VENTANA systems, inc.

3/18/09

Offsets Collaborative Report

Introduction

The Offsets Collaborative was organized by the Western States Petroleum (WSPA) to provide an open forum on issues related to offsets policy in the context of ARB's Scoping Plan under AB 32 rulemaking and subsequent regulations consistent with the Scoping Plan under AB 32. The collaborative was held on October 28-29 in Sacramento at the California Chamber of Commerce. The gathering, facilitated by Ventana Systems, was designed to help industry, regulators and NGOs discuss offsets policy and its role in greenhouse gas emissions reductions.

The underlying objective of the collaborative process is to provide a forum for interested parties to engage in constructive dialogue, education, technical review, research and guidance to assist CARB and other agencies in promulgating regulations for the successful implementation of AB32 and creating an effective offsets policy in California. The workshop was explicitly not designed to converge on policy recommendations, develop consensus or make decisions. Instead, much of the time was dedicated to divergent thinking: considering offsets regulatory options from many

perspectives in order to identify new ways forward which might be reflected in the rule making process. Our hope is that in the long run such an approach will lead to a robust regulatory scheme that works because policies are not boxed in by premature consideration of implementation details. For the same reason, we elected to focus on considerations related to the greater good for California, rather than the allocation of costs and benefits among interested parties.

The goal of the offsets workshop was to discuss and better understand a variety of topics, including the following:

- Benefits and risks of an offsets provision
- Geographic or Quantitative Limits
- Effects of offsets on innovation
- Constraints and tradeoffs that guide program design
- Design elements that meet the constraints

Participants were invited experts and interested parties that have exhibited an interest in the issue. Participants included representatives from CARB, CalEPA, Office of the Governor, WCI, NRDC, EDF, Union of Concerned Scientists, Southern California Environmental Rights Alliance, The Climate Trust, Nature Conservancy, CA Climate Action Registry, Stanford University, UC Berkeley, KP, CA Chamber of Commerce, E2, EcoSecurities, APX, Van Ness Feldman, Cantor CO2e, CRA International, EKO AMP, Climate Change Capital, BP, Chevron, Occidental, Valero, ExxonMobil, Shell, WSPA and CMTA.

This workshop report is a synthesis of comments from individuals in the group. It does not reflect the official position of, nor has it been endorsed by, any participant or organization involved.

Overview

Day 1 of the workshop was divided into three discussions: benefits of offsets, risks, and quantitative and geographic limits (see Appendix B – Agenda). Each discussion was kicked off with a brief presentation, intended to provide some general background and catalyze discussion. David Montgomery of CRA led off the benefits discussion, summarizing model results indicating the cost savings and other benefits resulting from the availability of offsets. Michael Wara of Stanford described some of the tensions in the international offsets markets for CDMs. Bob Epstein initiated the quantity and geography limits discussion, with a particular emphasis on innovation effects. See Appendix C – Presentation Materials.

CARB and Cal/EPA agreed to start Day 2 with a question and answer session, to give participants a chance to ask about the next steps in the road to a final regulation under AB 32. Then we (Ventana) presented our synthesis of the Day 1 discussion, captured in a series of diagrams discussed at greater length below. The remainder of the day was spent on a discussion of the design task ahead – objectives, constraints and tradeoffs that should guide decisions about offsets. One participant, in closing comments, framed that task concisely as, not setting the right quantity and price of offsets, but ensuring that offsets played the right role in greenhouse gas regulation.

Workshop output

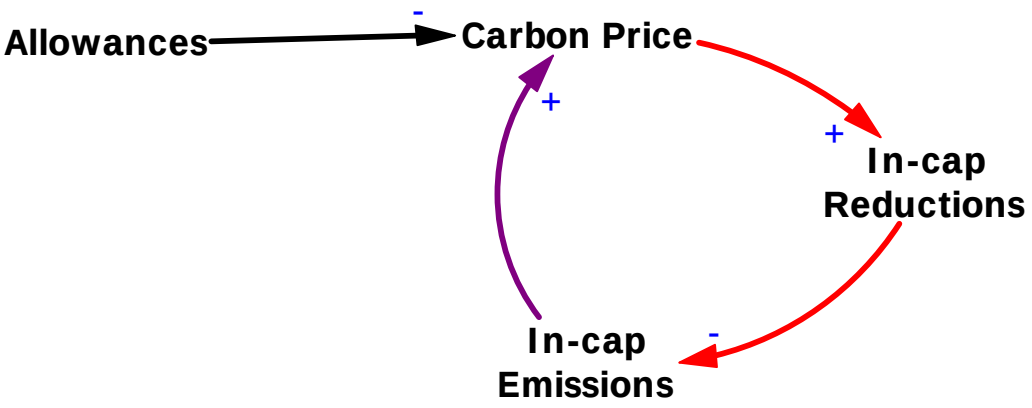
At the opening of the workshop, a participant proposed that we avoid the term offsets, because it means so many different things to different people. Having read much of the public record on offsets prior to the workshop, we agree that communication is difficult. Many of the problems arise because, as in the parable of the four blind men and the elephant, people are talking about different facets of the same problem, or making statements that are contingent on unstated assumptions that are not necessarily shared.

Fortunately, the face-to-face conversation in the workshop was not so murky. At the end of the first day of the workshop, we reflected on the discussion, and discovered that much of it could be placed in a systematic framework, which places comments about isolated effects of offsets in a broader context and resolves some differences in perspectives. We have used that framework to present the major points of the collaborative discussion in a series of influence diagrams.

The language on the following diagrams is as follows: arrows indicate causality, A **è** B is read as, "A causes or influences B." The direction of influence is indicated by a + or -; A **è** $^{+}$ B for example can be interpreted as "An increase in A causes or influences an increase in B, all else equal." A crosshatch on an arrow shaft, **f** , indicates a delay in action (there are many, but we have shown only a few prominent ones).

Market Clearing

Offsets are one of many components of a cap and trade system. The core of cap and trade is a GHG allowance market, which can operate as shown below. The price of carbon (or CO2eq) is bid up until emissions reductions are sufficient to bring in-cap emissions in line with the supply of allowances in this model.

