

Energy and Climate Change

Why was Energy and Climate Change a Material Topic in 2015?

Global Context: Climate change is a major global challenge and an area of increasing importance for businesses and communities alike. In a carbon-constrained world, energy production and consumption needs to change in order to reduce greenhouse gas (GHG) emissions and transition to a low-carbon economy. This will likely require significant change in the way we produce and consume energy.

2015 was a significant year for global action on climate change. At the United Nations Climate Change Conference, COP21, countries from around the world negotiated the Paris Agreement. In the lead-up to and following the Paris Agreement, a number of jurisdictions have commitments to reduce emissions, which is likely to result in higher prices on carbon emissions. Businesses are increasingly stepping forward to advocate for more climate-related regulation and guidance, to reduce uncertainty and create a level playing field.

Industry Context

As society transitions to a low-carbon economy, the transition will present risks and opportunities for the mining industry. Demand for commodities is likely to shift in response to a low-carbon environment, and certain commodities may be more significantly affected than others. In response to COP21, a number of major mining jurisdictions announced new climate change commitments. These measures will likely result in higher carbon costs in North America. As mining operations require large amounts of energy to produce and transport their products, energy is one of their most material costs. As large energy consumers, mines also produce significant GHG emissions, which exposes them to potential new costs as the price of carbon increases.

Teck Context

We recognize the need to take action on climate change and we are committed to reducing GHG emissions by improving energy efficiency, implementing low-carbon technologies and advocating for carbon pricing. Few companies in our industry have as much experience with carbon pricing as Teck. All of our steelmaking coal business, half our copper business, and all of our smelting and refining business are

currently covered by carbon pricing. Based on this experience, we believe that carbon pricing is the most efficient and effective way to materially reduce emissions and that implementing such mechanisms will require leadership from governments and industry.

As the world transitions to a low-carbon economy, there will be shifts in the commodity demand mix. In response, our strategy is focused on three areas: diversification to ensure exposure to a range of commodities, targeting the lower half of the cost curve to allow our operations to withstand the impacts of higher carbon prices and potential demand shifts, and continuing to lower our GHG emissions by improving our efficiency and investing in alternative energy generation. We believe our products will have an important role to play in a low-carbon world. For example, steelmaking coal will be required to produce the steel used in low-emission high-density housing, copper for use in electric vehicles and alternative energy, zinc for galvanizing to extend material life cycles, and energy to support higher incomes and a larger global population.

Teck is one of the lowest-emission miners in the world. In comparison to our peers, Teck's steelmaking coal and copper production ranks among the lowest for carbon intensity, based on data from the ICMM. Despite our low-energy intensity, we are committed to continuously improving our energy efficiency and reducing our GHG emissions. Energy costs remain one of Teck's most significant operational expenditures and energy use is a major source of GHG emissions at our operations. As resources are extracted, we expect to mine at deeper depths and move materials further distances in the coming years, which will make it increasingly challenging to further reduce our energy intensity.



What is in this Topic?

Energy (fuel and electricity consumption and costs, energy intensity, energy efficiency initiatives), climate risks and emissions (greenhouse gas emissions, other gas emissions and ozone-depleting substances)

Performance Highlights

Implemented energy reduction projects resulting in

1,200 terajoules

of energy reductions since our baseline year of 2011. Projects ranged from optimizing blasting efficiency for increased grinding efficiency to using more energy-efficient lighting.

Implemented projects that have reduced greenhouse gas emissions by approximately

200 kilotonnes

to the end of 2015, including the continued displacement of coal in our dryers by natural gas and the piloting of LNG as a dual fuel source in haul trucks.

As of the end of 2015,

30.7 megawatts

of alternative energy generation is in operation. Recent efforts included investing in solar power near our Quebrada Blanca Operations.

Learn More

Visit the [Paris Pledge for Action website](#).



How Does Teck Manage Energy and Climate Change?

