Going Green with inthinc™

How inthinc's Vehicle Telematics Benefit the Environment by Reducing Fuel Consumption

inthinc Technology Solutions: leveraging telematics to help corporations improve driver safety, optimize fleet management costs and reduce vehicles' impact on the environment.

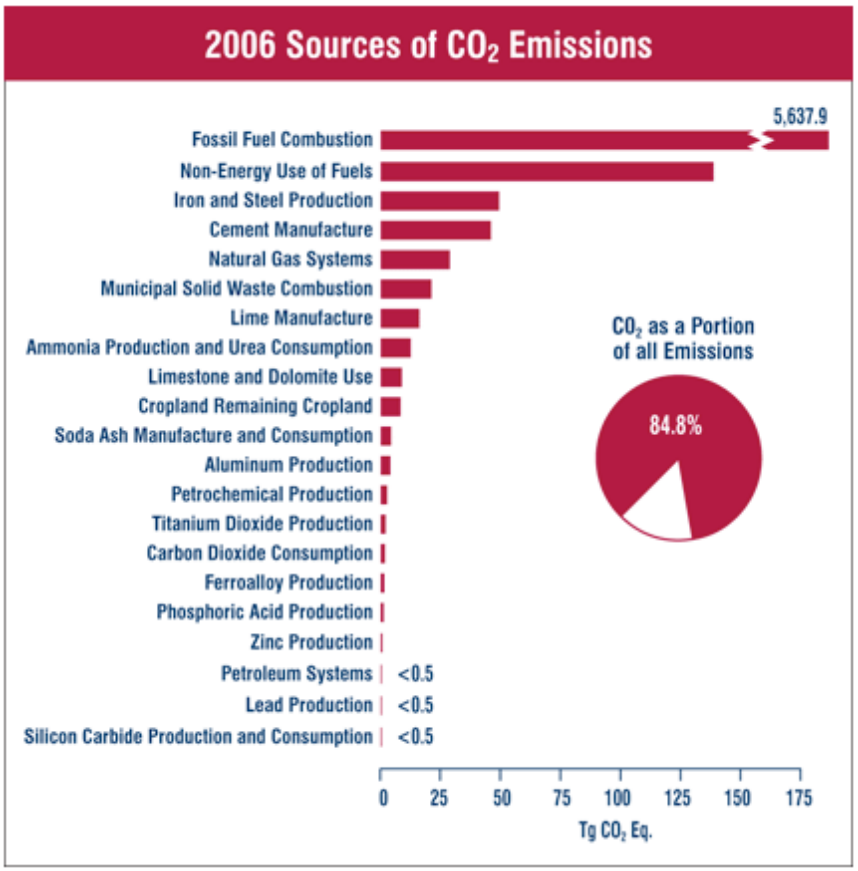
The Environmental Dangers of CO_2

According to the Intergovernmental Panel on Climate Change (IPCC), man-made global warming is likely to cause various global calamities, including widespread drought, famine, coastal flooding, increased malnutrition and the destruction of many animal species.[i] Conventional wisdom holds that anthropogenic global warming is caused by the drastic increase of greenhouse gases (GHG) that have been pumped into the atmosphere beginning with the industrial revolution. Of all the GHGs, carbon dioxide is allegedly the most harmful. To this point, the IPCC claims, "Carbon Dioxide (CO_2) is the most important anthropogenic GHG. Its annual emissions grew by about 80% between 1970 and 2004."[ii]

By far the largest source of CO_2 emissions is fossil fuel combustion (see **Figure 1**). The process of generating electricity is the single largest source of CO_2 emissions in the United States, representing 41 percent of all CO_2 output. Transportation ranks immediately behind electricity generation as the second largest contributor of anthropogenic CO_2. [iii]

Figure 1

Sources of CO_2 Emissions[iv]



According to the Environmental Protection Agency (EPA),

> Almost all of the energy consumed in the transportation sector is petroleum based, including gasoline, diesel and jet fuel. Automobiles and light-duty trucks account for almost two-thirds of emissions from the transportation sector and emissions have steadily grown since 1990….
>
> Emissions from transportation depend on the number of trips or miles traveled by each type of vehicle each year, which are in turn influenced by larger economic trends and consumer behavior. Over the long term, changes in the fuel efficiency of vehicles (e.g., mileage), and in the type of fuel used can also influence the level of emissions.[v]

