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AUTHORITY OF PACIFIC ISLAND STATES TO REGULATE GREENHOUSE GASES FROM THE INTERNATIONAL SHIPPING SECTOR

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This white paper assesses Pacific island states' legal authority under international law to regulate greenhouse gas emissions from the international shipping sector and considers what regulatory options are permissible within this legal framework.

SUMMARY OF REGULATORY OPTIONS

The United Nations Convention on the Law of the Sea (LOSC) is the primary legal instrument governing national authority to regulate the international shipping sector. Under the LOSC, a state or a group of states wishing to regulate greenhouse gas (GHG) emissions from existing ships may do so in three capacities: as port, flag, or coastal States. Under port State jurisdiction, a state may condition entry to its ports on certain requirements. Under flag State jurisdiction, a state may regulate ships registered under its flag. A state is generally unconstrained in setting regulations over ships entering its ports or flying its flag, as long as the regulations are fair and enacted in good faith. Consequently, states may impose emissions reductions measures in the form of structural adjustments, fuel requirements, and operational changes. Moreover, the regulations could be structured as a technology standard, emissions standard or a market-base mechanism.

In contrast to port and flag State jurisdiction, coastal State jurisdiction is constrained by the navigational rights of foreign ships. Coastal State authority to control GHG emissions beyond internationally agreed upon rules and standards is likely restricted to ships traveling through its territorial waters. Moreover, regulations must not impair the right to innocent passage. In effect, regulatory options over foreign ships in a state's territorial seas are limited to two options. First, a state may impose an emissions standard, as long as there are alternative ways of meeting the adopted standard. Second, a state may impose operational requirements on ships, such as a speed limit.

Under the LOSC, states may work together outside of the IMO to establish regional or multilateral agreements to reduce emissions from the international shipping sector. While parties to a regional agreement may mutually agree to forego rights afforded to them under the LOSC, they may not infringe on the rights of non-party states. For example, a regional agreement that establishes speed limits for ships traveling outside of territorial waters would only be enforceable among member parties. On the other hand, provisions of a regional agreement may be applied to non-party ships if they work within the confines of each state's unilateral authority. For example, an agreement may set emissions or technology standards over ships entering all member parties' ports and flying any member state's flag.

A regional agreement would be advantageous over unilateral action since it would reduce competitiveness concerns for participating states while also impacting a larger percentage of the international fleet. Regional agreements can also harmonize enforcement practices. Cooperation in enforcement may improve the efficacy of regulations through sharing resources and information and by expanding the scope of surveillance.

A regional agreement is confined in its scope to the portion of the global shipping fleet that is registered under member states' respective flags or that enter its ports. Consequently, to maximize the reach of a regional agreement, Pacific island states should consider trying to form partnerships with countries that have active ports or a large fleet registered under its flag. Forming strategic partnerships would also improve enforcement capacity. Within the region, Japan, Singapore and the Philippines are all home to particularly active ports.[1] A transpacific agreement with the United States would also greatly increase the reach of a regional agreement due to California's active ports.[2] Alternatively, the EU may offer a good opportunity for collaboration. The EU is already proposing to regulate emissions from international shipping, and it is also working with other countries to develop efficiency standards for international shipping. Pacific islands could join the EU's monitoring, reporting and verification program or design their own program modeled off of the EU regulations.

In addition to the LOSC, regulations over international shipping should comply with the General Agreement on Tariffs and Trade (GATT). The GATT is primarily concerned with preventing protectionist policies that favor domestic products over foreign products. To prevent a GATT violation, Pacific island states should ensure that any differential treatment is for the purpose of achieving emissions reductions. Moreover, all regulations should be imposed on both domestic and foreign ships. Finally, any regulations that treat ships differently based on their point of origin should be flexible, transparent, and take into account the differing situations of different countries.

In sum, while the LOSC authorizes Pacific island states to regulate emissions from the international shipping sector, jurisdictional constraints limit regulatory options. States may collaborate to broaden the reach and improve the effectiveness of regulatory measures, but only to a limited extent.

[1] These countries were all top 50 busiest container ports in 2011. *The JOC Top 50 World Container Ports* THE J. OF COMM. 30 (2012).

[2] California boasted two of the world's top 25 container ports in 2011. *Id.*

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I. BACKGROUND

While greenhouse emissions from international shipping have received relatively little attention in climate change mitigation efforts, the sector offers substantial opportunities for emissions reductions. International shipping has been estimated to account for approximately 2-3% percent of anthropogenic GHG emissions worldwide.[3] To put this figure in perspective, if shipping emissions were a country, it would have been the seventh largest emitter in 2011.[4] Emissions from the sector continue to grow and are expected to double by 2050 under business-as-usual conditions.[5] According to a 2009 report by the International Maritime Organization (IMO), there is significant potential for reduction of GHGs from international shipping.[6] The report found that improved efficiency through technical and operational measures could reduce emissions from 25% to 75% of current levels.[7] Despite the potential for reductions, there has been limited progress to regulate emissions from shipping on the international level.

Under the Kyoto Protocol, Member Parties committed to working through the IMO to pursue GHG reductions from international shipping.[8] In 2009, the IMO's Marine Environment Protection Committee (MEPC) developed two technical measures to address GHG emissions from ships: the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP) on all ships. In 2011, these measures were added to Annex VI of The International Convention for the Prevention of Pollution from Ships, known as the Marpol Convention 73/78, as mandatory provisions for those member states that adopted the annex. The EEDI sets minimum energy efficiency standards for new ships, which vary by ship type and size. Requirements will be tightened periodically. The SEEMP also addresses energy efficiency but through helping shipping companies manage fleet efficiency and encouraging the adoption of new technologies and practices.

While these new measures will result in extensive emissions reductions over time as compared to business-as-usual projections, the IMO has admitted that "the technical and operational measures will

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[3] Buhang et al, International Marine Organization (IMO), *Prevention of Air Pollution from Ships - Second IMO GHG Study 2009 - Update of the 2000 IMO GHG Study* 1 (2009) (using 2007 base data to calculate 2.7% for intentional shipping); INTERNATIONAL ENERGY AGENCY, CO_2 EMISSIONS FROM FUEL COMBUSTION: HIGHLIGHTS 65 (2013) (estimating 645.13 million tonnes of CO2 emissions from international marine bunkers in 2011); U.S. Energy Information Administration, *International Energy Statistics* (estimating 32,578.645 million tonnes CO_2 emissions worldwide in 2011),http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=ww,&syid=2011&eyid=2011&unit=MMTCD.

[4] International shipping would fall just behind Germany, which was responsible for approximately 748 million tonnes of CO_2 emissions in 2011. U.S. Energy Information Administration, *International Energy Statistics*, http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=all,&syid=2007&eyid=2011&unit=MMTCD

[5] Pew Center for Climate Change, Climate TechBook: Marine Shipping 1 (Mar. 2010).

[6] International Marine Organization (IMO), *Prevention of Air Pollution from Ships - Second IMO GHG Study 2009 - Update of the 2000 IMO GHG Study* 54(2009).

[7] *Id.*

[8] Kyoto Protocol to the United Nations Framework Convention on Climate Change, UN Doc FCCC/CP/1997/7/Add.1, art. 2(2) (1997).

not be sufficient to satisfactorily reduce the amount of GHG emissions from international shipping."[9] This is largely due to the fact that the EEDI only applies to new ships and do not impact existing fleets. Because of the long life spans of ships, these measures will take decades before they affect a meaningful percentage of Member States' fleets. Consequently, improving efficiency of existing ships is critical to achieving substantial, timely reductions from the international shipping sector.

There are many ways to reduce emissions from existing ships. Potential reduction measures fall into three broad categories. First, reductions can be achieved through structural adjustments to improve efficiency such as replacing equipment or utilizing low resistance hull coating. Second, emissions reductions can be achieved through converting to more efficient fuels or adopting renewable energy technology to supplement fossil fuels, such as the use of sails. Finally, ships can improve efficiency through operational changes and maintenance, such as hull cleaning, fleet maintenance, or simply reducing speed. "Slow steaming" is already sometimes employed voluntarily to reduce fuel costs. Depending on the circumstances, emissions regulations could be structured as operational or technological requirements or they could allow ships to select the optimal combination of approaches through setting an emissions standard or employing a market-based mechanism, such as a tax or cap-and-trade program.

States wishing to regulate international shipping are constrained by international law. This memo will review four international instruments pertaining to the state jurisdiction to regulate GHG emissions from the international shipping sector: (1) The Kyoto Protocol, (2) The International Convention for the Prevention of Pollution from Ships, (3) The United Nations Law of the Sea, and the (4) General Agreement on Tariffs and Trade. This memo will discuss regulatory authority and constraints under each of these instruments and assess regulatory options given the limitations of international law. Following this analysis, this memo will provide a case study of the European Union's actions to control emissions from shipping and aviation in order to demonstrate potential legal and nonlegal barriers to state action.

II. THE KYOTO PROTOCOL

SUMMARY: The Kyoto Protocol does not preclude unilateral or regional emissions regulations, as long as they are in addition to the mandated international efforts through the IMO.

