

EXECUTIVE SUMMARY

# Predicting Policy for Sustainable Materials

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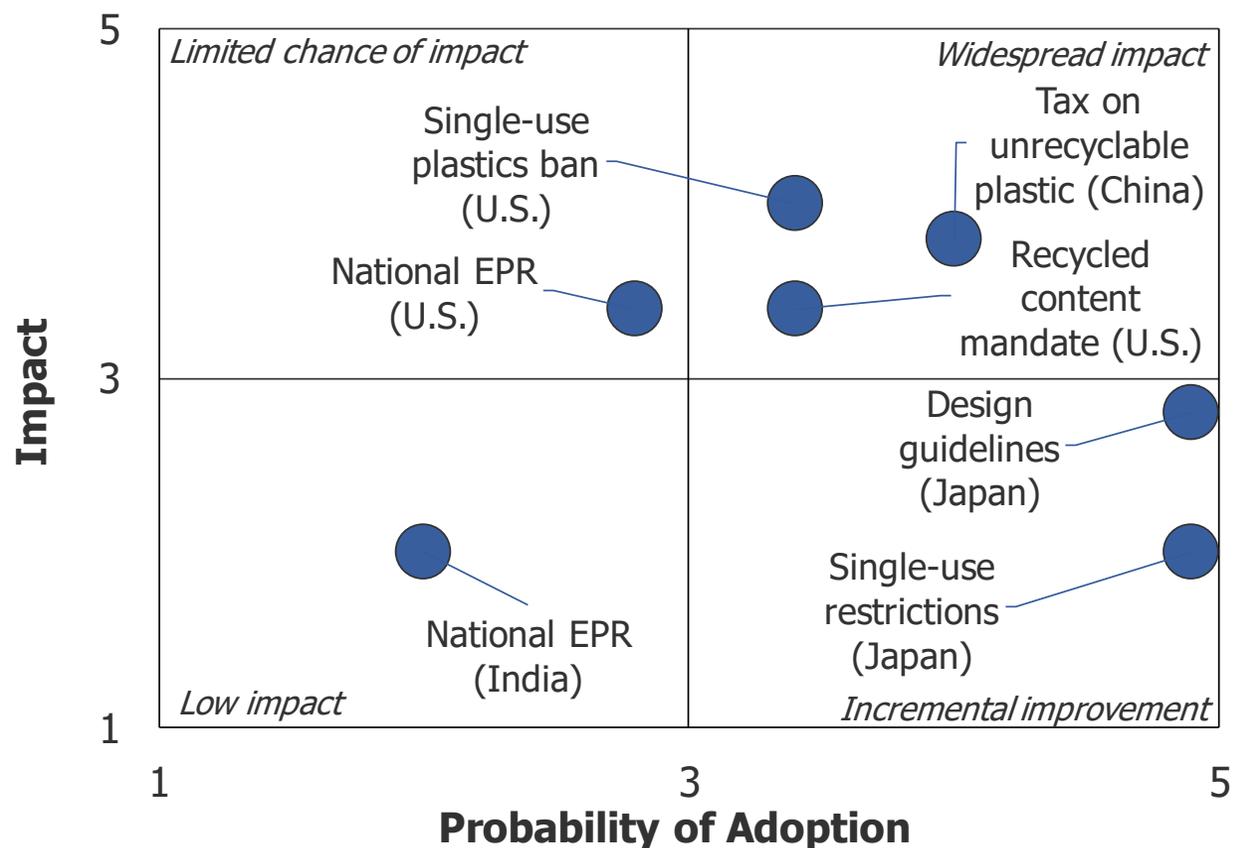
# Executive Summary

Over the past few years, sustainability has become a priority for innovation teams in materials and chemicals as well as consumer-facing industries like apparel, food, and beauty. Policy is increasingly the core driver of sustainability efforts.

We developed a qualitative framework to assess policies, based on impact and probability of adoption. Extended producer responsibility (EPR) schemes and taxes on unrecyclable plastic stand out in terms of total impact, while single-use plastic bans are most likely to proliferate.

Clients should watch for a potential tax on unrecyclable plastics in China and a federal ban on single-use plastics in the U.S. The uncertainty around the implementation of EPR type policies in the U.S., Japan, and India limits the impact for now.

