

ORIGINAL ARTICLE

Nihil novi sub sole: The Need for Rethinking WTO and Green Subsidies in Light of United States – Renewable Energy

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Abstract

US–Renewable Energy is the last in a series of WTO disputes involving subsidies schemes with local content requirements. Local content requirements (LCRs) are highly discriminatory and trade distortive instruments and therefore all cases concerning green energy have been found to violate WTO law. However, recent jurisprudence has developed a different definition of prohibited LCRs under the GATT and the SCM agreement, the latter allowing for some leeway to define origin of products under a government subsidy scheme. Depending how the subsidy scheme is framed, it will be able to be excused from the GATT's more stringent prohibition of LCRs, this raises question of consistency in the application of the LCRs prohibition. Moreover, we review a simple and robust approach that modern welfare economics suggests for framing discussions of subsidy policy. We apply this approach to the case of renewable energy subsidies and discuss some complexities with respect to local content requirements. In conclusion, this allows us to critically assess and review proposals to increase coherence between WTO subsidy policy and green energy promotion policies and submit proposals to achieve better suited WTO subsidy rules.

Keywords: WTO law; renewable energy; subsidies; local content requirements; green taxation; green energy promotion

1. Introduction

The WTO framework does not favor trade in green goods as opposed to other goods and its rules apply equally to renewable energy and to fossil fuel energy. Thus, some scholars consider that the WTO does not contribute to the climate change fight, (Rubini, 2012, 2015a; Cosbey and Mavroidis, 2014; Charnovitz and Fischer, 2015; Marhold, 2017). In recent years, state subsidies necessary to promote renewable energy were challenged as violations of WTO law (see Table A1 in annex). Renewable energy support schemes were mostly attacked as subsidies contravening the General Agreement on Tariffs and Trade (GATT), the Trade-Related Investment Measures (TRIMs), and the Agreement on Subsidies and Countervailing Measures (SCM). As renewable energy requires support schemes in order to be economically viable, these cases were seen by certain scholars as a sign that the WTO rules on subsidies had to be reviewed (Rubini, 2012, 2015a; Cosbey and Mavroidis, 2014; Marhold, 2017). Other scholars instead highlighted that the major issue in these subsidies cases was not the subsidy granted for promoting renewable energy but the local content measures attached to those schemes, which favored the sourcing of domestic equipment or inputs for the production of green energy (Hartmut, 2014; Marín Durán, 2018; Celli, 2019). These local content measures made the support schemes trade distorting and prohibited under Article III:4 GATT as well as under the TRIMs and the SCM agreement.

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Indeed, all the subsidies cases that were submitted to a panel (and or Appellate Body) were found to have a local content component and they were challenged under the national treatment provision (Article III of GATT), the TRIMs agreement, and the SCM agreement.

The *US–Renewable Energy*¹ dispute belongs to this list of WTO disputes against local content requirements (LCRs) in subsidies programs given to promote renewable energy. The case was brought by India against 11 measures enacted by seven American States, all of which concerned the promotion of renewable energy and contained LCRs.

The case was brought by India after losing a similar challenge to the US because of LCRs under the Jawaharlal Nehru National Solar Mission (‘NSM’) for solar cells and solar modules (*India–Solar Cells*).² Unlike India, the US did not raise any justifications for the measures and the panel declared the measures in violation of Article III:4 GATT and exercised judicial economy on all other Indian claims concerning TRIMs and SCM violations. The panel report was later challenged by both the US and India. The appeals focused on the panel’s decisions with respect to the admissibility of claims regarding measures which were amended or repealed after initiation of the dispute and which therefore fell outside the scope of the panel’s terms of reference.

The US did not raise any real defense to justify the prohibited measures in front of the panel. Also, the matters raised in appeal suggest that the US could not justify the incriminated measures under WTO law.

Regulations aiming at legitimate objectives such as the promotion of renewable energy and the fight for climate change could be justified under the general exceptions’ provisions contained in Article XX GATT. However, past jurisprudence has shown that the inherently discriminatory characteristics of LCRs are difficult to reconcile with Article XX GATT requirements. Still, as specified in the Appellate Body *Brazil–Taxation*³ decision, subsidies that fall under the exception in Article III:8 GATT can be excused from Article III:4 GATT stricter requirements, and could be granted some tolerance under the SCM because of the legitimate need to define ‘domestic goods’. Subsidies that cannot claim an exception under Article III:8 GATT instead will violate Article III:4 GATT any time they provide even for the slightest LCR. Therefore, following the decision of the Appellate Body in *Brazil–Taxation*, we have to consider whether the perceived inability of the US to raise Article III:8(b) GATT does not lead to a different treatment across different types of subsidies under WTO law.

This article aims, on the one hand, to review the jurisprudence on WTO prohibitions of domestic content and its exceptions, highlighting why the existing treaty justifications were probably not available to the US in this renewable energy case (section 2). We then review the economic policy and political economy rationale for subsidies and industrial policy (section 3) and look at how to achieve a better balance between the WTO necessity to ensure lesser trade distortions and the legitimate economic and non-economic rational of governments to intervene in their economies (section 4).

2. Renewable Energy Subsidies and the WTO

2.1 Local Content Requirements Prohibitions and Non-Discrimination under WTO Law

LCRs condition the grant of a subsidy on producing a certain value added locally, on the use of local inputs, on the use of equipment produced locally, or on achieving a certain investment threshold in local production or research facilities (see, e.g.: Hufbauer et al., 2013; Hestermeyer and Nielsen, 2014; Batra and Bafna, 2018; Ornelas and Puccio, 2020).

All the measures challenged by India had some kind of LCR, as reported in [Table 1](#).

¹*United States – Certain Measures Relating to the Renewable Energy Sector (US–Renewable Energy)*, DS510.

²*India – Certain Measures Relating to Solar Cells and Solar Modules (India–Solar Cells)*, DS456.

³*Brazil – Certain Measures Concerning Taxation and Charges (Brazil–Taxation)*, DS472.

