

## **The Plastic Scrap Market since China's import ban**

Plastics are a relative newcomer to the recycling industry. Bringing a wide variety of useful characteristics, plastics have enjoyed a sweeping adoption in consumer products and industrial applications due to its large supply and easy scalability. This relatively sudden and widespread market penetration has revolutionized lifestyles while economic policies have been slow to adapt. Growing political concerns about the environment and the rapid increase of information technology has led nationalistic policy makers to make short-term but rather impactful changes with the wishful thinking that a technology will emerge to solve problems. One of these policies is China's ban on the import of plastic scrap, particularly the sort that would need a secondary processing step to prepare the materials as a direct manufacturing input. According to UN Comtrade data, China had been importing approximately two-thirds of the world's plastic scrap exports for approximately a decade up until this point.

### ***High-Density Polyethylene (HDPE) Scrap***

At the beginning of 2017, U.S. exports of plastic scrap were increasing dramatically, led by a considerable growth in demand for high-density polyethylene (HDPE) plastics. This is indicated by the initial price spike in Figure 1 for Colored HDPE bales which is an upper-mid grade category being used as a baseline for price relationships. The sudden drop in prices also coincides with the Chinese government's announcement of the incoming import ban which occurred in early April. HDPE scrap export volumes reduced in the following months but didn't begin a decline until the fall months as details of the import ban were making themselves known which also led to manufacturing starting to wind down for the holiday season.

After the implementation of the import ban, U.S. HDPE scrap exports and domestic pricing exhibited more traditional supply and demand characteristics for the 2018 year. However, 2019 has started off with even lower export demand. This may be seen in the reduced demand from 2018's strong growth markets of Vietnam, Turkey, and India (Figure 2). While it appears that pricing for HDPE plastic scrap has been relatively stable since the summer of 2017, this may also be an effect of U.S. energy production working to offset changes in global oil and gas production that have kept prices a bit more supported.

### ***Polyethylene Terephthalate (PET) Scrap***

PET scrap is a widely recognizable category of plastic scrap. The market fluctuations seen in the HDPE scrap market appear to be comparatively calmer in the PET scrap market. PET does not have the same range of utilization in industrial applications or large and durable products. What it can boast is more robustness to primary polyethylene production from the energy industry. PET scrap enjoys a lower degree of competition from supply gluts because PET demand is a stronger driver for its production. The latter half of 2018 saw the U.S. become a net importer of PET scrap. While there may be a more gradual shift in PET scrap markets, the decline in global demand may be a longer term trend due to environmental concerns about plastics pollution.

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### ***Mixed or Commingled Plastics (#1-7 or #3-7)***

Mixed plastics are seeing a divergence as sorting for quality has become a necessity to meet what demand is available. During the fall of 2017, prices for HDPE began to rise and exports declined. Commingled #1-7 bales and colored HDPE bales had a relatively high price difference considering other major residential recyclables were falling value. It made economic sense to add the labor cost inputs to sort out more. This secondary processing niche grew more over 2018 as the value of #3-7 bales went down in value. The consistently lower value of #3-7 to #1-7 bales over this time coincides with HDPE and PET scrap prices being consistently higher than during the latter half of 2017. The flight to quality polymers that can be procured in high volumes is pushing down the quality in lower grade bales.

### ***Notable Country Markets***

*Hong Kong* - China's import ban first affected the import and export market for Hong Kong. Import volumes for plastic scrap were approximately 50,000 metric tons monthly leading up to the spring of 2017 and the announcement by the Chinese government. By the end of summer 2017, imports of U.S. plastic scrap were reduced by more than half. Previous ISRI estimations held that Hong Kong was likely re-exporting up to 90% of their imported U.S. plastic scrap into mainland China. It appears that Hong-Kong based scrap dealers may have been re-exporting within a range of 70-90% of their imported U.S. plastic scrap.

*Southeast Asia* – As illustrated in Figure 3, Vietnam and Malaysia dramatically increased their consumption of U.S. exports of plastic scrap at the onset of the import ban announcement. Estimates are that the increased volumes were entirely from rerouted rejections at Chinese ports. As exporters tried to squeeze as many shipments as possible before the Jan 2018 deadline, the import volumes of U.S. plastic scrap increased again around October 2017. Vietnam virtually cut off all U.S. imports in the summer of 2018 and Malaysia severely reduced their acceptance of U.S. imports. The sheer volume of overflow and rejections likely meant that lower grade material was being diverted to these markets and prompted them to severely reduce their acceptance of plastic scrap. Thailand appeared to be a latecomer as an alternative destination. U.S. plastic scrap exports to Thailand didn't begin to ramp up until December 2017 and may have been due to the political turmoil that occurred there with the passing of King Bhumibhol Adulyadej and the loss in confidence of the Prime Minister and his government. Like Vietnam and Malaysia though, Thailand also began curtailing during the summer of 2018. Indonesia showed growth in late 2018 and had been one of the top 10 market destinations for U.S. plastic scrap exports in early 2017. Their import demand pattern ran counter to much of the rest of Southeast Asia and their volume demand has been relatively small compared to the void from China's reduced global market presence.

