



# Gauging citizen support for a low carbon fuel standard



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## HIGHLIGHTS

- Most citizens are unaware of British Columbia's low carbon fuel standard (LCFS).
- We observe passive support: low awareness and high support of the policy.
- An LCFS achieves broad support among British Columbia's and Canadian citizens.
- Households relying on single occupancy vehicles are less likely to support an LCFS.

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## ABSTRACT

Since 2007, several variations of a low carbon fuel standard (LCFS) have been implemented around the world. While emerging research tends to focus on greenhouse gas emission reductions from an LCFS, no studies have assessed the policy's political acceptability—a critical component of implementation. We elicit public support for an existing LCFS in British Columbia and a hypothetical (proposed) LCFS for the rest of Canada using survey data collected from a representative sample of Canadian citizens ( $n=1306$ ). Specifically, we assess: (1) citizen awareness of British Columbia's LCFS, (2) stated citizen support for the LCFS, and (3) how individual characteristics relate to levels of citizen support. We find that British Columbia's LCFS is almost unknown among British Columbia respondents, but once explained, 90% of respondents support it. We refer to this combination of low knowledge and high support as “passive support.” We find similarly broad support in all other Canadian provinces, implying that citizen opposition is unlikely in jurisdictions considering an LCFS. Statistical analysis identifies some individual characteristics associated with LCFS support, including attitudes, demographics, and contextual factors. Results indicate where policymakers might anticipate opposition if it arises due to increased policy stringency or media coverage.

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## 1. Introduction

Various jurisdictions around the world have recently implemented or are considering implementing a low carbon fuel standard (LCFS)—a performance-based climate policy that aims to decarbonize transportation by reducing average greenhouse gas (GHG) intensities in transportation fuels (Farrell and Sperling, 2007). Versions of an LCFS have been implemented in California, the European Union, and in British Columbia, Canada. This study explores public support of the LCFS existing in British Columbia, and public support of a proposal to implement such a policy across Canada.

Emerging research tends to focus on GHG emission reductions

from an LCFS, with some consideration of whether such a policy is an economically efficient way to reduce GHG emissions. However, it is arguable that a “good” climate policy is not only effective and efficient—but also politically acceptable. For example, political acceptability is thought to be the main impediment to implementing a strong carbon tax in most jurisdictions—no matter how effective or efficient the policy is on paper. Here we explore the political acceptability of an LCFS, focusing on public support. To date, no published research has explored public support relating to an LCFS.

There is little consensus in policy literature on what type or level of public support is required for a given climate policy to be deemed acceptable. We consider three constructs: citizen awareness, perceived effectiveness, and stated support. Awareness is the basic knowledge that the policy exists. Perceived effectiveness is the citizen's beliefs regarding the policy's expected GHG reductions in the period from 2008 to 2020. Citizen support is measured

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as a citizen's stated position in support of, or opposition to, an LCFS. Research suggests that citizen awareness is not necessarily related to public support of climate policy, but perceived effectiveness can be positively associated with support (Rhodes et al., 2014). We anticipate that supplier-focused climate policies like the LCFS are likely to receive broad "passive support," where citizens are unaware of the policy, but express support when the policy is explained.

We empirically explore citizen perceptions of an LCFS using survey data collected from a representative sample of Canadian citizens ( $n=1306$ ), including an oversample in British Columbia ( $n=475$ ), where an LCFS has been approved for almost five years (at the time of data collection in 2013–2014). Our research objectives are to assess:

1. citizen awareness and perceived effectiveness of British Columbia's LCFS (for British Columbia's sub-sample only);
2. citizen support for the LCFS in British Columbia, Canada as a whole, and by Canadian region; and
3. how individual characteristics relate to citizen support in British Columbia and Canada.

The paper is organized as follows. First, we provide a background of LCFS-like policies existing in the world, followed by a literature review of the trends and characteristics of climate policy support. Second, we describe our research methodology, including survey data collection, operationalization of variables, and data analysis techniques. Then, we present the study results and discuss how they relate to the existing literature on climate policy support. Finally, we conclude with the key implications for future climate policy-making.

## 2. Overview of low carbon fuel standards

The transportation sector predominately relies on petroleum fuels, accounting for one-fourth of global and one-third of North America's GHG emissions (Intergovernmental Panel on Climate Change, 2014). An LCFS seeks to reduce average carbon intensities in transportation fuels measured in grams of carbon dioxide equivalent (CO<sub>2</sub>e) per megajoule of energy used. The idea behind this performance-based standard is to give fuel providers the freedom to select the lowest-cost low-carbon alternatives to comply with the policy. A typical LCFS differentiates fuels based on their carbon intensity values and targets lifecycle GHGs emitted in the process of extraction, processing, distribution, and fuel use (Yeh and Sperling, 2013). Therefore, the policy stimulates fuel providers to switch to lower carbon alternatives, such as biofuels, hydrogen, and electricity, or to reduce the upstream carbon intensity of petroleum production. While 'fuel' is commonly defined as "a product that is burned to produce heat or power" (Merriam-Webster Dictionary, 2014), the originators of the LCFS policy have been clear from the outset that electricity, if produced with few emissions and used in transportation, can also be considered as a 'low carbon fuel.' We follow this convention in stipulating fuel options within the LCFS.

