

# The Dream Of New U.S. Manufacturing Jobs

**WASHINGTON** – We know that President Donald Trump pledged to renegotiate (supposedly unfair) trade agreements worldwide with the goal of re-balancing the U.S. trade accounts, while forcing companies to move lost U.S. jobs back to America.

## **Millions of jobs**

His narrative –accepted as truthful by millions of U.S. voters– is that America lost millions of jobs in the last couple of decades, while buying from China and Japan (among others) goods worth hundreds of billions, with no reciprocity, because incompetent U.S. trade negotiators (Democrats and Republicans) were so ineffective (in fact so stupid) that they allowed this disaster to happen.

## **Brand new trade deals**

According to the White House, the remedy is quite simple. You reopen old deals, get better terms through tough negotiations, and you force the offending countries (Mexico, Japan, China, South Korea, among others) to sell less to America, buy more from America, and spit back all the U.S. jobs that moved to their countries on account of badly conceived trade negotiations led by incompetent and unpatriotic Washington trade representatives.

## **Not that simple**

If it were indeed so simple. The problem is that jobs are not akin to cash that can indeed be moved from one country to another in a matter of minutes. Regarding the loss of U.S. jobs, the fact is that in the last 20 to 30 years millions of U.S. manufacturing jobs moved to China because of China's extremely low labor costs. At the time, this was a most

compelling reason.

## **Cheap labor**

American and other Western companies, always seeking new ways to keep costs and therefore prices down, chose China as their base of manufacturing operations because China's labor costs at the time were very low. Therefore, making industrial products in China –especially goods that required labor intensive operations– was comparatively quite cheap.

In a fiercely competitive global economy, all companies seek and want to take advantage of low production costs which allow them to sell at lower prices, this way undercutting their competitors.

All this happened in large measure because (after China joined the World Trade Organization, WTO, in 2001) the rest of the world accepted China as a member in good standing of the international economic and trading system.

No one seriously wanted to penalize made in China products because of the harsh working conditions in Chinese factories and China's rock bottom wages. Was that a bad decision? Possibly. Still, be that as it may, the long term consequences of that decision, for all practical purposes, are irreversible.

## **Trade war and no new jobs**

A trade war with China, while the notion seems appealing to many, would cause a huge global crisis (you can expect retaliations and counter retaliations). And it would not produce the effect that President Trump would like to obtain: millions of jobs, now held by Chinese workers, "returning" to America, while America enjoys enhanced prosperity, and a positive trade balance.

***And why is this impossible? In large measure this is due to***

*the cumulative impact of China's role as a global manufacturing hub. This enviable position led to the creation, over time, of complex supply chains that link Chinese factories, (and therefore Chinese workers), with a web of suppliers and vendors, within China and/or other countries in the region (Taiwan, Vietnam, Thailand, South Korea, and others). These sophisticated supply chains provide the components and semi-finished products that are finally assembled and completed in China. The finished goods are eventually shipped to the United States and other countries.*

This being the case, it is simply impossible, even if we assumed the unanimous will to do so, to yank the jobs now with any Chinese factory which performs the final assembly of industrial products and move them to America.

### **You cannot recreate complex supply chains at will**

And here is why. For this "operation" to be successful, one would have to move and/or recreate –from scratch– in America the entire supply chain that now supports that particular Chinese factory. And this would require the creation, here in America –again, from scratch– of fine tuned business relationships between the lead manufacturer and a brand new network of U.S. suppliers and vendors based on their proven ability to perform at the level required (quality, standards, specifications, delivery time) and at costs low enough to guarantee the competitiveness of the made in America finished product.

### **No U.S. companies operating in many sectors**

If this were not enough, given the lack of meaningful industrial activity in many of the manufacturing sectors that moved to China or elsewhere decades ago, many of the needed suppliers that would be part of the brand new U.S. based supply chain simply do not exist anymore. They went out of business. How about that. No companies making the necessary

components, no supply chain.

## **Impossible**

From all of the above, you can see that the idea of transplanting complex networks of companies, working in harmony with one another, from China to the U.S. is an impossibility.

Again, let me stress that those supply chains were not improvised in China a couple of weeks ago. They were created over decades of tests, trials and error. The notion that the entire web of complex business relationships now at the core of Chinese manufacturing can simply be dismantled and transported to the U.S. is a childish fantasy.

## **An additional problem: automation**

And if this were not enough, you have to consider automation, a relatively recent development which did not play a significant role at the time of the jobs migration incentivised by low Chinese labor costs.

Keep in mind that automation has nothing to do with unfair trade practices. But it has the practical effect of killing U.S. factory jobs that used to be performed by humans. This is an unstoppable trend. Yes, the robots do many and in the future most of the jobs that factory workers used to do.

In a relatively short time, tomorrow's modern factory will probably be completely automated, with only a few highly specialized IT experts and engineers in charge of supervising the robots, and the overall production schedule.

Which is to say that, even if we assume that some manufacturing activities would "return" to America and/or new ones are created on U.S. soil, not much will change in terms of net new employment in manufacturing. In a best case scenario, maybe some factories will come back. But most of

the workers who used to be employed in that sector will be replaced by automation.

### **We are in a new era**

Keep in mind that now we are in a new era; an era in which humans will do less and less factory work. As robots now and in the future will do most of the work, labor costs will become less and less of an issue in determining the location of new industrial plants. Still, as tomorrow's factories will be even more automated, it is hard to see net gains in manufacturing jobs in America, or in the rest of the high cost western world, for that matter.

### **No jobs coming back**

In conclusion, here is the thing. The creation of complex supply chains created by Chinese companies to support China-based production over many decades cannot be dismantled and quickly reassembled at will here in America.

Furthermore, from now on automation is and will be the new manufacturing jobs killer. While automation, at least in some areas, may result in creating new forms of employment in new sectors that we cannot even think about today, the old factory jobs we used to know at some point will become extinct.

### **Can we do anything to reduce the trade deficit with China?**

That, said, what about the chronic trade imbalance with China? Very hard to do this. And this is in large measure due to the fact that millions of American consumers love to buy cheap consumer goods. And China, for the moment at least, is still the low-cost producer.

However, what can and should change in this enormously large bilateral trade relationship is the unfair treatment of foreign companies trying to establish themselves in China, or trying to sell their products and services to China.

## **Unfair treatment**

There is plenty of evidence indicating that U.S. exporters are penalized in a variety of ways. For instance, the Chinese use their own competition laws as an effective non tariff barrier against foreign companies. Chinese authorities selectively target U.S. and foreign companies accusing them of anti-competitive behavior, forcing them to pay fines and to license their technologies to Chinese entities, this way undermining their ability to work in China and their overall competitiveness.

## **Demand better terms**

This is an area where the Trump administration has legitimate ground to complain and demand better terms from China. Still, even if successful, this effort would lead at best to the narrowing of the trade imbalance gap, not to its disappearance.

As for the millions of new manufacturing jobs coming back to America on account of broad new trade agreements, well, dream on. This is just not going to happen.

