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Economic Policy Options to Correct the Failure of Competitive, Free Markets to Correctly Price Recycling Versus Garbage Collection / Disposal

by

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Systematic studies comparing the ecological and sustainability benefits of recycling against its costs strongly suggest that society would benefit from more recycling and less disposal of solid waste materials. For example, two recent studies analyzed the ecological benefits and net costs[1] of curbside recycling. These studies both concluded that curbside recycling's benefits are greater than its net costs.[2]

Unfortunately, many of the important ecological and sustainability benefits from recycling are external benefits. For example, recycling reduces the use of virgin raw materials in manufacturing products, which in turn reduces the emissions of pollutants that would otherwise occur from extraction of raw materials and their conversion into feedstocks for manufacturing. However, savings, e.g., lower health care expenditures that accrue to society when pollution caused by virgin materials use is reduced, do not get directly credited to recycling. This is because most of the costs caused by release of pollutants into the atmosphere or waterways or onto the ground are not paid for directly by extractors and refiners of virgin raw materials – that is, these costs of pollution, such as increased health care, are externalized onto someone other than the extractors and refiners who released the pollutants.

Thus, manufacturers that choose to use virgin materials are not charged as much for those virgin feedstocks as they should be. Consequently, manufacturers that use recycled feedstocks do not enjoy as much cost savings over virgin feedstocks as they would if pollution and other external costs were incorporated into the prices manufacturers had to pay for virgin materials.

The failure of competitive markets to charge pollution and other external costs to virgin materials extractors, refiners, and users causes a number of problems for recycling:

- Prices for recyclable materials are not as high as they would be if prices for virgin materials were higher.
- Prices for recycled-content products are not as competitive versus virgin-content products as they would be if virgin raw materials prices were higher.
- Prices for recycling collection services are not as competitive versus garbage collection and disposal as they would be if prices for virgin raw materials were higher.

The remainder of this article outlines a variety of financial and economic policy options to correct the failure of our competitive, free market system to correctly set prices and costs for recycling in comparison to garbage collection and disposal.

Maximize Avoided Garbage Cost Savings

Before we discuss policy measures to compensate for virgin material cost externalities, it is important to emphasize the importance of doing everything possible to maximize the downward flexibility of a community's garbage collection, transfer, and disposal system. When a community introduces waste reduction and recycling programs, the impact on waste management system costs will be lessened by the extent to which the garbage system and its associated costs can be readily downsized.

For example, some communities pay for garbage disposal on a volume or weight basis. Others pay a set annual fee or minimum periodic

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[1] Net cost is total cost for curbside collection, processing collected materials, and shipping processed materials to recycling markets, minus the revenues from selling processed recyclables, and minus avoided garbage collection, transfer, and disposal costs.

[2] See *The Monthly UnEconomist* for May 2001, June 2001, and March/April 2002, as well as the references cited therein, for further information on these two empirical studies.

charge (e.g., put or pay). The latter communities will gain little or no disposal costs savings (i.e., avoided disposal costs) from recycling, while the former will save for each and every ton or yard diverted by their recycling program(s). Cost flexibility also can be built into contracts for garbage collection and transfer.

For communities that own and operate some or all of their own garbage management system components, it is important to design and size facilities and other equipment, as well as negotiate labor contracts, that maximize downsizing capabilities and flexibility. This will ensure that recycling programs have the least effect on waste management budgets.

User Pay Structures and Cross-Subsidies

The first example of an economic method to correct for virgin material externalities is a particularly effective way to motivate recycling and pay for it at the same time. That is to charge weight- or volume-based user fees for garbage collection, and set those user fees high enough on average to allow recycling collection service to be provided at no additional charge to garbage collection customers.

Numerous studies have concluded that volume-based residential garbage collection fees result in significant increases in recycling.[3] Adding some specificity to previous research, a recent study by SRMG estimated that residential user fees that increase at least in proportion to the volume of waste improve recycling rates by about four percentage points over less sharply graduated user fees.[4] That same study also estimated that bundling curbside recycling costs into residential garbage collection fees, i.e., providing recycling at no additional charge, improved recycling rates by over ten percentage points.

