A guide for policy-makers in Turkey
EXECUTIVE SUMMARY

TURKEY’S POLICY PRIORITIES FOR PLASTIC POLLUTION SHOULD FOCUS ON ELIMINATING OPEN DUMPING, INCREASING INDUSTRY STEWARDSHIP AND RECYCLING.

Turkey launched its national ‘Zero Waste’ program aiming to close the loop for all waste materials. Turkey’s policies focus on national waste reduction and management to achieve these targets. For the moment, few policies focus on municipal-level improvements while municipalities primarily lead waste management. Improving the capacity of municipalities, in tourism hotspots and regions with open dumping issues, is vital for the waste management outcomes of ‘Zero Waste’ program. Upstream actions must be implemented to reduce plastic production, develop alternatives, and design products for recycling. New policies should encourage industry actors to reduce unnecessary plastic use, pay for their non-reusable waste, and invest in downstream waste management infrastructure. Growing recycling capacity requires improving collection and sorting systems to increases the quality of material, and investing in sorting and recycling facilities across the country. Turkey has set some ambitious targets to create a ‘zero waste’ community, and will need bolder action to realize this goal.

TURKEY’S MAIN CHALLENGE IN STOPPING PLASTIC LEAKING INTO THE MEDITERRANEAN IS ITS UNDERDEVELOPED WASTE MANAGEMENT SYSTEM.

Turkey is the 3rd waste generator in the region, generating 3.7 MTs of plastic waste in 2016. Only 6% of this plastic waste was recycled, while landfills managed 61% of waste. The remaining 33% of this plastic waste was uncollected, or openly dumped, resulting in 1.1MT leaking into nature. Limited municipal waste separation and sorting capabilities make local plastic recycling unprofitable. High plastic leakage hotspots exist in the Eastern Anatolia Region, where 74% of waste is openly dumped. As a result, Turkey is the second largest land-based source of plastic into the Mediterranean Sea. Turkey’s economy loses over $95M (€84M) annually due to plastic pollution, as it affects the tourism, shipping and fishing economies.
# INDEX

1. MAPPING THE LIFECYCLE OF PLASTIC IN TURKEY
   - Value chain analysis of plastics’ lifecycle from production to waste management
   - Evaluation of the main sources of plastic leakage into Nature

2. UNDERSTANDING THE IMPACT OF PLASTIC IN TURKEY
   - Overview of the impact of plastic on the country’s environment and economy
   - Spotlight on the top Mediterranean hotspots

3. EVALUATING THE POLICY LANDSCAPE REGARDING PLASTIC IN TURKEY
   - Review of the existing policy landscape and initiatives to curb plastic pollution
   - Roadmap to recommended future interventions

**ANNEX**

- The plastics value chain and stakeholders
- Glossary
- Methodology Overview
- Plastic waste system activities causing controlled and mismanaged waste
Turkey is the 3rd major waste generator in the region and 7th largest maker of plastic goods globally.

Overviews:
- Population: 79.8 million registered citizens (2019)
- Economy: €864 billion GDP (2016)
- Territory: 783,562 km² surrounded by four seas (Black Sea, Sea of Marmara, Aegean Sea, and Mediterranean Sea) and eight countries with 8,333 km of coastline, of which 52% is on the Mediterranean and Aegean seas.

Plastic footprint overview:
- Global plastic goods production: 7th largest plastic goods manufacturer worldwide
- Plastic manufacturing: 7.9 MT/year produced domestically, 5.8 MT/year virgin plastic imported, 2.1 MT/year domestic virgin plastic and trade surplus
- End of life management: 3.7 MT/year plastic waste generated of which 0.4 MT uncollected, 0.8 MT unregulated waste treatment (open dumping)

National facts:
- 7.9 MT/year produced domestically
- 5.8 MT/year virgin plastic imported
- 2.1 MT/year domestic virgin plastic and trade surplus
Two main actors are needed to produce plastic goods for consumption: i. Virgin plastics producers; and ii. Manufacturers/converters of virgin plastic into a plastic good. This total production figure includes all plastic products manufactured using local and imported virgin plastic material.

These are plastic goods produced with a mean product lifetime greater than 1 year, and/or exported for consumption in another country.

This figure includes waste with mean product lifetimes from 1 year (or less) to 35 years.

### Plastic Lifecycle Footprint

**Plastic Production**
- **7.9 MT**: 2nd
- **3.7 MT**: 3rd

**Plastic Usage**
- **2.4 MT**: 3rd
- **0.2 MT**: 5th

**Waste Management**
- **1.3 MT**: 2nd
- **0.02 MT**: 2nd

**Mismanaged Waste**
- **1.1 MT**: 2nd

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>7.9</td>
<td>3.7</td>
<td>2.4</td>
<td>0.2</td>
<td>1.3</td>
<td>0.02</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**Ranking per Country**
- 2nd: 7th
- 3rd: 14th

**Ranking per Capita**
- 100%: 14th
- 66%: 13th
- 6%: 14th

**% of Annual Waste Generation**
- 99.4 kg: 7th
- 47.4 kg: 14th
- 30.6 kg: 13th
- 2.8 kg: 14th
- 15.7 kg: 7th
- 1.6 kg: 7th
- 14.2 kg: 7th

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>n/a</td>
<td>100%</td>
<td>66%</td>
<td>6%</td>
<td>34%</td>
<td>3%</td>
<td>31%</td>
</tr>
</tbody>
</table>

PLASTIC WASTE MANAGEMENT

- **13% of generated waste remains uncollected** due to a lack of waste collection infrastructure inhibiting end-users from sorting, separating, disposing their plastic into the waste management system. For example, many end-users must travel over two kilometres from their respective homes to find waste collection points.

