

# Why Self-Driving Cars? Upgrade Bus Networks Instead

WASHINGTON – The ongoing buzz about the marvel of “driverless cars” soon hitting the roads is a bit too optimistic. A great deal of money and effort is devoted to perfecting this futuristic technology. We know that Google and other high-tech companies are involved in this research. General Motors has entered a \$ 500 million partnership with Lyft to produce a robot vehicle that will drive itself. Eventually it will be managed by Uber or similar services and used for ride-sharing.

## **The advantages**

I see the point of getting into a car that can safely take you anywhere. Instead of focusing on driving, while in the car, you are just a passenger. You can read, do work. You can safely make phone calls, or rest.

I can also understand how older or disabled people who can no longer drive but need to go places would find a self-driving vehicle to be the perfect solution to their daily mobility needs.

I can also see how it may possible within a realistic time frame to match car services like Uber and driverless cars. If this formula worked, many people would simply not buy cars anymore. And this would help alleviate traffic congestion. (More on this in a moment).

## **You are still stuck in traffic**

That said, this is not necessarily the best way to invest precious funds. And here is why. Suppose we get there. Suppose that there is some kind of breakthrough. Consumers will soon be able to buy an affordable, safe, intelligent car that they do not need to drive. Or we shall let Uber do the driving, so

that some of us will not own our cars anymore. Fine.

*Now imagine yourself in your new vehicle that drives you. You are in the middle of Los Angeles, or Cairo, or Paris, or Nairobi, at rush hour. Guess what, the car may drive you, but both the futuristic car and you are still stuck in horrible traffic. Sure, you are not as stressed as you used to be by bumper to bumper congestion, because the car does the driving. But you are still stuck in an endless traffic jam. If many cars will be owned and operated by Uber or equivalent services, there will be fewer cars on the road. Still, your daily commute will continue to be long and unpleasant. Your driverless will alleviate congestion. But it will not eliminate it.*

*So, here is my point. All this focus on making cars smart is a poor allocation of scarce resources. The problem is not that cars are not smart enough. The fact is that in large urban areas the car, private or Uber managed, is a poor choice to address the issues of easy, affordable, dependable personal mobility.*

*Let me say it again. There are just too many cars! And too many cars means shared discomfort for all users.*

### **The car is a bad solution to mobility needs**

The fact is that we are way past the point of diminishing returns when it comes to the usefulness of the automobile in all large urban areas, anywhere in the world. In most big cities the car is the wrong answer to our need to move around at leisure, in comfort, and reasonably fast. There are just too many people with too many cars.

The answer to epic traffic jams and slow-moving traffic, often 24/7, is not to make cars more intelligent. The answer is to get rid of cars altogether in large urban settings, and opt for smart mass transit solutions. (This general rule applies only to large cities. People living in rural areas, in

isolated communities, or remote farms need cars. And, of course, cars are necessary for road trips, long and short).

### **Bus Rapid Transit systems**

While there may be several options available, at the moment the most cost-effective solution seems to be **Bus Rapid Transit, BRT, systems.**

*“Come again? We are working on high-tech, intelligent cars and you are proposing clunky old buses? “* Yes, I recognize that this does not sound terribly sophisticated. And in fact it is not. And, yes, in the roll-out phase this BRT option can be very disruptive.

**But let me tell what you get with Bus Rapid Transit. You get all the advantages of an underground subway system, minus the often prohibitive cost of digging tunnels.**

### **Dedicated lanes, fast buses**

In most large cities, in order to create a BRT system you would have to ban or at least restrict private cars. The new seamless bus network becomes fast and efficient only if buses can have complete right of way via “buses only” dedicated lanes, not shared with other vehicles. And this means large urban areas where cars cannot travel.

Once we know that buses will be able to move freely without being stuck in traffic created by private vehicles, then BRT planners will be able to create the network with bus stops that become interchanges working just like subway stations. Passengers will buy their tickets before boarding. They will ride on a bus, exit at a stop that will also be an interchange, quickly board another bus, if they need to, and get to their destination within the estimated time.

### **Just like a subway, minus the construction cost**

in other words, you get all the advantages of an underground

subway system, in terms of easy access and speed, minus the cost of digging tunnels and building stations. *In most countries, these upfront costs are prohibitive.* And this is why most cities do not have subway systems. Or, if they have them, they are not large enough to serve the entire population. Hence the continued dominance of private cars.

***“So, are you telling us that the old-fashioned humble bus can take care of all urban transportation needs?” Yes, it can. But this new model assumes vision on the part of municipal leaders. They have to be able to sell to their citizens the unfamiliar notion of people moving around quickly and efficiently using surface public transportation that works exactly as a subway system, minus the cost of construction. They have to convince them that the bus network will be user-friendly, affordable and efficient.***

## **It works**

Well, here is the key question: does this work? Has it been tried before? The answer is yes, and yes. It works and there is plenty of evidence to demonstrate this. It all started back in 1974 in the city of Curitiba, Brazil. The very first BRT system was the result of years of experimentation by urban planners who finally came up with the model of “bus just like the subway”. And then the model spread throughout Latin America. In 2000 Bogotá, the capital of Colombia, launched its own TransMilenio BRT system.

