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# MISSED OPPORTUNITY FOR TUITION-FREE COLLEGE EDUCATION: EXPLAINING FEE INCREASES AT CALIFORNIA STATE UNIVERSITY

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The Master Plan for Higher Education, passed in California in 1960, formalized the role for the California State University and committed to providing free college tuition for legal residents of California. Since then, the system for funding higher education in the state has slowly moved away from this commitment. This article explores possible reasons for that departure, including changing levels of public support, economic recessions, and financial aid policies. Analysis of primary source documents from the California Postsecondary Education Commission and interviews with higher education policy experts support this examination of each possible cause. This article finds no specific factor to be responsible, rather a convergence of factors and events that have led to the current reliance on student fees by the CSU system.

## INTRODUCTION

With the passage of Proposition 30 on November 6, 2012, the financial distress of the California State University (CSU) may be somewhat ameliorated. Proposition 30 stabilized the budget by generating additional revenue with a one quarter cent increase on the state's sales tax, as well as an increase in personal income tax rates for those making more than \$250,000 per year. Proposition 30 also halted a mid-year trigger cut of \$250 million that was going to be imposed on the CSU. However, the CSU system still faces significant financial difficulties, as the problems with fees go back much further, and are much deeper, than the annual increases we have seen in response to the current economic recession.

The California Master Plan for Higher Education, passed in 1960, formalized the three-tiered structure in place today—community colleges, the California State University, and the University of California—with each system serving a different purpose in higher education. The Master Plan also expressed clearly the intention that college tuition in California should be free for legal residents. Students were responsible for paying “fees” that covered the costs of expenses excluding instructional minutes, such as lab equipment, health centers, and the student newspaper. As of January 2011, the CSU now refers to the portion of college education paid by students as “tuition fees.” The shift in terminology from “fees” to “tuition fees” may seem minor, but it underscores a more significant shift in the perception of the role of the state to fund higher education. If we understand how we arrived at this point,

we may have a better understanding of what is necessary to change this trend, assuming that Californians desire a change.

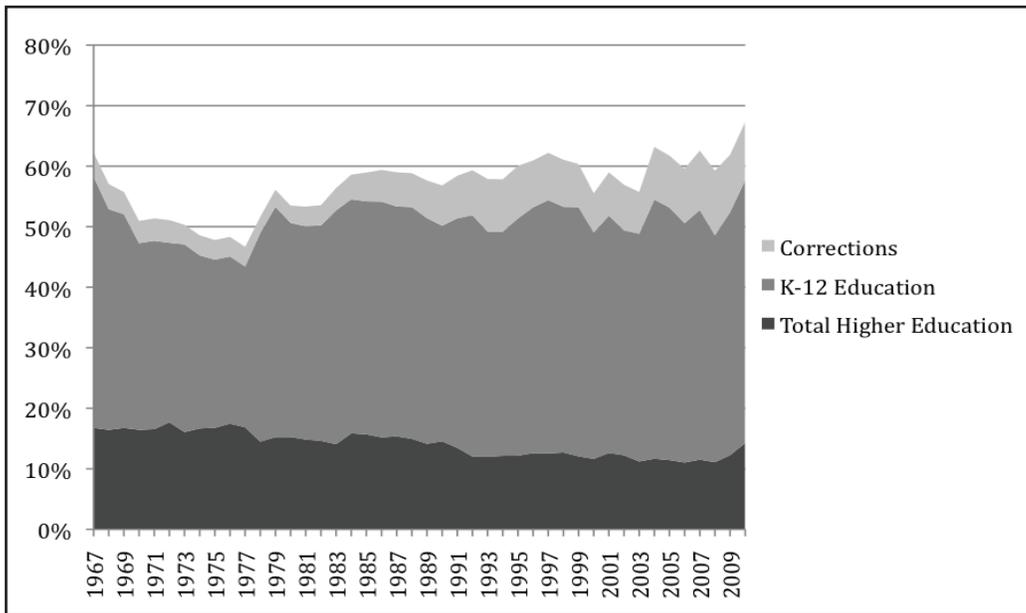
## STATE HIGHER EDUCATION FUNDING

Higher education has been competing for scarce resources with K-12 education, corrections, and the rising costs of Medicaid. Data from the California Postsecondary Education Commission (CPEC) show that state funding for higher education as a percentage of the General Fund (GF) budget has indeed decreased over time from a high of 17.7 percent in 1972-73 to between 11 and 12 percent for the majority of the last decade.

Interestingly, the K-12 education budget hovered near 40 percent of the GF budget long before Proposition 98 passed (beginning around the late 1970s to early 1980s), making it less clear that higher education has been in competition with K-12 education. Similarly, it is argued that states have felt a budget squeeze from Medicaid since the 1980s, but it seems more likely that higher education has been fighting for scarce resources with corrections and that the higher education budget has declined as the corrections budget has increased.

The data also show that for the most part, despite fluctuations in percentages, each sector saw an increase in its budget over the years, as shown in Figure 1. During periods of less fiscal prosperity, the budgets did decrease slightly, but an examination of the corrections budget demonstrates the dramatic effect that an increase of a few percentage points can have over the

Figure 1. Expense Categories as Percentages of the General Fund Budget<sup>1</sup>

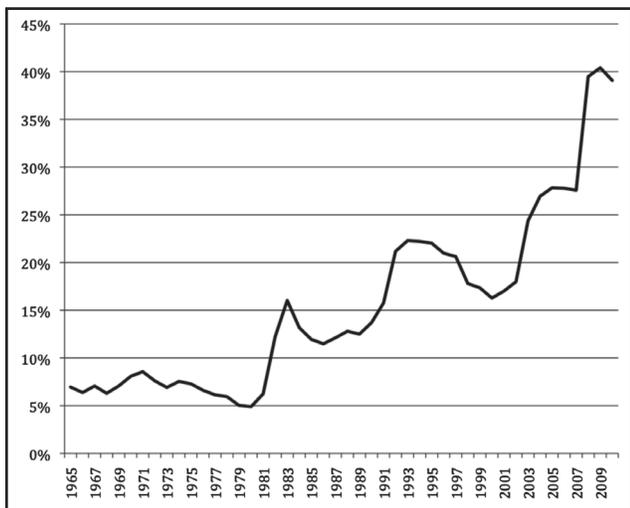


course of multiple years. The budget alone does not tell the whole story, since we know that the population has changed dramatically and the number of students being served in both K-12 and higher education surpassed early estimates.

**GROWING RELIANCE ON REVENUE FROM STUDENT FEES**

In the 1960s and 1970s, fee revenue accounted for between approximately 5 and 9 percent of the primary revenue funding sources. By the early 1990s, another recession period, fee revenue made up over 20 percent and in 2008-09 it accounted for over 39 percent. The data indicate that fee increases are particularly susceptible to decreases in the CSU budget, typically during economic downturns.

Figure 2. CSU Resident Student Fee Revenue as Percentage of CSU Budget<sup>2</sup>



Fee revenue has become a critical source of funding for the CSU system, especially in the last two decades. This growing reliance on student fee revenue implies that students and their families have indeed begun to pay a greater share of the cost of a college education.

**PUBLIC STILL SUPPORTIVE OF HIGHER EDUCATION BUT WANTS MORE ACCOUNTABILITY**

Some authors have argued that there has been a shift in ideology causing the public to be less inclined to support higher education funding. This shift may have begun decades ago, as an early CPEC document explains: “To some extent during the 1970s, public education was caught in society’s general skepticism about the integrity of its political institutions.”<sup>3</sup> However, national polls indicated the public still considered it a high priority, though there was concern about the management of the system and a need for accountability. More recently, a 2010 poll conducted by the Public Policy Institute of California (PPIC) found that 86 percent of Californians believe a college education is very important and 74 percent of California residents believe higher education is underfunded. Furthermore, a majority favors spending more on higher education, even if it means reducing funding for other programs.

The institutions themselves have recognized that as demographic and financial situations have changed, there is an increased need to determine how best to use their resources. The CSU Provost and Vice President for Academic Affairs recently asked, “Can our universities work seriously with K-12 on college readiness, so that we can use differently the more than \$50 million that we now spend on remediation just in the CSU?”<sup>4</sup> The recent request for a salary freeze for top paying

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positions in response to several incoming CSU presidents receiving salaries 10 percent above their predecessors is an example of the disconnect the public feels between the public institutions and how the institutions have shown their accountability with the use of discretionary funds.

### **LEADERS THINK STUDENTS SHOULD PAY MORE**

In the 1970s, numerous publications began to ask questions such as “Who pays for higher education? Who benefits? Who should pay? And how much should they pay?” This suggests a shift in the view of higher education from primarily a public good (a view shared in the Master Plan) to more of a private good. If the individual is a greater beneficiary, then the individual should pay a greater share of the cost. Despite these questions, during this time, the reports and recommendations for fee policies in California continued to reaffirm the intention of the Master Plan that the state should bear the primary responsibility for funding higher education.

In 1972, it was suggested that with costs rising for higher education (enrollment had doubled and costs had experienced a fourfold increase) and other state programs, it was time to re-examine the tuition-free policy to determine if it was still appropriate and feasible.<sup>5</sup> This suggests policymakers were adopting a perspective of financial necessity, not shifting in ideology. It was recommended that resident students with the ability to pay at UC and CSU should contribute towards the cost of their instruction, but the amount should be kept as low as possible and not exceed that of comparable universities. Despite this recommendation, the CSU did not openly collect or use student fees for the purpose of instruction (the definition of tuition according to the Master Plan) until a much later date.

In 1992, an option was proposed of setting fees to a certain percentage of the total cost of instruction (for example, fees at the CSU would be 25 percent of the total average cost of instruction). The report noted that this would be a departure from the history of providing “tuition-free” education and keeping fees as low as possible.<sup>6</sup> A 1993 report noted that “the question of how much of the costs of higher education should be borne by the students has still not been addressed systematically—the only answer to date (in terms of present practice in setting fees) being ‘ever more than before,’ with practice far exceeding State policy of moderation in fee increases.”<sup>7</sup> The report stated that per the Master Plan, fees were to be charged for costs not directly related to instruction, but the fees charged now clearly exceeded those costs.

A 2002 fee policy Commission still recommended that the state bear the primary responsibility for the cost of higher education, that resident fee increases should be gradual, moderate, and predictable (as possible), and that indicators, such as the percentage change in per capita personal income,

should be used to help determine fees to maintain gradual and moderate increases.<sup>8</sup>

Although there have been many attempts to redefine the Master Plan, it has not happened yet. Throughout this evolving discussion, some have described student fees as too high while others believe they are too low, making it difficult to determine an appropriate fee level.

### **FEE POLICIES DISCUSSED OR ADOPTED AFTER RECESSIONS**

Long-term fee policies may be the result of reactions to fee increases, usually after recessions. The timing of fee policy committees or commissions coincides with years following recession periods in the 1980s, 1990s, and 2000s. This suggests that when times are better and funding is more stable, determining an appropriate fee policy is less of a priority.

A 1984 report noted that the recession was clearly a major factor in the rapid rise in student fees, since other states had similarly seen large increases in student fees.<sup>9</sup> The report stated “the recent increases in fees at both institutions have stemmed less from any basic change in State policy toward student fees than from severe State budget shortages caused by the recent recession, compounded by tax-cutting measures such as Proposition 13.”

In 1996, the existing student fee policy in place from 1985-1996 expired. In 2002, after a period of economic stability followed by another decline, the legislature once again directed CPEC to develop long-term fee policy recommendations, “...given the lack of a statutory fee policy and the State’s deteriorating fiscal situation.”<sup>10</sup>

The intention to create a long-term fee policy after fee increases also suggests that policymakers are aware of the hardships caused by dramatic fee increases, and implies a genuine desire to maintain fees that are as low as possible. It also suggests fees increases are driven by financial necessity.

### **REACTIONS TO RECESSIONS EXACERBATED BY OPTIMISTIC BUDGETING AND ASSUMPTIONS**

Since fees and fee policies appear to be so closely tied to the budget, the State budget itself—and the amount of funding the State issues to the CSU—is clearly a factor. It has been argued that colleges and universities do disproportionately well during financially good fiscal years, but are disproportionately cut during periods of bad economic times.<sup>11</sup> Some claim this is because of the institutions’ ability to raise additional revenue through fee increases, an option other state supported programs do not have. While tax structure and limited term politicians may be part of the problem (and both of these characteristics could be attributed to California’s budget

problems), another issue is not an economic force, but a behavioral force, or the “tendency to assume that the future will be like the immediate past.”<sup>12</sup> The state tends to take an optimistic approach to expected revenues, as though they believe that when times are good, they will always be good. This also encourages over-committing resources.

Robert Harris, long-time employee of the Department of Finance, made a similar observation, describing a need for a stable input mechanism to project budgets, though California’s tax flow structure remains very volatile. “There is no capacity to know what it will be, so there is a tendency to assume greater input to balance the budget and implement programs. Unfortunately, you can only divide a dollar so many ways. And when that dollar is really only seventy-five cents you have even more problems.”<sup>13</sup>

Better economic times did not seem to require or present the same need for fee policies compared to periods of recessions. The financial conditions that led to dramatic fee increases were followed by requests for long-term fee policies. The need for more revenue was a greater priority than following the established rules for keeping fee increases gradual.

### **FEE INCREASES SHOULD BE GRADUAL, MODERATE, AND PREDICTABLE**

Some have argued the changes that have occurred have been incremental over time. Certainly the policy recommendations attempt to protect students and their families by making increases gradual, moderate, and predictable. Unfortunately, economic realities often undermine good intentions during periods of recession. In 1978, CPEC released a five-year plan update, noting that Proposition 13 had caused a fiscal crisis, and fee increases became a topic once again. Although concerned about the effects of fee increases, the commission noted that “increased student charges must be considered as one of several possible source of additional funding for the long-range financing of postsecondary education.”<sup>14</sup>

The 1984 Fee Policy Committee was partly the result of the Legislature’s concern of the lack of “explicit” policies that had allowed CSU fees to increase so dramatically in a few short years, and also the impact this would have on access to higher education.<sup>15</sup> Part of the solution to this problem was the recommendation that fees should be fixed at least ten months in advance and increases or decreases should not exceed 10 percent from the prior year.<sup>16</sup> The policy adopted was based on these recommendations. Senate Bill 195 stated fee increases should be “gradual and moderate.”<sup>17</sup>

The early 1990s marked another fiscal crisis and SB 1972 allowed the institutions to increase fees above the statutory cap of 10 percent, which meant a 40 percent increase in

student fees for the CSU to “offset a portion of the reduction in State General Fund support.”<sup>18</sup> This appears to be the first open use of fee revenue to supplant State funding for the cost of instruction. “These higher fees have forced the State and its public systems of higher education to abandon—at least in practice—their long-held principle of ‘tuition-free’ education, since student fees are now being used to support instruction and instructionally-related activities that were previously agreed to be the responsibility of the government.”<sup>19</sup>

In a 2006 CPEC report, the Commission stated “the basic tenets of the Master Plan regarding affordability have been eclipsed by the need to maintain access and educational quality in the face of declining state support.”<sup>20</sup> What these reports show is that over the years as the conversation of a long-term fee policy as been discussed, the intentions of the Master Plan remain relevant. There is large support for a system that keeps college affordable, with the state paying a larger share of the cost than students and families. However, despite the desire to keep fees moderate and predictable, over time, the reliance on fee revenue has become greater, due to the decisions of policymakers and the current economic recession.

### **FINANCIAL AID POLICIES MAY HAVE OPENED A DOOR FOR FEE INCREASES**

In 1994, CSU Chancellor Barry Munitz proposed an additional fee hike and included a provision that one-third of all new student fee income be used to “ensure continual access of low-income students.”<sup>21</sup> It is not clear how this percentage was derived, but it has been used consistently. It has been suggested that taking care of the “neediest” students with such policies makes it easier to raise fees. “Called ‘discounting,’ this practice has actually become one of the factors exerting upward pressure on tuition levels.”<sup>22</sup>

Access is one of the fundamental cornerstones of the CSU system. One of the motivations for keeping student fees low is to ensure universal access. Financial aid has become a major component for ensuring that students from low-income families are able to attain their college goals. With each increase in fees, or decrease in state funding, maintaining adequate financial aid became a higher priority, and often, recommendations for fee policies included additional recommendations for explicit financial aid policies.

Boyd Horne, a former financial administrator for CSU, agreed with this theory, stating, “Federal and state financial aid is at play because the fee amount determines the dollar amount students are eligible for, making it a back door way to get additional aid.”<sup>23</sup> The policy itself did not cause fee increases, but it was a part of the rationale for why increases could be implemented with minimal damage. Former president of CSU, Dr. Donald Gerth agreed, believing that the policy “gave

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a license to increase fees” based on the idea that everyone that needed help would receive it.<sup>24</sup>

Student fees have made up a larger share of the CSU revenue since the early 1990s. Until 1992-93, there were only two years in which the fees exceed 15 percent of the total revenues—1983-84 and 1991-92—otherwise, fee revenue made up less than 14 percent.<sup>25</sup> Since 1992-93, there was only one year—2000-01—in which fees made up less than 17 percent of total revenues. It is clear that the CSU is committed to maintaining access to its universities by ensuring financial aid for the neediest students, having implemented a policy dedicating a percentage of fee revenues to financial aid. The fact that fee revenues have made up a larger share of the CSU budget since the time that policy was passed indicates that this is a plausible argument.

### CONCLUSION

There are a number of explanations for why the state appears to have moved away from the Master Plan ideals. Ultimately many of these explanations for how we have arrived to our current situation are intertwined. Perhaps the lack of planning

is what has gotten us here, and under the current circumstances original intentions seem unrealistic now. Despite decades of research and analysis to determine an appropriate fee policy for the CSU, such a policy or explicit methodology still does not exist. Developing a rational fee policy is no easy task, and poor financial times mean few options for the CSU, leaving fee increases as the most obvious option for additional revenue.

Although the passage of Proposition 30 means less of a reduction to the CSU funding, this proposition, like many of the solutions proposed in the past, is not a permanent solution. Harsh economic realities have for decades continued to slowly erode the idea of tuition-free education. A budget is a representation of an agency’s priorities, and our state and universities reveal to the public what they value most through these documents. While California may still desire tuition-free education, what is the feasibility of such a desire? It is time to have a different conversation about higher education funding that looks at a policy based on these economic realities, instead of the philosophy that we have clung to but can no longer maintain.

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### ENDNOTES

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# PEACE THROUGH THE METAPHOR OF WAR: THE PACIFICATION POLICE OF RIO DE JANEIRO

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This article discusses Rio de Janeiro's military police units (*Unidades de Polícia Pacificadora*, UPP) and their role in the city's efforts to govern and develop its most impoverished areas, the *favelas*. The UPP face an uphill struggle as they seek to increase the role of the city government in these communities. Research for this article was conducted with UPP Social, a municipal program focused on urban development in "pacified" areas. Between 2011 and 2012, the author spent time with eleven UPP units, interviewing both police and citizens. The author finds that the perceptions of *favela* residents and the police continue to evolve as the UPP program expands, and concludes that with increased focus on community policing and internal reform, the UPP can continue to improve relations between the government and its urban poor. With Brazil hosting the World Cup in 2014 and the Summer Olympics in 2016, governance and urban development in its largest cities become more pressing. There is a window of opportunity now for the city of Rio de Janeiro to incorporate its urban poor into the political and economic fabric of the city.

## INTRODUCTION

Policing Rio de Janeiro has historically meant violence, primarily directed at the poor. Paradoxically, police violence peaked after Brazil's transition to democracy in 1985, with drug traffickers dominating the *favelas* and police countering with militarized operations. Until recently, the police killed about 1,000 people annually, totaling almost 10,000 deaths since 2003.<sup>1</sup> The residents of the *favelas*, where this violence was most concentrated, say that the police made no distinction between them and the traffickers, "The police only entered our community to kill...we were caught in the crossfire."<sup>2</sup>

Rio de Janeiro is renowned for its stunning levels of violence, especially in areas where the presence of the public authorities has long been precarious. The poor self-built their homes out of cardboard and wood, scaling up to bricks and concrete, persevering under the threat of removal since they lacked title to their land, a fact that ensured they received no electricity, no water and sanitation and minimal education and healthcare, as the provision of services would have been tantamount to legalizing their illegality. The *favelas* came to be controlled by armed criminals—in the 1980s by drug traffickers, and recently by militias of off-duty security officials. With homicides surpassing eighty per 100,000 in the 1990s, and even 200 per 100,000 in the *favelas* in the 2000s, Rio de Janeiro was more violent than countries in armed conflict.<sup>3</sup>

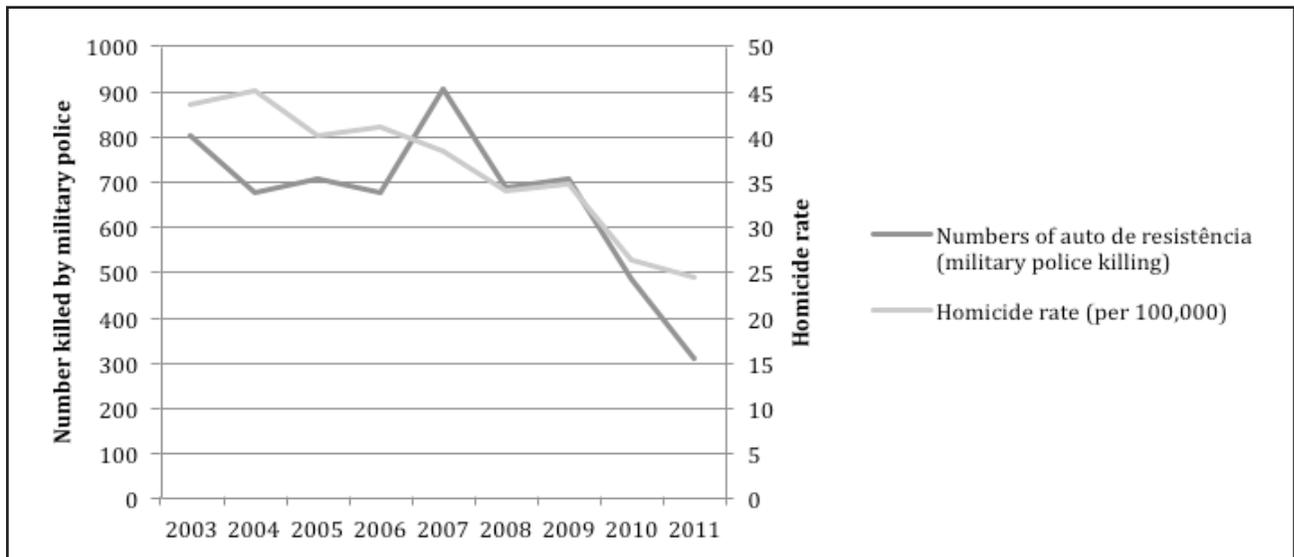
The pacification police (*Unidades de Polícia Pacificadora*, UPP) are Rio de Janeiro's response to this violence. The UPP were

inaugurated as a separate force within the military police in early 2009.<sup>4</sup> Their first objective is territorial control, not ending the drug trade, but removing the traffickers from the *favelas* where they operated with impunity. The UPP conduct community policing, furthering their second objective of fostering peace between *favela* residents and the police. There were 5,000 pacification police in twenty-six pacification police units as of August 2012 (the State Secretary of Public Security aims to install forty UPPs by 2012). Most are deployed in the *favelas* near the city's wealthy south zone. This is where the UPP can have the most visible impact, and from where they can eventually percolate to the more than 1,000 *favelas* of the city, most of which lay beyond the gaze of the media and the attention of public authorities.

