ATLANTIC FUTURE

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Atlantic Energy and the Changing Global Energy Flow Map

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ABSTRACT

An 'Atlantic energy renaissance' is currently unfolding across the 'Atlantic Basin,' where roughly half of the world's known fossil fuels are located and more than two-thirds of the world's renewable energy is currently generated. The technological revolutions in 'unconventional' and 'difficult' hydrocarbons – in shale and offshore – have recently contributed to a shift in the global center of gravity of energy supply away from the 'Great Crescent' and into the 'Atlantic Basin.' Combined with the shift in the global center of gravity for demand to emerging Asia-Pacific, these 'revolutions' are reversing the traditional 'westward' flow of energy from Eurasia to the Atlantic to produce a new pattern of global flows in which the countries of the Atlantic Basin will increasingly become the net suppliers of energy at the margin to Asia-Pacific. Furthermore, such 'revolutions' have also played a role in the recent reversal of fortunes of renewable energy, particularly in the Northern Atlantic. Therefore, while shifting energy flow map – largely driven by the Atlantic energy renaissance – both calls into question the notion of the 'Asian century' and problematizes the rationale behind the US 'pivot to Asia,' it also reveals new geopolitical and governance potential along the strategic horizon for Atlantic actors. However, such potential will remain unrealized without 'pan-Atlantic energy cooperation that addresses both the emerging issues of the new 'energy seascape' and the low carbon 'imperative.' Finally, the 'Atlantic energy renaissance' and the changing global energy flow map of which it is both cause and effect, also highlights the growing relative strategic significance of the 'Southern Atlantic.'

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1. The Atlantic Energy Renaissance[1]

A new Atlantic Basin is emerging, and energy is one of its principal driving vectors.[2] Indeed, an Atlantic energy renaissance has already been underway – unobtrusively--for nearly a generation. Only in the past few years, however, has the full potential force of such an underlying structural strategic change become perceptible. (Isbell 2012, 2013)

New players and technologies have recently emerged to notably alter the both the Atlantic Basin and global energy maps, as new conventional and 'unconventional' fossil fuel sources and new alternative 'low carbon' energies come online -- and as opportunities for 'pan-Atlantic' energy cooperation begin to emerge. This transformation of the Atlantic energy space is now unfolding across sectors and segments, among public and private actors, and all along the energy value chain. Most importantly, this Atlantic energy renaissance is emanating from both the old 'North' and 'South' Atlantics – not just from the United States, where it has been most loudly trumpeted for its assumed potential to finally secure 'national energy independence.'

In the Northern Atlantic, the 'shale revolution' is indeed radiating out from an increasingly less import-dependent North America. (CNAS 2014, CSIS 2014) As recently as early 2013, the International Energy Agency (IEA) expected the United States to overtake Russia in 2015 as the leading producer of natural gas and to overtake Saudi Arabia in 2017 as the world's leading producer of oil. However, the latter is happening this year, in 2014, and the former is about to occur. By 2019, the IEA projects the US will be producing over 13.1mbd.[3] Already the United States has become a net exporter of refined petroleum products for the first time since 1949. (EIA 2012b) Meanwhile, natural gas production is up 40% in the US since 2005. In 2012 shale gas accounted for 37% of US natural gas supply, up from only 2% in 2000.[4] By 2040, upwards of 50% of US natural gas production will be unconventional. (CSIS 2014)

The implications have quickly rippled across the Atlantic energy space to Europe, where displaced US coal has been backing out renewable energy and competing downward, to some extent, the price of Russian gas for Europeans. (Mufson 2012) The paradoxical result, at least so far, has been a relative undermining of Europe's vital role in the parallel 'low carbon revolution' which it has led for two decades from its position in the northern Atlantic. This recent Atlantic Basin dynamic has intensified the energy dilemmas perceived by the EU – whose member states are, on the one hand, relatively import-dependent (particularly on Russia, Central Asia and the Middle East; EC 2011, BP 2013a) but also, on the other hand, relatively environmentally conscious (particularly of climate change but also of the potential dangers of 'fracking').

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[1] This article has been derived from the introduction to a longer analysis conducted for, and submitted to, the Atlantic Future research project of the European Commission.

[2] Along with economic (trade, investment and finance), human security, sustainable development, ocean/marine, and other cultural and governance dynamics. For more on these other 'Atlantic drivers,' see the Eminent Persons Group of the Atlantic Basin Initiative, "A New Atlantic Community: Generating Growth, Human Development and Security of the Atlantic Hemisphere: A Declaration and Call to Action," a White Paper of the Atlantic Basin Initiative, Center for Transatlantic Studies, School of Advanced International Studies, Johns Hopkins University, March 2014.

[3] Grant Smith, "US seen as biggest oil producer after overtaking Saudi Arabia," Bloomberg, July 4, 2014 (http://www.bloomberg.com/news/2014-07-04/u-s-seen-as-biggest-oil-producer-after-overtaking-saudi.html)

[4] Steven Mufson, "Shale gas reshaping the U.S. industrial landscape," *The Washington Post*, November 15, 2012.

However impressive has been the 'shale revolution' in the Northern Atlantic, the deep-water offshore boom in the Southern Atlantic preceded this North American contribution to the Atlantic energy renaissance and continues to rival it. Catalyzed by the pre-salt discoveries in Brazil (by themselves as potentially as high as 50 to 200 bn bbl) and the development of the deep offshore in Angola and elsewhere in the Gulf of Guinea and along the West Africa Transform Margin, the 'offshore revolution' has embraced nearly all of Africa and most of Atlantic Latin America. (Isbell 2012) Over the last decade, investment in offshore oil exploration and production (E&P) has generated something akin to a 'Southern Atlantic oil ring' with offshore E&P on the rise from Namibia to Morocco in the East, and from Argentina to the Gulf of Mexico. Of the US$210bn in expected capex investment in global offshore hydrocarbons between 2011 and 2015, over 80% will take place in the Atlantic, and over two-thirds of that in the Southern Atlantic. Already Southern Atlantic offshore oil reserves (130bn barrels) dwarf those of the Arctic (90bn barrels). (IFP Energie Nouvelle 2012). In fact, the Southern Atlantic could become the key new region at the margin for increases in global oil production, as well as the most critical regional supplier of oil at the margin to Asia-Pacific.

At the same time, through its myriad public, private and civic actors, the Atlantic Basin is currently spearheading, however insufficiently still, the global technological and governance efforts to provide sustainable, 'low emissions energy access for all' (as in the UN's SE4All Initiative) and to avoid the worst aspects of climate change (as in the UNFCCC's goal of defending the '2-degree guardrail'). The first full blooming of the low carbon revolution has unfolded within the Atlantic Basin, where two-thirds of renewable energy generation now takes place and where a similar share of global installed renewable capacity is currently located. Although much of this has deployed in the Northern Atlantic, renewable energy is now finding more fertile terrain in Latin America and Africa, where global institutions and the regional development banks are now placing the priority for their low carbon, energy access and sustainable development goals. Nevertheless, the continued growth of low carbon energy has been at least partially undermined by the recent boom in unconventional fossil fuels. Indeed, business-as-usual projections see the Atlantic Basin oil accounting for nearly two-thirds of the growth in global oil production to 2030, even as the Atlantic is now projected to 'de-carbonize' its energy mix at a slower rate than the rest of the world, particularly Asia-Pacific. (BP 2013b)

2. The Shifting Global Energy Flow Map and the New Atlantic Center of Gravity

These competing energy 'revolutions' in the Atlantic have contributed to a redrawing of the global energy map. In stark contrast to the expectations of the reigning conventional wisdom -- still adhering to a once valid, but now increasingly obsolete, global energy map of the past -- the Atlantic energy renaissance is now beginning to challenge the long-held assumption that the global center of gravity for energy supply, particularly in the fossil fuel realm, would remain firmly rooted for the foreseeable future in the Middle East, Central Asia and Russia -- what we call the 'Great Crescent' on our new global geopolitical, governance and energy maps.[5] As Atlantic hydrocarbons

[5] This paper 're-projects' the world map into three major regions: (1) the 'Atlantic Basin' (which includes the four Atlantic continents in their entirety, along with their islands): Africa, Latin America and the Caribbean, North America and Europe); (2) the 'Great Crescent' (which groups together the traditional 20th century suppliers of hydrocarbons: Russia, Central Asia and the Middle East – a region which arcs in a 'great crescent' from Southwest Asia all across the northern half of the Asian 'continent'); and (3) 'Asia-Pacific'

reserves and production continue to increase over the coming decades, and as Asian energy demand continues to grow, the respective centers of gravity for global energy supply and demand are shifting such that global energy flows will continue to be significantly altered.

