

## Re: World's First Fuel Cell–Powered Train Locomotive Slated for 2008

**Source:** <http://sci.tech–archive.net/Archive/sci.energy/2004–08/0513.html>

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**Date:** 08/12/04

Date: Thu, 12 Aug 2004 05:08:11 -0400

Stephen Sprunk wrote:

> "Ian St. John" <[istjohn@noemail.ca](mailto:istjohn@noemail.ca)> wrote in message  
> news:y7nSc.21123\$Mq1.1082275@news20.bellglobal.com...  
>> Stephen Sprunk wrote:  
>>> Europe could use diesel today, but they don't because it costs more.  
>>  
>> Well the electicity prices are comparible to the U.S. while the cost  
>> of diesel and other fuels are highly taxed and cost much more (  
>> \$5/gallon or more). You have admitted that electricity is more  
>> expensive than diesel in the U.S. What makes you think that the  
>> costs favor electicity in Europe???  
>  
> European railroads pay taxes on diesel just like consumers do, so  
> that is part of the cost of the fuel. Over there, electricity costs  
> less to use per unit energy than diesel, no matter what speed. This  
> is very simple math.

Oops. You got me there. Must have been asleep. Yes. Diesel and liquid fuels are MORE expensive so electricity would be favored. A second drviign force for electrification that is not in the U.S.

>  
>> The main driving force behind electificaiton of the rails in Europe  
>> was the power to weight rations for high speed passenger traffic.  
>  
> The freight lines in Europe were electrified long before TGVs arrived  
> in 1981; it was motivated out of the economics of fuels, not out of  
> the power/weight ratio.

Possibly, but I can find no evidence that freight lines were electrified prior to the TGV program in the 1960s.

> Also, since TGVs *\_don't use freight tracks\_*,  
> why would they be electrified if it were only for TGV's benefit?

Now YOU must have dropped asleep. Go over that sentence. The TGV lines would

be electrified because it was the only way to get the power to weight ratio necessary for high speed.

- >
- >> *And please wipe the shit out of your ears. ... Clear now or do you*
- >> *need it repeated a twelvth time before you clue in?*
- >
- > *Ad hominem attacks don't add anything to the debate.*

Neither does your annoying habit of repeating your claims over and over without a shred of logic or evidence. I've argued with smarter brick walls.

- >
- >>> *Once you have the catenary up, diesel is still cheaper in the US*
- >>> *than electricity.*
- >>
- >> *Regardless of the cost of the catenary, the primary motivation to use*
- >> *electricity for high speed rail is the power to weight ration*
- >> *necessary. Turbines can be used where electrification is not feasible.*
- >
- > *It's feasible anywhere. The question is whether it's cost–effective.*

If it is the only feasible system then that is the primary motivation to design it that way. Cost effective just determines if it succeeds and is more to do with populations density and infrastructure. Ergo, HSR is designed for turbines where electricity is not feasible and the only place that electricity is feasible is the NEC.

- >
- >>> *Even on Amtrak's NEC, which is completely electrified,*
- >>> *most of the freight trains and even many passenger trains use diesel*
- >>> *because it's cheaper. Only Acela, the Metroliners, and a few*
- >>> *commuter trains use electric.*
- >>
- >> *I expect that freight uses diesel mainly because it does not want to*
- >> *be restricted to a specific corridor, or have to change around when*
- >> *exiting the*
- >> *corridor, while scheduled passenger traffic has nowhere outside the*
- >> *corridor to go.*
- >
- > *If electricity were cheaper for the US freight RRs, they'd put up*
- > *catenary in a heartbeat and it'd be universal just like in Europe.*

NOW you are agreeing that electrification is not the better way??? Well, consistency is not your forte. You seem to change with the wind.

