If we don’t make decisions based on science…….what else is there?

I have written much about the strength of our beliefs and how they influence important decisions. A case in point is the decision to close nuclear stations early in Germany. As we in the rest of the western world try and understand the German approach to eliminating nuclear power on the road to their Energiewende (energy transition), we must remember that this plan started in 2010, a year before the Fukushima accident. This energy transformation is a monumental task and a source of pride to most Germans. It has a very aggressive target of reducing emissions by 80 per cent and providing for 80 per cent of the country’s electricity consumption from renewable sources by 2050 all while “*aiming for a market-oriented energy policy that is free of ideology and open to all technologies, embracing all paths of use for power, heat and transport.*”

Much has already been said about the challenges along the way. We now know that raising renewables quickly to as high a level as Germany has done has an impact on the stability of the system; is severely affecting the electricity markets at times when high levels of subsidized wind and solar drive down prices for all other forms of generation risking putting conventional generators out of business; all while increasing fossil generation in the short term at least to make up for lost nuclear with a resultant increase in carbon emissions.

It wasn’t supposed to be this way. As stated in the 2010 policy paper, the purpose of the policy is to secure a reliable, economically viable and environmentally sound energy supply for the 21st century. While targeting renewable energy to account for the biggest share in this future energy mix; in 2010 it was also accepted that nuclear energy would be a

bridging technology on this road. In fact, the plan made maximum use of the existing nuclear fleet during the transition. Look at the following excerpt of the policy on the continued use of nuclear energy.

"*A limited extension of the operating lives of existing nuclear power plants makes a key contribution to achieving the three energy policy goals of climate protection, economic efficiency and supply security in Germany within a transitional period. It paves the way for the age of renewable energy, particularly through price-curbing impacts and a reduction in energy related greenhouse gas emissions.*

The operating lives of the 17 nuclear power plants in Germany will be extended by an average of 12 years. In the case of nuclear power plants commissioned up to and including 1980 there will be an extension of 8 years. For plants commissioned after 1980 there will be an extension of 14 years.

Additionally, the regulations on safety requirements for German nuclear power plants will be expanded, with requirements remaining at the highest technical level, in the framework of a 12th amendment to the Atomic Energy Act.

The extension of operating lives also creates the opportunity to increase financing in the fields of renewable energies and energy efficiency. To this end – in addition to the tax on nuclear fuel limited to the end of 2016 – a contractual agreement will be concluded with the operators of Germany's nuclear power plants on absorbing additional profits resulting from the extended operating lives."

In summary they want to get rid of their nuclear plants while also acknowledging they are currently both very economic and safe. Therefore nuclear plant operating lives would be extended to make more money generating more taxes to pay for the energy transformation to enable nuclear to ultimately be eliminated.

And then it happened, the accident at Fukushima. The result; this plan was abandoned and 8 nuclear units were shut down immediately while the remaining 9 will no longer get life extensions. This makes for a much harder transformation with coal use having increased from 2011 to 2012 with most electricity continuing to be generated from fossil fuels followed by nuclear (at about 16% now about half of its pre-Fukushima peak of around 30%). Acknowledging that Fukushima increased the fear of nuclear, is it rational to accelerate the removal of nuclear from the system when a plan was already in place to eliminate it; to the short term detriment of emissions and costs? But what is rational? If it means exhibiting behaviour consistent with your beliefs, then this decision may indeed be rational. But is it reasonable to not challenge one's beliefs to determine if they are valid at times like this?

And hence, the film Pandora's Promise. I was able to attend a showing where Robert Stone was also there to take questions from the audience. It made for a lively discussion and an overall fun evening.

First and foremost, I found it absolutely riveting to see the transformation of these five environmentalists as they came to understand the facts about nuclear energy. They talk about being a member of the environmental movement and how it went without saying that one would also be strongly opposed to nuclear power. After all, it was an evil technology and radiation kills. Frankly nuclear power can destroy the planet.

For some reason, these folks took the time to listen and see that much of what they believed in the past about nuclear power was simply wrong. I am sure that most of you in the nuclear industry have been providing these facts consistently to all that would listen over the last 30 plus years. So why are they listening now? Why listen when you haven't in the past? The facts are the same. But in this case the driver is

different. This group is overwhelming alarmed by the threat of climate change. And as such (and different to many others), they decided to explore ALL the options; even the ones that would have seemed ludicrous to them in the not too distant past. Or in other words, they chose to challenge their strongly held beliefs.

