

February 25, 2013 - Thank you Governor Snyder and this forum for seeking to hear the voice of our community.

My name is Kraig Schultz, I live in Grand Haven, MI with my Wife and two Teenage sons. I am an Engineer. I am here today representing the communities that live on the shore of Lake Michigan and speak from an engineering perspective as a citizen who is actively involved in building a better future for our Children and Great Grand Children.



"We do not inherit the earth from our ancestors, we borrow it from our children."  
Native American Proverb

We are the stewards of this land.  
Are we protecting it and keeping it healthy for our Children?

We are the Great Lakes State: For Thousands of years, you could travel anywhere on this land and drink the surface water from nearly any source, the rivers, the lakes, and especially the Great Lakes. Fish and plants could be eaten without fear of illness or disease – the land was clean and pure.



Enbridge's Oil Pipeline Breach Near Kalamazoo, MI

“EARTH FIRST! We'll destroy the other planets later.”  
Bumper Sticker Source unknown

But, in the last 100 years we have laced our surface waters with bacteria, chemicals and radiation that make them increasingly less healthy to drink.

And now, the chemicals we've burned, buried and spilled on the land in the last 50 years are starting to show up in our underground drinking water.

Have we enjoyed a low cost luxurious lifestyle at the expense of future generation's health? Mercury, Arsenic, Cyanide, Pesticides, Estrogen, Radiation on our land, in our water, in our food!

Today, we have found new ways to get cheap energy: Fracking our land, putting our underground drinking water at further risk and encouraging us to fracture the very surface of the earth for a short-term, limited supply of energy.



Clean, Pure Michigan

### Is our Energy Production Polluting our Land, Or MAKING IT CLEANER?

My charge to this forum is this: It is our moral responsibility to change our paradigm from “The Solution to Pollution is Dilution” where we allow just a tiny bit of pollution to come from our industry and energy production each day... Just a little bit of Mercury, just a little bit of Radiation, just a little bit of chemical to enter our water each day, to a new paradigm:

I quote Donald Sadaway of MIT (p. 195 of Bottled Lightning, by Seth Fletcher Hall and Wang Copyright 2011),

We must challenge ourselves, ”Instead of thinking about a process to make ~~steel~~ (energy) that does minimal harm to the environment in caparison to the process we have right now, what about thinking about a process that actually **CLEANS** the air and **CLEANS** the water, so that people fight to have the ~~smelter~~ (production) site **IN** their neighborhoods because the trees are greener near the ~~smelter~~, (industry), the water is cleaner having passed through the ~~smelter?~~ (plant)? A car that dives down the road and its exhaust is purer than the air coming into the front of the car? Why aren’t ~~you~~ we thinking this way? Why are ~~you~~ (we) thinking that the best we can do is zero? Today we’re at a negative, and the best we can hope to achieve is to get as close to zero but on the negative side as possible? ...I’m saying, why can’t ~~you~~ (we) bust through the zero axis and go positive?”





300 MPGe over last 6,000 Miles  
Built in a Barn by Michigan Public School Graduate

Efficiency by DESIGN

WE MUST DESIGN CLEANNESS INTO ENERGY PRODUCTION.

For the doubters in the crowd, who say I'm a dreamer, but in the real world we can't do that. I say to you, I'm just a normal guy with a Michigan public school education and I drive an electric vehicle I built in my barn that has averaged 300 MPGe over the last 6,000 miles. Can it be done? YES, it can be done! But, we must envision it, and take action to make it happen, by designing cleanness into the design of the product.

We must put away childish thoughts of making electricity with FIRE. Coal, Natural Gas, Nuclear, these are tools of the 20<sup>th</sup> century.

WE MUST DESIGN CLEANNESS INTO ENERGY PRODUCTION.



**GOOD NEWS!**

In 2012, Wind Power in Michigan is less expensive to install than Coal!