The very word "pacification" connotes both war and peace; war in the sense of repression, peace by means of submission. Through their occupation of spaces once governed by armed criminals, the UPP aspire to bring peace through metaphors of war. The question is whether they can do so where the police are seen as one of the main actors of violence. The statistics on public security are the most studied but least controversial. Overall violence in Rio has declined in the past decade. More telling, however, is what has happened to police violence since the implementation of the UPP, with the plunge in killings by the police pointing to the possibility that the UPP's community policing approach of permanent presence inside the *favelas* is more successful than previous strategies based on intermittent armed invasions.

## PEACE THROUGH THE METAPHOR OF WAR

Figure 1. Violence in Rio de Janeiro (data from the Instituto de Segurança Pública)



More interesting than security statistics are their unintended consequences. While the UPP were intended to pacify the *favelas*, they are also pacifying the police. The UPP are integrated into the community in ways unimaginable when the police once entered the *favelas* shooting, searching for traffickers, or for bribes. Residents now come to the UPP about unfulfilled promises, such as the pothole that the public works department said it was going to fix and never did, or the kindergarten whose roof collapsed and was never repaired. The UPP paved the way for service providers by enhancing security and making the *favelas* more visible and their infrastructure needs more pressing. Police reform is essential to the provision of public security, especially in the *favelas*, where security needs to be more than about which armed actor controls territory but actually allows residents to improve their homes and enhance their livelihoods, of which physical security is an essential pre-condition, but far from sufficient. Providing the security needed to urbanize and upgrade the informal settlements not only transforms the police but also tackles the root of insecurity inside these *favelas*—the poverty and inequality that have marginalized them from the rest of the city.

### A HISTORY OF VIOLENCE INSIDE THE FAVELAS AND WITHIN THE POLICE

It is difficult to determine where security ends and development begins in unprotected spaces such as the *favelas*. Government presence inside the *favelas* has long been selective, leaving them largely unprotected, and allowing their densely unmapped streets to serve as bases for illicit activities. Drug traffickers were able to divide hillsides among factions and embed themselves in communities to protect their business

in return for internal security and a range of services. It was a system of reciprocity, uneven and coerced, where silence was earned in the small ways that they provided social assistance and by threats of force. As a resident recalled, “Your head was to think, your ears were to listen, but your mouth was not to talk.”<sup>55</sup> The residents were forbidden cooperate with the police, but this was exactly what they were unlikely to do. As one recounted, “Why do we despise the police? Because we know that the traffickers are violent. They are bandits on the edge of the law. What can we expect from them? It is not that we like the traffickers, but we cannot trust the police.”<sup>56</sup>

The police force of Rio de Janeiro was founded almost 200 years ago when they were charged with restraining slave resistance and reinforcing social separations.<sup>7</sup> Police violence has been documented from independence to the present, from liberal to conservative governments, dictatorship to democracy, the police found ways of legalizing repression and enacting extralegal activities without punishment. The police remain a legacy of Brazil’s military dictatorship (1964-1985), when the police were subsumed under the armed forces in the name of upholding national security, rather than public security. There are still blurred distinctions between the military and the police, with the police organized on military lines, trained in military instruction and subject to military justice. To this day the police are known to climb the hillside *favelas* with the tactics of an occupying army, in tanks known as *caveirão* (big skull), with their flag depicting a skull impaled on a sword backed by two pistols—the skull symbolizing death, the sword combat weapons pointed downwards in a skull to indicate war, the black background meaning mourning and the pistols the insignia of the military police.<sup>8</sup>



An elite squad of the UPP in the process of “pacifying” a favela<sup>9</sup>

## EVOLVING PERCEPTIONS OF (IN)SECURITY IN THE FAVELAS

The UPP typify the paradox of the police—while they are responsible for public security, the police are often the source of insecurity in the eyes of the residents. The UPP are an attempt to redefine how the residents of the *favelas* see the police. None of the residents called for the end of the UPP, but many remain wary. They say they fear ongoing police repression. Some compare the militarization of their community by the UPP to their domination by the traffickers: “Nobody liked the shootings, but we left the judgment of the traffickers for that of the police. There are still heavy weapons; the only difference is that the gun is no longer in the hands of the trafficker but the police. What kind of peace is this?”<sup>10</sup>

The UPP stop residents in search of drugs, making many feel under constant vigilance. Residents see the searches as discriminatory, stemming from the mistaken belief that the community was once connected to the traffickers. Some even say the police searches inhibit their ability to come and go in ways that are reminiscent of when the traffickers controlled who entered and left the *favela*. At a community meeting, a father confronted the police over their searches of his son:

*Every police search becomes more and more violent. They think that our children are criminals. What has my son done to offend the police? It seems that if your face is poor, or if it's black or if it's dirty then you must be a bandit, but if there are no more traffickers here then why are we treated like criminals? The treatment of the police there (referring to the city) must be the*

*same as the police here (the favela). We are from here, so we have a right to walk around without harassment.*<sup>11</sup>

Another obstacle in bridging the divide between the residents and the police is the legacy of the traffickers. The residents say that the traffickers are still present, at least symbolically. There is still an abundance of trafficker graffiti, yet the residents do not need the graffiti to be reminded that the traffickers still watch over them. As one said, “with the arrival of the pacification police the weapons left, and the weapons were what we feared, but the movement, truthfully, it continues in a more hidden way.”<sup>12</sup> The traffickers influence the residents in subtle yet powerful ways. As a one recalled:

*It's difficult for us to change our minds from one moment to the next and think the police are here to help our community. There are many who hate the police because they witnessed police killings in the past. Some people fear the presence of the police more than the presence, though veiled, of the traffickers.*<sup>13</sup>

Their sway over residents is known as the power of suggestion (*poder de sugestão*), where the residents fear talking too much about the traffickers or appearing willing to cooperate with the police. This would become a liability if the traffickers return, as many fear they will. The traffickers also go to great lengths to retain their sway over the community. A faction warned residents not to give food to the police or let them use their bathrooms. In another community, they ordered local businesses to remain closed, revealing their enduring power even though their weapons are no longer visible on the streets.

### **BAILE FUNK**

One of the most contentious parts of the pacification police is the controversy over the *baile funk*, or the funk dances that were a main source of entertainment for the *favelas'* young adults under the control of the drug traffickers. The UPP initially banned these *bailes* in an attempt to ensure that the traffickers did not return. There is no common policy for the *bailes*; in some *favelas* they are permitted until a certain hour, in others they require the approval of the police captain, and in some they are forbidden. From the perspective of the UPP, the *bailes* represent the time of drug traffickers because it was at these parties that they sold their drugs. In contrast, young residents see the *bailes* as cultural expressions of their community, unjustly stigmatized by the police. As one complained:

*The shootings ended, but we live under a dictatorship of the police. They prohibit everything; everything requires their approval. Funk has been vetoed. Young people always have to submit to vexing searches. Of course it's good to no longer bear shootings, but to have peace we lost liberty.*

Regulation of the *bailes* is a point of conflict between the residents and the UPP. The police recognize this tension, but it is difficult to change the reality of those who grew up mesmerized by the traffickers. As a police captain explained:

*The adolescents are sitting on the sidewalk waiting for us to leave. Their best time was with the traffickers, but their plans—to get rich, to have many women and to die by the age of twenty—were destroyed with our arrival. They never studied so they have no opportunities. It's very difficult to change this perspective.*

Given the tensions between the UPP and *favela* residents, the presence of community meetings where grievances can be voiced marks a step forward. One meeting included a role-play where young residents and low-ranking policemen played out the controversial regulations of the *baile*, but with their roles reversed, so that residents acted as police and police as residents. A policeman pretending to be a resident requested permission for a *baile* that evening, and the two imitated an argument like the ones that would occur when the resident pretending to be a policeman refused. The intention was to show how frustrations escalated without compromise. When the resident imitating a policeman and the policeman imitating a resident pretended to fight it made everybody laugh at the reality of what really happened.

To win over the residents the UPP focus on the children. They sponsor activities, such as martial arts, music, and dance classes, often taught by officers. It is often the policewomen who are the closest with the children. In the words of one, “we are attempting to show a different side of the police, a more human side. And when the children say they do not like the police we try to explain why we are different.”<sup>14</sup> The parents confirm the benefits of the UPP for their children. As a mother explained as she waited outside the police station for her daughter to finish a dance class: “If they are permanent then the UPP will benefit the next generation. The children will have a better reference of the police and they will see that weapons are not necessary.”<sup>15</sup> The residents praise the UPP for providing a better reality for the children, who are no longer as tempted by the violence and the luxury of the traffickers and can admire the police in ways that were impossible before.

### **UNTANGLING METAPHORS OF WAR INSIDE THE MILITARY POLICE**

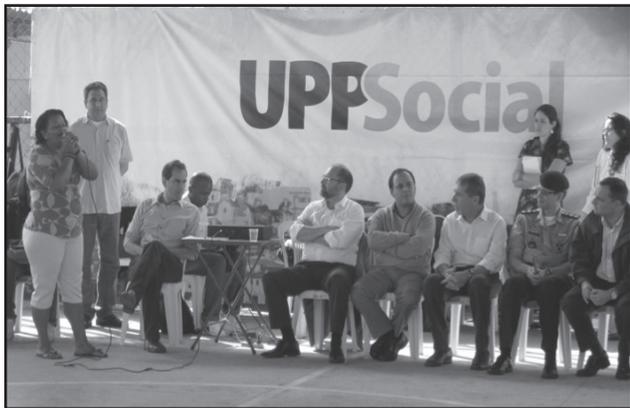
Undoing the “warrior ethos,” or the training that transforms the police into soldiers, is what the commander of the UPP most wants to reform. In his own words, “In the same way that violence held a symbolic value for the traffickers, with the police as their enemy, the police are trained not to recognize the humanity of the residents, who they see as their enemy.”

Instead, he seeks “mutual transformation, humanizing the police’s relations with the residents and humanizing the police as well.”<sup>16</sup> After six months of training in the police academy, those destined to serve in the UPP (an estimated 90 percent of recruits) have a two-week course in community policing. Their commander admits that this is more symbolic than practical, as he spends more time undoing what they learned in the academy than training them in community policing.

What is most interesting is that it is outside the police academy and on the streets of the *favelas* where the UPP are receiving their best training in community policing. By mediating the ongoing needs of the residents with the responsibilities of the public authorities, they are reforming the police by becoming service providers to the community, especially as they often the only public authorities in the *favelas*. The captains designate their most communicative recruits as proximity police, who walk around the community to learn the residents’ main concerns and bring them to the attention of the relevant government agencies. In some communities they even walk around without uniforms to foster approachability with the residents. In the words of a police captain: “Before people that wouldn’t speak with me now speak, or at least they say good morning; people that used to say good morning now come inside the station; people that would come inside the building now talk to me on the street.”<sup>17</sup>

The UPP have become the frontline service providers in many communities. The residents come to them when they want to report a power line that is in danger of falling over, or when they notice that there is no trash collection, or when there is a pothole that needs to be fixed so that the trucks of the electricity company and the garbage company can drive up the hill to address these problems. There are obviously difficulties in putting these responsibilities on the police, but community policing is about connecting the police to the community, and by being present in these communities and connecting their concerns with the electricity company, the garbage company, or the municipal public works agency, the pacification police are mediating concerns between the urban informal poor and the public authorities, and thus connecting the state to its citizens.

The security provided by the pacification police means that the state is more present in ways that it rarely was before when the traffickers controlled the *favelas*. This is true not only of the police as the state on the streets but also of the residents who can come and go from their community without fear of violence between the traffickers and the police, the utilities who can widen roads, connect public lighting and make other investments that the traffickers would prevent, not to mention the myriad other public and private authorities who no longer have the excuse of insecurity for not servicing these communities. The police have become receptacles for the communities' most important needs, from whose house was in danger of falling down in the next rainfall to when the government was finally going to fulfill its promise to reconstruct the kindergarten that collapsed during the last rainy season, from where the residents could deposit their garbage for collection to who qualified for the social tariff for electricity, from what light post needed repair to when the massive pothole in the main road was going to be filled... the demands upon the state are many, and most of these find their way to the pacification police as the most present (or at least the most visible) public authority in the community.



The UPP bringing together community leaders and the Municipal Secretary of Housing<sup>18</sup>

## CONCLUSION: FROM PACIFYING THE *FAVELAS* TOWARD PACIFYING THE POLICE

The UPP are reconstructing the identity of the police, not only in the eyes of residents but also in the minds of police. They are mediators between the unmet demands of the urban informal poor and the practical difficulties of serving their geographically complex, impoverished communities. Yet the police depend upon the support of urban infrastructure and social services that only the government can provide. The UPP provide the security to make this happen, and the publicity surrounding them puts more pressure on the government to act; but ultimately the UPP are dependent on myriad other interventions to reduce the divides that have long disconnected the *favelas* from the rest of the city. The police can coordinate community demands, but if they are not addressed then the police will inevitably lose legitimacy in the eyes of the residents, regardless of the reforms taking place inside the police. The police provide a limited form security, but many hope their presence will encompass a broader notion of security, one needed to address the roots of their poverty, or as one policeman said “public security includes everybody, not just the police.”<sup>19</sup>

The UPP are a step towards fostering inclusion in a city long divided, with the police as intermediaries between a state that has long been distant and the urban poor who have long been excluded. Cynicism says that they will not last, as other attempts at police reform in the *favelas* have failed, but with the eyes of the world on Rio de Janeiro it is hopeful that a temporary security fix will translate into a permanent governance approach. The pacification police are already transforming the ways that the urban poor experience the police, and with the police the most visible presence of the state on the streets, they are potentially transforming how the residents of the *favelas* interact with the state. These impacts are both narrow and profound, limited in the sense that only a few of the more than 1,000 *favelas* across the metropolitan will benefit from the pacification police, but extensive in the sense that they provide insight into a way forward in the inclusion of the urban poor in the urbanization of their communities and the integration of the poor into the political and economic fabric of the city.

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## PEACE THROUGH THE METAPHOR OF WAR

### ENDNOTES

[1] Instituto de Segurança Pública. <http://www.isp.rj.gov.br/Conteudo.asp?ident=150>.

[2] Author interview on May 31, 2011.

[3] Cano, Ignacio. 2012. "Os Donos do Morro: Uma avaliação exploratória do impacto das unidades de polícia pacificadora no Rio de Janeiro" Fórum Brasileiro de Segurança Pública.

[4] Brazil preserves a distinction between the civil and military police. The former are responsible for criminal investigations; the latter with patrolling the streets. The military police are not part of the military, though they were subsumed under the military during their dictatorship from 1964 to 1985.

[5] From unpublished ethnography prepared by the State Secretary of Social Assistance and

Human Rights (SEASDH).

[6] Author interview on May 27, 2011.

[7] Holloway, Thomas H. 1993. *Policing Rio de Janeiro: Repression and Resistance in a 19th Century City*. Stanford, CA: Stanford University Press.

[8] Hinton, Mercedes S. 2009. "Police and State Reform in Brazil: Bad apple or rotten barrel?" in Ed. Mercedes S. Hinton and Tim Newburn *Policing Developing Democracies*. New York, NY: Routledge, Taylor and Francis Group.

[9] Photo credit: Thayná Coimbra, 2011.

[10] Author interview on May 27, 2011.

[11] Resident speaking at a community meeting on July 6, 2011.

[12] Author interview on July 16, 2011.

[13] Author interview on July 10, 2011.

[14] Author interview on July 6, 2011.

[15] Author interview on May 31, 2011.

[16] Author interview with Colonel Robson Rodrigues on June 29, 2011.

[17] Unpublished ethnography prepared by SEASDH.

[18] Photo credit: Julia Tierney, 2011.

[19] Interview with a UPP Captain in a community in the Southern Zone on July 1, 2011.

# MOVING MEXICO BACK TO TAP WATER: STRATEGIES TO RESTORE CONFIDENCE IN THE WATER SYSTEM

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EDITED BY ANDREW ABORDONADO, ANKIT JAIN, AND TJ SHEEHY

Mexico's booming bottled water industry represents private provision of drinking water in a case where most public water systems have failed to provide water consumers can be feel safe drinking. Driven away from tap water by water quality risks and attracted to bottled water by good advertising, Mexico consumes more bottled water per capita than any other country in the world—approximately US\$1.8 billion, nearly as much as the US\$2.3 billion Mexican water utilities collect from their customers. While water and sanitation coverage is good in most parts of Mexico, water loss rates are high, service is often intermittent, and household storage increases the risk of contamination.

This article proposes a strategy to improve the quality of tap water and the reputation of Mexico's water utilities. Continuous water supply and increased water quality monitoring, along with the transparent dissemination of water quality data and a campaign to educate the public about the safety of properly treated and distributed tap water, could help to restore consumer confidence in tap water.

## INTRODUCTION

Throughout the world, the quality of tap water and consumer confidence in the safety of tap water vary. Low confidence in tap water quality, or distaste for the flavor of tap water, can lead consumers to purchase bottled water. Use of bottled water for drinking is often prevalent in developing countries where the reliability of drinking water infrastructure and water quality is often limited. This article examines the case of Mexico, where bottled water consumption is particularly high.

Mexicans consume approximately 27 billion liters of bottled water per year, more bottled water per capita than any other country in the world.<sup>1</sup> At a price of US\$0.068 per liter for water purchased in 20-liter jugs called *garrafones* (how the vast majority of bottled water is purchased in Mexico),<sup>2</sup> representing a national expense of \$1.8 billion per year, nearly as much as the estimated \$2.3 billion water utilities collected in 2010.<sup>3</sup> The bottled water boom in Mexico represents private provision of drinking water in a situation where most consumers are not confident in tap water. While consumption of bottled water can be an effective temporary measure where tap water is not safe, some argue that in the long-run improved tap water supply is a more efficient and equitable solution.<sup>4</sup>

Confidence in Mexico's tap water, or at least willingness to drink it, appears to be declining over time. According to Claudia Campero, a Mexico representative of Food & Water Watch (quoted by McClatchy Newspapers), a Washington-based consumer advocacy group, drinking fountains were common twenty years ago in public schools and parks, which

is no longer the case in most parts of Mexico.<sup>5</sup> This decline in tap water consumption and rise in bottled water consumption could be due to a decline in confidence in tap water quality and/or a rise in access to and ability to pay for bottled water. While so much spending on bottled water can be seen as a failure of the country's public water systems, it can also be seen as an opportunity for the public water sector to improve the quality of the service it provides, restore consumer confidence in tap water, and capture at least a portion of the revenue stream going to bottled water companies.

This article provides a brief overview of Mexico's bottled water industry, describes the strengths and weaknesses of the country's public water service, and proposes a strategy for improving the quality of tap water service (both water quality and supply continuity) and the reputation of the public water sector.<sup>6</sup> While the cost of the proposed water supply improvements are not estimated, it is shown that the money Mexicans spend on bottled water would be enough to significantly increase investments in public water supply. The article does not comment on what extent improvements to tap water service quality should be paid for through increases in water rates as opposed to subsidies funded by general taxes, as this is a decision better left to the Mexican political system. While Mexico is an extreme case, much of the same analysis could be applied to other countries where bottled water consumption is high due to low confidence in the quality of the tap water. Mexico's current situation should also serve as a warning to other countries where consumers are still consuming tap water: maintain tap water quality and

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the public image of tap water or customers may switch to bottled water.

### MEXICO'S BOTTLED WATER INDUSTRY IS BOOMING

Mexico's bottled water industry is the second largest in the world (behind the United States), with annual production of approximately 27 billion liters.<sup>7</sup> According to Beverage Marketing Corporation, Mexicans consume an average of 235 liters of bottled water per person annually, the highest per-capita rate in the world.<sup>8</sup> A 2010 Inter-American Development Bank (IADB) survey of 1,301 households in nine large Mexican cities found an even higher annual consumption of 480 liters per capita.<sup>9</sup> Recently, Mexico's bottled water industry has grown significantly. From 2005 to 2010, the industry grew at an annual rate of 7.8 percent as compared to 3 percent for the United States.<sup>10</sup> While the three largest bottled water companies in Mexico (Danone, PepsiCo, and Coca-Cola) account for 40 percent of sales, a large share of the rest of the market is made up of much smaller local businesses.<sup>11</sup>

Concerns about the quality of tap water, in addition to good advertising campaigns and distribution methods, have helped Mexico's bottled water industry to grow.<sup>12</sup> Consumers have more confidence in bottled water than tap water, but bottled water is a much more costly option, and may not always be safe either. The price of bottled water, at US\$0.068 per liter, is over 200 times the 2004 average price of US\$0.00032 per liter of tap water.<sup>13</sup> Although the estimated US\$1.8 billion in annual bottled water expenditures represents only 0.18 percent of Mexico's GDP, it represents a much larger portion of most families' household incomes.<sup>14</sup> Average monthly bottled water expenditures of US\$10.37 in the IADB survey represent 2.9 percent of US\$350, the approximate median household income reported in the survey, and approximately 9 percent of the 2010 Mexican minimum wage.<sup>15</sup>

The high cost of bottled water disproportionately burdens low and middle-income consumers, who have less capacity to pay and often suffer from the worst piped water service. For example, a 2001 telephone survey in Mexico's Federal District found that in the East Zone, where average monthly income was US\$308, 91 percent of respondents consumed bottled water while in the West Zone, where average monthly income was US\$598, only 61 percent of respondents consumed bottled water.<sup>16</sup> Similarly, the IADB survey found that middle class respondents consumed an average of thirty-six liters of bottle water per capita per month, as compared to forty-four liters for poor respondents.<sup>17</sup> In addition to economic costs, the transport and distribution of bottled water result in substantial energy consumption and environmental impacts.<sup>18</sup>

Despite the high costs of bottled water, monitoring of its quality is limited. The small water bottling companies

popping up in Mexico are so numerous that they are often not inspected.<sup>19</sup> Although there are sanitary specifications governing bottled water, Mexico's Federal Commission for Protection Against Sanitary Risks (COFEPRIS) does not publish information on bottled water quality.<sup>20</sup> A 1999 study of twenty-three brands of bottled water sold in *garrafrones* in Mexico City found that most samples did not meet the Mexican bacteriological standards.<sup>21</sup> Thus, while Mexicans are spending a large amount of money on bottled water, there is no guarantee that all of this water is safe.

