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Transitional Gas: Canadian LNG Exports Could Provide Europe's Energy Security and Hasten a Net-Zero Future

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Exercise Solo Flight

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TRANSITIONAL GAS: CANADIAN LNG EXPORTS COULD PROVIDE EUROPE'S ENERGY SECURITY AND HASTEN A NET-ZERO FUTURE

INTRODUCTION

On 29 June 2021, Canada signed into law the Canadian Net-Zero Emissions Accountability Act (The Act)[1]. The Act, though a domestic policy, signaled to the global community Canada's intention to move rapidly towards a state of net-zero carbon dioxide (CO_2) emissions and placed an emphasis on use of low-carbon intensity fuels and renewables. The primary renewables are solar, wind, hydropower, and biofuels[2]. The altruistic goals of the law, to combat CO_2-driven climate change, are approached with a strategy which ignores an important and complex consideration: energy security. Coined in the 1970s in response to the fuel crisis, the use and meaning of the term has evolved over time and, considering world events, is increasingly relevant today[3]. The constraints The Act places on development of natural gas resources, most notably by a moratorium on government investment, are problematic from an energy security standpoint because renewables remain far from capable of replacing traditional fuel sources[4].

At a baseline, one could consider energy security to be the ability to "ensure reliable energy is available at reasonable prices."[5] However simple, this definition contains some significant implications which require further consideration. Notably, from where the energy is sourced: Europe may have considered itself to have achieved a reliable energy supply prior to the Ukraine-Russia war but was reliant on Russia as its main supplier of natural gas[6]. After the invasion, Russia severely cut back its natural gas supplies to Europe resulting in energy prices in 2022 being over seven times higher than their previous four-year average (2016-2020)[7]. The

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[1] Environment and Natural Resources Canada, *Canada's 2030 Emissions Reduction Plan* (Ottawa: Environment and Natural Resources, 2022), last modified 22 June 2022, https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030/plan.html.

[2] International Energy Agency, "Energy System: Renewables," accessed 7 April 2024, https://www.iea.org/energy-system/renewables.

[3] A simple definition of energy security is the availability of sufficient and stable energy supplies, at affordable prices. There is a great deal of nuance concealed in this simple definition, some of which will be discussed in this essay. For a deeper dive into energy security, see: Michael T. Klare, "Energy Security," in *Security Studies*, ed. Paul D. Williams and Matt McDonald, 4th ed. (United Kingdom: Routledge, 2023), 592-593, accessed 26 February 2024, https://ebookcentral.proquest.com/lib/cfvlibrary-ebooks/reader.action?docID=7185965&ppg=591&pq-origsite=summon; see also, Matthew Foss, "The impact of renewables on energy security," *Canadian Foreign Policy Journal* 28, no. 3 (Sep 2022): 236, 238, accessed 26 February 2024, www-tandfonline-com.cfc.idm.oclc.org/doi/full/10.1080/11926422.2022.2118138.

[4] Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security: practical considerations for a low-carbon transition," *Canadian Foreign Policy Journal* 28, no. 3 (Nov 2022): 202, accessed 26 February 2024, https://www.tandfonline.com/doi/full/10.1080/11926422.2022.2122524.

[5] Matthew Foss, "The impact of renewables..., 236.

[6] Michael T. Klare, "Energy Security ..., 601-602.

[7] International Energy Agency. *How to Avoid Gas Shortages in the European Union in 2023 A practical set of actions to close a potential supply-demand gap* (Paris: IEA, 2022), 6, accessed 4 April 2024, https://www.iea.org/reports/how-to-avoid-gas-shortages-in-the-european-union-in-2023

experience in Europe demonstrated the risk of being too reliant on a single supplier. It can be seen, therefore, that energy security requires avoiding the situation where a single supplier can leverage a critical energy source to threaten or punish the recipient[8]. With this in mind, a recent Canadian international policy suggests that it should take Europe's energy security into consideration: sanctions on Russia.

