



Protecting  
so much more  
than your  
product

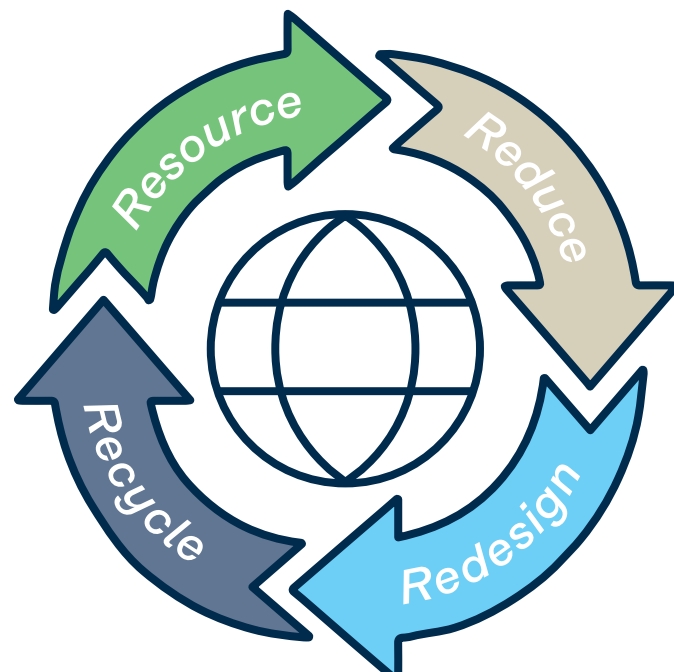
[eval.kuraray.com](http://eval.kuraray.com)

**kuraray**  **EVAL™**



## Kuraray and EVAL™

As the impact we create on our environment becomes an ever greater concern, the world continues to look for solutions that are truly sustainable. At Kuraray Co., Ltd. we're committed to contribute to an improved natural environment and quality of life. We're involved with our local communities. We monitor and work hard to reduce the resources we use, and carefully control and target reduced emissions.



We're proud of these achievements, but what really sets us apart is our pioneering and often unique technologies, bringing value to our customers and to the world. **This is the story of just one of them, EVAL™ EVOH. And this is how it works:**