Our Targets and Commitments

- Reduce energy consumption
- Reduce GHG emissions
- Support alternative energy generation
- Engage and advocate for effective carbon pricing

In 2010, we proactively established company-wide short- and long-term energy and GHG reduction targets to drive improvements in energy efficiency and to reduce our GHG emissions at our operations. We implement energy and GHG reduction projects, we share best practices in energy management among our operations to achieve our goals and we contribute to global efforts to reduce emissions by advocating for carbon pricing. We have also set goals that drive investment in lower-carbon and alternative energy generation, including investments that ultimately contribute to the transition to a low-carbon economy.

Reducing Greenhouse Gas Emissions

We are taking action to minimize our contribution to global GHG emissions and to support broader efforts to combat climate change. We have set ambitious targets to reduce GHG emissions and improve energy efficiency at our operations and we are making significant progress towards achieving them. We implemented several energy and GHG reduction projects that contributed to our energy goals in 2015. We also identified reduction projects that were successful at a number of our sites, and worked to implement them at our other operations. These included optimizing blasting efficiency to increase grinding efficiency, the continued installation of lightweight truck boxes, installing variable-speed drive technology on ventilation and dryer fan motors, using more efficient fan designs, and using more energy-efficient lighting, among other projects.

Collectively, projects implemented in 2015 have reduced annual energy consumption at our operations by 40 gigawatt hours (150 terajoules) — enough power for 1,400 homes. Since 2011, our efforts have resulted in reduction projects totalling 1,200 terajoules (TJ) exceeding our 2015 goal of implementing reduction projects that reduce energy consumption by 1,000 TJ. We have also surpassed our 2015 GHG reduction target of 75,000 tonnes of CO₂-equivalent (CO₂e) emissions, with reductions estimated at approximately 200,000 tonnes of CO₂e emissions at the end of 2015. Moreover, this has also produced savings for our bottom line. For example, a recommendation, made through our employee energy reduction engagement campaign at Highland Valley Copper Operations, to replace a pump will

save an estimated 6.5 terajoules (TJ) in energy and \$150,000 in energy costs when implemented in 2016. Learn more in [this case study on www.teck.com](http://www.teck.com).

Supporting Climate Action

At Teck, we are committed to supporting society's move towards a lower-carbon future. That is why we are implementing initiatives to reduce our emissions and actively advocating through industry organizations and directly with governments for effective and efficient carbon pricing, which we believe can materially reduce emissions.

Teck supports an effective and efficient price on carbon emissions. An effective price on carbon is one that reduces emissions and ensures that all emitters and all jurisdictions are contributing to solutions. By applying a carbon price for all emitters, all sectors of the economy are incentivized to play their part in solving a challenge to which we are all contributors. Carbon policies must be implemented in a manner that is reasonably consistent between jurisdictions so that the risk of creating a competitive disadvantage for some emitters does not induce carbon leakage — the transfer of production and associated emissions to countries with limited or no GHG regulations — are avoided. This approach is critical to the long-term success of emissions reductions. Broad-based pricing of carbon is the most effective way to incentivize emission reductions while also ensuring that all emitters and jurisdictions are contributing to the solution. Further, it will level the playing field for companies like Teck who have already had to adapt existing carbon pricing into their business as outlined in the Carbon Pricing and Regulation section.

Understanding Our Climate Risk

At Teck, carbon pricing is integrated at multiple levels of decision-making, ranging from annual operating budgets developed at the site level to corporate decision-making for large capital investments. We incorporate a carbon price into our capital and risk decision processes where material, and calculate and consider our carbon exposure in terms of absolute costs incurred on an annual basis and projected out to at least 2020. Where a clear and certain carbon price is present, we incorporate that price and any known and/or planned changes to the carbon price. Where uncertainty exists, we may conduct sensitivity analyses to better understand what our exposure and risks are under different carbon pricing and regulatory scenarios.

