Strong trends toward energy transition may act as game changer in the wax industry

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Global energy and chemical markets are currently making strong advances toward energy transition, which seemed more like blue-sky thinking until 2020. The economic and health crises in 2020 have recentered the attention of the players in the chemicals and energy market toward protecting the global ecosystem and regeneration. The wax industry is also advancing toward cleaner, sustainable, and circular products, which could potentially reshape the future of this industry.

As the supply of petroleum wax continues to tighten, synthetic and natural waxes have stepped up to fill in the supply gap. Do these waxes also align with the global trend toward sustainability and regeneration? And are consumer preferences changing in favour of end-products with low carbon footprints and green products?

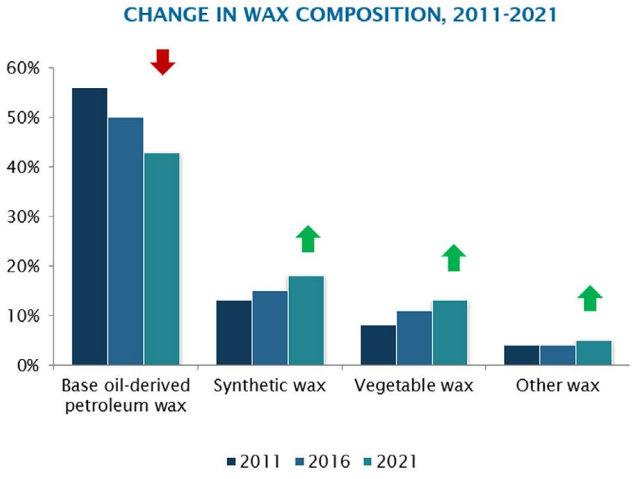


***Figure 1:** Change in wax composition, 2011-2021, Source: Kline & Company's Global Wax Industry: Market Analysis and Opportunities report.*

The good news is that some waxes produced via synthetic and natural processes may have the ability to offer sustainable solutions to end-customers in this industry. Synthetic waxes that are produced via the Fischer-Tropsch (FT) process and polymerisation of ethylene have relatively lower carbon footprints, as the source material for these waxes is typically natural gas. These waxes are also free from toxic impurities such as polycyclic aromatic hydrocarbons, sulphur, and heavy metals, which may be found in petroleum waxes.

Polyethylene (PE) waxes currently upstage other synthetic waxes when it comes to offering innovative sustainable products. Byproduct PE waxes that are produced via thermal cracking of waste plastics replace the "end-of-life" concept with "regeneration" in the plastics industry -- one of the most vexed industries for waste generation. Thermal cracking or pyrolysis of waste plastics into oils and waxes is gaining immense attention. Several new players are entering this market around the world, such as GreenMantra in Canada and Clariter in Europe.

Additionally, nearly every large chemical company — Dow, BASF, Shell, ExxonMobil, LyondellBasell Industries, Sabic, Ineos, Braskem, and TotalEnergies, to name a few — either has joined hands with a smaller firm in developing a process or is creating its own.

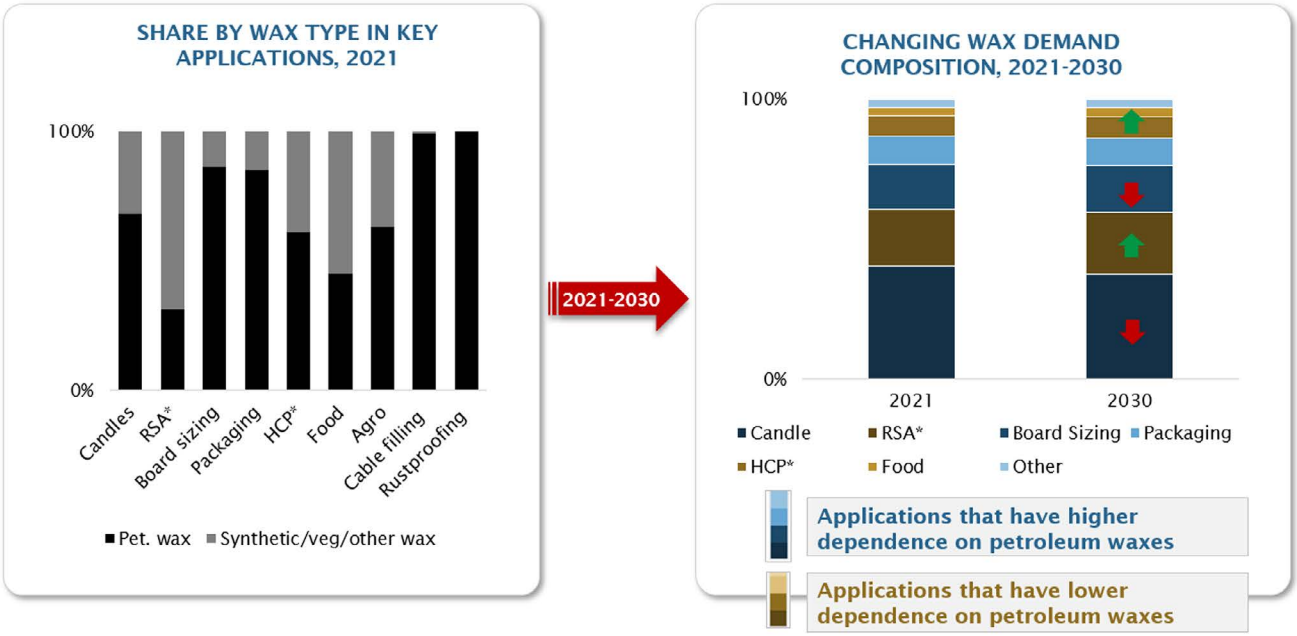
Figure 2:

