

The law and policy of carbon pricing in Singapore – incoming shifts towards greater ambition towards carbon neutrality

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I. Introduction

Climate change has recently been given greater attention globally, since it poses one of the greatest security threats that humans have ever faced.¹ Many have voiced concerns over the climate problem. Recently, the 2022 UN Intergovernmental Panel on Climate Change worryingly noted that:

“Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought and fire weather. Increasingly, these observed impacts have been attributed to human-induced climate change particularly through increased frequency and severity of extreme events... The extent and magnitude of climate change impacts are larger than estimated in previous assessments.”²

At the international level, the UN General Assembly (“**UNGA**”) unanimously passed a resolution in 2015, setting out the 2030 Agenda for Sustainable Development,³ with the accompanying Sustainable Development Goals (“**SDGs**”).⁴ Singapore, as an active participant of the UN,⁵ has likewise sought to implement the SDGs both domestically⁶ and internationally.⁷

¹ UN Security Council, “Climate Change ‘Biggest Threat Modern Humans Have Ever Faced’, World-Renowned Naturalist Tells Security Council, Calls for Greater Global Cooperation” (23 February 2021) Press Release SC/14445.

² UN Intergovernmental Panel on Climate Change, “Climate Change 2022, Impacts, Adaptation and Vulnerability: Summary for Policymakers” <https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_FinalDraft_FullReport.pdf> accessed 13 March 2022, 8.

³ UNGA, “Transforming Our World: the 2030 Agenda for Sustainable Development” (21 October 2015) UN Doc A/RES/70/1.

⁴ *Ibid.*, 14.

⁵ See generally, Tommy Koh, Li Lin Chang, Joanna Tze Yan Koh, *50 Years of Singapore and the United Nations* (World Scientific, 2015).

⁶ See PM Lee Hsien Loong, “National Statement by PM Lee Hsien Loong at the 74th Session of the United Nations General Assembly” <<https://www.pmo.gov.sg/Newsroom/National-Statement-by-PM-Lee-Hsien-Loong-at-the-74th-Session-of-the-United-Nations-General-Assembly>> accessed 13 March 2022; PM Lee Hsien Loong, “National Day Rally 2019” <<https://www.pmo.gov.sg/Newsroom/National-Day-Rally-2019>> accessed 13 March 2022.

⁷ UN Sustainable Development Goals Knowledge Platform, “Singapore” <<https://sustainabledevelopment.un.org/memberstates/singapore>> accessed 13 March 2022.

Directly relevant to this discussion is Goal 13, which sets out the goal for states to take urgent action to combat climate change and its impacts.⁸ In fact, as a perennial problem that has plagued the world, the SDGs are also not the first attempt at seeking to tackle climate action in pursuit of sustainable development.⁹

Domestically, climate change poses a huge threat to Singapore's survival: dry spells may affect water sources; extreme weather may result in more flooding; and Singapore may face food scarcity from climate change.¹⁰ In light of the existential threat posed, various laws and policies have been instituted to stabilize and reduce greenhouse gas (“GHG”) emissions,¹¹ and have borne some fruit in the last few years.¹² The key strategy in Singapore to effect climate action is *via* energy efficiency,¹³ which has been addressed by a combination of fiscal tools (e.g., subsidies), capability-building tools (e.g., training programs), and facilitative/regulatory tools/standards (e.g., mandatory audits).¹⁴

These risks, which emerge due to GHG emissions at a global level, are an important reason to remain engaged with multilateral institutions such as the UN. Despite Singapore's size, it has remained involved with global efforts,¹⁵ including its involvement with the UN group of Small Island Developing States, and the Alliance of Small Island States,¹⁶ both of which have played an important role in promoting climate change ambition.¹⁷

⁸ Ibid, 23.

⁹ Ibid, 14. Specifically, it recognizes that “the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.” See **Part II**.

¹⁰ National Climate Change Secretariat, “Impact of Climate Change and Adaptation Measures” <<https://www.nccs.gov.sg/faqs/impact-of-climate-change-and-adaptation-measures/>> accessed 13 March 2022; for the impacts that climate change may have internationally, see generally, International Panel on Climate Change, “Summary for Policymakers” in Masson-Delmonte, Zhai et al (eds) *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (IPCC, 2018).

¹¹ See generally, Joseph Chun and Lye Lin Heng, *Environmental Law in Singapore* (Academy Publishing, 2019), ch 34.

¹² Department of Statistics Singapore, “Greenhouse Gas Emissions by Gas Type, Annual” <<https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=17066>> accessed 13 March 2022.

¹³ National Climate Change Secretariat, “National Climate Change Strategy 2012” (NCCS, 2012) <<https://www.nccs.gov.sg/files/docs/default-source/publications/national-climate-change-strategy.pdf>> accessed 13 March 2022, 40-41. “Singapore’s Intended Nationally Determined Contribution (INDC) and Accompanying Information” <<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Singapore%20First/Singapore%20INDC.pdf>> accessed 13 March 2022, Annex; “Singapore’s Update of its First Nationally Determined Contribution (NDC) and Accompanying Information” <<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Singapore%20First/Singapore%27s%20Update%20of%201st%20NDC.pdf>>, accessed 13 March 2022, 16.

¹⁴ National Climate Change Secretariat, *ibid*, 41.

