Crude oil exports from the Port of Corpus Christi and the resulting CO_2 greenhouse gases

The effect on climate change of the 2015 repeal of the 1975 crude oil export ban

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April 2021

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Introduction

At least since 2018, the Port of Corpus Christi has been the largest single American exporter of crude oil. That number one status is stated on page 6 of the Port's 2018 – 2019 Annual Report located at:

https://portofcc.com/annual-report/

(That number one spot, surpassing the Port of Houston, may have started in 2017). The implications of what this means for adding CO_2 greenhouse gases to the atmosphere when the exported volumes of crude oil are combusted at the various foreign destinations are staggering. CO_2 greenhouse gases are

directly responsible for dramatically increasing non-natural, atmospheric global warming and thus creating the resultant disastrous climate change. Why is an entity in our very own community the source of such a calamitous contribution to an existential threat to the life on our planet?

On December 22, 1975, the United States passed the Energy Policy and Conservation Act (EPCA), commonly referred to as the crude oil export ban. This law was passed in response to an oil embargo imposed by OPEC, which was driven by its Arab country members, in response to the United States supporting Israel during the 1973 Arab-Israeli War, also referred to as the Yom Kippur War. The EPCA, with some minor exceptions, banned the export of all domestically produced crude oil. However, a consolidated appropriations bill, which was passed on December 18, 2015, had a clause which removed Section 103 from the EPCA. That was the part of the EPCA banning exports of crude oil.

Crude oil exports started almost immediately. The first crude oil export from the Port of Corpus Christi was on December 31, 2015 and the crude oil exports from the Port have increased dramatically year-over-year since that time. There will be more discussion of the background of the EPCA and the reasons for, and the consequences of, its repeal in the section **Why, and how, did this happen?**. In addition, that section will contain some references with regard to the EPCA historical information given above.

Amount of CO_2 greenhouse gases resulting from Port of Corpus Christi crude oil exports

But first, let us address our primary subject and dig into some of the numbers involved, i.e., the volumes of crude oil being exported from the Port of Corpus Christi to foreign destinations and the resultant massive amounts of the greenhouse gas CO_2 generated from this crude oil when it is used at those final destinations. The Port of Corpus Christi's web page "**Outbound Crude Oil – Domestic and Export Markets**", located at:

https://portofcc.com/outbound-crude-oil/

gives detailed data from January 2016 through, at the time of this writing, February 2021. This is an excerpted example of the layout of the data on that web page, although you should go ahead and take a look at the web page for yourself:

Outbound Crude Oil – Domestic and Export Markets 2021

BPD	Jan'21	Feb'21
TOTAL:	1,892,342	1,432,903
Domestic	95,850	68,878
Exports	1,796,492	1,364,025
Export %	95%	95%

BPD is the abbreviation for "Barrels per day monthly averages"

For the purposes of this paper, all of the data from that web page was inserted into a PostgreSQL relational database and then some SQL language code was written so that queries could be run to perform various calculations and also to display the data in a more illuminating format. Running one such query results in the data looking as in **Table 1** below. This is just an excerpt - the full output, back to January 2016, will be given at the end of this report. The query, in addition to putting average daily monthly barrels of crude oil exported all on one line, calculates monthly totals from the daily averages. It also shows the total amount of CO_2 generated from the consumption of the exported crude oil using the EPA's multiplier factor of 0.43 metric tons of CO_2 generated per barrel of oil consumed. The table does not include the numbers for Domestic shipments because this paper is concerned with foreign exports. In addition, since 2016, the Domestic shipment numbers have dramatically decreased as a percentage of the total and now have stabilized at around 5%:

Table 1

Month	Avg. BPD Exported	Total Barrels Exported	Avg. BPD Total	Total Barrels	Metric Tons of CO_2 Exported
2021-02	1,364,025	38,192,700	1,432,903	40,121,284	16,422,861
2021-01	1,796,492	55,691,252	1,892,342	58,662,602	23,947,238
2020-12	1,909,914	59,207,334	2,026,584	62,824,104	25,459,154
2020-11	1,613,399	48,401,970	1,731,685	51,950,550	20,812,847
2020-10	1,504,154	46,628,774	1,616,879	50,123,249	20,050,373

The EPA's multiplier factor of 0.43 metric tons of CO_2 generated per barrel of crude oil consumed is obtained from the EPA's web page "**Greenhouse Gases Equivalencies Calculator - Calculations and References"** located at:

https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

That web page has a section about ¼ of the way down which is titled "Barrels of oil consumed" and which documents that multiplier factor of 0.43. That section references, and has a link to, the "2006 IPCC Guidelines for National Greenhouse Gas Inventories" report. That Intergovernmental Panel on Climate Change 2006 report has been amended twelve times since 2006.