The wax market has also recently seen the introduction of new revolutionary bio-based polyethylene (PE) waxes. This type of wax is produced from plant-sourced ethanol, a 100% renewable source. This wax can assist end-users in adhesives, cosmetics, coatings, and compounding markets in reducing their carbon footprints. In June 2021, Braskem, a Brazilian petrochemical company, introduced a sugarcane ethanol-based bio-PE wax product to its *I'm green*™ branded product portfolio.

Demand for such products in the future will be drive driven by PVC manufacturers who are introducing bio-based PVC products to their portfolios and are looking for bio-based solutions for PVC lubrication. Bio-based PVC technology has surfaced recently with eminent PVC manufacturer INEOS' INOVYN business at the forefront of it with its BIOVYN branded bio-PVC products.

Natural waxes, such as palm and soy, that are produced from renewable plant-based sources and carry a green label on them, are doing exceedingly well in candle applications. These waxes are also gaining tailwinds in cosmetics, food-based packaging, and coatings applications, driven by their suitability for food contact. Natural waxes have historically advanced only in application areas that consume softer waxes, due to their lower melting points. However, the growing desire of wax consumers to use sustainable ingredients in other applications that have been traditionally served by harder, high melt-point waxes, will drive up their demand in the long term. Clariant's Licocare rice bran wax, which is targeted at high melt applications such as masterbatches, is a striking example of the kind.

How will the wax industry acclimatise to the new sustainable and circular environment? What roadblocks can possibly slow down the adoption of waxes with low-carbon footprints?



**RSA-Rheological and Surface Applications (PVC, tire/rubber, hot-melt adhesives, coatings, paints, masterbatches, and others.*

HCP-Health, Cosmetics, and Personal Care.

***Figure 3:** Source: Kline & Company's report titled Global Wax Industry: Market Analysis and Opportunities.*

The wax market has historically exhibited versatility and adeptness in absorbing non-petroleum waxes in the absence of a sufficient supply of petroleum wax. In the future, it is estimated that wax customers in traditional candles or board sizing applications, who are sensitive to changes in the supply or price of wax, will experience a more significant impact. These applications will find it tougher to transition toward more expensive alternatives to petroleum wax, such as FT waxes. These applications are driven by end-consumer discretion, have low barriers to entry, and are also vulnerable to substitution in the long run.

In contrast, rheological and surface applications, such as PVC, hot-melt adhesives, masterbatches, inks, paints, and coating, are higher-value applications that offer higher barriers to entry. Such markets in the long run will have higher flexibility to absorb cleaner or sustainable products, such as synthetic waxes or even chemically modified plant-sourced waxes, which are typically more expensive.

A foreseeable challenge in transitioning toward clean and sustainable waxes could arise due to the raw material limitations of these waxes. Both synthetic, as well as plant-sourced, natural waxes could possibly see supply limitations in the long-term future due to several reasons. For example, in FT waxes, nearly half of the global supply is met by Chinese coal-to-liquids (CTL) plants that convert coal to syn gas for producing waxes and other products. These plants are not likely to see any capacity additions beyond 2030, as China tightens its carbon emission limits to meet its carbon neutrality targets by 2060. Other synthetic wax suppliers, such as thermal degradation PE producer, may see lower volumetric growth due to raw material issues. The raw materials (plastic waste) that these plants consume are non-uniform in nature, resulting in lower-quality finished products. While these waxes may be able to meet the circular economy objective, they may miss achieving the required quality standards for several applications.

Vegetable oil-derived waxes may seem to hit the nail on the head, as they are plant sourced. However, these waxes will also have their own limitations in the future. Growth in palm plantations, from which palm wax is derived, has been termed "the other oil spill," as it has resulted in large-scale deforestation of tropical forests in Asia. Negative consumer sentiments associated with palm plantations are likely to hamper the growth of palm waxes in the future. Soy waxes are produced from soy oil, which is also seeing growing demand from other competing markets such as fuels and food. This could restrict the availability of soy oil for producing wax in the future.

Energy transition trends will provide a new spin to the wax market

The ever-complex wax market is in for new challenges as the energy and chemicals markets move toward clean and green products. The consumers in this market are increasingly demanding materials that are produced from cleaner and renewable sources. The suppliers, at the same time, are trying to exhibit their commitment to protecting the global ecosystem by including new, innovative products based on renewable and recycled sources. With a reinforced global wave toward sustainability and circular economy, the wax industry finds itself at the dawn of a new era where the goals of wax market participants will coalesce with sustainability targets.

These wax industry insights are sourced from Kline & Company's recently published, in-depth report, *Global Wax Industry: Market Analysis and Opportunities*.

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