



Climate Change and Clean Energy in the 2030 Agenda: What Role for the Trade System?

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International Centre for Trade
and Sustainable Development

Think Piece

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LIST OF ABBREVIATIONS

AAAA	Addis Ababa Action Agenda
AB	Appellate Body
APEC	Asia Pacific Economic Cooperation
APP	Asia Pacific Partnership
BCA	border carbon adjustment
CET	clean energy technology
EBI	Environmental Business International
EGA	Environmental Goods Agreement
GATT	General Agreement on Tariffs and Trade
GHG	greenhouse gas
GWP	global warming potential
HS	Harmonized System
IEA	International Energy Agency
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IMT	Institute of Management Technology
IP	intellectual property
IPR	intellectual property right
IRENA	International Renewable Energy Agency
LCR	local content requirement
MFN	most favoured nation
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
PV	photovoltaic
RTA	regional trade agreement
SCM	Subsidies and Countervailing Measures
SDG	Sustainable Development Goal
TM	Technology Mechanism
TNA	Technology Needs Assessment
UNFCCC	United Nations Framework Convention on Climate Change
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNGA	United Nations General Assembly
WCO	World Customs Organization
WHO	World Health Organization
WTO	World Trade Organization

FOREWORD

The United Nations 2030 Agenda for Sustainable Development adopted in September 2015 includes a Sustainable Development Goal (SDG 13) dedicated to urgent action to combat climate change, and another (SDG 7) focused on ensuring access to sustainable energy. Questions of mitigation and adaptation to climate change are also integrated throughout the Agenda, reflecting how central these issues will be to sustainable development prospects for the next 15 years. Targets related to international trade are also woven through the 2030 Agenda, many of which leverage trade as a “means of implementation” of other objectives.

This think piece, written by Kasturi Das at the Institute of Management Technology (IMT Ghaziabad, Delhi-NCR) and Kaushik Ranjan Bandyopadhyay (TERI University, New Delhi) explores how trade rules, in particular those established at the multilateral level, could support progress towards the 2030 Agenda’s objectives related to climate change and clean energy. It forms part of a series that analyses the contribution trade and trade policy could make to achieving key development objectives of the 2030 Agenda. The series is designed to help policymakers and other stakeholders to think through the role of trade policy in the implementation of this new framework of global commitments.

The authors focus on six key policy challenges at the intersection of trade policy and climate change and clean energy and recommend prioritizing policy actions in three areas: fossil fuel subsidies; clean energy subsidies; and access, dissemination and transfer of climate-friendly technologies. The authors also suggest policy actions to tackle three other important issues; dealing with the political economy of local content requirements; pricing carbon nationally while tackling international competitiveness and carbon leakage concerns, including through border carbon adjustments; and designing “carrots” and “sticks” for more ambitious action under climate clubs. In light of the political sensitivities surrounding the latter three issues, however, the authors suggest the related policy actions could be considered less urgent priorities. This pragmatic approach also reflects, to a degree, the most pressing current issues in international negotiations.

This think piece draws from a wide range of work by the policy and academic community, by the authors and by ICSTD, including through the E15Initiative, on the role of international trade and trade frameworks in tackling climate change. By linking existing and new ideas on this interaction to the objectives of the 2030 Agenda, this think piece articulates how an important body of ongoing work relates to the context of the new global development agenda.

The 2030 Agenda should spur policymakers to think about how trade policy can support the global framework’s clear and ambitious objectives on climate change and clean energy. We hope that this paper proves useful to this work.



Ricardo Meléndez-Ortiz
Chief Executive, ICTSD

EXECUTIVE SUMMARY

The United Nations 2030 Agenda for Sustainable Development (the 2030 Agenda) including 17 Sustainable Development Goals (SDGs) and supporting targets and the Addis Ababa Action Agenda, will form the substantive core of the new global development agenda. International trade is a direct or cross-cutting means of implementation for achieving many of the specific SDGs and related targets. The objective of this think piece is to help policymakers understand the key contributions that trade policy could make to the 2030 Agenda objectives around addressing climate change and improving access to clean energy for all, particularly as set out in SDGs 7 and 13. It covers six key policy challenges, namely reforming fossil fuel subsidies; creating room for subsidies to support scale-up of clean energy technologies; facilitating access, dissemination, and transfer of climate-friendly technologies; dealing with the political economy of local content requirements (LCRs); pricing carbon nationally while tackling international competitiveness and carbon leakage concerns, particularly through border carbon adjustments; and designing “carrots” and “sticks” for more ambitious action under climate clubs. The think piece recommends prioritising policy actions in the short term mainly in three areas: fossil fuel subsidies; clean energy subsidies; and access, dissemination, and transfer of climate-friendly technologies.

Fossil fuel subsidies are huge and environmentally and socially harmful. SDG Target 12.c calls for fossil fuel subsidy reform. The World Trade Organization (WTO) Agreement on Subsidies and Countervailing Measures (SCM Agreement) has thus far failed to discipline fossil fuel subsidies owing to their political sensitivity, inadequate disclosure of these subsidies by members, coupled with challenges in demonstrating whether these subsidies are “actionable” (i.e. whether they confer “specific” benefits to an enterprise, industry, or region and have adverse effects on the interests of other WTO members). The key policy suggestions of the think piece towards addressing these concerns include: more comprehensive and transparent disclosure of fossil fuel subsidies under the SCM Agreement; clarifying their “actionable” status; and gradual phase-out and ultimate prohibition of these subsidies.

Virtually all countries that are promoting clean energy or producing clean energy products provide some kind of subsidies to this sector. SDG 7 calls, inter alia, for substantially increasing the share of renewable energy in the global energy mix, which is likely to require ongoing support from governments. However, clean energy subsidies have repeatedly been challenged under the WTO dispute settlement system. This think piece suggests removing some of the legal uncertainty around these subsidies by clarifying key concepts in the SCM Agreement in the context of clean energy subsidies as well as clarifying the applicability of the General Agreement on Tariffs and Trade (GATT) Article XX General Exceptions provisions to the SCM Agreement; agreeing on a time-limited and conditional “peace clause” preventing WTO disputes being taken against certain carefully selected categories of climate-related subsidies; and re-introduction of the category of “non-actionable subsidies” under Article 8 of the SCM Agreement to provide leeway to certain types of clean energy subsidies.

SDG Goal 17 includes three targets relating to technology and SDG Target 7.a calls for enhanced international cooperation to facilitate access to clean energy research and technology. Removing distortions in global markets for clean energy technologies could help improve access and their dissemination. In addition to tariff liberalisation in clean energy technologies, as is attempted under the plurilateral Environmental Goods Agreement (EGA), the role of intellectual property rights (IPRs) assumes significance for technology transfer. Under the EGA, the think piece recommends inclusion of adaptation-related goods; creating scope for updating the list of

environmental goods; eventual multilateralisation of this plurilateral initiative; and a joint effort by the WTO and World Customs Organization to revise the Harmonized System (HS) classifications to better reflect climate-friendly goods. On IPRs, the think piece suggests establishment of an appropriate mechanism that could address, on a case-by-case basis, any intellectual property-related barriers confronting United Nations Framework Convention on Climate Change (UNFCCC) parties that are also WTO members. WTO members could also adopt a Declaration for climate-related mitigation and adaptation technologies re-affirming the flexibilities already available under the Trade-related Aspects of Intellectual Property Rights (TRIPS) Agreement. Finally, South-South cooperation is also suggested as an avenue worth exploring further, in particular for adaptation technologies.

Given the rampant use of LCRs by developing and developed countries alike in the clean energy space and the proliferation of WTO disputes on the issue over the recent past, addressing LCRs pertaining to clean energy is certainly worth exploring. However, LCRs are less of a priority for policy action, in view of the political economy issues around them. Similarly, policy options regarding border carbon adjustments are attached relatively less priority in the short term given the complexities around them such as political sensitivity, development implications, as well as WTO legality. As for climate clubs, sweeping policy actions to create policy space under WTO law to enable such clubs to apply discriminatory “carrots” and/or “sticks” do not seem to be realistic in the short term; governments could instead explore establishing clubs under regional trade agreements and prioritise the use of carrots rather than sticks!

1. INTRODUCTION

December 2015 saw the adoption of the Paris Agreement in the 21st Conference of the Parties, which set the aim of keeping the global temperature increase from pre-industrial levels well below 2°C and pursuing efforts to limit it to 1.5°C. Although by now, nearly all United Nations Framework Convention on Climate Change (UNFCCC) parties have submitted their Nationally Determined Contributions (NDCs) under the Paris Agreement, taken together the current pledges are far from adequate to achieve even the 2°C target, as revealed by the UNFCCC's own analysis.¹ This finding reaffirms the “gap” that was already underscored in the Paris Agreement (UNFCCC 2015a), and the IPCC's AR5 report (IPCC 2014) as well as in the United Nations General Assembly (UNGA) resolution establishing the 2030 Agenda (UN 2015a). The Paris Agreement, however, also creates room for countries to ratchet-up ambition in the future. If the 2°C target is to be achieved, massive improvements in energy efficiency, a huge scale-up in production of renewable energy and enhanced access to clean energy technologies are imperative, and trade has an important role to play.

1.1 Climate Change, Clean Energy, and the 2030 Agenda: Understanding the Nexus

Sustainable Development Goal (SDG) 13 within the 2030 Agenda calls for urgent action to combat climate change and its impacts. The IPCC AR5 report, released in 2014, underscores that avoiding 2°C of warming relative to pre-industrial levels requires, among other things, more rapid improvement in energy efficiency; tripling or quadrupling by 2050 the share of zero- or low-carbon energy supply from renewables, nuclear power, fossil fuels with carbon capture and storage, or from bioenergy with carbon capture and storage. In a similar vein, SDG 7 calls for substantially increasing the share of

renewable energy in the global energy mix; doubling the global rate of improvement in energy efficiency; and enhancing international cooperation to facilitate access to clean energy research and technology, among other targets set for 2030. The objectives around climate change and clean energy are also linked to several other SDGs.

Climate change poses risks to multiple dimensions of sustainable development, directly or indirectly influencing the achievement of various other goals and targets under the 2030 Agenda. Lack of adaptation and mitigation may create impediments in achieving many SDGs and will also make it challenging to sustain development progress over time. There are clear links between SDG 13 and targets that would contribute to climate change mitigation. For instance, progress towards SDG Targets 7.2 (increase share of renewable energy by 2030) and 7.3 (double the rate of improvement in energy efficiency by 2030) would support the global mitigation scenarios indicated in AR5. Target 12.c calls for rationalising inefficient fossil fuel subsidies by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out harmful subsidies. Several SDG targets reflect policy objectives that are also important components of climate change adaptation responses, including Target 1.5 (by 2030 build the resilience of the poor), Target 6.4 (increase water use efficiency), Target 9.1 (develop resilient infrastructure) or Target 11.5 (reduce number of deaths linked to disasters) (ICSU, ISSC 2015).