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## **Why Is Montenegro Joining NATO A Big Deal?**

**WASHINGTON** – With the US Senate approving by a huge margin Montenegro entering NATO, the US-led security pact, (only 2 senators opposed), soon enough this small country, once a region of the former Yugoslavia, will join the western military alliance created on April 4, 1949 with the Treaty of Washington. In “normal” times, this tiny NATO enlargement

should not be an event that would move the needle one way or the other.

### **Montenegro is small**

Indeed, on the face of it, Montenegro NATO membership should be a "non issue". Hard to believe how a very small Balkan nation, with a population of 650,000, an army with only 2,000 soldiers, and a country GDP that is about the same size as the budget of the New York City police force, will alter the balance of forces in Europe.

### **A symbol**

And yet, it is a sign of the times we live in that this issue of Montenegro and its accession into NATO somehow has become a big deal. Russia sees this step of Montenegro joining NATO as further evidence of a relentless eastward NATO expansion, most likely with the intent of encircling the Russian Federation, therefore creating a national security threat for Moscow.

### **Sending a message to Moscow**

The US and other western countries instead want to portray the extension of NATO's protection to this small Balkan nation as a manifestation of western political resolve. Russia is accused of trying to alter unilaterally the post war borders of Europe. Washington extending a helping hand to Montenegro, this way guaranteeing its security from possible external threats, supposedly would send a signal to Estonia, Poland and other NATO members bordering Russia: *"America is here to stay in Europe. No intention to leave. Abiding by the letter of the NATO Treaty, Washington pledges that it will stand by its allies, large and small, no matter what"*.

Adding more complexity to the Montenegro accession issue, it is clear that the country was and is divided on this matter. Pro NATO political forces have accused Russia of meddling.

## **Moscow and Washington should address distrust issues**

Be that as it may, instead of using tiny Montenegro as a political symbol, it would be better for both Washington and Moscow to get together and seriously try to find common ground regarding legitimate security concerns. No, NATO is not about to attack Russia. By the same token, NATO should recognize Russian concerns regarding ethnic Russians outside of the borders of the Russian Federation, and Moscow's historic connections with Slavic nations in Eastern Europe and the Balkans. The way forward should include ways which will enable Russia to feel more secure, while NATO countries can be convinced that Russia will use diplomacy, and not military force, (or subversion), to further its political interests in Eastern Europe and other border areas.

## **Find a way to improve East-West relations**

Montenegro's accession to NATO will change nothing when it comes to the balance of forces in Europe. However, the very fact that we are even talking about this enlargement of the western alliance as a real problem, contributing to the further deterioration of East-West political relations, is indicative of the under currents of deep distrust between the US and Russia.

It should be in the interest of both Washington and Moscow to address this distrust.

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**Wanted: Credible Centrist**



# Political Leaders

**WASHINGTON** – Recently, a Democratic party elected leader of national renown argued in a public forum that in order to regain lost momentum and credibility with the American voters the Democrats have to redefine themselves as the party of economic growth and inclusiveness.

## **Common sense messages**

At a national event focused on the future of U.S. small businesses, a Republican national leader claimed that America's greatness rests on its foundations as an opportunity society in which people can advance because of a rules based system that recognizes and rewards merit.

John Hickenlooper, the Governor of Colorado, a successful state chief executive, stated that through collaboration between Republican and Democrats we can find workable compromises on the future of the US health care system, and other national priorities.

Well, what do I make of all this? Very simple. These statements made by credible centrists in both parties raise the hope that it may be possible, even in this incredibly poisoned political climate, to rally millions of Americans, hopefully a majority, around the basic ideas of an optimistic country in which policy-makers promote economic growth, while upward mobility is based on genuine merit; and nobody is excluded or kept from advancing because of social class, gender, race, or anything else. In fact, the opposite –equal opportunity for all- is embraced by all.

And this must include quality education, the best foundation of future success in life, available to everyone; while bridges are built across every divide, and doors are wide open to all who are willing to make an effort.

## **It is an old idea**

This idea of America as a level playing field and fair rules used to be a shared vision embraced by most. Indeed, it was the belief that America offered genuine opportunity that attracted millions of immigrants who wanted to create in America a better life for themselves. It is about time to re-propose this vision in a manner that can be shared by today's Americans –Democrats and Republicans.

Indeed, who could object to public policies that promote economic growth, social advancement based on merit, while all citizens have genuine access to quality education, careers and consequently a good seat at the table?

## **Lost hope**

Of course, the last few years have told us an entirely different story. It is a story of lost hope, deep disappointment, and resentment. A story of popular distrust in the honesty and abilities of most elected leaders. A story of exaggerated promises not kept.

This has created an emotional anti-government rebellion on the right, (*"Washington is a rotten place"*) and the triumph of policy agendas on the left which advocate economic and social re-balancing achieved through redistribution by taking (ill-gotten gains) from the few ultra rich and giving to the rest of society. All this will be wisely designed and orchestrated by government, through taxation and subsidies.

## **Despondent America**

The outcome of all this is not pretty. The unexpected outcome of the November 2016 presidential elections is evidence of the widespread feeling of deep despair. Indeed, according to millions who voted for Donald Trump mostly because he is not a professional politician, "the system" failed –period. Its failure is so deep that it is not worth salvaging. In fact, it

should be dismantled. Millions of Americans feel deeply alienated.

Paradoxically, notwithstanding continuous economic growth and lower unemployment since the end of the Great Recession in 2010, rightly or wrongly millions of Americans who used to be part of a self-confident middle class now are and feel poorer and left behind. At the same time, millions of young people feel hopeless facing a world of diminished opportunities, while laboring under the crushing weight of absurdly large student debts.

### **There is a way out**

That said, I sense that there is a way out of this. Difficult, yes; but not impossible. Yes, America needs house cleaning. It needs fresh faces not tainted by the old ways of doing business.

The unimaginative political elites still populating Washington, DC have survived by over promising everything to everybody, while pretending to pay for all the goodies they offered to various (of course deserving) constituencies, knowing full well that the only way to finance all this public largess (unaffordable entitlements) was and is to borrow more and more, this way getting the country deeper and deeper into debt. Sadly, the Washington elites have no real economic growth strategy, while their policies aimed at buying votes through entitlements funded by public money and more and more borrowing are driving America towards the abyss of insolvency.

### **Credible people who will tell the truth**

Most Americans have common sense. However, they need credible new leaders who will tell the unvarnished truth about the dangers of systemic and growing fiscal imbalances, (i.e we have to agree on a sensible plan to reform all major federal entitlement programs, by far our biggest fiscal problem), while pointing the only way to get out of this ditch: economic

policies (think tax reform and smart deregulation affecting business activities) that will promote a more robust economic growth in a genuinely open and inclusive society. An inclusive society in which elected leaders are committed to destroying all artificial barriers to entry, while opening new avenues of opportunity to all.

President Donald Trump, a new leader who is not carrying the baggage of the distrusted establishment politicians, could lead the way in shaping a new American political conversation. As his presidency is just getting started, it is impossible to say whether he will engage in this effort or not. We should all hope that he will. This would benefit the country and him.

