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Author
Borenstein, Severin

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Severin Borenstein

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2547 Channing Way
Berkeley, California 94720-5180
www.ucei.org

The Implications of a Gasoline Price Floor for the California Budget and Greenhouse Gas Emissions

Severin Borenstein[1]

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Abstract: California is faced with an unprecedented budget crisis. The state is also committed to significant reductions in greenhouse gases that cause climate change. Meanwhile, the price of gasoline is plunging as the world economic slowdown cuts oil demand. At the intersection of these three situations lies an opportunity. In this policy paper, I analyze the effects of a transportation fuel surcharge that moves inversely to the price of oil. Such a surcharge could stabilize gasoline prices at levels that a few months ago would have been celebrated by consumers and still significantly reduce California's budget deficit. It would also slow the return of gas-guzzling vehicles that will otherwise result if oil prices remain at current levels.

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[1] Director, University of California Energy Institute (www.ucei.org); E.T. Grether Professor of Business Economics and Public Policy, Haas School of Business, University of California, Berkeley (faculty.haas.berkeley.edu/borenste); and Research Associate of the National Bureau of Economic Research (www.nber.org). Email: borenste@haas.berkeley.edu. For helpful comments and discussions I thank Howard Chong, Joe Farrell, Ryan Kellogg, Chris Knittel, Matt Kotchen, Karen Notsund, Carla Peterman and seminar participants at CSEM policy talks at UCEI and in Sacramento.

I. Introduction

California faces a budget deficit now projected to be more than $11 billion per year. Substantial budget cuts are under consideration for schools, social services, state payrolls and support for public transit, among others. Also on the table is a sales tax increase of up to 1.5% on all goods covered by the state's sales tax (which is most goods consumers purchase except some food, medicines and utility bills), an expansion of the sales tax to cover services, and an increase in the vehicle license fee.

At the same time the rapid decline in oil prices since July has threatened to derail California's attempts to reign in greenhouse gas (GhG) emissions in the state and meet the aggressive goals set by the AB32 legislation. If oil prices stay at their current level and gasoline prices commensurately remain well below $2.20 per gallon, there is little doubt that drivers will quickly return to their habits of a few years ago, buying larger gas-guzzling vehicles and driving them more.

The confluence of these situations creates an opportunity for California to stabilize gasoline prices at levels that just a few months ago would have been a welcome relief for consumers while mitigating the budget crisis and preventing significant backsliding on climate policy.

II. A Fuel Price Stabilization Program

I first present the Fuel Price Stabilization Program (FPSP) in its simplest form for clarity. In later sections, I discuss variations that address some of the concerns that might arise.

In its basic form, the FPSP would be a surcharge on transportation fuels that moves inversely to the price of oil. The FPSP would apply to gasoline, diesel and jet fuels. It would target a certain oil price and impose a surcharge on retail transportation fuel sales whenever the price of oil falls below the target. In the medium run, every $1 change in the price of oil translates to a 2.4 cent change in the price of wholesale gasoline and other fuels, which in California causes a price change at the pump of about 2.6 cents per gallon due to the addition of sales tax that averages about 8.5%.[2] So, the surcharge would be equal to 2.4 cents for every dollar difference between the price of crude oil and the target price. In order to avoid increasing the complexity of the gasoline sales tax calculation, the FPSP surcharge would be treated the same as all other components of the retail price of fuels (wholesale price, retail margin, federal excise tax, and state excise tax) and would be

[2] California gasoline contains about 5.7% ethanol which weakens this relationship slightly, but only very slightly because the price of ethanol moves closely with the wholesale price of gasoline.