And now you have similar mass transit solutions in Brisbane, Australia; Stockholm, Sweden; Cape Town, South Africa; Ottawa, Canada; and many more cities around the world.

## **Political impediments**

The only reason why BRT systems have not been adopted more widely by other large cities across the world is that municipal leaders are afraid of voters' backlash. They do not want to deal with the unavoidable skepticism and probable

resistance of millions of voters-drivers who may not believe that the new BRT system will work as advertised. Oddly enough, faced with abrupt changes, most city dwellers would rather endure the misery they know –monstrous traffic jams– rather than try something new.

So, this is mostly a political rather than a technical impediment. Meanwhile, however, millions of people spend hours and hours in traffic jams created by the shared, but totally mistaken, belief that the private vehicle is still the most cost-effective and most efficient way to address personal mobility needs.

### **Getting there, fast**

So, back to driverless cars. Would you rather have a high-tech car that drives you, but can do nothing to avoid traffic congestion and an endless daily commute, or would you rather get where you need to go by low tech bus that gets you there fast, thanks to a seamless and efficient network?

Think about it.

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# **Fight Global Warming With Disruptive Innovation – Not Mandates**

**WASHINGTON** – The Paris event on climate change will probably yield nothing really concrete. The fact is that, despite the rhetoric and the contrived “emergency mode”, there is a huge disconnect between the desired result to stop and possibly reverse global warming and the tools available for this

enormous undertaking.

### **Impossible targets**

Whatever the environmentalists may preach or demand, it is essentially impossible to put the entire world, or even most of it, on a stringent, low-carbon diet. Western politicians who claim that they have a plan are pandering, posturing, or dreaming. We could do this only if we had viable, truly cost-effective technological alternatives. And we do not have them. At least not yet.

### **Renewable energy? Not quite here yet**

Of course, there is renewable energy, the miracle cure. We have solar and wind power, and a lot more. But, so far at least, these are not really cost-effective solutions. Otherwise, they would have been already adopted –on a massive scale.

Sure, today we can install solar power plants in Namibia and Arizona or Morocco, and in other countries where there is a lot of sunshine all year round. As prices for this technology are coming down, this is beginning to make economic sense. But what about Sweden, Siberia, or Belgium? Not much sun there.

### **Mandates are a bad idea**

The worst public policy mistake has been to mandate the adoption of still imperfect renewable energy technologies, so that politicians could show that “we are doing something”. This is a bit like governments, circa 1980, mandating the purchase for every public office of the first generation of PCs running on the first Microsoft operating system. This would have created a rent position for PC manufacturers and for Microsoft, therefore diminishing the incentives to innovate and out-innovate each other.

### **Real innovation, not subsidies**

Indeed, if I know that whatever renewable technology I produce today, it will be adopted for political –rather than cost-effectiveness– reasons, why bother to invest more, refine it, perfect it and make it wonderful, as opposed to barely passable? I know that, because of the mandates, utilities are forced to buy my stuff. I make enough money this way. Then why push the envelope?

### **No real results out of Paris**

So, here is the thing. The big Paris gathering may yield something. But it will not be much. And we can be sure that measures promised eventually will not be implemented, at least not in full.

By the same token, it is obvious that poor countries do not have the luxury to tax carbon, or to subsidize solar.

In fact, guess what, the use of coal –by far the most hated carbon-based fuel– is going up, worldwide. Yes, up.

### **More coal plants in Japan**

Look at Japan, for instance. The Japanese have come up with a new generation of cleaner burning, lower emissions, coal-fired plants. They are better, for sure. But they still pollute a lot more than comparable gas-fired plants. Let alone zero emission solar.

### **Coal everywhere**

And yet the Japanese are merrily marching ahead. And they are actively marketing their “clean coal” plants in Indonesia, and elsewhere. India depends heavily on coal. And so does China. Ditto for America, even though coal in the US has been gradually displaced by cheaper (and much cleaner) natural gas.

Add to the mix parts of Africa, beginning with South Africa, the number two economy in the Continent, heavily dependent on coal. So, forget about abolishing coal. Right now, it simply

cannot be done.

## **The revolution**

Can this change? Of course it can. But we need some truly disruptive innovation in non carbon energy that does not need political coercion for early adoption.

Look, imagine that tomorrow we get state of the art, truly affordable and super efficient solar power. At the same time, Tesla or some other manufacturer comes up with a really cheap electric car that you can drive for 400 miles without recharging. Assuming all this, we are done.

It would take no more than a few minutes for millions and millions of price conscious consumers, and later on the whole world, to switch to the new technologies.

