
MUSINGS FROM THE OIL PATCH

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Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations. Allen Brooks

Will A KISS Environmental Policy Work For America?

The topic was how and why a carbon tax is the solution to our environmental challenges

It started as a trickle into our inbox, but then became a torrent. The topic was how and why a carbon tax is the solution to our environmental challenges. On February 2nd, Rhode Island State Representative Aaron Regunberg, a Democrat representing the city of Providence, introduced a bill for the legislature's consideration: Energize Rhode Island: Clean Energy Investment and Carbon Pricing Act of 2017. Rep. Regunberg attempted to claim the high moral ground with his statement: "With Exxon running the State Department and climate deniers at every level of Trump's administration, we must accept that the ambitious climate action necessary to guarantee a habitable planet for our children is not going to come from Washington."

Both Mr. Baker and Mr. Shultz understand the politics of governing and "the art of making a deal"

Little did we realize that this trickle would become a torrent only days later when leading Republican statesmen – James A. Baker, III and George Shultz, both former Secretaries of State and of the Treasury– would propose a carbon tax for dealing with climate change. We, like many others, were slightly taken aback by this proposal, especially coming from a native Texan who is closely associated with the oil business. Even Mr. Shultz, who after his years of service to the federal government went on to work for and eventually head up the Bechtel Group, a leading global construction company, has an energy connection. Both Mr. Baker and Mr. Shultz understand the politics of governing and "the art of making a deal." However, the explosive and toxic social issue of climate change just may test their combined abilities. For that reason, a keep it simple, stupid (KISS) policy may gain some traction.

In reading about Rep. Regunberg's bill, we see it as somewhat of a chest-thumping political move. While presented as a progressive effort, after study it becomes clear it is following legislation rather

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Rep. Regunberg’s proposal calls for Rhode Island to levy a \$15-a-ton tax on carbon dioxide or other greenhouse gases emitted from burning fossil fuels in the state

than leadership. That is in contrast to the leadership of Roger Williams, the founder of Rhode Island, whose fundamental disagreement with Pilgrim leaders in Massachusetts led to him being tried and convicted of sedition and heresy and being banned from the colony. Leaving shortly before being evicted, he headed 55 miles south to land outside the control of Massachusetts. He eventually crossed the Seekonk River and purchased land from the Narragansett Indians to establish the colony of Providence. A year later, another Massachusetts religious exile, John Clarke, led a group of followers from Salem and purchased the Aquidneck Island in Narragansett Bay and renamed it Rhode Island.

Eventually, Roger Williams secured a charter from the UK Parliament in 1644 for Providence Plantations – the cities of Providence and Warwick. Later, to resolve a dispute over who would rule Rhode Island, it and Providence Plantations were combined. The colony was known for welcoming individuals who were “distressed of conscience.” This religious openness attracted many individuals who were persecuted for their beliefs such as Baptists and Jews. The colony officially established a majority democratic form of government and became the first colony to formally separate religion from citizenship.

That religious and citizenship separation, along with Roger Williams’ deep friendship with the Narragansett Indians, became a contentious issue for neighboring Connecticut and Massachusetts. This tension played a major role in the Pequot War (1637-1638), when those colonies attempted to wipe out the local Native American tribes, while Roger Williams was helping protect their leaders.

A key defining difference amongst the colonies developed in the 1640s when Massachusetts and Connecticut enacted laws allowing slavery, while Providence Plantations banned the practice. When Providence was reunited with Rhode Island, the towns on Aquidneck Island rejected the anti-slavery law, effectively ending its enforcement within the colony. For the next century, the economic and political center of Rhode Island and Providence Plantations was Newport, which ignored the anti-slavery law and became the leading American port in the Triangle trade of molasses, rum and slaves.

Rep. Regunberg’s proposal calls for Rhode Island to levy a \$15-a-ton tax on carbon dioxide or other greenhouse gases emitted from burning fossil fuels in the state. Power plants, electricity and fuel distributors, and gas stations that sell the fuel are assessed the tax, with the money collected in the Clean Energy and Jobs Fund and “recycled” back into the state. The state would then redistribute this recycled cash on the basis of: 25% going to fund programs for renewable energy, energy efficiency and climate-change adaptation; 30% returned as a dividend to companies in the state based on their number of full-time employees; and 40% paid as a dividend to each

The legislation was proposed to be revenue neutral and the environmental movement wanted the tax to raise more money and to direct a significant portion of the funds to renewable energy projects

He meant that until Massachusetts, and possibly Connecticut, enact similar legislation, the Rhode Island law would not be implemented

The tax would be levied at the first point of fossil fuel's entry into the economy – a well, a mine or a port of entry

Rhode Island resident, either via credits against their income tax bills or in the form of a check if they don't file a tax return.

The structure of this proposed legislation is designed to counter the experience of a similar carbon tax proposed in the State of Washington. That legislation was put up for vote in last November's election and was defeated soundly by the citizens of a very liberal and pro-environmental state. Why did it get voted down? The legislation was proposed to be revenue neutral and the environmental movement wanted the tax to raise more money and to direct a significant portion of the funds to renewable energy projects. This is why the Rhode Island bill proposes spending 25% of the tax revenues on renewable energy projects.

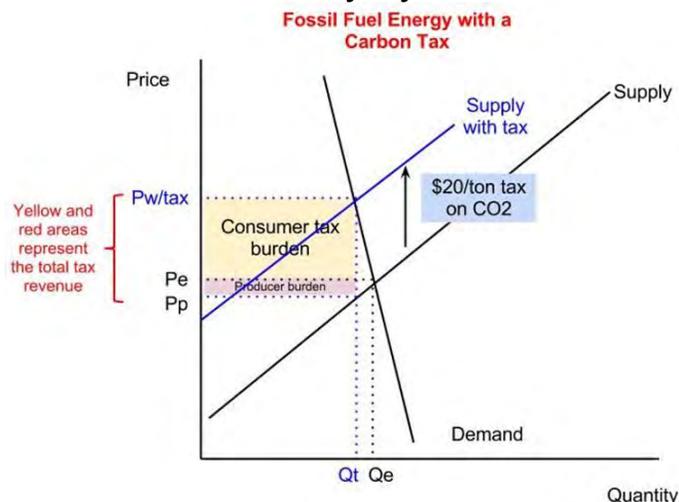
We smiled when we read Rep. Regunberg's rhetoric supporting the bill as we focused on the "dirty" little secret buried in the draft legislation. As Rep. Regunberg put it, "This policy would make Rhode Island a city on a hill when it comes to ambitious climate action, helping to inspire other states to follow our lead." He went on to say at the kickoff event for the legislation held at the Rhode Island Statehouse, "Anyone who was worried about this policy making Rhode Island an outlier should have no reason not to support immediate passage of this legislation because it's not actually going to be implemented until our neighbors step up and follow suit." By that he meant that until Massachusetts, and possibly Connecticut, enact similar legislation, the Rhode Island law would not be implemented. That condition reminded us of the challenge in raising our children when we were confronted with the "but everyone else does it" justification for their actions or wants. We also thought back to the era when Roger Williams was willing to "go his own way" rather than submit to the governing approaches of Massachusetts and Connecticut. I guess that isn't as important anymore.

The Rhode Island carbon tax idea was in our thoughts as just a few days later we opened our *Wall Street Journal* to find an op-ed written by Messrs. Baker and Shultz expounding on why a carbon tax was the right policy for this nation to deal with fossil fuels and climate change, as proposed by the Climate Leadership Council. The Republican leaders' carbon tax plan is less progressive than that proposed for Rhode Island. The Republican leaders' proposal would start with a "sensible" \$40-a-ton tax on the carbon in fossil fuels that would be collected by the government and rebated to residents quarterly in the form of a tax-free dividend from the government, with an initial annual estimate of \$2,000 per household. The tax would be levied at the first point of fossil fuel's entry into the economy – a well, a mine or a port of entry. The tax would increase steadily, enabling consumers and businessmen to plan accordingly. The advent of a carbon tax would eliminate the need for carbon emissions rules and regulations that have been stifling America's businesses and would be rolled back in consort with the introduction of the carbon tax.