¹⁵ National Climate Change Secretariat, “Singapore and International Efforts” <<https://www.nccs.gov.sg/singapores-climate-action/singapore-and-international-efforts/>> accessed 13 March 2022.

¹⁶ Ministry of Foreign Affairs, “Small States” <<https://www.mfa.gov.sg/SINGAPORES-FOREIGN-POLICY/International-Issues/Small-States>> accessed 13 March 2022.

¹⁷ Timothée Ourbak, Alexandre Magnan, “The Paris Agreement and climate change negotiations: Small Islands, big players” (2018) 18 *Regional Environmental Change* 2201.

This paper, which focuses on carbon pricing in Singapore, will first set out the goals that Singapore have set out in tackling climate action at the international plane. Then, it will look specifically at the laws and regulations in Singapore surrounding carbon pricing to meet these goals and assess their effectiveness. Subsequently, it will take a comparative approach and assess the laws and policy relating to carbon pricing in other jurisdictions, elucidating certain learning points and recommendations to improve the current carbon tax scheme in Singapore.

II. Carbon pricing and Singapore's climate action goals in the international system

While Singapore is a dualist system,¹⁸ which entails that there is no “automatic” incorporation of international law into Singapore’s domestic laws,¹⁹ its continued high degree of involvement in the UN renders international law a suitable starting point.²⁰ The primary mechanism under international law for the global response to climate change is the 1992 United Nations Framework Convention on Climate Change (“UNFCCC”),²¹ which established: (1) a general commitment to stabilize GHG and to limit emissions of GHG in developed countries; (2) a financial mechanism for developed countries to support the funding of measures; and (3) some general principles on climate change.²² The 1997 Kyoto Protocol²³ (with the Doha Amendment),²⁴ and the 2016 Paris Agreement²⁵ (which would run indefinitely) were subsequently put into place to implement the UNFCCC.²⁶

The key goal of the Kyoto Protocol, in line with the principle of “common but differentiated responsibilities” (“CBDR”)²⁷ was for Annex B states (comprising largely industrialized countries and

¹⁸ Chen Siyuan, “The Relationship between International Law and Domestic Law: *Yong Vui Kong v PP* [2010] 3 SLR 489” 23 Singapore Academy of Law Journal 1, [6] – [9].

¹⁹ Ibid.

²⁰ See generally, Tommy Koh, Li Lin Chang, Joanna Tze Yan Koh (n 5).

²¹ United Nations Framework Convention on Climate Change (adopted May 9 1992, entered into force 21 March 1994) 1771 UNTS 107.

²² Philippe Sands & Jacqueline Peel, *Principles of International Environmental Law* (Oxford University Press, 2019), 300.

²³ Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162.

²⁴ Doha Amendment to the Kyoto Protocol (adopted 8 December 2012, entered into force 31 December 2020) UN Doc C.N.718.2012.TREATIES-XXVII.7.c.

²⁵ Paris Agreement to the United Nations Framework Convention on Climate Change (adopted 12 December 2015, entered into force 4 November 2016) TIAS No. 16-1104.

²⁶ Philippe Sands and Jacqueline Peel (n 22), 299–300.

²⁷ For the meaning of common but differentiated responsibility, see UNGA, “Rio Declaration on Environment and Development” (12 August 1992) UN Doc A/CONF.151/26, Principle 7, where it states that “States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command”. For how it applies in the Kyoto Protocol, see Paul Harris, “Common but Differentiated Responsibility: The Kyoto Protocol and United States Policy” (1999) 7 New York University Environmental Law Journal 27, 33–35; Kyoto Protocol (n 23), Article 10.

some economies in transition)²⁸ to ensure their aggregate anthropogenic CO₂ equivalent emissions do not exceed their assigned limits (between 2008 to 2012;²⁹ with the Doha Amendment setting new net emission commitments between 2013 and 2020).³⁰ On the other hand, the Paris Agreement aimed to “[hold] the increase in the global average temperature to well below 2°C above pre-industrial levels and [pursue] efforts to limit the temperature increase to 1.5°C above pre-industrial levels”.³¹ In contrast to the Kyoto Protocol, the Paris Agreement takes a less “rigid distinction” to CBDR,³² encouraging developing countries to take greater responsibility for climate action.³³ Broadly, the Kyoto Protocol adopted a “top-down” approach, mandating targets and timetables for emissions reduction, while the Paris Agreement instead establishes a “bottom-up approach”, with the scope of actions to be determined by individual parties.³⁴

In the implementation of these goals, the international community has seen carbon pricing as a key instrument in the transition towards a low-carbon economy, reflecting the “polluter pays” principle.³⁵ The Kyoto Protocol introduced an indirect form of carbon pricing *via* the emission trading system, where countries can acquire emission units from other countries.³⁶ More recently, in the Paris Agreement, the usage of carbon pricing as a form of emission reduction was recognized as having an “important role” to play in climate action.³⁷

²⁸ UNFCCC, “Parties & Observers” <<https://unfccc.int/parties-observers#:~:text=Annex%20I%20Parties%20include%20the,Central%20and%20Eastern%20European%20States>> accessed 13 March 2022. It has been observed that “Annex I states under the UNFCCC are largely the same as those under Annex B of the Kyoto Protocol”: see Allwood J.M., B. Bossetti, N.K. Dubash et al., “Glossary” in O. Edenhofer, R. Pichs-Madruga, Y. Sokona et al. (eds), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2014, Cambridge University Press), 1252.