### TAP WATER IN MEXICO: GOOD COVERAGE, QUESTIONABLE QUALITY

While it lags behind many developed countries, Mexico's drinking water infrastructure is on par with infrastructure in other parts of Latin America. Water supply coverage is quite high, and CONAGUA, Mexico's National Water Commission, claims that nearly all water supplied is disinfected before being piped in bulk to local operators that distribute it to consumers. However, many people receive only intermittent water service, which is an inconvenience and can result in contamination both in the distribution pipes and during household storage. Water quality monitoring and publication of water quality data are lacking, and the 2010 IADB survey showed that consumer confidence in tap water quality is low.<sup>22</sup> Public investment in water and wastewater infrastructure has risen over the last decade, but as of 2003 lagged behind other countries in Latin America as a percentage of GDP. Water and sewer tariffs vary by region, but are generally low.

### WATER COVERAGE IS SLIGHTLY HIGHER THAN THE REGIONAL AVERAGE

The World Health Organization and UNICEF's Joint Monitoring Program (JMP) estimated that in 2008, 94 percent of Mexicans had access to an "improved" water source and that 87 percent had access to piped supply on the premises. These statistics are similar to Latin America and the Caribbean as a whole, where an estimated 93 percent have access to improved sources and 84 percent have access to piped supply.<sup>23</sup> The JMP defines an "improved source" as "one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with fecal matter."<sup>24</sup> Water supply coverage is lower than average in rural areas of Mexico, where the JMP estimates that in 2008, 87 percent had access to improved supply and 72 percent had access to piped supply on the premises.<sup>25</sup> Coverage also varies significantly by region. In 2010, CONAGUA reported overall coverage of 90.9 percent, with coverage of over 98 percent in some states (Aguascalientes, Coahuila, and Tlaxcala) and below 80 percent in others (Oaxaca, Chiapas, and Guerrero).<sup>26</sup>

### INTERMITTENT SERVICE AND HIGH RATES OF WATER LOSS

While water supply coverage is high in Mexico, the quality of

service is often sub-standard. Many households with piped water receive intermittent service, meaning that they do not always have water available at their taps. In the 2010 IADB survey of households in nine large Mexican cities, 40 percent of respondents said their water was cut off sometimes or frequently.<sup>27</sup> According to the 2010 Mexican census, only 73 percent of households with piped water received water every day for at least part of the day.<sup>28</sup> The problem of intermittency is particularly common in poor and rural areas of Mexico.<sup>29</sup>

In addition to being an inconvenience for users, intermittent supply is a threat to water quality, because contaminants can seep into leaky pipes when they are depressurized and water can become contaminated during household storage.<sup>30</sup> In a study in India, where the same sectors of distribution systems were operated both intermittently and continuously, rates of microbial contamination were higher under intermittent operation.<sup>31</sup> Intermittent supply has been linked to a typhoid outbreak in Tajikistan,<sup>32</sup> a paratyphoid fever outbreak in India,<sup>33</sup> and diarrhea rates in a city in Uzbekistan.<sup>34</sup>

Infiltration of contaminants into pipes is more of a risk where infrastructure is in poor condition. In Mexico City, for instance, the 1985 earthquake and land subsidence due to over-pumping from underground aquifers caused damage to water pipes, increasing concerns that contaminants may be seeping into the drinking water system.<sup>35</sup> A 1995 study in Mérida, Yucatán found that even though 95 percent of 383 samples taken where water entered the household met bacteriological standards, only 74 percent of samples taken from indoor taps in the same households met the same standards.<sup>36</sup> The difference was attributed to deterioration of water quality in cisterns or elevated tanks called *tinacos* used to store water in the household, which could be due to deficient cleaning and maintenance of the tanks by the users. Of households with *tinacos* in the 2010 IADB survey, 13 percent said they never cleaned them and another 3 percent said they cleaned them less than once per year.<sup>37</sup>

High rates of water loss are a key contributor to intermittent supply. While physical losses due to leakage are more directly related to intermittent supply, commercial losses due to illegal connections and unbilled consumption also contribute to the problem. Because commercial losses represent consumption that users do not pay for, they reduce users' incentives to conserve water.<sup>38</sup> The average rate of non-revenue water (water that is unaccounted for either due to physical leakage or unbilled consumption) in Mexico was estimated to be 44 percent in 2005.<sup>39</sup> That is substantially higher than 23 percent, the average for the best-performing quartile of a survey of 123 utilities in developing countries, and 15 percent, the average for developed countries.<sup>40</sup> Based on 2009 data from CONAGUA, non-revenue water averages 39 percent for systems serving over 50,000 people, still quite high.<sup>41</sup> Non-revenue water and wasteful consumption are hard to control

when customers' consumption is not metered, as was the case for 31 percent of Mexican water users as of 2005.<sup>42</sup>

### PUBLIC DISTRUSTS TAP WATER

Consumer confidence in tap water is low in most parts of Mexico, and given intermittent supply, the lack of water quality monitoring, and the lack of publicly available tap water data, these concerns are well founded. According to Mexican Norm NOM-127-SSA1-1994, drinking water should meet standards for forty-one physical, bacteriological, and chemical parameters to be considered potable. However, in practice, at the municipal level water is normally only analyzed for residual chlorine and sometimes fecal coliforms.<sup>43</sup> While it may not be feasible or necessary to regularly monitor all forty-one of the water quality parameters in NOM 127-SSA1-1994 everywhere, more monitoring and publication of water quality results is needed.<sup>44</sup> Given the lack of information, it is difficult to evaluate what the actual water quality situation is throughout Mexico. However, multiple studies in different parts of the country have found significant microbial contamination in tap water by the time it gets to the point of use.<sup>45</sup> Much of this contamination may occur during household storage.

In addition to other treatment that may be needed, drinking water is normally disinfected to inactivate microbes that may be present. In 2010, CONAGUA reported that 97.4 percent of water supplied was disinfected (mainly with chlorine), up from 95.9 percent in 2004.<sup>46</sup> However, these numbers only indicate that the bulk water was disinfected when it entered the system, not that the water contained a sufficient amount of chlorine when it arrived at customers' taps, which is generally the responsibility of local water system operator with supervision from the Federal Commission for Protection Against Sanitary Risks (COFEPRIS).<sup>47</sup> Chlorination practices can also vary over time, so the fact that a water utility normally chlorinates does not mean that it chlorinates 100 percent of the water it provides. A 2004 nationwide study by COFEPRIS found that 16 percent of Mexicans with household connections did not receive an adequate level of residual chlorine at their taps.<sup>48</sup> SACM, Mexico City's water utility, reports that of 5,275 chlorine samples it took in the first eleven months of 2012, 5.1 percent had no chlorine and 1.1 percent had less than the regulatory minimum of 0.2 milligrams per liter.<sup>49</sup>

Apart from microbial risks, some of the aquifers used for drinking water in Mexico suffer from saltwater intrusion and the Comarca Lagunera aquifer is reportedly contaminated with arsenic.<sup>50</sup> Reduction of salinity and the removal of arsenic require additional and more costly treatment processes, which might make bottled water a more economical option for drinking water in these cases.

While the available data does not allow for a comprehensive evaluation of tap water quality in Mexico, it is clear that many Mexicans do not trust it. Only 19 percent of urban households

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in the 2010 IADB survey said they drink water directly from the tap and only 54 percent said they cook with it.<sup>51</sup> Of those who did not drink tap water, 81 percent said they purchased bottled water, 8 percent said they filtered the tap water, and 7 percent said they boiled the tap water.<sup>52</sup> Eighty-one percent of those who didn't drink tap water said they didn't drink it because it is dirty or because they do not trust its quality.<sup>53</sup>

Given the lack of monitoring, this lack of trust in tap water quality is probably well founded, but if there are cases where tap water is of good quality, most consumers have no way of knowing. Mexican water utilities are not obligated to publicize water quality information,<sup>54</sup> and 79 percent of households in the IADB survey said they did not know where to get information about the quality of the water they receive in their homes.<sup>55</sup> Despite monitoring and reporting of bottled water quality being quite limited, 70 percent of the IADB survey respondents agreed or strongly agreed that information was available about bottled water quality, perhaps a result of advertising by the bottled water companies.

Although disinfection is important to ensure the microbial quality of drinking water, chlorination could be part of the reason some Mexicans are turning to bottled water. Chlorine itself results in a flavor that many people notice, particularly people who are not accustomed to drinking chlorinated water.<sup>56</sup> Also, chlorine can react with other compounds present in the water to produce tastes and odors.<sup>57</sup> Many Mexicans, particularly in rural areas, are not accustomed to the flavor of chlorine and do not like it.<sup>58</sup> Thus, even if tap water is disinfected and safe, they may prefer bottled water because of the flavor. This problem is exacerbated when, in an effort to ensure that they maintain a certain level of residual chlorine, some drinking water utilities add more chlorine to the water than they need to.<sup>59</sup> For example, a third of 112 samples collected in a 2009 special sampling campaign in parts of Mexico City were above the regulatory maximum chlorine level of 1.5 milligrams per liter.<sup>60</sup> That regulatory maximum may have been set based partly on taste, since the United States Environmental Protection Agency's maximum residual disinfectant level goal for chlorine, based solely on health risks, is 4.0 milligrams per liter.

If chlorine doses are not too high, the flavor of chlorine may be less of a problem in urban areas than in rural areas. In the IADB's survey in Mexican cities, of the respondents who said they did not drink tap water, only 10 percent said their water smelled bad and only 21 percent said it tasted bad. Forty-four percent, on the other hand, said their tap water had a good smell and 29 percent said it had a good flavor. The rest of respondents who did not drink tap water said smell and flavor were mediocre. Only 6 percent of urban households in the IADB survey said they did not drink tap water principally because it had a lot of chlorine.<sup>61</sup>

The cities of Monterrey and Chihuahua are exceptions to Mexicans' widespread distrust of tap water. In the IADB survey, 60 percent of respondents in Monterrey and 50 percent of respondents in Chihuahua said they drink water directly from the tap. Water service in Monterrey and Chihuahua will be discussed later in this paper.

### WATER AND SANITATION INVESTMENT IN MEXICO

Public water and sanitation investment has increased substantially in Mexico in the last decade. In 2010, total investment in projects that included participation of federal agencies was US\$2.5 billion (US\$1.3 billion from federal funds; US\$420 million from state funds; US\$290 million from municipal funds; and US\$430 million from other sources).<sup>62</sup> That number has increased substantially from US\$1.1 billion in 2002.<sup>63</sup> Of the 2010 investments, US\$720 million went to potable water, US\$970 million to sewers, US\$230 million to sanitation, US\$380 million to improving efficiency and US\$170 million to other items such as studies, projects, and supervision.<sup>64</sup> Most water and sanitation investment has had federal involvement, and thus is included in the preceding numbers. In 2003 the World Bank estimated total water and sanitation investment in Mexico to be US\$1.5 billion,<sup>65</sup> while CONAGUA's figure for 2003 investments with federal involvement was US\$1.1 billion, or 75 percent of the estimated total.<sup>66</sup> While it is difficult to know exactly how much investment comes from commercial credit and the water utilities themselves, the World Bank estimates it to be a small portion of total investment, perhaps only 5 percent.<sup>67</sup> Although increasing in the last decade, water and sanitation investment in Mexico was starting from low levels. Total 2003 water and sanitation investment in Mexico was 0.27 percent of GDP, lower than many other Latin American countries like Chile (0.67 percent), Colombia (0.36 percent) and Brazil (0.38 percent), but higher than Argentina (0.10 percent).<sup>68</sup>

### MEXICANS SPEND ALMOST AS MUCH ON BOTTLED WATER AS THEY DO ON TAP WATER

Mexicans spend nearly as much on bottled water as they do on all of the tap water they use. In 2010, CONAGUA estimated that water utilities billed a total of US\$2.8 billion for domestic water consumption and actually collected US\$2.3 billion, an 81 percent collection rate. That means Mexicans spent 80 percent as much on bottled water as they did on tap water, despite the fact that utilities provided 328 times as much water (by volume) and billed 160 times as much water to domestic customers as the bottled water industry produced.<sup>69</sup> It is important to note that the amount Mexicans pay in water bills often does not represent the total cost of tap water. For instance, in the Federal District, revenues from customers represented 52 percent of the water utility's operating budget.<sup>70</sup>

Water rates vary substantially throughout Mexico.<sup>71</sup> This would be expected since utilities, production costs, and socio-

economic situations vary throughout the country as well. This variation notwithstanding, the average 2004 Mexican tariff of US\$0.32 per cubic meter was only half the Latin American average of US\$0.65 per cubic meter.<sup>72</sup> It is hard to get reliable data on how the revenues utilities collect from their customers compare to their costs, but some hypothesize that revenues are generally insufficient or just enough to cover operating expenses, with nothing or very little left over for investment or even proper maintenance.<sup>73</sup> The large sum of money that Mexicans pay for bottled water suggests they could save a lot if they could be confident enough in the tap water to drink it instead. The following section proposes a strategy for Mexican water utilities to improve services in order to take advantage of these savings.

### A PLAN FOR IMPROVING POTABLE WATER SERVICE AND INCREASING REVENUES

This section lays out a strategy for improving the quality of service provided by Mexican water utilities and, once water quality has been verified, improving customers' perception of tap water. Continuous service and improved water quality monitoring are key components of the strategy. Initially, it could be rolled out as a pilot in a few cities of Mexico, and then expanded. Experiences from the pilot cities can be used to better design the initiation and expansion of the strategy in the rest of the country, and successes in the pilot cities can be used as evidence to promote the expansion of the strategy.

In countries where tap water is safe to drink but some people chose to consume bottled water anyway, bottled water has been shown to be costly, inefficient, and energy intensive.<sup>74</sup> However, there are admittedly significant differences between the drinking water situation in those countries and in Mexico. First, tap water quality is currently deficient in many parts of Mexico, and improving it will require significant investments. Second, bottled water in Mexico is less expensive and probably less resource intensive, since most people consume it from large refillable *garrafrones* rather than small disposable bottles. For these reasons, some might argue that Mexico's two-track system—bottled water for drinking and tap water for everything else—is a viable alternative to the difficult task of maintaining high quality piped water service in low- and middle-income countries. More research is needed into the costs of bottled water consumption in countries like Mexico where tap water quality is inadequate and how they compare to the costs of improving tap water quality. While such research is beyond the scope of this article, some rough cost comparisons can be used to suggest that improving tap water supply to reduce dependence on bottled water would be a cost-effective investment.

### IMPROVING SERVICE AND INFRASTRUCTURE

As discussed in the previous section, intermittency is a weakness of the service currently provided by many Mexican

water utilities. Intermittency is an inconvenience for users, who either have to adjust their consumption patterns to the times that the water is on or invest in household storage to store water for use when the tap water is turned off. Intermittent supply is also a risk to water quality both in the drinking water distribution system and in household storage tanks.

Generally, water supply can be made more continuous by increasing supply capacity or reducing consumption and leakage. Often, all that is needed is a reduction in leakage and wasteful consumption.<sup>75</sup> It is important to note that drinking tap water instead of bottled water would not result in a significant increase in tap water consumption. While Mexico's consumption of 27 billion liters of bottled water per year is a lot of bottled water, it represents only 0.26 percent of the 10.2 trillion liters of tap water supplied in 2010.<sup>76</sup> The first step to making supply continuous in many Mexican systems would be to fix leaks and reduce non-revenue water. Such efficiency measures are often much more cost-effective than increasing supply. For instance, a 1996 study in Mexico City estimated that the per-unit investment cost of leak reduction was one-eighth the cost of additional supply.<sup>77</sup> In some cases, of course, increases in supply and infrastructure amplifications will also be needed, but such measures should only be taken when they are more economically efficient than loss reduction.

Since much of the water quality risk associated with intermittent supply comes from household water storage, once continuous supply is established it will be important to convince users to consume water directly from the tap rather than storing it first. For that to happen, users must be confident that continuous supply will be reliable. It may also be helpful for utilities to assist customers in changing their household plumbing so that water no longer passes through storage tanks on its way to the tap.

In areas of the country where continuous supply may not be immediately feasible, water utilities should take steps to minimize the risk caused by intermittent supply. While further research is needed in this area, some potential risk reduction strategies include protecting drinking water distribution pipes from sewer pipes and other contaminant sources, ensuring adequate supply pressure when the water is on, and promoting safe drinking water storage practices within households.

### WATER QUALITY REGULATION AND MONITORING

Some Mexicans' concerns with the quality of their tap water are well founded. Even if water is treated and disinfected before it enters the pipe network, its quality may deteriorate in the distribution system, particularly if the system is operated intermittently.<sup>78</sup> Increasing service continuity will be an important step to improving water quality. However, in addition to continuous supply, frequent monitoring by a regulatory agency is an important part of maintaining water quality. While CONAGUA and COFEPRIS monitor residual

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chlorine and provide some statistics at a national level, this is not enough. Monitoring should include more water quality parameters than just residual chlorine, such as turbidity and fecal indicator bacteria, and should be done at customers' taps, not just where bulk chlorinated water is entering the system. Also, monitoring should be strategic, focusing on specific contaminants, such as arsenic and other heavy metals, where water sources are vulnerable to those contaminants.

Water quality sampling will only serve as a regulatory spot check to make sure water providers are generally providing high quality water and catch some problems if they arise. In addition to taking water samples, regulatory authorities (CONAGUA and/or COFEPRIS) should monitor water providers' treatment and distribution practices to ensure that they are adequate to maintain water quality.

Improved water quality monitoring is likely to improve consumer confidence in tap water in places where tap water is of good quality. If consumers do not trust governmental entities, such as CONAGUA and COFEPRIS, to do such water quality monitoring, it may be beneficial for some water quality monitoring to be contracted out to an independent private company or an international NGO working in Mexico. Consumers appear to trust private companies to provide them with high quality bottled water, so they might also trust a non-governmental entity to monitor the quality of tap water.

The water quality improvement strategies proposed here do not specifically address problems raised by contamination of some groundwater sources by saltwater intrusion, arsenic, or other inorganic contaminants. Water quality monitoring is important for identifying areas where specific inorganic contaminants are a problem. Once those areas are identified, solutions such as alternative water sources, advanced treatment, and the use of bottled water should be considered.

### PROMOTING TAP WATER AS SAFE AND ECONOMICAL

Even if tap water is safe, customers will not be confident in it unless they know it is safe. Increased water quality monitoring must be accompanied by the requirement that utilities make water quality data readily available to customers. In cases where tap water already meets water quality norms, this transparency will assuage consumers' fears and increase their willingness to pay for service. In cases where utilities are not meeting water quality norms, the required transparency will serve as a motivation for utilities to improve their treatment, disinfection and distribution practices. In a survey of water users in Antalya, Turkey, where about half of the population does not drink tap water, mainly due to water quality concerns, the second most commonly suggested solution to water quality problems (after the removing hardness from the water) was more intensive water quality analysis with publicized results.<sup>79</sup> COFEPRIS or other Mexican regulatory authorities might consider adopting a rule similar to the United

States Environmental Protection Agency's 1998 Consumer Confidence Rule, which requires water system operators to provide their customers with annual reports on the quality of the water provided by the system.<sup>80</sup>

In addition to informing consumers of the quality of their tap water, the Mexican water sector should educate citizens that properly treated and distributed tap water can be just as safe as bottled water and much more economical. As the lead national agency for water and sanitation, CONAGUA is well positioned to lead this campaign. ANEAS, the National Association of Mexican Water and Sanitation Utilities, and COFEPRIS, could also play key roles in the campaign.

As discussed previously, some Mexicans object to the flavor and odor of chlorine in tap water. To address this problem, CONAGUA should work with water utilities to make sure they are not applying too much chlorine and to educate consumers about the benefits of having the proper amount of chlorine in drinking water. Mexican water utilities could also consider the use of chloramines as a disinfectant residual (after initial disinfection with free chlorine) instead of free chlorine, since chloramines result in a less noticeable flavor.<sup>81</sup> However, chloramines' disinfectant properties are different from free chlorine's and the use of chloramines would add complexity to the drinking water treatment process, so it would be very important to carefully analyze the suitability of chloramines for Mexican water systems before promoting their use.<sup>82</sup>

### IMPLEMENTATION: FUNDING IMPROVEMENTS TO SERVICE QUALITY

Estimating the cost of the proposed efficiency and infrastructure improvements is beyond the scope of this paper. However, it is worth pointing out that the amount of money Mexicans spend on bottled water is on the same order as what is spent on piped drinking water supply and the investments that might be needed to improve it. Reducing the amount of money Mexicans spend on bottled water by 50 percent would save consumers US\$900 million per year, enough to increase Mexico's annual investment in water supply by approximately 50 percent of 2010 levels.<sup>83</sup> In the case of the Federal District, water managers there suggested in 2002 that they could modernize water service at an additional cost of US\$200 million per year.<sup>84</sup> According to the 2010 IADB survey, Mexico City residents who buy bottled water spend an average of US\$2.36 per capita per month on bottled water.<sup>85</sup> Assuming 80 percent of the city's 19.2 million people drink bottled water, at US\$0.068 per liter this amounts to annual expenditures of about US\$370 million, almost double what the water managers said they needed in 2002.

