

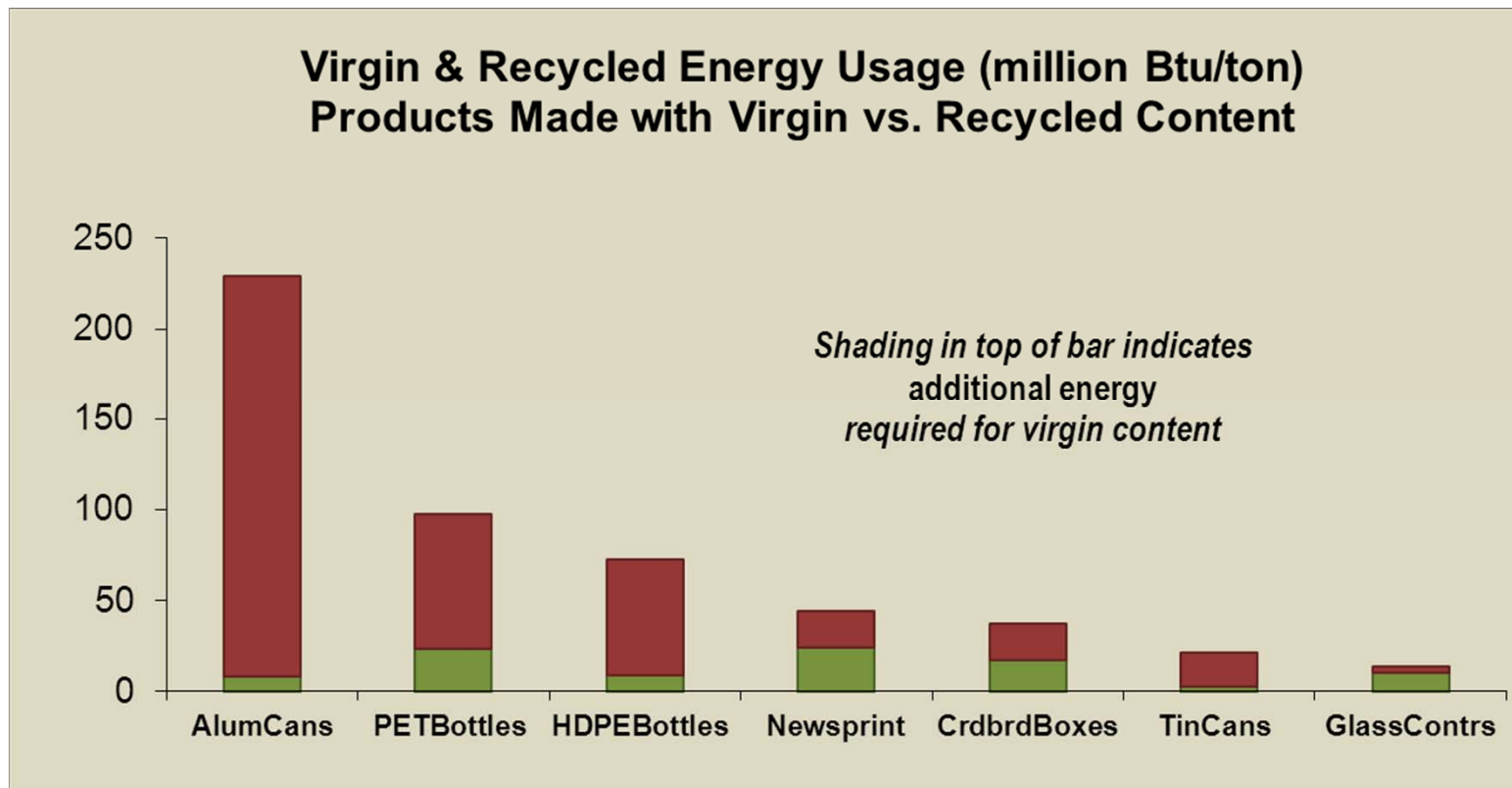
Undermining Sound Resource Use Through Subsidies to Primary Materials and Waste Management

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Benefits of Recycling: Energy Savings