- **21% of the collected waste in Turkey is openly dumped** as the domestic waste management system has insufficient capacity to handle current waste volumes, particularly in the Eastern and South Eastern parts of the country. The Eastern Anatolia Region treats 74% of their waste through open dumping which is expected to leak directly into nature.

- Local plastic recycling remains unprofitable due to a highly contaminated domestic waste feedstock resulting from limited municipal waste separation and sorting capabilities. Private recyclers are seeking to import higher quality waste from high-income countries to scale the industry, but this limits the benefits of recycling for local waste management.

---

**PLASTIC PRODUCED** 7.9 MT

**WASTE GENERATED** 3.7 MT

**WASTE COLLECTED** 3.2 MT

**LANDFILL** 2.2 MT

**RECYCLED PACKAGING MATERIAL** 0.2 MT

**NOT COLLECTED** 0.5 MT

**OPEN DUMP** 0.8 MT

US $1.6 bn of foreign capital was invested into the Turkish plastic industry since 2002 and focused mainly on plastic goods manufacturing rather than virgin plastic material production.

Turkey is the 2nd largest producer of plastic goods in the region and production of plastic goods reached 7.9MT for the Turkish market in 2016 growing at 3.7% over the last five years.

Turkey is an attractive market as domestic consumption of plastic products grew at 4.1% over the last five years outstripping production growth.

Packaging is the largest industry producing 40% of plastic goods, and source of 90% of local plastic waste given their product lifetime of less than one year.

Turkey imports 87% of its virgin plastic for domestic consumption, and LDPE and PET virgin plastics make up over half of the annual plastic material usage in Turkey.

Source: PAGEV Turkish plastic industry report (2017)
As of 2018, Turkey imported approximate 3.5% of the total global waste trade, entering the top 10 importers.

This increased occurred following China's 2018 plastic waste trade reforms, as large amounts of waste were redirected to new locations. The Turkish government currently has no restrictions on the import of plastic waste.

Turkey was the 2nd receiver of UK plastic in 2018.

After the UK, Turkey's other largest import sources are Belgium and Germany.

This waste is imported for the purpose of recycling, as it can only be traded for these purposes (not for landfill or dumping).

This plastic waste material is purchased by private recyclers as high-quality inputs for the production of secondary material.

A large portion of Turkish recycling capacity is dedicated to imported waste.

Locally generated plastic waste is typically lower-quality due to less effective sorting and treatment processes, and therefore is of lower value to recyclers.

Therefore, while PAGEV estimated there are 751 licensed recycling plants and 566 collection and separation, only 6% of Turkish plastic waste is recycled through these facilities.

In 2018, Turkey saw a 39% increase in plastic waste imports for recycling, driven by the UK.

Net plastic waste trade in Turkey (2016-18), metric tonnes

<table>
<thead>
<tr>
<th>2016</th>
<th>Plastic trade waste growth</th>
<th>Plastic trade waste reduction</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>142,759</td>
<td>89,478</td>
<td>31 other nations</td>
<td>198,785</td>
</tr>
<tr>
<td>198,785</td>
<td>68,132</td>
<td>29 countries</td>
<td>21,347</td>
</tr>
</tbody>
</table>

Net plastic waste exports grew five times over the last two years from the United Kingdom to Turkey.

Source: Dalberg analysis, UN Comtrade (2018), PAGEV Turkish plastic industry report (2017), Greenpeace, 2019: ‘Plastic waste trade research briefing’
63 kT/year OF PLASTIC ENTERS THE MEDITERRANEAN SEA

SEA-BASED

Fisheries, aquaculture and shipping result in 3% (1.9kT) of this plastic debris. Items include crab pots, mussel nets, fishing boxes, shipping containers, jerry cans, gloves, and oil drums.

RIVERS

Rivers account for 19% (13.4 Kt) of the plastic leakage. The Ceyhan, Seyhan, and Buyuk Menderes rivers are the most contaminated waterways in the region after the Nile.

COASTAL ACTIVITIES

Coastal activities cause 78% (48.0 Kt) of plastic inputs into the sea resulting from poor city waste management practices, tourism and recreational activities. Hotspot cities include Izmir, Mersin, Adana and Antalya.

30% (19kT) of the annual sea plastic leakage reaches its final destination in one year.

