A Breath of Fresh Air: Managing Air Quality



Presenter: Sherry Godlewski Resiliency and Adaptation Manager for the New Hampshire Department of Environmental Services



Presenter: Paul Shoemaker Director of the Environmental & Occupational Health Division of the Boston Public Health Commission

Weathering Change: Local Solutions for Strong Communities

ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience



ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience

www.communityresilience-center.org



Strengthen communities to prepare, respond and recover in the face of climate impacts and other disruptions through collaborative, innovative solutions.

Abigail Abrash-Walton, Co-Director

ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience

Graduate Certificate for Climate Resilience Professionals

Antioch University New England's Center for Climate Preparedness, in conjunction with Antioch's Sustainable Development and Climate Change graduate program has initiated a set of six on-line courses leading to an accredited Graduate Certificate in Climate Change Resilience

- Engage in each course for 4 weeks
- Courses can be taken either for graduate credit or for professional continuing education credits
- Increase your skill set in climate resilience for better outcomes
- Discover solutions to local issues you face on the job or in your community.
- Register for one course or the whole series.



Visit our website for more information about this series and the certificate program. <u>http://www.communityresilience-center.org/climate-change-resilience-series/</u>

ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience

Climate Impacts: Communication, Facilitation & Stakeholder Capacity Building

Dates: November 4 - December 8, 2018 *Registration deadline: TODAY Nov 1, 2018*

It is clear that we need to support communities in their recovery and help them decrease their vulnerability to future impacts. It is imperative to rethink how we can engage individuals to build the public support and political will to create climate resilient communities.

Through this short course, we will add to our arsenal of strategies to overcome barriers to action. You will learn about communication tactics employed in other successful campaigns that can be used to engage your audience.



Instructor: Christa Daniels, Ph.D.

Register for this course, the first in the online Climate Change Resilience Series http://www.communityresilience-center.org/climate-change-resilience-series/



www.toolkit.climate.gov



Ned Gardiner, Engagement Manger

Meet the challenges of a changing climate by finding information and tools to help you understand and address your climate risks.

Logistics

•If you can hear me, you are already connected to the Broadcast and do not need to call in.

•If you have a question, please write it in the Q&A section (not Chat) and select to All Panelists, so we can see the questions.

•If you are having technical difficulty, please use Chat and send to Host, so we can address the issue with you directly.

•The presentation will be recorded and posted to the Antioch website within a week: <u>www.communityresilience-center.org</u>

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Questions

- Please submit questions via the Q&A section (not Chat)
- Select to All Panelists.
- If we are not able to get to your question today, we will try to address it after the webinar in our general follow up email or you may hear directly from the presenters.



Overview of Greenhouse Gas Emissions in 2016

Sources of Greenhouse Gas Emissions in 2016



U.S. EPA (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016.

A Breath of Fresh Air: Managing Air Quality

Weathering Change: Local Solutions for Strong Communities

ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience



Protecting Air Quality, with a Co-Benefit of Reducing CO₂ Emissions

A Breath of Fresh Air: Managing Air Quality November 1, 2018

Sherry Godlewski NH Department of Environmental Services



Clean Air Act 1970

Amended 1977 & 1990

EPA sets standards and we have to comply

- based on latest science and technology
- Set enforceable emission limits on large pollutant-emitting facilities
- Set emission standards for motor vehicles and fuels

Our job is to ensure that air quality standards are met!





National Progress Toward Clean Air



Meeting the Clean Air Act Standards Protecting Public Health





"The Dirty Half-Dozen"

(Criteria Air Pollutants)

Ozone

Nitrogen Oxides





Fine Particle Pollution (PM)

Sulfur Dioxide

Carbon Monoxide



EPA has set Outdoor Air Standards for each Criteria Pollutant (National Ambient Air Quality Standards – NAAQS)

Primary Standards: Health-based standards to protect public health with adequate margin of safety (for example parts per million)

Secondary Standards: Welfare-based standards to protect environment (e.g., crops, vegetation, wildlife, buildings and visibility)





NHDES' Mobile Source Program

Clean Diesel Program EPA supported: retrofits & replacements



Transportation Conformity A review process to ensure federally funded projects do not impact the NAAQS

Granite State Clean Cities Reduce petroleum use in transportation by promoting alternative fuels & fuel reduction strategies







Durham's EV Charging Station

Annual "pump it up" events – check air pressure of employee vehicles



Carpooling incentives





Work with DOT & Regional Planning Commissions



Walkable Communities

Park & Rides; Transit

Commute Green Events

Supporting Local Food!