**BAD NEWS!**

641 Wind Turbines = 978 MW

1 Nuclear Plant = 1,000 MW

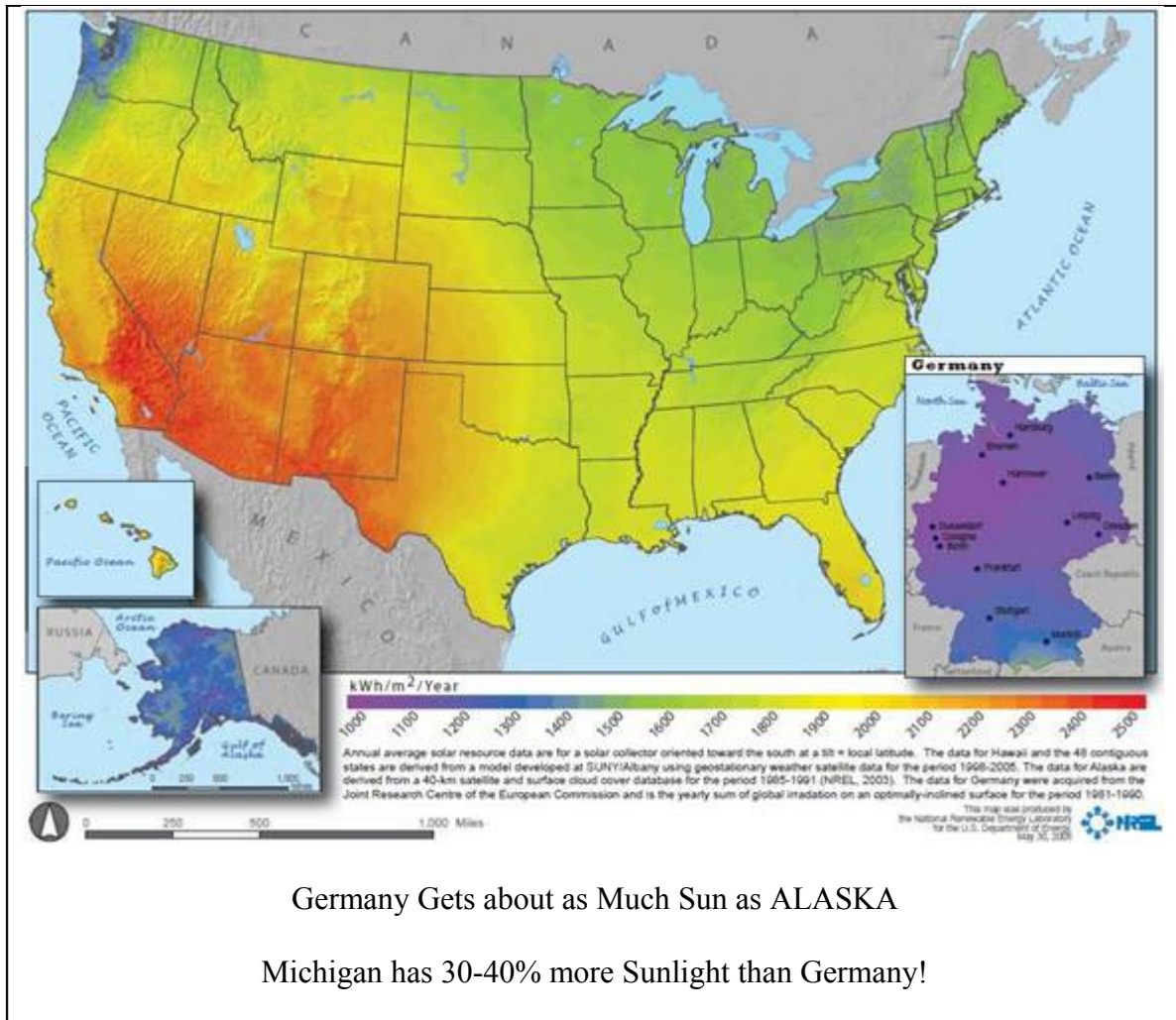
1 Coal Plant = 1,000 MW

**GOOD NEWS!**

In the February Report, we found out that, Wind Power in Michigan is less expensive to install than New Coal Fired Plants!

[http://www.michigan.gov/documents/mpsc/implementation\\_of\\_PA295\\_renewable\\_energy\\_411615\\_7.pdf](http://www.michigan.gov/documents/mpsc/implementation_of_PA295_renewable_energy_411615_7.pdf)

But, the 641 Wind Turbines we've built all over the state provide the equivalent of 1 Large Coal Plant or 1 Nuclear Plant! How will we replace all our Fire Plants? Will we cover our land with Wind Turbines as far as the eye can see?