The Kyoto Protocol does not explicitly address state authority to regulate GHG emissions from shipping. In fact, it only briefly references maritime emissions, and only with respect to international cooperation. Article 2(2) provides:

> The Parties included in Annex I shall pursue limitation or reduction of emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the

[9] International Maritime Organization, Greenhouse Gas Emissions (Last visited Dec. 13, 2013), http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Pages/GHG-Emissions.aspx

> International Civil Aviation Organization and the International Maritime Organization, respectively.[10]

Whether this mandate for international cooperation inhibits unilateral action is not readily apparent. The Court of Justice of the European Union addressed this issue when considering the EU's Aviation Directive in 2011, since aviation emissions are governed under the same provision.[11] The court found that the requirement for international cooperation does not commit member states to act exclusively through the International Civil Aviation Organization (ICAO).[12] States may act unilaterally or regionally as long as it is in addition to working with the international organizations specified in the provision. Since shipping is addressed under the same provision, the Kyoto Protocol would likely be found not to preclude unilateral shipping regulations either.

Further support for unilateral action can be found in Article 2(1), which calls on Annex I parties to implement further "policies and measures in accordance with [their] national circumstances," including "measures to limit and/or reduce emissions of [GHGs] not controlled by the Montreal Protocol in the *transport sector*."[13] Since shipping falls squarely within the transportation sector, this provision supports state action to reduce emissions from the sector. Moreover, it would be unreasonable if the EU had to wait infinitely for the IMO to act (despite years of negotiations), when the EU is responsible under the Convention for meeting its emissions limits.[14]

III. MARPOL CONVENTION 73/78

SUMMARY: The MARPOL CONVENTION 73/78 does not preclude unilateral or regional regulation of maritime GHG emissions. In fact, Annex VI provides that atmospheric pollutants should be treated the same as non-atmospheric pollutants under international law. This provision allows states to regulate GHGs as non-atmospheric pollutants, which have a much clearer framework than atmospheric pollution under the Law of the Sea Convention.

The Marpol Convention 73/78 does not explicitly address national authority to implement stricter GHG emissions regulations. However, Annex VI impacts the way that the Law of the Sea Convention may be interpreted with respect to air pollution. Article 6 subparagraph 6 states that:

> The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in

[10] Kyoto Protocol to the United Nations Framework Convention on Climate Change, UN Doc FCCC/CP/1997/7/Add.1, art. 2(2) (1997).
[11] Case C-366/10, Air Transp. Ass'n of Am. V. Sec'y of State for Energy & Climate Change (Dec. 21, 2011).
[12] *Id.* at para. 77-8.
[13] Kyoto Protocol to the United Nations Framework Convention on Climate Change, art. 2(1) (emphasis added); *See also,* AOIFE O'LEARY ET AL., LEGAL IMPLICATIONS OF EU ACTION ON GHG EMISSIONS FROM THE INTERNATIONAL MARITIME SECTOR, CLIENTEARTH 10 (2011).
[14] RICARDO-AEA, SUPPORT FOR THE IMPACT ASSESSMENT OF A PROPOSAL TO ADDRESS MARITIME TRANSPORT GREENHOUSE GAS EMISSIONS, CLIMA.B.3/SER/2011/0005 Issue number 5 at 36 (Jan. 13, 2013).

> force at the time of application or interpretation of this Annex, applies, *mutatis mutandis*, to the rules and standards set forth in this Annex.[15]

According to Professor Erik Molenaar of Utrecht University School of Law, inclusion of the term "mutatis mutandis" applies the provisions addressing vessel-source pollution to air pollution under international law. This means authority given under the United Nations Convention on the Law of the Sea over discharge pollution applies to vessel-source air pollution, at least among member states that adopt Annex VI.[16] This is advantageous because the regime for non-atmospheric pollution is much more detailed and well known than that of vessel-source air emissions.[17]

Moreover, Professor Molenaar asserts that the fact that Annex VI has been adopted by states representing almost the entire international shipping industry supports *erga omnes* application of the provision, meaning that the provision applies to the entire international community, not just those states who signed the Annex.[18] However, because not all states have adopted the Annex, both general vessel-source pollution and air pollution provisions of the Law of the Sea will be discussed in the following section.

IV. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

The United Nations Convention on the Law of the Sea (LOSC) entered into force in 1994. Intended to serve as the "Constitution for the Oceans," the LOSC is the primary international instrument for determining a state's jurisdiction to regulate GHG emissions from international shipping.

The LOSC recognizes three bases for jurisdiction over ships. States can act in the capacity of a flag, coastal, or port State. A flag State is the state whose nationality under which a particular vessel is registered. Flag states have primary jurisdiction under LOSC. Port and coastal States authority pertains to regulating foreign ships. Coastal State jurisdiction generally is concerned with violations that occur within or affect a state's maritime zones.[19] Enforcement actions may be taken in-port or while the ship is traveling within waters where the state exercises jurisdiction. Port State jurisdiction is based on ship's voluntary presence at port.[20] Port State regulations are usually structured as conditions to entry.[21]

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[15] The 1973 International Convention for the Prevention of Pollution from Ships as modified by the 1978 Protocol ("Marpol 73/78") Annex VI, Reg. 11(6) (1997).
[16] ERIK JAAP MOLENAAR, COASTAL STATE JURISDICTION OVER VESSEL-SOURCE POLLUTION 506 (International Environmental Law and Policy Series, vol. 51, 1998).
[17] *Id.*
[18] MOLENAAR, *supra* note 16, at 508. In practice, this provision is especially relevant since states commonly apply their legislation (enforcing the international regimes they are subject to) to foreign ships regardless of the flag Country's adherence to that convention. *Id.*
[19] *Id.* at 92.
[20] *Id.*
[21] *Id.* at 130.

While the LOSC does not explicitly address climate change, it broadly defines marine pollution such that GHG emissions fall under the definition.[22] State authority to control pollution discharged by ships is delineated in Part XII of the LOSC. Article 192 imposes a general obligation on states to protect and preserve the marine environment. Article 194 requires states to take all "necessary" action permitted under the LOSC "to prevent, reduce and control pollution of the marine environment from any source…" Despite this sweeping responsibility, Part XII and zonal parts of the LOSC considerably constrain jurisdiction to control pollution from foreign ships beyond international standards.

For jurisdictional purposes, the LOSC divides the ocean into maritime zones based on the proximity to the state's coast. Regulatory authority over vessel-source pollution from foreign ships decreases and navigational rights increase as maritime zones move away from the coast. This section will review prescriptive and enforcement authority over foreign ships by zone and then discuss flag State authority. Finally, the section will conclude with a few general restrictions and a discussion of authority for regional action under the LOSC.

A. Authority over Ships at Port

Summary: Because ports are internal waters, States may generally regulate emissions as conditions to port entry. This power is relatively unconstrained, aside from publicity requirements and general nondiscrimination and reasonableness provisions. States have the power to prevent breach of port entry conditions or deny entry where conditions are not met.

1. Prescription

Because ports are usually located within the territory of a state and thus subject to the state's territorial sovereignty, customary law recognizes the right of states to condition access into ports.[23] The LOSC acknowledges the authority to condition entry for pollution control purposes in Article 211 (3), which provides that:

> States which establish particular requirements for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels in their ports or internal waters or for a call at their off-shore terminals shall give due publicity to such requirements and shall communicate them to the competent international organization.

It is noteworthy that Article 211 does not limit prescriptive authority in any substantive way. It only establishes general procedural requirement of due publicity. The competent international organization

[22] "'Pollution of the marine environment' means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities." United Nations Convention Law of the Sea (LOSC), art. 1(4), 18 U.N.T.S. 3 (1982).

[23] LOSC defines ports as "the outermost permanent harbor works which form an integral part of the harbor system are regarded as forming part of the coast…" LOSC art. 11; *See,* Louise de La Fayette, *Access To Ports In International Law*, 11 Int'l J. Marine & Coastal L. 1, 1 (1996).

is understood to be the IMO.[24] The LOSC provides no other restrictions over port-entry conditions except for general reasonableness requirements of good faith, abuse of rights, and non-discrimination provisions, discussed *infra* section F.

One important limitation of port access conditions is that they are predicated on a ship's voluntary presence. Consequently, conditions should not be imposed where ships are in port by necessity.[25]

2. ENFORCEMENT

Because ports are internal waters, the LOSC does not directly address in-port enforcement on in-port violations. In addition to in-port enforcement, it is well established that port States may deny entry as means of enforcement as long as the ship is not in distress.[26] In addition to enforcement at port, the LOSC authorizes coastal States to prevent breach of port entry conditions:

> In the case of ships proceeding into internal waters or a call at a port facility outside internal waters, the coastal State also has the right to take necessary steps to prevent any breach of the conditions to which admission of those ships into internal waters or such a call is subject.[27]

Molenaar maintains that the preventative nature of this power allows its application while a ship is in the territorial sea even if it is not yet (or still) at port.[28] The term "necessary steps" has been interpreted to confer a full range of enforcement powers to prevent noncompliance subject to international law.[29] Furthermore, Molenaar maintains that this provision also impliedly gives port States the same authority.[30]

B. AUTHORITY OVER SHIPS IN TERRITORIAL WATERS

SUMMARY: In territorial waters, states may not disrupt or impair innocent passage or impose restrictions that apply to construction, design, equipment or manning (CDEM). Emissions standards are likely permissible, especially if there are alternative means of compliance. States cannot charge ships simply for crossing territorial waters, but they may set fees for violations of emissions regulations.

