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**Comments on The Western Climate Initiative's
*Draft Program Scope Recommendations***

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These comments offer Sightline Institute's perspective on the WCI Scope Subcommittee's March 3, 2008 draft recommendations. As in all our considerations of WCI policy, Sightline's goal is to foster a market mechanism that is **effective** in reducing emissions; **fair** to consumers, particularly low- and middle-income households; and **efficient** for the economy as whole, presenting the least administrative and regulatory burden for businesses, while providing the greatest opportunities for low-cost emissions reductions.

In addition to these comments, Sightline endorses the comments submitted by the Western Climate Advocates Network (WeCAN) to both the Scope and Electricity Subcommittees.

Our perspective on the Scope Committee's recommendations can be summarized as follows:

- The WCI market mechanism should cover all emissions that can be accurately and reliably measured in a **common, unified carbon market**. In particular, emissions from the transportation sector should not be treated differently from emissions in the industrial, commercial, residential, or electricity sectors. A broad market will tend to send consistent price signals, improve efficiency, limit price volatility, and decrease the likelihood of price spikes or shocks.
- In the transportation sector, complementary policies (ranging from vehicle standards, to transit investments, to incentives for fuel efficient travel) can serve an important role in providing businesses and families with flexibility and alternatives that can reduce both emissions and energy expenses. However, **complementary policies should not take the place of a cap**. A cap provides a necessary backstop to complementary policies, ensuring that emissions reductions are real, verifiable, and achieved at the lowest overall cost. In the end, there is no good alternative to including transportation fuels in the cap.

Sightline will submit additional technical comments in the coming weeks. In this document, however, we direct our attention to Low Carbon Fuel Standards. Specifically, we address the following question: **Is the Low Carbon Fuel Standard a viable alternative to capping transportation fuels?**

In Sightline's view, the Low Carbon Fuel Standard is a promising policy that could help spur the development of a sustainable, low-carbon fuel industry, while giving WCI jurisdictions vital information about the comprehensive effects of the WCI's transportation sector on the global climate. Nevertheless, we do not believe that the Low Carbon Fuel Standard should substitute for, or take the place of, transportation fuels in an economy-wide cap.

1. What is a Low Carbon Fuel Standard, and how might it work?

The Scope Subcommittee mentions Low Carbon Fuel Standard (LCFS) as a possible alternative to including transportation emissions in an economy-wide cap and trade program:

...analysis may indicate that there are policies for particular sectors that may be preferable to a cap-and-trade program. For example, analysis may indicate that a low-carbon fuel standard is preferred to including liquid transportation fuels in the cap-and-trade program. [Section 6.3]

And:

A low carbon fuel standard would be a possible alternative to including liquid fuels in the cap and trade program. [Appendix B.10]

The LCFS would require comprehensive life cycle assessments of all liquid fuels consumed within the WCI. To the extent possible, these life cycle assessments would measure the full range of climate-warming emissions attributable to each fuel stream, including production, shipping, refining, distribution, and ultimately combustion. The LCFS would further require fuel suppliers within the WCI to keep the average emissions intensity of the liquid fuels they sell—that is, the amount of carbon equivalents emitted over a fuel's lifecycle, per BTU of fuel—at or below a specified level during a given compliance period.

2. Is the LCFS an exemption from the cap, or a different kind of cap?

The LCFS could be implemented in two ways. It can be a fixed emissions intensity standard that does not vary with the total amount of transportation fuel consumed in the economy. Or it can be a variable standard that is updated periodically, based on fuel consumption levels, so as to keep total emissions from the transportation sector at a desired level.

If the LCFS is implemented as a fixed standard of emissions intensity, as it is in California, it would effectively exempt transportation fuels from the cap. Under a fixed emissions intensity standard, total emissions will depend both on the level of the emissions standard, and on the quantity of fuels consumed throughout the WCI. So, for example, if emissions intensity declines but total fuel consumption increases, then **total transportation emissions could increase from current levels**. In fact, this dynamic is precisely what is expected in California. According to a technical analysis of the policy, “a 10% reduction in carbon intensity would result in an increase of 13% in *absolute* emissions.”¹

If absolute emissions from the transportation sector increase, then WCI jurisdictions will have little choice but to reduce emissions from other sectors in order to meet their overall reduction goals. Sightline does not believe that this is a fatal flaw for the LCFS because, in our view, not all sectors need be required to produce proportional reductions. But without the cross-sector trading afforded by a common cap, an increase in transportation emissions would likely require WCI to alter its schedule of emissions allowances for other sectors or else miss its targets.