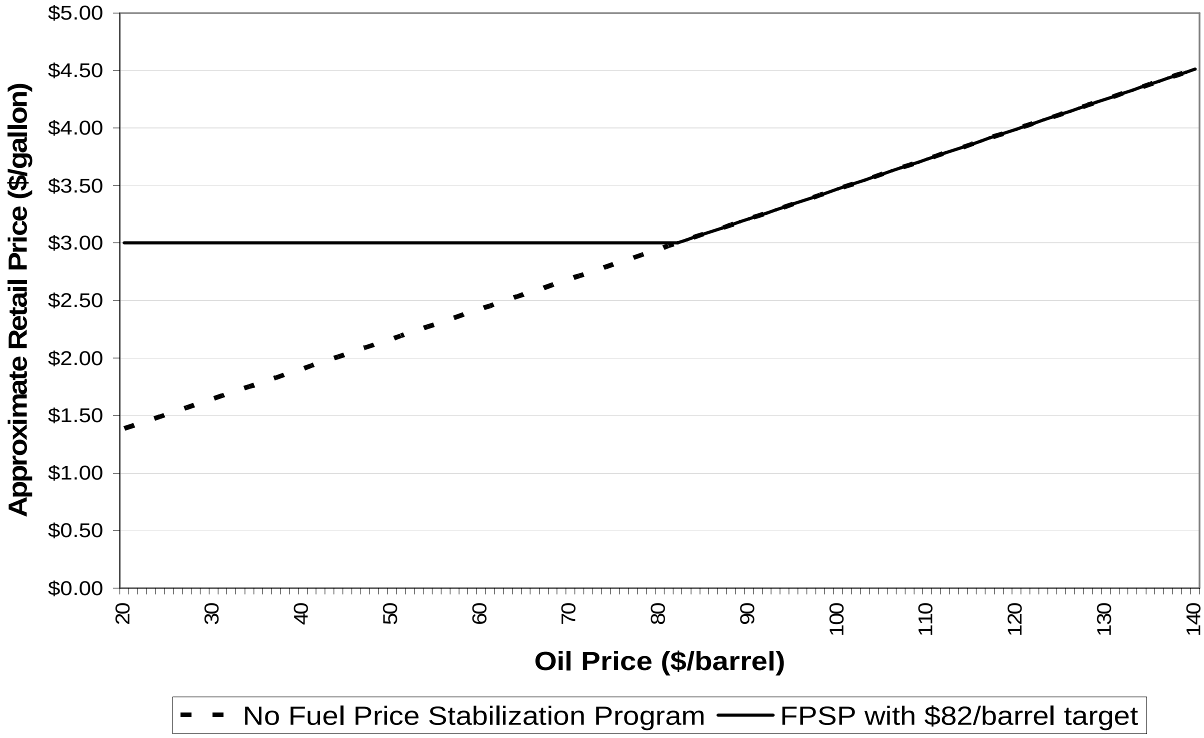

Figure 1: Approximate Retail Price Under Illustrative Fuel Price Stabilization Program

subject to sales tax.[3]

Setting the target oil price would set an approximate target retail fuel price. Given average gasoline refining and retailing margins in the recent past, a target oil price of $82 per barrel would result in a target retail gasoline price of about $3.00 per gallon. I will use this target oil price to illustrate the FPSP, but it is important to stress that this is just an example. The target level is a policy choice that can be determined by the legislature and Governor.

The exact retail price that would result from targeting an $82 per barrel oil price would depend on fluctuations in refining and retailing margins, which the state would make no attempt to influence. Realistically, it would not be surprising to see retail prices fluctuate plus or minus 20 cents. Figure 1 illustates the approximate retail prices as a function of crude oil prices with and without the FPSP.

In practice, it would make sense to adjust the FPSP surcharge periodically, probably monthly. Each month, the agency responsible for implementing the FPSP could calculate the difference between the target oil price and the exogenous oil index – probably the

[3] This is simply an accounting normalization. One could make the FPSP surcharge exempt from sales tax and make it slightly larger in order to generate the same total revenue. But doing so would make tax collection more complex.

NYMEX front-month crude oil price that is generally referred to in the media as "the" price of oil. If the oil index price were above the target, the FPSP surcharge would be zero. If the index were below the target, the surcharge would be 2.4 cents per gallon multiplied by the dollar-per-barrel difference between the index price and the target price.

Why target oil prices instead of retail fuel prices?

There are at least two reasons that the FPSP surcharge should be based on world oil prices. First, the fact is that it would be impossible to target a retail price exactly unless the surcharge were going to be set separately for each station and adjusted at least daily. That would effectively be retail price regulation, a path that has proven unworkable in the past.

More importantly, the target on which the FPSP surcharge is based, and thus the level of the surcharge, should be out of the control of any of the producers or retailers in the California fuels market. If the surcharge were based on wholesale or retail prices in California, then a seller might be able to raise its price and force the surcharge to adjust downward in response, effectively causing the state to subsidize price increases by sellers. This problem wouldn't occur if the market were so competitive that sellers had absolutely no control over price, but that isn't always the case in California.[4]

In addition, targeting a price in California would raise questions about which price in which region should be targeted, and whether the surcharge should be different for regions with different prices. Prices do vary regionally in California for reasons of both cost and differences in market competitiveness. Most of those variations are completely legitimate market outcomes, while some may be more questionable. But in any case, attempting to use the FPSP to try to achieve greater price parity across the state would distract from the primary issues it addresses.

At what level should the target be set?

This is a policy choice that should depend on both the amount of revenue the state wishes to raise and the degree to which it wishes to discourage increased fuel use. Of course, in reality, it will depend on politics as well.

The analysis, however, can be done independent of these considerations. The choices can be presented to the legislature and Governor in the form of estimates of revenue raised and GhG emissions prevented as a result of various possible targets. Due to volatility in oil prices, unpredictability of the California economy, and uncertainty about the price and

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[4] See Borenstein, Bushnell and Lewis (2004) and Borenstein and Bushnell (2005).

income elasticities of demand for gasoline and diesel, these will not be completely reliable predictions. Below, I make three suggestions for reducing the volatility of revenues from the FPSP. I then present some sample calculations that give an idea of the range of impact.

III. Budget and Environmental Impact of a Fuel Price Stabilization Program

The calculations in section VI present a range of possible scenarios for revenue impact, but a simple calculation gives an idea of the magnitude of effect of an FPSP.

California currently uses approximately 65 million gallons of fuel per day of which is about two-thirds is gasoline (inclusive of blended-in ethanol) and the remainder is divided about equally between diesel and jet fuel. That quantity would vary, of course, both with the price of fuel and with the strength of California's economy, which is likely to be weak for at least the near term.

At the market close on Friday, November 14, the futures prices for oil delivery during 2009 averaged about $62/barrel. If the FPSP were implemented as of January 1, and if the target price were set at $82/barrel, then the best estimate is that the surcharge would raise about $12 billion in 2009.[5] That estimate, however, is heavily dependent on the oil price forecast, a factor I discuss in more detail in section VI.

The environmental impact of the FPSP surcharge is also uncertain, but based on existing evidence of fuel demand elasticity a baseline estimate is possible. The estimate depends on how much the FPSP raises retail fuel prices and the size of the demand elasticity. Assuming that the relevant short-run elasticity is about -0.1 and long-run elasticity is about -0.5,[6] then if the FPSP resulted in $3/gallon gas prices when they instead would have been about $2.50 absent the FPSP, the FPSP would result roughly in 2% less GhG release from transportation fuels in the short run and about 9% less in the long run.[7] To put that in some context, the long-run change of 9% is about one-quarter of the entire reduction California is currently targeting to reach by 2020.