Energy, the focus of SDG 7, is considered as a vital resource that is required to meet all other SDGs and is often dubbed the “missing MDG” (Bandyopadhyay and Das 2016). There are many crucial links between SDG 7 and

¹ According to UNFCCC (2016a), full implementation of all the conditional and unconditional actions outlined in the NDCs taken together would fall far short of what is required to fulfill the ambition of limiting global warming to 2°C or 1.5°C targets.

other SDGs. Access to basic energy services is a requirement for poverty eradication (SDG 1). As of 2013, Nearly 1.2 billion people (i.e. 17 percent of the global population) have no access to electricity and 2.7 billion people (i.e. 38 percent of the global population) rely on wood, charcoal, or dung as their principal sources of energy for cooking and heating (IEA 2015). Access to modern and clean energy can potentially create employment and the income generation that can directly reduce poverty levels (Karekezi et al. 2012).

Access to sustainable sources of energy is crucial to reduce indoor air pollution which arises from traditional biomass and firewood combustion used by women for cooking, putting their own and their children's health at risk and exacerbating premature maternal and infant mortality. Realisation of SDG 7 is thus linked to SDG 3 (ensure healthy lives and promote well-being for all at all ages) as children and women are most vulnerable to indoor pollution-related deaths.² It is also linked to SDG 5 (achieve gender equality and empower all women and girls) as women are most exposed to the risk of burning biomass. Modern sources of energy, i.e. electricity, are crucial for lighting households and schools and allowing education to continue in an uninterrupted manner, suggesting a clear link between SDG 7 and SDG 4 (on inclusive and equitable quality education and life-long learning opportunities for all).³

Access to modern forms of energy is an enabler of sustainable economic growth, hence SDG 7 is interwoven with SDG 8 (on sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all). A sustainable growth path will require energy intensity to be reduced. It will also require resource-efficient energy generation. Conventional forms of power generation are

water intensive, meaning SDG 7 is linked with SDG 6 (ensure availability and sustainable management of water and sanitation for all). The problem gets compounded if thermal power plants are located in water stressed regions.⁴

The deployment of modern forms of energy will also create new productive employment opportunities. New data from IRENA reveals that global employment in renewable energy increased by 5 percent in 2015 to reach 8.1 million. Although overall growth in jobs slowed compared to previous years, the same IRENA data indicate the total number of jobs in renewables worldwide continued to rise, in contrast with labour markets in the broader energy sector (IRENA 2016).

Renewable energy and energy efficiency, reflected in the targets under SDG 7, are crucial for sustainable consumption and production and thus are linked to SDG 12 (ensure sustainable consumption and production patterns). Finance is crucial for capex-heavy energy infrastructure and investments, and removal of trade barriers will help to lower the costs of the goods and services required to build renewable energy infrastructure. Thus, SDG 7 is also linked to SDG 17 (strengthen the means of implementation and revitalise the global partnership for sustainable development) including Target 17.7 on the diffusion of environmentally sound technologies.

1.2 Trade in the Context of the SDGs, Climate Change, and Clean Energy

In the 2030 Agenda, trade is regarded as an engine for inclusive economic growth and poverty reduction that contributes to the promotion of sustainable development. Several systemic trade-related targets are included

2 WHO estimates indicate that over four million people die prematurely from illness attributable to the household air pollution from cooking with solid fuels (WHO 2016).

3 UNDESA (2014) indicates that as of 2014, collectively, 188 million children attend schools not connected to any type of electricity supply—a number of people greater than the populations of Nigeria, Bangladesh, Russia or Japan.

4 For instance in India and China nearly 70 percent and 60 percent of the existing coal-fired power plants, respectively, are located in water stressed areas (IEA n.d.).

under SDG 17 as cross-cutting means of implementation for the entire framework of goals. Trade-related targets also appear in the context of several other SDGs.⁵ Many trade-related elements, along with complementary policy commitments, are also reflected in the Addis Ababa Action Agenda (AAAA) (UN 2015b).

The SDG Target 17.15 and elements of the AAAA⁶ explicitly refer to the need for policy coherence for sustainable development, an effort which should include more coherence between trade and other policy frameworks. Issues of policy coherence have become particularly contested in the climate-trade interface. Concerns have been raised that trade measures addressing climate change and clean energy may be used for protectionist purposes. Recent years have seen a surge in WTO disputes specifically targeting clean energy supports and policy measures (see Annex 1). Leaving the fate of climate-related actions to the WTO dispute settlement system is an option that is not only costly, but is also associated with risks and uncertainty, leading to a chilling effect on investment in the sector (Meléndez-Ortiz 2016). Hence, it is important to explore the various ways in which policy-makers could attempt to clarify grey areas in

trade law or undertake other trade-related actions so as to help them advance their climate and clean energy-related objectives, and thereby advance the 2030 Agenda as well.

Written against the above backdrop, this think piece briefly analyses some of the key legal issues and policy challenges at the interface of climate and energy policies on the one hand, and trade regimes on the other. In light of the analyses, the think piece suggests a set of policy actions that governments could undertake between now and 2030 with the aim of helping the trade system to better contribute towards achievement of climate and clean energy objectives and the 2030 Agenda. As far as possible, trade policy-related actions are identified alongside their potential to be implemented by the governments in the short term (within five years), medium term (within 10 years) and long term (15 years or more).

While the authors are mindful of the policy attention shifting to regional trade agreements (RTAs) as fora for trade governance and rulemaking, the predominant focus of the policy actions suggested here is on the multilateral trade regime under the World Trade Organization (WTO) and related plurilateral agreements.⁷

5 See for instance, Targets 2b, 3b, 8a, 10a, 14.6. For further details, see Tipping and Wolfe (2016).

6 See paras 79, 87, 91 (UN 2015b).

7 This is primarily because issues of policy space and legal clarity on trade matters for advancing the climate and clean energy agenda in the context of SDGs have been most widely raised in the context of the WTO regime, particularly owing to the dispute settlement system which makes WTO obligations enforceable.

2. ISSUES AND POLICY CHALLENGES AT THE CLIMATE-CLEAN ENERGY-TRADE INTERFACE

2.1 Reforming Fossil Fuel Subsidies

Fossil fuel subsidies are by far the largest category of energy subsidies. They consist of subsidies that encourage exploration, production, or use of fossil fuels (Horlick and Clarke 2016). According to International Energy Agency (IEA) estimates, fossil fuel subsidies amounted to US\$550 billion in 2013 (IEA 2014).

SDG Target 12.c calls for fossil fuel subsidy reform, emphasising that such reform must take fully into account the specific needs and conditions of developing countries and minimise the possible adverse impacts on their development in a manner that protects the poor and the affected communities.

Given their perverse environmental, fiscal, macroeconomic, and social consequences, fossil fuel subsidies could hamper achievement of various SDGs. For instance, such subsidies increase the use of fossil fuels, increase premature deaths through local air pollution, lead to worsening congestion and other adverse side-effects of vehicle use, and increasing atmospheric greenhouse gas (GHG) concentrations that cause climate change (Coady et al. 2015). According to the International Monetary Fund (IMF), ending fossil fuel subsidies would cut global carbon emissions by 20 percent, which would be a major contribution towards taming global warming (Coady et al. 2015). Fossil fuel subsidies also impose large fiscal costs, which need to be financed by some combination of higher public debt, higher tax burdens, and crowding out of potentially productive public spending (for example, on health, education,

and infrastructure), all of which can be a drag on economic growth and sustainable development (Coady et al. 2015). For all of these reasons, there is a strong case for fossil fuel subsidy reform.

The issue is also politically sensitive because some governments provide fossil fuel subsidies to support the poor. Subsidies for the consumption of fossil fuels are, however, an ineffective way of providing support to low-income households since most of the benefits from energy subsidies are typically captured by rich households (Coady et al. 2015). One way to address this is by providing targeted income support for households below the poverty line in place of explicit subsidies on the purchase price of fuels. This also helps in mitigating the distribution consequences of subsidy reform. The direct cash transfers associated with select fossil fuels introduced in India (Soni et al. 2012) and Indonesia (Tumiwa et al. 2011) are cases in point.⁸

While the relevance of fossil fuel subsidy reform for the WTO agenda has been acknowledged at the highest levels of the organisation,⁹ hardly any concrete action has been taken to date. This is perhaps not surprising given the highly politically sensitive nature of the issue.

The WTO Agreement on Subsidies and Countervailing Measures (the SCM Agreement) would be the key framework for WTO action on fossil fuel subsidies. Under the SCM Agreement, subsidies are prohibited if they are linked with either export performance or local content requirements (LCRs). Even if they are not prohibited, subsidies can

8 These governments allowed the fuels to be sold at the market price, and then transferred subsidies directly to targeted low-income (below poverty line) users with the aim of reducing leakages, delays, and corruption and to mitigate the impact of the subsidy reform on the poor.

9 In the words of former WTO Director-General Pascal Lamy, “discussion on the reform of fossil-fuel subsidies has largely bypassed the WTO. This is a missed opportunity” (Lamy 2013). Also see WTO (2010).

still be “actionable” if they are “specific” to an enterprise, industry, or region and have adverse effects on the interests of other WTO members (Jones 2016). However, proving either adverse effects or specificity appears to be particularly difficult for fossil fuel subsidies. For consumer subsidies, in particular, it would be extremely challenging to demonstrate that these subsidies are “specific” given that their benefits accrue to a broad base of consumers spread across the entire economy. A classic case in point is the benefits that accrue from dual pricing of energy, where governments set a lower price for domestic consumption of fossil fuel, compared to the price charged for exported fuel. It is very difficult to prove the specificity of a subsidy that results from such dual pricing of energy as these schemes normally apply to all enterprises and industries throughout the economy.

In addition to disciplining subsidies, the SCM Agreement obliges WTO members to notify their subsidies, providing sufficient details to allow other members to assess their impacts on trade. Subsidies so notified are to be reviewed in the SCM Committee. However, in practice, the notification requirement has an insignificant impact on fossil fuel subsidies to date due to lack of transparent disclosure and reporting on their nature and magnitude. In fact, notification rates under the SCM Agreement have in general been low (van Asselt 2014). Hence, WTO reporting vastly understates the extent of the subsidisation that occurs (Horlick and Clarke 2016). Even if members do notify subsidies, the surveillance mechanism rarely leads to the subsidies being questioned (van Asselt 2014).

In contrast to the recent wave of WTO disputes in the clean energy space, there has not been a single dispute to date pertaining

to fossil fuel subsidies. This could, at least in part, be attributable to the difficulty of substantiating a claim that a particular fossil fuel subsidy is trade distorting. Another reason could be a fear of retaliatory actions by other WTO members against a complaining member’s own fossil fuel or renewable energy subsidies (Wold, Wilson, and Foroshani 2012).

Fossil fuel subsidy reform has been discussed in other international fora. In the UNFCCC context, fossil fuel subsidy reforms are being discussed as part of the agenda items on Response Measures (UNFCCC 2009). G20 leaders pledged to phase out fossil fuel subsidies in 2009 (G20 2009). However, the rising oil prices from 2009 to 2012 (that led to doubling of energy subsidies) (Howse 2013) coupled with lack of clear definition,¹⁰ limited transparency on subsidy levels, and lack of an enforcement mechanism have essentially led to failure in the implementation of the G20 pledge (Harrison Institute of Public Law 2014).