Table 1. Local content requirement in the US State measures challenged by India

Name of the Measure	Primary beneficiary	Type of benefit	Local Content Requirement
Washington State Additional Incentive	Light and power business	Credit against taxes for incentives paid	Additional incentives for electricity produced using solar inverters, solar modules, stiring converters or wind blades manufactured in Washington State
California Manufacturer Adder	Customers	Incentives payment	Additional incentive for the installation of eligible distributed generation resources 'from a California Supplier' or <i>generation and energy storage equipment 'manufactured in California'</i>
Montana Tax Incentives	Ethanol distributors	Tax incentives	<i>Ethanol produced in Montana from Montana agriculture and wood products (incentive for ethanol using non-Montana agricultural products only if Montana products are unavailable)</i>
Montana Tax Credit	Special fuel distributors; owners or operators of a motor fuel outlet	Credit against taxes	The investment for which credit is claimed must be to primarily blend petroleum diesel with <i>biodiesel made entirely from Montana-produced feedstocks</i>
Montana Tax Refund	<i>One: 'licensed distributors' paying a special fuel tax on biodiesel Second: owners or operators of a motor fuel outlet</i>	Two tax refund programs	<i>Biodiesel is entirely produced from biodiesel ingredients produced in Montana</i>
Connecticut Additional Incentive	Homeowners acquiring solar photovoltaic system via a lease or power purchase agreement; system owners	Performance-based incentives (PBI); expected performance-based buydowns (EPBB)	Additional incentives are paid for the use of <i>'major system components manufactured or assembled in Connecticut'</i>
Michigan Equipment Multiplier/ Michigan Labor Multiplier	Electricity providers	Renewable energy credit required for electric providers	Additional renewable energy credit given for electricity generated using renewable energy system created from <i>equipment made in Michigan or constructed using workforce of residents of Michigan</i>
Delaware Equipment Multiplier/ Delaware Labor Multiplier	Retail electricity suppliers and municipal electric companies	Renewable energy credits and solar renewable energy credits	Additional credit for solar or wind installations in Delaware provided that <i>50% of the cost of equipment (inclusive</i>

(Continued)

Table 1. (Continued.)

Name of the Measure	Primary beneficiary	Type of benefit	Local Content Requirement
			<i>components) are manufactured in Delaware or the facility is constructed using 75% in-state workforce</i>
Minnesota solar energy production incentive (SEPI)/ Minnesota Photovoltaic rebate	Owners of grid-connected solar photovoltaic modules; owners of solar thermal systems in residential or commercial premises	performance-based financial incentives; rebates	All incentives and rebates are given if: the solar photovoltaic module or solar thermal systems qualifies as 'Made in Minnesota'

Source: Authors' elaboration from *US-Renewable Energy*.

These kinds of LCRs were the main reason for the different WTO disputes that took place since 2010 on subsidies for renewable energy.⁴ In these disputes, local content requirements were always challenged under Article III of GATT, under the TRIMS agreement, and under the SCM agreement. Indeed, LCRs have trade distorting effects, giving competitive advantages to domestic products as opposed to imported goods, and for this very reason are prohibited by several WTO provisions (Grossman, 1981; Bagwell and Sykes, 2005).

Following past jurisprudence on LCRs, the panel in *US-Renewable Energy* found the measures to be in violation of Article III:4 GATT, which prohibits more generally any regulations giving less favorable treatment to imported goods as opposed to like domestic products. The panel in *US-Renewable Energy* applied a four-step analysis to check the compatibility with Article III:4 GATT.⁵

First, the imported good and the domestic good required must be 'like' products. As LCR provides discrimination on the basis of origin, it is not problematic to determine that the imported good and domestic good were 'like' products as they are often identical. The panel simply confirmed that where a measure distinguishes product solely on the basis of origin, a detailed analysis of likeness is not necessary.

The second element under Article III:4 GATT concerned whether the requirement or advantage is derived from a law or regulation or requirement that affects the internal sale, offering for sale or purchase, transportation, distribution, or use of the good. Given the broad definition given to this phrase in WTO jurisprudence, the panel conclusion was straightforward, as all the measures identified by India were based on legislative instruments issued by State entities.

The third part of the panel's analysis focused on the impact that the measures, covered by Article III:4 GATT, have on the conditions of sale or purchase of imported goods and that create incentives or disincentives to buy foreign goods as opposed to domestic ones. The panel recalled that LCRs were found in past jurisprudence to necessarily affect the condition of competitions between domestic goods and imports and rejected the US claims according to which India had not proven that the measures created disincentives to buy imported products as opposed to domestic ones.

⁴*China – Measures Concerning Wind Power Equipment*, DS419; *Canada – Certain Measures Affecting the Renewable Energy Generation Sector (Canada-Renewable Energy)*, DS412; *Canada – Measures Relating to the Feed-in Tariff Program (Canada-Fit)*, DS426; *European Union and Certain Member States – Certain Measures Affecting the Renewable Energy Generation Sector*, DS452; *India-Solar Cells*; *US-Renewable Energy*.

⁵*US-Renewable Energy*, paras. 7.85–7.247.

Finally, Article III:4 GATT requires that imported products are accorded 'less favorable' treatment than the like domestic product, which implies that the challenged measures are not giving equal opportunities for imported products to compete with like domestic products. The US argued that the less favorable treatment test required India to provide at least some proof that the measures created incentives to buy domestic goods. However, the panel recalled the Appellate Body report in *Thailand–Cigarettes*, explaining that Article III:4 GATT covers also *potential* discrimination and therefore *likelihood* that the discrimination really occurs is not necessary. In other words, Article III:4 GATT applies also to *de jure* and not only to *de facto* discrimination. As LCRs require purchase of domestic products in order to obtain a certain advantage (a direct subsidy or tax exemption), they create *de jure* incentives favoring domestic products over imported goods. Therefore, LCRs were automatically considered to give 'less favorable' treatment to imported goods. This is why LCRs (including in the energy renewable cases) were always found to be in violation of Article III:4 GATT.⁶

Once the violation of Article III:4 GATT was established, the panel exercised judicial economy on India's claims under the TRIMs and the SCM agreements. The main reason for exercising judicial economy was that the prohibitions of LCRs under Article 2.1 and 2.2 of TRIMs and Article 3.1(b) and Article 3.2 SCM are narrower than the prohibitions under Article III:4 GATT.