The potential change in GhGs can also be compared to the Low Carbon Fuel Standard that is under development for the state. Currently, the LCFS has an aggressive target of

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[5] The details of this calculation are presented in section VI.

[6] Recent estimates of short-run elasticity are somewhat smaller (in absolute value) than -0.1 (Hughes, Knittel and Sperling (2008) and Small and Van Dender (2007)), while earlier estimates are considerably larger (Espey (1998)). Among the studies surveyed by Espey (1998) the median long-run demand elasticity estimate is -0.43, and the mean is somewhat higher in absolute value.

[7] In terms of actual GhG release, this amounts to a savings of about 11,000 tons per day in the short run and 55,000 tons per day in the long run.

10% reductions in transportation GhGs. Even if that goal were met, a drop in the price of gasoline from $3.00 to $2.50 per gallon is estimated to negate nearly 100% of the savings from the LCFS. If the price without the FPSP is well below $2.50, then the additional GhGs from the low fuel price would more than cancel out all of the gains from the LCFS. Of course, reaching the LCFS goal with alternative fuels will in itself raise fuel prices somewhat, but that just means that those revenues that could have gone into the state coffers, while reducing GhGs, are instead going into the higher cost producing alternative fuels.

These are not precise estimates, but they are median-case scenarios of a sort. They demonstrate that both the budget and the environmental consequences of an FPSP could be quite significant. On the other hand, if oil prices drift upward over time, as is quite possible, and the FPSP target price remains the same, then the GhG reduction attributable to the FPSP would be substantially smaller as fuel prices would be high even without the program. Various scenarios are explored in section VI.

Cutting fuel use has other benefits worth noting. Reducing fuel consumption contributes to improving U.S. energy security, making the U.S. economy less subject to macroeconomic shocks from oil price fluctuations, and reducing the world price of oil, thereby lessening transfers of wealth to some countries that are antagonistic to the U.S. The impact of a California FPSP on these goals would be quite small, but like the state's GhG-reduction program, it would show leadership in the pursuit of these national and international policy goals.[8] More locally, the modest decrease in traffic from an FPSP would have disproportionate effects in reducing traffic congestion, because the last 1% of traffic added to the road causes much more than a 1% increase in traffic congestion and delays.[9]

IV. Revenue Volatility from a Fuel Price Stabilization Program

Probably the most serious policy concern about the FPSP (as opposed to the obvious political concerns) is that the revenue stream it generates would be highly uncertain. If the price of oil moved up substantially, the program revenues could decline or completely disappear. Conversely, if the oil prices fell further, the state would receive much greater revenues than anticipated. Three different approaches could help to greatly mitigate the revenue volatility.

First, passage of an oil severance tax, as has been proposed by the Governor and some legislators, would counterbalance revenues from the FPSP to some extent. A rise in oil

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[8] I discuss these effects in more detail in Borenstein (2008).

[9] Raising fuel prices is clearly not the best way to address congestion, but given the political refusal to implement congestion tolls, an FPSP would make a positive contribution.

prices would increase revenue collected from the severance tax and lower revenue from the FPSP. Oil price decreases would have the opposite effects. In times of high oil prices, when producers are making high profits and consumers are getting pinched at the gas pump, oil producers would provide more revenue to the state and consumers less. In times of low oil prices, consumers would provide more revenue and less would come from oil producers. As currently envisioned, however, the oil severance tax plan would generate about $1 billion per year, substantially less revenue than the FPSP, so this would not fully balance the revenue volatility.

Second, if California adopted a program like the FPSP, the state could hedge some of the revenue risk by investing in oil price futures traded on the NYMEX and other exchanges. Up to the FPSP target price, the value of the futures contract moves exactly inversely to the revenues from FPSP, so the state could greatly stabilize total revenue by holding both revenue streams. If the price of oil went above the FPSP target, further increases in oil prices would generate additional revenues for the state. The main problem with this strategy is that California probably could not hedge most of the revenue risk in oil futures markets without actually affecting the price in those markets. If California were to try to fully hedge the revenue risk in the futures market, it would want to hold futures equal to about 1.5 million barrels/day, but currently the average open interest across all months in 2009 is about 2 million barrels/day. Still, some degree of hedging would reduce revenue volatility.

Third, and most easily adopted, would be a recalibration of the FPSP to adjust less than 100% with changes in the price of oil, which might be called a "soft floor." For instance, if the current price of oil is $62 and the target price was going to be set to $82 under the original program described above, the surcharge would be set to cover 100% of the difference between $62 and $82. Instead, under a soft floor, the surcharge could be set to cover only 50% of the difference, but the target price could be set to $102. At $62/barrel, both implementations result in gas prices around $3.00, so these two programs generate the same surcharge and revenue. But as the price of oil changes, the retail price of gasoline captures about half of the change in the price of oil, as illustrated in figure 2. As a result, revenues under the soft floor change half as much as under the original plan. In this example, if the price of oil went to $82, revenues would drop by 100% under the original plan, but would only drop by about 50% under this soft floor with a 50% adjustment. Likewise, if the price of oil dropped below $62 in this example, revenues would only expand by half as much under the soft floor as they would under the "hard floor" in the original plan. A soft floor with a 50% adjustment would reduce revenue volatility by 50%, but a higher or lower adjustment factor could be adopted.