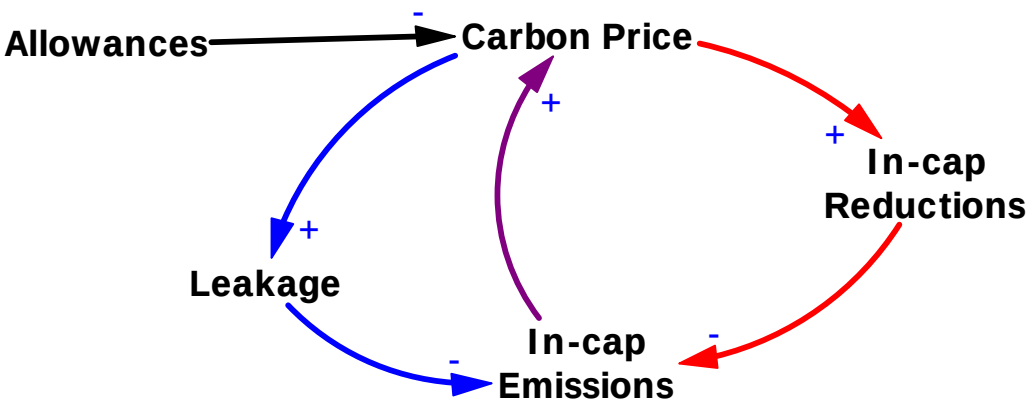


This is the fundamental market-clearing feedback loop. As participants pointed out, it is augmented by a number of complementary processes that also help match the supply of allowances to the demand for emissions.

Leakage

Not all of those processes are beneficial. One discussed in the collaborative is leakage. Leakage occurs when, in response to increasing carbon prices, firms in the market choose to shift their activities outside the boundaries of the cap, rather than to invest in emissions reductions within

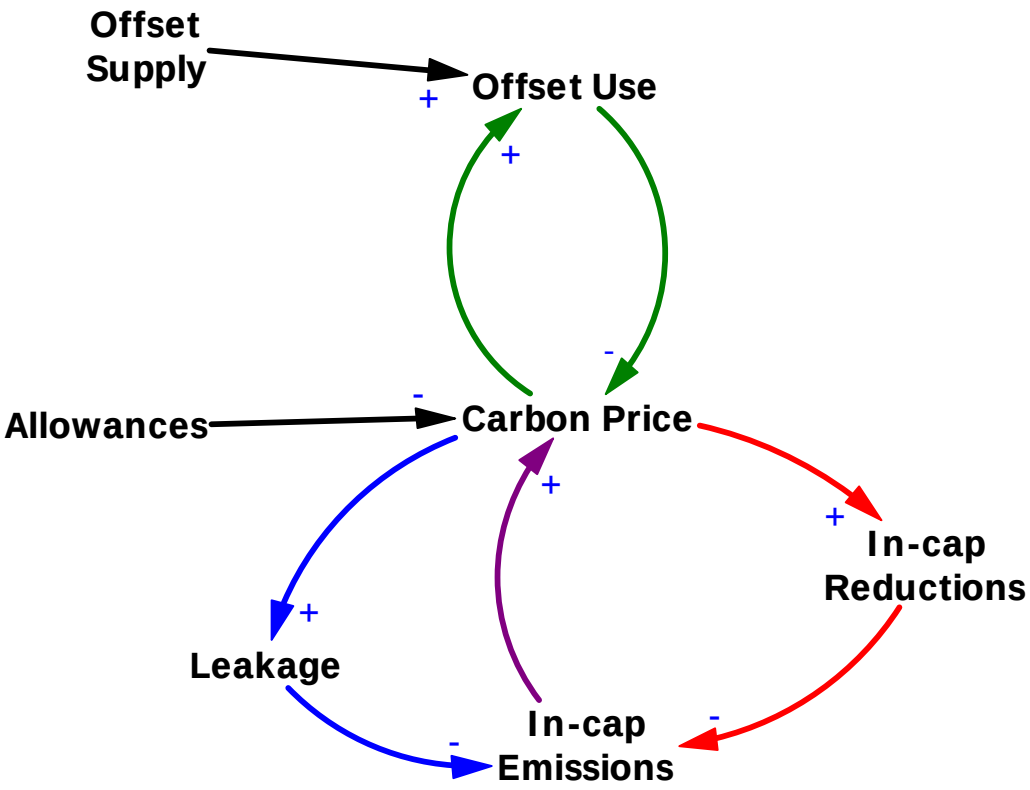
the cap. This might take the form of shuffling of refinery crude slates, or energy intensive industries moving out of state or overseas, for example.



Leakage reduces in-cap emissions, but can result in parity or even an increase in total emissions globally.