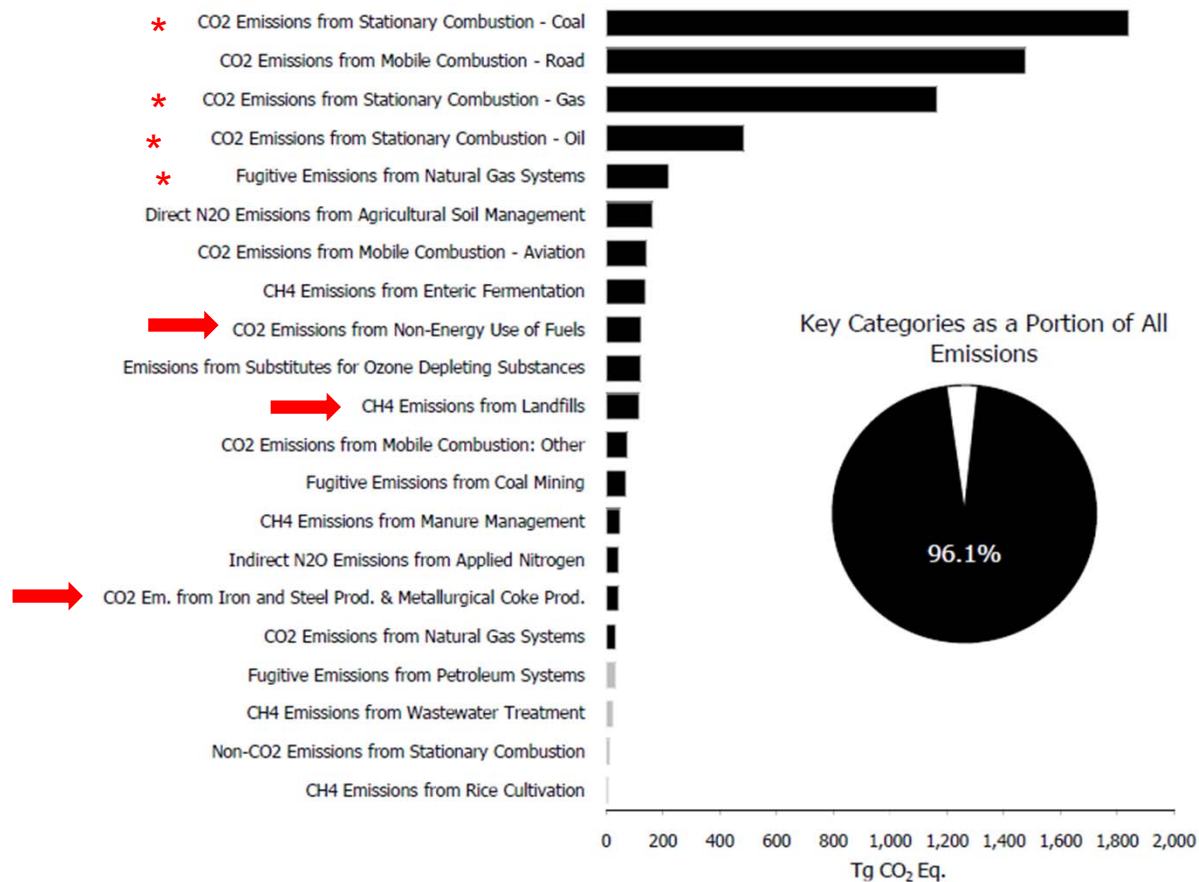
Source: Jeff Morris, Sound Resource Management Group, 2011

Benefits of Recycling: Lower GHG Footprint

Per Ton Estimates of GHG Emissions Emitted (Avoided), MTCO2e					
Material	If Source-reduced	If Recycled	If Landfilled	If Combusted	If Composted
Aluminum Cans	(8.26)	(13.61)	0.04	0.05	NA
Carpet	(4.02)	(7.22)	0.04	0.66	NA
Mixed Metals	NA	(5.40)	0.04	(1.05)	NA
Mixed Paper (residential)	NA	(3.51)	(0.03)	(0.51)	NA
Corrugated Containers	(5.60)	(3.10)	0.08	(0.51)	NA
Mixed Recyclables	NA	(2.87)	(0.05)	(0.44)	NA
Personal Computers	(55.78)	(2.26)	0.04	(0.17)	NA
Steel Cans	(3.19)	(1.80)	0.04	(1.54)	NA
PET	(2.07)	(1.52)	0.04	1.28	NA
Mixed Plastics	NA	(1.50)	0.04	1.29	NA
Tires	(4.34)	(0.39)	0.04	0.51	NA
Glass	(0.53)	(0.28)	0.04	0.05	NA
Food Scraps	0.00	NA	0.75	(0.13)	(0.20)
Leaves	0.00	NA	(0.54)	(0.16)	(0.20)

Source: US EPA, Waste Reduction Model (WARM), accessed 6/13/11.

Largest Sources of GHG in US Include Some Relevant Sectors



* Derivative impact through energy-intensive primary production processes.

Source: US EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2009*, April 2011.