The consumer bears most of the tax's impact

From an economic point of view, less fossil fuel supply would be needed, as the higher price due to the tax reduces consumption. As Exhibit 1 shows, the consumer bears most of the tax's impact. What would also be expected, given a rising tax over time, is for the demand curve to also shift, but because demand for fossil fuels is largely inelastic, the shift will take longer to become evident. What the shape of the new long-term demand curve looks like is unknown, but economic theory is sure about the reduction in current demand due to moving the price point up the demand curve as a result of the tax.

Exhibit 1. Economic Theory Says Carbon Taxes Work



Source: welkerswikinomics.com

The quarterly rebates are designed to offset the hardship higher energy costs impose on families and businesses

The Baker-Shultz carbon tax is designed to signal to the economy the least environmentally damaging fuels to power the nation going forward, while recognizing that it will lift energy and energy-related costs for all consumers. The quarterly rebates are designed to offset the hardship higher energy costs impose on families and businesses. The problem is that much like taking two aspirin after spraining your ankle, you suffer pain until: a) you find the aspirin; b) you swallow them; and c) the pain medication works. From an economic theory point-of-view, taxes that raise the price of an inelastic (a purchase that cannot be postponed) good such as energy hurts consumer budgets and forces spending cutbacks. There is also the question of how consumers will handle their dividend windfalls, as traditionally people save a large portion before spending the balance. Since the rebates will be less than 100% of the tax collected, consumer spending may be throttled back. How much spending is lost also depends on how much sticks to the hands of bureaucrats.

The key point of the Baker-Shultz plan is that very little of the tax collections will be retained by the federal government to administer

Annually, the administrative cost would total \$69.6 million, which, relative to the federal government, is a rounding error for most department budgets

the plan. We have no idea how many additional bureaucrats will be necessary, but certainly there will additional federal employees hired. Based on 2012 Congressional testimony by Richard Gregg, U.S. Treasury Department fiscal assistant secretary, it costs the federal government \$0.09 per electronic transfer versus \$1.05 per paper check mailed. If we assume there are 125.82 million households in the U.S. in 2016 who would receive dividend payments and 5% of them receive checks, the administrative costs per quarter would be \$17.4 million (\$6.6 million for checks and \$10.8 million for electronic transfers). Annually, the administrative cost would total \$69.6 million, which, relative to the federal government, is a rounding error for most department budgets. We can't estimate what the bureaucracy overhead would cost, but it likely will be much greater than the dividend expense.

The KISS approach merely establishes a cost for using fossil fuels, which would appropriately assign a greater cost to the fuels emitting the most carbon

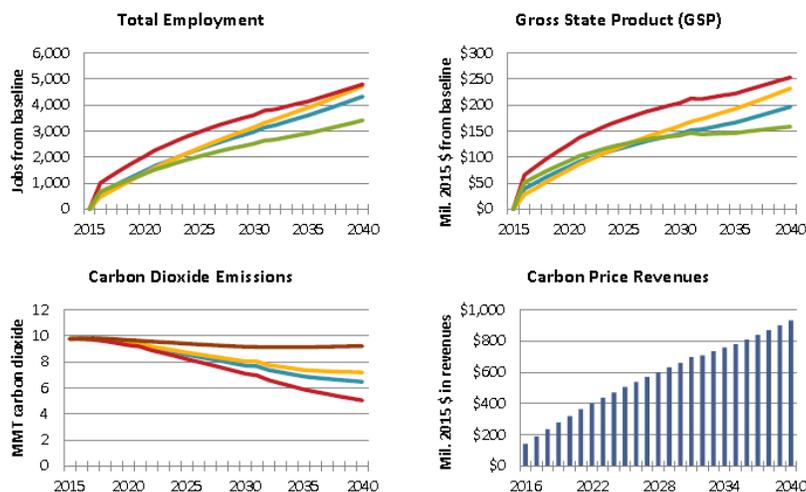
A KISS carbon tax, such as that proposed by Baker-Schultz is likely a better option than the Rhode Island approach, which conjures up memories of the failed Solyndra investment as well as other green energy projects of the Obama administration. The KISS approach merely establishes a cost for using fossil fuels, which would appropriately assign a greater cost to the fuels emitting the most carbon. Its aim is to drive users to cleaner burning fuels. In contrast, the Rhode Island plan (and presumably the other New England states' plans) returns only a fraction of the tax to consumers, so it essentially is just another tax masquerading as an environmental solution, while allowing politicians to determine where the money flows.

“All of the four cases increase the total number of jobs and GSP [Gross State Product] in Rhode Island”

To support its proposal, the Rhode Island sponsors of the carbon tax rely on a report prepared in 2015 by Regional Economic Models, Inc., a Washington, D.C. based economic consulting firm. In their report, four possible tax plans were developed, each having a different revenue distribution structure. The common element of the plans had the carbon tax starting at \$15 per ton and escalating each year by \$5, while also being indexed for inflation. The reports' conclusion was: “All of the four cases increase the total number of jobs and GSP [Gross State Product] in Rhode Island—mostly by reducing the importation of fossil energy and, therefore, keeping dollars local to create jobs and grow businesses in the Ocean State. The carbon price also discourages fossil fuel usages, which reduces emissions relative to the BASELINE scenario.”

The report summarized its conclusions in the following four charts:

Exhibit 2. How Rhode Island Will Benefit From A Carbon Tax



Source: REMI

It is presented as good news for Rhode Island politicians, who are still shepherding the 50th worst performing state economy according to the 2016 CNBC ranking of America’s Top States for Business

Like all good consultant reports, it is presented as good news for Rhode Island politicians, who are still shepherding the 50th worst performing state economy according to the 2016 CNBC ranking of America’s Top States for Business. Amazingly, Rhode Island’s economy in 2016 dropped two places from its 2015 finish! The CNBC ranking, which is highly coveted by state politicians, showed that Rhode Island’s infrastructure ranked dead last for both 2016 and 2015, and measures such as quality of life fell to 24th from 12th and education quality declined to 20th place from 13th in 2015. The state’s workforce was tied at 23rd place, but its economy ranking fell six spots to 45th and its cost of living ranked 43rd, while the cost of doing business was 45th. The performance of the Rhode Island economy over the past decade has caused the youth of the state to seek better job opportunities outside of Rhode Island, leaving the state with an aging population that will further add to its challenges.

The overall impact of these programs will be a hit of \$670-\$893 million to the state’s already weak economy

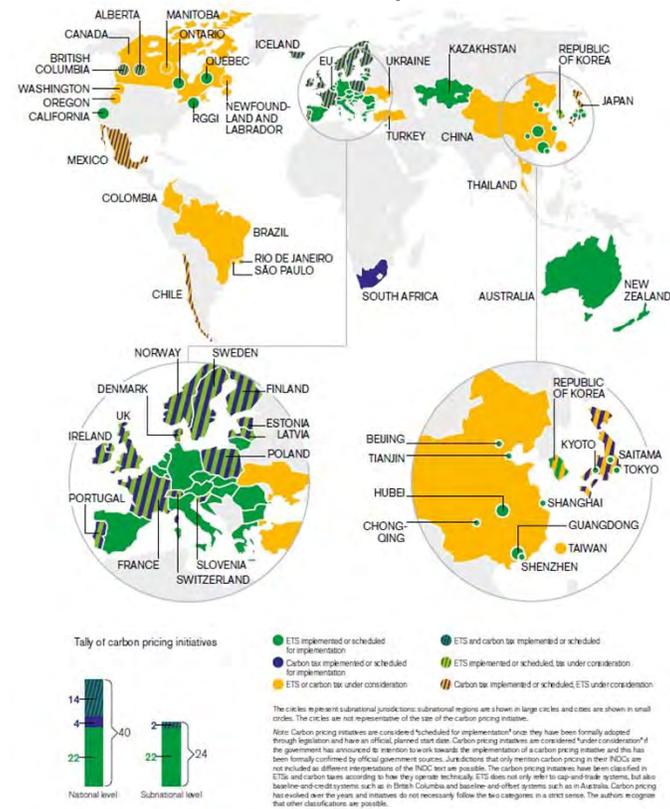
In contrast to REMI’s glowing report on the benefits from the carbon tax and other green-energy programs for Rhode Island, a 2016 report prepared by the Rhode Island Center for Freedom & Prosperity came to a sharply different conclusion. The RI Center is a non-profit organization that promotes free-market solutions for social and economic issues. It found that the state government’s green-energy initiatives, including the carbon tax, will cost Rhode Island 4,000-6,000 jobs, boost the cost of the state’s government by \$141-\$190 million and lead to a 49%-73% increase in the base cost of electricity that, in turn, will lift electricity rates by 13%-18%. The overall impact of these programs will be a hit of \$670-\$893 million to the state’s already weak economy. According to Mike Stenhouse, CEO for the RI Center, "Our state economy is simply too fragile to be able to handle this kind of negative hit."