Indeed, Article 2.1 of TRIMs imposes a prohibition to introduce any trade-related investment measure violating Article III or Article XI GATT. Thus, Article 2.1 TRIMs incorporates the prohibition enshrined in Article III:4 GATT but applies it only to trade-related investment measures. A representative list of trade-related investment measures inconsistent with Article III:4 GATT are included in an annex as per Article 2.2 TRIMs. The cases *Canada–FIT* and *India–Solar Cells* clarified that LCRs fell under Article 1(a) of the list annexed to TRIMs. These cases also confirmed that, if the TRIMs measure falls under the illustrative list, it is automatically found to be in violation with Article III:4 GATT.⁷

With respect to the SCM, the panel refers to the *Brazil–Taxation* dispute. In *Brazil–Taxation*, the Appellate Body highlighted that, while Article III:4 GATT would prohibit any degree of LCR, the SCM must still allow some kind of legitimate requirements to define those goods entitled for domestic support. In that sense, not all the LCRs violating Article III:4 GATT would be in violation of the SCM.⁸ Therefore, finding a violation of Article III:4 GATT was considered by the panel in *US–Renewable Energy* as sufficient to also violate the SCM. This position of the panel in *US–Renewable Energy* is only true because the US did not raise Article III:8(b) GATT. As we will see in section 2.2 of this paper, Article III:8(b) GATT exonerates subsidies given exclusively to domestic producers from certain disciplines of Article III GATT (including Article III:4 GATT); those subsidies would still need to comply with the narrower restriction under the SCM.

Therefore, the panel considered that, if the US were to bring its measures into compliance with Article III:4 GATT, it would necessarily restore any violations under TRIMs or the SCM.⁹

2.2 The Difficulty of Justifying Local Content Requirements under Articles XX or III:8 GATT

As opposed to its predecessors, the US did not try to raise justifications either under Article III:8 GATT or under the general exceptions provided in Article XX GATT.

The previous jurisprudence has made it abundantly clear that it is difficult to justify LCRs under Article XX GATT. However, the inability to raise justifications under Article III:8(b) GATT could lead to inconsistency under WTO law with regard to the treatment of LCRs in subsidies.

⁶Local content requirements in the context of renewable energy: *Canada–Renewable Energy*; *Canada–FIT*; *India–Solar Cells*; *US–Renewable Energy*. Beyond renewable energy, you can also look at the cases regarding cars: *Indonesia – Certain Measures Affecting the Automobile Industry*, DS54; *India – Measures Affecting the Automotive Sector*, DS146.

⁷*Canada–Renewable Energy* and *Canada–FIT*.

⁸Appellate Body Report, *Brazil–Taxation*, paras. 5.111–5.112.

⁹*US–Renewable Energy*, paras. 7.347–7.368.

2.2.1 *Legitimate Policy Objectives under Article XX and Local Content Requirements*

Article XX GATT allows violation from GATT rules in order to achieve a certain number of legitimate policy objectives. Even though climate change objectives are not directly cited, measures to tackle climate change could easily be found to achieve some of the legitimate objectives mentioned under Article XX GATT. However, Article XX GATT is based on the cornerstone concept of non-discrimination. In the case of discriminatory policies, such as LCRs, one must prove that these discriminatory features are both necessary, and the least trade-restrictive, to achieve the legitimate objective. We review here previous attempts to justify LCRs under Article XX GATT and why those failed.

In the *Brazil–Taxation* case, Brazil tried to justify certain LCRs under the INOVAR-Auto program, which granted tax advantages to car producers. Brazil argued that discriminatory measures aimed at increasing vehicle safety and reducing CO₂ emissions were justifiable under Article XX (b) GATT, covering measures ‘*necessary to protect human, animal or plant life or health*’. While the panel agreed that the discriminatory aspects of INOVAR-Auto could have contributed to the above-stated legitimate objective, it did not find that those measures were necessary to achieve the objectives. Moreover, the panel concluded that the complaining parties had identified a set of alternatives, which were both WTO-consistent and less trade-restrictive and could have provided an equivalent or higher contribution to achieving those same policy goals.¹⁰

In the *India–Solar Cells* case, India tried to justify the LCR on the basis of Article XX(j) GATT concerning measures ‘*essential to the acquisition or distribution of products in general or local short supply*’. The idea was to create local production of solar cells and modules via the LCRs, understanding the term ‘*general or local short supply*’ as including domestic short supply. This interpretation was rejected. The Appellate Body highlighted that ‘*general and short supply*’ under Article XX(j) GATT must be assessed taking into account both domestic production and imported goods.¹¹ Therefore, Article XX(j) GATT cannot justify LCRs in the presence of domestic production shortage if the product could be obtained via imports. Karttunen and Moore (2018) analyzed the arguments of India looking at the data and showed that indeed there had been no global shortage for these goods the years preceding the WTO dispute.

India had also tried to argue that the LCR was necessary in order to comply with its international obligations to fight climate change. India raised Article XX(d) GATT, which applies to measures in order to enforce laws and regulations not inconsistent with GATT. The Indian claim was refused because the Indian plan set out objectives and not rules securing compliance with environmental laws and therefore failed to have the normative character required by Article XX(d) GATT. Moreover, we fail to see how the discrimination between domestic and imported solar cells can achieve the objective of enforcing climate change laws and policies; it will actually make it more difficult to achieve the climate change objectives as LCRs can raise internal prices creating disincentives for cheaper imports.

So, even if renewable energy subsidies achieve some of the legitimate goals recognized under Article XX GATT, the discrimination created by LCRs will be hard to justify under Article XX GATT.

2.2.2 *Article III:8 and Differential and More Favorable Treatment for Certain Subsidies?*

Requirements to comply with Article III:4 GATT can be lifted via Article III:8 GATT. Still, it is not certain that measures in the *US–Renewable Energy* case could have fallen under the exceptions in Article III:8 GATT.

The requirements under Article III:4 GATT can be lifted in the case of public procurement provisions under Article III:8(a) GATT. In the *Canada–FIT* and *India–Solar Cells* disputes, Canada and India respectively tried to raise this public procurement exception in order to justify the violations under Article III:4 GATT and Article 2 TRIMS. In both cases, the Appellate Body

¹⁰Panel Report, *Brazil–Taxation*.