Canada joined the global effort to sanction Russia following its invasion of Ukraine. Sanctions cut both ways, so levying them means Canada has decided that denouncing Russian actions and acting against Russia's economy are worth potentially harming Canadian economic interests[9]. The most effective element of Canadian sanctions on Russia was unfortunately not impacts to Russia's economy but joining the West in a collective denunciation of Russian aggression[10]. Despite unprecedented sanctions, the Russian economy remains viable, even growing in 2023[11]. Because Russia is a petroleum exporter, one upon which Europe is heavily reliant, the impact of sanctions is buffered by the EU's inability to cut off natural gas imports[12].

Canada has sent two important policy signals to the international community: an attempt to establish itself as a leader in the transition to net-zero and a denunciation of Russia's aggression. These are not mutually exclusive goals. Being a leader means accepting certain realities which are discussed in this paper. First, transitioning to a net-zero future will still involve using fossil fuels for the next several decades[13]. Second, achieving reductions in CO_2 emissions by switching from coal to natural gas is a positive step even if not the final one. Finally, Russia is a geopolitical foe which derives a significant proportion of its GDP from oil and gas exports. Other OPEC countries, while not foes, are not friends either. Canada, as a

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[8] Michael T. Klare, "Energy Security..., 594.
[9] Daniel W. Drezner, "The Hidden Hand of Economic Coercion," *International Organization* 57, no. 3 (2003): 643-644, accessed 8 May 2024, doi:10.1017/S0020818303573052.
[10] George Tsouloufas and Matthew Rochat, "Revisiting the effectiveness of economic sanctions in the context of Russia's invasion of Ukraine," *Canadian Foreign Policy Journal* (17 May 2023): 11-12, Accessed 8 October 2023, https://doi-org.cfc.idm.oclc.org/10.1080/11926422.2023.2198247.

[11] World Bank, "Russian Federation: The Head of ACRA Predicted the Growth of the Russian Economy in the Summer of 2023," *MENA Report*, Sep 30, 2022, accessed 4 May 2024, https://login.cfc.idm.oclc.org/login?url=https://www.proquest.com/wire-feeds/russian-federation-head-acra-predicted-growth/docview/2719625964/se-2; see also, Jason Bordoff and Meghan L. O'Sullivan, "The Age of Energy Insecurity: How the Fight for Resources is Upending Geopolitics," *Foreign Affairs* 102, no. 3 (May, 2023), accessed 26 February 2024, https://www.foreignaffairs.com/world/energy-insecurity-climate-change-geopolitics-resources
[12] Michael T. Klare, "Energy Security..., 601-602.
[13] Michael T. Klare, "Energy Security..., 596. Indeed, it is important to recognize that net-zero does not mean *no* fossil fuels, it means that use of fossil fuels, or other CO_2-emitting fuels, is balanced by actions to capture, absorb, or negate the CO_2 production. Net-zero implies a continued emission of CO_2 and thus a future in which carbon-based fuels remain in use.

leader, must recognize that transitioning too quickly to a net-zero future hands Russia and OPEC a dangerous share of the oil and gas market, and the power that goes with it[14].

Recognizing that transition to net-zero will require natural gas as an alternative to coal and oil and to provide continued energy when renewables fail, Canada can enable a global transition to net-zero without sacrificing energy security, while preventing authoritarian regimes from gaining dangerous control, by developing LNG exports to support Europe's transition to net-zero over the next 30 years.

DISCUSSION

Meeting Net-Zero: Not Immediately

Canada is not alone in working towards net-zero emissions. The Paris Climate Agreement, which went into effect in 2016, had many signatories[15]. Europe has made substantial changes to its energy sources which have resulted in reductions of greenhouse gas emissions. Use of renewable energy sources like wind and solar power have increased dramatically, but most of its reductions to greenhouse gas emissions have been brought about by replacing coal with natural gas to produce electricity[16]. There are a few reasons why Europe, and the rest of the Paris Agreement signatories, have not simply transitioned to fully renewable energy sources.

