

Air Quality Progress Report 2014

Clean Air Hamilton



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Chair
Clean Air Hamilton

www.cleanair.hamilton.ca



First the good news!

Hamilton Air Quality Facts

- ✓ 90% improvement in major pollutants (risk factors) since 1970s
- ✓ 80 – 90% improvement in toxics over last 20 years
- ✓ Climate Change targets met
- ✓ Active Involvement of all sectors of community, including City Council



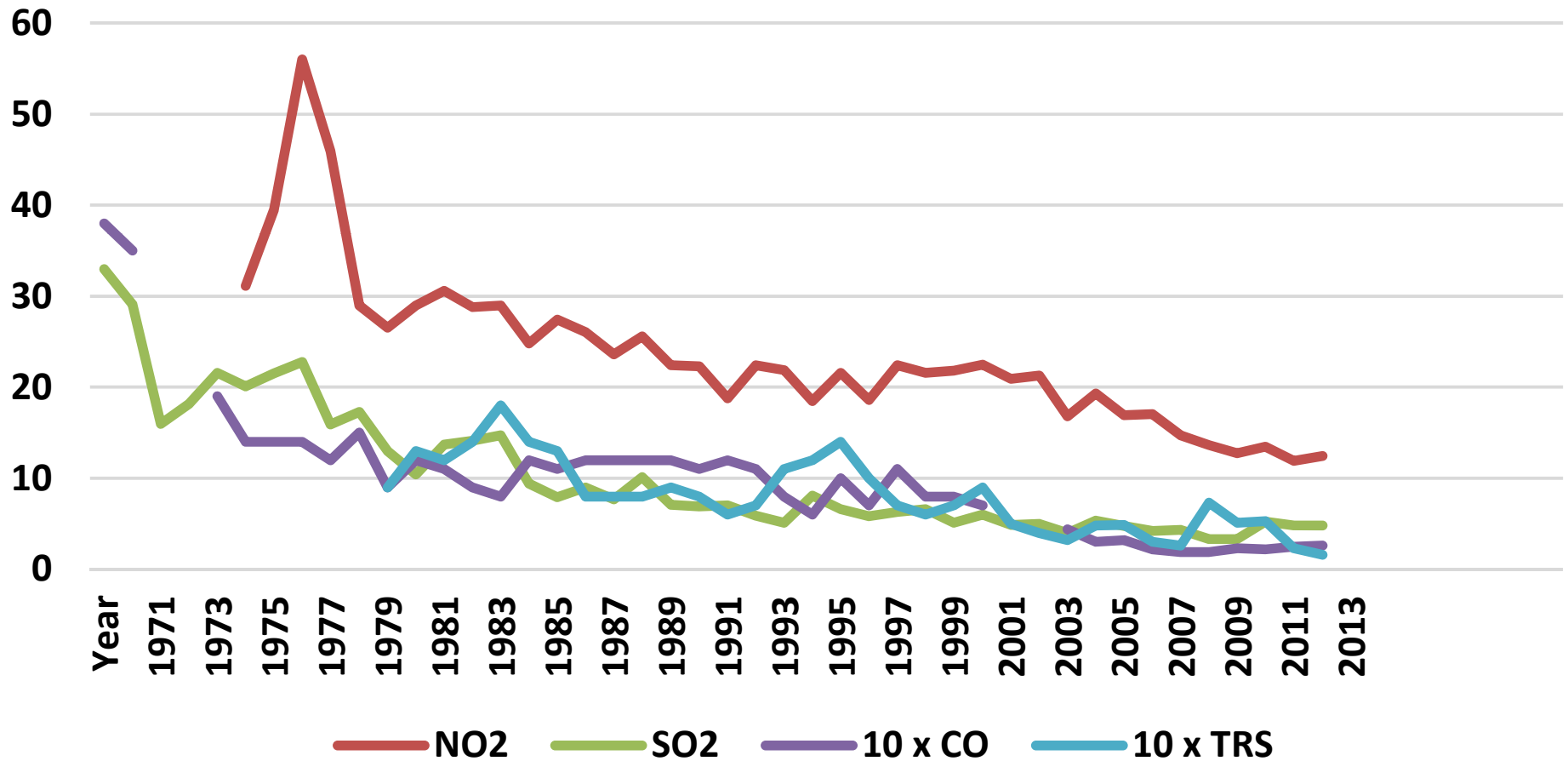
U. N. Award

**Best Practice Worldwide
for
City Scale Air Quality Improvement**

**The Hamilton Air Quality Initiative
(now Clean Air Hamilton)**

Air Quality Trends

Long Term Trends 1970 - 2013



Air Quality Trends

Annual percentage decreases over time are significant
(1996 to 2014 MOE downtown air monitoring site)
(PM10 1997 to 2014, PM2.5 1998 to 2014)

- Total suspended particulate (TSP) levels, down 52%;
- Inhalable particulate matter (PM10), down 30%;
- Respirable particulate matter (PM2.5), down 32%;
- Nitrogen dioxide (NO₂), down 49%;
- Sulphur dioxide (SO₂), down 35%;
- Total reduced sulphur odours, down 99%;
- Benzene, down 87%;
- Polycyclic aromatic hydrocarbon (PAH, measured as benzo[a]pyrene), down 78%; and
- Deaths due to air pollution decreased from 229 in 2003 to 186 in 2012; a 19% improvement (uncorrected for population increase)

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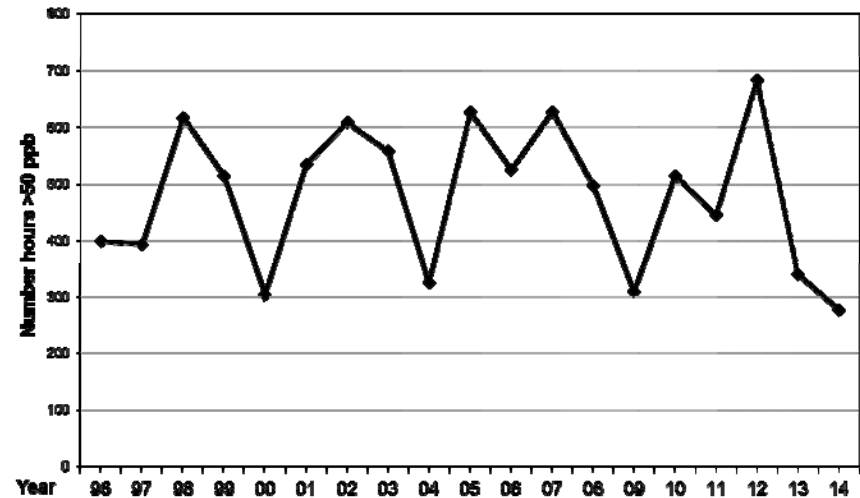
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Air Quality Trends:

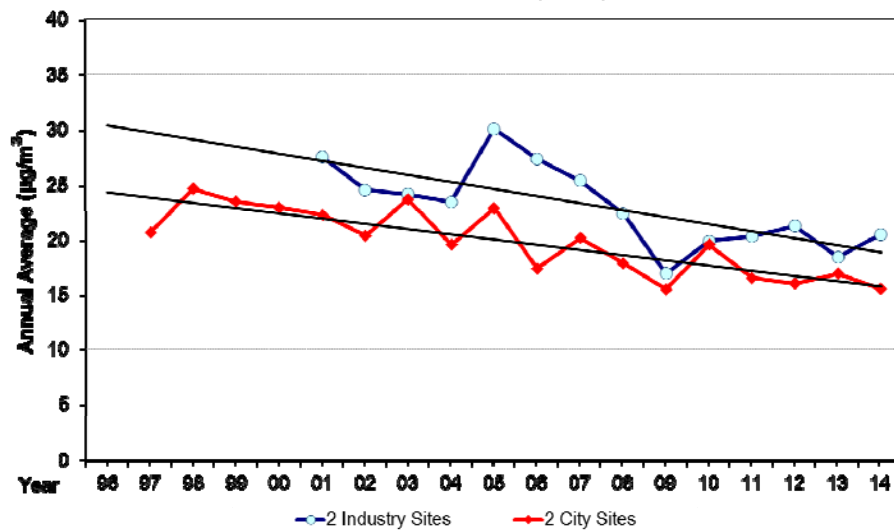
Steady Decreases in Major Air Pollutants over Past Decade