¹¹Appellate Body Reports, *India–Solar Cells and Solar*.

confirmed that Article III:8 (a) GATT could not be raised because the product subject to the public procurement and the product discriminated were not the same. Indeed, in both cases, the product procured was electricity while the product discriminated via the LCRs was equipment needed to produce such electricity. As in the above mentioned cases, it would have been impossible to justify the US measures under Article III:8(a) GATT.

Article III:8 GATT provides also an exception for domestic subsidies programs (Article III:8(b) GATT). The latter exception was not raised in the context of the *Canada-FIT* and *India-Solar Cells* disputes, probably because earlier case-law had not confirmed that subsidies covered by Article III:8(b) GATT could be exempted from complying with Article III:4 GATT. The Appellate Body in *Brazil-Taxation*¹² changed that and confirmed that Article III:8(b) GATT creates an exception for the application of certain disciplines of Article III GATT, including Article III:4 GATT. Subsidies falling under Article III:8(b) GATT do not need to comply with Article III:4 GATT but with the prohibition of subsidy contingent on the use of domestic product under Article 3(1)(b) of the SCM. The latter prohibition has been more narrowly defined than the prohibition under Article III:4 GATT. Indeed, the prohibition under Article 3(1)(b) SCM would allow for rules that legitimately define what a domestic product is, so that the subsidy can be granted to products that are of domestic origin only. The limits between legitimate requirements to define the origin of subsidized products and the prohibition of subsidies contingent on domestic content are not necessarily well defined in the jurisprudence and would certainly merit some clarifications (Ornelas and Puccio, 2020).

Still, Article III:8(b) GATT does not apply to all domestic subsidies' programs.

First of all, that provision only applies to the 'payment of subsidies exclusively to domestic producers'. The panel in *EC-Commercial Vessels* was confronted with the question whether measures justifiable under Article III:8(b) GATT included those for whom the final beneficiary was not a producer but the final customer. The panel considered that the difference between 'ultimate beneficiary' and 'formal recipient' of the subsidy, was not important for the purpose of Article III:8(b) GATT.¹³ Therefore, the measures in *EC-Commercial Vessels* were found to be 'payment of subsidies exclusively to domestic producers', even if the shipbuilders were not the final beneficiary of the aid.

However, the *US-Renewable Energy* case raises further questions on the potential application of Article III:8 (b) GATT: can Article III:8(b) GATT apply to subsidies granted to businesses other than producers? Second, can non-discriminatory tax incentives be justified under Article III:8(b) GATT?

On the first question, some of the challenged American measures were directed to distributors or retailers. 'Producers' are generally understood as manufacturers and thus the term does not usually cover businesses purely in the distribution and retail industry. It is true though that most of the distributors or retailers targeted by the US measures had also a 'production' function such as for example the retailers under the different Montana schemes. Moreover, those schemes targeting customers concerned the installation of equipment which will generate electricity. Strict application of article III:8(b) GATT only to 'producer' *stricto sensu*, would imply that WTO law applies a different discipline with respect to LCR depending on who receives the subsidy payment.

The second issue concerns whether subsidies given in the form of tax reliefs are covered by Article III:8(b) GATT. The Appellate Body *Canada-Periodicals* relied on the understanding that the term 'payment' under Article III:8(b) GATT completely excludes subsidies given in the form of foregone revenues (as in the case of tax rebates and tax reliefs such as those challenged in the *US-Energy Renewable* case).¹⁴ In Ornelas and Puccio (2020), it was argued that what were excluded from Article III:8(b) GATT were only subsidies based on **discriminatory**

¹²Appellate Body Report, *Brazil-Taxation and Charges*.

¹³Panel Report, *European Communities – Measures Affecting Trade in Commercial Vessels (EC-Commercial Vessels)*, DS301, paras. 7.72–7.75.

¹⁴Appellate Body Report, *Canada – Certain Measures Concerning Periodicals*, DS31.

taxation in violation of the requirements of Article III:2 GATT. Indeed, Article III:8(b) GATT requires that payments to domestic producers be made ‘*consistently with the provisions of [Article III GATT]*’, which is fundamental in order to avoid circumvention of the rule prohibiting discriminatory taxation under Article III:2 GATT. If the idea of *payments* to domestic producers is understood as excluding from Article III:8(b) GATT any subsidies that are based on foregone taxation including those not entailing a discriminatory element, then there risks of a different standard of compliance being imposed for two different sets of domestic subsidies: those based on tax relief would not be allowed to introduce any LCR, while those based on direct payments (for example loans) could be justified under Article III:8(b) GATT and could benefit from the narrower prohibition under the SCM.

3. Some Law and Economics of Renewable Energy Subsidies

This case raises at least three issues of considerable interest in the regulation of domestic subsidies that have spillovers from domestic policy to international trade: the general issue of non-actionable subsidies, the range of legitimate restrictions on the form of subsidies, and extent to which subnational governments operating legally (even constitutionally) with respect to national law can be constrained by international agreements. Before discussing each of these issues, we provide a brief review of the theory of economic policy that is the standard framing of any discussion of subsidies.

3.1 Subsidies in the Theory of Economic Policy

The theory of economic policy focuses on policy choice in an economic environment characterized by significant spillovers, domestic and international, from a policy act. This theory is just a framework for thinking about policy choice.¹⁵ Specifically, we proceed by answering the following three questions:

1. What is the objective?
2. What is the set of available instruments?
3. Of the available instruments, which achieves the goal at lowest cost?

The first step in answering the first question is to determine whether the objective is *economic* or *not*.

An economic policy goal recognizes that under well-specified and well-understood conditions, economies may fail to produce fully efficient outcomes. The goal of policy in these cases is to find an intervention that moves the economy toward (optimally to) full efficiency. Standard cases are externalities (e.g. pollution), or imperfect competition (e.g. oligopoly).

A non-economic objective is a goal that is not related to breakdown in the efficient functioning of the economy, but the pursuit of which involves interference in the economy. For example, it may be an objective to increase the amount of education taken by citizens, not because it makes them more productive but because it makes them better citizens. Most governments have more-or-less explicit income distribution goals that have nothing to do with productivity. Many industrial policies are justified on the basis that those industries are essential to national pride (e.g. space exploration) or national survival (e.g. military expenditure). From the perspective of the theory of economic policy, the issue is never whether, or not, these are ‘good objectives’.

