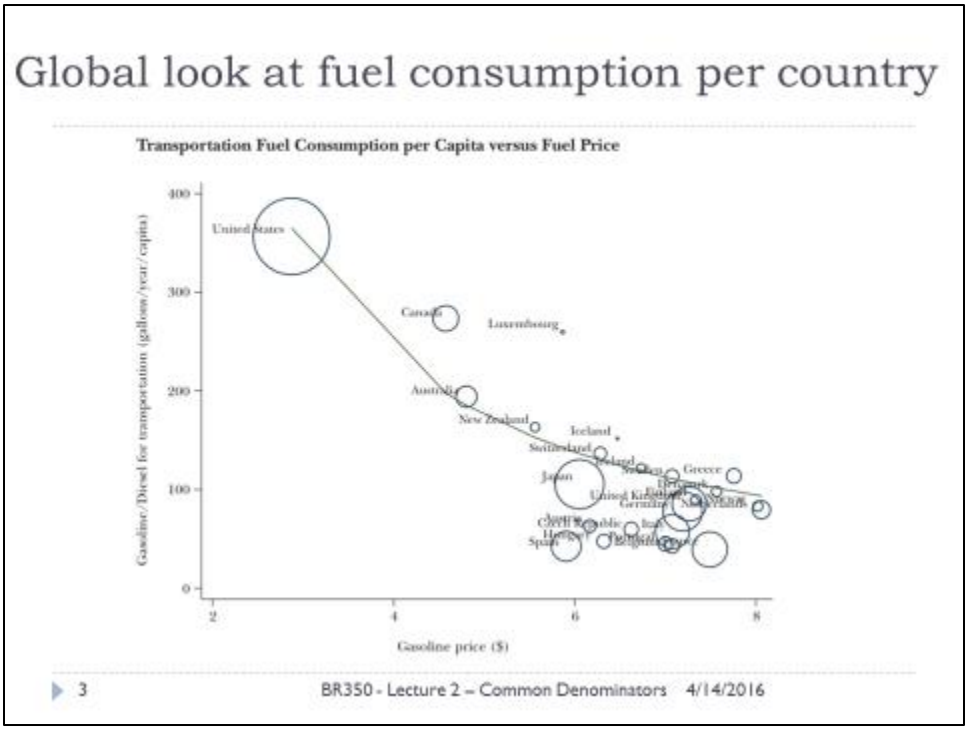
Energy Policy

Lecture 21 – USA Fuel Paradigm

Week 9 – Energy Policy
-Learning Objectives-

- Explain the pros and cons of current energy policies for fuels and bioenergy.
- Identify an impact of current energy policy on an industrial or agricultural sector
- Suggest a fuel or emissions regulation you would make if you could and explain how it would improve things.



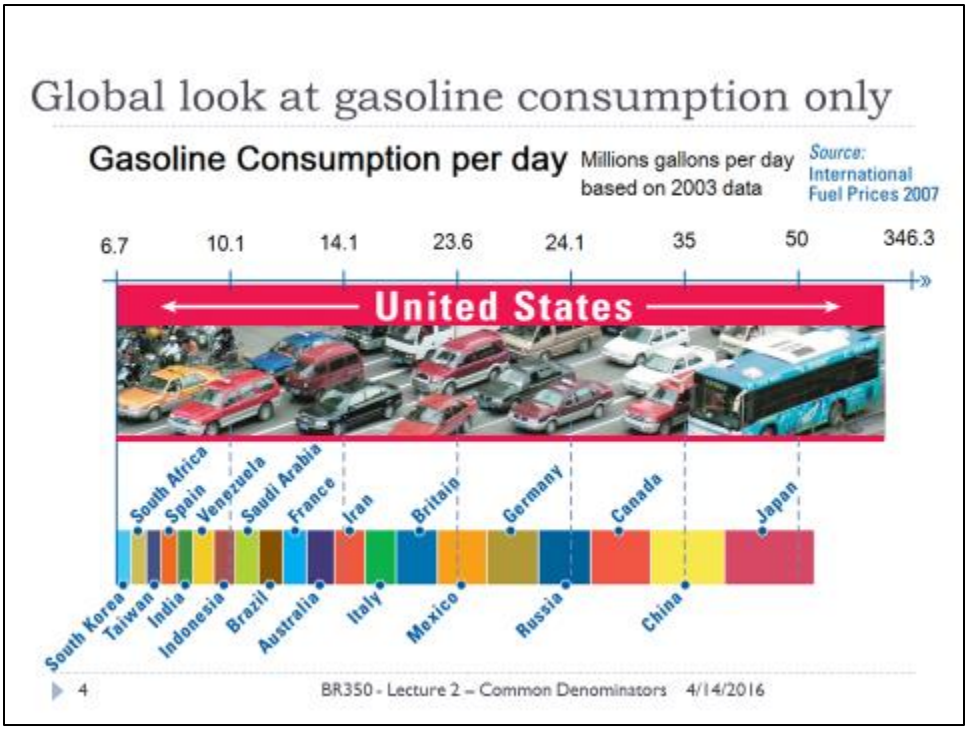
Data from worldbank.org – transportation fuel consumption per capita vs fuel price 2013.
blogs-images.forbes.com/modeledbehavior/files/2012/09/gasuse.jpg
Gupta, Sanjeev, and Walter Mahler. "Taxation of petroleum products: theory and empirical evidence." Energy Economics 17.2 (1995): 101-116.