The physical risks of climate change can include rising sea levels, rising temperatures and changes in precipitation. These can result in the increased intensity and duration of extreme weather events such as storms, drought and flooding. These all have the potential to impact our activities. Consequently, climate variables (e.g., precipitation, temperature, water runoff) are integrated into the design and operation of our business.

In 2010, we began working with technical experts in the field of climate modelling and forecasting to better understand potential future changes in climate-related variables. This project is serving to assess the utility of climate modelling as a tool while developing data that is integrated into our decision-making and risk management practices. For example, we take into consideration climate modelling in project development, mine planning and closure planning and have for many years. For example, trends in permafrost advance and retreat, precipitation patterns, tidal variations and storm intensity impacts on operations/transport are all evaluated using simulated scenarios. The results of these scenarios are used to set the design criteria for new projects and existing operation upgrades so that our business decisions today are appropriately risk managed for the potential eventualities of the conditions of tomorrow.

Carbon Pricing and Regulation

Over the past decade, carbon regulations have emerged across the globe. We recognize that current and future regulations may affect our business by placing direct costs on our operations and increase the costs of production. We already incur carbon costs in Canada as a result of provincial regulations in B.C. and Alberta. Our expectation is that this trend will continue, with new regulations being implemented and carbon costs increasing over time.

The Province of B.C. introduced a carbon tax on fossil fuels in 2008. The tax is imposed on various fossil fuels used in B.C. For 2015, our seven B.C.-based operations incurred \$52.6 million in provincial carbon tax, primarily from our use of coal, diesel fuel and natural gas. Our Cardinal River Operations (CRO) meets Alberta GHG compliance requirements through efficiency improvements and the use of offsets generated from our interest in our Wintering Hills Wind Power Facility. In 2015, we expect that CRO will be below the performance threshold, and will therefore not require offsets to meet the compliance obligations.

In 2015, governments in both B.C. and Alberta initiated engagement processes to review, analyze and determine climate change policies that will apply starting in 2018. Teck is actively engaged in the consultation processes, and we will refine our forecast cost estimates once each government provides further detail as to the design of their future climate change policies.

Prior to these announcements, forecasting using a variety of scenarios demonstrates an exposure in 2020 ranging from \$30 million to \$60 million for our B.C. operations. In Alberta, based on scenarios that include reduction requirements ranging from 12% to 40%, and carbon costs ranging from \$15 to \$40 per tonne of CO₂e emissions, we estimated that our compliance costs could be \$0.5 million to \$4.5 million per year for our Cardinal River Operations. Assessing the same scenarios for our Fort Hills and Frontier projects, compliance costs could range from \$10 million to \$75 million per year if and when both of these projects start operations.

Snapshot

Participating in Global Action on Climate Change

We believe that Teck and the broader mining industry have a role to play in addressing climate change, which is why we are actively working to reduce our own carbon footprint and to advocate for policies to support the global transition to a low-carbon economy.

On the international stage, we are a signatory of the [Paris Pledge for Action](#), which invites non-state organizations to take action to support the objectives of the 2015 Paris Agreement on climate change to limit global temperature rise to less than 1.5 degrees Celsius above pre-industrial levels.

For our own operations, we have set ambitious targets to reduce emissions and improve energy efficiency. Since 2011, we have made significant progress towards achieving these goals, with a cumulative reduction to date of more than 200,000 tonnes of CO₂ annually.

Mining also has a role to play by supplying the materials necessary for climate action. Many of the metals and mineral products we produce are essential to building the technologies and infrastructure necessary to reduce GHGs and fight climate change. The average wind turbine, for example, requires about 180 tonnes of steel, which, in turn, requires about 100 tonnes of steelmaking coal to produce. Many renewable energy systems also require as much as 12 times more copper than traditional energy systems.

How Does Teck Manage Energy and Climate Change?