Now run another SQL query to simply look at the annual amount of CO_2 greenhouse gases in metric tons that is generated by the volume of crude oil that is being exported by the Port of Corpus Christi. That query also shows the year-over-year percentage increase. That data is in **Table 2** (2016 was the first export year and 2021 is incomplete, hence the N/A in the last column for those two records):

Table 2

Year	Total Barrels Exported	Total Metric Tons CO_2	Barrels % increase
2021	93,883,952	40,370,099.36	N/A
2020	555,164,689	238,720,816.27	100%
2019	277,527,802	119,336,954.86	63%
2018	169,915,025	73,063,460.75	52%

2017	111,757,735	48,055,826.05	265%
2016	30,564,482	13,142,727.26	N/A

Finally, run one last query for overall totals from January 2016 through February 2021. The result is in **Table 3**:

Table 3

Total Barrels Exported	Total Metric Tons CO_2
1,238,813,685	532,689,884.55

That's over 1.2 billion barrels of crude oil exported by the Port of Corpus Christi, and 532 million metric tons of the resulting CO_2 being emitted into the atmosphere, from January 2016 through February 2021.

What do these massive amounts of CO_2 greenhouse gases mean?

Every informed, objective and rational person knows that the massive amounts of CO_2 being spewed into the atmosphere as a result of fossil fuel usage are leading to a calamitous change in the climate. Scientists had unequivocally come to this conclusion and documented it by the late 1980's. But it is difficult to understand what these kinds of CO_2 greenhouse gas volumes mean just from a numbers perspective. In other words, it is hard to grasp two separate concepts in this regard in other than an abstract manner:

(1) What does it mean for a gas, CO_2, to "weigh" some amount. We tend to inherently envision substances in a gaseous form to be "as light as air", to just float weightlessly in the atmosphere. But simple, uninformed intuition with regard to scientific subjects can, and most often is, very misleading. It may not be until a high school or college chemistry class where someone even thinks about the fact that all molecules, even in gaseous form, have "mass", i.e., weight.

(2) What do these massive numbers mean in and of themselves, i.e., can you really get your mind around numbers like the approximately 238 million metric tons of CO_2 generated just by the 2020 exports alone? Not really. It becomes a somewhat abstract notion that does not really hit home. Just the fact of speaking in "metric tons" is an incredible concept when speaking of CO_2 greenhouse gases caused by the combustion of crude oil. And then you have the sheer magnitude of the number 238 million. Numbers like this are too easy to throw around without creating what should properly, and logically, be a very visceral, shocking impact.

One approach in trying to get such things across is to create a visualization tool. Sometimes that works, and sometimes it does not. In fact, it can be misused by those not acting in good faith. However, in this instance, it is at least an attempt at getting an idea across, an idea which is based purely on the numbers and facts.

So let us begin with such a visualization, i.e., what is the weight of this volume of CO_2 in terms of the weight of a solid slab of steel and how large is this slab of steel? All of the conversion factors given below are easily found, and verifiable, on various web sites and/or online conversion calculators, thus the links to such web pages will not be given inline here in the interest of keeping reference overload limited:

(1) One cubic foot of steel weighs approximately 490 pounds. Most of the various forms of steel are around this number.

(2) One pound = approximately 0.000453592 metric tons.

(3) Thus the weight of a cubic foot of steel in metric tons =
490 pounds * (0.000453592 metric tons / 1 pound) =
490 * 0.000453592 metric tons = 0.222 metric tons.

(4) The total weight of CO_2 greenhouse gases emitted by the crude oil exports from the Port of Corpus Christi from January 2016 through February 2021 = 532,689,884.55 metric tons (shown previously in **Table 3**).

(5) The volume, in cubic feet, of solid steel per 532,689,884.55 metric tons =
532,689,884.55 metric tons * (1 cubic foot of steel / 0.222 metric tons) =
2,399,503,984.46 cubic feet of solid steel (about 2.4 billion cubic feet).