## Analysis of potential policy



# The goal of this report is to provide a framework for predicting the spread of regulation

The evolution of the regulatory landscape is not a simple thing to forecast, as political and economic factors play a huge role in determining outcomes. This challenge is further complicated by both murky understanding of the science on the part of the legislators who are typically responsible for major regulations and the wide range of possible outcomes that could be viewed as “sustainable.” While the report will make some specific predictions about upcoming regulations, the goal is to give clients a framework to conduct their own analysis and make predictions about the future of regulations.

To do this, we have developed a qualitative framework to assess policies, described on the next slide. This framework is built on a few core beliefs about policy:

- **Simple policy is more likely to spread than complex policy.** Complexity is a burden on governments and corporations and creates opportunities for failure. Simple policies with visible impacts are more politically attractive.
- **Revenue-generating policy is more likely to spread than cost-creating policy.** While some nations are tax-averse, policies that can raise revenues or offset the costs of waste management are generally beneficial to governments and thus more likely to be adopted.
- **Some countries and regions are policy pioneers.** There are a handful of governments that are out ahead of their peers, such as the EU and California, and these groups often set the tone for other regions.
- **Policy that achieves its stated goals is more likely to spread than policy that does not.** At the risk of stating the obvious, policy that can demonstrate its outcomes is easier to defend. We focus on stated goals rather than more wide-ranging (but contentious) measures of overall sustainability. One can argue the sustainability of plastic bags, for example, but bag bans are effective at achieving their goal of eliminating these items.

# We evaluate policy on four factors to gauge how likely a regulation is to spread

## Ease of adoption

Assesses the regional specificity of the policy and determines how easily it could be implemented elsewhere as follows:

- 1 = Major political and implementation barriers*
- 3 = Some political and/or implementation barriers*
- 5 = No political or implementation barriers*

## Anticipated cost

Assesses the current or projected cost of the policy for the implementing government as follows:

- 1 = More than \$5 billion in expenditures*
- 2 = \$1 to \$5 billion in expenditures*
- 3 = No major expenditures or revenue*
- 4 = \$1 to \$5 billion in revenue*
- 5 = Revenue over \$5 billion*

## International reputation

Assesses both the size of the governing body instituting the policy and that body's track record of spreading regulation:

- 1 = Small body with no policies spread*
- 3 = Modest size or few policies adopted*
- 5 = Large body with a clear track record of spreading policy*

## Impact

Assesses if the outcomes of the policy have aligned with the goals, and if so, how substantial the changes were:

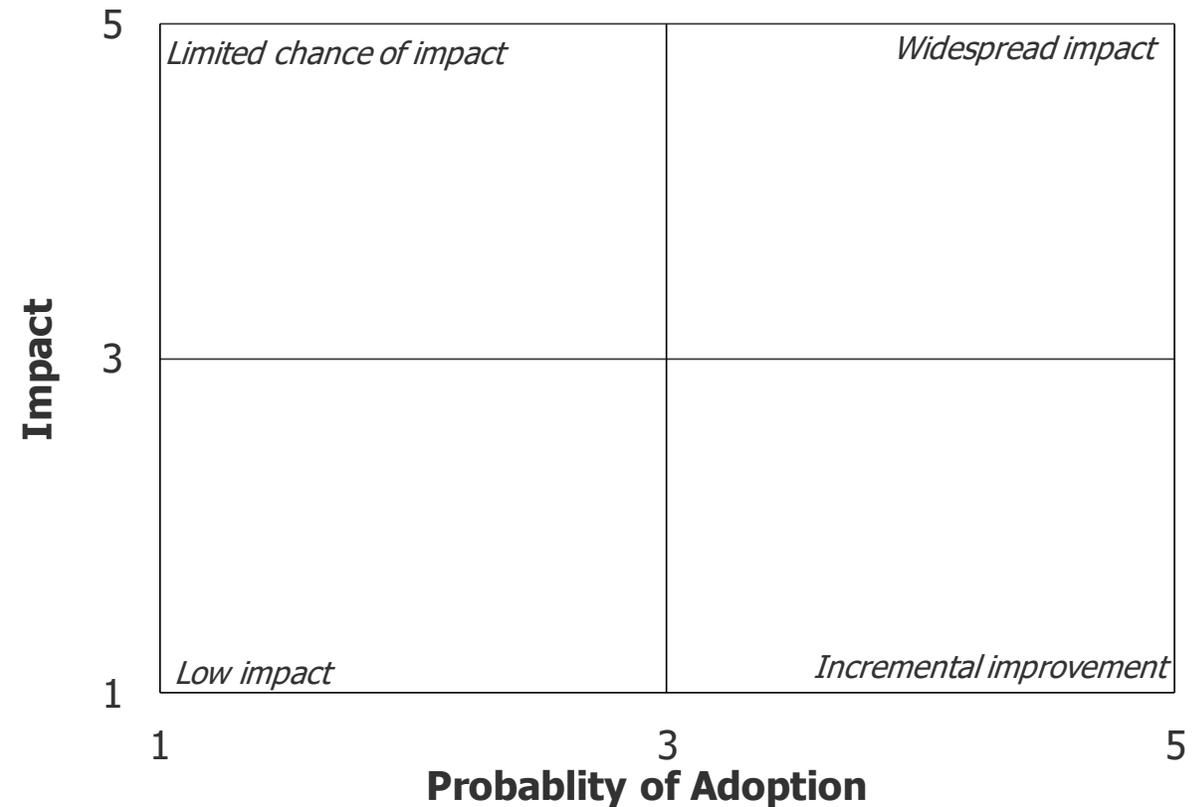
- 1 = Outcomes don't align with policy goals*
- 3 = Outcomes align with goals and create moderate change*
- 5 = All the outcomes align with goals and create major impact*

# We use these four scores to obtain a composite probability of adoption score for policy

The four scores from the previous slide are combined to obtain a composite probability of adoption score. We weight the costs more heavily, as these are often a contentious issue. To make predictions about policy, we map the impact score and probability of adoption score to a two-by-two framework, shown at right. The different quadrants represent our overall take on the future effects of different policies. The impact of the regulation does contribute to both axes – while unusual, this reflects our view that impactful regulations will be more likely to spread.

Factors	Weight
Ease of adoption	25%
Anticipated cost	35%
International reputation	15%
Impact	25%
Probability of adoption	100%

## Policy analysis framework



## SUMMARY AND PROBABILITY OF ADOPTION

# Single-use plastics ban

## Europe, 2019

The region is moving toward banning certain single-use products where alternatives are readily available, some beginning in 2021 and the rest implemented as the European Commission (EC) sees fit. The immediate ban list includes plastic cutlery, plates, stirrers, straws, cotton swabs, balloon sticks, cups, expanded polystyrene (EPS) takeout boxes, and all oxodegradables.

The goal of this ban is to reduce the impact of plastic products on the environment, particularly the marine environment, and on human health.

### Ease of adoption score: 5

While relatively easy to implement, single-use plastic bans must overcome significant political pressure from producers of the banned materials.

### Anticipated cost score: 3

While producers and consumers will generally face higher product costs due to higher prices of alternative materials, the EU will face minimal expenses beyond accounting and enforcement.

### International reputation score: 5

The EU is often at the forefront of sustainability policy ideation and seen as a testing ground for the rest of the world. Several sustainability-focused EU policies have been adopted by the international community in recent years.

### Impact score: 4.5

The EU's single-use plastic ban is forcing producers to transition toward nonplastic materials, significantly reducing the region's plastic waste generation. This will have the intended impact of reducing the quantity of plastic waste in the environment.

### Probability of adoption overall score: 4.3

The EU's single-use plastic ban is the most impactful form of single-use bans implemented to date. As has already been seen in Canada and the U.S., it is very likely to spread with minimal modification.

## SUMMARY AND PROBABILITY OF ADOPTION

# Single-use plastics ban China, 2020

The country is moving toward banning certain single-use products where alternatives are readily available, affecting certain industries immediately, with widespread implementation by the end of 2022. The ban list includes all plastic bags, cutlery, plates, stirrers, straws, and cotton swabs, EPS takeout boxes, and daily chemical products containing microbeads. Notably, plastics China classifies as biodegradable, including partially compostable materials like PLA, have been excluded from the ban.