Most countries have developed policies favouring renewables like wind and solar power, including significant investment in technological development and deployment: there is political will to transition[17]. There are clear benefits to wind and solar power: the energy source can be locally produced, is free, and no outside agent can wield them as a weapon to threaten a geopolitical foe[18]. When the clear benefits and political will to embrace renewables are considered, there is no reason to believe that supply-side pressures will drive a faster transition to renewables; there are practical challenges to deploying them at a scale which can replace fossil fuels[19]. Development of these renewables requires sources of special minerals which are not universally available. In fact, whereas there are many countries which export oil and gas, most minerals required for wind and solar power, and for the advanced electrical storage required by

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[14] Michael Lynch, *Shifting Oil Industry Structure and Energy Security Under Investment Phase-Outs* (Washington, DC: Energy Policy Research Foundation), 11, accessed 28 March 2024, https://eprinc.org/wp-content/uploads/2021/11/Evolution-of-the-Oil-Industry-FINAL.pdf.

[15] Michael T. Klare, "Energy Security..., 597; see also, Jason Bordoff and Meghan L. O'Sullivan, "The Age of Energy Insecurity.

[16] Matthew Foss, "The impact of renewables..., 243.

[17] U.S. Energy Information Administration, International Energy Outlook (Washington, DC, 2023), 33, accessed 7 April 2024, https://www.eia.gov/outlooks/ieo/index.php; see also, International Energy Agency, " World Energy Outlook," accessed 8 May 2024, https://www.iea.org/reports/world-energy-outlook-2023.

[18] Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 213.

[19] By supply-side pressures I refer to reductions of fossil fuel supplies ahead of renewable capacity to replace them. Most states want to transition but have practical limitations preventing them from doing so quickly.

them, comes from or is processed in China[20]. Canada has identified deposits of all required elements and could potentially have a significant global impact in this domain[21].

Another concern, especially for regions of high population density, is the land use requirements for power generation: wind power requires about 10 times more land per unit of electricity generated than nuclear power and solar power 100 times more land use[22]. Given the benefits of wind and solar power, to onshore energy supplies and to achieve greenhouse gas reduction targets, European states have worked around some of these challenges: notably with large wind farms in the littoral seas surrounding western Europe[23]. As a result, Europe produces 16-20% of its energy needs through wind and solar power[24].

The most important challenge with wind and solar power is that they are not always available: the sun does not always shine, and the wind does not always blow. The intermittent nature of these power sources means that an alternative, reliable source is required to ensure a stable power supply[25]. For the foreseeable future, that means hydrocarbons. For climate-minded Europe, meeting its climate goals while ensuring a stable power supply meant switching from coal to natural gas – with Russia being the biggest supplier[26]. When Europe levied economic sanctions against Russia in response to its invasion of Ukraine, Russia responded by cutting natural gas exports to Europe. To meet domestic electricity demands with reduced Russian gas supply, EU countries were forced to increase coal-fired power supplies[27]. Coal is more CO_2-

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[20] Michael T. Klare, "Energy Security..., 600-601; see also, Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 213.

[21] Maryscott Greenwood, "New relevance for Canada on the world stage," *Canadian Foreign Policy Journal* 28, no. 3 (2022), 339-340, accessed 9 December 2023, https://doi-org.cfc.idm.oclc.org/10.1080/11926422.2022.2117219; see also, Natural Resources Canada, Critical Minerals Centre of Excellence, last modified 11 December 2023, accessed 4 May 2024, https://www.canada.ca/en/campaign/critical-minerals-in-canada/critical-minerals-an-opportunity-for-canada.html. Assessing Canada's potential to supply the elements required for development of solar and wind power and for advanced batteries is an intriguing area to study. It is beyond the scope of this paper, but the viability of Canada's natural resources should be carefully evaluated and considered at a national policy level under both environmental and national security lenses.

[22] Matthew Foss, "The impact of renewables..., 242.

[23] I have sailed through the English Channel to Northern Germany and around Denmark into the Baltic Sea. The deployment of offshore wind farms is stunningly impressive.