Offsets

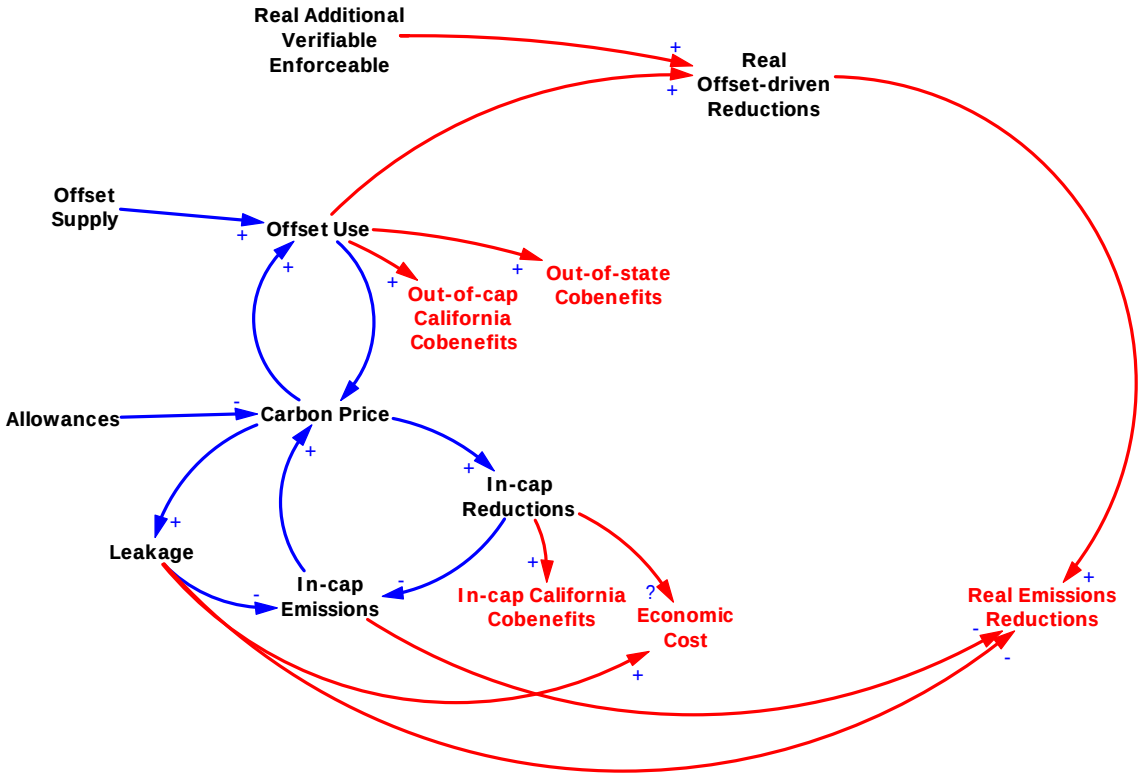
Offsets provide another avenue for market clearing. Rather than investing in on-site reductions, market players can buy offsets, which also serve to bring the sum of emissions and offsets into line with the supply of allowances. All else equal, the availability of offsets reduces the price of carbon and increases in-cap emissions while yielding offsetting reductions outside of the cap. Through the effect on the carbon price, they may also lower leakage.



A variety of mechanisms not shown function analogously to these three loops. A safety valve, for example, links the supply of allowances to the carbon price – when the price reaches the safety valve threshold, unlimited allowances are available from a seller of last resort (e.g., the state). A mechanism in the RGGI increases offset eligibility above a price threshold. These and other features constitute a set of negative feedbacks that enable emissions to be managed through the price signal with some measure of stability. The supply and diversity of alternatives, as well as the delays involved in using them, determine the effectiveness and volatility of the market.

Goals

The purpose of the market clearing activity above is multifaceted. The primary objective of GHG policy is of course to achieve real emissions reductions, but cobenefits and economic costs must be considered as well.



At lower left (red), in-cap reductions influence economic costs (the carbon price also has macroeconomic impacts beyond its direct effect through emission reduction behavior, not shown). Note that the sign of this link is indicated with a ?, because it is contested. Participants commented on the conflict among models on this point: generally, top-down equilibrium models assume that the sign is positive, i.e. that emissions reductions are costly. Bottom-up models sometimes suggest that is negative, i.e. that some emissions reductions are free or negative-cost, particularly when externalities like air quality are considered. Leakage also results in economic costs, due to loss of in-state activity.

The location of cobenefits is also important. Cobenefits from in-cap reductions always occur within California, but participants noted that the distribution of cobenefits within the state also matters; for example, cobenefits in a low density area might not adequately compensate lost cobenefits in a high density area. Cobenefits from offsets are more diverse. Some might occur within California; participants suggested that regulators could even explicitly target in-state cobenefits through an offset purchasing program (funded by allowance set-asides) or other mechanisms. Cobenefits could also occur from the use of offsets out-of-state, e.g., in developing countries. Some participants noted that cobenefits elsewhere were not explicitly valued in AB32, while others argued that they might have strategic and relationship benefits, and thus long term value to the state, as well as some moral attractiveness.

Ultimately, much of the value of offsets hinges on whether they are real, additional, etc. (top). Note, though, that the net effect of offsets on emissions is greater than their direct additionality and effect on in-cap reductions, due to leakage. Some deficiency in additionality might be made up for by a reduction in leakage that can amplify the direct effect of the offset.

Innovation

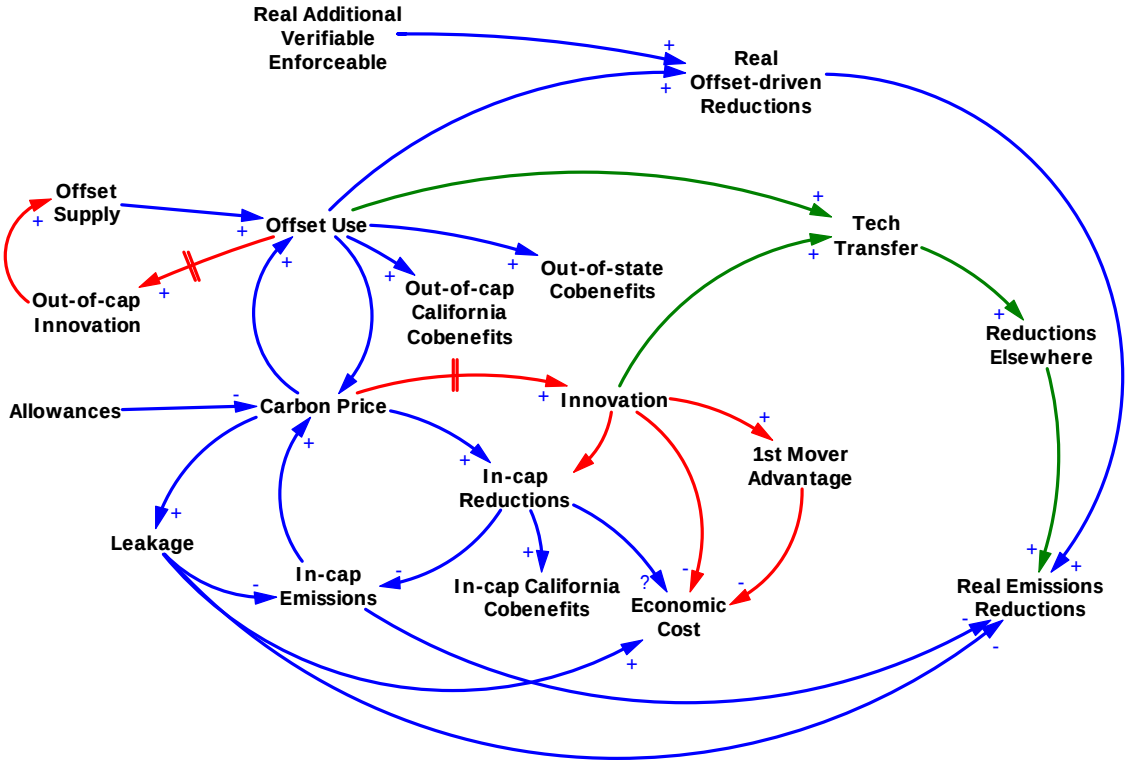
In our informal review of public comment prior to the collaborative, impacts on innovation were frequently cited as a concern in developing offset policy. It is difficult to reconcile conflicting arguments in the public record, but the conversation in the collaborative provided clarity by recognizing multiple kinds of innovation, occurring in and out of California, and in capped vs. uncapped sectors.