SEABED

Sea bed plastic deposits are estimated to be nine times smaller than coastline plastic accumulation, with 11% of waste settling onto the sea bed.

COASTLINE

19% of plastic washes back onto the Turkish coastline within the year, and 95% of this plastic comes from Turkey.

SEA SURFACE

70% (44kT) of the plastic leaked into the sea every year takes up to a decade to reach its final destination due to wind patterns and sea currents, and remains on the sea surface concentrating in the Cilician region of the Mediterranean. Eventually, 80% of all debris will settle on the coastline.

PLASTIC IMPACT

The environmental impact of Turkey’s production and consumption of plastic is higher than average:

- Turkey’s plastic generation and imports require the equivalent of 103M barrels of oil in energy, and emits 40.3 MT on CO2.
- However, the high proportion of long-term plastic uses (e.g. construction) results in longer average plastic life, and a lower yearly waste percentage.

Turkey’s coastlines receive the highest plastic debris flux of any Mediterranean coasts

- The most common items found on coasts are ‘user items’ e.g. cigarette ends, food containers, confectionery wrappers, and plastic bottles.

- Turkish waters were recorded to have the highest concentration of floating plastic on sea surface in the Mediterranean, with up to 20g/m² of fragmented plastic detected across the Cilician Sea.

The high levels of coastal and sea pollution present an important threat to the marine ecosystem on the region.

| TURKEY’S COASTLINE EXPERIENCES SOME OF THE WORST IMPACTS OF PLASTIC POLLUTION IN THE MEDITERRANEAN |
|---|---|---|---|
| ENERGY CONSUMED IN OIL EQUIVALENT | CO₂ EMISSIONS | ANNUAL COASTLINE PLASTIC POLLUTION | DAILY PLASTIC DEBRIS FLUX PER KM OF COASTLINE | ECONOMIC COST OF POLLUTION |
| 103M barrels | 40.3 MT | 12.6kT | 7.56 kgs/km, average: 5.1 kgs/km | $96.5 million |

1. On Turkey’s Mediterranean Coast. Turkey also faces high levels of plastic pollution on the Marmara Sea and on the Black Sea coasts. This figure represents the total plastic debris ending up on the country’s coastlines each year, as showcased on the right-hand graph on slide 9

2. Calculated based on the total economic cost of pollution for all 22 Mediterranean countries

3. Economic impact of plastic pollution on Tourism, Fisheries, and Maritime Trade. Total excludes the cost of clean-up

4. Total CO₂ lifecycle emissions from production, recycling and incineration (See Annex III for further details)

Levels of pollution are dictated by how much waste is openly dumped in the region, which varies substantially across Turkey:

- Open dumping is most predominant in Eastern Anatolia, where the waste management system lacks controlled methods of disposal. In the provinces of Diyarbakir, Malatya and Van over 90% of collected waste is openly dumped. These regions are affected by ongoing regional conflict, and difficult to reach with initiatives.

- The Black Sea and Central Anatolian regions also see high rates of open dumping averaging 44% of MSW. The large region of Konya performs particularly badly, with over 80% of waste openly dumped in nature.

- On average, the Mediterranean region sees somewhat lower levels of open dumping, averaging 18%. However, the high influx of tourists overwhelms waste management in some regions, such as Mugla, which sees over 60% of waste openly dumped, and Mersin, where 35% of waste is dumped.

However, pollution hotspots are also driven by a number of other factors, including the deltas of major rivers and sea current flows.
MEDITERRANEAN HOTSPOTS

CILICIA HAS THE MOST PLASTIC DEBRIS ON THE MED

- Cilicia experiences the highest coastline pollution in the Mediterranean
- The Bays of Iskenderun, Mersin and Taşucu, have the highest levels of plastic accumulation, as currents lead to limited sea circulation.
- Plastic is also carried to this coast by major rivers: Ceyhan, Seyhan, Goksu and Asi.
- Izmir is the most polluted coast along the Aegean sea.
- Plastic pollution is driven by the high concentration of small touristic resorts, seeing an high seasonal influx of tourists overwhelming local waste management capacity.
- The most intense accumulations are found in the Gulfs of Marmaris and Gulluk, respectively averaging plastic item densities of 992 and 375 items/km².
- Weaker currents in the narrow bays prevents the outward flow of plastic debris.
- Waste management is overwhelmed by high tourism influx, leading to 60% open dumping.
- The bathyal depths (between 200 m and 800 m) of Antalya Bay, finding 115-2762 plastic items/km².
- Plastic enters the sea through coastal and touristic activity, and through shipping and fishery activity around the port of Antalya.

Source: Cerim et al. 2014
Güven et al. 2014
The Mediterranean and Aegean Regions are visited by over 22 Million tourists each year. In peak tourist months of July and August, tourists increase local population by over 10% across the regions. However, tourism flow is highly concentrated within coastal areas, and in some of these small towns, tourists can be up to 4 or 5 times the local population in these summer periods. This influx in population increases the total amount of waste produced in these months by almost 12%, up to 8,000 tonnes. Local municipalities, already limited in their capacity to handle waste management, are overwhelmed by the additional waste influx, and are likely to rely heavily on open dumping. This additional waste management costs the region at least $1.44M in waste management over the year.

