First International Symposium on Adverse Health Effects from Wind Turbines

The Global Wind Industry and Adverse Health Effects: Loss of Social Justice?

Picton, Prince Edward County, Ontario, Canada

October 29-31, 2010

Session VI

Social Marketing - Disinformation

Abstract and bio on slide 2 is reproduced from the Symposium Program

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Picton, Prince Edward County, Ontario, Canada

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Ross McKitrick, Ph.D. –

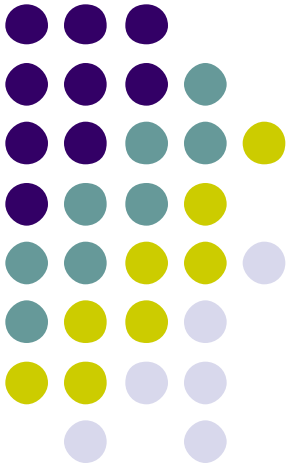
COAL KILLS: WHERE ARE THE BODIES?

Abstract: This presentation will look at the evidence regarding the health effects of coal-fired power generation in Ontario. The Ontario government maintains that the risk is large enough to necessitate shutting down the two major coal-fired generating stations in Southern Ontario and replacing them with, among other things, wind turbine installations. I will explain the nature of the Lambton and Nanticoke generating facilities and the network of thermal power plants in the northeast corridor of which they are a part. I will also explain their air pollution control features and the potential effects on Southern Ontario air quality from eliminating these plants, as estimated in the province's own cost-benefit analysis. I will then discuss observed air pollution trends in Ontario since the 1960s and show that the claims that current air pollution levels result in thousands of cases of illness and death are not supported in up-to-date, peer-reviewed literature.

Bio: Dr. McKitrick is a Canadian economist specializing in environmental economics and policy analysis. He is professor of economics at the University of Guelph; a senior fellow of the Fraser Institute, a Canadian free market public policy think tank. He is the author of Economic Analysis of Environmental Policy (2010) McKitrick gained his doctorate in economics in 1996 from the University of British Columbia, and in the same year was appointed Assistant Professor in the Department of Economics at the University of Guelph. In 2001 he received an Associate Professorship and has been a full Professor since December 2008. He has since published research on palaeoclimate reconstruction, including co-authoring "Corrections to the Mann et al (1998) Proxy Data Base and Northern Hemisphere Average Temperature Series" and "Hockey Sticks, Principal Components and Spurious Significance" with Stephen McIntyre. He continues to publish research in economics, usually in the area of environmental policy.

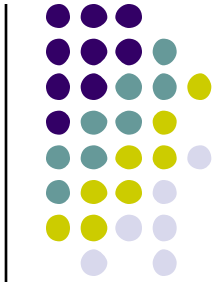
The case against the case against conventional energy

Ross McKitrick, Ph.D.
Professor of Economics
University of Guelph



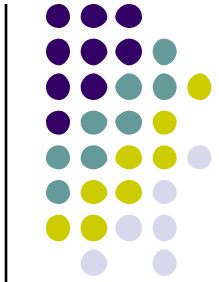
Presented to
1st International Symposium
October 31 2010, Picton, Ontario

The case against conventional energy



- Air pollution from coal-burning power plants is getting worse and worse
- Power plant emissions cause thousands of cases of illness and death each year in Ontario
- Cutting carbon emissions from power plants is necessary to stop global warming
- We can create jobs and economic growth by developing the green energy sector

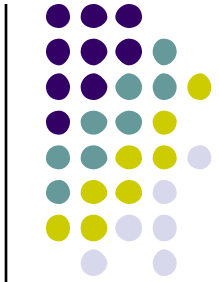
A general principle from economics



- Force the proponent to clarify what they are concerned about.
  - Presumably we are not interested in wind energy for its own sake.
  - What are you *really* interested in? – let's target that directly
- If it's air pollution, we regulate air pollution
- If it's greenhouse gases, we can regulate GHG's too
- If it's economic growth, we already try to promote that
  - But in none of these cases does the *stated* concern lead to the conclusion that we should pursue wind energy

Presented at the First International Symposium on Adverse Health Effects from Wind Turbines - October 29-31, 2010

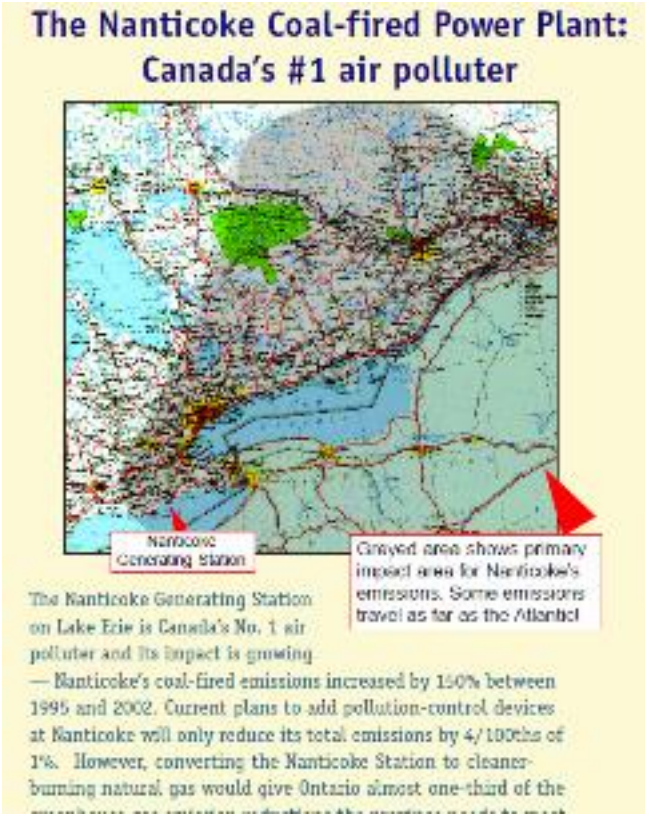
A general principle from economics



- In particular:
  - Air pollution has fallen dramatically in Ontario since the 1960s via regulation and emission control technology.
  - Even if power plants had to fully offset GHG emissions they would not resort to wind or solar energy as a compliance strategy.
  - Wind energy subsidies and F-I-T's do not create jobs, they destroy them through higher energy prices and higher taxes.
- Therefore, if these are your concerns, wind energy is not a solution.
- The only people who want to push wind energy for its own sake are those who expect to profit from it.

Air pollution from coal-burning power plants is getting worse and worse

- Nanticoke “coal-fired emissions” rose 150% from 1995-2002: OCAA



Power plant emissions cause thousands of cases of illness and death each year in Ontario

- 1,900 deaths per year from air pollution; 9,800 hospital admissions: OMA

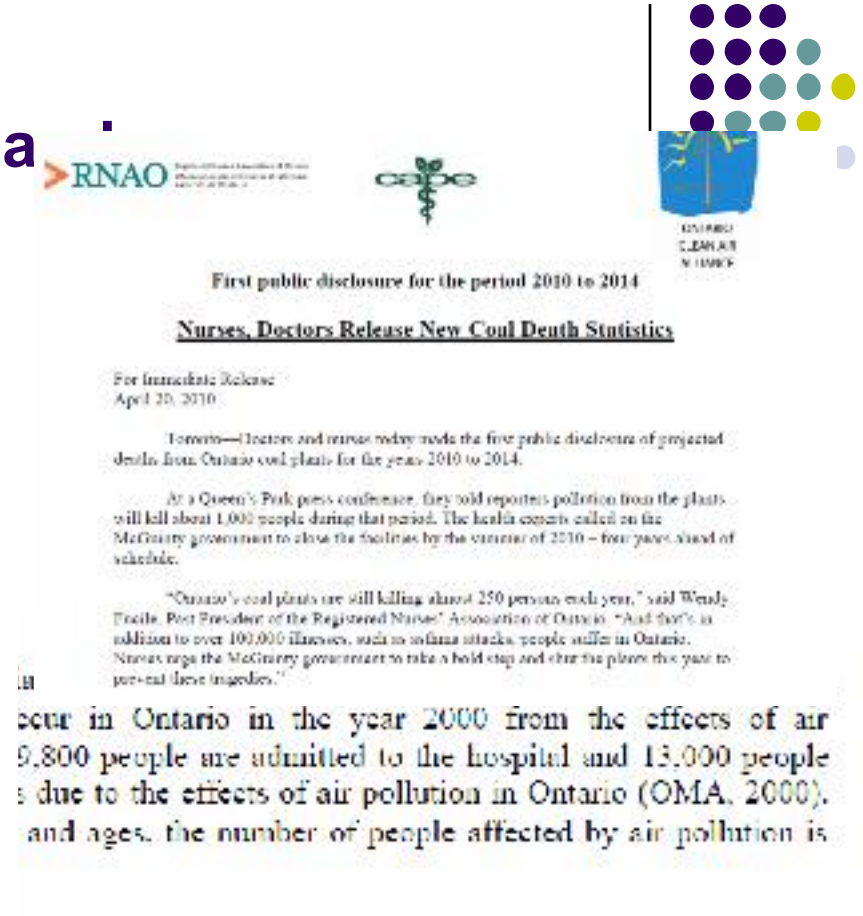
-

-

The Ontario Medical Association recently estimated that approximately 1,900 premature deaths were expected to occur in Ontario in the year 2000 from the effects of air pollution. Annually, about 9,800 people are admitted to the hospital and 13,000 people make emergency room visits due to the effects of air pollution in Ontario (OMA, 2000). As our population increases and ages, the number of people affected by air pollution is also expected to increase.