The territorial sea extends up to twelve nautical miles from the coast.[31] Coastal State sovereignty extends to the waters and air space over its territorial sea, with certain limitations. Coastal States may

[24] MOLENAAR, *supra* note 16, at 104.
[25] AOIFE O'LEARY ET AL. *supra* note 4, at 20.
[26] de La Fayette, *supra* note 23, at 11.
[27] LOSC art. 25(2).
[28] MOLENAAR, *supra* note 16, at 105.
[29] *Id.*
[30] *Id.* at 103.
[31] The baseline from which zones are measured is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State. LOSC art. 5.

regulate pollution from vessels traveling through their territorial sea, including atmospheric pollution; however, regulatory authority is limited by the right of innocent passage.

It is worth noting that the LOSC provides special rules for archipelagic states to determine their territorial borders.[32] States' sovereignty extends over archipelagic waters, but just as with territorial waters, regulatory authority is limited by the right of innocent passage.[33] Thus, while archipelagic waters are governed under unique provisions of the LOSC, they may generally be treated as territorial waters for the purpose of assessing the authority to regulate shipping emissions.[34]

Because of Marpol 73/78 Annex VI, this section will discuss general pollution provisions in addition to atmospheric pollution provisions.

1. PRESCRIPTION

Article 211(4), which delineates prescriptive powers regarding general pollution from vessels in the territorial sea, authorizes coastal States to "adopt laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the right of innocent passage." However, such laws and regulations may not "hamper innocent passage of foreign vessels."

Article 212 delineates prescriptive powers regarding atmospheric pollution. It directs states to adopt laws and regulations to prevent, reduce and control atmospheric pollution of the marine environment that apply to the air space of the territorial sea, "taking into account international agreed rules, standards, and recommended practices and procedures..."[35] States are also directed to "take other measures *as may be necessary* to prevent, reduce and control such pollution."[36]

While the language of Article 212 differs from Article 211, both generally confer prescriptive authority over ships in the territorial sea. Unlike Article 211, Article 212 does not refer to innocent passage. However, from the rest of the LOSC framework, it is clear that regulation under 211 is still subject to the limitations of innocent passage.[37]

a. INNOCENT PASSAGE

The principle of innocent passage is intended to secure navigational rights of foreign ships while traveling through territorial seas. The LOSC defines passage as traversing the territorial sea either without entering internal waters or for the purpose of proceeding to or from internal waters.[38] While passage must be "continuous and expeditious," the term includes stopping or anchoring "so far as the

[32] LOSC art. 47.
[33] LOSC art. 52.
[34] One key difference, though not likely relevant to emissions regulations, is that archipelagic waters are also subject to non-suspendable sea lanes passage. LOSC art. 53.
[35] "Air space under their sovereignty" refers to territorial waters only. MOLENAAR, *supra* note 16, at 501.
[36] LOSC, art. 212(2).
[37] LOSC, art. 17 (stating that all ships "enjoy the right of innocent passage through the territorial sea.").
[38] LOSC, art. 18(1).

same are incidental to ordinary navigation or are rendered necessary by force majeure or distress or for the purpose of rendering assistance to persons, ships or aircraft in danger or distress."[39]

Passage is innocent as long as it is "not prejudicial to peace, good order or security of the coastal State."[40] The LOSC provides a non-exhaustive list of activities that constitute non-innocent passage. Most relevant to GHG emissions control is subsection (h): "any act of willful and serious pollution contrary to this Convention."[41] The term "willful" implies that the pollution must be intentional, but the level of intent is unclear.[42] In the case of GHG emissions regulations, even if emissions were intentional, it is unlikely that the impacts of any one violation would be considered "serious." If there were an event where emissions were serious, they likely wouldn't be willful.[43] Consequently, this memo will presume that regulation must respect the rights of ships in innocent passage.

The right of innocent passage does not preclude states from regulating vessel source pollution in territorial waters. Indeed, Article 21 explicitly permits states to promulgate regulations "relating to innocent passage through the territorial sea" for the sake of "conservation of the living resources of the sea" and "the preservation of the environment of coastal State and the prevention, reduction and control of pollution thereof" as long as regulations comply with the remaining provisions of the LOSC.[44] Innocent passage only limits the extent to which a state may impair passage. Article 24 provides:

> 1. The coastal State shall not hamper the innocent passage of foreign ships through the territorial sea except in accordance with this Convention. In particular…the coastal State shall not:
> (a) impose requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage; or
> (b) discriminate in form or in fact against the ships of any State or against ships carrying cargoes to, from, or on behalf of any State.

The LOSC does not define what constitutes 'hampering' innocent passage. Literature on the subject suggests that this determination is essentially a question of "reasonableness" that balances the extent of the hindrance to passage with the seriousness of the state's threatened interest.[45] While the balancing test provides some guidance, it still leaves some ambiguity with respect to what is considered 'hampering' innocent passage.

Based on the theory of innocent passage, the LOSC sets a substantive categorical exclusion from prescriptive jurisdiction over ships in territorial waters. Under Article 21, laws and regulations applying

[39] *Id.* at 18(2).
[40] LOSC, art. 19(1).
[41] *Id.* at art.19(1)(h)
[42] MOLENAAR, *supra* note 16, at 197.
[43] *Id.*
[44] LOSC, art 21(1)(d), (f).
[45] Brian Smith, *Innocent Passage As A Rule Of Decision*, 21 COLUM. J. TRANSNAT'L L. 49, 91 (1982); See also MOLENAAR, *supra* note 16, at 202.

to ships in territorial waters may not "apply to the design, construction, manning or equipment of foreign ships, unless they are giving effect to generally accepted international rules or standards."[46] Regulation applying to CDEM are considered a *per se* impairment of innocent passage. This exemption is intended to prevent the development of a patchwork of inconsistent requirements that could render compliance technically or economically impracticable.[47] Since this memo is only concerned with prescriptive authority by individual states or regional agreements, CDEM regulation over ships in the territorial sea will not be discussed.

While a direct technological requirement is clearly not permitted in the territorial sea, it is less clear whether regulations that indirectly impact CDEM fall under the categorical exclusion. Emissions standards, while not design standards in name, are likely to impact CDEM and thus could be considered to "apply" to CDEM. The LOSC does not explicitly discuss emissions standards, but its discussion of discharge standards provides some guidance in this respect. Article 194(3)(b) distinguishes discharge control regulations from regulations covering CDEM.[48] Molenaar suggests that for jurisdictional purposes emission standards should be treated like discharge standards since both are intended to regulate the amount of substances that enters the marine environment as opposed to specifying design standards.[49] Put another way, discharge and emissions standards are outcome-oriented, while CDEM standards are a means-based approach.

A potential issue may arise where an emissions standard can only be met through a specific CDEM method.[50] Molenaar suggests that emissions standards should be permissible *as long as* effects on CDEM are "incidental and minor."[51] Legislation enacted as backdoor means for the purpose imposing CDEM standards would be impermissible.[52] To prevent any risk of emissions standards being considered CDEM, states should structure standards to allow flexibility in means of compliance.

It is noteworthy that port entry conditions can include CDEM requirements, even though adhering to CDEM requirements by their very nature means that the requirements will stay with the ship when it leaves the port and enters territorial waters. The underlying theory is that a foreign ship agrees to comply with more stringent environmental and safety standards in order to operate in a particular country.

Finally, to protect innocent passage, the LOSC imposes a procedural requirement that states must give due publicity of any regulation relating to innocent passage through territorial seas.[53]

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[46] LOSC, art 21. The meaning of "generally accepted international rules or standards," known as GAIRAS, is discussed in Section D(1)(a).
[47] Smith, *supra* note 45, at 76–77 .
[48] *See* Dan Lickel, *Regulating Foreign Vessels Under The Clean Air Act*, 3 SAN DIEGO INT'L L.J. 145, 156-7 (2002).
[49] MOLENAAR, *supra* note 16, at 21.
[50] *See* Lickel, *supra* note 48, at 159.
[51] MOLENAAR, *supra* note 16, at 200.
[52] *Id.*
[53] LOSC art. 21(3).

b. Charges Limitation

Article 26 prevents states from imposing charges on foreign ships for passage through the territorial sea.[54] Charges may only be imposed for services rendered to the ship during its passage. This provision prohibits a carbon tax or some sort of fee that is levied for passage alone. There is no equivalent limitation under the LOSC for ships entering a state's port.

2. Enforcement

a. General Enforcement Provisions

As with prescription, enforcement over ships in the territorial sea is limited by the right to innocent passage. For reasons discussed above, this section will presume ships are in innocent passage at the time of enforcement.

With respect to general vessel-source discharge, the LOSC provides enforcement jurisdiction for coastal States to inspect vessels in the territorial seas where there are "clear grounds" that a ship has violated a marine protection law therein.[55] Furthermore, "where the evidence so warrants, [coastal States may] institute proceedings including detention of the vessel."[56]

The text cross-references Part II section 3, thereby subjecting enforcement actions to requirements under Article 24 and Article 28.[57] Article 28 addresses civil jurisdiction in relation to foreign merchant vessels in innocent passage. It states that a vessel should not be stopped for the exercise of civil jurisdiction unless it pertains to liabilities related to its current passage.[58] However, this limitation does not pertain to ships that are proceeding from internal waters.[59] As previously discussed, Article 24 prevents impairing or disrupting innocent passage. The complexities of determining what constitutes impairment of innocent passage with respect to enforcement are essentially the same as with prescriptive authority.