The goal of this ban is to increase the production and usage of easily degradable materials.

### Ease of adoption score: 3

While relatively easy to implement, single-use plastic bans must overcome significant political pressure from producers of the banned materials. China's ban must also ensure local buy-in for the buildup of compostable EOL options to address the biodegradable plastic exception.

### Anticipated cost score: 2

The Chinese government will need to spend billions to build up and educate its consumers about a plastics composting EOL system. Such systems, designed for plastic rather than conventional organic waste, will likely require government funding to remain afloat.

### International reputation score: 3

Though its sustainability agenda is often ridiculed by the West, China's sustainability-focused policies have had a significant influence over much of Asia, especially India. Its size is also enough to move markets by itself.

### Impact score: 3

While China's single-use plastic ban will have the intended effect of increasing the production and usage of easier-to-degrade materials, the significant lag time in building up a composting EOL system will make the potential environmental benefits of the policy moot.

### Probability of adoption overall score: 2.65

While China does have a significant influence over its region, the low environmental impact of its single-use plastics ban makes the policy unlikely to spread without modification.

## SUMMARY AND PROBABILITY OF ADOPTION

# Recycled content mandate

## Europe, 2019

The region will require all PET bottles (except those used for medical purposes) placed on the European market after 2025 to contain at least 25% recycled content, 30% after 2030.

The goal of this requirement is to increase the market value of recycled materials in order to encourage advanced recycling investment.

### Ease of adoption score: 3

While relatively easy to implement and track, the establishment of recycled content requirements must overcome significant political pressure from the affected industries.

### Anticipated cost score: 3

While producers and consumers will face higher costs due to the premium emerging for high-quality recycled materials, the EU will face minimal expenses beyond accounting and enforcement.

### International reputation score: 5

The EU is often at the forefront of sustainability policy ideation and seen as a testing ground for the rest of the world. Several sustainability-focused EU policies have been adopted by the international community in recent years.

### Impact score: 3.5

The EU's investment in advanced recycling technologies has increased, along with the prices of secondary materials. These trends were already in place before the mandate, but the mandate has helped reinforce these outcomes aligned with its goals.

### Probability of adoption overall score: 3.8

The EU's recycled content requirement, as has been seen in Canada and the U.S., is both easy to implement and impactful. It is likely to spread with minimal modification.

## SUMMARY AND PROBABILITY OF ADOPTION

# Tax on unrecyclable plastic Europe, 2021

The region has created a tax based on the weight of nonrecyclable plastic packaging placed on each of its member states' domestic market during the previous year, calculated by [Eurostat](#). The [tax rate](#) is \$0.96/kg, with a lump sum rebate for member states with a national income below the EU average. Member states can customize how to implement the tax domestically, and any imports will be subject to the domestic tax scheme.

The goal of this tax is to create incentives for member states to reduce their waste generation and increase recycling rates.

### Ease of adoption score: 1

Will require significant buy-in and customization from local governments as well as an infrastructure to properly calculate and enforce taxes. Without an established producer responsibility organization (PRO) system, implementation would likely be impossible.

### Anticipated cost score: 5

Expected to generate about \$7.9 billion annually, which will be used to support the general EU budget.

### International reputation score: 5

The EU is often at the forefront of sustainability policy ideation and seen as a testing ground for the rest of the world. Several sustainability-focused EU policies have been adopted by the international community in recent years.

### Impact score: 4

The EU's tax on plastic packaging, while complicating the transition toward alternatives, directly incentivizes its member states to reduce their waste generation. While recycling is not directly incentivized, products are encouraged to align with the recycling infrastructure.

### Probability of adoption overall score: 4

The European plastic tax, though difficult to adopt, will have such a large impact in a highly reputable region that it is likely to spread to other regions over the next decade.