Power plant emissions cause thousands of cases of illness a . death each year in Ontario

- 1,900 deaths per year from air pollution; 9,800 hospital admissions: OMA
- 250 deaths from coal-plants annually: RNAO
-



RNAO

First public disclosure for the period 2010 to 2014

Nurses, Doctors Release New Coal Death Statistics

For Immediate Release
April 20, 2010

Toronto—Doctors and nurses today made the first public disclosure of projected deaths from Ontario coal plants for the years 2010 to 2014.

At a Queen's Park press conference, they told reporters pollution from the plants will kill about 1,000 people during that period. The health experts called on the McGuinty government to close the facilities by the summer of 2010 – four years ahead of schedule.

"Ontario's coal plants are still killing almost 250 persons each year," said Wendy Fraser, Past President of the Registered Nurses' Association of Ontario. "And that's in addition to over 100,000 illnesses, such as asthma attacks, people suffer in Ontario. Nurses urge the McGuinty government to take a bold step and close the plants this year to prevent these tragedies."

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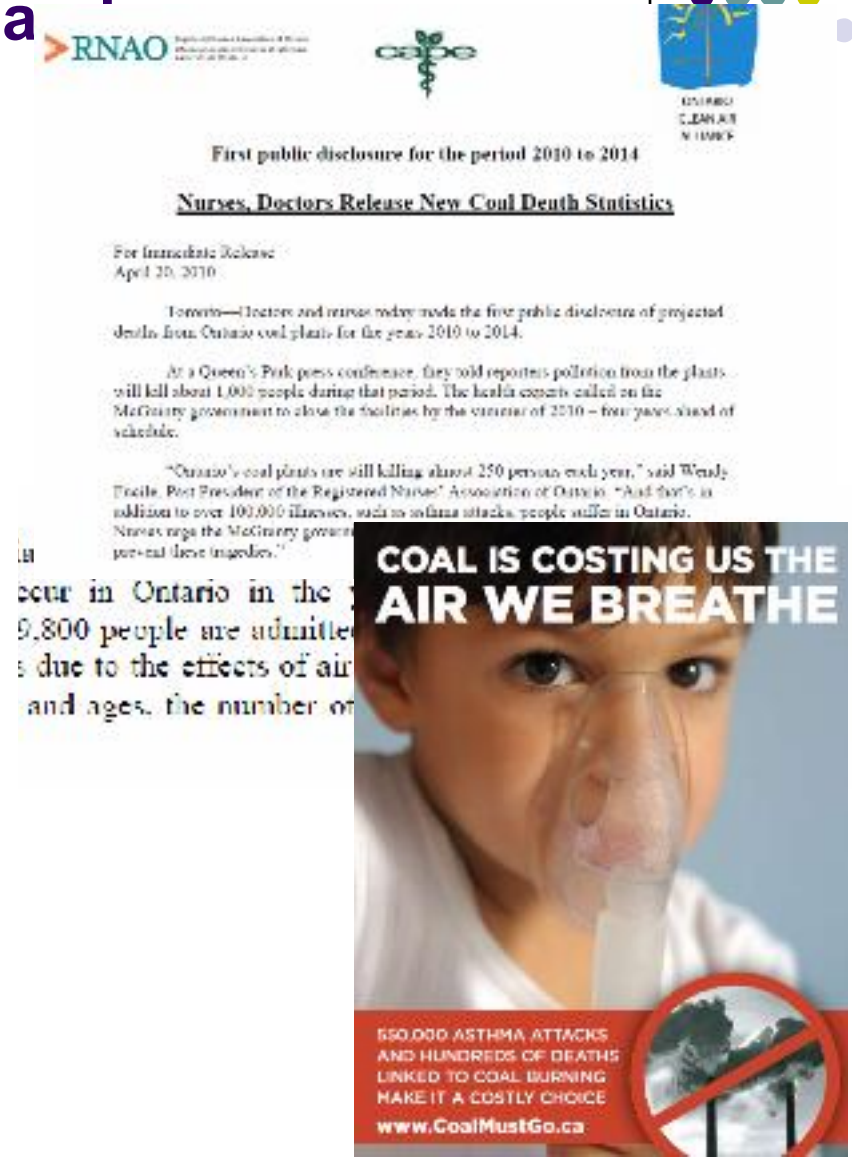
Power plant emissions cause thousands of cases of illness a death each year in Ontario

- 1,900 deaths per year from air pollution; 9,800 hospital admissions: OMA
- 250 deaths from coal-plants annually: RNAO
- 550,000 Asthma attacks and hundreds of deaths: OCAA



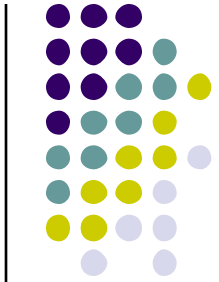
Cutting carbon emissions from power plants is necessary to stop global warming

- OCAA

Other arguments

- Green energy creates jobs

Topic 1: Air pollution

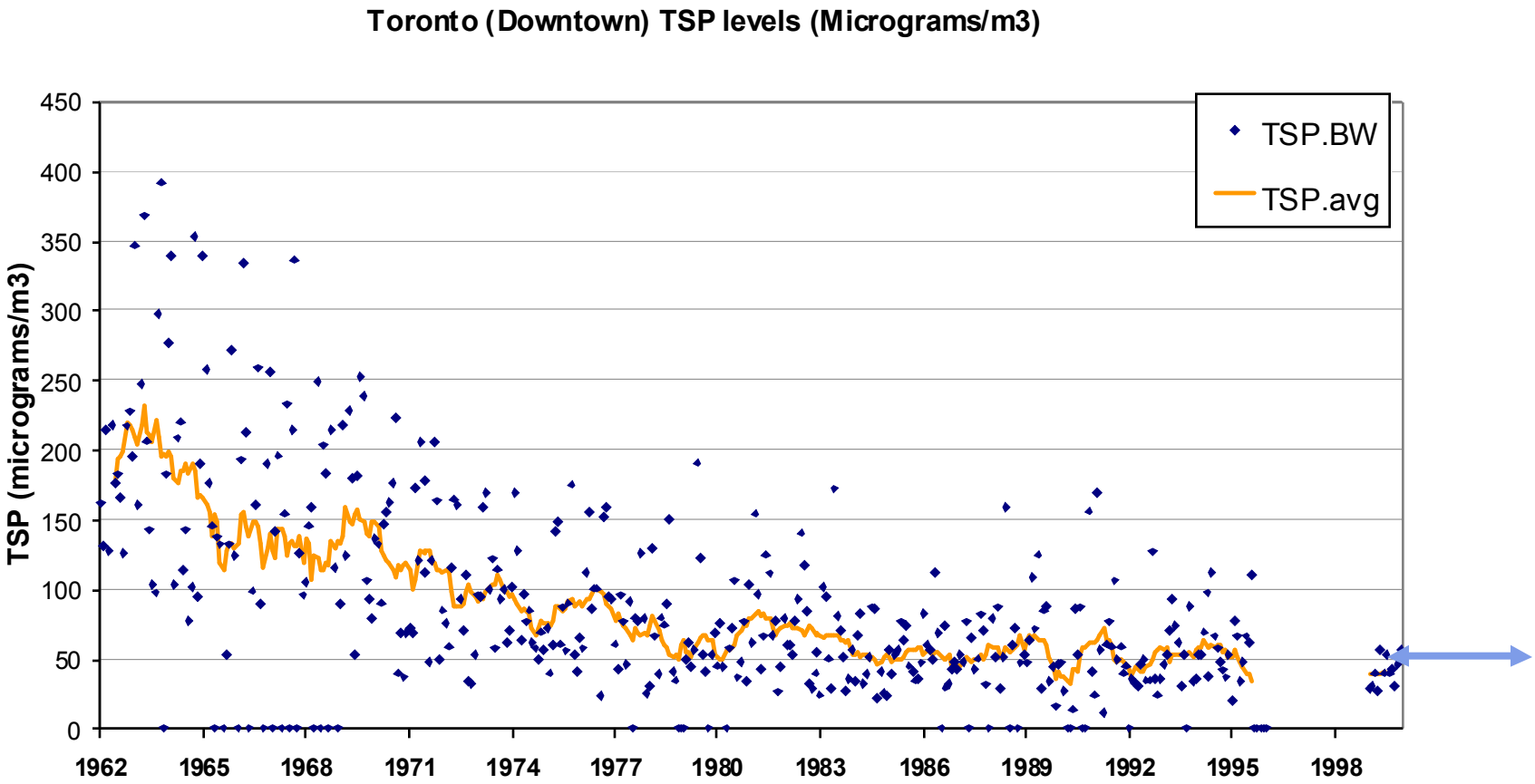


- Air pollution in Ontario has been falling, not rising, for decades.

