
The Applicability of the EPA Market Forces Study to the Scrap Metal Recycling Industry

Provided in Connection with Comments by the Institute of Scrap Recycling Industries, Inc., to
EPA Docket ID No. EPA-HQ-RCRA-2010-0742 (Amendment to Definition of Solid Waste)

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SUMMARY

The Institute of Scrap Recycling Industries, Inc. (ISRI) has commissioned Professor Robert Stavins and Analysis Group, Inc. to comment on the 2006 ICF study of market forces in the recycling industry (“Market Forces Study”)¹ and its applicability to the scrap metal recycling industry. EPA relies in part on the conclusions of the Market Forces Study to justify its proposed revisions to the 2008 rule on the definition of solid waste as it relates to materials sold to third parties for recycling.² It is our understanding that these proposed revisions may extend new requirements to third parties who receive scrap metal for recycling and that it is unclear whether EPA believes that the observations contained in its Market Forces Study apply to transfers of scrap metal (as opposed to other materials) for recycling by third parties. Given this ambiguity, ISRI has asked us to review the Market Forces Study and evaluate whether its conclusions *should* be applied to the scrap metal recycling industry.

Our conclusion, after having reviewed the relevant, available data, is that conclusions of the Market Forces Study should not be applied to the scrap metal recycling industry. The primary conclusion of the Market Forces Study – that recyclers are apt to over-accumulate recyclable material (i.e., engage in “sham recycling”), posing a risk to health and the environment – relies on a simplistic and flawed understanding of market dynamics. More fundamentally, the key assumption underlying the Market Force Study’s conclusion – that recyclers get paid to accept recyclable material – incorrectly characterizes the scrap metal recycling industry. Scrap metal recyclers pay for virtually 100 percent of the scrap metal they acquire, and thus do not meaningfully differ from the “traditional” manufacturers with which they are compared in the Market Forces Study and by EPA. Consequently, EPA should not rely on the Market Forces Study to justify extending its proposed rule to firms in the scrap metal recycling industry.

ABOUT THE AUTHORS

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¹ “A Study of Potential Effects of Market Forces on the Management of Hazardous Secondary Materials Intended for Recycling,” EPA Office of Solid Waste, prepared and submitted by ICF International, November 21, 2006 (“Market Forces Study”).

² “Definition of Solid Waste; Proposed Rule,” 76 Federal Register 141 (July 22, 2011), pp. 44094-44154 (“Proposed Rule”).

and Natural Resources Faculty Group at the John F. Kennedy School of Government, Harvard University. He is a University Fellow of Resources for the Future and a Research Associate of the National Bureau of Economic Research. He is an elected Fellow of the Association of Environmental and Resource Economists, and was Chairman of the U.S. EPA's Environmental Economics Advisory Committee. Professor Stavins' research has focused on diverse areas of environmental economics and policy, including examinations of market-based policy instruments, regulatory impact analysis, innovation and diffusion of pollution-control technologies, environmental benefit valuation, policy instrument choice under uncertainty, competitiveness effects of regulation, depletion of forested wetlands, political economy of policy instrument choice, and costs of carbon sequestration.

Jonathan Borck, Ph.D., a Manager at Analysis Group, specializes in the application of economics and statistics in the areas of energy, the environment, and finance. His casework in energy and environment has included analyses of state and federal climate policies, allowance allocation in cap-and-trade programs, and oxygenate use in gasoline. He has supported academic affiliates in the estimation of damages from environmental contamination and in the use of the hedonic property value, benefit transfer, and contingent valuation methodologies for valuing natural resources and quantifying environmental damages. Dr. Borck has authored several consulting reports and presentations on the design of California's cap-and-trade program for controlling greenhouse gas emissions, and his research on voluntary corporate environmentalism and the beyond-compliance behavior of firms has appeared in the *Annual Review of Environment and Resources*, *Ecological Law Quarterly*, and *The Environmental Law Reporter*.

Janis M. Carey, Ph.D., a Vice President at Analysis Group, specializes in resource, environmental, and energy economics. She has managed large case teams and worked with prominent academics affiliates to provide support in all phases of litigation. She has also provided strategy, valuation, and regulatory analysis services in non-litigation contexts, including working in the firm's climate change practice. Prior to joining Analysis Group, she was an Assistant Professor in the Division of Economics and Business at the Colorado School of Mines, where she taught classes in resource, environmental, and energy economics. Her academic research on water markets and electric utility restructuring has been published in peer-reviewed journals including the *American Journal of Agricultural Economics*, the *Natural Resources Journal*, and *The Energy Journal*.