Why not add an additional tax on consumers that will generate a nice pot of money the politicians can hand out to curry favors from recipients

Given the state of Rhode Island’s economy, why not add an additional tax on consumers that will generate a nice pot of money the politicians can hand out to curry favors from recipients. Citizens are being quickly reminded of the 38 Studio scandal of a few years ago that cost them \$75 million. The loss came from funds loaned to an electronic gaming company headed by retired Boston Red Sox pitcher Curt Schilling that was lured to the state by the offer of the financing. Almost before the ink was dry on the loan documents, financial issues arose and in 2012, 38 Studios declared bankruptcy that revealed a massive government scandal, the full extent of which remains unknown.

Many states, provinces and countries have in place, are considering or have plans for a carbon tax. The World Bank recently published a map showing countries in green with some form of carbon tax in place, and those in yellow either having such a tax planned or under consideration.

Exhibit 3. The Global Landscape For Carbon Taxes



Source: World Bank

While the Baker-Schultz carbon tax plan has sponsorship from two leading economists – Martin Feldstein and Gregory Mankiw, both former chairs of the President’s Council of Economic Advisors – the plan is structured to be revenue neutral. People considering carbon

In Canada, the experience of British Columbia is held up as an example of a successful carbon tax

taxes such as this one often look to history for proof of its benefits. They often cast their eyes to Canada where the federal government has just passed a carbon tax that will come into effect for any province that hasn't enacted its own carbon tax by 2018. The push for carbon taxes is designed to help Canada meet its Paris climate agreement commitments for reducing greenhouse gas emissions.

In Canada, the experience of British Columbia is held up as an example of a successful carbon tax. It was instituted in 2008. The initial plan followed the "textbook" revenue-neutral structure, but, according to recent reviews, it has slowly morphed into a more progressive structure as tax reductions have trended toward more corporate tax relief with less help being directed to residents and especially low-income citizens.

Whether the British Columbia carbon tax is working seems to be open to debate. Studies we have examined conclude that the tax is working as planned, while other studies question if it is meeting its goals. A 2015 report concluded that the carbon tax has largely worked as planned, but that its tax-neutrality structure has been eroded into one with "industrial policy" objectives promoting certain economic sectors. Whether that is good or bad seems to depend on one's political agenda.

Emission reductions through reduced fuel consumption and greenhouse gas emissions seem to be in line with expectations

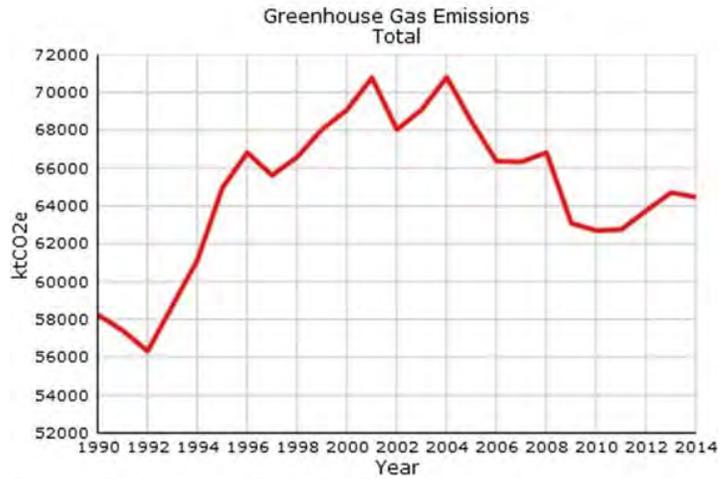
Two important conclusions coming from this report are that emission reductions through reduced fuel consumption and greenhouse gas emissions seem to be in line with expectations, while it also appears that the carbon tax has not hurt the province's economic performance. While both conclusions are important and positive, they seem to be based on data through 2014. Recently, questions are being raised as to whether the carbon tax is still generating positive results.

The 2014 Emissions Trend Report says British Columbia is actually on track to increase them from 2005 levels by 11% by 2020

Last April, Canada's environment minister wrote her provincial counterpart that based on Environment Canada's latest greenhouse gas projections, British Columbia will struggle to meet its 2020 goal of reducing emissions by one-third from 2007 levels. In fact, instead of reducing greenhouse gas emissions, the 2014 Emissions Trend Report says British Columbia is actually on track to increase them from 2005 levels by 11% by 2020.

Exhibit 4, on the next page, shows the history of carbon emissions in British Columbia between 1990 and 2014. As seen, emissions rose steadily and sharply from 1992 to 2004 before beginning to fall. The decline stopped in 2011 and then climbed.

Exhibit 4. Even With Carbon Tax Emissions Are Rising

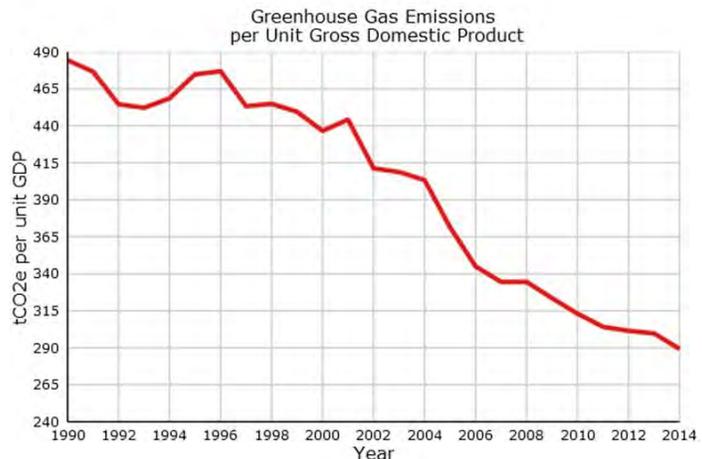


Source: Environmental Reporting BC

The pace of the decline in carbon emissions slowed at the time of the 2008 global financial crisis and has remained at a flattened pace compared to the early years of this century

Looking at the impact of emissions on the province's gross domestic production, the chart in Exhibit 5 looks considerably different – a steady decline from a peak that starts in 1990. When one looks at 1990-1996, there was a decline followed by an increase almost back to the 1990 peak. What is interesting about the chart is that the pace of the decline in carbon emissions slowed at the time of the 2008 global financial crisis and has remained at a flattened pace compared to the early years of this century. The change in pace also happens to coincide with the introduction of the British Columbia carbon tax. Is this merely a coincidence or something more significant?