Another study by SRMG, this time on commercial garbage collection quantities, looked at the impact of no-additional-charge recycling on garbage generation per employee for eleven different types of businesses categorized by SIC (Standard Industrial Classification) code.[5] Redmond is one of the three Puget Sound (WA) suburban cities where the contracted hauler, Waste Management, graciously agreed to weigh garbage dumpsters. Redmond offers on-site recycling collection at no charge to all businesses that subscribe for garbage collection service. In a second city, Kirkland, a few businesses get no charge recycling on an informal basis. In the third city, Renton, businesses have to pay a separate subscription fee for on-site recycling.

Not surprisingly, garbage collection weights per employee in Redmond average 28% below per employee garbage weights in Renton, holding constant business type. Kirkland's per employee business garbage averaged over 8% less than Renton's. This result is illustrated in Figure 1, Estimated Weekly Garbage Disposal per Employee by Business Type and City (pounds per employee).[6]

Further work needs to be done to determine the exact impact of no-additional-charge commercial recycling. At the same time, this conclusion for commercial recycling is consistent with research findings for residential no-additional-charge curbside recycling. These results for both residential and commercial garbage and recycling collection indicate the power of a simple economic incentive to motivate recycling and at the same time help offset virgin raw material externalities.

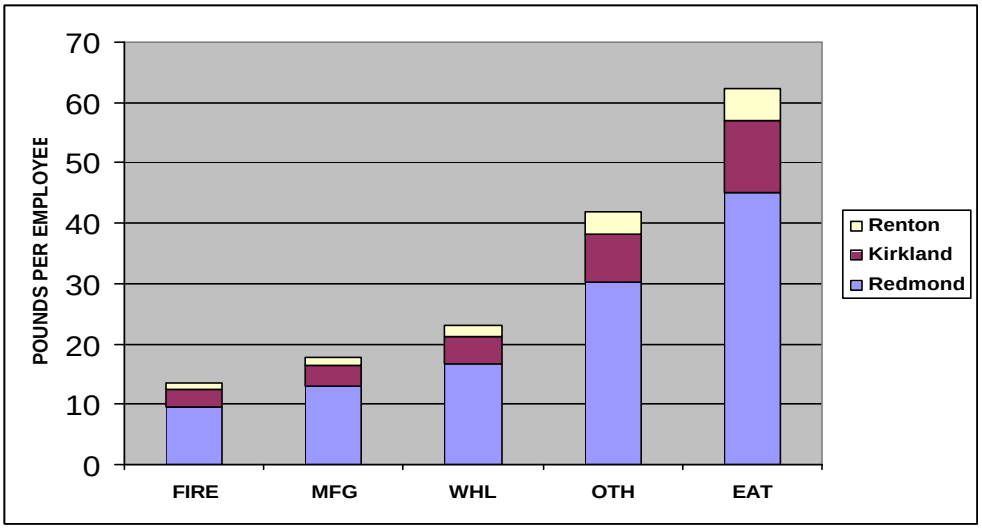
[3] See for example, Lisa Skumatz, "Nationwide Diversion Rate Study – Quantitative Effects of Program Choices on Recycling and Green Waste Diversion: Beyond Case Studies," October 1996.

[4] Jeffrey Morris, "Incentives to recycle – an end to the Seattle Stomp!" *Warmer Bulletin*, January 2000, No. 70; Jeffrey Morris, "What works best to increase waste diversion?" *Resource Recycling*, January 2000, Vol. XIX, No.1; and *The Monthly UnEconomist*, September and October 1999, Vol. 1, Nos. 3 and 4.

[5] See *The Monthly UnEconomist* for November/December 2001 for a detailed review of this study.

[6] In Figure 1, FIRE = finance, insurance and real estate businesses, MFG = manufacturing, WHL = wholesale, EAT = eating and drinking establishments, and OTH = other business types.