(6) Using some basic geometry, the dimensions of a cubic foot are, of course, 1 foot x 1 foot x 1 foot. Thus the two-dimensional base area of a solid that is one cubic foot in size is, removing the dimension of height, 1 foot x 1 foot = 1 square foot. So 2,399,503,984.46 cubic feet of solid steel has a base area of 2,399,503,984.46 cubic feet * (base area of 1 square foot / 1 cubic foot) =
2,399,503,984.46 square feet of base area (about 2.4 billion square feet).

(7) A square foot = 0.000000035870064279155 square miles (scientific notation = 3.5870064E-8)

(8) So converting 2,399,503,984.46 square feet to square miles, we get:
2,399,503,984.46 square feet * (0.000000035870064279155 square miles / 1 square foot) =
86.07 square miles.

Thus the amount of CO_2 greenhouse gas which resulted from the Port of Corpus Christi exporting crude oil from January 2016 through February 2021 generated a weight of CO_2 that is equivalent to a solid slab of steel one foot high that covers 86.07 square miles. That is a square area that is 9.28 miles on all four sides.

(9) The city of Corpus Christi, according to 2019 United States Census Bureau data located at:

https://www2.census.gov/geo/docs/maps-data/data/gazetteer/2019_Gazetteer/2019_gaz_place_48.txt

has a land area of 159.703 square miles and a water area of 329.023 square miles (the water area includes Corpus Christi Bay and an area off North Padre Island). A map of the boundaries of Corpus Christi is located at (as of this writing) the "**Corpus Christi Open Data**" web site on the web page:

https://gis-corpus.opendata.arcgis.com/datasets/city-limits?geometry=-99.448%2C27.272%2C-95.276%2C28.124.

The breadcrumb is https://gis-corpus.opendata.arcgis.com/ → click on the **Boundaries** icon → in the **Search** box at the top type in "**city limits**" → click on the **City Limits** link at the top of the results.

Thus the solid slab of steel 86.07 square miles in area and one foot high would cover more than one half of the land area of Corpus Christi. Take a minute, close your eyes, take a deep breath, and try to visualize that fact.

(10) Let us assume that the Port of Corpus Christi fully intends to continue exporting crude oil at the rate that it did in 2020. Then how long would it take to double the amount of CO_2 greenhouse gases that were generated by the crude oil exported from January 2016 through February 2021, i.e., how long before we cover the entire land area of Corpus Christi with that one foot tall slab of steel? The calculation, given the numbers previously shown in tables, would be to divide the number of barrels exported between January 2016 and February 2021 by the number of barrels exported in 2020, i.e., 555,164,689 barrels. So you get 1,238,813,685 barrels * (1 year / 555,164,689 barrels) = 2.23 years.

So, in about 2 years and 3 months from the beginning of March 2021, i.e., sometime in May or June 2023, we would have that one foot tall slab of steel covering the entire land mass of Corpus Christi. Also, some would be spilling over into the water area within the city limits.

Why, and how, did this happen?

The following discussion will use information, and will quote, from the two papers below:

(1) A General Accounting Office (GAO) report requested by Senators Edward J. Markey (D-Mass.) and Tom Carper (D-Del.) which was released in October of 2020. The title is "**CRUDE OIL MARKETS Effects of the Repeal of the Crude Oil Export Ban**" and its location is:

https://www.markey.senate.gov/news/press-releases/new-gao-report-requested-by-markey-finds-lifting-oil-export-ban-results-in-higher-costs-for-american-consumers-no-reduction-in-foreign-oil-dependency

(2) A paper by Greenpeace titled "**Policy Briefing: Carbon Impacts of Reinstating the U.S. Crude Export Ban**" published in January of 2020 and located at:

https://www.greenpeace.org/usa/research/crude-export-ban-carbon/

When quoting from a specific page in those papers, the page number given in this report will refer to the page number at the bottom of the page in the respective PDF's.

Both of these papers detail the reason for the 1975 passage of the Energy Policy and Conservation Act (EPCA) that were given at the beginning of this paper in the **Introduction** section, i.e., the reason being the OPEC oil embargo of 1973. But they also detail the reasons for the 2015 lifting of the crude oil export ban. The repeal was directly related to the boom in hydraulic fracturing, i.e., fracking, that

started really taking off around 2009. This is from page 8 of the GAO report (reference superscripts have been removed for readability):

“After a decades-long decline, U.S. crude oil production began to increase in 2009. The successful application and expansion of horizontal drilling and hydraulic fracturing led to a boom in the extraction of crude oil from shale formations. Most of the crude oil produced in the United States since the shale oil boom has been light, sweet crude oil, which has characteristics that differ from heavy crude oil, which comprises most historic domestic production.”