Exhibit 5. Carbon Tax Seems To Help Cut Emissions

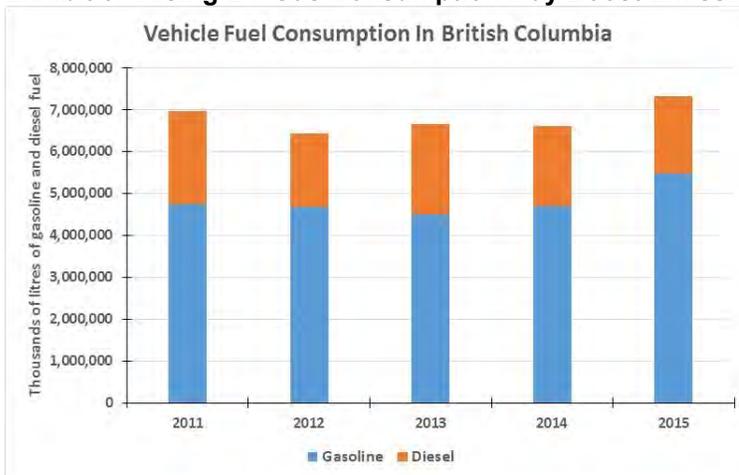


Source: Environmental Reporting BC

One thing that is happening in British Columbia is that its vehicle fuel consumption has begun rising as shown in Exhibit 6 on the next

page. As the local population grows and the economy expands, this increase in gasoline consumption is not a complete surprise.

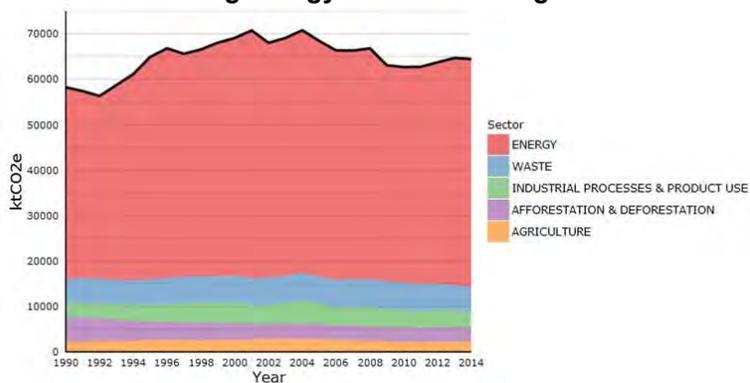
Exhibit 6. Rising BC Gas Consumption May Boost Emissions



Source: Statistics Canada

Another consideration is how carbon emissions are growing in the province primarily from its energy sector. That is important since the province derives most of its electric power from hydro sources, which are clean.

Exhibit 7. Growing Energy Sector Boosting Emissions

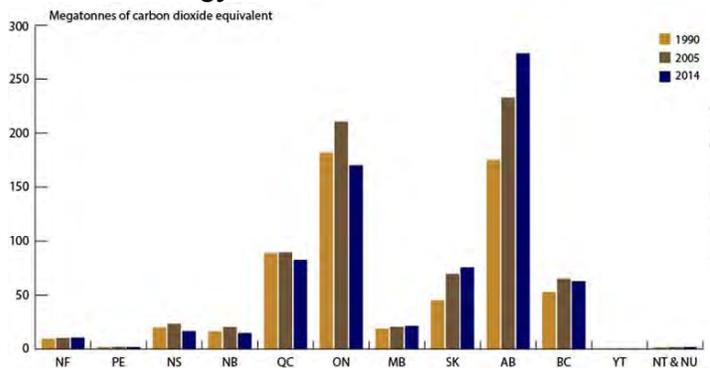


Source: Environmental Reporting BC

While British Columbia’s performance improved between 2005 and 2014, the latest data suggests these gains are shrinking

As British Columbia becomes more of an energy producer, it may see its carbon emissions rise further. This possibility can be seen by looking at the record of carbon emissions by province for 1990, 2005 and 2014. What Exhibit 8 (next page) shows is that Alberta and Saskatchewan, both substantial energy producers, experienced rising carbon emissions over time. While British Columbia’s performance improved between 2005 and 2014, the latest data suggests these gains are shrinking and the province is starting to follow the pattern of its energy-intensive neighboring provinces.

Exhibit 8. Energy Intensive Provinces Lead Emissions

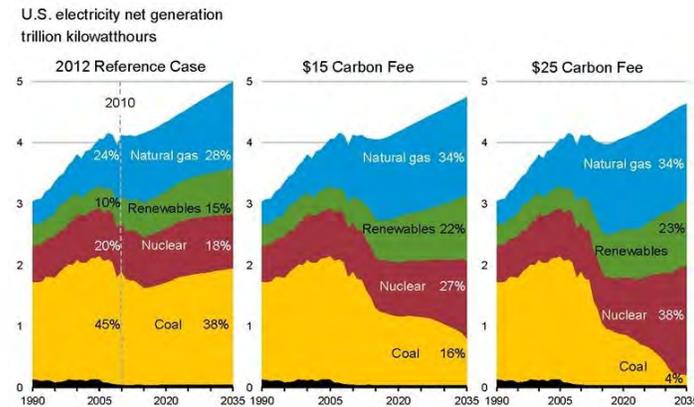


Source: Statistics Canada

As a share of electric generation, coal’s contribution falls from 38% under the reference case to 16% in 2035 under the \$15 per tax fee, but it is only 4% under the \$25 per ton case

It is interesting to see how the U.S. Energy Information Administration (EIA) assesses the impact of a carbon tax on fuel use in this country. In 2012, the EIA compared possible fuel mix shifts for generating electricity under a \$15 per ton carbon fee and a \$25 per ton fee versus its then-reference case. As the charts in Exhibit 9 show, the higher the carbon fee, the greater the impact on coal’s role in generating electricity in 2035. As a share of electric generation, coal’s contribution falls from 38% under the reference case to 16% in 2035 under the \$15 per tax fee, but it is only 4% under the \$25 per ton case. What would it be under a \$40 a ton fee? Renewables and natural gas benefit from the carbon fee. As the carbon fee increases, according to the EIA, the major fuel beneficiary is nuclear power, whose share goes from 18% in 2035 to 38% under the \$25 per ton fee case. Given what has happened to natural gas prices and nuclear power since 2012, we would guess that the latter’s benefit would not be as much as in the earlier forecasts, while natural gas would gain more market share. Renewables would likely benefit, also.

Exhibit 9. Coal Is The Big Loser Under Carbon Tax



Source: EIA, Annual Energy Outlook 2012

Major oil companies such as ExxonMobil are supportive of a KISS carbon tax

While reducing carbon emissions is the desired goal, there is a broad range of possible approaches from the KISS proposal to highly restrictive legislation such as proposed by Rhode Island. Major oil companies such as ExxonMobil are supportive of a KISS carbon tax, primarily for two reasons: they see it as the least disruptive market force and they expect the tax will come with reduced environmental rules and regulations.

Given the current mood of the nation, we doubt either of these carbon tax proposals, or likely any carbon tax, have much chance of becoming law in the near-term

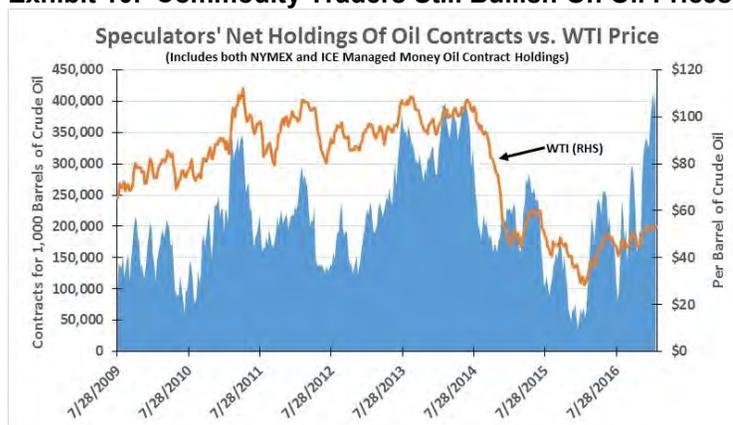
Citizens in favor of small government will recoil at all these proposals since setting the tax rate allows politicians to open up a flood of revenue for the government. Recycling essentially all of it should inflict the least economic harm, but even that theory is open to question. The experience in British Columbia and Australia, who tried it for a couple of years before rejecting the carbon tax, presents a mixed bag of outcomes. Given the current mood of the nation, we doubt either of these carbon tax proposals, or likely any carbon tax, have much chance of becoming law in the near-term.

Are The Forces Present To Break Oil Out Of Its Range?

