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Study: Waxman-Markey bill costly to US refiners

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Economic consequences to the US refining industry of the American Clean Energy and Security Act (ACES), H.R. 2454, also known as the Waxman-Markey (W-M) energy and climate bill, are profound, according to an evaluation by Energy Policy Research Foundation Inc. The legislation calls for controlling emissions of greenhouse gasses (GHGs) by placing a price on them. The bill passed the House of Representatives on June 26, 2009, and companion legislation is under discussion in the US Senate.

Under the W-M bill, manufacturers (refiners) and importers of transportation and other fuels derived from crude oil would be required to purchase allowances to account for the carbon dioxide emitted into the atmosphere as a result of combustion of these fuels beginning in 2012, 2 years before any free allowances are distributed. Allowances could be bought and sold under the legislation's cap-and-trade program.

US refiners would be responsible for approximately 45% of all emissions covered by the W-M bill, which would regulate 86% of all US emissions by 2016. US refiners, but not importers, would have to purchase allowances for stationary source emissions (emissions released at the refinery). US refiners would receive some free allowances beginning in 2014 and ending in 2026 to assist in transitioning to a higher cost operating environment, but these allowances are small compared to the total obligations under the program (Table 1).

Rising costs

The cap-and-trade program as outlined in the W-M legislation will require the US refining industry to adjust to a new set of cost structures and a new regulatory program. This program will not be applied in a vacuum but within the structure of an industry already facing rising competition from foreign refiners and a rising mandate to increase sales of biofuels.

The US possesses 20% of the world's refining capacity (17.5 million b/d of the world's 86 million b/d of capacity) and is the world's largest consumer of oil, making it one of the most important markets in determining product trade flows.

In recent years the US has imported 10-12% of its gasoline and gasoline blending components (1 million b/d), an increase from approximately 6% in 2000. Imports' share of supply has held steady as gasoline demand has declined over the past 2 years and as the supply of ethanol has tripled in under 5 years. Ethanol production was barely over 200,000 b/d in 2004 and has averaged 672,000 b/d through the first 8 months of 2009.

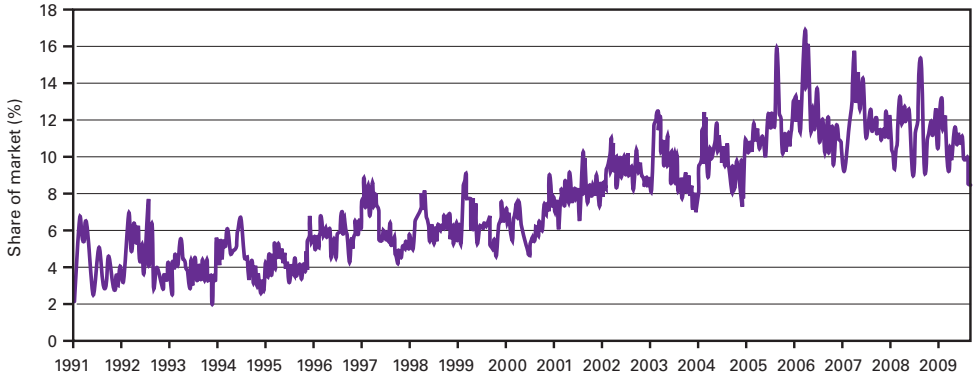
Gasoline imports are and will be a firmly integrated part of US petroleum supply. The US imports the majority of its gasoline from Canada, the Virgin Islands, and Europe, where the dieselization of passenger cars has left refiners with surplus gasoline.[1] Fig. 1 shows gasoline imports' share of US gasoline supply.

Because refineries vary widely in complexity, product mix, and access to markets, no single production function (or supply curve) can fully capture the cost of producing the entire slate of refined products for the US economy. However, it is possible to approximate the cost of

This article is adapted from a report available on EPRINC's web site at http://www.eprinc.org/pdf/refiningindustry-waxmanmarkey.pdf.