But the Atlantic energy renaissance is not occurring in a vacuum; nor is it completely free of counterpoising tendencies. Rather, it is emblematic – even part and parcel -- of a number of deeper, globally-reaching tectonic shifts now convulsing the 'global energy flow map.' These global – but also 'Atlantic shaped' and 'Atlantic shaping' -- trends include:

- A *westward shift in the global center of gravity for energy supply* into the Atlantic Basin, driven by recent, significant expansion in Atlantic energy resources – in particular, shale in the Northern Atlantic and offshore oil and gas in the Southern Atlantic. Already the Atlantic world holds over 40% of global 'proven reserves' of petroleum and upwards of two thirds of broader (not yet 'economical') oil resources (including 'unconventional' oil and the 'deep offshore'). The Atlantic also contributes 44% to daily oil production; by 2030, this share is projected to rise to 47% -- as nearly two-thirds of the projected growth in global oil production will take place in the Atlantic Basin. (BP 2013b)

  Beyond 2030, gas will begin to replace oil within the global energy mix and upon the global 'energy seascape' -- and by 2050 gas will have nearly completed displaced oil to account for 80% of globally traded energy, with most of it transported across the global 'energy seascape.' (IIASA 2013) Because Atlantic Basin is potentially even more central on the future gas map than in the case of oil – with two-thirds of the world's estimated shale gas reserves and nearly half of all 'technically recoverable gas resources' (TRR) – future Atlantic gas production will extend and reinforce the supply-side of the currently emerging 'West-to-East' global energy 'flow circuits.' (EIA 2013)

- An *eastward shift in the global center of gravity for energy demand* into Asia-Pacific (but also into the 'Great Crescent'). This trend has -- and continues to be -- driven by: (1) *structural declines in Atlantic Basin energy demand* (from reduced energy intensity and enhanced energy efficiency stemming from economic 'maturity' and technological change); and (2) *structural increases in Great Crescent and Asia-Pacific demand*, (in part the product of an ongoing, decades-long, eastward shift in the center of gravity for manufacturing output from the northern Atlantic to Asia-Pacific). Global energy demand is projected to more than double by 2050. The Atlantic Basin will slip from contributing 45% of global energy demand in 2010 to only 39% by 2050. Meanwhile, the relatively 'energy short' extra-Atlantic, particularly Asia-Pacific, is set to increase its contribution to global energy demand from 55% in 2010 to 61% in 2050. (IIASA 2013)

- A *continual 'drying up' of the traditional post-World War II pattern of 'net westward global energy flows'* and *their subsequent reversal to become 'net eastward – or 'Asia-bound' -- global energy flows'* (or 'West-to-East' flows). As

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(already a standard regional categorization -- in contrast to the two new 'units of analysis' introduced above – this region is comprised of what are commonly referred to as the sub-regions of 'South Asia,' 'Southeast Asia' and 'East Asia', together with the islands of the Indian and the Pacific, including Australia and New Zealand). In an attempt to reveal new strategic trends which cannot be identified on the currently dominant versions of global geopolitical and energy maps, this 'Atlantic Basin projection' re-cuts existing national and regional energy data into these new regional categories, or 'units of analysis,' and then concentrates the analysis of the implications of changing global flows.

the traditional historical pattern of 'Atlantic Basin demand' depending on surplus 'Great Crescent supply' continues to evaporate, the Atlantic Basin will become increasingly energy 'autonomous' – in net terms – and Atlantic energy exports, at the margin, will increasingly flowing 'east,' bound for Asia-Pacific.

These shifts in global energy flows represent a transformation of the 'Traditional-Cold War' global energy map into the 'newly emerging global energy flow map' of the first half of the 21st century. Upon the 'Cold War' map of the past, for nearly half a century the Northern Atlantic was highly dependent on the 'Great Crescent' for 'westward' energy flows -- both land-based and seaborne, but principally and increasingly the latter – with the Strait of Hormuz and the Suez Canal representing the key chokepoints on the map, although with time a growing flow moved out of the Persian Gulf 'eastward' to a nascently emerging Asia-Pacific, lending the Straits of Malacca their increasing relative strategic significance.[6]

In stark contrast, on the 'newly emerging global energy flow map,' Asia-Pacific is increasingly dependent, at the margin, on 'eastward' (or at least 'Asia-Pacific bound') seaborne oil and gas flows out of the Atlantic Basin -- and increasingly out of the Southern Atlantic. The majority of these growing energy flows follow a 'flow circuit' out of the Southern Atlantic, around the Cape of Good Hope and across the Indian Ocean Basin to India, through Southeast Asia and its multiple straits, to the contested 'rim land' seas of the Pacific (ie, the South and East China Seas). While the 'Hormuz-Malacca energy flow circuit' remains crucial, so too now becomes the Cape Passage and the East African sea lanes (while the Suez Canal loses in relative global strategic importance).

Furthermore, the 'initial' and 'intermediate corridors' of all such seaborne flows following 'flow circuits' out of the Atlantic Basin to Asia-Pacific will also increasingly shift with time from their current East-West orientation -- through the 'low latitude' canals -- to a North-South flow following longer stretches of Atlantic sea lanes – before turning towards Asia-Pacific to move through the 'high latitude' 'inter-basin' passages.

This will occur because of a confluence of now-shifting 'flow circuit constraints' and 'enablers.' First, even the enlarged and/or refitted Panama and Suez canals will increasingly come to represent 'bottlenecked chokepoints' – once the enlarged 'Asia-Pacific bound' capacity of Panama and the still spare 'eastward' capacity of Suez are absorbed over the years to 2030 by increasing Atlantic Basin energy flows to Asia-Pacific. Second, there is the expected continued upward push in international shipping traffic -- which has grown 400-fold since the mid-19 century and tripled in the last ten years, and which is expected to double again by 2030, and to triple by 2050. (UNCTAD 2012, Stopford 2010). Third, shipping and marine-related technology have and will continue to evolve such that the largest seaborne vessels – which already cannot pass through the canals and which tend to carry bulk and dry cargoes (ie, raw materials) – will increasingly to be pushed to the 'high-latitude' passages to reach Asia-Pacific from the Atlantic, particularly through the Cape Passage in the South, but also even through

[6] More than 17mbd of oil pass through the Straits of Hormuz, at the mouth of the Persian Gulf – meaning 17 million barrels of oil every day. This is equivalent to 35% of all seaborne oil trade, and nearly 20% of globally produced oil. (BP2013a, EIA 2012) More than 85% of it is now going to Asia (India, China, Japan and South Korea), and by 2035 nearly all of it will be Asia-bound. Well over 75% of the oil moving through Hormuz daily also passes through the Strait of Malacca in Southeast Asia. Approximately 15mbd pass through Malacca daily – including the bulk of the Hormuz oil and some additional flows coming from West Africa around the Cape Passage on their way to the Far East. The shut-down of either of these straits – or both -- would take more oil off the market than is currently produced by Saudi Arabia (perennially around 9mbd-10mbd). The pipeline links between the Gulf countries and the Mediterranean or Red Sea are minimal – at most 4mbd of spare capacity (EIA 2012) -- and would take years and many billions of dollars to build new sufficient excess pipeline capacity capable of fully backing up the Strait of Hormuz.

the Arctic's 'Northern Route' (as the latest 'enhanced weatherization' technology allows more and more ships to effectively use this Arctic route, even in its current state). (Marques Guedes, 2012; Käpylä & Mikkola, 2013)

The first of these 'high-latitude' 'inter-basin' passages – the rising Southern Passage – flows south out of the Southern Atlantic and through the Cape Passage, along the northern reaches of the Southern Ocean, and into the Indian Ocean – the traditional 'mediating' basin between markets and destinations in the Atlantic and Asia-Pacific (given the enormous breadth of the Pacific Basin). The other is the emerging Northern Route, which flows north from the northeast Atlantic and into the Arctic Ocean – which, as climate change melts the Arctic icecap, becomes a potential new rival, or complement, to the Indian Ocean as a 'mediating' basin between the Atlantic world and Asia.[7]

In addition to the future erosion of the strategic significance of the canals vis-à-vis the 'high latitude passages' into the Indian Ocean and the Arctic, the canals will suffer further relative loss of importance as a result of the emergence of a new rival, strategic 'eastward' energy flow to Asia-Pacific from Arctic Russia (where most of the projected, if limited, hydrocarbons production in the Arctic are expected to take place). Therefore, the Bering Strait, long a strategic 'hard power' passage, could become for the first time a strategic energy 'chokepoint.' Nevertheless, it is not likely to ever rival the other 'straits' for strategic significance (represented, in part, by the relative volume of the flow), particularly those of the 'Hormuz-Malacca' energy flow circuit. At least in the near-to-mid-term -- even with ongoing climate change -- the ultimate, inherent limitations of the Arctic on most economic activities, together with the likelihood that most Arctic oil and gas will be economically marginalized by the Southern Atlantic 'offshore revolution,' will prevent 'Arctic Basin' global energy flows – both those originating from Arctic production and those potentially passing through from the Atlantic Basin to Asia-Pacific – from ever contributing more than marginally to the total of global seaborne energy flows. [8]

As a result of all of the factors analyzed above, maritime traffic of all types, but particularly of Atlantic Basin global energy flows (both 'intra-' and 'extra-basin' bound), will become increasingly dense, particularly along the 'western' and 'eastern' seaboards of the Atlantic, as the 'low latitude' canals – while continuing to accommodate their newly expanded maximum capacity throughputs – come to represent a shrinking share of global energy flows over time; and as Atlantic energy flows rely increasingly on maritime 'flow circuits' through the 'high latitude' passages to reach growing markets in Asia-Pacific. Furthermore, these trends also point to a rapidly growing relative strategic significance for the 'Southern Atlantic' -- and for the Southern Ocean around Antarctica. Such trends serve as harbingers, then, for rising future investments in transportation, communications, and port facilities, in addition to energy, in the southern reaches of the Atlantic.