(except ground level ozone)

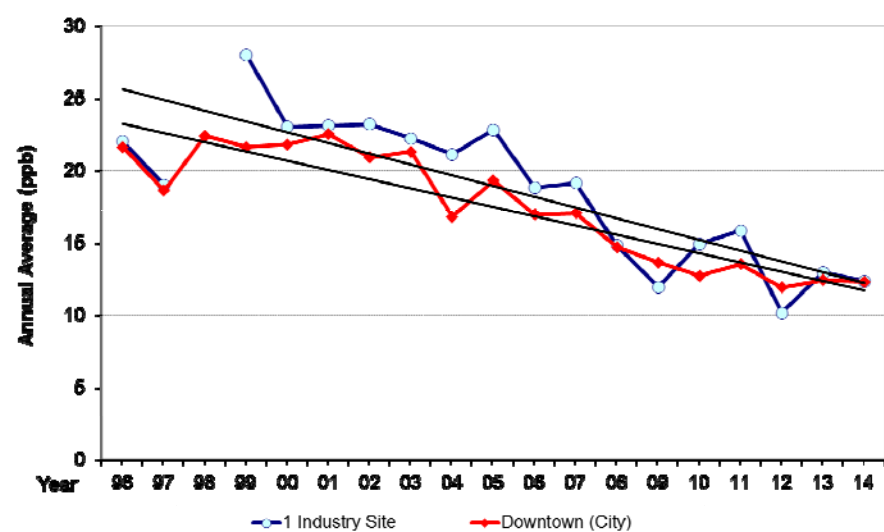
Ground Level Ozone Trend
Number of Hourly Exceeds >50 ppb 3 station average



Inhalable Particulate (PM₁₀) Trend

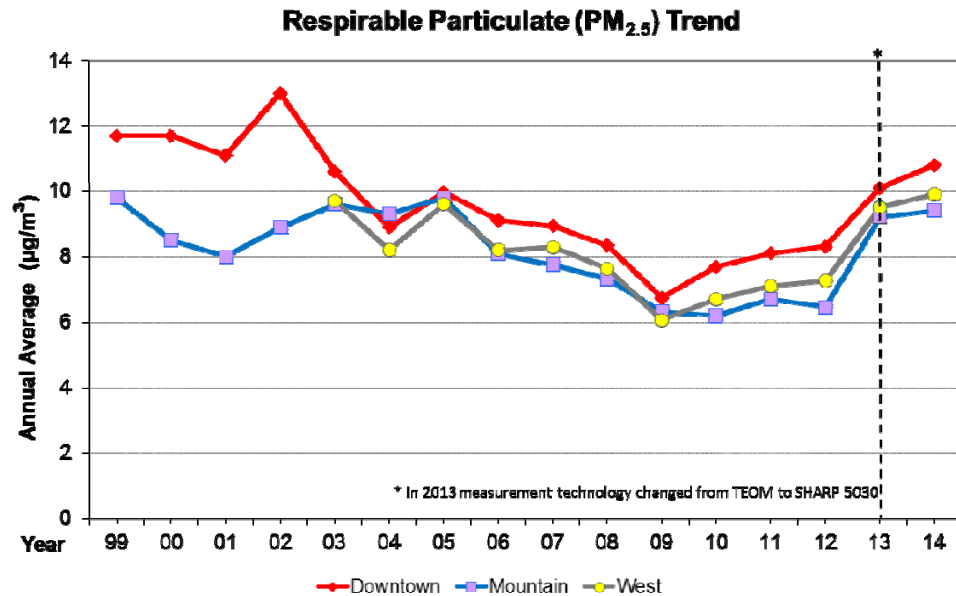


Nitrogen Dioxide Trend

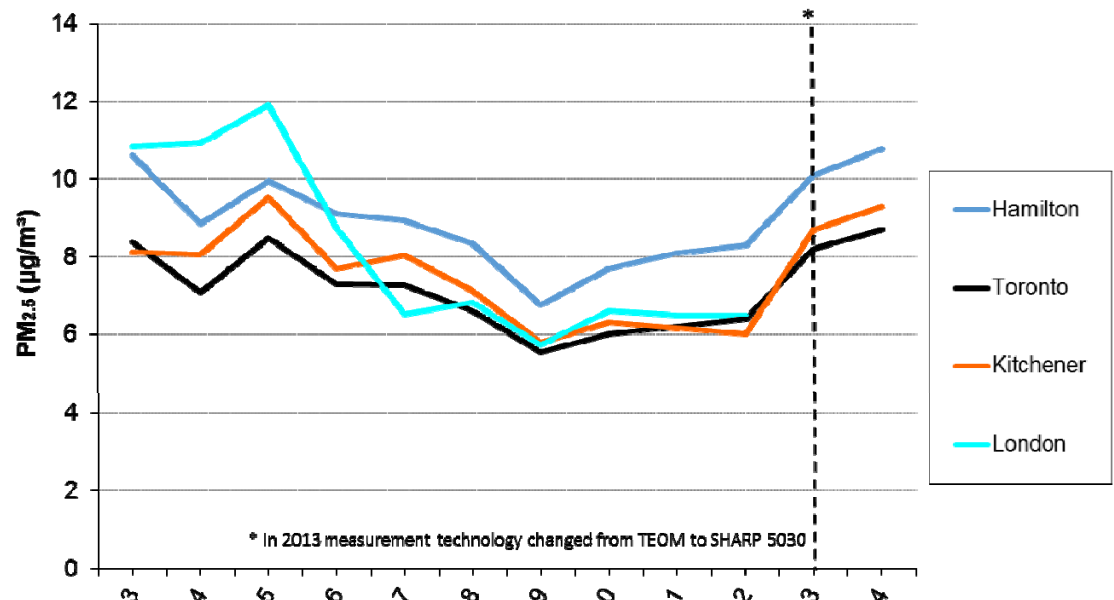


Air Quality Trends:

Respirable Particulate PM_{2.5}



12-Year Trends for PM_{2.5} (Four Ontario Cities)

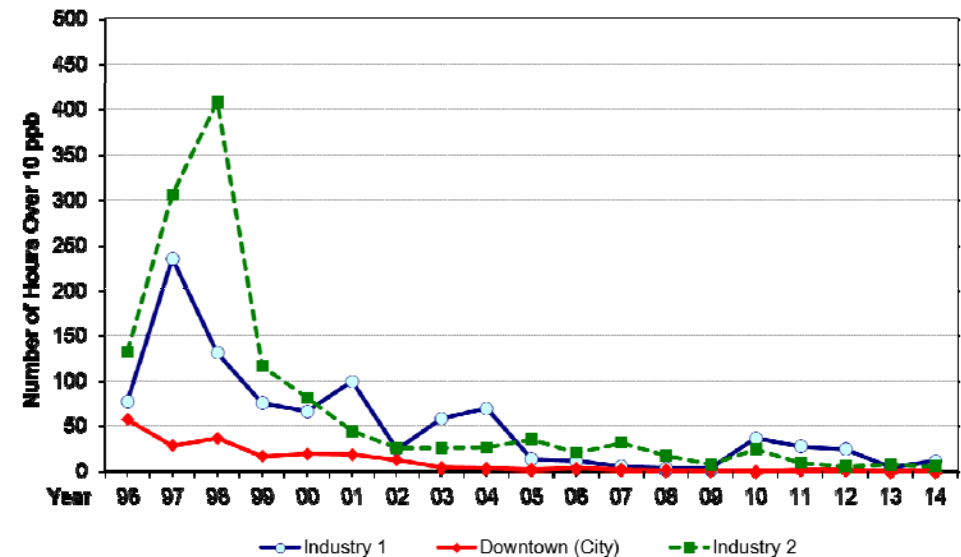


Air Quality Trends:

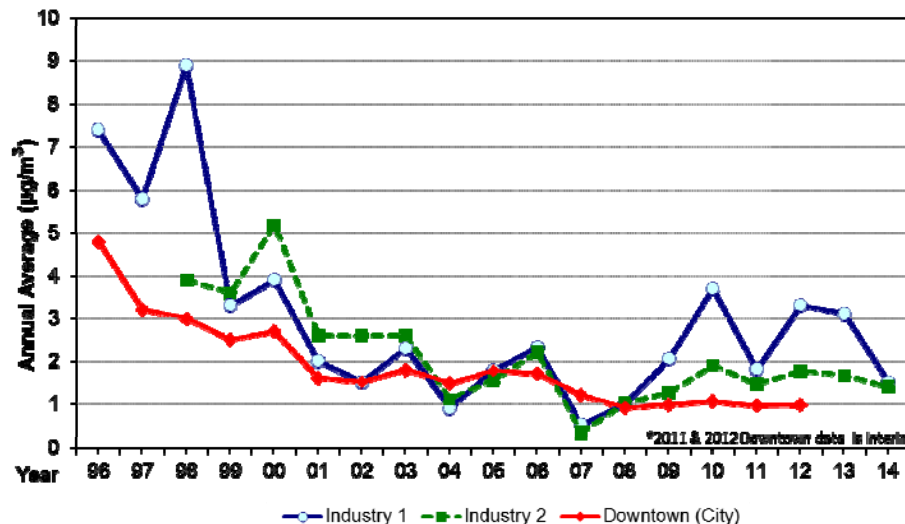
Total Reduced Sulphur, Benzene and Benzo[a]pyrene

Comparisons of 'Downtown' site and 'Industry' sites

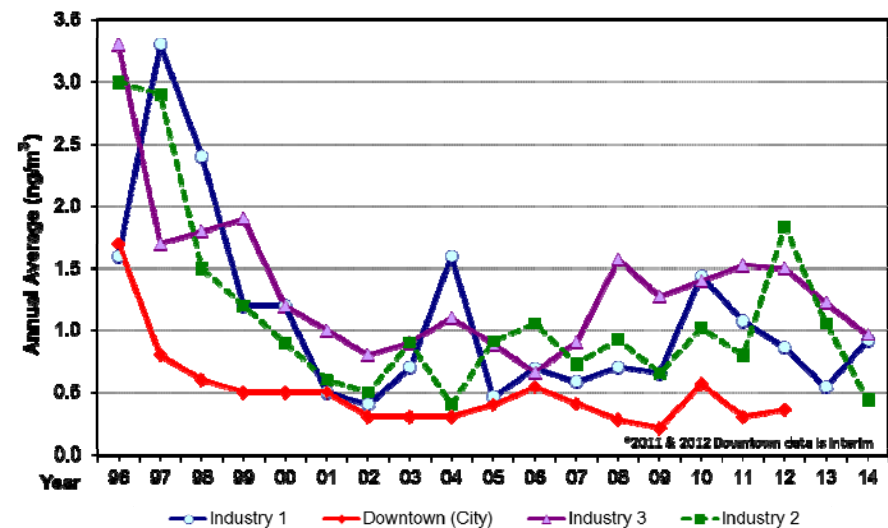
Total Reduced Sulphur Trend
Hours Over 10 ppb Odour Threshold



Benzene Trend



Benzo(a)pyrene Trend



Ministry of Environment and Climate Change

Forecast for BaP and Benzene.

30% reduction in suspended particulate matter, benzene and benzo[a]pyrene from coke ovens within the first couple of years.

40% reduction by 2020

(due to adoption of U.S. EPA protocols)

Are We There Yet?

Unfortunately, No

- ✓ Estimated 186 premature deaths, 395 respiratory hospital admissions and 322 cardiovascular hospital admissions each year in Hamilton (as of 2011)
- ✓ Downward trends for some pollutants flattening out
- ✓ Climate Change new targets

Why is air quality so
important?