### **Impossible?**

Well, in the end all this sounds too lofty, in fact unrealistic. Yes, this is an appeal to an admittedly mythologized idea of an America “where anything is possible as long as you work hard and play by the rules” which (truth be told) never fully existed in the way many refer to it.

And then there is the huge problem of yanking benefits away from millions (deserving or undeserving, it does not matter) who got used to getting them. *“Come on...get real. Nobody gets elected by promising less, let alone by promising to cut existing benefits. And we in Washington just do not know how to deliver stronger economic growth. We only know how to distribute subsidies”.*

### **The way ahead**

And yet, if we do not want to see America follow Europe on the path of historic decline, it is imperative to make real progress on these two related fronts:

***1) restore fiscal sanity by reforming all the major entitlement programs***

***2) genuinely and forcefully promote economic growth and real opportunity for all***

The alternative is political chaos, the de-legitimization of our institutions, and rapid economic decline.

Some elected leaders of both parties know this. I just hope that their common sense message will be heard, understood and embraced.

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## **Facing Low Oil Prices Exxon Is Looking For New Strategies**

**WASHINGTON** – Major oil companies are in deep trouble. Too much global supply means lower crude prices. If this continues –and there is every little evidence that it will not– this means that large exploration projects in far away lands that typically require large up front investments may no longer have economic justifications. Simply stated, these projects mean too much money invested now for potentially weak or even negative returns years from now.

### **Move into shale**

Hence the decision just announced by the new Exxon leadership to invest more in the U.S. shale oil sector. This move would require lower up front capital investments, as opposed to the traditional focus huge on large “conventional oil” exploration ventures, many of them off shore operations, which may cost billions over a number of years before they become operational. It is hoped that this move into U.S. shale would create greater operational flexibility, since shale wells do not cost that much and can be “turned on or off” fairly

quickly, depending on global demand and supply fluctuation.

This is how *Oil & Energy Insider* (March 3, 2017) describes the move:

*“Exxon goes big on U.S. shale. New ExxonMobil (NYSE: XOM) CEO Darren Woods gave his first presentation to investors this week, where he outlined a strategy to step up investment in U.S. shale. Exxon will allocate a quarter of its 2017 budget to short-cycle shale projects. The move will help the oil major navigate an uncertain market, as cash can be returned to the company much quicker from shale drilling than it can from the major offshore projects that Exxon has long been accustomed to. Still, Exxon will move forward aggressively on its large offshore discovery in Guyana, hoping to bring it online in the next few years. “*

## **Diversify**

So, here is the thing. Exxon is trying to diversify its energy portfolio. It will continue work on existing “conventional oil” projects. But it will try to mitigate the risks associated with large commitments to new expensive projects in a volatile and downward trending crude prices environment by buying more into the less risky U.S. shale sector.

I say smart move. However, it may just not be enough. In part thanks to the U.S. shale oil revolutions that began in earnest about a decade ago, there is just too much crude supply worldwide.

## **It may not work**

Hard to believe that OPEC’s oil price support efforts –its decision to cut production, somewhat– even if aided by similar production cuts enacted by Russia and other non-OPEC producers, will manage to put a real floor on oil prices.

Good luck to Exxon. It really needs it in order to protect its

position as an American oil giant.

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## China To Become Green Super Power?

**WASHINGTON** – Many Western environmentalists and commentators openly praise China for its declared energy policy objective of turning itself into a truly “*Green Super Power*”. They claim that, unlike Trump’s America, (ignorant and backward), China (smart and forward-looking) truly understands the threat of global warming, and is actually doing something very serious about it.

### **Hundreds of billions for green power projects**

Indeed China has committed hundreds of billions of dollars to renewable energy projects. It is leading the world in massive investments in wind and solar projects, with more to come.

Contrast that with heretic America now led by a President who believes and publicly affirms that global warming is nothing but a hoax. Indeed, instead of leading the way in renewable energy investments, President Trump’s America promises to revive (dirty, high emissions) coal production, while he just signed executive orders that will re-start two major oil pipeline projects that had been blocked by President Barack Obama, at least in part because of environmental concerns.

### **Responsible China**

So, there you go. Communist China’s leaders are acting as responsible stewards of our Planet Earth, while democratic America is the prisoner of anti-science bizarre bigotry that

ignores “the facts” about green house gases and global warming, and the dire consequences of disastrous energy policies still based on fossil fuels that will end up cooking the world.

### **The truth is more complicated**

Well, this is how the critics of American policies would like to frame the argument. But the truth is far more complex. It is indeed true that China is investing very substantial amounts in green energy projects. But it is also true that renewables are and will continue to be a small fraction of China’s power generation capacity. The fact is that China relies today and will continue to rely in the future mostly on coal –yes, old-fashioned dirty coal– to produce about 66% of its electricity.

In contrast, if you look at the current mix, U.S. electricity generation is on balance far greener.

### **Green America?**

In the U.S. coal is now used for only 33% of power generation, a much lower proportion than China’s, (50% less, in fact). On account of the shale gas revolution that made natural gas abundant and cheap, America now relies on low emissions natural gas for 33% of electrical generation capacity. This percentage is destined to increase, mostly at the expense of dirty coal. While this transformation is driven by market factors, as opposed to government green policies, the added bonus here is that natural gas is a much more environmentally friendly fossil fuel.

If you add 20% of power generation produced by nuclear and 6% from hydro, (an old-fashioned source of renewable energy), the picture is not that disastrous.

### **Less coal, more natural gas**



While the contribution from other renewables is still rather small in America –solar represents only 0.6% of total power generation capacity, while wind is a still a modest 4.7%– the fact remains that America relies on coal for only 33% of its power generation, while China uses this dirty fuel for almost 70% of its total electricity generation.

So, looking at the numbers, (to date at least), America is far greener than China.

The truth is that coal-fired plants are and will continue to be for years to come the major electricity producers in China. Even at current levels of new investments in renewables, it will be a long time before China becomes green in a meaningful sense.

## **Biomass**

In the meantime, if we break down China's renewable energy mix, we see that (if we exclude hydro) by far the biggest percentage is represented by biomass. As noted by Bjorn Lomborg in a recent op-ed piece published in The Wall Street Journal (A "Green Leap Forward" in China? What a Load of Biomass, February 5, 2017):

*"It is peculiar—though unsurprising given the sensibilities of Western environmentalists—that those who celebrate China's "Green Leap Forward" almost always focus on wind and solar technology. By far the largest source of renewable energy used in China is traditional biomass—that is, people burning charcoal, firewood and dung, as China's poor do to stay warm. Biomass is the biggest source of killer air pollution in the world."*

## **Health concerns**

As biomass energy production entails burning animal dung, wood and charcoal, this type of fuel is hardly green, because of the fumes and soot produced by its combustion. If you consider

that in China biomass is used for home heating and cooking mostly by the rural poor, this means that the fumes released by these “green fuels” cause a variety of respiratory diseases to vulnerable, low income people.

