



Phasing Lead Out of Gasoline, a Case Study

- **Product standards vs. pollution taxes, and**
- **Product standards with and without supply management**



The Leaded Gasoline Case Study

National Commitments, Policies and Measures

- Between 1972 and 1980, Canada, the US, Japan and the European Community formed the intention to compel gasoline retailers to remove lead from retail gasoline sales.
- All of these nations set the same target date for the full elimination of lead in gasoline used on road: 1990.
- Canada and the United States regulated product standards. Gasoline distributors' rights to release lead in gasoline was capped at 1980 levels in 1981. Distributors' lead content entitlements declined on a straight-line basis to 0 in 1986. Cdn. Distributors could sell or bank (to 1988, maximum) unused lead rights. Distributors complied on sales portfolio average basis (the lead standard did not apply to every tank of gasoline).
- In addition to regulating lead content standards (where distributors were the obligated parties), the US ruled that US distributors were required to acquire and retire 1 US lead allowance for each specified unit of lead released to the market. In 1981, the US government freely allocated 98% of US allowances equal to 1980 lead-in-gasoline consumption levels to **US petroleum product refiners**. The free allocation of US lead allowances to US refiners declined on a straight-line basis to 0. This action meant that any US importer of leaded gasoline had to buy lead allowances from a US refiner to maintain imports while they were still legal.
- European nations elected to introduce the “lead differential tax”, to discourage leaded “petrol” (gasoline) demand. EU nations committed to direct all lead differential tax revenues to RD&D and critical strategic refinery and auto industry investments to help refined petroleum product producers remove lead from gasoline and car makers implement engine modifications. They also regulated lead content limits—enforced at the refinery level—but permitted refiners to “comply jointly” (i.e they could bank and trade lead production rights).
- For the most part, European governments kept their commitments to dedicate revenues from the lead differential tax to investments in refinery and retail system upgrades.

The Leaded Gasoline Case Study

Results: Canada and the United States, in Summary

- Lead was essentially out of gasoline sold in the US by 1992. Lead was essentially out of gasoline sold in Canada by 1989.
- Canadian regulations obliged Canadian refiners to stop making leaded gasoline and all of Canadian refining capacity was converted to unleaded by 1989.
- The North American average premium for unleaded over leaded gasoline equated to about US\$210/1,000 litres, or \$0.021/litre. This was about ½ the cost Canadian economists had forecast would result from ordering the lead out of gasoline
- US Treasury officials say that foreign (inc. Canadian) purchases of US lead allowances (required to maintain US export market share during the phase out) largely financed US refiners' cost of plant modifications. They also estimate that less than 30% of the cost of US allowances was passed through to US customers.

1. First lesson learned: Cdn. “product standard”-type regulation appears very efficient.

2. Second lesson learned: But the US stings Canadian suppliers by successfully executing an highly protectionist agenda through its addition and manipulation of a lead allowance allocation, on top of the product standard, in the first ever “cap and trade” regulation.

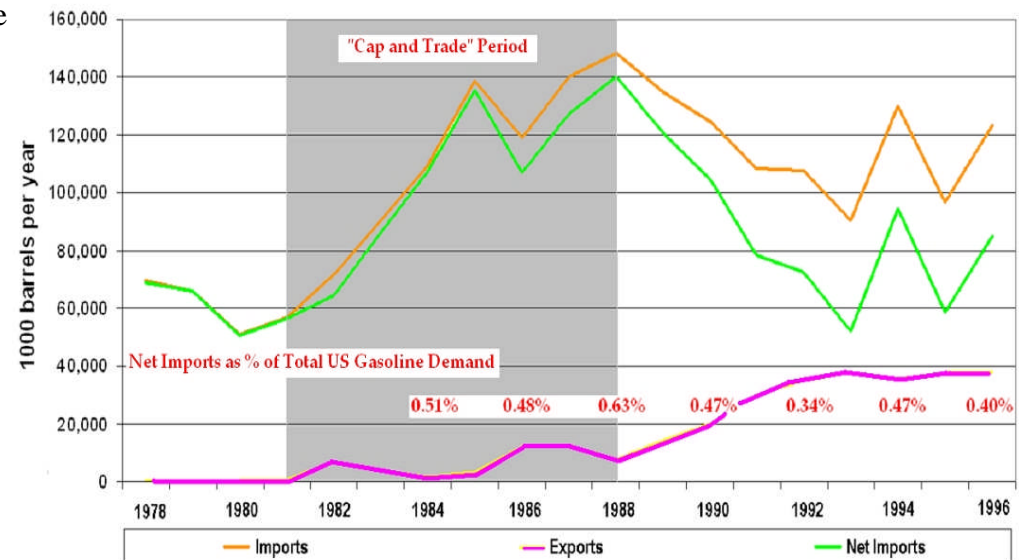
Year	US Retail Motor Gasoline Prices, 1976-1990 (nominal US\$ per litre)			
	Leaded Regular	Unleaded Regular	Unleaded Price Differential	% Difference
1976	\$ 0.156	\$ 0.161	\$ 0.005	3.4%
1977	\$ 0.164	\$ 0.174	\$ 0.011	6.5%
1978	\$ 0.166	\$ 0.177	\$ 0.011	6.3%
1979	\$ 0.227	\$ 0.238	\$ 0.011	4.7%
1980	\$ 0.314	\$ 0.330	\$ 0.016	5.0%
1981	\$ 0.346	\$ 0.365	\$ 0.018	5.3%
1982	\$ 0.322	\$ 0.343	\$ 0.021	6.6%
1983	\$ 0.306	\$ 0.328	\$ 0.021	6.9%
1984	\$ 0.299	\$ 0.320	\$ 0.021	7.1%
1985	\$ 0.296	\$ 0.317	\$ 0.021	7.1%
1986	\$ 0.227	\$ 0.246	\$ 0.018	8.1%
1987	\$ 0.238	\$ 0.251	\$ 0.013	5.6%
1988	\$ 0.238	\$ 0.251	\$ 0.013	5.6%
1989	\$ 0.264	\$ 0.269	\$ 0.005	2.0%
1990	\$ 0.304	\$ 0.306	\$ 0.003	0.9%