Sustainability Strategy Spotlight

Progress Against Our 2015 Goals

- Implemented projects resulting in 1,200 terajoules of energy reduction since our baseline year of 2011. Projects ranged from optimizing blasting efficiency for increased grinding efficiency to using more energy-efficient lighting.
- Implemented projects that have reduced greenhouse gas emissions by approximately 200 kilotonnes to the end of 2015, including the continued displacement of coal in our dryers by natural gas and the piloting of LNG fuel in haul trucks.
- As of the end of 2015, 30.7 MW of alternative energy generation is in operation. Recent efforts included investing in solar power near our Quebrada Blanca Operations.

For a full list of 2020 and 2030 goals, see page 18.

Low-Carbon Energy

One of our key goals is to minimize the amount of GHG emissions created while producing our products. Based on data reported by ICMC, our coal business unit has among the lowest carbon intensities in the world for our production of steelmaking coal.

At between 60 and 70 kilograms of CO₂ per tonne, it is less than half the industry average of over 150 kilograms of CO₂ per tonne. Furthermore, our copper production averages 3 tonnes of CO₂ per tonne of copper — 25% below the industry average of 4 tonnes.

In addition to projects we have implemented to reduce our energy consumption and GHG emissions, we also enjoy access to low-carbon sources of electricity.

In B.C., where seven of our operations are located, 92% of grid electricity is clean and renewable energy, and is almost entirely generated from hydro.

Our Trail Operations, also located in B.C., includes one of the largest fully integrated zinc and lead smelting and refining complexes in the world, and is our largest consumer of electricity, accounting for 44% of our company's total electricity consumption. The electricity consumed at Trail Operations is provided by the Waneta hydroelectric dam and transmission system, in which Teck holds a two-thirds interest. This enables Trail Operations to produce refined zinc and lead at a lower GHG intensity compared to producers powered by fossil-fuel based electricity grids.

In the past several years, approximately 25% of our energy requirements (i.e., electricity and fuels) were supplied by non-carbon-emitting sources, primarily hydroelectricity. Of our total electricity consumption in 2015, 80%, or 10,984 TJ, was hydroelectricity.

In some of the other jurisdictions where we operate — such as Alberta and Chile — the electricity grids are more heavily based on fossil fuels. Recognizing this, one of our sustainability goals is to commit to 100 megawatts of alternative energy generation by 2030.

Alternative Energy Generation

Teck is also investing in research and building alternative power generation technology. We are partners in a large-scale wind power facility in Alberta, and a community solar farm in B.C., and we are assessing other opportunities to build and source alternative power generation for our other sites. Our investment in Wintering Hills has provided an opportunity to develop our understanding of wind power generation, which facilitates evaluation of other opportunities to develop wind farms around our operations.

In January 2015, we increased our interest in Wintering Hills to 49%, with TransAlta Corporation, the current project operator, holding the remaining 51%. Our 49% share of power generation from Wintering Hills in 2015 was 136 GWh, enough power to provide 85,000 tonnes of CO₂-equivalent credits. Our share of expected power generation in 2016 is 135 GWh, although actual generation will depend on weather conditions and other factors.

We set a 2015 goal of 30 megawatts (MW) of alternative energy generation, and set a 2030 goal to expand that portfolio to 100 MW. To meet our targets, we have been exploring opportunities for the procurement of alternative energy sources. As of the end of 2015, 30.7 MW of alternative energy generation is in operation, which meets and exceeds our 2015 goal of generating 30 MW.

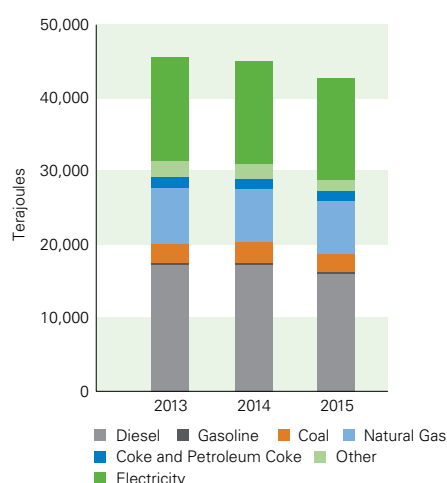
What was Our Performance in Energy and Climate Change in 2015?