In this graph, the size of the circle is proportional to population. The line is a fitted value from the regression of the log of consumption on the log of price.

Notice how the U.S. pretty much stands alone in terms of how cheap our gasoline is and how much we use. This is an unusual relationship because usually when demand is high, price gets higher and we definitely have the demand, but not the price to match. It doesn't completely abide by the normal fuel supply and demand economics of the rest of the world because the U.S. has done some unique things in regard to taxes, subsidies, and the supply side of the equation.

The domestic taxation of petroleum products is an important source of revenue in most countries. However, there is a wide variation of tax rates on petroleum products across countries, which cannot be explained by economic theory alone. There are always questions about the extremely low domestic petroleum price policies in many oil exporting countries, as well as the extremely high petroleum tax rates in some oil importing countries. When this is looked at closer, it appears that in addition to providing a significant amount of revenue, both economic efficiency and the welfare of the population can be improved if oil exporting countries levy a tax on domestic use of petroleum products to close the wedge between low, long-run marginal costs of production and the world market price.

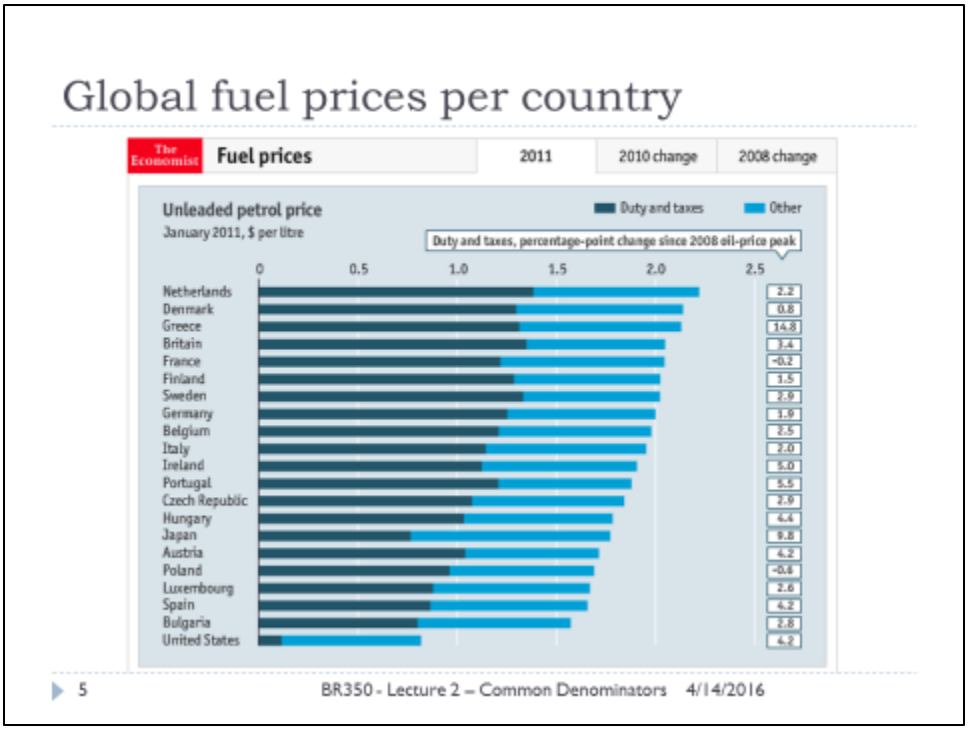
Simply put, as much as we don't want to hear it or pay it, taxing fuel makes a lot sense from an economic and societal stability perspective.