BACKGROUND ON THE SCRAP METAL RECYCLING INDUSTRY

Scrap metal recyclers purchase scrap metal and process it into usable specification-grade commodities. Scrap metals purchased by the industry include iron and steel, aluminum, copper, lead, and zinc. As shown in Table 1, by far the largest category, both in quantity and value, is iron and steel. According to the U.S. Geological Survey (USGS), “Recycled iron and steel scrap is a vital raw material for the production of new steel and cast iron products. The steel and foundry industries in the United States... are highly dependent upon scrap.”³

The scrap metal recycling industry’s business model is straightforward. Recyclers purchase scrap metal from a variety of sources, ranging from large manufacturers with scrap as a by-product of their production processes to peddlers selling aluminum cans. Recyclers process these materials into specification-grade commodities and sell them to steel mills, smelters, foundries, and other industrial consumers. A substantial portion of scrap commodities is exported. For example, in 2009, approximately 22 million tons of processed scrap iron and steel, representing fully 41 percent of domestic output, were exported to countries such as China, Turkey, and Canada.⁴

Table 1. Recycling Statistics for Selected Metals

Scrap Metal	Quantity of Recycled Metal (Metric Tons)		Value of Recycled Metal (Billions of Dollars)	
	2008	2009	2008	2009
Iron and Steel	66,400,000	53,100,000	\$23.2	\$11.0
Aluminum	3,330,000	2,710,000	\$8.9	\$4.7
Copper	852,000	774,000	\$6.0	\$4.1
Lead	1,140,000	1,110,000	\$3.0	\$2.1
Zinc	339,000	273,000	\$0.7	\$0.5

Source: U.S. Geological Survey, “Recycling – Metals [Advance Release],” pp. 61.2-61.3 in “2009 Minerals Yearbook,” July 2011. Available online at <http://minerals.usgs.gov/minerals/pubs/commodity/recycle/myb1-2009-recyc.pdf>.

³ U.S. Geological Survey, “Iron and Steel Scrap,” pp. 80-81 in “Mineral Commodity Summaries 2011,” January 21, 2011. Available online at <http://minerals.usgs.gov/minerals/pubs/mcs/2011/mcs2011.pdf>.

⁴ U.S. Geological Survey, “Iron and Steel Scrap,” pp. 80-81 in “Mineral Commodity Summaries 2011,” January 21, 2011. Available online at <http://minerals.usgs.gov/minerals/pubs/mcs/2011/mcs2011.pdf>; data from ISRI.

SUMMARY OF MARKET FORCES STUDY

In its recent Proposed Rule on the Definition of Solid Waste (DSW), the U.S. Environmental Protection Agency (EPA) proposes to revise and restructure regulations on hazardous secondary materials transferred from one entity to another for the purposes of recycling. EPA justifies its proposal in part by referencing the Market Forces Study. The Market Forces Study claims that “economic forces shaping firm recycling behavior might be different than those at play in manufacturing processes using virgin materials” and that these differences can lead to “firms... accumulating too much waste without actually recycling it” – an outcome referred to in the Market Forces Study as “sham recycling.”⁵

The Market Forces Study’s conclusion that commercial recyclers are prone to engage in sham recycling depends on a critical assumption: that recyclers get paid to accept material. If this were true, the recycler would generate revenue simply through acquiring material, and thus might have an incentive to do so regardless of whether it intends to process the material into a usable commodity. If, after receiving the material, market conditions were unfavorable – that is, if the marginal cost of processing the acquired material into a usable commodity were to exceed the price the processed material could fetch in the marketplace – the recycler might not process it, leading to the over-accumulation of material.

The Market Forces Study contrasts recyclers in this situation with “traditional” manufacturers that purchase their input materials. “Traditional” manufacturers do not face an incentive to obtain inputs unless they expect the production process to be profitable. If they do not expect it to be profitable, they will avoid obtaining input materials, if possible, because acquiring them imposes a cost with no accompanying gain. Thus, according to the Market Forces Study, the incentive to over-accumulate inputs is substantially less among “traditional” manufacturers than among commercial recyclers.⁶

EPA uses this reasoning directly in its Proposed Rule, describing the Market Forces Study’s conclusion that commercial recyclers are “inherently different” from “normal manufacturing” firms and thus are more prone to sham recycling:

⁵ Market Forces Study, pp. 8-9.

⁶ Market Forces Study, pp. 2-3, 8-9.

