



Canadian Exports of Crude Oil and Natural Gas

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Summary of Canadian Exports of Crude Oil and Natural Gas

Crude Oil Export Highlights

- After meeting domestic refining needs in Western Canada and Ontario, almost all Canadian crude oil production is exported to the United States. Limited access to tidewater ports, specifically in Western Canada, prevents oil from being sold abroad. For context, Canada exported ~78% of its total oil supply to the United States in 2022.
- Canada is the United States' largest foreign crude oil supplier, making up ~60% of all United States imports in 2022, equating to roughly 6X the next biggest supplier, Mexico. Canada's dominant position is due to our trade history, geographic proximity, integrated pipeline infrastructure, and compatible heavy crude oil.
- A lack of new pipeline takeaway capacity in recent years has ultimately limited the export potential for Canadian crude oil. The forthcoming Trans Mountain Expansion Project (TMEP) will increase Canadian oil exports to the US West Coast. TMEP will also present an opportunity to ship oil to Japan, India, and SE Asia.

Natural Gas Export Highlights

- The North American shale revolution has altered the natural gas supply/demand dynamic, turning Canada's sole export market, the United States, into its main competitor. In 2022, Canada exported 48% of its natural gas supply to the United States. From 2010 to 2021, natural gas exports to the US decreased by 18% due to increased natural gas production in the northeast US, its main competitor.
- In Canada, tight gas plays in the Montney, Deep Basin, Duvernay, and other northwest Alberta and northeast BC areas offer significant development potential. Like oil, the growth of gas exports has been limited by pipeline constraints and the inability to tap into global markets via LNG.
- Compared to the other top natural gas-producing countries, Canada has significantly lagged in the growth of its natural gas exports. Post 2025, LNG exports from Canada's West Coast and the US Gulf Coast will be of sufficient volume for Canada to expand into global market opportunities.

Source: Canada Energy Regulator, US Energy Information Administration

Canadian Crude Oil & Natural Gas Exports (2022)

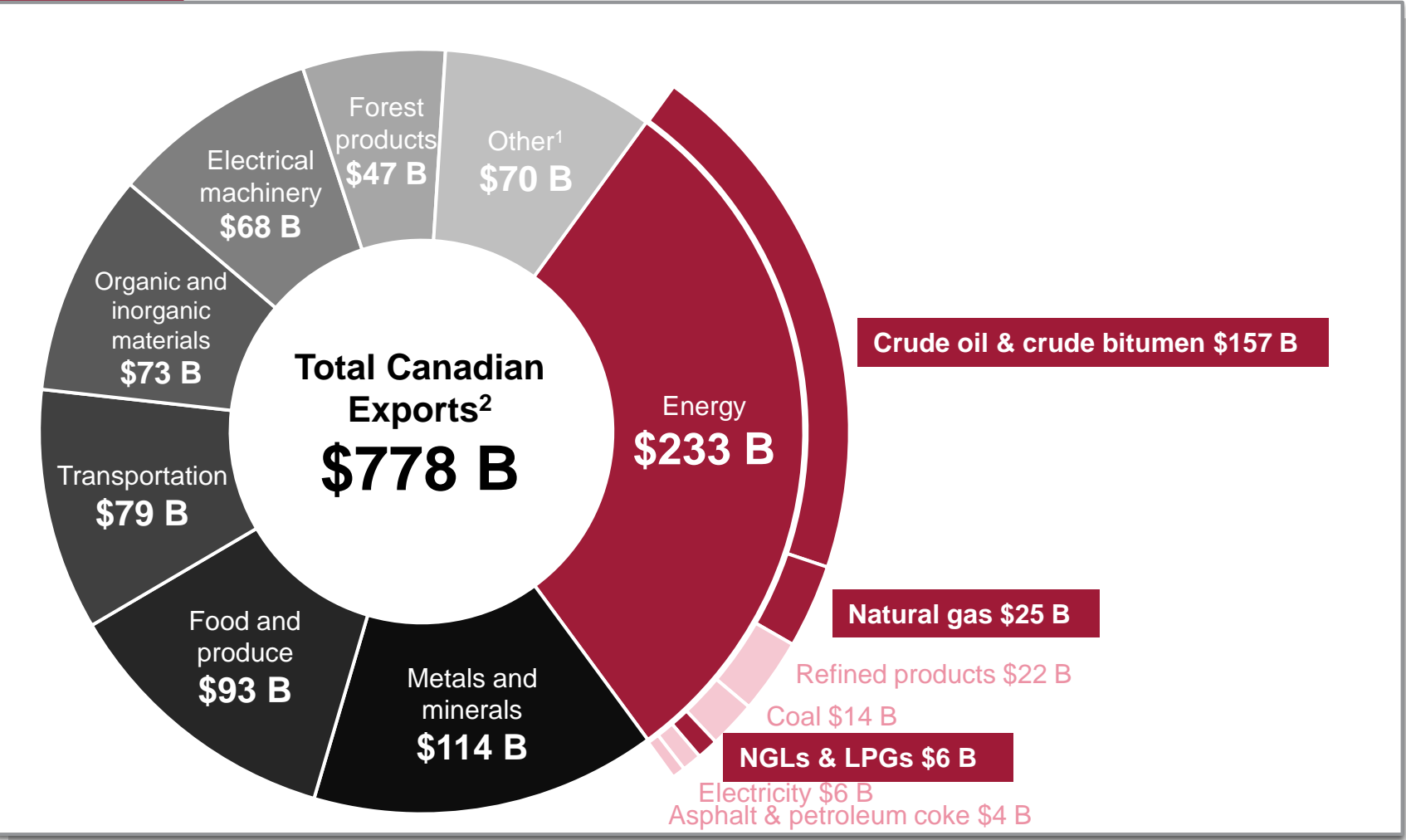
~4.1 MMB/d

Crude Oil & NGLs

~8.2 Bcf/d

Natural Gas

Annual Value of Canadian Exports by Category | 2022

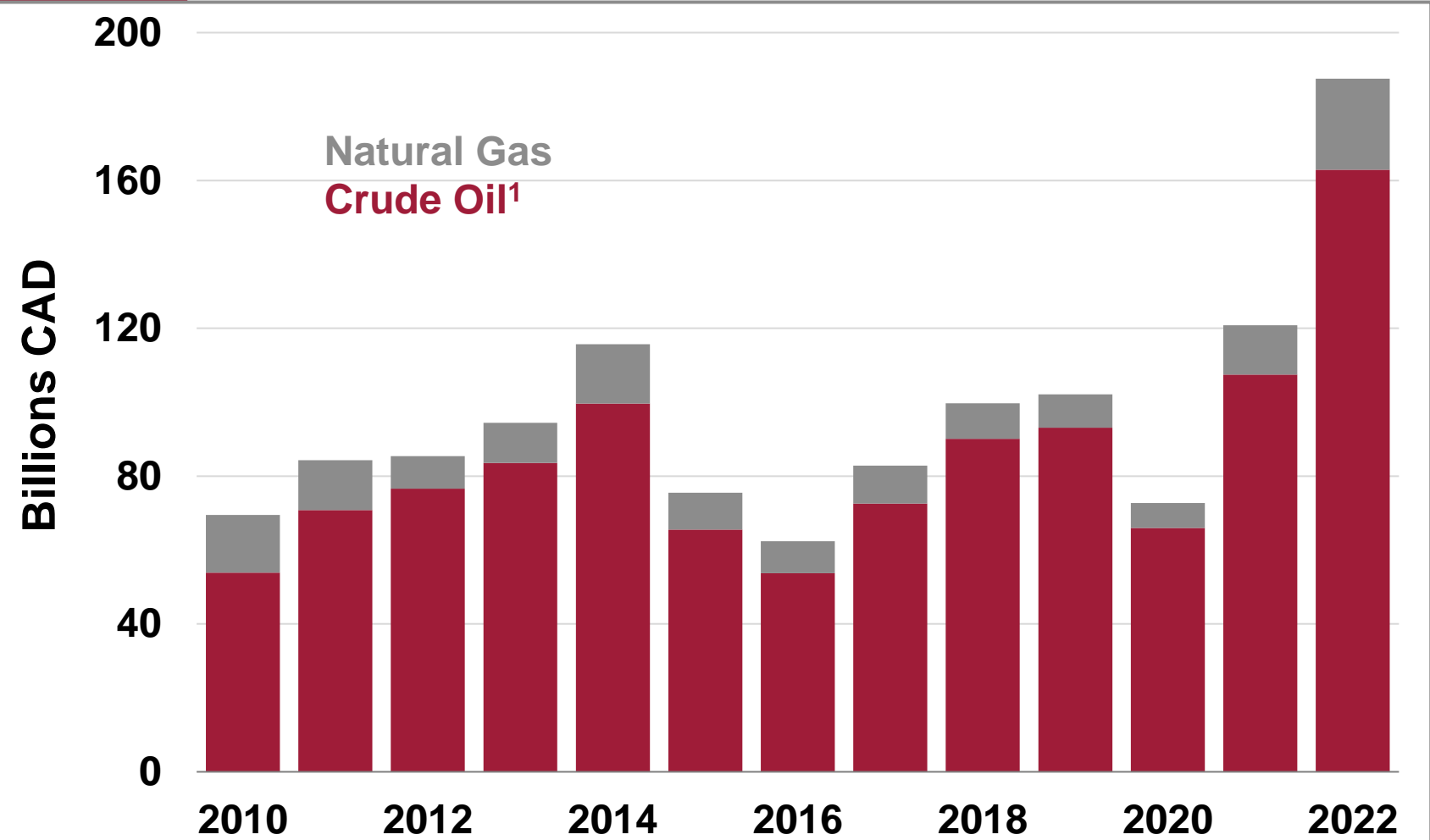


- Combined, crude oil, NGLs and natural gas exports accounted for \$188 billion in 2022, roughly 24% of total Canadian exports.
- The Canadian economy benefits greatly from crude oil and natural gas exports.
- By comparison, the export value of other major industries in Canada in 2022: plastics (\$22 B), fertilizers (\$18 B), iron & steel (\$15 B), pharmaceuticals (\$14 B), aircraft & spacecraft (\$13 B), and paper & paperboard (\$11 B).

Source: Statistics Canada. Canadian International Merchandise Trade Web Application

¹ Other includes medicine, medical, textiles, and animal products
² Exports include re-exports

Canadian Crude Oil & Natural Gas Export Values | Annual | 2010 to 2022



- In 2022, Canadian crude oil exports were \$162 billion, while natural gas exports were \$25 billion.
- From 2010-2021, combined crude oil and natural gas exports have ranged from approximately \$50 to \$120 billion per year, depending on commodity prices.
- More recently, the value of crude oil and natural gas exports have benefited from elevated commodity prices, a weak Canadian dollar, and increasing production levels.

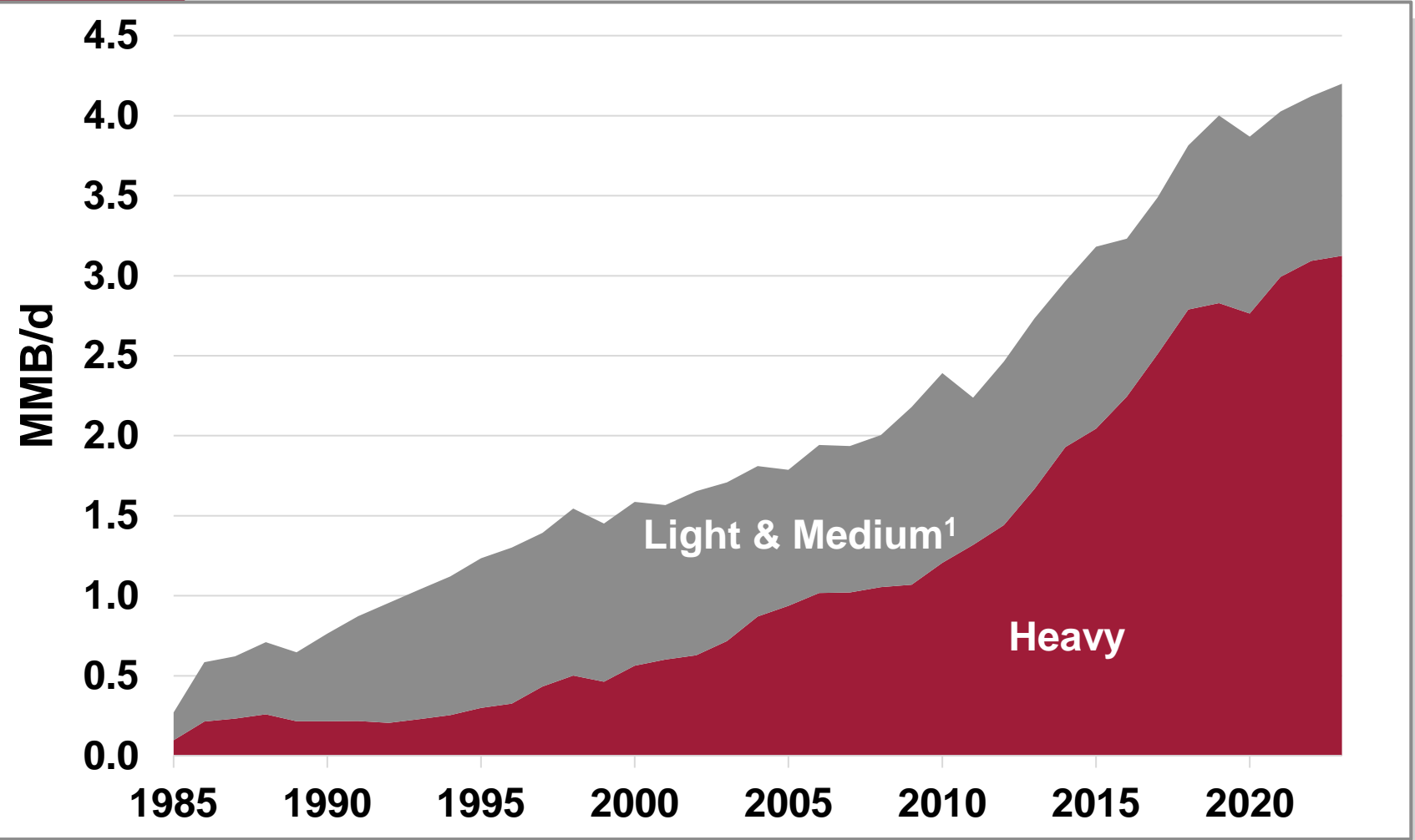
Source: Statistics Canada. Canadian International Merchandise Trade Web Application

¹ Crude oil includes bitumen, condensate, NGLs and LPGs



Crude Oil Exports

Canada Crude Oil Exports by Type | Annual | 1986 to 2023

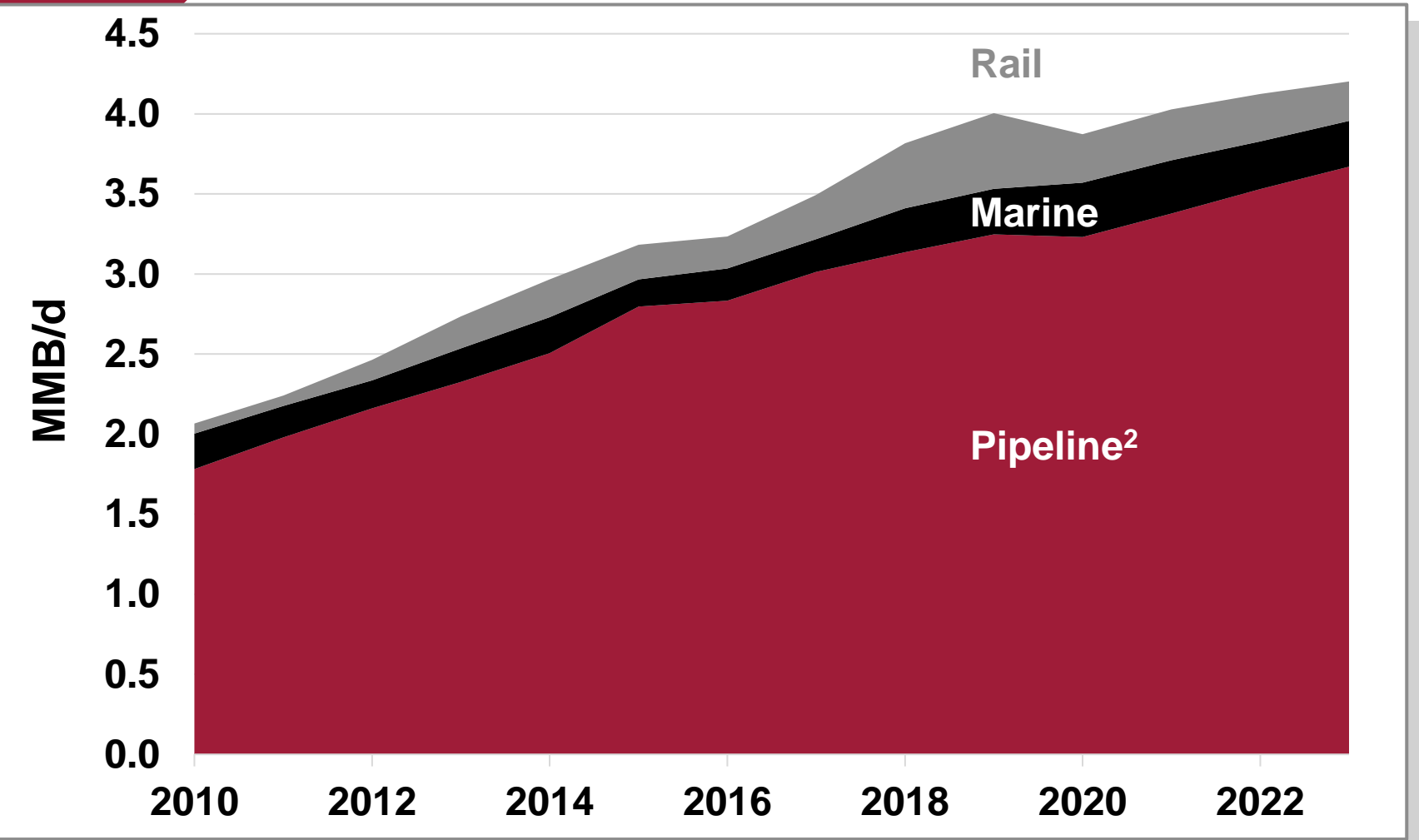


- After meeting domestic refining needs in Western Canada and Ontario, over 98% of Canadian crude oil production is exported to the United States due to proximity and Canada’s limited access to alternative trade partners.
- Integrated oil infrastructure built over 70+ years, supports a mutual relationship wherein the United States is the primary market for Canadian oil.
- In tandem with the development of Alberta’s oil sands, Canada has steadily grown its crude oil exports, averaging ~4.1 MMB/d (75% heavy) in 2022, roughly double 2008 levels of ~2.0 MMB/d.

Source: Canada Energy Regulator - Commodity Tracking System

¹ Includes NGLs

Canada Crude Oil Exports¹ by Mode of Transportation | Annual | 2010 to 2023



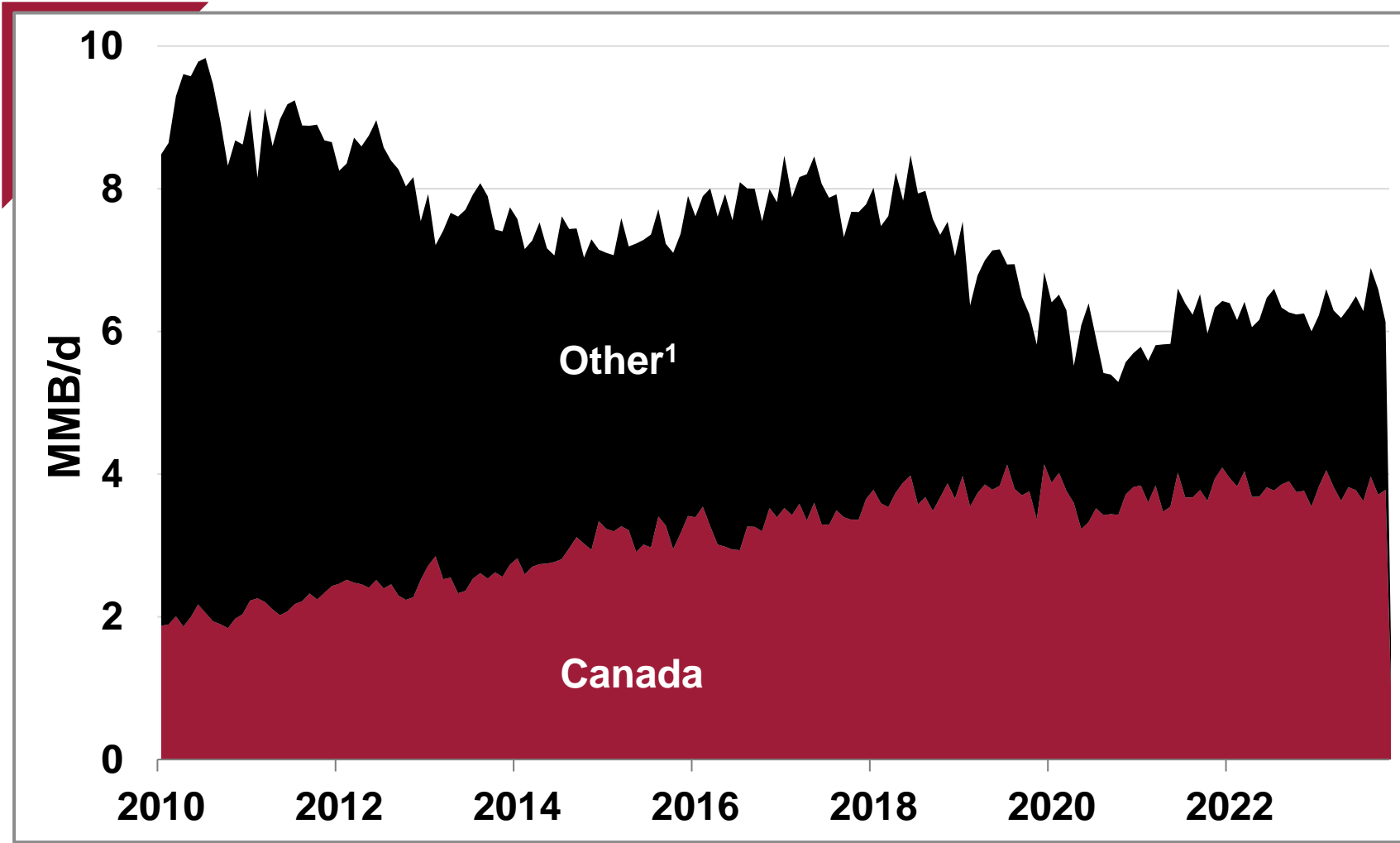
- Canadian crude oil is predominantly exported via pipeline, which accounted for approximately 85% of total export volumes in 2022.
- Canada’s major crude oil export pipeline infrastructure includes the Aurora, Enbridge Mainline Express, Keystone, Milk River and Trans Mountain pipelines.
- A small percentage of crude oil is exported to tidewater via the Westridge Marine Terminal in Burnaby, BC, and offshore projects in Atlantic Canada.
- Crude-by-rail is the marginal transport option primarily used to transport crude oil to the US Gulf Coast. This region accounted for ~65% of total Canadian rail shipments in 2022.