### **It will take a long time**

So, what is really going on here? It is true that China is committed to increasing the percentage of its electricity generation provided by clean solar and wind. In absolute numbers, China’s renewable generation added capacity is truly impressive. However, as a percentage of the total (keep in mind that China has a population of 1.3 billion energy users), this contribution from renewables is and will continue to be rather modest.

### **Still reliant on coal**

The fact is that major efforts in wind and solar notwithstanding, China still relies and will continue to rely on traditional dirty coal as the key component of its power generation mix for many years. In fact, while wind farms are built, China is adding more coal-fired generation.

It is therefore a misrepresentation to state that China is well on its way to becoming a “Green Super Power”. While the intention may be there, it will be a long time before China will be able to rely mostly on renewables for its power generation needs.

### **Let the markets decide**

The larger lesson here is that in the end it will be superior technology delivered at competitive prices that will tilt the power generation balance. When renewables will be really cost competitive without subsidies, then they will be adopted on a massive scale in China, in America and elsewhere.

Right now, at least in the West, the push for early adoption

of still expensive technologies is not driven primarily by economic considerations. It is pushed forward by policy-makers through mandates, set asides and tax breaks created because of strong environmental concerns.

While this is understandable, we should not muddy the waters by arguing that if China can go all the way with renewables, so should America. China is doing something important. But, on close inspection, a lot less than what is stated by Western environmentalists.

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## Oil Prices Will Go Down But U.S. Shale Will Survive

**WASHINGTON** – After the oil production cuts recently announced first by OPEC and then non OPEC oil producers, oil prices rallied. This is because supply cuts must mean tighter markets and therefore higher prices. Well, looking at what most energy sector analysts say, this idea of a sustained oil rally is a dream that will soon end. And this is because there are too many exemptions to these announced cuts, too many special cases and too many opportunities to cheat, since rather modest total production cuts are to be spread thinly among many producers.

**Oil prices will fall again**

Who is going to check about full compliance? Bottom line,

expect oil prices to lose altitude again, as soon as hard data about production among OPEC and non OPEC countries will become known, probably towards the end of January. Keeping all this into account, while West Texas Intermediate, WTI, closed at about \$ 53 on January 5, it is hard to believe that it will stay at that relatively high level for much longer.

### **What will happen to the U.S. shale sector?**

That said, the really interesting question, assuming persistent low crude prices, is whether the U.S. shale oil industry will be able to withstand another prolonged price squeeze.

If recent history is good guidance, I would say: yes, it will. Surprising everybody, the American oil shale sector, until a few years ago deemed to be profitable only assuming oil would stay at or above \$ 60 per barrel, managed to survive, when oil beginning in 2014 went down to \$50, \$ 40, and even \$ 30 per barrel.

Of course, the success record is quite uneven within a sector characterized by so many diverse players that differ in terms of size, profitability of their reserves and financial conditions. Many shale energy company, especially those carrying quite a bit of debt, just could not make it. They went bankrupt. Others were bought by stronger competitors.

### **U.S. shale oil sector made up of diverse players**

In truth, there is no such thing as a homogeneous U.S. shale oil sector. There are many energy companies operating in different states. Each one is different. And the chances to survive or thrive in a tough market environment because of low oil prices depend on many factors unevenly spread. Indeed, while examining companies, analysts have to take into account the specific geology that will affect production techniques and oil recovery levels and related costs, the company's management skills, the amount of debt each company carries,

the ability to apply in a timely manner state of the art new technologies, and a lot more.

Still, even taking to account that some companies are strong and some very weak, with many more in between, it is fair to say that the sector as a whole proved to be surprisingly resilient, given the low profit margins in a depressed oil price market.

### **Sustained production**

Yes, the total U.S. rig count went down, dramatically, following the 2014 price collapse. But overall production, with some ups and downs, did not go down that much. The shale oil sector proved to be quite flexible.

While large conventional operations cannot be brought on line, closed and restarted at will, the shale sector is far more flexible. And this means that shale operators do not need to bet on a 5 year window of high prices that will guarantee profits in order to start operations.

They can quickly respond to price fluctuations, producing more when prices are high; while shutting down production when prices drop below their break even point. Look, obviously it is not just like flipping a light switch. But you get the idea. Shale is nimble.

### **How much flexibility and resilience?**

So, flexibility and resilience define the American shale oil sector. But here is the question. Is it possible for U.S. shale to become ever more productive and nimble? Or, at some point, no matter how much they try to cut costs, the energy companies hit a profitability wall?

While we know that the shale plays in the Permian basin in Texas can stay in business even with oil at \$ 40 or even \$ 30 per barrel, what about all the other reserves in Oklahoma,

North Dakota and other states? If we assume prices going down to \$ 40 or even \$ 30 per barrel for an extended period of time, how many shale companies, many of them operating in far less favorable locations, have a realistic chance to survive, let alone be profitable? Can new fracking technologies perform more miracles, or has the sector become as productive as it can get?

### **How long can Saudi Arabia endure the adverse impact of lower oil revenue?**

The honest answer is that we do not know. That said, we also do not know how long oil prices will stay this low. Indeed, we do not know how long Saudi Arabia, the world's biggest producer and OPEC's *de facto* leader, can endure the economic and fiscal impact of low prices without resorting to much steeper cuts in order to jack up prices and therefore state revenues.

We all know that Saudi Arabia's oil industry will be profitable even with oil at \$ 30 per barrel, because Saudi extraction costs are very low. But the problem is that the Saudi Government depends on high oil prices to finance practically everything.

While the Monarchy is trying to change things, right now the Saudi State needs to lubricate with cash infusions a rent based society in which hardly any Saudi citizen is engaged in truly productive activities.

### **Low oil prices hurt**

Which is to say that low oil prices hurt different producers in different ways. OPEC now has tried to drive prices up by announcing relatively modest production cuts to be spread among various producers. Some non OPEC countries indicated that they would also participate, with the shared objective of jacking up prices.

Based on what know, this time the trick probably will not work, because too many producers are saying one thing about cuts and then planning to do the opposite (keep production levels high, or in some cases, ramp up production).

### **When will Saudi Arabia announce serious cuts?**

But at some point Saudi Arabia will start running out of cash; and so it will have to cut its oil production in order to drive prices up. This would help the Saudi state immensely in its effort to stabilize its finances. However, any Saudi move aimed at supporting oil prices would also help the marginal U.S. shale producers. Some of them are hanging tight, hoping for better days to come.

In other words, who will give up first? Will the U.S. shale sector be eventually defeated by prolonged low oil prices? Or will Saudi Arabia have to swallow the bitter pill and cut production (therefore giving up some of its market share) in a far more significant way in order to drive prices up, with full knowledge that this will help U.S. shale companies?

### **Bet on Yankee ingenuity**

All in all, when it comes to endurance and resilience in adverse market conditions, I would still bet on Yankee ingenuity. The American shale oil industry surprised the world by inventing and then deploying hydraulic fracturing (fracking) and horizontal drilling on a large scale, this way bringing on line millions of barrels of oil that was deemed to be unrecoverable. And then they delivered an even bigger surprise when they managed to make the entire sector much more productive and efficient in record time, when faced with a sudden crude oil price collapse.

