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Enabling the Energy Transition and Scale-up of Clean Energy Technologies:

Options for the Global Trade System

Policy Options Paper

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on behalf of the E15 Expert Group on Clean Energy Technologies and the Trade System

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Note

The policy options paper is the result of a collective process involving all members of the E15 Expert Group on Clean Energy Technologies and the Trade System. It draws on the active engagement of these eminent experts in discussions over multiple meetings as well as think pieces commissioned by the E15Initiative and authored by group members. Ricardo Meléndez-Ortiz was the author of the report. Ingrid Jegou was the lead writer and Mahesh Sugathan contributed significantly to the final paper. While a serious attempt has been made on the part of the author to take the perspectives of all group members into account, it has not been possible to do justice to the variety of views. The policy recommendations should therefore not be considered to represent full consensus and remain the responsibility of the author. The list of group members and E15 papers are referenced.

The full volume of policy options papers covering all topics examined by the E15Initiative, jointly published by ICTSD and the World Economic Forum, is complemented with a monograph that consolidates the options into overarching recommendations for the international trade and investment system for the next decade.

The E15Initiative is managed by Marie Chamay, E15 Senior Manager at ICTSD, in collaboration with Sean Doherty, Head, International Trade & Investment at the World Economic Forum. The E15 Editor is Fabrice Lehmann.

E15Initiative

Jointly implemented by the International Centre for Trade and Sustainable Development (ICTSD) and the World Economic Forum, the E15Initiative was established to convene world-class experts and institutions to generate a credible and comprehensive set of policy options for the evolution of the global trade and investment system to 2025. In collaboration with 16 knowledge partners, the E15Initiative brought together more than 375 leading international experts in over 80 interactive dialogues grouped into 18 themes between 2012-2015. Over 130 overview papers and think pieces were commissioned and published in the process. In a fast-changing international environment in which the ability of the global trade and investment system to respond to new dynamics and emerging challenges is being tested, the E15Initiative was designed to stimulate a fresh and strategic look at the opportunities to improve the system's effectiveness and advance sustainable development. The second phase of the E15Initiative in 2016-17 will see direct engagement with policy-makers and other stakeholders to consider the implementation of E15 policy recommendations.

E15Initiative Themes

- Agriculture and Food Security
- Clean Energy Technologies
- Climate Change
- Competition Policy
- Digital Economy
- Extractive Industries*
- Finance and Development
- Fisheries and Oceans
- Functioning of the WTO
- Global Trade and Investment Architecture*
- Global Value Chains
- Industrial Policy
- Innovation
- Investment Policy
- Regional Trade Agreements
- Regulatory Coherence
- Services
- Subsidies

* Policy options to be released in late 2016

For more information on the E15Initiative:
www.e15initiative.org

Abstract

With the challenges of access to energy, energy security, and the imperative of climate change becoming more pronounced in recent years, interest in clean energy has surged. Mitigation efforts to limit global warming to no more than 2 degrees Celsius or 1.5 degrees Celsius as compared to pre-industrial levels will primarily hinge on a rapid and massive scale-up of clean energy. The December 2015 Paris Agreement on climate change is fundamentally about fostering an urgent and massive transformation to a low carbon or carbon-neutral energy base for the world economy. The urgent need to shift to a cleaner energy mix has thus made reform of the supply and use of energy a key policy priority for the global community. The world has witnessed a spectacular growth of clean energy technologies (CETs) in the past two decades, most of it in response to purposeful international, national, and subnational policies. The result is today's global and dynamic clean energy industry, encompassing manufacturing, services, and knowledge, mostly organized in international value chains, and highly dependent on trade and investment. All of this activity, however, has highlighted the shortcomings and obstacles of uncoordinated policies and inconsistent rules. The present paper seeks to examine the ways in which current trade policies and frameworks enable or hold back the pressing need for further development of clean energy. Based on this analysis, it identifies a set of policy options for the global trade system to support the scale-up of CETs. A first set of options is related to addressing systemic issues with a view to enhancing trade governance for renewable energy and climate policies in the context of the WTO framework. These proposals include: (i) an amendment of GATT rules; (ii) temporary waivers; (iii) an interpretive understanding to clarify existing obligations; (iv) a plurilateral agreement; and (v) a moratorium on dispute settlement in the area of clean energy. A second set of options addresses reform of existing rules and the formulation of new rules aimed at strengthening markets for CETs as well as responding to the need for any additional policy space that may be required to pursue mitigation and other sustainable development goals through the scale-up of clean energies. The options on strengthening markets consider: (i) scenarios for tariff liberalization in CETs; (ii) removing barriers to clean energy services; and (iii) addressing regulatory issues such as non-tariff barriers and clean energy access to networks. The options on policy space focus on three areas that could benefit from greater clarity, predictability, and flexibility: (iv) subsidies; (v) local content requirements; and (vi) trade remedies. Many of the options explored in the paper are motivated by the wish to refrain from unnecessarily relying on the WTO's dispute settlement mechanism to define the limits on how climate action is allowed to interfere with trade. These options range from ambitious proposals for comprehensive reform of the trade system to more gradualist, short-term approaches to support the deployment of clean energy globally.

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Abbreviations

AD	anti-dumping
APEC	Asia-Pacific Economic Cooperation
ASCM	Agreement on Subsidies and Countervailing Measures
CET	clean energy technology
CO2	carbon dioxide
COP	Conference of the Parties
CVD	countervailing duty
DDA	Doha Development Agenda
DSU	Dispute Settlement Understanding
EGA	Environmental Goods Agreement
EGS	Environmental Goods and Services
FTA	free trade agreement
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GHG	greenhouse gas
GPA	Government Procurement Agreement
HS	Harmonized System
LCR	local content requirement
MEA	multilateral environmental agreement
MFN	most favoured nation
NTB	non-tariff barrier
PV	photovoltaic
RTA	regional trade agreement
SETA	Sustainable Energy Trade Agreement
TBT	technical barrier to trade
TiSA	Trade in Services Agreement
TPP	Trans-Pacific Partnership
TRIMs	Trade-Related Investment Measures
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TTIP	Transatlantic Trade and Investment Partnership
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

Executive Summary

A global scale-up of clean energy carries several benefits such as enhanced energy access, increased energy security, and, not least, enabling rapid progress in climate change mitigation through reductions in greenhouse gas emissions driven by decarbonization of energy supply use. Growing political commitment to these goals as well as the introduction and expansion of clean energy policies worldwide have driven unprecedented levels of activity in the sector. This has happened both in terms of investments as well as the development of clean energy technologies (CETs) reflected by a surge in patenting activity. New initiatives such as that of the Solar Alliance of 100 sunshine-rich countries announced at the COP21 Climate Conference in Paris in December 2015 will further spur an expansion of clean energy investments.

Background

The global and highly dynamic clean energy sector today comprises manufacturing, services, and knowledge-based industries organized along global value chains and heavily dependent on trade and investment policies. The lack of coherent and coordinated trade and investment policies and governance frameworks has resulted in numerous barriers and obstacles that add unnecessary risks to investments, complicate the organization of supply chains, and add costs at borders and behind, all delaying the scale-up of clean energy worldwide. The growing number of trade remedy cases involving both anti-dumping as well as anti-subsidy measures add to tensions among trading partners while increasing uncertainty and exerting a chilling effect on investment. A further examination of the ways in which trade policies and frameworks can constrain or encourage clean energy scale-up is therefore required.

While initiatives at the regional and plurilateral level to reduce barriers to trade in CETs have been launched, the lack of progress in the WTO's Doha Round has proven to be a serious hindrance to more comprehensively addressing trade-related obstacles at a multilateral level. The WTO Ministerial Conference of 2011 and the Davos declaration on the Environmental Goods Agreement (EGA) speak of "the need to look at ways that may allow Members to overcome the most critical and fundamental stumbling blocks."

It is against this backdrop that the E15 Expert Group on Clean Energy Technologies and the Trade System was established, jointly convened by ICTSD with Friedrich Ebert Stiftung and Chatham House in partnership with the World Economic Forum. The objective of the Expert Group was to examine the major challenges and opportunities for expanding the use of CETs through trade. The mandate was to identify and put forward policy options for the global trade system to support the scale-up of CETs and respond to the urgency of the climate change imperative.

This paper presents the main policy options discussed by the Expert Group in 2013–2015. A first set of options is related to addressing systemic issues with a view to enhancing trade governance for renewable energy and climate policies in the context of the WTO framework. A second set of options addresses reform of existing WTO rules and the formulation of new rules aimed at strengthening markets for CETs as well as responding to the need for any additional policy space that may be required to pursue mitigation and other sustainable development goals through the scale-up of clean energies. While offering the options for consideration, the Group clearly recognizes the unpredictability and limits of WTO litigation as a strategy to pursue these goals. Indeed, many of the options explored in the paper are motivated by the wish to refrain from unnecessarily relying on the WTO's dispute settlement mechanism to define the limits on how climate action is allowed to interfere with trade and vice-versa.

Policy Options

The first category of options outlined in the paper attends to systemic reform. The proposals include: (i) *an amendment of GATT rules* to ensure that policies supporting the development and scale-up of clean energy for climate change mitigation purposes are more explicitly permissible and thus sheltered from challenge; (ii) *temporary waivers* (which could be coupled with an amendment) that legally waives the application of a stated WTO obligation; (iii) *an interpretative understanding* that clarifies the meaning of existing WTO obligations and which could be "taken into account" when interpreting a treaty; (iv) a *plurilateral agreement* between a group of countries regarding how they will interpret WTO rules in trade relations with each other; and (v) a *moratorium on dispute settlement* in the area of clean energy.

All of these systemic options vary in their degree of challenges in terms of ease of implementation. For instance, a negotiated amendment, while providing legitimacy not present in a litigated settlement, would also require consensus among WTO members on the need for reform as well as a two-thirds-majority agreement on a new text. The process could take several years and run the risk of creating parallel rules, as it would only bind the members that have accepted it. Waivers would similarly face difficulties in securing broad agreement among WTO members. While also challenging, there are successful precedents regarding interpretative understandings that have influenced dispute settlement. A plurilateral agreement could be easier to achieve, as it would not require the same degree

of consensus as the other options. However, the impact of such an approach would depend both on the scope of the agreement and whether its parties include important players in the WTO. A number of group experts have also advocated the idea of plurilaterals outside the trade system in the form of "climate clubs" involving major greenhouse gas emitting countries. These experts consider a general exception to the most-favoured-nation clause allowing such clubs to be a simpler pathway to pursue urgent climate goals as compared to the difficulty of amending several WTO provisions. In addition, given the risks of WTO litigation, the option of a moratorium on clean energy disputes was also discussed. The moratorium would permit temporary breaches of WTO rules by members in the interest of climate change mitigation. While more feasible than an amendment of WTO rules, it would raise issues of coherence.

The second category of options concerns reform of existing WTO rules and the formulation of new rules under two broad headings: strengthening markets and policy space.

First, as regards the strengthening of markets for CETs, the paper outlines the rationale and process behind the following options identified by the Expert Group: (i) different scenarios for *tariff liberalization* of CETs and addressing non-tariff measures under multilateral, regional, plurilateral, and unilateral schemes; (ii) removing barriers to *clean energy services* through initiatives that involve the development of better classifications, the identification of products and activities relevant for the supply of CETs, and the actual implementation of trade reforms with a coordinated approach to clean energy goods and services liberalization; and (iii) addressing *regulatory issues* such as domestic regulation in services, standards and conformity assessment measures, renewable energy and third party access to networks and fixed infrastructure, cross-border clean energy trade, and the expansion of network capacity. The possibility of including an annex to the General Agreement on Trade in Services (GATS) or a reference paper to clarify and develop the above rules is explored, as are the lessons that can be drawn from innovative approaches to clean energy in plurilateral and regional agreements.

Second, concerning the additional policy space and associated measures that may be required to pursue climate change mitigation and other sustainable development goals, the Expert Group specifically looked at three areas that could benefit from greater clarity and predictability as well as "flexibility" with respect to trade rules. These are subsidies, local content requirements, and trade remedies.