http://www.hydrogenambassadors.com/background/petrol-consumption-per-day.php

Prime Numbers: Pain at the Pump - By Gerhard Metschies | Foreign Policy
http://www.foreignpolicy.com/articles/2007/06/11/prime_numbers_pain_at_the_pump

Everyone already knows the United States consumes an incredible amount of gasoline. Nonetheless this image still makes an impressive comparison because it helps us realize that the U.S. consumes more gasoline than every developed world in the country combined. This is old news and the U.S. has been leading the world in fuel consumption for decades. A more interesting story is why. We have a high standard of living, but maybe not always the highest depending on the metric. We are a very rich country, but again maybe not always the richest depending on the metric. We are certainly an enormous country by any measure, but there are other large countries as well. So, if we aren't unbelievable special from these common country comparison perspectives, why are we so unbelievably special from the gasoline utilization perspective?

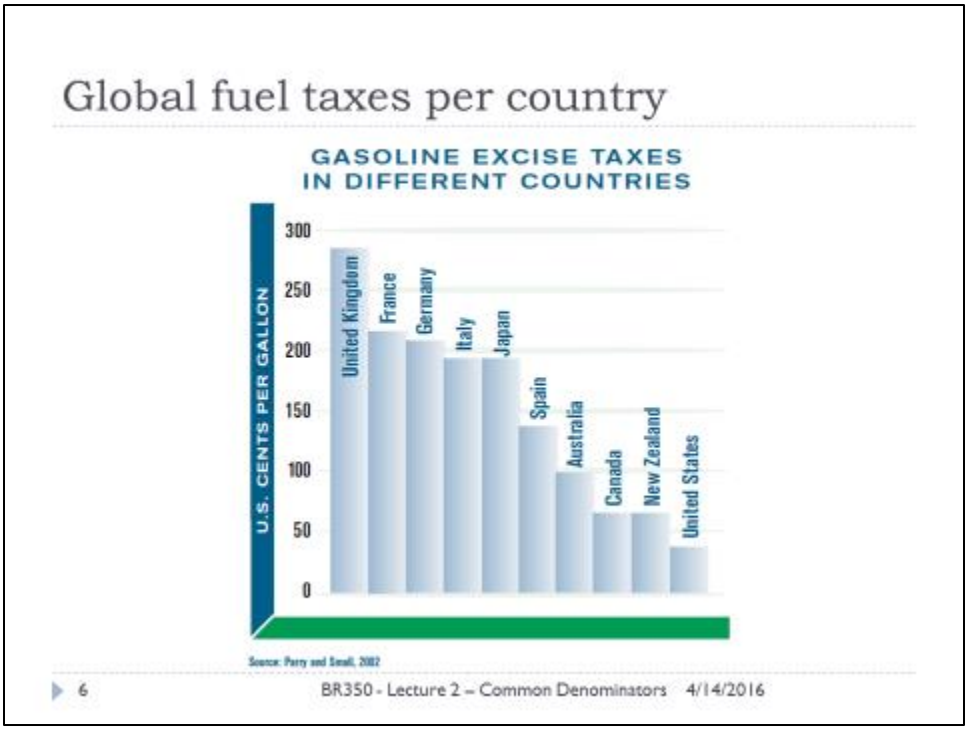


www.economist.com/blogs/freeexchange/2011/02/energy_prices/print
Energy prices: Tax away vulnerability | The Economist

Adeyeye, Adenike. Estimating U.S. Government Subsidies to Energy Sources, 2002-2008. Environmental Law Institute, 2009.