In theory, however, an LCFS could govern more than just emissions intensity. If the allowable emissions intensity were adjusted periodically, based on recent (or projected) fuel consumption, and on emissions reduction targets, then the LCFS could function as a *de facto* cap on emissions from the transportation sector. Well-timed and accurate adjustments to the allowable emissions intensity could help the transportation sector achieve emissions reductions that are comparable to the reductions that other sectors will achieve through the cap. However, correctly administering periodic changes to the fuel intensity standard would be very challenging, and such changes would add an element of unpredictability for fuel suppliers.

Moreover, a frequently-adjusted LCFS is really just a cap by another name, but it's a cap with an inherent preference for a particular solution to emissions reductions: the addition of low-carbon fuels to the liquid fuel supply. As Lee Friedman, a professor of public policy at U.C. Berkeley, has noted, “a real challenge for the LCFS is whether it can be implemented in a way that does not inefficiently bias it in favor of biofuels and against non-liquid fuel alternatives.”² In particular, the **LCFS will tend to discriminate against other methods of reducing emissions**, including plug-in electric hybrids, hydrogen- (and natural gas- and propane-) powered vehicles, conventional fuel efficiency, and simply driving less.

In Sightline's view, it would be far more economically efficient to simply mandate an economy-wide cap, while allowing the market to decide whether the addition of low-carbon fuels to the transportation fuel supply is the most cost effective means of reducing emissions. Perhaps the market would find that that some other mix of solutions would be more cost effective; or perhaps it would find that the LCFS doesn't go nearly far enough in promoting low-carbon fuels. Thus, if it truly functions as a cap on transportation emissions,

¹ Alexander E. Farrell, Daniel Sperling et al., “A Low-Carbon Fuel Standard for California,” Part 1: Technical Analysis, August 1, 2007.

² Lee S. Friedman, “Should California Include Motor Vehicle Fuels in a Greenhouse Gas Cap-and-Trade Program?” draft paper presented at the Annual Research Conference, Association of Public Policy Analysis and Management, Washington, D.C., November 8, 2007 (revised December 2007, version 1.1).

the LCFS accomplishes with greater administrative complexity, and less economic efficiency, what could be achieved far more straightforwardly: simply including fuels under an economy-wide cap.

3. LCFS could require a sophisticated fuel tracking infrastructure.

As shown by the life cycle analyses performed to date, **similar fuel streams can have very different life cycle emissions profiles**. It is well understood, for example, that fuels extracted from Alberta's viscous tar sands have far higher life cycle emissions than oil from Saudi Arabia. But even refined products from different tar sands projects may vary considerably in their emissions profiles. Emissions will similarly vary for deepwater drilling, steam injection, and other increasingly common, energy-intensive oil production methods. Just so, same-type biofuels can have vastly different upstream emissions. For example, modeled lifecycle emissions for biodiesel from tropical palm oil plantations may differ substantially from the emissions for biodiesel derived from Midwest soybeans. These upstream emissions differences are so substantial that, if not properly accounted for, they could thwart the goal of achieving genuine emissions reductions through the LCFS.

Thus, if the LCFS is to provide an accurate reflection of the actual life cycle emissions of fuels consumed within the region, WCI jurisdictions—or the firms that provide fuel to the WCI—will need to implement a fairly sophisticated fuel tracking infrastructure. Otherwise, there will be no way to know the actual emissions associated with any particular mix of fuels purchased for consumption within the WCI.