None of this could be done, everybody said. And the shale oil people did it. May be they will keep doing it, surprising all analysts once again.

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# The Obama Foreign Policy Record

**WASHINGTON** – The almost universally accepted narrative dished out daily by the serious, high brow U.S. media is that come January 20, 2017, with Donald Trump as President, we shall have 4 years of “*Amateur Hour*” in U.S. foreign policy. This dismal prospect is of course a far cry from the thoughtful, insightful and properly balanced foreign policy agenda expertly crafted and implemented by President Barack Obama and his top-notch foreign and national security policy team.

## **The incompetents are taking over**

We are told by savvy analysts that, all of sudden, from reliable, steady competence that –as we all should know– raised American prestige worldwide, we shall plunge into an abyss of policy mayhem stirred by dangerous ignorance mixed with laughable (or dangerous) braggadocio, with a stupendously unqualified Commander in Chief at the helm.

## **Condescension**

This narrative is another expression of the Olympian condescension of the perennially entitled leaders of the Washington foreign affairs establishment. They simply cannot get used to the reality of a complete outsider, with no real hands-on experience in this field until now reserved to few insiders, now in charge.

## **Trump is inexperienced**

True, Trump is inexperienced. He may indeed fail in foreign policy, and we should not take this prospect lightly, as there



are bound to be consequences. On the other hand, he may not fail, after all. Trump will have a team working for him. Most of the people he picked thus far have considerable international and national security experience.

### **Right mix?**

That said, has he chosen the right mix of people? Even more important, when confronted with difficult decisions, in murky situations when there is no obvious right policy choice, will Trump have the right instincts? Will he manage to safeguard –better yet, advance– the American National Interest? Quite frankly, we do not know yet. Time will tell.

### **Obama's record**

However, while we can only speculate about the future, we do know a great deal about the Obama Team foreign policy record. And, no, it is not stellar. Contrary to the official narrative, the supposedly expert hands that have been in charge until now are not shining stars. And Obama is no great leader when it comes to directing U.S. foreign affairs. Hesitation, mixed messages and retreat have defined American foreign policy under his stewardship.

Now, after George W. Bush's profoundly ill-advised pro-democracy enthusiasm which led America into two horrendously costly and mostly unsuccessful wars –Afghanistan and then Iraq– a new foreign policy guided by restraint was indeed a welcome change after the 2008 elections. But there is a huge distinction between careful, calculated withdrawal behind defensible lines, while spelling out U.S. continuing strategic priorities, and policy confusion leading to retreat.

### **Allowing chaos in Iraq**

In Iraq, President Barack Obama used Baghdad's intransigence regarding the legal status of U.S. troops which would stay on after December 2011 as a good excuse for ending the

negotiation with then Prime Minister Nuri al-Maliki. With no deal with Baghdad in place, the U.S. pulled completely out of Iraq at the end of 2011.

At that time Iraq was a relatively stable but still fragile and politically split country (Sunni in the North, Shia in the South) in which America had invested an enormous amount of resources. Pulling out completely while the wounds had not healed was an ill-advised and in the end horribly wrong decision.

To this day, President Obama claims he had no choice, given the uncooperative stance of the Baghdad government. But this is nonsense. If the Obama administration really wanted a deal with Prime Minister al-Maliki that would have allowed a substantial U.S. military presence after 2011 it would have found a way to get one.

### **Get out**

The fact is that Obama wanted out of Iraq, entirely for domestic political reasons. He wanted out of Iraq in order to show to the American people that he had made good on a major campaign promise: he had brought all the troops home. And, in fact, later on he repeatedly bragged about this “accomplishment” represented by the closing of the Iraq War chapter. Which is to say that concerns about Obama’s popularity at home caused America to essentially abandon a country in which it had invested years, hundreds of billions, and so many lives of killed U.S. soldiers.

Could sizable American troops stationed in Iraq have prevented the steady descent into chaos that followed their departure? We do not know for sure. But it is not far-fetched to believe that they could have helped keep things together.

### **Belated U-turn in 2014**

That said, Obama was forced to make a complete U-Turn on Iraq

when this deeply divided country was confronted with an invasion masterminded in 2014 by the Islamic State, or ISIL from its bases in Eastern Syria. A massive invasion, by the way, that the sophisticated Obama intelligence leaders never saw coming.

With no U.S. troops on the ground, (thanks to Obama's complete troops withdrawal decided back in December 2011), ISIL breezed, mostly unopposed, into Northern Iraq. In a matter of days it took over Mosul –the second largest city in the country– and the entire North West of Iraq. An eyewitness quoted by *The Guardian* said that:

*“The city [Mosul] fell like a plane without an engine. They [ISIL] were firing their weapons into the air, but no one was shooting at them.”*

Beyond taking over Mosul, ISIL captured vast amounts of cash and a huge arsenal of U.S. supplied weapons and material, simply because the Iraqi troops had run away.

So, here is the upshot regarding Obama's record on Iraq: U.S. troops out; ISIL in. The Caliphate takes over 1/3 of the country within days. America forced to move back in. But slowly and with hesitation. Meanwhile, militias funded by Iran spread through the country. This is complete policy failure.

### **Surge in Afghanistan?**

In Afghanistan, President Obama started with an almost comical public debate in the Fall of 2009 (first year of his mandate) about what U.S. policy should be regarding the continuing Taliban insurgency. Obama finally ended the deliberations in November 2009 with a commitment to a “Iraq-like” surge in Afghanistan. But it was a surge accompanied by a publicly announced withdrawal timetable.

Yes it was just like that. Washington would send additional troops aimed at stabilizing this perennially chaotic country;

but only for a short while. How ill-advised. You go to war not to shoot around a little bit, and then go home. You go to war to win. Or you do not go at all. Result? 20016 is over and the war in Afghanistan is still going on. This is another failure due to Washington's indecisiveness and half measures.

### **Get rid of Ghaddafi**

Then there was Libya, and the ill-conceived idea of toppling dictator Ghaddafi, without even a thought of a game plan about what to do afterwards. Result? Ghaddafi was toppled and he is certainly dead. But so is Libya, now a failed state torn apart by various warring militias. This is failure number three.

### **Hesitation about Syria**

And what about Syria? in 2011, at the beginning of the Arab Spring, President Obama declared that President Assad heavy-handed repression of initially peaceful pro-democracy demonstrations was intolerable. Assad, Obama declared, "had to go".

Strong words. However, this clear statement of a U.S. policy objective –nothing but regime change would do for Syria–lacked even the semblance of a policy aimed at obtaining the outcome: make Assad go.

This incoherence between grandiose objectives and no policy to implement them was only the beginning of a half-hearted U.S. policy in support of some factions within the Syrian opposition.

