-3 GW/year.

Photo: Urbasol

[8] European Commission, Competitiveness of corporate sourcing of renewable energy 2019.

A Green Deal for Europe

The European energy transition is driving transformational change, redefining the economy and society in Europe.

Key European sectors such as transport and industry must transition to new business models (electromobility, low-carbon industry) and innovate to maintain their global competitiveness. At the same time, the coal phase-out challenges European coal regions to restructure their energy systems, with a direct impact on their economies.

With the highest level of public support, solar energy delivers ambitious climate policies while still supporting Europe's industrial base through the supply of competitive, clean and reliable energy.

As such, solar energy unites Europe’s commitment to achieve carbon neutrality by 2050 with the need to shape a ‘Green Deal’ for European citizens and businesses – providing local growth, jobs and ensuring social buy-in and political acceptance.

Photo: Shutterstock / inacio pires

> *We have this handy fusion reactor in the sky called the sun. You don’t have to do anything. It just works. It shows up every day and produces ridiculous amounts of power.*
>
> *Elon Musk*
> *Tesla Founder and CEO*

European Industrial Strategy for solar

A robust European solar industry will deliver more than the energy transition: it can provide at least 500,000 highly skilled jobs for Europe by 2030 and increase value added.

With at least 80% growth expected in 2019, and over 20 GW of annual additional installations from 2020 onwards, now is the right time to support the growth of the European solar industry and provide EU solar companies with the means to compete at a global level.

WHAT'S THE IMPORTANCE OF AN INDUSTRIAL STRATEGY FOR SOLAR IN EUROPE?

Europe is a solar industry leader

The European solar industry is a frontrunner in R&D and manufacturing of equipment, inverters and raw and processing materials. Today, 40% of patents on renewable energy are from the EU.

Competitive solar manufacturing is possible in Europe[9]

European companies have already joined forces with Europe's leading R&D institutes to develop state-of-the-art solar technologies, and to reinvigorate a competitive upstream solar industry – including polysilicon, wafers, cells and module manufacturing. The HJT-Technology, with higher efficiencies developed by Meyer Burger and applied by Enel in Catania, is one of many recent breakthroughs achieved by European solar companies. However, such initiatives lack the necessary support to scale their production, which is crucial to becoming competitive on a global scale.

Existing initiatives for a competitive EU storage industry must be completed by an overarching strategy to promote the growth of the European solar industry

In line with the approach developed by the Strategic Forum for Important Projects of Common European Interest, the European Commission must recognise the solar sector as a value chain of strategic importance for Europe.

Coal regions in particular could benefit greatly by transitioning to solar. These regions have tremendous untapped solar potential and are attractive business environments for new competitive manufacturing facilities.[10] The Platform for Coal Regions in Transition should therefore work hand-in-hand with the Clean Energy Industrial Forum to support the development of tailor-made strategies for the relocation of solar manufacturing sites in former coal and lignite regions.

Emerging markets are hungry for solar

Supporting European solar companies to export and expand their market outside Europe will help consolidate a global leadership position. Future trade negotiations on the model of the Environmental Goods Agreement must be reinitiated to eliminate all trade barriers on green goods, and reach our international climate commitments.

Solar means jobs

The European Union should urgently address the need for training and upskilling to support the energy transition of key economic sectors (mobility, buildings, energy). The EU Skills Agenda initiatives should be adapted in this regard, to facilitate even more European solar jobs.

[9] Competitiveness of a European PV Production Chain, 2019.
[10] Global Market Outlook 2019-2023.

Solar: powering Europe's carbon-neutral economy

To achieve a carbon-neutral economy by 2050, more than 80% of electricity will need to be powered by renewable energy. To meet this increasing electricity demand,[11] electricity production must also increase by up to 2.5 times above current levels. This requires the exponential growth of solar energy across all sectors of the economy — power, industry, transport and heating — as the cleanest and most affordable renewable energy source in Europe.

