

Transportation Solutions Defense and Education Fund

P.O. Box 151439 San Rafael, CA 94915 415-370-7250

January 10, 2025
By E-Mail to:
comments@
valleylinkrail.com

Kevin Sheridan, Executive Director
Tri-Valley – San Joaquin Valley Regional Rail Authority
2600 Kitty Hawk Road, Suite 103
Livermore, CA 94551

Re: Valley Link Project EA

Dear Mr. Sheridan:

TRANSDEF, the Transportation Solutions Defense and Education Fund, has been focused on reducing the growth in Vehicle Miles Travelled (VMT) for 26 years. Prior to the advent of the Altamont Corridor Rail Project, our organization's efforts have emphasized the creation of higher-speed rail transport across the Altamont Pass, despite the Metropolitan Transportation Commission, which delayed the help this Corridor needed by funding the widening of I-580. MTC recommended the Pacheco Pass to the High-Speed Rail Authority, rather than the obvious choice of investing in high-speed rail in the Altamont Corridor, which was very congested back in 2008, when the Pacheco was not.

As a multi-billion dollar 22-mile rail line that requires the relocation of interstate highway lanes (an FHWA matter), the Valley Link Project clearly qualifies as a "major federal action [] significantly affecting the quality of the human environment." (40 CFR §1502.) Most of these miles of rail would not be on currently operational rail lines, suggesting the existence of potential impacts. The "major federal action" categorization plus the EA's serious deficiencies, identified in the comments below, require that FTA issue a determination requiring the preparation of an Environmental Impact Statement (EIS) for this project.

TRANSDEF offers the following comments on the Environmental Assessment (EA) for the Valley Link Project (Proposed Project). All page numbers refer to the EA.

Merits Comments on the Proposed Project

1-4, 1-5: As a threshold matter, neither the Project Purpose nor the Project Need reflect the project's legislative mandate: to provide "cost-effective and responsive transit connectivity, between BART's rapid transit system and the Altamont Corridor Express commuter rail service, that reflects regional consensus and meets the goals and objectives of the San Joaquin Valley and Tri-Valley communities, consistent with the

project feasibility report adopted pursuant to Section 132661.” (P.U.C. sec. 132652(a), emphasis added.) The Rail Authority lacks legal authority under California law to plan, develop, deliver, and/or operate the Proposed Project. (California Public Utilities Code sec. 132651 et seq.) The Proposed Project would not connect BART with the Altamont Corridor Express commuter rail service. The Proposed Project is inconsistent with the Regional Transportation Plan approved by the San Joaquin Council of Governments. The Proposed Project is not “cost-effective” under FTA standards. The Proposed Project is inconsistent with the project feasibility report adopted in 2019, which did not consider the alignment of the Proposed Project, in the miles easterly of Stone Cut in Altamont Pass. Mountain House Community Alternative Station is not a “logical terminus” given the Rail Authority’s legislative mandate to connect BART to ACE under Calif. Public Utilities Code sec. 132652.

Because the ACE mainline is parallel to the Proposed Project and runs only several miles away from the Dublin/Pleasanton BART station, the creation of an entirely new transit system is inherently wasteful. A reasonable alternative would connect BART to the ACE line at Radum Junction, via the Iron Horse Trail, an abandoned Southern Pacific rail line. If, in addition to merely connecting BART to ACE, it was desired to “Provide a frequent and reliable transit option in the Interstate 580 corridor,” more capacity for more trips could be acquired at a much lower cost, with less environmental impact, by purchasing slots from ACE's host, the Union Pacific Railroad.

The Iron Horse Trail Alternative needs to be evaluated in an EIS because it would avoid the significant environmental impacts associated with the “Tri-Valley I-580 Shifting” major component of the Proposed Project. Reconstruction of 11 miles of a 9-10 lane-wide interstate highway has very significant environmental impacts that are not adequately evaluated in the EA.