# SUMMARY AND PROBABILITY OF ADOPTION

## EPR policy establishment

### Germany, 1990 to 2003

Germany established the first [extended producer responsibility](#) (EPR) scheme for packaging in the early 1990s in response to high levels of landfilling. This EPR scheme was mandatory for all players in the value chain and included a number of obligations for producers, retailers, and groups in the logistics value chain. Crucially, there was a requirement for materials to be recycled; groups were obliged to find or create markets for the secondary materials if none existed. This EPR scheme was managed by a PRO that had a monopoly hold on the market – the Duales System Deutschland, or DSD. Producers were originally charged fees not based on the weight of the packaging; this was revised as the system ran into early financial troubles.

The goal of this system was to increase recovery and recycling rates for all materials.

#### **Probability of adoption overall score: 3.2**

The strong impact of Germany's EPR, combined with its leading position within the EU, means that the EPR scheme has spread despite its cost and complexity.

#### **Ease of adoption score: 2**

The development of a functioning EPR system was far from easy. The German system has been iterated on continually over the past 30 years; it places a substantial compliance burden on companies seeking to do business in Germany, causing resistance in other countries.

#### **Anticipated cost score: 2**

Germany's EPR scheme faced multiple cost hurdles; initial fees were too low, and the amount of waste collected was much higher than expected. While revisions helped, costs were one of the driving factors in a later shift to an open-market PRO system.

#### **International reputation score: 5**

This system created an approach later adopted by much of the EU and groups around the world. It also created the famous "Green Dot" recycling symbol, which has since been used worldwide.

#### **Impact score: 5**

This system has driven strong outcomes; Germany's recovery rate for plastics jumped from 11% in 1991 to 61% in by 1997. The EPR scheme also helped drive down consumption of packaging and limit waste growth as the economy grew.

## SUMMARY AND PROBABILITY OF ADOPTION

# EPR policy establishment

## Canada, 2009

The [Canadian Council of Ministers of the Environment](#) implemented a nationwide requirement for the establishment of EPR and product stewardship frameworks in each province (northern territories were excluded) for several products within six to eight years of its announcement. These frameworks were allowed to be customized in each jurisdiction, though most were established, both incidentally and intentionally, as monopoly-based PRO schemes.

The goal of this policy was to create a harmonized system of EPR schemes, shift the EOL cost burden to producers, reduce the volume of waste generated, and improve waste recovery and recycling rates.

### Ease of adoption score: 2

The creation of EPR policies faces significant political opposition across the value chain and requires a substantial amount accounting and research to customize policies on a local level. North American EPR policy is backed by several influential environmental NGOs.

### Anticipated cost score: 2

The costs of creating locally customized EPR policies and an accounting system are nonnegligible. To align with new EPR regulations, new waste management system costs are often created.

### International reputation score: 1

Despite several efforts, Canada's sustainability policies have performed poorly compared to those of other OECD countries. In recent years, Canada has tended to favor the adoption of tried-and-tested European policies with little or no modification instead of developing its own.

### Impact score: 2

There was little harmonization among provinces, and some failed to implement EPR schemes for the target materials. Collection increased, but poor transparency makes it hard to evaluate impact – studies point to a [plastic packaging recycling rate of 15%](#), far lower than the EU's.

### Probability of adoption overall score: 1.85

EPR policies can fail spectacularly when implemented in a top-down manner with minimal regional specificity. Unless pushed though by environmental NGOs, EPR policies established in this form are unlikely to spread.

# SUMMARY AND PROBABILITY OF ADOPTION

## EPR policy transition

### Germany, 2003 to 2006

The country, which had established one of the first monopoly-based packaging EPR systems under the PRO Duales System Deutschland (DSD), transitioned to an open-market EPR system. DSD ran a significant deficit throughout its existence, averaging \$2.6 billion in expenditures per year.

The goal of this transition was to reduce the cost of Germany's EPR system without losing its environmental efficiency.

#### Ease of adoption score: 3

The transition from a monopoly-based to an open-market EPR system forced Germany to increase the complexity of its reporting and verification system to limit free ridership, though it was building on an existing scheme with established obligation targets and producer buy-in.

#### Anticipated cost score: 4

Germany's transition reduced overall system costs by 25% to 30%, representing hundreds of millions in savings each year.

#### International reputation score: 5

Germany is consistently listed among the countries with the highest recycling rate in the world and is known as a hotbed for recycling innovations.

