

Analysis of Ontario's Industrial Emissions Reduction Program

Prepared by Keith Stewart, Ph.D.
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The recommendations in this report have been endorsed by the
following organizations:

Canadian Environmental Law Association

Citizens Environmental Alliance

Clean North

Grey Association for Better Planning

International Institute of Concern for Public Health

Local Enhancement and Appreciation of Forests

Ottawa Citizens Against Sewage Pollution

Ontario Public Interest Research Group – Carleton

Pembina Institute for Appropriate Development

Sierra Club of Canada

Toronto Environmental Alliance

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Prepared by Keith Stewart, Toronto Environmental Alliance¹

Executive Summary:

On June 21, the Ontario government announced a Clean Air Plan to reduce industrial air pollutants. This plan contains two separate policy packages. The first package, and the focus of this paper, is a set of pollution limits and an emissions trading system for industrial emitters of nitrogen oxides and sulphur dioxide (which cause smog and acid rain). The second policy package is a new regulatory framework to govern emissions of air toxics from industrial sources, which will be addressed in a future paper (a draft of this analysis can be obtained from the Toronto Environmental Alliance).

The proposed Industrial Emissions Reduction Plan (IERP) is essentially an extension of the NO_x and SO₂ caps and emissions trading system developed for the electricity sector in 2001 to other industrial sectors.

Environmental and health groups have long advocated for caps on emissions from large industrial sources and while the reductions called for in the next ten years are relatively modest, they would appear to be at least a step in the right direction. Yet by extending the emissions trading system to the other industrial sources, the environmental and health benefits of this initiative are undercut, and perhaps even entirely negated.

This is because the emissions trading system was developed - and provided enough emissions 'allowances' to the electricity sector - on the assumption that Ontario's coal-fired generating stations would remain open. The new provincial government, however, has committed to closing the coal plants, thereby dramatically reducing pollution from these plants. If even a third of these unused pollution allowances from the electricity sector are sold to other industries, then they won't have to reduce emissions at all to meet the 2010-2014 limits and they could even increase emissions above current levels.

There is also the future possibility of emissions allowances being sold in the U.S. market, thereby increasing smog- and acid rain-causing emissions downwind of Ontario.

Closing the loopholes in this plan are also important because NO_x and SO₂ emissions are linked to greenhouse gas emissions (both come from the burning of fossil fuels), so this Clean Air Plan will also have significant implications for action on climate change.

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Recommendations:

To provide an incentive for further reductions and continuous improvement under the Industrial Emissions Reduction Plan, the provincial government should:

1. Lower the caps by reducing the quantity of emission allowances.
2. Auction some or all of the emissions allowances in order to generate revenues to fund monitoring and environmental improvements while creating an economic incentive for polluters to reduce beyond their maximum allowable emission levels.
3. Prohibit the trading of emissions allowances or credits of smog precursors (the preferred option).
4. If there is emissions trading:
 - Remove the electricity sector from the trading system and specify instead that all new electricity generators must achieve emissions levels per megawatt hour equal to or less than those from best available high-efficiency natural gas technology.
 - Eliminate the creation of emissions credits from uncapped sources.
 - Limit the rest of the trading system to Ontario-based sources (i.e. no international or interprovincial trading).
 - Include mechanisms to protect local air quality from adverse impacts of trading (e.g. the creation of hotspots where facilities in highly impacted areas trade their way out of reductions).

ONTARIO'S INDUSTRIAL EMISSIONS REDUCTION PLAN

The proposed Clean Air Plan contains two major policy packages. The first of these is a set of pollution limits and an emissions trading system for industrial emitters of nitrogen oxides and sulphur dioxide.

The proposed Industrial Emissions Reduction Plan (IERP) is essentially an extension of the NO_x and SO₂ caps and the emissions trading system developed for the electricity sector in 2001 to other industrial sectors. The extension of pollution caps to other industrial sectors is partially a response to criticisms of Ontario's emissions trading system for electricity generators, but in practice there is a large loophole in the proposed system related to the government's stated intention to phase out Ontario's coal-fired electricity generators that could allow industrial polluters to increase emissions.

Even without the trading provision, the new NO_x and SO₂ caps are not as 'tough' as advertised.