\rightarrow Ski Areas

- \rightarrow School pick up areas
- \rightarrow School busses
- \rightarrow Municipalities
- \rightarrow Hospitality Industry

Co-benefits of Our Programming





Total U.S. Greenhouse Gas Emissions by Economic Sector in 2016





Wintertime Air Pollution

Keene NH at dawn on 12/2/2012

Cleaner air at higher elevations

Inversion Layer



Pollution trapped in valley by temperature inversion

Wood Stove Change - Out Programs

Problem with wood smoke build up in valley areas

Funding to replace old inefficient wood stoves

Education about burning & storing wood the right way









Outreach Campaign Message

Burn the right wood – burn only dry hardwood

Use the right stove – it is best to use an EPA certified stove. If you can't buy a new woodstove keep yours cleaned at least yearly

Burn the right way – maintain a hot bright fire. Smoldering wood is inefficient and makes more smoke!

Haven't gone over the standard since 2013!

Emission reductions, more efficiency in wood burning, more sustainable fuel use & less pollution!





Not Just Air Resources

Other Initiatives with Co-Benefits



NHSaves Button Up Workshops

NH Saves - Collaboration of New Hampshire's electric and natural gas utilities

Provide customers with information, incentives, and support designed to save energy, reduce costs, and protect our environment statewide

Cover basic building science principles and examples of whole house weatherization measures that will button up homes for the heating and cooling seasons

Include energy efficiency programs offered by NH utilities, availability of energy audits and weatherization, rebates on electric and gas appliances as well as for new construction







Other Ideas and Programs with Co-Benefits of Reducing CO₂ Emissions

Partner with Utilities to Help Businesses Reduce Energy Use + SAVE MONEY

Water Conservation

Keeping Land in Open Space Forestry + Agriculture Wetlands + Salt Marshes + Buffers CO₂ sink

Any Waste Reductions Initiatives

Any Energy Efficiency Initiatives





Other opportunities within our Adaptation & Resiliency work

Thank You





CleanAir Cabs:

Climate Change, Public Health, and Environmental Justice



Paul Shoemaker, MPH, MBA Director, Division of Environmental & Occupational Health Boston Public Health Commission





Board of Health for the City of Boston

 Mission: To protect, preserve, and promote the health and well being of Boston's residents, particularly the most vulnerable



Environmental & Occupational Health Division Mission

To respond to the full range of environmental and occupational public health issues in residences, public buildings, businesses, industry, and the environment, which pose a health threat to the citizens of Boston, particularly those most vulnerable.



Boston's Taxi Industry in 2005

- Limited number (1,825) of medallions controlled by a small pool of owners, most also own the cars
- Owner leases the car/medallion to a driver
 - > \$700/week (14 consecutive 12-hour shifts)
 - > \$170/week premium for a hybrid
 - > 12-hour shift rates are \$77/\$18
- Driver pays for all fuel costs and tolls/fees
- Driver's income is fares less costs



- 1,825 licensed taxi cabs in Boston
- Most used Crown Victorias (10mpg)
- 60,000 100,000 miles/year/car

- Tailpipe emissions asthma and other illness
- Greenhouse gas emissions
- Economic considerations





History of CleanAir Cabs

| April 2005 | BPHC approached by concerned citizen, John Moore, with the idea of hybrid cabs | | | | |
|-------------------|--|--|--|--|--|
| Late 2005 | Shopped the idea to BPD Hackney Division, MASSPort, City Hall, and ICLEI Local Government for Sustainability | | | | |
| Early 2006 | Approval for use of Ford Escape and Toyota Camry hybrids as cabs by BPD | | | | |
| April/May 2006 | Logan Airport offers 'front of line' privilege to hybrid cabs | | | | |
| June 2006 | Receive grant from the Oak Foundation for incentives | | | | |
| Sept. 2006 | First hybrid cab displayed at AltWheels festival on City Hall Plaza | | | | |
| Apr. 2007 | Formal program launch | | | | |

BOSTON PUBLIC HEALTH COMMISSION



The taxicab goes green

TONY LEE tony.lee@metro.us



TUESDAY, SEPTEMBER 26, 2006

BOSTON That's not a racing stripe seen running down the side of a Boston taxicab. More accurately, it's a sign of hope for a cleaner city.

metro

Adorned with a unique green stripe that sets it apart from the rest of the fleet, the city's first hybrid taxi was introduced to the streets this weekend as part of the Alt Wheels Festival.