US Lead Allowance Allocation...an Highly Protectionist Supply Management Regime

- The US Lead allowance allocation penalized US petroleum product marketers who imported leaded product and favoured vendors of product that was made in US refineries. It particularly favoured US refiners who added unleaded capacity to their plant sites but continued to manufacture leaded fuel (as opposed to those who modified existing plants to eliminate lead and make only unleaded gasoline).
- The US leaded gasoline supply management regime required petroleum product *distributors* to hold quota (allowances) for only *US product sales*. This encouraged US refineries to continue to produce leaded fuel during and after the phase-out and to cultivate new export markets for US-produced leaded gasoline.
- The integrated US producers were slow to develop the capacity to distribute unleaded during the phase out, but quick to redirect their leaded gas production to export markets. The initial result was an increase in *both* US leaded gasoline exports and total gasoline imports. The increase in import demand generated pure profits (from US refinery surplus lead allowance sales to importers) for US refiners, who used revenues from US lead allowance sales to finance development of their unleaded fuel refining capacity. US refiners, however, did not significantly cut back their leaded gasoline production capacity until the late-1990s, and only after when new US regulations (introduced in 1996) required them to. The US importers exercised market power to deduct the cost of US lead allowances from Canadian suppliers' margins. Treasury Board officials estimated that less than 30% of the price paid to US refiners for lead allowances was passed through to US customers as an increase in the retail price of gasoline.
- During the lead phase out, Cdn. exporters' shares of the overall US gasoline market appeared to grow—but they realized that increase primarily in the terminal leaded fuel market; real gains in the US unleaded market were small.
- Between 1981 and 1988, US refinery gasoline output grew 25%, the largest 7-year growth in refinery output in US history.
- US refiners timed their construction of US retail capacity to distribute unleaded fuel to match the end of the phase out (1988). After 1988, US gasoline imports crashed when US refiners took over the entire new domestic unleaded market and shifted now declining leaded gasoline production to export markets. US refiners continued to grow export market share by substituting unleaded for leaded exports after 1996, when EPA rules finally prohibited US refinery production of leaded gasoline.

US Trade in Finished Gasoline



The Leaded Gasoline Case Study

Results: Europe

- Leaded gasoline meeting regulated refinery specs still dominated petrol supply through 1995, *even though the “lead differential tax” price premium that consumers paid for leaded petrol, relative to unleaded, ranged from US\$0.23 to US\$0.91/litre.*
- In 1995, EU member states finally adopted Canada-style product standard dictating full leaded petrol phase out at the point-of-sale by 2003.
- Leaded petrol meeting regulated refinery specs still dominated petrol supply through 1999, inspite of a price premium for leaded petrol ranging from US\$0.43 to US\$1.41/litre.
- At end of 2007, lead remained in all petrol sold in 3 EU member states. Those states (Greece, Spain and France) refused to implement final lead-free gasoline product standards because the governments felt they could not afford to give up lead differential tax revenues at that time.

Retail Price Differential in Europe: Premium Leaded over Premium Unleaded Petrol, US\$/ litre

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Belgium	\$ 0.61	\$ 0.64	\$0.92	\$ 0.86	\$ 0.91	\$ 0.76	\$ 0.76	\$ 0.76	\$ 0.82
Denmark	\$ 0.93	\$ 0.79	\$0.41	\$ 0.23	\$ 0.23				
Germany	\$ 0.87	\$ 0.64	\$0.67	\$ 0.67	\$ 0.75	\$ 0.78			
Ireland	\$ 0.31	\$ 0.11	\$0.34	\$ 0.45	\$ 0.48	\$ 0.60	\$ 0.83	\$ 1.31	\$ 1.41
Greece	\$ 0.44	\$ 0.54	\$0.48	\$ 0.44	\$ 0.46	\$ 0.50	\$ 0.48	\$ 0.45	\$ 0.49
Spain	\$ 0.23	\$ 0.15	\$0.23	\$ 0.19	\$ 0.37	\$ 0.40	\$ 0.26	\$ 0.30	\$ 0.43
France	\$ 0.36	\$ 0.39	\$0.50	\$ 0.49	\$ 0.30	\$ 0.37	\$ 0.40	\$ 0.41	\$ 0.43
Italy	\$ 0.39	\$ 0.33	\$0.48	\$ 0.60	\$ 0.55	\$ 0.49	\$ 0.47	\$ 0.52	\$ 0.44
Luxembourg	\$ 0.52	\$ 0.71	\$0.92	\$ 0.81	\$ 0.86	\$ 0.84	\$ 0.83	\$ 0.81	
Netherlands	\$ 0.69	\$ 0.69	\$0.82	\$ 0.79	\$ 0.81	\$ 0.89			
Portugal	\$ 0.56	\$ 0.58	\$0.53	\$ 0.15	\$ 0.10	\$ 0.31	\$ 0.30	\$ 0.30	
United Kingdom	\$ 0.51	\$ 0.60	\$0.64	\$ 0.70	\$ 0.71	\$ 0.63	\$ 0.83	\$ 0.95	\$ 1.11

