Re-Thinking Global Climate Change:
A Local, Bottom-Up Perspective

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Abstract

This article provides a timely and forward-thinking analysis regarding the transition to clean energy. It does so by offering a behavioral-economics analysis of prosumer-market factors. We argue that transitioning to clean energy cannot be achieved solely through top-down or bottom-up methods; rather, a symbiotic relationship between government or businesses creating opportunities and individual prosumers is key. The article puts an emphasis on the effectiveness of bottom-up factors like smart cities, NGOs, and ordinary citizens.

I. Introduction

This article focuses on the potential role of the citizen in promoting climate-friendly approaches to energy and trade. One of the mega-trends of this century is a paradigm shift from the 20th-century's top-down approach to climate governance (e.g., the Kyoto Protocol) to a greater emphasis on bottom-up leadership. Not only does the Paris Agreement allow states to design their own mitigation contributions, but non-state actors, including citizens, nongovernmental organizations (NGOs), cities, local leaders (mayors and governors), and businesses, are playing a major role in implementing the agreement's climate goals. In energy governance, we observe a similar push for energy democratization as control over energy security shifts and new energy actors emerge, namely prosumers (i.e., consumers who are also producers of (renewable) energy and who use energy in a smarter, more efficient manner)* and renewable energy cooperatives. This article argues that, particularly in this age of declining multilateralism, such bottom-up approaches could help to expedite the changes in global energy patterns required to mitigate climate change.

The rest of the article proceeds as follows: section two analyzes the shift in the trade regie from top-down to bottom up, and deals with the decline of a top-down multilateral trade system, proposes a bottom-up approach to governance that the Paris Agreement offers, and then elucidates the citizens'

* It is interesting to see the conceptual evolution of this phenomenon of energy actors over time: Initially, one referred to an energy user, then consumer, then customer, and now prosumer. For an analysis of prosumers, see R. Leal-Arcas *et al*., "Prosumers: New actors in EU energy security," *Netherlands Yearbook of International Law*, Vol. 48, pp. 139-172, 2017.

involvement in trade institutions and agreements. Section three explains the concept of citizen empowerment by presenting the energy transition goals, and proposes bottom-up approaches to the energy transition. Section four concludes.

II. The Trade Regime From Top-Down to Bottom-Up

A. Decreasing Relevance of the World Trade Organization

Multilateralism does not seem to be doing well these days, at least not at the World Trade Organization (WTO). There are multiple reasons for the troubles at the WTO. For one, it has not kept pace with economic and geopolitical changes, with multilateral negotiations under its auspices appearing to go nowhere and its dispute settlement system stagnating. The failure of the Doha Round is attributed by some to the deadlock between the European Union and the United States regarding agricultural subsidies, the resulting disregard of the developing countries' interests in access to global markets for agriculture, and the fundamental lack of a shared social purpose among the major trading powers.[1] Another possible reason is the fundamental lack of trust among citizens that their interests are being sufficiently considered by those negotiating behind closed doors. Current WTO procedures, which mainly contemplate actions by member states' governments, are perceived as too inflexible, and thus unable, to pay attention to the concerns of various non-state actors. Some proposals for citizens' empowerment, such as the involvement of civil society in the Committee on Trade and Environment and their participation as stakeholders during the negotiation process of future trade agreements, are difficult to incorporate into these state-to-state procedures and processes at the WTO. Hence, during the 1999 WTO Ministerial Conference in Seattle, large crowds demonstrated on the streets, asking trade technocrats to be transparent and share the outcome of their deliberations. Since that time, demonstrations have become a common feature of trade rounds.

Whatever the reasons, the glittering days of the global trade regime appear to be numbered. Instead, the focus of trade negotiations has shifted from the WTO arena to plurilateral or "mega-regional" trade agreements, such as the Trans-Pacific Partnership (TPP), its latest iteration, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), and the Trans-Atlantic Trade and Investment Partnership (TTIP). These "new generation" agreements seem more consistent with sustainable

development concerns, in general, and climate change action in particular. Especially important is the inclusion of environmental (and labor) provisions and chapters: e.g., Chapter 20 of the Comprehensive and Progressive Trans-Pacific Partnership,[2] Chapter 24 of the Comprehensive Economic and Trade Agreement,[3] and the "Trade and Sustainable Development" chapter in the Trans-Atlantic Trade and Investment Partnership negotiations.[4] The willingness to take non-economic concerns into account is not limited to developed countries; emerging economies are likewise participants to these trade negotiations and agreements.[5]