Toronto Air Pollution Trends

- Notes:
  - Data from NAPS stations at
    - Bay & Wellesley (BW)
    - Queensway & Hurontario (QH)
    - Lawrence and Kennedy (LK)
  - Monthly averages + 12-month MA
  - Pre-1974 data from Ontario MOE
  - NAAQS Lowest Desirable Standard

Toronto Air Pollution Trends



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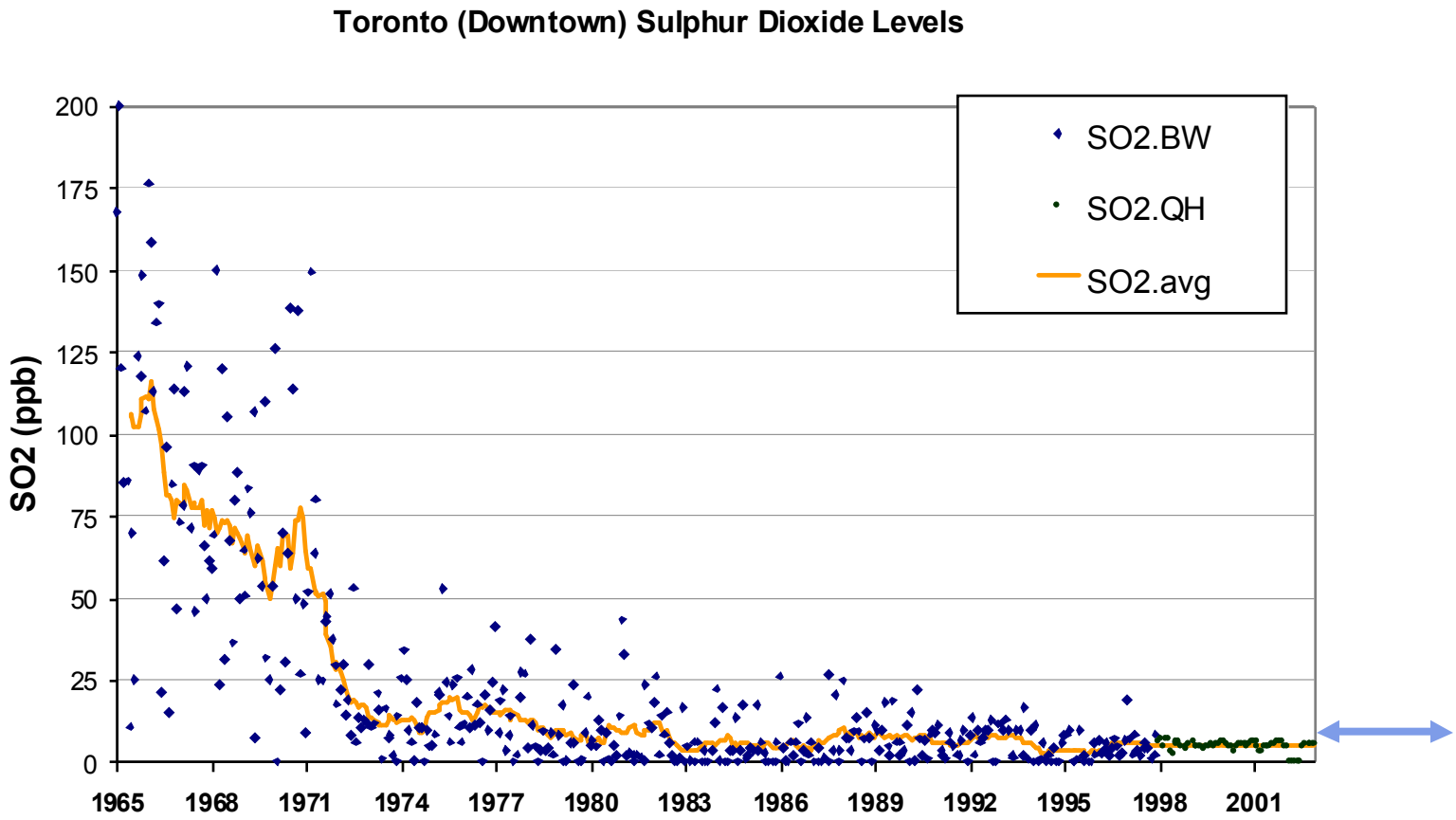

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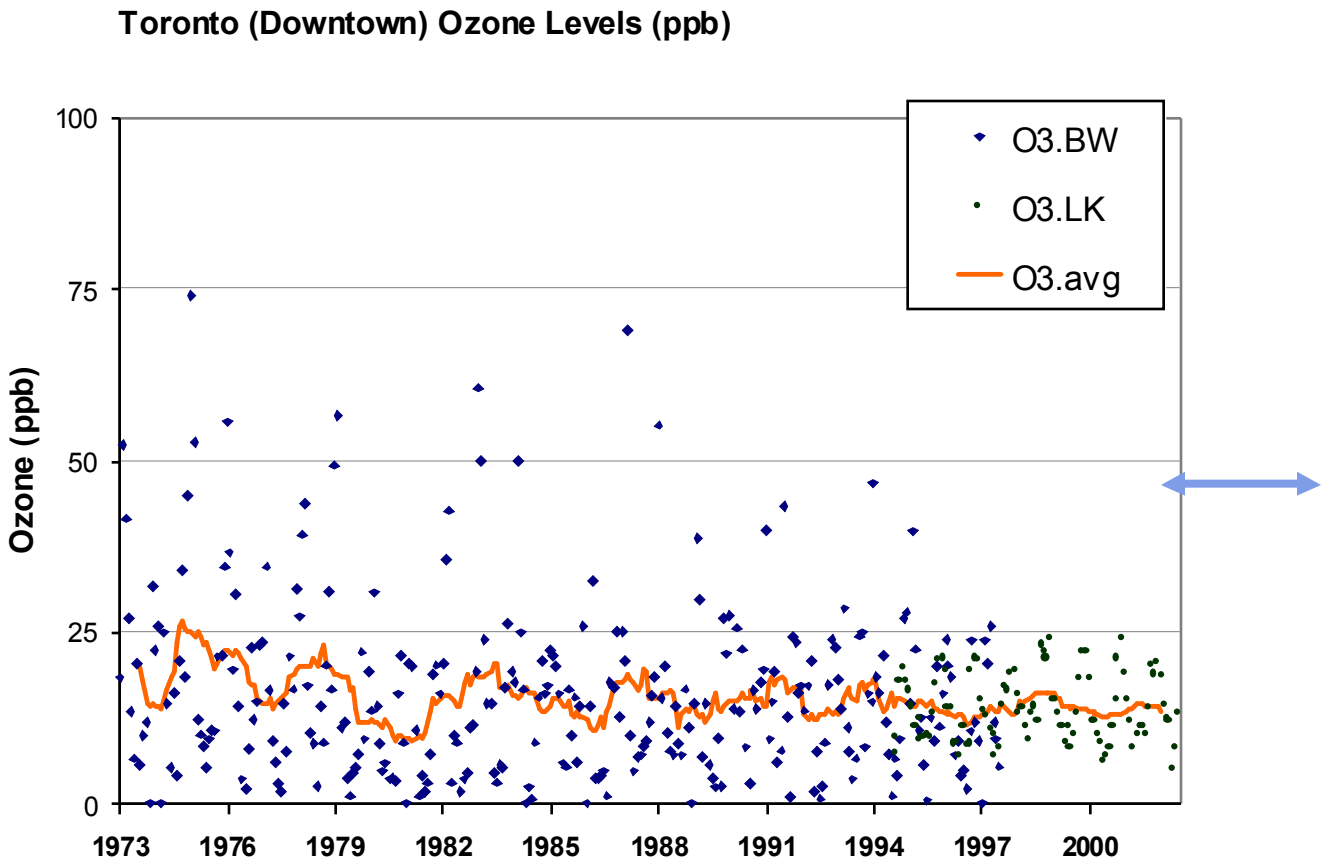