Needless to say, this fuel tracking infrastructure would have to be developed essentially from scratch. Complications abound. Liquid fuel streams intermingle before they reach the WCI borders, and at various stages of the supply chain. Thus, the LCFS might **need to track fuel movement beyond the region's borders**. Fuel streams mingle again after they reach refiners within the WCI, which could complicate compliance. While there are many reasons to believe that this tracking infrastructure would lend precision and depth to the WCI's assessments of the global impacts of its transportation fuels purchases, the development of such a tracking mechanism is nonetheless an enormous undertaking. Moreover, it is an undertaking that could require data collection and monitoring activities in regions of the globe over which WCI jurisdictions have little reach and no authority.

4. Life cycle analysis is expensive, occasionally controversial, and inherently uncertain.

Even assuming that a reliable tracking system can be developed in an ever-changing global fuels market, the LCFS would still require additional, massive efforts to measure the life cycle emissions from all of the different fuel streams that would enter the WCI. Yet even a well-managed, credible, and well-funded life cycle assessment process will likely achieve

results that are tentative, uncertain, and imprecise. As a recent technical assessment of California's LCFS notes:

There is no widely agreed upon [life cycle analysis] methodology for measuring all of the important global warming impacts of transportation fuels. In some cases, data about important effects are missing or uncertain. ...life cycle assessment of vehicle fuels is a complex and evolving field of study, and there remain uncertainties and in key data and assumptions.³

The problems here are threefold. First, a precise life cycle assessment (LCA) requires large amounts of accurate and comparable data about emissions throughout the global fuel supply chain. But in many cases, **the data are not available**. Some data may be in the hands of foreign corporations or foreign governments that have no incentive to collect, maintain, or release it. (In fact, they may have strong incentives to restrict access to it.) In other cases, the data simply do not exist. Life cycle assessments will therefore rely on data proxies, estimates, and industry averages, all of which will add substantial uncertainty to the exercise.

Second, **there is no universally accepted method** for conducting a life cycle analysis of transportation fuels. The ISO standards for life cycle assessment identify an initial "boundary setting" stage for such analyses, which identifies the areas to be examined, as well as the areas to be excluded from consideration.⁴ Yet boundaries can vary—sometimes substantially—among different analyses and analysts. Quite often, the areas that are excluded from consideration are every bit as important as those that are included. In spite of the great importance of boundary choices, there is no universal agreement about which boundaries are truly relevant to a fuel supply system. Moreover, analytical boundaries are often chosen because of data availability, rather than because of what is genuinely important.

Third, **life cycle assessments will need to be informed by the results of economic and land use models**. For example, increases in biofuels production from food crops may result in cropping and other land use changes that can affect the amount of carbon stored in soils and ecosystems. Likewise, adding biofuels to the fuel stream could create a "rebound" effect: an increase in the supply of fuel would reduce prices, which in turn would increase consumption slightly—thus diminishing the emissions benefits of lower-carbon fuels. In addition, many life cycle analyses rely on economic input-output modeling to account for economy-wide impacts of different activities. Generally speaking, input-output LCA models estimate environmental impacts based on broad, economy-wide averages for different economic sectors, rather than precise measurement of the emissions attributable to specific firms. As a result, input-output models offer enormous advantages in simplifying LCA models, but the simplicity can come at the cost of precision.

³ Alexander E. Farrell, Daniel Sperling et al., "A Low-Carbon Fuel Standard for California," Part 1: Technical Analysis, August 1, 2007.

⁴ See, for example, the Wikipedia entry on life cycle assessment, http://en.wikipedia.org/wiki/Life_cycle_assessment. For more detail about the life cycle analysis standards, see the International Organization for Standardization, standards ISO 14040:2006 at http://www.iso.org/iso/catalogue_detail?csnumber=37456, and ISO 14044: 2006 at http://www.iso.org/iso/catalogue_detail?csnumber=38498.

Economic and land use models can be quite valuable tools where precise data are unavailable. Yet these **modeling results are often debatable and uncertain**. Even in the best of circumstances, models are only approximations of reality. Relying on multiple models—of the fuel production cycle, of economic interactions resulting from increased production of low-carbon fuels, and of global agro-economic impacts resulting in land use changes, and of the effects of land use changes on long-term emissions—will create a haze of uncertainty around life cycle emissions estimates, preventing a precise understanding of whether the goals of the LCFS are truly being met.

