

Carbon Pricing Approaches

in oil and gas producing jurisdictions

P.J. Partington, Matt Horne

February 2013

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Carbon Pricing Approaches in Oil and Gas Producing Jurisdictions

Carbon pricing is increasingly being implemented around the world as policymakers seek to drive innovation and cut greenhouse gas emissions at lowest cost. Major oil and gas producing jurisdictions are no exception to this trend. In this report, we explore the details of these systems in Alberta, British Columbia, California, Australia, Norway, and the European Union. These jurisdictions were chosen because they produce significant amounts of oil, gas, and refined petroleum products (see Figure 1), in addition to having implemented various approaches to carbon pricing. Along with Canada, Australia and Norway are the only net energy exporters in the OECD.

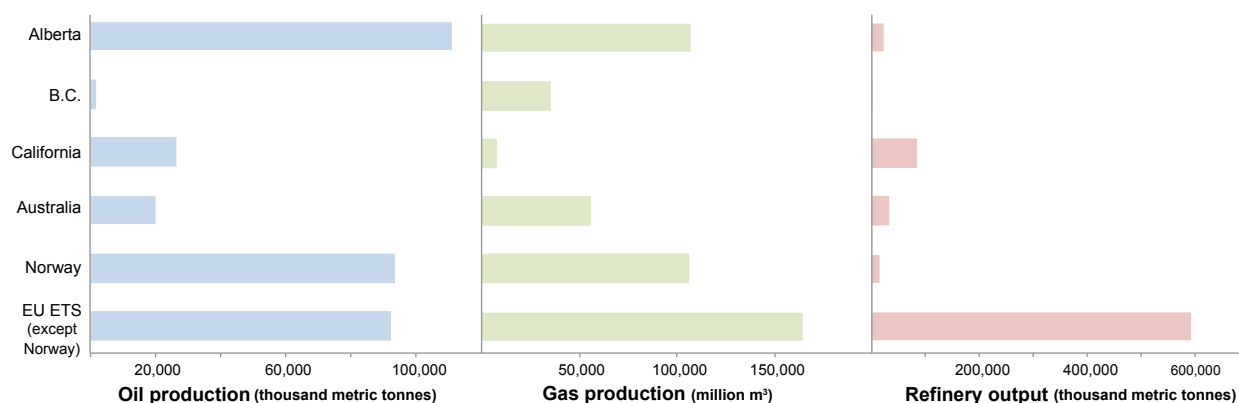


Figure 1. 2011 oil production, gas production and refinery output in selected jurisdictions

Note: Norway is a participant in the EU ETS

Data sources: Data for EU ETS, Norway and Australia from IEA Statistics, *Oil Information 2012* (Tables 18-19) and *Natural Gas Information 2012* (Table 1). Data for California from EIA sources and CEC *Weekly Fuels Watch Report*. Natural gas data for Canadian provinces from NEB, *Marketable Natural Gas Production in Canada*. Oil and refining data for Canadian provinces from StatsCan, *CANSIM Table 126-0001* and ERCB, *ST98*. Some uncertainty is inherent due to different reporting measures across the jurisdictions.

The main features of our assessment of carbon pricing systems for leading oil and gas producers are summarized in Table 1 (next page). Further details on each system can be found in the descriptions that follow.

The following metrics are examined:

- **Carbon price:** The carbon price that will apply in 2013, in CAD per tonne.
- **Coverage:** The proportion of the jurisdiction’s total greenhouse gas (GHG) emissions (combustion, fugitives, industrial process, land-use change, agriculture, etc.) covered by the carbon price.
- **Hard cap:** Whether or not the system places an absolute limit on the total emissions of covered entities.

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- **Percentage of allowance value collected by government:** The proportion of total allowance value that flows to government.
 - **Offsets for compliance:** The extent to which offsets may be purchased for compliance.
 - **Anticipated revenue:** Projected public revenue from the system in 2013.
 - **Allocation of revenue:** The planned or legislated use of carbon pricing revenues collected by government.