Source: Canada Energy Regulator

¹ Includes NGLs

² Export volumes by truck are very limited and are grouped with pipeline

US Crude Oil Imports Canada vs. Other Sources | Monthly | 2010 to Q4/2023*



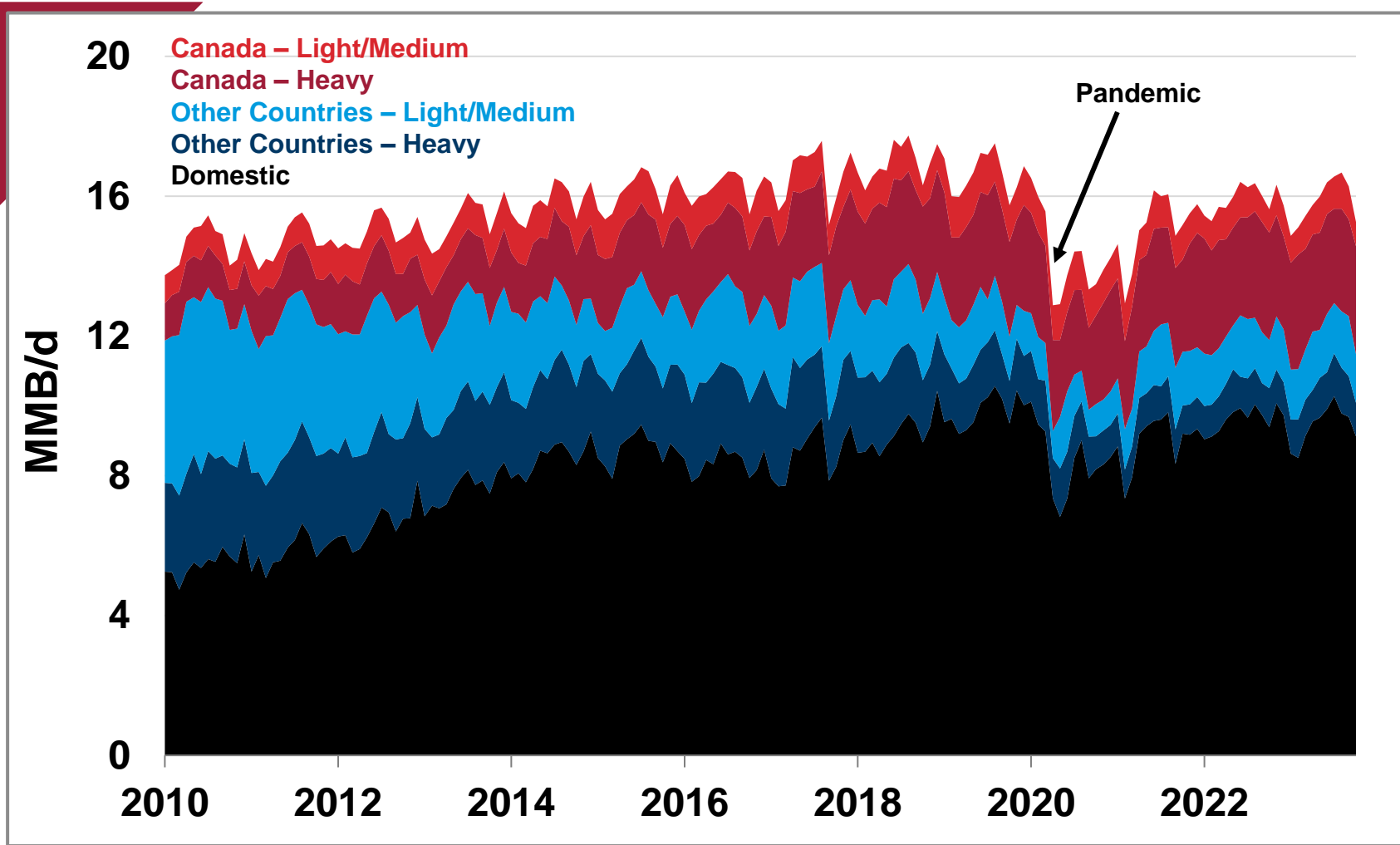
- The United States is home to one of the largest and most complex refinery systems in the world, which requires significant crude oil imports.
- The proliferation of US shale oil (a light oil) has diminished the need for crude oil imports. Since peaking at ~9.8 MMB/d in early 2010, total crude oil imports have decreased by ~30% to average 6.3 MMB/d in 2022.
- Despite this, Canada has steadily grown its US exports. Canada now accounts for ~60% of all imports to the US. Canada's heavy oil is not substituted by US domestic shale oil, a light crude oil.

Source: US Energy Information Administration

¹ Other is comprised of approximately 28 countries based on 2022 data

*2023 data is YTD average up to Oct 2023

Total US Refinery Throughput by Source | Monthly | 2010 to Q4/2023*

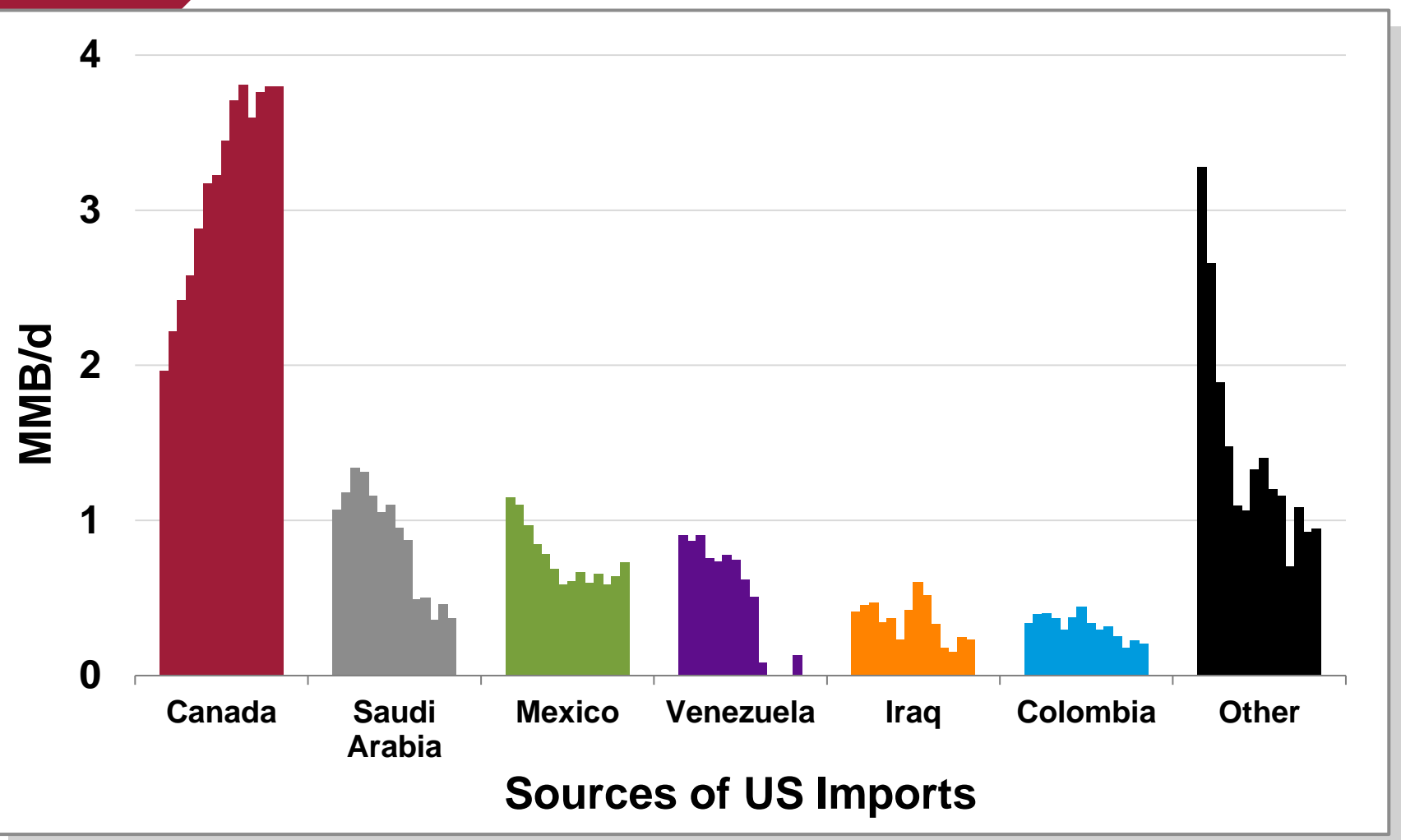


- Domestic crude oil accounts for roughly 60% of US refinery runs. The United States has now hit the limits for running light domestic shale oil and is exporting ~3.6 MMB/d of domestic crude oil production (2022) as a result.
- The US complex refineries (primarily in the Gulf Coast and Midwest) are built for processing heavy oils. Canadian heavy oil has been expanding market share in these regions, increasing by ~185% since 2010. Over the same period, Canadian light/medium crude as a source for US refinery runs has remained relatively consistent, averaging around 1 MMB/d.
- Canadian crude oil currently accounts for roughly 20-25% of total US refinery demand.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

Total Annual US Crude Oil Imports by Country | Annual | 2010 to Q4/2023*

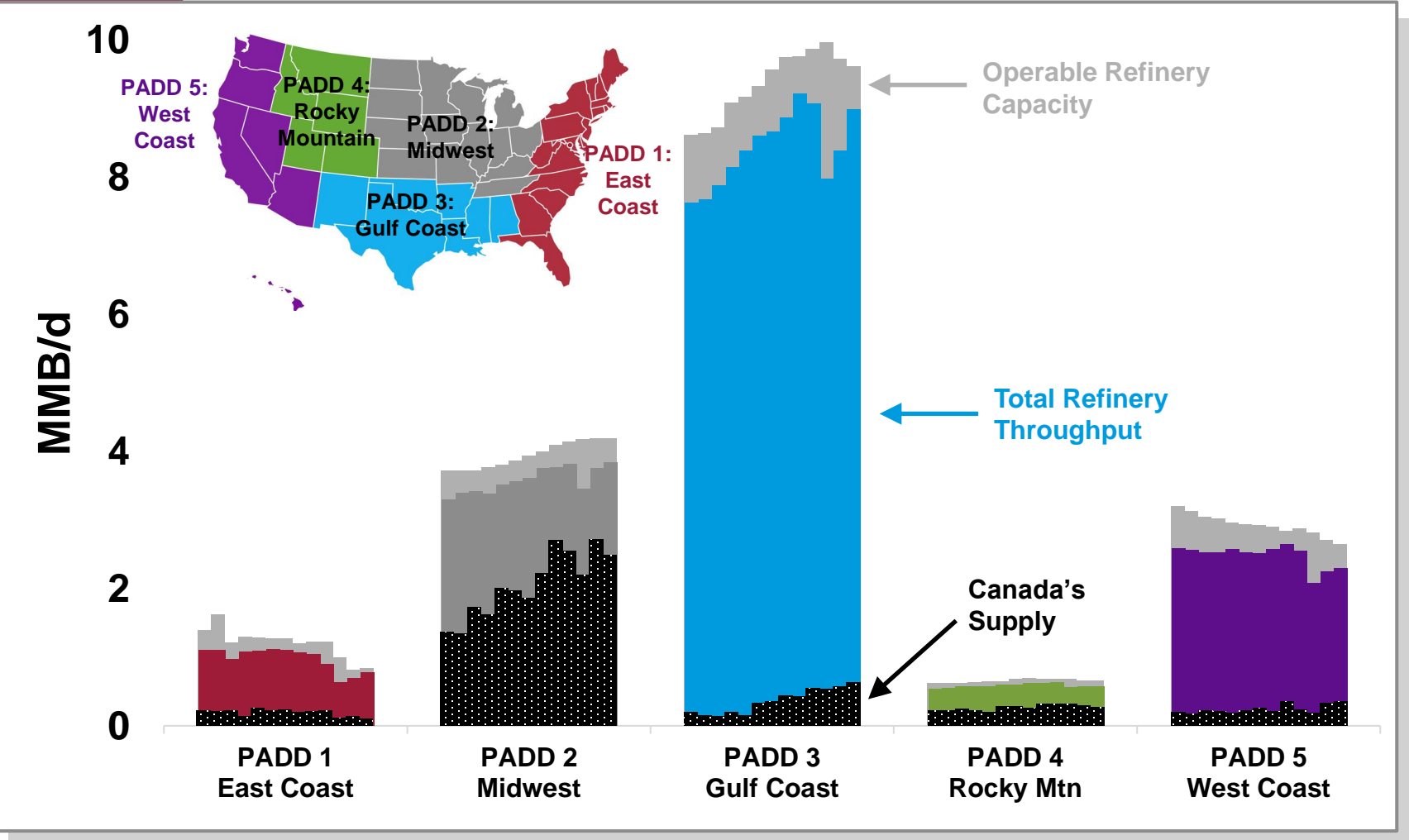


- Canada is the dominant source of crude oil imports for the United States – roughly 6X larger than the next biggest supplier, Mexico. Other major import sources include Saudi Arabia, Venezuela, Iraq, and Colombia.
- In recent years, Canadian heavy crude has stepped in to fill the void left by Venezuela, which has faced sanctions, and Mexico, related to underinvestment.
- Imports from Saudi Arabia have decreased, primarily because of the rise of US domestic light oil.
- While not expected, Canada could still grow its US market share by displacing other heavy oil suppliers.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

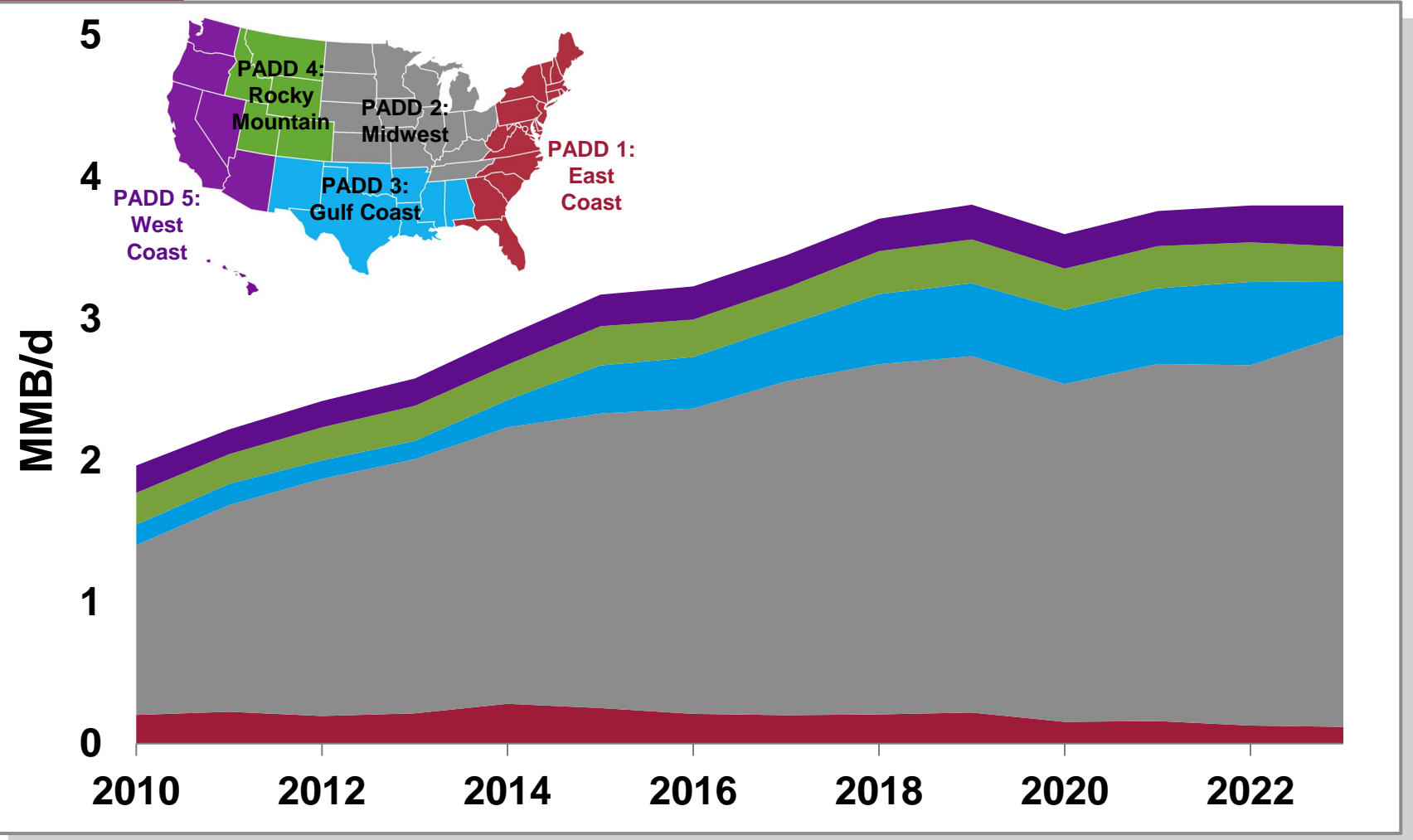
Total Annual US Refinery Throughput by PADD | Annual | 2010 to 2022



- The US refining complex is comprised of five districts, known as the Petroleum Administration for Defense Districts (PADDs).
- Combined, the US PADDs have approximately 18 MMB/d of operable refining capacity, with many refineries that process heavy crude oil.
- Canada is a key source of crude oil imports for PADDs 2 and 4, which are landlocked. Canada is a growing supplier to PADD 3, the largest refining region.
- PADDs 1, 3, and 5 are less reliant on Canada due to tidewater access and a lack of Canadian pipeline connections.

Source: US Energy Information Administration

Canadian Crude Oil Exports by PADD | Annual | 2010 to Q4/2023*



- Canadian oil is vital to United States energy security. PADD 2 is currently the largest market for Canadian crude oil exports to the United States in 2022 (equal to ~2.5 MMB/d). Meanwhile, PADDs 3 to 5 combined accounted for ~1.1 MMB/d in 2022.
- PADD 3 offers a potential opportunity for Canada to capture incremental market share amidst faltering supply from Venezuela and Mexico. Still, insufficient pipeline capacity limits this possibility.
- Upon completion of the Trans Mountain Expansion Project (TMEP), Canada's market share in PADD 5 is expected to grow.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

New Market Opportunities via the Trans Mountain Expansion Project (TMEP)

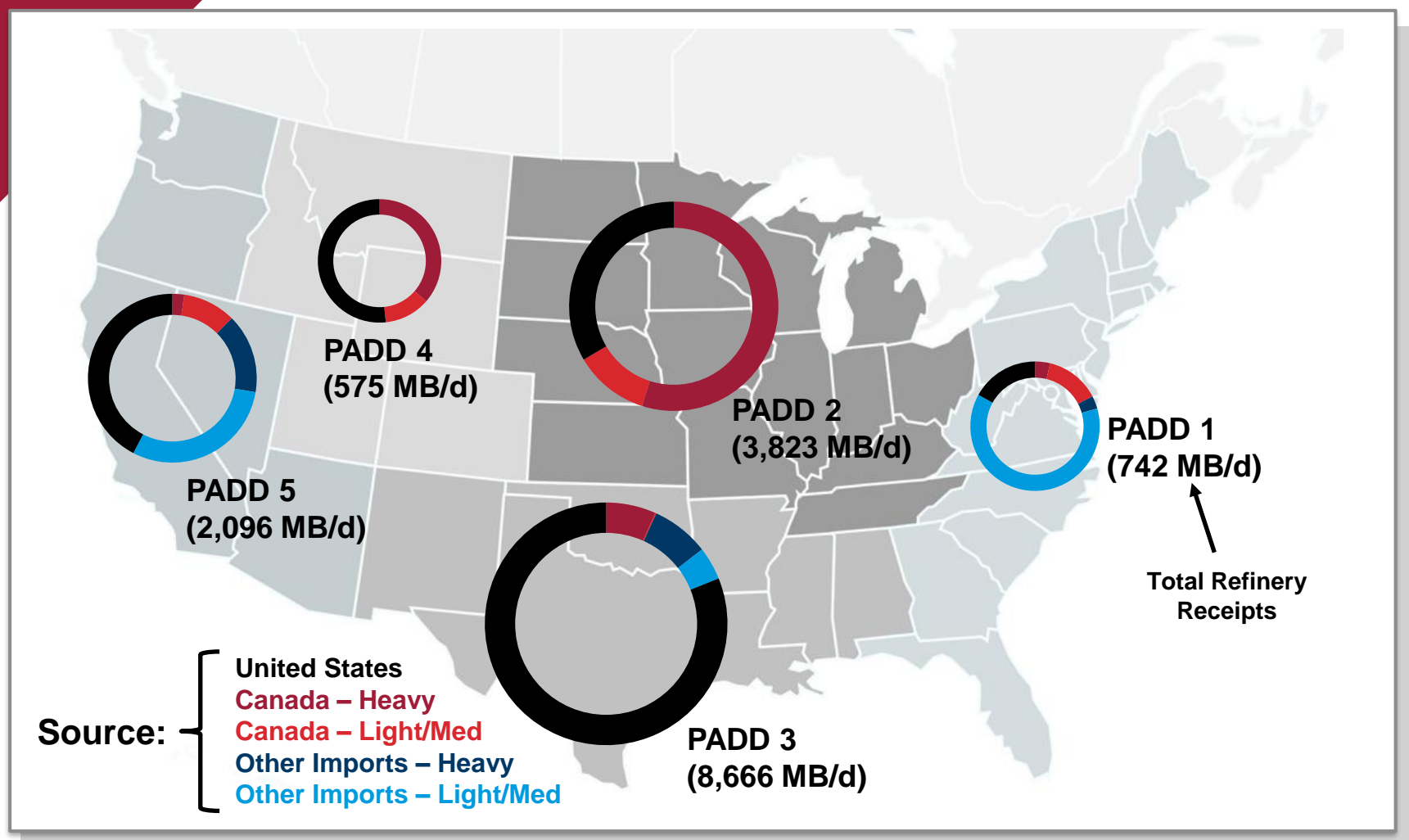
- Once complete, the forthcoming TMEP will add 590 MB/d of incremental export capacity out of the WCSB, bringing the total pipeline capacity to 0 MB/d.
- As part of the expansion project, three new docks will be built at the existing Westridge Marine Terminal to accommodate increased tidewater access, facilitating growth in exports to PADD 5 (US West Coast) and new market opportunities in Japan, China, Southeast Asia, and India.
- Canadian oil provides energy security and supply diversity for Eastern Asia markets. Based on estimates using [SeaRates](#), Canada also has shorter seaborne transportation distances compared to competing grades of heavy crude from countries in Latin America and the Middle East to reach Asia.
- According to the Statistical Review of World Energy, total oil demand in Asia Pacific in 2022 was ~35.8 MMB/d, accounting for roughly 36% of global demand. From 2000 to 2022, oil demand in Asia Pacific has increased by approximately 67%. Based on the January 2024 Short-Term Energy Outlook from the US Energy Information Administration, the majority of global oil demand growth in 2024 and 2025 is expected to be driven by non-OECD Asia, led by China and India.
- It remains to be seen how much Canadian crude oil will land in Asia, as demand in PADD 5 should be strong, and the closest proximity market is the most economic.