[24] International Energy Agency, "Countries & Regions: Europe, Energy Mix" accessed 8 May 2024, https://www.iea.org/regions/europe/energy-mix; see also, Matthew Foss, "The impact of renewables..., 243. For context, Canada produces less than 7% of its electricity from wind and solar, though it does produce a significant amount of hydroelectric power: International Energy Agency, "Countries & Regions: North America, Canada, Energy Mix" accessed 8 May 2024, https://www.iea.org/countries/canada/energy-mix.

[25] Matthew Foss, "The impact of renewables..., 242-243. The alternative source must be one that can be switched on and off quickly in response to changing environmental conditions. This rules out nuclear power as the alternative as the fission cells produce unabated power once activated.

[26] Michael T. Klare, "Energy Security..., 601-602.

[27] International Energy Agency. *How to Avoid Gas Shortages* ..., 11.

intensive than natural gas, and much of the EU's progress towards its climate change goals was realized by switching from coal to natural gas, so this was an undesirable regression[28].

Considering the above factors, it is unsurprising that modeling conducted by the US Energy Information Administration (EIA) predicts that natural gas will remain an important energy source globally and in Europe through 2050[29]. In some cases, the EIA predicts that Europe's natural gas demand will grow to support strong economic growth. Also importantly, the EIA predicts an increase in energy demand of 34% by 2050[30]. Notably, industrial economies will be relying on either coal or natural gas to fuel their economies even as non-fossil fuel sources increase[31]. These evolving trends were exacerbated by Russia's invasion of Ukraine. In 2019, fossil fuels made up 84% of global energy production and renewables had insufficient capacity to support the post-COVID economic recovery[32]. Following the invasion, prices of oil, coal, and natural gas spiked creating a global energy crisis. This meant that Europe's energy security required acquiring fuel sources in an increasingly competitive environment. It also meant that states working to develop industrialized economies had fewer resources to invest in renewables and were more likely to revert to the cheapest power available: coal or oil. On the one hand, these events challenged Canada's, and the other Paris Agreement signatories', goals of reducing greenhouse gas emissions. On the other hand, they created an opportunity for Canada to leverage its natural gas resources to reverse Europe's increased coal use and thus reduce greenhouse gas emissions.

Canada's Natural Gas Source: Significant, But Challenging

Canada is the world's fifth largest natural gas producer, but its exports have been almost exclusively to the United States[33]. This was good business for decades, but the US shale gas revolution meant an increase in American domestic natural gas production and a declining demand for Canada's more expensive natural gas[34]. Because Canada lacks liquefaction facilities to produce Liquified Natural Gas (LNG) it has been unable to access more lucrative markets: as of 15 May 2024, natural gas in Europe was selling for about 4 times the North American rate[35].

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[28] Matthew Foss, "The impact of renewables..., 238, 243; see also, International Energy Agency. *How to Avoid Gas Shortages in the European Union*..., 11.
[29] U.S. Energy Information Administration, *International Energy Outlook*..., 37.
[30] Ibid., 8.
[31] Ibid., 13, 32.
[32] Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 203-204.
[33] Ibid., 210.
[34] Andrei Romaniuk, Hamid Rahmanifard, and Hossein Hossein, "*Canadian Crude Oil and Natural Gas Production, Supply Costs, Economic Impacts and Emissions Outlook (2019-2039)*," C*anadian Energy Research Institute* (Calgary: Canadian Energy Research Institute, 2019), 12, accessed 7 April 2024, https://canadacommons-ca.cfc.idm.oclc.org/artifacts/1182973/canadian-crude-oil-and-natural-gas-production-supply-costs-economic-impacts-and-emissions-outlook-2019-2039/1736102/; see also, Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 210.
[35] Jennifer Winter et al, "The Potential for Canadian LNG Exports to Europe," *The School of Public Policy publications* 11 (Jan. 2018), 26, 31 accessed 4 May 2024, https://www.proquest.com/docview/2204835839?parentSessionId=aeU30lT8LD2TbATX7ROXcHXHH8iqZBEZrO

Tellingly, a 2018 report by the Calgary-based School of Public Policy identified that one major challenge to developing a viable business case for developing pipelines and LNG facilities was the lack of difference between the North American and European price points for natural gas, a situation which has ameliorated[36]. With the energy crisis gripping the world, Canada's Senate believes that Canada has a singular, urgent, opportunity to develop its export capability to benefit from diversified markets and to insulate it from less favourable trade with the US[37].