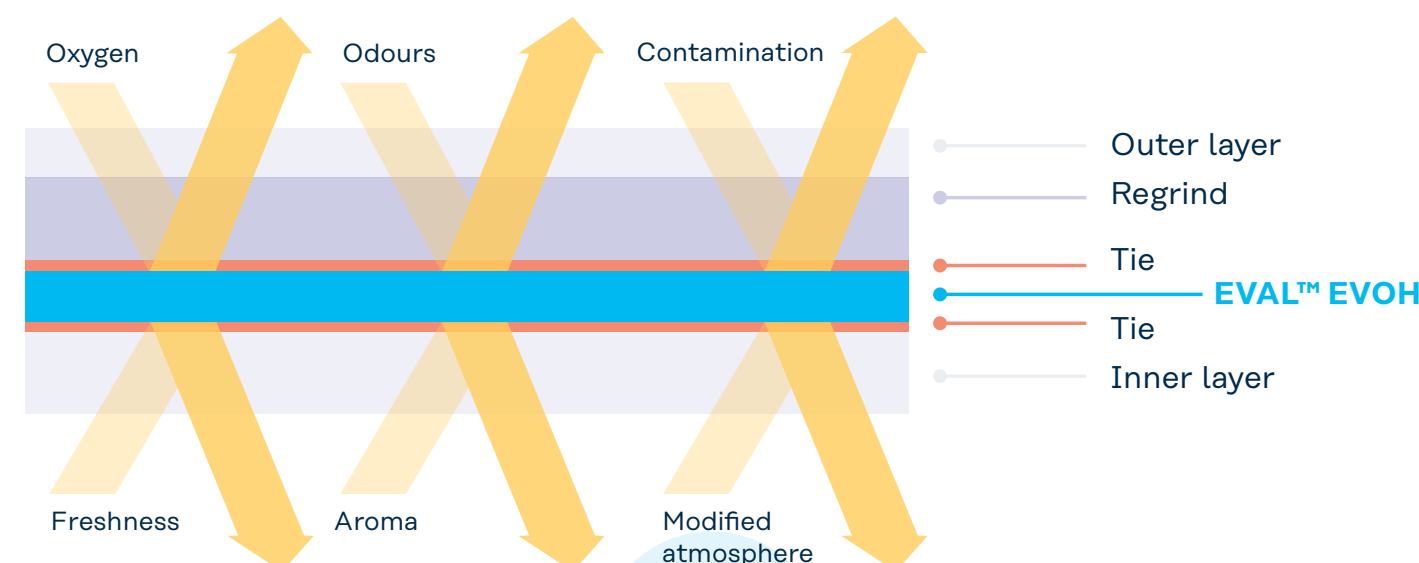
**10m LDPE = 1mm EVAL™ EVOH**

Imagine a plastic wall that is 10 metres thick. Not very much is going to get through a barrier like that. Now imagine that the same protective function can be realised with only 1 mm. With EVAL™ EVOH it can. In fact, it normally takes just a few microns of this EVOH copolymer to create an amazingly effective gas and aroma barrier. In which applications does it add function and what does it mean for the environment? The answer is simple: take any valuable material that needs a protective gas or aroma barrier around it. Like food or cosmetics or vitamins. Even the fuel in your car. A very thin layer of EVAL™ is enough to do the job.

## Building better barriers

EVAL™'s barrier properties give more performance per thickness than any conventional polymer, and the barrier function works in both directions.

- ➔ Freshness, aroma and modified atmosphere are locked inside where you want them.
- ➔ Oxygen, odours and contamination are kept outside where they belong.



### NOTICE

The information, specifications, procedures, methods and recommendations herein are presented in good faith, are believed to be accurate and reliable, but may well be incomplete and/or not applicable to all conditions or situations that may exist or occur. No representation, guarantee or warranty is made as to the completeness of said information, specifications, procedures, methods and recommendations or that the application or use of any of the same will avoid hazards, accidents, losses, damages or injury of any kind to persons or property or that the same will not infringe patents of others or give desired results. Readers are cautioned to satisfy themselves as to the suitability of said information, specifications, procedures, methods and recommendations for the purpose intended prior to use.



## EVAL™ adds value to a product life cycle

Let's see how we can put some EVAL™ barrier to good use, and just how useful it can be throughout an entire product life cycle.

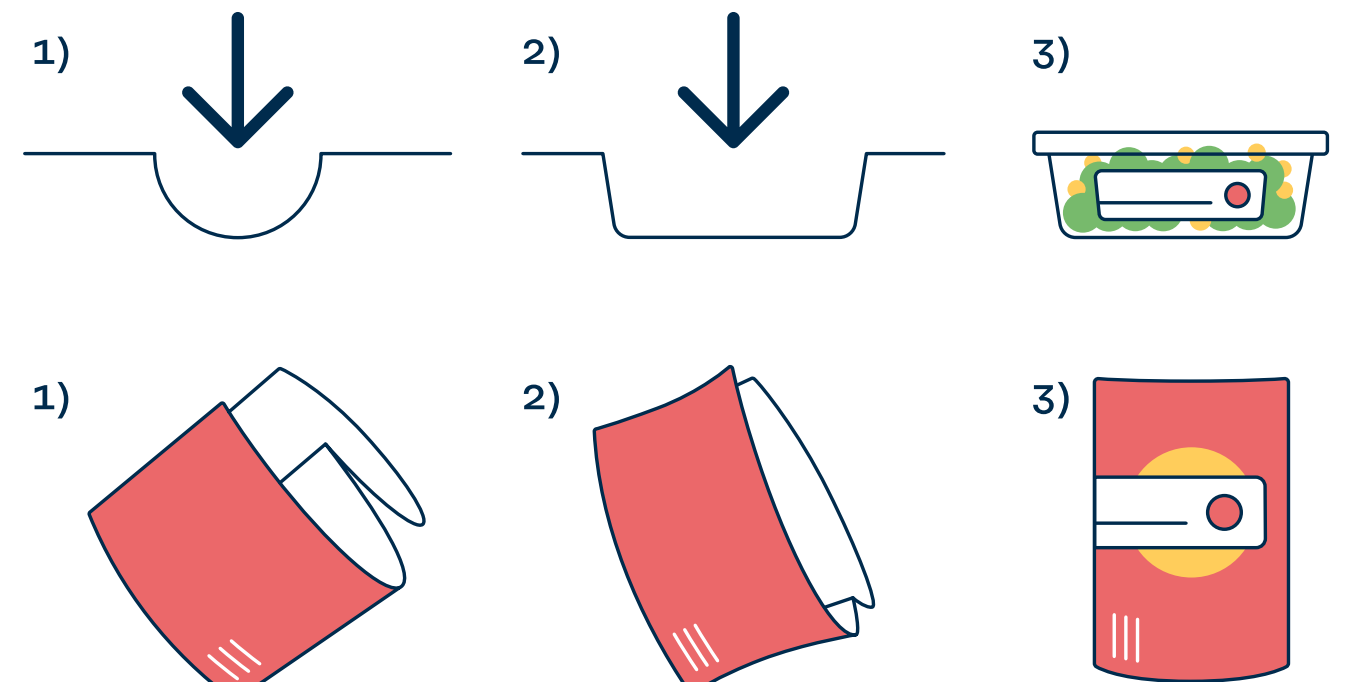
### Protecting environment and productivity