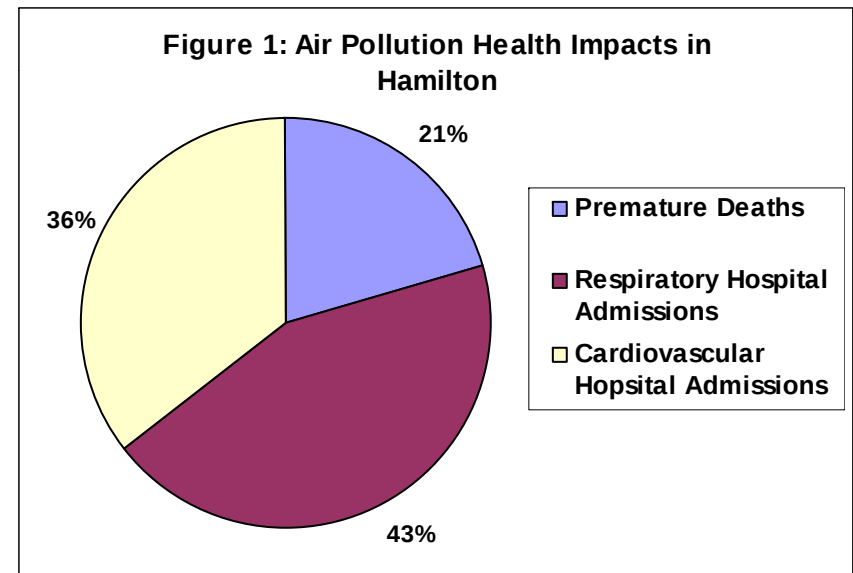
Health Impacts

Hamilton Air Quality and Public Health

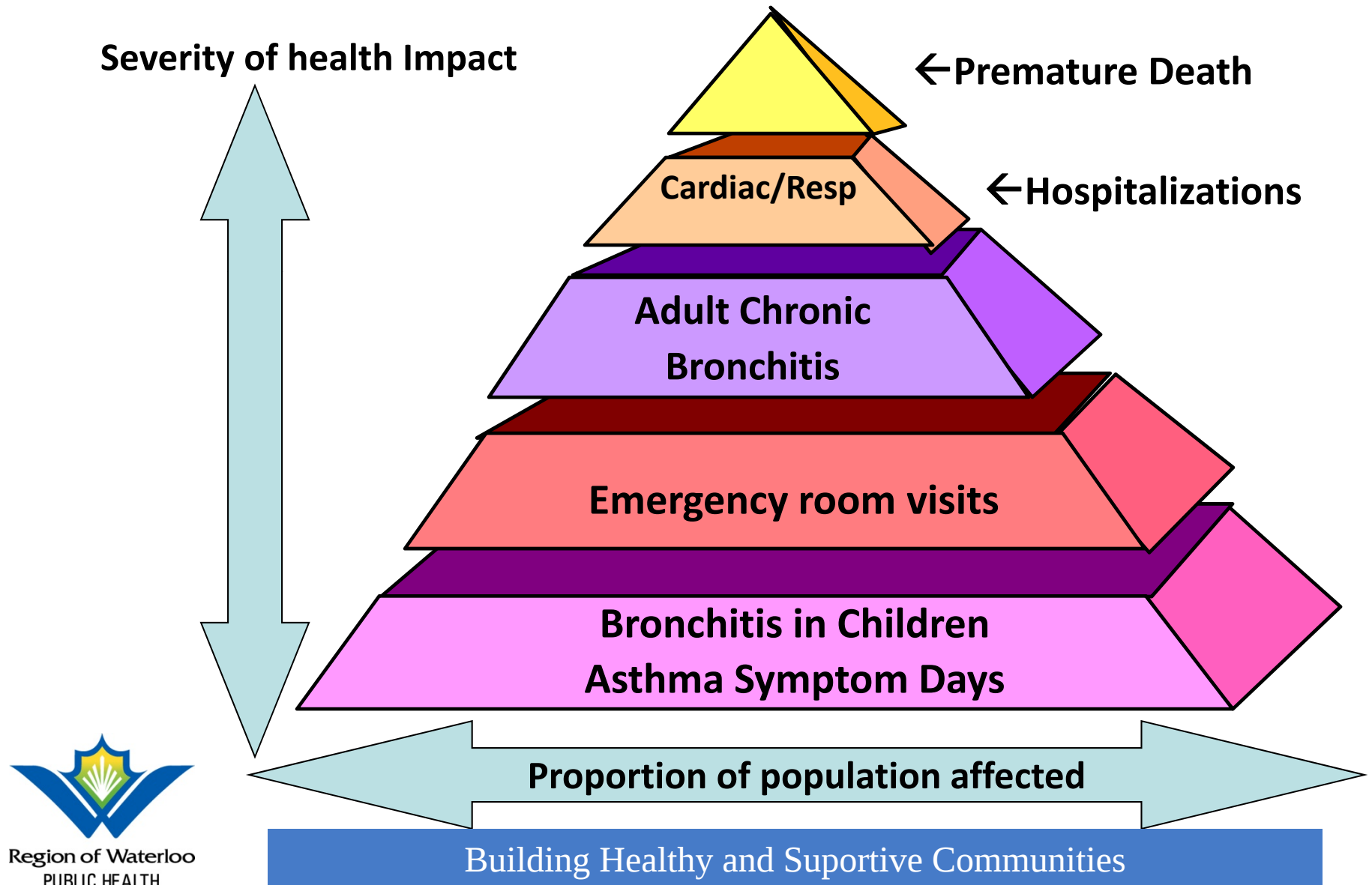
SENES Health Assessment Report, 2011

5 Key Air Pollutants have the following health effects outcomes in Hamilton **each year**:

- **> 180** premature deaths
- **> 710** respiratory and cardiovascular hospital admissions
- Most current review of scientific literature on air quality and public health.
- Primary focus remains as reduction of human exposures to:
 1. Particulate Material (PM₁₀ and PM_{2.5})
 2. Nitrogen Oxides (NO_x)
 3. Ground Level Ozone (O₃)



Pyramid of Health Effects



Where do these risk numbers
come from?

1952

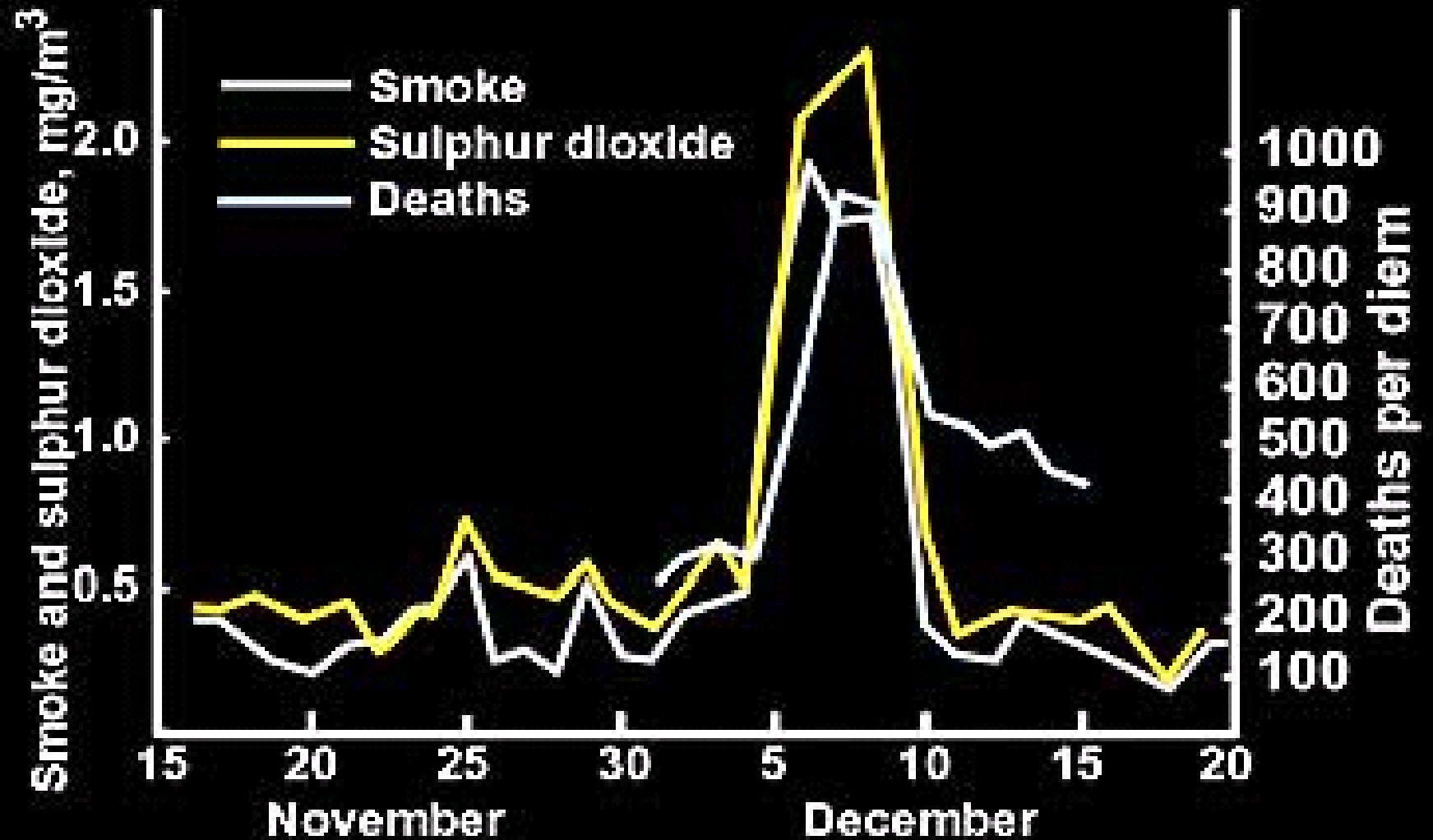
Great Fog, London , England

11,000 deaths



Epidemiology

Greater London, 1952



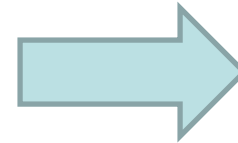
Paris, March 2015



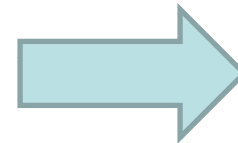
So how did we get to be good at this?

Evolution of Clean Air Hamilton

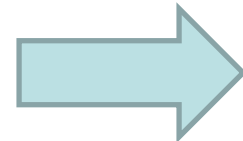
Hamilton Air Quality Initiative



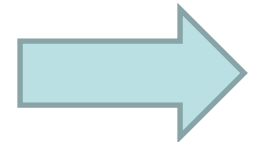
Clean Air Hamilton



Climate Change



Air Quality Task Force



Clean Air Hamilton



**Science based / Diverse / Inclusive /
Facilitated Consensus**

Clean Air Hamilton

Clean Air Hamilton was established as an implementation committee to act on recommendations contained in 1997 HAQI Reports and provide an ongoing forum for air quality stakeholders.

- Community-based initiatives are directed at:
 - Researching air quality and health issues related to air quality.
 - Developing policies aimed at improving air quality in Hamilton.
 - Encouraging emission reductions through adoption of best practices.
 - Educating the public on air quality issues, ways to improve air quality and reduce personal exposures.
- Internationally recognized:
 - 1500 website hits/week
 - Inquiries are received regularly from organizations and individuals in Ontario, Canada, the U.S. and from around the world (“gold standard”).

Clean Air Hamilton

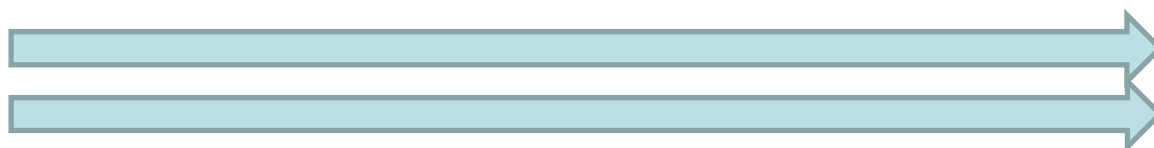
- Stakeholders come from across the community:
 - Citizens of Hamilton
 - Ontario MOECC, Health Canada, Environment Canada
 - ArcelorMittal Dofasco, US Steel Canada, Horizon Utilities
Hamilton Industrial Environmental Assn., Rotek Environmental
 - Green Venture, Environment Hamilton
 - McMaster University, Mohawk College
 - City of Hamilton (Health, Planning & Public Works)