- > *Even most low–speed passenger trains entirely within the NEC use*
- > *diesel because it's cheaper; the only ones that don't are Acela and*
- > *trains going into tunnels or other areas (like mid/lower Manhattan)*
- > *where diesel is banned.*

The price difference only becomes meaningful when the system is feasible. Is this not simple enough for you? For HSR the only feasible system is electricity where it is available and turbine when it is not. Since you cannot run HSR on diesel there is no 'advantage' to diesel for HSR. As to freight, I have explained why they do not electrify. The fact that HSR has electrified but freight has not SHOULD be enough of a clue even for you. It is not economics. It is the restrictive nature of the NEC for freight that moves over the entire continent.

>

>>> *No, it says that's the only area with enough catenary to power  
>>> high-speed trains.*

>>

>> *This is ambiguous. The 'overhead electrical lines' may refer to the  
>> high power grid lines rather than the catenary. The statement makes  
>> no sense in their 'being enough' catenary lines, while the other  
>> interpretation makes sense in terms of tapping the power necessary  
>> to feed the catenary.*

>

> *So you're saying California, with an excess of 5GW even during peak  
> consumption, doesn't have enough power in the grid to handle a few 9MW  
> trains? Other states tend to have even more (percentage wise) excess  
> power.*

Having enough power is not the issue and yes, it can be very disruptive. The excess power is generally required to be about 15% of the total to prevent problems in the 'last watt'. You may remember a bit of a problem not that long ago?

But the problem is not the total power load but the CHANGE in load. Switching 9 MW on and off at short intervals is NOT what the system is designed for. Please use your mind for something other than a hatrack. I would not have mentioned the problem if there were no evidence of a problem. It is a fairly well established issue.

>

> *There are distribution capacity shortages on the lines into many major  
> cities, however that's not where trains will be consuming the most  
> power.*

Where the power is used is not as much of an issue as the short term variations in demand. The grid is used to send power where it is used in very short time scales. Just look at the NW blackout and how fast it progressed. Why do you keep introducing red herrings?

> *TGVs don't exceed 140km/h within Paris or its suburbs, and  
> that corresponds to a power draw of less than 2MW (and only for short  
> periods).*

The power needed to accelerate is high no matter if you are going from 20 to 40 or from 70 to 90.

- > *You might need a few new distribution lines, but that's a*
- > *minor cost compared to building the tracks, and the new power*
- > *consumption (at retail prices) would pay the utilities back in short*
- > *order. Electric railroads even provide their own power stations;*
- > *they can take 25kV and higher feeds directly from the power grid and*
- > *distribute the power up and down the tracks themselves.*

My my. You make my point and don't know it. Why do you think the railroads PROVIDE their own power substations and controls! To minimise the impact on the main grid and to provide the grid stabilisation for the cycling peak loads. In other words the investment in grid upgrading is obvious from your OWN statement. You cannot just 'tap' the power grid. You MUST upgrade it and that is an expensive operation. One of the disadvantages of catenary electric power is the high cost of fixing up the power grid to provide stability against load variations.

- >
- >> *There are a lot of problems with demand variations in most electrical*
- >> *trains.*
- >> *Europe has a lot of experience with this*
- >
- > *Sure, with hundreds of trains operating at any given time and up to*
- > *8.8MW/train, that will tax the power grid a bit. One or two new power*
- > *plants would cover all of France's trains, however, so it's not any*
- > *sort of crisis.*

I cannot determine if you are ignorant or just catatonic. The total power is not the point. The varying loads ARE.

- >
- >> *and it is even a problem on the Singapore MagLev line which is only*
- >> *27 kms long and the only big periodic demand.*
- >
- > *Singapore doesn't have anywhere near the electric capacity available*
- > *in the US or Europe.*

I'm starting to favor the catatonic theory. The brain is no longer functional for some reason. But don't worry. THE world goes on because people in Singapore DO know the problem and developed the grid upgrades to deal with it. It is one big cost of both HSR and MagLev.