#### Impact score: 3

Germany's transition to an open-market EPR system substantially reduced system costs at the cost of increasing free ridership.

#### Probability of adoption overall score: 3.65

With clear economic efficiency advantages over monopoly-based systems, several EPR schemes will likely transition toward open-market approaches when mature.

# Taxes and bans will spread the fastest in the coming years due to their simplicity

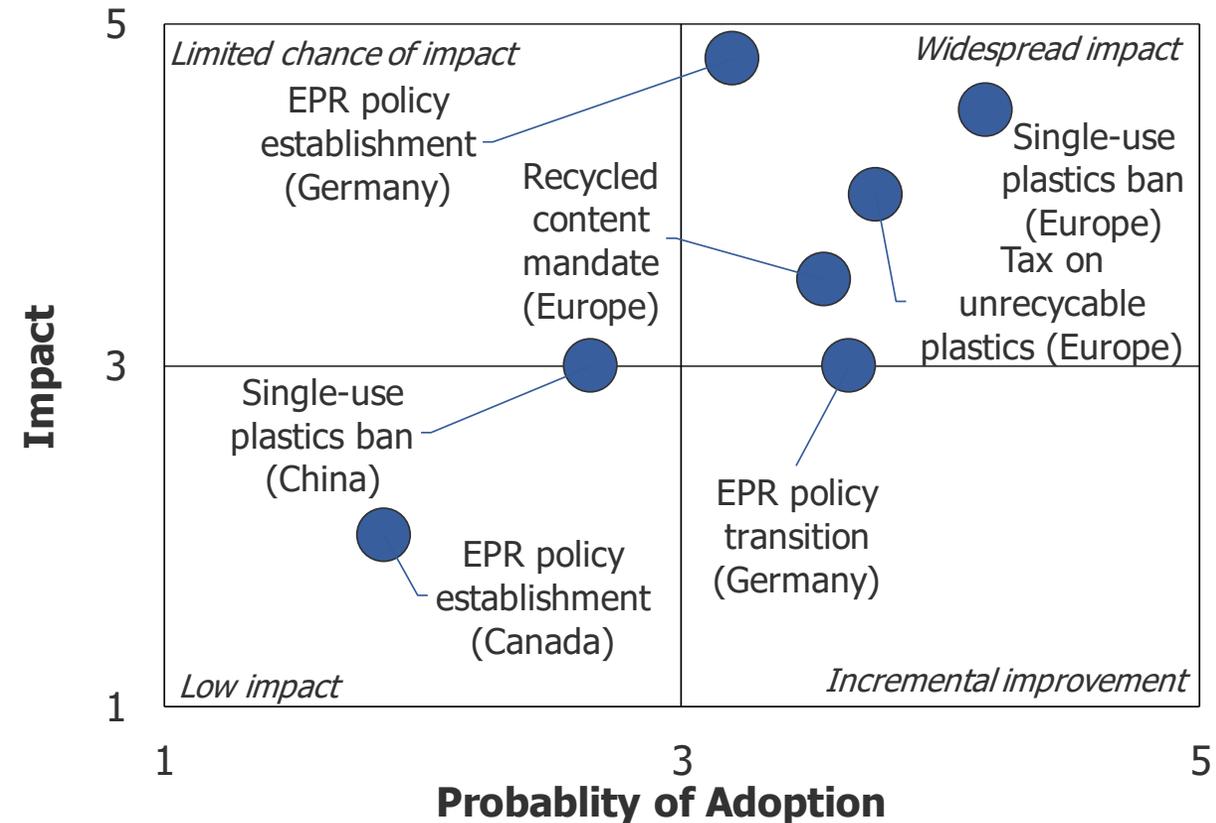
The chart at right plots the scores of these different policies. Content mandates and taxes stand out overall, while EPR policies face more significant barriers to adoption.

Europe’s tax on plastic packaging, though difficult to implement in many countries, is one of the most impactful and profitable sustainability packaging taxes ever created. It may not be viable in many countries for the immediate future, but its overall impact on packaging materials and design will be closely monitored by other leading nations.