Evolution of Air Quality Roles

Major Source Control

Point Sources

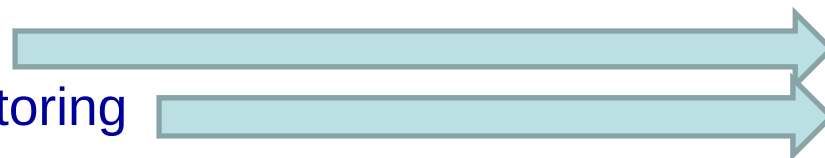
Vehicles



Detailed Local information

Municipal Health Impacts

Local/Neighbourhood monitoring



Outreach and Education



Personal Actions/Responsibility

Control of Emissions and Exposures



Clean Air Hamilton

Ongoing Activities

- Liaison between all Hamilton AQ stakeholders
- Monthly meetings
- Grant program (\$56,000) funded by City of Hamilton Public Health
- Annual report – Completely revised format for 2014 year
- Annual presentation to Board of Health/City Council
- Clean Air Hamilton website
- Input to federal/provincial/municipal decision making and actions

Annual Report

Brian Montgomery

Karen Logan

Lynda Lukasik

Jim Stirling

Andy Sebestyen

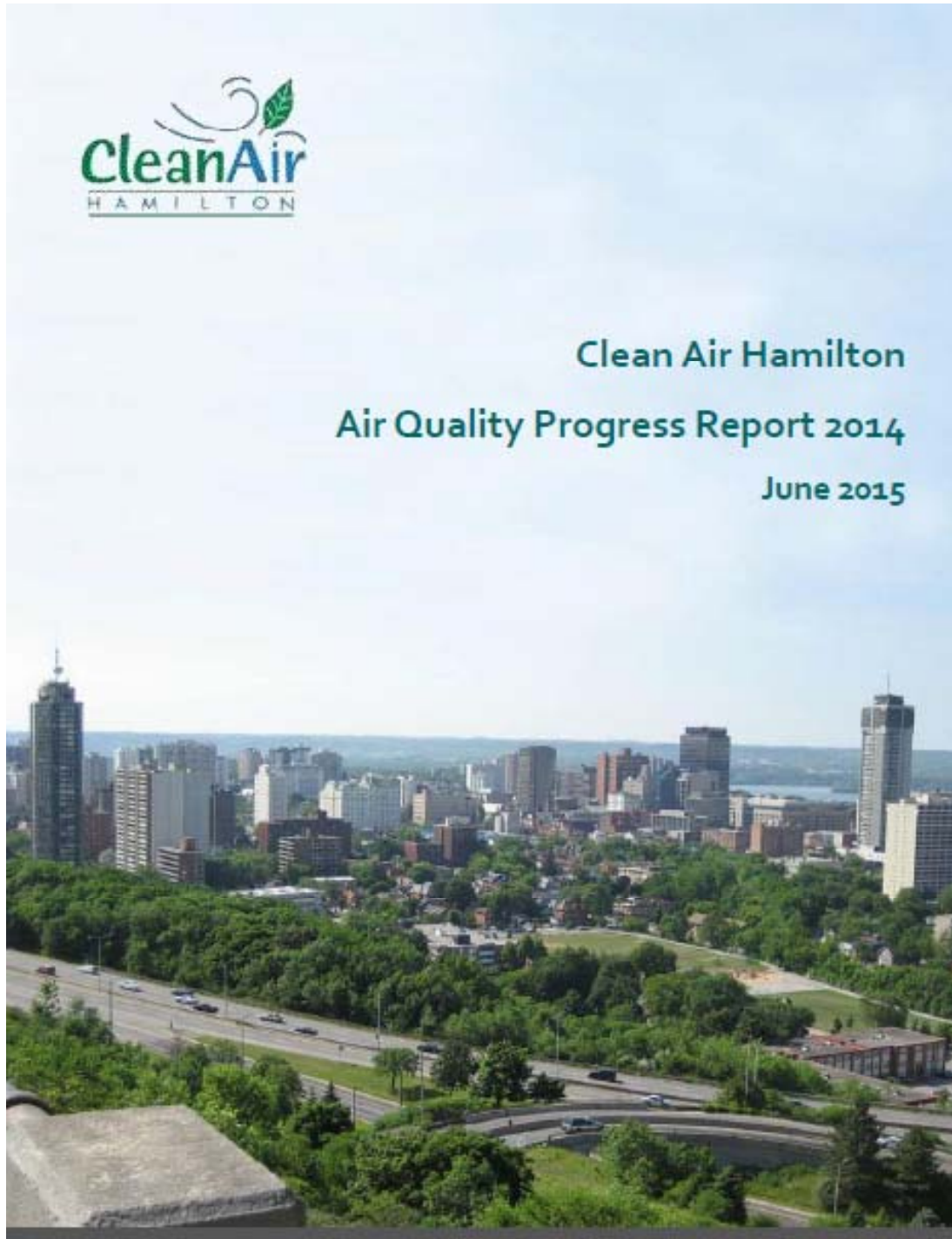
Kathryn Enders

Katie Chan

Denis Corr

Matt Lawson

MOECC (Geoff
Knapper, Dan
Dobrin, Natalie
Stacey)



Community Projects Supported Through Clean Air Hamilton

- **Hamilton Air Quality Health Index Mapping Project**
A real-time, web based air pollution and AQHI map for Hamilton,
www.hamiltonaqhi.com
- **Upwind Downwind Conference 2014**
International conference on best ways to improve air quality
- **Fresh Air Kids**
Air Quality education and better ways to get to school using mobile air
monitoring data http://www.youtube.com/watch?v=bAlhVs_sEpk
- **Totally Transit Bus Education**
Older adults
School-aged children
- **DASH/MASH Program**
Evaluate feasibility of active transportation highway across foot of
escarpment and mountain brow

Other Air Quality Projects Supported by Public Health/Clean Air Hamilton

- Mobile/Neighbourhood Air Monitoring
- AQHI Outreach Activities
- Air Quality Model for Hamilton
 - Source identification and relative importance