Light, sweet crude oil means that the oil has a lower viscosity that allows it to flow at regular ambient temperatures (hence “light”) and that it is low in sulfur content (hence “sweet”). Heavy, sour crude oil is more viscous (hence “heavy”) and to allow it to flow through pipelines, various methods may have to be used (such as heating at various stages). It is called “sour” because it has a higher sulfur content. However, what was to be done with all of that light, sweet crude?

This is from page 5 of the Greenpeace report (reference superscripts have been removed for readability):

“U.S. shale oil is overwhelmingly light sweet crude, meaning it is low-density and has a low sulfur content. For much of the decade prior to the emergence of the shale boom, many U.S. refiners had optimized their refineries to process heavy sour crude. This low-quality crude is abundant primarily in Mexico, Venezuela, and Canada. During the 2000s, U.S. refiners believed secure sources of light sweet oil were in decline, and future production growth was anticipated to come primarily from sources of heavy oil, particularly the Canadian tar sands. Processing these heavier, more difficult-to-refine crude varieties meant refiners could profit from converting this cheap, low-quality feedstock into more valuable refined products, but it required large capital investments in specialized refining equipment. In America’s largest refining centers, particularly on the Gulf Coast and in the Midwest, billions of dollars were spent reconfiguring refineries to process cheap, imported heavy sour crude.

As domestic production of light oil boomed in the early 2010s, refiners found ways to increase domestic light oil processing, but soon ran up against limits. Producers feared a light oil refining wall would be hit imminently, leading to a stagnation and cessation of production growth.

Following two years of intensive lobbying on Capitol Hill, a clause to repeal Section 103 of the EPCA and remove all crude oil export restrictions was inserted into a must-pass consolidated appropriations bill, which passed on December 18, 2015. However, presidential authority to reinstate restrictions was maintained, in the case of sanctions, national security, or a presidentially declared national emergency.”

So there you have it. The repeal of the crude oil export ban stemmed from the fact that the United States did not have the capacity to refine the light, sweet crude being produced in ever more voluminous amounts. The oil industry had no intention of making the massive capital investments required to modify refineries so that they could refine light, sweet crude. The fracked crude oil had to be offloaded to foreign destinations to allow production to not only continue but to increase. The Greenpeace paper’s statement regarding the limits of domestic refining capacity for light, sweet crude oil is echoed in the GAO report on pages 9 – 10.

Again from page 5 of the Greenpeace paper, you get some background regarding the actual legislative effort to remove Section 103 from the EPCA that was driven by former Congressman Joe Barton of Texas (reference superscripts have been removed for readability):

‘I**n 2013, oil producers began a major lobbying effort to overturn the crude oil export regulations. This push was initially led by Exxon and the American Petroleum Institute. Former Congressman Joe Barton, a Republican from Texas who became the key driver of legislation to repeal the ban, recalled his being approached by ConocoPhillips lobbyists in early 2014. “I opposed the idea, because I thought we should keep our oil in the U.S. But then I heard from Scott Sheffield, the chief executive of Pioneer Natural Resources. Pioneer was a major producer in the Permian, and if the crude oil export ban was not lifted, he said, Pioneer’s future was cloudy.”**

Barton became convinced to introduce legislation to lift the export ban following industry arguments that growing U.S. production would soon outgrow its available uses at the time. “Both Conoco and Pioneer pointed out that there wasn’t a market for our growing domestic shale oil production, because our U.S. refineries were set up to process the heavier foreign oils.”’

Overall effect on crude oil exports, imports and production due to the lifting of the export ban

Here is a summary of the overall effects on U.S. crude oil exports, imports and production due to the lifting of the crude oil export ban. Again, when quoting from a specific page in the GAO and Greenpeace papers, the page number given in this report will refer to the page number at the bottom of the page in the respective PDF’s:

Exports

Just from looking at the figures for the Port of Corpus Christi given earlier in **Tables 1**, **2** and **3**, it is easy to see that exports of crude oil are increasing dramatically every year. This is the general overall national trend, not just for the Port of Corpus Christi. The increased export numbers are discussed on page 17 of the GAO report:

“After the repeal of the ban, the market for U.S. producers expanded, allowing for an increase in exports from 465,000 barrels per day to 10 countries in 2015 to almost 3 million barrels per day to 43 countries in 2019, according to our analysis.”