It must be conceded that development of a LNG export capability to Europe which bypasses the US is not a trivial matter. Although proven reserves are significantly higher than production, accessing those reserves is a challenge. Eastern Canadian provinces have all enacted moratoriums on hydraulic fracturing which leaves most of their natural gas reserves inaccessible[38]. This means that Western Canada, predominantly Alberta, or the United States are the only sources of natural gas for potential LNG export terminals in Quebec or the Maritimes. Given the increased domestic demand in the US, and the value to the US of exporting their surplus to Europe or Asia, the US is unlikely to be a reliable source - which effectively rules out the Maritimes as an export hub[39]. That leaves Western Canada and the TransCanada Mainline pipeline to Quebec as the sole viable source. There is one LNG facility being proposed in Quebec, Stolt LNGaz, which has a direct connection to the pipeline. This facility would face two major challenges to be competitive: cost of pipeline transport and liquefaction. The proposed facility is relatively small scale, but its connection to a pipeline, access to labour, and supply of inexpensive hydroelectric power could help reduce some of the base costs and make the facility a viable business proposition[40].

It must also be borne in mind that the report analyzing the viability of this facility was written before Russia invaded Ukraine and natural gas prices outside North America increased. Furthermore, development of LNG exporting facilities in Eastern Canada could spur production in the Western basin and potentially mitigate some of the up-front costs. The Canadian government can further support the development of LNG export to Europe by recognizing LNG

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o4wFdqu44%3D&pq-origsite=summon&accountid=9867&sourcetype=Scholarly%20Journals; see also, Business Insider, "Natural Gas Price Today," Accessed 15 May 2024, https://markets.businessinsider.com/commodities/natural-gas-price.; and, Trading Economics, "EU Natural Gas TTF," Accessed 15 May 2024, https://tradingeconomics.com/commodity/eu-natural-gas#:~:text=European%20natural%20gas%20futures%20are%20trading%20around%20%E2%82%AC30%2FMWh%2C,over%20rebuilding%20fuel%20inventories%20for%20the%20coming%20winter; note that 1 MWh = 3.412 MMBTU.

[36] Ibid., 2-3.

[37] Senate Canada, Standing Senate Committee on Banking, Trade and Commerce. *Canada: Still Open for Business?* (Ottawa: Canada Commons, 2018), 6, 20, accessed 7 April 2024, https://canadacommons-ca.cfc.idm.oclc.org/artifacts/1199076/canada/1752201/view/; Canada loses billions because the US is able to buy its natural gas at depressed prices and resell it internationally as LNG: Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 210.

[38] Jennifer Winter et al, "The Potential for Canadian LNG Exports to Europe..., 29, 34.

[39] Ibid., 35-36.

[40] Ibid., 43.

exports as a security priority and enact policies which aid the business case. This would require making exceptions to some elements of The Act but would recognize the importance of stable energy for Europe and signal that Canada is a leader in global energy security committed to fighting climate change.

There is demand for Canada's natural gas specifically. European and Japanese leaders have visited Canada to request its support meeting their energy demands and energy security[41]. These countries recognized that Russia, and other autocratic nations, posed too great a risk to rely on and looked to Canada for stability and dependability. These parties were also subject to Trump-era instabilities and have the same concerns regarding the potential of future US trade challenges as Canada does[42]. Their interest is also driven by the relatively new concept: Environment, Social, and Governance (ESG). An ESG assessment is an analysis of how much an energy source pollutes (including extraction, refinement, and transport), whether it has a negative or positive impact on society (do workers and society benefit), and whether companies are corrupt or well-managed[43]. Canada is the top-ranked country in ESG among major fossil fuel producers making it an extremely attractive source for countries looking for responsibly sourced, reliable energy[44]. Liquifying gas requires a significant energy supply, so Canada's strong ESG score is in part attributable to its generation hydroelectric power: the planned LNG production in Kitimat, BC will require about half the CO_2 to produce as the global average[45]. Given Quebec's significant source of hydroelectric power it is reasonable to assume that LNG exported from there would have a similarly competitive ESG score as LNG produced in BC. Also, with legislation like The Act establishing Canada's commitment to a net-zero future, Canada has a bona fide commitment to countering climate change, unlike its competitors in Russia or OPEC. Canadian LNG's strong ESG score makes it especially competitive in the European market compared with gas from Russian or other OPEC countries.