Some participants argued for offsets as a driver of innovation. This might occur through two pathways. First, use of offsets in uncapped sectors (e.g., agriculture and forestry in California) creates an incentive to innovate in areas that would not otherwise be reached by the carbon price signal under the cap. As emissions reductions from offsets lead to learning-by-doing, costs fall and the supply of offsets increases, providing further opportunities (red, top left).

Second, offset use in developing countries might not only contribute direct emissions reductions (blue link, top right); it could also serve as a vehicle for technology transfer (green). The technology diffusion process, kick-started with offsets, would contribute additional emissions reductions.

Other participants argued that offset use could diminish innovation incentives. Under the cap, the carbon price creates profitable opportunities for innovation. Innovations in turn provide greater in-cap reductions and lower economic costs. In addition, if California acts before other regions, innovation may confer strategic first-mover advantages (creation of a greentech industry) that provide an economic benefit (shown here as a negative effect on economic cost). Offset use, by lowering the carbon price (all else equal), diminishes the signal driving the innovation effects (red, middle). Note that the link between the carbon price and innovation includes a delay, due to the lead time required for R&D, adoption, and related processes.

The effect of carbon prices on innovation was regarded as controversial. Participants drew a distinction between short term innovation by reconfiguring existing technology to meet new criteria – which might be effectively catalyzed by a carbon price – and long term invention through deliberate R&D, which might not. At the least, participants argued, the kind of long term, transformative technology sought to address climate issues would require a stable, credible, durable price signal. Some suggested that a direct technology policy, rather than use or avoidance of offsets, would be more appropriate for driving long term innovation.

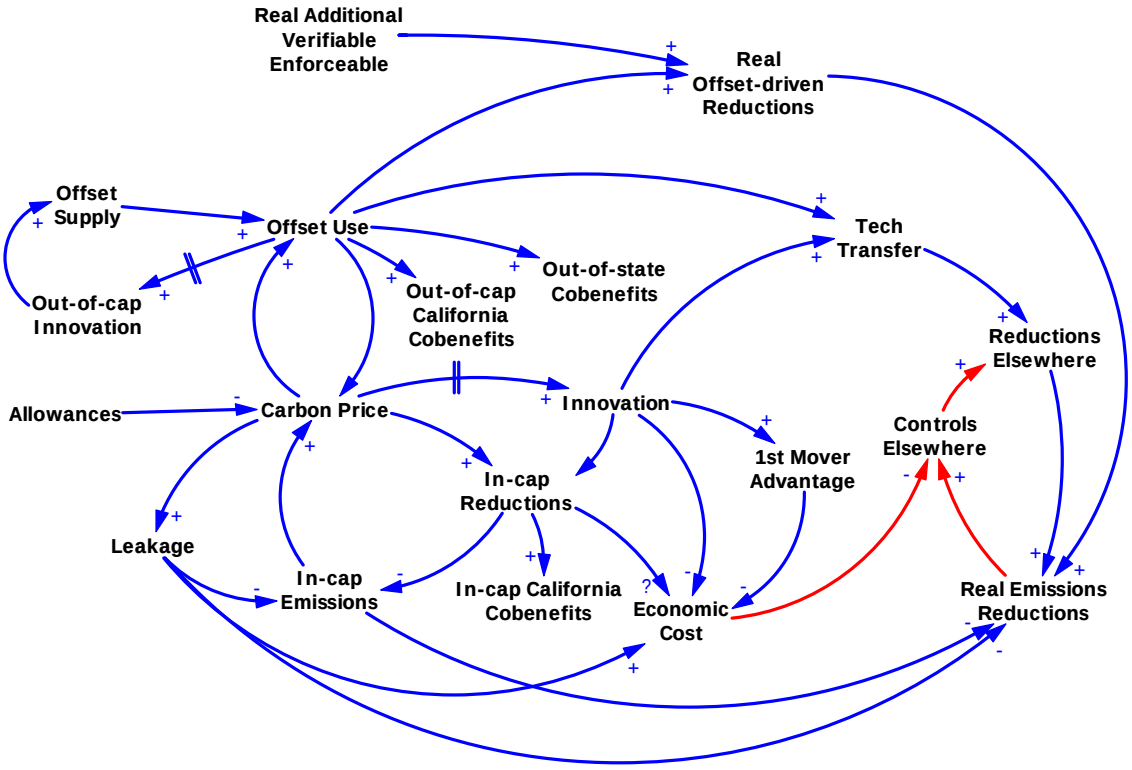


Imitation

Participants noted that, in the end, California emissions reductions alone are not sufficient, and that a goal of aggressive action is to catalyze the development of emissions controls elsewhere. This theme emerged in the Crude Flows Collaborative as well:

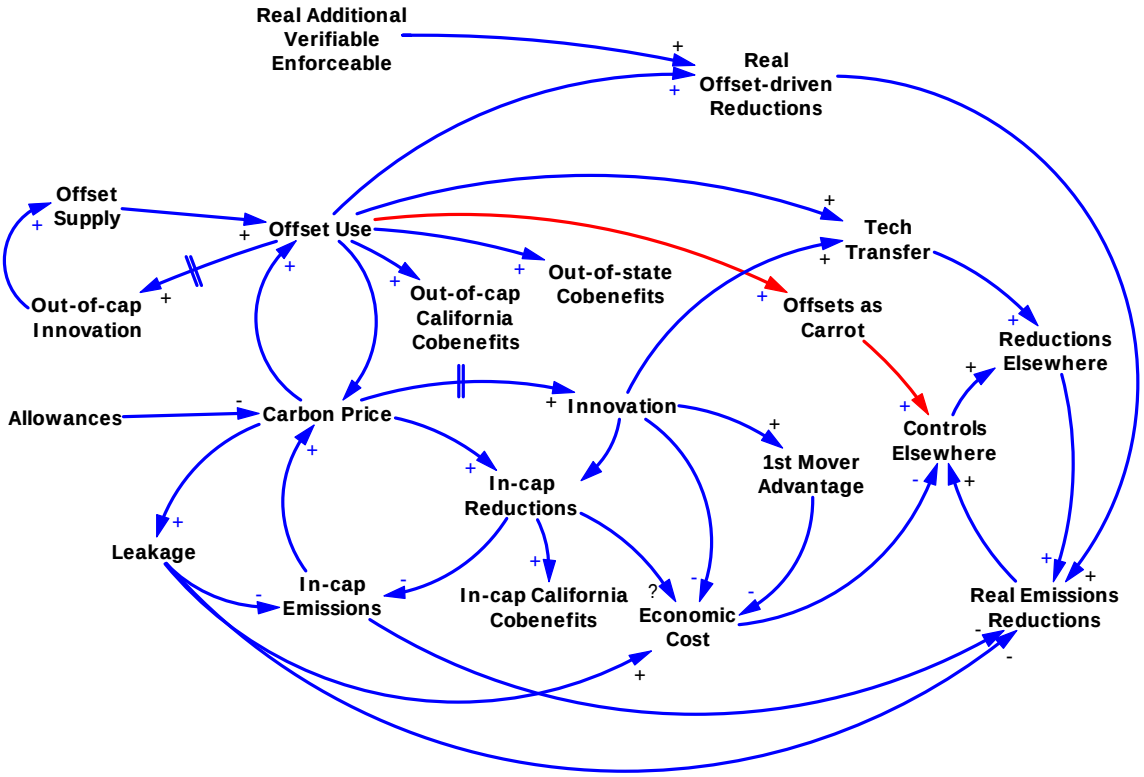
> "Because California is an open economy, a certain amount of leakage is inevitable. The more stringent controls become, the greater the incentive to fuel vehicles out of state, reshuffle crudes, move energy intensive production to other regions, etc. (black loop). There are two ways to combat leakage. One is to capture as much of it as possible through accounting systems. However, for the most part that requires an increase in policy complexity, which may be counterproductive if it increases cost and disruption. The other approach is to bring a greater geographic area under the umbrella of emissions controls through imitation (green loops). All else equal, a simpler policy is easier for other states to replicate, and more likely to be copied if it leads to early success."

Offsets could help the policy imitation process in two ways: by increasing the perception of success in California, and by serving as a direct incentive (see next section). The perception of success is a function of the balance between real emissions reductions achieved and the attendant cost and disruption from emissions controls. To the extent that offsets can mitigate price volatility, leakage, and other negatives without short-circuiting real reductions, innovation or other positives, they can help drive the implementation of emissions regulation elsewhere.



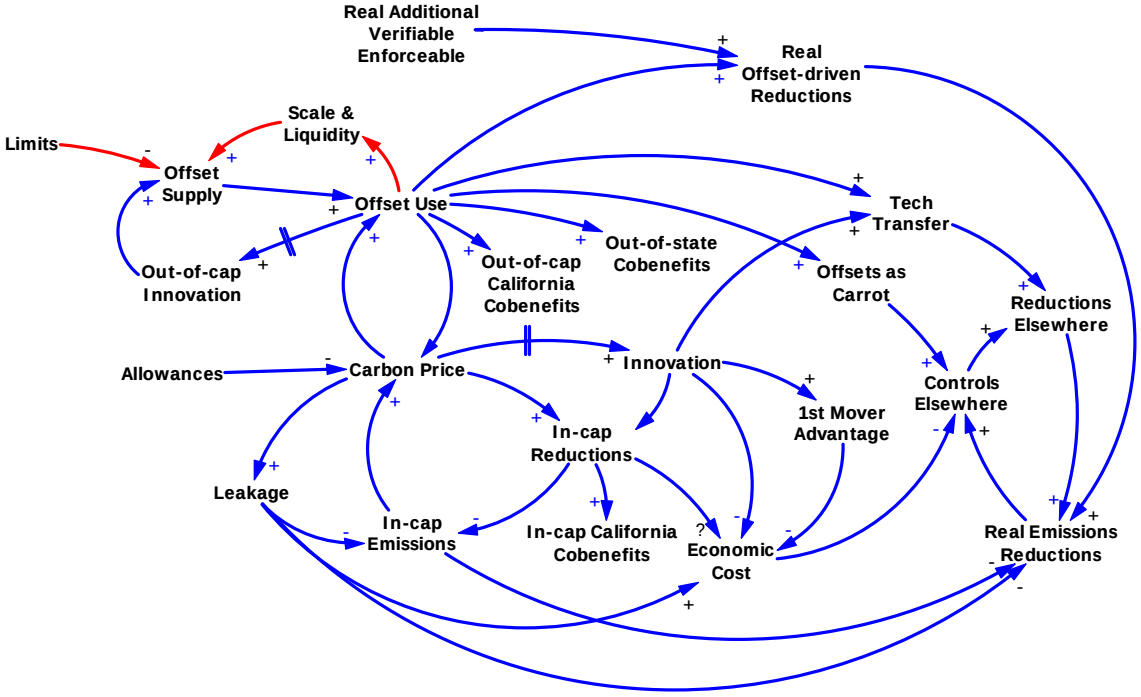
Incentives

A direct effect of offsets on diffusion of emissions policy could use offsets as a carrot (green). First, participants noted that international offsets engage developing country partners in a relationship, and starts them toward an infrastructure for management of emissions. One participant argued that, while at present the partnership may appear asymmetric, many long term relationships start that way. Second, several proposed visions of offset mechanisms tied to income or other thresholds, such that developing countries would transition from selling offsets to undertaking their own (possibly costly) emissions reductions at a defined point.