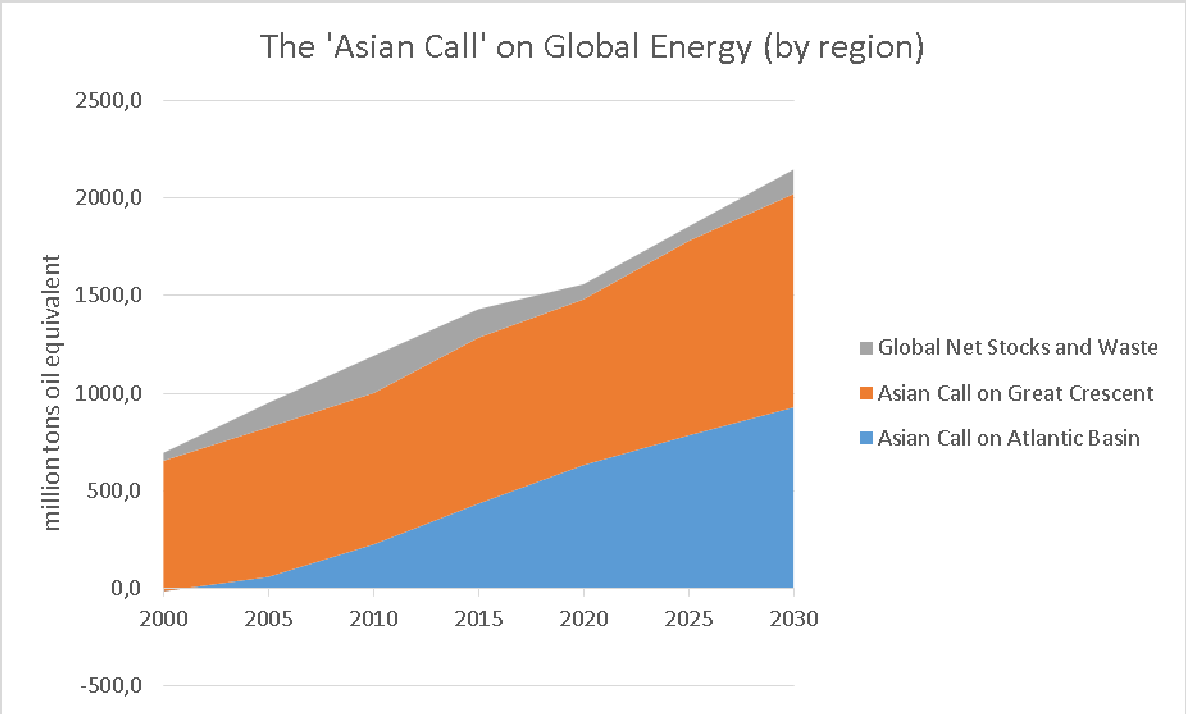
The bottom line, in strategic terms, is that seaborne oil and gas flows will increasingly *reverse their overall net direction* (Emerson 2014) -- from Cold War East-to-West flows to the new 21st century West-to-East flows. As a result, the 'Atlantic Basin' (with the Southern Atlantic potentially playing a key role) becomes the strategic hydrocarbons supplier-region *at the margin* for growing energy consumption in Asia-Pacific. In this regard, it is striking to note that *only a decade ago, nearly all projections of global*

[7] For an optimistic appraisal of the future potentials of the Arctic, see Scott Borgerson, "The Coming Arctic Boom: As the Ice Melts, the Region Heats Up", *Foreign Affairs*, July/August 2013, pp. 76-89.
[8] For a more circumspect analysis of the near and mid-term future of the Arctic, see Juha Käpylä & Harri Mikkola, "Arctic Conflict Potential: Towards an extra-Arctic perspective," Finnish Institute for International Affairs, Briefing Paper 138 (2013).

energy supply and demand (whether from the IEA, the EIA, OPEC or the World Energy Council) *foresaw increasing global energy demand at the margin being met entirely by the Middle East* (and in particular by Saudi Arabia).

Yet today, in stark contrast, the Atlantic Basin already supplies nearly one-third of that same total, global 'energy demand call' at the margin, now increasingly concentrated in the Asia-Pacific region -- *and by 2030 the Atlantic Basin is projected to provide nearly half*. (See Figure 1) Nothing could more synthetically and emblematically reflect the reality of the 'Atlantic energy renaissance' – both its causes and its effects -- than this singular and dramatic (if long-building and then recently abrupt) shift in the global energy flow map.

Figure 1. Absorption of the 'Asian Call' on Global Energy, Atlantic vs Great Crescent, 2000-2030



Source: BP Energy Outlook 2030, January 2013 and own-elaboration. Note: this refers to all traded energy, including oil, gas and coal, in million tons of oil equivalent annually. 50 million tons of oil (equivalent) annually is equal to approximately one million barrels a day of flow (or 1mdoe). 500mntoe = 10mbdoe, roughly.

If nothing else, this ongoing transformation of the global energy flow map begins to call into question the ascendant notion that the center of gravity of 'global power' has clearly and irrevocably shifted from the 'West' to the 'East' -- and that we are now in the 'Asian Century.' Most 'global power indexes' – which form part of the ostensible intellectual support for the consensus notion of the 'Asian Century' – do not even include a distinct energy variable. But if the Gulf Wars, in the end, made little strategic sense, without the variable of the oil, they would have signified a dangerous less the zero. Even today, as the 'pivot to Asia' unfolds, the 'Carter Doctrine' has not been formally rescinded. This new global energy flow map, therefore, also problematizes the geo-economic and geopolitical rationale behind the proclaimed 'pivot to Asia' that strategically responds to the notion of the 'Asian Century' – and the notion of 'global power' that supports it. At the very least this new perspective – or 'Atlantic Basin projection' – of the global energy flow map offers to more deeply inform the strategic

calculations behind the pivot (whether it becomes 'transatlantic' or remains a strictly US strategic posture).[9]

In the final analysis, whatever position or weighting current administrations or regimes might assign, within their own strategic equations, to the variables shaped by shifting energy dependency balances between countries and regions – or to the changing global 'flow circuits' that generate and articulate such shifting dependencies upon the global 'energy land- and seascapes' -- *global energy balances will continue to move, over the course of the foreseeable future, in favor of the Atlantic Basin and, at least in relative terms, against the rest of the world* (ie, the traditional fossil fuel suppliers of the 'Great Crescent' and the increasingly dominant consumers of the future in Asia-Pacific).

3. The Paradoxes, Challenges and Opportunities of the Atlantic Energy Renaissance

3.1 The Shale Revolution in the Northern Atlantic

Paradoxically, much of the above has passed largely unnoticed, even in North America, where the drum-beat focus on the 'shale revolution' and its supposed promise to deliver 'national energy independence' has tended to obscure the broader Atlantic energy renaissance from view, along with its own unique implications, risks and opportunities. While the shale revolution has conceptually overrun former concerns of 'peak oil,' it has also been cast through an overly rigid strategic focus – or 'geopolitical projection' -- that frames the potential of shale resources almost exclusively as a means to regain previously eroded economic competitiveness and global geopolitical influence, conceived of nearly entirely in 'national' terms.

At best, the potential of the 'shale revolution' has been thought of in 'bilateral' or 'transatlantic' terms. If North America is now on track to become a significant net energy exporter over the next two decades, its 'transatlantic' partners in Europe remain, by and large, highly dependent on the 'Great Crescent.' Over half of the hydrocarbons consumed in the EU are supplied by Russia and the Middle East (EC 2011, BP 2012) More than 21% of all the EU's oil imports (or 15% of its total oil consumption) came from the Middle East in 2011, and some 50% of imports (4mbd), or around 35% of total EU oil consumption 13 mbd) came from the Russia (BP, 2012). In 2011, the EU imported three-quarters (75%, or 335 bcm annually, BP 2012) of the gas it consumed that year (448 bcm). Around 35% of these imports (or 26% of total European gas consumption) was supplied by Russia (around 117 bcm).[10] (EC, 2011).

Although in the years since 2011 Europe's oil dependence on the Middle East has declined somewhat (mainly due to the imposition of trade sanctions on Iran), more

[9] For a serious, if Eurasian-centric, discussion of the 'pivot to Asia,' and its motivations, rationales, contours and potentials to become the basis of a 'transatlantic' strategic posture, see Hans Binnendijk, ed., *A Transatlantic Pivot to Asia: Towards New Trilateral Partnerships*, Center for Transatlantic Relations, Johns Hopkins University SAIS, Washington, D.C., 2014. One notable exception to the book's traditional 'Eurasian' focus is the contribution from Daniel S. Hamilton ("Asia's Pivot to the Atlantic: Implications for the United States and Europe") which charts the recent (inter)penetration of Asia-Pacific (with)in the Atlantic Basin – and particularly with/in the Southern Atlantic (which we 'tend to forget' given our seemingly 'fixed focus' on Eurasia).

[10] This last figure corresponds to 2011 levels.

recently cited levels of Russian gas imports into the EU, reported in the context of the Ukrainian crises of 2014, have them as high as 130 bcm in 2012 and 162 bcm in 2013, reaching 30% of total EU gas consumption. (Clingendael 2014, based on Gazprom data).[11]

However, these levels of dependence on Russian gas *for the 'EU as a whole'* are relatively modest enough to obscure the fact that in Central and Eastern Europe this external dependence on Russia is far higher (given that the northwestern and southwestern flanks of Europe basically do not consume Russian gas). Eastern European dependence on Russian gas is currently around 70% on average as a sub-region – *double the overall all EU dependence ratio on Russian gas, and more or less the current level of Asia's external dependence on Middle East oil.* In the case of some of the smaller Eastern European and Baltic countries – typically (although not always) with economies in which gas makes up a relatively high share of the primary energy mix, and/or where fear of, and antipathy toward, Russia can still be palpably felt -- the relationship is one of near 'total dependence' on Russia. As a result, Europe tends to perceive an energy security risk as nearly inherent in its relationship with its eastern neighbor, even in the face of the traditional counter-argument that Russia is even more dependent on the EU as an essential export market for its gas.[12]

Despite all of this, the 'shale revolution' remains stalled in Europe as a number of economic (eg, basin cost structures), legal (eg, property rights), environmental (eg, local pollution and water contamination) and political obstacles (eg, environmental and low carbon opposition) will continue to stand in its way over the near-to-midterm.[13] Nevertheless, in light of the aging and increasingly compromised traditional infrastructure links across the 'energy landscape' of Central and Eastern Europe which continue to tie Europe to the Great Crescent energy suppliers – and driven principally by the current crisis in the Ukraine – there has recently been much renewed 'transatlantic' debate of the potential to reduce Europe's dependence on the Great Crescent, and particularly Russia, by imports of liquefied natural gas (LNG) from the United States, to be provided mainly through increased shale production.