Beyond individual consumption, the tourism sector developed around visitors is a key driver of plastic production and waste. Globally, the tourism sector is particularly intensive in waste generation compared to other sectors such as manufacturing and agriculture (Arbulu et al. 2015).

On the other hand, tourism can be a source of initiatives or pressure to resolve plastic pollution. Examples include:

- The government’s Environment Friendly Business Certificate (Pine Tree Symbol): This certificate is awarded to accommodation facilities based on the energy efficiency, decreased material consumption and waste generation. 336 facilities have been awarded a Green Star by 2016, and are encouraged to keep up these practices through government support to their electricity expenses.

- Similarly, the International Environmental Education Foundation awards Blue Flag certification to the beaches, marinas and yachts fulfilling certain standards and best practices.

- The Ministry of Tourism and Culture and UNDP have launched the Future is Tourism initiative to award sustainable tourism projects around the country.

- WWF has been working since 1997 with the municipality of Cirali to develop a sustainable tourism, including the creation of diverse, sustainable and environment-friendly economic opportunities and the protection of biodiversity through improved resource and waste management.
Plastic pollution might compromise tourist flow to particular marine areas, and threaten new private sector investment in hotel developments, etc. in these areas.

Two studies on tourism in Turkey revealed that cleanliness is the most important factor influencing beach choice both for domestic and foreign tourists. 41% of survey respondents stated a strong dislike for debris on beaches, and cited this a major reason not to return to a particular tourist destination.

Marine plastic pollution reduces both the supply of, and demand for, seafood due to animal deaths and concerns that animals have ingested plastic.

Plastic pollution, including abandoned fishing gear, can also clog boat engines leading to disruption of the fishing industry.

Commercial shipping vessels are extremely sensitive to collisions with plastic pollution, entanglement of floating objects with propeller blades and clogging of water intakes for engine cooling systems.

Costs are incurred by vessel downtime, delays and additional maintenance costs.

Shoreline cleaning range costing $100 per tonne collected by volunteer-led initiatives, to in excess of $20,000 per tonne for dense waste and heavy fishing gears.

McIlgorm et al. found that the average shoreline clean-up cost estimate across studies has an average of US$1500/tonne.

Costs in Turkey have been found to be much higher, as the Istanbul Metropolitan Municipality Marine Services Directorate is expecting a cost of $7-24 million to clean up the Bosphorus and Marmara Sea.

The impact and costs of marine plastic pollution are not typically borne by the polluters, but by coastal communities, local municipalities and directly affected industries.

## Zero Waste Program

**The Zero Waste program** is launched, aiming to make all **public buildings** waste free (100% of waste is recycled or composed).

It is announced that the **Beştepe Presidential Complex** is waste-free.

In **2017**, Turkey adopted a strong national programme on waste management for plastic, paper, glass, clothing and metal:

- Led by Emine Erdoğan, wife of President Recep Tayyip Erdoğan, the Zero Waste Project signals strong political will to tackle the issue of mis-managed waste and improve material circularity in Turkey.
- The project focuses on public buildings as an entry-point for improved waste-management practices and awareness raising.
- The projected economic benefits of the ‘Zero Waste Project’, gained from secondary uses of waste materials, is estimated around 1.4 billion, according to the Turkish authorities.
- To achieve these targets, the project implements measures across the country to help limit waste and promote recycling and composting:
  - Supporting the development of infrastructure for a nationwide recycling system by public and private institutions, and providing technical guidance and financial incentives to these recycling facilities.
  - Supporting the development of additional composting infrastructure to treat food waste.
  - Raising awareness on waste pollution and providing training for businesses around the country through 230 state institutions.

### Key Milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>The Zero Waste program is launched, aiming to make all public buildings waste free (100% of waste is recycled or composed).</td>
</tr>
<tr>
<td>2018</td>
<td>It is announced that the Beştepe Presidential Complex is waste-free.</td>
</tr>
<tr>
<td>Feb 2019</td>
<td>All Turkish ministry buildings are to implement the initiative by Feb 2019.</td>
</tr>
<tr>
<td>2019</td>
<td>The initiative is being rolled out to <strong>230 buildings</strong> including public institutions, schools and shopping malls.</td>
</tr>
<tr>
<td>2023</td>
<td>All public buildings will be waste-free and a nation-wide recycling system will be in place.</td>
</tr>
<tr>
<td>2030</td>
<td>Turkey will become waste-free.</td>
</tr>
</tbody>
</table>

- **Increasing recycling capacity to 751 licenced plants through increased funding from the private sector**
- **Presidential public awareness campaigns and education programmes**

CURRENT POLICIES REGARDING PLASTICS

PLASTIC PRODUCTION

- **Ban on free plastic bags**: 0.25 TL fee on plastic bags (fee to increase yearly) to reduce per capita use from 440 to 90 by 2025
  - **Results**: saw an estimated 70% decline in 3 months, but faced strong consumer backlash against the fee