As just one example, take something good for us, like vegetables. Already in the farm field, **high-barrier mulching films containing EVAL™** help get things off to a good start. Barrier films containing EVAL™ keep fumigants in the soil where they're needed. The barrier is so effective compared to standard films that the agricultural industry created the term TIF™ (totally impermeable film). An EVAL™ layer of just a few microns **helps increase production yields, reduce the amount of chemicals released into the environment, and increase the amount of safely cultivable land.**



### Attractive and functional design

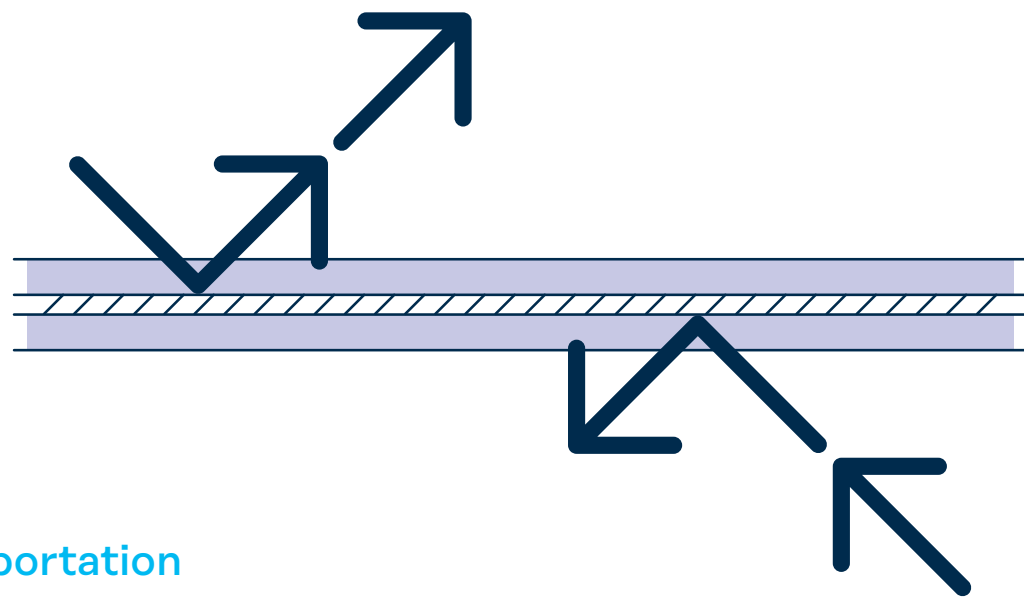
Now that we are ready for packaging, another very thin layer of EVAL™ will be enough to ensure that our vegetables get out the store with their freshness intact. **We have all the freedom we need to design an attractive yet functional packaging for our vegetables.** Choosing plastic makes it even easier to create just the right packaging size and shape. Almost any form is possible. Cup, tray, stand-up-pouch or another type of food packaging? Whatever your choice, our EVAL™ team can help you develop the optimum structure of your packaging.



## Protecting quality and value

So what are the benefits? First, the quality and vitamins of the vegetables inside the pack are **protected against oxygen and odour**, avoiding spoilage and prolonging freshness. Second, since it takes only tiny amounts of EVAL™ to do the job, it is easy to **design packaging that uses fewer resources and weighs much less**, without losing its protective function.

