

21st Century Recycling in the Wild, Wild West: Turning Challenges into Opportunities

“The effect of China’s new policy (is) . . . the economics of recycling are unfavorable for many recyclable commodities, challenging what recycling means to Californians.” – Scott Smithline, CalRecycle Director

On May 4, 2018, China stopped accepting any imports of recyclable materials from the United States. The move sent shock waves throughout Western states that depended on China to take their recyclable commodities. California was particularly hard-hit.

One year later, the impact on the state, its cities, business, residents, and the recycling industry are clear. The reality has settled in: No more mixed plastics. No more plastic film. And, mixed paper is being phased out of international markets.

How did we get here?

China’s National Sword Disrupts World Markets

Since the early 1990s, China had been the largest consumer of the world’s recyclable commodities. They imported 55 percent of the world’s plastic, fiber, metals, and other commodities, 44 percent of U.S. scrap, and 62 percent of California’s exported materials. In 2016, California exported nine million tons of paper and 500,000 tons of plastic to China.

In the past decade, China launched several initiatives to address the country’s growing environmental issues, including emissions and waste:

- 2013: Operation Green Fence – Limited imports of recyclable materials and increased inspections
- 2015: Made in China – Calls for increasing Chinese-domestic content of core materials to 40 percent by 2020 and 70 percent by 2025
- 2017: National Sword – Banned 24 categories and proposed limiting contamination rates to 0.3 percent
- 2017: Blue Sky – Enforcement program to combat commodities smuggling
- 2018: National Sword revised maximum contamination rates to 0.5 percent.

There is no sign that China will allow flexibility, in fact, it is getting more difficult to ship to China, even for the commodities that are able to meet the quality specifications. There is also indication that by 2020 China will ban all foreign scrap, whether or not it meets the 0.5 percent quality requirements.

In response to China’s restrictions, some countries in Southeast Asia (Malaysia, Thailand, Indonesia, etc.) have opened their markets. However, many lack adequate waste management systems, ports, or roadway infrastructure to import in vast volumes, and many of their mills are not as sophisticated as the Chinese mills.

These countries have been overwhelmed by the influx of material being shifted to their countries, and have followed China’s lead by requiring tighter quality control and even banning certain grades of recyclables. Taiwan has banned mixed paper and plastics, Malaysia has put a hold on plastic imports, and Vietnam has tightened quality requirements on mixed paper and plastic.

China's Impact on California

China's ban on scrap has had a direct, major impact on the waste haulers and recyclers who serve the cities and residents of Western states, with those on the coasts being hit the hardest. Domestic mills are scarce in those regions, and they rely heavily on exports. While India has become an outlet for the East Coast, high freight costs and low prices make the economics cost-prohibitive for West Coast facilities.

City of Industry - MRF recovery 2016 actual vs 2018 estimate		
	2016	2018 %Decline
Cardboard	29%	-11%
Mixed Paper	42%	-76%
Plastic Film	.0015%	-100%
#3-7 mix plastic	2%	-90%

Commodities prices on the material that is allowed also have been negatively impacted. For example, the price of old corrugated cardboard/containers (OCC) and mixed paper has declined by \$100 per ton for higher-quality materials.

In order to comply, major players in the waste industry have been forced to increase their work force by at least 25 percent, slow down production lines to accommodate more intensive sorting of materials from waste, and invest heavily in upgrading infrastructure and equipment (optical sorting, robotics, and other cutting-edge technology).

China's move comes at a time when California is raising the recycling bar significantly, embarking on a comprehensive new solid waste and recycling strategy. California leads the nation in legislation and regulations aimed at improving sustainability and protecting the environment. Nowhere is that more evident than in waste and recycling.

It has been 30 years since the passage of AB 939 in California in 1989. That landmark legislation required all California cities and counties, individually, to achieve a 50 percent level of waste diversion from landfills by the year 2000 – under the threat of up to \$10,000 per day penalties for failure to comply. Fortunately, most cities and counties were able to achieve that level of diversion by 2000 or shortly thereafter.

Most recently, SB 1383 targets Short-Lived Climate Pollutants (SLCPs) like methane, fluorinated gases including hydrofluorocarbons (HFCs), and black carbon. The California Air Resources Board (CARB) estimates that worldwide methane emissions may be responsible for 20% of climate change attributable to greenhouse gases (GHGs).