The WTO, with its existing subsidy code and strong dispute settlement system, is still a logical home for a framework of disciplines on fossil fuel subsidies. Taking into account the challenges confronting fossil fuel subsidy reform and the role of WTO in dealing with it, governments could consider the following policy actions.

Suggested Policy Actions

- **(Short Term) Given the complexities and political sensitivities involved in the issue of fossil fuel subsidy reform, to begin with WTO members could aim for more comprehensive and transparent reporting of fossil fuel subsidies under the notification provision of the SCM Agreement. This could be achieved, at the first instance, with an agreement**

¹⁰ In the absence of a universal clear definition of fossil fuel subsidies, different organisations such as the IEA, IMF, and OECD have come out with different estimates that vary from a narrow definition, such as direct cash payment by a government to an energy producer or consumer, to as broad a definition as any government interventions that, directly or indirectly, affect prices or costs (UNEP 2008).

among WTO members mandating the full disclosure of fossil fuel subsidies (Jones 2016).

- (Short to Medium Term) WTO members could clarify that fossil fuel subsidies are actionable subsidies under the SCM Agreement (Bacchus 2016). This could be done through a WTO Ministerial Decision.¹¹
- (Medium to Long Term) WTO members could agree on a gradual phase-out and ultimate prohibition of fossil fuel subsidies (Bacchus 2016), particularly production subsidies, while taking into account the impact of consumption subsidies on the poor (Horlick and Clarke 2016).

2.2 Creating Room for Subsidies to Support Scale-up of Clean Energy Technologies

Virtually all countries that promote clean energy or producing clean energy products (objectives reflected in targets under SDG 7) provide some kind of subsidy or assistance to this sector. Nonetheless, global renewable energy subsidies are relatively modest compared to fossil fuel subsidies, totalling only US\$120 billion in 2013 according to IEA estimates, in contrast with fossil fuel subsidies of US\$550 billion in the same year (IEA 2014). According to IEA projections, with rapid cost reductions and continued support, renewables are expected to account for almost half of

the increase in total electricity generation to 2040, the use of biofuels is expected to more than triple to 4.6 million barrels per day and the use of renewables for heat will more than double (World Energy Outlook 2013). There is, therefore, a strong need for continued policy support to renewable energy to achieve these levels. Without such support, production in this sector will be less than what is socially desirable, due to the failure of the market to take into account the positive externalities generated by the sector. Market signals are further distorted by the existence of fossil fuel subsidies. Besides, there is also the infant-industry argument for protection,¹² although this may not always apply.

Support to the clean energy sector is often delivered as part of a policy package also intended to generate certain other economic benefits, such as creating local jobs, stimulating growth, etc. (Meléndez-Ortiz 2016). Such policies take various forms, such as production subsidies for clean energy technologies (often including LCRs), feed-in tariff programmes and consumer subsidies. Many of these kinds of policies have been contested in trade disputes at the WTO (Annex 1) and/or in domestic trade remedy cases.¹³ Among the 11 disputes related to clean energy initiated under the WTO since 2010, as many as eight cited the SCM Agreement in the request for consultations initiating the dispute (Annex 1).

11 A Ministerial “Decision” is an expression of the WTO membership’s voice regarding interpretation of a particular provision in a covered WTO agreement, rather than deferring entirely to the dispute settlement system (Pauwelyn 2016). As clarified by the WTO Appellate Body (WTO 2012: para 262), a decision adopted by members may qualify as a “subsequent agreement between the parties” regarding the interpretation of a covered WTO agreement or the application of its provisions if: (i) the decision is adopted subsequent to the relevant covered agreement; and (ii) the terms and content of the decision express an agreement between members on the interpretation or application of a provision of WTO law. Such a subsequent agreement would be taken into account in the interpretation of the WTO agreements, pursuant to Article 31(3)(a) of the 1969 Vienna Convention on the Law of Treaties, which with respect to interpretation of treaty provisions states: “There shall be taken into account, together with the context: (a) any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions[.]”

12 According to this argument, support is required to bolster the development of the sector, in order to help it grow, mature, and eventually become a viable alternative to fossil fuel-based energy.

13 For a list of recent countervailing duty investigations concerning renewable energy products, see Wu (2015), Table 2.

The key policy challenge here is the zone of uncertainty regarding clean energy subsidies, due to a lack of clarity on what is allowed and what is not under WTO law (Bacchus 2016). As noted by Howse (2014), in its decision in the Canada-Renewable Energy case (Disputes DS412 and DS426),¹⁴ the WTO Appellate Body (AB) suggested that clean energy markets, as structured through government policy, may operate differently from conventional energy markets, and that the benchmarks in the SCM Agreement should be applied accordingly. This, he argues, “suggests some deference to government policies to ensure that, despite the cost gap, a viable clean-energy market can operate.” However, the AB decision left many questions unanswered, including how to apply the key concepts of the SCM Agreement, namely, “financial contribution,” “benefit,” and “specificity” to the particular features of clean energy markets (Howse2014).¹⁵

The current legal uncertainty and potential for market instability from spiralling trade disputes on clean energy policies make a strong case for policy-makers to agree to clarify what the trade rules regarding clean energy subsidies should be. The following policy actions could be considered on a priority basis from these perspectives.

Suggested Policy Actions

- **(Short to Medium Term) WTO members could arrive at an “interpretative understanding”¹⁶ to clarify key concepts in the SCM Agreement, such as**

“financial contribution,” “benefit,” and “specificity” (Meléndez-Ortiz 2016) in the context of clean energy subsidies. The same “interpretative understanding” could also clarify whether the General Exceptions provisions of the General Agreement on Tariffs and Trade (GATT) Article XX are applicable as a defence against violation of the SCM Agreement.¹⁷

Such an understanding would help to clarify the extent of policy space available to WTO members for clean energy subsidies, and clarify an important and sensitive grey area in the existing WTO law as to whether the GATT Article XX Exceptions, which can, under certain conditions, cover measures taken for environmental purposes, apply to the SCM Agreement and hence potentially provide space for some clean energy subsidies. Although it will not be an easy option to implement in practice, there is a case for prioritising action here.

- **(Medium Term) Through a Ministerial Decision, WTO members could establish a time-limited “peace clause” agreeing that for a certain specified period members shall not challenge through the WTO dispute settlement system certain carefully selected categories of clean energy-related subsidies, provided certain conditions specified in that decision are complied with.**

Such a decision could provide a degree of clarity regarding the kinds of allowable

14 The Canada-Renewable Energy case (DS412) was initiated in September 2010 by Japan against the Government of the Province of Ontario’s Feed-in Tariff (FIT) programme, which included a local content requirement (LCR). The EU separately challenged the same FIT programme later, in August 2011 (DS 426). The panels established for these two cases investigated in parallel and coordinated their findings. Subsequently, the AB reports for the two cases were also combined.

15 For a subsidy to be challenged in the WTO, there must be a “financial contribution” by government, a “benefit” conferred, and the subsidy must be “specific.” The conclusion would therefore depend on how each of these concepts is interpreted: “financial contribution,” “benefit,” “specificity.”

16 See Article IX.2 of the Agreement Establishing the WTO (the Marrakesh Agreement).

17 Howse (2010) argues that this can be done through an interpretative understanding only (i.e. without any textual amendment) since the SCM Agreement constitutes a *lex specialis* (law governing a specific subject matter) to the GATT’s rules on subsidies.

subsidies, at least within the specified period. The conditions could include an obligation on WTO members to provide detailed notification of any such subsidy so as to improve transparency. The SCM Committee could be required to monitor subsidies notified by WTO members under this decision. Members could also commit to answer any questions and enter into informal consultations regarding their clean energy-related subsidies, whether notified or non-notified.

While this option could help reduce the number of cases coming to the WTO, it would be politically difficult to have members agree to give up, even temporarily, some of their rights under the WTO Dispute Settlement Understanding.

- **(Medium to Long Term) WTO members could consider re-introducing the category of “non-actionable subsidies” under Article 8 of the SCM Agreement, which lapsed on 1 January 2000, to create a safe harbour for certain types of clean energy and climate-related subsidies from the disciplines of the SCM Agreement.¹⁸ The scope of the “non-actionable subsidies” category could be broadened (compared to the relevant provisions in the original Article 8) to include certain other types of climate-**

or clean energy-related subsidies¹⁹ so as to make the safe harbour more effective (Wu 2015).

WTO members’ opinions are likely to vary as to whether it is indeed necessary to bring back the category of “non-actionable” subsidies on climate grounds. After all, the members failed to reach a consensus on renewing this category of subsidies in 2000. However, under the present circumstances, it seems useful to consider again the scope for re-introducing this category, in light of the 2030 Agenda’s climate-related objectives.

2.3 Facilitating Access, Dissemination, and Transfer of Climate-friendly Technologies

SDG Goal 17 on means of implementation includes three targets relating to technology.²⁰ In particular, Target 17.7 calls for promotion of the “development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.” Besides, SDG Target 7.a calls for enhanced international cooperation to facilitate access to clean energy research and technology, and for promotion of investment in energy infrastructure and clean energy technology.

18 As originally concluded, the SCM Agreement contained, in Article 8, a safe harbour allowing particular forms of subsidies. These included (1) certain types of research subsidies; (2) subsidies providing assistance to disadvantaged regions; and (3) subsidies promoting the adaptation of existing facilities to environmental requirements. These were classified as “non-actionable subsidies” that could not be challenged. This provision was time-limited, however. On 1 January 2000, it was not renewed by WTO members, and so automatically expired.

19 While two types of non-actionable subsidies originally included under this Article, namely (a) certain types of research subsidies, and (b) subsidies promoting the adaptation of existing facilities to environmental requirements, may be re-introduced for climate-related purposes, the scope of coverage of “non-actionable subsidies” may be broadened. Some potential types of non-actionable subsidies suggested by Wu (2015) are:

- Subsidies for renewable energy infrastructure development and upgrades;
- Feed-in-tariff and/or other demand/price guarantee schemes (without LCRs);
- Consumer grants/rebates for renewable energy, subject to limitations.

In light of the need for special and differential treatment of developing countries, a safe harbour could be created for certain other types of climate- or clean energy-related subsidies that are specifically pertinent for developing countries in the context of climate change actions and SDGs. These could include, for instance: subsidies for off-grid renewable energy products (Wu 2015).