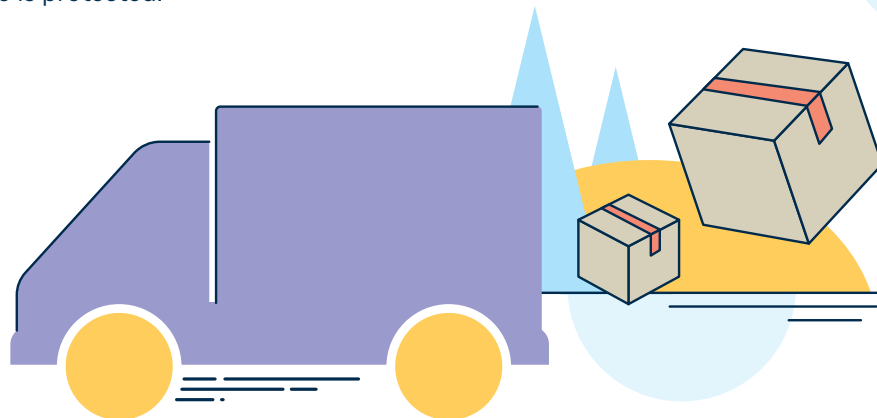
Although normally associated with multilayer plastic structures, thin multilayer films containing EVAL™ can add functional barrier properties to almost any substrate, including renewable materials like PLA or paper and carton.



## Efficient transportation

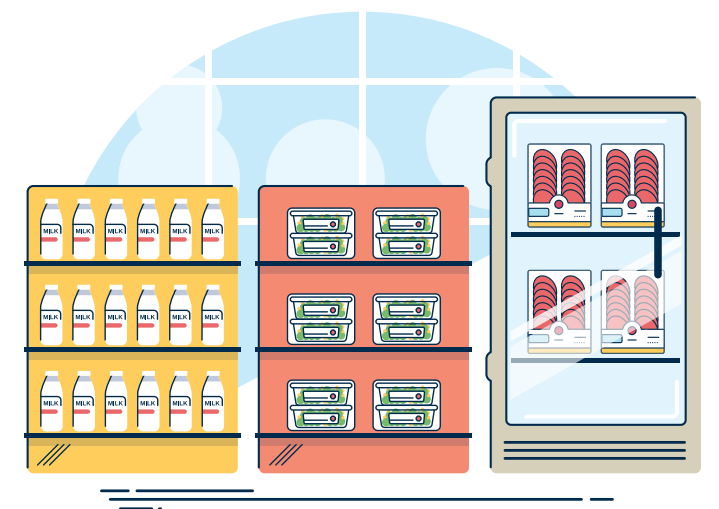
Packaging containing EVAL™ can be adapted to just the right size, shape and proportion, making packing, transport and distribution as efficient as possible. In other words, **lighter weight and smarter designed packaging means fewer trucks on the road for the same amount of value**. And that is definitely a good thing.

Moreover, during transport EVAL™'s outstanding barrier properties protect our vegetables against outside odors and contamination. That way, they remain fresh, and all the hard work and resources that were invested aren't wasted. Every step of the way, the product's quality and value is protected.



## Easy storage, prolonged freshness

Once our packs have arrived at the store, their optimized shapes fit perfectly on the display shelves. For some products, using EVAL™ means it is **no longer necessary to use refrigeration**, saving energy. Even better, thanks to EVAL™, **the product freshness is maintained without the need for artificial additives and conservatives**. The vegetables can be safely stored and displayed for longer periods of time.



## Better packaging means reduced waste, conserved resources

Packaging is all about getting the product to you, fresh and intact. The worst thing we can do for the environment is let the vegetables go bad, which would waste all the many resources invested in them up until now, including any inappropriate packaging. That is no small achievement considering that in the developing world up to 50% or more of food is wasted before it can even be consumed. Even in the developed world, up to 30% of the food we buy is thrown away. **Using functional packaging in the correct portion size is a great way to reduce waste and save resources.**

