

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

**Source:** <http://sci.tech–archive.net/Archive/sci.energy.hydrogen/2004–08/0304.html>

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**From:** Ian St. John (*istjohn\_at\_noemail.ca*)

**Date:** 08/11/04

Date: Tue, 10 Aug 2004 22:39:49 -0400

Stephen Sprunk wrote:

> [ *alt.politics.republican removed, since my server doesn't carry it* ]  
>  
> "Ian St. John" <istjohn@noemail.ca> wrote in message  
> news:AobSc.13997\$a65.546095@news20.bellglobal.com...  
>> Stephen Sprunk wrote:  
>>> *If the goal was to make a yard switcher, it appears they've*  
>>> *succeeded. That wasn't the goal I'd gotten from previous messages*  
>>> *in the thread.*  
>>  
>> *The fact that it was a GP–10 was prominent. How could you confuse a*  
>> *GP–10 with an SD90??*  
>  
> "A modern diesel locomotive is 4+ MW. Who the fuck would want a  
> 1.2MW?"

Well, obviously a yard switcher would want 1.2 MW and is there is nothing to say that a 'modern' yard switcher would need more!

>  
> *The only "modern diesel locomotives" in the 4MW range are long–haul*  
> *freights.*

If you say so. I gather that you do not like my reply to Eric Gisin, who made the above claims?

>  
>>>>> *History shows the RRs want the biggest locos they can get for*  
>>>>> *long–haul routes, rather than stringing together a dozen (or two)*  
>>>>> *tiny locos.*  
>>>>  
>>>> *Sure. P.S. nice illogical non–sequitor or is it a red herring? If*  
>>>> *they build FC line haulers they will be sized to the job. Fuck, you*  
>>>> *are clueless. Were you always this dim or is it due to brain*  
>>>> *damage?*  
>>>>

>>> *But can they actually build long–distance FC locos with sufficient  
>>> (and safe) storage capacity to match the range a full–size  
>>> diesel–electric loco can do today?*

>>

>> *No. But then we are talking about hybrids not all electric storage.  
>> Is this something like dyslexia, where you cannot help but confuse  
>> what is being discussed?*

>

> *You have to store an FC's fuel somewhere, and H2 (the fuel they run on  
> today) has nowhere near the storage density that diesel has.*

Again, you confuse the issue. The FC locomotive is not a 'hybrid'. The fuel cell project was making a yard switcher/ short haul as a first step which was clear from their selection of a GP–10 and 1.2 MW motor. The hybrid idea was introduced by comparison to the Green Goat ( a hybrid yard switcher).

And if you had done some reading you would know that the FC switcher was using anhydrous ammonia in a tank car as the fuel source, which is a fairly dense storage for hydrogen and easily available since it is generally moved and delivered by freight trains. An interesting concept really. Not much use in cars as anhydrous ammonia is not very 'user friendly' but fine for trains which carry the stuff anyway.

>>>>>> *If diesel were banned for environmental reasons, the railroads  
>>>>>> (the few that wouldn't go bankrupt) would simply electrify their  
>>>>>> lines and switch to 6000hp electrics. It's a lot simpler,  
>>>>>> cheaper, more proven than any hydrogen–based "solution".*

>>>>>>

>>>>>> *No. They would probably first adapt to turbine electric power. The  
>>>>>> electrification of the rail is more costly.*

>>>>>>

>>>>>> *And what fuel would they be using to spin those turbines?*

>>>>>>

>>>>>> *JP4 or something equivalent like diesel.*

>>>>>>

>>>>>> *You missed the entire point of what I said.*

>>>>>>

>>>>>> *No. You talked about banning diesels for environmental reasons. That*

>>>>>> *would mean for their pollution, especially fine particulates. The*

>>>>>> *turbines do not have this problem.*

>>>>>>

>>>>>> *So turbines have no pollution?*

Please take some remedial reading skills. I did not say that they did not have pollution. I guarantee that they spew out CO2 and that is becoming a pollutant these days, not to mention NOx, and any sulfur in the fuel is bound to come out as SOx. The main advantage is no fine particulates or organic vapors as they are very thorough at burning the fuel completely.