SB 1383 has set a target of recycling 15 million tons per year (75 percent) of all organic waste that continues to be disposed in landfills by 2025. Final regulations are still being hammered out as of this writing, but proposed elements include strict recordkeeping, reporting, enforcement, and fines and penalties. Local municipalities, generators, and haulers are tasked with implementing, monitoring, and meeting the goals of SB 1383.

The impact of this new regimen will require additional infrastructure, increased staffing, and the adoption of expensive new technologies.

With the state contributing a small percentage of the total expenditure required, the rest will fall on ratepayers. Residential solid waste and recycling rates are expected to increase by at least 25 percent and as much as 100 percent in some jurisdictions. Commercial rates also will increase by significant percentages.

While CalRecycle expects that new facilities will be built to process organic wastes, California still needs markets for those wastes. CalRecycle requires that each city and county directly procure products from recycled organic waste at approximately 10 percent of total organic recycling.

However, the proposed regulations currently limit this procurement to compost, renewable natural gas (RNG) for transportation, and paper – with extensive recordkeeping and reporting.

This could impose a significant procurement burden when other sectors, including the State of California itself (e.g., Caltrans), agriculture, and fire/flood-damaged lands have a much greater demand and capability for the use of recovered organic materials.

In addition, every city and county must have an edible food recovery program to capture 20 percent of what is currently disposed in landfills by 2025, also with extensive reporting and record-keeping requirements.



Turning Challenges Into Opportunities

As these changes filter their way throughout the State of California, its agencies, counties, school districts, and municipalities, Athens is exploring bold new technological solutions to meet customers' recycling needs. For example, Athens' newest Materials Recovery Facility (MRF) uses high-tech air separators, optics and AI robotics to produce higher-quality materials and tap into markets such as Korea.

At Athens Services, we view the "low-quality" paper and plastics banned from the international markets as a resource, not a residue. We are vetting technologies to harvest "low-quality" plastic and paper from the waste stream using special screens, optical sorters, and specialized grinders to create a fuel substitute that actively reduces air emissions while also lowering the total amount of coal used in a power plant. This ReEngineered Feedstock (REF) from municipal solid waste could have a tremendous positive impact on the carbon footprint of our cities and customers.

Athens has partnered with Komar Industries, a domestic equipment manufacturer, to develop a hydraulic organic screw press (OSP), the first of its kind. Our goal is to use the OSP to wring the liquid organics from the waste stream and process it through an anaerobic digester to produce CNG for our trucks. In its trial phase, the OSP is showing great potential in recovery and diversion.

New technologies and options like these are not cheap, but they are becoming increasingly necessary if we are to have any chance to improve the sustainability of our environment. At Athens Services, we believe that these investments are both worthwhile and necessary.

In addition to the adoption of new technologies, major infrastructure investments and upgrades will be necessary to deal with the collapse of the China market and the increased requirements in California.

With cities requiring diversion, and zero markets for certain grades, all processors will need to continue to invest more capital in equipment to improve commodities quality, while facing heavy financial pressures due to disappearing markets and falling demand.

An estimated 100 organic waste recycling and processing facilities at a cost of \$2-3 billion will need to be designed, permitted, and built throughout California to achieve the diversion of about 15 million tons of organic waste (75% organic waste disposal reduction goal) by 2025.

These facilities will typically be composting and anaerobic digestion facilities. To help meet this need, Athens Services is nearing completion of the first phase of a new, state-of-the-art, upgraded processing system at its American Organics composting facility in Victorville. The upgraded improvements also will include enhancement of environmental control systems to protect groundwater and improve air quality.

The second phase will be completed prior to implementation of SB 1383 in 2022. This phased expansion will increase the capacity of the existing facility by 150,000 tons annually to accommodate the organic waste stream.

Athens Services is also working with several anaerobic digestion developers to identify opportunities to create CNG for our fleet from collected food waste.

Where Do We Go From Here?

Athens supports a reasonable goal of reducing Short-Lived Climate Pollutants (SLCPs) and the disposal of organics, but to reach them will require some important components:

- A dramatic increase in markets for compost and renewable fuels
- Substantial solid waste and recycling rate increases or other sources of funding
- Revisions to existing state requirements to reduce delays in siting and permitting solid waste infrastructure
- Grant funding to support research, development, and construction of new organics facilities.

We firmly believe that we are all partners in working toward achieving the state's goals. CalRecycle and other state agencies, federal agencies, the local public sector, the private sector, and the public all have a share of the responsibility. However, we must face it together in as cost-effective a manner as possible for the sake of the environment, our cities, and our residents.