Table 1. Summary of carbon pricing in major oil and gas producing jurisdictions

Jurisdiction	Total emissions in 2010 (million tonnes)	Carbon price (CAD/tonne)	Coverage	Hard cap	Percentage of allowance value collected by government	Offsets for compliance	Anticipated revenue in 2013 (CAD)	Allocation of revenue
Alberta	233	Up to \$15	Covers ~50% of Alberta's total GHGs including combustion and fugitive emissions from facilities emitting > 100 kt CO ₂ e. Industrial process emissions are excluded.	No	Up to 12%	Unlimited	\$55-75 million	Investments in technology development and deployment, as well as climate adaptation, via technology fund.
British Columbia	62	\$30	Combustion emissions from fossil fuels (price applied upstream based on carbon content of fuels). Covers ~70% of B.C.'s total GHGs.	No	Equivalent to 100% (tax)	None	\$1.2 billion	Reductions in personal (\$554m) and corporate (\$721m) taxes.
California	457 (2009 data)	Determined by market. Minimum price of \$10, rising 5%/yr plus inflation.	Facilities emitting > 25 kt CO ₂ e. Transportation fuels and natural gas distributors to be added in 2015. Will cover ~85% of total GHGs in 2015.	Yes	Up to 10% in 2013, increasing over time. (100% from transportation and heating sectors when covered in 2015) 100% of electricity sector allowance value allocated for ratepayer benefit.	Up to 8% of total compliance obligation.	\$660 million to 3 billion	Clean economy and emissions reduction investments, to be determined by legislature with input from the governor, state departments and agencies, and stakeholders.
Australia	543	\$24 (transitioning to flexible price in 2015)	Facilities emitting > 25 kt CO ₂ e and natural gas distributors. An effective carbon price is also applied to domestic aviation, domestic shipping, off-road transportation in most industries, rail transport and non-transport use of fuels through the fuel tax system. Covers 66% of total GHGs.	From 2015	95-100% during fixed price period (2012-14)	Up to 5% of total compliance obligation during the initial fixed-price period.	\$9.02 billion	Household assistance (>50%), industry assistance (40%), low carbon investment.
Norway (CO ₂ tax)	54	Varies by sector. \$71 for oil and gas (2013).	CO ₂ from fuels, industry. Excludes international shipping, forestry. Covers roughly 50% of total GHGs.	No	Equivalent to 100% (tax)	None	\$1.4 billion	Pension Fund - Global, general revenues.
EU ETS (Phase III)	4,810	Determined by market. Currently ~\$10, forecast between \$5-\$28 for 2013-2020, depending on when and how comprehensively planned ETS reform is implemented.	CO ₂ from facilities with net thermal input over 20 MW and aviation, as well as N ₂ O and PFCs from certain industrial processes. Covers 43% of total GHGs.	Yes	Approximately 50% in 2013, rising over time	Overall use limited to 50% of total ETS reduction. Limits to individual firm use set by directive.	\$10.2 billion	Determined by member states. Non-binding commitment to invest at least half in emissions reductions and adaptation.

Alberta

Alberta's Specified Gas Emitters Regulation (SGER) applies to all the emissions sources from facilities emitting more than 100 kt CO₂e per year other than industrial process emissions and CO₂ from biomass. Industrial process emissions are reported, but do not have reduction requirements. In total, the regulation applies to approximately 50 per cent of Alberta's emissions. The system, in place since July 2007, requires covered emitters to achieve a targeted reduction in emissions intensity below a facility-specific baseline level. After a grace period during the first three years of a facility's operation, the facility must reduce its net emissions intensity by two per cent each year, reaching the maximum reduction requirement of 12 per cent in its ninth year of operation.

Facilities with an emission intensity above their target can comply by purchasing Emissions Performance Credits from facilities that have outperformed their targets, by making payments of \$15 per tonne CO₂e into the Climate Change and Emissions Management Fund (CCEMF), or by purchasing offset credits from projects in Alberta.

The money paid into the CCEMF is invested in emission-reduction projects in Alberta by an independent not-for-profit corporation mandated by regulation. The fund aims to support the development and application of "transformative technologies," with a primary focus on energy conservation and efficiency, carbon capture and storage, and greening energy production, as well as increasing Alberta's capacity to adapt to climate change.

The SGER will expire in September 2014 and is currently being reviewed by the Government of Alberta.

