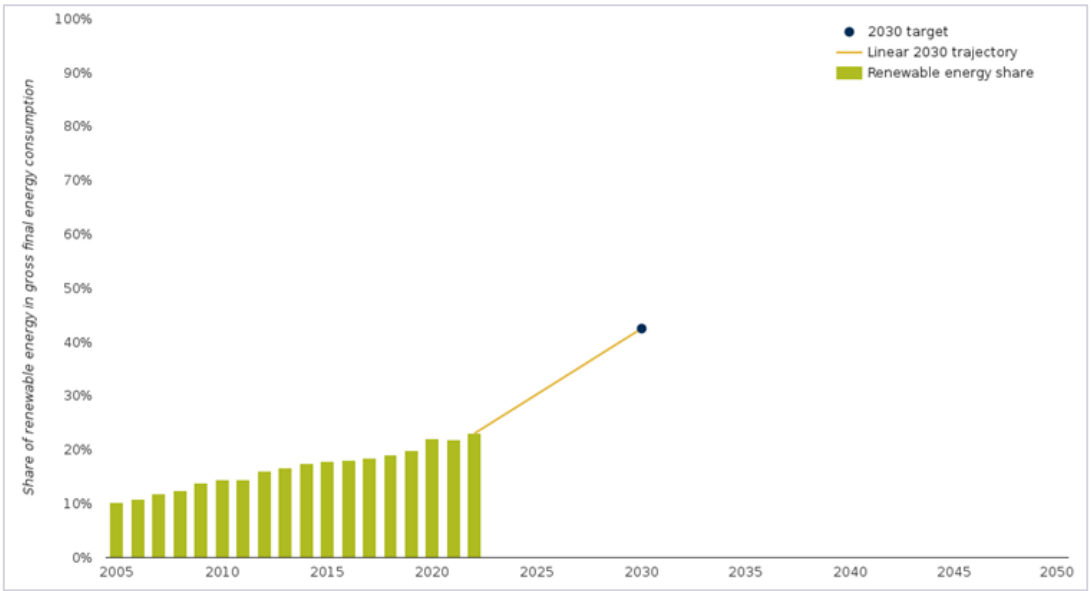
How Adhesive Tapes support the Clean Energy Transition

The **global energy crisis** continues to make headlines. Multiple issues over the past couple of years like the pandemic and geopolitical conflicts have led to spikes in coal, oil, natural gas, and electricity prices.

While we are already in the midst of the transition to renewable energy, these factors have further accelerated the need to **de-fossilise the energy sector**. In fact, for the chemical industry as well, the road to achieving net-zero targets by 2050 is largely dependent on the **availability of renewable energy**.

Image credit: Microsoft designer

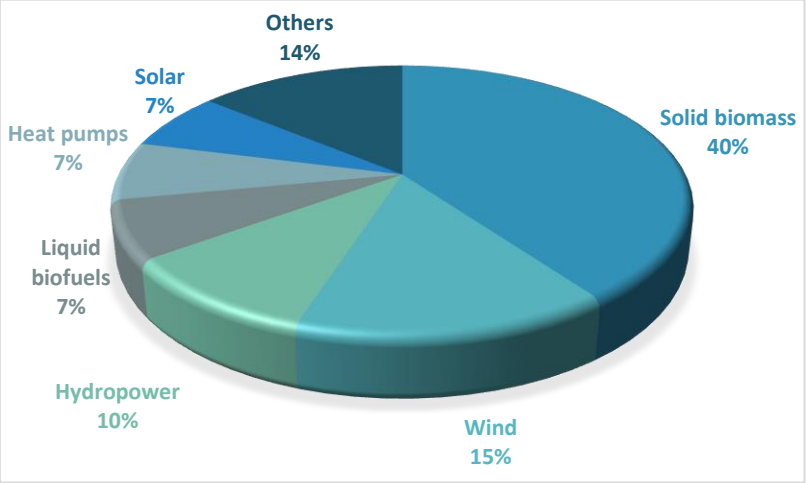
In Europe, since the introduction of the Renewable Energy Directive, the share of renewable energy sources in EU energy consumption almost doubled from 2010 (12.5%) to 2022 (23%). That shows good progress but given the urgency to drive **EU's clean energy transition**, the directive was revised in 2023 and a **challenging target of 42.5%** was set for 2030. Reaching the new target will require a very challenging CAGR of 8% on the share until 2030.[1]



Progress towards renewable energy source targets for EU-27
Image credit: European Environment Agency

The renewable energy sector is gearing up to expand capacity to meet this ambitious target. Here, the chemicals and materials sector, including the **adhesive tapes industry**, can contribute and support the production of essential parts and components for scaling up operations.

In Europe, multiple **renewable energy sources** contribute to the total renewable energy supply. According to data from Eurostat (2022), the main sources include solid biomass, wind, hydropower, and solar amongst others.



Renewable energy sources – Eurostat (2022)

Various market research reports suggest that 'adhesive tapes for the renewable market' is on a strong growth trajectory, particularly in the **wind and solar industries**. This is driven by factors such as the ever-growing demand, technical advances, and regulatory support.