5. An example of the problem: two competing life cycle models.

A technical assessment of California's proposed LCFS notes strengths, limitations, and discrepancies in two of the principle fuel cycle assessment tools currently in use:⁵

The GREET model is probably the best publicly available LCA model for fuel analysis, but its shortcomings in the handling of land use changes are well recognized... LEM is more comprehensive, including more extensive and detailed treatment of land-use related effects, though some of the analysis is fairly speculative.

The report continues:

LCA may not be the best tool to measure some relevant phenomena (*e.g.*, changes in energy and agricultural markets resulting from biofuel production).

Sightline concurs with all of these assessments. Together, they suggest that the available life cycle analytical models are useful tools—perhaps even vital ones—for improving the performance of the WCI transportation sector. Yet **there are still substantial uncertainties** in their results and conclusions; and, further, for reliable results, additional land use and economic modeling must supplement any LCA analytical tool.

The comparisons between the LEM and GREET models, in the table reproduced below, clearly illustrate the uncertainties in competing estimates of life cycle assessments.

⁵ Alexander E. Farrell, Daniel Sperling et al., "A Low-Carbon Fuel Standard for California," Part 1: Technical Analysis, August 1, 2007.

Table ES-3: Global Warming Impacts estimated by two LCA models, adjusted for energy at the wheel (g CO₂ eq / MJ)

Fuel	Fuel production pathway	GREET	LEM (CEF)
CA RFG	Marginal gallon produced in CA	92	85
Diesel	Ultra-low-sulfur diesel produced in CA	71	73
Propane	From petroleum	77	67
CNG	From North American natural gas (in spark ignition engines)	79	81
BTL	Fischer-Tropsch diesel from California biomass (poplar trees)	- 3	–
CTL	Fischer-Tropsch diesel from coal	167	–
Biodiesel	FAME biodiesel from Midwest soybeans	30	224
Ethanol	Midwest corn ethanol from a coal-fired dry-mill	114	–
Ethanol	Midwest corn ethanol from a natural gas-fired dry-mill	70	97
Ethanol	Midwest corn ethanol using stover as fuel in a dry-mill	47	–
Ethanol	California corn from a gas-fired dry-mill, wetcake coproduct	52	–
Ethanol	Cellulosic ethanol from California poplar trees	- 12	–
Ethanol	Cellulosic ethanol from Midwest prairie grass	7	–
Ethanol	Cellulosic ethanol from municipal solid waste	5	–
Electricity	CA average electricity	27	–
Electricity	Natural gas combined cycle and renewable generation	21	34
Hydrogen	Hydrogen from biomass, delivered by pipeline	22	–
Hydrogen	Hydrogen from steam-reformation of onsite natural gas	48	26

In particular, note the profound difference between the two models' assessments of the life cycle emissions from Midwest soybeans. The GREET model found that soy biodiesel *reduces* life cycle emissions by two thirds, compared with petroleum diesel. But the LEM model, by contrast, found that soy biodiesel *triples* aggregate emissions, compared with petroleum diesel. In absolute terms, the emissions estimates differed by a factor of more than seven. More generally, while the two fuel life cycle models are often comparable in their assessments of the life cycle emissions from a particular fuel source, **the GREET and LEM models never completely agree.**

Thus, while the researchers suggest that these uncertainties do not preclude implementation of the standard, they admit that it would necessitate “a significant, robust, and continuing research effort.” (They identify biofuels and land use as a particularly problematic area.) Further, they recognize that life cycle analysis may not accurately measure some aspects of low-carbon fuel production, including changes in energy and agricultural markets. To understand the effects of changes in these dynamic markets, the authors note that, “a good place to start would be to conduct transparent, side-by-side comparisons of all relevant analyses to understand where they differ in structure, data, assumptions, and so forth.”

In other words, implementation of **LCFS would be predicated on a huge amount of new research**—not only into life cycle analysis itself, but also into models that can forecast changes to dynamic energy and agricultural markets. Of course, the process of selecting a uniform life cycle assessment method for the WCI could yield greater accuracy than any model currently in existence. But ultimately, life cycle assessment may never become a precise science. Well-informed and fair-minded analysts with identical data may

come to very different conclusions about the emissions associated with any particular fuel stream.

