

Chapter 1 : How Much Americans Spend On Gas Every Year [GRAPHIC] | HuffPost

Turning Wasted Fuel Into Profit When it comes to fleet operations, wasted fuel is a huge eater of profit for your business. Fuel can be wasted by poor maintenance upkeep, driver performance and route planning.

Those represent the direct costs of fossil fuels; money paid out of pocket for energy from coal, natural gas, and oil. What are fossil fuels? Fossil fuels are rock-like, gas, or liquid resources that are burned to generate power. They include coal, natural gas, and oil, and are used as an energy source in the electricity and transportation sectors. Externalities are sometimes easy to see, such as pollution and land degradation, and sometimes less obvious, such as the costs of asthma and cancer, or the impacts of sea level rise. Many consequences are far removed from our daily lives and may only affect a minority or marginalized subset of the population. Costs accrue at every point of the fossil fuel supply chain. Extraction processes can generate air and water pollution, and harm local communities. Transporting fuels from the mine or well can cause air pollution and lead to serious accidents and spills. When the fuels are burned, they emit toxins and global warming emissions. Even the waste products are hazardous to public health and the environment. Understanding these impacts is critical for evaluating the true cost of fossil fuels—and for informing our choices around the future of energy production.

Extracting fossil fuels Photo: Shutterstock There are two main methods for removing fossil fuels from the ground: Mining is used to extract solid fossil fuels, such as coal, by digging, scraping, or otherwise exposing buried resources. Drilling methods help extract liquid or gaseous fossil fuels that can be forced to flow to the surface, such as conventional oil and natural gas. Both processes carry serious health and environmental impacts. Coal mining Over the past several decades, there has been a gradual shift from underground coal mining to surface mining in the United States. Surface mining, which is only effective for shallow deposits, often employs highly invasive techniques, including area strip mining and mountaintop removal. Underground mining The most obvious and severe cost of underground coal mining is the threat it poses to the health and safety of coal miners. In addition to job site accidents, coal mining can lead to chronic health disorders. Black lung disease pneumoconiosis continues to be a common ailment among coal miners. The disease was responsible for the deaths of approximately 10, former miners between and , and continues today [3]. Adverse impacts to the environment are another significant cost of underground coal mining. Mines can collapse or gradually subside, affecting surface and subsurface water flows. Mine fires also occur, particularly in abandoned mines. And acid mine drainage at underground coal mines can be a long term environmental management issue; according to the US Environmental Protection Agency EPA , if active and abandoned coal mines are not properly managed, water can sometimes flow through the mine and become highly acidic and rich in heavy metals. The resulting drainage water is detrimental to human, plant, and animal life [4]. Surface mining Surface mining involves removing the overlying soil to access the coal below, devastating local environments. Mountaintop removal, a particularly destructive form of surface mining, involves stripping all trees and other vegetation from peaks and hilltops, and then blasting away hundreds of feet of the earth below with explosives. Runoff water, laden with metals, from a mountain top removal site. The process results in both short- and long-term environmental impacts. In the short term, huge volumes of excess rock and soil are typically dumped into adjacent valleys and streams, altering their ecosystems and diverting the natural flow of streams. In the long term, coal removal sites are left with poor soil that typically only supports exotic grasses. Buried valleys are similarly slow to rebound. The EPA reports that as of , mountaintop removal coal extraction had buried nearly 2, miles of Appalachian headwater streams, some of the most biologically diverse streams in the country [6]. Surface mining can also directly impact the health and safety of surrounding communities. Mudslides, landslides, and flashfloods may become more common. And depending on the chemical makeup of the coal deposit, mines can pollute local drinking water sources with toxic chemicals like selenium, arsenic, manganese, lead, iron, and hydrogen sulfide [7]. A Harvard University study, which assessed the life cycle costs and public health effects of coal from to , found a link to lung, cardiovascular, and kidney diseases—such as diabetes and hypertension—and an elevated occurrence of low birth rate and preterm births associated with surface mining practices. Oil and gas drilling The

environmental and health costs of onshore and offshore oil and gas drilling are also significant, and often unseen. The impacts of unconventional extraction methods, such as natural gas hydraulic fracturing commonly called fracking have received much attention, but all methods of oil and gas extraction carry hidden costs.