20 Targets 17.6 to 17.8.

According to IEA estimates (IEA 2015), to keep the global rise in temperature to less than 2 °C, the additional cost of deploying clean energy technologies between 2016 and 2050 would be US\$40 trillion. As developing countries may account for up to 90 percent of energy demand growth to 2050 (IEA 2015), the importance of their technological capabilities to manage this transition effectively and efficiently cannot be overstated (UNFCCC 2015b). The UNFCCC also recognises the need for technology transfer from developed to developing countries in various provisions.²¹

Trade regimes assume particular significance in the context of access to, dissemination, and transfer of clean energy technologies. Removing distortions in global markets for clean energy technologies could help improve access to the technologies and their dissemination. Although the WTO Doha Round mandate includes the liberalisation of trade in environmental goods and services, negotiations appear to have stalled. More progress is visible at regional and plurilateral levels. In 2012, the 21 Asia Pacific Economic Cooperation (APEC) member economies committed to reducing their applied tariff rates to 5 percent or less on a list of environmental goods (APEC 2012a) by the end of 2015 (APEC 2012b). Subsequently, in 2014, 14 WTO members launched negotiations on a plurilateral Environmental Goods Agreement (EGA), which is being negotiated in line with WTO rules, with three more members²² joining later. The EGA will build on the APEC list of environmental goods. The latest list released in August 2016 includes goods from around 300 tariff lines, including several related to clean energy technology (ICTSD 2016).

Clean-energy related technologies are part of a broader market for environmental goods and services, a market which is growing rapidly (Bucher et al. 2014). It was estimated to be worth US\$ 866 billion in 2011 (EBI 2012), with some analysts²³ expecting it to rise to US\$ 1.9 trillion by 2020.

In addition to tariff liberalisation in clean energy technologies, intellectual property (IP) protection, regulated, in part, by trade agreements, is a key issue in increasing access, diffusion, and transfer of clean energy technologies in developing countries. Patenting activity in clean energy technologies is growing. A study by UNEP, EPO, and ICTSD (2010), for instance, found that patenting rates (patent applications and granted patents) in selected clean energy technologies (CETs) have increased at roughly 20 percent per annum since 1997, outpacing patenting in the fields of traditional fossil fuel and nuclear energy sources. Much like other technology sectors, the top six countries that accounted for almost 80 percent of all patent applications in the CETs reviewed were all developed countries, namely Japan, the United States, Germany, the Republic of Korea, the United Kingdom, and France, with each showing leadership in different sectors. Among developing countries, China, with a relatively high level of patent applications, seems to be an outlier.²⁴

The link between technology transfer and IP protection has remained a contentious issue in the UNFCCC context, and the Paris Agreement contains no textual guidance on the matter. Though several studies have identified IPRs as a barrier to transfer of climate-related

21 See for instance, Article 4.5 of the UNFCCC.

22 The current 17 EGA members are Australia, Canada, China, Costa Rica, the European Union, Hong Kong, China, Iceland, Israel, Japan, Korea, New Zealand, Norway, Singapore, Switzerland, Chinese Taipei, Turkey, and the United States.

23 See Blazejczak, Braun, and Edler (2009).

24 A report by Copenhagen Economics (2009) found that around 92 percent of the 7,400 climate change technology patents owned by residents of emerging economies in 2008 were owned by China. The same report found that only 0.1 percent of the 215,000 patents in the areas of waste and biomass, solar, fuel cell, ocean, geothermal, and wind power technologies, registered during the period 1998-2008, were registered in low-income developing countries.

technologies,²⁵ empirical evidence thus far seems to be inconclusive.²⁶ The existing literature tends to indicate that if a developing country wants only to access advanced foreign technologies, IP issues are likely to be less important, as foreign companies can simply sell the relevant technology without the risk of local competition. If, however, a developing country aims to assimilate new technologies and hence increase its own technological capabilities, then developed country firms are more likely to use IPRs to restrict or even prohibit access to a technology's underlying IPs. In both cases, however, cost can still be a major barrier to access (Lewis2007).

The role of IP in the transfer of climate-related technologies has been debated over the years in at least three WTO fora: the Trade and Environment Committee;²⁷ the TRIPS(trade-related aspects of intellectual property rights) Council;²⁸ and the Working Group on Trade and Technology Transfer,²⁹ although without concrete breakthroughs to date.

Suggested Policy Actions

- **(Short Term) The list of goods under the EGA negotiation could cover climate change adaptation-related goods and technologies.**

The EGA negotiations have so far focused on climate change mitigation-related goods. Liberalisation of climate change adaptation-related goods is a potential avenue for the EGA to contribute towards the SDGs which has remained rather less explored to date. This liberalisation could, by lowering the cost of relevant goods, potentially contribute to strengthening countries' adaptive capacity under SDG Target 13.1. That said, identification of adaptation-related goods is much more complex compared to mitigation-related goods for various reasons,³⁰ making the inclusion of adaptation goods under EGA considerably more challenging.

- **(Short Term) Given its list-based approach, the EGA could have an in-built mechanism to create scope for the addition of new items and deletion of existing items.³¹**

This would create room for updating the EGA's list of goods in tandem with technological progress and the commercialisation of more climate-friendly goods (Cosbey 2014).

- **(Short to Medium Term) Initiatives could be taken to multilateralise the EGA at the WTO once a critical mass is reached.**

25 See, for instance, TWN (2012).

26 See, for instance, Barton (2007).

27 In 2011 China and India made a joint submission to the WTO Trade and Environment Committee, which underscored that IPRs must not become a barrier for the transfer of environmentally sound technologies to developing countries (WTO Document no. TN/TE/W/79, dated 15 April 2011).

28 In February 2013 Ecuador made a submission in the TRIPS Council to initiate a discussion on IP, climate change, and technology transfer (WTO document no. IP/C/W/585, dated 27 February 2013).

29 The Working Group on trade and technology transfer established by the Doha Round decision (Paragraph 37 of document WT/MIN/(01)/DEC/1) in 2001 has not been able to deliver its recommendations as at the time of writing, a clear indication of the contentious and politically sensitive nature of the issue (see for instance, WTO document WT/WGTTT/M/50 dated 28 January 2016).

30 For details, see Olhoff (2015).

31 Without scope for such revisions/modifications, a list-based approach may end up providing perverse incentives for continued use of technologies, which might have qualified as climate-friendly when the agreement was signed, but might not pass muster in the future, in view of the advent of more climate-friendly technologies. To ensure the environmental legitimacy of the evolving list, any decision to amend it should be backed by sound science. A panel of independent advisors could provide recommendations in this regard based on an objective scientific assessment of the state of the art.

The point at which membership of the EGA reaches critical mass could be defined in various ways, including by share of trade in environmental goods. Multilateralisation, which is in fact already envisaged, could not only increase the agreement's coverage of countries, but could also improve the perceived legitimacy of the EGA. To this end, provisions could be included in the agreement for WTO members who are not party to the EGA to enjoy observer status before joining the agreement.³²

- **(Medium Term) The WTO could work with the World Customs Organisation (WCO) to revise the Harmonized System (HS) of tariff classifications to better reflect climate-friendly goods.**

This work could be informed by the findings and recommendations of the Customs Working Group of the EGA and their implementation (if any) in the context of the EGA initiative.³³

Technology development and transfer-related initiatives are being undertaken by the UNFCCC Technology Mechanism and SDG Technology Facilitation Mechanism. However, these efforts are arguably more likely to succeed if the WTO is included as well, given that trade and IP-related issues are intertwined with the issues

of technology development and transfer, and that these areas come under the purview of the WTO's TRIPS Agreement. The following policy actions are suggested in this context.

- **(Short to Medium Term) An appropriate mechanism could be established for more collaborative deliberation between the WTO and the relevant UN bodies on climate-related technologies' development and transfer.**

Among other things, this mechanism could address, on a case-by-case basis, any IP-related barriers confronting UNFCCC parties that are also WTO members in their endeavour to deliver on NDCs under the Paris Agreement.³⁴ If barriers identified under the Technology Needs Assessments (TNA)³⁵ of an UNFCCC Party that is also a WTO member point to specific IP-related barriers, the matter could be referred to the proposed mechanism, which may explore workable solutions to overcome the barrier concerned.

- **(Short to Medium Term) WTO members could adopt a Ministerial Declaration for climate-related mitigation and adaptation technologies, in line with the Doha Declaration on TRIPS and Public Health,³⁶ re-affirming the flexibilities**

32 This would not only ensure the transparency of EGA activities, but would also allow for the much-needed time and information-gathering that would help non-parties decide to join the agreement if/when they are convinced of its overall benefit. Inclusion of some carefully negotiated special and differential treatment provisions (e.g. longer time periods for the phase-out of tariffs) for developing and least-developed countries could create a more conducive environment for multilateralising the EGA initiative.

33 For more on the WTO-WCO relationship, see WTO (2016).

34 The COP21 in Paris decided to strengthen the UNFCCC Technology Mechanism (TM) to serve the Paris Agreement's aims, and instructed the TM to undertake further work on technology research, development, and demonstration, as well as the development and enhancement of endogenous capacities and technologies. In addition, the UNFCCC's subsidiary bodies are entrusted with the task of elaborating a new "technology framework" to provide "overarching guidance" on the TM's work in the new climate regime. This framework should facilitate the updating of technology needs assessments and the enhanced implementation of their results, among other things. See Jegou, Hawkins, and Botwright (2016).

35 The TNA reports prepared under the established system of the UNFCCC highlight priority technology needs in the context of mitigating greenhouse gas emissions and adaptation to the adverse impacts of climate change. The reports also identify specific barriers to technology transfer and set out possible measures to address them.

36 TRIPS allows members to undertake measures by making use of certain "flexibilities" in-built in the agreement, such as allowing the non-voluntary or compulsory licensing of a technology, or a government use authorisation for a patented technology, limited exceptions for non-commercial research, etc. (See for instance, Taubman and Watal 2010). However, the use of these flexibilities has turned out to be a politically sensitive issue. It was against this background that the Doha Declaration on TRIPS and Public Health was adopted in 2001 to re-affirm the policy space available under TRIPS which the WTO members could utilise for undertaking measures on public health and access to medicine.

already available under TRIPS that WTO members could utilise in the area of climate-related technologies.

Although TRIPS includes certain flexibilities that allow deviations from specific obligations regarding IP rules, the use of these flexibilities (e.g. the use of compulsory licensing) has turned out to be politically sensitive, with developing countries reportedly confronting diplomatic pressure³⁷ or the threat of unilateral retaliatory measures³⁸ when they have sought to use them. In that context, such a declaration could help developing countries feel more confident in making full use of these flexibilities.³⁹ Notably, the AAAA re-affirms the right of WTO members to take advantage of the TRIPS flexibilities (UN 2015b: para 86).

- **(Short to Medium Term) Given that some developing countries, particularly China, have made significant strides in the development of some climate-related technologies, South-South cooperation is worth exploring further, not only for mitigation technologies but more so for adaptation technologies.**

South-South cooperation on adaptation technologies assumes importance in view of the significant commonalities in the

challenges and vulnerabilities confronting many developing countries. Notably, several regional fora focusing on broader trade and economic cooperation have already included climate-related technology cooperation initiatives on their agenda.⁴⁰ South-South cooperation could also be facilitated through various club-like arrangements focusing on clean energy technology innovation and deployment.⁴¹

2.4 Dealing with the Political Economy of Local Content Requirements

Local content requirements (LCRs) for renewable energy are a key policy challenge in the context of increasing the share of clean energy under SDG 7. They are often included in requirements for the provision of financial support or in the context of government procurement. Lewis (2014) includes examples of LCRs in the renewables space from a number of countries, developed and developing alike.⁴² Meyer's (2015b) survey of renewable energy programmes containing LCRs within the United States identified 44 such programmes in 23 states.