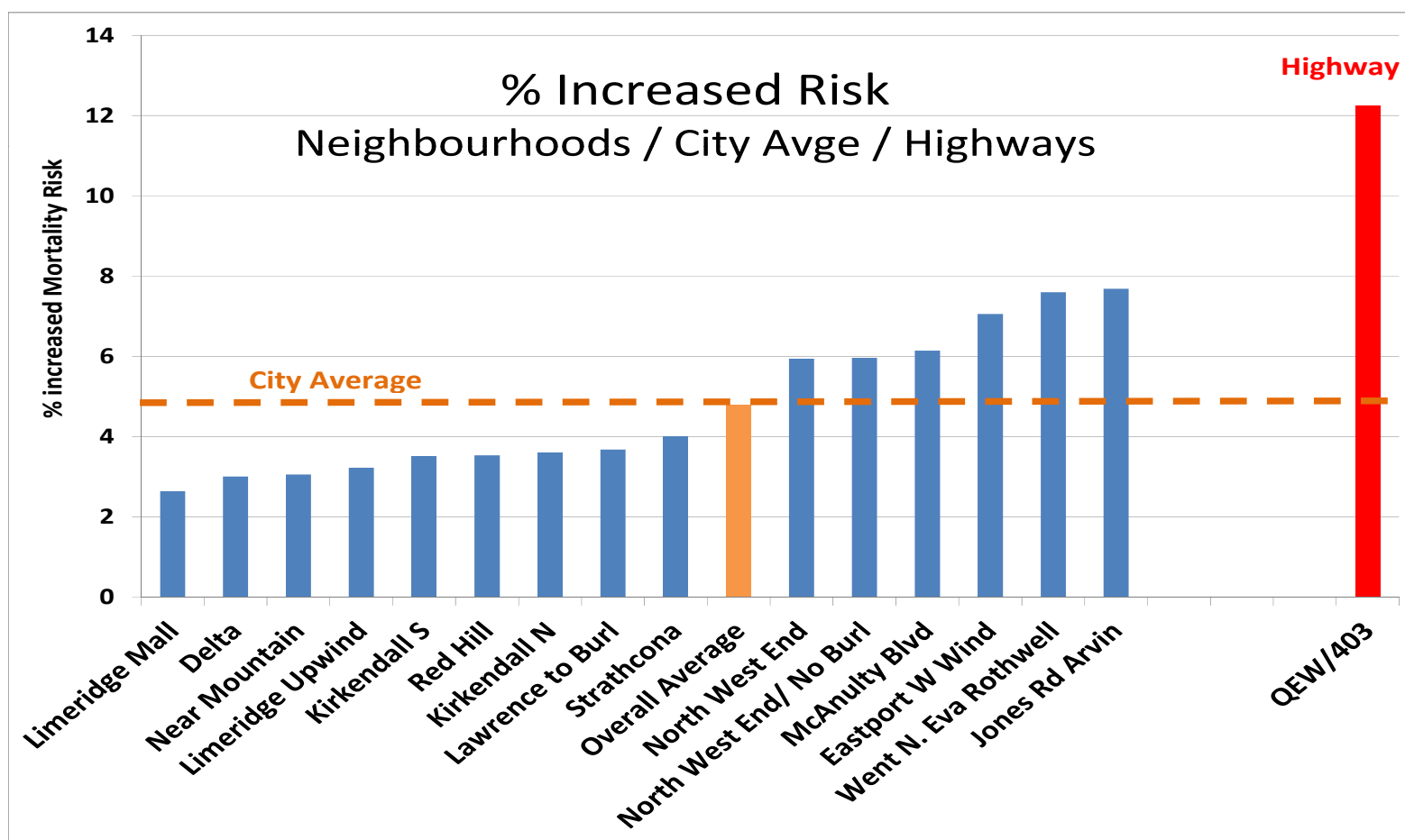
Air Monitoring

Monitoring Air Quality

- **Air Monitors collect outdoor air quality data.**
 - Data used to compare levels of air pollutants to standards.
 - Data can be used to identify sources of air pollutants, and
 - Data can be used to evaluate the potential impacts of air emissions on human health.
- **Fixed monitor networks: three networks in Hamilton.**
 1. Ontario Ministry of the Environment's network of three Air Quality Index (AQI) stations (downtown, west end, mountain).
 2. Hamilton Air Monitoring Network (HAMN) of 17 stations in the east end industrial core primarily.
 3. Public Health Services, 2 AirPointer moveable stations.
- **Mobile air monitoring: uses a van outfitted with air monitors.**
 - Can make measurements anywhere in City and can monitor while moving along roads.
 - Can measure what citizens are actually breathing in their locality.
 - Can identify local sources of air emissions.
 - Can be used to make comparisons between neighbourhoods, along streets/highways and at locations with suspected emissions.

Mobile Air Monitoring: Neighbourhoods Study

Originally, Air Quality measurements were performed in 15 neighbourhoods and along QEW and Hwy. 403; 26 neighbourhoods requested measurements; additional neighbourhoods monitored in 2014/2015.

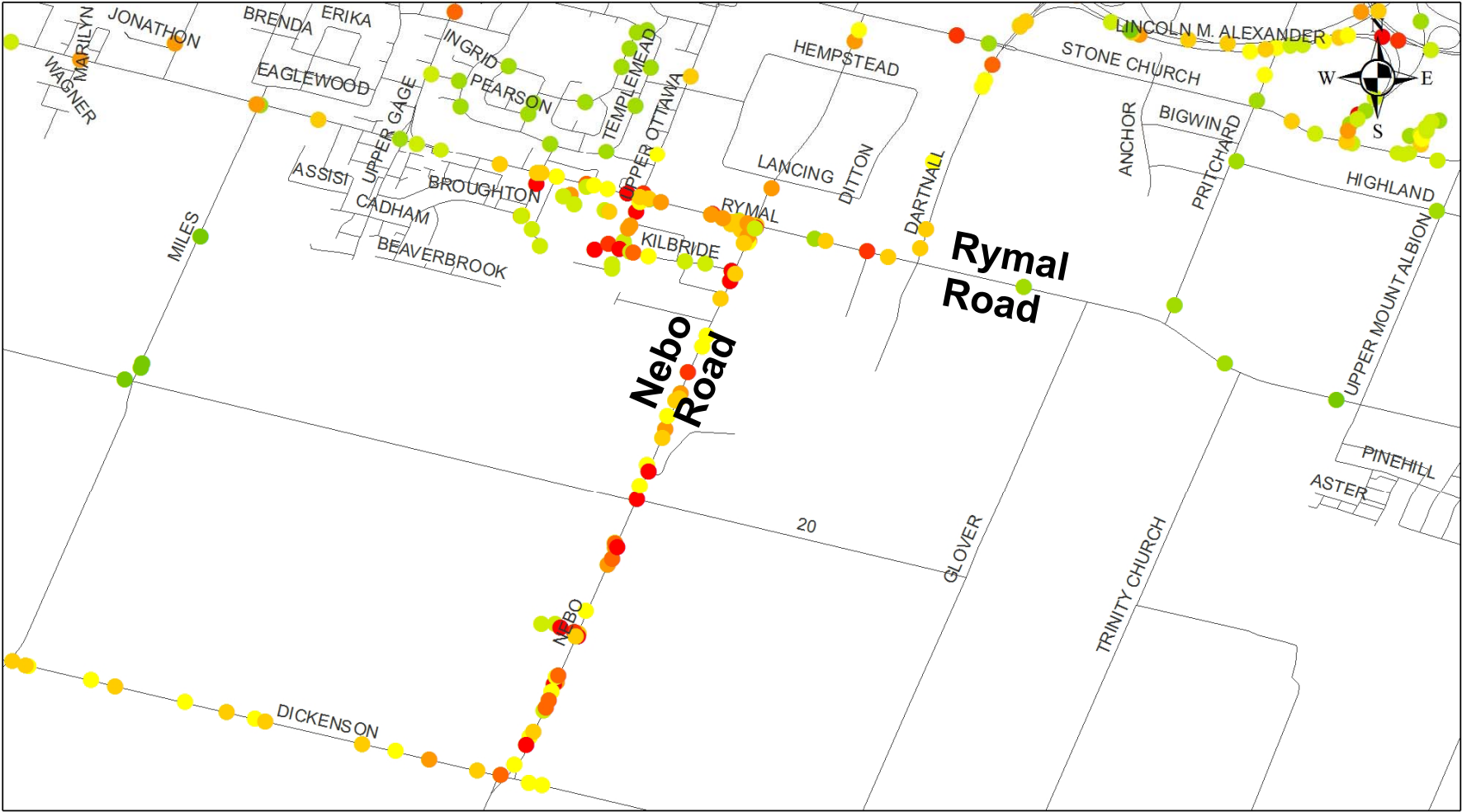


Phase 2 Neighbourhood Mobile Monitoring

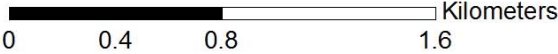
- Jolley Cut Area
- Upper Gage/Upper Ottawa/East Mountain Park
- Gourley (Garth, Mohawk, West 5th, Stonechurch)
- Ancaster (Wilson/Fiddlers Green)
- Meadowlands (Horning, Oakes)
- Rymal and Paradise (Falkin West and East)
- Linc/Red Hill Intersection Area
- Rymal/Mud Area
- Sanford School Area (Gibson)
- Cope St (Normanhurst)
- South Sherman (St Clair)
- Fruitland and Barton
- Durand

