



Circular Economy of Plastics



نابكو الوطنية
napco national





Our Commitment to a Circular Economy

is to foster premium re-use of plastic scrap to reduce carbon emissions and to divert plastics destined for landfills or incineration into recycled applications supporting a circular economy of plastics

Sustainability Context

Napco National CJSC is developing a circular economy by collecting and recycling plastic scrap from its plants and customers in Saudi Arabia, thereby, reducing greenhouse gas (GHG) emissions and diverting plastics from landfills. We have invested in facilities, as well as waste collection, sorting and cleaning equipment, in Jeddah and Dammam, to recycle post-industrial, post-commercial, and agricultural plastic scrap.

Collecting scrap and regenerating resins unlocks a massive opportunity for value creation. According to the Gulf Petrochemicals and Chemicals Association (GPCA), only 10% of plastics in the GCC are recycled.¹ The association estimates that the plastics recycling industry could add as many as 10 new jobs per ton of plastic waste generated.²



With Saudi Vision 2030³ energizing a range of industries, Saudi Arabia's Public Investment Fund (PIF) announced a plan in October 2017 to establish The Saudi Recycling Company as a waste management government enterprise to support and operate investments in domestic recycling sector projects in alliances with private-sector companies.⁴

By reducing virgin raw material consumption and increasing reuse and recycling, Napco aligns with UN Sustainable Development Goal - SDG12 Responsible Consumption and Production⁵. Napco will also focus on developing partnerships with government entities, resin producers, and industry associations to further plastic waste management and recycling infrastructures, in line with UN SDG17 Partnerships⁶.





Outcomes

Collection, Sorting & Washing of Plastic Scrap

Impact

Invested in a new plastics recycling line and a high-speed turbo mixer in Saudi Arabia

Maintained steady collection of recyclable plastic scrap, of which over 50% was from sister companies in Saudi Arabia:

- Plastic films, clogs and lumps, bumpers and non-woven diaper trim (76.6%)

Saved over 56,000 m² in landfill area⁷

Reduced greenhouse gas (GHG) emissions associated with landfilling by 569 metric tons of carbon dioxide equivalent (MTCO₂ E)⁸

- Floor Sweep Plastic Scrap (21.6%)

Converted 100% by sister companies

- PVC Scrap (2%)

In 2017, despite a difficult economic environment, Napco National continued to invest in recycling equipment and infrastructure, as it expanded scrap collection within Jubail and Dammam in the Eastern Province and Jeddah and Rabigh in western Saudi Arabia. The operation optimizes sorting by material



and color and includes both dry and wet washing capabilities to ensure the possibility of converting premium applications.

Napco collected post-industrial and post-commercial plastic polymers and plastic scrap, including floor sweep, film scrap, clog and lump scrap, and core scrap. Resin waste was washed and sent for converting into quality recycled plastics. Napco segregates film, clog and lump scrap by polymer family and color to ensure premium applications, then grinds and washes the scrap to be sent for conversion. Core scrap is sold off for reuse.

For petrochemical producers, Napco offers 24/7 on-premises collection and

recycling of polymer scraps, using fully owned equipment, from trucks equipped with hook loaders, dumpsters, and balers (compactors) to forklifts and flatbed trucks. It also collects diaper pack trim from sister companies within Napco Consumer Products division, agri and strawberry films from local farms, and post-commercial films from shipping agencies, warehouses and commercial centers.

By diverting plastic waste that would have been landfilled or incinerated into useful applications, the plants support UN SDG12 (Target 12.5) to substantially reduce waste generation through recycling and reuse.⁹



Polymer Scraps Collected



1985	● Napco Modern Plastics Products Company in Dammam starts recycling with limited capacity, a pioneering initiative in the Kingdom
1990	● Napco shifts recycling machines to United Plastics Products Company in Jeddah
2007	● SABIC awards its plastic scrap agreement to Napco Modern Plastics Products Company in Dammam, which: <ul style="list-style-type: none"> • Installed bailers at the customer sites • Provided forklift operators & transportation
2008	● Recycling reaches 400 tons / month using fewer but newer machines, and compounding begins at Uniplast, a stand-alone facility in Jeddah
2013	● Napco expands from recycling plastic scrap to off-grade material from petrochemical companies for special applications
2015	● Recom in Jeddah reaches a recycling capacity of 1,800 MT / month
2015	● Napco invests in a Recom recycling facility in Dammam, Saudi Arabia, including a state-of-the-art pellet washing line and size reduction machine for petrochemical lumps
2017	● Napco companies become branches of Napco National C.JSC
2017	● Napco National invests to expand recycling capacity and reach within Jeddah in western Saudi Arabia and Jubail and Dammam in the Eastern Province