LCRs are often used in an attempt to gain additional local benefits from increased renewables deployment, such as sustainable economic growth and domestic employment.

37 See Sen (2015).

38 The US initiated a WTO dispute against Brazil regarding the compulsory licensing provisions in the Brazilian patent law. The compulsory licences granted in Thailand and India were criticised by some developed countries, such as the EU and US. Developed countries have also sometimes withdrawn trade concessions and imposed trade sanctions against developing countries because of the developing countries' choice of IP regime (CIPR 2002).

39 The Brazilian Foreign Minister raised the idea of a Declaration on IP and climate change technologies at the UNFCCC Conference of the Parties in Bali in 2007. A similar proposal was included in a submission made by Ecuador in 2013 to the TRIPS Council (WTO 2013). It has also been endorsed by several commentators. See for instance, TWN (2012).

40 T The SAARC (South Asian Association for Regional Cooperation), BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation), and ASEAN (Association of Southeast Asian Nations) offer examples of some such initiatives.

41 These arrangements include the Asia Pacific Partnership on Clean Development and Climate, Major Economies Forum, Climate Technology Initiative, International Partnership for Energy Efficiency Cooperation, and International Renewable Energy Agency, and India-ASEAN Science and Technology Fund, among others (Benioff et al. 2010).

42 Lewis (2014) includes the following examples of countries that have included LCRs in support policies for specific renewables sectors: China (wind, 1997); Brazil (wind, 2002); India (solar, 2010); Canada (wind, 2003; wind/solar, 2009); Ukraine (wind/solar, 2013); USA (wind/solar/others, 2009); Spain (wind, 1994); Italy (solar, 2011); France (solar, 2012); Croatia (wind/solar/others, 2012); South Africa (wind/solar, 2011); Turkey (wind/solar/others, 2011); Argentina (wind, 2005); and Malaysia (wind/solar/others, 2010).

Such policy choices are often based on political motivations rather than on economic analyses and consideration of trade law (Kuntze and Moerenhout 2013). It has been argued that while infant-industry arguments might be applied to justify LCRs in certain cases, for those industries that are now well established, there may no longer be a need (Howse 2014). Besides, by making clean energy, or clean energy technologies, more expensive than they need to be, LCRs could end up undermining environmental objectives (Howse 2014). A counter argument is that notwithstanding their discriminatory nature, renewable energy programmes involving LCRs can increase global welfare in the aggregate, by creating political support at the local level which may not be forthcoming otherwise.⁴³

LCRs violate the National Treatment provision of GATT and are illegal under the Trade-Related Investment Measures (TRIMs) Agreement of the WTO. As has been confirmed by the Appellate Body in the Canada-Renewable Energy case, subsidies contingent on LCRs are prohibited outright under the WTO SCM Agreement (Wu 2015). The rampant use of LCRs in the renewable energy space, trade law violations notwithstanding, perhaps explains why LCRs have been the subject of six of the 11 disputes related to renewable energy that have been initiated under the WTO since 2010 (Annex 1).

Suggested Policy Actions

- **(Short to Medium Term) Through a Ministerial Decision, WTO members could establish a time-limited “peace clause” stating that for a certain specified period members shall not challenge through the WTO dispute settlement system LCRs imposed in the clean energy space, provided certain conditions⁴⁴ set out in that decision are complied with, including gradual phase-out of LCRs within the specified time period.**

It would be politically difficult to have members agree to give up, even temporarily, their rights under the Dispute Settlement Understanding. However, given the rampant use of LCRs by developing and developed countries alike and the proliferation of WTO disputes over LCRs, this option is worth exploring with the aim of reducing the number of disputes, although it may be a low priority in view of the domestic and international political economy considerations outlined above.

- **(Medium Term) WTO members could develop an interpretative understanding of the SCM Agreement to facilitate the conversion of SCM-inconsistent LCRs into other kinds of WTO-consistent measures.⁴⁵**

43 Many of the benefits from providing global public goods, such as reducing greenhouse gas emissions are not internalised by local communities directly, although they may bear the costs of investments in renewable energy technology. Local efforts to address global public goods problems may therefore need to be linked to a tangible benefit for the community, which is what LCRs attempt to do (Meyer 2015b).

44 Such conditions could include, among other things, an obligation for WTO members to provide detailed notification of any such LCR so as to facilitate transparency and peer review. The SCM Committee could be required to monitor those LCRs notified by WTO members under this decision. WTO members benefiting from this “peace clause” could be required to answer any questions from other members regarding such LCRs, notified or non-notified, and may also be required to be involved in informal consultations with other members regarding any issues and concerns pertaining to such LCRs. Certain other carefully negotiated conditions may also be included to minimise LCRs’ negative effects (in the form of trade-distortion, for instance) and maximise their positive effects and effectiveness in achieving their local policy objectives. For instance, Johnson (2016) offers suggestions to improve the effectiveness of LCRs, one of which is that LCRs should be limited in duration and incorporate planned evaluation phases.

45 For example, the understanding could establish a presumption that subsidies conditional on providing benefits to the economy, such as training or hiring local workers and technology transfer, are consistent with WTO rules, provided they are non-discriminatory and do not violate MFN provisions (Meléndez-Ortiz 2016).

This option might take longer to negotiate than a “peace clause” but could help governments to gradually find a balance between the demand for LCRs and their WTO obligations.

2.5 Pricing Carbon Nationally while Tackling International Competitiveness and Carbon Leakage Concerns

Carbon pricing is mentioned only very briefly in the 2030 Agenda (e.g. in para 69 of the AAAA), but is likely to play an important role in action pursuant to the SDGs and UNFCCC commitments. At present, some 40 governments and 23 cities, states, and regions have put a price on carbon, covering 12 percent of annual global GHG emissions. This marks a three-fold increase over the past decade.⁴⁶ However, current efforts regarding carbon pricing around the world are very much fragmented; both the coverage as well as the price range vary significantly from one jurisdiction to another (ranging from less than US\$1 per tCO₂e⁴⁷ to US\$130 per tCO₂e) (World Bank 2015). Notwithstanding, according to ICAP (2016) among the 185 INDCs submitted by the UNFCCC parties covering roughly 95 percent of global emissions, nearly half indicate that they will use or consider using international carbon markets to reach their climate targets. The Paris Agreement has

also created room to account for transfers of mitigation effort among countries, effectively creating a negotiated basis for future links between domestic emissions trading schemes (Mehling and Görlach 2016). However, a uniform carbon price is nowhere visible on the horizon, nor is it a practical approach under the present circumstances.

In a world of unequal carbon prices, a key challenge confronting climate policy-makers is how to implement stringent national carbon abatement measures while at the same time tackling “carbon leakage” and related international competitiveness concerns.⁴⁸ Two main approaches have been explored in this context: (a) “levelling down” the carbon cost, for example through free allocation of emissions allowances;⁴⁹ and (b) adjusting for the carbon cost differentials at the border,⁵⁰ through a measure known as border carbon adjustment (BCA).⁵¹

At least in theory, BCAs could be economically more efficient than free allocation and more effective in tackling leakage; but BCAs are also more complex and controversial and hence more challenging to implement (Carbon Trust 2010), particularly when they are applied to imports. EU and US proposals to impose unilateral BCAs on imports reportedly met

46 See World Bank 2016.

47 A metric measure (tonnes of CO₂ equivalent) is used to compare the emissions from various GHGs based upon their global warming potential (GWP). GWP is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide. (See EPA (n.d.)

48 It is often argued that carbon costs imposed by a jurisdiction could put some of the affected industries (say, in the energy-intensive, trade-exposed sectors) at a competitive disadvantage vis-à-vis competitors located in jurisdictions that are not imposing comparable carbon constraints, potentially leading to new investments being made in jurisdictions with less stringent carbon constraints. Thus, a part of the emissions reduction achieved by an abating jurisdiction could be offset by an increase in emissions elsewhere—a phenomenon called carbon leakage. The real size of this potential effect is not clear. As observed by WTO-UNEP (2009): “studies to date find generally that the cost of compliance with an emission trading scheme is a relatively minor component of a firm’s overall costs, which include exchange-rate fluctuations, transportation costs, energy prices and differences across countries in the cost of labour.”

49 Free allocation is most commonly used, since this approach comes closest to preserving “business as usual” (Carbon Trust 2010).

50 See for instance, Dröge et al. (2009); Reinaud (2009).

51 In the case of a carbon tax, for instance, a BCA could be applied so that the imported good’s total cost reflected what it would otherwise have to pay in carbon tax had it been produced domestically. In the case of a cap-and-trade scheme, a border measure could require the domestic importers or foreign exporters of a product to buy emission permits equivalent to those purchased by the domestic producers of the same (or similar) good.

with vehement opposition from developing countries who considered such attempts to be “green protectionism” and hinted at retaliation.⁵² Developing countries also took up the issue at the UNFCCC, arguing that adoption of such measures would contravene the principles and provisions of the UNFCCC (South Centre 2009), particularly equity, CBDR-RC, and Article 3.5.⁵³ The Paris Agreement did not provide any textual guidance regarding unilateral trade measures.⁵⁴

No countries, however, have actually implemented BCAs at the time of writing. Besides the potential political and diplomatic ramifications, part of the reason could be the uncertainty pertaining to the WTO legality of BCAs, owing to certain grey areas in the WTO jurisprudence.⁵⁵ Another issue is the possible development implications of BCAs, given their impact on exports from developing countries and concomitant impact on employment, income, and livelihoods. Notably, the UNGA resolution establishing the 2030 Agenda (UN 2015a) strongly discourages unilateral trade measures.⁵⁶

Rather than contemplating unilateral BCAs, interested countries could use the multilateral forum of the WTO to debate and discuss issues around BCAs with the aim of reaching a deliberated political understanding

and greater legal clarity. The policy actions suggested below are conceived keeping all these factors in view.

Suggested Policy Actions

- **(Short to Medium Term)** Given the politically sensitive nature of the issue of BCAs and the lack of clarity on certain aspects of WTO jurisprudence that could have a bearing on BCAs, interested WTO members could initiate informal discussions on an exploratory basis, for example in the Committee on Trade and Environment, on whether/how BCAs could be implemented in light of WTO law, development imperatives, and political realities.
- **(Medium Term)** Depending on how the informal discussions go and whether they succeed in garnering necessary buy-in from the WTO membership, particularly developing countries, attempts could be made to come up with carefully crafted guidelines⁵⁷ as to how a BCA could be designed and implemented in such a manner as to increase its chances of complying with WTO law.

A threshold question in this context is what the motive behind the BCA is. This is not only crucial from the political angle but also

52 See Colvin (2009).

53 See Article 3.5 of the UNFCCC: “The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.”

54 To offer institutional space for discussing this issue, among others, the UNFCCC parties created a forum on the impact of the implementation of response measures in 2010 (UNFCCC 2010) which continues to deliberate.