Not to scale; For illustrative purposes only

Source: Canada Energy Regulator, SeaRates, Energy Institute 2023 Statistical Review of World Energy, US Energy Information Administration – Short-Term Energy Outlook (Jan 2024)

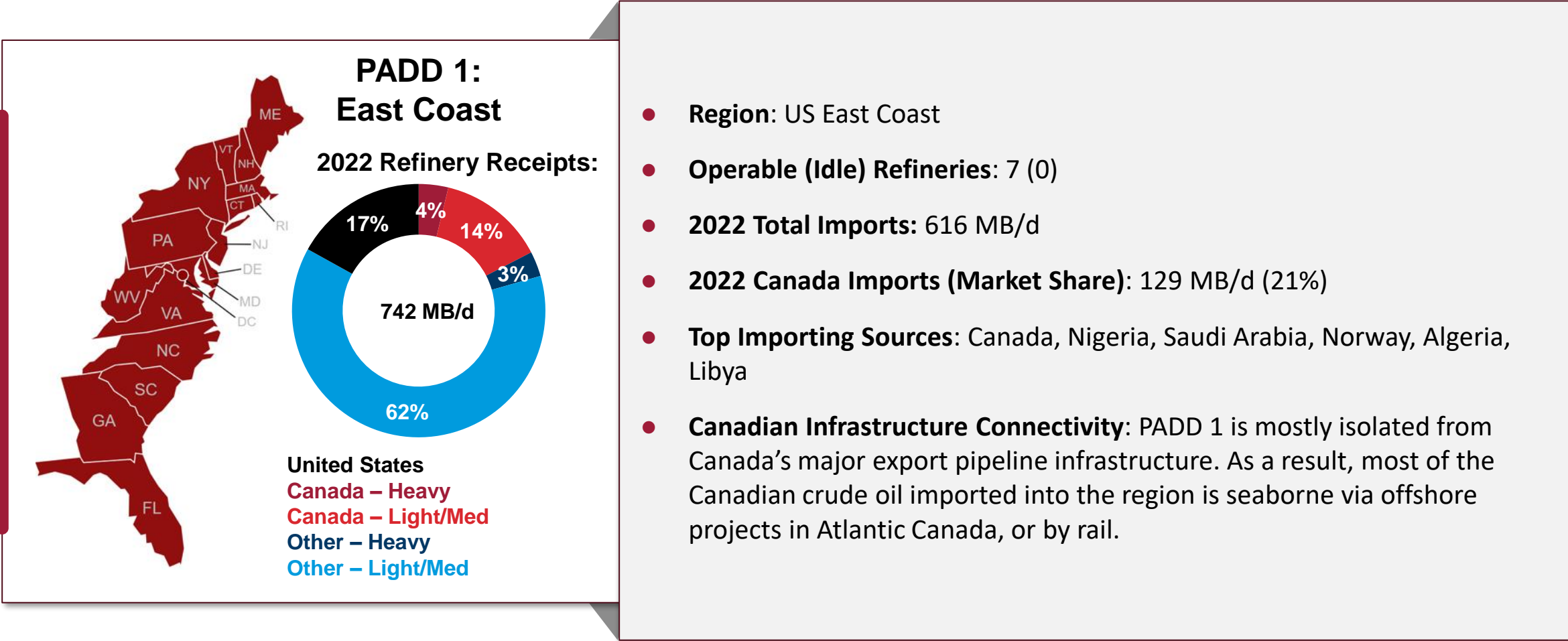
US Crude Oil Refinery Receipts by PADD and Source | 2022



- With no access to alternative sources, PADDs 2 and 4 are landlocked and reliant upon Canadian crude oil imports to meet refinery demand.
- Conversely, PADDs 1, 3, and 5 have limited pipeline connections with Canada, and are less dependent on Canada due to tidewater access.
- Supply dynamics in PADD 3 have drastically changed in recent years as US domestic production has surged, driven by the Permian Basin. In 2022, US domestic supplies accounted for over 80% of PADD 3 feedstock demand. However, significant demand for heavy oil imports remains given the refinery complexion in the region.

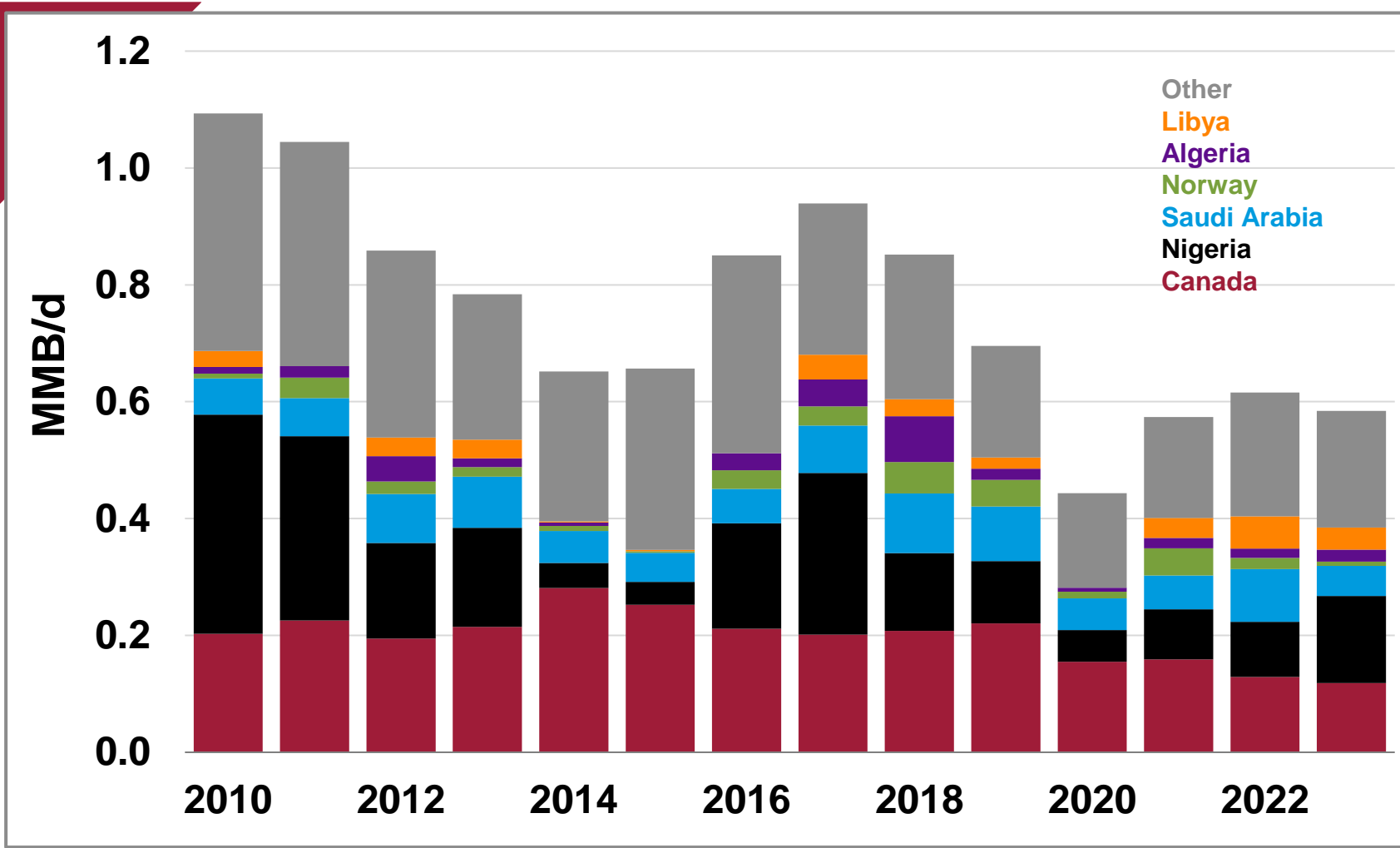
Source: US Energy Information Administration

PADD 1 East Coast Snapshot



Source: US Energy Information Administration

PADD 1 Crude Oil Imports by Country | Annual | 2010 to Q4/2023*

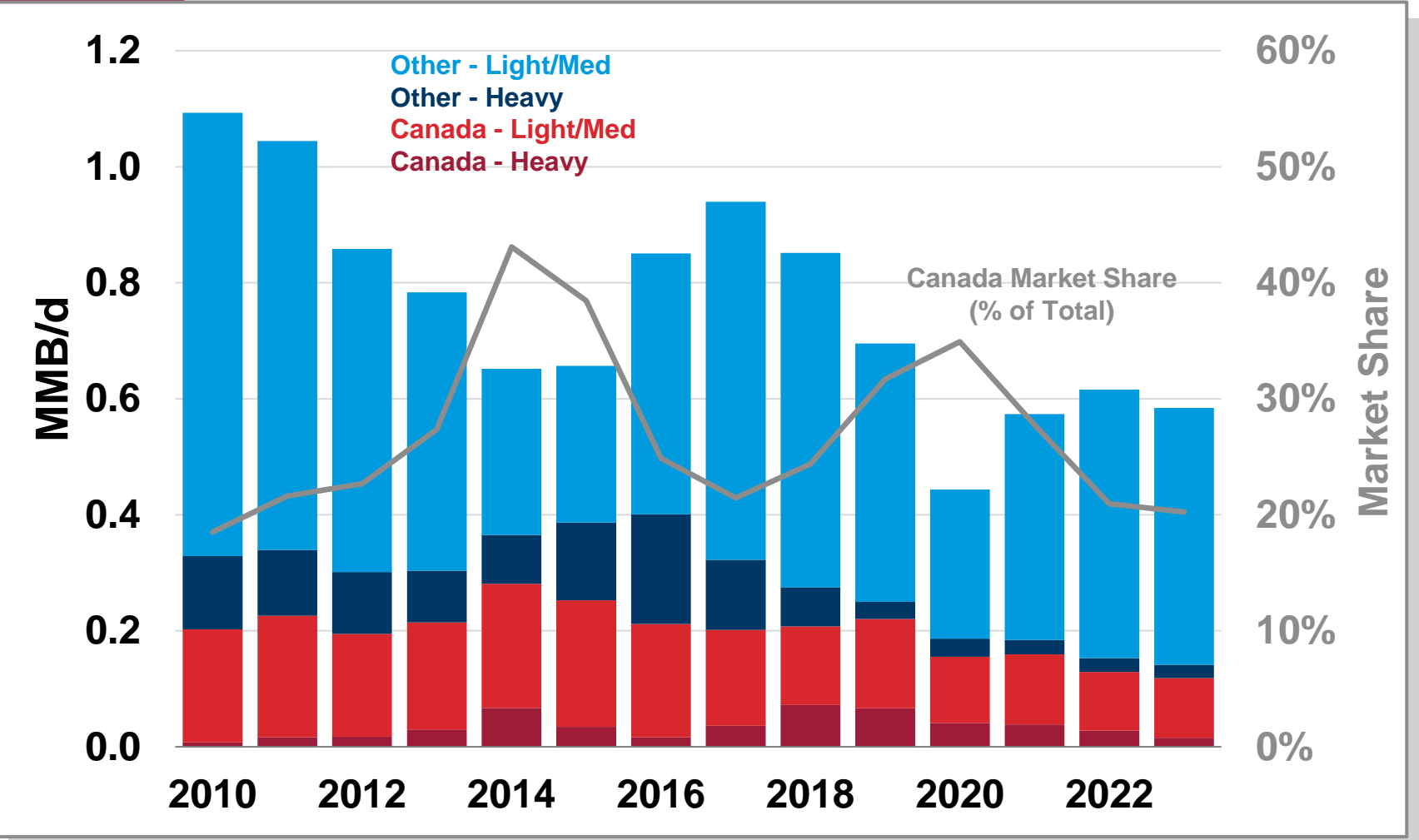


- The largest foreign suppliers of crude oil to PADD 1 (East Coast) include Canada, Nigeria, Saudi Arabia, and Norway.
- In 2022, 129 MB/d of Canadian crude oil was imported into PADD 1, compared to 94 MB/d and 90 MB/d from Nigeria and Saudi Arabia, respectively.
- Canadian feedstock in PADD 1 has remained relatively consistent at roughly 150-250 MB/d since 2010.
- Operable refining capacity in PADD 1 has decreased following the shutdown of the Philadelphia Energy Solutions refinery (~335 MB/d) in Pennsylvania in 2019.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 1 Crude Oil Imports Canada vs. Other Sources | Annual | 2010 to Q4/2023*

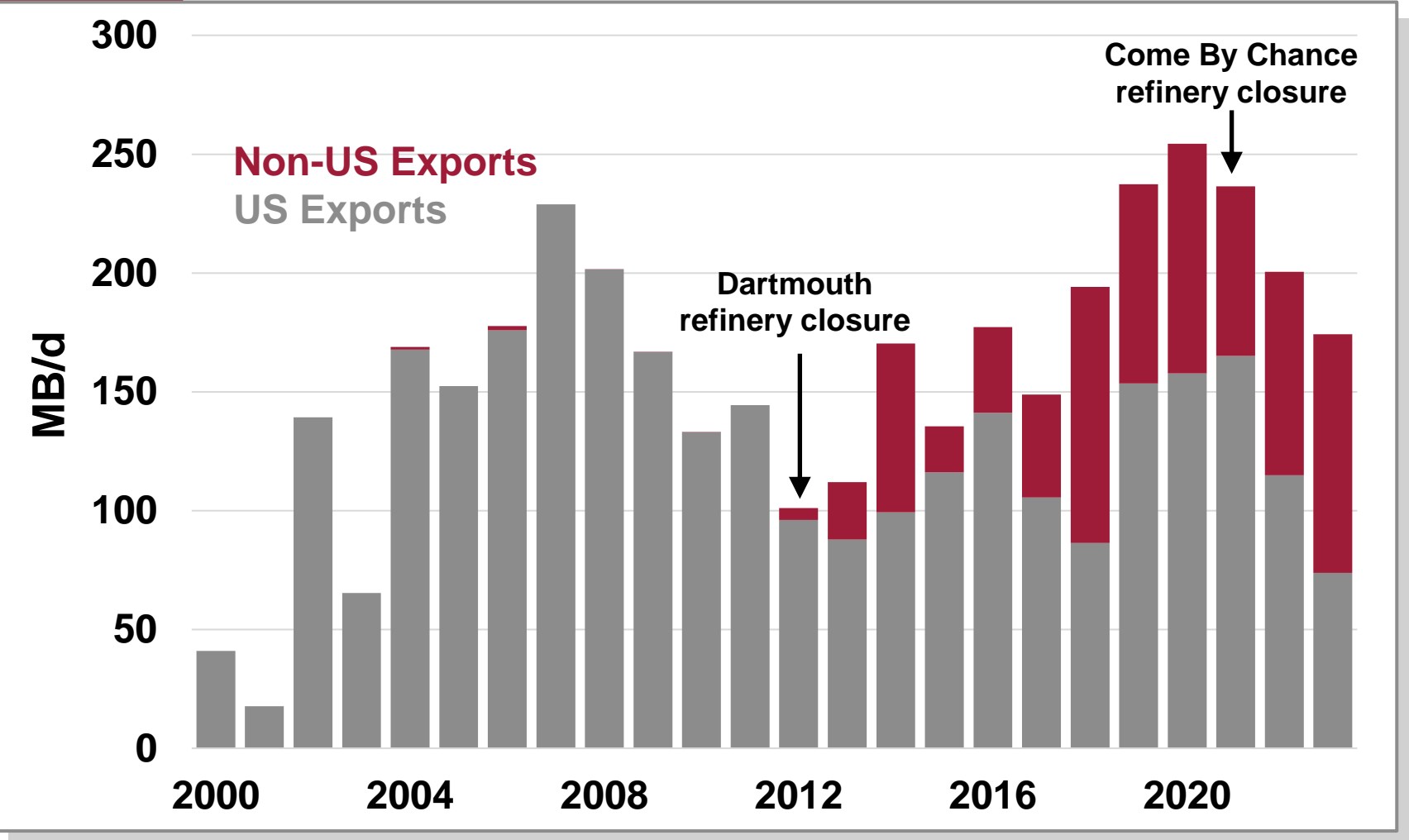


- PADD 1 (East Coast) is a light oil-consuming region with simple refineries. In 2022, Canadian oil imports to PADD 1 were 129 MB/d (78% light/medium and 22% heavy).
- Canadian crude oil imports into PADD 1 equated to an overall market share of 21%.
- Beyond offshore growth in Atlantic Canada, Canada has little opportunity to expand its position in this region, considering the limited infrastructure connectivity and the small appetite for heavy oil.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

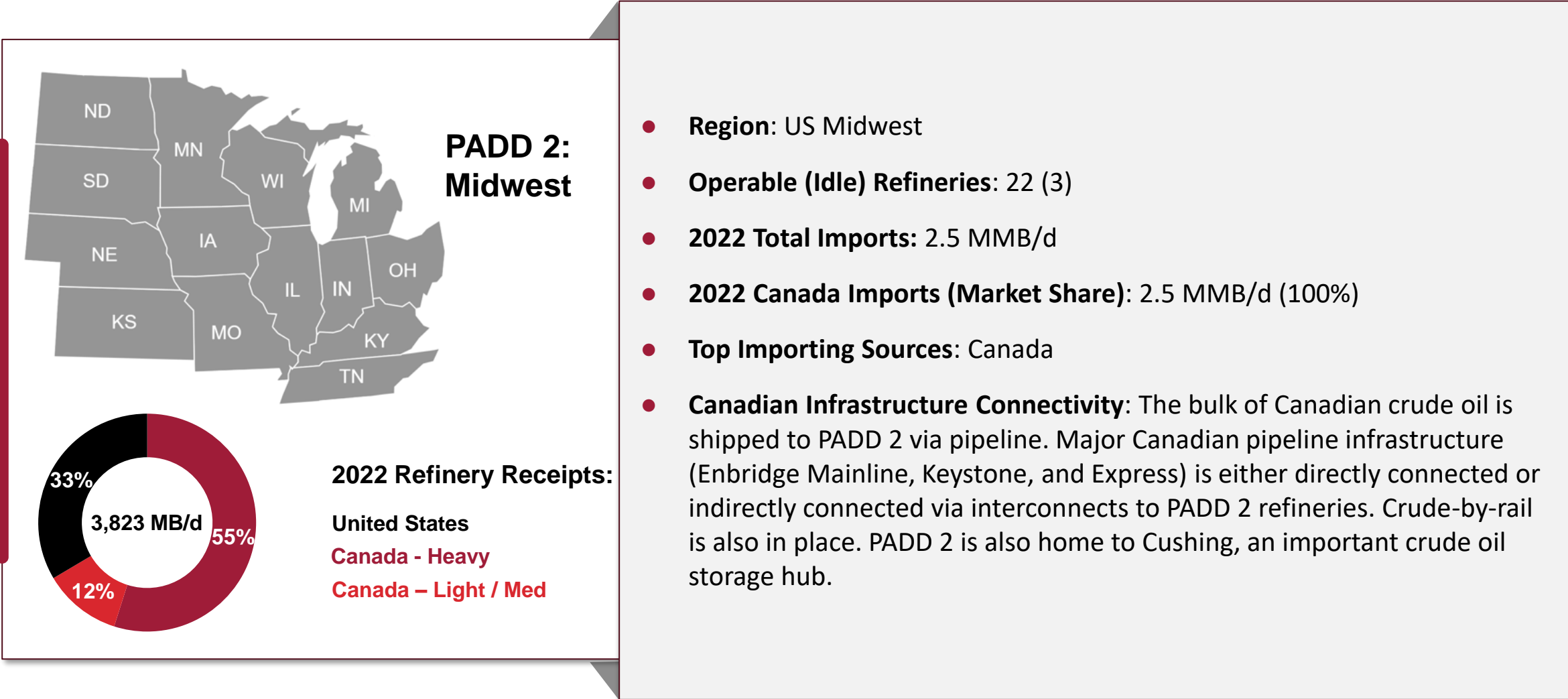
Atlantic Canada Crude Oil Exports | Annual | 2000 to 2023



- The composition of crude oil exports from Atlantic Canada has shifted following the closure of the Dartmouth refinery in 2013 and other US East Coast refinery closures. Prior to, roughly 100% of crude oil that was not consumed by domestic refineries was exported to the United States.
- Since then, a larger proportion of crude oil exports from Atlantic Canada have been destined for Europe, mainly to Italy, Netherlands, Spain, and the United Kingdom. In 2023, non-US exports accounted for approximately 58% of total crude oil exports from Atlantic Canada. These markets present a potential opportunity for Atlantic Canada to grow its production in the future.