- >
- >>> *Similar catenary could be installed on any other*
- >>> *rail line in the country. The real problem is that Amtrak doesn't*
- >>> *own much track except for the NEC, and they have no authority to*
- >>> *force a private railroad to install catenary -- and as I've noted,*
- >>> *the freight RRs have no motivation to do it for their own use.*
- >>
- >> *The problem with expanding overhead catenary is a lot bigger than*
- >> *your simple claims. You would have to make major changes to the*
- >> *electrical grid to deal with the demand spikes.*

- >
- > *New distribution lines might be needed, but that's a trivial problem*
- > *compared to getting private RRs with no vested interest in passenger*
- > *rail from electrifying their tracks.*

Maybe it is just a lack of sleep or poor judgement in estimating the costs of the 'trivial' problem but you really need a few smart pills. Your 'trivial problem' has kept electric HSR from the rest of the country and promoted turbine HSR everywhere but the NEC and you STILL have not clued in that it is NOT trivial.

- >
- >>> *The HSR proposal in Florida (FOX) was for a TGV derivative, using*
- >>> *electric power.*
- >>
- >> *No. They were considering all sorts of schemes and I do not think*
- >> *that they*
- >> *settled on any one yet. The FOX proposal was scrubbed by Jeb Bush*
- >> *back in 1999. <http://www.trainweb.org/hsr/>*
- >>
- >>> *Ditto for Texas.*
- >>
- >> *Texas was a candidate for maglev, but again, nothing came of it.*
- >
- > *It was a candidate for TGV as well. Maglev was proposed at one time,*
- > *but unlike TGV it had no state support or investment at all.*

Regardless. No electric HSR proposals. Duuuuhhhhh. At what point does your brain start up?

- >
- >> *Maglev is a 'crackpot idea???*
- >
- > *The only operational high–speed maglev in the world is a small test*
- > *track in Japan;*

My my, you have blinders. How COULD you have missed the start of the line? I find it hard to believe that even a monomaniac with serious blind spots would have had a hard time missing it. OOps. It was Shanghai, not Singapore. <http://www.popsci.com/popsci/bown/2003/article/0,18881,536727,00.html>

- > *they're decades ahead of the US in HSR work,*

No. The japanese are concentrating on superconducting maglev and are learning that it is too complicated. The Germans are using narrow gap maglev and sold the only working maglev system to Shanghai. The system uses a VERY small gap and high speed controls to allow use of permanent magnets but the price is that the track has to be almost perfectly flat and straight. It costs a FORTUNE to build the track.

The Shanghai system currently has 77 passengers per train ( 440 capacity ) so it is a bit weak economically. More of a brag like having the highest skyscraper rather than economically justified.

- > *and if*
- > *they can't get it into production service yet there's no way we (with*
- > *almost zero HSR experience) can get it to work.*

I have heard of people with inferiority complexes but you take the cake. No wonder the Japanese specialise in developing technologies first invented in the U.S. but ignored because nobody had the courage to believe they could do it. The reference to the \*passive\* maglev system should have been enough of a clue but apparently you are still asleep. The main advantage of the passive maglev is that it has high ground clearance ( so tracks do not have to be perfect ) or does it need complex controls or superconducting magnets. What part of this did you miss? P.S. NASA is the only current developer of the technology. They want a HSR system travelling an incline as the 'first stage' of a shuttle upgrade or replacement.

- >> *And as for financing ANY rail scheme is*
- >> *financed by government in the end. There is no other way to build up*
- >> *the capital and rights of way necessary. For HSR, for example, the*
- >> *NWC had to eliminate all level crossing and just think how much road*
- >> *constructino that takes!*
- >
- > *The NEC was grade–separated decades ago for safety and efficiency*
- > *reasons; the fact Amtrak \_wouldn't\_ have to pay for doing the work is*
- > *one of the main reasons Acela was even possible on Amtrak's*
- > *shoestring budget.*

The fact that the grades were separated was critical to HSR. You keep imagining that people do these things out of whim or maybe random chance, like your imaginary electrification of European rail and your removal of grade crossing that have been traditional to the RR in the U.S. Does the fact that grade crossing are NOT being removed everywhere else not give you a simple clue? The removal of grade crossings was driven by the demand for SOME sort of HSR in the NEC. It was not a 'freeby' but cost JUST as much regardless of whether it was the state or Amtrak that drove the program to remove this barrier to HSR.

- >
- > S