IMPORTS' SHARE OF US GASOLINE SUPPLY*

Fig. 1



*Total gasoline imports as share of finished motor gasoline product supplied.
Source: EPRINC calculations from Energy Information Administration data

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alternative regulatory programs (e.g., biofuels mandates, tax treatment, cap-and-trade legislation) on the entire refining sector by standardizing different segments of the industry to a common product slate and then evaluating the relative cost of producing the standard product slate across all units.

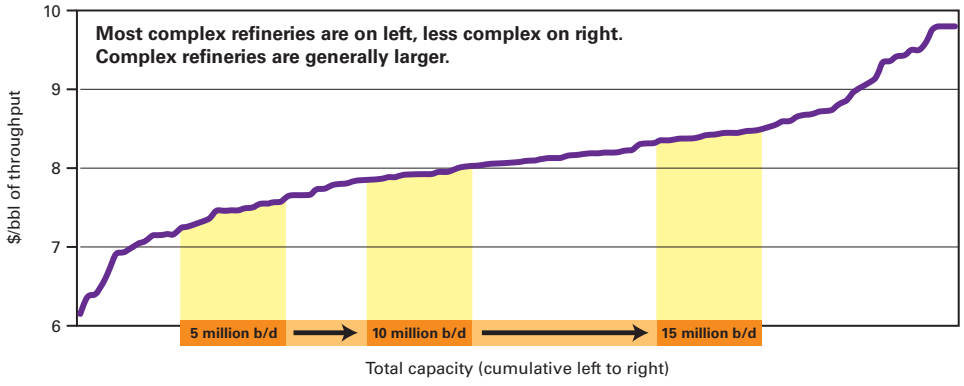
While such a calculation may not yield a precise competitive metric for an individual unit, this approach does permit an estimate of the average cost of alternative regulatory programs and what those programs are likely to do to the cost of producing the standard product slate for the entire economy. Estimating this shift in the cost of producing the product slate is essential for estimating how much of the rising cost can be passed through to consumers as well as subsequent adjustments (losses) in market share to foreign refineries.

Fig. 2 shows EPRINC's estimate of the cost of production for the entire US processing fleet for 2015-30 under the Energy Information Administration's Annual Energy Outlook 2009 reference scenario—prior to any capacity reductions resulting from rising costs from pending legislative and regulatory programs (blend wall, removal of Section 199 from the tax code, and cap-and-trade legislation) or as a result of competitive pressures from emerging and expected growth in world refining capacity likely to take place in the period.

In this "business as usual" scenario the US production function remains relatively stable with real operating costs reflecting the EIA forecast for modestly rising feedstock prices.

US REFINERS' EFFECTIVE COST OF PRODUCTION—2015-30*

Fig. 2



*Some lubricant and small niche refineries have been excluded.
Source: EPRINC calculations

EMISSION ALLOWANCES UNDER WAXMAN-MARKEY BILL*

Table 1

Year	Total CO_2 emissions permitted for US economy	US refiners' emissions stationary (source)	US refiners' emissions (product combustion)	Refiners' total emission compliance obligation	Emission allowances provided at no cost	Net emission allowance purchase requirement
	Million tonnes/year of CO_2					
2015	5,003	256	2,029	2,285	100	2,185
2020	5,056	250	1,980	2,230	101	2,129
2025	4,294	248	1,964	2,212	86	2,126
2030	3,533	249	1,973	2,222	0	2,222

*Actual emissions for the entire US will be higher as ACES covers only 86% of the US economy. Does not include allowances allotted to small business refiners, 0.25% of the free allowance pool. All estimates are prior to trade flow adjustments from higher cost of US refinery operations under the Waxman-Markey bill
Source: HR 2454, EPA Data, EIA W-M Basic Case Projected Refinery Crude Throughputs, and EPRINC Calculations.