The Iron Horse Trail Alternative was dismissed from consideration on p. 2-32 with the following objections: “Would not meet the project objective regarding fast, cost-effective implementation that is responsive to the communities it would serve. In addition, its impacts on residential neighborhoods, parklands, and a regional trail, and inferior ridership (resulting in less reductions of vehicle miles traveled, greenhouse gas [GHG] emissions, etc.), would not meet the project’s objective to be a model of sustainability. Would result in use of a Section 4(f) resource.” These assertions are straw men, offered for the purpose of obstruction. This Alternative would be much faster to build, much less costly and offering a more seamless connection to BART, which would be directly above. With a little bit of creativity, consultants could have avoided the very impacts they decry, for example by considered tunneling through the residential neighborhood. Finally, this corridor was a historic rail line, on which was built a trail. It’s ridiculous to claim this is a “Section 4(f) resource.” The “inferior ridership” claim for the Iron Horse Alternative is unsubstantiated by data in the EA. These are all reasons to require an EIS.

The Proposed Project would destroy another Federal project, an unacceptable waste of federal resources. Approximately \$7.5 million of Federal Highway Administration (FHWA) stimulus funds (2009 American Recovery and Reinvestment Act) were used to

construct high-occupancy vehicle (HOV) lanes in the Interstate 580 median that would be demolished as part of the "Tri-Valley I-580 Shifting" project component if the Proposed Project were approved. (TIP ID No. ALA130031, Project ID No. 6273056.)

2-11: The lack of a cross-platform transfer at Dublin/Pleasanton station is a serious impediment to building ridership. It adds impedance to travel, the opposite of seamlessness. This planning error must be corrected.

2-17: The Project has three operations and maintenance facilities to serve a four-station rail line. That likely sets a new FTA record and almost certainly flunks any cost-effectiveness test.

2-20, 2-21: Tracy Operations and Maintenance Facility: It is beyond ludicrous to locate a heavy rail repair site where there is no connection to the rail network. Clearly this politicized decision must be reversed. The EA admits, "Trains would be transported by truck between the Mountain House LF and the Tracy OMF/OSS." The EA is deficient in that it fails to disclose how often "trains would be transported by truck." TRANSDEF is unaware of any existing U.S. rail project that requires transport of trains by truck in order to undergo regular maintenance.

2-22: Extensive experience in Germany has led to the conclusion that hydrogen fuel cell-powered trains are significantly more expensive and less reliable than battery-electric trains, which are equally zero-emissions at the vehicle. See attached articles: *Baden-Württemberg rules out hydrogen traction; Hydrogen trains up to 80% more expensive than electric options, German state finds.*

3-30: It is exceedingly unwise to locate two of four stations in locations with flooding risk. One is actually on a flood control district's property! Doesn't FTA have regulations against such foolishness?

The EA is Deficient for the following reasons

1-3: The following statement is a gross misstatement of the law: "AB 758 (amended by Senate Bill [SB] 548 in 2021) was signed into law on October 13, 2017, establishing the Authority for the purposes of planning, developing, and delivering transit connectivity between the BART system and ultimately connecting to the future expansion of the Altamont Corridor Express (ACE). The Proposed Project is the first step to meeting the intent of this law." The law called for a connection to ACE, period, not "ultimately connecting to the future expansion of the Altamont Corridor Express (ACE)." Because the Proposed Project will not connect to ACE, it does not at all meet "the intent of this law." Therefore, the Mountain House Community Station is not a "logical terminus."

1-4: The Legislature authorized the Authority to be a construction authority. However, the Project Purpose is consistent with what transit districts do. e.g., "Provide a frequent and reliable transit option in the I-580 corridor..." Isn't this articulation of Project Purpose inflated beyond all reason?

1-5: Similarly, the articulated Project Need is far more vast than a construction authority would assert. They are formed just to get something built.

1-5: The EA does not contain a finding that the Proposed Project is consistent with San Joaquin County land use policy.

1-6: The 2017 population projections are now obsolete, as they were made before California started to lose population. The 2022 population projections need to be confirmed with more recent analysis.