(i) On *subsidy reform,* the most ambitious measure would be an amendment of the Agreement on Subsidies and Countervailing Measures (ASCM), and/or Article XX of the GATT to ensure that policies supporting the development and scale-up of clean energy for climate change mitigation purposes would be more explicitly permissible and thus sheltered from challenge. However, the difficulties of this systemic approach were recognized. Other options for reform that were proposed include: (a) an interpretative understanding to resolve the ambiguity regarding the question of whether the general exception under GATT, Article XX, applies to the disciplines in the ASCM; (b) an alternative approach that would involve clarification of the concepts "benefit," "financial contribution," and "specificity" in the ASCM; and (c) a waiver from the ASCM for clean energy policies under certain specific conditions, including the reform of policies that undermine the objectives of the waiver, in particular fossil fuel subsidies.

(ii) On *local content requirements* (LCRs), despite weak evidence concerning the environmental benefits of such measures as well as their incompatibility with WTO rules, they are prevalent in a number of WTO members around the globe. There is thus a need to further review or clarify existing WTO rules as a priority issue. Options such as a gradual phasing out of LCRs were explored but found little support in the Group. An alternative option would be to have an interpretative understanding of the ASCM to facilitate the conversion of ASCM-inconsistent LCRs into other kinds of WTO-consistent measures. An example would be to presume that subsidies conditional on providing benefits to the economy, such as training or hiring local workers and technology transfer, would be presumed to be consistent with WTO rules provided they are non-discriminatory and do not violate MFN provisions.

(iii) Finally, on *trade remedies,* the Group put forward options to be pursued in the short and long term in the following areas: (a) reform of the WTO rules governing anti-dumping and anti-subsidy measures to achieve a better alignment with normal competition or antitrust rules; (b) enforcement of existing laws, including, for instance, WTO anti-dumping provisions that call for calculations to take account of declining costs related to learning curves spread over the product cycle; and (c) other options considered feasible in the short to medium term include limiting the level, time, and scope of trade remedies on clean energy, as well as introducing a criterion on climate change in national public interest tests. These options could be explored under the WTO, unilaterally, or within the context of regional trade agreements or a sectoral agreement such as the EGA. In addition, a peace clause on trade remedies (or their elimination) in the clean energy sector could be applied among like-minded countries.

Members of the group also argued during the E15 deliberations that it might be more desirable to seek a universal response cutting across sectors, or make small adjustments, rather than carve out CETs as a special sector. Moreover, for many of the options, the merits of more regulation as against enabling greater global competition will also need to be weighed up. In the case of plurilateral agreements, how these agreements might evolve over time, for example in terms of their scope and coverage as well as the willingness and ability of new entrants to accede, including developing country WTO members with sensitivities to be balanced over differentiated treatment, are all issues which will warrant further consideration and analysis.

The main policy options are presented in Annex 1 in a summary table structured over a short to long-term time horizon. The latter include ambitious proposals for comprehensive reform of the trade system to support the scale-up of CETs, whereas the former offer a gradualist and potentially more feasible approach in the immediate term to respond to the urgent imperative of climate change mitigation.

1. Introduction: Why is this important?

Scaling-up the use of clean energy worldwide is related to multiple potential benefits and sustainable development gains. These primarily include: enhanced access to energy for underprivileged populations by addressing deficient energy supply (energy poverty); (ii) increased energy security by lessening dependence on unreliable sources; and thirdly—indeed the current overriding driver behind the development and growth of clean energy technologies (CETs)—combating climate change through the mitigation of greenhouse gases (GHGs) in the most critical emitting sector of economic activity, the supply and use of energy. Climate change, in addition to being perceived as a present and catastrophic danger to life on earth,[1] has also been recognized as "the greatest economic challenge of the 21st century."[2] Addressing the causes of climate change hinges primarily on a relatively rapid and massive shift to a cleaner energy mix.

The world has witnessed an unprecedented and spectacular growth of CETs in the past two decades, most of it as a response to purposeful international, national, and subnational policies. A critical moment of change came about with the negotiation and enactment of the Kyoto Protocol (1997–2005) linked to the United Nations Framework Convention on Climate Change (UNFCCC). Detailed research evidences the surge in technological development at that time by using customs classification to look into patents filed for the six dominant CETs (UNEP, EPO, and ICTSD 2010). The trend has since continued, spurred both by emerging policies and efforts to tackle climate change, but also by a renewed determination of the international community to provide "sustainable energy for all," backed up by specific political commitments, ensuing programmes, and new financing. A dramatic growth in public and private investment has thus been documented during these past years, with resilience even during the global economic crisis.[3]

Going forward, the December 2015 Paris Climate Conference (COP21) of the UNFCCC has seen the announcement of bold and grandiose initiatives to take the scale-up of CETs to a much higher order of magnitude to reach the ambitious mitigation targets set in the Paris Agreement. On the public sector side, India intends to launch an International Solar Alliance of over 100 sunshine-rich countries. For its part, the US has facilitated the formation of the Breakthrough Energy Coalition, a group of the world's most influential 28 investors determined to fuel innovation and development by massively financing companies that have the potential to deliver affordable, carbon-free power from the research lab to the market.

At the country level—both national and subnational—a vast and wide innovative policy effort involves macro, fiscal, energy, industrial, science and technology, employment and trade tools, among others. The result is today's global and remarkably dynamic clean energy industry, encompassing manufacturing, services, and knowledge, mostly organized in international value chains, and highly dependent on trade and investment.

All this activity has highlighted the shortcomings, incoherencies, and obstacles of uncoordinated policies and frameworks. Rules are working at cross-purpose hindering expansion and compromising the efficient use of resources; and markets are rigged with obstacles that add unnecessary risks to investments, complicate the organization of supply chains, and add costs at borders and behind, all delaying the scale-up of clean energy worldwide. A surge in cases of both anti-dumping and anti-subsidies, as well as in local content requirements (LCRs), specifically targeting CETs, is indicative of growing tensions. Recurring to dispute settlement and anti-dumping investigations and duties are options that are costly, associated with risks and uncertainty, and have a chilling effect on investment in the sector. Hence the relevance of examining the way in which trade policies and frameworks enable or hold back the pressing need for further scale-up and development of clean energy.

A few modest initiatives have been set off, but much more is needed. Examples of action with potential benefits to CETs include: the Asia-Pacific Economic Cooperation (APEC) agreement on environmental goods, which covers a few components of CETs; President Obama's 2013 Climate Action Plan, specifically calling for trade liberalization of goods related to CETs; and the ensuing negotiation towards an Environmental Goods Agreement (EGA), also likely to contain a few critical CET-related products, actively being pursued among a group of WTO members since its launch in 2014 in Davos-Klosters with specific reference to combating climate change.

[1] The Working Group II Contribution to the fifth assessment report of the IPCC focuses on "Impacts, Adaptation and Vulnerability" and provides detail on risks across sectors and regions (IPCC 2014).
[2] Christine Lagarde, Managing Director of the IMF, in a speech at the World Economic Forum in Davos, January 2013.
[3] See for example Frankfurt School-UNEP-Bloomberg New Energy Finance (2015).

At the multilateral level, the lack of a successful conclusion to the WTO's Doha Round has for a long time effectively prevented the WTO from taking on new issues. December 2015 also saw action in this respect as negotiators at the WTO Ministerial Conference in Nairobi made a decision to abandon Doha's straightjacket and freed members to pursue new issues through approaches delinked from the resolution of the 14 year old multilateral round. Already the Ministerial Conference of 2011 and the Davos declaration on EGA speak of "the need to look at ways that may allow Members to overcome the most critical and fundamental stumbling blocks."

It is against this backdrop that the E15 Expert Group on Clean Energy Technologies and the Trade System was established, jointly convened by ICTSD with Friedrich Ebert Stiftung and Chatham House in partnership with the World Economic Forum. The objective of the Expert Group was to examine the major challenges and opportunities for expanding the use of CETs through trade. The mandate was to identify and put forward policy options for the global trade system to support the scale-up of CETs and respond to the urgency of the climate change imperative.

The Group sought to examine the following questions: (i) given the crucial role of CETs in addressing climate change, in what ways can the global trade system support the wider use of CETs; (ii) are current international regulatory frameworks and trade-related policies adapted to meeting these challenges; (iii) how can the trade system respond to the specific vulnerabilities and concerns related to climate change of countries at different levels of development; (iv) is there a need to reform the WTO or for non-WTO initiatives to explicitly tackle CETs as a set of particular goods, services, and knowledge that require a differentiated approach; (v) in order to strengthen trade governance in CETs, what options are available for reforming specific WTO goods agreements (such as the Agreement on Subsidies and Countervailing Measures (ASCM) and the Anti-Dumping (AD) Agreement) or the WTO General Agreement on Trade in Services (GATS); and (vi) is there a need for a specific trade agreement on CETs?

This paper presents in some detail the main policy options identified by the E15 Expert Group in 2013–15. It draws upon written material commissioned for the Group and on formal discussions that took place among the experts as well as in open events organized under the E15Initiative—notably a session at the ICTSD Bali Trade and Development Symposium in December 2013—and the World Economic Forum Regional Meeting in Panama in April 2014. The paper has also benefited from continuous feedback from ongoing programmes in ICTSD and other institutions represented in the Group; the Forum's relevant Global Agenda Council; the SETI Alliance;[4] and the monitoring of the EGA negotiations as well as the evolution of the policy landscape in key countries and global markets.

[4] http://seti-alliance.org/en.

2. Background to Trade Governance in Clean Energy

2.1. Rationale for Treating Clean Energy Differently and for Taking Action

With the challenges of access to energy, energy security, and climate change imperatives becoming more pronounced in recent years, interest in clean energy has surged. In addition, the Paris Agreement on climate change, the new universal treaty reached in December 2015, primarily relies on the multi-faceted pledges of countries to transform their energy systems. Hence, there is now an agreed urgency to phase out the use of fossil fuels, reduce energy intensity, and shift to a cleaner energy mix, making reform of the supply and use of energy a high priority for the global community. While other objectives such as job creation could be pursued through the development of various other sectors of economic activity, including environmentally friendly sectors, climate change is unique in that mitigation efforts to limit global warming to no more than 2 degrees Celsius by 2050 will primarily hinge on the scale-up of clean energy given that 83% of GHG emissions are associated with fossil fuel energy use—making it the largest single contributor to global warming (IEA 2013). In addition, the critical function of energy as an enabler of economic activity worldwide makes this CET scale-up a global policy priority.

As countries strive to accomplish the shift to clean energy—often in combination with other goals such as generating domestic employment and revenue—a range of policies and measures have been put in place, some of which have trade implications. Given that clean energy generation is dependent on fragmented production across jurisdictions and global value chains in equipment as well as in services, trade policy measures at any point along the chain impact costs and the optimal use and sourcing of inputs. This, in turn, impacts the level of investments in and scale-up possibilities of clean energy. Consequently, tensions arise and there is growing recourse to the dispute settlement mechanisms of the WTO, and increasingly to bilateral or regional mechanisms of dispute management. This raises questions as to whether the existing rules are the most adequate to arbitrate and adjudicate.

Currently, there are no energy-specific rules or commitments in the WTO, nor any structured discussion in the WTO on issues related to renewable energy. There are rules pertaining to energy and to CETs in other structures of trade and investment governance, most notably in the context of the Energy Charter or in bilateral and regional trade agreements. Research indicates that a supportive framework of rules as well as targeted trade and investment arrangements could contribute to fostering the scale-up of renewable energy. Given the considerable potential benefits in terms of sustainable development, and particularly the implications for climate change mitigation, the E15 Expert Group strongly felt that this avenue should be fully explored and sustained.