The film was not so much about advocating nuclear power (although it does) but rather of documenting the journey of these five individuals. They visit plants. They visit Chernobyl and Fukushima and they explore the realities about the technology. What I found the most compelling was the hand held dosimeter they carried as they traveled that showed radiation levels no higher at Chernobyl or Fukushima than most of the rest of the world. This kind of evidence is hard to argue with.

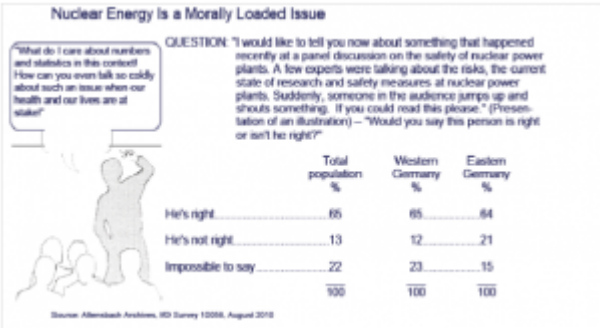
But as interesting as this all is, this post is not about a group of environmentalists who have decided to put their faith in science as search for the truth. Rather it is about why so many others don't do the same. It seems as science is always appreciated when it supports your side of an issue. i.e. science is proving climate change which is pro-environment so science is right. Science shows that nuclear power is good but that disagrees with environmental dogma so sweep it aside. It's good news when those who use science to make their climate case are realizing they should do the same when they evaluate nuclear power. We should applaud anyone who takes the time to challenge a long held belief.

So, while Germany is aiming for a market-oriented energy policy that is free of ideology, why are they so dogmatic that nuclear needs to go and the quicker the better? I recently was provided with a copy of a very interesting presentation made by Dr. Thomas Petersen at the Jahrestagung Kerntechnik 2013 in Berlin this past spring that explores "Nuclear energy and the perception of risk in Germany". While presented at a conference the presentation has not been available on line to

date. I want to thank Dr. Petersen for giving me permission to post it so you can see what I think is a remarkable set of data.

Most of us outside of Germany probably believe that Germany is a world leading innovator when it comes to technology. Yet in this presentation it would appear that most Germans do not have faith (or trust) in experts when it comes to science. They overestimate risk and consequences and are extremely averse to taking any risk they perceive can cause harm. The slides note that a majority believe life is becoming more dangerous with time; are concerned that technological progress is risky and that research into certain technologies should be stopped; and that in politics, decisions are too often made on the basis of facts rather than how people feel.

When it comes to nuclear power, it is high on the list of technologies that carry too much risk. Consider the following slide:



Pulling all of these thoughts together is saying something along the lines of “I believe what I believe – I know that nuclear power is dangerous so please don’t try and deter me with facts or truth”. The really scary part is that in today’s western democracies this is indeed how we make decisions. And while we may want to laugh, or cry; it is always important to remember these decisions have very real consequences. Less nuclear, more carbon. Fact. Less nuclear, more fossil fuels. Fact. Less nuclear, more coal – and more illness and fatalities from pollution. Fact.

So what is happening in Germany? The great transformation. Yes, they are doing great things with renewables. There is no doubt. But at what cost in the short term? The subsidies are destroying European energy markets, new coal plants are being built and carbon emissions are going up. All to replace perfectly safe well run nuclear plants before they reach their end of life. Nuclear plants have never hurt a single individual in Germany and likely never will. So what exactly are these people being protected from?

The answer is clear as I close with this final quote from a pro-transition blog that disputes the negative impact on coal use of the policy by arguing it is a short term blip. When talking about the reduction in nuclear generation over the last two years, the author concludes, *"This reduction is a long-hoped for goal and the inspiration for the nation's energy transition. Germans don't want nuclear reactors. They haven't since the 1970's and they really don't want them after Fukushima."*

We can see that five environmentalists have taken on their beliefs due to a larger concern – climate change. I wonder what issue it will take, if anything, for Germans to do the same?

Note:

In addition to the film, Pandora's Promise, Mark Lynas has released a short book called Nuclear 2.0 available on Amazon in electronic format only. I have read it and frankly it is extremely well done. It meticulously addresses the concerns with nuclear one by one by one with clear and effective information to make the reader see the facts. I recommend it if you haven't had a chance to read it.