Air Pollution Measurements

Nebo Rd Rymal



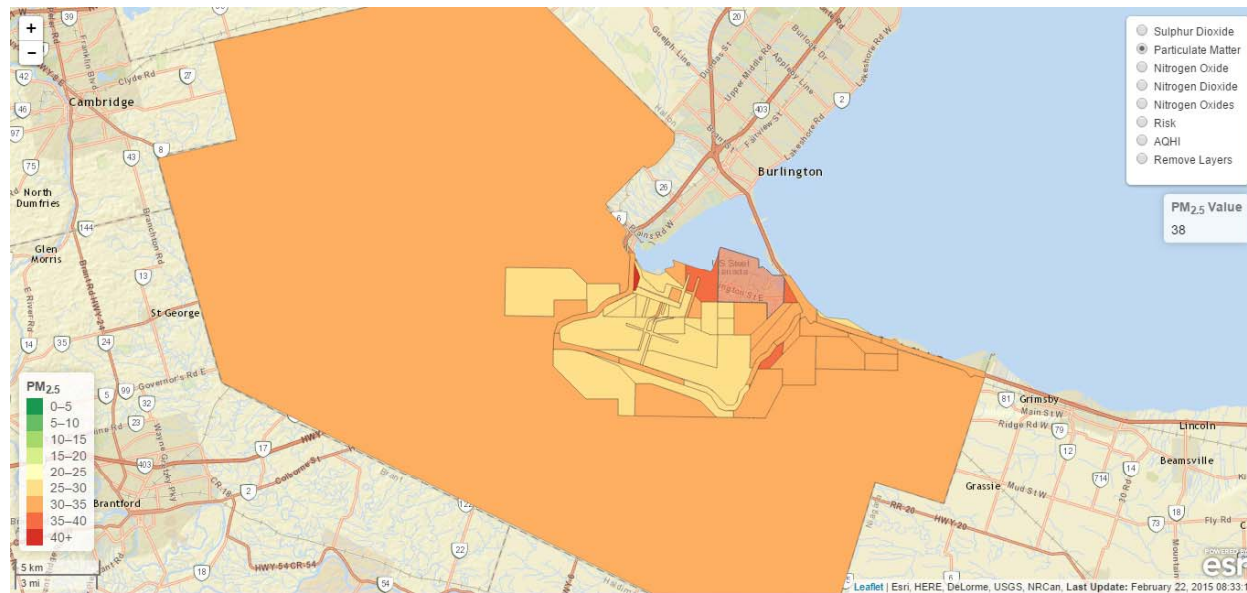
% Air Quality Risk



Outreach and Education

Real Time Air Pollution Mapping of Hamilton

www.hamiltonaqhi.com



Mobile Air Monitoring Fresh Air Kids

Van outfitted with a range
of real-time monitors for:

CO
NO
NO₂
PM₁₀, PM_{2.5}, PM₁
SO₂

A GPS system



Neighbourhood of Holy Name of Jesus School, Hamilton



0 0.175 0.35 0.7 Kilometers

Totally Transit – School Kids and Older Adults

Since 2007, 4,400 elementary students, another 4,200 at environmental fairs.

Since 2013, 173 older adults.

Upwind Downwind Conference 2014



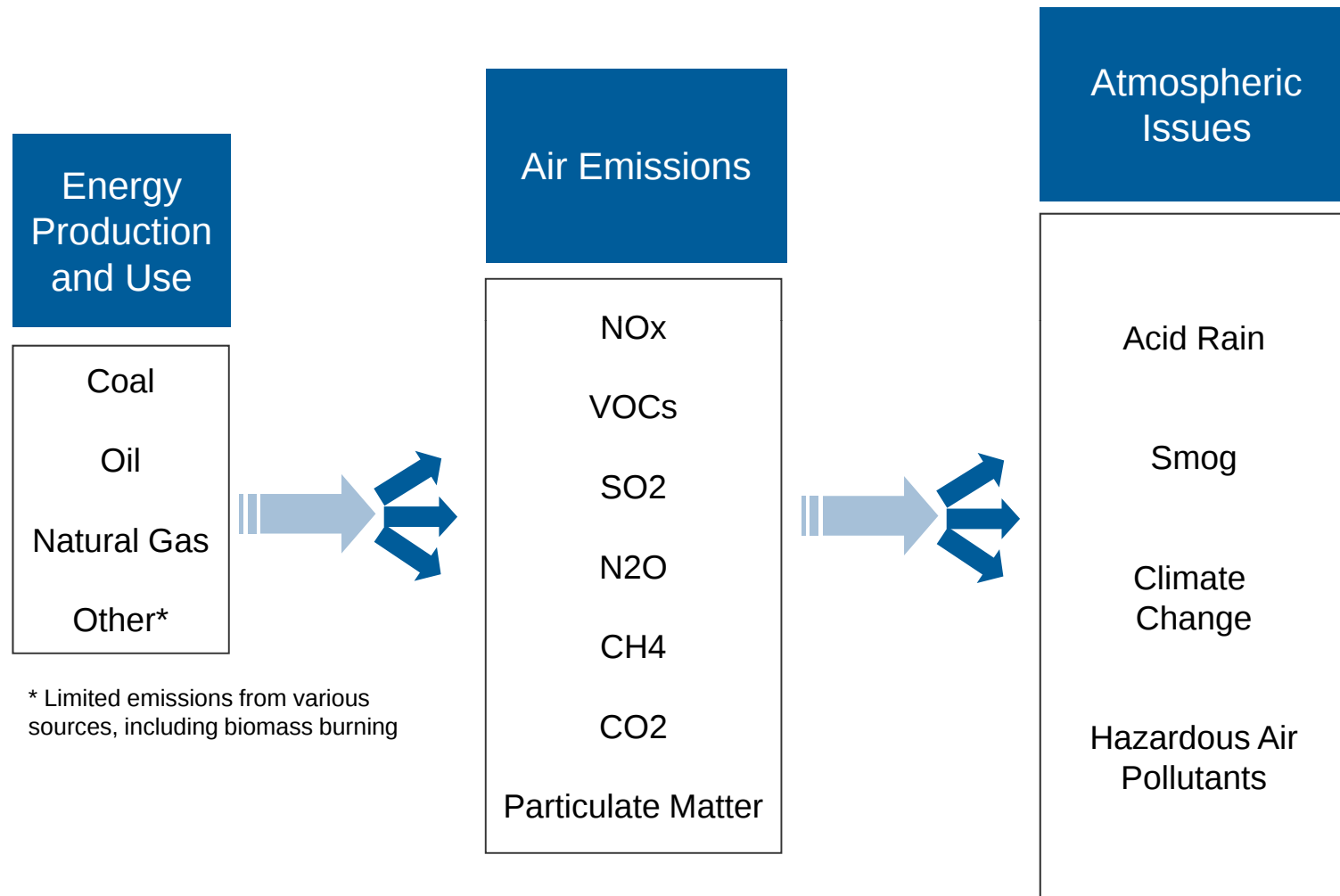
- Focused on health, transportation and the built form.
- 166 health promoters, planners, university/college students, environmental consultants, industry, municipal, provincial and federal staff, retirees and citizens participated.
- “Biophilia” concept

Air Quality Task Force

Air Quality Task Force

- Request by Board of Health to look at and recommend “actions that can be taken by the City to reduce air pollution in Hamilton”.
- The AQTF responded with an Action Plan in 2013.
- 10 Recommendations in the areas of air modelling and monitoring, planning, education and outreach, green infrastructure, and updating of municipal by-laws aimed at decreasing particulate matter in the environment.
- The full AQTF Action Plan approved by the Board of Health can be found in
<http://www.cleanair.hamilton.ca/downloads/AQTF%20Action%20Plan.pdf> .
- The 10 recommendations–are expected to work synergistically to achieve air pollution reductions in the City of Hamilton.

Air Quality & Climate Change



Source: Pollution Probe, 2003

Hamilton is 75 metres (245 ft) above sea level





Climate Change Facts

- In Hamilton, climate change emissions have been declining since 2006
- 29% lower in 2012 than in 2006
- Met and exceeded Vision 2020 target of “20% by 2020”
- New target of 80% by 2050 established.

Community Climate Change Concerns

- Flooding,
- Drastic or unpredictable weather patterns,
- Increased pollution.

Hamilton citizens wish to see:

- increased education and awareness
- more renewable resources usage
- reducing emissions
- better infrastructure
- reduction of sprawl
- more political intervention

Where's the sizzle?
Or
How do you sell it?

Electric Cars

PlugnDrive

\$30,000 - \$8500
= \$21,500

Save \$2000/yr for 5 yrs
\$21,500 - \$10,000
=\$11,500

Range 100 – 140 km

Fleet Demo/Feasibility
Study ?