2.2. Vision—Where do We Need to Go?

A prosperous, sustainable, and inclusive future must build on a low or carbon-neutral economy. The world has committed to limiting global warming to below 2 degrees Celsius, thereby reducing the threats related to sea level rise, droughts, floods, spread of diseases, climate-related migration, and major economic losses. Therefore, measures for clean energy expansion required to meet this goal must be supported rather than constrained by other governance frameworks, including trade rules or trade-relevant policies. Whereas due consideration must be given to other important national policy objectives such as poverty alleviation, economic development, and employment—often a precondition for the "buy-in" of clean energy expansion among voting populations—this needs to be done through policy alignment and coherence. Synergies must and can be sought so that clean energy is allowed to be the engine of growth as well as the solution to climate change.

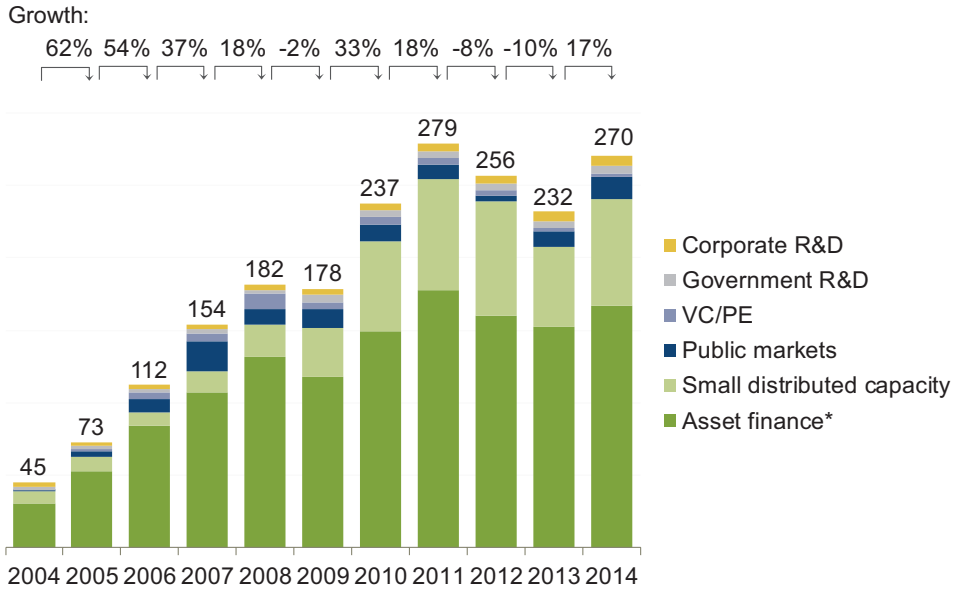
2.3. Trends in CET Scale-Up and their Relation to Policies: Surges in Investment, Patents, and Trade Remedies

2.3.1. Investments are surging into CETs

Renewable energy continues to see a surge in investments. Global investment in renewable power and fuels (excluding large hydroelectric projects) amounted to US$270.2 billion in 2014, nearly 17% higher than in 2013 (US$215 billion) and a significant jump from US$40 billion a decade earlier in 2004.[5] Developing countries also saw a jump in investments over 2013 by 36% to US$131.1 billion. Despite a significant fall in oil prices by over 50% in 2014, investment funds to renewables are not expected to be significantly affected (except in certain sectors like biofuels or in oil-exporting countries) given they do not compete for power investment dollars. Indeed, strong technology cost-reductions have continued to drive investment momentum, particularly in solar and wind. Overall investment in solar rose 29% over the previous year to US$149.6 billion in 2014, while that in wind grew 11% to a record US$99.5 billion in 2015.

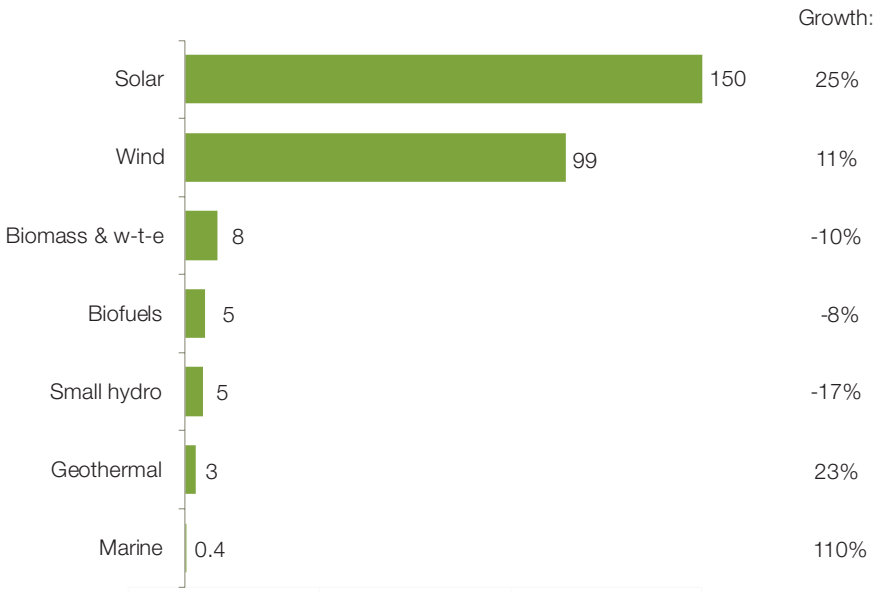
[5] The data in this section is taken from Frankfurt School-UNEP-Bloomberg New Energy Finance (2015).

Figure 1: Global New Investment in Renewable Energy by Asset Class, 2004–14 (US$ bn)



*Asset finance volume adjusts for re-invested equity. Total values include estimates for undisclosed deals.
Source: Frankfurt School-UNEP-Bloomberg New Energy Finance (2015)

Figure 2: Global New Investment in Renewable Energy by Sector, 2014 and Growth on 2013 (US$ bn)



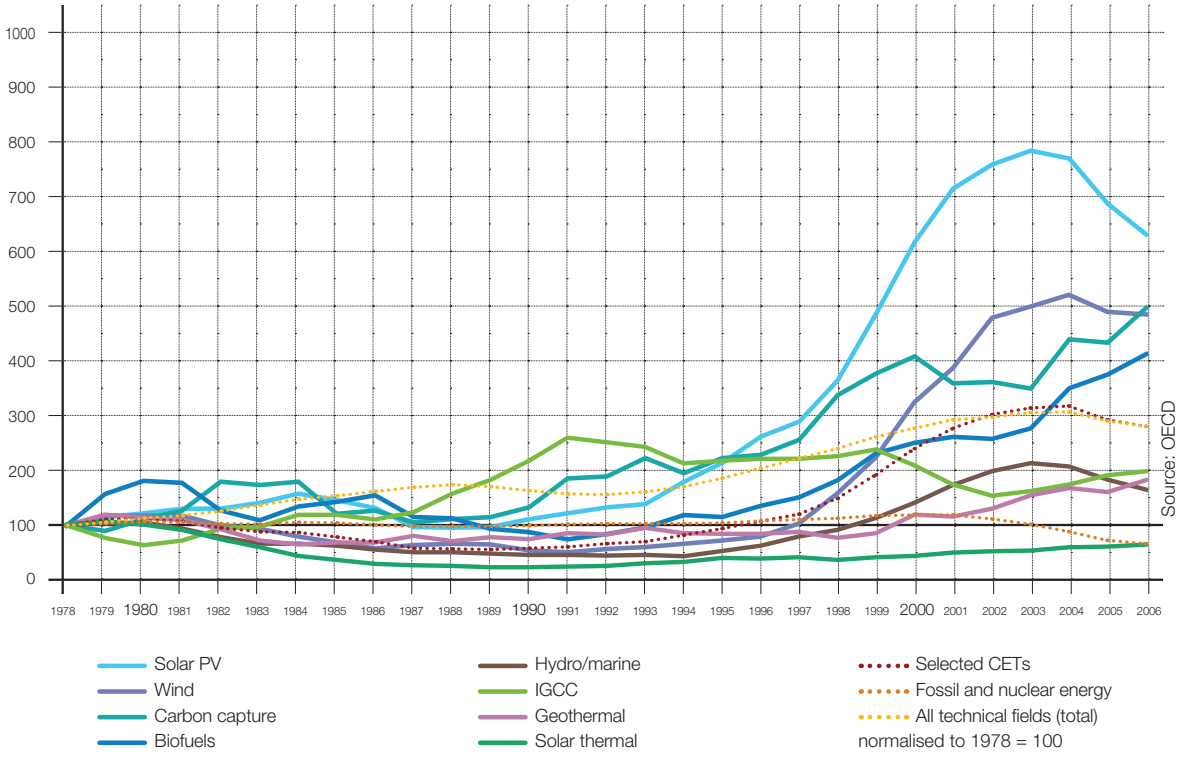
*Asset finance volume adjusts for re-invested equity. Total values include estimates for undisclosed deals.
Source: Frankfurt School-UNEP-Bloomberg New Energy Finance (2015)

Despite this growth, wind, solar, biomass and waste-to-power, geothermal, small hydro, and marine power are estimated to have contributed just 9.1% of total world electricity generation in 2014, a small increase relative to 8.5% in 2013. This would be equivalent to a saving of 1.3 gigatonnes of carbon dioxide (CO2) taking place as a result of the installed capacity of those renewable sources. However, to put this into perspective, in 2011, CO2 emissions from the combustion of coal alone increased by 4.9% to 13.7 gigatonnes of CO2. Clearly, the scale-up of renewables will need to further accelerate to have a meaningful impact on mitigation targets.

2.3.2. Growth in CET patenting activity

There is also clear evidence that patenting activity in CETs is growing. The above-mentioned empirical study (UNEP, EPO, and ICTSD 2010) conducted on the role of patents in the transfer of CETs found that patenting rates (patent applications and granted patents) in selected CETs have increased at roughly 20% per annum since 1997, thereby outpacing the traditional fossil fuel and nuclear energy sources. As Figure 3 below shows, the surge in CET patenting activity coincided with the adoption of the Kyoto Protocol in 1997, which provides a strong signal that political decisions setting adequate frameworks are important for stimulating the development of CETs (ibid).

Figure 3: Growth Rate of Claimed Priorities Patenting for Selected CETs



Source: UNEP-EPO-ICTSD (2010)

Patenting has been dominated by six countries, which incidentally figure among the top traders in a range of environmental technologies including CETs and also, with the US, the second largest GHG emitter in the world in terms of absolute emissions (Ge, Friedrich, and Damassa 2014). These countries are Japan, the US, Germany, Korea, the UK, and France. They account for 80% of patent applications in the CETs reviewed by the study with the exception of geothermal, and they also dominate patent filing trends. However, China is the next most important filing destination for actors in the top six countries, which points to its importance as a market for the deployment of CETs.

Despite this domination of the "big six," a number of other countries emerge as significant actors in selected fields when CET patent data is benchmarked against total patenting activity (all technology sectors) in a given country. For instance, India features among the top five countries for solar photovoltaic (PV), while Brazil and Mexico share the top two positions in hydro/marine (UNEP, EPO, and ICTSD 2010).

2.3.3. Trade flows in CETs are dominated by a select group of countries

The original group of 14 countries that initiated negotiations on the plurilateral Environmental Goods Agreement make up a significant portion of trade in a number of CETs, including solar PV panels and wind turbines (see Box 1). In wind turbines, non-EGA members such as India are also prominent exporters.

Box 1: G14 Trade in CET Products

The G14[6] account for an overwhelming portion of trade in the core CET products—wind turbines and solar PV equipment—in particular in terms of exports. In the period 2011-13, the G14 accounted on average for 96% of the value of world exports (excluding intra-EU28 trade) in wind-powered generating sets (Harmonized System (HS) 850231), although its share in total world trade (exports plus imports) was less than 70% (because of a smaller share in global imports). Similarly, the G14 portion of world trade (excluding intra-EU28 trade) in HS 854140 (which includes solar PV cells, modules, and panels) was about 90% (its share in world imports fell from 91.5% in 2011 to 84% in 2013). Between 2011 and 2013, the value of G14 exports in HS 854140 to other G14 countries (excluding intra-EU28 trade) fell by more than one third, while the value of G14 exports to non-G14 countries increased by approximately 15%. PV-specific national trade statistics (using the ITC Trade Map) reveal that the portion of Chinese exports of PV cells, in value terms, shipped to other G14 markets fell from 94% in 2011 to 79% in 2013 as the combined result of a more than 60% reduction of exports to G14 markets (in particular the EU and the US) and an almost 70% increase in exports to non-G14 countries (from a relatively low base).