Limits

Participants from the financial sector and offset providers noted that scale and liquidity are key to functioning markets. Liquidity is emergent – it only becomes evident as offsets are bought and sold – and in itself is a component of the attractiveness of providing and using offsets. Scale is important in both the provision and regulation of offsets, because it only makes sense to develop a program or approval architecture for a market that will be large enough to justify the overhead. This creates a strong self-reinforcing dynamic of success-to-the-successful. All else equal, quantity limits reduce scale, and thus diminish the chances of a viable market. Participants suggested connections to larger regional or international markets as an option for securing scale beyond the capabilities of California alone.



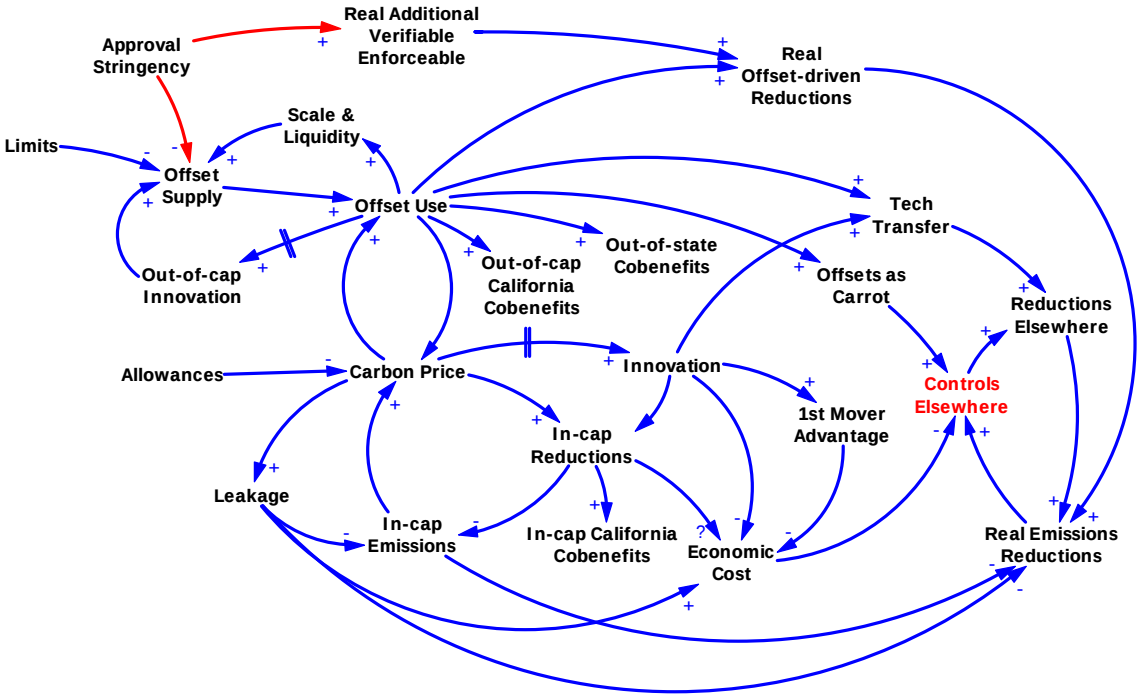
The conversation around geographic and quantity limits was much more extensive than can be shown on the diagram; some further comments are presented in Other Insights below.

Approval

The group spent some time discussing approval criteria. Again, some of the subtlety of the conversation does not lend itself to diagrammatic representation. However, one key point does: that there is a tradeoff between setting stringent approval criteria, to ensure that offsets are real, additional, verifiable, etc., and the resulting offset supply. Obviously it is desirable to reduce offset supply to the extent that offsets are not real. However, participants pointed out that the accounting and approval burden of checking could reduce the incentive to provide quality offsets as well. A variety of suggestions were advanced for mitigating this problem, including

- A common insurance pool or other mechanism that would guarantee the performance of the total offset portfolio, in the event that individual projects underperformed.
- Systematic discounting of offset reductions to correct for biases in valuation.
- A top-down programmatic approval process, to avoid the gaming that can occur in valuation of projects bottom-up, given the diversity of assumptions that can plausibly be made for the many attributes of an activity.

A participant noted that the performance risk of a particular project can be mitigated by including it in a diverse portfolio of projects. If there is systematic bias in the valuation of projects, that creates a different kind of risk that cannot be diversified away, but could be corrected through discounts or changes in approval criteria. The real problem arises when perverse or conflicting incentives create a moving target for regulators. This challenge was described as an analog to the problem of accounting and securities regulation, where new challenges continually emerge.