Our operations require energy for the production and transportation of our products, and energy is one of our most significant expenses. We are focused on continually identifying opportunities to improve our energy efficiency and reduce greenhouse gas emissions in order to reduce costs and minimize our carbon footprint.

Energy Use

In 2015, we consumed a total of 42,521 TJ of energy (i.e., electricity and fuels), as compared to 45,336 TJ in 2014. Trends in fuel (diesel, gasoline, coal, natural gas, coke, petroleum coke and other fuels) and electricity consumption for the past three years are shown in Figure 19. In 2015, 10 of our operations reduced their absolute energy consumption from 2014.

Figure 19: **Energy Consumption by Type 2013–2015¹**



(1) Other includes propane, waste oil, fuel oils and other process fuels.

Table 26: **Primary Uses of Energy at our Operations**

Fuel Type	Primary Uses
Electricity	· Powers processing at our metal mines (e.g., milling) and the smelter facility at Trail Operations
Coke, petroleum coke, natural gas and coal	· Provides the primary process and combustion fuels at Trail Operations
Natural gas and coal	· Used primarily for drying our coal product
Diesel	· Fuels haul trucks to move material
Natural Gas	· Fuel in LNG form for haul trucks to move material

What was Our Performance in Energy and Climate Change in 2015?

Case Study

Energy and Climate Change: Piloting LNG at our Steelmaking Coal Operations

Fuel used to power our mobile equipment fleets is a significant contributor to our operational greenhouse gas (GHG) emissions. As part of our work to reduce GHG emissions and minimize our carbon footprint, Teck launched a pilot to test the use of liquefied natural gas (LNG) as a fuel source in six haul trucks at our Fording River steelmaking coal operation in southeastern B.C.

The use of blended LNG/diesel-fuelled haul trucks — the first ever at a Canadian mine site — has the potential for significant environmental benefits and cost savings. LNG produces virtually no particulate or sulphur dioxide emissions and reduces GHG emissions by up to 20% in comparison to diesel alone. We have the potential to eliminate approximately 35,000 tonnes of CO₂ emissions annually at our steelmaking coal operations and potentially reduce fuel costs by more than \$20 million annually by adopting LNG and diesel hybrid fuel across our operations.

FortisBC — a B.C.-based electric power and gas distribution/retail company — is transporting and supplying LNG to Fording River. The pilot is one of the steps we are taking to achieve our long-term target to reduce annual GHG emissions by 450,000 tonnes at our operations by 2030. To date, we have reduced annual emissions by 200,000 tonnes as the result of initiatives implemented since 2011.

With support from FortisBC, we have upgraded Fording River's truck maintenance shop, provided engine conversion kits, installed fuelling facilities and implemented a comprehensive safety program in advance of the pilot. The pilot is expected to run until mid-year 2016 and will provide more information about the potential of using LNG more broadly across Teck's haul truck fleet, creating the opportunity for further fleet conversions to LNG in the future.

"LNG is a fuel source that has the potential to lower costs, significantly reduce emissions and improve environmental performance at our operations. We are committed to minimizing our own carbon footprint while at the same time continuing to provide the mining products that are essential to building a modern, low-carbon society."

