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The Honorable Jeff Denham
1730 Longworth Building House Office Building
United States House of Representatives
Washington DC, 20515

Dear Representative Denham:

This letter is in regards to the Audit by the Federal Railroad Administration's (FRA) High Speed Intercity Passenger Rail Grant Oversight Processes.

As the former High Speed Rail Planning Manager at the Los Angeles County Metropolitan Transportation Commission, METRO, I urge you to investigate the financial risks associated with the California High Speed Rail (HSR) project.

The intended course of HSR development, written into the language of Proposition 1A , was to insure better transit options for the public at each of the HSR station hubs. In Los Angeles County, that ideal began to diverge as soon as the HSR funding was on the horizon, and then more blatantly once the money was approved. Since 2009, political wrangling transformed several local transit projects into honeypot deals, with ample funding and no oversight the cause.

One way to put HSR back on track is to remove control of the project from the California High Speed Rail Authority and turn it over to the State of California Department of Transportation, Division of Rail and create a statewide organization that incorporates HSR, Commuter Rail, Light Rail and Heavy Rail.

The topic of this memo is the electrical grid problems associated with HSR and the lack of true value in the current estimates. It appears that the costs associated with HSR have been repeatedly underestimated so that the federal money could be secured early in the planning process.

In summary, with regards to the current HSR budget:

1. Request expert analysis of the true costs of building the new electrical grid system for HSR and compare that value to the current HSR estimate.

2. Request budgetary investigation into the true costs of raising and adjusting the current electrical grid wherever it comes in contact with HSR.
3. Request that new HSR clearances be analyzed and added to the CPUC regulations in order to estimate the true costs of item number two.

General Overview

HSR creates two problems for California's electrical power grid: the first, building a new power supply system for HSR, and the second, raising the height of the existing high voltage transmission lines (HVTL) wherever they intersect and cross over the catenary electrical supply system for HSR.

Each item is estimated to cost around five billion dollars (\$5,000,000,000). Total could exceed ten billion dollars (\$10,000,000,000).

With regards to the first item, from a recent California Public Utilities Commission (CPUC) report, signed December 31, 2013, and referenced below:

"The California High Speed Rail Authority (CAHSRA) programmatic Environmental Impact Report / Environmental Impact Statement did not assess the electric infrastructure needed."

How could a monetary value be given in the lump sum HSR estimate for the electric infrastructure if it had not been studied by the CPUC?

For the second under-budgeted item, the existing high voltage transmission lines (HVTL) must be raised or relocated wherever they cross the HSR catenary lines. HVT lines cannot be buried, they must be raised. New towers must be built.

In the last five years there does not appear to be coordination between California High Speed Rail Management (CAHSR), CPUC and Pacific Gas and Electric (PG&E) regarding the problems with the electrical grid. Ask for copies of meeting minutes and agendas. True estimates for the relocation of HVTL are missing from the construction budget. These total amounts are in the billions of dollars. It will take years of coordination to re-adjust the power lines and this item is missing from the schedule.

The third item discussed involves the CPUC rules for clearances between high voltage lines and the HSR catenary lines. The current rules for clearances were written for trolley cars and are almost one hundred years old. There are rules for electrified commuter trains but the CPUC has no standard clearance for high speed trains passing under high voltage wires and needs to analyze the effect of trains traveling 220 miles per hour. This analysis has not been done and may take several years to determine.

Item 1). Cost of new electric infrastructure

New infrastructure to build an electrical system to supply power to HSR, excerpt taken from the analysis of the Budget Change Proposal signed by the CPUC December 31, 2013:

http://www.cpuc.ca.gov/NR/rdonlyres/BF95706A-50B5-46CD-877F-BFDA85F6DC89/0/BCP_6ElectricalInfrastructurePlanngforHSRInitiative.pdf

"The project will take hundreds of megawatts of power from the 115 kilovolt (kV) electric transmission system at new substations placed at 30-mile intervals along the right of way. The electricity will be stepped down to 25 kV, which is the voltage used by the high speed trains. Unfortunately the current electric transmission grid is not currently aligned to provide this support. Major additions to the transmission grid will be required to ensure a safe and reliable power supply to the rail project. These include at least 25 new substations, and there will likely be a new 115 kV line needed north of Los Angeles."

"The HSR system will require connection to the electrical grid every 30 miles at the transmission voltage level. In order to accommodate the new HSR interconnections to the electrical system, the electric utilities will need to expand their systems, with new transmission lines, substation upgrades, or both."

The referenced CPUC document is a staffing request for additional personnel. After budget approval, it generally takes six months for the CPUC to hire staff. Therefore, at the present time, there is not a full time staff person at the CPUC assigned to address the HSR electrical infrastructure.

Question: How were the previous costs for the new electrical subsystem estimated if there was no one at the CPUC dedicated to an estimate?

Factors to be considered in sub-station design can be found in these documents:

Capitol Costs for Transmission and Substations:

http://www.wecc.biz/committees/BOD/TEPPC/External/BV_WECC_TransCostReport_Final.pdf

Building Transmission Lines in the West:

http://www.wiresgroup.com/docs/TransHub_WECC_100812.pdf

Cost factors include: substation equipment, transmission lines, high voltage towers, conductors, transformers, terrain difficulty, security, right-of way acquisition, eminent domain legal fees, land rentals, and contractor overhead at about 20% of total listed costs.