²⁹ Kyoto Protocol (n 23), Article 3(1).

³⁰ Doha Amendment (n 24), Article 1.

³¹ Paris Agreement (n 25), Article 2.

³² Pieter Pauw, Kennedy Mbeva & Harro van Asselt, “Subtle differentiation of countries’ responsibilities under the Paris Agreement” (2019) 86(5) *Palgrave Communications* 1, 2.

³³ Joseph Chun and Lye Lin Heng (n 11), [34.015].

³⁴ Philippe Sands and Jacqueline Peel (n 22), 299–300.

³⁵ United Nations Climate Change News, “Calls Increase to Use Carbon Pricing as an Effective Climate Action Tool” *UN Climate Change News* (22 September 2020) <<https://unfccc.int/news/calls-increase-to-use-carbon-pricing-as-an-effective-climate-action-tool>> accessed 13 March 2022.

³⁶ Kyoto Protocol (n 23), Article 17; UN Climate Change Secretariat (UNFCCC), “The Kyoto Protocol Mechanisms” (2010, UNFCCC) <https://cdm.unfccc.int/about/cdm_kpm.pdf> accessed 13 March 2022, 5.

³⁷ UNFCCC, “Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015 Addendum Part two: Action taken by the Conference of the Parties at its twenty-first session: Adoption of the Paris Agreement” (29 January 2016) UN Doc FCCC/CP/2015/10/Add.1, [136].

Singapore ratified these international instruments,³⁸ and was even amongst the first few countries to ratify the Paris Agreement.³⁹ For the purposes of the UNFCCC and the agreements under it, Singapore is (presumably) considered a developing country,⁴⁰ and therefore not subject to more stringent obligations set out in these agreements. Nonetheless, Singapore has continued to play an active role in meeting its obligations under these agreements. Notably, under the Paris Agreement and the UNFCCC, Singapore has already submitted two intended nationally determined contribution (“NDC”) in 2015 and 2020.⁴¹ These NDCs indicate a “stretch goal”⁴² to reduce emissions intensity by 36% between 2005 and 2030, with the aim of peaking at 65 MtCO_{2e} around 2030.⁴³

III. Singapore’s implementation of carbon pricing

A. Existing domestic laws and policies effecting carbon pricing

To meet its climate goals, Singapore has adopted carbon pricing measures domestically through setting carbon taxes. The Carbon Pricing Act,⁴⁴ which was passed in 2018 (Singapore’s Year of Climate Action),⁴⁵ and came into force in 2019, sets the taxation rate at \$5/tCO_{2e}.⁴⁶ The Act targets large emitters, where only individuals having control of business facilities⁴⁷ of specified industry sectors⁴⁸

³⁸ United Nations Treaty Series, “Chapter XXVII Environment: United Nations Framework Convention on Climate Change” <https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXVII-7&chapter=27&Temp=mtdsg3&clang=_en> accessed 13 March 2022; United Nations Treaty Series, “Chapter XXVII Environment: Kyoto Protocol” <https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-a&chapter=27&clang=_en> accessed 13 March 2022; United Nations Treaty Series, “Chapter XXVII Environment: Paris Agreement” <https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-7-d&chapter=27&clang=_en> accessed 13 March 2022.

³⁹ United Nations Treaty Series, “Chapter XXVII Environment: Paris Agreement”, *ibid.* Singapore became a signatory to the Paris Agreement on 22 April 2016, and ratified it on 21 September 2016.

⁴⁰ United Nations Framework Convention on Climate Change (n 21), 27; Joseph Chun and Lye Lin Heng (n 11), [34.019].

⁴¹ “Singapore’s Intended Nationally Determined Contribution (INDC) and Accompanying Information” (n 13); “Singapore’s Update of its First Nationally Determined Contribution (NDC) and Accompanying Information” (n 13).

⁴² “Singapore’s Intended Nationally Determined Contribution (INDC) and Accompanying Information”, *ibid.*, Annex.

⁴³ *Ibid.*, 1; “Singapore’s Update of its First Nationally Determined Contribution (NDC) and Accompanying Information” (n 13), 1.

⁴⁴ Carbon Pricing Act 2018 (No. 23 of 2018).

⁴⁵ NEA, “Factsheet on Year of Climate Action” <<https://www.nea.gov.sg/docs/default-source/default-document-library/annex-h---year-of-climate-action.pdf>> accessed 13 March 2022.

⁴⁶ Carbon Pricing Act 2018 (n 44), Third Schedule. The Carbon Pricing Act still does not allow such international trading of carbon credits to meet the taxes under the Carbon Pricing Act. However, this is quickly changing, with the government indicating that from 2024, businesses can use high-quality, international carbon credits to offset up to 5% of their taxable emissions in lieu of paying carbon tax. See *Singapore Parliamentary Debates, Official Report* (18 February 2022) vol 95 (Lawrence Wong, Minister for Finance); Melissa Low and David Broadstock, “Commentary: The merits of Singapore’s new carbon trading marketplace” (10 June 2021) *Channel Newsasia* <<https://www.channelnewsasia.com/commentary/climate-impact-x-carbon-market-trade-credits-offset-tax-net-zero-1846566>> accessed 13 March 2022; Joseph Chun and Lye Lin Heng (n 11), [34.064].

