Urban Trees Help Conserve Fuel in Parked Cars

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Everyone who fills a car's gas tank with gasoline at the filling station knows that gasoline is volatile - the smell of fuel vapours is the giveaway here. What we smell are volatile organic compounds (VOCs), mainly benzene. There is also methane in gasoline, and it, like benzene, is dangerous to our health. Getting a whiff of gasoline in the air when we fill the car's gas tank generally is not harmful, thankfully. But on the whole, it is simply not good that some of the chemicals in gasoline escape into the atmosphere as vapour. For one thing, that material is then not available to power the car, so you've paid for some gasoline, as little as it might be, that you don't burn. Second, the vapours are unwelcome in the atmosphere - the direct adverse health effects on humans are well known, plus these VOCs add to the chemical soup we call urban air which is generally relatively dirty. VOCs are various sorts are precursors to smog formation.

Consistent with the basic laws of chemistry and physics, the hotter the liquid, the greater the rate of loss of vapours from it. Icy water, for example, doesn't lose as much water vapour as does boiling water. So, if your car is sitting under a hot summer sun all day - and you know how hot it can get inside the car after hours in the blazing sun - it is losing more fuel as vapour than if the car were shaded.

Shade is pretty much the only way we can keep a car cool in the summer. Let's start with built shade. At home, that's the garage, carport, or underground parkade. Away from home, it would be a multi-storey concrete parkade (except for the top floor which is usually open to the elements). Built infrastructure works. But so do trees! Many people don't like to park their cars under trees because of the various drippings that fall from the leaves and insects in the canopy, not to mention the frequent bird poop. That aside, the air temperature under tree shade can be several degrees cooler than that in direct sunshine, plus the direct sunshine on the car can lead to heating inside the vehicle that goes far beyond just the air temperature.

Let's consider an outdoor parking lot at a business park or shopping mall. My favourite in thinking through this issue of fuel volatilization is Bayers Lake on the west side of Halifax. There are hectares upon hectares of asphalt surface on both sides of, and including, Chain Lake Drive (see the Google image below). If there are trees in that landscape, they are small ones, far apart, along the Chain Lake sidewalks. We know that sunlight on the asphalt also causes VOCs to escape the bitumen mix and enter the atmosphere (we'll address this issue of asphalt degradation in a later article). The asphalt is dark, especially when fresh, meaning that it absorbs more heat per unit area than, say, a white surface like concrete or a green surface such as foliage.

Needless to say, the parking lots are hot places on a warm sunny summer day. Now, imagine the parking lot full of cars, each one heating up when sitting still in the parking lot, sometimes for many hours. VOCs are continuously escaping from the fuel tanks. Could there be a solution for shading the cars to reduce their temperature and thus reduce the VOC emissions? I see three possibilities. First, an indoor concrete parkade. This would be costly, and I doubt that the

community of interests in Bayers Lake would consider charging for parking in such a facility (actually, one would need several to service the entire business park). Second, perhaps a field of photo-voltaic panels could be installed some five or six metres above the parking surface, thus generating electricity while shading the cars underneath. Third, the parking lots could be rebuilt so that trees shade all the parked cars.

The tree solution is one many people would scoff at. Surely the expense would be enormous compared to the benefit. To that I would say "yes" if you consider only the benefit of reducing VOC emissions. As this series of articles will demonstrate, a single tree, line of trees, or woodland full of trees generate a diverse and plentiful array of benefits for people in urban areas.

I know there are tree-shaded parking lots in various cities in Canada, but they are usually quite small. What might a large one look like? Well, it would look like the Parc des Allées de Chartres in Bordeaux, France. The Google image below shows that in summer, the canopy over the parking lot - exclusively of London plane trees - is fully closed. I visited this place only in winter, but it was still full of cars, as in the photos I took in 2013.

To close, trees are, on balance, good to have in parking lots, partly to shade cars and keep them cool and losing less gasoline from their tanks. But as Scott and colleagues wrote in 1999, the costs and benefits of trees in parking lots are complicated to sort out. Wolf (2004) offered a series of considerations for making parking lots less environmentally damaging. Trees are effective in doing that.

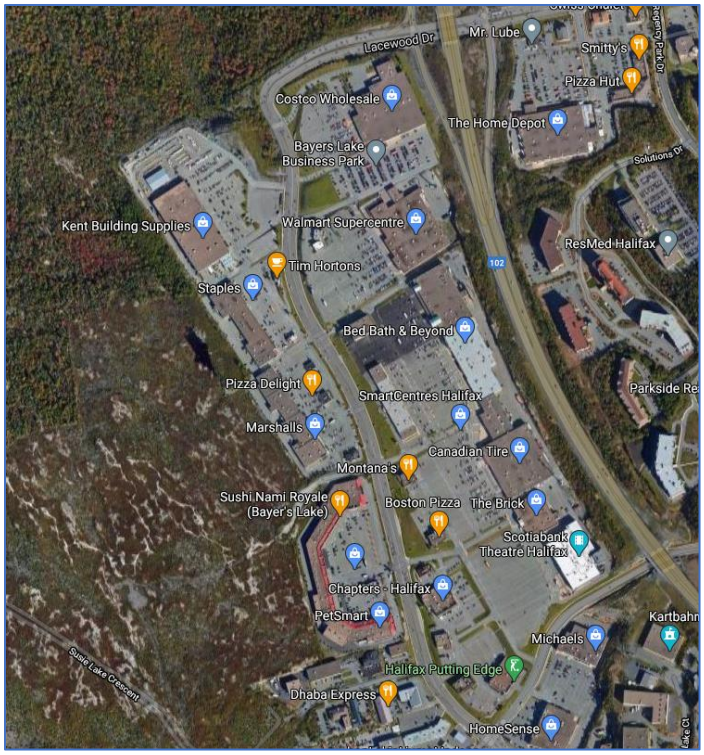
References:

Scott, K.I., J.R. Simpson, and E.G. McPherson. 1999. Effects of tree cover on parking lot microclimate and vehicle emission. Journal of Arboriculture 25:129-142.

Wolf, K. L. 2004. Trees, Parking and Green Law: Strategies for Sustainability. Stone Mountain, GA: Georgia Forestry Commission, Urban and Community Forestry.

Additional Reading:

https://www.fluorotherm.com/tips-preventing-gas-evaporation/


Lacewood Dr
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Bayers Lake Business Park
Solutions Dr
Kent Building Supplies
Walmart Supercentre
ResMed Halifax
Tim Hortons
102
Staples
Bed Bath & Beyond
Pizza Delight
SmartCentres Halifax
Parkside Re
Marshalls
Canadian Tire
Montana's
Sushi Nami Royale (Bayer's Lake)
Boston Pizza
The Brick
Scotiabank Theatre Halifax
Chapters - Halifax
PetSmart
Kartbahn
Michaels
Halifax Putting Edge
Dhaba Express
HomeSense


Rue Ferrere
Unité Locale Bordeaux Croix-Rouge française
iConcept Bordeaux
Computer store
Chartres
Quai Louis XVIII
Hôtel des Quinconces
Consulat Général de Turquie
Flash Immobilier
Allées de Chartres
Allées de Chartres
Parc des Allées de Chartres
Allées de Bristol
Allées de Bristol
Quai Louis XVIII
Monument aux Girondins
Dramatic, historic fountain monument
Place des Quinconces


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