None of these responses would fully eliminate revenue volatility from an FPSP, but

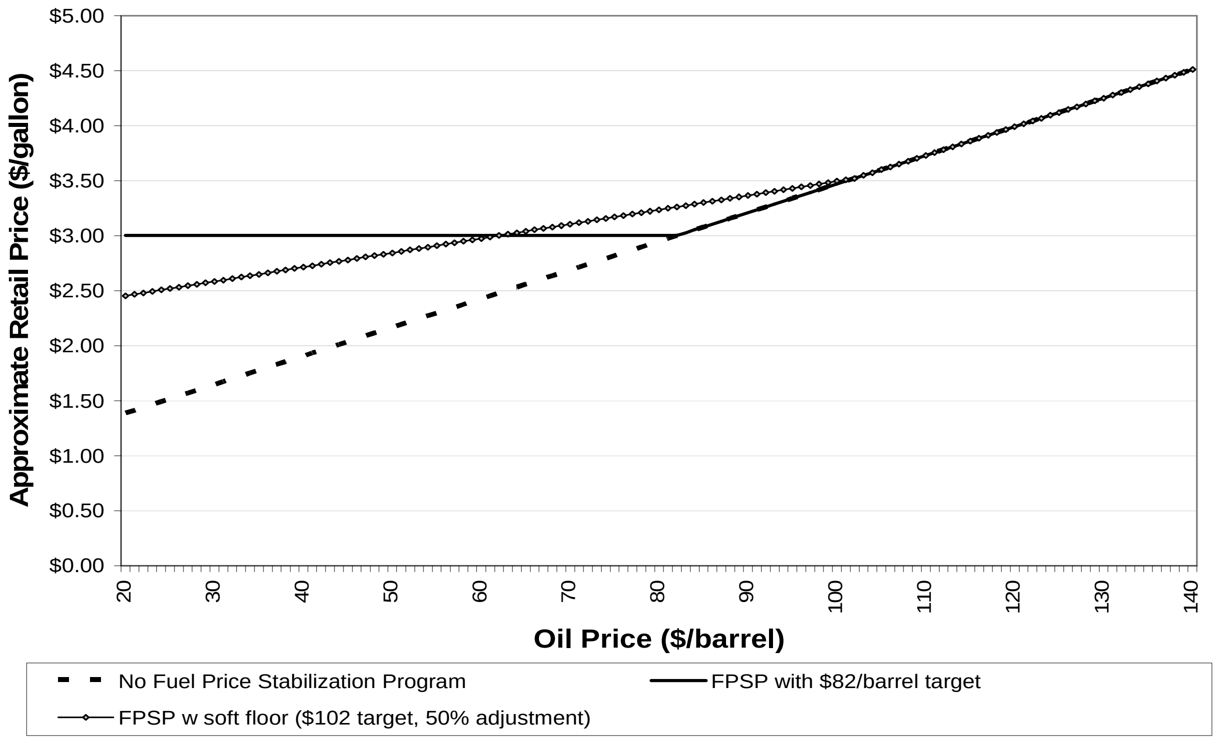

Figure 2: Approximate Retail Price Under Illustrative FPSP with Hard Floor and Soft Floor

together it seems quite possible that these approaches could make the revenue as stable as it is for other revenue sources on which the state relies.

V. State Economic and Policy Considerations

In the current economic downturn, is implementing a fuel surcharge going to be a further drag on the economy? Yes, but all of the options on the table have the same concern. Unlike the federal government, California can't just run a deficit indefinitely. All of the options – sales tax increase, income tax increase, cuts in state and local government spending, or some form of an FPSP – are contactionary from a macroeconomic standpoint. The federal government has the flexibility to run an expansionary macroeconomic policy during a recession even when its budget is way out of balance, but California does not.

The difference between an FPSP and the other options is that an FPSP also supports another important state policy goal, reducing greenhouse gases. If California does not take action to stabilize fuel prices at $3 per gallon or higher, there is every reason to think that drivers will return to the behavior they exhibited before 2006 when SUV sales were quite strong and there was little or no discussion of actions one could take to save gas. Even if an Obama administration moves quickly to grant California the right to regulate greenhouse gas emissions, other policies for GhG reduction will take years to implement and will still not reduce the use of the existing fleet of vehicles if fuel prices stay low.

Who bears the cost of a surcharge?

The calculations that I have done assume that 100% of the surcharge gets passed through to consumers. That is very likely to be the case. California consumers about 1.7% of the world oil supply and the surcharge would likely change California's consumption by less than 10% or around 0.1% of the world oil market. This would simply not be enough to noticeably move oil prices in the long run.[10]

Some of the surcharge might be borne by refiners producing gasoline for California. This would occur if reduced statewide gasoline demand lessened the capacity constraints refiners might otherwise face in their production process and, thus, reduce the scarcity rents associated with selling refined transportaion fuels. With demand levels down and the national economy appearing to be headed for a deep recession, however, those scarcity rents are unlikely to be a significant factor in the next year or two even without the surcharge. In the longer run, the reduced demand due to the surcharge will reduce incentives to expand refining capacity so that scarcity rents return to a level (in expectation) that allows refiners to cover the cost of the new investments they make.

The reduced fuel quantity sold due to the surcharge would affect retailers. In the short run, they would earn lower profits than if no surcharge were imposed, though about as high as they would earn if the price of oil returned to the target level. In the longer run, the quantity change will affect the number of retailers who continue in business, but retail margins would return to a level that justifies the investment in the industry.

In the short run, the surcharge would have no effect on oil prices and possibly some small effect on refiner and retailer profits, but most of the cost would be borne by consumers. In the longer run, virtually all of the surcharge would be paid by consumers.