What is this increase in percentages? To calculate a percentage increase between two numbers, the formula is:

Percentage increase = ((second number – first number) / (first number)) * 100%.

So according to the GAO report, the percentage increase in crude oil exports from 2015 to 2019 = ((3,000,000 million barrels – 465,000 barrels) / (465,000 barrels)) * 100% = 545%.

From page 6 of the Greenpeace paper, you get the following (reference superscript has been removed for readability):

“Since December 2015, exports have grown over 750 percent, from roughly 400,000 bpd in 2015 to 3.4 million bpd in October 2019, the latest month of available figures.”

According to the Greenpeace report, the percentage increase in crude oil exports from 2015 to 2019 = ((3,400,000 million barrels – 400,000 barrels) / (400,000 barrels)) * 100% = 750%.

Depending on how particular oil analysts arrive at some of these numbers, and the possible small variations in time spans being used, you may get the barrel variations seen in these two calculations. The numbers, no matter how you look at them, indicate a massive increase in crude oil exports.

Imports

Basically, crude oil imports have not changed since the repeal of the export ban. This is from Page 17, Footnote 32, of the GAO report:

“Prior to the repeal of the export ban, U.S. imports of crude oil were trending down, from about 9.2 million barrels per day in 2010 to about 7.4 million barrels per day in 2015. After the repeal of the ban, U.S. imports of crude oil increased for 2 years—from about 7.4 million barrels per day in 2015 to about 8 million barrels per day in 2017—before decreasing again in 2018 and 2019.”

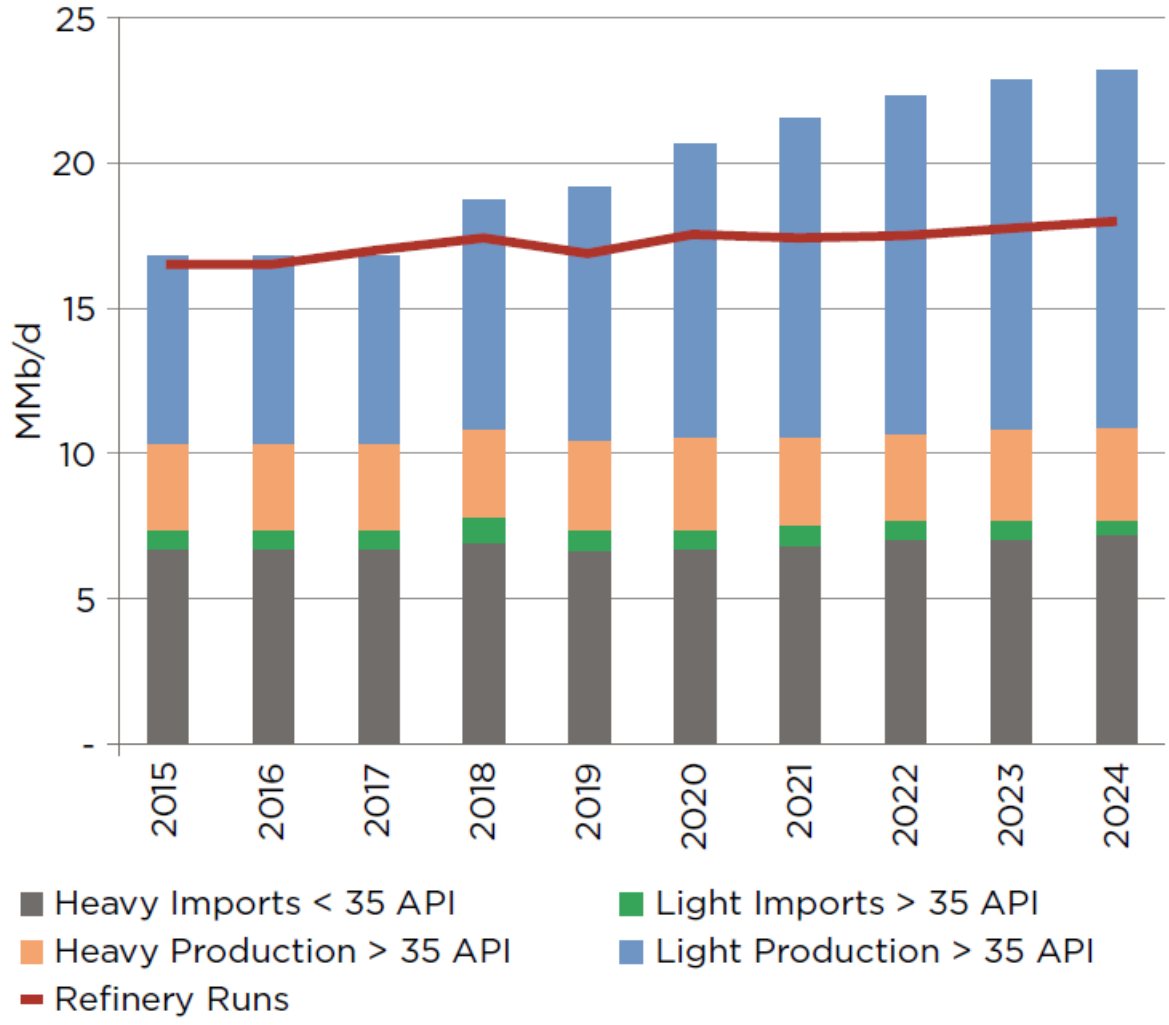
From page 20 of the GAO report (reference superscripts have been removed for readability):