Emissions Caps

The provincial government proposes to limit emissions of NO_x and SO₂ from large emitters within the petroleum refining, iron and steel, pulp and paper, glass, carbon black and cement sectors, and to reduce these emissions over time. Previously, only the electricity system faced both NO_x and SO₂ limits, while Inco and Falconbridge faced SO₂ caps.

In order to comply with the Canada Wide Standard for ground-level ozone, Ontario has committed to achieving a 45% reduction in NO_x emissions from 1990 levels by 2010. Emissions will only be reduced by 17% relative to 1990 levels by 2010, which means that more will have to be done to reduce NO_x emissions from the transportation sector (the largest source of NO_x emissions). Moreover, NO_x levels are already 12% lower than 1990 levels, so reductions relative to 2001 levels (the most recent data available) are projected to be a modest 5% by 2010 and 9% by 2015 (see Table 1).

There is a similar story with regards to sulphur dioxide reductions, at least with regard to pre-2015 reductions (see Table 2). Current emissions of SO₂ for non-ferrous smelters were already 84 kilotonnes below the former SO₂ cap of 365 kilotonnes. So if we use actual emissions rather than regulated limits, then SO₂ emissions are only required to be reduced by 13% relative to current levels in the 2010 – 2014 period. A larger cut (51%) is required by 2015, in line with the recommendations of the Acidifying Emissions Task Group in 1997.

In summary, the majority of the proposed emission reductions have already been achieved and the 'tough' new targets actually envision a slower rate of improvement than what has occurred since 1990 (with the exception of the more substantial post 2015 reductions in SO₂). This represents a major lost opportunity, and the proposed IERP does not incorporate any incentive to reduce beyond the level of these caps.

Recommendation:

Lower the caps by reducing the quantity of emission allowances to ensure that industry does its fair share to fight smog and acid rain.

Table 1: NO_x emissions cap proposed by MOE June 21/04 (all figures in kilotonnes)

Sector	1990	2001	Proposed Emission Budgets			
			2006	2007-09	2010-14	2015+
Petroleum	14.4	10.4 (-28% from '90)	11.9	11.0	10.2 (-2% from '01) (-29% from '90)	10.2
Iron & Steel	15.7	12.7 (-19% from '90)	12.8	11.8	10.9 (-14% from '01) (-31% from '90)	10.9
Pulp & Paper	8.9	6.8 (-24% from '90)	6.9	6.5	6.2 (-9% from '01) (-30% from '90)	6.2
Glass	2.1	2.1	2.1	2.0	1.8 (-14% from '01 & '90)	1.8
Cement	17.9	19.7 (+10% from '90)	20.3	18.6	16.9 (-14% from '01) (-5.5% from '90)	14.8 (-17% from '90) (-25% from '01)
New Source Set Aside			3.1	3.1	3.1	3.1
Total	59	51.7 (-12% from '90)	57.1 (-3% from '90) (+10% from '01)	52.9 (-10% from '90) (+2% from '01)	49.0 (-17% from '90) (-5% from '01)	46.9 (-21% from '90) (-9% from '01)

Table 2: SO₂ Emission Caps proposed by MOE June 21/04 (all figures kilotonnes)

Sector	1990	2001	Proposed Emissions Budgets			
			2006	2007-09	2010-14	2015+
Petroleum	57.0	58.7 (+3% from '90)	54.8	44.8	34.9 (-39% from '90) (-41% from '01)	34.9
Iron & Steel	38.7	18.5 (-52% from '90)	19.0	17.8	17.2 (-56% from '90) (-7% from '01)	17.2
Pulp & paper	9.1	7.5 (-18% from '90)	7.6	6.6	5.8 (-36% from '90) (-23% from '01)	5.8
Cement	16.6	21.0 (+27% from '90)	22.2	21.2	19.6 (+18% from '90) (-7% from '01)	15.7 (-5% from '90) (-25% from '01)
Carbon Black	11.0	9.5 (-14% from '90)	11.0	10.4	10.7 (-3% from '90) (+13% from '01)	10.7
Subtotal w/out smelters	132.4	115.2 (-13% from '90)	114.6	100.8 (-24% from '90)	88.2 (-33% from '90) (-23% from '01)	84.3 (-36% from '90) (-27% from '01)
Non-ferrous smelting	365 (regulated cap)	281 ² (-23% from 1990 cap)	331 (-9% from '90) (+18% from '01)	241 (-34% from '90) (-14% from '01)	241 (-34% from '90) (-14% from '01)	91 (-75% from '90) (-68% from '01)
New Source Set Aside			17.1	17.1	17.1	17.1
Total	497.4	396.2 (-20% from '90)	462.8 (-7% from '90) (+16% from '01)	359.1 (-28% from '90) (-9% from '01)	346.3 (-30% from '90) (-13% from '01)	192.4 (-61% from '90) (-51% from '01)