Largest *Industrial* Sources of GHG Include Many Relevant Sectors

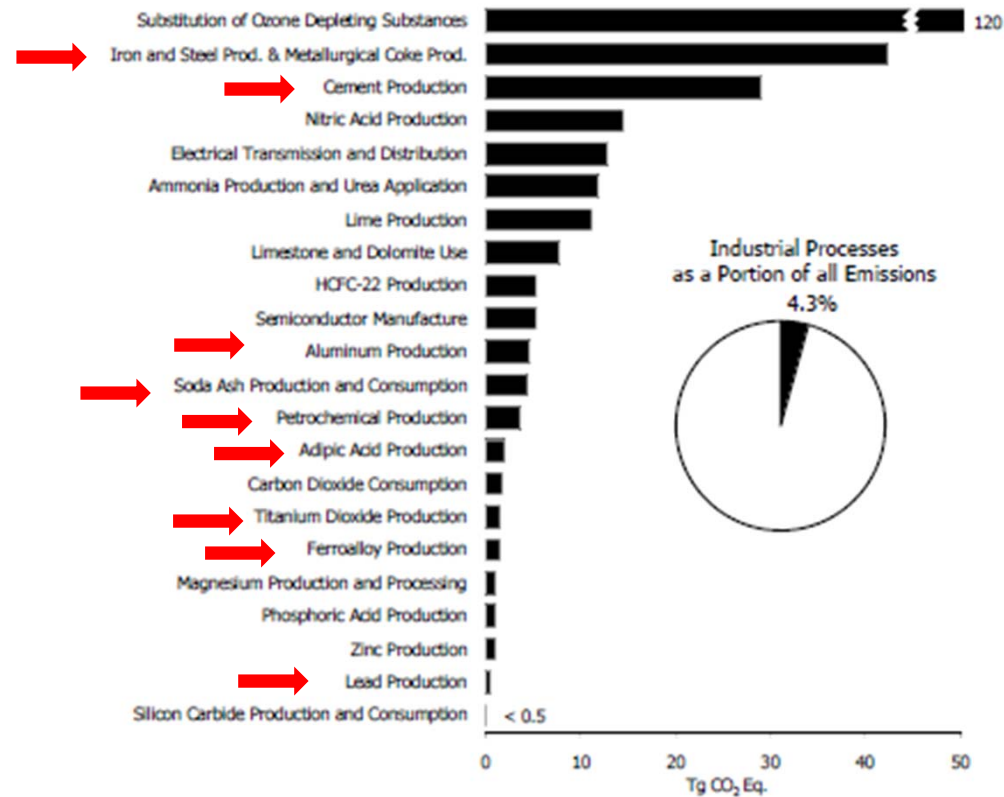


Figure 4-1: 2009 Industrial Processes Chapter Greenhouse Gas Sources

Source: US EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2009*, April 2011.

Benefits of Recycling: Reduced Pressure on Ecosystems

Metal		World Mine Production, 2007 (t/yr)	Demand from Electronics Sector (t/yr)	Electronics sector demand/mine production
Silver	Ag	20,000	6,000	30%
Gold	Au	2,500	250	10%
Palladium	Pd	215	32	15%
Platinum	Pt	220	13	6%
Ruthenium	Ru	30	6	20%
Copper	Cu	16,000,000	4,500,000	28%
Tin	Sn	275,000	90,000	33%
Antimony	Sb	130,000	65,000	50%
Cobalt	Co	58,000	11,000	19%
Bismuth	Bi	5,600	900	16%
Selenium	Se	1,400	240	17%
Indium	In	480	380	79%

Source: Christian Hagelucken, Umicore Precious Metals Refining, presentation at the Basel Convention, Geneva Switzerland, 7 Sept. 2007.

Status Check: Most Materials Still Thrown Away

Table 1. Generation and Recovery of Materials in MSW, 2009*

Material	Generation (Mil. Tons)	Percentage Disposed
Paper and paperboard	68.43	37.9%
Glass	11.78	74.5%
Steel	15.62	66.5%
Aluminum	3.4	79.7%
Other nonferrous metals†	1.89	31.2%
<i>Total metals</i>	20.91	65.5%
Plastics	29.83	92.9%
Rubber and leather	7.49	85.7%
Textiles	12.73	85.1%
Wood	15.84	85.9%
Other materials	4.64	73.5%
<i>Total materials in products</i>	171.65	64.3%
<u>Other wastes</u>		
Food, other‡	34.29	97.5%
Yard trimmings	33.2	40.1%
Miscellaneous inorganic wastes	3.82	~100%
<i>Total other wastes</i>	71.31	70.9%
Total municipal solid waste	242.96	66.2%

* Includes waste from residential, commercial, and institutional sources.