“In addition, imports of refined products increased by 10 percent from 2015 to 2019, according to our analysis, and were not substantively affected by the repeal of the ban, according to four of the economists and market analysts we interviewed.”

The Greenpeace report, on page 7, shows data from “**U.S. oil and gas industry experts RBN Energy**”. The below quote and chart from page 7 indicate that there is very little projected change in the amount of heavy crude oil imports until at least 2024:

“The chart shows that there has been very little change in heavy oil refining since 2015, and RBN expects current heavy crude imports of around 6.5 million bpd to remain constant to at least 2024, continuing to feed the heavy crude optimized refineries discussed above.”

Figure 3: RBN Energy Analysis of U.S. Crude Supply/Demand/Export Balance



Source: RBN Energy[24]

Any statement asserting that the exporting of crude oil to foreign destinations is making the U.S. energy independent is patently false, which should be self-evident just on the face of it.

Production

Domestic production of crude oil has increased at the same sharp rate as exports, i.e., domestic production increases are due entirely to the ability to export the crude oil. Production and export of crude are now in a positive feedback loop, i.e., the more that is exported, the more incentive there is to keep dramatically increasing production.

This is from the GAO report on page 18 (reference superscript has been removed for readability):

"The expanded market and higher prices for U.S. crude oil after the repeal of the ban provided stronger incentives for greater investment in domestic crude oil production, according to eight of the nine economists and market analysts we interviewed. These incentives eventually caused production to increase compared to what it would have been had the export ban remained in place. According to EIA data, total production of U.S. crude oil rose by roughly one-third, from

approximately 9.3 million barrels per day just before the repeal of the ban in December 2015 to about 12.8 million barrels per day in December 2019."

This is from page 7 of the Greenpeace report (reference superscripts have been removed for readability):

'As this briefing's main analysis will show, oil production growth lowers global oil prices, stimulates oil demand, and leads to higher global carbon dioxide emissions. Rystad Energy's base case projection for U.S. oil production, which closely matches the EIA's High Oil and Gas case, suggests that production could reach over 18.9 million bpd by 2032. This would be over 50 percent growth from 2019 levels, and is predicated on the continued absence of climate policies or other regulation to constrain U.S. oil production. As RBN Energy's analysis clearly shows, all of this production growth would likely be exported. If it cannot be exported, then it is highly unlikely that so much oil will be produced.

As Jim Teague, the chief executive of Enterprise Products, the U.S.'s largest crude exporter, told The Dallas Morning News in November 2019, "Without the crude oil export ban repeal, the United States would not be producing half of the oil it is today because it could not be exported."'

The consequences for climate change given current and planned levels of crude oil production and export – the 1.5°C temperature limit is likely out of reach

The Greenpeace paper states very clearly the consequences for climate change should the United States continue to produce crude oil for export. This is from page 2 of that report (reference superscripts have been removed for readability):

"A growing body of research has shown that continued investment in fossil fuel extraction will put global climate goals out of reach. The contradiction between a climate-safe emissions trajectory and increasing fossil fuel production is most stark in the United States, which the shale boom has made the world's leading oil and gas producer. One key factor in triggering this boom was the 2015 removal of the decades-old ban on crude oil exports."

Also from page 2 of that Greenpeace report:

"In this briefing, we find that reinstating the U.S. crude oil export ban could lead to reductions in global carbon emissions by as much as 73 to 165 million metric tons of CO2-equivalent each year."