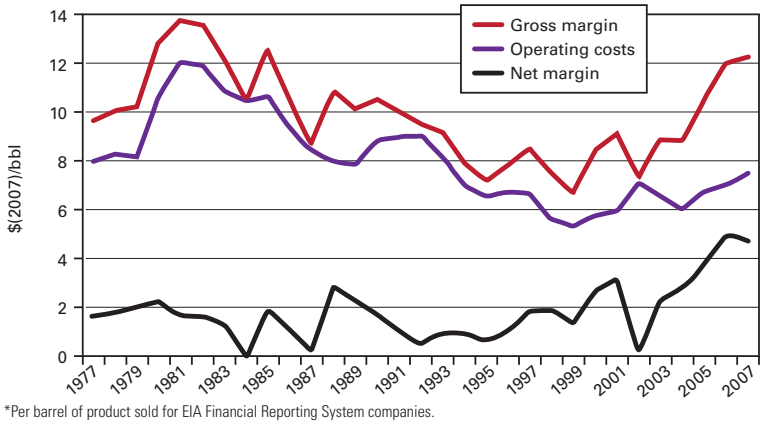
This scenario also assumes no substantial capacity expansion as the US faces essentially flat demand for transportation fuels for the forecast period. In EIA's reference case, liquid fuels consumption remains virtually flat throughout the forecast period, rising at 0.1%/year, and fuel prices rise at 2.6%/year.[2]

The EPRINC estimate heading into the 2015-30 timeframe has operating costs (fixed and variable) of approximately $6/bbl, rising to over $9/bbl depending on complexity, without any major commitments to capacity expansion. The 50 most complex US refineries account for 10 million b/d of capacity, meaning nearly 60% of total US refining capacity is found in 40% of its refineries.

According to EIA's Financial Reporting System, operating costs shown in Fig. 3 have remained relatively steady in recent years, within their historical range of $6-8/bbl, and are consistent with EPRINC's estimates in Fig. 2. Net margins were strong during the refining "golden era" from 2004 to 2007, but more recent data, shown in Fig. 4, suggest net margins have likely returned to their historical level around $2/bbl.

US PRODUCT MARGINS AND COSTS*

Fig. 3



*Per barrel of product sold for EIA Financial Reporting System companies.
Source: EIA

LOSSES FROM PRODUCT AND STATIONARY ALLOWANCE COSTS WITH…

Table 2

	Low foreign supply case	Medium foreign supply	High foreign supply case
	Capacity at risk of closure (Million b/d, except job losses)		
…CO_2 cost of $15/ton			
Product emission costs - 90% passthrough	0.80	1.50	2.4
Stationary emission costs	0.75	1.50	2.25
Total capacity losses	1.55	3	4.65
Total job losses	80,000	160,000	240,000
…CO_2 cost of $30/ton			
Product emission costs - 90% passthrough	1.3	2.3	3.0
Stationary emission costs	2.1	4.2	5.0
Total capacity losses	**3.4**	**6.5**	**8.0**
Total job losses	**180,000**	**275,000**	**350,000-400,000**

Fig. 4 below shows gross margins for refined products accounting for 85% of the barrel. Gross margins have returned to their historical levels near $10/bbl after several years at or over $15/bbl beginning in 2004. Composite margins shown in Fig. 4 do not include bottom-of-the-barrel products, which generally sell below crude cost.

Regulatory cost

The industry is likely to face a range of cost pressures in the coming years from both existing regulatory programs and new legislation. EPRINC has estimated the cost of the following regulatory and legislative initiatives and divided the cost outcomes into two categories: 1. costs faced by US refiners but not by many foreign suppliers, and 2. costs faced by both US and foreign suppliers.

With regard to cost of operations borne by US refiners alone, the cost of acquiring allowances for stationary emissions of GHGs at the refinery site, and adjustments in tax rates (such as removal of Section 199 in the US tax code) are the most prominent. Although refined products entering the US from some foreign sources may have a cost penalty from CO_2 control costs from stationary emissions, a large volume of processing capacity now in place abroad as well as new capacity scheduled to come on line will be free of a higher cost structure from carbon controls of stationary source emissions and will also not be subject to the higher proposed cost tax structure faced by US refiners.

In some cases, national governments may decide to participate in an international agreement to reduce GHGs but may select control strategies that do not raise the cost of industrial operations and instead focus on strategies to promote efficiency and reduce consumption by end-users, as the European Union is attempting. The potential for widely differing cost structures for refining in international markets is especially important in the near to medium term.

