Economic Impact of Pending Air Regulations on the U.S. Pulp and Paper Industry

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Introduction

The forest products industry is currently facing a long list of proposed air regulatory changes that could impose large costs. The American Forest & Paper Association (AF&PA) engaged URS to estimate the likely costs of complying with these pending regulation changes and Fisher International Inc. to assess the impact of these compliance costs on the economic viability of U.S. pulp and paper mills.

The URS findings are presented in detail in an accompanying report dated June 2010, and a regulation-specific summary of the consulting firm's cost estimates appears in Appendix A of this report indicating which rules were included in this assessment and which were not.

In summary, the Fisher study, working with URS compliance cost data, shows severe impacts on the pulp and paper industry from EPA's Boiler MACT rule and other upcoming Clean Air rules for which the costs could be estimated, as follows:

- Boiler MACT:
  - 16,888 jobs lost in the pulp and paper manufacturing mills alone.
  - 71,774 jobs lost considering both the job losses in pulp and paper mills and the jobs lost along their supply chain and in the surrounding community.[1]

- Boiler MACT plus other upcoming Clean Air regulations:
  - 43,666 jobs lost in pulp and paper manufacturing alone.
  - 185,581 jobs lost considering both the losses in pulp and paper mills and the jobs lost along the supply chain and in the surrounding community. [2]

Methodology

Fisher International was asked to quantify the likely impact of potential new air pollution control regulations on employment in U.S. pulp and paper mills by estimating how many mills would be in jeopardy of closing if they have to comply with the relevant new air regulations. To make the estimate, we used two major sources: Fisher*Solve*™, a proprietary industry database describing the assets and costs-of-production of each mill, and descriptions provided by URS of how different types of mills would need to respond to each potential new regulation and the costs of that compliance.

We projected the costs of compliance for each mill and calculated them as a percentage of the mill's costs of production. When compliance would increase a mill's cost-of-production by more than a sustainable amount, we listed that mill and its associated employment as being "at-risk." It is important to note that the costs projected in this

[1] Note that these estimates do not include job losses in the wood products manufacturing sector of the forest products industry from an estimated $2.2 billion in new MACT costs.
[2] Note these estimates do not include job losses in the wood products manufacturing sector of the forest products industry.

report for each mill's compliance do not include the costs associated with a number of regulations for which URS was unable to quantify the compliance impact.[3] Also, there is another set of regulations that trigger a cost to a mill only when the mill makes a physical change, such as by rebuilding a boiler. As we do not know which mills will make which changes in the future, these impacts also are not included in this analysis. The analysis, therefore, may understate the impact of regulations on mill costs.

We assumed that the "sustainable amount" of incremental cost a given mill could absorb was equal to the amount of cash that the average mill produces for its owner after variable costs and capital expenditures. In other words, when a mill gets to a cash break-even level, it becomes a serious risk for closure. The average sustainable amount of cost increase for the industry based on this analysis is 12.5% of cost of production. (See below for a more detailed explanation.)

In most cases, compliance requires both capital and operating costs. We translated capital costs into operating costs by using an interest rate of 11%, representing the industry's weighted average cost of capital (WACC), and a term of five years. We based the WACC on a survey of investment bankers and industry analysts. The five-year term was arrived at by noting that the industry's capital structure is approximately 50% debt and 50% equity, and the average industry term of debt is about ten years. Funding with equity is equivalent to a term of "zero" years, thus yielding an average of five years.

The following table summarizes how we arrived at the financial "at-risk" rate of spending on compliance that would put a mill in jeopardy of closing. Ideally, we would have compared the cost impact of compliance to mill margins. Since we did not have data on each mill's margin, we used an industry average "at-risk" rate and compared it to each mill's cost-of-production as a proxy.

We estimated the industry average "at-risk" rate using data drawn from the financial statements of a group of public U.S. pulp and paper companies. We found the industry's average gross margin over a 10-year period, which is revenue less the cost of goods sold (mainly materials and labor) as a percentage of revenue. We then deducted average capital expenditures per dollar of sales and an average cost-of-sales (such as broker commissions and early payment discounts).

These calculations resulted in an average "at-risk" rate (the maximum amount of cash cost increase the typical mill could absorb) of 10.1% of sales. Given the industry's average margins, this is equivalent to 12.5% of cash cost-of-production. Hence, if air regulation-related incremental operating costs and annualized costs associated with capital expenditures to comply with the regulations amount to more than 12.5% of a mill's cash costs, the mill is classified as at risk of closing.