The above figures are clearly very approximate. The estimate of \$200 million per year to improve water supply in Mexico City may not include needed long-term investments. Likewise,

increasing water supply investments by 50 percent could lead to increased operational costs. Nonetheless, these rough calculations show that savings from a significant reduction in bottled water consumption could fund an increase in spending on public water supply. It is also important that reduced expenditures on bottled water would be one of many benefits of water and sanitation investments. Users would have safer water for cooking, washing dishes and bathing as well as for drinking, and would save time by not having to purchase and transport *garrafondes*. Continuous water supply would be more convenient for users and would eliminate water storage costs. Sixty percent of the IADB survey respondents had a plastic water storage tank and 18 percent had cisterns. In Tegucigalpa, Honduras, and cities in India, the coping costs associated with intermittent supply have been shown to be high.<sup>86</sup>

It is important to remember that savings from reduced bottled water consumption would go to consumers, but the expense of water supply improvements would be incurred by utilities or whoever is funding them. While this article does not prescribe how improvements to Mexico's water systems should be funded, multiple mechanisms could work. Infrastructure investments could be financed through loans to be paid back by increasing water rates once service quality has improved, bottled water expenditures have decreased, and willingness to pay for tap water has increased. A 2001 study in the Federal District by Soto and Bateman found respondents willing to pay an average of 164 percent more than they were currently paying just to prevent service quality from deteriorating over the next ten years or willing to pay 197 percent more than they were currently paying in order to improve service quality.<sup>87</sup> Any tariff increases should be designed to maintain affordable water supply options for the country's low-income citizens. In focus groups that were part of the same Federal District study, users commented that it would be logical for water prices to vary in accordance with ability to pay.<sup>88</sup> In view of these findings, Soto proposed a rate structure for Mexico City that would vary by neighborhood according to the income level and quality of water service.<sup>89</sup>

Given the vital importance of clean drinking water, as an alternative to water rate increases, government could use general taxes to pay for water supply improvements by increasing subsidies to water providers. One disadvantage of highly subsidized drinking water can be a reduction in consumers' incentives to conserve. In the same Federal District focus groups, users expressed concerns that the current rate structure did not provide sufficient incentive to conserve scarce water.<sup>90</sup> Nonetheless, a properly designed rate structure, using increasing block rates for example, can subsidize water service while still providing an incentive to conserve. In fact, although it took advantage of users' willingness to pay more, the rate structure proposed by Soto for the Federal District still called for continuing some subsidies.<sup>91</sup>

### CASES OF MONTERREY AND CHIHUAHUA: TRUST IN TAP WATER IS POSSIBLE

Compared to other large Mexican cities, in Monterrey and Chihuahua, consumer confidence in tap water is high and bottled water consumption is low. Sixty percent of Monterrey respondents and 50 percent of Chihuahua respondents in the 2010 IADB survey said they drink water directly from the tap. The higher rate of tap water consumption appears to be due to fewer concerns with tap water quality. Ninety percent of respondents in Monterrey and 82 percent in Chihuahua said that tap water was safe to drink, as compared to the average of 41 percent across nine cities surveyed.<sup>92</sup> While most respondents in Monterrey who did not drink tap water bought *garrafondes*, 73 percent of Chihuahua respondents who did not drink water directly from the tap said they filter tap water to drink rather than buying bottled water.<sup>93</sup>

According to commonly used indicators, Monterrey's water utility performs much better than most Mexican utilities, but Chihuahua's utility appears to perform about average. Water supply in Monterrey is more continuous than other cities, but that is not the case for Chihuahua. Eighty seven percent of respondents to the IADB survey in Monterrey said their water was rarely or never cut off, as compared to 58 percent for Chihuahua and an average of 60 percent for the nine cities surveyed.<sup>94</sup> Both Monterrey and Chihuahua's utilities have high customer metering coverage and operate with high commercial efficiency as compared to other Mexican water utilities (Table 1). However, water losses are significantly lower and physical efficiency (which takes into account leakage) is higher in Monterrey as compared to other Mexican utilities, while Chihuahua is about average along these metrics. Further research into why utility customers in Monterrey and Chihuahua drink tap water could be useful for other Mexican water utilities looking to improve service quality.

### CONCLUSION

The large amount of money spent on bottled water in Mexico, partly because consumers cannot trust their tap water, reflects poorly on the country's water and sanitation sector. Fortunately, this situation represents an opportunity for savings through reduced expenditures on bottled water if tap water service is improved by taking the following measures:

- Improve efficiency and infrastructure in order to provide continuous water supply.
- Institute an extensive water quality monitoring program, led by an institution with consumer trust.
- Keep consumers informed of the quality of their tap water and educate them about the safety of properly treated and distributed tap water.

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**Table 1. Comparison of 2010 performance indicators for water utilities in Mexican cities<sup>95</sup>**

	<b>Monterrey</b>	<b>Chihuahua</b>	<b>Average Across Reporting Mexican Utilities</b>	<b>Number of Reporting Utilities</b>
<b>Water production (liters/person/day)</b>	254.19	288.3	256.03	99
<b>Commercial efficiency (%)</b>	99%	83%	69%	64
<b>Physical efficiency 1 (%)</b>	73%	59%	63%	65
<b>Global efficiency (%)</b>	71%	52%	43%	59
<b>Customer metering coverage (%)</b>	99%	92%	56%	92
<b>Losses per connection (m3/connection)</b>	88.8	150.13	141.54	69

- As consumer confidence in tap water grows, assure the financial stability of water utilities, either through increased rates or increased government funding, using the new revenues to fund drinking water infrastructure improvements.

More research on the costs and benefits of improving tap water supply is needed, but it is clear that the savings from a significant reduction in bottled water consumption would be

enough to fund an increase in Mexico's spending on public water systems. While Mexico is an extreme case of bottled water consumption, similar strategies could also be used in other countries where consumer confidence in tap water is low. Perhaps even more importantly, Mexico's current situation should serve as a warning to other countries where consumers still trust tap water but water supply systems are vulnerable due to unplanned urban growth, intermittent water supply and underfunded water utilities.

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### ENDNOTES

[1] The IADB estimates consumption at 7.23 billion gallons or 27.6 billion liters per year ["Latin America's Other Water Infrastructure." November 10, 2011. <http://www.iadb.org/document.cfm?id=36984584>]. LGA Consulting estimated 2009 consumption at 26 billion liters [Bottled Water in Mexico: Second in the World & Growing. LGA Consulting Blog. Dec. 3, 2010. <http://www.lgaconsulting.com/blog/bottled-water-in-mexico-second-in-the-world-growing/>]; Johnson, Tim. McClatchy Newspapers. In Mexico, fear of tap water fuels bottled-water boom. May 27, 2010; IADB. "Latin America's Other Water Infrastructure." November 10, 2011. <http://www.iadb.org/document.cfm?id=36984584>.

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com/blog/bottled-water-in-mexico-second-in-the-world-growing/] estimates Mexican bottled water industry revenues to be \$140 billion pesos (US\$11.0 billion) per year, but it is unclear how they arrived at the figure; CONAGUA. Situación del Subsector Agua Potable, Alcantarillado y Saneamiento. 2011. <http://www.conagua.gob.mx/CONAGUA07/Publicaciones/Publicaciones/DSAPAS%20Edicion%202011.pdf>.

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# TRANSPORTATION SPENDING IN AN ERA OF CONSTRAINED BUDGETS: A CONVERSATION WITH

FORMER CONGRESSMAN FROM MINNESOTA JAMES OBERSTAR

INTERVIEW BY RAPHAEL BARCHAM, CRAIG BOSMAN, AND KEVIN MCNELLIS



James Oberstar represented northeast Minnesota's 8th District in the United States House of Representatives for thirty-six years, from 1975 to 2011, and was the longest-serving member of Congress from Minnesota ever. He served as Chairman of the House Transportation and Infrastructure Committee from 2007 to 2011 and as ranking minority member of the committee from 1995 to 2007. He is well known for his co-sponsorship of SAFETEA-LU, a \$286.3 billion program that funds transportation infrastructure, including highways, bridges, and public transportation. He currently serves as a Senior Advisor to National Strategies LLC, a Washington-based consulting firm, a board member for Geronimo Wind Energy, and the Board Chair of the Center for Excellence in Rural Safety at the Humphrey School of Public Affairs at the University of Minnesota.

*PolicyMatters* sat down with Congressman Oberstar during his week in residency on the University of California, Berkeley campus to discuss the recently passed surface transportation reauthorization bill and policy mechanisms that could be utilized to close the infrastructure financing gap.

**PolicyMatters Journal (PMJ):** *We want to start off with a question on the recent surface transportation reauthorization bill, the Moving Ahead for Progress in the 21st Century Act (MAP-21), which had been a very routine spending bill but was the subject of a very contentious fight this summer. From a perspective outside of Capitol Hill, what are your thoughts on the reauthorization?*

**Congressman Oberstar:** Well it's not the status quo. It's a step back from the status quo actually. Investing less than previously, and because there was no restoration of funding for the Highway Trust Fund, it's a very significant step back—instead using general revenue dollars to replace the missing dollars from the Highway Trust Fund. The factor that we need to understand first is that the value of the highway construction dollar has eroded nearly 50 percent in just the last eight years. Construction costs have gone up; cost of materials have gone up. China, India, and the European

Union are all building and upgrading their [transportation] networks, driving up the price of construction materials, while we are sitting back and in fact back-paddling. So the price of construction materials has decreased the purchase value of the Highway Trust Fund dollar.

We need to keep pace if we're going to compete in the world marketplace and compete effectively here at home. There is a cost to congestion, and we're seeing congestion choking our major metropolitan areas. [This] also impedes the ability of rural areas to move goods to market because we haven't improved the circulation of goods in the metropolitan centers and have not developed freight corridors to move goods from point of production to point of consumption.

Previously we had annual appropriations for the highway system, which we today call the national highway system.

Prior to the interstate system, each state got what it could under an allocation system out of general revenues, but the interstate highway changed all that. The money in the first fifteen years went directly to the highway system. By 1982, we created the national highway system, and what we created for construction was the certainty of the availability of dollars [through the Highway Trust Fund]. A distribution formula was established and agreed upon by all the states. Now states could take on projects that would take two to three years to complete knowing that the money would be available at the end of the project.

Now with the bill that passed this summer, we're back to an era of general revenue appropriations. Twenty billion dollars added to the program will function as the dedicated revenue stream. But if there is a sequester in the post-election Congress and they're pressed to reduce revenues in order to reduce deficit, then that money can directly come out of the highway and transit program. So with this bill we made a slide backwards into an era of uncertain policy and uncertain funding for transportation programs.

**PMJ:** *On a political level, do you think the model of large multi-year transportation funding authorization bills is no longer feasible or needs to be changed in some way, given the contentious process and result of MAP-21? In other words, does the whole model need to be changed, or do you see the model as still good but that the content can be improved in future Congresses?*

**Oberstar:** The model has proven its effectiveness. We know that you wouldn't be able to build miles and miles of this high-caliber highway system that we have without sustained dedicated revenue streams that ensure the completion of the project at the time of the bid awarding. What's missing in the whole equation is the political will to inform the public to advocate for an increase in user fees, and to adjust it to the construction cost index and not to the consumer price index.

There are arguments from skeptics—the Tea Party and budget hawks—that say trust funds are unsustainable; the revenue source is not realistic; and that the fuel-efficient automobiles and electric cars cannot be taxed at the pump. That's nonsense; the issue is not how much fuel the vehicle is using. The issue is how much of the road it's using, and how much impact on our highway system it is making.

Trucks put a huge pressure on highways and bridges. Trucks,

since 1948, have doubled in size, length, and weight. It is putting enormous pressure on our roads, and the American Trucking Association supports an increase in the gas tax. They [trucking companies] already pay a higher fee right now with diesel fuel costs, and they pay for tires and other truck products where the taxes go into the Highway Trust Fund. What they can't stand is the congestion that chokes their movement of goods.

You could order whatever you want and anything you need from internet sites, but the internet doesn't deliver that bottled water or that chair to your house. The truck does; part of that journey goes by rail, some of it goes by air, but in the end that truck has to get to your house. If it's sitting in traffic, it's not being productive. Every five-minute delay that UPS trucks experience nationwide costs the company \$100 million—measured by overtime payment to drivers, late delivery fees to customers, and the maintenance costs of vehicles because they're driving on roads in such bad shape.

So congestion has a real cost. In the Twin Cities, about five years ago, the group Minnesota 2020 was advocating for an increase in the gas tax to have more investment in Minnesota highways statewide—but especially in the Twin Cities. So they all got together with the legislators and increased the gas tax by ten cents, which was at first vetoed. They came back with five cents, which overrode the veto. Minnesota now has over \$1 billion per year in revenue along with constitutional amendments, which I supported, and we reinstated the vehicle tax and the vehicle registration fees. So Minnesota is one of the few states—maybe the only state—that passed the gas tax in recent years.

**“There are arguments from skeptics—the Tea Party and budget hawks—that say [the Highway Trust Fund] is unsustainable; the revenue source is not realistic; and that the fuel-efficient automobiles and electric cars cannot be taxed at the pump . . . The issue is not how much fuel the vehicle is using. The issue is how much of the road it's using, and how much impact on our highway system it is making.”**

**PMJ:** *Will an increased gas tax and other user fees really be feasible in the current political climate?*

**Oberstar:** I think you have to rethink the whole equation. Is fuel consumption the yardstick of measurement for our effect on the roadway, or should it be the use of that roadway?

Fuel consumption, that is cents per gallon, was considered to be the best indicator of use of our road system and the need of each state for its share of the Highway Trust Fund that we established as the gas tax emerged in 1956.

In the last stages of the interstate highway legislation, the idea of a gas tax emerged. Users of the system would pay for it; it was three cents. Gasoline was thirty-three cents per gallon, so that was 10 percent of the cost of the fuel. People paid it willingly and it passed the [U.S.] House and Senate. Then two years later the Bureau of Public Roads came back to the Congress and said, “We’ve made new calculations. The cost of construction is going up, so we need another cent.” That penny passed in the House by a voice vote; you can’t pass a prayer on a voice vote today. The consensus is missing, what’s happened to that?

We didn’t have another increase [in the gas tax] until 1982, and then in 1992 with George [H. W.] Bush. Part of it was to go to deficit reduction. So we’ve been on autopilot since 1993 and have passed two transportation bills, now a third, that did not increase the user fee to finance the future of transportation. That’s not reasonable; that’s not sustainable. Now some things have changed in the meantime—more fuel-efficient cars and electric cars—so we have to come back and rethink the basic principle. Is fuel consumption the best yardstick for use of that roadway?

**PMJ:** *Do you see some vehicle miles traveled (VMT) fee as being desirable or feasible to replace part of the gas tax or to supplement it?*

**Oberstar:** In 1956, the average household had one vehicle, now it’s three. That one vehicle traveled 9,600 miles [annually], now we’re traveling 15,000 miles per vehicle. The use of the roadway has exploded; the impact on our highways is tangible. We had 70,000 bridges in 1986 that were structurally deficient or functionally obsolete. I held a hearing after the collapse of the I-35 Bridge in Minnesota in September 2007. We had 153,000 bridges that were structurally deficient or functionally obsolete.

That’s not sustainable. We have to look at other models as a supplement to the [Highway] Trust Fund revenues, but I think that should remain as an anchor program. The user fee should be increased and should be indexed to construction

costs—to keep pace with use—while we experiment with vehicle miles traveled. Oregon did undertake a [VMT] initiative about five years ago; 286 vehicles participated in the initiative, and they found that it’s doable.

Then this raised a privacy concern: people claiming that the government will know where you are. But everyone uses a cellphone these days and that knows where you are. Your credit card knows where you are, so what’s the big fear of the device in your car that will tell you and some billing source how many miles you’ve traveled. You can put filters that prevent it from knowing where you’ve driven; some truck drivers have that concern. For electric vehicles, all you do is put an application into the charger at home that says how much electricity you’re using and have a formula that relates to miles driven. That car is not skimming above

the road surface. It’s using the highway. No matter the energy source, you need to make your contribution for using it. So yes, there are other ways of generating revenue in our urban mobility.

**PMJ:** *What political arguments do you think will be most effective to persuade the current and future Congress to do these kinds of things—trying new supplemental funding mechanisms and supporting other areas that we think are important, such as pedestrian and bicycle infrastructure? What events can change the paradigm here?*

**Oberstar:** The most important argument, I believe, should come from the business community. Anything that consumers buy moves by truck. Very few people go to the store and buy large products and bring it home. If the business community doesn’t let its voice be heard in the legislative halls, then these actions won’t be taken.

What I advocate is that businesses aren’t going to have a significant bottom line if they can’t move their goods to and from market. So they have to be in the forefront in this advocacy. If it costs you more to get those goods to market, then you’re losing your costs to logistics. In the 1980s, logistics—moving goods to and in the marketplace—was consuming 17 percent of GDP. Then because of the accelerations of the interstate highway program and improvements in urban settings, that dropped by the year 2000 to 7 percent. But each year since then it has been creeping up, and now it’s about 10 percent of GDP

again. Our roadways have not improved to keep pace with the growth of business and the movement of freight. So all those folks who are trying to ship products, they have to be the advocates for increased investments. It's been on autopilot too long; they need to take notice.

**PMJ:** *Social equity has become a bigger issue when thinking about transportation initiatives. How can we target our federal dollars into areas that are most in need of transportation infrastructure?*

**Oberstar:** The most important mode for social equity without making transportation a welfare issue or a social benefit issue is to discuss it as urban transit: the ability to move people within urban areas, fluidly and efficiently. For example, the PACE system in Chicago. In the '70s, there were these shopping malls in suburban Chicago but no one to work there and no one to do domestic work in homes. So Chicago experimented with job access in reverse commute with compensation from the public sector and also the business sector to cover the cost of domestic and shopping center workers to travel from the center city to suburbs and back. They found that for every \$1 million of support, they generated \$10 million in revenues.

The South Line light rail extension in Sacramento, only 6.8 miles, had 3,200 people ride the opening day. Many of those people, prior to its opening, either had no access to work or had to carpool. Now they had public transit and 2,700 vehicles came off the roads in one week. Who did it serve? The low-income communities in Sacramento.

That's a huge social impact benefit, and we can repeat that all across the country. Transit use has been growing at 1 million new riders each day for the last seven years, with 10.6 billion transit trips last year. On the other hand, compare that to Paris where 11 million people per day use the Metro; that's 3.5 billion rides per year. Paris alone is equal to one-third of our nationwide transit use.

**PMJ:** *To switch gears, we want to hear your thoughts on the dysfunction of Congress. In your opinion, what has contributed most to this dysfunction?*

**Oberstar:** I was asked the other day, whom I thought was the most effective president in dealing with Congress, and I said Harry Truman. He's probably one of the last presidents to come to Capitol Hill. Truman would come up and they would have bourbon and brandy, play poker, and talk politics

about what needed to be done once or twice a week. They don't do that anymore. The president is too busy; Congress is too busy. They're too busy chasing the money stream.

Congress meets fewer days per year, does less substantive legislative work, retreats to their respective ideological corners, does not discuss issues substantively, and becomes—the House more than the Senate—a reflection of a parliamentary system. That is not what the framers of the Constitution intended. The filibuster has closed off rational discussion of substantive issues. There is a polarization of fortress districts. The intensity [for members] of needing to spend time in their district than in Washington because of the influence of money in campaigns has changed everything.

**“Congress meets fewer days per year, does less substantive legislative work, retreats to their respective ideological corners, does not discuss issues substantively, and becomes . . . a reflection of a parliamentary system. That is not what the framers of the Constitution intended.”**

In my first election in 1974, there were 800 incumbents and challengers. Those 800 spent \$75 million in 1974. In 2010, it was \$1.2 billion. We didn't have the first million-dollar House race until 1978. That was a year where there were nine races in which each candidate spent \$500,000 and another twenty or so spent \$250,000. Spending \$250,000 now doesn't even get you in the door anymore. In my district, \$3.5 million is coming in from outside money. Money is flowing in, but we're in the midst of a recession. Where is all the money coming from? There is going to be over \$2 billion spent in the congressional elections this year [in 2012].

So what does that say and what consequence does that have on the legislative process? You see the flood of members making calls asking for money. Then they attend fundraisers and travel across the country raising money from lots of different groups. You don't get money from people you don't support, and a good many support you because you're an advocate for their issues not because they gave you money. There's always that suspicion: if you're tilting on an issue and say, “This group supported my campaign and they're probably good guys,” then you'll probably lean their way.

# PAYING FOR TRANSPORTATION INFRASTRUCTURE: OPTIONS FOR CREATING REVENUE THROUGH THE FREIGHT SYSTEM

DAN SMITH AND DAVID PEYTON

EDITED BY KEVIN MCNELLIS AND EMILY VAUGHAN

As the possibility of a new highway spending bill arose in 2010, the National Cooperative Freight Research Program (NCFRP) at the National Academy of Sciences commissioned *Project 29: New Dedicated Revenue Mechanisms for Freight Transportation Investment*.<sup>1</sup> This paper summarizes the analysis and findings of that effort, which identified feasible options for dedicated federal revenue streams for infrastructure investments and assessed the relative merits and implementation challenges of these options. While no single revenue mechanism can meet all of the objectives laid out by the NCFRP, it is clear that registration fees and fuel taxes are more pragmatic options than Vehicle Miles Traveled (VMT) fees. Further clarification of national transportation infrastructure policy goals and consideration of these options by federal policymakers is needed.

## BACKGROUND

National investment in transportation infrastructure has lagged demand, and the shortfall has gained political visibility. U.S. infrastructure spending stands at about 2.5 percent of GDP, versus 5 percent in Europe. Multiple commissions and studies have concluded that U.S. expenditures on surface transportation infrastructure are far too low to keep pace with growing volume.<sup>2</sup> Estimates place the annual federal requirement as high as \$40 billion while current fuel and excise taxes generate only about \$30 billion, and not all of that is spent on infrastructure.

Nowhere is this gap more apparent than in the nation's freight transportation system. Nearly all consumer goods used and sold in America move at some point by truck on publicly financed roads and highways.<sup>3</sup> A new national infrastructure index confirms that highway congestion is increasing while overall surface transportation performance is slipping.<sup>4</sup> A recent study by the American Transportation Research Institute found peak-period truck speed reductions of as much as 30 percent in 250 congested locations.<sup>5</sup> Corresponding freight transportation and logistics cost increases eventually find their way to the consumer.

The recent recession provided only a brief reprieve in the rapid growth of U.S. commerce and trade and the resulting demand for freight movement. Private railroads, pipelines, trucking companies, airlines, and barge operators have invested cautiously to add capacity just ahead of demand.

Public airports and seaports with revenue streams and access to the bond market have likewise added capacity.

In contrast, federal investment in highways, inland waterways, and deep draft navigation has lagged well behind the growth in demand. This federal investment shortfall is becoming increasingly manifest. Symptoms of this problem include:

- Capacity shortfalls, pavement deterioration, and obsolete geometry on federal-aid highways that impede the flow of trucks.
- Obsolete and failing locks on inland waterways, which cause delays, restrict capacity, and increase operating costs.
- Shortfalls in maintenance dredging and channel improvement funding, which restrict the ability of some U.S. ports to handle larger ships and expanding trade.

There are several reasons for the shortfall:

- Federal fuel taxes account for about 90 percent of federal Highway Trust Fund investments but have not been increased since 1993, while inflation has reduced their real buying power.<sup>6</sup>
- About 15 percent of federal fuel tax revenue is diverted to transit and other non-highway uses.<sup>7</sup>
- The Harbor Maintenance Trust Fund has a large unspent balance because Congress has not authorized its full use for port projects.<sup>8</sup>

- Legislation was passed frequently between 1938 and 2000 to fund waterways and harbor dredging.<sup>9</sup> Since then, congressional inaction has left gaps of five to seven years between major funding bills.

The persistent funding shortfall and lack of dedicated funding for freight infrastructure has prompted industry, academic, and government concerns and proposals for alternative funding mechanisms. Most such proposals remain highly conceptual, however, with little detailed analysis.