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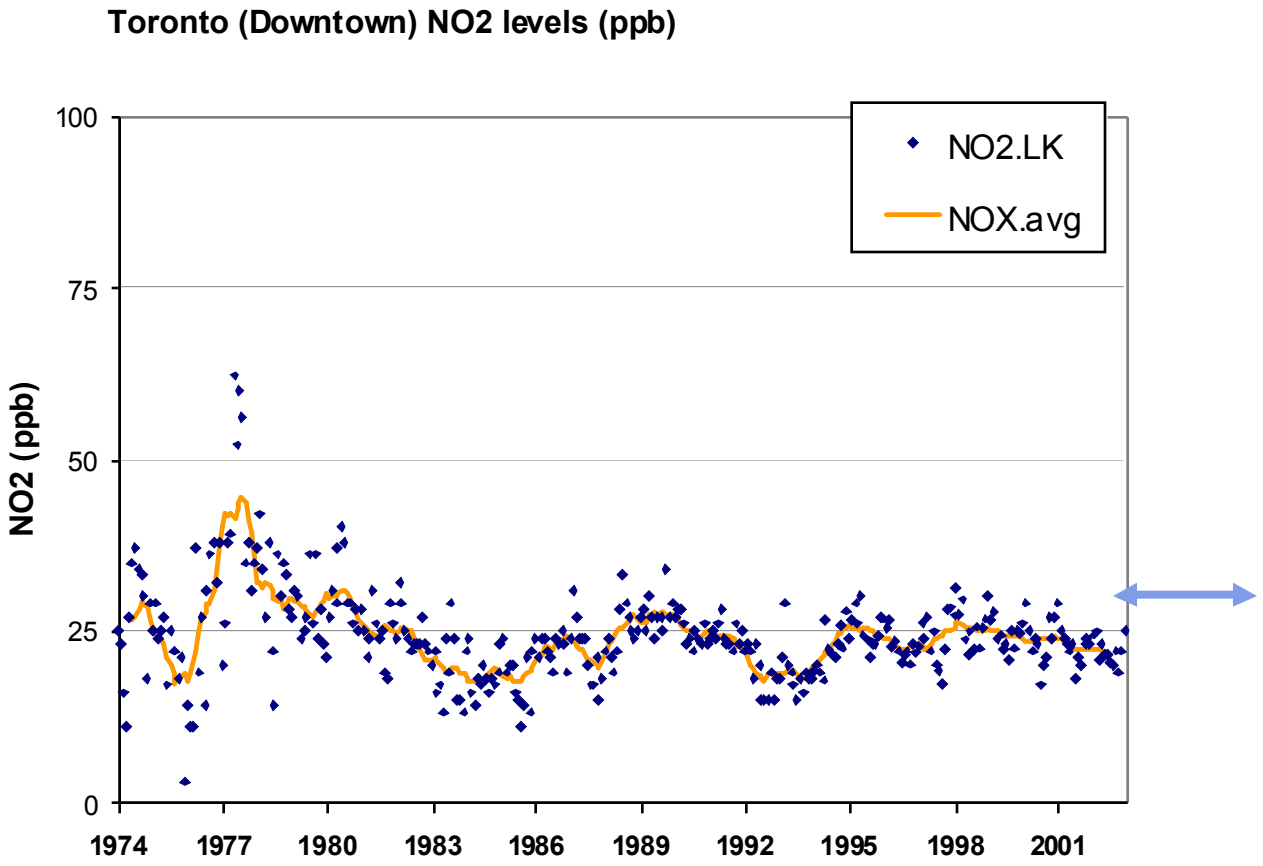


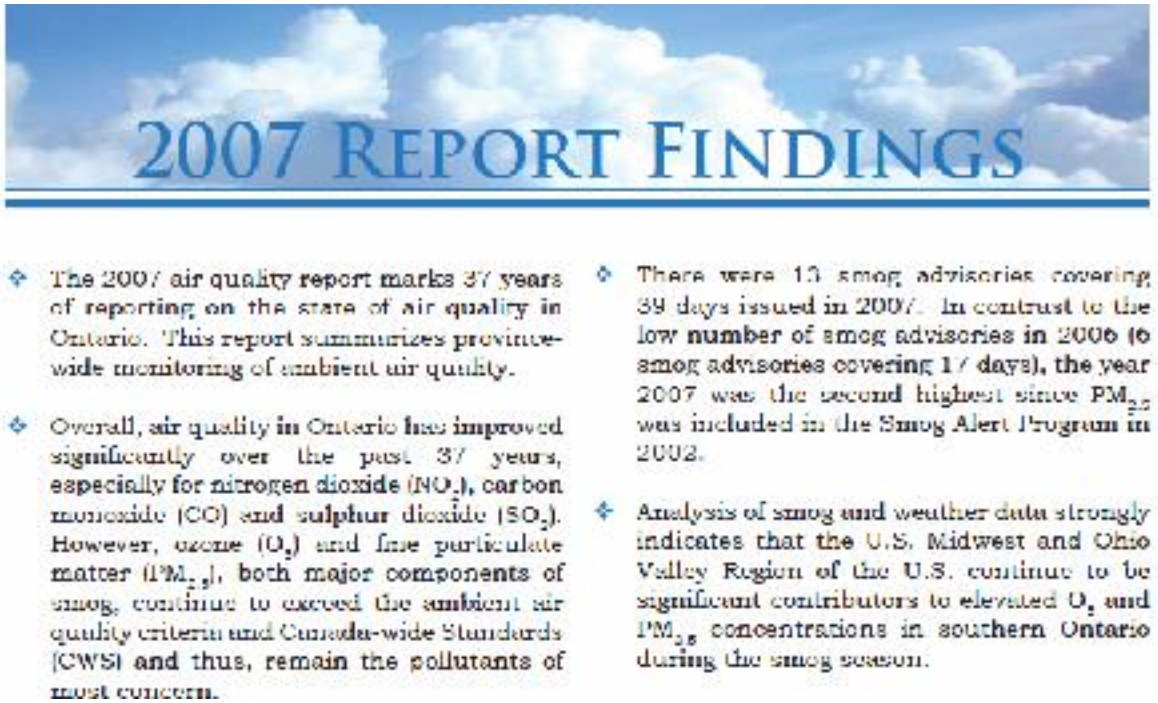
“We never had this many smog warnings when I was growing up”

“We never had this many smog warnings when I was growing up”

- **That’s because we didn’t have the smog warning system when you were growing up!**
- But we still had smog
- AQI developed in early 1990s
  - AQI = maximum of 6 (scaled) contaminant readings
- Smog advisories only began in 1993
- System revised in August 2002 to include $PM_{2.5}$, to be triggered much more easily
- Had today’s system been in place in 1960s and 1970s, smog advisories would have been common all year; today’s would seem infrequent by comparison

Provincial Air Quality

- Air Quality in Ontario – annual report



2007 Report Findings

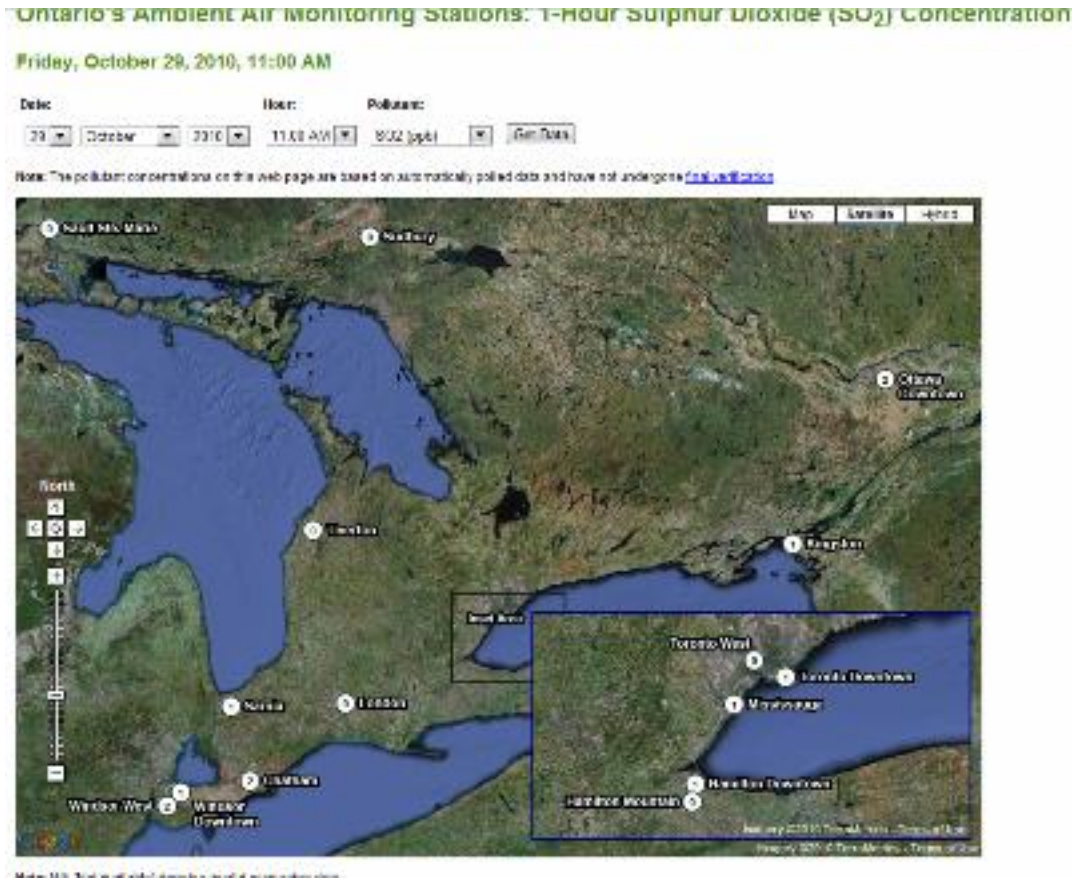
- The 2007 air quality report marks 37 years of reporting on the state of air quality in Ontario. This report summarizes province-wide monitoring of ambient air quality.
- Overall, air quality in Ontario has improved significantly over the past 37 years, especially for nitrogen dioxide (NO_2), carbon monoxide (CO) and sulphur dioxide (SO_2). However, ozone (O_3) and fine particulate matter ($PM_{2.5}$), both major components of smog, continue to exceed the ambient air quality criteria and Canada-wide Standards (CWS) and thus, remain the pollutants of most concern.
- There were 13 smog advisories covering 39 days issued in 2007. In contrast to the low number of smog advisories in 2006 (6 smog advisories covering 17 days), the year 2007 was the second highest since $PM_{2.5}$ was included in the Smog Alert Program in 2002.
- Analysis of smog and weather data strongly indicates that the U.S. Midwest and Ohio Valley Region of the U.S. continue to be significant contributors to elevated O_3 and $PM_{2.5}$ concentrations in southern Ontario during the smog season.