The idea has been seized upon by many as a political project with which to renovate the strategic relevance of the 'transatlantic' relationship. Typically, there have been calls for more collaborative action from the US-EU Energy Council. On the other hand, US LNG exports to Europe face opposition from a strange bedfellow alliance of large industrial and chemical companies (that would like to keep gas prices in the US as low as possible) together with environmentalists (intent on stymying the development of hydrocarbons).

Perhaps more importantly, a number of Northern Atlantic energy analysts have also recently questioned the underlying economic rationale of US LNG exports to Europe. (Boersma and Greving, 2014) (Goldthau and Boersma, 2014). The cost structure of Russian gas is low enough to at least limit the potential for diversifying Europe's gas imports away from Russia in the near-term. Nor is it is entirely clear that US LNG exports (even if from relatively cheap shale gas) will ultimately ever be able to compete on cost with Russian gas in Europe, given the large up-front capital costs that would be

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[11] In addition, the EU is also dependent on Russia for 30% of its coal imports, while half of all Russian coal exports go to the EU.

[12] Almost all Russian gas goes West in pipes; 50% to 70% to EU; the rest to Belarus, Ukraine, Caucasus, Turkey and the Balkans.

[13] The same could be said of the southern Atlantic, where the potential in unconventional hydrocarbons is large. This is particularly true in Mexico, Argentina and South Africa – Atlantic countries where low carbon, environmental and other local interests are beginning to resist the spread of shale gas but where also energy reforms would also be required to generate more sustainable increases in gas production.

required, both in the US (for liquefaction) and in Europe (for regasification and for more European gas interconnections, particularly between Spain and France).

Despite these uncertainties, however, a number efforts are afoot to boost US gas exports to Europe. Indeed, a huge re-directional infrastructure shift is underway in the US, as regasification (import) plants are being reconverted into liquefaction (export) plants. In 2007, 30 US projects were waiting for 'import' approval; today, 30 are waiting for 'export' approval, mainly along the Gulf of Mexico and the Atlantic coasts of North America. Cheniere plans to export LNG to Europe from its Sabine Pass facility by the end of next year, while export approval has been granted to five other LNG export projects to begin production after 2016.

This first wave of projects alone could allow for some 9bcm a day of exports by the end of the decade (some 15% of current US gas production), making the US an overall net natural gas exporter by 2021. By 2025, the US could be exporting as much as 40bcm of LNG a day (60% of current production levels) -- if the entire application pipeline is eventually approved and executed. Although the US is still importing about 8% of its gas consumption (mainly from Canada), by 2040 net export capacity will be about 12%. (CSIS 2014)

Successful conclusion of the Transatlantic Trade and Investment Partnership (or TTIP) would facilitate this process, as US legislation grants automatic export approval of gas to countries that have signed a free trade agreement with the US. (Otherwise, gas exports must obtain government approval, while crude exports remain banned.) But the crisis in the Ukraine has even provoked discussions over possibility of including specific energy chapters in the currently-under-negotiation TTIP, and debates over their potential contents.

It is unlikely that any rapidly conceived, 'transatlantic' effort to reduce European dependence on the Great Crescent (but concretely Russia) will make progress very rapidly – at least not in the short run, and *particularly if such an effort remains exclusively 'northern Atlantic.'* However, over the middle-run of 10 to 15 years out (between 2025 and 2030) the EU's dependencies on the Great Crescent could be strategically reoriented, even if not completely eliminated. *However, for such a strategic thrust to have any chance at sustainable success, even in the long run, it will require a deep inclusion of Atlantic partners from the Southern Atlantic.*

A 'pan-Atlantic vision' of a strategy to reduce European dependence on Russia based upon the broader possibilities of replacing these 'land-based' energy import flows into Europe with seaborne flows from other parts of the Atlantic Basin -- including the Mediterranean and broader Africa, Latin America and the Caribbean, as well as North America -- would have a greater chance of making a difference more quickly on the ground than would a purely Northern Atlantic crisis response. Although much African oil is already heading east to Asia, and a large portion – although not all-- of US gas exports will eventually go there as well, in the future much of Europe's flattening hydrocarbons demand could be met more cheaply and politically sustainably by imports from Atlantic partners in Africa, Latin America and North America.

If the shale revolution remains limited to North America – with or without US LNG exports to Europe -- it still implies graves risks to the environment and human health, as well as, paradoxically, to the global climate itself. Chief among the obstacles to -- and risks associated with -- further shale gas expansion will be the potential impact of 'fugitive emissions' of methane on the ultimate carbon footprint of gas, which

conventional wisdom assumes is 50% that of coal and 67% that of oil.[14] Methane, the principal component of natural gas, is also a greenhouse gas which is potentially, if not typically, released with shale gas production (depending on geology and local regulation and safety controls). Because methane has approximately 40-times more heat-trapping capacity than carbon dioxide, the issue of 'fugitive emissions' is the pivot upon which turns at least half of the shale revolution's ultimate rationale – to serve as a 'lower-carbon bridge fuel.' (Isbell, 2012)

But should the 'shale revolution' finally manage to spread beyond North America, it would contribute even more than it already has to the market and political undermining of the state policies and business models previously put into place and developed by Northern Atlantic public and private sectors to accelerate the deployment of low carbon technologies. This 'breaking effect' on the trajectory of renewable energy, particularly in the Northern Atlantic, has actually begun to occur as the result of the downward pressure not just on the structure of global gas prices, but also, in 'market-linked' fashion (via the 'substitution effect'), on the price of coal – the very fuel that gas is supposed to be a 'bridge' away from.

A supreme expression of the contradictions generated by the 'shale revolution' has been the recent paradoxical reversal of the respective trends in the so-called 'emissions gap' to 2020 on both sides of the Northern Atlantic. On the one hand, the US can now claim that it will achieve the (admittedly weak) goal of reducing US greenhouse gas emissions to 17% below the 2005 level by 2020 (even though it never formally committed, in a binding way, to these goals at the Copenhagen Climate Summit, given that the Senate had not, and would not, adopt the House's Waxman-Markey Bill which incorporated these national commitments). However, Europe now finds itself in the uncomfortable position of burning more and cheaper coal, which raises emissions – placing the EU's 20-20-20 objectives in danger, across the board – and placing downward pressure on the price of Russian gas sold to Europe, which constrains the pace of renewables deployment and reinforces, again paradoxically, Europe's most notably extra-Atlantic energy dependency.

3.2 The Offshore Revolution in the Southern Atlantic

In the Southern Atlantic, where over half the population lives beyond the reach of the energy grid, and where 'distributed' forms of solar energy are already competitive with other off-grid electricity sources – even without subsidies or further public support -- the marginal superiority of the low carbon revolution over its hydrocarbon contemporaries with respect to the post-Millennium 'sustainable development' goals is most apparent. Under the auspices of the UN's 'Sustainable Energy for All' initiative, Africa faces an opportunity – more likely to be realized if embraced by 'pan-Atlantic' energy cooperation – to leap-frog a generation of (possibly inappropriate) technological development by pursuing a more flexible sustainable development model based on 'distributed' energy 'services' provided by local 'energy services companies' through smaller-scale off-grid and mini-grid solar electricity technologies and through the provision of improved biomass technologies. (Thorne and Felten 2014)

At the same time, however, the 'offshore revolution' has presented the countries of the South with at least a new tempting opportunity to attempt to transform projected increases in hydrocarbons revenue into the longed-for authentic 'seeds' of both

[14] For a fuller discussion of the risks and opportunities posed by the shale gas 'revolution,' see Isbell 2012, pp. 76-98.

'sustainable development' and the 'low carbon revolution.' The potential financial, economic and political distortions within Southern Atlantic macroeconomies (eg, Dutch Disease and the corruption of state institutions and enterprises) -- and the potentially corrosive effects on the very body politic itself (eg, the multi-faceted 'oil curse') -- that potentially could be reinforced or unleashed afresh by the Southern Atlantic hydrocarbons boom could easily make the political and economic culture of potential beneficiary countries, particularly in Africa, unfit to receive global green and climate funds -- even if the 'developed' countries of the Northern Atlantic and Asia-Pacific make good on their current pledges (US$100bn a year from 2020 to 'developing countries'). Inevitably, then, this same 'offshore boom' cultures within itself the 'seeds' of a premature abortion of the 'low carbon revolution' in the Southern Atlantic -- at least for a season, and perhaps a crucial one.

The ultimate effect of the latter scenario would be to shipwreck the UN's SE4All Initiative, along with its objectives (extensions of the Millennial Goals), at least in the Southern Atlantic. Certain hydrocarbons exporters in the Southern Atlantic – Mexico, Brazil, and Angola (along with other potential energy exporters, like Morocco) -- must take the lead, reforming their energy policies, regulatory regimes and even their political economies so as to make them compatible with the 'managed avoidance' of 'Dutch Disease' and the 'oil curse' and a successful policy integration of the hydrocarbons boom with the pressing imperative (theirs and ours) of sustainably achieving 'low emissions energy access for all.'