Finally, from page 2 of the Greenpeace report:

“This range of carbon emissions reductions is the equivalent of closing between 19 and 42 coal plants, and delivers a carbon benefit comparable to implementing President Barack Obama’s proposed light-duty vehicle efficiency standards.”

The Greenpeace paper, in Endnote 2 at the end of the paper, references a website named “**Production Gap Report**” located at https://productiongap.org/. The Home page of that website states the following:

“The Production Gap Report report, first launched in 2019, measures the gap between Paris Agreement goals and countries’ planned and projected production of coal, oil, and gas.

This year’s special issue of the report finds that the production gap remains large: countries plan to produce more than double the amount of fossil fuels in 2030 than would be consistent with a 1.5°C temperature limit.”

What should be done about this: reinstate the crude oil export ban

Obviously, the crude oil export ban should be reinstated. This is from page 2 of the Greenpeace report:

“The next president and Congress must reinstate the crude oil export ban as one part of a suite of ambitious Green New Deal policies to phase out fossil fuel production, ensure justice and equity for workers and communities, and transform the U.S. economy.”

There has already been an attempt at this by Senators Edward Markey, D-Mass., Ron Wyden, D-Ore., and Jeff Merkley, D-Ore. On Sept. 19, 2019, they introduced Bill S. 2527, i.e., “**The Block All New Oil Exports Act**” (also called the “**BAN Oil Exports Act**”). The web page is located at:

https://www.congress.gov/bill/116th-congress/senate-bill/2527

On that web page, you can click on the **Text (1)** tab for the full text of the act. There was never a roll call vote related to this bill. There was an earlier, almost identical, version of this bill, S. 2886, introduced on May 21, 2018 by Senator Edward Markey. That bill also never came to a vote:

https://www.congress.gov/bill/115th-congress/senate-bill/2886

Without reinstating the crude oil export ban, there is very little chance of achieving the goals set by the **United Nations Climate Change Paris Agreement of 2015** (ironically, the same year that the crude oil export ban was repealed in the United States). The website is located at:

https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

As stated on that United Nations Climate Change Paris Agreement website:

“The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016.

Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.”

Action to take in the Coastal Bend to get the crude oil export ban reinstated

While attempting to reinstate the crude oil export ban is obviously an effort that entails a national political and environmental organization effort, there are efforts that can be undertaken here at the local Coastal Bend level to try and get this accomplished. Basically, it entails a large-scale informational and educational outreach to the general public that would include the following:

(1) Informing the general public of the disastrous effects of climate change, not only globally, but right here locally.

(2) Getting across the idea that moving away from fossil fuels for all citizens across the globe, but especially here in Texas, is doable. Moving away from fossil fuels is of course a massive undertaking and entails a hard fight against extremely powerful vested interests. But it does not have to entail economic hardship for people and communities if everyone works together and is committed to making a just transition in the move to renewable energy. It simply must be done.

This is a subject that is too extensive to be covered in this paper, so there will be more work forthcoming in this regard.

Full reformatted crude oil export data from the Port of Corpus Christi website

As mentioned previously, in the section **Amount of CO2 greenhouse gases resulting from Port of Corpus Christi crude oil exports**, **Table 1** in that section was just an excerpt of the full reformatted crude oil export data from the Port of Corpus Christi website. Below is the full table with all of the data:

Table 1 - all Port of Corpus Christi crude oil export data

Month	Avg. BPD Exported	Total Barrels Exported	Avg. BPD Total	Total Barrels	Metric Tons of CO_2 Exported