² In 1985, under the Countdown Acid Rain program, non-ferrous smelters had their SO₂ emissions capped (265 kilotonnes for Inco and 100 kt for Falconbridge). In the IERP background document, this regulated limit is included in the table as their regulated limit for 2001, but according to Environment Canada's National Pollution Release Inventory actual emissions in 2001 from Inco only 242.7 kt and 38.3 kt for Falconbridge. The 281 kt actual emissions are used here rather than the 365 kt regulatory cap in order to give a more accurate picture of environmental improvement.

Emissions Allowances and the Emissions Trading System

Emission allowances are 'permits to pollute', i.e. they entitle the corporation who owns them to release harmful substances into our environment that cause smog and acid rain. As such, they represent a valuable public resource. While it is difficult to predict what the price of NO_x in Ontario would be in advance of seeing the final market design and how integrated it is with the U.S. trading program, these credits are extremely valuable. Given that the 2004 price of NO_x in the U.S. northeast under the NO_x-SIP Call trading system has averaged Cdn\$3,915/tonne,³ the 57,100 tonnes allocated for 2006 would be worth over \$200 million if they were all sold at that price.

There is also an indirect, but very real, cost associated with these allowances. Because they represent the legal right to pollute the air with contaminants that cause smog, acid rain and climate change, there are significant environmental and health costs associated with their use. The Ontario Medical Association has estimated that the direct health and economic costs of ground-level ozone and particulate matter (for which NO_x and SO₂ are the primary precursors) are in excess of \$1 billion per year.⁴ The industrial sectors capped under this program are also responsible for the majority of acid-rain causing emissions, which damage vegetation and aquatic habitats.

Furthermore, some environmentalists object to the transformation of environmental values (healthy eco-systems, clean air) into economic values (dollars), for this means that decisions will be made through the market by those who have the most money (corporations) rather than by those who are affected by pollution based on democratic decision-making processes.

Yet these allowances are to be distributed free of charge, based on historical levels of emissions. In effect, they are a transfer of current and future environmental values to industrial polluters. There is also a large quantity of emissions allowances 'set-aside' for distribution to new facilities or the expansion of existing facilities (6% of current NO_x emissions and 4% of current SO₂ emissions are 'set-aside' in 2010, and these will be increased if existing plants shut down as the closed plant's allowances are added to the 'set-aside' allocation).

In discussions on the national greenhouse gas trading program, environmentalists pushed for the emissions allowances to be distributed via auction rather than given away for free. The money collected under such a system can be used to finance the regulatory system required to monitor emissions trading and other environmental programs. The auctioning of allowances also provides an economic incentive to go beyond the minimum. In response, the federal government has proposed allocating 85% of the greenhouse gas emission

Recommendation:

Auction some or all of the emissions allowances in order to generate revenues to fund monitoring and environmental improvements, while creating an economic incentive for polluters to reduce beyond their maximum allowable emission levels.

³ Source: www.emissionstrading.com. The number has been converted to Canadian dollars and metric tones.

⁴ Ontario Medical Association, Illness Cost of Air Pollution (2000).

allowances in its national GHG emissions trading system for free, and auctioning the remaining 15%.

Yet in contrast to smog and acid rain-forming gases like NO_x and SO_2 , greenhouse gas emissions do not have any local impacts – they are dispersed around the globe. Allowing for emissions trading in pollutants with local impacts can create highly localized ‘hot zones’, also known as ‘sacrifice zones’ where contamination is concentrated in one location and that population and ecosystem faces an unfair burden of illness.

Given the local health impact of NO_x and SO_2 – and the generous allowances available to industry – there is no compelling reason to allow for emissions trading in smog-forming pollutants. By auctioning allowances, the government can create an economic incentive to reduce pollution levels below the capped levels, while ensuring that caps are not exceeded.