¹⁵As with all applied welfare economics, we must presume the existence of an objective function (otherwise ‘optimal policy’ has no meaning). The existence of such a thing is a deep problem of pure welfare economics, but it is conventional in economics and the application of economics to law to assume that such a thing can be attributed to something we will call ‘the state’ (see e.g. Grossman and Horn, 2013).

We simply take it as read that these are policy goals, legitimately arrived at, and it is the job of the analyst to suggest the best way to pursue that policy.¹⁶

The second step is to specify in as much detail as possible the way that goal is embedded in the economy. Economic objectives come equipped with a natural representation of the issue. There must be a ‘distortion’ that is causing the economy to underperform relative to the policy objective, and we can use the undistorted economy as a baseline from which to compare the extent of deviation from maximal efficiency. We presume that the policy-maker’s objective function provides a measure of the gain from reducing the inefficiency in question.¹⁷ Measuring the direct gain is only half the problem, we also need to evaluate the gains and losses that result from policy spillovers. We take it as a definition of a significant policy that there are spillovers – across sectors, across households, and across national economies. Some of these spillovers will be universally positive (e.g. reduction of pollution), but the same policy will also affect relative prices (and thus distribution of national income) and, in a dynamic international economy, spillovers may affect the competitive condition of national industries and future national income. Non-economic objectives are considerably more difficult. In principle, the same logic applies: we compare the objective function before and after implementation of the policy. The problem is that here there is no natural metric for the evaluation. If we cannot say how big, or small, the gain is, we cannot say how that compares to the costs and benefits of the spillovers. If we cannot make such a comparison, we cannot talk sensibly about policy choice as an optimization problem.

Suppose that the goal is to stimulate the use of renewable energy.¹⁸ We presume that this is an economic goal. That is, for some reason, the market is not supporting the efficient level of investment in, and production of, renewable energy. The first question to be answered is to what degree is the market failing to provide support for renewable energy. The fundamental issue is *why* this might be the case. Without an account of cause, it is essentially impossible to talk about appropriate policy (to say nothing of deciding if there is a problem at all). Compare two claims: first is the argument that this industry will never be profitable, but will provide a social benefit that exceeds the private cost; or, second, that international competition forecloses an otherwise profitable industry that with some fixed period of support could become profitable (essentially an infant industry argument). For the first, in addition to providing evidence of the benefits that will flow from support for the industry, there is the question of why the industry will never be profitable. With that proven, the other essential piece is to identify the margin by which the sector fails profitability. The infant industry case is clearer, but much more problematic. Once it is shown that the industry *can* become profitable (and sufficiently profitable that, along with social benefits, it covers the cost of the intervention), it is immediately clear that the problem is not profitability, but some form of capital market failure. In either case, if the goal is environmental and not industrial, it is never going to be first best to interfere with competition (domestic or international).

Suppose, then, that we have determined the source and magnitude of the market failure that is interfering with achieving optimal efficiency. The next step is to produce an inventory of available policy instruments. Governments have many (MANY) policy instruments at their disposal, but

¹⁶Of course, as citizens we may find the policy objectives of the government objectionable and might argue against them. But in that case, we have ceased to be advisors and have become citizens. If the policy is sufficiently objectionable, we should resign as an advisor and, possibly, engage in political opposition to the policy.

¹⁷It is common to use national income as a measure and compare the distorted to the undistorted national income. If this is genuinely a case of an economic objective, moving from the distorted to the undistorted state should increase national income. It is, however, well understood in welfare economics that national income, except under very special circumstances, is not a measure of welfare (Chipman and Moore, 1973, 1976).

¹⁸There is a sizable literature in law and economic on precisely this question, especially as it relates to WTO law. On the general relationship of climate change to WTO, see for example: Zhang and Assunção (2004), Green (2005), Green (2006), Raslan (2018). With specific reference to renewable energy, see: Cosbey and Mavroidis (2014), Rubini (2014, 2015a), Asmelash (2015), Charnovitz and Fischer (2015), and Lee (2016). In general, these papers emphasize the goals of policy, but do not consider systematic analysis of spillovers. Thus, they cannot really be seen as framed by standard theory of economic policy tools.

the number that have direct relevance for any given specific policy goal will be more limited. A standard illustration of the logic of instrument comparison is the fact that the economic effect of a $k\%$ tariff on a specific commodity can be precisely replicated by the simultaneous application of a $k\%$ production subsidy and a $k\%$ consumption tax on the same commodity. The importance of this fact is that each of the components of the tariff creates independent and additive welfare costs. Thus, if the goal is to stimulate production of a sector, the consumption tax component, if it has any effect at all, is to work against the goal and reduce consumer welfare. Thus, applying a production subsidy alone will achieve the production goal at lower cost, or permit achievement of a greater degree of stimulation at the policy optimum. There are, of course, many other instruments that might move output in the right direction: input subsidies (including employment subsidies or accelerated depreciation of capital equipment), taxation of sectors that compete with the preferred sector for resources, and many others.

In addition to instrument specific relative costs (i.e. tariffs v. production subsidies), in thinking about costs we also need to consider the details of spillovers from the focus of the policy intervention to households, firms (and sectors), and countries. As we have already noted, success in accomplishing a goal is not a complete answer to the policy choice problem. We need to think about the costs associated with choosing a policy and, in addition to the direct costs (e.g. subsidies, etc.), the spillovers play a major role here. Governments have many objectives and policies that emerge from complex political environments are often in conflict with one another. Thus, a policy that seeks to stimulate output in some specific sector will generally have an effect on income distribution that could interfere with the state's income distribution goals.¹⁹ This is a cost of the policy in question. In an environment of scarce resources, resources used to provide a subsidy may mean some other policy cannot be pursued. This is an opportunity cost of the policy in question. Finally, of course, the policy may affect world prices (terms of trade) and spill over to the policy goals of other governments. While this is unlikely to be seen as a cost to the home government in a first-order sense, it is internalization of precisely this sort of spillover that Bagwell and Staiger emphasize as the foundation of the WTO (Bagwell and Staiger, 2002). It should be clear that these costs could overwhelm any benefit and certainly imply much lower levels of intervention at the optimum than would obtain without their explicit consideration.