Figure 1
Estimated Weekly Garbage Disposal per Employee by Business Type and City
(pounds per employee)



Deposits, Advance Disposal Fees, and Producer/Product Responsibility Taxes

A second general set of economic policies to motivate/fund recycling and offset virgin material externalities involves deposits, advanced disposal fees, and other producer/product responsibility measures designed to internalize recycling costs into product prices. These fees preferably should be imposed on the product manufacturer so that producers have an incentive to design and otherwise manage their product(s) to minimize waste management costs at the end of their product's life.

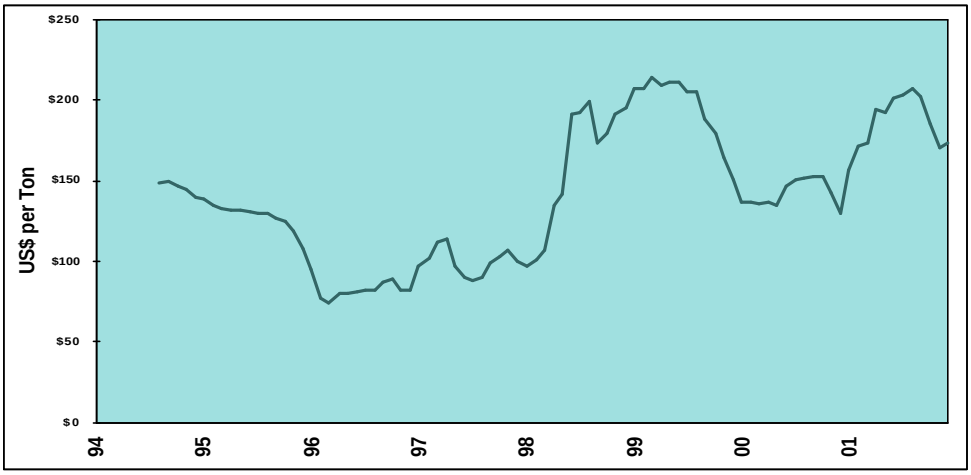
A well-known example of this type of economic policy is the beverage container deposit/redemption system. These systems often impose the initial deposit on beverage producers or bottlers who then pass it on to the consumer, although the deposit can also be imposed directly on the consumer as a tax. Deposit/redemption systems then refund some or all of the deposit to the beverage consumer when the targeted material is returned for recycling. Deposit-redemption systems are particularly effective at diverting materials due to the direct economic incentive provided by redemption payment. They can also be self-supporting, depending on the level of unredeemed deposits, the market value of recycled materials, and the efficiency of the redemption and recycling infrastructure.

For example, beverage container deposit/redemption programs are in effect in ten states in the U.S. These states recycled 72% of all used beverage containers in 1999, with the level of diversion depending importantly on the magnitude of the deposit and the convenience of redemption locations. The forty states without beverage container deposit/redemption systems recycled just 28% of beverage containers in that same year.[7]

U.S. beverage container deposit/redemption systems also differ widely in cost-effectiveness. Some U.S. programs are self-supporting. Some obtain additional revenues through such means as processing fees charged to container manufacturers based on the differential between processing costs and market value for particular materials. These fees help motivate the container producer to make containers as non-toxic and easy to reuse or recycle as possible.

[7] R. W. Beck, Franklin Associates, Sound Resource Management, and Tellus Institute, *Understanding Beverage Container Recycling: A Value Chain Assessment prepared for the Multi-Stakeholder Recovery Project, Stage 1*, prepared under the direction of Businesses and Environmentalists Allied for Recycling (BEAR), A project of Global Green USA, October 4, 2001.

Figure 2
Sulfur Dioxide Emissions Allowance Trading
(average monthly prices)



Cap & Trade or Bans

Disposal bans, or caps combined with market trading of emissions/disposal allowances, represent a third powerful economic policy to promote recycling and offset virgin material externalities. For example, bans on collection in garbage and/or disposal of lawn and garden debris or cardboard are often used to force generators to divert those materials, either to a backyard composting system in the case of yard debris, or to a no-additional-charge or subscription curbside collection program for materials or quantities that cannot be managed at home.