EPRINC has identified substantial foreign refining capacity with open access to the US market that faces neither stationary emission costs for controlling GHGs nor corporate tax levels which would raise their cost structure to levels comparable to the cost structure of US refiners. Fig. 5 shows IEA's forecast for worldwide refining capacity additions expected to come online between 2009 and 2014. The IEA forecast does not include three 400,000 b/d projects in Saudi Arabia which now appear to be moving forward and are all scheduled to start up by 2014, although the completion of any one refinery cannot be guaranteed. China is set to be the largest source of new capacity.

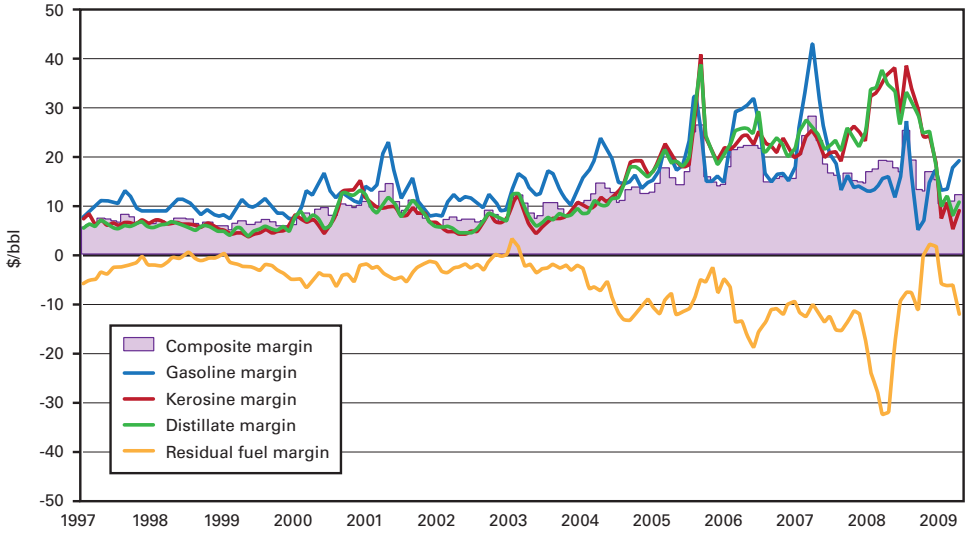
Depending upon the cost of allowances and whether Section 199 provisions are repealed, the incremental cost of operating the US refining fleet will rise by $1-2/bbl in 2015 as a result of Section 199's repeal and stationary emission costs.

The cost imposed on refiners for their stationary emissions is 75¢/bbl, based on the typical amount of refinery emissions per barrel of throughput (0.05 tons/bbl) and the average price of CO_2 allowances in the Environmental Protection Agency's core scenario for 2015 ($15/ton of CO_2 equivalent) to $1.50/bbl in the same scenario without international offsets. EPA further estimates that real carbon prices would rise at a rate of approximately 5% per annum.

The repeal of the Section 199 manufacturers' tax credit will add about 25¢/bbl to production costs with refinery runs at an annual average of 15 million b/d. Section 199 was enacted to provide all US manufacturers, not only oil refiners, with a tax treatment that is more competitive with foreign manufacturers. The proposed repeal of the credit would

GROSS MARGINS BY PRODUCT

Fig. 4



Source: EPRINC calculations from EIA data

affect only oil refiners and oil and gas companies; it would remain in place for all other domestic industries.[3]

The new $1-2/bbl cost does not include product allowance costs which are also imposed on imports. It represents an increase in operating costs of 12.5-25% for a refinery with operating costs of $8/bbl and would wipe out 50-100% of net margins for a refiner earning $2/bbl should the refiner be unable to pass this cost to consumers. Inclusion of free allowances granted between 2014 and 2026 lowers the cost to 75¢-$1.50/bbl. Pass-through of such costs to consumers will be difficult because imported fuels will not be subject to them. After 2015 operating costs will rise further as allowance prices become more costly. It is also worth noting that in EIA's analysis of W-M, basic case allowance prices are 70-130% higher than those in EPA's "core" scenario during 2015-30.

