



## Reflections on ASPO 10, Vienna 2012 – Part 2

Posted by [Phil Hart](#) on June 9, 2012 - 12:59am

Topic: [Alternative energy](#)

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After [Part One](#), this is Part Two of my thoughts on some of the energy related themes of this ASPO conference and where we find ourselves now.



*From the ASPO 10 [Picture Gallery](#)*

## Renewable Energy and Electricity

There were several presentations through the conference with a focus on renewable energy. Unfortunately, most of them were largely about the vision for renewables in Europe, rather than the details about how the vision might be achieved. For a technical ASPO conference this was a little disappointing, but reflected partly the political nature of the keynote speakers and/or sponsors. The only thing that was really new to me was the Power to Gas presentation (see energy storage below).

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From his experience with the UK Industry Taskforce on Peak Oil, Jeremy Leggett had some interesting if depressing ‘Yes Minister’ type anecdotes and quotes, reflecting just how hard it will be to turn around the incumbency of governments and the existing energy suppliers. As I have read before, Jeremy talked about the potential of solar in particular to become a disruptive technology when grid parity pricing is reached in the not very distant future. We may be surprised by how quickly it replaces fossil fuels at that point.

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While the conference was short on technical detail, there’s a very different feel to the way the

Austrians and Germans talk about their plans for renewables compared to the Brits. While the U.K. has voiced some grand plans for renewables, there are few policies or programs in place that might support such a transition. Meanwhile, with a commitment to decommission nuclear, the reliance on natural gas for power generation increases further with little regard for how quickly North Sea gas production is declining or where future supplies will come from. In contrast, the Germans and Austrians also have grand visions for renewables but they seem well aware of the practical challenges ahead, and they have a much better track record in delivering changes already.

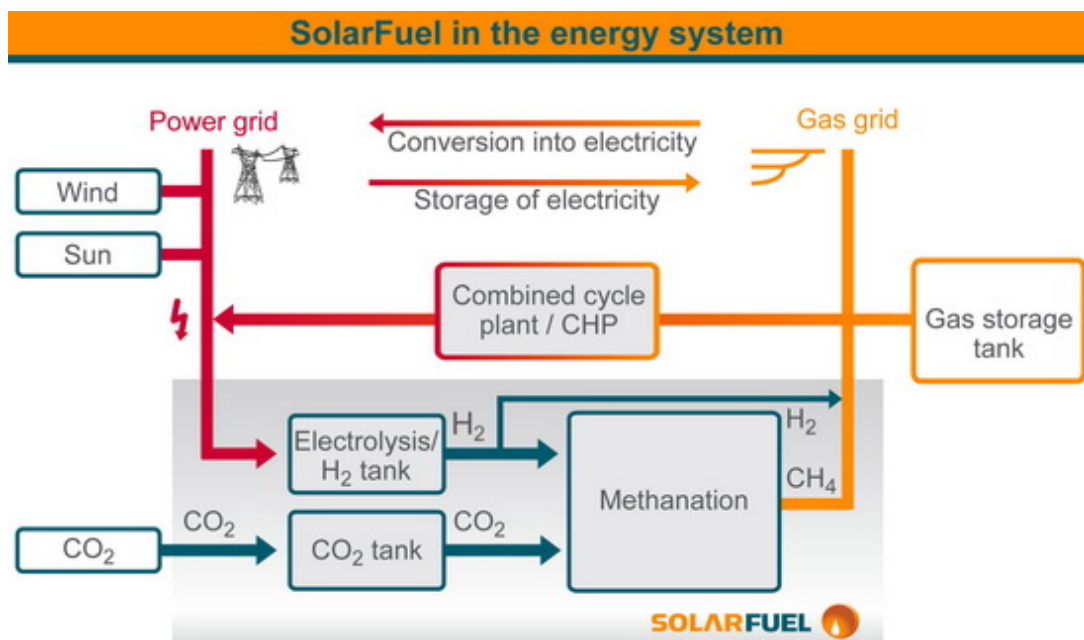
In both Germany and Austria, the already lofty goals have been ramped up even further in response to the events at Fukushima in Japan. The Germans today have serious penetration of solar and wind, and a grid at capacity in some corners as a result. I get the sense they are well aware of the challenges they have set themselves and will commit everything that we admire about what it is to be German towards finding the limits of what is possible with renewables.

## Energy Storage

Hermann Pengg gave one of the more interesting presentations of the conference. It's just a pity that he, like many other keynote speakers, took 15 minutes to get to the meaty part of the presentation leaving precious little time for the important details.

Audi have teamed up with [SolarFuel](#) to demonstrate their 'Power to Gas' concept. The driver (excuse the pun) is the need for long-term storage of renewable energy to cover demand during what can be 2-3 weeks of low wind under the large high pressure systems which can sit over Europe in winter and summer. Pumped hydro storage is seen as the most efficient but storage volumes even where there are hydro schemes are usually only the order of days, and Germany has precious little anyway.