Source: Vossenaar (2014)

[6] The original G14 is composed of Australia; Canada; China; Costa Rica; the European Union (and its 28 member states); Hong Kong, China; Japan; Korea; New Zealand; Norway; Singapore; Switzerland; Chinese Taipei; and the United States.

At the same time, growth in trade has been accompanied by a rise in the use of trade remedies (both AD and countervailing duties—CVDs) against what is perceived as unfair "dumping" or "subsidization." China is emerging as the primary target and the measures are primarily being used by the US and EU. Other countries such as Australia, India, China, and Peru have also pursued renewable energy investigations. Targeted countries include Argentina, Canada, China, EU, Indonesia, Korea, Malaysia, Singapore, Taiwan, the US, and Vietnam (see Table 1).

Table 1: Trade Remedies on Clean Energy

Product	Country	Trade Remedy	Initiation of Investigation	Year Since Trade Remedy Measures are in Force
EU				
Biodiesel	US	**AD + AS**	2008	2009
Biodiesel	Canada	**AD + AS**	2010	2011
Biodiesel	Singapore	~~AD~~ + ~~AS~~	2010	-
Biodiesel	Argentina	**AD** + ~~AS~~	2012	2013
Biodiesel	Indonesia	**AD + AS**	2012	2013
Bioethanol	US	**AD** + ~~AS~~	2011	2013
Glass Fibres	China	**AD**	2009	2010
Solar Panels	China	~~AD~~ + ~~AS~~	2012	Resolved through price undertaking agreement in 2013. Non-participating producers/exporters in agreement still facing duties.
Solar Glass	China	**AD + AS**	2013	2013
Peru				
Biodiesel	US	AD	2009	
Australia				
Biodiesel	US	**AD + AS**	2010	2010
Wind Towers	China and Korea	**AD**	2013	2014
Solar Modules/Panels	China	AD	2014	
US				
Wind Towers	China	**AD + AS**	2011	2012
Wind Towers	Vietnam	**AD + AS**	2011	2012
Solar Panels	China	AD+-AS	2011	2012
Solar Panels	China and Chinese Taipei	**AD**	2014	2014
Solar Panels	China	**AS**	2014	2014
Canada				
Solar PV modules and laminates	China	**AD + AS**	2014	[2015]
China				
Polysilicon	US	AD + AS	2012	2013
Polysilicon	EU	AD + AS	2012	2014
Polysilicon	South Korea	AD + AS	2012	2013
India				
Solar Cells/Modules	China	~~AD~~	2012	-
Solar Cells/Modules	US	~~AD~~	2012	-
Solar Cells/Modules	Malaysia	~~AD~~	2012	-
Solar Cells/Modules	Chinese Taipei	~~AD~~	2012	-

Note: Trade remedies in force are highlighted in bold. Investigations that have been terminated are crossed out. The remaining trade remedies are under investigation, but might come into force. The use of […] means that the formal decision is not taken. The absence of brackets around a year means a final decision has been taken and duties continue to be applied.

Source: The table builds on Table 1 in Kasteng (2013) and has been updated by the author as of July 2015.

It is estimated that over the period 2008–12, trade remedies affected US$32 billion worth of trade in green products, thus causing an annual reduction in trade of about US$14 billion and a trade loss of US$68 billion over a five year period (the duration of trade remedies is five years) (see Table 2). According to a global survey of trade remedies in the CET sector from 2008 through early 2014 carried out by the Peterson Institute for International Economics (Cimino and Hufbauer 2014), there were 41 cases of trade remedies, which included 26 AD cases and 15 parallel subsidy investigations. Of these, 18 cases targeted solar energy products, 16 targeted biofuels, and seven cases targeted wind energy products.

A number of factors have sparked the use of trade remedy measures. These include: supply-demand imbalances; commoditization and falling prices of solar PV; the rise of China as a manufacturing and export hub in solar and wind equipment; as well as special AD and CVD duties extending to China as it is considered a "non-market" economy. While a number of clauses applying non-market status to China's economy are set to expire in 2016, it is being debated whether this implies the automatic exemption of China or whether it would fall within the discretion of the importing country (Parnell 2015).

The number of active trade remedy cases being pursued within the WTO Dispute Settlement Understanding (DSU) is significantly less although it still exceeds 10 since 2010. The EU anti-dumping measure on biodiesel from Argentina is one such clean energy related trade remedy dispute that has seen a WTO panel being established on 23 June 2014.[7]

The WTO has also seen disputes on local content measures whose use in the CET sector appears to be rising despite WTO rules explicitly prohibiting their use as well as related subsidies. A complaint by Japan and the EU against the LCR in Ontario's feed-in tariff programme led the WTO's Dispute Settlement Body to rule against Canada (ICTSD 2013). Ontario consequently reduced its domestic content requirements for future contracts and eliminated them in December 2013. The savings to Canadian ratepayers from this elimination has been estimated at Canadian $1.9 billion over 35 years.

India has also faced two challenges from the US on its LCRs for solar PV cells and modules under its Nehru Solar Mission. The first challenge, which did not proceed beyond consultation, was related to the first phase of the Mission under which developers of PV projects using crystalline silicon technology had to source their solar cells and modules domestically. Under the second phase, launched in October 2013, this requirement was also extended to thin-films, an important US export to India, which fell after the measure was introduced even though analysts argued that most Indian solar PV capacity development was driven by state requirements which did not include LCRs. Further, of the total 9,000 megawatts being commissioned under Phase II between now and 2017, only half—in the first batch of projects, 375 megawatts out of 750—will be subject to the domestic sourcing requirements. Still, the US contended that the measures were inconsistent with India's obligations under Article III of GATT and Article 2.1 of the Agreement on Trade-Related Investment Measures (TRIMs), also stating that solar power developers who maintain the

Table 2: Comparative Statistics of Countries that Impose Anti-Dumping and Countervailing Measures Targeting Renewable Energy Products

Country	GDP, 2012 (US$ billions, current prices)	Renewable electricity net generation, 2012 (TWh)[b]	AD cases		CVD cases		Total imports affected for 41 AD/CVD cases in renewables (US$ millions)
			Number of cases in renewable energy since 2008	Number of total cases (2008-2012)[a]	Number of cases in renewable energy since 2008	Number of total cases (2008-2012)[a]	
Australia	1,532	29.0	3	49	1	7	456
China	8,227	797.4	3	53	2	6	2,144
European Union	16,687	684.1	10	75	8	21	24,408
India	1,842	162.0	4	167	0	0	502
Peru	204	22.1	1	10	1	7	40
United States	16,245	507.8	5	68	3	44	4,414
Total	n.a.	n.a.	26	422	15	85	31,965

n.a. = not applicable; TWh = terawatt hours; AD = anti-dumping; CVD = countervailing duties

[a] The total number of AD and CVD cases is through year-end 2012, based on Bown (2012a) and (2012b).

[b] Renewable energy sources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action. Data for China and India from 2011; EU data from 2010; all other data from 2012.

Note: Cases that target multiple countries but concern the same product(s) are counted separately.

Sources: GDP from World Bank, World Development IndicatorsDatabase, http://data.worldbank.org/indicator; electricity generation from US Energy Information Administration, International Energy Statistics, http://www.eia.gov/countries/data.cfm#undefined; AD/CVD cases from tables A1 - A2, Bown (2012a) and Bown (2012b); total imports covered by AD/CVD cases from authors' calculations, see table 3.

Source: Cimino and Hufbauer (2014)

[7] https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds473_e.htm.

domestic content requirements receive special advantages including long-term tariffs for electricity. The US challenges led to the establishment of a WTO panel in September 2014 (ICTSD 2014). India defended its measures as government procurement, a claim difficult to justify given the WTO ruling in the Canada case.[8] The DSU ruling was made in August 2015, where the panel ruled against India (Kanth et al. 2015). At the time of writing, the panel report has not yet been made public. However, the case also opens up possibilities for designing measures to promote local content by non-signatories to the Agreement on Government Procurement (GPA) that may be compliant with their existing WTO obligations.

The use of trade remedy measures as well as local content measures increases the price of CET equipment, leading to price rises in power generation and a dampening effect on investment. Thus, solar power producers in various countries, for example, have generally opposed the imposition of such measures and requirements; whereas domestic equipment manufacturers that struggle to compete with cheaper imports (whether due to perceived unfair advantages or not) favour them.

On the other hand, many view the clean energy sector as a "new frontier" with opportunities to build a manufacturing base and generate jobs, but which also requires some degree of protection or non-compliance with WTO rules as they exist. What appears clear is that the there is a high degree of correlation between the countries that are among the biggest GHG emitters, the biggest traders, the biggest destinations for clean energy investments, and those most involved in trade disputes in the clean energy sector.

The intertwining of very similar actors also implies that from a governance point of view, action by a select number of countries both in the climate sphere and the trade policy sphere could make a big difference to the prospects of renewable energy scale-up.

2.4. Why Litigation Does Not Work

One option to address gaps and resolve a lack of clarity is through litigation. However, the purpose of litigation in the WTO context is "to preserve the rights and obligations of Members under the covered agreements" (DSU Article 3.2) rather than to attempt to change the rules. Porges and Brewer (2013), referring to Van Grasstek (2013) and others, claim that the cost and delay involved in achieving change through negotiation lead members to try to make new rules through litigation. But litigation does not offer clarity and long-term predictability to the market, as WTO rulings are specific to each case. Therefore, while they may provide a general indication of the broad direction in which policy measures need to go, they cannot be a precedent. Litigation also involves time delays and may not respond flexibly to the needs of a dynamic and fast-evolving CET market and investment landscape. Consequently, it may not form a solid foundation of governance that would enable CETs to be massively scaled up in response to the urgent imperative of climate change mitigation. In the event of slow momentum in negotiations as well as the drawbacks of litigation, the interpretation of rules through WTO committees or negotiations carried out through *ad hoc* or sectoral processes could emerge as a more realistic option for reform. Members of the Expert Group have therefore argued that litigation is not necessarily a preferred route forward, in particular as the rules that the panels interpret in litigation were drafted long before climate change was on the agenda. Rather, many of the options explored in this paper are motivated by the wish to refrain from unnecessarily relying on the WTO's dispute settlement mechanism to define the limits on how climate action is allowed to interfere with trade.

[8] Presentation by Amelia Porges at the E15 Expert Group Meeting on 2 July 2014.

3. Trade Policy Options to Support Clean Energy Scale-Up

3.1. Options for Addressing Systemic Issues

The WTO agreements, particularly the General Agreement on Tariffs and Trade (GATT), were drafted long before climate change was high on the agenda of policy-making. Hence, there is no specific mention of the challenge in the texts. Any policies and measures implemented for climate change reasons, with possible trade implications, therefore have to be justified largely on the general exception clause of the GATT, Article XX, and in particular its provisions (b) and (g). These read:

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

In addition, the general exception of the GATS (Article XIV) provides a similar right of adoption of measures affecting trade in services in order to protect human, animal or plant life or health.

The E15 Expert Group has studied several options for enhancing policy space for renewable energy and climate policies in the context of the WTO framework. The most ambitious of these measures would consist of amending the GATT, so as to ensure that policies supporting the development and scale-up of clean energy for climate change mitigation purposes would be more explicitly permissible and thus sheltered from challenge. The amendment rules appear in Article X of the WTO's constitution, the Marrakesh agreement establishing the WTO. Bringing climate-related considerations into the GATT as well as the GATS and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) would automatically cover any trade-related measure, as specific agreements such as the Agreement on Agriculture or the ASCM are an extension of the GATT continuum.[9]

An amendment would require consensus regarding the need for reform, and subsequently regarding the text. If members manage to overcome this hurdle and a text is negotiated, at least two thirds of the membership would need to give a positive acceptance, a process that would likely take several years. Once the amendment would enter into force, it would only bind the members that have accepted it, meaning that the system could end up with two sets of parallel rules.