By 2050
more than
80%
of electricity will be powered by renewables

[11] All EC "2050 Long-term Strategy" scenarios result in a reduction of the final energy demand by 2050, but a higher electricity demand due to the electrification of the economy.

Photo: Shutterstock / Happy Together

Harvest the full potential of solar: ambitious and stable framework conditions

The implementation of robust National Energy and Climate Plans combined with a strong EU mechanism to ensure Europe's 32% renewable target is met will reinforce predictability for solar companies in the future. In the context of increasing market exposure, the ongoing review of the EU State Aid Guidelines for Energy and Environment should make sure that future renewable support schemes are maintained where necessary and are compatible with innovative and promising business models, such as residential, commercial and industrial self-consumption, and corporate Power Purchase Agreements (PPAs).

Europe has huge solar potential. For example, the unused rooftop surface for generating solar energy is a "1.4 TW missed opportunity".[12] This could be addressed easily by following the example of pioneering regions, such as California, Florida, Australia, and several cities in Europe - including Paris, Tubingen, and Vienna - and by requiring installations of solar rooftop solutions for new buildings and major renovations. Existing restrictions on large-scale solar installations should also be removed urgently.[13] The EU should boost the deployment of innovative large-scale applications in combination with advanced digital technologies (grid intelligent solar) and help ease access to solar deployment on unused or degraded land (former coal and nuclear sites, brownfields, floating solar, agri-energy).

[12] Lappeenranta-Lahti University of Technology LUT.

[13] Global Energy System based on 100% Renewable Energy, Energy Watch Group and LUT University - 2019.

Photo: Shutterstock / FrameStockFootages

The solar rooftop potential in Europe is significant, at an estimated

1.4 TW

Solar at the core of a cost-efficient and fully sustainable electrification strategy

The electrification of Europe's economy will bring significant opportunities for the growth of solar, as the most cost-competitive and easily deployed electricity source. Combined with digital and storage solutions (smart appliances, batteries, heat-pump), renewable-based electrification connects and empowers key sectors of the economy: transport, building, and industry and supports ambitious decarbonisation strategies.

"Boosting renewable-based electrification of the transport, building and industrial sector should be an overarching priority, as it will drive a sustainable decarbonisation strategy and accelerate the energy transition."

Ensuring that the right infrastructure is in place will also be crucial: for example, the upcoming review of the Alternative Fuel Infrastructure Directive (AFI) will be a key milestone to ensure that Europe has the appropriate infrastructure to host a massive EV fleet, and that these vehicles will play their part in the EU's future energy system.

The next European mandate should lead the digital transformation of the European energy sector and economy. This is needed to effectively integrate renewables into the grid and to empower renewable installations to provide their flexibility services, thus helping contain investments in additional network infrastructure. In November 2017, an IEA report on 'Digitalisation and Energy' identified digitalisation as Europe's next energy transition challenge. By 2019, very little has been done at the European level to drive this change.

"Producing at marginal costs close to zero, the massive penetration of solar and other competitive renewable technologies is a critical prerequisite to enable cost-competitive and fully sustainable sector coupling."[14]

The mass deployment of cost-efficient renewable electricity will enable the use of another energy carrier – green molecules. The EU should prepare for this new opportunity and act now to ensure it claims industrial leadership. Hydrogen from renewable electricity is the missing link to fully deliver Europe's Green Deal, enabling difficult-to-decarbonise industries to transition to the new economy, and open the door to a competitive future free of high energy costs.

Last but not least, a systemic approach to reducing CO2 emissions across all sectors is needed. An appropriate price on carbon emissions will align investment decisions with EU climate objectives, avoid stranded assets, and support the energy transition.

[14] In line with Paris Agreement.


Our mission is to lead our 200+ members to make solar the core of a smart, sustainable, secure, and inclusive energy system in order to reach carbon neutrality before 2050.
SolarPower Europe
Leading the Energy Transition