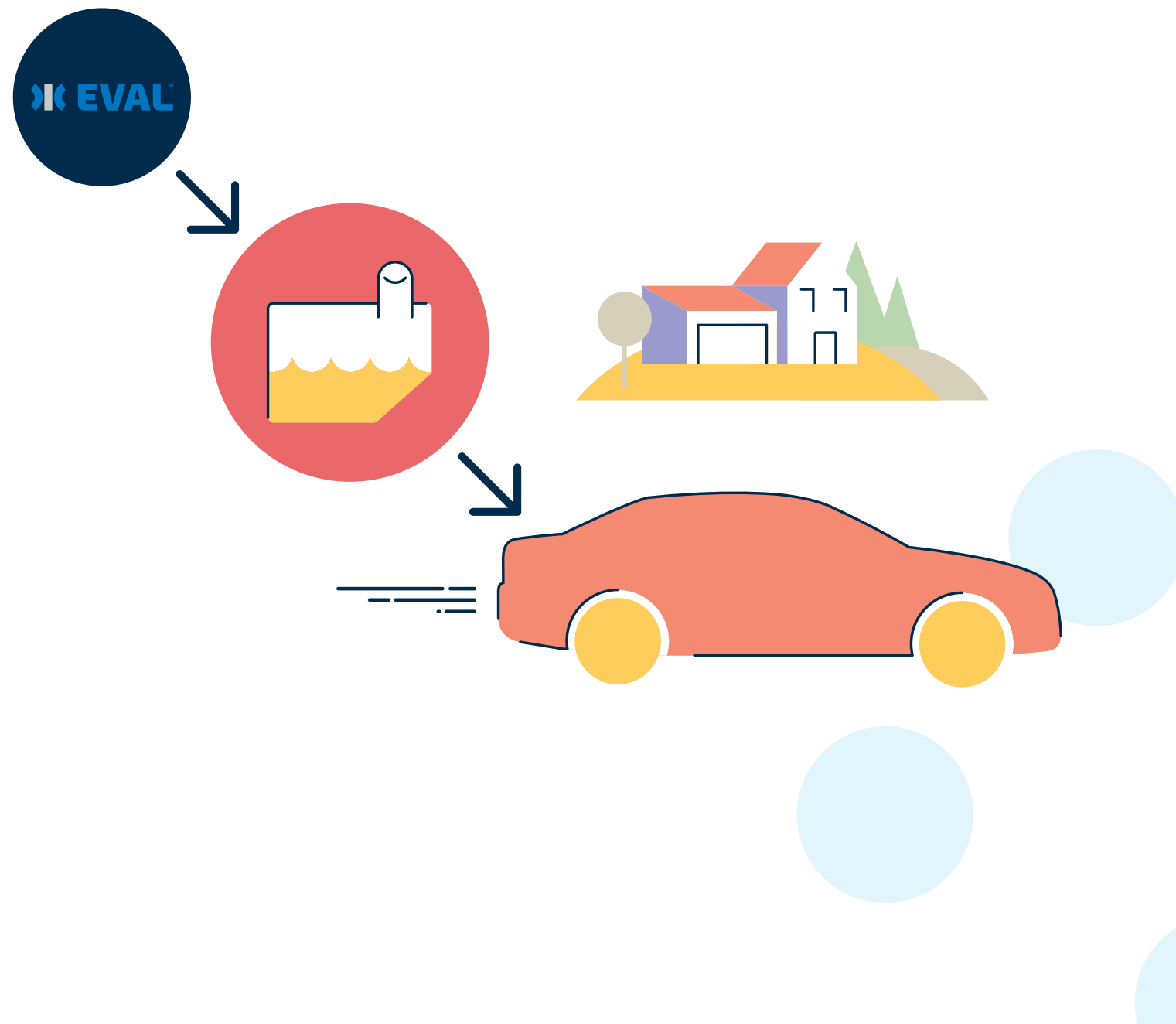


**Less waste**

## Convenient and reliable

Now that we have purchased the vegetables, it is time to take them home. Lightweight and flex-crack resistant plastic packaging is easy to carry, and won't break in your car on the way home. **The EVAL™ barrier layer makes sure that the integrity of the barrier remains unharmed during transport, handling and storage or even when the package is folded.**