... the pattern of discard at off-site, third-party reclaimers is a result of inherent differences between commercial recycling and normal manufacturing. As opposed to manufacturing, where the cost of raw materials or intermediates (or inputs) is greater than zero and revenue is generated primarily from the sale of the output, hazardous secondary materials recycling can involve generating revenue primarily from the receipt of the hazardous secondary materials...⁷

Given the assumption that commercial recyclers are paid to accept recyclable products (an erroneous assumption for the scrap metal recycling industry, as discussed below), the Market Forces Study then turns to a discussion of the factors expected to increase the likelihood of sham recycling:

- The value of the recycled product is low
- The prices of input materials or recycled products are volatile
- Recyclers have low net worth.

First, according to the Market Forces Study, if the value of the recycled product is low, recyclers that get paid to accept material rely more on the acceptance fees for revenue and thus “may have an incentive to accept a greater quantity of recyclable waste than they could properly manage.”⁸ Second, according to the Market Forces Study, when the prices of input materials or the recycled product are unstable, recyclers are more “subject to sudden upsets to their revenues or costs,” which can lead to losses. Third, according to the Market Forces Study, recycling firms with greater net worth “have more to lose from liability issues” associated with the processing of recyclable materials “and thus have a greater incentive to invest in careful waste management practices.”⁹

In its proposed rule, EPA echoes these assertions as well:

“[I]n certain types of commercial recycling, the product has low value, the prices are unstable, and/or the firm has a low net worth. Facilities in these situations can be more susceptible to environmental problems from the over-accumulation

⁷ Proposed Rule, Section VII(B), p. 44108.

⁸ Market Forces Study, p. 42.

⁹ Market Forces Study, pp. 42-43.

or mishandling of hazardous secondary materials, especially when compared to recycling by a well-capitalized firm that yields a product with high value.”¹⁰

EPA proposes to address these concerns by tightening restrictions on commercial recyclers.

As described below, however, the conditions that the Market Forces Study claims increase the likelihood of sham recycling *simply do not apply to the scrap metal recycling industry*. Consequently, *EPA should not use the Market Forces Study* as justification for concluding, or even inferring, that the transfer of scrap metal to third-party scrap recyclers for the purposes of recycling increases the likelihood that such materials will be discarded rather than recycled.

THE MARKET FORCES STUDY DOES NOT APPLY TO THE SCRAP METAL RECYCLING INDUSTRY

Scrap Metal Recyclers Pay for Virtually 100 Percent of the Scrap Materials They Acquire

The Market Forces Study does not apply to the scrap metal recycling industry primarily because *scrap metal recyclers pay for virtually 100 percent of the scrap materials they acquire*. Scrap metal recyclers therefore face no more incentive than “traditional” manufacturers do to over-accumulate input materials.

The Market Forces Study’s conclusions – and the justifications that EPA offers in its Proposed Rule – depend on the assumption that scrap metal recyclers get paid to accept scrap materials. Based on our review of the scrap metal recycling industry, that is almost never the case. ISRI staff estimate that scrap metal recyclers pay for virtually 100 percent of the materials they acquire.¹¹ Scrap metal has value, and purchasing it for processing is the industry’s business model. ISRI notes that, “As the original recyclers, for decades – and indeed, centuries – the scrap recycling industry has been purchasing, processing and brokering old materials to be remade into new products...”¹²

¹⁰ Proposed Rule, Section V(D), p. 44100.

¹¹ Conversation with ISRI members, October 17, 2011.

¹² ISRI, “The Scrap Recycling Industry: The Original Recyclers.” Available online at www.isri.org/iMIS15_Prod/ISRI/_About/Scrap_Recycling_Industry.

Information on individual recyclers' websites further highlights that scrap metal recyclers pay for the materials they acquire:

- “Metalico operates both ferrous and non-ferrous scrap metal recycling facilities in New York, Pennsylvania and Ohio, serving both U.S. and Canadian markets. **All forms of metal scrap are purchased** from manufacturers, small scrap dealers, demolition contractors, and peddlers. The scrap is sorted and prepared for sale to mills, furnaces and foundries....”¹³
- “Our Recycling segment operates under the name CMC Recycling from almost 50 scrap metal processing plants located across the U.S. CMC Recycling is one of the largest processors of nonferrous scrap metals and one of the largest regional processors of ferrous scrap metals in the U.S... We operate scrap metal processing facilities strategically located throughout the southwest and southeastern United States, and **we buy consumer, electronic, and industrial scrap at all of our locations...**”¹⁴
- “**Scrap metal is purchased** from industrial manufacturers, railroads, auto salvage facilities, metal dealers and individuals.”¹⁵
- “SA Recycling’s 40 facilities are open to the public and ready to serve your metal recycling needs. **We accept and pay you cash on the spot**, subject to relevant scrap metal laws, for all types of metal and CRV items...”¹⁶
- “**All manner of scrap metals can be sold to OmniSource** – steel, aluminum, copper, stainless steel. **We buy everything** from industrial scrap to metal scrap from individuals.”¹⁷

¹³ Metalico, Inc. (<http://www.metalico.com/profile.html>). Emphasis added.