Regressiveness of a gasoline surcharge

There would no doubt be concern that an FPSP may disproportionately hurt the poor. The evidence on this is actually not so clear. Poterba (1991) does a detailed analysis of data from the Consumer Expenditure Survey comparing gasoline expenditures to total expenditures of the household. He finds that low-spending households tend to spend about the same share on gasoline as high-spending households. Poterba focuses on expenditures rather than income since income is more volatile year-to-year and over one's lifetime than wealth, which may be more closely reflected by annual expenditures. West and Williams (2004) focus on share of income, but account for change in behavior. They find that a gas tax would be somewhat regressive, primarily because they find that the top-income quintile

[10] The fact that California produces some oil or where the state imports oil from is irrelevant for analyzing price effects in an integrated world oil market. See Borenstein (2008).

spend a substantially lower share of income on gasoline than all of the lower quintiles, which are relatively comparable in gasoline-expenditure share.

Or course, given the policy options available, the right question is whether an FPSP would be more regressive than the alternatives. It is unclear from the research whether a sales tax increase would be more regressive than an FPSP. There is little doubt that the reductions in government services would be substantially more regressive. An income tax increase could be progressive, but it would depend on how it is structured.

Border issues

Implementing an FPSP at a state level also raises concerns due to the price differential with neighboring states.[11] The issue arises for both surface transportation and air travel. For surface transportation, the impact could be significant for sales very close to the borders with Oregon, Nevada and Arizona. Three factors, however, mitigate this effect. First, slightly less than 1% of California's population lives within 30 miles of these borders.[12] If there was concern about the impact on these regions, one could even reduce the FPSP surcharge for sales occuring within a certain distance of these borders, such as 30 miles, and have only a tiny impact on revenue. Second, depending on the implementation of the FPSP surcharge, the border differential may be not be much larger than state price differences that occured in summer 2008. Those 30-50 cent differentials occured primarily due to the impact of California's sales tax on gasoline — which neighboring states do not charge — when oil prices skyrocketed. Finally, and perhaps most importantly, the border areas are also the ones hit hardest by the state sales tax differentials. A 1.5% increase in the state sales tax would also drive retail sales across the border for a wide range of goods, the effect would just be more diffuse.

For air transportation, the concern is aircraft carrying excess fuel into the state in order to minimize purchases at California airports, known as "'tankering" fuel. Fuel capacity constraints greatly limit this arbitrage by planes flying longer distance flights. On shorter flights, such as under 1000 miles, it is possible for aircraft to carry significant extra quantities of fuel, though maximum takeoff and landing weights limit this opportunity.

[11] The California-Mexico border is of much less concern due to the high time and hassle costs of crossing the border.

[12] Of course, one would be concerned about population on both sides of the border since those from outside the state would be less inclined to purchase in California. The other side of these borders, however, are also very sparsely populated. Still, there would be some impact from truckers and other long-distance travelers who purchase just outside California in order to minimize purchases in the state.

VI. Details of Budget and Environmental Calculations

I use 2007 consumption for baseline calculations. In 2007 the average price of oil was about \$75 per barrel, higher than the \$62 per barrel predicted by the NYMEX futures market for 2009, and near the \$82 per barrel I use as the target price for the FPSP in many of the calculations. According to the U.S. Energy Information Administration, retail gasoline prices in California averaged \$3.07 per gallon for regular in 2007.[13] The economy will be substantially weaker in 2009 than it was in 2007, but normal population and demand growth would otherwise lead to greater demand in 2009. So, it is difficult to know exactly how 2009 demand will compare to 2007, but assuming 2007 demand levels is probably a reasonable starting point for the analysis.

California daily fuel consumption in 2007 was 42.7 million gallons of gasoline, 11.7 million gallons of diesel and 11.0 million gallons of jet fuel. For these calculations, I aggregate these to get 65.4 million gallons per day. I assume the same surcharge is applied to all three fuel types. The analysis assumes that the 2007 consumption levels would result in 2009 if the surcharge stabilized prices at a level consistent with \$82 per barrel oil. The calculations all assume that the refining margin is \$0.28/gallon, the retail margin is \$0.14/gallon, the federal gasoline tax is \$0.183/gallon, the state excise tax is \$0.195/gallon, and the sales tax is 8.5% on all components of the price.[14] The revenue from the surcharge is calculated as the direct surcharge payment plus the additional sales tax collected on the increased retail price.

I first do the calculations with a "hard floor" as described in section II, in which the surcharge moves in the opposite direction of the oil price and adjusts 100%. Then I consider a "soft floor" as described in section IV, in which the surcharge adjusts less than 100% for oil price changes. None of these calculations is intended to be an exact forecast of prices, emissions, or surcharge revenues. But they do illustrate the range of possible outcomes.

As a baseline, the top panel of table 1 presents a range of possible outcomes if no FPSP is adopted. For each oil price, the expected retail gasoline price and consumption quantities are shown using a short-run demand elasticity assumption of -0.1 and a long-run elasticity of -0.5. The short-run column is likely to be a better guide for the impact over a year or so, while the long-run column is likely to be a better guide for the impact over many years.

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[13] Refinery margins were substantially higher in 2007 than they are likely to be in 2009. In 2007, refineries experienced significant capacity constraints, particularly in production of California's CARB gasoline, which resulted in very high profits. With some capacity growth and the suddenly weakening economy, refineries are likely to have substantially more spare capacity in 2009 and are likely to experience substantially lower margins.