Airqualityontario.com

- AQI by city
- Detailed hourly readings
- Friday Oct 29 ➔

Airqualityontario.com

- Obtain by city or by map



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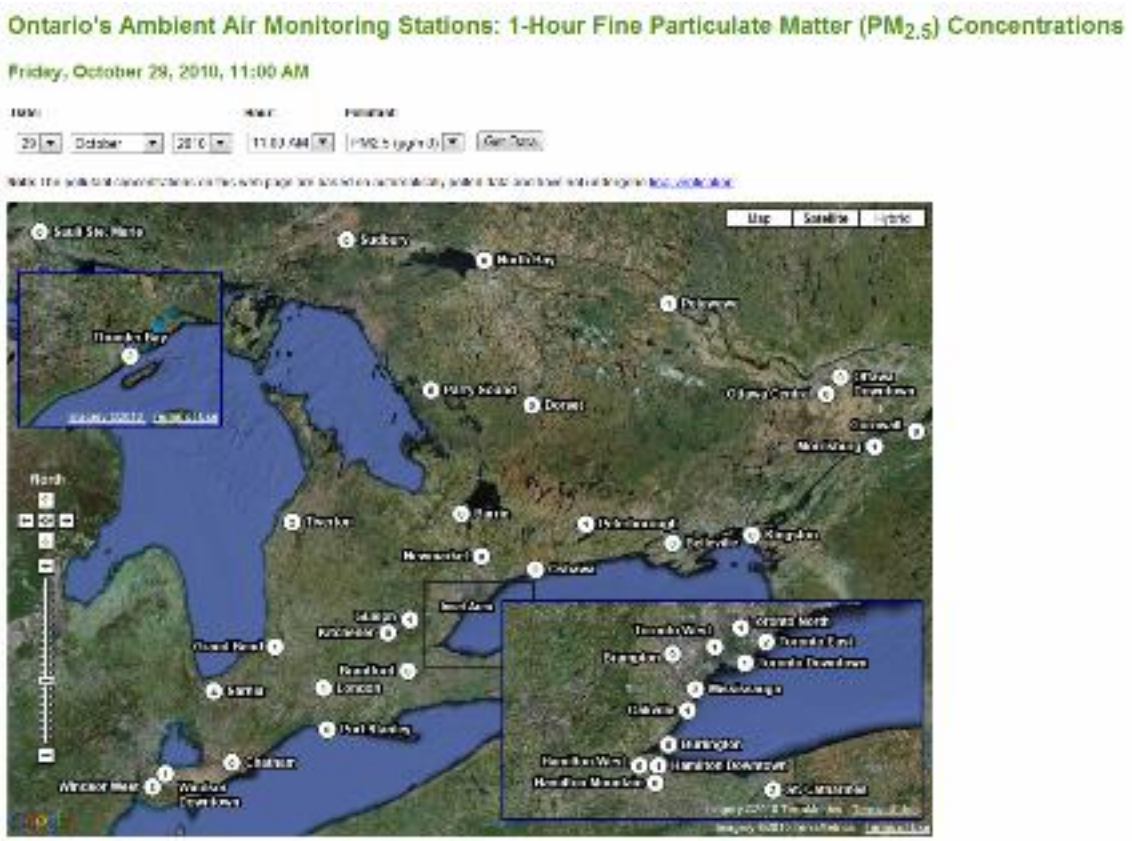

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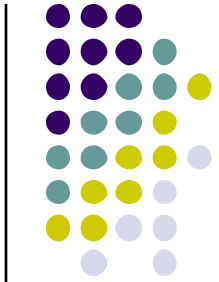
Closing the coal-fired power plants won't have a material effect on our air quality



- 2 problems:
  - Our only persistent issue is Ozone, which is not "emitted", it is a complex product of atmospheric processes and precursors
  - The precursors largely come from the US

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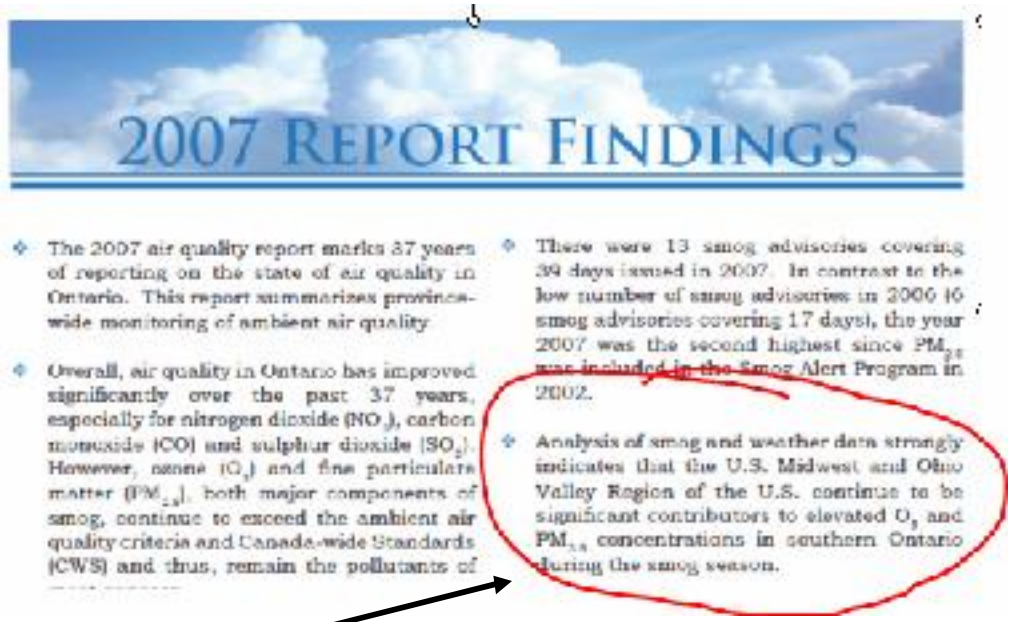

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US contributions to Ontario air pollution

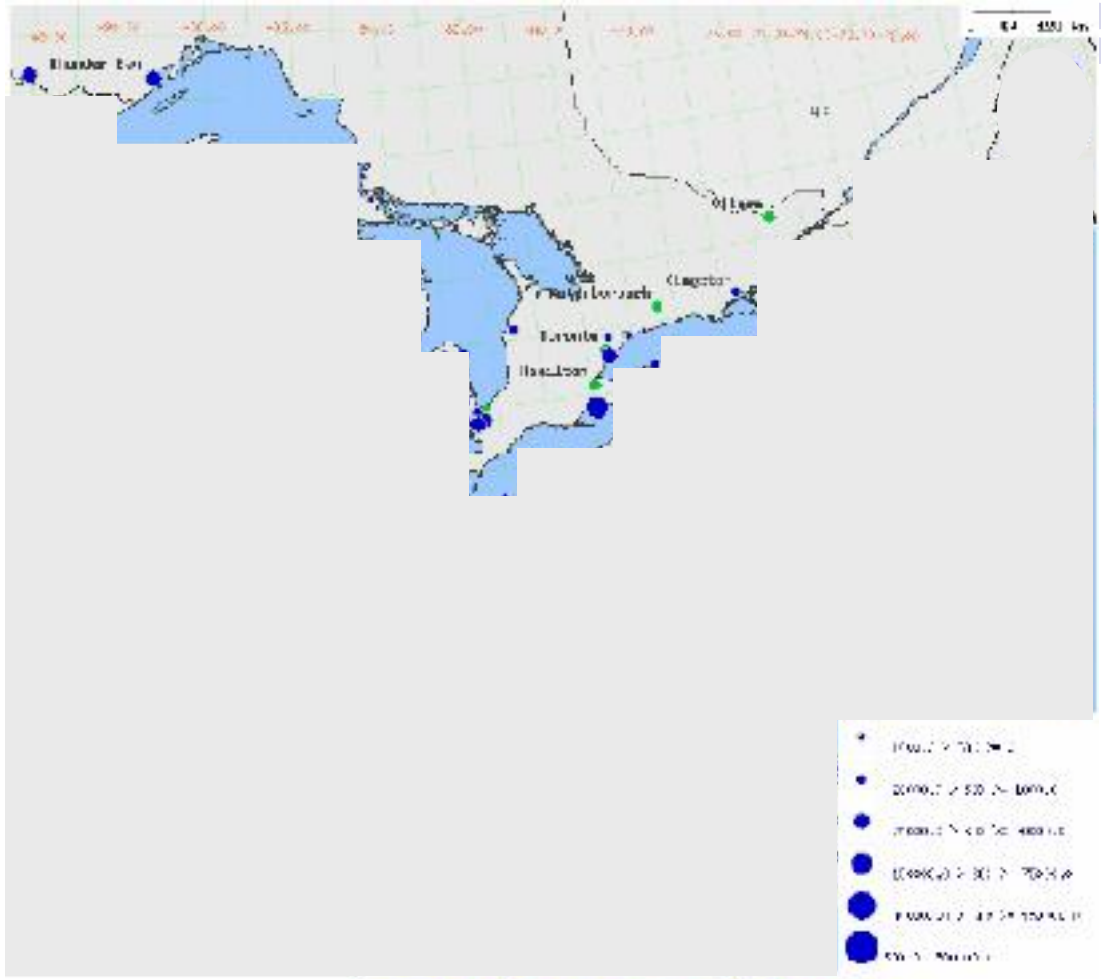

Figure A-4: Sulphur dioxide emissions from power plants shown as dots that vary in size according to their emission inventories
U.S. 1995 (with 2001 updates) and Canada 1999 Emission Inventories
(source: Ontario Ministry of the Environment)