¹⁴ Commercial Metals Company (<http://www.cmc.com/CMC-Americas-Recycling.aspx>). Emphasis added.

¹⁵ Schnitzer Steel Industries, Inc. (http://www.schnitzersteel.com/metals_recycling_profile.aspx). Emphasis added.

¹⁶ SA Recycling (<http://www.sarecycling.com/residential>). Emphasis added.

¹⁷ OmniSource Corporation (<http://www.omnisource.com/sell>). Emphasis added.

Recent press accounts describing the scrap metal recycling industry not only confirm that scrap metal recyclers pay for the material they acquire but note that the prices for scrap metal have been increasing:

- “In the scrap-metal industry, Petersen is known as a peddler, and his presence here is proof of the catholic nature of S. D. Richman Sons. **It buys from the many** (any legitimate source who has steel, iron, copper, aluminum or brass) and sells to the few (mills that melt the old metal to make new metal)... Fueled by building booms in China and India, **the price of scrap metal is at near-historic highs** — more than \$400 for a gross ton of steel, \$4 a pound for copper — so the magnet of global capitalism pulls the scrap into Maguire’s yard.”¹⁸
- “Bob Conroy owns one of the recycling centers in the region that is seeing a trend... **The price for iron has gone up** from between \$50 to \$100 per ton to as much as \$400, he said, and **the price for copper also has risen** from 80 cents a pound a decade ago to up to \$4.”¹⁹
- “A Delaware official says Navy plans to recycle rather than sink four retired warships won't affect plans to scuttle a destroyer off the coast of Maryland... A Naval Sea Systems Command spokesman says the decision to scrap four other ships was an economic one made in response **to high prices for scrap metal.**”²⁰

This business model, in which scrap metal recyclers pay for the material they acquire, has characterized the industry for some time. For example, as described by EPA in a 1993 study of the market for scrap aluminum:

The cost of aluminum scrap is the largest cost component incurred by the scrap suppliers (collectors and processors)... None of the suppliers, including the most capital-intensive processors of scrap, spends more on processing than on obtaining the raw material itself. This is what makes aluminum such a

¹⁸ Jason Fagone, “There’s Gold in That Scrap,” *The New York Times*, August 12, 2011. Emphasis added.

¹⁹ “Rising Scrap Metal Prices Mean More People Recycling in the Chicago Suburbs,” Associated Press, October 7, 2011. Emphasis added.

²⁰ “Navy Ship Heading to Bottom to Become Reef, High Scrap Prices Led to Recycling of 4 Others,” Associated Press, April 14, 2011. Emphasis added.

“recyclable” product: Aluminum is easy to reuse without a great deal of expensive processing.²¹

In addition, a 1997 article in the *Smithsonian Magazine* discussed the market for scrap materials:

Metals prices move with global economics, but as I write this, you can take broken aluminum lawn chairs to your nearest scrapman and he’ll give you 35 cents a pound. Brass plumbing fetches around 50 cents, copper wire without insulation, 85 cents. Ferrous metals – steel and iron – are a lot harder work: \$1 to \$5 for 100 pounds, depending on the grade and whether they’re attached to some undesirable substance such as plastic.²²

The Market Forces Study does not consider a model in which a scrap metal recycler pays for the recyclable material it acquires. If it did, it would conclude that a scrap metal recycler is not meaningfully different from a “traditional” manufacturing firm. A scrap metal recycler, like any manufacturer, bases its decisions on how much to spend on input materials (e.g., scrap metal) on the expected revenue it can earn from its output (recycled material). *It has no more incentive to accumulate scrap metal without processing it than any manufacturer has to accumulate inputs without using them in its production process.*

The Market Forces Study Takes a Simplistic View of Market Dynamics, Including in the Scrap Metal Recycling Industry

Given the assumption that recyclers pay to acquire recyclable materials, the Market Forces Study goes on to discuss factors that it claims increase the likelihood of over-accumulation of materials or sham recycling. As described above, the first factor it lists is the value of the recycled product. The Market Forces Study argues that the likelihood of over-accumulating recyclable material is greater if the value (i.e., price) of the recycled product is low. Thus, by implication, if a recycled product has a low value, EPA should be more concerned about sham recycling.

The Market Forces Study offers an incomplete picture, however, of market dynamics in any industry, including the scrap metal recycling industry. As a matter of basic economics, it is not

²¹ U.S. Environmental Protection Agency, “Markets for Recovered Aluminum,” April 1993, p. 17. Available online at <http://www.epa.gov/osw/nonhaz/municipal/pubs/sw90077a.pdf>.