⁴⁷ *Ibid.*, s 4, s 7.

⁴⁸ *Ibid.*, s 5; Carbon Pricing (Regulation and General Matters) Regulations 2018 (No. S858 of 2018), s 3.

which emit more than 25,000 tCO₂e in a calendar year would be subject to the carbon tax.⁴⁹ In particular sectors, there exists other indirect carbon pricing measures. For example, the Vehicular Emissions Scheme creates an interlocking web of taxes and rebates which apply to vehicles based on their emission rates. Where all emission levels of a vehicle fall within bands A1 and A2 of emission levels,⁵⁰ the registered owner can apply for rebates on the registration fees of their new or secondhand vehicle.⁵¹ On the flipside, if emission levels fall within bands C1 or C2 for any of the specified emissions,⁵² the owner will be subject to additional taxes, under the Road Traffic (Vehicular Emissions Tax) Rules 2017.⁵³

B. An evaluation of Singapore's carbon pricing scheme and its climate goals

Singapore adopts a carbon tax approach, which sets a price on carbon by defining an explicit tax rate for GHG emissions. However, another alternative in carbon pricing which featured prominently in the Kyoto Protocol framework is emission trading – under this system, emission rates are capped, and emitters can trade units to comply with the cap.⁵⁴ There are good arguments to support either scheme: some argue that carbon taxes are superior to emission trading, since they are easier to understand and implement.⁵⁵ Others have argued that the signaling function is clearer for carbon taxes instead of emission trading – for carbon trading, there is no ambiguity in the message that the cost of GHG emissions must be internalized, while emission trading may send the message that the government permits one to pollute if one is willing to pay.⁵⁶ Further, it has also been argued that carbon taxes are more cost efficient.⁵⁷ On the other hand, carbon taxes cannot ensure that emission reduction reaches

⁴⁹ Carbon Pricing Act, *ibid*, Second Schedule, Part 1, s 7. If the company emits more than 2,000 tCO₂ in a calendar year, it would be required to register the business facility as a reportable facility, but will not be subject to the tax unless it exceeds 25,000 tCO₂ in that year.

⁵⁰ Road Traffic (Motor Vehicles, Registration and Licensing) Rules (Cap 276, R 5, 2014 Ed.), First Schedule.

⁵¹ *Ibid*, s 7, s 10.

⁵² These include Carbon dioxide (CO₂); Carbon monoxide (CO); Hydrocarbons (HC); Oxides of nitrogen (NO_x); and Particulate matter (PM). See Road Traffic (Vehicular Emissions Tax) Rules 2017 (S 776/2017), First Schedule, Second Schedule

⁵³ Road Traffic (Vehicular Emissions Tax) Rules 2017 (S 776/2017).

⁵⁴ For how these approaches work, see generally, World Bank, “Carbon Pricing Dashboard” <<https://carbonpricingdashboard.worldbank.org/what-carbon-pricing>> accessed 13 March 2022. Another nascent market-based approach is the use of a carbon club. See e.g., Joel Fun, “Climate Clubs, the Paris Agreement, and the International Trade Regime: Synergies and Conflicts” (2022) 12(1) *The King’s Student Law Review* 1.

⁵⁵ Euston Quah & Christabelle Soh, “Why carbon tax is needed and what it means for Singapore” *Straits Times* (12 May 2017), <<https://www.straitstimes.com/opinion/why-carbon-tax-is-needed-and-what-it-means-for-singapore>> accessed 13 March 2022.

⁵⁶ Reuven S. Avi-Yonah & David M Uhlmann, “Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than Cap and Trade” (2009) 28(3) *Stanford Environmental Law Journal* 4, 44.

⁵⁷ See Bettina B.F. Wittneben, “Exxon is right: Let us re-examine our choice for a cap-and-trade system over a carbon tax” (2009) 37(6) *Energy Policy*; Maria Francesch-Huidobro, “Singapore Carbon Taxes: An Analysis of the Policy Context” (May 2019) *Regional Project Energy Security and Climate Change Asia-Pacific* <https://www.kas.de/documents/265079/265128/Marai+Francesch_Singapore+Carbon+Taxes+%28With+KAS+Layout%29.pdf/e3ffca6b-9f81-f335-3fc2-61b8af1bcc29?version=1.0&t=1557997672081> accessed 13 March 2022.

intended targets and may unfairly put larger businesses at a cost disadvantage.⁵⁸ While the verdict is still out on which approach is better in implementing carbon pricing,⁵⁹ such concerns are probably of “second-order importance”⁶⁰ – the more pressing problem is whether Singapore’s implementation of carbon taxes, while accounting for local circumstances, can satisfactorily meet the targets under the Paris Agreement.