From AQO 2005 appendix
http://www.ene.gov.on.ca/envision/techdocs/5158e_index.htm

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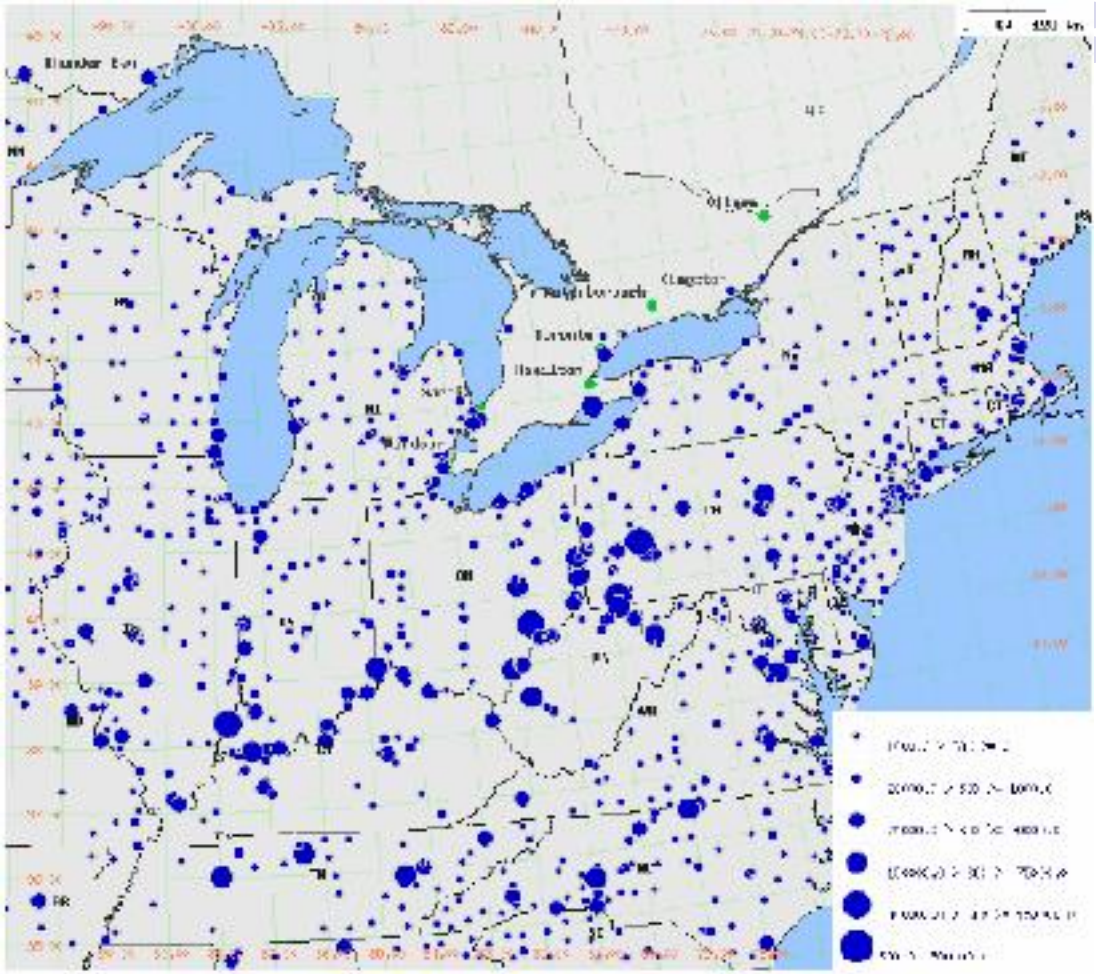

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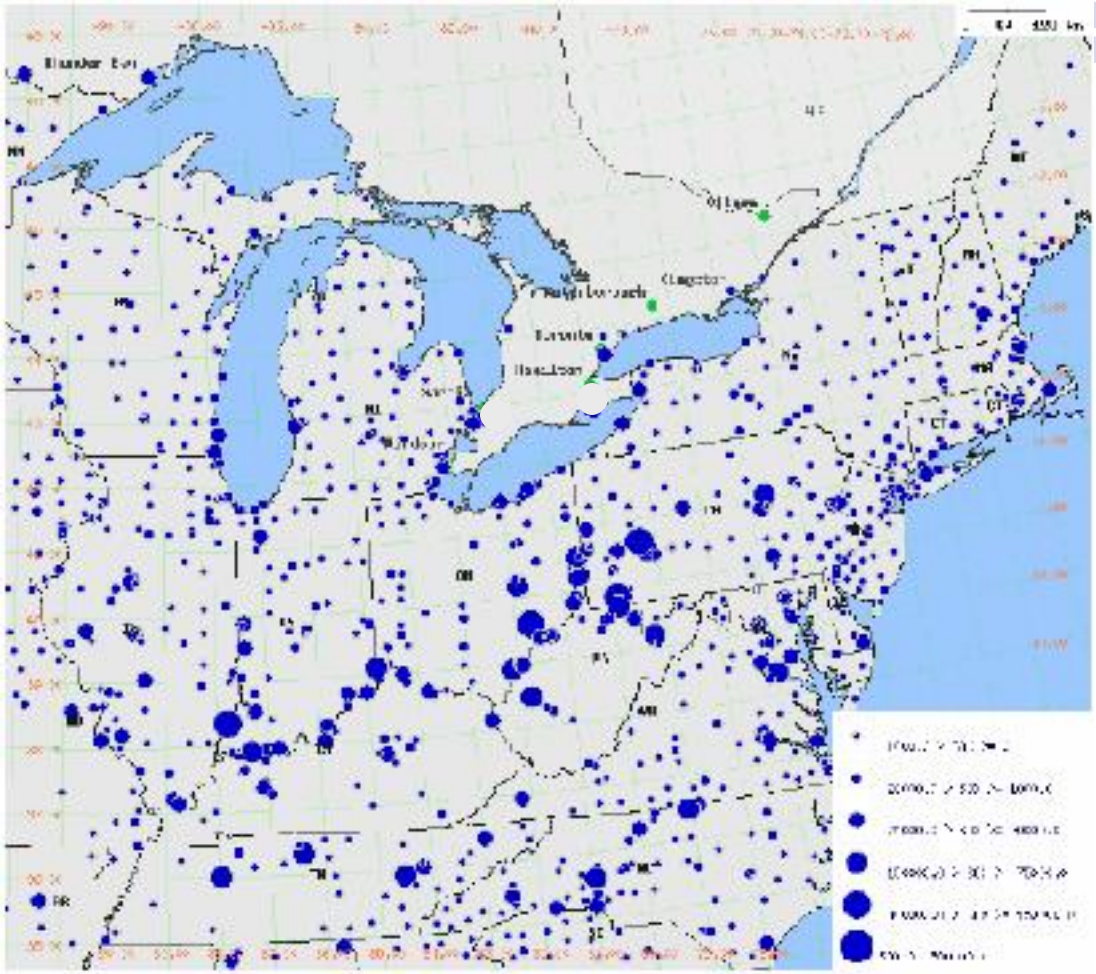
The effect of closing Lambton and Nanticoke



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2003, 2005 reports to Ontario government by RWDI Inc., on contribution of OPG to smog episodes

REGION	Approx Avg 1998 Average Concentrations		Base Case			
			Ozone		PM10	
	Ozone	PM10	DSS05	DSS03	DSS05	DSS03
Ottawa-Carleton RM	20	30	0.00	0.00	0.56	0.57
Durham RM			0.04	0.08	1.00	0.99
York RM			0.01	0.04	1.07	1.08
Toronto MM	20	40	0.03	0.07	1.12	1.12
Peel RM			0.01	0.04	1.00	1.00
Hamilton-Wentworth RM	20	40	0.05	0.12	1.65	1.74
Haldimand-Norfolk RM			1.97	2.94	3.03	3.14
Waterloo RM			0.01	0.02	1.17	1.34
Lambton County			0.43	0.89	1.69	2.64

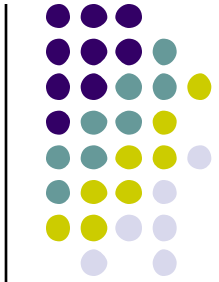
REGION		Base Case			
		Ozone		PM10	
		DSS05	DSS03	DSS05	DSS03
Ottawa-Carleton RM	Approximate % Contributions from OPG	0.0%	0.0%	1.6%	1.6%
Durham RM		0.2%	0.4%	2.9%	2.8%
York RM		0.1%	0.2%	3.1%	3.1%
Toronto MM		0.2%	0.4%	3.2%	3.2%
Peel RM		0.1%	0.2%	2.9%	3.1%
Hamilton-Wentworth RM		0.3%	0.6%	4.7%	5.0%
Haldimand-Norfolk RM		9.9%	14.7%	11.2%	9.0%
Waterloo RM		0.1%	0.1%	3.3%	3.8%
Lambton County		2.2%	4.5%	4.8%	7.3%