As the possibility of a new highway spending bill arose in 2010, the National Cooperative Freight Research Program (NCFRP) of the Transportation Research Board commissioned *Project 29: New Dedicated Revenue Mechanisms for Freight Transportation Investment*.<sup>10</sup> This paper summarizes the analysis and findings of that effort.

The study had three objectives: (1) Identify feasible, practical options for providing dedicated federal revenue and finance mechanisms to support investment in freight transportation infrastructure; (2) provide a comprehensive analysis of the functioning and implications of the potentially most viable options; and (3) assess the relative merits of these potentially most viable options and describe in detail requirements and steps for their implementation and operation.

The study assumed that the federal fuel tax system would remain in place as the major revenue source for federal transportation infrastructure funding. The study team concentrated on potential mechanisms to fund a national freight infrastructure program analogous to the existing Highway Trust Fund, which is currently supported by fuel and excise taxes.

## EVALUATION CRITERIA

The study scope laid out evaluation criteria for freight transportation infrastructure revenue mechanisms, including:

- **Net Revenue and Efficiency.** The gross revenue from any given tax burden will be offset by the federal cost of implementation, collection, and enforcement. The total burden on the freight industry includes the tax or fee itself and the costs of implementation and ongoing compliance. Comparing the net federal revenue to the total industry burden yields insights into revenue efficiency.
- **Long-term Revenue Outlook.** Improved fuel efficiency, increased use of alternative fuels, and potential substitution of electric power will reduce the long-term revenue potential of fuel

taxes. Other revenue options may induce modal shifts or other effects that impact their long-term revenue potential.

- **Technical Feasibility.** Implementing a tax or fee system requires measuring the activity being taxed, collecting the data, and translating that information into tax or fee payments.
- **Multi-modal Application.** Policymakers on many levels would prefer to coordinate planning and funding for the truck, rail, marine, and air freight modes. That preference would be served by a revenue mechanism that could be applied across modal boundaries.
- **Linkage Between Use and Payment.** Reflecting the public finance principle of “user pays,” many proposals reflect a strong preference for “user fees” varying with the impact of freight operations. Some of this preference seems attributable to the expectation that user fees will function as prices for road use and encourage economic efficiency.
- **Incentives and Impacts.** Incentives and secondary impacts of revenue mechanisms should encourage transportation efficiency, congestion reduction, and environmental responsibility.
- **Equity.** Candidate revenue mechanisms will have different impacts on different freight industry participants. While perfect equity is likely unachievable, deviations from equity should be minimized and should be consistent with some public purpose where possible.
- **Political and Public Acceptance.** A definitive conclusion on changeable public and political option is illusive, but surveys and public reactions to date can be used to identify specific acceptance handicaps.

## CANDIDATE REVENUE MECHANISMS

The study team began with a list of over thirty possible revenue mechanisms and narrowed them to a few freight-specific candidates.<sup>11</sup> Three major revenue categories were eliminated based on the following considerations:

*Carbon taxes* are essentially fuel taxes when applied to transportation since fuel accounts for almost all the carbon content of transportation activities. To fund infrastructure, carbon taxes would have to be much higher, and give a much higher share to transportation than in any proposals to

## PAYING FOR TRANSPORTATION INFRASTRUCTURE

date. All U.S. carbon tax proposals to date have focused on environmental incentives and remediation rather than funding infrastructure, and few have been successful. Lacking adequate revenue potential or political acceptance, carbon taxes are not a promising revenue source for freight infrastructure for the foreseeable future.

*Waybill, bill of lading, or value-added taxes* would impose a tax on freight transportation service.<sup>12</sup> However, many—perhaps even most freight shipments—are carried by private shipper-owned fleets, where no invoice or bill of lading is ever generated. Defining taxable transportation services provided by private fleets and estimating their fair market value would be extremely difficult, and would almost certainly introduce market distortions between private transportation by shipper-owned fleets and for-hire transportation by commercial truckers. Moreover, there is not a close relationship between the price charged for transportation service and its impact on infrastructure. Such taxes were therefore judged to be technically infeasible, and to have fundamental incentive and equity shortcomings.

*Public-private partnerships (PPPs)* between state agencies and private concerns to build infrastructure provide flexibility and leverage rather than new revenue streams. PPP funding sources can usually be accessed through revenue bonds or other instruments. The efficiencies of private sector operation are also theoretically accessible through outsourcing or design-build-operate contracts. *An investment tax credit (ITC)* can encourage private investment of a particular type or in a general development direction. Neither PPPs nor ITCs, however, bring significant new revenue into the federal funding system.

These considerations further narrowed the field to three major options with variations on each:

- A fuel tax surcharge.
- Vehicle miles traveled (VMT) fees.
- Federal vehicle registration fees.

These options are described below and then compared in a following section.

### FUEL TAX SURCHARGE

Increasing the existing federal taxes on diesel fuel and gasoline is the most straightforward way to increase overall revenue for transportation infrastructure. However, an overall fuel tax increase would not necessarily yield a dedicated revenue stream for freight infrastructure.

**Fuel Tax Surcharge Options.** This study considered fuel tax surcharges, levied on some subset of the truck population. Fuel tax surcharges would be dedicated “user fees” varying

with miles traveled and vehicle weight, since fuel consumption rises with both factors. Raising large revenues entails reaching as many vehicles as possible; conversely, the more narrowly targeted a surcharge becomes, the lower the expected yield.

*Applicability:* All the options yield different results depending on which trucks are subject to taxes or fees. Medium-duty and heavy-duty trucks are classified as gross vehicle weight (GVW) Classes 4-8, with Classes 7-8 being the largest trucks and “semis.”

There are about 9 million Class 4-8 trucks in the U.S. About 7 million can carry freight, based on their body type, although it is impossible to say how they are being used. About 6 million of those “freight” trucks use diesel fuel, and about 4 million are Class 7-8 trucks. Most of the Class 7-8 trucks use diesel, so there are about 3.8 million heavy-duty “freight” diesel trucks.

*Policy Design:* The two choices are (1) whether to impose the surcharge on diesel only or on all fuels, and (2) whether or not to rely on electronic vehicle identification.

- **Diesel Fuel Tax with Non-freight Refunds.**

This option is essentially that proposed in the Freight FOCUS Act of 2011 (H.R. 1122), which would target freight highway users through increased diesel fuel taxes with annual tax refunds or tax credits for non-freight vehicles.<sup>13</sup> An extra twelve cents per gallon would go into a new Goods Movement Fund. All diesel fuel buyers would pay the higher rate, with no new record keeping requirements. Non-freight diesel fuel purchasers would have to incorporate refund or credit requests in income tax filings, and in the legislation tax-exempt entities might receive payments directly from DOT. The fuel tax surcharge itself would be collected through the existing system at no incremental cost.

- **Diesel/Gas Tax with Non-freight Refunds.**

To cover all highway freight vehicles, or all medium- and heavy-duty trucks, it would be necessary to cover all fuel types including gasoline, natural gas, and ethanol. Doing so would spread the tax burden more equitably across freight vehicles, but would dramatically expand the number of vehicles involved and the corresponding costs of compliance.

- **Diesel Fuel Tax with Vehicle Identification (ID).**

Another option for a freight-only fuel tax surcharge is to identify the vehicle electronically at fueling locations. There are several technologies available, most relying on dedicated short-range communications

(DSRC). Federal implementation costs to develop standards and a national data collection system would be substantial, as would on-going collection and enforcement costs.

- **Diesel/Gas Tax with Vehicle Identification.** Expanding a vehicle ID system to cover all fuel types while distinguishing freight from non-freight vehicles would increase implementation, collection, and compliance costs significantly. All U.S. vehicles (about 250 million) would have to be equipped with ID tags to signal the appropriate tax rate at fueling locations.

**Collection.** Existing fuel taxes are paid by the fuel producer or wholesaler twice each month from roughly 1,000 “rack” locations, the points at which fuel leaves wholesale storage for delivery to retail outlets. The system is highly efficient because it does not require vehicle identification or vehicle-by-vehicle transactions and accounting. Trucks that operate and purchase fuel in more than one state reconcile taxes paid and VMT by state under the International Fuel Tax Agreement (IFTA) system. A similar annual or periodic statement reconciling fuel taxes owed could also be a means of collecting a federal tax or surcharge.

Making a fuel tax vehicle-specific would negate much of the fuel tax’s efficiency. A low-tech tax option would use the current system; the additional diesel or gas tax would be collected at wholesale “rack” locations, and all customers would pay the same tax rate at the pump (or equivalent purchasing method). Eligibility for a tax refund or credit would depend on vehicle type. A high-tech vehicle ID system would use wireless technology to identify the vehicle and the appropriate fuel tax rate at the point of purchase. Tagging all diesel vehicles (or for a diesel/gas option, all vehicles) would be very costly. Presumably this cost would have to be borne by the vehicle owner; otherwise a federal subsidy would raise the public implementation costs significantly. The fueling station itself would also have to be equipped with technology to identify vehicles and charge the appropriate tax rate.

#### VEHICLE MILES TRAVELED (VMT) FEES

A Vehicle Miles Traveled (VMT) system would impose charges on vehicle owners or operators based on the number of miles traveled on public roads and highways. VMT fees (also known as mileage-based user fees, or MBUFs) have been widely discussed, as a replacement for fuel taxes.<sup>14</sup> VMT fees might mitigate the expected decline in fuel tax revenue from fuel efficiency improvements. Interest in VMT fees has also been driven by their potential application in congestion pricing and toll collection.

**VMT Fee Options.** While there are numerous variations on

VMT fees, they can be split into two basic types:

- **Distance/Vehicle VMT Fees.** Distance/vehicle VMT fees would vary by vehicle class (e.g. GVW Class 4-8) and charge operators for the miles traveled by each vehicle. VMT fees would vary directly with mileage, fulfilling the desire for “user fees.” VMT fees for trucks could be implemented through a high-cost/ high-tech on-board unit (OBU) or through a low-cost/ low-tech mix of OBU, commercial, and self-reporting systems. In either case there would be high federal collection and enforcement costs, and a long implementation period. Distance/vehicle VMT fees would not support congestion pricing options because they would not identify location or time of travel.
- **Time/location VMT fees.** Time/location VMT fees would use Global Positioning System (GPS) technology or other systems to identify the time and location of travel and vary the fee accordingly. Each truck would be equipped with such a system, a costly undertaking for the trucking industry.<sup>15</sup> Time/location VMT fees would permit incorporation of tolling and congestion pricing. However, implementation of congestion pricing or tolling would still depend on local initiatives. To date, the only two public congestion pricing proposals (in New York City and San Francisco) have been withdrawn in the face of public opposition.

**Collection.** The complexity of distance/vehicle and time/location VMT fee systems would require more elaborate collection mechanisms than other options. For passenger cars and light trucks it is generally thought that implementation of VMT fees will require universal installation of on-board devices to track miles traveled and automatically communicate either the raw information or a VMT fee total to the taxing authority. Implementation of distance/vehicle VMT fees in much of the freight and service trucking sector may be technically easier than in the passenger sector due to the growing use of commercial on-board units in fleets and the existing VMT reporting system used to apportion state fuel tax revenue for interstate trips, but would still face formidable cost and acceptance barriers.

Annual collection costs for a distance/vehicle VMT fee are variously estimated to range from about \$10 to \$100 per vehicle. The lowest figures are informal “guesstimates” that are not backed by empirical data or analysis. The most appropriate estimate obtained by the research team is a figure of \$35 per vehicle for the administrative and collection costs of the E-Z Pass system in the Northeast U.S. That estimate

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is used in later cost comparisons of revenue options. The higher collection cost estimates (up to \$100 per vehicle) would further decrease the net federal revenue. The collection costs for time/location VMT fees would be higher still, but have not been reliably estimated.

### FEDERAL REGISTRATION FEE

Heavy-duty truck owners pay annual registration fees to the states and to the federal government. The federal tax is a maximum of \$550 per year, and there is a sales tax on new trucks and an excise tax on truck tires.

**Registration Fee Option.** The research team concluded that the simplest and most cost-effective means of generating revenue for a dedicated freight infrastructure fund would be an expanded federal registration fee on medium and heavy-duty trucks (e.g. GVW Classes 4-8) that varied by vehicle class. A registration fee would not be a direct user fee but would be a proxy for truck infrastructure impact and requirements.

**Collection.** Federal registration fees could be implemented by expanding the existing Heavy Vehicle Use Tax system, which presently covers only Class 7-8 trucks. The Heavy Vehicle Use Tax is an annual lump sum tax. There would be a relatively small increase in labor and electronic processing capability required but no new technology.

An alternative to direct federal registration fee collection would be “piggybacking” on state registration fee collection. All states currently factor vehicle weight or weight class into their registration fees, so a federal registration fee that varied by vehicle weight class should be compatible. Truck owners would make one annual payment covering both state and federal fees. Besides the lower public sector collection cost, “piggybacking” would reduce industry compliance cost.

### SUMMARY COMPARISONS

Table 1 summarizes and compares the leading revenue options based on the key evaluation criteria. The ratings are relative, rather than absolute. Moreover, many of the rankings depend on the details of revenue mechanism design rather than fundamental characteristics.

As the table shows, *no candidate mechanism excels against every criterion*. None of the options are particularly promising for multi-modal application, and none of them create significant efficiency incentives. As a revenue mechanism, a federal truck registration fee appears to be most productive and most practical. A registration fee, however, does not achieve many of the ancillary objectives such as facilitating transportation demand management. The summary table, in fact, can be seen as an example of how difficult it is to pursue multiple policy objectives with a single policy instrument.

**Net Revenue and Efficiency.** To compare the tax burden and revenue efficiency, the research team analyzed the results of a \$5 billion annual gross revenue for each of the three options. The \$5 billion target was chosen to illustrate the differences between the options, not as a policy goal. Table 2 shows revenue and cost estimates as applied to either Class 4-8 freight trucks or all Class 4-8 trucks. The rates required to yield \$5 billion in gross revenue depend on the subset of trucks to which the rates are applied. Widening the scope yields lower rates.

The three leading options could all yield substantial revenue for freight infrastructure. Note however, that a \$5 billion tax burden can yield as little as \$4.3 billion in net federal revenue due to implementation, collection, and enforcement costs. The total burden of fees, implementation costs, and compliance costs on the freight industry could be as high as \$6.9 billion.

The differences in cost translate into differences in revenue efficiency. Table 2 provides estimates of net annual federal revenue (\$5 billion less collection and annualized implementation cost), annual industry cost (\$5 billion plus annualized implementation and compliance costs), and the “efficiency ratio” between them.

- The highest efficiency ratios—for a diesel fuel tax surcharge with tax refunds and for vehicle registration fees—are due to the absence of significant implementation costs. Both of these options build on existing collection systems.
- Options that rely heavily on technology, the fuel taxes with vehicle ID and the VMT fees, have high implementation and collection costs that dilute their revenue generating effectiveness.

Revenue mechanisms that build on existing tax, fee, or regulatory systems without introducing new technology or infrastructure have the lowest implementation, collection, and compliance costs. A federal registration fee would be the quickest and least expensive. If such a fee became effective in 2013, revenues would improve immediately because the fees are due monthly on a rolling basis depending on the month of the truck’s first use.

The low-tech variation on fuel tax surcharges and the federal registration fee yield the greatest net federal revenue at the lowest industry cost, and are therefore the most efficient. Given the startup costs, VMT fees would likely show the greatest scale economies, with efficiency rising as the fee rises. VMT fees for trucks would also be much more efficient if there were already a national VMT system for passenger vehicles in place, thus spreading implementation and collection costs over more vehicles.

Table 1. Revenue Mechanism Comparison Matrix

Screening Criteria	Fuel Tax Surcharge	Distance/ Vehicle VMT Fee	Federal Registration Fee
<b>Net Revenue and Efficiency</b>			
Federal net revenue from given tax burden	Moderate	Low	High
Federal implementation and collection costs	Moderate	High	Low
Freight industry tax and cost burden	Low	High	Low
Relative Revenue Efficiency	Moderate	Low	High
<b>Long-Term Revenue Outlook.</b>			
Long-term revenue potential	Moderate	High	High
Responsiveness to inflation	Low	Low	Low
Stability/sustainability of revenues over time	Moderate	High	Mixed
<b>Technical Feasibility</b>			
Technical feasibility	High	Moderate	High
Time to implement	Short	Long	Short
Potential for evasion	Moderate	High	Low
Traffic Demand Management options	None	None	None
<b>Multi-Modal Application</b>			
Coverage of all freight and service modes	Potential	Low	Potential
Modal neutrality	Potential	Low	Potential
Modal shift (e.g. from truck to rail)	Moderate	Low	Low
Alignment of truck fees with highway costs	Moderate	Potential	Potential
<b>Linkage between Use and Payment</b>			
Emphasize user fees over taxes	High	Moderate	Moderate
Link between payment basis and use impacts	High	Moderate	Low
<b>Incentives and Impacts</b>			
Incentives for productivity gains	Low	Low	Low
Incentives for user behavior	Low	Low	Low
<b>Equity</b>			
Between payers, users, and beneficiaries	Moderate	Potential	Moderate
Between public and private sector users	Low	Potential	Potential
Between freight, passenger, and service users	High	Potential	Moderate
<b>Political and Public Acceptance</b>			
Likely legal challenges	Low	Likely	Possible
Legislative feasibility	Low	Low	Moderate
Administrative feasibility	High	Low	High
Freight Stakeholder positions	Moderate	Adverse	Moderate
International legality	High	Questionable	High
Public and commercial privacy issues	None	Serious	None

Table 2. Revenue and Costs for \$5 Billion Target

Revenue Mechanisms	Rates	Net Federal Revenue - Billions	Annual Industry Cost - Billions	Annual Cost Per Vehicle	Ratio
<b>Fuel Tax Surcharge</b>	<b>\$/Gal</b>				
<b>Diesel fuel surcharge with non-freight tax refunds</b>					
Class 4-8 freight	0.25	5.0	5.1	1048	0.97
<b>Diesel/gas surcharge with vehicle ID</b>					
Class 4-8 all types	0.14	4.6	5.6	625	0.82
<b>VMT Fee</b>	<b>\$/VMT</b>				
<b>Distance/Vehicle Fee - OBU/Options</b>					
Class 4-8 all types	0.02	4.3	6.4	713	0.67
<b>Distance/Vehicle Fee - OBU Only</b>					
Class 4-8 all types	0.02	4.3	6.9	763	0.63
<b>Annual Registration Fee</b>	<b>\$/Vehicle</b>				
Class 4-8 all types	555	5.0	5.2	580	0.95

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**Long-term Revenue Outlook.** The maximum revenue potential is primarily an issue of political, industry, and public acceptance of appropriate taxes or fees. Three factors differentiate the maximum long-term potential net revenue of the various options:

- Annual federal costs of collection and enforcement;
- Diesel tax revenue lost from conversion to gasoline-powered trucks; and
- Fuel, VMT, and registration revenue lost from truck to rail modal shifts.

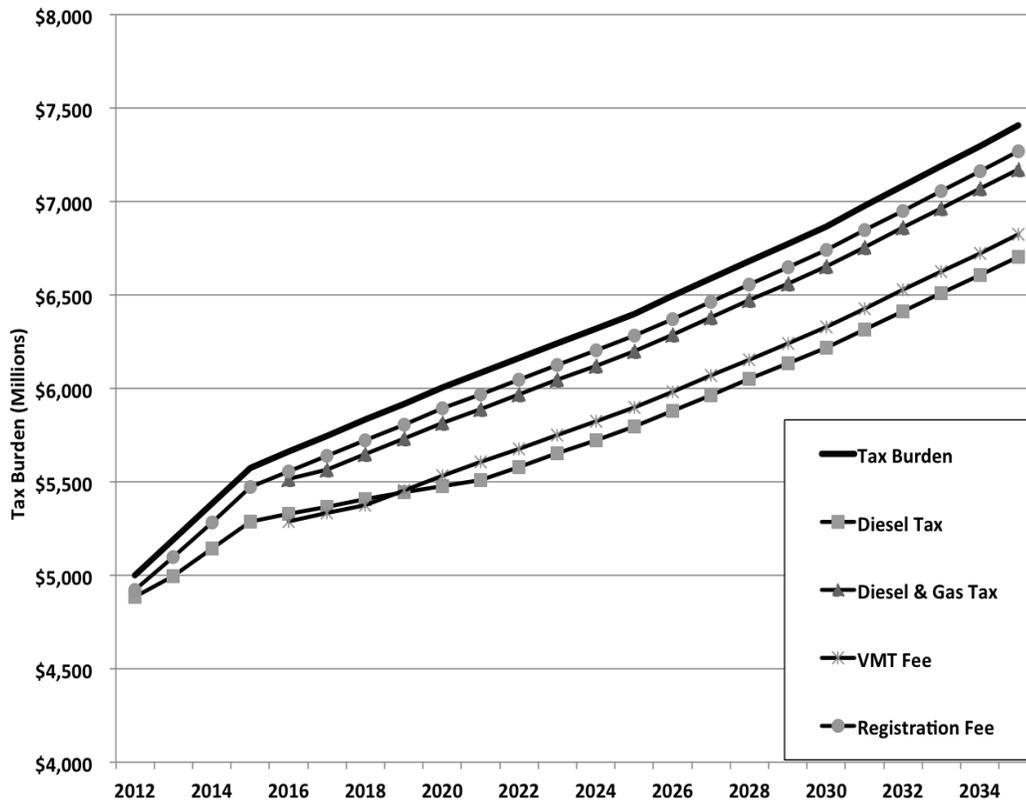
As the revenue target and tax burden rise, the efficiency of most options declines slightly as transportation activity shifts from truck to rail. The exception is the diesel-only fuel tax surcharge, which also loses some of its value due to tax-induced conversion of medium-duty truck fleets to gasoline. The loss of revenue is limited by the underlying inelasticity of demand for freight transportation. As the economic impacts and analysis suggests, the adverse impact on commodity production and consumption would be relatively small.

The long-run revenue available from each option also depends on the growth expected in the tax or fee base—fuel

use, VMT, or truck registrations—and the offsetting costs and diversions discussed above. As Figure 1 shows, there would be a multi-year implementation lag for revenue from the two technology-dependent sources, the diesel and gas tax with vehicle ID and the VMT fee. Net revenue from the vehicle registration fee and the diesel and gas tax surcharge tracks the gross tax burden closely. Net revenues from the VMT fee and the diesel-only tax surcharge grow at similar rates, but at a lower level due to the high collection cost and conversion to gasoline trucks induced by a diesel tax surcharge. Any revenue mechanism will need to be indexed to preserve its long-term revenue potential and buying power. The failure to index in the face of annual cost inflation has been a key factor in the diminished effective revenue-raising power of fuel taxes.