## **The end of coal, gas and oil**

Millions would install cheap and highly efficient solar panels on their roofs, this way making their own electricity, at home. Then they would dump their cars with gasoline engines and buy an electric vehicle that they can charge at home at almost zero cost. People would make this switch not because they are pious environmentalists, but because they want to save money.

This way, in no time we would have eliminated coal, natural gas (power generation fuels) and oil (transportation fuel) as our key energy sources. Think of that. And we would have achieved the dream of a mostly carbon-free world.

## **Not enough R&D**

This is what we should aim for. Whereas, right now we get little investment in R&D in new energy technologies, and plenty of mandates, regulations, and subsidies for still rudimentary renewable energy solutions.



We should spend real money on “Moon Shot” projects. Bold stuff, out of the box ideas. Of course, most of these efforts will lead to nothing. Lots of money will be burnt on crazy ideas. But this is what happens when you go into uncharted territory.

### **Fantastic energy future?**

Nobody really knows what our main source of energy will be in 50 years. I hope it will be something fantastic, clean and cheap. But if we continue at this pace, chances are that in 50 years we will continue to have debates about “clean coal”, and “lower emission”, gasoline-fired internal combustion engines.

And, if that is so, forget about “solving” global warming.

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# **You Cannot Kick Start Innovation**

**WASHINGTON** – The Emirates News Agency a year ago announced a partnership between the UAE Ministry of Economy and General Electric, the giant US technology multinational. They just signed a Memorandum of Understanding whose objective is “to strengthen the culture of localised innovation, and inspire UAE government employees with deep insights on the innovation and entrepreneurship ecosystem”.

### **GE will show how to do innovation**

The Emirates News Agency explained that “GE will organise leadership speaker sessions to be led by experts at the GE Ecomagination Innovation Center in Masdar City, a regional hub that promotes collaborative research and innovation, for 30

government employees nominated by the Ministry of Economy. The Speaker Series will specifically address the areas of FastWorks, GE's new initiative to promote the 'start-up' culture, which emphasises the disciplines of lean manufacturing and agile software development."

There was also an announcement about "discussions on entrepreneurship and innovation, the role of education in innovation, and the Industrial Internet, GE's path-breaking approach to digital industrialisation through the power of big data and advanced analytics. All workshops are designed to promote the integration of innovative thinking into our everyday lives to achieve significant leaps in productivity and efficiency."

And there was more. A variety of workshops on this and that, demonstrations of how 3D printing works, and so forth.

### **The UAE government promotes innovation**

This agreement with GE supposedly demonstrated how deeply the UAE government is committed to the promotion of innovation in the UAE. As a high level official put it: *"The MoU with GE is a strong testament to the commitment of the Ministry, and indeed the UAE Government, to promote a culture of innovation and entrepreneurship nation-wide. With a focus on sharing best practices, the MoU will help provide deep insights into the newest trends in innovative thought processes, manufacturing, and technologies among the government staff through high-caliber workshops."*

And the article reported many other lengthy quotes from other high level UAE officials. It is all about "bringing new insights", "creating a culture of sharing", enhancing "co-creation".

### **Mostly nonsense**

Looks promising, doesn't it? Well, no. In fact, most of this

is just nonsense.

Here is the thing. The UAE may have the money and the resources to convince GE, and may be other tech companies, to engage in these kinds of exercises. But they are generally futile.

***And here is why.***

***You can import innovative technologies. But you cannot import a culture that breeds innovation.***

***No, "an innovation culture" cannot be imported, prescribed, or mandated. Innovation happens because a self-renewing, innovation friendly eco-system has been created, quite often by accident, may be around a research university, or another prominent R&D facility or laboratory.***

***Generally this happens in dynamic, open economies that encourage entrepreneurship, with a history of applied science and technology and successful commercial applications of new developments.***

***And this is certainly not the profile of the UAE, not even close.***

### **The building blocks**

We know what the essential building blocks for an innovation-driven economy are; at least the big ones that make innovation possible.

For starters, you need a dynamic, free market economy. Then you absolutely need laws and a judicial system that protect private property and intellectual property. Then you need human capital that can be successfully mobilized. And this means that you need some very good science and engineering schools. And top-notch business schools. This type of high quality education system will create a chance that at least some of the graduates will develop a passion for working on

new ventures.

Keep in mind that most of these budding would be entrepreneurs will try and fail. In some cases multiple times. But some of them will come up with something. Those who do will need additional support to bring their idea or prototype to the next level.

Hence the critical importance of networks created by top-notch academic institutions, research labs, and other R& D outfits. And, of course, you need developed capital markets, and a robust venture capital industry capable of spotting new comers and willing to risk real money on what look like good prospects that could very well turn out to be duds. And finally you need real and well-regulated stock markets where a successful new venture that plans to go public can receive new funding from willing investors.

### **Just the minimum**

Please note. This is just the beginning. These are just minimum prerequisites. You may have all this and still no consequential innovation is produced. And why so? Because “creating innovation” is still more art than science. Many would-be innovators fail. Some give up. Some don't. Sometimes they pursue something, and then stumble into something else. Not infrequently, there are strange, totally unexpected discoveries.

