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Backgrounder

Reducing greenhouse gas emissions through transportation fuel policy

The European Union's proposed fuel-quality directive and implications for Canadian oilsands producers

At a Glance

On February 23, 2012, a European Commission EC committee will vote on details to implement an amendment to the fuel-quality directive that aims to reduce the greenhouse gas (GHG) emissions associated with transportation fuels. The proposal would essentially encourage the use of cleaner and lower-carbon fuels over those with a higher carbon footprint. This could have implications for Canada's oilsands producers since, in general, more greenhouse gas emissions are produced in the extraction and refining of oilsands than in producing and refining conventional oil. The following backgrounder answers some frequently asked questions about how the proposed European Union (EU) fuel-quality directive could affect Canada's oilsands sector and overall efforts to reduce greenhouse gas emissions from transportation fuels.

Frequently asked questions

Q: What is the EU fuel-quality directive?

The fuel-quality directive is part of the European Union's commitment to a 20 per cent reduction in carbon emissions from transportation by 2020. To help fulfill this goal, suppliers of transport fuels are obliged to reduce the life cycle GHG intensity of their products — gasoline, diesel, and jet fuel — by six per cent by 2020 (relative to 2010).[1]

In order to accurately account for the GHG impact of different fuels, the proposal includes default emissions values for each major fuel feedstock. The values for biofuel feedstocks have already been adopted and now the Commission is seeking to set the values in a similar manner for fossil fuel feedstocks.

Q: What is the process for turning this proposal into law?

The goal of reducing the carbon intensity of transport fuels by six per cent was agreed to in Amendment 7a to the fuel-quality directive, passed in 2009 (Directive 2009/30/EC). The amendment agreed on methods to calculate the emissions from biofuels and delegated the task of determining equivalent methods for fossil fuels (and electricity for transport) to the EC's Fuel Quality Committee.

In EU policymaking, deferring the development of details necessary to implement a decision to a technical committee is a common process, known as comitology. The Fuel Quality Committee is now considering a proposal to fully implement Amendment 7a.

The proposal must pass the committee with a qualified majority[2] (i.e. 74.8 per cent or 258 out of 345 votes) in order to proceed. After it passes committee, the European Parliament has a limited period in which to veto the proposal. It may not make amendments. If the proposal is not vetoed, it becomes law.

If there is not a qualified majority voting either for or against the proposal, then it proceeds to the ministerial level, where the environment ministers of member states will study it further.

Q: Why is the EU targeting transportation fuel specifically?

The fuel-quality directive is part of the EU's action plan[3] to address emissions from all sectors of the economy. Emissions from heavy industry and aviation are covered under the Emissions Trading Scheme. Strict vehicle emissions standards are making passenger transportation more efficient. The fuel-quality directive rounds this out by ensuring that fossil and alternative fuels (biofuels, hydrogen, natural gas, electric, etc.) compete on a fair basis in terms of GHG emissions, and thus contribute their fair share in meeting the EU's overall GHG emissions-reduction objectives.

Q: Why does the directive differentiate between fuels?

Fuels produced from different feedstocks (the raw material used to produce fuel) can vary significantly in their GHG emissions intensities because of differences in the extraction and refining processes and associated energy needs. Failing to account for these significant differences between crude supplies from various feedstocks could undermine efforts to reduce overall emissions.

For this reason, the fuel-quality directive uses basic fossil fuel categories including conventional, coal-to-liquid, gas-to-liquid, shale oil, and natural bitumen. Once categorized, each fossil fuel receives a default greenhouse gas intensity value based on the average or most likely value for that feedstock (Table 1). The feedstock approach is a sound compromise between not accounting for any differences between crudes' emissions intensities and differentiating all possible pathways (i.e. each individual crude source).

While there are ranges of emissions within a feedstock (deviating from the averages), and possibly some overlap between some of the categories at their margins, this approach works for the overwhelming majority of fossil fuel sources, as the feedstock category average values are sufficiently different from one another.

The agreed baseline, based on calculations by CONCAWE (an oil industry body), is 88.3 gCO_2/MJ, from production through combustion. In other words, on average, in 2010 each megajoule of energy used in the EU for transport emitted 88.3 grams of carbon dioxide.

Any producer that outperforms the 'default' emissions value for their feedstock can choose to obtain their own value by supplying the relevant data. This creates an incentive for innovation and rewards past improvements.