**Technical Feasibility.** High-tech collection solutions may offer greater precision and potential linkages to future traffic management systems, but have higher implementation, collection, and compliance costs. Fortunately, technical feasibility within the freight sector is not an issue for any of the leading options, although time/location VMT fees do present technical challenges. The differences show up in implementation time, cost, and evasion potential. For all three candidate mechanisms, low-tech implementation approaches result in lower costs, shorter implementation timelines, and

**Figure 1. Long-term Revenues Rise in Parallel**



greater revenue generation efficiency. In all three cases, low-tech collection methods could build on existing systems.

**Multi-modal Application.** Many researchers and policy-makers have advocated a multi-modal revenue mechanism to support multi-modal planning and investment. A fuel tax surcharge could cover all modes that use fuel. A single multi-modal fuel tax surcharge for freight infrastructure is technically feasible, but an attempt to create and allocate such a fund is likely to encounter political and institutional barriers. “Vehicle miles traveled” is a highway transportation metric, and attempting to apply VMT fees to rail or water modes would entail potentially onerous overhead costs without a clear connection between such fees and freight infrastructure requirements. Vehicle registration fees can conceivably be applied to the full range of freight transportation modes and the equipment they employ (absent any statutory prohibitions).

**Linkage Between Use and Payment.** There are challenges in making any revenue source correspond as closely as possible to vehicle infrastructure impacts. The degree to which each option is a “user fee” depends on system design. Fuel taxes and VMT fees are user fees, with the linkage between use and payment dependent on program details. Registration fees are not closely linked to infrastructure use, but could vary by vehicle type and size.

**Incentives and Impacts.** The tax and fee rate levels contemplated in this analysis would not create strong incentives for change in freight industry operations. The changes in overall cost structure would be minor, far less than the fuel cost variability that the industry has recently experienced. The transportation system impacts, environmental impacts, and economic impacts would all be modest. The exception would be a diesel tax surcharge that widened the cost gap between diesel fuel and gasoline, thus encouraging the substitution of gasoline-powered trucks for diesel trucks.

**Equity.** Equity between users, vehicle types, and industry segments is again a matter of system design more than an intrinsic feature of each option. One serious issue is the definition of “freight vehicles” and the choice of fuels to tax. There is no straightforward, unambiguous way to classify vehicle types or industry segments as “freight,” and some medium and heavy trucks use gasoline instead of diesel. Proposals to tax “freight” trucks would also raise equity issues between freight and service truck operators. Each option would also have to cope with exemptions for off-road and public sector uses, electric and hybrid vehicles, and international trucking.

**Political and Public Acceptance.** There is limited information on the acceptance of freight-focused revenue mechanisms. Most of the studies and surveys have focused on public acceptance of taxes or fees on passenger vehicles.

The Mineta Transportation Institute at San Jose State University has taken a series of public opinion surveys on revenue options.<sup>16</sup> A mileage tax was the least popular option with 21 to 22 percent respondent support. Gas tax variations were generally more popular than VMT fees. As the Mineta Transportation Institute report notes, support increased with linkage to specific environmental issues and benefits.

Available surveys suggest that adverse public reaction to the perception of privacy invasion would create barriers to implementation of time/location or GPS-based VMT fees.<sup>17</sup> Table 3 summarizes results from a Minnesota DOT survey of public opinion regarding VMT fees. Respondents were presented with a “high tech” approach involving GPS-based OBUs, and a “low tech” approach that did not involve GPS. The results show a much stronger concern for privacy with the high-tech GPS approach.

Table 3. MBUF Public Opinion Study Results<sup>18</sup>

Approach	Least Liked		Most Liked		MBUF Preference
High Tech	Loss of Privacy	42%	Base for Fees	24%	8% extremely positive
	Costs	31%	Easy to use	16%	
	Base for Fees	16%	Fairness	14%	
	Uncertainty of outcomes	8%	Collection Method	9%	56% extremely negative
	Inconvenience	6%	Lower Costs	4%	
	Enforcement issues	5%			
Low Tech	Inconvenience	25%	Base for Fees	34%	18% extremely positive
	Costs	22%	Fairness	16%	
	Base for fees	16%	Lower Costs	11%	
	Uncertainty of outcomes	11%	Easy to use	11%	35% extremely negative
	Loss of Privacy	11%	Collection Method	8%	
	Enforcement issues	7%	Less invasive/more private	6%	

**CONCLUDING OBSERVATIONS**

While no single revenue mechanism can meet all of the objectives laid out in this study, it is clear that *registration fees and fuel taxes are more pragmatic options than VMT fees*. Much of the appeal of VMT fees is the hope that they will lead to congestion pricing, but that hope is not sustained by the functional and acceptance barriers faced by VMT mechanisms.

When viewed as a part of a larger, overarching freight infrastructure strategy—instead of as single revenue stream options—these choices appear less daunting. However, whether the federal government uses a fuel tax surcharge, VMT fees, or registration fees, there will be difficulty in creating the right incentives to achieve other policy goals. Perhaps by using multiple tools and integrating approaches, the federal government may be able to achieve a better fit between revenue collection and complex industry realities.

This policy study, albeit limited to freight, moved in parallel with short-term extensions of highway funding before Congress passed Moving Ahead for Progress in the 21st

Century (MAP-21) in 2012—a short-term financing law expiring at the end of Fiscal Year 2014. The NCFRP Report described here cannot be said to have influenced the outcome, but the research did dispense with a number of alternatives that could not withstand scrutiny. When the congressional committees do return to the matter, the overlooked revenue potential of heavy-vehicle registration fees should be relevant.

Clarification of policy goals and direction from Congress would assist transportation planners and administrators in making choices and tradeoffs. As pointed out at the beginning of this paper, there is little consensus on the appropriate level of infrastructure investment. While there is interest in a multi-modal approach, there are no federal guidelines to balance the support for passenger and freight needs, or between truck, rail, marine, and air freight modes. Transportation planners and researchers could be much more confident in the alignment between revenue generation and policy goals if policymakers made certain what those goals were. MAP-21, directs DOT to start that policy, providing an opportunity to align revenue initiatives with national transportation objectives.

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**ENDNOTES**

[1] A team led by The Tioga Group, Inc. and including the Economic Research Development Group (EDR Group), Steptoe & Johnson, LLC. (a Washington, D.C. law firm), and Professor Shama Gamkhar of the University of Texas Lyndon B. Johnson School of Public Affairs was awarded the project. NCFRP Report 15: Dedicated Revenue Mechanisms for Freight Transportation Investment, produced through the National Cooperative Freight Research Program, National Academy of Sciences (Washington, DC, 2012). Available at <http://www.trb.org/main/blurbs/166971.aspx>.

[2] NCFRP Report 15, Appendix A.

[3] U.S. Federal Highway Administration, Freight Story 2008, U.S. Department of Transportation (Washington, DC, 2008). Available at [http://ops.fhwa.dot.gov/freight/freight\\_analysis/freight\\_story/](http://ops.fhwa.dot.gov/freight/freight_analysis/freight_story/).

[4] Michelle Oswald et. al, “Measuring Infrastructure Performance: Development of a National Infrastructure Index,” Public Works Management Policy, October 2011 vol. 16, no. 4, 373-394. Available at <http://pwm.sagepub.com/content/16/4/373.abstract?rss=1>

[5] American Transportation Research Institute, “FPM Congestion Monitoring”, November 2012. <http://atri-online.org/2011/10/01/fpm-congestion-monitoring-at-250-freight-significant-highway-locations/>.

[6] NCFRP Report 15, 11.

[7] NCFRP Report 15, 11.

[8] Associated General Contractors of America, “Harbor Maintenance Trust Fund,” November 2012, [http://www.agc.org/cs/harbor\\_maintenance\\_trust\\_fund](http://www.agc.org/cs/harbor_maintenance_trust_fund).

[9] U.S. Fish and Wildlife Service, “Water Resource Development Acts”, February 2010, <http://www.fws.gov/habitatconservation/wrda.html>.

[10] NCFRP Report 15.

[11] Three categories were eliminated in initial screening because they were not applicable to freight or were not currently feasible. International trade fees (container fees, HMT, Customs fee diversion) were found to be better suited to project-specific or port-area funding than to national freight infrastructure. Tolling is primarily a project-specific mechanism. The study addressed tolling as part of public-private partnerships and

time-location VMT options. True freight tonnage, ton-mile, or value taxes are currently infeasible because most freight shipments are not weighed and their value is not known. NCFRP Report 15.

[12] A waybill is an internal shipping and routing document generated by freight carriers.

[13] The Freight FOCUS Act would assess the surcharge on all diesel fuel purchases. Public agencies that did not haul freight would receive tax refunds; private sector purchasers that did not haul freight would receive tax credits. NCFRP Report 15.

[14] See Appendix A, NCFRP Report 15.

[15] So-called “consumer grade” GPS used in automotive navigation systems is insufficiently precise to be used as a basis for fees. NCFRP Report 15.

[16] See Appendix A, NCFRP Report 15.

[17] See Appendix A, NCFRP Report 15.

[18] Presentation by K.R. Buckeye, MDOT, at 2010 Symposium on Mileage-Based User Fees: Moving Forward, April 20-21, 2010.

# PATHWAYS TO ZERO NET ENERGY USE: EXAMINING OFF-SITE SUSTAINABLE ENERGY CREDITS FOR NEW BUILDINGS IN CALIFORNIA

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EDITED BY LEONARDO COVIS, MARY CLAIRE EVANS, JASON PERKINS, AND ANNA SCODEL

In order to make a zero-net-energy building code policy feasible in California, an offset program could be designed to accompany on-site energy measures. Such a program should be administratively feasible, effective, and provide enough offsets to reach zero-net-energy use at an acceptable cost with minimal price volatility. Using that criteria, this article examines the four most promising potential offsets: energy efficiency credits, utility-delivered renewables, location efficiency credits, and on-site transportation solutions. The author argues that the design of any such program would be further improved by changing the underlying zero-net-energy concept to a path-to-zero-carbon concept that makes available offset options from a broader array of markets without the perils of isolated policymaking.

COMMENTARY

## INTRODUCTION

As a densely populated state with large energy needs and a major greenhouse gas (GHG) footprint, California sits at the forefront of energy conservation efforts and policies. Ensuring that new construction meets a zero-net-energy (ZNE) standard—where the “amount of energy provided by on-site renewable energy sources is equal to the amount of energy used by the building”—is a major goal of California energy policy.<sup>1</sup> The impetus for ZNE building policy began with former California Governor Schwarzenegger’s Executive Order S-03-05 and California’s landmark greenhouse gas (GHG) law—the Global Warming Solutions Act of 2006 (AB 32). The act requires the state to reduce GHG emissions to 1990 levels by 2020, and executive orders set a target to reduce the 1990 level of GHG emissions by 80 percent by the year 2050. Reducing building emissions plays a significant role in meeting this challenge since they account for nearly one-quarter of all California GHG emissions.<sup>2</sup>

To meet these ambitious GHG goals, the state may institute a new ZNE-mandated building code that would prohibit new buildings from using more energy than they produce over the course of a year. Building codes are an effective policy tool because “[n]o incentive or market-based program can achieve the market penetration routinely achieved by codes.”<sup>3</sup> Thus, a zero-net-energy stakeholder group, which includes the state’s investor-owned utilities and the state’s various energy and air agencies, namely the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and California Air Resources Board (CARB), is discussing building code changes for residential buildings by the year 2020 and for commercial buildings by the year 2030.<sup>4</sup>

At most new building sites, developers and property owners can achieve this ZNE goal by limiting energy use through efficient design and by generating energy on-site, primarily with solar panels. However, energy-intensive and site-constrained buildings cannot always achieve zero-net-energy use over the course of a year only on-site, especially if they are multi-story buildings or have serious climate-control needs.<sup>5</sup> In light of this dilemma, the ZNE partnership has considered modifying the goal to achieving “zero-net-energy or equivalent.”<sup>6</sup> The goal of this analysis is to recommend the best “equivalent” offsets to grant a building site to net-out the energy-related GHG emissions “gap.”

The viability of a ZNE policy with offsets has already been partially tested by existing programs and markets. Some property owners and developers are voluntarily reducing energy use, generating energy on-site, and reducing their carbon footprint through purchasing renewable energy credits and other carbon-dioxide offsets. Also, the State of California has required investor-owned power utilities to expand renewable energy generation, leading to the development of tradable renewable energy credits. California has also incentivized these utilities to reduce energy demand by allowing them to classify energy efficiency investments as capital on which they are allowed to earn a profit. This analysis envisions how the lessons drawn from these markets and programs could be expanded to produce offsets that fill the net GHG gap for buildings under California’s emerging ZNE building policy.

## IMPLEMENTATION AND ACCOUNTABILITY ASSUMPTIONS

This article assumes that a state-mandated ZNE policy, like

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many other state building policies, would be implemented by the city and county agencies that presently have the power to approve private developments in California.<sup>7</sup> An effective accountability scheme that tracks the creation and use of offsets is essential to ensure the validity and uniqueness of each credit. In particular, a system of offset credits needs to be transparent, verifiable, and comprehensible for building owners, entrepreneurs, and regulators. An accountability system would likely involve substantial administrative costs and must be faithfully administered; however, determining cost estimates and particular details of such schemes, beyond broad details, is not the focus of this analysis.

### DEFINING THE GOAL OF ZERO NET ENERGY

The idea of a ZNE policy is relatively new and there is still debate over whether the goal of California's ZNE efforts is to (1) minimize GHG emissions or (2) reduce energy use.<sup>8</sup> While reducing energy use can be an enviable goal for other reasons, this paper assumes that ZNE policy is primarily intended as an implementation measure of AB 32. Thus, this analysis assumes that the underlying goal of a ZNE policy is to minimize greenhouse gases associated with a building's energy use, not just to minimize energy use itself.

It is important to make this stipulation so that potential policy options geared toward the state's overarching climate goals can be substantiated. In a functional sense, using this broader definition of zero-net-energy goals would help provide building owners with more options to minimize costs and fill their GHG gaps. This paper now turns to an assessment of the various ways ZNE offsets or credits could be designed.

### CRITERIA FOR ANALYSIS

This analysis examines the viability of various types of ZNE credits based on (1) cost and related incentives; (2) effectiveness at reducing GHG emissions; and (3) the ease with which they could be implemented.

### COST AND INCENTIVES

The expense of and responsibility for purchasing offsets are important considerations. Building owners have a clear incentive to minimize the cost of ZNE offsets, which can be quantified in terms of dollars per unit of avoided annual emissions (i.e. a unit of cost-effectiveness).

It is important to note that cost-effectiveness is, so to speak, in the eye of the beholder, meaning that demand for offsets may vary across different types of buildings. For instance, buildings located in dense, urban settings typically have higher floor-to-area ratios than those in suburban locations, reducing the land parcel area available for solar power production.<sup>9</sup> Thus, building owners in dense, urban locations would rely more on purchasing offsets to fill their GHG emissions gap.

This analysis also determines whether property owners or tenants would be responsible for paying for each credit and which party would realize the most financial benefit. Those credits that would inherently benefit tenants but would require owners to bear their cost are least likely to be purchased because owners would have little incentive to purchase them.

### ELECTRICITY COST FORECASTS AS A MEANS FOR COST COMPARISON

However, finding a way to set baselines for cost comparison across different types of offsets is important.<sup>10</sup> This paper establishes a retail electricity price benchmark to compare all costs during the year 2020,<sup>11</sup> and primarily focuses on retail electricity prices for large commercial buildings, as these end users would be the most likely purchasers of credits. The average retail price of electricity in California in 2012 is 11 to 14 cents per kilowatt-hour for large commercial buildings served by investor-owned utilities.<sup>12</sup> Using information from two different studies, this analysis will use an electric utility price benchmark of 16 to 26 cents per kilowatt-hour for the year 2020.<sup>13</sup>

### EFFECTIVENESS

In order to translate energy savings or demand into carbon mitigation, based on forecasts of carbon intensity in the year 2020,<sup>14</sup> this research uses a California-statewide average conversion factor of 0.6 pounds of carbon dioxide gas-equivalent for every kilowatt-hour of electricity use.<sup>15</sup> This conversion factor is likely to decrease over time because of the state's efforts to drastically reduce GHG emissions and the increasing efficiency of California's energy and transportation systems. Because reducing carbon intensities could impact the effectiveness of some offsets, this research analyzes the ability of various credit options to consistently and accurately quantify their impacts on GHG emissions. Although there are numerous offset options, this project only considers those credits with the potential to reduce California's commercial office building GHG gap by a third or more; the options explored below all could reduce at least an equivalent of 0.2 pounds of annual carbon-dioxide emissions per square foot of building space during the year 2020.<sup>16,17</sup>

### IMPLEMENTATION

Given that ZNE policy is still in flux, conceptualizing how an offset system would work is somewhat theoretical and speculative. The analysis assumes that zero-net-energy would be defined in terms of direct building energy use only and would exclude energy use in other sectors—including the energy used to charge electric vehicles—when calculating a building's GHG gap. Given these parameters, this research identifies offsets that are implementable and enforceable, i.e. those that could minimize GHG emissions over a long-term time horizon (twenty years), with minimal risk of double-counting and free-rider hazards.

## OFFSET DESIGN SYSTEMS

Judging by the above criteria, there are four offset system designs that show significant promise—energy efficiency credits, utility-delivered renewables, location efficiency credits, and on-site transportation solutions. Each of them is explored in turn below.

### SYSTEM OPTION 1: ENERGY EFFICIENCY CREDITS

The CPUC requires each investor-owned utility (IOU) to run a sizeable energy efficiency retrofit program to reduce energy use in existing homes, buildings, and industrial sites before adding electricity generation capacity to the grid. Under this proposal, each utility company would build on the scale of its existing energy efficiency program. For example, IOUs could add a relatively simple credit-purchasing program to allow building owners to fund additional energy efficiency retrofits in exchange for credits to fill their GHG emissions gaps.

In this model, a building owner would essentially be allowed to pay a utility company to offset the building's GHG gap by reducing a concomitant amount of energy use in other buildings and facilities. Utilities would be required to determine the cost-effectiveness of their existing programs so they could charge a uniform fee for each unit of GHG savings. In return for the fee, utilities could issue an energy efficiency credit to the property owner documenting the amount of energy and GHG reduction the certificate represents. For example, a utility could use the funds paid by building owners to incentivize the energy-efficiency retrofitting of existing homes, leveraging homeowners' dollars further.

This model resembles an emerging "energy savings certificate" market in Connecticut that allows for the market trading of certificates to raise capital to fund retrofits. Connecticut's deregulated retail electricity suppliers are required to meet an energy efficiency portfolio standard and do so in part by purchasing energy savings certificates that fund investor-owned utilities' energy efficiency programs.<sup>18</sup> In short, property owners would be responsible for purchasing energy efficiency credits from utilities. They would have the incentive to do so instead of taking more unilateral measures on-site (i.e. investing in their own efficiency) if this option is relatively less expensive than additional on-site measures.

### COST AND INCENTIVES

While purchasing energy efficiency credits can be relatively inexpensive, the basic model for this credit assumes that the new buildings will still need to purchase conventional electricity from a utility. Thus, the cost of energy efficiency credits would be passed on to energy consumers in the form of higher prices. But just how much extra would this cost?

Because utilities are heavily regulated, this analysis assumes the CPUC will force utilities to set the price of energy efficiency credits at or near the actual cost of retrofitting older buildings and industrial sites. Over the span of ten to fifteen years, these retrofit costs in California have ranged from 2.5 to 3.0 cents per kilowatt-hour saved among the state's participating utilities, as reported for the years 2006 and 2007.<sup>19</sup> After accounting for inflation compared to the current price of electricity, this amount represents a 25 percent surcharge.<sup>20, 21, 22</sup> This program would also involve additional, non-trivial administrative costs, perhaps driving prices up another 21-38 percent.<sup>23</sup> Accounting for inflation, the average unit cost of an energy efficiency certificate could range from 22 to 30 cents per kilowatt-hour-equivalent or 37 to 50 cents per equivalent pound of carbon dioxide. Given these cost premiums, and the fact that owners and tenants would still pay conventional electricity costs, the price of this offset makes efficiency credits more expensive than the retail price of electricity, but less expensive than many other offsets.

### EFFECTIVENESS

Energy efficiency credits would result in a direct long-term reduction in energy use, and therefore, a reliable reduction in GHG emissions. Since there are a plethora of buildings, homes, and industrial processes to be retrofitted and the niche of new commercial buildings that would need to buy offsets is only a subset of the new building construction market, this project assumes that the supply of energy efficiency credits would be ample. The CPUC's aggressive energy efficiency retrofit plan still leaves half of all single family homes to be retrofitted by 2020 and half of all commercial buildings to be retrofitted by 2030. This credit could help fund CPUC's aggressive energy efficiency targets and make more expensive efficiency adjustments cost-effective.

### IMPLEMENTATION

These credits would result in the permanent retrofit of existing buildings, which would need to be monitored by an accountability regime. In order to avoid double-counting, the energy and GHG savings need to be estimated and certified. Given the current utility-sponsored retrofit programs, studies could be conducted periodically to certify the cost-effectiveness of retrofit programs. Enforcement would depend on certificates issued by utilities that could be easily tracked given the relatively centralized nature of utilities. While the information can be centrally tracked, debate has raged over the baseline from which to measure retrofit savings and whether to use actual performance or designed savings.

### SUMMARY: ADVANTAGES AND DISADVANTAGES OF EFFICIENCY CREDITS

#### ADVANTAGES

- Can quantify direct GHG savings

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- GHG savings are permanent
- Enforcement relies on verifiable certificates
- Requires only one-time monitoring
- Enforceable with certificate
- Owner is responsible and realizes savings

### **DISADVANTAGES**

- Baseline for energy savings is debated
- Tenants still pay for electricity use
- Cost does not incentivize additional on-site energy reduction and production measures

### **SYSTEM OPTION 2: UTILITY-DELIVERED RENEWABLE ENERGY**

Alternatively, a utility could simply charge a large commercial building higher energy prices in order to fund 100 percent renewable energy generation. Under this model, renewable generation off-site would fill the GHG gap for buildings that have exhausted their on-site design efficiency and renewable generation potential. In this model, building owners would request a 100 percent renewable power surcharge to be applied to all their building's ratepayer accounts. The utility company would relay that information to the statewide oversight agency and issue a certificate to the building owner to demonstrate the purchase agreement to local building officials.