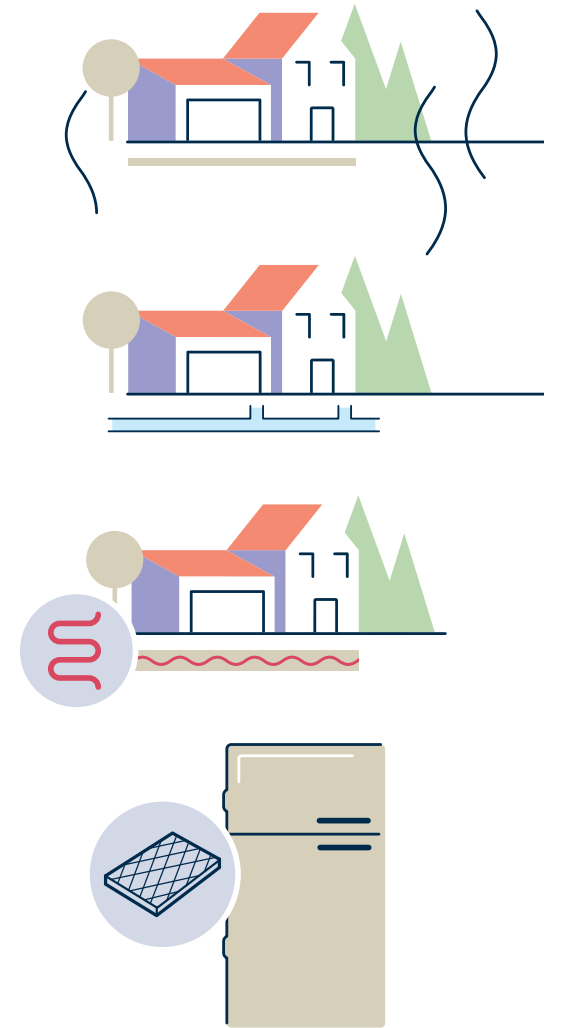
You may not know it, but it's very likely there's a layer of EVAL™ hard at work in your car's plastic fuel tank. **The lighter weight of the fuel system helps make your car more fuel efficient, while the EVAL™ layer makes sure that the fuel vapor stays inside** to run your car instead of permeating out into the atmosphere.



## Energy-efficient and safe

**Even in your home, EVAL™ may be hard at work, helping to keep your living environment safe and efficient:**

- Barrier liners below the foundation help keep harmful radon gas from penetrating inside.
- EVAL™ used in district heating pipes helps them to remain energy efficient and prolongs their life time.
- EVAL™ also keeps oxygen out of underfloor heating systems, avoiding corrosion and helping it run longer.
- Even in your fridge, high-tech insulation panels containing EVAL™ keep your opened bottles, packs, pouches or cups cool in an energy-efficient way.



## Efficiency means savings

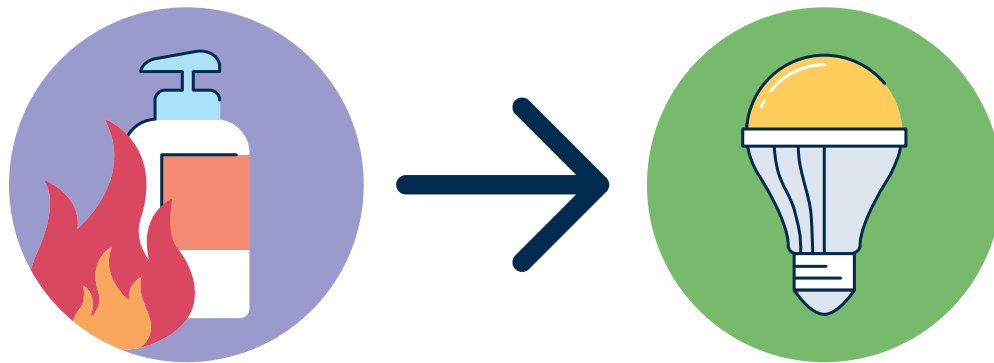
We've seen how EVAL™ can add real function at all stages of a product's life cycle. From field to fridge to fork, EVAL™ helps reduce the amount of resources used, use energy more efficiently and makes sure the product gets to you with all its flavor, vitamins and value intact. **All this efficiency means less impact on the environment, but also means more cost savings for you.**