Petroleum-based energy has monetary as well as environmental consequences. The U.S. consumed approximately 145 billion gallons of gasoline in 2010.[vi] At a very conservative average price of $3.21 per gallon (February 2011), Americans are expected to spend just over $455 billion dollars on gasoline alone assuming consumption levels are constant.[vii] Organizations relying on fleet vehicles understand better than most the enormous burden of these fuel costs. Each year it is increasingly clear that society needs a solution to alleviate the environmental and financial costs imposed by motor vehicles.

inthinc's Green Solution

inthinc™ technology can alleviate the environmental and financial costs associated with automobile emissions in three ways:

1. Minimizing engine time
2. Controlling speed
3. Reducing aggressive driving

Minimizing Engine Time

Idle Time

In a 2009 study, researchers explained in detail the environmental and financial cost of idling.

> …the average American idles for roughly 16 min a day, resulting collectively in close to 94 MMt (million metric tons) of CO_2 and over 10 billion gallons of gasoline annually. The CO_2 emissions associated with idling account for roughly 1.6% of the total US emissions, based on estimates from 2006. To put these figures into context, 94 million tons of CO_2 is almost double the total emissions for the iron and steel manufacturing industry, which as the largest industrial source of carbon in the US produces around 51 million tons annually…. Idling accounts for 9% of all CO_2 emissions associated with the use of private motor vehicles and 5% of all emissions attributable to the individual and household sector.[viii]

In commercial applications, where drivers aren't personally responsible for fuel or maintenance costs of the vehicles they drive, idling can be an even larger problem. This is especially true for service fleets making several stops daily. In this start-and-stop environment, the vehicle is often left running, even though the EPA suggests that vehicles should be turned off rather than idling for 30 or more seconds.

The average American idles for roughly 16 minutes a day, creating almost 94 million metric tons of CO_2 and burning over 10 billion gallons ($30 billion) of gasoline annually.

inthinc's idle time monitoring capability provides fleet managers with the information to eradicate idle time completely— sometimes dramatically reducing emissions and cutting fuel costs in the process.

Consider the realistic circumstances of an imaginary organization that maintains a fleet of 500 service vehicles. On average, each vehicle makes 5 service calls per day and each call lasts an average of 30 minutes. Despite a policy to turn off the vehicle at each stop, 20% of the drivers (100) leave their cars running during each service call. By correcting non-compliant idling behavior, over one year the organization would idle 66,000 fewer hours, burn approximately 37,620 fewer gallons of gasoline and save about $94,000 in fuel costs. According to EPA averages, it will also release 366 fewer tons of CO_2 into the atmosphere in the same time frame.[1]

Figure 2 shows a section of the inthinc idle time report from a real fleet. It reports total driving time, low idle time, high idle time, total idle time and the percentage of total driving time represented by each. The report easily sorts to show the most egregious idling offenders.