An amendment of the GATT, meaning that members' concerns will have been resolved by negotiation and agreement, would indeed give the ultimate decision a level of legitimacy that is not present in any rule change brought about through litigation (Porges and Brewer 2013). However, members of the Expert Group have argued that such a solution would be unlikely, as it would seem very difficult to reach consensus on the need for an amendment, in addition to the transaction time to consent on the subsequent text. More importantly, such an amendment would not necessarily provide legal security for climate change measures, as there is a risk that the system would operate based on two sets of rules. As stated by Porges and Brewer, "any member that cares more about its exports than about climate change can decide not to accept the amendment, free ride on the climate change mitigation measures by others, and retain the ability to bring a WTO dispute against the climate change mitigation measures."

A waiver could possibly bridge over the period before an amendment enters into force, and eliminate the free rider problem. Waivers are governed by Article IX:3 and IX:4 of the Marrakesh Agreement. Waivers are temporary and have the effect of legally waiving the application of a stated WTO obligation.

[9] The ASCM for instance is an interpretation/elaboration of GATT, Article XVI.

If WTO members wish to authorize discriminatory measures based on climate change concerns, they can do so by agreeing on an amendment package coupled with a waiver that expires for each member when the amendment has entered into force for that member. However, the unavoidable political problems of obtaining a waiver, similarly to an amendment, remain; members wanting an amendment and a waiver will need to make the environmental, economic, factual, and political case for the specific measures they want to take, and persuade other members to go along. They would also need to actively engage with the concerns of other members regarding the trade impact of the measures that the waiver could cover.

Another option could be an interpretative understanding, as provided for under Article IX:2 of the Marrakesh Agreement. Such multilateral interpretations are meant to clarify the meaning of existing obligations, rather than to modify their content. A decision to adopt an interpretative understanding must be taken by a three-quarter majority of all members. Any proposal for an understanding must first be recommended by the council overseeing the relevant agreement decision, which requires consensus. The legal status of an understanding is that it shall be "taken into account" when interpreting a treaty.[10] Although challenging to achieve, there are a few examples of successful interpretative understandings, which have also had an impact in disputes, such as the *US-Tuna II* referring to a decision by the Technical Barriers to Trade (TBT) Committee (Porges and Brewer 2013).

An option that would not require the same degree of consensus would be a plurilateral agreement between a subgroup of countries regarding how they will interpret WTO rules in trade relations with each other. The impact of such an agreement would depend both on the scope of the agreement and on whether its parties include major players in the WTO.

Under a plurilateral agreement, members would in any case be bound by the non-discrimination rules of the WTO. Yet member countries would be free to agree to more restrictive rules than under the WTO—for example, they could strengthen the disciplines on anti-dumping. However, if they were to agree to a more flexible interpretation of rules, in the area of subsidies for instance, they would still be subject to possible challenges by any non-participant that is a WTO member.

A plurilateral agreement of this sort stands apart from the WTO and cannot be blocked by one WTO member, unlike the options discussed above. However, unless added to Annex 4 of the Marrakesh Agreement, the agreement has no stable legal relationship with the WTO. Adding the plurilateral to Annex 4 would require consensus. In light of the recent developments in Geneva, where a group of countries have agreed to negotiate the EGA plurilateral agreement on a most-favoured-nation (MFN) applicability basis, this option may be timely and appealing.

A number of experts have also advocated the idea of plurilaterals outside the trade system, under the form of "climate clubs" involving major GHG emitting countries. According to Leycegui and Ramírez (2015), such clubs would provide trade incentives for participating members conditional on the attainment of a minimum standard of "contribution" towards climate goals while not increasing trade restrictiveness towards non-club WTO members. The authors consider a general and permanent exception to the MFN clause allowing such "clubs" to be a simpler pathway to pursue urgent climate goals as compared to the difficulty of amending several WTO provisions.[11]

Given the risks and unpredictability of litigation as a strategy highlighted earlier, one additional option could be to agree to a moratorium on dispute settlement in the area of clean energy. Precedents exist in intellectual property, under Article 63 of the TRIPS Agreement, and in Agriculture, under the Peace Clause in Article 13 of the Agreement on Agriculture. Porges and Brewer (2013) suggest that the WTO could adopt a similar dispute settlement concerning some or all climate change mitigation measures. In that case, members would have to make the case for the urgency of action to mitigate climate change, the necessity of the actions they contemplate, and justify why actions cannot be undertaken in a WTO-compliant manner. Members would also have to engage with and resolve the concerns of other members regarding the trade impact of the proposed climate measures.

By choosing this option, the rules would remain unchanged; it would simply be tolerated that WTO members, for specific climate change purposes, would sometimes need to be in breach of the rules. Whereas this may be a more feasible way forward than the amendment option, for example, it would seem less attractive from a coherence perspective: if members recognize that certain measures may be necessary for climate change purposes, should it then not be possible to make these WTO-compatible?

Some group members have argued during the E15 deliberations that it may be more desirable to seek a universal response cutting across sectors, or make smaller adjustments, rather than carve out CETs as a special sector. The merits of more regulation as against enabling greater global competition will also need to be weighed up.

3.2. Options for Reform or New Rules

This section covers policy options with regard to specific trade reforms and the need for new rules as proposed by members of the Expert Group. These have been categorized on the basis of two broad objectives: (i) strengthening markets; and (ii) responding to the need for any additional policy space that may be required to pursue climate change mitigation and other sustainable development goals through the scale-up of clean energies.

[10] Vienna convention on the Law of Treaties (1969), Article 31.(3)(a).
[11] According to Leycegui and Ramírez, this would be similar to Article XXIV of the GATT permitting regional trade agreements based on certain conditions, or the Enabling Clause that forms the basis of special and differential treatment enjoyed by developing countries with respect to a number of provisions.

3.2.1. Strengthening markets

Trade reform can take the shape of market access liberalization involving the removal of import tariffs and non-tariff measures for CETs, as well as the scheduling of new market access commitments for clean energy services. In addition, markets can be strengthened through a better classification of clean energy services while also addressing regulatory issues such as domestic regulation of services and the governance of private standards. The need to avoid "technological lock-in" is important and initiatives should encourage the adoption and dissemination of new technologies as they evolve.

i. Tariff liberalization under different scenarios: Doha Development Agenda, EGA, regional trade agreements, a Sustainable Energy Trade Agreement (SETA), and unilateral action

Reducing or eliminating tariffs is highly relevant in a world of fragmented production and value chains across jurisdictions, regardless of how low tariff levels may appear. As inputs and intermediate goods cross borders multiple times, tariff costs can aggregate to very meaningful amounts before goods reach final assembly. Such costs have a major bearing on the choice of competitive sourcing options for diverse final markets. Tariff liberalization on clean energy goods is a tangible, fairly simple measure that countries could undertake to facilitate a scale-up of CETs. Whereas the mandate on environmental goods in the Doha Development Agenda (DDA) would allow for progress in this area, multilateral negotiation has to date been largely unsuccessful. Consequently, this subsection focuses on options to make progress in effective plurilateral settings.

An option within reach: the EGA plurilateral initiative

In January 2014, as indicated above, a group of thirteen WTO custom territories plus the European Union announced their commitment to "achieve global free trade in environmental goods" and hence their intention to negotiate a relevant trade agreement, now called the EGA.[12] This agreement builds on APEC's Early Voluntary Sectoral Liberalization initiative and specifically APEC's 2012 agreement to reduce applied tariffs on a list of 54 environmental goods to a maximum of 5% by end-2015. The intent of the original 14 EGA members is to extend the benefits accruing from the initiative on an MFN basis to all other WTO members—i.e. on a non-discriminatory basis to signatories and non-signatories alike.[13]

The EGA countries include a majority of the main trading economies in many relevant environmental goods. The agreement will only be finalized as WTO-compatible once a critical mass threshold is reached. In the WTO context, "critical mass" is self-defined, meaning that market participation would indicate the necessary number of exporters and importers to minimize free riding such that any outsider economy will be too small to undermine the resulting agreement. Observers of the EGA have speculated that this threshold could be 90% of global markets, following the model set by the WTO Information Technology Agreement, an existent plurilateral tariff cutting arrangement.[14] Critical mass can only properly be calculated once the final list of goods has been agreed. ICTSD preliminary calculations show that in 2012 the 14 EGA countries accounted for 86% of global trade (79% in imports and 93% in exports). Excluding intra-EU28 trade as well as re-imports and re-exports, the share was 83% (Vossenaar 2014).

The EGA is an excellent candidate for making progress in the area of CETs and trade. For the agreement to be significant, it is crucial that that all relevant goods are included. The Joint Statement in Davos refers to environmental goods, and highlights clean energy. ICTSD analysis of the APEC list—the baseline list for the EGA negotiations—shows that some 15 out of the 54 goods are relevant for the supply of renewable energy (Vossenaar 2013). For the ensuing agreement to become truly relevant for climate mitigation purposes, it would seem necessary to significantly increase the coverage of goods. In particular, components now left out of the APEC list, such as inverters used in solar PV systems and ball and needle bearings used in wind turbines, should be included.

Aware of the difficult and so far inconclusive Doha negotiations in seeking to determine what constitutes an environmental good, the EGA negotiations have moved beyond this top-down approach and are proceeding on the basis of lists of goods submitted by parties.

A more ambitious plurilateral approach: a SETA

Whereas the EGA is now within reach, it has a broader focus than CETs, covering a range of other environmental technologies like waste and water treatment and air pollution. Another plurilateral approach that would more directly target CETs could be a Sustainable Energy Trade Agreement, as proposed by ICTSD (2011). Such an agreement could take the form of a plurilateral agreement negotiated inside or outside the WTO, with the benefits either extended to the full WTO membership adopting the MFN approach, or following the more exclusive GPA approach, meaning that tariff concessions would apply only to SETA members. For the tariff reduction element, the outcome could be similar to the EGA, in particular if the MFN approach were adopted. However, SETA is

[12] See the Joint Statement Regarding Trade in Environmental Goods, issued at Davos, available at http://trade.ec.europa.eu/doclib/docs/2014/january/tradoc_152095.pdf.
[13] The number of signatories has since risen to 17 with newcomers Iceland, Israel, and Turkey joining the agreement, which actually represents 44 parties when all EU states are factored (see Box 1).
[14] Other critical mass agreements negotiated under the WTO include telecommunications and financial services, with the former including a rules aspect in addition to market access commitments.

envisioned as a more comprehensive agreement than the EGA, addressing a vast range of policies and other trade barriers beyond tariffs, such as services restrictions and non-tariff measures. The final outcome of a SETA for the scale-up of CET would therefore be more significant than the EGA. It would, however, most likely be more challenging to negotiate.

Benefits of a multilateral setting

As there is now an initiative to negotiate environmental goods, including clean energy goods, in a plurilateral setting driven by the countries that have been leading the Environmental Goods and Services (EGS) negotiations, it seems unrealistic to expect progress in the area under the Doha Round negotiations. Therefore, the preferred option would be to build on the EGA and to make it as effective, comprehensive, and inclusive as possible.

Sticking for the moment to tariffs, it is important to bear in mind that the main gains from tariff liberalization accrue to those undertaking their own tariff reform. Therefore, it would be central for countries currently outside of the EGA negotiations to join the agreement, or to match the tariff concessions domestically. Not only would this create opportunities for enhanced trade and growth, but it would also increase the opportunities for technology transfer, so that CETs become increasingly available also in non-EGA countries.

The rationale for treating CET goods differently to other goods in a trade context is found in the climate change imperative; hence the importance of expanding the mitigation opportunities related to clean energy globally. This is especially true as many developing economies, currently largely outside the EGA, are expected to see their energy demand grow significantly over the next decades. At the same time, they are committed under the UNFCCC's Paris Agreement to increasingly contribute to mitigation action, and have voluntarily registered under their pledges, the so-called Intended Nationally Determined Contributions, plans to substantially scale-up CETs. It is thus important that their shift to a cleaner energy mix is facilitated through all possible means, including through trade policy.