If, however, the government does proceed with an emissions trading system for smog precursor gases, then at the very least it should address the loopholes in the emissions trading rules.

Recommendation

Prohibit the trading of emissions allowances or credits for smog precursor gases.

Loopholes in the Emissions Trading System for NO_x and SO_2

There are a number of ‘loopholes’ in the emissions trading system that should be closed if the government chooses – contrary to the recommendation above – to proceed with emissions trading for NO_x and SO_2 .

The major weakness of the proposed IERP is related to the extension of the emissions trading developed for the electricity sector to the other industrial sectors. In 2000, the U.S. and Canadian federal governments negotiated an Ozone Annex to the Canada-U.S. Great Lakes Air Quality Agreement that place limits on NO_x emissions from the electricity sector in Ontario and the U.S. northeast.

In 2001, the previous government of Ontario adopted a hybrid emissions trading system which capped emissions from electricity generators, but allowed them to trade with the un-capped sectors who could create ‘emissions credits’. This system was adopted in an attempt to comply with the requirements of the Ozone Annex. In essence, this trading system was designed to allow Ontario to continue operating its coal-fired electricity generating stations. It allocated generous NO_x and SO_2 allowances to the electricity sector (see Table 3 below) on the assumption that the coal plants would continue to operate with some end-of-pipe technology put in place to ‘scrub’ out the capped pollutants (while increasing emissions of other pollutants such as mercury and carbon dioxide); if the scrubbers weren’t enough, Ontario Power Generation (or successor companies) would be able to buy ‘credits’ from the un-capped sectors.

Both Environment Canada and the U.S. Environmental Protection Agency objected to Ontario’s proposed emissions trading system because it allowed the capped sector (electricity generators) to trade with uncapped sectors (industrial and mobile sources),

hence electricity generators could exceed their cap. In response, the Ontario government limited electricity producers exceeding their cap by more than 33% due to trading. This solution was also criticized by the U.S. EPA and Environment Canada, as well as numerous Ontario environmental groups, as inconsistent with the goals of the Ozone Annex.

However, the new government's commitment to phase out Ontario's coal-fired electricity generators by 2007 has dramatically altered the terrain for the emissions trading system. In 2001, Ontario Power Generation emitted 44.6 kilotonnes of NO_x and 149 kilotonnes of SO₂, with the vast majority of these emissions coming from its five coal plants. Under the existing trading rules, the electricity sector will be allocated 28 kilotonnes of NO_x emissions allowances starting in 2007 and 131 kilotonnes of SO₂ allowances, so the sector would have to either reduce NO_x emissions by 16.6 kilotonnes and SO₂ emissions by 18 kilotonnes, or purchase a corresponding amount of emission credits from the uncapped sector (up to a maximum of 37 kilotonnes NO_x and 174 kilotonnes SO₂).

If the coal plants are phased out, however, emissions of NO_x and SO₂ will be dramatically reduced. If the output from the coal plants are replaced through energy conservation and renewables, then all of these allowances (28 kilotonnes NO_x and 131 kilotonnes SO₂) will be available to be sold. If the plants are replaced by high-efficiency gas, then NO_x emissions should be cut by approximately 90% while SO₂ emissions would be virtually eliminated. In either scenario, the unused allowances that would potentially be available dwarf the reduction requirements placed upon the other industrial sectors through the proposed Industrial Emissions Reduction Plan (see Table 3).

Table 3: The Impact of the Coal Phase-out on Emissions Trading

		Emissions Allocations to Electricity Sector	Estimated Electricity Sector Emissions (without coal plants)	Emission Credits Available to be Sold if Coal Plants are Closed	Credits needed by other Ontario Industry to meet proposed IERP caps ⁵
2007	NO _x	28	5	23	1.2
	SO ₂	131	0	131	37.1
2010	NO _x	28	5	23	2.7
	SO ₂	131	0	131	49.9

Even if Ontario industry doesn't purchase all of these credits, they could potentially be sold to U.S. polluters, as the government has signaled its intention to integrate the Ontario trading system with the U.S. system.