Of course, all policy decisions must deal with some level of uncertainty. Yet exchanging the relative certainty of an economy-wide cap—in which emissions measurement is both direct and fairly accurate—with the uncertainty of results informed by a series of models concerning land use, global economics, and fuel production, would likely amount to exchanging real, certifiable emissions reductions for far more speculative and uncertain benefits.

6. A second example of the problem: biofuels life cycle assessment.

Recent controversies over biofuels illustrate the profound uncertainties about data and methodology; and they highlight potential pitfalls in using life cycle assessment as a policy tool. Two recent peer-reviewed studies published in the journal *Science* examined the interactions among international biofuels demand, global commodities markets, and land use changes.⁶ The authors conclude—contrary to much previous research—that the comprehensive, life cycle emissions from most biofuels can be far greater than for conventional petroleum fuels once land use changes such as deforestation are taken into consideration.

Other researchers have questioned these conclusions, often vehemently. Yet the vigorous debate shows that, even after decades of research, **expert opinion varies dramatically** on whether biofuels from food crops are genuinely a climate-friendly alternative to petroleum fuels, given current (and foreseeable) technological and economic conditions.

Sightline has been closely following this debate for years, and we do not expect the controversy to abate any time soon. If anything, the **uncertainties have increased in recent years** as the analytical boundaries of life cycle analysis have expanded. Of course, researchers on all sides suggest that future biofuels technologies may someday offer quite substantial climate benefits. However, the controversy over the *Science* articles illustrates, once again, that well-informed and thoughtful researchers can come to very different conclusions about the emissions associated with any particular fuel stream.

7. A Low Carbon Fuel Standard could invite “fuel shuffling.”

Putting aside the administrative and methodological difficulties of life cycle assessment, the hope that the LCFS would genuinely influence emissions reductions for

⁶ Joseph Fargione et al., “Land Clearing and the Biofuel Carbon Debt,” *Scienceexpress*, February 7, 2008; and Timothy Searchinger et al., “Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land Use Change,” *Scienceexpress*, February 7, 2008.

activities outside the WCI is somewhat speculative. In fact, if the WCI were the only jurisdiction to employ such a standard, the **LCFS might *not* stimulate additional production of low-carbon fuels**, nor reduce the production of high-carbon fuels worldwide. Rather, the LCFS might simply direct already-produced low-carbon fuels to the WCI market, while leaving higher-carbon fuels to satisfy demand for the rest of the global economy.

The problem is somewhat similar to the one that “contract shuffling” poses in the electricity sector. With contract shuffling, regulated entities may “comply” with emissions requirements simply by rearranging their contracts with out-of-state uncovered generators; the “clean” electricity gets assigned to regulated entities, but there is no overall change in the exporter’s actual generation mix. However, **the potential for “fuel shuffling” is far worse than for contract shuffling** in the electricity sector. Whereas contract shuffling is mostly limited to the uncovered jurisdictions within the Western electricity grid, the opportunities for fuel shuffling are quite literally global in scope.

In all its high-carbon and low-carbon forms, transportation fuels are genuinely global and fungible commodities that are relatively easy to transport virtually anywhere; indeed, that’s part of what makes them so valuable. Thus, a regional LCFS could do little more than prompt distributors to direct low-carbon (and presumably more expensive) fuel into the WCI economy, while redirecting higher-carbon fuels to other markets around the globe. Because WCI accounts for only a small fraction of world oil consumption, a LCFS that covers only the WCI would reduce the carbon-intensity of the world’s fuel only marginally, if at all.