### What about Solar?

We have to change the rules, we have to change our thinking. But, we don't need to use our imagination, for Germany, which has less sunlight per year than ALASKA is already getting over 40% of its Peak electricity from Solar in 2012. They are 20 years ahead of us in the journey, so we can learn from their example. How did they do it? They started 20 years ago with a very simple first step, "Feed In Tarriffs".

Using Feed In Tarriffs, over half of the renewables in Germany were done at the community and individual level!

For more information visit: <http://www.boell.org/> <http://energytransition.de/>  
<http://cleantechnica.com/2013/02/09/germany-solar-power-lessons/>

1990 Feed In Tarriff - Implemented in Germany

1. Fixed Payments for 20 year
2. Guaranteed grid access
3. Germany's installed cost for Solar PV is ½ of U.S. due to Licensing and Paperwork





High Level Nuclear Dry Cask Storage at Big Rock Point,  
Traverse City, Michigan.

Safe storage for 10,000 YEARS+ !?  
Who says we can't store energy over night?

Every day we receive enough Sunlight to feed our energy cravings.

We can transition to solar and wind and enjoy cheap electricity with no daily emissions from production. But, the skeptics say, it will not work, because we have no way to store energy.

Let me remind you that,

The people who say,  
“We cannot store Energy OVERNIGHT”,  
are the same people who say  
“We can safely store nuclear wastes for 10,000 YEARS”.

Rephrase of statement made by Arnie Gundersen of Fairewinds Energy Education at the  
2012 Mountain of Waste Conference in Chicago, IL

“But, if you believe that man can build a repository to store nuclear waste for 250,000 years, surely these same people can find a way to store electricity overnight.”



**Photo courtesy of AES Storage**

**A123 GRID STORAGE SYSTEM.  
Up to 4 MWh Capacity Per Trailer**

Besides, we are already storing energy overnight at Utility Scale. A123 is building Grid Storage Systems with Lithium Batteries inside highly portable cargo containers that can hold up to 4MWh of energy!

More Information: <http://www.a123systems.com/smart-grid-storage.htm>





The Ultimate GRID STORAGE SYSTEM  
Battery Electric Cars with Grid Access

Let us not forget, the citizens of this fine state have helped pay to build three huge battery plants in that are not producing batteries, because we don't have cars to put them in?! Yet, we have a need to store energy from the grid! Let's build the batteries today!

Your average all electric car has a battery that could power your house for a day. (The Nissan Leaf has a 21 kWh Battery. My house averages 21 kWh per day!). Automobiles are the ultimate in Decentralized, Mobile Grid Storage Systems – having the ability to charge anywhere, and move quickly to a location in need of energy.

Current Reality: there are millions of cars already built that could be converted to electric drive, and thousands of homeowners and inventors like me who are begging for batteries from JCI and LG CHEM and A123 but we cannot purchase them because those companies will not deal with us, we are too small!

In Summary,

I recommend that we phase out Coal, Nuclear and Natural Gas as existing plants reach the end of their lives, and that we replace them with clean, and less costly renewable sources like wind and solar. We also must focus on reducing consumption by improving efficiency's of our cars and buildings.

1. In 2012, Wind Power in Michigan is less expensive to install than Coal today!
2. Use Germany's success with Solar as a template to grow our Solar Industry
  - a. Legislate Feed-In Tariffs with 20 year contracts
  - b. Guaranteed grid access
  - c. Streamline paper work for Solar Installations
3. Develop a standard to allow Electric Vehicles to function as Grid Storage Systems
4. Encourage Michigan Battery Producers to support Grid Storage Applications.
5. Heighten Focus on Legislation to set higher standards for Efficiency's in Buildings and Cars
6. Continue to make legislation that sets extremely high standards for clean environment

To solve our problems we must all be involved and active in doing the work that needs to be done to prepare for a healthy future.

We only need to look to our recent past to see how good legislation has improved our quality of life today with cleaner air and water, better gas mileage, healthier wildlife...

Good Government Policy examples include, the Clean Air Act, CAFÉ Standards, Bans on DDT, Emission Control Standards and Michigan Public Act 295.

The role of our policy makers is to set high standards for what is best for the entire community in the long run. We must not seek to just please our immediate constituency.

The Natives who lived in this land for thousands of years before we came here taught that we must plan for the 7<sup>th</sup> generation. 140 years from now, how will our great grand children taste our contribution when they drink the water? Will it be a bitter glowing chemical after taste, or will they be refreshed and cleansed by clean, pure water?

Thank You,

Kraig Schultz

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