This graph makes it pretty clear that the U.S. is unique in its decision not to tax fuel.

Fuel prices in the U.S. are substantially below levels elsewhere in the rich world, and this is almost entirely due to the rock bottom level of fuel tax rates. The low cost of fuel encourages greater dependence; the average American uses much more oil per day than other rich world citizens. This dependence also impacts infrastructure investment choices, leading to substantially more spending on highways than transit alternatives. And this, in turn, reduces the ability of U.S. households to substitute away from driving when oil prices rise. There are any number of good reasons to raise the fuel tax rate. The current rate no longer brings in enough money to cover current highway spending. Fuel taxes are an efficient way to raise revenue, and the government needs revenue; higher tax rates will hit consumers just like rising oil prices. But those prices are rising anyway and a fairly minor tax can make a big difference given the volumes we consume.



Parry, Ian WH., "Is Gasoline Undertaxed in the United States?" The RFF Reader in Environmental and Resource Policy (2006): 83.

Despite all the policy and laws about imposing minimum miles-per-gallon requirements on sales of new vehicles, a much more effective policy to address fuel consumption, highway spending and public transportation would be to raise the federal gasoline tax. Higher gasoline taxes would reduce fuel consumption not only by encouraging the development of more fuel-efficient vehicles, but also by encouraging people to drive cars rather than sport utility vehicles and minivans, to buy new (more fuel-efficient) vehicles more often, and to reduce the overall amount of mileage. Just imposing minimum miles-per-gallon requirements on sales of new vehicles without a fuel tax lowers the cost per mile of driving, and could worsen the level of emissions and the number of cars on the road. Our refusal as a country to support some level of fuel taxation works against many of our environmental aspirations.

http://www.hydrogenambassadors.com/background/price-to-fill-up-a-honda-civic.php

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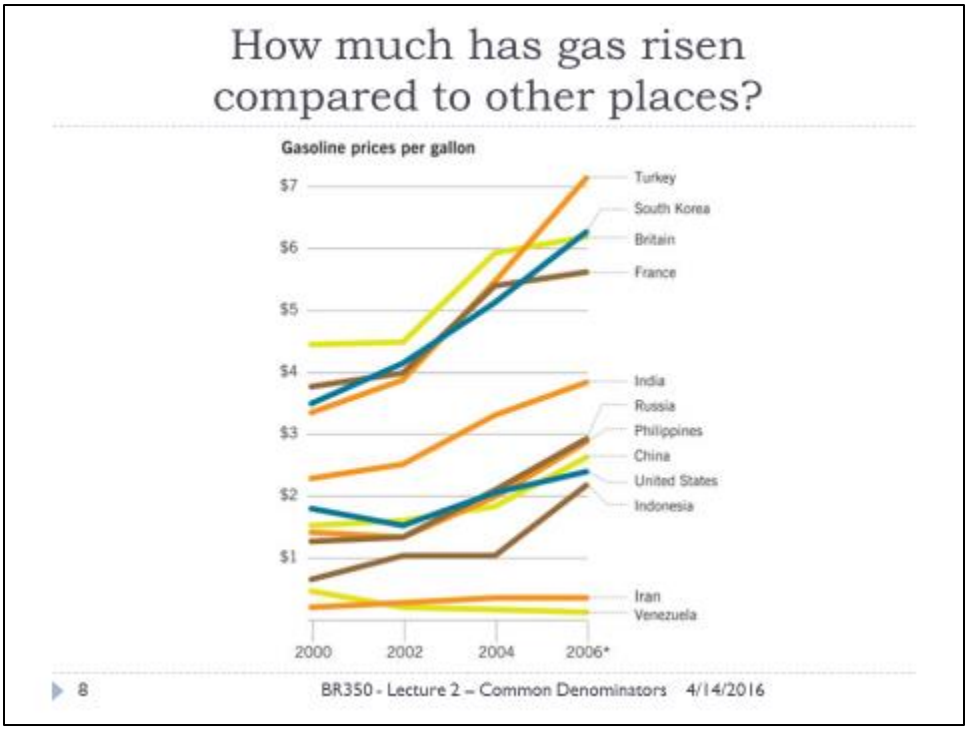
Here is another graph showing how cheap our fuel is comparatively speaking. I believe that gasoline and fuels in general are not a great home for biomass products because the markets are too artificial and simpler biomass products like acetic acid and butanol will probably always have better margins. Once those niche markets were saturated, other markets like them should be targeted using the same platforms.