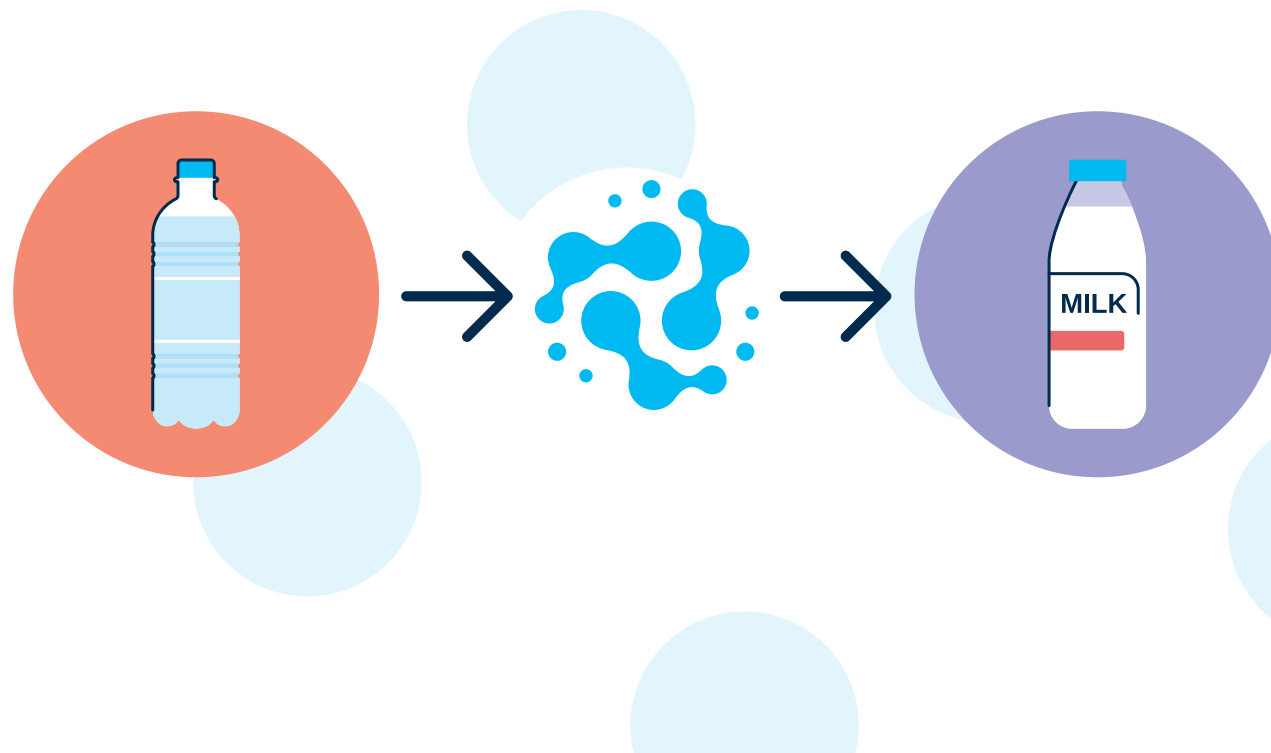
## Energy recovery

Eventually, the life of the packaging comes to an end, but the story is not completely finished yet. **Even at end of life, EVAL™ still has some energy and function left.** If not used for recycling, the energy stored in EVAL™ and the rest of the packaging can be recovered.



## EVAL™ is recyclable

If not used for energy recovery, plastic packaging containing EVAL™ can be broken up into pellets and used in regrind material. **EVAL™ will not disrupt polyolefin recycling streams.** In post-industrial recycling, many thicker multilayer sheet and bottle applications usually already include a structural regrind layer that mixes polyolefins and EVAL™. Post-consumer recycling is the next step forward.



## Reduce impact on the environment by adding functional value

- ➔ EVAL™ allows for lighter weight packaging without losing functionality.
- ➔ EVAL™ maintains freshness and prolongs shelf life.
- ➔ EVAL™ allows packaging that is safe, reliable and convenient even while making it more effective.
- ➔ EVAL™ protects quality, and helps assure that value arrives intact.
- ➔ EVAL™ is recyclable and recoverable.
- ➔ EVAL™ helps conserve resources and avoid waste, reducing impact throughout the product life cycle.

### Did you know?

EVAL Europe N.V. (Kuraray's European EVOH production plant in Antwerp, Belgium) obtained ISCC-PLUS certification, enabling the market introduction of EVOH from renewable resources (Bio-circular EVOH).



## Protecting so much more than your product

- ➔ Reduce weight
- ➔ Prolong freshness
- ➔ Protect value
- ➔ Add function
- ➔ Reduce waste
- ➔ Minimize environmental impact

Learn how EVAL™  
can help you reduce  
impact on the  
environment at  
[eval.kuraray.com](http://eval.kuraray.com)

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