1-7 to 1-8: "Need for Safe Travel Options through the Corridor": This assertion is potentially misleading: "the accident rate for this stretch of I-580 was more than three times the national average, and a quarter of the accidents resulted in fatalities ...". Please provide statistics for the volume of heavy trucks in that stretch of highway, the involvement of heavy-duty trucks in these accidents, and a comparison with heavy truck-involved accidents nationally. Furthermore, if this Project truly reduced passenger car trips on I-580 through Altamont Pass, that could ironically induce more heavy-duty truck traffic in this corridor, exacerbating purported highway safety concerns.

1-8: TRANSDEF agrees with this assertion: "Dedicated right-of-way for transit would provide for safer conditions." That is why an alternative should be studied in the EIS that creates a bus-only lane through the Altamont Pass, either on I-580 or on the former Southern Pacific Railroad bed. Those buses could use the existing "express lanes" on I-580 between the vicinity of Greenville Road and (East) Dublin/Pleasanton BART station. That alternative (use of the existing "express lanes") would eliminate the need to demolish and reconstruct nearly eleven miles of I-580, which would significantly reduce its environmental impacts, compared to the Proposed Project.

1-9: The EA confuses GHG emissions with climate pollutants: "These populations are also burdened with the negative effects of GHG emissions." Similarly, "deliver climate benefits to disadvantaged communities." There are no climate benefits that are specific to disadvantaged communities.

2-1: The EA failed to study an Alternative Build project. NEPA requires the study of alternatives, even if they were previously studied. NEPA Section 102 (C)(iii): "a reasonable range of alternatives to the proposed agency action, including an analysis of any negative environmental impacts of not implementing the proposed agency action in the case of a no action alternative, that are technically and economically feasible, and meet the purpose and need of the proposal"

2-1: The reasonably foreseeable transportation network does not include San Joaquin County's future projects, invalidating the analysis for this interregional project.

2-11, 2-12: The following assertion is false: "Use of the station would be designed to provide seamless intermodal passenger service among Valley Link, BART, and local bus transit providers that currently serve the Dublin/Pleasanton BART Station." Transfers between BART and Valley Link would not be "seamless." The EA asserts

that patrons transferring between the systems would be required to descend one staircase, exit the turnstiles, “cross under I-580 for 250 feet using the existing BART station access walkway,” enter the other system’s turnstiles, and climb another staircase.

Currently almost all bus stops are on the northerly (Dublin) side of I-580. The Valley Link station would be located on the southerly (Pleasanton) side of I-580. Currently just one bus route has a stop on the Pleasanton side of the I-580. This is not seamless.

2-11, 2-13: Isabel Station: Isabel Station essentially exists in order to justify the “upzoning” of property within its vicinity through the City of Livermore’s Isabel Neighborhood Specific Plan. Despite the spurious claims that this is “transit-oriented development,” very few patrons actually will walk or cycle to this station.

The long walk on the “Pedestrian Bridge” from the parking lot and “Bus Stop Area” would cross Arroyo Las Positas, an I-580 onramp, and at least six lanes of eastbound I-580. It adds impedance to travel. This likely is one of the longest entrances to a transit station in the United States, measured from bus bays to station platform. FTA must compel the Project sponsor to disclose the length of the “Pedestrian Bridge.”

The “pedestrian bridge (concrete box girder with galvanized safety barriers)” would not provide a pleasant environment for station patrons. Wind and rain likely would blow through it. At nighttime there would be harsh glare from six or more lanes of eastbound I-580 beneath it. The ambient highway noise also would deter Isabel Station users. The Isabel Station platform in the median of I-580 presents similar problems.

The EA asserts, “The station site is within the City of Livermore’s Isabel Neighborhood Specific Plan, which envisions more than 4,000 new housing units, parks, offices, and retail all within walking distance to the station.” The vast majority of those housing units are on the northerly side of I-580. The “Potential Pedestrian Bridge” crossing westbound I-580 indicates that Project sponsor is not committed to providing station access from the northern side of I-580 where the vast majority of those housing units are located. If the City of Livermore and Project sponsor actually believed in the “transit-oriented development” for this new development, then they would have funded the “Potential Pedestrian Bridge” and included it in this Project.