Allowances distributed to refineries will provide some financial relief, but "free" allowances cover less than half of all stationary emissions.

Allowance purchases

US refiners and product importers must purchase allowances for the emissions released from consumption of the fuels they produce or import. W-M assumes that domestic refiners will be able to pass through 100% of these costs to consumers and will therefore be protected from trade flow risks. However, pass-through of increases in taxes and feedstock prices is often less than 100%.[4]

Although pass-through has at times been 100%, and sometimes greater, in an environment of excess worldwide capacity 100% pass-through is unlikely. Foreign refiners selling in the US market will likely find opportunities to spread allowance costs (paid by importers) among the portion of their product slate not subject to such costs.

Because the scale of product allowances is so large, over $30 billion/year at $15/ton of CO_2 for 15 million b/d of product sales, sub-100% pass-through of product allowance costs will pose a huge risk to refiner profitability and will likely force many to idle or close capacity.

Even at a rather optimistic pass-through rate of 90% and an allowance price of $15/ton, refiners must absorb 60¢/bbl of product (30% of a $2/bbl net margin). At $30/ton, a price closer to EIA estimates of allowance prices, 90% pass-through would force refiner to absorb $1.20/bbl, over half of a typical refiner's net margin.

Likely adjustments

EPRINC evaluated the extent to which the W-M legislation would raise operating costs and the likely adjustments that would take place both to domestic operating capacity and to direct and indirect employment throughout the refining sector. The major conclusions of EPRINC's report are that with enactment of the W-M legislation:

- The market environment will be characterized by Rising Regulatory Costs and Excess Capacity Abroad

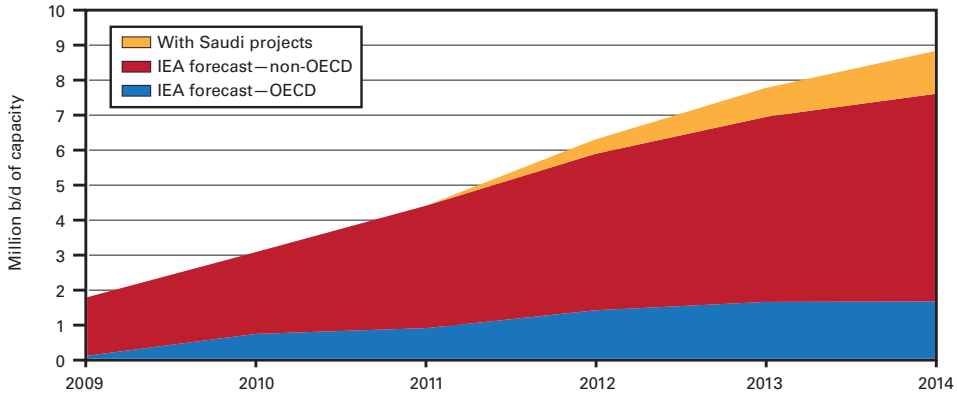
The GHG provisions, i.e., the required purchase of stationary source and combustion allowances under W-M, will take place in an environment in which the US refining industry must simultaneously adjust to:

1. Rising costs of production from recently enacted environmental and regulatory requirements.

2. Rising competition from foreign competitors as 7.6-8.8 million b/d of new refining capacity comes online by 2015-80% of which will be built outside the Organization for Economic Cooperation and Development. Based on EIA's projected estimate of world petroleum demand through 2015, there is likely to be as much as 18 million b/d of excess crude distillation capacity worldwide.