Water impact When oil and gas are extracted, water that had been trapped in the geologic formation is brought to the surface. When hydraulic fracturing methods are used, the total amount of waste water is amplified by the large volume of water and chemicals involved in the process. One government-sponsored report found that, from 2005 to 2010, 14 oil and gas companies used 1.4 billion gallons of hydraulic fracturing products containing chemicals and other components [12]. Another study identified 1,000 chemicals contained in fracking products used in shale gas extraction. Researchers could track only 100 chemicals from that larger list and found that 25 percent of those chemicals cause cancer or other mutations, and about half could severely damage neurological, cardiovascular, endocrine, and immune systems [13].

Land use A large amount of land is disturbed by the drilling wells, access roads, processing facilities, and pipelines associated with oil and gas drilling operations. In particular, noise and habitat fragmentation can harm wildlife populations. The advent of horizontal drilling technology, used extensively in unconventional gas production, has greatly reduced the surface footprint of drilling operations by allowing multiple wells to be drilled from a single well pad. However, much of the development of the US shale gas resources is occurring in locations where oil and gas production has not previously taken place in some cases in wilderness areas, requiring extensive infrastructure development and land degradation [15].

A flare burning excess methane at a drilling site. The full global warming impact of natural gas also includes methane emissions from drilling wells and pipeline transportation. Methane, the main component of natural gas, is a much more potent greenhouse gas than carbon dioxide—some 34 times more effective at trapping heat over a year timescale and 86 times more effective over a 100 year timescale [16]. Methane losses must be kept below 3 percent. Oil drilling can also produce methane. Although it can be captured and used as an energy source, the gas is often either vented released or flared burned. Vented methane contributes greatly to global warming, and poses a serious safety hazard. Flaring the gas converts it from methane to carbon dioxide, which reduces its impact but still releases additional greenhouse gases to into the atmosphere. The World Bank estimates that 5 percent of methane is flared.

Offshore drilling Offshore oil and gas drilling poses many of the same risks as onshore drilling; however, these risks are amplified due to the remote location of offshore drilling sites and the complicated engineering required. In 2010, an explosion at the Deepwater Horizon offshore oil rig in the Gulf of Mexico killed 11 workers and led to the release of approximately 4 million gallons of oil. The accident was unique in terms of its scale, but environmental and safety incidents are common in the offshore oil and gas industries. Between 2005 and 2010, offshore drilling rigs experienced 34 fatalities, 1,000 injuries, and 60 oil spills of more than 50 barrels each [20]. For example, tar sands —an extremely viscous oil with the consistency of peanut butter—requires significantly more energy to mine and refine, emitting up to three times more greenhouse gas emissions than conventional oil in the process. These and other additional emissions mean that the dirtiest sources of oil can add as much as an extra ton of pollution per year for the average car.

Transporting fossil fuels Photo: Coal In most cases, coal is transported from mines to power plants. In 2010, approximately 68 percent of the coal used for electric power in the US was transported by rail: Train cars, barges, and trucks all run on diesel fuel, a major source of nitrogen dioxide and soot, which carry substantial human health risks [22]. Transporting coal can also produce coal dust, which presents serious cardiovascular and respiratory risks for communities near transportation routes [23].

Natural gas Natural gas is transported over long distances by transmission pipelines, while distribution pipelines deliver gas locally to homes and businesses. But natural gas is also highly flammable, making the process of transporting it from wellhead to homes and businesses dangerous. Between 2005 and 2010, there were 5,000 significant safety incidents related to natural gas pipeline transmission and distribution, leading to fatalities and injuries [24]. In addition to safety concerns, natural gas leaks from transmission and distribution pipelines are a significant source of methane emissions. A recent study, which mapped urban pipeline leaks in Boston, found 3,000 separate leaks under the city streets. The study noted that Boston is not unique; other cities, like New York and Washington DC, have aging natural gas distribution infrastructures, and similar methane leaks are likely widespread [25]. Large leaks from natural gas infrastructure also occur. The growth in LNG shipments has

provoked safety concerns, particularly where LNG terminals are situated near densely settled areas. In the wake of the Sept. Oil Oil is transported across the ocean in supertankers, and it is moved over land by pipeline, rail, and truck. In every case, the risk of oil spills poses a serious environmental threat. The infamous Exxon Valdez oil spill released , barrels of oil into the Prince Williams Sound in Alaska, but was only the 35th largest marine oil tanker spill since While major oil spills have decreased, they still occur: Spills and leaks from onshore oil pipelines also continue to be a major risk. Burning fossil fuels Photo: Wikimedia Some of the most significant hidden costs of fossil fuels are from the air emissions that occur when they are burned. Unlike the extraction and transport stages, in which coal, oil, and natural gas can have very different types of impacts, all fossil fuels emit carbon dioxide and other harmful air pollutants when burned. These emissions lead to a wide variety of public health and environmental costs that are borne at the local, regional, national, and global levels. Global warming emissions Comparing energy sources in terms of their global warming pollution. Adapted from information from the Intergovernmental Panel on Climate Change Of the many environmental and public health risks associated with burning fossil fuels, the most serious in terms of its universal and potentially irreversible consequences is global warming. In , approximately 78 percent of US global warming emissions were energy-related emissions of carbon dioxide. Of this, approximately 42 percent was from oil and other liquids, 32 percent from coal, and 27 percent from natural gas [34].