B. A Different Model: Climate Change

Unlike the WTO, the Paris Agreement takes a bottom-up approach to commitments. Rather than being negotiated, emissions targets are designed by each party according to its national circumstance. The idea is to attract wide participation, especially by all the major emitters of greenhouse gases, and,—although it may sound counter-intuitive,—to promote greater ambition by removing the fear of sanctions for non-compliance. Another distinction from the WTO is that the targets are not legally binding and are subject to reporting and review rather than being enforceable through binding dispute settlement. As part of these reviews, the agreement encourages updating of targets because it was recognized that the initial set of targets from over 180 countries was not sufficient to meet the global temperature goal.

Beyond the largely bottom-up approach to targets, the Paris outcome created platforms and other opportunities for non-state actors to take on commitments for emissions reduction and participate in the multiple processes.[6] This strategy is expected to augment or supplement national governments' goals and commitments. This approach, also called "hybrid multilateralism" by some authors, is characterized by an intricate entanglement of public and private authority and involves a "more integrated role [for non-state actors] in multilateral processes through…monitoring of national action and experimentation with local, regional and transnational mitigation and adaptation strategies."[7]

Indeed, a huge amount of activity on the part of both businesses and non-national governments is occurring worldwide. Among many examples, the Non-State Actor Zone for Climate Action (NAZCA) tracks their voluntary climate action commitments.[8] In the case of the United States, businesses and state/local governments were already taking significant climate action before President Trump's announcement of his intent to withdraw the United States from the Paris Agreement; however, that announcement triggered a

multitude of additional initiatives (e.g., We Are Still In, the U.S. Climate Alliance).

Global issues, such as climate change, poverty, or terrorism,[9] are too big for nation-states, but are (somewhat counter-intuitively) more suitable for cities to tackle.[10] Multiple human activities today are concentrated in cities. They are where the majority of the world population lives[11] (and this trend is still rising);[12] where 50% of global waste is produced;[13] where 80% of global economic activity (as measured by gross domestic product) takes place;[14] and from which between 60% and 80% of greenhouse gas (GHG) emissions originate.[15] City mayors tend towards a more pragmatic approach that arguably offers better governance on these matters. Moreover, mayors tend to come from the cities they govern and therefore garner a much higher level of trust than politicians at the national level. Accordingly, as the main polluters and the main implementers of legislation,[16] cities (and therefore citizens) can, and should, take climate action. Indeed, cities around the world are demonstrating innovative strategies for advancing solutions to climate change.[17] Specifically, city-level climate action that includes a much greater participation of citizens is very promising.[18] The so-called "all hands on deck" approach means that climate action includes citizens' seemingly mundane daily choices, such as commuting to the workplace and upgrading the lighting system in buildings.[19]

Rapid decarbonization efforts have the greatest potential in cities, particularly in developing countries and in sectors such as construction, transport, energy, water, and waste. In these areas, private sector investments are most crucial.[20] While the private sector is not lacking in initiative to contribute to climate change mitigation efforts, citizens can additionally put pressure on businesses to undertake environmentally responsible and beneficial activities.[21] Parenthetically, when politicians fall short, businesses may have a role to play in helping decarbonize the economy. While politicians are susceptible to short-termism (for obvious electoral reasons) and may be too risk-averse, entrepreneurs tend to be "riskophiles" and persistent, with longer-term visions and commitments.

Private sector-led climate action and initiatives matter on two main fronts: first, on actual contributions to the decrease in global GHG emissions; and second, through private investors financing the mitigation and adaptation efforts of other businesses or of capital-deficient developing countries (and the cities therein). Companies that have set, or committed to set, science-based climate targets include Honda Motor Company, The Port Authority of New York and New Jersey, AstraZeneca, IKEA, Tesco, and Dell Technologies.[22] Science-based targets refer to "the level

of decarbonization required to keep global temperature increase below 2 degrees Celsius compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change."[23] The Portfolio Decarbonization Coalition, for example, comprises asset owners and managers that collectively endeavor to re-channel "capital from particularly carbon-intensive companies, projects and technologies in each sector" to "particularly carbon-efficient" ones and "will commit to a concrete decarbonization plan."[24]

A question remains, however, whether and how these types of bottom-up responses to climate change can be specifically imported into the energy transition sphere. As the world reduces its oil dependence, production and export of green technology and reliance on clean energy would be of considerable value. Two ingredients may help move forward the energy transition: international collaboration and energy decentralization. Potential international collaboration can be achieved in the field of technology, for which international trade will certainly play a major role. As for energy decentralization, the emergence of micro-/mini-grids dealing with locally produced wind and solar energy as well as electric-vehicle batteries is the way forward. All of these innovations will not only help in providing better access to energy, but it will also decentralize economies.