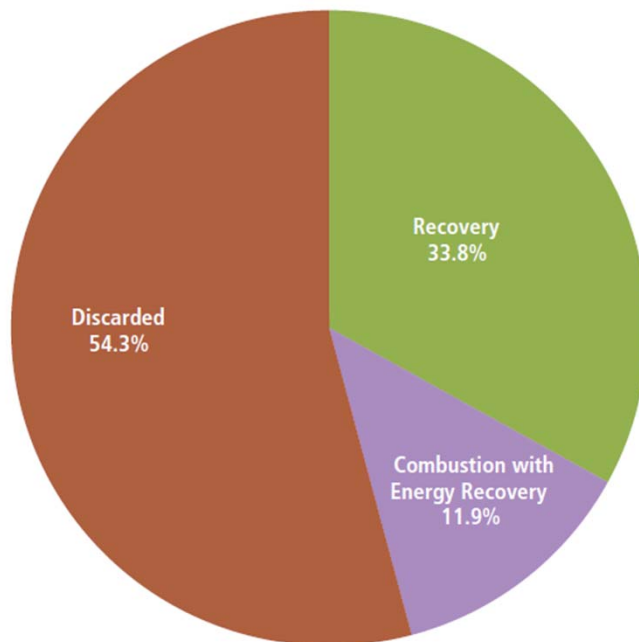
† Includes lead from lead-acid batteries; ‡ Includes recovery of other

MSW organics for composting; Totals may not add due to rounding.

- Discard rates < 50% only for paper and “other non-ferrous metals.”
- Recovery rate of aluminum overall quite low, despite surging prices.
- Many materials with recovery rates less than 20%.

Status Check: Landfills and WTE Dominate MSW Management

Figure 4. Management of MSW in the United States, 2009



- 66.2% of tonnage ends up in landfills or incinerators.
- WTE with proper pollution controls:
 - Better than landfilling.
 - But still among lowest value outlets for materials in MSW.

US EPA, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2009*

How Subsidies Harm Recycling and Reuse

- **Input prices.** Prices of secondary materials are normally derivative of primary materials.
 - Direct subsidies to mining reduces the market clearing price of primary materials.
 - Subsidies to energy or water erode financial value of recovering these inputs through recycling and reuse.
- **GHG benefits** of recycling are high, but remain uncaptured without carbon constraints.
- **Disposal subsidies.** Recycling competes with landfilling and incineration.
 - Subsidies to WTE and landfilling are common.
 - Drive down the costs that recycling helps avoid, diminishing the value of recycling.
- **Cross-subsidies**
 - Poor regulation of contaminants in the recycle stream.
 - Little enforcement of Waste Bans.
 - Diversion of unclaimed bottle deposits by States rather than curbside programs.
- **Illustrative**, not comprehensive, list of subsidies follows.

Subsidies to Extraction

	\$mils/year	Beneficiary materials/sectors
Ability to treat income from timber, coal or domestic iron ore production as capital gains if held > 1 year	400	Paper, steel
Excess of % over cost depletion, nonfuel minerals*	100	Steel, aluminum, other metals
Land patenting; royalty-free hard rock mining on federal lands under Mining Law of 1872**	80	Precious metals, lead
Expensing of exploration and development costs: nonfuel minerals*	100	
Expensing of timber growing costs	240	Timber and paper
Special tax rate for qualified timber gain	440	Timber and paper
Ability to exempt income from exploration and mining of natural resources from corporate taxation under Publicly-traded partnership rules	20	
	1,380	
*Similar subsidies for oil and gas wells with much higher taxpayer costs.		
**Assumes 8% royalty (past proposal; oil royalties go to >16%), mineral value from Pew (2010).		
Sources: JCS-3-10; CRS 2010; Lazzari 2008; Pew 2010		

Percentage Depletion: Deducting More than You Paid

	Relevant minerals	Rate, US Deposits	Rate, Foreign Deposits
Steel	Iron ore‡	15%	14%
	Coal‡	10%	10%
Aluminum	Bauxite‡	22%	14%
Glass	Sand, limestone	14%	14%
Plastics	Oil and gas*	15%	15%
	Coal	10%	10%
Cements	Calcium carbonate‡	14%	14%
	Aggregates‡	Most are 5%	Most are 5%
Electronics	Copper, lead, other metals‡	Most are 22%; Cu is 15%	Most are 14%

‡Value on which tax break taken can include some additional processing steps, not just value at mine mouth.

*Subject to more stringent limitations on use than other minerals.