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[41] Nahayat Tizhoosh and Peter Zimonjic, "Scholz says Germany wants more natural gas from Canada but lacks infrastructure, business backing," *Canadian Broadcasting Corporation*, published 23 August 2022, accessed 8 May 2024, https://www.cbc.ca/news/politics/scholz-vassy-kapelos-lng-russia-gas-1.6559814; see also, Associated Press, "Japanese PM asks for Canada's help on clean energy," *Associated Press*, published 12 January 2023, accessed 8 May 2024, https://apnews.com/article/politics-canada-government-japan-fumio-kishida-9e552750a24da2afe7de56b0daa1cb7a; see also, Spencer Van Dyk, "Greece would 'absolutely' be interested in purchasing Canadian LNG: Greek PM," *CTV News*, published 24 March 2024, accessed 8 May 2024, https://www.ctvnews.ca/politics/greece-would-absolutely-be-interested-in-purchasing-canadian-lng-greek-pm-1.6819966.

[42] Senate Canada, Standing Senate Committee on Banking..., 20.

[43] Michael Lynch, *Shifting Oil Industry Structure..., 1, 7, 9.*

[44] Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 209.

[45] Ibid., 210.

Russia, OPEC, and Autocracies: Powerful Problems

Russia became a geopolitical foe through its recent history of aggression against its neighbours: seizing land from Georgia in 2008, the illegal annexation of Crimea in 2014, and the invasion of Ukraine in 2022. The latter two resulted in increasing economic sanctions, culminating in severe economic sanctions after the invasion. These sanctions, while effective in signaling a collective condemnation of Russian aggression have done little to punish the state's economy. While Canada and the US established tight import controls which banned importing Russian oil and gas, they account for a negligible proportion of Russian exports. On the other hand, Europe is a significant importer, as its proximity suggests it should be. Import sanctions from Europe would be much more impactful than those from states farther away[46]. An analogy would be sanctions on North Korea failing to compel it to change because its closest major importer, China, does not participate in the sanctioning regime[47].

Where the North Korean analogy differs is that Europe *wants* to reduce its imports of Russian energy but is limited in its ability to do so. Russia punished Europe by reducing gas exports and sent the message that Europe needed Russian gas, an act which spurred Europe to seek alternative natural gas sources[48]. With its significant reserves of natural gas, Canada can, by way of LNG exports to stabilize European demand, and enable Europe to turn the tables on Russia by levying import sanctions that damage Russia's economy. Given Putin's tight grip on the Russian state it seems unlikely that any sanctions will cause him to change course, but sanctions which damage the Russian economy may constrain Russia's ability to prosecute its war.

Russia's actions highlighted the predictable risk of placing too much power in an autocratic regime's hands: the same has been seen in the influence the Middle East, Russia, and Venezuela have wielded since the 70s[49]. What can be concluded from the past 50+ years, and the latest aggressive use of an energy source by an autocrat, is that handing too much power to autocrats is a high-risk endeavor which does not benefit global stability[50]. Not only does it empower countries like Russia to do as they please, but many of the major fossil fuel supplying regions, due to their sociopolitical systems, become restive when fuel prices drop[51]. As a country