It makes very little sense for biomass to try and fight into the gasoline market. The U.S. has some of the lowest gas taxes in the world and this has the effect of giving the U.S. some of the lowest gas prices, thus encouraging gasoline usage. U.S. oil and gas subsidies also create a massive market for fuels that get used for strategic reserves and the poor. This U.S. subsidy driven market is somewhat independent and insulated from global market effects, stabilizing the oil refining industry in the US and increasing the number of profitable oil refiners. The combination of this supply and the demand created by the system of minimal taxation has worked so well, that in combination with the buying power of the dollar, U.S. citizens consume more gasoline daily than all other countries combined.

The existing system of subsidies, taxation, and transportation in the U.S. has created a gasoline addiction that may not be sustainable in the long term, particularly if alcohols can be produced at rock bottom prices from natural gas, coal and waste. Who knows how it will play out, but it seems that the landscape is changing and that by the time biofuels companies are done picking the low hanging fruit with high margins, they might not bother with fuels. Oil companies and refiners have a lot of cushion to adjust and stay profitable and competitive in the fuels market, so focusing on products that are hard to make from oil makes more sense.



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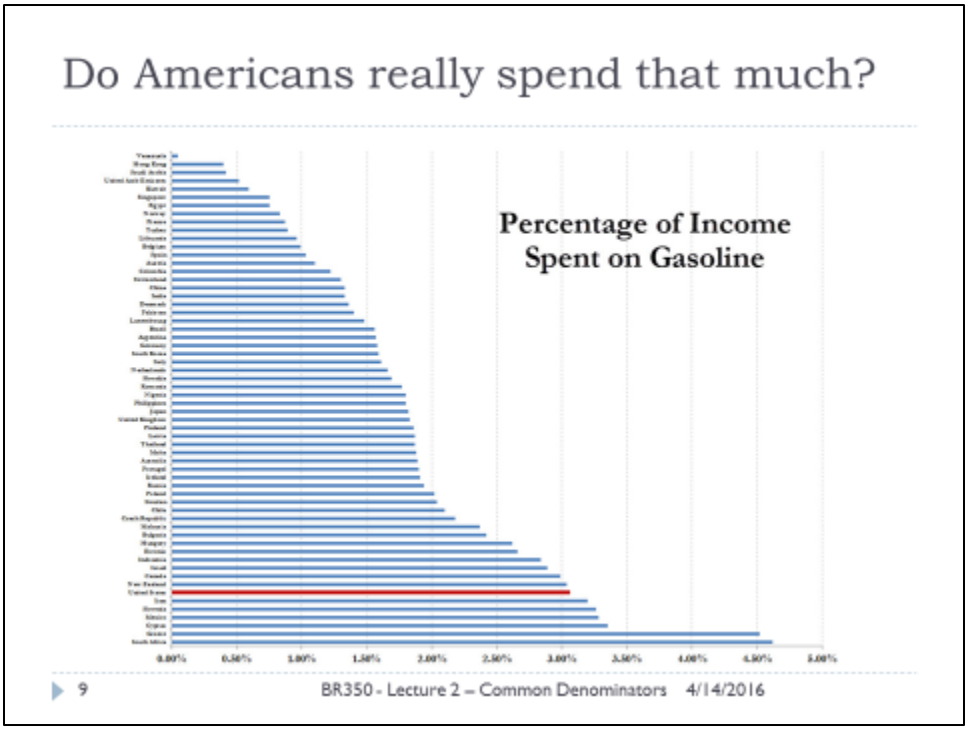
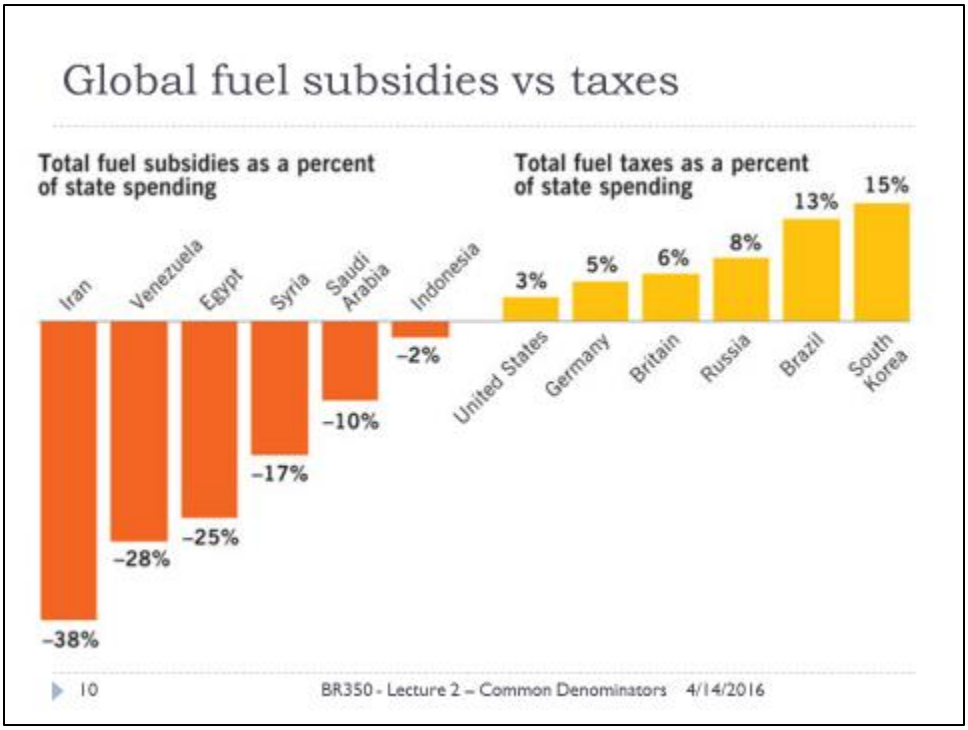
Recently, many countries have abandoned subsidies in favor of higher gas taxes to try and balance their budgets. This has become even more commonplace since the 2008 recession. It is a delicate balance because of the effect it has on consumer spending and commerce. Increasing miles per gallon potentially helps commerce without hurting consumer spending, but like we have discussed it has other ramifications down the road.