Several variations of an LCFS policy were adopted around the world in 2007–2010. Here we briefly outline versions implemented in California (U.S.), the European Union (EU) and British Columbia (Canada). Each version has unique design characteristics, and has met with different degrees of political controversy.

The state of California was the lead jurisdiction to propose an LCFS in 2007 and to implement it in 2010. The policy obliges fuel providers to reduce the carbon intensity of their fuel mix by 10% by 2020 from 2010 levels, starting with a 0.25% reduction in 2011 (California Air Resources Board, 2009). California's LCFS has

market flexibility features that allow fuel suppliers to bank and trade GHG reduction credits. Since its implementation, the policy is estimated to have prevented 2.8 Mega tonnes (Mt) of CO<sub>2</sub> and is projected to achieve 25 Mt CO<sub>2</sub> in annual lifecycle reductions from fuel production to combustion by 2020, contributing about 14% to the achievement of the state's 2020 GHG reduction target (California Air Resources Board, 2009; Yeh et al., 2013). California's LCFS has faced multiple legal challenges from the oil, trucking, ethanol, and agricultural industries claiming that the policy discriminates against out-of-state commerce and fuels by incorporating the distance a fuel travels to California into the calculation of carbon intensity values (Kasler, 2014). However, most of these claims have been rejected by California state courts because the policy distinguishes fuels based on real differences in their carbon intensities resulting from transportation, and therefore motivates out-of-state industries to reduce emissions rather than restricts activities of those industries (Brisson et al., 2014). Washington, Oregon, and several states in the Midwest and the Northeast/Mid-Atlantic region are considering adoption of California's LCFS policy approach (Yeh et al., 2012).

The European Union proposed an LCFS policy at about the same time as California in 2007. In 2009, the European Commission revised the existing Fuel Quality Directive (FQD) to incorporate LCFS features into the policy. The FQD requires a 6% reduction in the carbon intensity of transportation fuels by 2020, which is less stringent than California's LCFS target (EU Parliament, 2009). However, the FQD is broader in that it establishes sustainability criteria for biofuels (Yeh and Sperling, 2013). Specifically, the policy does not allow biofuels where the land use effects of production would cause high carbon emissions or lead to reduced biodiversity. Although the policy was ratified in 2008–2009, it is still not in force due to the delays in approving implementation measures, which include the ranking methodology for carbon intensity of fuels. If the original intensity values for unconventional oils are kept in the FQD, the policy is projected to result in up to 19 Mt CO<sub>2</sub> savings per year, in addition to the annual 50–60 Mt CO<sub>2</sub> reductions from supplying alternative fuels to meet the FQD target (Kampman et al., 2012).

In 2010, British Columbia was the first and only province in Canada to enact its own LCFS policy – the Renewable and Low Carbon Fuel Requirements Regulation (RLCRR). The policy consists of two components: (1) the Renewable Fuel Requirement, which sets a 5% renewables target for gasoline and 3% for diesel starting in 2010 (with the target for diesel increasing to 4% in 2011), and (2) the Low Carbon Fuel Requirement, obliging fuel suppliers to reduce the carbon intensity of transportation fuels by 10% by 2020, consistent with California's LCFS target (BC Ministry of Energy and Mines, 2014). Unlike California's LCFS, British Columbia's policy cannot be met through reductions of carbon intensity of upstream petroleum production because it does not differentiate between the carbon intensity of different sources of crude oils. Although Bailie et al. (2007) estimate the impact of British Columbia's LCFS at 0.7 Mt CO<sub>2</sub> by 2020 (which contributes about 2% to the achievement of the provincial GHG reduction target), the British Columbia government reported a reduction of 0.9 Mt CO<sub>2</sub> in 2012 due to the use of renewable and low carbon fuels (BC Ministry of Energy and Mines, 2014). However, as with many policies, it is difficult to estimate the marginal effects of British Columbia's LCFS, especially when other climate policies are in place, such as a carbon tax of \$30 per tonne of CO<sub>2</sub> on all fossil fuel based transport fuels, and the fact that the compliance period began in only 2010.

In contrast to the policies in California and the EU, British Columbia's LCFS has received little attention from industry and media. Other climate policies have garnered much more media attention. The LCFS has been mentioned only 21 times in British

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