2003, 2005 reports to Ontario government by RWDI Inc., on contribution of OPG to smog episodes

REGION	Approx Avg 1998 Average Concentrations		Gas Replacement			
			Ozone		PM10	
	Ozone	PM10	DSS05	DSS03	DSS05	DSS03
Ottawa-Carleton RM	20	30	0.00	0.00	0.01	0.01
Durham RM			0.02	0.01	0.02	0.01
York RM			0.01	0.00	0.02	0.01
Toronto MM	20	40	0.02	0.01	0.02	0.01
Peel RM			0.01	0.00	0.02	0.01
Hamilton-Wentworth RM	20	40	0.01	0.01	0.02	0.02
Haldimand-Norfolk RM			0.07	0.31	0.03	0.05
Waterloo RM			0.00	0.00	0.02	0.02
Lambton County			0.03	0.05	0.02	0.02

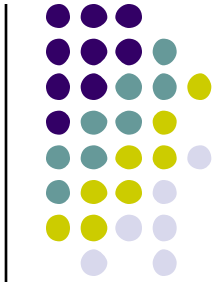
REGION	Approximate % Contributions from OPG	Gas Replacement			
		Ozone		PM10	
		DSS05	DSS03	DSS05	DSS03
Ottawa-Carleton RM		0.0%	0.0%	0.0%	0.0%
Durham RM		0.1%	0.1%	0.1%	0.0%
York RM		0.1%	0.0%	0.1%	0.0%
Toronto MM		0.1%	0.1%	0.1%	0.0%
Peel RM		0.1%	0.0%	0.1%	0.0%
Hamilton-Wentworth RM		0.1%	0.1%	0.1%	0.1%
Haldimand-Norfolk RM		0.4%	1.6%	0.1%	0.1%
Waterloo RM		0.0%	0.0%	0.1%	0.1%
Lambton County		0.2%	0.3%	0.1%	0.1%

Topic 2: Air pollution & health



- The connection between power plant emissions and illness/mortality is based on a statistical model, not actual, observed effects.

Ontario Gov't Cost-Benefit Analysis 2005 (DSS Consul.)



- 4 scenarios:
  - S1: Base Case (status quo)
  - S2: Switch to all gas-fired generation
  - S3: Switch to combined all nuclear/gas
  - S4: Impose stringent new controls on coal

- DSS Consultants concluded
  - S3 cheapest with annualized costs of $1.9b
  - S2 next at $2.6b
  - S4 -- $2.8b
  - S1 costliest with annualized costs of $4.4b

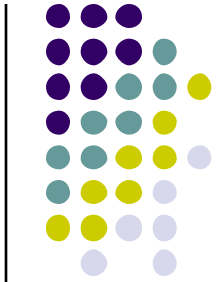
DSS numbers

Annualized Costs ($2004 Millions)

	S1	S2	S3	S4	
Financial Costs	$985	$2,076	$1,529	S1,307	
Health Damages	S3,020	$380	S365	S1,079	DSS05
Environmental Damages	$371	$141	S48	$356	
TOTAL COST	**S4,377**	**$2,605**	**$1,942**	**S2,802**	

S1 (Status Quo) twice as costly as
S3 (chg to nuclear/gas)

But 2 years earlier DSS had done a study for OPG and one for OMA…



- Health costs were much lower in DSS 2003
- What changed?
  - Health effects parameters
  - Rather than using survey, they relied solely on results from one 1993 study that yielded health effects ~7x larger than other studies
- What if 2005 study used same model as in 2003?

DSS numbers

Annualized Costs ($2004 Millions)

	S1	S2	S3	S4	
Financial Costs	$985	$2,076	$1,529	$1,307	
Health Damages	$3,020	$388	$365	$1,079	DSS05
Environmental Damages	$371	$141	$48	$356	
TOTAL COST	**$4,377**	**$2,605**	**$1,942**	**$2,802**	

	S1	S2	S3	S4	
Financial Costs	$985	$2,076	$1,529	$1,307	DSS05 with
Health Damages	$405	$17	$125	$161	DSS03 health
Environmental Damages	$371	$141	$48	$356	coefficients
TOTAL COST	**$1,761**	**$2,264**	**$1,702**	**$1,884**	

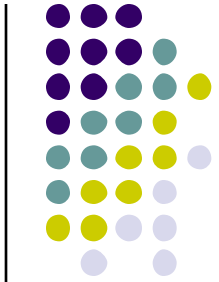
Now Status Quo is tied for cheapest!

Lambton & Nanticoke

Generating Plant	Unit	Emission Controls	Output (TWh/yr)
Lambton	1	LNB, ESP	1
	2	LNB, ESP	1
	3*	LNB, ESP, FGD, SCR	3.25
	4*	LNB, ESP, FGD, SCR	3.25
Nanticoke	1	LNB, ESP	1.925
	2	LNB, ESP	1.925
	3	LNB, ESP	1.925
	4	LNB, ESP	1.925
	5	LNB, OFA, ESP	2.45
	6	LNB, OFA, ESP	2.45
	7*	LNB, SCR, ESP	2.75
	8*	LNB, SCR, ESP	2.75

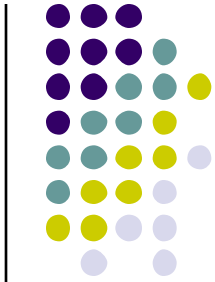
TABLE 1: COAL UNITS. Information source: Table A-1. * denotes unit to be used in Scenario 5.

Air Pollution & Health



- Three types of studies
  - Clinical
  - Model Selection
  - Model Averaging

Air Pollution & Health



- CLINICAL STUDIES
- **No support for health effects from PM at current ambient levels**
  - …no form of ambient PM—other than viruses, bacteria, and biochemical antigens—has been shown, experimentally or clinically, to cause disease or death at concentrations remotely close to U.S. ambient levels. …hundreds of researchers, in the U.S. and elsewhere, have for years been experimenting with various forms of pollution-derived PM, and none has found clear evidence of significant disease or death at relevant airborne concentrations.
    - GREEN AND ARMSTRONG (*Reg. Tox. Pharm.* 2003)
  - Overall, the clinical data does not lend much support to the observations seen in the epidemiology studies, particularly to the observations that high ambient particulate concentrations are associated with mortality within hours or a few days at most.
    - HEALTH CANADA (1997)
  - For the most part, people will not notice or suffer from any serious or lasting ill effects from levels of pollution that are commonly experienced in the UK, even when levels are described as 'high' or 'very high' according to the current criteria…Perhaps surprisingly, long term exposure to air pollution is unlikely to be a cause of the increased number of people now suffering from asthma in the UK.
    - COMEAP, UK (2000)

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MODEL SELECTION (EPIDEMIOLOGY)

- Based on partial correlations between pollution and health measure, sometimes without controls for weather, economic factors etc.
- Generally small and inconsistent results, e.g. Domenici et al. *JASA* (2002)
  - 88 US cities
  - In 20 of 88, PM reduces mortality
- Recent reanalyses of Birmingham data have overturned previous findings of Schwartz

Air Pollution & Health

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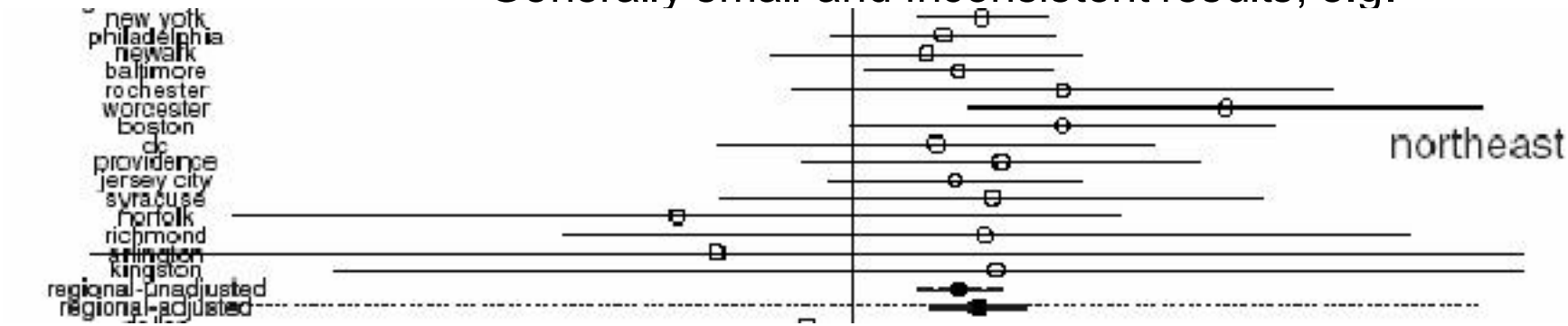

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- Perils of relying on selected correlation coefficients