C. Citizen Involvement in Trade Institutions/Agreements

In light of the abovementioned decline in popularity or political viability of the multilateral trade system, states are entering into more regional trade agreements (RTAs), a number of which also contain innovative provisions furthering the energy transition by promoting the use and development of clean or renewable energy technologies.[25] Energy-related provisions in regional trade agreements can take various forms: including those allowing exceptions from "normal" trade rules for sustainable energy mechanisms;[26] extending subsidies for the low-carbon economies;[27] establishing climate finance instruments and capacity-building activities to develop carbon markets;[28] and enhancing trade in environmental (climate-friendly) goods and services.[29] Some RTAs additionally contain provisions that encourage investment in the energy sector with the specific objective of expanding and diversifying the energy mix and reducing dependency on fossil fuels.[30]

Yet, while there are indications of its waning status, the multilateral trading regime represented by the WTO continues to be relevant because most countries will remain predominantly energy-dependent, and therefore, markets for climate-friendly goods and services need to be opened up.

International trade can also aid in responding to today's sustainability challenges, specifically those pertaining to climate change and energy transition, by offering means for various actors to cooperate in enhancing sustainable energy. International collaboration is important in making clean energy cheaper and encouraging its wider use, and international trade in clean energy technologies can "mitigate greenhouse gas emissions in addition to the economic gains that can be expected from an optimization of supply chains."[31]

Accordingly, the continued relevance of the multilateral trade system can no longer mean that only states would be involved in the development of trade agreements that relate to, or affect, the energy sector. Due consideration must be given to the interests of non-state stakeholders who should be allowed to participate in multilateral trade processes either directly, by giving them seats at negotiating tables or committees, or indirectly through procedures facilitating transparency and greater consultation.

With regard to existing trade remedies, for instance, various stakeholders should be consulted because their inputs are relevant in ascertaining whether an anti-dumping or countervailing duty is in the public interest.[32] At the WTO, there already exist promising efforts to engage with civil society: at the Eleventh Ministerial Conference in Buenos Aires, 251 NGOs from 52 countries were accredited.[33]

The role of citizens and micro, small, and medium enterprises (MSMEs) in international trade governance is another example of a bottom-up approach to sustainable development governance that would shift the current paradigm. The WTO[34] has focused on trade-policy related factors that affect MSMEs' limited but gradually growing participation in international trade, and tackled how e-commerce and other information and communications technology (ICT)-oriented services encourage their access to world markets and global value chains.[35] Participation in international trade helps SMEs grow and become more profitable, and cooperation among states helps lessen obstacles to such participation.[36] Specifically, trade agreements can, among others, reduce variable and fixed costs of trade that are particularly burdensome for SMEs, and can ease the information deficiency or asymmetry relating to non-tariff measures (i.e., standards and regulations) that SMEs have to deal with.[37] Trade cooperation likewise enables states to provide preferential treatment (and access) to SMEs and assist their technological development.[38] The report also highlighted the MSMEs' contribution to the creation of more inclusive employment which potentially brings more citizens closer to the global marketplace.[39]

The EU leads in strategically using policy support and economic

incentives, such as trade and investment opportunities, to bolster climate change mitigation efforts in non-EU countries. One of the more recent manifestations of this leadership is the Partnership Instrument, which is a financing instrument that "support[s] the external dimension of EU internal policies…and help[s] to address major global challenges such as energy security, climate change and environmental protection."[40] Moreover, in December 2017, the European Commission announced the creation of a new advisory group on EU trade agreements.[41] The group aims to increase transparency and inclusiveness in EU trade policy. The EU Commission is committed to this cause.[42] Incorporating the perspective of this wide group of stakeholders[43] (consumer groups, trade unions, and other non-governmental organizations) on EU trade policy will certainly help towards "better"—i.e., greater understanding of interlinkages and more emphasis on sustainability concerns—trade policymaking in the future.