8. A single, global fuel model: some benefits, some pitfalls

There is one potential option for creating a “simple” version of the LCFS that could, at least in theory, reduce the complications of fuel tracking (mentioned in section 3) and fuel shuffling (mentioned in section 7). Rather than tracking the provenance of individual fuel streams that enter the WCI from around the globe, and developing a specific life cycle emissions estimate for each stream, the WCI could instead invest in a single, unified model of the global fuel supply system. Ideally, this unified model would incorporate:

- Emissions resulting from petroleum production, from exploration to extraction to refining to consumption;
- Major fuel supply and demand interactions throughout the global economy;
- Any relevant land use change impacts resulting from biofuels production; and
- Likely changes in terrestrial carbon storage that would result from foreseeable land use changes.

If successful, this unified model could produce default estimates for the emissions that would result from the consumption of each type of liquid transportation fuel consumed in the region—i.e., a default value for the marginal BTU of gasoline, diesel, ethanol, biodiesel, propane, and so forth.

By focusing on the *marginal production* of transportation fuels—that is, global emissions that would not occur, but for consumption within the WCI—a model of this type would eliminate the need to track individual fuel supply chains and their associated emissions. Fuel suppliers would comply with the LCFS simply by selling different fuel types, with different default emissions values, such that the overall emissions intensity of their fuel mix fell below the regulatory target. Fuel sellers would be free to choose *any* mix of fuels, provided that the end result was a sales mix that reduced emissions to the target level.

As an example of how this sort of model might work, consider the web of economic interactions resulting from providing petroleum gasoline to the WCI. Fuel consumption in the WCI contributes to global demand, raising the price of oil on global markets. Higher-priced oil, in turn, spurs certain kinds of energy-intensive investments in petroleum exploration and production, increasing emissions from the fuel supply. Higher prices also slightly depress energy demand elsewhere around the globe, and create incentives for cost-effective conservation. Rising petroleum prices further affect consumption of complementary energy products, including natural gas and coal. Higher prices also stimulate production of renewable fuels products, such as biofuels, with attendant effects on terrestrial carbon storage, which in turn depend on the geographic location in which the fuel production will likely occur. Each of these effects has the potential to influence emissions, either by reducing them (in the case of demand destruction and lower-carbon fuel production) or increasing them (in the case of agricultural conversion and production of fuels from difficult-to-obtain fossil sources).

In the end, a successful model would follow all the important strands of causation resulting from fuel consumption within the WCI, predicting the global emissions that would result from providing the WCI with any particular fuel type. This approach would eliminate worries about “fuel switching,” by ensuring that emissions estimates genuinely reflect the comprehensive, global effects of different fuel supply choices within the region. It would also obviate emissions tracking and emissions data collection for individual fuel streams, since the emissions attributable to fuel consumption within the WCI would not be attached to the particular fuels consumed regionally, but to the effects on overall global emissions.

There is, unfortunately, a very serious flaw in this approach: a model of this scale, with the level of precision required for a regulatory program with substantial economic and environmental consequences, is simply unprecedented. The volume of effort required—in data collection, model development, model verification, and perhaps even computational power—is unknown and could perhaps even resemble the massive efforts required to model global climate change. Even then, as with climate predictions, there would likely be a degree of inherent uncertainty.

In the end, this “simple” version of a life cycle analysis isn’t simple at all. While it avoids the need to engage in specific fuel supply tracking, and eliminates the need to estimate emissions impacts from particular fuel streams, it also would require extraordinary investments in time, data collection, and modeling expertise.

9. LCFS is a lost opportunity for revenue recycling.

Like a cap and trade system, a low carbon fuel standard would likely raise the cost of transportation fuels. The biggest different is that under cap and trade, higher emissions costs can be recaptured by the public as revenue from auctioning permits. The revenue can then be used for a range of beneficial public purposes: programs that reduce the cost of emissions reductions by providing low carbon transportation alternatives (e.g., transit, or subsidies for efficient vehicles); research and development into lower-carbon fuels; and programs that compensate poor and middle-income families for higher energy costs.

But under the LCFS, consumers will pay higher prices that go only for more expensive, lower-carbon fuels (plus the cost of tracking, data collection, and fuel stream analysis). No revenue will be collected for the public benefit, and so there is no opportunity for the beneficial recycling of revenue that can ease the impacts of the program on consumers or taxpayers. As a result, **the ultimate consumer impacts of the LCFS are potentially *higher*** than the consumer impacts from cap and trade—even if prices at the pump increase more under a cap and trade system.