EPR policies are the most potentially impactful tool in a policymaker’s arsenal, and Germany’s history and transition are a roadmap for implementation. Despite the impact, EPR’s complexity makes it less likely to spread outside the EU relative to simpler measures.

While China’s single-use plastic ban is less effective than Europe’s, its regional influence may see it spread and split global opinion on the question of bioplastic packaging sustainability even further.

**Analysis of current policy**



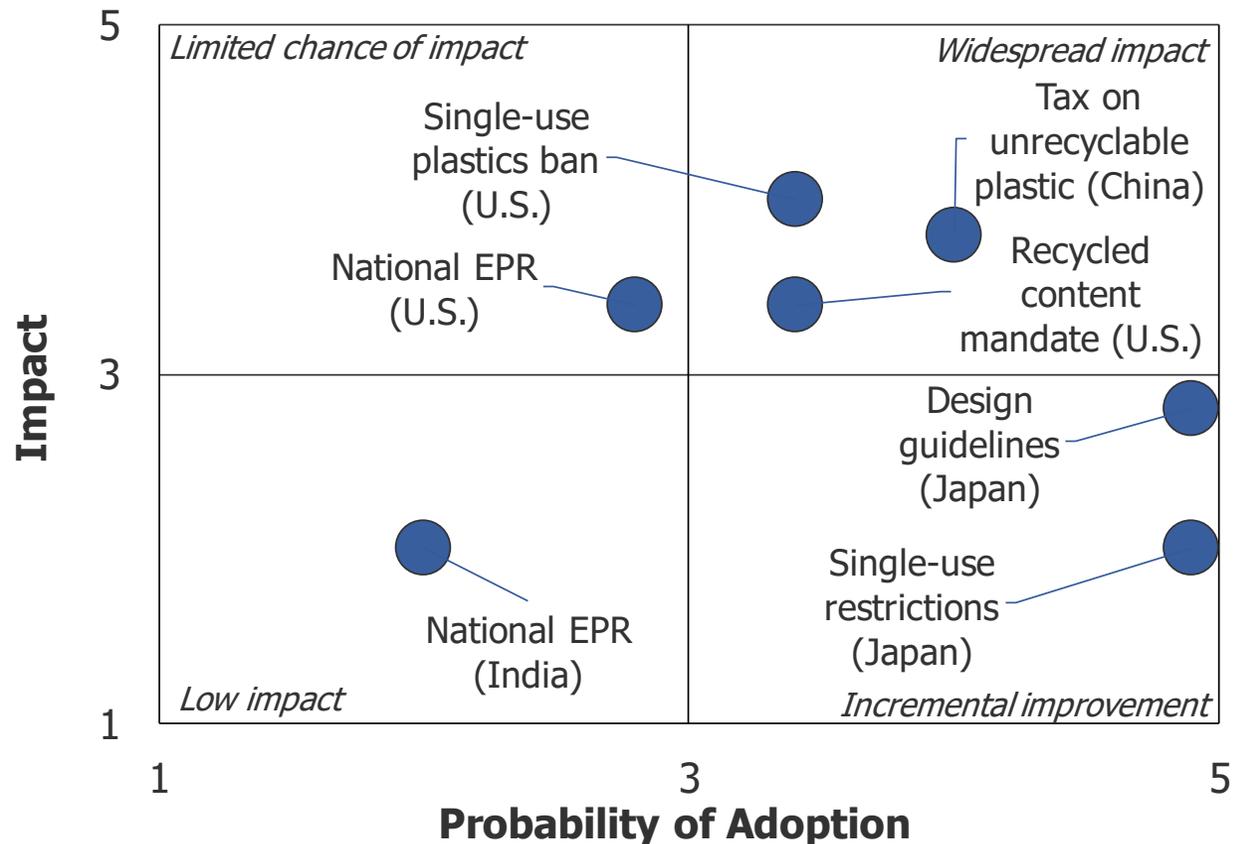
# Bans and taxes are most likely to spread, while EPR schemes will see piecemeal adoption

The chart at right summarizes our views – expect the biggest, most likely impacts globally to come from bans on single-use plastics and taxes on unrecyclable plastics. EPR policy, though potentially the single most impactful approach to sustainability, will struggle to gain traction outside the EU, as implementation remains a major barrier.