***Military planners should know that a little bit of support is not enough. In war, either you are in or you are out. Even if your method is to support the opposition, as opposed to sending your own troops, you have to be with them all the way. Support to your side in the conflict has to be decisive. The objective must be victory.***

## **Media criticism**

Well, even the serious usually pro-Obama media, after years of U.S. half measures, recognized that Syria is a huge policy failure for Obama. this is a BBC analysis dated October 2015:

*"[Regarding Syria] the philosophical discussion at the White House was heated and fierce, leading to stalemate, not resolution.*

*For years Obama and his deputies refused to say categorically: we're not doing this. Instead a decision was postponed.*

*Four years later, the result is a splintered Syrian opposition, the growth of the Islamic State group and a humanitarian disaster stretching across Europe.*

*Last year, in a move that was more symbolic than serious, Obama asked Congress for money to fund a programme allowing US personnel to teach rebels marksmanship, navigation and other skills.*

*The goal was to train about 15,000 rebels in Jordan and other countries so they could return to Syria and fight. However, US defence officials admitted last month [September 2015] that only four or five of the recruits in the programme had actually returned to the battle."*

## **It ended badly**

And this was the BBC, a fairly sympathetic voice. A year later, things got only worse. The result of years of U.S. policy confusion and half measures is a semi-destroyed Syria, Russian massive intervention in support of Assad, the Iranians and Hezbollah firmly planted there, a defeated opposition just driven out of Aleppo, not to mention untold numbers of dead people and millions of refugees. And now, a new ceasefire was arranged by Russia in partnership with Turkey and Iran. The U.S. is not even at the table. Talk about American retreat.

This is a colossal policy failure.

## **ISIL in Iraq**

And then there is ISIL in Iraq, the worst consequence of the U.S. total military withdrawal from the country it had invaded back in March of 2003. In a speech to the Nation, on September 10, 2014, President Obama sounded really tough about ISIL and the threat that it represented for the region and indeed the world.

He declared that: *“Our objective is clear: we will degrade, and ultimately destroy, ISIL through a comprehensive and sustained counter-terrorism strategy”*.

It sounded that America really meant business. To begin with, Obama told the world that Washington had assembled a powerful coalition of 66 countries. Impressive? Not so much. If you care to dig just a little bit, you discover that this unbeatable anti-ISIL Armada includes heavyweights like Luxembourg, Somalia, Iceland, Bosnia, Bahrain, Romania, Cyprus, Estonia, Panama, Montenegro, Latvia and Albania. Are you still impressed?

## **Painfully slow progress**

And the American military effort has also been modest. Two years later, while there have been significant successes against ISIL, we are still not done. Coalition supported Iraqi forces, (by the way this would also include support from Iran) are getting closer to Mosul; but they are still far from retaking it and eventually driving ISIL out of Iraq, let alone “destroying” it, as Obama pledged.

This is almost inconceivable. ISIL is a bunch of nasty thugs who use barbaric methods. But ISIL is not the German Wehrmacht smashing France, or the Japanese Imperial Army conquering Manchuria or the Philippines. It is a rag-tag, third-rate military force. It is unbelievable that America, with the

largest and most technologically advanced military force in the world, could not destroy the self-proclaimed Islamic Caliphate in a matter of weeks.

To the contrary, a recent *Washington Post* story indicated that this battle against ISIL is going to be long slug:

*"[...] But a full offensive to retake the city [of Raqqa, de facto capital of ISIL] could still be months or more away, despite hopes in Washington that an operation to take the Islamic State's most symbolically significant stronghold would be well underway before President Obama left office."*

This slow and uneven progress is the military outcome of policy confusion and partial military engagement. Despite Obama's clear commitment a couple of year ago, the mighty U.S. still has not managed to *"degrade and ultimately destroy ISIL"*.

### **Pivot to Asia?**

And there are many more examples of grand plans that yielded little. Consider the pivot to Asia. Nice idea; but little to show in terms of results. Suffice to say that China, just as America publicly committed to shift its policy focus on Asia, has managed to increase its sphere of influence throughout most of the South China Sea –essentially unchallenged.

True, the Obama administration made all the right noises when confronted with the evidence that China is busy building up and militarizing small islands scattered across the South China Sea that it occupied with the bogus justification that these rocks (some of which do not even qualify as "land" according to international law) have always been under Chinese sovereignty.

The Obama administration has not been able to challenge this creeping Chinese expansion, nor has it been capable or willing to persuade the Chinese to retreat and get out.

## **Iran**

I am purposely leaving out of this analysis the Iran nuclear deal, because it is a lot more complicated than these other issues, and because in Iran's case the Obama administration acted with purpose towards a fairly clear policy objective: freeze the Iranian nuclear program. And this objective has been reached. While there are many vocal critics of the deal, none of them seem to have a better plan. Just getting out of a "bad deal" without having anything to replace it will not yield better outcomes.

## **Obama's retreat**

Anyway, you get the picture. Clearly, it is always easy to point out foreign policy failures with the benefit of hindsight. Of course, it would be completely unfair to blame Obama for an Arab World in chaos, and other major troubles.

Still, the net result of Obama's 8 years in office is not stellar.

All in all, U.S. policies regarding Iraq, Afghanistan, Libya, Syria and ISIL reveal a pattern of hesitation, in fact genuine confusion, and the inability to define, articulate and pursue what in Obama's mind is the U.S. national interest.

## **What U.S. retreat signals to the world**

***It would be disingenuous to conclude that all these failures, mixed messages and retreats from the world stage do not matter, because America after all is still the most powerful country on earth.***

***It is obvious that other political leaders around the world look at both American military capabilities and American political will. If they conclude that America lost its will, its powerful military forces will not deter as much as they used to.***



## **Will Trump be better?**

In the end, it is perfectly alright to express doubts about President-elect Trump ability to articulate a mature U.S. foreign policy. Still, the idea that come January 20 2017 the rowdy, clueless children are taking over, while the thoughtful grown ups have been driven out of the room is nonsense.

Quite frankly, if the poor Obama foreign policy record is the best the mature and experienced adults are capable of, then we may as well give the untested Trump and his team a chance.

Who knows, they may surprise us.

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# **Donald Trump And Nuclear Weapons**

**WASHINGTON** – Casual talk about nuclear weapons and their possible use is not recommended. Likewise, tough remarks about not being outspent by opponents on nuclear weapons procurement and deployments may create anxiety and fears about “arms races” and a path to war within the general public; but they do not amount to a clearly delineated new nuclear strategy.

## **Modernize U.S. nuclear weapons**

I would not try to over interpret general statements made by President-elect Donald Trump on matters pertaining to the U.S. nuclear arsenal and possible policy changes, as for the moment they are not accompanied by a specific new policy agenda.

That said, here is what President-elect Donald Trump could say and do about the American nuclear arsenal, if his purpose

were, as I hope, to reaffirm the long-standing U.S. policy whereby peace is ensured by a robust and always credible American nuclear arsenal that can and will be used in case of an attack.