Producers and commodity speculators are “wishing and hoping” oil prices will move higher

We fully understand that we are engaged in a fool’s errand, but trying to divine where crude oil prices may be heading helps us focus on the developments with selective forces that impact near-term price movements. Acknowledging that age-old corporate strategy, producers and commodity speculators are “wishing and hoping” oil prices will move higher, at least based on the record net long positions of commodity traders. What a better world it would be if oil was trading at \$70 or \$80 a barrel. According to producers, they don’t need \$100 a barrel such they benefitted from for four years prior to OPEC’s decision in November 2014 to let oil freefall to its “market-driven” price level. Will wishing and hoping get us there?

Exhibit 10. Commodity Traders Still Bullish On Oil Prices



Source: CFTC, EIA, PPHB

If we look to trends such as the value of the U.S. dollar that impacts the price of all commodities that trade globally, or the volatility of the

option index on the value of the U.S. Oil Fund, it sure looks like we may get there. Looking at those trends is also what commodity traders are doing as they are placing their bullish bets. As we have done before, in Exhibit 11, we have highlighted in the yellow circle the current market conditions for these two measures along with the trend in spot oil prices. This allows you to compare the current environment for those forces against market conditions that existed back in 2008-2009 when oil prices were recovering following the global financial crisis. This was a time when oil prices were just beginning their ascent back above \$100 a barrel.

Exhibit 11. Market Forces Suggest Higher Oil Prices Coming



Source: EIA, St. Louis Fed, Marketwatch, PPHB

After considering the status of these factors, one would have to say that the odds favor higher oil prices in the future

The International Energy Agency has claimed that OPEC cut its combined output by one million barrels per day at the start of 2017, a 90% compliance ratio

After considering the status of these factors, one would have to say that the odds favor higher oil prices in the future. Of course, that observation avoids answering the questions of how high oil prices might climb when they break out and how long they might remain at lofty levels. Those questions are what haunts oil price forecasters. Therefore, we will follow the admonition given to oil price forecasters – never predict both a price and a date in the same forecast. To do so ensures that you will be wrong, and thus you will certainly be engaged in a fool's errand.

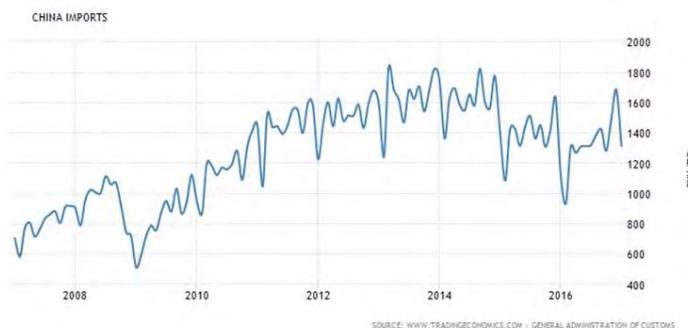
A disconcerting issue is that despite the claims of OPEC officials and reports from various media surveys of OPEC member countries that they are living up to their commitment to cut production, import data suggests they are not. Moreover, based on China's January import data, many of the non-OPEC countries who agreed to support OPEC's production cut with their own output reduction are not following through. The International Energy Agency (IEA) has claimed that OPEC cut its combined output by one million barrels per day at the start of 2017, a 90% compliance ratio. This high compliance is contrary to the history of the organization that has basically only met about two-thirds of its agreed-to cuts in the past.

The 11 OPEC member countries who agreed to the production cuts actually increased their shipments to China by 28% year over year, and by 4% sequentially from December

An article published on *ZeroHedge.com* made the point that after examining the Chinese oil import data for January, it appears that crude oil shipments from the 11 OPEC member countries who agreed to the production cuts actually increased their shipments to China by 28% year over year, and by 4% sequentially from December. The author of the report made the point that the month-to-month increase came at a time when production was supposed to be declining. The problem with this report may be a confusion of production and importing – they cannot physically be simultaneous.

While we could not find the same import numbers the author quotes (we may have been looking at a different data source), we found a chart of the monthly value of China's oil imports from 2007 through January 2017. What the chart shows is that during the \$100 a barrel oil price boom, China's crude oil import value was rising – not surprising given the higher oil price and increased volumes.

Exhibit 12. China Oil Imports Break Pattern of Prior Years



Source: chinaoilweb.com

virtually every year the value of oil imports declined between December and January, which is contrary to what the article suggests happened this time

The other observation from the chart was that virtually every year the value of oil imports declined between December and January, which is contrary to what the article suggests happened this time. The historic pattern is largely explained by the effort of oil officials to build up oil supplies in the country prior to the celebration of the Chinese New Year when the country essentially shuts down for a week. That holiday is usually in late January, so it makes sense that import volumes would rise at calendar year-end and then decline in January as the holiday shuts down the country for part of that month.

But that does not suggest anything about oil production

A supportive point for the article's conclusion, however, is to look at where the January low was in 2016 compared to this January. As the chart shows, this January's low is considerably higher than the prior January low. But that does not suggest anything about oil production. The sailing distance between the Port of Doha in Qatar and Beijin Harbor in southern China is 6,100 nautical miles. At a speed of 10 knots, the trip requires 25.5 days of sailing time.

What we do know about the global oil market is that Asia is the fastest growing region and is the prime target for large crude oil

He is hauling 505 tons of stuff, which is the equivalent of 200 African Elephants!

exporters such as Saudi Arabia and Russia. Therefore, it is not a coincidence that Saudi King Salman is leading a large delegation of officials on a month-long trip to the region currently. He has visited Malaysia and just arrived in Indonesia, before heading on to Brunei, Japan, China and the Maldives before stopping off in Jordan on his way home.

Some eye-opening facts about how King Salman is traveling on this trip. He is hauling 505 tons of stuff, which is the equivalent of 200 African Elephants! Included in his stuff that was transported by six Boeing jets and a military cargo plane are two Mercedes-Benz S600 cars and two free-standing elevators. He is also traveling with 1,500 people, including 10 ministers, 800 delegates and 25 princes, who traveled to Indonesia, the site of the longest segment of the trip, on 36 different flights over a three-week period. The entourage is occupying hundreds of hotel rooms in four of the most exclusive hotels in Jakarta. Our guess is that the bill for this trip will resemble the national debt of many small countries.

They are watching oil supplies coming into the Asian region from the Atlantic Basin including West Africa and the North Sea

After reading a report from the commodity strategy team at RBC Capital Markets, it reinforces our view that the *ZeroHedge.com* article is confused about the data. The report focused on the issue of Saudi Arabian oil pricing into Asia as a precursor of when higher oil prices might occur. They are watching oil supplies coming into the Asian region from the Atlantic Basin including West Africa and the North Sea. These are not normal sources for Asian oil supplies. The summary to their report stated the following:

“Given the plethora of headline noise in the oil market, we continue to cut through to what ultimately matters. Our view remains that light crudes in the Atlantic Basin have to clear in order for the market to move materially higher. The one leading indicator to watch is the monthly Official Selling Prices for Saudi Arabia’s flagship Arab Light Crude into Asia.

“The OPEC production cut means that there are fewer barrels flowing from the Middle East to Asia, leaving that key demand region reaching farther than usual to pull barrels. In short, Atlantic Basin crudes are migrating eastward.

“The Saudis cannot raise light OSPs into Asia on a material basis until there is less competition”

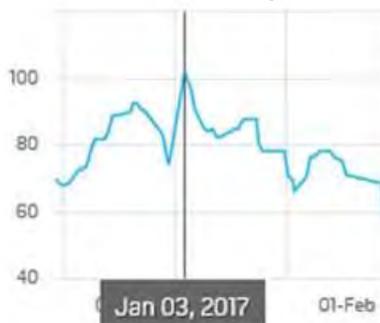
“With increased light, sweet barrels heading toward Asia from less conventional trade routes, the Saudis cannot raise light OSPs into Asia on a material basis until there is less competition. Raising OSPs is a sign that the Saudis deem Asia less competitive, meaning that the Atlantic Basin has been cleared and the global rebalancing is well underway.”