PLASTIC USAGE

- **Bottle deposit scheme by 2021**: creating a financial incentive to return plastic bottles to deposit points set up by producers
  - **Results to date**: small-scale pilot in the Istanbul metro, and a few schools

WASTE MANAGEMENT

- **Extended producer responsibility**: producers must ensure 54% of all waste is recycled (56% from 2020)
  - **Results**: ineffectively applied, given low recycling rates and challenges applying to SMEs or informal sector

- **Upgrading and increasing recycling facilities across the country**
  - **Results**: licensed recycling plants doubled to 751 over 5 years

- **Trainings and support** to public organisations and businesses improve waste management.
  - **Results**: 230 buildings declared ‘waste free’ by the First Lady Emine Erdogan

- **The Regulation on the Control of Packaging Waste** states that municipal authorities are responsible for collecting and sorting waste from the blue-bin mix-recycling method
  - **Results**: municipalities lack the capacity to conduct sorting, leading to limited, low quality recycling

MISMANAGED WASTE

- **Regulation on Waste Management 2015** prohibits the non-fulfilment of technical requirements on the establishment and use of landfills, banning open dumping
  - **Result**: 32% of waste openly dumped

- **Beach clean-up operations**: Clean-up operations e.g. Surface Marine Litter Cleaning Operation by sweeper boats in İzmir, İzmit, İstanbul, municipalities focusing on the sea coasts and the Bosphorus
  - **Results**: e.g. 20,000kg removed monthly by Beşiktaş municipality

While waste management is primarily led by local municipalities, there are limited policies focused on driving municipal-level improvements, and they are focused down-stream.
**GOALS**

<table>
<thead>
<tr>
<th>PLASTIC PRODUCTION</th>
<th>PLASTIC USAGE</th>
<th>WASTE MANAGEMENT</th>
<th>MISMANAGED WASTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing demand: less single use plastic is produced and consumed</td>
<td>While banning plastic items is a useful measure, broader behaviour change is required for industries and consumers</td>
<td>Improving the capacity of municipalities is key to overall waste management outcomes</td>
<td>More accountability is essential to limit mismanagement at a national and local level</td>
</tr>
</tbody>
</table>

**POLICY LANDSCAPE: TO ACHIEVE SYSTEM-LEVEL GOALS, ‘BEST PRACTICES’ CAN BE IMPLEMENTED ACROSS THE VALUE CHAIN**

<table>
<thead>
<tr>
<th>National level</th>
<th>Municipal level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enforce standards on the use of recycled material plastic packaging on imported plastics (e.g. EU target to use 30% recycled plastic in all beverage bottles by 2030).</td>
<td>Support industry in improving recyclability and reusability of products (e.g. design requirements to connect plastic caps to bottles) and plastic reduction measures (e.g. alternative delivery systems).</td>
</tr>
<tr>
<td>Support industries pioneering innovative alternative materials (e.g. bioplastics) based on life-cycle assessment.</td>
<td>Work with industries on the business case for reduced plastic or improved recyclability, e.g. certifications (EU Ecolabel), sustainable tourism, etc.</td>
</tr>
<tr>
<td>Evaluate initiatives to reduce plastic consumption based on drivers of customer purchasing decisions, (e.g. are decisions driven by impact or financial incentives, what level of reward is required?)</td>
<td>Work with local businesses operators, including the tourism industry to minimize the usage of disposable plastic items advocate with citizens and tourists to reduce consumption of items most commonly found on local beaches.</td>
</tr>
<tr>
<td>Improve EPR standards and ensure reporting of generated waste and 56% target, and engage industry in investing in better waste mgmt.</td>
<td>Create municipal awareness programs on sorting waste at the source which improves the quality of recyclable materials.</td>
</tr>
<tr>
<td>Create accountability mechanisms for mis-managed waste at a national level, identifying worst performers for additional support.</td>
<td>Develop seasonal waste management plans and finance additional capacity for municipalities of high tourist influx.</td>
</tr>
<tr>
<td>Evaluate whether the high influx of imported plastic waste is being mismanaged, and consider limiting this practice as required.</td>
<td>Grow recycling industry locally across underserved areas, fostering job creation and opportunities.</td>
</tr>
</tbody>
</table>