Regeneration of Recycled Resins

Impact

Increased production of recycled resins in Saudi Arabia by 77.2%

- Reduced greenhouse gas (GHG) emissions by over 71,100 metric tons of carbon dioxide equivalent (MTCO₂E)¹⁰

Sister companies converted 40.8% of recycled resins



Napco National in Saudi Arabia regenerated plastic scrap from suppliers, customers, and Napco plants into recycled resins in 2017. Napco uses closed loop mechanical recycling to channel collected scrap into the same application or into applications requiring similar quality recycled resins, rather than combining all scrap into lower value final-use applications that cannot be recycled again.

Sister companies incorporated nearly 41% of these recycled resins into plastic films, thermoforming sheets, bitumens, drip irrigation pipes, injection molding grates and pallets. Agri and strawberry films, for example, were reconverted into mulch film and silage covers, while diaper trim pack was converted into films for the bitumen industry. Other resins were used to produce garbage bags and bin liners, as well as irrigation pipes.

Napco utilizes well-known international research and development centers, including INDEVCO Polymer Application Center for Technology (PACT), which develops solutions to recycle and compound difficult polymers, such as multi-layer barrier films. With experienced scientists, PACT carefully selects the right additives to enhance properties of recycled plastic resins to streamline plastic scrap for higher-value converting.

Napco is further developing new compounded and recycled products for blown films, thermoforming films, and injected molded products.

Regenerating plastic waste into quality resins promotes efficient use of natural resources, in line with UN SDG12 (Target 12.2) Responsible Consumption and Production ¹¹.





References

- 1 Gulf Petrochemicals & Chemicals Association (2018, March 19). Circular economy & plastics, p.9.
<http://gpc.org.ae/wp-content/uploads/2018/03/Circular-Economy-and-Plastics.pdf>
- 2 Saudi Gazette (2018, March 16). GCC must embrace circular economy, leverage opportunities: Speakers.
<http://saudigazette.com.sa/article/530434/BUSINESS/GCC-must-embrace-circular-economy-leverage-opportunities-Speakers>
- 3 Vision 2030 Kingdom of Saudi Arabia
<http://vision2030.gov.sa/en>
- 4 Saudi Press Agency. (2017, October 16). Public Investment Fund to establish recycling sector company.
<http://www.spa.gov.sa/viewfullstory.php?lang=en&newsid=1677834>
- 5 United Nations Sustainable Development Knowledge Platform. Sustainable Development Goal 12. Ensure sustainable consumption and production patterns.
<https://sustainabledevelopment.un.org/sdg12>
- 6 United Nations Sustainable Development Knowledge Platform. Sustainable Development Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.
<https://sustainabledevelopment.un.org/sdg17>
- 7 To calculate the approximate landfill surface saved, we followed the following assumptions
 - a) When disposing, plastic waste would be compressed in bales
 - b) Each waste bale holds 400 kg (0.4 MT) with a width of 110 cm, height of 80 cm, and length of 130 cm
 - c) Volume of bale = $L \times W \times H = 1.144 \text{ m}^3$
 - d) Landfill area per bale = $L \times W = 1.43 \text{ m}^2$
- 8 United States Environmental Protection Agency (2015, March). WARM Version 13: Exhibit 4, p. 5.
<https://www3.epa.gov/epawaste/conserve/tools/warm/pdfs/Plastics.pdf>
Net landfilling emissions = $0.04 \text{ MT CO}_2\text{E/Short Tonne} = 0.0363 \text{ MT CO}_2\text{E/tonne}$



- 9** United Nations Sustainable Development Knowledge Platform. Sustainable Development Goal 12. Ensure sustainable consumption and production patterns.
<https://sustainabledevelopment.un.org/sdg12>
- 10** Pusch, Thema Umwelt, 1/2009, p. 3
<https://timeforchange.org/plastic-bags-and-plastic-bottles-CO2-emissions>
Derivation: Recycling of plastic saves on average about 2.5 kg CO² per kg of plastic (~2.5 MTCO₂ per MT of plastic)
- 11** United Nations Sustainable Development Knowledge Platform. Sustainable Development Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.
<https://sustainabledevelopment.un.org/sdg17>