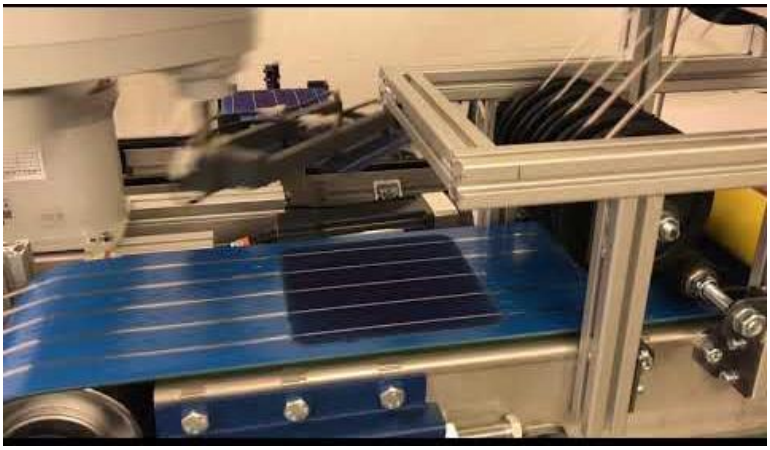
Innovative tape solutions for the solar photovoltaic market

Tapes are used in the manufacture of photovoltaic cells and the integration of solar panels. During the production of solar cells, adhesive tapes prevent them from slipping during the vacuum and lamination process. Also, **tapes offer a convenient alternative** to traditional methods used for mounting solar panels such as mechanical fasteners that require drilling holes and make the cells bulky.

The solar power industry is evolving rapidly, with innovative approaches like **flexible solar panels** gaining traction. These new panels will utilize high-performance adhesive tapes extensively. Unlike traditional fasteners, these tapes offer the flexibility necessary to produce efficient and adaptable solar panels.

An innovative example of the application of these flexible solar panels comes from **OPES Solutions**. They recently established a new company – OPES Solar Mobility – aiming to make transportation more sustainable with flexible solar panels. They've developed the SolFlex solar module, which is ideal on curved surfaces due to the flexible design and **double-sided adhesive tape** tested by **Fraunhofer CSP**.

Another recent innovation from the manufacturing side comes from the Swedish start-up, **Sticky Solar Power**. They shared details of their innovative "Tape Solution", which uses 60% less silver than conventional processes. In this process, an **adhesive tape with an attached copper wire** is used. The machine places solar cells upon the tape eliminating the need for single cell soldering. Instead, the soldering occurs during the lamination, eliminating the need for silver.



The tape solution by Sticky Solar Power - Interconnecting solar cells at low cost

Tapes in Wind Power Industry: Addressing the need for reliable bonding in harsh environmental conditions

Adhesive tapes find use in the manufacturing, installation, and maintenance of wind turbines. The growing demand for both **offshore and onshore wind power** is expected to further drive the demand for adhesive tapes in this sector.

Masking Tapes for Mould masking and Mould release	Single- and Double-sided Tapes for Blade production	Single- and Double-sided Tapes and Films for Blade protection

Tape solutions for wind turbines

In addition to providing erosion protection, high-performance adhesive tapes also play a key role in **bonding exterior attachment parts** ensuring the longevity of rotor blades in harsh conditions. These include:

- Vortex generators that optimise the airflow around the blade root
- Serrations that reduce blade noise and vibration
- Gurney flaps that optimise lift, drag, and moment coefficient

Specialised tapes for the renewable energy market: Commercial examples

Several tape manufacturers have developed comprehensive tape solutions to meet the requirements of the solar and wind energy markets. Some of the commercially available examples are listed in the table below.

Tape Manufacturer	Specialised Tape Solutions for Renewable Energy Market
3M	3M™ Charge-Collection and Bus Tapes 3M™ Solar Acrylic Foam Tapes 3M™ Dielectric Tapes 3M™ Specialty Tapes 3M™ VHB™ Foam Tapes
Lohmann GmbH & Co.KG	Adhesive tape technologies for renewables
Saint-Gobain Tape Solutions	Norgard™ front sheet ETFE film Adhesive tape solutions for renewable energy
Stokvis Tapes	PSA Tape solutions for solar panels and wind turbines
Tecman Advanced Material Engineers	Adhesive tape solutions for solar panels and wind turbines
tesa	Tape solutions for: Wafer-based solar modules Thin film solar modules Next-generation solar modules Wind energy (mould preparation) Wind energy (lay-up and infusion process) Wind energy (rotor blade finish)
Trayma	Adhesive tape solutions for solar panels and wind turbines

Table 1. Adhesive tape solutions for Renewable Energy: Key players in the market

Conclusion

With continued regulatory support and technical advances, the demand for adhesive tapes in the renewable energy market is expected to grow further in the coming years. Their multifunctionality supports the needs of the ever-evolving and growing clean energy segment, especially the solar and wind energy sectors.

In summary, adhesive tapes contribute to efficient, reliable renewable energy systems.

References:

[1] https://www.eea.europa.eu/en/analysis/indicators/share-of-energy-consumption-from