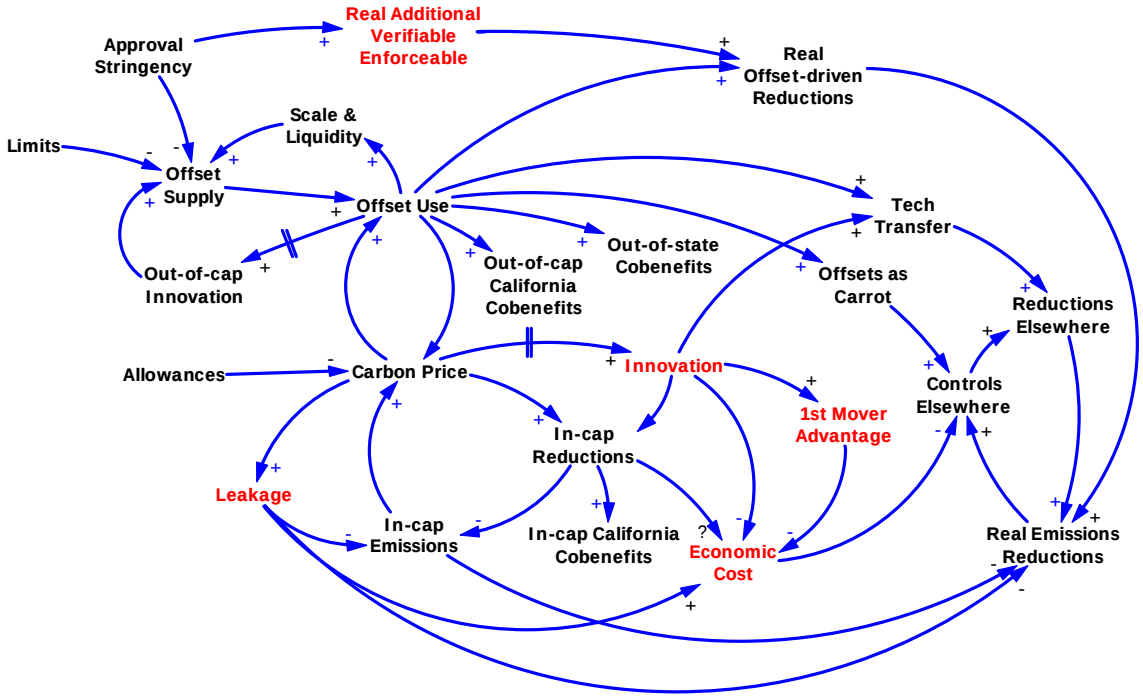
A related insight emerged in the Crude Flows Collaborative:

> "Quality is a function not only of resources, but also of the complexity of the task undertaken. It is tempting to increase complexity in order to increase the control of emissions, but, given fixed resources, the side effect of doing so may be to diminish quality, increasing the effect of disruption and cost. Thus it may be better to start simple, avoiding disruption from errors, and count on success to augment resources, permitting greater control later."

An offsets program could fail because it is too open to questionable projects, but also if it is too closed to establish scale and liquidity.

Uncertainties

Taking a systemic view of offsets explains some of the divergence in views of offsets evident in the public comment record and collaborative conversation. Whether offsets are beneficial or not hinges on some key uncertainties, highlighted below:



In one (much simplified) worldview, offsets are undesirable, because they diminish the carbon price signal driving innovation, without providing real reductions. That worldview is most likely to apply if,

- Price is a significant driver of innovation,
- First-mover advantages have real value for California,
- Leakage is not a serious problem,
- In-cap cobenefits are more valuable than out-of-cap and out-of-state cobenefits, and
- Economic costs of in-cap mitigation efforts are low or negative.

On the other hand, another view holds that offsets are desirable, for more or less the opposite reasons:

- Price signals are weak or insufficient drivers of innovation,
- The benefits of a greentech economy might not accrue to California,
- Leakage erodes in-cap emissions reductions,
- Economic costs of mitigation are significant,
- Offsets provide cobenefits outside the cap and the state, as well as technology transfer and incentives that contribute to emissions reductions elsewhere, and
- Offsets are, for the most part, real.

Some of these are empirical questions that can be resolved, but for most the answers have been controversial for decades and will remain elusive for at least some time. That does not mean that offsets policy cannot go forward in an adaptive mode; as one participant put it, we should seek surgical policies that target the beneficial dynamics without their side effects, not blunt instruments.

Other Insights and Questions

Obviously the world of offsets cannot be condensed to a single picture. Other comments that emerged in the discussion include:

- Models disagree about the magnitude and direction of effects of various ways for CARB to implement AB32; CARB analysis indicates employment benefits, while general equilibrium models typically indicate job losses. However, a participant speculated that most likely they agree on the direction of the influence of offsets: more offsets, more employment in California, all else equal.
- Participants questioned models more generally, both for the particulars (e.g., the lack of a difference in behavioral response to price signals vs. a quantity cap) and omissions (articulation of innovation drivers, and representation of what a greentech economy might look like). Reconciliation of conflicting model results would add value.
- It was suggested that buying CDMs raises no questions of additionality, because they already exist. However, concerns were expressed about perpetuating the CDM, because a future in which large emitters (China) transition to buying offsets, rather than making internal reductions, doesn't make sense. Others regarded the CDM as a beneficial bridge to a cap for developing countries.
- Participants discussed several views of offset quality, using the analogy of buying a tomato at a farmer's market. One view is the zero-sum game with asymmetric information: the shopper would like to buy a tomato that is ripe, delicious, and healthy, while the vendor would like to provide a tomato that looks good long enough to make the transaction, but otherwise is as cheap as possible to produce. Others characterized the relationship as a long-term transaction, in which the vendor has a strong incentive to provide a quality tomato today, in order to build a relationship with the buyer. A third possibility is that the offset buyer, unlike the tomato shopper, doesn't plan to eat the offset, and thus is indifferent to its quality, as long as credit is received for the purchase.
- Concern about loss of cobenefits from in-cap reductions may be misplaced. Even in the presence of offsets, the carbon price will not be zero, and significant in-cap reductions will occur, providing cobenefits. Only the most costly in-cap reductions would be displaced by offsets.
- What do offset quantity constraints mean at the entity level? Do limits apply to the market, or to all firms individually? If they apply to the market as a whole, how does one ensure that the sum of entity actions complies?
- For large industrial emitters, managing delays is crucial. Long and uncertain permitting processes, equipment turnover times, and technology development cycles make it difficult to meet emissions reductions schedules. Offsets could provide a useful buffer, but only if the value of the offset is not itself subject to long delays and uncertainty.
- There are important questions about the fungibility of allowances under the cap, offsets, and LCFS credits that have implications for liquidity and scale of markets.
- Offsets in isolation don't need to satisfy all the objectives of AB32. Cobenefits may also be provided though the LCFS and RPS, for example. Price stability can be improved through a safety valve and long compliance periods.