"This is yet another example of how we can partner with an important industry serving Boston's residents and visitors to reduce impacts on public health and environment," Mayor Thomas Menino said.

A hybrid cab in Boston was originally the idea of John Moore, a local architect who first pitched the idea to the city but was told he needed some numbers to back up his proposal. So Moore went to work, following a cab for to hours in a hybrid to see how much of a difference it would make.

While the cab burned 12 gallons of gas, the hybrid spent just over three.

"That was all they needed to see," said Moore, who launched Boston CleanAir



BOSTON

MAYOR THOMAS MENINO steps into the city's first hybrid taxl, a Toyota Camry introduced to Boston's streets this past weekend.

Cabs soon thereafter.

Moore thought he would surrender the idea if and when he met objections, but he never did. "It's just a great idea," he said. "It helps everyone — the driver, the passenger, the citizens [of Boston]." Chosen by the Boston Cab Association to be the first to drive the Toyota Camry, Festus Igharo, a native of Nigeria, has received nothing but positive returns.

"When people get in the car they say, 'I wish all taxis in Boston were like this,'" Igharo said. Moore hopes to have 100 hybrid taxis on the road within a year. No new medallions are being offered, so the new vehicles would simply replace the old Crown Victorias currently clogging both cab stands and, in reality, the city's air.