Their observation about fewer barrels moving from the Middle East to Asia is supported by a chart from *PlattsMarine* showing Persian Gulf to Japan VLCC (very large crude oil carrier) tanker rates. As noted, tanker rates for this route rose during December as OPEC

Rising and falling tanker rates are a true reflection of the movement of crude oil, especially in an oversupplied tanker market

members stepped up output prior to the imposition of the production cutback. Tanker rates spiked at the very beginning of January when the last of the December production was available. Rates have steadily declined since early January through the end of February when they fell sharply, presumably reflecting even less oil available for the Asian market from Middle East producers. Rising and falling tanker rates are a true reflection of the movement of crude oil, especially in an oversupplied tanker market. The Chinese customs data reflects the arrival of crude oil volumes after many days at sea.

Exhibit 13. Arabian Gulf-Japan VLCC Rates



Source: *PlattsMarine*

The question remains whether commodity traders are responsible for driving spot oil prices up

At this time, we think the earlier fundamental trends we focused on are more supportive of higher oil prices than the Chinese import data is for lower oil prices. The question remains whether commodity traders are responsible for driving spot oil prices up as they built their super-bullish bet for further crude oil price increases. Will this peak mark another time when the next move in oil prices is down? Time will tell.

Are Oil Company Execs Like Ostriches About EVs?

Exxon Mobil Corp. announced that due to the low oil prices that prevailed during 2016, it had determined that 4.3 billion barrels of oil-equivalent (boe) reserves no longer qualified as proved reserves

Recently, after years of never having to write down the amount of their proved oil and gas reserves, Exxon Mobil Corp. (XOM-NYSE) announced that due to the low oil prices that prevailed during 2016, it had determined that 4.3 billion barrels of oil-equivalent (boe) reserves no longer qualified as proved reserves. In that category was 3.5 billion barrels of bitumen at the Kearl oil sands project in Alberta, Canada. The other 800 million boe that no longer qualifies as proved reserves is spread throughout North America. At the same time, the company announced it had added one billion boe to its proved reserves through purchases, improved asset performance and a decision to fund the expansion of the Tengiz project in Kazakhstan. While ExxonMobil's proved reserves stand at 20 billion boe, the company estimates that its total hydrocarbon resources are 91 billion boe. It is these last numbers that have some investors nervous as they worry that changes underway in the global oil and gas business may result in a meaningful portion of these resources

This report was an analysis of the potential for continued cost reductions in solar photovoltaics (PV) and electric vehicle (EV) technology to displace fossil fuel demand and help mitigate carbon emissions

If true, managers still have time to adjust their plans to ensure that assets are not impaired and that the company is repositioned to capitalize on future business opportunities

The recent decline coincides with China's entrance into the solar panel manufacturing business

and proved reserves being at risk of never being produced as demand for oil and gas falls in the future.

Recently, significant media attention was directed to a joint report issued by environmental research groups Carbon Tracker and the Grantham Institute at Imperial College London. This report was an analysis of the potential for continued cost reductions in solar photovoltaics (PV) and electric vehicle (EV) technology to displace fossil fuel demand and help mitigate carbon emissions. The key message of the study was that the dynamic improvements in these two technologies will significantly disrupt energy company markets and business outlooks. Therefore, energy company managers who rely on "business as usual" scenarios when planning their company's futures are at risk of seriously underestimating how quickly their markets may shrink, leaving them with substantial corporate assets at risk of having little or no value. That is certainly a scenario that scares investors, and something that should concern oil company executives. But how real is this threat?

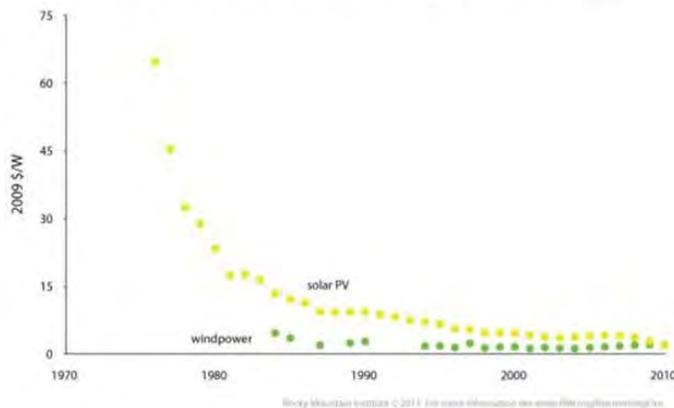
The message of the study is that energy company managers (and their shareholders) should consider focusing on more disruptive business scenarios and to more rigorously assess whether their current business models and strategies are actually much riskier than currently believed. If true, managers still have time to adjust their plans to ensure that assets are not impaired and that the company is repositioned to capitalize on future business opportunities. Of course that requires that oil demand will not completely end, as some environmentalists are hoping.

The Carbon Tracker/Grantham Institute report is based on critical assessments for future cost improvements for PV and EV technologies. In the report, the authors cite that PV module costs have fallen by 99% since 1976. While the source of that statement was not accessible, Exhibit 14 (on next page) has a chart produced by Rocky Mountain Institute showing the capital cost of PV panels from 1976 to 2010. In this analysis, the cost-per-watt in 2015 dollars declined from about \$65 per watt to approximately \$2.

A more recent analysis by the Lawrence Berkeley National Laboratory covering 1998 to 2015 shows a different measure of PV cost. (See Exhibit 15 on next page.) The pattern of that decline is interesting. It took 11 years for the price per watt to drop from \$12 to \$8. Notice how the cost per watt dropped between 1998 and 2000, but then remained flat until 2002, after which it declined for the next three years. Starting in 2005, the cost slowly increased for two years before beginning a slow decline that lasted for two years. In 2009, the pace of decline accelerated until it reached about \$4 per watt, or half the 2009 value. The recent decline coincides with China's entrance into the solar panel manufacturing business and its prompt dumping of surplus output into the U.S. market, driving down panel prices and driving U.S. manufacturers out of business.

Exhibit 14. Solar Cost Cut Reflects Expensive Starting Point

U.S. wind and solar photovoltaic capital cost trends, 1976–2010

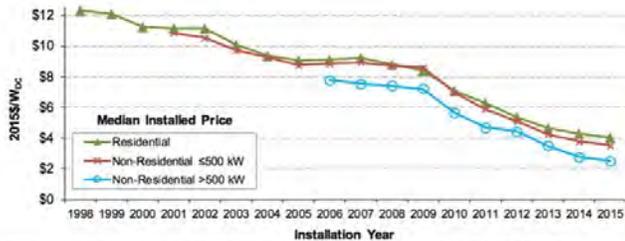


Source: Rocky Mountain Institute

Will these price reduction trends continue as in the past?

It is difficult to separate how much of the historical price decline came from technological improvements versus that from a misguided investment strategy by China. More importantly, will these price reduction trends continue as in the past and how dependent on technological breakthroughs in material science are lower prices in the future?

Exhibit 15. Recent Panel Cost Reduction Due To China



Notes: See Table 1 for sample sizes by installation year. Median installed prices are shown only if 20 or more observations are available for a given year and customer segment.

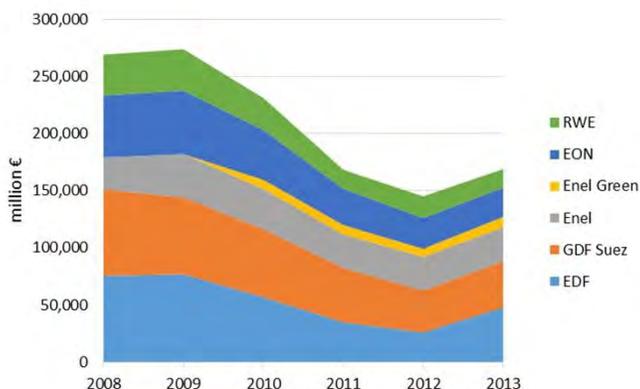
Figure 6. Median Installed Price Trends over Time

Source: Lawrence Berkeley National Laboratory

The reason offered for the value decline was that the utility managers failed to predict the penetration of low-carbon technologies due to cost deflation in these technologies

An additional point was made in the report’s introduction about value destruction from low-carbon transformations and how they should be avoided. The report cites an earlier Carbon Trackers’ report that between 2008 and 2013, the European Union’s five largest utilities lost over €100 billion (US\$105.6 billion) in market value. The reason offered for the value decline was that the utility managers failed to predict the penetration of low-carbon technologies due to cost deflation in these technologies.