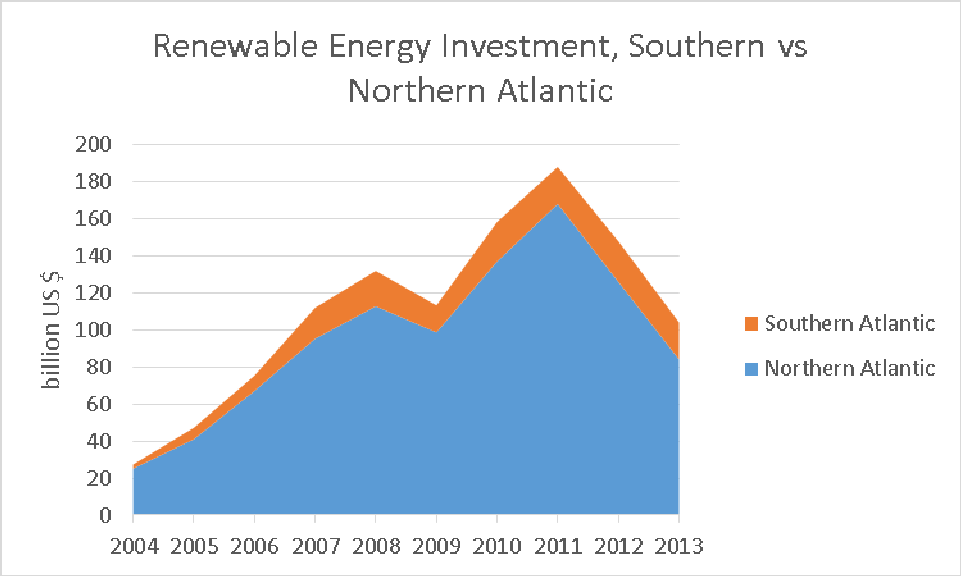
Indeed, the Southern Atlantic is globally unique in that agriculture, energy, climate and land-use constraints and possibilities all tend to converge and intersect in Africa and Latin America unlike in any other region in the world. (Isbell 2012) This uniqueness generates large risks stemming from incompatible land-use strategies, but also significant opportunities to integrate energy, climate, agriculture, water, forestry and land-use policies in the Southern Atlantic. Such factors recommend that Southern Atlantic countries consider formulas for transnational 'pan-Atlantic' energy cooperation, broadly conceived.

3.3 The Recent Retreat of the Atlantic Basin Low Carbon Revolution

Renewable energy is even more highly concentrated in the Atlantic Basin than are the traditional fossil fuels. Considering the basin's collective installed capacities for solar (77% of the world total), wind (64%) and geothermal (59%), Atlantic renewables (also known as NRETs, or 'non-conventional renewable energy technologies') constitute roughly two-thirds of the world's total installed 'renewable' electricity capacity. In terms of generation and consumption, the Atlantic accounts for more than 75% of total global modern renewable energies. (BP 2013a). Despite this apparent, impressive Atlantic dominance in 'non-conventional renewable energy technologies (or NRETs), the Atlantic Basin's current lead in the roll-out of modern renewables remains either insufficient, irrelevant or unsustainable. A number of difficult challenges and mounting barriers continue to undermine the strength of future renewable energy deployment.

Chief of among these challenges, *lagging investment in renewable energy in the Atlantic Basin* is now at its lowest level (US$104bn in 2013) since 2006, when such Atlantic investment was US$75bn a year -- and 75% of the global total. Today, Asia-Pacific renewable energy investment accounts for more than 49% of the global total compared with only 48% in the Atlantic Basin. Nevertheless, over the same period renewable energy investment in the Southern Atlantic remained steady, at approximately US$20bn a year (see Figure 2). (REN21 2014)

Figure 2. Atlantic Basin Renewable Energy Investment, Northern vs Southern, US$ bn, 2004-2013

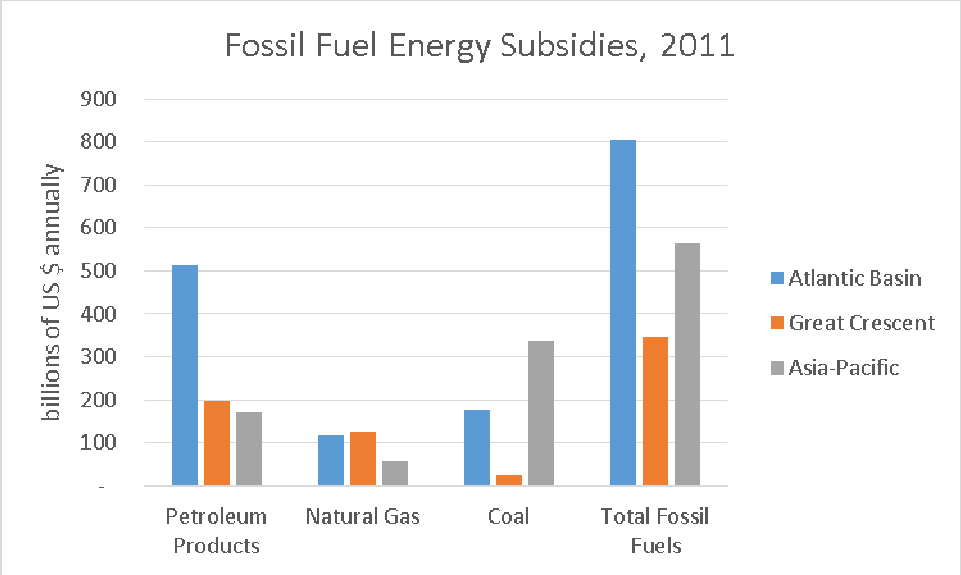


Source: Renewable Energy Status Report 2014, REN21 (2014) and own-elaboration.

- *Lingering, if rapidly disappearing, 'headline' cost differentials between renewable energies and fossil fuels* – along with a lopsided public subsidy advantage for fossil fuels – continue to tilt the playing field against renewable energy. Such 'levelized cost differentials' have recently all but evaporated in the Northern Atlantic, while in the Southern Atlantic they have fallen to only US$0.12/kWh and US$0.06/kWh for grid-connected solar and wind power, respectively. (Vergara et al, 2014; Fraunhofer ISE, 2013). At the same time, recent studies suggest that the 'societal benefits' of NRETs in the Southern Atlantic (including the avoided costs of carbon emissions and particulate pollution and the additional economic benefits in terms of improved balance of payments and net job creation) could be as high as double – or even four times as much as – these 'levelized cost differentials.' (Vergara et al, 2014)

  Meanwhile, post-tax public subsidies to fossil fuels worldwide came to US$1.7 trillion last year (IMF, 2013), while just the 'direct' subsidies to fossil fuels (not including 'indirect' support from tax breaks and exemptions) alone came to US$544bn in 2012 -- more than five times the level of state support for renewable energies worldwide (US$101bn). (IEA, 2013) Figure 3 reveals the level of fossil fuel subsidies in the Atlantic Basin (compared with other major regions) in 2011.

Figure 3. Global Fossil Fuel Energy Subsidies, by fuel and by major region, 2011



Source: International Monetary Fund, *Energy Subsidy Reform – Lessons and Implications, 2013* http://www.imf.org/external/np/pp/eng/2013/012813.pdf. Note: These are 'post-tax' fossil fuel subsidies, including both direct subsidies and indirect tax expenditures and exemptions, represented in US$ value.

The Atlantic Basin provides 58% of all ('post-tax') subsidies to oil (US$513bn of US$807bn globally) and 47% of all fossil subsidies worldwide (US$806bn of US$1.7tn). The Great Crescent is the largest subsidizer of gas (42% -- US$126bn of US$299bn -- and 20% of all fossil subsidies), while Asia-Pacific accounts for 63% of global coal subsidies (US$338bn of US$539bn) and for 33% of all fossil fuel subsidies globally. Only three Atlantic Basin countries – the US, Venezuela and Mexico -- figure in the top ten (with the US at the top), and only six in the top fifteen (including Egypt, Canada and Algeria). *Given the outsized share of the US in total global fossil fuel subsidies (US$502bn of US$1.7tn), it is clear that the 'fossil' character of the Atlantic Basin – in relative global terms – is being sustained by the Northern Atlantic, and by North America in particular.*

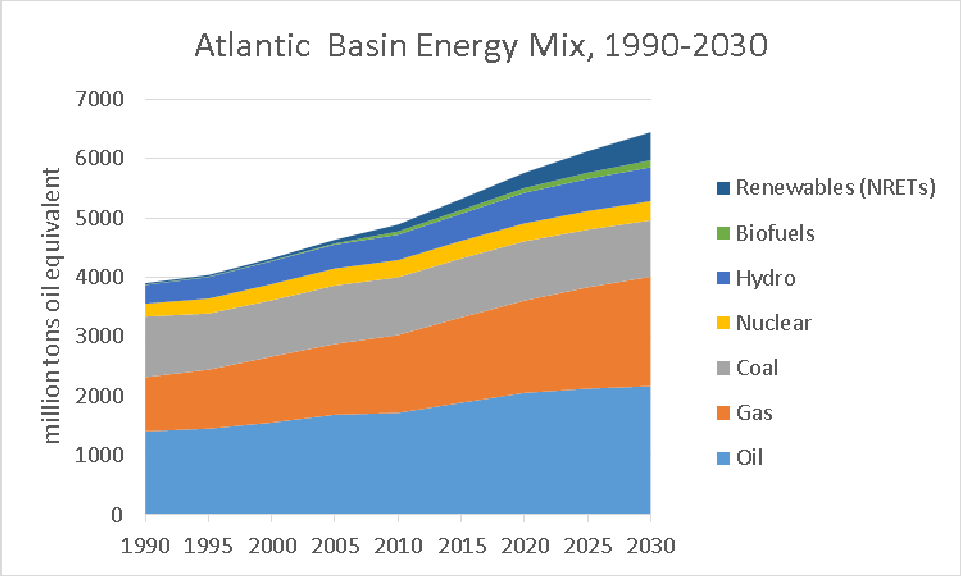
- *Recent changes in the energy policy environment,* have been unfavorable to renewable energy, contributing to a *'re-carbonization' of the Atlantic Basin energy trajectory*. The energy policy environment of the northern Atlantic, in particular, has recently been turned on its head. For the two decades preceding the financial crisis of 2008, renewable energies faced an increasingly favorable policy and commercial landscape. But a combination of abrupt pressures and constraints coming from shifting global trends colliding with the worst global economic crisis since the Great Depression has generated a political backlash against renewable energy and climate change policies that has significantly undermined NRET rollout.

  First there was the so-called 'death' of US 'cap-and-trade' legislation in the fall of 2009 and winter of 2010. Then came an inundation of Chinese solar panels onto the global solar market, just as Northern Atlantic investment community made a risk-averse turn with respect to renewable energy. After that, came the 'Euro crisis' and the reversal of much European state support for renewables (the dramatic, retroactive reduction of support in Spain being

perhaps the most significant and emblematic European case). And then the full effects of the 'shale revolution' in the US were felt across the Atlantic Basin.