The LOSC provides less detail regarding enforcement of atmospheric pollution regulation. Article 222 only broadly states, "States shall enforce, within the air space under their sovereignty… their laws and regulations adopted in accordance with article 212, paragraph 1, and with other provisions of this Convention…"[60] The use of "shall" indicates that enforcement is mandatory,[61] but the article fails to specify what modes of enforcement are permissible. Molenaar maintains that Article 222 is also subject

[54] LOSC art. 26.
[55] LOSC art. 220(2).
[56] *Id.*
[57] Enforcement under this provision must be "without prejudice to the application of the relevant provisions of Part II, section 3." LOSC, art. 220(2); Molenaar, *supra* note 16, at 242–43.
[58] LOSC art. 28(2).
[59] *Id.* at art. 28(3).
[60] LOSC art. 222.
[61] Molenaar, *supra* note 16, at 504.

to the restrictions of Articles 24 and 28.[62] Consequently, enforcement powers for atmospheric pollution control are similar to those under Article 220. One exception is that Article 222 does not require "clear grounds." However, this standard arguably should be taken into account anyway as part of the "reasonableness test" regarding innocent passage.[63]

b. CHARGES LIMITATION

The charges limitation under Article 26 does not prevent states from fining ships for violating pollution regulation.[64] In fact, Article 230(2) specifically allows monetary penalties for violations of pollution control measures in the territorial sea.

c. ENFORCEMENT OF VIOLATIONS FROM TERRITORIAL SEAS WHILE SHIP IS AT PORT

The LOSC permits states to enforce violations committed in the territorial sea while a ship is voluntarily at that state's port. However, this authority is limited to enforcement of "generally accepted international rules or standards"[65] and thus does not extend to unilateral laws and regulations.

C. AUTHORITY OVER SHIPS IN THE CONTIGUOUS ZONE:

SUMMARY: State authority over ships in the contiguous zone is extremely limited. Authority to regulate GHG emissions from ships traveling through the contiguous zone depends on the interpretation of the term "sanitary regulations." If the term is interpreted to include emissions regulations,then state authority to enforce regulations pertaining to the territorial sea is expanded to ships traveling through the contiguous zone. In other words, even when a ship is in the more distant contiguous zone, a state may take action against the ship related to violations that occurred or may soon occur in the territorial sea. Otherwise, there is no authority to regulate GHG emissions in the contiguous zone.

The contiguous zone extends up to 24 nautical miles from the coast.[66] Prescriptive authority for national legislation and regulations in the contiguous zone is considerably more limited than in territorial waters. States may only "exercise the necessary control to . . . prevent infringement on customs, fiscal, immigration or sanitary laws and regulations within its territorial sea" and punish violations of such laws.[67] To fit within these parameters GHG regulations must fall into the category of sanitary regulations. The LOSC does not provide guidance on the scope of the term. Nor has the International Tribunal for the Law of the Sea addressed this issue. Some scholars advocate a broad interpretation of

[62] *Id.*
[63] *Id.*
[64] *Cf.* ECJ Case 308/06, Reference for preliminary ruling from the High Court of Justice (England and Wales), Queen's Bench Division made on 14 July 2006 (Administrative Court) (2008)(finding Directive 2005/35/EC which provides for penalties for violation of pollution control measures valid on other grounds).
[65] LOSC art. 218(1), 220(1).
[66] LOSC, art. 33(2).
[67] *Id* at art. 33(1).

"sanitary regulations" that would include environmental laws,[68] while others maintain that the term does not include any type of vessel-source pollution.[69] In support of this narrow interpretation, Molenaar points to the language and structure of the LOSC. Since pollution regulatory powers are explicitly provided elsewhere in the LOSC, he maintains that it is unlikely that the term "sanitary regulations" was intended to implicitly include pollution controls.[70]

The plain meaning of the term "sanitary" suggests that environmental laws may be sanitary laws if they are intended to protect human health.[71] For example, solid waste regulation falls squarely within this definition. Whether emissions regulations to mitigate climate change could be considered sanitary regulations is less clear. While climate change negatively affects human health through impacts such as increased range of vector diseases, regulations of GHGs emitted in the contiguous zone would not have a discernible health benefit on the state; rather, they would only represent a very small fraction of a much broader international effort.

Even if the term "sanitary regulations" is interpreted to include regulations of GHG emissions, the rest of the provision severely limits state authority to control them. Authority over ships in the contiguous zone is only granted for the purpose of preventing infringement or enforcing a violation of regulations within a state's territorial sea.[72] There is no prescriptive or enforcement authority to protect the environment of the contiguous zone itself.[73] Instead, the grant of authority is essentially an extension of enforcement powers over ships that are in transit to or from the territorial sea to prevent or enforce a violation therein.[74] Moreover, the provision only grants this power as "necessary" thereby casting further uncertainty on the scope of authority.[75]

In sum, state authority over ships in the contiguous zone is extremely limited. The authority to regulate GHG emissions from foreign ships traveling through the contiguous zone depends on the interpretation

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[68] MOLENAAR, *supra* note 16, at 277 (citing works by L.A.Teclaff, G.H. Allen, and G.J.Timagenis).

[69] *See id.*; KARI HAKAPÄÄ, MARINE POLLUTION IN INTERNATIONAL LAW. MATERIAL OBLIGATIONS AND JURISDICTION (1981)(stating that nothing in the preparatory work of the International Law Commissions or the Geneva Conference indicated that the term sanitary was intended to include pollution control); Bodansky, Protecting the Marine Environment from Vessel-Source Pollution: UNCLOS III and Beyond, 18 Ecology L.Q. 719, 755 n.175 (1991) (citing Anderson, Andrew W. Anderson, *National and International Efforts to Prevent Traumatic Vessel Source Oil Pollution*, 30 U. Miami L. Rev. 985, 1002 ("the term 'sanitary' was probably not intended to include anti-pollution regulations") and Dinstein, Dinstein, Yoram Dinstein, *Oil Pollution by Ships and Freedom of the High Seas*, 3 J. Mar. L. & Com. 367 (1972) (it is only "with some stretch of the imagination, [that oil pollution] may be considered as falling within the ambit of the sanitation clause").

[70] MOLENAAR, *supra* note 16, at 277.

[71] The Mirriam-Webster Dictionary defines "sanitary" as "of or relating to health." MIRRIAM-WEBSTER, www.merriam-webster.com.

[72] *See,* LOSC, art. 33 (1).

[73] Bodansky, Protecting the Marine Environment from Vessel-Source Pollution: UNCLOS III and Beyond, 18 Ecology L.Q. 719 at n.175 (1991).

[74] MOLENAAR, *supra* note 16, at 276.

[75] *Id.*

of "sanitary laws." If the term is interpreted to include emissions regulations, jurisdiction is limited to enforcement of violations that occurred in the territorial sea or prevention of such violations.

D. AUTHORITY OVER SHIPS IN EXCLUSIVE ECONOMIC ZONE

SUMMARY: In the Exclusive Economic Zone, States may not enact regulations that go beyond international standards. The LOSC does provide a special provision for regulation of pollution in geographically or ecologically sensitive regions; however, the global nature of GHGs would likely prevent its application.

1. PRESCRIPTIVE AUTHORITY

a. IN GENERAL

The exclusive economic zone (EEZ) extends up to 200 miles from a state's coast.[76] Article 56(1) provides coastal States with "sovereign rights for the purposes of…protection and preservation of the marine environment" in the EEZ. However, the LOSC goes on to substantially limit this authority in Section XII. Article 211(5) limits prescriptive jurisdiction to regulations "giving effect to generally accepted international rules and standards established through the competent international organization or general diplomatic conference." The competent international organization referred to is generally understood to be the IMO. [77]

The LOSC does not clarify what constitutes "generally accepted international rules and standards," known as GAIRAS. This ambiguity has raised debate among scholars. The term can be broadly construed to limit jurisdiction to binding international instruments or customary law. However, the dominant view is that the standard is less stringent, [78] since it would otherwise be redundant with existing terms that would have been clearer to use.

Even presuming that GAIRAS is a lower standard than customary law, there is still some dispute as to what level of international recognition is required for a standard to be "generally agreed upon." Some scholars have proposed that the term requires an international instrument to be in force or to have attained customary status.[79] The International Law Association committee disagrees. They maintain that GAIRAS is based on whether the instrument is respected by most states and has been adopted by the particular state choosing to impose the rules.[80] Following the ILA interpretation, Molenaar states that "[t]he preferred interpretation of 'generally accepted' is met when there is 'widespread and representative participation in the convention, provided it included that of States whose interests were

[76] LOSC art. 57.
[77] ERIK FRANCKX, VESSEL-SOURCE POLLUTION AND COASTAL STATE JURISDICTION: THE WORK OF THE ILA COMMITTEE ON COASTAL STATE JURISDICTION RELATING TO MARINE POLLUTION (1991-2000) 20 (2001).
[78] *Id.*
[79] *See,* MOLENAAR, *supra* note 16, at 153, 155.
[80] FRANCKX, *supra* note 77, at 107.

specifically affected are fulfilled."[81] In practice, some states simply impose international rules and standards on foreign ships in their maritime zones, once the coastal State has ratified the relevant instrument.[82]

Even with the less stringent interpretation, it is unlikely that regional standards could qualify as "generally accepted" such that third parties could be subject to regulations. However, if more countries joined over time, a regional agreement could potentially become generally accepted at a later date.[83]

b. SPECIAL POLLUTION PREVENTION AREAS

The LOSC provides a special provision to protect marine environments that are particularly ecologically sensitive through the designation of Special Pollution Prevention Areas. Under Article 211(6), if a state has "reasonable grounds" for believing that a "clearly defined area" of their EEZ requires special pollution prevention measures, it may apply to the IMO for approval to adopt special pollution control laws and regulations for that area. This tool, however, is limited to special circumstances where "the adoption of special mandatory measures for the prevention of pollution from vessels is required for recognized technical reasons in relation to [the area's] oceanographic and ecological conditions, as well as its utilization or the protection of resources and the particular character of its traffic."