While bans and caps may not at first glance appear to strictly be economic policy measures, further consideration reveals that they do exert strong influence on markets for recycling collection services or on costs paid for pollutant emissions. Disposal bans, for instance, induce waste generators to pay for recycling collection services even when they cost more than garbage collection and disposal.

Perhaps even more to the point, a second example, caps on pollutant emissions, indicates how a cap can result in the imposition of a market cost on certain releases of that pollutant. Caps are an effective way to limit pollution while at the same time using the market to encourage private industry to decide the most efficient way to attain pollution reduction goals.

The idea is to cap emissions[8] and then set up a market on which emissions allowances can be traded by the businesses whose emissions are constrained. This system for controlling pollution takes advantage of the fact that some businesses can meet their emissions caps very cost effectively. In fact, some can overachieve their emissions targets and sell allowances for their excess attainment to businesses that would find it very costly to meet their pollution caps. This saves the latter firms from the expense of installing their own, more costly methods for directly controlling their pollutant emissions.

Figure 2, Sulfur Dioxide Emissions Allowance Trading (average monthly prices), shows average trading prices for sulfur dioxide (SO_2) emission allowances under U.S. EPA's regulatory program to limit emissions of this pollutant. The prices shown on the chart represent the trading value of SO_2 emission allowances that results when high achievers sell their excess SO_2 allowances to firms that find it cheaper to buy these allowances than it would be to install their own pollution control equipment. The SO_2 trading prices indicate how a regulatory limit on pollu-

[8] A cap at zero emissions would be equivalent to a ban.

tion can impose a cost value on what is otherwise an uncosted externality, in this case emissions of sulfur dioxide pollution.

In the field of solid waste management one could consider, by analogy with the SO_2 cap and trade program, placing caps on some or all solid waste emissions -- i.e., per capita or per employee limits on garbage, or on disposal of certain recyclables. The regulated communities or businesses could then trade disposal allowances amongst themselves on a market established to facilitate these trades.

Some communities or businesses with more efficient waste reduction and recycling systems might be able to come in well under their regulatory disposal cap. Under a cap and trade program they could sell allowances for their excess disposal cap attainment, thus generating funds to help pay for their diversion programs.

Communities or businesses where it would be more costly to set up reduction or recycling programs could buy disposal allowances to attain their disposal cap whenever the market price for disposal allowances was below the cost of new diversion programs.

In this way the state or regional authority could establish an overall goal for per capita and/or per employee disposal reductions, assign caps to each community's or business' disposal, and facilitate an exchange among the regulated entities of disposal allowances. This would help minimize total costs overall for communities and businesses as they work to attain their individual disposal goals.

About The Monthly UnEconomist

This monthly online newsletter available at www.ZeroWaste.com (or www.SoundResource.com) intends to provide insight and analysis on the everyday economics of recycling and the unpriced or underpriced environmental benefits of reducing waste disposal and replacing virgin-content products with products manufactured from recycled materials. In addition to *The Monthly UnEconomist*, Sound Resource Management's website ZeroWaste.com also offers recycling markets price history graphs, reports on a variety of topics including the economic and environmental benefits of recycling, and GarboMetrics - elegant, yet not mysterious tools and spreadsheet models for solid waste and recycling.

These materials are all available for no charge at www.ZeroWaste.com. User feedback is encouraged via info@ZeroWaste.com, and substantive comments will be published in our newsletter whenever they add to our understanding of recycling.

As an example of newsletter content, some issues of the *UnEconomist* analyze northwestern and northeastern U.S recycling market prices for nine recycled materials (mixed paper, ONP, OCC, glass containers, tin cans, UBC, PET bottles, HDPE natural bottles, and HDPE colored bottles). These prices are tracked by online graphs updated quarterly.

In addition, some issues of the *UnEconomist* are devoted to GarboMetrics, economic models for managing and analyzing solid waste and recycling. These newsletter issues explain the structure and use of GarboMetric models provided at ZeroWaste.com for such purposes as designing garbage customer rate structures and correctly comparing garbage rates in different communities. GarboMetric models and corresponding issues of *The Monthly UnEconomist* can be downloaded at no charge from www.ZeroWaste.com.