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[46] George Tsouloufas and Matthew Rochat, "Revisiting the effectiveness of economic sanctions..., 9.
[47] Jina Choi, Hyoshin Kim, and Jinhwan Oh, "Effectiveness of Economic Sanctions Against North Korea and Role of China: Empirical Approach," *Global Business & Finance Review* 22, no. 2 (06, 2017): 12-13, accessed 2 October 2023, https://doi.org/10.17549/gbfr.2017.22.2.8.
[48] Jason Bordoff and Meghan L. O'Sullivan, "The Age of Energy Insecurity...
[49] Jason Bordoff and Meghan L. O'Sullivan, "The Age of Energy Insecurity...; and, Jeff Kucharski and Heather Exner-Pirot, "Canada's role in global energy security..., 212.
[50] Matthew Foss, "The impact of renewables on energy security..., 240.
[51] Michael T. Klare, "Energy Security..., 601. Many petrostates use revenues from their fossil fuel exports to bribe their populations into accepting the regime. The populaces of these states are often ill-content with their political situation but are placated by the programs the government provides. When upheavals eliminate the government's ability to placate the populace with material benefits, revolts like the Arab Spring result. For more on this, see Rex

seeking recognition on the world stage as a supporter of the rules-based order, Canada has a motivation to seek courses of action which reduce instability and avoid giving power to autocrats.

Marching too quickly to net-zero risks instability and empowering autocrats, but Canada can mitigate these risks. Reducing supply does not reduce demand; the two operate roughly independently of one another, so the challenge Canada faces is that a lack of investment in fossil fuels without a concomitant decrease in demand creates energy insecurity and hands a dangerous amount of power to autocrats[52]. This is problematic considering the need for fossil fuels to support the transition to net-zero and the expectation that it will be decades still until the world reaches net-zero[53]. By reducing production in Western countries out of a desire to drive a net-zero future, the West empowers autocrats in OPEC nations to set prices and drive global policy through their control over critical energy sources[54]. As one of the few Western countries with spare reserves of natural gas, Canada is well-positioned to provide LNG to Europe (and friendly Asian states) to support the transition to a net-zero future.

CONCLUSION

As a would-be leader in fighting climate change, Canada can acknowledge that transitioning to net-zero will require natural gas as an alternative to coal and oil and to provide stable energy when renewables fail. Doing so does not reduce Canada's credentials as a country serious about reducing CO_2 emissions, but rather enhances its status. Canada can enable a global transition to net-zero without sacrificing energy security by developing LNG exports to support Europe over the next 20-50 years. The time span is sufficient to allow for investment in infrastructure and is tied to realistic predictions of the global ability to transition to net-zero fuel sources. Doing so will allow Europe, and the world, to transition to renewable power sources without empowering autocratic regimes, such as those in OPEC. In that vein, it will also allow Europe to enact import sanctions on Russian gas which could punish the Russian economy in a meaningful way for that state's invasion of Ukraine.

This research paper uncovered several areas for future research and policymaking. First, development of an LNG export capacity faces several headwinds described in this text and in more detail in cited sources. More research is needed to establish whether a viable business case can be made. The Canadian government can develop policies favouring LNG exports from the East coast which can assist development of viable business cases. Development of strong

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Brynen et al., "Political Culture Revisited," In Beyond the Arab Spring: Authoritarianism and Democratization in the Arab World (Colorado: Lynne Reinner Publishers, 2012), 107-111.

[52] Brower, Derek. "COP26: oil price soars even as the world turns against fossil fuel**."** *Financial Times,* Nov 5, 2021.

[53] Matthew Foss, "The impact of renewables..., 242-243; and, U.S. Energy Information Administration, *International Energy Outlook...*, 8, 13, 32, and 37.

[54] Michael Lynch, *Shifting Oil Industry Structure...*, 16-17.

environmental policies and controls for hydraulic fracturing may also ease the moratoriums in Atlantic Canada allowing more direct sources of natural gas.

Finally, the transition to renewable power sources requires large sources of specialized minerals such as cobalt, lithium, nickel, and rare earth elements. At present, almost all of these are processed in China, though Canada has identified sources of all of these. One area for research and policy development is to evaluate the viability of Canada becoming a global source of these elements. Doing so would reduce China's ability to control renewable energy which is a favourable goal for the West.

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