Special Pollution Prevention Areas do not seem to be a good fit for regulating GHG. Even though island nations are particularly vulnerable to the impacts of GHGs, the global nature of GHG emissions would prevent an assertion that emissions from that specific geographical area were particularly harmful. As a result, this provision would not likely be an available avenue for regulating GHGs in the EEZ.

2. ENFORCEMENT AUTHORITY

Under the LOSC, enforcement powers over ships in the EEZ increase with the degree of harm threatened by a given violation. Where there is "clear grounds" to believe a violation has occurred, a State may require the vessel to provide information such as its registry and next port of call.[84] Where there is "clear objective evidence" that a violation has resulted in a "substantial discharge causing or threatening significant pollution of the marine environment," then the state make physically inspect the ship.[85] Where there is "clear objective evidence" that the discharge resulted in "major damage or threat of major damage to the coastline or related interests...or any resources of its territorial sea or [EEZ]," the state may institute proceedings and detain the ship. Since GHGs emissions from any give ship are unlikely to cause major damage or pose a threat of significant pollution, enforcement powers in the EEZ are limited to information gathering.

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[81] MOLENAAR, *supra* note 16, at 183.
[82] *Id.* at 177.
[83] *Id.* at 159–60.
[84] LOSC, art. 220(3).
[85] LOSC, art. 220(5).

If the vessel is at port, the LOSC also gives enforcement powers to investigate violations that occurred when the ship was in the EEZ; however, as in territorial waters, authority is limited to violations of GAIRAS.[86]

E. Flag State Authority

Summary: Flag States have extensive discretion in regulating ships registered under their flag. The Republic of the Marshall Islands is a popular flag of convenience. In fact, its registry is one of the world's largest. Thus, the Marshall Islands could exercise its authority as a flag State to regulate the large number of ships flying its flag. However, ships may choose to leave the registry once it is no longer economically advantageous.

Flag States have principal jurisdiction over vessels flying their flag, and jurisdiction extends over the ship regardless of its location (although there is concurrent jurisdiction when a ship is in another state's waters). The LOSC affirms flag State jurisdiction while laying down some additional obligations. Article 211(2) requires states "adopt laws and regulations for the prevention, reduction, and control of pollution of the marine environment from vessels flying their flag or of their registry."[87] Furthermore, states must ensure compliance of vessels flying their flag with both international and national rules and standards regarding pollution control and provide for effective enforcement of such rules.[88]

A ship owner may choose the state with which it will register its ship. While the LOSC requires a "genuine link" between the ship and its flag State,[89] this requirement has little meaning in practice. To reduce operation costs such as compliance costs associated with environmental and safety regulations, many corporations register their ships in a country different from the country of ownership. These flags are referred to as "flags of convenience." The Republic of the Marshall Islands has become an increasingly popular flag of convenience. In 2010, 1,468 of the nation's 1,593 registered ships were foreign.[90] Over the last decade the registry has experienced remarkable growth.[91] Currently, the Marshall Islands' registry is the third largest flag of convenience registry and the seventh largest registry worldwide.[92] Moreover, the registry is comprised of particularly large ships. As of 2013, the registry represented 8.6% of the deadweight tonnage (the weight a ship can carry) worldwide, while only accounting for 2.37% of ships worldwide. [93]

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[86] LOSC, art. 218(1).
[87] LOSC, art. 211(2).
[88] LOSC, art. 217(1).
[89] LOSC, art 91.
[90] Central Intelligence Agency, The World Factbook, https://www.cia.gov/library/publications/the-world-factbook/geos/rm.html
[91] UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, REVIEW OF MARITIME TRANSPORT 46 (2011)
[92] Central Intelligence Agency, The World Factbook, https://www.cia.gov/library/publications/the-world-factbook/geos/rm.html
[93] UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, REVIEW OF MARITIME TRANSPORT 56 (2013).

Despite the Marshall Islands' large registry, the nature of flags of convenience tempers the promise of this regulatory approach. Just as a ship may choose its registry, it may also change its registry. If shipping companies see new regulations as too onerous, they may choose to register their ships under another flag of convenience. Consequently, the Marshall Islands registry might be constrained in its reach over ships registered under its flag.

F. General Limitations on State Authority

The LOSC provides general fairness provisions that states must observe in regulating international shipping, regardless of the maritime zone. Article 227 prohibits states from discriminating "in form or in fact" against vessels of another state. This provision prohibits states from treating ships differently on the basis of their flag State. However, the IMO acknowledges that regulations may take into account "appropriate differences" such as ship type or structure.[94]

Article 300 prohibits states from exercising jurisdiction under the LOSC that would constitute an abuse of rights. Under international law, four types of actions constitute an abuse of rights: (1) acting in bad faith; (2) acting for an improper purpose; (3) taking into account irrelevant factors while discounting relevant factors; and (4) acting unreasonably.[95]

Both Article 227 and Article 300 should be taken into account in designing maritime emissions regulations. States should develop regulations based on sound research and ensure that the structure of regulations does not result in discrimination based on a ship's flag State.

G. Regional action

The LOSC encourages cooperation among states to prevent and control atmospheric vessel-source pollution. Article 212(3) provides, "States, acting through competent international organizations or diplomatic conference, shall endeavor to establish global and *regional* rules, standards, and recommended practices and procedures to prevent, reduce and control such pollution." Members of regional agreements may mutually agree to forego rights afforded to them under the LOSC, but they may not infringe on the rights of non-parties.[96] For example, a regional agreement may not impair innocent passage of ships registered under the flag of non-party states.

A regional agreement to regulate GHGs from international shipping would offer significant advantages over unilateral action. First, it would reduce this risk (or at least the extent) of loss of competitiveness for a given state.[97] If one Pacific island state sets stringent port entry requirements for emissions reductions, then ships may choose to forgo entering its ports over bearing the costs of compliance.

[94] MPEC, Legal Aspects of the Organization's Work on Greenhouse Gas Emissions in the Context of the Kyoto Protocol 3 (2008), http://www.sjofartsverket.se/pages/14228/58-4-20.pdf.
[95] Vasilios Tasikas, *The Regime Of Maritime Port Access*, 5 Loy. Mar. LJ 1, 33 (2007).
[96] Agreements among two or more State Parties may not "affect the enjoyment by other State Parties of their rights or the performance of their obligation under this Convention." LOSC, art. 311 (3).
[97] See Molenaar, *supra* note 16, at 125, Table IV.1.

Pacific island states are likely particularly vulnerable because they make up such as small percentage of the global market. As more states adopt a given standard, they begin to represent a larger share of the market, thereby increasing a ship owner's economic incentive to comply. For this reason, it would be especially advantageous to form an agreement with a state that has a particularly active port, such as Singapore, Japan, or the Philippines.[98]

Second, a regional agreement could increase overall emissions reductions from the shipping sector by increasing the number of ships subject to regulations. Third, having more states party to the agreement would expand the scope of surveillance and improve enforcement capacity, further increasing the effectiveness of the regulatory program.[99] Through creating a network of states that are willing to inspect ships at their ports, a violation is more likely to be detected. This is especially important if regulations include behavioral requirements that extend beyond a state's territorial waters, such as slow steaming.

The Paris Memorandum of Understanding on Port State Control (Paris MOU), a regional agreement among European nations to ensure compliance with safety and environmental standards, exemplifies how regional action can improve enforcement capacity. The Paris MOU focuses on ensuring effective enforcement of international standards primarily through agreed upon inspection practices for foreign ships that enter member States' ports. The MOU also provides for information exchange, including data on all inspections conducted by Member States. By harmonizing inspection practices, member States prevent competitive disadvantage and make efficient use of their limited resources through employing a complex set of criteria to determine which ships should be inspected.[100] The Paris MOU could serve as a model in coordinating enforcement practices in the development of a regional agreement to control GHG emissions.

Unlike the safety and environmental standards covered by the Paris MOU, the IMO is yet to establish standards for GHG emissions from existing ships. Consequently, a regional agreement would have to determine the desired rules or standards in addition to establishing enforcement procedures. To maximize the reach of the emissions rules, an agreement should take advantage of all jurisdictional bases (flag, coastal, and port State). Because of the expansive authority of port and flag State jurisdiction, standards could include operational efficiency, structural efficiency, and fuel type requirements over flag ships and foreign ships enter Member States' ports. These standards could be supplemented by operational requirements over ships traveling through member states' territorial seas. Alternatively, an emissions standard or market based mechanism could be employed over ships entering member states' ports and flying member states' flags to allows ships to choose the most cost effective means to achieve the desired reduction. As previously mentioned, regional agreements may not infringe on the rights of non-parties. Therefore, any portions of the regional agreement that expand

[98] Top 50 World Container Ports (last visited December 13, 2013), http://www.worldshipping.org/about-the-industry/global-trade/top-50-world-container-ports
[99] MOLENAAR, *supra* note 16, at 125.
[100] *Id.* at 127.

jurisdiction from the authority conferred under the LOSC could only be enforced among parties to the agreement. Despite this limitation, it is clear that a regional agreement offers many advantages to unilateral action.