Without the “Potential Pedestrian Bridge,” patrons accessing Isabel Station from the northerly side of I-580 would be required to walk across the Isabel Avenue overcrossing of I-580, cross an I-580 onramp, turn left onto Airway Boulevard, cross Arroyo Las Positas, traverse the entire station parking lot, re-cross Arroyo Las Positas, and re-cross the eastbound lanes of I-580. Therefore, TRANSDEF believes that few of the “more than 4,000 new housing units, parks, offices, and retail” actually are “within walking distance of the station.”

2-14, 2-15: The proposed Southfront Station largely exists so that the neighboring McGrath Corporation can re-develop its industrial site.

The “pedestrian bridge (concrete box girder with galvanized safety barriers)” would not provide a pleasant environment for station patrons. Wind and rain likely would blow through it. At nighttime there would be harsh glare from six or more lanes of eastbound I-580 beneath it. The ambient highway noise also would deter Southfront Station users. The Southfront Station platform in the median of I-580 presents similar problems as the Isabel Station (discussed above).

The EA asserts, “The platform and pedestrian bridge would be designed so as not to preclude a future extension of the pedestrian bridge to the north of I-580.” Note that southerly side of Sunflower Court on the northerly side of I-580 (“Springtown”) in the vicinity of Southfront Station currently is undeveloped and apparently owned by a public entity. If the Project sponsor were serious about pedestrian and bicycle access to Southfront Station from the northerly “Springtown” side, then it would have included it in the Project.

2-22: The EA fails to analyze the safety and the GHG impacts of hydrogen propulsion.

2-23: While the EA calls for a Transportation Management Plan, it is missing any estimate of the delays that can be expected from construction activities. The public needs to know whether the hours of delay caused by construction could exceed the savings resulting from the Project.

3-1: Energy must be studied, at least for the purpose of making a comparison between the one-time project construction energy expenditure and the overall project energy savings accumulated over 20 years. This is the only way to determine whether the project's net energy impacts are positive or negative.

3-33: How many 100-year floods have we seen in the last five years? The hydrologic record as to 100-year storms has been made obsolete by increasingly extreme weather variations. The hydrologic record is no longer adequate evidence of safety from floods. See: U.S. Hydrologic Design Standards Insufficient Due to Large Increases in Frequency of Rainfall Extremes, accessed 12/28/24 at: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GL083235>

3-29: The GHG analysis failed to consider the impacts of hydrogen leaks. The UK Government released a report in 2022 that found “Nevertheless, any leakage of hydrogen will affect atmospheric composition (with implications for air quality) and have an indirect warming effect on climate, partially offsetting some of the climate benefits of the reduction in carbon dioxide.” *Atmospheric implications of increased Hydrogen use*, accessed 12/28/24 at <https://assets.publishing.service.gov.uk/media/624eca7fe90e0729f4400b99/atmospheric-implications-of-increased-hydrogen-use.pdf>

3-29: Because “green” hydrogen continues to be extremely expensive, and is likely to remain that way, the EA should assume any hydrogen-powered vehicle will not run on green hydrogen. Battery-electric vehicles, powered by the current California grid, would emit lower GHGs than hydrogen created from methane.

3-30 to 3-31: The Hazardous Materials section is grossly deficient in that it fails to discuss any issues associated with hydrogen fuel used for train propulsion. Missing study areas include hydrogen transport, storage, and use in the Proposed Project. Leaking hydrogen gas, especially after a train derailment, could pose a significant hazard, especially at the accident site.

3-38: The Transportation and Traffic section does not adequately analyze the “Tri-Valley I-580 Shifting” project component. Appendix B (Proposed Right-of-Way) to the EA indicates that substantial acreage of right-of-way must be acquired for “Tri-Valley I-580 Shifting,” yet the EA document itself fails to analyze the environmental impacts of the “Tri-Valley I-580 Shifting” in a thorough manner, especially in the Transportation and Traffic section. An Environmental Impact Statement will be necessary to analyze the very significant environmental impacts with demolishing and reconstructing nearly eleven miles of I-580 between (East) Dublin/Pleasanton BART station and Greenville Road.