[14] Each gallon of fuel burned is assumed to emit 19.4 pounds of CO_2 equivalent greenhouse gases. A metric ton is 2206.4 pounds.

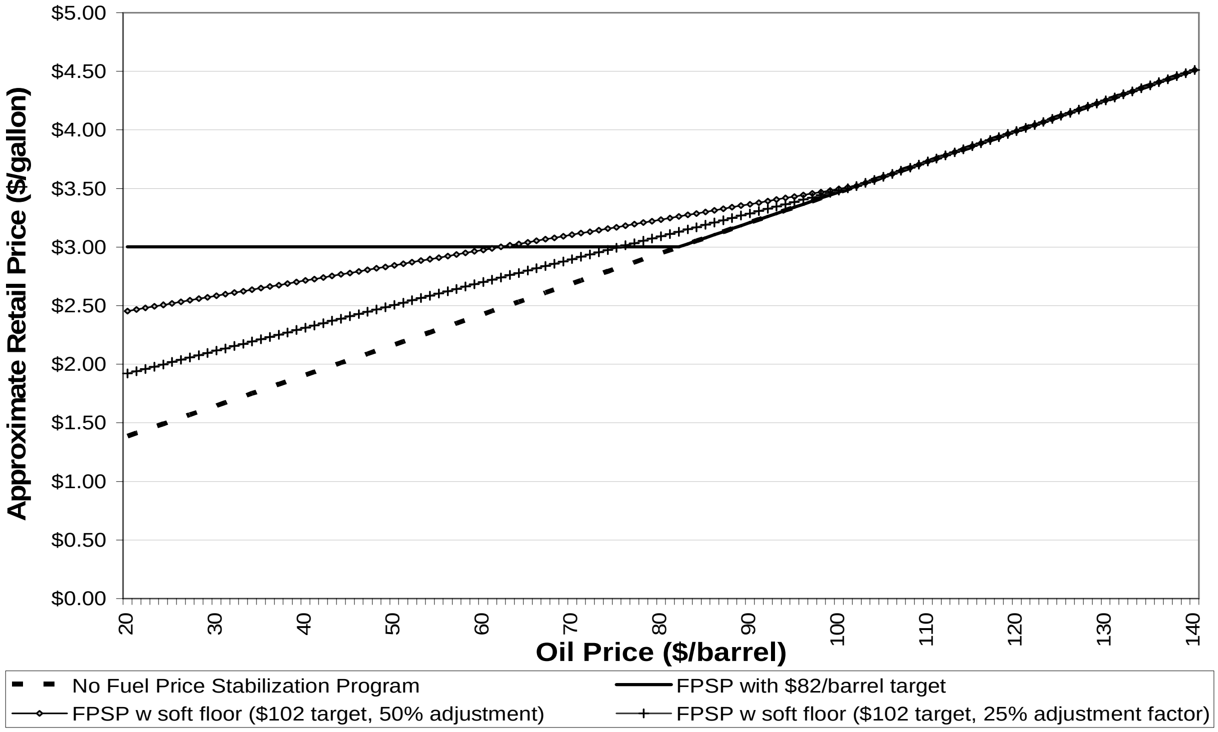

Figure 3: Approximate Retail Price Under Illustrative Alternative FPSP Implementations

The second panel in table 1 shows the price, quantity, emissions and surcharge revenue from a hard-floor FPSP targeted at an oil price of $82 per barrel. The program would generate $12.4 billion per year at an oil price of $62, but revenues would change rapidly with movements in the oil price.[15]

The third panel illustrates a soft-floor FPSP that would generate the same revenue with oil at $62 per barrel as the hard-floor FPSP, but would be less sensitive to movements in the oil price. In this example, the soft floor would have a 50% adjustment factor, so the surcharge would change by 1.2 cents, rather than 2.4 cents, for every $1 per barrel movement in the price of oil. In order for this implementation to generate the same revenue at $62 per barrel as the hard-floor FSPS in the panel above, the target oil price is adjusted upward to $102.

The bottom panel illustrates another soft-floor option in which the revenues are scaled down by half. This example has the same target oil price as in the third panel but only a 25% adjustment factor. The effect on price is illustrated in figure 3. This program would generate lower revenues, less GhG reduction, and less volatile revenues than the soft

[15] This ignores any mitigation in volatility from purchasing oil futures contracts or from a counterbalancing revenue stream from a severance tax.