Return to the case of renewable energy promotion as an economic objective. We have just seen that if a general production subsidy will accomplish the goal, a tariff (or some other border policy) will do so as well but at higher cost. Given the nature of the cases considered here, the production process is complex, and benefit may be had by subsidizing particular components of the production process. In particular, in addition to direct subsidies to the purchase of particular inputs, the government might choose to condition access to the subsidy based on location of production of those inputs (i.e. local content rules). There is a sizable economics literature on local content rules, but the main point here is that such rules will raise the cost of achieving the goal (otherwise, there would be no need for the rule).²⁰

¹⁹There is a large literature on policy reform that is specifically concerned with a multiply distorted environment (Hatta, 1977; Diewert, Turunen-Red, and Woodland, 1989). That is, in addition to environmental externalities (of which there might be several, potentially related in complex ways), the country may be economically large (and thus possess an optimal tariff), have sectors with unions, and/or imperfectly competitive product markets, etc. It is an old literature on the theory of the second best that made the point that optimal environmental policy when it is the sole distortion may be very different when that distortion interacts with other distortions and non-economic policy goals (Lipsey and Lancaster, 1956) More directly relevant to the concerns of this paper is work that applies this approach to the case of the relationship between trade policy and environmental policy (Copeland, 1994; Beghin, Roland-Holst, and Van Der Mensbrugghe, 1997; Turunen-Red and Woodland, 2004; Chau, Färe, and Grosskopf, 2013).

²⁰The standard references on the economics of local content under competitive conditions are: Grossman (1981); and Mussa (1993). There are also a number of papers focused on content protection under imperfect competition that do not seem relevant to our case.

In thinking about the spillovers from environmental policies, unlike our usual presumption that spillovers are expected to be negative (and possibly large – thus, at least in part, the existence of the WTO), positive international spillovers are likely to be a feature. If the objective of a country's policy directed to support renewable energy is at least partially about global warming and climate change, and if that policy is successful at achieving such an objective, it will also indirectly benefit other countries as all are affected by climate change and global warming. This case raises a tricky issue in developing evidence-based policy – only some of the spillovers will be carried by price.

The last stage in the theory of economic policy algorithm is selection of the (constrained) best instrument from the inventory identified in the second stage. This is the stage where the theory respects the constraints on policy choice that emerge from the political system. That is, once we have ranked the members of our inventory of instruments in terms of benefits (in terms of achievement of the expressed policy goal) net of the direct and indirect (i.e. spillovers) costs, it is almost trivial to say that we should pick the instrument at the top of the list. The problem is that some of those best instruments may not be available. One possibility is that the state lacks resources to pursue the optimal policy (e.g. subsidies). However, it is at least as likely that opposition to some policies comes from politically influential groups whose interests are damaged by spillovers from the policy. Thus, instead of the first-best policy, the constrained best (generically referred to as 2nd best) is the optimal choice. However, the further down the list we go in pursuit of a politically sustainable policy, the less of our goal we are able to achieve at the optimum, because the cost rises as we go further down the list.

The upshot of this somewhat meandering overview of the theory of economic policy is that, for the case of environmental policy, and most other policy goals as well, some form of subsidy will be the preferred policy. As has been widely noted in the law and economics literature, this raises difficult issues for WTO jurisprudence. Sovereign governments have many perfectly legitimate, economic and non-economic, reasons to intervene in their economies and it will often be the case that the optimal form of intervention will be a subsidy of some kind. From the point of view of system design, this is what we should want. It is all well and good to talk about minimizing the effect of these policies, but our starting point is that significant policies have significant spillovers.

3.2 Political Economy Issues in Environmental Subsidies

When we think about justifying the form or magnitude of a given subsidy, we return to the third stage of the theory of economic policy algorithm: choice from constrained sets of instruments. Unlike border measures that are unambiguously about trade and can be evaluated relatively straightforwardly in terms of price-carried externalities that the WTO was invented to deal with, environmental subsidies (like most subsidies whose first-order justification is domestic) emerge from a domestic political process involving very different interests and institutions than those producing tariffs (or other border measures). As environmental issues become increasingly significant (and they *are* becoming increasingly significant), the demands by national civil society for state action will also grow. How governments respond to these demands will affect not only the legitimacy of the state, but also the legitimacy of the market (domestic and international). Political sustainability of policy will be an essential part of the policy calculus. The links to trade policy make this a tricky issue for the WTO, but it should be recalled that environmental policy is also linked to a variety of domestic policies (local development, regional and inter-group equity concerns, general technology policy, etc.).²¹ All of these are at least as important as trade and most are more significant to national politicians.

We noted earlier that the state must be represented by an objective function and we expect that objective function to vary systematically across states. First, and most simply, taking the issue of,

²¹There is a tendency for trade economists to view any state action that interferes with trade as intentional protection and something to be avoided. While this is certainly possible, this is an area where we would argue that the presumption should strongly be that an environmental policy's primary target is the environment.

say, response to global warming in isolation, different states may well view the issue differently. A standard example is states that view the issue as defined by current scientific consensus, even if that consensus is characterized by relatively weakly held priors, *versus* those states who apply a precautionary principle.²² These preferences will help define domestic policies and the willingness to engage in certain forms of trade. In addition to preferences with respect to environmental issues directly, the way the issue relates to trade will be a function of all the things that determine policy with respect to trade: endowments, technologies, household preferences, competitive conditions, etc. We have already noted that these all affect the optimal (and constrained optimal) policy. However, even in the nearly institution free political environment considered in most political economy research by economists, these factors will also affect the political demands facing a state. Until very recently, one of the distinctive facts about the politics of trade is that it has not been effectively linked to other domestic issues. As Nelson (1989) argues, the striking success of liberalization in the post-War era has been in no small measure a function of the fact that trade never became a public political issue. As a result, it could be handled by technocrats with only very weak connections to other issues. This is certainly not the case with environmental policy which is linked to a variety of domestic policies (agricultural policy, local development, regional and inter-group equity concerns, general technology policy, etc.). Because the relative weights of these other issues in the determination of environmental policy differ significantly across countries, and those differences affect the institutional form and the (public and private) political definition of the issue. That in turn affects the set of policies in the constrained inventory and their ranking under the state's objective function. All of these flow from differences across national civil societies and the institutions that map civil society, and the economy, into the state. Which is to say that they will produce very different selections from even a common inventory of policies.²³

Consider the case of local content rules essential to the renewable energy cases that are the subject of this paper. On their own, these seem to be straightforward violations of national treatment. Furthermore, on purely economic grounds, if the issue is promotion of renewable energy, local content rules would seem to be less efficient than an unconstrained subsidy policy. We have already noted that the theory of economic policy would be skeptical of such a claim. That is the burden of defending a local content rule on purely economic grounds would be heavy. However, the political context could change that calculation. If we start from the recognition that a subsidy policy requires the deployment of scarce fiscal resources, as opposed to some more direct, and costly, form of protection, and recognizing that those fiscal resources must be raised from domestic residents, it is clear that some form of priority to domestic firms in accessing those resources may make the policy more politically palatable.²⁴ Those losses should be weighed along with the generally positive spillovers from use of renewable energy.