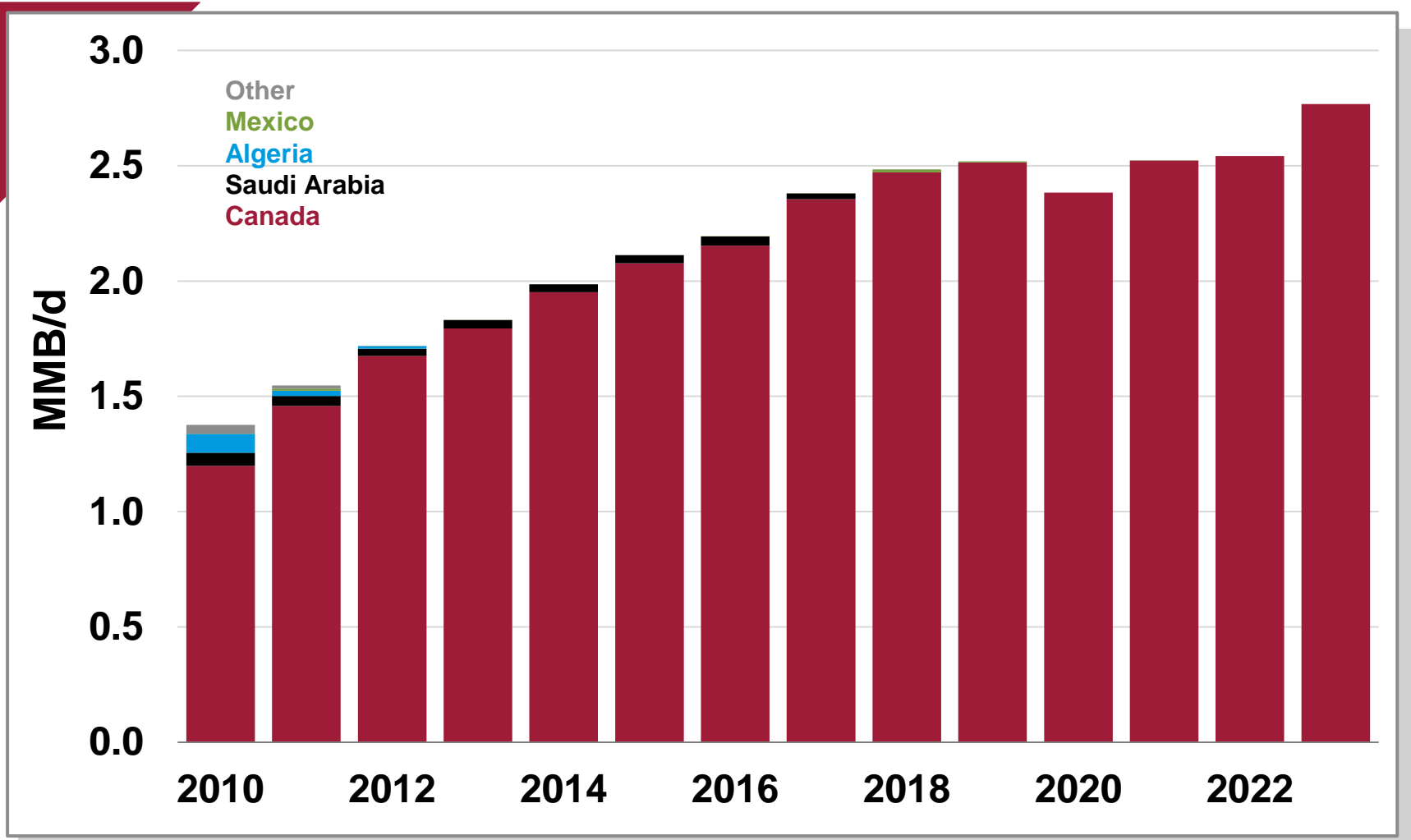
Source: Statistics Canada. Canadian International Merchandise Trade Web Application, Canada Energy Regulator

PADD 2 Midwest Snapshot



Source: US Energy Information Administration

PADD 2 Crude Oil Imports by Country | Annual | 2010 to Q4/2023*

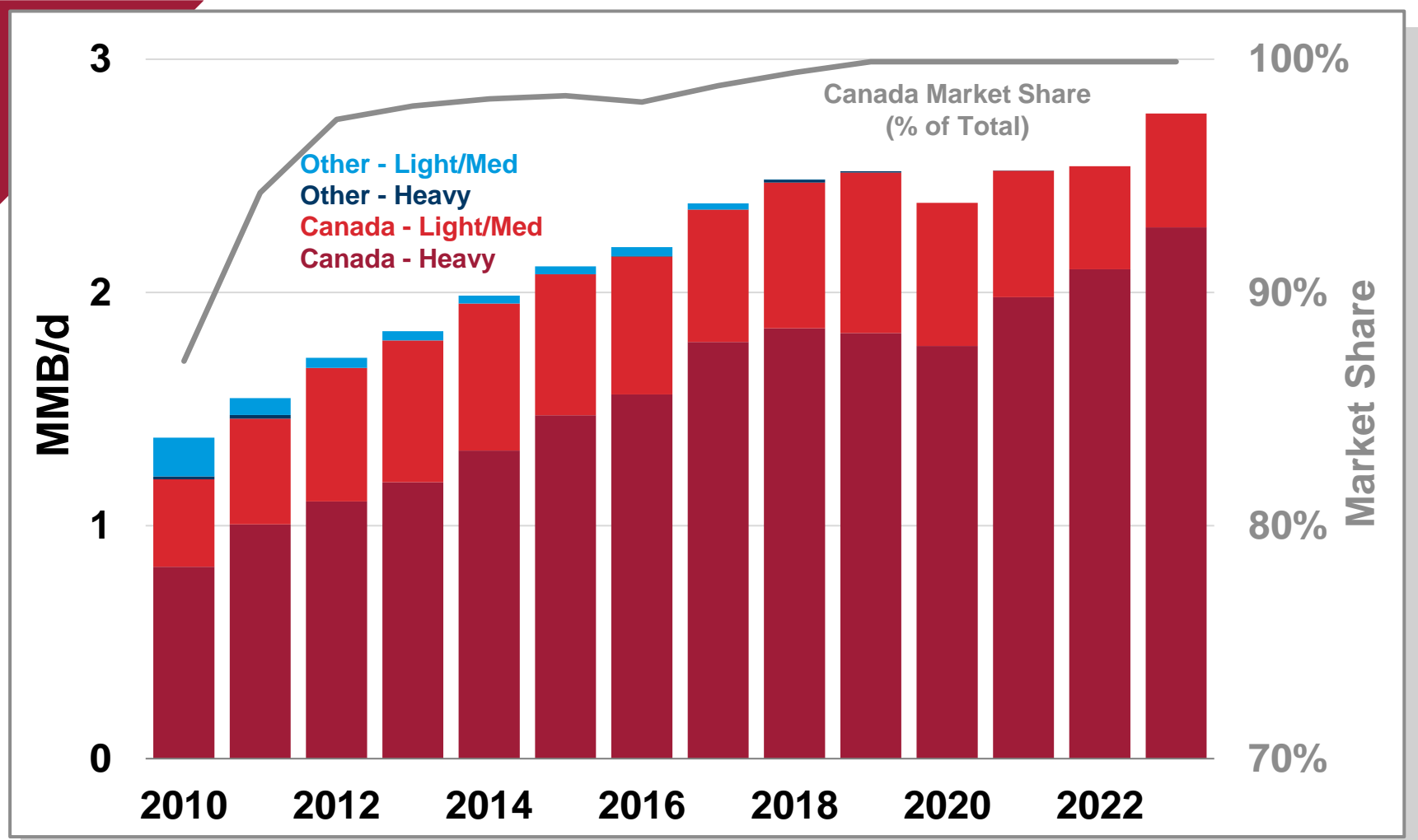


- PADD 2 (Midwest) is the largest market for Canadian crude oil, making up 67% of all Canadian exports (2022) to the United States.
- PADD 2 is extremely dependent on Canada for imports and domestic oil production.
- In 2022, ~2.5 MMB/d of Canadian crude oil was imported into PADD 2, over double 2010 levels.
- PADD 2 is landlocked, with pipelines providing imports and domestic supply. If Western Canadian supply were to be disrupted, this would create scarcity because of the region’s limited alternative supply sources.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 2 Crude Oil Imports Canada vs. Other Sources | Annual | 2010 to Q4/2023*



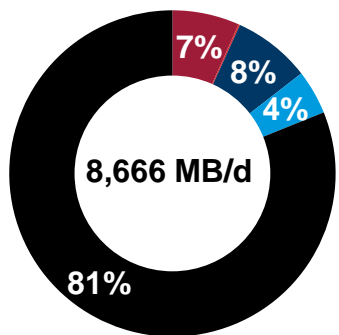
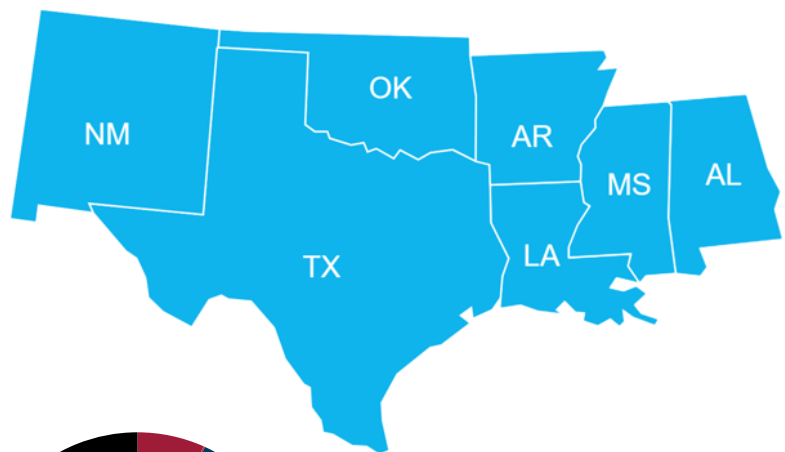
- PADD 2 (Midwest) is a complex refining region. In 2022, Canadian imports were 2.5 MMB/d (17% light/medium and 83% heavy).
- Canada is the only source of foreign oil in PADD 2.
- In the absence of refinery growth, the incremental opportunity for Canada to expand its market share is limited, given its dominant position in the region.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 3 Gulf Coast Snapshot

PADD 3: Gulf Coast



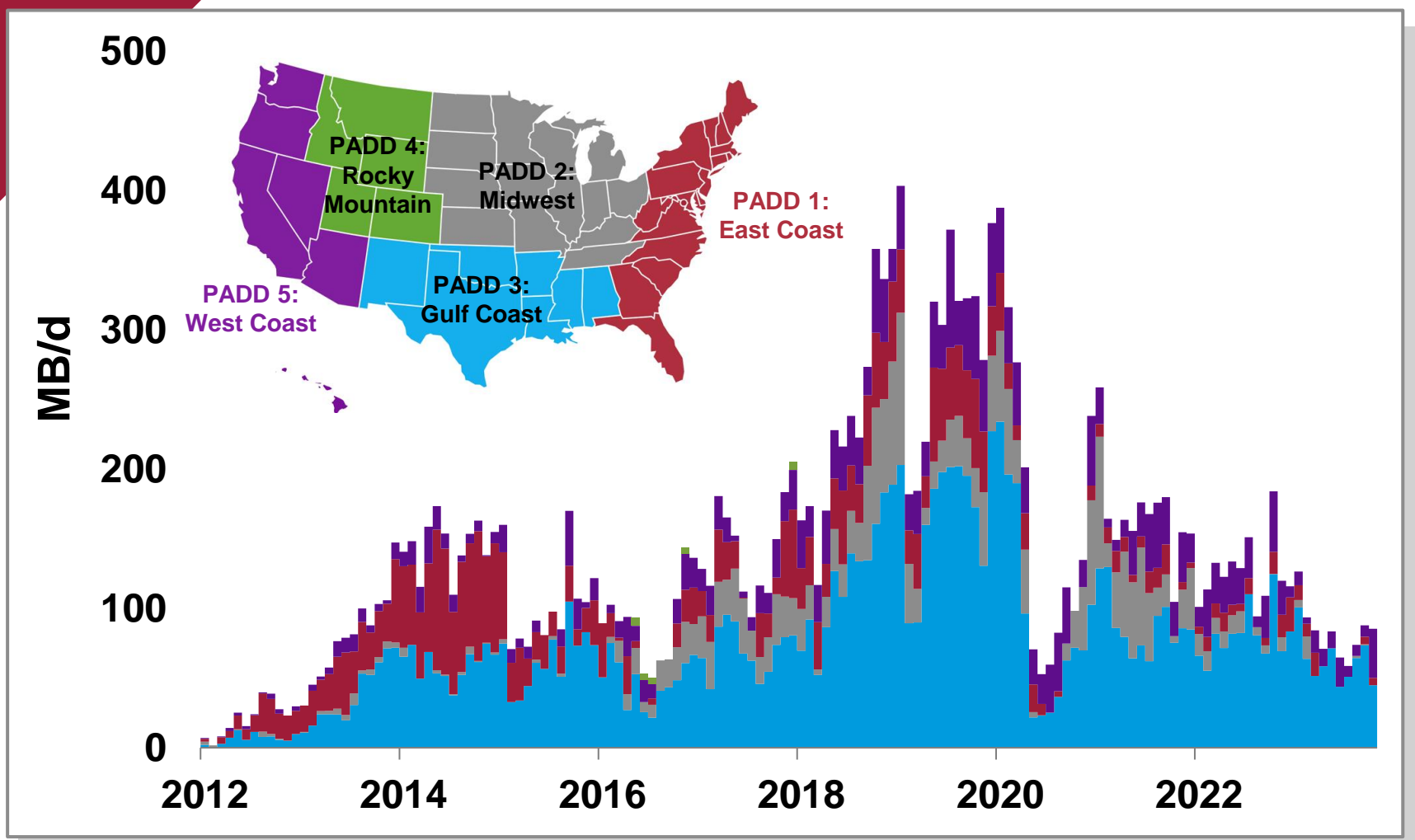
2022 Refinery Receipts:

United States
Canada – Heavy
Other – Heavy
Other – Light/Med

- **Region:** US Gulf Coast
- **Operable (Idle) Refineries:** 56 (0)
- **2022 Total Imports:** 1.6 MMB/d
- **2022 Canada Imports (Market Share):** 5 MB/d (36%)
- **Top Importing Sources:** Canada, Mexico, Venezuela, Saudi Arabia, Colombia
- **Canadian Infrastructure Connectivity:** The Keystone pipeline provides a direct transportation route to PADD 3 for Canadian crude oil. There is also the availability to transport crude oil to the Gulf Coast from PADD 2 (Midwest) via various pipeline interconnects. Recent pipeline expansions (Enbridge Line 3, Flanagan South via Seaway) and reversals (Capline) have allowed for increased Canadian crude oil flows to the Gulf Coast via PADD 2.

Source: US Energy Information Administration

Canadian Crude Oil Rail Exports by PADD | Monthly | 2010 to Q4/2023*

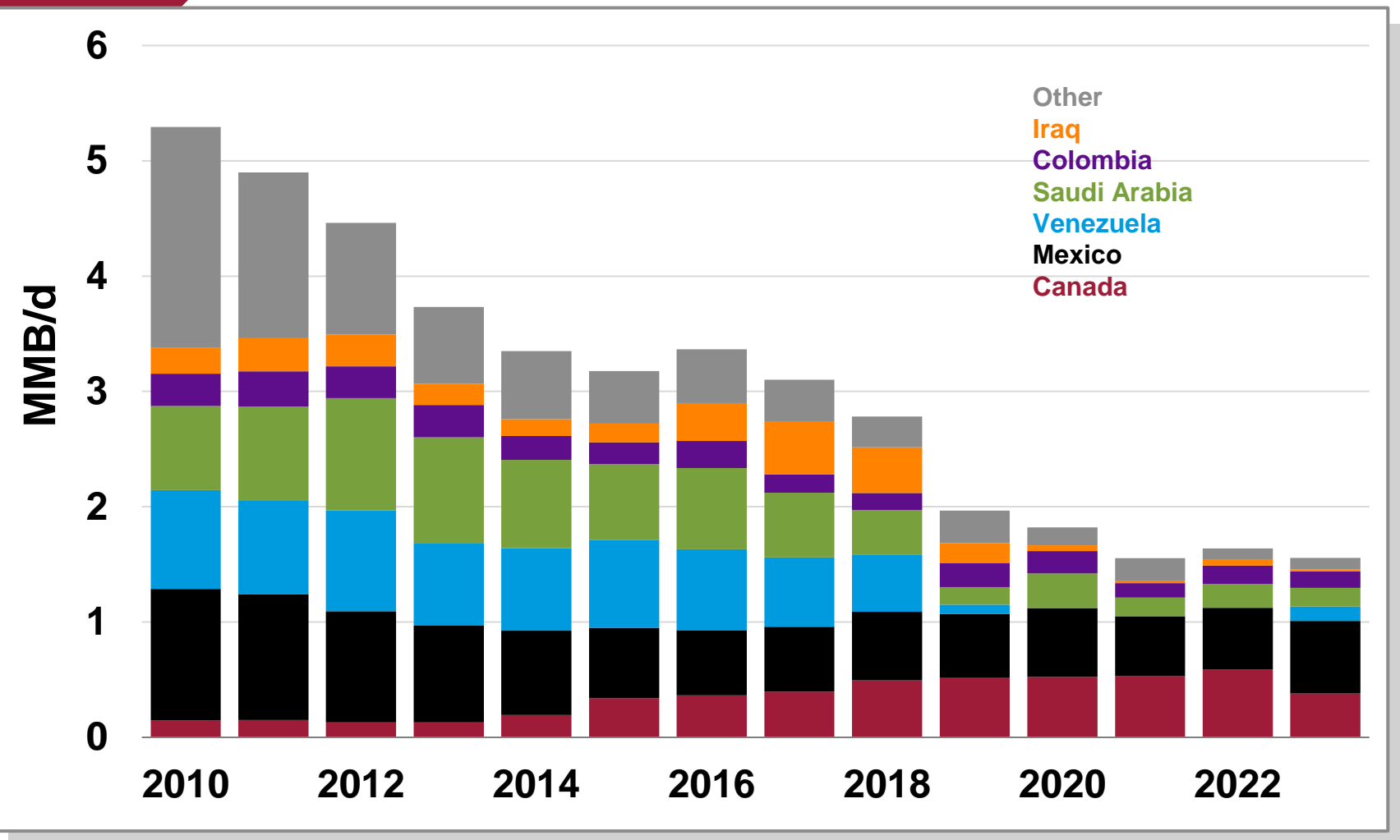


- During periods of insufficient pipeline takeaway capacity in the WCSB, rail is used to transport crude oil.
- The interconnected North American rail network allows access to the various PADDs.
- PADD 3 in the Gulf Coast is the primary destination for Canadian crude-by-rail imports, accounting for ~65% of rail shipments in 2022.
- Crude-by-rail is generally more expensive for transporting crude oil than pipelines.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 3 Crude Oil Imports by Country | Annual | 2010 to Q4/2023*

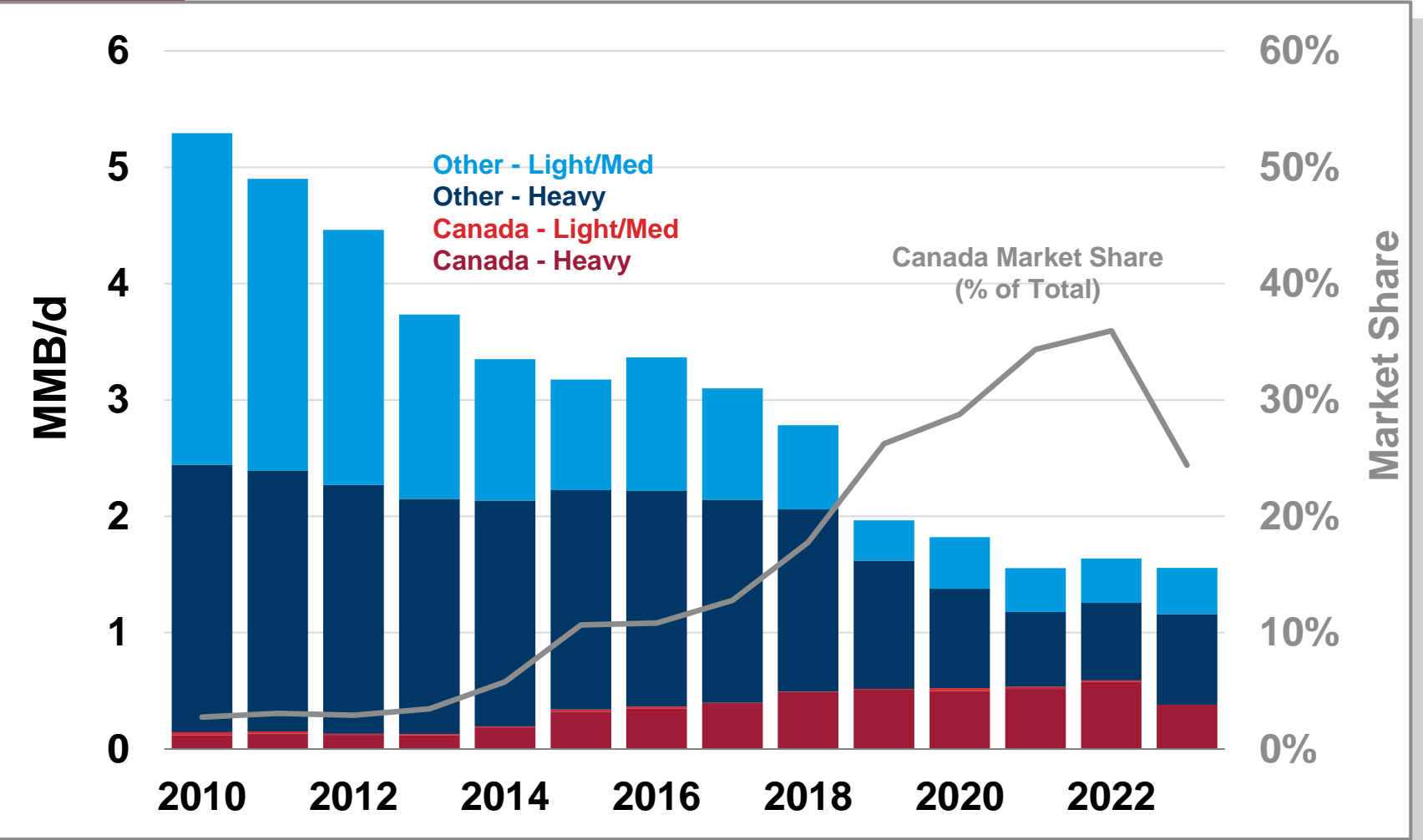


- Canada, Mexico, Venezuela, and Saudi Arabia have historically been the top suppliers of crude oil to PADD 3 (Gulf Coast) refineries.
- PADD 3 boasts the largest refining capacity in the United States, a significant portion of which is designed to handle heavy sour crude, making Canada an ideal customer amidst dwindling heavy oil supplies from Venezuela, Mexico, and Colombia.
- In recent years, Canadian heavy crude has partially filled the void left by Venezuela amidst US sanctions. Looking ahead, imports from Mexico could decrease following the start-up of a new domestic refinery.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 3 Crude Oil Imports Canada vs. Other Sources | Annual | 2010 to Q4/2023*