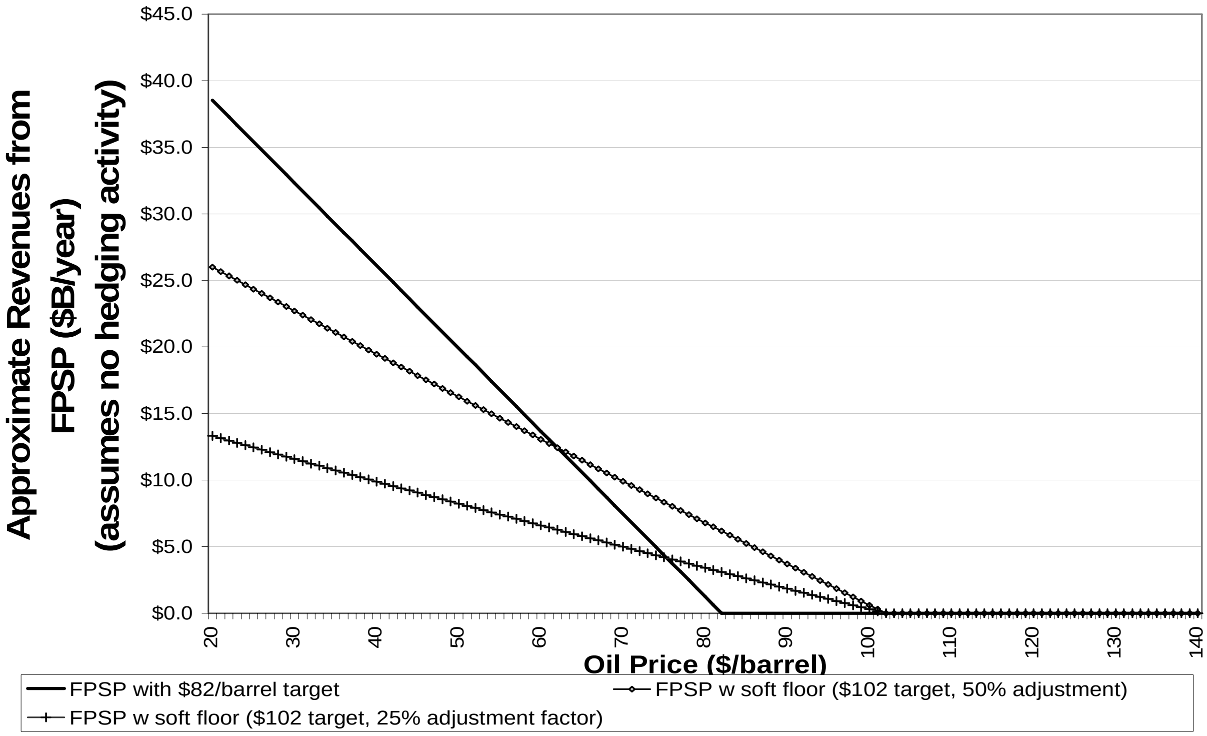

Figure 4: Approximate State Revenues from FPSP Under Illustrative Alternative Implementations

floor with a 50% adjustment factor.[16] The revenue generation potential of each possible implementation is illustrated in figure 4.

Finally, table 2 carries out the same calculations but with lower target oil prices. In the second panel, the hard floor is set at $72/barrel, which would yield a retail price of roughly $2.74 per gallon.[17] The third and fourth panels show a soft floor with a target oil price of $92/barrel and adjustment factors of 50% and 25%, respectively.

VII. Implementation Issues

The implementation of an FPSP would be straightforward in concept because excise and sales taxes are already collected by the California Board of Equalization. Once the surcharge is set for a coming month, implementation of an FPSP it is equivalent to a change in the state excise tax on gasoline, so it could be collected through the same process. In practice, these taxes are collected along the supply chain, not all at the retail seller, in

[16] The volatility with a 25% adjustment factor would be smaller in absolute terms than with a 50% adjustment factor. It would be exactly the same in proportion to the amount of revenue raised.

[17] As before, these calculations probably overstate the refiner margins – and thus the retail price – over the next year, because weak demand for gasoline (and overproduction of gasoline as a co-product of diesel production) is likely to keep refinery margins lower than normal.

order to reduce fraudulent underreporting of sales at the retail level. That makes changing taxes somewhat more complicated.

While it would be possible to proceed with an FPSP by adopting a target oil price, adjustment factor and starting date, it would also be quite feasible to phase in the start of the program. For instance, with a given target oil price, the adjustment factor could start at 10% and ramp up by ten percentage points each month until it got to the program's permanent (or at least, longer run) adjustment factor. In much the same manner, an FPSP could be gradually ratcheted up over time. For instance, the target oil price could be gradually increased, effectively increasing the fuel price floor over time.

In the long run, an FPSP is not the best way to deal with the cost of reducing greenhouse gases. A price system for GhGs, probably established through a tradeable permit system and covering all sources of GhGs, would make more sense, because it would cover not just the 40% of California GhGs that come from transportation. If and when such a general tradeable permit system (or, alternatively, a GhG tax) comes online, it would make sense to phase out the FPSP. The attraction of an FPSP right now is, first, that it can be implemented quickly and could raise substantial revenue, and, second, that it would reduce the significant increase in GhG emissions that will otherwise occur in the transportation sector over the next few years if oil prices stay low.

VIII. Conclusion

A gasoline surcharge that adjusts inversely with the price of oil will tend to stabilize gasoline prices while reducing California greenhouse gas emissions. Any policy to reduce the budget deficit by increasing revenues or reducing government services will have detractors, and a gasoline surcharge will be no exception. Unlike other budget alternatives, however, the fuel price stabilization program supports the state goal of addressing climate change while significantly reducing the deficit.

The amount of revenue that an FPSP generates could easily be adjusted. It could raises anywhere from a small fraction to nearly the entire budget deficit. Volatility of revenues from an FPSP is a definite concern, but it can be mitigated substantially through the design of the program, by coupling it with other negatively-correlated revenue sources, and through conventional hedging strategies.

An FPSP is not the ideal program for longer-run management of greenhouse gas emissions; that should be done through pricing of GhGs on an economy-wide basis, probably through a cap-and-trade program.