The idea is to use excess electricity to hydrolyse water into hydrogen and oxygen and then react a CO<sub>2</sub> stream with the hydrogen to create methane, which can then be pushed into the gas grid. The gas grid has enormous storage capacity, so in this way the excess renewable energy can be stored for conversion back to electricity in gas plants when needed.



The claimed theoretical efficiency for the conversion from electricity to gas is 60% but it would be good to see more details to support that. I also have questions about the CO<sub>2</sub> stream needed for

the reaction.

Power to Gas looks like an interesting concept, that makes use of existing infrastructure to solve possibly the biggest challenge of having a high penetration of renewables. The efficiency of the process does not look great and still needs to be demonstrated, but any storage of the volumes and over the time scales required may be better than none.

## Smart Grids

Thinking about the inefficiencies of storage really emphasises the need for a mix of renewables that match demand as closely as possible. Given the costs of storage, a premium can be paid for those that more closely match demand or particularly those that can be dispatched as required. It also means that smart grids to actively manage demand are also quite important as the alternative of even short-term storage is quite inefficient. Ideas like IP switching of your fridge or electric hot water system to balance short term fluctuations in the grid seem pretty achievable to me.

## Public Transport

Something I appreciated outside the conference venue was Vienna's fantastic public transport. The underground, surface trains and trams were frequent and very efficient at moving us around town. I've never seen so few cars in a major city, even in peak hour, nor did I ever feel like I could have got around quicker or easier in one. One of the presenters was claiming (I think) that 70% of travel kilometres are made by walking, cycling or on public transport and it's easy to believe. Transport in Vienna is very well prepared for a future with less oil.

## Heavy Transport Vehicles

On day 2, Stefan Hausberger provided an interesting technical presentation on the options for fuel reductions in heavy vehicle transport. Like aviation, about 30% of current costs are for fuel. But capital and labour costs are also high. There are many ways that the fuel efficiency of large vehicles can be improved, but only a few that are likely to be cost effective. The main area for improvement is in the aerodynamics. Hybrid technologies also make sense for buses, but less so far for trucks (more so in hilly areas).

Travelling at reduced speeds may work well for individual transport where time is not the limiting factor but for heavy transport vehicles, that means more trucks and more drivers are required to deliver the same amount of freight. Therefore the effect is much less beneficial.

In summary, fuel efficiency savings of about 10% are likely to be achieved in heavy vehicles, but beyond that it gets very difficult. This is an outcome I've seen repeated in many other areas. If each sector or user of oil in the economy can only increase efficiency by 10%, then oil declines greater than that will have to be met by demand destruction.

## Electric Vehicles

There was not much discussion about electric vehicles, and certainly nothing that changed my view on this front. With high energy demand (and embedded resources) in a large heavy vehicle like the Volt, I don't see the current crop of electric vehicles as delivering the right kind of response to peak oil.

I think small, efficient vehicles with no more size and mass than that required for a typical commuting journey are far more likely to be bought in quantities to make a meaningful difference

to oil consumption. This includes small vehicles like [TREV](#) and right down to electric bicycles which I think have a particularly bright future.

## Stretched to Breaking Point

At this point I move beyond what was discussed at the conference to restate how I see the global picture today. There are two themes related to oil supply and demand that have been getting progressively more tense since the low oil prices that marked the first phase of the credit and oil crisis in 2008. Both of these are set against the evolving credit crisis which threatens to dwarf supply constraints with even more severe demand destruction.

## Violence, unrest and tension in the Middle East

It does not appear that the Middle East can now go back to the undemocratic, authoritarian but otherwise generally stable regimes that previously held sway for several decades now. Any number of scenarios could further disrupt livelihoods and oil supply in the region.

## How long can China increase oil consumption?

Despite global oil supply breaking slightly above the plateau range of the last few years, most of the growth in demand for oil in China has been met by demand destruction in OECD countries. How much longer before Chinese growth (ie. more than just a 'slowdown') is capped by lack of oil or lack of a world economy to export to?

## Deleveraging and the Credit Crisis

The financial system is in crisis; the inevitable result of a credit bubble that has been seventy years in the making and which has been blown out of all proportion in the last decade. For the moment, the world economy is limping along as enough people still believe that growth may somehow be restored and the mountain of debt one day repaid. Were it not for the ceiling on oil supply, it might have been possible to blow another, bigger bubble but that looks impossible now with weak economies still facing \$100 oil.

The trigger for the next crisis phase might come from the oil market as above, or it might unfold more directly from events in Europe and the United States. Either way, when the realisation comes that the trillions of dollars of credit (debt) underpinning asset prices around the world cannot and will not be repaid, then deleveraging in earnest may begin. I believe it could be many years in such a deflationary environment before we really test oil supply limits and begin discussing peak oil again.

*Thanks to Michael, Georg and Rembrandt for organising the ASPO 2012 conference in Vienna. I admire the effort you put into making it possible. I for one enjoyed the conference and my time in Vienna.*



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