Furthermore, while the Atlantic Basin remains the leader in most relevant low carbon categories, modern renewable energy continues to contribute only a small share of the Atlantic Basin energy mix. Although the share of NRETs (solar, wind, geothermal, etc) is expected to rise in the future, BP's business as usual projection foresees their contribution to the basin's energy mix – nearly 3.5% today – to be only 7.3% by 2030 (although it is true that NRETs will grow faster than any other energy source). 'Traditional, conventional renewable energies' (nuclear, hydro, biofuels) will maintain their share of around 16% of the total Atlantic Basin energy mix to 2030; over the same period, the share of fossil fuels will fall, but only from 81% today to 77% by 2030 (see Figure 4).

Figure 4. Atlantic Basin Primary Energy Mix, Historical and Projections, 1990-2030



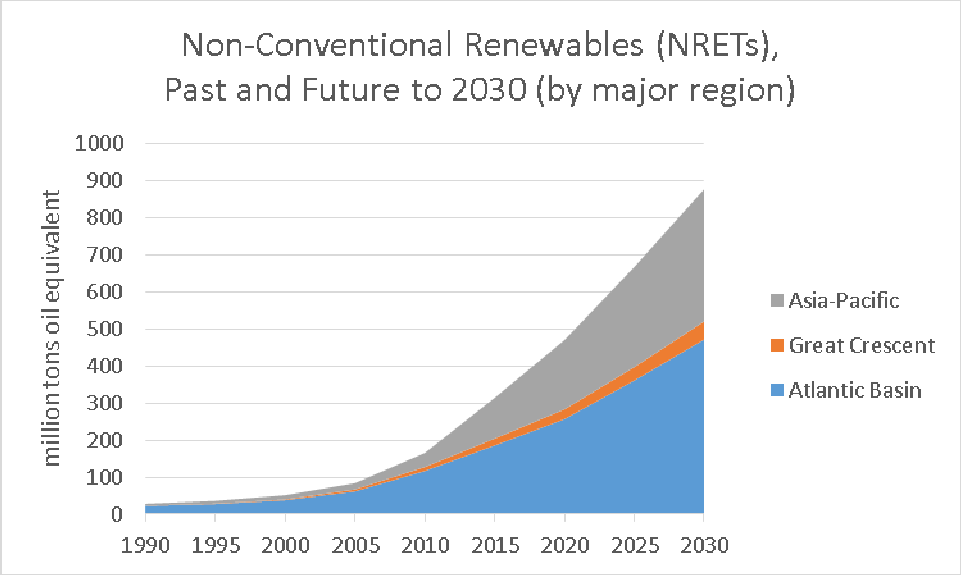
Source: BP Energy Outlook 2030, January 2013.

Although the Atlantic Basin energy mix was slightly less fossil fuel-intensive (82%) in 2010 than the world's, by 2030, according to the business as usual projection, the fossil fuel-intensity of the world's energy mix will have fallen six percentage points (to 81%), compared with a decline of only five percentage points in the Atlantic, implying that *the Atlantic Basin is now expected to de-carbonize its energy mix at a slower rate to 2030 than the rest of the world.* So much for the Atlantic Basin's low carbon leadership – at least according to 'business as usual' for another 15 years.

It is also to be expected that Asia-Pacific will continue to erode Atlantic Basin predominance in the basic categories of renewable energy consumption and production capacity – as low carbon technologies logically, and necessarily, expand across Asia to provide increasingly cheap renewable energy more closely to the rising centers of global demand. Already Asia-Pacific has increased its share of global renewable energy production from less than one-fifth in 1990 to more than one-third today; by 2030, according to our business-as-usual projection, Asia-Pacific will contribute 41% of all renewable energy production, cutting much of the

Atlantic Basin's prior lead (54% in 2030, down from 79% in 1990; see Figure 5). Although this follow's BP business-as-usual projection, it does reveal that under current configurations and conditions, low carbon roll-out is now far more intensive in Asia-Pacific than in the Atlantic Basin.

Figure 5. Renewable Energy Production, by Region, Historical and Projections, 1990-2030



Source: BP Energy Outlook 2030, January 2013.

3.4 The 'Carbon Constraint' and Atlantic Carbon Feedbacks upon the Global Energy Flow Map

Nevertheless, independent of whatever geopolitical implications one might gather from the Atlantic energy renaissance and the change in the global energy flow map of which it is both cause and effect, there are other considerations that certainly must modify anyone's geo-economic and geopolitical conclusions.

If the world were still more like it was a generation ago, the reach of this Atlantic 'fossil revolution' and its implications would begin to unfold across the global energy and geopolitical maps within a strategic context devoid of any 'climate' or 'carbon constraint.' This was indeed the situation the last time hydrocarbons unexpectedly undercut low carbon energy development in the 1980s, when non-OPEC oil production (principally from the Atlantic Basin) surged, Saudi Arabia stopped building spare capacity to compensate for the over-production of its cartel associates, and oil prices collapsed.

But today, in 2014, the mounting realities of precisely such a 'carbon constraint' – in its real material form (ie, rising temperatures and sea levels, shifting biomes and ecosystems, etc), if not yet in its necessary economic monetary expression (ie, carbon's 'market price') -- now generate profound uncertainties with respect to the ultimate implications and potentials of the most recent, multi-faceted resurgence of hydrocarbons in the Atlantic Basin.

Climate change – whether conveniently denied or clearly perceived and prepared for with awe-inspiring prudence – will continue to problematize any and all of the strategic conclusions possibly drawn from the maps mentioned above -- be they the geopolitical maps used to articulate and mount the 'pivot to Asia,' or the newly emerging global energy flow map identified above that would at least challenge many of the pivot's assumptions -- or even the many other geopolitical and energy maps that might be perceived through different strategic lenses in Asia-Pacific or the Great Crescent – or those that might be now forming within the Southern Atlantic.

At a bare minimum, the global reserve maps that underpin current hydrocarbons production and guide the future investments of the world's oil and gas companies will come under closer scrutiny. Hydrocarbons companies – be they the private companies we call IOCs, or the state companies we call NOCs – will see both the strategic relevance and the market value of their declared reserves increasingly called into question. For any ultimate embodiment of the real, material 'carbon constraint' in an effective monetary form (ie, a globally-applicable 'price' of carbon) would imply that a significant amount of currently booked global oil and gas reserves (upwards of one trillion barrels) would need to remain unburned -- 'stranded assets' cut off from any conventionally-conceived form of future stream of income. (Grantham Research Institute, 2013) Based on business-as-usual projects of future growth rates, we estimate that the world's 'carbon budget' (consistent with a successful defense of the '2-degree guardrail') will be exhausted as early as 2030 but likely before 2040. (BP2013b)

Furthermore, ongoing technological development in the energy and energy-related realms will certainly continue to roil the 'flow circuits' of the global energy flow map, shifting the sources of supply and demand across national, regional, continental and maritime borders -- and even beyond, into the high seas of the ocean basins, into the open realm of the bulk of the remaining planetary commons. Innovation and climate change will now interact to continue to tipping the scales: sometimes against traditional fossil fuels (as might occur in the case of a significant breakthrough in energy storage technology), sometimes against renewable energy (as has recently occurred as a result of the Atlantic Basin hydrocarbons 'revolutions'). In other instances, these technological 'scales' – mediated by physical and human geography -- will tip against, or in favor of, a particular country, a region, a basin.

3.5 The Rise of the Seascape

Beyond the paradoxes and dilemmas generated by the recent interactions between fossil fuels, climate change, low carbon energy and sustainable development within the Atlantic space, there are at least two other increasingly significant strategic dynamics are bound up with the Atlantic energy renaissance. The first is *the rise of the 'seascape' and the emergence of the 'blue economy'* (including but certainly not limited to marine-based energy). Driven by an increasingly rapid rate, and intensifying reach, of technological innovation which has opened the sea depths and allowed for the mapping of their unique and largely unknown spaces, systems and topographies, the ongoing emergence of the global 'seascape' reflects a long-term shift in relative geo-economic and geopolitical significance (*and transnational governance potential*), away from the traditional geopolitical and energy 'landscapes' and increasingly into the sea -- the next great resource frontier.

Over time, technological innovation has deepened the division of labor, pushing the dividing line of economic specialization beyond the household, then beyond the locally-confined market of the village, then past the boundaries of the regional and national

economies, and finally, now, even beyond the terrestrial/land frontiers of the global political economy to stretch more exhaustively across -- and more penetratingly into -- the 'global seascape.' As the center of economic and geopolitical gravity continues its 'modern' shift from the land to the sea – dating back to Atlantic Europe's first 'emergence' in the late 15th century -- our actual energy, geo-economic, geopolitical and governance maps are increasingly 'marine-centered' and 'ocean basin-based.' Only now the long-building strategic shift to the seascape is approaching an inflection point, as both global geopolitics and global political economy begin to enter their respective 'post-modernities.'