>

>>>> *Diesel ICEs are the most cost–effective powerplant for locos today;*

>>

>> *Not necessarily. For high output, the turbine would be the choice as*

>> *it is for high speed rail. Diesels are just the traditional choice.*

>

> *Turbines do not exist anywhere in the world of HSR. Every HSR line*

> *in the world, including those in the US both built and proposed, is*

> *powered by overhead electric.*

You have a fascinating level of 'blind spotting'. Did you poke out an eye or something?

<http://www.fra.dot.gov/Content3.asp?P=653>

<http://www.sikorskyarchives.com/train.html>

<http://www.webprowire.com/summaries/465106.html>

Turboliners Enter Service

Monday, April 14, 2003 marked the long–awaited start of revenue service with the first of the refurbished RTL–III Turboliner trainsets. Amtrak is currently utilizing Set #1 for one round trip each weekday between Albany and New York's Penn Station. Set #2 is at the Rensselaer Maintenance Facility, waiting for acceptance by Amtrak and Set #3 is scheduled for delivery by Supersteel by the end of June.

Initial equipment reliability has been good for the first 30 days of service, with reportedly only one planned trip having been missed. Passenger impressions are generally favorable; however concern has been expressed with the reduced aisle width, seat comfort and lack of convenient baggage storage.

Amtrak plans to limit the Turboliner's use to Albany – New York runs in the immediate future and will likely not start a second daily round trip until the third set is delivered and accepted.

Bruce B. Becker, ESPA President

High speed rail using gas turbines in the U.S. goes back to 1950 with the 'blue goose'. Think of that. Five years after WW2. I'm not sure even aircraft has turbines as a rule back then.

>

>>> *the question was what they'd do if diesel (and presumably other*

>>> *fossil fuels) were banned. They wouldn't switch to H2, they'd go*

>>> *electric.*

>>

>> *Ah. So you are not banning diesels. You are banning fossil fuels?*

>> *Why did you not say so. If they banned fossil fuels I expect that*

>> *they would just continue on using diesel engines but develop*

>> *biodiesels supplies. Much cheaper. It is commercially available now*

>

> *At a price roughly double that of dino diesel. Electricity is*

> *between the two in price.*

No. At quite competitive costs. <http://www.esemag.com/0501/diesel.html>

Note that you can buy commercial biodiesel in Toronto and have it delivered by tanker truck. There are also two retail stations selling a 20% blend of biodiesel/diesel.

- >
- > *And, while I know electricity in the US isn't pollution-free, neither*
- > *is biodiesel.*

Exactly what pollution are we talking about? Pesticides?

- >
- >> *and a small part of the Sonoran*
- >> *desert could potentially provide enough biodiesel fuel to power the*
- >> *U.S. [http://journeytoforever.org/biodiesel\\_yield.html](http://journeytoforever.org/biodiesel_yield.html)*
- >
- > *Get back to us when someone has the money to build that pipe dream.*

'Someone' had the money to build the current multi trillion dollar investment in crude oil. By comparison, switching to biodiesel would be pocket change. That 'someone' is John Q Public. Jojoba or palm oil, depending on how much water can be delivered. Some output would probably be needed to run desalination plants on the ocean border.

- >>>> *Most long-distance freight in Europe is electric; the diesel*
- >>>> *engines they use are mainly for switching and short-haul*
- >>>> *movements. Totally different requirements.*
- >>>>
- >>>> *The reason they use electrics is mostly because they want high*
- >>>> *power, low cost, and low weight for high speed rail systems.*
- >>>>
- >>> *Read closer. Europe uses electric for long-distance freight*
- >>> *because, due to their taxes, it's cheaper than diesel. Electric*
- >>> *will be cheaper (and easier to deal with) than H2 as well.*
- >>
- >> *Think a second. The rails are electrified for high speed rail. Why*
- >> *would they use inefficient onboard diesels when they already have*
- >> *the power freely available. Do not confuse the driving motivation*
- >> *with the opportunity cost.*
- >
- > *Europeans don't use diesel when electricity is available because*
- > *diesel is more expensive there.*

Not the point. They could still have used diesel powered locomotives. The driving force for the change came with high speed passenger rail which COULD NOT use diesels and thus paid the 'cost of conversion' after which it became simple for freight to use the same electrification grid.