55 For further details, see Das (2015b).

56 In paragraph 30 it strongly urges countries “to refrain from promulgating and applying any unilateral economic, financial or trade measures not in accordance with international law and the Charter of the United Nations that impede the full achievement of economic and social development, particularly in developing countries.”

57 Guidelines would be helpful because the ultimate determination of the WTO compatibility or otherwise of any BCA measure would lie on the nitty-gritty of the design and implementation of the measure (Das 2015b) and because, according to some commentators, it is possible to design a BCA on imports in such a way as to make it WTO-compliant (Cosbey et al. 2012).

from the legal angle.⁵⁸ Whatever the legal position, the political sensitivity around the issue suggests that any attempt to initiate discussions on BCAs, even in an informal setting, seems to be a tall order at this point and may be accorded lower priority. In view of the complexities associated with BCAs on imports, the alternative suggestion that follows might be useful.

- **(Medium Term) WTO members confronting carbon leakage concerns of energy-intensive, trade-exposed sectors could enter into negotiations to induce member countries with less stringent or no carbon constraints to impose export taxes based on carbon content in those sectors.**

An export tax, if properly designed and implemented,⁵⁹ may go a long way in addressing the carbon leakage concerns of the importing country in the affected sectors.

2.6 Designing “Carrots” and “Sticks” to Provide Incentives for more Ambitious Action under Climate Clubs

Climate clubs are groups of countries that are willing to undertake more ambitious climate

mitigation action than is envisaged under the multilateral forum of the UNFCCC (Victor 2015). This could be part of the climate change action integrated into national policies, further to SDG Target 13.2. Countries building climate clubs would hope to achieve membership with a critical mass in terms of carbon emissions; in this context, it may be noted that only about 12 to 15 countries account for around 75 percent of global world emissions (Victor 2015). Several governments have attempted to create clubs of key countries that could cooperate on climate change issues. While some of these club efforts are *de novo*, others build on existing institutions. Keohane and Victor (2011) identified four such nascent club-making efforts in the area of climate change: the Asia Pacific Partnership, Major Economies Forum, G8, and G20. More recently, Brewer et al. (2016) have found examples of at least eight types⁶⁰ (categorised by objectives) of climate or climate-related clubs among existing arrangements and negotiations in progress. It is worth underscoring here that Article 6 of the Paris Agreement, on Cooperative Approaches, has arguably created room for such club approaches (Marcu 2016), though further details of this provision are yet to be worked out.

58 BCAs implemented with the motive of addressing only competitiveness concerns or only as political leverage would be far more difficult to justify under WTO law, while a BCA implemented purely on the environmental ground of preventing carbon leakage stands a better chance of being found consistent with WTO law, provided it does not reveal any protectionist intent and is designed and implemented with WTO law in mind. The General Exceptions provisions of GATT Article XX (clauses (b) and (g)) could provide room for defending a BCA if it is implemented on environmental grounds, provided that, among other things, the measure is “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” (Article XX chapeau). Article 3.5 of the UNFCCC also contains similar language aimed at deterring the use of unilateral trade measures for protectionist purposes.

59 There are several reasons why an exporting country might agree to impose a carbon-based export tax: (a) where it otherwise faces the risk of unilateral BCA being imposed on its exports by the importing country; (b) where an export tax would allow the exporting country to retain the revenue, whereas BCA by the importing country would generate revenue for the importing country; and (c) where there is diplomatic and political pressure by the importing country. A parallel could be drawn in this context with Voluntary Export Restraints (Ito 1993).

60 These are: (i) knowledge sharing and coordination—IEA Multilateral Technology Agreements and Implementing Agreements; (ii) technology transfer—Global Green Growth Institute; (iii) technology deployment, standards, and incentives—Low Carbon Technology Partnerships initiative; (iv) research, development, and demonstration—Carbon Sequestration Leadership Forum; (v) increasing trade in climate-relevant goods or services—Environmental Goods Agreement and Asia Pacific Economic Cooperation forum; (vi) joint or aggregate carbon emissions reduction, absolute or relative—Global Methane Initiative and Climate and Clean Air Coalition to Reduce Short-lived Climate Pollutants (CCAC); (vii) reductions in other pollutants, or in energy use, with ancillary carbon consequences—Clean Energy Ministerial and (viii) investment facilitation—Renewable Energy and Energy Efficiency Partnership.

Greater scale of action could be achieved under a climate club through the creation of an incentive framework that induces reluctant countries to join the club and discourages free-riding by non-members. This is generally proposed to be achieved through a combination of “carrots,” i.e. “club goods” or benefits available exclusively to club members; and “sticks” (Nordhaus 2015; Victor 2015, etc.), i.e. penalties on non-members for not joining the club. The form of penalty most widely proposed in the context of climate clubs is BCAs (Das 2015c). However, to the extent that a BCA is implemented as “leverage” to discourage free-riding, it could be more difficult to justify under WTO law.⁶¹

One way of addressing the WTO legality issues could be to create space in WTO law for club members to apply exclusive trade benefits among themselves or apply trade sanctions to non-members (Bacchus 2016). However, reaching such a decision is likely to be extremely difficult, not least because both benefits and sanctions involve discrimination between WTO members, whereas non-discrimination between trading partners (“most-favoured-nation” or MFN treatment) is a fundamental premise on which the multilateral trade regime is built (Das 2015b).

The following policy actions are suggested in this context.

Suggested Policy Actions

- **(Short Term) Climate club-like arrangements could be established under RTAs, either under upcoming RTAs or by broadening existing RTAs.**

Preferential trading conditions could be extended to other club members in this context because of exceptions in the WTO regime for RTAs, such as GATT Article XXIV and the Enabling Clause, which establish specific criteria that justify the deviation from WTO obligations, including MFN treatment (Leycegui and Ramírez 2015).

- **(Short to Medium Term) Instead of applying sticks in the form of trade penalties as a first option, clubs could prioritise the use of carrots in the form of clearly defined “club goods” to encourage members to join the group (Esty 1994), keeping sticks only as threats or last resorts.⁶²**
- **(Medium Term) In case sticks are needed to address free-riding by non-group members, climate club members could establish a spectrum of measures, including non-trade interventions, such as good faith negotiations, diplomatic warnings, etc., that would enable them to select a measure commensurate with the severity of the environmental harm faced or the impact of the free-riding (Esty 1994), resorting to stringent trade measures only when other options are not effective.**

61 See footnote 59.

62 To the extent climate actions by certain developing countries are constrained by availability of funds and appropriate technology at affordable prices, and given that multilateral efforts towards ensuring financial support and technology transfer for such countries have been far from adequate to date, it may be worth exploring further whether club approaches could add more value by creating carrots in the form of finance, technology transfer, and other capacity building support for developing countries, over and above what may be achievable multilaterally under the UNFCCC. Such carrots would also be in keeping with the objectives of achieving SDGs.

3. CONCLUSION

The objective of this think piece is to help policy-makers understand the key contributions that trade policy and trade rules could make to the 2030 Agenda objectives around addressing climate change and improving access to clean energy for all. While the think piece covers six areas, policy actions in the short term could be prioritised in the areas of (a) reforming fossil fuel subsidies; (b) creating room for subsidies supporting scale-up of clean energy technologies; and (c) facilitating access, dissemination, and transfer of climate-friendly technologies.

Given the widespread use of LCRs by developing and developed countries alike in the clean energy space and the proliferation of WTO disputes on the subject in recent years, addressing LCRs pertaining to clean energy

is certainly worth exploring. However, LCRs are accorded relatively less priority for policy action, in view of the political economy considerations surrounding them, which are likely to make action in this area challenging. Similarly, policy actions regarding BCAs, could be given relatively less priority in the short term given the complexities arising in terms of the measures' political sensitivity, their development implications, as well as their WTO legality. As for climate clubs, sweeping policy actions to create space in WTO law to enable such clubs to apply discriminatory "carrots" and/or "sticks" does not seem to be workable at this juncture. The policy actions pertaining to climate clubs that are suggested here are therefore rather modest and do not demand high priority.

REFERENCES

- APEC. 2012a. “ANNEX C—APEC List of Environmental Goods.” http://apec.org/Home/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx
- APEC. 2012b. “2012 Leaders’ Declaration.” http://www.apec.org/meeting-papers/leaders-declarations/2012/2012_aelm.aspx
- Bacchus, J. 2016. “Global Rules for Mutually Supportive and Reinforcing Trade and Climate Regimes.” *E15 Expert Group on Measures to Address Climate Change and the Trade System - Policy Options Paper*. E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.
- Bandyopadhyay, K.R., and K. Das. 2016. “Where are we on the Missing MDG - Energy?” Chapter 7 (77-96) in *India and Sustainable Development Goals: The Way Forward*, United Nations and Research and Information System for Developing Countries (RIS).
- Barton, J.H. 2007. “Intellectual Property and Access to Clean Energy Technologies in Developing Countries: An Analysis of Solar Photovoltaic, Biofuels and Wind Technologies.” *ICTSD Trade and Sustainable Energy Series Issue Paper No. 2*. Geneva: International Centre for Trade and Sustainable Development (ICSTD).
- Benioff, R., H. de Coninck, S. Dhar, U. Hansen, J. McLaren, and J. Painuly. 2010. *Strengthening Clean Energy Technology Cooperation under the UNFCCC: Steps toward Implementation*. Oak Ridge, TN: NREL, ECN and URC.
- Blazejczak, J., F. Braun, and D. Edler. 2009. “Global Demand for Environmental Goods and Services on the Rise: Good Growth Opportunities for German Suppliers.” *German Institute for Economic Research: Weekly Report* 3 September 2009,5(20).http://www.diw.de/documents/publikationen/73/diw_01.c.334079.de/diw_wr_2009-20.pdf
- Brewer, T.L., H. Derwent, and A. Błachowicz with contributions by M. Grubb and assistance from G. Canzi and E. Arcese. 2016. “Carbon Market Clubs and the New Paris Regime.” *Paper for the World Bank Group’s Networked Carbon Markets Initiative*. London: Climate Strategies.
- Bucher, H., J. Drake-Brockman, A. Kasterine, and M. Sugathan. 2014. “Trade in Environmental Goods and Services: Opportunities and Challenges.” *International Trade Centre Technical Paper*. Geneva: International Trade Centre.
- Carbon Trust. 2010. *Tackling Carbon Leakage: Sector-specific Solutions for a World of Unequal Carbon Prices*. London: Carbon Trust.
- CIPR. 2002. *Integrating Intellectual Property Rights and Development Policy*. London: Commission on Intellectual Property Rights.
- Coady, D., I. Parry, L. Sears, and B. Shang. 2015. “How Large are Global Energy Subsidies?” *IMF Working Paper* No. WP/15/105. Washington, DC: International Monetary Fund.
- Colvin, J. 2009. “Obama vs. Krugman: Five Reasons the President’s Right on Carbon Tariffs.” *Huffington Post Blog*, 16 November. http://www.huffingtonpost.com/jake-colvin/obama-vs-krugman-five-rea_b_287634.html
- Copenhagen Economics. 2009. *Are IPR a Barrier to the Transfer of Climate Change Technology?* Copenhagen: Copenhagen Economics A/S and the IPR Company Aps.