*Other country markets* - India was expected to become a growth destination market for U.S. plastic scrap exports as a result of the ban, a growing recycling industry within India, and their

burgeoning manufacturing infrastructure. However, after capturing more market share, India has been a relatively steady market for plastic scrap but not significantly more so than before the ban. This year, however, the Indian government plans an import ban of their own but seems to have delayed its implementation for six months, partially due to enhanced trade relations that were established by ISRI in a trade mission several years ago. What can surely be said is that the growth in India's scrap consumption is that it's likely more robust and internally driven rather than a reactionary adaptation to a supply glut. Canada was also seen as another hopeful destination market but the sophistication of the U.S.-Canada trade relationship meant that there was probably little capacity to grow without major capital investment. South Korea has virtually tripled their monthly import volumes of U.S. plastic scrap but their current monthly import volumes are on par with Malaysia and Thailand's reduced intake.

### ***Overall Analysis and Remarks***

The plastic scrap market on a global scale is heavily weighted between the largest manufacturing export economy in China and the largest consuming economy in the United States. By cutting off the return supply of material that goes into consumer products, it was evident that globally traded volumes would go down. Polyethylene production is heavily influenced by energy prices. Other polymers are reactionary to that polyethylene production and value but depending on the supply-demand relationship, the reaction may be muted or exaggerated. In this case, there appears to be a supply issue so reactionary prices have been muted. However, a flight to quality in scrap baling, has pushed mixed plastic pricing down into a niche category that generally encompasses plastic scrap sourced from residential streams that cannot access the technology to separate for quality.

The plastics market can be economically sustainable on free-market principles. Trade barriers and misplaced incentives from policy prescriptions have pushed lower grade plastics into the category of public goods. This is due to service elements of the recycling process being couched into waste management programs to create blended value accounting that conveniently packages an array of services for local governments to budget. Technological advances may help rebalance pricing. However, systems research in order to tease out improved collection and transportation logistics have been limited or slow in their adoption. This likely means that the next advancement in plastic scrap recycling will be regionalized for the near-term.

Essentially, China's import ban has created a chokepoint that has put back pressure on supply markets to shift the balance of their recycling sortation. The change in quality means increased labor costs that erases any profit margins on lower grade materials that were still recyclable. Alternative markets were overwhelmed due to the overflow that China's massive manufacturing and labor base is no longer absorbing. The effects of the ban will still have repercussions for the foreseeable future.

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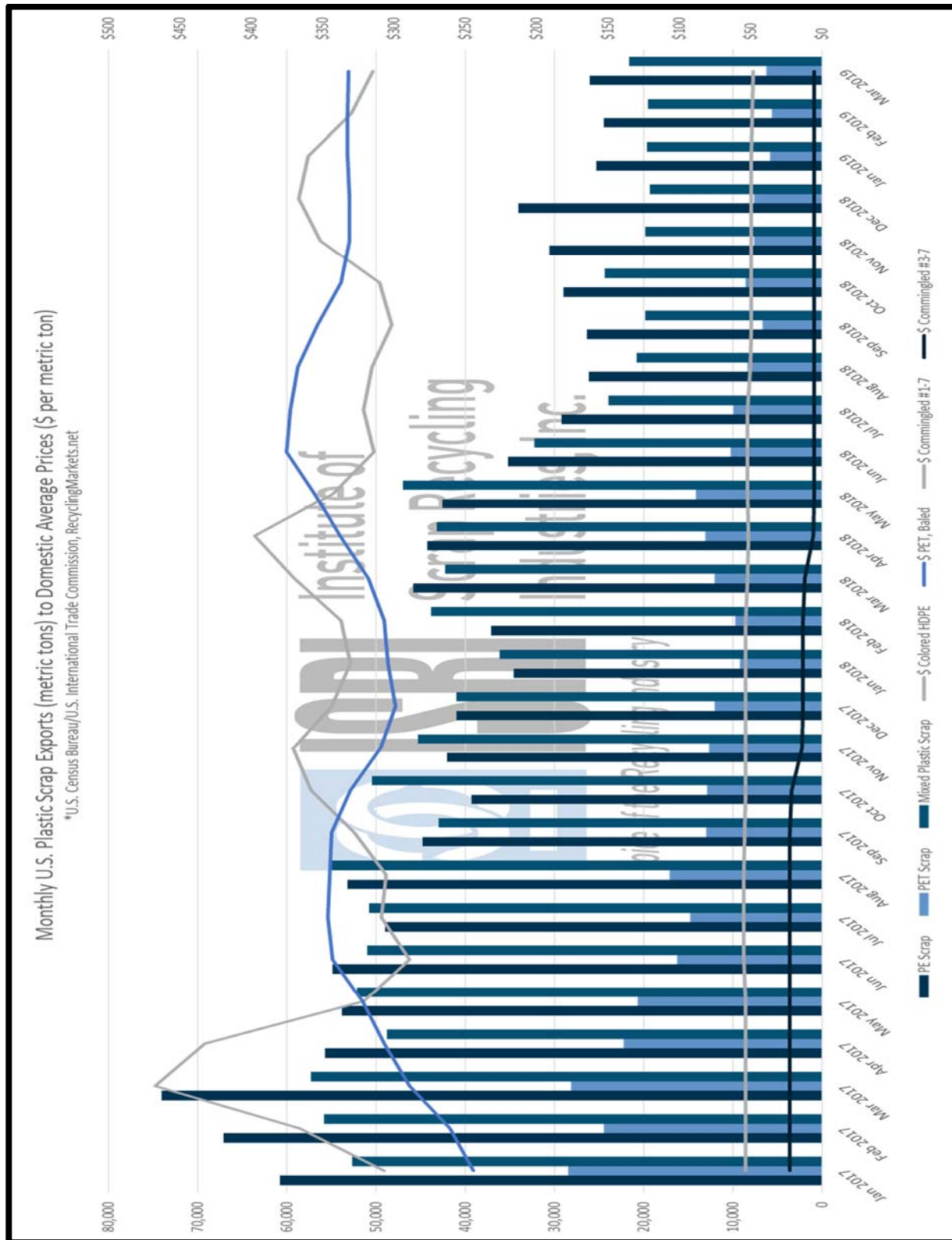