10. What role remains for the LCFS?

Sightline believes that the LCFS is an intriguing policy that may help spur the development of a genuinely low carbon fuels industry. Such an industry could offer new and inexpensive options for achieving emissions reductions, even while it created better data about emissions from the transportation fuel cycle that occur outside the WCI. Indeed, there is much to be learned from the potential development and implementation of a credible LCFS. And in the nearer-term, verifiably low carbon fuel might help entities comply with a cap in certain circumstances. Thus, the development of the LCFS may be a useful or even vital *complementary* policy, in the context of an economy-wide cap.

Yet at present, the LCFS is an unproven system, relying on untested (and perhaps inherently uncertain) methods of analysis, in an area that still generates substantial scientific controversy. As the recent controversy over biofuels suggests, an improperly implemented LCFS could, at least in theory, do more harm than good—perhaps mistakenly encouraging *greater* emissions through inaccurate assessment of life cycle emissions. Expert disagreement and inherent uncertainty is not just an academic problem, but a fundamental challenge to policies based on life cycle analysis. As a result, Sightline believes that deploying the LCFS as a substitute for the more certain policy of cap and trade is simply unwise.

Conclusion: The Advantages of a Common, Unified Carbon Market

Sightline commends the Scope Subcommittee for investigating all available options to reduce transportation emissions, but we believe that any attempt to exclude major sectors from an economy-wide cap would very likely be a mistake. At minimum, the committee

should exercise extreme caution in deciding—and justifying to the public—that such a course is “preferable” to a broad, uniform economy-wide cap.

There are many reasons to believe that excluding major sectors from an economy-wide cap would be troublesome to *all* market participants. Consider, for example, a case in which electricity generators and industrial emitters are subject to a fixed, declining emissions cap, but the transportation sector is subject to, say, a low carbon fuel standard in lieu of a cap. Many complications could arise:

- **Inconsistent price signals.** Different mechanisms for different sectors would almost certainly create competing or conflicting price signals for emissions in different sectors of the economy. As a result, the market would direct emissions reductions with reduced economic efficiency, perhaps encouraging more expensive reductions in lieu of cheaper ones.
- **Reductions in cross-sector trading.** A broad market-based system helps find the cheapest emissions reductions *wherever* they may occur in the economy. By contrast, sector-specific command-control regulations sacrifice economic efficiency and compliance flexibility.
- **Increases in price volatility.** Generally speaking, a diversified portfolio of independent sectors will reduce volatility. For example, if the carbon allowance market is limited to the electricity sectors and major industries (many of which are dependent on electricity prices), then a sequence of low-hydro years could result in unsustainable price spikes with few good compliance options for covered entities. But if there are multiple large and independent sectors participating in the market mechanism, then additional allowances will be available for purchase, cushioning price spikes and encouraging least-cost emissions reductions throughout the economy.

It has been suggested that sectors may not be included in a common, unified cap and trade program if they are relatively inelastic, or if they are unlikely to achieve significant reductions. We urge the Scope Subcommittee to re-examine this assumption. The purpose of an economy-wide scope is *not* to achieve parallel reductions in each covered sector. On the contrary, a broad scope is important precisely because it allows different sectors to respond differently to a declining supply of carbon.

Some sectors may achieve cheap and easy reductions quickly, but find further reductions more challenging. By contrast, other sectors may be relatively inelastic in early years, but realize substantial reductions later on when new technologies emerge. A broad scope provides flexibility for each sector to respond in the most efficient manner for the entire economy—whether by reducing end-use demand for energy; reducing the carbon-intensiveness of the energy it consumes or sells; financing its reductions from other sectors; or perhaps purchasing offsets.

A maximally broad scope reflects our inability to predict the future. We cannot know with certainty what economic conditions or technological developments will prevail in the coming decades. One thing *is* clear, however: if global carbon emissions are not reduced expeditiously, we risk potentially catastrophic climate change. Only a firm and declining cap

on carbon can guarantee that the WCI states and provinces will meet the challenge they have set for themselves.