- Cosbey, A. 2014. "The Green Goods Agreement: Neither Green nor Good?" *IISD Commentary*. Winnipeg: International Institute for Sustainable Development.
- Cosbey, A., S. Dröge, C. Fischer, J. Reinaud, J. Stephenson, L. Weischer, and P. Wooders. 2012. *A Guide for the Concerned: Guidance on the Elaboration and Implementation of Border Carbon Adjustment*. Stockholm: Entwined Project.
- Das, K. 2015a. "Traversing WTO Law in a World of Unequal Carbon Prices." *Opinion Piece for E15 Initiative*. <http://www.ictsd.org/opinion/traversing-wto-law-in-a-world-of-unequal-carbon-prices>
- Das, K. 2015b. "Climate Clubs: Carrots, Sticks and More." *Economic and Political Weekly, Sameeksha Trust* L No 34, 24-27.
- Das, K. 2015c. "Trade Law and the International Politics of Pricing and Clubs." In the Proceedings of the 'Global Climate Policy Conference—New Research for Effective Action at Paris and Beyond' held in New Delhi from 30 April to 1 May 2015. London: Climate Strategies and Stanley Foundation.
- Das, K. 2016. "Policy Space for Clean Energy and the Global Trade Governance under WTO: India Solar Dispute and Beyond." In *the Conference Proceedings, XUB Sustainability Summit 2016: Energy, Peace and Global Governance*. Bhubaneswar, India: Xavier School of Sustainability, Xavier University.
- Dröge, S., H. van Asselt, K. Schumacher, T. Brewer, L. Mohr, R. Ismer, W. Suwala, M. Mehling, Y. Takamura, S. Monjon, T. Voituriez, P. Quirion, X. Wang, K. Neuhoff, and M. Grubb. 2009. "Tackling Leakage in a World of Unequal Carbon Prices." London: Climate Strategies.
- EPA. n.d. "Glossary of Climate Change Terms." <https://www3.epa.gov/climatechange/glossary.html#GWP>
- Esty, D.C. 1994. *Greening the GATT: Trade, Environment, and the Future*. Washington, DC: Institute for International Economics.
- G20 2009. "G20 Leaders Statement: The Pittsburgh Summit." September 24-25, 2009, Pittsburgh.
- Harrison Institute of Public Law. 2014. "Using the Transatlantic Trade and Investment Partnership to Limit Fossil Fuel Subsidies." *Discussion Paper, The Greens/EFA, European Parliament*, 9 January 2014.
- Horlick, G., and P.A. Clarke. 2016. "Rethinking Subsidy Disciplines for the Future." *E15 Task Force on Rethinking International Disciplines—Policy Options Paper*. E15 Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.
- Howse, R. 2010. *Climate Mitigation Subsidies and the WTO Legal Framework: A Policy Analysis*. Winnipeg: International Institute for Sustainable Development.
- Howse, R. 2013. "Energy Subsidies: The Ball is now in the WTO's Court." *The Globe and Mail*, 2 April. <http://www.theglobeandmail.com/report-on-business/economy/economy-lab/energy-subsidies-the-ball-is-now-in-the-wtos-court/article10633014/>
- Howse, R. 2014. "Securing Policy Space for Clean Energy under the SCM Agreement: Alternative Approaches." E15 Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum. www.e15initiative.org/

- ICAP. 2016. *Emissions Trading Worldwide: Status Report 2016*. Berlin: ICAP.
- ICSU, ISSC. 2015. *Review of the Sustainable Development Goals: The Science Perspective*. Paris: International Council for Science (ICSU).
- ICTSD. 2016. "Environmental Goods Agreement Negotiators Agree Roadmap for Conclusion." *BIORES Analysis and News on Trade and Environment*. <http://www.ictsd.org/bridges-news/biores/news/environmental-goods-agreement-negotiators-agree-roadmap-for-conclusion#>
- IEA. n.d. "World Energy Outlook, Water for Energy." <http://www.worldenergyoutlook.org/resources/water-energy-nexus>
- IEA. 2014. *World Energy Outlook 2014, Executive Summary*. Paris: International Energy Agency.
- IEA. 2015. *Energy Technology Perspectives 2015*. Paris: International Energy Agency.
- IPCC. 2014. "Climate Change 2014: Mitigation of Climate Change." *Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel, and J.C. Minx. Cambridge, UK and New York, NY: Cambridge University Press.
- IRENA. 2016. "Renewable Energy and Jobs: Annual Review 2016." http://www.se4all.org/sites/default/files/IRENA_RE_Jobs_Annual_Review_2016.pdf
- Ito, T. 1993. "U.S. Political Pressure and Economic Liberalization in East Asia." In *Regionalism and Rivalry: Japan and the United States in Pacific Asia*, edited by J. Frankel and M. Kahler. Chicago: NBER/University of Chicago Press.
- Jegou, I., S. Hawkins, and K. Botwright. 2016. "What Role for Trade and Investment in the New Climate Regime?" ICTSD *BIORES Analysis and News on Trade and Environment*. <http://www.ictsd.org/bridges-news/biores/news/what-role-for-trade-and-investment-in-the-new-climate-regime>
- Johnson, O. 2016. "Promoting Green Industrial Development through Local Content Requirements: India's National Solar Mission." *Climate Policy* 162: 178-95.
- Jones, N. 2016. "Trade in 2030 Agenda Era: Fossil Fuel Subsidies and the WTO." July. <http://www.ictsd.org/bridges-news/bridges-africa/news/trade-in-a-2030-agenda-era-fossil-fuel-subsidies-and-the-wto>
- Karekezi, S., S. McDade, B. Boardman, and J. Kimani. 2012. "Energy, Poverty and Development." In *Global Energy Assessment—Toward a Sustainable Future*. Cambridge, UK, New York, NY, and Laxenburg, Austria: Cambridge University Press and the International Institute for Applied Systems Analysis.
- Keohane, R.O., and D.G. Victor. 2011. "The Regime Complex for Climate Change." *Perspectives on Politics* 9(1): 7-23.
- Kuntze, J.-C., and T. Moerenhout. 2013. *Local Content Requirements and the Renewable Energy Industry—A Good Match?* Geneva: International Centre for Trade and Sustainable Development (ICTSD). www.ictsd.org
- Lamy, P. 2013. "Remarks to the Workshop on the Role of Intergovernmental Agreements in Energy Policy." 29 April. http://www.wto.org/english/tratop_e/envir_e/wksp_envir_apr13_e/wksp_envir_apr13_e.htm

- Leycegui, B., and I. Ramírez. 2015. "Addressing Climate Change: A WTO Exception to Incorporate Climate Clubs." E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.
- Lewis, J.I. 2007. "Technology Acquisition and Innovation in the Developing World: Wind Turbine Development in China and India." *Studies in Comparative International Development* 42: 208-232.
- Lewis, J.I. 2014. "The Rise of Renewable Energy Protectionism: Emerging Trade Conflicts and Implications for Low Carbon Development." *Global Environmental Politics* 14(4) November.
- Marcu, A. 2016. "Carbon Market Provisions in the Paris Agreement (Article 6)." *CEPS Special Report* No. 128/January 2016. Brussels: Centre for European Policy Studies.
- Mehling, M., and B. Görlach. 2016. "Multilateral Linking of Emissions Trading Systems." *CEEPR Working Paper* 2016-009. Cambridge, MA: MIT Center for Energy and Environmental Policy Research.
- Meléndez-Ortiz, R. 2016. "Enabling the Energy Transition and Scale-Up of Clean Energy Technologies: Options for the Global Trade System." *E15 Expert Group on Clean Energy Technologies and the Trade System - Policy Options Paper*. E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.
- Meyer, T. 2015b. "How Local Discrimination Promotes Global Public Goods." *96 Boston University Law Review* 1939, 1954-55.
- Nordhaus, W. 2015. "The Climate Club: Designing a Mechanism to Overcome Free Riding in International Climate Policy." *American Economic Review* 105(4): 1-32.
- Olhoff, A. 2015. "Technologies for Adaptation and their Transfer, Diffusion and Uptake." (Draft) *Discussion Paper by UNEP DTU Partnership*. http://www.unep.org/energy/Portals/50177/Session%2020Technologies%20for%20adaptation%20and%20the%20convention_Draft%2013%20April%202015.pdf
- Pauwelyn, J. 2016. "Interplay between the WTO Treaty and Other International Legal Instruments and Tribunals: Evolution after 20 Years of WTO Jurisprudence." http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2731144
- Reinaud, J. 2009. "Trade, Competitiveness and Carbon Leakage: Challenges and Opportunities." *Energy, Environment and Development Programme Paper*: 09/01. London: Chatham House, UK.
- Sen, A. 2015. "India will not Respond under Pressure on IPR Issues." *The Hindu BusinessLine*. <http://www.thehindubusinessline.com/economy/india-will-not-respond-under-pressure-on-ipr-issues/article7167412.ece>
- Soni, A, A. Chatterjee, K.R. Bandyopadhyay, K. Lang, and D.V. Dunbar. 2012. "Citizen's Guide to Energy Subsidies in India." *TERI and IISD*. https://www.iisd.org/gsi/sites/default/files/ffs_india_czguide.pdf.
- South Centre. 2009. *South Bulletin*. Issue 41. Geneva: South Centre.
- Taubman, A., and J. Watal. 2010. "The WTO TRIPS Agreement - A Practical Overview for Climate Change Policymakers." *Informal Note of the Intellectual Property Division of the WTO Secretariat*.