Don Lindsay,
President & CEO, Teck

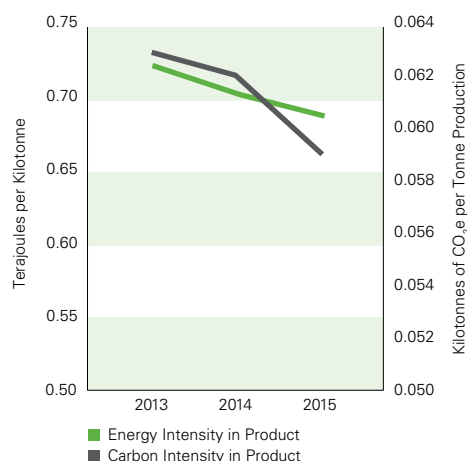


Energy Intensity

In Figures 20 to 22, we outline our energy intensity, or the amount of energy used per tonne of product, which is a measure of efficiency that helps us to better manage our performance. The variability found in the data for these figures falls within the normal parameters of mining operations.

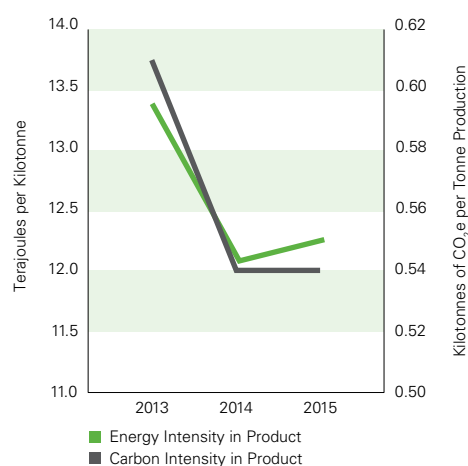
Energy and carbon intensity for the production of steelmaking coal continued to decrease (improve) in 2015 (Figure 20). This change is due to a continued focus on productivity improvements in mining, maintenance and processing operations, as well as the increased use of natural gas to displace coal in the product dewatering process.

Figure 20: **Energy and Carbon Intensity for Steelmaking Coal Production 2013–2015**



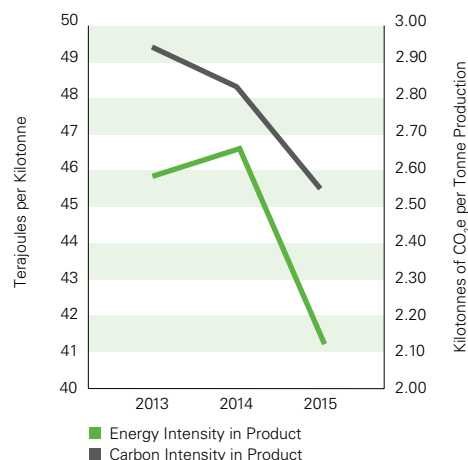
In 2015, both Trail and Red Dog saw reductions in their energy and carbon intensities as a result of continued focus on operational efficiency. Overall, however, energy intensity increased, as a greater proportion of our zinc production came from Trail Operations relative to previous years.

Figure 21: **Energy and Carbon Intensity for Zinc and Lead Production 2013–2015**



In 2015, both our energy and emissions intensities for copper decreased (Figure 22). The decrease in intensities is the result of a large decrease (improvement) in intensity at Highland Valley Copper due in part to higher ore grades and the increased proportion of our total copper production coming from Highland Valley Copper, our lowest GHG-intensity copper operation.

Figure 22: **Energy and Carbon Intensity for Copper Production 2013–2015**



Greenhouse Gas Emissions

In 2015, our total GHG emissions, as CO₂e, were 2,826 kilotonnes (kt), compared to 3,066 kt in 2014. Of those totals, our direct GHG emissions¹⁴ were 2,469 kt in 2015, compared to 2,723 kt in 2014. Figure 23 shows a detailed breakdown of our emissions by fuel type.

The key sources for direct GHG emissions vary significantly by operation. For example, at our steelmaking coal operations, the drying of coal, our mobile equipment, and the methane gas released from coal seams during mining each account for roughly one-third of total emissions. Emissions from Trail Operations are dominated by the use of coal in the furnaces and the use of natural gas to produce steam for heating process solutions. At Red Dog Operations, the diesel used to produce electricity and fuel for mobile equipment is the key source of GHG emissions. The primary source at Highland Valley Copper Operations, which receives electricity from the hydroelectric grid, is the use of diesel for our mobile equipment. As such, the options for reducing emissions vary significantly across our different operations. In 2015, 10 of our operations reduced their GHG emissions.