PROJECTED REFINING CAPACIY ADDITIONS

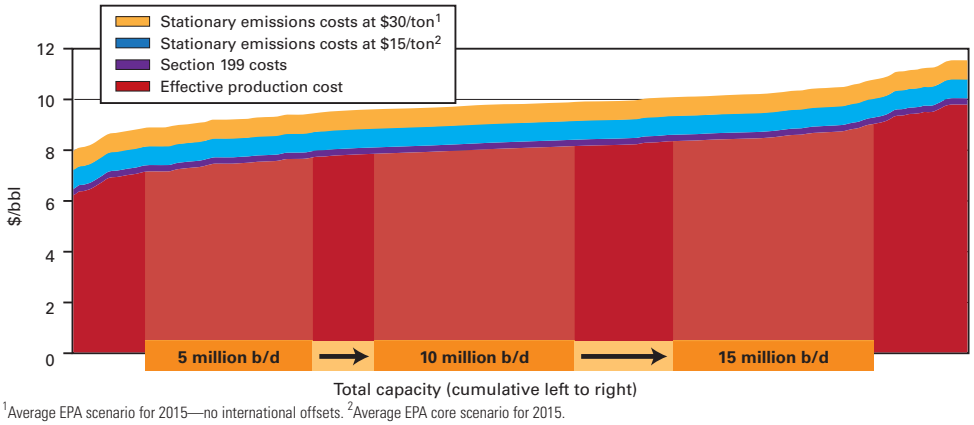
Fig. 5



Source: EIA Medium-Term Oil Market Report; EPRINC data and calculations

OPERATING COSTS WITH STATIONARY EMISSIONS, SEC. 199 REPEAL

Fig. 6



[1]Average EPA scenario for 2015—no international offsets. [2]Average EPA core scenario for 2015.
Source: EPRINC

3. Flat or declining demand for transportation fuels in the US market.

The emergence of major new centers of global refining combined with rising production costs for domestic operations due to environmental regulations, rising taxes, and biofuel mandates will further shrink margins and place 2.5 million b/d of the current 17.5 million b/d of domestic operable capacity at high risk of permanent closure early in the 2015-30 forecast period, even without any accounting for the increased costs associated with allowance purchases beginning in 2012 as called for in the W-M legislation.

- Stationary-source allowance costs alone will idle additional US capacity.

The GHG allowance costs associated with stationary emissions, a cost not placed on imported fuels, represent a large increase in refiners' cost of production. This cost alone will put the profitability of many refiners at risk. Full pass-through of such costs is unlikely considering the amount of excess worldwide capacity.

Constraints on pass-through for stationary emission costs alone will erase 25-50% of a typical refinery's net margins in the program's first few years, inclusive of free allowances allotted to refiners. As shown in Fig. 7a, some capacity will be idled or permanently shut down. The volume of lost capacity is highly dependent upon the availability of foreign capacity, but much of this capacity is coming online now, and even under the most optimistic case, US capacity losses will be substantial: 750,000-2.25 million b/d with allowance prices at just $15/ton. At an allowance cost of $30/ton of CO_2, capacity losses rise to 2.1-6.3 million b/d.

- Pass-through of product emission allowance costs is unlikely at a $15/ton allowance cost.

Full pass-through of product emission costs will also be unlikely. EPRINC has identified sustained periods when refiners have been limited to passing through increases in feedstock prices and taxes to as low as 50-75%. In a market environment of substantial excess capacity (both in the US and abroad) opportunities for 100% pass-through will be rare as lower-cost refiners seek to shift costs among the product slate to maintain operating capacity. The scale of GHG allowance costs for product emissions is so large that a pass-through rate of 80% or even 90% will force a large segment of the industry to idle capacity.

Failure to achieve full pass-through of product allowance costs will place large segments of the industry at risk of closure—in addition to capacity threatened by stationary emission costs. As shown in Fig. 7b and Table 2, the range of potential capacity losses relating solely to product emission costs would be 800,000-2.4 million b/d at 90% pass-through even under the more optimistic scenario of an allowance cost of $15/ton of CO_2.

- Pass-through of product emission allowance costs is unlikely at a $30/ton allowance cost.

In a scenario where allowance costs reach $30/ton with 90% pass-through of product emission costs, total capacity losses could rise to as much as 8 million b/d, and job losses could approach 400,000.

- In the 2015-2030 forecast period evaluated by EPRINC, gasoline prices could rise by an average of 20-40¢/gal under the carbon costs calculated by the EPA.

Gasoline, and all other petroleum-based transportation fuels, could rise by over $1/gal under some CO_2 allowance cost forecasts by the EIA.