III. The Concept of Citizen Empowerment

Citizens' empowerment is a relatively new concept in global governance.[44] Consumers' and citizens' participation in the determination and implementation of solutions to global problems significantly deviates from the traditional approach under which inter-governmental decisions dictate commitments and actions from the top down. One way that private individuals are participating in climate action is through the Carbon Rationing Action Group (CRAG) initiative, wherein a voluntarily formed group tracks each member's personal CO2 emissions (air travel, household heating, car use, household electricity consumption, and/or other public transport use).[45] The CRAG initiative has a notable enforcement mechanism in the form of financial penalties and exclusion from the scheme.[46] Additionally, individuals are exercising their power as consumers by demanding "green products and services"; in this regard, eco-labeling aids in sending signals between consumers and producers and facilitating transactions.[47]

A. Energy Transition Goals

Promoting the use of renewable energy is one of the most pressing concerns for climate change and long-term sustainability at a global level. The long-term goal should be 100% energy use from wind, solar, and hydropower sources. At present, the EU has set a binding target of 20% final energy consumption from renewable sources by 2020,[48] and the Council has endorsed achieving at least 27% renewable energy consumption in 2030.[49] While the transition is happening at a slow pace,[50] it is

promising that the energy mix is changing to low carbon[51] and is getting cheaper.[52] Apart from the power sector, heating, cooling, and transport are sectors where fossil fuels need to be gradually replaced with renewables.[53] Sector coupling—either among sub-units within the energy sector or between energy and other sectors—might be a way to make this replacement possible.

However, the achievement of energy transition goals cannot rely on reduced energy demand alone as it is not realistic to expect such a considerable reduction. Instead, the focus should be directed to a smart policy design for energy demand, with "smartness" measured along the dimensions of sustainability, collaboration, and intelligence.[54] As researchers explain:

> *[A] holistic approach is required to effectively deal with the current challenges posed by the sustainable development principles: consumers (and their communities at large) should be explicitly encouraged to be directly engaged through a more participative and collaborative behavior, factually realizing a collaborative consumption strategy, that is a technology-enabled sharing of goods and services between consumers that requires enhanced forms of collaborations.*[55]

Smart energy demand policy needs to be complemented with technological and institutional improvements on the supply side. The "smart grid" concept and the emphasis on collaborations among producers and consumers capture this suggestion.[56] As will be elaborated below, making energy access cheaper and more secure requires the reduction or elimination of legal technical barriers to energy technology so that smart grids can take off in different jurisdictions.[57] If we succeed at a more efficient and sustainable energy system, energy imports and energy dependency will gradually fall, costs will be cut, and GHG emissions will be reduced.

In energy policy, "it has become clear that efforts to steer people towards 'better'—that is, more energy efficient—choices and behaviours are much needed."[58] As suggested by Lucia Reisch, there is increasing evidence that the right incentives do spur behavioral change.[59] This has certainly been the case in Nordic countries; the Nordic model has been very successful in designing bottom-up approaches to policies with the right incentives and market integration.[60]

The main drivers of energy transition include: increased access to information and communication; energy decentralization that leads to energy democratization[61] via a multilevel governance system; citizens' empowerment[62] aiming at a state of autarky (in as much as this is possible) in a customer-centered system that enables them to exploit market opportunities; new business models; innovation; stronger and smarter grids; better and

smarter regulation aimed at reducing or eliminating technical barriers; and electrification, which drives the deployment of renewable energy.[63]

As the foregoing initiatives and proposals suggest, implementing a successful energy transition requires consideration of several factors: circularity/cradle-to-grave principle (recycling over and over again), consumers' engagement, decarbonization, long-term thinking, minimizing social impact on consumers, multilevel governance (local, regional, national, supranational, international), simplicity, speed (namely making sure that the energy transition happens within a reasonable timeframe), affordability, and transparency with data.

B. Bottom-up Approaches to the Energy Transition

Pursuing energy transition through citizen empowerment takes various forms. Undertakings can be conceptually categorized into those directed at consumer information dissemination and raising public awareness; access to cheaper, smarter, and more secure energy; and cooperation among prosumers and collaboration between producers and consumers

Information Dissemination and Awareness

In light of evidence that the younger generation wants to consume in a sustainable manner,[64] use of social media (Twitter, Facebook, YouTube) could be leveraged to further educate the youth (the segment of society that makes most use of it) about the links among trade, climate change, and energy consumption, and more broadly, to involve them in policymaking and public life.