Figure 2

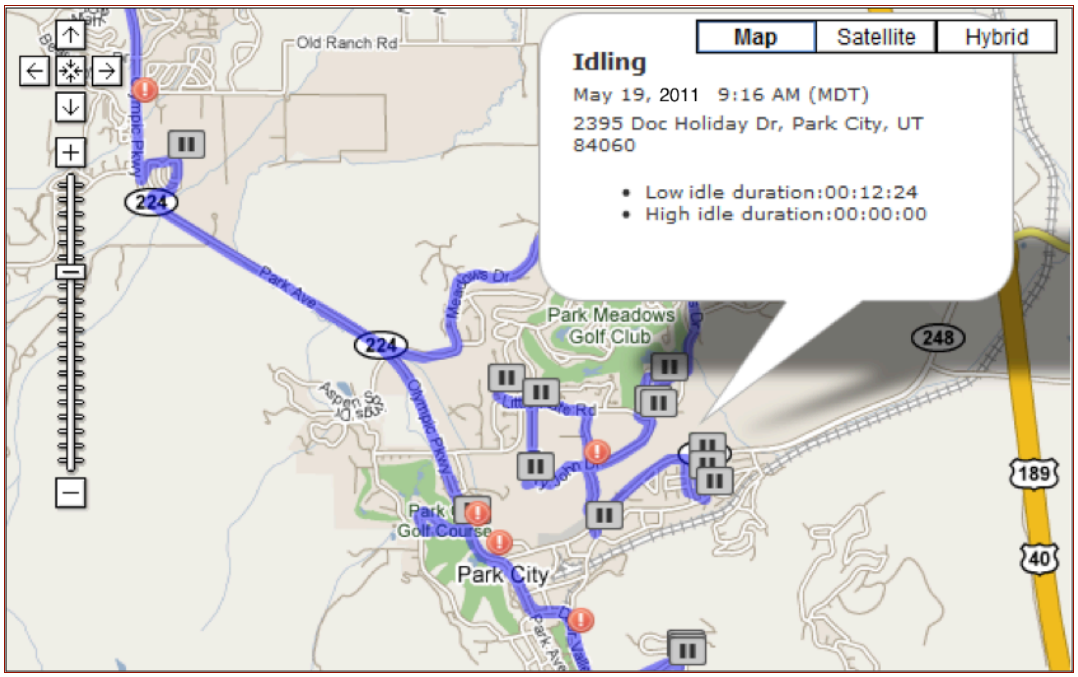
The inthinc Idling Report

For even greater detail, a fleet manager can select the "trips" hyperlink on the right hand side of the report. **Figure 3** shows the last 30 days of trips and all associated violations, including idling events. Each icon that looks like the pause button on a remote control represents an idling event. By clicking on an icon, an administrator can acquire the details of each event. This idling data enables administrators to easily identify inappropriate idling behavior and take corrective measures.

[1] These numbers are based on EPA estimates that idling burns .57 gallons of gasoline per hour and that on average an idling vehicle emits 1.4g of CO2. Also assumes price of $2.50 per gallon of gasoline.

Figure 3

Idle Event Details



Unauthorized Trips

Employees often use work vehicles for personal purposes. Moonlighting activities, side jobs, and personal visits can add up to a significant number of unauthorized miles. Like idling, these miles increase fuel costs and unnecessarily add CO_2 to the atmosphere; they also increase maintenance costs and the likelihood of a crash. Because most employers don't have a way to know whether unauthorized miles are being driven, they don't know they have a problem.

Moonlighting activities, side jobs, and personal visits can add up to a significant number of unnecessary miles.

inthinc solutions combat unauthorized miles in three ways. First, an employer can see every trip (where a driver goes from the time the vehicle is turned on to the time it is turned off) over the last 30 days. Since most employers know where their drivers are supposed to operate, they can easily look at a map and determine whether their drivers are operating in the appropriate area. Second, a fleet manager can establish smartZones™ (advanced geofences) that alert administrators in real-time via text message or email when drivers enter or exit a designated area. Lastly, every portal notification is given a time stamp, enabling administrators to very quickly know which drivers are using vehicles during off hours.

Controlling Speed

While each vehicle reaches its optimal fuel economy at a different speed (or range of speeds), gas mileage usually decreases rapidly at speeds above 60 mph. Put simply, obeying the speed limit increases fuel efficiency. And when cars are more fuel efficient, they burn less gas and introduce less CO_2 into the atmosphere.

Enforcing the speed limit in the US could result in roughly 55 million fewer tons of CO_2 over 4 years.

According to the UK Energy Research Center, merely enforcing the current 70 mph speed limit would result in 1million fewer tons of CO_2 produced in the UK by 2009. The UK Energy Research Center also found that decreasing the speed limit from 70 mph to 60 mph would reduce carbon emissions by almost half over four years—over 7.5 million metric tons in all.[ix]