V. GENERAL AGREEMENT ON TARIFFS AND TRADE

Regulating emissions from the international shipping sector would likely increase the costs of transporting goods. Since increased shipping costs would likely be passed on to consumers in the price of goods, emissions regulations would impact international trade. The World Trade Organization (WTO) governs international trade through the General Agreement on Tariffs and Trade (GATT). Those Pacific island states that are members of the WTO must ensure that regulations over international shipping are in compliance with the GATT.

The GATT lays out general requirements, such as nondiscrimination provisions, and then sets out a list of exceptions to the general rules. If regulations impose the same requirements (emissions standards, technological specifications, etc.) on all domestic and foreign ships entering or exiting their ports, they are likely to comply with the general requirements. On the other hand, regulations that require ships to pay a fee or tax or purchase allowances based on emissions as a condition to port entry could raise issues of discrimination if they treat ships differently based on their flag state or the source of goods. However, if a Member State were challenged, it would likely be successful in invoking one of the GATT exceptions. Therefore, the GATT would not likely prevent Pacific island states from regulating shipping emissions. This section will briefly discuss the relevant GATT provisions to ensure an exception could be successfully invoked in the event of a challenge.

A. GENERAL ARTICLES

SUMMARY: Regulations of greenhouse gas emissions from international shipping could violate Article III of the GATT if they favor domestic goods over foreign goods.

If regulations over emissions from international shipping were challenged under GATT, it would likely be under Article III National Treatment on Internal Taxation and Regulation. Article III prohibits Member States from treating domestic goods favorably over foreign goods once they enter the domestic market.[101] A complaining party challenging a measure under Article III must show that imported products are taxed or charged in excess of 'like' domestic products.[102] The WTO Appellate Body has found that "even the smallest amount of "excess" is too much."[103] The scope of what constitutes a tax or charge under the GATT is broad and includes indirect taxes or charges, such as a pollution tax.[104] A

[101] General Agreement on Tariffs and Trade art. III, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194 [hereinafter GATT]
[102] GATT art. III(2).
[103] Appellate Body Report, *Japan-Taxes on Alcoholic Beverages*, WT/DS8/AB/R 23 (Jul. 30, 1997).
[104] J. Meltzer, *Climate Change And Trade--The EU Aviation Directive And The WTO*, 15 JOURNAL OF INTERNATIONAL ECONOMIC LAW 111, 129 (2012).

carbon tax on ships could be construed to fall under Article III because the costs of transporting goods are expected to be passed on to the price of the goods.[105]

The California Fuel Standard established under Assembly Bill 32 provides an example of how regulations intended to reduce GHG emissions could be considered discriminatory. California's Fuel Standard was designed to reduce the carbon intensity of transportation fuels that are consumed in California. Taking into account production, refining and transportation of fuel, the California Air Resources Board (CARB) categorized fuel types by region and process and assigned each a carbon intensity value. Since out-of-state fuels had to travel further distances, they result in higher transportation emissions, which were reflected in their fuel intensity values.

Like the GATT, the Dormant Commerce Clause of the U.S. Constitution prohibits discrimination against out-of-state goods. In *Rocky Mountain Farmers Union v. Corey,*[106] ethanol producers challenged the California Fuel Standard alleging that CARB had discriminated against out-of-state fuel by taking into account the origin of fuel in determining carbon intensity. The Ninth Circuit Court found that the Fuel Standard was not facially discriminatory "simply because it effects in-state and out-of-state interest unequally."[107] In overturning the district court decision, the court determined that CARB's consideration of geography was permissible since it was for the purpose of determining GHG emissions and since the Fuel Standard employed one consistent methodology in determining each fuel type's carbon intensity.[108] In her dissent, Judge Murguia argues that the majority improperly considered CARB's reasoning for distinguishing in-state and out-of-state ethanol in determining whether the Standard was discriminatory[109] and asserts that the Fuel Standard is facially discriminatory.[110]

Regulations that treat ships differently based on their port of origin for the purpose of reducing GHG emissions could be challenged under the GATT following the same line of reasoning seen in *Rocky Mountain Farmers.* While the California Fuel Standard was upheld, the Dispute Settlement Body (DSB) could find a violation under Article III despite the regulation's proper purpose. Therefore, it is important that a state can successfully invoke an exception under Article XX.

B. Article XX General Exceptions

Summary: If a measure is found to be in violation of the GATT, a member state can invoke one of the Article XX General Exceptions. Subsection (g) creates an exception for measures "[related] to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." If shipping regulations were challenged under

[105] See *id.* at 133.
[106] *Rocky Mountain Farmers Union v. Corey,* No. 12-15131 (9th Cir. Sep. 18, 2013).
[107] *Id.* at 34.
[108] *Id.* at 37-38, 40
[109] *Id.* at 73.
[110] *Id.* at 72.

the GATT, a state could likely successfully invoke subsection (g), as long as the regulations were applied to domestic and foreign ships.

If a measure is found to be in violation of the GATT, a member state can invoke one of the Article XX General Exceptions. GHG emissions regulations could potentially fall under XX (b) or (g). The relevant text of Article XX provides:

> Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:
>
> (b) necessary to protect human, animal or plant life or health; . . .
> (g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;

An adjudicating body determines whether an Article XX exception applies through a two tiered analysis. First, the measure must fall under one of the enumerated exceptions. Second, the measure must be in compliance with the chapeau of Article XX. This section will discuss the requirements of each component.

1. Complying with an Enumerated Exception

Subsection (b) requires a measure to be "necessary to protect human, animal, or plant life or health." Necessity is determined through a balancing test that weighs the importance of the interests at stake, the extent to which the measure will contribute to its objective, and its trade restrictiveness. The DSB has found that "[t]o be characterized as necessary, a measure does not have to be indispensable. However, its contribution to the achievement of the objective must be material, not merely marginal or insignificant . . . "[111] Demonstrating a "material" contribution to climate change mitigation will be challenging for shipping regulations given that the sector only accounts for three percent of annual global emissions. Because Pacific island states account for such a small percentage of overall global emissions, even if shipping regulations were considered as a part of a state's broader GHG policies, the overall impact is still minimal. A regional effort would bolster the contribution argument, but would still likely be insufficient. Consequently, subsection (g) is likely to be more successful if emissions regulations were challenged under the GATT.

Where subsection (b) requires necessity, subsection (g) only requires the measure to be "related to the conservation of a natural resource."[112] The standard for "relating to" has been described as requiring a "substantial relationship" between the means and ends,[113] or that the measure is "reasonably related"

[111] Appellate Body Report, *Brazil – Measures Affecting Imports of Retreaded Tyres* ('Brazil-Tyres'), para. 210 (Dec. 3, 2007).
[112] GATT art. XX(g).
[113] Appellate Body Report, US – Standards for Reformulated and Conventional Gasoline ('US–Gasoline'), 19, WT/DS2/AB/R (Apr. 29, 1996).

to the ends sought.[114] The DSB would likely find that regulations intended to reduce GHG emissions are reasonably related to climate change mitigation. In addition, the DSB has previously found that clean air is an exhaustible natural resource within the definition of subsection (g).[115]

The second consideration under the Article XX (g) analysis is whether the measure is "made effective in conjunction with restrictions on domestic production or consumption." Regulations that apply to both domestic and foreign ships should comport with this requirement, especially if regulations are part of a state's broader GHG policy. In sum, given the relatively low standard of subsection (g), it is very likely that a member state could invoke this exception for regulations of maritime emissions, as long as the regulations are applied to both domestic and foreign ships. [116]

2. THE ARTICLE XX CHAPEAU

SUMMARY: The chapeau is a good-faith provision that ensures Article XX exceptions are not used to permit unjustifiable or arbitrary discrimination or disguised restrictions on international trade. Discrimination will be unjustifiable or arbitrary where it is not rationally related to its purpose. To avoid unjustifiable or arbitrary discrimination, states must make good-faith efforts to engage bilateral or multilateral agreements and take into account the differing situations of different countries. In addition, regulations must be sufficiently flexible and transparent.

The function of the chapeau is to prevent of abuse of the exceptions enumerated in Article XX.[117] To accomplish this end, the chapeau subjects all measures to three requirements: (1) the measure must not constitute unjustifiable discrimination between countries where the same conditions prevail; (2) the measure must not constitute arbitrary discrimination between countries where the same conditions prevail; and, (3) the measure must not be a disguised restriction on international trade.[118]

In determining whether a measure is unjustifiably or arbitrarily discriminatory, the DSB will assess whether the reasons given for discrimination bear any rational connection to the objective falling within the purview of a paragraph of Article XX. [119] In this analysis, the DSB will assess both intentional discrimination and discriminatory effects.[120] As such, any differential treatment among ships should be for the purpose of reducing GHG emissions. To avoid arbitrary or unjustifiable discrimination, a member state must demonstrate that it has engaged in across-the-board negotiations and made a good-faith effort to achieve bilateral or multilateral agreements.[121] Those Pacific island states that have engaged in

[114] Appellate Body Report, US – Import Prohibition of Certain Shrimp and Shrimp Products ('US–Shrimp'), WT/DS58/AB/RW para. 141 (Oct. 12, 1998).
[115] *US – Gasoline*, at 14.
[116] *Cf* Henrik Horn & Petros C. Mavroidis, *Border Carbon Adjustments and the WTO* 36 Note 29 (2010)(noting that an inefficient practice is acceptable under XX(g) but not under XX(b)).
[117] *US – Gasoline*, at 22.
[118] *US – Shrimp*, at para. 150.
[119] *Brazil – Tyres,* para. 227.
[120] *US – Shrimp,* p. 64-72.
[121] *Id.* at para. 166.