### **What about GE in the UAE?**

Anyway, what has this to do with GE trying to foster a culture of innovation in the UAE? Plenty. The UAE may be trying to promote good things. But the notion that a Ministry can energize the creative juices of the people by signing an MoU with a large US multinational is mostly a dream, unless it is a mere public relations exercise.

### **Do the Emirates have an innovation friendly environment?**

Sure enough, if indeed the UAE were a modern, market-driven free economy with lots of talented entrepreneurs already working on next generation stuff, then some practical advice delivered through workshops by real pros could make a real difference. But this assumes the existence of a solid foundation that we are not sure is really there.

### **You cannot copy successful models**

Here is the basic point. You simply cannot make things happen if the fundamentals are not already well established. For instance, the whole world knows about Silicon Valley in the U.S. And yet nobody has been able to replicate it. And this is because in Silicon Valley there is a unique culture, peculiar sets of non linear connections and relationships, and cross-pollination that sometimes may take place in counter intuitive ways. There is no formula for this.

There is nothing wrong in the desire to promote innovation. But the best that governments can do is to make sure that they can and will establish the essential preconditions, the “enabling environment” which may lead to the create a business friendly eco-system.

### **First of all, you must have genuine freedom**

*And the most essential of all preconditions is genuine, unfettered freedom. Yes personal freedom. What's that got to do with science and technology? Plenty. If it did not, then the old Soviet Union , a country that gave eminent scientists a privileged status within its society, should have been a remarkably successful innovation factory. But this did not happen. And this is because those scientists were all state employees working on (mostly national security) assignments. They did not own their inventions. They could not market them. They could not start private companies. The state owned everything.*

**Free people have a chance to explore and discover**

In Western countries it is different. When educated people with advanced knowledge about science, technology and organizations feel genuinely free, then they are also free to think and experiment, sometimes in new and unorthodox ways. This environment is the precursor to innovation, sometimes very successful innovation.

### **Make money**

Because they are free to think out of the box, some entrepreneurs may very well find or make something really new and become innovators. And part of the incentive is that the would-be innovators know that they will own their ideas, and that the system will allow them to market them without creating artificial obstacles.

Yes, they will be able to make money through the products of their intellect. All this happens because free people who are free to be innovators want to try to be innovators (at least some of them) and hopefully gain from their successes.

They did not get this urge and passion to try new things because they attended a state-sponsored workshop in an oil rich country that at best has a culture of trade, but certainly not of industry.

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# **Fusion: The Next Energy Revolution**

WASHINGTON – TIME's cover story (November 2, 2015) has this tantalizing title: *"Unlimited Energy. For Everyone. Forever."*

*FUSION, It might actually work this time".*

## **Fusion**

Yes, the long article is about "fusion", the Holy Grail for all those who seek a way to produce and harness abundant, cheap, and emission free energy. However, this is still a distant dream. Indeed, the inside joke among those who have been working on nuclear fusion is that *"fusion is about 30 years away, and it will always be 30 years away"*.

Therefore, fusion is something theoretically possible, but so removed from practical reality that it is in fact only a fantasy. Indeed, even if we take it literally, "we shall have nuclear fusion 30 years from now" does not mean "never". But it is a very long time away for a world that is seeking practical, commercially viable alternatives to fossil energy –today.

## **The global energy picture**

When it comes to energy, we know where we are. Contrary to even recent predictions, we still have plenty of oil and gas, not to mention enormous coal reserves. In fact, thanks to the US-led "hydraulic fracturing" revolution, now we can tap into large oil and gas shale reserves that we believed to be economically non viable until very recently.

However, energy from fossil fuels is still too expensive for many developing countries. Hundreds of millions of people in Africa and Asia lack electricity and modern transportation systems simply because they cannot afford them.

## **Emissions**

Besides, fossil fuels extraction, processing and consumption contributes to environmental degradation, while their emissions increase the amounts of greenhouse gases that cause global warming.

Those who really worry about climate change (they seem to be a majority) declared that, because of global warming, we have to curb the use of fossil fuels now, while switching to emission free renewable energy.

### **Good intentions**

The intentions are good. However, the problem with this approach is that it is not cost-effective, at least not yet. At its current level of technological development renewable energy (mostly wind and solar) is still too expensive and not reliable. In many cases, it is adopted only because of imposed legal mandates. This may make environmentalists happy, but it is bad economics.

### **Enter fusion**

How would fusion change all this? Well, if indeed fusion would move from quasi-science fiction to commercially viable reality, its impact would be equivalent to the invention of the electric light bulb.

Fusion is what takes place in the sun, at extremely high temperatures. Imagine that we would learn how to provoke fusion while properly containing it, and use the tremendous amount of power released by it. This would be a real revolution. As TIME put it: "Unlimited Energy. For Everyone. Forever."