First, the current carbon tax rate of S\$5/tCO_{2e} is plainly insufficient to both internalize the costs of carbon emissions by large emitters, and discourage emitters from excessive emissions. Expert estimates of the social cost of carbon are presently at around USD\$25-150/tCO_{2e}.⁶¹ The World Bank has indicated that carbon prices of at least US\$40-50/tCO_{2e} by 2020 and US\$50-100/tCO_{2e} by 2030 are required to meet the Paris Agreement goals.⁶² In February 2022, the annual Budget announced a revision of the existing carbon rates. Instead of the modest target price of \$10-\$15/tCO_{2e} by 2030 initially suggested in 2018⁶³ (which would have put Singapore as an outlier),⁶⁴ the government announced more drastic hikes. While the \$5/tCO_{2e} will initially be retained until 2023, it will be revised to \$25/tCO_{2e} in 2024 and 2025, and \$45/tCO_{2e} in 2026 and 2027, with a view to reaching \$50-80/tCO_{2e} by 2030.⁶⁵

However, even if the carbon tax rates are sufficient to meet its revised goals, there is still the question of whether Singapore’s climate goals, especially those set out in its NDC, are adequate to meet the global commitments espoused under the Paris Agreement. In fact, Climate Action Tracker’s assesses Singapore’s climate goals as “critically insufficient”⁶⁶ – if all countries’ NDCs were in this range,

⁵⁸ Donghyun Park, Shu Tian, Mai Lin C. Villaruel, “Taxing Emissions in Singapore” (10 February 2020) <<https://blogs.adb.org/blog/taxing-emissions-singapore>> accessed 13 March 2022.

⁵⁹ See e.g., Wei Li & Zhijie Jia, “Carbon tax, emission trading, or the mixed policy: which is the most effective strategy for climate change mitigation in China?” (2017) 22(6) *Mitigation and Adaptation Strategies for Global Change* 973.

⁶⁰ Jean Tirole, “Some Political Economy of Global Warming” (2012) 1(1) *Economics of Energy and Environmental Policy* 121, 123.

⁶¹ Peter Howard & Derek Sylvian, “Expert Consensus on the Economics of Climate Change” (December 2015) Institute for Policy Integrity: New York University School of Law <<https://www.edf.org/sites/default/files/expertconsensusreport.pdf>> accessed 13 March 2022, 23.

⁶² World Bank, “State and Trends of Carbon Pricing 2020” (May 2020) <<https://openknowledge.worldbank.org/bitstream/handle/10986/33809/9781464815867.pdf>> accessed 13 March 2022, 20; Carbon Pricing Leadership Coalition, “Report of the High-Level Commission on Carbon Prices” (29 May 2017) <https://static1.squarespace.com/static/54ff9c5ce4b0a53deccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing_FullReport.pdf>, 3–4.

⁶³ *Singapore Parliamentary Debates, Official Report* (20 March 2018) vol 94 (Masagos Zulkifli B M M, Minister for the Environment and Water Resources).

⁶⁴ Grace Ho, “Singapore can introduce higher carbon taxes and still stay competitive: MAS chief” (14 July 2021) *The Straits Times* <<https://www.straitstimes.com/singapore/politics/singapore-can-introduce-higher-carbon-taxes-and-still-stay-competitive-mas-chief>> accessed 13 March 2022.

⁶⁵ *Singapore Parliamentary Debates, Official Report* (18 February 2022) vol 95 (Lawrence Wong, Minister for Finance).

⁶⁶ See however, the National Climate Change Secretariat’s response: Grace Yeoh, “Report which rated Singapore’s climate policies as ‘critically insufficient’ may not have accounted for ‘unique challenges’: NCCS” (24 September 2021) *Channel*

global warming would reach $>4^{\circ}\text{C}$ by 2030.⁶⁷ However, it must also be noted that the revised goals espoused in Budget 2022 are a welcomed step towards greater climate ambition. By enhancing Singapore's goals from the Green Plan 2030 (in which Singapore merely aimed to cut emissions by 50% from their peak in 2050),⁶⁸ to achieving net-zero emissions as soon as viable in the second half of the century, this brings Singapore closer to its global climate goals. It marks a clear strategic shift in line with the practice of many other states, which are similarly aiming for climate neutrality by and around 2050.⁶⁹

Nonetheless, not all is gloom. Singapore's carbon tax system is promising in terms of the GHG emissions covered by the carbon taxes – by targeting large companies alone, and even excluding the effects of land transport fuel taxes, it has already covered around 80% of Singapore's total GHG emissions.⁷⁰ This is put in stark contrast to many other developed countries, which have had a far lower coverage rate (e.g., France and Denmark at around 35%; Switzerland at 33%; and Norway at 66%).⁷¹

IV. Improving the existing carbon pricing scheme: lessons from other jurisdictions

To allay the concerns and improve on the current carbon tax scheme in Singapore, it may be helpful to draw a leaf from the experiences of other jurisdictions.

A. Sweden

The first jurisdiction that this paper chooses to look at is Sweden, given its extremely high carbon tax rates at US\$123/tCO_{2e},⁷² sufficient to cover the social costs resulting from GHG emissions. First introduced in 1991 alongside a pre-existing energy tax, its carbon tax rates have increased by almost 5 times.⁷³ Tax rates are continually revised and increased annually based on an index.⁷⁴ Conventional wisdom might have one think that such high tax rates would detrimentally affect its economic

Newsasia <<https://www.channelnewsasia.com/sustainability/cat-report-singapore-climate-polices-national-climate-change-secretariat-2198861>> accessed 13 March 2022.

⁶⁷ Climate Action Tracker, “Singapore” <<https://climateactiontracker.org/countries/singapore/>> accessed 13 March 2022.