This loophole in the trading system undercuts the environmental and health benefits anticipated from the coal phase-out announcement, as pollution reductions from the electricity sector could result in increases in other sectors or in upwind U.S. states. It is however, easily closed for the policy decision to phase out coal means there is no compelling reason to maintain an emissions trading system for the electricity sector, and a very compelling reason to eliminate it.

Another loophole in the emissions trading system is the ability of the capped sectors to trade with the uncapped sectors, thereby increasing real emissions from the 'capped'

⁵ These numbers are calculated from the data in Table 1 and 2 above by subtracting the proposed caps from current emissions.

sectors above their nominal cap. The concerns raised by Environment Canada and the EPA related to emissions credit trading and the Ozone Annex were identified above. But environmentalists have been particularly critical of emissions credit trading because there is no absolute limit on emissions, and the credit creation system is particularly vulnerable to abuse. This vulnerability is due to the fact that corporations are buying and selling something that doesn't exist, i.e. emissions that would have happened (but didn't) because of some action that they took, which they wouldn't have taken anyway.

And there are lots of uncapped sources who could create and sell credits. In Ontario, not all industrial sources are capped; for example, the chemical sector emitted 11 kilotonnes of NO_x and 'other industry' emitted 24 kilotonnes of NO_x in 1999, but aren't capped.⁶ Programs which reduce pollution from vehicles (e.g. Car Heaven) could also conceivably aggregate emissions reductions and sell them to industrial sources as emissions credits.

Nor is the creation of credits limited to Ontario sources. The trading rules allow emitters in the 12 key states named in the Ozone Annex (New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Kentucky, Ohio, Michigan, Indiana, Illinois, Wisconsin) to create credits and sell them to Ontario's capped sectors. While it is true that downwind sources do affect Ontarians, the government of Ontario should not be creating a system whereby action in Ontario (such as the coal phase-out) allows downwind polluters to increase emissions, which appears to be the policy goal of the Ontario government. In any case, it will be very difficult to verify whether these 'credits' represent real emissions reductions that go beyond business-as-usual, and even if they are real reductions in pollution, their beneficial effect is eliminated by allowing them to be sold as credits which simply result in increased emissions from Ontario's capped sectors.

If capped entities are allowed to trade allowances, there is still a need to address problems of local loading (i.e. 'hot' or 'sacrifice' zones where pollution is concentrated in one area because local sources are buying credits from sources further away). The trading system must have in place mechanisms to address situations where local air quality is unacceptable and to prevent degradation of existing good air quality via trading.

Recommendations:

1. No emissions trading (the preferred option).
2. If there is emissions trading:
 - Remove the electricity sector from the trading system and specify instead that all new electricity generators must achieve emissions levels per megawatt hour equal to or less than those from best available high-efficiency natural gas technology.
 - Eliminate the creation of emissions credits from uncapped sources.
 - Limit the rest of the trading system to Ontario-based sources (i.e. no international or interprovincial trading).
 - Include mechanisms to protect local air quality from adverse impacts of trading.

⁶ Government of Ontario, *Ontario's Anti-Smog Action Plan: Progress Through Partnership* (2002), p. 62.

The Clean Air Plan and Climate Change

The major source of NO_x, SO₂, VOCs and greenhouse gases is the burning of fossil fuels in our homes, factories, electricity generating stations and vehicles. Measures which reduce emissions of NO_x and SO₂ will reduce greenhouse gas emissions directly (as ozone levels are reduced) and hopefully indirectly (as more efficient boilers and motors reduce fuel consumption and hence carbon dioxide emissions).

Measures which reduce one pollutant by installing an end-of-pipe solution like SO₂ or NO_x scrubbers may actually increase greenhouse gas emissions as the overall fuel efficiency of the plant is reduced (i.e. more fuel is burnt to achieve the same level of production because energy is required to operate the scrubber). In developing air pollution reduction plans, corporations and governments should seek to promote measures which reduce multiple pollutants rather than one at the expense of all the others.

In particular, it is important to close the emissions trading loophole related to the coal phase-out. Otherwise, the greenhouse gas benefits from reducing coal use in electricity plants may be undercut as emissions (including greenhouse gases) rise in other sectors, particularly if emissions credits are traded to U.S. coal plants which face limits for NO_x and SO₂ but not for carbon dioxide and hence could increase production.