General public awareness and empowerment can additionally be enhanced through wider use of eco-labeling,[65] which enables informed decision-making about consumption and "encourage[s] the behavioral change of producers and consumers towards long-term sustainability."[66] Among the better-known examples of government-supported eco-labels are ENERGY STAR[67] (US) and Blue Angel (Germany).[68] To deliver cost-saving energy efficiency solutions, the former partners with the U.S. Environmental Protection Agency (EPA),[69] which, in turn, enters into partnership agreements with foreign governments—Canada, Japan, Switzerland, and Taiwan—to promote specific Energy Star qualified products in their markets.[70]

Improvement of Access to Cheaper, Smarter, and More Secure Energy

Energy transition through decentralized power generation is linked to enabling individuals, households, schools, and small businesses, among other entities, to become "energy citizens" or "prosumers" who

produce and, in certain circumstances, sell their own renewable electricity.[71] Prosumers can additionally further the goals of environmental protection and market competition by providing essential grid services, like energy storage, and by committing to reduce or shift their consumption patterns as part of efficiency and demand response programs.[72]

New policies and regulatory frameworks, as well as the reduction or elimination of any legal barriers,[73] are critical to encourage the creation of scalable micro-grids for prosumers and utility companies, achieve better grid management, and harmonize these developments with other policy objectives. Foremost of these barriers is the lack of definition of the concept of prosumers and the concomitant lack of recognition of their rights and obligations under existing laws and regulations.[74]

Cooperation and Collaboration

Citizen empowerment also involves helping prosumers help themselves. In the wind energy sector of several EU countries (i.e., Austria, Germany, Sweden, The Netherlands), the formation of cooperatives—pioneered by Denmark—enables individuals and small-scale entities to invest their pooled resources in infrastructure to generate and distribute the energy that they themselves are primarily using.[75] Notably, this model has also been gaining attention in North America.[76]

Private actor-led initiatives occurring at the transnational level are likewise emerging. One example is Breakthrough Energy Coalition,[77] which comprises patient and tolerant visionary billionaires with diverse backgrounds, as well as "global corporations that produce or consume energy in vast quantities, and financial institutions with the capital necessary to finance the world's largest infrastructure projects," who are collectively determined to provide reliable, affordable, and carbon-neutral energy by investing in and building innovative technologies. In its so-called "Landscape of Innovation," the Coalition aims to address emissions in five key areas: electricity, transportation, agriculture, manufacturing, and buildings.[78] Another initiative called Mission Innovation[79]brings together a group of 22 countries and the EU,[80] aiming to reinvigorate and accelerate clean energy innovation throughout the world to make clean energy affordable for all. Various multinational companies, including 40% of the Fortune 500 companies, are collectively undertaking to contribute to energy transition by aiming to procure 100% of their energy needs from renewable sources.[81]

IV. Conclusion

At a time when multilateral and exclusively state-to-state action is quite unpopular, while global challenges are simultaneously mounting and increasingly intertwined, the capabilities of citizens, cities, and other non-state actors need to be tapped and harnessed. Decarbonization is one global challenge that lies at the intersection of the trade and climate change regimes. A key ingredient to facilitating trade in climate-friendly energy is participation by a greater number of diverse stakeholders, who are more attuned to local environmental conditions and to energy demand and supply.

As this article elaborates, in the absence of a well-functioning WTO, and drawing on the precedent of climate action and the Paris Agreement innovations, attention should focus on the ways in which non-state actors can be empowered to play a greater role in accelerating the energy transition. The rise of the so-called energy prosumers—consumers *cum* producers—is an important development that holds great potential and requires further support from states, such as through the establishment of a legal framework recognizing prosumers' rights and obligations. The small scale in which these non-state entities typically operate to improve energy access and security makes collaboration among them worth encouraging. Various co-operatives in the European renewable energy sector can be taken as models.

Current discussions regarding WTO reforms should also include how these new entities can access global markets and how WTO rules should be applied to the energy sector. Member States should not be constrained in implementing measures like trade-related concessions and local content requirements to encourage these entities' participation, particularly in the production and diffusion of clean energy. In this regard, proposals for a General Agreement on Trade in Energy and/or a Sustainable Energy Trade Agreement,[82] which covers liberalization of trade in environmental goods and services, deserve further study. No solution to big challenges, such as climate change and trade liberalization, would be possible without social mobilization and cooperation among governments, companies, and researchers, whose role is to provide good information to create good policy.

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