Table 1. Proposed default greenhouse gas intensity values by feedstock

Fuel source (feedstock)	Proposed default value (gCO_2/MJ)
Conventional oil	87.5
Natural bitumen (e.g. oilsands)	107.0
Shale oil	131.3
Coal-to-liquid	172.0
Gas-to-liquid	97.0

Q: What criteria are used to distinguish between types of fuel under the proposed standards?

The fuel-quality directive differentiates between transportation fuels based on the types of feedstock from which they are produced. For example, fuels produced from shale oil and fuels produced from natural bitumen are in different categories than conventional oil. The distinctions separating these categories are based on the physical properties of the feedstock, not their geographic origin.

To distinguish between crude oil and bitumen, the fuel-quality directive looks to the distinct differences between their physical and chemical characteristics. In the directive, natural bitumen is defined according to two main criteria: density (API gravity) and viscosity (for a given temperature). According to this definition, sources that are more dense (heavier) and also more viscous than the cut-off are categorized as "natural bitumen." Crudes that are either less dense or less viscous are placed in the "conventional" category.

The proposal notes that employing both criteria together should remove any ambiguity, and that these criteria can be applied uniformly across all crude sources. Assigning default carbon intensity values to each major feedstock is important to the integrity of the fuel-quality directive's objective. Accurately accounting for the GHG impacts of various fuels will ensure that fuels compete for access to the European market on a level basis.

Q: Why does fuel from the oilsands have a different carbon intensity value than conventional fuel?

Extracting and processing bitumen from the oilsands is generally more energy intensive than conventional oil production, resulting in comparatively high life cycle emissions for these fuels. This is due to the heat required to separate the heavy bitumen from the surrounding sand and rock, as well as the processing needed to refine the long hydrocarbon chains into usable transportation fuels.

Independent analysis shows that oilsands fuel from even the least-emitting projects has higher life cycle emissions than 97 per cent of conventional oil entering Europe.[4]

The value of 107 gCO_2/MJ assigned to the natural bitumen feedstock category stems from a peer reviewed study from Stanford University that was commissioned by the European Commission.[5] The study found that the most likely, or average, emissions intensity associated with production, transport and consumption of oilsands in the EU would be 22 per cent greater than the average conventional crude currently processed in EU refineries.

Suggestions that the process of assigning this value is not "science-based" are inaccurate. As noted above, any producer that outperforms the default emissions value for their feedstock can choose to obtain their own value by supplying the relevant data.

Q: Does the directive unfairly discriminate against Canadian oilsands fuel?

The EU's proposed fuel-quality directive does not unfairly disciminate against Canada's oilsands. As noted above, the distinctions separating various fuel feedstock categories are based on the physical properties of the feedstock, not their geographic origin.

The specific default value for natural bitumen applies to all fuels that are produced from oilsands anywhere in the world. While the vast majority of commercial oilsands development is happening in Alberta, with current production of approximately 1.6 million barrels per day, other reserves[6] exist globally in countries such as Venezuela, Madagascar, the Republic of Congo, the United States and the Russian Federation. Some of these resources are currently being considered for development and the same default value would be placed on the fuel they produce.

Natural bitumen, like the type produced in Canada's oilsands, is proposed to have its own specific default value because its production is more energy intensive, which in turn means the final product has a higher carbon intensity on a life cycle basis than conventional oil. In the directive, natural bitumen is defined in a technology-neutral way, based on the index value assigned by the American Petroleum Institute (API value), viscosity, CN code (a trade designation for EU import and export goods[7]) and production method. According to the directive, "natural bitumen" as a refinery feedstock has the following properties:[8]

> (a) An American Petroleum Institute Gravity of 10 degrees or less when situated in a reservoir formation at its place of origin and measured at the standard temperature prescribed in testing method American Society for Testing and Materials (ASTM)48 D287;
>
> (b) An annual average viscosity at reservoir temperature greater than that calculated by the equation Viscosity (Centipoise) = $518.98e^{-0.038T}$; where T is the temperature in Celsius;
>
> (c) Falling within the definition for tar sands under combined nomenclature code CN 2714 10 00 as outlined in Council Regulation (EEC) No 2658/8749;
>
> (d) Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage where the thermal energy is mainly derived from sources other than the feedstock source itself.

Fuel derived from natural bitumen in countries other than Canada — such as extra heavy crudes from Venezuela's Orinoco belt — would be treated in the same way under the fuel-quality directive.