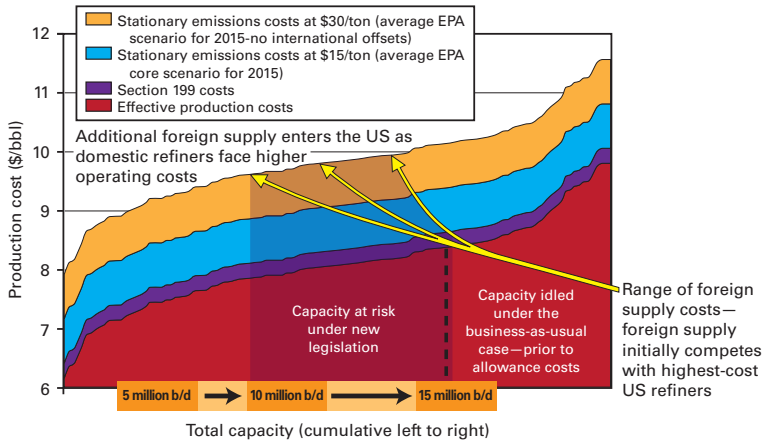
- Carbon leakage remains a severe trade risk to the US refining industry.

The purpose of the W-M bill is to curtail GHG emissions, but the cap-and-trade program poses severe risks to the structure of the US refining industry, and instead of reducing GHGs as intended the legislation will replace domestically produced fuels with imported fuels. In addition, the hundreds of products made from petroleum would see price increases as refiner operating costs rise.

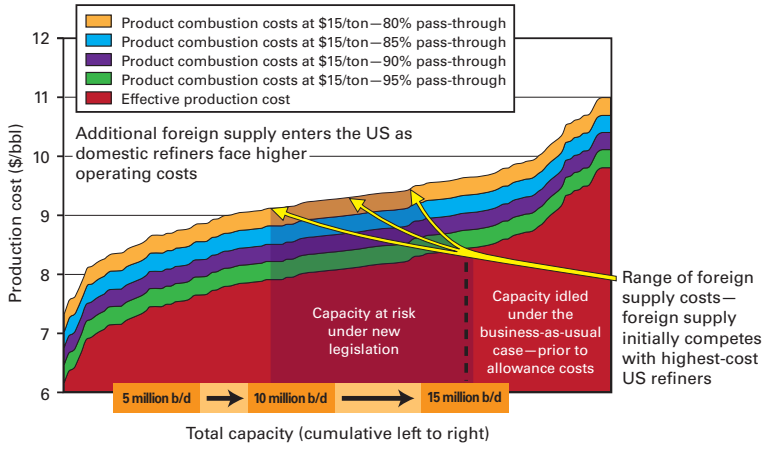
The W-M bill and its companion legislation in the Senate, the Boxer-Kerry climate bill, specifically exclude petroleum refiners from receiving free emission allowances set aside for

US CAPACITY AT CLOSURE RISK FROM COST INCREASES FROM... Fig. 7

...Stationary-source GHG obligations, 2015-30 Fig. 7a



...Product combustion GHG obligations, 2015-30 Fig. 7b



Source: EPRINC

trade-vulnerable industries. However, in the European Union's Emission Trading System (EU ETS), the world's only functioning GHG cap-and-trade system, the refining industry has been designated as a trade-vulnerable industry under the program's "carbon leak" criteria, and a review is under way to determine what amount of additional free allowances the industry will be allotted to cover its stationary emissions. Refiners operating under the EU ETS are not responsible for their products' emissions.

A complex tariff structure could be implemented to rebalance costs to reflect the cost of their carbon content in all products imported by the US, but implementing such a complex tariff raises many technical, legal, and trade risks. Also, some countries may even adhere to international agreements on carbon controls but do so in a manner that that does not alter costs of production at major industrial facilities. ✦

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Larry Goldstein is a Trustee of EPRINC and director of special projects and previously was president. He has extensive advisory relationships with energy companies, research institutes, and government agencies. He has testified before numerous congressional committees and regulatory bodies and has been appointed to the National Petroleum Council (NPC) by every secretary of energy. He was a founder and president of the PIRA Energy Group, an energy consulting firm that is currently retained by nearly 400 companies.

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