⁶⁸ LKYSPP, “Is Singapore's Green Plan 2030 Ambitious Enough?” (18 March 2021) <<https://lkyspp.nus.edu.sg/gia/article/is-singapore-s-green-plan-2030-ambitious-enough>> accessed 13 March 2022.

⁶⁹ LKYSPP (n 68).

⁷⁰ National Climate Change Secretariat, “Carbon Tax” <<https://www.nccs.gov.sg/faqs/carbon-tax/>> accessed 13 March 2022.

⁷¹ See The World Bank, “Carbon Pricing Dashboard” <https://carbonpricingdashboard.worldbank.org/map_data> accessed 13 March 2022, for an overview of all the jurisdictions in the world with carbon pricing, and its coverage.

⁷² Thomas Sterner, “The carbon tax in Sweden” in Claude Henry, Johan Rockström, Nicholas Stern eds, *Standing up for a Sustainable World: Voices of Change* (Edward Elgar, 2020), 60.

⁷³ Ministry of Finance (Sweden), “Sweden's Carbon Tax” (18 August 2021) <<https://www.government.se/government-policy/swedens-carbon-tax/swedens-carbon-tax/>> accessed 13 March 2022.

⁷⁴ Ministry of the Environment (Sweden), “Sweden's long-term strategy for reducing greenhouse gas emissions” (December 2020) <https://unfccc.int/sites/default/files/resource/LTS1_Sweden.pdf> accessed 13 March 2022, 37.

competitiveness. Yet, Sweden's GDP has increased substantially (+84%) between 1990-2019, which is accompanied by a 29% fall in GHG emissions.⁷⁵ Other studies have likewise shown that there is no evidence to show that carbon taxes would adversely impact employment or GDP growth, based on the experiences of Sweden and other EU states.⁷⁶

Such taxes were introduced in 1991 as a result of two separate political processes. On one hand, there was a demand for drastic reduction in marginal income tax rates; on the other, there was an increasing interest in environmental issues.⁷⁷ Essentially, Sweden utilises the policy of green tax change, or “*grön skatteväxling*” to increase taxes on environmentally hazardous products and services while reducing taxes on labour.⁷⁸ To balance carbon taxes with industrial competitiveness,⁷⁹ Sweden grants significant exemptions in various industries, including mining, agriculture and forestry. Thus, Swedish carbon taxes covers approximately 40% of GHG emissions.⁸⁰ However, many of these companies are still subject to other forms of carbon pricing, most notably the EU Emission Trading System.⁸¹

While there are various differences between Sweden and Singapore (e.g., biofuels are not subject to carbon tax in Sweden,⁸² Sweden has alternative energy sources unviable in Singapore (including hydro and nuclear),⁸³ Sweden has few big energy users,⁸⁴ and a “green tax change” is probably unfeasible in Singapore given Singapore's pre-existing low income tax rates)⁸⁵ there are valuable lessons that can be gleaned.

⁷⁵ Ministry of Finance (Sweden) (n 73).

⁷⁶ Gilbert E. Metcalf & James H. Stock, “The Macroeconomic Impact of Europe's Carbon Taxes” (July 2020) National Bureau of Economic Research Working Paper Series 27488 <<https://www.nber.org/papers/w27488>> accessed 13 March 2022.

⁷⁷ Susanne Åkerfeldt & Henrik Hammar, “CO2 Taxation in Sweden: Experiences of the Past and Future Challenges” (2015) *Revue Projet* <https://www.un.org/esa/ffd/wp-content/uploads/2016/12/13STM_Article_CO2-tax_AkerfeldtHammar.pdf>, 2; Thomas Sterner (n 72), 62.

⁷⁸ Environmental Protection Agency (Sweden), “Grön skatteväxling” (27 February 2014) <<https://web.archive.org/web/20141030112431/http://www.naturvardsverket.se/Miljoarbete-i-samhallet/Miljoarbete-i-Sverige/Uppdelat-efter-omrade/Styrmedel/Ekonomiska-styrmedel/Gron-skattevaxling/>> accessed 13 March 2022.

⁷⁹ Ricardo Energy & Environment, “Sweden Energy and Carbon Tax Policy: Rethinking Decarbonisation Incentives – Policy Case Studies” (1 October 2018) <<https://esc-non-prod.s3.eu-west-2.amazonaws.com/2018/10/Sweden-Case-Study-FINAL.pdf>> accessed 13 March 2022, 11.

⁸⁰ See World Bank, (n 71). Greenhouse gases broadly include CO₂, methane, nitrous oxide, and fluorinated gases.

⁸¹ Samuel Jonsson, Anders Ydsted & Elke Asen, “Looking Back on 30 Years of Carbon Taxes in Sweden” (23 September 2020) <https://taxfoundation.org/sweden-carbon-tax-revenue-greenhouse-gas-emissions/#_ftn9> accessed 13 March 2022.

⁸² Torbjörn Schiebe, “Should every country on earth copy Sweden's carbon tax?” (19 October 2019) *apolitical* <<https://www.carbonpricingleadership.org/blogs/2019/10/18/should-every-country-on-earth-copy-swedens-carbon-tax>> accessed 13 March 2022.

⁸³ IEA, “Sweden” <<https://www.iea.org/countries/sweden>> accessed 13 March 2022; Grace Yeoh (n 66).

