Why megaprojects often have megapitfalls

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Bay Bridge. Credit: daviduweb via flickr

While the new Bay Bridge is finally functional, it stands more as a symbol of dysfunction than anything else. From the start it seemed born under a bad sign, down since it began to crawl—like, if it wasn't for bad luck, it wouldn't have no luck at all.

Blues lyrics aside, the new eastern span of the Bay Bridge did have a bad run from the get-go. First there was a seemingly unending squabble about design: Should it be a simple utilitarian viaduct or a signature architectural marvel that would rival the Golden Gate Bridge? Then there were seismic concerns about the final design, a self-anchored suspension span. Some engineers—most notably UC Berkeley professor

of structural engineering Abolhassan Astaneh-Asl—publicly criticized the self-supported span as patently unsafe and said it could shake itself to pieces during a big quake. Then came the revelations about inferior structural steel from China, corroding anchor rods, and faulty welds. And the cost—leaping lizards, the cost. The price tag jumped from an original 1996 estimate of $1 billion to $6.4 billion.

Arguably most maddening of all was the state response to the delays, missteps and apparent incompetence. Through multiple administrations, the emphasis seemed by many to be on obfuscation and diversion rather than on transparency and engagement. When interviewing government spokespeople, reporters often felt they were getting Zen koans in response to forthright questions about funding and safety.

But perhaps the greatest surprise about the Bay Bridge saga is that its woes shouldn't have been a surprise. In her new book, Remaking the San Francisco–Oakland Bay Bridge: a Case of Shadowboxing with Nature, UC Berkeley city and regional planning adjunct assistant professor Karen Trapenberg Frick makes the case that the bridge brouhaha was no outlier. Rather, it was simply the latest manifestation of the megaproject phenomenon.

Gigantic projects, maintains Frick, typically incorporate several Cs: They are colossal, costly, controversial, and bedeviled with control and communication issues.

"These projects inevitably involve multiple government bodies and various citizen and advocacy groups, all representing different points of view and interests," says Frick. "Ultimately, points of controversy arise. With the new Bay Bridge, that involved the alignment of the span, the design, ancillary projects like pedestrian and bicycle pathways and rail communications, and finally, the controversies over structural integrity and material outsourcing to China. There were also conflicts about who

decided what, who was responsible for what. No single agency had the final word. Caltrans [the state's transportation department], MTC [the Metropolitan Transportation Commission] and the state Legislature all were involved."

Such situations are costly. Every time there's a delay, or a change in plan, or a dispute, the dollars ebb away. Think of a kitchen remodeling job expanded by a googleplex.

Caltrans, for its part, has steadfastly maintained that the controversies bedeviling the Bay Bridge are much ado about very little. Last year, the project's chief engineer, Brian Maroney, said the bridge would hardly move during a major earthquake even if all the anchor rods were absent. And in a 2014 letter to state Senate Housing and Transportation Committee chairman Mark DeSaulnier, Caltrans director Malcolm Dougherty stated that the bridge was absolutely safe, problems raised by the media were "fixed or being fixed," and that cost overruns were due to factors outside the agency's control, including design changes, political issues, and market conditions.

The Bay Bridge project parallels other megaprojects, says Frick, noting that University of Oxford business school professor Bent Flyvbjerg has analyzed data on huge projects reaching back 70 years, and concluded such undertakings have a "calamitous history of cost overruns."

Frick notes that the U.S. General Accounting Office attributes megaproject underestimates and subsequent gigantic overruns to the way costs are figured. Initial estimates are produced during the planning stages, and then adjusted—inevitably upward—as design and engineering work is completed. Also playing into cost inflation: currency inflation, adjustments to project configuration, and simple human error.

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professor emeritus Oliver Williamson has written that there are costs with every transaction, Frick notes. "For megaprojects like the Bay Bridge, those costs can't be measured just in project dollars. There are also transactional expenditures for environmental scoping and documentation, for public meetings, for legal costs associated with lawsuits and delays. So going into a megaproject thinking it can be done for 'only' double the original estimate is probably overly optimistic."

Some projects are obviously in the public interest and must be built, however inefficient and expensive the undertaking. The new span of the Bay Bridge is probably in this category; somehow, people must have a way to drive from San Francisco to the East Bay and vice versa.

But the benefits of other megaprojects are not so clear cut. The massive trans-Delta water conveyance project promoted by the Jerry Brown administration could expedite water deliveries to regions south of the Sacramento/San Joaquin Delta, but it will not increase California's water supply by a single drop; it will also cost many billions of dollar and degrade the Delta's ecosystems. And California's High Speed Rail to connect major cities such as Los Angeles and San Francisco via the Central Valley, another project favored by Gov. Brown, also will be stratospherically expensive. Experts remain divided on its merits as an effective and affordable mass transit system, and it will gobble up farmland and mar rural scenery. Controversy and intense and organized opposition dog both projects.

So why are they so enthusiastically hyped?

First, says Frick, megaproject boosters are often susceptible to "optimism bias": a reflexive and unrealistic optimism about the timelines and budgets for their projects.

Second, megaprojects develop a momentum of their own because of a

concept known as "the technological sublime." Simply put, people—often people with power, money or both—become besotted with megaprojects because they are truly impressive and promote a dramatic solution to real or perceived problems.

Moreover, she says, big projects never occur in isolation.

"They are built on the memory of a region, and in recognition of the other iconic projects of that region. They are often associated with projects that are already built—like another trans-bay tube for BART. Infrastructure can take on a sublime aspect to politicians, to developers, to other people of influence. They want to be associated with that sublimity. But as we often see, efforts to achieve the sublime often become cautionary tales."

Little wonder, then, that megaprojects such as the new Bay Bridge seem to stutter, stall, post dizzying cost overruns, and inevitably, disappoint. But it hasn't always been that way. In the mid-20th century, massive reclamation projects and the interstate highway system transformed the American landscape. That was both good and bad, of course, and it raises the question: What's different between now and then?

A few things, says Frick. First, there was bipartisan support for such projects back in the day. Environmental concerns and the NIMBY ("not-in-my-backyard") opposition barely registered on the national scope.

"The regulatory burden is far greater now," says Frick. "There are increasing concerns about the expenditure of public funds on one hand and environmental impacts on the other. Finally, you have increasing skepticism about government from all portions of the political spectrum. And that skepticism only increases when cost overruns and other problems become standard for every project."

So what's the solution to the megaproject conundrum? First, it may be time to take a page from Brown's first tenure as governor, back when the mantra "small is beautiful" prevailed. "Sometimes big projects aren't needed," says Frick. "Sometimes a smaller-scale, incremental response is better. For example, instead of a new rail line or a fully fledged rapid transit system, you might achieve most of your goals by street redesigns to expedite bus passage."

More broadly, policy makers, public agencies and developers may need to stop promising the Big Rock Candy Mountain and covering their butts when the final result is a hill of beans.

"When big projects are proposed, there has to be time and space created to engage the public in a meaningful and transparent way," Frick says, "and the likelihood of additional costs have to be factored in and acknowledged. We have to ask, what are the comparables? What are the possible unknowns? And we need to get honest answers to those questions."

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