### **Cheap, no radiations**

And the beauty of all this is that fusion is cheap. The raw material for fusion is super abundant hydrogen. And fusion is much more powerful than fission (this is what happens in nuclear power plants), without the disadvantage of creating nuclear waste, or radiations. Besides, just like nuclear power, but unlike wind or solar, fusion would generate a constant supply of energy.



Imagine the consequence of this energy revolution. We could power almost anything at a fraction of today's cost. Forget about drilling oil wells, transporting and then refining crude oil. Forget about coal mines. Forget about gas wells, and pipelines.

### **Energy for developing countries**

We could give clean, affordable energy to all poor countries, so that they would be able to kick-start their economic development without the huge up front costs associated with the construction of power generation plants, and the additional expenses related to fueling them and running them.

### **A game changer?**

Well, has there been any breakthrough? Have we removed the "we shall have fusion, 30 years from now" insurmountable barrier? Not quite. In this respect the article disappoints a bit. We are still not "there". However –and here is the good news– we have entered a new dimension that may be indeed the prelude to a real game changer.

### **State-run programs**

Here is the thing. Until recently fusion research was the domain of publicly funded researchers. And this was and is a systemic weakness. The allocation of (relatively scarce) public funds devoted to fusion research and experimentation is governed by too many rules, procedures and endless bureaucratic protocols.

And it seems that risk averse program managers dominate this process. As a result, everybody is doing pretty much the same stuff. New frontiers are not explored. Hardly any progress registered.

Mega international projects, such as ITER (International Thermonuclear Experimental Reactor) in the South of France,

are years behind schedule and billions over budget. ITER started in 2008. It is now estimated that the reactor will be operational in 2027. In the meantime, projected costs ballooned from \$ 5 billion to \$ 20 billion.

## **Private capital**

But something has changed. And the change is that private capital is now bankrolling small and generally unknown start-ups. And these start-ups (like Tri Alpha, Helion Energy and General Fusion) are experimenting new technology approaches that seem to be more promising.

Now, this renewed enthusiasm about fusion is no guarantee of success. But it indicates both optimism and impatience among dedicated scientists, and beyond. Obviously there are many people, including funders, who believe that the science has been properly addressed, and now the trick is to move to the next step, by making the machines that will make fusion possible and commercially viable.

## **Getting there?**

Again, let's stress that optimism and the availability of venture capital is no indication of ultimate success. However, many more smart people focusing on fusion may increase the likelihood of faster progress.

One again, the very idea of fusion seems to be the classic example of something that is "too good to be true", and therefore impossible. Still we may, just may, get there. And may be sooner than we think.

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# After Gigantic Failures Is US Still IT Leader?

WASHINGTON – Whatever can be said about the not so vibrant US economy, there is usually agreement that America is and will be the world leader when it comes to IT. Indeed, US companies lead in microprocessors, software, networking systems, on-line retailing, on-line music distribution, smart phones applications, and now social media. You know the names: Apple, IBM, Microsoft, Oracle, Cisco Systems, Intel, AMD, HP, Dell, Amazon, Facebook, LinkedIn, and many, many more.

## **Vulnerabilities**

And yet, recent events show an entirely different picture. A picture of antiquated systems, gigantic failures and alarming vulnerabilities. Let's start with the US Government. For whatever reasons, Washington is several steps behind when it comes to IT. There seems to be a systemic inability to stay on top of things when it comes to modernizing old IT devices, software and networks. Reliance on obsolete systems means inadequacies and failures, while it creates opportunities for those who want to penetrate US networks, this way compromising or damaging complex systems of great national security value.

## **Gigantic failures**

Gigantic failures include the epic collapse of the brand new website that was supposed to allow millions of Americans to access the medical insurance exchanges created by Obamacare health law. It was an unmitigated national disaster. It took months to fix the issues stemming from poor design.

Most recently, the US State Department could no longer issue visas to foreigners for several days because of a computer system breakdown. Mind you, this is a key agency of the US

Federal Government.

And then we have the unbelievable hacking of the Office of Personnel Management (OPM), the largest record keeper of all US Government employees. Notwithstanding deliberate efforts to obfuscate and minimize, now we know that 21.5 million (yes, this is million) confidential files that include background investigations, career records and much more pertaining to millions of past and present federal government employees are now in the hands of still unknown cyber criminals. Imagine that. Highly sensitive, personal information about millions of people ended up we do not know where, possibly in China. And apparently the US Government was unable to prevent any of this.

### **Private sector problems**

When it comes to the private sector there are also major black spots. Just a few days ago UNITED, one of the largest airlines in the world, had to ground all its airplanes for a few hours because of computer software errors.

On the same day the New York Stock Exchange had to halt floor trading (it continued electronically elsewhere, on other platforms) for more than 3 hours because of software malfunctions. Can you imagine that?