### **COST AND INCENTIVES**

While future electricity costs can only be estimated, not proven, it is safe to assume that utility-delivered 100 percent renewable power would be priced above conventional electricity generation; renewable electricity generation is typically more expensive to install and is more difficult to plan for than fossil fuel electricity generation. In short, renewable sources can be much more intermittent and temporal, resulting in higher renewable electricity rates.<sup>24</sup>

However, the surcharge for 100 percent renewable energy may decline over time due to economies of scale, and because a larger proportion of electricity generation will come from renewables (i.e. conventional and 'renewable' electricity prices will converge). Although the price of 100 percent renewable electricity has initially been high, coming in at 15 percent above conventional electricity prices in 2011, additional reports show that solar generation projects are becoming increasingly cost-competitive.<sup>25</sup> Concerns about reliability and backup generation persist; however, it can be safely assumed that the price of renewable energy will continue to decline in the future. Thus, the surcharge for renewables could be relatively small when compared to the cost of financing and implementing energy efficiency programs. In terms of who might bear these costs, for non-owner-occupied buildings,

building owners would be incentivized to push this cost onto the tenant, though the owners would derive the primary financial benefit from the offset.

### **EFFECTIVENESS**

Because utilities would deliver 100 percent renewable electricity to buildings, this option ensures that participating building owners would eliminate the marginal GHG emissions directly associated with the conventional energy use of their buildings.

### **IMPLEMENTATION**

By establishing a particular 100 percent renewables rate system for commercial buildings, utilities could recoup the cost of delivering completely renewable electric power to properties. Accountability of this program would be much simpler than all other offset programs since it would take place at the level of the utility company and use existing regulatory schemes, not at the level of each individual property owner, which would present onerous additional burdens for local officials.

### **SUMMARY: ADVANTAGES AND DISADVANTAGES OF UTILITY-DELIVERED RENEWABLES**

#### **ADVANTAGES**

- Can quantify direct GHG savings
- GHG savings are permanent
- Easily accountable
- Easy to monitor
- Enforcement relies on verifiable certificates

#### **DISADVANTAGES**

- Tenants pay higher electric rate
- Cost does not incentivize additional on-site energy reduction and production measures

### **TRANSPORTATION SOLUTIONS: OPTIONS 3 AND 4**

Building location can have a great impact on transportation-related GHG emissions.<sup>26</sup> Issuing transportation credits would encourage building owners to design more carbon-friendly properties, investments that could reduce the off-site GHG emissions created by the movement of people and goods to and from their building. There are two general types of transportation offsets, location efficiency credits and on-site transportation credits, detailed below, however these two options share largely the same structure.

Under this model, a building owner would include a commitment in their agreement with the local planning body to design the building in a travel-reducing manner in exchange for a transportation credit. Accountability is generally simpler for these offsets than for the preceding

offsets because planning agencies would also serve as local clearinghouses for transportation credits, reducing the risk of double-counting credits. This analysis assumes the local government would approve the credit as an offset and register it with the statewide oversight agency and issue a certificate to the property. Alternatively, these offsets could be tracked completely outside the statewide oversight agency due to their local nature. The role of certifying a credit could also be accomplished by other means, such as documenting the projected savings in an environmental impact report.

### SYSTEM OPTION 3: TRANSPORTATION— LOCATION EFFICIENCY CREDITS

This offset would reward building owners for locating in a place where the induced travel behaviors of occupants and visitors result in lower GHG emissions than the nearby regional average. Encouraging people to use less carbon-intensive modes of transport than their peers would reduce off-site GHG emissions associated with the property.

#### COST AND INCENTIVES

Locating buildings in high-density areas can be expensive, but this credit would reward such investments if they are made in a transit-conscious manner. However, pursuing this credit option says nothing about the building's actual energy demand; building owners may still need to purchase conventional electricity. But owners of such buildings may not have to invest in 100 percent renewable electricity because of these location efficiency credits. Under this option, owners would face many tradeoffs, and would be the most important actor in this regime because they choose where to build.

#### EFFECTIVENESS

A location's impact on travel behavior is based on travel options and behavior in the building's vicinity, which is predictable but has a range of uncertainty. Tools do exist to make estimates of the size of these location credits. For example, the California Emissions Estimator Model (CalEEMod) developed by the South Coast Air Quality Management District would be a valuable tool for estimating reductions in GHG emissions. Compared to locating a building in the most sprawling suburban context, the model estimates that locating a comparable building in the densest urban context would reduce vehicular travel by up to 65 percent, resulting in huge building-related GHG emissions reductions. Even compared to locating a building in a compact infill area, the model estimates a comparable building placed in the densest urban context would reduce vehicular travel by up to 50 percent.<sup>27</sup> Even if a building's location was credited with reducing vehicular travel only by 10 percent, that could potentially more than offset all the GHG emissions associated with the energy use of a highly efficient commercial building.<sup>28</sup>

### IMPLEMENTATION

This system would largely operate at the local level. New buildings already participate in extensive land use planning processes, which could be adapted to include induced GHG emissions assessments. Mechanisms also exist to ensure monitoring over time. After buildings are constructed, retrofits or new site construction would likely trigger a local building department to issue additional permits, which could lead them to discover any plans to dramatically change a building's occupancy and design.

### SUMMARY: TRANSPORTATION—LOCATION CREDITS

#### ADVANTAGES

- No additional cost
- Permanent solution
- Easy to monitor and enforce
- Advantageous for infill and high-density sites
- Owner is responsible and realizes savings

#### DISADVANTAGES

- Need to identify regional GHG caps
- Uncertainty around travel behavior
- Cost does not incentivize additional on-site energy reduction measures

### SYSTEM OPTION 4: TRANSPORTATION— ON-SITE TRANSPORTATION CREDITS

On-site transportation credits would account for the reduction in GHG emissions associated with the design features of a building itself and its on-site transportation facilities, as opposed to the inherent location of a building. Examples of potential investments that could earn on-site transportation credits include reducing parking spaces for solo commuters, installing secure bicycle storage and shower/locker facilities, and decoupling parking fees from building rent, thereby requiring each driver to purchase a parking permit and thereby discourage car commuting. These credits have permanence because they require on-site capital investment and so are inherently less susceptible to change. Since changes in use or design would most likely require approval, local agencies would not need to rigorously monitor buildings for compliance. Instead, local agencies would assess whether changes in offset requirements would be necessary to approve an owner's request to change a building's design or use.

#### COST AND INCENTIVES

Most on-site transportation solutions could actually save property owners money by reducing the amount of parking built or by creating a revenue stream from parking. The costs of some physical amenities like bicycle lockers, clothes lockers, and showers for commuters could be dwarfed by the

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savings achieved from not building parking spaces. On a pure cost basis, these alternative transportation investments may be the more economical choice.

The GHG ramifications are more complex. Even with innovative investments in transportation amenities, property owners would still need to purchase electricity, perhaps from conventional sources. Distributional concerns exist as well, as this system would put the onus of GHG mitigation on employees and visitors more than property owners. The owner would benefit from real savings while tenants' employees may have to purchase parking or find other forms of transit.

### EFFECTIVENESS

On-site transportation credits are based on travel behavior in response to on-site design features that impede driving and incentivize using other modes of transportation. This credit should only account for those design features not otherwise mandated by other laws and policies, to avoid double counting the effects of other aspects of building codes and policies. Since transportation design features' effects on GHG emissions can overlap, dividing the effect of each design feature can be difficult. Local agencies can overcome this technical hurdle by requiring building owners to analyze design scenarios that include and exclude the additional, non-mandated, on-site design features for which owners seek credit.

The difference in GHG emissions between those scenarios' results could be assigned as a ZNE offset credit. The South Coast Air Quality Management District's CalEEMod would be a valuable tool for estimating reductions in GHG emissions in this instance as well. For instance, the model estimates that pricing workplace parking would result in up to a 20 percent reduction in vehicular travel, which would more than offset all the GHG emissions gap associated with the energy use of a highly efficient commercial building.

### IMPLEMENTATION

Again, this would take place primarily at the local level. On-site transportation solutions would be physical, durable investments. Retrofits or new site construction would likely require a building department to issue additional permits and would provide an opportunity to prevent design features, meant to reduce GHG emissions, from being removed.

### SUMMARY: TRANSPORTATION—ON-SITE CREDITS

#### ADVANTAGES

- Most likely results in cost savings
- Solutions are mostly permanent
- Easy to monitor and enforce
- Advantageous for infill and high-density sites

#### DISADVANTAGES

- Need to identify regional GHG caps
- Uncertainty around changes in travel behavior
- Cost does not incentivize additional on-site energy reduction or production measures

### ASSESSING VIABILITY: EXPLORING POTENTIAL TRADEOFFS

The main tradeoffs inherent in choosing potential offsets are: (1) the ability to reliably and easily quantify their projected impacts; (2) cost-effectiveness; (3) ease of implementation; and (4) the alignment of incentives with responsibility. On these measures, energy efficiency credits, utility-delivered renewable power, and location efficiency credits score well. On-site transportation solutions credits, highly dependent upon travel behavior and whose conversion into equivalent energy use will change over time, are not as reliably quantified as other offsets. Table 1 on the following page further summarizes the characteristics of each alternative. (*Editor's Note: The author also examined the viability of virtual net metering, tradable renewable energy credits, and travel demand management credits in the original submission. These options were rejected based on the analytic criteria, and are omitted here due to length constraints.*)

### ILLUSTRATING POTENTIAL OUTCOMES: BUILDING SCENARIOS

To illustrate how building owners would select offsets from the viable options explored above, envision three similar four-story buildings with 55,500 square-feet of rentable office space and an annual GHG emissions gap equivalent to 100,000 pounds of carbon dioxide or 166,000 kilowatt-hours of electricity in 2020.<sup>29</sup> One is located on the edge of downtown San Francisco, one is located on an infill site in a moderately dense urban area outside of a downtown, and one is located on a constrained building site in a suburban area.

The downtown building would qualify for a full location efficiency credit due to transit availability and lack of parking. It would not be charged to comply with the ZNE policy beyond the building code's energy efficient design requirements.

The infill building would qualify for the location efficiency credit, covering half its emissions gap. The building owners would have the choice to pay \$18,000 to \$25,000 upfront for energy efficiency credits; pay nothing and make tenants' employees pay for parking at a cost of \$1,000 to \$5,000 per space per year; or force their tenants to collectively pay an annual surcharge of \$2,700 to \$3,500 on their electricity bills.

The suburban building would not likely qualify for a location efficiency credit, but the building owners would have the choice to pay \$36,000 to \$50,000 one-time upfront for energy

**Table 1. Summary of Alternatives**

The following table shows the performance of the offset system options on the criteria using a three-tiered scale: Low, Medium, and High—with High meaning the alternative scores well on the criterion and Low meaning the alternative does not score well.

Alternatives  Criteria		Efficiency	Renewables	Transportation	
		Energy Efficiency Credits	Utility Renewables	Location Efficiency	On-Site Transportation Solutions
<b>Energy/GHG</b>	Conserves Energy or Both Energy & GHG?	<b>Energy and GHG</b>	GHG	GHG	GHG
<b>Quantifiable</b>	Consistent and easy to quantify	Medium	<b>High</b>	Medium	Low
	Available Quantity	<b>Virtually unlimited</b>	<b>Can cover entire gap</b>	<b>Can cover entire gap in dense, urban areas</b>	<b>Can cover entire gap</b>
<b>Cost Effective</b>	Minimizes Cost	Medium	Medium	<b>High</b>	<b>High</b>
<b>Implementation</b>	Permanent	<b>High</b>	<b>High</b>	<b>High</b>	<b>High</b>
	Avoids double counting	Medium	<b>High</b>	<b>High</b>	<b>High</b>
	Easily enforceable	Medium	<b>High</b>	<b>High</b>	<b>High</b>
<b>Incentives</b>	Incentivizes on-site solutions	Low	Low	Low	Low
<b>Responsibilities</b>	Party incentivized	<b>Owner</b>	Owner	<b>Owner</b>	Owner
	Party responsible	<b>Owner</b>	Tenant	<b>Owner</b>	Tenant

COMMENTARY

efficiency credits, pay nothing and make tenants’ employees pay for parking at a cost of \$2,000 to \$5,000 per parking space per year, or force their tenants to collectively pay an annual surcharge of \$2,700 to \$3,500 on their electricity bills.

**RECOMMENDATIONS FOR CALIFORNIA**

In light of the above options, California faces a choice between offering viable ZNE-related offsets outlined here or redesigning its ZNE goals. Under the first choice, new buildings could cover their GHG emissions gap due to energy use by purchasing one or several of the four offset types described above. Under the second choice, the state would

revise its goals for commercial building code policy from a zero-net energy concept to a path-to-zero-carbon concept. Such a revision would seek to maximize flexibility, adhere closer to AB 32, leverage additional resources, and minimize unintended consequences for interested parties.

**CHOICE #1: IMPLEMENT VIABLE OFFSETS**

If a ZNE policy moves forward as envisioned, California should create an oversight agency that would manage a ZNE-offset program and offer all four viable options as a basket of choices for building owners. Offering multiple options reduces the risk of compliance cost volatility, as multiple strategies can

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be pursued. This would give owners flexibility to minimize costs while effectively addressing the ZNE challenge.

The following offset systems should be offered because they are financially viable, align responsibilities and incentives, are effective at reducing GHG emissions, and are transparent, accountable, and viable:

- Energy efficiency credits: The CPUC should implement an energy efficiency credit program with the utility companies.
- Utility-delivered renewables: The CPUC should require utilities to establish a 100 percent renewable rate to fund renewable energy projects.
- Location efficiency credits: The state should provide credits to buildings that are located on land parcels where GHG emissions from transportation use fall below the regional average.
- On-site transportation credits: The state should provide credits to buildings where on-site transportation design exceeds other requirements and incentivize non-single-occupant vehicular use.

The state would need to establish an accounting tool to track offsets as has been established for tracking investor-owned utilities' compliance with various policy mandates like the renewable portfolio standard (RPS). Such a database would also track the offset claims for each building. Local jurisdictions could theoretically track offset claims themselves, but this would be impossible for those working independently and onerous for a collaboration that is separately administered from the state. A statewide oversight agency would have much greater scale efficiency in tracking and monitoring offsets, and would minimize administrative costs over time.

### CHOICE #2: REVISING GOALS

Alternatively, California could choose not to pursue GHG reductions through full-scale ZNE policy implementation. In short, the ZNE partnership could change the zero-net-energy

concept for new buildings to a path-to-zero-carbon concept, and accordingly re-evaluate potential offsets. Minimizing GHG emissions with a ZNE policy is inherently flawed, as it attempts to regulate air emissions indirectly through building codes. Perhaps the problem should be addressed more directly.

Regulation of commercial building emissions could instead be divided by industrial sector. Transportation and water agencies could similarly establish policies to minimize GHG emissions only in their sectors of the economy. But this could create a disjointed and potentially more costly set of regulations. Even the California Energy Commission, a ZNE partner, recognizes that “[t]his isolation leads to missed opportunities to leverage resources and unintended consequences.”<sup>30</sup>

A more nimble regulatory policy would recognize that reducing transportation use, water use, and energy use are important goals; but in practical effect, when it comes to the world's climate challenges, it does not matter much where or from what activities GHG emissions are generated. All tools should be integrated and used together to reduce GHG emissions regardless of their specific source. Essentially, in this view the ZNE concept is a somewhat tangential endeavor from the state's larger climate goals, which should be better coordinated to achieve GHG emissions reductions while maintaining regulatory flexibility.

In this integrative line of thought, the state could replicate CARB's AB 32 cap-and-trade framework among the population of new commercial buildings. In essence, the state could set a GHG emissions cap on new buildings that is adjusted by region, by occupant use, and by the size of the building. The state could ratchet that cap down over time while allowing for offsets to be purchased across all sectors of the economy. This would not only align better with AB 32, but also put new buildings on a path to zero-carbon, as is envisioned in the United Kingdom.<sup>31</sup>

Faced with these two choices, California must decide which form of commercial building code policy better suits its ambitious climate goals.

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[2] Martha Brooks, California Energy Policy: Zero Net Energy Buildings, California Energy Commission (Sacramento, CA, 2011).

[3] “California Energy Efficiency Strategic Plan: ZNE Action Plan: Commercial Building Sector 2010-2012,” prepared by Engage 360 (Rosemead, CA, 2010).

[4] “California Long Term Energy Efficiency Strategic Plan,” prepared by the California Public

Utilities Commission (San Francisco, CA, 2008).

[5] Charles Eley, “Defining Zero Net-Energy for California Buildings,” prepared for Engage 360 (Rosemead, CA, 2011).

[6] “Guide to Title 24 of the 2010 California Building Standards Code,” California Building Standards Commission (Sacramento, CA, 2010).

[7] *Ibid.*

[8] McHugh Energy Consultants, Inc, “Revised Zero Net Energy (ZNE) Definition: IEPR Workshop: California Energy Commission,” California Energy Commission (Sacramento, CA, 2011).

[9] A floor-to-area ratio is a term used in land use planning that measures the ratio of total building floor space to the parcel area. Many cities use a floor-to-area ratio to in zoning ordinances to regulate building density.

[10] “7,000 kWh to Zero in Eight Years Flat: A Strategy for Net Zero Energy Residential Buildings by 2020,” prepared by McHugh Energy Consultants (Fair Oaks, CA, 2011). Available at [http://www.zne2020.org/PathToNetZero\\_v1.0.pdf](http://www.zne2020.org/PathToNetZero_v1.0.pdf)

[11] The year 2020 is used as a benchmark in this analysis because that is the farthest-out forecasts project, because it is the deadline to meet the legislated renewable portfolio standard of 33%, and because state agencies have set a goal of implementing the first zero-net-energy standards for residential construction during that year.

[12] “Regulated California Electric and Gas Utility Ratepayer Costs,” prepared by the California Public Utilities Commission (San Francisco, CA, 2011).

[13] This range is based on two studies. The California Energy Commission in 2007 forecasted retail electricity prices for the year 2018 with an average annual growth rate of 1.8%. “Draft Staff Report: Staff Forecast: Average Retail Electricity Prices: 2005 to 2018,” California Energy Commission, (Sacramento, CA, 2007). Using these figures, in the year 2020 the retail price may be in the range of 16 to 19 cents per kilowatt-hour. Another author explains that California has had much a higher historical annual growth rate of 5-7% resulting in a year 2020 forecast of 17 to 26 cents per kilowatt-hour. Bloomenergy, “Understanding California’s Electricity Prices,” 2009. Available at <http://www.bloomenergy.com/fuel-cell/resources/>.

com/fuel-cell/resources/.

[14] This factor was converted from an estimated conversion factor of 0.26 metric tons of carbon dioxide- per megawatt-hour of electricity usage forecasted for the year 2020.

[15] “California Clean Energy Future Metrics,” prepared by the California Energy Commission (Sacramento, CA, 2011).

[16] During 1996, the annual median energy use of a commercial building in Census Region 9 including Alaska, California, Hawaii, Oregon, and California was 13 kilowatt-hours per square-foot per year. This analysis assumes that an off-set-authorized building will achieve a 70% reduction in energy use from that time due to building code standards, leaving a GHG gap equivalent to 3 kilowatt-hours in the year 2020, or 1.8 pounds of carbon dioxide, per square-foot per year. The minimum scale, arbitrarily set, is one-third of this anticipated energy-related GHG gap. Note that while this source is old, it does represent a time before more stringent building energy codes were established in California. The buildings from that time are representative of the baseline from which 70% energy reduction is measured.

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[21] “Baseline Economic Forecast-January 2012,” prepared by the Congressional Budget Office (Washington, DC, 2012). Available at <http://www.cbo.gov/publication/42909>.

[22] “CPI Inflation Calculator,” prepared by the Bureau of Labor Statistics of the U.S. Department

of Labor (Washington, DC, 2012). Available at [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm)

[23] Given that administrative and marketing costs ranged from 21-38% with administrative costs around 10% for renewable credits, it is conceivable that additional costs of this magnitude could be incurred under an energy efficiency credit system. Friedrich, “Saving Energy Cost-Effectively.”

[24] Bloomenergy, “Understanding California’s Electricity Prices,” 2009. Available at <http://www.bloomenergy.com/fuel-cell/resources/>

[25] Steven Weissman, “The Cost of Renewable Energy Put in Perspective,” November 28, 2011. Available at <http://blogs.berkeley.edu/2011/11/28/the-cost-of-renewable-energy-put-in-perspective/>

[26] “Energy Facts: Reducing Foreclosures and Environmental Impacts through Location-Efficient Neighborhood Design,” prepared for the Natural Resources Defense Council (Chicago, IL, 2010).

[27] “California Emissions Estimator Model,” created by the South Coast Air Quality Management District (Diamond Bar, CA, 2011). Available at <http://www.caleemod.com/>.

[28] A highly efficient commercial building is expected to emit 1.8 pounds of carbon-dioxide-equivalent GHG emissions per square-foot per year without any on-site renewable energy generation. A solo commuter emits an equivalent of 23 pounds of carbon dioxide per square-foot of building space per year based on average building occupancy, commute length, and vehicular gas mileage. A 10% drop in vehicular travel use would more than compensate for the GHG emissions associated with energy use.

[29] The figures presented in this section are estimates made by the author in light of the above information and sources.

[30] “California Center for Sustainable Communities at UCLA,” CA Energy Commission.

[31] “Zero Carbon for New Non-Domestic Buildings: Consultation on Policy Options,” prepared by the United Kingdom Department for Communities and Local Government (London, UK, 2009).

# POSITIONING CALIFORNIA FOR THE FUTURE: A VIEWPOINT ON THE STATE'S BUDGET DILEMMA AND THE FISCAL OPPORTUNITY AHEAD

COMMENTARY BY ELIZABETH HILL

EDITED BY KATIE FLEMING

Elizabeth Hill, a 1975 graduate of the Goldman School of Public Policy at the University of California, Berkeley, joined California's Legislative Analyst Office in 1976 as a program analyst. She was appointed California's Legislative Analyst ten years later. In her thirty-two years of state service, she served as a non-partisan fiscal advisor to the California Legislature on fiscal and policy issues. Her office also prepared impartial analyses of all initiatives and constitutional measures qualifying for the statewide ballot.

During her retirement, Hill is an active board member of the Goldman School of Public Policy, the California Healthcare Foundation in Oakland, and California Competes, an organization that develops non-partisan and financially pragmatic recommendations for improved policies and practices in California higher education.

## INTRODUCTION

California voters on November 6, 2012 gave state policymakers a golden opportunity to get the state's fiscal house in order after a decade of major budget deficits. The passage of Proposition 30 increases the sales tax rate by one-quarter cent for four years and the personal income tax rates on upper-income taxpayers for seven years. It is projected to raise about \$6 billion in annual state revenues from 2012-13 through 2016-17. Another change resulting from the election is that for the first time since 1933, one party—the Democrats—will have a supermajority in both houses of the state legislature. Taking advantage of this two-pronged opportunity will take political courage, vision, discipline, and restraint.