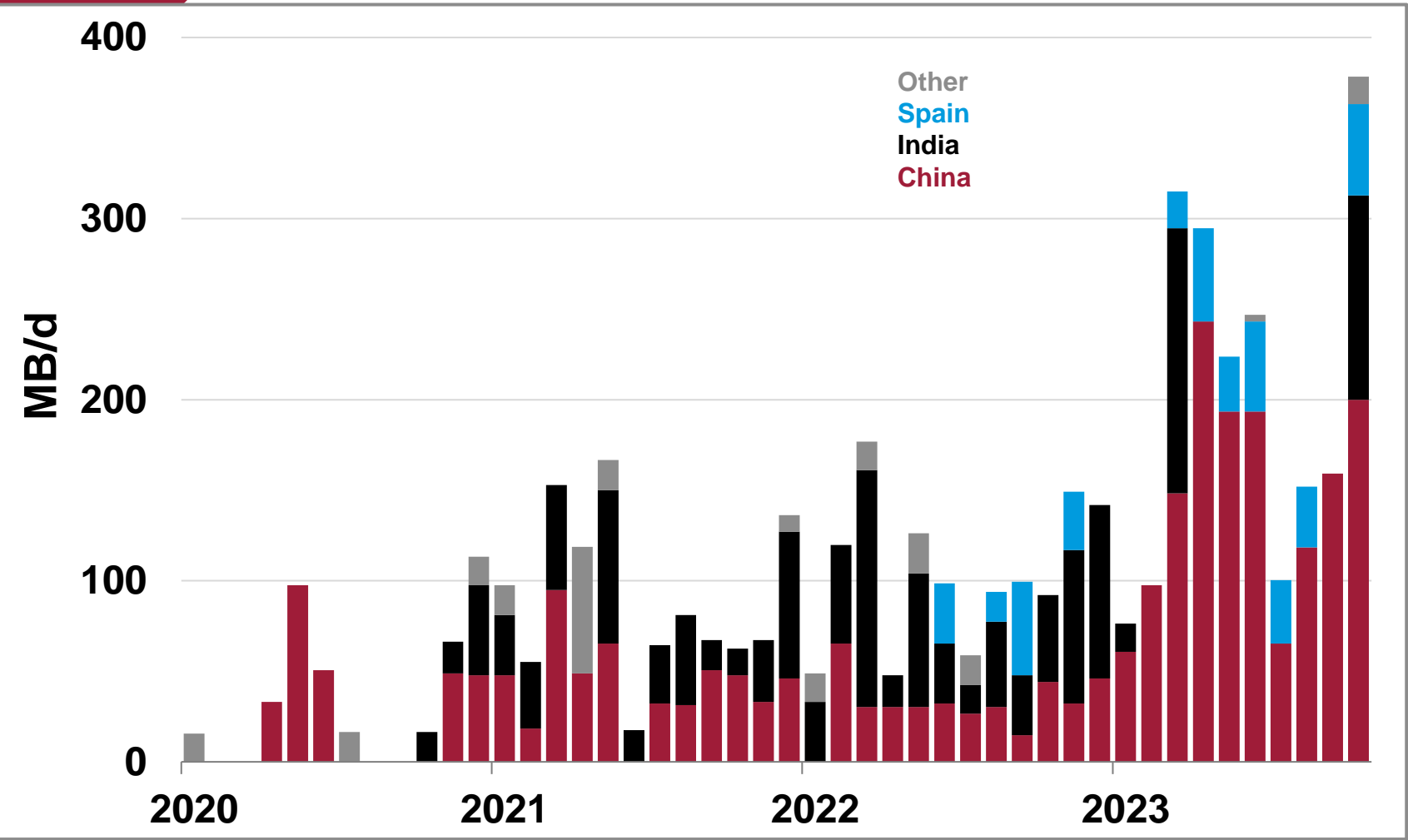


- An increase in US production following the shale oil revolution has necessitated fewer crude oil imports to PADD 3 (Gulf Coast).
- However, since 2010, Canada has managed to increase its market from 3% of total imports in 2010 to over 35% in 2022.
- Additional growth of Canadian supply to PADD 3 requires new pipelines or expansions. With the Keystone XL cancellation, new pipelines are not expected.
- In 2023, Canada's decrease in market share in PADD 3 was largely attributable to increased re-exports from PADD 3 to other countries.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

Canadian Crude Oil Re-Exports | Monthly | 2010 to Q3/2023*

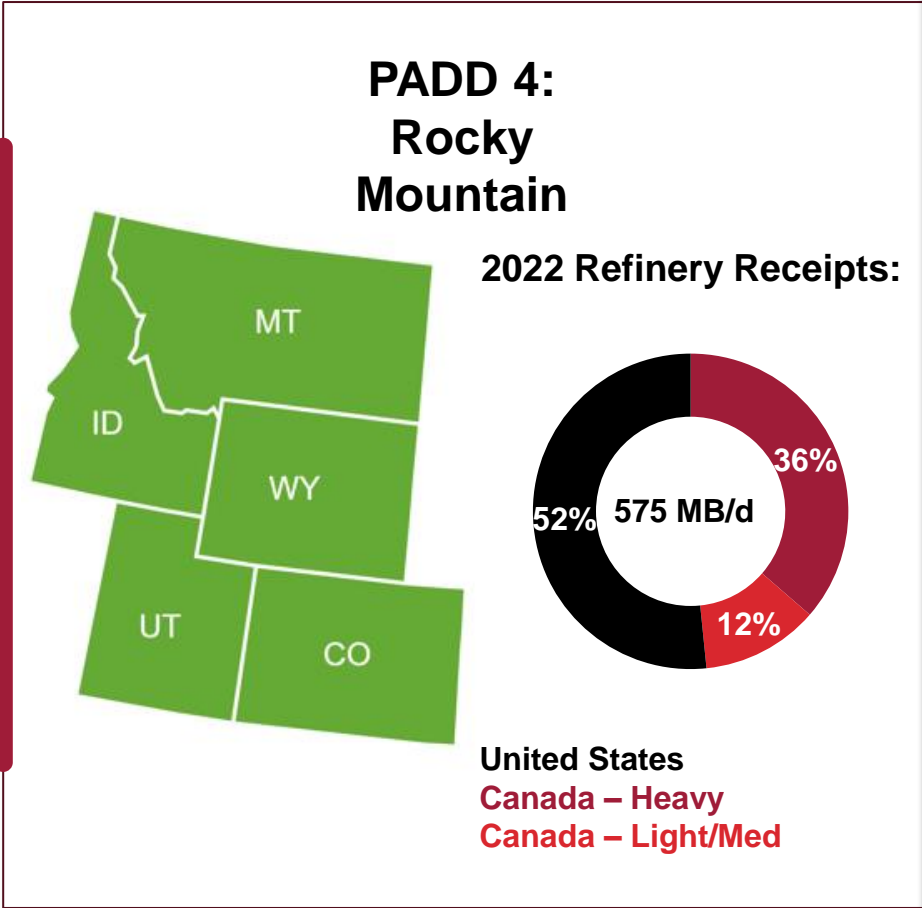


- Since 2020, Canadian heavy crude oil has been re-exported via the US Gulf Coast (PADD 3) to China, India, and Spain.
- As a result of production cuts from OPEC+, which reduced the supply of heavier crude oil grades, these countries are using alternative sources of heavy, including Canadian oil re-exported from PADD 3.
- In 2022, crude oil re-exports of Canadian oil via the US Gulf Coast averaged approximately 100 MB/d and reached a record high of approximately 380 MB/d in October 2023. This increase in re-exports likely attributed to Canada's decrease in market share in PADD 3 in 2023.

Source: US Census Bureau, RBN Energy

*2023 data is YTD average up to Oct 2023

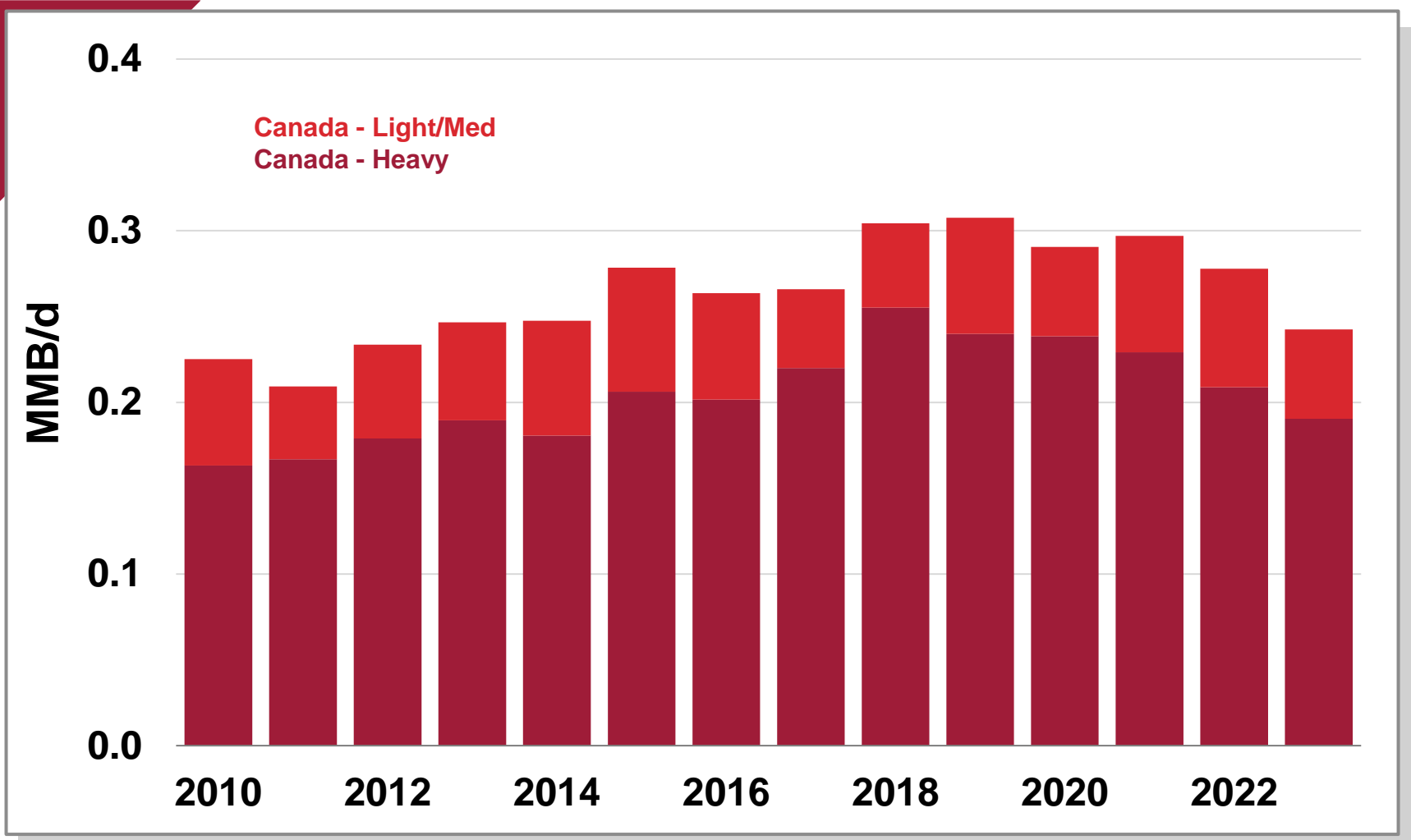
PADD 4 Rocky Mountain Snapshot



- **Region:** US Rocky Mountains
- **Operable (Idle) Refineries:** 13 (2)
- **2022 Total Imports:** 278 MB/d
- **2022 Canada Imports (Market Share):** 278 MB/d (100%)
- **Top Importing Sources:** Canada
- **Canadian Infrastructure Connectivity:** The Express, Aurora, and Milk River pipelines service PADD 4 with Canadian crude oil.

Source: US Energy Information Administration

PADD 4 Crude Oil Imports Canada vs. Other Sources | Annual | 2010 to Q4/2023*

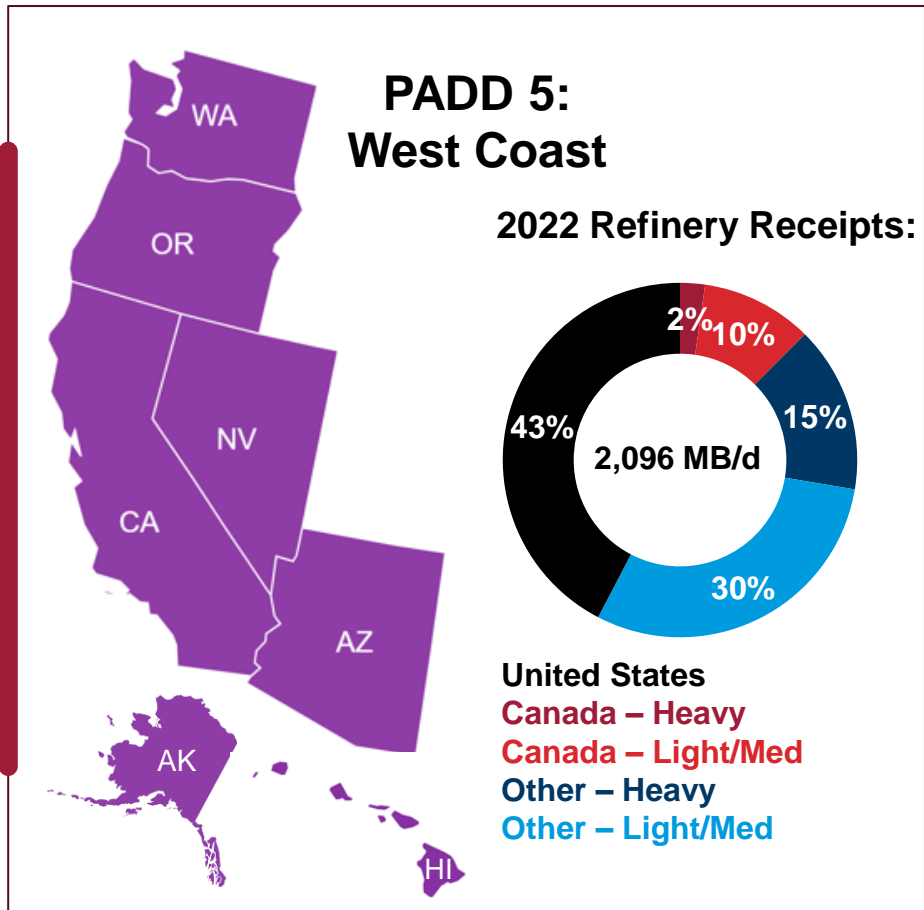


- PADD 4 (Rocky Mountains) imported 278 MB/d (75% heavy & 25% light/medium) of Canadian crude oil in 2022.
- Total Canadian feedstock has remained relatively consistent since 2010, ranging from ~200-300 MB/d.
- PADD 4 is landlocked and dependent on domestic and Canadian supply only. A curtailment of Canadian supply would likely create PADD 4 oil shortages.
- PADD 4 is the smallest US region in terms of refining capacity, and in the absence of future refinery growth, presents little opportunity for Canada to grow.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

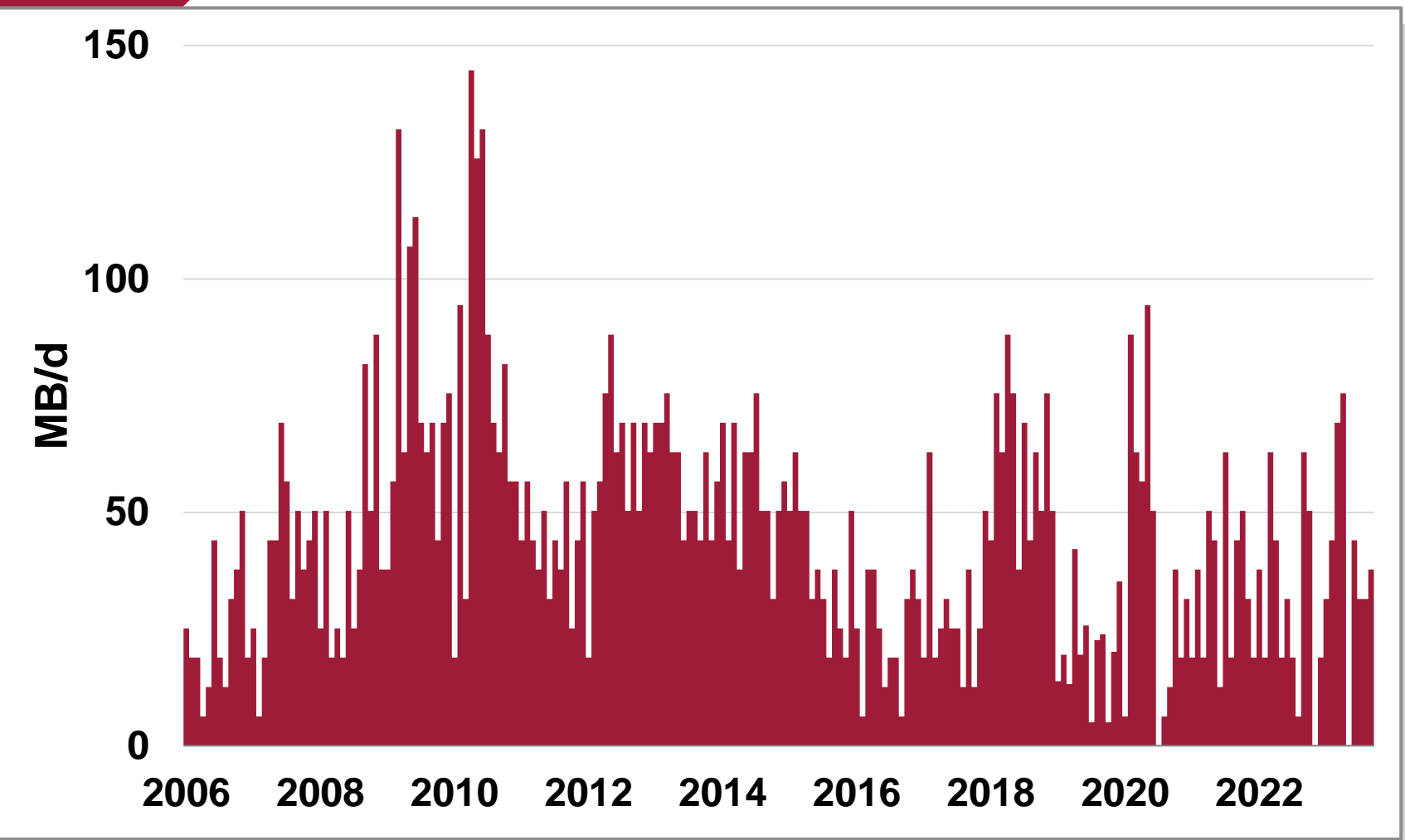
PADD 5 West Coast Snapshot



- **Region:** West Coast
- **Operable (Idle) Refineries:** 26 (0)
- **2022 Total Imports:** 1.2 MMB/d
- **2022 Canada Imports (Market Share):** 261 MB/d (22%)
- **Top Importing Sources:** Canada, Saudi Arabia, Ecuador, Iraq, Colombia
- **Canadian Infrastructure Connectivity:** The Trans Mountain pipeline transports Canadian crude oil to refineries in the State of Washington. The majority of Canadian crude oil shipped out of Westridge Marine Terminal in Burnaby lands in California. A small portion of Canadian crude oil (~25 MB/d in 2022) is also imported into PADD 5 via truck/rail.