Likewise, conventional oil from Canada would be assigned the same carbon intensity value as all other conventional crudes entering Europe.

Q: How could this proposed fuel-quality directive affect Canadian oilsands producers in the near future?

Only within the last few years has a small amount[9] of oilsands-derived diesel fuel arrived in the EU from the U.S. Gulf Coast. This amount is expected to increase if pipelines are built from the oilsands to the U.S. Gulf Coast (for example, Keystone XL) or to the eastern seaboard of North America.

So while a fuel-quality directive in the European Union would not directly impact current oilsands producers, it would make oilsands less competitive with less GHG-intensive transportation fuel products if oilsands producers were to expand further into the European market.

Perhaps more importantly, it sets a clear precedent for other jurisdictions, like the Northeastern United States, that are considering transportation fuel policies that aim to reduce life cycle GHG emissions. If more and more regions begin to reduce the carbon intensity of their transportation fuels, then the oilsands may face increasing challenges in accessing new markets so long as the carbon footprint of the oilsands remains high.

It is worth emphasizing, however, that policies like the fuel-quality directive do not "ban" oilsands products, but rather create a market-driven incentive for oilsands producers to reduce the GHG intensity of their production.

Q: How can fuel suppliers comply with the fuel-quality directive?

Fuel suppliers must report annually on the GHG intensity of the fuels they supply. In addition to reductions that can be achieved by supplying lower-carbon biofuels, suppliers can receive credits for projects to reduce venting and flaring (a large source of emissions in some fields), supply of electricity for transport, and projects to reduce upstream emissions by improving efficiency or implementing other technologies such as carbon capture and storage (CCS).[10]

Q: What are the longer-term implications for Canadian oilsands exports?

Given policies like the fuel-quality directive, if the Canadian oilsands are to be competitive in the long term, there is a clear need to reduce the GHG emissions coming from extraction and upgrading. Otherwise, there will be increasing concerns from downstream markets, like the EU, on the carbon content of oilsands crude.

Long-term competitiveness can be driven by policies and technological innovations, and from provincial or federal climate regulations, such as a price on carbon. Status quo oilsands production is already starting to close market doors for the oilsands industry. Until significant improvements are achieved in the carbon management of oilsands, it is likely that additional markets will close to oilsands or establish a competitive advantage for lower-carbon fuel sources.

Q: How could the EU's proposed fuel-quality rules drive innovation in the oilsands sector?

Some commentators have argued that the fuel-quality directive will penalize oilsands producers that do clean up their GHG emissions and come in below the average. This is not true. In fact, oilsands

producers that have a greenhouse gas emission intensity lower than the fuel-quality directive's default value can receive their own custom value and "race to the top" by reporting their actual emissions.

In sum, any producer that outperforms the "default" emissions value for their feedstock through any of a number of pathways can choose to obtain their own life cycle GHG value by supplying the relevant data. This creates an incentive for innovation, rewards disclosure and past improvements.

More and more oilsands operators[11] believe that they can get their oilsands production emissions down to a level competitive with conventional oil. While this has yet to be demonstrated with the appropriate public data, doing so would allow Canadian oilsands producers to prove that they can compete in a low-carbon world, and could go a long way toward improving the image of the oilsands in the global energy market.

Q: What should Canada be doing to ensure oilsands fuel can compete in a market that is shifting in favour of lower-carbon fuel sources?

Canada's federal Natural Resources Minister Joe Oliver has recently argued that the fuel-quality directive "actually penalizes countries and companies that provide transparent, independently verifiable data."[12] However, rather than defending the oilsands industry from market pressures for low-emissions fuel, Canada should be advocating that the fuel-quality directive require transparency and GHG accounting at the outset, raising the bar for all countries that export fuel to Europe.

The best way for Canada's oilsands producers to ensure their ability to compete in the emerging low-carbon marketplace is to accelerate progress in reducing the GHG emissions from oilsands production.

Leading oilsands producers — those who make significant investments in efficiency, production process innovation, renewable energy, GHG offsets, carbon capture and storage, etc. — may already have emissions below the default value for their feedstock type. To reap the benefits of this improved performance, oilsands producers need to disclose their emissions performance to the EU regulator, and seek approval for their own pathway. The incentive for doing so is that under the fuel-quality directive, the EU creates a market preference for low-carbon fuels. This creates an incentive for producers to beat their peers on environmental performance and to innovate, creating a virtuous cycle that promotes lower-carbon growth.