Referencing the Cost Calculator on pages 5-3 and 5-4 from the above document, estimated costs for new substations: twenty-five (25) sub-stations at one hundred million dollars each equals two and one half billion dollars (\$2,500,000,000). This does not include the costs for a new 115 kV line north of Los Angeles and substation upgrades.

Costs for right-of way acquisition, eminent domain legal fees, land rentals, high voltage tower construction, estimated at \$100,000,000 per substation. Twenty-five (25) sub-stations locations at one hundred million dollars each equals two and one half billion dollars (\$2,500,000,000).

Total costs for new electrical supply system for HSR: five billion dollars (\$5,000,000,000).

This is a very conservative estimate using values given in the referenced documents. My background is primarily track, alignment and coordination of large scale transportation projects. An estimate for the proposed new electrical grid should be investigated by an expert and that new amount compared to the budget from the CAHSR Board.

As an example, Seattle built a new sub-station. "The site acquisition and clean-up, SEPA review, design and construction of the Denny Substation Project is currently estimated to cost approximately \$201.5 million."

<http://www.seattle.gov/light/dennysub/program.asp>

My estimate, per substation, is half that value. Request an investigation into the cost of the new electrical grid needed to supply power for HSR.

Question: Where does the power come from that feeds this new system and who will pay for it?

Item 2.) Cost of raising the current electrical lines over HSR

High Voltage Transmission Lines (HVTL) criss cross Northern and Southern California. This electrical supply network intersects HSR in many locations and the wires need to be raised at every point of conflict. How the towers will be moved, where they will be moved, how high up the bottom wires need to be moved, and how the power supply will be affected has yet to be fully addressed.

When Members of the HSR Board were asked these questions in 2011, they answered, it's in the lump sum estimate.

This seemed a fiscally irresponsible response for any stage of design. This construction problem should be broken out as a separate line item in the budget, the costs are

enormous. Each single case of High Voltage Towers relocation takes years of negotiations, multi-agency involvement with massive calculations with regard to energy distribution. It is estimated that there are over fifty crossings throughout the state but a full analysis is difficult as access to the electrical grid maps are restricted by Homeland Security.

Each set of conflicting high voltage lines will have to be raised higher due to the designated clearances from the CPUC, yet the critical distance has not been established. See item 3.

In order to raise the power lines, newer high voltage towers on either side of the HSR alignment will have to be built. Power lines will have to be lengthened and nearby towers will require wires cut and adjusted using precise calculations. During construction, electricity will have to be diverted and re-routed in stages. HVTL relocations would have to be staggered in scheduling. For each case there will be road closures, detours, CPUC public participation hearings, EIR/EIS, community outreach, eminent domain legal fees, right-of-way agreements, rental fees established, permits and contractor review and supervision. The Federal Aviation Administration (FAA) will require review of the new height of towers; much crop dusting occurs in the Central Valley. The FAA may take ten years to approve new airspace altitude restrictions.

The high voltage utilities could be buried, but that usually costs three times as much as standard HVTL towers and would require an underground cooling system.

For each location throughout the state where the High Voltage Transmission lines are impacted by the HSR alignment, each re-build will cost an estimated one hundred million dollars (\$100,000,000) which includes the above mentioned costs plus contractor overhead.

Estimated cost missing from budget for the relocation of the high voltage towers: fifty (locations) times estimated one hundred million dollars per location (\$100,000,000) equals five billion dollars (\$5,000,000,000).

Item 3.) Clearances

The CPUC does not currently have clearance regulations specifically addressing high speed rail. The clearances in General Order (GO) 95 have not been updated since the use of trolley car lines.

See General Order 95, Case 2, Figure 6, page G-6 for clearance diagram:
<ftp://ftp.cpuc.ca.gov/gopher-data/GO/GO-95.pdf>

The crossing of the HVT and the HSR catenary has only recently begun to elicit conversation between the CPUC and other agencies. This topic may take years to resolve.

From the report mentioned in Item 1.

"The HSRA recently petitioned the CPUC to adopt rules regarding electric safety for high- speed electric trains using 25 kV power. The HSRA drafted a set of proposed rules, to which utilities objected. The CPUC has opened a rulemaking (R.13-03-009) regarding such rules."

Here is the referenced CPUC Rulemaking 13-03-009, dated August 1, 2013.

https://www.pge.com/regulation/High-SpeedRailElectricSafetyOIR/Rulings/CPUC/2013/High-SpeedRailElectricSafetyOIR_Ruling_CPUC_20130801_282902.pdf

"Order Regarding Whether to Adopt, amend, or Repeal Regulations Governing Safety Standards for the use of 25 kV Electric Lines to Power High Speed Trains."

HSR poses a host of technical issues regarding electrical supply. The list is exhaustive and will be time consuming. These issues need to be resolved. The discussion had only just begun.

Missing from that list is the clearance distance required between the bottom wires of the HVTL and the HSR catenary when trains travel at 220 mph. Only when that distance is stated in a CPUC General Order can the new height of the HVTL be determined throughout the state of California.

Thank you for taking the time to read my letter. Hopefully this explanation of the missing costs from the HSR budget will be of some use in your investigation.

There are other monetary funding issues of concern involving HSR, HSPiR, FTA, Metrolink, Los Angeles Union Station and the LA Regional Connector that I will address in three individual letters to follow.

Sincerely,

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