Source: US Energy Information Administration

Canadian Crude Exports via Westridge Marine Terminal | Monthly | 2006 to Q3/2023*

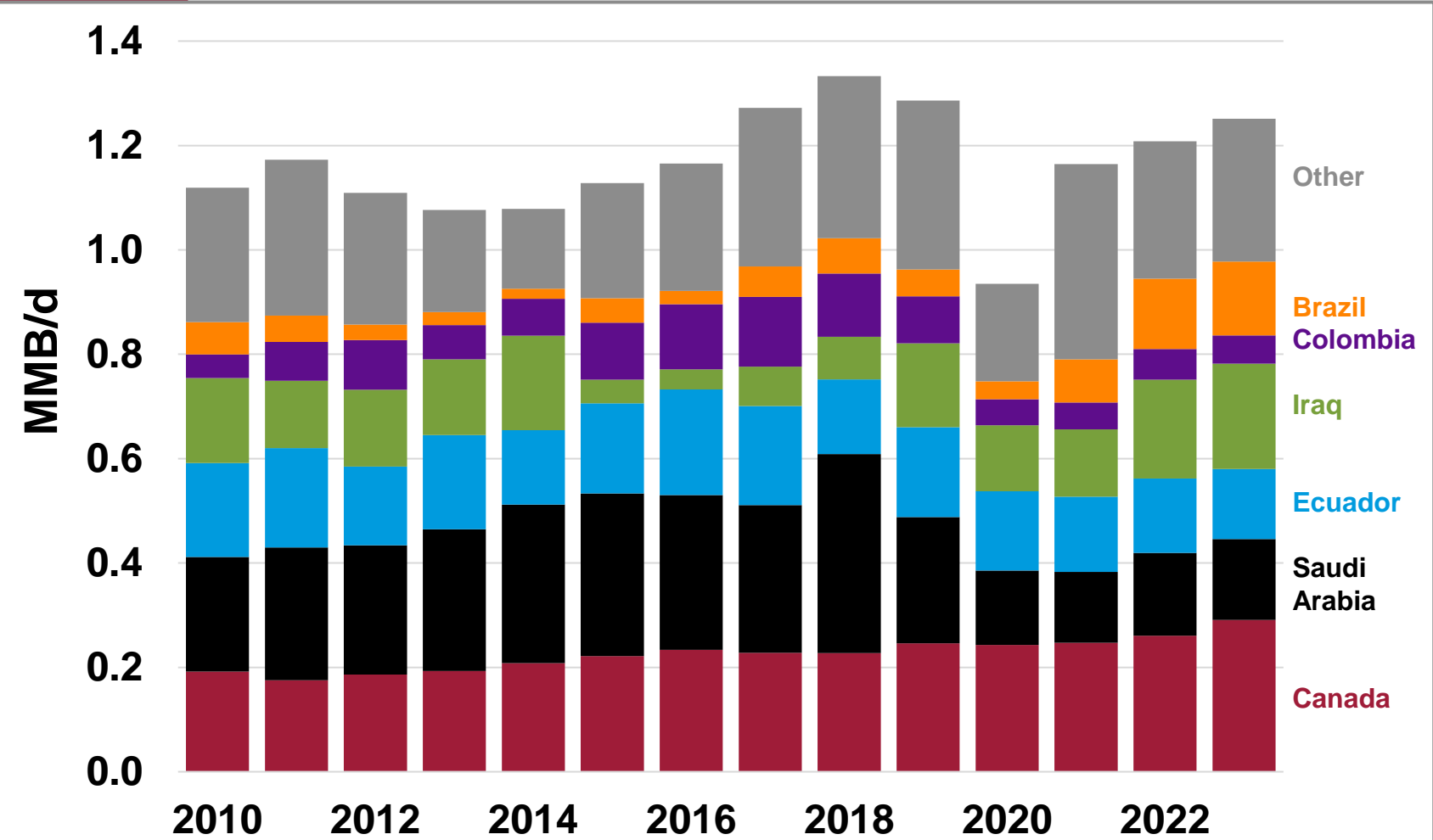


- Canada’s Westridge Marine Terminal in Burnaby provides tidewater access and is serviced by the Trans Mountain pipeline.
- In 2022, Canadian crude oil exported out of the Westridge Marine Terminal averaged 31 MB/d, and it is expected that the vast majority went to PADD 5 (West Coast).
- The Trans Mountain Expansion Project (TMEP), which encompasses an expansion of the Westridge Marine Terminal, will facilitate increased marine exports to PADD 5 as well as the potential for shipments to key markets in Asia.

Source: Canada Energy Regulator

*2023 data is YTD average up to Sep 2023

PADD 5 Crude Oil Imports by Country | Annual | 2010 to Q4/2023*

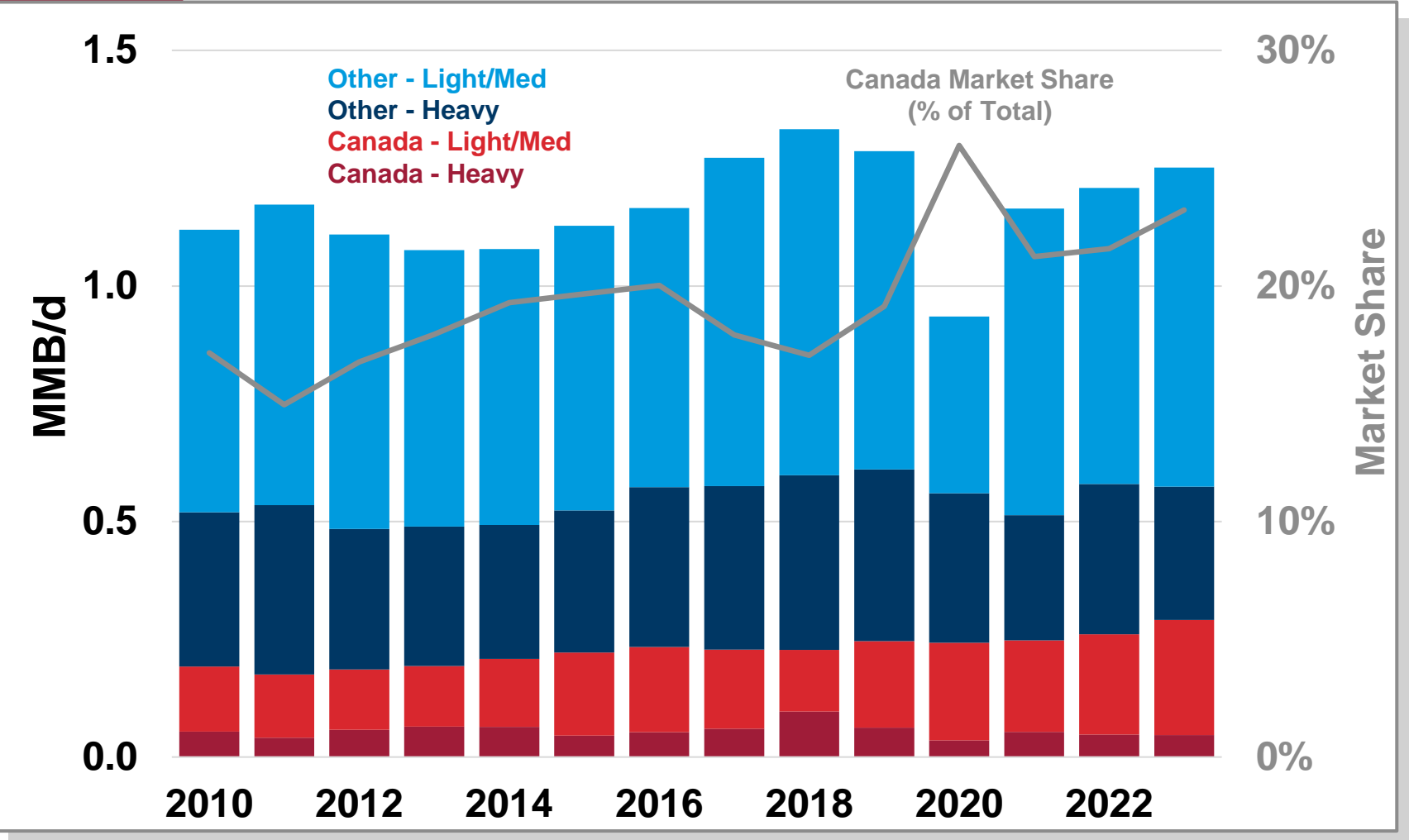


- From an import perspective, Canada, Saudi Arabia, Ecuador, and Iraq have historically been the top suppliers of crude oil for PADD 5 (West Coast) refineries.
- In 2022, 261 MB/d of Canadian crude oil was imported into PADD 5, compared to 1 MB/d and 159 MB/d from Iraq and Saudi Arabia, respectively.
- Canadian feedstock in PADD 5 has remained relatively consistent at roughly 200-250 MB/d, the majority of which is delivered into Washington state via the Trans Mountain pipeline.

Source: US Energy Information Administration

*2023 data is YTD average up to Oct 2023

PADD 5 Crude Oil Imports Canada vs. Other Sources | Annual | 2010 to Q4/2023*

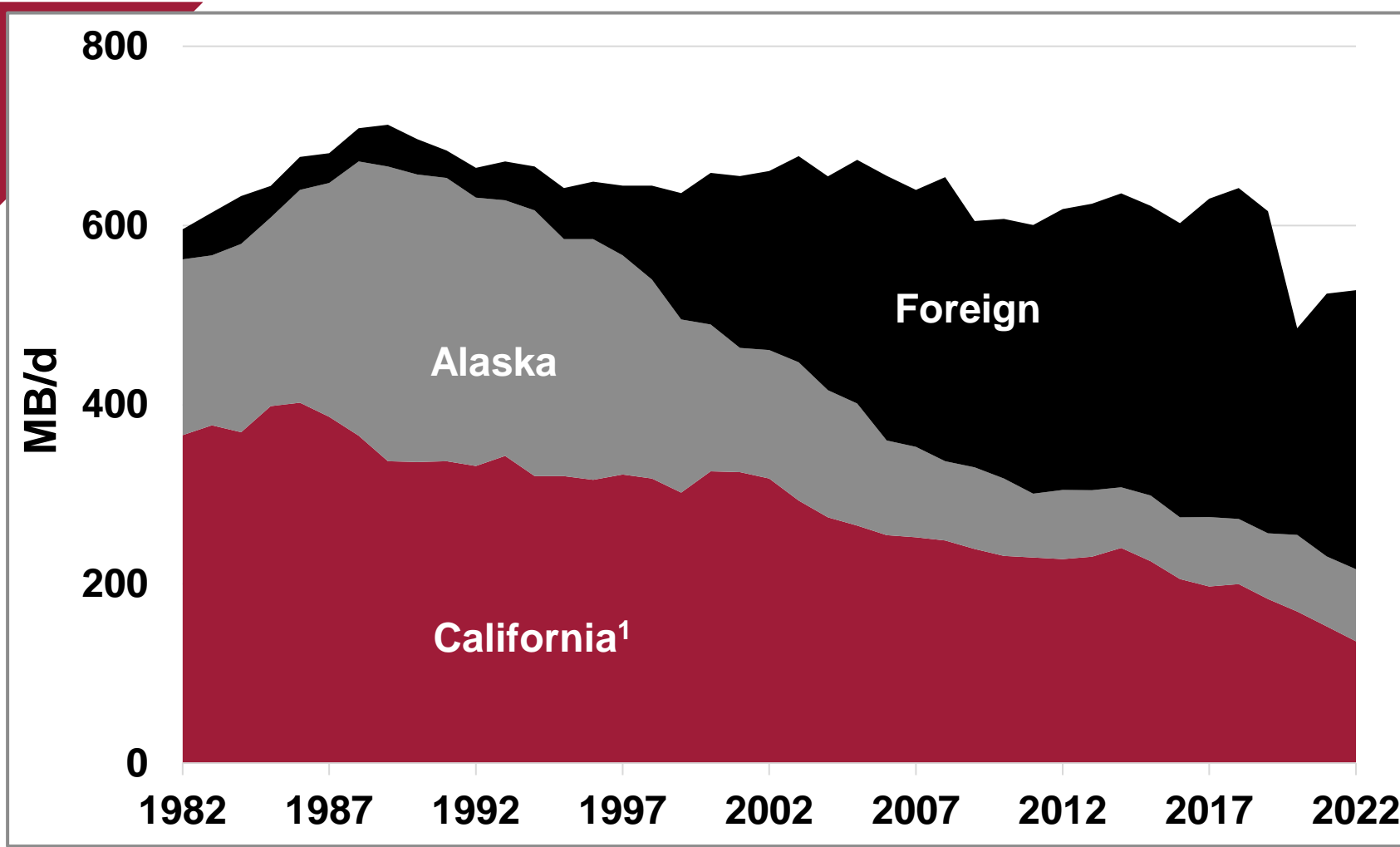


Source: US Energy Information Administration

- In PADD 5 (West Coast) Canadian imports were 261 MB/d (82% light/medium & 18% heavy) in 2022, equating to an overall market share of 22%.
- California refineries are designed to process heavy crude grades from the state's San Joaquin Valley, which is in steady decline. The region also processes Alaskan crude oils that are heavier grades.
- Upon the completion of the Trans Mountain Expansion Project (TMEP), PADD 5 presents an excellent opportunity for Canadian heavy crude oil blends to displace heavy crude oil imports from Latin America and the Middle East due to shorter transportation distances.

*2023 data is YTD average up to Oct 2023

Crude Oil Supply Sources to California Refineries | Annual | 1982 to 2022



Source: California Energy Commission

¹ California totals may also include minor amounts from North Dakota and Gulf Coast States

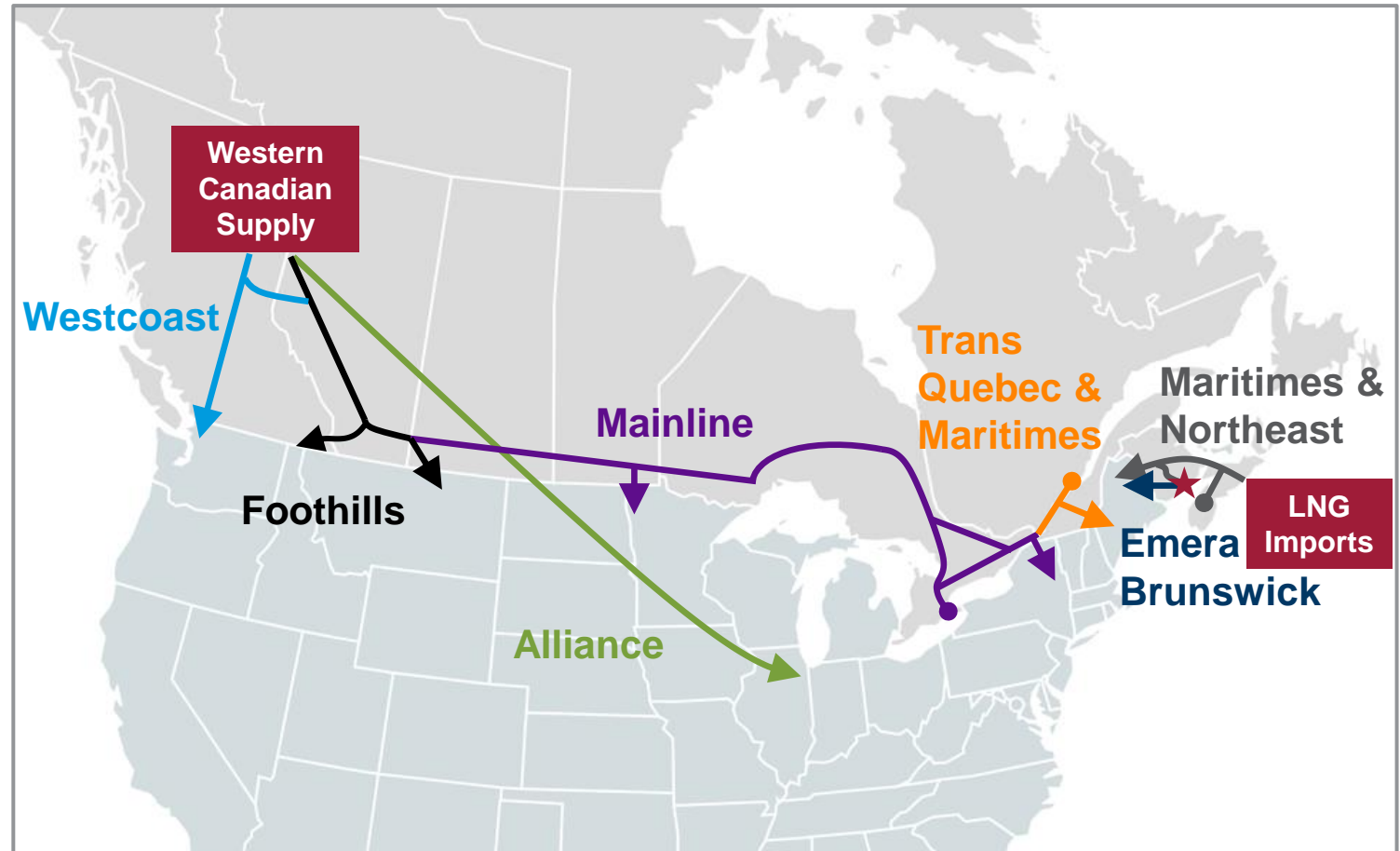
- California refineries are designed to process heavy crude grades from the state's San Joaquin Valley, as well as from Alaska, which are both in steady decline.
- Canadian heavy oil blends should also help offset declines in Alaska supply and, thanks to shorter seaborne transportation distances, should have a competitive advantage compared to competing grades of heavy crude from countries in Latin America and the Middle East.
- The Trans Mountain Expansion Project (TMEP) could increase the supply of Canadian light oil to Washington refineries, which still consume some offshore imports of light crude oil.



Natural Gas Exports

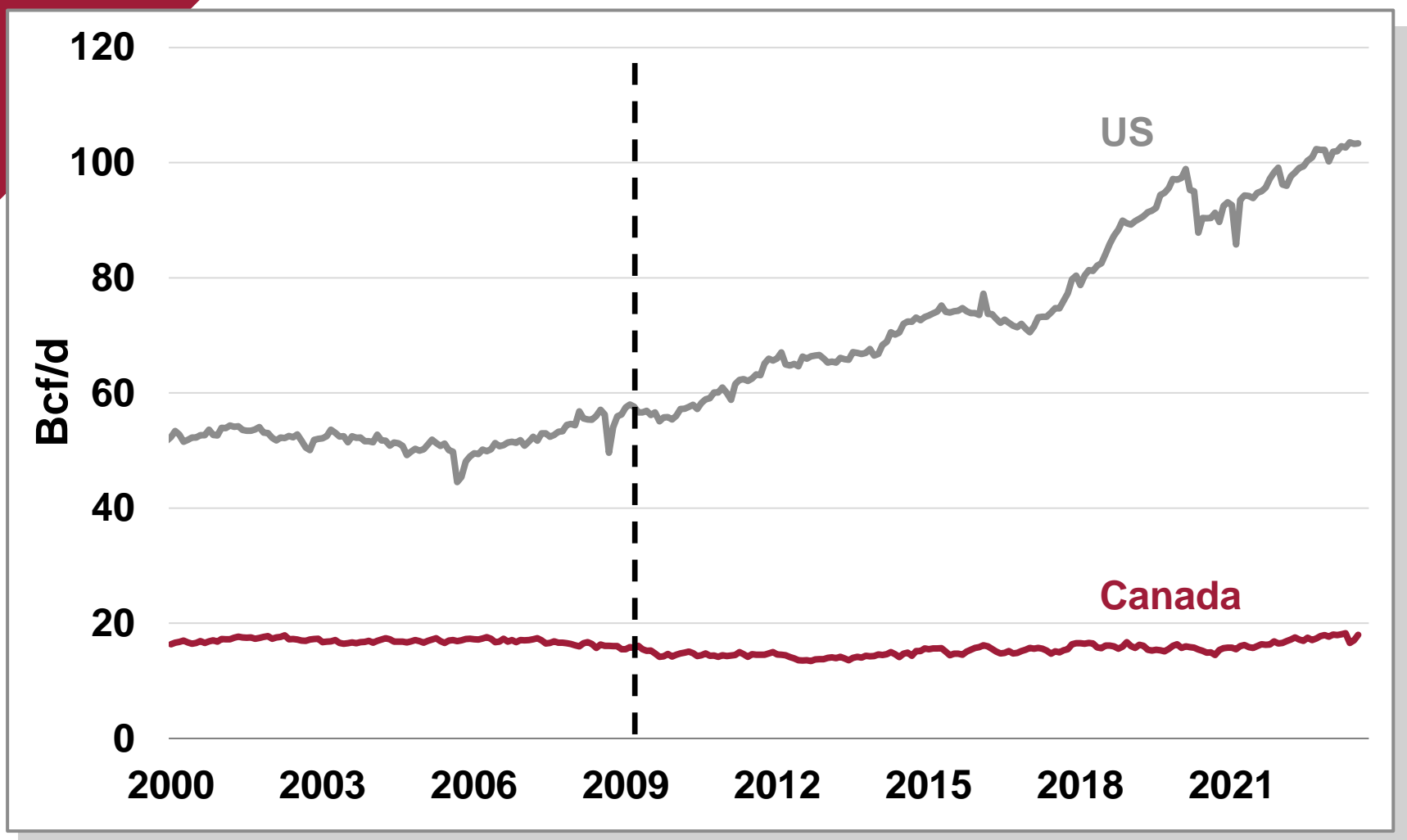
Canadian Natural Gas: Existing Export Markets and Pipeline Infrastructure

- With no current LNG export capacity from Canada, the United States is the sole export market for Canadian natural gas.
- Canada is expected to have its first LNG exports in 2025 from the West Coast, with the start-up of LNG Canada Phase 1.
- The Canadian natural gas market is highly integrated with the United States through a vast pipeline network.
- The North American shale revolution has altered the supply/demand dynamic, turning Canada's sole export market (the United States) into its main competitor.
- Increased natural gas production in the US from the Marcellus, Haynesville, and Permian has displaced Canadian natural gas in select US markets.