Chapter 2 : Cat | Managing Fuel Costs with Fleet | Caterpillar

Lower fuel costs - it's easier than you think. Motor fuel, and diesel in particular, is the lifeblood of any construction endeavor. Without fuel, there's no equipment, and without equipment, well, good luck getting that two-ton I beam into place or digging a foundation with a shovel.

After depreciation, fuel is the largest cost for fleets. Controlling this often volatile, ever-changing expense is among the biggest challenges for fleet managers. Truck fleet managers looking for better ways to handle that part of their operation have several tools that they can use to control costs at the pump and during day-to-day operations. Two of the most beneficial are fuel cards and telematics while in-vehicle solutions are also increasing their presence. Fuel cards are the older of these tools, having existed for several decades. But, some high-tech improvements have helped to make fuel cards even more indispensable in running modern truck fleets. Related - Diesel or Gasoline: Above all, fuel cards allow the fleet manager to gauge potential areas of improvement and savings. According to Basile, the fuel card grants fleet managers the ability to compare outside commercial fuel sales to in-house fuel dispensing in near real-time as they occur, which differs from waiting on a once-monthly statement from a credit card provider. Fleet managers know this too well, sometimes reviewing reports can become a daunting task when the fleet manager has to review hundreds of pages worth of monthly transactions. This creates extra work for fleet managers. Additionally, fleet cards hold drivers accountable for their fuel purchases, fuel use, and tracking weekly miles per gallon mpg accurately. The fleet fuel card serves as a watchdog, in the sense that if a fleet driver attempts to misappropriate fuel or cover up their spending at a fueling station, they will be caught. As the fleet driver reports his or her weekly mpg, the fleet manager can weigh that information against the data the fleet fuel card provider generates and reprimand the driver. Evolving Fuel Management Solutions Fuel management has come a long way and continues to be an integral part of fleet operations. And, with the help of advances in technology, the process is made easier for fleet managers to oversee. In-vehicle devices and online portals are making their way into fuel management operations. A trend that is picking up steam is fleets slowly migrating to the radio frequency identification RFID realm. RFID is used to tag objects, in this case, the fleet vehicle, and track them. As fleet managers look for more ways to standardize processes, they can turn to programs that help monitor other areas of fleet operations and link them together. In doing so, the fleet manager would get a more holistic view of their operations while also keeping fuel management in sight. The biggest advantage to online portals, maintenance programs, and in-cab solutions is the passage of data in real time. The fleet manager does not have to wait on reports; he or she can receive notifications of suspicious fueling activity via text message or e-mail. Fleet managers can address drivers and problem areas almost immediately. Differing from other in-vehicle technology providers, Derive Systems offers fleet managers a software solution through engine calibrations that also helps fleets achieve overall savings. From the start, Derive works closely with customers to understand the specific needs of their fleet in order to create a calibration for them. After taking into consideration fluctuations in fuel prices, Derive Systems guarantees a one-year ROI. Instead of focusing on driver behaviors, these evolving fuel management solutions put the emphasis on data and the vehicle. Chris Ransom, manager of Solution Architects for Verizon Networkfleet, defines the issue of fuel management broadly. The first is the most obvious "use less of it. Among the most common are routing efficiency and reduction in idling. The latter, in particular, was a long-suspected waste of fuel, but it took the introduction of telematics and its ability to measure idling to identify the extent of the problem, and take steps to curtail it for fuel and emissions savings. Once an idle time initiative has been put in place and that behavior addressed, speeding and aggressive driving, e. This is especially helpful in areas such as sanitation where a vehicle may have certain pickup points. Simply getting back on the route would cause them to miss spots or need to backtrack, thus increasing fuel usage. There are others as well. There are new areas that telematics has helped fleet managers identify as a potential area of saving fuel. By having insight into fuel costs and KPIs across the entire fleet you can stay in control and prevent possible fraud. For Mark Wallin, VP of Product Management for Telogis, connecting the truck, the driver, and the work together is the key formula for increased efficiency.