Q: Will this proposed measure actually achieve any global GHG reductions, since the oilsands product could be exported to other countries, such as China?

The fuel-quality directive sends a strong signal to fuel suppliers that the market value of their products depends on their carbon intensity. Fuels with higher carbon intensity could, in theory, still be exported to other countries such as China, but at a lower price as their market value decreases.

Continued oilsands production depends on the policy signals that are sent by the major oil consumers, so the EU (as one of the biggest oil consumers in the world) sends the correct message in this respect. California has also implemented a low carbon fuel standard and reporting requirements. It is likely that other countries in the world will copy the EU standard, which will have an impact on investment and will contribute to a global decrease of GHG emissions.

Q: What is the Pembina Institute's perspective on the value of a high-carbon label for transportation fuels, like the one the EU is considering?

The proposed emissions value for bitumen in the EU's fuel-quality directive sends a signal to fuel suppliers everywhere — not just Alberta — that the global marketplace is now considering the carbon intensity of various fuels when making buying decisions. Instead of lobbying European countries and downplaying the significance of GHGs from the oilsands,[13] Canadian decision-makers could invest their efforts in implementing federal regulations or helping Alberta to strengthen provincial regulations that drive down GHG emissions from the oilsands sector, enabling oilsands to compete with less-carbon intensive crudes from other jurisdictions. Not only would this keep markets open, but it would spur innovation here.

There are aspects of the fuel-quality directive that could be improved, such as driving greater transparency in supply chains by mandating GHG accounting from all fuel imports into Europe, and by further differentiating in the directive between crude supply types (e.g. for heavy oil).[14]

Rather than lobbying against the EU's proposed fuel standards, the Government of Canada should focus its efforts on ensuring that all crudes and other transport fuel sources are required to compete on a level playing field.

Endnotes

[1] European Commission, "The EU Climate and Energy Package," http://ec.europa.eu/clima/policies/package/index_en.htm

[2] Eurofound, "Qualified Majority Voting," http://www.eurofound.europa.eu/areas/industrialrelations/dictionary/definitions/qualifiedmajorityvoting.htm

[3] European Commission, "Roadmap for moving to a competitive low-carbon economy in 2050," http://ec.europa.eu/clima/policies/roadmap/index_en.htm

[4] International Council on Clean Transportation, Carbon Intensity of Crude Oil in Europe (prepared by Energy-Redefined LLC, 2010), 56, http://www.theicct.org/carbon-intensity-crude-oil-europe

[5] Adam R. Brant, *Upstream greenhouse gas (GHG) emissions from Canadian oil sands as a feedstock for European refineries* (Stanford University, 2011).

[6] Richard F. Meyer, Emil D. Attanasi, and Philip A. Freeman, *Heavy Oil and Natural Bitumen Resources in Geological Basins of the World* (United States Geological Survey, 2007) http://pubs.usgs.gov/of/2007/1084/OF2007-1084v1.pdf

[7] European Commission Taxation and Customs Union, "The Combined Nomenclature," http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/index_en.htm

[8] European Commission Fuel Quality Committee, "Draft directive… laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels," Article 1.2.

[9] Greenpeace, *Tar Sands in Your Tank: Exposing Europe's Role in Canada's Dirty Oil Trade,* http://www.greenpeace.org/canada/en/campaigns/Energy/tarsands/Resources/Reports/tar_sands_in_your_tank/

[10] European Commission Fuel Quality Committee, "Draft directive… laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels," Annex 3.

[11] Jeremy van Loon, "Oil sands CO_2 to match conventional in decade: Suncor," *Bloomberg News*, October 6, 2011, http://www.bloomberg.com/news/2011-10-06/oil-sands-co2-to-match-conventional-in-decade-suncor-ceo-says.html

[12] "Minister Oliver Objects to the European Union's Discrimination of Canadian Crude Oil," media release, Natural Resources Canada, October 23, 2011, http://www.nrcan.gc.ca/node/3143

[13] Friends of the Earth Europe, *Canada's Dirty Lobby Diary: Undermining the EU Fuel Quality Directive* (2011) 3, http://www.foeeurope.org/publications/2011/FOEE_Report_Tar_Sands_Lobby_Final_July82011.pdf

[14] Andrew Leach, *Rescuing the Frog*, "An economist pretending to be a geologist," February 15, 2012, http://andrewleach.ca/oilsands/an-economist-pretending-to-be-a-geologist/