The question thus arises as to whether these countries would easily join an initiative where the list of goods has already been defined and agreed. Would they be prepared to leave aside previously expressed concerns about the inclusion of dual-use goods, or the possible exclusion of energy-related goods of importance to them such as biofuels? Or, would there be a need for an innovative mechanism that would facilitate entry for non-signatories over time? Some developing country concerns, for instance sensitivity regarding impacts on domestic industries or the need for policy space to develop their own green industries, may require some form of special and differentiated treatment to accommodate such concerns. This is an area that will require further analysis.

Lessons/options from regional trade agreements (RTAs)[15]

Several aspects regarding CETs and trade governance are being innovated within RTAs. Increasingly, such schemes are evolving from models of "shallow integration" based on liberalizing trade in goods towards "deeper integration," involving both horizontal expansion (agreements that cover services, trade facilitation and customs, investment, competition, environmental policy) and vertical expansion (commitments on regulatory cooperation and coherence). While a number of RTAs include a set of "General Exceptions" based on Article XX of the GATT, others such as the EU-Korea Free Trade Agreement (FTA) provide a specific exception to their trade facilitation agreement for "legitimate policy objectives such as the protection of national security, health and the environment" (Art. 6.1(g)).

The EU-Singapore FTA is particularly noteworthy in that it contains a chapter on sustainable energy and provisions unprecedented in other trade agreements. For instance, the agreement includes an Article (12.7) on Prohibited Subsidies, and another that establishes a "best endeavours" obligation to remedy or remove competition effects caused by Other Subsidies (similar to the ASCM's concept of actionable subsidies). An accompanying Annex (12-A) lists subsidies that may be provided. These include subsidies for environmental purposes, provided: the subsidy is necessary to achieve the policy objective; the amount provided is the minimum required to achieve that objective; and the aid "does not affect the conditions of trade of either Party or the conditions of competition between the Parties." An interesting aspect is that the parties record in the agreement that they share the goal of reducing subsidies to fossil fuels (Article 13.11.3) but the Article on Prohibited Subsidies specifically excludes subsidies to the coal industry.

In Article 275 of the EU-Peru-Colombia FTA, the parties agree to "promote and facilitate access, dissemination and use of best available technologies for clean energy production and use and for mitigation of and adaptation to climate change." The recently concluded Trans-Pacific Partnership (TPP) includes commitments by all parties to eliminate tariffs on environmental goods upon entry into force of the agreement, and to facilitate trade in environmental services. Under the Environment chapter, the parties will also work together to address non-tariff barriers (NTBs) on these products and services to further promote trade in environmental goods and services.[16]

Certain agreements, such as those of the US with Korea, Colombia, and Panama, contain more ambitious commitments regarding implementation of multilateral environmental agreements (MEAs), essentially using trade policy to enforce MEA commitments. The TPP picks up this approach and, for the moment, applies it to conventions related to trade in endangered species, marine pollution, and the Montreal Protocol on substances that deplete the ozone layer, implementation of the latter bringing about climate mitigation benefits.

[15] This section is drawn from Gehring et al. (2013).
[16] TPP Chapter 20, Environment, available at https://ustr.gov/sites/default/files/TPP-Final-Text-Environment.pdf.

Trade mechanisms have also been used in RTAs to enforce environmental cooperation objectives. For instance, according to Article 13.6 of the EU-Korea agreement, parties "strive to facilitate trade" in environmental goods and services, including tariffs and NTBs. The EU-Colombia-Peru and EU-Central America RTAs "agree to consider" areas in which removal of barriers and obstacles to trade would support sustainable development and climate change mitigation efforts. Others, such as the majority of Canada's FTAs, provide for very broad tariff liberalization that includes most frequently referenced environmental goods (e.g. the APEC list). The US Trade Act of 2002 establishes market access for US environmental technologies, goods, and services as a priority, and is thus often covered in US trade agreements. The Environment chapter of the TPP also includes commitments by all TPP parties to effectively enforce their environmental laws, and not to waive or derogate from environmental laws in order to attract trade or investment. The Comprehensive Economic and Trade Agreement, between the EU and Canada, includes a binding commitment not to lower environmental standards (Cosbey 2014).

As indicated, NTBs are also being addressed in RTAs. In addition to the reference to NTBs in the TPP Agreement mentioned above, the EU-Singapore FTA sets out specific commitments in Chapter 7 on Non-Tariff Barriers to Trade and Investment in Renewable Energy Generation. It includes: (i) obligations not to impose local content requirements that affect the other party's products, service suppliers, investors or investments; (ii) obligations to ensure that authorization, certification, and licencing procedures are objective, transparent, and not arbitrary or discriminatory; and (iii) agreement for mutual recognition of compliance testing of almost all goods in HS Chapter 84 (i.e. boilers, machinery, and mechanical appliances like refrigerators) and solar PV panels and wind-powered generators.

In the area of regional integration, the emerging mega-regionals especially provide interesting opportunities for furthering trade in CETs. Indeed, their mere size makes any progress on this issue potentially very important.

The TPP does include a section on the Transition to a Low Emissions and Resilient Economy. In support of this transition to a low emissions economy, it recognizes the need for collective action, and agrees to mutual cooperation and support in transitioning to a low emissions economy. It also makes explicit reference to cooperation on matters of joint or common interest with respect to energy efficiency; development of cost-effective, low emissions technologies and alternative, clean and renewable energy sources; sustainable transport and sustainable urban infrastructure development, among others. However, the nature of cooperation is not specified, making the provision rather soft.

The Transatlantic Trade and Investment Partnership (TTIP), between the US and the EU, is also a particularly interesting mega-regional as it would theoretically be able to set the bar high and make progress on behind the border issues. Indeed, tariffs between the two are typically already low, which is why the focus is on regulatory cooperation and on addressing NTBs. The negotiations, however, are heavily criticized by environmental groups on both sides of the Atlantic (see for example Ackerman 2015). It would be important that their concerns are addressed, and that the agreement contribute to raising environmental standards and take concrete action, not the least in relation to climate change and clean energy.

ii. Services: GATS scheduling, classification, DDA, Trade in Services Agreement, and RTAs

Trade in services plays a critical role in the deployment of clean energy and comprises a major input into clean energy projects. It is therefore crucial to address clean energy services in a trade context. After more than a decade of services negotiations under the GATS, little progress has been made in the area and there is a need for targeted efforts.

One interesting development has been the launch of negotiations on a Trade in Services Agreement (TiSA) by a group of like-minded countries.[17] As in the case of the EGA described in the subsection on tariffs, TiSA offers a promising venue to achieve progress in the area of clean energy using a plurilateral approach, which could later benefit the full WTO membership.

One of the challenges in clean energy services (or services in general for that matter) is the lack of an appropriate, universally agreed classification (Sugathan 2013). Environmental services follow the fairly old W/120 classification list based on the United Nation's Central Product Classification, and may not adequately capture a number of clean energy services, particularly in critical areas such as design and installation, construction and maintenance. However, the absence of an appropriate classification should not prevent countries from reforming the clean energy services sector. Rather, countries should take action to address this gap.

As a first step, a scoping exercise that helps countries better understand the coverage of products and activities that may be relevant for the supply of CETs would be a prerequisite for eventually negotiating commitments (Bernabe 2013). Such an exercise could take place in the Council for Trade in Services under the WTO, if this would be opportune given the current state of the DDA. Alternatively, the exercise could evolve within TiSA and take the form of a negotiating proposal by a country or a group of countries. This could then lead to a document that would set out all

[17] At the time of writing, these countries are Australia, Canada, Chinese Taipei, Chile, Colombia, Costa Rica, Hong Kong China, the EU, Iceland, Israel, Japan, Mexico, New Zeeland, Norway, Pakistan, Peru, Singapore, South Korea, Switzerland, Turkey, and the US.

the different activities or services subsectors relevant to clean energy, which will aid in the development and optimal usage of clean energy through their liberalization. In this exercise, countries could turn for inspiration and guidance to existing sectoral approaches under the GATS—such as the GATS Annexes on Air Transport, Financial Services, and Telecommunications, as well as the Understanding on commitments in Financial Services.

A next step would then be to engage in actual trade reform (ibid). If a critical mass of countries would be prepared to engage and make commitments, it would make sense to try and negotiate an agreement incorporating definitions and descriptions as identified in the scoping exercise. If only a smaller group of countries opt to make commitments, it may make more sense to incorporate the definitions as laid out in their individual schedules of commitments.

Much of the above could take place in a plurilateral setting. The benefit is that it may enable a more expeditious process, with potentially greater coverage than would be possible under a multilateral process, which would involve more trade-offs and compromises. Given the more flexible approach to services negotiations traditionally (as compared to goods negotiations) it would still be possible for new entrants in a future agreement to make appropriate commitments relative to their respective domestic conditions. Having said that, it would also imply a bigger risk that new entrants miss out on the opportunities linked with domestic reform than in the case of goods. This could be compensated for to some extent by new members undertaking autonomous liberalization efforts that spur reform, even if they are not immediately scheduled as binding commitments.

In this context, if countries choose to pursue a plurilateral approach to trade in clean energy services, initially outside the WTO, for instance through a SETA-type approach, one recommendation would be to liaise closely with the EGA negotiations on tariffs. Indeed, clean energy goods and services are often provided in an integrated manner, and a minimum level of coordination would result in a more coherent outcome. Even better would be to fully integrate services negotiations as part of the EGA, thereby turning it into a green technologies agreement. A proposal on the fusion of goods and services negotiations for technologies where this may be required has been explored in the E15 Expert Group on Services.[18] Currently, a few parties to the EGA have indicated that they wish to address services in that agreement. In this scenario, there will need to be even stronger coordination with TISA, as the latter could involve negotiations on several services such as construction and engineering that will also be relevant to clean energy delivery.

iii. Regulatory issues; NTBs: TBTs, harmonization, private standards, regulatory convergence, domestic regulation of services; access to infrastructure and networks

In addition to the multiple avenues of possible progress undertaken unilaterally, plurilaterally, or regionally, there are still reforms that would need to take place under the WTO (Bernabe 2013). One example is the area of non-tariff measures in clean energy, particularly standards and conformity assessment measures, and the extent to which these may unfairly restrict trade or be more burdensome than necessary. Another area is the lack of clarity in WTO rules regarding the extent to which private sector standards can be disciplined under the TBT Agreement (which would be relevant for clean energy technologies).

Yet another example concerns domestic regulation in services. In fact, discriminatory regulatory measures may result in inhibiting not only the supply, transmission, dispatch, and distribution of renewable energy, but also, more relevant in the context of international trade, the foreign service suppliers who are intent on investing in and supplying those services. At the same time, space will need to be provided to address legitimate domestic regulatory concerns of WTO members.

Yulia Selivanova (2015) points out that to meet climate change targets, large amounts of clean energy will need to be able to connect to networks, including for the purpose of cross-border trade in clean energy. Indeed, a number of countries will find that their natural conditions make it impossible to source clean energy from within their territory, and importing electricity may be needed to shift their energy mix away from fossil fuels. Long-term investments in energy infrastructure will therefore be necessary.[19] Moreover, regulation of access on reasonable terms to transport and distribution networks will be crucial for the integration of clean energy trade into an economy. While the multilateral trade rules are oriented towards ensuring market access, additional measures are needed to guarantee availability of fixed infrastructure and timely access to transportation pipelines/networks, distribution systems, etc. The issues and proposals discussed below with respect to clean energy access to infrastructure and networks, and the implications for WTO reform, particularly GATS rules, are derived from Selivanova (2015).