²² Kevin Krajick, “Mining the Scrap Heap for Treasure,” *Smithsonian Magazine*, May 1997.

the product's value per se that affects production decisions, as the Market Forces Study claims, but rather the profit (i.e., margin) that recyclers can earn from recycling the product. In making its production decisions, a firm will compare the marginal benefit of production (i.e., the price at which it can sell its output) to the marginal cost of production. A low-value product can still be profitable to produce if the costs of producing it are sufficiently low. Similarly, a high-value product can be unprofitable to produce if the costs of producing it are sufficiently high. Thus, the Market Forces Study makes a fundamental economic error by focusing exclusively on the marginal benefits of production.

As an empirical matter, data on recycling profits are difficult to obtain. Nonetheless, we have seen evidence to suggest that scrap metal recyclers earn small but positive profits.²³ Moreover, sources indicate that demand for recycled metals is high, which would be expected to lead to higher prices for processed scrap. For example, in January 2011, the USGS reported that "North America has been experiencing a shortage of iron and steel scrap, owing to increased export demand," which has led to "significantly increased prices for scrap."²⁴ Scrap metal recyclers have little incentive acquire scrap without processing it. At a minimum, the Market Forces Study's focus on the "low value" of the recycled product is overly simplistic. A complete analysis would examine both the marginal benefits and the marginal costs of production and would be industry-specific and time-specific.

The second factor that the Market Forces Study claims increases the likelihood of over-accumulation of recyclable material is price volatility. The Market Forces Study argues that the over-accumulation of material is more likely if prices for scrap or recycled products are unstable. Thus, by implication, if market prices vary widely, EPA should be more concerned about sham recycling. The Market Forces Study, however, fails to consider the fact that price volatility is a common issue in commodity markets, not just the recycling market, and that participants in those markets can and do rely on fundamental economic forces and a variety of active strategies to cope with price volatility.

First, basic economics tells us that markets are related and that price changes in one market affect prices in other markets. For example, if the price for recycled steel declines, demand for scrap steel would be expected to decline, and the price for scrap steel would consequently be

²³ Conversation with Joe Pickard, Chief Economist for ISRI; data from five publicly traded scrap recyclers (CMC, Industrial Services of America, Metalico, Schnitzer Steel, and Sims Metal Management) supplied by ISRI.

²⁴ U.S. Geological Survey, "Iron and Steel Scrap," pp. 80-81 in "Mineral Commodity Summaries 2011," January 21, 2011. Available online at <http://minerals.usgs.gov/minerals/pubs/mcs/2011/mcs2011.pdf>.

expected to fall. Thus, while a scrap metal recycler would not generate as much revenue from processing scrap steel, it would also pay less to acquire scrap steel. In fact, our understanding is that this is precisely how the scrap metal recycling market works: falling demand for transformed, specification-grade commodities leads to falling demand and prices that recyclers pay for the scrap they acquire.²⁵

In addition to relying on these natural market dynamics to attenuate the effects of price volatility, recyclers, like firms in any industry, can take active steps to cope with unstable prices. For example, scrap metal recyclers may hedge the risk of price declines using metals futures. They may also enter into price contracts with buyers of recycled products that lock in prices over a certain period of time. The Market Forces Study fails to give serious consideration to these and other strategies that recyclers may employ to minimize the risks of price volatility.

CONCLUSION

EPA relies in part on the Market Forces Study to justify its proposal to revise and restructure restrictions on third-party recyclers, a group that includes scrap metal recyclers. It should not. The Market Forces Study's fundamental assumption – that recyclers get paid to accept material for recycling – does not apply to the scrap metal recycling industry. Consequently, the Market Forces Study's conclusions about the likelihood of sham recycling are not applicable. Scrap metal recyclers buy their input material, process it, and sell the recycled products. The available evidence indicates that recyclers earn positive profits, and we expect that recyclers can rely on market forces and actively employ various strategies to minimize the risk of commodity price volatility. The scrap metal recycling industry does not meaningfully differ from the “traditional” manufacturing industries with which it is compared in the Market Forces Study and by EPA.

²⁵ Conversation with ISRI members, October 17, 2011. This once again highlights the need to consider both marginal revenues *and* *marginal costs* to understand a firm's production decisions. As described above, it is not the product's value per se that affects production decisions, as the Market Forces Study claims, but rather the profit (i.e., margin) that recyclers can earn from recycling the product. Profit is clearly affected by the costs recyclers incur to acquire scrap metal for processing.