- Tipping, A., and R. Wolfe. 2016. *Trade in Transforming Our World: Options for Follow-up and Review of the Trade-related Elements of the 2030 Agenda for Sustainable Development*. Geneva: International Institute for Sustainable Development (IISD) and International Centre for Trade and Sustainable Development (ICTSD). www.ictsd.org
- Tumiwa, F, T. Laan, K. Lang, and D.V. Dunbar. 2011. "Citizen's Guide to Energy Subsidies in Indonesia." http://www.iisd.org/pdf/2011/indonesia_czguide_eng.pdf
- TWN. 2012. "Climate Change & Technology Transfer: Addressing Intellectual Property Issues." *Submission by the Third World Network to the TEC, UNFCCC*. http://unfccc.int/ttclear/misc/_StaticFiles/gnwoerk_static/TEM_tec_cfi_ee/7843d4ba5e5e459c99deb4e47b972e83/f7d4f254005e4fb786bd4cf1679e5d1a.pdf
- UN. 2015a. "Transforming our World: The 2030 Agenda for Sustainable Development." A/RES/70/1, United Nations (The SDG Agenda).
- UN. 2015b. "Outcome Document of the Third International Conference on Financing for Development: Addis Ababa Action Agenda." A/CONF.227/L.1, 15 July.
- UNDESA. 2014. "Electricity and Education: The Benefits, Barriers, and Recommendations for Achieving the Electrification of Primary and Secondary Schools." <https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=1608&menu=35>
- UNEP. 2008. "Reforming Energy Subsidies: Opportunities to Contribute to the Climate Change Agenda." http://www.unep.org/pdf/pressreleases/reforming_energy_subsidies.pdf
- UNEP, EPO, and ICTSD. 2010. *Patents and Clean Energy: Bridging the Gap between Evidence and Policy*. Geneva: International Centre for Trade and Sustainable Development (ICTSD).
- UNFCCC. 2009. "Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol." *Note by the Secretariat*, FCCC/KP/AWG/2009/INF.3, 16 March.
- UNFCCC. 2010. Decision 1/CP.16.
- UNFCCC. 2015a. "Adoption of the Paris Agreement, Proposal by the President." Draft decision -/CP.21, FCCC/CP/2015/L.9, 12 December.
- UNFCCC. 2015b, "Strengthening National Systems of Innovation to Enhance Action on Climate Change." *TEC Brief #7*, Technology Executive Committee.
- UNFCCC. 2016a. "Aggregate Effect of the Intended Nationally Determined Contributions: An Update." *Synthesis Report by the Secretariat*, FCCC/CP/2016/2, May 2.
- UNFCCC. 2016b. "Guidance to Assist Developing Country Parties to Assess the Impact of the Implementation of Response Measures, including Guidance on Modelling Tools." *Technical Paper by the Secretariat*, FCCC/TP/2016/4.
- van Asselt, H. 2014. "Governing the Transition away from Fossil Fuels: The Role of International Institutions." *SEI Working Paper No. 204-07*. Stockholm: Stockholm Environmental Institute.
- Victor, D.G. 2015. "The Case for Climate Clubs, Think Piece." *ICTSD-WEF E15 Expert Group on Measures to Address Climate Change and the Trade System* (Co-convened with Climate Strategies).
- WHO. 2016. "Household Air Pollution and Health." *Fact Sheet No.292*. <http://www.who.int/mediacentre/factsheets/fs292/en>

- Wold, C., G. Wilson, and S. Foroshani. 2012. "Leveraging Climate Change Benefits through the World Trade Organization: Are Fossil Fuel Subsidies Actionable?" *Georgetown Journal of International Law* 685-693.
- World Bank. 2015. "State and Trends of Carbon Pricing 2015." Washington, DC: World Bank.
- World Bank. 2016. "Leaders Aim to Put a Price on Half of All Global Carbon Emissions." <http://www.worldbank.org/en/news/feature/2016/04/21/leaders-aim-to-put-a-price-on-half-of-all-global-carbon-emissions>
- World Energy Outlook. 2013. International Energy Agency, <http://www.iea.org/textbase/npsum/weo2014sum.pdf>
- WTO. 2010. "DDG Singh: 'Fossil Fuel Subsidy Reform Is an Important Tool in Fight against Climate Change'." Address by Deputy Director-General Harsha V. Singh, in opening a joint conference by the Global Subsidies Initiative, the International Institute for Sustainable Development and the United Nations Environment Programme. World Trade Organization, Geneva. http://www.wto.org/english/news_e/news10_e/ddg_14oct10_e.htm.
- WTO. 2012. "United States—Measures Affecting the Production and Sale Of Clove Cigarettes (US-Clove Cigarettes)." *Appellate Body Report*, 4 April 2012.
- WTO. 2013. "Contribution of Intellectual Property to Facilitating the Transfer of Environmentally Rational Technology: Communication from Ecuador to the TRIPS Council." *WTO Document* No. IP/C/W/585 dated 27 February.
- WTO. 2016. "Trade Negotiations Committee." https://www.wto.org/english/thewto_e/coher_e/wto_wco_e.htm
- WTO-UNEP. 2009. *Trade and Climate Change, A report by the United Nations Environment Programme and the World Trade Organization*. Geneva: WTO.
- Wu, M. 2015. "Re-examining 'Green Light' Subsidies in the Wake of New Green Industrial Policies." E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.

ANNEX 1: CLIMATE-RELATED WTO DISPUTES

Dispute number/ title	Respondent	Complainant	Challenged measure(s)	Agreements cited (in the request for consultations)	Date initiated/Present Status
DS412/Canada - Certain Measures Affecting the Renewable Energy Generation Sector	Canada	Japan	Ontario's feed-in tariff programme, including local content requirement, for electricity generation using solar photovoltaic (PV) and wind power technology	GATT 1994; SCM Agreement; TRIMs	13 September 2010/ On 5 June 2014, the respondent (Canada) notified that it had implemented the Dispute Settlement Body (DSB) recommendation to bring the disputed measure into conformity with WTO law. No compliance proceeding initiated.
DS419/China - Measures Concerning Wind Power Equipment	China	US	China's grants, funds, or awards to enterprises manufacturing wind power equipment, contingent on local content requirements	GATT 1994; SCM Agreement; China-Protocol of Accession	22 December 2010/ On 22 December 2010, the complainant (US) requested consultations with the respondent (China). No dispute settlement panel established and no withdrawal or mutually agreed solution notified.
DS426/Canada - Measures Relating to the Feed-in Tariff Programme*	Canada	EU	Ontario's feed-in tariff programme, including local content requirement for electricity generation using solar PV and wind power technology	GATT 1994; SCM Agreement; TRIMs	11 August 2011 / On 5 June 2014, the respondent (Canada) notified that it had implemented the DSB recommendation to bring the disputed measure into conformity with WTO law. No compliance proceeding initiated.

Dispute number/ title	Respondent	Complainant	Challenged measure(s)	Agreements cited (in the request for consultations)	Date initiated/Present Status
DS437/United States - Countervailing Duty Measures on Certain Products from China	US	China	Seventeen countervailing duty investigations conducted by the US against various Chinese products, which included solar panels and wind towers	SCM Agreement; GATT 1994; China-Protocol of Accession	25 May 2012/ AB and dispute settlement panel found the disputed measure(s) to be inconsistent with WTO law. Report(s) adopted by the DSB on 16 January 2015, with recommendations to bring the US measure(s) into conformity with WTO law. The US is undertaking implementation of these recommendations. In January 2016, the US and China reached a procedural understanding regarding possible further proceedings to facilitate the resolution of the dispute.
DS443/European Union and a member State - Certain Measures Concerning the Importation of Biodiesels	EU, Spain	Argentina	Spanish Ministerial Order regulating allocation of quantities of biodiesel needed to achieve the mandatory target of renewable energy. (The measure is the national implementation of the EU regulatory framework for energy from renewable sources)	GATT 1994; TRIMs; Agreement Establishing the WTO	17 August 2012/ On 17 August 2012, the complainant (Argentina) requested consultations with the Respondent (EU; Spain). No dispute settlement panel established and no withdrawal or mutually agreed solution notified.

Dispute number/ title	Respondent	Complainant	Challenged measure(s)	Agreements cited (in the request for consultations)	Date initiated/Present Status
DS452/European Union and Certain member States - Certain Measures Affecting the Renewable Energy Generation Sector	EU; Italy; Greece	China	Feed-in tariff programmes with local content requirements in EU member states, including but not limited to Italy and Greece	GATT 1994; SCM Agreement; TRIMs	5 November 2012 / On 5 November 2012, the complainant (China) requested consultations with the respondent (EU; Italy; Greece). No dispute settlement panel established and no withdrawal or mutually agreed solution notified.
DS456/India - Certain Measures Relating to Solar Cells and Solar Modules	India	US	Local content requirement pertaining to solar cells and/or modules imposed by India in the initial phases of India's ongoing Jawaharlal Nehru National Solar Mission involving solar power developers selling electricity to the government	GATT 1994; TRIMs; SCM Agreement	6 February 2013 / The case proceeded to AB stage following appeal of the dispute settlement panel report by India on 20 April 2016. On 16 September 2016 the AB ruled against India.
DS459/European Union and Certain Member States - Certain Measures on the Importation and Marketing of Biodiesel and Measures Supporting the Biodiesel Industry	EU	Argentina	Measures to promote the use of energy from renewable sources, and measures to establish support schemes for the biodiesel sector	GATT 1994; TBT; Agreement Establishing the WTO; TRIMs; SCM Agreement	15 May 2013 / On 15 May 2013, the complainant (Argentina) requested consultations with the respondent (EU). No dispute settlement panel established and no withdrawal or mutually agreed solution notified.

Dispute number/ title	Respondent	Complainant	Challenged measure(s)	Agreements cited (in the request for consultations)	Date initiated/Present Status
DS473/European Union - Anti-Dumping Measures on Biodiesel from Argentina	EU	Argentina	Anti-dumping measures imposed by the EU in 2013 on biodiesel originating in, inter alia, Argentina; and certain provisions in the EU regulation regarding determination of dumping margins	Anti-dumping Agreement; GATT 1994; Agreement Establishing the WTO	19 December 2013 / On 29 March 2016, the disputesettlement panel's report was circulated to members. Report not yet adopted or appealed.
DS480/European Union - Anti-Dumping Measures on Biodiesel from Indonesia	EU	Indonesia	Certain provisions in EC regulation on anti-dumping from non-EU countries; and anti-dumping measures imposed in 2013 by the EU on imports of biodiesel originating in, inter alia, Indonesia	Anti-dumping Agreement; Agreement Establishing the WTO; GATT 1994	10 June 2014 / At its meeting on 31 August 2015, the DSB established a dispute settlement panel. Following the agreement of the parties, the panel was composed on 4 November 2015.
DS510/United States - Certain Measures Relating to the Renewable Energy Sector	US	India	Localcontent requirements and subsidies provided by eight US states (Washington, California, Montana, Massachusetts, Connecticut, Michigan, Delaware, and Minnesota) in the renewable energy sector	GATT; TRIMS; SCM Agreement; Agreement Establishing the WTO	9 September 2016 / Request for consultations by India.

Source: Das (2016).

* Note: Panel and Appellate Body reports in Canada–Renewable Energy (DS412) and Canada–Feed-In Tariff Program (DS426) were released together (effectively merging the two cases).

ICTSD has developed a series of papers that explore the contribution that trade and trade policy could make to key objectives of the 2030 Agenda for Sustainable Development.

- Trade in *Transforming Our World: Options for Follow-up and Review of the Trade-related Elements of the 2030 Agenda for Sustainable Development*. By Alice Tipping & Robert Wolfe, 2016.
- *The 2030 Agenda and the Potential Contribution of Trade to Gender Equality*. By Jeni Klugman, 2016.
- *Trade, Food Security, and the 2030 Agenda*. By Eugenio Díaz-Bonilla & Jonathan Hepburn, 2016.
- *Trade, Natural Resources, and the 2030 Agenda*. By Richard King, 2016.
- *Trade, Public Health, and the 2030 Agenda*. By Xavier Seuba, 2016.
- *Priority Trade Policy Actions to Achieve the 2030 Agenda and Transform African Livelihoods*. By Lily Sommer & David Luke, 2016.

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