[3] Roughly $2 billion in new capital costs for pulp and paper mills meeting various National Ambient Air Quality Standards (NAAQS); changes to the New Source Review (NSR) requirements; New Source Performance Standards (NSPS) and Clean Air Interstate Rule (CAIR) were not factored into the mill closure/job loss calculations because they could not be allocated to specific mills.

The increase in costs of compliance with new air regulations will affect mills in different ways. In some cases, mills will suffer increases in costs greater than their domestic competitors, thus losing competitiveness and becoming risks for closure. In other cases, even if all mills in a product category experience similar cost increases, U.S. mills become "at-risk" for closure because international competitors gain a cost advantage.

Item	Percent
10-year average industry gross margin	19.7%
Less 10-year average capital expenditures per $ of sales	7.6%
Less factor for cost of sales	2.0%
Equals at-risk rate as percent of sales	10.1%
At -risk rate as percent of cost-of-production	12.5%

Results

Based on the 12.5% at-risk rate and Fisher's estimates of mill-specific increases in annualized air regulation compliance costs, the calculations suggest that boiler MACT regulations, if they are incremental to the pending manufacturing-related air regulations, would result in the closure of 30 mills employing 16,888 people or 14% of the primary pulp and paper sector's workforce. (The primary pulp and paper sector encompasses only pulp and paper mill jobs; logging jobs and converting operations are excluded.)

The calculations also suggest that 92 pulp and paper mills would be at significant risk of closing if all the new regulations were implemented. These mills employ 43,666 people, or 37% of the primary pulp and paper sector's workforce.

The following table shows potential mill shutdowns and job losses for a range of "at-risk" rates. The 12.5% "at-risk" rate used in this study is shown in bold.

Mills at Significant Risk of Closure						
	Incremental from Adding Boiler MACT		P&P Mfg Regs Only		Total of Boiler MACT and P&P Mfg Regulations	
Risk Rate	Jobs At Risk	Jobs At Risk	# Locations	# Locations	Jobs At Risk	# Locations
Base					119,160	356
5.0%	12,157	30	73,554	148	85,711	7
7.5%	18,166	34	56,614	116	74,780	150
10.0%	15,475	34	42,824	88	58,299	122
12.5%	**16,888**	**30**	**26,778**	**62**	**43,666**	**92**
15.0%	18,619	29	11,770	34	30,389	63
17.5%	8,625	17	6,127	23	14,752	40

Ripple Effect

Pulp and paper mill jobs support jobs in other industries that supply the pulp and paper industry in local communities and throughout the United States. A scholarly paper prepared by the Economic Policy Institute -- "Updated Employment Multipliers for the US Economy, 2003" -- was provided to Fisher by AF&PA. Table 9 of the paper indicates that for every 100 jobs in the paper industry, there are an additional 325 jobs sustained in other industries due to the purchase of supplies and the re-spending of worker incomes. Hence, the pulp and paper industry's multiplier is 4.25.

Applying the 4.25 multiplier in the previous table suggests that some 72,000 jobs can be lost by imposing boiler MACT regulations on top of the proposed new pulp and paper manufacturing-related air regulations (16,888 X 4.25 = 71,774) and that a total of 185,000 jobs – inside and outside the pulp and paper industry -- could be lost as a result of the entire suite of proposed air regulations (43,666 X 4.25 = 185,581).

Mill & Community Jobs at Risk at 4.25 Multiplier			
Risk Rate	**Incremental from Adding Boiler**	**P&P Mfg Only**	**Total of Boiler MACT and P&P Mfg Regulations**
Base	506,434	506,439	506,430
5.0%	51,667	312,605	364,272
7.5%	77,205	240,610	317,815
10.0%	65,769	182,002	247,771
12.5%	**71,774**	**113,807**	**185,581**
15.0%	79,130	50,023	129,153
17.5%	36,656	26,040	62,696

Fisher International also calculated pulp and paper jobs losses associated with the proposed regulations by region. The regional do not include the multiplier effects.

Job losses for Regions (No Multiplier)			
	Incremental At Risk Jobs from Adding Boiler Regs.	**At Risk Jobs for P&P Mfg. Regulations Only**	**At Risk Jobs for Boiler and P&P Mfg Regulations**
US - Northeast	640	4,521	5,161
US - Midwest	7,026	4,804	11,830
US - Southeast	8,822	12,882	21,704
US - West	400	4,571	4,971
Total US	16,888	26,778	43,666

Appendix A

URS Estimates of Pulp and Paper Mills Costs of Complying With Proposed Air Regulations:

- ***Boiler MACT***
  - $4.6 billion in new capital costs, plus $560 million in operating costs
  - Rule controls PM/metals, HCl, CO, mercury and dioxin from hundreds of biomass and fossil fuel boilers.
  - Stringency of emission limits within EPA's discretion but proposed limits suggest severe impacts likely
  - Final rule expected in December 2010 with controls in place by 2013