2021-02	1,364,025	38,192,700	1,432,903	40,121,284	16,422,861
2021-01	1,796,492	55,691,252	1,892,342	58,662,602	23,947,238
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2020-09	1,690,184	50,705,520	1,794,123	53,823,690	21,803,374
2020-08	1,784,025	55,304,775	1,868,682	57,929,142	23,781,053
2020-07	1,580,677	49,000,987	1,743,671	54,053,801	21,070,424
2020-06	1,288,857	38,665,710	1,405,401	42,162,030	16,626,255
2020-05	1,261,523	39,107,213	1,379,091	42,751,821	16,816,102
2020-04	1,207,122	36,213,660	1,460,597	43,817,910	15,571,874
2020-03	1,466,869	45,472,939	1,683,837	52,198,947	19,553,364
2020-02	1,504,492	43,630,268	1,598,601	46,359,429	18,761,015
2020-01	1,381,469	42,825,539	1,603,294	49,702,114	18,414,982
2019-12	1,336,067	41,418,077	1,494,088	46,316,728	17,809,773
2019-11	1,222,378	36,671,340	1,336,133	40,083,990	15,768,676
2019-10	1,338,176	41,483,456	1,463,837	45,378,947	17,837,886
2019-09	1,182,802	35,484,060	1,294,067	38,822,010	15,258,146
2019-08	685,221	21,241,851	902,578	27,979,918	9,133,996
2019-07	409,671	12,699,801	559,523	17,345,213	5,460,914
2019-06	513,653	15,409,590	666,016	19,980,480	6,626,124
2019-05	398,592	12,356,352	586,678	18,187,018	5,313,231
2019-04	491,087	14,732,610	706,612	21,198,360	6,335,022
2019-03	489,089	15,161,759	617,472	19,141,632	6,519,556
2019-02	490,718	13,740,104	663,126	18,567,528	5,908,245
2019-01	552,542	17,128,802	690,565	21,407,515	7,365,385
2018-12	551,823	17,106,513	710,586	22,028,166	7,355,801
2018-11	416,140	12,484,200	571,241	17,137,230	5,368,206
2018-10	559,331	17,339,261	736,550	22,833,050	7,455,882
2018-09	488,217	14,646,510	689,813	20,694,390	6,297,999
2018-08	470,139	14,574,309	659,660	20,449,460	6,266,953
2018-07	307,699	9,538,669	568,723	17,630,413	4,101,628
2018-06	480,376	14,411,280	619,243	18,577,290	6,196,850
2018-05	522,019	16,182,589	656,585	20,354,135	6,958,513
2018-04	499,537	14,986,110	582,313	17,469,390	6,444,027
2018-03	499,500	15,484,500	648,656	20,108,336	6,658,335
2018-02	441,422	12,359,816	623,233	17,450,524	5,314,721
2018-01	348,428	10,801,268	458,153	14,202,743	4,644,545
2017-12	350,663	10,870,553	513,582	15,921,042	4,674,338
2017-11	304,348	9,130,440	494,614	14,838,420	3,926,089
2017-10	497,570	15,424,670	683,053	21,174,643	6,632,608
2017-09	441,702	13,251,060	603,030	18,090,900	5,697,956
2017-08	197,649	6,127,119	399,845	12,395,195	2,634,661
2017-07	257,004	7,967,124	533,771	16,546,901	3,425,863
2017-06	311,816	9,354,480	484,834	14,545,020	4,022,426
2017-05	271,079	8,403,449	497,117	15,410,627	3,613,483
2017-04	339,464	10,183,920	532,588	15,977,640	4,379,086
2017-03	235,035	7,286,085	480,306	14,889,486	3,133,017
2017-02	267,061	7,477,708	526,615	14,745,220	3,215,414

2017-01	202,617	6,281,127	463,034	14,354,054	2,700,885
2016-12	154,862	4,800,722	433,837	13,448,947	2,064,310
2016-11	151,243	4,537,290	412,667	12,380,010	1,951,035
2016-10	78,569	2,435,639	397,173	12,312,363	1,047,325
2016-09	198,577	5,957,310	409,693	12,290,790	2,561,643
2016-08	86,575	2,683,825	309,668	9,599,708	1,154,045
2016-07	34,980	1,084,380	341,183	10,576,673	466,283
2016-06	79,968	2,399,040	316,429	9,492,870	1,031,587
2016-05	25,644	794,964	322,102	9,985,162	341,835
2016-04	48,257	1,447,710	366,818	11,004,540	622,515
2016-03	86,693	2,687,483	374,017	11,594,527	1,155,618
2016-02	7,520	218,080	352,422	10,220,238	93,774
2016-01	48,969	1,518,039	434,479	13,468,849	652,757

Revisions

(1) August 2021 – In the section **What do these massive amounts of CO2 greenhouse gases mean?**

In numbered item (8), the sentence:

> That is a square area that is 86.07 miles on all four sides.

Has been changed to:

> That is a square area that is 9.28 miles on all four sides.

However, the original description of a solid slab of steel that “would cover more than one half of the land area of Corpus Christi” is still correct.

(2) August 2021 – In the section **What do these massive amounts of CO2 greenhouse gases mean?**

There were two consecutive items numbered “(9)”. The second item is now correctly numbered “(10)”.