3-41: The single paragraph discussing the project construction impacts is grossly deficient. That paragraph begins, “Construction activities could result in temporary disruption of the roadway network due to construction detours, traffic control measures, and temporary road closures.” That is a massive understatement of the effects of construction of the Proposed Project, which essentially would demolish and re-construct nearly eleven miles of I-580 from (East) Dublin/Pleasanton BART station to Greenville Road to clear the median for the Valley Link project. Existing “express lanes” in the median would be demolished and re-constructed in different locations nearby. The highway would be widened to accommodate the re-located lanes. One or more of the existing “express lanes” would be widened because the current lanes received design exceptions to be narrower when originally constructed, but would be widened as part of the I-580 reconstruction and lane re-configuration. The wider lanes presumably would have greater capacity than the current lanes. The environmental impacts of the wider I-580 with greater capacity should be analyzed in an Environmental Impact Statement.

Appendix A: A-8: “Figure A3.2-10: Key View 5 (I-580 Westbound at Greenville) – Proposed” demonstrates the negative impact of the Proposed Project on the scenic vista of the Livermore Valley for westbound I-580 motorists entering the Livermore Valley. As Figure A3.2-10 demonstrates, the massive concrete flyover structure for Valley Link would obstruct the view of the Pleasanton Ridge some 15 miles distant. In addition, this Valley Link flyover could pose a safety hazard, especially at night, in that the headlights of approaching eastbound trains would shine onto westbound motorists descending the grade. Some motorists might mistake the train for a wrong-way truck. To avoid these aesthetic and safety impacts, a tunnel beneath westbound I-580 should be considered as a sub-alternative or mitigation in the EIS.

There needs to be an additional “viewpoint” or “Key View” (between “Key View 9” and “Key View 10”) included along I-580 in the vicinity of Stone Cut in Altamont Pass. There the Proposed Project would cut into the hillside along westbound I-580. The visual impact could be significant from westbound I-580. The excavation apparently would be high on that hillside, giving the appearance that the entire hillside is bisected.

Editorial Comment

2-11: It appears text at the beginning of this page is missing. It doesn't connect to the previous page.

Conclusion

The Valley Link project is a “major Federal action[] significantly affecting the quality of the human environment” (40 CFR §1502) and because the Federal Transit Administration (FTA) would “[p]rovid[e] more than a minimal amount of financial assistance ...” (40 CFR §1508.1(w).) Project sponsors intend to apply for hundreds of millions of dollars of Federal capital grant funding. The “Tri-Valley I-580 Shifting” project component (repeatedly referred to in Appendix B: Proposed Right of Way) by itself has significant effects on the quality of the human environment; that project component would reconstruct nearly 11 miles on Interstate Highway 580 between East Dublin/Pleasanton BART station and Greenville Road in Livermore. Therefore, preparation of an Environmental Impact Statement is required.

A “Finding of No Significant Impact” (FONSI) would be inappropriate because the Proposed Project would “have a significant effect on the human environment.” (40 CFR §1508.1(q).) An Environmental Impact Statement must be prepared.

Thank you for considering these comments.

Sincerely,

/s/ DAVID SCHONBRUNN

David Schonbrunn,
President

Attachments

Baden-Württemberg rules out hydrogen traction

Hydrogen trains up to 80% more expensive than electric options, German state finds



Baden-Württemberg rules out hydrogen traction

By [Railway Gazette International](#) | 1 November 2022



A Siemens Mobility Mireo B Plus battery EMU.

GERMANY: Hydrogen-powered rolling stock is less efficient and more expensive than battery-powered traction on non-electrified routes, according to a study commissioned by the Baden-Württemberg *Land* transport ministry. Conventional electrification is also a better choice where there are infill opportunities, the study concluded.