Source: US Code Title 26 Sections 613, 613A

Subsidies to Land Reclamation

	\$mils/year	Beneficiary materials/sectors
Ability to deduct mining reclamation reserves prior to performance of closure activities	40	
Amortization and expensing of reforestation expenditures	240	Timber and paper
Inadequate bonding for mine closure and reclamation, public and private land		
Already paid by taxpayers since 1998	2,600	Value for hard rock mines only; coal and oil and gas wells much higher.
Residual liabilities	20,000 - 84,000	Value for hard rock mines only; coal and oil and gas wells much higher.
<i>Sources: JCS-3-10; Pew, 2010; Earthworks, 2011.</i>		

Subsidies to Capital: Accelerated Depreciation

	Description (IRS Class Number)	Depreciation Period (Yrs)	Method
<u>Extraction</u>			
	Mining (10.0); O&G exploration and production (13.2)	7	200% DB
	Offshore drilling (13.0); O&G well drilling (13.1); Cutting of timber (24.1)	5	200% DB
<u>Production</u>			
	Carpets (22.3); Chemicals and Allied Products (28.0)	5	200% DB
	Pulp and Paper (26.1); Rubber (30.1); Finished Plastic (30.2); Glass (32.1); Primary Nonferrous Metals (33.2); Primary Steel Mill (33.4)	7	200% DB
	Cement (32.2)	15	150% DB
<u>Waste management</u>			
	Waste reduction and resource recovery plants (49.5)	7	200% DB
	Conversion of biomass into energy (not assigned)	5	200% DB

Source: IRS, Publication 946, April 2011

Subsidies to Capital: Tax-Exempt Bonds

- Municipal bonds, private activity bonds (PABs) main sources.
 - Solid waste disposal sites have been eligible since 1954.
 - Eligible facilities include portions of manufacturing processes (e.g., at ethanol plants).
 - Some recycling facilities (so long as 65% of incoming stream has no market value) became eligible in last few years; still limited access.
 - Clean Renewable Energy Bonds: tax credit bonds open to LFGTE, WTE; not to recycling.
- Municipal debt: public ownership of landfills has been fairly common; not so for MRFs, WTE.
- Issuances/year to solid waste not broken out separately; likely > \$100m/year.

Burn, Baby, Burn: Tax Credits for Using Recyclables as Fuel

- **Open-loop biomass:** Solid wood waste, pallets, crates, clean construction wastes, landscape trimmings; excludes paper “commonly recycled” (1.1 c/kWh for 2011).
- **Agricultural wastes:** manure and litter from cows, pigs, poultry, sheep (1.1 c/kWh for 2011).
- **Steel industry fuel:** “refined” coal waste sludge used to manufacture coke (\$6.33/ton for 2011).
- **Municipal solid waste:** wide open?
 - WTE plants;
 - Landfill gas; PLUS:

“...any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include...” domestic sewage, irrigation return flows, point source discharges from industrial facilities, or special nuclear byproducts. (42 USC 6903).

Landfills & WTE Subsidies

- Accelerated depreciation and tax-exempt bonds
- EPA Landfill Methane Outreach Program: 17 years of promotion.
- Federal renewable electricity PTC:
 - Landfills: 13 billion kWh year of electricity (LMOP) would generate roughly \$140m/year in federal PTCs.
 - WTE: 22 million kWh year of electricity would generate about \$24m/year in federal PTCs.
- State renewable energy portfolio standards
 - 36 states have RPS programs that landfill gas qualifies for (LMOP).
 - REC values \$5-50/MWH (0.5-5 c/kWh).
 - If all projects get average of this range (2.75 c/kWh), RECs provide another \$350m/year in subsidies to landfilling.
 - No data on WTE amounts.
- Fugitive methane releases remain a large and under-characterized problem.

Black Liquor Subsidies: Money for Nothing

- Recovery boilers: old technology in widespread use.
- Alternative Fuel Mixture tax credit:
 - 50 cpg; new liquid fuels from biomass.
 - Black liquor with a bit of diesel met the regs.
 - \$4 billion in refundable credits claimed by virgin paper mills through end of 2009 (*Mufson, Wash. Post*).
 - Congress finally shut the loophole.
- Cellulosic tax credit is newest loophole: >\$500 million claimed by mills for 2010 (*Mufson, Wash. Post*).

Summary

- Recycling and reuse options
 - Strong environmental benefits.
 - Marketplace disadvantages from subsidies to primary production and disposal.
- Wide ranging problem
 - Poorly characterized.
 - US and international impacts.
 - Important to include subsidies to key inputs such as energy and water.
- Politicized industrial policies undermine environmental goals.