Although few are aware of it, three-quarters of the planet's surface is covered by water. "How inappropriate to call this planet Earth," wrote the British writer, Arthur C. Clarke, "when it is quite clearly Ocean."[15] After all, this same salt water constitutes 99% of the planet's 'living space' by volume. Largely as a result, transportation and commerce are typically more efficiently undertaken by sea. As such, over 90% of physical merchandise trade (by volume, and nearly three-quarters by value) takes place via marine transport along the world's sea lanes (including two-thirds of the global oil trade, one-third of the gas trade, and the large majority of other 'global material flows', expected to triple by mid-century).[16]

Already some 5% of global GDP – or US$3 trillion annually – is generated from marine and coastal industries, while some 40% of the world's population directly depends upon marine and coastal biodiversity.[17] (GOC 2014) Furthermore, the role of the oceans in the maintenance in species diversity and of coastal ecosystem services, and in the absorption of carbon dioxide, is also critical, and – given the deplorable state of oceans in general and their rapid rate of deterioration -- it will demand more and more intensive transnational collaboration. (Holthus 2012a, 2012b)

The strategic emergence of the 'global seascape' is at once shaping the Atlantic energy renaissance and being driven by it. Nearly one-third of the global total of *tradable energy* and three-quarters of *globally traded* energy is transported via the seascape. Based on annual national bilateral trade data from UNCOMTRADE, we estimate that total 'Atlantic Basin global energy flows' (including both intra- and extra-Atlantic energy trade) constitute over three-quarters of the total use of the global 'seascape' for the transportation of 'global energy flows.' Furthermore, *'intra-Atlantic' (or 'Atlantic Basin') energy flows -- 75% of all 'Atlantic Basin global energy flows (of which only 25% are 'extra-Atlantic') -- make up around two-thirds of total maritime energy transportation on the global seascape.*

In addition to *the increasing significance of the 'seascape' for the transportation of global energy flows* – along with the consequent risks to traditional and human security along the sea lanes and maritime 'rim lands' -- *one-third (28mbd) of global oil production (87mbd) already takes place in the 'offshore' and 60% of this (18mbd) is produced in the Atlantic Basin seascape.* The 'offshore' is the fastest growing category within global oil production, with the 'ultra-deep offshore' the fastest growing sub-

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[15] "How inappropriate to call this planet Earth when it is clearly Ocean," quoted in James E. Lovelock "Hands Up for the Gaia Hypothesis," *Nature*, Volume 344, Number 6262, 8 March, 1990 (p. 102); also: "... As science-fiction author Arthur C. Clarke noted, it is 'inappropriate to call this planet Earth when it is quite clearly Ocean'," as quoted in "Oceans: The blue frontier," *Nature,* 469, 12 January 2011 (pp. 158-159).

[16] Total global seaborne trade has increased since 1970 at an average annual rate of 3.1% and is expected to double yet again by 2030 (UNCTAD 2012). Since the mid-19th century, it has increased 400-fold in cargo volume terms, reaching nearly 1.5 trillion tons of seaborne cargo per capita annually (Stopford 2010).

[17] See Marcia Stanton, "The Worth of the Deep Blue," *Namib Times*, April 27, 2013 (http://www.namibtimes.net/forum/topics/the-worth-of-the-deep-blue) (Stanton 2013)

category – and both are set to continue to grow in absolute and relative terms. As such, Atlantic Basin dominance in the maritime transport of 'global energy flows' along the global 'seascape' is complemented and buttressed by the Atlantic's clear lead along the burgeoning frontier of offshore oil and gas E&P. This is particularly true in the so-called 'deep offshore' (ie, more than 1000m), one of the defining features of the nascent Southern Atlantic 'oil ring.'

Meanwhile, a growing share of wind production is also taking place 'offshore,' while other forms of marine energy (wave, tidal, current etc.) are now on the midterm term horizon. (Holthus, 2012b; IPCC 2011) According to the IEA: "Current world electricity demand is 17 500 TWh. There is the potential to develop 20 000-80 000 TWh of electricity generated by changes in ocean temperatures, salt content, movements of tides, currents, waves and swells. These technologies are proven." Furthermore, as more energy comes out of the 'Atlantic energy seascape,' more energy will also be transported along the seaborne 'flow circuits' of the Atlantic Basin, underlining its rising relative strategic significance as a 'seascape', both compared to the 'energy landscape' and to the other 'ocean-basin energy seascapes.' However, the IEA goes on to point out that ". . . there there are siting and environmental issues. Ports, coastal waters, and the open sea are divided into fishing permit areas and shipping routes. *To capitalize on this energy source, international collaboration is necessary*."[18] In the end, energy offers just one central justification to consider the prospect of 'pan-Atlantic' transnational cooperation.

As it is, therefore, the Atlantic Basin increasingly dominates the global 'energy seascape,' accounting for about two-thirds of all global maritime energy stocks and flows. Because of the Atlantic Basin's outsized role in the 'global energy seascape,' in the short- and medium run much of the world's sea, ground and air transportation (which rely nearly completely on oil and gas) will depend directly upon – more than any other strategic region or realm -- the efficiency, productivity and security of the Atlantic 'energy seascape' – and, increasingly into the future, the Southern Atlantic 'seascape.'

The rise of the 'global seascape' – along with its multidimensional coalescence into distinct (but related and interlocking) 'ocean basins' -- is the most central, dimension-deepening and space-sculpting dynamic on the emerging geopolitical and global energy flow maps to be revealed by our nascent 'Atlantic Basin projection.' This centrality on the global energy flow map also makes the Atlantic Basin and its 'seascape' the key regional pivot for defining and seizing the challenges and opportunities presented by global energy, climate change and transnational governance.

With the continued development of satellite, communications, information, computing and a new wide range of 'marine' technologies, the ocean basins and their 'seascapes' are now emerging into technical -- and even public – consciousness. A conscious 'energy, geopolitical and governance' mapping of the 'seascapes' of the world's ocean basins would go a long way toward transforming the dominant but obsolete 'Traditional-Cold War' geopolitical and global energy flow maps into a more multi-dimensional, fully-rendered 'ocean basin projection.' While the physical, geographic, ecological 'mapping' effort has already been underway for a generation, propelled into a much more rapid dynamic by recent breakthroughs in marine and information technologies, the geo-economic, geopolitical and governance 'mapping' task has only begun.

[18] Both for IEA quotes on ocean energy, see: http://www.iea.org/techinitiatives/renewableenergy/ocean/

Nevertheless, there are already broad ocean basin approaches emerging now in the form of a number of nascent attempts in the Atlantic, the Arctic, the Pacific and the Indian Ocean Basins to theorize and articulate a new kind of regionalism – relevant for scientific, social and geopolitical analysis, and for transnational collaboration and governance -- framed around the particular ocean-basin in question. The APEC and TTP in the Pacific Basin and the Indian Ocean Regional Association (IOR-ARC) in the Indian have prefigured the recent emergence of the Arctic Council and an 'Atlantic Basin Initiative'. While the latter remains a private, civil society initiative, it does engage and catalyze broader public/state participation. The recent appearance of the 'Atlantic Basin Initiative' now means that there are significant movements afoot in all the world's ocean basins that frame each basin themselves as relevant units of analysis and as increasingly 'mutually-interested' communities for transnational collaboration across sectors.

3.6 The Future of 'intra-Atlantic' Energy Flows and 'Pan-Atlantic' Energy Cooperation

One final dynamic – the evolution of 'intra-Atlantic' energy trade -- is intimately linked with the rise of the global seascape and interacts with the other shifting trends mentioned above that are transforming the 'Traditional-Cold War' global energy flow map. Although the Atlantic Basin was once highly energy dependent on the 'extra-Atlantic' – and in particular on the Middle East -- the international energy trade and investment patterns of Atlantic countries have become, since the 'oil shocks' of the 1970s, overwhelmingly 'intra-basin.' Of the total collective energy exports from the countries of the Atlantic Basin, nearly 90% have as their destination another 'Atlantic Basin' country, while two-thirds of the collective energy imports of Atlantic countries is sourced from within the basin. (UNCOMTRADE, 2014)

For four decades, beginning with the OPEC oil crisis of 1973-74, most Atlantic countries of engaged in a strategic effort to diversify their pronounced levels of energy import dependency away from Eurasia (in general, and the Middle East, in particular) – and toward growing alternative sources in the Atlantic Basin. However, while the objective of this effort has now palpably materialized on the strategic horizon for North America (in the form of the 'shale revolution' of the US and the 'oil sands' boom in Canada) and even for much of the Southern Atlantic (in the form of biofuels, renewable energy and the 'offshore revolution'), Europe remains strongly tied to the 'land-based' energy corridors of Eurasia – as opposed to the 'seascape' of a nascent 'Atlantic Basin energy system.' Furthermore, Europe's extra-Atlantic dependency on the 'energy landscape' of its terrestrial frontier with the old Eurasian 'heartland' has recently deepened still further, even despite the troubled (or at least confused) relationship with Russia and the ongoing – and heightening -- instability in the Middle East.

Furthermore, over the course of the last decade, as the 'unipolar moment' gave way to a new historical present (which some have called a 'zero polar moment'), renewed global 'south-south' gravities -- not felt in such force since the 1970s -- have coalesced across the Southern Atlantic, injecting centrifugal forces within the Atlantic energy space. The result has been a recent 'extra-Atlantic' erosion of intra-basin energy linkages, particularly with regard to energy exports and imports.

However, this recent south-south dispersal of certain Atlantic energy dynamics into the extra-Atlantic should not yet be regarded as the permanent reversal of a decades-long deepening 'intra-Atlantic' trend. These 'extra-Atlantic' tendencies have been driven mainly by 'transitory adjustments', including a sudden, rapid and unexpected reduction in US demand for Southern Atlantic oil (as US shale oil production grows and US

import demand falls) and by increasing Asia-Pacific energy demand and Asia 'oil diplomacy' in the Southern Atlantic (often within the geopolitical context of an emerging Global South consciousness). But these centrifugal tendencies could be constructively transformed and rechanneled by pan-Atlantic energy cooperation. As Atlantic Basin energy investment, resources and production continue to expand faster than Atlantic demand, the basin's remaining pockets of extra-Atlantic dependencies will have to opportunity to either attempt to reduce such dependencies directly, or nudge them toward new or deepening 'intra-Atlantic' energy relationships.