Compiled by a consortium of consultants including Transport Technologie-Consult Karlsruhe GmbH and komobile GmbH of Wien, the study examined three options for 16 unelectrified routes across Baden-Württemberg:

conventional electrification, use of hybrid electric-battery multiple-units and deployment of hybrid trains fitted with hydrogen fuel cells.

The study found that there was no case for further consideration of hydrogen on economic and operational grounds. Direct comparison with the alternatives showed that, taking infrastructure characteristics and the nature of local operations into account, there was no route where the use of hydrogen would be warranted.

Strategic assessment

On certain routes, full electrification could be justified where it filled gaps in the existing electrified network. In other cases, use of hybrid battery-electric rolling stock was the most viable option.

Various infrastructure scenarios and their associated costs were studied and possible synergy effects and strategic aspects evaluated. Rolling stock costs including maintenance and energy costs were examined — the study looked at acceleration and braking performance, energy consumption and CO₂ emissions, including those generated at sites remote from the point of use. Potential sites for hydrogen fuelling points and battery charging were assessed and possible ‘islands’ of overhead wires and the logistics needed to supply hydrogen fuelling points were examined.

While the use of hydrogen fuel cells required little or no modifications to existing infrastructure and few changes to operations, disadvantages included high costs for establishing fuelling points and related new infrastructure. High energy consumption and high costs meant poor efficiency, exacerbated by a full tank of hydrogen not sufficing for a full day’s use; this implied that additional rolling stock could be needed. The limited availability of ‘green’ hydrogen was also a factor.

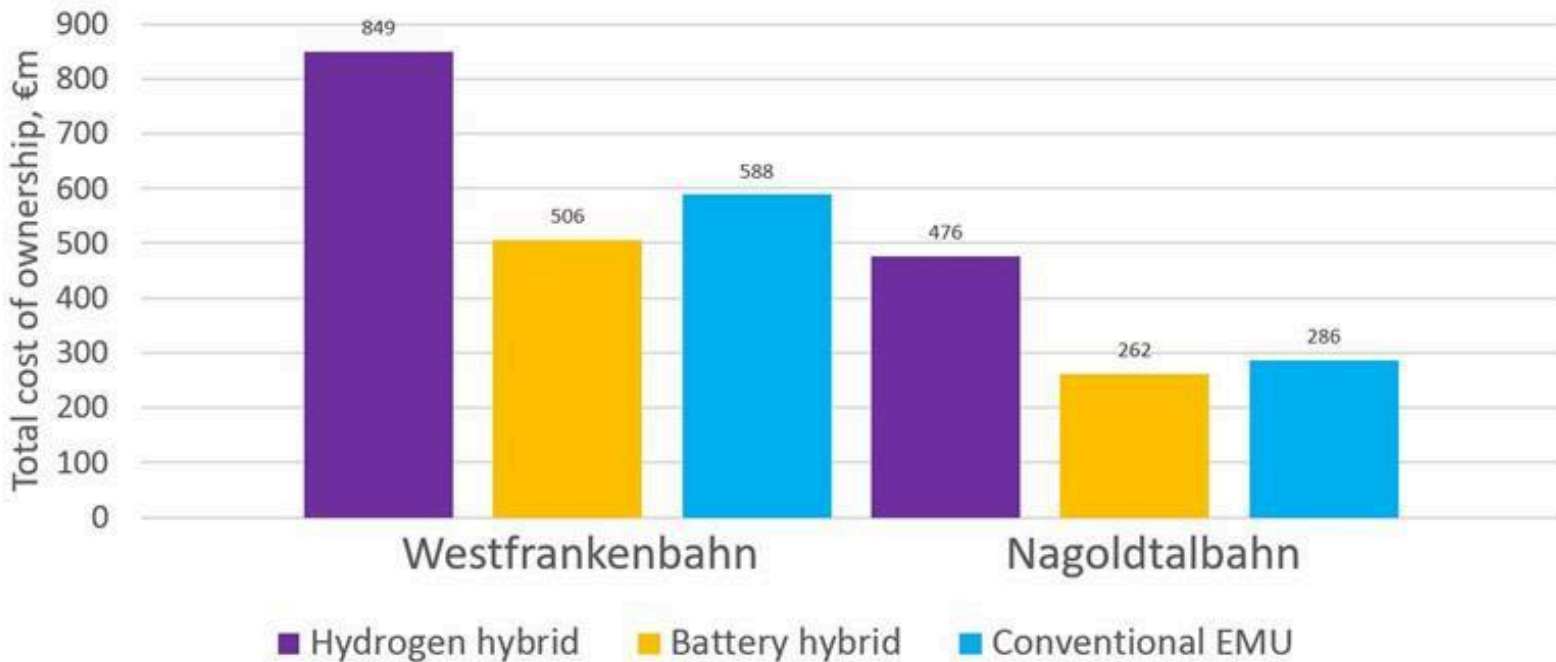
Hybrid battery-electric trains could be used where there were gaps in the power supply; they were comparable to electric trains in terms of operational efficiency. With the ability to operate without interruption for a whole day if batteries could be charged while operating under wired sections, there would be no need to stop for refuelling; the option of full electrification at a later date remained.