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Table 1: Illustrative Calculations of Impact of Fuel Price Stabilization Program

NO FPSP										
	Retail Gas		Daily Quantity			Daily GhG Emissions				
Oil Price	Price		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5			
($/barrel)	($/gallon)		(millions of gallons)			(thousands of metric tons)				
$42	$1.96		68.2	80.9		601	712			
$52	$2.22		67.4	76.0		593	669			
$62	$2.48		66.7	71.9		587	633			
$72	$2.74		66.0	68.4		581	602			
$82	$3.00		65.4	65.4		575	575			
FPSP (hard floor targeted at $82 per barrel)									Annual	
	Retail Gas		Daily Quantity			Daily GhG Emissions			Surcharge Revenues	
Oil Price	Price		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5
($/barrel)	($/gallon)		(millions of gallons)			(thousands of metric tons)			($ Billion per year)	
$42	$3.00		65.4	65.4		575	575		$24.9	$24.9
$52	$3.00		65.4	65.4		575	575		$18.6	$18.6
$62	$3.00		65.4	65.4		575	575		$12.4	$12.4
$72	$3.00		65.4	65.4		575	575		$6.2	$6.2
$82	$3.00		65.4	65.4		575	575		$0.0	$0.0
FPSP (soft floor targeted at $102 per barrel with 50% adjustment factor)									Annual	
	Retail Gas		Daily Quantity			Daily GhG Emissions			Surcharge Revenues	
Oil Price	Price		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5
($/barrel)	($/gallon)		(millions of gallons)			(thousands of metric tons)			($ Billion per year)	
$42	$2.74		66.0	68.4		581	602		$18.8	$19.5
$52	$2.87		65.7	66.9		578	588		$15.6	$15.9
$62	$3.00		65.4	65.4		575	575		$12.4	$12.4
$72	$3.13		65.1	64.0		573	563		$9.3	$9.1
$82	$3.26		64.9	62.7		571	552		$6.2	$6.0
FPSP (soft floor targeted at $102 per barrel with 25% adjustment factor)									Annual	
	Retail Gas		Daily Quantity			Daily GhG Emissions			Surcharge Revenues	
Oil Price	Price		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5		elas= -0.1	elas= -0.5
($/barrel)	($/gallon)		(millions of gallons)			(thousands of metric tons)			($ Billion per year)	
$42	$2.35		67.0	73.9		590	650		$9.6	$10.5
$52	$2.55		66.5	71.0		585	625		$7.9	$8.4
$62	$2.74		66.0	68.4		581	602		$6.3	$6.5
$72	$2.94		65.5	66.1		577	582		$4.7	$4.7
$82	$3.13		65.1	64.0		573	563		$3.1	$3.0

Table 2: Illustrative Calculations of Impact of FPSP with Lower Target Oil Prices

NO FPSP

Oil Price ($/barrel)	Retail Gas Price ($/gallon)	Daily Quantity (millions of gallons) elas= -0.1	Daily Quantity (millions of gallons) elas= -0.5	Daily GhG Emissions (thousands of metric tons) elas= -0.1	Daily GhG Emissions (thousands of metric tons) elas= -0.5
$42	$1.96	68.2	80.9	601	712
$52	$2.22	67.4	76.0	593	669
$62	$2.48	66.7	71.9	587	633
$72	$2.74	66.0	68.4	581	602
$82	$3.00	65.4	65.4	575	575

FPSP (hard floor targeted at $72 per barrel)

Oil Price ($/barrel)	Retail Gas Price ($/gallon)	Daily Quantity (millions of gallons) elas= -0.1	Daily Quantity (millions of gallons) elas= -0.5	Daily GhG Emissions (thousands of metric tons) elas= -0.1	Daily GhG Emissions (thousands of metric tons) elas= -0.5	Annual Surcharge Revenues ($ Billion per year) elas= -0.1	Annual Surcharge Revenues ($ Billion per year) elas= -0.5
$42	$2.74	66.0	68.4	581	602	$18.8	$19.5
$52	$2.74	66.0	68.4	581	602	$12.5	$13.0
$62	$2.74	66.0	68.4	581	602	$6.3	$6.5
$72	$2.74	66.0	68.4	581	602	$0.0	$0.0
$82	$3.00	65.4	65.4	575	575	$0.0	$0.0

FPSP (soft floor targeted at $92 per barrel with 50% adjustment factor)

Oil Price ($/barrel)	Retail Gas Price ($/gallon)	Daily Quantity (millions of gallons) elas= -0.1	Daily Quantity (millions of gallons) elas= -0.5	Daily GhG Emissions (thousands of metric tons) elas= -0.1	Daily GhG Emissions (thousands of metric tons) elas= -0.5	Annual Surcharge Revenues ($ Billion per year) elas= -0.1	Annual Surcharge Revenues ($ Billion per year) elas= -0.5
$42	$2.61	66.3	70.1	584	617	$15.8	$16.7
$52	$2.74	66.0	68.4	581	602	$12.5	$13.0
$62	$2.87	65.7	66.9	578	588	$9.4	$9.5
$72	$3.00	65.4	65.4	575	575	$6.2	$6.2
$82	$3.13	65.1	64.0	573	563	$3.1	$3.0

FPSP (soft floor targeted at $92 per barrel with 25% adjustment factor)

Oil Price ($/barrel)	Retail Gas Price ($/gallon)	Daily Quantity (millions of gallons) elas= -0.1	Daily Quantity (millions of gallons) elas= -0.5	Daily GhG Emissions (thousands of metric tons) elas= -0.1	Daily GhG Emissions (thousands of metric tons) elas= -0.5	Annual Surcharge Revenues ($ Billion per year) elas= -0.1	Annual Surcharge Revenues ($ Billion per year) elas= -0.5
$42	$2.29	67.2	74.9	591	659	$8.0	$8.9
$52	$2.48	66.7	71.9	587	633	$6.3	$6.8
$62	$2.68	66.2	69.3	582	609	$4.7	$4.9
$72	$2.87	65.7	66.9	578	588	$3.1	$3.2
$82	$3.07	65.3	64.7	574	569	$1.6	$1.5