Acknowledgements

This report is a reflection of the high quality of the discussions over the two days. We thank the presenters, participants, and WSPA organizers for the privilege of leading the process, and for thoughtful comments on earlier drafts of this report.

Contact

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Appendix A - Questionnaire Responses

Discussion A Economic Benefits of Incorporating an Offsets Provision

- Benefits for California
  - Leakage, Cost Control, Opportunities
- Benefits for the World

What are the key open questions from this discussion that you would like answered?

1) What are the alternative cost containment mechanisms to offsets? How can the value of offsets as a tool be maximized as a portfolio of policies w/ various levels of risk/return? Can we extrapolate more realistic #s representing the availability of offsets in CA and globally?
2) The cost analysis was misleading as the domestic and international offsets were defined differently. It would be interesting to see the analysis done against a common definition.
3) The open question is to what extent does AB32 call for reductions and game changers in CA in order to establish a model for others and reduce CA's very large carbon footprint versus reducing planetary CO2e. To a certain extent. Part of CA's footprint results from our impacts and therefore we should acknowledge that thru our program. Otherwise shouldn't the AB32 goals and State energy / air pollution policies take precedence over offsets?
4) Do we really all agree that cost containment is important / necessary?
5) Benefits – linking to climate adaptation
6) The cost curves show fairly low costs for offsets. If the offsets are bought at a low cost, what impact does that have on a company's incentive to reduce GHG emissions on-site? Don't we want to drive reductions in CA first? It seems as though low cost offsets drives reductions to occur elsewhere – and is problematic for gaining any co-benefits. How would the speakers address this issue?
7) Why is additionality a consideration if the reductions are certified as real, quantifiable, enforceable and permanent? As local and State authorities mandate reductions under local building permitting, land use, etc. issues, the term additionality will become increasingly important. As the quantity of reductions is continuously reduced artificially through "additionality" how will the costs not increase?
8) Near term reductions will be relatively easy to achieve. Existing State policies will be driving them. Wouldn't offsets sent the wrong long-term signal for needed and aggressive innovations? Need for offsets will really be dependent on the level of stringency of other WCI partner caps.

Discussion B Risks of an Offsets Provision

- Additionality, reality, verification
- Administrative issues/challenges
- EJ and co-benefits

Your key questions are?

1) What about programmatic CDM approaches? How many of these risks can be mitigated and how many cannot?
2) How do you develop an offsets program that balances the ability to mitigate cost but also delivers economic and environmental co-benefits? Is there a role for (for example) restricting who can trade or direct investment into impacted communities?
3) Believe biggest question is policy objective of State. If the objective is to create maximum emission reduction at the lowest cost, the argument for offsets is very strong.
4) How do you ensure 3rd world offsets are created w/o displacing indigenous populations, or using similar environmental standards we would require in CA? By allowing offsets, isn't CA delaying reductions and co-benefits that would otherwise occur in minority or low income communities? Are we not transferring some jobs to offset generating jurisdictions?
5) What are our goals for offsets? It was not clear on how limiting offsets => innovation.
6) What are the levels of efficiency or inefficiency in the various scenarios that have been presented in use of CA only vs. international market, etc?

Discussion C Geographic or Quantitative Limits

- Can offsets drive innovation?
- Other innovation drivers

Your key questions are?

1) Do quantitative / geographic limits actually help drive innovation? Are there mechanisms that do a better job of driving innovation? What are the different steps to research, development, and deployment of new low / zero carbon technologies, and do offsets have a role in that? If so where?
2) Why use offsets to drive innovation? Would expect other policy tools likely to have greater and more direct impact.
3) How to link international offsets with progress already made in CA with ARB and CCAR?

Other critical issues?

1) How energy efficiency projects started at the community scale can turn into offsets – either as compliance at utilities under C&T obligations or funded by the State? How do you deal with indirect effects? (e.g., for a distributed generation project, what is the carbon intensity of the marginal generating unit it displaces?)

Appendix B – Agenda

Offsets Collaborative

October 28-29, 2008
California Chamber of Commerce
1215 K Street
Sacramento, CA

October 28 (12:00 noon to 5:00 pm)

12:00	Box Lunches	
12:15	Welcome and Self Introductions • Participants • Antitrust Warning • Introduction to Collaboratives • No attribution – free exchange of views	Moran Barr Wang Wang
12:45	Economic Benefits of Incorporating an Offsets Provision • Benefits for California o Leakage, Cost Control, Opportunities • Benefits for the World	Montgomery
1:30	Risks of an Offsets Provision • Additionality, reality, verification • Administrative issues/challenges • EJ and co-benefits	Wara
2:15	Break	
2:30	Geographic or Quantitative Limits • Can offsets drive innovation? • Other innovation drivers	 Epstein
4:00	Day 1 concluding remarks Process check for Day 2	

October 29 (**8:30 to noon)** California Chamber of Commerce

8:00	Continental Breakfast/Coffee and informal discussions	
8:30-8:45	Feedback on Day 1 discussions Road map for regulation	Ventana CARB
8:45-10:00	Discussion – what constraints and tradeoffs must guide design? • Political issues • Actual reductions (not all offsets) • Cost containment (de facto safety valve)	
10:00-10:15	Break	
10:15-11:45	Discussion – what design elements meet the constraints? • How do we get the "right" amount of offsets? • Separate EJ program?	
11:45-Noon	Participant parting comments Summary and Adjournment	

Appendix C – Presentation Materials

1. David Montgomery, CRA
2. Michael Wara, Stanford
3. Background and Day 2 briefing
   Note on methods: the briefing materials include results from an informal survey of public comment at CARB on offsets. The survey indicates the general level of interest in various topics, but should be taken with a grain of salt for two reasons: it is based on an informal coding of the various comments, and it only considers electronically searchable documents (not faxes or scanned mail).