These two counterpoised 'flow circuits' – 'intra-Atlantic' versus 'extra-Atlantic' energy trade flows – represent important poles of possibility and incentive for deepening pan-Atlantic energy cooperation upon the coalescing foundations of a nascent Atlantic Basin energy system. Indeed, the energy renaissance currently unfolding across the Atlantic Basin -- along with the new 'global energy flow map' it is now helping to shape -- holds out the promise of facilitating a new experimental form of 'transnational energy cooperation' which might serve as the foundation for a 'second best' Atlantic Basin alternative to a now long foundering, or at least elusive, international attempt at 'global governance' – and as a model for other experiments in 'second best' transnational governance in the realm of energy, or beyond.

Even with the recent loss of intra-Atlantic energy trade to Southern Atlantic exports to Asia-Pacific, the Atlantic Basin energy space is still especially propitious for transnational energy cooperation. Given its concrete and specific 'Atlantic configuration,' more than any other region in the world the Atlantic Basin is something of a 'microcosm' of the energy world, reflecting in Atlantic form the dynamics of the global energy sector. In contrast to the 'Eurasian space' of the Energy Charter Treaty (ECT) – currently the world's only multilateral, rules-based energy governance regime – the Atlantic incorporates a relative balance between net importers and net exporters, between developed and developing/emerging countries, between international private oil and gas companies (IOCs) and state hydrocarbons firms, and between fossil fuel and low carbon industries.

The nascent Atlantic Basin energy system also includes countries that were once highly dependent on energy imports but which have recently transformed such energy dependence into net energy exporter status -- or are on that trajectory now (eg, Brazil and the US), along with others that have lost net exporter status (the UK), those moving in the same direction (Venezuela), and even others that still might recapture or rejuvenate such net exporter status, given sufficient policy reforms (Argentina, Mexico and Nigeria). This makes the Atlantic Basin a space of numerous different energy experiences, enriching the possibilities for cross-fertilization of 'best practices' and the interlocking of mutually beneficial commitments to transnational energy cooperation. In contrast, although the ECT process flourished in the 1990s – during the honeymoon glow of the Velvet Revolutions and the collapse of communism -- only to founder during the following decade as relations soured between the large majority of net-importing, consumer countries in Europe and Russia, by far the ECT's single largest producer, among only a handful from the ex-Soviet Union.

Furthermore, it is in the Atlantic Basin where the competitive and often adversarial relations between the 'traditional' energy world -- rooted in fossil fuels and the energy policy and business models created around them -- and the 'emerging' world of renewable energies and other new low-carbon technologies -- typically compatible with more flexible and decentralized policy models – face the best prospects of being practically resolved – in legislatures, in regulatory bodies and on the ground. At stake in a potential pan-Atlantic energy cooperation initiative could be a future of competition, or of cooperation, between the fossil fuel industries and those of the emerging low carbon world.

The 'Luanda Declaration' of the Eminent Leaders Group of the Atlantic Basin Initiative (June 2013) has already called for transnational energy cooperation in the Atlantic Basin and the adoption of an Atlantic Charter for Sustainable Energy. The Atlantic Basin Initiative has responded by convoking the first meeting (in Cancun, Mexico in November 2014) of a newly forming *Atlantic Energy Forum* (AEF).

4. Tentative Conclusions and Other Provisional Reflections

Perhaps against pre-conceived expectations, an 'Atlantic Basin projection' of the emerging global energy flow map presents us with a very different view of the strategic horizon than that to which we have long become accustomed. *Energy, along with its drivers and implications, is not necessarily a source of strategic Atlantic vulnerability – as many of us have always assumed -- but rather one of potential resilience, integrative unity and strength, and transnational governance possibilities*.

The standard, optimistic 'North American' depiction of the 'national' US energy resurgence captures only a fraction of the strategic potential of the 'Atlantic energy renaissance.' At the basin level, *the energy realm now offers Atlantic actors a potential margin of strategic flexibility*. However, much of the potential benefit of such enhanced Atlantic strategic flexibility would be, by its very nature, 'collective' and, as such, dependent on the binding dynamics of effective, pan-Atlantic energy cooperation.

Projecting the global energy flow map through the Atlantic Basin framing ultimately suggests, however, that if Atlantic Basin countries were to engage in pan-Atlantic, transnational energy cooperation they might capitalize on the geopolitical and/or governance opportunities of the Atlantic energy renaissance. Pan-Atlantic energy cooperation, however, will not necessarily resolve the central 'paradox' of the Atlantic energy renaissance, given the dominance of Atlantic fossil fuels -- although it could contribute to the transformation of this potentially chronic contradiction at its heart into a new strategic horizon of possibilities for transnational governance.

The opportunity to free Atlantic actors of the geopolitical limitations, real or perceived, of external energy dependence on the Middle East and other parts of the Great Crescent is what now appears of the strategic horizon of Atlantic energy. Or, at least, it is this 'opportunity' which appears on what is now *an increasingly illusory strategic horizon*, particularly when its potentials and risks are viewed, as they so often are, in isolation from the 'carbon constraint.' Many recent strategic evaluations of the economic and geopolitical implications of the 'revolution' in US shale oil and gas do not even mention climate change (or do so only in an obligatory passing), let alone refer to the 'carbon budget constraint'.[19] Yet, certainly any future geopolitical scenario must consider the implications of this constraint.

The potential strategic value of an ongoing Atlantic hydrocarbons boom, including the possibility of becoming the energy supplier at the margin to Asia-Pacific, is at least somewhat muted by the economic and political discount that must be applied to the

[19] See, for example, CNAS 2014, and CSIS 2014. In the US, however, the absence of the climate change angle from discussions of the 'shale revolution' could be the product of consensus attempts to avoid the ideological and political division that has developed over the 'validity' of the current international consensus on climate change science, so as to feasibly produce strategic analysis and recommendations within a 'bipartisan' context for highly 'partisan' audiences.

production and consumption of carbon-intensive fossil fuels, particularly as the fossil fuel 'carbon constraint' -- at least in its 'physical,' if not its 'economic' or 'regulatory' form -- continues to tighten. So while an energy vise no longer faces the Atlantic Basin along the strategic horizon, a climate vise still does. Indeed, a disturbing paradox resides at the motivating heart of the Atlantic 'hydrocarbons revolutions' -- *the Atlantic Basin's future may become more and more awash in seaborne fossil fuels, but it will be awash with oil, gas and coal that it cannot, should not, dare not burn* -- or sell to others in Asia-Pacific who will.

If the ongoing shifts in the global geopolitical and energy flow maps do not sufficiently integrate the budding, but imperiled, 'low carbon revolution,' future global scenarios will become increasingly volatile and unpredictable as a result of the distorting and complicating feedback mechanisms – ecological, economic, geopolitical – produced by fossil fuel induced climate change. This potential vulnerability will be acute even for those for countries that project large increases in oil and gas production (and income) in the future, particularly if they have NOCs that are, or can be, used 'strategically' -- or at least with some autonomy from immediate 'market pressures' (a perceived margin of strategic flexibility that often boomerangs in the form of the 'oil curse.' *Countries that continue to entertain potential strategic horizons that are only consistent – or realizable -- with both significant increases in hydrocarbons production and a sudden absence of further climate change are likely to have a higher chance of unexpected encounters with 'negative Black Swans.'* Most Atlantic Basin hydrocarbons producers could easily fall into either of these categories.

At this stage, the 'Atlantic Basin projection' is nothing more than an attempt to nudge our currently reigning geopolitical and energy maps away from their 'national,' 'continental' and 'land' biases, and towards a more universally-applicable and more fully-fledged 'ocean basin projection' of our global maps. Yet, in the end, even this partial, 'modified' projection of our dominant global maps problematizes not only the notion of the 'Asian century' and the foreign policy formulations of the 'pivot', but also the strategic horizon of the very industry – hydrocarbons -- upon which rests the currently emerging global energy flow map.

The 'Atlantic Basin projection' also problematizes the widespread idea that 'governance' must now always be 'global,' if not also immediate in its effective manifestations, if it is to be successful – at least for a whole host of issues that are now considered by the 'global' consensus to be 'global' (energy and the environment being two relevant cases in point). In order for the Atlantic energy renaissance to be sustainable in its effective contribution to global energy, climate, development and governance goals, pan-Atlantic energy cooperation will likely be required. Atlantic Basin efforts to build effective transnational cooperation and governance frameworks – or even to create an 'Atlantic Community' – are therefore justified, and to be welcomed by all, even in the supposed age of 'globalization' and even in a supposedly 'Pacific Century.'

Acknowledging the *full 'pan-Atlantic' nature and potential* of the current energy resurgence in the Atlantic space, however, makes it very clear that the Atlantic Basin is contributing to significant changes in the global energy flow map – and to the global geopolitical map which overlays it. Now that such shifts can be identified and increasingly delineated through the new 'Atlantic Basin projection' of the world's energy and geopolitical mappings, a subsequent re-weighting of the crucial energy variables within strategic calculations becomes essential.

The Atlantic energy renaissance now demands a constructive reappraisal of the various energy and foreign policy patterns that -- while remaining rooted in the increasingly obsolete global energy map of the past -- have provided the impetus for many of our recent and often costly 'strategic navigations' of the globe – the many opportunity costs of which have included insufficient public and private support for low carbon energy -- particularly relative to currently high levels of public and private support for fossil fuels -- and potentially even the world's '2-degree guardrail.'

For Europeans looking to diversify their external energy dependence away from the 'Great Crescent'; for Africans looking to square the potential hydrocarbon bonanza with the imperative for 'sustainable low emissions energy access for all'; and for Americans, north and south, looking for new forms of transnational energy cooperation to overcome the diminishing marginal returns of traditional formulas – indeed, for all 'Atlantics' -- the pan-Atlantic energy renaissance and the Atlantic Basin energy space now beckon. And for anyone seeking a strategic framing capable of superseding the mental maps of the past, the 'Atlantic Basin projection' offers this possibility, opening as it does the way forward to an entirely new 'ocean basin projection' of our global geopolitical and energy maps.

Perhaps we will never be 'all Atlantics now' – to 'defamiliarize' the old chiche yet again – but more and more of us are.

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