⁸⁴ Thomas Sterner (n 72), 65.

⁸⁵ Singapore has a top income tax rate of 22%: Inland Revenue Authority of Singapore, “Income Tax Rates” <<https://www.iras.gov.sg/irashome/Individuals/Locals/Working-Out-Your-Taxes/Income-Tax-Rates/>> (13 March 2022). This is significantly low compared to other jurisdictions. See e.g., Ann Williams, “Where the rich pay the highest taxes: See how Singapore stacks against others in the world” (20 October 2015)

First, Singapore can consider having mechanisms and indexes to create a more dynamic and effective carbon taxation regime that aligns with the broad goals under the Paris Agreement, instead of piecemeal modifications on a year-on-year basis.

Second, that Singapore presently relies on less clean sources of energy (with ~99% of primary energy consumption coming from petroleum and other natural gases) does not mean that a lower tax rate on energy is warranted,⁸⁶ since an insufficiently high carbon taxes may, ironically, hinder the goal of improved energy efficiency: when tax levels in Sweden were initially imposed, studies showed that low tax rates disincentivised investment in energy-efficient technology.⁸⁷ Thus, even though Budget 2022 has indicated that the use of petrol, diesel and compressed natural gas will be moderated through fuel excise duties instead of being subject to additional carbon taxes,⁸⁸ sufficient care must be placed to ensure that the duties on these energy sources are adequate to ensure that Singapore meets its climate goals.

Third, high tax rates may not necessarily jeopardize economic growth, if such carbon taxes are well-managed by ensuring that carbon tax redistribution is economically efficient.⁸⁹

B. Canada

The other jurisdiction that is of interest is Canada, and its federal laws governing minimum carbon taxes for all states.⁹⁰ Under the Greenhouse Gas Pollution Pricing Act passed in 2019,⁹¹ carbon tax is

<<https://www.straitstimes.com/business/economy/where-the-rich-pay-the-highest-taxes-see-how-singapore-stacks-against-others-in-the>> accessed 13 March 2022. In fact, Singapore's tax rates are lower than the average in all continents around the world: KPMG, "Individual Income Tax Rates Table" <<https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/individual-income-tax-rates-table.html>> accessed 13 March 2022, and can explain why Singapore's tax-to-GDP ratio is likewise considerably low compared to the rest of the world: OECD, "Revenue Statistics in Asia and the Pacific 2021" <<https://www.oecd.org/tax/tax-policy/revenue-statistics-asia-and-pacific-singapore.pdf>> accessed 13 March 2022.

⁸⁶ Energy Market Authority, "Singapore's Energy Story" <<https://www.ema.gov.sg/ourenergystory>> accessed 22 September 2021; United States Energy Information Administration, "Singapore" (August 2021) <<https://www.eia.gov/international/analysis/country/SGP>> accessed 22 September 2021.

⁸⁷ Bengt Johansson, "The Carbon Tax in Sweden" in OECD, *Innovation and the Environment* (OECD Publishing, 2000), 91.

⁸⁸ *Singapore Parliamentary Debates, Official Report* (18 February 2022) vol 95 (Lawrence Wong, Minister for Finance).

⁸⁹ See e.g., Jairo Yunis and Elmira Alikabari, "Carbon Pricing in High-Income OECD Countries" (2020) *Fraser Institute* <<https://www.fraserinstitute.org/sites/default/files/carbon-pricing-in-high-income-oecd-countries.pdf>>.

⁹⁰ Government of Canada, "Carbon Pollution Pricing Systems across Canada" (12 July 2021) <<https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>> accessed 13 March 2022. Large producers are however not subject to these taxes, but are instead subject to a cap-and-trade scheme: see e.g., Jason Dion, "Explaining Output-Based Allocation (OBA)" *Canada's Ecofiscal Commission*, <<https://ecofiscal.ca/2017/05/24/explaining-output-based-allocations-obas/>> accessed 13 March 2022.

⁹¹ Greenhouse Gas Pollution Pricing Act (SC 2018, c. 12, s. 186) (CA). The Greenhouse Gas Pollution Pricing Act has been found by the Supreme Court of Canada as constitutional, after challenges raised in various states: see *References re Greenhouse Gas Pollution Pricing Act* [2019] ONCA 544 (Ontario Court of Appeal); *References re Greenhouse Gas Pollution Pricing Act* [2019] SKCA 40 (Saskatchewan Court of Appeal); *References re Greenhouse Gas Pollution Pricing*

set at a present rate of C\$40/tCO_{2e},⁹² and is slated to increase to C\$170/tCO_{2e} by 2030.⁹³ What is interesting about Canada's approach to carbon taxes is its recognition that such taxes are inherently regressive in nature. It returns much of the revenue back to the individual households through state-wide rebates.⁹⁴ In fact, rebates to most households are still generally larger than carbon pricing costs.⁹⁵ Specifically, wealthier households stand to bear the larger brunt of the taxes; with higher consumption, they will only be refunded a fraction of the carbon taxes they will pay, unlike poorer households.⁹⁶

The Canadian approach recognises that unmitigated carbon taxes may have detrimental effects on the other SDGs such as Goal 10 (Reduced Inequalities).⁹⁷ Initially, carbon tax in Singapore was marked to be used to fund technological improvements and urban solutions to drive decarbonization, and not for redistribution.⁹⁸ However, this did not account for how carbon-intensive goods such as transport, food and electricity are typically characterized as necessities in developed countries such as Singapore, and imposing taxes on these items will have a greater impact on the poor.⁹⁹ In Budget 2022, to recognize the impacts that elevated carbon pricing would have on households and businesses, the government will use part of the tax revenue to cushion the impact on these businesses.¹⁰⁰ Unlike Canada, Singapore has greater ability to invest in energy infrastructure due to significantly greater

Act [2020] ABCA 74 (Alberta Court of Appeal); *References re Greenhouse Gas Pollution Pricing Act* [2021] SCC 11 (Supreme Court of Canada).