Exhibit 16. What Really Drove Utility Value Decline?



Source: Carbon Tracker

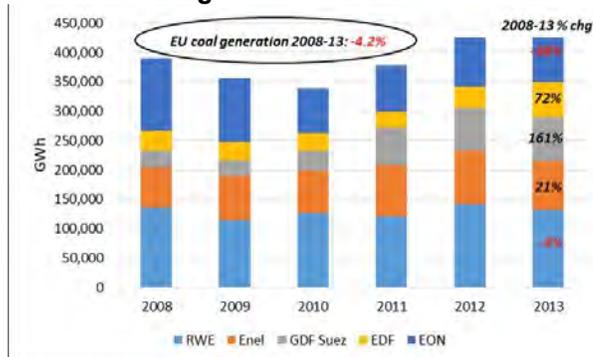
For Europe, however, its economic recovery didn't come until the first quarter of 2016, eight years after the financial crisis

Much of the increased coal consumption came in the final two years of the period examined, which coincided with Germany's mandate to massively develop green energy

That earlier Carbon Tracker report contained several charts that raise questions about the conclusions offered in this new report. Exhibit 16 tracks the change in market capitalization for the five large utility companies. Remember that the global financial crisis exploded on the scene in 2008 and was followed by a global recession in 2009. For Europe, however, its economic recovery didn't come until the first quarter of 2016, eight years after the financial crisis. Also, several of the utilities' market values were significantly impaired by rash government decisions to shut down their country's nuclear power plants following the Fukushima, Japan, nuclear accident in 2011. Attributing all this value loss to management failure in appreciating low carbon energy is an overstatement, in our opinion.

We also thought the use of the chart of coal generation by these utilities over 2008-2013 was interesting. As shown, Carbon Tracker states that total EU coal consumption fell by 4.2% over the period, but what the chart actually shows is that the five major utilities collectively increased their coal use. Two of the five utilities decreased their coal use, while the other three increased their use, and several by significant amounts. Much of the increased coal consumption came in the final two years of the period examined, which coincided with Germany's mandate to massively develop green energy. The significant growth in intermittent solar and wind power generating capacity forced utilities to burn more coal from both domestic sources and imported from the U.S., in order to keep German's power grid from failing.

Exhibit 17. Large Utilities Used More Coal For A Reason



Source: Carbon Tracker

Will the pace reflect that of the mobile phone, or the telephone?

The significance of the new report for the oil industry was the section on the growth of EVs and their impact on future oil demand. Like other studies of EVs' future and gasoline demand, a handful of key assumptions drive the conclusions. For example, what will be the acceptance of EVs? Will the pace reflect that of the mobile phone, or the telephone? Apple (AAPL-Nasdaq) introduced the iPhone in 2007 and by 2010, according to a survey, 9 out of 10 men, women and children had a cell phone in the U.S. On the other hand, in the U.S. in 1902, there were 2.4 million phone lines, which increased 12-fold by 1943 to 26.4 million phone lines. In 1937, a U.S. census determined that there were 19.5 million total phone lines in the country with 11 million being residential lines. That represented a 32% household penetration rate, but after three and a half decades.

Their statement was that GM would lose \$9,000 per Bolt sold

This report focuses on the reduction in battery cost as a key driver for acceptance of EVs. They point to the U.S. Department of Energy's report showing that battery costs have fallen from \$1,000/watt in 2008 to \$268/watt in 2015, a 73% reduction. They go on to point out a statement from General Motors (GM-NYSE) that it has reduced the battery cost for its Chevy Bolt to \$145/watt. This forms the basis for the assumption that "through maintained R&D and strong investment, the capital cost of BEVs [battery electric vehicles], plug-in hybrids (PHEVs) and hydrogen fuel cell vehicles (FCVs) will reach cost parity with ICEs [internal combustion engines] by 2020." What the authors seemed to ignore was GM's statement at that time when they discussed reducing battery costs. Their statement was that GM would lose \$9,000 per Bolt sold.

The battery pack will account for 23% of the vehicle's total sales price

The Chevy Bolt has a 60 kilowatt battery. At GM's cost per watt, the battery pack for the Bolt will cost \$8,700 for a car whose list price is \$37,500 before any tax incentives. The battery pack will account for 23% of the vehicle's total sales price, but only 18.7% of the cost, after adding in the estimated \$9,000 loss. If GM's battery cost is what the Energy Department says, then the Bolt battery costs nearly twice the lower estimate.

In 2016, 777,497 EVs were sold worldwide out of a vehicle output of 93 million units, for a 0.84% penetration rate

Based on our fleet growth estimates, even if the industry produced seven million EVs a year from now to 2025, the fleet would be about 40 million EVs short

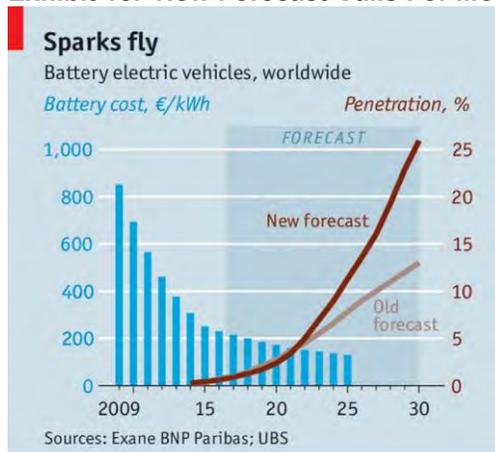
GM is reportedly offering an 8-year, 100,000 mile warranty. We don't know if that is the coverage for the battery, too. Articles we have read suggest that the battery pack will last five years, but we assume that its life depends on where the vehicle is used, as battery life is impacted by temperature extremes.

Before considering the impact of EVs on gasoline demand, the question of how fast EVs penetrate the global vehicle fleet needs to be answered. At the current time, it is estimated that there are about 1.7 million EVs on the road out of a global fleet of close to 1.1 billion vehicles, or a negligible 0.15%. EVs are doing much better in terms of annual vehicle sales. In 2016, 777,497 EVs were sold worldwide out of a vehicle output of 93 million units, for a 0.84% penetration rate. Given country and state mandates for EV sales, the global auto industry is ramping up its plans for introducing more models and growing output. Just how quickly it happens is the question.

According to investment bank Morgan Stanley (MS-NYSE), by 2025, EV sales will hit seven million units and make up 7% of the vehicles on the road. If the global fleet grows by 93 million units per year, and attrition is half that amount, then by 2025 there will be about 1.5 billion vehicles, suggesting that there would be 105 EVs on the roads. Based on our fleet growth estimates, even if the industry produced seven million EVs a year from now to 2025, the fleet would be about 40 million EVs short of the Morgan Stanley estimate, another five million units per year on average.

Exane BNP Paribas, another bank, sees EVs representing 11% of the global fleet in 2025. They have a forecast for penetration rates for EVs tied to battery cost reduction trends. What they see in their forecast (Exhibit 18) is a sharp ramp up in EV penetration over the next five years. Between 2025 and 2030, Exane BNP Paribas sees the EV share of the global vehicle fleet moving from 11% to 26%.