In a word, nuclear deterrence works only if America demonstrates that it has both the tools, (state of the art nuclear weapons, ready to be launched), and the determination to retaliate, (this is about the ability to convey to all potential enemies that America has and will have the political will to retaliate, under all circumstances, no exceptions).

because of all of the above, President-elect trump could declare that America will continue to invest in the modernization of its nuclear triad (strategic bombers, land based intercontinental ballistic missiles, and ballistic missiles based on submarines). He could justify this policy by arguing that a modern, up to date nuclear arsenal is also a reliable arsenal. (Hence the recent decision made by the Obama administration to finally procure a new generation of strategic bombers in order to replace dangerously old B-52s).

### **The importance of Command and Control**

Furthermore, he could add that, in order to ensure continued reliability of its nuclear forces under any scenarios, the U.S. will continue to invest in all aspects of Command, Control, Communications and Intelligence regarding U.S. nuclear weapons.

This is all about the goal of conveying to our adversaries that America's nuclear deterrent will always be a viable option in any and all situations. Even under the most catastrophic scenarios, there will always be a surviving, legitimate Commander in Chief in full control of all U.S. nuclear weapons. Even if the President and Vice President and other national security leaders down the chain of command

were killed by terror attacks, a legitimate U.S. National Command Authority will always survive, fully prepared to retaliate massively against any aggressor.

### **Always prepared**

So, here is the simple message to any hostile power: Never count on America to be caught unprepared by a surprise attack. Never count on any scenario in which America would surrender without retaliating. Massive retaliation will always be U.S. policy. Therefore, count on the certainty that disastrous losses will be inflicted on any attacker. Swift and devastating “massive retaliation” will always follow any attack against America. Therefore: *“Do not even think about it”*.

### **Invest in ballistic missile defense**

Moreover, a Trump administration should focus on the creation of credible ballistic missile defenses. The U.S. standing policy based on a credible nuclear deterrent and the determination to use it should work against major nuclear powers (think Russia or China) that (supposedly) will always act rationally. But it may not work vis-a-vis an unpredictable nuclear armed North Korea or Iran (should Iran eventually get its own nuclear weapons).

Hence the need to protect America with robust missile defenses capable of intercepting and destroying incoming North Korean nuclear armed missiles before they reach U.S. soil. As odd as this may sound, America at this time has a very limited number of interceptors. They are woefully inadequate to guarantee our security against rogue nuclear powers that cannot be deterred by the threat of massive retaliation.

### **Reliable nuclear weapons reinforce stability**

Should president Trump announce such policy objectives, they should be interpreted by all observers –domestic and foreign–

as reassuring. America will continue to rely on its nuclear deterrent. However, for such a deterrent to be credible, and therefore for nuclear weapons to act as a stabilizing force, it has to be modernized, in order to guarantee its reliability, resilience and survival under any scenarios.

### **Obsolete weapons create instability**

Indeed, although this may not be immediately apparent to the lay person, a neglected, semi-obsolete nuclear arsenal, accompanied by a weak Command and Control system that may break down under severe stress is dangerous and destabilizing. Whereas a state of the art force that is always ready and reliable and always controllable by a legitimate National Command Authority creates stability.

### **Keep the peace**

A robust Command, Control and Communications system, capable of withstanding the shock of a massive surprise attack will guarantee that under any scenarios a competent and fully empowered authority in Washington will always be in total control over America's nuclear forces.

### **There will be no surprises**

The sum total of all these policies regarding the continuous modernization of U.S. nuclear weapons would be to convince any and all adversaries that they should rule out any scenarios under which America may be caught by surprise and therefore not follow through on its promise to retaliate. The U.S. main policy objective here is to convince all enemies that there is no "war winning scenario" against America.

Therefore, when it comes to dealings with an America always armed and ready to retaliate, peace is the best option.

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# US Public Education In Crisis

**WASHINGTON** – The international student proficiency scores gathered under the auspices of the Program for International Student Assessment, (also known as PISA), tell us a sad story about the state of U.S. public education. Simply stated, compared to the rest of the developed world, US kids do poorly in math and barely within average in other key subjects. How can America remain the world economic leader in this hyper competitive global knowledge economy, when U.S. school children do not know basic math?

## **Debates but no action**

And please note that this new (and rather depressing) PISA international ranking is not news. Previous PISA scores were very similar. And these mediocre to bad comparative test results come after decades of sometimes heated debates in America focused on the need to drastically improve U.S. public education standards. Which is to say that endless deliberations yielded almost nothing of value.

Indeed the first loud warning about the state of U.S. public education came all the way back in 1983, with the publication of ***“A Nation at Risk: The Imperative for Educational Reform”***. This was a landmark report produced by then President Ronald Reagan’s National Commission on Excellence in Education.

## **We are not out of the woods**

The publication of *A Nation at Risk* was supposed to be the wake-up call, the strong alarm bell that would force policy makers and civil society organizations to rethink and reorganize public education by improving standards and most of all the quality and preparedness of teachers.

Well, it did not work out that way. More than 30 years later, and notwithstanding good experimentation and some improvements, (think charter schools, for instance), we have yet to see major reforms implemented nationwide.

Hence the depressing performance of US kids in these international PISA scores, year after year.

### **How bad?**

Well, how bad is bad? Here is an account of the PISA results as published in US News and World Report:

*“The 2015 Program for International Student Assessment, or PISA, study is the latest to document that American students are underperforming their peers in several Asian nations. The U.S. was below the international average in math and about average in science and reading. Singapore was the top performer in all three subjects on the PISA test.*

*More than half a million 15-year-old students in about 70 nations and educational systems took part in the 2015 exam. The test is coordinated by the Paris-based Organization for Economic Cooperation and Development, or OECD.*

*Here are the main things to know about the PISA exams:*

*Not so encouraging.*

*The test is based on a 1,000-point scale. Among the findings:*

*-In math, the U.S. average score was 470, below the international average of 490. Average scores ranged from 564 in Singapore to 328 in the Dominican Republic.*

*-In science, the U.S. average score was 496, about the same as the international average of 493. Average scores ranged from 556 in Singapore to 332 in the Dominican Republic”.*

**U.S. students: bad in math, mediocre in other subjects**

So, here is the picture, the U.S. placed number 25 (out of 70) in science; 24 (out of 70) in reading proficiency; and 40 (out of 70) in mathematics.

***Here is the conclusion: America is still very much a "Nation at Risk". It is just amazing and indeed inexcusable that decades of talking about education reform produced at best minimal results. If America were a poor under developed country with no resources, we could understand this under performance. But this is still the richest country on Earth. Given this country's resources -financial and intellectual- the protracted inability to fix U.S. public education is inexplicable.***

### **Here is the real story**

Or may be this anomaly can be explained, after all. U.S. mediocre to bad scores averages hide the fact that in America we have what amounts to a two tier education system. One good and the other bad, or very bad.

Indeed, state of the art schools (mostly private) are available for the children of the elites who, for good money, can buy the best education available. The poor and the minorities (often one of the same) can access only mediocre or failing public schools. Not surprisingly, these under served students do poorly or very poorly in school. Indeed, some of them graduate from high school being functionally semi-illiterate. Some never graduate. If you combine good and very bad schools, the result is low average scores.

### **The elites are well served**

The only conclusion here is that this surprising lack of interest in public education reform and improvements sadly stems from the fact that the children of the elites (the people who in the end make policy) are doing just fine, thank you.