One of the challenges with regulation of third party access to transportation networks in a trade governance context is related to the fact that such infrastructure is mostly controlled by private companies rather than by governments, the subjects of obligations under

[18] See the policy option paper in the present series produced by the E15 Expert Group on Services, entitled Rethinking Services in a Changing World. Option 10 addresses the issue of compatibility between rules governing goods and services and calls for the establishment of a Working Group (or another mechanism) open to all WTO members, which could consider, among others, the possibility of including both goods and services in some stand-alone agreements such as one dealing with environmental products.

[19] There is already interest in and serious discussions on developing an interconnected global grid for clean energy. See for example Chatzivasileadis, Ernst, and Andersson (2013).

WTO agreements. Existing rules do not address the anticompetitive practices commonly carried out by incumbents controlling different segments upstream and downstream of the energy value chain. To address this, additional pro-competitive disciplines would be necessary. Selivanova argues, however, that it would be inefficient and unreasoned to negotiate pro-competitive disciplines for clean energy networks alone. A better option would be general rules linked to the GATS, with possible specific provisions covering preferential access for clean energy to networks.

Additional commitments, either in an annex to the GATS on Energy Services or a reference paper, could be used to address competition issues and third party access to fixed infrastructure, similarly to the additional disciplines for the telecommunications sector. The following issues need to be tackled to secure an effective pro-competitive framework for clean energy trade, including third party access to fixed infrastructure:

- Ensuring third party access to and interconnection with energy networks and grids, as well as other essential infrastructure whether dominated by government entities or privately-owned companies;
- Creating an independent regulator separate from and not accountable to any supplier of energy services;
- Ensuring non-discriminatory, objective, and timely procedures for the transportation and transmission of energy;
- Maintaining appropriate measures for preventing certain anticompetitive practices in the sector;
- Ensuring transparency in the formulation and implementation of rules, regulations, and technical standards;
- Requiring the provision of non-discriminatory and timely information on data relevant for transportation and transmission of energy, such as prices and transmission capacity;
- Ensuring security of supply and non-interruption of energy transportation; and
- Providing expeditious and fast-track dispute settlement (as the interruption of energy transportation services can have drastic consequences on consumers).
- Moreover, it should be envisaged to allow governments to provide preferential grid access to clean energy on a non-discriminatory basis between domestic and foreign suppliers. In addition to general provisions to this effect in an annex or reference paper, this could be achieved through the inscription of corresponding services in the members' schedule with a listing of respective conditions and qualifications.

Furthermore, as regards transit through fixed infrastructure (such as grids), general transit rules are not as complete as they should be to address all pertinent problems faced by cross-border clean energy trade.

It has sometimes been doubted whether Article V of the GATT 1994 applies to energy products and materials at all, especially electricity and transportation methods, notably grids. For the sake of clarity and predictability on the above issues, it could be envisaged to adopt an interpretative note to Article V, clarifying that transit disciplines indeed do cover electricity transit via fixed infrastructure. Similarly, it should be possible to clarify that the obligation for a member state to guarantee freedom of transit applies in any case, regardless who owns the transportation infrastructure.

Should the application of WTO transit rules with respect to energy be revisited (which is desirable), the Energy Charter Treaty transit provisions and the Transit Protocol discussions could be useful to draw lessons from (despite the failure to reach a final agreement on the Transit Protocol). Issues such as setting transit tariffs, congestion management, and the distribution of available capacity are especially pertinent.

Finally, the question of preferential access for "clean" electricity to transport networks should be addressed. Legislation in some countries already gives priority grid access to renewable energy, although, until present, such clean energy has typically been produced domestically. In the case where the capacity of networks is limited, and transit becomes *de facto* impossible because of preferential access granted by the national legislator to domestically produced renewable energy, the implications of current rules are not clear. For the purpose of promoting clean energy, the rules should explicitly allow priority access to the networks, be it exported, imported, or domestically produced and consumed.

Another option would be to address the issues related to energy trade through fixed infrastructure in a separate agreement devoted to energy trade under the auspices of the WTO, including in a plurilateral setting, such as the proposed SETA (ICTSD 2011). Apart from the question of feasibility of such an agreement, it could be argued that the disciplines covering energy trade via fixed infrastructure should be created for energy in general, not only clean energy. However, according to Selivanova (2015), clean energy trade would be the main beneficiary of such rules, especially if the possibility of preferential access for clean energy to the networks could be introduced.

Considering the lack of extra large capacity in energy infrastructure, third party access rules will not necessarily be sufficient to address the problem. Therefore, a more difficult issue is linked to the creation of new infrastructure. For the development of regional and global energy trade, it would be important to devise rules that mandate new infrastructure construction, especially if an investor offers to undertake this construction. Rules for the expansion of network capacities and the construction of new infrastructure are necessary for the development of clean energy trade and investment. The WTO framework does not contain investment disciplines; yet such disciplines appear necessary to effectively advance the construction of fixed infrastructure required for clean energy trade (ibid).

3.2.2. Policy space beyond tariffs

Non-tariff measures constitute important barriers to trade in many cases, and particularly in the realm of clean energy. The CETs in this paper refer to those required for the provision of electricity where the sector competes with fossil fuels, which continue to benefit from considerable subsidies, granted at the consumer and producer level, in countries at all levels of development across the world. Moreover, the clean energy sector itself receives different kinds of subsidies and assistance, both to compensate for fossil fuel support but even more to bolster the development of a sector that is still young and in need to grow, mature, and eventually become a viable alternative to fossil energy. This support is often delivered as part of a policy package also intended to stimulate local jobs, growth, and income. In addition, energy is often provided through complex public-private supply chains and with a heavy involvement of state-owned enterprises. All in all, this gives rise to intricate business models where it is difficult to distinguish "regular" business from various policy objectives.

Whereas reducing barriers to market access for CETs is crucial for optimizing supply chains, governments often wish to retain a degree of policy space to pursue various goals related to sustainable development. These include not only climate change mitigation but also the generation of green jobs, domestic industrial development, and technology transfer. It has also been argued that in bigger markets the creation of domestic "green industries," including in the CET sector, will drive down long-term costs of clean energy deployment even if they may impose short-term costs or are uncompetitive relative to CET imports (in the absence of trade barriers). The "unlevel playing field" in which renewables have to compete against often heavily subsidized fossil fuel sectors is also mentioned to justify support to the CET sector.

In all of these discussions, it is important to bear in mind whether the achievement of climate mitigation goals would be constrained or facilitated in any way by the adoption of such policy space, and also if they could be pursued in the most effective manner without sacrificing domestic economic and social policy objectives. Critics of the need for "policy space" often argue that trade restrictions may not be the answer to foster domestic CET industries, nor indeed be the optimal response to any of the other relevant policy objectives. For instance, to generate green jobs, climate mitigation policies may most effectively be served by sourcing technologies and services at the lowest cost in world markets. Moreover, critics also point out that clean energy scale-up also generates jobs in services such as installation, construction, and maintenance that are invariably local. Further, they also argue that WTO rules do not restrict the pursuit of clean energy in any way (even through subsidization) so long as measures do not discriminate between local and foreign-made technologies. However, there is arguably a lack of clarity regarding the extent and type of measures that countries can use for clean energy deployment. In addition, the increasing use of trade remedies in response to the perceived dumping or subsidization of CETs also pits "fairness in trade" against "rapid CET deployment," which benefits from cheap imports.

The Expert Group proposals outlined below concern three areas related to domestic policy space and associated measures that could benefit from greater clarity and predictability as well as "flexibility" with respect to trade rules. The three areas are subsidies, local content requirements, and trade remedies.

iv. Subsidies: options for adjusting the ASCM

The work carried out by the E15 Group has highlighted that the *status quo* is not an option in the area of subsidies and the ASCM. Members argue that there is a need for some sort of reform; on the one hand to ensure that governments have the necessary policy space to support the development of clean energy, and on the other to further discipline the use of support that may be trade distortive, either between countries or between sectors (e.g. fossil fuels and clean energy).

The recent *Canada-Renewable Energy/FIT* case to some extent provided shelter for certain non-discriminatory support policies, but it did not offer full immunity.[20] The creation of this partial safe harbour may have come at the expense of transparency and subsidy governance (Cosbey and Rubini 2013). Unless steps are taken to address this, the WTO will most likely be facing increasing litigation. As stated in section 2 *supra*, members of the Expert Group and think piece authors Cosbey and Rubini as well as Porges and Brewer argue that a case law solution has inherent limitations and express the opinion that this is not the preferred way forward. Cosbey and Rubini (2013) contend that "only reform can ensure the legitimacy of the fundamental decision of what type of government intervention should be permitted and what should not. Only reform can ensure the necessary legal certainty to both government and business action."

A number of alternatives to litigation exist. These range from the very ambitious, often requiring considerable efforts to achieve, to options that may offer temporary and/or partial solutions, involving a lower level of political compromise.

The most ambitious measure would be an amendment of the ASCM, and/or Article XX of the GATT to ensure that policies supporting the development and scale-up of clean energy for climate change mitigation purposes would be more explicitly permissible and thus sheltered from challenge. This option was discussed earlier under systemic issues. Another option, also described in section 3.1, could therefore be an interpretative understanding. An interpretative understanding could, for example, resolve the ambiguity regarding the question of whether the general exception under Article XX of the GATT applies to the disciplines in the ASCM (Howse 2013). An interpretative understanding could also reinforce the *dicta* suggested in *Brazil-Retreaded Tyres*,[21] suggesting that climate change policies would fall within the provisions (b) and (g) of that article (ibid). One advantage of this approach is that it might be able to address the issue of fossil fuel subsidies. Under Article XX (b), a member subsidizing clean energy would

[20] Canada – Certain Measures Affecting Renewable Energy Generation Sector, Canada – Measures relating to the Feed-in Tariff program, WT/DS412/R, WT/DS426/R.
[21] Brazil – Measures Affecting Imports of Retreaded Tyres, WT/DS332/AB/R.

need to justify the necessity of the support. If the member at the same time offers subsidies to the fossil fuel sector, it might be difficult to argue that support to the CET sector is "necessary," as a less trade restrictive measure exists—i.e. eliminating the support to fossil fuels.

Another approach for an interpretative understanding could be to offer clarification on the concepts of "benefit," "financial contribution," and "specificity" in the ASCM (ibid). For example, in the case of specificity, the understanding could define what would be acceptable as "objective criteria or conditions" in the context of clean energy subsidies. Howse (2013) suggests that "this would be based, in the first instance, on recognizing that increasing the use of clean energy relative to energy that contributes to climate change and to other environmental and health problems is a legitimate objective of subsidies policies in this area." He thereafter suggests that "as an indicative matter illustrative lists might be developed of design features and operational practices that should be presumed to be consistent with the language 'objective criteria and conditions' and others that are likely to be problematic (…)."

An interpretative understanding could similarly help clarify whether a feed-in tariff constitutes a "financial contribution." Howse suggests that this could be done by specifying that clean energy and fossil fuel generated energy are not "like" products or services; that measures that address the relatively higher cost of generating clean energy should therefore be presumed not to provide a financial contribution to clean energy market actors; and that such measures shall be deemed not to provide "price support" within the meaning of Article 1 of the ASCM.

Finally, on the issue of benefit, the interpretative understanding could build on the ruling of the Appellate Body in the *Canada-Renewable Energy* case (see above), and include principles that would state that the determination of benefit requires a comparison against an appropriate market benchmark, which should be different than conventional energy markets. Measures targeted at addressing the cost difference between producing clean energy and conventional energy should be presumed not to confer a benefit.

Another approach is a waiver from the ASCM for existing clean energy policies, similar to the discussion in section 3.1. Howse (2013) proposes that a waiver could apply to policies based on their objectives, meaning that it would apply only to subsidies specifically addressing environmental externalities. It could also be conditioned upon the removal of discriminatory aspects of policies within a set, relatively short time frame. It could further contain an Article XX chapeau-like provision, requiring that policies under the waiver do not constitute arbitrary or unjustifiable discrimination. To benefit from the waiver, a WTO member could be required to eliminate or reform other policies that undermine the objectives on the basis of which the waiver is granted, in particular fossil fuel subsidies.

v. Local content requirements

Local content requirements are part of the subsidy discussion, and the Expert Group has identified specific options to address them.

