

--David Schonbrunn

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The pace of climate change is accelerating. Forceful action now is needed, especially in the transport sector, because it produces the largest segment of greenhouse gas emissions (GHGs). Policy prescriptions to respond to climate change are relatively easy to come by. This author has already published two such articles in *Thinking Highways*.

Our society's ability to respond to the challenges of climate change is hampered not only by the lack of political will to implement such ideas but by self-interest. Billions of public dollars are wasted on transportation projects promoted by politicians as monuments to themselves, leaving cost-effectiveness in the dust.

In California, voters recently approved \$10 billion in bonds for a High-Speed Rail (HSR) system. These trains could serve as the centerpiece of a climate change program to reduce single-occupant driving. The transition to a much higher share of the travel market for transit is a key strategy for reducing greenhouse gases. And yet, environmentalists including the author have had to file suit, challenging the Environmental Impact Report for the Bay Area portion of the HSR route. Plaintiffs assert that the report is biased in favor of an alternative that will result in lower ridership, fewer benefits for the region and higher environmental impacts.

The problems with the HSR project are, in fact, endemic in the world of large infrastructure projects, which are now known as megaprojects. It seems like the worst projects continually rise to the top of the funded list. In the San Francisco Bay Area, the region's transportation funding agency keeps supporting billion dollar projects such as the BART extension to San Francisco Airport, the BART extension to San Jose and Santa Clara, and the San Francisco Municipal Railway Central Subway.

There's a pattern here: cost-effective options are bypassed in favor of extremely expensive options justified by biased alternatives analyses. Spending lots of money is more important than what it is being spent on. While rumors abound that the major engineering firms are driving this pattern, no actual proof exists. Decisions are driven by politics instead of by sound engineering. Extensive public involvement processes are a sham--volumes of public input are collected on why the agency's preferred alternative is the wrong choice, but then are completely ignored in the subsequent decisionmaking.

Academic studies of megaprojects have found a consistent pattern of the underestimation of costs, and the over-promising of benefits. A very important book on the topic, *Megaprojects and Risk*, by Bent Flyvbjerg, conducted an extensive survey of the literature, and determined that this error pattern was not random, but was clearly a technique used to promote these projects.

California High-Speed Rail

The California HSR project is a case study in what can go wrong with a \$40+ billion project. In 1996, the California High-Speed Rail Commission issued its Summary Report and Action Plan, which recommended a route connecting the Central Valley to the Bay Area via the Altamont Pass (the I-580 Corridor). Its successor agency, the California High-Speed Rail Authority, then proceeded to undo that work and declare another corridor, the Pacheco Pass to be the preferred route. **GRAPHIC** Their efforts to bury the previous recommendation went so far as to declare in their Statewide Environmental Impact Report that the Altamont Pass had been discarded from consideration because it did not meet the Purpose and Need of the Project. The hue and cry that erupted from that move forced the Authority to re-study this issue. Plaintiffs sued to overturn this later report, claiming it was completely biased.

The issue of route selection is crucial to transit activists, who recognize that HSR over the Altamont Pass could also provide interregional transit service in the highly congested I-580 Corridor. There is no corresponding congestion relief potential in the Pacheco Corridor, because it is unpopulated. Environmentalists oppose the Pacheco Corridor because it goes right through the middle of the Grasslands Ecological Area, the largest remaining contiguous block of wetlands in California. In addition, two cities that joined the lawsuit are concerned about the impacts of running elevated tracks through their towns.

The initial plan for HSR proposed a station in Los Banos on a dairy farm, in a locale with only a handful of residents. Because all the other HSR stations were located in existing downtowns, this choice was highly unusual. When it came to light that the farm was owned by the family of a former State Assemblyman, who had been a paid consultant to the Authority, it was dropped from the plan. Nonetheless, thousands of acres around the station have been bought up by a well-connected Sacramento land speculator and his financial backers. The only advantage that plaintiffs could discover for the Pacheco alignment was the availability of inexpensive vacant land that could be turned into a bedroom community for Silicon Valley.