**EXAMPLE BEST PRACTICE INITIATIVES**

- Enforce standards on the use of recycled material plastic packaging on imported plastics (e.g. EU target to use 30% recycled plastic in all beverage bottles by 2030).
- Support industry in improving recyclability and reusability of products (e.g. design requirements to connect plastic caps to bottles) and plastic reduction measures (e.g. alternative delivery systems).
- Support industries pioneering innovative alternative materials (e.g. bioplastics) based on life-cycle assessment.
- Work with industries on the business case for reduced plastic or improved recyclability, e.g. certifications (EU Ecolabel), sustainable tourism, etc.
- Evaluate initiatives to reduce plastic consumption based on drivers of customer purchasing decisions, (e.g. are decisions driven by impact or financial incentives, what level of reward is required?)
- Work with local businesses operators, including the tourism industry to minimize the usage of disposable plastic items advocate with citizens and tourists to reduce consumption of items most commonly found on local beaches.
- Improve EPR standards and ensure reporting of generated waste and 56% target, and engage industry in investing in better waste mgmt.
- Consider a 4-stream recycling system to reduce sorting required.
- Implement newer EU directives on landfill use (e.g. 18/98 directive, restricting the landfilling of municipal waste to <10% of MSW).
- Create municipal awareness programs on sorting waste at the source which improves the quality of recyclable materials.
- Develop seasonal waste management plans and finance additional capacity for municipalities of high tourist influx.
- Grow recycling industry locally across underserved areas, fostering job creation and opportunities.

---

**page 18 | TURKEY Stop the flood of plastic – A guide for policy-makers in Turkey**
## TURKEY

### PRIORITY ACTIONS – POLICY LANDSCAPING ANALYSIS

<table>
<thead>
<tr>
<th>FOCUS AREA</th>
<th>POTENTIAL IMPACT</th>
<th>FEASIBILITY AND TIMEFRAME</th>
<th>PRIORITY ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. ELIMINATE OPEN DUMPING</strong></td>
<td>Ensure 100% of waste is collected and managed</td>
<td><strong>Feasibility:</strong> difficult</td>
<td>Focus programmes on ‘red-zone’ municipalities with high need, but also strong local contact and support</td>
</tr>
<tr>
<td></td>
<td>Target Eastern and Central Anatolia, the Black Sea and tourism hotspots on the Med</td>
<td><strong>Timeframe:</strong> long</td>
<td>Use public campaigns to build awareness on dangers and impacts</td>
</tr>
<tr>
<td></td>
<td>Eliminate the top source of plastic leakage into nature</td>
<td></td>
<td>Leverage the tourism industry to lobby for better waste mgmt</td>
</tr>
<tr>
<td></td>
<td>Empower municipalities to manage their waste generated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce adverse health and safety issues related to open dumping near communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Value chain segment targeted:</strong></td>
<td>High impact on plastic in nature</td>
<td>Feasibility: medium-difficult</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High difficulty to implement</td>
<td>Monitoring EPR has been challenging for SMEs and the informal sector. However, pressure is growing on companies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Focus on articulating the economic case to help reduce plastic pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. INCREASE INDUSTRY STEWARDSHIP:</strong></td>
<td>Ensure all producers pay for their waste, and invest in waste management infrastructure</td>
<td><strong>Feasibility:</strong> medium-difficult</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourage industry (producers and users, e.g. tourism) to reduce unnecessary plastic use and improve recyclability</td>
<td>Monitoring EPR has been challenging for SMEs and the informal sector. However, pressure is growing on companies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achieve the EPR standard of 56% of waste managed by producers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implement industry-initiatives, such as the new bottle-collection scheme</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stimulate innovation from industry around reducing, re-using and re-designing plastic products</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Involve new industry segments (e.g. tourism) in plastic pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Value chain segment targeted:</strong></td>
<td>High impact on plastic in nature</td>
<td><strong>Feasibility:</strong> medium-difficult</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High difficulty to implement</td>
<td>Monitoring EPR has been challenging for SMEs and the informal sector. However, pressure is growing on companies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Focus on articulating the economic case to help reduce plastic pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. INCREASE RECYCLING CAPACITY:</strong></td>
<td>Improve collection and sorting to increase the quality of recycling</td>
<td><strong>Feasibility:</strong> medium</td>
<td>Leverage the momentum of the Zero Waste Program to promote the development of more recycling facilities</td>
</tr>
<tr>
<td></td>
<td>Invest in sorting and recycling facilities in underserved regions</td>
<td></td>
<td>Develop studies on how to improve the quality of plastic waste for secondary material production, and on the effects of imported waste</td>
</tr>
<tr>
<td></td>
<td>Stimulate demand for recycled plastic (e.g. mandatory uses of secondary materials, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Value chain segment targeted:</strong></td>
<td>Medium impact on plastic in nature</td>
<td><strong>Feasibility:</strong> medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium difficulty to implement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TURKEY’S PRIORITIES ARE**

- Eliminating open dumping,
- Increasing industry stewardship,
- And recycling
## ANNEX I – THE PLASTICS VALUE CHAIN AND STAKEHOLDERS