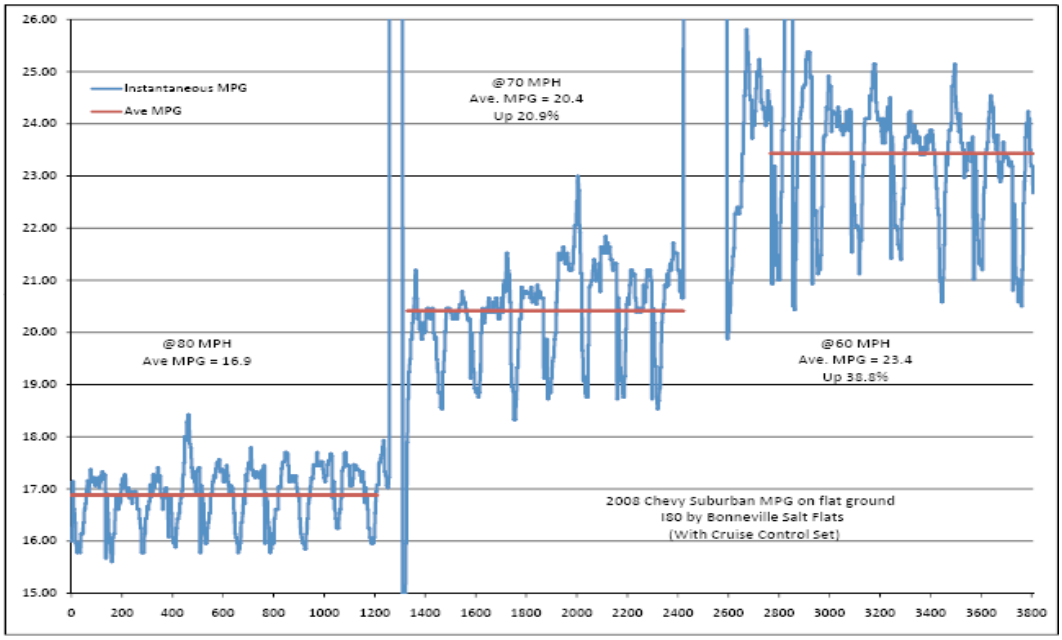
According to the Society of Motor Manufacturers and Traders (SMMT), there were over 34 million vehicles on UK roads in 2006.[x] The United States, on the other hand, supports over 250 million vehicles—almost eight times the number of vehicles in the UK.[xi] Assuming American vehicles achieve a similar reduction in CO_2 emissions, enforcing the speed limit in the US could result in roughly 55 million fewer tons of CO_2 over four years—the equivalent of removing over 8.3 million Toyota Camrys from the road.[xii,xiii]

According to the EPA and US Department of Energy (DoE), one can assume that each 5 mph you drive over 60 mph is like paying an additional $0.24 per gallon for gas (assuming $3.79 per gallon).[xiv]

At high speeds, fuel efficiency fluctuations are very pronounced. An inthinc study showed that decreasing speed from 80 mph to 60 mph in a Chevy Suburban achieved more than a 38% increase in fuel efficency (Figure 4), resulting in an equivalent reduction in GHG emmissions.

Figure 4

Fuel Efficiency at Various Speeds[xv]



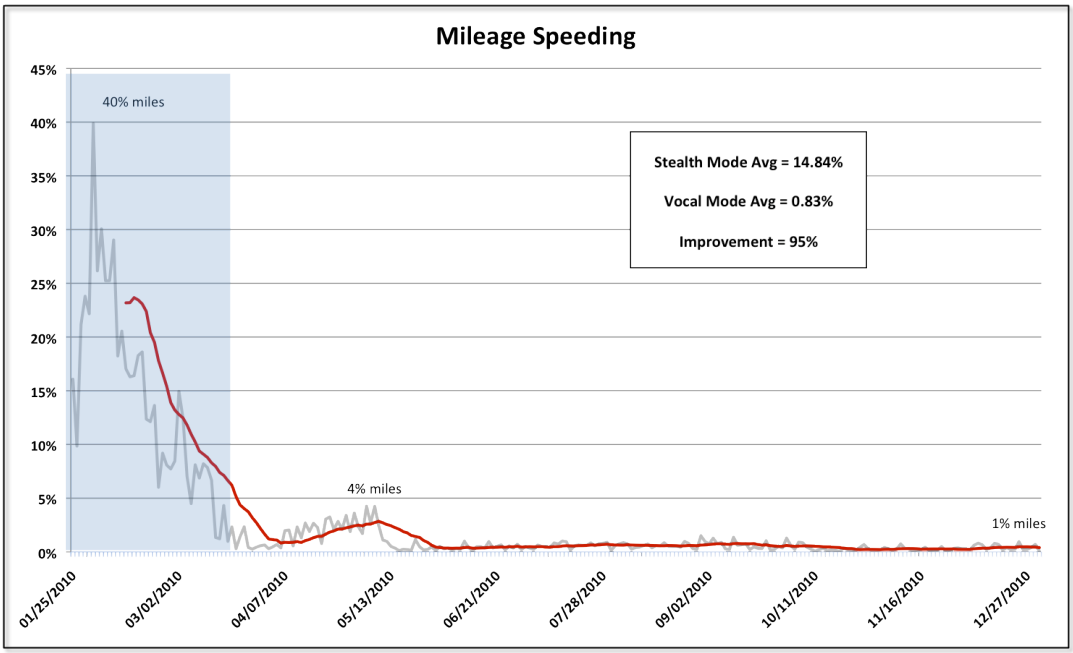
inthinc controls speed with an industry-leading propriety system called Speed-by-Street™. Speed-by-Street is a feature available on all inthinc™ devices that provides real-time alerts to users when their vehicle exceeds the posted speed limit. No other driver safety system has this capability.