Disadvantages of battery power included a relatively short operating range before batteries needed recharging; in most cases some infrastructure improvements would be needed.

Whole-life costs compared

Total cost of ownership

Economic assessment over a 30-year period with residual value for infrastructure



Comparison of the three options on two groups of routes showed that the cost of using hydrogen power was significantly higher over a 30-year period. 'Total cost of ownership' on the Westfrankenbahn would be €849m for hybrid trains with fuel cells compared with €588m for electrification and €506m for hybrid-battery trainsets. On the Nagoldtalbahn hydrogen power would cost €476m against €286m for electrification and €262m for hybrid-battery trains.

The study recommended that five routes be electrified and that up to 664 km of route should be operated with hybrid battery-electric trainsets. Local authorities have been invited to debate the conclusions of the study with the *Land* transport ministry with a view to agreeing a strategy for emission-free rail services by the start of 2023.

Test programme

Baden-Württemberg has committed to no further acquisitions of diesel-powered trains. It has already tested trains powered by hydrogen fuel cells and batteries, and further trials are planned. A hybrid Alstom Talent multiple-unit with batteries ran on the Gäubahn between Stuttgart and Horb from January to May 2022 and an Alstom Coradia iLint hybrid unit with fuel cells was tested on the Zollern-Alb-Bahn from Eyach to Hechingen and Sigmaringen from mid-July 2021 until the end of February 2022.

A fleet of 23 battery-electric Siemens Mireo trainsets is due to enter commercial service from December 2023 on six routes, three of which originate at Offenburg. In addition, a Siemens Mireo Plus H hybrid unit with fuel cells is to be tested in commercial service on the Nagoldtalbahn from Tübingen to Horb and Pforzheim for one year from January 2024; partners in this project include Deutsche Bahn, which is working on the development of an innovative hydrogen fuel cell fuelling point.

Baden-Württemberg Transport Minister Winfried Hermann said that to reach climate targets set for the transport sector, diesel traction on the rail network had to be eliminated as soon as possible. As installing overhead wires took a long time and could in some cases be very costly, the choice on several routes was to use alternative traction. The study had provided valuable insights, he concluded.

Network	Route	Recommendation
Nagoldtalbahn	Pforzheim – Horb	hybrid electric-battery
Donautalbahnhof Plus network	Ulm – Sigmaringen; Sigmaringen – Tuttlingen; Herberlingen – Aulendorf	hybrid battery-electric
RSB Bodensee – Oberschwaben network	Aulendorf – Kisslegg	electrification
Westfrankenbahn	Crailsheim – Lauda/Königshofen – Wertheim – Miltenberg – Seckach	hybrid battery-electric
Hohenlohebahn	Heilbronn – Öhringen – Schwäbisch – Hall/Hessental	electrification
Stuttgart area	Korntal – Weissach; Kirchheim/Teck – Oberlenningen; Nürtingen – Neuffen	electrification