<table>
<thead>
<tr>
<th>PLASTIC PRODUCTION</th>
<th>PLASTIC USAGE</th>
<th>WASTE COLLECTION</th>
<th>WASTE TREATMENT</th>
<th>SECONDARY MARKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESCRIPTION</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>DESCRIPTION</strong></td>
</tr>
<tr>
<td>Manufacturing of virgin plastic from fossil fuel chemicals by a process of polymerization or polycondensation</td>
<td>Use of plastic from conversion of material into specific products until disposal of product as waste by the end-user</td>
<td>Recovering disposed plastic waste from end-users and sorting waste into various streams for treatment</td>
<td>Treatment of sorted plastic waste through various methods such as landfilling, incineration, recycling and dumping</td>
<td>Reuse of plastic within an economy after reprocessing waste into a secondary material</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KEY STAKEHOLDERS</th>
<th>PETROCHEMICAL COMPANIES</th>
<th>OIL &amp; GAS COMPANIES</th>
<th>PLASTIC CONVERTERS</th>
<th>END CUSTOMERS</th>
<th>LOCAL AND NATIONAL AUTHORITIES</th>
<th>REGULAR BODIES</th>
<th>PLASTIC PRODUCERS</th>
<th>WASTE MANAGEMENT COMPANIES</th>
<th>PLASTIC CONVERTERS</th>
<th>PLASTIC RECYCLERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESCRIPTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Petrochemical companies</td>
<td>Oil &amp; gas companies</td>
<td>Plastic converters (^1)</td>
<td>End customers (individual, institutional, and commercial)</td>
<td>End customers</td>
<td>Local and national authorities</td>
<td>Regular bodies</td>
<td>Plastic producers</td>
<td>Waste management companies</td>
<td>Plastic converters</td>
</tr>
</tbody>
</table>

\(^1\) Manufacturers of plastic products in all plastic markets (e.g. packaging, building and construction, transport) that convert virgin plastic into a specific products for use within the economy. These plastic products can be combined with other non-plastic materials during the conversion process.
## ANNEX II – GLOSSARY

<table>
<thead>
<tr>
<th>TERMS</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled landfill</td>
<td>A landﬁlling process which is subject to a permit system and to technical control procedures in compliance with the national legislation in force.</td>
</tr>
<tr>
<td>Uncontrolled landfill</td>
<td>A landﬁlling process which fails to meet certain standards and technical control procedures, and therefore is at risk of leakage or contamination.</td>
</tr>
<tr>
<td>Open dump</td>
<td>Illegal land disposal sites at which solid wastes are disposed of in a manner that does not protect the environment, and are therefore susceptible to leakage, open burning, and are exposed to the elements, vectors, and scavengers.</td>
</tr>
<tr>
<td>Controlled waste treatment</td>
<td>All legally compliant waste treatment operations, including controlled landﬁlling, waste-to-energy (incineration) and recycling.</td>
</tr>
<tr>
<td>Secondary material production</td>
<td>The total amount of secondary plastic product extracted from the plastic recycling process, averaging at 55% of the material inputted for recycling.</td>
</tr>
<tr>
<td>Recycling</td>
<td>All plastic collected for recycling from the waste stream. This ﬁgure is not adjusted for actual material losses during reprocessing into a secondary material. These material losses result from collected plastic considered as not recyclable due to additives preventing recycling or food contamination, etc.</td>
</tr>
<tr>
<td>Mismanaged waste</td>
<td>All plastic left uncollected, openly dumped into nature, littered, or managed through uncontrolled landﬁlls.</td>
</tr>
<tr>
<td>Recovered mismanaged waste</td>
<td>Mismanaged waste that re-enters the controlled waste management process through waste-pickers, clean up operations, or any other method.</td>
</tr>
<tr>
<td>Bio-degradable</td>
<td>A product that can be broken down by microorganisms (bacteria or fungi) into water, naturally occurring gases like carbon dioxide ($CO_2$) and methane ($CH_4$) and biomass.</td>
</tr>
<tr>
<td>Blue Economy</td>
<td>Represents all economic activities related to oceans, seas or coastal areas. It covers established sectors such as ﬁsheries, shipbuilding and tourism as well as emerging industries, including ocean energy and biotechnology.</td>
</tr>
</tbody>
</table>
### Annex III - Methodology for the Calculation of Each Data Metric in This Guidebook