Using GPS technology, inthinc devices can identify the road on which a vehicle is located at any given time. By matching street location to a database of associated speed limits, the device informs its user of the posted speed limit by alerting the driver when he exceeds that limit.

In January of 2010, inthinc™ installed safety devices in a large fleet of service vehicles. The effect the devices had on speeding is displayed in **Figure 5**. During the initial 4 weeks, the devices were in "Stealth Mode" in order to establish a baseline of speeding behavior. Within 45 days of implementation, the percentage of driving time spent speeding decreased from 40% to 4%. From January 2010 to December 2010, speeding decreased overall by a total of 95%. Currently, time spent speeding in this fleet is now less that 1% of the time.

Figure 5

Real Fleet Speeding Violation Reduction



Reduce Aggressive Driving

According to the EPA and DoE, aggressive driving (speeding, rapid acceleration and braking) wastes gas. It can lower your gas consumption by 33 percent at highway speeds and by 5 percent around town. inthinc's systems provide mentoring and reports for each of these behaviors. **Figure 6** shows how the inthinc solution reports aggressive driving behavior through the web portal.

Aggressive driving can lower gas consumption by 5% (around town) to 33% (highway).

Figure 6

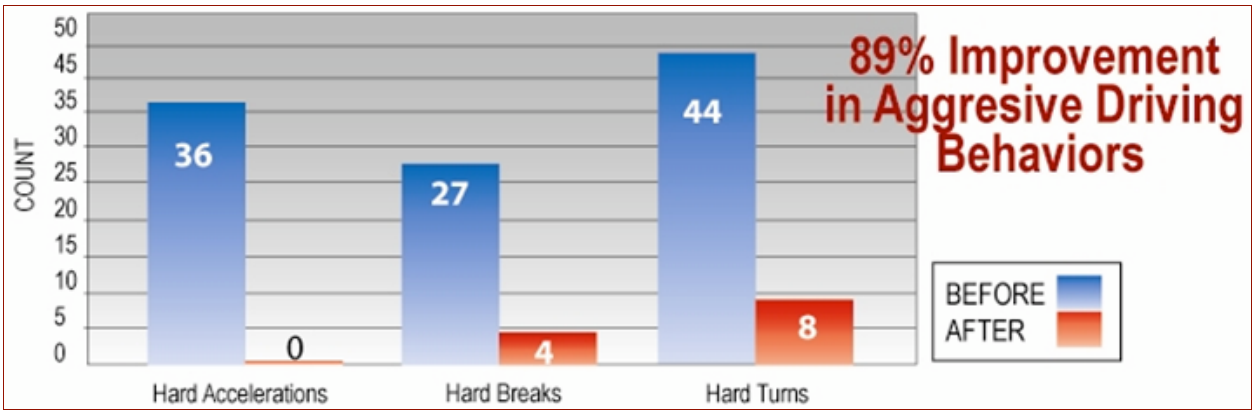
Aggressive Driving Report

Location	Date/Time	Event	Speed	Severity	
4701-4819 S 2165 E, Holladay, UT 84117, USA	Apr 25, 2011 3:47 PM (MDT)	Unsafe Turn	17 mph	Low	exclude
6295-6387 S Cottonwood Canyon Rd, Salt Lake City, UT 84121, USA	Apr 25, 2011 7:11 AM (MDT)	Hard Acceleration	14 mph	Low	exclude
400 Areva Rd, Roosevelt, UT 84066, USA	Apr 24, 2011 4:06 PM (MDT)	Hard Dip/Bump	9 mph	Low	exclude
U.S. 191, Helper, UT 84526, USA	Apr 23, 2011 5:13 PM (MDT)	Hard Dip/Bump	29 mph	Low	exclude
997-1135 Fort Union Blvd, Midvale, UT 84047, USA	Apr 20, 2011 3:32 PM (MDT)	Hard Acceleration	0 mph	Low	exclude
1900-1978 S Charleston Ln, Salt Lake City, UT 84121, USA	Apr 19, 2011 9:30 PM (MDT)	Hard Acceleration	0 mph	Low	exclude
1801-1839 E 4525 S, Holladay, UT 84117, USA	Apr 19, 2011 4:07 PM (MDT)	Hard Dip/Bump	16 mph	Low	exclude
4700-4750 S 2000 E, Holladay, UT 84117, USA	Apr 19, 2011 1:32 PM (MDT)	Hard Dip/Bump	16 mph	Low	exclude

The ability to monitor and mentor aggressive drivers has drastically reduced aggressive driving events within inthinc's install base. **Figure 7** shows the aggressive driving improvements an actual fleet experienced by implementing inthinc technology. This company not only saved significant money in fuel and maintenance costs, they made their drivers safer and drastically reduced CO_2 emissions at the same time.