This is thrown into particularly high relief when the policy is adopted by a sub-national government. Most states are constrained by their constitutions to maintain a balanced budget, so the need to justify any new fiscal expenditure (including tax expenditures) is a real constraint. Interestingly, the US Supreme Court has recognized the right of states to engage in discrimination under very specific circumstances (these include local content rules in the allocation of subsidies). While it is exceptionally unlikely that these policies seek explicitly to burden international trade, they privilege local firms (primarily relative to other US firms). While the Commerce Clause of the US Constitution, and its extension via the Dormant Commerce Clause, outlaws virtually all attempts by states to interfere in interstate commerce, the Court has accepted as constitutional the

²²It seems exceptionally unlikely that chlorinated chicken could become a major issue for US domestic regulators or trade negotiators.

²³Of course, it is unlikely that the constrained inventory of policies will be identical across countries. Options may be ruled out in one country but not another for any of the reasons sketched in this paragraph.

²⁴We abstract here from the use of local content rules to pursue policies seeking to stimulate business in depressed regions or among groups of citizens facing historical discrimination (women, minorities, etc.). As we note above, a given policy may seek to address more than one issue to create a coalition in support of the policy.

granting of monetary subsidies that are available only to in-state firms (Coenen, 1998). The basic logic is that citizens have a privileged right of access to fiscal resources raised from them for the provision of public goods. Interestingly, the Court and general legal commentary seems to see a justification in terms of legislative accountability; subsidies are more visible than benefits that run through taxes and, because of that visibility, the public politics are more likely to restrict interest group abuses. That is, as Coenen (1998) notes, the Court seems to recognize a particular right that runs through democratic legitimation that applies to direct subsidies but not to indirect subsidies.²⁵

As Cosbey and Mavroidis (2014) pointed out in their analysis of a similar case, the current WTO jurisprudence on subsidies is problematic. In a sense, it goes back to a time when border measures were the main issue facing the WTO and there was an attempt to fit subsidy rules into a similar framework. Of course, the goals remain the same – creating a stable regime that balances the gains from liberalization while protecting the needs of sovereign governments – but the environment is very different. With the rise of global warming as an issue of first-rate importance and the rise of China as a power of first-rate importance, those rules no longer serve their larger purpose. It behooves us, as it did Cosbey and Mavroidis, to use this opportunity to think through the next steps.

4. The Need to Reform Subsidies in the WTO for Green Goods and Beyond

The members of the WTO are sovereign nations and although these nations are linked via various forms of global economic relations that are on balance mutually beneficial, legitimation of domestic and international markets necessarily runs through domestic political systems. Civil societies in the democratic, capitalist political economies that make up the core of the world trading system and the political core of the WTO expect their governments to pursue policies that balance the gains from relatively free markets against the violation of strongly held norms across a variety of issues that relate to the operation of those markets. If the policy space needed for carrying out the balancing act is diminished significantly by international commitments, governments may be forced to choose between withdrawing from international commitments or face demands for radical political transformation.²⁶ The framers of the GATT were well aware of this tension and built in a number of escape clauses oriented primarily to the core business of the GATT tariffs.

As the general level of tariffs have fallen to a level approximating free trade, the role of subsidies in managing the tension between the demands of the market and the demands of civil society have increased significantly, and those escape clauses seem decreasingly able to respond to an environment characterized by rapid technological changes producing dramatic changes in the domestic and global economies (Baldwin, 2016).²⁷ At the same time, the rise of China, a market-oriented country with very different institutions is an additional source of tension.²⁸ All three core powers engage in extensive subsidy activity, but the political systems that deliver the subsidies, the meaning of subsidies in those systems, and the forms those subsidies take differ significantly. Given the centrality of subsidies to both conflict and stability going forward, the world trading system, and the WTO in particular, needs to find a way to accommodate and manage them. In this sense, Charnovitz highlights that WTO law seems to be the area of international public law which imposes more constraint on green subsidies (Charnovitz, 2014).

It was therefore asked whether WTO law is too stringent for promoting green goods and how to increase coherence between climate change policies and WTO law.

²⁵Justices Scalia and Thomas appeared willing to contemplate dropping of the dormant commerce clause in the interest of stronger states rights in determining essentially local policy.

²⁶There are no shortage of arguments that widespread anti-globalist populism is evidence that we have already reached that point (Rodrik, 2011, 2017).

²⁷For the increase in the use of subsidies, see the data and reports of Simon Evenett's Global Trade Alert project, www.globaltradealert.org/.

²⁸As with Japan in the 1980s, it is hard to avoid the conclusion that near hysteria about China stems in no small measure from its linguistic and cultural distance from the Western powers that created and managed the GATT/WTO system.

Stephenson (2013) has directly claimed that the prohibition of LCRs at the WTO could be too stringent and should be reconsidered for renewable energy. The rationale for this argument was based on an article by Kuntze and Moerenhout (2014), arguing that there are at least four rationales for LCRs in green subsidies: political economy arguments in order to gain domestic support for the green transition, infant industry theories, the creation of ‘green jobs’, and environmental benefits of greater competition in the medium term. However, there is little economic evidence that the benefits of LCRs could offset the economic costs which are instead documented in the economic literature and also recognized by Stephenson (2013). Moreover, it would be difficult to advocate in favor of an exception from the prohibition of LCRs for renewable energy goods and not for other legitimate policy aims. Thus, advocating for a full exception on LCR for renewables would likely open a *can of worms*, potentially legitimizing measures that have significant trade distortions effects.