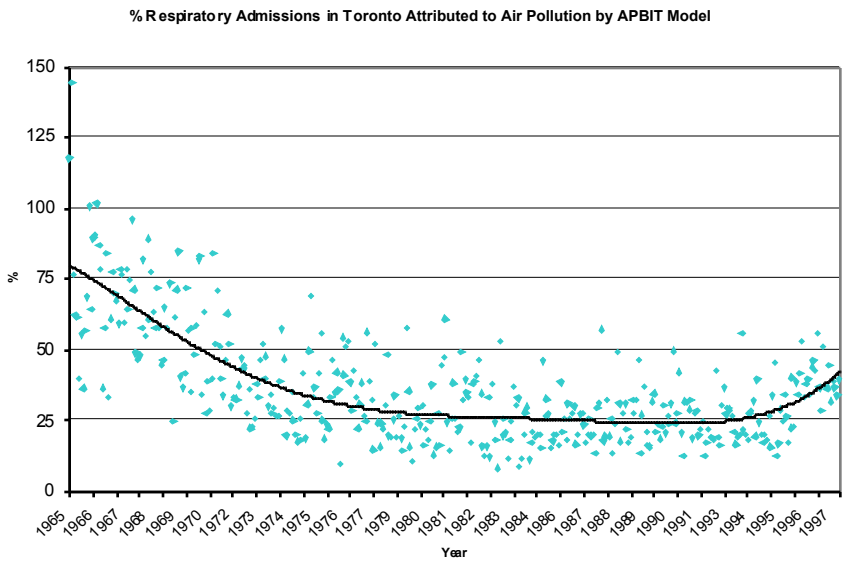

Figure 4: APBIT Model attribution of respiratory disease in Toronto, extended back to 1965.

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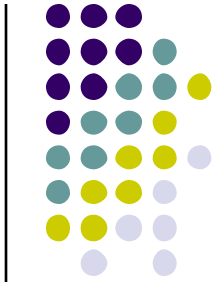

MODEL AVERAGING

- Resolves problem of sensitivity of results to model selection by searching over all possible models
- Clyde (2000), Clyde and DeSimone-Sasinowska (1997); Koop and Tole (2004); Koop, McKitrick and Tole (2010)
- Results have uniformly shown epidemiological results do not hold up when model uncertainty considered
- E.g. Koop and Tole (2004) find zero effect of ozone levels on mortality after controlling for weather

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MODEL AVERAGING

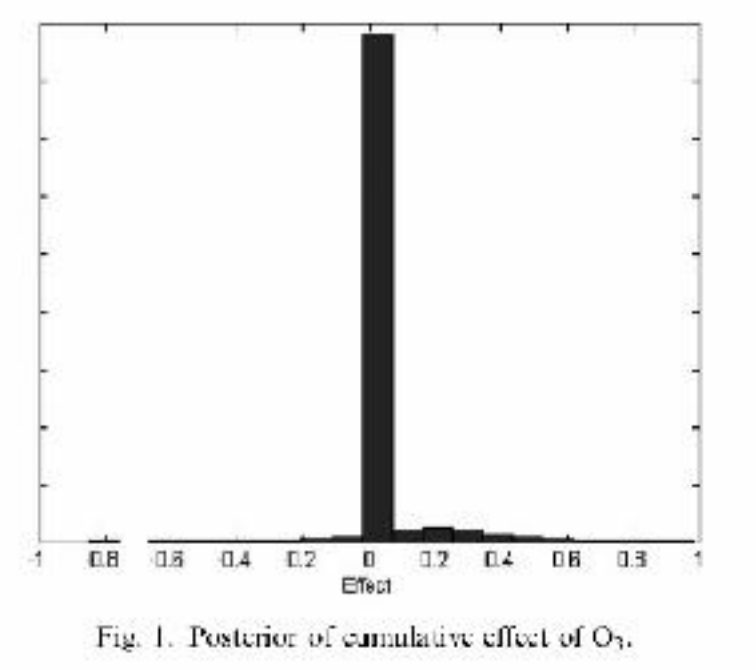

Fig. 1. Posterior of cumulative effect of O_3.

Koop and Tole, *JEEM* (2004)

Toronto Data on ozone and mortality

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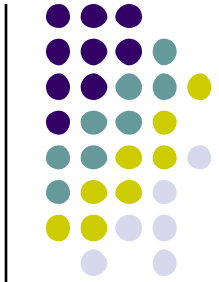

- Koop, McKitrick and Tole, *EM&S* 2010
  - Analysed data for 13 Canadian cities from 1974-1993
  - Used unique long term StatsCan data set on hospital admissions
  - Controlled for effects of income, smoking and economic growth along with pollution & weather
  - Examines statistical uncertainty directly using pooled cross-sectional and time-series analysis

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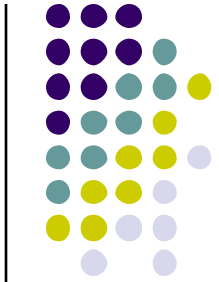
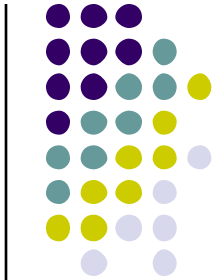


- No correlation between admissions for lung illnesses & air pollution levels
- Income and smoking are the major factors
- Model uncertainty and choice of time period can affect conclusions

Topic 3: GHG's



- If what you want is to reduce GHG's, subsidizing wind turbine installations is an extremely expensive and inefficient option.

Wind turbines & GHG's

- 2 flaws:
  - Even Kyoto-sized emission reductions would have no discernible effect on climate because major emitters are not covered by the treaty

Wind turbines & GHG's

- 2 flaws:
  - Even Kyoto-sized emission reductions would have no discernible effect on climate because major emitters are not covered by the treaty
  - Charging for permits or offsets is much more efficient than subsidizing wind turbines – *if the goal is reducing GHG's*
    - Suppose we charge emitters for the estimated damages due to CO2 emissions.
    - There are over 200 studies that take the climate models at face value and tally up the potential damages.
    - The mean damages are quite low, many studies put amount less than $20/tonne
    - Emission charges at that rate, or even double that, do not induce power producers to switch from coal to wind

UK: current carbon price not enough to induce switch

Carbon price of $160-180 needed to induce investment in nuclear, compared to current costs of coal

1) UK Energy Ultimatum: Companies Demand Green Subsidies For Nuclear And Gas

Financial Times, 25 October 2010

Sylvia Pfeifer, Energy Editor

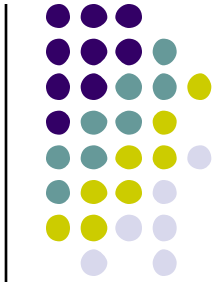
Britain's "big six" energy companies will this week warn Chris Huhne, secretary of state for energy, that the government's proposed "floor price" for carbon emission permits is not enough of an incentive for them to invest in new nuclear power stations.

Executives from the companies, including Centrica, EDF Energy and Scottish Power, now owned by Iberdrola, are due to make their views clear at a dinner with Mr Huhne on Wednesday.

The industry has reached a consensus position with all companies agreeing that some form of additional incentive is required. Options range from a feed-in tariff to guarantee the price for low carbon electricity to payments to companies as reward for having available generation capacity.

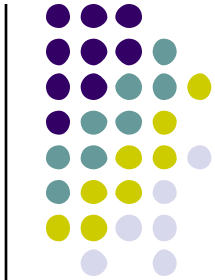
The government has already said it is seeking to put a floor under the price of carbon dioxide permits under the European Union's emissions trading scheme. But executives believe if that were to be the only incentive the floor would have to be set at a pretty high level, with estimates ranging between €80 and €90 a tonne of carbon. The companies argue any floor price should start at a relatively low level and then gradually step up towards a level of about €35 a tonne of carbon. Prices are currently hovering at around €15 a tonne.

The green “economy”



- Windmills don’t run on wind, they run on subsidies
- Solar panels are not powered by sunlight, they are powered by taxpayers
- Without subsidies and renewable mandates they don’t operate
- In other words, the green energy sector takes $2 worth of inputs and produces $1 worth of energy
  - This is not wealth-creation, it is wealth destruction
  - It is not job creation, since even more jobs have to be destroyed to fund the subsidies

Conclusions



- Expose ulterior motives by asking: what are you *really* interested in?
  - **Air pollution?** It has already been addressed through emission control technology; and building wind turbines in Ontario won't reduce particulates coming from Ohio anyway
  - **Health costs?** Even using the OMA parameters, conventional energy from the retrofit units at Lambton&Nanticoke cost less than the alternatives. And those claims are almost certainly exaggerated.
  - **Greenhouse gases?** Then price them directly. But that won't induce power companies to build wind turbines.
  - **Jobs and the economy?** Then subsidies and wind energy mandates are the *last* thing we want.

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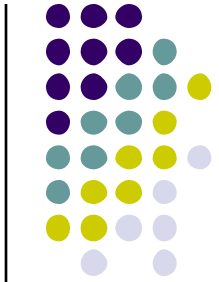

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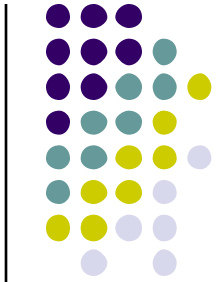

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