http://www.freerepublic.com/focus/bloggers/3040155/posts

An important aspect of all this is how much Americans spend on gasoline to support our lifestyles. We know that Americans consume the most by a vast margin and we know that we are amongst the least taxed to keep process low, but what does that mean for us? The reality is that because of how spread out we are from a housing perspective and the size of our middle and lower class, we spend a huge amount of what we make on fuel. Americans deal with some of the highest annual fuel costs in the world, not because of how much fuel costs per say, but more because of how we choose to live and how we have developed as a country. South Africa has to produce all its fuel by gasifying coal and based on current numbers South Africans only spend about 1% more than Americans on fuel based on percent of income. Most of us feel powerless to change our lifestyles, so that we consume less fuel. It is sobering to consider how much we actually spend given how cheap our fuel really is.



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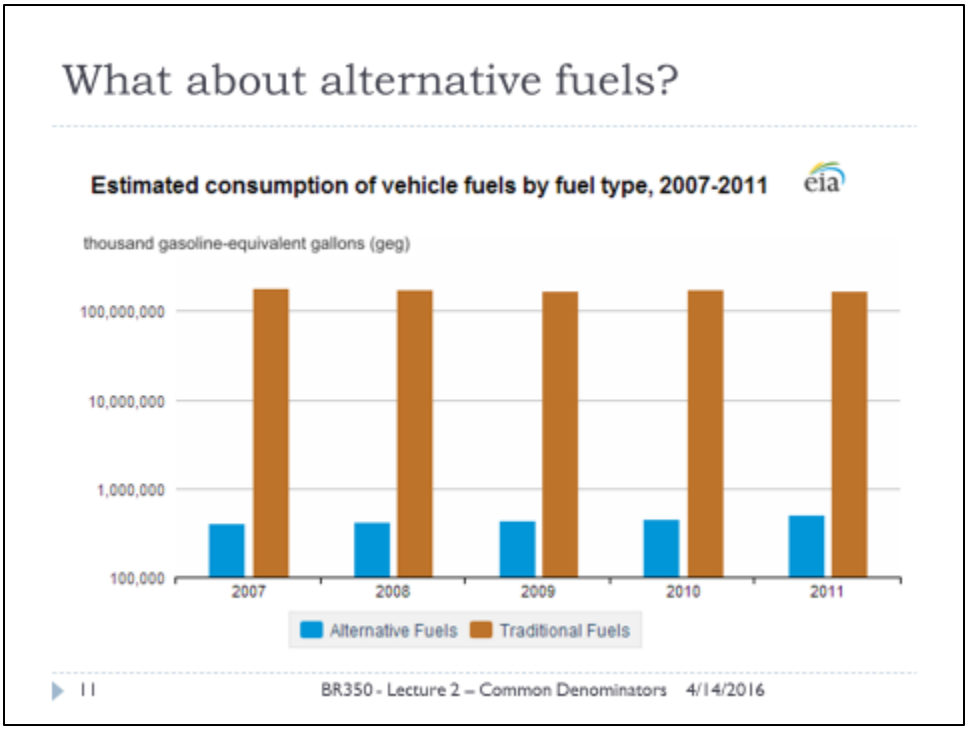
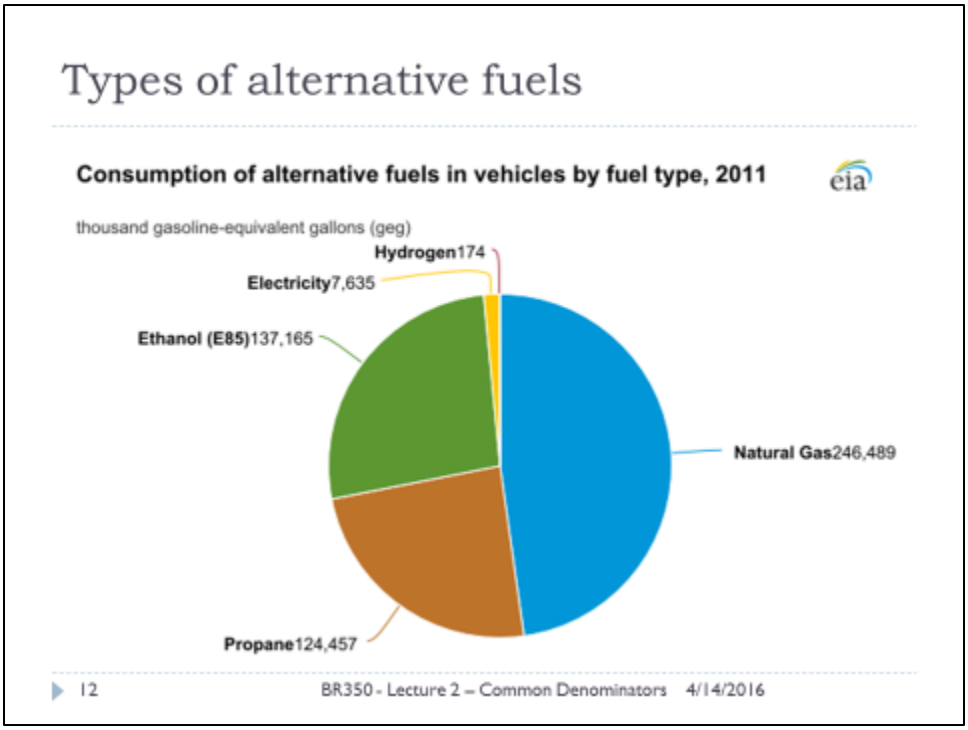
There are countries that subsidize fuel and countries that tax it. Fuel is such a massive commodity that this can have major effects on a countries budget. Iran's subsidies cut into its spending budget by 40%, whereas South Korea's high fuel taxes bring in 15% of its spending budget.