IMO negotiations should be able to demonstrate good-faith efforts to internationally regulate GHG emissions from shipping.

While the chapeau focuses on discrimination in countries where the same conditions prevail, the DSB has found unjustifiable discrimination where a measure fails to take into account the appropriateness of the measure given the differing conditions prevailing in exporting countries.[122] This means member states must design regulations to take into account the differing situations in countries that will be affected by the measure.

In addition to the design and structure of a measure, the DSB will also assess whether a measure is discriminatory in its implementation. The measure should not be too rigid or inflexible such that it fails to account the differing conditions in other countries.[123] In addition, transparency is required in order to ensure the measure is not implemented in an arbitrarily discriminatory manner.[124]

Lastly, the state must ensure the selected measure does not constitute a disguised restriction on international trade. It is unlikely that a regulation would be considered a disguised restriction on international trade if it were neither arbitrary nor unjustifiably discriminatory. However, this analysis requires the DSB to look a little closer at a given measure to ensure it is not "under the guise of a measure formally within the terms of an exception listed in Article XX."[125] If a measure is also applied to both foreign and domestic ships and if maritime regulations are only part of a broader policy to mitigate climate change, this provision should not pose an issue for emissions regulations.

VI. CASE STUDY: EU PROPOSAL FOR REGULATION OF INTERNATIONAL SHIPPING EMISSIONS

Citing the slow pace of IMO discussions and the urgency to mitigate climate change, in June 2013 the European Commission ("the Commission") announced a proposal to establish monitoring, reporting and verification (MRV) regulations for carbon dioxide emissions from maritime transport.[126] Under the regulations, MRV obligations would apply to all ship voyages to, from, and between EU ports, regardless of a vessel's flag of registry.[127] Ship owners would also be required to provide additional information, such as data to determine the ships' energy efficiency.[128] The MRV system will exclude small emitters and minimize any accessibility or competitiveness issues that might arise.

[122] *Id*. at para. 165.
[123] *Id.* at para 177.
[124] *Id.* at para. 183.
[125] *US – Gasoline*, p.25.
[126] European Commission, *Communication: Integrating maritime transport emissions in the EU's greenhouse gas reduction policies*, COM (2013) 479, 4 (June 28, 2013).
[127] Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013, ec.europa.eu/clima/policies/transport/shipping/docs/com_2013_480_en.pdf.
[128] *Id.*

The Commission has proposed the MRV system as part of a three step plan. After the implementation of the MRV system, the Commission intends to define a reduction target for the maritime transport sector and then establish a market-based measure for the sector.[129] The Commission has indicated a "strong preference" for international regulation of shipping emissions established through the IMO. If international negotiations are successful, the Commission proposes integrating its MRV program into the generalized system.[130] In fact, the EU is already working with the US, Japan, Australia, and others on the development of efficiency standards and a global MRV scheme.[131] Since IMO regulations are not likely to be immediately forthcoming, Pacific island states may consider attempting to join the EU's MRV regulations (in addition to the proposed market-based mechanism) or at least work with the EU and other states to harmonize standards or otherwise coordinate efforts.

The proposed shipping regulations follow the EU's regulation of aviation emissions. Directive 2008/101/EC ("Aviation Directive") incorporated aviation emissions into the EU ETS by requiring all flights landing or taking off in the EU to purchase emissions credits for the entirety of their journey beginning in 2012. While the regulatory requirements differ, the jurisdictional basis for the proposed shipping regulations is akin to the EU's aviation regulations—both apply to all transport that begins or ends in the EU. Since the aviation regulations have already been the subject of much international attention, they may be instructive as to potential legal and nonlegal barriers to regulation international shipping. This remainder of this section will discuss political and legal issues that have arisen as a result of the jurisdictional basis of the Aviation Directive.

The international aviation community challenged the Aviation Directive asserting that it violated a number of treaties in addition to customary law.[132] The Court of Justice of the European Union upheld the Aviation Directive. As previously discussed, the court found that the Directive did not violate the Kyoto Protocol.[133] In addition, the court found that the extraterritorial effect of Aviation Directive was permissible. It reasoned that once an aircraft is physically in the territory of a member state, it is subject to unlimited jurisdiction of that state.[134] The court emphasized that aircrafts were free to fly over member states without being subject to regulation and that the regulation was a consequence of an aircraft choosing to operate in the EU.[135] Under this reasoning, EU's proposed shipping regulations would also be permissible under international customary law, since jurisdiction is based on the presence of a ship in internal waters (i.e. at port).

The Aviation Directive was not challenged under the GATT. If the Directive were challenged under the GATT, it would likely be under Article III under the reasoning that flights delivering goods from countries

[129] European Commission, *Communication: Integrating maritime transport emissions in the EU's greenhouse gas reduction policies*, COM (2013) 479, 4 (June 28, 2013).
[130] *Id.* at 5.
[131] *Id.* at 4.
[132] Air Transp. Ass'n of Am. V. Sec'y of State for Energy & Climate Change, Case C‑366/10 (delivered Dec. 21, 2011).
[133] *Id.* at para. 73-78.
[134] *Id.* at para. 124-25.
[135] *Id.* at para. 126-28.

further away would require more allowances thus making foreign products more expensive then like products from within the EU. If the DSB did find the Directive discriminatory under Article III, the EU could invoke Article XX (g). As previously discussed, subsection (g) only requires that the measure is "[related] to the conservation of exhaustible natural resources" and is made "in conjunction with restrictions on domestic production or consumption." Since the Directive is intended to reduce GHG emissions from the shipping sector and applies to both domestic and foreign flights, it is very likely that the Directive would comply with the exception.

It has been suggested that the Directive could be considered unjustifiable or arbitrary discrimination under Chapeau due to its limited capacity to reduce aviation emissions.[136] For example, the Directive only takes into account the length of the last leg of any flight.[137] Consequently, two flights with the same point of origin would have differing allowance requirements if one has a layover and the other flies directly to the EU. This could be considered arbitrary, first because it treats similar flights differently and second because it could encourage flights to make stops resulting in increased emissions. However, where the EU has and continues to make a good-faith effort to encourage international action, it seems unfair to be penalized for the inherent jurisdiction limitations of unilateral action.

In addition to the legal challenge, the Aviation Directive was met with considerable international opposition. The United States passed the EU ETS Scheme Prohibition Act, which bans airlines from complying with the directive.[138] China and India also instructed their airlines not to take part in the scheme.[139] China also suspended a $14 billion deal with an EU commercial aircraft manufacturer. [140] In addition, the International Civil Aviation Organization (ICAO) issued a working paper criticizing the Directive as an ineffective tool and requested the Council to set up a policy group to develop a framework for market-based measures (MBM) in international aviation.[141] The EU responded by delaying the inclusion of flights originating or landing outside of the EU for one year.[142] At the 38th ICAO General Assembly meeting, the ICAO Assembly agreed to develop a global MBM by 2016 that would go into effect by 2020. In response to the ICAO, the Commission proposed amending the regulations so that only the portion of a flight that takes place in European regional airspace would be covered by the

[136] Meltzer, *supra* note 104, at 145.
[137] Katelyn E. Ciolino, *UP IN THE AIR*, 38 BROOKLYN J. INT'L L. 1151, 1158 (2013); Meltzer, *supra* note 104, at 145.
[138] European Union Emissions Trading Scheme Prohibition Act, S. 1956, 112th Cong. (2011), *available at* http://thomas.loc.gov/cgi-bin/query/z?c112:S.1956:
[139] Anurag Kotoky, India Joins China in Boycott of EU Carbon Scheme, REUTERS (Mar. 22, 2012), www.reuters.com/assets/print?aid=USLNE82L02220120322.
[140] Tim Hepher, *China halts 10 more Airbus orders: sources,* REUTERS (Mar. 15, 2012), http://www.reuters.com/article/2012/03/15/us-china-europe-ets-idUSBRE82E11620120315.
[141] ICAO, Inclusion of International Civil Aviation in the European Union Emissions Trading Scheme (EU ETS) and its Impact C-WP/13790 4.1 (Oct. 17, 2011).
[142] Press Release: Stopping the clock of ETS and aviation emissions following last week's International Civil Aviation Organisation (ICAO) Council, European Commission - MEMO/12/854 12/11/2012, http://europa.eu/rapid/press-release_MEMO-12-854_en.htm.

EU ETS. The amendment did not appease India, China, and U.S. lawmakers, who have maintained their opposition to the measure.[143]

The controversy over the Aviation Directive demonstrates that even if the EU regulations are legal, political feasibility may also be a hurdle to unilateral action. So far, the proposed shipping regulations have not been met with the same level of international opposition as the Aviation Directive. This may be because they only require MRV at this time and do not yet require the purchase of emissions allowances. If the EU follows through with its intent to eventually include shipping emissions in the EU ETS, more substantial international controversy may arise.