Figure 1

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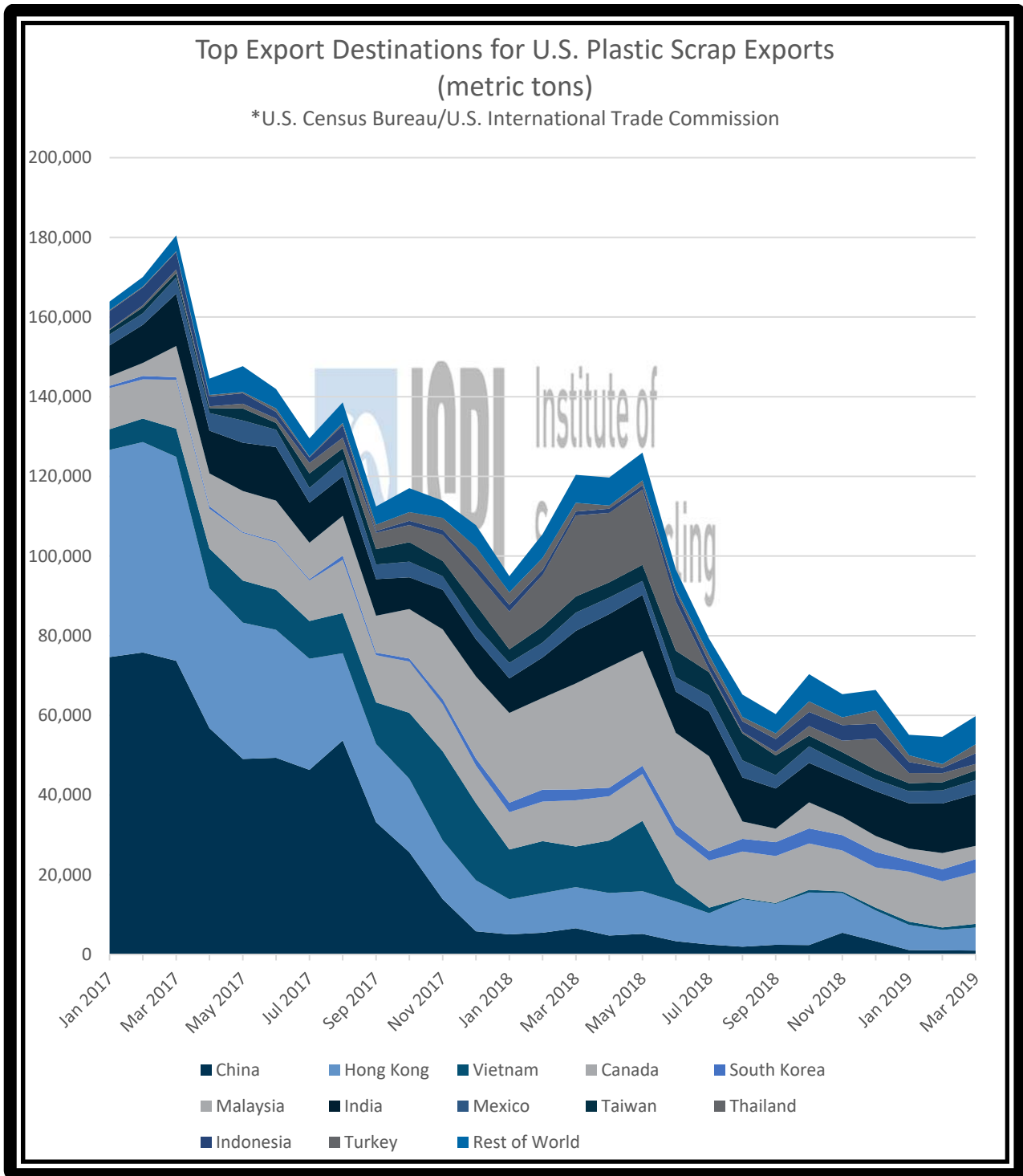