British Columbia

British Columbia currently levies a tax of \$30 per tonne on emissions from the combustion of fossil fuels defined under the *Carbon Tax Act*. This includes flaring emissions from the natural gas sector, but the tax does not cover non-combustion emissions from fugitive sources, industrial processes, waste, and agriculture as well as emissions from deforestation. The tax covers roughly 70 per cent of B.C.'s total GHG emissions. After its implementation in 2008 at a rate of \$10 per tonne, the tax followed a schedule of annual \$5 per tonne increases, which is now complete.

B.C.'s carbon tax is expected to generate \$1.172 billion in revenue over fiscal year 2012/13, relative to a \$43 billion budget. By law, this revenue must be used to reduce other taxes so that the tax is revenue-neutral for the government. The province's 2012 budget allocates \$554 million of carbon tax revenue to reductions in personal taxes, and \$721 million to reductions in corporate taxes. The former includes a low-income climate action tax credit and Northern and Rural Homeowner benefit, aimed at offsetting the proportionally higher impact of the tax on low-income and rural citizens.

California

Beginning in 2013, the state of California is implementing a mandatory cap-and-trade system under its landmark 2006 climate change law, AB32. The system covers all facilities emitting

over 25 kt CO₂e per year, and will expand in 2015 to include transportation fuel and natural gas distributors. At this point, the system will cover approximately 85 per cent of the state's GHG emissions.

Allowance prices are expected to range from \$10-50 per tonne in 2013. This reflects the initial reserve price of \$10 per tonne and the effective price cap set by the price containment reserve, which will offer a small percentage of allowances for sale at fixed prices (initially set at \$40, \$45, and \$50 per tonne). Both will increase by five per cent plus inflation in each subsequent year.

In the initial auction, held November 14, 2013, allowances cleared just above the reserve price of \$10 per tonne.

During the first compliance period (2013-14), approximately 90 per cent of allowances will be allocated freely to industry based on performance benchmarks for each sector. Electric utilities will have all their allowances allocated freely, but will be required to use the value exclusively for the benefit of ratepayers (either in the form of direct rebates or expanded energy efficiency programs). The remaining allowances will be auctioned.

The proportion of allowances auctioned will rise by 2020. The state is expecting to collect between \$660 million and \$3 billion in the first year, rising to between \$2.8 and \$11 billion in 2015. All auction revenue is deposited into the state's Greenhouse Gas Reduction Fund, where it is available for lawmakers to appropriate to further the goals of AB 32. Two recently-signed laws, AB 1532 and SB 535, help guide these decisions by establishing a framework for developing investment plans that drive emissions reductions and economic growth and mandating that at least a quarter of these investments benefit disadvantaged communities.

Emitters may use offsets (including allowances or offset credits from a linked system) to cover up to eight per cent of their compliance obligation.

Australia

In July 2012, Australia began implementing its Clean Energy Future legislative package, which includes a carbon pricing system. The system covers facilities emitting more than 25 kt CO₂e per year, including combustion, process and fugitive emissions, as well as natural gas suppliers. An effective carbon price is also applied through the fuel tax system to domestic aviation, domestic shipping, rail transport, off-road transport in industry (with the exception of agriculture, forestry and fishing), and non-transport use of fuels. Companies that prefer to manage this price liability directly can choose to include these emissions under the carbon pricing system instead through the Opt-In Scheme. In total, 66 per cent of Australia's emissions are covered by the carbon price.

There is a fixed carbon price for the first three years of the system. Allowances can be purchased directly from government for \$23 AUD (\$24 CAD) per tonne in 2012, after which the rate will increase 2.5 per cent per year. In 2015, following the initial fixed price period, the system will transition to a cap-and-trade system. Beginning in 2015, Australian firms will be able to submit EU allowances for compliance, and a formal two-way link between the two systems is anticipated by 2018.

The emission cap for the period 2015-19 will be set in 2014 after an independent assessment of the appropriate level. If Parliament cannot agree on the cap level, a default cap is triggered which is in line with Australia's second commitment period target under the Kyoto Protocol. This default cap will reduce emissions by at least 12 million tonnes a year.

Forty per cent of initial carbon price revenue is allocated to support a package of programs and allocations to assist industry and reduce competitiveness concerns. Through the Jobs and Competitiveness Program, emissions-intensive trade-exposed industries are allocated free allowances covering between 66 per cent and 94.3 per cent of industry average carbon costs, depending on their level of emissions intensity and/or trade exposure. These free allocations decrease by 1.3 per cent per year. Over the three-year fixed price period, an estimated \$8.6 billion in allowance value will be distributed freely through this program. This assistance will be independently reviewed in 2014, prior to the flexible price period.