Plaintiffs are concerned that an HSR system designed to benefit land speculators will perform badly, as the route is longer than the previously recommended one, making it more expensive to operate, with fewer passengers. Instead of the promised operating surpluses, it seems likely the project as currently conceived will require State subsidies. Plaintiffs suspect that ten years of planning, costing \$60 million, have been entirely wasted.

Megaprojects that serve the public interest

A megaproject that has been captured by special interests can do tremendous economic harm, both in future costs to the public as well as in opportunity costs. Avoiding the worst impacts of global warming requires the urgent deployment of low-carbon alternatives. Reducing GHG emissions on a global scale will require massive investment in infrastructure. If scarce resources are directed into bloated and wasteful projects instead of opportunities like cost-effective transit, GHG emissions will continue

to climb. This, in turn, will lead to the environmental consequences of worse levels of climate change. Choosing the right infrastructure projects, and their most cost-effective alternatives, thus, is crucial to our survival.

After reviewing the financial consequences of failed megaprojects, *Megaprojects and Risk* recommends building accountability into the way these projects are structured:

1. A public agency cannot both protect the public interest and act as the sponsor of a megaproject, because these roles conflict. It is better that the agency use the public-private partnership model, and be one step removed.
2. The public agency needs to first define performance specifications for its project. If these are carefully conceived, private interests will be unable to capture the project by selecting routing alternatives on the basis of secret motivations. In the case of High-Speed Rail in California, the route selection process was way too tempting a target for manipulation in the service of private agendas for it to be left to a political body.
3. Route decisions are better left to the consortium that will design, finance, build, operate and maintain the system. The consortium contract needs to ensure that the partners are in it for the long haul, especially the operator. If each of the partners has a strong voice in the route selection process, the economics of private risk capital will provide the discipline to minimize construction costs and maximize operating revenues. A strong environmental review process will then constrain the economic interests of the consortium where they conflict with the public interest.
4. Proposals from third parties to modify the route so as to access their land or city need to be made public, so that the additional costs of a longer route are transparently borne by those standing to gain.

For a California HSR project, public funding of the early stages of project development is necessary, to reduce the risks associated with the huge cost of the project to manageable levels. It would have been wise to seek DBOM proposals, and offer one or more finalists the funding to do a route plan and Environmental Impact Report. The information gained from preliminary engineering and environmental approvals would then enable the consortia to make firm bids to the agency. Competition here serves the public interest, resulting in the best possible deal. The involvement of private risk capital and the contractual obligation to operate the system for at least ten years are the checks and balances needed to ensure that a megaproject's economic performance is optimized.

Planning as a Criminal Act

All too often, public agencies push their professionals (planners, engineers, EIR preparers) to favor one project alternative over others that perform better technically. Public officials seem to feel entitled to place their personal stamp on history, and/or deliver favors from the public trough. If that requires ordering a consultant to steer their analysis towards a favored alternative, so be it.

Choosing a less cost-effective alternative is stealing from the public. Vanity-driven or greed-driven megaprojects consume resources that are needed to fight climate change. The consequences of conventional public project development then, are not merely the waste of public funds, but the failure to implement the cost-effective projects needed to greatly reduce our GHG emissions. To deter this diversion of public resources, it should be a criminal act to knowingly steer a project through the exercise of professional competence to an alternative less favorable to the public. Getting politicians to support legislation that would eliminate this key perk of public life, however, is going to be tough.

In a meeting where the California Attorney General asked the public how to improve project delivery, the author responded: "Make it a criminal act for someone to use their professional certification to make a bad project appear more favorable than it otherwise would be." The Attorney General asked "What would be a bad project?" I replied "BART to San Jose" (a very popular but enormously expensive megaproject). "Oh, no" he replied. "BART to San Jose is a good project."