### **All systems breaking down?**

*Well, are these signs that the entire US IT infrastructure is breaking down? Not really. But these are signs that America is losing its edge. While we understand that federal bureaucracies are slow, there is no justification whatsoever for Washington's chronic delays when it comes to adopting current IT technologies, while retaining old systems that are patently inadequate, not to mention highly vulnerable to cyber warfare and cyber crime.*

And the private sector has some catching up to do. Most

corporate networks are essentially unprotected against cyber attacks, while there are just too many unforced errors that indicate bad systems and poor programming.

### **Still the world IT leader?**

So here is the question. Given all these well documented failures, can America still claim a world leadership position when it comes to IT?

I am not so sure anymore. But I do hope that responsible people both in government and the private sector do appreciate that it is impossible to retain great power status when your IT systems –the nerve centers of all that matters in any advanced society– are accident prone and extremely vulnerable to attacks.

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## **Bill Gates: Fund High Risk Energy Ventures**

**WASHINGTON** – Here is what Bill Gates, (IT technology visionary, Microsoft founder, net worth about \$ 80 billion), said talking to The Financial Times about policies aimed at reducing carbon emissions: ***“When you say what can we do about climate change, the easiest thing to say would be: ‘Hey, let’s just take today’s technology and replace transport, electricity, industrial power with carbon-free emissions.’ Unfortunately the cost of doing that with today’s technology is beyond astronomical”***. [Emphasis added].

### **It will not work**

Got that? This approach –deploying what we’ve got– will not

work. Bad idea. A non starter. And this is because trying to replace all carbon energy based systems with currently available renewable technologies would entail costs that are *“beyond astronomical”*.

In other words, according to a recognized brilliant entrepreneur, current policies that advocate precisely that –replacing carbon based systems with imperfect, inefficient and still costly solar or wind power systems– are wrong, and they will prove to be prohibitively expensive.

### **This warning should invite reflection**

This simple and unambiguous statement from a universally recognized smart person should be taken as a serious alarm bell. It should invite a pause and serious reflections among well-intentioned environmentalists, climate change believers and the policy-makers who follow their advice.

*“While we believe in our goals aimed at reducing greenhouse gases that cause global warming, may be we are going about it the wrong way”*. I suspect that Gates is right. When it comes to wind and solar, or electric vehicles, what we have developed so far is still rather primitive and inefficient.

### **Superior technologies do not need subsidies**

Indeed, If renewable energy technologies were already cost-effective and efficient, they would have been spontaneously adopted on a massive scale. Why would you drive a car running on gasoline, if you could buy a cheap, high performance electric vehicle with batteries that can be quickly recharged at a fraction of what it costs to fill up with gasoline? Superior technologies find buyers and eventually take over simply because they are better. They do not need government mandates, subsidies, tax breaks and other artificial incentives in order to gain a modest market share.

### **Below the horizon**

That said, what does Gates suggest? He suggests something really difficult. Our hope, he stated in the same FT interview, should be in achieving a true quantum leap when it comes to clean, affordable energy production. Therefore, we should be providing financial backing to enterprises that are pursuing real technological breakthroughs in untested sectors, with the hope of producing improvements that will not be just incremental, but truly disruptive. The steam engine was a breakthrough. The automobile was a game changer. The internet and all the software that supports it is true innovation. However, a very expensive electric vehicle (think Tesla) with limited range provided by a conventional battery, while interesting, is not a game changer.

### **Too risky?**

The disincentive to engage in this type of investing is that most of these hoped for new technologies probably will not work. Which is to say that a lot of capital will be invested and burnt, with zero results. And very few investors are willing to take this kind of chance.

Bill Gates of course can afford to do some of this investing. And he is doing it. He has spread about \$1 billion (this is his personal money) among a variety of enterprises. And he is planning to double this commitment. He is hopeful, but also realistic. He calls this “high risk” investing, and he says in the interview that there is may be a 10% chance of getting results. But he also believes that we have to push the envelope. If we want breakthroughs, we have to bankroll dreamers.

Here are some examples of where Gates is putting his money. He is working with a company called TerraPower that is planning to build mini nuclear reactors that will use nuclear waste as fuel. Another possibility for energy generation is some sort of “solar chemical” power that would reliably create a liquid hydrocarbon. And then there are “kite balloons” that

would house turbines high up in the atmosphere.

### **More government-funded R&D**

Anyway, you get the picture. All this looks intriguing, but most improbable; and therefore too risky. You cannot expect General Electric, Siemens or United Technologies to invest in any of these ventures.

And this is why Bill Gates is also advocating for more government-funded R&D in basic science, that is to say not tied to immediate commercial results. Unfortunately, the US Government does not support basic science in the same way as it used to decades ago.

The Manhattan Project was only a hope. Eventually it did produce the first atomic weapon. But there was no certainty that there would be any results when a group of scientists were tasked by Washington with what appeared an almost impossible goal. But we know that they could work on their "mission impossible" because the US government provided all the backing and all the funding. No way that these people could have organized and sustained the same multi-year effort relying on some private company or university funding.

### **They private sector will not do this**

One cannot expect that profit oriented corporations will pour billions of dollars into ventures that may never produce any results. The risks are too high. Impossible to justify these investments to shareholders and investors who normally expect immediate rewards.