Image from Wikimedia.org

BOSTON PUBLIC HEALTH COMMISSION



Excerpt from drivebehind fuel cost study

Crown Victoria vs. Escape Hybrid

| Hybrid Taxi Test: 4/16/2005 | | | | | | | |
|-----------------------------|---|-------|---------|---------|----------|--------------|---------|
| | | | | Moving | Moving | Stopped | Stopped |
| Time Action | Location | Fare? | Odmtr | w/fare | w/o fare | At Stand | Waiting |
| 1:24:00 PM Arrive pickup | Somerville | n | 6932 | 0:00:00 | 0:05:40 | | |
| 1:26:00 PM Leave pickup | | v | | | | 0:00:00 | 0:02:00 |
| 1:34:00 PM Arrive dropoff | Somerville | v | 6934 | 0:08:00 | 0:00:00 | | |
| 1:35:00 PM Leave dropoff | | 'n | | | | 0:00:00 | 0:01:00 |
| 1:42:00 PM Arrive pickup | Cambridge | n | 6936 | 0:00:00 | 0:07:00 | | |
| 1:45:00 PM Leave pickup | | v | | | | 0:00:00 | 0:03:00 |
| 1:53:00 PM Arrive dropoff | Cambridge | Ý | 6938 | 0:08:00 | 0:00:00 | | |
| 1:54:00 PM Leave dropoff | C C | 'n | | | | 0:00:00 | 0:01:00 |
| 2:05:00 PM Arrive stand | Cambridge | n | 6940 | 0:00:00 | 0:11:00 | | |
| 2:07:00 PM Leave stand | , i i i i i i i i i i i i i i i i i i i | n | | | | 0:02:00 | 0:00:00 |
| 2:09:00 PM Arrive pickup | Cambridge | n | 6940.5 | 0:00:00 | 0:02:00 | | |
| 2:11:00 PM Leave pickup | | y | | | | 0:00:00 | 0:02:00 |
| 2:32:00 PM Arrive dropoff | Airport | y | 6947 | 0:21:00 | 0:00:00 | | |
| 2:33:00 PM Leave dropoff | | n | | | | 0:00:00 | 0:01:00 |
| 2:48:00 PM Arrive stand | Somerville | n | 6953 | 0:00:00 | 0:15:00 | | |
| 2:51:00 PM Leave stand | | n | | | | 0:03:00 | 0:00:00 |
| 2:54:00 PM Arrive pickup | Somerville | n | 6953.5 | 0:00:00 | 0:03:00 | | |
| 2:56:00 PM Leave pickup | | y | | | | 0:00:00 | 0:02:00 |
| 3:01:00 PM Arrive dropoff | Somerville | y | 6954 | 0:05:00 | 0:00:00 | | |
| 3:08:00 PM Leave dropoff | | n | | | | 0:00:00 | 0:07:00 |
| 3:11:00 PM Arrive stand | Somerville | n | 6955 | 0:00:00 | 0:03:00 | | |
| 3:25:00 PM Leave stand | | n | | | | 0:14:00 | 0:00:00 |
| 3:26:00 PM Arrive pickup | Somerville | n | 6955.5 | 0:00:00 | 0:01:00 | | |
| 3:27:00 PM Leave pickup | | У | | | | 0:00:00 | 0:01:00 |
| 3:50:00 PM Arrive dropoff | Somerville | У | 6959 | 0:23:00 | 0:00:00 | | |
| 3:50:20 PM Leave dropoff | | n | | | | 0:00:00 | 0:00:20 |
| 4:07:00 PM Arrive pickup | Somerville | n | 6963 | 0:00:00 | 0:16:40 | | |
| 4:08:00 PM Leave pickup | | У | | | | 0:00:00 | 0:01:00 |
| 4:15:00 PM Arrive dropoff | Somerville | У | 6964 | 0:07:00 | 0:00:00 | | |
| 4:17:00 PM Leave dropoff | | n | | | | 0:00:00 | 0:02:00 |
| 4:20:00 PM Arrive pickup | Somerville | n | 6965 | 0:00:00 | 0:03:00 | | |
| 4:23:00 PM Leave pickup | | У | | | | 0:00:00 | 0:03:00 |
| 4:32:00 PM Arrive dropoff | Somerville | У | 6967 | 0:09:00 | 0:00:00 | | |
| 4:35:00 PM Leave dropoff | | n | | | | 0:00:00 | 0:03:00 |
| 4:44:00 PM Arrive pickup | Somerville | n | 6969 | 0:00:00 | 0:09:00 | | |
| 4:45:00 PM Leave pickup | | У | | | | 0:00:00 | 0:01:00 |
| 4:57:00 PM Arrive dropoff | Somerville | У | 6972 | 0:12:00 | 0:00:00 | | |
| 4:58:00 PM Leave dropoff | | n | | | | 0:00:00 | 0:01:00 |
| 5:06:00 PM Arrive pickup | Somerville | n | 6973 | 0:00:00 | 0:08:00 | | |
| 5:07:00 PM Leave pickup | | У | | | | 0:00:00 | 0:01:00 |
| 5:24:00 PM Arrive dropoff | Back Bay | У | 6978 | 0:17:00 | 0:00:00 | | |
| 5:24:20 PM Leave dropoff | | n | | | | 0:00:00 | 0:00:20 |
| 5:40:00 PM Arrive HQ | Somerville | n | 6984 | 0:00:00 | 0:15:40 | | |
| 9:02:00 hours | TOTALS: | 17 | 97.0 | 3:14:40 | 3:27:40 | 1:11:00 | 1:08:40 |
| | | | | | | | |
| Vehicles: | | | | | | | |
| | | | gallons | | | | |
| ???? Crown Victoria | 181.280 mi. | 10.25 | used | | \$22.03(| \$2.149/gal) | |
| | , | | gallons | | | | |
| 2005 Eccano (4)4/D) | 6 997 mi | 2 77 | used | | ¢9 10 | | |
| 2005 Escape (4WD) | 0,00/1111. | 5.77 | useu | | 20.10 | | |

Boston Cab Association Toyota Camry Hybrid Taxi (2007) Fuel Consumption data

Camry Fuel Use Data

| Fill-up Date | Gas Used (gallons) | Gas Used (dollars) | Gas Price (\$/gallon) | Odometer Reading | Miles Traveled | Mileage (miles/gallon) |
|-----------------|-----------------------|-----------------------|--------------------------|---------------------|-------------------|---------------------------|
| 10/5/06 | n/a | n/a | n/a | 5240 | n/a | n/a |
| 10/7/06 | 10.597 | \$22.88 | \$2.16 | 5603 | 363 | 34.3 |
| 10/10/06 | 8.570 | \$18.33 | \$2.14 | 5897 | 294 | 34.3 |
| 10/11/06 | 8.658 | \$18.52 | \$2.14 | 6184 | 287 | 33.1 |
| 10/13/06 | 8.357 | \$17.54 | \$2.10 | 6474 | 290 | 34.7 |
| 10/16/06 | 11.812 | \$24.79 | \$2.10 | 6862 | 388 | 32.8 |
| 10/18/06 | 9.904 | \$20.59 | \$2.08 | 7203 | 341 | 34.4 |
| 10/20/06 | 9.833 | \$20.44 | \$2.08 | 7534 | 331 | 33.7 |
| 10/21/06 | 6.943 | \$14.43 | \$2.08 | 7752 | 218 | 31.4 |
| 10/23/06 | 10.040 | \$20.87 | \$2.08 | 8072 | 320 | 31.9 |
| 10/26/06 | 10.317 | \$21.45 | \$2.08 | 8413 | 341 | 33.1 |
| 10/28/06 | 11.319 | \$23.19 | \$2.05 | 8783 | 370 | 32.7 |
| 10/31/06 | 11.647 | \$24.21 | \$2.08 | 9190 | 407 | 34.9 |
| 11/2/06 | 9.415 | \$19.57 | \$2.08 | 9521 | 331 | 35.2 |