Some coal-fired electricity generators are eligible to receive free allowances under the condition of submitting a Clean Energy Investment Plan each year, in which generators must identify their plans for investment in new capacity, emissions intensity reductions at existing facilities and R&D, as well as the options identified by their Energy Efficiency Opportunity assessments. There is also funding to support the closure of up to 2,000 MW of highly emissions-intensive coal-fired power facilities by 2020. Other industrial sectors are assisted with specific transitional and investment programs.

More than half of carbon price revenue will be used to assist households in managing increases in the cost of living through the Clean Energy Household Assistance Package. In addition to initial lump sum payments, the revenue will be used to permanently increase social security payments and triple the general income-tax-free threshold to \$18,200. This will result in tax cuts for all taxpayers earning under \$80,000 per year.

Norway

In addition to participating in the EU ETS, Norway — the second-largest natural gas exporter in the world — also applies a significant carbon tax.

The tax, in place since 1991, applies to combustion CO₂ emissions from fuels, offshore oil and gas extraction and other economic sectors at varying rates, covering roughly 68 per cent of Norway's CO₂ emissions (or approximately 50 per cent of all GHGs). Certain sectors — pulp and paper, fishmeal, domestic aviation and shipping — pay reduced rates. In 2013, the highest rate will apply to the offshore oil and gas sector (which accounts for virtually all oil and gas production), at approximately \$71 per tonne — roughly double the 2012 level. The offshore sector must also purchase all of its ETS allowances.

Revenues collected from the oil and gas sector go to the Government Pension Fund – Global. Revenues from other sectors flow to general revenues. Roughly \$1.42 billion in carbon tax revenue is projected for 2013.

European Union

The European Union Emissions Trading Scheme (EU ETS), launched in 2005, is the world's largest carbon market. It covers roughly 11,000 facilities in 30 countries, including Norway, Iceland and Liechtenstein in addition to the 27 EU member states. Switzerland is also planning to participate in future. In addition to Norway, several of these member states are significant oil and gas producers – particularly the U.K. (53,335 thousand tonnes oil; 47,594 million m³ gas in 2011), Netherlands (80,575 million m³ gas), Denmark (11,310 thousand tonnes oil).

The ETS currently covers CO₂ emissions from industrial facilities with a rated thermal input over 20 MW, as well as domestic aviation — in all, accounting for 40 per cent of the EU's total GHGs. Covered facilities include power stations and other combustion plants, oil refineries, coke ovens, iron and steel plants and installations producing cement, glass, lime, bricks, ceramics, pulp, paper and board. In Phase III, which began in 2013, coverage expands to include the petrochemicals, ammonia and aluminum sectors. Nitrous oxide emissions from certain industrial processes and perfluorocarbons from aluminum have also been added.

While the vast majority of allowances were allocated freely by member states in the first two phases of the ETS, auctioning is the primary means of allocation in Phase III. Beginning in 2013, at least half of allowances will be auctioned, including full auctioning in the power sector in most of the EU member states. The proportion of auctioned allowances will further increase over time. Free allocation for sectors deemed to be at significant risk for carbon leakage will be benchmarked against the best-performing 10 per cent of facilities in the EU producing the same product. Sectors deemed to be at significant risk of leakage will receive 100 per cent of the benchmarked allocation for free. Sectors not at significant risk of leakage receive 80 per cent of the benchmarked allocation for free in 2013, declining to 30 per cent by 2020 and 0 per cent in 2027.

Member states determine the use of auction revenue, but the ETS Directive recommends at least half of it (and all revenue from the aviation sector) be invested in further emission reductions and climate adaptation. In addition, 300 million allowances are set aside in the New Entrants Reserve to fund innovative clean energy demonstration projects, including carbon capture and storage. The 2013 cap level is set just under 2.04 billion tonnes, implying total auction revenues in the range of \$10.2 billion at current prices.

Over Phases II and III combined (2008-2020), offsets may be used for compliance accounting for up to half of the total reduction in emissions under the ETS between 2005 and 2020. Limits for individual firms are determined by an EC directive.