But will Washington go back to supporting open-ended innovation, with the hope that some day, someone will come up with something really transformative when it comes to affordable clean energy? Or will Washington keep subsidizing solar panels that provide an inadequate, expensive alternative to gas-fired power plants?



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# US EPA: Fracking Does Not Create Systemic Water Safety Risks

WASHINGTON – After years of research and analysis, a 1,399 page US Environmental Protection Agency (EPA) report concluded that hydraulic fracturing (fracking) is safe. The technology widely deployed more than a decade ago in the US to extract shale oil and gas in fact does not create systemic risks for drinking water.

## **This is big**

*Now, this is big. It is a well known fact that the EPA is no friend of the US oil and gas industry. And yet, nothing was found. Notwithstanding large resources spent in studying the allegations indicating that fracking indeed created a systemic risk for humans and for agriculture, (supposedly chemicals injected into the soil during fracking seep into the water table causing pollution), the EPA found no evidence of systemic risk.*

## **There are accidents**

The EPA study did indicate that defective well construction in some instances caused chemicals seepage that led to water pollution. But this was due to the negligence of some energy companies that did not follow established well construction protocols.

Obviously there is a huge distinction between a few accidents caused by negligence resulting in faulty well construction and widespread accidents due to inherently unsafe fracking

technologies.

What we get from the EPA report, and this is consistent with other findings, is that fracking is safe. As long as energy companies follow mandated well construction protocols, fracking does not threaten the water table.

### **How will Governor Cuomo react?**

Now how will New York State Governor Andrew Cuomo react to this EPA report? Almost alone in America, (Maryland joined him later), Cuomo banned fracking in his state on the basis of public health concerns, even though the technology is used all over America, (Texas, Oklahoma, Colorado, Louisiana, Wyoming, and other states).

And this long list includes neighboring Pennsylvania where the state authorities (under Republican as well as Democratic Governors) welcomed the shale gas industry that uses the very same fracking technologies deemed to be too risky on the other side of the state border. In fact, New York and Pennsylvania share the same, immensely large gas rich formation known as Marcellus Shale.

### **Pseudo science and politics**

Cuomo's argument was that more scientific review is necessary in order to be really, really sure that fracking is 100% safe. In truth, we all know that the Governor had to bend to the purely ideological, anti-carbon industry bias of New York State Democrats. He simply could not go against the wishes of his party; even though this is a costly decision.

Indeed, by banning fracking Cuomo forced many communities in the Western part of New York state, (this where the Marcellus shale gas is located), to give up millions of dollars in royalties that would otherwise come to them from energy companies, should fracking be allowed.

But now, after the EPA report made it clear that fracking does not pose any systemic risks to the water table, it will be a lot more difficult for Cuomo to tell the (rather poor) up state communities that he intends to keep the fracking ban.

Now everybody knows that there is no scientific basis for this prohibition.

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## **US Airport Screeners Failed To Detect Weapons In 96% Of Test Cases**

**WASHINGTON** – The US Department of Homeland Security tested the capabilities of the Transportation Security Administration airport screeners by sending in under cover agents carrying the same prohibited items that terrorists would want to smuggle into an airplane.

### **Total failure**

Guess what, the TSA screeners failed to detect anything whatsoever in 67 out of 70 tests. This is a 96% failure rate. Which is to say that the TSA, this cumbersome federal security bureaucracy, with thousands of screeners in all US airports, cannot detect anything. Therefore, it is totally useless.

The sad irony in all this is that the TSA was created as a response to the tragic September 11, 2001 hijackings. The idea was that America needed to raise the professional standards of all its airport screeners. Up to that point, most of them were employees of private contractors hired by airports to provide

security services.

Well, in the light of the 9/11 tragedy it seemed appropriate to create a stronger and more professional defense against future terror plots. Hence the decision to establish the Transportation Security Administration whose federal employees –we are told–are carefully screened and then properly trained.

### **The TSA is a failure**

Well, good intentions aside, this reorganization did not work out, to put it mildly. We all go through airport security screenings. The whole process is cumbersome and time consuming. Take your jacket off, remove your shoes, belt, change, keys, and cell phone. Place your laptop in a separate container, go through the metal detector.

And apparently, as we just found out, all this is for nothing. As the recent tests have demonstrated, this complicated, expensive, labor intensive TSA apparatus cannot detect anything. A determined would be terrorists in most cases would get through.

### **This is a national disgrace**

A 96% failure rate is more than an embarrassment. It is a national disgrace. This is the United States of America. Supposedly we are the technology leaders in almost anything, including screening equipment. And yet, the US Federal Government cannot set up an agency capable to properly screen airlines passengers. And what is the response to this scandal?

Almost nothing. We understand that Melvin Carraway, the interim head of the TSA, has been reassigned. Yes, not fired, reassigned. We also heard from Jeh Johnson, the Secretary of Homeland Security, that new measures will be taken to strengthen the screening procedures.