Source: Canada Energy Regulator

Canadian vs. US Natural Gas Production | Monthly | 2000 to Q3/2023*

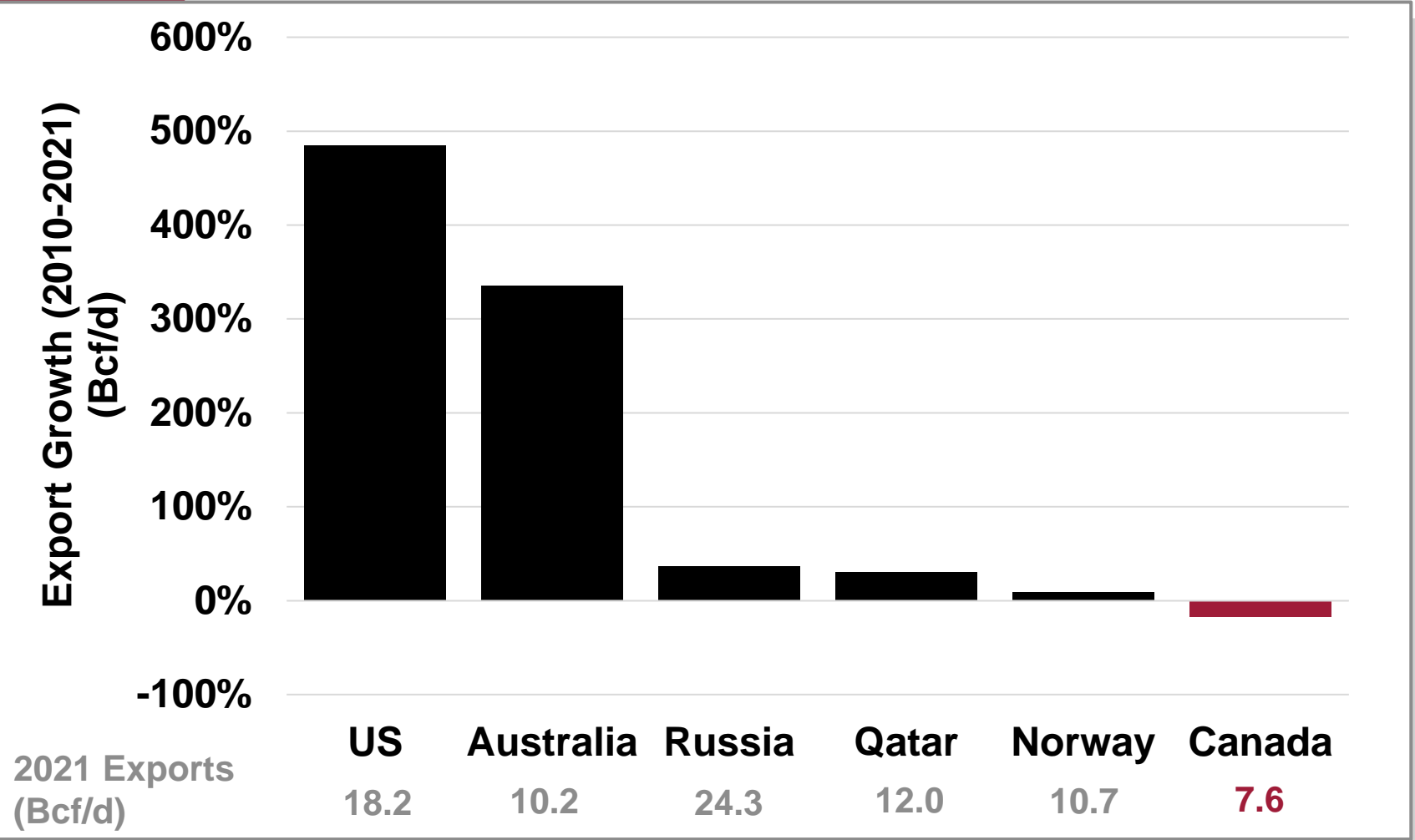


- Prior to 2009, natural gas production in Canada and the United States remained relatively consistent at ~50 Bcf/d and ~17 Bcf/d, respectively. Following the shale revolution, US natural gas production has more than doubled, supported by increased domestic demand and LNG exports.
- In Canada, tight gas plays in the Montney, Deep Basin, Duvernay, and other areas in northwest Alberta and northeast BC offer significant development potential. Growth has ultimately been constrained by limited pipeline capacity, a lack of market opportunities outside of the United States, and relative investment competitiveness amidst regulatory uncertainty.

Source: Canada Energy Regulator, US Energy Information Administration

*2023 data is up to Sep 2023

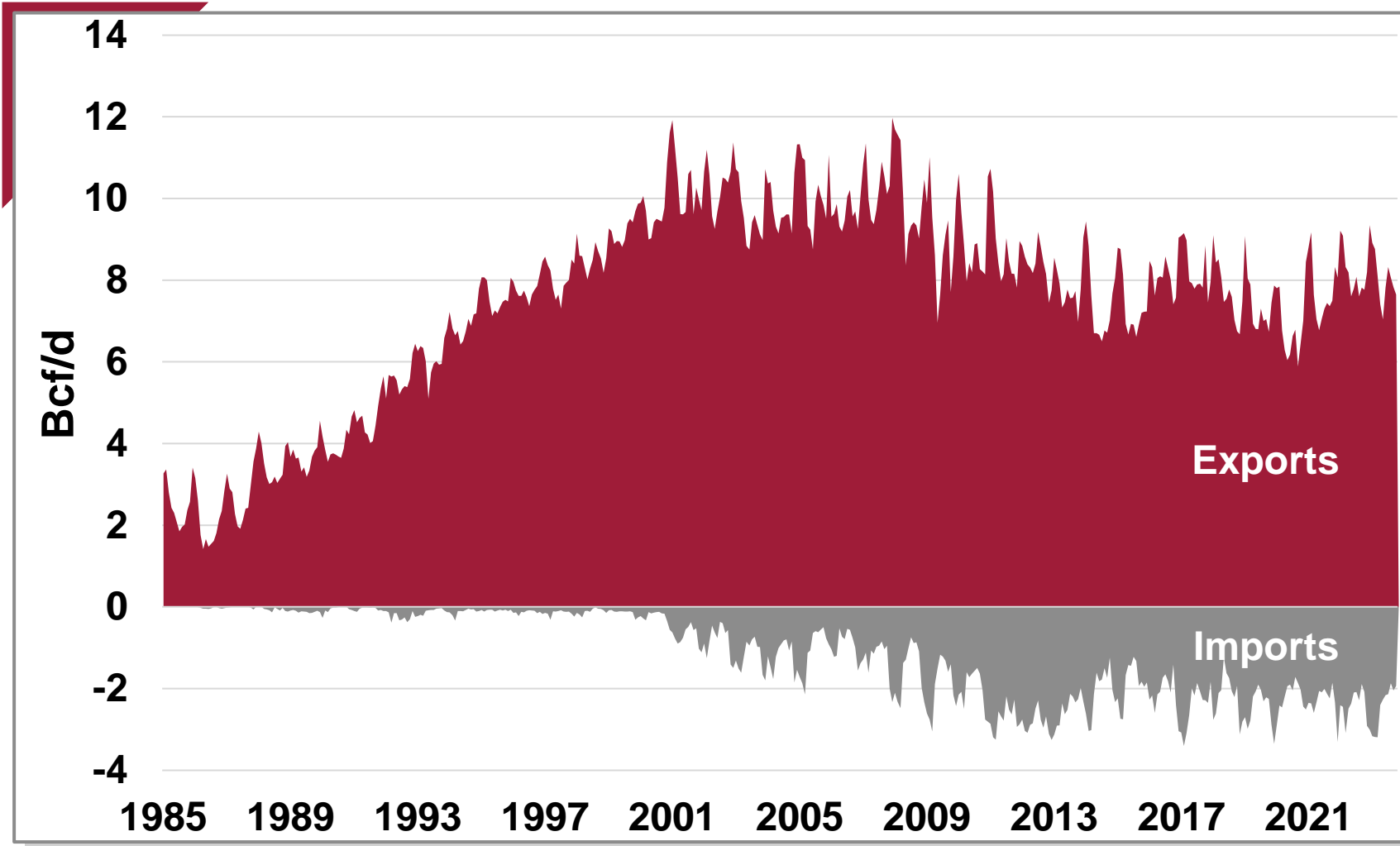
Natural Gas Export Growth by Country | 2010 to 2021



- Compared to the top natural gas producing countries, Canada has significantly lagged in the growth of its natural gas exports.
- From 2010 to 2021, the United States and Australia grew their natural gas exports by 485% and 335%, respectively.
- Over the same period, Canadian natural gas exports decreased by 18% as Canada’s sole customer, the United States, grew domestic natural gas production and put pressure on Canadian imports. A lack of LNG development has constrained Canada’s ability to seek out new customers beyond the United States.

Source: US Energy Information Administration

Canadian Natural Gas Exports/Imports | Monthly | 1985 to Q4/2023*

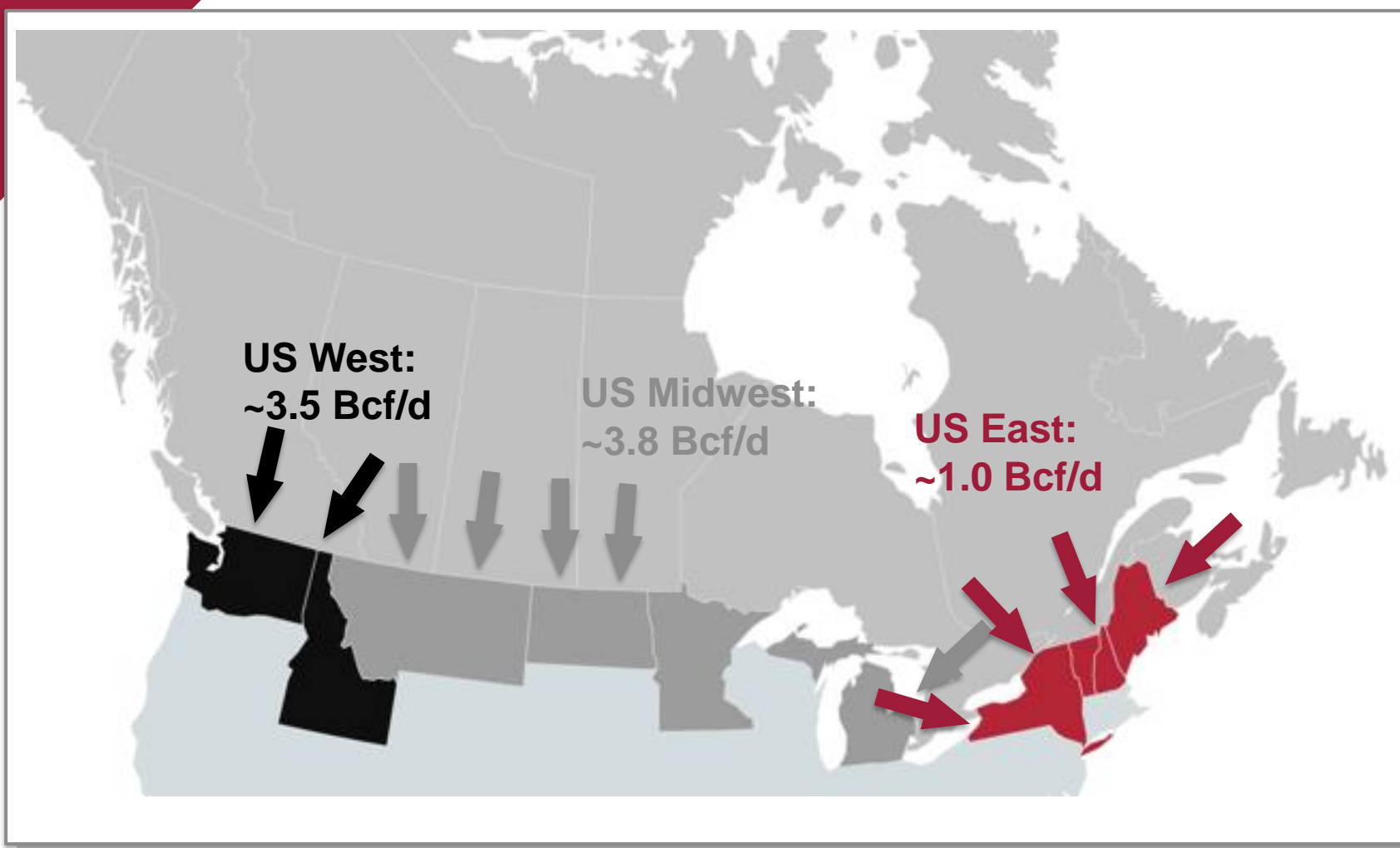


- From 1985 to 2002, Canadian natural gas exports to the United States steadily increased from ~2.5 Bcf/d to ~10 Bcf/d.
- Natural gas exports remained relatively consistent from 2002 to 2009 at ~10 Bcf/d before reaching a period of decline in conjunction with the surge of US natural gas production from the discovery of shale gas. Not only did Canada lose exports during this period, but US production also began to displace Canadian supply in Ontario and Quebec.
- Net exports averaged ~5.8 Bcf/d in 2022. After a period of decline from 2000 to 2013, Canadian exports have been relatively stable in the last 10 years.

Source: Canada Energy Regulator

*2023 data is up to Oct 2023

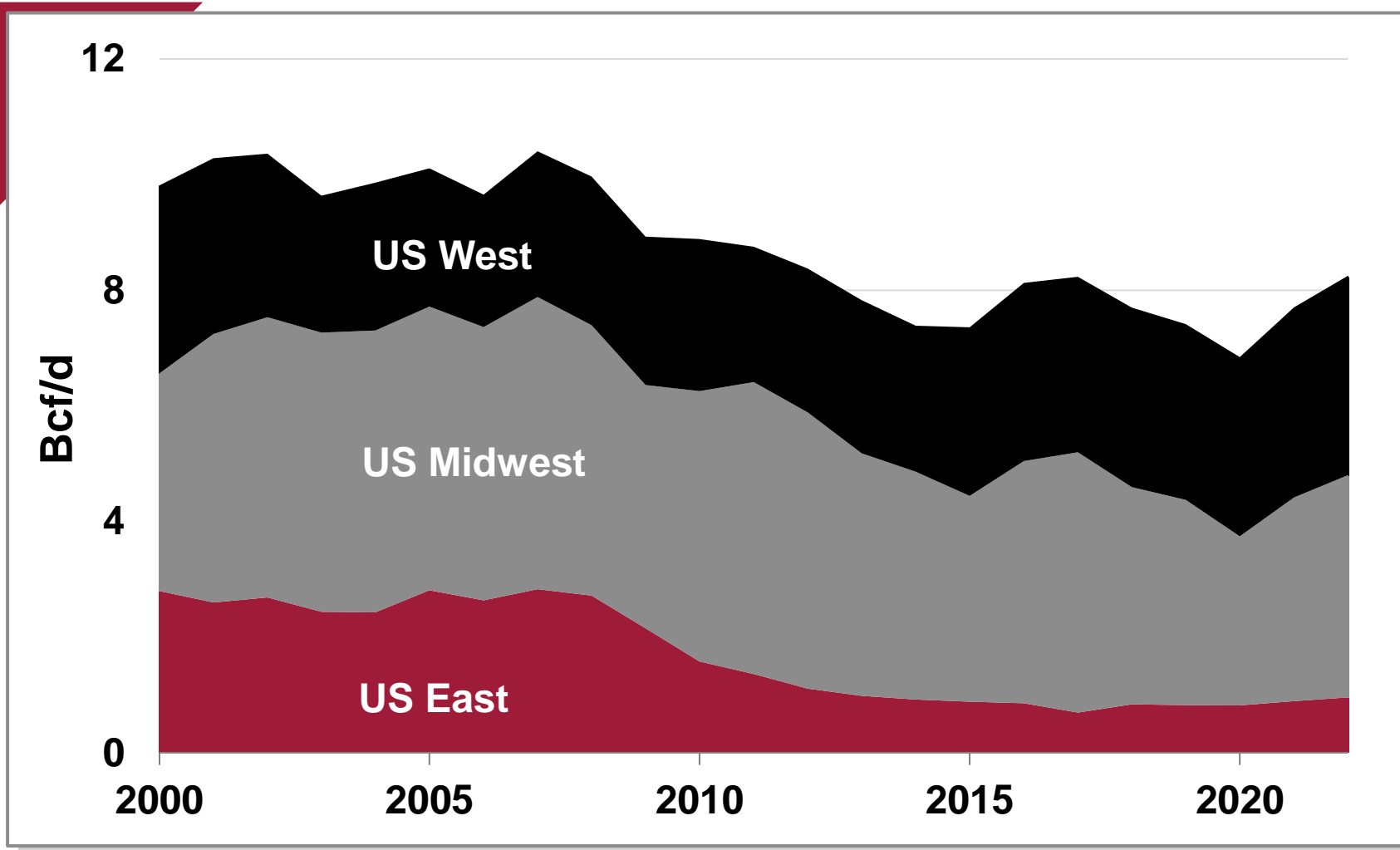
Canada Natural Gas Exports by Region | 2022



- The US Midwest is Canada's largest natural gas export market and is serviced by the Foothills Saskatchewan, Alliance, and TransCanada Mainline pipelines. Canada exported ~3.8 Bcf/d to the region in 2022.
- The US West is the next largest region for Canadian natural gas exports, accounting for ~3.5 Bcf/d in 2022. The region is serviced by the Foothills BC pipeline and the Westcoast Transmission system.
- In 2022, ~1.0 Bcf/d was exported to the US East region, which is serviced by the TransCanada Mainline and TransQuebec & Maritimes pipelines.

Source: Canada Energy Regulator

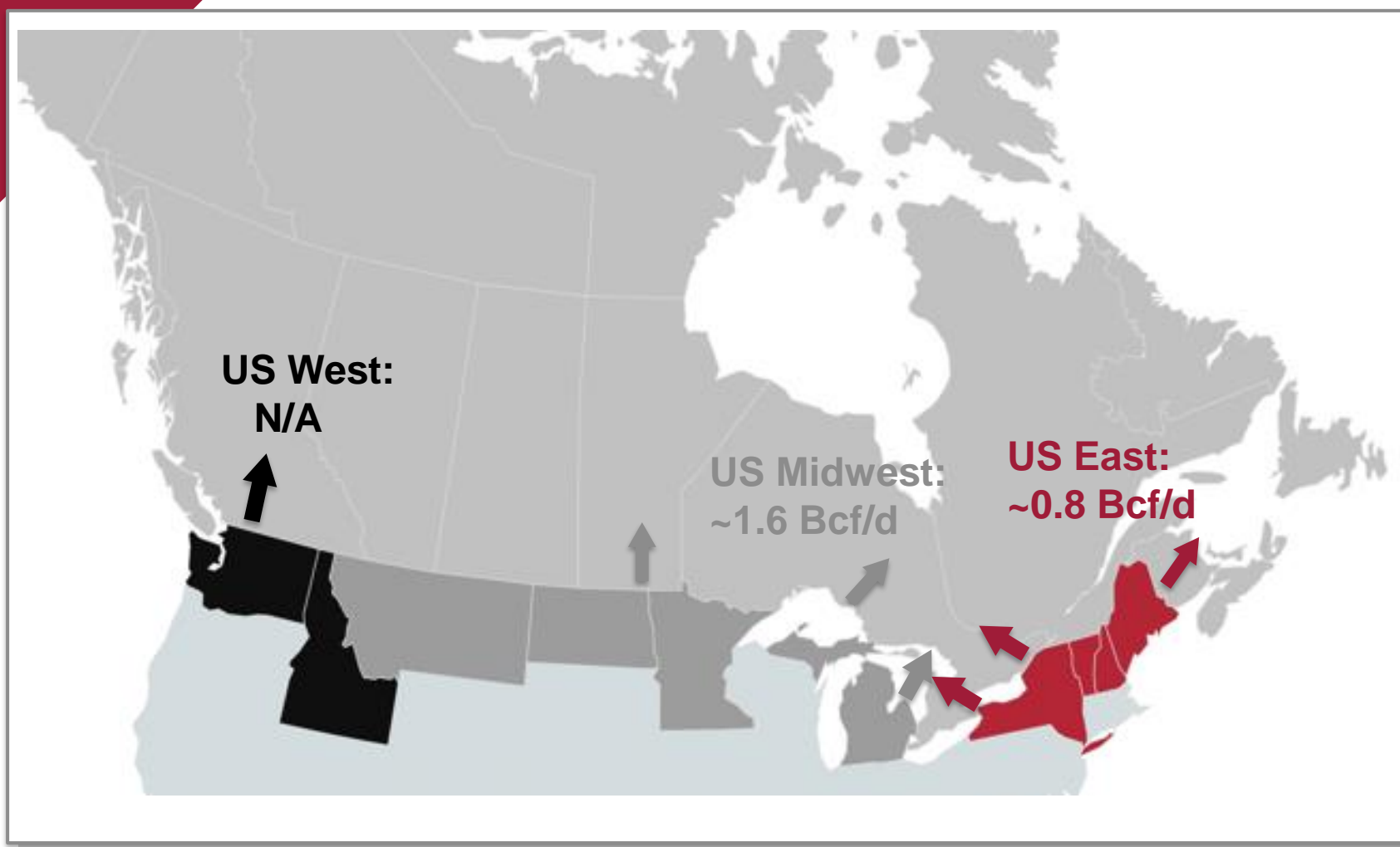
Canada Natural Gas Exports by Region | Annual | 2000 to 2022



- Traditional export markets for Canadian natural gas have changed over time due to a shift in North American supply/demand dynamics.
- Natural gas exports to the United States decreased to ~8.2 Bcf/d in 2022 from the peak of ~10.4 Bcf/d in 2007.
- From an export perspective, the change has predominantly impacted the US East region, where domestically produced natural gas from the Northeast US has displaced Canadian volumes.
- Exports to the US West and US Midwest regions have remained relatively consistent at a combined ~7.0 Bcf/d.