data source: European Commission Statistics Bureau, Eurostat,
http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0_1136239_0_45571447&_dad=portal&_schema=PORTAL



How Did Canada and the US Get the Lead Out by 1990 at a Cost of \$0.02/L, while the UK Still Found it Impossible to Do So by 1999 With Leaded Gas Selling at a US\$0.40 and \$1.11/L Premium Relative to Unleaded?

- We interviewed numerous government officials and oil industry representatives and asked them this question.
- European government officials told us that as long as it was legal to sell leaded gasoline, the petroleum production wholesalers simply REFUSED TO OFFER unleaded gasoline for sale. Some governments ordered them to offer minimum volumes in the early 1990s. The companies, they said, complied by offering the legal minimum, but concentrated the supply at a small number of stations that were far apart, making access to unleaded a dream for most consumers. In response to this situation, some governments then required the wholesalers to guarantee minimum unleaded volumes at every station. Companies complied, but also adjusted the wholesale prices of leaded and unleaded gasoline, effectively shifting lead tax burden to unleaded gas sales to maximize overall profits. The retail price differential was always less than the posted lead differential tax..
- Company representatives told us that when the government set a price for lead, in the tax measure, government removed 50% of the basis of competition in the European market. They said that in Canada and the US, given the legally binding product standard, companies competed to produce a compliant new product at least cost. In Europe, however, government's commitment to manipulate price removed market motivation to compete on price.



Beyond its Highly Regressive Nature, What Are the Killers in Lead/Carbon Tax Strategies?

Wholesale Prices of Fuel Will Always Increase Faster Than Taxes, and Price Increases Will Not Appear Where Government Wants to See Them

Increase in crude oil input cost per 1,000 litres of petrol, Europe, 1999 – 2008 = €144.61

Assuming that 46% of the average barrel of crude refined in Europe was converted to gasoline between 1999 and 2008, the cost of crude feedstock for gasoline in Europe increased €145 per 1,000 litres of gasoline. But wholesale (pre-tax) gasoline prices increased between €400 and €600 per 1,000 litres.

And even though there was little variation in crude supply and refining costs from state to state, there were large regional variations in the rate of increase of wholesale gasoline prices. **Look at how much more wholesale prices increased than taxes increased for EU gasoline sales from 99 – 08. Even after netting out the €145/bbl increase in crude feedstock costs, refineries took multiples of the leaded tax increase as wholesale price increase.**

What was happening?

When governments announced their intentions to use taxes to raise commodity prices to the point of “demand destruction”, prudent managers of enterprises that produced or imported the tax-targeted commodity had no choice but to attempt to capture more of the market-will-bear price than the governments would get. So wholesale gasoline prices increased faster than the tax increased—much faster than governments anticipated—as the private sector, protecting investor interests, sought to take a larger share of the market-will-bear price than government was going to get through taxation.

Small manufacturing sector job loss rates accelerated, particularly in the food processing, pulp paper & wood products, machinery fabrication and white goods-producing sectors—sectors most vulnerable to increases in transport fuel costs and least able to benefit from corporate income tax cuts that were partially financed with new lead differential tax revenues. New market entrants declined, because they could not benefit from income tax cuts in the short term. Lead differential tax-financed RD&D projects benefited only market incumbents and differential tax-financed income tax cuts favoured profitable market incumbents who sold traditional taxed products over less profitable innovative new market entrants.

change per 1000 litres, 1999 - 2008

Netherlands			
wholesale price	total taxes	VAT	Other Taxes (1)
€ 550.14	€ 187.83	€ 97.97	€ 89.86

change per 1000 litres, 1999 - 2008

United Kingdom			
wholesale price	total taxes	VAT	Other Taxes (1)
€ 499.92	€ 122.41	€ 74.47	€ 47.94

change per 1000 litres, 1999 - 2008

Sweden			
wholesale price	total taxes	VAT	Other Taxes (1)
€ 412.70	€ 155.69	€ 82.53	€ 73.16

change per 1000 litres, 1999 - 2008

Germany			
wholesale price	total taxes	VAT	Other Taxes (1)
€ 555.00	€ 259.54	€ 105.88	€ 153.66