VII. CONCLUSION

A. ASSESSING REGULATORY OPTIONS WITHIN THE FRAMEWORK OF INTERNATIONAL LAW

Under the LOSC, a Pacific state may regulate GHG emissions from international shipping in three capacities: 1) as a port State over ships entering its ports; 2) as a flag State over ships in its registry; and 3) as a coastal State over ships traveling through its territorial waters. States may exercise their authority unilaterally or implement regional agreements. Figure 1 shows the types of regulation that a state may impose under the LOSC.

Figure 1. Permissible forms of national regulation under the UN Convention on the Law of the Sea according to the type of jurisdiction.

	Authority over Ships Entering a State's Port	Authority over Ships in Territorial Sea	Authority over Ships in the EEZ or Contiguous Zone	State Authority over Ships in its Registry
Operational Efficiency	✓	?	X	✓
Structural Adjustments	✓	X	X	✓
Fuel Type Specifications	✓	X	X	✓
Emissions Standard	✓	?	X	✓
Emissions Tax or Market-Based Mechanism	✓	X	X	✓

This figure demonstrates states' broad authority to regulate ships entering their ports and registered under their flag. Contrastingly, authority over foreign ships outside internal waters is extremely restricted. Due to the right to innocent passage and the CDEM restriction, it is uncertain whether

[143] Valerie Volcovici and Devidutta Tripathy RUETERS Oct 22, 2013 2:59pm EDT http://www.reuters.com/article/2013/10/22/eu-airlines-carbon-idUSL5N0IC1XT20131022.

states may impose operational efficiency measures, such as a speed limit, or an emissions standard over ships traveling through the territorial sea.

As port States, Pacific island states may set regulations in the form of conditions to port entry. Because ports are internal waters, states have broad discretion in setting port entry requirements. Conditions may be in the form of fuel type requirements, technological or structural requirements, an emissions standard, or an emissions-based fee. Port entry conditions may also be in the form of operational requirements that apply even when the ship leaves the port. For example, a condition of entry could be to abide by slow steaming requirements while traveling through the state's contiguous zone and EEZ, or even on the high seas. However, without means to enforce behavioral requirements outside of the state's territorial waters, the regulations might mean little in practice.

If port entry conditions impose differing requirements based on a ship's country of origin, they could be considered discriminatory under the GATT. States should take the necessary steps to ensure they can successfully invoke a GATT exception. First, states should ensure that regulations will in fact lead to emissions reductions. Transparency and a clear intent and purpose will help assure that restrictions are not intended for protectionist purposes.[144] Second, states should design regulations taking into account differing situations that exist in different countries. Specifically, states should consider flexibility mechanisms and alternatives that reduce trade restrictiveness. Moreover, any discriminatory provisions should be directly related to the goal of reducing GHG emissions and implemented in conjunction with domestic climate mitigation measures.

As flag States, Pacific island states have broad authority to regulate vessels registered under their flag. States may establish fuel type, technological, or operational efficiency requirements or allow ships to determine the best mix of energy efficiency measures by putting in place an emissions standard or a MBM. Since the Marshall Islands is a major flag of convenience, it currently has the capacity to regulate a large number of foreign ships. However, the Marshall Islands may be limited in its practical capacity to effectively impose regulations since ships may choose to leave the registry if onerous regulations are put in place. Moreover, enforcing such regulations would also pose substantial challenges, since ships flying the Marshall Islands flag are located all over the world.

Unlike port and flag State jurisdiction, coastal State jurisdiction is constrained by the navigational rights of foreign ships. A state may only regulate emissions beyond GAIRAS over from ships traveling through its territorial waters, and such regulations may not impair the right to innocent passage. Consequently, regulatory options over ships in a state's territorial seas are limited to two options. First, emissions standards are likely permitted, as long as there are alternative ways of meeting the adopted standard. For example, an emissions standard that can be achieved through a combination of fuel change, structural adjustments, and operational changes is likely permissible. Second, states may impose operational requirements on ships, such as slow steaming.

[144] *See,* Meltzer, *supra* note 104, at 155.

Under the LOSC, coastal States do not have authority to regulate emissions from ships traveling through the contiguous zone[145] or the EEZ beyond internationally agreed upon standards. However, port entry requirements can affect shipping emissions of ships traveling through these zones, because equipment or other structural changes adopted to conform to port entry requirements will travel with a ship wherever it goes. Similarly, as previously mentioned, operational requirements can apply to the contiguous zone and the EEZ, but the coastal State has no enforcement authority while the ship is outside of territorial waters.

All regulatory authority under the LOSC is subject to fairness and good faith provisions. Thus, regulations may not discriminate between vessels of different states. Additionally, to prevent an abuse of rights, regulations must be enacted in good-faith, for proper purposes, be reasonable, and take into account only relevant factors.

In considering regulatory options, Pacific islands states should account for potential unintended consequences. If the costs of complying with regulatory requirements outweigh the economic gain from serving those markets, ships may decide to forego business with a state over incurring the high costs of regulatory compliance. This would negatively impact the state's economy and reduce the efficacy of the emissions regulations. Regional action would be advantageous in this regard, because if more states imposed the regulatory requirements, then ship owners would have a higher incentive to comply and continue to serve those markets. Regional action may also improve enforcement through shared information and increased capacity for surveillance.

In addition to legal and practical concerns, if the EU's Aviation Directive is any indication, political feasibility may also present a hurdle to unilateral regulation of maritime emissions. Forming alliances with other states, especially states outside the region may reduce international pushback. Since the EU is already proposing regulations over emissions from international shipping and working with other countries to develop efficiency standards, it may offer a good opportunity for collaboration. Pacific islands could join the EU's MRV program or design their own program modeled on the EU regulations. This would reduce the burden on ships that travel between the two regions by only subjecting them to one set of requirements. Developing an effective model for regulation, might also instigate the development of an international mechanism.

In sum, the Pacific states have a number of regulatory options to control emissions from the international shipping sector. However, jurisdictional constraints may prevent regulations from reaching a sufficient percentage of the worldwide fleet to make a substantial reduction in emissions from the sector. Regional action can improve the effectiveness of regulatory measures, especially if an agreement includes states with particularly active ports or large registries. Ultimately, however, there is no replacement for an international agreement. In developing state regulations, Pacific states should continue to encourage international action and work towards harmonized approaches to facilitate the eventual development of an international standard.

[145] If emissions regulations are considered "sanitary laws," then a state's enforcement capacity over violations that occurred in the territorial seas is expanded, but their prescriptive powers remain the same.

B. ACHIEVING EMISSIONS REDUCTIONS OPTIONS THROUGH ENCOURAGING VOLUNTARY ACTION

Given the constraints of international law in regulating GHG emissions from international shipping, a voluntary policy or certification program that encourages efficiency in the shipping industry may be an attractive alternative to mandatory regulations

In an effort to reduce costs and mitigate environmental risks, manufacturers and retailers across the world are increasingly looking to improve energy and water efficiency and reduce GHG emissions associated with their products.[146] As part of this effort, corporations are holding suppliers to environmental performance standards, a process known as "greening supply chains." In addition, as the risks of climate change become more apparent, many companies have begun integrating an "internal carbon price" into their business strategies.[147] In fact, a report by the Carbon Disclosure Project has found that carbon pricing has become standard operating practice in business planning, and that many companies have also set internal targets for GHG emissions reductions.[148] The shipping industry transports approximately 90% of the global trade.[149] Where there is substantial potential for reducing emissions from international shipping, transportation of goods presents a strategic opportunity for companies to green their supply chains and life-cycle GHG emissions from their products. A voluntary program could capitalize on the existing market incentive to reduce emissions by helping corporations do so effectively and in a verifiable manner.

A voluntary program to reduce shipping emissions could be structured similarly to Leadership in Energy & Environmental Design ("LEED") certification, a voluntary program in the U.S. designed to encourage design, construction, operation, and maintenance of green buildings. In order to become LEED certified, a building must earn points by adopting design elements such as sustainable siting, efficient energy use, and sustainable materials. A building can qualify for one of four ratings (certified, silver, gold or platinum) depending on the number of points it earns. A voluntary shipping certification program could employ a similar flexible rubric that allows a given company to select the preferred mix of operational, structural, and fuel strategies to reduce emissions. The program could certify individual ships or an entire fleet. Shipping companies would be able to advertise their ships as certified to manufacturers and retailers, who could in turn take into account emissions reductions in the life cycle of their products. In this way, a voluntary program could capitalize on existing market pressures without being subject to the limitations of international law. Moreover, a voluntary program could encourage an international agreement by demonstrating the effectiveness of emissions reduction in the sector, providing model standards, and gaining the support of participating corporations.

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[146] Ben Block, *More Corporations Are "Greening" Supply Chains*, World Watch Institute, http://www.worldwatch.org/node/6268; Ray Cheung et al., *Greening Supply Chains in China,* World Resources Institute, Executive Summary (Oct. 2010) http://www.wri.org/publication/greening-supply-chains-china.

[147] CARBON DISCLOSURE PROJECT NORTH AMERICA, USE OF INTERNAL CARBON PRICE BY COMPANIES AS INCENTIVE AND STRATEGIC PLANNING TOOL 2 (DECEMBER 2013), https://www.cdp.net/CDPResults/companies-carbon-pricing-2013.pdf.

[148] *Id.*

[149] International Maritime Organization, IMO and the Environment 2 (2011).