Source: Canada Energy Regulator

Canada Natural Gas Imports¹ by Region | 2022

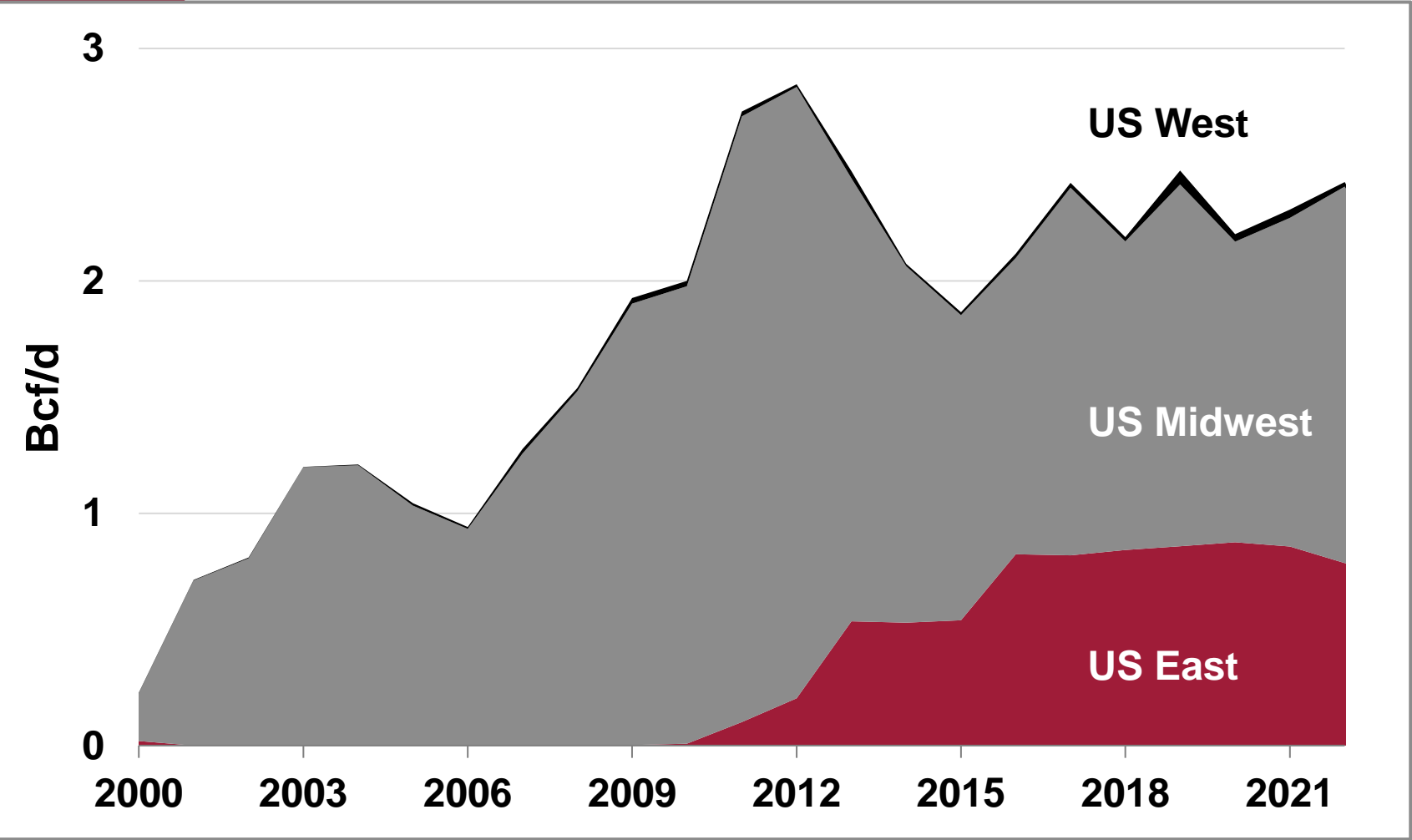


- From an import perspective, the proliferation of shale gas in the Northeast US has resulted in increased US natural gas imports into Ontario and New Brunswick.
- New Brunswick, Ontario, and Quebec are the provinces that are the most dependent on US natural gas imports.
- In 2022, ~1.6 Bcf/d was imported from the US Midwest region, predominantly into southern Ontario.
- An additional ~0.8 Bcf/d was imported into southern Ontario and New Brunswick from the US East region.

Source: Canada Energy Regulator

¹ A portion of imports in the Midwest and East regions is re-exported Canadian natural gas, which cannot be tracked. Therefore, actual US-sourced gas may be lower.

Canada Natural Gas Imports¹ by Region | Annual | 2000 to 2022

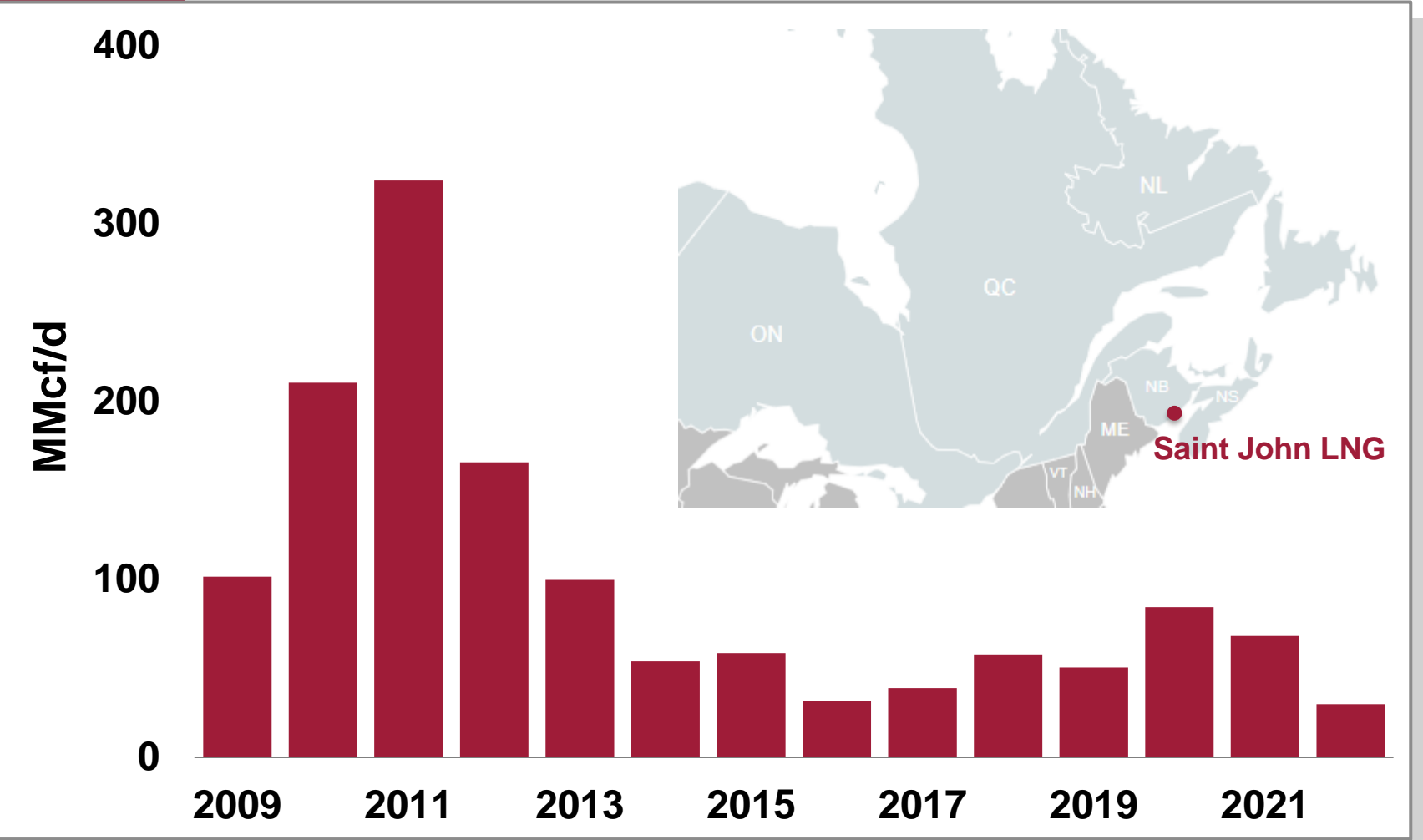


- Canadian imports into Ontario began to increase following the commissioning of the Alliance Pipeline in 2000, which transports natural gas into the US Midwest where it can then be re-imported into Ontario via interconnecting pipelines.
- The emergence of the Marcellus and Utica basins in the Northeast US resulted in Canada losing market share in the US Midwest and US East regions beginning in 2011. US growth also resulted in more US imports into Ontario and New Brunswick.
- In 2022, natural gas imports to Canada (from the United States) averaged ~2.4 Bcf/d.

Source: Canada Energy Regulator

¹ A portion of imports in the Midwest and East regions is re-exported Canadian natural gas, which cannot be tracked. Therefore, actual US-sourced gas may be lower.

Canadian LNG Imports | Annual | 2009 to 2022



- Canada’s lone LNG import terminal is located in Saint John, New Brunswick.
- Saint John LNG (formerly Canaport LNG) is a receiving and regasification terminal that supplies natural gas to New Brunswick and the Northeast US. The terminal received its first shipment in 2009, and has a maximum send out capacity of 1.2 Bcf/d.
- Saint John LNG imports peaked in 2011 at 324 MMcf/d and have declined significantly to 30 MMcf/d in 2022 amidst increased natural gas production in the US Northeast.

Source: Canada Energy Regulator, Saint John LNG

New Market Opportunities via Canadian LNG

- Continued growth of Canada's natural gas industry to meet global demand is dependent upon the development of LNG facilities in Western Canada.
- Alberta and BC are home to a vast, high-quality resource base that is held to stringent environmental standards. Canadian LNG developers are similarly held to high environmental standards while receiving support from many Indigenous communities.
- According to the Oxford Institute for Energy Studies, once operating, LNG Canada is expected to have an emissions intensity of 0.15 percent per CO₂ tonne, in accordance with the BC government's legislated LNG emissions intensity benchmark. This is roughly 40% less than the global average emissions intensity for LNG of 0.35 percent per CO₂ tonne.
- LNG shipped from coastal BC facilities would require ~50% fewer shipping days to land in markets in North Asia, compared to competing sources in the US Gulf Coast which must traverse the Panama Canal, creating uncertainty due to water levels and potential congestion.
- Currently, there are four major LNG projects (LNG Canada Phase I & II, Cedar LNG, Woodfibre LNG, and Ksi Lisims LNG) in Canada under various stages of development, totaling ~5.9 Bcf/d of future nameplate capacity potential.
- Numerous other major LNG export facilities have been proposed but none have received approval or have reached a FID, including the Saint John LNG in New Brunswick, the Grassy Point LNG project in Newfoundland, and the Tilbury Phase 2 LNG Expansion in Delta, BC.



Not to scale; For illustrative purposes only

Source: Canada Energy Regulator, Natural Resources Canada, Oxford Institute for Energy Studies, Shell Canada

Selected West Coast Canada LNG Projects Under Development

LNG Canada

- **Location:** Kitimat, BC
- **Export Capacity:** Phase I - 1.8 Bcf/d, Phase II - 1.8 Bcf/d
- **Pipeline:** Coastal GasLink (complete – late 2023)
- **Project Proponents:** Shell, PETRONAS, PetroChina, Mitsubishi Corporation and KOGAS
- **FID:** Phase 1 (Oct 1, 2018), Phase 2 TBD
- **Commercial operation date:** Est. 2025

Cedar LNG

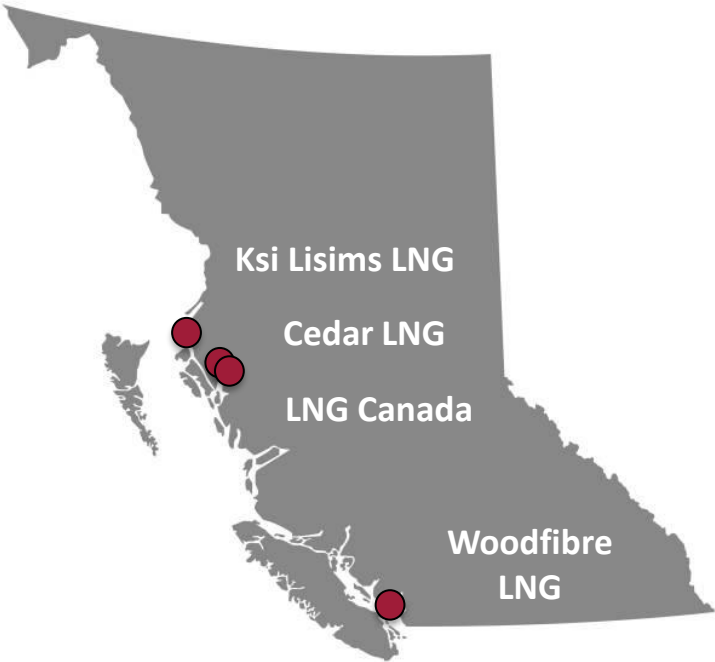
- **Location:** Kitimat, BC
- **Export Capacity:** 0.4 Bcf/d
- **Pipeline:** Coastal GasLink (complete – late 2023)
- **Project Proponents:** Pembina, Haisla Nation
- **FID:** Early 2024; EPC contract for floating LNG unit awarded in January 2024 - [LINK](#)
- **Commercial operation date:** Est. 2028

Woodfibre LNG

- **Location:** Squamish, BC
- **Export Capacity:** 0.29 Bcf/d
- **Pipeline:** Eagle Mountain (under construction)
- **Project Proponents:** Pacific Energy Corporation, Enbridge Inc.
- **Notice to Proceed:** April 2022
- **Commercial operation date:** Est. 2027

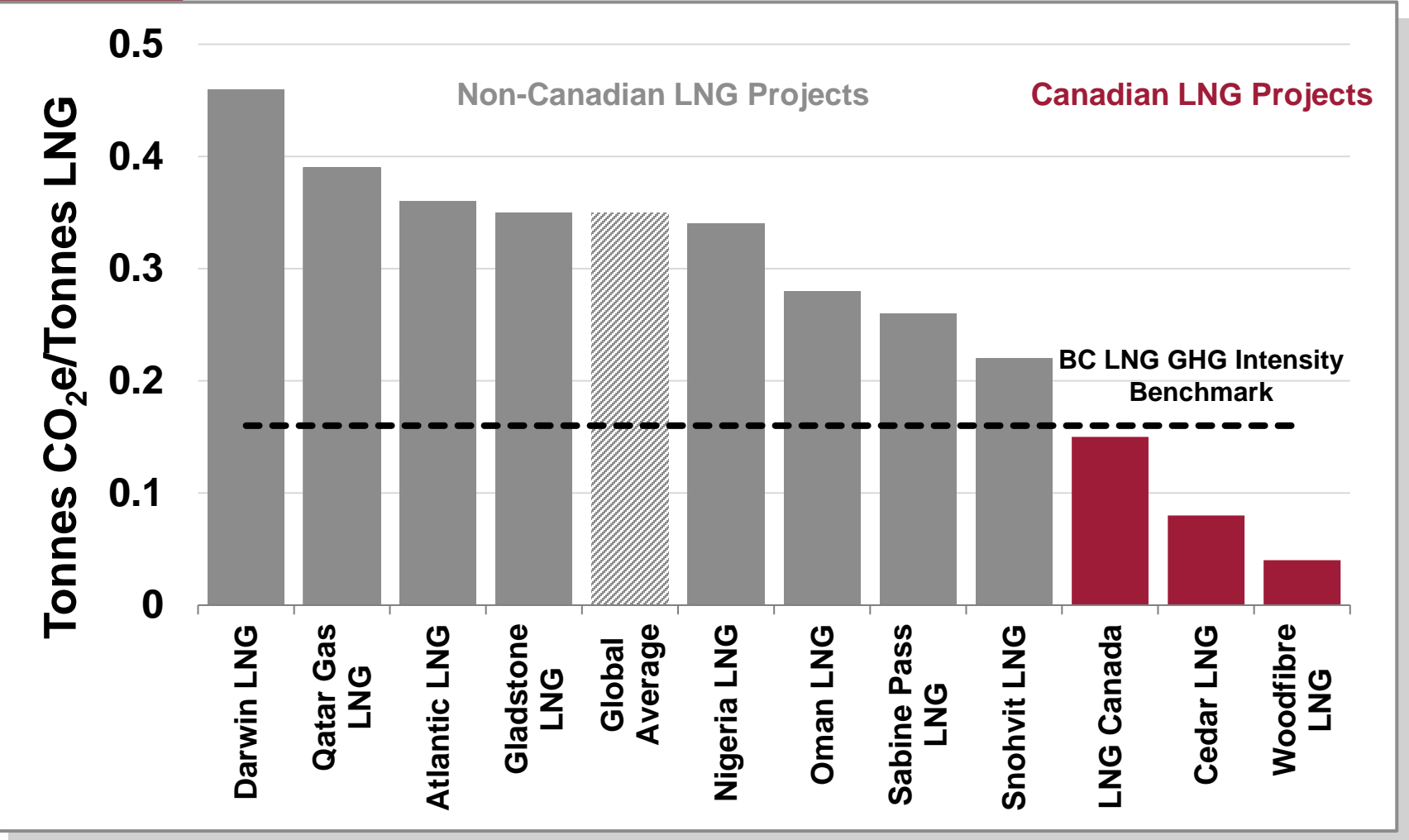
Ksi Lisims LNG

- **Location:** Wil Milt, BC
- **Export Capacity:** 1.6 Bcf/d
- **Pipeline:** TC Prince Rupert Gas Transmission
- **Project Proponents:** Nisga’a Nation, Western LNG, Rockies LNG (Canadian producer consortium)
- **FID / Commercial Operation Date:** TBD; Environmental Assessment Certificate application filed; Announced in Jan 2024 a signed 20-year LNG sale and purchase agreement with Shell



Source: Canada Energy Regulator, LNG Canada, Cedar LNG, Woodfibre LNG, Ksi Lisims LNG

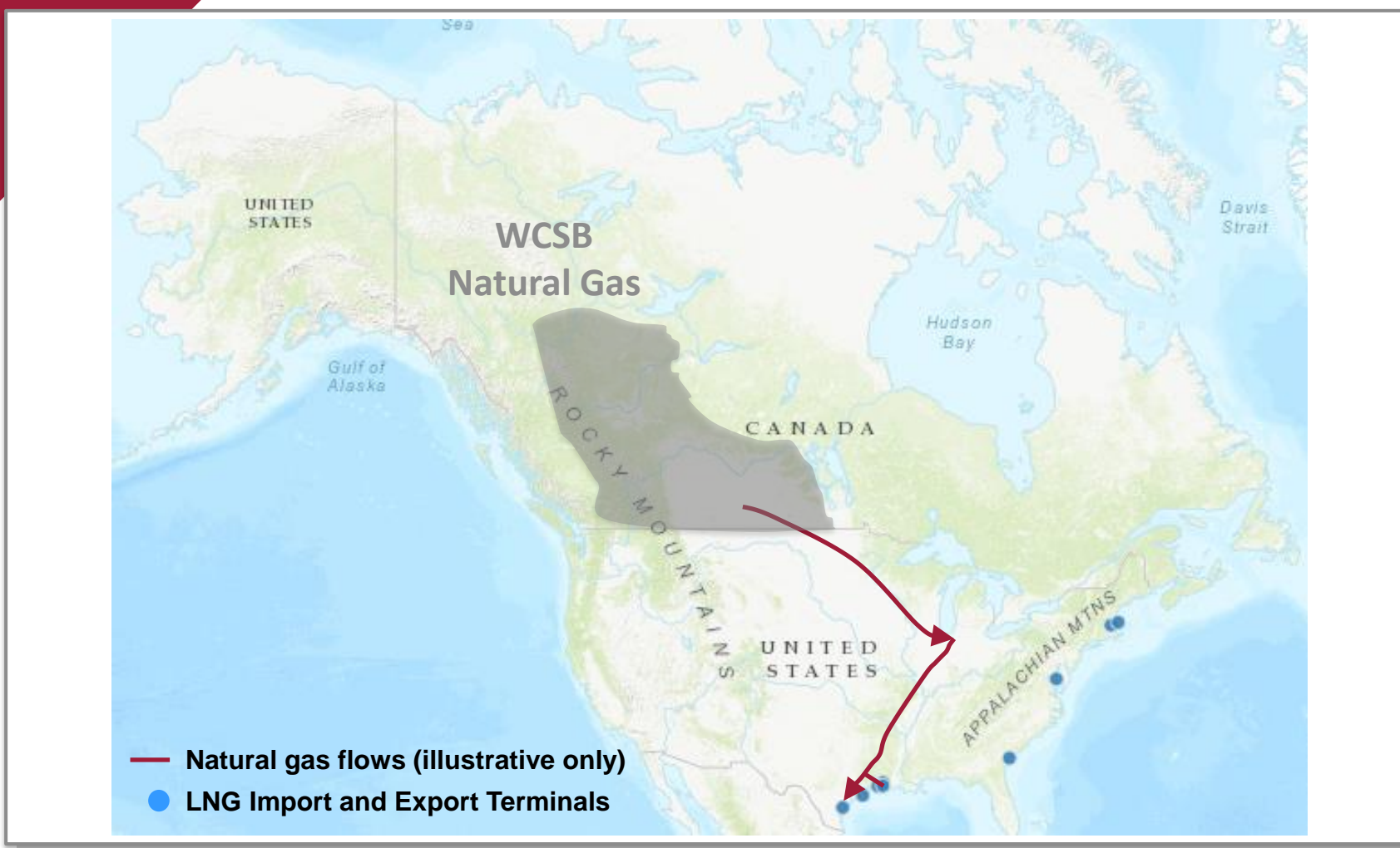
Global LNG Project Comparison by CO₂ Emissions



- Canadian LNG facilities are poised to be some of the lowest emitting in the world.
- The BC government has committed to having the cleanest LNG facilities in the world by setting a GHG intensity benchmark of 0.16 tonnes CO₂e/tonnes LNG.
- On an emissions intensity basis, LNG Canada, Cedar LNG and Woodfibre LNG will be roughly 57%, 77%, and % below the global LNG average of 0.35 tonnes CO₂e/tonnes LNG, respectively, based on current published estimates.

Source: Oxford Institute for Energy Studies, Delphi Group, LNG Canada, Woodfibre LNG, Cedar LNG, Government of BC, CAPP

New Market Opportunities via US Gulf Coast LNG



- Canadian producers can also export gas via LNG facilities in the US Gulf Coast (USGC).
- To date, select Canadian natural gas producers have signed +0.4 Bcf/d of long-term supply agreements at various USGC LNG facilities with Cheniere Energy.
- Further long-term supply agreements with USGC counterparties will likely be announced as companies look to increase their market diversification by adding exposure to international pricing through LNG.

Source: US Energy Information Administration, ARC Resources, Tourmaline Oil