As for all the others who are struggling, their learning conditions and dismal career and life prospects are not a national priority, it seems.

What a shame.

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## Mass Produced Electric Cars? Sooner Than You Think

**WASHINGTON** – The still unresolved issue that will determine if and when there will be real mass demand for Electric Vehicles, EVs, is how to design and manufacture cheaper, lighter batteries for EVs with a higher energy reservoir, and therefore capable of traveling longer distances with one electric charge.

### **Getting there**

The optimists tell us that we are getting there. They cite significant technological innovations and dramatic cost reductions already achieved in the past few years. All true. Batteries are cheaper. EVs now can travel farther. And the optimists also tell us that new collaborative efforts now underway may help expedite additional progress in battery design and effectiveness.

### **Cheaper batteries, coming soon**

Here is a good example. *“Cheaper, more powerful electric car batteries are on the horizon.”* This headline appeared on ScienceDaily, 9 August 2016. The story is about a new joint effort linking the U.S. Department of Energy, several U.S.



academic institutions and the private sector, under the leadership of a Binghamton University expert.

*“The White House –Science Daily wrote– recently announced the creation of the Battery500 Consortium, a multidisciplinary group led by the U.S. Department of Energy (DOE), Pacific Northwest National Laboratory (PNNL) working to reduce the cost of vehicle battery technologies. The Battery500 Consortium will receive an award of up to \$10 million per year for five years to drive progress on DOE’s goal of reducing the cost of vehicle battery technologies.”*

*“[Assuming success, this effort] will result in a significantly smaller, lighter weight, less expensive battery pack (below \$100/kWh) and more affordable electric vehicles.*

*M. Stanley Whittingham, distinguished professor of chemistry at Binghamton University, will lead his Energy Storage team in the charge.”*

*“We hope to extract as much energy as possible while, at the same time, producing a battery that is smaller and cheaper to produce,” said Whittingham. “This consortium includes some of the brightest minds in the field, and I look forward to working with them to create lithium batteries that will power future electric vehicles more affordably.”*

According to the Science Daily story, other Battery500 Consortium members include:

- *Pacific Northwest National Laboratory*
- *Brookhaven National Laboratory*
- *Idaho National Laboratory*
- *SLAC National Accelerator Laboratory*
- *Stanford University*

- *University of California, San Diego*
- *University of Texas at Austin*
- *University of Washington*
- *IBM (advisory board member)*
- *Tesla Motors, Inc. (advisory board member)*

## **Breakthrough?**

Well, is this an indication that we are on the verge of a major breakthrough when it comes to the most critical component of future generation EVs? Who knows, really.

Still, if I were the CEO of a major oil company, I would feel very nervous.

Never mind OPEC and its mixed signals regarding its willingness and ability to freeze/cut production in order to stabilize global oil prices. Never mind the ongoing tensions between political rivals Saudi Arabia and Iran and their potential impact on oil markets.

## **Oil will become obsolete**

The real scary thought is that oil may soon become obsolete. Yes, you got it right: *"Oil may soon become obsolete"*.

Of course this will not happen suddenly. And of course there will still be a significant need for many oil derived products other than gasoline for automobiles. (Think jet fuel, diesel for heavy trucks, oil for plastics and other petrochemical products, and a lot more).

Still, the fact is that on a global scale crude is used mostly to produce the gigantic rivers of oil-derived gasoline that end up in the tanks of hundreds of millions of cars powered by internal combustion engines. Tanks that need to be refilled very often with more and more gasoline.

## **End of the conventional car**

***If and when cheaper EVs powered by cost-effective new generation batteries hit the road, there will be a fairly rapid revolution. This will be the end of the conventional car powered by an internal combustion engine.***

Indeed, an electric charge is much cheaper than filling your tank with gasoline. Much cheaper batteries, assuming some companies will manage to manufacture them relatively soon, will lower the price of future electric vehicles, while increasing the distance EVs can cover with one charge.

As soon as this happens, there will be a consumers-led revolution. Millions of drivers across the world will quickly switch to EVs because they will be finally affordable, dependable, and much cheaper to operate, not to mention far cleaner than their gasoline powered counterparts. (By the way: not entirely clean. EVs run on electricity, a zero emission fuel. However, a significant percentage of electricity in the U.S. and elsewhere is produced by burning coal and natural gas. Which is to say that if you consider the source of their fuel, although emissions free, EVs are still not entirely "clean").

## **How soon?**

That said, the big, open question for any oil executive is: *"How much time do we have left before the whole oil sector will collapse, due to lack of demand"?*

It is very clear that this revolutionary transformation brought about by mass-produced EVs will happen. But nobody knows when: 5 years? 10 Years? 15 Years?

And here is the big problem for the oil industry. In order to properly run their businesses, oil executives must plan ahead. And these plans entail major capital investments needed now in order to reap significant gains to be realized several years

down the road in terms of new oil production coming on line.

Indeed, for oil companies to stay profitable, mature wells close to exhaustion need to be replaced by fresh production. And this means investing now, sometimes on a massive scale, in order to secure continuity of future oil production. This is how the industry works. Except that now this traditional approach is no longer a sure bet.

Given developments in EV battery technologies, today oil executives know that this cycle of investments-exploitation-new investments-future exploitation will no longer work indefinitely.

### **The end of oil companies as giant players**

If and when EVs will become dominant because of technological and cost breakthroughs in batteries technology, this will signal the beginning of the end for major oil companies.

In the not so distant future, many of them will run the risk of being caught with new expensive projects half completed that all of a sudden are no longer economically viable on account of collapsing demand for their product –oil– once coveted, and now out of fashion.

Beyond these contingencies, because of EVs almost all oil companies will have to cut production, concentrating on the cheapest crude, in order to survive in a new energy era characterized by drastically diminished demand for oil and oil products. The weakest players will not be able to make it. They will go under, or they will be bought by bigger companies.

### **Oil will still be needed**

Having said all this, will EVs amount to a final catastrophe for the oil sector? Not entirely. Let's keep all this in perspective. Even assuming state of the art, cost-effective

EVs quickly replacing an enormous global fleet of gasoline powered vehicles, there will still be demand for oil.

Heavy trucks and ships will continue to run on oil derived diesel fuel for many, many years. Likewise, thousands upon thousands of civilian and military airplanes will still rely on jet fuel made from crude oil. Petrochemical and plastics industries across the globe will continue to need oil derived products.

All this is true. However, assuming a fairly rapid switch to EVs, the global demand for oil, now driven largely by demand for oil derived gasoline, will collapse. All of a sudden, the global oil industry will face gigantic over capacity: too much oil and too little demand. Only the ultra lean, low-cost operators with a solid financial base will survive.

### **Good bye Exxon?**

Hard to think of a world in which Exxon Mobil will be a mid-sized company confined to producing oil for jet fuel and diesel trucks only, since millions of cars will run on electricity, and no longer on gasoline. But we are getting there. And this may happen sooner than we think. Call it the next "oil shock".