Baden-Württemberg transport minister Winfried Hermann and colleagues with a Siemens Mireo Plus B battery hybrid train. Photo: Siemens Mobility

'Will no longer be considered' | Hydrogen trains up to 80% more expensive than electric options, German state finds

Study commissioned by Baden-Württemberg concludes that line electrification or battery hybrid trains would be far cheaper over 30 years

20 October 2022 12:11 GMT *UPDATED 20 October 2022 12:11 GMT*

By **Leigh Collins**

Hydrogen trains will no longer be considered as a possible replacement for diesel locomotives in the German state of Baden-Württemberg, after a study it commissioned found that installation of overhead electricity lines or battery hybrid trains were far more economic over a 30-year period.



Hydrogen: hype, hope and the hard truths around its role in the energy transition

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“The state has had a total of 16 non-electrified route sections examined for the use local emission-free rail vehicles. In most cases, battery hybrid trains turned out to be the best solution,” the state in southwest Germany said in a [press release](#).

Battery hybrid trains are powered by a battery that is recharged on sections of track with overhead power lines.



Liebreich: 'Hydrogen is starting to look like an economic bubble – and here's why'

Consequently, hydrogen fuel-cell trains “will no longer be considered in the near future for various operational and economic reasons”, the state said.

“In a direct comparison, this technology was not able to assert itself on any of the examined routes in Baden-Württemberg — due to the infrastructure and operational characteristics.”

In a [25-page press-conference presentation](#) on the report’s findings, the state’s transport minister, Winfried Hermann, set out the positives and negatives for each of the three zero-carbon options considered: hydrogen trains, battery hybrids and conventional electric trains powered by overhead lines.

The positives for hydrogen were: minor impacts upon introduction and during operation, and no changes required to the rail infrastructure. But the negatives were: costly filling stations; low efficiency, high energy consumption and high cost; the possible need to increase the number of trains because the range would not be sufficient for a whole day of travel; limited availability of green hydrogen; and the need to continually resupply the hydrogen filling stations.

The presentation showed the total cost of ownership (TCO) over a 30-year period on two of the “sub-networks”.

On the Westfrankenbahn line, the TCO of a hydrogen-powered operation would be €849m (\$833m), compared to €506m for a battery hybrid and €588m for conventional electric trains.



The potential for green hydrogen use in passenger vehicles and central heating is 'low': Moody's

And on the Nagoldtbahn, the cost differences were even higher, with hydrogen coming in at €476m, compared to €262m for battery hybrid — 81% less.

The report's authors — Karlsruhe-based transport analyst TTK, Austrian consultant Komobile and “other partners” — recommended that the three of the six sub-networks replace diesel locomotives with battery hybrids; and that the other three should use conventional electric trains, although in each case, the cost difference between battery hybrid and overhead power lines was said to be “small” or “very small”.

The state owns the local rail company, Landesanstalt Schienenfahrzeuge Baden-Württemberg (SFBW), which buys trains and then leases them to operators. The idea behind this is that states can take out cheaper loans than private companies, thus reducing costs.

SFBW actually placed an order for 27 Mireo Plus B battery hybrid trains from Siemens in 2020, which will be delivered between June and December next year.

“Thanks to the battery hybrid drive of the Mireo Plus B, trains in the Ortenau regions will run emission-free from December 2023,” said Hermann last month.

A similar study last year in the state of Saxony to investigate carbon-neutral replacements of diesel locomotives in the Leipzig area found that battery trains were “optimal” compared to hydrogen ones.

This does not mean that hydrogen trains have no future in Germany or anywhere else.

In fact, the Cuxhaven to Buxtehude line in northwest Germany will become the world's first 100% hydrogen railway when all its 15 diesel passenger trains are replaced by H₂-powered models made by Alstom by the end of this year.

A hydrogen refuelling station has already been installed halfway along the 79km route — initially supplied by H₂ produced locally as a by-product of chlor-alkali electrolysis at the nearby Dow chemical plant. But there are question marks over how



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