Figure 7

Real Fleet Aggressive Driving Reduction



The inthinc Effect on the Environment

Excessive engine use (from idling or unnecessary trips), speeding and aggressive driving can combine to more than double CO_2 emissions. Given the vast number of fleet vehicles, limiting these behaviors would result in unprecedented reductions in CO_2 emissions nationally and worldwide. inthinc's solutions are designed specifically to address these environmentally unfriendly driving behaviors. Current inthinc customers have experienced significant improvements in each of these behavioral areas. inthinc's results are good for everybody: the company saves money in fuel consumption, maintenance costs and crash reduction; the drivers are safer because they drive less aggressively and obey the speed limit; and the atmosphere absorbs up to 50% less CO_2—keeping our kids and grandkids safe from the calamities associated with climate change.

---

[i] Intergovernmental Panel on Climate Change. Climate Change Report 2007: Synthesis Report.
[ii] Ibid.
[iii] Environmental Protection Agency. Retrieved May 2009 from http://www.epa.gov/climatechange/emissions/co2_human.html
[iv] EPA. Retrieved Jun 2009 from http://www.epa.gov/climatechange/emissions/co2_human.html
[v] Ibid.
[vi] Environmental Information Agency. Retrieved April 2011 from http://tonto.eia.doe.gov/ask/gasoline_faqs.asp
[vii] Ibid.
[viii] Carrico, A.R. et al., Costly myths: An analysis of idling beliefs and behavior in personal motor vehicles. Energy Policy (2009), doi:10.1016/j.enpol.2009.03.031
[ix] The UK Energy Resource Center. Quick Hits: Limiting Speeding. October 2006. Retrieved Jan 2009 from http://www.ukerc.ac.uk/Downloads/PDF/Q/Quick%20Hits/0610LimitingSpeed.pdf
[x] Society of Motor Manufacturers and Traders. Retrieved Jan 2009 from http://www.smmt.co.uk/dataservices/indanalysis.cfm?catid=551&sid=-2

[xi] Department of Transportation. Bureau of Transportation Statistics. Retrieved Jan 2009 from http://www.bts.gov/publications/national_transportation_statistics/html/table_01_11.html
[xii] EPA. Retrieved Jan 2009 from http://www.epa.gov/oms/consumer/f00013.htm
[xiii] Data360. Retrieved Jun 2009 from http://www.data360.org/dsg.aspx?Data_Set_Group_Id=629
[xiv] EPA and DoE. Retrieved April 2011 from http://www.fueleconomy.gov/feg/driveHabits.shtml
[xv] Internal inthinc Experiments. 2008.