| Totals: | 28 | 127.41 | \$266.81 | \$2.09 |
|---------|------|---------|----------|-----------|
| | days | gallons | | (average) |

John W. Moore Source: Boston CleanAir CABS johnm@post.harvard.edu











BOSTON

Greenhouse Gas Emissions

Cumulative CO₂ Emissions for a Single Taxi

🗖 Crown Victoria taxi 🛛 🗖 Hybrid Taxi



5-year savings ~360,000 pounds of $C0_2$ /cab replaced at 60,000 miles/year/cab



- August 2008 City mandates all cabs in fleet convert by 2015
- March 2009 Medallion owners sued in Federal Court, blocking the order
- 2012 City awards Boston Cab Association with the Green Business Award for converting 400/500 cabs





Impact as of Summer 2018

• 1,828 taxi medallions in Boston

1,787 currently on the road

●861 (48% of cabs on the road) are hybrids



Climate Change & Co-Benefits

~3,800 gallons of gasoline saved per cab every 60,000 mile year

- 72,200 pounds of CO₂ equivalent emissions prevented at the tailpipe
- ~\$6,800 increased revenue for medallion owner
- ~\$4,000 increased income for the driver (\$10,500 gas savings less lease premium)





Climate Change & Co-Benefits

~3,271,800 gallons of gasoline unburned every year by the fleet

- Over 31,000 tons of CO₂ reduced per year at the tailpipe
- Over 155,000 tons over 5 years
- Asthma ED visits decreased despite no change in the rate (12%) of adults with asthma
 - > 11/1,000 in 2003
 - > 10.12/1,000 in 2015
- Cab drivers report higher customer satisfaction



- Coalition building engaging gatekeepers and peers
- "Speak the language of the audience"
 - > Health, Finance, Safety, Climate, Prestige
- Limited time incentives to get from early adopters to critical mass
- Leading by example



Remaining & Emerging Challenges

- Getting the rest of the cabs
- Reducing personal vehicle traffic
- Rideshare services like Uber and Lyft
 - > Nearly 100,000 rides/day
 - > Pulling passengers from public transit as well as cabs
 - > No clear incentive mechanism for hybrids/EV but there are central decision-makers

Questions

- Please submit questions via the Q&A section (not Chat)
- Select to All Panelists.
- If we are not able to get to your question today, we will try to address it after the webinar in our general follow up email or you may hear directly from the presenters.



Join us again in January for:

Built Environment - Resilient Water Features Thursday, January 24, 2019 12:00-1:15 PM EST

Climate change is expected to produce heavier rainfalls and more intense storms that can contaminate lakes and estuaries, while rising seas drive stronger currents that combine to erode shorelines. Resilient communities will need to be able to live with more water in motion. This session uses water resources planning and adaptation to better prepare for the next emergency, and to sustainably manage flooding and sea level rise. It covers a range of climate adaptation from coastal adaptation with living shorelines (Burdick), and municipal resiliency for inland flooding as it relates to green infrastructure (Roseen). Participants will leave this session with an appreciation of reorganizing and maintaining the landscape to mitigate projected impacts through enhanced knowledge of nature-based infrastructure, application of low-impact development, site design, and other smart growth practices to address climate effects.



Presenters: Dr. David Burdick, University of New Hampshire and Dr. Robert Roseen, Waterstone Engineering

ANTIOCH UNIVERSITY NEW ENGLAND Center for Climate Preparedness and Community Resilience



Thank You

Please take the time to fill out the short evaluation for this webinar so we can continue to bring you topics that are most useful for you. An evaluation link has already been emailed to you.

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U.S. Climate Resilience Toolkit