Exhibit 18. New Forecast Calls For More EVs



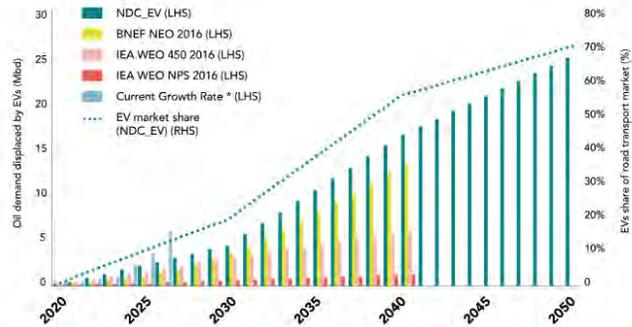
Source: *The Economist*

What even this most aggressive EV forecast shows, however, is that gasoline will remain an important petroleum industry product

The Carbon Tracker/Grantham Institute study has the most aggressive penetration rate, which begins accelerating over the next decade reaching close to a 60% penetration rate in 2040, or 1.1 billion EVs out of a global fleet of roughly two billion vehicles. By 2050, the study sees EVs representing over 70% of the world fleet. The point of their forecast is to show that more aggressive EV penetration rate scenarios lead to much greater negative impacts on gasoline demand than oil companies such as British Petroleum plc (BP-NYSE) and Exxon Mobil Corp. (XOM-NYSE) are projecting in their long-term energy forecasts. Under the Carbon Tracker/Grantham Institute forecast, by 2025, EVs could displace two million barrels a day of oil, which they estimate was the same amount responsible for the 2014 oil price collapse. What even this most aggressive EV forecast shows, however, is that gasoline will remain an important petroleum industry product.

Exhibit 19. Aggressive EV Forecast Drives Large Oil Impact
What could lower-cost EVs mean for oil demand?

Figure 19. Comparing levels of oil demand displaced by EVs across institutional projections^a



Source: IEA World Energy Outlook 2016, BNEF New Energy Outlook 2016, and Citi-Inspired analysis 2016^a

^a * Current Growth Rate* is derived from BNEF and assumes EV sales increase by 65% year on year. Data can be found at: <https://emba.bloomberg.com/finance/2016/04/01/iea-projections-shown-in-figure-19-assume-linear-integration-between-new-data-points-in-the-2016-WEO/>

Source: Carbon Tracker

Renewables and EVs, in all their forms, will create disruption for energy companies

Our purpose in critically evaluating the Carbon Tracker/Grantham Institute report is that key assumptions about economics of new energy technologies and the pace at which they may be embraced will impact the outcome of the forecast. Several months ago when we did our own study of the EV impact on gasoline demand, we concluded that in a reasonable uptake scenario, there would be a greater dislocation than many managers were/are expecting. Renewables and EVs, in all their forms, will create disruption for energy companies. How great a disruption remains to be seen, but the pace of the disruption could come swiftly, which is the message of this report. It is not a bad message for energy company executives. They should factor PV and EVs into their strategic thinking. Our best guess at this point is that the future trajectory for the oil industry will be somewhere between where ExxonMobil and

BP see it going and what this report predicts. Oil demand will be impacted, but that will not mean the end of the fossil fuel industry.

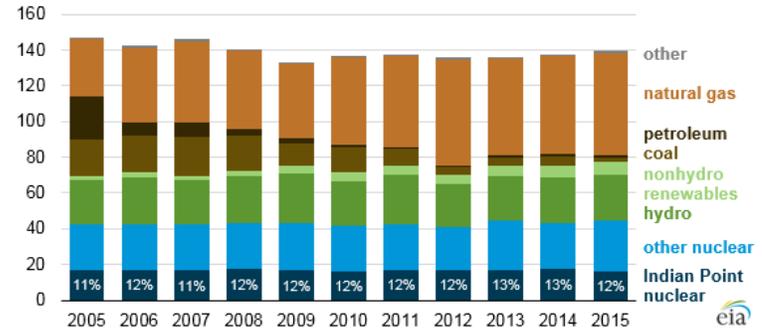
Study Says New York Can Do Without Nuclear Power Plant

The plant supplies New York State with about 12% of its total power needs

New York has started down the road to the closure of the Indian Point nuclear power plant, a controversial move given the state's power needs. The plant, which contains two reactors, provides New York City and neighboring Westchester County with about a quarter of its electricity. The plant supplies New York State with about 12% of its total power needs. Overall, the state's nuclear power plants supply its residents and businesses with approximately 40% of its annual electricity use. Surprisingly, nuclear power generation capacity represents only five gigawatts of the state's 40 gigawatts of total power generating capacity, or roughly 12.5%. Based on data from the U.S. Energy Information Administration (EIA), in 2015, New York State's nuclear power plants generated about 42 billion gigawatt-hours of electricity out of the 140 billion gigawatt-hours of total power output, or 30% of the total, used in the state.

Exhibit 20. Indian Point Nuclear Plant Is Key Power Source

New York state net electricity generation by fuel, 2005-15
billion kilowatthours



Source: EIA

Closing this plant was a goal of Gov. Cuomo who has considered it a safety risk for the region

New York Governor Andrew Cuomo (Dem) has negotiated a deal with Indian Point's corporate owner, Entergy Corporation (ETR-NYSE), to retire the plant by 2021, some 14 years ahead of its scheduled retirement following a 20-year extension of the plant's original operating license. Closing this plant was a goal of Gov. Cuomo who has considered it a safety risk for the region. In return for closing this plant, Gov. Cuomo has negotiated deals to provide subsidies to keep operating three older nuclear power plants located in upstate New York. Under the program he has developed, New York State will provide \$7.6 billion in subsidies to keep those plants operating. The political calculus is that Gov. Cuomo is opting in favor of keeping jobs and energy upstate, while promoting safety and environmental concerns downstate.

A new study suggests that maybe all this renewable power will not be needed if the state embraces more ambitious energy efficiency policies

With the impending loss of such a large component of electric power generating capacity, which operates at a 93% efficiency ratio, New York State will need to develop alternative power supplies. Gov. Cuomo wants this new electricity supply to come from renewable energy – wind, solar and hydropower. One of his first efforts is to develop a large, and expensive, offshore wind farm off the tip of Long Island. Gov. Cuomo is also considering a deal to bring large volumes of hydropower from Canada into the state and down to the New York City area. However, a new study suggests that maybe all this renewable power will not be needed if the state embraces more ambitious energy efficiency policies.

The report highlighted how Massachusetts and Rhode Island have been shaving about 3% off their electricity use annually by providing incentives for shifting to more efficient lighting, appliances and heating and cooling systems

The proposed transmission line project could carry enough hydropower from Canada to New York City to meet half the supply lost with shutting down Indian Point. The remaining power could come from other power sources such as renewables – solar or wind – or from natural gas-fired plants. Two environmental groups – Riverkeeper and the Natural Resources Defense Council – have sponsored a study by Synapse Energy Economics that determined that the remaining power shortfall can be met by improving the efficiency of the use of electricity in New York. The report highlighted how Massachusetts and Rhode Island have been shaving about 3% off their electricity use annually by providing incentives for shifting to more efficient lighting, appliances and heating and cooling systems. Some towns in Rhode Island have been replacing their street lights with more efficient ones, while others have even turned theirs off for a portion of the night.

Steve Nadel, executive director of the American Council for an Energy Efficient Economy, said, “There’s no single silver bullet, but lots of silver BBs that add up to this savings.” He stated that based on 2015 data, Rhode Island saved 2.9% of its electricity sales, while Massachusetts saved 2.7%. In contrast, Mr. Nadel said that New York saved just over 1% of its electricity consumption. The American Council prepares an annual scorecard of state energy efficiency performance. In its latest rankings, Rhode Island and Massachusetts were tied with Vermont at the top. New York was tied for 14th with Illinois, Michigan, Minnesota and Oregon.

This path to meeting the state’s future energy needs, rather than relying on renewables, is problematic for many residents

Can New York achieve these efficiency savings? According to Mr. Nadel, New York can triple its efficiency if it emphasized some of the measures used by Rhode Island and Massachusetts. This path to meeting the state’s future energy needs, rather than relying on renewables, is problematic for many residents. But, as Mr. Nadel characterized it, “It’s not as sexy, but energy efficiency is lower cost.” That would be welcomed by New York residents who appear to be facing much higher electricity costs if Gov. Cuomo’s vision for the state’s power system is adopted.

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