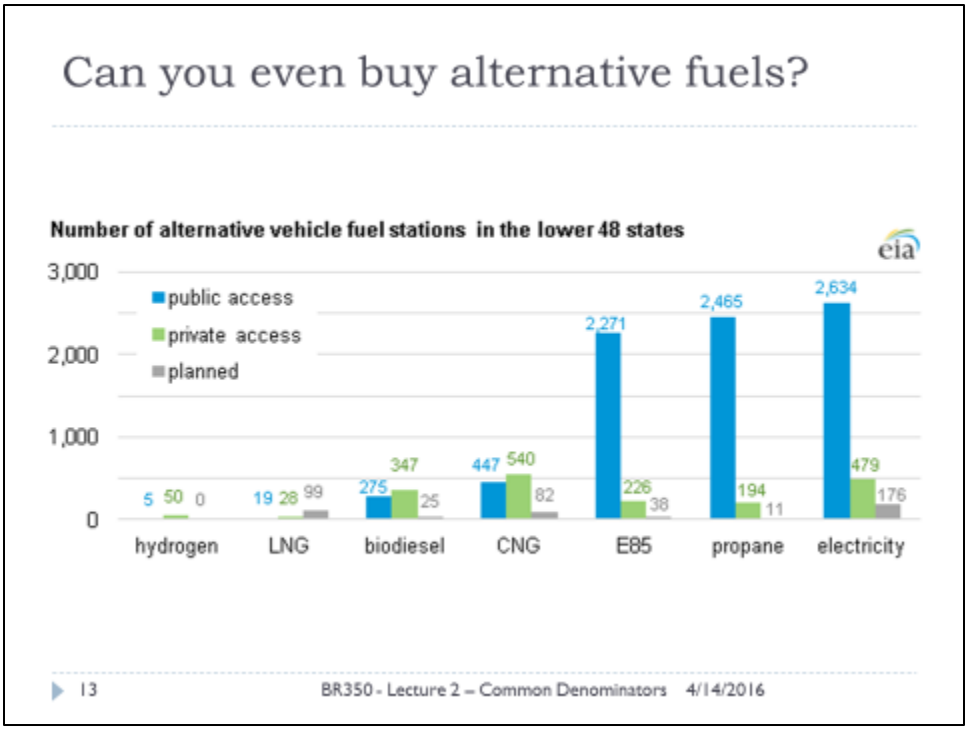
http://www.eia.gov/renewable/afv/
http://www.investingdaily.com/17243/amid-ethanol-subsidies-gas-gains-as-fuel/

So what about alternative fuels other than gasoline? It is hard to get a feeling for how many of these vehicles are out there, but this graph provides a pretty fair comparison. The reality s that gasoline and diesel are far more common than anything else, somewhat because of the fuel paradigm we just discussed and also because of the available vehicles.



http://www.eia.gov/renewable/afv/
http://www.investingdaily.com/17243/amid-ethanol-subsidies-gas-gains-as-fuels

When we discuss alternative fuels we are primarily talking about ….. Not less common fuels like butanol, methanol, and biodiesel.



http://www.eia.gov/todayinenergy/detail.cfm?id=6050#tabs_AltTransportFuelStations-1

Even if you have a vehicle that can be powered by an alternative fuel, having a place to fill up can be a major challenge. Based on this right now, ethanol, propane, and electric are the most convenient alternative fuels. Based on in-place infrastructure the two most practical are actually just electricity and natural gas. Electricity and natural gas are available in most urban locations in the United States, just like traditional gas stations. This makes them the easiest alternative sources of energy without question as long as suitable and economic vehicles can be produced and made available.

Next Lecture – Renewable Energy and Fuel Policy

http://en.wikipedia.org/wiki/Strategic_Petroleum_Reserve_(United_States)

When you get a chance, please take some time to read about the SPR.

The Strategic Petroleum Reserve (SPR) is an emergency fuel storage of oil maintained by the United States Department of Energy. It is the largest emergency supply in the world with the capacity to hold up to 727 million barrels.

The current inventory is displayed on the SPR's website. As of July 2014, the inventory was 691.0 million barrels. This equates to ~35 days of oil at current daily US consumption levels of ~20 million barrels per day. The total value of the crude in the SPR is approximately $65 billion.