## CALIFORNIA'S BUDGET IN CONTEXT

California was the world's ninth largest economy in 2011—with a gross state product slightly less than \$2 trillion. As the most populous state in the country, California's economy outperforms all other states. Despite its economic strength, the Great Recession of 2007-09 hit California, like the rest of the country, hard. During the good economic times of the late 1990s, the state increased its spending commitments and reduced taxes. When state revenues declined significantly in 2001-02, a budget hole was created that policymakers have been trying to address ever since. In the early years of the crisis, budget solutions tended to be short-term reflecting a one-year at a time approach. The state also relied heavily on borrowing to make ends meet—both from the private bond markets and internally within the state budget. Internal borrowing took the

form of loans from the state's special funds that are dedicated to specific purposes, as well as deferrals of payments to local governments and schools. In late 2008, following the near collapse of world credit markets, the state's fiscal condition deteriorated rapidly. As the California Legislative Analyst's Office reported in January 2011, the legislature enacted about \$60 billion of one-time and ongoing actions to address California's 2009-10 budget shortfall. This was followed in subsequent years with budget solutions totaling \$20 billion in 2010-11, \$27 billion in 2011-12, and \$16 billion in 2012-13.

## THE STATE'S CREDIT CARD IS MAXED OUT

When Governor Jerry Brown took office in January 2011, it was estimated that borrowing to address the state's budget problem totaled more than \$30 billion. In my view, the state has maxed out its credit card.

To assist the state in addressing budget problems from the 2001 recession, the voters passed Proposition 57, The Economic Recovery Bond Act, in March 2004. This measure authorized the state to sell \$15 billion of bonds to deal with its budget deficit. Governor Arnold Schwarzenegger and other proponents made this argument in the state's voter pamphlet in support of the measure: "The California Economic Recovery Bond will let us refinance our inherited debt and give the state time to deal with its ongoing structural deficit."

While the economic recovery bonds did buy the state some time to deal with its fiscal problems, a combination of factors, including the Great Recession, contributed to continued

## POSITIONING CALIFORNIA FOR THE FUTURE

budget problems for the State of California. Like any borrowing, however, the bill ultimately comes due and that is where the state finds itself today. Our interest payments today are essentially taking funds away from current services in order to pay for services delivered a number of years ago. Governor Jerry Brown has called attention to the state's credit card referring to it as a "wall of debt."

### LOCKED-IN SPENDING AND LOCKED-OUT REVENUE

Policymakers have faced very difficult challenges balancing the state budget over the last decade. One aspect of the budget problem that is often overlooked is the impact of the initiative process on the budgetary levers that are available to policymakers to balance the state budget. California is one of twenty-five states, largely in the west, with the initiative process. California is the only state of those initiative states, however, that does not permit some form of legislative repeal or amendment of statutory initiatives—either directly after passage or after a specified period of years.

After working on twenty-five statewide elections by helping to prepare the statewide voter pamphlet, I am of the view that while the initiative process is an important avenue for the public's voice in California, it has contributed significantly to the state's fiscal dilemmas. Specifically, the initiative process has become the instrument of special interests rather than the tool to rein in the power of special interests, as was the intent in 1911 when it was established. In fact, the process in California has spawned its own industry of lawyers, signature gatherers, and campaign consultants.

The largest example of how initiatives have locked in spending includes Proposition 98 passed by the voters in 1988. This measure, in its simplest terms, earmarks approximately 40 percent of General Fund revenue for K-12 schools and community colleges through a minimum state-funding guarantee. Another example of dictated spending is Proposition 49 that was passed by the voters in 2002. It requires, regardless of other school needs, that the state fund "after school programs" at a specified funding level each year.

Ballot restrictions, however, are not limited to the spending side of the ledger. Historically, the state sales tax was deposited in the General Fund and could be used for whatever purpose the legislature deemed was the highest priority. Proposition 42, passed by the voters in 2002, instead permanently directed sales taxes on gasoline to be used exclusively for transportation purposes. Another example of locked out revenues is Proposition 99, passed by the voters in 1988. This measure imposed a twenty-five-cent per pack surtax on cigarettes and a comparable surtax on other tobacco products and directed the funds to be used primarily for health-related programs.

A recent example of ballot box budgeting is the passage of Proposition 39 in November 2012. It raises additional revenue of approximately \$1 billion annually from multistate businesses, but dedicates \$550 million each year for five years to projects that create energy efficiency and clean energy jobs in California. By tying the legislature and governor's hands in this manner, these initiatives have limited the state's ability to respond to changing circumstances and priorities in California.

### BUDGET OUTLOOK

In order to assist the legislature with its budgetary planning, the California Legislative Analyst's Office (LAO) prepares an annual forecast each November that assesses the state's fiscal situation on a current law basis. In "The 2013-14 Budget: California's Fiscal Outlook," the LAO found that the combination of economic recovery, prior budget cuts, and the additional, temporary taxes provided by the passage of Proposition 30 result in a much smaller budget problem facing the legislature in 2013-14 than it has faced in recent years. Specifically, the LAO estimates that the state will end the current fiscal year, 2012-2013, out of balance by \$943 million and will face a \$936 million operating deficit in 2013-14. For the two years combined—assuming continued economic recovery and that federal officials act to avoid the near-term economic problems associated with the so-called "fiscal cliff"—the state faces a \$1.9 billion budget problem.

### WHAT SHOULD POLICYMAKERS DO?

After nearly eighty years, the legislature has a supermajority party. Legislative Democrats have an historic opportunity to position the state for the future by making government work better for the benefit of all Californians. The legislature and the governor will face intense pressure to restore prior spending cuts and address a myriad of problems across the policy spectrum. Spending restraint and a strategic approach to expenditures that invest in the state's future are absolutely critical to the state's success in both the near and long term.

As the LAO noted in its report, restoration of the budgetary reserve is critical. The sensitivity of the budget condition to changing economic variables as well as unanticipated spending increases makes this a strategic decision for the state's success. Long-term fiscal reform should also include an examination of the initiative process to allow for statutory legislative changes, under certain circumstances, a number of years after passage of a measure. Locked-in spending and locked-out revenues have hampered policymakers' ability to adjust to changing state needs and priorities.

California, the Golden State, has a long history of seizing opportunities. This one is too important for the state's future for policymakers to fail to act.

# GOVERNING THE GOLDEN STATE: A CONVERSATION WITH LIEUTENANT GOVERNOR OF CALIFORNIA GAVIN NEWSOM

INTERVIEW BY SHEETAL DHIR



Gavin Newsom was elected as the 49th Lieutenant Governor of California on November 2, 2010. During his tenure as Lieutenant Governor, his top priorities have been economic development and job creation, improving access to higher education, and maintaining California's environmental leadership. In 2011, Newsom worked with a variety of stakeholders to create a comprehensive economic blueprint for the state of California.

Previously, Newsom was elected the 42nd Mayor of San Francisco in 2003, becoming San Francisco's youngest mayor in 100 years. He was re-elected to a second term in 2007. While serving as mayor, Newsom advocated for and passed same-sex marriage legislation. He signed the Health Choices Plan in 2007 to provide San Francisco residents with universal healthcare, and also committed to making healthy food options more accessible to families. He was one of the first mayors in the country to embrace these progressive issues.

*PolicyMatters* sat down with Lieutenant Governor Newsom following the November 2012 election to discuss his views on a wide variety of public policy issues, including education and economic development in California and across the nation.

**PolicyMatters Journal (PMJ):** *How do you feel about November's election results?*

**Lieutenant Governor Newsom:** Obviously two feelings: proud and optimistic. The optimism comes from this growing demographic reality that the world is starting to catch up to a lot of the values that we've espoused out here in San Francisco and California. I don't say that in a bragging sort of way, but I do think there is a generational reality. This millennial generation, a more empathetic generation, which came out to vote in huge numbers, and that's the point of my optimism. I think we focus so much on Latino voters and women voters—which is absolutely right and significant—but not enough on the millennials. Even those that voted for [Mitt] Romney are increasingly looking at the issue of climate change more seriously, are moving past the stale debate around marriage equality, and are understanding the importance of choice in the context of women's rights. That

gives me great optimism about the future of the country. So that's what I read when I looked and dissected the numbers. It was so much bigger than an individual, because individuals come and go. The president is given just four more years, but people and principles transcend, and so I'm hopeful.

**PMJ:** *In the past you've spoken of two Californias—a coastal California and an inland California—how do you react to what happened with the ballot propositions—especially with unemployment falling and the state of property values?*

**Newsom:** The issue of California really is a tale of two states. We live in two different worlds in the same state—increasingly coastal and inland. I've been traveling, and I've been to thirty-nine counties; deeply getting into them, not just driving through them. It's been fascinating. I spent a lot of time in and around Imperial County and the Inland Empire, where they're in depression era unemployment and

it's not hyperbolic to say that. Imperial County right now has 28.5 percent unemployment. That's not underemployment—those are not the folks who have dropped out of seeking employment—that's just the stated unemployment. I live in a county, Marin, with 5.8 percent unemployment; 5.8 percent to 28.5 percent in the same state. It's an extraordinary thing, and so I worry about that.

That's what my work on the economic development commission has been about. Not just complaining about it but searching for specific, practical ideas. We've hired Brookings and McKinsey and we went out across the country—virtually and physically—to see what best practices were in terms of economic development. How can we fix this? How can we deal with the issue of childhood poverty? How can we deal with 4,000,000 people that won't be covered by Obamacare after we implement it? What are we doing to prepare for that? What are we doing to prepare for austerity measures that may come in any grand bargain the president has with the Republican Congress? How do we react to potential cuts to Medicaid and the issues of addressing Medicare and entitlement cost?

So those issues will play out, but nothing is more important than the issue of schools. I'm of the opinion that you can't reform K-12 education; you need to create something different. Reform assumes using the same ingredients. I don't think we can. I think it's no longer a valid model for the world we're living in. It's a model that was conceived of during the industrial revolution to pull people off their farms and bring them out of the rural areas to an industrial mind frame. That's why we have summer vacation, which was to till the fields.

The reality was we set people up as factories. We stamp you by your date of manufacture, your age; we teach you in separate subject matters; and we have bells that ring as if Benjamin Franklin was still around. It's a broadcast model of education. Even in higher education, we lecture, you write or type, and then we test. We test to your memorization skills, to your robotic skills, and not to your creativity.

**PMJ:** *What does your ideal classroom look like?*

**Newsom:** Throw out the desks; give me some round tables. Flip the classroom completely, where homework is done in the classroom and where teachers are mentors and coaches. Teachers create a Socratic style of teaching, where

there are groups of different cohorts—not based on date of manufacture, meaning your age. Students should be dealing with real life creativity and problem solving exercises. Lectures are provided in a format where you have that ability to rewind, pause, and fast forward, and you get a completely different experience in a classroom setting that is physically different from the one we have today.

I think the debate we're having in education about how much we love or hate teachers, seniority, and tenure is trivial considering the magnitude of the crisis at hand as it relates to K-12 and higher education. I've been challenging the University of California and California State University systems. (*Editor's Note: Newsom sits on both the UC Board of Regents and the CSU Board of Trustees.*)

**PMJ:** *Yes, you've been quite vocal.*

**Newsom:** Yes, and perhaps it's hyperbolic to make this comparison, but it reminds me a little of Kodak, the company. They were still doing extraordinarily well in the film business even though there was this new shift to digital happening. But they never reconciled that reality and those trend lines because they were making so much money. They made only modest little adjustments, but the world wasn't moving modestly. The world is no longer connected; it's hyper-connected. The rate of speed is growing dramatically. So we are making modest adjustments in a world where traditional systems are being leveled. They have been leveled in the media; they've been leveled in probably every other area—except in government, which I would argue that public education is part of that governance structure. And I think technology is finally going to flatten this area [of education]. We need to get ahead of it and that's my argument.

**“[N]othing is more important than the issue of schools. I'm of the opinion that you can't reform K-12 education, you need to create something different. Reform assumes using the same ingredients. I don't think we can. I think it's no longer a valid model for the world we're living in.”**

**PMJ:** *From your perspective, do you think California is governable?*

**Newsom:** Yes, I think if you turn it upside down. I think the days of the guy or gal on the white horse are over. I think we're asking the wrong question: What's Sacramento going to do? It's the old adage: if you don't like the way the world looks standing up, then stand on your head and go local.

Amazing things are happening locally, including education reform. I can go to almost any county in the state and there's an extraordinary model of reform: after-school programs, preschool programs, arts education, and STEM (Science, Technology, Education, and Mathematics) programs. All remarkable, but it just needs to be scaled. So the solutions to our problems are out there; we just have to go out and find them and seek them.

This notion of hierarchy is dead. The world is now flat, it's peer-to-peer, it's side-by-side, and it's decentralized. Kids today are now kids of technology. They're not necessarily going through traditional conduits of government to solve problems. They're solving them directly themselves.

**PMJ:** *Because you have to, it's your local community. If no one else is going to do it, you have to pick up the pieces yourself.*

**Newsom:** So the whole thing needs to flip upside down to a community-organizing model. We have to read our own history; flipped upside down as armies of Davids not Goliaths. Your generation is the net generation, it's the participation generation, and it's the generation of choice. We have a fast food model of education based on age. This mass education is no longer relevant to the world we're living in.

I'm an employer—I have close to 1,000 employees—so I speak from real firm knowledge. Twenty years I've been in business creating jobs. Here's a real sense of what I'm looking for: I want creative problem solvers. I don't want a resume and I don't want their SAT score. I don't care about those things. I want to ask someone, "Here's a problem, how would you go about solving it?" As opposed to how well you did on a standardized test. That means we need to customize a curriculum for individuals based on where they are. Just as we go on our Ipods or Androids, and we have hundreds of thousands of applications that are ready to customize the worlds of entertainment and media.

**PMJ:** *It's an interactive model asking "What do you want out of your education?"*

**Newsom:** It's all about choice, every kid's choice. We still have a broadcast model of education and a broadcast model of politicking in terms of governing. Not campaigning,

we're very good at using the tools of technology to get elected. But already I've stopped receiving calls about how fabulous Barack Obama is because they're already turned off. How can you keep that going to change the world? To use these tools of technology to better our communities and to keep them going? That's what we're missing and that's the opportunity.

**PMJ:** *Shifting to the environment, AB 32 (California's Global Warming Solutions Act), do you think we're on track?*

**Newsom:** I think cap and trade is good, but I think putting a price on carbon is better. We're the only game in town so to speak. We're going to lean into this in November [2012] when we start the first cap and trade sales and then full implementation [in 2013]. We've got to be open to argument and not ideological about this. I'm worried in a year or two you're going to see big spikes in energy costs, particularly in the inland part of the state. The concern there is that there will be a big wakeup call to socio-economic issues and the ability to pay; so we have to be sensitive to that. I want California to continue to lead, but you can't be ideological in these efforts.

But I don't think we're going to get near to where we need to get on the issue of climate change, which scares the hell out of me more than any other issue times infinity. Nothing else comes close. I've been saying this for years. No one has woken up to the reality of what has happened in the past few years; so I'm very worried about it.

**PMJ:** *How do you garner allies and support when it seems like no one is waking up to the problem?*

**Newsom:** It takes a [Hurricane] Sandy to get everyone aware, but then we do adaptive strategies as opposed to dealing with the underlying causes. Already we are moving on to debates with [John] Boehner right now about the fiscal cliff, which I get. It's situational values not sustainable values, and that's the mess we're in. We deal with the moment and we don't think sustainably in the broadest context. So AB 32 is principled; it's important. We're going to lead by example and we need more partners. It can't just be California leading the way because we need to scale it.

**PMJ:** *Do you think the administration has paid attention to it? Are they open to comprehensive climate change legislation?*

**Newsom:** This is my idea of the army of Davids versus Goliaths. Once you get into office you don't have the power. The power is in the people; the power is with us. You can't just count on someone who is stuck in a system that doesn't allow you a lot of room to navigate. It doesn't matter how good you are or how talented you are.

For example, there are few people that have ever existed in politics as talented as Barack Obama, but look how limited his choices ultimately are because of the reality of that system and the pressure points of that system. The best we did in the first term was fuel efficiency standards, which are incredible and one of the great successes of the first four years. But it's not even close to where we need to be; not even within a margin of error of where we need to be. And that was when we had a Democrat-controlled Congress for those first few years and the momentum with the promises being promoted. Hopefully in the second term he can do a lot more, but that's incumbent upon us to give the president the room to navigate.

**PMJ:** *In terms of participatory governance, what do you say to bankrupt cities in California, such as Vallejo, and their efforts to do participatory budgeting? Do you think there's value in that effort?*

**Newsom:** I've written a book about it called *Citizenville*, which will be out in February [2013]. It lays out ideas like participatory budgeting, which I am a huge fan of. You have these anomalies—these flair-ups in presidential campaigns—where people are lulled into believing that people are engaged and more civic-minded. Then you go back to reality, back to our original form of seeing lower participation in local races, and lower participation in statewide races. You need the enthusiasm of a presidential race to dial that back up. That's the disconnect; so we need to deal with that middle.

Participatory budgeting, where you feel a sense of ownership and engagement, is incredibly important. I love the opportunity to iterate city by city. Try new things, see if they work, share those best practices, and scale them up. Again, I don't count on Sacramento to do these things. We have sort of an anti-reform agenda, because reform assumes people give up a little bit of power or control on both sides. That's extraordinarily difficult to break. So you start at the local level—where it's easier to do that—and all of a sudden it thaws that hierarchical structure.

**PMJ:** *How do you propose pro-growth strategies in and around California, particularly when members of both parties accuse the state of being so hard on business?*

**Newsom:** We'll never be the cheapest place, but we can be the best place. That means we have to invest in our engines of growth and the most important investment is people, human capital. The reason businesses excel—those successful businesses—is talent, and we have long conveyed talent—more than any other state—through our universities and our system of higher education. That's why it's so disconcerting that we've put so much sand in the gears of that conveyor belt over the past few years with these billion-dollar cuts [in education spending]. We've stemmed the bleeding, but you're going to see even more tuition increases.

That's number one: education. From a business perspective, I have long wondered why the California Chamber of Commerce is not the one getting headlines for being arrested and shutting down UC [Board of] Regents meetings. Because to me, I don't think there's any more important issue for the California Chamber of Commerce than what's happened at the CSU, UC, and community colleges. If you care about business—which presumably that's the purpose of the California Chamber of Commerce—then *they* should be front and center, not the students and faculty. I'm stunned that I've not seen a letter from the Chamber of Commerce to the [Board of] Regents saying, "We're concerned about what's going on." It's as if big businesses are now just hovering in the state, not even operating in the state.

**“The reason businesses excel—those successful businesses—is talent, and we have long conveyed talent—more than any other state—through our universities and our system of higher education. That’s why it’s so disconcerting that we’ve put so much sand in the gears of that conveyor belt over the past few years with these billion-dollar cuts [in education spending].”**

**PMJ:** *How are you going to bring them back down?*

**Newsom:** The problem is that the world has changed. The ownership of these companies is no longer localized; it's distributed globally. We are collectively owners, so it's very difficult. The world of business has changed so radically as globalization has advanced in the last few decades. I'm more

## A CONVERSATION WITH LIEUTENANT GOVERNOR OF CALIFORNIA GAVIN NEWSOM

concerned about the business community's involvement in solving big issues. That said, it's not an excuse for giving up.

We're going to try some new things this next year to right that wrong. But the most important thing is that [the state] has to be competitive. We have to invest in our strengths. So California can't divest in education, have the highest taxes in America, the most burdensome regulations, and compete.

You can get away with higher taxes and more restrictive regulations if you have a dynamic workforce that offers something unique and distinctive, and that's what we've had in the past. We still have it, but you have to balance those things and that's where I get concerned. I don't have a problem being a little bit out of market here as long as we are extraordinary on the other side. It's when you're average across the board and out of touch on your regulations, then you will pay a price.

Just as an example, ask Intel why they have so many folks in Washington State. It's because they have no corporate taxes in Washington State—zero. [In California] we have 8.84 percent, one of the highest in America. People say we should raise corporate taxes. That's great, but it's difficult when Nevada and Texas and Washington State don't. It's nice in the abstract, but there are real world decisions that people are making. We've got to be competitive, we've got to make the business community know that they matter and we care.

We have to focus on the real engine of growth: start-ups and small businesses that are growing. There was a great study that the Kauffman Foundation did, showing that from 1977 to 2010—with the exception of just seven years—all the net new jobs in this country were created by small businesses and start-ups. Big businesses don't create jobs; they cut jobs. Most medium-sized businesses are looking to be more cost-efficient and their highest cost factor is labor. So the chances are they're looking to reduce the size of their labor force. It's those small businesses with big growth potential that we should be investing in, creating those conditions where we're making it easier to get a planning department permit and a building permit.

**PMJ:** *Facilitating their work, that's how you create community, right? Do you have any advice for policy students? What should we pay attention to?*

**Newsom:** Lincoln said something beautiful. He said, "We're all born originals, but we die copies." Others have said, "Life de-geniuses you." What I mean by saying that is don't be de-geniused. Maintain your originality, be cautious about the way things are done, maintain your sense of idealism

and audacity—ready, fire, aim—and ask for forgiveness and not permission. Make mistakes; be bold and audacious and maintain your integrity. Be open to argument and interested in evidence. Don't be an ideologue—someone who has already figured it out. Seek first to understand, then to be understood. The world we live in tends to celebrate power as opposed to celebrating courage, and I think that's sad. So maintain your sense of courage and change that.

**PMJ:** *What does your next ten years look like?*

**Newsom:** I would love to be governor, because I am an executive at heart as a business guy and a two-term mayor [of San Francisco]. I love getting things done. I love public policy. I love ideas; I think the best politics are a better idea. When I was mayor, we probably had 450 ideas. Some were good, some were terrible, some were massive failures, and some were over-promised. Some were absolutely exceptional like universal healthcare that became models for the country, universal preschool, universal after-school, and audacious ideas from composting requirements to community justice centers to reimagining our homeless service delivery system. We did a lot of great things and I love that, so I want to lean into that world. I want to radically think about education again, and not just reform it.

**PMJ:** *Would that be a 'Day One' priority?*

**Newsom:** It's a priority now; but without the authority to do it, it's frustrating. And we've got to move faculty into the direction of online education. It's not to take away from the educational excellence that exists at UC and CSU, but it's to provide another layer of opportunity, of engagement, that I think is critical based on the world we live in. Education would be the dominant agenda, starting with radical new pilots in each of our school districts, tying funding and incentives to those efforts. It would be a bottom-up, iterative process not coming out of Sacramento. But we give real flexibility and real decision-making to local folks to do things radically differently. Then assess and measure the success or failure of those initiatives.

But the worst experiment is not experimenting. The biggest risk is not taking one as it relates to education right now. We have a [high] dropout factor in California, in particular the Los Angeles Unified School District, and you cannot justify the status quo. You cannot justify anything except radically rethinking your approach. You cannot justify to those families playing in the margin; you cannot argue to fail more efficiently and call that a policy.