Figure 2

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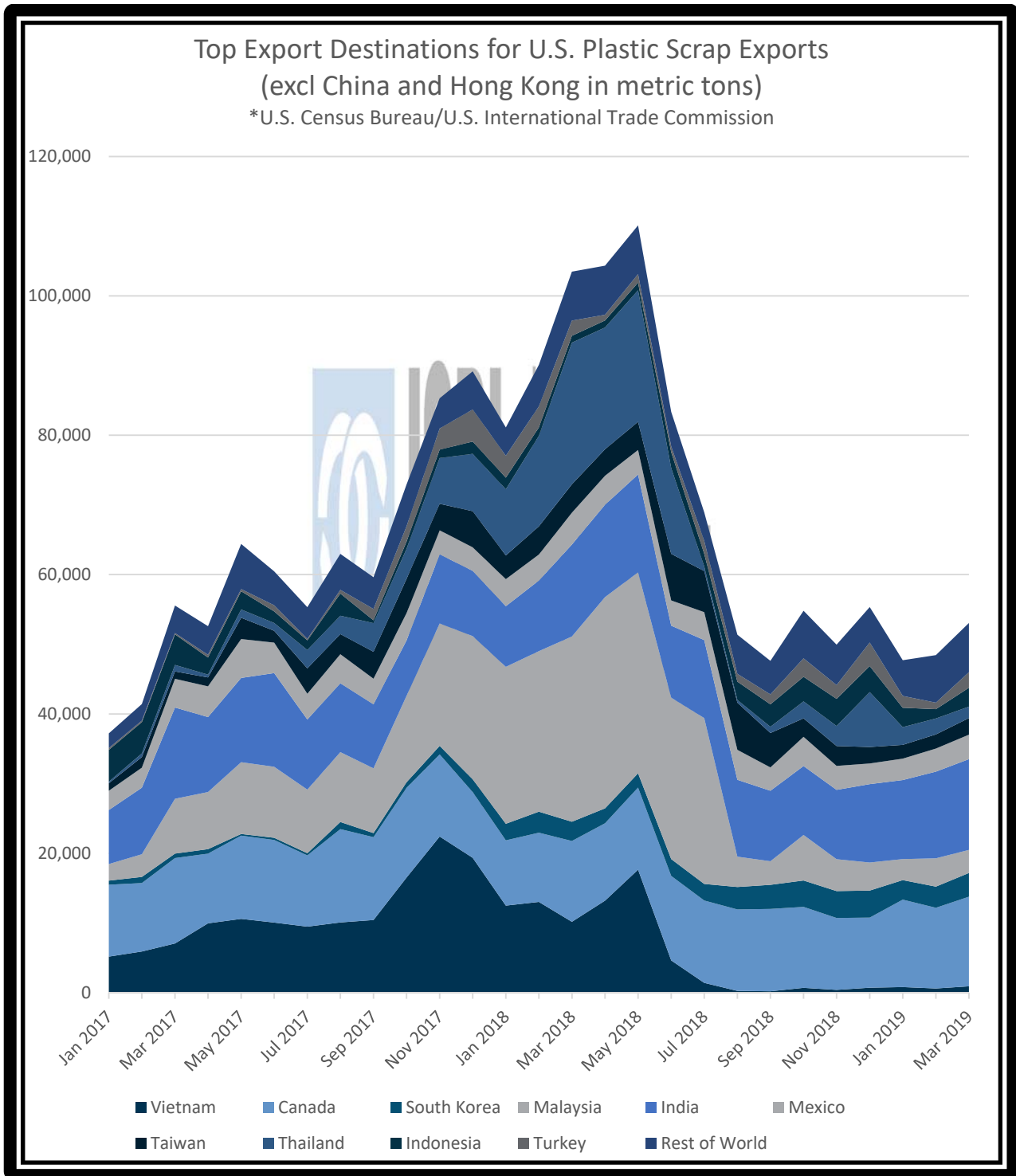


Figure 3

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