<table>
<thead>
<tr>
<th>Section</th>
<th>Metric</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic Lifecycle (MT)</td>
<td>Plastic produced</td>
<td>Collected national-level data on total production of PP, PET, HDPE, LDPE, PCV and PS. Plastics are used in many products that are imported and exported and limited public data exists separating these goods into their raw materials used. This plastic goods production data by country is not adjusted for international trade (import and export) of these products. If national plastic goods data unavailable, calculated based on the ratio of global plastic production to plastic waste for 2016 in the WWF global plastics report (78%).</td>
</tr>
<tr>
<td></td>
<td>Waste Generation and Management</td>
<td>Collected national-level data on total plastic waste generation per annum, or total waste MSW waste generation and percent composition of plastic within MSW. Also collect national-level data on plastic management (percentages of plastic waste collected landfilled, incinerated, recycled or openly dumped). Data validated with relevant WWF national offices.</td>
</tr>
<tr>
<td></td>
<td>Mismanaged waste</td>
<td>Calculated by adding the total waste which goes uncollected, openly dumped and sent to uncontrolled landfills. Data on uncollected waste is taken from the World Bank ‘What a Waste 2.0’ Database.</td>
</tr>
<tr>
<td></td>
<td>Waste recovered or leaked into nature</td>
<td>Calculated using the proxy of 90% of mismanaged waste ending up in nature, based on the study completed by Jenna Jambeck Research Group, 2015. We assume the rest of the waste is recovered through clean-up operations, etc.</td>
</tr>
</tbody>
</table>
| | Waste leaked into the Mediterranean | - For countries whose coastline are only on the Mediterranean, this figure is calculated based on the proxy that 10% of plastic waste becomes marine litter, as found in the analysis completed by Jenna Jambeck Research Group, 2015.  
- For countries with multiple coastlines, this figure also takes into consideration the proportion of waste generated by regions with coastlines on the Mediterranean. |
<p>| | Waste leaked by source (sea-based, rivers, coastal) | Collected data on sea-based sources and major rivers from S. Liubartseva et al, 2018. Where data is missing for other major rivers, annual plastic flux is calculated as a ratio between the Po River’s drainage basin, and its annual plastic flux. Coastal sources represent the remainder of annual leakage. |</p>
<table>
<thead>
<tr>
<th>SECTION</th>
<th>METRIC</th>
<th>METHODOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLASTIC IMPACT</td>
<td>Energy consumed in oil equivalent (M, barrels)</td>
<td>Calculated based on the weighted average of energy required to make a kilogram of global plastic (PP, PET, HDPE, PS, PCV), converted into barrel of oil equivalent.</td>
</tr>
<tr>
<td></td>
<td>Average age of plastic life (years)</td>
<td>Calculated based on national data collected on the production of plastic per industry, and the average lifetime of plastic goods in each industry, as found in peer-reviewed research completed by Roland Geyer et al, “Production, Use, and Fate of All Plastics Ever Made”, 2017</td>
</tr>
<tr>
<td></td>
<td>CO₂ emissions (MT)</td>
<td>Calculated based on the average CO₂ emissions caused by plastic production, incineration and recycling, as reported by SITRA, 2018: “The Circular Economy a Powerful Force for Climate Mitigation”.</td>
</tr>
<tr>
<td></td>
<td>Annual coastline plastic pollution (kT)</td>
<td>Calculated based on the daily plastic debris flux (kg/km) multiplied by the total length of the coastline and 365 days. This differs from the total plastic leaked into nature as it doesn’t include plastic on the sea-bed and sea-surface.</td>
</tr>
<tr>
<td></td>
<td>Economic cost of pollution (M, €)</td>
<td>Calculated based on the methodology used in McIlgorm et al, 2011 to estimate the cost of plastic pollution to the APAC region, which takes the proxy of cost to the fishing and shipping industries from Takehama, 1990.</td>
</tr>
<tr>
<td></td>
<td>Cost of waste generated by tourists (M, €)</td>
<td>Calculated based on the proportion of waste generation caused by tourists, which was calculated based on national statistics on tourist arrivals and departures. The cost uses the World Bank estimated cost of $50-100/T of waste in an advanced system.</td>
</tr>
</tbody>
</table>
ANNEX IV – PLASTIC WASTE SYSTEM ACTIVITIES CAUSING CONTROLLED AND MISMANAGED WASTE

- **CONTROLLED WASTE TREATMENT**
  - **MANAGEMENT PROCESS**: CONTROLLED LANDFILL
    - Description: Managed disposal of waste on land with little or no pre-treatment. Site meets requirements for gas monitoring, site compacting and land covering.
  - **MANAGEMENT PROCESS**: INDUSTRIAL INCINERATION
    - Description: Combustion of plastic in a controlled and closed industrial process with exhaust gases adhering to environmental emission regulations.
  - **MANAGEMENT PROCESS**: RECYCLING
    - Description: Plastic collected from the waste stream and reprocessed into a secondary material.

- **MISMANAGED WASTE**
  - **MANAGEMENT PROCESS**: UNCOLLECTED WASTE
    - Description: Unrecovered plastic from the end-user via a waste collection system and does not enter a formal waste treatment process.
  - **MANAGEMENT PROCESS**: UNCONTROLLED OR UNSPECIFIED LANDFILL
    - Description: Absence of control of the disposal operations of plastic and lack of management of the landfill site.
  - **MANAGEMENT PROCESS**: OPEN DUMPING
    - Description: Discarded plastic directly on land, freshwater or marine areas. Alternatively, littering or any form of unregulated plastic waste management such as open burning.

---

1 Not accounting for plastic losses during the recovery process
2 Unless explicitly specified as “controlled” or “sanitary” landfills, we consider all other landfills as uncontrolled.

Why we are here
To stop the degradation of the planet’s natural environment and to build a future in which humans live in harmony with nature.

wwf.org.tr

Turkey is the third waste generator in the Med

3rd

€95
mill/year lost by blue economy to plastic pollution

21%
of collected waste is openly dumped

6%
of plastic waste is recycled

39%
increase in plastic waste import, driven by UK