- > *The opposite is true here: most*
- > *freights running on electrified rail lines still use diesel because*
- > *it's more cost-effective.*

Rather, there is only one area which has the electricity infrastructure to support the electrified rail system. I pointed that out to you. Having trouble with your reading skills again?

>  
>>>> *Other than electric rail the only other way to have such light weight high power is by turbine engine and if you look at high speed rail proposals for the U.S. you will notice that as the engine of choice.*  
>>>>  
>>> *The only HSR in the US (existing or proposed) uses overhead electric; try again.*  
>>>  
>> *If you have an example where they have electrified, it is news to me.*  
>> <http://www.railway-technology.com/projects/amtrak/>  
>  
> *Amtrak's entire Northeast Corridor, from DC to NYC to Boston, is electrified, as are many other railroads in the area. Bombardier's American Flyer trains (used by Amtrak for Acela Express service) exclusively use overhead power, and that's the only HSR trainset meeting US safety standards. It was based on the French TGV, which is also exclusively electric, though the Eurostar variants can use third-rail power instead of overhead for low-speed runs on the UK side of the Chunnel.*

I posted the link. It also notes the problems in running an overhead electric system and other notes point out that this is the ONLY area that can currently electrify their passenger rail system. Which explains why the New York to Detroit run is using a turbine.

>  
>> *Hmm. It mentions the problems of carrying the 25kv catenary over lifting bridges. The engineering challenges are not trivial and I imagine that level crossing must be avoided and that must cost a LOT. Only one place has the traffic to afford this in the U.S. I guess. <http://www.house.gov/mica/rlhigh.htm>*  
>> *"In the United States, the 400-mile route between Washington, DC and Boston (the Northeast Corridor) is virtually the only track with enough overhead electric lines to supply electricity to a high-speed rail train."*  
>> *which is why, I imagine, that the majority of proposals have been for turbine powered locomotion.*  
>>  
> *No, the other proposals have all included similar electrification.*

No. Proposals for Florida, California, etc tend to be 'show me' at this point and include things like mag lev or overhead suspension. Not to be taken as serious commitments yet. As noted, there isn't the electricity infrastructure for it yet and that would be a major cost.

- > *As does every existing HSR line in the world -- France, Germany,*
- > *Spain, Japan, etc. all use overhead electric, not turbines.*

I am not pushing turbines. I have just noted that the U.S. tends to propose them as the only way to make a high speed rail service without the development of the electrical infrastructure.

- >
- > *The only commercially available turbine loco, the TurboTrain, hasn't*
- > *seen use in the US in years and the last remaining one (in France of*
- > *all places) is being phased out because it's too damn expensive to*
- > *operate and maintain, and because the super-hot exhaust causes damage*
- > *to tunnels, bridges, nearby trains, overhead power lines, etc.*

There is that blind spot again.

- >
- >>>> *Having power delivered from the lines reduces the weight of the*
- >>>> *locomotive part allowing for a relatively light weight locomotive*
- >>>> *and cars with the power to haul at high speed. Obviously, the same*
- >>>> *pressures would exist in the U.S. if they made a similar investment*
- >>>> *in high speed commuter freight, but let us not talk about*
- >>>> *fantasies. The U.S. requirements for rail will be for slow speeds,*
- >>>> *heavy cargo and passenger rail will be an afterthought. WAY too*
- >>>> *many level crossing.*
- >>>>
- >>>> *Weight is actually an advantage for freight; electric locos actually*
- >>>> *require ballast weight to improve traction. Nobody but you brought*
- >>>> *up passenger rail.*
- >>>>
- >>>> *Actually, you did with your reference to high speed passenger trains*
- >>>> *in Europe using electricity.*
- >>>>
- >>>> *No, I started by talking about "Most long-distance freight in Europe*
- >>>> *is electric"; you mentioned passenger rail first.*

Well, that is splitting hairs. The electrification of rails in Europe was primarily driven by the need for high power, low weight for passenger travel so it immediately comes to mind when discussing electrically powered trains in Europe which YOU brought up.