In the U.S., national-level recycled content mandates and single-use plastic bans are most likely; a national EPR scheme faces major uncertainty in terms of adoption, although it would be impactful. Clients should instead look to state-level adoption of EPR as the most likely outcome.

China, unsurprisingly, emerges as the nation to watch. A tax on unrecycled plastics is likely and would have major knock-on effects for the entire industry. Just as China’s ban on single-use plastics is fueling growth in bioplastics, a future tax could fuel growth in plastic alternatives.

**Analysis of potential policy**



# Outlook

1

## **Regulations will create space for more expensive innovations**

Packaging is one of the most notoriously cost-sensitive spaces. Many of these regulations, including taxes and EPR schemes, will help create the opportunity to drive previously too-expensive approaches mainstream by creating opportunities for cost offsets.

2

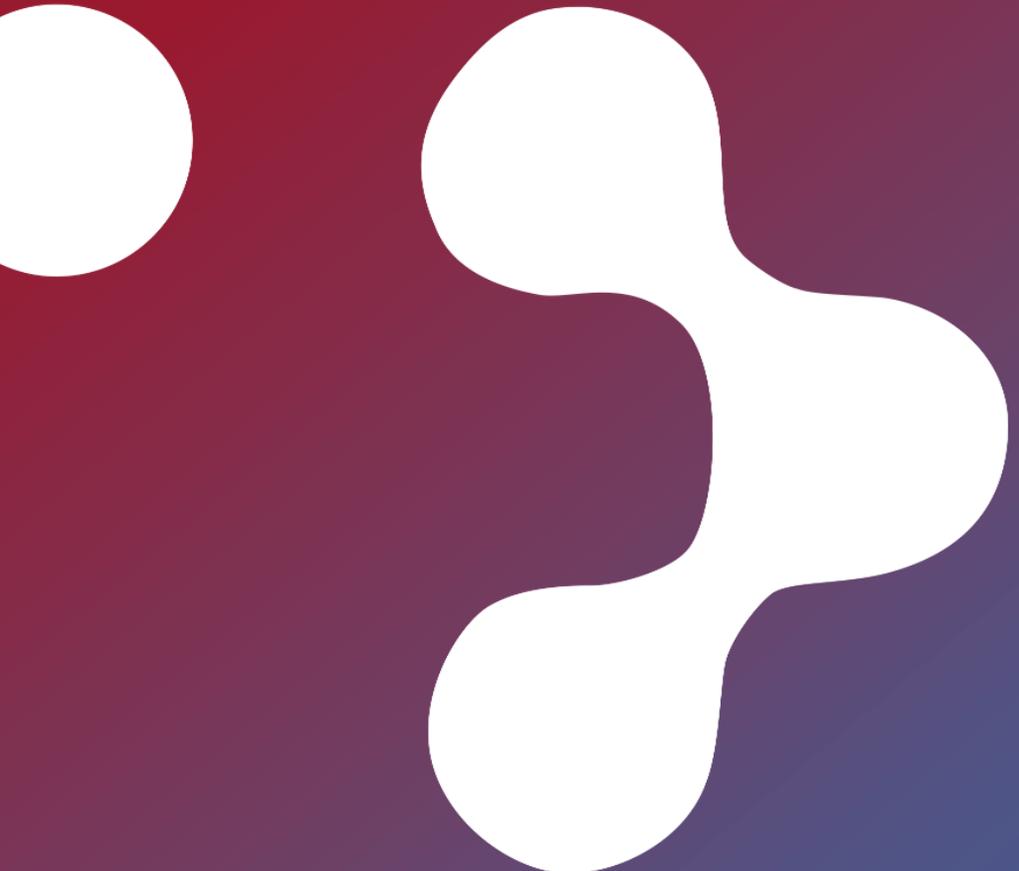
## **Policy foresight is only going to get more important**

Policy is the key driver for sustainability and system transition. As more and more of what innovation teams are tasked with is system transition, fluency with global policy will become even more important.

3

## **Look to policy in Asia**

Policy in Asia – especially Southeast Asia – will have the biggest impact, as these growing economies are consuming more packaging and still building out waste management ecosystems.



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