⁹² Greenhouse Gas Pollution Pricing Act, *ibid*, Schedule 4.

⁹³ "Canada's Supreme Court rules in favour of national carbon tax" (25 March 2021) *BBC News* <<https://www.bbc.com/news/world-us-canada-56526115>>.

⁹⁴ Dana Nuccitelli, "Canada passed a carbon tax that will give most Canadians more money" (26 October 2018) *The Guardian* <<https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/oct/26/canada-passed-a-carbon-tax-that-will-give-most-canadians-more-money>> accessed 13 March 2022.

⁹⁵ Office of the Parliamentary Budget Officer (Canada), "Reviewing the Fiscal and Distributional Analysis of the Federal Carbon Pricing System" (4 February 2020) <https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/RP-1920-024-S/RP-1920-024-S_en.pdf> accessed 13 March 2022; The Canadian Press, "Most Canadian households will get back more than they pay from carbon tax, PBO finds" (4 February 2020) *Financial Post* <<https://financialpost.com/commodities/energy/canada-to-collect-c2-81-bln-in-direct-revenue-from-federal-carbon-price-in-2019-20>> accessed 13 March 2022.

⁹⁶ Neil McDonald, "Justin Trudeau's carbon tax is revenue neutral... for now" (24 April 2019) <<https://www.cbc.ca/news/opinion/carbon-tax-revenue-1.5107979>> accessed 13 March 2022.

⁹⁷ UNGA (n 3), 21.

⁹⁸ Ministry of Sustainability and the Environment, "Written Reply to Parliamentary Question on Carbon Tax by Ms Grace Fu, Minister for Sustainability and the Environment" (5 July 2021) <<https://www.mse.gov.sg/resource-room/category/2021-07-05-written-reply-to-pq-on-carbon-tax/>> accessed 13 March 2022.

⁹⁹ See e.g., Julius Andersson and Giles Atkinson, "The distributional effects of a carbon tax: The role of income inequality" (September 2020) Grantham Research Institute on Climate Change and the Environment Working Paper No. 349, Centre for Climate Change Economics and Policy Working Paper No. 378 <<https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2020/09/working-paper-349-Andersson-Atkinson.pdf>> accessed 13 March 2022; Julius Andersson, "Carbon tax regressivity and income inequality" (17 May 2021) Stockholm School of Economics <<https://www.hhs.se/en/about-us/news/site-publications/publications/2021/carbon-tax-regressivity-and-income-inequality/>> accessed 13 March 2022; Euston Quah & Christabelle Soh (n 55).

¹⁰⁰ *Singapore Parliamentary Debates, Official Report* (18 February 2022) vol 95 (Lawrence Wong, Minister for Finance).

political buy-in.¹⁰¹ Thus, it may be unnecessary to return large proportions of tax revenue through direct rebates. While there is undoubtedly a need to improve income equalities by mitigating the regressive nature of such taxes, significant amounts of money could and should be used instead to “support investments in new low-carbon and energy efficient solutions”,¹⁰² ensuring a rapid and permanent shift towards low-carbon energy sources to meet Singapore’s climate goals.

V. Conclusion

Singapore’s carbon tax system, which has only been implemented in the last 4 years, is still in its infancy. And indeed, some may claim that Singapore’s position as a small island-state means that it is unnecessary to fully implement effective carbon taxes. However, it is still imperative for Singapore not to shirk away from its responsibilities as part of the global community. As the US Supreme Court in *Massachusetts v EPA* observed, “[a] reduction in domestic emissions would slow the pace of global emissions increases, no matter what happens elsewhere”.¹⁰³ Even though Singapore may produce only ~0.1% of global GHG emissions,¹⁰⁴ its contributions to combating climate change as part of the global collective must be enhanced, and cannot be ignored.

¹⁰¹ Canada is presently run by a minority Parliament headed by Justin Trudeau: see e.g., “Explainer: Federal election 2019: Trudeau’s Liberals have a minority government. What now? A guide to Oct. 21’s results” (23 October 2019) <<https://www.theglobeandmail.com/politics/article-federal-election-2019-results-trudeau-liberal-minority-explainer/>> accessed 13 March 2022.

¹⁰² *Singapore Parliamentary Debates, Official Report* (18 February 2022) vol 95 (Lawrence Wong, Minister for Finance).

¹⁰³ *Massachusetts v Energy Protection Agency* (2007) 549 U.S. 497, 526.

¹⁰⁴ National Climate Change Secretariat, “Singapore’s Emissions Profile” <<https://www.nccs.gov.sg/singapores-climate-action/singapore-emissions-profile/>> accessed 13 March 2022.