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Scorecarding and gamification are a big piece of that. If your fuel management goals are related to driver behavior and optimizing routes to drive fewer overall miles, then the ideal is to empower the drivers to achieve those goals. You will also find more opportunities to reward and encourage the ones who do well and train the ones who fall short. This view allows you to impact driver behavior in a meaningful way. Immediate feedback is another area that will help fleets control fuel cost, according to Sutarik. Fuel was very expensive in It was the No. This is a heck of a tool to use for a promotional statement.

Chapter 3 : Fuel Cost Calculator

The MY CAFE standards for passenger cars and light trucks were a product extensive stakeholder dialogue, and they were expected to save more than \$ trillion in fuel costs and deliver more than \$8, in fuel savings over the lifetime of each vehicle by

Some of the practical ways to reduce fuel cost are listed below. Use public transportation Walking or biking does not consume fuel, and as such does not accumulate fuel cost. In most cases, public transport alternatives to cars such as buses, trains, and trolleys are viable options of reducing fuel cost. Due to the communal nature of ride sharing, the fuel costs of operating public transport are generally less than the fuel costs associated with each individual operating their own vehicle. In some places, public transport is free. Considering the costs associated with owning or renting a car creates even more incentive to use other modes of transportation.

Carpool Also known as car sharing, carpooling is the arrangement between two or more people to travel to a shared destination in a single vehicle. Although a heavier car consumes more fuel, it is usually more efficient than two people driving separate cars towards the same destination. Use a more fuel efficient vehicle Driving a smaller car makes a great difference – the cost per mile is about half for a small sedan than for a large SUV. Similarly, drive with a less powerful engine than you need. Tune the engine A properly tuned engine maximizes power and can greatly enhance fuel efficiency. Make sure the tuner gets the message. Fixing a car that is noticeably out of tune or has failed an emissions test can improve its gas mileage by an average of 4 percent – this amount will vary depending on the nature of the repair. Fixing a serious maintenance problem, such as a faulty oxygen sensor, can improve your mileage by as much as 40 percent. Such accessories offer no real handling enhancements, although they may look nice on your car. Also, place signs or cargo on the roof so that the object angles forward. This will reduce the frontal area of the object, and it will cause less drag, and cause you to use less fuel. Adjust tires Make sure the tires are inflated to the right levels. Properly inflated tires can reduce fuel consumption by up to 3 percent. Your tires also lose about 1 PSI per month, and when the tires are cold e. It is recommended to check tires at least monthly, preferably weekly. Having properly inflated tires will also help you avoid uneven wear on the tread. Sometimes gas stations use automatic air compressors that stop at a pre-determined level. To make sure you inflate to the right level, double-check pressure with your own gauge. Recommended inflation pressures are for cold tires; put about 3 PSI more in if the tires have been driven on awhile. Inflate to the pressure recommended by the car manufacturer, not to the level stamped on the tire. For example, using 10W motor oil in an engine designed to use 5W can reduce your gas mileage by a considerable amount. Using 5W in an engine designed for 5W can lower your gas mileage by 1 percent to 2 percent. Also, look for motor oil that says "Energy Conserving" on the API performance symbol to be sure it contains friction-reducing additives. Plan trip carefully There is no more obvious way to save gas than to drive a shorter distance. Plan your route carefully. It is also possible to judge which route will have the least traffic. Take highways instead of local routes or city streets when possible – the steady speed maximizes fuel efficiency. Maintain a log over time of how much gas you use with respect to the distances you travel. You can check the miles you go using the main odometer, and how much gas you put in from the gas pump, including fractions. The best tool for this purpose is a spreadsheet. It will keep you focused, and ensure the highest level of accuracy. There is always danger of seeing errors from gas pumps that stop pumping at different points, or fractions of miles being dropped off your odometer when you reset it. When driving in a city, try to park in a central location, and then walk from one appointment to another, or take public transportation. Ragged stop-and-go city driving is terrible for your gas mileage. This also saves the high level of gas used in parking and pulling out in a parking lot. Factors that determine the fuel price Government intervention Governments may intervene in gasoline referred to as petrol in some parts of the world markets by taxation, which may raise prices for consumers within or outside the governmental territory. Similarly, certain industries may receive financial support from the government to promote commercial enterprise a subsidy. Generally, subsidized products or services can be sold at lower prices. Financial markets The global oil price fluctuates constantly. The retail fuel price is closely related to the global oil price fluctuation. Politics