## **No action**

And so, this is it? In a serious America the Secretary of Homeland Security, whose number one job is to guarantee airport security, would have immediately resigned. A major investigation would have been ordered into all aspects of TSA operations: hiring, training, procurement of screening equipment.

But in America we do not do these things anymore. Gigantic government services failures are explained away. And, after a couple of days, the sanitized bad news just disappears.

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# **Up to 19 Years To Build A Highway**

**WASHINGTON** – In country X *“New highway projects can require up to 200 regulatory steps and take between 9 and 19 years to complete –with planning, design and environmental reviews consuming up to half of that time. Even small projects can take between four and six years from start to finish.”*

## **Grotesque inefficiency**

If true, this is an extreme and sad example of how a grotesque level of bureaucratic inefficiency, combined with layers of overlapping political jurisdictions, (central, regional and local governments having to agree on where to build a highway), delay or kill investments aimed at improving basic infrastructure. Imagine that. May be 10 years, in many cases much longer, to have a highway project proposed, presented, vetted, approved and finally built.

And where is this happening? Are we talking about India, Sudan, Venezuela, or Uzbekistan?

### **This is happening in America**

No. We are talking about the United States of America, supposedly the beacon of economic modernity, managerial efficiency and effective public administration.

At least this is what we get from a WSJ op-ed piece by Mac Zimmerman (*Taxing for Highways, Paying for Bike Lanes*, May 26, 2015) from which the above quote is extracted.

And we can assume that the author did not make this up, as the data he produced in his article is taken from a 2011 study produced by the non partisan Congressional Research Service.

### **Losing competitiveness**

So, there you have it. Crazy, but true. And here is an incredible paradox. US experts and various consultants go around the world explaining to emerging markets governments how red tape prevents economic development.

Maybe it is time to redirect this effort. It is frankly absurd that, as a Nation, we tolerate this level of inefficiency. No wonder that our economic competitiveness rankings have been going steadily down in the past few years.

The question is: does anybody care? Do we really believe that 10-15 years or more to build a highway is just about right?

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# Hyper Regulated US Solar Energy

WASHINGTON – Recently I read a very good piece on the future of solar power in the United States. Very informative. And yet, there is something really odd about it. The piece has not been written by a solar power expert, or by an industry analyst. It has been written by a lawyer.

## **Not market-driven**

And this detail sheds light on what is really going on with renewable energy in the United States. Whatever the merits of the technology, whatever the progress in improving performance, lowering costs and therefore prices for would-be consumers, the fortunes of renewable energy are not market-driven.

They are driven by laws, regulations, mandates for power generation companies, tax subsidies, set-asides, and what not. In other words, many if not most people in America base their decision on whether to buy or not to buy solar panels for their homes not on the merit and cost-effectiveness of the technology but on the tax advantages, rebates and/or subsidies that come with purchasing solar panels.

## **Lawyers are the real experts**

And this is why the “go to people” when you have questions are lawyers and not engineers. Lawyers are indeed the most qualified experts. They can go through the thicket of laws, regulations and tax exemptions. They can tell you whether or not solar energy will be financially rewarding for you.

## **Renewable energy’s fortunes dictated by regulations**

And here is the problem. We have a large new industry coming

along whose future is not dictated mostly by the inherent strengths of its products, but largely by the inducements provided by many policy makers who believe that renewables are “good”, while carbon based energy is “bad”. For this reason they encourage consumers to embrace renewable energy through a variety of fiscal inducements.

Sadly, regarding power generation and distribution, it is true that even before renewable energy came along there was no level playing field. Electrical utilities are highly regulated and already subjected to all sorts of restrictions, obligations and mandates. But adding to this bloated regulatory environment by favoring a new industry (at the expense of others, such as coal-fired power plants) is hardly a way to improve things.

### **Bad public policy**

This is a really bad way to conduct public policy. Of course, we have to acknowledge that taxation and regulations are commonly used to favor other industries as well. Still, the fact that we accept policy-driven market distortions in some sectors of the economy (housing for instance) is not a good argument for extending this bad practice to new technologies affecting other key sectors, already heavily regulated or not.

### **Market economy, different rules**

In a real market economy, consumers would choose products based on their value, and not on tax advantages.

But if we do believe that we are no longer in a market economy, then we should accept as “normal” the absurdity of getting advice on solar power (and many other products) from lawyers and other regulations experts.

However, if we accept this as the new “normal”, then we also kiss good-bye to capitalism and to its ability to allow the best companies to emerge and thrive on the basis of the



value they offer.

What we are getting now is that too many companies and/or sectors do well or at least survive because they are in political favor, or because they can hire the best lobbyists who will help them get the most favorable tax regime.

This non-market economic system may work well for the well-connected; but it is a disaster in the making for the overall US economy and for its overall future competitiveness. Be it in Soviet Russia or statist France, politically mandated economic choices never work. And I really mean "never".