The Uruguay Round, in the SCM, experimented with the idea of creating a category of non-actionable subsidies (Article 8 SCM). The goal was to identify measures targeting widely agreed goals of national governments (e.g. regional aid, support for research and development, and environmental policy). For a variety of reasons, this experiment ended in 1999, leaving only prohibited and actionable subsidies. The actionability of green subsidies has been considered problematic as renewable energy is dependent on subsidies and therefore cannot be economically viable without support, and some scholars have raised the issue of whether the expired Article 8 SCM should be revived (Rubini, 2012, 2015b; Cosbey and Mavroidis, 2014; Marhold, 2017).

In particular, Article 8(2)(c) covered: ‘*assistance to promote adaptation of existing facilities to new environmental requirements imposed by law and/or regulations which result in greater constraints and financial burden on firms*’, and could be applied to renewables and climate change measures. Article 8(2)(c) imposed some constraints on the covered subsidies. One of these constraints, requesting a limit to 20% of the cost of adaptation, would be hard to respect for green subsidies as mentioned by Cosbey and Mavroidis (2014). WTO members would have to consider expanding Article 8 SCM to apply it efficiently to green subsidies. Still, the question remains whether it would be acceptable to reactivate Article 8 SCM only for green goods and not for subsidies pursuing other legitimate purposes. While Article 8 SCM contemplated issues seen as fundamentally domestic (regional aid, environmental policy, support for R&D) and were originally expected to have little or no trade impact, as we argued above, any significant policy is going to have significant spillovers and WTO rules for subsidies need to recognize that fact.

Thus, the combination of fundamentally domestic policies with potentially significant spillovers would seem to require a distinctive approach. On the one hand, as Hoekman and Nelson (2020) argue, given the complex combination of differing understandings of policy goals, differing political institutions, and differing economic structures, it seems unwise to attempt detailed legal provisions. On the other hand, the system benefits from relative predictability in dispute resolution. Thus, a purely ‘diplomatic’ (i.e. power-based) approach is problematic – as the creation of the SCM implies. These considerations suggest that the WTO could build on the approach applied in agricultural trade, using green, amber, and red boxes.²⁹ However, unlike the attempt to legislate this directly (as black letter law), we would see these as ‘*presumption boxes*’. That is, members would agree on the sorts of issues that would fall in the various boxes. As is broadly the case with specific trade concerns, this creates a starting point for discussion framed in essentially technical terms (see the excellent discussion in Karttunen, 2020).

²⁹The idea is that the measures that are adopted with the intention of distorting trade will be presumed to be inconsistent with WTO law (red box). Measures adopted as part of programs recognized by the agreement to be part of the legitimate policy interests of a government are presumed to be consistent with WTO law and non-actionable (green box). Measures adopted that are not clearly linked to legitimate policy interests or are unnecessarily trade distorting, but not adopted explicitly to distort trade, would be open to negotiation (amber box). This approach is obviously related to the Agriculture Agreement, under which domestic support is divided into three boxes with similar intent.

Many environmental cases, like those considered here would (as contemplated in the original SCM) clearly be green box cases. The presumption would be that subsidies in this area are legitimate unless a case can be made that either the form or magnitude of the intervention is inappropriate to the goal of promoting environmental sustainability. It would seem appropriate that in green box cases, the complainant would need to provide some evidence of the magnitude of, and the injury associated with, the spillover from the policy. For red box cases, the presumption would be reversed, and for amber box cases there would be no presumption.

The above box system would however require modification of the SCM, which could be particularly difficult as proven by the slow pace of WTO reforms. Eliason (2019) proposed the use of waivers under Article IX of the WTO agreement, allowing exceptions to an obligation under any of the WTO agreements. Eliason suggests that using such a procedure (which was used for example for adopting the Enabling Clause which allows exceptions to Article XXIV GATT concerning Free Trade Agreements and Customs Union) could facilitate negotiation for green subsidies' rules. Indeed, if consensus cannot be reached, a vote can be requested.

Still, reforming the system and agreeing on a good balance between exception and rule could be particularly difficult. Something can already be done by improving the coherence in the interpretation of the exception for subsidies under article III:8 GATT and of the prohibition of LCR under the SCM. Indeed, as analyzed in section 2 of this paper, if we compare the *Brazil Taxation* case with the *US–Energy Renewable* case, we end up in a situation where some subsidies, covered by the exception under Article III:8 GATT, may be excluded from the discipline under Article III:4 GATT and need only to comply with the narrower prohibition of LCR under the SCM, while other subsidies will be subject to the stricter rules of Article III:4 GATT. Some of the US measures were not necessarily targeting 'domestic producers' moreover most US measures involved some tax credits or rebates and did not involve 'direct payments' as provided under Article III:8(b) GATT. So, the issue is first whether there is a need to enlarge the interpretation of the exception under Article III:8(b) GATT in order to ensure a more coherent treatment of different subsidies schemes under WTO rules. There is also a need to better clarify the scope of the prohibition of LCRs under the SCM agreement as mentioned in Ornelas and Puccio (2020). The Appellate Body in *Brazil–Taxation* distinguishes between, on the one hand, legitimate requirements to define domestic goods in subsidies, and, on the other hand, the prohibited LCRs. Clarifying the boundaries between those two concepts would significantly improve and clarify the policy space for subsidies, not only for green subsidies but for any domestic subsidies.

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Annex

Table A1. WTO disputes concerning renewables and LCRs

Title of dispute	Type Energy	Complainant	Date of consultation request	Status of consultation
DS510 <i>US-Renewable Energy</i>	Renewable	India	9.09.2016	Panel report under appeal
DS456 <i>India-Solar Cells</i>	Renewable	United States	6.02.2013	Authorization to retaliate requested (including 22.6 arbitration) compliance proceedings ongoing
DS452 <i>EU-Energy Package</i>	Renewable	China	5.11.2012	In consultations
DS426 <i>Canada-Feed-In Tariff Program</i>	Renewable	EU	11.08.2011	Implementation notified by respondent
DS412 <i>Canada-Renewable Energy</i>	Renewable	Japan	13.09.2010	Implementation notified by respondent
DS419 <i>China-Measures Concerning Wind Power Equipment</i>	Renewable	US	22.12.2020	Consultations