Cosbey and Rubini (2013) clearly state that an LCR is not fundamentally an environmental measure, but rather an instrument of industrial policy. Environmental goals can be achieved through LCRs under certain circumstances, but the evidence is thin and suggests that even when that is the case LCRs cannot be considered effective measures. Jha (2013) shows that LCRs raise the costs of clean energy goods for domestic power producers and hinder the immediate and cost-effective generation of clean electricity. Howse (2013) further argues that it may no longer be true that LCRs are necessary to gain political support for incentives and other measures directed at promoting clean energy, as the programmes in question are, in many instances, well established and endorsed by their constituencies.

As LCRs are explicitly aimed at distorting trade and investment flows, they are expressly prohibited under WTO subsidy law. Yet despite weak evidence concerning the environmental benefits of such measures, as well as their incompatibility with WTO rules, LCRs continue to be implemented around the globe. New programmes are even being launched since the WTO Appellate Body ruled against the LCR component of the Ontario feed-in tariff scheme under *Canada-Renewable Energy.*

The question therefore arises whether it is necessary to review existing rules to further clarify the situation. ICTSD research has looked into options for a gradual phasing out of LCRs, possibly limited to developing countries, while at the same time agreeing to an explicit moratorium against any new LCRs. This option would have the benefit of recognizing developing country needs for an adjustment period. It would also avoid further litigation and rally WTO members around an explicit intention to refrain from using LCRs, which might promote better compliance with existing rules. However, this option has generated little support among group members.

An alternative way forward would be to have an interpretative understanding of the ASCM facilitate the conversion of ASCM-inconsistent LCRs into other kinds of WTO-consistent measures which ensure that recipients of clean energy subsidies provide benefits to the local economy. Howse (2013) argues that as a general matter it could be affirmed that conditions such as the training or hiring of local workers, as well as technology transfer, should be presumed to be consistent with GATT, TRIMs, and ASCM rules provided they do not discriminate against imports or violate MFN treatment.

Given the growing use of LCRs despite the prohibition imposed by WTO rules, and particularly in a time of rising foreign direct investment in the CET sector, the issue will need to be addressed on a priority basis.

vi. Trade remedies

The work carried out in the context of the E15 Expert Group on CETs calls for a reform of the WTO rules governing anti-dumping and anti-subsidy measures to achieve a better alignment with normal competition or antitrust rules (Horlick 2013, Howse, 2013, and Kasteng 2013). This would involve, *inter alia*, the revision of the definition of abuse of a dominant position and of dumping so that the rules specifically target anticompetitive behaviour rather than simple price discrimination, for example, for which there are typically many valid reasons. It would also include addressing some of the more common procedural weaknesses, such as product definition, the identification of indicators of injury, and verification of causality between dumping or subsidization and injury. It would also be desirable to: (i) include a "public interest test," which would require input from a broader range of stakeholders than is the case today; and (ii) consider the inclusion of environment-specific provisions in the agreements.

Before turning to this long-term agenda, a number of options can be considered in the short to medium term. To begin with, WTO members can simply choose to enforce existing law (Horlick 2013). For example, the current Anti-Dumping Agreement includes provisions that in effect require recognition of "Moore's law," which envisages the halving of solar panel costs every 18 months due to learning curves. Dumping calculations must take into account costs spread over the product cycle, as well as the start-up situation of new products and factories.

Other specific options, less ambitious than comprehensive reform as described above, and thus potentially feasible in the short to medium term, include the following (Kasteng 2013):

- Trade remedies on clean energy might be limited in level, by making use of the lesser duty rule;[22]
- Trade remedies might be limited in time;
- Trade remedies might be limited in scope, for example by only permitting measures on a certain number of clean energy products or a certain import value; and
- A criterion on climate change in national public interest tests might be introduced.

Whereas Kasteng refers to these as options for the WTO, it would seem that they could also be applied unilaterally, or within the context of RTAs or a sectoral agreement such as the EGA.

However, research shows that significant trade chilling effects of remedies occur already at the stage of the initiation of an investigation, and that even if the exporter wins the case in the initial phase there is a negative impact on trade (de Lima-Campos and Vito 2004). Therefore, it would be desirable to identify policy options that would prevent cases from even starting (Horlick 2013). This might include options such as a peace clause on trade remedies in the clean energy sector (Lester and Watson 2013). Although theoretically this could be done unilaterally, a more likely scenario would be to reach agreement among a group of like-minded countries, for example in the EGA or in mega-regionals like the TPP and TTIP. In fact, EGA signatories and TPP parties are among the primary users of trade remedies in clean energy. The latter option would therefore go a long way towards addressing the global problem of remedies in the sector. Within the EGA or other trade agreements, it would also be possible to simply eliminate the trade remedy tool—there are several precedents, for example in the New Zealand-Australia FTA or in the European Union (Swedish National Board of Trade 2013).

If the waiver from the ASCM (discussed in section 3.2.2 (iv) above) were implemented, it could include an agreement not to take trade remedy action against any policy covered by the waiver during its period of validity (Howse 2013).

Other more gradualist options could include (ibid):

- An undertaking by willing WTO members to engage in consultations as soon as they are aware that policies and practices in another member may give rise to trade remedy action in their jurisdiction; and
- A commitment to publish an objective study of the costs and benefits of both the measures being responded to by trade remedy action as well as the remedies themselves.
- In a longer-term perspective, WTO members could also consider including a provision of "non-use" of trade remedies in a future WTO agreement on environmental goods, as provided for in the Doha declaration, para 31 (iii).

[22] The lesser duty rule ensures that the trade remedies are not higher than necessary to remove the injury inflicted on the domestic industry.

4. Concluding Note

The main policy options presented in this paper are listed in annex in a summary table structured over a short to long-term time horizon. The latter include ambitious proposals for comprehensive reform of the trade system to support the sustained scale-up of CETs, whereas the former offer a gradualist and potentially more feasible approach in the immediate term to respond to the urgent imperative of climate change mitigation and other sustainable development goals.

The historic Paris Agreement reached by delegates to the UNFCCC in December 2015 commits signatory nations to reductions in greenhouse gas emissions with the objective of limiting global warming to "well below" 2 degrees Celsius. The new framework places the burden of action on the implementation by individual nations of respective Nationally Determined Contributions. Most plans for transitioning to a low emissions economy refer to ambitious targets to shift energy matrixes through rapid and massive deployment of clean energy. Effectively implementing the agreement will require increased investment in research and development on CETs, and reaching mitigation targets will in large part depend on the success of CETs. As argued in this paper, an enabling framework of rules as well as targeted trade and investment arrangements can greatly contribute to fostering the necessary scale-up of renewable energy globally.

The policy options paper produced under the E15Initiative by the Expert Group on Measures to Address Climate Change and the Trade System, available in this series, underlines that "most of the opportunities trade offers in the common struggle against climate change are currently being missed. The effort to address climate change must occur not only within the UNFCCC; it must also occur within the global trade system. There are a whole array of ways the WTO and other trade arrangements can be used affirmatively to maximize trade as a positive force in fighting and forestalling climate change."

In offering a broad set of options for consideration by policy-makers and other stakeholders in developed and developing countries alike, the E15 Expert Group on Clean Energy Technologies has sought to contribute to this effort.

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Annex 1: Summary Table of Main Policy Options

Short-term options	Medium-term options	Long-term options
Options for addressing systemic issues		
A **moratorium on dispute settlement** in some or all areas of climate change mitigation based on agreement with trading partners including those whose trade could be impacted by such measures.	A **plurilateral agreement** between a subgroup of countries regarding how they will interpret WTO rules in trade relations with each other.	An **amendment package** coupled with a **waiver** with respect to WTO rules on the grounds of policy space required for climate change mitigation and based on Article IX:3 and IX:4 of the Marrakesh Agreement.
	An **interpretative understanding**, as provided for under Article IX:2 of the Marrakesh Agreement. Such multilateral interpretations are meant to clarify the meaning of existing obligations, rather than to modify their content.	
Options for reform or new rules		
Strengthening markets: tariff liberalization		
Establish **list of environmental goods** that includes all key clean energy goods in the context of the EGA and eliminate bound tariffs to zero.		Finalize the DDA on EGS.
Ensure **coordination between the EGA and TiSA** for a coherent approach to CETs.		
Propose a mechanism that would make it easier for **countries outside the EGA to join**.		
Include some form of **special and differentiated treatment in the EGA** to address developing country concerns.		
Strengthening markets: services & regulatory issues		
Work towards the **inclusion of services relevant for CETs in TiSA**, and for an eventual inclusion of TiSA under the WTO.	Agree to an understanding or an **annex to the GATS on clean energy services**, similar to the annex on telecommunications.	Address **domestic regulations** in the area of clean energy services under the WTO
Ensure **coordination between TiSA and the EGA** on goods for a coherent approach to CETs.	**Interpretative note to GATT, Art. V,** clarifying that **transit disciplines** cover electricity transit via fixed infrastructure and that the obligation for a member state to guarantee freedom of transit applies in any case, regardless of who owns the transportation infrastructure.	Finalize the DDA on EGS.

Short-term options	Medium-term options	Long-term options
Promote a **discussion under the WTO Committee on Trade and Environment** about identifying services relevant to the supply of CETs.	Countries make **reform commitment**s reform based on the **understanding or annex** under TiSA or the GATS.	Revisiting the application of **WTO transit rules** with respect to energy.
	Include **clean energy services in the EGA**.	Formulation of **WTO investment disciplines** to effectively address the construction of fixed infrastructure necessary for clean energy trade.
	Additional commitments either in an annex to the GATS on Energy Services or a Reference Paper to address competition issues and third party access to fixed infrastructure including **priority access for clean energy to the networks** whether exported / imported or domestically produced and consumed.	
	Addressing the issues related to **energy trade through fixed infrastructure** in a separate agreement, including a plurilateral one, under the auspices of the WTO devoted to energy trade (such as a Sustainable Energy Trade Agreement).	
Policy space: subsidies & local content requirements		
	An **interpretative understanding** to clarify concepts in the **ASCM** such as “benefit”, “specificity” and “financial contribution” as well as for example the relationship between GATT Article XX and ASCM.	
	A **waiver** from the **ASCM** that applies only to subsidies specifically addressing environmental externalities and made conditional on removing any discriminatory aspects within a set, relatively short time frame as well as other domestic policies inconsistent with the waiver objectives (e.g. fossil fuel subsidies). It could also contain an Article XX chapeau-like provision, requiring that policies under the waiver do not constitute arbitrary or unjustifiable discrimination.	

Short-term options	Medium-term options	Long-term options
	An **interpretative understanding** of the **ASCM** to facilitate the conversion of ASCM-inconsistent **LCRs** into other kinds of WTO-consistent measures that ensure that recipients of clean energy subsidies provide benefits to the local economy.	
Policy space: trade remedies		
A **better enforcement of existing law**, for example by recognizing "Moore's law" on learning curves and cost reductions over a product life cycle.	**Eliminate trade remedies** in RTAs and/or the EGA	In concluding the Doha negotiations on environmental goods, insert a **provision on the "non-use"** of trade remedies.
An undertaking by willing WTO members to engage in **consultations** as soon as they are aware that policies and practices in another member may give rise to trade remedy action in their jurisdiction.		Reform WTO rules on trade remedies in general (i.e. beyond their use in clean energy).
Make use of the **lesser-duty rule in remedy cases** in the area of clean energy; introduce a time limit for trade remedies on clean energy; and limit trade remedies on clean energy goods in scope.		
A commitment to **publish an objective study** of the costs and benefits of both the measures being responded to by trade remedies as well as the remedies themselves.		
Introduce a climate change criterion in **national public interest tests.**		
Introduce a **peace clause** on trade remedies on the clean energy sector in new RTAs and/or the EGA.		

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The experts all participated in their personal capacity. The views and recommendations expressed in the policy options paper are not attributable to any institution with which members of the E15 Expert Group are associated.

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