Other Pending Air Regulations Where Costs Could Be Assigned to Mills[4]:

- *Cluster MACT I/III Re-do and Residual Risk*
  - $780 million – >95% of costs due to MACT organic HAP (Methanol) controls on paper machines; $360 million in O&M is especially high due to energy intensive nature of controls which also produce over 2 million metric tons of CO_2
  - New Cluster MACT could set limits on additional pieces of equipment (like paper machines) for organic HAPs; EPA has discretion not to undertake de novo review of MACTs
  - Residual risk review likely to show few risks remain
  - EPA scheduled to complete by December 2011 with controls by early 2015

- *Cluster MACT II Re-do and Residual Risk*
  - $3.3 billion: >95% of cost due to MACT; $300 million in O&M plus 1.5 million metric tons of new CO_2 emissions
  - New MACT II could lead to addition of mercury, and HCl controls and more stringent PM controls on recovery furnaces, lime kilns, and smelt tanks. Again, EPA has discretion whether to revisit MACTs;
  - Residual risks from these sources also small
  - EPA scheduled to complete by December 2011 with controls by early 2015

- *Hydrogen Sulfide HAP Listing*
  - $2.7 billion in capital, plus $180 million in operating costs
  - Assumes H_2S listed as HAP and MACT establishes limits for pulping operations and wastewater treatment ponds

[4] Fisher was unable to allocate about one billion of these costs to mills so the total capital cost used was $5.7 billion.

- EPA has discretion to deny petition or conclude not an issue for pulp mills based on careful risk assessment

Other Pending Air Regulations Where Costs Could NOT Be Assigned to Mills:

- *CISWI Rule*
  - $460 million in capital costs and $50 million in O&M.
  - Rule establishes nine pollutant limitations for boilers burning any solid wastes
  - Estimate assumes most materials burned in forest product industry boilers are classified as fuels and thus regulated under Boiler MACT
  - Final expected in December 2010 with controls by 2013

- *Boiler Area Source/GACT*
  - $9 million in capital costs, plus $1.3 million in operating costs.
  - Rule sets HAP emission requirements for smaller boilers at so called "area sources" such as box plants.
  - Impact of rule could be lessened if EPA adopts work practices such as tune-ups rather than numeric limits for CO
  - Final rule by 2010 and compliance within 3 years

CAIR 3/Air Transport Rule for Industrial Boilers
  - $870 million in capital; total O&M would be $220 million
  - Assumes medium and large boilers burning majority coal or oil must significantly reduce SO_2 and NOx
  - Promulgation in 2011 with compliance over the next five years

- *Start-up, Shutdown & Malfunctions (SSM) Provisions Removed from MACT*
  - $100 million, plus $3 million in O&M
  - If EPA compelled to eliminate SSM exemptions and venting allowances then installation of redundant controls or suffer periods of shutdown with no production would drive costs even higher. EPA has discretion to develop reasonable work practices to replace current SSM exemptions
  - EPA linking schedule with pulp and paper toxic rules, so complete by 2012

- *Ozone NAAQS revisit*
  - $400 million in capital and $30 million in O&M
  - Tighter standard will drive more VOC and NOx controls than other rules require for smaller contributors in or near more numerous non-attainment areas
  - EPA plans to reset NAAQS by summer 2010 ; impacts would occur 4 to 5 years after finalization

- *PM fine NAAQS Implementation*

- $284 million in capital and $40 million in O&M
- Assume tighter annual standard will drive further SO_2 and NOx controls. As in all the above NAAQS, EPA has the discretion to determine “ample margin of safety” necessary to protect public health.
- Final in 2011 with controls needed for attainment 5 or so years out

- *Revised NAAQS for NO_2*
  - $72 million in capital if control strategies reach beyond highway corridors; $7.4 million in O&M
  - Final in early 2010 with controls on select sources in five years (2015)
  - Significant uncertainty in ability to meet increments modeling for projects

- *Revised NAAQS for SO_2*
  - $40 million in capital and $7.5 million in operating costs
  - Final in June 2010 with controls on select sources in five years (2015)
  - Significant uncertainty in ability to meet increments modeling for projects

- *Kraft Pulp NSPS Revisions*
  - $83 million in capital through 2020 and $56 million six years after effective date given more mills trigger retrofit requirements
  - EPA can defer action on NSPS or set equivalent to MACT to avoid new costs
  - EPA linking schedule with pulp and paper toxic rules so complete by 2012