Political elements such as structure, regime, personnel, and events can all affect the cost of fuel. Political relationships between countries are also a factor; nations can go to war over resources, or form alliances in order to trade, both of which can affect the cost of fuel. Geographic area Certain geographical areas or countries in the world have an abundance of oil, while others do not have a single drop. Regional consumers within close proximity of high supplies of oil are more likely to have lower costs of fuel due to ease of access. Areas without their own supply of oil that are isolated from the rest of the world such as islands in the Pacific can find fuel to be relatively expensive. Natural disaster or weather Earthquakes, tsunamis, hurricanes, major floods, and other such nature-related phenomena can affect the production, manufacturing, and logistics of gasoline, which can possibly affect the price of fuel. For instance, a snowstorm may close certain roads, disallowing the transportation of the resource and driving up fuel costs in these areas. Hurricanes or earthquakes can damage oil refineries, abruptly halting production, which can also eventually increase fuel cost.

Chapter 4 : Wasted fuel from U.S. flight delays costs billions | Reuters

If the industry's on-time performance this year is the same as last, then wasted fuel costs could exceed \$2 billion, based on the sharply higher per-gallon price of jet fuel, said Schumer, a New.

Posted by Elizabeth Stratiotis Jan 22, Featured , Supply Chain Planning 1 Ocean shipping is the most energy efficient forms of freight transportation. Recent estimates show that moving goods by ocean container can be 17 times more fuel-efficient than transporting the same goods by air, and 10 times more efficient than transporting goods by road. Environmentally, greenhouse gas emissions can be reduced when shipping goods by sea. How much does it really cost to keep these vessels going? Ocean carriers are required to recover these costs to maintain levels of service, meaning the price of shipping goods will continue to face upward pressures. To illustrate the effect of rising fuel costs, consider the following example of a large modern container vessel used in Trans-Pacific trade, with an actual, maximum container capacity of 7, TEUs twenty foot equivalents or 3, FEUs forty foot equivalents. This number could be greater for a number of reasons, such as if the voyage were more than 14 days long, or if the vessel were smaller and less fuel-efficient per container, or if scheduling delays required the vessel to speed up to stay on-schedule. How much would it cost to keep 5 vessels going for an entire year, assuming the same costs? This is not a sustainable business scenario. How environmental measures affect fuel costs. The global shipping industry is bracing for a key regulatory decision that could mark a milestone in reducing maritime pollution, but could nearly double fuel costs in a sector already reeling from its worst downturn in decades. Europe and China are tightening environment rules. The European Union has already agreed that the 0. Ship owners can comply with these tighter controls by either: Fitting scrubbers to clean exhaust emissions. The first choice, switching fuels, will also increase the cost of fuel. Operational changes have been implemented by carriers to address rising fuel costs. Carriers are trying to act to address the excessive costs of fuel by utilizing a range of operational adjustments. Beginning in early , most container lines began restructuring their operations to address fuel price trends. Consolidated services through multi-carrier alliances. Consolidated routes to serve more locations with fewer ships. Improved monitoring of hull and propeller conditions to reduce resistance and improve efficiency. Every sector of the economy is being affected by rising fuel costs. The transportation industry is being particularly hard-hit.

Chapter 5 : Calculating the Cost of Gas for a Road Trip | HowStuffWorks

The current average cost of diesel fuel across the United States comes out to \$ And while we have certainly seen worse (let's not forget , when the average price came out over \$4), fuel is far from cheap.

Chapter 6 : Tips for Controlling Fuel Costs - Fuel - Work Truck Online

The fuel dollars saved per year, for one forklift running on one shift for various fuel costs are shown in the graph below. Using this example, a forklift with CO lowered from % CO to % CO and fuel costing between \$1/gal to \$3/gal will save between \$ to \$1, per year.

Chapter 7 : Gas Prices in Australia - Gasoline, Petrol, Fuel Prices in Australia

Home» Fact # November 2, Fuel Wasted in Traffic Congestion SUBSCRIBE to the Fact of the Week The researchers at the Texas Transportation Institute have recently published new estimates of the effects of traffic congestion.

Chapter 8 : Gasoline and Diesel Fuel Update - Energy Information Administration

The price of gasoline is as volatile as the substance itself. Fuel expenses can quickly burn a hole in your pocket, money

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that could be better used for more unavoidable expenses. Here's a checklist of things you can do to avoid wasting fuel.

Chapter 9 : The Hidden Costs of Fossil Fuels | Union of Concerned Scientists

Help slash fuel costs by changing a few simple behaviors behind the wheel Help reduce your fuel spend by as much as one-third with calm and gentle driving coached by Verizon Connect. Display driver data in our game-like leaderboard and turn maximizing fuel efficiency into a fleet-wide game.*