We estimate our indirect GHG emissions associated with electricity use for 2015 to be 357 kt, or approximately 13% of our total emissions. These emissions are associated primarily with our Cardinal River, Red Dog, Carmen de Andacollo and Quebrada Blanca operations, as their electricity power grids are based heavily on fossil fuels. Elsewhere, our indirect emissions were relatively small, as operations in B.C., Newfoundland and Washington State obtain a significant proportion of their electricity from hydroelectric generation.

In comparison to the broader industry, our GHG emissions per unit of production are significantly lower. ICMM data indicates our steelmaking coal operations have among the lowest carbon intensities in the world when compared to other coal mines. Likewise, emissions associated with our copper production are 25% percent below the industry average. Data is not currently available to assess the relative GHG intensity of our zinc operations.

¹⁴ Fugitive emissions from our coal operations (i.e., estimated methane release) are captured as direct emissions.

What was Our Performance in Energy and Climate Change in 2015?

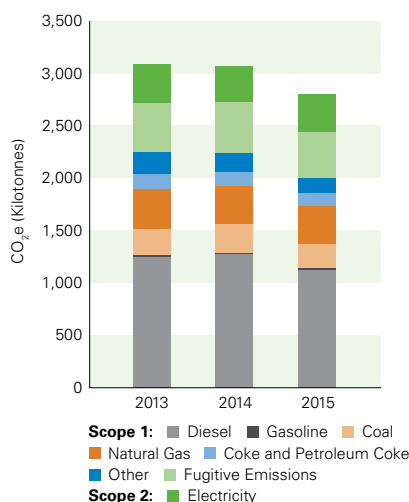
Emerging Risk — Transition to Low-carbon Economy

Achieving the COP21 goal of limiting climate change to 1.5 degrees Celsius or less will likely result in new regulations, policies and changing consumption patterns that could either negatively or positively affect demand for various mining commodities as they come into effect.

Outlook for Energy and Climate Change

Energy will continue to be one of the most significant costs in our business. As such, we will continue to focus on improving our efficiency and, as a result, reducing our greenhouse gas emissions. For example, we will continue our pilot project to test the use of LNG fuel in haul trucks at our operations and work with sites to identify and implement projects to further reduce our energy usage. In 2016, we will continue to advocate for carbon pricing, reduce our emissions and support the development of alternative energy technologies.

Figure 23: **GHG Emissions by Fuel Type**
2013–2015^{1,2}



- (1) Scope 1 (Direct) Greenhouse Gas Emissions: Emissions that occur from energy sources that are owned or controlled by the company.
- (2) Scope 2 (Indirect) Greenhouse Gas Emissions: Emissions that occur from the generation of purchased electricity consumed by the company. Scope 2 emissions physically occur at the facility where electricity is generated.

Scope 3 Emissions

While scope 1 (direct) emissions occur from energy sources controlled by the company and scope 2 (indirect) emissions occur from electricity consumed by the company, scope 3 emissions are other emissions that arise from sources owned or controlled by other entities within our value chain. For example, scope 3 emissions include those arising from business travel by employees, the use of our products, and the transportation of materials that we purchase and sell. Consequently, scope 3 emissions cover a wide spectrum. Our approach is to identify and quantify those that are material to Teck.

Our most material scope 3 emissions are from the use of our steelmaking coal product by our customers. Unlike the vast majority of coal, which is burned to generate electricity, steelmaking coal has special properties that make it a suitable input for manufacturing steel. Based on our 2015 sales volumes, scope 3 emissions from the use of our steelmaking coal are approximately 76,000 kt of CO₂e.