BMW i3



Ford Focus EV



Kia Soul EV



Mitsubishi i-MiEV

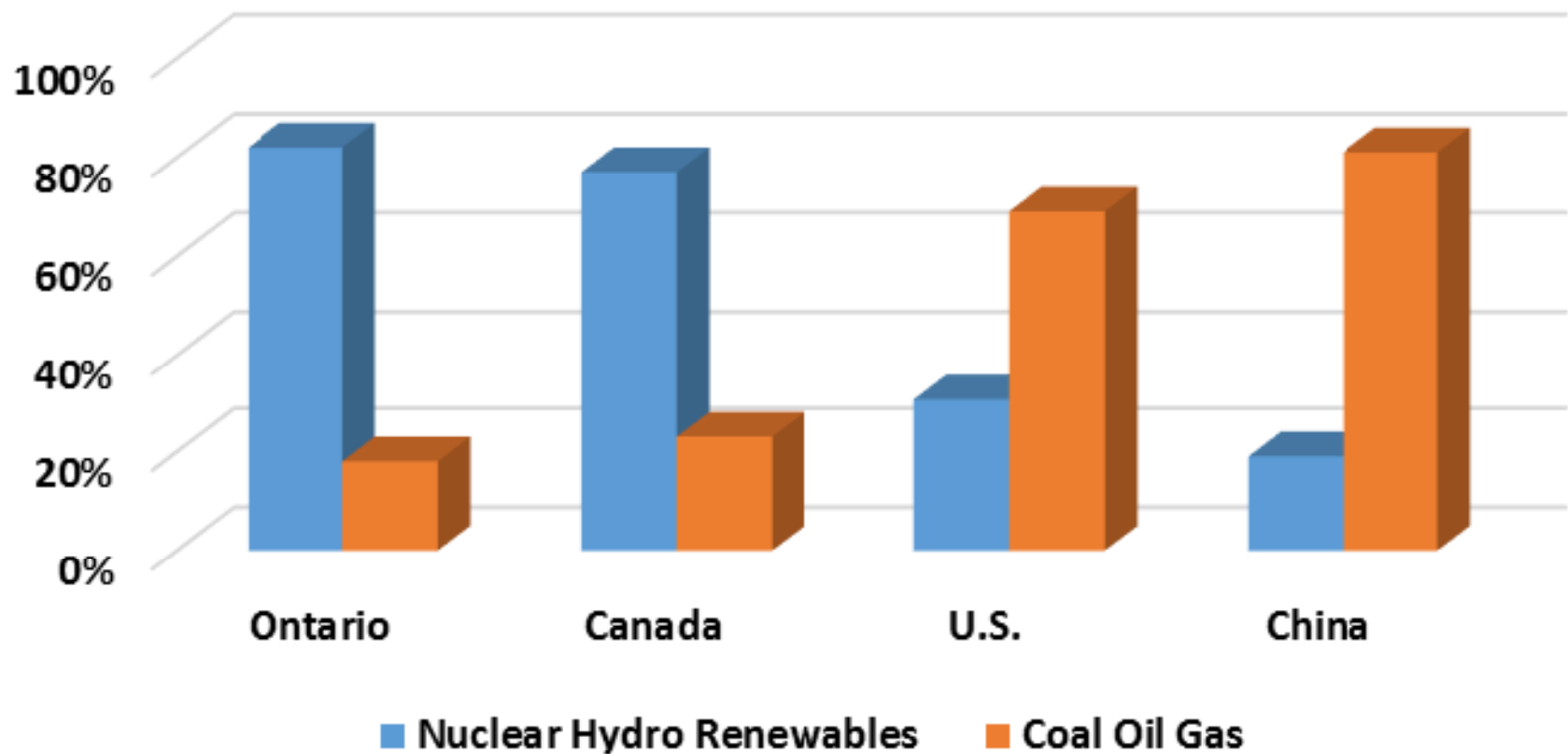


Nissan LEAF



smart fortwo Electric Drive

Electricity Generation Ontario, Canada, U.S, China



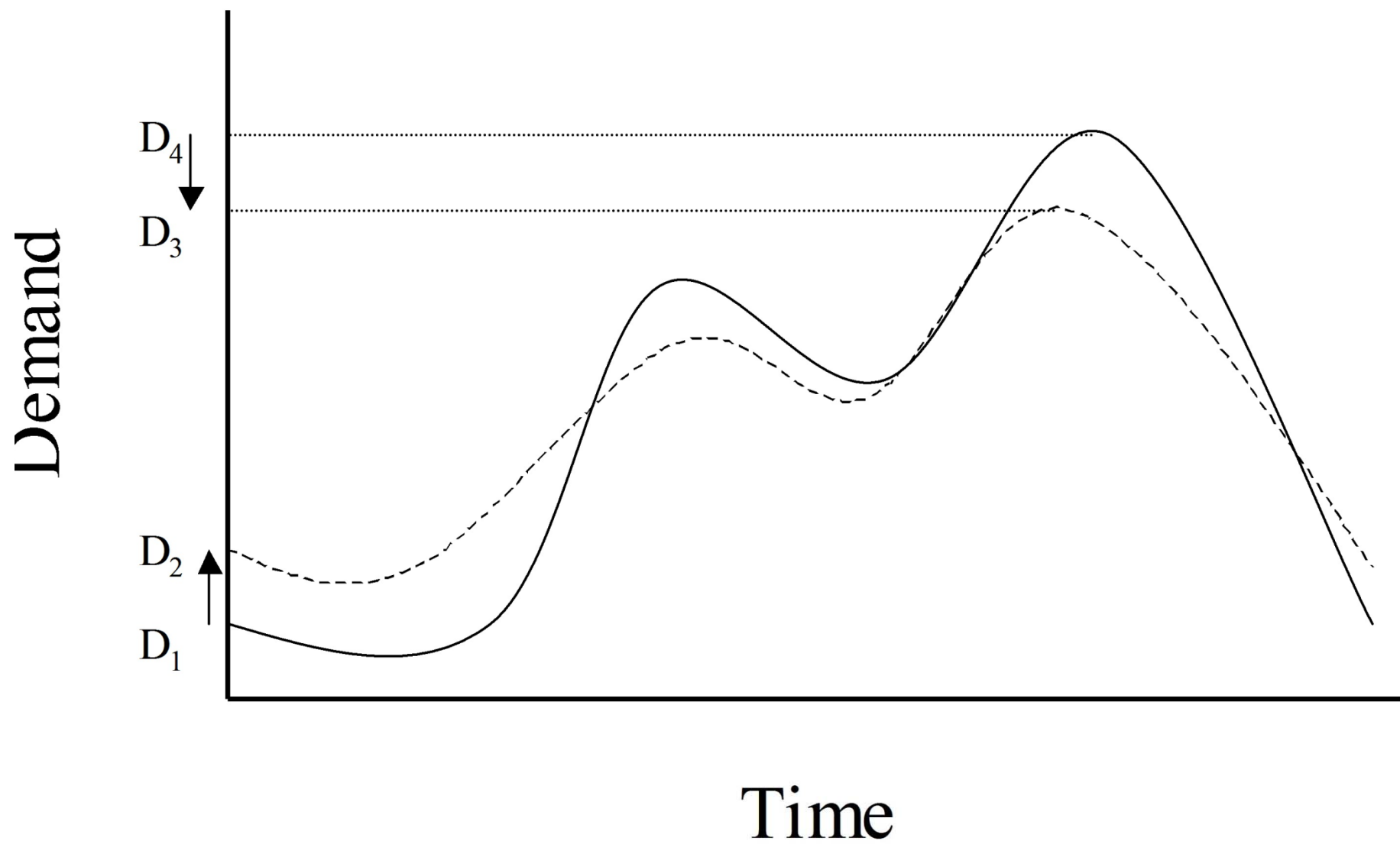


Figure 1: Demand curve changes with shifted load

LRT





The DASH

Downtown Active Transportation Superhighway

and

MASH

Mountain Active Transportation Superhighway

Free Solar Cells for All



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COMPANY

GRASSHOPPER ACADEMY

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GO SOLAR WITH GRASSHOPPER

Making an environmentally responsible choice doesn't have to be hard or expensive, with Grasshopper Solar, it's affordable (and profitable too). Whatever your budget or need, we'll make it easy to go solar and earn more.

LEARN MORE

Overall Recommendations to City

1. Continue to support and undertake all the recommendations of the Air Quality Task Force in the areas of air modelling and monitoring, planning, education and outreach, green infrastructure, and updating of municipal by-laws aimed at decreasing particulate matter in the environment.
2. Continue to support and encourage Hamiltonians to reduce their transportation-based emissions through the use of transportation alternatives including public transit, bicycles, walking, hybrid or electric vehicles, etc. and in supportive policies such as complete streets and transportation demand management.
3. Encourage the continued efforts of the Ministry of Environment and Climate Change and industry to reduce air borne contaminants in the City of Hamilton and the Province of Ontario.



On behalf of ***Clean Air Hamilton***

